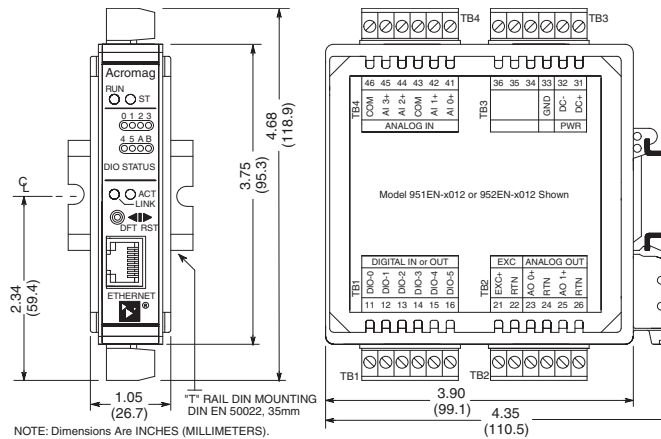


Ethernet I/O: BusWorks® Series

951EN, 952EN Ethernet Analog and Discrete I/O Modules



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

EtherNet/IP™
conformance tested

Modbus/TCP
conformance tested

4 analog inputs, 2 analog outputs, 6 discrete I/O channels ♦ Ethernet/IP, Modbus TCP/IP, i2o peer-to-peer

Description

Models

951EN: Combo module, analog current inputs
952EN: Combo module, analog voltage inputs

These modules provide an isolated Ethernet network interface for analog and discrete I/O signals. Multi-range analog inputs and outputs support a wide variety of industrial devices. High-resolution, low noise, A/D and D/A converters deliver high accuracy and reliability. 3-way isolation further improves system performance. The discrete I/O provide monitoring and control of on/off, high/low, or open/close industrial devices. Tandem I/O provides output level control and status verification in one unit.

The i2o function lets inputs on one module write directly to outputs on another module.

Analog Input Ranges

DC Current (user-selectable ranges)
 0 to 1mA, 0 to 11mA, 0 to 20mA, 4 to 20mA
 0 to 20 amps AC (with optional AC sensor)

DC Voltage (user-selectable ranges)
 ±1V, ±5V, ±10V DC

Analog Output Ranges

DC Current (user-selectable ranges)
 0 to 1mA, 0 to 20mA, or 4 to 20mA
 (0 to 625 ohm loads, typical)

Discrete I/O Range

0 to 35V DC active-high inputs
 Current sourcing (high-side switched) outputs

Network Communication

EtherNet/IP or Modbus TCP/IP 10/100 network

Power Requirement

15 to 36V DC supply (3.3 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
- EtherNet/IP or Modbus TCP/IP communication with automatic 10/100Mbps negotiation
- i2o technology for peer-to-peer communication without a network controller (see Page 6)
- Multi-function, multi-channel stand-alone module is very economical
- High-resolution 16-bit Σ - Δ A/D and D/A converters ensure precise measurements
- 0-35V DC solid-state logic interface can monitor or control a wide variety of devices
- Discrete I/O channels are individually configurable as inputs or outputs in any combination
- Bi-directional discrete I/O facilitates read-back monitoring of the output state
- Built-in 5.6K ohm pull-down SIP resistors (socketed)
- Selectable failsafe modes (0%, off, last-state, or pre-defined) help prevent unsafe conditions
- Compact packaging with pluggable terminals saves space and simplifies wiring
- Wide operational temperature range permits installation in extreme environments

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Performance Specifications

◆ General Specifications

See Page 9 for communication and other specs.

◆ Analog Input

Configuration

Four input channels. Input range is selectable as a 4-channel group.

Accuracy

Better than $\pm 0.05\%$ of span (0.1% for 0-1mA range), typical. Accuracy near or below 0mA or 0V is degraded if input COM shares AO/DIO RTNs.

Analog to Digital Converter (A/D)

16-bit $\Sigma\text{-}\Delta$ converter.

Resolution: 0.005% or 1 part in 20000.

Noise Rejection

Normal Mode: Better than 40dB @ 60Hz.

Common Mode: Better than 140dB @ 60Hz.

Input Conversion Rate

Less than 50mS per channel.

Input Impedance

DC current input (951EN): 49.9 ohms.

DC voltage input (952EN): Greater than 110.5K ohms.

◆ Analog Output

Configuration

Two output channels. Individually selectable ranges.

Accuracy

Better than $\pm 0.05\%$ of span (0.1% for 0-1mA range), typical.

Digital to Analog Converter (D/A)

16-bit converter.

Current Output Compliance

12V minimum, 13V typical.

Current Output Load Resistance Range

0 to 625 ohms, typical.

◆ Discrete Input

Input Type

Six independent, active-high, buffered inputs with a common connection. Built-in 5.6K ohm pull-down resistors socketed for 3-channel groups.

Input Signal Voltage Range

0 to 35V DC, maximum.

Input Impedance

100K ohms, typical.

Input Signal Threshold

TTL compatible with 100mV of hysteresis, typical.

◆ Discrete Output

Output Type

Six independent, open-source, MOSFET switches.

Output Voltage and ON Resistance

Up to 35V DC max. (0 to 330mA/ch continuous).

0.15 ohms maximum ON resistance.

◆ 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: i2o function only on Modbus TCP/IP modules

◆ I/O Modules

951EN-4012

Combo module, current inputs, Ethernet Modbus TCP/IP interface, i2o communication

951EN-6012

Combo module, current inputs, EtherNet/IP interface

952EN-4012

Combo module, voltage inputs, Ethernet Modbus TCP/IP interface, i2o communication

952EN-6012

Combo module, voltage inputs, EtherNet/IP interface

◆ Accessories

Industrial Ethernet Switches

See Page 25.

Hardware Accessories and Power Supplies

See Page 26.

Software Support

See Page 27.

i2o™ Input-to-Output Peer-to-Peer Communication



Acromag's i2o technology allows modules to talk directly to another module across any Ethernet media without a PLC, PC, or other controller in between. Input channels on one module can write to output channels on a remote module.