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## Networked Robotics Interfaces to Custom Biogenic Systems Cryofreezers (#30039- #30040)

*These products enable the remote data collection of temperature and liquid level (usually liquid nitrogen level), from Custom Biogenic Systems cryofreezers via standard computer networks. The products are designed to be used in conjunction with the Networked Robotics NTMS4 (Network Telemetry Monitoring System) hardware and with Networked Robotics Tempurity™ System software. Tempurity is designed for network-based data collection and monitoring of real-time scientific data in FDA-regulated environments.*



### Description

As shown in the figure above, the “NTMS” side of the cryofreezer 4-20 ma interface connects to one of the four measurement ports of the NTMS and the other connector is attached to the appropriate cryofreezer 4-20 ma outputs on the back panel via a pair of wires.

### Versions

Product versions are differentiated only by the parameter obtained. Each must be connected to the appropriate output of the cryofreezer.

#### Product Number

#30039 Temperature (A or B)

#30040 Liquid Level

### Packing List

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

- (1) CBS Cryofreezer 4-20 ma Interface
- (1) Set of Connection Wires
- (1) CAT5E Cable
- (1) RJ45 Coupler for Extensions

## ***Data Collection from Any Combination of Monitored Devices***

Because each NTMS4 unit has 4 “universal” measurement ports, data from any combination of Networked Robotics interfaces to scientific instruments and sensors can be collected with a single unit. To collect all three reported possible outputs on a CBS freezer, you would need two Temperature versions for the A and B temperatures, and the Liquid Level version for the liquid nitrogen level, thus 3 of the 4 NTMS’ data collection ports would be required. The fourth port could be used for data collection from any other Networked Robotics interface.

## ***Installation***

The Networked Robotics CBS cryofreezer Interfaces are attached to a 4-20 milliamp source and to the Networked Robotics NTMS network hardware. There are three major steps in the installation of this product:

- 1) Physical installation
- 2) Configuration of Networked Robotics NTMS hardware to which the data source is attached
- 3) Manual testing of data collection via the network

Each of these steps should be performed successfully before attempting to configure and monitor real-time data via the Tempurity System. Detailed information on configuring data collection in Tempurity is available in the Tempurity Systems User’s Guide (Networked Robotics document number “Tempurity-04-0006.5”) on the Networked Robotics web site.

### ***1. Physical Installation***

#### ***Data/Electronic Connections***

This product can be installed as far as 100 meters from the Networked Robotics NTMS network hardware and connections are easily made and extended with CAT5 cable and the included couplers. You may wish to install the Networked Robotics NTMS hardware in a network closet, and then “patch” to this product at the monitored site via your company’s network cable plant.

The unit should not be subjected to extreme environmental ranges and should be placed in a location removed from possible exposure to high temperature, liquids, or other harsh environmental conditions.

Connect this product to one of the four ports of an NTMS using the CAT5 cable. Check that the NTMS is powered on, and verify that the data collection port is set properly for data collection from DCP/LVP (see below).

If the NTMS is powered on, and the CAT5 cable connection is made correctly between this product and the NTMS, the yellow LED will illuminate while it does an internal calibration. Then it will go out when it is ready to be polled. Every time the Cryofreezer Interface probe is polled by the NTMS, the LED will come on briefly.

Secure the unit to a convenient permanent location using the dual-lock provided on the back. The dual-lock sticks best to metal (except aluminum) or plastic surfaces. It may not adhere as well to surfaces such as drywall or wood, or to porous materials such as concrete. The probe can be removed from its dual-lock base for maintenance or cleaning.

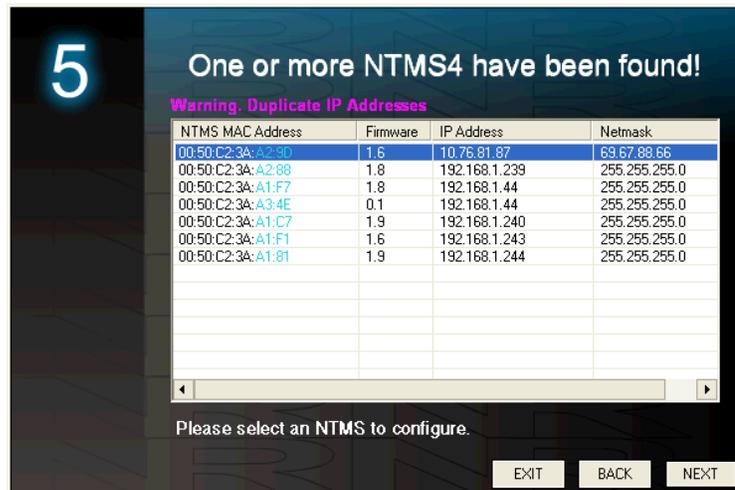
## ***Connections***

Attach the gray wire to the 4-20 ma (+) and the orange wire to the (-) of the relevant parameter. Attach the interface CAT5 cable to one of the four data collection ports of the NTMS.

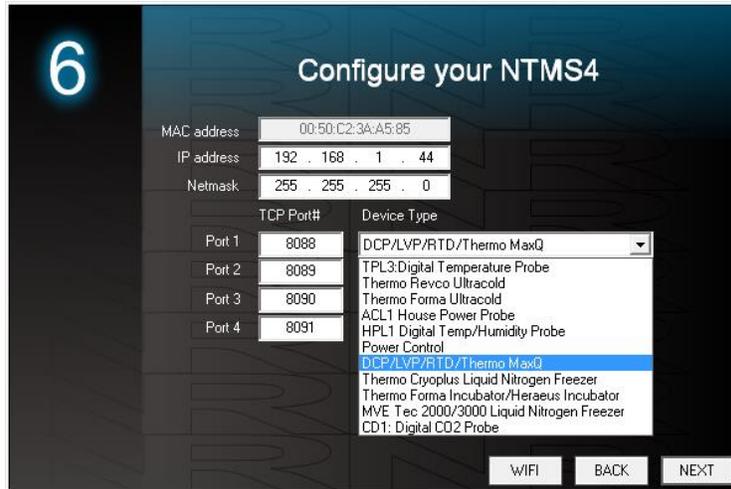
## 2. Configuring the NTMS

Configure your NTMS network hardware for data collection from this instrument. This is done by running the latest version of the NTMS Configuration Wizard  from any PC that is on the same subnet 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. 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.)
3. Click on the NTMS measurement port where the probe is connected, and under the “Device Type” drop down select “DCP/LVP” for Low Voltage Probe as shown below.



4.

5. Click “NEXT” to complete the NTMS configuration.

*Note: If the NTMS measurement port is configured as the incorrect interface type (The correct type is “LVP/DCP”) in the NTMS Configuration Wizard, then the yellow light will never activate despite having the correct physical connection to both the NTMS and the voltage source.*

### 3. Testing Data Collection through the Network

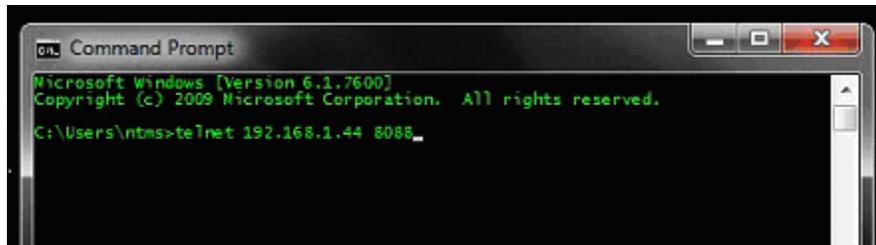
Once the configuration is complete as described above we recommend testing the ability to make network temperature and other measurements by using the “Telnet” utility from any PC. This commonly-used network utility sends simple network commands that will elicit a temperature or level reading from the probe.

Windows clients may need to enable the Telnet utility as follows (Windows 7,8,10): 1 Start. 2 Control Panel. 3 Programs and Features. 4 Turn Windows Features on or off (upper right of screen). 5 Check “Telnet Client”. 6 Press Ok.

1. From Windows choose “START”, then “RUN”, and then type “CMD” and press return.
2. In the black screen type “Telnet” IP Port, where IP is the IP address and Port is the network port address as selected by your use of the NTMS Configuration Wizard as described above.

e.g.

Telnet 192.168.1.44 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 device. A reading and the associated checksum value should be returned. For non-temperature values ignore the reported units. For more about debugging network connections to monitored devices see the Tempurity System User’s Guide.

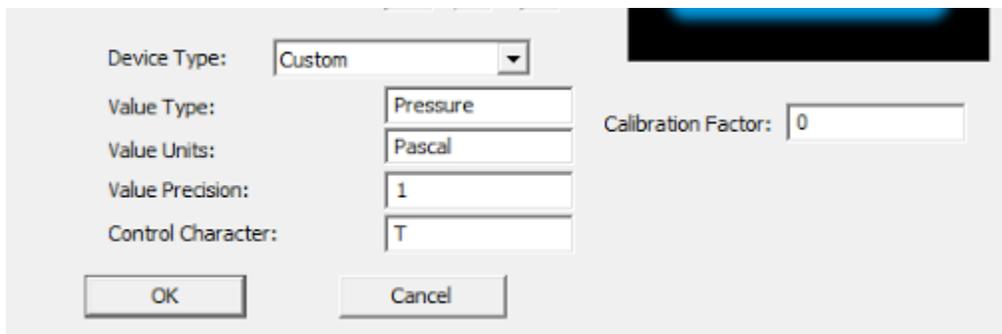
For use with the Tempurity System, you will need to add the network address (IP address and network port address) of the new monitored device (the CBS cryofreezer parameters) to the Tempurity Server configuration. See the Tempurity System User’s Guide section on server configuration for more information.

The control character for this interface is “T” for all products.

If the appropriate value is not returned, check network parameters, network ports, firewalls and connections and try again before attempting to configure data collection using Tempurity System software.

## **Configuring Data Collection in the Tempurity Server Configuration Utility**

Use of this product for liquid level requires the definition of a monitored device of type “Custom” in the Tempurity Server Configuration Utility . See the Tempurity System User’s Guide, especially pages 38 and 39 of the Version 2 User’s Guide (NR Document Number Tempurity 04 0006.5) and the section on Tempurity Server configuration for more information. The control character to acquire data from this product is “T”. The figure below shows how a Networked Robotics pressure probe is configured.



The screenshot shows a configuration dialog box with the following fields and values:

- Device Type: Custom
- Value Type: Pressure
- Value Units: Pascal
- Value Precision: 1
- Control Character: T
- Calibration Factor: 0

Buttons for OK and Cancel are visible at the bottom of the dialog.

In the case of this product for “level” the value type might be called “level” and the units should be inches. The precision and control character would be as shown.

## **Operation**

The Networked Robotics’ NTMS network hardware continually reads values from the cryofreezer at approximately 4 second intervals. The most recent value collected by the NTMS is available for network requests by the Tempurity System which by default collects remote data at one minute intervals.

During normal operation, the yellow LED will occasionally blink. The blink indicates an active data read by the NTMS. If the yellow LED does not activate, either the configuration of the NTMS port has been changed and is no longer correct or the connection to the NTMS is lost and the cables or NTMS status should be checked.

Data is truncated at the high and low data value limits provided by CBS. See vendor documentation for additional information.

## **Reference**

### **Power Supply**

*The unit derives its power from the regulated 5 volts DC supplied by the Networked Robotics NTMS hardware. It requires no external supply.*

### **Unique IDs**

Unique IDs for this product have not yet been formalized.

### **4-20 ma Resistive Load**

The resistive load for this 4-20 ma circuit is 499 ohms.

### **Product History**

This product is a version of the Networked Robotics' 4-20ma probe which has been modified for data collection from CBS cryofreezer 4-20ma outputs.

### **Physical Specifications**

Weight:	65 grams (2.3 ounces)
Length:	77.22 mm (3.040 inches)
Width:	66.22 mm (2.607 inches)
Height:	48 mm (1.890 inches)

### **Performance and Accuracy**

*The measurement capability of this product is a combination of the accuracy produced by CBS' 4-20 ma interface and the accuracy of our voltage sensor. Formal NIST-traceable calibration should be sought in regulatory environments Tempurity System software can adjust readings to maximize accuracy according to calibration results if needed.*

## **Support**

If you need assistance with your Networked Robotics Interfaces to CBS cryofreezers 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)

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