

6. 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 have 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.

7. CUSTOMER CARE

Germany ista breeze

Serkan Urut

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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

We, the ista breeze Serkan Urut Riemenstr. 31 D-74906 Bad Rappenau VAT D-815 013 747

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ista Breeze

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OPERATING MANUAL

Wind / Solar Hybrid - Charge Controller 12V 24V



CONTENT

| | |
|--------------------------------|---|
| 1. Introduction..... | 3 |
| 2. Connection..... | 3 |
| 3. Operation..... | 5 |
| 4. Characteristic..... | 6 |
| 5. Technical Specifiction..... | 7 |
| 6. Warranty..... | 8 |
| 7. Customer Care | 8 |

5. Technical specifications

| | 12V battery | 24V battery |
|--|--|-------------------|
| Voltage to discriminate 12V or 24V system | 17,0 V | |
| Voltage for battery charge start | 12,6 V | 25,2 V |
| Voltage for battery charge end | 14,6 V | 29,2 V |
| Minimum voltage to detect battery | 8,5 V | 17,5 V |
| Maximum input voltage security | 25,0 V | 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 | 3000 rpm | |
| Maximum power in wind turbine | 500W | 500W |
| Maximum power in solar input | 300W | 300W |
| Efficiency at full power | ≥ 75% | ≥ 85% |
| Recommended minimum battery | 12V / 200Ah | 24V / 150Ah |
| Internal fuse | 40A | |
| 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 | |

4. Characteristics

- Input for wind generator 500W.
- Input for solar panel 300W.
- Operation in 12V or 24V with automatic detection.
- Reverse polarity protection on the battery.
- Short-circuit protection (internal fuse 30A).
- Reverse polarity protection on the solar panel.
- Reverse Current protection at night in the solar panel.
- Disconnection and brake of the turbine by excessive temperature.
- Disconnection and brake of the turbine by excessive voltage.
- Disconnection and brake of the turbine by overspeeding.
- All solid state components.
- Turbine brake soft, avoiding mechanical shock.
- Turbine brake operates without even energy.
- Manual brake button.
- Ambient temperature compensation (-0,033V / ° C) for battery charging.
- Status display via two LED lights.
- Reading battery voltage, input voltage, solar panel voltage, temperature, turbine rotation.
- DXNET communication network capable of connecting the Man / Machine Interface (MMI) for battery voltage monitoring, turbine speed, solar panel voltage and temperature controller.
- Automatic shutdown upon reaching maximum or minimum operation temperature.
- Filters in analog readings to eliminate noise.
- Protection against lightning.
- Control via microcontroller RISC and programming via logical blocks, greatly facilitating the inclusion of new features.

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.

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 |

1. 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 AERO-500 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 AERO-500 controller automatically detects the voltage used in the battery bank (12V or 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.

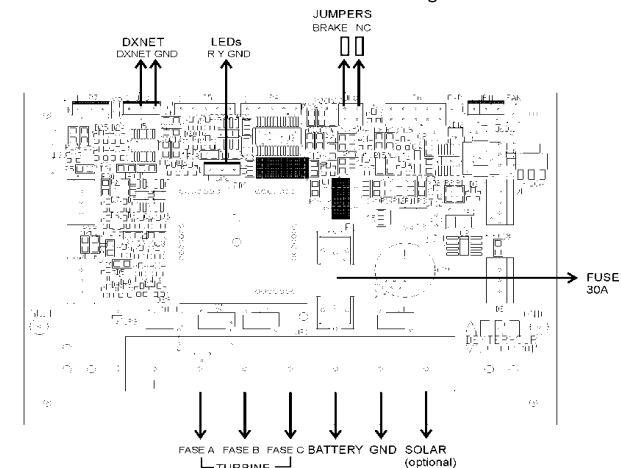
The braking is soft, preventing mechanical stress on the turbine support tower and the turbine itself. It also enables the thermal dissipation of accumulated rotational energy of the rotor over 20 seconds, which contributes to less heating of the braking circuit.

The USB connector allows you to connect an optional alphanumeric display (MMI) to AERO-500 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.

2. Connection

The AERO-500 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+).

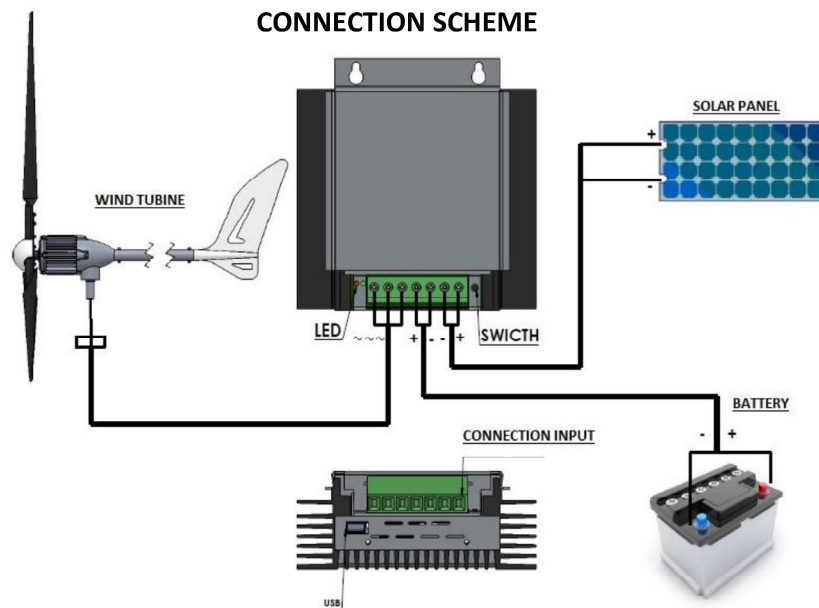
Internally there is a 40A fuse (F1) to protect the circuit in the event of a short circuit. Normally, this fuse should not burn because there is protection against reverse polarity, both the battery and solar panel.

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.

The USB connector (JP12) may be connected to the optional alphanumeric display (MMI) for AERO-500 controller.



3. Operation

The mechanical assembly of the AERO-500 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 mm² 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 (12V or 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 AERO-500 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 AERO-500 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 AERO-500 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.