

USBtoMBus-XL

USB to M-Bus communication interface converter

- > USB to M-Bus converter
- > Versions for connecting 45, 80, 120, 190 M-Bus slave devices
- > Standard operating voltage range DC 12 to 30V
- > Extended error indication with multiple status LEDs
- > Communication speeds up to 9600bps
- > Protections and filters ensuring high durability of the entire device against surges and failures



Overview

USBtoMBus-XL communication converters are durable converters of the M-Bus industrial communication bus to the common USB computer interface. The converters enable easy connection of M-Bus devices to control or computer systems using the USB interface for the purpose of data collection and processing.

The converter creates a virtual serial port after it has been connected to a PC. The communication parameters of this port can be configured in its driver settings or directly in the program that will use this port.

Depending on model the M-Bus port has a connection capacity for 45, 80, 120 or 190 M-Bus slave devices. The interface has the highest rating of surge protection and is resilient to failures on the M-Bus line.

The states of the M-Bus line and the converter are evaluated and monitored by a microprocessor. Error states are indicated by status LEDs which simplify identification of the converter's current state and possible causes of a malfunction. The LEDs also indicate functionality of the converter, power source state, M-Bus line load and possible error states on the line.

The converter works at a standard level of DC voltages with polarity reversal protection.

Technical parameters

USB communication interface	
Protection	protection against 15kV ESD, filters
Galvanic separation	>1kV from power supply, 1kV from the M-Bus line
M-Bus Master communication interface	
Number of attachable devices	four versions: 1 to 45, 80, 120, 190 M-Bus slave devices
Baud rate	300 - 9600 bps
Protection	- overvoltage protection TVS 1500W - electronic protection against overloads, short circuit and external voltage on the line. Time of recovery to normal operation within 1 second. Converter can withstand sustained short circuit on the communication line
Galvanic separation	1kV from power supply, 1kV from USB
Power supply	
DC power	12V to 30V. Model XL190 20V to 30V.
Protection	- overvoltage protection TVS 1500W - power source polarity reversal protection
Power consumption	0.85W to 15W Depends on M-Bus line load, power supply, converter model. Consumption falls to min. value during short and overload on M-Bus line.
Temperature	
Operating range	-40°C to 70°C

Mechanical parameters

The converter is made from a robust aluminium box which ensures excellent mechanical durability, enhanced interference resistance and improved heat dissipation from the converter to the environment. The converter is designed to be mounted on a 35 mm DIN rail (EN 50022 top hat rail). Weight of the converters ranges from 230g to 250g depending on model.



Top view



Side view with DIN rail attached

LED indication

Operational states indication

LED	State
Power LED turned on	Converter and power supply is alright.
Transmit LED flashing	Data is transmitted to the M-Bus line.
Receive LED flashing	Data is received from the M-Bus line.
Meters LED turned on	Load on M-Bus line. Meters are connected to the line.
Meters LED turned off	Disconnected M-Bus line. No meters are connected to the line.
Meters LED fast flashing	Max. amount of meters on M-Bus line reached (2 meters tolerance).

Malfunction states indication

LED	State
Power LED flashing	Internal converter error.
Power LED flashing + turned on Err./Coll. LED	External voltage on M-Bus line or Internal converter error.
Err./Coll. LED flashing or turned on	Converter overload - too many meters, short on the M-Bus line or capacitive overload on M-Bus line (C of line $>5\mu\text{F}$). When turning on the power - capacitive overload on M-Bus line (C of line $>1\mu\text{F}$). Increased capacitance may be caused by meters during power up. Capacitance can afterwards fall below $1\mu\text{F}$.
Err./Coll. LED turned on for a short while	During data reception - flashing Receive LED . Communication collision. Simultaneous reply from multiple meters. During data transmission - flashing Transmit LED . An error occurs during transmission (incorrect voltages on the M-Bus line). Internal converter error or capacitive overload on M-Bus line.

EMC compatibility

EMC compatibility of the M-Bus converter has been tested according to the following industrial environment standards in an accredited laboratory.

EMC emission tests

Standard	Test	Level
EN 55011	Power line - CONDUCTED EMISSIONS 10/150 kHz - 30 MHz	Class A
EN 55011	RADIATED EMISSIONS (Electric Field) 30 MHz - 1000 MHz	Class A

EMC immunity tests

Standard	Test	Level
EN 61000-4-2	ELECTROSTATIC DISCHARGE (ESD) - Contact discharge	± 4kV
EN 61000-4-2	ELECTROSTATIC DISCHARGE (ESD) - Air discharge	± 8kV
EN 61000-4-3	RADIATED RADIO-FREQUENCY ELECTROMAG. FIELD 80MHz - 1GHz	10 V/m
EN 61000-4-3	RADIATED RADIO-FREQUENCY ELECTROMAG. FIELD 1.4GHz - 2GHz	10 V/m
EN 61000-4-3	RADIATED RADIO-FREQUENCY ELECTROMAG. FIELD 2GHz - 2.7GHz	3 V/m
EN 61000-4-4	ELECTRICAL FAST TRANSIENT/BURST - Power line	± 4 kV
EN 61000-4-4	ELECTRICAL FAST TRANSIENT/BURST - M-Bus line	± 4 kV
EN 61000-4-5	SURGE IMMUNITY - Power line. Common/differential mode.	± 1kV / ± 500 V
EN 61000-4-5	SURGE IMMUNITY - M-Bus line. Cable shielding.	± 4 kV
EN 61000-4-5	SURGE IMMUNITY - M-Bus line. Common/differential mode.*	± 4kV / ± 2kV
EN 61000-4-6	CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS 0,15MHz - 80 MHz. M-Bus line.	10 V

* Test carried out at the request of the manufacturer. The M-Bus port of the converter achieves the highest level of overvoltage protection according to the EN 61000-4-5 standard. Carrying out this type of test is not required with the use of shield cable. Reaching the highest level of protection on the M-Bus port also guarantees the highest achievable reliability of the converter. The M-Bus interface often poses the greatest risk of overvoltage and the ensuing destruction of the converter.

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