

# EtherStax® Series Ethernet I/O Modules

Modbus TCP/IP

Modbus UDP/IP

i2o® Peer-to-Peer



**Rugged, Stackable  
Analog and Discrete  
High-Density I/O**



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# Answers @ Acromag

*Experience counts:  
especially when  
selecting an I/O  
partner. And with  
50+ years of I/O  
experience, Acromag  
can help you improve  
reliability, increase  
productivity and  
reduce your costs.*



ISO9001  
AS9100



## Process Instruments, Signal Conditioners, and Distributed I/O



### Acromag: The I/O Leader

Acromag is a customer-driven manufacturer focused on developing embedded I/O products that provide the best long term value in the industry. Compare and you'll find that Acromag products offer an unmatched balance of price, performance, and features.

### 50 Years of I/O Experience

Acromag has more than 50 years of measurement and control experience. Since 1957, we have delivered nearly a million units to thousands of customers around the globe for manufacturing, power, environmental, transportation, and military applications.

### Quality with a 2-Year Warranty

We take every measure to guarantee you dependable operation and products that perform at or beyond the specifications. State-of-the-art manufacturing and military-grade components add an extra degree of ruggedness. Acromag is also certified for ISO9000/AS9100 quality control management procedures.

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### Online Ordering

For your convenience, Acromag provides full product documentation and pricing information on our website. You can obtain quotes or even place your order directly on our website.

### Fast Delivery from Stock

Most products can be shipped within 24 hours of receiving your order.

### Special Services

We are happy to accommodate your special requirements and offer the following services:

- Custom product development
- Custom calibration
- Source inspections, quality audits
- Special shipping, documentation
- Protective humiseal coating
- Plastic and stainless steel tagging

### Certification and Approvals

Many Acromag products carry globally recognized agency approvals and safety certifications.

- CE
- UL, cUL
- Atex
- CSA
- Ethernet/IP conformance
- Modbus conformance
- HART conformance

# Ethernet I/O: EtherStax® Series



## ES2000 Series Rugged, High-Density Ethernet I/O



### ◆ Discrete I/O Modules



### ◆ Analog I/O Modules



### ◆ Open Board OEM Versions



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# Ethernet I/O: EtherStax® Series

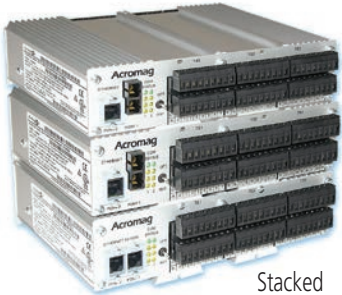
## ES2000 Series Rugged, High-Density Ethernet I/O



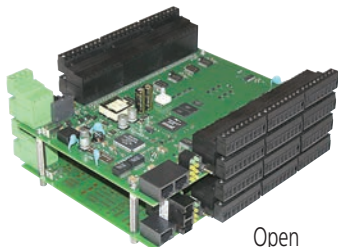
Front



Back



Stacked



Open

### EtherStax ES2000 Series Rugged, Stackable Ethernet I/O

EtherStax I/O blocks provide a ruggedized, high-density solution to interface many analog and discrete signals to your control system. A stackable aluminum housing maintains a small footprint and stands up to industrial environments. The Ethernet interface supports Modbus TCP/UDP/IP for reliable host data transfer or peer-to-peer communication. Web-based configuration simplifies setup with any web browser. For OEM systems, or those that require specialized housings, an open-board version without the enclosure is available. EtherStax are ideal for a broad range of measurement and control applications.

### Rugged, Industrial-Grade Design

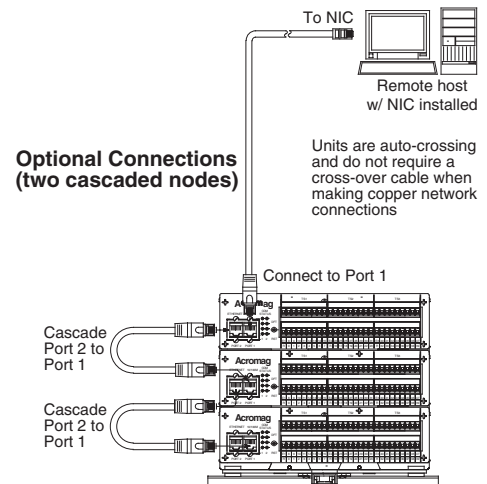
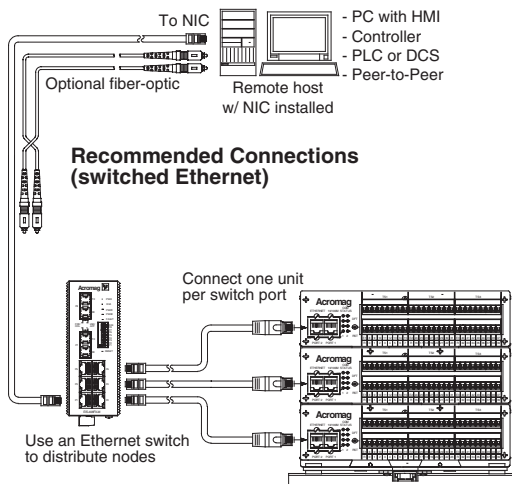
EtherStax are designed for high-reliability operation. Units feature 3-way isolation and surge protection. The I/O circuitry has over-temperature, over-voltage, and over-current protection. Redundant communication paths and DC power ensure dependable operation. If network communication is lost, outputs fail safely and a relay provides local alarming or shutdown functions.

### Stackable, High-Density I/O

A variety of models offer a mix of analog and discrete I/O interfaces with up to 96 channels on a single unit. Monitor sensors, control devices, or add local alarms. The units interlock for secure stacking that consumes little space when mounted on a surface or DIN rail.

### Key Features & Benefits

- High-density industrial Ethernet I/O:  
Put hundreds of I/O channels in less panel space.
- Stackable aluminum or open-board packaging:  
Choose industrial-strength or low-cost mounting.
- Rugged, shock and vibration-resistant design:  
Mounts on machinery, DIN rail, wall, or flat surface.
- Modbus TCP/UDP/IP or i2o peer-to-peer network:  
Reliable communication to host or between nodes.
- Easy web configuration with copy function:  
Quickly set up units with any web browser.
- Dual-port Ethernet hub or switch w/MDI/MDI-X:  
Get diagnostics, redundancy, and easy expansion.
- Ready for STP, RSTP, other redundancy schemes:  
Supports dual-path communication via copper and fiber.
- Local failsafe SPST 5A fault relay:  
Provides alarm/shutdown if network or power fails.
- Surge suppression and 1500Vrms isolation:  
Protects power, relay, I/O, and each Ethernet Port.
- Redundant DC power w/internal diode coupling:  
For "bump-less" transfer to back-up power.
- Extended operating temperature of -40 to 70°C
- Designed for CE and UL/cUL Class1 Div 2 ABCD



# Ethernet I/O: EtherStax® Series



## ES2000 Series Rugged, High-Density Ethernet I/O

### Features

**High-strength aluminum packaging**  
Dove-tailed grooves on top for stacking and interlocking units

**Dual Ethernet ports**  
Two Cu or one Cu / one fiber

**Locking Ethernet connection**  
RJ45 clip frame provides secure media connections resistant to shock and vibration when used with compatible cables.

**Default/Reset toggle switch**  
Restore communication to factory configuration or reset the unit.

**Port status LEDs**  
Indicate switch/hub mode, link, activity, 10/100Mbps, port faults

7.25" Depth  
2.444" Height

**Status LEDs**  
Power, I/O, relay status

**Fault relay**  
Local 5A Form A relay

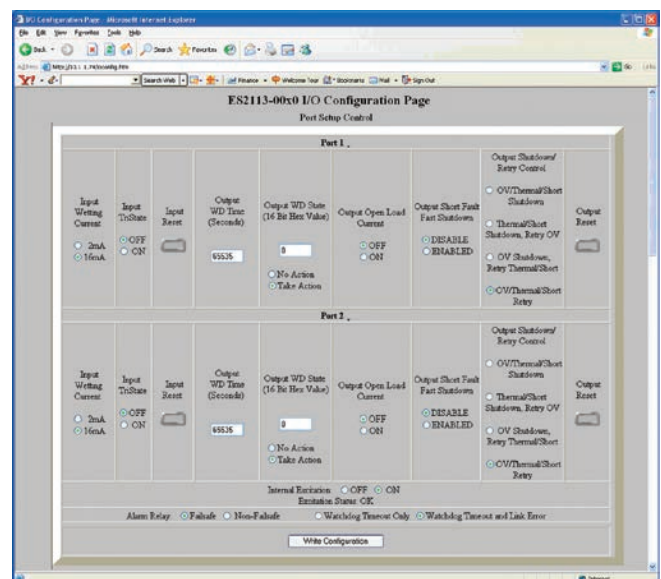
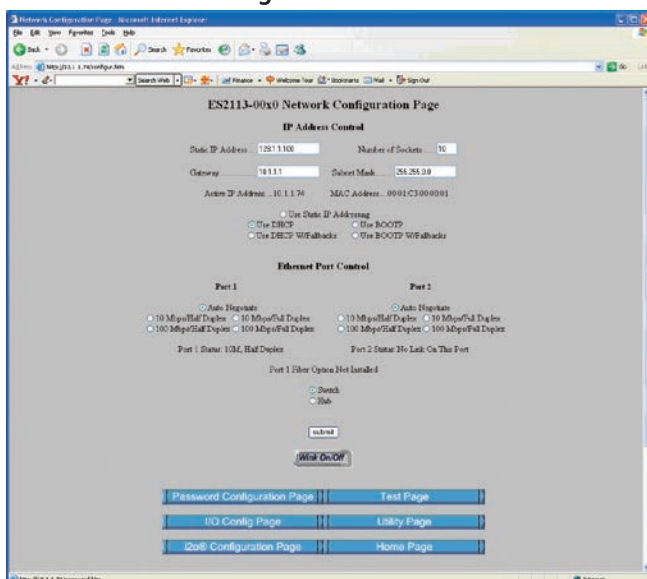
**High-density industrial I/O**  
Up to 96 channels per unit with pluggable terminal blocks.

8.226" Width

**Redundant DC Power**  
Pluggable terminals

**Earth ground terminal**  
One on each side

### Network and I/O Configuration Screens





# Ethernet I/O: EtherStax® Series

## Applications

### Ideal for remote I/O or control rooms

With a variety of I/O configurations and flexible signal ranges, EtherStax serves many industries.

#### End-user Industries:

- Power gen & distribution
- Water & wastewater
- Oil & gas refining
- Food, dairy, beverage
- Chemical/petrochem
- Metals processing
- Pharmaceutical
- Military & Aerospace

#### System Integrators:

- SCADA applications
- Building & energy mgmt
- Factory automation
- Specialty machinery

#### OEM Machinery:

- Engine & turbine controls
- Packaging equipment
- Semiconductor fab
- Switch gear equip.
- Boilers & furnaces
- Material handling

### Distributed I/O for Batch Processing

EtherStax I/O interfaces sensors, actuators, displays and other instruments to a PLC, DCS, or PC over your Ethernet network. Analog inputs monitor temperature, level, flow, pressure, voltage, current, and myriad process variables. Analog outputs control drives, pumps, valves, motors, and heaters, or write to displays and recorders. Discrete inputs detect open/close and change-of-state while discrete outputs perform on/off control.

### SCADA and Remote I/O

In addition to all the functions already mentioned, EtherStax are ideal for supervisory control and data acquisition at remote sites. Units tolerate -40 to 75°C allowing outdoor mounting. Flexible, redundant power supports battery operation. Multi-media capability enables use of copper, fiber-optic, or wireless Ethernet networks to eliminate the high cost of leased lines.

### Discrete Manufacturing

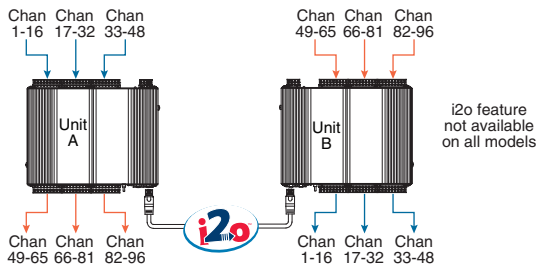
EtherStax models with high-density discrete I/O provide a cost-efficient solution for automated operations such as machining, assembly, and packaging. These compact units can mount on machinery without worry of electrical noise, high voltage surges, or vibration affecting performance. EtherStax have a high level of immunity and resistance to transient signals from solenoids, motors, and magnetic fields.

### Ethernet-Enable your OEM Machinery

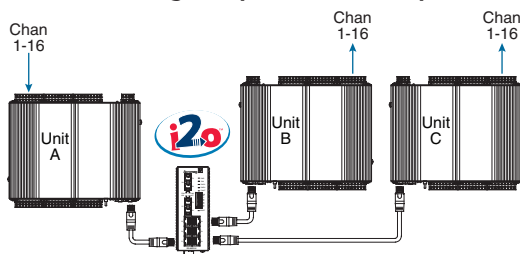
Make your machines Internet-ready with EtherStax and monitor operation from any PC with an Ethernet link. The rugged aluminum housing can bolt directly to your equipment. Alternatively, the open-board version can mount in a NEMA enclosure or inside your machine. Resistant to shock and vibration, EtherStax units provide dependable operation even on moving machinery.



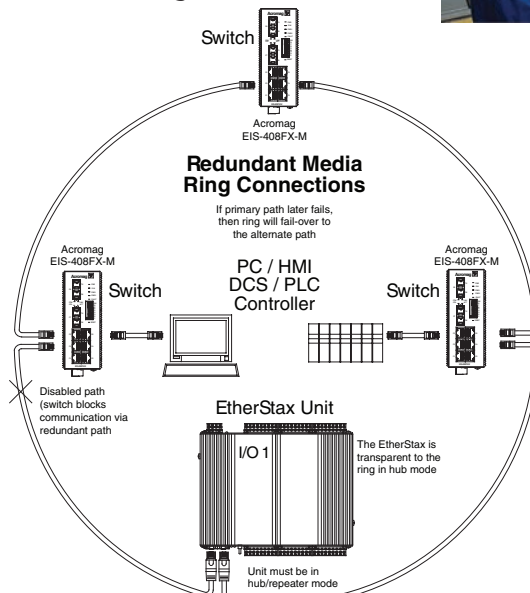
### Peer-to-Peer Bi-Directional Communication



### Peer-to-Peer Signal Splitter (dual outputs)



### Redundant Ring Connections





# Ethernet I/O: EtherStax® Series



## General Operation and Performance Specifications

### General Specifications

For information about specific units, please refer to the model data sheets or manuals.

#### ◆ Inputs and Outputs

See individual model data sheets for details.

#### ◆ Enclosure and Physical

##### Dimensions

8.226 inches wide x 2.444 inches tall x 7.25 inches deep. Units stack together on 2.175 inch centers.

##### I/O Connectors

Plug-in terminal blocks rated for 15A/300V; AWG #12-24 stranded or solid copper wire.

##### Network Connectors

See Ethernet Interface

##### Enclosure Material

Extruded aluminum, 6063 T6 alloy, silver anodized finish.

##### Printed Circuit Boards

Military grade fire-retardant epoxy glass per IPC-4101/98.

##### Safety Approvals

CE marked. UL/cUL Listed.

Hazardous Locations:

Class 1; Division 2; Groups A, B, C, and D.

#### ◆ Environmental

##### Operating Temperature

-40 to 70°C (-40 to 158°F).

##### Storage Temperature

-40 to +85°C (-40 to +185°F).

##### Relative Humidity

5 to 95%, non-condensing.

##### Power Requirements (Unit Main)

18-36V DC.

Redundant, diode-coupled terminals.

See individual model data sheets for power specifications.

##### Isolation

I/O, power, relay, and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC.

##### Installation Category

Designed for Pollution Degree 2 environment with an Installation Category II rating (over-voltage category).

##### Electromagnetic Interference Immunity (EMI)

I/O have resistance to inadvertent state changes with interference from switching solenoids, commutator motors, and drill motors.

##### Electromagnetic Compatibility (EMC)

Meets EN50082-1.

##### Electrostatic Discharge (ESD) Immunity

Meets EN61000-4-2.

##### Radiated Field Immunity (RFI)

Meets EN61000-4-3 and ENV50204.

##### Electrical Fast Transient Immunity (EFT)

Meets EN61000-4-4.

##### Conducted RF Immunity (CRFI)

Meets EN61000-4-6.

##### Surge Immunity

Meets EN61000-4-5.

##### Emissions

Meets EN61000-6-4:2007.

##### Radiated Frequency Emissions

Meets CISPR16 Class A

##### Shock and Vibration Immunity

Rating for single surface-mount unit in enclosure.

Mechanical Shock: 50g, 3ms, with 3 half-sine shock pulses in each direction along 3 axes

(18 shocks), and 30g, 11ms, with 3 half-sine shock pulses in each direction along 3 axes (18 shocks), per IEC60068-2-27.

Random Vibration: 5g sinusoidal & 5 grms

random vibration 10-500Hz, in 3 axes at

2 hrs/axis per IEC60068-2-64 & IEC60068-2-6.

#### ◆ Ethernet Interface

##### Network Connector (Copper)

8-pin RJ-45 sockets for 10Base-T/100Base-TX connections. Wired MDI-X by default but includes automatic MDI/MDI-X crossing.

##### Network Connector (Fiber)

Duplex SC-type, multi-mode transceiver for IEEE 802.3u 100Base-FX cable connections.

##### Protocol

Modbus TCP/IP or UDP/IP with integrated web-browser reconfiguration.

##### i2o Peer-to-Peer Communication

Supported on select models only.

See individual model data sheets for details.

##### IP Address

Default mode static IP address is 128.1.1.100.

##### Port

Up to 10 Modbus TCP/IP sockets supported. Uses port 502 (reserved for Modbus).

##### Transient Protection

Transient voltage suppressors are applied on all ports (power, I/O, Ethernet ports).

##### Data Rate

Switch mode: auto-sense 10Mbps or 100Mbps on copper connections, 100Mbps on fiber-optic connection.

Hub/repeater mode: fixed at 100Mbps and auto-negotiation does not apply.

##### Duplex

Switch mode: auto-negotiated, full or half duplex.

Hub/repeater mode: only half-duplex and auto-negotiation does not apply.

##### Compliance

IEEE 802.3, 802.3u, 802.3x.

##### Network Distance

Distance between two devices on an Ethernet network is generally limited to 100 meters using copper cable, and 2km using multi-mode fiber optic cable. Distance may be extended using hubs and switches.

##### Address

IP address can be preset by the user (static) and loaded from internal non-volatile memory, or it can be automatically acquired at startup via a network server using a BOOTP (Bootstrap Protocol) or DHCP (Dynamic Host Configuration Protocol). Includes default mode toggle switch to revert unit to a "known" fixed static IP address of 128.1.1.100, useful for trouble-shooting purposes.

## Ordering Information

See individual model data sheets for details.

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# Ethernet I/O: EtherStax® Series

## Easy Peer-to-Peer Communication with Acromag i2o®

### i2o input-to-output messaging

Acromag's i2o technology is the easy way to transmit input values for remote output without a PLC, PC or master CPU.

With i2o, many Ethernet I/O modules have the ability to operate like a long-distance transmitter. You can convert your sensor inputs at Point A to process control signals at Point B. Or, you can monitor discrete devices at one site by reproducing the discrete levels with a relay output at another location.

### Use your existing Ethernet lines to save time and wiring expenses

Connect input modules to output modules using your existing copper/fiber infrastructure or with a single new cable. Multiple I/O modules can be multiplexed through a switch or wireless radios.

### No complicated controllers.

### No software. No programming.

Acromag Ethernet I/O modules have a built-in web page making it simple to configure using your standard web browser. Just click a few menu settings, enter the IP addresses, and you are done. Fast and easy.



BusWorks 900EN Series I/O Modules

### Up to 12 channels per module and reliable, failsafe communication

Monitor up to a dozen devices with a single pair of I/O modules. Discrete I/O modules have twelve channels that you can set up as inputs or as outputs in four-channel groups. This allows bi-directional communication between two modules. Analog input modules measure up to six current, voltage, thermocouple, or RTD sensor signals. This data is then transmitted to a six-channel analog output module providing DC current or voltage output signals.

### Wire-saving applications

Our i2o technology lets an input module speak directly to an output module. It is ideal for non-critical projects that don't need a PLC or PC master. Reproduce remote signals based on timed or event updates.

- Remote monitoring of process variables (temperature, pressure, level, flow) and discrete devices
- Remote data display, recording, alarms, or control
- Signal splitters
- Analyzer system monitoring
- Power and water utility monitoring
- Tank level, pump, and valve control
- Remote monitoring of motor loads and contactor status
- Remote control switching stations
- Environmental control systems
- Process shutdown, alarming, and annunciator systems
- RFID systems

## Peer-to-Peer Communication

### Analog Inputs

4-20mA,  
0-10V DC,  
thermocouple,  
RTD/resistance

### Discrete Inputs

on/off,  
high/low,  
open/close,  
momentary  
push-buttons

### Any Ethernet Media

Copper, fiber,  
wireless, or Internet

### Analog Outputs

proportional  
4-20mA or  
0-10V DC

### Discrete Outputs

on/off,  
high/low,  
open/close



EtherStax I/O® also supports i2o

**Input-to-Output**  
input channel writes  
to the output channel  
(uni-directional or bi-directional communication)



# Ethernet I/O: EtherStax® Series



## Acromag i2o® Technology for Peer-to-Peer Communication

### ES2000 Series Units with i2o

#### ◆ Analog Input Modules

ES2153

16 analog current inputs,  
16 analog voltage or 8B inputs

#### ◆ Analog Output Modules

ES2171

16 current outputs

ES2172

16 voltage outputs

#### ◆ Analog I/O Modules

ES2151

16 analog current inputs,  
16 analog voltage or 8B inputs,  
16 analog current outputs

ES2152

16 analog current inputs,  
16 analog voltage or 8B inputs,  
16 analog voltage or 8B outputs

#### ◆ Discrete I/O Modules

ES2113

96 solid-state input/outputs

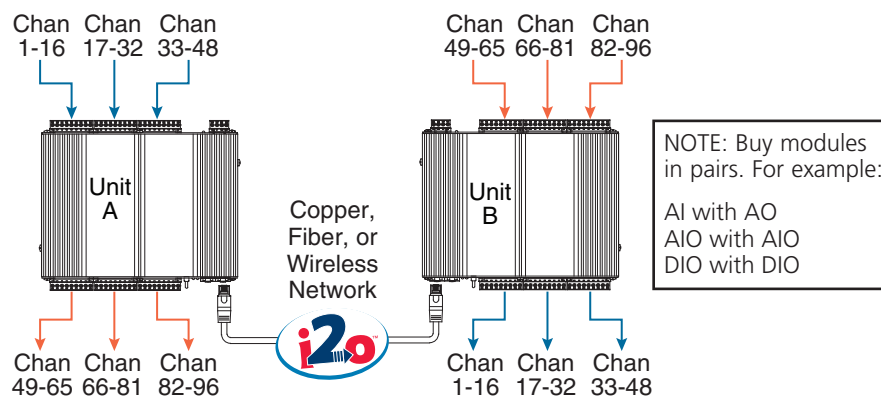
ES2117

32 solid-state inputs

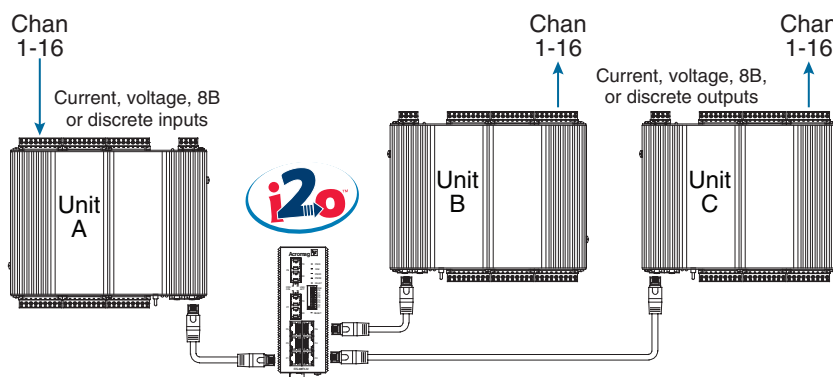
16 relay outputs



### Installation #1: Peer-to-Peer Bi-directional Communication



### Installation #2: Peer-to-Peer Signal Splitter (dual outputs)



i2o® Configuration Page						
Port Number	% Span Change	Update Time(100mS)	Map To IP Address	Map To Holding Register	Mapping Method	Map To Internal Outputs
Port 1 Voltage	0.0 0.0	150 0	128.1.1.102 0.0.0.0	40351 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	<input type="radio"/> NO <input type="radio"/> YES
Port 2 Voltage	0.0 0.0	0 0	0.0.0.0 0.0.0.0	0 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	<input type="radio"/> NO <input type="radio"/> YES
Port 1 Current	0.0 0.0	0 0	0.0.0.0 0.0.0.0	0 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	
Port 2 Current	0.0 0.0	0 0	0.0.0.0 0.0.0.0	0 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	

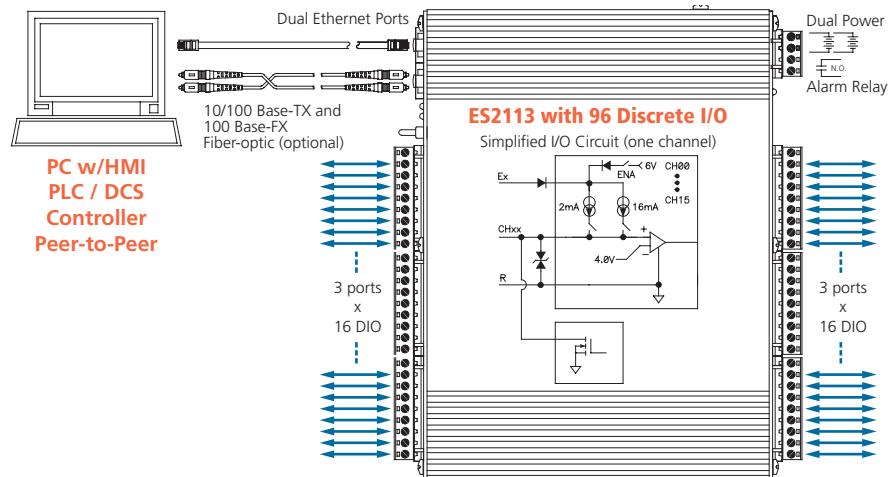
Analog I/O module (ES2152) configuration screen

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# Ethernet I/O: EtherStax® Series

## ES2113 Ethernet Discrete I/O Modules



### 96 bi-directional discrete I/O channels ♦ Modbus TCP/IP, i2o peer-to-peer communication

#### Description

EtherStax I/O blocks provide a ruggedized, high-density solution to interface a very large quantity of discrete I/O signals to your control system. A stackable aluminum housing maintains a small footprint and stands up to harsh, industrial environments. Web-based configuration simplifies setup with any web browser.

#### Input Ranges

0 to 28V DC, active-low inputs

#### Output Range

0 to 28V DC (0.5A/ch) low-side switches

#### Ethernet Communication

10/100Base-T(X) and 100Base-FX  
Modbus TCP/IP or UDP/IP protocol  
Acromag i2o® peer-to-peer technology

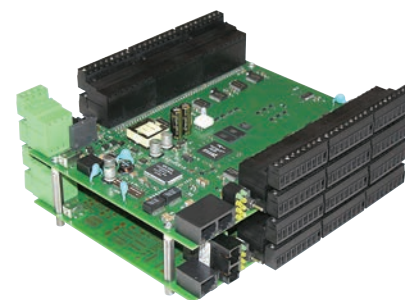
#### Power Requirement

18 to 36V DC (redundancy-ready)

#### Approvals

CE, UL, & cUL listed  
Class 1; Division 2; Groups A, B, C, D.

- **96 discrete I/O channels:**  
Bi-directional channels support any input/output mix in a single unit.
- **High-density stackable unit:**  
Stacked mounting puts a lot of I/O in a very small footprint to save panel space.
- **High Speed Channel Updates:**  
Updates all 96 channels in 1mS.
- **Modbus TCP/IP or UDP/IP protocol:**  
I/O functions as slave to host controller.
- **Peer-to-peer i2o communication:**  
Inputs to one unit automatically update outputs on another over Ethernet link.
- **Change-of-state or timed updates:**  
Event-driven updates transmit data in less than 5mS between peers with i2o.
- **10 Modbus TCP/IP sockets/sessions:**  
Multiple masters can talk to an EtherStax unit at the same time.
- **Self-test checks I/O operation:**  
Test I/O channels from a web browser before wiring terminals to devices.
- **Selectable input "wetting" current:**  
Internal current source eliminates pull-ups and improves dry contact interface.
- **Automatic change of state detection:**  
Inputs detect quick momentary changes of state that occur between polling.
- **Internal or external port excitation:**  
Selectable source on each 16-channel port simplifies wiring and adds flexibility for use with 5-28V DC logic.
- **Loop-back monitoring on all channels:**  
Inputs confirm output states for increased system reliability.
- **Watchdog timers and failsafe outputs:**  
Communication fault sends output to a pre-defined state or holds the last value.
- **Output open-load detection:**  
Output fault detection is selectable on individual channels.
- **Thermal, current, voltage protection:**  
I/O is protected from excessive levels to reduce downtime.



Open circuit board versions also available.

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## Performance Specifications

### ◆ General Specifications

See Page 7 for communication and other specs.

### ◆ Inputs

#### Configuration (active-low inputs)

96 channels (six 16-ch ports) with a common return (RTN). Each input is connected in tandem with open-drains of output mosfets. Any mix of I/O occurs as all channels are high impedance inputs unless written. Output channels can be read back at any time (loop-back monitoring).

#### Input Signal Voltage Range

0 to 28VDC, 31V maximum. Surge protected.

#### Input Threshold Detection and Sensitivity

4V DC threshold. Level or latching inputs.

#### Input "Wetting" Current

Built-in current sources switch from 16mA initially (20ms) to 2mA (continuous), default mode. Sources can be changed to 2mA or turned off.

#### Excitation

Internal (default): 6V DC, 400mA.

External: 6 to 28V DC typical. Separate excitation terminal (logic) for each 16-channel port. Internal and external supplies are diode-blocked from each other. Includes reverse polarity protection.

#### Peer-to-peer (i2o) communication

Change-of-state updates: Less than 5ms events.  
Timed updates: Configurable for 1-90 seconds.

### ◆ Outputs

#### Configuration (low-side switches)

96 channels (six 16-ch ports) of open-drain mosfet switches with common source connection at port RTN terminal. Each output is connected in tandem with buffered inputs.

#### Output "OFF" Voltage Range

0 to 28V DC, 31V maximum. Surge protected.

#### Output "ON" Current Range

0 to 300mA DC continuous, each output.

#### Output "ON" Maximum Current

450mA DC maximum with any 8 channels "on" continuously per 16 channel port

#### Output Port Maximum Current

4.8A: 16 channels @ 300mA continuous  
3.6A: 8 channels "off" & 8 channels @ 450mA

### ◆ Local Alarm Output

#### Configuration

Isolated relay de-energizes (failsafe) or energizes (non-failsafe) as configured when the watchdog timer detects a media or communication failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

5A @ 24VDC/250VAC, 6000 cycles resistive.  
3A @ 24VDC/250VAC, 100,000 cycles general.  
2A @ 24VDC/250V AC, Hazardous locations

#### Maximum Switching Voltage

250VAC, 125VDC.

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226" x 2.444" x 7.25".  
4 lbs. (1.8 kg) packed (unit weighs 3.4 lbs).  
Without enclosure: 7.920" x 1.875" x 7.25".  
1.65 lbs. (0.75 kg) packed (unit weighs 1.05 lbs).

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class 1; Div. 2; A B C D.

Open board units: UL Recognized

#### Shock and Vibration Immunity

Rating for single surface-mount unit in enclosure.

Mechanical Shock: 50g, 3ms, with 3 half-sine shock pulses in each direction along 3 axes (18 shocks), and 30g, 11ms, with 3 half-sine shock pulses in each direction along 3 axes (18 shocks), per IEC60068-2-27.

Random Vibration: 5g, 5-500Hz, in 3 axes at 2 hours/axis per IEC60068-2-64.

### ◆ Environmental

#### Operating and Storage Temperature

Operating: Open bd, -40 to 75°C (-40 to +167°F)  
Enclosed bd, -40 to 75°C (all outputs "off")  
-40 to 70°C (all outputs "on" at rated Max.).  
Storage: -40 to +85°C (-40 to +185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.  
Dual copper ports: 2.5W with external excitation, 3.5W with internal excitation.  
Fiber optic units: Call factory.

#### Isolation

I/O, power, relay and Ethernet port-to-port.  
Peak: 1500V AC, ANSI/ISA-82.01-1988.  
Continuous: 250V AC, 354V DC.

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. Web-configurable as a true switch (default mode) or hub.

#### Network Connector [10/100 Base-T(X)Copper]

One or two 8-pin RJ-45 connectors. Automatic MDI/MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode with SC connector. 2km communication distance. Full/half-duplex, selectable.

#### Protocols and Addressing

Modbus TCP/IP or UDP/IP. i2o peer-to-peer.  
StaticIP, DHCP, BootP. Configurable IP addresses.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions programmable via web page.

#### Ethernet Redundancy

Compatible with STP, RSTP, proprietary schemes.

## Ordering Information

### ◆ I/O Modules

#### ES2113-0000

96 DIO, two copper ports, IP20 enclosure

#### ES2113-0010

96 DIO, two copper ports, open circuit board

#### ES2113-1000

96 DIO, one Cu & one fiber port, IP20 enclosure

#### ES2113-1010

96 DIO, one Cu & one fiber port, open board

### ◆ Accessories

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

See Page 34.

#### Software Support

See Page 36.





# Ethernet I/O: EtherStax® Series

## ES2117 Ethernet Discrete I/O Modules



PC w/HMI  
PLC / DCS  
Controller  
Peer-to-Peer

Dual Ethernet Ports

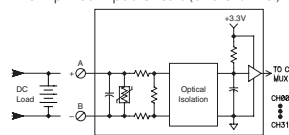
10/100 Base-TX and  
100 Base-FX  
Fiber-optic (optional)

Optocoupler  
Inputs 0-15

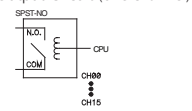
Mech Relay  
Outputs 0-7

### ES2117 with 48 Discrete I/O

Simplified Input Circuit (one channel)



Simplified Output Circuit (one channel)



Dual Power

N.O.  
Alarm Relay

Optocoupler  
Inputs 16-31

Mech Relay  
Outputs 8-15

48 Channel-Isolated Discrete I/O (32 DC inputs, 16 AC/DC outputs) ♦ Modbus TCP/IP, i2o peer-to-peer

### Description

EtherStax I/O blocks provide a ruggedized, high-density solution to interface a large quantity of isolated discrete I/O signals to your control system. A stackable aluminum housing maintains a small footprint and stands up to harsh, industrial environments. Web-based configuration simplifies setup with any web browser.

### Input Range

20-36V DC

### Output Range

Outputs: 2A @ 250V AC or 110V DC SPST  
Alarm: 2A @ 240V AC or 125V DC SPST

### Ethernet Communication

10/100Base-T(X) and 100Base-FX  
Modbus TCP/IP or UDP/IP protocol  
Acromag i2o® peer-to-peer technology

### Power Requirement

18 to 36V DC (redundancy-ready)

### Approvals

CE, UL, & cUL listed:  
Class 1; Division 2; Groups A, B, C, D.

- Fully isolated between all circuits: Inputs, outputs, alarm, network ports, enclosure, and power are isolated from each other for safety and noise immunity.
- High-density stackable unit: Stacked mounting puts a lot of I/O in a very small footprint to save panel space.
- Modbus TCP/IP or UDP/IP protocol: I/O functions as slave to host controller.
- Peer-to-peer i2o communication: Inputs to one unit automatically actuate outputs on another over Ethernet link.
- Channel-to channel input isolation: Inputs provide high or low-side sensing for AC or DC circuits.
- Automatic change of state detection: Inputs detect quick momentary changes of state that occur between polling.
- Logic inversion (i2o only): Active high inputs can switch remote peer-to-peer outputs on or off.
- Change-of-state or timed updates: Event-driven updates transmit data in less than 10ms between peers with i2o.
- 10 Modbus TCP/IP sockets/sessions: Multiple masters can talk to unit at same time.
- Local alarm function: Dedicated failsafe relay is controlled via watchdog timer and link-loss conditions.
- Heavy-duty 2A relays: 16 SPST outputs provide high/low-side 2A switching up to 250V AC or 110VDC
- Programmable outputs: Normally open relays are configurable to energize or de-energize on power-up.
- Built-in slave relays: Inputs can control outputs on same unit to provide slave relay interface.
- Self-test checks I/O operation: Unit checks internal I/O communication and allows verification via web browser.
- Watchdog timers: Communication fault sends output to a pre-defined state or holds the last value.



Open circuit board versions also available.

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## Performance Specifications

### ◆ General Specifications

See Page 7 for communication and other specs.

### ◆ Inputs

#### Configuration

32 individually isolated, buffered inputs grouped in two 16-ch ports. Active-high operation.

#### Input Voltage Range

20-32V DC, 36V DC max.

Max voltage/operating temperature:

36V DC @ 65°C max.

#### Input Signal Threshold and Hysteresis

OFF-ON: 13V min, 20V max, 16V DC typical.

ON-OFF: 11V max, 7V min, 9V DC typical.

#### Input Impedance

6k ohms

#### Input Isolation:

Channel-to-channel: 150V AC isolation rating.

Port-to-port: 250V AC safety isolation rating.

#### Input Response Time

Less than 5ms.

#### Peer-to-peer (i2o) communication

Change-of-state updates: Less than 10ms events.

Timed updates: Configurable for 1-90 seconds.

### ◆ Outputs

#### Configuration

One 16-ch port of isolated SPST-NO mech. relays.

#### Maximum Switching Voltage / Load Rating

250V AC, 110V DC @ 2A.

#### Mechanical Life

20 million operations minimum.

#### Electrical Life (@ 20 cycles per minute)

100k operations minimum at 2A.

#### Contact Resistance (Initial)

30 milliohms, maximum.

#### Output Response Time

Less than 5ms.

#### Minimum Load

100µA/100mV DC.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (software-configurable) relay trips on power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Maximum Switching Voltage/Load Rating

240V AC, 125V DC @ 2A

100K operations minimum.

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. Web-configurable as a true switch (default mode) or low-latency hub.

#### Network Connector [10/100 Base-T(X)Copper]

One or two 8-pin RJ-45 connectors. Automatic MDI/MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode with SC connector. 2km communication distance. Full/half-duplex, selectable.

#### Protocols and Addressing

Modbus TCP/IP or UDP/IP. i2o peer-to-peer.

StaticIP, DHCP, BootP. Configurable IP addresses.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions programmable via web page.

#### Ethernet Redundancy

Compatible with STP, RSTP, proprietary schemes.

### ◆ Environmental

#### Operating and Storage Temperature\*

Operating: -40 to 65°C

Storage: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.

4.7W (copper ports), 6.0W (fiber-optic ports).

#### Isolation

I/O, power, relay and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC (150V AC ch-ch).

See User Manual for full temperature specs.

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226" x 2.444" x 7.25", 4 lbs. packed.

PCB: 7.920" x 1.875" x 7.25", 1.65 lbs. packed.

#### Safety Approvals (pending)

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Div 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).

Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ EtherStax I/O Units

All units have 32 inputs, 16 AC/DC outputs and i2o peer-to-peer communication capability.

#### ES2117-0000

20-36V DC inputs, two Cu ports, IP20 enclosure

#### ES2117-0010

20-36V DC inputs, two Cu ports, open board

#### ES2117-1000

20-36V DC inputs, Cu & fiber ports, IP20

#### ES2117-1010

20-36V DC inputs, Cu & fiber ports, open board

### ◆ Accessories

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

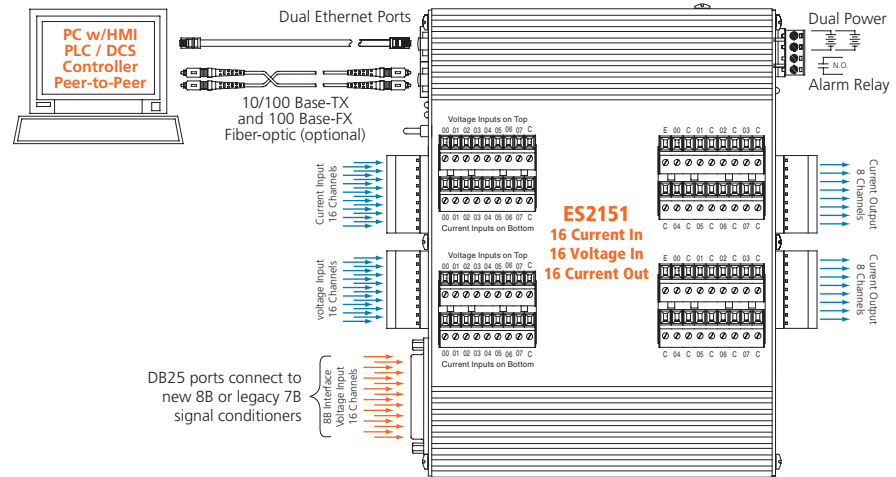
See Page 34.

#### Software Support

See Page 36.

# Ethernet I/O: EtherStax® Series

## ES2151 Ethernet Analog Input/Output Modules

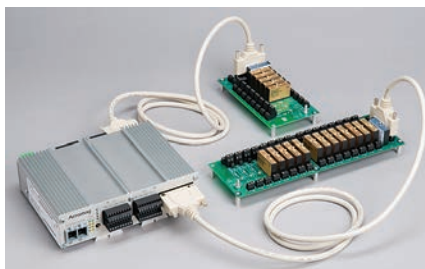


32 analog current/voltage inputs ♦ 16 analog current outputs ♦ Modbus TCP/UDP, i2o communication

### Description

These EtherStax I/O units provide a rugged, high-density, and high-speed solution to interface a large quantity of analog input signals. Units accept 16 single-ended analog voltage inputs and 16 single-ended current inputs. The ES2151 also provides 16 analog current outputs. Two DB25 ports support an alternate interface of voltage I/O from 8B input or output modules. This combination of high-density analog inputs and outputs is ideal for many sensor interface applications in remote zones.

EtherStax units are built and tested for high reliability and dependable performance in hostile environments. Available in an aluminum enclosure or as an open circuit board, both formats stack vertically to maintain a very small footprint.



Interface to 8B signal conditioning modules.

### Input Ranges

±5V, ±10V, ±20mA, 0-20mA, 4-20mA DC

### Output Ranges

0-20mA, 4-20mA DC

### Ethernet Communication

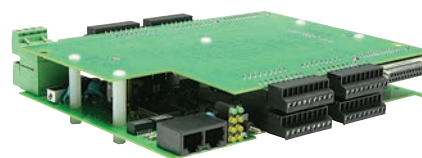
10/100Base-T(X) and 100Base-FX, Automatic MDI/MDI-X on all copper ports, Modbus TCP/IP or UDP/IP protocol i2o peer-to-peer

### Power Requirement

18 to 36V DC (redundancy-ready)

### Approvals

CE, UL/cUL:  
Zone 2, Class 1, Division 2, Groups ABCD



Open circuit board versions are also available.



Select from more than 100 8B input modules.

### Key Features & Benefits

- 48-channel high-density combination of analog inputs and outputs
- DB25 ports for alternate voltage I/O from 8B signal conditioning backpanels
- 4-way isolation and surge suppression
- High-resolution 16-bit A/D and D/A's
- High-speed scanning for 10 millisecond update of all 48 channels
- Automatic zero/span calibration
- Built-in loop-back circuit verifies outputs
- On-demand self-test verifies calibration
- Web browser configuration
- User-configurable sample averaging and integration/totalization function with non-volatile registers
- Dual-format data registers support 16-bit integers or 32-bit floating point
- Scaling registers on all channels
- Peer-to-peer i2o communication with percent-of-span and timed updates

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## Performance Specifications

### ◆ General Specifications

See Page 7 for communication and other specs.

### ◆ Analog Field Inputs

#### Input Channel Configuration

16 single-ended analog voltage inputs and  
16 single-ended analog current inputs.

#### Input Ranges (select on per-channel basis)

±5V, ±10V, ±20mA, 0-20mA, or 4-20mA DC.

#### Input Scaling (per-channel basis)

Floating Point Format: IEEE-754.

#### Input Resolution

16-bit maximum, 0.00166% (1 part in 60,000).

#### Input Accuracy

Current Input: Better than 0.1% of range.

Voltage Input: Better than 0.05% of range.

#### Input Impedance

Voltage: 4M ohms minimum.

Current: 100 ohms.

#### Input Scan Groups and Scan Times

Eight user-enabled 4-channel scan groups. 770µS  
update/group (5mS for all 32 channels) with averaging,  
loopback, and totalization functions disabled.

#### Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS),  
18V clamp level typical.

#### Noise Rejection

CMR (50-60Hz): Better than -72dB.

#### Sample Averaging (user-configurable)

0-500 samples. One register for all channels.

### ◆ External 8B Input and Output Modules

See Bulletin 8400-479 for details.

### ◆ Analog Field Outputs

#### Output Channel Configuration

16 current outputs.

9-16V DC external excitation required.

#### Output Ranges (per-channel basis)

0-20mA or 4-20mA DC sourced.

User-configured on a per-channel basis.

#### Maximum Output Load at Excitation

265 ohms @ 9V.

400 ohms @ 12V.

540 ohms @ 15V.

#### Output Resolution and Accuracy

Resolution: 13-bit maximum, 0.0122%.

Accuracy: Better than 0.1% of range.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (user-configurable) relay trips on  
power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

3A @ 24V DC/250V AC, 100,000 cycles general.

2A @ 24V DC/250V AC, Hazardous locations.

#### Maximum Switching Voltage and Power

250V AC / 750VA, 125V DC / 90W.

### ◆ i2o Peer-to-Peer Communication

Each port of 8 input channels can be mapped to out-  
put ports of two ES215x units. Updates based on time  
(100mS resolution) or percent of range change (0.1%  
resolution).

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. User-configurable as a true  
switch (default mode) or low-latency hub.

#### Network Connector [10/100 Base-T(X)Copper]

One or two 8-pin RJ-45 connectors. Automatic MDI/  
MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode with SC connector. 2km communica-  
tion distance. Full/half-duplex, selectable.

#### Protocols

Modbus TCP/IP, UDP/IP, i2o peer-to-peer.

#### Addressing

StaticIP, DHCP, BootP.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions user-configurable.

#### Ethernet Redundancy

Compatible with STP, RSTP, or any ring scheme.

### ◆ Environmental

#### Operating and Storage Temperature

Operating: -40 to 70°C (-40 to 158°F).

Storage: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.

4.8W (copper ports), 5.8W (fiber-optic ports).

#### Isolation

I/O, power, relay and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC (150V AC ch-ch).

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226 x 2.444 x 7.25", 4 lbs. packed.

PCB: 7.920 x 1.875 x 7.25", 1.65 lbs. packed.

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Div 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).

Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ EtherStax I/O Units

#### ES2151-0000

Current/voltage inputs, current outputs,  
two Cu ports, IP20 enclosure

#### ES2151-0010

Current/voltage inputs, current outputs,  
two Cu ports, open board (no IP20 enclosure)

#### ES2151-1000

Current/voltage inputs, current outputs,  
Cu & fiber ports, IP20 enclosure

#### ES2151-1010

Current/voltage inputs, current outputs,  
Cu & fiber ports, open board (no IP20 enclosure)

### ◆ Accessories

#### 8B Modules and Backpanels

See Page 32.

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

See Page 34.

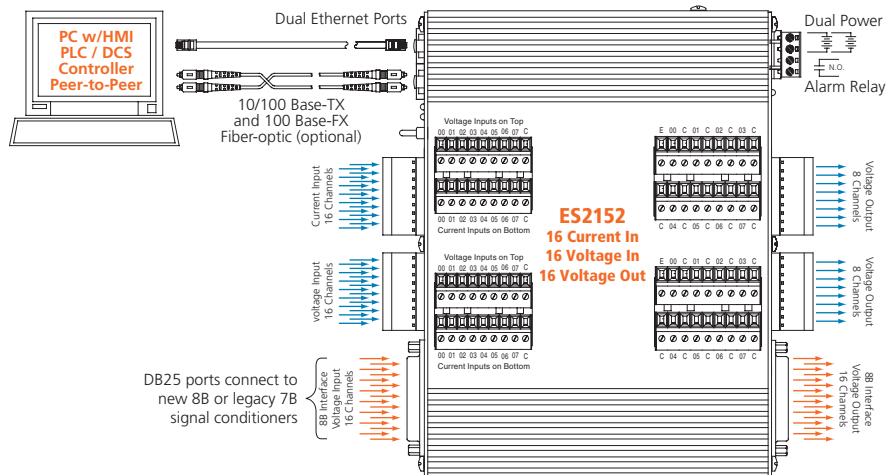
#### Software Support

See Page 36.



# Ethernet I/O: EtherStax® Series

## ES2152 Ethernet Analog Input/Output Modules

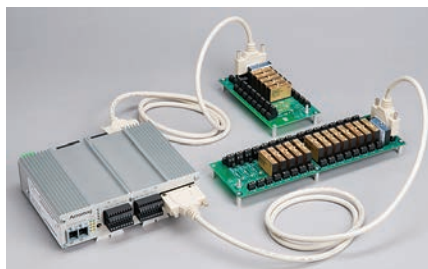


32 analog current/voltage inputs ♦ 16 analog voltage outputs ♦ Modbus TCP/UDP, i2o communication

### Description

These EtherStax I/O units provide a rugged, high-density, and high-speed solution to interface a large quantity of analog input signals. Units accept 16 single-ended analog voltage inputs and 16 single-ended current inputs. The ES2152 also provides 16 analog voltage outputs. Two DB25 ports support an alternate interface of voltage I/O from 8B input or output modules. This combination of high-density analog inputs and outputs is ideal for many sensor interface applications in remote zones.

EtherStax units are built and tested for high reliability and dependable performance in hostile environments. Available in an aluminum enclosure or as an open circuit board, both formats stack vertically to maintain a very small footprint.



Interface to 8B signal conditioning modules.

### Input Ranges

±5V, ±10V, ±20mA, 0-20mA, 4-20mA DC

### Output Ranges

±5V, ±10 V DC

### Ethernet Communication

10/100Base-T(X) and 100Base-FX, Automatic MDI/MDI-X on all copper ports, Modbus TCP/IP or UDP/IP protocol i2o peer-to-peer

### Power Requirement

18 to 36V DC (redundancy-ready)

### Approvals

CE, UL/cUL:  
Zone 2, Class 1, Division 2, Groups ABCD



Open circuit board versions are also available.



Select from more than 100 8B input modules.

### Key Features & Benefits

- 48-channel high-density combination of analog inputs and outputs
- DB25 ports for alternate voltage I/O from 8B signal conditioning backpanels
- 4-way isolation and surge suppression
- High-resolution 16-bit A/D and D/A's
- High-speed scanning for 10 millisecond update of all 48 channels
- Automatic zero/span calibration
- Built-in loop-back circuit verifies outputs
- On-demand self-test verifies calibration
- Web browser configuration
- User-configurable sample averaging and integration/totalization function with non-volatile registers
- Dual-format data registers support 16-bit integers or 32-bit floating point
- Scaling registers on all channels
- Peer-to-peer i2o communication with percent-of-span and timed updates

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# Ethernet I/O: EtherStax® Series



## Performance Specifications

### ◆ General Specifications

See Page 7 for communication and other specs.

### ◆ Analog Field Inputs

#### Input Channel Configuration

16 single-ended analog voltage inputs and  
16 single-ended analog current inputs.

#### Input Ranges (select on per-channel basis)

±5V, ±10V, ±20mA, 0-20mA, or 4-20mA DC.

#### Input Scaling (per-channel basis)

Floating Point Format: IEEE-754.

#### Input Resolution

16-bit maximum, 0.00166% (1 part in 60,000).

#### Input Accuracy

Current Input: Better than 0.1% of range.

Voltage Input: Better than 0.05% of range.

#### Input Impedance

Voltage: 4M ohms minimum.

Current: 100 ohms.

#### Input Scan Groups and Scan Times

Eight user-enabled 4-channel scan groups. 770µS  
update/group (5mS for all 32 channels) with averaging,  
loopback, and totalization functions disabled.

#### Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS),  
18V clamp level typical.

#### Noise Rejection

CMR (50-60Hz): Better than -72dB.

#### Sample Averaging (user-configurable)

0-500 samples. One register for all channels.

### ◆ External 8B Input and Output Modules

See Bulletin 8400-479 for details.

### ◆ Analog Field Outputs

#### Output Channel Configuration

16 DC voltage outputs.

#### Output Ranges (per-channel basis)

±5V, ±10V DC (at ±1mA).

User-configured on a per-channel basis.

#### Output Impedance

1 ohm maximum.

#### Output Resolution and Accuracy

Resolution (±10V): 16-bit maximum, 0.00166%.

Resolution (±5V): 15-bit maximum, 0.00305%.

Accuracy: Better than 0.05% of range.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (user-configurable) relay trips on  
power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

3A @ 24V DC/250V AC, 100,000 cycles general.

2A @ 24V DC/250V AC, Hazardous locations.

#### Maximum Switching Voltage and Power

250V AC / 750VA, 125V DC / 90W.

### ◆ i2o Peer-to-Peer Communication

Each port of 8 input channels can be mapped to out-  
put ports of two ES215x units. Updates based on time  
(100mS resolution) or percent of range change (0.1%  
resolution).

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. User-configurable as a true  
switch (default mode) or low-latency hub.

#### Network Connector [10/100 Base-T(X)Copper]

One or two 8-pin RJ-45 connectors. Automatic MDI/  
MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode with SC connector. 2km communica-  
tion distance. Full/half-duplex, selectable.

#### Protocols

Modbus TCP/IP, UDP/IP, i2o peer-to-peer.

#### Addressing

StaticIP, DHCP, BootP.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions user-configurable.

#### Ethernet Redundancy

Compatible with STP, RSTP, or any ring scheme.

### ◆ Environmental

#### Operating and Storage Temperature

Operating: -40 to 70°C (-40 to 158°F).

Storage: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.

4.8W (copper ports), 5.8W (fiber-optic ports).

#### Isolation

I/O, power, relay and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC (150V AC ch-ch).

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226 x 2.444 x 7.25", 4 lbs. packed.

PCB: 7.920 x 1.875 x 7.25", 1.65 lbs. packed.

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Div 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).

Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ EtherStax I/O Units

#### ES2152-0000

Current/voltage inputs, voltage outputs,  
two Cu ports, IP20 enclosure

#### ES2152-0010

Current/voltage inputs, voltage outputs,  
two Cu ports, open board (no IP20 enclosure)

#### ES2152-1000

Current/voltage inputs, voltage outputs,  
Cu & fiber ports, IP20 enclosure

#### ES2152-1010

Current/voltage inputs, voltage outputs,  
Cu & fiber ports, open board (no IP20 enclosure)

### ◆ Accessories

#### 8B Modules and Backpanels

See Page 32.

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

See Page 34.

#### Software Support

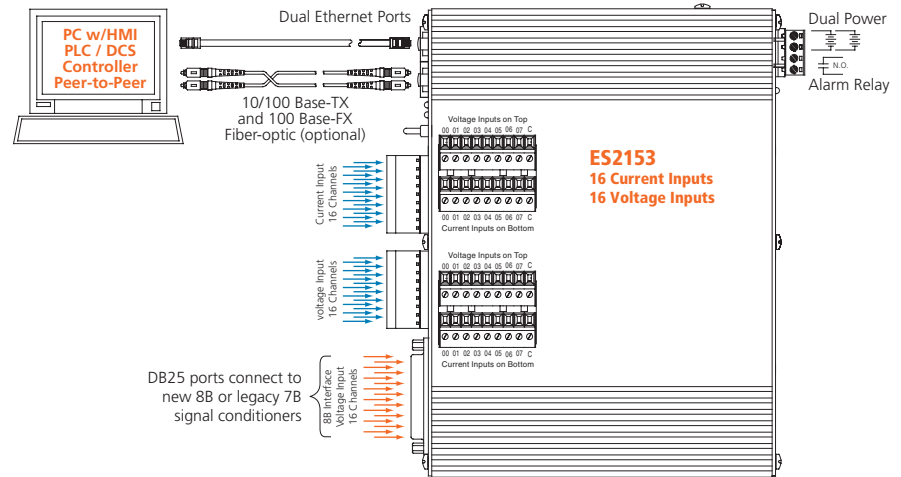
See Page 36.





# Ethernet I/O: EtherStax® Series

## ES2153 Ethernet Analog Input Modules

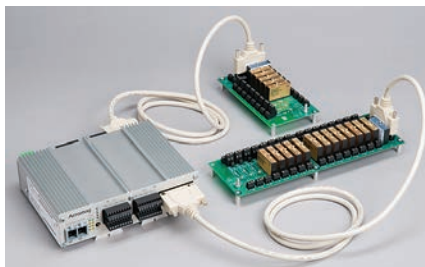


32 analog inputs (16 current + 16 voltage)s ♦ Modbus TCP/IP, UDP/IP, i2o® peer-to-peer communication

### Description

These EtherStax I/O units provide a rugged, high-density, and high-speed solution to interface a large quantity of analog input signals. Units accept 16 single-ended analog voltage inputs and 16 single-ended current inputs. A DB25 port supports an alternate interface of voltage inputs from 8B signal conditioning modules. This combination of high-density analog current and voltage inputs is ideal for many sensor interface applications in remote zones.

EtherStax units are built and tested for high reliability and dependable performance in hostile environments. Available in an aluminum enclosure or as an open circuit board, both formats stack vertically to maintain a very small footprint.



Interface to 8B signal conditioning modules.

### Input Ranges

±5V, ±10V, ±20mA, 0-20mA, 4-20mA DC

### Ethernet Communication

10/100Base-T(X) and 100Base-FX, Automatic MDI/MDI-X on all copper ports, Modbus TCP/IP or UDP/IP protocol i2o peer-to-peer

### Power Requirement

18 to 36V DC (redundancy-ready)

### Approvals

CE, UL/cUL:  
Zone 2, Class 1, Division 2, Groups ABCD



Open circuit board versions are also available.



Select from more than 100 8B input modules.

### Key Features & Benefits

- 32-channel high-density combination of analog current and voltage inputs
- DB25 ports for alternate voltage I/O from 8B signal conditioning backpanels
- 3-way isolation and surge suppression
- High-resolution 16-bit A/Ds
- High-speed scanning for 10 millisecond update of all 32 channels
- Automatic zero/span calibration
- On-demand self-test verifies calibration
- Web browser configuration
- User-configurable sample averaging and integration/totalization function with non-volatile registers
- Dual-format data registers support 16-bit integers or 32-bit floating point
- Scaling registers on all channels
- Peer-to-peer i2o communication with percent-of-span and timed updates

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## Performance Specifications

### ◆ General Specifications

See Page 7 for communication and other specs.

### ◆ Analog Field Inputs

#### Input Channel Configuration

16 single-ended analog voltage inputs and  
16 single-ended analog current inputs.

#### Input Ranges (select on per-channel basis)

±5V, ±10V, ±20mA, 0-20mA, or 4-20mA DC.

#### Input Scaling (per-channel basis)

Floating Point Format: IEEE-754.

#### Input Resolution

16-bit maximum, 0.00166% (1 part in 60,000).

#### Input Accuracy

Current Input: Better than 0.1% of range.

Voltage Input: Better than 0.05% of range.

#### Input Impedance

Voltage: 4M ohms minimum.

Current: 100 ohms.

#### Input Scan Groups and Scan Times

Eight user-enabled 4-channel scan groups. 770µS  
update/group (5mS for all 32 channels) with averaging,  
loopback, and totalization functions disabled.

#### Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS),  
18V clamp level typical.

#### Noise Rejection

CMR (50-60Hz): Better than -72dB.

#### Sample Averaging (user-configurable)

0-500 samples. One register for all channels.

### ◆ External 8B Input and Output Modules

See Bulletin 8400-479 for details.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (user-configurable) relay trips on  
power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

3A @ 24V DC/250V AC, 100,000 cycles general.

2A @ 24V DC/250V AC, Hazardous locations.

#### Maximum Switching Voltage and Power

250V AC / 750VA, 125V DC / 90W.

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. User-configurable as a true  
switch (default mode) or low-latency hub.

#### Network Connector [10/100 Base-T(X)Copper]

One or two 8-pin RJ-45 connectors. Automatic MDI/  
MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode with SC connector. 2km communica-  
tion distance. Full/half-duplex, selectable.

#### Protocols

Modbus TCP/IP, UDP/IP, i2o peer-to-peer.

#### Addressing

StaticIP, DHCP, BootP.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions user-configurable.

#### Ethernet Redundancy

Compatible with STP, RSTP, or any ring scheme.

### ◆ i2o Peer-to-Peer Communication

Each port of 8 input channels can be mapped to out-  
put ports of two ES215x units. Updates based on time  
(100mS resolution) or percent of range change (0.1%  
resolution).

### ◆ Environmental

#### Operating and Storage Temperature

Operating: -40 to 70°C (-40 to 158°F).

Storage: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.

4.8W (copper ports), 5.8W (fiber-optic ports).

#### Isolation

I/O, power, relay and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC (150V AC ch-ch).

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226 x 2.444 x 7.25", 4 lbs. packed.

PCB: 7.920 x 1.875 x 7.25", 1.65 lbs. packed.

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Div 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).

Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ EtherStax I/O Units

#### ES2153-0000

Current/voltage inputs, two Cu ports,  
IP20 enclosure

#### ES2153-0010

Current/voltage inputs, two Cu ports,  
open board (no IP20 enclosure)

#### ES2153-1000

Current/voltage inputs, Cu & fiber ports,  
IP20 enclosure

#### ES2153-1010

Current/voltage inputs, Cu & fiber ports,  
open board (no IP20 enclosure)

### ◆ Accessories

#### 8B Modules and Backpanels

See Page 32.

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

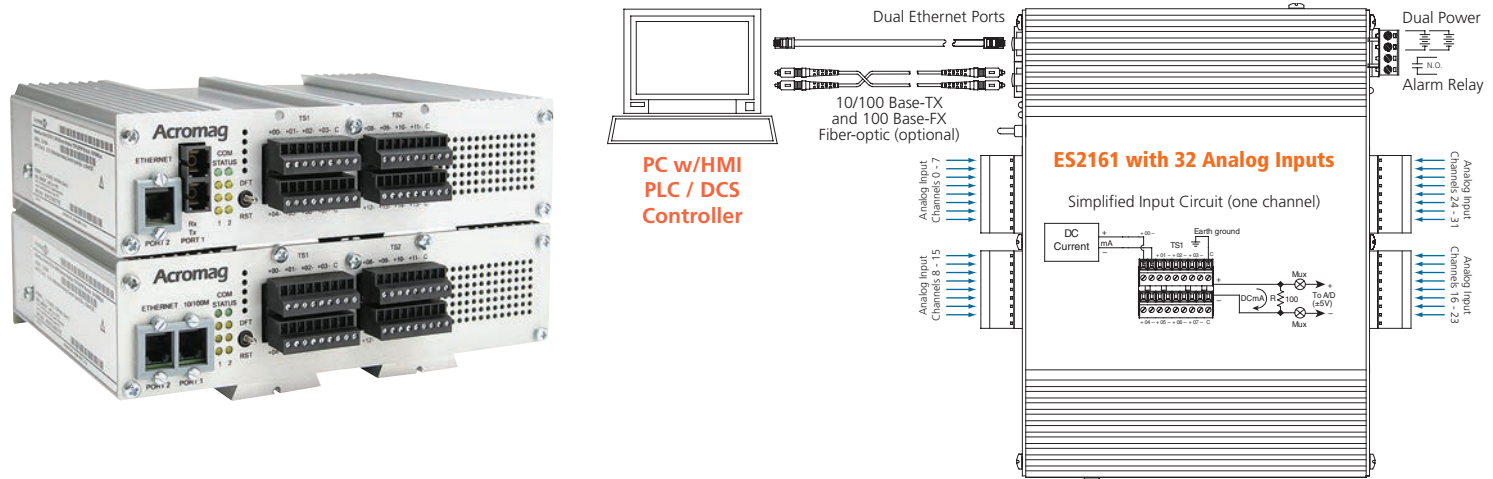
See Page 34.

#### Software Support

See Page 36.

# Ethernet I/O: EtherStax® Series

## ES2161 Ethernet Analog Input Modules



### 32-channel differential analog current input ♦ Modbus TCP/IP or UDP/IP communication

#### Description

These EtherStax I/O units provide a rugged, high-density, and high-speed solution to interface a large quantity of analog input signals. Units accept 32 differential analog current inputs, which are ideal for many sensor interface applications in remote zones. Available in an aluminum enclosure or as an open circuit board, both packages stack vertically to maintain a very small footprint. Many other features help increase reliability, improve performance and protect from harsh environments.

#### Input Ranges

±20mA, 0-20mA, 4-20mA DC

#### Ethernet Communication

10/100Base-T(X) and 100Base-FX, Automatic MDI/MDI-X on all copper ports, Modbus TCP/IP or UDP/IP protocol

#### Power Requirement

18 to 36V DC (redundancy-ready)

#### Approvals

CE, UL/cUL:  
Zone 2, Class 1, Division 2, Groups ABCD

#### Key Features & Benefits

- 32 differential current analog inputs
- 4-way isolation and surge suppression
- Configurable from any web browser
- High-resolution 16-bit A/D
- Fast scanning up to 1KHz
- Dual-format data registers support both 16-bit signed integers and 32-bit floating point formats
- User-configurable IEEE-754 32-bit floating point scaling registers on all channels
- User-configurable integration function on all channels with totalizing 32-bit non-volatile counter registers
- User-configurable sample averaging and integration/totalization function with non-volatile registers
- Built-in precision voltage source for automatic calibration
- On-demand self-test with built-in calibration sources

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## Performance Specifications

### ◆ General Specifications

See Page 7 for communication and other specs.

### ◆ Analog Field Inputs

#### Input Channel Configuration

32 differential analog inputs. 16 channels on front and rear panels of unit.

#### DC Current Input Ranges (per-channel basis)

±20mA, 0-20mA, or 4-20mA DC (default).

User-configured on a per-channel basis.

#### Input Scaling (per-channel basis)

Floating Point Format: IEEE-754 32-bit configurable for 12 digits with 4 decimal places.

16-bit Signed Integer Format: All channels are represented as ±30,000.

#### Input Resolution and Accuracy

Resolution: 15-bit maximum, 0.003%.

Accuracy: Better than 0.02% of range.

#### Input Impedance

100 ohms.

#### Input Scan Groups and Scan Times

Eight user-enabled 4-channel scan groups.

5mS (200Hz) update of all 32 channels.

8mS (125Hz) update when totalizing.

First 4-channel group updates in 770µS (1.3KHz). Each additional 4-channel group adds 590µS to update time.

#### Sample Averaging

0 to 500 samples, user-configurable.

#### Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS),

18V clamp level typical.

#### Noise Rejection

Common Mode (50-60Hz): Better than 72dB.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (software-configurable) relay trips on power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

5A @ 24V DC/250V AC, 6000 cycles resistive.

3A @ 24V DC/250V AC, 100,000 cycles general.

2A @ 24V DC/250V AC, Hazardous locations.

#### Maximum Switching Voltage and Power

250V AC / 750VA, 125V DC / 90W.

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. Web-configurable as a true switch (default mode) or low-latency hub.

#### Network Connector [10/100 Base-T(X)Copper]

One or two 8-pin RJ-45 connectors. Automatic MDI/MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode duplex SC connector. 2km communication distance. Full/half-duplex, selectable.

#### Protocols and Addressing

Modbus TCP/IP or UDP/IP. StaticIP, DHCP, BootP.

Configurable IP addresses.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions programmable via web page.

#### Ethernet Redundancy

Compatible with STP, RSTP, proprietary schemes.

### ◆ Environmental

#### Operating and Storage Temperature

Operating Ranges:

-40 to 70°C (-40 to 158°F).

Storage Range: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.

4.2W (copper ports), 5.25W (fiber-optic ports).

#### Ambient Temperature Effect

Less than 25ppm/°C (0.0025%/°C).

#### Isolation

I/O, power, relay and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC.

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226" x 2.444" x 7.25", 4 lbs. packed.

PCB: 7.920" x 1.875" x 7.25", 1.65 lbs. packed.

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Div 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).

Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ Models

#### ES2161-0000

Current inputs, two Cu ports, IP20 enclosure

#### ES2161-0010

Current inputs, two Cu ports, open board

#### ES2161-1000

Current inputs, Cu & fiber ports, IP20 enclosure

#### ES2161-1010

Current inputs, Cu & fiber ports, open board

### ◆ Accessories

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

See Page 34.

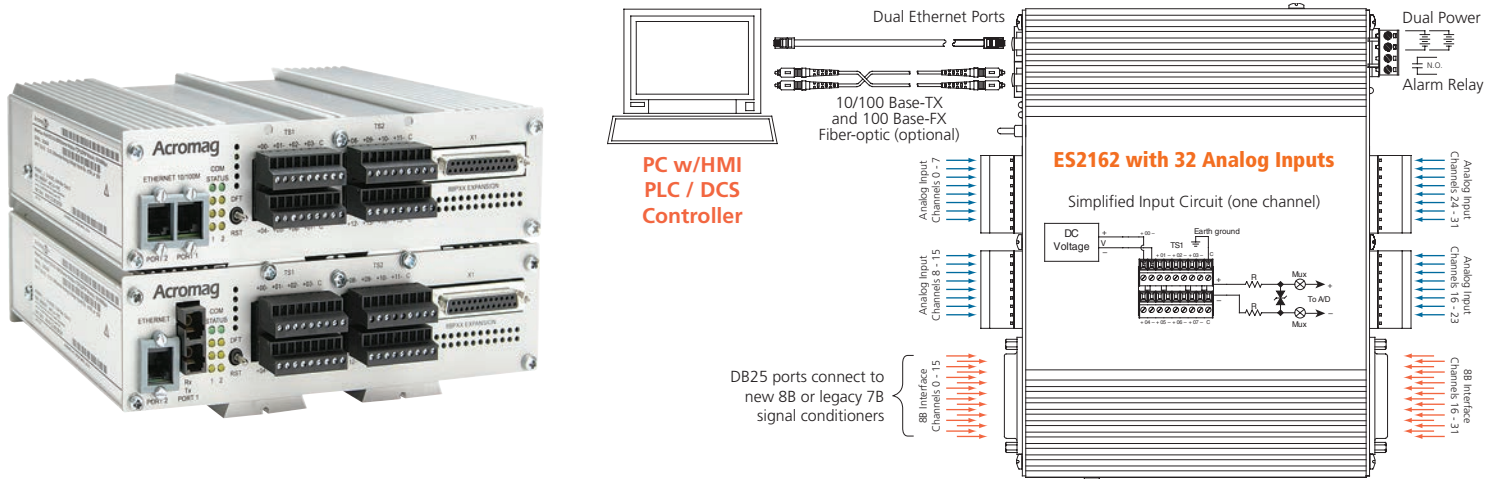
#### Software Support

See Page 36.



# Ethernet I/O: EtherStax® Series

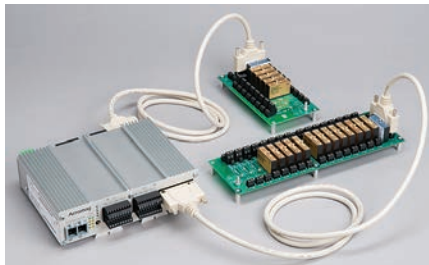
## ES2162 Ethernet Analog Input Modules



### 32-channel differential analog voltage input with 8B interface ♦ Modbus TCP/IP or UDP/IP communication

#### Description

These EtherStax I/O units provide a rugged, high-density, and high-speed solution to interface a large quantity of analog input signals. Units natively accept 32 differential high-level analog voltage inputs, which are ideal for most sensor interface applications in remote zones. For systems requiring high channel-to-channel isolation or a variety of input signals (voltage, current, temperature, frequency, load cell, etc.), the ES2162 has two ports that will each interface 16 inputs from an 8B signal conditioner backpanel. Available in an aluminum enclosure or as an open circuit board, both packages stack vertically to maintain a very small footprint. Many other features help increase reliability, improve performance and protect from harsh industrial environments.



Interface to 8B signal conditioning modules.

#### Input Ranges

±5V, ±10V DC

#### 8B Signal Conditioner Interface

Dual DB25 ports provide alternate interface to 8B signal conditioner backpanel systems

#### Ethernet Communication

10/100Base-T(X) and 100Base-FX, Automatic MDI/MDI-X on all copper ports, Modbus TCP/IP or UDP/IP protocol

#### Power Requirement

18 to 36V DC (redundancy-ready)

#### Approvals

CE, UL/cUL:  
Zone 2, Class 1, Division 2, Groups ABCD



Open circuit board versions are also available.



Select from more than 100 8B input modules.

#### Key Features & Benefits

- 32 differential high-level voltage analog inputs
- Dual DB25 ports for alternate interface to 8B signal conditioning backpanels
- 4-way isolation and surge suppression
- Configurable from any web browser
- High-resolution 16-bit A/D
- Fast scanning up to 1KHz
- Dual-format data registers support both 16-bit signed integers and 32-bit floating point formats
- User-configurable IEEE-754 32-bit floating point scaling registers on all channels
- User-configurable integration function on all channels with totalizing 32-bit non-volatile counter registers
- User-configurable sample averaging and integration/totalization function with non-volatile registers
- Built-in precision voltage source for automatic calibration
- On-demand self-test with built-in calibration sources





## Performance Specifications

### ◆ General Specifications

See Page 7 for communication and other specs.

### ◆ Analog Field Inputs

#### Input Channel Configuration

32 differential analog inputs. 16 channels on front and rear panels of unit.

#### DC Voltage Input Ranges (per-channel basis)

±5V or ±10V DC (default).

User-configured on a per-channel basis.

#### Input Scaling (per-channel basis)

Floating Point Format: IEEE-754 32-bit configurable for 12 digits with 4 decimal places.

16-bit Signed Integer Format: All channels are represented as ±30,000.

#### Input Resolution and Accuracy

Resolution: 16-bit maximum, 0.00167%.

Accuracy: Better than 0.02% of range.

#### Input Impedance

Greater than 1M ohms.

#### Input Scan Groups and Scan Times

Eight user-enabled 4-channel scan groups.

5mS (200Hz) update of all 32 channels.

8mS (125Hz) update when totalizing.

First 4-channel group updates in 770µS (1.3KHz). Each additional 4-ch. group adds 590µS to update time.

#### Sample Averaging

0 to 500 samples, user-configurable.

#### Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS),

18V clamp level typical.

#### Noise Rejection

Common Mode (50-60Hz): Better than 72dB.

### ◆ 8B External Inputs

See Bulletin 8400-479 for details.

#### Compatible 8B Modules and Backpanels

Dual DB25 (front and rear) ports provide cable connection to industry-standard 8B backpanels with analog input modules only. Each DB25 port alternately connects up to 16 input channels to any 8B backpanel via an SCMXA006 cable. NOTE: Differential input channels are disabled in 8-channel groups when DB25 port(s) are used.

#### Input Configuration (per-channel basis)

Web page configuration sets channels to sense inputs via screw terminals or DB25 port.

#### 8B Input Module Outputs

All 8B input modules provide 0-5V, 1-5V or ±5V DC outputs.

#### 8B Input Module Power

8Bs require 5V DC ±5%. For other power options, order one (1) supply per backpanel.

7-34V DC: Model 8BPWR-2 power supply.

AC power: Model PS5R-B05 or PWR-4505.

#### 8B Input Isolation (CMV Input-to-Output)

1500Vrms channel-to-channel isolation.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (software-configurable) relay trips on power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

5A @ 24V DC/250V AC, 6000 cycles resistive.

3A @ 24V DC/250V AC, 100,000 cycles general.

2A @ 24V DC/250V AC, Hazardous locations.

#### Maximum Switching Voltage and Power

250V AC / 750VA, 125V DC / 90W.

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. Web-configurable as a true switch (default mode) or low-latency hub.

#### Network Connector [10/100 Base-T(X)Copper]

One or two 8-pin RJ-45 connectors. Automatic MDI/MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode duplex SC connector. 2km communication distance. Full/half-duplex, selectable.

#### Protocols and Addressing

Modbus TCP/IP or UDP/IP. StaticIP, DHCP, BootP.

Configurable IP addresses.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions programmable via web page.

#### Ethernet Redundancy

Compatible with STP, RSTP, proprietary schemes.

### ◆ Environmental

#### Operating and Storage Temperature

Operating Ranges:

-40 to 70°C (-40 to 158°F).

Storage Range: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.

4.4W (copper ports), 5.5W (fiber-optic ports).

#### Isolation

I/O, power, relay and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC.

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226" x 2.444" x 7.25", 4 lbs. packed.

PCB: 7.920" x 1.875" x 7.25", 1.65 lbs. packed.

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Div 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).

Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ Models

ES2162-0000

ES2162-0010

Voltage inputs, two copper ports.

IP20 enclosure (-0000) or open board (-0010).

ES2162-1000

ES2162-1010

Voltage inputs, one copper and one fiber port.

IP20 enclosure (-1000) or open board (-1010).

### ◆ Accessories

#### 8B Modules and Backpanels

See Page 32.

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

See Page 34.

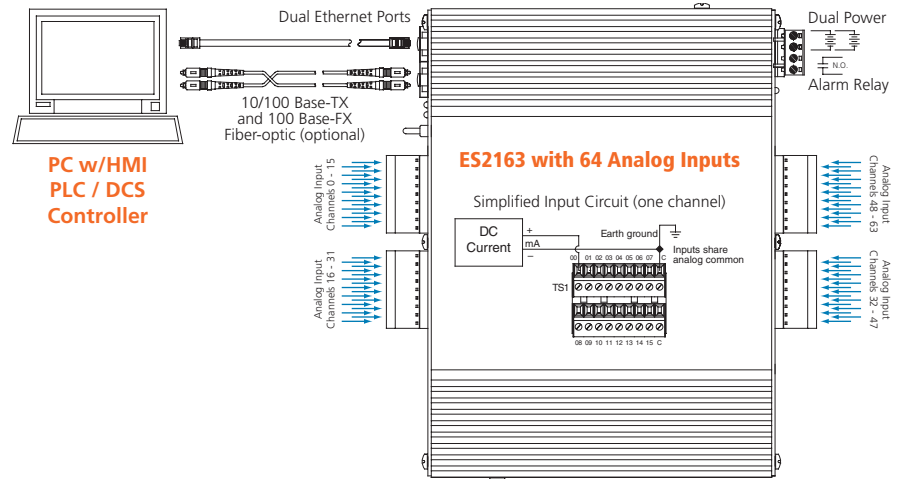
#### Software Support

See Page 36.



# Ethernet I/O: EtherStax® Series

## ES2163 Ethernet Analog Input Modules



64-channel single-ended analog current input ♦ Modbus TCP/IP or UDP/IP communication

### Description

These EtherStax I/O modules provide a rugged, high-density, and high-speed solution to interface a large quantity of analog input signals to SCADA and distributed I/O systems. Each unit converts up to 64 single-ended analog current signals from various sensors and instruments for transmission to an Ethernet-based control network. Typical applications include process control, automated manufacturing, remote data acquisition, test and measurement, embedded computing, and supervisory monitoring systems.

EtherStax units are built and tested to deliver high reliability and dependable performance in hostile environments. Many features help increase reliability, improve performance and protect from harsh environments. Available in an aluminum enclosure or as an open circuit board, both formats stack vertically to maintain a very small footprint.

### Input Ranges

±20mA, 0-20mA, 4-20mA DC

### Ethernet Communication

10/100Base-T(X) and 100Base-FX, Automatic MDI/MDI-X on all copper ports, Modbus TCP/IP or UDP/IP protocol

### Power Requirement

18 to 36V DC (redundancy-ready)

### Approvals

CE, UL/cUL:  
Zone 2, Class 1, Division 2, Groups ABCD



Open circuit board versions are also available.

### Key Features & Benefits

- 64 single-ended analog current inputs
- 4-way isolation and surge suppression
- High-resolution 16-bit A/D
- High-speed scanning with 10 millisecond update of all 64 channels
- Automatic zero/span calibration
- On-demand self-test verifies calibration
- Configurable from any web browser
- User-configurable sample averaging and integration/totalization function with non-volatile registers
- Dual-format data registers support 16-bit integers or 32-bit floating point
- Scaling registers on all channels

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## Performance Specifications

### ◆ General Specifications

See Page 7 for communication and other specs.

### ◆ Analog Field Inputs

#### Input Channel Configuration

64 single-ended analog inputs. 32 channels on front and rear panels of unit.

#### DC Current Input Ranges

±20mA, 0-20mA, or 4-20mA DC (default).  
User-configured on a per-channel basis.

#### Input Scaling (per-channel basis)

Floating Point Format: IEEE-754 32-bit configurable for 12 digits with 4 decimal places.

16-bit Signed Integer Format: All channels represented as ±30,000.

#### Input Resolution and Accuracy

Resolution: 15-bit maximum, 0.003%.

Accuracy: Better than 0.1% of range.

#### Input Impedance

100 ohms.

#### Input Scan Groups and Scan Times

Eight user-enabled 8-channel scan groups.

10mS (100Hz) update of all 64 channels.

First 8-channel group updates in 1.80mS (555Hz).

Each additional 8-channel group adds 1.20mS to the update time.

#### Sample Averaging

0 to 500 samples, user-configurable.

#### Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS),  
14V working voltage.

#### Noise Rejection

Common Mode (50-60Hz): Better than 72dB.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (software-configurable) relay trips on power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

5A @ 24V DC/250V AC, 6000 cycles resistive.

3A @ 24V DC/250V AC, 100,000 cycles general.

2A @ 24V DC/250V AC, Hazardous locations.

#### Maximum Switching Voltage and Power

250V AC / 750VA, 125V DC / 90W.

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. Web-configurable as a true switch (default mode) or low-latency hub.

#### Network Connector (10/100 Base-TX Copper)

One or two 8-pin RJ-45 connectors. Automatic MDI/MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode duplex SC connector. Full-duplex only. 2km communication distance.

#### Protocols and Addressing

Modbus TCP/IP or UDP/IP. StaticIP, DHCP, BootP. Configurable IP addresses.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions programmable via web page.

#### Ethernet Redundancy

Compatible with STP, RSTP, proprietary schemes.

### ◆ Environmental

#### Operating and Storage Temperature

Operating Range: -40 to 70°C (-40 to 158°F).

Storage Range: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.

4.4W (copper ports), 5.5W (fiber-optic ports).

#### Ambient Temperature Effect

Less than 35ppm/°C (0.0035%/°C).

#### Isolation

I/O, power, relay and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC.

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226" x 2.444" x 7.25", 4 lbs. packed.

PCB: 7.920" x 1.875" x 7.25", 1.65 lbs. packed.

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Division 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).

Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ Models

#### ES2163-0000

Current inputs, two Cu ports, IP20 enclosure

#### ES2163-0010

Current inputs, two Cu ports, open board

#### ES2163-1000

Current inputs, Cu & fiber ports, IP20 enclosure

#### ES2163-1010

Current inputs, Cu & fiber ports, open board

### ◆ Accessories

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

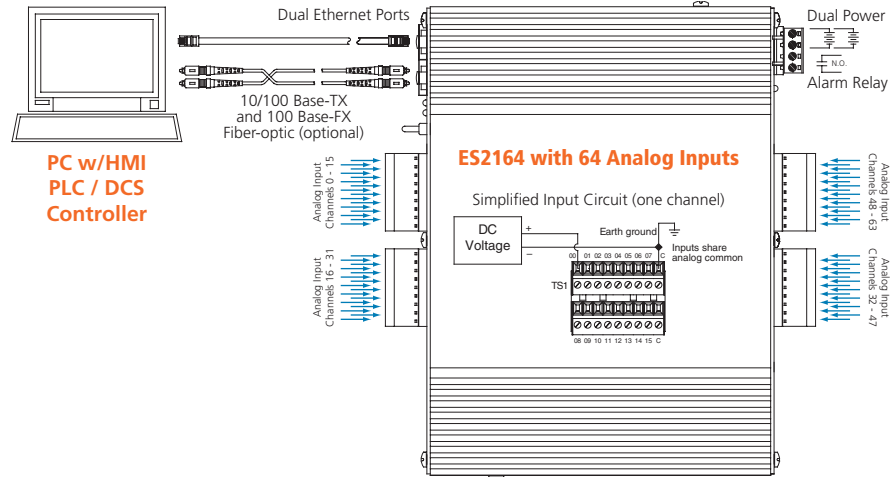
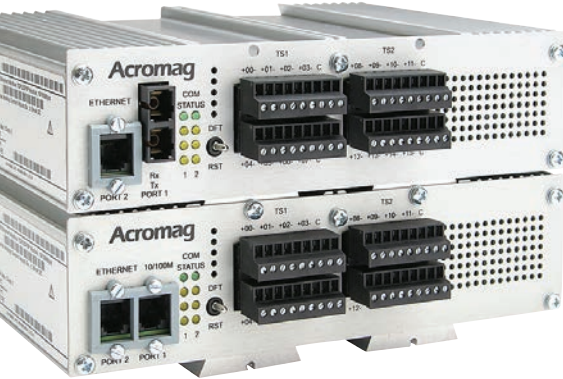
See Page 34.

#### Software Support

See Page 36.

# Ethernet I/O: EtherStax® Series

## ES2164 Ethernet Analog Input Modules



64-channel single-ended analog voltage input ♦ Modbus TCP/IP or UDP/IP communication

### Description

These EtherStax I/O modules provide a rugged, high-density, and high-speed solution to interface a large quantity of analog input signals to SCADA and distributed I/O systems. Each unit converts up to 64 single-ended analog voltage signals from various sensors and instruments for transmission to an Ethernet-based control network. Typical applications include process control, automated manufacturing, remote data acquisition, test and measurement, embedded computing, and supervisory monitoring systems.

EtherStax units are built and tested to deliver high reliability and dependable performance in hostile environments. Many features help increase reliability, improve performance and protect from harsh environments. Available in an aluminum enclosure or as an open circuit board, both formats stack vertically to maintain a very small footprint.

### Input Ranges

±5V, ±10V DC

### Ethernet Communication

10/100Base-T(X) and 100Base-FX, Automatic MDI/MDI-X on all copper ports, Modbus TCP/IP or UDP/IP protocol

### Power Requirement

18 to 36V DC (redundancy-ready)

### Approvals

CE, UL/cUL:  
Zone 2, Class 1, Division 2, Groups ABCD



Open circuit board versions are also available.

### Key Features & Benefits

- 64 single-ended analog voltage inputs
- 4-way isolation and surge suppression
- High-resolution 16-bit A/D
- High-speed scanning with 10 millisecond update of all 64 channels
- Automatic zero/span calibration
- On-demand self-test verifies calibration
- Configurable from any web browser
- User-configurable sample averaging and integration/totalization function with non-volatile registers
- Dual-format data registers support 16-bit integers or 32-bit floating point
- Scaling registers on all channels

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## Performance Specifications

### ◆ General Specifications

See Page 7 for communication and other specs.

### ◆ Analog Field Inputs

#### Input Channel Configuration

64 single-ended analog inputs. 32 channels on front and rear panels of unit.

#### DC Voltage Input Ranges (per-channel basis)

±5V or ±10V DC (default).

User-configured on a per-channel basis.

#### Input Scaling

Floating Point Format: IEEE-754 32-bit configurable for 12 digits with 4 decimal places.

16-bit Signed Integer Format: All channels represented as ±30,000.

#### Input Resolution and Accuracy

Resolution: 16-bit maximum, 0.00167%.

Accuracy: Better than 0.05% of range.

#### Input Impedance

Greater than 1M ohms.

#### Input Scan Groups and Scan Times

Eight user-enabled 8-channel scan groups.

10mS (100Hz) update of all 64 channels.

First 8-channel group updates in 1.80mS (555Hz).

Each additional 8-channel group adds 1.20mS to the update time.

#### Sample Averaging

0 to 500 samples, user-configurable.

#### Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS),

14V working voltage.

#### Noise Rejection

Common Mode (50-60Hz): Better than 72dB.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (software-configurable) relay trips on power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

5A @ 24V DC/250V AC, 6000 cycles resistive.

3A @ 24V DC/250V AC, 100,000 cycles general.

2A @ 24V DC/250V AC, Hazardous locations.

#### Maximum Switching Voltage and Power

250V AC / 750VA, 125V DC / 90W.

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. Web-configurable as a true switch (default mode) or low-latency hub.

#### Network Connector (10/100 Base-TX Copper)

One or two 8-pin RJ-45 connectors. Automatic MDI/MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode duplex SC connector. Full-duplex only. 2km communication distance.

#### Protocols and Addressing

Modbus TCP/IP or UDP/IP. StaticIP, DHCP, BootP.

Configurable IP addresses.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions programmable via web page.

#### Ethernet Redundancy

Compatible with STP, RSTP, proprietary schemes.

### ◆ Environmental

#### Operating and Storage Temperature

Operating Range: -40 to 70°C (-40 to 158°F).

Storage Range: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.

4.4W (copper ports), 5.5W (fiber-optic ports).

#### Ambient Temperature Effect

Less than 25ppm/°C (0.0025%/°C).

#### Isolation

I/O, power, relay and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC.

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226" x 2.444" x 7.25", 4 lbs. packed.

PCB: 7.920" x 1.875" x 7.25", 1.65 lbs. packed.

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Division 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).

Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ Models

#### ES2164-0000

Voltage inputs, two Cu ports, IP20 enclosure

#### ES2164-0010

Voltage inputs, two Cu ports, open board

#### ES2164-1000

Voltage inputs, Cu & fiber ports, IP20 enclosure

#### ES2164-1010

Voltage inputs, Cu & fiber ports, open board

### ◆ Accessories

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

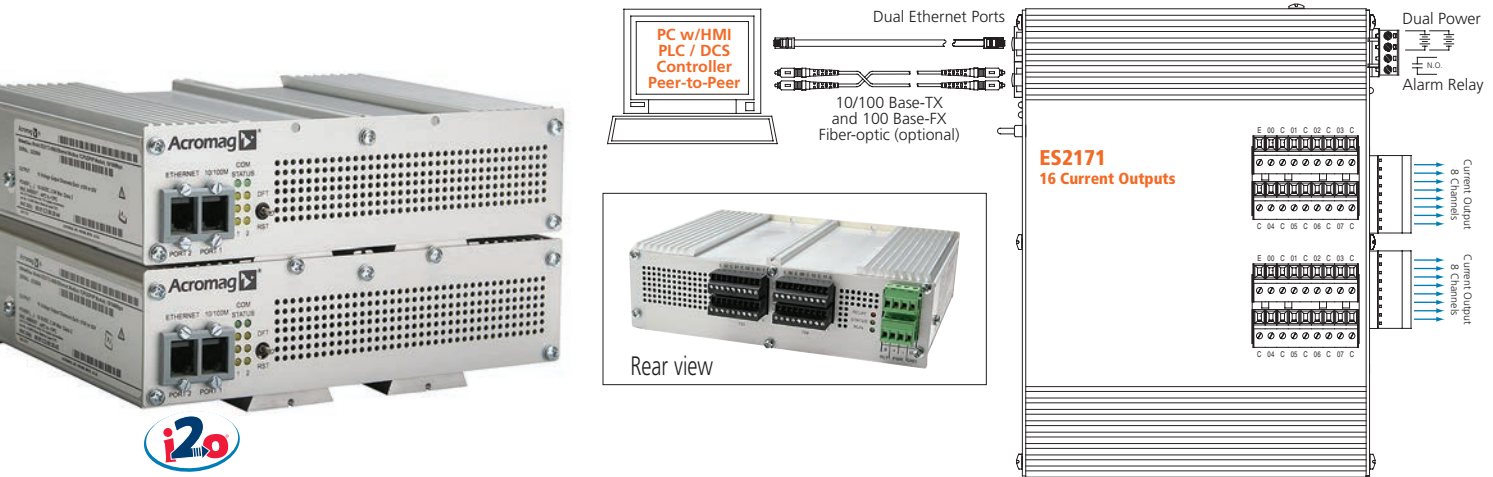
See Page 34.

#### Software Support

See Page 36.

# Ethernet I/O: EtherStax® Series

## ES2171 Ethernet Analog Output Modules



16 analog current outputs ♦ Modbus TCP/IP, UDP/IP, i2o® peer-to-peer communication

### Description

These EtherStax I/O units provide a rugged, high-density, and high-speed solution to interface analog output signals. Each unit provides 16 high-level analog current outputs to control various industrial devices.

Typical applications include driving indicators, display devices, and chart recorders. The outputs can also control variable speed drives, solenoid valves, motors, positioners and other actuators. Another common use is for re-transmission of analog signals to remote SCADA, PLC, or DCS systems.

EtherStax units are built and tested for high reliability and dependable performance in hostile environments. Available in an aluminum enclosure or as an open circuit board, both formats stack vertically to maintain a very small footprint.

### Output Ranges

0-20mA, 4-20mA DC

### Ethernet Communication

10/100Base-T(X) and 100Base-FX, Automatic MDI/MDI-X on all copper ports, Modbus TCP/IP or UDP/IP protocol i2o peer-to-peer

### Power Requirement

18 to 36V DC (redundancy-ready)  
9 to 16V DC output excitation required

### Approvals

CE, UL/cUL:  
Zone 2, Class 1, Division 2, Groups ABCD



Open circuit board versions are also available.

### Key Features & Benefits

- 16-channel high-density analog output
- 3-way isolation and surge suppression
- High-resolution 16-bit D/A
- High-speed updates of less than 4 milliseconds for all channels
- Built-in loop-back circuit verifies outputs
- On-demand self-test verifies calibration
- Web browser configuration
- Peer-to-peer i2o communication output target device for Model ES215x inputs

### i2o Peer-to-Peer Messaging

With Acromag's i2o technology, you can map inputs from ES215x units to output channels on an ES2171 module. Select updates based on time or on a percent of range change (100mS or 0.1% resolution).

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

Tel: 248-295-0880 ■ Fax: 248-624-9234 ■ sales@acromag.com ■ www.acromag.com ■ 30765 S Wixom Rd, Wixom, MI 48393 USA

# Ethernet I/O: EtherStax® Series



## Performance Specifications

### ◆ Analog Field Outputs

#### Output Channel Configuration

16 single-ended current outputs.  
9-16V DC external excitation required.

#### Output Ranges (per-channel basis)

0-20mA or 4-20mA DC sourced.  
User-configured on a per-channel basis.

#### Maximum Output Load at Excitation

265 ohms @ 9V.  
400 ohms @ 12V.  
540 ohms @ 15V.

#### Output Resolution and Accuracy

Resolution: 13-bit maximum, 0.0122%.  
Accuracy: Better than 0.1% of range.

#### Output Response Time

1 channel: Less than 3mS, typical.  
16 channels: Less than 4mS, typical.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (user-configurable) relay trips on power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

3A @ 24V DC/250V AC, 100,000 cycles general.  
2A @ 24V DC/250V AC, Hazardous locations.

#### Maximum Switching Voltage and Power

250V AC / 750VA, 125V DC / 90W.

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. User-configurable as a true switch (default mode) or low-latency hub.

#### Network Connector [10/100 Base-T(X) Copper]

One or two 8-pin RJ-45 connectors. Automatic MDI/MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode with SC connector. 2km communication distance. Full/half-duplex, selectable.

#### Protocols

Modbus TCP/IP, UDP/IP, i2o peer-to-peer.

#### Addressing

StaticIP, DHCP.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions user-configurable.

#### Ethernet Redundancy

Compatible with STP, RSTP, or any ring scheme.

Port Number	% Span Change	Update Time(100mS)	Map To IP Address	Map To Holding Register	Mapping Method	Map To Internal Outputs
Port 1 Voltage	0.0 0.0	150 0	128.1.1.102 0.0.0.0	40351 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	<input checked="" type="radio"/> NO <input type="radio"/> YES
Port 2 Voltage	0.0 0.0	0 0	0.0.0.0 0.0.0.0	0 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	<input checked="" type="radio"/> NO <input type="radio"/> YES
Port 1 Current	0.0 0.0	0 0	0.0.0.0 0.0.0.0	0 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	
Port 2 Current	0.0 0.0	0 0	0.0.0.0 0.0.0.0	0 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	

Example i2o peer-to-peer mapping configuration screen from input source module (ES215x model).

### ◆ i2o Peer-to-Peer Communication

Each port of 8 output channels can serve as a target for mapped inputs from ES215x units. Updates are based on time (100mS resolution) or percent of range change (0.1% resolution).

### ◆ Environmental

#### Operating and Storage Temperature

Operating: -40 to 70°C (-40 to 158°F).  
Storage: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.  
3.3W (copper ports), 4.6W (fiber-optic ports), not including excitation power.  
9-16V DC @ 400mA external power required for driving the outputs.

#### Isolation

I/O, power, relay and Ethernet port-to-port.  
Peak: 1500V AC, ANSI/ISA-82.01-1988.  
Continuous: 250V AC, 354V DC (150V AC ch-ch).

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226 x 2.444 x 7.25", 4 lbs. packed.  
PCB: 7.920 x 1.875 x 7.25", 1.65 lbs. packed.

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Div 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).  
Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ Models

#### ES2171-0000

Current outputs, two Cu ports, IP20 enclosure

#### ES2171-0010

Current outputs, two Cu ports, open board (no IP20 enclosure)

#### ES2171-1000

Current outputs, Cu & fiber ports, IP20 enclosure

#### ES2171-1010

Current outputs, Cu & fiber ports, open board (no IP20 enclosure)

### ◆ Accessories

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

See Page 34.

#### Software Support

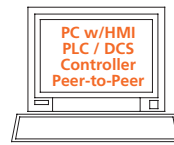
See Page 36.





# Ethernet I/O: EtherStax® Series

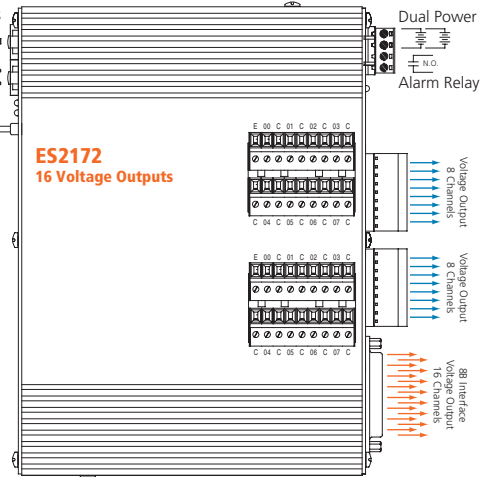
## ES2172 Ethernet Analog Output Modules



Dual Ethernet Ports  
10/100 Base-TX and 100 Base-FX  
Fiber-optic (optional)



Rear view



16 analog voltage outputs ♦ Modbus TCP/IP, UDP/IP, i2o® peer-to-peer communication

### Description

These EtherStax I/O units provide a rugged, high-density, and high-speed solution to interface analog output signals. Each unit provides 16 high-level analog voltage outputs to control various industrial devices.

Typical applications include driving indicators, display devices, and chart recorders. The outputs can also control variable speed drives, solenoid valves, motors, positioners and other actuators. Another common use is for re-transmission of analog signals to remote SCADA, PLC, or DCS systems.

EtherStax units are built and tested for high reliability and dependable performance in hostile environments. Available in an aluminum enclosure or as an open circuit board, both formats stack vertically to maintain a very small footprint.



Open circuit board versions are also available.

### Output Ranges

±5V, ±10 V DC

### Ethernet Communication

10/100Base-T(X) and 100Base-FX, Automatic MDI/MDI-X on all copper ports, Modbus TCP/IP or UDP/IP protocol i2o peer-to-peer

### Power Requirement

18 to 36V DC (redundancy-ready)

### Approvals

CE, UL/cUL:  
Zone 2, Class 1, Division 2, Groups ABCD



Interface to isolated 8B analog output modules.



Select from a dozen 8B output modules.

### Key Features & Benefits

- 16-channel high-density analog output
- 3-way isolation and surge suppression
- High-resolution 16-bit D/A
- High-speed updates of less than 4 milliseconds for all channels
- Built-in loop-back circuit verifies outputs
- On-demand self-test verifies calibration
- Web browser configuration
- Peer-to-peer i2o communication output target device for Model ES215x inputs

### i2o Peer-to-Peer Messaging

With Acromag's i2o technology, you can map inputs from ES215x units to output channels on an ES2172 module. Select updates based on time or on a percent of range change (100mS or 0.1% resolution).





## Performance Specifications

### ◆ Analog Field Outputs

#### Output Channel Configuration

16 single-ended DC voltage outputs.

#### Output Ranges (per-channel basis)

±5V, ±10V DC (at ±1mA).

User-configured on a per-channel basis.

#### Output Impedance

1 ohm maximum.

#### Output Resolution and Accuracy

Resolution (±10V): 16-bit maximum, 0.00166%.

Resolution (±5V): 15-bit maximum, 0.00305%.

Accuracy: Better than 0.05% of range.

#### Output Response Time

1 channel: Less than 3mS, typical.

16 channels: Less than 4mS, typical.

### ◆ External 8B Output Modules

See Bulletin 8400-479 for details.

### ◆ Local Alarm Output

#### Configuration

Failsafe or non-failsafe (user-configurable) relay trips on power or link-loss failure.

#### Type

SPST-NO, 1 Form A, Class I, Division II approved.

#### Rating

3A @ 24V DC/250V AC, 100,000 cycles general.

2A @ 24V DC/250V AC, Hazardous locations.

#### Maximum Switching Voltage and Power

250V AC / 750VA, 125V DC / 90W.

### ◆ Ethernet Interface

#### Internal Switch or Hub/Repeater

Dual-port Ethernet switch. User-configurable as a true switch (default mode) or low-latency hub.

#### Network Connector [10/100 Base-T(X) Copper]

One or two 8-pin RJ-45 connectors. Automatic MDI/MDI-X. 100m communication distance.

#### Network Connector (100 Base-FX Fiber-optic)

One multi-mode with SC connector. 2km communication distance. Full/half-duplex, selectable.

#### Protocols

Modbus TCP/IP, UDP/IP, i2o peer-to-peer.

#### Addressing

StaticIP, DHCP.

#### Ethernet Modbus TCP/IP Sockets/Sessions

1-10 socket/sessions user-configurable.

#### Ethernet Redundancy

Compatible with STP, RSTP, or any ring scheme.

Port Number	% Span Change	Update Time(100mS)	Map To IP Address	Map To Holding Register	Mapping Method	Map To Internal Outputs
Port 1 Voltage	0.0 0.0	150 0	128.1.1.102 0.0.0.0	40351 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	<input checked="" type="radio"/> NO <input type="radio"/> YES
Port 2 Voltage	0.0 0.0	0 0	0.0.0.0 0.0.0.0	0 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	<input checked="" type="radio"/> NO <input type="radio"/> YES
Port 1 Current	0.0 0.0	0 0	0.0.0.0 0.0.0.0	0 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	
Port 2 Current	0.0 0.0	0 0	0.0.0.0 0.0.0.0	0 0	<input type="radio"/> Unipolar to Unipolar <input type="radio"/> Bipolar to Unipolar <input type="radio"/> Bipolar to Bipolar <input type="radio"/> Unipolar to Bipolar	

Example i2o peer-to-peer mapping configuration screen from input source module (ES215x model).

### ◆ i2o Peer-to-Peer Communication

Each port of 8 output channels can serve as a target for mapped inputs from ES215x units. Updates are based on time (100mS resolution) or percent of range change (0.1% resolution).

### ◆ Environmental

#### Operating and Storage Temperature

Operating: -40 to 70°C (-40 to 158°F).

Storage: -40 to 85°C (-40 to 185°F).

#### Power Requirements

18-36V DC. Redundant, diode-coupled terminals.

3.3W (copper ports), 4.6W (fiber-optic ports), not including excitation power.

#### Isolation

I/O, power, relay and Ethernet port-to-port.

Peak: 1500V AC, ANSI/ISA-82.01-1988.

Continuous: 250V AC, 354V DC (150V AC ch-ch).

### ◆ Enclosure and Physical

#### Housing Classification and Dimensions

IP20: 8.226 x 2.444 x 7.25", 4 lbs. packed.

PCB: 7.920 x 1.875 x 7.25", 1.65 lbs. packed.

#### Safety Approvals

CE marked and UL/cUL Listed.

Hazardous Locations: Class I; Div 2; A, B, C, D.

Open board units: UL Recognized.

#### Shock and Vibration Immunity (in enclosure)

Mechanical Shock: 50g (3ms), 30g (11ms).

Random Vibration: 5g, (5-500Hz).

## Ordering Information

### ◆ Models

#### ES2172-0000

Voltage outputs, two Cu ports, IP20 enclosure

#### ES2172-0010

Voltage outputs, two Cu ports, open board (no IP20 enclosure)

#### ES2172-1000

Voltage outputs, Cu & fiber ports, IP20 enclosure

#### ES2172-1010

Voltage outputs, Cu & fiber ports, open board (no IP20 enclosure)

### ◆ Accessories

#### 8B Modules and Backpanels

See Page 32.

#### Industrial Ethernet Switches

See Page 33.

#### Hardware Accessories and Power Supplies

See Page 34.

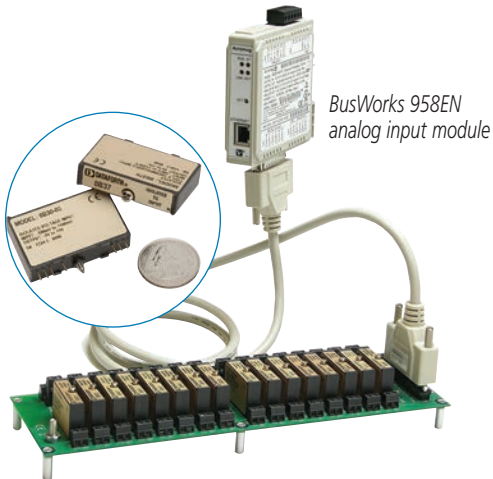
#### Software Support

See Page 36.

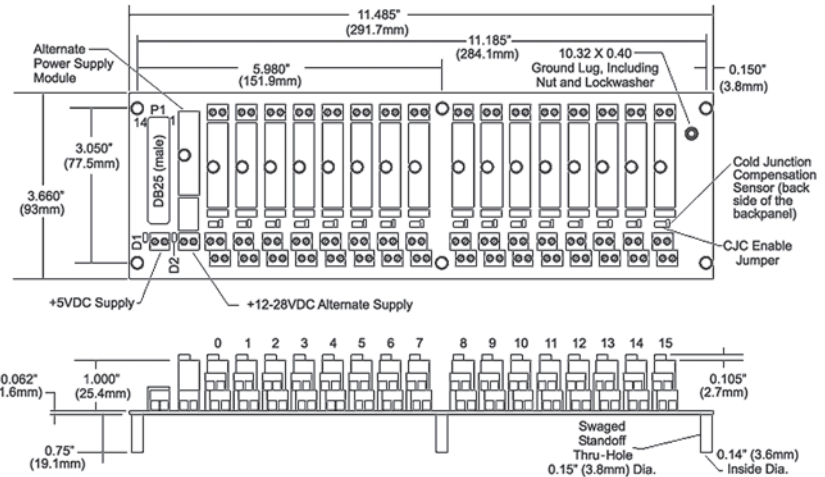


# Ethernet I/O: EtherStax® Series

## 8B Signal Conditioning Modules



*BusWorks 958EN  
analog input module*



### High-density isolation amplifiers ♦ Parallel interface connects to Ethernet Analog Input Modules

#### Description

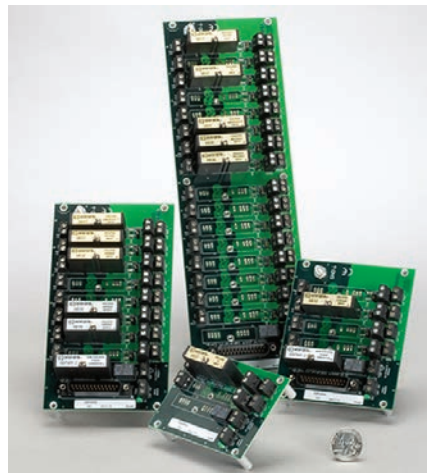
This new line of high-density isolated signal conditioners provides 17 family groups with a total of 102 models that interface to a wide variety of voltage, current, temperature, position, frequency, and strain measuring devices. Housed in a package only one-fifth the size of competing products, the 8B module series offers instrument-class performance with superior specifications for accuracy, linearity, filtering, isolation, output noise and much more.

#### Key Features & Benefits

- ±0.05% accuracy
- ±0.02% linearity
- 1500Vrms isolation
- 3- to 5-pole low-pass filter
- 120dB CMR
- ANSI/IEEE C37.90.1 transient protection
- Field I/O protection from 30 to 240V AC continuous
- -40°C to 85° operating temperature range
- DB25 connector for Ethernet interface to Acromag BusWorks or EtherStax I/O modules
- CE compliant
- UL/cUL listing pending for Class 1, Division 2

#### Applications

- Systems requiring high channel-to-channel isolation, noise rejection, surge suppression, and amplification
- Designed for front-end signal conditioning or embedded applications:
- DCS, PLC, controllers, data acquisition, remote I/O, recorders, etc.
- On-board embedded OEM applications
- Protects equipment, increases accuracy, and installs/expands easily
- Low-cost, high-density amplifier system



#### Ordering Information

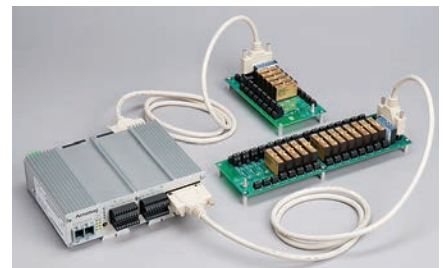
*NOTE: Please refer to Acromag Bulletin #8400-479 or visit [www.acromag.com](http://www.acromag.com) for full ordering information.*

##### ♦ Input Modules

- Current input
- Voltage input; 1kHz, 20kHz, or narrow bandwidth
- RTD input; linearized; 2-, 3-, or 4-wire RTD
- Thermocouple input; linearized or non-linearized
- Strain gage input; wide or narrow bandwidth
- Potentiometer input
- Frequency input

##### ♦ Accessories

- 2-, 4-, 8-, and 16-position analog I/O backpanels
- Power supplies
- Interface cables
- 19-Inch metal mounting rack



*8Bs also connect to EtherStax analog I/O modules (ES2151, ES2152, ES2153, ES2162, ES2172 models)*

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# Ethernet I/O: EtherStax® Series



## 900EN Series, EIS Series Industrial Ethernet Switches

### ◆ 5-Port Switch, Unmanaged



### ◆ 8-Port Switch, Unmanaged



### ◆ 8-Port Switch, Managed, FX



### 900EN-S005 Ethernet Switches

Acromag's five-port Ethernet switch is designed for use in industrial applications. Rugged construction and a variety of security features ensure reliable operation under demanding conditions. Internal intelligence enables "connect and go" operation for fast and easy network installation with auto-negotiation of data rate, flow control, and crossover signal compatibility. No configuration is necessary when the 900EN-S005 is used as a simple switch with Acromag I/O modules. For advanced users, this switch offers numerous control functions that are easily configured through DIP-switch settings or programmed using your computer.

- Five shielded RJ-45 sockets, 8-pin, 10Base-T / 100Base-TX
- 1500V port-to-port isolation
- Redundant power support
- -25 to 70°C operating range
- CE, ATEX marked. UL, cUL listed, Class I; Div. 2; Groups A, B, C, D.

### EIS Series Ethernet Switches

#### Models

- EIS-308: 8-port (Cu), unmanaged
- EIS-358: 8-port (Cu), redundancy, unmanaged
- EIS-408: 8-port (Cu/fiber), redundancy, managed

EIS series switches are designed for harsh environments. They feature a rugged IP30 aluminum case, 300,000 hour MTBF, and power supply redundancy for dependable networking.

#### Managed or unmanaged operation

With web-based setup, managed switches ensure easy installation and maintenance. Managed switches also support many powerful Ethernet features such as port VLAN, Quality of Service (QoS), Internet Group Management Protocol (IGMP) Snooping, and failure alarms.

#### Self-healing redundant ring capability

Some models employ redundancy to provide self-recovery if the primary communication path fails. Redundant ring technology instantly reconfigures to provide an alternate path. The fast recovery time protects mission-critical applications from interruptions and temporary malfunctions.

- Ultra-fast redundant ring technology (<300ms) supports STP, RSTP and proprietary protocols
- -10 to 70°C operating temperature range
- Port-to-port isolation (1200V AC)
- Built-in RFI/EMI and surge/transient protection

### Ordering Information

#### ◆ Switches

For more information please visit [www.acromag.com](http://www.acromag.com).

#### 900EN-S005

Ethernet switch, 5-port Copper

#### EIS-308

Ethernet switch, 8-port Copper

#### EIS-358

Ethernet switch with redundancy, 8-port Copper

#### EIS408FX-M

Ethernet switch with redundancy, 6 Cu / 2 Fiber-optic, multi-mode fiber (up to 2 km).

#### EIS-408FX-S

Ethernet switch with redundancy, 6 Cu / 2 Fiber-optic, single-mode fiber (up to 30 km).

#### ◆ Accessories

Hardware Accessories and Power Supplies  
See Page 34.

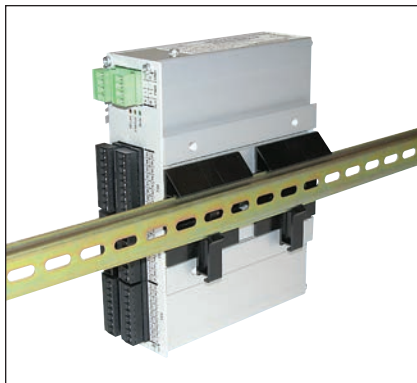
**Acromag**   
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# Ethernet I/O: EtherStax® Series

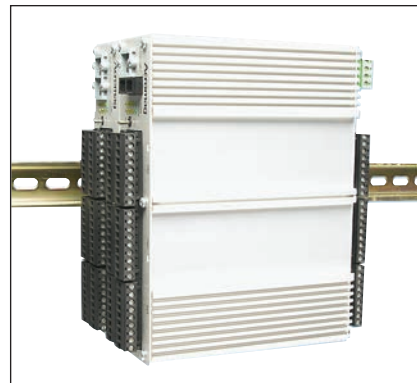
## Mounting Mounting kits, DIN rail strips and accessories



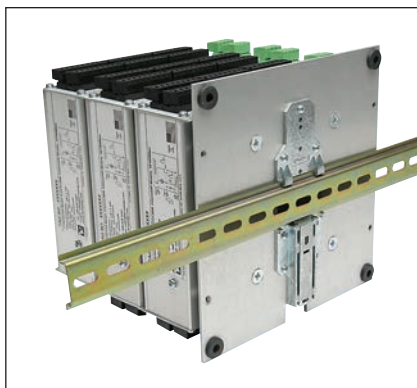
Interlocked units without mounting kit.



ESA-DIN-VMK kit (vertical terminals).



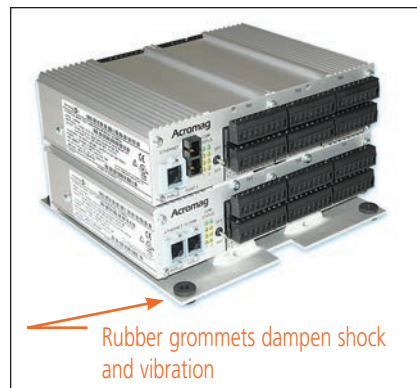
ESA-DIN-VMK supports two stacked units.



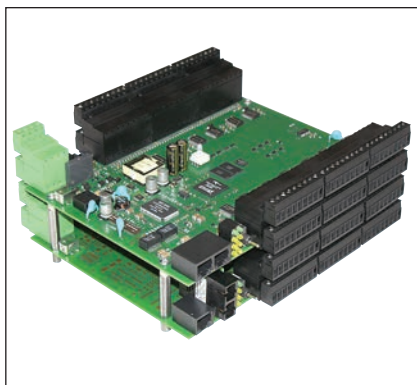
ESA-DIN-HMK kit (horizontal terminals).



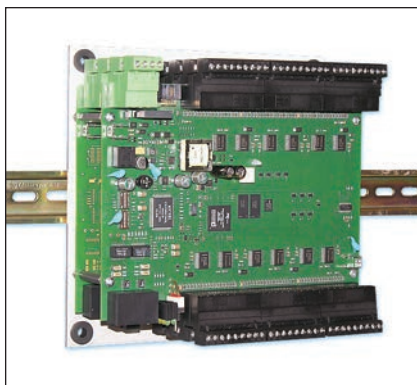
ESA-DIN-HMK supports three stacked units.



ESA-SMK surface/machine mounting kit.



ESA-OMK open board stacking kit. One kit supplies standoffs to stack two units.



Units stacked with ESA-OMK kit can mount on a DIN rail with ESA-DIN-HMK kit plate.



Side-by-side 19-inch rack mounting with ESA-DIN-HMK kit on a DIN rail.

# Ethernet I/O: EtherStax® Series



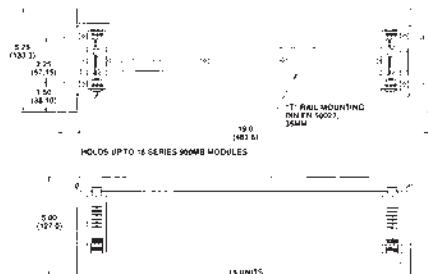
## Accessories

### ◆ Mounting Hardware



#### Din-Rail Mounting

For your convenience, Acromag offers several mounting accessories to simplify your system installation. Our 19" rack-mount kit provides a clean solution for mounting your I/O modules and a power supply. Or you can buy precut DIN rail strips for mounting on any flat surface.



### Ordering Information

Visit [www.acromag.com](http://www.acromag.com) for more information.

#### 20RM-16-DIN

19" rack-mount kit with DIN rail

#### DIN RAIL 3.0

DIN rail strip, Type T, 3 inches (75mm)

#### DIN RAIL 16.7

DIN rail strip, Type T, 16.7 inches (425mm)

#### ESA-DIN-HMK

DIN rail horizontal mounting kit, holds three EtherStax units.

#### ESA-DIN-VMK

DIN rail vertical mounting kit, holds two EtherStax units.

#### ESA-OMK

Open circuit board EtherStax mounting kit, stacks two units.

#### ESA-SMK

Surface mounting EtherStax kit, mounts up to three units.

### ◆ Power Supplies



#### Universal Slimline Power Supplies

PS5R-S Slim Line models give you all the power of a traditional power supply in only half the space. They feature universal voltage inputs and all the convenient features you've come to expect. Use them in tight spaces or save valuable DIN rail space while still filling your requirements for power. With nine models available, it's easy to find the one that's right for your application!

#### Input Power Requirement

85 to 264V AC or 105 to 370V DC

#### Output

5V DC, 12V DC, or 24V DC  
10W to 240W

### Ordering Information

Visit [www.acromag.com](http://www.acromag.com) for more information.

#### PS5R-SB05

Power supply, 10W, 2.0A at 5V DC

#### PS5R-SB12

Power supply, 15W, 1.2A at 12V DC

#### PS5R-SB24

Power supply, 15W, 0.65A at 24V DC

#### PS5R-SC12

Power supply, 30W, 2.5A at 12V DC

#### PS5R-SC24

Power supply, 30W, 1.3A at 24V DC

#### PS5R-SD24

Power supply, 60W, 2.5A at 24V DC

#### PS5R-SE24

Power supply, 90W, 3.75A at 24V DC

#### PS5R-SF24

Power supply, 120W, 5A at 24V DC

#### PS5R-SG24

Power supply, 240W, 10A at 24V DC

### ◆ Cables and Adapters



#### Wiring Accessories

Acromag offers a variety of data cables and signal adapters to complete your application.

### Ordering Information

Visit [www.acromag.com](http://www.acromag.com) for more information.

#### 5035-355

Ethernet straight cable, CAT5, 3 feet long, shielded

#### 5035-360

Ethernet crossover cable, CAT5E, 5 feet long, shielded

#### 4001-096

USB Ethernet adapter

#### 4001-110

Ribbon cable, 5 feet, DB25 male to 26-pin female IDC connector, interfaces 3B/5B input modules to select EtherStax or BusWorks I/O modules

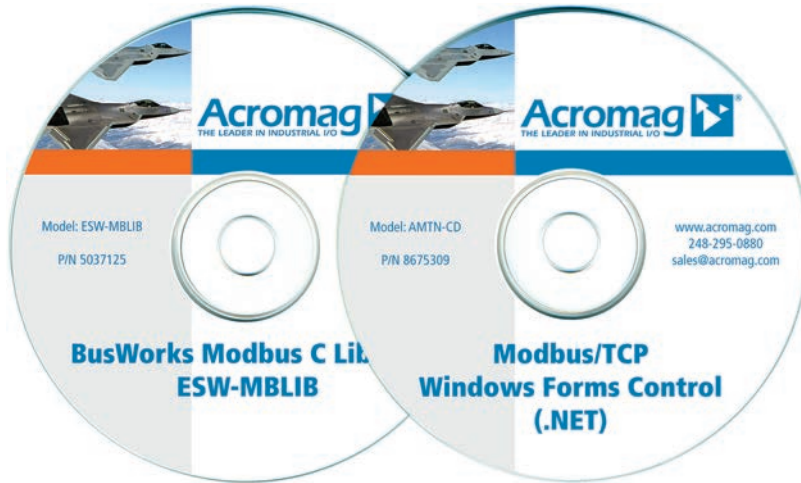
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THE LEADER IN INDUSTRIAL I/O





# Ethernet I/O: EtherStax® Series

## Software Support Application Development Tools



```

Command Prompt - exmbtcpip

Modbus TCP/IP Example 9500-370A

1. Exit this Program
2. Set IP Address: 10.1.1.161
3. Set Register Address: 0
4. Set Register Count: 4
5. Report Slave I.D.
6. Read Output Status
7. Read Input Status
8. Force Single Coil
9. Force Multiple Coils
10. Read Output Registers
11. Read Input Registers
12. Preset Single Register
13. Preset Multiple Registers

Select: 11
00 0002
01 0000
02 0000
03 0000
    
```

Integrate with HMI and SCADA Software ♦ Supports five operating systems ♦ Demo versions available

### Description

These software development tools help you quickly integrate Acromag Ethernet I/O with your application program.

#### OPC DA Server

This low-cost server is exclusively for use with Acromag Modbus TCP/IP Ethernet devices. The OPC Server connects Acromag's I/O modules to your HMI, SCADA or custom-built Visual Basic / C++ applications. Easy CSV import / export capability saves development time for faster deployment.

#### .NET / ActiveX Controls

These software controls provide a fast, easy way to communicate with any Modbus/TCP slave devices connected to your PC. Within minutes, your Visual Basic, Visual C, .NET, Excel, or other compatible applications will be talking Modbus protocol.

### Function Libraries with C Source Code

Our C library of function routines speeds framing of Modbus messages. Examples help link your code with provided function calls to configure, read, and write to Acromag I/O modules. Ideal for Windows, Linux, VxWorks, and QNX OS.

### Key Features & Benefits

- High-Speed OPC connectivity to all Acromag Modbus TCP/IP devices
- OPC DA Server supports all OPC-compliant HMI and SCADA applications
- ActiveX and .NET controls enable fast, easy communication with any Modbus TCP/IP or Modbus RTU slave device
- ActiveX and .NET controls support Visual Basic, Visual C++ and Excel applications
- Modbus C Libraries enable use with Linux, VxWorks, QNX, and other OS platforms
- Free evaluation versions



### Ethernet Software Development Tools

Model	Description	Program Environment	Operating Systems
ACMBTCP-OPC	Modbus TCP/IP Master OPC DA Server	HMI, SCADA, Visual Basic, C++	Windows XP, Vista, 7, Server
AMTN-CD	Modbus TCP/IP .NET Controls	Visual Basic, C++, C#	Windows XP, Vista, 7
AMTX-CD	Modbus TCP/IP ActiveX Controls	Visual Basic, C++, Excel	Windows XP, Vista, 7
ESW-MBLIB	Modbus C Library of Function Routines	Visual C++	Win, Linux, VxWorks, QNX, OS-9

### Ordering Information

See table for model numbers. Software is provided on CD-ROMs except ACMBTCP-OPC which is download only. For more information, visit our website.

[www.acromag.com/software](http://www.acromag.com/software)







## Notes

# Dependable Value.

http://www.acromag.com/ - Windows Internet Explorer

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RELIABILITY ○  
FLEXIBILITY ●  
FAST DELIVERY ●  
ENGINEERING SUPPORT ●  
ONE-STOP I/O SHOP ●

## RELIABILITY


- 7-year warranty
- ISO 9001, AS9100 certified
- Long-term availability
- 50 years of experience



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### Ethernet I/O for 8B Inputs

958EN interfaces 16 high-level analog input signals from 8B signal conditioners. A DB25 port provides a parallel connection to a rack of 8B analog input modules. [Read more...](#)




### Ethernet I/O with 64-channel A/D

These EtherStax I/O modules provide a rugged, high-density, and high-speed solution to interface a large quantity of analog input signals to SCADA and distributed I/O systems. [Read more...](#)



### I/O Server Industrial PC

Acromag's Industrial I/O Server is a rugged industrial PC with truly integrated support for user I/O. A built-in carrier card interfaces up to four plug-in I/O modules to the Intel Atom® CPU. [Read more...](#)



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