

**910 SERIES WINDCHARGER
MK1 & MKII**

FAULT FINDING MANUAL

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1. INTRODUCTION

This manual contains important information concerning fault finding, maintenance and repair of your 910 series windcharger.

It is strongly recommended that you read this manual and familiarise yourself with its contents before commencing any procedures contained within this document.

Mark I and Mark II machines are covered in this manual. The MkII can be recognised by the rectangular blade fixing slots in the hub moulding as opposed to round in the MkI.

WARNING!

- 1. When turning, the windcharger is capable of generating high voltages. Extreme caution must be exercised at all times to avoid electric shock.***
- 2. No attempt to repair the system should be made until the wind generator is restrained from turning.***
- 3. The windcharger is fitted with ceramic magnets which can be easily damaged by heavy handling. The main generator assembly should be treated with care during transit and assembly.***
- 4. It is essential to observe the proper polarity when connecting the windcharger into an electrical circuit. Reverse connection will damage the windcharger and incorrect installation will invalidate the warranty.***
- 5. If in doubt refer to your dealer, a competent electrical engineer or the manufacturer.***

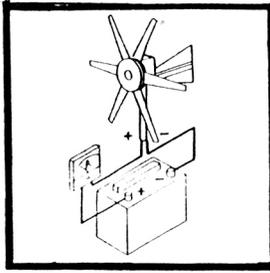


Figure 1

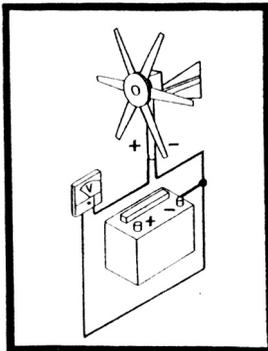


Figure 2

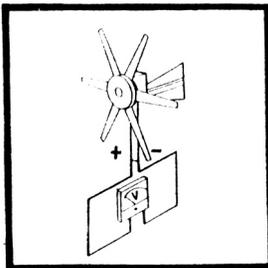


Figure 3

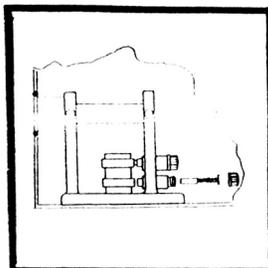


Figure 4

2. TROUBLE SHOOTING GUIDE

The following trouble shooting guide assumes that the system has been installed in accordance with the instructions contained in the Rutland Windcharger 910 Series Owners Manual.

CAUTION!

When making checks to the wind generator system, observe the warning printed in the introduction to this manual. Before removing any components, ensure that the turbine is safely restrained from turning.

a NO CHARGE CURRENT

1. The output from the generator can be checked with the machine still erected on the mounting pole by connecting an ammeter in the circuit. The ammeter will only show a reading if there is sufficient wind blowing i.e. above 5 mph (Fig.2.).

2. If there is no reading on the ammeter, disconnect the output leads from the battery and check the voltage by connecting a DC voltmeter across the output leads from the generator. If the measured voltage is over 12 Volts the wind turbine is performing correctly and indicates a faulty battery or battery connections (Fig.2).

3. If no voltage is present across the generator output leads connected to the battery, check the output directly from the two short wires from the generator (Fig.3). By spinning the blades by hand a reading of 5 volts or more indicates that the generator is OK. The fault could be in the cables between the generator and battery set. Check the continuity of the cables with an Ohms meter.

4. If no voltage is present across the generator, remove the sideplate and check the condition of the brushes and slipring. This is the most common fault with the wind turbine. Ensure that the brush is touching the slipring. If not, replace brushes (Part No. 917-001). If the slipring is dirty or contaminated with black deposits, the brushes may be sticking. This can be cleaned using very fine emery paper (Fig.4).

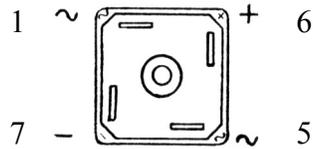
5. If the brush sliprings appear to have overheated this indicates that the battery has at some time been connected the wrong way round.

6. The rectifier(s) can also be checked using a multimeter with an Ohms scale suitable for reading up to 100 Ohms (Fig.5).

TEST	METER LEAD RED TO TERMINAL	METER LEAD BLACK TO TERMINAL	READING OHMS
1	6	5	10-20
2	5	6	Infinity
3	6	1	10-20
4	1	6	Infinity
5	5	7	10-20
6	7	5	Infinity
7	1	7	10-20
8	7	1	Infinity
9	6	7	40-80
10	7	6	Infinity

RECTIFIER UNIT

Figure 5



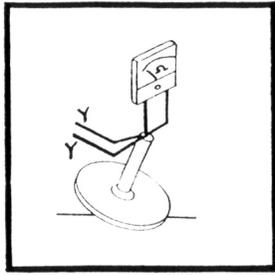


Figure 6

7. To remove measure the main stator winding resistance remove the two output wires from the end of the generator shaft. (Ignore the two yellow wires leading to the thermostat). Measure the resistance of the main winding. When checking the winding resistance ensure that the generator is absolutely stationary (Fig.6).

MkI 910 Series. Round blade sockets.	12V	8.0
		24V
24.0		
(12V - 6.0 in early machines)		

MkII 910 Series. Rectangular blade socket	12V	2.0
	24V	8.0

If the winding resistance is correct and the machine does still not function contact the manufacturer or your dealer.

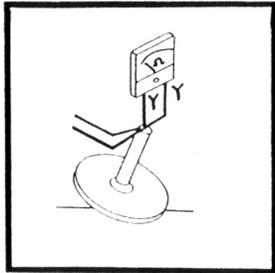


Figure 7

b. INTERMITTENT CHARGE CURRENT

Carry out the checking procedure in Section 2a. The most common cause of intermittent charge is a contaminated slipping or worn or damaged brushes.

c. LOW CHARGE CURRENT

1. Check that the battery is not defective.
2. Is the generator siting appropriate? (See Section 4 of Owners Manual).
3. Are all the blades correctly fitted? (See section 5 of Owners Manual).
4. Is the machine furling because of high winds?
(Applicable to Furlmatic models only).
5. Is there sufficient wind, i.e. above 5 mph?
- 6.** A faulty thermostat will not prevent unit from charging, however the output from the generator will be permanently restricted by either the choke to a maximum of 2 Amps or the dual rectifier to 60% of the power. To check the thermostat remove the two yellow wires from the hub shaft when the hub is cold, check with an Ohms meter scale for zero reading. If the reading is infinite either the windings are hot or the thermostat is faulty, refer to the manufacturer or your dealer (Fig.7).

7. A faulty choke is most unusual so check the solidity of the terminals and condition of the coils before fitting a replacement.

7. A transient suppressor is fitted on top of the slipping assembly. This device is fitted to prevent transients reaching the rectifier and causing damage. If this unit is faulty it will show signs of having been overheated.

8. If no solution is found contact the manufacturer or your dealer.

d. LOW BATTERY VOLTAGE

1. Check condition of batteries and battery connections.

2. Ensure the battery voltages are correct, i.e. 12 Volt or 24 Volt. (See section 4, Pre-Assembly-Batteries - 910 Series Owners Manual)

3. Check the battery discharge rate is not greater than the charge current and capacity of the batteries.

4. Refer to Section 2a, if battery connections are correct.

e. OVER-CHARGING

1. If the battery voltages are over 14.7 Volts for a 12V system and 29.4 Volts for a 24 Volt system, the batteries are being over-charged and a regulation device should be fitted. The wind turbine uses a Shunt Regulator (Part No. CA-11/01).

2. If a regulator is fitted check the regulator fuse and replace if blown with a 15 Amp 1/4" type. If the regulator does not warm up when the battery volts are high, return the regulator to the manufacturer or your dealer.

f. HIGH OUTPUT (HIGH WINDS FURLMATIC ONLY)

The Furlmatic is designed to furl out of the wind in very strong winds above 40 mph. If the machine does not furl out the batteries may be damaged through overcharging.

1. Check that the tail rotates freely on its brushes. If stiff, grease may be applied to free tail.

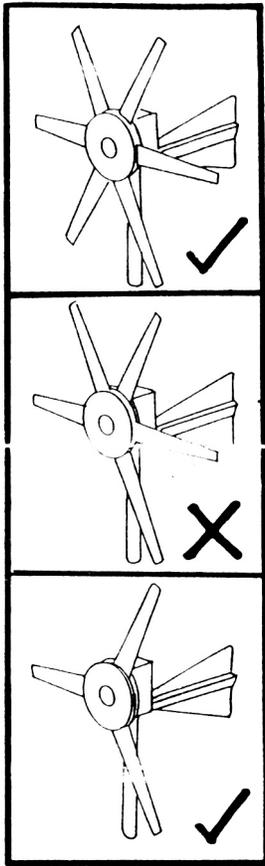


Figure 8

2. Check tail is fitted correctly (Section 5b of the Owners Manual).

3. If the machine continues not to furl, consult the manufacturer or your dealer.

g. EXCESSIVE VIBRATION (or TOWER OSCILLATION)

The turbine is designed to run silently but in strong winds some blade noise may occur. This is quite normal due to the high rpm of the turbine.

1. Check that all guy ropes are tight.

2. Check that the machine is secured on the tower properly.

3. Check for tightness of all nuts and bolts.

4. Ensure that the blades are fitted correctly. (Refer to Section 5 of the Owners Manual).

5. Check blades for damage. If any damage is found replace the blade available from your dealer or the manufacturers. The machine will run balanced with 3 blades until the replacement is fitted. (Fig.8).

h. TURBINE NOT TURNING

1. Is there sufficient wind to turn the blades i.e. above 5 mph?

2. Check for a short circuit in the system.

3. Check that the generator is running freely.

4. If the turbine is not running freely see that the generator is not touching the windshaft housing. If this is the problem remove the inspection cover. Reposition the hub so that it can rotate freely and tighten the two bolts, locking the shaft into position (Fig.9).

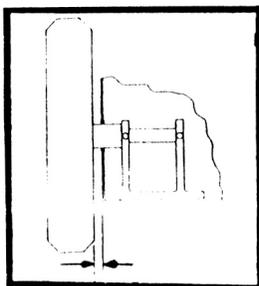


Figure 9

In the unlikely event that you encounter any problems with your windcharger, our technical sales staff will be happy to advise you on any of these procedures or any other queries that you may have.

3. BEARING REPLACEMENT

a. HUB BEARINGS

Worn hub bearings can be the cause of vibration. This can be checked by moving the wind shaft from side to side. If there is excessive movement this indicates worn bearings. The removal of the hub bearings allows the stator winding (item 2) to be changed. Study the exploded view for your particular machine to familiarise yourself with the components before starting.

CAUTION

When offering hubs towards each other they will be attracted together by a large magnetic force capable of severely damaging fingers.

When re-assembling it is essential the indents on the mating face of each hub half line up with each other. When the hub is apart care should be taken to ensure that no steel or magnetic particles are picked up by the magnet. It is also essential to make sure that the magnets are clean before re-assembly.

1. Remove the blades. Two screws per blade on Mk1 machines and four screws per blade on MkII machines.
2. Remove the side cover plate and remove wires from the choke and from the rectifier. Machines fitted with twin rectifiers remove wires from the rectifiers.
3. Slacken the wto shaft locking screws (item 21) and slide the hub out of the wind shaft support casting (item 5).
4. Remove the six screws (item 17) joining the hub halves together. Insert two screws (item 17) in the back of the hub. Gradually turn the screws jacking the two hub halves apart. Once the hub is part the stator can be removed.

WARNING! The hub halves are very strong magnets and should be handled with extreme care.

5. The bearings are held on the shaft by loctite Grade 648 and into the hub by loctite Grade 641. It is most essential that loctite be used.
6. The bearings can be removed with a suitable bearing puller.
7. Before replacing the bearings remove all the loctite deposits from the shaft and bearings. This is most important, to allow the halves to join properly.
8. Once assembled allow at least 1 hour for the loctite to harden before turning the shaft.

b YAW BEARINGS

Worn yaw bearings can be the cause of vibration. This can be checked by moving the tail fin up and down with the machine mounted on its pole (Fig.10). Excessive movement indicates worn bearings. The removal of the pole casting (item 3) from the wind shaft support casting (item 5), allows the bearings to be renewed and replacement of the slipring.

1. Remove the inspection cover and remove the brushes from the brush holders.
2. Remove the M5 locking screw from the side of the wind shaft support casting (item 5).
3. Gently heat the wind shaft support casting with a hot gun, (direct heat away from the wind shaft housing to prevent damage to the paint).
4. With a soft mallet tap the pole casting until it is free from its housing.
5. Unsolder the output wires (red and black) from the top of the slipring.
6. The slipring can now be removed by placing the ring in a soft jaw vice and gently tapping the pole casting until the loctite seal is broken.
7. Remove the circlip with circlip pliers.
8. Finally, remove the bearings with a suitable bearing puller.
9. Replacing the bearings is the reversal of removing with the addition that the slipring must be fitted with loctite Grade 648.

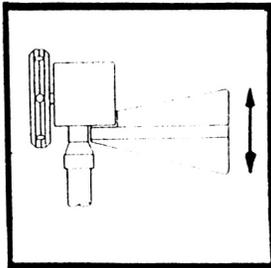
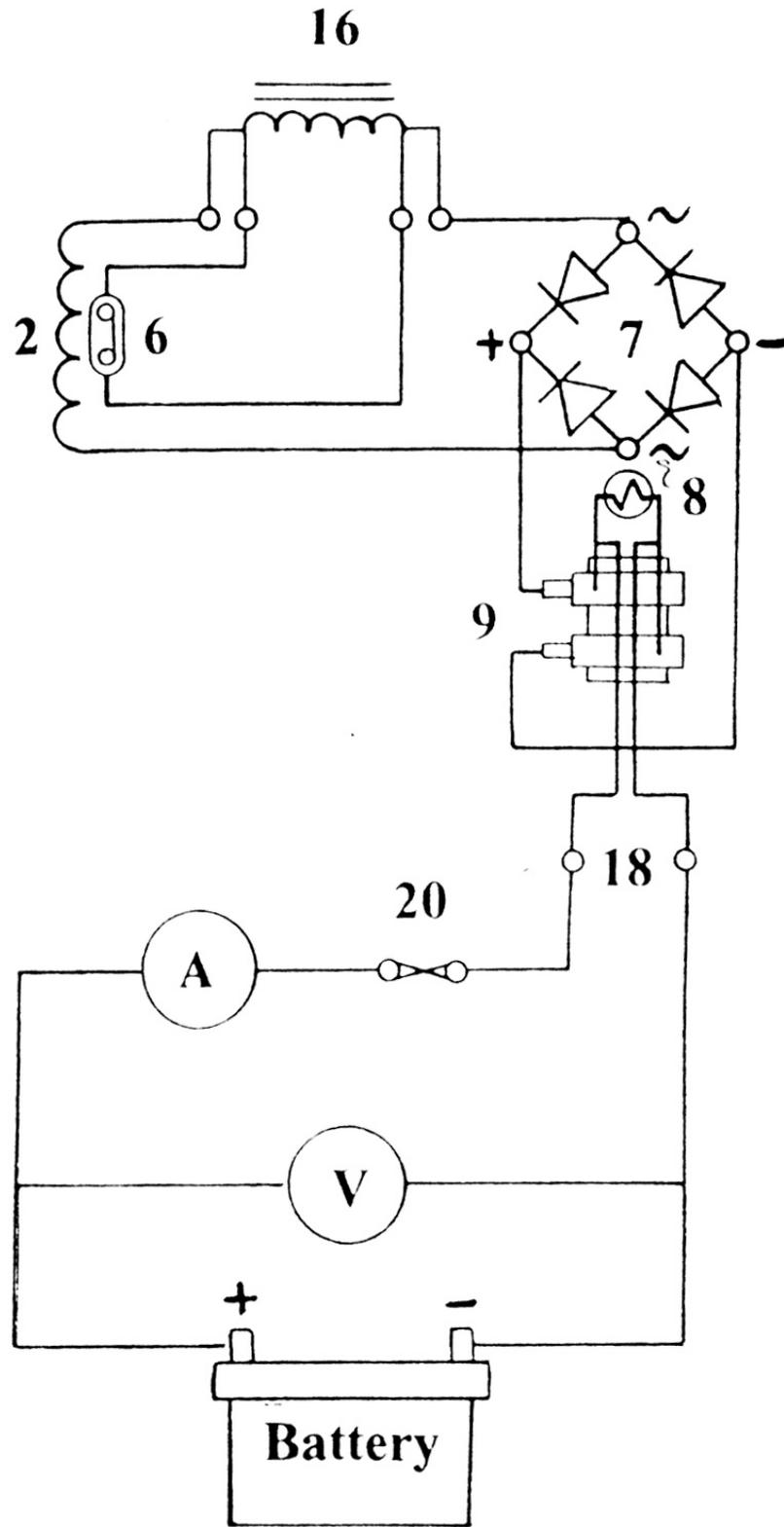
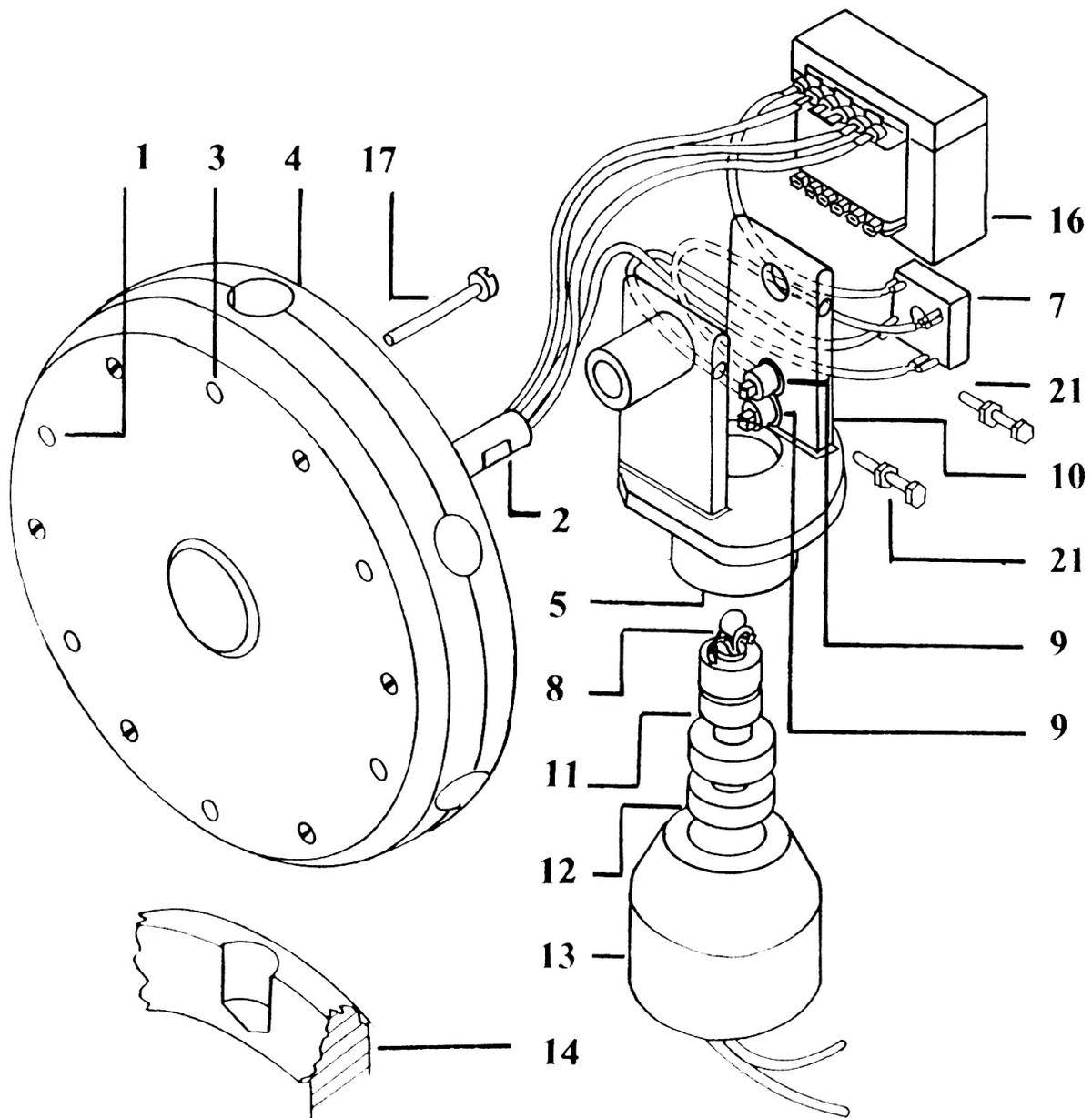


Figure 10

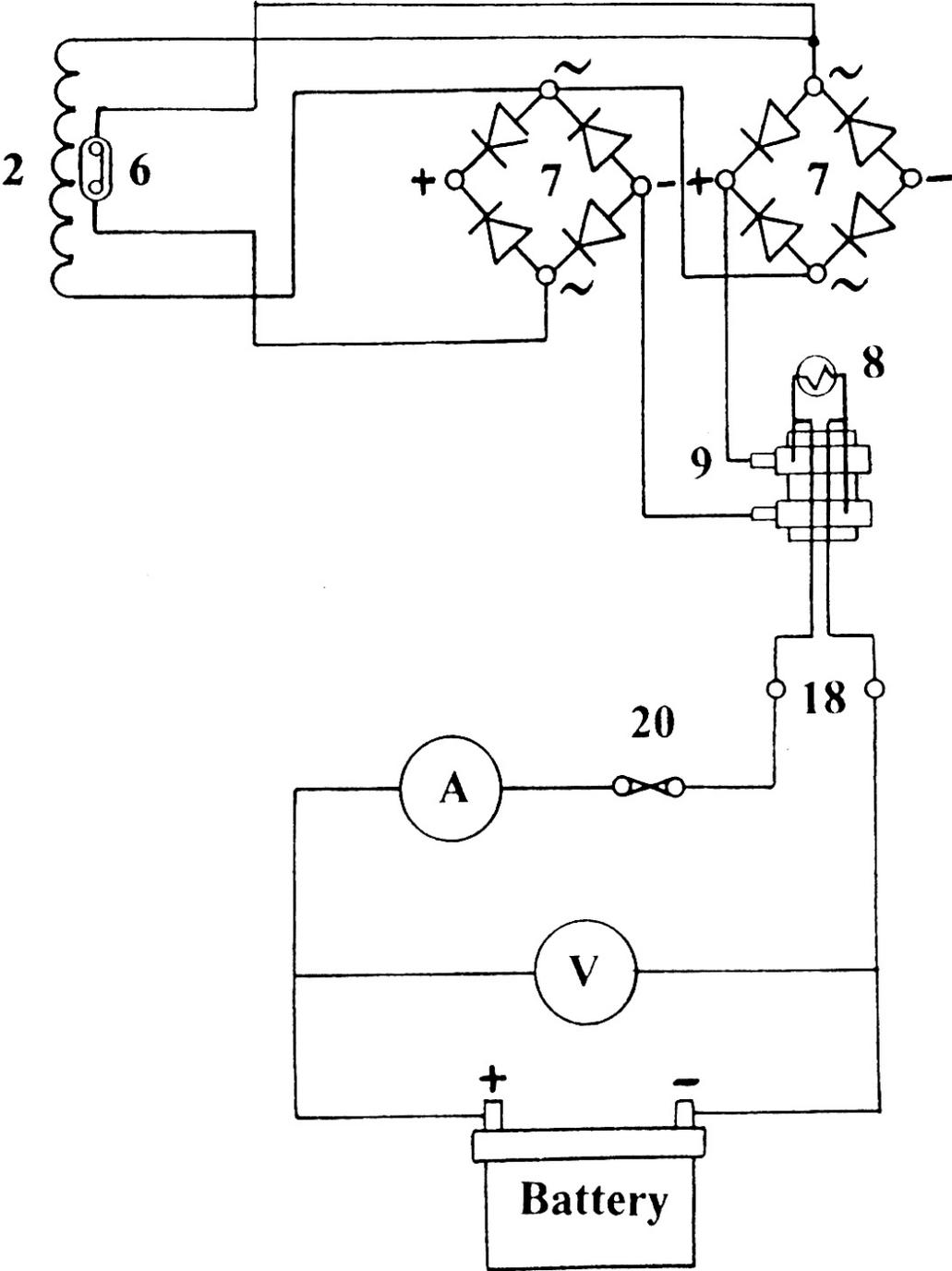
Internal Wiring Diagram with Choke Mk I



Exploded View with Choke Mk I



Internal Wiring Diagram with Twin Rectifiers Mk II



Exploded View with Twin Rectifiers Mk II

