Twin Converter 45x45 with Power-over-Ethernet (PoE)

MICROSENS

Introduction

Future Proof Concept
The MICROSENS Fiber To The Office concept with its intelligent combination of fiber and twisted-pair cabling offers a long term and therefore future proof investment into the building infrastructure.

Twin Converter
For a typically office environment with two work places two converters are integrated in one device. The transmission of the Fast Ethernet signals happens protocol transparent. Due to the integrated Link Through function the device is also link transparent.

Short latency for VoIP applications
The converter enables especially IP phones with Twisted-Pair connectors to connect with Optical Fiber networks (FTTD), because a conversion offers a most short latency.

Power-over-Ethernet integrated
With the Power-over-Ethernet (PoE) standard IEEE802.3af it is possible to supply data and power to the connected end device over the twisted-pair cable. An additional power supply for the end device is not necessary.

Easy Installation
Due to the tool less snap-in installation the mounting of the switch is done easily and fast. This most compact system on the market ensures furthermore the compatibility to the most common installation systems of the world.

Features

- **Converter**
  Fanless Fast Ethernet 100 Mbps Installation Converter according IEEE 802.3,
  two converters per unit for double work environments typically.
- **Bridge Mode**
  To connect end devices with 10 Mbps at the Twisted-Pair connectors optionally the switch can configured as a bridge.
- **Installation**
  Quick and easy installation via “snap in“ (tool less) in cable channels/ducts and floor tanks
- **Power Supply**
  48 V DC for the switch and PoE, unused ports can be disabled in order to save power, max. power consumption of the switch is 4 W (without PoE powering), PoE power is max. 30.8 W (2x 15.4 W per port)
- **Twisted-Pair Ports**
  2x 100Base-TX (RJ-45), Autonegotiation, half or full duplex mode, auto crossing (automatic matching to the pinout of the connected data cable). Full PoE function according to IEEE 802.3af with max. 15.4 W per port. In the Bridge mode additional 10/100Base-TX Autonegotiation is available.
- **Fiber Optic Port**
  2x 100Base-FX (LC, MT-RJ oder VF-45), optional multimode or single mode fiber for optimized matching of an existing fiber infrastructure.

Technical Specifications

Type	Fast Ethernet Installations Converter 45x45 Twin Converter 100Base-TX / 100Base-FX according IEEE 802.3 for installation in cable channels and sub floor boxes
Operation Mode	Converter 100Base-TX / 100Base-FX (Standard), Bridge 10/100Base-TX / 100Base-FX (configurable)
Power-over-Ethernet	Integrated Controller according IEEE 802.3af, Supply max. 15.4 W per port (class 0)
Cable Type	Shielded-Twisted-Pair Cable, 100Ω, Category 5 with RJ45 Plug
Max. Cable Length	100 m (TP)
Optical Fiber Type	Multimode Optical Fiber 50 or 62.5/125 µm, duplex, with MT-RJ, VF-45 or LC connector Optional: 9/125 µm single mode Optical Fiber
Data Transmission Rate	max. 100 Mbps (full duplex max. 200 Mbps)

Optical Parameters

Multimode	Wavelength:	1310 nm
	Optical Output Power:	-19 dBm
	Sensitivity:	-31 dBm
	Max. Transmission:	2 km*, full duplex
Single mode	Wavelength:	1310 nm
	Optical Output Power:	-15 dBm
	Sensitivity:	-30 dBm
	Max. Transmission:	15 km*, full duplex, optional 40 km

LED Indicators

Pwr	stand by	
TXn	on:	link on Twisted-Pair port
	flashing:	data transmission
	off:	no Twisted-Pair link
FXn	on:	link on optical fiber port
	flashing:	data transmission
	off:	no optical fiber link
PoEn	green:	Power-over-Ethernet activated at the port
	amber:	Power-over-Ethernet activated, not active
	off:	Power-over-Ethernet deactivated
Brdg	off:	converter mode
	flashing:	bridge mode

Power Supply	48 VDC (44..57 V) Twin Converter power consumption max. 4 W
Operating Temperature	0°C to 50°C
Storage temperature	-20°C to 85°C
Relative Humidity	5% to 90%, non condensing.

*Length specifications based on the assumption of typical fiber attenuation and can not be guaranteed.

System Elements

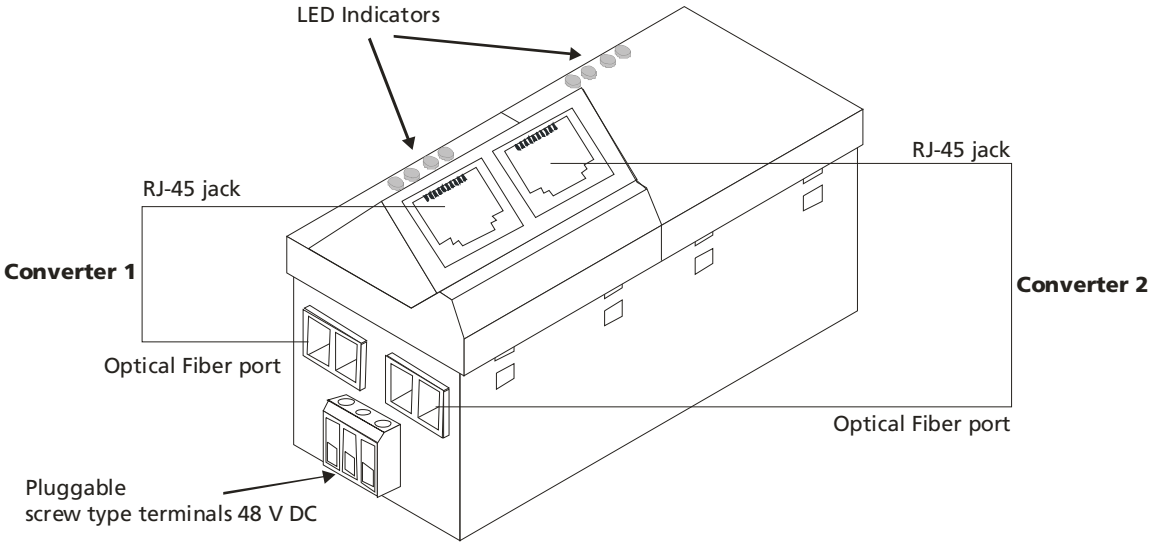


Fig. 1: Converter elements

Link Transparency

The converter has the integrated **"Link Through"** functionality to support the connection control. The connection status of the fiber segment is forwarded to the twisted pair segment. In due to this the twisted pair connection is switched off in a case of failure at the fiber segment.

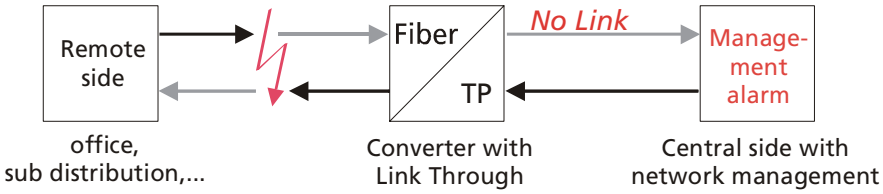


Fig. 2: Link Through

The Advanced Link Monitor (ALM) function offers to monitor additional the transmit fiber connection of the local device. To do this the Advanced Link Monitor function has to be activated at the remote unit. If this remote unit is loosing the optical receive signal he also turns off the transmit fiber port.

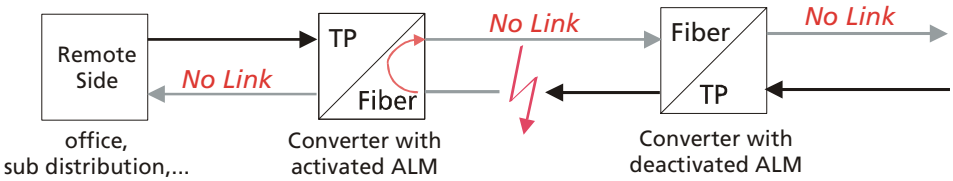


Fig. 3: Advanced Link Monitor

Configurations

The switch can be configured for the operation mode by the DIP switches. The DIP switches bear the following meanings:

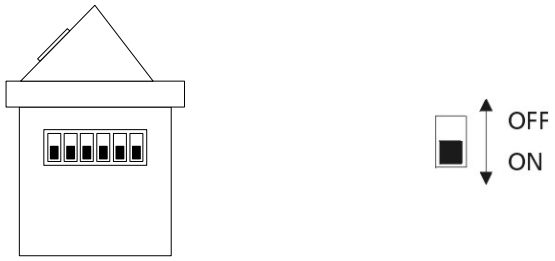


Fig. 4: Position of the DIP switches

No.	Description	Function
I1	PoE	Power-over-Ethernet mode for both Twisted-Pair ports off: PoE deactivated on: PoE activated
I2	Operation Mode	Switching bridge/converter mode for both converters off: bridge mode on: converter mode (standard)
I3	AN 100F	Autonegotiation mode for both Twisted-Pair ports off: 100FX – Autonegotiation limited to 100 Mbps half duplex on: 100FX – full Autonegotiation 100 Mbps half and full duplex
I4	Auto MDI-X	Auto Crossover for both Twisted-Pair ports off: Auto Crossover deactivated, RJ-45 connectors on MDI-X on: Auto Crossover activated
I5	Link Through	Link Through Mode off: Link Through deactivated on: Link Through activated (Twisted Pair → Optical Fiber, Optical Fiber → Twisted Pair)
I6	ALM	Advanced Link Monitor off: Advanced Link Monitor deactivated on: Advanced Link Monitor activated (Optical Fiber → Optical Fiber)

Converter Reset

For resetting the Twin Converter a Reset push button is blind placed in port 2. It can be activated with the MICROSENS' Reset special tool. By releasing the Reset push button all connections will be re-initialises

In the Bridge Mode configuration additionally the switch memory and the MAC table will be erased.

Dimensions

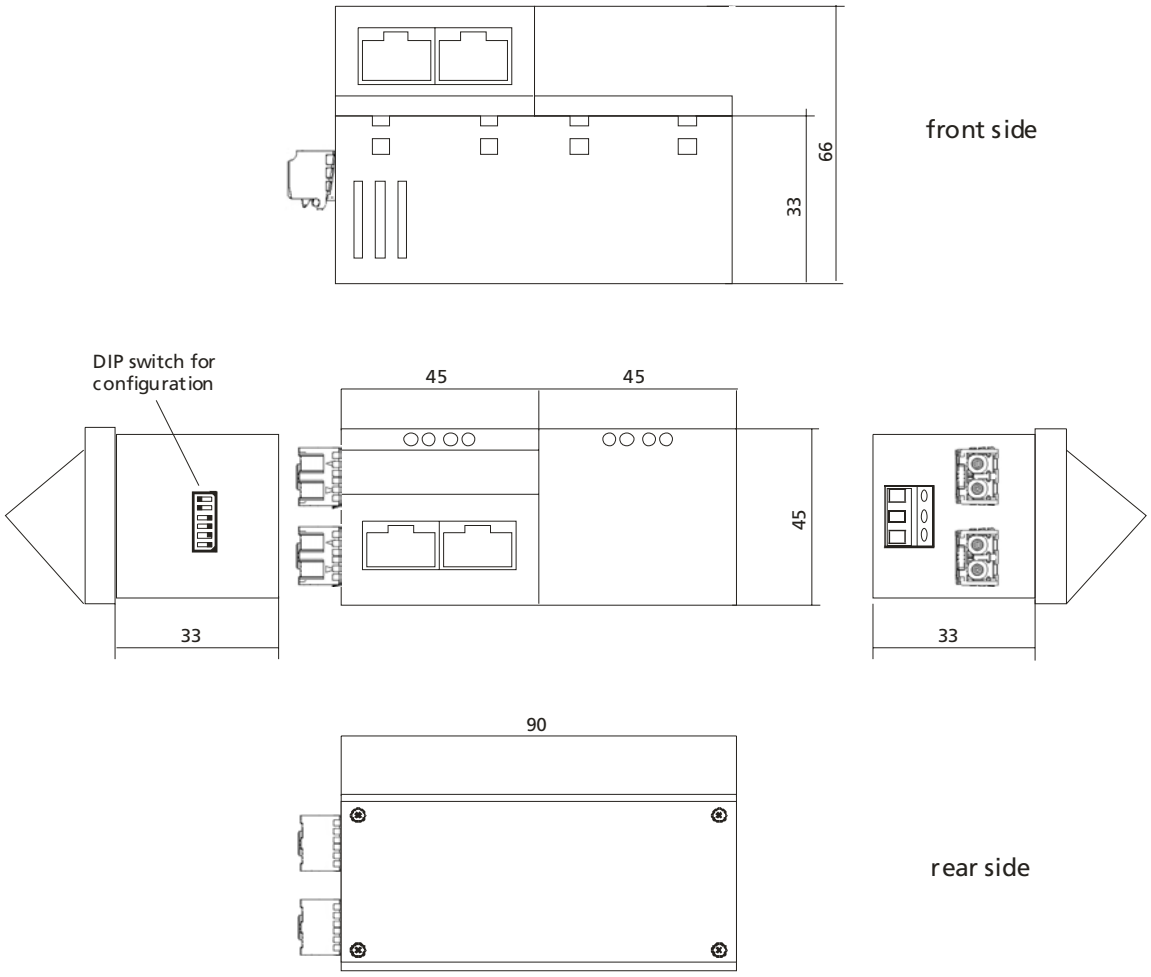


Fig. 5: Dimensions

Length reduction

100Base-FX half duplex segment
The converter has a signal delay of max. 25 bit times. Through this, the maximum segment length of 412 m is reduced about 25 m for fiber and about 30 m for twisted pair cable. This reduction has also to be considered at single mode fiber.

100Base-FX full duplex segment
In full duplex segments the signal delay has no influence on the maximum segment length.

Power-over-Ethernet

Power-over-Ethernet (PoE) provides the power supply of end devices such as IP phones, wireless access points , Web cameras, access control systems via twisted-pair cables.

The Power-over-Ethernet functionality according to the new IEEE802.3af standard is integrated into the switch. The standard defines the functions of both the Power Sourcing Equipment (PSE) and of the Powered Device (PD). A handshake protocol between PSE and PD negotiates the current supply where several levels are possible.

The power is supplied according to the IEEE 802.3af standard via the unused wires of the RJ45 socket (wire 4 and 5: positive line, wire 7 and 8: negative line).

As defined in the norm per port can be supplied up to 15.4 W power to the end device. The supply of the connected end devices up to 2x 15.4 W happens thereby directly from the converters' 48 V power supply.

This power supply is additionally to the operation power of the converter to be considered at the total rating of the power supply. Optionally power supplies are available for the converters' connection to 230 V AC mains supplies (see page 8, paragraph "Accessories").

To protect all end devices, which are not PoE-able, the power supply will be switched not until a valid PoE signature of the end device is found.

Also in active operation the taken power and applied voltage will be monitored permanently. If the acceptable limits will decrease or transcend immediately the power supply will be disconnected.

Product Safety

DANGER! Optical components can emit invisible laser radiation.

ATTENTION: Infrared light as it is used for data transmission on optical fibers is not visible to the human eye, but nevertheless may cause severe damage.

In order to prevent any eye damage:

- Never look into the output of optical fibers or components - risk of severe eye damage!
- Apply protective caps to all unused optical ports.
- Do not start system operation prior to completing all wiring.

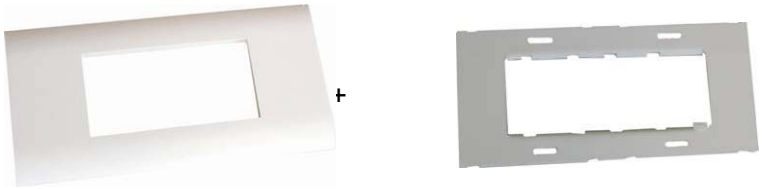
Active laser components employed in this system comply with laser safety class 1.

Mounting/Accessories

The Twin Converter supports with its tool-less snap-in mounting all cable-channel designs which conform to an international 45 mm standard (e. g. S 99 programme from the company Ackermann).

For the universal mounting optional accessories are available:

- Accessories for installation in standard E2-case of cable-channels below windows (MS140029, 2-part set):



Cover frame Adapter plate

- Accessories for installation in Ackermann-sub floor-tanks with 2-fold boxes: (MS140026, 3-part set):

Box Frame Blind cover

- Accessories for installation in Ackermann-sub floor-tanks with 3-fold boxes: (MS140026, 4-part set):
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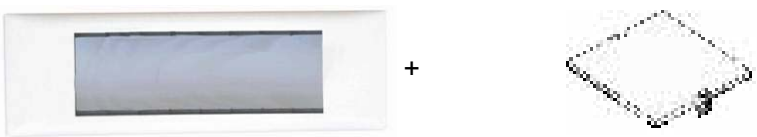
Box Frame Blind cover

- Accessories for wall mounting (MS140010, 2-part. Set white):



3-fold box Blind cover

Order Information

Art.-No.	Description	Connectors
MS450295P-48	Installation PoE Twin Converter FX/TX, 45x45 2x LC duplex 1310nm multimode, 2x RJ-45, Power-over-Ethernet according IEEE802.3af on TX ports, converter or 10/100TX bridge configurable, Link Through, ALM, 48 VDC input	2x LC 2x RJ-45 1x screw type terminals
MS450296P-48	Installation PoE Twin Converter FX/TX, 45x45 2x VF-45 duplex 1310nm multimode, 2x RJ-45, Power-over-Ethernet according IEEE802.3af on TX ports, converter or 10/100TX bridge configurable, Link Through, ALM, 48 VDC input	2x VF-45 2x RJ-45 1x screw type terminals
MS450297P-48	Installation PoE Twin Converter FX/TX, 45x45 2x MT-RJ duplex 1310nm multimode, 2 xRJ-45, Power-over-Ethernet according IEEE802.3af on TX ports, converter or 10/100TX bridge configurable, Link Through, ALM, 48 VDC input	2x MT-RJ 2x RJ-45 1x screw type terminals

Accessories

Art.-No.	Description
MS140010	Wall mount-set, 2 pcs., 45x45 white Wall box 3-times, Blind cover
MS140024	Mounting-set 45x45-System 2-fold Ackermann (GB2) cover frame, blind plate (black)
MS140026	Mounting-set 45x45-System 2-fold Ackermann GB2 box, cover frame, blind plate (black)
MS140027	Mounting-set 45x45-System 3-fold Ackermann GB3 box, cover frame, blind plates (black)
MS140029	Universal mounting set for the installation in standard cable channels (mounting adapter + cover frame, white)
MS700675	Power supply 65 Watt, input: 100-230 V AC, output: 48 V/ 1,35 A
MS700430	Hat-rail power supply 60 Watt Wide range input: 85-264 V AC, output: 48 V / 1,25 A