User Manual

Wind and Solar
Hybrid Charge Controller

HCON Series

1KW / 2KW 48VDC

Dear Customer,

Thank you very much for choosing our product. This manual contains important information about the installation and operation of your wind and solar charge controller. Please read this manual carefully before installing and using the product.

Any work should follow the required safety standards and applicable regulations. The product should be handled and installed by professionals or appropriately qualified persons. Suitable precautions and safety measures should be taken in all cases.

1. Product overview

This controller has been designed to charge 48V lead acid battery banks from wind turbines and solar panels. The controller can be used with either a wind turbine alone, or a solar array alone, or wind + solar combined charging one battery bank at the same time.

Warning! The "nominal" voltage of your wind turbine and the solar array should match the battery bank voltage 48V. This controller is only suitable for:
- 48V wind turbines (3-phase AC 50-65V output)
- 48V solar arrays (maximum power voltage 64-80V, open circuit voltage 80-100V).

The controller comes packaged with a separate dump load unit which is required for unloading and protecting the battery when it is fully charged.

Features

- **Intelligent and powerful** technology ensures a high level of product reliability
- **Simple structure with a modular design** guarantees a stable performance
- **PWM charging mode** for optimal charge acceptance by the battery bank
- **A range of protection functions** (overcharging, overvoltage, reverse polarity, load short circuit, lightning, current limiting, automatic brake etc)

- **Inbuilt temperature sensor for** temperature compensation of charging
- **Small current charging mode** for a low battery (gentle charging of a very low battery with only part of the available current)

Optional Features

The controller comes with an in-built RS485 communication port which can accept connection of various devices, such as a remote meter display, control panel, GPRS communication module etc. These devices are optional and need to be purchased / configured separately from the controller, using the appropriate RS485 to USB / RS485 to 232 converting cables.

2. First use and operating procedures

1) Use insulated copper or tinned copper cables of the appropriate cross-section (but in any case not smaller than 6 mm^2) to connect system components.
2) Connect the dump load to the **DUMP LOAD** terminals of the controller.
3) Connect the battery to the **BATTERY** terminals on the controller. **Although the controller has reverse polarity protection, make sure the positive and negative cables are connected to the correct "+" and "-" terminals.**
4) Attach the wind turbine output cables to the **WIND INPUT** terminal on the unit. **Please make sure the wind turbine blades are not rotating or are moving at a very slow speed during this step of the installation.**

5) Finally, connect the solar panel(s) to the positive and negative **SOLAR INPUT** terminals on the controller. **Please keep the solar panel(s) covered during this process**.

Wiring diagram
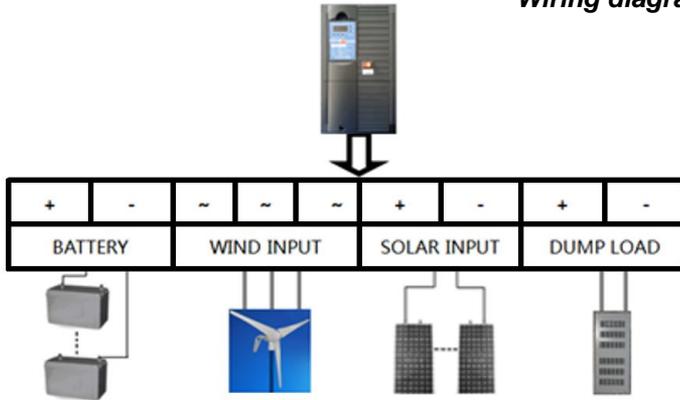
6) The controller comes with an On / Off switch on the front panel. This switch is designed for customers looking to disable battery charging and divert all energy to the dump load (e.g. when away from the system for a long period of time). When the controller is in normal operation of the battery charging, **this switch should stay in the "On" position**. Turning it into the "Off" position disables battery charging and activates the dump load.

7) If you need to disconnect the wind turbine for a significant period of time, please note that for most wind turbines it is not recommended that the 3 wind turbine AC output wires remain open circuit. Typically the best method is to short all three wires and isolate them from other objects. Consult your wind turbine manufacturer or supplier for detailed guidance on this question before making a decision.

3. Display information

Pressing **"READ"** on the controller will show the battery voltage, solar charge current, wind turbine charge current and wind turbine revolutions per minute (RPM).

| Name	Description	
Light Indicator	V	Shows battery voltage
	I1	Shows PV current
	I2	Shows wind turbine current
	r/min	Shows wind turbine RPM
	Un	Shows controller is unloading
	CH	Shows controller is charging

Note: **Indicates that the light is illuminated.**

4. Fault indication

The following fault codes might appear on the controller display.

Fault Code	Fault Name	Solution
FAL0	Controller under voltage	Check that the charging function of the controller is working correctly; reduce the drain of the battery.
FAL1	Controller over voltage	Check that the charging function of the controller is working correctly; check the dump load (unloader) unit.
FAL2	Controller over current	The charging or unloading current is too high. Check that the connected solar / wind power sources are within the nominal limits of the controller.
FAL4	Controller output short circuit	Check that the load is short-circuited or too large, examine all wiring and connections.
FAL5	Inverter communication fault	Fault detected with the connected inverter (in case if it is linked to the controller). Please contact your supplier or distributor of the equipment

5. Mechanical dimensions
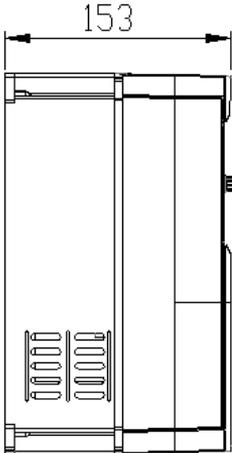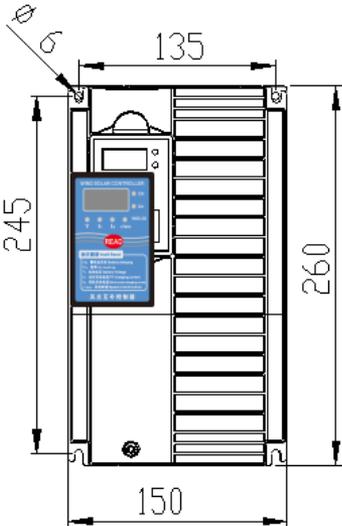
6. Data and Specifications

Model	HCON-1KW-48	HCON-2KW-48
Battery Rated Voltage	48V	
Max Combined Charging Current	43A	54A
Wind power		
Wind Turbine Rated Power	1000W	2000W
Wind Turbine Max power	1800W	2700W
Wind Turbine Rated Voltage	50V	
Wind turbine Max Input Voltage	65V	
Solar power		
Solar Rated Power	600W	1000W
Max Solar Input Voltage	100V	
Max Solar Input Current	13A	20A
Over Voltage	64.8VDC	
Over Voltage Recover	62.4VDC	
Small Current Charging Voltage Range	< 43.2VDC	
Direct Charging Voltage Range	43.2VDC < battery voltage < 55.2VDC	
PWM Charging Voltage Range	55.2VDC < battery voltage < 58.0VDC	
Unloading Voltage Range	55.2VDC < battery voltage < 58.0VDC: PWM unloading battery voltage > 58.0V: full unloading	
Charging Stop Voltage	58V	
Temperature Compensation	-3mV / °C / 2V	
Use Environment	Temperature: -10°C ~ 40°C; Humidity: <95% no condensation; avoid sources of heat and direct sunlight	
Size	L×W×H: 258×136×149 (mm)	
Display	LCD display	
Quiescent Current	≤20mA	