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DPS Air Differential Pressure Sensors (#30027-#30030)

This product enables the remote data collection of air or dry to dry differential pressure via standard computer networks. It is useful for real-time data collection from a wide variety of pressure sources including the air pressures serving clean rooms. The sensor is designed to be used in conjunction with the Networked Robotics NTMS (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.

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Description

As shown in the figure above, the "NTMS" side of the Differential Pressure Sensor connects to one of the four measurement ports of the NTMS and the top connector is attached to two sources of pressure, usually via tubing. The probe measures the resultant differential pressure between the two sources in Pascal units. A small airflow is required through the gas connections. The sensor is not designed for use at high altitude.

Versions

Product versions are differentiated only by the expected differential pressure*.*

 Product Number Range

  #30027 from -62 to +62 Pascal
  #30028 from -5 to 125 Pascal
  #30029 from -50 to 500 Pascal

#30030 from -100 to 3500 Pascal

Packing List

This package includes the basic hardware you will need to connect the Differential Pressure Sensor to the NTMS.

- (1) Differential Pressure Sensor
- (1) CAT5E Cable
- (1) RJ45 Coupler for Extensions

1/8" hose for air connections are not included.

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. Only one connection is shown in the figure on the first page.

Installation

The Networked Robotics Differential Pressure Sensor is attached to a pressure 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 pressure 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 pressure 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

The Differential Pressure Sensor 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 the Differential Pressure Sensor 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 the Differential Pressure Sensor 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 Temp:DCP (see below).

If the NTMS is powered on, and the CAT5E cable connection is made correctly between the Differential Pressure Sensor and the NTMS, the yellow LED on the Differential Pressure Sensor will illuminate while it does an internal calibration. Then it will go out when it is ready to be polled. Every time the Differential Pressure Sensor 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.

Air Connections

We recommend a hose with an inner diameter of 1/8 to 3/20 inch (3.18 to 3.8mm). Tube length up to 1 meter will affect the reading less than 1%, however a 4 meter length will affect the reading by -3.2%. A small amount of airflow is required through the sensor between the high and low connections. Neither air input can be blocked or plugged.

Attach the high pressure hose to the chamber with the highest pressure and the low pressure hose to the chamber with the lowest pressure. Although the sensor will report negative values the output is not calibrated in this case.

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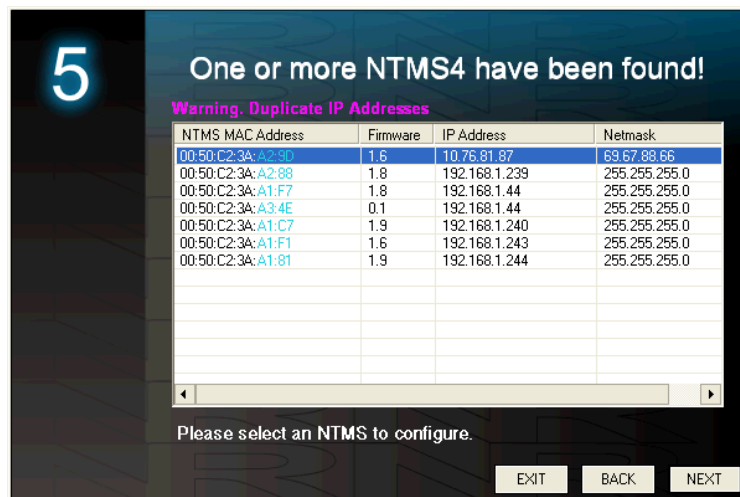
2. Select the NTMS to which the interface is attached, and proceed to the "NEXT" screen. (IP addresses must be set properly for your institution. If you are uncertain about the IP address to use, check with your network administrator.)

3. Click on the NTMS measurement port where the probe is connected, and under the "Device Type" drop down, select "DCP/LVP/RTD" as shown below.
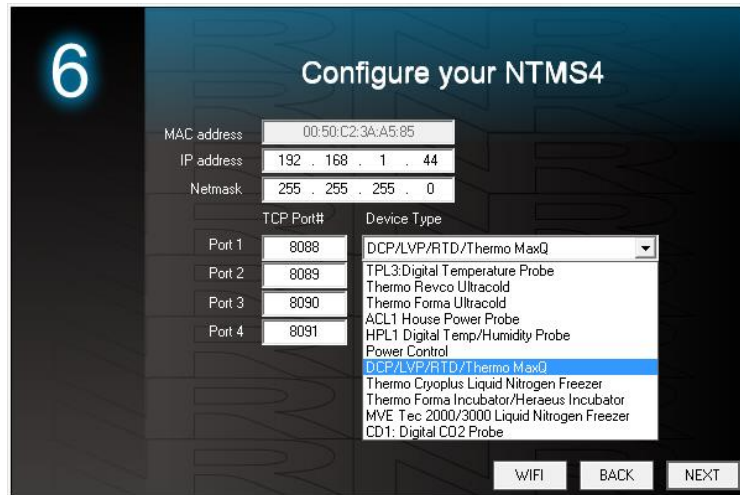
4. Click "NEXT" to complete the NTMS configuration.

Note: If the NTMS measurement port is configured as the incorrect interface type (The correct type is "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 pressure 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.
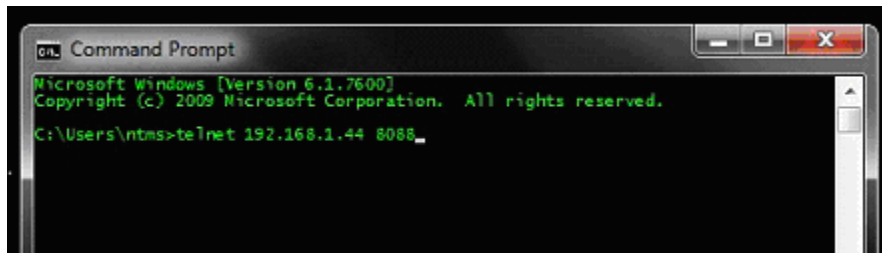
3. If you are successfully connected through the network you will see a blank screen.

4. Type a capital "T", the command character for this device. A pressure and the associated checksum value should be returned. 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 differential pressure sensor) to the Tempurity Server configuration. See the Tempurity System User's Guide section on server configuration for more information.
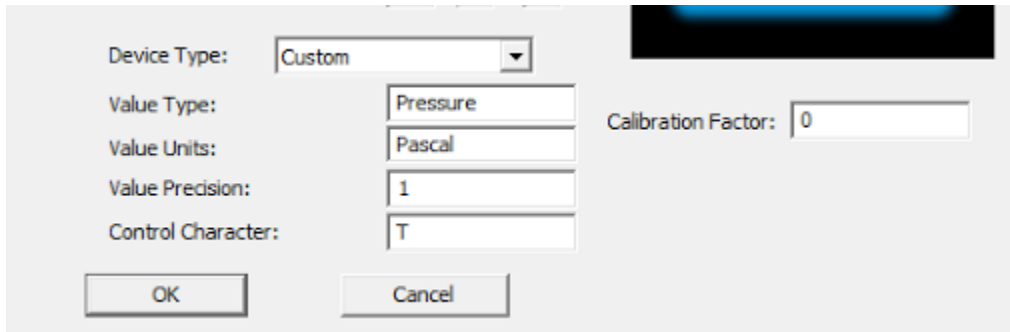
The control character for this interface is "T".

If a pressure 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 the Differential Pressure Sensor usually requires 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 pressures from a differential Pressure Sensor is "T". The figure below shows a potential configuration for a pressure sensor.

Operation

The Networked Robotics' NTMS network hardware continually reads pressure in Pascal units from the differential pressure sensor 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.

The product uses a dynamic measurement principle. In order to measure pressure it drives minute airflow through the sensor. Airflow through the unit is higher at higher differential pressures with a maximum of about 120 ml/min at full scale.

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 for a differential pressure sensor or the connection to the NTMS is lost and the cables or NTMS status should be checked.

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

All Networked Robotics hardware holds electronic globally unique IDs. Differential Pressure Sensor IDs are of the format:

0C:0000:0000:0302
or
42:0000:0000:0302

Where A 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 Networked Robotics "Probe 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

The measurement capability of this product is built around the Sensirion SDP-1000-series integrated circuit. The accuracy of the reading is about 1% at 10% or more of full scale. The reading is dependent on altitude. For accuracy information see the datasheet for SDP1000 / SDP2000 differential pressure sensors entitled: "Low Range Differential Pressure Sensor for Air and Non-Aggressive Gases" or the datasheet for the Sensirion 8xx Differential Pressure Sensors.

Support

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