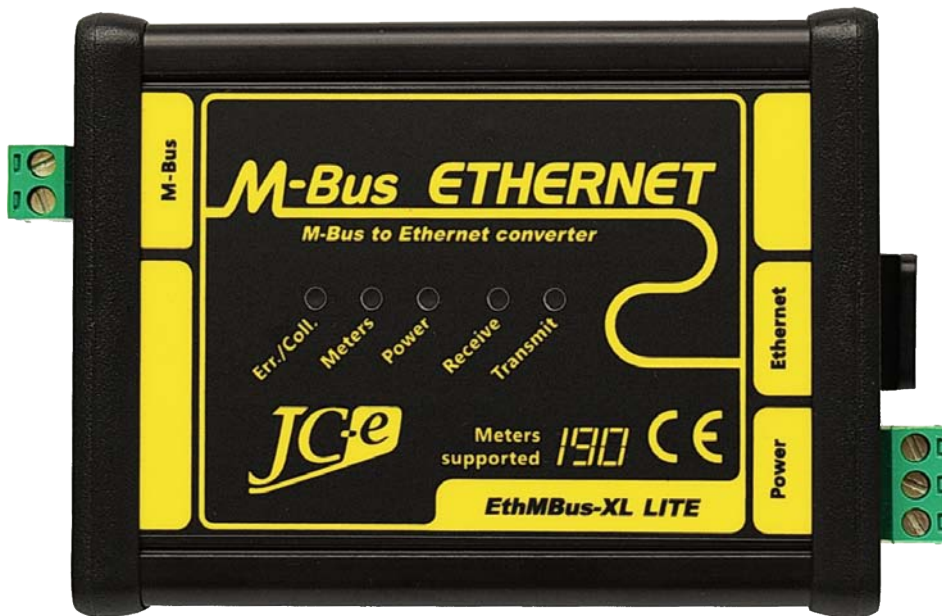


M-Bus to Ethernet interface converter EthMBus-XL LITE



Instructions manual

Version: 2020/1.2-EN

Communication converters of the XL line



EthMbus-XL LITE communication converter

EthMbus-XL LITE is a converter with increased durability intended for communication connection of devices with the M-Bus industrial bus to an Ethernet computer network. It enables transfer of M-Bus messages using the TCP and UDP Ethernet protocols without modifying the content of the M-Bus messages.

It supports connection of 1 to 45, 80, 120 or 190 M-Bus slave devices depending on the converter version. The M-Bus port has a very high level of resilience against overvoltage and malfunctions on the line.

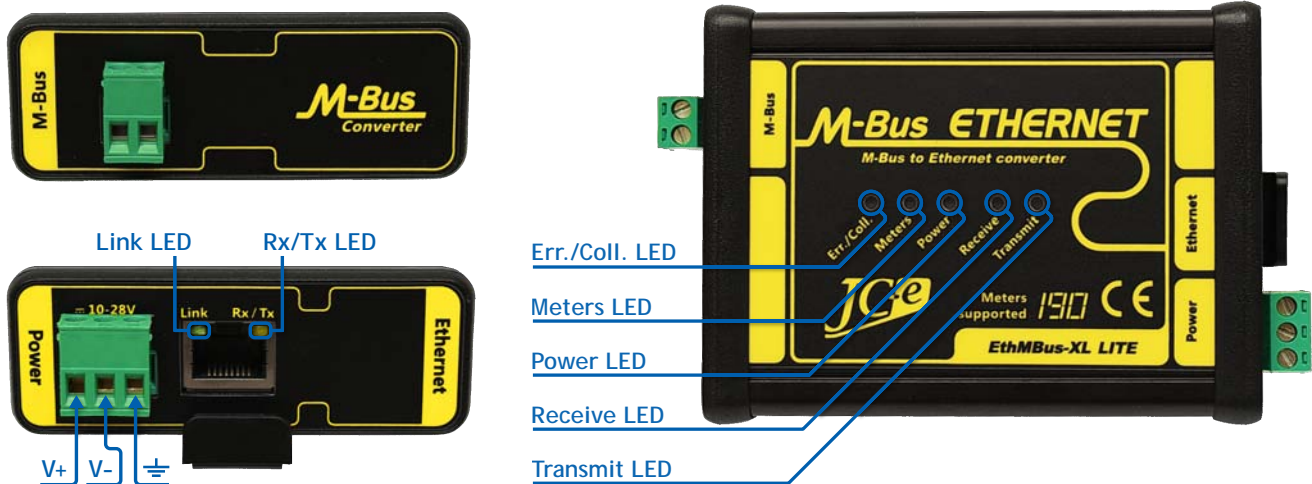
Converter operation states are indicated with seven LEDs making it easy to determine the current state of the converter or possible causes of failure.

Communication with the converter and a PC application can be realized using a virtual serial COM port or directly via TCP/IP connection. The virtual serial port connection is suitable for older programs designed to work only with the serial communications interface.

Technical parameters

Ethernet communication interface	
Communications interface	10BASE-T or 100BASE-TX (auto-sensing)
Communication protocols	ARP, UDP, TCP, ICMP, AutoIP, DHCP, HTTP
Connector	RJ45
Compatibility	Ethernet: Version 2.0/IEEE 802.3
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 Ethernet
Connector	plug-in connector for wires of up to 2.5 mm ² cross-section area
Power Supply	
Recommended range of power supply voltages	
DC power supply	12V to 30V. Model XL190 20V to 30V.
Maximum limits of supply voltage - permanent operation at these voltages is not recommended	
Minimum DC voltage	11V - min. voltage required for converter operation
Maximum DC voltage	31V - at higher the overvoltage protection starts to activate
Protection	overvoltage protection TVS 1500W
Power consumption	1.8W to 16W depends on converter model and number of M-Bus devices
Connector	plug-in connector for wires of up to 2.5 mm ² cross-section area
Temperature	
Operating range	0°C to 60°C
Mechanical construction	
Mechanical design	aluminium box
Mounting	DIN rail 35 mm (EN 50022 top hat rail)
Dimensions: H x W x L	38 x 81.5 x 107 mm without connectors, 38 x 81.5 x 125 mm with connectors
Protection classification	IP40
Weight	220g (XL45, XL80) 240g (XL120, XL190)

Layout of connectors and status LEDs



Connectors

- **M-Bus** – Plug-in connector for connecting the M-Bus line with M-Bus slave devices.
- **Power** – Plug-in connector for DC power supply. **V+** positive pole, **V-** negative pole, \perp earth ground.
- **Ethernet** – RJ45 connector for connecting the Ethernet communication cable.

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 μ F). When turning on the power - capacitive overload on M-Bus line (C of line >1 μ F). Increased capacitance may be caused by meters during power up. Capacitance can afterwards fall below 1 μ 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.

🔌 Ethernet indication

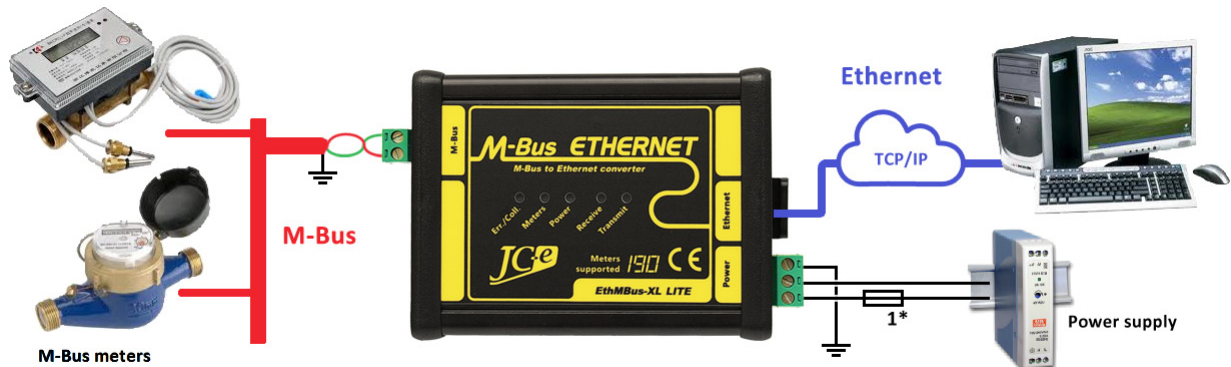
LED	State
Link LED	LED indicates status of the Ethernet network connection. The LED is turned off if no connection is available. The LED is on when the connection is active.
Rx/Tx LED	LED indicates communication activity. The LED is turned on during network activity, data transfers.

Typical application

Typical wiring of the converter with M-Bus devices, power supply and Ethernet network connection.

• Power Supply

The recommended range of DC power supply voltage is 12V to 30V. The connection of the power supply voltage uses a plug-in connector labeled POWER. Maximum power consumption is 16W and



depends on the load on the M-Bus line and converter model.

*Note 1** The use of external current protection is advised for additional protection of the power supply and to limit the short circuit current during overvoltage.

• Ethernet

The connection uses a standard RJ45 connector and it is recommended to use a STP (Shielded Twisted Pair) Ethernet cable. Supported transfer speeds are 100Mbps and 10Mbps in duplex and half-duplex modes.

Note: Because the Ethernet interface isn't equipped with protection against overvoltage or with noise filters, in industrial environments it is recommended to use it only for short lengths (less than 3m) or in spaces which comply with the EN55024 standard for IT environments.

• M-Bus line

The interface is of M-Bus Master type and depending on converter model allows for connection of 45 (67,5mA), 80 (120mA), 120 (180mA) or 190 (285mA) M-Bus SLAVE devices. Note: The brackets show the maximum idle current. The interface is protected against overvoltage, overload, external voltage and short circuit on the line. It is recommended to use a shielded twisted pair cable in the construction of the communication line. The shielding of the cable should be grounded preferably at the entry point of the switchgear cabinet. The M-Bus port is rated at the highest level of protection - Class 5 according to the EN 61000-4-5 standard measured on an unshielded cable. The use of a shielded cable further increases the level of protection. The use of additional rough overvoltage protection is recommended only on the LPZ0A-LPZ1 interface on a building entry point of the M-Bus line.

The communication speed ranges from 300bps to 9600bps. Even parity with one stop bit and 8 bit data word is used as standard.

Note: suitable types of cables for connecting the M-Bus devices

- indoor environment - LiYCY 2x0.14mm² up to 100m length, LiYCY 2x0.25mm² up to 200m
- outdoor/indoor environment - J-YStY 1*2*0.6mm up to 200m, J-YStY 1*2*0.8mm up to 400m

Configuration of the converter through the web interface example

Default network settings of the converter

Static IP address of the converter 192.168.0.7

Subnet mask: 255.255.255.0

Default gateway: 192.168.0.1 *Note:* communication runs within local network.

Communication protocol TCP Server. *Note:* virtual COM port or an application with a TCP interface.

Login credentials for the web interface user: *admin* password: *admin*

Default settings of the M-Bus communication line

Transfer speed 2400bps.

Data format: 8 bits, even parity, 1 stop bit.

Converter configuration steps

1. Connect power supply to the converter – POWER connector. The *Power* LED should turn on.
2. Connect the converter to the network or directly to a PC via an Ethernet cable. When a successful connection is established the *Link* status LED turns on and the *Rx/Tx* LED starts to flash.
3. Configuration of the converter can be done with the web interface by entering the IP address into a web browser.

Web interface configuration:

- Converter mode - in the left menu choose *Converter mode* and under *Connection Mode* select one of the following modes: *TCP Server*, *TCP Client*, *UDP Single* or *UDP Multi*. According to the selected mode fill in the values for *Local Port Number*, *Remote Port Number* and *Remote Server Addr*.
Click the *Save* button to save the new settings.
- Network settings - in the left menu choose *Ethernet Config* and enter the network settings.
To use a static IP address under *IP type*: select *Static IP*. Fill in the *Static IP* address, network mask in *Submask*, and if necessary *Gateway* IP address and *DNS server* IP address.
Click the *Save* button to save the new settings.

Warning: When changing the IP address it is necessary to re-open the web interface by entering the newly configured IP into the web browser.
- M-Bus line configuration – in the left menu choose *Converter mode*. The top section contains the M-Bus settings. These allow to change the communication speed. The default is 2400bps.
When changing this configuration, click the *Save* button to save the settings.

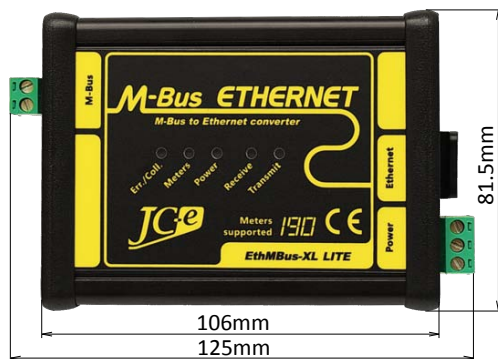
Note: The Lite version of the SL converter cannot be used with the *Lantronix DeviceInstaller* application. It also does not offer a configuration interface through a Telnet terminal.

To create a virtual serial port the USB-VCOM application can be used. It can be downloaded here:

<https://www.usriot.com/support/downloads/usr-vcom-virtual-serial-software.html>

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).



Top view



Side view with DIN rail attached

EMC compatibility

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

EMC testy vyžarovania

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 testy odolnosti

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.

Handling of electronic waste

- Non-functional, discarded electronic device must be handed to a proper collection authority.
- The electronic device must be separated from unsorted communal waste.
- Failure to handle the scrapped electronic device according the mentioned guidelines may cause negative impact on the environment and human health.
- Handing the old device to a proper collection authority will warrant the recovery of useful materials with which you contribute to their repeated use after recycling.
- All information in this paragraph is represented by the following symbol present on every electronic device.
- The purpose of this symbol is to guarantee the retrieval and separate collection of e-waste. These types of devices cannot be disposed of to unsorted communal waste.



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