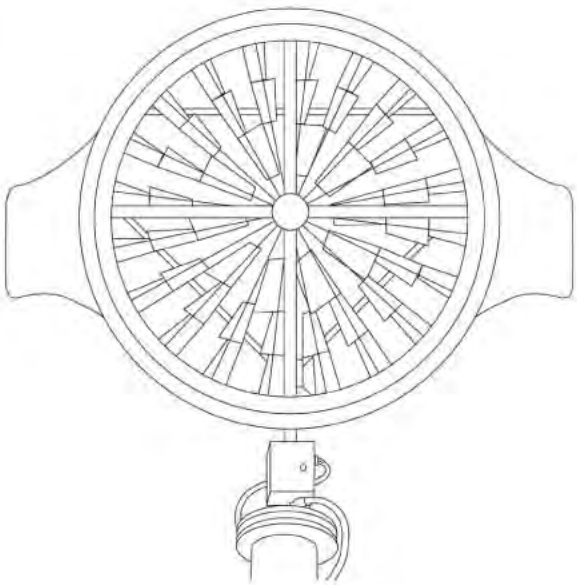
WindTronics



WINDTRONICS™ Wind Turbine

Model BTPS6500

Master Installer's Guide

230VAC/50Hz

EMCo Systems Solutions, Inc.

P.O. Box 25120 San Mateo, CA 94402
www.emcosystems.net

This manual is intended for the use of a licensed contractor. If you are a licensed and insured contractor who would like to become an Authorized Installer, please download the application from our website www.windtronics.com.

Safety Information

Important Safety Instructions

1. This Master Installer's Guide contains important instructions for the **WINDTRONICS**™ Wind Turbine installation and maintenance. Please save it.

2. Read the entire Master Installer's Guide prior to installation and follow all warnings and cautions included on the Master Installer's Guide and/or attached to the **WINDTRONICS**™ Wind Turbine.

3. Improper installation, adjustment, alteration, service maintenance, or use can cause fire, electrical shock, or other conditions which may cause death, personal injury or property damage.

4. Choose a very calm, nearly no wind, day for the installation.

5. Follow the installation procedures contained within this Guide and all safety codes. Follow your National Electric Code and your local building zoning codes.

6. Only licensed and trained personnel should move and lift the **WINDTRONICS**™ Wind Turbine. The turbine should only be moved using standard hoists and hydraulic lifts such as a crane or bucket truck.

7. Appropriate protective personal equipment such as hard hat, work gloves, safety glasses, and closed-toe work shoes should be worn when installing the **WINDTRONICS**™ Wind Turbine.

8. Only licensed and trained personnel can perform the following maintenance functions on this **WINDTRONICS**™ Wind Turbine:
    - Open and work on the **SMARTBOX**™ Controller
    - Open and work on the Junction Box at the turbine
    - Apply any torque to any of the turbine's fasteners

9. The installation directions include recommendations of a variety of options. These must be approved and certified by your local Professional Engineer (PE). The installer must acquire all the necessary permits from the local authorities prior to installation.

The **WINDTRONICS**™ Wind Turbine is manufactured by WindTronics. Please contact WindTronics at:

621 Sprucewood Avenue
Windsor, Ontario
N9C 0B3

877-946-3898

Manufacturer reserves the right, without notice or liability, to change design and specifications at any time.

For sales, product information, parts, warranty, or service requests, please conact EMCo Sytems Solutions, Inc. at Toll Free: 1(855) ASK-EMCo

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Evaluation and Installation List

☐ Permits

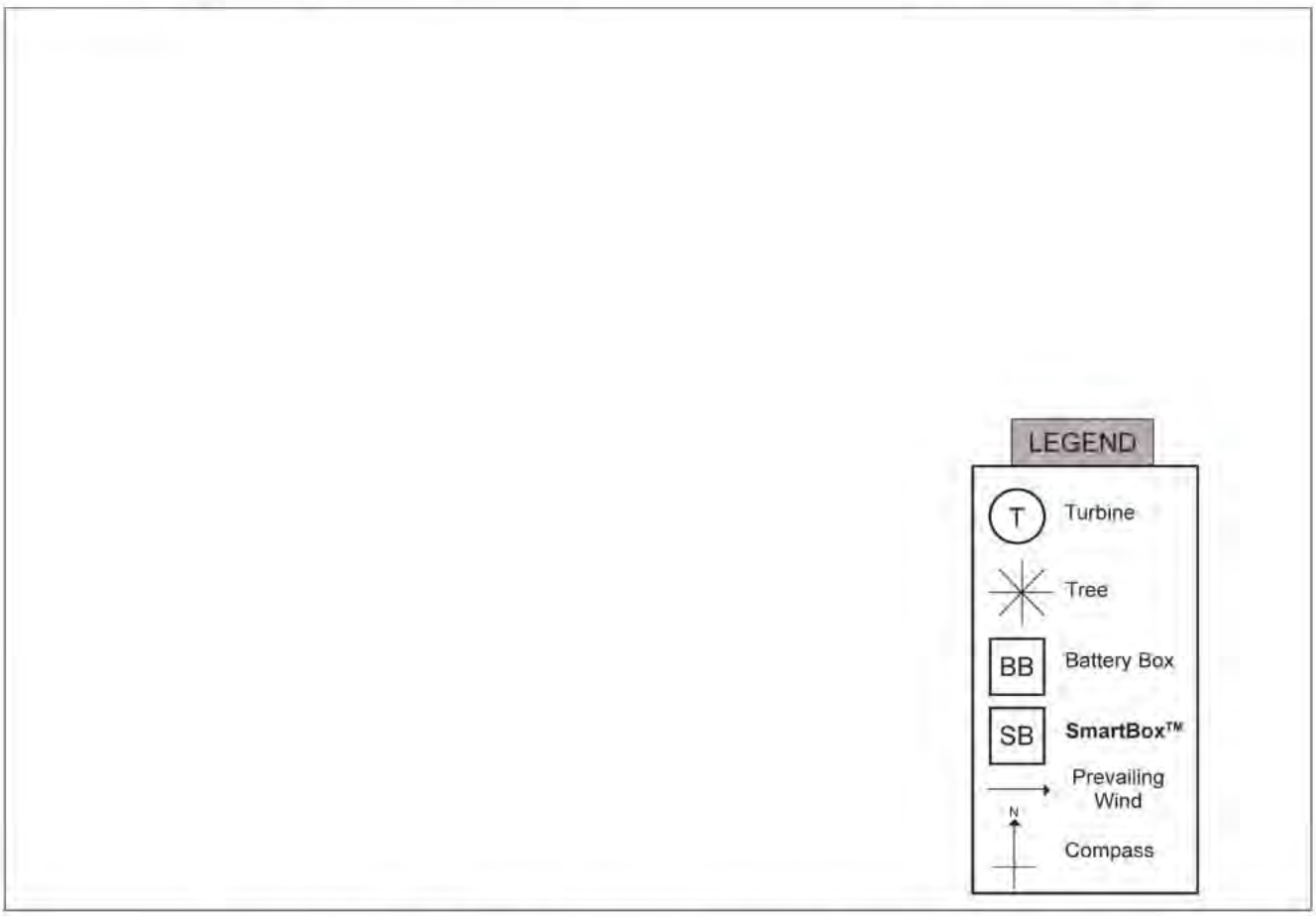
- ☐ Permit#_____ Date_____
- ☐ Permit#_____ Date_____
- ☐ Permit#_____ Date_____
- ☐ Permit#_____ Date_____

☐ Site evaluation (go to page #5 for requirements)

- ☐ Distance from Turbine to SmartBox (max 200 ft (60m))_____
- ☐ Height to center of Turbine_____
- ☐ Draw all obstructions on site map

☐ Draw site map (view from above - use space below for your drawing)

- ☐ Prevailing wind direction
- ☐ Location of:
  - ☐ Obstacles
  - ☐ Turbine
  - ☐ SmartBox
  - ☐ Battery enclosure (max 10ft (3m) from Smart Box or 20ft (6m) from DC Charger)



☐ Mounting Hardware (choose one – see pages 5-10 for drawings - see *WindTronics Wind Turbine BTPS6500 Owner's Manual* for more details)

- ☐ Flat roof: **QUADPOD**™ Mount and Ballast (need drawing)
- ☐ Pitched roof: **QUADPOD**™ Mount and **ROOFBOX**™ Mount
- ☐ Pole: height_____ material_____
  (example on page 7)

☐ Accessories (Supplied by Installer)

- ☐ Batteries: TWO-12V, 100Ah, deep cycle batteries - Type may be AGM or marine-grade flooded
- ☐ Battery enclosure
- ☐ (2) Fused disconnects (see page #12)
- ☐ (1) Non-fused disconnect (see page #12)
- ☐ Sub panel
- ☐ Connection:
  - ☐ ¾" Conduit
  - ☐ 1" Conduit
  - ☐ Battery terminal lugs
  - ☐ CAT5E or CAT6 stranded cable
  - ☐ #4 THWN - 2 red
  - ☐ #4 THWN - 2 black
  - ☐ #4 THWN - 2 green
  - ☐ #6 THWN - 2 green
  - ☐ #8 THWN - 2 black
  - ☐ #8 THWN - 2 red
  - ☐ #8 THWN - 2 white
  - ☐ #10 THWN - 2 black
  - ☐ #10 THWN - 2 white
  - ☐ #10 THWN - 2 red
  - ☐ #12 THWN - 2 green

A run of conduit shall contain not more than four quarter bends or a combination of bends totaling 360 degrees between pull points. Tubing shall not be threaded, and fittings shall be listed for use with EMT and shall be securely fastened to the tubing.

☐ Unpack (refer to instructions in package)

- ☐ SmartBox: Serial #_____
- ☐ Owner's Manual

Turbine crate:

- ☐ Turbine: Serial #_____
- ☐ (2) Deflectors and mounting hardware
- ☐ Junction Box with Dump Load
- ☐ Anemometer
- ☐ Owner's Manual
- ☐ Master Installer's Guide
- ☐ QA Inspection Sheet
- ☐ Unpackaging Instructions
- ☐ Deflector Installation Instructions (assemble before mounting)

☐ Mount and Level Turbine – refer to lift point on page 10

☐ Connect – refer to page 12 for wiring diagram

☐ Commission – follow menus on SmartBox display (refer to pages 14-15)

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Site Survey

⚠ WARNING

Personal Injury and Property Damage Hazard

Improper installation, alteration, service or maintenance may result in death, serious bodily injury or property damage. Installation or repairs made by unqualified persons could result in hazards to you and others. Installation must conform with all safety and other codes of all governmental authorities having jurisdiction.

The information contained in this owners manual is intended for use by licensed and trained professionals that are experienced in installing and servicing the **WINDTRONICS**™ Wind Turbine, are familiar with all precautions and safety procedures required in such work, and are equipped with the proper tools and machinery.

When selecting the best location for the wind turbine, consider the following:

1. Wind – is the area windy enough to support the installation of a wind turbine?
2. Height – install as high as possible. Ideally, it should be greater than 33' from ground to turbine center for best performance and safety of personnel.
3. Obstructions – place the turbine in the location furthest away from all obstacles (buildings, trees, parapets, HVAC units, rooftops, etc.)
4. Prevailing Wind – as a general guide, place the turbine in a location that can best take advantage of prevailing winds (if you do not know, you can find historical "wind rose" information on the Internet).

IMPORTANT: PLEASE TAKE NOTE

If the prevailing wind has to travel across a rooftop before passing through the turbine it will be less effective than if the turbine was placed where the wind would come into contact with the turbine first.

Mounting Options

⚠ WARNING

Personal Injury and Property Damage Hazard
Do not install the **WINDTRONICS**™ Wind Turbine in a location that is accessible to children or pets. Failure to follow this warning may result in death, personal injury or property damage.

⚠ WARNING

Personal Injury and Property Damage Hazard
The **WINDTRONICS**™ Wind Turbine must be mounted by licensed and trained personnel only, with the use of all appropriate hardware. Failure to follow this warning may result in death, personal injury or property damage.

Whichever mounting option is chosen should be approved by a local Professional Engineer (PE). All of the options listed have been rated by our Professional Engineer. Please refer to the following designs and their included specifications.

⚠ WARNING	Failure to follow proper installation practices for any of the mounting options could result in death, serious injury and/or property damage.
⚠ CAUTION	WHEN MOUNTING ON OR OVER A COMBUSTIBLE SURFACE, A FOOT PLATE OF AT LEAST 1.43 mm GALVANIZED OR 1.6 mm UNCOATED STEEL EXTENDED AT LEAST 150 mm BEYOND THE EQUIPMENT ON ALL SIDES MUST BE INSTALLED.
⚠ WARNING	Power shall be disconnected from the equipment before the junction box enclosure is opened and the enclosure shall be closed before the power is restored. Failure to do so may result in death, serious injury and/or property damage.
⚠ WARNING	If any maintenance is to be done on the turbine, the turbine must be put in STOP mode, the turbine switch on the junction box must be in the "Turbine Off" position" and the wheel must be tie wrapped to prevent turning. Failure to do so may result in death, serious injury and/or property damage.
⚠ CAUTION	Use of WindTronics products for other than their intended purpose may void warranty.

Pole Mount

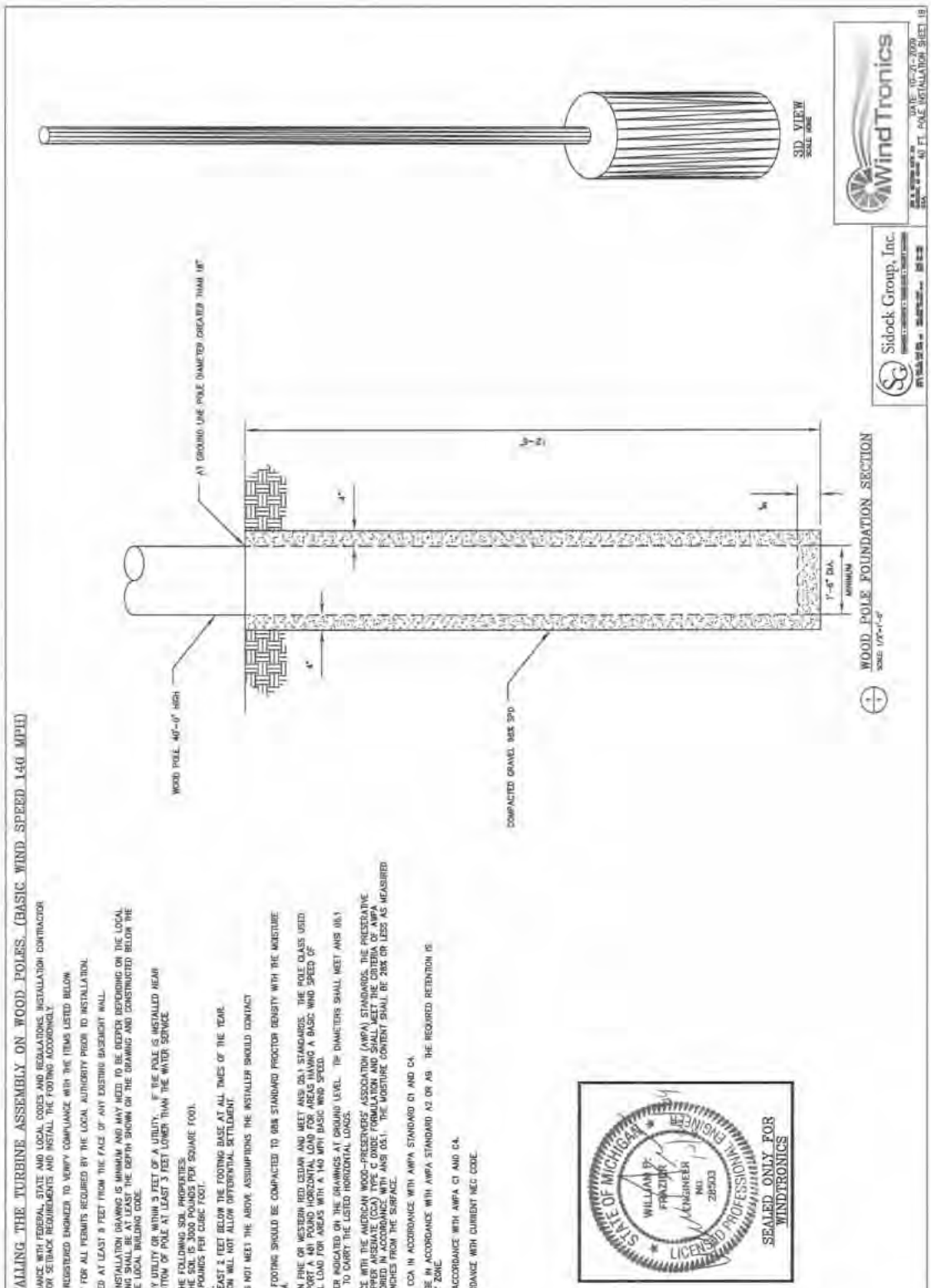

Figure 1 Pole Mount

Ballast Mount

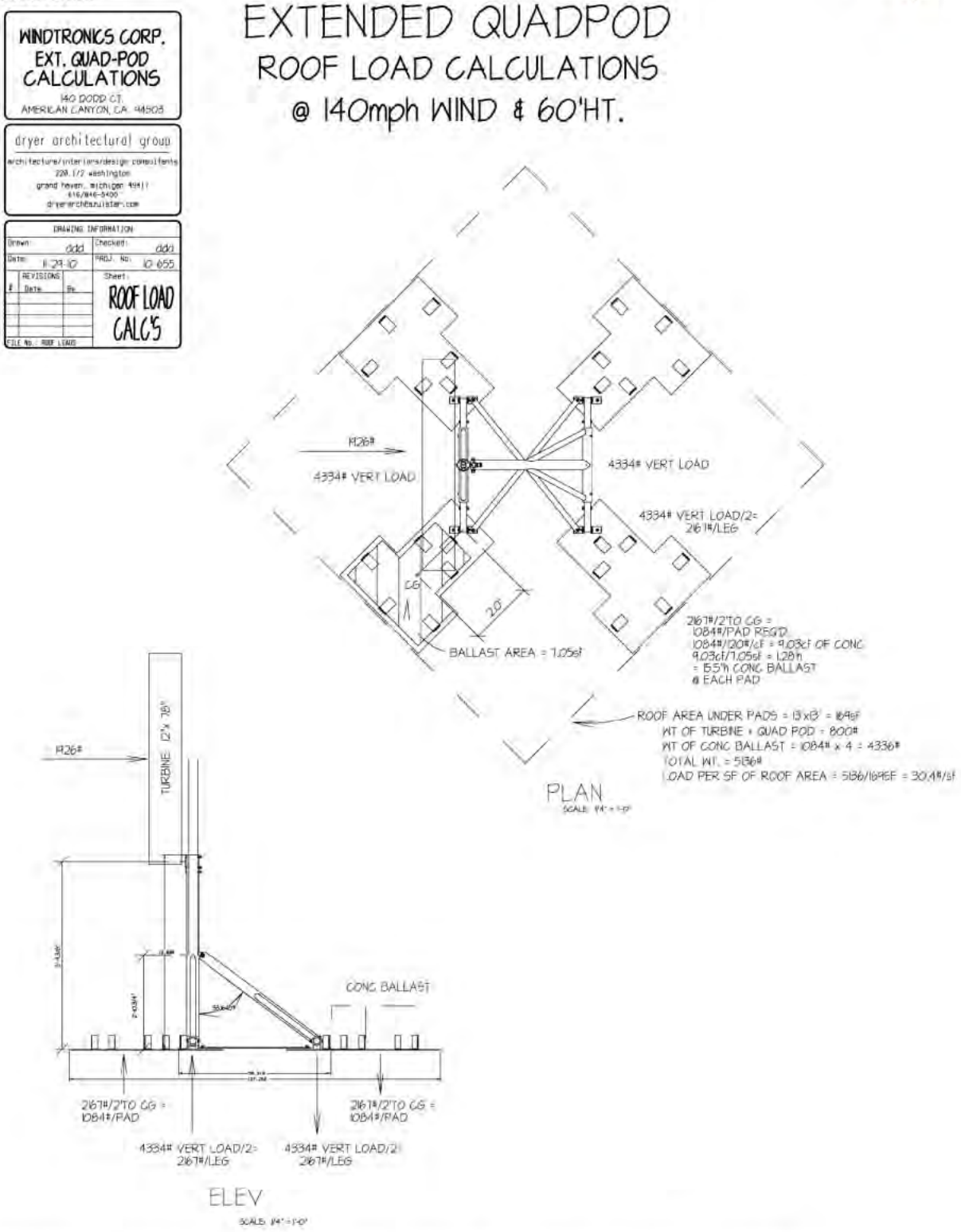

Figure 2 Ballast Mount

ROOFBOX™ Mount Extended QUADPOD™ Mount

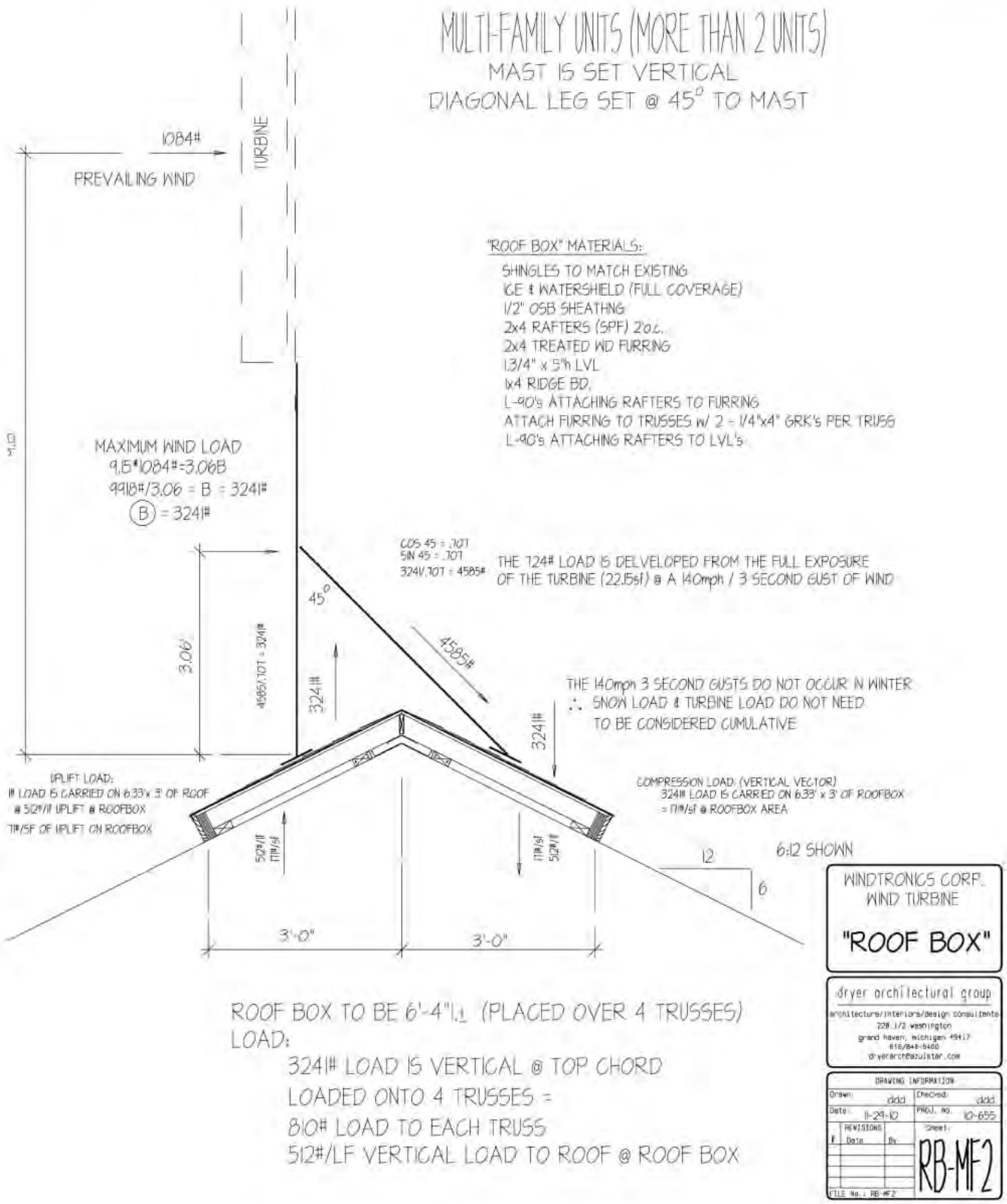

Figure 3 ROOFBOX™ with QUADPOD™ Mounting

Lift Point

Only licensed and trained personnel should move and lift the **WINDTRONICS**™ Wind Turbine. The turbine should only be moved using standard hoists and hydraulic lifts such as a crane or bucket truck. The recommended lift point is shown in the photograph below:

Figure 4 Proper Turbine Lift Point

Wiring

⚠ WARNING **ELECTRIC SHOCK HAZARD**
Disconnect turbine and battery circuits before wiring. Turn off all power before wiring. Failure to follow safety warning could result in serious injury and/or death.

PROFESSIONAL INSTALLATION required

Installations must meet all local electrical codes. Installations for the equipment should only be performed by a qualified electrician or a licensed and trained WindTronics installer.

The wiring connections between a mounted **WINDTRONICS**™ Wind Turbine, Battery Box and **SMARTBOX**™ Controller is relatively simple. The following diagram details and specifies the wire gauges required in this installation. It is strongly recommended that a certified and trained electrician performs all the electrical connection. All electrical systems must be grounded in accordance to your National Electric Code and local standards. Please refer to the **SMARTBOX**™ Controller Manual for full details on wiring, connecting and commissioning of the **WINDTRONICS**™ Wind Turbine.

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Illustration of Turbine System Connections

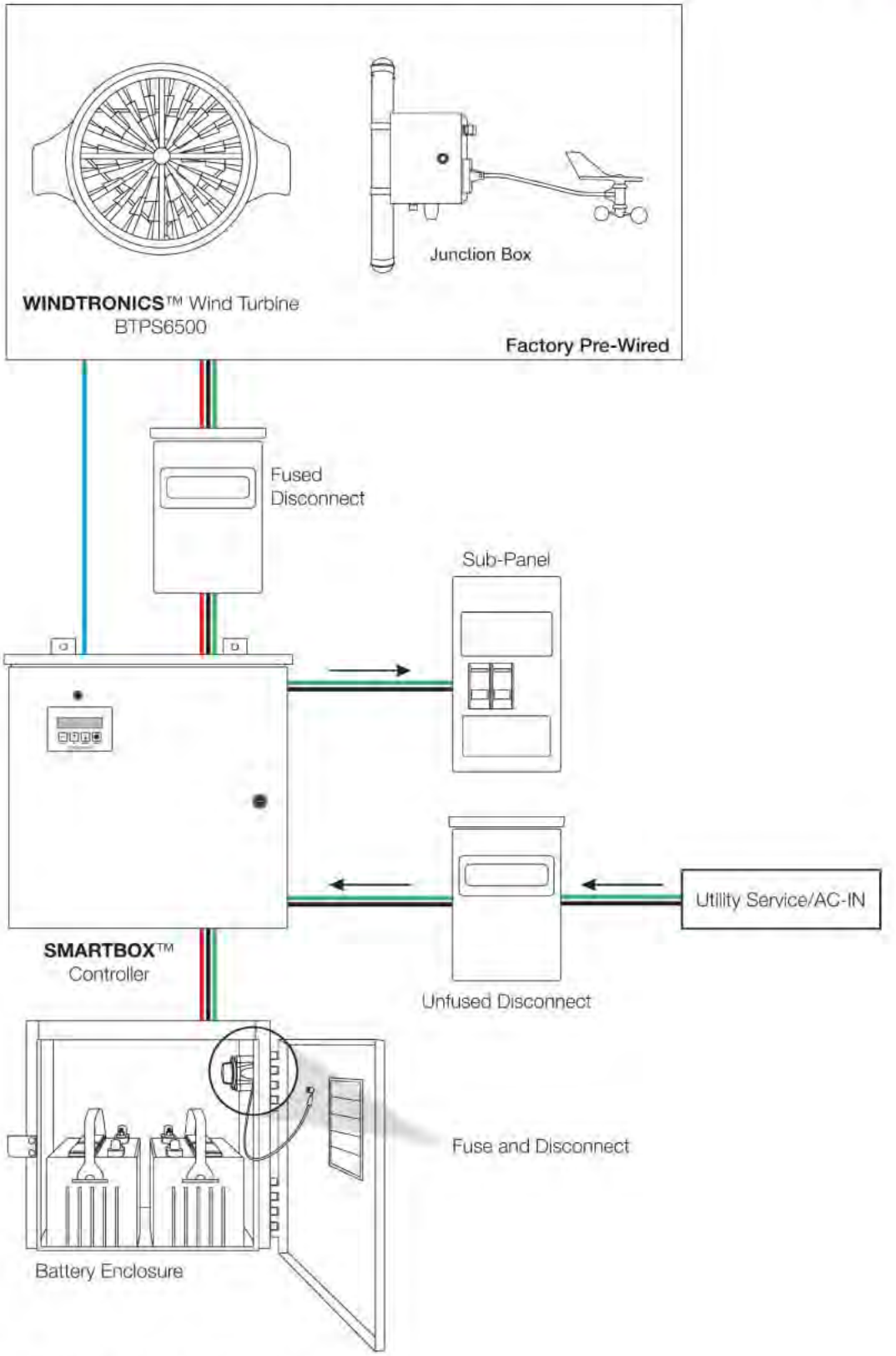
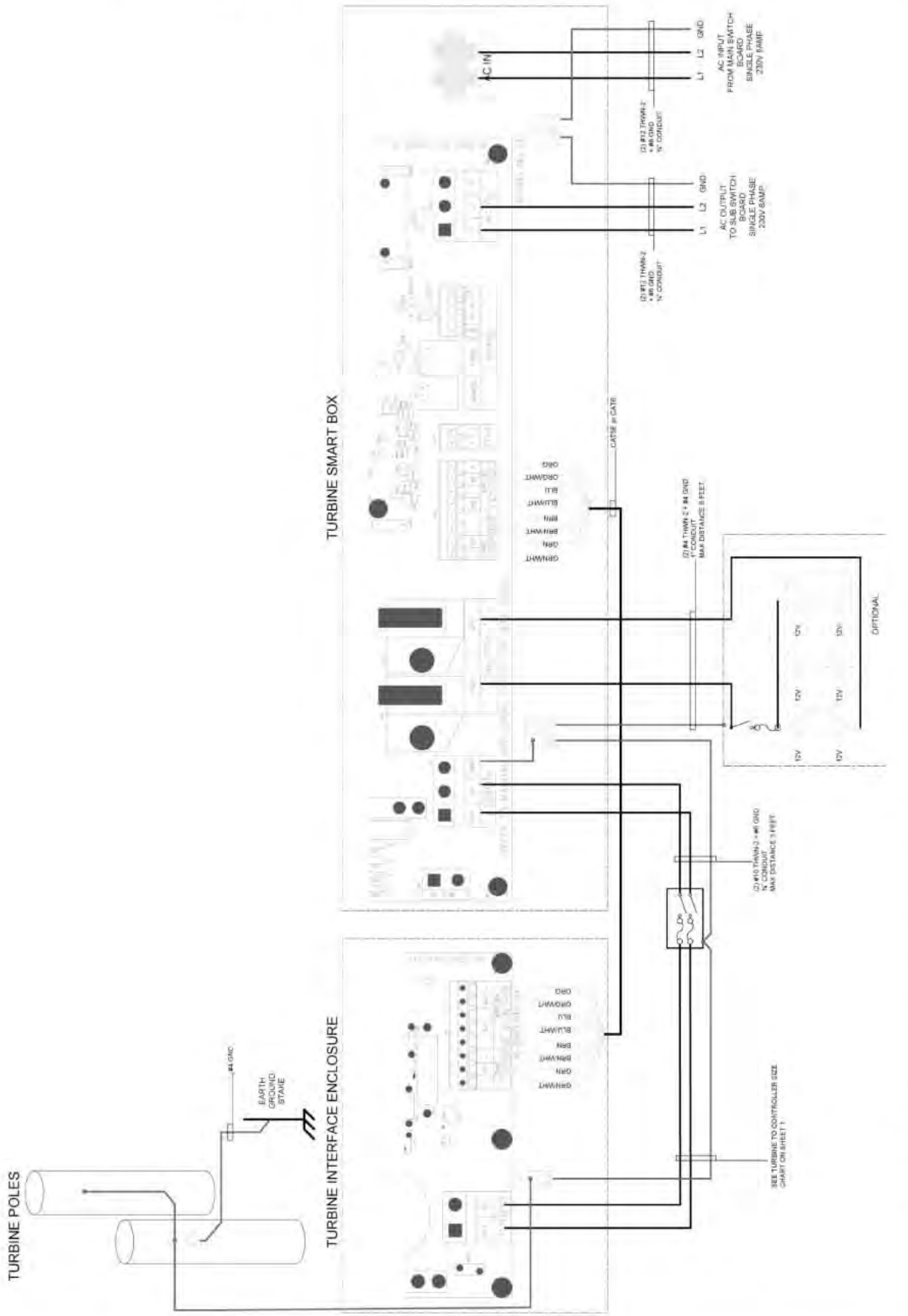


Figure 5 System Connection

Electrical Wiring Diagram



TURBINE TO CONTROLLER WIRE SIZE CHART

TURBINE WIRE	MAX DISTANCE (FT)	EMT CONDUIT (INCH)
#10 (#6 GND)	150	3/4
#8 (#4 GND)	200	1

Figure 6 Wiring Diagram

Junction Box

Purpose: Interface between the turbine and the **SMARTBOX**™ Controller which houses the safety braking circuitry to limit the maximum turbine speed. Turbine will brake if voltage generated exceeds 165Vdc. The cylinder attached to the junction box houses the resistor used to brake the turbine and dissipate excess energy as heat. The anemometer sends wind speed and direction signals to the **SMARTBOX**™ Controller. The turbine will also brake if wind speeds exceed 40 mph (17.9 m/s).

Mounting: The junction box comes hard wired to the turbine. It should be mounted high enough off the ground to ensure the anemometer will be able to function through all seasons (i.e. will not be covered with snow in the winter). The junction box can be mounted through two pre-drilled holes in the black bars on the back of the junction box. The **QUADPOD**™ Mount has pre-drilled holes for mounting of the junction box. Mounting hardware is supplied by the Installer.

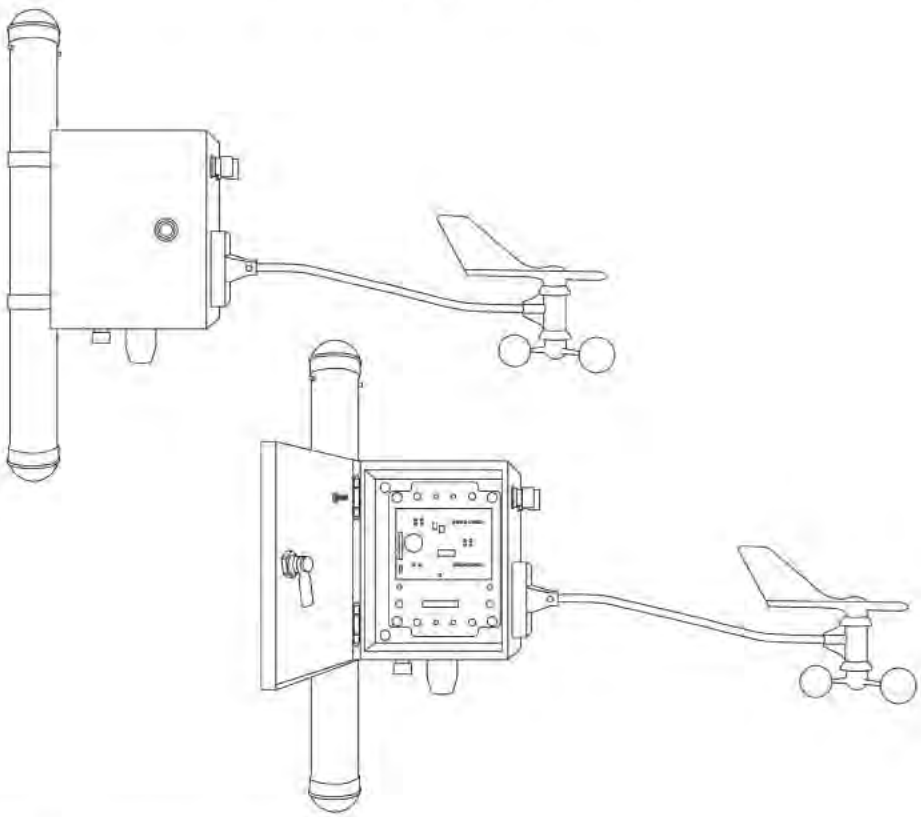


Figure 7 Junction Box Enclosure

Commissioning

⚠ WARNING **EXPLOSION OR FIRE HAZARD**
Entering battery information incorrectly may result in explosion or fire.

During commissioning, the controller and turbine must be setup. In the controller, very important system information such as the battery type, number of battery banks and battery capacity must be setup. **Ensure you have this system information prior to commissioning**. See the ***SMARTBOX™*** *Controller Owner's Manual* for proper set up.

In addition to **SMARTBOX™** controller setup, the turbine's components will also need to be tested. This testing can be done via the controller's display.

The following is the proper procedure to commission the **WINDTRONICS™** Wind Turbine with the **SMARTBOX™**. Do not proceed with commissioning until ALL DISCONNECTS are in the OFF position and the turbine blades are free to turn.

1. **Check all connections for polarity.**
2. Apply the battery power to the unit with the disconnect or selector switch inside the battery enclosure.
3. The LCD display will light up and prompt a display:

Display	Description
WINDTRONICS RX.XX FIRST POWER UP	The **SMARTBOX™** will display this for 5 seconds and then move to the required setup information.

4. The system will automatically walk you through the commissioning process. All steps must be completed before the turbine will operate. If problems are found during this process, you can turn off the battery disconnect at any time to restart the power up process. All of the settings will be saved, but you must start over and step through all the steps until complete.

   For optimal performance it is IMPORTANT to enter OPTIMAL battery information (steps 5-7). We only recommend using TWO 12V, 100Ahr deep cycle batteries of either AGM or marine-grade flooded type. Please enter the following optimal settings for best performance.

5. At the first prompt screen, select the battery type by using the arrow keys. Press ENTER when finished.

Display	Description	Optimal
ENTER BATTERY TYPE FLOODED	Set the battery type	Enter **FLOODED or AGM** to match batteries used

6. Select the battery Amp hour rating for ONE battery by using the arrow keys. Press ENTER when finished.

Display	Description	Optimal
ENTER BATTERY AHr 100	Set the battery Amp hour rating for ONE battery	Enter **140** for 100Ahr battery

7. Select the number of battery banks in parallel by using the arrow keys. Press ENTER when finished.

Display	Description	Optimal
ENTER BATTERY BANKS 1	Set the number of battery banks	Enter **3** for one bank of 2-12V batteries

8. At this point the batteries are all set up. Now we will move to the turbine setup and check its components for operation. This requires two people: one at the turbine and one at the **SMARTBOX**™ Controller.

9. Step 10 is for testing the turbine. Turn on the turbine disconnect. Put the Turbine On/Off Switch in the ON position.

10. Observe Turbine Blades:

    - If turbine blades are rotating and display reads GREATER than 0V, press ENTER to continue.
    - If turbine blades are rotating and display reads 0V, turn off battery disconnect, check wiring, and restart commissioning process.

    [NOTE: If wind is not causing turbine wheel to spin, gently spin the wheel by hand to determine if the Smart Box is detecting a voltage.]

Display	Description
TURBINE INPUT OK	Shows if a turbine voltage was found.

11. Testing the AC grid connection: Turn on the AC disconnect from the Grid input.

12. Check the display and make sure the AC voltage is OK. Range should be 110V ±5% (or 220V ±10%). If there is no grid connection, press ENTER to skip.

Display	Description
AC Grid 120V OK?? (or 230V OK??)	Checks the AC voltage. Press ENTER to skip if there is no grid connection or if voltage is within range. If not within range, re-start commissioning.

13. Test AC load connection: Turn on AC disconnect to the load. Turn on all items on the sub panel load to make sure turbine inverter can handle the load.

14. The system commissioning is now complete. Press ENTER to start the turbine. In the technician menu, you can force this process over again if required.

Display	Description
COMMISSION COMPLETE	Press ENTER to Start the Turbine.

Manufacturer reserves the right, without notice or liability, to change design and specifications at any time.

Spare Parts

Part Description	Part Number (qty 1 each)	#/Turbine	Supplier
Short Blade	WT6K142	10	WindTronics
Long Blade	WT6K143	10	WindTronics
Zip Ties	FT-8	220	Panduit
Bushing Housing Assembly	WT6KASSY010	1	WindTronics
Thrust Bearing (*New* May 10, 2011)	WT6K219	1	WindTronics
Ceramic Bearing	WT6K170	2	WindTronics
Shroud	WT6K030	4	WindTronics
Turbine Junction Box Assembly (does not include dump load)			
Grid Tied	WT6KASSY032	1	WindTronics
Non-Grid Tied	WT6KASSY034	1	WindTronics
Finned Dump Load Enclosure Assembly (*New* May 10, 2011)	WT6KASSY025	1	WindTronics
Anemometer (note: Aurora inverter does not use an anemometer)	WT6KASSY013	1	WindTronics
Stator Assembly	WT6KASSY008	136	WindTronics
Wheel Assembly (*with magnets*)	WT6KASSY036	1	WindTronics

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