

## Product Datasheet - Technical Specifications



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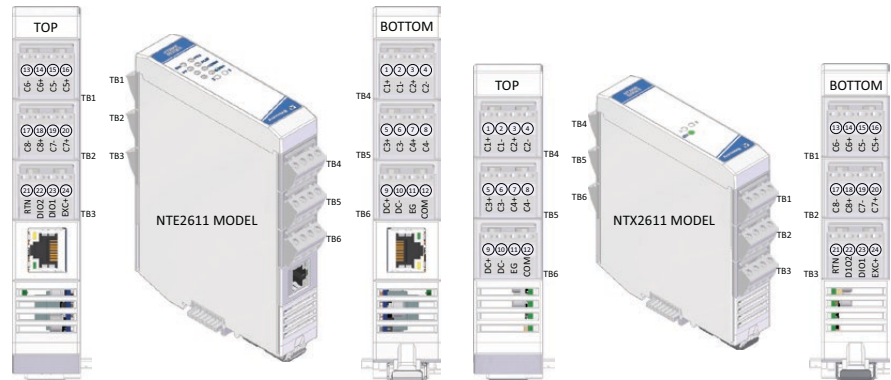
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# Ethernet I/O: BusWorks® NT Series

## NT2610 Ethernet Temperature Input Modules



EtherNet/IP



8 thermocouple / mV inputs ♦ 2 discrete I/O ♦ Ethernet I/O plus Expansion I/O ♦ Multi-protocol support

The BusWorks® NT2000 series offers a cost-effective, modular solution for Ethernet remote I/O systems. Two module types are available. NTE Ethernet models provide the protocol interface plus eight I/O signal processing channels. NTX expansion modules add eight more I/O channels when mated to any NTE Ethernet communication module.

NT2610 modules offer 8 thermocouple/millivolt inputs and 2 bidirectional discrete digital I/O channels. Each input can support a variety of sensor types. NTE Ethernet models provide a network interface to monitor temperature levels. Appending NTX expansion models can interface up to 32 TC/mV sensor inputs at a single IP address.

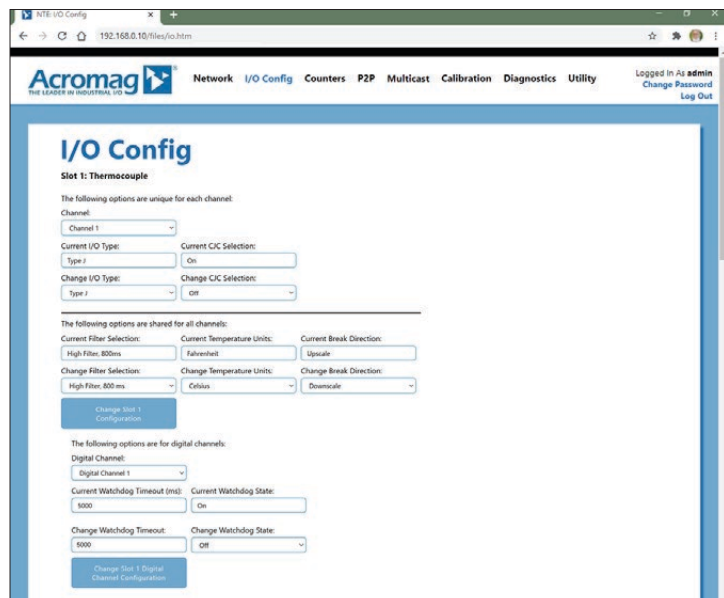
Applications include monitoring temperatures in tanks, pipes, motors, heaters, chillers, and many industrial processes. Many pressure, weight, flow, and chemical sensors also provide a millivolt output.

An isolated RS-485 bus links up to three expansion modules to the Ethernet module with bus connectors that join units along the DIN rail. This internal NT bus distributes power and communication between the modules. Users can mix analog, temperature, and discrete I/O modules across the NT bus.

Acromag's i2o® messaging technology allows direct peer-to-peer or multicast communication between remote modules without a master controller.

### Key Features & Benefits

- Configured over Ethernet using a web browser
  - Expandable I/O capacity, up to 64 I/O channels at one IP address
  - Field-selectable Modbus TCP/IP, \*Ethernet/IP, or \*Profinet communication
  - i2o peer-to-peer or multicast communication
  - Dual RJ45 ports enable daisy chain topology
  - Eight differential thermocouple/millivolt inputs
  - Accepts TC types J, K, T, R, S, B, E, or N and millivolt ranges of  $\pm 100\text{mV}$  or  $\pm 500\text{mV}$
  - Discrete I/O can provide limit alarms for sensor inputs or monitor TTL or 32V logic levels
  - \*OPC-UA, \*MQTT and \*RESTful API IIoT support
  - \*Conditional logic for rule-based I/O operation
  - Advanced \*alarm and \*data logging functions
  - 1500V isolation between I/O, network, and power
  - Thin 25mm housing with pluggable terminals
  - Wide temperature operation (-40 to 70°C)
  - CE compliant. UL/cUL Class 1 Div 2 and ATEX/IECEx Zone 2 approvals (pending)
- \* Coming soon. Consult factory for availability.



Easily configure I/O modules using any web browser.

**Acromag**   
THE LEADER IN INDUSTRIAL I/O

# Ethernet I/O: BusWorks® NT Series

## NT2610 Ethernet Temperature Input Modules

### Performance Specifications

#### ■ Ethernet Interface (NTE models only)

##### Communication

Configurable for Modbus TCP/IP, Ethernet/IP, or Profinet. Ethernet/IP, Profinet support coming soon.

10/100Mbps data rate, auto-sensing.

##### IP Address

Default 192.168.0.10. Configurable static IP or DHCP.

#### ■ Analog Inputs

##### A/D Converter

Eight TC/mV input channels differentially multiplexed to a 24 bit sigma-delta ADC (only 16-bits are used).

##### Input Sensor Ranges

Thermocouple types J, K, T, R, S, E, B, N. Millivolt ranges of  $\pm 100\text{mV}$  or  $\pm 500\text{mV}$  DC.

##### Input Accuracy

Better than  $\pm 0.05\%$  of span typical,  $\pm 0.1\%$  maximum. Thermocouple accuracy is  $\pm 0.5^\circ\text{C}$  or  $\pm 1.0^\circ\text{C}$  typical depending on type and temperature range.

##### Break Detection

Configurable for upscale or downscale open sensor or lead break detection.

##### Linearization (T/C Inputs)

Within  $\pm 0.25^\circ\text{C}$  of the NIST tables.

##### Thermocouple CJC Accuracy

-20 to  $+50^\circ\text{C}$ :  $\pm 0.5^\circ\text{C}$  maximum.

-40 to  $+70^\circ\text{C}$ :  $\pm 1.0^\circ\text{C}$  maximum.

##### Temperature Measurement Drift

$\pm 80\text{ppm}$ ,  $\pm 0.0080\%$ .

#### ■ Discrete Inputs (Active-Low)

##### Input Signal Voltage Range

0 to  $+32\text{V}$  DC.

##### Input Current

$280\mu\text{A}$ , typical at  $32\text{V}$  DC.

##### Input Signal Threshold

TTL compatible w/100mV of hysteresis, typical.

1.7V DC Low-to-High, 1.6V DC High-to-Low.

0.8V DC TTL LOW limit, 2.0V DC TTL HIGH limit.

##### Input Resistance

100K ohms typical (input only),  $\sim 10\text{K}$  ohms w/ tandem output using internal pull-ups.

##### Input Response Time

5ms typical, not including network time.

#### ■ Discrete Outputs (Sinking)

##### Output "OFF" Voltage Range

0 to  $32\text{V}$  DC.

##### Output "ON" Current Range

0 to  $250\text{mA}$  DC, continuous.

##### Output Rds ON Resistance

0.8 ohms typical, 1.6 ohms maximum.

##### Output Response Time

10ms typical. Does not include network time.

#### ■ General I/O

##### Input Update/Conversion Rate

Fresh data available to the network every 10ms.

##### Response Time from an Ethernet command

Less than 5ms, typical.

##### Excitation

External voltage of 4-32V required between I/O EXC and any RTN for D/I/O. Excitation must source 500mA minimum (at 32V). For both channels at 250mA max. rated load.

##### I/O Pull-Ups (Internal)

Each discrete I/O channel has  $10\text{K}\Omega$  pull-up to EXC to pull the tandem open drain output and input high/OFF.

#### ■ Environmental and Physical

##### Temperature and Humidity

Operating:  $-40$  to  $+70^\circ\text{C}$  ( $-40$  to  $+158^\circ\text{F}$ ).

Storage:  $-40$  to  $+85^\circ\text{C}$  ( $-40$  to  $+185^\circ\text{F}$ ).

Relative Humidity: 5 to 95%, non-condensing.

##### Isolation

1500V AC for 60 seconds and 250V AC or 354V DC continuous between I/O channels (group), each network port and power circuits.

##### Power Supply

9-32V DC SELV power wired to NTE model only.

Power to NTX models is via its NT bus connection.

##### Power Consumption

NTE2611:  $\leq 1.5\text{W}$  (input).

NTX2611:  $\leq 0.5\text{W}$  max. (each).

##### Dimensions (width x height x depth)

NTE:  $25 \times 116.9 \times 139.2\text{ mm}$  ( $0.98 \times 4.6 \times 5.48$  inches).

NTX:  $25 \times 116.9 \times 116.65\text{ mm}$  ( $0.98 \times 4.6 \times 4.59$  inches).

##### Weight

NTE: 0.5 lbs (0.23 kg).

NTX: 0.3 lbs (0.14 kg).

#### ■ Standards and Certifications

##### Electromagnetic Compatibility (EMC)

CE marked, per EMC Directive 2004/108/EC.

##### Safety Approvals

UL/cUL: Class I; Div 2; Groups A, B, C, D (pending).

ATEX/IECEx: Zone 2 (pending).

### Ordering Information

#### ■ Models

##### NTE2611-1111

Ethernet I/O module with dual RJ45 ports, 8 thermocouple/mV inputs and 2 discrete I/O

##### NTX2611-0011

Expansion I/O module with 8 thermocouple/mV inputs and 2 discrete I/O

#### ■ Accessories

##### 5035-369

##### 5035-370

Ethernet patch cable, low EMI, double-shielded. 3 feet (5035-369) or 15 feet (5035-370).

##### PS5R-VB24

Power supply, 24V DC, 15W output.

