



SWIFT™ Wind Energy System 1.5kW
Owner's Manual
PD0017-2

NOTICES

All information contained in this document is believed to be reliable; however Renewable Devices Ltd assumes no responsibility for inaccuracies or omissions. The user of the product assumes full risk and responsibility.

All specifications are subject to change without notice.

Wind generator systems must be installed by registered installers and in accordance with all of the appropriate regulations and manufacturer's approved installation and operation procedures.



This product has been designed and manufactured using recycled and recyclable materials where practical.

When operating this equipment, observe all safety procedures as detailed in this manual. This manual is an important safety document and should be retained for future use.

This manual applies to systems shipped after April 2010 and with the Kaco Powador 2002 inverter. If your system is not supplied with this inverter, contact your installer for the correct version of the manual.

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1. Introduction

As part of our mission to provide accessible renewable energy technologies, Renewable Devices Ltd (RDL) have produced the world's first building mountable wind energy system capable of providing a cost effective renewable energy source for worldwide domestic, commercial and industrial use.

The SWIFT Wind Energy System™ is the world's first aerodynamically silent building mountable 1.5kW micro-wind turbine. The emphasis of the design process has focused on safety, reliability, ease of operation and high performance levels making it the first choice in wind power generation.

This document is the owner's manual for the SWIFT Wind Energy System™ and will provide the user with all the information required to use and operate the turbine.

This document is not an installation or commissioning manual. For installation and commissioning requirements see the install manual.

If you have any further questions after reading this document, please contact your installer or distributor.

2. Safety Information

To ensure safe operation of the SWIFT Wind Energy System™ and to avoid any injury or risk of electric shock, ensure that you read and understand the following precautions:



Caution: Do not go near the moving parts of the turbine when it is in operation.



Caution: The SWIFT Wind Energy System™ must be installed by a suitably qualified and approved technician. The system contains no user serviceable parts. Please contact your authorised installer/distributor if there are any problems with the device. Never try to repair or modify the system yourself.

Every effort has been made in the design of the SWIFT Wind Energy System™, to ensure the turbine operates as safely as possible. Please make safety your primary concern and be aware of the hazards outlined in this manual.

2.1 Mechanical Hazards

The rotor of the SWIFT™ turbine rotates at very high speeds and can present a serious mechanical hazard.

The turbine will have been mounted in a location such that personnel will not come into contact with it during everyday activities. However, please ensure that the DC isolator is locked in the 'off' position (see section 4.5.2) if work is to be carried out in the vicinity of the SWIFT™ turbine.

Contact your installer if you notice any damage to the system or any abnormalities in its operation.

2.2 Electrical Hazards

When the electrical system of the building is being worked on, the turbine should be isolated from the mains supply. This requirement is detailed on the warning stickers mounted both on the inverter and the consumer unit. The turbine is isolated as described in section 4.5.3.

The inverter will have been mounted in accordance with the requirements of the Kaco Powador 2002 manual supplied. If the inverter must be moved for any reason, contact your installer.

Read the user section of the Kaco Powador 2002 manual supplied and observe all requirements for its safe operation.

Contact your installer if you notice any damage to the electrical system or any abnormalities in its operation.

Modifications to any part of the equipment, which are not expressly approved by the manufacturer, will void any warranty, user rights and authority to operate this product.

3. Product Description

3.1 System Components

The turbine will be installed as shown in figure 1.

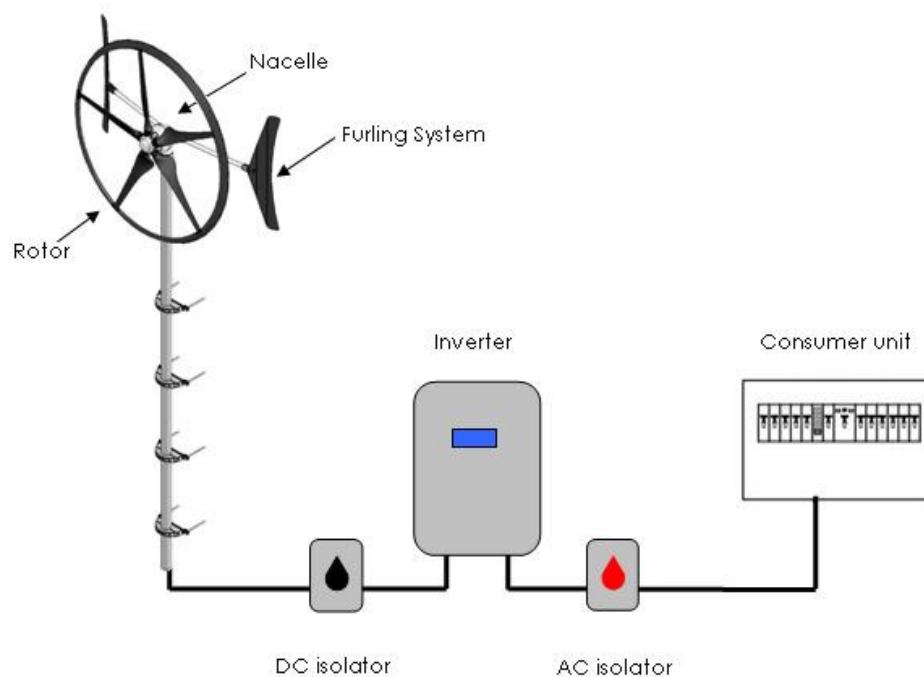


Figure 1 – Turbine System and Components

3.2 Document Pack

Your installer will have provided you with a site survey before installing your turbine.

The installer will provide the following documents on completion of the installation and commissioning:

- Owner's manual PD0017 (this manual), including installer contact details in section 0
- Kaco Powador 2002 manual
- SSEG commissioning certificate (ID0020) to be sent to your DNO

For the warranty on the system to be valid, your installer must complete and return the installation certificate ID00019. You may wish to ask for a copy for your records.

4. Installation and Operation

4.1 Installation



Caution: The SWIFT Wind Energy System™ must be installed by a suitably qualified and approved technician. The system contains no user serviceable parts. Please contact your authorised installer/distributor if there are any problems with the device. Never try to repair or modify the system yourself.



The mounting systems for the SWIFT™ turbine and have been designed and tested to ensure structural integrity under extreme wind loadings – they must never be replaced or modified without consultation with Renewable Devices Ltd.

Dedicated electrical isolators allow you to isolate the SWIFT™ Wind Energy System™ should maintenance or repair work be necessary on the turbine or in the vicinity of the turbine. See section 0 for instructions for isolating the turbine.

For your records, the installer will add details of the location of each of the major components in section 0

4.2 Normal Operation

The rotor will start spinning at operating speed when the inverter is connected to the grid. The DC isolator and AC isolator must be in the 'on' position.

The SWIFT Wind Energy System™ is designed to operate autonomously in all conditions. When running in normal operation, the SWIFT™ turbine and inverter do not require any user attention. All of the on-board and remote electronic controls will ensure that the system is operating safely and efficiently.

4.3 Safety Systems

The SWIFT Wind Energy System™ design incorporates several features to allow it to withstand very high wind speeds.

4.3.1 Furling System

The furling mechanism is designed to turn the rotor out of the wind when the wind speed increases beyond a pre-defined limit.

4.3.2 Braking System

The turbine has a braking system which operates if the rotor speed exceeds the safe operating level or if the turbine is disconnected from the grid. When the turbine is braked, the rotor will turn slowly despite high wind speeds. When there is a reduction in wind speed or the inverter re-connects to the grid, the rotor will spin up to normal operating speeds.

4.3.3 Lock Down System

A lock down system is designed to operate in the event of a fault which causes the turbine to vibrate excessively or the rotor to over speed. See section 7 for the symptoms of a lock down. If the system has been displaying these symptoms for a day or more, a manual reset is required to return the turbine to normal operation. The reset procedure is described in section 4.5.4. Record the reset in the log sheet in section 0.



Before resetting the turbine, it is essential to check the condition of the turbine. Carry out a visual check of the system from the ground or another safe viewing position. Check that the rotor, furling system and mounting system show no obvious signs of mechanical damage, such as signs of an impact or of loose fastenings.



After resetting the turbine and when there is some wind, watch the rotor spin up. Switch the turbine off (section 4.5.3) and contact your installer if

- there are signs of excessive vibration
- there is damage to the turbine
- there are unusual noises from the turbine
- the rotor spins at full speed, but the turbine is not generating any power (scroll through the inverter display screens to check power being generated)
- the lock down operates again
- there is movement, damage or cracking in the structure around the mounting system

4.4 Grid Tie Inverter - Operation

The inverter allows the optimum amount of power to be taken from the turbine under all wind and loading conditions. The LCD display provides information about current operating status, as well as energy and power generation. The inverter also controls the connection of the turbine to the grid.

The inverter has been specifically designed to optimise the amount of energy drawn from the SWIFT™ turbine. See the Kaco Powador 2002 manual for all aspects of the inverter operation.

4.5 DC and AC Isolators

4.5.1 Normal Operation

During normal operation, the DC isolator and AC isolator switches should be set to 'On'. The inverter will connect to the grid approximately 3 minutes after it is switched on.

4.5.2 Braking the Turbine

To brake the turbine, for example if access to the roof is required:

- 1) Ensure that the AC isolator and MCB/RCD in the consumer unit are in the ON position.
- 2) Turn the switch on the DC isolator to BRAKE , and wait at least 30 seconds.
- 3) Go outside and check that the rotor speed is very low or rotor is stationary.
- 4) Switch the DC isolator to the OFF position and padlock.

4.5.3 Switching off the Turbine

If work on the electrical or mechanical system is to be undertaken, the turbine should be both braked and isolated. In this instance do the following:

- 1) Ensure that the AC isolator and MCB/RCD in the consumer unit are in the ON position.
- 2) Turn the switch on the DC isolator to BRAKE , and wait at least 30 seconds.
- 3) Go outside and check that the rotor speed is very low or rotor is stationary.
- 4) Switch the DC isolator to the OFF position and padlock.
- 5) Switch the AC isolator to the OFF position and padlock.

4.5.4 Resetting the Turbine

See section 0 before resetting the turbine.

- 1) Ensure that the AC isolator and MCB/RCD are in the ON position.

- 2) Turn the switch on the DC isolator to BRAKE, and wait at least 30 seconds.
- 3) Go outside and check that the rotor speed is very low or rotor is stationary.
- 4) Switch the DC isolator to the OFF position.
- 5) Check that the inverter is grid tied (green LED with the pylon symbol.)
- 6) Turn the DC Isolator switch to RESET and allow it to return to the OFF position.
- 7) Turn the DC Isolator switch to ON.
- 8) Record the reset operation in the log book (section 0 of this manual).

The turbine should now be reset and fully operational.



Caution: The braking system should only be operated in an emergency or maintenance situation. Do not try to protect the turbine in high winds by parking the rotor.

4.6 Inspection

The system has been designed to be maintenance free, but in the case of any abnormalities or damage to the turbine, contact your installer immediately.



Caution: The SWIFT Wind Energy System™ must be maintained by a suitably qualified and approved technician. The system contains no user serviceable parts. Please contact your authorised installer/distributor if there are ever any problems with the device, never try to repair or modify the system.

Take the opportunity every 4 – 6 months to watch the system's behaviour in windy conditions.

If you notice any abnormalities or damage to the turbine, especially the items listed in section 4.3.3, contact your installer immediately.

The system should be inspected by a Renewable Devices approved installer after 5 years. Depending on your operating environment, your installer may recommend more frequent inspection.

5. Technical Specification

Turbine Type	Upwind Horizontal Axis with Acoustic Diffuser Ring
Rotor Radius	1.0m / 1.04m Diffuser
Swept Area	3.4m ²
Nacelle Weight	37kg (65kg including rotor & furling assembly)
Start-Up Speed	3.4m/s
Rated wind Speed	12m/s
Rated Power Output	1.5kW
RPM at rated Wind speed	450 RPM

Generator	Permanent Magnet
Governing type	Angle furling/Dynamic brake
Governing wind speed	14m/s
Shut-down Mechanism	Dynamic Brake
Control Included	Yes
Grid tie version	Standard Product (includes inverter)
Electrical network viability	50Hz 230V (North American version also available)
Phase configuration	Single
Mounting system available	4 mounting systems available
Acoustic Emissions	<35dB [A]
Product Life	20 year design life
Turbine Class	BS EN 61400 Class 2
Warranty	2 year manufacturers warranty (return to base).

6. Frequently Asked Questions

How can I tell when the wind is strong enough to power the inverter and produce useful electricity?

As a general guide, if you can individually focus on the blades of the rotor as it is spinning, the wind is not strong enough for normal turbine generation.

Why is the rotor still turning slowly even though I have switched on the brake?

With the turbine braked, the rotor will not slow to a standstill when braked – it will continue to spin but at a slow, safe speed.

What happens to the SWIFT™ system in the event of a grid power cut?

The UK and other electricity supply regulations state that a micro generator such as your SWIFT™ turbine cannot be allowed to supply electricity into your electricity system in the event of a loss of supply from the grid. This is because of the potential dangers of having a live generator attached to a system on which repair work may be being undertaken. In the event of loss of power from the grid, your SWIFT Wind Energy System™ will automatically disconnect and no power will be available from it. Once the grid connection has been re-established, the SWIFT Wind Energy System™ will automatically re-connect and resume normal operation.

Why is the inverter not connected to the grid?

The green LED with the pylon symbol indicates that the inverter is grid connected. Regulations state that a micro generator must disconnect from the grid if the grid frequency or voltage go out of specified limits. After a grid fault the inverter must wait for up to five minutes (dependant on local regulations) before reconnecting.

7. Troubleshooting

If your turbine is not performing as expected, check the following items before contacting your installer.

Symptom	Potential Causes
Nothing displayed on inverter screen	AC isolator / Breaker in distribution board are in the 'off' position.
Turbine not generating	DC isolator in 'brake' or 'off' position.
Meter or inverter counter not showing any generation despite strong winds	Normal braking due to high winds (rotor returns to normal speed when wind speed reduces). No action required.
Rotor turning slowly despite high winds	Turbine locked down (perform reset according to section 4.3.3).
Turbine not generating	No grid available or grid out of specification.
Meter or inverter counter not showing any generation despite strong winds	
No green LED displayed by pylon symbol on inverter, may be fault message on inverter.	
Rotor turning slowly despite high winds	

Switch the turbine off (section 4.5.3) and contact your installer if

- there are signs of excessive vibration
- there is damage to the turbine
- there are unusual noises from the turbine
- the rotor spins at full speed, but the turbine is not generating any power (scroll through the inverter display screens to check power being generated)
- the lock down operates shortly after a reset (in the next windy period) or the lock down has operated more than three times in one month
- there is movement, damage or cracking in the structure around the mounting system

8. Installation Notes

INSTALLER CONTACT (Name, address & telephone number)	Name: Address: Contact No:	
LOCATION OF INVERTER		
LOCATION OF TURBINE (MAST/NACELLE/ROTOR)		
LOCATION OF CONNECTION TO ELECTRICAL SYSTEM		
SERIAL NUMBERS	TURBINE NUMBER	
	ROTOR	
	NACELLE	
	FINS AND BOOMS	
	INVERTER	
INSTALLER NOTES		

8.1 WARRANTY

The installer must return the installation certificate ID0019 for the warranty on the turbine to be valid.

9.0 Owner's Log Book

Date	Event / Comment / Work Completed	By (name and organisation)

