



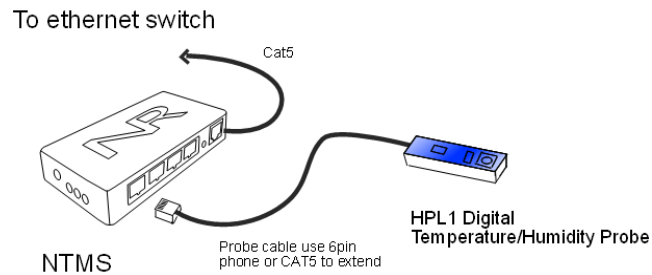
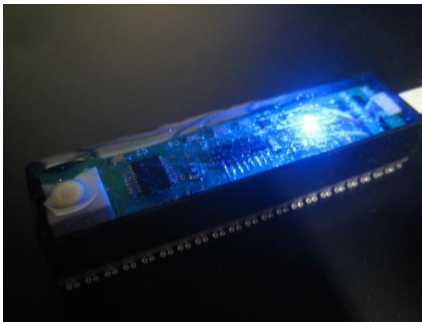
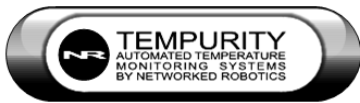
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## Digital Humidity Probe, HPL1 (#30009)

The Networked Robotics HPL1 Digital Humidity Probe enables the remote data collection and monitoring of both relative humidity and temperature via standard computer networks. The HPL1 is designed to be used in conjunction with the Networked Robotics NTMS (Network Telemetry Monitoring System) hardware and Networked Robotics Tempurity™ System software. The Tempurity System is designed for data collection and monitoring in FDA-regulated environments including pharmaceutical, medical, and food industries.



### Description

The LED in the digital HPL1 indicates at-a-glance the state of the operation of the humidity probe to the network. The view window shows blue when connected normally and flashes green when data is being collected from Networked Robotics' NTMS network hardware. The probe can be extended to up to 300 feet from the NTMS and probes can be patched via CAT5 cable plant to NTMS units mounted in network closets. Industrial Dual-lock® is used to attach the probe to a substrate so installation is quick and easy. Probes are coded with electronically unique readable IDs to enhance calibration quality and regulatory compliance.

### Packing List

This package includes the basic hardware you will need to connect the HPL1 probe to the NTMS.

- (1) HPL1 Digital Humidity Probe
- (1) RJ-45 Coupler for extensions

### Hardware Installation

There are three major steps in the installation of this hardware

- 1) Physical installation

- 2) Configuration of the Networked Robotics NTMS hardware to which the HPL1 is attached.
- 3) Manual testing of data collection via the network

Each of these steps, especially manual testing through the network, as described below, should be performed successfully before attempting to configure real-time data collection via the Tempurity System. Detailed information on configuring this monitored device through Tempurity is available in the [Tempurity System's User's Guide](#) (Networked Robotics document number "Tempurity-04-0006.5") which is available on the Networked Robotics web site.

## **1. Physical Installation**

### ***Probe Location***

Carefully select the location of the sensor. The white membrane in the tip of the probe allows humid air to reach the integrated circuit that determines the humidity measurement. The tip must not be blocked by samples or any other material.

The probe is water resistant and can be mounted outdoors. The white tip is resistant to the entry of water. It provides IP54 protection which protects against "splashing water". The HPL1 must not be submerged in any liquid.

Avoid the use of solvent vapors or other contaminants in cleaning. Certain solvents and plastics can release gases that bind with the polymer coating of the internal integrated circuit that produces the reading. Exposure to these substances will cause a shift in the humidity reading. For more information contact Networked Robotics.

### ***Room Humidity and Measurements via Wall Plates***


In offices or laboratories that are well populated with network jacks, humidity and room temperatures from every room in the entire building can be visible to anyone on the network within just a few hours. Using this method of installation, NTMS units are mounted on rack hardware and shelves in network closets. Each NTMS port is patched to an HPL1 via a network wall plate. The HPL1 can be attached directly to the wall plate using its Dual Lock® backing. This method allows very quick connect-time but is best implemented in offices or laboratories that are well-populated with network wall plates.

### ***Attaching the HPL1 Probe to the Inside of a Refrigerator***


To apply a Networked Robotics HPL1 digital temperature probe to the wall of your refrigerator first ensure that the refrigerator wall is dry. (If frost or condensation has built up on the wall, use a paper towel to dry it. In some cases you may want to briefly apply a gloved hand to the wall where the dual-lock will be affixed.)

## **2. Configuring the NTMS Physical Port for the Appropriate Data Collection Type**

Configure your NTMS network hardware for data collection from this type of instrument.

This is done by running the latest version of the NTMS Configuration Wizard  from any PC that is on the same subnet (behind the same router) as the NTMS to be configured. You can obtain the configuration wizard from the "download" section of the Networked Robotics web page. New sensor and interface types are being added periodically to the wizard so the screens below may change.

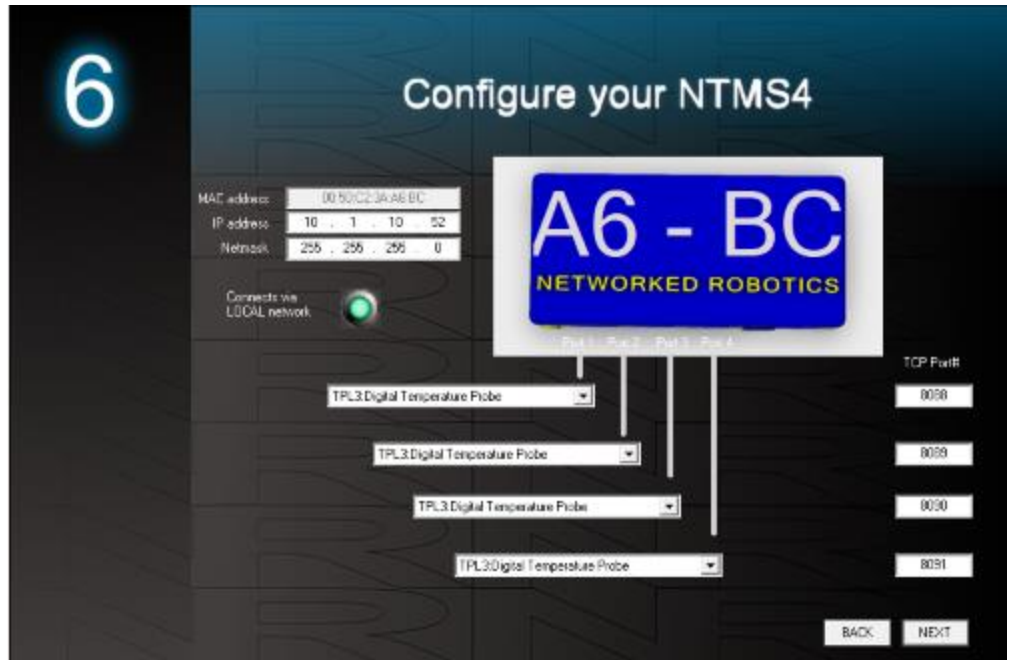
1. Run the wizard and verify that the NTMS to which the interface is attached is discovered. This NTMS must be running firmware revision 2.0 or higher. If it is

not, stop the installation and upgrade your NTMS hardware's firmware with the NTMS Upgrade Wizard  available from the Networked Robotics download-page. There are special precautions needed when upgrading an NTMS running firmware version 1.x to firmware version 2.0 or higher.

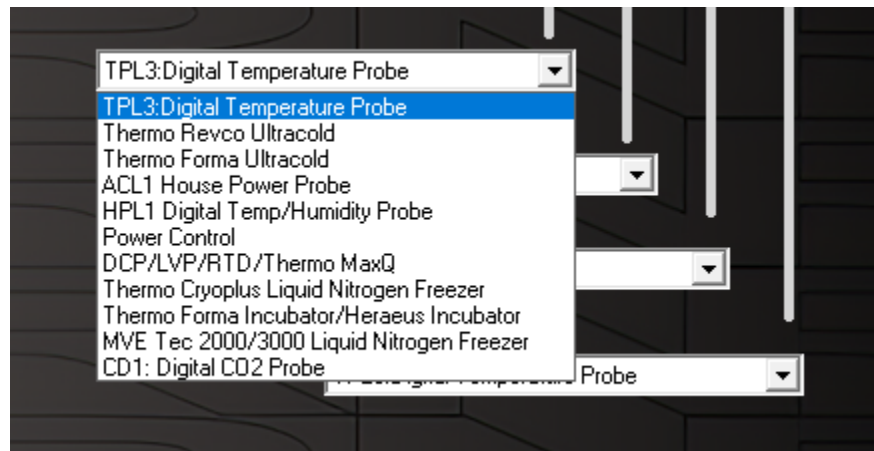
2.



3. Select the NTMS to which the interface is attached and proceed to the "NEXT" screen. (IP addresses must be set properly for your institution. If you are uncertain about the IP address to use, check with your network administrator.)



4. Click on the drop-down for the physical port on the NTMS where the probe is connected, and under the “Device Type” drop down, select TPL3.



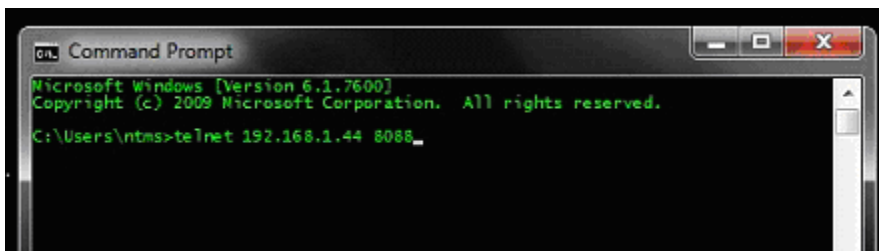
### **3. Testing Data Collection through the Network**

Once the configuration is complete, we recommend manually testing the ability to make network temperature measurements by using the common “Telnet” utility. This can be done from any networked computer with access to the NTMS network hardware.

Telnet is included with Windows, but you may need to activate it. On Windows 10 and 11 computers activate the Telnet utility as follows: 1 Start 2 Control panel 3 Programs 4 Turn Windows Features on or off 5 Check “Telnet Client” 6 Click Ok

1. From the Windows Command Prompt. On some Windows versions click the Windows key (start), then type “CMD”, and then click on the command prompt.
2. At the black screen type “Telnet” + *IP Port* (where *IP* is the IP address and *Port* is the network port address (e.g.8088) as selected by your use of the NTMS Configuration Wizard in screen 6 as described above.)

For example “Telnet 10.1.200.3 8088”



3. If you are successfully connected through the network, you will see a blank screen.
4. Type a capital “T” the command character for this probe. A temperature and the associated checksum value should be returned. Type capital ‘H’ and the relative humidity will be returned.

Failure to connect indicates a network problem. An “error” message indicates a problem in the connection at the instrument. If a temperature is not returned, check network parameters, network ports, firewalls and connections and try again. It is best to confirm successful network data collection using Telnet before attempting to configure data collection in the Tempurity System.

For more about debugging network connections to probes see the appendix of the Tempurity System User’s Guide.

## ***Configuring Data Collection in Tempurity: The Tempurity Server Configuration Utility***

In the Tempurity System, you will need to add two new monitored devices to the Tempurity Server configuration, one for temperature data collection and one for relative humidity data collection. See the Tempurity System User’s Guide and the section on server configuration for more information. The command character to acquire temperature is “T” and for humidity is “H”. The network addresses (IP and network port combination) will be the same for both of these Tempurity System monitored devices.

### ***Operation***

During normal operation, the blue LED on the HPL1 will be lit. The green LED will occasionally blink. The blink indicates active data read by the NTMS. If the blue LED goes out permanently, this is an indication that the probe is not connected properly to the NTMS. If the green light does not blink, then this is an indication that either the NTMS data port is not configured properly for collection from the HPL1 type of “monitored device”, or that the cable or other physical connection to the NTMS should be checked.

Regardless of settings in the Tempurity System, the NTMS network hardware continually reads humidity and temperatures from the HPL1 at about 3-second intervals. The most recently collected values are available for network-side-initiated data requests by the Tempurity System.

## **Storage and Cleaning Procedures can Affect the Reading**

Certain "outgassing" molecules, plastics and organic solvents in high concentration, can bind with the probe and affect the reading. The reading is permanently affected under normal environmental conditions. If your probe is to be stored for long periods or subject to harsh environmental conditions, it is best to block the white sensor cap with Kapton® tape. The below is excerpted from the Sensirion handling guide.

"Be particularly careful when using strong cleaning agents (e.g. detergents, alcohols, brominated or fluorinated solvents). Cleaning any part of a product might lead to high concentration of cleaning agents on the sensor."

"Do not use polyethylene antistatic bags (light blue, pink or rose color). Do not use adhesive tapes inside packaging."

"Use only recommended Kapton® tape Electrical Tape 92 by 3M™"

## **Reference**

### **Unique IDs**

All Networked Robotics hardware holds electronic globally unique IDs. HPL1 probe IDs are of the format:

**06 0000:0000:0002**

Where 6 indicates the product number, and the other characters indicate the electronic ID of the unit. Electronic IDs can be read through a Windows computer using the "Digital Probe Calibration Programmer" (Networked Robotics part number #30010) hardware through a USB connection.

### **Communications Specifications**

The HPL1 communicates with the NTMS using RS-232 at 1200bps. The HPL1 will accept the following case sensitive commands:

V: Display version info

H: Take combined Humidity, Temperature reading

A: Take readings at 1 second intervals until another key is entered.

### **Color Coding**

HPL1 probes are color coded by mesh at the sensor and at the connection to the NTMS according to the last digit of their electronically embedded Networked Robotics unique ID. Examples are below:

Last Digit of Electronic ID	Color	Last Digit of Electronic ID	Color
0 Green		8 Black	
1 Yellow		9 Dk Blue	

See [our support page on color codes](#) for a full list of all 16 possible color codes and the associated last digit of the Networked Robotics unique ID.

## **Physical Specifications**

Weight:	26.9 grams (9.5 ounces)
Length:	76.2 mm (3 inches)
Width:	19.0 mm (.75 inches)
Height:	9.9 mm (.39 inches)

Ingress Protection: IP54

## **Performance and Accuracy**

*The HPL1 probe measurement capability is built around the Sensirion SHT15 integrated circuit. Accuracy of the SHT15 is listed as constant at 2% error between 10 and 90 percent relative humidity. The Sensirion chip reports temperature to .1 degrees Celsius and has a distribution of accuracies based on the temperature. For instance, the chip has a temperature accuracy of .3 degrees at room temperature and 1.5 degrees Celsius at the maximum ranges of -40C and +125. See the data sheet of the Sensirion SHT15 integrated circuit for more detailed information.*

*See the section "Storage and Cleaning Procedures can Affect the Reading" above.*

## **Support**

If you need assistance with your HPL1 Digital Humidity probe or other products, contact Networked Robotics by phone at 877-FRZ-TEMP (877-379-8367) or by email at [support@networkedrobotics.com](mailto:support@networkedrobotics.com) or visit our web page at <http://www.NetworkedRobotics.com>.

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