



SEPTEMBER 2004
LHB8100A
LHB8101A
LHB8102A
LHB8103A
LHB8107A
LHB8108A

User Manual

Industrial Media Converter for 10Base-FL/10Base-T and 100Base-FX/100Base-TX

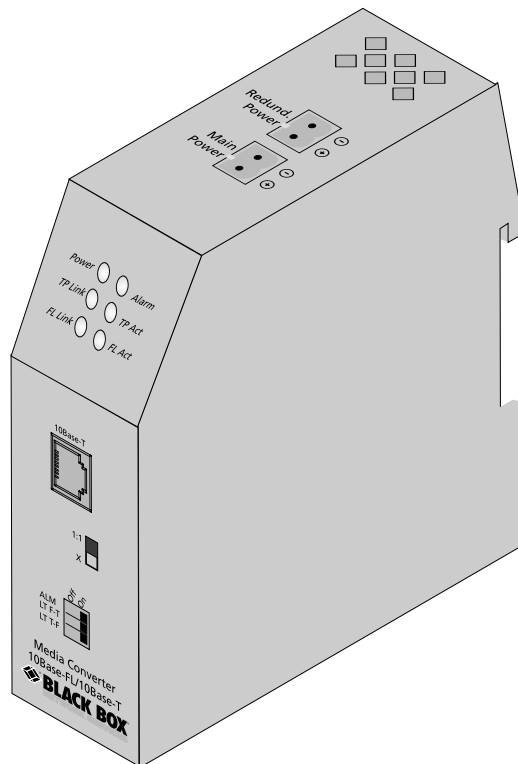


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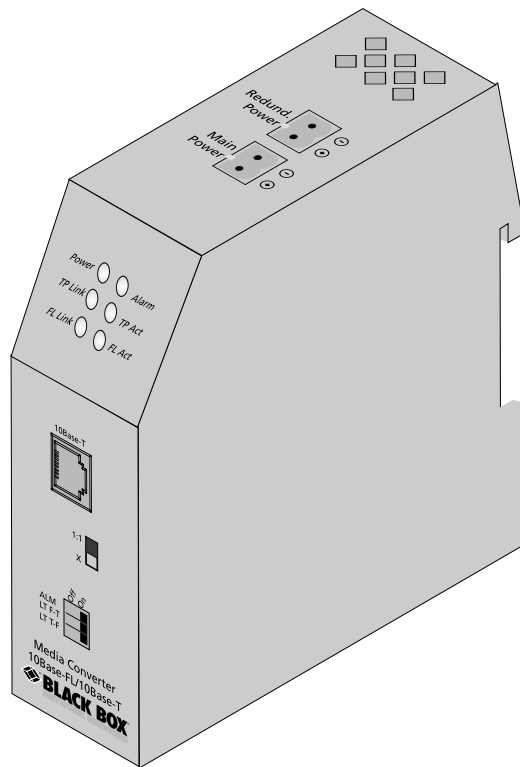
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Introduction

For extreme demanding use in industrial environments, Black Box has developed special hardened (industrial) media converters.

These converters have several advanced features such as Link Pass Through, ALM, potential free alarm contacts, connectors for redundant power supply, cross over switch, solid metal chassis and an extended temperature range.

Besides the Ethernet (10Base-FL/10Base-T) and Fast Ethernet (100Base-FX/100Base-TX) converter, the industrial product range includes serial interfaces converters for RS-232, RS-422, RS-485. Call Black Box tech Support for more details.



Safety Notes

WARNING: Infrared radiation, used for data transmission in the optical fibres - although invisible to the human eye - can nevertheless cause damage.

To avoid damage to the eyes:

- never look straight into the output of fibre optic components – danger of blinding!
- cover all unused optical connections with caps.
- commission the transmission link only after completing all connections.

The active laser components used with this product comply with the provisions of **Laser Class 1**.

DANGER: Conductive components of power and telecommunications networks can carry dangerously high voltage.

To avoid electric shock:

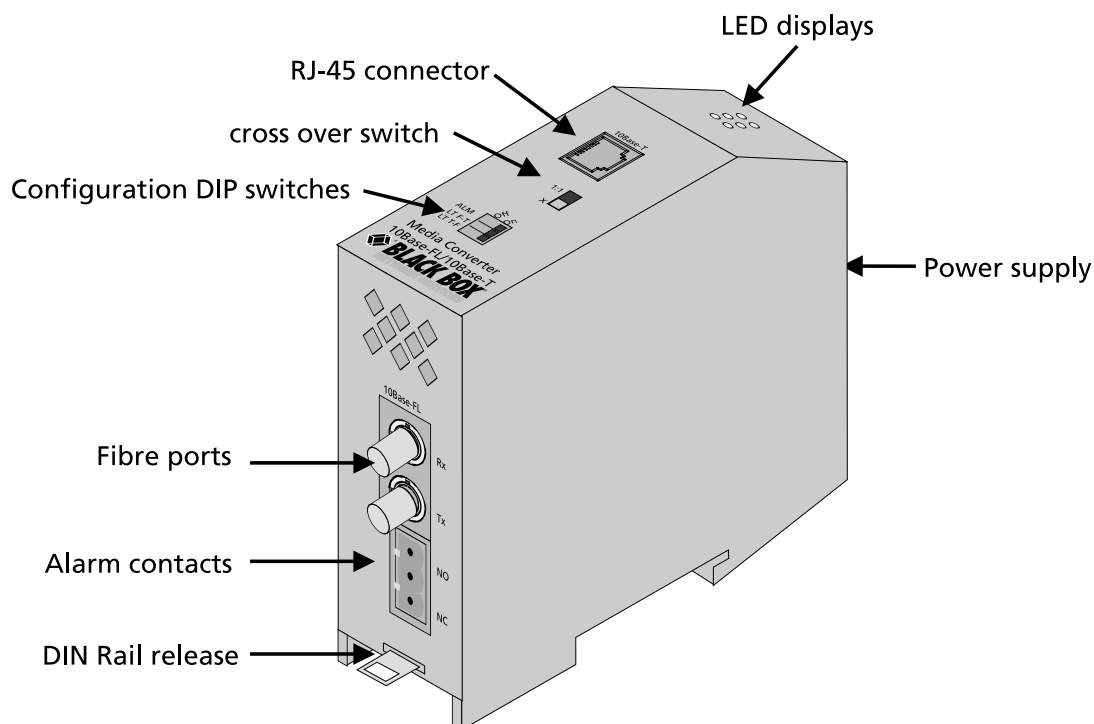
- Do not carry out installation or maintenance work during lightning storms.
- All electric installations must be carried out in accordance with local regulations.

Mounting

The Media Converter is housed in a solid metal box with an integrated fixture for the installation on standard 35-mm DIN EN 50 022 rails.

The fixation of the BLACK BOX Media Converter on the rail is done with a locking latch that can be opened from the bottom side. If multiple devices are mounted in line, a minimum space of 20-mm should be kept between the devices, to ensure sufficient heat dissipation.

Connectors



Connections

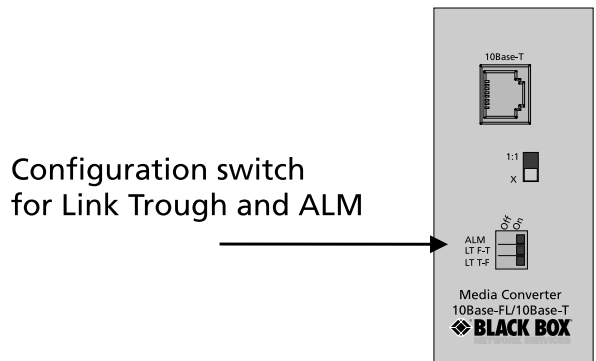
The connection of the media converter to a hub /switch can be done with a standard 1:1 patch cable. Because the pin-out of the RJ-45 port can be crossed it is also possible to use a 1:1 patch cable to connect end devices.

Autonegotiation (only for Fast Ethernet version)

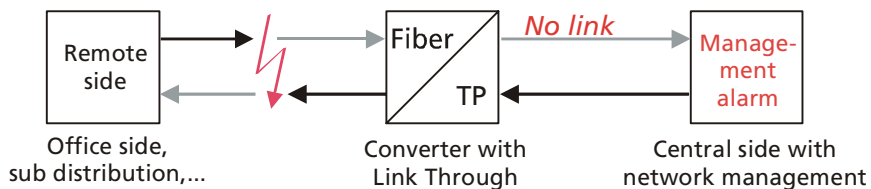
This protocol is used during the connection establishment to recognise the transmission mode (half or full duplex). This always ensures maximum transmission speed. Because the autonegotiation protocol is not defined for the fibre side, the converter allows you to set the fibre port configuration manually.

Link Transparency

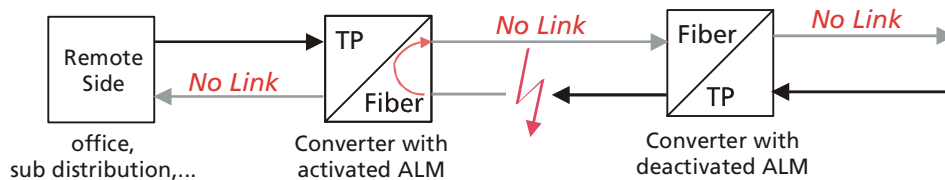
In most applications the connection states of each segment is monitored by the management of the central switch or hub. When using a media converter the connection is divided in two different segments - one fibre and one copper segment. An interruption can occur in one segment without being noticed in the other segment. To avoid this problem our Industrial media converters have an integrated "Link Pass Through" functionality. This function 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 fibre port is interrupted if the twisted pair connection fails and vice versa.



Additional to Link Through the loss of the transmitting optic fibre can be recognized by Advanced Link Monitor (switch ALM FX: on). In case of loss of the fibre port, the copper and the fibre 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 relay contacts for connection of external alarm systems. The connection type is a 3-pin screw connector at the bottom of the device. In this connection, an open (NO) or closed (NC) pin-out can be selected. The connector is switched in case of losing a connection (twisted pair and fibre) or a general failure of the device.

Length reduction (only for Fast Ethernet version)

Half duplex transmission

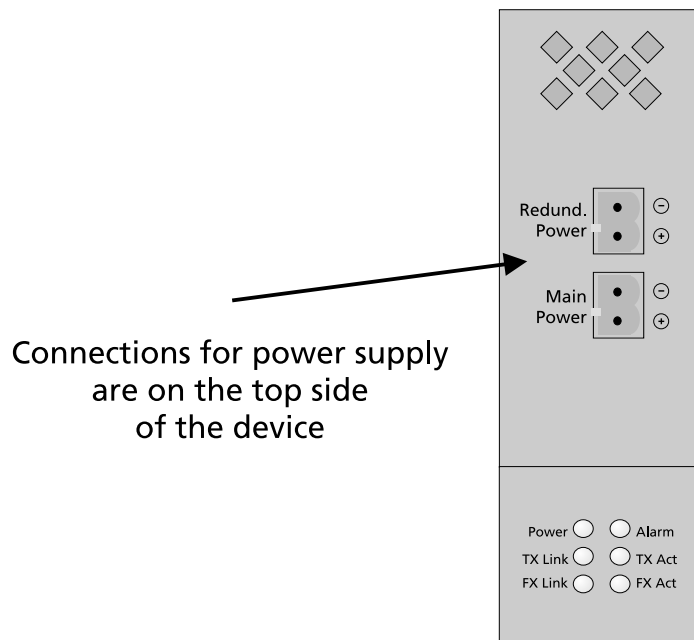
The converter has a signal delay of max. 25 bit times. Through this, the maximum segment length of 412 m is reduced about 25 m for fibre and about 30 m for twisted pair cable. This reduction has also to be considered at single mode fibre.

Full duplex transmission

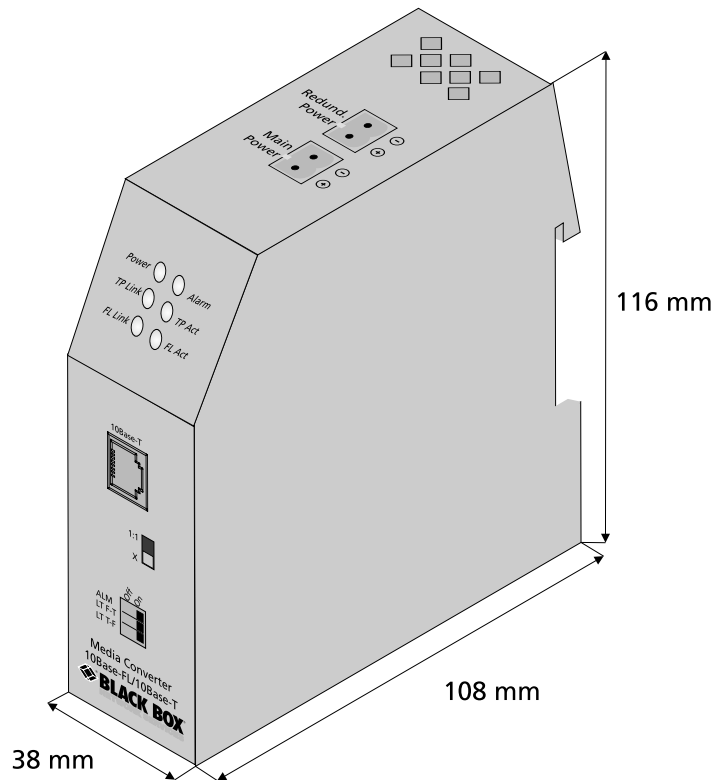
In full duplex segments the signal delay has no influence on the maximum segment length.

Power Supply

The power supply is done by an external power supply with an output voltage of 24 V DC. This power supply is not included at delivery, but can be ordered separately (LHB8000-PS). The connection is done by the pluggable screw terminals on the top side of the device. The connection of a redundant power supply can be done by the second screw terminal.

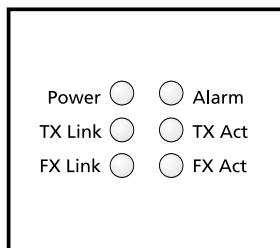


Dimensions



Transmission Speed

The twisted pair port of the Media Converter adapts automatically to the highest possible speed using the auto-negotiation protocol. The LED display shows the selected speed.



The transmission in full duplex mode is indicated by the related LED (on). If the connection is working in half duplex mode, this LED indicates collisions for the connected segment (flashing).

The transmission mode of the fibre uplinks are selected by the network management. Important: Distances longer than 412 m can only be realized in full duplex mode. The duplex settings are independent from the mode of the ring feature.

Order Information

Art.-No.	Description	Connectors
LHB8100A	Ethernet media converter 10Base-FL / 10Base-T Multimode 850 nm	2 x ST, 1 xRJ45 Power supply, Relay Contacts
LHB8101A	Ethernet media converter 10Base-FL / 10Base-T Single mode 1300 nm	2 x ST, 1 xRJ45 Power supply, Relay Contacts
LHB8102A	Fast Ethernet media converter 100Base-FX / 100Base-TX Multimode 1300 nm	2 x SC, 1 xRJ45 Power supply, Relay Contacts
LHB8103A	Fast Ethernet media converter 100Base-FX / 100Base-TX Multimode 1300 nm	2 x ST, 1 xRJ45 Power supply, Relay Contacts
LHB8107A	Fast Ethernet media converter 100Base-FX / 100Base-TX Single mode 1300 nm	2 x SC, 1 xRJ45 Power supply, Relay Contacts
LHB8108A	Fast Ethernet media converter 100Base-FX / 100Base-TX Single mode 1300 nm	2 x ST, 1 xRJ45 Power supply, Relay Contacts
LHB8000-PS	Power Supply Unit for up to 6 devices; 100-240VAC 50/60Hz input/1Amp, -24VDC output/2,1Amp	1x 5-position Terminal Block 1x 3-position Terminal Block

Technical Specifications

Type	Ethernet / Fast Ethernet media converter for industrial use	
Fibre type	Multimode 62,5/125 or 50/125µm, Single mode 9/125µm, duplex	
Cable type	Shielded Twisted Pair cable, 100 Ohm, Category 5, Pin-out RJ45-port crossable per switch, 100 m	
Speed	10 or 100 Mbps	
LED displays	<i>Power</i>	Ready for operation
	<i>FX-Link</i>	Fibre link
	<i>FX-Act</i>	Data traffic on fibre
	<i>TX-Link</i>	Twisted Pair link
	<i>TX-Act</i>	Data traffic on Twisted Pair
	<i>Alarm</i>	Link interrupted
Mounting	35-mm hat rail, according DIN EN 50 022	
Power supply	18 - 60 V DC / max. 500 mA by external power supply (LHB8000-PS) Connection by screw terminal, redundant connector	
Dimensions	38W x 108D x 116H mm	
Operating temp.	-20°C to 60°C	
Storage temp.	-20°C to 80°C	
Rel. humidity	5% to 90% non condensing	

Optical parameter

Ethernet multimode	<i>min. distance:</i>	2 km
	<i>opt. power:</i>	-19 dBm
	<i>sensitivity:</i>	-32,5 dBm
	<i>wavelength:</i>	850 nm
Ethernet single mode	<i>min. distance:</i>	10 km (full duplex)
	<i>opt. power:</i>	-24 dBm
	<i>sensitivity:</i>	-32,5 dBm
	<i>wavelength:</i>	1300 nm
Fast Ethernet MM	<i>min. distance:</i>	2 km (full duplex)
	<i>opt. power:</i>	-19 dBm
	<i>sensitivity:</i>	-31 dBm
	<i>wavelength:</i>	1300 nm
Fast Ethernet SM	<i>min. distance:</i>	15 km (full duplex)
	<i>opt. power:</i>	- 15 dBm
	<i>sensitivity:</i>	- 31 dBm
	<i>wavelength:</i>	1300 nm

Black Box Contact Information

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