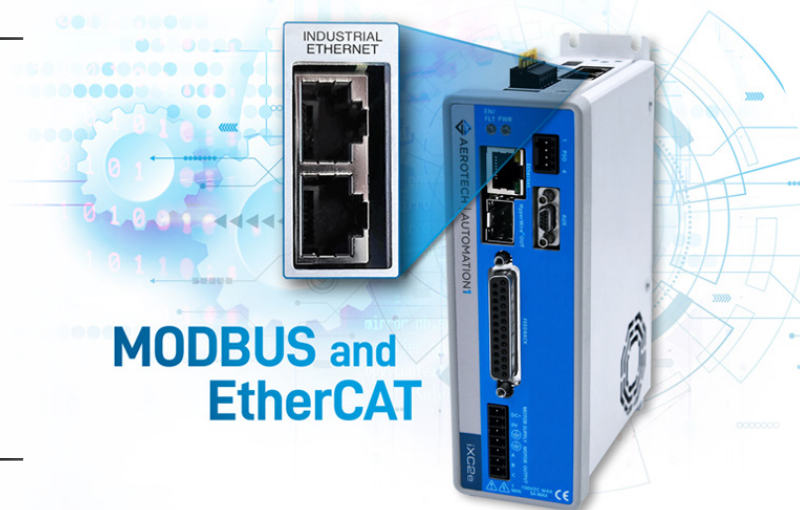


AEROTECH AUTOMATION

EtherCAT[®], EtherNet/IP[™] and
MODBUS in Automation1

Industrial Ethernet



Expand Your Automation Solution

Industrial Ethernet (IE) is enhanced with determinism and real-time control for use within an industrial setting. All Automation1 PC-based and drive-based controllers (equipped with IE ports) support Modbus TCP/IP and EtherNet/IP IE protocols. Additionally, Automation1 drive-based controllers (equipped with IE ports) support EtherCAT IE protocols. Supporting IE protocols makes Automation1 controllers highly expandable. Data items on the IE networks are mapped to registers in the Automation1 controller, making the networked devices directly accessible to the Automation1 controller and vice versa.

Automation1

Automation1 Industrial Ethernet support is part of the user-friendly Automation1 motion control platform, which includes the following:

- ◆ **Development Software**
- ◆ **Controls**
- ◆ **Motor Drives**
- ◆ **Fiber-Optic HyperWire[®] Communication Bus**

KEY FEATURES:

- ◆ **EtherCAT[®]** SubDevice support for Automation1 drive-based controllers
- ◆ **EtherNet/IP[™]** Adapter support for all Automation1 control hardware
- ◆ **MODBUS SUPPORT** for all Automation1 control hardware
- ◆ Enables **EXPANSION OF YOUR CONTROL ARCHITECTURE**
- ◆ Allows for integrating Automation1 into **LARGER AUTOMATION SYSTEMS**
- ◆ Enables **EXPANSION OF I/O** on a machine controlled by Automation1

AUTOMATION1 INDUSTRIAL ETHERNET SUPPORT

INDUSTRIAL ETHERNET SUPPORT			
Industrial Ethernet Functionality	MODBUS	EtherCAT	EtherNet/IP
Compatible with PC-Based Automation1 Controller	Yes	No	Yes
Compatible with Drive-Based Automation1 Controller (when configured with IE ports)	Yes	Yes	Yes
Default Offering with -IE1 Industrial Ethernet Option1	Enables the Automation1-iSMC to operate as a MODBUS TCP Server	No EtherCAT Connections	No EtherNet/IP Connections
Offering with -CP1 Controller Plus Option¹	Connect to 1 MODBUS Client Connect to 16 MODBUS Servers	n/a	n/a
Offering with -IE2 Industrial Ethernet Option¹	No MODBUS Connections	Enables the Automation1-iSMC to operate as an EtherCAT SubDevice	No EtherNet/IP Connections
Offering with -IE3 Industrial Ethernet Option¹	No MODBUS Connections	No EtherCAT Connections	Enables the Automation1-iSMC to operate as an EtherNet/IP Adapter
Data Access	<p align="center"><u>MODBUS Client</u> InputWords (Read-Only) OutputWords (Read/Write) InputBits (Read-Only) OutputBits (Read/Write) OutputWordsStatus (Read-Only) OutputBitsStatus (Read-Only)</p> <p align="center"><u>MODBUS Server</u> InputWords (Read/Write) OutputWords (Read-Only) InputBits (Read/Write) OutputBits (Read-Only)</p>	<p align="center"><u>EtherCAT Device:</u> Rx PDO (Read-Only) (Inputs) Tx PDO (Read/Write) (Outputs)</p>	<p align="center"><u>EtherNet/IP Adapter:</u> Input Block 0 (Read-Only) Output Block 0 (Read/Write) Input Block 1 (Read-Only) Output Block 1 (Read/Write)</p>
<p>Status Items / Data Collection Automation1 supplies many Modbus, EtherCAT and EtherNet/IP status items that you can use directly or through Data Collection.</p>	<p><u>MODBUS configuration status items:</u> Modbus Client Connected Modbus Client Error</p> <p>Modbus Server Connected Modbus Server Error</p> <p><u>Modbus data status items:</u> Modbus Client Input Words Modbus Client Input Bits Modbus Client Input Words Status Modbus Client Output Words Modbus Client Output Bits Modbus Client Output Words Status Modbus Server Input Words Modbus Server Input Bits Modbus Server Output Words Modbus Server Output Bits</p>	<p><u>EtherCAT configuration status items:</u> EtherCAT Connected EtherCAT Error</p> <p><u>PDO data status items:</u> EtherCAT Rx Pdo Size EtherCAT Tx Pdo Size EtherCAT Rx Pdo EtherCAT Tx Pdo</p>	<p><u>EtherNet/IP Adapter:</u> EtherNet/IP Adapter Enabled EtherNet/IP Adapter Connected EtherNet/IP Adapter Error</p> <p><u>Implicit Data Items:</u> EtherNet/IP Adapter Input Block 0 Size EtherNet/IP Adapter Input Block 1 Size EtherNet/IP Adapter Output Block 0 Size EtherNet/IP Adapter Output Block 1 Size EtherNet/IP Adapter Input Block 0 EtherNet/IP Adapter Input Block 1 EtherNet/IP Adapter Output Block 0 EtherNet/IP Adapter Output Block 1</p>

Continued on next page

Industrial Ethernet Functionality	MODBUS	EtherCAT	EtherNet/IP
Networking Interface	100BASE-TX network ports on drive-based controllers <u>Supported families of network cards:</u> Broadcom Gigabit (bge1g.rsl) Intel 10/100Mbps (ie100m.rsl) Intel Gigabit (ie1g.rsl) RealTek 10/100 Mbps (rtl100m.rsl) RealTek Gigabit (rtl1g.rsl)	100BASE-TX network ports on drive-based controllers.	100BASE-TX network ports on drive-based controllers <u>Supported families of network cards:</u> Broadcom Gigabit (bge1g.rsl) Intel 10/100Mbps (ie100m.rsl) Intel Gigabit (ie1g.rsl) RealTek 10/100 Mbps (rtl100m.rsl) RealTek Gigabit (rtl1g.rsl)
Supported Automation1 Hardware	Automation1-iXC6e ² Automation1-iXC4e ² Automation1-iXC4 ² Automation1-iXC2e ³ Automation1-iXC2 ³ Automation1-iXA4 ⁴ Automation1-iXL5e ² Automation1-iXL2e ³ Automation1-iXI4 ² Automation1-iXR3 ² Automation1-iHXA4 ² Automation1-iPC ²	Automation1-iXC6e ² Automation1-iXC4e ² Automation1-iXC4 ² Automation1-iXC2e ³ Automation1-iXC2 ³ Automation1-iXA4 ⁴ Automation1-iXL5e ² Automation1-iXL2e ³ Automation1-iXI4 ² Automation1-iXR3 ² Automation1-iHXA4 ²	Automation1-iXC6e ² Automation1-iXC4e ² Automation1-iXC4 ² Automation1-iXC2e ³ Automation1-iXC2 ³ Automation1-iXA4 ⁴ Automation1-iXL5e ² Automation1-iXL2e ³ Automation1-iXI4 ² Automation1-iXR3 ² Automation1-iHXA4 ² Automation1-iPC ²

- Options are ordered as part of the Automation1-iSMC configuration.
- Required ethernet ports are part of the base hardware configuration. For the Automation1-iPC, additional ports can be added.
- Requires the -EB2 expansion board option with Industrial Ethernet ports.
- Requires the -IE1 option with Industrial Ethernet ports.

AUTOMATION1 INDUSTRIAL ETHERNET SUPPORT

MODBUS TCP/IP

Modbus TCP/IP is an extension of the Modbus family of vendor-neutral communication protocols used for supervision and control of automation equipment. Specifically, it provides a network and transport layer in an Internet environment over the TCP/IP protocols for the Modbus application layer. The most common use of the protocol is for communication with Ethernet-based PLCs, I/O modules and other simple field buses or I/O networks. The Modbus TCP/IP protocol is an automation standard.

EtherCAT

EtherCAT stands for Ethernet for Control Automation Technology. It is a real-time communication protocol over standard Ethernet hardware / networks. In EtherCAT, the network topology has one central controller that manages the communication of up to N (65,535) other devices. EtherCAT devices transfer data “on the fly,” enabling high speed, high throughput communication over the Ethernet physical layer.

EtherNet/IP

EtherNet/IP is an application-layer protocol that uses standard Ethernet (TCP/UDP) communication to implement the Common Industrial Protocol (CIP). CIP is frequently employed for reliable communication with various automation components, including Ethernet-based PLCs, I/O modules and field devices. Communication is facilitated through two primary methods: implicit messaging, which uses UDP for time-critical, scheduled data exchange at a fixed Requested Packet Interval (RPI), and explicit messaging, which uses TCP for setting or retrieving object data for standard objects like Identity and Message Router.