MEMO

Section	Parts to tightened	Tightening torque
Frame	Front wheel shaft and nut	7.00～10.00 kg-m
	Front fender and fender stay (F) (R)	0.60～0.95 kg-m
	Fender stay (F) (R) and front fork	0.60～0.95 kg-m
	Front fender center stay and front fork	0.80～1.25 kg-m
	Handle crown and inner tube	0.80～1.25 kg-m
	Handle crown and steering shaft	0.80～1.25 kg-m
	Handle crown and steering shaft	4.20～6.50 kg-m
	Handle crown and handle upper holder	1.80～2.50 kg-m
	Front flasher and headlight	0.80～1.25 kg-m
	Master cylinder and brake hose 1	1.50～2.00 kg-m
	Brake hose 1 and brake pipe 3	1.30～1.80 kg-m
	Brake pipe 3 and joint	1.30～1.80 kg-m
	Brake hose 2 and joint	1.50～2.00 kg-m
	Brake hose 2 and brake pipe 1	1.30～1.80 kg-m
	Brake pipe 1 and caliper	1.30～1.80 kg-m
	Caliper (L) and caliper (R)	7.50～9.50 kg-m
	Caliper (L) and caliper breed screw	0.60～0.90 kg-m
	Caliper (R) and front fork outer tube	4.00～5.00 kg-m
	Disc to disc bracket	0.80～1.00 kg-m
	Disc bracket and hub	1.70～2.20 kg-m
	Stop switch and joint	1.50～2.00 kg-m
	Engine mounting nut	2.70～3.40 kg-m
	"	2.70～3.40 kg-m
	"	2.70～3.40 kg-m
	"	5.00～7.00 kg-m
	Engine front bracket and frame	1.40～2.20 kg-m
	Engine rear bracket and frame	1.40～2.20 kg-m
	Oil tank and oil hose	6.00～9.00 kg-m
	Battery box stay to frame	0.80～1.25 kg-m
	Pivot shaft and frame	5.00～8.00 kg-m
	Rear wheel shaft and rear arm	12.00～18.00 kg-m
	Rear fender and frame	0.80～1.25 kg-m
	Tension bar and brake plate	1.40～2.20 kg-m
	Tension bar and rear arm	1.40～2.20 kg-m
	Muffler and frame	4.00～7.50 kg-m
	Exhaust pipe and frame	1.60～2.60 kg-m
	Handle crown and meter bracket	1.40～2.20 kg-m
	Neutral switch and engine	1.00～1.50 kg-m
	Meter bracket and meter cover	0.20～0.30 kg-m
	Rear arm and rear end arm	0.80～1.25 kg-m
	Rear stay and frame	0.80～1.25 kg-m
	Rear flasher light and stay	0.80～1.25 kg-m
	Cramp coupler and frame	0.20～0.30 kg-m
	Axle holder and front fork	0.80～1.25 kg-m
	Oil tank and frame	0.75～1.20 kg-m
	Battery box and frame	0.75～1.20 kg-m
	Battery box stay and battery box	1.10～1.80 kg-m
	Frame and rear cushion	2.30～3.70 kg-m
	Frame and rear cushion	3.00～4.80 kg-m

Tightening Torque for Engine and Frame Parts

Section	Part to tightened	Tightening Torque
Engine	Sutd bolts, crankcase stud bolts	M8-P1.25 (1.5～2.0 kg-m) M10-P1.25 (2.0～2.5 kg-m)
	Cap connecting clamp bolts	3.5～4.0 kg-m
	Upper and lower crankcase clamp bolts	M8- (2.0～2.2 kg-m) M10 (3.7～4.0 kg-m)
	Oil filter	2.0～2.3 kg-m
	Warning switch	2.0～2.3 kg-m
	Electric motor mounting bolts	2.0～2.3 kg-m
	Stop valve mounting bolts	4.0～4.5 kg-m
	Relief valve mounting bolts	4.0～4.5 kg-m
	Straigher cover mounting bolts	With hexagon hole 0.8～1.0 kg-m
	Drain plugs	4.0～4.5 kg-m
	Crankcase cover (L) mounting bolts	With hexagon hole 0.8～1.0 kg-m
	Rotor and crankshaft mounting bolts	3.7～4.0 kg-m
	Generator cover mounting bolts	With hexagon hole 0.8～1.0 kg-m
	Cylinder holding bolts (stud)	M10-P1.25 (2.0～2.5 kg-m)
	Cylinder holding bolts	M8-P1.25 (2.0～2.3 kg-m)
	Bracket and cam shaft	M10-P1.25 (3.7～4.0 kg-m)
		On exhaust valve side
		M6-P1.0 (0.8～1.0 kg-m)
		M8-P1.25 (2.0～2.3 kg-m)
	Rocker arm, valve lock nuts	M8-P1.0 (2.5～2.8 kg-m)
	Delivery pipe banjo bolt	2.0 ～1.3 kg-m
	Cylinder head cover holding bolts	With hexagon hole 0.8～1.0 kg-m
	Tachometer gear set screws	M6-P1.0 (0.8～1.0 kg-m)
	Tappet cover holding screws	2.0～2.3 kg-m

CONVERSION TABLE

LENGTHS

Multiply	By	To Obtain	Multiply	By	To Obtain
Millimeters (mm)	0.03937	Inches	Kilometers (km)	0.6214	Miles
Inches (in)	25.4	Millimeters	Miles (mi)	1.609	Kilometers
Centimeters (cm)	0.3937	Inches	Meters (m)	3.281	Feet
Inches (in)	2.54	Centimeters	Feet (ft)	0.3048	Meters

WEIGHTS

Kilograms (kg)	2.205	Pounds	Grams (g)	0.03527	Ounces
Pounds	0.4536	Kilograms	Ounces (oz)	28.25	Grams

VOLUMES

Cubic centimeters (cc)	0.06102	Cubic inches	Imperial gallons	277.274	cu.in.
Cubic inches (cu.in.)	16.387	cc.	Liters (l)	1.057	Quarts
Liters (l)	0.264	Gallons	Quarts (qt)	0.946	Liters
Gallons (gal)	3.785	Liters	Cubic centimeters (cc)	0.0339	Fluid ounces
U.S. gallons	1.2	Imperial gals.	Fluid ounces (fl.oz)	29.57	cc.
Imperial gallons	4.537	Liters			

OTHERS

Metric horsepower (qs)	1.014	bhp	Foot-pounds (ft-lbs)	0.1383	kg-m
Brake horsepower (bhp)	0.9859	ps.	Kilometers per liter (km/l)	2.352	mph
Kilogram-meter (kg-m)	7.234	Foo-pounds	Miles per galton (mpg)	0.4252	km/l
Kilograms/sq.cm (kg/cm)	14.22	Pounds/sq.in. (Lbs/in^2 or psi)			
Centigrade (C°)	(C° x 9/5) + 32	Fahrenheit (F°)			

TORQUE SPECIFICATIONS

Stud size	kg-m	In -lbs*
6 mm	1.0	90
7	1.5	135
8	2.0	180
10	3.2–4.0	300–350
12	4.0–4.6	350–400
14	4.6–5.2	400–450
17	5.87–7.0	500–600

*Ft-lbs=In-lbs divided by 12

Millimeters to Inches

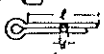
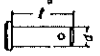
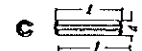
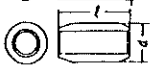
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0		0.0039	0.0079	0.0018	0.0157	0.0197	0.0236	0.0276	0.0315	0.0354
1	0.0394	0.0433	0.0472	0.0512	0.0551	0.0591	0.0630	0.0669	0.7099	0.0748
2	0.0787	0.0827	0.0866	0.0906	0.0945	0.0984	0.1024	0.1063	0.1102	0.1142
3	0.1181	0.1200	0.1260	0.1299	0.1339	0.1378	0.1417	0.1457	0.1496	0.1535
4	0.1575	0.1614	0.1654	0.1693	0.1732	0.1772	0.1811	0.1850	0.1890	0.1929
5	0.1969	0.2000	0.2047	0.2087	0.2126	0.2165	0.2205	0.2244	0.2283	0.2323
6	0.2362	0.2402	0.2441	0.2480	0.2520	0.2559	0.2598	0.2638	0.2677	0.2717
7	0.2756	0.2795	0.2835	0.2874	0.2913	0.2953	0.2992	0.3031	0.3071	0.3110
8	0.3150	0.3189	0.3228	0.3268	0.3307	0.3346	0.3386	0.3425	0.3465	0.3504
9	0.3542	0.3583	0.4016	0.3661	0.3701	0.3740	0.3780	0.3819	0.3858	0.3898
10	0.3937	0.3976	0.4016	0.4055	0.4094	0.4134	0.4173	0.4213	0.4252	0.4291

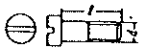
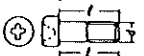
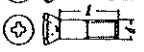
0.01mm=0.004 0.03mm=0.0012 0.05mm=0.0020 0.07mm=0.0028 0.09mm=0.0035
0.02mm=0.008 0.04mm=0.0016 0.06mm=0.0024 0.08mm=0.0031 0.10mm=0.0039

Inches to Millimeters

	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0		0.254	0.508	0.762	1.016	1.270	1.524	1.778	2.032	2.286
0.1	2.540	2.794	3.048	3.302	3.556	3.810	4.064	4.318	4.572	4.826
0.2	5.080	5.334	5.588	5.842	6.096	6.350	6.604	6.858	7.112	7.366
0.3	7.620	7.874	8.128	8.382	8.636	8.890	9.144	9.398	9.652	9.906
0.4	10.160	10.414	10.668	10.922	11.176	11.430	11.684	11.938	12.192	12.446
0.5	12.700	12.954	13.208	13.462	13.716	13.970	14.224	14.478	14.732	14.986
0.6	15.240	15.494	15.748	16.002	16.256	16.510	16.764	17.018	17.272	17.526
0.7	17.780	18.034	18.288	18.542	18.796	19.050	19.304	19.558	19.812	20.066
0.8	20.320	20.574	20.828	21.082	21.336	21.590	21.844	22.098	22.352	22.606
0.9	22.860	23.114	23.368	23.622	23.876	24.130	24.384	24.638	24.892	25.146
1.0	25.400	25.654	25.908	26.162	26.416	26.670	26.924	27.178	27.432	27.686

0.001"=0.0254mm 0.003"=0.0762mm 0.005"=0.1270mm 0.007"=0.1778mm 0.009"=0.2286mm
0.002"=0.0508mm 0.004"=0.1016mm 0.006"=0.1524mm 0.008"=0.2032mm 0.010"=0.254mm

Kind	Parts	Shape
11	Bolt	
12	Bolt	
13	Bolt	
14	Pin, cotter	
15	Pin, clevis	
16	Pin, spring	
18	Pin, dowel	

Kind	Parts	Shape
21	Screw, oval head	
22	Screw, flat head	
23	Screw, cylinder head	
24	Screw, crown head	
25	Screw, pan head	
26	Screw, oval head	
27	Screw, flat head	

2B) NUT AND WASHER

(9 0 0 0 0 - 0 0 0 0 0)

- 1st 0: Kind
- 2nd 0: Material and heat treatment
- 3rd 0: Surface treatment
- 4th 0: Normal diameter (d)
- 5th 0: Classification
- N/A

Kind	Class	Parts	Shape
28	1	Nut	
28	2	Nut	
28	3	Nut	
28	5	Nut, slotted	
28	7	Nut, crown	

Kind	Class	Parts	Shape
29	1	Washer, spring	
29	2	Washer, plain	
29	3	Washer, tooth	
29	4	Washer, tooth	

2C) OTHERS

(9 0 0 0 0 - 0 0 0 0 0)

Oil seal	93100-00000	Tire	94100-00000
"O" ring	93200-00000	Tube	94200-00000
Bearing	93300-00000	Band, rim	94300-00000
Circlip	93400-00000	Rim	94400-00000
Ball	93500-00000	Chain	94500-00000
Pin, dowel B	93600-00000	Joint, chain	94600-00000
Grease nipple	93700-00000	Spark plug	94700-00000

In addition to the "10 digits" that we have mentioned above, we have 2 more digits that must be included in the part number whenever there is a COLOR part involved. The IBM COLOR CHART consists of the following numbers:

000-00000-00-	22	Candy Red	000-00000-00-	24	Ligit Vermilion (Red)
000-00000-00-	25	Yamaha Yellow	000-00000-00-	33	Deep Black
000-00000-00-	34	Super Black	000-00000-00-	35	Silver
000-00000-00-	44	Candy Blue (new)	000-00000-00-	81	Primer

PLEASE do not fail to include this color number when ordering painted parts.

EXAMPLES: (FRAME SECTION)

000-2	22	10-00	Rear Cushion	(22)	Identifies the Rear Fender area.
000-2	31	36-00	Outer tube R	(31)	Identifies the Front Fork area.
000-2	41	71-00	Knee grip L	(41)	Identifies the Tank/Seat area.
000-2	53	86-00	Collar, sprocket shaft	(53)	Identifies the Rear Wheel area.

EXAMPLES: (ELECTRIC/WIRING SECTION)

Any part number that you find within the "five-digit" section which starts with the number 8 is a component of the ELECTRIC/WIRING section, ie.:

000-	8	1910-20	Regualtor
000-	8	2510-10	Main switch assembly
000-	8	2590-10	Wire harness assembly
000-	8	2116-00	Lead wire (–)
000-	8	2540-00	Neutral switch assembly

The FOURTH and FIFTH digits ARE the ACTUAL PART NUMBER'

000-141	01	-00	Carburetor (L)	(01)	Identifies the Carburetor (L)
000-141	02	-00	Carburetor (R)	(02)	Identifies the Carburetor (R)
000-113	11	-01	Cylinder (L)	(11)	Identifies the Cylinder (L)
000-113	21	-01	Cylinder (R)	(21)	Identifies the Cylinder (R)
000-241	71	-00	Knee grip (L)	(71)	Identifies the Knee Grip (L)
000-241	72	-00	Knee grip (R)	(72)	Identifies the Knee Grip (R)

C. The last TWO DIGITS 9th & 10th in the "10 Digit" series, advises you of any changes, corrections or modifications to the original parts.

EXAMPLES: (YCS1) 174-18511- 00 Fork, shift (1) – This gear was modified for better performance and therefore the number was changed to read:

174-18511- 01

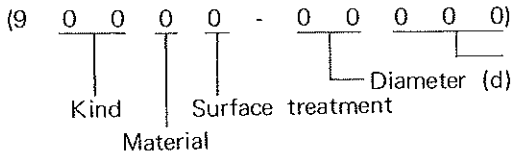
If we get a further modification of this part, and we hope not, the number will then read.

174-18511-02 or 03

2. INTERCHANGEABLE PARTS:
These "10 digits" are divided into 2 sections of "5 digits" each.
These series ALWAYS start with the number "9" followed by Nos. 1, 2, 3 or 4, plus 8 more numbers.

91000-00000 number is used for Bolts, Cotter-Pins, etc.
92000-00000 number is used for Screws, Nuts, etc.
93000-00000 number is used for Oil-Seals, O-Rings, Bearings, etc.
94000-00000 number is used for Tires, Rims, Spark Plug, etc.

2A) BOLT, PIN AND SCREW



7. IBM PARTS ORDER SYSTEM

In order to help our dealers to understand how our IBM system works, we are providing these hints.

1. Basic composition: 000-00000-00 (for standard parts)
2. Basic composition: 00000-00000 (for interchangeable parts)

1. STANDARD PART: These 10 digs are divided in three (3) sections: a-b-c

A. These first three digits represent the original model in which this part was used.

164	-00000-00)	Identifies the YL2/YL2C model (100cc.)
165	-00000-00)	
166	-00000-00)	
167	-00000-00)	
168	-00000-00)	Identifies the YR1 model (350cc).
169	-00000-00)	Identifies the YDS5E model (250cc).
170	-00000-00)	
171	-00000-00)	Identifies the YM2C model (350cc).
172	-00000-00)	
173	-00000-00)	Identifies the YCS1E model (180cc).
174	-00000-00)	
177	-00000-00)	Identifies the TD1C model (250cc Road Racer)

You will also find that some of these "three-digit" numbers will interchange with, or are used for other models. In addition to the various "three digits" that we mentioned above and which are assigned originally for those models, we also have quite a few "three digit" models that are not sold in the U.S.A.

B. The next FIVE DIGITS represent the Section and Actual Part No.
The FIRST DIGIT of this "five digit section" represent the section of the m/c to which the part belongs. i.e.

000-	1	0000-	00	(1)	represents the ENGINE section
000-	2	0000-	00	(2)	represents the FRAME section
000-	8	0000-	00	(3)	represents the ELECTRIC or wiring section

The SECOND & THIRD digits represent the location of the part within the sections. (Engine-Frame-Electric).

EXAMPLES: (engine SECTION)

000-1	13	11-00	Cylinder	(13) Identifies the Crankcase area.
000-1	16	01-00	Ring set Std.	(14) Identifies the Piston area.
000-1	74	01-00	Main Axle ass'y	(74) Identifies the Transmission area.
000-1	41	01-00	Carburetor ass'y (L)	(41) Identifies the Carburetor area.

3. Oil System

Possible Cause	Inspection and Repair
1. Oil level too low.	Check and refill.
2. Oil too thin.	Improper weight or too contaminated:change oil.
3. Oil pump defective.	Loosen oil delivery line to head and check for oil flow.
4. Oil passage plugged.	Disassembly engine pour solvent or direct air through oil passages.

4. Too Much Blue Exhaust Smoke

Possible Cause	Inspection and Repair
1. Too much engine oil.	Check oil level and drain some if necessary.
2. Breather plugged up.	Check and clean if necessary.
3. Cylinder and/or piston rings worn.	Make necessary measurements and replace as necessary.
4. Worn or cracked valve guide.	Make necessary measurements and replace as necessary.
5. Cracked valve guide seals.	Make necessary inspection and replace as necessary.

2. Fuel System

Possible Cause	Inspection and Repair
1. Butterfly valve not opening completely or in synchronization.	Make corrective adjustment.
2. Dirty air filter element.	Clean with high pressure air.
3. Carburetor float level incorrect.	Measure and change if required.
4. Incorrect main jet size.	Remove jet and check stamped size.
5. Incorrect jet needle clip location.	Check position of clip in needle.
6. Cracked and leaking vacuum diaphragm.	Remove air cleaner and observe vacuum piston operation while running engine.
7. Carburetor not level.	Level carburetors.
8. Choke half on.	Check chokes.

3. Compression System

Possible Cause	Inspection and Repair
1. Weak or broken valve spring.	Make valve spring tests, replace if weak.
2. Valve timing (camshaft) incorrect.	Check cam chain tension.
3. Broken piston rings.	Compression abnormal. Replace.

D. Engine overheating

1. Ignition

Possible Cause	Inspection and Repair
1. Ignition timing too advanced or retarded.	Check timing.
2. Malfunctioning governor.	Check action of governor rod and pivot weights.
3. Too hot spark plug heat range.	Check heat range.

2. Fuel System

Possible Cause	Inspection and Repair
1. Too lean air-fuel mixture.	Any jet plugged or too small. Air leak in carburetion intake system.
2. Bad gasoline.	Listen for detonation: check for unusual deposits on spark plug.

B. Poor idle and/or low speed performance

1. Ignition System

Possible Cause	Inspection and Repair
1. Spark plug fouled or incorrect gap.	Clean and gap, or replace if necessary.
2. Contact points bad.	Clean and gap, or replace if necessary.
3. Incorrect ignition timing.	Reset timing.
4. Weak spark.	Check ignition coil and condenser.
5. Partially discharged or defective battery.	Weak horn and lights-check fluid level; recharge;

2. Fuel System

Possible Cause	Inspection and Repair
1. Tank cap vent plugged.	Clean or repair as necessary.
2. Fuel petcock plugged.	
3. Carburetor slow speed system inoperative.	
4. Pilot screw out of adjustment or plugged.	
5. Carburetor float level incorrect.	
6. Starter levers on.	
7. Air leak.	Manifold equalizer tube cracked, or rubber carburetor manifold cracked.
8. Carburetor not level.	
9. Equalizer tube has hole or loose connection.	

3. Compression System

Possible Cause	Inspection and Repair
1. Incorrect tappet clearance.	
2. Valve timing (camshaft) incorrect.	
3. Valve seat leakage.	
4. Valve guide worn.	

C. Poor mid-range and high speed performance

1. Ignition System

Possible Cause	Inspection and Repair
1. Spark plug incorrect	Clean and gap to 0.5~0.6mm or change plug if necessary.
2. Advance (or spring) defective.	Advance not able to turn, governor weight not pivoting Check for correct "retard" to 'full' advance" position.
3. Ignition timing off	
4. Points set too close	Re-gap to 0.3~0.4 mm

6. TROUBLE SHOOTING

A. No start or difficult to start

1. Ignition System

Possible Causes	Inspection and Repair
1. Carbon-fouled or worn out spark plug.	Clean or replace plug. Gap to 0.5 ~ 0.6 mm
2. Gap incorrect or bridged.	
3. Contact breaker point burned up or won out.	Clean or change points.
4. Point gap incorrect.	Set point gap (0.3 ~ 0.4 mm)
5. Ignition timing out of adjustment.	Set ignition timing.
6. Ignition coil failed.	Use electro-tester to measure primary and secondary winding resistance. Also make a standard coil test.
7. Condenser shorted out.	Use electro-tester to check capacity and insulation.
8. Brown or red ignition wires broken or shorted.	Turn on main switch. Hit horn and stoplight. No operation means possible broken wire.
9. Main switch no good.	Check main switch.
10. Blown fuse.	Replace.
11. Battery discharged or defective.	Check specific gravity of each cell with hydrometer.

2. Fuel System

Possible Causes	Inspection and Repair
1. No gas.	Disconnect fuel line at carburetor; turn fuel petcock, on, check for fuel flow.
2. Tank cap vent hole plugged.	
3. Petcock defective.	
4. Fuel line plugged.	
5. Carburetor not level.	
6. Carb equalizer tube has hole or loose connection.	

3. Compression-Cylinder Compression Measure Shows Low Pressure

Possible Cause	Inspection and Repair
1. Lack of tappet clearance; valve held open.	Adjust tappet.
2. Valve timing incorrect.	Camshaft improperly installed or cam chain loose.
3. Cylinder head gasket broken.	Check for combustion gases blowing out past gasket.
4. Valve seat defective.	See Valve Seat Repair Section.
5. Piston rings(s) defective.	Too much smoke while riding motorcycle, Especially blue smoke indicating oil burning. See individual wear sections for inspection methods.
6. Cylinder tapered or out of round.	
7. Valve guide(s) worn out.	
8. Guide seals bad.	

Failure 2–6: The "TAIL LAMP" indicator does not light (with the stop switch OFF in this instance) though the stop lamp is lighting normally as a result of the broken tail lamp filament.

Does the rear lamp outage (GW) indicate 12V?

No → Faulty unit.

Yes → Breaking of filament in "TAIL LAMP" indicator or faulty grounding.

Failure 2–7: The tail lamp is lighting normally, while the stop lamp is also lighting (with the stop lamp switch OFF in this instance).

Does the stop lamp (Y) indicate 12V?

No (40 to 50% of normal voltage) → Faulty unit.

Yes → Faulty stop lamp switch.

Failure 2–8: The "TAIL LAMP" indicator does not light (with the tail switch OFF in this instance) even though the stop lamp is lighting.

Does the rear lamp outage (GW) indicate 12V?

No → Faulty unit.

Yes → Breaking of filament in "TAIL LAMP" indicator or faulty grounding.

Failure 2–9: The "TAIL LAMP" indicator lights (with the tail switch OFF in this instance) even though the stop lamp filament is broken.

Does the tail switch (BW) indicate 12V with the tail lamp unlighted?

No → Faulty unit.

Yes → Faulty tail switch.

Failure 2–10: The "TAIL LAMP" indicator does not light even though the filament of the tail and stop lamps are broken (with the switches both for the tail and stop lamps ON in this instance).

Does the rear lamp outage (GW) indicate 12V?

No → Faulty unit.

Yes → Breaking of filament in "TAIL LAMP" indicator or faulty grounding.

Failure 2–2: The high beam filament does not light even though the low beam filament is broken.

Is the high beam indicator lamp lighting normally?
- No → Does the resistor (YB) indicate 12V?
- Yes → Breaking of high beam filament or faulty grounding.

Does the resistor (YB) indicate 12V?
- No → Does the register (Y) indicate 12V:
- Yes → Breaking of high beam indicator lamp filament or faulty grounding.

Does the register (Y) indicate 12V:
- No → Is the "LAMP" indicator shining brightly?
- Yes → Faulty register assembly.

Is the "LAMP" indicator shining brightly?
- No → Does the head lamp switch (W) indicate 12V:
- Yes → Faulty dimmer switch.

Does the head lamp switch (W) indicate 12V:
- No → Faulty head lamp switch.
- Yes → Faulty unit, breaking of filament in "LAMP" indicator, or faulty grounding.

Failure 2–3: The "LAMP" indicator is not lighting although the low (high) beam filament is lighting normally as a result of the broken high (low) beam filament.

Does the head lamp outage (LG) indicate 12V?
- No → Faulty unit.
- Yes → Breaking of "LAMP" indicator filament or faulty grounding.

Failure 2–4: The low(high) beam filament is also lighting, while the high(low) beam is lighting.

Does the head lamp terminals (DRIVE terminals) indicate 12V when the dimmer switch is set to the low beam?
- 40 to 50% of normal voltage → Faulty unit
- Yes → Faulty dimmer switch.

Failure 2–5: The stop lamp does not light even when the tail lamp filament breaks (with the stop switch OFF in this instance).

Does the stop lamp (Y) indicate 12V?
- No → Does the stop switch (GY) indicate 12V?
- Yes → Breaking of stop lamp filament or faulty grounding.

Does the stop switch (GY) indicate 12V?
- No → Does the register (YR) indicate 12V?
- Yes → Faulty unit.

Does the register (YR) indicate 12V?
- No → Is the "TAIL LAMP" indicator lighting a little dimly.
- Yes → Faulty register assembly.

Is the "TAIL LAMP" indicator lighting a little dimly.
- No → Does the tail lamp switch (BW) indicate 12V.
- Yes → Faulty unit.

Does the tail lamp switch (BW) indicate 12V.
- No → Faulty tail lamp switch.
- Yes → Faulty unit, breaking of filament in "TAIL LAMP" indicators, or faulty grounding.

Checkout of Reserve Lighting Switch

A. Head Lamp Circuit

1. Turn Main Switch (keyswitch) to position II.
2. Push headlight on-off switch to ON (red dot) (R handle).
3. Place headlight high-low switch to high (H) (L handle).
   The blue high beam indicator lamp will come on (tachometer).
4. Remove head lamp unit from head lamp body.
5. Disconnect yellow wires (2) from yellow wire to head lamp socket (yellow is high beam filament). The high beam filament will go out and the low beam filament should come on. Also, the white "LAMP" indicator should come on. The high beam indicator (blue) in the tachometer will go out.
6. Reconnect the yellow wires (3). The low beam filament and "LAMP" (white) indicator will go out. The high beam filament and high beam indicator (blue) will come on.
7. Place headlight high-low switch to low (L) (L handle).
8. Disconnect green wire (low beam filament) from green wire going to head lamp socket. The low beam filament will go out and the high beam filament will come on with reduced brilliance (lower intensity than low beam). The white "LAMP" indicator should come on.
9. Reconnect green wires and replace head lamp unit in head lamp body.
10. Operate headlight high-low switch to ensure that headlight and high beam indicator (blue) are working in a normal manner.
11. Turn Main Switch and headlight on-off switch to off positions.

B. Stop Lamp and Tail Lamp Circuits

1. Turn Main Switch (keyswitch) to position II.
2. Push headlight on-off switch to ON (red dot) (R handle).
3. Apply front brake to check stop lamp operation. The red "TAIL LAMP" indicator (instrument cluster) should come on (very bright) each time either brake is applied.
4. Disconnect blue wire (tail lamp filament) at wire bundle under seat. The tail lamp filament will go out and the stop lamp should come on at about the same brilliance of the tail lamp filament. The red "TAIL LAMP" indicator (instrument cluster) will come on (very dim), indicating to rider that tail lamp is not on, but stop lamp is on continuously.
5. Apply front brake. The stop lamp and red "TAIL LAMP" indicator should increase in brilliance to normal intensity. Release front brake.
6. Reconnect blue wire (tail lamp filament). The tail lamp filament will come on and the red "TAIL LAMP" indicator will go out.
7. Disconnect yellow wire (stop lamp filament) at wire bundle under seat.
8. Apply front brake. Stop lamp will not come on. The red "TAIL LAMP" indicator will not come on, indicating to rider that stop lamp filament is not on.
9. Reconnect yellow wires under seat.
10. Operate brakes to ensure that both stop lamp and tail lamp are operating normally.
11. Turn Main Switch and headlight on-off switch to off positions.

Checking Switch in Faulty Function (Refer to the exterior wiring diagram.)

Failure 2–1: The low beam filament does not light even though the high beam filament is broken.

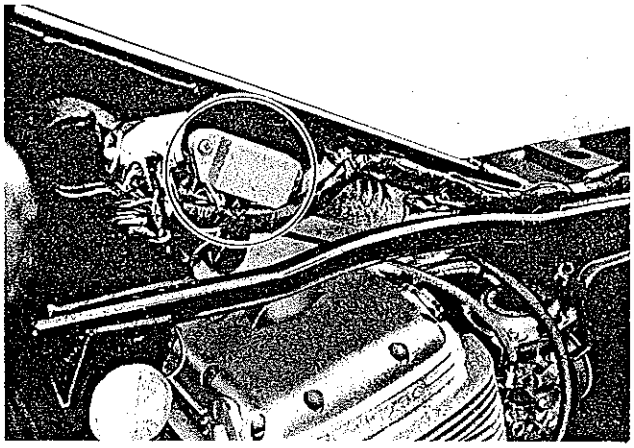
Do the head lamp terminals (PASS terminals) indicate 12V?
- No → Is the "LAMP" indicator shining brightly?
  - No → Does the head lamp switch (W) indicate 12V?
    - No → Faulty head lamp switch.
    - Yes → Faulty unit or breaking of filament in "LAMP" indicator.
  - Yes → Faulty dimmer switch.
- Yes → Breaking of low beam filament or faulty grounding.

Functions and Operation

The reserve lighting switch has the following three functions:

a. Automatic switch-over of headlight to the other beam when one beam gets faulty.
b. Automatically decreased lighting on the stop lamp in the event of tail lamp failure.
c. Warning of the rider of stop lamp malfunction.

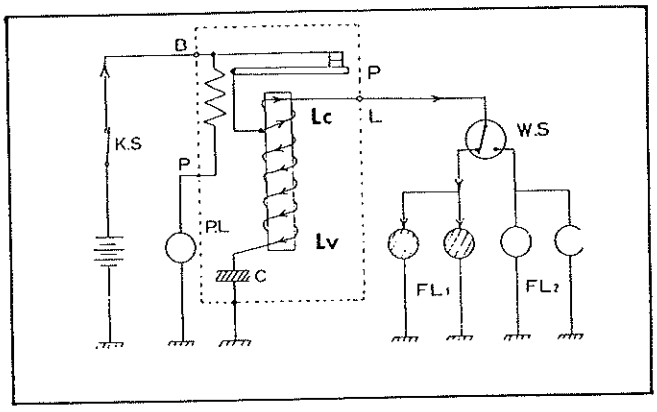
See table below for operating characteristics.



Reserve Lighting Switch Operation

	OPERATING CONDITION	INDICATOR	RESERVE LIGHTING FUNCTION
HEAD LAMP Low Beam:	Normal	None	None
	Faulty	"LAMP" (white)	High beam comes on at low brilliance
High Beam:	Normal	Blue lamp in tachometer	None
	Faulty	"LAMP" (white)	Low beam comes on
TAIL LAMP	Normal	None	None
	Faulty	"TAIL LAMP" (dim red)	Stop lamp comes on at low brilliance and stays on
STOP LAMP	Normal	"TAIL LAMP" (bright red)	None
	Faulty	None (absense of red "TAIL LAMP" denotes failure to rider)	None

As soon as the condenser becomes sufficiently discharged, magnetism ceases and the point spring pulls one point into the other. Voltage once again flows to the flasher lights, causing them to light. At the same time some voltage charges the condenser. The process continues to repeat itself until the switch is turned off.



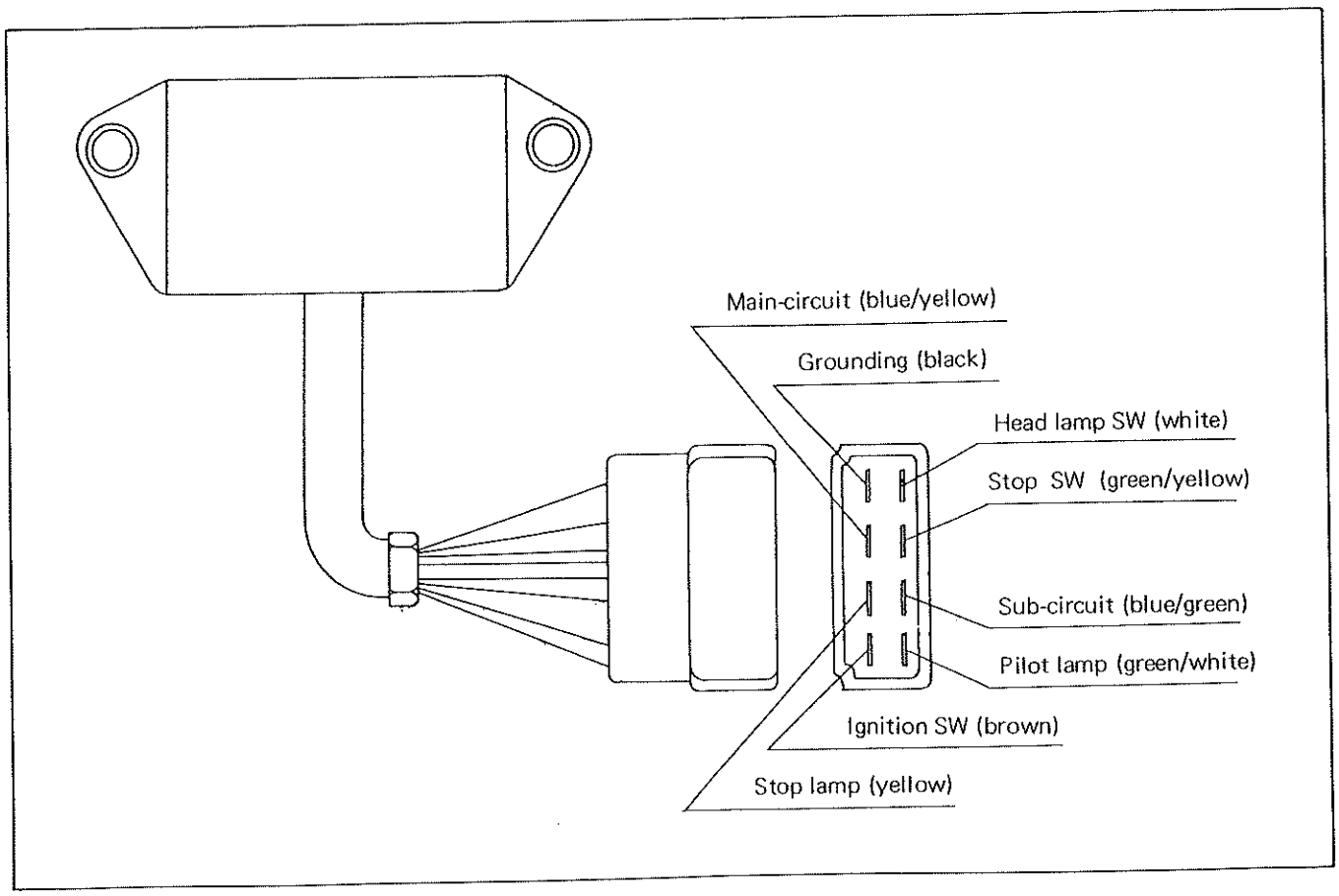
d) Improper Operation

d-1) No flasher action at all:
Check for a broken or shorted wire in the turn signal circuit.

d-2) Too slow or too fast flasher action:
A burned out flasher bulb will slow the flasher action. Check the condition of all flasher bulbs. If flashing action is too slow, and all bulbs are good, the flasher relay (condenser inside) is defective. Replace the relay.

Note:
A bulb of incorrect watt rating will also affect flasher speed - doublecheck all bulbs for correct voltage and/or wattage.

RESERVE LIGHTING SWITCH

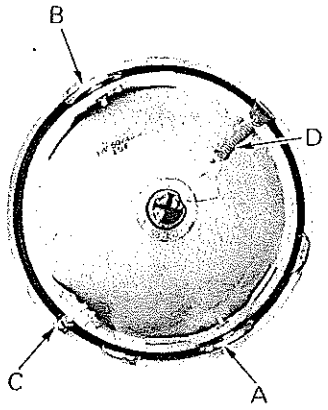


LIGHTING CIRCUIT

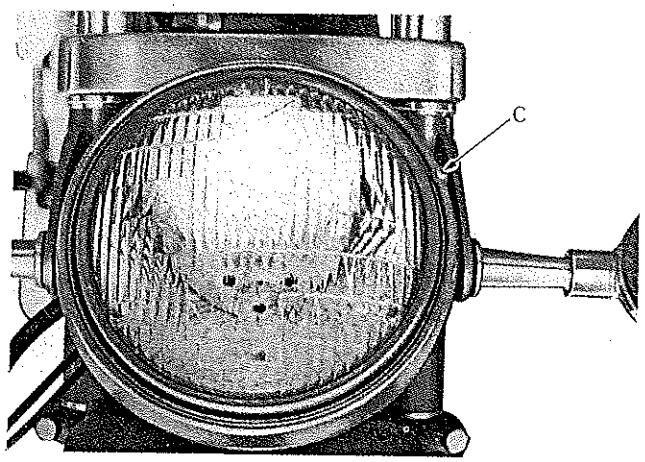
1. Headlight

a) The headlight is a semi-sealed unit with a non-replaceable filament. If the headlight burns out, replace the entire headlight bulb unit.

b) Replacement:
Remove screws "A", "B" and "C' ("C" is the side adjustment screw). Unhook spring "D" and pull the defective unit out of its shell. Slip a new unit into position and install parts "A", "B", and "C".

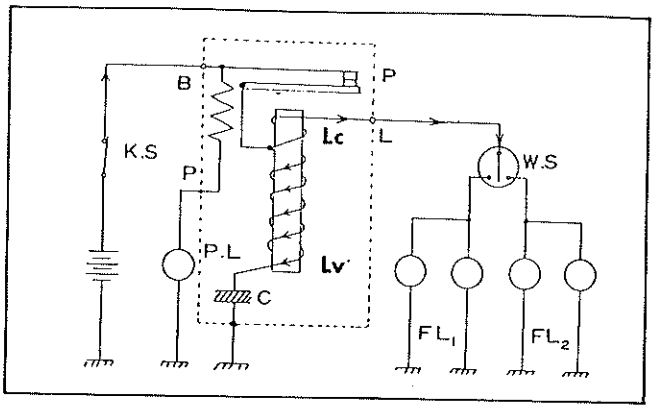


c) Adjustment:
Screw "C" controls side-to-side headlight movement. Screw it in or out until the headlight beam is centered.

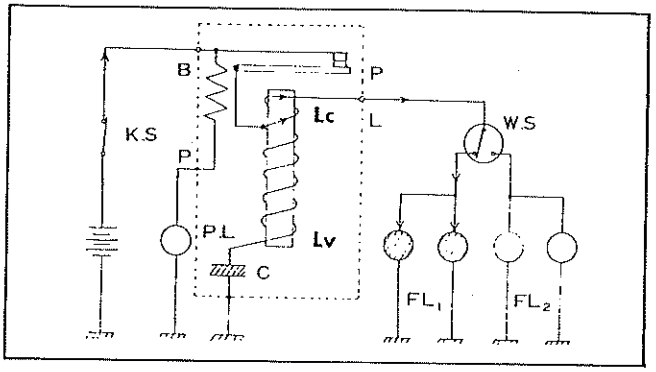


2. Turn Signals

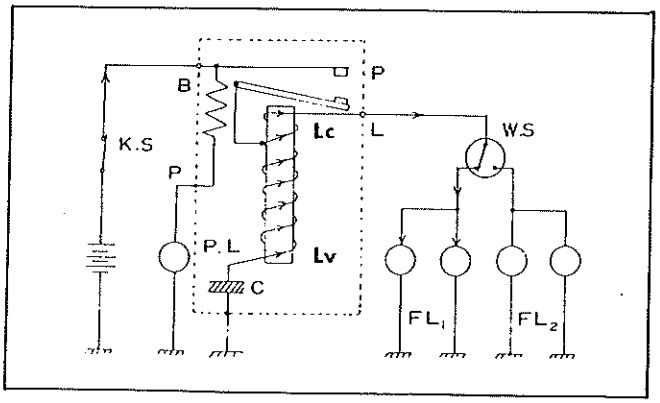
a) Voltage flows from battery to the relay condenser. The condenser becomes fully charged (including wire to flasher switch) and all voltage flow stops in the relay)

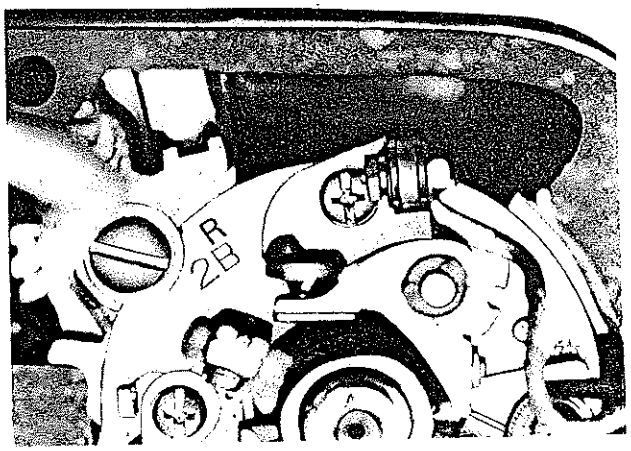


b) When the relay switch is activated, voltage flows from the battery through the "Lc" winding and causes the flasher to light.



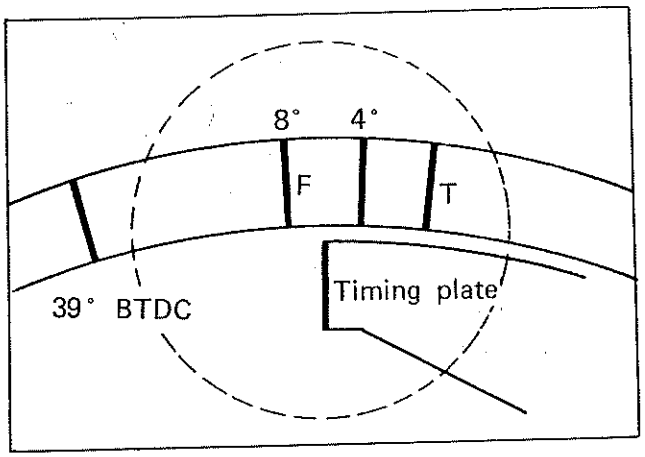
c) At the same time that voltage lights the flasher, the "Lc" winding around the metal core creates an electromagnet that pulls the contact points apart. Voltage flow stops and the flasher lights go out. Magnetism to hold the points apart is momentarily maintained because the stored electrical charge in the condenser discharges back through "Lv" and "Lc" winding. The stored condenser amperage, however, is not sufficient to light the flasher lights (due to their being a high resistance load), so both flasher lights do not light again.



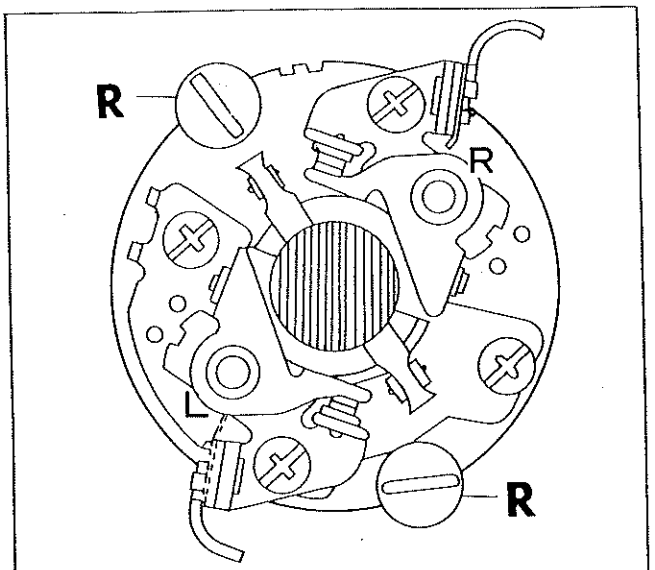


6. Rotate the crankshaft in the direction of running rotation (counterclockwise when viewed from the left side) until the right-hand set of points just start to open, as indicated by the point checker.

7. Check the rotor timing mark position. If the right-hand points are timed correctly, the timing plate will position between "F" stamped two timing marks on the rotor.
   If timing plate does not full between the lines a corrective adjustment must be made to the points.



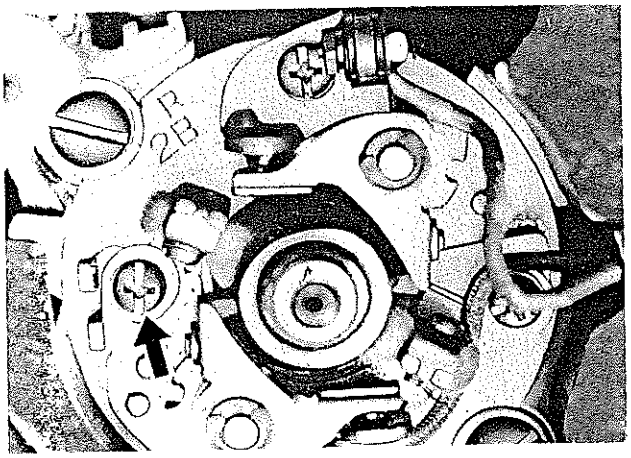
8. With the timing marks lined up correctly, loosen both base plate lock screws. Pivot the entire plate until the right cylinder points just start to open, (as indicated by the point checker).



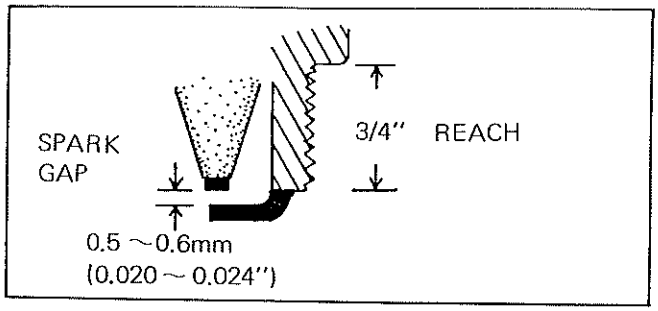
Base plate lock screws

9. Tighten down both lock screws and check the timing again to make sure the base plate has not moved.

10. To set left cylinder timing, repeat steps 4 thru 8, except to switch the point checker probe from the gray wire to the orange wire. The left cylinder points are held in place on the base plate by two different lock screws. Loosen both lock screws as shown in the accompanying figure and make the necessary adjustments.



11. With the point checker hooked up to the orange wire, rotate the crankshaft. The left-hand points must now open when the rotor mark lines up with the stator full advance mark. Switch the point checker lead to the right-hand cylinder and re-check.

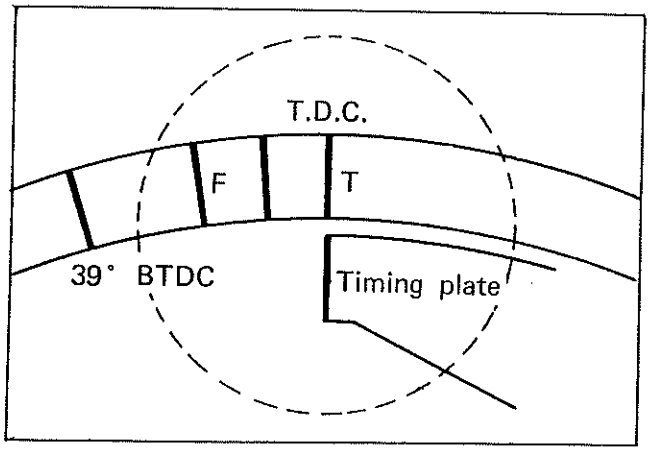


SETTING IGNITION TIMING

Caution

1. Ignition timing is checked by observing the position of the timing marks on the rotor in relation to the timing plate on the field coil assembly.

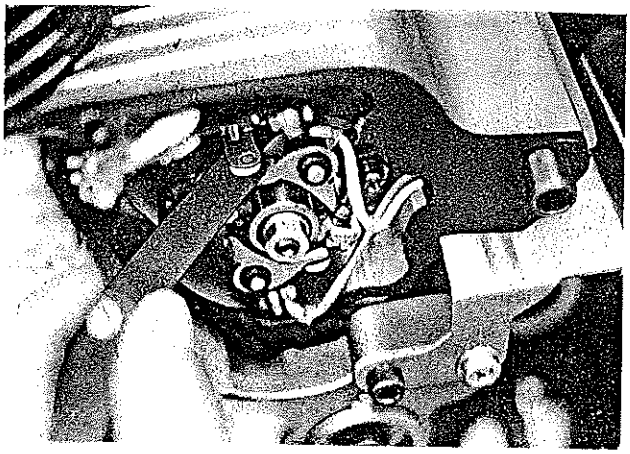
2. The field coil assembly has one timing plate. The rotor has four timing marks. The first mark is identified by the letter "T". This means the piston is at "Top Dead Center".
   The next two marks, identified by the letter "F" stamped counterclockwise from them, is the point of proper ignition timing when fully retarded (engine stopped or idling). When setting ignition timing, set it so both cylinders fire between the marks (both ignition advance weights completely closed).



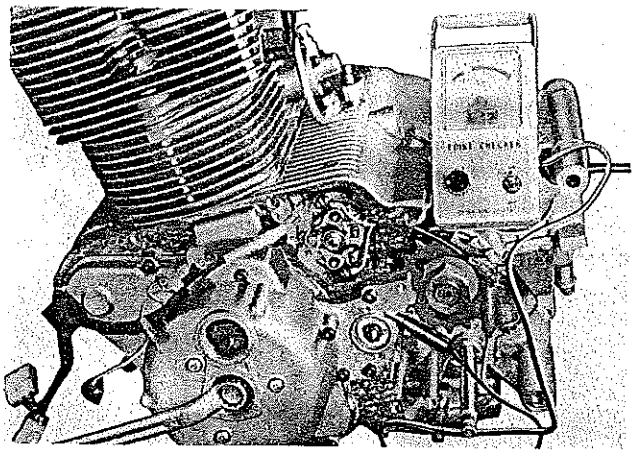
3. The fourth timing mark indicates 39° before TDC, the fully advanced ignition position.

Note:

Each point gap should be checked first, and adjusted, if necessary. Then proceed with the timing adjustment.



4. Check the point checker for full scale deflection (Infinity to Zero resistance), then hook the black lead to a good ground; the red lead to the gray point wire (right cylinder).



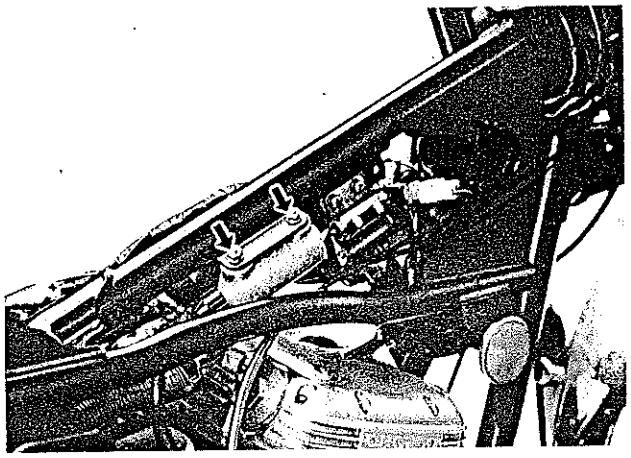
Caution:

Ignition timing for each cylinder is set separately. However, it is absolutely necessary that the right cylinder points are timed BEFORE the left cylinder points. The right cylinder points are mounted directly to the ignition point base plate. The left cylinder points however mount, on a separate plate that is in turn mounted to the large ignition base plate. If the left cylinder points are timed first, they will shift out of position when the base plate is pivoted to time the right cylinder points.

5. The letter "L" (for left cylinder) is stamped next to one set of points, the letter "R" (for right cylinder) is stamped next to the other set. This indicates which set of point fires which cylinder.

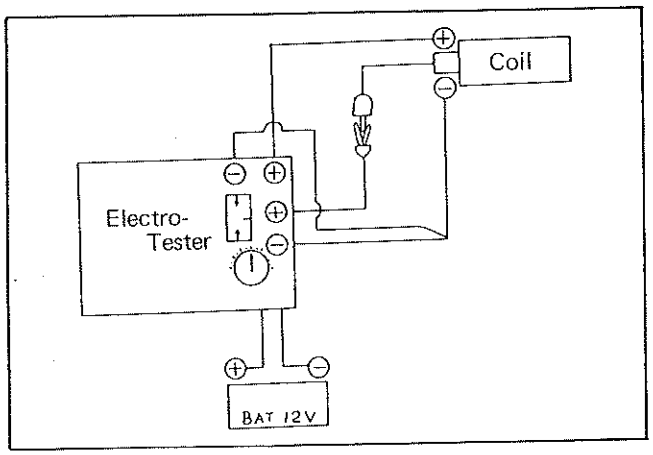
IGNITION COIL

1. Location
   The ignition coils are mounted to a bracket directly in back of the steering head. They can not be removed until the gas tank is removed.

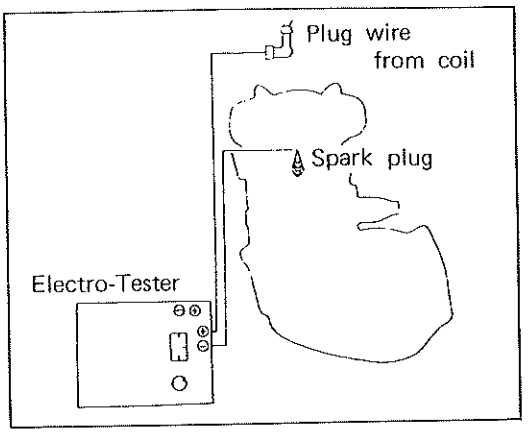


2. The ignition coils can be checked on the machine. It is not necessary to remove either the coil or the gas tank unless the coil is defective and needs replacing.

3. Static Test:
   Follow the diagram below to check the coil. Leave the ignition key off and block the points open with a piece of paper. The coil should show at least 7mm spark gap. (Instruction for setting up the Electro-tester can be found on the Electrotester cover.)



4. Dynamic Test:
   Follow the diagram below for setting up. Close the point gap on the Electrotester to zero. Turn the ignition on and start the machine. Rev the machine to 2~3,000 rpm (or the rpm you wish to test at) and begin opening the tester's point gap. When the engine begins to misfire, close the point gap until it runs smooth again. Point gap should be at least 7mm.



SPARK PLUGS

1. Standard spark plug is an NGK B-8ES which is a 19mm, 3/4" reach, fairly cold plug.

2. Under normal conditions the spark plug should show no deposits on the porcelain insulator around the positive electrode. The porcelain should be a light to medium tan color. After 2,000 ~ 4,000 miles fuel deposits will begin to build up on the plug. Fuel deposits are easily cleaned off but as this is the period for a tune-up it is advisable to replace the spark plug.

3. If one or both plugs are wet, black, and/or heavily sooted, this is an indication that temperatures within the combustion chamber are too low. Check with the rider as to his habits. The plug is designed to give best performance during moderate to medium-high speed cruising.

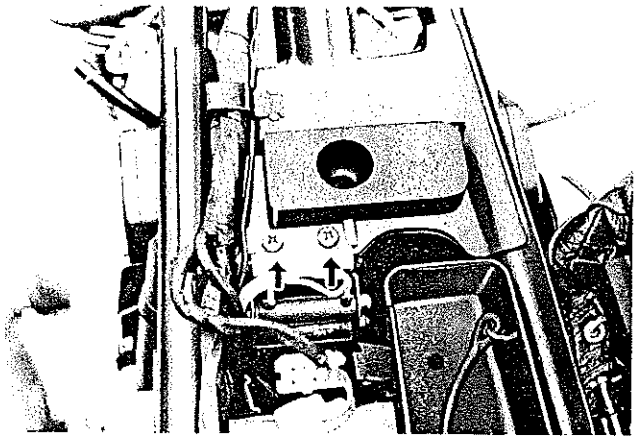
4. If one or both plugs are white, blistered, and/or the electrode has melted away, this is an indication of excessive combustion chamber temperature.

5. Under normal circumstances it is best to tune carburetion to achieve a correct spark plug reading. However, if the situation is only slightly incorrect then one step hotter (B-7ES) or colder (B-9ES) spark plug can be installed. If the machine is being driven under extremely adverse conditions it may be necessary to change carburetion, timing, and one or more heat ranges in the plug.

6. Servicing
   Clean the electrodes of carbon and adjust the electrode gap to 0.5 ~ 0.6mm (0.020" ~ 0.024"). Be sure to use the specified plug, B-8ES, when replacing.

CONDENSER

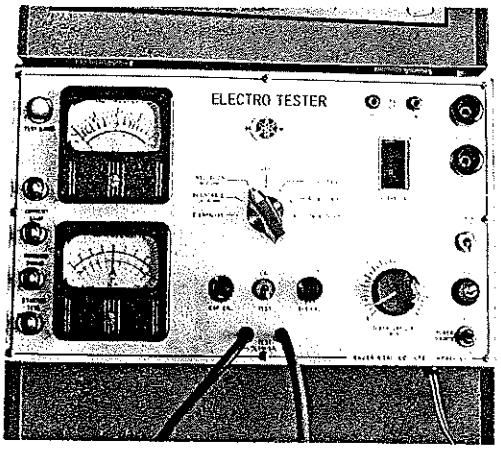
1. Two ignition condensers are located on the front of the seat under the fuel tank. They are mounted as a single assembly and must be replaced as a set in the event of failure.



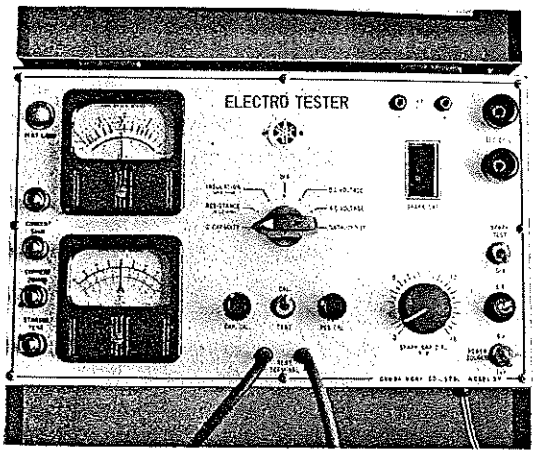
2. The condensers serve as a storage device to decrease arcing across the ignition points. Should one fail there could be either no spark or severe point pitting due to arcing. In the vent of severe arcing there is also the possibility that the strength of the ignition spark may be decreased.

3. To test the condition of either condenser, pull the male/female connection apart.

4. Hook an ohmmeter to the condenser. Black (Neg) lead to the condenser case, Red (Pos) lead to the wire running from the center of the condenser. There will be a momentary flow of current and then the condenser should show at least 5+ million ohms resistance between the positive terminal and ground.

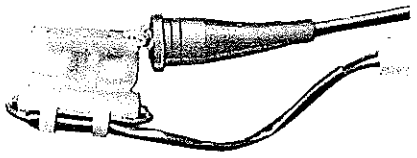


5. Next, hook up an electrotester to the condenser. (Leads in the same position). Turn the main function switch to "C.CAPACITY" and the calibration switch to "CAL".

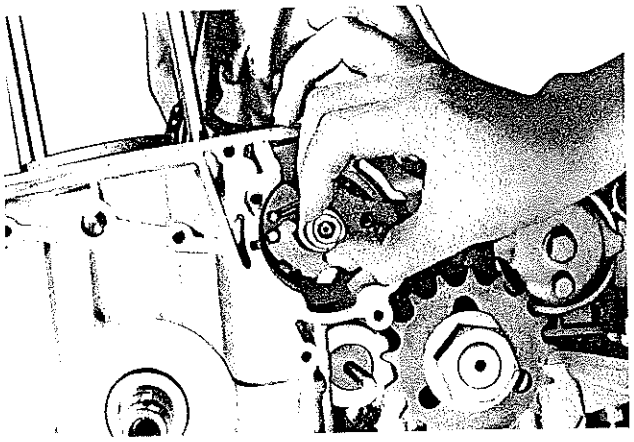


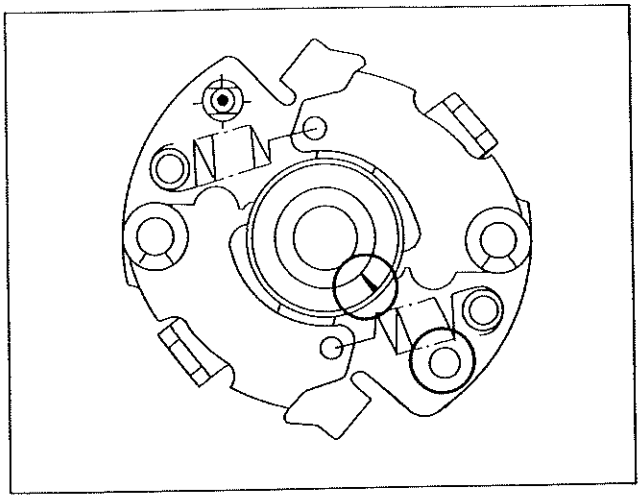
6. Turn the "CAP CAL" knob until the meter needle points to .22μF on the red meter scale for "Capacitance".

7. Turn the Calibration switch to "TEST". The needle should stay in approximately the same position. If it moves very far into the red, replace the condenser assembly.

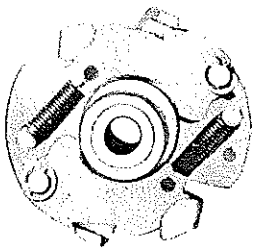


ADVANCE ASSEMBLY





4) The point cam is not integral with the assembly. During installation, align the mark on the cam with the pin on the assembly shaft. If reversal, ignition timing will be reversal.

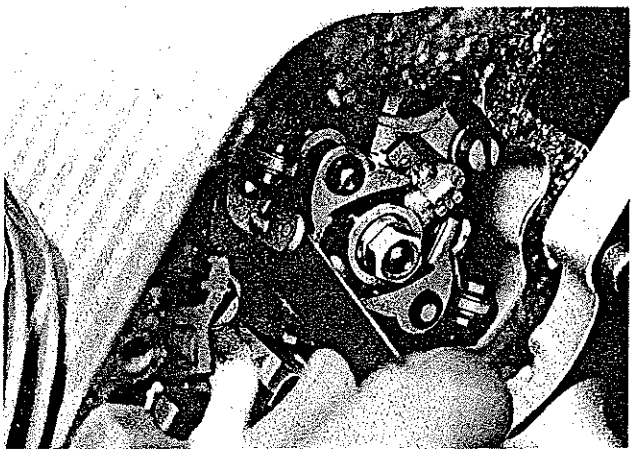


1) The governor is attached to the oil pump shaft. Two centrifugal weights pivot on pins. Each weight has a small extension that fits into the disk notch. As engine rpm increases, both weights begin to swing out on their pivot pins due to centrifugal force acting on the rotating unit. The weights continue to swing outward as rpm's increase until the weights are stopped by fixed stopper pins. As these weights pivot, the extensions in the disk notches cause the disk to rotate. Since the disk is directly attached to the point cam rod, the ignition point cam also rotates, which causes ignition timing to advance.

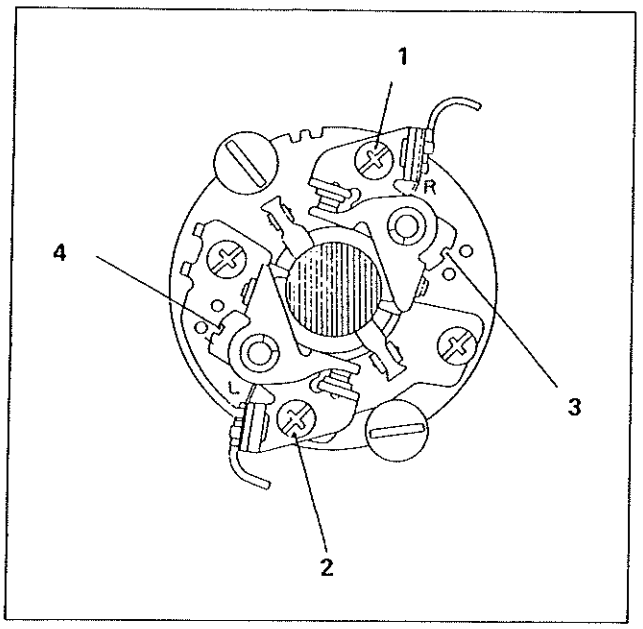
2) Both weights must pivot smoothly or ignition advance will not occur at the proper rpm, nor will it advance to its fullest extent. On occasion, light-weight grease must be applied to the weight pivot pins.

3) The advance unit mechanically changes ignition firing from 6° BTDC at low rpm to 39° BTDC at high rpm (full advance). The ignition point cam is attached to the camshaft.

b) To clean the points, run a point file between the points until the gray deposits and pits have been removed. Spray the points with ignition point cleaner or lacquer thinner, then snap the points shut on a white business card (or paper of hard texture) and repeatedly pull the card through until no more carbon or metal particles come off on the card. (The card may be dipped in lacquer thinner or other cleaner to facilitate this procedure)



c) To gap the points, first rotate the engine until the ignition cam opens the points to their widest position. Slip a 0.4mm feeler gauge into the gap. It must be a tight slip fit. If an adjustment is necessary, loosen the point lock screw (1 or 2) as shown in the accompanying drawing, insert a screwdriver into the adjustment slots (3 or 4), and open or close the points until the feeler gauge indicates the correct gap. Retighten the lock screw and recheck the gap.

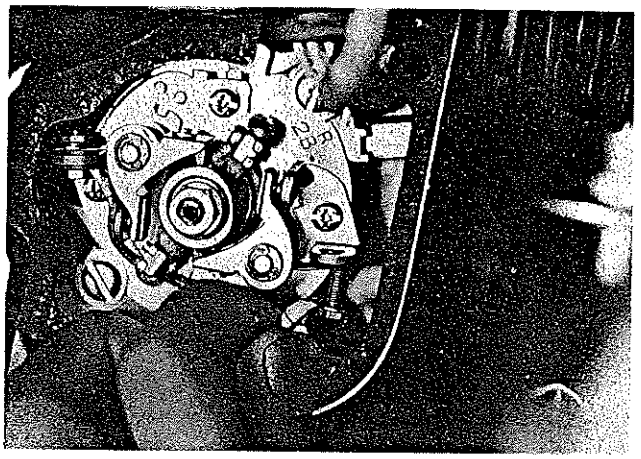


d) Next, rotate the camshaft until the second set of points opens to its widest point. Then perform the same steps as described in the previous paragraph.

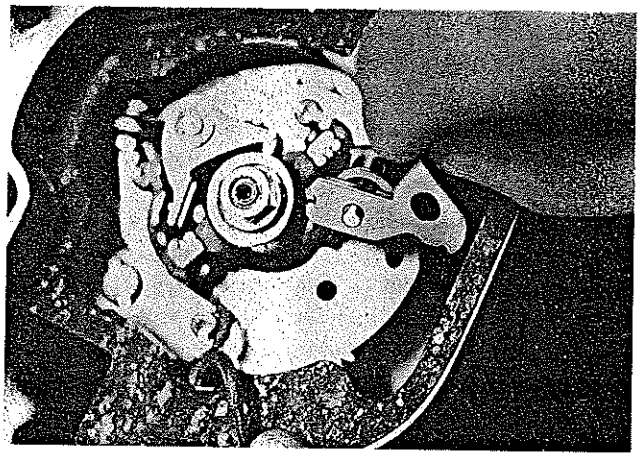
Note:
Add a few drops of light-weight oil onto the felt rubbing pad after each point adjustment to lubricate the point cam surface. Do not overoil.

Replacement

1) Unscrew the point wire securing screw. Completely remove the point lock screw. Lift the entire point assembly up off the point base plate.



2) Locate the new set of points into position by slipping the point assembly locating pin into the appropriate locating hole in the base plate.

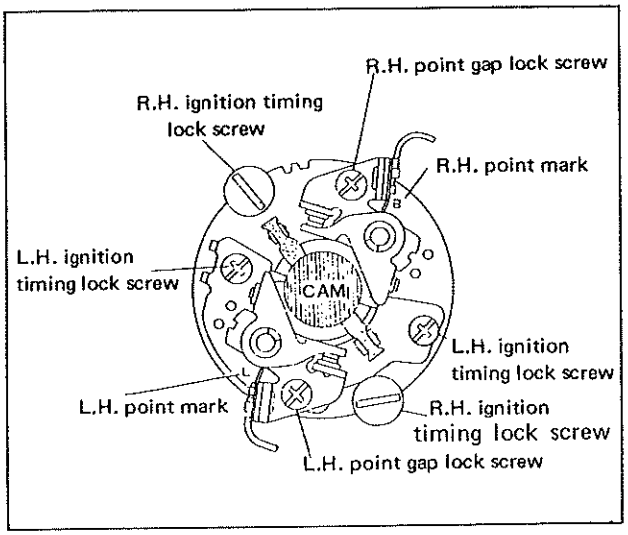


3) Insert and tighten the point lock screw. Finish this replacement by attaching the point wire to the stationary point and regapping the new point assemble.

IGNITION BREAKER POINTS

This unit is equipped with two independent sets of ignition points; one for each cylinder. They are both located in a single housing mounted on the middle of the crankcase (L). The points act as circuit breakers for the ignition system. A point cam spins counterclockwise in the center of the ignition unit. A lobe on the cam controls the opening and closing of the points.

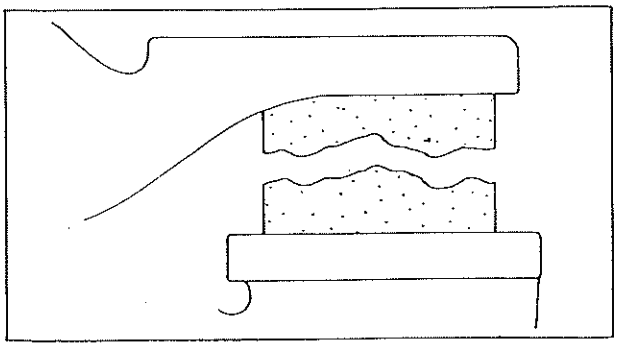
When the points are closed, current flows to the primary coil (which begins to build a magnetic field). At a precisely calculated point of crankshaft rotation, the cam forces the points apart, which stops current flow to the primary winding in the ignition coil. High voltage is then generated in the coil's secondary winding and causes a spark to jump the plug electrodes.

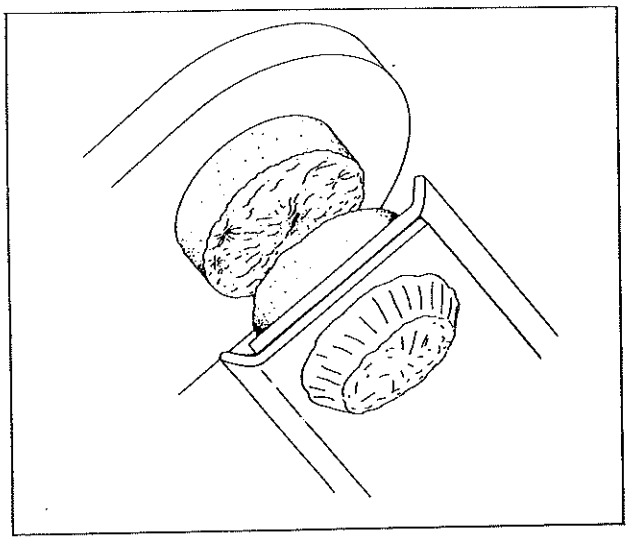


Inspection

Wear

a) The points gradually become burnt and pitted. This is normal wear. However, metal from one point might transfer to the other. If this metal build-up cannot be cleaned off with a point file, the points should be replaced.





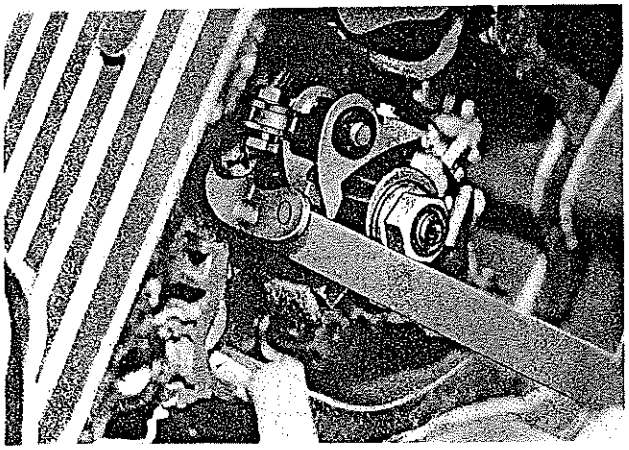
b) Oil may gradually seep past the seal and coat the points or wiring. This will burn onto the points creating an insulating film. It must be cleaned off with ignition cleaning solvent.

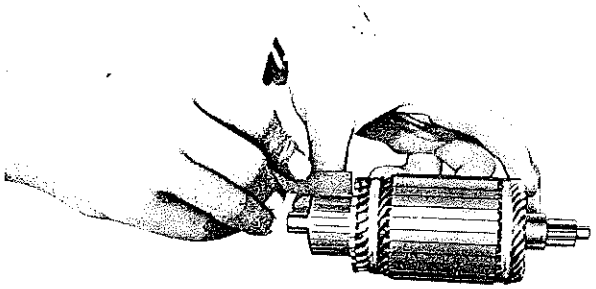
c) The fiber cam follower mounted on the pivoting point arm rubs against the cam Eventually this block wears down which results in a reduction of the point gap and retarded timing of the cylinder. The remedy is to regap the points and check the timing (timing should be checked any time the points are regapped.)

d) If a point return spring becomes weak or broken, the pivoting point will bounce. Timing will become erratic and ignition firing will be uneven. Measure spring tension by attaching a scale (measured in grams) to the pivoting point. It should take 650 ~ 850 g to cause the points to separate. (Use a point checker to measure the separation electrically).

Repair

a) Point gap on each set of points must be set at 0.3 ~ 0.4 mm (0.012" ~ 0.016"). Constant electrical arcs across the points cause some metal to burn away, changing point gap. Clean and regap the points every 2,000 miles. Check timing after regapping.





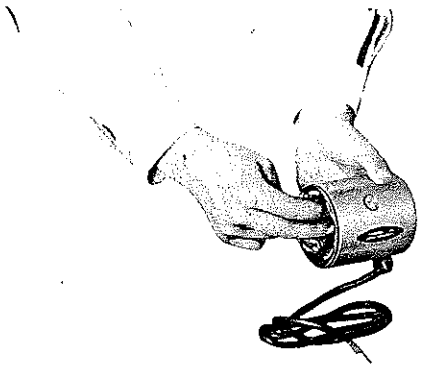
Note:
Should turning be required, check the condition of the cover bearings, armature electrical properties, starter amperage draw and rpm and, finally, carbon brushes.

Carbon brushes

1) Check brush length and replace if at or near limits.
   Minimum length . . . . . 4.5 mm
2) Check brush spring pressure. Replace if over/under specs.

Note:
Spring pressure is measured with a nominal length brush installed. Lift until spring starts to lift off brush and note reading on scale. (Nominal : 800 gr.)

3) Clean the brush holders thoroughly. Use clean solvent, a soft-bristled brush, and dry with high-pressure air stream.

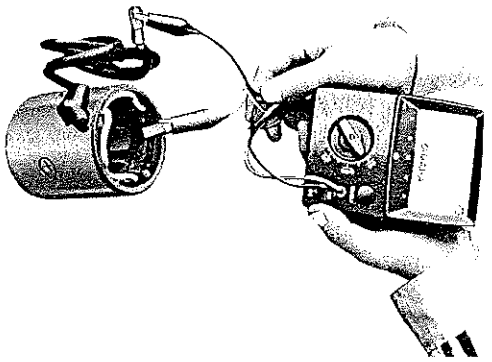


Yoke

1) If the yoke area is dirty, clean with clean solvent and dry with high-pressure air.

2) Yoke coil resistance is 0.05 ohms.
   If coil resistance is more than 0.055 ohms or less than 0.045 ohms, replace it.

   If the yoke shows leakage to ground (resistance is less than 0.1 million ohms) replace it. (20 °C)



Note:
Immediately after cleaning, the yoke may show some insulation leakage. Wait for it to thoroughly dry before checking or reinstalling.

Covers

1) Check oil seals for hardening, cracking, and worn lips. Replace as necessary.

Note:
During reassembly, pre-lube the lips of all seals with "white" grease. (lithium soap base grease)

2) Clean the bearings thoroughly, lightly oil each and check for hard spots during rotation, cracked or broken balls and/or races, etc.
   Replace as necessary.

Note:
During reassembly, all non-sealed bearings should be given a light coating of 20W or 30W "SE" (MS) Motor oil.

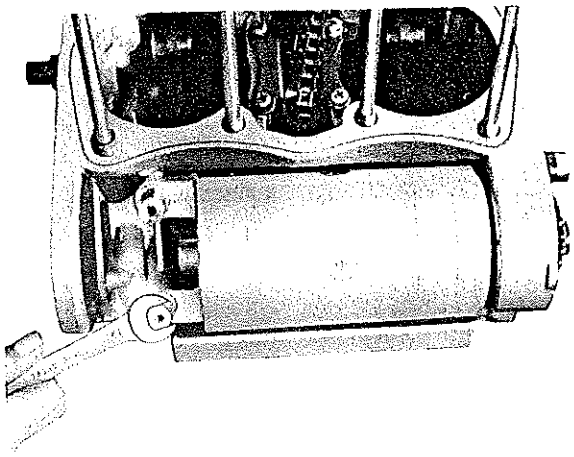
Disassembly

Starter motor

1) Remove the generator cover.

2) Remove the two cover installing bolts and the four motor mounting bolts.

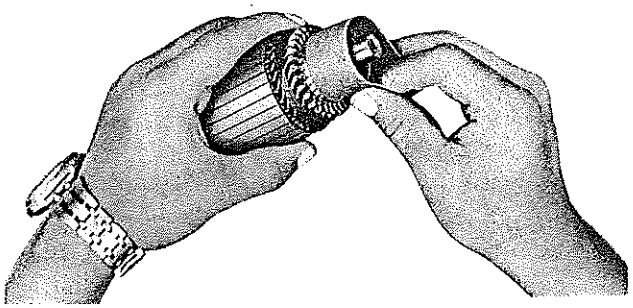
3) Remove the motor. Pull straight back from its mounting location.



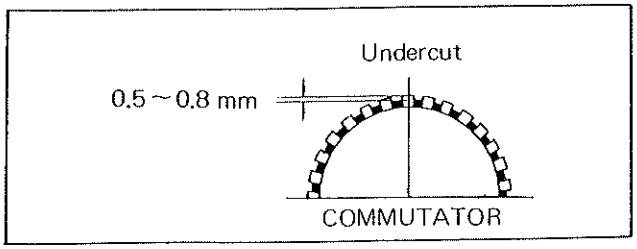
Servicing and troubleshooting

Armature

1) If the commutator surface is dirty, clean with #600 grit sandpaper as shown in the drawing at the right. After sanding, wash thoroughly with electrical contact cleaner and dry with high-pressure air stream.

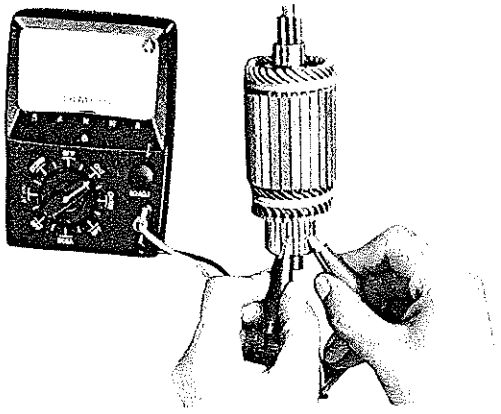


2) The mica insulation between commutator segments should be 0.5 ~ 0.8mm below the segment level. If not, scrape to proper limits with appropriately shaped tool. (A backsaw blade can be ground to fit.)

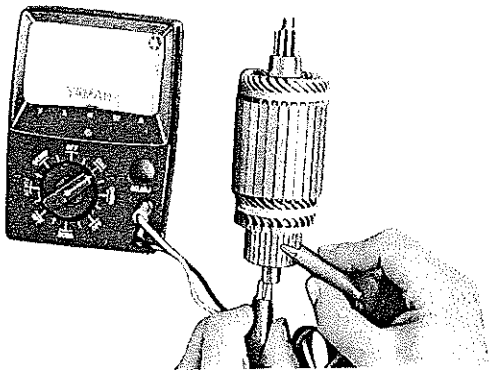


3) Each commutator segment should show zero ohm resistance to the others and at least three million ohms resistance to the core. If there is less than 3 meg ohms resistance to the core, or one of the segments is open, replace the armature.

In addition, the armature can be placed on a "growler" (testing device) and checked magnetically for internal shorts. Follow manufacture's test recommendations.

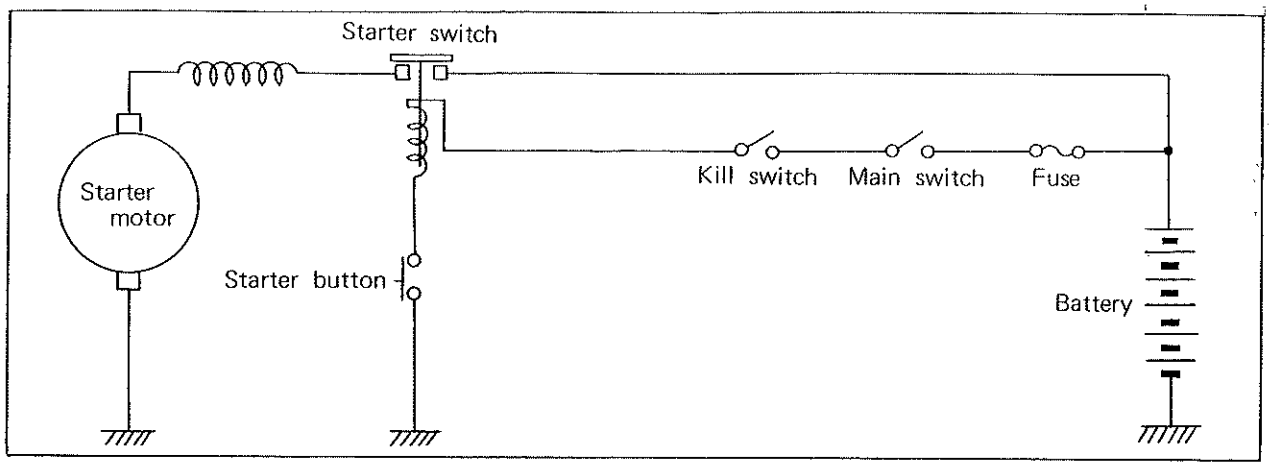


4) If the armature shows signs of having been in contact with the yoke windings check the front and rear cover bearings.
Replace as necessary.



5) If the commutator surface shows heavy scoring it can be turned down on a lathe or commutator turning machine. Check the specification chart for minimum allowable commutator diameter. Recut the mica after turned down.

STARTOR MOTOR



When the solenoid (starting motor switch) closes, a direct circuit from the battery to ground through the motor circuit is created.
Resistance is extremely low in this circuit and, consequently, a heavy current flow passes through the motor to ground, causing the motor to turn.

Specifications

Note:

The following specifications should be refered to while disassembly and trouble-shooting (explained in following chapters) is taking place.

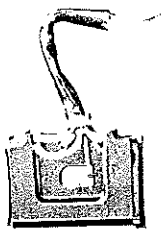
COMPONENT	ITEM	MAINTENANCE STANDARDS	REMARKS
Motor			Hitachi Type S108-37
FIELDS	Resistance	0.05 ohms (20°C)	
BRUSH	W x T x L	16 x 7 x 11 mm	
	Limit length	4.5 mm	
ARMATURE	Resistance	0.055 ohms (20°C)	No Grounded core
COMMUTATOR	Diameter	33 ϕstd	
	Wear limit	32 ϕ	
	Mica undercut	0.5~0.8 mm	
	Undercut limit	0.2 mm	
	Max. allow runout	0.15 mm	Out of roundness
BRUSH SPRING		800 gr pressure std.	(+10%, −25%)
STARTER SWITCH	Yoke gap		(solenoid)
	Core gap	1.55~1.88 mm	
	point gap	0.88~1.11 mm	
	magnet windings	3.5 ohms (20°C)	
	Cut-in Voltage	6.5 V or less	
	Cut out Voltage	4.0 V or less	
	Coil circuit	4A Draw. (20°C)	
MISCELLANEOUS ELECTRICAL			
STARTER MOTOR DRAW:		42A or less (12V)	No load
LOAD:		8.7 V 100 A (580 r.p.m.)	
CONSTRAINT:		4 V 300 A or less	

(3) The battery is overcharged or in a somewhat overcharged state.

Trouble	Cause	Remedy
Wiring	Shunt generator is faulty, because of a short-circuit between P-terminal and F-terminal circuits.	Remove short.
Battery	Internal short-circuit.	Replace.
Regulator	1. Abnormal rise in no-load voltage.	Readjust.
	2. Regulator grounding is faulty.	Correct grounding.
	3. Coil has a broken lead.	Repair or replace.

Inspection

1) To check the silicon rectifier, the A.C. generator and silicon rectifier should be disconnected. Next, check the silicon rectifier by connecting it in the forward and reverse directions, alternately.
If current flows through the rectifier only when it is connected in the forward direction, it is in good condition. If current flows in both forward and reverse directions or will not flow in either direction, the rectifier is faulty. It should be replaced.



Note:

Do not use a Megger for this test. The use of a Megger will ruin the silicon diode.

Troubles and remedies

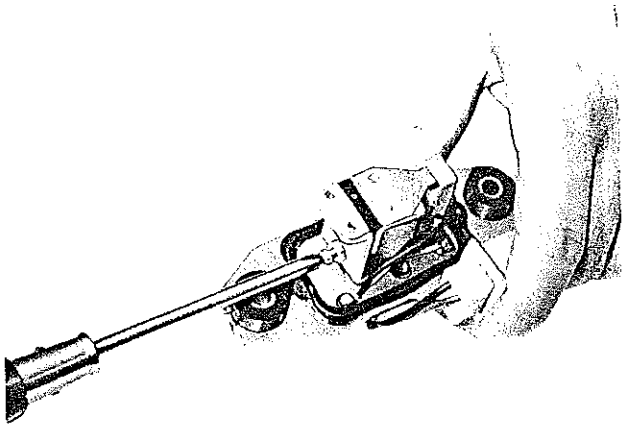
If any trouble occurs, refer to the following chart.

(1) The battery is not charged at all.

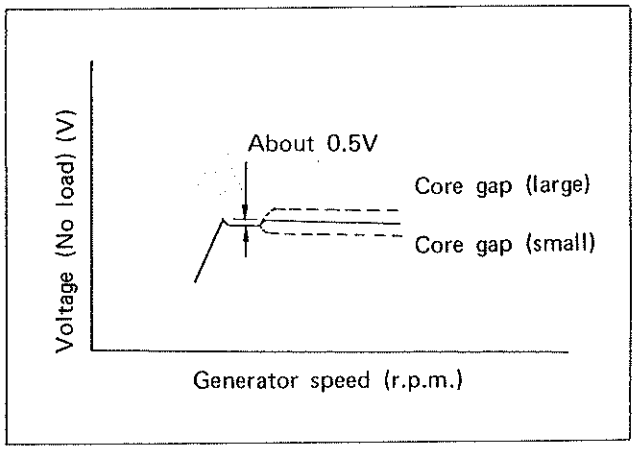
Trouble	Cause	Remedy
Wire or ammeter	Wire broken, short-circuit, or faultv wire joint.	Repair or replace.
Generator	Coil is broken, grounded or has a short-circuit.	Replace.
Silicon rectifier	Silicon diode is faulty.	Replace.
Regulator	Lead wires are broken or short- uricuted. No-load voltage is lower than specified.	Repair. Readjust.

(2) The battery is undercharged or in a somewhat discharged state.

Trouble	Cause	Remedy
Wiring	Wire broken, short-circuit, or loose connection.	Repair or retighten.
Generator	1. Field coil has a short circuit. (Test resistance.)	Replace
	2. Stator coil has a short-circuit.	Replace.
	3. Stator coil has a broken wire.	Replace.
	4. Silicon diode is faulty.	Replace.
Regulator	1. No-load voltage is lower than specified.	Readjust.
	2. Contact points are dirty or dusty.	Clean.
	3. Coil or resistor has a short-circuit.	Replace.
Battery	1. Electrolyte level is lower.	Add distilled water.
	2. Plates are shorted.	Replace.



After the adjustment, the generated voltage shows slight fluctuations as illustrated below.
When the generator speed increases from low (the lower contact is in operation) to high (the upper contact is in operation), the voltage fluctuates slightly, but this is a normal phenomenon. If the voltage shows a 0.5 volt increase, the adjustment is considered to be correct. If the voltage increase is more or less than 0.5 volt, the core gap should be readjusted.



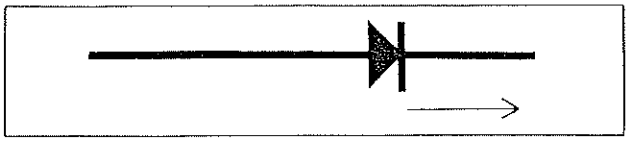
Note:

The regulator should be checked every 8,000 miles (12,000 km) of operation. For this check, the regulator should be removed from the generator.

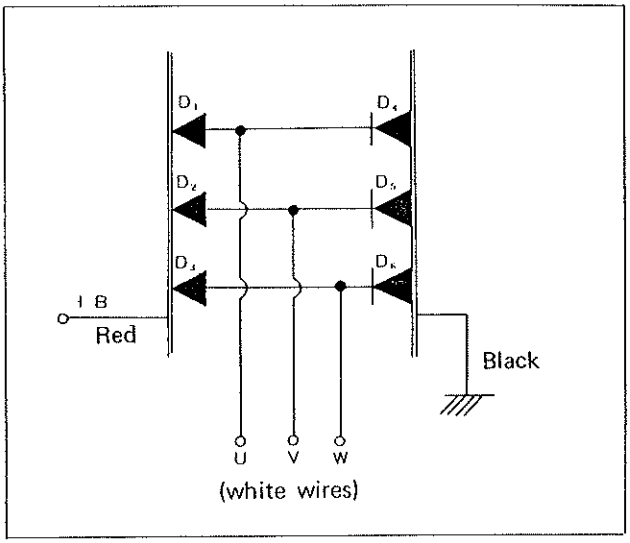
RECTIFIER

a) This unit is a full wave rectifier which changes the alternating current generated by the alternator to a direct current by passing the alternating current through six silicon diodes. The diodes permit only one-way electrical flow. The direct current is sent to the battery and main switch.

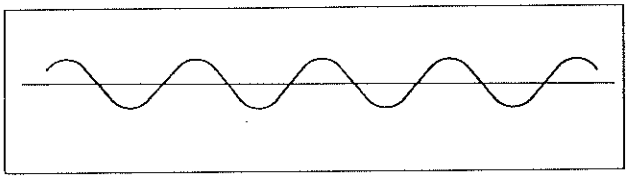
b) The sign below indicates a one-way diode. Current flows in the direction the sign is pointing.



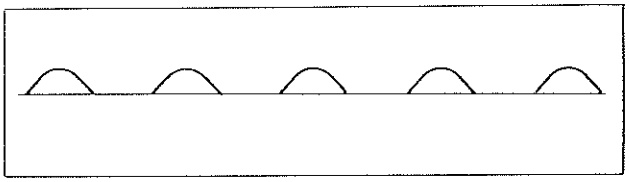
c) Schematic representation of the three phase, full wave rectifier in the TX750 generating circuit.



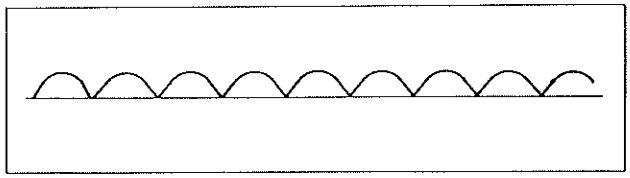
d) Wave form of standard alternating current.

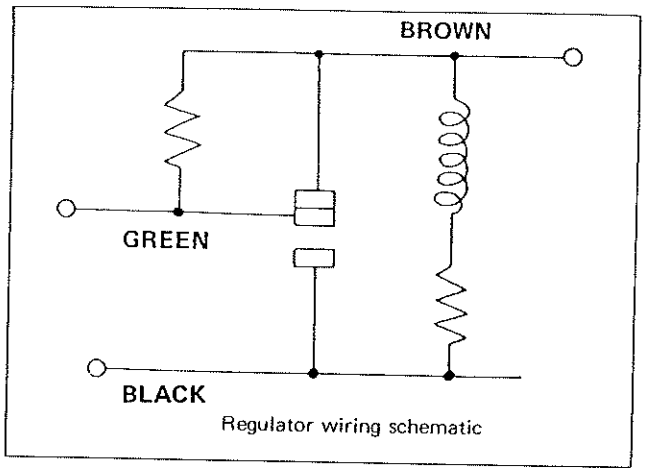


e) Wave form of alternating current after half-wave rectification by one diode (now direct current).



d) Wave form of AC after full wave rectification.



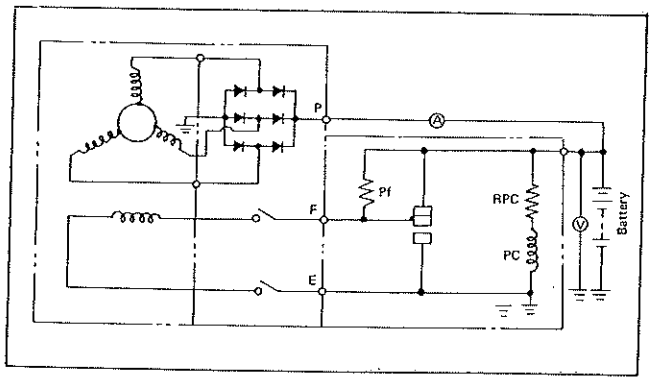


Regulator wiring schematic

b) The regulator operates as a magnetic switch. As charging voltage rises, part of this voltage is routed through an electro-magnet in the regulator. Rising voltage creates greater regulator magnetism, which in turn pulls the central contact point through different positions. Different resistors are switched into the circuit as this central contact point moves. These resistors cut down the amount of current passing to the field windings, which reduces the charging voltage output.

Adjustment

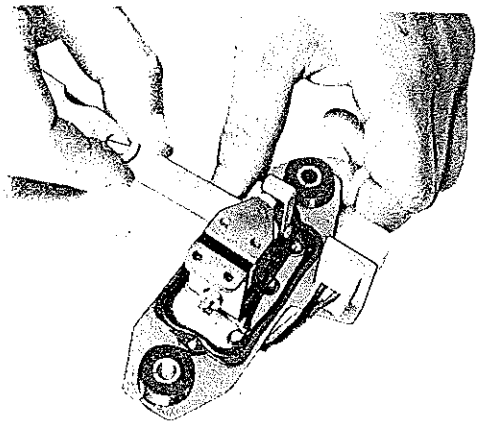
1. When adjusting the regulator, a D.C. voltmeter, ammeter, and tachometer are necessary. They are connected as illustrated, and adjustment should be made in the following sequence.



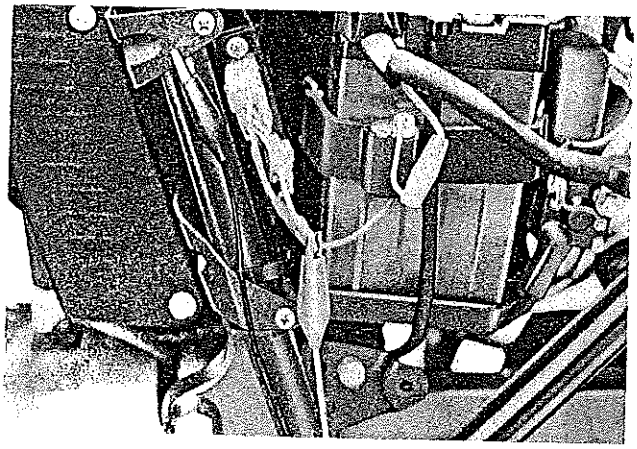
a) Remove the regulator from the frame, and check the contact points. If the point surfaces are rough, they should be smoothed away with sandpaper (#500) or #600).
After sandpapering, throughly clean contact points with point contact cleaner.

b) Check the core and points for gaps. If any gap is incorrect, it should be adjusted.
First adjust the core gap and then the point gap.
Core gap . . . . . 0.6 – 1.0mm
Point gap . . . . . 0.3 – 0.4mm

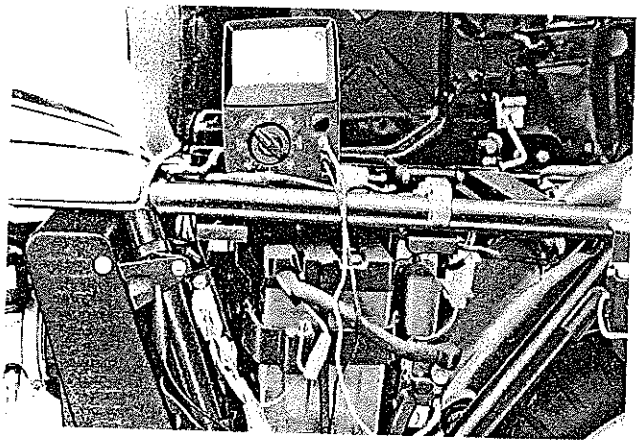
Note:
No adjustment is required for the yoke gap.



c) Charging voltage output can be controlled at the regulator. Inside the housing is a screw that pushes against a flat spring steel plate. This is the adjusting screw.



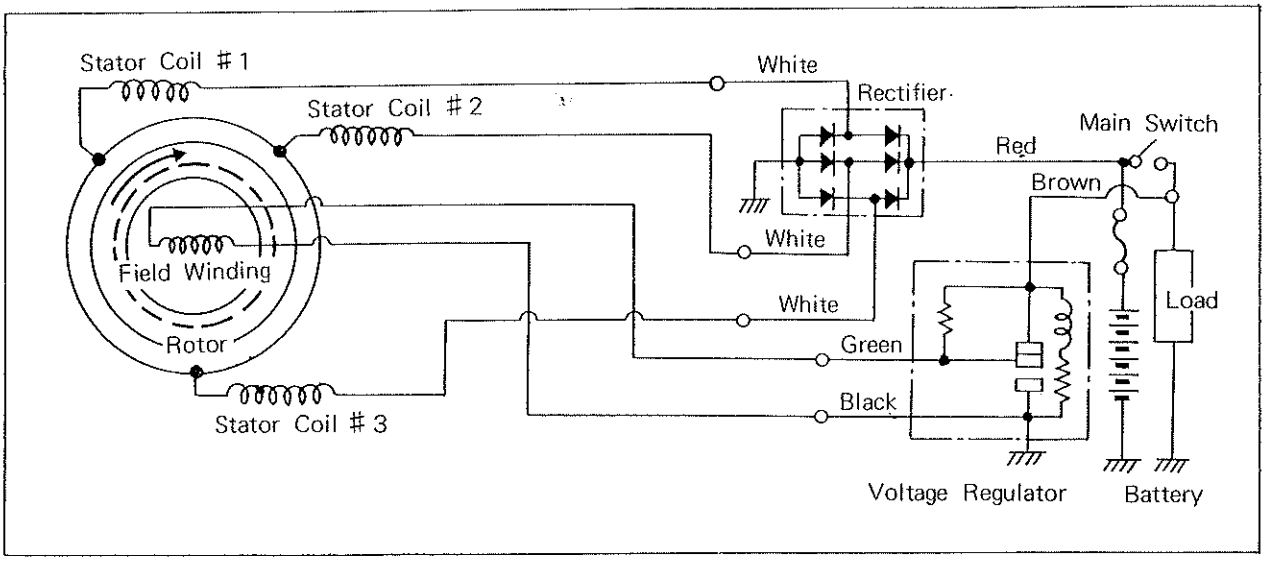
d) Start the engine. Disconnect the fuse box wire leading to the battery and hook up a voltmeter from the fuse box to ground. Accelerate the engine to 2,500 rpm. The voltmeter should read 14.5~15 volts. DC. If it varies from this amount twist the adjusting screw in to raise the charging voltage or out to reduce the voltage.



e) If any of the previous tests reveal no continuity to exist check all main switch wires. If these wires appear to be in satisfactory condition (not broken or shorted to the frame), then the main switch itself is defective and must be repalced.

CHARGING CIRCUIT

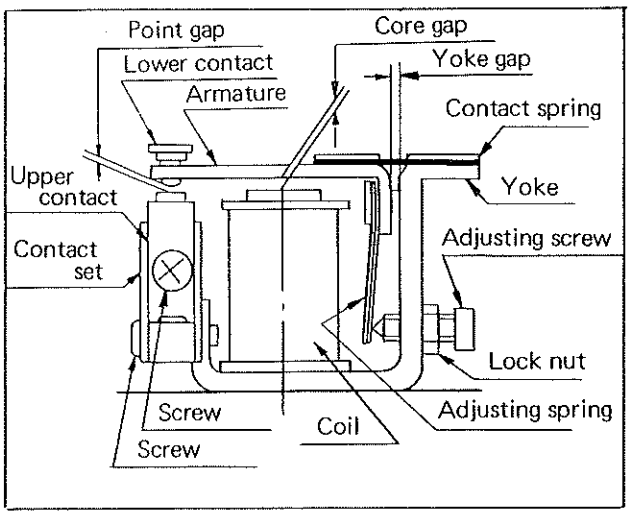
This circuit consists of the battery to first provide voltage to the field windings, regulator, and main switch.



REGUALTOR

This circuit consists of the battery to first provide voltage to the field, windings, regulator, and main switch.

a) The regulator's function is to pass a controlled amount of current the field windings which creates a magnetic field that produces a charging voltage in the three stator windings.



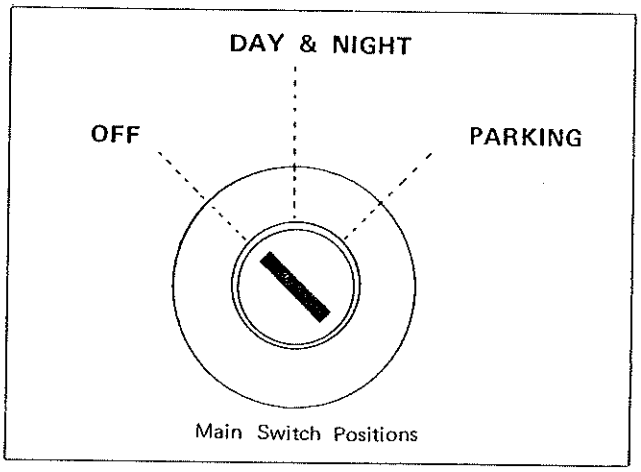
Storage

a) Whether it is a new battery or one that has been in service, preparation for storage of either one is almost identical. When new, the battery is dry charged (no electrolyte). Keep it away from moisture and heat. A stored dry-charged battery can last several months without losing a great deal of its charge.

b) A used battery should be filled to the maximum level with distilled water, given a complete charge and stored in a cool area (coldness slows the process of battery discharge). It should be given a booster charge every two months. When preparing to place a stored battery back into service, check for sufficient electrolyte and fully charge the battery.

MAIN SWITCH

The TX750 uses a three position switch that directs current from the battery (or alternator) to the various lighting and ignition circuits.



Main Switch Positions

1st position: Prevents current from flowing to any circuit.

2nd position: Supplies current to all day and night circuits, including (1) horn, (2) ignition coils, (3) front and rear stop switches, (4) turn signal switches, (5) all indicator lights, and headlight/taillight switches.

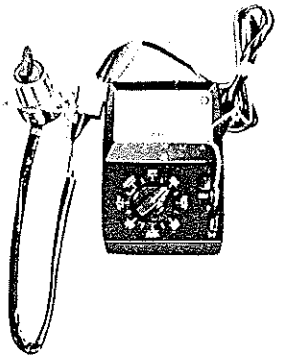
3rd position: Only the parking light is activated.

Location and Replacement

The switch is mounted on the bracket.

1) Remove the fuel tank and disconnected the lead wires from the speedo/tachometer and main switch.

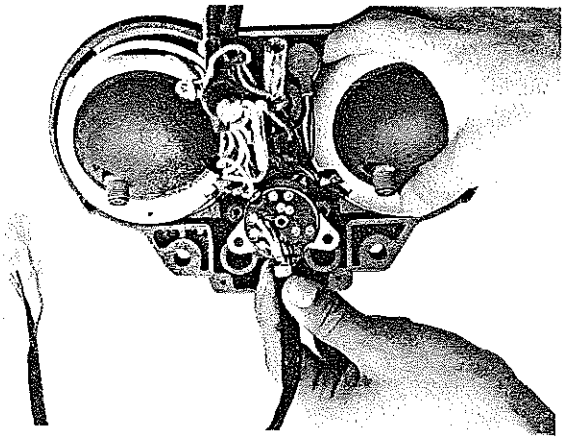
2) Remove the bracket with speedo/tachometer and main switch. After that, remove the cover and main switch mounting screws.
The main switch can now be removed from the bracket.



Trouble-shooting

1) If voltage from the battery (or alternator) reaches the main switch (through the red wire), but, the same voltage does not pass through the switch, then it should be checked.

a) Use a pocket tester or electro-tester with the meter set to register continuity (Ohms x 1). Make all continuity checks at this main switch multiple connector.



b) Three wires hook into the multiple connector; red, blue, and brown. Hook one lead of the tester to the red wire and use the other as a probe. First, check that there is no continuity between the red wire and the switch housing.

c) Turn the switch to the "Day-night" position. Probe with the unattached meter lead. Touch the brown wire end and then the red/red or blue wire end. Continuity must exist.

d) Turn the switch to the "Parking" position and touch the probe to the blue wire end. Continuity must exist.

BATTERY

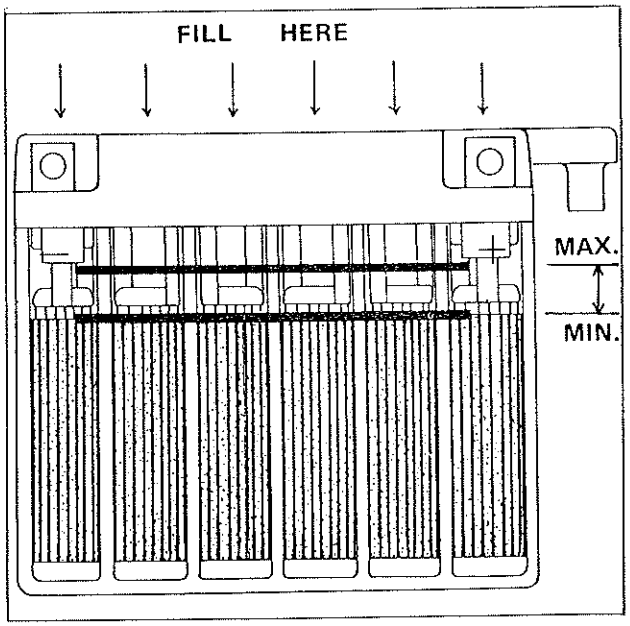
Servicing a new battery

a) Check battery housing for cracks or other damage. Fill the battery with electrolyte and let set for an hour. This allows the acid to soak into the paltes. With the caps off, hook up a trickle charger to the battery and charge it at 1 amp/hour rate or less. Check the specific gravity. Each cell should have a rating of 1.260 ~ 1.280. If the electrolyte has dropped below minimum level after charging, add electrolyte (rating of 1.260 - 1.280).

Battery maintenance

a) Periodic inspection can determine the condition of the battery housing and the condition of the internal parts. Check for cracks or holes in the housing. Check for broken plates, sulfation, low fluid level, or corroded terminals.

b) The battery housing is marked with a minimum and maximum fluid level. If any cell fluid level drops below the minimum level, fill with distilled water to correct height. Check once a month or more often in hot weather. DO NOT use tap water.



Charging

a) Remove the battery and check the specific gravity of each cell. A fully charged cell reads between 1.260 - 1.280. If the rating is less than 1.260, the battery needs charging.

b) Fill each cell to the proper level with distilled water. Leave the filler caps off until battery charging has finished. Use a battery charger that may be regulated for a maximum output of 1.6 amp. The TA750 battery uses a 16 amp/hour battery. DO NOT exceed a one amp input as excessive heat may be generated within the battery.

Note:

An autotransformer may be used to regulate output of an automobile battery charger.
Battery fluid level sometimes drops duirng charging. Refill if necessary, using distilled water.

Trouble-shooting

1) Excessive fluid evaporation from cells: Normal battery operation requires fluid to be added to the cells approximately once a month. If distilled water must be added every week or two, the battery is possibly being overcharged. Check voltage input from the alternator.

2) Low fluid level in one cell: If one cell continuously loses more fluid than others, check for a shorted cell. A shorted cell creates abnormal fluid evaporation. Check with a hydrometer for excessive difference in specific gravities between the cells.

3) Won't hold a full charge:
   a) First check the alternator output to eliminate the possibility of a low charging rate. Next, check for loose terminal connections (creating high resistance), or a build up of material in the bottom of the housing that could short the paltes. Nothing can be done about loose terminals chemselves except to replace the battery.

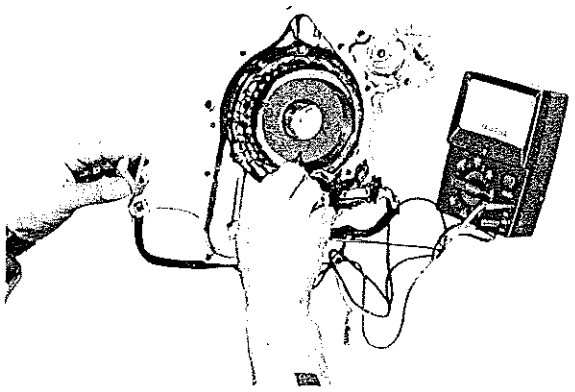
      Sediment at the bottom of the housing can sometimes be removed by flusing the battery out several times with distilled water if the cell is discharged; flush with electrolyte if fully charged. Dry the battery off and recharge for a few hours. If enough loose sediment is flushed out, the battery could hold a charge. If the battery still cannot hold a full charge, replace it.

4) Sulfation: Sulfation, in the form of a white, scaly material, gradually forms on the plates and at the bottom of the housing. It is created over a period of time as the sulfuric acid combines with the lead plates to produce lead sulbate (white particles of sulfation). It is a product of age and use. The battery usually needs to be replaced when sulfation reaches the point of shorting out the plates.

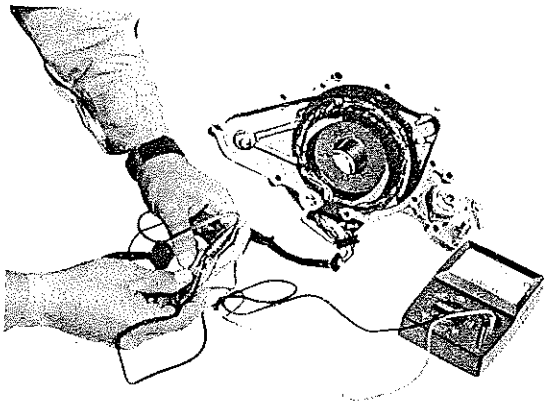
5) Make sure that the wires are hooked to the proper battery terminals, The red wire must be hooked to the "positive" terminal, the black lead must be hooked to the "negative" terminal. If the wires are reversed, the battery will quickly loose its charge. Very likely the battery will be destroyed if the reversed hook-up is left connected for any length of time.

Inspection

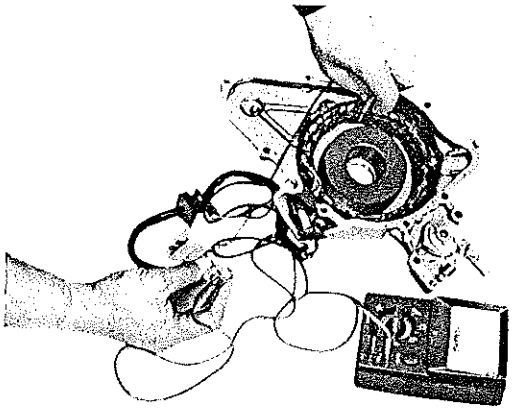
1) The field coil can be checked for insulation and wire breakage with an ohmmeter.
If there is continuity between the lead wire and the core, the core is grounded.
Look for broken insulation and lead wires touching backing plate, if ground cannot be eliminated, field coil must be replaced.

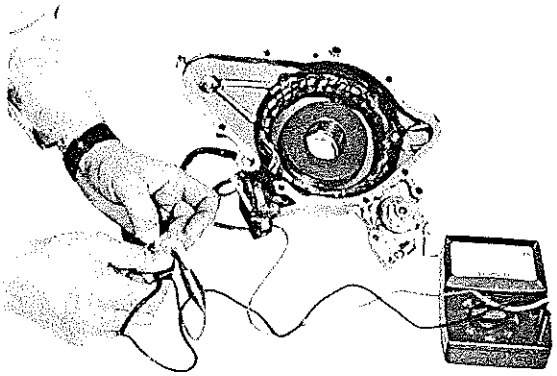


If there is no continuity between the two lead wires, the coil is considered to be broken, and should be replaced. If the resistance across the field coil measures 4.9 ohms, it is considered to be in good condition.



2) The stator coil can also be checked for insulation and wire breakage with a tester.
There are three stator coil terminals located in the 4-pin connector of the stator coil wiring harness. Measure the resistance between each of these terminals and the stator coil assembly core (there is no wire connected to the core; touch meter lead to bare metal of core). There should be infinite resistance (no continuity) between any stator coil terminal and the core itself. If there is, the stator coil assembly is shorted and must be replaced.
Stator coil windings may be checked for continuity by measuring between any two of the three-terminals (white wires). This must be done for all three combinations (A-B, A-C, B-C). In each case the resistance should be approximately 0.7 ohms. The stator coil assembly should be replaced if any other resistance is obtained.





Handling Notes:

The A.C. generator is used in combination with silicon rectifiers, and therefore, it should be handled with the following special care.

1) Be careful not to connect the battery to the generator in the wrong polarity. Otherwise, the silicon diodes establish a short-circuit in the battery, thus allowing a large amount of current to flow through the diodes. This will ruin the silicon diodes and burn the wire harness.

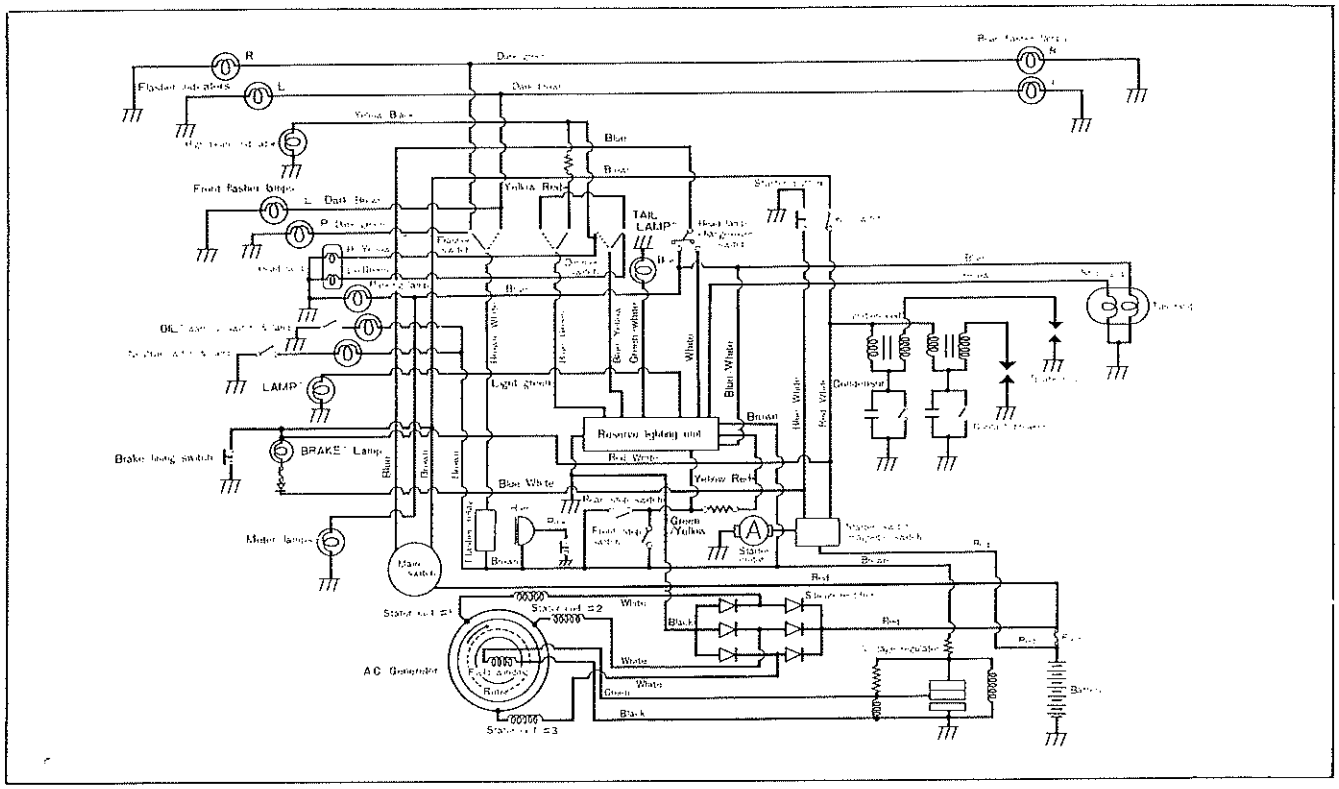
2) Be sure to connect the terminals correctly.

3) Do not turn the engine at high speeds with the P terminal circuit (of the silicon rectifier) disconnected. A high voltage will be generated and ruin the silicon rectifier.

4) During quick charging of the battery, the silicon rectifier must always be disconnected at the P terminal.

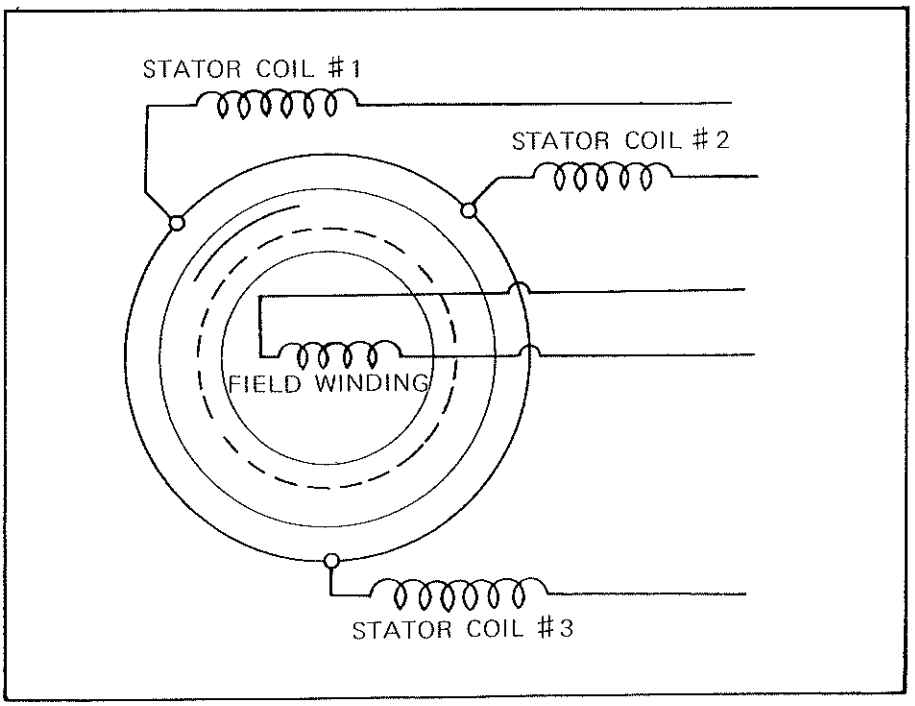
5. ELECTRICAL EQUIPMENT

Unlike a conventional type alternator, the A.C. generator used in the TX750 has no brushes and slip rings, because the fixed coil does not rotate and is separated from the rotor. That is, it has no parts subject to wear.
This A.C. generator is of three-phase A.C. design and uses six silicon diodes for full-wave rectification.

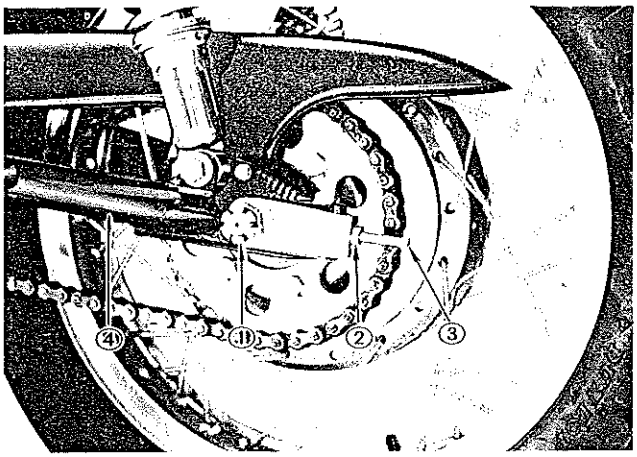


A.C. GENERATOR

The rotor is designed to interrupt the magnetic field created by the sationary field winding. Openings in the rotor are sinusoidal in shape and alternately make and break the magnetic field to the three stationary armature winding. See figure below.



4) Rotate both adjusting bolt 3 to obtain the correct free play, and at the same time make sure that both ends of the axle are positioned evenly. This can be done by matching the marks on the sides of the swing arm 4 just above and to the rear of the rear wheel nuts.



5) After completing the adjustment, retighten all lock nuts.

Tightening torque:
① 12.0 ~ 18.0 kg-m (90~135 ft-lbs)
② 1.0 kg-m (90 in-lbs)

6) Finally, check for correct brake pedal and stoplight operation as they could have changed due to the chain adjustment.

A worn chain causes wear to both sprockets. If either sprocket is excessively worn, it can cause a new chain to wear out prematurely. Strict attention should be paid to the condition of all three components if any one is replaced. Possiblly two or all three components might require replacement if wear is excessive.