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INSTALLER INSTRUCTION MANUAL

WIND INTERFACE BOX



ORIGINAL INSTRUCTIONS

This manual must be considered as an integral part of the device and must always be easily at hand for quick reference for anyone interacting in anyway with the device itself.

The manual must always be kept together with the device, even if assigned or passed on to another user.



Operators are required to read this manual and stringently follow the instructions given herein, since **Power-One** shall not be held liable for damages to persons and/or items, or to the device itself, if they arise from failure to observe the conditions described below.

The Client is required to safeguard the trade secrets represented herein, hence the following documentation and annexes thereto may not be altered, modified, reproduced or transferred to third parties without authorisation to do so from **Power-One**.

1 - Introduction and general considerations

Warranty and Supply Conditions

The warranty conditions are described in a special certificate supplied with the device. Further, the warranty conditions are considered to be valid if the customer adheres to the indications in this manual; any conditions deviating from those described herein must be expressly agreed in the purchase order.



Power-one declares that the equipment complies with the pertinent legislation currently in force in the European Community and has issued the corresponding declaration of conformity.

Not included in the supply

Power-One accepts no liability for failure to comply with the instructions for correct installation and will not be held liable for equipment upstream or downstream from the device it has supplied.



**It is absolutely forbidden to modify the equipment.
The Customer is fully liable for any modifications made to the equipment.**

Given the countless array of system configurations and installation environments possible, it is essential to check the following: adequate spaces, suitable for housing the equipment; airborne noise produced based on the environment; potential fire hazards.

Power-One will not be held liable for non-production, even when arising from equipment failures or the data communication system.

Power-One will NOT be held liable for defects or malfunctions arising from: improper use of the equipment; deterioration resulting from transport or particular environmental conditions; absence or incorrect performance of maintenance; tampering or unsafe repairs; use or installation by unqualified persons.

Power-One will NOT be held responsible for the disposal of: displays, cables, batteries, accumulators etc. The Customer shall thus dispose of substances potentially harmful to the environment in accordance with pertinent legislation in force in the country of installation .



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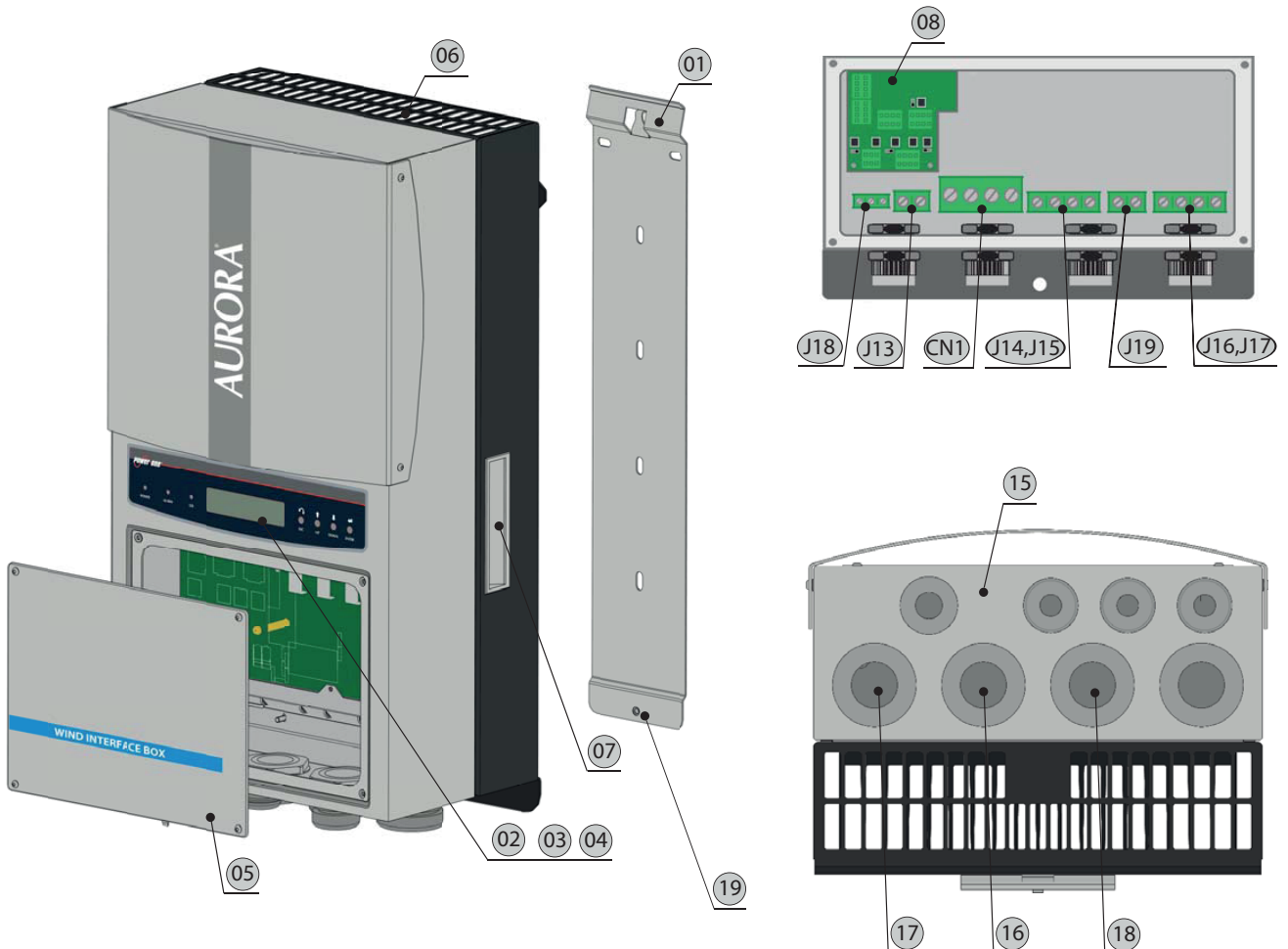
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Auxiliary power supply terminal block	J18
Service holes	15
AC Hole	16
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DC Hole	18

Visual representation of the references



0000003BI.EN

The document and who it is for

Purpose and structure of the document

This operating and maintenance manual is a useful guide that will enable you to work safely and carry out the operations necessary for keeping the equipment in good working order.



The document was originally written in ITALIAN; therefore, in the event of inconsistencies or doubts please ask the manufacturer for the original document.

List of annexes

In addition to this operating and maintenance manual, (if applicable or on request) the following attached documentation is supplied:

- EC declaration of conformity, cCSAUS
- warranty



WARNING: Part of the information given in this document is taken from the original documents of the suppliers. This document contains only the information considered necessary for the use and routine maintenance of the equipment.

Staff characteristics



The customer must make sure that the operator has the necessary skill and training to do his/her job. Personnel in charge of using and maintaining the equipment must be expert, aware and skilled for the described tasks and must reliably demonstrate their capacity to correctly interpret what is described in the manual.



The employment of a person who is NOT qualified, is drunk, or on narcotics, has a prosthetic mitral valves or a pacemaker is strictly forbidden.



The customer has civil liability for the qualification and mental or physical conditional of the professional figures who interact with the equipment. They must always use the personal protective equipment provided for by the laws of the country of destination and whatever is provided by their employer.

Reference legislation

The requirements under the following reference standards were met for the design and production of the equipment.



- **2006/95/EC** Low Voltage Directive (ex-73/23/EEC).
- **2004/108/EC** Electromagnetic Compatibility Directive, Italian Legislative Decree No. 194 of 6/11/2007 (ex-89/336/CEE).
- **Italian Legislative Decree No. 81 of 9/4/2008** Updating the consolidated text on safety (ex-L.Decree No. 626/94 of 18/9/1994), Directives for Improving Occupational Health and Safety.
- **UNI EN ISO 14121-1: 2007** Safety of Machinery - Risk Assessment Principles
- **IEC EN 60204-1: 2006** Safety of Machinery - Electrical equipment of machines. Part 1: General requirements.
- **UNI EN 12198-2: 2009** Safety of Machinery - Assessment and reduction of risks arising from radiation emitted by machinery.
- **UNI 9513:1989** Vibration and shock. Vocabulary. - Terms relating to vibration and shock.
- **IEC 70-1 (EN 60529 June 1997)** Degrees of protection provided by enclosures (IP Code).
- **UNI 10893: 2000** Technical product documentation – instructions for use. Organization and order of contents
- **UNI ISO 10015: 2001** Guidelines for training.
- **ISO 7000 - DIN 30600** Graphic symbols and signs for function identification.
- **UNI 11394: 2001** Technical information – System for assessing the instructions for use of technical goods.

Symbols and signs

Table: Symbols

	In the manual and/or in some cases on the equipment, danger or hazard zones are indicated with signs, plates, symbols or icons, such as the CE marking.
	Indicates that it is mandatory to consult the manual or original document, which must be available for future use and must not be damaged in any way.
	This points out operations or situations in which staff must be very careful, respectively, of: Generic hazard or hazardous voltage
	Indicates out a risk arising from the presence of hot zones or zones with parts at high temperatures (risk of burns).
	Indicates that the examined area must not be accessed or that the described operation must not be carried out.
	Indicates that the equipment must not be worked on by anyone with a pacemaker, prosthetic mitral valve or prosthesis with electronic circuits.
	Indicates that it is mandatory to carry out the described operations using the clothing and/or personal protective equipment provided by the employer.
	Indicates the level of protection of the equipment according to IEC standard 70-1 (EN 60529 June 1997).
	Indicates that the system must be earthed
	Indicates the permitted temperature range
	Indicates a risk of electric shock. Indicates the time needed to discharge stored energy: 10 minutes
	Indicates that the equipment must be disposed of in accordance with the regulations in force in the country of installation.
	Indicates, respectively, direct and alternating currents
	Indicates that there is no transformer

Field of use, general conditions

Power-One accepts no liability for damage of any kind that could arise from incorrect or careless operations.



The equipment must not be used for any purpose other than its intended field of use. The equipment MUST NOT be used by inexperienced staff, or even experienced staff if carrying out operations on the equipment that fail to comply with the indications in this manual and attached documents.

Intended or allowed use

This equipment is a rectifier, designed to:

convert an alternating current (AC) from a wind turbine into direct current (DC) suitable for input to one or more AURORA inverters and for connecting brake resistor loads which must not be intended as a safety guard system for wind plant.

Limits of the field of use

Only a single wind turbine generator can be connected to the interface input (do not connect batteries or other power supply sources).

The Wind Interface can be employed only if all the technical characteristics are observed.

Improper or disallowed use



IT IS STRICTLY FORBIDDEN TO:

- Install the equipment in environments with particular fire risk or with adverse or inappropriate weather and environmental conditions, (temperature and humidity).
- Use the equipment with ineffective or disabled safety devices.
- Use the equipment or parts of the equipment by connecting it to other machinery or equipment, unless expressly provided for.
- Modify operating parameters that are not accessible to the operator and/or parts of the equipment to vary the performance or change its insulation.
- Clean with corrosive products that could eat into parts of the equipment or generate electrostatic charges.
- Use or install the equipment or parts of it without having first read and correctly interpreted the content of the operating and maintenance manual.
- Warm or dry rags and clothing on parts at elevated temperatures. In addition to being dangerous, doing so would compromise component ventilation and cooling.



2 - Characteristics

General conditions

A description of the characteristics of the equipment is given so as to identify its main components, thus establishing the technical terminology used in the manual.

The technical terms used herein and the quick reference system are further supported by the:

- Table of contents
- Reference number index
- Index

The Characteristics chapter contains information about models, details of the equipment, characteristics and technical data, overall dimensions and identification of the equipment itself.



In certain cases, there may be a need to separately document software functionality or attach supplementary documentation to this manual intended for more qualified professionals.

Models and range of the equipment

The models of Wind Interface devices specified in this manual can be divided into two groups according to the maximum output power (15-25 kW).

- **25 kW MODEL**

25 kW-WIND-INTERFACE (EU Version)
25 kW-WIND-INTERFACE-US (US Version)

- **15 kW MODEL**

15 kW-WIND-INTERFACE (EU Version)
15 kW-WIND-INTERFACE-US (US Version)

Identification of the equipment and manufacturer

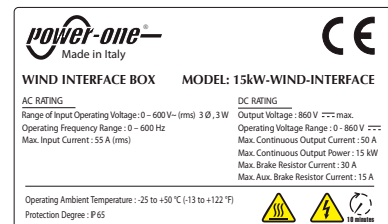
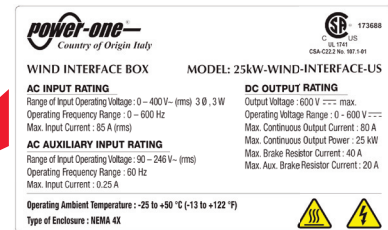
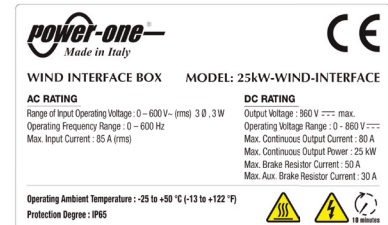
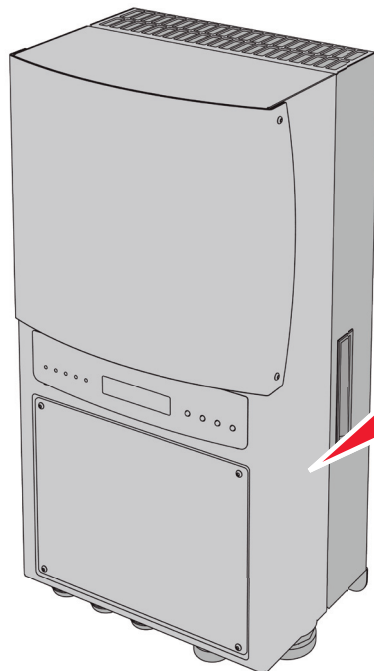


The technical data provided in this manual does not substitute the data supplied on the labels affixed to the equipment.

The labels affixed to the equipment must NOT be removed, damaged, stained, hidden, etc., for any reason whatsoever.



Note: The labels must NOT be covered with any objects or parts (rags, boxes, equipment, etc.) and should be cleaned regularly and kept clearly visible.



Characteristics and technical data

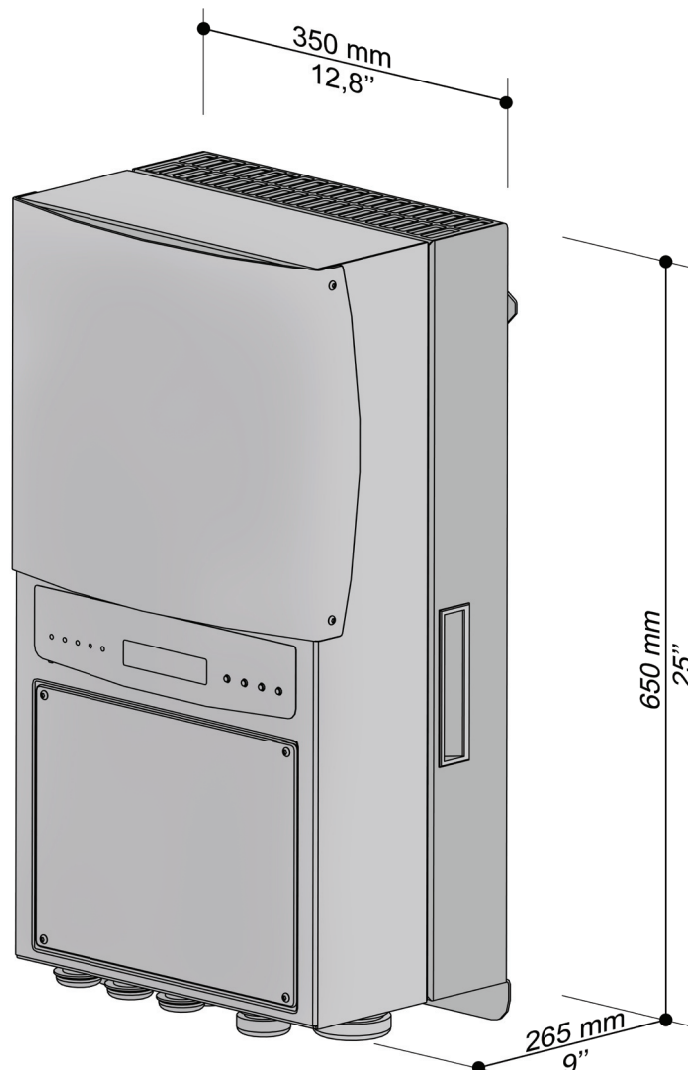
Table: Technical Data

	25kW-WIND- INTERFACE	25kW-WIND-INTER- FACE-US	15kW-WIND- INTERFACE	15kW-WIND- INTERFACE-US
Input Side				
AC Input Voltage Range (No damage) ($V_{acd,min} \dots V_{acd,max}$)	0...600 V	0...400 V	0...600 V	0...400 V
Operating AC Input Voltage Range ($V_{acmin} \dots V_{acmax}$)	35...600 V	35...400 V	35...600 V	35...400 V
Operating Frequency Range ($f_{min} \dots f_{max}$)	0...600 Hz	0...600 Hz	0...600 Hz	0...600 Hz
Maximum AC Input Current (I_{dcmax})	85 A	85 A	55 A	55 A
Maximum Current in Main Brake Resistor ($I_{MBR,max}$)	50 A	40 A	30 A	30 A
Voltage Range in Main Brake Resistor ($V_{MBRmin} \dots V_{MBRmax}$)	0...1000 V	0...600 V	0...1000 V	0...600 V
Maximum Current in Auxiliary Brake Resistor ($I_{ABR,max}$)	30 A	20 A	15 A	15 A
DC Voltage Range in Auxiliary Brake Resistor ($V_{ABRmin} \dots V_{ABRmax}$)	0...850 V	0...600 V	0...850 V	0...600 V
Type of Inputs Connection	Screw terminal block Cable gland	Screw terminal block Cable gland	Screw terminal block Cable gland	Screw terminal block Cable gland
Input Protection				
Input Over Voltage protection - Varistors	4	4	4	4
Input Fuse Size	3 x 100 A	-	3 x 100 A	-
Output Side				
Maximum Output Power (P_{dcmax})	25 kW	25 kW	15 kW	15 kW
Output Voltage Range ($V_{dc,min} \dots V_{dc,max}$)	50...850 V	50...600 V	50...850 V	50...600 V
Maximum Output Current ($I_{dc,max}$)	80 A	80 A	50 A	50 A
Type of Output Connection	Screw terminal block Cable gland	Screw terminal block Cable gland	Screw terminal block - Cable gland	Screw terminal block - Cable gland
Output Protection				
Output Over Voltage	Yes	Yes	Yes	Yes
Operating Performance				
Peak Efficiency (η_{peak})	99.6 %	99.6 %	99.6 %	99.6 %
Stand-by Consumption	< 14 W	< 14 W	< 14 W	< 14 W
Communication				
Local Monitoring System	RS 485	RS 485	RS 485	RS 485
User Interface	Display LCD with 16 characters x 2 lines	Display LCD with 16 characters x 2 lines	Display LCD with 16 characters x 2 lines	Display LCD with 16 characters x 2 lines
Environmental				
Ambient Temperature Range	-25...+50°C / -13...122°F	-25...+50°C / -13...122°F	-25...+50°C / -13...122°F	-25...+50°C / -13...122°F
Relative Humidity	< 98% w/o conden- sation	< 98% w/o conden- sation	< 98% w/o conden- sation	< 98% w/o conden- sation
Noise Emission	< 50 dB(A)	< 50 dB(A)	< 50 dB(A)	< 50 dB(A)
Maximum Operating Altitude without Derating	2000 m / 6560 ft	2000 m / 6560 ft	2000 m / 6560 ft	2000 m / 6560 ft

Physical				
Environmental Protection Rating	IP 65	NEMA 4X	IP 65	NEMA 4X
Cooling	Natural	Natural	Natural	Natural
Dimensions (H x W x D)	650mm x 350mm x 265mm / 25" x 12.8" x 9"	650mm x 350mm x 265mm / 25" x 12.8" x 9"	650mm x 350mm x 265mm / 25" x 12.8" x 9"	650mm x 350mm x 265mm / 25" x 12.8" x 9"
Weight	25 kg / 55.1 lb	25 kg / 55.1 lb	22 kg / 48.5 lb	22 kg / 48.5 lb
Mounting System	Wall bracket	Wall bracket	Wall bracket	Wall bracket
Safety				
Marking	CE	cCSAus	CE	cCSAus
Safety and EMC Standard	EN 50178, EN 61000-6-2, EN 61000-6-4	UL 1741, CSA - C22.2 N. 107.1-01	EN 50178, EN 61000-6-2, EN 61000-6-4	UL 1741, CSA - C22.2 N. 107.1-01

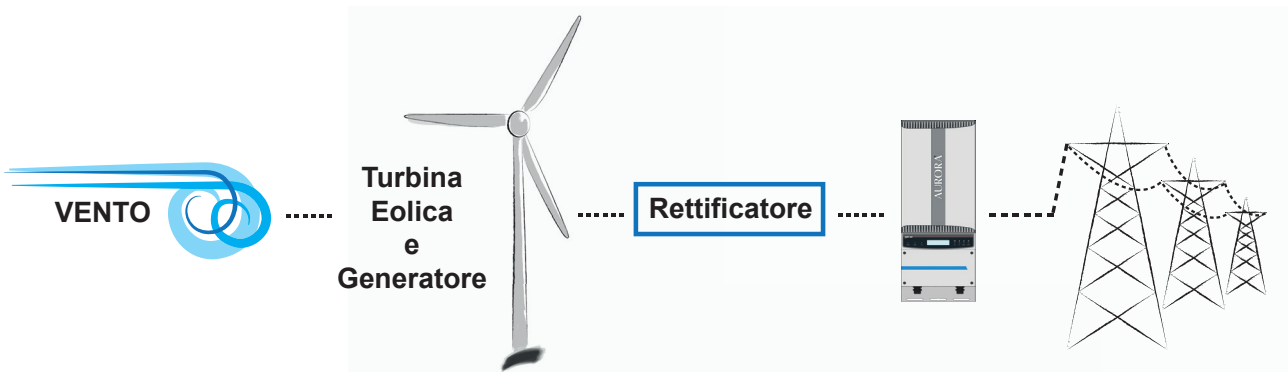
Overall dimensions

The overall dimensions are expressed in millimetres and inches.



Wind power system characteristics

A wind power system is a set of components (hydraulic, mechanical and electrical) which combine to convert wind energy into a directly usable energy form. In Wind Electric Conversion Systems (WECS), wind energy is converted into electricity with a conversion system known as a Wind Turbine Generator.



A WECS for Mini and Micro wind power systems normally comprises:

- **Wind Turbine**

A hydrodynamic device which converts wind energy into mechanical energy. The turbine is equipped with a number of blades (usually 2 or 3) coupled to a motorized shaft. This could either be horizontal or vertical: these configurations are referred to as HAWT (Horizontal Axis Wind Turbine) and VAWT (Vertical Axis Wind Turbine).

- **Generator**

The generator converts the mechanical power furnished by the turbine into electricity. Mini wind power systems normally use a synchronous permanent magnet generator (PMG). The voltage produced by the PMG has an amplitude and frequency that depends on the rotational speed of the turbine. Thus, before being connected to the power distribution grid, this generated power must first be transformed to have an amplitude and frequency compatible with the grid.

- **Rectifier**

The rectification unit rectifies and filters the alternating current (AC), thus producing a direct current (DC) output.

- **Inverter**

The conversion from direct current (DC) to alternating current (AC), compatible with grid standards, is efficiently carried out by the inverter. When connected in parallel with the grid, the alternating current from the inverter flows directly into the domestic distribution circuit, which is in turn connected to the public distribution grid.

Product Description

The Wind Interface described in this document has the following characteristics:

- **Rectification**

There are two independent rectification channels. The first supplies the Brake Resistor (Parking). The second channel provides DC voltage for the inverters and the diversion load. A semi-controlled bridge disconnects the inverters if the voltage exceeds the maximum manageable value. This characteristic prevents potential damage to the inverters 2 overvoltage.

- **Power Curve Management**

Each wind turbine has its own characteristic power curve, usually determined following a series of tests conducted in a wind tunnel. The Wind Interface directly integrates the turbine's power curve internally. Thus, the Wind Interface will in turn act as pilot, after having correctly recognized the inverters. The Power Curve can be defined based on the generator rotation speed (rpm) or the output DC voltage from the Wind Interface. Given the wide variety of wind turbines currently on the market, together with the vast diversity of PMGs, installing a default characteristic power curve in the Wind Interface would not be useful. Accordingly, Wind Interfaces are shipped to the client with no curves stored in their internal memories.



It should nevertheless be borne in mind that the characterisation of the wind turbine generator in terms of $P=f(V)$ or $P=f(RPM)$ is calculated by the wind turbine manufacturer.

- **Diversion Load Management**

This permits deviation of excess power provided by the turbine to an external resistor load.

The diversion load could be supplied simultaneously to the inverters. Normally, the diversion load is activated when the power output from the turbine exceeds the inverters' maximum manageable power. The use of the Diversion Load enables the generator voltage to be kept under control and prevents the turbine from overspeeding. The activation threshold can be adjusted

- **Activating the Braking Resistor**

When the output voltage from the rectifier exceeds the absolute maximum DC voltage (configurable parameter) that can be input to the inverters, the diversion load will be disconnected from the latter. At this point, the braking resistor will be activated so as to brake the turbine. In addition, the Braking Resistor will be activated whenever there is a fault detected by the Wind Interface (mode: Dynamic Soft Start =0).



The correct dimensioning of the diversion and brake resistors is closely linked to the characteristics of the system comprising the turbine and PMG. The foregoing is beyond Power-One's scope of responsibility. The definition of the electrical values (R and P) is thus the responsibility of the wind turbine manufacturer or the customer.



The Wind Interface cannot always prevent wind turbine overspeeding (e.g., on generator failure) and an external circuit is thus necessary (mechanical or electrical) to safeguard the entire system (Safety Brake).

• **Configurable Relays**

The Wind Interface provides three relays for the project designer. These can be employed:

GP1: to activate an external remote switch (optional) to control the braking resistors.

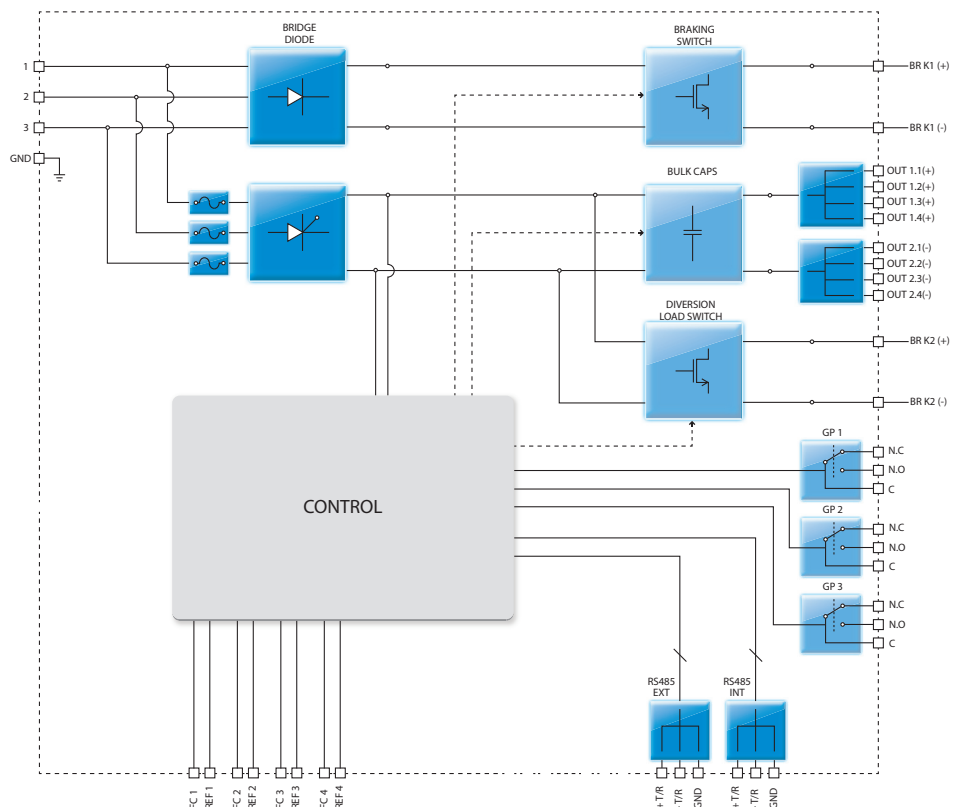
GP2: to activate a cooling fan (optional) for the braking resistors.

GP3: when the wind turbine stops, which is when this relay activates; a useful characteristic for disconnecting a possible external transformer in the system and thus avoiding unnecessary consumption during no-wind conditions.

• **Wind Interface States**

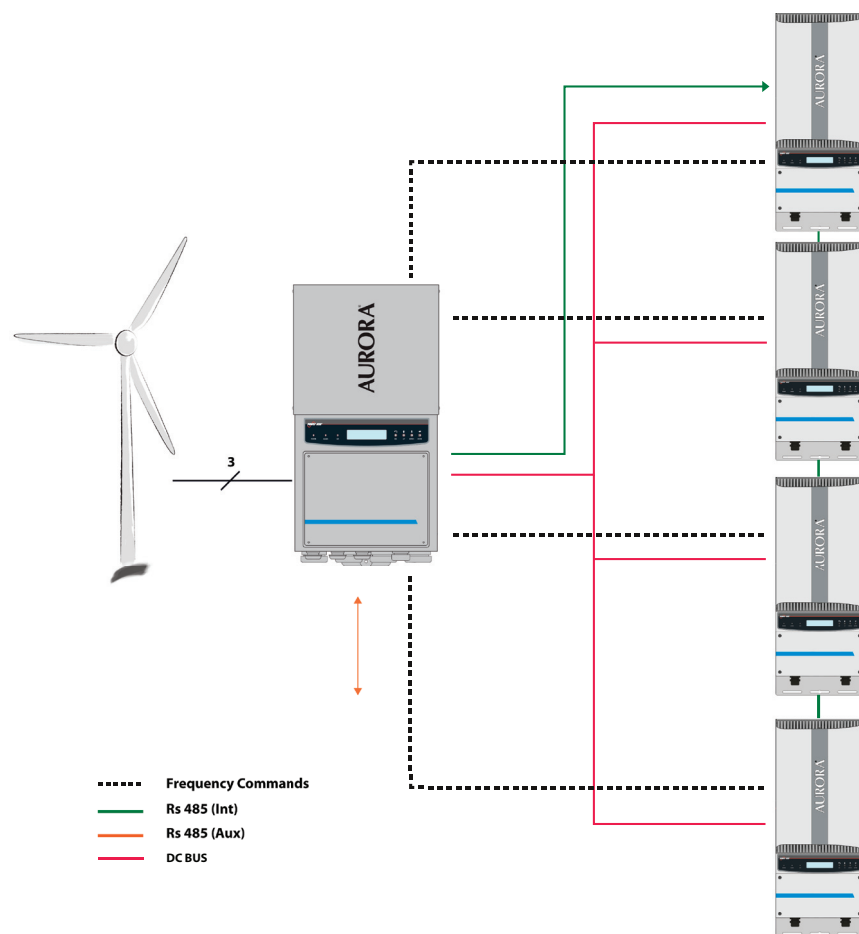
The Wind Interface state changes to “Ready to RUN” when no system faults have been detected. The system state changes to “RUN” if no dangerous conditions are detected.

The Wind Interface exits from the “RUN” state whenever a fault condition is detected.



Wind Power System

Each Wind Interface can be connected to a maximum of four inverters and two resistors (Diversion and Brake). The internal RS485 bus and the four frequency commands are used to control the connected inverters. The system works in a master-slave configuration, where the Wind Interface is the master and the inverters are the slaves. The Wind Interface can be connected to a personal computer through the auxiliary RS485 port. The supplied software package enables the downloading of the wind turbine's power curve and the management of certain system parameters.



The Wind Interface can control both Isolated inverters (I) as well as Transformer-Less (TL) inverters. If TL inverters are chosen, the wind power system must have only one inverter connected directly to the distribution grid. The remaining inverters must be connected to the grid through an isolating transformer.

Safeguards

Fuses

Three fuses are installed by default for both EU versions (15 kW and 25 kW) to protect the device from currents exceeding the limits independently for each generator phase. 100A preinstalled fuses are used.



If a fuse breaks and interrupts the circuit, do not replace it or attempt to switch the device on again. Contact the Power-One support service.

Other safeguards

The Wind Interface is equipped with additional safeguards to ensure safe operation. These include:

- Monitoring the input voltage and currents to prevent them from exceeding the maximum permitted values
- Internal temperature control to limit overheating of the unit and the bulk capacitors.

3 - Safety and accident prevention

Safety instructions and general information

The device has been manufactured in accordance with the strictest accident-prevention standards and supplied with safety devices suitable for the protection of components and operators.

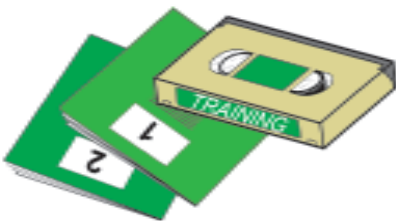


It is clearly impossible to anticipate the vast number of installations and environments in which the device will be installed. It is therefore necessary for the customer to appropriately inform the manufacturer about particular installation conditions.

Power-One accepts no liability for failure to comply with the instructions for correct installation and will not be held liable for equipment upstream or downstream from the device it has supplied.



It is essential to provide operators with correct information. They must therefore read and comply with the technical information given in the manual and in the attached documentation.



The instructions given in the manual do not replace the safety devices and technical data for installation and operation affixed to the product, and they certainly do not replace the safety standards in force in the country of installation or the rules of basic common sense. The manufacturer is willing to train staff, at its premises or on site, in accordance with conditions to be set out in the contract.



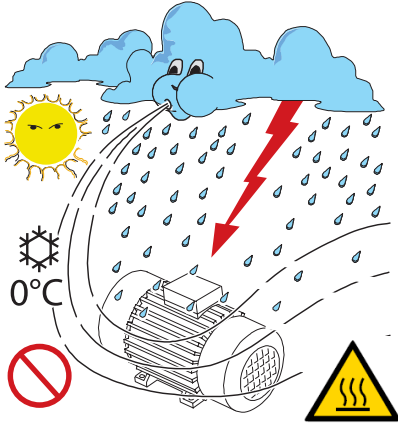
Do not use the device if you detect any operating anomalies.

Avoid improvised or temporary repairs. All repairs should be carried out using only original spare parts, which must be installed in accordance with their intended use.

Liabilities arising from commercial components are the responsibility of the respective manufacturers.

Hazardous areas and operations

Environmental conditions and risks



The device can be installed outdoors, but only in environmental conditions that do not prevent its regular operation. Adverse environmental conditions, such as: sun, rain, snow, wind, excess heat or cold, high altitudes, humidity, etc., can lead to a reduction in performance.

Power-One IS NOT responsible for the disposal of the device: displays, cables, batteries, accumulators, etc., and therefore the customer must dispose of these items, which are potentially harmful to the environment, in accordance with the regulations in force in the country of installation.

The same precautions should be adopted for destroying the device.



The device is not designed to operate in environments that are particularly inflammable or explosive.



The customer and/or installer must appropriately train operators or anyone who may come near the equipment, and highlight, if necessary with notices or other means, the hazardous areas or operations at risk: **magnetic fields, hazardous voltages, high temperatures, possible discharges, generic hazard, etc.**

Signs and labels



The labels attached to the equipment must absolutely NOT be removed, damaged, dirtied, hidden, etc.

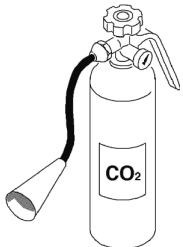
The labels must be cleaned regularly and kept visible at all times, i.e., they must NOT be hidden with objects and extraneous parts (rags, boxes, equipment, etc.).

The technical data shown in this manual do not replace those shown on the labels attached to the device.

Thermal hazard



WARNING: the removal of guards or covers must not be effected until **10 minutes after the voltage has been switched off**, this allows components time to cool down and any electrostatic charges and eddy currents to be discharged.



When the device has just been switched off, it may have hot parts as a result of overheating of the heated surfaces (e.g.: transformers, accumulators, coils, etc.) so be careful where you touch.

In the event of fire, employ CO₂ foam extinguishers and auto-extraction systems to fight fire in closed environments.

Clothing and protection of personnel



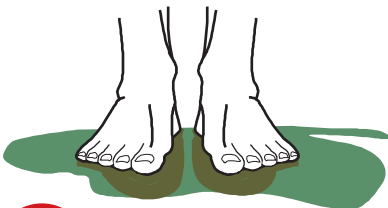
Power-One has done its best to eliminate sharp edges and corners, but as this is not always possible you are advised always to wear the clothing and personal protective equipment provided by the employer.



Personnel must not wear clothes or accessories that could start fires or generate electrostatic charges or, in general, clothing that can compromise personal safety.

All operations on the equipment should be performed with suitably insulated instruments.

Staff must NOT go near the equipment with bare feet or wet hands.



Maintenance operations must be carried out with the device disconnected from the grid.

The maintenance technician must in any case ensure that no one else can switch on or operate the device during the maintenance operations, and should report any anomaly or damage due to wear or ageing so that the correct safety conditions can be restored.

The installer or maintenance technician must always pay attention to the work environment, ensuring that it is well-lit and has sufficient spaces to ensure an escape route.

In the installation, consider or check that the **noise emitted in terms its environment** is does not exceed the thresholds contemplated by law (less than 80 dBA).



Residual risks



Despite the warnings and safety systems, there are still some residual risks that cannot be eliminated.

These risks are listed on the following table with some suggestions to prevent them.

Table: residual risks

RISK ANALYSIS AND DESCRIPTION	SUGGESTED REMEDY
Noise pollution due to installation in unsuitable environments or where personnel work permanently.	Reassess the environment or the spot for installation.
Suitable local ventilation that does not cause overheating of the equipment and is sufficient not to create discomfort to people in the room.	Restore suitable ambient conditions and ventilate the room.
External atmospheric agents	Maintain ambient conditions suitable for the system.
Overheating of surfaces at high temperatures (transformers, accumulators, coils, etc.) can cause burns. Pay particular attention not to block any of the device's cooling slats or systems.	Use suitable protective equipment or wait for the parts to cool down before switching the device on.
Inadequate cleaning: compromises cooling and does not allow the safety plates to be read.	Clean the device, plates and work environment adequately.
Accumulation of electrostatic energy can generate hazardous discharges.	Ensure the devices have discharged their energy before working on them.
Inadequate training of staff.	Ask for a supplementary course.
During installation, temporary fastening could entail a risk of detachment from the bracket 01	Carefully monitor and restrict access to the installation area.
Accidental disconnections of the quick-fit connectors with the device in operation, or wrong connections, may generate electric arcs	Carefully monitor and restrict access to the installation area.

4 - Lifting and transport

General conditions

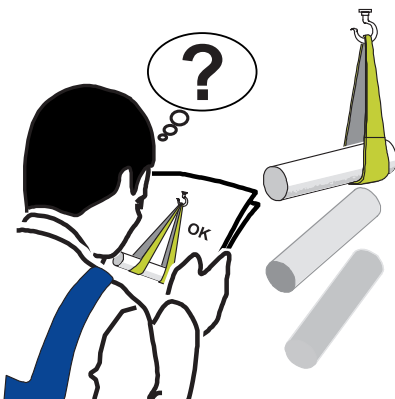
Transport and handling



Transport of the equipment, especially by road, must be carried out by suitable ways and means for protecting the components (particularly electronic components) from violent shocks, humidity, vibration, etc.

During handling, do not make any sudden or fast movements that could generate dangerous swinging.

Lifting



Power-One usually stores and protects individual components by suitable means to make their transport and subsequent handling easier. Nonetheless, as a rule, it is necessary to turn to the experience of specialized staff to take charge of loading and unloading components.

Where indicated and/or available, eyebolts or handles, which can be used as anchorage points, are inserted and/or can be inserted.

The ropes and means used for lifting must be suitable for bearing the weight of the equipment.

Do not lift several units or parts of the equipment at the same time unless otherwise indicated.

Unpacking and checking



Bear in mind that the packaging elements (cardboard, cellophane, staples, adhesive tape, straps, etc.) may cause cuts and/or injuries if not handled with care.

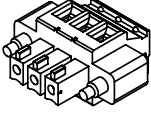
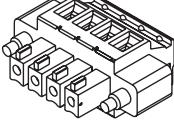

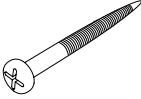

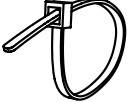

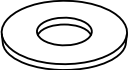

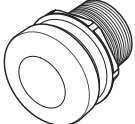
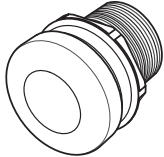
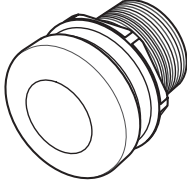
Packaging components must be disposed of in accordance with the regulations in force in the country of installation.

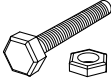
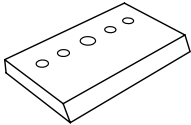
When opening the package, check that the equipment is undamaged and that all components are present.

If any defects or damage are detected, stop unpacking and contact the carrier, and also promptly inform **Power-One**.

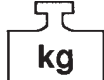
List of components supplied

Table: Components supplied with the equipment

Components available for all models		Quantity
	3-Pole Connector	3
	4-Pole Connector	2
	SX10 Anchor	4
	6.3x70mm Screw	4
	M6x16 Screw	5
	Tie wrap	15
	Male key TORX TX20	1
	M6 Washer UNI6593	4
	M6 Washer UNI1751	5
Components available for EU model		Quantity
	PG16 Fitting	3
	PG21 Fitting	1
	PG36 Fitting	4

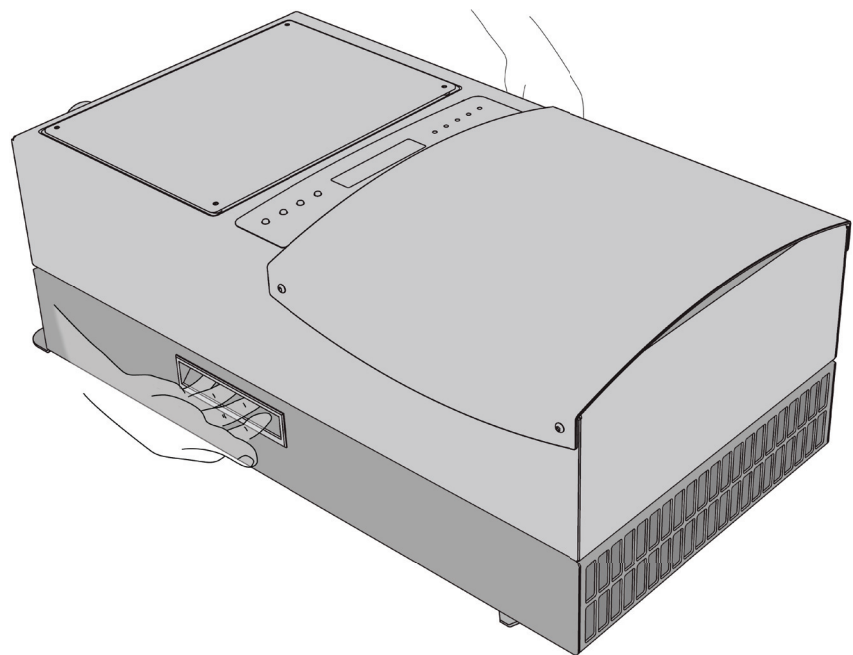
	Components available for US model	Quantity
	M6 Bolt and Nut	5
	Copper flat for fastening earth cables	1

Weight of the groups of device

Table: Weights	Mass weight in kg 	Lifting points #
	WIND-INTERFACE 15 kW: 22 kg WIND-INTERFACE 25 kW: 25 kg	2



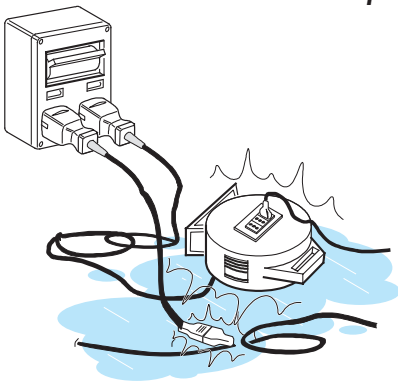
If the package is stored correctly, it can withstand a **maximum load of 4 stacked devices**. DO NOT stack with equipment or products other than those indicated.



5 - Installation

General conditions

The device is installed depending on the system and the place where the device is installed. Its performance thus depends on the correctness of the connections.



Staff authorised to carry out the installation must be specialised and experienced in this job; they must also have received suitable training on equipment of this type.

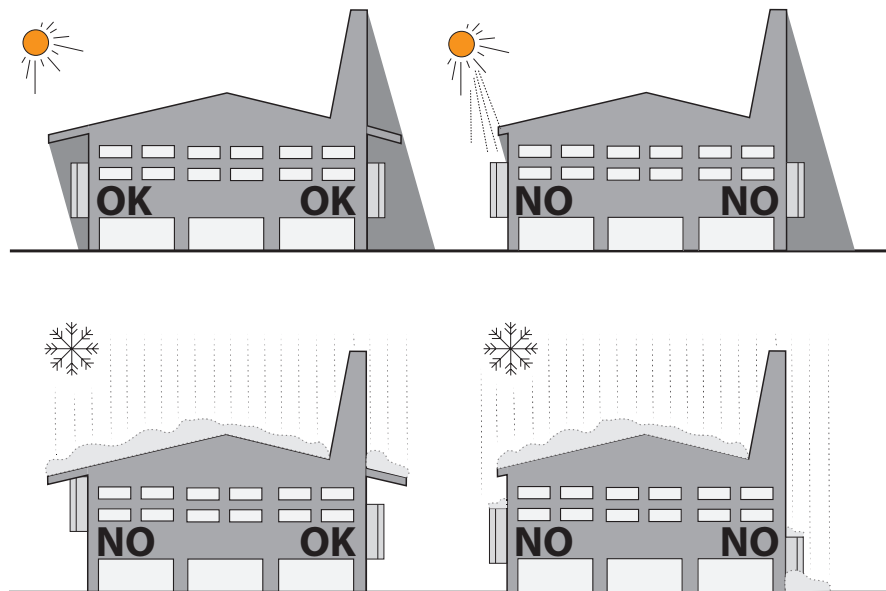
The operation must be carried out by specialised staff and it is advisable to adhere to the indications in this manual, diagrams and attached documentation.



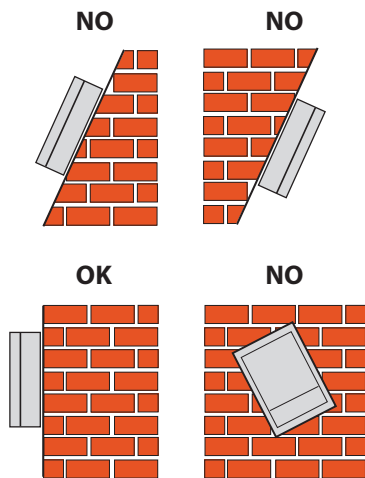
Carry out installation with the device disconnected from the grid (grid-side S2 and wind turbine side S1 disconnect switches open). The wind turbine must be parked and secure.

Environmental checks

- Consult the technical data to check the environmental conditions to observe (level of protection, temperature, humidity, altitude, etc.).
- The recommended placement should prevent exposure to direct sunlight and adverse weather.
- Do not install in small closed rooms where air cannot circulate freely;
- Always ensure that the flow of air around the Wind Interface is not blocked so as to prevent overheating.
- Do not install in places where gases or flammable substances may be present.
- Do not install in rooms where people live or where the prolonged presence of people or animals is expected, because of acoustic noise (at < 50dB(A) @ 1 m.) that the Wind Interface could make during operation.
- Avoid electromagnetic interference that can compromise the correct operation of electronic equipment, with the consequent hazards.

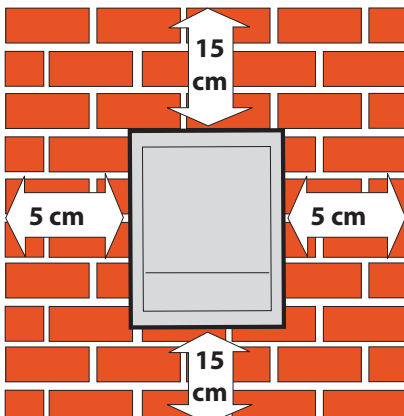


Installation position

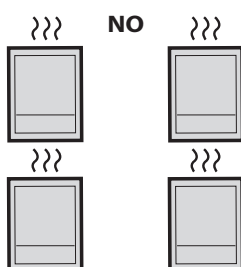
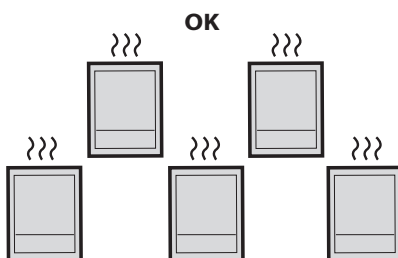
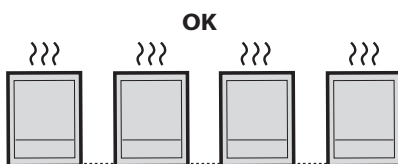


When choosing the place of installation, observe the following conditions:

- Install on a wall or strong structure suitable for bearing the weight.
- Install in safe, easy to reach places.
- If possible, install at eye-level so that the display and status LEDs can be seen easily.
- Install at a height that considers the heaviness of the equipment. Failure to meet this condition could result in problems during servicing, unless suitable means are provided to carry out the operation.
- Install vertically with a maximum inclination of 5° (forward or backward) so as not to compromise heat dissipation..



- Maintenance on device hardware and software entails removing the front cover. Check that there are the correct safety distances for the installation that will allow the normal control and maintenance operations to be carried out.
- Comply with the indicated minimum distances.

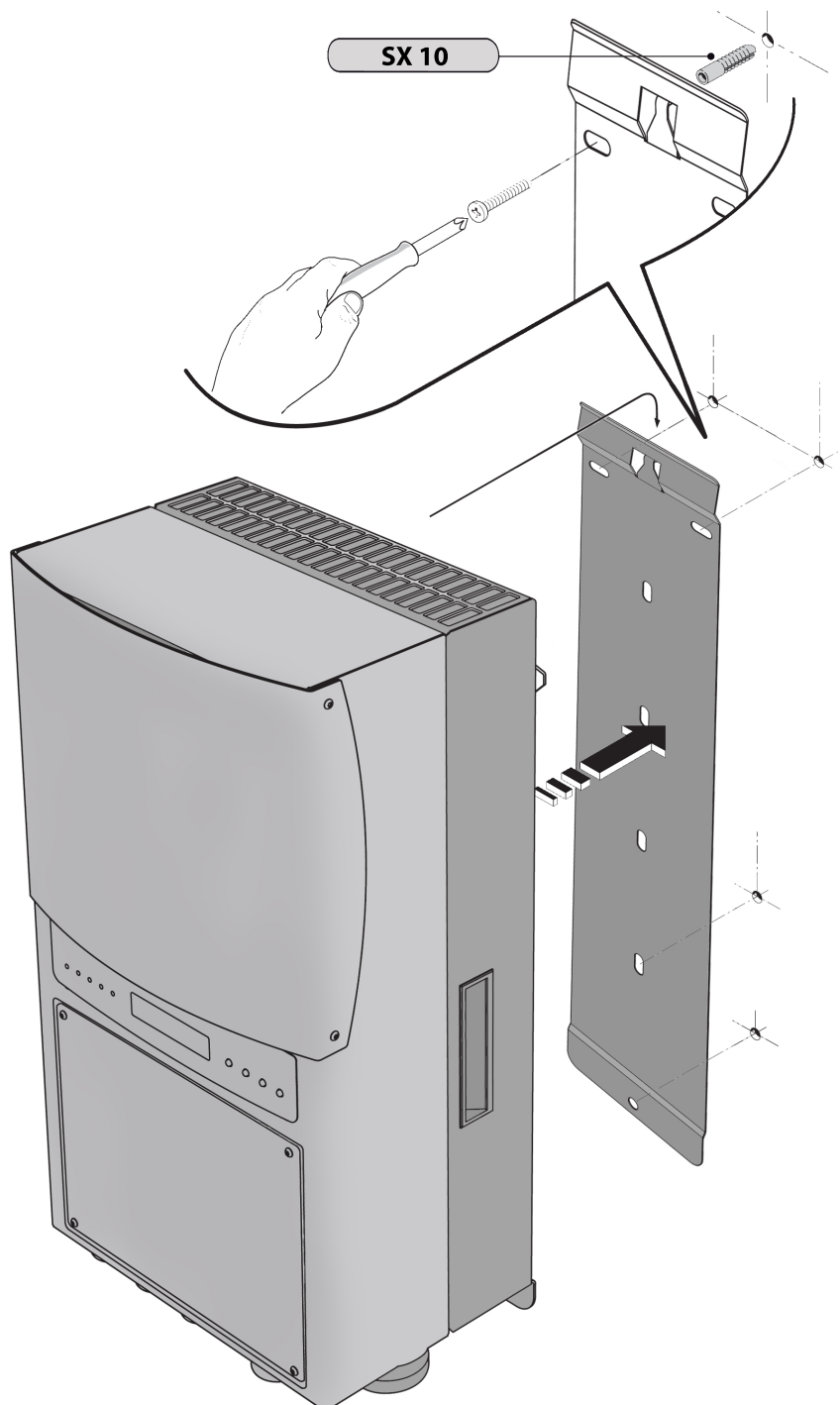


- For a multiple installation, position the Wind Interface and inverters side by side.

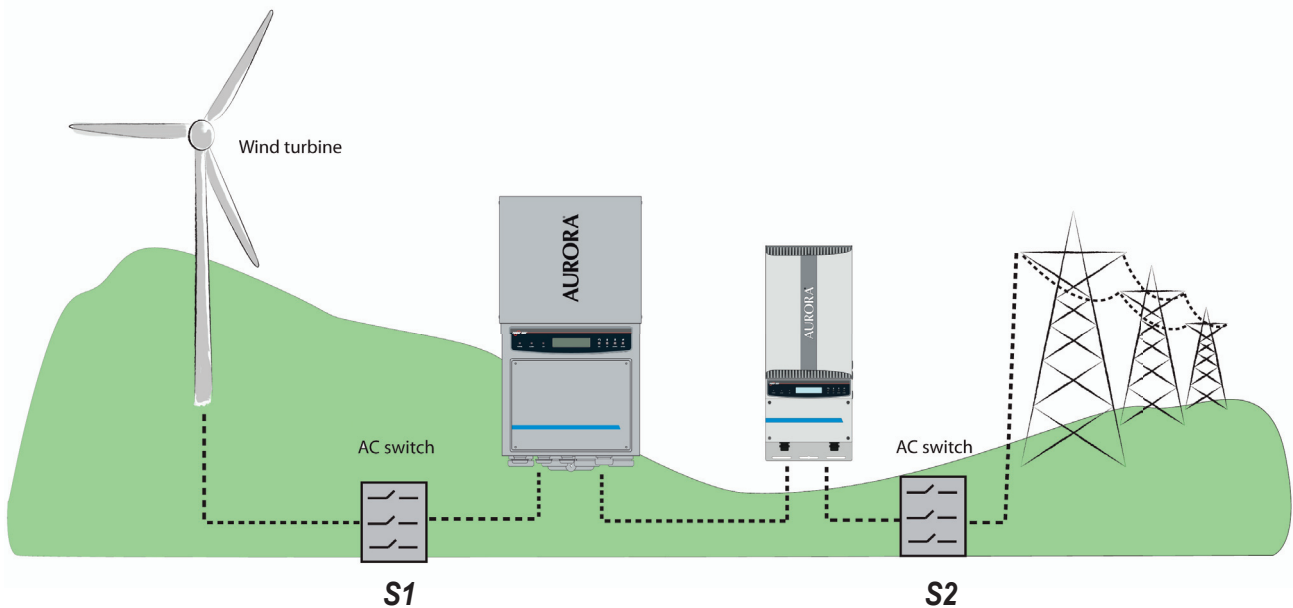
- If the space available does not allow this arrangement, position the Wind Interface and inverters in a staggered arrangement as shown in the figure so that heat dissipation is not affected by other inverters.

Wall mounting

- Position the bracket **01** squarely against the wall and use it as a drilling template.
- Drill the four holes necessary, using a drill with a bit (diameter: 6-8 mm). The depth of the hole must be at least 70 mm.
- Secure the bracket to the wall with 4 anchors (SX10) and 4 screws (6.3x70 mm) supplied as a kit.
- Hook the Wind Interface onto the bracket. The handles **07** can be used for lifting.
- With the M6x16 bolt, secure the Wind Interface to the hole **19** on the bracket.



Installation procedure



In accordance with the diagram shown in the figure, the wind power system must be designed with one disconnect switch installed upstream from the Wind Interface (**S1**) and another one downstream from the inverters (**S2**). Refer to the manual for the inverters used to ascertain the characteristics of the latter switch.



In order to correctly perform each step entailed in this procedure, we recommend reading this section (and subsections) with due attention. Any operation carried out and not described in this manual could damage the equipment and cause a hazardous situation.

Ensure that the wind turbine has been stopped and is secure!

- 1) Open the disconnection switch upstream from the wind turbine. (**S1**)
- 2) Open the AC side of the switch (**S2**) for the inverters to isolate it from the grid.
- 3) Dismount the front panel from the Wind Interface by first removing the screws on the panel. Do so with the supplied TORX TX20 key.
- 4) Connect the frequency command cables to the wind interface and inverters (also refer to “Frequency Command to the Inverters”).
- 5) Connect the serial RS485(int) to the Wind Interface and inverters [also refer to “Procedure for linking RS485(Int)”].
- 6) Connect the serial RS485(aux) to the Wind Interface and the adequate USB-RS485 - PC adapter [also refer to “Procedure for linking RS485(Aux)”].

- 7) Connect the auxiliary power supply cable to the Wind Interface Box (also refer to “Connection the Auxiliary Power Supply”).
- 8) Connect the DC output from the Wind Interface to the input for the inverters [also refer to “Connecting the Output (DC Side)”].
- 9) Connect the cable for recognising the inverter to the input of the Wind Interface (also refer to “Connecting to the input for service mode“).
- 10) Connect the auxiliary power supply cable to the grid (230V or 110V). The Wind Interface will start up (also refer to “Connecting to the input for service mode“).
- 11) After installation, open software WindBoxCVI. The main menu is shown in fig. 1.

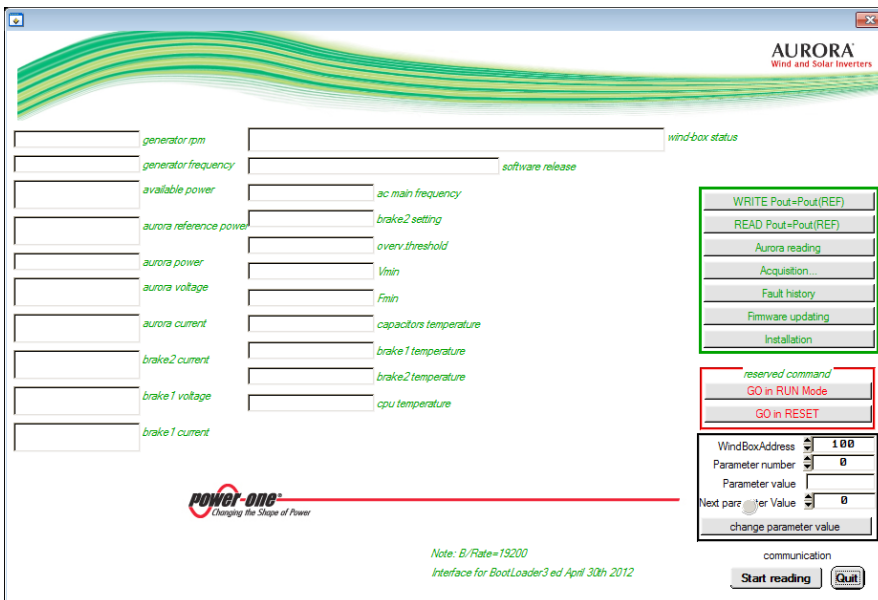


Figure 1

- 12) Click on the button “Start Reading”. The parameters and status of the Wind Interface will appear (Fig 2).

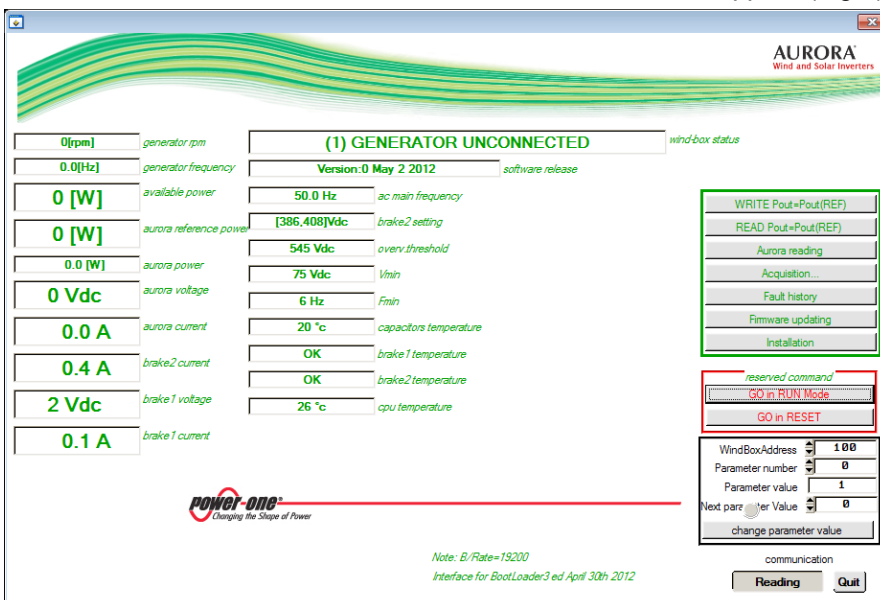


Figure 2

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13) Click on the button “GO in RESET”. On the following screen (Fig. 3), enter the password “470” and click on “CONTINUE”.

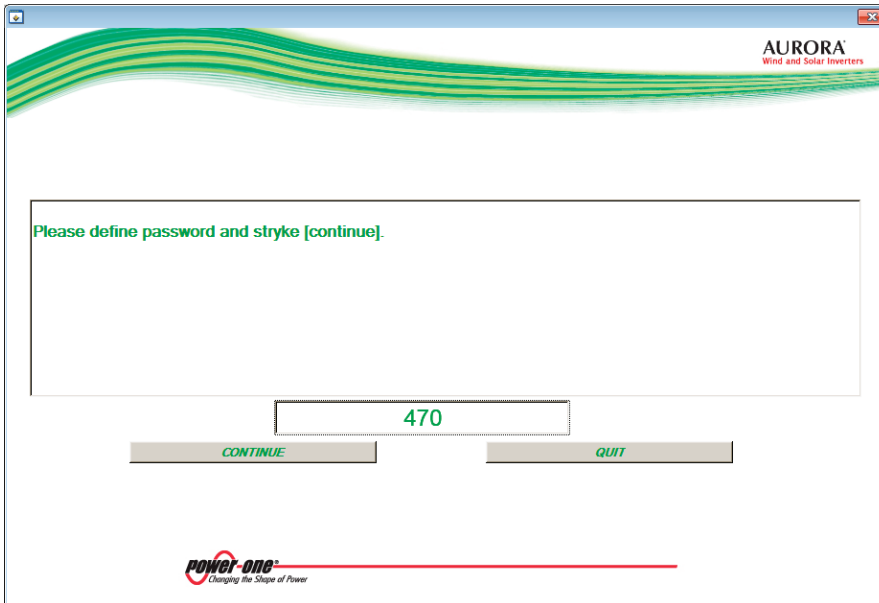


Figure 3

The Wind Interface display will show:



14) Enter “51” in “Parameter number” and “1” in “Next parameter Value”. Click on “change parameter value” (Fig. 4). “Parameter value” will then change to “1” (Fig. 5).

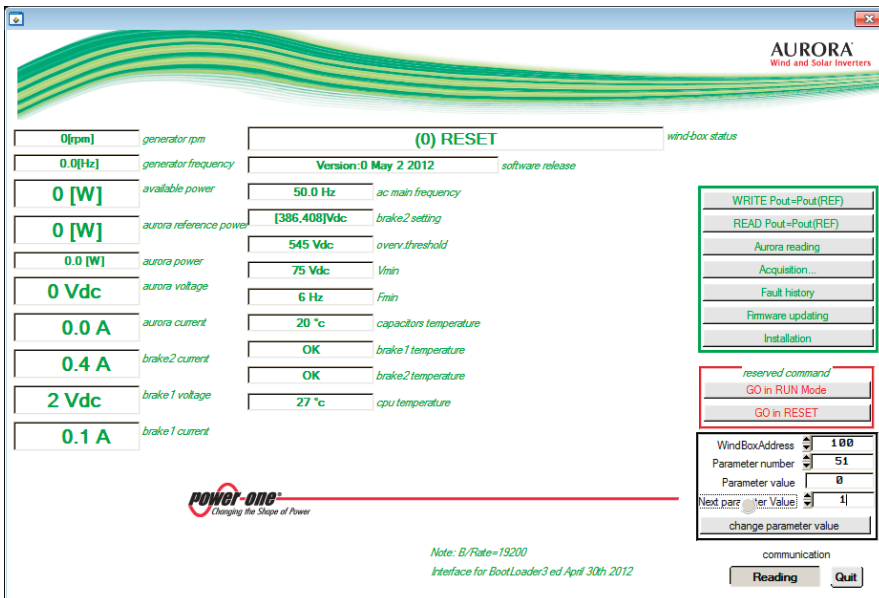


Figure 4

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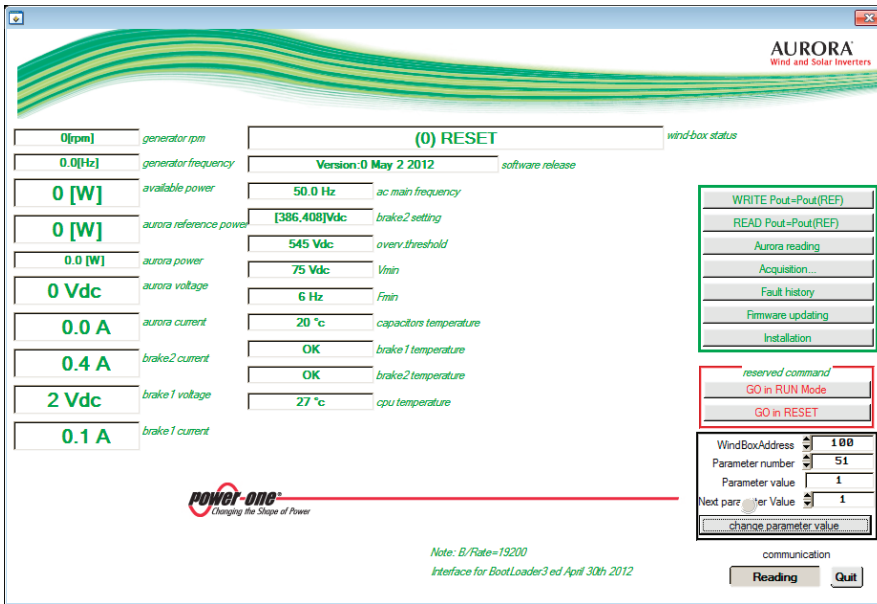


Figure 5

15) Click on the button “GO in RUN Mode”. On the following screen, enter the password “470” and click on “CONTINUE”. The main menu (Fig. 7) will display the status “(1) GENERATOR UNCONNECTED”.

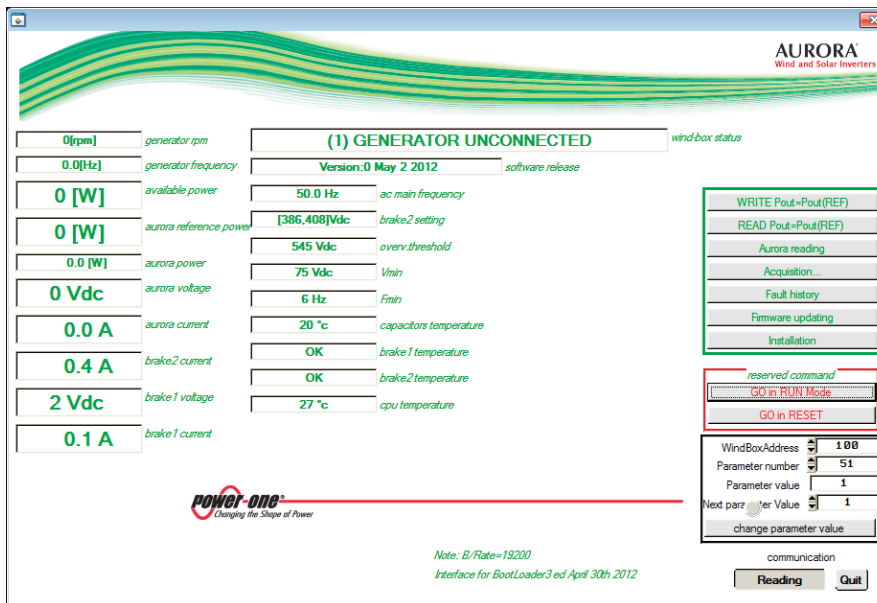
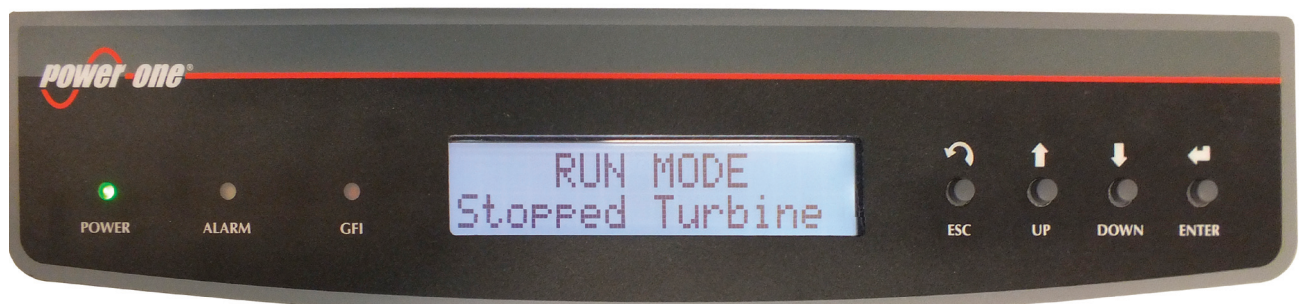


Figure 7

The Wind Interface display will show:



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16) Connect the input of the Wind Interface to the grid (230V). The status displayed by the software "Windbox CVI" will change to "(2)SOFT START" and then to "(3) RUNNING" (Fig 8). The inverters will start up (Fig. 9).

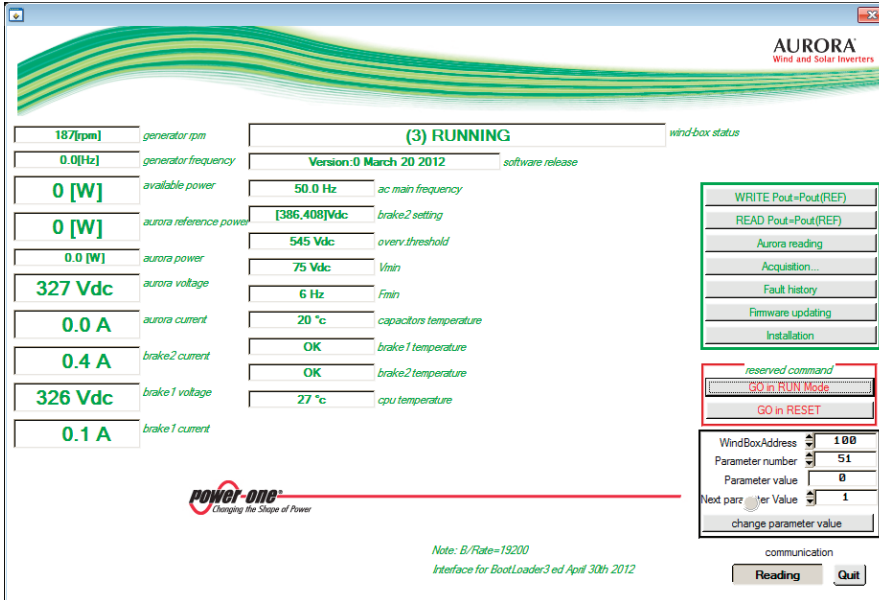


Figure 8

The Wind Interface display will show:

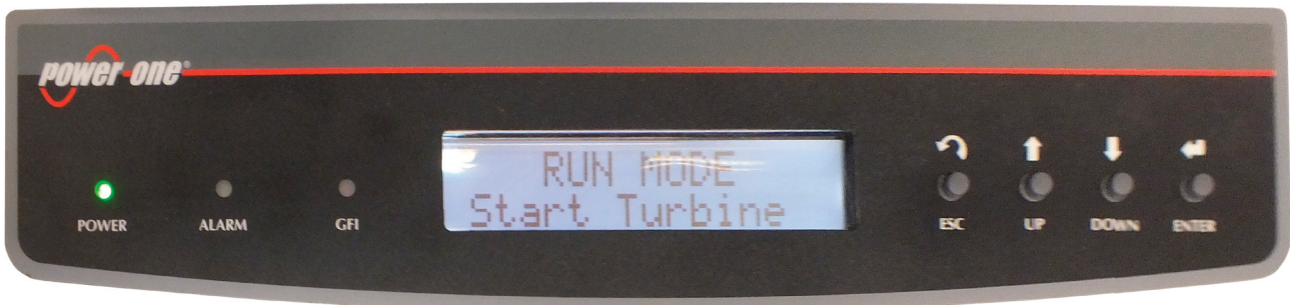


Figure 9

17) From the main menu, click on “Aurora Reading”. The menu shown in figure 10 will appear.



Figure 10

18) Click on “Aurora Initialization”, and the display will appear as shown in figure 11. Enter the password “470” (Fig. 12) and click on “CONTINUE” (Fig. 13). When the procedure has ended, the software will display the screen shown in figure 14. Clicking on the button “Continue” will display the recognized inverters (Fig. 15). Click on “Quit” to return to the main menu.

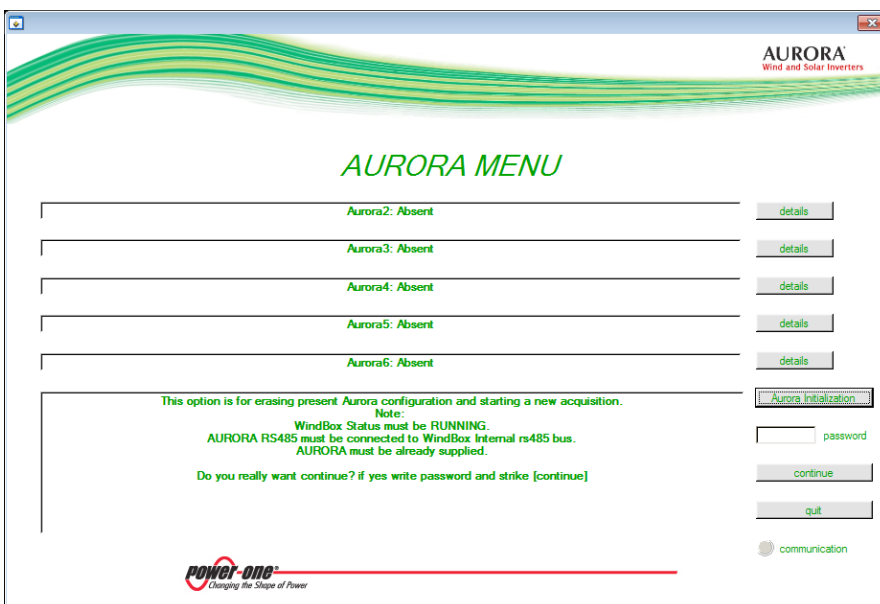


Figure 11

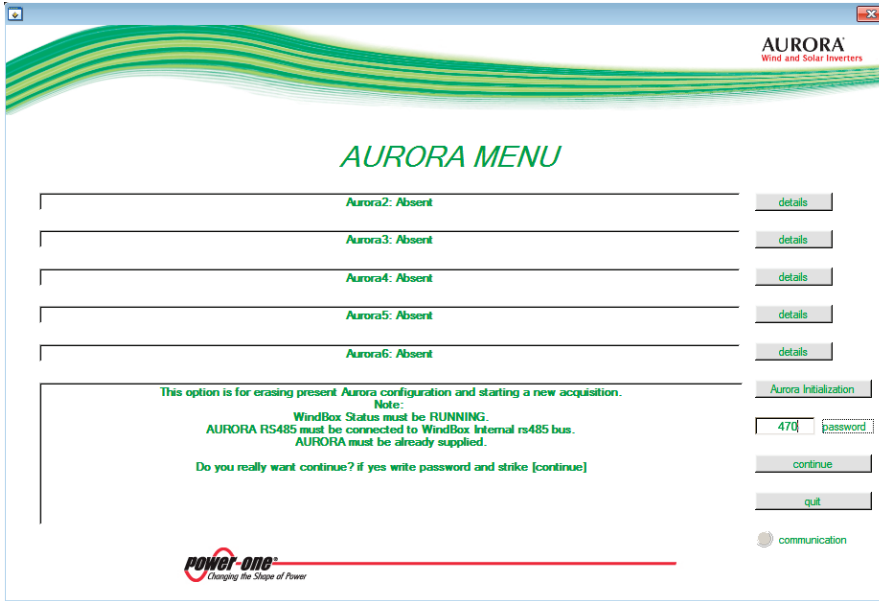


Figure 12



Figure 13

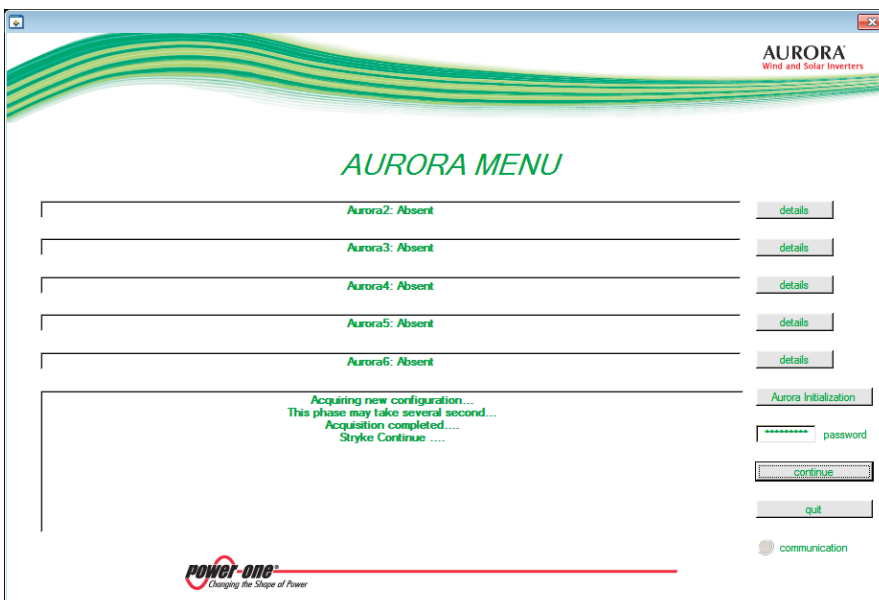


Figure 14

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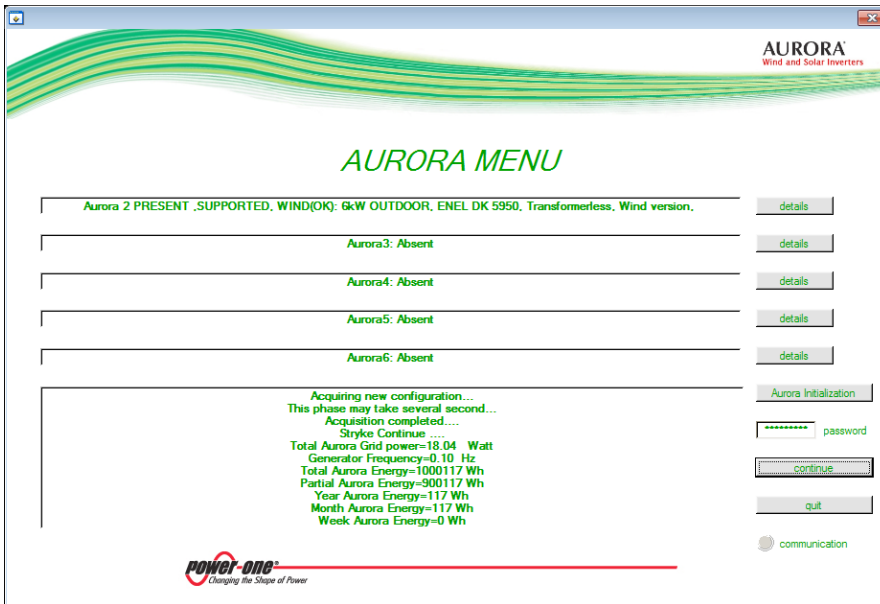


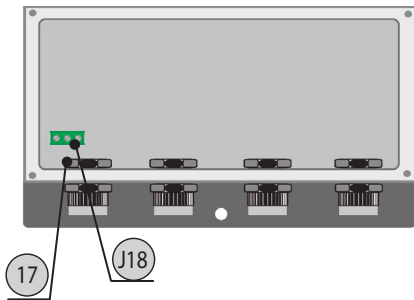
Figure 15

- 19) Repeat points 13 and 14 to set the Wind Interface status to RESET.
- 20) Remove the grid voltage from the Wind Interface input.
- 21) Open disconnect switches S1 and S2. Allow the Wind Interface to be powered solely by the auxiliary.
- 22) Modify the parameters and enter the power curve for the wind turbine.
- 23) Connect the Wind Interface to the wind turbine output (Also refer to: Input connection to the Wind Power Generator (AC Side))
- 24) Close the switches on the AC side for the turbine (S1) and the grid side (S2).

Connection of the Auxiliary Power Supply

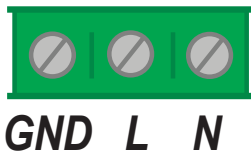


To prevent electrocution hazards, all the connection operations must be carried out with the disconnect switches upstream from the Wind Interface and downstream from the inverters disarmed.



The auxiliary power supply (110V or 220V) is used by the Wind Interface to power the logic board. The auxiliary power supply connections must pass through hole **17**. The kit supplied with the Wind Interface is provided with a fitting to for connecting any type of tube on the market to the hole **17**, namely: rigid, flexible, spiral, corrugated, etc. These tubes should nevertheless have an external diameter of between 37mm and 42mm. The electrical cable to use is three pole (See the paragraph “Characteristics and dimensions for cables and the tube”).

Procedure:



- 1) Unscrew the cap from the hole **17** and remove it.
- 2) Fit and screw the fitting correctly.
- 3) Fit the tube, with the adequate external diameter, through the fitting.
- 4) Screw the fitting to grasp the tube rigidly and verify that the seal is tight.
- 5) Insert the three pole cable inside the tube
- 6) Connect the conductors (GND, L, N) to the terminals on the block **J18**.

Characteristics and dimensions for cables and the tube

The table lists the maximum cross section permitted for the wires used for the auxiliary power supply.

<i>Type of Conductor</i>	<i>MAX WIRE GAUGE (mm²)</i>
GND, L, N	4

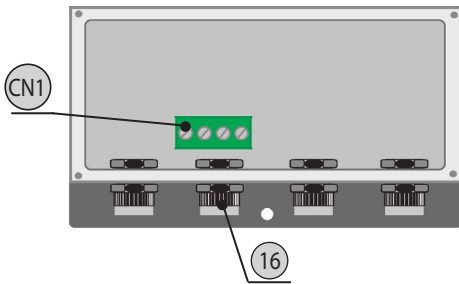
The tube containing the wires used for the auxiliary power supply must have the following characteristics:

<i>Type of Tube</i>	<i>External Diameter of the Tube (mm)</i>
Rigid, flexible, spiral, corrugated	37-42



The cross section of the wires must be selected considering the real operating current.

Connecting to the input for service mode



AC side connections must pass through one of the four holes **16**.

Procedure:

- 1) Unscrew the cap from the hole **16** and remove it.
- 2) Fit and screw the fitting correctly.
- 3) Fit the tube, with the adequate external diameter, through the fitting.
- 4) Screw the fitting to grasp the tube rigidly and verify that the seal is tight.
- 5) Insert the three pole cable inside the tube
- 6) Connect the conductors to the terminals on the block **CN1** (Also refer to “AC side terminal block connection”).

Characteristics and dimensions for cables and the tube

The table lists the maximum cross section permitted for AC cables. In any case, connection of the Wind Interface to earth is mandatory.

<i>Type of Conductor</i>	<i>MAX WIRE GAUGE (mm²)</i>
S, R, GND	25

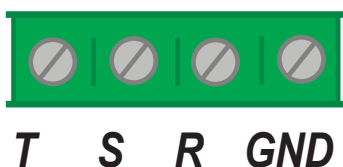
The tube containing the AC side conductors must have the following characteristics:

<i>Type of Tube</i>	<i>External Diameter of the Tube (mm)</i>
Rigid, flexible, spiral, corrugated	37-42

Connection to the AC side terminal board



To prevent electrocution hazards, all the connection operations must be carried out with the disconnect switch upstream from the Wind Interface disarmed and with the wind turbine in parking.

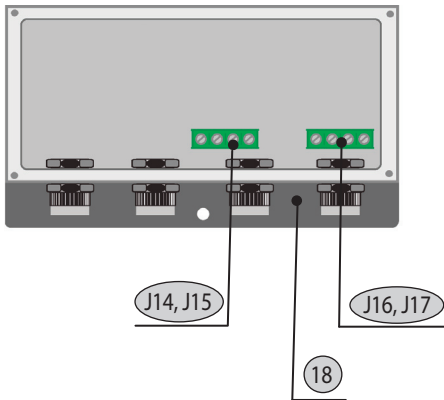


Pass the three pole cable through the tube and connect the conductors (S, R e GND) to the terminals on the terminal block **CN1** in the correct order.

Connecting the Output (DC Side)



To prevent electrocution hazards, all the connection operations must be carried out with the disconnect switch upstream from the Wind Interface disarmed and with the wind turbine in parking.



The following procedure illustrates the connection of the Wind Interface output to the DC cables from the inputs of the Inverters.

The cables for the DC section could be run through the holes **18**. The kit contains the fittings for connecting a tube with an external diameter of between 37mm and 42mm to the Wind Interface.

- 1) Unscrew the selected cap and remove it.
- 2) Fit and screw the supplied fitting correctly.
- 3) Insert the tube with the adequate external diameter
- 4) Screw the fitting to grasp the tube rigidly and verify that the seal is tight.
- 5) Insert the cable inside the tube
- 6) Connect the conductors from the inverters, observing the correct polarity, to the terminals on the terminal block **J14, J15** and **J16, J17**.

Characteristics and dimensions for cables and the tube

The table lists the maximum cross section permitted for DC side cables.

<i>Type of Conductor</i>	<i>MAX WIRE GAUGE (mm²)</i>
DC	16

The tube containing the DC side conductors must have the following characteristics:

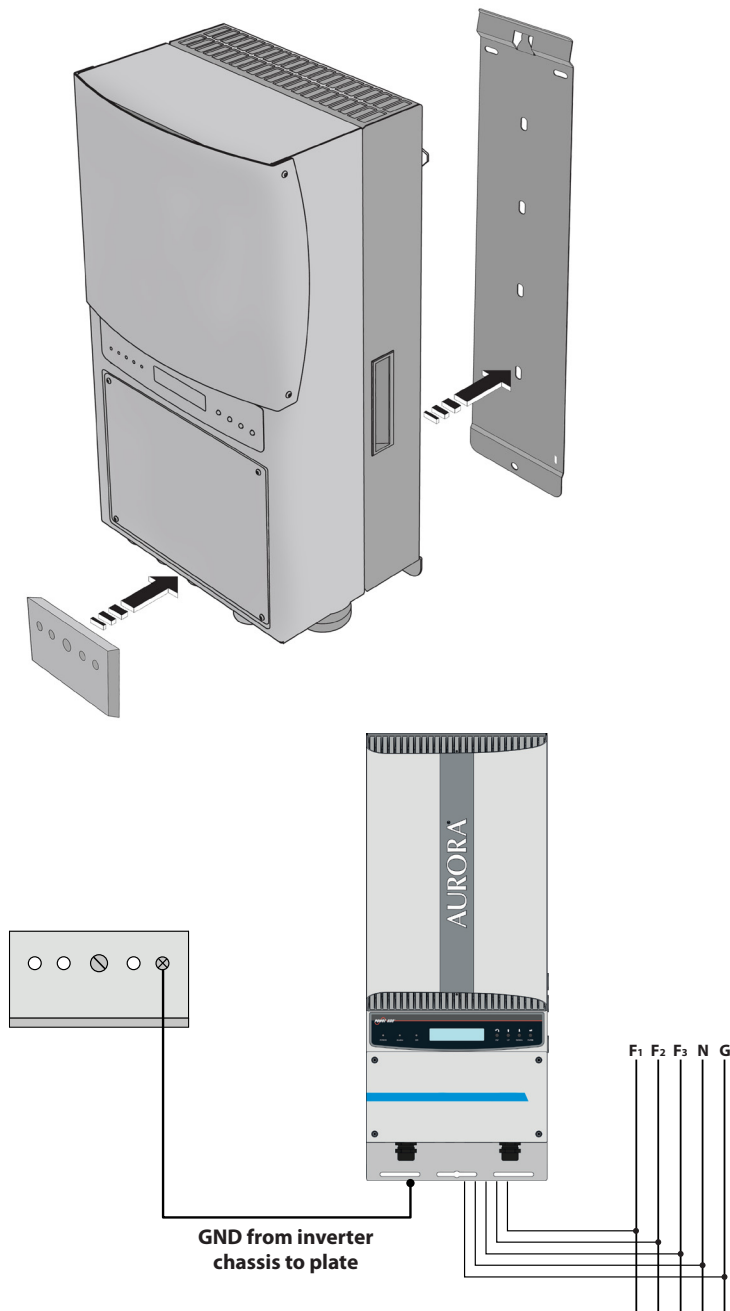
<i>Type of Tube</i>	<i>External Diameter of the Tube (mm)</i>
Rigid, flexible, spiral, corrugated	37-42



In the US version, the earth cables from the inverters must be bonded to the metal bar provided in the kit.

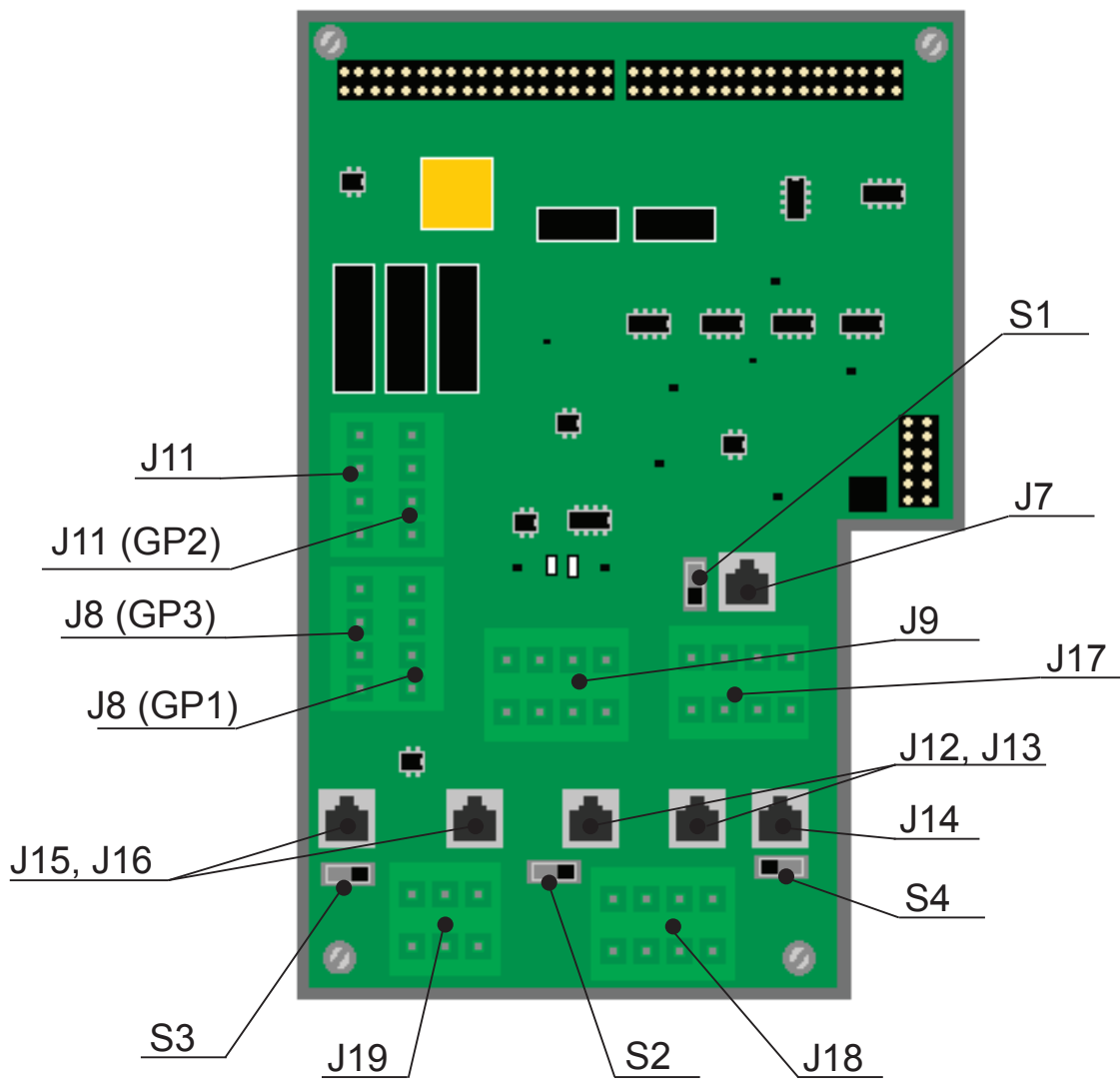
Bracket Model Connection (only US version)

Fasten the copper bar to the Wind Interface with the M6 bolts and nuts provided in the kit.



Connect the earth cables from the inverters to the copper bar with the M6 bolts and nuts.

Logic board

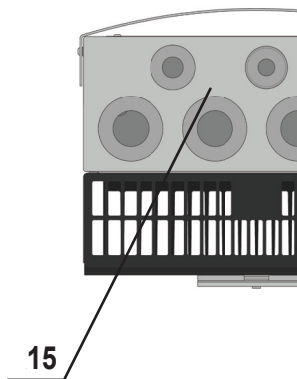


communications board 09

Ref.	Description	Wire Gauge
J17	Auxiliary RS485 line connection (aux)	1.5 mm ² , 16 AWG
J14	Auxiliary RS485 line connection on RJ45 connector	RJ45
J18	Internal RS485 line connection (int)	1.5 mm ² , 16 AWG
J12, J13	Internal RS485 line connection (int) on RJ45 connector	RJ45
J9	Inverter frequency commands connection	1.5 mm ² , 16 AWG
J8 (GP1)	GP1 Relay Connection	1.5 mm ² , 16 AWG
J11 (GP2)	GP2 Relay Connection	1.5 mm ² , 16 AWG
J8 (GP3)	GP3 Relay Connection	1.5 mm ² , 16 AWG
J7	Auxiliary CANBUS line connection (NOT ACTIVE)	RJ45
J19	Internal CANBUS line connection (NOT ACTIVE)	1.5 mm ² , 16 AWG
J15, J16	Internal CANBUS line connection (int) (NOT ACTIVE) on RJ45 connector	RJ45
J11	Connection for the "Emergency Stop" signal	
S4	Switch for setting the termination resistance of the RS485 line (aux)	
S2	Switch for setting the termination resistance of the RS485 line (int)	
S3	Switch for setting the termination resistance of the MODBUS line (int)	
S1	Switch for setting the termination resistance of the MODBUS line (aux)	

000028B1

Connections to the logic board



Each cable that must be connected to the logic board must go through one of the four service holes **15**.

- One orifice is PG21; the adequate fitting enables the connection of tubes with an external diameter of between 23mm and 25.5mm.
- Three orifices are M20; the adequate fitting enables the connection of tubes with an external diameter of between 20mm and 22mm.

Unscrew and remove the caps from holes to be used. Fit and screw in the fittings, insert the tubes with the appropriate external diameter, screw the fittings appropriately to grasp the tube securely.

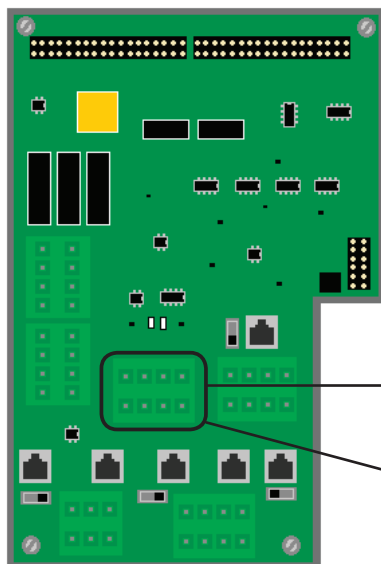
Frequency command to the Inverters

The frequency commands are used to pilot each inverter connected to the Wind Interface.

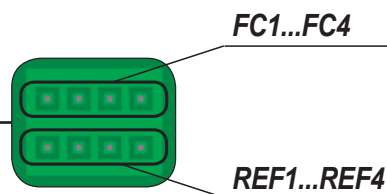


NOTE 1: The maximum number of inverters that can be piloted is four.

NOTE 2: Each channel is insulated from the next.



The signal wires (+)FC and (-)REF from each inverter, after passing through the tube, must be fastened to terminal **J9**, observing the correct polarity as shown in the figure:



Be particularly mindful when connecting the frequency command (FC) with the corresponding reference (REF).

Serial communication (RS485)

There are two RS485 communication lines on the Wind Interface:

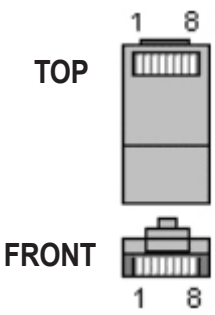
This connection enables the user to modify certain product parameters, load the wind turbine's power curve and monitor the system.

Int – Line for communications between the Wind Interface and the inverters.

RS485 (AUX) and RS485(Int) serial line connections could use the terminal connectors **J17** and **J18** as well as a RJ45 connector to be connected to the dedicated port, which are **J14** and **J12, J13** respectively. The two RJ45 connectors (**J12, J13**) available for the RS485 (Int) communication, are equivalent to each other and can be used interchangeably for the input or for the output of the line in realising the daisy chain connection with the inverters. The same is true for connections made using the terminal connector **J18**.

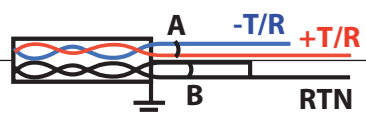
Two different types of connection can be made for each line:

- Connection of the conductors using the terminal connectors **J18** (+T/R, -T/R and GND)
- Connection via RJ45 connectors connected to ports **J12, J13** crimped according to the following arrangement:

	Pin No.	Function
	1	not used
	2	not used
	3	+T/R
	4	not used
	5	-T/R
	6	not used
	7	GND
	8	not used

For long distance connections, the connection on terminal connector is preferable using a shielded twisted pair cable with characteristic impedance of $Z_0=120$ Ohm like the one shown on the following table:

Signal	Symbol	Pair	Cable
Positive data	+T/R	A	1
Negative datum	-T/R	A	2
Reference	RTN	B	1+2

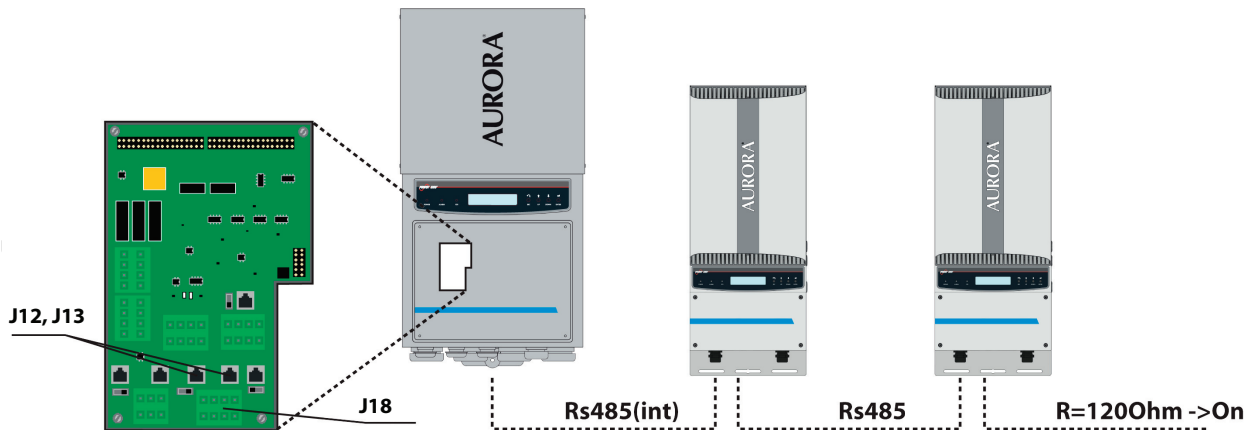


Procedure for linking RS485(Int)

The wires for the RS485(Int) link must be run through the tube and connected according to the “daisy-chain” arrangement (“in-out”) to the inverters, and matching up the signals. It should be kept in mind that it is essential to activate the termination resistance of the communication line in the last inverter in the chain by switching the corresponding switch (Refer to the inverter manual).

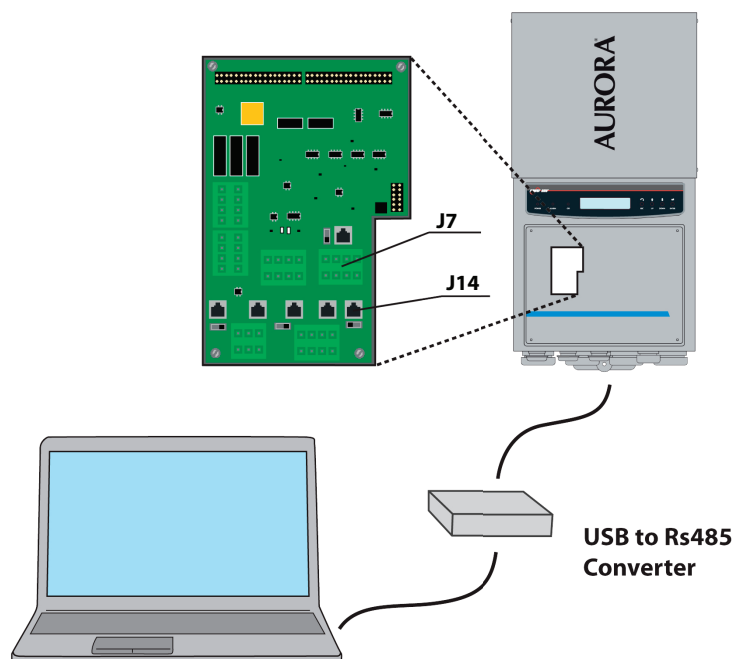


NOTE: Set a different RS485 address for each inverter in the chain. The inverter connected via signal +FC1, REF1 must have address 2, the inverter via +FC2, REF2 must have address 3, and so on. The address on the inverter is set through the display and the push-button panel (Refer to the inverter manual).



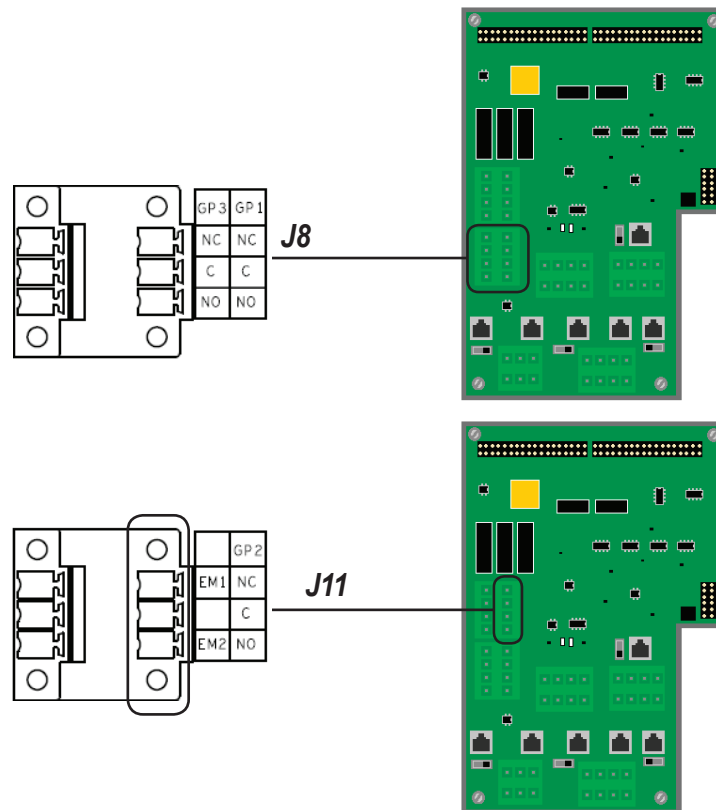
Procedure for linking RS485(Aux)

The adapter PVI-USB-RS485_232 and software WindBoxCVI are necessary for enabling communication between the Wind Interface and PC.



Configurable Relays

The Wind Interface has three relays. The relays can be connected with normally open contact (being connected between the NO terminal and the contact C) and with normally closed contact (being connected between the NC terminal and the common contact C).



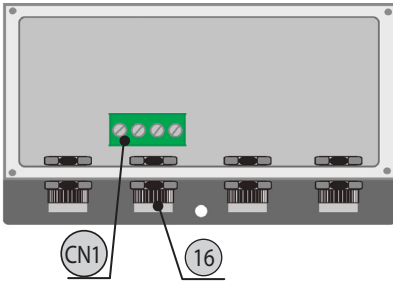
Relay **GP1** is activated whenever there is a machine “Fault”. In particular, this relay could be used to pilot the load permitting wind turbine parking. Relay **GP2** is activated when intending to engage the cooling fan (optional) for the brake (dump or brake).

Relay **GP3** could be employed to disconnect a possible transformer from the wind power system, thus avoiding any unnecessary loss of system efficiency. This relay is closed under normal operating conditions and opens whenever the Wind Interface output DC voltage is absent for a period of time longer than 20 minutes.

Emergency Stop Input

The signal applicable to the connector **J11** permits monitoring of the status of any emergency push button present in the system.

Input connection to the Wind Power Generator (AC Side)

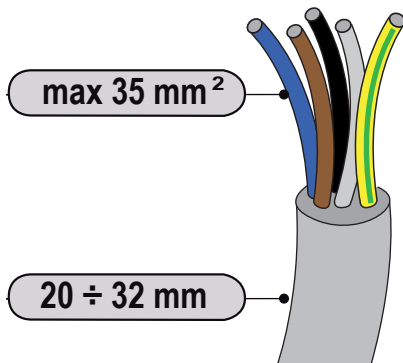


The electrical cable to use is four pole, which must be run through the tube and connected to terminal block **CN1**.

Characteristics and dimensions for cables and the tube

The table lists the maximum cross section permitted for AC side cables. It should be kept in mind that, in any case, connection of the Wind Interface to earth is mandatory.

Type of Conductor	MAX WIRE GAUGE (mm ²)
T - S - R - GND*	25



The tube containing the AC side conductors must have the following characteristics:

Type of Tube	External Diameter of the Tube (mm)
Rigid, flexible, spiral, corrugated	37-42

Load protection switch (AC disconnect switch)

To protect the AC connection line of the Wind Interface, a device needs to be installed to protect against over current. Depending on the Wind Interface model employed, this device should have the following characteristics:

	-EU	-US
Type	Automatic Circuit Breaker with Thermal Magnetic Protection	
Rating for Voltage/Current	600V/125A	480V/125A

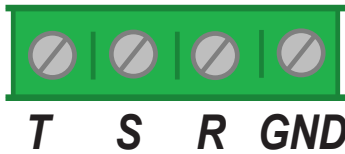
* The earth conductor must have a minimum cross section equal to that of the TSR structures and, in any case, no less than 10 mm².

Characteristics Prot. Magnetic	B/C	B/C
Number of poles	3	3

Connection to the AC side terminal board



To prevent electrocution hazards, all the connection operations must be carried out with the disconnect switch upstream from the Wind Interface disarmed and with the wind turbine in parking.



Pass the four pole cable through the tube and connect the conductors (T, S, R and GND) to the terminals on the terminal block **CN1**.

Modifying Wind Interface parameters

1) From the main screen of software WindBoxCVI, after having pressed the key “Reading”, click on “Install Menu”. The screen shown in figure 1 will appear.

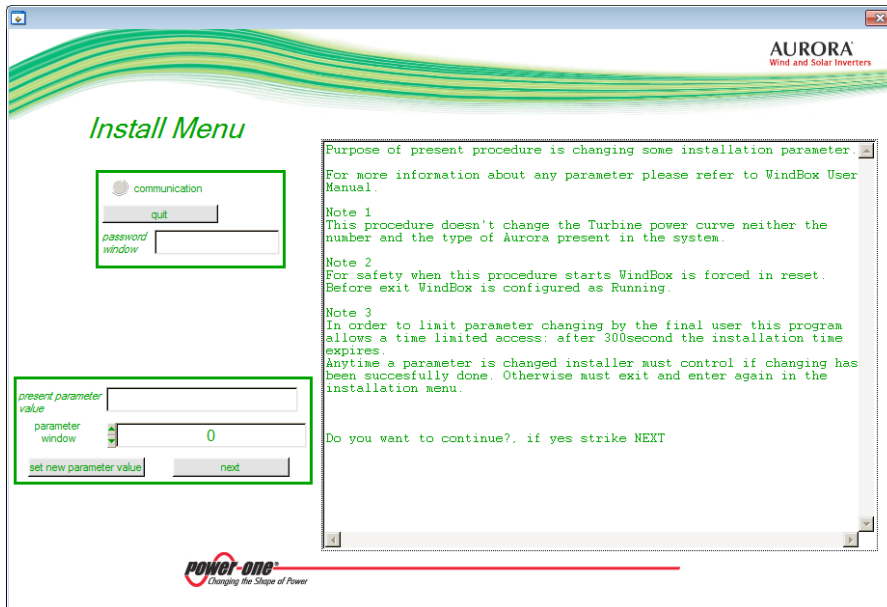


Figure 1

- 2) Click on the button “NEXT”
- 3) Enter the password “740” in “password windows” and then click “NEXT”.
- 4) By clicking repeatedly on “NEXT”, select the parameter of interest.
- 5) Enter the desired parameter in “parameter windows” and store by clicking on “set new parameter value”. (for a complete list and brief description of the parameters that can be modified, see the NOTE).
- 6) Repeat points 4 and 5 for all the parameters intended for modification.
- 7) Exit the Installation menu by pressing the key “Quit”.

Note: List of parameters that can be modified

Parameter number	Name	Value Range	Default
95	Polepair	1-60	12
142	GenVmin	20 - 80 V	75 V
141	GenFmin	3 - 50 Hz	6 Hz
149	Brake1Present	0-1	0
122	MaxAuroraBulk	0 - 993 V	850 V
137	Br2StartV	133 - 578 V	669 V
170	Dynamic Soft Start	0-1	0

138	Br2V100	200 - 639 V	736 V
150	EmergencyEnable	0-1	0
51	Service	0-1	0

Pole Pair

Insert the number of pole pairs for the wind turbine generator in this field. This enables the software to calculate the number of revolutions per minute (RPM) for the generator.

GenVmin

This defines the voltage under which the turbine has insufficient energy to be able to start up the inverters. For voltages under GenVmin, the semi-controlled bridge is left "OFF".

GenFmin

This defines the frequency under which the turbine has insufficient energy to be able to start up the inverters. For frequencies under GenFmin, the semi-controlled bridge is left "OFF".

Brake1Present

Set the value of this variable to 1 if there is a Brake Load in the wind power system. Otherwise, set it to 0.

MaxAuroraBulk

This defines the maximum DC voltage beyond which the semi-controlled bridge is left open. This thus protects the inverters from overvoltage.

Br2StartV

This defines the priming voltage for the diversion load.

Br2V100

This defines the voltage at which the diversion load is at full load.

EmergencyEnable

Setting the value for EmergencyEnable to 1 will enable the reading of the status of the emergency push button in the system. Enabling this parameter will permit feedback on the status of the system and a log on the use of the emergency push-button.

Service

Setting Service to 1 will activate the power supply to the inverters by the wind interface through the electrical power grid. This function will enable you to complete the commissioning of wind power system even in no-wind conditions. For further information, see the chapter on system installation.

Dynamic Soft Start

Setting this parameter to "0" or "1" will activate two possible Wind Interface operating modes. For further details, see the paragraph on "Operating Modes".

Operating Modes

There are two possible operating modes, which can be selected by modifying the parameter “DynamicSoftStart” (170) during installation.

“DynamicSoftStart” = 0



The Brake Load connected to the contactor, piloted by relay GP1, or to terminal block BRK1 RES, must always be present. If there is no brake load, the error “BrakeFault” will appear. The machine will thus need to be restarted.

Startup Procedure

On startup, the Wind Interface Box controls the input voltage, and if it exceeds the “GenVmin” and is less than 100 V (settable by the parameter MAx no Soft Start), the semi-controlled bridge will close and the wind power system can then begin to export energy to the grid. Whenever the voltage generated by the wind turbine exceeds 100 V, the Wind Interface Box activates the brake (Brake Load) to slow the turbine and recommence the startup procedure.

Exceeding the overvoltage limit

If the voltage exceeds the limit set in the parameter “MaxAuroraBulk” (122), the brake (Brake Load) will activate and open the semi-controlled bridge. The brake is released when the turbine has halted. The brake is activated from 0 to 100% of duty in 2 seconds so as not to excessively overload the turbine.

“DynamicSoftStart” = 1

Startup Procedure

On startup, the Wind Interface Box controls the input voltage, and if it exceeds the “GenVmin” and is less than 100 V the semi-controlled bridge will close and the wind power system can then begin to export energy to the grid (Figure 1). Whenever the voltage generated by the wind turbine exceeds 100 V, the Wind Interface Box activates a soft start procedure to prevent excessive Inrush current (Figure 2).

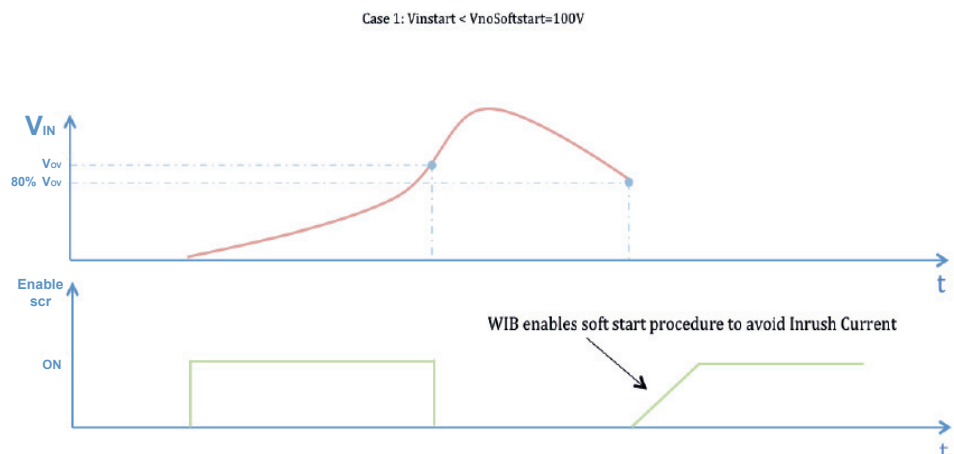


Figure 1

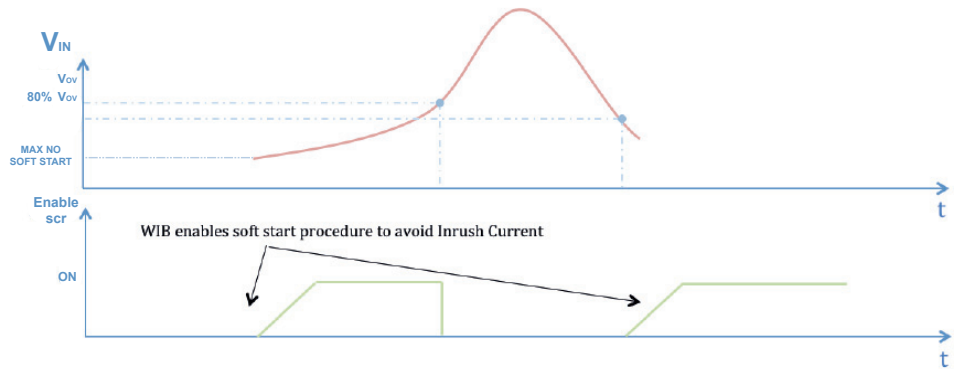


Figure 2

Exceeding the overvoltage limit

If the voltage limit set via “MaxAuroraBulk” (122) is exceeded, the semi-controlled bridge will open to prevent damage to the inverters. When the voltage descends under 80% of the MaxAuroraBulk, the soft start process will be activated to close the semi-controlled bridge, reactivating the inverters.

Entering and modifying the wind turbine power curve

- 1) From the main menu of the software “WindboxCVI”, click on “reading”.
- 2) Click on “WRITE Pout=Pout(REF)”. The screen shown in the Figure will appear. Click on “CONTINUE”.

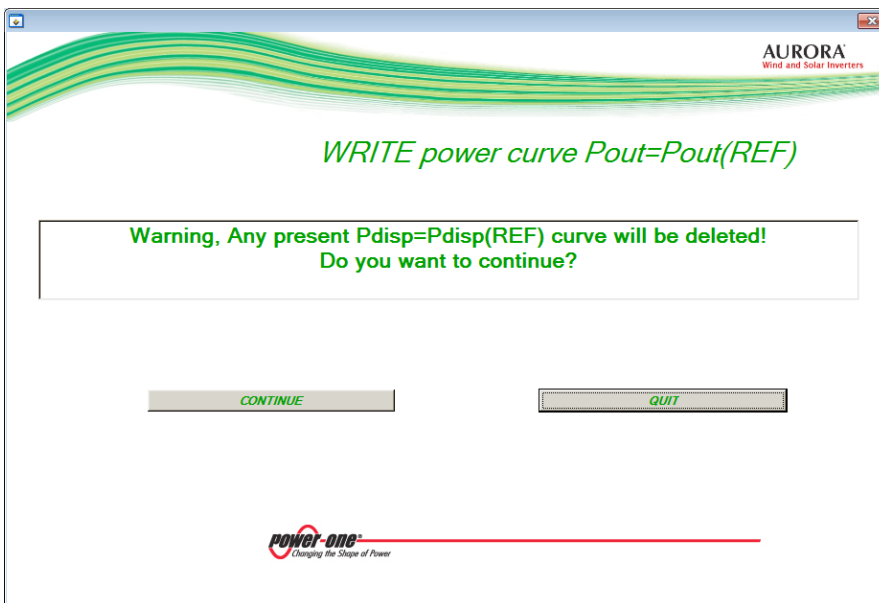


Figure 2

- 3) “Option (A)” will allow you to select:

- Define curve Using MENU:

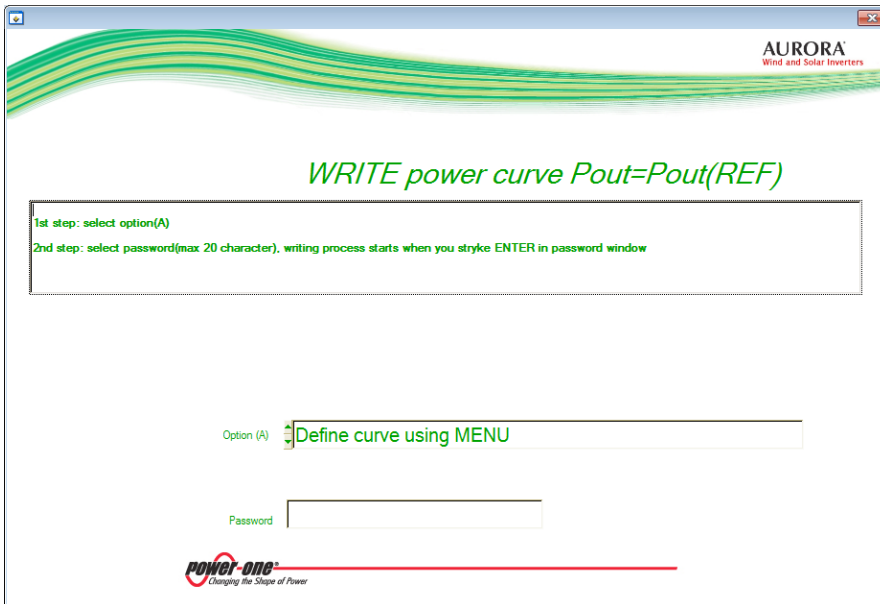


Figure 3

Selecting “Define Curve using MENU” will allow you to define the curve. Select the password at your preference to encrypt the curve and press the Enter button on the keypad. The menu (Fig. 4) will be enabled to create the wind turbine power curve.

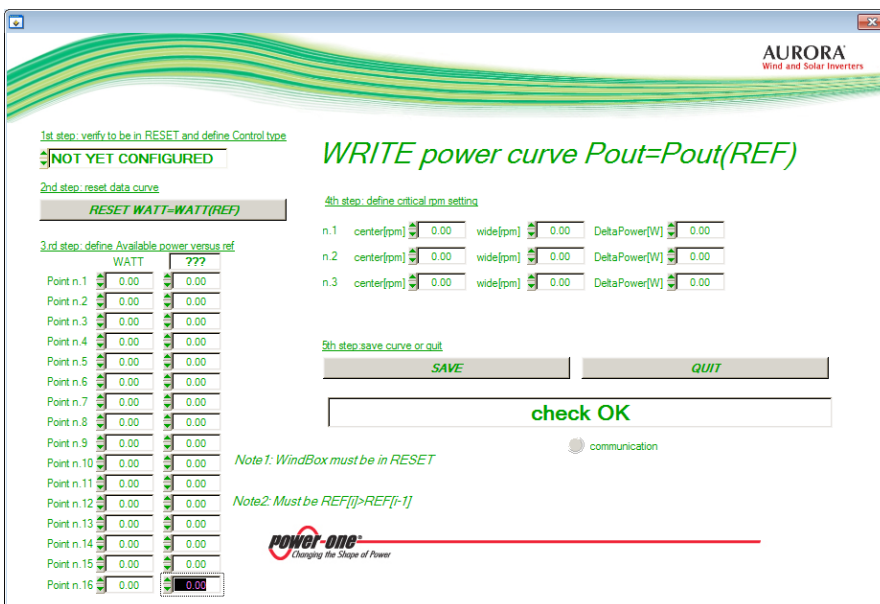


Figure 4

- a) For step 1, select whether you want to define the power curve based on the DC voltage or RPM.
 - b) Compile the table. Even if you opt not to fill in all 16 points, the table will be filled in automatically.
 - c) Click on “SAVE” to store the curve in the Wind Interface.
- Copy curve from file "CurveParameter.CRT":

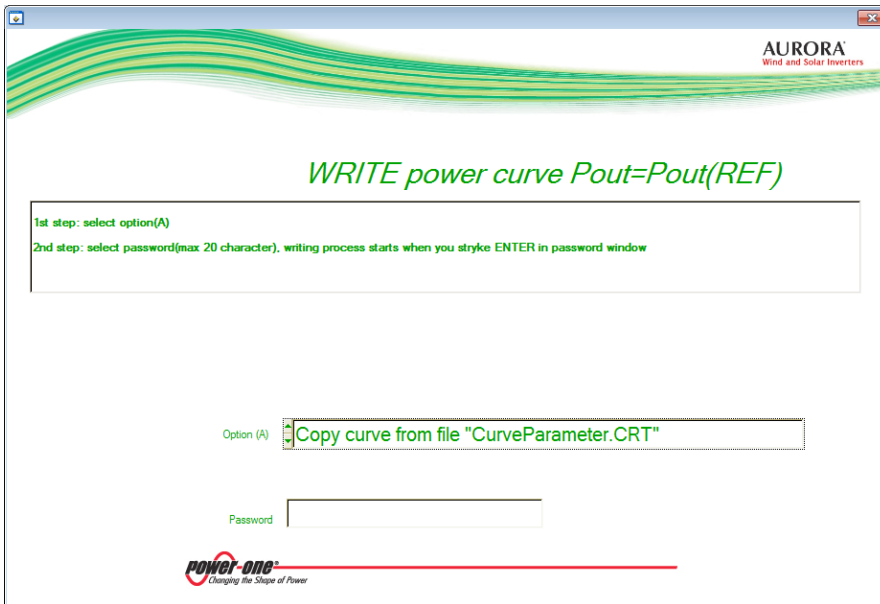


Figure 5

By selecting “Copy curve from file 'CurveParameter.CRT’”, you will be able to load a curve previously saved on your PC onto the Wind Interface.

Enter the password with which you would like to encrypt the curve. An automatic process will commence to load the curve.

The file CurveParameter.CRT must be located in the same folder as the software.

6 - Instruments

General conditions



One of the first rules for preventing damage to the equipment and operator is to have a thorough understanding of the INSTRUMENTS. We therefore advise you to read this manual carefully. If you are not sure about anything or there is discrepancy in information, please ask for more detailed information.



Do not use the equipment if:

- ***you have insufficient qualifications to work on this equipment or similar products;***
- ***you are unable to understand how it works;***
- ***you are not sure what will happen when the buttons or switches are operated;***
- ***you notice any operating anomalies;***
- ***there are doubts or contradictions between your experience, the manual and/or other operators.***

Power-One cannot be held liable for damage to the equipment or the operator if it is the result of incompetence, insufficient qualifications or lack of training.

Description of keypad and display

Through the combination of LED panel buttons **04**, values can be set or data can be displayed by scrolling them.

This panel **04** also contains LEDs for machine status conditions.

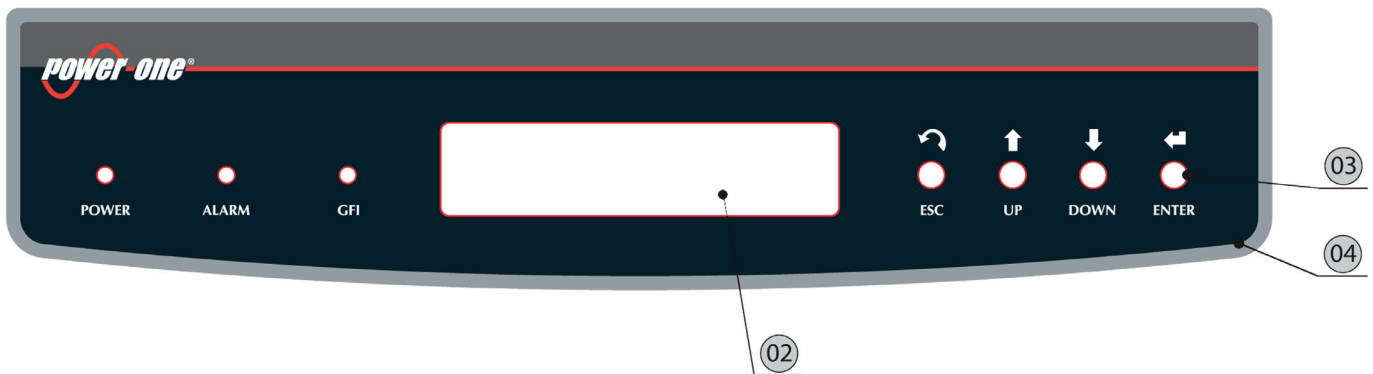


Table: Function of buttons and LEDs

Green LED POWER	Indicates that the Wind Interface is working correctly.
Yellow LED ALARM	Indicates that the Wind Interface has detected an anomaly. The type of problem is shown on the display.
ESC Button	This button allows you to exit a mode.
UP Button	This allows you to read the data on the display by scrolling upwards, or to increase the set value to correct it during data entry.
DOWN Button	This allows you to read the data on the display by scrolling downwards, or to decrease the set value to correct it during data entry.
ENTER Button	This allows you to confirm the operation or to enter the set data item.

With various multiple combinations possible, the LEDs can indicate conditions that are different from the original single one; see the various descriptions given in the manual.

With various multiple combinations possible, the buttons allow actions that are different from the original single one; see the various descriptions given in the manual.

7 - Operation

General conditions



Before checking the operation of the equipment, it is necessary to have a thorough understanding of the INSTRUMENTS chapter and the functions that have been enabled in the installation.

The equipment operates automatically without the aid of an operator; operating state is controlled through the instruments.

The interpretation or variation of some data is reserved exclusively for specialized and qualified staff.



The incoming voltage must not exceed the maximum values shown in the technical data sheet in order to prevent equipment from becoming damaged.

Consult the technical data for further details.

Even during operation, check that the environmental and logistic conditions are correct (see installation chapter).

Ensure that these conditions have not changed over time and that the equipment is not exposed to adverse weather conditions and or isolated with foreign bodies.

Monitoring and data transmission

User interface mode

The Wind Interface is capable of informing on its operation through the following instruments:

- Warning lights (luminous LEDs)
- LCD display for displaying operating data
- Data transmission on a dedicated RS-485 serial line (AUX). The data could be stored in a PC. If the RS-485 line is used, it may be advisable to use the RS-485/RS232 serial interface converter. Contact **Power-One** assistance for any doubts about the compatibility of devices.

Types of data available

The Wind Interface provides two types of data, which are usable through the relevant interface software and/or through the display **02**.

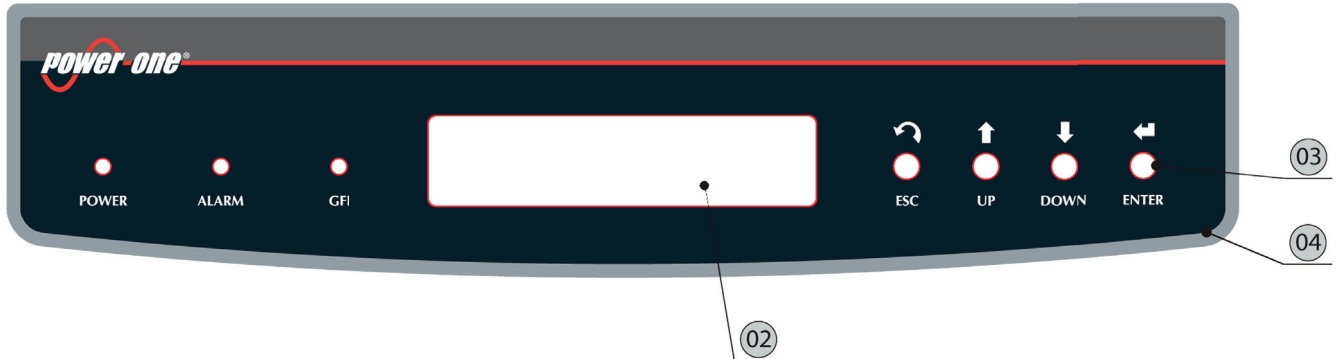
Real-time operating data

Real-time operating data can be transmitted on request through the communication lines and are not recorded in the Wind Interface. For data transmission to a PC, the free software supplied with the device can be used (please check at www.power-one.com for further updated versions).

Internally stored data

The Wind Interface internally stores a set of data that are necessary for processing statistical data and an error log with time marking.

Description of the menus



Description of keypad and display

The display **02** permits navigation through the menu by using the buttons on the panel **04**. The display comprises 2 rows with 16 characters each, which could be used for:

- Viewing the operating state and statistics
- Viewing service messages for the operator
- Viewing alarm and fault messages
- Modifying the settings of the Interface

The UP and DOWN buttons on the panel **04** are used to move around a menu or to increase/decrease the settable values.

The ESC button permits:

- access to the three main sub-menus: STATISTICS, SETTINGS and INFORMATION
- return, during navigation, to the previous sub-menu and stores the set value

The ENTER, during navigation, enables access to the desired submenu.

Statistics Menu

Selecting STATISTICS from the three main sub-menus gives access to:

- **Grid Power (W)**
Instantaneous power fed to the grid.
- **Daily Energy (kWh)**
Daily energy produced.
- **Weekly Energy (kWh)**
Energy produced over the last 7 days.
- **Monthly Energy (kWh)**

Energy produced during the current month.

- **Annual Energy (kWh)**

Energy produced over the last 365 days.

- **Total Energy (kWh)**

Total energy produced.

- **Period Energy (kWh)**

Energy produced during the selected period.

- **Reset Period (kWh)**

Resets the values in the Period Energy section.

Settings Menu

Selecting SETTINGS from the three main sub-menus will bring up the section for entering the password.

The default password is "0740".

- Use ENTER to scroll the digits (from left to right)
- Pressing ESC will return you to the main menu (Once suffices)
- Use DOWN to progressively scroll the numerical scale downwards (from 9 to 0)
- Use UP to progressively scroll the numerical scale upwards (from 0 to 9)

After having entered the password, pushing ENTER will bring up the various submenus for modifying the parameters of the Interface box.

- **Language**

Allows you to set the required menu language.

- **Reset Software**

This parameter either enables or disables the possibility of modifying system settings.

"0": system settings cannot be modified.

"1": system settings can be modified.

- **Minimum Voltage**

This defines the voltage for which the turbine generates enough power to be able to start up the inverters.

- **Gen.Rated.Power**

Defines the rated power of the turbine expressed in kW.

- **Max.Bulk.Aurora**

Defines the DC voltage at which the Interface box disconnects from the inverters so as to preclude overvoltage problems at the inverters.

- **Start.V.Brake2**

Defines the voltage at which Brake 2 will begin braking.

- **End.V.Brake2**

Defines the voltage at which brake 2 has the maximum braking (100%).

- **Brake1 present**

Either 1 or 0 to define whether brake 1 is present or not.

- **Fan Time**

Time for which relay GP2 **a07** remains activated after releasing Brake 1 and/or Brake 2. The output GP2 **a07** could be used to supply power to a brake cooling fan.

- **Eng.Emergency**

Provides feedback to the turbine on the status of the "Emergency Button" (opt). This thus provides the option of recording the possible pulse pressure on the system log. This characteristic is disengaged if this value is set to "0".

- **Contrast**

Display contrast setting (scale from 400 to 9000).

- **Backlighting**

Adjusts Display brightness (scale from 13000 to 19999).

- **Ext485Address**

Allows you to set the address for communication of the Interface box connected to the RS485 serial line. The possible addresses go from 100 to 107. Scroll through the numbers with the UP and DOWN buttons.

- **Service**

Information menu

Select the information menu to access information on the Wind Interface and connected inverters.

- **Wind-Box**

- **Part/Number**

- Allows you to view the Wind Interface's identification code

- **Serial/Number**

- Allows you to view the Wind Interface's serial number.

- **SW Version**

- Allows you to view the software version installed in the Wind Interface.

- **Reset Events**

- **Status**
- **CPU Temperature**
Temperature of the CPU
- **Cap Temperature**
Temperature of the Bulk capacity.
- **Aurora n.x**
 - **Part/Number**
Allows you to view the attached inverters' (x) serial number.
 - **Serial/Number**
Allows you to view the attached inverters' (x) serial number.
 - **Alarm**
Allows you to any alarms active for the connected inverter (x)
 - **Status**
Allows you to view the status of the connected inverter (x)

Where x is the number of the inverter whose information we intend to view.

- **Brake no.1**
 - **Status**
 - **Reset Events**
 - **Resistance**
 - **Temperature 0/1**
- **Brake no.2**
 - **Status**
 - **Reset Events**
 - **Resistance**
 - **Temperature 0/1**
- **Generator**

- Rpm
- Voltage
- Power

8 - Maintenance

General conditions

Checking and maintenance operations must be carried out by specialized staff assigned to carry out this work.



Maintenance operations must be carried out with the equipment disconnected from the grid, unless otherwise indicated.



For cleaning, DO NOT use rags made of filamentary material or corrosive products that may corrode parts of the equipment or generate electrostatic charges.
Avoid temporary repairs. All repairs should be carried out using only genuine spare parts.
The maintenance technician is under an obligation to promptly report any anomalies.

DO NOT allow the equipment to be used if problems of any kind are found, and restore the normal conditions correctly or otherwise make sure that this is done.



Always use the personal protective equipment provided by the employer and comply with the safety conditions of the Accident prevention chapter.

Power-One accepts no liability if the checking and maintenance cycles indicated in this manual and in the attached documentation are not complied with correctly, and also when maintenance is entrusted to unqualified staff.



To maintain the correct working performance, have the systems checked by your installer after **approximately 2 years** of activity.

Storage and dismantling

Storage of the equipment or prolonged stop

If the equipment is not used immediately or is stored for long periods, check that it is correctly packed and contact **Power-One** for storage instructions.

The equipment must be stored in well-ventilated indoor areas having no characteristics that could damage the components of the equipment.

Restarting after a long or prolonged stop requires a check and, in some cases, the removal of oxidation and dust that will also have settled inside the equipment if not suitably protected.

Dismantling, decommissioning and disposal

La **Power-One** is NOT responsible for the disposal of the equipment: displays, cables, batteries, accumulators, etc., and therefore the customer must dispose of these items, which are potentially harmful to the environment, in accordance with the regulations in force in the country of installation.

If the equipment is dismantled, in order to dispose of the products that it is composed of, you must adhere to the regulations in force in the country of destination and in any case avoid causing any kind of pollution.



Dispose of the various types of materials making up parts of the equipment in dumps suitable for such purpose.

Table: disposal of components

COMPONENT	CONSTRUCTION MATERIAL
Frame, brackets, supports	Arc-welded steel FE37
Casing or covers	ABS, plastic
Coating	RAL
Gaskets and seals	Rubber / Teflon / Viton
Electrical cables	Copper / Rubber
Cable trays	Polyethylene / Nylon
Back-up battery	Nickel / Lead/ Lithium