

NRG INSTRUCTIONS

Windcube PV Trailer

Moderate Climate

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TABLE OF CONTENTS

INTRODUCTION 3

SPECIFICATIONS..... 3

MATERIALS & TOOLS 3

Towing information 3

Included Tools 3

Optional Tools..... 3

SECTION 1: TOWING AND SITING 4

SECTION 2: TRAILER ASSEMBLY 4

SECTION 3: WINDCUBE PLACEMENT 6

SECTION 4: ANCHORING 8

SECTION 5: CONNECT WINDCUBE, MODEM AND POWER MONITOR 8

SECTION 6: POWER EQUIPMENT ON 9

SECTION 7: TRANSPORT 10

SECTION 8: COMMISSIONING REPORT 11

Summary..... 11

Site Description 11

Configuration 11

General Info 11

Lidar physical setup and orientation 12

Lidar Software Setup..... 12

Trailer Configuration..... 13

Local Conditions..... 13

Lidar Software Screen Shots 13



Windcube PV Trailer

Introduction

Step-by-step instructions for the installation of the NRG Remote Power Supply Trailer assembly are provided below. This involves unpacking the equipment, deploying the PV panels and setting up the Windcube platform.

This trailer assembly includes all of the parts and tools required to get the system up and running, including a folding 2' ladder. Installation requires two able-bodied adults. Access to extra-low voltage (24 V DC) is required; take care when connecting PV panels and working inside the connection cabinet.

Specifications

- Enclosed trailer with
 - Leveling jacks
 - Anchor kit
 - WINDCUBE platform on front
- Transport room for WINDCUBE package and other tooling/supplies
- PV: 1035W (3 panels at 345W each)
- Multi angle and stow position deployment frame
- Batteries: 600Ah@24 V (12 count, 12V 100Ah 8G30H)
- Low mounted, outside vented, aluminum battery boxes (2)
- Charge controller : Prostar PS-30M
- Ambient temperature sensing, voltage and remote system monitoring
- Exterior WINDCUBE power cord
- A toolkit is provided that should cover most assembly.

Materials & Tools

Towing information

- 2" ball
- 4-pin trailer lights

Included Tools

- Screwdriver - flat
- Screwdriver - #2 Phillips
- 3/8" x 7/16" wrench
- 1/2" x 9/16" wrench
- Adjustable wrench
- 3/4" wrench
- Zip ties
- PV connector tool
- 2' ladder



Figure 1: Hand tools

Optional Tools

- Metal bar for installing anchors is not included



Windcube PV Trailer

Section 1: Towing and Siting

Only tow the remote power trailer with a vehicle with a minimum **3000+** lb towing capacity.

When arriving at the site, be sure to select a relatively level location, and orient the driver's side of the trailer toward South. The ground should be firm, but the included blocking will provide extra stability.



Figure 2: Typical towing vehicle

1. Place a block under the tongue jack, and rotate the jack into position.
2. Unclip the wiring, towing chains and tongue clip; disconnect the trailer hitch.
3. Jack the trailer up clear of the towing vehicle and pull the vehicle forward.
4. Place blocks under the rear corner jacks and engage the jacks to stabilize the trailer.
5. Locate the side jacks and extend the driver's side jack until it reaches the last hole. The passenger side jack is not extended. Block both jacks and crank them down until they are holding some of the trailers weight.
6. Use a level to adjust the trailer until it is relatively flat.

Section 2: Trailer Assembly

Items have been secured with Bungee cords, Ratchet straps, cardboard pieces and blocking. When unstrapping, be sure to save all packing materials for future transport.

1. Disconnect all bungee cords.
2. Remove and retain Shipping Bracket at base of Panel Frame and the blocking from the floor (if a Windcube is shipped inside the trailer).
3. Remove Panel Frame from trailer.
NOTE: Install Panel Frame on trailer before unpacking solar panel.
4. Mount Panel frame to trailer
 - a. Hold in position and install two pivot bolts at the top of the PV frame to the side of the trailer.



b. Swing out and install struts; choose an angle based on season or location (50°, 33° or 28°).

5. Tighten all bolts hand tight with wrench.



6. Mount PV panels

- a. Remove ratchet straps.
- b. Remove Shipping Bracket from top of stacked PV panels.

NOTE: Remove PV panels one at a time, and use a bungee cord to support them against the wall.

c. Lift the first PV panel into position.

NOTE: The PV panels should be installed vertically with the cables and connectors on the top side. There are two posts (as seen on the right) underneath the lower side that allow the panel to sit on the bottom crossbar.

d. Line up bolt holes and install bolts.





- e. Repeat d. and f. for remaining panels.

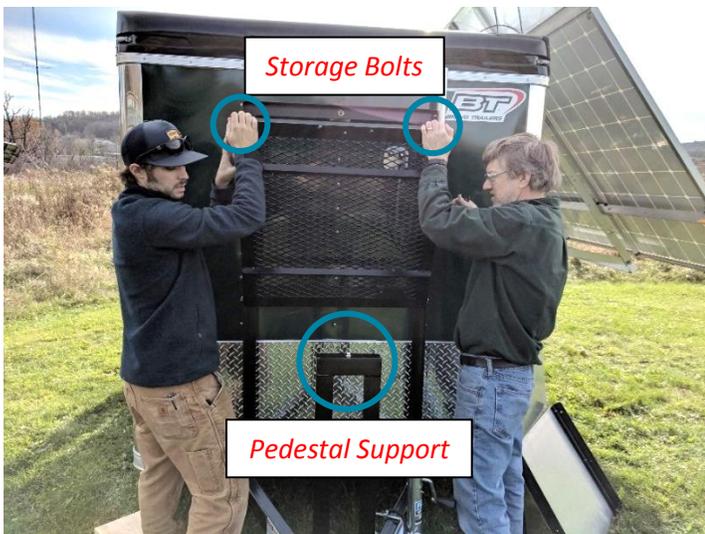


7. Connect each PV panel's male and female connectors to the trailer's male and female connectors.

NOTE: Male connectors attach to female connectors.

Section 3: Windcube Placement

1. Install the Windcube platform.
 - a. Remove nut and washer from pedestal support.
 - b. Loosen storage bolts on either side of stowed platform.
 - c. Lower platform into position and replace washer and nut on the pedestal support; hand tighten.
2. Install Windcube on platform.
 - a. Install the Windcube on the platform so it is facing North.



- b. Attach the Windcube antenna to one of the two Antenna Mounts and push the end of the antenna cable through the strain relief on the front of the trailer into the inside of the trailer. It may be necessary to pull out the rubber gasket in the strain relief, slip it over the cable and then reinsert it



Windcube PV Trailer

- to get the cable through. Connect it to the modem inside the electrical cabinet. See Section 5 modem details.
- c. Install an Ethernet cable through the strain relief in the front and connect it between the Windcube and the Ethernet switch in the electrical cabinet.
 - d. Connect the DC Power Supply Cable that comes with the Windcube to the power cable on the front of the trailer. Connect to other end to the Windcube.
 - e. Put the Windcube wiper pump into the provided 5 gallon bucket and feed the wiring through the hole in the lid. Fill the bucket with distilled or deionized water and it hang under the Windcube platform. Plug the power cable into the Windcube connection cabinet and the pump hose into the Windcube's wiper arm.
 - f. Once fully commissioned install the metal siding around the three exposed sides of the platform.
 - i. Fit the front side on first. The bottom of the panel sits in front of the lip of the platform.
 - ii. Secure the front side by installing lower front bolts hand tight
 - iii. Thread bolts out thru main frame upper hole, so side panels can be hung on these, and the bolts facing out on the front panel angles.
 - iv. Then hang northern side on upper bolts and secure with wing nuts. Install remainder of bolts in lower holes. Hand tighten.
 - v. Install the south side last because it allows access to the Windcube's connection cabinet. Hang side panel. Use wing nuts on upper bolts and thread in remaining bolts in lower holes.
 - vi. When all bolts are installed go around and tighten them all.

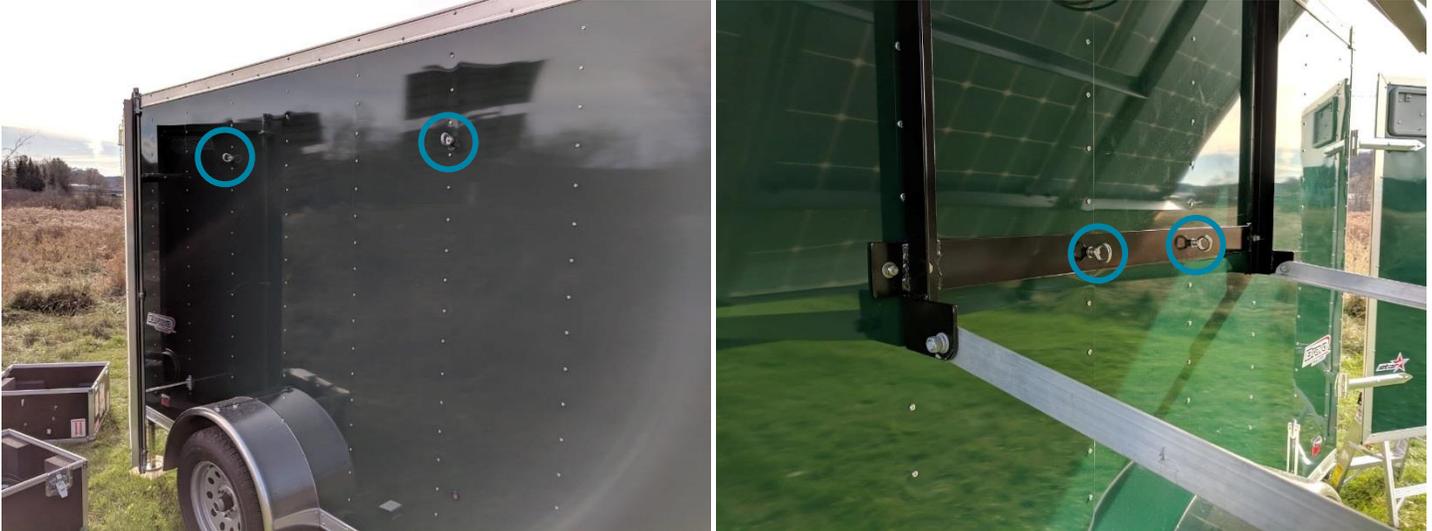




Windcube PV Trailer

Section 4: Anchoring

The trailer ships with four small screw-in earth anchors that can be used if additional stability is desired. There are two anchor points on either side of the trailer:



1. Attach one end of the anchor cable to the anchor points on the sides of the trailer.
2. Unscrew the turn buckle until it is extended as far as it can go.
3. Pull the anchor cables out to the sides at about a 45° angle.
4. Take note of where the end of the cable comes to on the ground. Come in some and screw the anchors straight down into the ground using a metal bar.
5. Attach the anchor cable to the end of the anchor and pull excess cable thru wire rope clips and tighten clips back up.
6. Adjust final tension with turnbuckles.
7. Repeat at the remaining three anchor points and then tighten them all down to be the same tension.



Section 5: Connect Windcube, modem and power monitor

Typically, the Windcube's modem should be moved to the trailer control box to share communications with the PV power monitor.

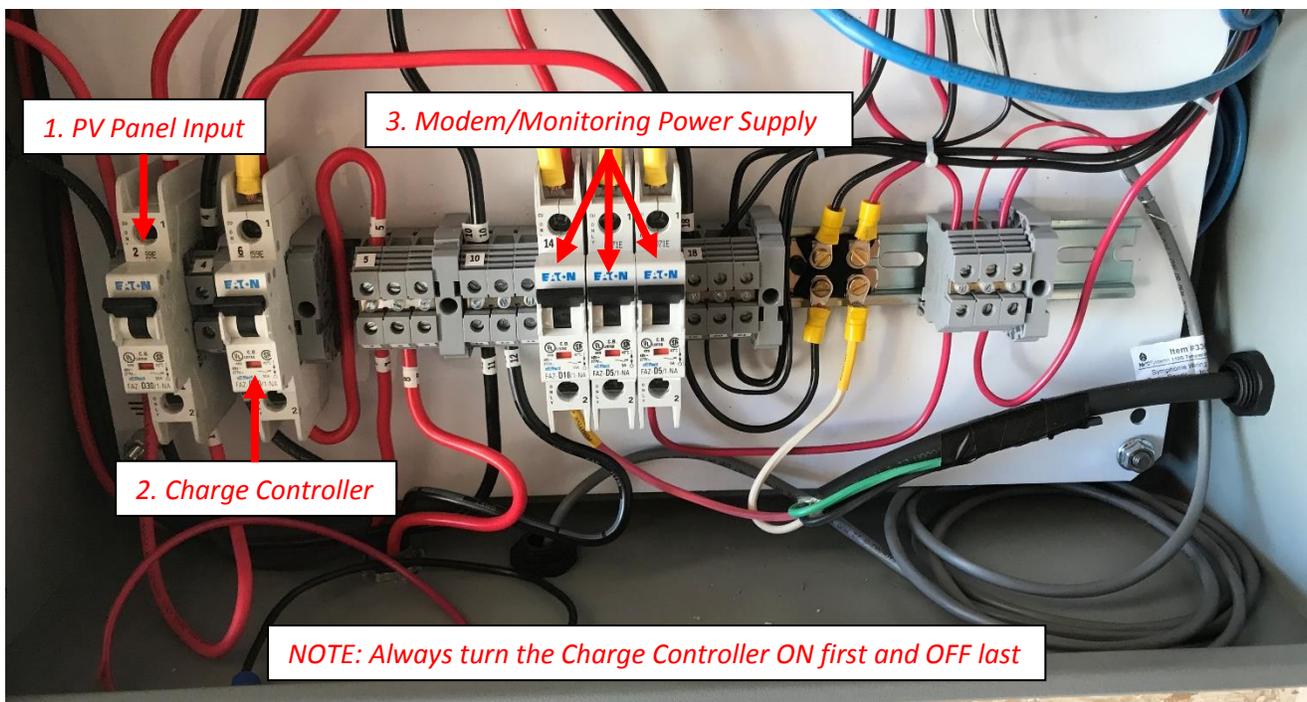
1. Remove the modem from the Windcube
 - a. Open the back door (opposite connection panel).
 - b. Remove the modem Ethernet, antenna and power connections (3/8" wrench for antenna).
 - c. Remove the modem (if not already installed in the trailer).
 - d. Close the back door and open the front door.
 - e. Locate P2 on the bottom rack (4th from right, see picture below).
 - f. Disconnect the WHITE cable from P2 – pull the collar straight back.
 - g. Connect the BLACK cable to P2 – line up the red dots and push the collar straight in.



2. Connect Windcube cables
 - a. DC supply side cable to trap door.
 - b. Ethernet cable to LAN port.
3. Install the antenna on the Antenna mount (see picture of mount in Section 3).
4. Mount modem in PV Trailer shelter box.
 - a. Locate the upper DIN rail, mount modem in place next to the Ethernet switch and connect with an Ethernet cable.
 - b. Connect Power Monitor and Windcube Ethernet cables to the switch.
 - c. Connect 24V DC power cable to modem.

Section 6: Power Equipment On

1. In shelter box, turn on the system by flipping the 2nd breaker first (Charge Controller), followed by the 1st (PV Panel Power Input), and finally the 3rd, 4th, 5th breakers (Modem/Monitoring Power Supply):





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2. Configure modem for cellular service
 - a. Install SIM card
 - b. Connect Laptop to Ethernet switch
 - c. Open browser, navigate to 192.168.1.1
 - d. User = root
 - e. Pass = RNRG
 - f. Configuration > Mobile WAN > Enter APN, username and password (if applicable), scroll down and click Apply
 - g. Test internet service by opening a new tab and navigating to www.google.com

Note: NRG has a number of modem configuration instructions sheets. Please contact Technical Support with the modem model name and the appropriate document will be shared.

3. Turn Windcube on, connect to Laptop port and configure per Windcube the user manual.

Section 7: Transport

The solar panel frame can be secured vertically by removing the struts and letting the frame hang on the top pivot point. The frame can then be locked into place by inserting the long locking arm into the low part of the frame. This will allow the trailer to be moved short distances without disassembling the PV array.



Figure 3: PV Frame Locking Arm

For longer distance trips the panels should be removed and stowed in the trailer.



Windcube PV Trailer

Section 8: Commissioning Report

Summary

Summary of scope of work here...

Preparations ahead of the installation were made by _____, including:

- Enter info here
- Enter info here

The installation was completed XX/XX/XXXX and took approximately X days.

Site Description

Access to the site is via...

The installation site is...(describe site's proximity to other nearby landmarks or features)

The area around the installation site....describe landscape and soil, note any unusual features.

Configuration

General Info

Client Name	
System Installed	Windcube WLS7-XXX; NRG Systems PV/Battery Trailer - XXX

Date of Field Work:		Location:	
Client contact name:			
Telephone			
Email			
Field engineer			
Client participants			



Lidar physical setup and orientation

Site location (internal GPS)	
Site location (handheld GPS)	
Internal compass heading (magnetic north)	degrees
Handheld compass heading (magnetic north)	degrees
Magnetic declination	deg W
Lidar physical orientation, reference true north	
Pitch/Roll	deg / deg
Lidar surface height	1.7 m
Lidar beam angle	28° degrees
Distance to closest met tower	m
Vertical offset (tower base)	< X m
Power source	NRG Systems PV / Battery Trailer
Cellular service	User: / Pass:
SIM SN / Phone Number	89014103270290631886 / 415-629-2860
Modem IMEI	
Modem Login	
Windcube Key Location	
Windcube Transport Case Location	

Lidar Software Setup

Lidar software version	
Statistical averaging interval	10 minutes
Measurement heights (m)	
Time synchronization	
Programmed direction offset (config)	degrees



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Flow Complexity Recognition (FCR) enabled?	
Communicating with WindWeb?	

Trailer Configuration

Trailer Padlock Combo	
PV/Battery Specs	3 x 345W = 1035 W / 600 Ah @ 24v DC
Trailer Hitch and Light Connector Type	2" ball, 4-pin trailer lights
Location of Trailer Title	
Solar Panel Angle	
Battery Monitoring IP Address	
Modem Type / SN / MAC / IMEI	

Local Conditions

- Photo documentation of surrounding terrain and surface features in 45° direction sectors
- Azimuth, distance and elevation angle, as seen from the remote sensing instrument, of nearby met tower
- Estimated magnitude and orientation of any slope at the site
- Written description of surface features/obstacles to the wind flow within visible range, along with estimated distance, height, elevation.

Lidar Software Screen Shots

- Real time wind speed and direction
- CNR
- Acquisition/spectra