

EMCON 200

PTP transparent Ethernet media converter



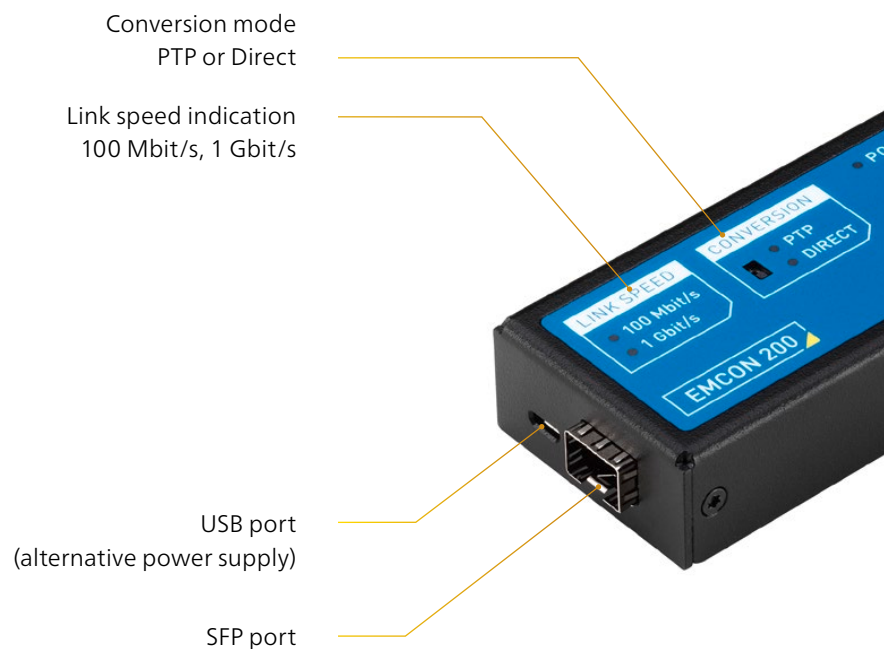
Ethernet media converter

EMCON 200 is an Ethernet media converter used for connecting optical fiber and twisted pair copper Ethernet networks. Copper-based connections are limited to a certain data transmission rate and distance, whereas optical fiber cables can transmit more data over much longer distances.

EMCON 200 can also be used in networks with different fiber optic link speeds and wherever IEEE 1588 Precision Time Protocol (PTP) time synchronization is required. EMCON 200 is also a valuable accessory for OMICRON's CMC and DANEO 400 devices that can provide the power required for EMCON 200 with an Ethernet cable (PoE).

Main features

- > Cut-through forwarding between twisted pair copper and optical fiber networks
 - > 100BASE-TX to 100BASE-X
 - > 1000BASE-TX to 1000BASE-X
- > PTP transparent clock according to IEEE 1588-2008 for preserving time synchronization
- > Link speeds of 100 Mbit/s or 1 Gbit/s (determined by the connected SFP transceiver)
- > Power supply with Power over Ethernet (PoE) or USB
- > Various fiber types (depending on SFP module) for high flexibility
- > Auto-negotiation with link partners
- > No frame size limit (jumbo frames support)
- > Link fault pass through
- > Low power consumption



Field of application

- > Accessory for OMICRON CMC and DANEO 400 test sets for connecting to optical fiber networks (power supply via PoE)
- > Standalone device for connecting optical fiber and twisted pair copper networks
- > Back-to-back connection with two EMCON 200s for network communication across long distances

Powering options

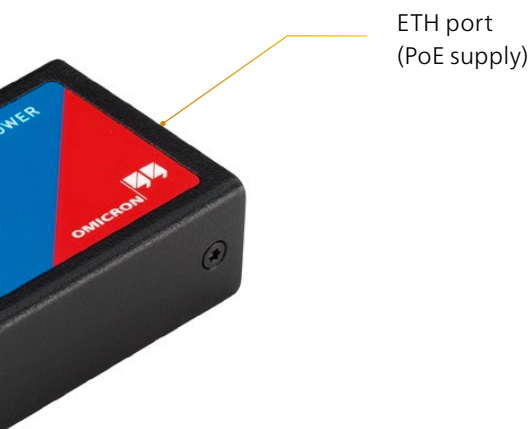
EMCON 200 is powered either via PoE or via USB:

PoE – Power over Ethernet

In order to power EMCON 200 with PoE it needs to be connected via an Ethernet cable to a PSE (Power Sourcing Equipment) such as OMICRON's CMC or DANEO 400 devices. If no PSE is available, a PoE injector can be used instead.

USB

EMCON 200 can be powered via its Micro-B USB 2.0 port with a common USB charger (e.g., from a mobile phone) or a USB cable from a PC or laptop can be used.



Conversion modes

EMCON 200 offers the following two conversion modes:

PTP mode

EMCON 200 works as a PTP transparent clock that preserves PTP time synchronization. It modifies PTP messages as they pass through the media converter. EMCON 200 knows how much time it takes for a packet to pass through the media converter because it knows the packet's residence time. EMCON 200 writes this residence time into the correction field of the PTP packets.

Direct mode

When using direct mode, data is converted directly to the physical layer without adding or removing any information from it. In this mode, EMCON 200 has minimum packet delays, but the delays are different for the two directions (i.e., "fiber to copper" and "copper to fiber"). The asymmetry of the packet delays affects the PTP path delay measurements, and this influences the accuracy of the PTP time synchronization in the network.

In special cases where two EMCON 200 media converters are used "back to back", the asymmetry of the direct mode is compensated (see page 4).

Your benefits

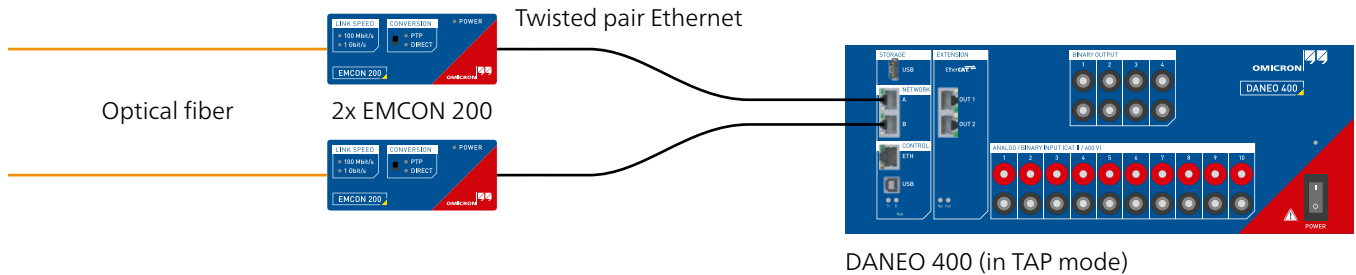
- > Small and lightweight
- > Preserves PTP time synchronization
- > Easy plug & play handling with PoE
- > Supports various fiber types for high flexibility
- > Clear device status overview

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Examples for direct mode (back-to-back)

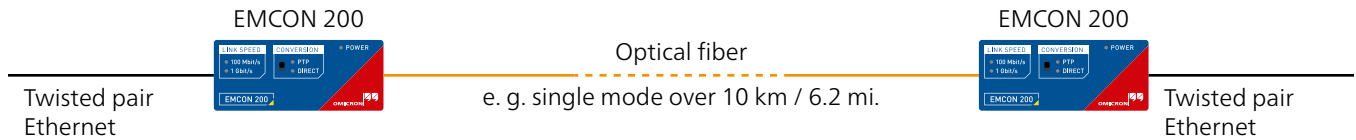
Network TAP

To set up a network TAP to monitor or record network traffic, two EMCON 200 media converters can be used to connect the tapping device (e.g., OMICRON's DANE0 400) to the optical fiber network. The packet asymmetry created by the first media converter ("fiber to copper" connection) is compensated by the second media converter ("copper to fiber" connection).






Long distance optical fiber connection

For data transmissions over long distances, optical fiber cables are used. With EMCON 200 a twisted pair Ethernet network on both ends of the line can be connected to the optical fiber cabling. The packet asymmetry created by the first EMCON 200 is compensated by the second EMCON 200 media converter.



Accessories and technical data

SFP transceiver	Description	Media	Wavelength	Distance	Order No.
	100BASE-FX	Multi-mode	1310 nm	2 km / 1.25 mi.	P0000600
	1000BASE-SX	Multi-mode	850 nm	550 m / 0.34 mi.	VEHZ1112
	1000BASE-LX	Single-mode	1310 nm	10 km / 6.2 mi.	VEHZ1111

EMCON 200



Ports

Twisted pair ETH port	100BASE-TX or 1000BASE-T Auto-negotiation (100 / 1000 Mbit/s full duplex, depending on SFP transceiver)
Optical fiber SFP port	100BASE-X or 1000BASE-X 50/125 or 62.5/125 multi-mode fiber 9/125 single-mode fiber Far end fault indication Auto-negotiation for 1000Base-X
USB port	Micro-B USB 2.0

Timing

IEEE 1588-2008 protocol	Supports E2E and P2P delay mechanism Supports Layer 2 (with/without VLAN), IPv4, and IPv6 transport mechanisms No configuration required Suitable for PTP profiles such as IEC 61850-9-3 or IEEE C37.238-2011
PTP transparent clock	Corrects internal latencies and inherent conversion asymmetries Updates PTP correction field for all event messages Enabled in PTP conversion mode
Minimal jitter	Time stamping resolution: 4 ns Typically ≤ 8 ns in PTP conversion mode
Low latency	PTP conversion mode: 25467 ns at 100 Mbit/s 2894 ns at 1 Gbit/s Direct conversion mode: 915 ns at 100 Mbit/s 432 ns at 1 Gbit/s

Power supply

Power over Ethernet (PoE)	Class 1 powered device according to IEEE 802.3af
USB	< 2.5 W with active link depending on SFP transceiver

Mechanics

Dimensions (W x H x D)	110 mm x 25mm x 50 mm / 4.3 x 1.0 x 2.0 in
Weight	128 g / 0.28 lb

Environmental conditions

Operating temperature	-25 °C ... + 50 °C / - 13 °F ... + 122 °F
Humidity	5 % ... 95 % relative humidity; no condensation

Safety standards

Europe	EN 62368-1
USA	UL 62368-1
International	IEC 62368-1

Electromagnetic compatibility

Europe	EN 61326-1; EN 55032 Class B; EN 55024
USA	47 CFR 15 class B of FCC
International	IEC 61326-1; CISPR 32 Class B; CISPR 24

A strong and safe connection

Welcome to the team

At OMICRON you can always depend on an experienced team that actively supports you and an infrastructure that you can rely on. We always listen attentively in order to understand your needs so that we can offer you the best possible solutions. We strive for lasting partnerships and ensure that you can continue to rely on your product long after you've purchased it. In order to do this, we focus on quality, the transfer of knowledge and unique customer support.

Aditya, David and Fabian are able to tell you about the services we have available for you and why it pays to be part of the team.



Aditya Taneja
Application Specialist



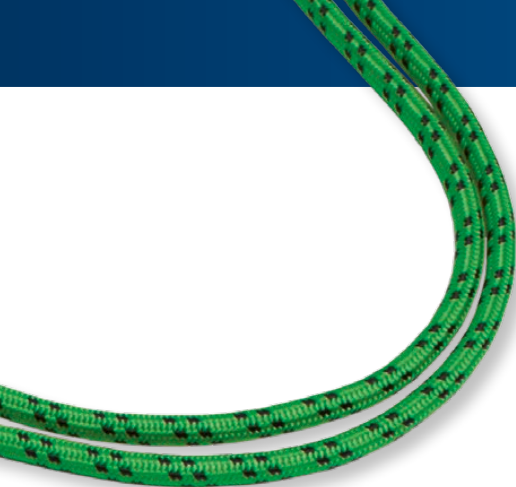
Solutions you can rely on...

... developed with experience, passion and an innovative approach that we use to continually set groundbreaking standards in our industry sector.

We invest more than 15 % of the total turnover in research and development so that we can even guarantee the reliable use of the latest technology and methods in the future.

Our comprehensive product care concept also guarantees that your investment in our solutions – like free software updates – pays off in the long term.





David Negron
OMICRON Academy



We share our knowledge...

... by maintaining a constant dialogue with users and experts. Some examples of this are our customer events and conferences that take place all over the world and our collaboration with numerous standardization committees.

We also make our knowledge available to you in the customer section of our website in the form of application reports, specialized articles and articles in the discussion forum. With the OMICRON Academy, we also provide a wide spectrum of training possibilities and assist you with Start-up training and free webinars.



Fabian Kolb
Technical Support

24/7 support

When rapid assistance is required...

... our excellent level of support is always appreciated. You can reach the highly-qualified and committed technicians in our customer support department 24 hours a day, seven days a week – and it's completely free. We deal with repair services and service features in a fair and non-bureaucratic manner.

We can help minimize your downtime by lending you equipment from a readily available plant at one of our service centers in your area. A comprehensive offer of services for consulting, testing and diagnostics completes our range of services.

OMICRON is an international company serving the electrical power industry with innovative testing and diagnostic solutions. The application of OMICRON products allows users to assess the condition of the primary and secondary equipment on their systems with complete confidence. Services offered in the area of consulting, commissioning, testing, diagnosis and training make the product range complete.

Customers in more than 150 countries rely on the company's ability to supply leading-edge technology of excellent quality. Service centers on all continents provide a broad base of knowledge and extraordinary customer support. All of this together with our strong network of sales partners is what has made our company a market leader in the electrical power industry.

For more information, additional literature, and detailed contact information of our worldwide offices please visit our website.