# Networked Robotics Interface to Adam Eqipment® Balances and Scales (#30042)

This product enables the continuous remote data collection of weight from Adam Equipment balances and scales. One example use for this product is for the weight-based monitoring of liquid nitrogen levels in storage dewars. This product is 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.
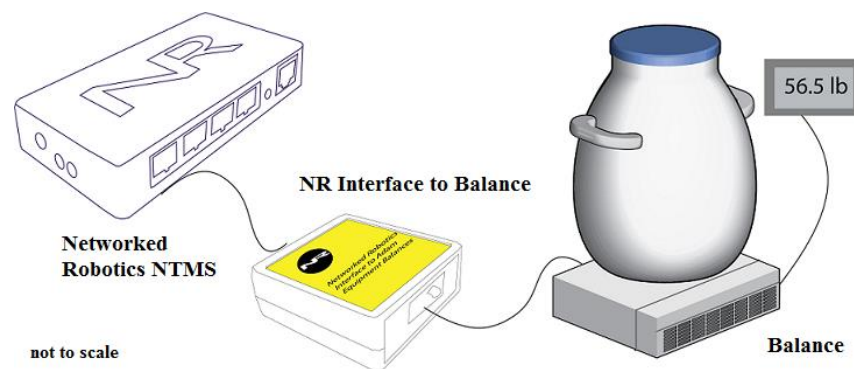
Description

This product currently supports the CPWPlus-series platform balances, and bench and floor scales, including the "P", "W", and "M" series from Adam Equipment. The "NTMS" side of the Adam Equipment Balance Interface connects to one of the four measurement ports of the Networked Robotics NTMS. The "Balance" side is connected to the serial digital output port of the scale or balance. This unit supports the data collection of weight in either kilograms or pounds. Information on the matching of scale model and size to dewar size can be found in the reference section of this document. Scale maximums in the CPWplus line range from 13 pounds to 660 pounds depending on model.

Packing List

This package includes the basic hardware you will need to connect the balance interface to the NTMS.
- (1) Adam Equipment Balance Interface
- (1) Balance interface Cable
- (1) CAT5E Cable
- (1) RJ45 Coupler for Extensions

Data Collection from Any Combination of Monitored Devices

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 NTMS unit.

Installation

The Networked Robotics Adam Equipment balance interface is attached to the balance and to the Networked Robotics NTMS network hardware. There are three major steps in the installation of this product:

1) Physical installation including configuration of scale parameters
2) Configuration of the Networked Robotics NTMS hardware to which the scale is attached
3) Manual testing of data collection via the network

The testing step 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
Configuring the Scale for Data Collection

The balance should be plugged into a power outlet. Although Adam Equipment balances can be battery-powered the unit should be permanently connected to power for continuous monitoring applications.

Data transmission parameters must be set correctly in the balance to enable network data transmission. Use the Adam Equipment CPWPlus balance operator's manual which is available at the link:
https://www.adamequipment.com/media/docs/Print%20Publications/Manuals/CPWplus_UM_EN.pdf to make the changes.

The balance must be changed from the default parameters to the continuous streaming mode of data output labeled "trn 2" in the balance.

The unit may only be monitored in units of kilograms. Ounces and pounds-ounces are not valid units for this interface. The following are instructions from the balance operator's manual:

Hold the [Tare/Zero] key and then press the [On/Off] key
Momentarily release the [Tare/Zero] key. The display
shows the first parameter - auto power off.

To exit the parameter setting at any time, press the
[Print/Hold] key.

To scroll through the user parameters, press the [Unit] key (which will advance to the next parameter). To return to normal weighing, turn the scale off and back to on again or press the [Print/Hold] key.

"Pr Off" should be selected.

Select the scale backlighting options (BL1, BL2, BL3) as desired

Units should be set to "On kg" or only kilograms. Make sure that all the other unit possibilities are set to off.

The Communication address should say "Add 0" for address 0.

The baud rate should say "b 2400"
Par should be "Par 1" (8 bits 1 stop bit)
Transmission mode should be changed to "trn 2" which is continuous output
Hold should be set to "hod 1" or no hold.

Data/Electronic Connections

This product can be installed as far as 100 meters distant from the Networked Robotics NTMS network hardware and connections are easily made and extended with CAT5 cable and the included couplers. As an option, you may wish to install the Networked Robotics NTMS hardware in a network closet, and then "patch' to the scales via this product at the monitored site via your company's network cable plant/wall plates.

The interface 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.

It is best for the weight display unit of the scale (the scale's controller) to be mounted in an area that is visible but not easily accessed, such as behind the scale. This prevents accidental tares.

Some versions of the interface may be required to be attached to certain kinds of scales. Some versions have 100 kg maximums and some have 1000 kg maximums. Make sure you have the right version for the type of dewar or other weight source.

If you are using the balance to monitor a dewar then place the dewar squarely on the balance. If possible attach a safety cord to prevent tipping or use Networked Robotics' proprietary weighing platforms.

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

Connect the 9pin serial connector to the balance platform or its controller depending on the model and use the screws on the connector to secure it. Use the included CAT5 cable from the connector to the connector labeled "Balance" on the interface.

If the NTMS is powered on, and the CAT5 cable connection is made correctly between this product then:

- The yellow LED will flash as data is acquired from the scale
- The red LED will flash as weight data is sent to the Networked Robotics NTMS network device
- The green LED will normally be on permanently, but will flash if a 0 or undefined weight reading is detected

Secure the interface 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 interface can be removed from its dual-lock base for maintenance or cleaning.

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.)
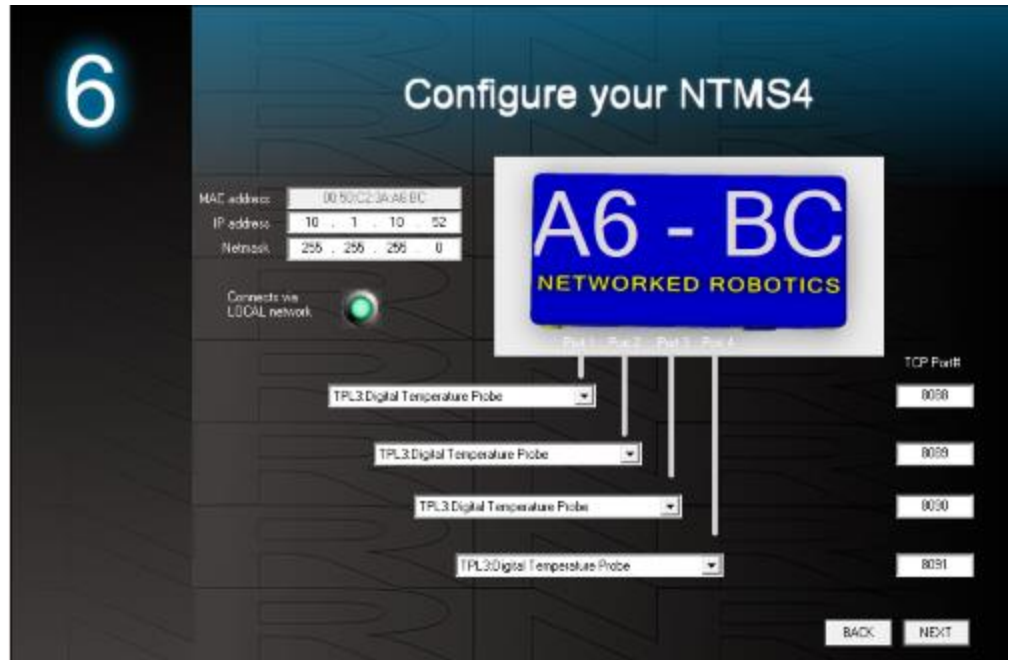
4. Click on the drop-down for the physical port on the NTMS where the probe is connected, and under the "Device Type" drop down, select DCP/LVP/RTD.
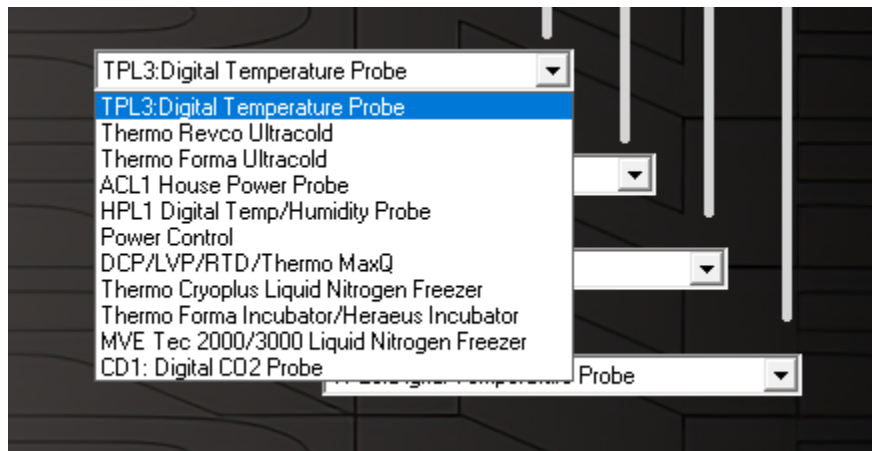

3. Testing Data Collection through the Network

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"
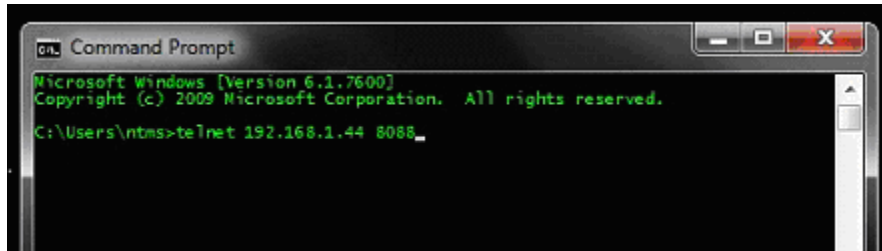
3. If you are successfully connected through the network you will see a blank screen.

4. Type a capital "T" the command character for this probe. A weight and the associated checksum value should 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.
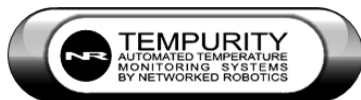
For more about debugging network connections to probes see the appendix of the Tempurity System User's Guide.

Configuring Data Collection in the Tempurity Server Configuration Utility

Use of this product for measuring weight 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 weight from this product is upper-case "T".**

The figure below shows how a Networked Robotics scale interface is configured. In the case of these interfaces the value type would be "weight" for example and the units would be "cg" as this interface reports in units of 10x kilograms.

Device Type:	Custom			
Value Type:	Weight		Calibration Factor:	0
Value Units:	Cg			
Value Precision:	1			
Control Character:	T			
OK		Cancel		

Operation

This unit either reports weights in kilograms or in kilograms x 10.

Periodically verify that both the red and yellow lights are blinking as expected.

Do not place any extraneous items on or touching the scale as it can artificially affect the weight.

The empty to full weight ratio in dewars between 10 liters and 50 liters is about 1 to 3. So about 2/3 of the weight of a full dewar is liquid nitrogen. Care must be taken to set the low limit weight for the device in the Tempurity System to above the empty weight of the dewar plus the expected weight of samples. If you know the model number of your dewar then empty and full weights are available in the online specifications by the manufacturer.

The Networked Robotics' NTMS network hardware continually reads values from the balance 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. When the interface is disconnected from the balance or if the power of the balance is off the yellow light will stop blinking.

During normal operation, the yellow LED will occasionally blink. The blink indicates an active data read from the balance. If the yellow LED does not activate then either the configuration of the balance serial port has been changed and is no longer correct for the interface or the connection is lost and the cable to the balance should be checked.

This interface will not send a 0 weight, so if a tare has occurred then no reading will be sent to the network. Eventually the Tempurity System will issue a communications alarm if data is not sent as expected.

Some Adam Equipment models will auto-tare in certain conditions when power is off and then restored. Higher end models will not auto-tare in this event.

Do not press the "Tare/Zero" button when the dewar is on the scale.

Adam Equipment scales have an internal battery that may need replacement after a year to three years or of operation.

Reference

Maximum Weight

Some versions have a maximum weight of 100kg and some have a maximum weight of 100kg.

Power Supply

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

History

This product is a modified version of the Networked Robotics Streamer Probe on which several other Networked Robotics products are based. The Adam Equipment scale parameters are set to "stream" data continuously.

Selecting a Scale: Links to Dewar Manufacturer Weight and Diameter Specifications

If you are using this product to monitor liquid nitrogen dewars care must be taken to use the correct scale with the correct-size balance platform for the base of each dewar. If your dewar uses a roller base or tipping stand you can use the CpwPlus W-series instruments from Adam Equipment which have a 500mm square base, a built-in rack to be vertically stable, and wheels to move the assembly easily. For available products see https://www.adamequipment.com/cpwplus-weighing-scales.Scale platform bases in this line are available in 300mm x 300m (11.81 inches), 500mm x 500mm (19.68 inches), and 900 x 600m. In general dewars to capacity 25 liters may use 300mm platforms, dewars with capacity from 25 to 50 liters should use 500mm platforms and dewars and tanks 50 liters or larger should use 900 x 600.

Dewars have a concave bottom with an internal ring that supports the weight of the tank on the floor. This ring has a few-inch smaller diameter than the width of a dewar. Therefore a few-inch smaller diameter scale platform can be used than the dewar diameter.

Unique IDs

All Networked Robotics sensor hardware holds electronic globally unique IDs. The IDs for these Adam Equipment interface products are of the format:

34:0000:0000:0302

Where the first field indicates the product number, and the other characters indicate the sequential electronic ID of the unit. Electronic IDs for most Networked Robotics products can be read through a Windows computer using the Networked Robotics "Calibration Programmer and ID Unit" (Networked Robotics part number #30010) hardware through a USB connection.

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

This product does not measure weight. It reports the weight determined by the scale. Thus the precision and accuracy of this product are generally that of the Adam Equipment balance or scale instrument. In some cases rounding or truncation of the lower significant digits may apply.

Support

If you need assistance with your Networked Robotics Adam Equipment Balance Interface or other products, contact Networked Robotics by phone at 877-FRZ-TEMP (877-379-8367) or by email at support@networkedrobotics.com