

# Ethernet media converter for industrial use

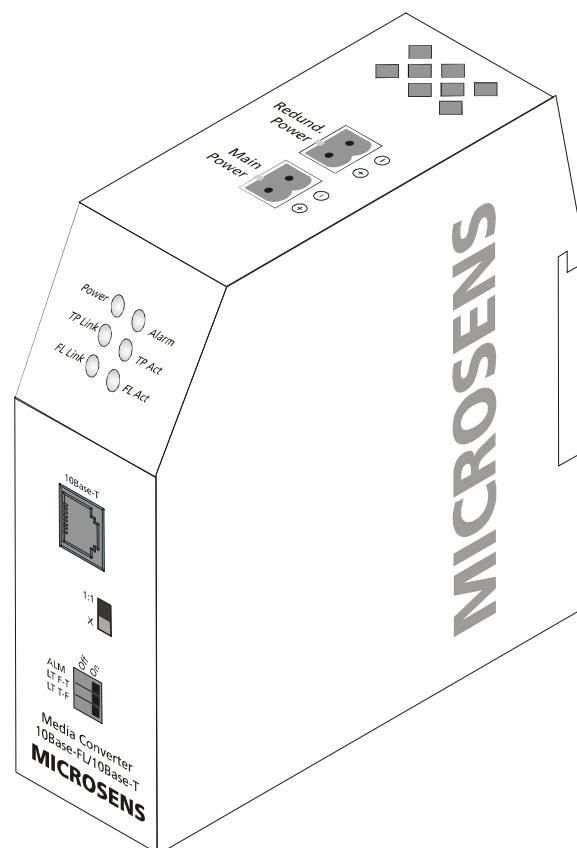
# MICROSENS

## General

For the extreme demanding use in industrial environments MICROSENS has developed special media converter.

The converter has included several features such as Link Through, ALM, potential free alarm contacts, connector for redundant power supply, cross over switch, solid metal chassis and an extended temperature range.

The industrial product range includes beside the Ethernet (10Base-FL/10Base-T) and Fast Ethernet (100Base-FX/100Base-TX) converter of this data sheet also media converter for serial interfaces (RS-232, RS-422, RS-485).



## Technical Specifications

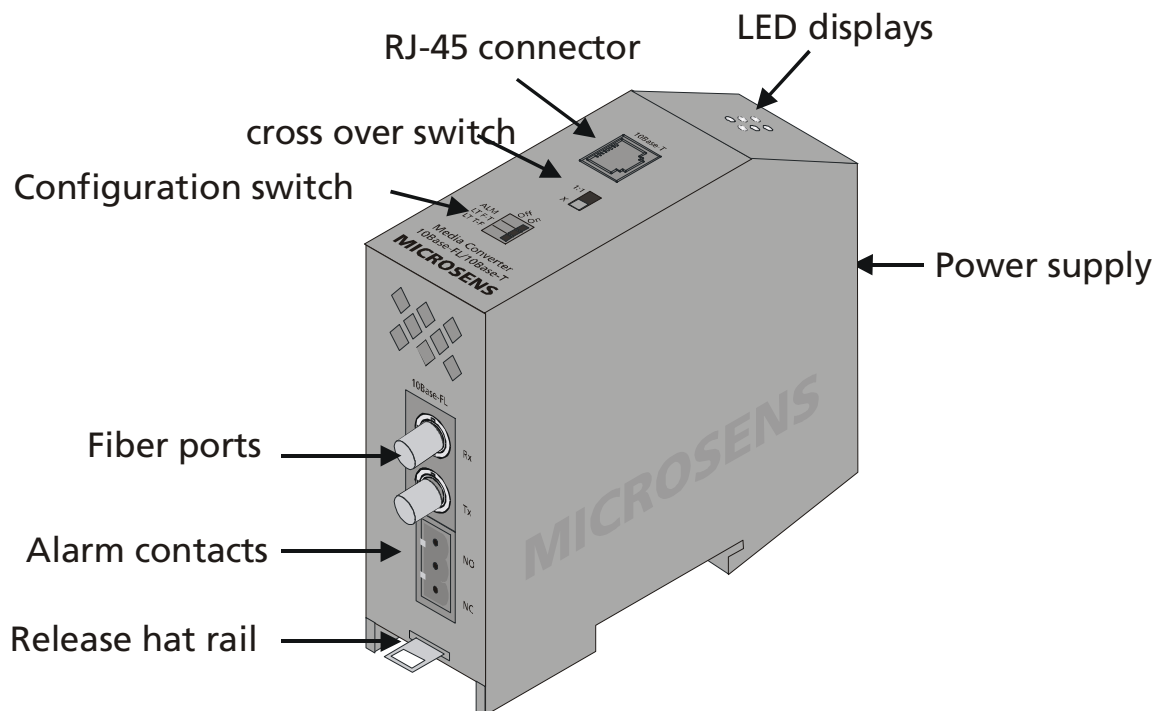
<b>Type</b>	Ethernet / Fast Ethernet media converter for industrial use	
<b>Fiber type</b>	Multimode 62,5/125 or 50/125µm, Single mode 9/125µm, duplex	
<b>Cable type</b>	Shielded Twisted Pair cable, 100 Ohm, Category 5, Pinout RJ45-port crossable per switch, 100 m	
<b>Data rate</b>	10 and 100 Mbit/s	
<b>LED displays</b>	<i>Power</i>	Ready for operation
	<i>FX-Link</i>	Fiber link
	<i>FX-Act</i>	Data traffic on fiber
	<i>TX-Link</i>	Twisted Pair link
	<i>TX-Act</i>	Data traffic on Twisted Pair
	<i>Alarm</i>	Link interrupted
<b>Mounting</b>	35 mm hat rail, according DIN EN 50 022	
<b>Power supply</b>	18 - 36 V DC / max. 500 mA by external power supply Connection by screw terminal, redundant connector	
<b>Dimensions</b>	38 x 108 x 116 mm (B x T x H)	
<b>Operating temp.</b>	-20°C to 60°C	
<b>Storage temp.</b>	-20°C to 80°C	
<b>Rel. humidity</b>	5% to 90% non condensing	

## Optical parameter

<b>Ethernet multimode</b>	<i>min. distance:</i>	2 km
	<i>opt. power:</i>	-19 dBm
	<i>sensitivity:</i>	-32,5 dBm
	<i>wavelength:</i>	850 nm
<b>Ethernet single mode</b>	<i>min. distance:</i>	10 km (full duplex)
	<i>opt. power:</i>	-24 dBm
	<i>sensitivity:</i>	-32,5 dBm
	<i>wavelength:</i>	1310 nm

<b>Fast Ethernet MM</b>	<i>min. distance:</i>	2 km (full duplex)
	<i>opt. power:</i>	-19 dBm
	<i>sensitivity:</i>	-31 dBm
	<i>wavelength:</i>	1310 nm
<b>Fast Ethernet SM</b>	<i>min. distance:</i>	15 km (full duplex)
	<i>opt. power:</i>	- 15 dBm
	<i>sensitivity:</i>	- 31 dBm
	<i>wavelength:</i>	1310 nm
	<i>min. distance:</i>	40 km (full duplex)
	<i>opt. power:</i>	- 5 dBm
	<i>sensitivity:</i>	- 34 dBm
	<i>wavelength:</i>	1310 nm
	<i>min. distance:</i>	80 km (full duplex)
	<i>opt. power:</i>	- 5 dBm
	<i>sensitivity:</i>	- 34 dBm
	<i>wavelength:</i>	1550 nm
	<i>min. distance:</i>	125 km (full duplex)
	<i>opt. power:</i>	0 dBm
	<i>sensitivity:</i>	- 37 dBm
	<i>wavelength:</i>	1550 nm

## Connectors



## Connections

The connection of the media converter to a hub /switch can be done with a standard 1:1 patch cable. Because the pinout of the RJ-45 port can be crossed it is also possible to use a 1:1 patch cable to connect end devices.

## Autonegotiation (only for Fast Ethernet version)

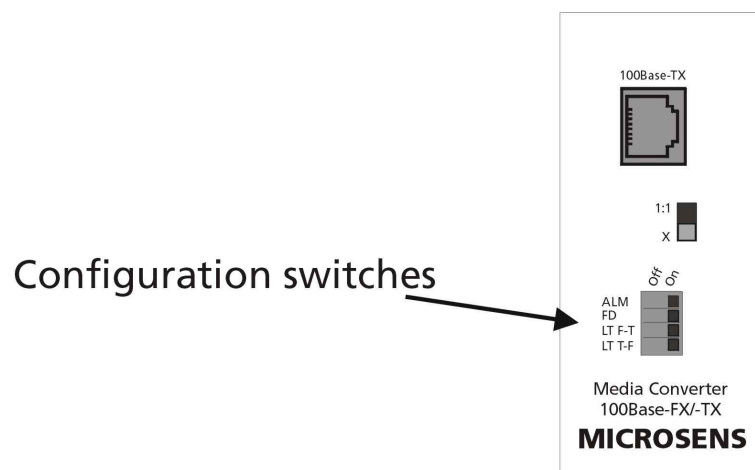
This protocol is used during the connection establishment to recognise the transmission mode (half or full duplex). This ensures that always the maximum transmission speed is reached. Because the autonegotiation protocol is not defined for the fiber side, the converter has a helpful manual configuration feature.

To support the configuration MICROSENS offers this protocol and allows the configuration of the full duplex mode (DIP switch FD: on). Now the converter is getting active during the connection establishment and reacts on the autonegotiation protocol of the connected device.

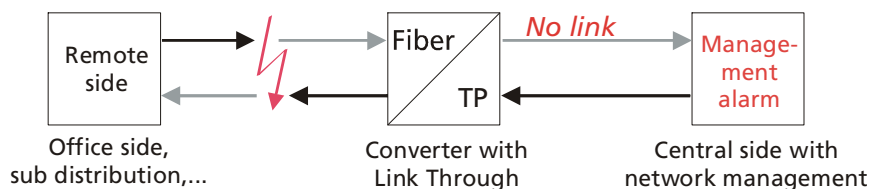
If this feature is deactivated the converter has no effect on the configuration of the connection. The transmission mode half or full duplex is determined by the connected devices then.

## Link Transparency

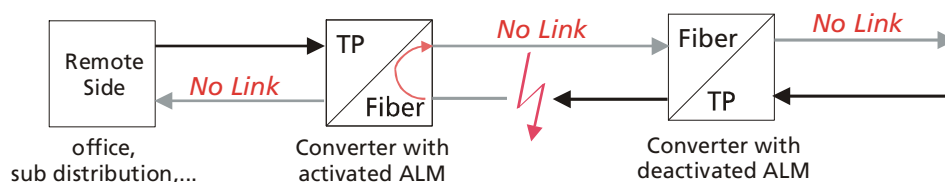
At most of the application the connection states of each segment is monitored by the management of the central switch or hub. Using media converter has the problem that the connection is divided in two different segments. It can happen that an interruption in one segment is not noticed in the other segment. To avoid this problem these media converter have the integrated "Link Through" functionality which is forwarding the link status from one segment to the other.



To ensure that the network management can read the connection status, the converter has additional integrated features such as Link Through and Advanced Link Monitor (ALM). The Link Through forwards the connection status to the converted segment. Due to this the fiber port is interrupted if the twisted pair connection fails and vice versa.



Additional to Link Through the loss of the transmitting optic fiber can be recognized by Advanced Link Monitor (switch ALM FX: on). In case of loss of the fiber port, the copper and the fiber port is switched off (see Fig. 9). This ensures that the central network components can determinate this failure exactly.



Media converter with integrated ALM feature can be combined with all central equipment (e.g. switches, hubs, bridges).

**Attention:** To ensure the correct setup of the connection, only one side of the connection should have activated ALM.

## Alarm relay contacts

The converter has potential free relay contacts for the connection of external alarm systems. The connection is done by a 3 pin screw connector at the bottom of the device. At this connector the pinout, opened or closed (NO/NC), can be selected. This contact is switched in case of loosing a connection (twisted pair and fiber) or a general failure of the device.

## Length reduction (only for Fast Ethernet version)

### Half duplex transmission

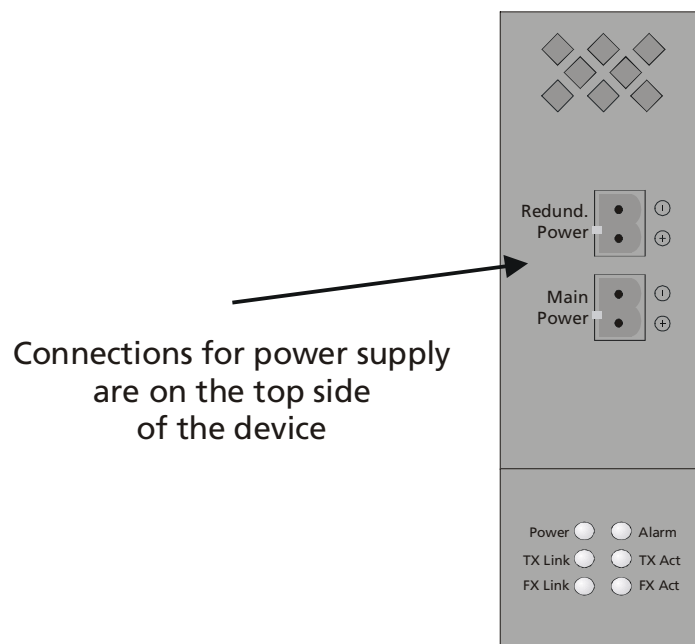
The converter has a signal delay of max. 25 bit times. Through this, the maximum segment length of 412 m is reduced about 25 m for fiber and about 30 m for twisted pair cable. This reduction has also to be considered at single mode fiber.

### Full duplex transmission

In full duplex segments the signal delay has no influence on the maximum segment length.

## Power supply

The power is supplied is done by an external power supply unit, which is not included at delivery. The connection is done by plug gable screw terminals at the top of the device. The connection of a redundant power supply is possible with the second terminal.



## Mounting

The converter has a very solid metal chassis prepared for the mounting on 35 mm hat rails. The mounting is done on 35 mm hat rails according DIN EN 50 022. The fixation of the MICROSENS switch on the rail is done with a locking pin that can be opened from the bottom side. Multiple devices can be lined up on the rail.

## Order designation

Art.-No.	Description	Connectors
MS650400-T	Ethernet media converter 10Base-FL / 10Base-T Multimode 850 nm (Option -T: Link Through can not be switched off!, Funktion on page 5)	2 x ST, 1 xRJ45 Power supply, Relay Contacts
MS650405-T	Ethernet media converter 10Base-FL / 10Base-T Single mode 1300 nm (Option -T: Link Through can not be switched off!, Funktion on page 5)	2 x ST, 1 xRJ45 Power supply, Relay Contacts
MS650420	Fast Ethernet media converter 100Base-FX / 100Base-TX Multimode 1300 nm	2 x SC, 1 xRJ45 Power supply, Relay Contacts
MS650421	Fast Ethernet media converter 100Base-FX / 100Base-TX Multimode 1300 nm	2 x ST, 1 xRJ45 Power supply, Relay Contacts
MS650424	Fast Ethernet media converter 100Base-FX / 100Base-TX Single mode 1300 nm	2 x SC, 1 xRJ45 Power supply, Relay Contacts
MS650425	Fast Ethernet media converter 100Base-FX / 100Base-TX Single mode 1300 nm	2 x ST, 1 xRJ45 Power supply, Relay Contacts
MS650426	Fast Ethernet media converter 100Base-FX / 100Base-TX Single mode 1300 nm, 40 km	2 x SC, 1 xRJ45 Power supply, Relay Contacts

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