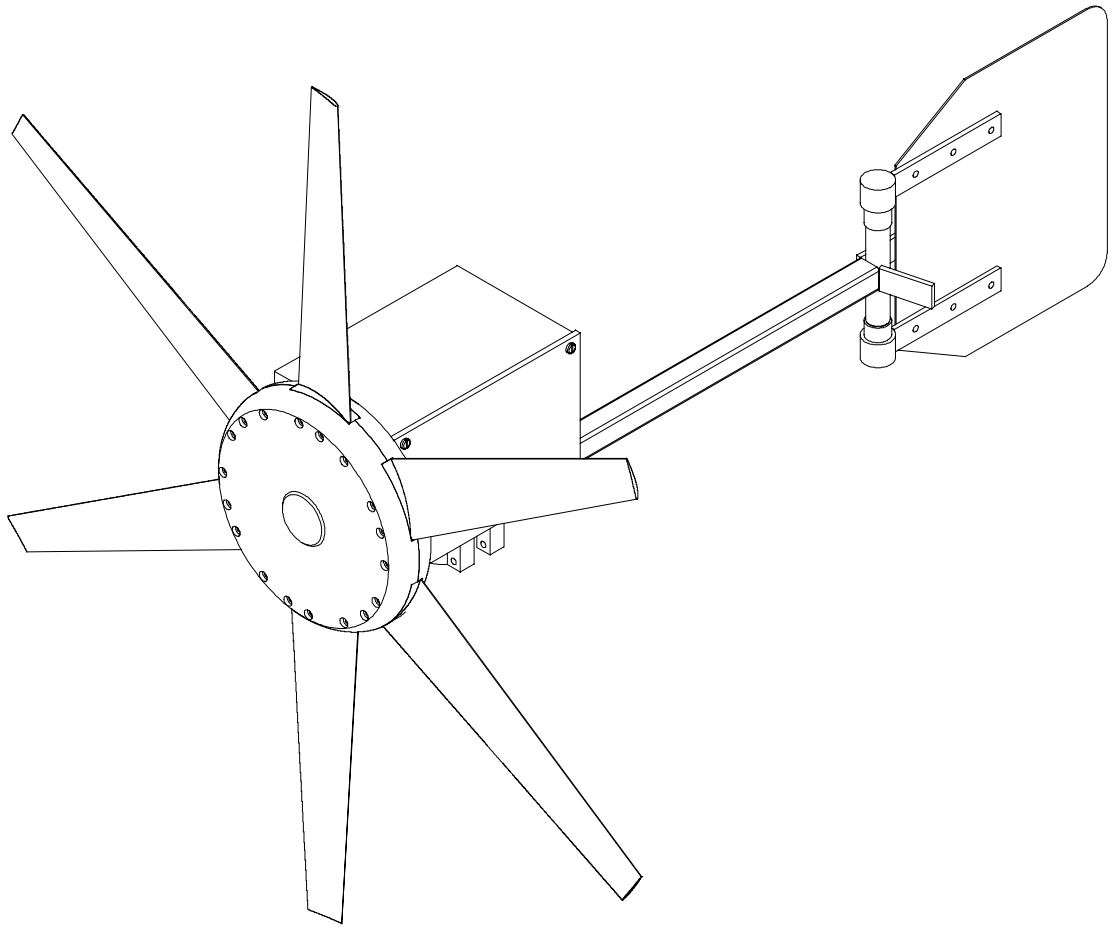
Rutland FM910-3 Windcharger
Fault Finding Guide



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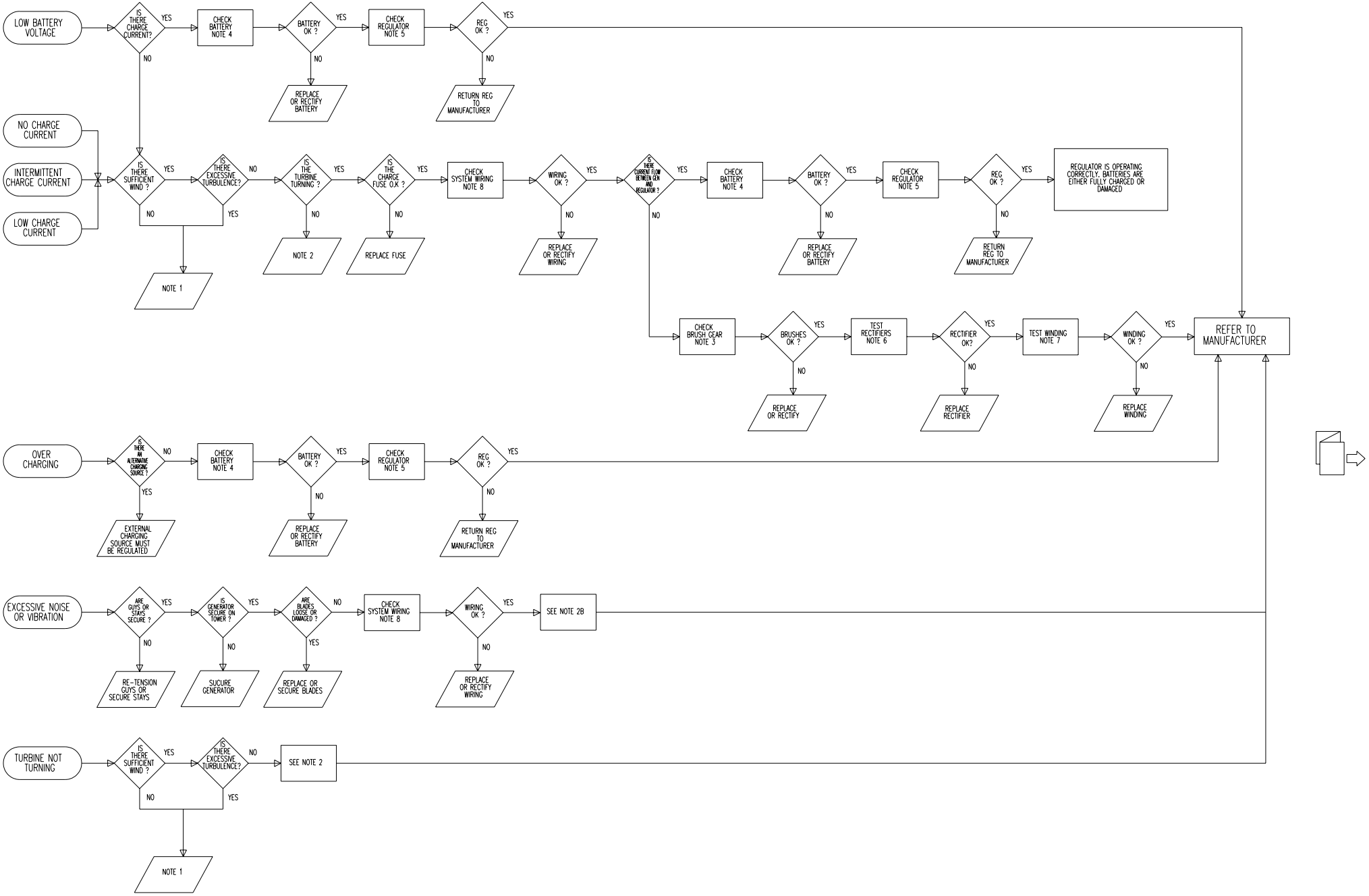

LOW BATTERY VOLTAGE
IS THERE CHARGE CURRENT?
YES
NO
CHECK BATTERY NOTE 4
BATTERY OK ?
YES
NO
REPLACE OR RECTIFY BATTERY
CHECK REGULATOR NOTE 5
REG OK ?
YES
NO
RETURN REG TO MANUFACTURER
NO CHARGE CURRENT
INTERMITTENT CHARGE CURRENT
LOW CHARGE CURRENT
IS THERE SUFFICIENT WIND ?
YES
NO
IS THERE EXCESSIVE TURBULENCE?
NO
YES
NOTE 1
IS THE TURBINE TURNING ?
YES
NO
NOTE 2
IS THE CHARGE FUSE O.K ?
YES
NO
REPLACE FUSE
CHECK SYSTEM WIRING NOTE 8
WIRING OK ?
YES
NO
REPLACE OR RECTIFY WIRING
IS THERE CURRENT FLOW BETWEEN GEN AND REGULATOR ?
YES
NO
CHECK BATTERY NOTE 4
BATTERY OK ?
YES
NO
REPLACE OR RECTIFY BATTERY
CHECK REGULATOR NOTE 5
REG OK ?
YES
NO
RETURN REG TO MANUFACTURER
REGULATOR IS OPERATING CORRECTLY. BATTERIES ARE EITHER FULLY CHARGED OR DAMAGED
CHECK BRUSH GEAR NOTE 3
BRUSHES OK ?
YES
NO
REPLACE OR RECTIFY
TEST RECTIFIERS NOTE 6
RECTIFIER OK?
YES
NO
REPLACE RECTIFIER
TEST WINDING NOTE 7
WINDING OK ?
YES
NO
REPLACE WINDING
REFER TO MANUFACTURER
OVER CHARGING
IS THERE AN ALTERNATIVE CHARGING SOURCE ?
NO
YES
EXTERNAL CHARGING SOURCE MUST BE REGULATED
CHECK BATTERY NOTE 4
BATTERY OK ?
YES
NO
REPLACE OR RECTIFY BATTERY
CHECK REGULATOR NOTE 5
REG OK ?
YES
NO
RETURN REG TO MANUFACTURER
EXCESSIVE NOISE OR VIBRATION
ARE GUYS OR STAYS SECURE ?
YES
NO
RE-TENSION GUYS OR SECURE STAYS
IS GENERATOR SECURE ON TOWER ?
YES
NO
SUCURE GENERATOR
ARE BLADES LOOSE OR DAMAGED ?
NO
YES
REPLACE OR SECURE BLADES
CHECK SYSTEM WIRING NOTE 8
WIRING OK ?
YES
NO
REPLACE OR RECTIFY WIRING
SEE NOTE 2B
TURBINE NOT TURNING
IS THERE SUFFICIENT WIND ?
YES
NO
IS THERE EXCESSIVE TURBULENCE?
NO
YES
SEE NOTE 2
NOTE 1

INTRODUCTION

This manual contains important information concerning fault finding on your Rutland FM910-3 Windcharger.

It is strongly recommended that you read this manual and familiarise yourself with its contents before attempting to repair the Windcharger system.

To use this fault finding guide, open out this flow chart, select the symptom in the left hand column & follow the arrows & instructions.

WARNING!

- *When turning, the Windcharger is capable of generating voltages in excess of the nominal voltage, therefore it should not be allowed to rotate without connection to the battery or regulator. Caution must be exercised at all times to avoid electric shock.*

- *No attempt to repair the system should be made until the wind generator is restrained from turning.*

- *The Windcharger is fitted with ceramic magnets which can be damaged by heavy handling. The main generator assembly should be treated with care during transit and assembly.*

- *It is essential to observe the correct polarity when connecting the Windcharger and all other components into an electrical circuit. Reverse connection will damage the Windcharger and incorrect installation will invalidate the warranty.*

- *If in doubt, refer to your dealer, a competent electrical engineer or the manufacturer.*

Notes:

1. Insufficient Wind / Turbulence
Please see page 4 of the WG910-3 Owners Manual "Siting the Windcharger"- Document No SM-124 supplied with the FM910-3.

2. Turbine Not Turning
A. Check for a short circuit in the system. Ensure there are no wires trapped or shorted to the supporting pole or other earth on the system. Ensure all wiring is connected correctly and securely.

B. Check that the generator hub is running freely by rotating the hub by hand. If it does not, it could be due to a mechanical defect inside the hub. If the hub produces a rumbling sound, this could be due to faulty bearings which should be replaced.

3. Check Brushes and Slipring
- Remove the generator from it's mounting & place it face down on a suitable flat surface.
- Remove the 4 screws which secure windshaft housing cover in place, remove the cover to expose the rectifier assembly.
- Remove the 4 self tapping screws which secure the brush holder assembly in place.
- Withdraw the brush assembly and inspect the brushes and slipring surface.
  The slipring can be cleaned using fine emery cloth, applying light pressure to the slipring while rotating the post adaptor.
  Check the brushes for signs of damage or overheating, overheating indicates that at some time the battery has been connected with reverse polarity.
- Replace brushes if necessary.

4. Check Battery Condition.
- Check that the battery voltage is correct for the system.
- Check the battery terminal voltage.
- Check electrolyte level if a non-sealed battery is fitted.

5. Check Regulator.
This section applies to the SR200 regulator. If you have a RWS200 or other regulator, please refer to the regulator manual.
Before attempting to bench test the regulator, disconnect it from the system & re-connect the wind generator directly to the battery, if the system now charges as expected this indicates that the regulator is at fault, if the symptoms are still unchanged then this indicates the fault is elsewhere.
In order to check the regulator it is necessary to use a variable d.c power supply together with a voltmeter and ammeter, if this equipment is not available the regulator must be returned to the manufacturer.

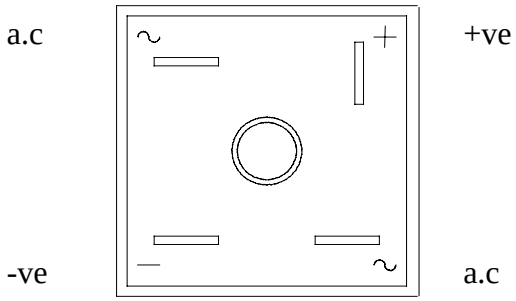
- Connect the Black lead of the SR200 to the negative of the power supply.
- Connect both the Brown and the Red leads of the SR200 to the positive of the power supply.
- Slowly increase the voltage of the power supply until 13.8v (27.6v on 24v unit) is reached, at this point the regulator will begin to draw current and the red LED will

light, a further increase of the power supply voltage will cause the Regulator to draw more current & the voltage will rise to a max of 14.4v (28.8v on 24v unit).

- The built in blocking diode can be checked using a multimeter set to Ohms range applied between the Red & Brown leads of the Regulator. Positive lead to Brown, negative lead to Red should show continuity. Positive lead to Red, negative lead to Brown should show no continuity.
- If the Regulator does not operate as above it should be returned to the manufacturer or replaced.

6. Check Rectifiers.

- Remove the connections from both rectifiers
- Using a multimeter on Ohms range, the rectifier can be tested as follows.



Red lead to +ve rectifier terminal, Black lead to each a.c terminal - No Continuity
Black lead to +ve rectifier terminal, Red lead to each a.c terminal - Continuity
Red lead to -ve rectifier terminal, Black lead to each a.c terminal - Continuity
Black lead to -ve rectifier terminal, Red lead to each a.c terminal - No Continuity

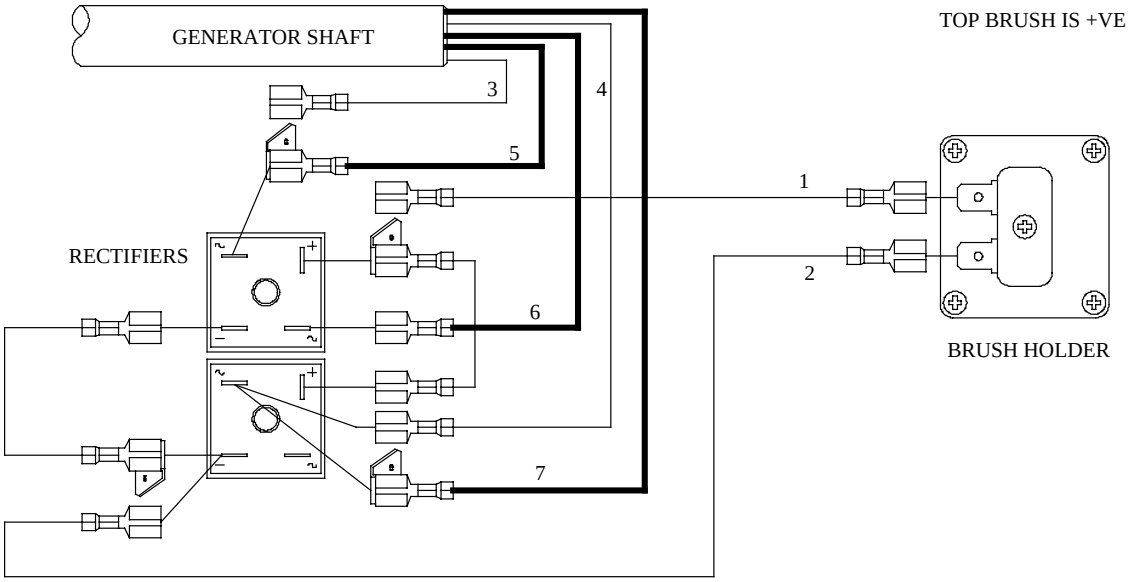
- If the rectifiers do not check out as above they should be replaced.

7. Check Winding.

- Disconnect the 3 generator leads from the rectifiers.
- Using a multimeter on Ohms range or an Ohmeter, measure the resistance between 2 of the 3 leads, the reading should be approx 1.6Ω for a 12v machine, 6.4Ω for a 24v machine, at 20°C.
- Repeat the process for each combination of 2 leads, in each case the readings should be approximately the same.
- If the resistance measured is greatly different from above, the winding should be replaced.
- Disconnect the 2 thermostat leads from the rectifier, using a multimeter on Ohms range, check the continuity of the thermostat between these 2 leads, at room temperature the thermostat should be open indicated by no continuity reading, if continuity is measured the winding should be replaced.

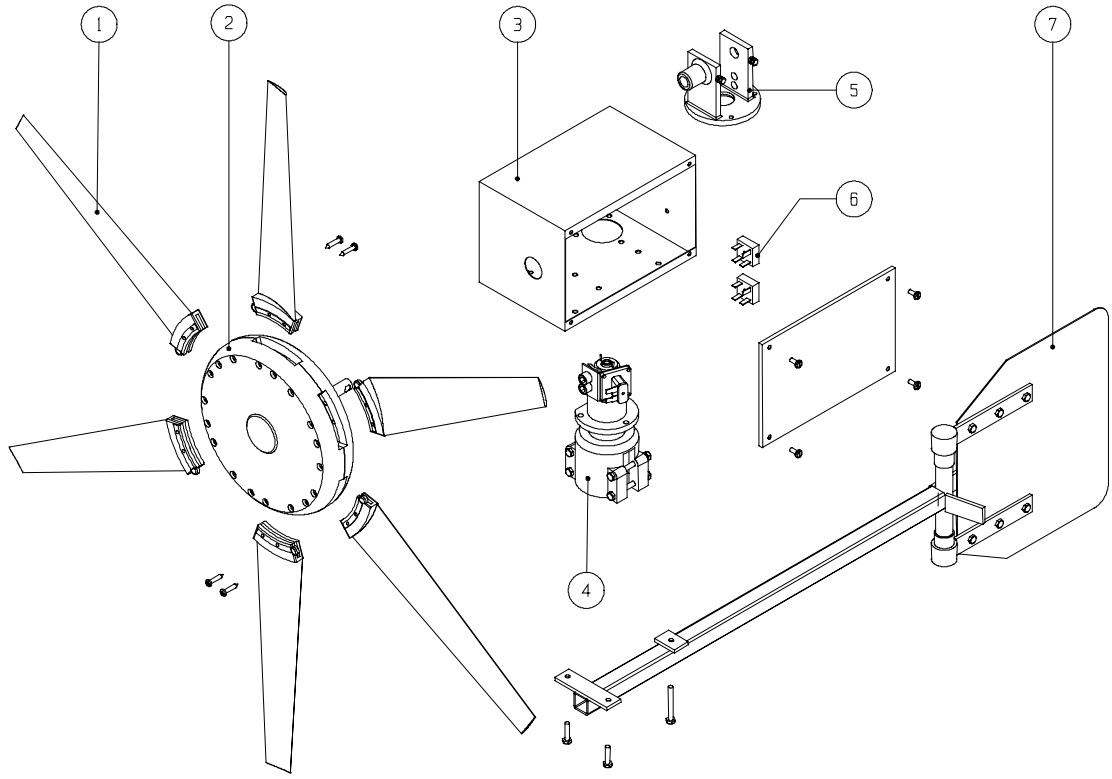
8. Check System Wiring

- Check all wiring & connections between the wind generator, regulator and battery for damage, corrosion & open circuit or poor/loose connections.



No	Description
1	Red cable
2	Black cable
3	Thermostat lead
4	Thermostat lead
5	Winding output lead
6	Winding output lead
7	Winding output lead

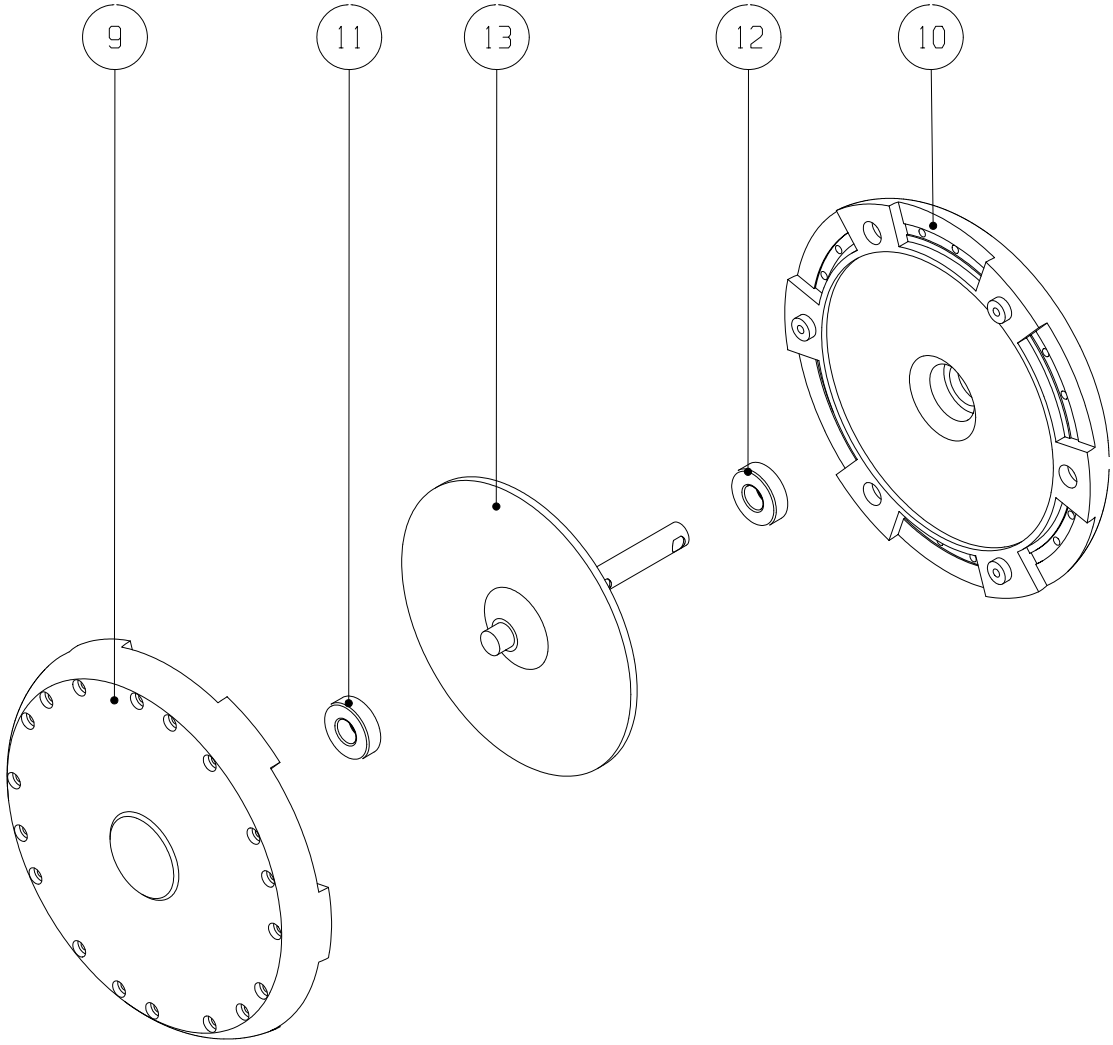
Internal Wiring Diagram



Exploded View 1. Main assemblies.

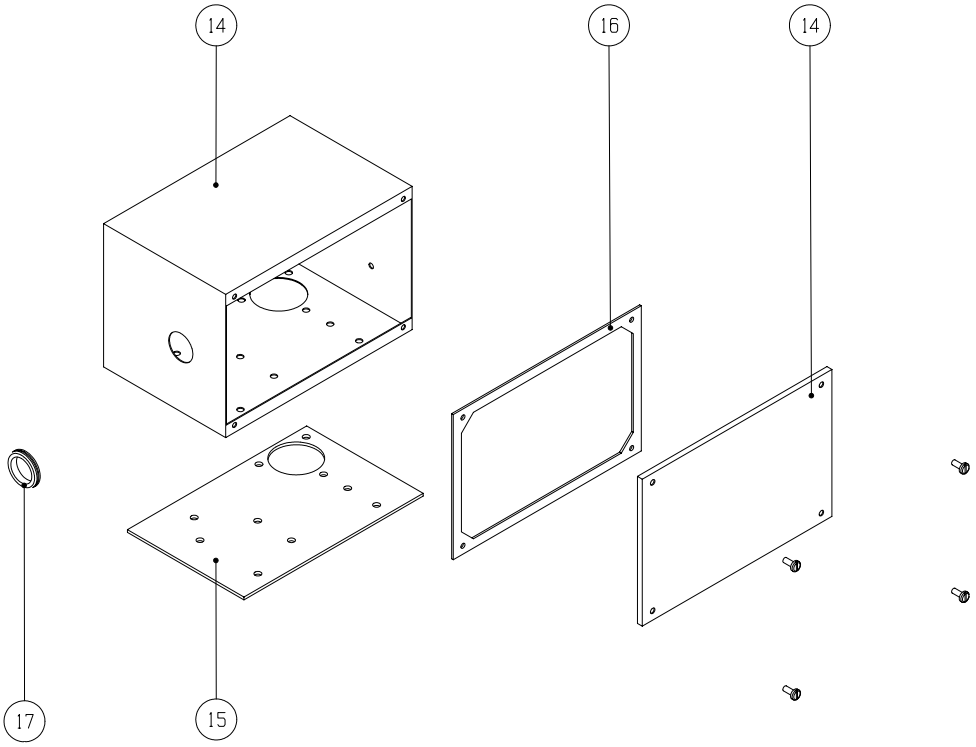
Item No	Description	Marlec Part No
1	Aerofoil Blade	01-100
2	Hub assembly (Exploded view 2)	SA-02/07 (12v)
	Including: Front Hub Moulding (Item 9)	SA-02/08 (24v)
	Rear Hub Moulding (Item 10)	
	6202 2RS Bearing (Items 11 & 12)	
	Stator Winding (Item 13)	
3	Windshaft Housing Assembly (Exploded view 3)	SA-09/02
	Including: Windshaft Housing (Item 14)	
	Baseplate (Item15)	
	Gasket (Item 16)	
	Grommet (Item 17)	
4	Post casting Assembly (Exploded view 4)	SA-05/05
	Including: Slipring (Item 18)	
	Carbon Brush (item 19)	
5	Windshaft Casting Assembly	SA-04/03
6	Bridge Rectifier	913-001
7	Tail assembly	SA-08/01

Items above with Part Nos prefixed 'SA' are supplied ready assembled.
Components of assemblies with Item numbers are available separately.



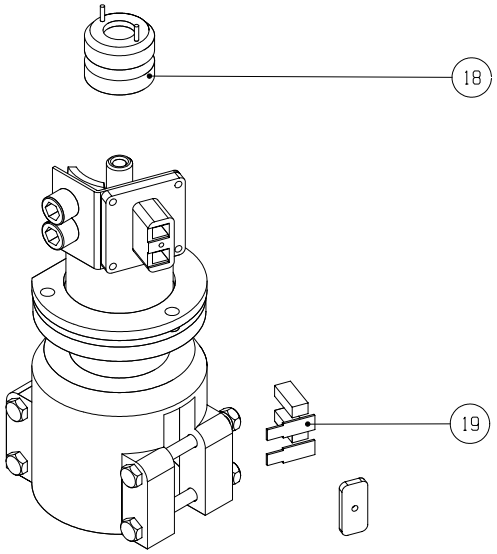
Exploded view 2. Hub assembly

Item No	Description	Marlec Part No
9	Hub Moulding (Front) MK III	SA-01/05
10	Hub Moulding (Rear) MK III	SA-05/04
11	6202 2RS bearing (Hub Front)	921-013
12	6202 2RS bearing (Hub Rear)	921-013
13	Stator MKIII 12V (FM910-3)	SA-06/09
	Stator MKIII 24V (FM910-3)	SA-06/10



Exploded view 3. Wind shaft housing assembly

Item No	Description	Marlec Part No
14	Windshaft Housing	SA-09/02
15	Baseplate	01-046
16	Gasket	01-062
17	Grommet	931-001



Exploded view 4. Post adaptor assembly.

Item No	Description	Marlec Part No
18	Slipring	919-003
19	Carbon Brush (Qty 2 Required)	917-003