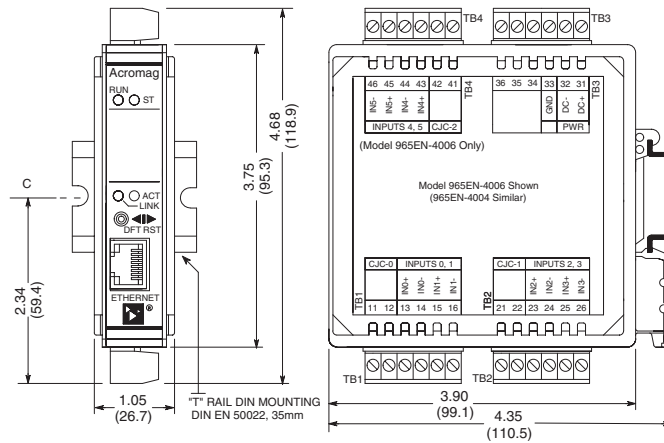


# Ethernet I/O: BusWorks® Series

## 965EN Ethernet Temperature Input Modules



Standard model includes cage clamp terminal blocks. Optional terminals are available (see Page 26).

**EtherNet/IP™**  
conformance tested

**Modbus/TCP**  
conformance tested

4 or 6-channel thermocouple/millivolt input ◆ Ethernet/IP, Modbus TCP/IP, i20 peer-to-peer messaging

### Description

These modules provide an isolated Ethernet network interface for up to six input channels. Differential inputs eliminate ground noise and each terminal block includes a cold junction compensation (CJC) sensor for more precise temperature measurements. Multi-range inputs accept signals from a variety of sensors and devices. High-resolution, low noise, A/D converters deliver high accuracy and reliability.

### Input Ranges

Ranges are selectable for a 3-channel group.

Thermocouple (user-selectable type)  
Type J, K, T, R, S, E, B, or N

DC Millivolts (user-selectable range)  
±100mV or ±1V DC

### Network Communication

EtherNet/IP or Modbus TCP/IP 10/100Mbps  
with automatic data rate negotiation

### Power Requirement

15 to 36V DC supply (2 Watts) required

### Approvals

CE/ATEX marked.  
UL, cUL listed, Class I; Div. 2; Groups A, B, C, D.  
EtherNet/IP, Modbus/TCP conformance tested.

### Key Features & Benefits

- Configurable from standard web browser
- Universal inputs support a variety of sensors
- Thermocouple break detection (upscale or downscale) identifies sensor wiring failures
- High-resolution 16-bit  $\Sigma$ - $\Delta$  A/D converters ensure precise, high accuracy measurements
- Wide operational temperature range

### Performance Specifications

#### ◆ Input

Input	Input Range	Accuracy (typical)
Type J	-210 to 760°C	±0.5°C
Type K	-200 to 1372°C	±0.5°C
Type T	-260 to 400°C	±0.5°C
Type R	-50 to 1768°C	±1.0°C
Type S	-50 to 1768°C	±1.0°C
Type E	-200 to 1000°C	±0.5°C
Type B	260 to 1820°C	±1.0°C
Type N	-230 to -170°C	±1.0°C
Type N	-170 to 1300°C	±0.5°C
Voltage	±100mV or ±1V DC	±0.1% of span

Cold Junction Compensation (CJC) Accuracy:  
±0.5°C.

#### Noise Rejection

Normal Mode: Better than 40dB @ 60Hz.  
Common Mode: Better than 140dB @ 60Hz.

#### Input Filter Bandwidth

-3dB at 3Hz, typical.

#### Input Conversion Rate

80mS per channel.

### ◆ Environmental

Ambient Temperature and Humidity  
Operating: -25 to 70°C (-13 to 158°F).  
Storage: -40 to 85°C (-40 to 185°F).  
Relative humidity: 5 to 95%, non-condensing.

#### Isolation

1500V AC for 60 seconds or 250V AC continuous.  
3-way isolation between I/O, network, and power.

### Ordering Information

NOTE: i20 function only available on 6-channel Modbus TCP/IP modules

#### ◆ I/O Modules

**965EN-4004**  
4-channel TC/mV input, Ethernet Modbus TCP/IP

**965EN-6004**  
4-channel TC/mV input, EtherNet/IP

**965EN-4006**  
6-channel TC/mV input, Ethernet Modbus TCP/IP, i20

**965EN-6006**  
6-channel TC/mV input, EtherNet/IP interface

#### ◆ Accessories

**Industrial Ethernet Switches**  
See Page 25.

**Hardware Accessories and Power Supplies**  
See Page 26.

**Software Support**  
See Page 27.

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