ETHERNET/MFC 010 Technical Datasheet

EtherNet/IP interface box in combination with MFC 010

- Seamless integration into EtherNet/IP environments
- Integrated web server for easy configuration, maintenance and diagnostics
- 2-port Ethernet switch enabling flexible network topologies

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1.1 Seamless EtherNet/IP integration for Coriolis mass flowmeters

The EtherNet/IP™ interface box is used to provide a seamless connection between a mass flowmeter and an EtherNet/IP™ network. The EtherNet/IP™ interface box enables the scanner of the EtherNet/IP™ network to control the field device.

No proprietary configuration software is needed. All necessary configuration can be made via the built-in web interface or engineering tool using the EDS.

EtherNet/IP™ is many times faster than most other established protocols used in process automation today. This allows unequalled fast exchange of process data and virtually instantaneous configuration of the field device.

①	**Power connector** This connector is used to apply power to the EtherNet/IP™ interface box. It is also used to connect protective earth (PE) to the power connector.
②	**USB port** This port is intended for authorised service personel use only.
③	**Factory reset button** This button can be used to perform a reset to factory settings.
④	**Status LEDs**
⑤	**EtherNet/IP™** connectors 2-port switch with daisy chain functionality.
⑥	**Modbus RTU connector**
⑦	**DIN rail connector** The DIN rail mechanism fastens the EtherNet/IP™ interface box to a DIN rail and connects it to the protective earth (PE).

Highlights

- Integrated switch for line and ring topology
- Support of Device Level Ring (DLR) for redundancy
- Password protected web server to facilitate configuration and diagnosis of the device
- Electronic Data Sheet (EDS) available for convenient deployment
- Add-On Instruction (AOI) available for use in Rockwell environments

Industries

- Food & Beverage

1.2 Features

The EtherNet/IP™ interface box supports the following features:

- 2 EtherNet/IP™ ports with
  - Support for Beacon-based DLR and linear network topology
  - Galvanically isolated bus electronics
  - 10/100 Mbit, full/half duplex operation
- Choice of two pre-defined sets of input data
- Modbus RTU port with configurable termination and polarisation
- Web server with field device specific user interface
  - Status information
  - Access to all parameters of the flowmeter
  - Calibration procedures
  - Settings page
  - Diagnostic information

1.3 Communication with the field device

The EtherNet/IP™ interface box communicates via Modbus RTU Protocol with the attached field device.

The following parameters can be configured:

- Modbus slave address of the field device
- Baud rate
- Parity
- Termination and polarization
- Write timeout
- Disconnect time

After power up, the EtherNet/IP™ interface box tries to connect with the field device until the connection can be established. As long as no connection is established LED FD is flashing green. If a compatible field device is connected, LED FD will switch to green. Otherwise LED FD will be flashing red.

The EtherNet/IP™ interface box can be used with the following field devices:

- OPTIMASS 1010 C
- OPTIMASS 3010 C
- OPTIMASS 7010 C
- OPTIGAS

If the connection is disturbed or interrupted longer than the specified disconnect time, the EtherNet/IP™ interface box will shut down the connection and try to reconnect.

When the baud rate, the parity or the Modbus slave address is changed and a device is connected, the change will be performed in the field device. Afterwards the connection will be re-established with the changed parameters.

1.4 Connections

1.4.1 Class 1

General details

Class 1 connections are used to transfer I/O data and can be established to instances in the assembly object. Each class 1 connection will establish two data transports - one consuming and one producing. The heartbeat instances can be used for connections that shall only access inputs. Class 1 connections use UDP transport.

- Total number of supported class 1 connections: 4
- Supported API: 2...3200 ms
- T → O connection type: Point-to-point, Multicast
- O → T connection type: Point-to-point
- Supported trigger types: Cyclic, CoS

Connection types

Exclusive-Owner connections

- Process values without configuration
- Process values with configuration
- Extended process values without configuration
- Extended process values with configuration

Input-Only connections

- Input Only
- Input Only Ext

Listen-Only connections

- Listen Only
- Listen Only Ext

1.4.2 Class 3

The EtherNet/IP™ interface also supports class 3 connections.

General details

Class 3 connections are used to establish connections towards the message router. Thereafter, the connection is used for explicit messaging. Class 3 connections use TCP transport.

- No. of simultaneous class 3 connections: 16
- Supported API: 2...10000 ms
- T → O Connection type: Point-to-point
- O → T Connection type: Point-to-point
- Supported trigger type: Application

2.1 Technical data

Measuring system

Description	The EtherNet/IP™ interface box is used to provide a seamless connection between a mass flowmeter and an EtherNet/IP™ network. The EtherNet/IP™ interface box enables the scanner of the EtherNet/IP™ network to control the field device. No proprietary configuration software is needed. All necessary configuration can be made via the built-in web interface or engineering tool using the EDS.
Network settings	DHCP: On
	Hostname: <none>
	Port 1 Ethernet link speed: Auto
	Port 2 Ethernet link speed: Auto

Operating conditions

Temperature	Operating temperature: -20...+70°C / -4...+158°F
	Storage temperature: -20...+85°C / -4...+185°F
Relative humidity	The product is designed for a relative humidity of 5% to 95% non-condensing.

Installation conditions

Mounting	The EtherNet/IP™ interface box can be physically installed by mounting it onto a DIN rail.
Dimensions	L x w x h [mm]: 101 x 35 x 109.8 (without connector); L x w x h [inch]: 4 x 1.4 x 4.3 (without connector)
Weight	144 g / 0.3 lb (with connector)

Electrical connection

Supply voltage	The EtherNet/IP™ interface box requires a 24 V (-60%/+25%) DC power source.
Power consumption	The typical power consumption is 150 mA at 24 V.
Protective earth (PE) requirements	In order to achieve proper EMC behaviour, the product must be connected to protective earth (PE) via the DIN rail connector. If the DIN rail cannot be used, PE must be connected to the power connector. We cannot guarantee proper EMC behaviour unless these PE requirements are fulfilled. **Note:** According to the EtherNet/IP™ specification, the shield of each RJ-45 connector is not directly connected to PE. There shall however be a low impedance connection of infrastructure components, such as patch panels, to PE.

2.2 Field device connector

The connector used to connect to the field device is located at the bottom of the EtherNet/IP™ interface box.

Terminal	Description
PE	PE/shield
A	RS-485 A line (+)
B	RS-485 B line (-)
GND	RS-485 signal ground

- *Proper grounding is mandatory for reliable operation of the device.*
- *Shield and signal ground shall not be interconnected.*

2.3 Power connector

Terminal	Description
+	+24 VDC
-	Supply ground
Earth symbol	PE (protective earth)

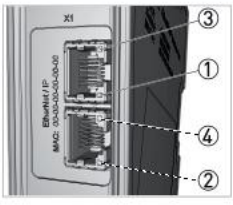
MFC 010 power supply with 12 VDC is needed!

The terminal tightening torque must be between 0.5...0.8 Nm / 5...7 lbs-in.

2.4 Ethernet connectors

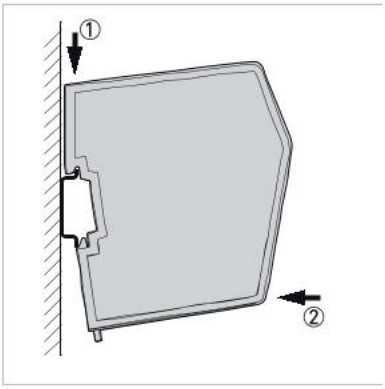
The two standard Ethernet connectors (RJ45) are marked as "X1" and are located on the front of the EtherNet/IP™ interface box.

Properly shielded cables shall be used for reliable operation of the device.

	LED	Description
	1	Not connected
	2	Not connected
	3	Link/Activity LED (port 1)
	4	Link/Activity LED (port 2)

3.1 Mounting the EtherNet/IP□ interface box

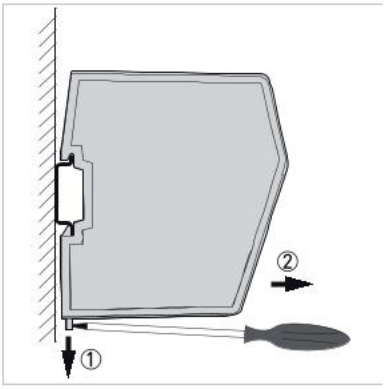
The EtherNet/IP™ interface box can be physically installed by mounting it onto a DIN rail.



DIN rail mounting

Make sure the DIN rail fastening mechanism on the back of the module is in a fixed and closed position, i.e. pushed all the way up.

To mount the module, first hook it on to the DIN rail (①), then push it against the DIN rail to make it snap on (②).



DIN rail unmounting

To unmount the module, a screwdriver is needed. Use the screwdriver to push the fastening bracket on the back of the module down until it locks in a fixed and open position (①).

Then unhook the module from the DIN rail (②

Fixed and closed position

Do not leave the module with the DIN rail fastening mechanism in a fixed and open position. This may eventually wear the fastening mechanism out so it cannot be used efficiently.

Be sure to push the DIN rail fastening mechanism back into the fixed and closed position after unmounting the module.

KROHNE product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature assemblies
- Pressure transmitters
- Analysis products
- Products and systems for the oil & gas industry
- Measuring systems for the marine industry

Head Office KROHNE Messtechnik GmbH
Ludwig-Krohne-Str. 5
47058 Duisburg (Germany)
Tel.:+49 203 301 0
Fax:+49 203 301 103 89
info@krohne.com

The current list of all KROHNE contacts and addresses can be found at:
www.krohne.com

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