



[ COMMERCIAL ]  
INSTALLATION GUIDE

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## How to Use This Guide:

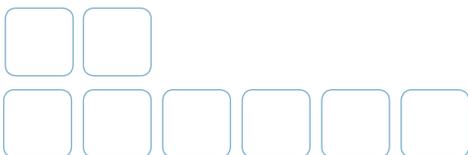
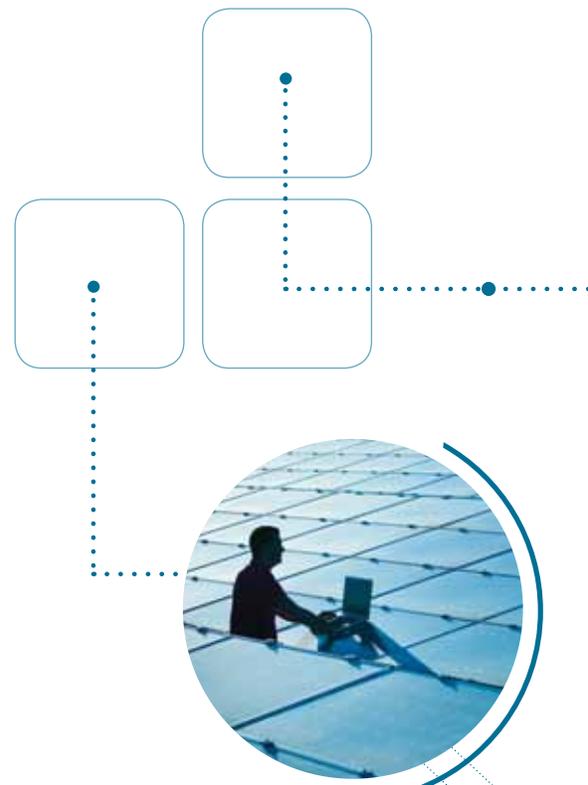
The first section of this guide is designed to assist you with the installation of your DECK Monitoring hardware. The revenue grade meter and AcquiSuite are standard hardware components included with any Commercial Monitoring Solution purchased through DECK.

**Sections c – e** refer to optional add-ons that you may have purchased. Refer to these as needed.

Finally, the second section will help you with the software configuration of your AcquiSuite. If, at any time, you would like to speak with the technical support department at DECK please call: **(503) 395.8817**

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**\* DISCLAIMER:**  
 DECK Monitoring is not an electrical contractor. All installation of electrical hardware must be performed by a licensed electrician. The following installation instructions are provided in good faith. DECK will not be held responsible for any damage to equipment or injury resulting from the installation of this equipment.

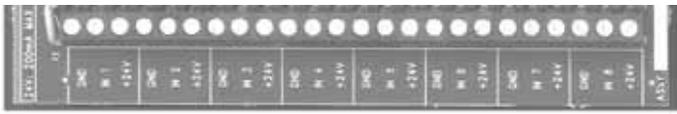


# Hardware Components

## a. Revenue Grade Meter

### 1 Powering Your Meter:

If your meter requires an external power supply it can be taken from and +24V port on the bottom of the AcquiSuite.



: Powering Your Meter  
: Diagram fig.1

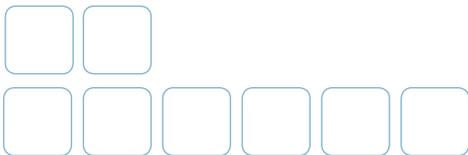
### 2 Supplying Reference Voltage:

For a standard 480 3-phase system each of the three hot conductors must be tapped to supply reference voltage to the meter.

### 3 Attaching your CTs:

Each CT should be wired to the meter and run to the respective conductor.

**\*Note:**  
Please obey polarity on your CTs.



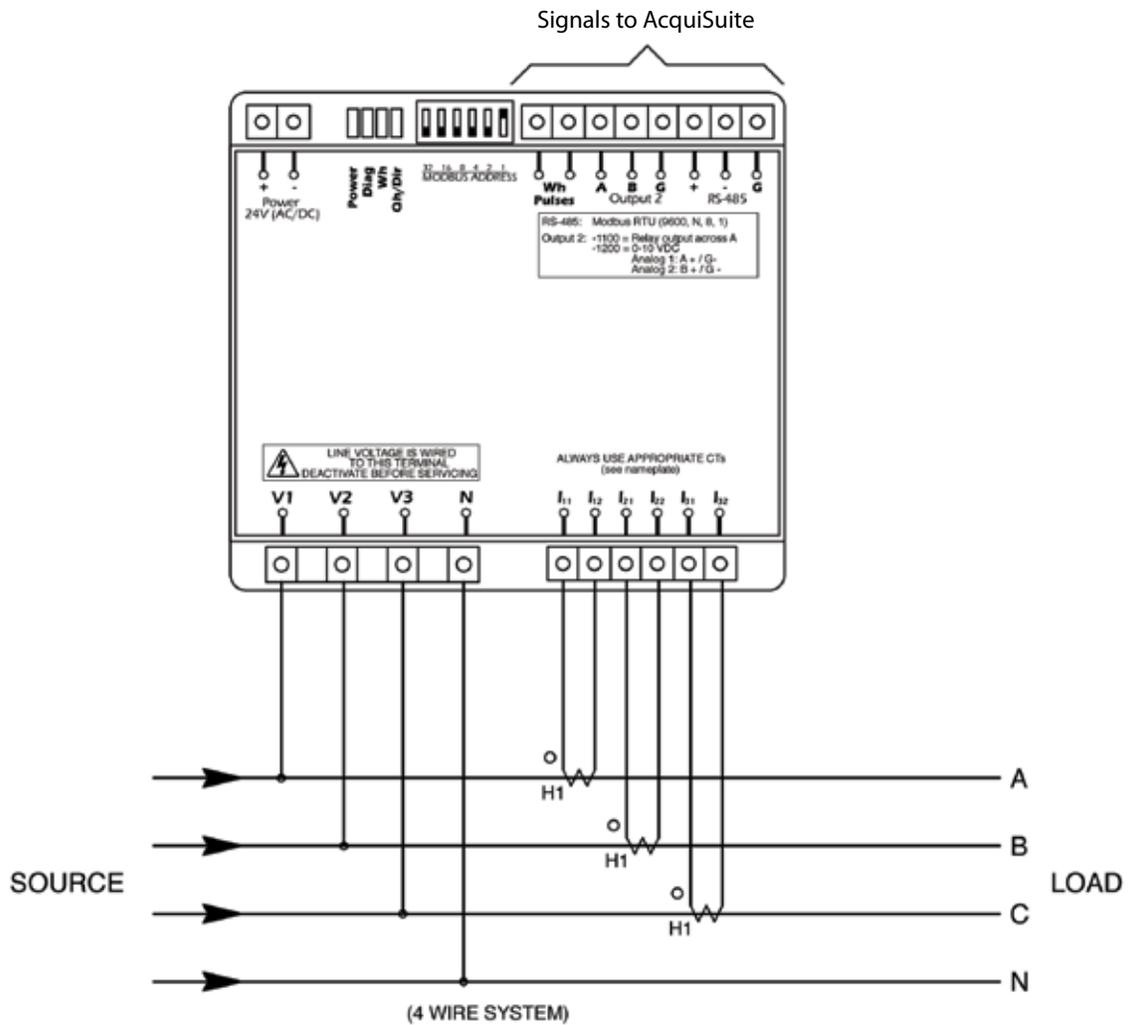
4 Wire the output connections:

The revenue grade meter has 3 Modbus wires that need to be connected to the AcquiSuite: positive, negative, and ground. If the revenue grade meter is the only Modbus device, simply connect it directly to the AcquiSuite's modbus inputs.

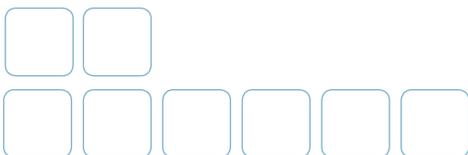
If there are any additional devices in your chain, daisy chain the devices per Modbus specification.

**\*Note:**

The wiring may be different on your system. Please reference your meter's installation guide.



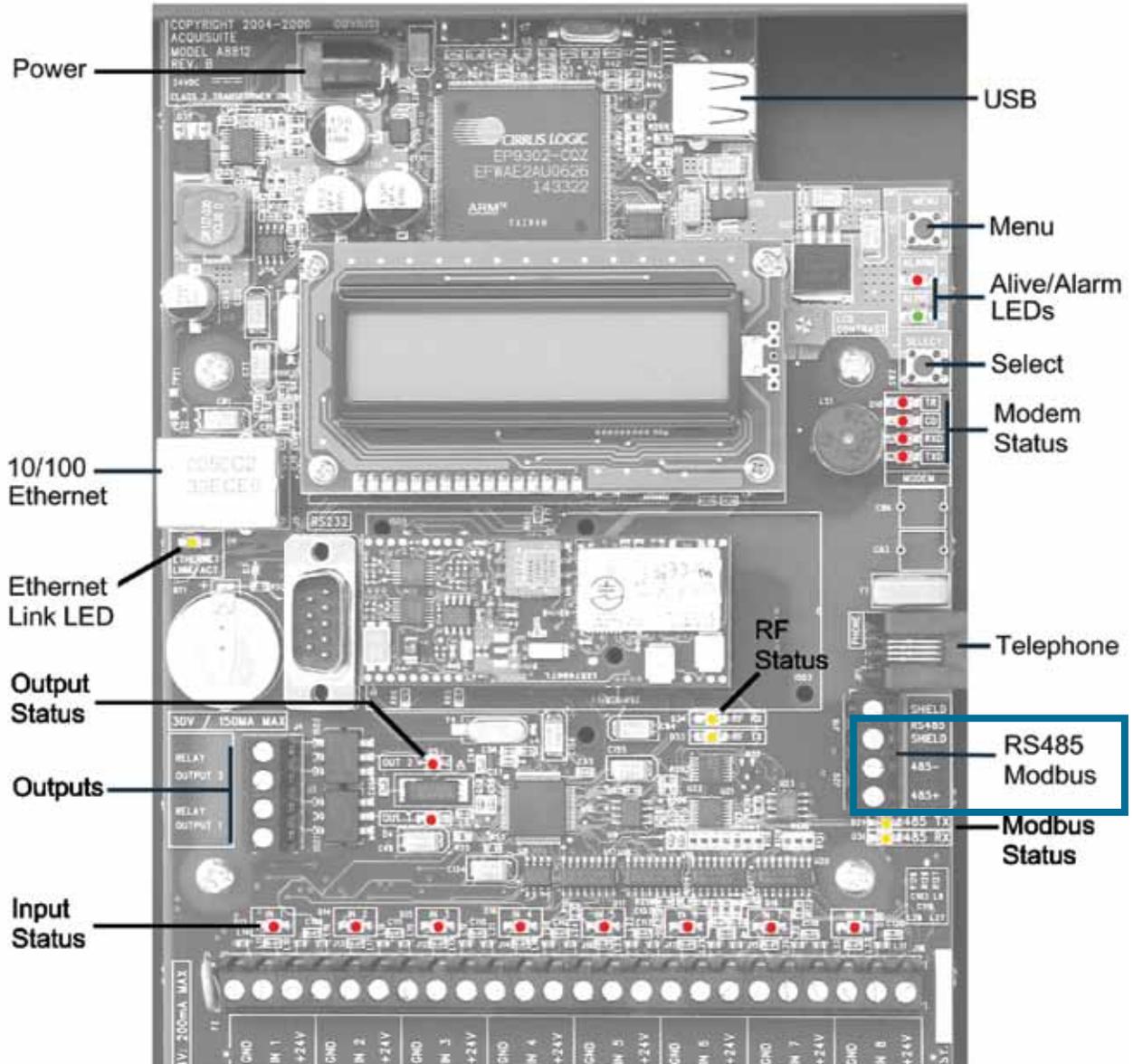
Four-Wire, (Wye), wiring diagram fig. 2



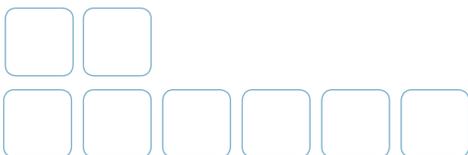
**b. AcquiSuite**

The positive and negative leads from the revenue grade meter run to the positive and negative modbus termination points on the AcquiSuite. (fig.3)

A Cat5e cable must be run from the 10/100 Ethernet port to provide Internet connectivity to AcquiSuite unit.



AcquiSuite A8812 Internal View  
fig. 3



**\*Note:**

The following sections refer to the possible add-ons that you may have purchased for your site through DECK Monitoring. These add-ons are configured using the Modbus protocol to communicate properly with the AcquiSuite unit.

The three most important things to remember when creating a Modbus chain are:

- Each Modbus device must have a unique MODBUS ID.
- Modbus devices are connected in a daisy chain fashion. This means that the input on one device leads to the input on the next.
- The Modbus chain should be terminated with 150Ω 1/4W resistor

**c. Modhoppers**

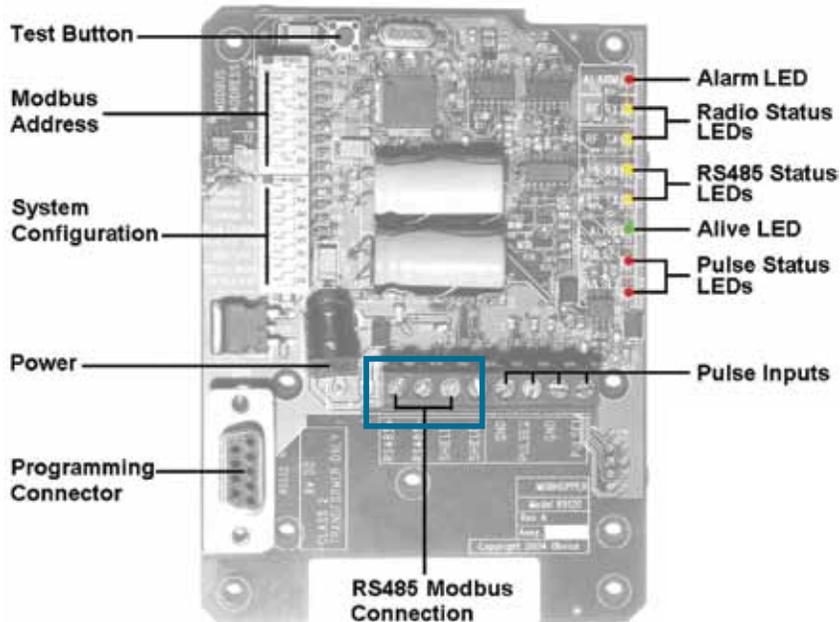
The Modhopper comes with two units: a send and a receive. The receive unit is wired to the Modbus chain.

Connect the provided antennae. Avoid sharp bends in the antennae wire as this will degrade the performance of the unit.

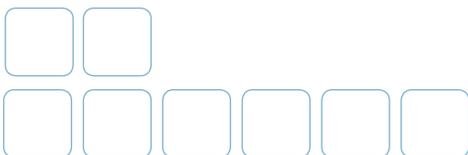
After powering on the unit check that it is functioning as expected by checking the following LEDs:

**Alive:** blinks green once per second.

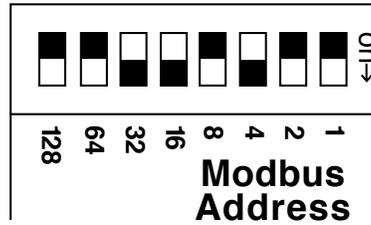
**RS485RX/TX:** should blink about once per second while Modhopper is hooked up to an AcquiSuite unit.



⋮ RS485 Modbus connection  
⋮ fig. 4

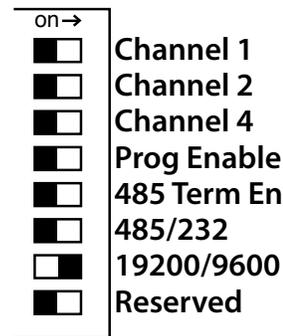


The Modbus address can be set by the Modbus Address dipswitches as shown in (fig.5).



Modhopper  
Dipswitch  
Address.  
fig. 5

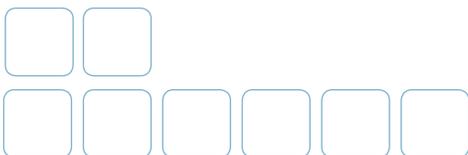
The system setting dipswitches are a powerful set of tools that can assist you while you configure your Modhopper. The channel dipswitches can be used to specify the channel (0-6 only) to be used by the Modhoppers. This can be used to remove interference caused by multiple Modhopper pairs. Channel 7, with all three switches on, is not allowed.



Modhopper Channel  
Dipswitches  
fig. 6

**485 Termination Enable:** enable if the Modhopper is the last modbus device on a chain.

**Baud Rate:** should be set to "on."

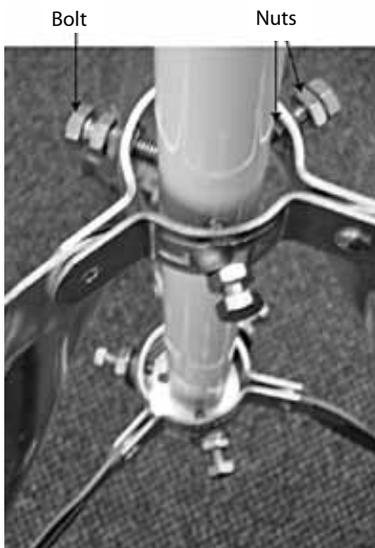


### d. Weather Station

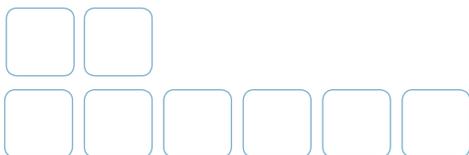
All weather stations come pre-configured to Modbus ID 51.

#### Installation: Mast and Tripod Assembly

- 1 Remove tri-pod antenna from packaging.
- 2 Expand tri-pod legs and insert antenna mast through hole at the top and secure nuts and bolts attached to tri-pod. (fig. 7)
- 3 Place NEMA enclosures flush against the antenna mast, with the bottom resting on the top supports of the tripod legs. Secure the top using one of the four U-bolts provided, tighten to ensure stability. (fig. 8)
- 4 Remove the Temperature or Temperature and Humidity device and using screws and bolts provided, attach the device in an inverted position to the longest of the adjacent sides of the support arm.



Tri-pod bolt and nuts placement for securement  
fig. 7



Using a 5" wrench secure the tripod.  
fig. 8

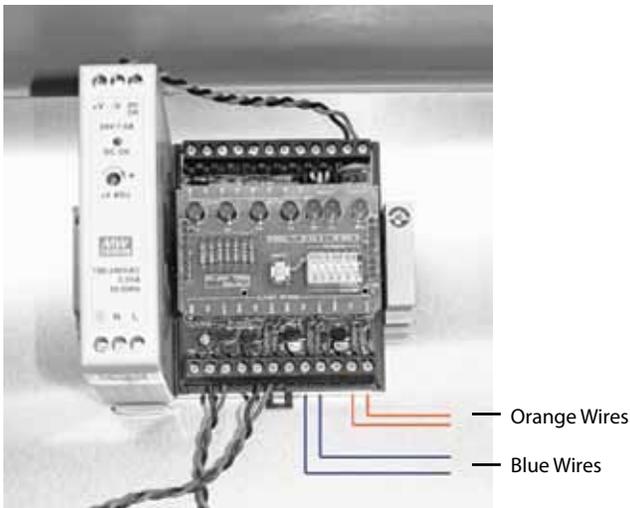
- 5 Approximately 5" from the top of the enclosure is the optimum placement for the bottom of the support arm. Use the other two U-bolts provided to secure the arm directly to the mast via the longer of the adjacent sides (the same side the temperature sensors is attached to, only mounted internally within the enclosure).
- 6 Next attach the Pyranometer to the top of the support arm, assuring alignment with three mounting holes on the arm and the sensor itself. Attach using bolts and nuts provided.
- 7 The final step for installation is simply placing the wind direction and speed sensor over the top of the mast, using attached fastening screws to secure.

#### Pyranometer Alignment

Once removed from the packaging, note the built in levelling system attached to the device. This allows you to set the device level to ensure proper sun exposure. A Pyranometer is level when the bubble is in the center, or as close as possible, of the leveling gauge.

### Wiring Instructions: Temperature/Temperature & Humidity

Both the Temperature and Humidity analog sensors in both devices (whether just the temperature, or encompassed in one) are not polarity sensitive. What this means is that either of the lead wires can be attached to the +24V power supply or the Analog input interchangeably. So for the temperature and humidity sensor which has two blue (humidity) and two orange (temperature) wires coming from the device, either one of the blue wires and either one of the orange wires can be attached to any of the inputs (typically A1 or A2 respectively), and the remaining blue and orange wires to any available +24V terminal.



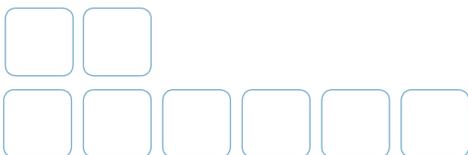
Temperature & Humidity  
fig. 9

### Pyranometer

The Pyranometer is polarity sensitive. Improper connection to this device may destroy the sensor. The Pyranometer uses an Amplifier to convert the standard millivolt signal to a 4-20 mA. Locate the device labeled UCLC inside of the large NEMA enclosure. Unscrew the amplifier lid and make note of the two sets of paired colored screw terminals, (Black & White and Red & Black). Locate the leads coming from the Pyranometer (center conductor shield) and insert them through the gasket on the left of the device correlating with the black & white screw terminals. Attach the center conductor lead (clear coat) to the white screw terminal and the shield (bare) lead to the black screw terminal.

### Power Supply

**No power cable is provided** for providing power to the weather station. To power the device, the user needs to either supply the device with 110-120VAC, in which case we would install the power supply as shown in fig. 9; otherwise the user would need to provide 24VDC to a terminal strip where the power can be branched off to power the respective devices.



### e. String Monitoring

#### Hardware Installation:

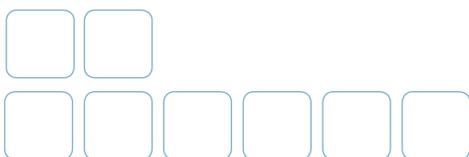
- 1 Mount the A89DC-08 inside the electrical enclosure. Be sure to provide enough room to route the load wires through the Hall effect sensor openings.
- 2 Attach the power supply to the A89DC-08. Be sure to observe the polarity. Note: Power can be disconnected by removing the screw terminal plug from A89DC-08 power connection socket.
- 3 Connect the RS485 Modbus network loop. Do not ground the RS485 shield inside the electrical panel. All RS485 and 24vdc power wires, including the shield should be insulated to prevent accidental contact to high voltage conductors.
- 4 Power-up the A89DC-08. Observe the LEDs to confirm the device is operating.

**Alive (green):** blinks once per second while the system is operating correctly.

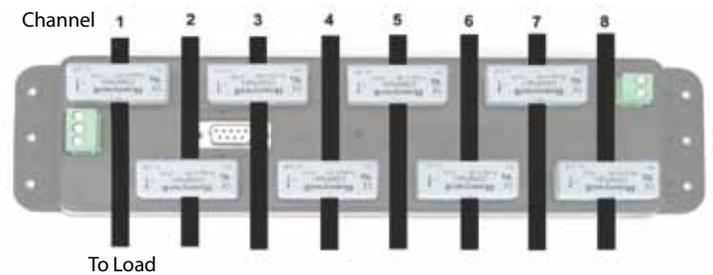
**RS485 RX:** The RX lead should blink whenever a Modbus query is sent on the RS485 loop. When the A89DC-08 is attached to a AcquiSuite or a Modhopper device, the RX lead should blink about once per second.

- 5 Set the Modbus ID. The default Modbus address of the A89DC-08 is set to 1. The Modbus ID can be changed from within the AcquiSuite unit.
- 6 Once the A89DC-08 is powered up and communications have been confirmed, the DC load wires should be installed. Remove power from the A89DC-08 before installing the load wires.

**WARNING: Disconnect power and lock out all power sources during installation. DO NOT CONNECT VOLTAGE OR CURRENT INPUTS LIVE**



- 7 Each DC load wire should be run through the opening in the A89DC-08 Hall effect sensor. The arrow on the top of the sensor indicates the direction of current flow, and should point in the direction of the load. In a solar PV system, the arrow should point towards the inverter.

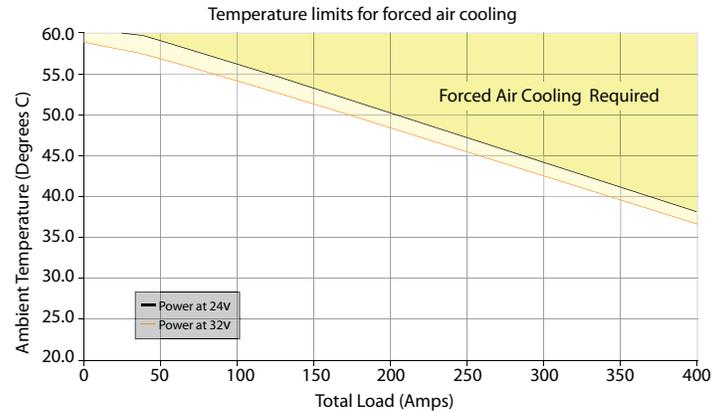


A89DC-08 Hall Effect Sensor  
fig. 10

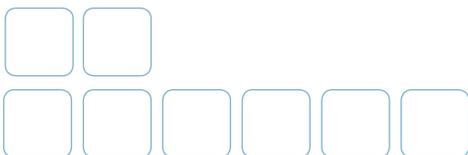
Temperature:

The A89DC-08 may generate a fair amount of heat depending on the total current load being monitored. If the A89DC-08 is to be mounted in a sealed enclosure outdoors, care should be taken to ensure the device does not overheat. The heat generated by the A89DC-08 is proportional to the total of load current being monitored. In situations where high load current is to be monitored, and the ambient air temperature will be above room temperature, forced air cooling will be required. The chart in (fig.11) shows this requirement.

When using the chart shown in (fig.11), the total current being monitored on all 8 channels should be averaged over a one minute period. The chart assumes long term current levels at a steady rate. Infrequent peaks lasting less than 30 seconds (such as inrush current) should not be used for this calculation. For example, if the power being monitored will be a maximum of 200AMPs (total of all channels) and the ambient air exceeds 50c, forced air cooling will be required.



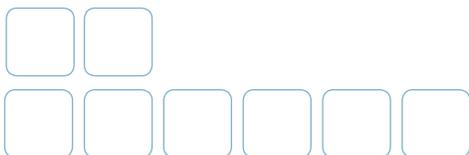
Temperature limits graph for forced air cooling fig. 11



## Software Configuration

Your AcquiSuite will automatically attempt to find a DHCP server and retrieve an IP address. For most applications this will be sufficient. If your network requires a static IP see Appendix 1:Static IP.

- 1 When the AcquiSuite has found an acceptable IP address it will display it on embedded LCD screen. On any computer on the same network as the AcquiSuite , open a web browser and direct it to the IP address that the AcquiSuite displays. You will be greeted by the '*AcquiSuite-Data Acquisition Server*' page (fig. 12).
- 2 Click on the link. You will be asked for your login credentials. The default login/password is admin/admin.
- 3 Now that you've logged in you will be redirected the '*Welcome*' page. On the left is the navigation pane where we will choose which area of the AcquiSuite we wish to configure. The right pane in the '*Welcome*' page displays information about different areas and allows us to change settings. (fig. 13)
- 4 To change your password click on '*Accounts*' in the left pane to expand the list. Now click on the '*Admin*' user to get to the '*Login Settings*' page. By clicking on '*Change Your Password*' you can change your password from the default. (fig. 14)



### AcquiSuite - Data Acquisition Server

[Click here for System Configuration](#)



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fig. 12



fig. 13

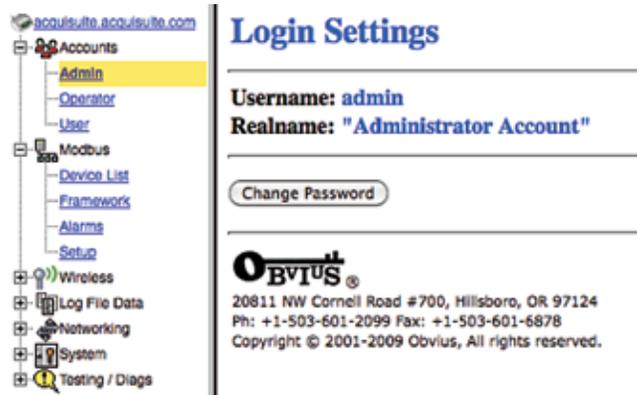


fig. 14

5 Next, open the 'Modbus' list and click on 'Device List'. Here you will find a list of all your active Modbus devices. Check this list against the list of Modbus devices on your network. Verify that the status for every device is listed as 'OK' and that the type of device is correct. (fig. 15)

6 Now we can give our devices logical names to help in reporting and further troubleshooting. Choose your first device and click on its Modbus ID (listed under 'Device' column). (fig. 16)

7 Scroll down to the bottom of the page, (the length of page is determined by device type), and click on 'Configure'. In the 'Device Name' field enter a logical name that will help you to identify the device. Repeat for each device that you have in the Modbus loop. (fig. 17)

8 At this point you have successfully configured your AcquiSuite. The only step now is to push your data to DECK Monitoring servers and call DECK at (503) 395.8817. To forward your data, expand the 'Log File Data' and choose 'Setup/Upload'. Click on 'Upload Data Now' and your upload will commence. Clicking on 'View Transfer Log' will let you watch the transfer progress as data is transferred from your local AcquiSuite to the DECK servers. (fig. 18)

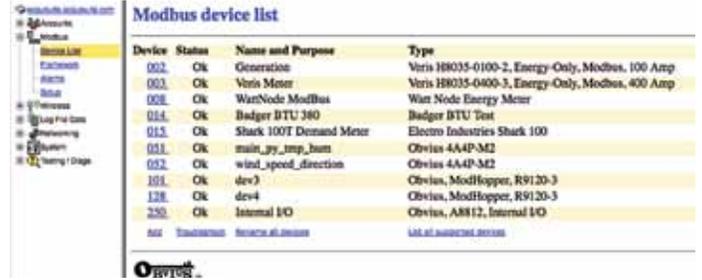


fig. 15

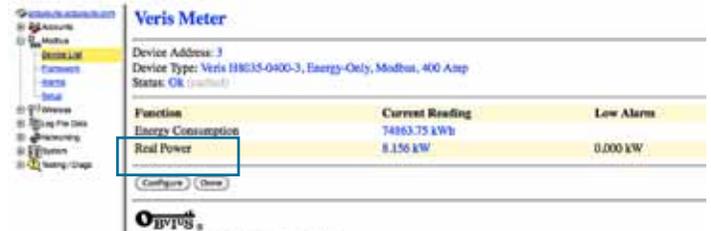


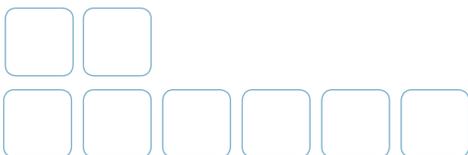
fig. 16



fig. 17



fig. 18



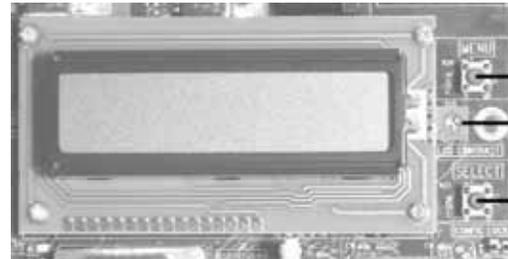
## Appendix 1: Static IP

### \*Note :

▶ You will need the following to complete this section:

- Valid IP address for your network.
- Subnet Mask.
- Gateway IP address.
- DNS IP address.

If you do not know any of these contact your Network Administrator.



Menu Button

LCD Contrast

Select Button

⋮ The Acquilite LCD

- 1 Power on your AcquiSuite. The following message will appear on the built-in LCD screen.

```
AcquiLite Ready
192.168.40.44
```

- 2 This indicates that the AcquiSuite is responding properly and ready to be configured. Locate the menu and select buttons.

- 3 Press the Menu button once to get to the TCP/IP Configuration Menu.

```
[Main Menu]
TCP/IP Config
```

- 4 Press the Select button once to get to the IP Configuration Menu.

```
[TCP/IP Config]
IP Address
```


- 5 Press the Select button one more time to get to the IP address.

```
[IP Address]
192.168.40.44
```

At this point, the cursor on the display will be blinking on the first number in the IP address on the second line.

To change the number, press the menu button and the display will cycle through the digits 0-9 as well as ".". Once the correct digit is displayed, press the select button to advance to the next digit and repeat the process until all the digits are correct.

Set the [Netmask], [Gateway], and [DNS Server] addresses repeating the previous steps. The only change is that after reaching the TCP/IP menu, press the Select button multiple times to cycle to Netmask, Gateway, and DNS Server menus.