

## INSTRUCTION MANUAL - MODEL WCP-D

### AIR Wind Turbine Digital Control Panel

The wind generator digital control panel is fully calibrated and ready for installation. Please follow the instructions below for proper indoor installation. This manual covers 4-32 Amp rated WCP-D which is designed to operate with 12-48 VDC nominal battery banks.

P/N	BREAKER SIZE	TURBINE TYPE
2-ARAC-D-5	5 A	AIR 40/BREEZE – 48 V
2-ARAC-D-10	10 A	AIR 40/BREEZE – 24 V
2-ARAC-D-20	20 A	AIR 30/AIR X MARINE/SILENT X – 48 V AIR 40/AIR BREEZE – 12 V
2-ARAC-D-25	25 A	AIR 30/AIR X MARINE/SILENT X – 24 V
2-ARAC-D-40	40 A	AIR 30/AIR X MARINE/SILENT X – 12 V



### OVERVIEW:

This control panel is **designed to be installed indoors** protected from weather. Installation requires drilling holes into the base of the plastic enclosure to allow for mounting and wiring.

The Circuit Breaker switch is used to turn on and off the wind turbine control panel as well as provide protection in case of a major fault. The RUN-STOP toggle switch controls the operation of the wind turbine. In the RUN position, it allows the wind turbine to operate and produce power while in the STOP position it will electrically break the wind turbine stopping or stalling the rotation (in this mode some rotation may occur in windy conditions). The center position is the OPEN position, disconnecting the

wind turbine from the battery bank but not brake the wind turbine. **WARNING** – the turbine should not be left in the Open Circuit/Middle position on the stop switch except during trouble shooting for short periods. The Digital display meter provides information on current (A), battery voltage (V), power (W) and wind generator energy production (W - hrs) over the recorded time-period.

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The WCP - D is designed and should be used only with the Primus AIR family of wind turbines. The WCP-D has 5 models and is specific to the Primus wind turbine. Primus wind turbines, such as the Air Breeze, Air 40, Air-X Marine, Air 30, AIR MaX and AIR Silent X, have built-in regulators allowing protection of the batteries from

overcharging. If the wind turbine does not have a built-in regulator, an external diversion load controller will be required on the battery bank to provide proper protection from over charging.

## **Warning**

**Disconnect battery(s) prior to making connections. Secure the rotor blades of the wind turbine mechanically so that it is unable to rotate.**

## **MECHANICAL INSTALLATION:**

Locate a suitable mounting area for the WCP - D, preferably as close to the battery bank as possible where it will be interconnected yet where there is still easy access to view the meter and operate the controls.

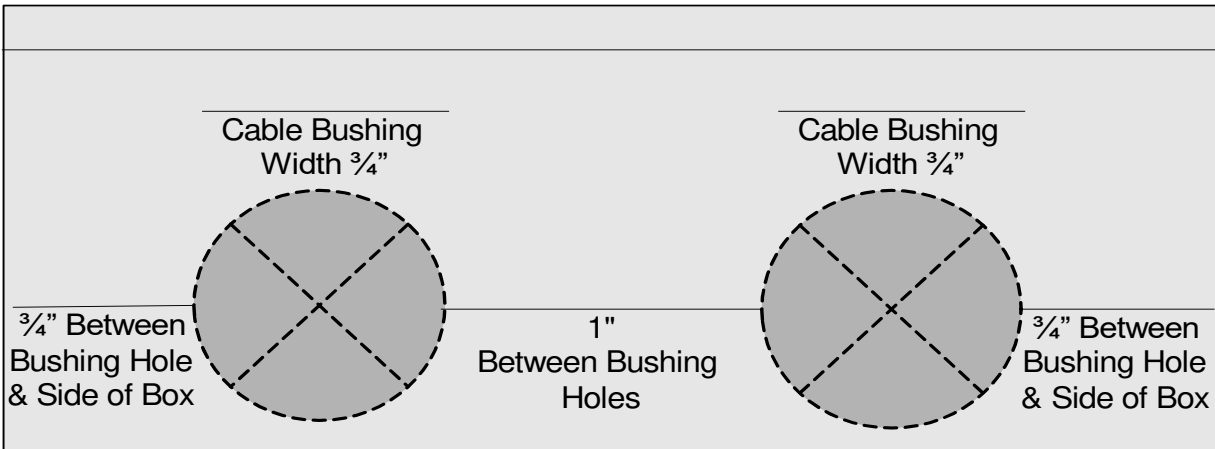
**Enclosure Mounting:** The enclosure of the control panel is designed to be mounted on a surface in the vertical position only. Additional holes are required to be drilled in the enclosure for mounting and wiring.

- 1) Remove the cover off the enclosure base during the four corner screws.
- 2) Identify a mounting location for the enclosure base. It is recommended the control panel be located as close to the battery bank as possible (7' or less) for a more accurate reading of battery voltage. Mark and drill the enclosure back with holes adequate enough to mount the enclosure back to the mounting area surface (hardware not included) for your specific location.
- 3) Determine optimum location to bring wires in and out of the enclosure. A 3/4" clear hole is required to secure the included wire bushings. Typically the wind generator input wire and battery wires are fed through the top, top one third sides of the enclosure or sometimes through bottom of the enclosure (see attached typical mechanical drawing locate the holes). When locating wire bushing holes try to position them so they are as close to the bottom of the enclosure as possible allowing for easy wiring passage internally while not interfering with the internal circuits.

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Recommend placing Holes on either Top or Bottom Ends of Enclosure



Make holes as close to back side as possible

- 4) Mount the now predrilled enclosure base into place. Insert wire bushings and pre-stripped wires accordingly.
- 5) Make the connections as described in the section below, being sure that wires are routed internally in the box to avoid interference with the internal components. The WCP terminal blocks, which will accept an 8 AWG or smaller wire size, provides for easy interconnect of the two turbine wires and two battery power wires.
- 6) Insert cover onto enclosure (it should easily fit in place, be cautious that the wires are not interfering with the internal components or the cover) and secure with 4 original mounting screws after wiring is complete.

## ELECTRICAL INSTALLATION:

**Wind Generator Connection:** Mechanically tie off the wind turbine blade so that it cannot operate while making your connections. Connect the wires of the 12-48V wind turbine feed wires to the terminals marked wind. Negative to -2 and Positive to 1+ of the Control Panel using the appropriate wire size (8 AWG or smaller) which the blocks will accept, see Figure 2. If a larger gauge wire is required, use a few inches of 8 AWG wire to transition to the terminal blocks. The green grounding wire of the wind generator is connected to the grounding system.

## Warning

**ABYC STANDARDS AND PRACTICES should be followed during the installation along with the manufacturer's recommendation. This manual is made available to assist during installation and start up and is not intended to supersede the ABYC Standards or the Manufacturers requirements and recommendations.**

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## Caution

Wire size of the interconnect to both input (wind generator) and output (battery bank) of the control panel is critical to the proper operation of the wind generator. Please consult a Wire Sizing Table (Primus AIR Manual) to be sure you have the minimum wire size so that the voltage drop is less than 3%.

- 1) **Battery Connections:** Be sure battery feed wires are not connected to the battery at this time. Connect the battery feed wires to terminals marked Battery with Negative to -4 and Positive to 3+ of the control panel using the appropriate wire size (see Figure 2).

## Warning

It is strongly recommended to recheck the tightness of the screws on the terminal block where the connections are made. Initially, tight screw connections will loosen as the wire compresses and therefore going back to recheck the tightness of the screws after a period of time will help assure a good connection.

- 2) **Mounting:** Mechanically install the panel into the enclosure base using all 4 cover screws.

- 3) **Battery Connection:** Verify the Circuit Breaker on the Control Panel is in the “OFF” position. Set the RUN–STOP switch in the “STOP” position. Connect the battery feed wires from the Control Panel to the battery bank terminals. Make sure all connections are tight and the wires are of proper size and are mechanically secured.

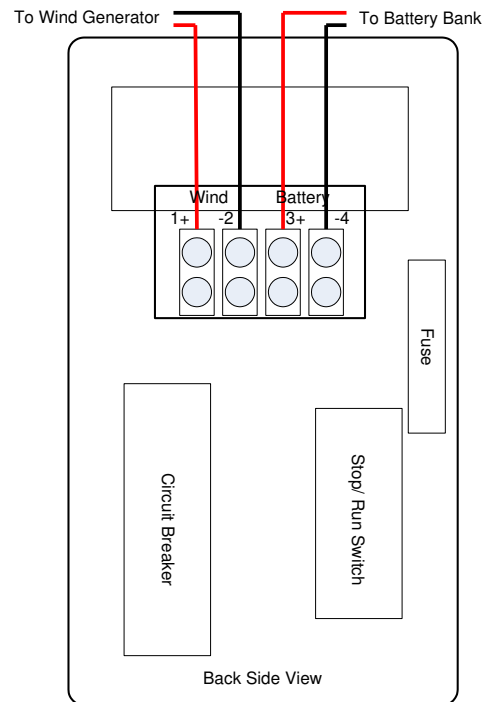


Figure 2

## Warning

Please be sure polarity (negative/positive) is correct, if not it will damage the control panel and the wind turbine voiding warrantee.

## START UP:

Remove the mechanical tie off of the wind turbine so that it can spin freely. It should rotate at this point (if wind present) but have some resistance (Run-Stop switch is in the “STOP” position).

Turn Circuit Breaker to the “ON” position. The digital meter should illuminate and indicate battery system voltage. No current or wattage would be displayed at this time. If there is an energy value displayed, reset to zero by following procedure in section marked “Energy Display/Reset” Switch the RUN-STOP switch to the “RUN” position. The wind turbine should begin turning and current should be displayed provided the battery bank is at 85% or less – not in regulation (please refer to Primus manual for battery regulation set points).

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If the battery bank is “topped off” or fully charged, the wind generator regulator will prevent the wind generator from rotating. The wind turbine LED should blink and if there is sufficient wind it should begin spinning and current should be displayed provided the battery bank is at 85% or less. Please see the Primus AIR instruction manual that came with the wind generator for more information.

## Warning

**Set the wind generator RUN-STOP switch in the “STOP” position prior to turning off or on the power circuit breaker.**

In order for the Hybrid energy systems to be operational, the circuit breaker must be left in the “On” position which allows the wind generator to be applying energy to the battery bank when wind is available. Leaving the circuit breaker “on” and wind circuits active will deplete only a minor amount of energy from the battery during non-energy producing periods and should not be of concern. The wind system typically works in harmony together with other energy producing systems on board such as solar PV, alternator or AC powered battery charger and therefore it is not necessary to turn “off” the wind circuit breaker when these are active (refer to PWP instruction manual for more information).

## Note

**It is strongly recommended the installer/user read the PWP instruction/start up manuals prior to powering up the WCP - D and related equipment. Adjustments may be necessary based on the type of batteries in the system and other optional features which may be needed for your particular installation.**

## DISPLAY OPERATION:

**Backlight Control:** short press the small button located on the right side of the display to turn on or off the backlight. The backlight has a memory function and therefore it will keep your setting even after it powered off.

**Energy Display/Reset:** The energy information on the display represents a cumulative amount of energy production from its prior reset. To reset it back to zero complete the following steps:

1. Long press the button on display until the power display area reads “CLr” and then release the button.
2. The energy display will begin *flashing* indicating it in the reset mode. Short press the button again and the energy value should be cleared and it should automatically exit the flashing reset mode.
3. If there is no activity within 5 seconds, it means the energy value has not been clear and the meter will automatically exit the energy reset mode.
4. If the value has not cleared to zero then repeat step #1 to make a second attempt to clear the reset of the energy value.

The Energy value is accumulated number (Energy = Power x Time). It will be maintained in the memory of the meter even if circuit breaker is turned off. A manual Energy value reset of the display will be necessary if you want to have a new Energy value.

**Set Voltage Alarm:** The display meter has built in high and low-voltage alarms. If you wish to adjust them from the default follow the below instructions:

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1. Long press the button to the right of the display until the power display area reads “SET” then release the button.
2. The Voltage display will show the high voltage alarm value, the Current display will show the low voltage alarm value and the last digit begins to flash. Short press the button to advance the setting. When there is no button activity over 3 seconds the meter will switch to the next digit automatically from the High voltage alarm value to the Low voltage alarm., There are a total of 6 digits the range of voltage alarm can be set from 6.5 to 99.9 V
3. After completing your adjustments for the alarm setting, long press the button until the screen displays pass which means you set the successfully the voltage alarm and it will automatically exit the setting state.

## Warning

**The meter is set up from the factory to work with a 50A shunt which is built into the controller. If the button is held to long the power area may begin displaying CURR which can allow accidental adjustment of the shunt setting. Do not change the setting of 50A as it will put the meter out of calibration. To exit this mode, long press the button to exit back to normal display.**

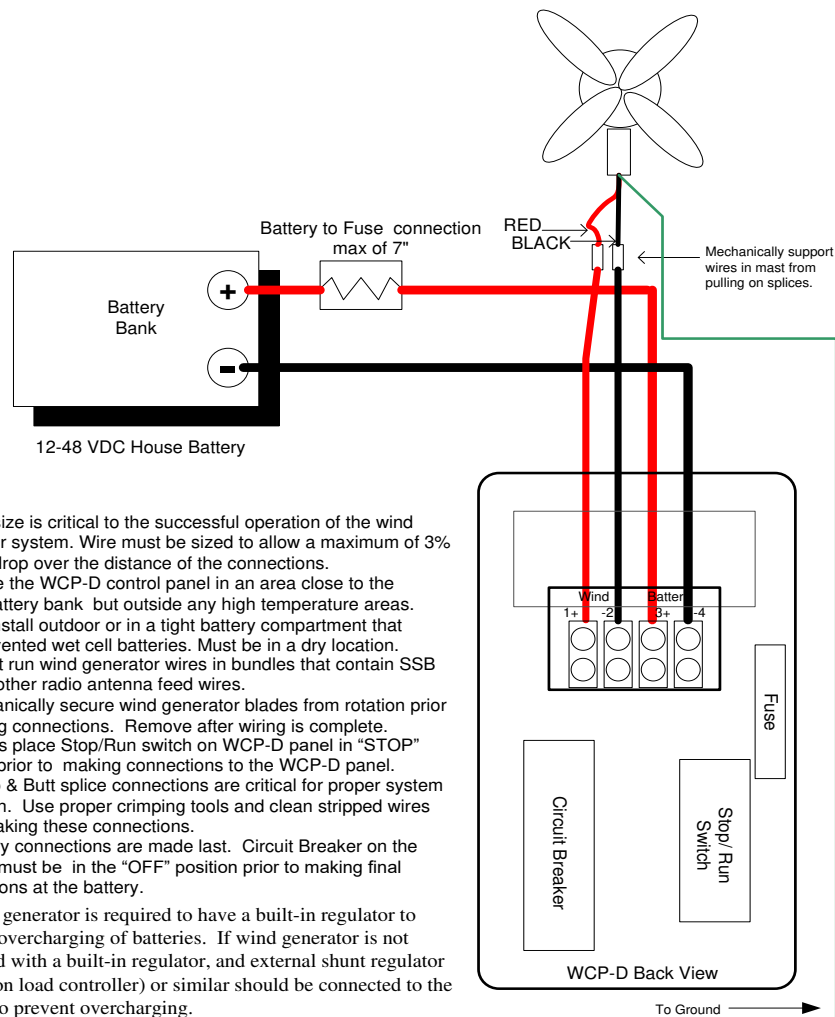
## TROUBLESHOOTING:

1. **Wind Turbine is Cycling On/Off:** When your battery bank is approaching top off (full charge), you may see the wind turbine starting and stopping very frequently. This is caused by the wind turbine attempting to do the final top off on to your battery bank. It may be necessary to lower the voltage set point for the wind generator regulator to eliminate this problem. See the PWP instruction manual for more information.
2. **Wind Turbine Not Operating Properly:** Primus Wind Power AIR wind turbines contain a microcontroller for operating/regulation. From time to time transients or electrical noise (i.e. lightning strikes, keying the SSB microphone, etc.) may cause these microprocessors to go unstable. To correct the problem turn the WCP – D Stop/Run switch to Stop, wait approximately 5 minutes and then set it back to Run. If this does not resolve the problem, please refer to the PWP manual for additional troubleshooting advice or contact PWP Tech support.
3. **Display Blank:** Complete the following steps:
  - 3.1. Check that the DC circuit breaker is in the ON position.
  - 3.2. Confirm that the correct DC voltage is applied to the controller by checking the battery terminals inside the controller (use a voltmeter) after you have removed it from its enclosure base.
  - 3.3. If the display is still blank after you confirm voltage is applied to the controller and the DC breaker on the controller has been turned ON then check the fuse.
  - 3.4. Fuse check. Remove power from the controller, unscrew the fuse holder and check the fuse for continuity. If the fuse has failed the continuity check replace the fuse and repower the controller.
  - 3.5. If the controller display is still blank, controller requires servicing.

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## WCP HOOKUP DIAGRAM



### Notes:

- 1) Wire size is critical to the successful operation of the wind generator system. Wire must be sized to allow a maximum of 3% voltage drop over the distance of the connections.
- 2) Locate the WCP-D control panel in an area close to the house battery bank but outside any high temperature areas. Do not install outdoor or in a tight battery compartment that houses vented wet cell batteries. Must be in a dry location.
- 3) Do not run wind generator wires in bundles that contain SSB radio or other radio antenna feed wires.
- 4) Mechanically secure wind generator blades from rotation prior to making connections. Remove after wiring is complete.
- 5) Always place Stop/Run switch on WCP-D panel in "STOP" position prior to making connections to the WCP-D panel.
- 6) Crimp & Butt splice connections are critical for proper system operation. Use proper crimping tools and clean stripped wires when making these connections.
- 7) Battery connections are made last. Circuit Breaker on the WCP-D must be in the "OFF" position prior to making final connections at the battery.
- 8) Wind generator is required to have a built-in regulator to prevent overcharging of batteries. If wind generator is not equipped with a built-in regulator, and external shunt regulator (diversion load controller) or similar should be connected to the battery to prevent overcharging.

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