

# Rutland 504 Windcharger

## Owners Manual

Installation and Operation





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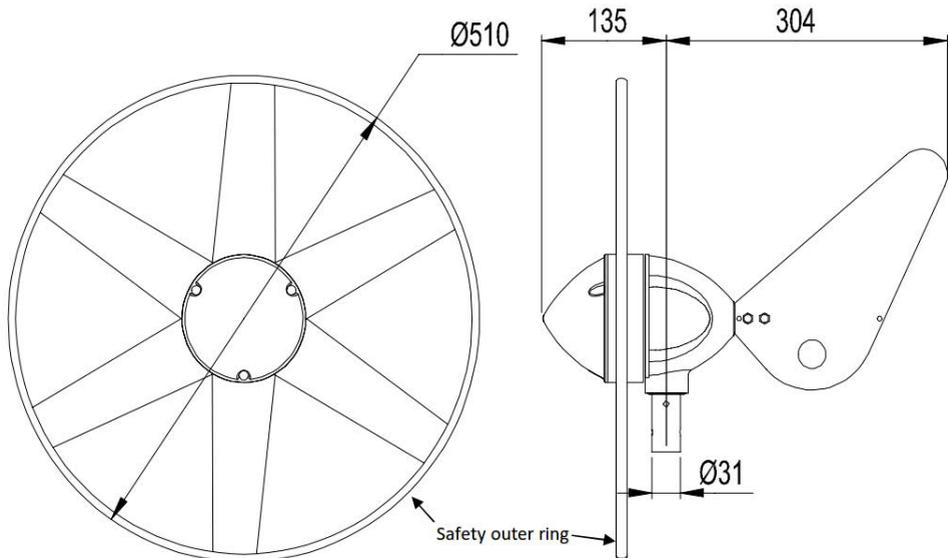
## Introduction

Congratulations and thank you for purchasing your Rutland 504 Windcharger. The utmost of care goes into the manufacture of all our products in our ISO9002 approved factory. To ensure you get the very best out of the Rutland 504 we recommend that you read this manual and familiarise yourself with its contents before installing and operating the Windcharger system.

## Summary of Features and Uses

- Aerodynamically styled to maintain good wind flow and stability.
- Low wind speed start up maximises power generation in low winds.
- High grade construction materials for durability, U.V. stability and weather resistance.
- Provides a D.C. power supply to charge 12 V battery banks where low power is needed for domestic devices as well as navigation equipment etc.
- Designed for use on board sailing yachts and temporary leisure applications.
- Note that there are other Rutland Windchargers designed for permanent use on land—visit [www.marlec.co.uk](http://www.marlec.co.uk) to find out more.

## Rutland 504 Profile & Dimensions



## General Guidelines and Warnings

- *Mounting pole outside diameter MUST NOT exceed 38.1mm for at least the top 0.5m. 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. A broken blade will cause turbine imbalance with consequent damage.*
- *When turning, the Windcharger is capable of generating voltages in excess of the nominal voltage. The turbine must never be allowed to rotate unless it is electrically connected to a regulator or batteries. Connecting an open circuit running turbine to the electrical system can cause serious damage to system components owing to excessive voltage. Caution must be exercised at all times to avoid electric shock.*
- *Stopping the turbine – this may be necessary to undertake battery maintenance. If possible stopping the turbine should be done in low wind speed conditions. The turbine can be slowed by rotating or orienting the tail fin upwind, this will slow the turbine sufficiently for it to be safely secured to the pole with rope. Avoid leaving the turbine tied up for any period of time, we recommend that the turbine either be covered to give protection from the weather or removed and stored in a dry location. We recommend the use of Marlec charge regulator that includes a shutdown switch.*
- *Choose a calm day to install the equipment and consider other safety aspects. 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 Rutland 504 Windcharger is suitable for sailing boats and some temporary land based applications. When storm winds are forecast the turbine can be restrained to minimise wear and tear particularly when installed on land. based applications where furling model windchargers are normally recommended. Note that where the manufacturer recommends a furling type Windcharger should have been used the warranty is invalidated in cases of storm damage.*
- *If in doubt, refer to your dealer, a competent electrical engineer or the manufacturer.*

**Check You Have Received** - See Rutland 504 Exploded View

- 1 x safety turbine with main generator assembly
- 1 x nose cone + 3 x snap rivets
- 1 x tail fin assembly + 2 x M6 hex head screws
- 1 x 5 mm Allen key
- 1 x 2-way terminal block
- 2 x M8 x 16 button cap screws
- 2 x shakeproof washers

**Exploded View of Rutland 504 Models**

Safety Turbine - *The blades incorporating the outer ring must not be tampered with or altered.*

Nose Cone with  
3 x snap rivets

Nacelle containing  
Windshaft Assembly

Tail Fin Assembly  
with 2 x M6 x 12  
Hex. Head screws,  
spring washers  
and plain washers.

Post Adaptor Assembly -  
*This fits into a pole of  
31.7mm internal  
diameter and NO MORE  
THAN 38.1mm external  
diameter.*

**Other Items****What You Will Need -Tools**

- Suitable wire stripper
- Small terminal screwdriver
- Large flat blade screwdriver
- Crosshead screwdriver
- 10 mm spanner or socket

**Other Items You Will Need**

- Mounting pole and stays
- Cable
- Batteries
- Battery Terminals
- Connector Blocks (as determined by your total system)

**Other Items You May Have Selected**

- A Rutland Charge Regulator from our range
- Cable (usually 2.5mm<sup>2</sup> twin core - Part No 902-015)
- Rutland 503/504 Marine Mounting Kit and Stays Kit ( CA-12/01 & CA-12/32 )
- Rutland 503/504 Land Tower Kit & Rigging Kit ( CA-12/12 & CA-12/13 )
- Short section of stainless steel tube to adapt into your own mounting design

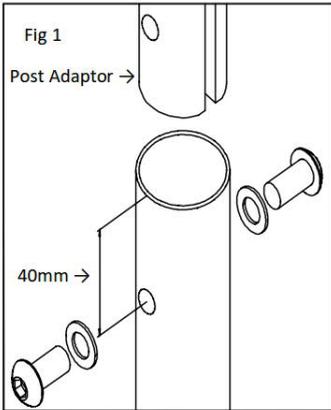
## Assembly & Installation

### Twelve Step Quick Start Guide

1. Choose an open site to expose the Windcharger to a clear flow of wind and avoiding obstructions. On board mount the Windcharger at least 2.0 metres above the deck and on land at least 4 - 6 m high. *Read the full section on **Siting**.*
2. Choose a mounting pole with an internal diameter of 31.7 mm and external diameter of no greater than 38.1 mm for the top 0.5 m minimum to (i) prevent accidental damage and (ii) meet warranty conditions.
3. Mount a charge regulator, from the Marlec range, to a suitable vertical surface and close to the battery. Follow instructions supplied with the charge regulator.
4. Drill the mounting pole, if required, in preparation to accept and secure the Windcharger. *See **Assembly and Installation** section.*
5. Choose suitable two core cable to connect from the Windcharger to the regulator. Up to 20m this should be of at least 2.5mm<sup>2</sup> cross sectional area.  
*For other distances see the table in **Cable Specifications**. A short section of 4mm<sup>2</sup> cross sectional area is required to link the regulator to the battery.*
6. Position the mounting pole ( *this may be done on the ground before raising the pole* ) so that the selected cable can be threaded along it.
7. Fit the tail and nose to the Windcharger using fasteners provided.
8. Join the cable threaded through the pole to the Windcharger output cable using the connector block provided. Wrap with insulating tape. Alternatively use a latching plug and socket. *We recommend looping back the cable and securing with a cable tie to provide strain relief to the joint.*
9. Carefully push the cables down the pole whilst sliding the post adaptor down the pole. Line up the holes and secure in place with the screws and washers provided. Tighten with the Allen key. **Do not allow the turbine to spin freely.**
10. Locate the charge regulator close to the battery and carefully follow ALL the regulator guidelines and installation sequences for connecting the Windcharger through to the battery.
11. Ensure that the battery connections are permanent as the Windcharger should NEVER be operated without a connection to the battery.
12. Raise and secure the Windcharger. It can now be allowed to rotate. Follow the “ **Up and Running- Four Points Final Checklist**” featured later. Also the “ **General Guidelines and Warnings**” section expands on the above points.

## Assembly & Installation Detailed Instructions

### Tower Preparation (Fig.1)

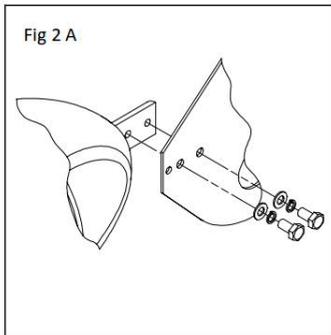


1. The post adaptor fitted to the 504 is designed to fit inside a standard 31.7mm internal diameter tube. Max external diameter 38.1mm (1½").
2. Mark and centre-punch two positions diametrically opposite, at 90° to the pipe seam if necessary, 40mm from top of the tube.
3. Drill two holes 8.5mm in diameter on centre-punch positions.

*Note: When using the Rutland 504 Mounting Kits, items 2 and 3 can be ignored, as these are pre-drilled.*

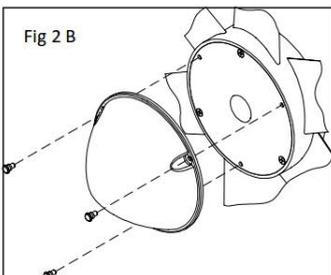
### Marlec Tower Options

- Rutland 504 Marine Mounting Kit **CA-12/01**
- Marine Stays Kit for use with Mount Kit **CA-12/32**
- Rutland 504 Land Tower & Rigging Kit for temporary installations **CA-12/12 & CA-12/13**
- Tube sections to adapt to own pole arrangement - 1000mm **CA-12/15** or 500mm **CA-12/16**



### Tail & Nose Assembly (Fig.2 A & Fig.2 B)

1. Place the generator, nose down, on a flat soft surface.
2. Fit the tail into position on the protruding portion of casting, ensuring the holes in the casting align with the corresponding holes in the tail fin.
3. Secure the Tail fin in position with the 2 M6 screws and washers, ensuring the plain washers are against the tail fin. (Fig 2A)
4. Check tightness of all screws. (*Do not over-tighten*).
5. Place the nose cone into position aligning the holes and press the snap rivets into the holes to secure. (Fig 2B)



## Electrical Connection and Fitting to The Tower

1. Run the cable selected (see Fig 14) down the inside of the pole.
2. Select one of the basic wiring systems in Figs 3, 4 & 5 and follow the manual provided with the selected charge regulator.
3. Connect the wind generator flying leads to the cable protruding from the tower using the connector block supplied, taking care to observe polarity. Connect the Windcharger + to cable + and windcharger – to cable –  
**Red is + Positive**  
**Black is - Negative**
4. Wrap the connection with insulation tape to secure/protect from environment. Alternatively join the cables using a latching-type plug and socket.
5. Locate the wind generator into the tower whilst gently easing the cable from the tower base to ensure the cable is not trapped. Secure the wind generator to the tower using the button cap screws and shake proof washers provided, tighten using the 6mm Allen key provided.

## Up and Running

### Four Point Final Checklist

Before raising and securing the wind generator:

1. Check the tightness of the tail fixing screws and generator mounting screws.
2. Check free rotation of the hub and yaw axis.
3. Check that the cable is not trapped.
4. Check that 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.

*Caution-The performance of your Windcharger will be impaired if the pole is not vertical.*

# Typical Wiring Diagrams For The Rutland 504 Windcharger

Fig 3  
HRS503 Regulator with optional solar up to 80W.

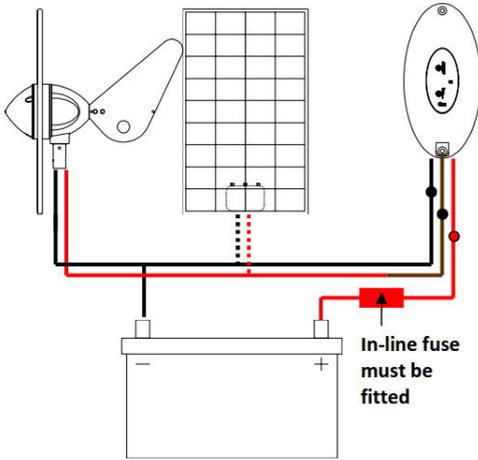


Fig 5  
HRSi Regulator for single battery bank & optional solar panel up to 160W

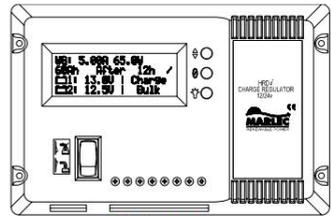
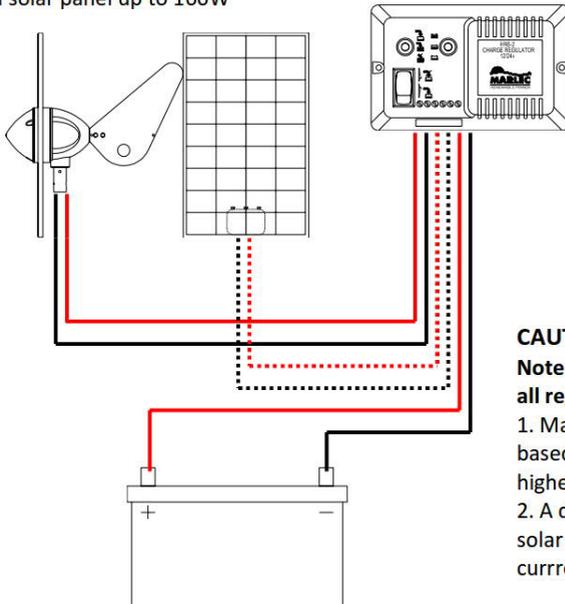


Fig 4  
HRDi Regulator for dual battery charging & optional solar panel up to 160W

### CAUTION! Note for solar panel connections to all regulators:

1. Maximum solar panel ratings are based on 25°C, downrate for use in higher ambient temperatures.
2. A diode must be fitted to the solar panel(s) to prevent reverse current.

## 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.

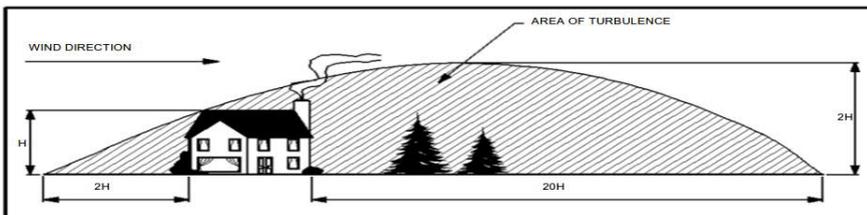
The smooth flow of wind over land and water is often interrupted by a multitude of obstructions causing wind shear and turbulence.

**Wind shear** 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.

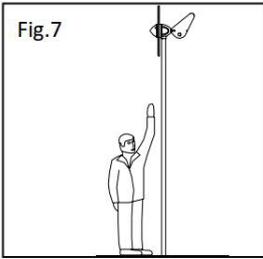
**Turbulence** is caused by the wind passing over obstructions such as moored boats, trees and buildings.

Both wind shear and turbulence diminish with height and can be overcome simply by putting the turbine 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.6).

Fig 6

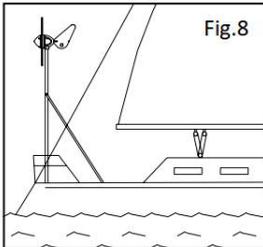


## On Board Systems

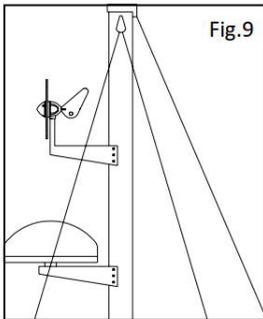


- The wind generator should be mounted at a safe height, a minimum of 2 metres (6.5 feet) above the deck and away from other obstacles which could interfere with the blades or tail assembly (Fig. 7).

- The Rutland 504 is designed to fit inside an aluminium or stainless steel tube with an internal diameter of 31.7mm (1<sup>1</sup>/<sub>4</sub>”). The external diameter must not exceed 38.1mm (1<sup>1</sup>/<sub>2</sub>”), see **Warnings!**



- Suitable tube: 1<sup>1</sup>/<sub>2</sub>” 10 SWG aluminium or Stainless Steel 35mm x 1.5mm.
- The Rutland 503/504 Mounting Kit is available for deck mounting or short sections of stainless steel tube of 500mm & 1m pre-drilled are available to adapt to your own fabrication.



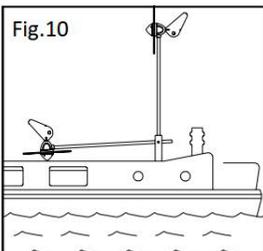
We suggest the following mountings according to preference and site conditions:

### Pushpit (Fig.8)

A suitable pole mounted to the deck with deck plates and rigid stays is the most popular method of mounting the Windcharger on yachts, e.g. Rutland 504 Marine Mounting Kit **CA-12/01** and Marine Stays Kit **CA-12/32** available from Marlec.

### Mizzen (Fig.9)

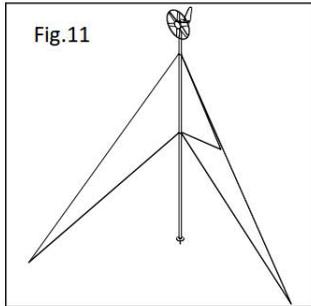
Mizzen mounting is suitable on larger yachts, taking advantage of greater wind flow the higher the wind turbine is mounted.



### River Boats (Fig.10)

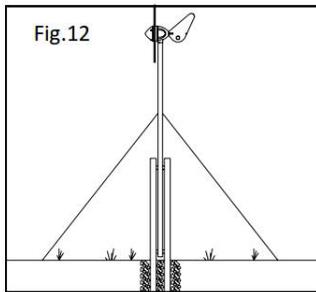
A pivot pole is ideal for river boats as the Wind charger can easily be raised and lowered. The Rutland 503/504 Mounting Kit has a hinge type deck fixing.

## Temporary Land Based Systems



The Rutland 504 is designed to fit inside an aluminium or stainless steel tube with an internal diameter of 31.7mm ( $1\frac{1}{4}$ " ). Max external diameter 38.1mm ( $1\frac{1}{2}$ " ).

A portable Land Tower and Rigging Kit, illustrated in Fig 11 is available from Marlec. Part Nos: **CA-12/12 & CA-12/13**



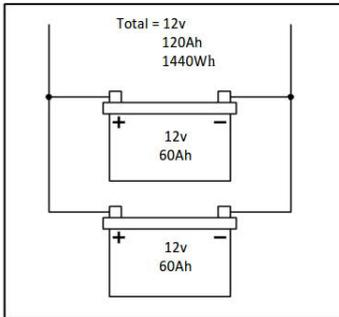
Centre Pivoted Pole

Pivot type towers are recommended as these allow for easier installation and lowering for access to the wind generator.

A suitable mounting pole can be erected using a 6.5 metre (21 feet) length of 50mm (2") galvanised water pipe adapted down to 31.7mm for a minimum length of 500mm at the top section. The tube must be supported by a minimum of two sets of three guy lines. The attachment points for the guy lines to the tower should be securely fixed to the tower. Follow these guidelines:

- The guy wires should be a minimum of 3mm 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.

## Further System Requirements



Batteries in parallel to increase ampere hours (Fig.13).

*Note : Batteries must not be joined in series as this will increase the voltage rating*

### Batteries

Leisure/Deep Cycle batteries are specifically designed for good performance in terms of charge/discharge cycles. Batteries are an important part of the renewable energy battery charging system and should be sized according to the 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 that one of the charge regulators available from Marlec is fitted to prevent batteries becoming overcharged in strong winds and during low energy consumption periods. A regulator is essential where gel and sealed batteries are used.

- Batteries may be linked as shown in the Fig 13. It is essential to observe polarity as follows:

**Red is + Positive    Black is - Negative**

Fig 14	Cable Size		
Cable Run (m)	(mm <sup>2</sup> )	SWG	AWG
0-20	2.5	15	13
21-30	4	13	11
31-45	6	11	9
46-80	10	9	7

### Cable Specification

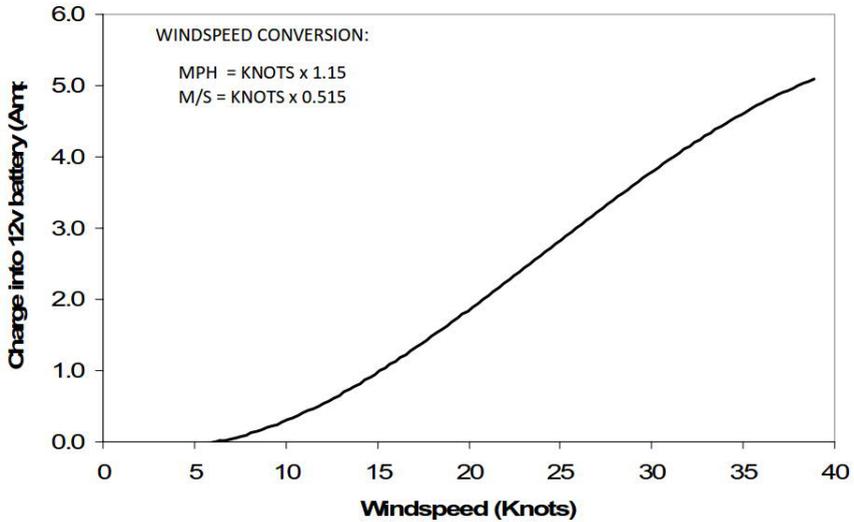
The cable used for connection of the Wind charger to the batteries should be in accordance with Fig 11. The use of a smaller cable than recommended will reduce the performance of the charging system.

Cable and connectors are available from your dealer or the manufacturer.

## Specification and Performance

### Guideline Performance Curve

*Note : The curve shown below is for clear, non-turbulent wind conditions; this may not be achieved in some installations. Refer to the section on Siting to optimise performance at your site. Wind speeds are in situ of the turbine and may not reflect those measured at mast top or those reported by the Met. Office.*



## Maintenance and Troubleshooting

### Inspection and Maintenance

The Rutland 504 requires no scheduled maintenance but an annual inspection should be carried out to monitor the general condition of the system to ensure the electrical and mechanical integrity and safety of the system.

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

*Note : The Wind charger is designed for continuous running, this achieves maximum resistance to water ingress. Should the unit be restrained for any extended period it is recommended that it be covered or removed to a dry location.*

### Trouble Shooting

In the unlikely event that your Rutland 504 should develop a defect, the turbine should first be tied to prevent the blades from turning to perform the static tests below. (Follow the procedure described in the Inspection and Maintenance section). It will be necessary to let it run for the tests to check for power production.

1. **Read the 12 Steps Quick Start Guide** and **Up and Running** sections and be satisfied that your system complies.
2. **Is there sufficient wind?** The Rutland 504 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 masthead anemometer or weather reports.
3. Static Tests:
  - **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.

#### 4. Running Tests:

• **Check for power output from the windcharger following this procedure:**

- A Set a digital multi-meter to DC Amps, scale of up to 5A or less if possible. Connect the meter positive (+) probe to the wind gen output positive cable and the meter negative (-) to the regulator input positive. Provided there is sufficient wind there should be a current reading. This establishes that power is being delivered.
- B Using the same multi-meter setting as above measure between the “regulator to battery” + and the battery +. Provided there is sufficient wind there should be a current reading. This establishes if power is passing through the regulator.
- C If both above are unsuccessful set the multi-meter to DC Volts. Disconnect the wind generator from the regulator and connect the meter + to the wind gen + and the meter – to the wind gen -. Provided there is sufficient wind there should be a variable voltage reading according to the speed of the wind seen at the wind turbine. This will establish if the wind generator is able to deliver power or not.
- D If tests A and C are successful but test B fails to produce results connect the wind gen directly to the battery. Set the digital multi-meter to DC Amps and measure power between the wind gen + and the battery +. If a reading is measured, providing there is sufficient wind, then the regulator is faulty.
- E If the wind turbine fails to deliver any current or open circuit V reading undertake the further tests below.

5. Mechanical inspection. It may be necessary to remove the Wind charger from its pole for the following tests.

**A Check the brushes and slip ring for wear or damage.**

- To inspect the brushes, remove the tail fin and the plastic nacelle.
- The brushes can be inspected by removing the caps from the brush holders & withdrawing the brushes.
- Heavy deposits on the slipping and reduced power indicate a possible reverse connection to the battery. Clean the slipping with fine glass paper and fit new brushes.

**B 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.

If the above checks have identified a need for spare parts or failed to identify the problem you should contact Marlec who can advise you of your nearest distributor in their world wide network. In the first instance we recommend that you contact the company from whom the product was originally purchased.

**If in doubt, refer to your dealer or manufacturer.**

## Français

### Introduction

Félicitations pour votre achat d'une éolienne Rutland 504 ! Comme tous nos produits, elle a été fabriquée avec le plus grand soin, dans notre usine certifiée ISO 9001. Pour obtenir pleine satisfaction de votre éolienne Rutland 504, nous vous recommandons de lire entièrement ce manuel et de vous familiariser avec son contenu **avant** de commencer l'installation ou de l'utiliser.

### Principales caractéristiques et applications

- Conception aérodynamique pour une bonne prise au vent.
- Tourne avec peu de vent pour optimiser les performances même par vent faible.
- Matériaux de qualité pour une durée de vie optimale, une bonne résistance aux UV et aux conditions climatiques.
- Permet de charger des batteries 12V.
- conçue pour fonctionner sur des bateaux ou temporairement sur des camping-cars

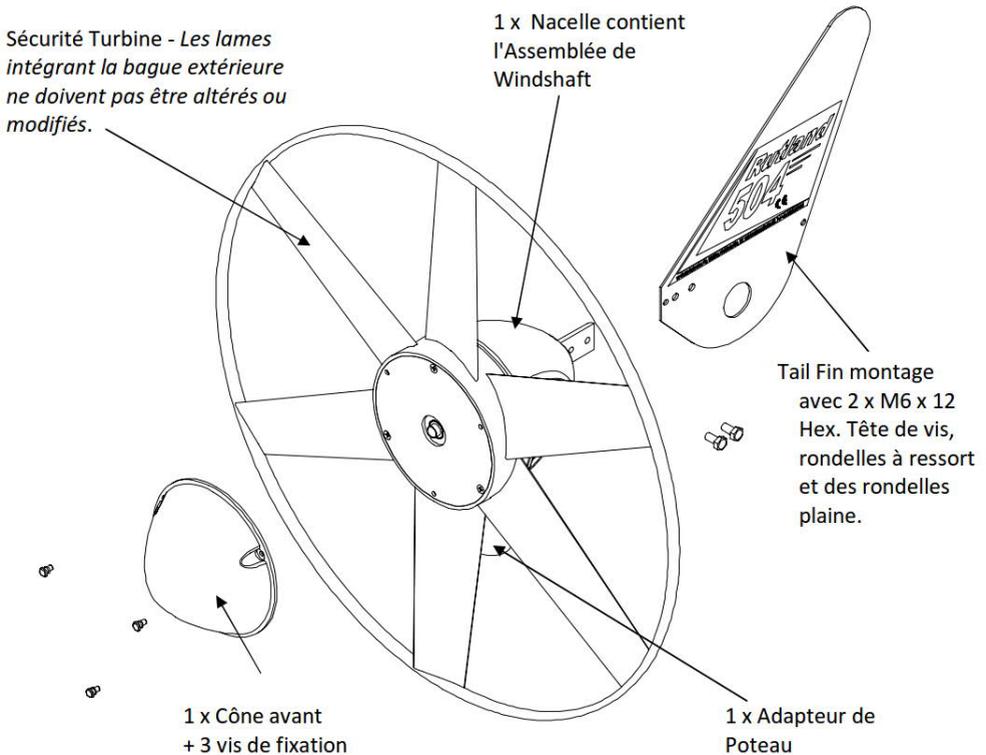
### Informations générales et mises en garde

- Le diamètre externe du mât ne doit pas être supérieur à 31.8mm, au moins sur les 50 derniers centimètres. Ne pas utiliser de mât plus gros au risque de réduire le jeu nécessaire entre les pales et le mât. En cas de vents forts, les pales risquent de heurter le mât et de s'endommager. Une pale brisée provoque un déséquilibre capable d'entraîner des dégâts importants.
- Lorsqu'elle fonctionne, l'éolienne peu générer de l'électricité à haute tension, c'est pourquoi elle ne doit pas tourner tant qu'elle n'est pas reliée à un régulateur ou à des batteries. Raccorder directement l'éolienne à l'installation électrique peut provoquer des dégâts importants en raison de la surtension. Pour éviter tout risque d'électrochoc, vous devez être constamment vigilant.
- Stopper l'éolienne – Cela peut s'avérer nécessaire avant d'intervenir sur les batteries. Dans la mesure du possible, il est préférable de le faire lorsque le vent est faible. L'éolienne peut alors être ralentie en orientant l'aileron contre le vent ce qui permet de l'immobiliser en l'attachant au mât avec une corde. Éviter de l'immobiliser trop longtemps. Il est recommandé de la couvrir pour la protéger des effets du climat ou de la déposer pour l'entreposer en lieu sec. Les régulateurs sont équipé d'un interrupteur Marche/Arrêt.
- Entres autres éléments de sécurité, effectuer l'installation par temps calme.
- Aucune tentative de réparation ne doit être engagée tant que l'éolienne n'est pas immobilisée.
- L'éolienne est équipée d'aimants céramiques qui peuvent facilement être abîmés lors de leur manipulation. Elle doit être maniée avec précaution durant le transport et le montage.
- Il est essentiel de respecter les polarités lors du branchement de l'éolienne ainsi que de tous les autres composants du système électrique. Inverser les branchements endommagerait l'éolienne et une installation incorrecte annulerait la garantie.

- *L'éolienne Rutland 504 est conçue pour une utilisation sur des bateaux à voiles ou certaines applications terrestres. Lorsque des vents d'orage sont annoncés, l'éolienne peut être immobilisée pour prévenir les risques d'usure et de casse. Notez bien que le non respect de ces recommandations fabricant entraîne l'invalidation de la garantie produit au cas où l'éolienne serait endommagée par des vents forts.*

*En cas de doute, se référer à votre revendeur, à un ingénieur compétent en électricité ou au fabricant.*

## Vue Éclatée du Rutland 504



## Guide d'installation en douze étape

1. Choisir un emplacement dégagé pour que l'éolienne soit exposée au vent sans aucune obstruction. A bord d'un bateau, la monter au minimum 2,5 m au-dessus du pont et sur terre à une hauteur de 4 à 6 m minimum. *Lire le chapitre « Choix de l'emplacement ».*
2. Prévoir un mât de 31.7 mm de diamètre intérieur et de 38.1 mm maximum de diamètre extérieur, au moins sur les 50 derniers centimètres, pour prévenir tout risque de dégâts et effectuer un montage conforme aux exigences de la garantie.
3. Monter un régulateur, choisi dans la gamme proposée par Marlec, sur un plan vertical et à proximité des batteries. Suivre les instructions de montage fournies avec le régulateur.
4. Le cas échéant, percer les trous de fixation sur le mât et fixer l'éolienne au mât. *Voir le chapitre « Assemblage et installation de l'éolienne ».*
5. Choisir un câble adéquat à deux conducteurs pour relier l'éolienne au régulateur. Jusqu'à 20 m de longueur, choisir un câble d'une section de 2,5 mm<sup>2</sup>. Pour relier le régulateur à la batterie, un câble de 4 mm<sup>2</sup> est nécessaire. *Pour d'autres longueurs, se reporter au chapitre « Type de câble ».*
6. Passer le câble dans le mât (*cela peut se faire au sol, avant de dresser le mât*).
7. Fixer l'aileron et le cône avant sur l'éolienne, à l'aide des fixations fournies.
8. Utiliser le bloc de connexion fourni pour raccorder le câble passé dans le mât au câble sur l'éolienne. Protéger la connexion avec du ruban isolant. Vous pouvez aussi utiliser une prise *Nous recommandons d'effectuer une boucle et de la fixer afin de diminuer la contrainte sur la connexion.*
9. Pousser les câbles à l'intérieur du mât avec précaution, et poser l'adaptateur dans le mât. Aligner les trous de fixation et sécuriser le montage avec les rondelles et les vis fournies. Serrer en utilisant la clé Allen également fournie. **Empêcher la turbine de tourner à vide.**
10. Monter le régulateur à proximité de la batterie et suivre rigoureusement **toutes** les instructions ainsi que la séquence de branchements pour raccorder l'éolienne aux batteries.
11. L'éolienne ne doit **en aucun cas** pouvoir fonctionner sans être raccordée à la batterie, s'assurer que la connexion soit permanente.
12. Dresser et fixer le mât. L'éolienne est maintenant prête à fonctionner. Effectuer les vérifications (en quatre points) indiquées au chapitre « Dressage et mise en service de l'éolienne ». Les « Informations générales et mises en garde » énoncées ci-dessus doivent également avoir été intégrées.

# Español

## Introducción

Felicitaciones y gracias por comprar un cargador eólico Rutland 504. Utilizamos sumo cuidado en la fabricación de todos nuestros productos en nuestra fábrica aprobada por la Norma ISO9001. Para asegurarnos de que reciba lo mejor de nuestro Rutland 504, le recomendamos que lea este manual y se familiarice con su contenido antes de instalar y poner en funcionamiento el sistema del cargador eólico.

## Resumen de características y usos

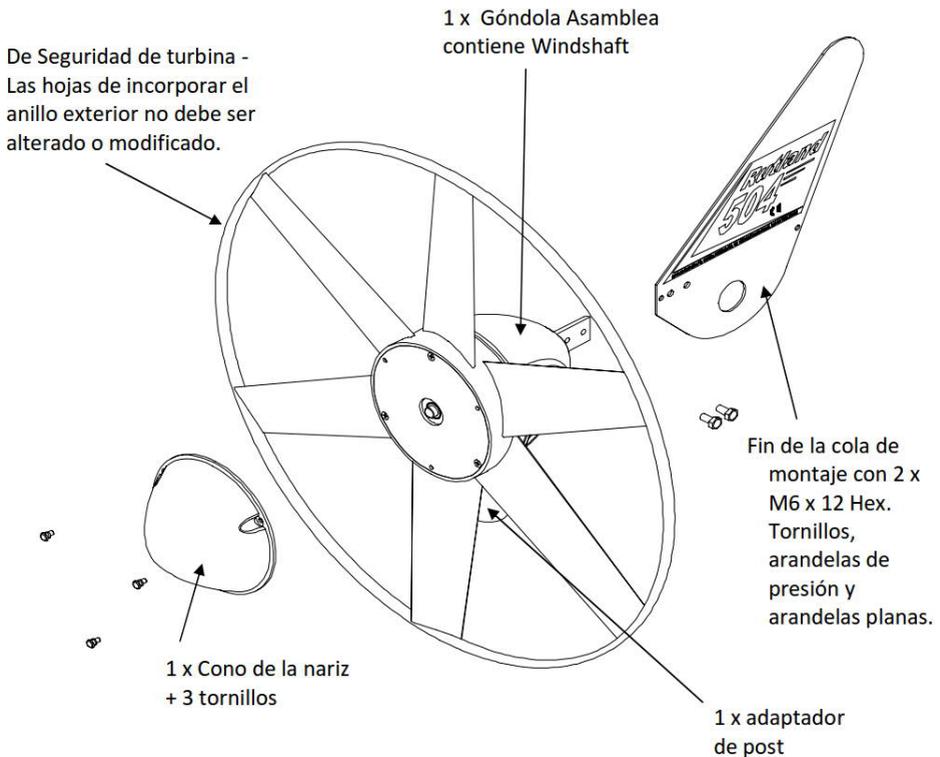
- estilo aerodinámico para mantener estabilidad y un buen flujo del viento
- el arranque con vientos a baja velocidad maximiza la producción de energía en vientos de poca fuerza
- materiales de construcción de gran calidad para mayor durabilidad, estabilidad U.V y resistencia a la intemperie
- proporciona una fuente de alimentación CC para cargar bancos de batería de 12 voltios.
- diseñado para su uso a bordo de yates de vela y aplicaciones de uso temporal en autocaravanas
- Nota: Existen otros cargadores eólicos Rutland diseñados para instalaciones permanentes en tierra, para obtener mayor información, comuníquese con Marlec o visite la página Web [www.marlec.co.uk](http://www.marlec.co.uk)

## Pautas y advertencias generales

- El diámetro externo del mástil de montaje NO DEBE exceder los 38.1mm aunque sea en los 0,5m superiores. No utilice mástiles más grandes ya que esto reducirá el espacio entre la torre y la paleta. En condiciones de vientos fuertes, esto puede provocar daños al cargador eólico ya que la paleta entra en contacto con el mástil de montaje. Una paleta rota producirá un desequilibrio en la turbina y daños posteriores.
- Al girar, el cargador eólico es capaz de generar voltajes superiores al voltaje nominal. Nunca permita que la turbina gire a menos que se encuentre conectada eléctricamente a un regulador o a una batería. La conexión de una turbina que funciona con un circuito abierto al sistema eléctrico puede provocar daños graves a los componentes del sistema por el excesivo voltaje. En todo momento, tenga cuidado y evite las descargas eléctricas.
- Detención de la turbina: puede ser necesaria para realizar el mantenimiento de la batería. Si es posible, detenga la turbina en condiciones de viento a baja velocidad. Disminuya la velocidad de la turbina girando o dirigiendo la aleta de la cola contra el viento; esto disminuirá la velocidad de la turbina lo suficiente como para que ésta se pueda sujetar con una soga y sin peligro al mástil. Evite dejar la turbina atada durante mucho tiempo; le recomendamos que cubra la turbina para protegerla de la intemperie o retírela y guárdela en un lugar seco. Le recomendamos que utilice el regulador de carga Marlec que incluye un interruptor de desconexión.
- Elija un día sin viento para instalar el equipo y tenga en cuenta otros aspectos de seguridad.
- No intente reparar el sistema hasta que el generador de viento este sujeto y no pueda girar.
- El cargador eólico esta ajustado con imanes cerámicos que pueden dañarse durante una fuerte manipulación. Tenga cuidado con el ensamblaje del generador principal durante el transporte y el montaje.

- Es esencial respetar la polaridad correcta al conectar el cargador eólico y todos los demás componentes en un circuito eléctrico. Una conexión inversa dañará al cargador eólico y la instalación incorrecta anulará la garantía.
- El aerogenerador Rutland 504 es adecuado para su uso en los barcos de vela y algunas aplicaciones terrestres. Cuando se pronostican vientos de tormenta el aerogenerador restringe su fuerza para minimizar el desgaste. Tenga en cuenta que cuando el fabricante recomienda que debería haberse utilizado un tipo de aerogenerador con furling, la garantía queda invalidada en los casos de daños causados por tormenta
- Si tiene alguna duda, consulte con el proveedor, un ingeniero eléctrico competente o el fabricante.

### Vista de la Rutland 504



## Guía rápida de inicio – 12 pasos

1. Elija un sitio abierto para exponer al cargador eólico a un flujo libre de viento y así evitar obstrucciones. A bordo, monte el cargador eólico por lo menos a 2,4 metros de la cubierta, en tierra por lo menos a 4 hasta 6 metros de altura. *Lea toda la sección de **Instalación**.*
2. Elija un mástil de montaje con un diámetro interno de 31.7mm y un diámetro externo no mayor a 38.1mm para los primeros 0,6mm como mínimo para (i) evitar daños accidentales y (ii) cumplir con las condiciones de la garantía.
3. Monte un regulador de carga, del rango Marlec, sobre una superficie vertical adecuada y cerca de la batería. Siga las instrucciones proporcionadas con el regulador de carga.
4. Perfore el mástil de montaje, en caso de ser necesario, para prepararlo para que tolere y sujete al cargador eólico. *Vea la sección **Montaje e Instalación**.*
5. Elija un cable de dos conductores adecuado para que el cargador eólico se conecte con el regulador. De hasta 20 m, éste debería ser un área de secciones de por lo menos 2,5 mm<sup>2</sup>. Es necesaria una pequeña área de sección de 4 mm<sup>2</sup> para unir el regulador a la batería. *Para consultar otras distancias, vea la clasificación en **Especificaciones para cables**.*
6. Coloque el mástil de montaje (*esto puede hacerlo en el piso antes de levantar el mástil*) de tal manera que el cable seleccionado pueda enroscarse a lo largo del mismo.
7. Ajuste la cola y la nariz del cargador eólico mediante los fijadores proporcionados.
8. Una el cable enroscado en el mástil al cable de salida del cargador eólico mediante el bloque conector proporcionado. Envuelva con cinta aisladora. O bien utilice un tapón o toma corriente con pestillo. *Le recomendamos enroscar el cable y asegurarlo con una cinta de sujeción para cables para aliviar la tensión en la junta*
9. Con cuidado presione los cables hacia el mástil mientras desliza el adaptador del mástil por el mismo. Alinee los orificios y sujételos en el lugar con los tornillos y arandelas proporcionadas. Apriete con la llave Allen. **No permita que la turbina gire libremente.**
10. Ubique el regulador de carga cerca de la batería y siga cuidadosamente TODAS las pautas y secuencias de instalación del regulador para conectar el cargador eólico a la batería.
11. Asegúrese de que las conexiones de la batería sean permanentes ya que el cargador eólico NUNCA debe ponerse en funcionamiento sin estar conectado a la batería.
12. Levante y sujete el cargador eólico. Ahora puede dejarlo que gire. Siga la “**Lista de control final de 4 puntos denominada: Instalado y en Funcionamiento**”, que se observa más adelante. También la sección “**Pautas y advertencias generales**” amplía sobre los puntos mencionados.

## Deutsche

### Einleitung

Wir gratulieren und bedanken uns für den Erwerb Ihres Rutland 504 Windchargers. Wir leisten die beste Sorgfalt bei der Herstellung von allen unseren Geräten gemäß dem anerkannten Betriebsstandard ISO9001. Zur Gewährleistung für alle Vorteile beim Gebrauch von Rutland 504 bitten wir Sie diese Anleitung vollständig durchzulesen, bevor Sie mit der Montage und Inbetriebnahme des Windchargers fortfahren.

### Zusammenfassung der Funktionen und Anwendungen

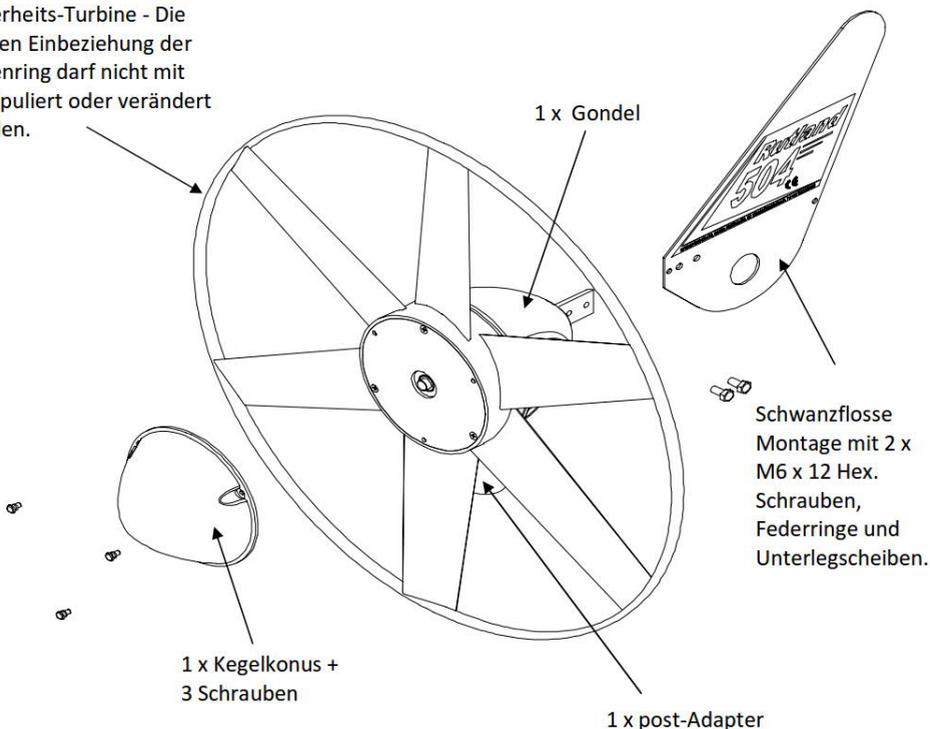
- Aerodynamisch gestaltet für einen ausgezeichneten Luftstrom mit Luftstabilität.
- Das Anlassen bei einer niedrigen Windgeschwindigkeit maximiert Stromerzeugung bei geringen Windstärken.
- Hochwertige Baustoffe für Strapazierfähigkeit, UV-Strahlungsstabilität und Witterungsbeständigkeit.
- Ein Gleichstromnetzgerät zum Aufladen eines 12 V Batteriesatzes wurde mitgeliefert.
- Entwickelt für Anwendungen an Bord von Yachten und gelegentlich auch für Reisemobile

### Allgemeine Richtlinien & Gefahrenhinweise

- Die Mastmontage DARF den Außendurchmesser von 38.1mm, zumindest den Oberen von 0.5m NICHT überschreiten. Größere Mastquerschnitte dürfen nicht verwendet werden, da dies zu einer geringeren Distanz zwischen dem Mast und dem Rotorblattspiels führt. Bei hohen Windbedingungen könnte es beim Windcharger zu Schaden führen, da das Rotorblatt mit dem festmontierten Mast in Kontakt kommen könnte. Ein zerbrochenes Rotorblatt verursacht ein Ungleichgewicht der Turbine und dementsprechend Schäden.
- Bei der Drehbewegung ist der Windcharger in der Lage Stromspannungen höher als die Nennspannung zu erzeugen. Es darf nie zugelassen werden, dass die Turbine rotiert, es sei denn das sie elektrisch mit einem Aufladekontrollgerät oder mit Batterien angeschlossen ist. Der Anschluss einer laufenden Turbine im Leerlauf an das Elektrosystem kann ernsthafte Schäden bei den Anlagebestandteilen, aufgrund der überhöhten elektrischen Spannung hervorrufen. Vorsicht ist stets zu bewahren zur Vermeidung eines Stromschlages.
- Das Anhalten der Turbine – wird bei der Wartung der Batterie notwendig. Falls möglich sollte die Turbine bei Bedingungen mit niedrigen Windgeschwindigkeiten gestoppt werden. Die Turbine kann durch das Rotieren oder durch das windwärts legen der Heckschaukel des Rotorblattes abgebremst werden, das führt zu einem Anhalten der Turbine, sodass sie sicher mit einem Seil an den Mast befestigt werden kann. Vermeiden Sie, dass die Turbine für längere Zeit festgebunden bleibt, wir empfehlen stattdessen, dass die Turbine entweder abgedeckt wird, um sie gegen die Witterung zu schützen oder entfernt und in einem trockenen Raum gelagert wird. Wir empfehlen den Nutzen des Marlec Aufladekontrollgerätes mit einem integrierten Schalter zur Stromabschaltung.
- Wählen Sie einen windstillen Tag für die Montage der Anlage und beachten Sie dabei weitere Sicherheitsfaktoren.
- Es darf kein Reparaturversuch an der Anlage stattfinden, bis alle Drehbewegungen des Windgenerators gedrosselt sind.

- Der Windcharger ist mit einem Keramikmagnet ausgestattet, der bei einer schwerwiegenden Handhabung beschädigt werden kann. Der Hauptstromgenerator sollte mit Sorgfalt während dem Transport und der Montage behandelt werden.
- Es ist notwendig die korrekte Polarität zu beachten, wenn der Windcharger und alle weiteren Bestandteile an den elektrischen Stromkreis angeschlossen werden. Ein Rückwärtsstrom wird den Windcharger beschädigen und eine inkorrekte Installation führt dazu, dass die Garantie gegenstandslos gemacht wird.
- Der Rutland 504 Windcharger eignet sich für Segelboote und für einige Anwendungen zu Land.
- Anmerkung, wenn es vom Hersteller empfohlen wurde, dass ein Windcharger der Furlmatic Modelle für jegliche Art von Segelvorrichtungen zu nutzen sei, wird die Garantie im Falle eines Sturmschadens gegenstandslos gemacht.
- Im Zweifelsfall wenden Sie sich bitte an Ihren Fachhändler, an einen fachkundigen Elektroingenieur oder an den Hersteller.

Sicherheits-Turbine - Die Klingen Einbeziehung der Außenring darf nicht mit manipuliert oder verändert werden.



## Kurzanleitung mit zwölf Anhaltspunkten

1. Wählen sie eine offene Stelle für die Montage Ihres Windchargers in einem bestimmten Luftstrom und unter der Vermeidung von Hindernissen. An Bord sollte der Windcharger mindestens 2.4 Meter über dem Deck und zu Lande mindestens 4 - 6 Meter hoch angebracht werden. *Lesen Sie den vollständigen Absatz zu: An einer Stelle befestigen (Siting).*
2. Wählen Sie einen Mast mit einem Innendurchmesser von 31.7mm und einem Außendurchmesser von nicht größer als 38.1 mm und mindestens für den Oberen 0.6m, um (i)einen Nebenschaden zu vermeiden und (ii) die Bedingungen der Garantie zu erfüllen.
3. Montieren sie eines der Aufladekontrollgeräte von der Firma Marlec an eine geeignete senkrechte Oberfläche und in der Nähe der Batterie. Befolgen Sie die Anleitung, die mit dem Aufladekontrollgerät mitgeliefert wurde.
4. Bohren Sie, falls erforderlich, in den Montagemast zur Vorbereitung der Befestigung und Inbetriebnahme des Windchargers. *Siehe Montage und Installation [Assembly and Installation].*
5. Wählen sie ein geeignetes zweiadriges Kabel für den Anschluss des Windchargers zum Aufladekontrollgerät. Bis zu 20 Meter, dies sollte mindestens von einer 2.5mm<sup>2</sup> Querschnittsfläche sein. Ein Kurzabschnitt von einer 4mm<sup>2</sup> Querschnittsfläche ist für die Verbindung zwischen dem Aufladekontrollgerät und der Batterie erforderlich. *Für weitere Abstände beziehen Sie sich bitte auf die Tabelle Kabelspezifikationen [Cable Specifications].*
6. Bringen Sie den Montagemast in eine bestimmte Stellung, sodass das gewählte Kabel aufgezogen werden kann, das kann auch auf dem Boden durchgeführt werden, bevor sie den Mast anheben.
7. Das Heck- und Vorderteil an den Windcharger mit den mitgelieferten Befestigungsteilen montieren.
8. Schließen Sie das durchgezogene Kabel am Mast mit dem Kabelausgang des Windchargers mit der mitgelieferten Anschlussleiste an und mit Isolierband umwickeln. Es kann als Alternative eine einklinkende Steckvorrichtung verwendet werden. *Wir empfehlen das Kabel zurückzuschlingen, um es mit einem Kabelbinder zu befestigen und eine Zugentlastung am Verbindungsstück zu erzielen.*
9. Die Kabel mit Sorgfalt am Mast hinunter schieben, während das Passstück am Mast herunter gleitet wird. Die Löcher in eine Reihe bringen und an der Stelle mit den mitgelieferten Schrauben und Muttern befestigen und mit dem Sechskantstiftschlüssel befestigen. **Die Turbine darf nicht sich nicht unbehindert im Kreis drehen.**
10. Das Aufladekontrollgerät neben der Batterie lokalisieren und mit Sorgfalt ALLE Richtlinien und Installationsanweisungen für den Anschluss an den Windcharger bis durch zur Batterie befolgen.
11. Sicherstellen, dass die Batterieanschlüsse dauerhaft sind, da der Windcharger NIE ohne einen Anschluss mit der Batterie in Betrieb genommen werden darf.
12. Den Windcharger anheben und befestigen. Die Drehbewegungen können nun durchgeführt werden. Befolgen sie die im folgenden erläuterte "Inbetriebnahme – 4-Punkte Überprüfliste". **[Up and Running- Four Points Final Checklist]**, ebenso die **"Allgemeinen Richtlinien und Gefahrenhinweise"**, die sich auf die obengenannten Punkte beziehen.

## Italiano

### Introduzione

Complimenti e grazie per aver acquistato il Generatore eolico Rutland 504.

Tutti i nostri prodotti sono fabbricati secondo procedure rigorose nei nostri stabilimenti certificati ISO9001. Per essere sicuri di utilizzare al meglio il Rutland 504 raccomandiamo di leggere questo manuale e di familiarizzare con il suo contenuto prima di installare e avviare il generatore eolico.

### Caratteristiche e utilizzo

- Lo stile aerodinamico consente di mantenere un buon flusso di vento e una buona stabilità.
- L'avvio con bassa velocità del vento massimizza la produzione di energia anche in presenza di venti leggeri.
- È costruito con materiali di alta qualità per garantire lunga durata, stabilità in presenza di raggi UV e resistenza agli agenti atmosferici.
- È dotato di un alimentatore DC per ricaricare banchi di batterie da 12 V
- quando è necessario un basso consumo energetico per elettrodomestici,
- apparecchiature di navigazione ecc.
- progettato per l'uso a bordo di yachts a vela e per applicazioni temporanee su camper a motore.

### Linee guida generali e avvertenze

- Il diametro esterno del palo di montaggio NON DEVE superare i 38,1 mm almeno per i 0,5 m della parte superiore. Non devono essere utilizzati pali di sezione maggiore in quanto ridurrebbero la distanza tra la pala e la torre. In condizioni di vento forte potrebbero verificarsi danni al generatore eolico poiché la pala potrebbe entrare in contatto con il palo di montaggio. Una pala spezzata provocherà uno squilibrio della turbina e un conseguente danno.
- Mentre il generatore eolico gira, è in grado di generare tensioni in eccesso rispetto alla tensione nominale. La turbina non deve mai ruotare quando non è collegata elettricamente ad un regolatore o a batterie. Collegare una turbina a circuito aperto in funzione all'impianto elettrico si possono verificare gravi danni ai componenti dell'impianto a causa della tensione eccessiva. Occorre esercitare cautela in ogni momento al fine di evitare scosse elettriche.
- Arresto della turbina: potrebbe essere necessario per effettuare la manutenzione della batteria. Se possibile, la turbina deve essere arrestata con venti a bassa velocità. La turbina può essere rallentata ruotando o orientando il timone di coda sopravento, rallentando così la turbina a sufficienza per poterla fissare in modo sicuro al palo con una corda. Evitare di lasciare la turbina legata. Si consiglia di coprire o di proteggere la turbina dalle intemperie oppure di rimuoverla e di conservarla in un luogo asciutto. Si consiglia l'uso del regolatore di carica Marlec dotato di interruttore di spegnimento.
- Scegliete una giornata tranquilla per l'installazione dell'apparecchiatura e rispettate tutte le misure di sicurezza.
- Non deve essere fatto nessun tentativo di riparare l'impianto finché non viene impedito al generatore eolico di ruotare.
- Il generatore eolico è dotato di magneti di ceramica, che possono essere danneggiati se non vengono maneggiati con cura. Il blocco principale del generatore deve essere trattato con cura durante il trasporto e il montaggio.

- È fondamentale rispettare la corretta polarità quando si collega il generatore eolico e tutti gli altri componenti ad un circuito elettrico. La connessione inversa danneggerà il generatore eolico e l'installazione non corretta invaliderà la garanzia
- *Il generatore eolico Rutland 504 è adatto per barche a vela e alcune applicazioni a terra. Quando si prevedono venti di tempesta la ventola potrà essere rallentata minimizzandone il logorio. Si noti che qualora il produttore raccomandasse l'utilizzo di un Windcharger modello furl la garanzia verrà invalidata in caso di danni provocati dal maltempo.*
- In caso di dubbi, contattare il proprio rivenditore, un ingegnere elettrico o il produttore.

### Vista esplosa di Rutland 504

Turbina di sicurezza.  
Le pale che incorporano l'anello esterno non devono essere manomesse o alterate.

Navicella contenente il gruppo dell'albero eolico

Gruppo timone di coda con 2 x M6 x 12 Hex. Viti a testa, rondelle elastiche e rondelle.

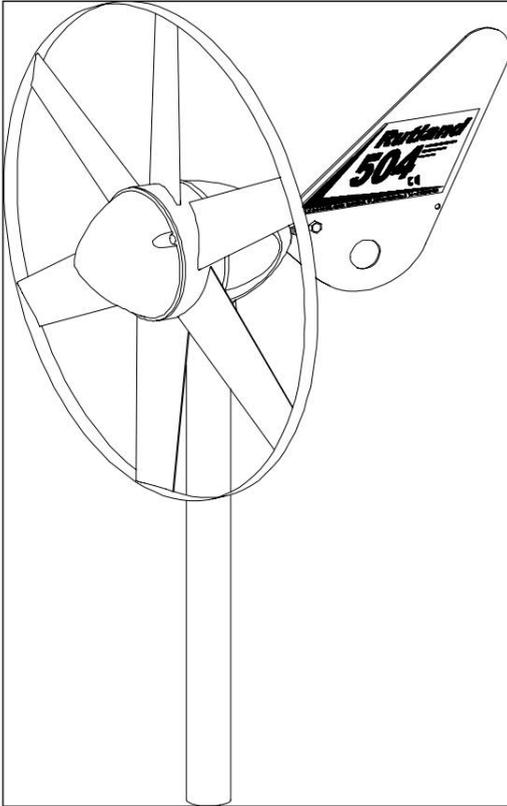
Gruppo adattatore montante.

Si inserisce in un palo di 31,7mm di diametro interno e NON PIÙ DI 38,1 mm di diametro esterno.

Naso cono con 3 rivetti a scatto

## Guida rapida in 12 punti

1. Scegliere un sito all'aperto in cui esporre il generatore eolico ad un flusso di vento evitando ostruzioni. A bordo, montare il generatore eolico ad almeno 2,0 m sopra il ponte e a terra ad almeno 4 - 6 m di altezza. *Leggere la sezione completa in **Luogo di utilizzo**.*
2. Scegliere un palo di montaggio con un diametro interno di 31,7 mm e un diametro esterno non superiore a 38,1 mm per almeno 0,5 m nella parte superiore per (i) prevenire danni accidentali e (ii) soddisfare le condizioni di garanzia.
3. Montare un regolatore di carica della gamma Marlec su una superficie verticale idonea e vicino alla batteria. Seguire le istruzioni fornite con il regolatore di carica.
4. Eseguire il foro nel palo di montaggio, se necessario, per accettare e fissare il generatore eolico. *Vedere la sezione **Montaggio e installazione**.*
5. Scegliere un cavo bipolare per collegare il generatore eolico al regolatore. Fino a 20 m questo dovrebbe avere un'area della sezione trasversale di almeno 2,5 mm<sup>2</sup>. È necessaria una corta sezione di area della sezione trasversale di 4mm<sup>2</sup> per collegare il regolatore alla batteria. *Per le altre distanze vedere la tabella in **Specifiche del cavo**.*
6. Posizionare il palo di montaggio (*questo può essere eseguito sul terreno prima di sollevare il palo*) in modo che il cavo selezionato possa essere filettato lungo di esso.
7. Montare la coda e il naso al generatore eolico mediante i dispositivi di fissaggio in dotazione.
8. Unire il cavo filettato lungo il palo al cavo di uscita del generatore eolico utilizzando il connettore in dotazione. Avvolgere con nastro isolante. In alternativa utilizzare una spina e una presa di blocco. *Si consiglia di attorcigliare all'indietro il cavo e di fissarlo con un fermacavo per un fissaggio corretto al giunto.*
9. Spingere con cautela i cavi lungo il palo mentre si fa scivolare in basso l'adattatore del montante verso il palo. Allineare i fori e fissare in posizione con le viti e le rondelle in dotazione. Fissare con la chiave a brugola. **Non consentire alla turbina di girare liberamente.**
10. Localizzare il regolatore di carica vicino alla batteria e seguire con attenzione TUTTE le linee guida del regolatore e le sequenze di installazione per il collegamento del generatore eolico fino alla batteria.
11. Fare in modo che i collegamenti della batteria siano permanenti poiché il generatore eolico non dovrebbe MAI funzionare senza collegamento alla batteria.
12. Sollevare e fissare il generatore eolico. Ora può ruotare. Seguire la "**Checklist finale in 4 punti per il funzionamento corretto**" seguente. Anche la sezione "**Linee guida generali e avvertenze**" si occupa nel dettaglio di quanto specificato sopra.



**For Your Records**

For your future reference we recommend you note the following:

**Windcharger Model 504:**

**Serial Number:**

**Date of Purchase:**

**Date of Installation:**

**Type of Regulator:**

## Limited Warranty

The Marlec Engineering Company Limited Warranty provides free replacement cover for all defects in parts and workmanship for 24 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 and are in the seller's opinion defective and are so found by Marlec upon inspection. A valid proof of purchase is required to make a warranty claim.

Defective parts must be returned by prepaid post to the manufacturer 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, misuse, damage caused by flying debris or natural disasters including lightning and hurricane force winds. This warranty does not extend to support posts, inverters, batteries or ancillary equipment not supplied by the manufacturer.

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

No responsibility is assumed for use of a non "furling" versions of the Rutland Windcharger where Marlec or one of its authorised agents finds that a turbine incorporating a furling device should have been used.



Manufactured in the UK by  
Marlec Engineering Co Ltd  
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Email: [sales@marlec.co.uk](mailto:sales@marlec.co.uk)

[www.marlec.co.uk](http://www.marlec.co.uk)

Did you know...

# Marlec also offer Solar Energy Systems!



Solar power that works with your  
Rutland Windcharger

Solar power to keep batteries  
topped up on-board



Marlec's innovative Solar iBoost+ enables  
you to automatically consume the excess  
energy generated at your home so you can  
just sit back and enjoy the extra savings!



  
**marlec**  
renewable power

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