CHAPTER 7. ELECTRICAL SYSTEM FOR DT125C

(DT125A, B Similar)

7-1. SPECIAL TOOLS

A. Pocket Tester

B. Electro Tester

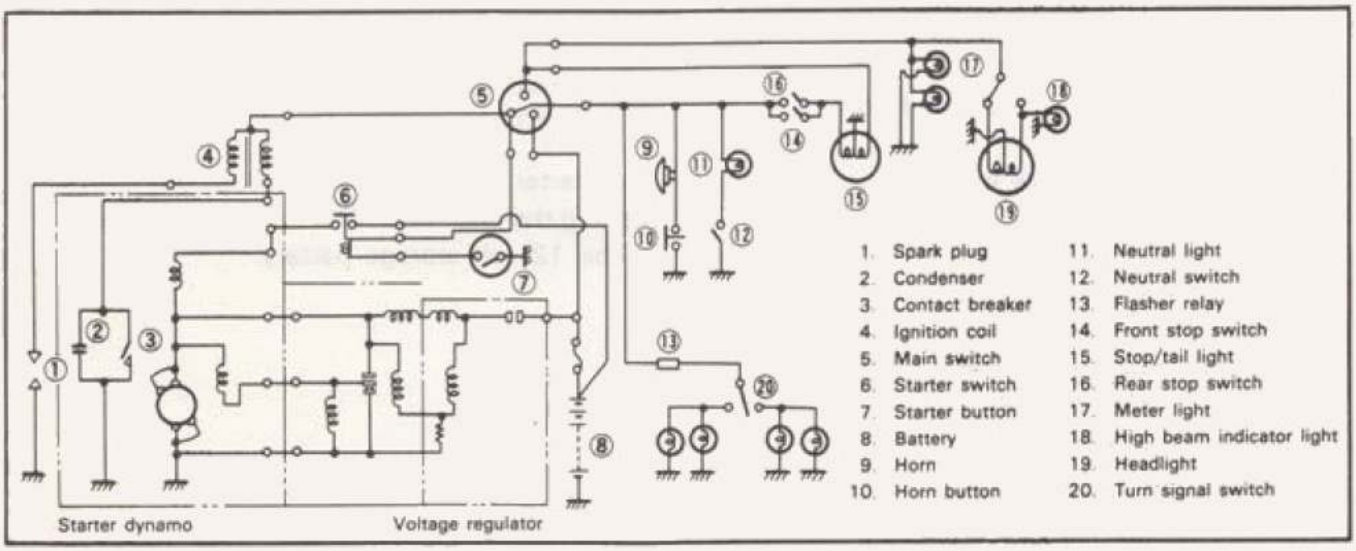
7-2. ELECTRICAL COMPONENTS

PART NAME	MANUFACTURER	DT125B	DT125A, B
Spark plug	N.G.K.	B-8ES	←
Ignition coil	Hitachi Ltd.	CM11-50B	CM-61-50
Starter Dynamo	Hitachi Ltd.	GS114-02	M100-03
Voltage regulator	Hitachi Ltd.	T107-20	T107-17
Starting switch	Hitachi Ltd.	A104-71	T104-35
Fuse	Taiko Mfg.	20AX2	←
Battery	Furukawa	12N7-3B, 12V 7AH	←
Ignition switch	Asahi Denso		
Handlebar switch (R)	Asahi Denso		
Handlebar switch (L)	Asahi Denso		
Front stop switch	Asahi Denso		
Rear stop switch	Asahi Denso		
Headlight	Koito Mfg.	12V 30/30W	12V 25/25W
High beam ind. bulb		12V 3W	
Tail/stop light bulb		12V 8/27W	
Neutral light bulb		12V 3W	
Speedometer bulb		12V 3W	
Tachometer bulb		12V 3W	
Flasher bulb(s)		12V 27W	
Flasher relay	Nihon Denso	JFK-0110	
Horn	Nikko Kinzoku	MF-12	

7-3. DESCRIPTION

The DT125C is equipped with a 12-volt starter dynamo which serves as a combination starter and direct current (D.C.) generator. All electrical components are powered directly by the 12-volt storage battery.

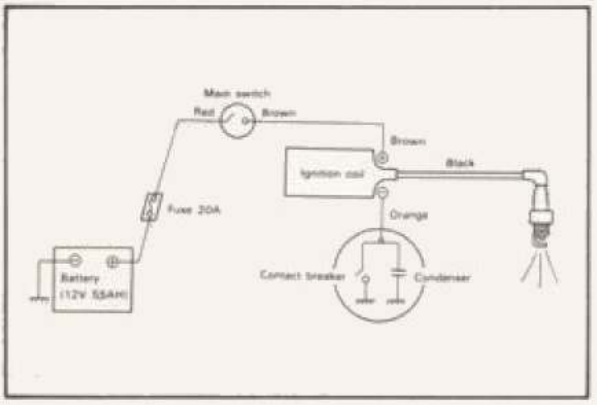
7-4. CONNECTION DIAGRAM



7-5. IGNITION SYSTEM (BATTERY IGNITION)

A. Description

The ignition system consists of the parts as shown in the following diagram. As the switch is turned on, the crankshaft begins to turn, and the cam attached to the armature makes the contact points open and close. This causes the current to flow and stop flowing alternately, thus induction a voltage in the primary circuit. The voltage produced in the primary winding by self-induction is stepped up by mutual-induction, and a high voltage is generated in the secondary winding in proportion to the turn ratio of the primary winding to the secondary. This high voltage causes a spark at the spark plug gap.



B. Ignition Timing-Checking and Adjustment (Refer to 2-5, C)

C. Spark Gap Test (Refer to 6-5, C)

D. Ignition Coil

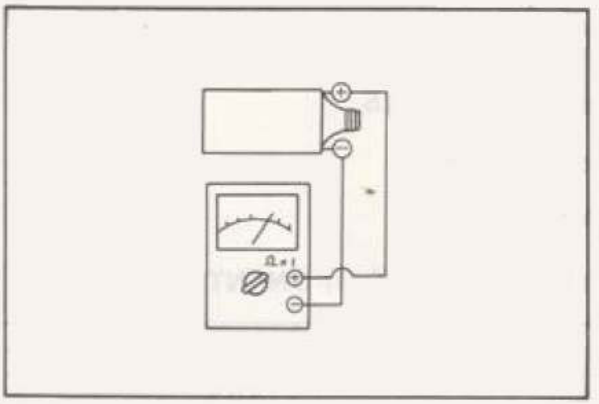
The ignition coil is installed inside the frame above the engine.

1. Ignition coil test (removed from the engine)

a. Ignition coil primary winding continuity test

The test is conducted by using the Yamaha pocket tester ($\Omega \times 1$). Connect the positive tester cord to the ignition primary positive side, and the negative tester cord to the ignition primary negative side.

Normal primary winding resistance: 4.2Ω

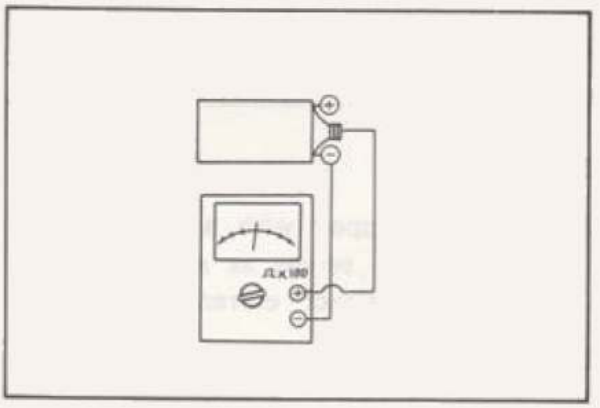


b. Ignition coil secondary winding continuity test

The Yamaha pocket tester ($\Omega \times 100$) is used. Connect the positive tester cord to the high tension cord and the negative tester cord to the primary negative side.

Normal secondary winding resistance: 10.8kΩ

* For details on spark test with the spark plug installed on the engine, refer to the "Flywheel Magneto".



7-6. STARTING AND CHARGING SYSTEM

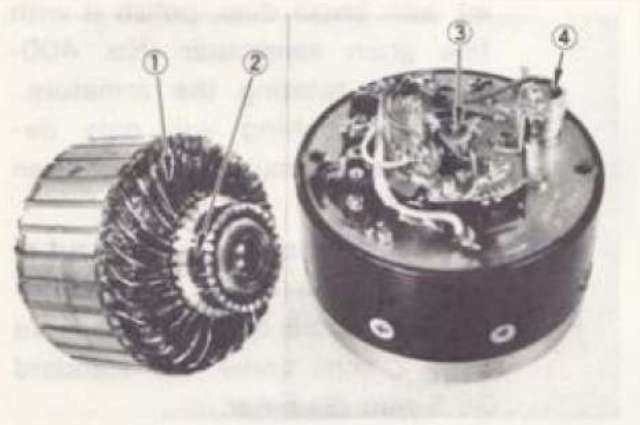
The starter dynamo has two functions: (1) starting the engine; and (2) supplying current to the 12-volt storage battery.

A. Charging Mode

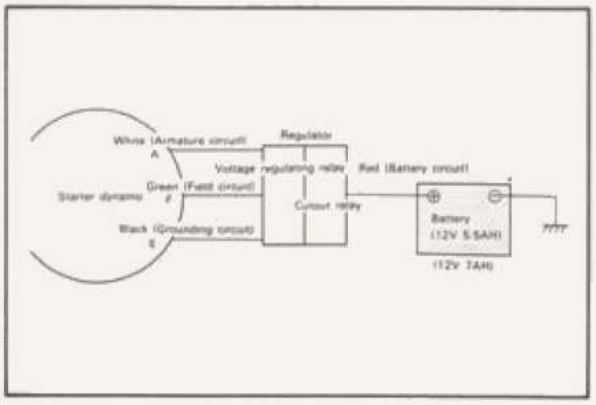
The charging system of the starter dynamo consists of the yoke assembly (shunt field coil and brushes) and the armature assembly (commutator). The armature coil cuts through the magnetic lines of force of the field coil as the engine runs so that the flow of alternating current is induced. The alternating current is converted into a direct current through the commutator brushes. The direct current voltage is kept constant by the voltage regulator, and supplied to each lead of the ignition, lighting and signal systems as well as to the battery.

B. Starting Mode

In the starting system of the starter dynamo, the series coil and the armature, working as a D.C. motor, generate a great amount of torque, by which the engine is cranked.



1. Armature coil
2. Commutator
3. Contact breaker
4. Condenser



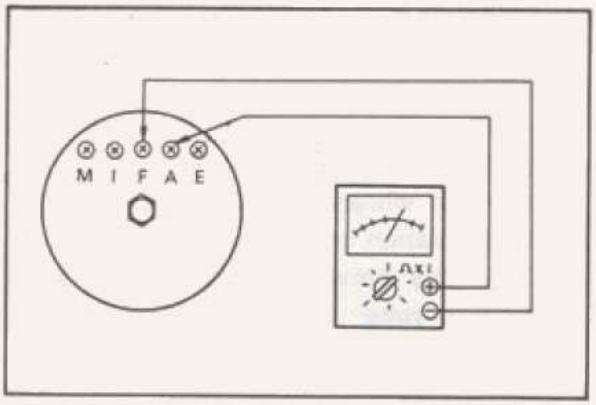
C. Checking the Dynamo

First disconnect the wires from the terminals A (white) and F (green), then ground the terminal F to E (black), with a jumper wire. Connect the positive lead of the tester to terminal A (white), and ground the negative tester lead to the engine. Start the engine and keep it running at 2,000 rpm. If the electricity generated reads more than 14V on the tester, the generator is in good working condition.

CAUTION:

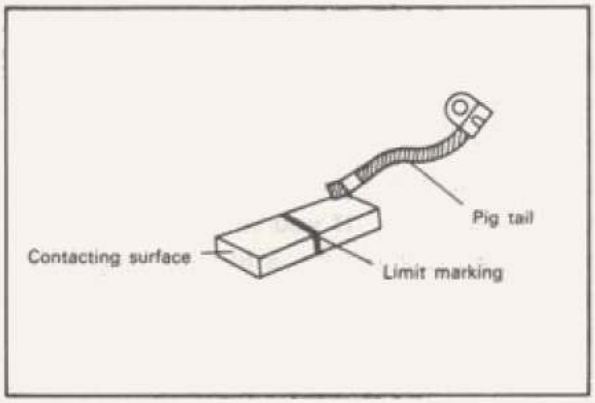
Do not run the engine at more than 2,000 rpm in this test. If you run the engine at more than 2,000 rpm, a high voltage current generated will ruin the coil, lead wire, etc.

1. Field coil continuity test
   Test is made by using the Yamaha pocket tester ($\Omega \times 1$). Connect the positive tester cord to the A terminal of the dynamo yoke, and connect the negative tester cord to the F terminal.



2. Checking carbon brushes

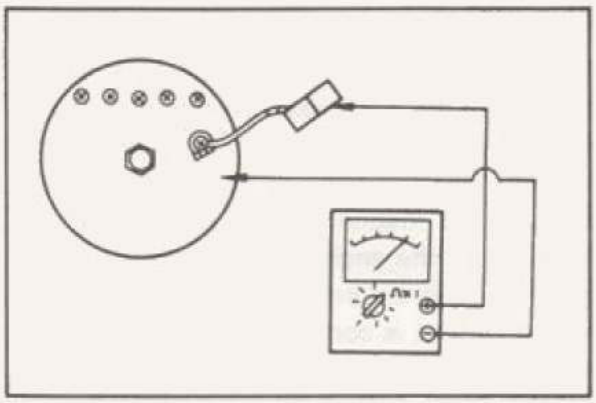
a. The contact surface of the carbon brush with the commutator must be more than three-fourths of the entire contact surface. If the brush is worn more than the limit, the charging efficiency of the dynamo will be reduced. Replace with a new one.



b. Materials of the brush
Use the brush having the model No. "MH-33" on its side.

c. Handling the brushes
When replacing the brushes, be sure the braided lead of the positive brush does not touch the edge of the breaker plate or brush holder, and that the lead of the negative brush does not touch the positive brush spring. The friction of the braided lead against other parts as a result of vibrations may wear through the insulation and cause a short circuit.

d. Continuity between carbon brush and dynamo yoke
Use the Yamaha pocket tester ($\Omega \times 1$).
There should be no continuity between the positive side brush and the yoke.
When there is continuity between the negative side brush and the yoke, the brush is considered to be in good condition.



If there is continuity between the positive side brush and the yoke, the possible cause may be short circuit of the brush holders or between the A and F terminals.

3. Checking the Armature Assembly

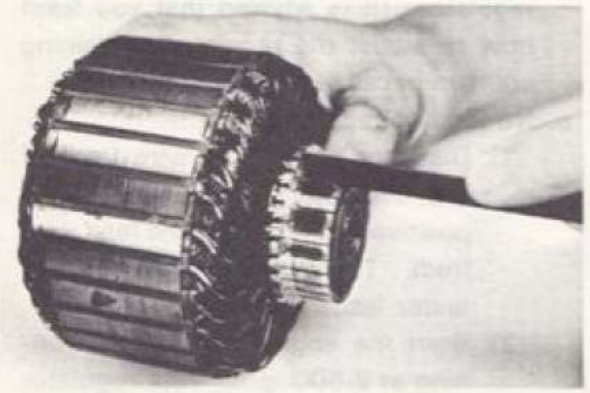
a. Thoroughly clean the commutator of oil and dirt.

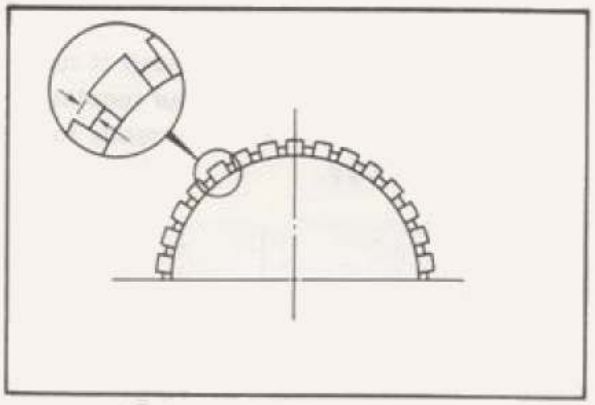
1) If the commutator is rough or dulled with brush dust, polish it with fine grain sandpaper (No. 400-600) by rotating the armature. Partial polishing will only deform the commutator and shorten brush life.

2) If the commutator is burned, out of round, or too rough to be sandpapered, turn it on a lathe no more than 2 mm under the standard 38.5 mm diameter.

b. Checking the commutator mica undercut

If the commutator is worn and if it has high mica, the mica should be undercut with saw blade. Sand off all burrs with sandpaper, be sure the mica is cut away clean between segments, leaving no thin edge next to segments.





Standard mica undercut	0.5 ~ 0.8 mm (0.0197 ~ 0.0315 in)
Minimum allowable mica undercut	0.2 mm (0.0079 in)

c. Continuity between commutator and iron core

For testing, use the Yamaha pocket tester ($\Omega \times 1$). If there is continuity between the commutator and the iron core, the armature coil is considered to be shortcircuit.

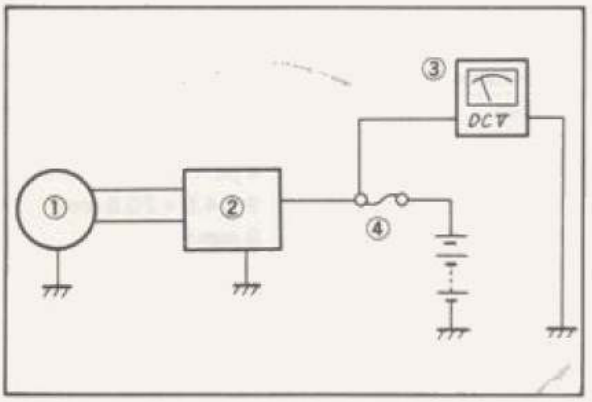
4. Dynamo Adjustment Standards (all 125)

Field:	
Resistance Shunt Series	4.8Ω
Brushes:	
Material	MH-33
Number	4 pc
Width × thickness × length	9 × 4.5 × 20.5 mm
Minimum length	9 mm (0.35 in)
Spring capacity	400 ~ 560g
Commutator:	
Diameter	38.5 mm (1.515 in)
Minimum diameter	36.5 mm (1.437 in)
Mica undercut	0.5 ~ 0.8 mm (0.0197~0.0315 in)
Minimum mica undercut	0.2 mm (0.0079 in)
Difference between max. and min. diameter	0.03 mm (0.0012 in)
Breaker:	
Point gap	0.35 ±0.05 mm (0.013 ±0.002 in)
Point pressure	1.5 ~ 1.7 kg
Ignition timing	1.8 ±0.05 mm (0.07 ±0.002 in)
Automatic spark advance	10 ~14°/ 1,350 ~ 1,600 rpm
Other:	
Dynamo dia. (outer)	134φ
Armature taper	1/5
Cut-in rpm and volt	13.0±0.5V, 2000 rpm
Capacity:	
Rated output rpm	2,300 rpm 14V7A

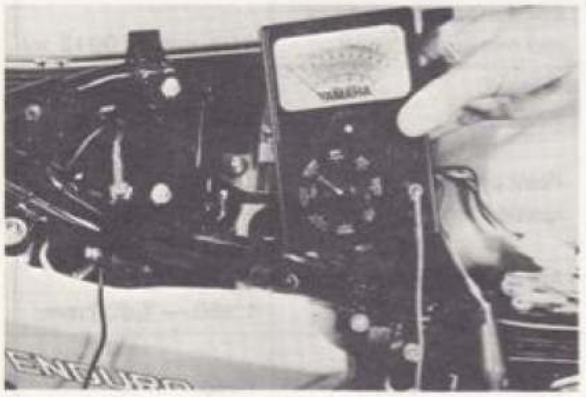
D. Measuring Charging Voltage

The charging current is measured by using the Yamaha pocket tester (D.C.20V).
Connect the positive tester cord to the B terminal of the regulator, and ground the negative tester cord to the frame. While maintaining the engine speed at 3,000 rpm, disconnect the battery circuit at the fuse, and take the voltage reading.

Normal voltage:
14 ~ 16V at 3,000 rpm



1. Dynamo
2. Rugulator
3. Pocket tester
4. Fuse

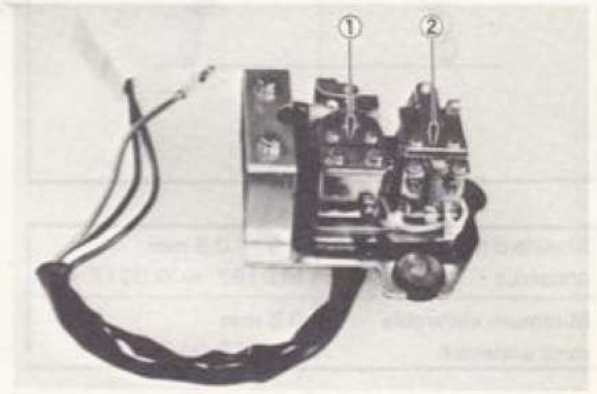


E. Regulator (Voltage Regulator)

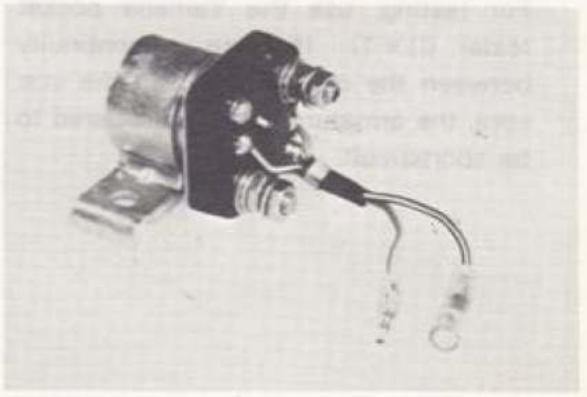
The dynamo alone can not provide stable electric current because fluctuating engine rpm affects the voltage. The regulator (also called a voltage relay) stabilizes the voltage generated by breaking the field coil circuit when the voltage exceeds a pre-set level. A cutout relay (also called a charging relay) is built into the regulator. It allows stable electric current from the dynamo output is lower than that of the battery voltage, it breaks the circuit to the battery so that battery will not drain. The starting switch is provided to direct a flow of current to the starter dynamo when the engine is started.

1. Checkout
   If the regulator can no longer control the voltage, the battery will be drained or over-charged, and all electrical parts may be burned out. So use a good tester when inspecting or adjusting the regulator. (It is advised that you learn how to adjust the regulator at training courses because it is very difficult.)

a. No-load voltage test
   1) Disconnect the lead wire (red) of the regulator and connect the positive tester lead to the lead wire (red). Then ground the negative tester lead.
   2) Start the engine and keep it running at 2,500 rpm. Your regulator is correct if the tester reads 15.8 ~ 16.5V.
   3) Start the engine and keep it running at 5,000 rpm. Your regulator is correct if the tester reads less than 16.9V.



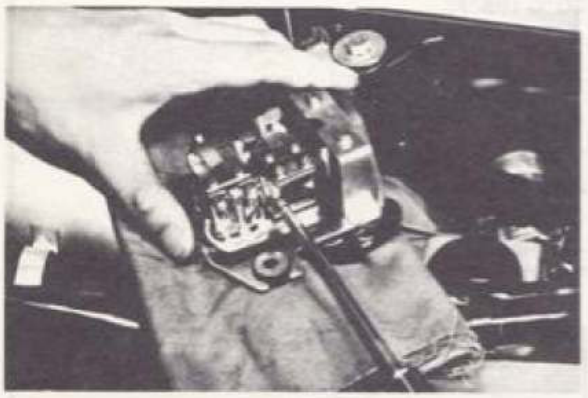
1. Voltage regulator
2. Cut out relay



1. Starter relay

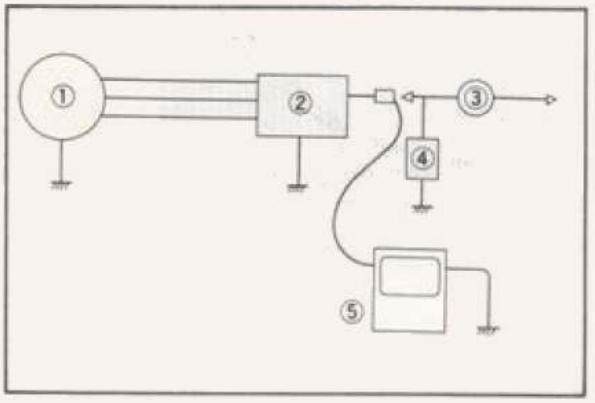
b. Adjustment

1) If the measured voltage is more or less than specified, adjust it by tightening or loosening the adjusting screw on the voltage relay side.



2) Cut-in voltage of the Cutout Relay

a) Connect the tester positive lead to the B(red) terminal, and then ground the negative lead to the frame.



1. Dynamo
2. Regulator
3. Main switch
4. Battery
5. Pocket tester

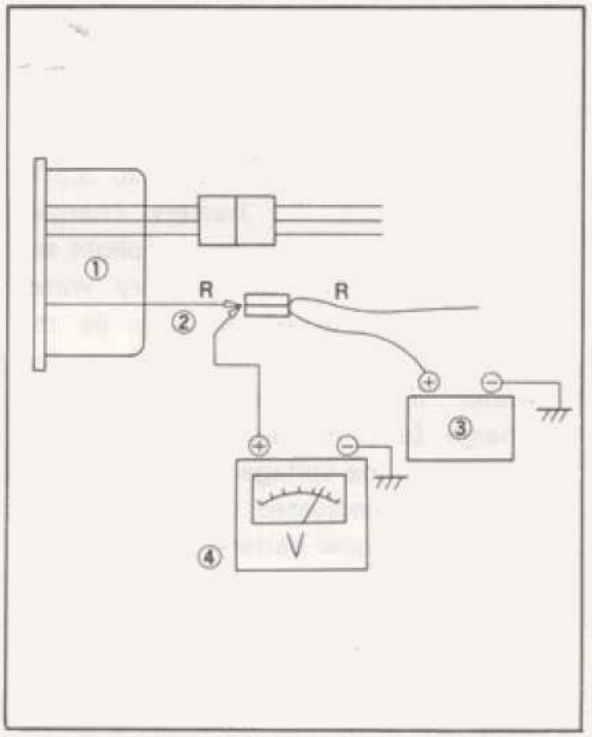
b) Start the engine, and increase engine speeds slowly. The cutout relay is correctly set if its breaker points close at 12.5 ~ 13.5V.

c) Adjustment

If the breaker points will not close at the specified voltage, adjust the cutout relay by changing its spring tension.

NOTES:

1. In actual practice, there will rarely be need to adjust the cutout relay.
2. If the point surfaces of the voltage and cutout relays are worn or pitted, polish them with fine sandpaper (No. 400-600) before making any adjustment.



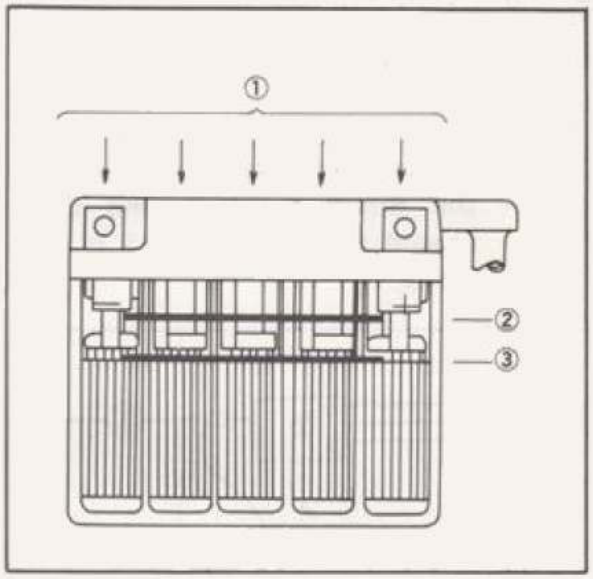
1. Regulator
2. Red lead
3. Battery
4. Pocket tester

2. Regulator Maintenance Standards

	Item	Maintenance standards	Inspection
Voltage regulator	No load voltage adjustment value	15.8—16.5V/2,500 rpm	When voltage is irregular
Voltage relay	Voltage coil resistance value Compensation value Core gap Point gap	11.8Ω/20°C (68°F) 10Ω/20°C (68°F) 0.4—0.7 mm 0.4—0.5 mm	
Cutout relay	Cut-in voltage Reversing current Voltage coil resistance value Core gap Point gap	13 ± 0.5V 5A or less 11.2Ω/20°C (68°F) 0.8—1.0 mm 0.6—0.8 mm	

F. Battery

1. The battery is a 12V-7AH unit that is the power source for all electrical components.
   Because of the fluctuating charging rate due to the differences in engine rpm, the battery will lose its charge if the horn and stoplight are excessively used at low rpm. The charging of the battery begins at about 2,500 rpm.
   Therefore, it is recommended to sustain engine rpm at about 2,500 to 3,500 rpm to keep the battery charged properly. If the horn and stoplight are used frequently, the battery water should be checked regularly as the continuing charging will dissipate the water. If the battery will not retain a charge (and the battery is in good condition), the voltage regulator setting should be readjusted.
2. Servicing a new battery
   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 plates. 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 1.270 ~ 1.280. If the electrolyte has dropped below minimum level after charging, add electrolyte (rating of 1.270 ~ 1.280).



1. Fill here
2. Max. Level
3. Min. Level

3. 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.

4. Charging

a. Remove the battery and check the specific gravity of each cell. A fully charged cell reads between 1.270 ~ 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 DT125C battery uses a 7 amp/hour battery. DO NOT exceed a one amp input as excessive heat may be generated within the battery.

NOTES:

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

5. Trouble-shooting

a. 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 dynamo.

b. Won't hold a full charge:

1) First check the dynamo 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 plates. Nothing can be done about loose terminals themselves except to replace the battery.

2) Sediment at the bottom of the housing can sometimes be removed by flushing 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.

d. 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 sulfate (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.

e. 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 hookup is left connected for any length of time.

6. 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.

7. Service Standards

Battery Spec.	12V 7HA	
Electrolyte specific gravity and quantity	1.27 ~ 1.28 520 cc	At full charge
Charging current	0.7A for 13 hours (Charge until specific gravity reaches 1.27 ~ 1.28)	When discharged
Refilling of electrolyte: Diameter:	Distilled water up to the max. level line	Once a month

G. Switches

The main switch and right and left handlebar switches may be checked for continuity or shorts with a pocket tester on the ($\Omega \times 1$) scale.

1. Main switch (DT125C)

	R	Br
OFF		
ON	○	○

2. Engine stop switch

	Br	R/W
OFF		
RUN	○	○

3. "Light" switch

	Br	L
OFF		
ON	○	○

4. Flasher switch

	Ch	Br/W	Dg
Left	○	○	
Neutral			
Right		○	○

5. Dimmer switch

	Y	L	G
Low		○	○
Hi	○	○	

6. Starter button

	L/W	Ground
OFF		
ON	○	○

7. Horn button

	P	Ground
OFF		
ON	○	○

7-7. LIGHTING SYSTEM

A. Description

The lighting system consists of the horn, headlight, taillight, stoplight, neutral light, flasher lights, meter lamps and the battery. The battery supplies 12-volt power to all lights and signals.

B. Light Bulbs and Horn

1. Headlight
   The headlight has a dual 12V, 25W /25W bulb. A high beam indicator light mounted in the tachometer has a 12V, 3W bulb.
2. Taillight and Stoplight
   A dual filament 12V, 8.3W taillight and 12V, 27W stoplight bulb is mounted in the taillight assembly. The lens of the taillight is provided with reflectors on its three sides — rear, right and left.
3. Flasher Lights
   The flasher lights each have a 12V, 27W bulb. A flasher pilot light mounted in the tachometer has a 12V, 3W bulb.
4. Neutral Indicator Light
   A neutral indicator light mounted in the tachometer has a 12V, 3W bulb.
5. Speedometer and Tachometer
   The speedometer and tachometer each have one 12V, 3W bulb for illumination.
6. Horn
   The horn is a 12V, flat type, and has a tone volume adjusting nut on its back.

C. Lighting Tests and Checks

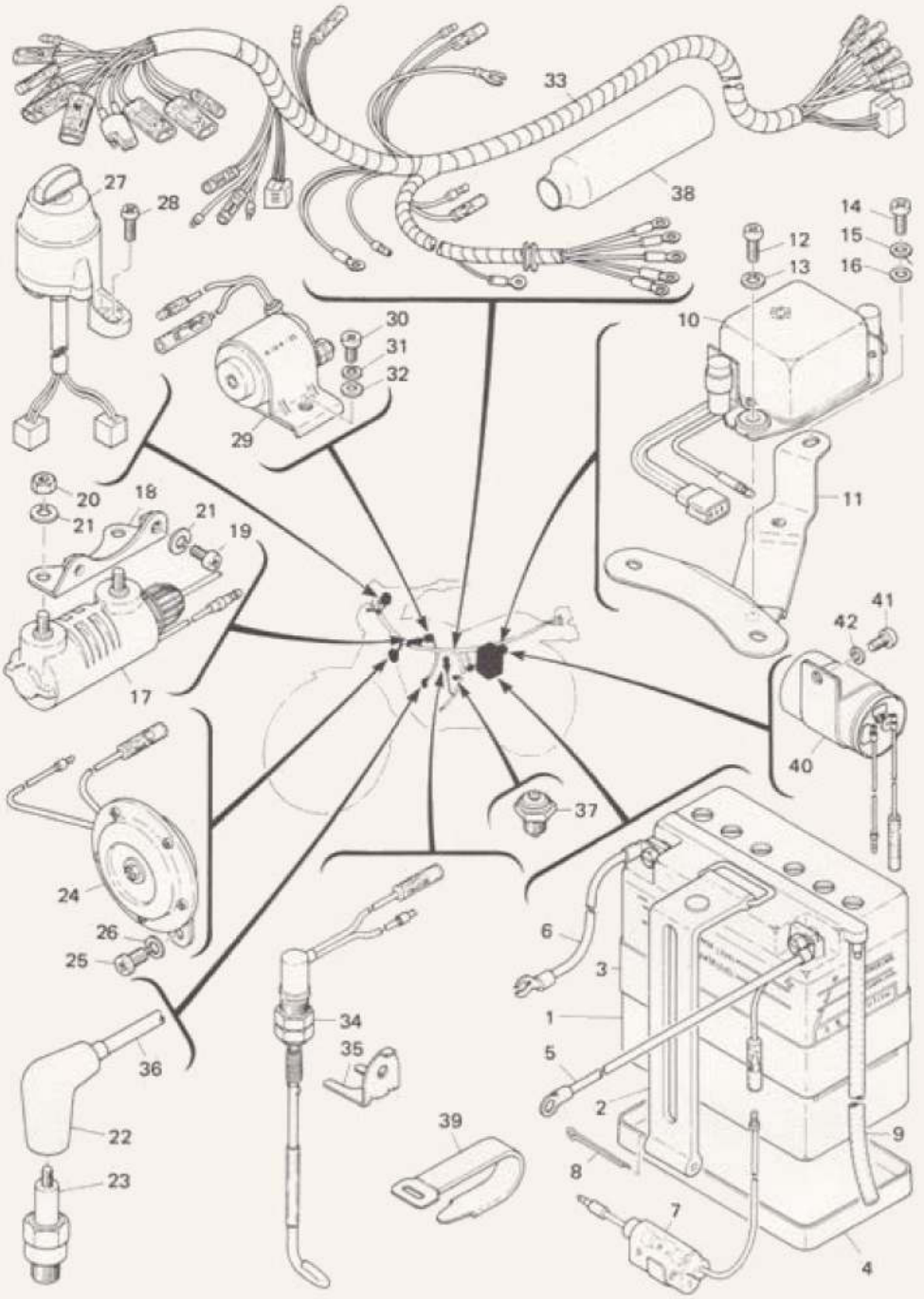
The 12V battery provides power for operation of the horn and all lights. If none of the above operate, always check battery voltage before proceeding further. Low battery voltage indicates either a faulty battery, low battery water, or a defective charging system. See Section 5-7, Charging System, for checks of battery and charging system.

1. Horn does not work.
   a. Check for +12 volts on brown wire to horn.
   b. Check for good grounding of horn (pink wire) when horn button is pressed.
2. Neutral light does not work.
   a. Replace bulb.
   b. Check for ground on light blue wire to neutral light when transmission is in neutral.
   c. Check for +12 volts on brown wire to neutral light.
   d. Replace neutral switch.
3. Taillight does not work.
   a. Replace bulb.
   b. Check for +12 volts on blue wire to taillight.
   c. Check for ground on black wire to tail/stop light assembly.
4. Stoplight does not work.
   a. Replace bulb.
   b. Check for +12 volts on yellow wire to stoplight.
   c. Check for +12 volts on brown wire to each stop switch (front brake and rear brake switches).
   d. Check for ground on black wire to tail/stop light assembly.
5. Flasher light(s) does (do) not work.
   a. Replace bulb.
   b. Right Circuit
      1) Check for +12 volts on dark green wire to light.
      2) Check for ground on black wire to light assembly.
   c. Left Circuit
      1) Check for +12 volts on dark brown wire to light.
      2) Check for ground on black wire to light assembly.
   d. Right and Left Circuits do not work.
      1) Check for +12 volts on brown/white wire to flasher switch on left handlebar.
      2) Ch-ck for +12 volts on brown wire to flasher relay.
      3) Replace flasher relay.
      4) Replace flasher switch.
6. Headlight
   a. High beam does not work.
      1) Check for +12 volts on yellow wire to headlight with dimmer switch in "High" position.
      2) Check for ground on black wire to headlight assembly.
      3) Replace headlight.

b. High beam indicator light (in tachometer) does not work.
   1) Replace bulb.
   2) Check for +12 volts on yellow wire to light.

c. Low beam does not work.
   1) Check for +12 volts on green wire to headlight with dimmer switch in "Low" position.
   2) Check for ground on black wire to headlight assembly.
   3) Replace headlight.

DT125C Electrical Components (See DT125A, B, C, Parts Lists for specific component identification)



1. Battery assembly
2. Battery band
3. Battery band
4. Battery seat
5. Plus lead wire
6. Minus lead wire
7. Fuse holder assembly
8. Cotter pin
9. Breather pipe
10. Voltage regulator assembly
11. Regulator fitting plate
12. Pan head screw
13. Spring washer
14. Pan head screw
15. Spring washer
16. Plain washer
17. Ignition coil assembly
18. Ignition coil bracket
19. Pan head screw
20. Nut
21. Spring washer
22. Plug cap assembly
23. Spark plug
24. Horn
25. Pan head screw
26. Spring washer
27. Main switch assembly
28. Pan head screw
29. Starter switch assembly
30. Pan head screw
31. Spring washer
32. Plain washer
33. Wire harness assembly
34. Stop switch assembly
35. Stop switch stay
36. High tension cord
37. Neutral switch assembly
38. Connector cover
39. Switch cord band
40. Flasher relay assembly
41. Pan head screw
42. Spring washer