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Networked Robotics Interface to Chart Biomedical® MVE Cryofreezers and Dewars (#30021)

The Networked Robotics Chart Biomedical® MVE Cryofreezer interface collects operational data directly from MVE-brand cryofreezers and some types of dewars. This product is designed to be used as part of the Tempurity™ System for collecting and monitoring scientific data in real-time via standard computer networks. This interface is used in conjunction with the Networked Robotics NTMS (Network Telemetry Monitoring System) hardware. The Tempurity System is designed for use in FDA-regulated environments.

To ethernet switch
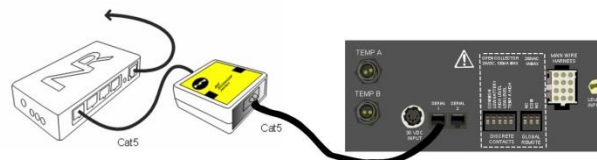
Description

This product enables network data collection directly from the data communications ports of all MVE liquid nitrogen cryofreezers and dewars with TEC3000 and TEC2000 controllers. MVE Cryosystem 6000 dewars are supported by this product. This interface is capable of collecting

instrument data: temperature A and B, liquid nitrogen level and yes/no fill status from the cryofreezer via a single connection to the controller. The data collected and stored in the Tempurity System will match the data on the instrument's front panel.

If your MVE model does not include a TEC controller then temperature can be collected from inside of the cryofreezer via the use of the Networked Robotics RTD probe (Networked Robotics Product #30014). You may also wish to use the Networked Robotics DCP Probe (Networked Robotics Product #30008) which can be connected to the alarm contact outputs of the MVE controller. Networked Robotics interfaces to scales are useful for monitoring liquid nitrogen level in dewars. A single NTMS4 device can enable data collection via all of our unique methods in any combination.

Packing List

This package includes the hardware you will need to connect MVE Cryofreezers to the NTMS.
- (1) MVE Interface
- (2) CAT5 Cable
- (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 MVE 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 cryofreezer 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

You will use the Networked Robotics NTMS4 network hardware and the Networked Robotics MVE interface shown below to enable data collection.

You will attach a CAT5 cable from the "serial" connector on the interface to the back panel of the cryofreezer or the TEC controller. Then attach another CAT5 cable from the "NTMS" port on the interface to an open data collection port on the Networked Robotics' network hardware.

Installation

The interface attaches via the dual-lock backing to metals (except aluminum) and plastic. It will not adhere to porous materials such as wood or drywall.

This interface can mounted up to 300 feet from Networked Robotics' NTMS hardware. One style of connection is to mount NTMS units in network closets and "patch in" connections to cryofreezers via the wall plates in your lab.

There are two types of controllers on MVE cryofreezers, cabinet-style freezers as shown below left on which data output connections are on the back of the unit, and vapor-style units, where the controller is elevated over the main nitrogen tank as shown below right. This interface is compatible with either style of freezer and with Cryosystem 6000 dewars (not shown).

MVE Cryofreezers with TEC3000 Controllers

The method of connection to freezers with TEC3000 controllers is shown below. Attach the MVE interface to any open NTMS port, and to the "Serial 1" connector on the back of the TEC3000 or instrument back panel.
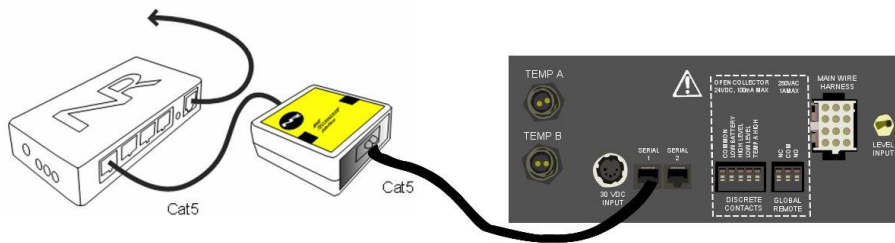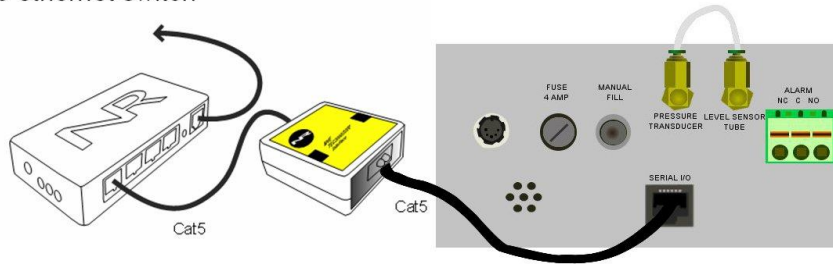

MVE Cryofreezers with TEC2000 Controllers

Connections to MVE freezers with TEC2000 controllers are made to the "Serial I/O" port of the controller.

To ethernet switch

Front Panel Setup

As long as the instrument is set to default values no front panel configuration is usually needed. If data is not collected as expected make sure that the serial data communication parameters are set to 9600,n,8,1 via the front panel.

The front panel of the TEC3000 controller is shown below.

For larger cryofreezer models you may need to set the units to "inches" rather than millimeters. The interface returns liquid nitrogen level values in the units that have been selected at the front panel. Because there is a 9999.9 value limit in the data reported, there are some larger MVE cryofreezer models for which data collection in millimeters is close to this limit. You should either use inches as the units for these instrument types, or enable high nitrogen level set points that are lower than this maximum.

Extensions

You can easily extend the length of any connection to 300 feet using the included RJ-45 coupler and standard network cable (CAT5 cable).
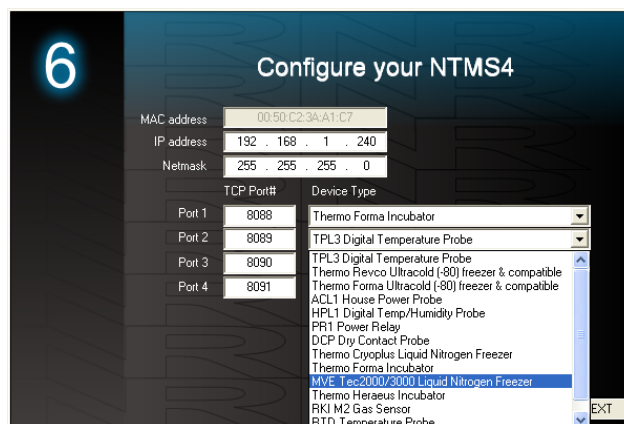
2. Configuring the NTMS

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 MVE 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.
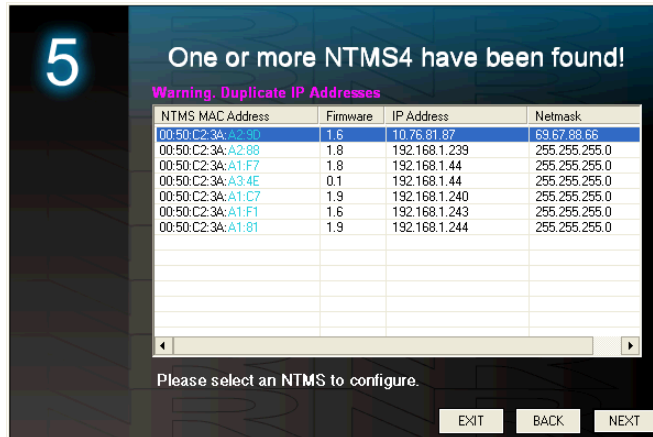
2. Select the NTMS to which the MVE is attached, and proceed to the "NEXT" screen. (IP addresses must be set properly for your institution. If you are uncertain about the IP address to use, check with your network administrator.)
3. Click on the NTMS measurement port where the probe is connected, and under the "Device Type" drop down, select "MVE TEC2000/3000Cryofreezers" or equivalent.


4. Click "NEXT" to complete the NTMS configuration.

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 "Telnet" utility from any PC. This commonly-used network utility sends simple network commands that will elicit a temperature reading from the MVE. For more about debugging network connections to probes see the appendix of the Tempurity System User's Guide.

On Windows 7,8,10 clients you may need to enable the Telnet utility as follows: 1 Start 2 Control Panel 3 Programs 4 Turn Windows Features on or off 5 Check "Telnet Client" 6 Press Ok.

1. From Windows click "START", then "RUN", and then type "CMD" and return.
2. At the black screen type "Telnet" *IP-Address Port* (where *IP* is the IP address of the NTMS to which the freezer is connected and *Port* is the network port address as selected by your use of the NTMS Configuration Wizard – usually 8088-8091 as shown above.)
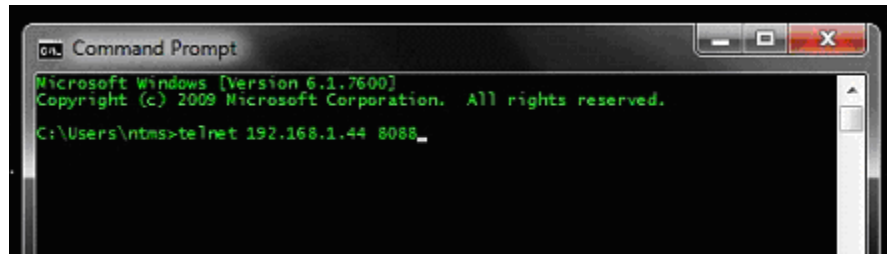
3. If you are successfully connected through the network you will see a blank screen.
4. Type a capital "T"; "L","F", or "B" the command characters for this interface. With "T" a temperature A and the associated checksum value should be returned.
5. Type a capital "L" and a level will be returned in the current units.
6. Type a capital "F" and the fill status (1, or 0) will be returned.
7. Type a capital "B" and Temperature B will be returned.

When data is returned as expected you are able to proceed to configure data collection in the Tempurity System. If data is not returned check your network configuration, cabling, and front panel setup and try again.

Operation

The NTMS takes readings from the MVE approximately every 3 seconds. The most recent values are available for network requests by the Tempurity System.

The OFAF (one fill all fill) protocol is not available on freezers to which this interface is connected.

Units for the "level" parameter are best set to inches. This interface reports values to 999.9 and thus has a reportable maximum level reading of 999.9. Some larger MVE models have reservoirs taller than this maximum when using centimeter units.

Tempurity records numeric values independent of units. If you change the units on the front panel of the instrument you must readjust the limits in the Tempurity System and restart the Tempurity Server.

The Importance of the "Fill Status" Parameter

Fill Status is an important parameter because it is the earliest indicator of a potential problem that will affect the temperature inside the cryofreezer. If the system runs out of nitrogen an alarm notification group set on the fill status parameter will send out notifications far before temperature or nitrogen level is out-of-range. When liquid nitrogen is low the freezer pumps new nitrogen in, setting the fill status parameter to 1 during this process. But if no liquid nitrogen is available then the fill status value will be set to 0 permanently until nitrogen is provided.

In the Tempurity System, set the allowed values to -100 as a low value and to 0 as a high threshold value.

Command Characters and Tempurity System Setup

The Tempurity System command character for temperature A is "T". Use the "Temperature" type in the Tempurity Server Configuration.
The Tempurity System command character for temperature B is "B". Use the "Temperature" type in the Tempurity Server Configuration.

The Tempurity System command character for nitrogen level is "L". Use the "Custom" type in the Tempurity Server Configuration.
The Tempurity System command character for fill status is "F". Use the "Custom" type in the Tempurity Server Configuration

Case matters.

Reference

Unique IDs

Unique electronic IDs are not available in this product.

Communications Specifications

The MVE interface operates at 9600, n, 8, 1 serial transmission rate.

Physical Specifications

Weight:	56 grams (2.0 ounces)
Length:	67.22 mm (2.647 inches)
Width:	66.22 mm (2.607 inches)
Height:	28 mm (1.102 inches)

Performance and Accuracy

This product reports the values that are derived by the MVE Cryofreezer and does not produce data independently. The Tempurity System reports the values that are determined by Chart Biomedical as displayed on the front panel of the MVE. See Chart Biomedical manuals for accuracy information.

Support

If you need assistance with your Networked Robotics Chart Biomedical MVE Cryofreezer interface or other products, contact Networked Robotics by phone at 877-FRZ-TEMP (877-379-8367) or by email at support@networkedrobotics.com

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