etherstuff

Ethermometer RHT

Temperature & Humidity Monitor
with Built-in Web, Email & SNMP

Ethermometer RHT Manual

The Ethermometer RHT monitors temperature and relative humidity in equipment rooms, rack rooms, unoccupied homes, transmitter or remote equipment sites, wherever you need to monitor and report temperature!

The Etherstuff Ethermometer RHT graphs temperature and R.H. on a built-in web server AND emails you temperature and humidity alarms. It can also monitor two auxiliary closures and email alerts when they are triggered. Plus it's SNMP V1 compatible.

Information you'll need to know
(you might need to get from your IT staff)
about your network:

The name or IP address of the email server that supports the address that the Ethermometer RHT sends email alerts to.

The SMTP port used by your email server (usually 25).

The email address you want to send temperature and closure alarms to - Temperature, Closure1, and Closure2 can all have different email-alert destination addresses as long as they're on the same email server.

If you want the unit to be on a static IP address, recommended, you'll need to have a "clear" address for it.

If you don't have DHCP, your network's gateway address and subnet mask.

Package Contents:
Ø Ethermometer RHT
Ø 6' 6P6C modular cord
Ø RHT-2 sensor
Ø Plug-in power supply
Ø This manual

Be sure to check the etherstuff.com website for other cool products and accessories!

www.etherstuff.com

Table of Contents

Etherstuff - 4341 Lake Gulch Rd - Castle Rock, CO 80104
www.etherstuff.com

Thank you for purchasing the Etherstuff Ethermometer RHT !
model ET-2RHT

> Package Contents:
> Ø   Ethermometer RHT
> Ø   6' 6P6C modular cord
> Ø   RHT-2 sensor
> Ø   Plug-in power supply
> Ø   This manual

Accessories for the Ethermometer RHT

The PF-1 Power Failure monitor.
Use with a closure input of your Ethermometer to monitor status of non-UPS-protected power with your UPS-protected Ethermometer.

Set the closure input up as "Alarm when open."

When power fails, the relay inside the little plastic box releases and the Ethermometer generates an email alarm.

Custom temperature probes available. Email us with your needs: support@etherstuff.com

More from Etherstuff

The Etherterminal model ET-1 bridges the gap between your office LAN, WAN, or even public internet network, and the serial devices you need to access.

EtherStuff's Etherterminal ET-1 single port terminal server.

Ø LAN enables "serial-only" devices for connecting to your Network.

   Ø M&C or CONSOLE connections to routers.
   Ø Thermostats
   Ø Modems
   Ø Industrial equipment
   Ø Satellite Receivers & Uplinks

Ø Access unlimited numbers of serial-only devices from any computer on your network via Telnet.

Ø Includes Etherstuff's Virtual Serial Port Driver for Windows (XP or 2000).

Check with your Etherstuff dealer or the etherstuff.com website for additional innovations!

The Ethermometer in its simplest installation:

Connecting your Ethermometer RHT to Power, LAN, and the Sensor, following the directions beginning on Page 6 will get you up and running in no time.

The Red power indicator should flash momentarily about once per second (like a heartbeat) to indicate that the Ethermometer Plus is powered up and reading the sensor successfully.

The Sensor Board
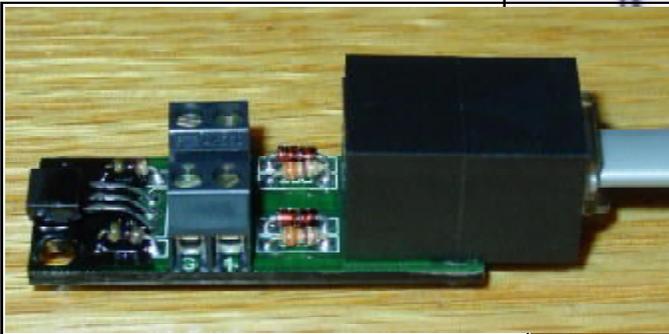
LAN, and Temperature Sensor.

The Ethermometer RHT sensor board provides an advanced temperature and R.H. sensor and two "closure inputs," brought out to two-pin screw terminals on the sensor board.

The optional Power Fail sensor and a user-supplied switch are shown here attached to the Closure1 and Closure2 screw terminals, respectively, on the Sensor board. The pushbutton switch shown here could be replaced with a door-entry switch, float switch, mechanical limit switch, photo-detector, or some other variety of dry-contact or isolated open-collector style "closure."

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## Steps for setting up your Ethermometer RHT

1) **Connections**:

a) Download the Etherset utility from www.etherstuff.com/support.html
  This utility makes it easy to find the ethermometer's DHCP-assigned IP address, or to set a static IP for the unit. Save the utility to your desktop or somewhere else that's easy to get to – you'll be using it shortly.

b) Plug the temperature sensor into the unit using the supplied modular cable.

c) Connect the Ethermometer RHT to your LAN using an standard (straight-thru) patch cable.

d) Power up the unit using the power supply provided.

e) Run the Etherset utility, enter the serial number of your Ethermometer Plus and click Find Device.
  Your serial number is located on the back panel of the unit and on the shipping box.

If your LAN supports DHCP, your ET-2RHT will have a meaningful IP address already in the IP address field of Etherset; write it down and click close. If your LAN doesn't support DHCP or you wish to assign a Static IP to your ethermometer, enter the static IP in the IP address field and click configure, then close. You can also change to a static IP or change the one assigned here at any time from the unit's web interface.

You can now browse to the ET-2's internal webserver for the remainder of the setup. Simply type the IP address of your ET-2RHT into the URL / address box of your favorite web browser and you should connect and see a webpage that looks a lot like this one: Note: loading the webpage the first time takes a few seconds as Flash content is sent to your browser.
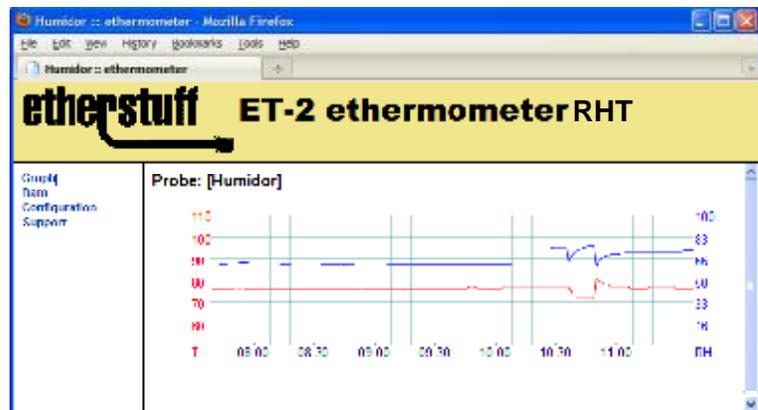
Configuration:

Click on Configure and a list of configuration menus will drop down. Next click on General.

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2) The General Device Settings are split into three pages. The first allows you to set up a unique name for your unit. Then, if desired, change the temperature scale (Celsius or Fahrenheit). The RHT2 temperature sensor is designed to be accurate (without field calibration) to within +/- 1 degree C from 0C-70C and +/- 2% RH fom 20%-80% RH and +/-3% across from 0 to 100% RH. Click next to save your changes and go to page 2 of 3.
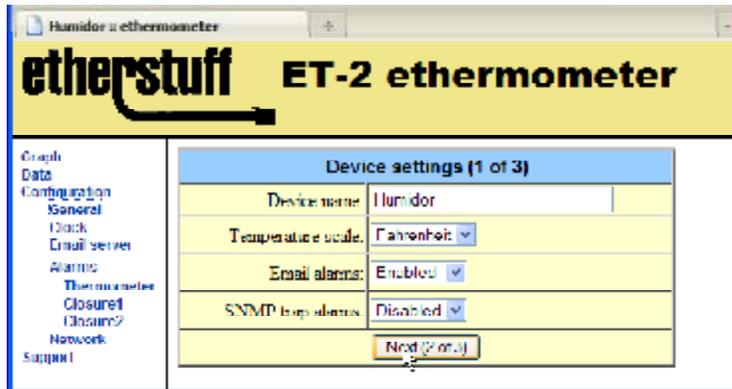
On this page the sensor is enabled (default) and you can enable and set manual offset calibration. The temp and RH offset values are positive or negative integers that change the reading by the integer value times the sensor resolution. Temperature resolution is 0.2 degrees C (or 0.36 degrees F); RH resolution is 0.4%.
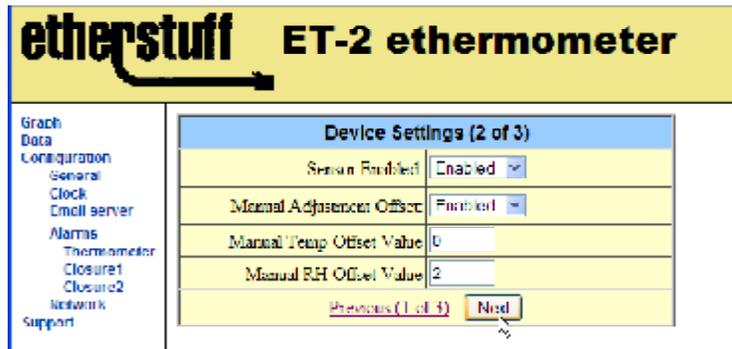
Leave these values at zero unless you have a more accurate,calibrated instrument for reference. You can check the calibration of the relative humidity probe using the RH Calibration procedure described in the Appendix B of this manual.

If you decide to modify the values simply divide the change you want by the resolution of the reading and use the closest integer.

For example, if you want the displayed /graphed/emailed value for RH to be higher by1.2% , the offset value would be 3, if you wanted it to be 1.6% lower, the offset value would be -4.

The maximum temperature offset (integer) value is 299 (which will change the reading by 59.8 degrees C - or approximately 107.6 degrees F). Offset values greater than 299 will produce temperature readings that are "rolled over" to the current "raw" reading of the probe. Although there may be some applications where largher offsets are justified, we recommend keeping the offset integer value within a range of +/- 18 which equates to approximately the worst case temperature innacuracy across the entire operating range of the probe (+/- 3.6 degrees C from -40 degrees C to 85 degrees C).

The relative humidity reading maxes out at 100%, so the first offset value that would exceed 100% is "rolled over" to 0%.

In most applications the RH offset shoule be within a range of +/-8, which equates to an offset of -3.2% to + 3.2% of the probe's actual reading - the sensor's maximum error specification.

General Device Settings (page 3 of 3)

The Ethermometer RHT can send a log of temperature and relative humidity readings via email every four hours. The email alarms are disabled by default. To enable them use the dropdown box and select Enabled. The log files are sent every four hours with default times of midnite, 4AM, 8AM, noon, etc. You can offset the time email logs are sent if you set the daily log email time for a value from 00:00:00 to 3:59:00. If you set this value to 2:00:00, log files will be emailed out at 2AM, 6AM, 10AM, 2PM, 6PM, and 10PM each day. Be sure to enter a valid email address in the email address field.
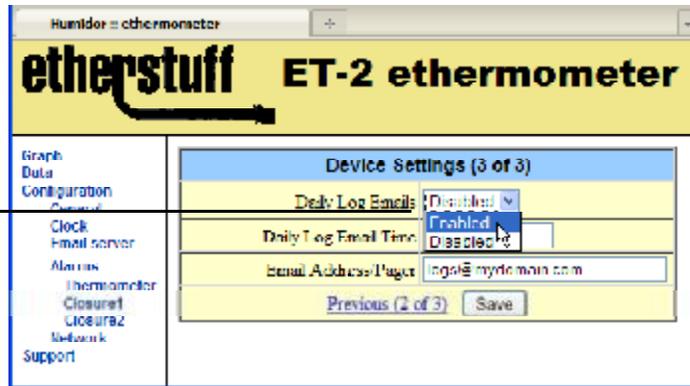
3) Clock

Set the unit's built-in Real time clock in 24 hour format with leading zeroes for times between midnite and 10 AM (*e.g.:* 07:30:00 *for 7:30AM*). Set the date as mm/dd/yy (*e.g.:* 01/05/11 *for January 5th, 2011*)

4) Email Server:
Click on Email server to bring up the following configuration page.

The email server name or IP address, smtp port number (usually 25), and "from" email address are set here.

The from email address can be one that helps to identify the message as coming from your ethermometer. It does not have to be a functional email address, but it must be in standard email address format. Click Save to activate these settings.

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5) Alarms

These are the three config pages where you set up the behavior of your email alarms for temperature, closure 1, and closure 2. The temperature thresholds and closure settings are also used for SNMP traps if you enable and set them up (see Network / SNMP settings).

To begin, click on Thermometer.
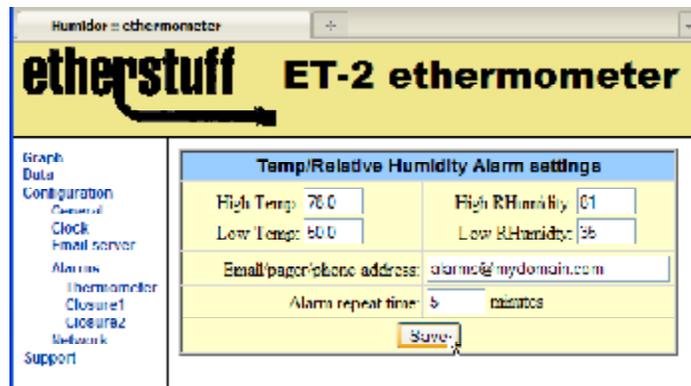
Set the high temperature threshold, low temperature threshold, High R.H. threshold, low R.H threshold, email address for alarms, and alarm repeat time here. When the temperature is higher than the high temp threshold or lower than the low temp threshold, the ET-2 will send an email to the email address set here. As long as the temperature is outside of the threshold values, the unit will send emails based on the alarm repeat timer setting. Click Save to activate these settings.

Closure 1 and Closure 2
The ethermometer can also monitor the status of two external closures and report changes in status via email. The RHT-2 sensor probe has two 2-pin screw terminals on it. One is marked 1 and G, the other is marked 2 and G.
These webpages set up the two alarm closure inputs. Here you can: customize the Closure name; set the closure input to Alarm when closed, alarm when open, or disabled; set the email destination for this alarm, and set how often new closure alarms will repeat, to minimize emails from a "chattering" or bouncing closure.
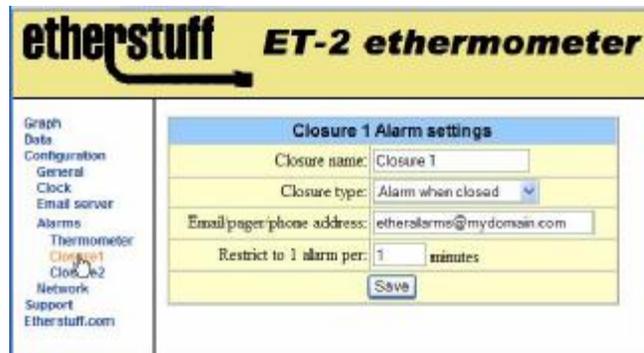
Click Save for the Closure settings to become effective. Be sure to set up the configuration for Closure 2 as well before continuing on to Network settings.
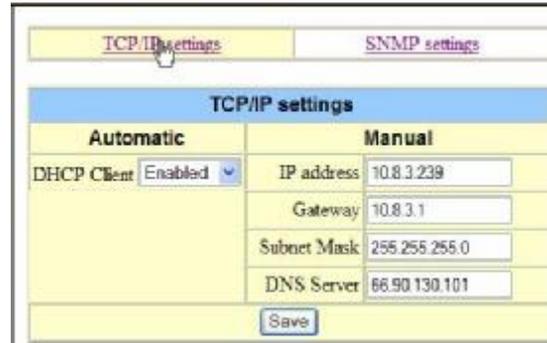
IMPORTANT NOTE:
The Ethermometer's closure inputs are designed to be used with "dry" closures or ground sink outputs only. Do NOT connect voltages to these inputs! See
Appendix A: Closure NOTES for some common closures you might want to
monitor with your Ethermometer. If you have nothing connected to one or both of
the Ethermometer's closure inputs, we recommend that you Disable them.

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Network:

6) TCP/IP settings.

When DHCP is enabled, all of these settings should be filled in automatically.
If you wish to change the device to a static IP, enter the new IP address (you have checked to make sure it's not already occupied… right?), make any other changes (if required) to the Manual settings, change the DHCP Client status to Disabled, then click Save. If you change the IP address, you'll have to re-point your browser at the new IP address to continue.

IMPORTANT: If you are unsure of the settings you should use for IP address, Gateway, Subnet Mask, or email server, we urge you to contact your network administrator or IT staff. Programming in the wrong values for any of these settings can cause problems on your network.

7) SNMP setup. (optional – leave disabled if you don't have SNMP or don't want your ET-2 monitored by your SNMP server)

If you are not familiar with how your organization's SNMP monitoring server is set up, defer this configuration to someone who is.

SNMP is turned OFF by default from the factory. Enabling SNMP for interaction with your enterprise SNMP monitoring software is accomplished within the three web pages under SNMP settings. Once the SNMP settings are configured and your SNMP monitoring server is able to see the ET-2, you may want to go back to the General settings page to enable SNMP traps as well.

Click Done (Save) when you are finished with the SNMP setup.

The MIB for the Ethermometer can be downloaded from etherstuff.com/support.
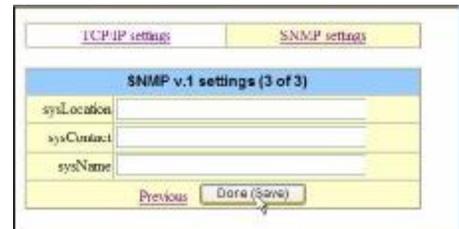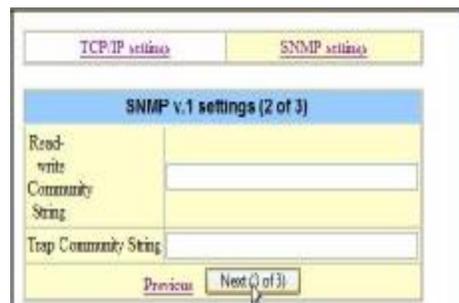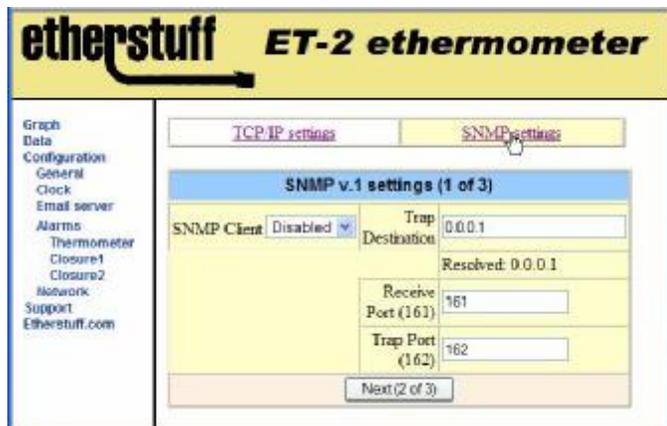
Using your model Ethermometer RHT

Click your Browser's refresh button or click on Graph to Load the Ethermometer's main webpage, the Graph. This view summarizes the last four hours of temperature and relative humidity readings. Note that the red trace represents temperature with the scale on the left; the blue trace represents relative humidity with the scale on the right.
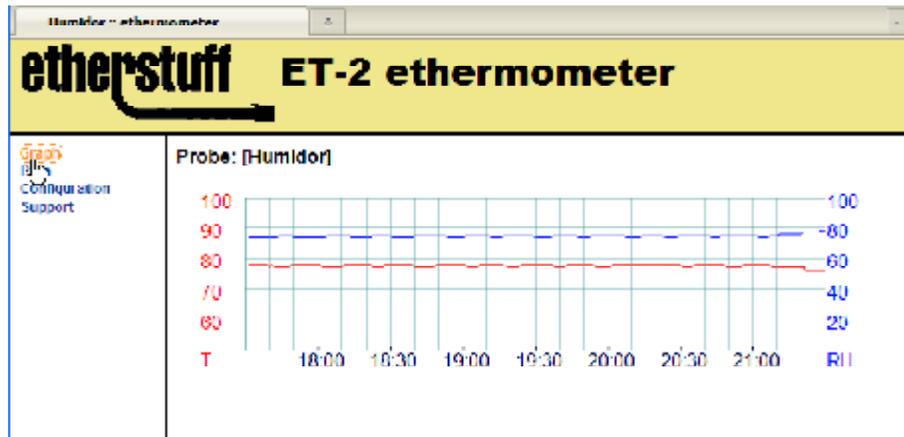

Widely divergent values within the unit's four-hour graphing window, in temperature or humidity, will cause the graph to automatically rescale vertically.

Clicking on Data will bring up the instantaneous values for temperature, relative humidity, and the two closure inputs. To update the displayed values, click Data again.
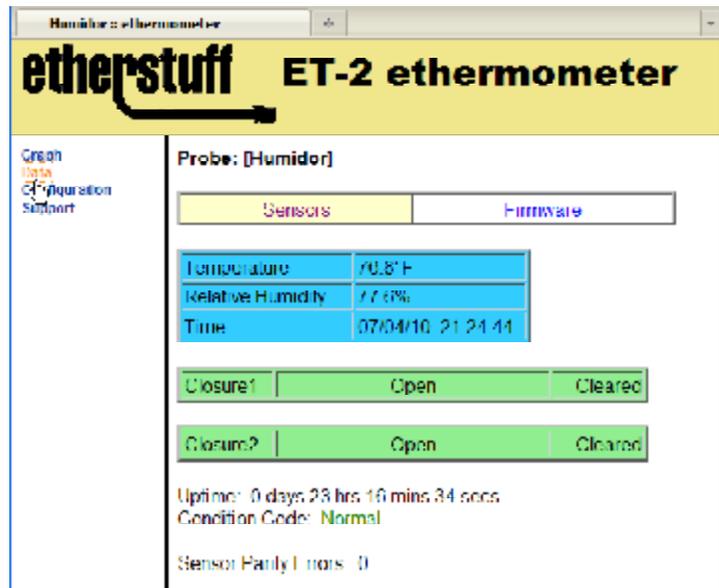
The Ethermometer's software version, serial number, and MAC address are displayed on the Data page, as well as unit uptime and condition code. When the ethermometer senses a network fault it will show up in the Condition Code field. The condition code will remain even once the condition is cleared so you will know the issue occurred. Cycling power will clear the code back to normal.

Clicking on the Firmware button in the upper-right portion of tis page will display the unit's firmware version, serial number, and MAC address information.
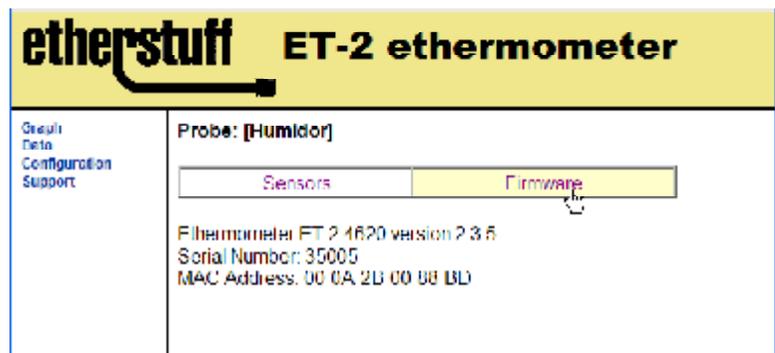
Appendix - Sample Alarm eMails

Sample Temperature alarm email

```
Probe: Humidor
High Temperature Limit: 77.0F
Low Temperature Limit: 50.0F
Recorded Alarm temp: 77.1F
Recorded at Time: 13:29:15
Recorded at Date: 07/03/10
Current temp: 71.1F
Current Relative Humidity: 74.9%
```

Sample Humidity alarm email

```
Probe: Humidor
High Relative Humidity Limit: 81%
Low Relative Humidity Limit: 35%
Recorded Relative Humidity: 2.4%
Recorded at Time: 10:27:44
Recorded at Date: 07/04/10
Current Temperature: 73.3F
Current Relative Humidity: 2.4%
```

Sample Closure alarm email

```
-------- Original Message --------
Subject: [Alarm] Closure Power Fail Monitor signaled
   Date: 3 Jan 2009 12:26:02 -0800
   From: 2.1a <ether2.1a>
     To: poweralarm@mydomain.com

Probe: 2.1a
Closure1: "Power Fail Monitor"
State: "Closed"
Time: 14:26:45
Date: 01/03/09
```

Appendix - Applications for the closure alarm inputs

The closure alarm inputs on the Ethermometer are pulled-up TTL inputs. They are zener diode protected, but are not optically isolated. As such, voltage spikes including static discharge can damage the inputs and possibly the Ethermometer. Because of this we suggest ONLY using dry contacts (like normally-open switch or relay contacts) or open-collector ground sinks to trigger the closure inputs.

Some suggested applications:

1) Power fail sensor. Connect your Ethermometer to your UPS protected power. Use a 5Vdc or 12Vdc "wall-wart" plugged in to non-UPS-protected power to energize an appropriately rated (continuous operation) relay with Form-C contacts. Connect the normally closed and common contacts of the relay to one of the closure inputs on the Ethermometer. When power fails, the relay will de-energize, triggering the Closure input. When the power comes back on, the relay will open and clear the closure alarm. If you'd rather not build your own, our PF-1 is available pre-made and ready to connect.

2) Magnetic door switch. Wire the closure of a magnetic door switch to a closure input and get email alerts when the door is opened and/or closed (depending on the type of magnetic switch).

3) Many varieties of pressure switches can be wired to the closure inputs of the Ethermometer for alerts based on water pressure, air pressure, vehicle passage, and more.

4) Mechanical limit switches on machinery, connected to your Ethermometer's closure inputs can alert you by email when they close.

5) Light activated sensors, laser detector circuits, noise activated switches, moisture detectors, smoke detectors, manually activated switches, even "doorbell" switches can send you an email alert when they trigger the closure inputs of your Ethermometer.

6) Monitoring status closures from other equipment – many broadcasters monitor the status of their PPM encoders or carrier alarms with the ethermometer.

If you find the Ethermometer useful, PLEASE tell your favorite electronics / IT supplier about us! Have them visit ***www.etherstuff.com.***

About the temperature sensor cables:

If you are experienced at making telephone cables with RJ-11 connectors, you can make your own custom length sensor wires.

The wire used for the temperature sensor / closure input connections is six conductor flat phone hookup wire. If you only want to use the temperature sensor, with no closures, you can use the more common 4-conductor wire and connectors. With either type it is important that you orient the RJ-11 connectors so that the locking tabs are on opposite sides of the flat cable. Usually one side or the other will be rounded, or have a line that runs the length of the wire, or some other indication of which side of the wire you are looking at.

Appendix continued

Calibration (see page 7 of this manual for details on manual offset calibration)

A fully-saturated or super-saturated sodium chloride solution, made with table salt and distilled water, enclosed in a small space will assert a relative humidity of approx 75.3% at normal room temperatures. It is reasonably consistent (within two-tenths of a percent R.H.) from 68-80 degrees Fahrenheit.

Find a quart- sized plastic container with a lid. An empty quart-sized yogurt or sour cream container works well. Whatever copntainer you use should be taller than it is wide. Make sure it is clean. Carefully cut about an inch-long slit in the center of the lid. Pass the sensor cable's RJ012 connector through the slit from outside to inside of the lid. Connect the sensor probe to the connector you just passed through the lid.

Set the lid/probe assembly aside while you add salt to the container.
Add enough salt to be 1-1/2 to 2 inches deep. Pour in enough water to just barely reach the top of the salt.

Place the lid on the container so that the sensor hangs down inside the container but does not come in contact with the salt or water.

The better your seal where the sensor cable goes through the lid, the better your make-shift humidity calibration tub will work. Hot glue along the slit and around the cable where it goes through does a terrific job, but the lid will need to be carefuilly cut away from the sensor cable later to re-use it.

SMS to your cell phone via email:

Some cellular carriers have sms-email portals to enable direct email to cell phones via SMS. It is recommended that SMS messages be sent from an SNMP monitoring package instead of directly from your ET-2.

The following information is believed correct as of this writing, but may not have been verified and may be changed by the respective cellular companies at any time. All trademarks./ tradenames listed in this section are owned by the respective cellular companies they are associated with. If advanced protocols are used by the carrier, you may have to use your SNMP software or an email forwarding service/program to send sms messages.
T-Mobile: phonenumber@tmomail.net
Virgin Mobile: phonenumber@vmobl.com
Cingular: phonenumber@cingularme.com
Sprint: phonenumber@messaging.sprintpcs.com (not port 25?)
Verizon: phonenumber@vtext.com
Nextel: phonenumber@messaging.nextel.com
where phonenumber = your 10 digit phone number

Important:
Keep in mind that inbound SMS charges by the carrier may apply.
Be sure to check your cellular plan / contract. The repeat email timer setting for RH, Temperature, and Closure 1 & 2 can limit how often these messages are sent.

Appendix continued

Frequently Asked Questions

Why is the Power LED not blinking on my ethermometer RHT?
If you see activity on the green and yellow lights on the network interface, but none on the Power LED (which should blink approximately once per second) your sensor is not communicating with the Ethermometer RHT. Your connecting cable (or sensor) is faulty. See page 11 of the manual for details on the sensor cable. The ethermometer RHT will not operate (no web pages, no alarms) with-out the sensor attached and communicating.

Why do GMAIL, YAHOO mail, other "free" email services not work for email delivery?
This baffled us at first. It turns out that GMAIL and YAHOO Mail, and probably most other free email services use an extended set of server to server communication rules (not part of the SMTP standard) that the ethermometer is currently unable to support. Most company email servers fully comply with SMTP and will work just fine with the ethermometer.

How long can the sensor cable be?
This depends somewhat on the ambient electrical noise level in your facility. We have tested the original ET-2 (temperature-only) sensor cable to 100' in reasonably "quiet" environments. We believe the RHT-2 sensor cable should be error-free in most environments up to at least 20 feet.

How do I change the IP address of my ethermometer? You can down load the free Etherset utility to view or change your device's IP address so that you can browse to it's web interface. Subsequent changes can either be made with Etherset or using the Network Settings page (under Configuration) on the web interface. The Network Settings page is where you can disable DHCP and set up a static IP address for your unit if desired.

What is SNMP? And how is the Ethermometer RHT compatible? The Ethermometer is SNMP Version 1 compliant. SNMP stands for Simple Network Management Protocol; it is a standardized way for software to directly communicate with devices on a network. There are many flavors of SNMP servers / monitoring software available. Setting up and using SNMP requires specific IT knowledge, and is out of the scope of this manual.

What are the environmental tolerances/requirements of the sensor and unit?
The Ethermometer should not be installed in a wet environment. It will remain happy if kept at normal room temperatures, ideally below 90 degrees F. The sensor probe is not designed for immersion. It should be kept out of direct sunlight to avoid UV degradation of the plastic insulation materials. The acceptable operating temperature range of the probe is -30 to +150 degrees Fahrenheit.

Why doesn't my ethermometer show up when I try to find it with the Etherset utility?
This can occur when you have windows (or a third party) firewall enabled and you haven't "unblocked" Etherset. It can also happen if you have some VPN software packages installed. Win7 is not sup-ported at this time.

How do I set up emailed logs on the Ethermometer RHT?
See page 8 of the manual.

Troubleshooting

The power indicator normally blinks its "heartbeat" at approximately 1 beat (blink) per second whenever the unit is powered up and the sensor is connected. If the Heartbeats stops, check the telco style line cord that connects to the sensor. If the power indicator is not on and the XMT and/or RCV indicato does not light up when the unit is connected to an active LAN connection, check for proper power supply operation. The Condition Code on the Data webpage can also help troubleshoot issues with LAN configuration.
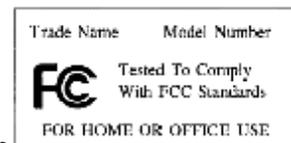
Warranty: Etherstuff products enjoy a 1 year limited warranty against manufacturing defects. Damage caused by abuse will not be covered by this warranty.

Disclaimer: The manufacturer reserves the right to make changes to this document or the product it describes without notice. The manufacturer shall not be liable for editorial or technical errors made herein. The manufacturer shall not be liable for incidental or consequential damages resulting from the furnishing, performance, or use of the product or this document. **Not for use in wet locations.**

FCC Part15 Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) This device may not cause harmful interference, and 2) this device must accept any interference received, including that which may cause undesired operation.
Etherstuff model ET-2

Specifications:

Power Supply Voltage:	9 - 12V DC or AC (internal rectifier/polarity protection)
Current requirements:	~50milliamps at 9-12 VDC
Ethernet Interface:	10BaseT
Protocols:	DHCP, DNS, SMTP, HTTP, SNMP v.1
Web Interface:	Temperature Graphing, Data Display, Configuration
Email:	Separate email destinations for temperature & closures
Temperature sensor:	Typically accurate to 0.5 degrees C at room temperature.
	Lead length can be up to 20' from ET-2RHT to sensor
	Uses Standard 6 conductor "telephone" cable and readily
	available connectors so you can make custom length cables.
	Range: -30 to +150 degrees F.
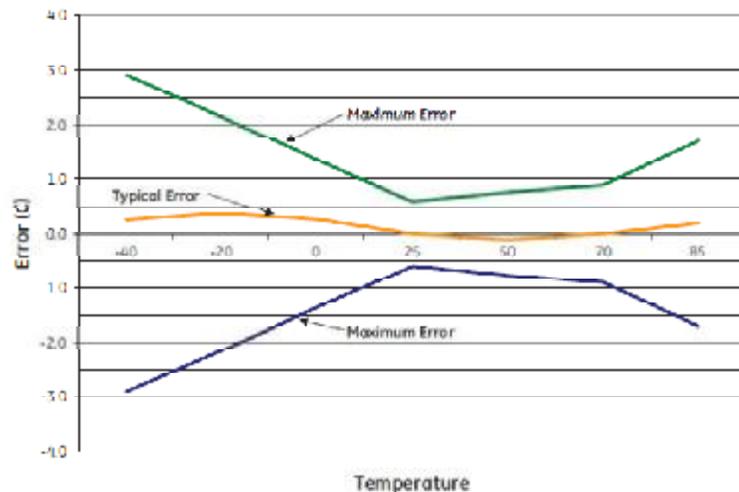
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