OPERATING MANUAL

Wind / Solar Hybrid - Charge Controller 24V 1000w

i/HCC-1000- Charge Controller

Introduction

The function of the charge controller is to monitor the battery voltage, and once it reaches full charge, disconnect energy sources (wind turbine and / or solar panel), in order to avoid overloading the battery bank. Furthermore, at risk to the turbine (excessive rotation), the controller actuates the braking automatically. Also in case of risk to the controller, such as over temperature, load interruption occurs and braking of the turbine. Other protections are also present, such as input voltage limits.

The i/HCC-1000 controller allows direct connection of wind generator (three-phase turbine with permanent magnets, up to 500W) and battery bank, in order to generate a complete solution to battery charge with power wind. It also have input for solar cell panel (300W maximum), in order to use solar and wind energy (hybrid system). The hybrid system as an interesting combination, since often days of little wind exhibit good insulation, and vice versa.

The i/HCC-1000 controller automatically detects the voltage used in the battery bank (24V), adjusting internal parameters as appropriate. Note that it is always preferable to use 24V system because the current is half of the 12V system, which generates much less heat losses.

All the controller circuit is designed with electronic components (solid state) without the use of electromechanical components (relays). This contributes to a long service life and substantially increases the reliability of the installation.

The braking is soft, preventing mechanical stress on the turbine support tower and the turbine itself. It also enables the thermal dissipation of accumulated rotational energy of the rotor over 20 seconds, which contributes to less heating of the braking circuit.

The USB connector allows you to connect an optional alphanumeric display (MMI) to i/HCC-1000 controller, to view various parameters such as battery voltage, internal temperature, etc.

The whole set is packaged in a metal housing of high mechanical strength which removes the heat generated efficiently, avoiding overheating.

Connection
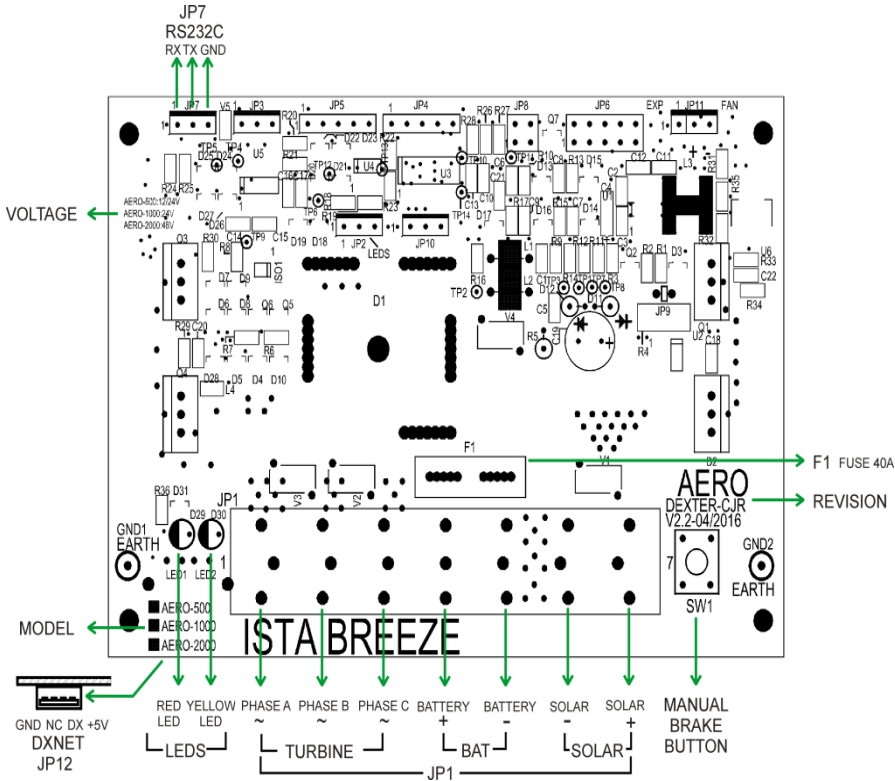
The i/HCC-1000 controller has the following connections:

The main connector (JP1) has seven contact: three contacts for the three phases of the wind turbine (PHASE A, B, C), a contact to the positive terminal of the battery (BATTERY+), a contact to the negative terminal of the battery (BATTERY-), a contact to the negative terminal of the solar panel (SOLAR-), and a contact to the positive terminal of the solar panel (SOLAR+).

Internally there is a 45A fuse (F1) to protect the circuit in the event of a short circuit. Normally, this fuse should not burn because there is protection against reverse polarity, both the battery and solar panel.

Two LED lights (yellow and red) indicate the operation of the controller. They are located to the left of the main connector (front view), as shown in the drawing.

A momentary switch to the right of the main connector allows you to force the braking of the turbine. To brake just press the key. To release the brake must press the key again. The red LED flashing constantly indicates when manual braking is activated. Note that the braking is soft, taking 20 seconds to reach minimum speed turbine.

As the braking is based on dynamic friction, that is, the energy generated by the turbine itself, will not necessarily completely stopping. A braked wind turbine could continue to rotate, but with a low speed. In case of strong winds (above 35 km / h) may occur that the turbine fall your speed when there is a wind temporary interruption, allowing your downswing. Once at low speed, the turbine will remain so until manual braking is off, even if the wind return to levels above 35 km / h.

Optional

- Man / Machine Interface (MMI) for battery voltage monitoring, turbine speed, solar panel voltage and temperature controller.
- RS232 serial port for communication with external supervisory system.

CONNECTION SCHEME
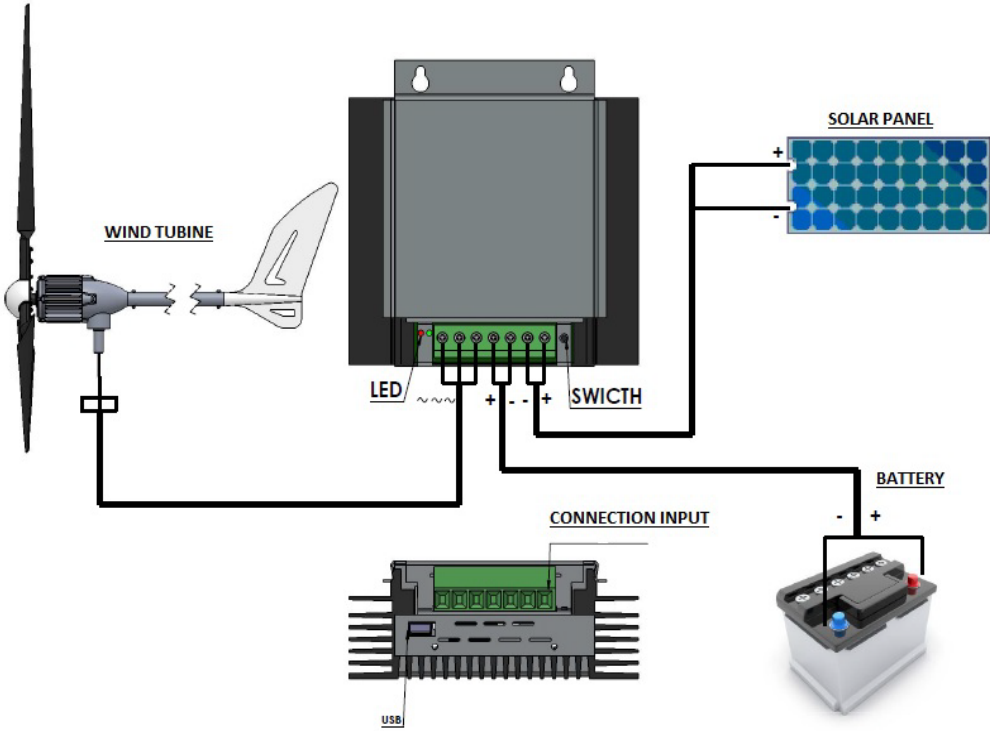
Operation

The mechanical assembly of the i/HCC-1000 controller must always be vertical, with connectors for battery connection, wind turbine and solar panel (JP1) in the lower position. This ensures efficient cooling by convection.

Connect the battery bank to the controller. The wiring to the battery bank must have a 4 mm2 of copper in diameter (6 mm 2 for systems 12V), and preferably as short as possible (less than 3 meters between controller and battery bank). After a moment, the two LEDs (red and yellow) should flash briefly, indicating system startup. Soon after, the yellow LED should be activated, indicating that the controller measured the voltage of the battery bank, and initialize its internal constants properly (24V battery bank).

If the two LEDs blink when powering the controller, and then the yellow LED remains off that means the battery voltage is outside the permissible limits (less than 8V). In this case it is necessary recharge the battery bank before connecting it to the i/HCC-1000 controller, or replace the batteries.

When connecting pay attention to the polarity battery. If reversed there will be no damage to the system, but the controller will remain de-energized.

Once energized the i/HCC-1000 controller, momentarily press the manual brake button. The red LED should start flashing, indicating manual braking activated. Place the three wind turbine wires shorted together to force the turbine stop. Beware of terminals open turbine, since this situation can arise high voltages if the propeller is moving. Wait about 30 seconds to perform complete cycle of braking, then remove the short circuit between the turbine wires and connect to the corresponding terminals (phase A, B, C).

The order of the wires is irrelevant. Do not do this operation if there is strong wind, because the little time with open wires may be sufficient to speed propeller and generate high voltages at its terminals. In this case, first stop mechanically the propeller spinning before handling the wires of the wind generator.

> **Warning: the wires of wind generator open can generate very high voltages if the propeller is moving, with electrical shock hazard. Always should do short circuit the terminals or stop mechanically the turbine before handling it.**

If the installation has solar panel connect it to the controller. The system is connected and ready to operate. Press the manual brake button to release the brake (red LED should turn off). If the turbine was mechanically immobilized can be released.

When there is load conditions (rotation in the wind turbine or the solar panel voltage, in the case of hybrid systems) the yellow LED flashes, indicating that the battery bank is being charged.

When reach full charge voltage, the red LED is turned on and the charge of the battery bank is interrupted.

If the red LED flashing intermittently means that some critical condition has been achieved, and the turbine will braked, and the battery charge will turned off. The red LED constantly flashing means that manual braking is activated.

Finally, if you acquired the optional alphanumeric display (MMI) for i/HCC-1000 controller, connect it to the front USB connector, allowing to view parameters such as battery voltage, internal temperature controller, solar panel voltage and rotation of the turbine.

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TEST Specification		24V battery
Voltage to discriminate 24V system	17,0 V	
Voltage for battery charge start		26,2 V
Voltage for battery charge end		29,6 V
Minimum voltage to detect battery		17,5 V
Maximum input voltage		48,0 V
Wiring recommended for battery bank	6 mm^2	4 mm^2
Maximum distance for battery bank	3 m	
Shutdown by high temperature	80 °C	
Shutdown by low temperature	-30 °C	
Reclosing for high temperature	60 °C	
Reclosing for low temperature	-20 °C	
Protections	battery reversal // solar panel reversal // reverse current in at night // High / low temperature // overspeeding / excessive voltage // Battery Disconnection // Atmospheric discharge // Braking without battery // soft braking (PWM)	
Temperature compensated battery charging limits	-0,03 V/°C	
Tracks thermal compensation	5°C | 15°C | 25°C | 35°C 45°C	
Minimum turbine rotation to indicate charge	300 rpm	
Minimum voltage solar panel to indicate charge	Vsolar ≥ Vbat	
Maximum speed turbine	1500 rpm	
Maximum power in wind turbine		1200w
Maximum power in solar input		300W
Efficiency at full power		≥ 85%
Recommended minimum battery		24V / 150Ah
Internal fuse	45A	
Soft braking time (PWM)	20 seconds	
Time switching to MMI data (optional)	5 seconds	
Recovery time after error conditions get out (overspeeding)	5 minutes	
Recovery time after error conditions get out (except overspeeding)	2 minutes	

INDICATION LEDS

Yellow LED	On	Energized system without battery charge
	Off	System powered down or battery damaged
	Blinking	Energized system with battery charging
Red LED	On	Fully charged battery
	Off	Not fully charged battery
	Blinking	Manual braking was activated
	Intermittent	1 pulse ---- Battery disconnected or insufficient voltage 2 pulses ---- Excessive input voltage 3 pulses ---- Excessive turbine rotation 4 pulses ---- Temperature error

Warranty

Germany ista Breeze guarantees that this device within 24 months from the date of the acquisition of the trader shows no material defects and processing errors which will impair the function of the wind generator.

If deficiencies are detected during this period, they should immediately be notified to the seller. The Germany ista breeze. will then check the warranty claim and repair the unit or provide replacement in parts or the whole of the wind generator. Is a prerequisite for the warranty is that the items were not used inappropriately and that the customer has complied with the construction and operation instructions whereas these include the inspection and maintenance tasks. The liability is excluded for damages that jhave occurred directly or indirectly that are caused by the wind generator. The responsibility of the company The Altinel Enerji LTD. is also excluded for the Damages caused by force majeure, such as storms, hail, lightning, flooding, etc.

When the wind turbine or its components have to be rebuilt and decomposed for checkup, repair, change or replacement because of warranty claims, then these costs have to be paid by the customer. The company Germany ista Breeze decides whether a wind driven generator will be repaired or a replacement will delivered. Otherwise the general terms and conditions of the dealer are applicable.

Germany ista breeze

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Disposal Dear Customer,

Please help avoid waste materials. Should you intend to dispose of this product, so please keep in mind that many of its components consist of valuable materials and can be recycled. therefore do not discharge it in the rubbish bin, but it please your council for recycling.

EC declaration of conformity

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iSTA Breeze