

EthMBus-XL SECURE

M-Bus to Ethernet converter

- > Versions for connecting 20, 45, 80, 120, 190 M-Bus slave devices
- > 10/100 Mbps Ethernet interface
- > TCP or UDP datagram message transmission with options for encryption and authentication
- > Supported connection modes: client or server
- > Simple web interface for configuration, including the option of using secure HTTPS protocol
- > Extended error indication with multiple status LEDs
- > Standard operating voltage range DC 12 to 30V
- > Protections and filters ensuring high durability of the entire device against surges and failures.



Overview

EthMBus-5 SECURE is a communication converter designed for secure remote communication with M-Bus meters via an Ethernet network.

The converter uses encryption and authentication to ensure secure data transmission from M-Bus meters and secure configuration via the web interface.

The converter works only as a transparent gateway and M-Bus messages are transmitted without any changes to their content. Messages are transmitted via TCP or UDP in client or server mode with the option to use encryption. Computer applications that do not have a TCP/IP interface can use a virtual COM port application for communication.

The M-Bus port has a connection capacity for 1 to 20, 45, 80, 120 or 190 M-Bus slave devices depending on the converter version. The interface has the highest grade of surge protection and is resilient to failures on the M-Bus bus.

Operational statuses are indicated by seven LEDs which makes it easy to determine the actual state of the converter or possible causes of failure. The LEDs indicate the state of the power supply voltage, Ethernet communication, M-Bus communication and fault conditions of the M-Bus line.

Technical parameters

Ethernet communication interface

Communications interface	10BASE-T, alebo 100BASE-TX (auto-sensing)
Communication protocols	ARP, UDP, TCP, ICMP, AutoIP, DHCP, HTTP, HTTPS, BOOTP, SMTP, SSHv2, SSLv3, TLS1.0-1.2
Connector	RJ45
Compatibility	Ethernet: Version 2.0/IEEE 802.3

M-Bus Master communication interface

Number of connectable devices	five versions: 1 to 20, 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.
Galvanic separation	1kV from power supply, >1kV from Ethernet

Power Supply

DC power	12V to 30V. Model XL190 20V to 30V.
Protection	overvoltage protection TVS 1500W
Power consumption	2.1W to 16.3W 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 60°C
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Mechanical parameters of the converter

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

i 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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