Active Ethernet I/O

ioLogik E2000 Series Active Ethernet I/O

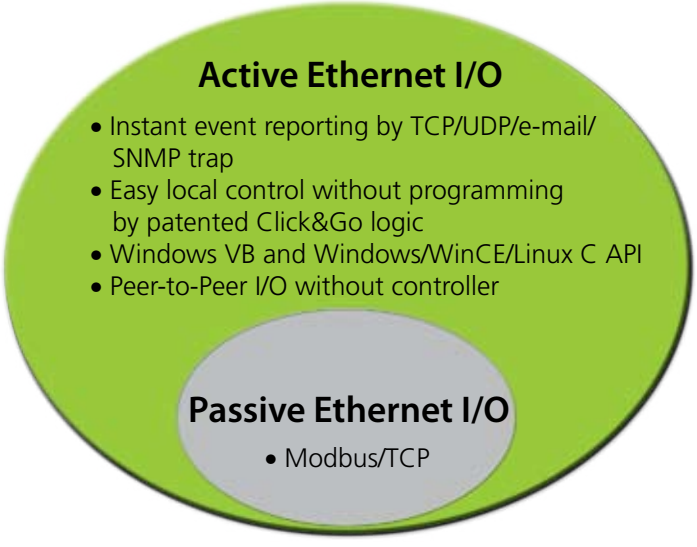
New Generation I/O that Talks over Ethernet

Active Ethernet I/O—a new breed of I/O server for intelligent, PC-based automation over Ethernet

Traditional Ethernet remote I/O solutions have been on the market for a long time, but until now, none of the products available could provide the active I/O messaging and faster I/O response time required by more and more applications. Traditional remote I/O solutions are "passive," in the sense that the products wait passively to be polled by a host computer. The response time, however, tends to be on the order of seconds. For customers who want a more efficient, real-time I/O solution (i.e., response time on the order of tens of thousandths of a second) for their Data Acquisition and Control (DA&C) systems, the "passive" Ethernet I/O structure is simply not qualified.

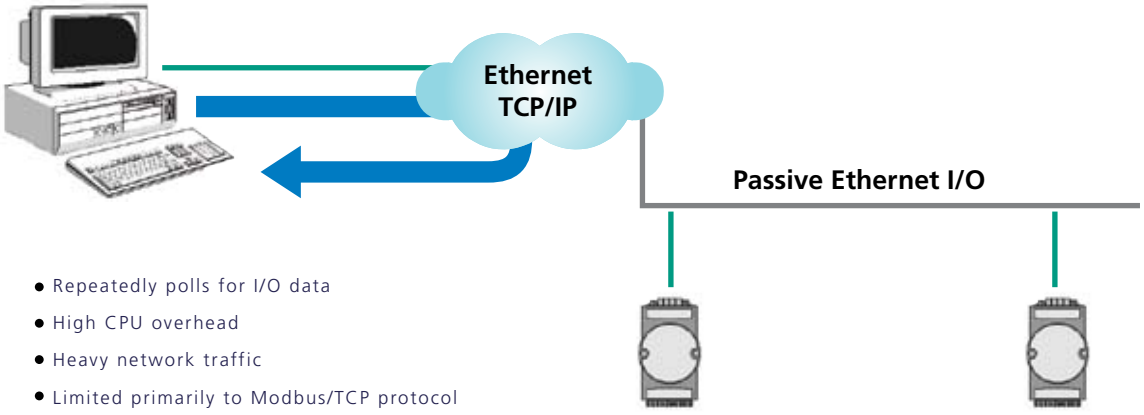
Moxa's Active Ethernet I/O line was developed specifically to address the limitations of the traditional passive approach.

Active Ethernet I/O is the future of PC-based automation. The market demands real-time DA&C solutions with local intelligence that can actively transmit I/O data over Ethernet networks. The traditional passive approach is unable to offer the features that Active Ethernet I/O provides, such as a centralized architecture and distributed intelligence.



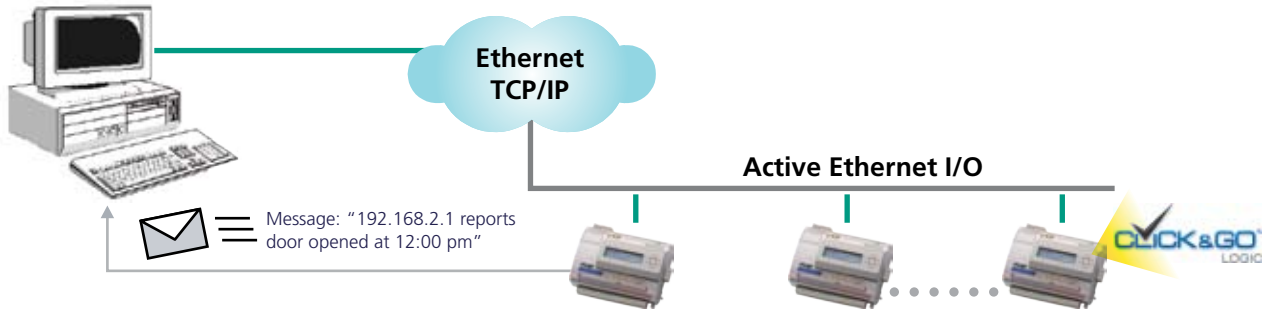
Improve efficiency with real-time data acquisition

Unlike traditional passive Ethernet I/O servers, Active Ethernet I/O servers can proactively transmit I/O status information over Ethernet or TCP/IP networks. Messages are sent within 50 ms* when I/O values meet user-defined conditions.



- Repeatedly polls for I/O data
- High CPU overhead
- Heavy network traffic
- Limited primarily to Modbus/TCP protocol

The host computer requires more CPU overhead to obtain real-time I/O data when using passive Ethernet I/O solutions. Additional network bandwidth is also consumed when the I/O node is larger.



- Waits for I/O messages in real-time
- Low CPU overhead
- Reduced network traffic
- Multiple channels via UDP, TCP, SNMP
- Supports passive Remote I/O functions

With Active Ethernet I/O architecture, the host computer waits for notification from the I/O server, which conserves CPU usage for use in other applications.

* The time is measured in the field test of a RFID system using ioLogik E2210. 50 ms is the typical latency in 100 Mbps Ethernet network.

Timely and accurate measurements to prevent data loss

CPU and/or network loading can cause delayed or lost signals in passive Ethernet I/O systems.

Active Ethernet I/O can proactively send real-time I/O information stamped with the date, time, and IP address.

Report-by-exception reduces Ethernet bandwidth consumption and host computer overhead

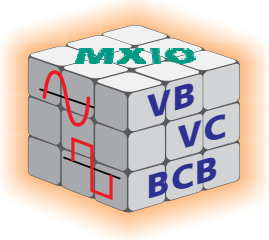
Active Ethernet I/O can save host computers from being required to decide what to do with I/O data once it is received. Using Click&GO logic, Active Ethernet I/O servers can deliver network messages directly to the host computers.

Compatible with existing SCADA and SNMP management software

The ioLogik E2000 series of Active Ethernet I/O servers is compatible with both standard Modbus/TCP and SNMP software. Most SCADA software, such as Citect, Intouch, or Kepware OPC Server, is supported with the use of standard Modbus drivers. In addition, the built-in SNMP V2 and the MIB file are available for both industrial automation and machine room management.

Quick programming with easy-to-use MXIO DLL library

ioLogik E2000 Active Ethernet I/O servers include an easy-to-use DLL library for quick programming. The MXIO DLL library supports Visual Basic, Visual C++, and Borland C++.



Unique LCD display module for on-site configuration

ioLogik E2000 Active Ethernet I/O servers support an optional LCD display module for on-site management and configuration. The unique display module can display network and I/O settings such as analog input value or digital input counter value. The IP address and netmask can be configured on-site without using a PC.

Multi-functional I/O configured by software

ioLogik E2000 Active Ethernet I/O servers are equipped with multi-functional I/O channels. On the ioLogik E2210, the digital input can operate in event counter mode and the digital output can operate in pulse output mode. On the ioLogik E2240, the analog input channel can be configured to receive mV, V or current(mA) signals.

No programming with hassle-free Click&Go™ Logic Control

Click&Go™ logic control is the key to turning an ioLogik E2000 server into an intelligent Active Ethernet I/O server.

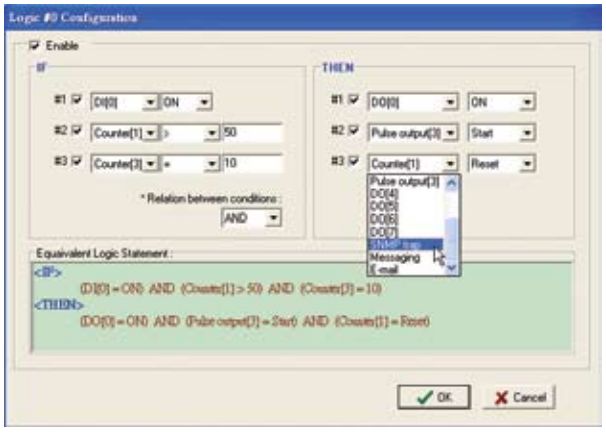
Click&Go™ logic lets you decide what I/O information and message to transmit, when to transmit it, and who to transmit it to, for simple alarm control and messaging. As opposed to using C-language or PLC-ladder, a person who understands basic logic concepts can complete the configuration themselves.

CLICK&GO™ LOGIC

Unlike passive Ethernet I/O architecture, Active Ethernet I/O allows several input signals to act as a single event that can simultaneously trigger a network message and local output signals. Communication between the host computer and Active Ethernet I/O device is concise and efficient. In addition, network message delivery is 20 times faster than with traditional SCADA systems (50 ms compared to 1 sec).

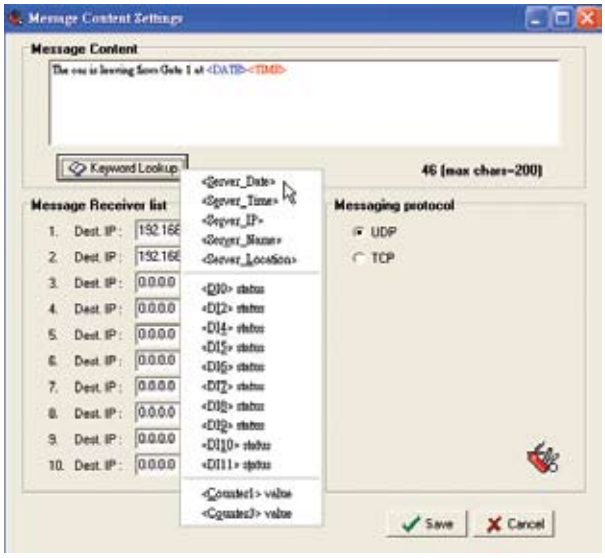
The unique Click&Go™ logic is a patent pending technology developed by Moxa.

Comprehensive if-then logic structure



You may define up to 16 rules with Active Ethernet I/O's Click&Go logic control. For each rule, up to 3 conditions and 3 actions can be set. For example, a rule could state that when a digital input is activated, a digital output will pulse for 3 seconds and a TCP network message will be sent.

User-define content for active I/O messaging



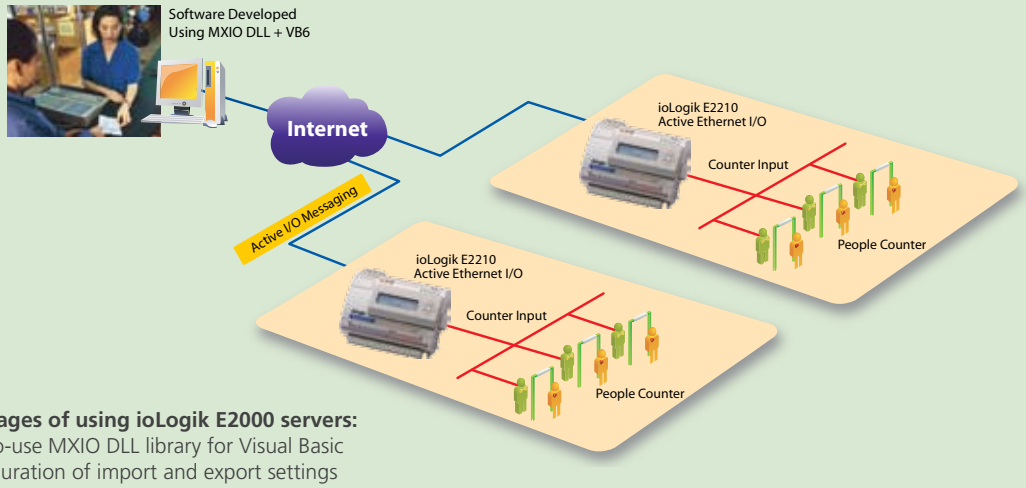
Network messages are completely user-defined and can be configured for transmission upon specific input signal conditions. Messages may be customized with dynamic fields that can indicate the exact time, date, or IP address of the I/O information.

Active Ethernet I/O for Real World Applications

Supermarket loyalty program uses Active Ethernet I/O

Customer loyalty is a decisive factor for success in retail. A European supermarket company has developed an in-store interactive system for retaining customer interest through games and rewards. The interactive system is currently in place in dozens of stores.

Moxa's ioLogik E2210 was selected to help track the number of visitors in each store's interactive system. Active Ethernet I/O on the E2210 allows data collection and messages without a separate PC, and the Click&Go logic makes configuration very easy. In addition, the easy-to-use libraries that are included make it possible to develop Active Ethernet I/O software quickly. These features made it easy to integrate the E2210 with the control center of the interactive system, which is a computer running a custom Visual Basic application.



Advantages of using ioLogik E2000 servers:

- Easy-to-use MXIO DLL library for Visual Basic
- Configuration of import and export settings
- Reduced network overhead using Active Ethernet I/O messaging with time-stamp
- Multiple trigger conditions for I/O messaging in Click&Go™ logic
- Built-in counter input channel with no counting loss
- Built-in RTC (Real-time Clock) with SNTP time synchronization

ioLogik E2210

Active Ethernet I/O with 12 Digital Inputs, 8 Digital Outputs

Features

- Actively transfer I/O data in real-time over Ethernet
- Easy-to-use Click&Go™ Logic for local output control and messaging
- 12-point 24 VDC digital input with DI/Event counter
- 8-point 24 VDC digital output as pulse output
- 10/100 Mbps Ethernet with Modbus/TCP protocol connecting up to 10 hosts
- SNMP to I/O mapping that works with Network Management System
- Quick programming library for VB, VC, BCB

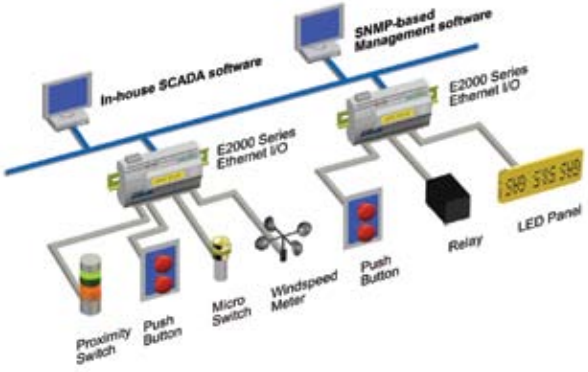
Linking Digital Inputs and Outputs to TCP/IP Ethernet Networks

The ioLogik™ E2210 is designed to allow system integrators to acquire and control on/off devices remotely over TCP/IP and Ethernet networks. On/off devices may include proximity switches, mechanical switches, push buttons, optical sensors, LEDs, and light switches. The ioLogik™ E2210 supports multiple protocols over Ethernet, such as Modbus/TCP, SNMP, HTTP, TCP, and UDP at 100 Mbps for high speed data acquisition. Data can be distributed to up to 10 host computers. Compared to a traditional field bus and serial interface, an Ethernet-based I/O server is more flexible for remote control and data exchange within a modern IT infrastructure.

Independent Configuration for Multi-Functional DI and DO Channels

Each digital input can be independently configured for DI or Event Counter mode, and each digital output can be independently configured for DO or Pulse Output mode.

Typical Application



Easy On-site Management using LCD Display Module

The optional LCD dislpay module is hot-pluggable and provides PC-free on-site management that substantially reduces configuration effort and time.

Specifications

LAN

Ethernet: 10/100 Mbps, RJ45
Protection: 1.5 KV magnetic isolation
Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, SNMP (MIB for I/O and Network), HTTP, SNTP, Active I/O Messaging, IP-filtering

Serial

Interface: RS-485 (2-wire): Data+, Data-, GND
Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters

Parity: None
Data bits: 8
Stop bits: 1
Flow control: None
Speed: 1200 to 115200 bps
Protocol: Modbus/RTU
Built-in Real Time Clock: Yes

Power Requirements

Power input: 24 VDC nominal, 12 to 48 VDC
Power consumption: 282 mA @ 24 VDC (typ.)
Field power: 24 VDC nominal, up to 36 VDC

Mechanical Specifications

Wiring: I/O cable max. 14 AWG

Environmental

Operating temperature: -10 to 60°C (14 to 140°F), 5 to 95% RH
Storage temperature: -40 to 85°C (-40 to 185°F), 5 to 95% RH

Digital Input

Inputs: 12, source type
I/O Mode: DI or Event Counter (up to 900 Hz)
Dry Contact: Logic 0: short to GND, Logic 1: open
Wet Contact: Logic 0: 0 to 3 VDC,
Logic 1: 10 to 30 VDC (DI COM to DI)
Common type: 12 points / 1 COM
Isolation: 3000 VDC

Digital Output

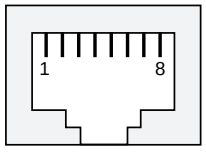
Outputs: 8, sink type
I/O Mode: DO or Pulse output (up to 1 KHz)
On-state voltage: 24 VDC nominal
Output current rating: Max. 200 mA per channel
Optical isolation: 3K VDC
Protection: Over temperature shutdown: Min. 170°C
Over current limit: typ. 750 mA/channel

Agency Approvals

EMI: FCC Part 15, CISPR (EN55022) Class A
EMS: IEC61000-4-2 (ESD), level 2/3
IEC61000-4-3 (RS), level 2
IEC61000-4-4 (EFT), level 2
IEC61000-4-5 (Surge), level 3
IEC61000-4-6 (CS), level 2
IEC61000-4-8 (PM), level 1
IEC61000-4-11 (Dip)
Safety: UL 508
Shock: IEC60068-2-27
Freefall: IEC60068-2-32
Vibration: IEC60068-2-6
Warranty: 2 years

Pin Assignment

Ethernet



PIN	Signals
1	Tx+
2	Tx-
3	Rx+
6	Rx-

Power / RS-485

Pin	1	2	3	4	5	6
Signal	V+	V-	FG	D+	D-	SG

I/O (left to right)

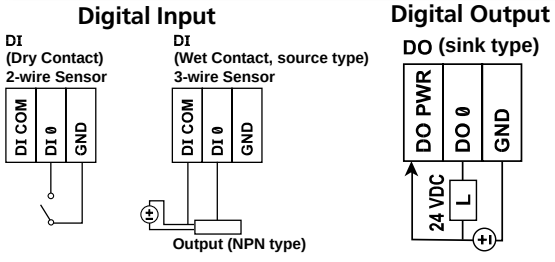
Pin	1	2	3	4	5	6	7	8	9	10	11	12
Signal	DI COM	DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8	DI9	DI10
Pin	13	14	15	16	17	18	19	20	21	22	23	24
Signal	DI11	DI. GND	DO.PWR	DO0	DO1	DO2	DO3	DO4	DO5	DO6	DO7	DO.GND

Ordering Information

ioLogik E2210: Active Ethernet I/O server with 12 digital inputs and 8 digital outputs

LDP1602: LCD display module with 16 x 2 text and 5 buttons

Wiring Example



ioLogik E2240

Active Ethernet I/O with 8 Analog Inputs, 2 Analog Outputs

Features

- Actively transfer I/O data in real-time over Ethernet
- Easy-to-use Click&Go™ Logic for local output control and messaging
- 8-channel analog input for mV, voltage, current signal with wire-off detection (at 4-20mA)
- 2-channel analog output for voltage, current actuator control
- Connects up to 10 hosts
- SNMP to I/O mapping that works with Network Management System
- Quick programming library for VB, VC, BCB
- NIST-traceable calibration

Linking Analog Inputs and Outputs to TCP/IP Ethernet Networks

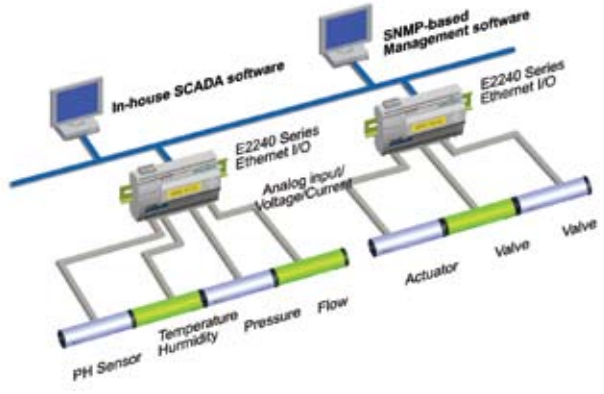
The ioLogik™ E2240 is designed for system integrators to acquire and control remote sensors and actuators remotely over TCP/IP and Ethernet networks. Types of sensors and actuators include pH, conductivity, temperature, humidity, pressure, flow, actuator, and valves. The ioLogik™E2240 supports Ethernet and can run multiple protocols, such as Modbus/TCP, SNMP, HTTP, TCP, UDP at 100 Mbps for high speed data acquisition. Data can be distributed to up to 10 host computers. Compared to a traditional field bus and serial interface, Ethernet-based I/O servers are more flexible with remote control and data exchange in a modern IT infrastructure.

Independent Configuration for Multi-Functional AI and AO Channels

Each analog input can be independently configured by software to voltage or current mode. The analog input channels support various signals ranging from +/-150 mV to +/-10V at 16-bit resolution.

The analog output channels support 0 to 20 mA and 4 to 20 mA @ 12-bit resolution.

Typical Application



Easy On-site Management using LCD Display Module

The optional LCD dislpay module is hot-pluggable and provides PC-free on-site management that substantially reduces configuration effort and time.

Specifications

LAN

Ethernet: 10/100 Mbps, RJ45
Protection: 1.5 KV magnetic isolation
Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, SNMP(MIB for I/O and Network), HTTP, SNTP, Active I/O Messaging, IP filtering

Serial

Interface: RS-485 (2-wire): Data+, Data-, GND
Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters

Parity: None
Data bits: 8
Stop bits: 1
Flow control: None
Speed: 1200 to 115200 bps
Protocol: Modbus/RTU
Built-in RTC: Yes

Power Requirements

Power input: 24 VDC nominal, 12 to 48 VDC
Power consumption: 282 mA @ 24V DC (typ.)
Field power: 24 VDC nominal, up to 36 VDC

Mechanical Specifications

Wiring: I/O cable max. 14 AWG

Environmental

Operating temperature: -10 to 60°C (14 to 140°F), 5 to 95%RH
Storage temperature:-40 to 85°C (-40 to 185°F), 5 to 95%RH
Shock: IEC60068-2-27
Freefall: IEC60068-2-32
Vibration: IEC60068-2-6

Analog Input

Input: 8
Resolution: 16-bit
Input range: +/-150 mV, +/-500 mV, +/-5 V, +/-10 V, 0 to 20 mA, 4 to 20 mA
Data format: 16-bit integer (2's complement)
Accuracy: +/- 0.1%, FSR @ 25°C, +/- 0.3%, FSR @ 0, 60°C
Sampling rate: 10 samples/sec (voltage)
6 samples/sec (current)
Input impedance: 900k Ohm
Built-in resistor for current input: 125 Ohm
Optical isolation: 3K VDC
Overvoltage: Can withstand continuous overvoltage (protection range -10V to 10V)

Analog Output

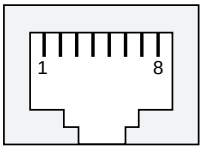
Outputs: 2
Resolution: 12-bit
Output range: 0 to 10V, 4 to 20 mA
Drive voltage: 15 VDC for current output
Data format: 16-bit integer (2's complement)
Accuracy:
+/- 0.1%, FSR @ 25°C, +/- 0.3%, FSR @ 0, 60°C (current)
+/- 0.2%, FSR @ 25°C, +/- 0.4%, FSR @ 0, 60°C (voltage)
CMR @ 50/60 Hz: 95 dB min.
Zero drift: +/- 9 μV/°C
Span drift: +/- 25 ppm/°C
Load resistor: < 250 Ohm

Agency Approvals

EMI: FCC Part 15, CISPR (EN55022) Class A
EMS: IEC61000-4-2 (ESD), level 2/3, IEC61000-4-3 (RS), level 2, IEC61000-4-4 (EFT), level 2, IEC61000-4-5 (Surge), level 3, IEC61000-4-6 (CS), level 2, IEC61000-4-8 (PM), level 1, IEC61000-4-11 (Dip)
Safety: UL 508
Warranty: 2 years

Pin Assignment

Ethernet



PIN	Signals
1	Tx+
2	Tx-
3	Rx+
6	Rx-

Power / RS-485

Pin	1	2	3	4	5	6
Signal	V+	V-	FG	D+	D-	SG

I/O (left to right)

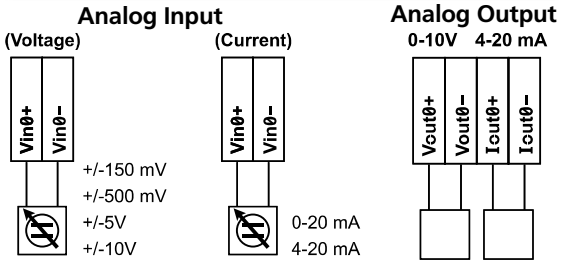
Pin	1	2	3	4	5	6	7	8	9	10	11	12
Signal	Vin0+	Vin0-	Vin1+	Vin1-	Vin2+	Vin2-	Vin3+	Vin3-	Vin4+	Vin4-	Vin5+	Vin5-
Pin	13	14	15	16	17	18	19	20	21	22	23	24
Signal	Vin6+	Vin6-	Vin7+	Vin7-	Vout0+	Vout0-	Iout0+	Iout0-	Vout1+	Vout1-	Iout1+	Iout1-

Ordering Information

ioLogik E2240: Active Ethernet I/O server with 8 analog inputs and 2 analog outputs

LDP1602: LCD display module with 16 x 2 text and 5 buttons

Wiring Example



LDP1602 LCD Display Module

LDP1602 LCD Display Module for ioLogik 2000 Series

Features

- Hot-pluggable display module for ioLogik Active Ethernet I/O and Serial Remote I/O servers
- Easy, portable configuration kit for IP display and configuration
- Direct display for analog value and digital input, counter status
- No battery required (powered by I/O server)

Installing the LCD Module

1. Take off the cover of the ioLogik server

2. Plug in the LCD display module

3. Instantly check and configure IP address

4. Check counter or analog value

Specifications

LCD display: 16 x 2 text display in English

Operating temperature: 0 to 55°C (32 to 131°F), 5 to 95% RH

Storage temperature: -20 to 70°C (-4 to 158°F), 5 to 95% RH

Ordering Information

LDP1602: LCD Display module for ioLogik 2000 series