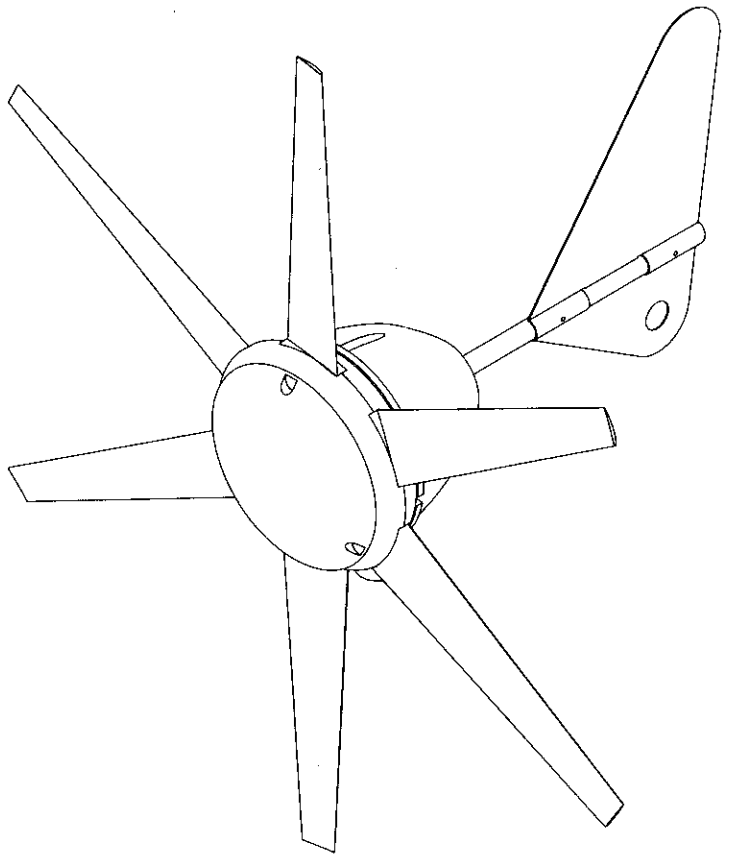
Rutland 913 Windcharger
Owners Manual



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Contents

INTRODUCTION

This manual contains important information concerning your Rutland 913 Windcharger and its installation and operation.

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

The Rutland 913 Windcharger is designed to provide a direct current (DC) power supply via a battery bank for 12/24V equipment, lighting, etc. It is also ideal for leisure and professional applications which require battery charging on non-mains sites.

WARNING!

- *Mounting pole outside diameter MUST NOT exceed 48.5mm. Larger section poles must not be used as this will reduce the tower to blade clearance. In high wind conditions this could cause damage to the windcharger by allowing the blade to come into contact with the mounting pole.*

- *When turning, the Windcharger is capable of generating voltages in excess of the nominal voltage. 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.*

- *The fuse supplied must be fitted to protect the system.*

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

CHECK YOU HAVE RECEIVED

- 24 x No. 10x25mm special self-tapping screws
- 1 x fuse and fuse holder
- 1 x main generator assembly
- 6 x aerofoil blades
- 1 x nose cone + 3 x nylon fixing screws
- 1 x 6mm allen key
- 1 x 2-way terminal block
- 2 x M10 buttoncap screws
- 2 x shakeproof washers

In the event of loss or damage, consult your dealer or the manufacturer.

WHAT YOU WILL NEED

Tools

- Suitable wire stripper
- Small terminal screwdriver
- Large flat blade screwdriver
- Phillips (cross-head) screwdriver

Other Items You Will Need

- Mounting pole
- Cable
- Batteries
- Battery terminals
- Connector blocks (as determined by your total system)

Other Items You May Have Selected

- SR200 Regulator or RWS200 Charge Controller
- Inter-connect unit
- Cable kit
- Rutland 913 mounting kit

SITING THE WINDCHARGER

General Considerations

The location and height of the mounting pole or tower for your wind turbine will be the major factor in the overall performance of your system.

The smooth flow of wind over land and water is often interrupted by a multitude of obstructions causing wind sheer and turbulence.

Wind sheer describes the interference between the fast moving upper air and the slow moving air close to the ground and the resulting decrease in average wind speed as one gets closer to the ground.

Turbulence is caused by the wind passing over obstructions such as moored boats, trees and buildings. Both wind sheer and turbulence diminish with height and can be overcome simply by putting the machine sufficiently high above them.

It is therefore essential that the wind generator should be located in an area as free as possible from disturbed wind flow. Bear in mind that downwind obstructions can be as detrimental to performance as upwind obstructions (Fig.1).

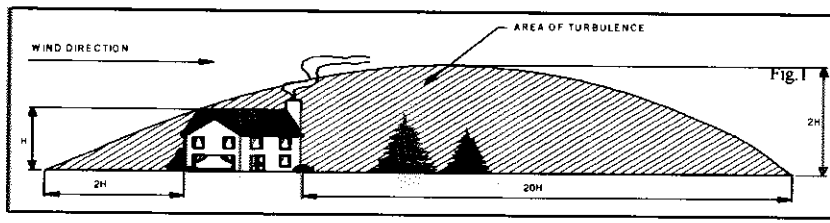


Fig.1

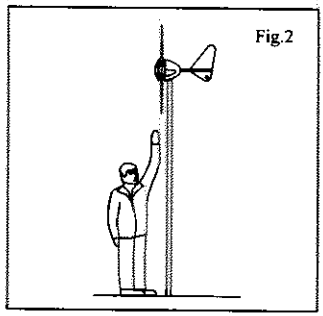


Fig.2

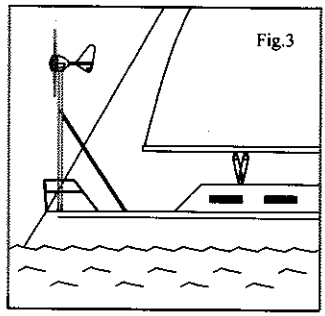


Fig.3

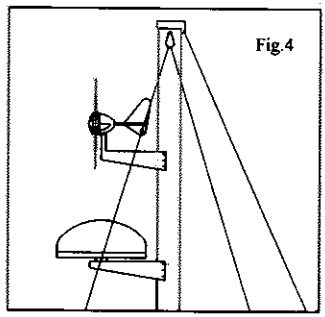


Fig.4

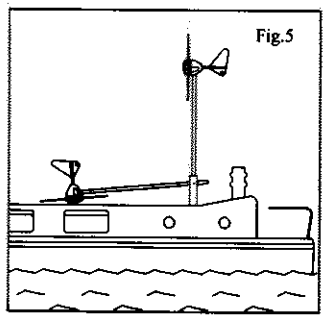


Fig.5

The wind generator should be mounted in a safe position, a minimum of 2.3 metres (7.6 feet) above the deck and away from other obstacles which could interfere with the blades or tail assembly (Fig. 2).

The Rutland 913 Mounting Kit (PartNo.CA-12/02) is available for deck mounting, or short sections of stainless steel tube of 1200mm and 600mm pre-drilled are also available for your own fabrication.

The Rutland 913 is designed to fit inside an aluminium or stainless steel tube with an internal diameter of 41mm. IMPORTANT: The external diameter MUST NOT exceed 48.5mm, see Warning in Introduction.
Suitable tubes:Stainless Steel $1^{3}/_{4}$" 16 SWG
Aluminium $1^{7}/_{8}$" 10 SWG

We suggest the following mountings according to preference and site conditions:-

- Pushpit (Fig.3)

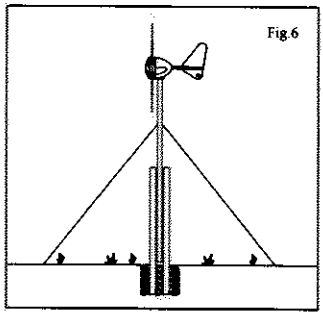
A suitable pole mounted to the deck with deck plates and guy ropes is the most popular method of mounting the Windcharger on yachts, eg. Rutland 913 Mounting Kit.

- Mizzen (Fig.4)

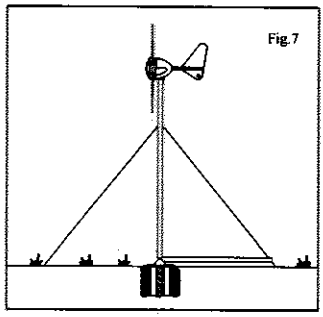
Mizzen mounting is suitable on larger yachts, taking advantage of greater wind flow the higher the wind turbine is mounted.

- River Boats (Fig.5)

A pivot pole is ideal for river boats as the Windcharger can easily be raised and lowered.



Centre pivoted pole



Base pivoted with gin pole

Land Based Systems

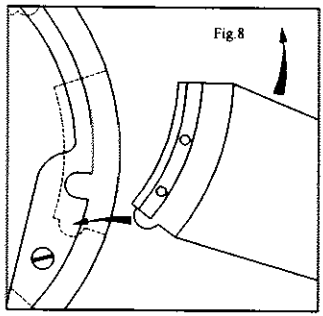
The Rutland 913 is designed to fit inside an aluminium, stainless or steel tube with an internal diameter of 41mm. IMPORTANT: The external diameter MUST NOT exceed 48.5mm, see Warning in Introduction.

A suitable mounting pole can be erected using a 6.5 metre (21 feet) galvanised (medium) tube. The tube must be supported by a minimum of four guy lines.

The attachment points for the guy lines to the tower should be securely fixed to the tower.

- The guy wires should be a minimum of 4mm in diameter.
- The shackles should be a minimum of 5mm in diameter.
- Rigging screws should be a minimum of 5mm in diameter.
- All items should be galvanised or stainless steel for protection against corrosion.
- Where guy lines are looped, the loop must incorporate a thimble and be fitted with a minimum of three rope grips.
- All ground fixings must be made suitable according to the terrain.

We suggest pivot type towers as these allow for easier installation and lowering for access to the wind generator. Two forms of pivot tower are suggested in Figs 6 & 7.



ASSEMBLY AND INSTALLATION OF THE WINDCHARGER

Blade Assembly (Fig.8)

1. Place the generator assembly on a flat surface hub-side down.

2. Position blade as shown. **The blades will only fit one way round.** Insert the protrusion at the trailing edge of the blade root fixing first into socket to align with the corresponding recess in the blade socket. The blade can then be easily inserted with a lever action. Gentle assistance with a soft faced mallet may be required.

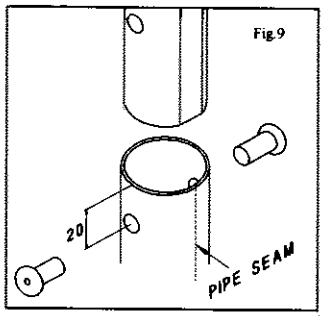
3. **Four screws are required for each blade.** Secure each blade with two special self-tapping screws provided by inserting each in turn through the cut-out in the nacelle, rotating the generator each time until the holes align.

4. Fit the remaining blade screws from the front of the generator hub.

5. Check tightness of all screws. (Do not over-tighten).

6. Fit the plastic nose dome in position on the front of the generator hub and secure in place with the three nylon screws provided.

Alternatively the blades and nose dome can be fitted after mounting the generator assembly to the tower.



Fitting Generator to the Tower (Fig.9)

1. The post adapter fitted to the 913 is designed to fit inside a standard 41mm internal diameter tube. The adapter is provided with a flat on one side to clear the weld seam on seamed pipe .

2. Mark and centre-punch two positions diametrically opposite, at 90° to the pipe seam if necessary, 20mm from top of the tube.

3. Drill two holes 10.5mm in diameter on centre-punch positions.

4. Position the Windcharger on the tower ensuring the flat on the post adapter aligns with the pipe seam if necessary. Two M10 x 16mm screws and shakeproof washers are provided for securing once the cables are installed.

Note: When using the Rutland 913 Mounting Kit, items 2 and 3 can be ignored as the unit is pre-drilled.

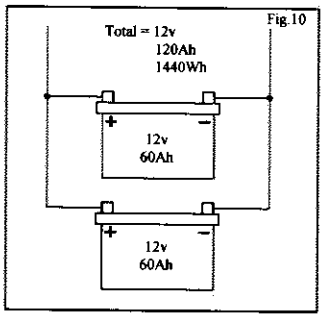
Final Mechanical Check

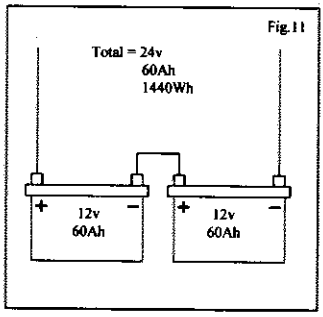
1. Check the tightness of blade screws and nose dome.

2. Check the free rotation of the hub and yaw axis.

Do not raise the Windcharger at this stage, the turbine must be connected to the battery before the blades are allowed to turn in the wind.

BATTERIES





Leisure/Deep Cycle batteries are specifically designed for good performance in terms of charge/discharge cycles. Batteries are the most important part of your battery charging system and should be sized according to your load requirements and provide at least 3 days reserve capacity. This will reduce cycling, prolong the life of the battery and ensure system reliability during periods of low wind.

Permanent connections should always be made to the battery terminals. Never use crocodile clips or similar devices. Battery terminals should be well greased with petroleum jelly or similar.

We strongly recommend the SR200 or RWS200 is fitted to prevent battery overcharging in strong winds and is essential with gel/sealed batteries.

Batteries may be linked as follows:

- In parallel to increase amp hours (Fig.10).
- In series to increase voltage (Fig.11).

Red is + Positive
Black is - Negative

CABLE SPECIFICATION

The cable used for connection of the Windcharger to the batteries should be in accordance with table 1. The use of a smaller cable than recommended will reduce the performance of the charging system.

Cable kits are available from your dealer or the manufacturer.

10m x 2.5mm² including battery clips (CA-10/11)
20m x 2.5mm² including battery clips (CA-10/12)

Cable Run (m)	Cable Size			
	12V		24V	
	mm²	AWG	mm²	AWG
0-20	2.5	13	1.5	15
21-30	4	11	2.5	13
31-45	6	9	4	11
46-80	10	7	6	9

Table.I

ELECTRICAL CONNECTION

1. Run the cable selected (see Table 1) down the inside of the pole.

2. Connect the wind generator flying leads to the cable using the connector block supplied, taking care to observe polarity.

   Red is + Positive
   Black is - Negative

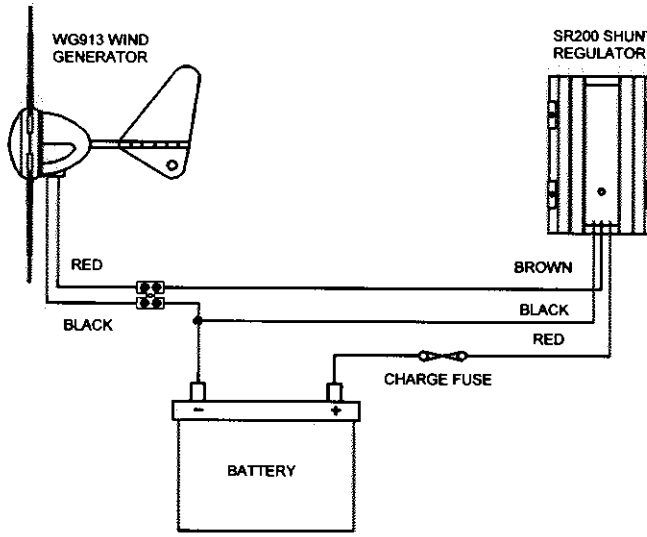
   Wrap the connection with insulation tape to secure/protect from environment. Alternatively join the cable using a latching-type plug and socket.

3. Reposition and secure the wind generator to the tower using the screws and shakeproof washers provided. Tighten using the 6mm Allen key provided.

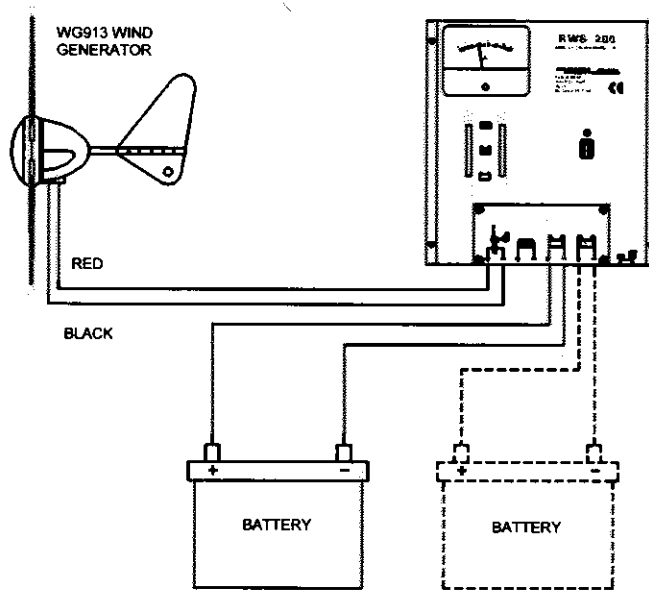
4. Final Electrical Connection:

   Select one of the following 2 basic systems and follow the manual provided with the SR200 or RWS200.

- **SR200 Regulator and Fuse**



- **RWS200 Controller**



UP AND RUNNING

- Before raising and securing the wind generator, check that:

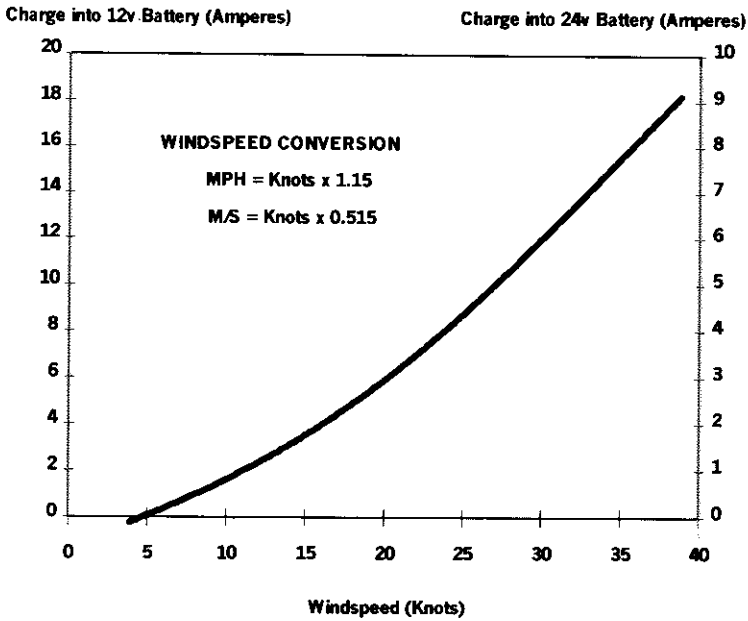
1. All final mechanical checks have been made.
2. The cable is not trapped.
3. All electrical connections are secure and safe.

- The wind generator can now be raised into position.

Take care to avoid all moving parts when raising and lowering the wind generator.

- When raised, secure the structure firmly in an upright position. The performance of your Windcharger can be impaired if the pole is not vertical .

SPECIFICATION AND PERFORMANCE



INSPECTION AND MAINTENANCE

The Rutland 913 requires no scheduled maintenance but an annual inspection should be carried out to monitor the general condition of the system.

- Before inspection, the turbine should either be lowered to the ground or tied to prevent the generator from turning. To stop the generator from turning proceed as follows:

1) Turn the wind generator out of the wind (180°) using the tail. A hole is provided in the tail fin to assist in this. The generator will eventually slow down.
2) Tie a blade to the mounting pole to prevent it from rotating.

- Whilst the generator is stationary, the following routine checks should be performed:

1) Check the blade screws for tightness.
2) Check all other nuts, bolts and screws for tightness.
3) Check the yaw axis for free rotation.
4) Check tower assembly for condition.
5) Check the tension of the guy wires if applicable. The tension of guy wires should be checked frequently during the first year.
6) The unit can be wiped with a mild detergent and rinsed with water to remove dirt and debris.

TROUBLESHOOTING

In the unlikely event that your Rutland 913 should develop a defect, the turbine should either be lowered to the ground or tied to prevent the blades from turning before the following inspection is carried out.

1. Read the Electrical Connection (page 10) and Up and Running (page 12) and be satisfied that your system complies.

2. If your Rutland 913 fails to turn or produces low output, check the following:

- **Is there sufficient wind?** The Rutland 913 needs 5 knots wind speed to start charging. The wind speed across the turbine blades may be greatly reduced in a marina or built-up area compared with the reading on a mast-head anemometer or weather reports.
- **Is the battery in good condition?** Check the voltage and electrolyte level of each battery.
- **Check electrical continuity** throughout the system, especially corrosion and poor connections in cable joins and connector blocks.
- **Check the brushes and slipring for wear or damage.** To inspect the brushes, remove the nacelle by removing the three fixing screws and slide nacelle backwards towards the tail fin. The brushes and slipring can be inspected by removing the four self-tapping screws fixing the brush holder assembly in place. Remove any black deposits from slipring with emery paper. Heavy deposits and reduced power indicate a possible reverse connection to the battery (see Page 10).
- **Check hub for free rotation with generator disconnected from battery.** If the hub does not rotate freely, check for a possible short circuit in the wiring. If no wiring fault is found refer to your dealer or manufacturer.
- **Remove the SR200/RWS200** from the charging circuit and connect the Windcharger direct to the battery via an ammeter. If no charge current is measured and there is sufficient wind, contact your dealer or manufacturer. If charge current is normal the battery is fully charged or regulator is faulty.

If in doubt, refer to your dealer or manufacturer.

Notes:

LIMITED WARRANTY

The Marlec Engineering Company Limited Warranty provides free replacement cover for all defects in parts and workmanship for 12 months from the date of purchase. Marlec's obligation in this respect is limited to replacing parts which have been promptly reported to the seller as having been in his opinion defective and are so found by Marlec upon inspection.

Defective parts must be returned by prepaid post to Marlec Engineering Company Limited, Rutland House, Trevithick Road, Corby, Northamptonshire, NN17 5XY, England, or to an authorised Marlec agent.

This Warranty is void in the event of improper installation, owner neglect or natural disasters and does not extend to support posts, inverters or batteries.

No responsibility is assumed for incidental or consequential damage, damage caused by the use of any unauthorised components.

No responsibility is assumed for non "furling" versions of the Rutland Windcharger (ie. the Standard and Marine generators) where Marlec or one of its authorised agents finds that a generator incorporating a furling device should have been used.