

RS-485 Fiber Converter for industrial Use

MICROSENS

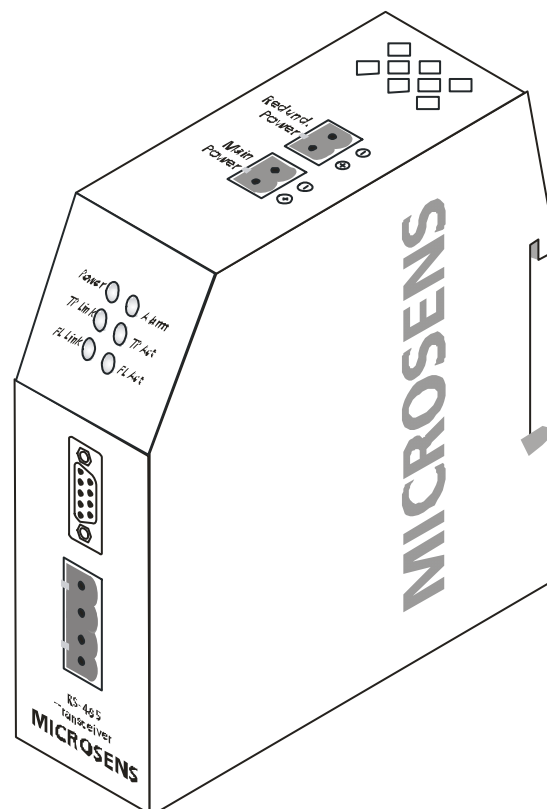
General

For the connection of devices, switch-gears and machine control systems with standardised serial interfaces MICROSENS offers special fiber converter in industrial design.

This RS-485 transceiver is compatible to the different industrial field bus systems like Profibus, Bitbus, Interbus etc.

The integrated holder allows a direct mounting on 35 mm hat rails. The power supply of the device is done by the 24 V DC inputs. A second power input is for the connection of a redundant power supply.

For a flexible installation the converter has beside the SUB-D9 connector the same pins also as a screw terminal block available. To the potential free external alarm contacts it is possible to connect any external alarm system.



Technical Specifications

Type	RS-485 Fiber Converter for industrial Use	
Fiber type	Multimode 62,5/125 or 50/125µm, Single mode 9/125µm, duplex	
Cable type	RS-485 with SUB-D9 connector or pluggable screw terminal block	
Data rate	max. 1.5 Mbps	
LED displays	<i>Power</i>	Ready for operation
	<i>FO-Xmt</i>	Transmit of data on fiber port
	<i>FO-Rcv</i>	Receive of data on fiber port
	<i>TXD</i>	Transmit of data on copper port
	<i>RXD</i>	receive of data on copper port
	<i>Alarm</i>	Relay Contact switched, missing FO-Link
Mounting	35 mm hat rails, according to DIN EN 50 022	
Power Supply	18 - 32 V DC / max. 500 mA via external power supply Alternative 9-18 V DC / max. 500 mA (MS65034x-12 Version) Pluggable screw terminal block, redundant connector	
Dimensions	38 x 108 x 116 mm (w x d x h)	
Operation temp.	-20°C to 60°C	
Storage temp.	-20°C to 80°C	
Rel. humidity	5% to 90% non condensing	

Optical Parameter

Multimode Version	<i>min. distance:</i>	2 km
	<i>min. opt. power:</i>	-19 dBm
	<i>min. sensitivity:</i>	-31 dBm
	<i>Wavelength:</i>	1300 nm
	<i>Connector:</i>	SC-duplex, optional ST
Single Mode Versions	<i>min. distance:</i>	15 km
	<i>min. opt. power:</i>	-15 dBm
	<i>min. sensitivity:</i>	-31 dBm
	<i>Wavelength:</i>	1300 nm
	<i>Connector:</i>	SC-duplex, optional ST
	<i>min. distance:</i>	40 km
	<i>min. opt. power:</i>	-5 dBm
	<i>min. sensitivity:</i>	-34 dBm
	<i>Wavelength:</i>	1300 nm
	<i>Connector:</i>	SC-duplex

Method of Operation

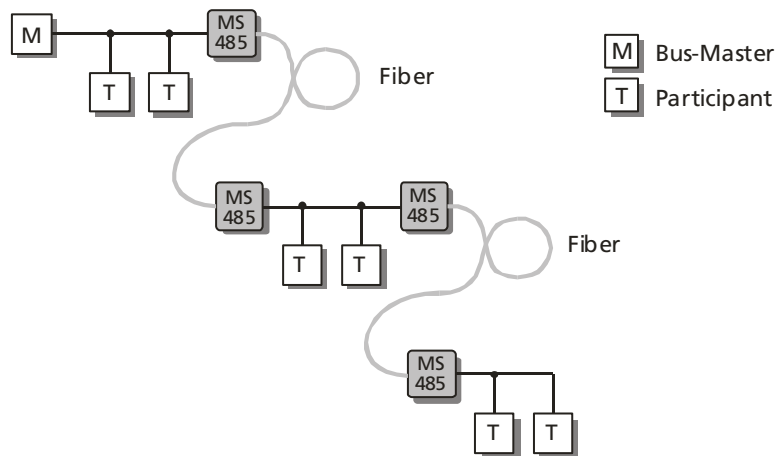
The data is transmitted on the RS-485 port in the half duplex mode, therefore the converter is able to select between the two directions. As soon the converter receives data on the copper port he transmits this data also on the fiber port to the remote unit. The remote unit detects this and sets its receiver to active for the configured hold up time.

In case of signal change during this hold up time, the RS-485 driver stays on the line until the last event of signal change plus the hold time.

The hold up time should not be selected too long, because then the bus would be blocked for a too long time. This could result into interrupted replies to the requests, because the receiver may not switched to the receive mode again.

RS-485 Topology with Fiber

The MICROSENS RS-485 transceiver makes an extension of a point-to-point RS-485 bus. Due to the extension by using fiber it is possible extend the maximum possible distance significant. The use of the RS-485 converter must be done always in a pair.



Conversion to Fiber

During the conversion of the RS-485 interface it must be guaranteed that the signal direction is detected correct. This is depending on the used protocol and speed.

The configuration of the transceiver can be done by several DIP switches. It is possible to configure the transceiver to be used with the different bus systems of the different vendors which give this transceiver a high flexibility. Please refer to the chapter configuration for the functions of the DIP switches.

Configuration

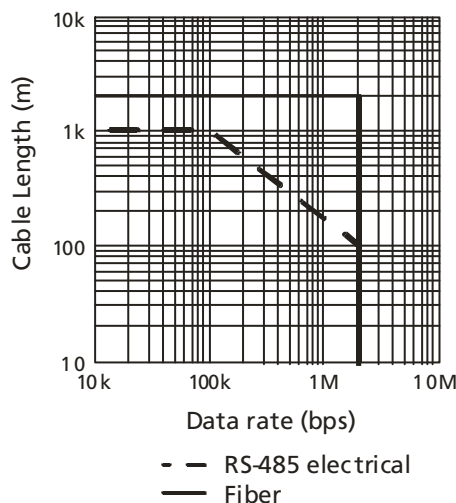
The DIP switches 1-4 are for the configuration of the speed which is used on the RS-485 bus.

Dip 1	Switch			Bit Rate (bps)	Hold up time (µs)
	Dip2	Dip3	Dip4		
off	off	off	off	1.500.000	7,6
off	off	off	on	750.000	15,2
off	off	on	off	500.000	22,4
off	off	on	on	375.000	30,0
off	on	off	off	187.500	60,4
off	on	off	on	93.750	120,4
off	on	on	off	75.000	150,0
off	on	on	on	-	-
on	off	off	off	115.200	106
on	off	off	on	57.600	211
on	off	on	off	38.400	315
on	off	on	on	19.200	628
on	on	off	off	9.600	1252
on	on	off	on	4.800	2512
on	on	on	off	-	-
on	on	on	on	-	-

The bit rate is based on the length on the length of one data block with 11 Bit. (1 Start Bit + 8 Data Bits + 1 Parity + 1 Stop Bit).

Transmission Line

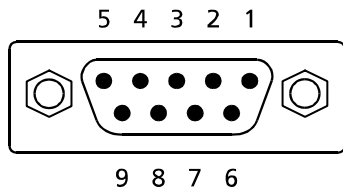
Beside the above mentioned advantage of the fiber optic transmission, it is possible to extend the maximum possible distance beyond the limits given by the RS-485 standard. The electrical connection has also one additional limitation. As higher the data rate is getting, that shorter the maximum distance is getting. The maximum distance using fiber optic is only limited by the optical attenuation of the fiber.



Pin out

The electrical RS-485 bus can be connected either to the SUB-D9 connector or the pluggable screw terminal block with 4 pins.

The SUB-D9 connector has the following pin out:



Pin	Signal	Description
1		unused
2		unused
3	Rx +/Tx +	Receive-/Transmit data positiv
4		unused
5	GND	Ground
6		unused
7		unused
8	Rx -/Tx -	Receive-/Transmit data negativ
9	VCC	+5V (for active termination)

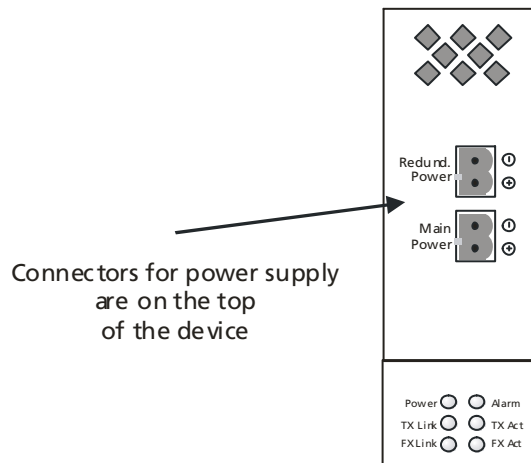
Pin out of 4-Pin screw terminal block:

RS-485	
1	RX+/TX+
2	RX-/TX-
3	RX+/TX+
4	RX-/TX-

Power Supply

The power supply is done by an external 24 V DC power supply unit. This power supply is not included at delivery. The connection is done with the screw terminal blocks at the top of the device.

The connection of a redundant power supply is possible with the second connector. Both inputs are decoupled and galvanic isolated from the rest of the device.



Alarm Contact

The converter has an integrated potential free alarm contact for the connection of external alarm systems.

The connection is done at the 3 pin pluggable screw terminal block at the bottom of the device. Depending on the used pins the contact is normally open or normally closed (NO/NC).

This contact is switched in case that the fiber connection is interrupted or if the power supply is down. In case of a fiber failure that alarm status is also indicated by an LED at the front side of the devices.

Important: Therefore it is possible to check the status of the fiber connection with help of this LED. For this line test create a loop at the remote side by connecting the two fibers (receive and transmit) together.

Mounting

The converter has a very solid metal chassis with integrated holder for hat rails. For the mounting it is possible to use 35 mm hat rails according to DIN EN 50 022.

The fixation of the MICROSENS transceiver 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 Information

Art.-No.	Description	Connectors
MS650342	RS-485 Fiber Converter, Multimode 1300 nm, ST	2x ST, 1x SUB-D9, 2x power supply, 1x Relay Contact
MS650343	RS-485 Fiber Converter, Multimode 1300 nm, SC	2x SC, 1x SUB-D9, 2x power supply, 1x Relay Contact
MS650345	RS-485 Fiber Converter, Single Mode 1300 nm, ST Laser 15 km	2x ST, 1x SUB-D9, 2x power supply, 1x Relay Contact
MS650347	RS-485 Fiber Converter, Single Mode 1300 nm, SC Laser 15 km	2x SC, 1x SUB-D9, 2x power supply, 1x Relay Contact
MS650346	RS-485 Fiber Converter, Single Mode 1300 nm, SC Laser 40 km	2x SC, 1x SUB-D9, 2x power supply, 1x Relay Contact
MS650342-12	RS-485 Fiber Converter, Multimode 1300 nm, ST, 12 V DC Input!	2x ST, 1x SUB-D9, 2x power supply, 1x Relay Contact