



# *Horizontal Axis Wind Turbine RE570*



- *Allows Investigation of an Efficient Three Phase to DC Horizontal Axis Wind Turbine*
- *Safe and Suitable For Student Operation.*
- *Instrumentation Allows Detailed Analysis of Turbine and Generator Performance.*
- *Optional Mast for Controlled Testing*
- *Optional Computerised Data Acquisition Upgrade*
- *Two year Warranty.*



## ***Introduction***

In the field of renewable energy wind power generation represents one of the most universally available sources of electrical energy. It is important that students understand the factors that affect turbine and generator performance.

The Hilton Horizontal Axis Wind Turbine RE570 allows students to investigate the performance of a typical small scale 3 phase to DC wind generator. The unit will provide interesting and instructive experimental work for all students, and will be of particular interest to those studying:

- Renewable Energy
- Aerodynamics
- Thermodynamics
- Energy Conservation
- Mechanical Engineering
- Fluid Mechanics

## ***Experimental Capabilities***

- Measurement of wind speed turbine speed and power generation relationship.
- Measurement of air velocity before and after the turbine.
- Calculation of theoretical power.

## ***Description***

A small diameter (less than 1.0m) horizontal axis wind turbine with 3 phase generator and integral DC rectification. The unit is supplied with a small mounting mast for installation at an elevated height.

Alternatively the unit may be mounted on a locally available mast or the optional RE570A mast for examination by students. A number of mast variants are available

The unit may be operated into the battery charge controller supplied and a variable load for performance investigation.

The number of blades may be varied for performance investigation.

The instrumentation and control console supplied allows measurement of electrical power output, turbine speed and variation of applied load.

The air velocities before and after the turbine is measured in order to allow students to investigate the overall performance of the unit.

## ***Specification***

A horizontal axis three phase to DC wind driven power generator with instrumentation console recording turbine speed, power output and adjustable load.

An optional mast is available for controlled testing.

An optional computerised data acquisition upgrade is available that allows all relevant system parameters to be automatically recorded on a PC.

The unit is supplied with a detailed experimental operating and maintenance manual giving example experimental results and sample calculations.

Accessories and spares for two years normal operation together with a full two year warranty are also included as standard.

## ***Dimensions***

Generator only, Without mast:-

Height: 91cm Depth: 61cm

Width: 91cm Weight: 20kg.

## ***Services Required***

### **RE570 Only**

**Electrical: A:** 220-230 Volts, Single Phase, 50Hz(With earth/ground).

Line current up to 5A at 230v

**B:** 110-120 Volts, Single Phase, 60Hz(With earth/ground).

Line current up to 10A at 110v

### **Optional Items:**

On application, depending upon location and environment.

## ***Accessories and Spares***

Unit supplied with:

- One experimental operating and maintenance manual in either English, Spanish or French.
- Accessories and spares for 2 years normal operation. List available on request.

## ***Ordering Information***

**Order as:** RE570 Horizontal Axis Wind Turbine

### **Electrical Specification**

#### **RE570 Only**

Either: **A:** 220-230 Volts, Single Phase, 50Hz(With earth/ground).

**B:** 110-120 Volts, Single Phase, 60Hz(With earth/ground).



## ***Language***

Either: English, Spanish, French.

## ***Optional Items, Order as:***

RE570A Optional Tilt Over Mast

REC571A Data Acquisition Upgrade

## ***Shipping Specifications***

RE570 Only

**Net Weight:** 20kg

**Gross Weight:** 180 kg. (approx.)

**Packing Case Dimensions:**

150 x 120 x 90 cm (approx.)

**Packing Case Volume:** 1.09m<sup>3</sup> (approx)

## ***Also Available On Request***

Further detailed specification.

Additional copies of instruction manual.

Recommended list of spares for 5 years operation.

## ***Optional Extra REC571A***

### **Data Acquisition Upgrade**

#### **Hardware details**

The Optional Computerised Data Acquisition Upgrade REC571A consists of a 21 channel Hilton Data logger (D103), together with pre-configured, ready to use, Windows TM compatible educational software.

Factory fitted coupling points on the RE570 allow installation of the upgrade to the unit at any time in the machine's extensive life.

The Hilton Data logger (D103) connects, using the cable supplied, to a standard USB port on the user-supplied PC. If more than one logger is required connection is via a second USB port or standard USB hub.

The combined educational software and hardware package allows immediate computer monitoring and display of all relevant parameters on the RE570.

#### **Software Details**

The pre-configured menu driven Software supplied with the Computer Upgrade REC571A allows all recommended experiments involving the electronic transducers and instruments on the RE570 to be carried out with the aid of computerised data acquisition, data storage and on-screen data presentation. This enhances student interest and speeds comprehension of the principles being demonstrated.

Students are presented with either raw data for later hand calculation or alternatively data may be transferred to most spreadsheets for computerised calculation and graphical presentation.

Data may be stored on disc and displayed at any time using the software supplied. Alternatively data may be transferred to any compatible spreadsheet together with individual time and date stamp on each reading for complex analysis.

#### **Additional Data Logging Facility Supplied As Standard**

The D103 is the third generation of Hilton Data Logger. It comprises an industrially proven 21 channel interface with 8 thermocouples (type T and K as standard) / differential voltage inputs ( $\pm 100\text{mv DC}$ ), 8 single ended DC voltage inputs ( $\pm 8\text{v}$ ), 4 logic or frequency inputs and one mains voltage input. In addition there are on board 12v DC,  $\pm 5\text{V DC}$  and  $\pm 15\text{v DC}$  power supplies for most commercially available transducers.



The Hilton Data Logging software supplied as standard with the REC571A package allows the D103 to be disconnected from the RE570 and used together with most standard transducers as a stand-alone computer data logger for the instrumentation and monitoring of existing laboratory equipment using locally sourced industrial transducers. The software is also backwards compatible with our many second generation D102 data loggers that are already in use worldwide.

Full data logger command protocol and communications details are provided in an extensive user manual that allows other software applications to communicate with the logger via the USB interface. Users can write their own software, typically in LabView, Matlab, C, C++, Visual Basic etc. This further expands the student project capabilities of the (Find&ReplaceloggerName) package from teaching and demonstration into the field of research and postgraduate study.

#### **Computer Hardware Requirements**

The menu driven Software supplied with the Computer Upgrade REC571A will operate on a PC which has at least 0.5Gb Mb ram, VGA graphics, 1Gb hard drive, CD drive and an available USB port. The software is Windows 2000, XP and 7 compatible.

#### **Ordering Information**

**Order as:** Data Acquisition Upgrade REC571A

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