



# Model EM1 Environmental Monitor



## Device Manual

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[www.sensatronics.com](http://www.sensatronics.com)

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V2.0

# **Regulatory Information**

## **U.S.A. Requirements**

### **FCC Radio Frequency Class A Notice for Environmental Monitor**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to take whatever measures may be necessary to correct the interference at their own expense. Do not attempt to repair or modify this equipment. All repairs must be performed by Sensatronics, or an authorized Sensatronics representative.

### **UL Listing - U.S. and Canada**

This equipment uses a power supply that has been listed by Underwriter Laboratories, Inc. for use in the U.S. and meets requirements of the Canadian Standards Association CAN/CSA.

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# Technical Support

Sensatronics never charges for customer support. Everything you need to get started and to keep your Sensatronics solution operating smoothly is included with the cost of your purchase.

Our highly skilled staff can answer your support questions and provide online training at your request – and you can share ideas with other Sensatronics customers through our online bulletin board.

You can reach our support team in any of the following ways:

✉ Email us at [support@sensatronics.com](mailto:support@sensatronics.com)

💻 Instant message us with AOL Instant Messenger  
Screen name: SensatronicsGuy

🖱 Access our Support Forum [www.sensatronics.com/bboard/](http://www.sensatronics.com/bboard/)

☎ Call us at 1 (800) 633-1033

# Product Overview

## Monitor

The Model EM1 Environmental Monitor is designed to monitor temperature, relative humidity and leak detection. Equipped to accommodate four ports per condition, it can be installed and running in minutes.

Designed with flanges for wall or rack mounting, the lightweight device measures a compact 4¼" x 3¼" x 1⅜" (10.8cm x 8.3cm x 3.49cm) and weighs about 0.35 pounds.



Probes are available separately to allow you to purchase just what you need according to the number of units and/or conditions that you are monitoring. The Model EM1 device is designed to be used with our standard temperature probes, combination temperature/relative humidity probes, and our specialty wetness probes. All come in varying lengths with custom lengths also available.

## Probes

The temperature/humidity probe measures temperatures from -40°F to 203°F (-40°C to 95°C) and relative humidity from 5% to 95%, non-condensing. The probe is supplied with a 10' cable; longer cables are also available.

In addition to the temperature humidity probe, you can use the standard or heavy-duty temperature probes used with the Model E.

The standard probe has a 50-foot, 24-gauge AWG cable with the sensor housed in a small, white nylon cap. It is appropriate for most indoor applications. The heavy-duty probe has a 75-foot, PVC-jacketed and shielded cable with the sensor housed in a stainless steel cylinder. It is designed to withstand the harsher outdoor environments.



**Note:** The standard and temperature/humidity probes can be used to 60°C. The heavy-duty temperature probe can be used to 95°C.

The wetness probe is a rope that detects the presence of conductive liquids in a location where wetness is undesirable. The probe is scaled from 1 to approximately 100 to indicate the degree of wetness. The probe is typically applied to floor locations or any selected location where the presence of conductive liquids will cause safety issues, damage, or some other form of hazard.

## **Software**

Our open architecture allows our device to run on any operating system through a variety of vendor software programs making us adaptable to new or current customer environments. Visit our Web site ([www.sensatronics.com/nms/listing.php](http://www.sensatronics.com/nms/listing.php)) to review the latest list of compatible software applications.

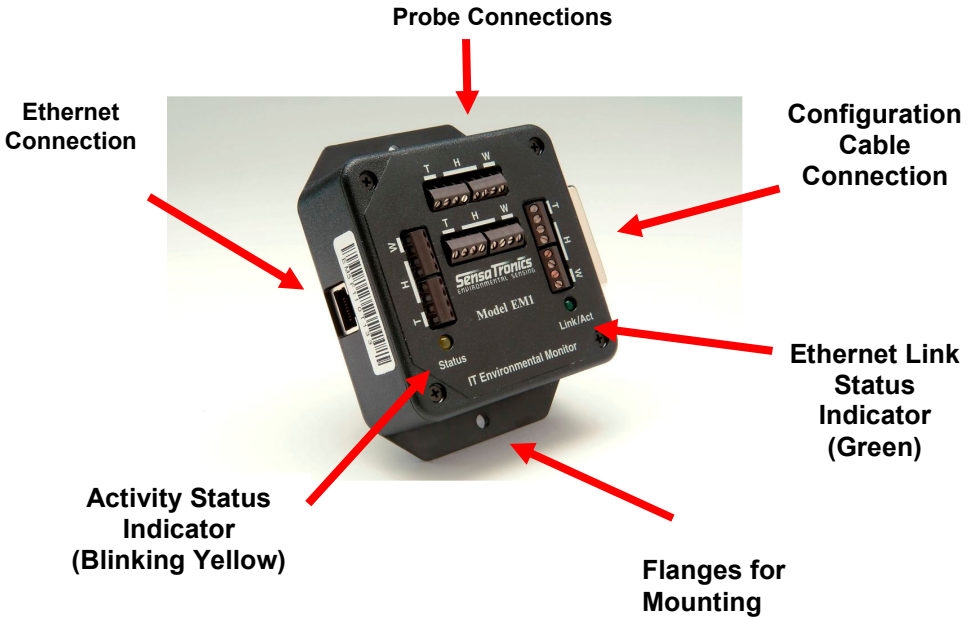
## **Technical Specifications**

### **Standard Features**

The Model EM1 Environmental Monitor is equipped with the following:

- Range from -40°F to 203°F (-40°C to +95°C)
- Network connection via Ethernet hub or switch
- Internal Web server
- Fahrenheit, Celsius, Kelvin or Rankine unit
- RS-232C (25-pin female D connector)
- Power supply of 9VDC@250mA
- Measures humidity with accuracy of 2.5%
- Measures wetness
- SNMP V1, partial MIB-II support
- Mounting flanges
- Light weight – about 0.35 lbs
- Compact size – 4 1/4" x 3 1/4" x 1 3/8"

# *Detail Diagram*



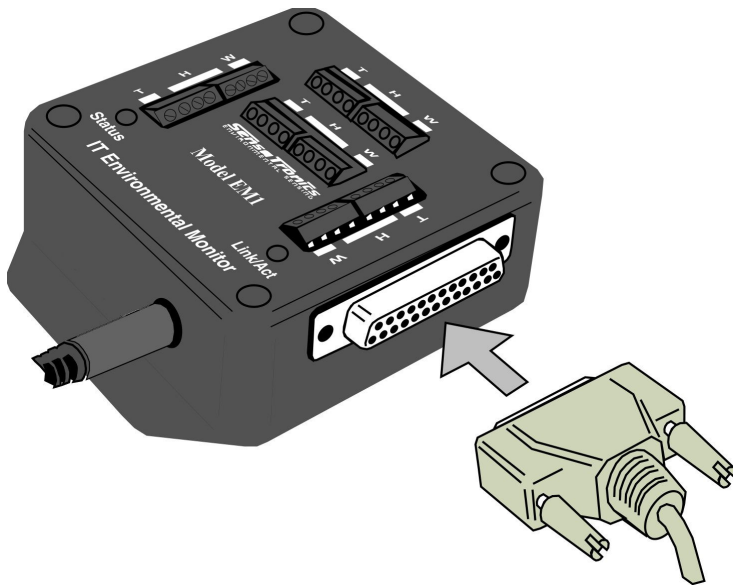


# Connecting the Device

## Step 1. Connect the Configuration Cable

A white configuration cable is supplied with the Model EM1 Environmental Monitor and plugs directly into the device. (This cable is only connected during the configuration process and does not need to remain connected during normal operation.)

- a. Connect the DB-25 male connector on the configuration cable to the RS-232 serial port on the right side of the temperature monitor.
- b. Connect the other end of the configuration cable (DB-9 female connector) to the serial port of your PC.

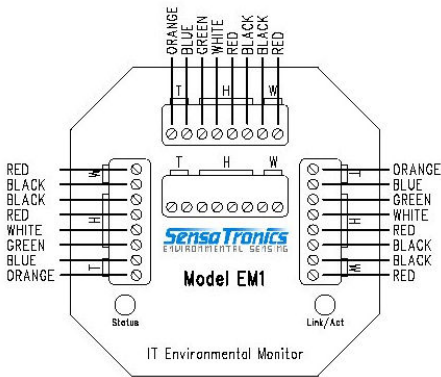


## Step 2. Connect the Temperature Probes

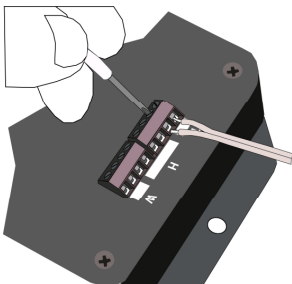
The EM1 Environmental Monitor can connect to up to twelve probes, four sets each of temperature, humidity, and wetness probes. A combination temperature/humidity probe counts as two probes, a wetness probe uses one wetness channel. Each temperature or wetness probe is comprised of a pair of wires – each wire must be connected to the device, polarity does not matter. For the humidity portion of the combination probe, four wires must be connected as described below.

- a. Using the screwdriver included with your device, connect the first pair of probe wires to the retainer labeled T.

**Note:** If attaching humidity/temperature probes then follow the color coded diagram below. (A brown wire may actually replace the orange wire in your particular unit.) If you are connecting a standard temperature probe, however, then you will need to attach the probe's Red/Black wires to the retainer labeled Blue/Orange, in the diagram below.



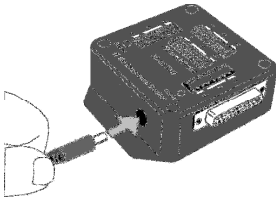
- b. Slip each wire into the appropriate slot and tighten the coordinating screw. (Continue for all probes using the next respective retainer.)



### ***Step 3. Connect the Power Supply***

A power cord is supplied with each Model EM1 Environmental Monitor.

- a. Plug the round end of the cord into the jack on the side of the temperature monitor.
- b. Plug the wall transformer into a powered outlet.
- c. Verify that the yellow activity status indicator (Status) is blinking. (As long as the module has power, the yellow activity status indicator will blink six times, pause briefly, and then repeat in a continuous cycle as it scans the probes for sensor readings.)



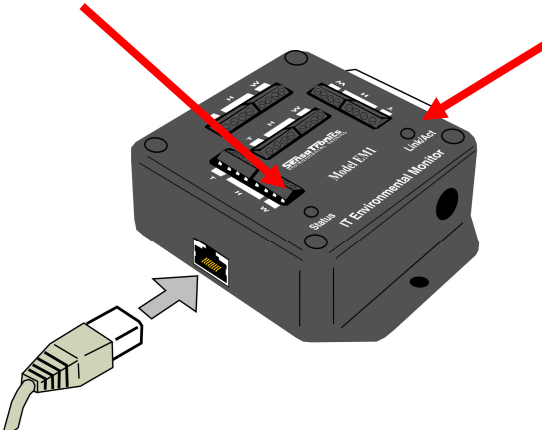
### ***Step 4. Connect the Ethernet Cable***

An Ethernet cable is supplied with the device.

- a. Connect one end of the Ethernet cable to the connector on the side of your temperature monitor and the other end to your network hub or switch.
- b. Verify that the green Ethernet link status indicator (Link/Act) is lit to indicate a good connection.

**Activity Status Indicator**

**Ethernet Link Status Indicator**



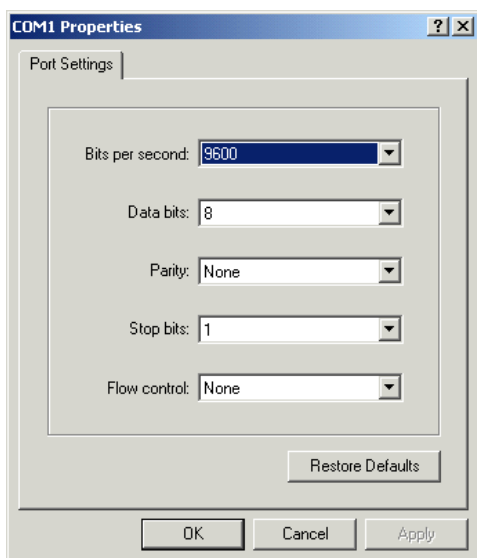
# Configuring the Device

Before you can use the Model EM1 Environmental Monitor, you must either determine a static IP address, network mask and gateway that is available on your network, or set the unit to DHCP mode. The address received in DHCP mode can be determined by connecting to the RS232 serial port.

## Step 1. Configure the RS-232 ports

Start a terminal emulator program (such as HyperTerminal included with MS Windows).

- a. Set the RS-232 port settings as shown:



Bits per second: **9600**

Data bits: **8**

Parity: **None**

Stop bits: **1**

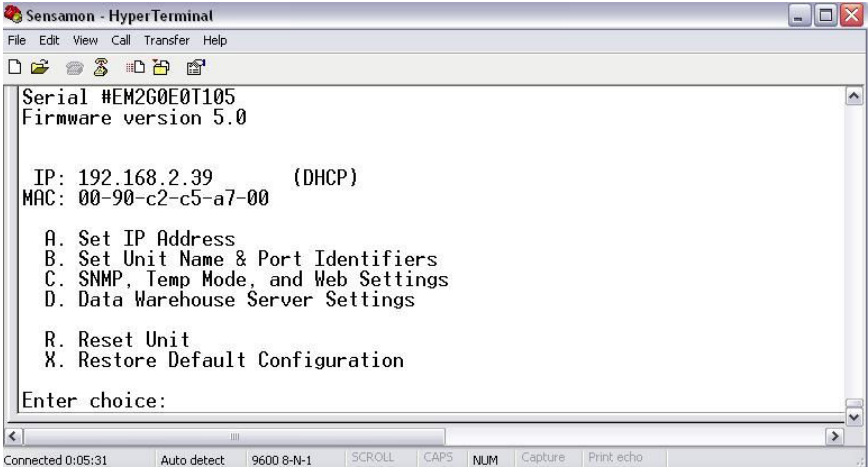
Flow control: **None**

**Note: If the settings are incorrect, the device will not be able to communicate with your terminal emulator.**

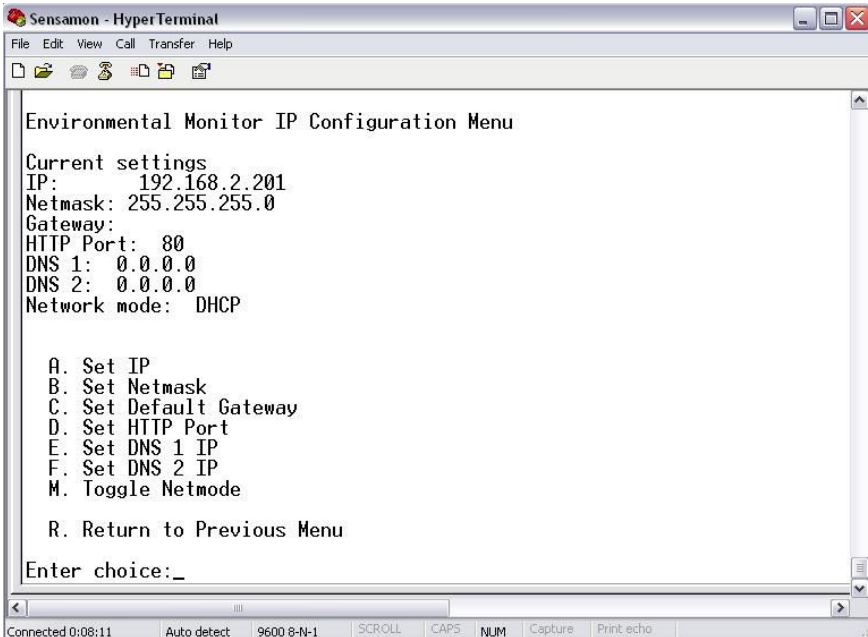
- b. Ensure that the power cord jack is connected to the Model EM1 Environmental Monitor and the wall transformer is plugged into a powered outlet.

## Step 2. Configure the IP Address and Network Mask

Press **Enter** to display the Main Menu. Select the menu items for configuring the unit and for setting the IP address and net mask.

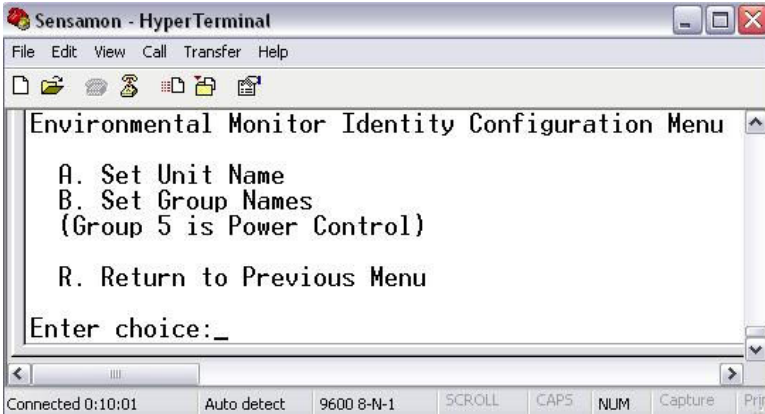


The menu will display as shown:



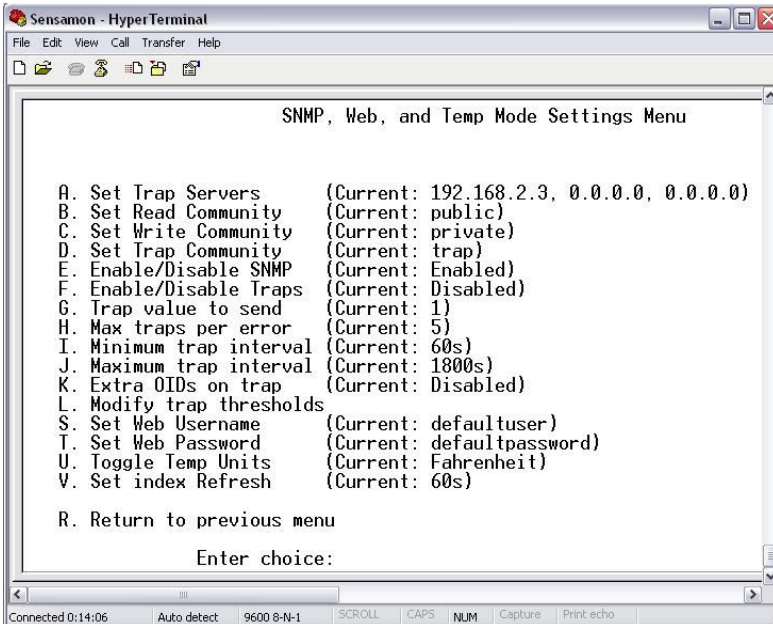
### Step 3. Name the Device and the Probes

We suggest that you name the unit and its associated probes with logical names for convenience. (The default probe names are Probe1, Probe 2, etc.). From the Main Menu, press **B** to make those changes.



### Step 4. Set SNMP Parameters

Return to the Main Menu and press **C** to set SNMP Parameters.



## ***Step 5. Complete the Process***

Return to the main menu to ensure that all settings take effect.

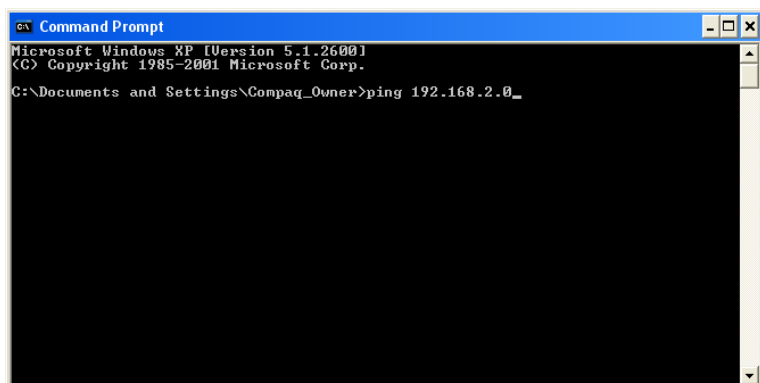
**Note: There will be a short pause before the Main Menu displays.**

- a. Disconnect the RS-232 cable from the device and from your PC.
- b. Connect one end of the Ethernet cable supplied with the Model E monitor to the device, and the other end of the cable to your network hub or switch.

## ***Step 6. Verify Proper Working Order***

Verify that the device is functioning as expected.

- a. At the Command Prompt, ping the device using the IP address that you assigned in Step 2.



- b. Launch a Web browser using the IP address that you assigned in Step 2. Temperature data should display. For example, if the unit IP is 192.168.2.201, enter <http://192.168.2.201> in your Web browser's address bar.

**Environmental Monitor: Test Monitor - Mozilla Firefox**

File Edit View Go Bookmarks Tools Help

[http://192.168.2.39/index.html](#) Go

Sensatronics SugarCRM Area Codes Sensatronics PIMM Sensatronics PIMM

Model:	EM1	Firmware Version:	5.0
Manufacturer:	Sensatronics	Release Date:	April 22, 2005
Website:	<a href="http://www.sensatronics.com/">http://www.sensatronics.com/</a>	Serial Number:	EM2G0E0T105

Unit name: Test Monitor

CEO Temp	CEO RH	CEO Leakage
74.4 °F	-999.9 %	-999.9

Wetness	-999.9
Humidity	-999.9 %
Temperature	-999.9 °F

Temperature	Humidity	Wetness
-999.9 °F	-999.9 %	-999.9

Temperature	-999.9 °F
Humidity	-999.9 %
Wetness	-999.9

**Sensatronics**  
Environmental Sensing

Model EM1

IT Environmental Monitor

Done



# Software Options

## ***SEMS Solution***

Sensatronics Environmental Management Solution (SEMS) is a comprehensive real-time, cold-storage monitoring solution that allows you to view the overall stability and well-being of your temperature-controlled units from a single Web-based interface. Our subscription-based service, coupled with our high-quality monitoring devices provides you with a complete monitoring, notification and trending analysis solution without having to invest in a complex infrastructure.

SEMS is comprised of three basic components: the temperature monitoring devices and probes, which monitor activity from a particular unit and then send data to the SEMS server; the SEMS server tracks utilization and compares the reported data against thresholds that you define, then broadcasts the status, including alerts and alarms; and desktop and Web-based graphical user interfaces which display the results in an easy to read format that allows any (or all) of your staff to easily view the overall status of your environment – or even to receive immediate alerts to a pager, cell phone, or text messenger for catastrophic failures.

Contact us for a real-time, online demonstration. Call (800) 633-1033 to schedule an appointment with one of our SEMS Sales Managers.

## ***SNMP***

SNMP Version 1.0 is supported in the Model E series of temperature monitors. The latest MIB files are available via our website at:

<http://www.sensatronics.com/downloads/snmp/>

To set the SNMP community strings, use the serial port configuration menus from Step 2, and press **C**.

**Note:** When configuring the SNMP community strings (read, read/write, and trap), be sure you don't leave any of them blank, or the SNMP module will not start. They default to public, private and trap.

A graphical representation of the latest MIB format can be found at our Web site

<http://www.sensatronics.com/downloads/snmp/em1-mibmap.png>

## ***CRON Log File Tool***

Perl scripts are available for simple logging of unit data by Unix/Linux/Solaris/ and other similar systems.

Download the scripts from our website at:

<http://sensatronics.com/downloads/plugins/cron/>

This CRON script produces a CSV Log File with date and temperatures suitable for importing into most common spreadsheets. The script requires netcat which can be found at the following URL.

**Note:** This script is NOT supported by Sensatronics.

<http://netcat.sourceforge.net/download.php>

**Note:** The script is designed to be executed no more than once per minute. We do not recommend polling at more frequent intervals.

## Write Your Own

The Model EM1 Environmental Monitor runs an internal Web server that listens for TCP/IP HTTP /GET requests on Port 80, and responds to five different URL requests – /index.html, /xmldata, /xmlconfig, /data and /config.

**/index.html:** This is the main index page that returns an HTML-formatted Web containing the temperatures of all connected probes. This index page also provides details about the Temperature Monitor such as manufacturer, serial number, unit, and probe names.

**/data:** This request will return an HTML-free Web page, consisting of a simple ASCII string of pipe-delimited data.

The data will be in the format of

"Temp mode|Group 1 temp|Group 1 Humidity|Group 1 Wetness|Group 2 Temp..."

This URL is typically used by OEMs who are packaging the Temperature Monitor for use with their own software and need an easy and efficient way to get at the probe temperature data. This URL is also handy for those wishing to write their own software interface to simply and quickly obtain the temperatures and incorporate them into their existing Network Management Software.

Here's an example:

```
F|70.9|46.0|67.8|-999.9|-999.9|75.7|69.9|-999.9|-999.9|222.6|-999.9|-999.9
```

**/config:** This request will return an HTML-free Web page, consisting of a simple ASCII string of pipe-delimited data. The information contained in this string of data will include configuration information about the Temperature Monitor such as serial number, unit and probe names, and model number.

Here's an example:

```
EM00000000|EM1|Model EM1|12|4.1|1|Server  
Room|T|Temperature|H|Humidity|W|Wetness|2|Group  
2|T|Temperature|H|Humidity|W|Wetness|3|Group  
3|T|Temperature|H|Humidity|W|Wetness|4|Group  
4|T|Temperature|H|Humidity|W|Wetness
```

To query the Temperature Monitor from within your own software, you will need an understanding of TCP/IP Sockets and the HTTP protocol. Consult the documentation of the specific programming language for details. After successfully initializing and opening up a TCP/IP socket to the Temperature Monitor, you will be able to communicate with it using the HTTP Protocol.

To request the /data URL simply send the following string

```
"GET /data HTTP/1.0 <CR><LF><CR><LF>"
```

Using the **Telnet** command is a convenient way of retrieving data from the Temperature Monitor. Open a telnet session to the Temperature Monitor unit's IP Address on Port 80.

For example, if the Temperature Monitor was configured on IP 192.168.2.101, you would send the following command:

```
telnet 192.168.2.101 80
```

If successful, you will be able to send command directly to the Temperature Monitor. Recall that one such command is **/temp:**

```
GET /data HTTP/1.0
```

Followed by pressing **Enter** twice.

This will return a non-HTML ASCII, pipe-delimited string...just as it would if you were to open your Web browser and type the following in the URL box:

```
http://192.168.2.101/data
```

Here's an example of a return string:

```
F|70.9|46.0|67.8|-999.9|-999.9|75.7|69.9|-999.9|-999.9|222.6|-  
999.9|-999.9
```

## Software Plug-ins

A plug-in is a module that extends the capabilities of the network management software. Following are some of the available applications that are compatible with our devices. Refer to the vendors' specific sites for further information.

Product	URL
ActiveXperts	<a href="http://www.activexperts.com">www.activexperts.com</a>
Advanced Host Monitor	<a href="http://www.ks-soft.com">www.ks-soft.com</a>
Big Brother	<a href="http://www.bb4.com">www.bb4.com</a>
Bizwatch	<a href="http://www.bizwatch.com">www.bizwatch.com</a>
DotCom-Monitor	<a href="http://www.dotcom-monitor.com">www.dotcom-monitor.com</a>
HP Openview	<a href="http://www.hp.com">www.hp.com</a>
Intellipool Network Monitor	<a href="http://www.intellipool.com">www.intellipool.com</a>
IPSentry	<a href="http://www.ipsentry.com">www.ipsentry.com</a>
MRTG	<a href="http://www.mrtg.org">www.mrtg.org</a>
N-Able	<a href="http://www.n-able.com">www.n-able.com</a>
Nagios	<a href="http://www.nagios.org">www.nagios.org</a>
Overseer Network Monitor	<a href="http://www.sensiblesoftware.com">www.sensiblesoftware.com</a>
Server Nanny	<a href="http://www.servernanny.com">www.servernanny.com</a>
Servers Alive	<a href="http://www.woodstone.nu">www.woodstone.nu</a>
SNMPc	<a href="http://www.castlerock.com">www.castlerock.com</a>
Tembria Network Monitor	<a href="http://www.tembria.com">www.tembria.com</a>
TempElert	<a href="http://www.tempelert.com">www.tempelert.com</a>
Visualware	<a href="http://www.visualware.com">www.visualware.com</a>
WhatsUp	<a href="http://www.ipswitch.com">www.ipswitch.com</a>

# Trouble Shooting

Problem	Solution
The unit does not work – what is wrong?	<p>Several problems could be responsible for the unit not working properly. Try the following:</p> <ul style="list-style-type: none"><li>- Verify that the wall transformer is securely plugged into the outlet and that the power cord jack is securely connected to the device.</li><li>- Verify that the outlet into which the transformer is plugged has power.</li><li>- Check probe line connections.</li><li>- If the unit was recently installed, verify that it was properly configured. <b>Note: The Flow Control Setting must be set to None. Try reconfiguring the device.</b></li></ul>
I can neither ping the unit nor display its internal Web page.	<ul style="list-style-type: none"><li>- Verify the unit's IP address and network mask to ensure that they are valid for your LAN/WAN.</li><li>- Ensure that once you have entered your IP address and network mask settings that you return to the main menu before powering down the device.</li><li>- Verify that your switch or hub is properly configured to work with the 10Mbps data rate at which the Ethernet interface is running.</li></ul>
I can display the Environmental Monitor's main/index page, but I cannot get to its other URLs (i.e., /config, /data).	<p>This may be due to a proxy server.</p> <ul style="list-style-type: none"><li>- Try bypassing the proxy or</li><li>- Configure the proxy to allow this traffic.</li></ul>

Problem	Solution
I get a temperature reading of -999.9°.	<p>This temperature reading indicates that the probe for that position is not connected.</p> <ul style="list-style-type: none"> <li>- Check the line to ensure you have a solid connection to the device.</li> <li>- Verify that the line between the probe and the device has not been cut.</li> </ul>
I get a temperature reading of 9999.9°.	<p>This temperature reading indicates that there is a short in the line, typically caused by the two probe leads touching each other.</p> <ul style="list-style-type: none"> <li>- Check the line for damage.</li> </ul>
Where can I find the latest software plug-ins?	<p>If you cannot find the latest plug-ins at the software publisher's Web site, check our plug-in listing at</p> <p><a href="http://sensatronics.com/downloads/plugins">http://sensatronics.com/downloads/plugins</a></p>
The wetness probe reads greater than 0 and less than 10. Is something wrong?	<p>The probe is sensitive to humidity and may read values less than 10 when no liquids are present. In the presence of liquid, the probe will read greater than 50. If the probe has previously been wet and then dried, it may need to be cleaned to avoid a false wetness reading. (See below.)</p>

Problem	Solution
<p>The wetness probe has gotten wet. Do I need to replace it?</p>	<p>No. However, it is probably necessary to clean the probe. To clean it, thoroughly rinse it in distilled water. An improperly cleaned probe may give false wetness readings. A wet probe may take 48 hours or more to dry, depending upon the humidity.</p>



# **Warranty**

## **GENERAL WARRANTY POLICY**

Sensatronics, LLC (hereinafter referred to as SENSATRONICS) warrants that the Product shall conform to and perform in accordance with published technical specifications and the accompanying written materials, and shall be free of defects in materials and workmanship, for the period of time herein indicated, such warranty period commencing upon receipt of the Product. This Limited Warranty applies only to hardware products manufactured by or for SENSATRONICS that can be identified by the Sensatronics trademark, trade name, or logo affixed to them. The Limited Warranty does not apply to any non-Sensatronics hardware products or any software, even if packaged or sold with Sensatronics hardware.

This warranty is limited to the repair and/or replacement, at SENSATRONICS discretion, of defective or non-conforming Product, and SENSATRONICS shall not be responsible for the failure of the Product to perform specified functions, or any other non-conformance caused by or attributable to: (a) any misapplication or misuse of the Product; (b) failure of Customer to adhere to any of SENSATRONICS specifications or instructions; (c) neglect of, abuse of, or accident to, the Product; or (d) any associated or complementary equipment or software not furnished by SENSATRONICS.

Limited warranty service may be obtained by delivering the Product to SENSATRONICS in the US or to the international distributor it was purchased through and providing proof of purchase or receipt date. Customer agrees to insure the Product or assume the risk of loss or damage in transit, to prepay shipping charges to SENSATRONICS, and to use the original shipping container or equivalent.

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## **HARDWARE PRODUCT WARRANTY DETAILS**

**WARRANTY PERIOD:** SENSATRONICS warrants hardware Product for a period of Two (2) Years.

**WARRANTY PROCEDURE:** Upon return of the hardware Product SENSATRONICS will, at its option, repair or replace Product at no additional charge, freight prepaid, except as set forth below. Repair parts and replacement Product will be furnished on an exchange basis and will be either reconditioned or new. All replaced Product and parts become the property of SENSATRONICS. If SENSATRONICS determines that the Product is not under warranty, it will, at the Customer's option, repair the Product using current SENSATRONICS standard rates for parts and labor.

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