

Weather Station Installation Manual *(last revised 2009-10-21)*

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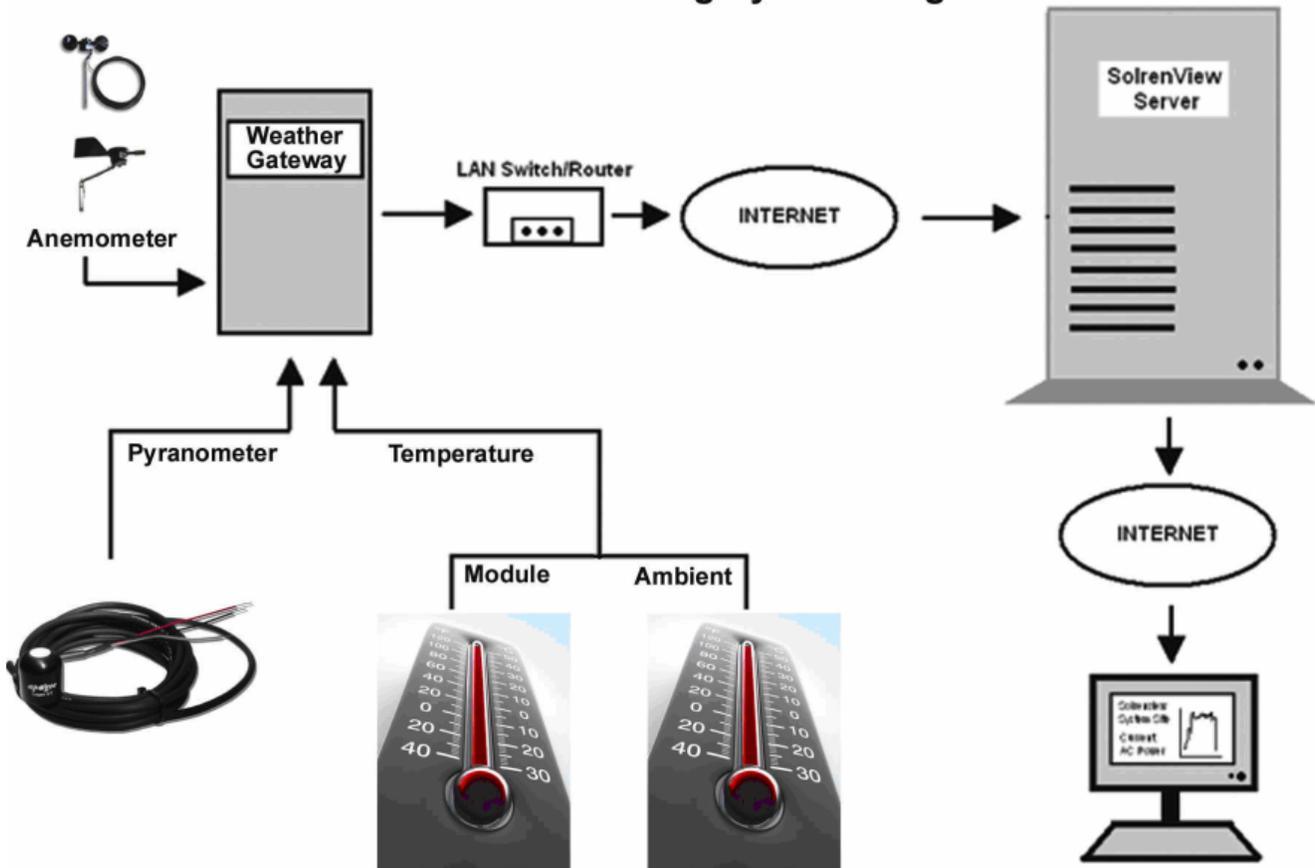


1. Weather Station Overview

The Weather Station collects environmental real-time data at the PV system site, and sends it to SolrenView™ server (<http://www.solrenview.com/>).

The data is graphed in the customer's web browser and further used to generate alarms to the customer if the PV system is underperforming.

Weather Data Monitoring System Diagram



All environmental sensors are directly wired into the Weather Data Monitor that resides inside a NEMA4 rated polycarbonate box.

The basic Weather Station package consists of the following set of sensors:

- PV Module Temperature Sensor
- Ambient Temperature Sensor
- Sunlight Sensor (pyranometer)

The optional Wind package comes with two additional sensors:

- Wind Speed Sensor
- Wind Direction Sensor / Vane

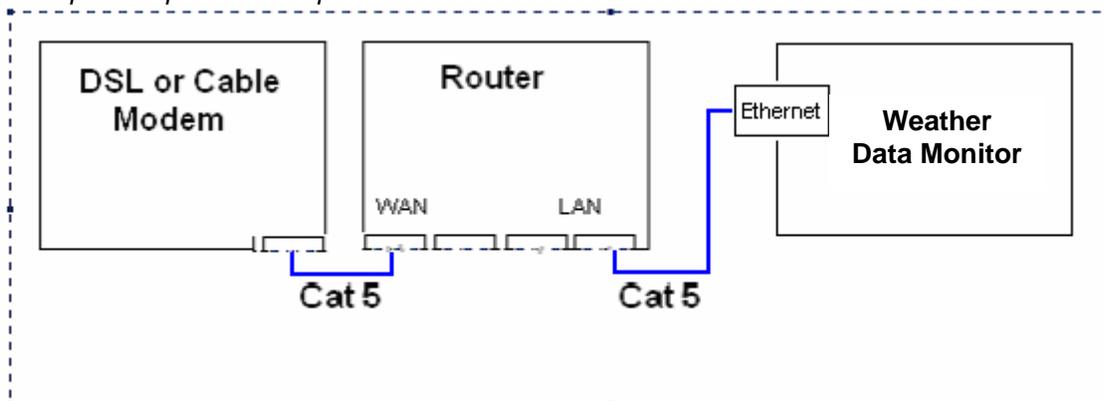
The Weather Station collects real-time data samples at a 1-minute interval. The data is then sent over the Internet to the SolrenView™ server as soon as a connection can be established. Data samples received by the server are stored and retrieved by the web server whenever a user queries the information with a browser (see [Viewing Web-Enabled Data](#)).

2. System Requirements

For remote monitoring to be possible, the system must have a reliable Internet connection via an Ethernet port. This usually requires the service of an ISP (Internet Service Provider). Please inquire about ISP services available in your neighborhood if you do not have one already (not included in the SolrenView™ package).

The Weather Station requires a physical connection via a Category 5 cable to the LAN (Local Area Network). A common setup is a router/switch to the Internet connection, and a Cat 5 connecting the Weather Data Monitor to one of the router/switch's ports.

Example: Simple LAN setup



Other remaining requirements include:

- A working Photovoltaic system
- Filled-out site survey (See [The SolrenView™ Site Survey](#))
- Purchase of Weather Monitoring package from Solectria Renewables.



3. The SolrenView™ Site Survey

In order to have enough information to customize a web site and enable Weather Monitoring, the site survey must be filled out and turned in *before the weather station is shipped out*. Below are fields expected on the survey, please fill it out to the best of your knowledge. Form may be submitted either through email or fax (see [Contact Information](#)). The site survey may alternately be downloaded here: [SolrenView Site Survey](#)

Weather Station LAN Configuration

DHCP mode may be selected to let the Weather Data Monitor automatically be assigned an IP from the local network **DHCP-enabled** router. If Local Area Network is not DHCP-enabled, a static local IP address must be specified in the survey. In most cases, DHCP mode is appropriate unless a fixed IP is preferred.

Please consult with IT personnel. For more information see [More about DHCP vs Fixed IP mode](#).

Installer Contact Information

Company Name, website:

Contact Person (email, phone#):

Email for Event Notifications:

Installation Site Details

Site Title:

Street Address:

City, State, Zip Code:

Time Zone (Atlantic, Eastern, Central, Pacific, etc):

Expected Install Date:

Wind speed and direction option (Y/N):

Weather Station LAN Configuration (please consult with local IT personnel, do not leave blank!)

DHCP (Yes/No)

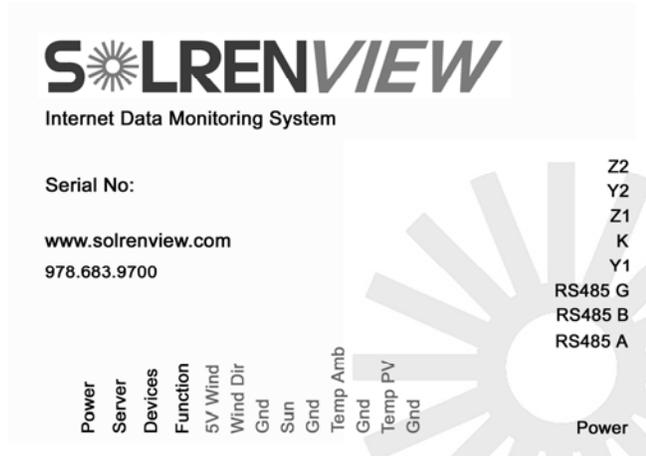
Data Monitor IP (if DHCP=No):

LAN Router/Gateway IP (must be provided if DHCP=No):

IT/Network Administrator Contact:

4. Installing SolrenView™ Weather Station

Refer to diagram below for the **Quick Installation Guide**:



Support#: 978-683-9700

LED Indicators

Devices: Every minute, it blinks orange once if sensor(s) are detected

Server: Blinks green once when packet is sent to SolrenView server

Power: Always on orange when AC power is applied.

Function: Heart Beat.

◆ **Connect network communication:**

Plug Cat5 cable to Ethernet port.

◆ **Enable Weather Monitoring:**

Make connections on monitor top to bottom:

(red, green, black) (Wind Option only)

(red, black/clear)

(black, black)

(black, black)

Make connections on bottom (Wind Option only):

Y1:red

Z: black

◆ **Apply 120V power**

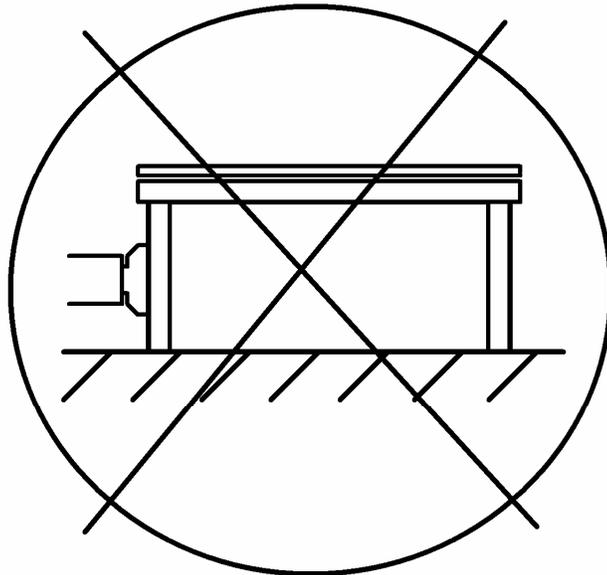
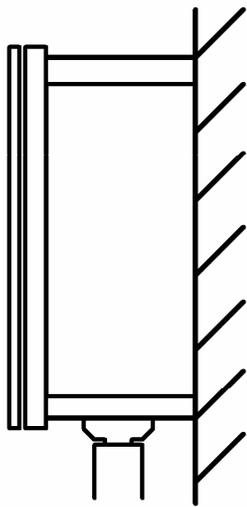
Connect L, N, GND to corresponding screw terminal on power supplies and turn on AC breaker.

Outdoor mounting of the Weather station enclosure

The 12 x 10 x 4 inch NEMA4 rated Weather Station enclosure is intended to be mounted in any nonhazardous outdoor location.



A sheltered (from falling rain and direct sunlight) location, such as under the module or under a north-facing awning is preferred, since it will extend the product's life.



The Weather Station enclosure should be mounted as close as practical to the Sunlight Sensor (pyranometer) to ensure best measurement accuracy.

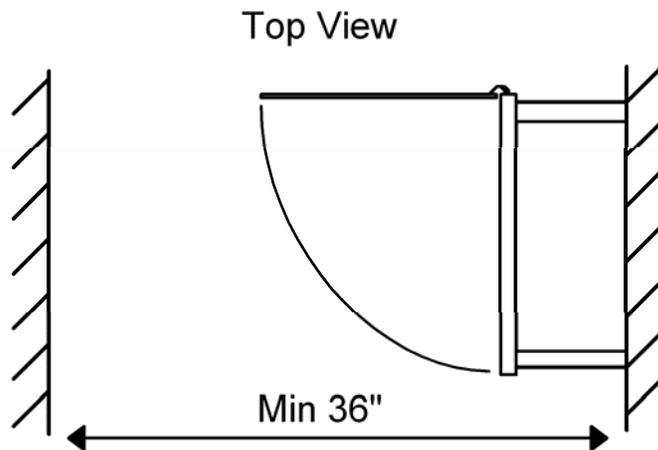
To maintain its NEMA rating the enclosure must be mounted vertically against a solid structure, using the four metal ¼-20 x 0.25 threaded inserts or supplied mounting ears.

Warning: Any other orientation will void the product warranty and shorten the products life.



Only the bottom side of the Weather Station enclosure should be penetrated by listed conduit hubs or connectors with appropriate environmental rating. The maximum metallic conduit diameter is ¾ in.

Allow 36 in. clearance to the front and 4 in. to the side of the enclosure for best serviceability.

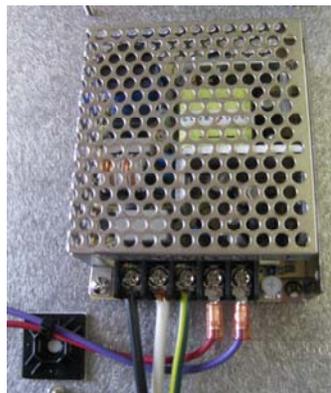


Wiring AC power to the internal Weather Station 24VDC power supply

This step of the installation process has to be performed by a licensed electrician.

It is recommended that a metallic conduit or raceway be used to bring 120VAC, 208VAC or 240VAC power into the enclosure (bottom center), where in agreement with local code.

- Open the hinged cover of the mounted enclosure.
- Unplug the white power supply connector on the bottom right and loosen the two SEM screws on the right side to flip the Weather Data Monitor to the left and to gain access to the 24VDC power supply underneath.
- Connect phase (L) and neutral (N) and ground wires to the corresponding screw terminals. A maximum AWG of #10 is recommended. In the case of a 208/240VAC service, the second phase has to be landed on the (N) terminal, while not connecting the neutral.



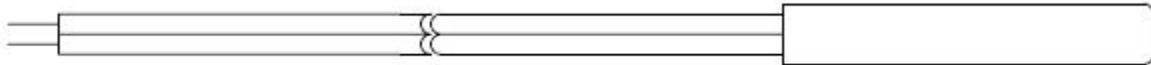
- Tug on all five power supply connections to verify tightness of the connections.

Installation of the PV Module Temperature Sensor

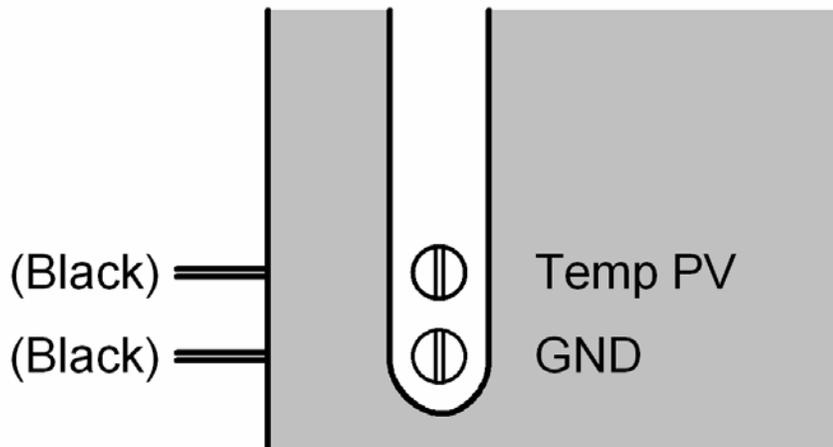
The PV Module Temperature Sensor can be taped to the backside of any PV module in the array, using the supplied Metal Tape.

A metallic or non-metallic conduit or raceway can be used to protect the PV Module Temperature Sensor cable on its way to the bottom right of the Weather station enclosure.

- Cut the PV Module Temperature Sensor cable to required length, allowing enough length for the Weather Data Monitor to be flipped back down into its resting position.
- Split the cable and strip back the first ¼ inch of each conductor.



- The Ambient Temperature Sensor is not polarized. Connect one of the two wires to the “Temp PV” terminal and the other one to the “GND” terminal just below it.



- Tug on both wires to ensure tightness of the connection.

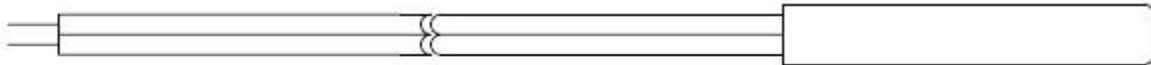
Installation of the Ambient Temperature Sensor

The Ambient Temperature Sensor comes factory-assembled inside the radiation shield. The radiation shield bracket can be mounted to a pipe (1.0 - 2.0 in. diameter), using the supplied U-bolt.

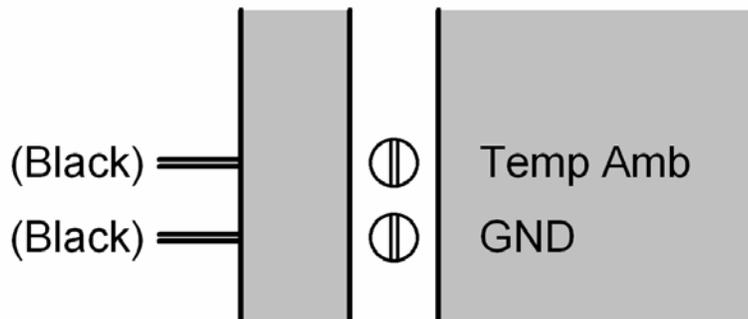
The radiation shield can be installed anywhere in the vicinity of the PV array. It is recommended to place the Ambient Temperature Sensor on the north side (in the northern hemisphere) of the array, otherwise you must provide array shading setback.

A metallic or non-metallic conduit or raceway can be used to protect the Ambient Temperature Sensor cable on its way to the bottom right of the Weather station enclosure.

- Cut the Ambient Temperature Sensor cable to required length, allowing enough length for the Weather Data Monitor to be flipped back down into its resting position.
- Split the cable and strip back the first ¼ inch of each conductor.



- The Ambient Temperature sensor is not polarized. Connect one of the two wires to the “Temp Amb” terminal and the other one to the “GND” terminal just below it.



- Tug on both wires to ensure tightness of the connection.

Installation of the Sunlight Sensor (Pyranometer)

The Sunlight Sensor is a Si-cell pyranometer. It is calibrated to measure the total direct and diffuse shortwave sunlight. Please call Solectria Renewables tech support if you want to use the Sunlight Sensor on with thin-film module array.



Picture courtesy Apogee Instruments, Inc.

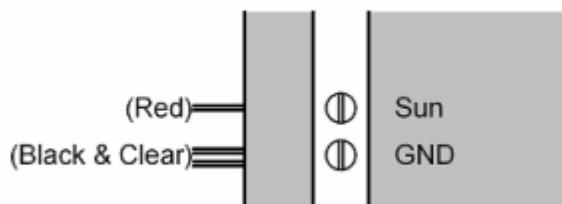
Install the sunlight sensor as close as possible to the Weather Station and do not extend the supplied wire length.

The sunlight sensor must be installed at the same azimuth and tilt angle than the PV array. **Do not mount the sensor level.** Drill a 3/16 in. hole into the bottom side of the aluminum frame of a PV module and use a 10-32 x 0.5 in. screw with lock washer to attach the sensor.

If different module strings have different orientations, choose the bottom of a module that is most representative of the array (average string orientation).

A metallic or non-metallic conduit or raceway can be used to protect the Sunlight Sensor cable on its way to the bottom right of the Weather station enclosure.

- Cut the Ambient Temperature Sensor cable to required length, allowing enough length for the Weather Data Monitor to be flipped back down into its resting position.
- Split the cable and strip back the first ¼ inch of each conductor.
- The Ambient Temperature sensor is polarized. Connect the red conductor the screw terminal that is marked “Sun”. Twist the black and clear conductor together and connect them to the “GND” terminal just below it.



- Tug on all three wires to ensure tightness of the connection.

Installation of the Wind Direction Sensor / Vane (Wind option only)

The vane is balanced and nearly friction free. Mount the vane leveled in unobstructed air on the north side (in the northern hemisphere) of your PV array, otherwise you must provide array shading setback.

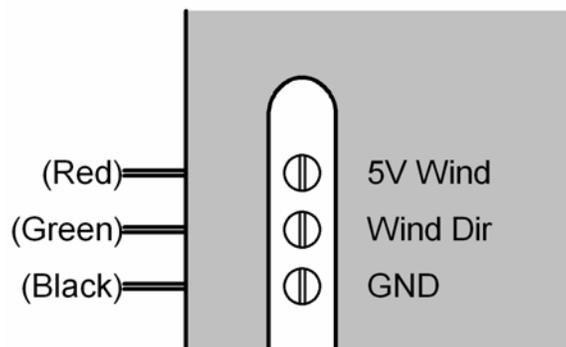


Picture courtesy inspeed.com, LLC

Use the two mounting holes in the offset bracket to mount the vane.

A metallic or non-metallic conduit or raceway can be used to protect the Wind Direction cable on its way to the bottom right of the Weather station enclosure.

- Cut the Wind Direction cable to required length, allowing enough length for the Weather Data Monitor to be flipped back down into its resting position.
- Split the cable and strip back the first ¼ inch of each conductor.
- The Wind Direction sensor is polarized. Connect the red conductor to the screw terminal that is marked “5V Wind”, connect the green conductor to the screw terminal marked “Wind Dir” and black conductor to the “GND” terminal just below it.



- Tug on all three wires to ensure tightness of the connection.

You must perform a true north calibration with your own compass and the Weather Data Monitor’s LCD/keypad. Do not use the mechanical calibration procedure described in the Vane’s owner manual.

Installation of the Wind Speed Sensor (Wind option only)

The Wind Speed sensor is balanced and nearly friction free. Mount the Wind Speed sensor leveled in unobstructed air on the north side (in the northern hemisphere) of your PV array, otherwise you must provide array shading setback.

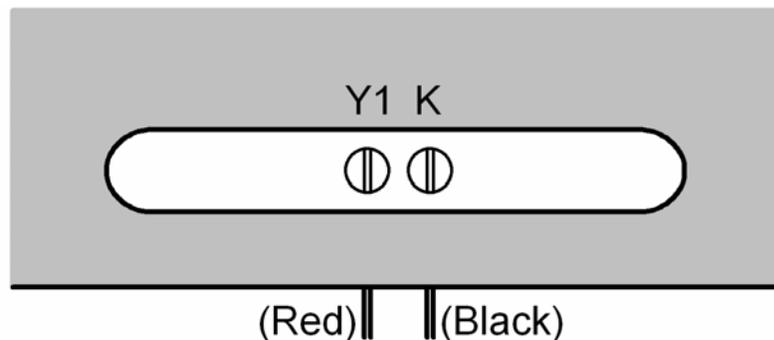


Picture courtesy inspeed.com, LLC

Use the two mounting holes in the offset bracket to mount the Wind Speed sensor.

A metallic or non-metallic conduit or raceway can be used to protect the Wind Speed Sensor cable on its way to the bottom right of the Weather station enclosure.

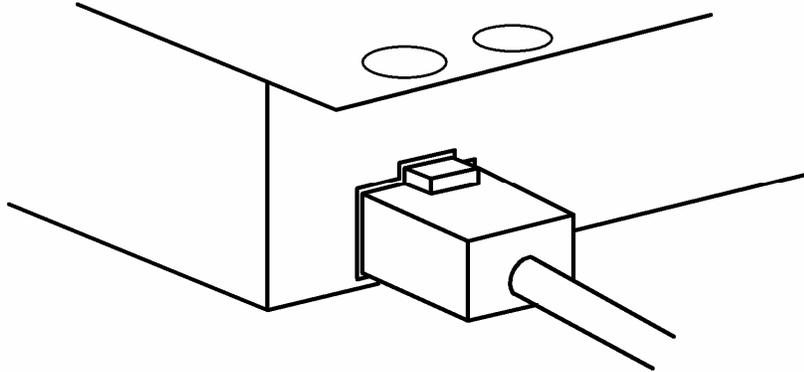
- Cut the Wind Speed Sensor cable to required length, allowing enough length for the Weather Data Monitor to be flipped back down into its resting position.
- Split the cable and strip back the first ¼ inch of each conductor.
- The Wind Speed sensor is not polarized. Connect the red conductor to the screw terminal that is marked “Y1” on the bottom of the Weather Data Monitor, and the black conductor to the screw terminal marked “K”.



- Tug on both wires to ensure tightness of the connection.
- Dress all the wires neatly with zip-ties and screw the Weather Data Monitor back down into its resting position.

Ethernet Connection

Once the wires have been connected correctly to the terminal blocks, connect the CAT 5 cable to the Ethernet port of the Weather Data Monitor. See [Example LAN Diagram](#).



A metallic or non-metallic conduit or raceway can be used to protect the Ethernet cable on its way to the bottom left of the Weather station enclosure.

****Note: Blinking of the LEDs on the Ethernet port (green, orange) only indicates the existence of a physical connection. This does not guarantee that a successful outbound network connection if the logical IP configuration (DHCP or LAN gateway, etc) has not been configured properly. Please see [IP Configuration](#) for more information and [Quick Installation Guide](#) for the LED indicators.**

Functional test of all sensors

You must test all sensors using the keypad/LCD of the weather station after all sensors, AC power wires, and Ethernet are installed. If the LCD shows the correct values, the same correct values will be displayed in your web-view, as soon as an internet connection is established.

- Turn on AC breaker; the LCD must light up and start rotating through information
- Once there is Ethernet activity, the LED near the Ethernet port on the Weather Data Monitor will blink green.
- In full sun, the PV module temperature is expected to be 20 – 40C higher than the displayed ambient temperature. No calibration is needed or possible.
- The ambient temperature must show realistic value. No calibration is needed or possible.
- The light sensor must show non-zero value in daylight. Use inverter output power display to estimate expected light level ($1100 \text{ W/m}^2 = \text{full power}$). Cover sensor with your hand to make the value go to zero. No calibration is needed or possible.
- As you rotate Wind Direction Sensor 360 degrees, the display must follow. Hold the Vane so that the golden nose is pointing to geographic north and execute the “Set Wind Dir” function in the LCD menu to calibrate out the mounting orientation.
- Spin the Wind Speed sensor. The display must show a number > 0 mph. Hold the Wind Speed sensor still. The display must show 0 mph.

5. Viewing Web-Enabled Data

With a web-enabled browser (ie Internet Explorer, Mozilla Firefox) open a page to <http://www.solrenview.com>

Click on ‘Live Sites’ at the top of the page, and a list of public system sites will be displayed. If your site isn’t listed yet, please call to check on the status of your site’s availability.

6. Alarm/Event Notifications

To be notified of system-related events, be sure to specify email address under the site survey/PO checklist.

To get notification through SMS, the 10-digit phone number and service provider must be provided. Ie 978-123-1234 (T Mobile)

5. Weather Station LCD Display

Button Description

ESC: To move up a level from the current menu.

↑↓: To scroll up/down the individual menu items

↵: To enter into selected menu.

Main/Default Screen

In this mode, the screen rotates between the live measurements from the external sensors.

Solar Irradiance
567.0 W/m²

Press any of the following keys to move from the main/default screen into the Start Menu

↑↓↵

To enter into selected menu item, press the ↵ key.

Start Menu

1. Measurements
2. Monitor
3. Sensors
4. Info

Measurements

Displays the data retrieved from the sensors. Use the ↑↓ buttons to move up and down the list:

Ambient Temp.
Module Temp.
PCB Temperature
Solar Irradiance
Wind Direction
Wind Speed

Pressing ESC will take the screen back to the start menu.

Note: data will only be available when sensor is connected

Monitor

Displays monitor settings that may be modified with the keypad.

- | | |
|--------------|--|
| 1. LAN | <i>Local Area Network configuration, applicable only for SolrenView monitoring</i> |
| 1. DHCP Mode | <i>See section on DHCP</i> |

- | | |
|-----------------------|--|
| 2. Static/Fallback IP | <i>If DHCP is turned on, this is then used as the fallback IP</i> |
| 3. Gateway IP | <i>IP address of LAN's default gateway.</i> |
| 4. Netmask | <i>Subnet mask</i> |
| | |
| 2. Date/Time | <i>Manual time set. This may be overwritten by scheduled NIST updates.</i> |
| | |
| 3. Reboot | <i>Reboots the monitor</i> |
| | |
| 4. Reset All | <i>Settings are cleared to factory defaults.</i> |

Sensors

Configure temperature display and calibrate wind direction.

- | | |
|-----------------|---------------------------------------|
| 1. Temperature | <i>Toggle between Deg C and Deg F</i> |
| 2. Set Wind Dir | <i>Calibrate wind direction</i> |

Note: To calibrate wind direction, the sensor must be connected/installed.

Info

Entering this will replay the info displayed during startup.

8. Contact Information

For more help and inquiries, please contact Solectria Renewables

Tel 978-683-9700

Fax 978-683-9702

or email

support@solrenview.com

sales@solrenview.com

9. Appendices

Appendix A: IP Configuration/Troubleshooting of the SolrenView Data Monitor

Reconfiguring the IP settings of the data monitor is only necessary if the data monitor is unable to connect to the SolrenView server, which can be verified by viewing the system's web status page, see [Status Indications](#).

Other reasons may include switching IP mode (DHCP to static IP address mode and vice versa), or any other necessary adjustments to the monitor's network configuration.

In order to configure the monitor's network settings, at the very least its IP address must be determined in order to access its web interface for manual IP configuration.

Step 1) Find the LAN IP address of the SolrenView Data Monitor

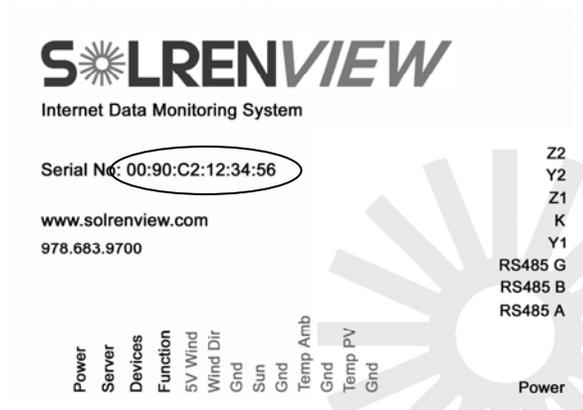
Skip to [Step 2](#) if the monitor's IP address is already determined.

To find the IP address of a DHCP-enabled SolrenView Data Monitor:

-Access and view the DHCP-client list of your local DHCP server. If the DHCP server is your router, open a web page to the router, ie <http://192.168.1.1> to find the DHCP client list. Refer to your network admin and/or router manual for help.

-Find the entry in the client list with the MAC address matching the number displayed on the SolrenView box, with format 00:90:c2:XX-XX-XX.

Example serial number display



The IP address of the data monitor should be displayed in the client entry.

Example DHCP client list

DHCP Active IP Table					Refresh
DHCP Server IP Address: 192.168.1.1					
Client Hostname	IP Address	MAC Address	Interface	Delete	
00:90:c2:12:34:56	192.168.1.100	00-90-c2-12-34-56	Ethernet	<input type="checkbox"/>	
computer1	192.168.1.101	xx-xx-xx-xx-xx-xx	Ethernet	<input type="checkbox"/>	

Step 2) Configuring the data monitor's IP settings

Using a computer connected to the same network the monitor is in, open up a browser with the monitor's determined IP address using [Step 1](#). For example: <http://192.168.1.100>.

If the page does not display, please call 978-683-9700 as older software versions may not support this.

Once the main page displays, navigate to 'Settings'. The IP configurations can now be altered. To disable DHCP, deselect the DHCP box, and enter the intended fixed IP and router/gateway settings.

Use DHCP	<input type="checkbox"/>
IP (Non-DHCP)	<input type="text" value="192.168.1.50"/>
Router/Gateway	<input type="text" value="192.168.1.1"/>
Netmask	<input type="text" value="255.255.255.0"/>

Submit the page or press enter, the data monitor will reboot if DHCP mode is changed. Verify that the new settings have been successfully configured.

For further troubleshooting refer to the following sections below.

When DHCP does not appear to be working:

DHCP configuration on the data monitor is done at startup, so the physical LAN connection must be present during this time. Make sure the Ethernet cable is plugged in *before* powering up the monitor.

To set the IP address of a DHCP-configured data monitor when DHCP is not supported on the LAN:

If available, use a DHCP-enabled router or temporarily enable DHCP on an existing router to find the IP address of the data monitor following the steps described in [Step 1](#). Then set the monitor to a fixed IP as described in [Step 2](#), after which the monitor will become compatible with a non-DHCP network.

DHCP-configured units shipped after December 2008 *without a specified gateway IP* will fallback to the static IP of **192.168.1.11** (subnet mask of 255.255.255.0) in the event that DHCP fails during startup. (*For units which have been provide with a specific gateway/router, the fallback IP will be the 11th address within the subnet of the provided gateway (ie If router/gateway field is configured as 192.168.5.1, fallback will be configured to 192.168.5.11.)*) Use a switch, hub, router, and/or crossover cable to connect to this IP address in order to reconfigure its IP settings as described in [Step 2](#). This fallback can be verified in the status box displayed under the 'Settings' page.

In the example below, the monitor fell back to 192.168.1.11 when DHCP failed during startup.

<p>Currently Configured MAC 00:90:c2:xx:xx:xx DHCP Failed, fell back to fixed IP IP 192.168.1.11</p>

Setting the Data Monitor’s Router/Gateway Field:

Starting December 2008 DHCP-configured units that have not been specifically given the router/gateway IP will have router IP field preset to 0.0.0.0. When this value is entered for DHCP-enabled units, the data monitor uses ARP to automatically search for an existing router/gateway.

In the example below, even though the router/gateway setting field was configured as 0.0.0.0, the data monitor was able to detect the existing router (192.168.1.1) and automatically configured the detected router IP as its gateway.

<p>Currently Configured MAC 00:90:c2:xx:xx:xx DHCP On IP 192.168.1.52 Netmask 255.255.255.0 Router/Gateway 192.168.1.1 (auto) Last Update 2008-12-02 13:56:22</p>	<p>Use DHCP <input checked="" type="checkbox"/></p> <p>IP (Non-DHCP) 192.168.1.11</p> <p>Router/Gateway 0.0.0.0</p> <p>Netmask 255.255.255.0</p>
--	--

Auto router detection will only work if the data monitor is in DHCP mode. In static IP mode, the router/gateway field of the data monitor (displayed above) must be set to the correct gateway address.

****Note/Caution:**
0.0.0.0 is not a valid IP address. Entering this in the router/gateway field will only trigger auto router detection in units shipped after December 1st 2008. For older units, configuring the router/gateway field to an invalid address will disable the data monitor’s connection to the SolrenView server. It is not recommended to alter the router/gateway field to an invalid address once the gateway/router IP is known and configured properly.

Appendix B: More about DHCP vs Fixed IP mode

Background: In every IP network, each device (computer, printer, router) must have a unique IP address within the particular domain (ie Local Area Network, Internet).

In most simple Local Area Network setups, a router acts as the Internet gateway for a LAN. When DHCP is enabled on the LAN, a DHCP server handles requests from DHCP clients and automatically assigns an IP address to the device. This is especially useful as new network devices can be easily added to the network.

In regards to SolrenView, the data monitor must be configured to either a fixed IP address, or as a DHCP client.

If the data monitor is configured as a DHCP-client:

After bootup it broadcasts a DHCP request to the LAN, and only after a successful exchange of messages with the DHCP server it is assigned an internal address within the network. If the network is NOT DHCP-enabled, the monitor will not be assigned an IP, unless a [fallback IP](#) has been configured. To reconfigure the data monitor's IP settings, see [IP Configuration](#)

If the data monitor is configured to a static IP address:

The address specified in the site survey will be the only address the data monitor binds to. If the subnet of the address does not match the LAN's it may not be reachable.

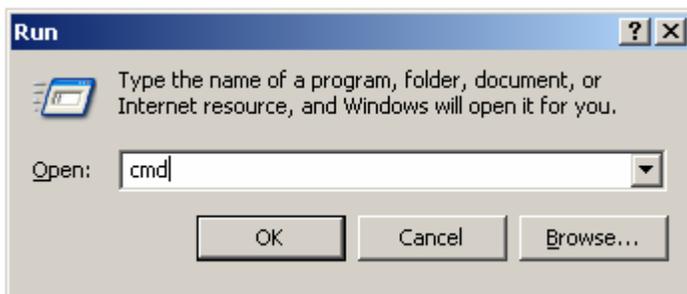
Note: The default gateway/router IP must be specified along with the fixed IP when static IP mode is selected in the site survey. The address specified must not be an occupied IP address in the LAN.

To determine whether a network is DHCP-enabled:

Check/access the router's configuration, please refer to your router's manual. If this is not possible, you can check the IP settings of a local computer within the **same or intended LAN**.

Checking IP configurations of a local computer (Windows only)

Step 1) Open a command prompt, ie Start->Run, type 'cmd' and press enter.



Step 2) Under the command window, type in 'ipconfig /all'. This will print out the IP configuration of the local computer. If the entry for 'Dhcp Enabled' is 'Yes' then the LAN is DHCP-enabled (see line circled in green below).

```
C:\WINDOWS\system32\cmd.exe
C:\>ipconfig /all

Windows IP Configuration

    Host Name . . . . . : xxxx
    Primary Dns Suffix . . . . . :
    Node Type . . . . . : Unknown
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix . :
    Description . . . . . : Broadcom NetXtreme 57xx Gigabit Controller
    Physical Address. . . . . : xx-xx-xx-xx-xx-xx
    Dhcp Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    IP Address. . . . . : 192.168.1.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1
    DHCP Server . . . . . : 192.168.1.1
    DNS Servers . . . . . : xxx.xxx.xxx.xxx

    Lease Obtained. . . . . : Wednesday, March 25, 2009 8:17:17 AM
    Lease Expires . . . . . : Wednesday, April 08, 2009 8:17:17 AM
```

If DHCP support still cannot be determined, the following are very general guidelines for determining DHCP functionality of a LAN in the event it cannot be verified with LAN router settings or a network administrator.

- Residential homes and smaller companies/organizations without an IT department/network administrator are typically DHCP-enabled. Disabling DHCP on a network necessitates having to manually allocate an IP address each time a network device is added, therefore there's an increased likelihood that there is a network administrator overseeing the IP assignments.
- Higher security networks (ie banks) or companies/organizations with a more extensive network structure are more likely to disable DHCP to prevent unknown devices from accessing its LAN resources.



Appendix C: Sensor Accuracy

Ambient and Module Temperature Sensor: +/- 2°C; +/- 4 F
Sunlight Sensor: 5% absolute accuracy, 3% uniformity

Appendix D: Maximum Wire/Cable Lengths

All extension wires must be rated for wet locations and be UV light resistant for maximum life. It is recommended that a metallic conduit or raceway be used.



The total Ethernet wiring distance between the Weather Station and the router/switch must not exceed 100 meters (328 ft).

The integrated power supply can be supplied with 120VAC, 208VAC or 240VAC. Total AC supply wire length (one way) must not exceed:

	Max length 120VAC	Max length 208/240VAC
AWG #14	700 ft.	2000 ft.
AWG #12	2000 ft.	2000 ft.
AWG #10	2000 ft.	2000 ft.

Individual sensor wires can be extended beyond the supplied lengths (one way), with a butt-splice, but must not exceed:

	AWG #12	AWG #16	AWG #20	AWG #24
PV module temperature	1000 ft.	1000 ft.	500 ft.	200 ft.
Ambient temperature	1000 ft.	1000 ft.	500 ft.	200 ft.
Wind speed	1000 ft.	1000 ft.	1000 ft.	400 ft.
Wind direction	1000 ft.	600 ft.	250 ft.	100 ft.



The Sunlight Sensor wires should not be extended beyond the factory supplied 10 ft. Longer wires will cause the inaccurate irradiance data.