

## Communication converter EthMBus-4M

EthMBus-4M is communication converter designed for the connection of devices with the M-Bus interface to control/computer systems for data collection from meters using the Ethernet network. The converter works as a transparent gateway and the transfer of M-Bus messages occurs without changing their content. Messages are transferred using the TCP or UDP protocol. The converter can work in client or server mode. Programs that do not have a TCP/IP interface may use a virtual serial COM port application for communication.

The M-Bus port has a connection capacity for one to four M-Bus slave devices. The interface has above standard grade of surge protection and is resilient against failures on the M-Bus bus.

The converter provides a comfortably wide range of DC power voltages to accommodate various simple applications. The power port also has a strong protection against overvoltage.

Operation states are indicated by six 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 or 100BASE-TX (auto-sensing)
Communication protocols	ARP, UDP, TCP, ICMP, Telnet, TFTP, AutoIP, DHCP, HTTP, SNMP
Connector	RJ45
Compatibility	Ethernet: Version 2.0/IEEE 802.3
M-Bus Master communication interface	
Number of connectable devices	1 to 4 SLAVE devices, idle current max. 6mA
Baud rate	300-9600 bps
Protection	- overvoltage protection TVS 600W - overload and short circuit electronic protection on the line, note: converter can resist sustained short circuit on the line
Galvanic separation	1kV from power supply, >1kV from Ethernet
Connector	plug-in connector for wires of up to 2.5 mm <sup>2</sup> cross-section area
Power Supply	
Recommended range of power supply voltages	
DC power supply	8V to 28V
Protection	overvoltage protection TVS 600W
Power consumption	1.3W to 1.9W. Depends on M-Bus line load and communication. Maximum power consumption during a short on the M-Bus line is 2.2W.
Connector	plug-in connector for wires of up to 2.5 mm <sup>2</sup> cross-section area
Temperature	
Operating range	-20°C to 50°C
Mechanical construction	
Mechanical design	plastic box
Mounting	DIN rail 35 mm (EN 50022 top hat rail)
Dimensions: height x width x length	58 x 36 x 95mm
Protection classification	IP20
Weight	72g

## 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 connecting the power supply.  
*Note: Polarity matters.*
- **Ethernet**  
RJ45 connector for connecting the Ethernet communication cable.



### Status LEDs



**Transmit** – The status LED is colored green and signifies data transmission on the M-Bus line.



**Receive** – The status LED is colored yellow and signifies data transmission on the M-Bus line. If the maximum number of devices connected to the M-Bus line is exceeded the status LED will flash alternately with the *Overload* LED.



**Overload/Short** – The status LED is colored red and indicates faulty state on the M-Bus line. Due to protection of the converter the data transmission and reception is stopped in this state.

- **M-Bus line is overloaded**

If there are more than 4 M-Bus SLAVE devices connected to the M-Bus line the *Overload/Short* status LED will start to flash. If there is a greater overload on the line, more than 7 M-Bus SLAVE devices are connected, the *Receive* and the *Overload/Short* status LEDs will flash alternately.

- **There is a short on the M-Bus line**

If there is a short circuit between the M-Bus wires, the load on the line is less than 500Ω or there is a greater number of M-Bus slave devices connected to the M-Bus line, the converter will interpret such a state as a short circuit on the line. The red *Overload/Short* LED will be turned on permanently.

*Note:* The default communication mode will be restored immediately after fixing the malfunction.



**Power** – The status LED is colored green and is turned on if a suitable power supply voltage is connected.



**Connection** – The status LED is dual colored and indicates status of the Ethernet network connection. The LED is turned off if no connection is available. A 100Mbps connection is indicated with green and a 10Mbps connection with orange LED light.



**Rx/Tx activity** – The status LED is dual colored and indicates the type of connection and communication activity. The LED is turned on only during network activity. Green color indicates full-duplex mode. Orange indicates half-duplex mode.

## 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 voltage is 8V to 28V. The connection of the power supply uses plug-in terminals labeled POWER. The polarity is marked on the terminals label and must be set accordingly. The converter has a polarity reversal protection. Maximum power consumption is 2.2W and depends on the M-Bus line load and power supply.

*Note.* 1\* In case of additional power source protection the use of external fusing is advisable e.g. 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 communication 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 allows for connection of up to four M-Bus SLAVE devices. The maximum idle current on the line is 6mA. The interface is protected against overvoltage, overload 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 reaches high level of immunity - class 4 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 2x0.14mm<sup>2</sup> up to 100m length, LiYCY 2x0.25mm<sup>2</sup> 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

### Network settings of the converter

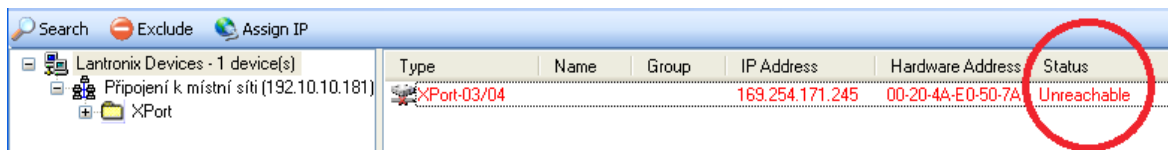
- Static IP address of the converter 192.168.10.1
- Subnet mask: 255.255.0.0
- Default gateway: 0.0.0.0 *Note:* communication runs within local network.
- Communication protocol TCP. *Note:* virtual COM port or an application with a TCP interface.

### Settings of the M-Bus communication line

- Transfer speed 2400bps.
- Number of data bits 8, even parity, 1 stop bit.

### Converter configuration steps

1. Connect power supply to the converter – POWER connector. The status LED *Power* LED starts to flash.
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. Launch the *Lantronix DeviceInstaller* application and select the network interface where the converter should be searched. The converted must appear in the Lantronix device list. The converted can be listed with different values in the *Status* field:
  - *Unreachable* – the converter is displayed in red color which means that it cannot be directly accessed in the given network and no configuration is possible. In this case using the *Assign IP* button the converter must be assigned an IP address based on its MAC address which is labeled on the back side of the converter.



Type	Name	Group	IP Address	Hardware Address	Status
XPort-03/04			169.254.171.245	00-20-4A-E0-50-7A	Unreachable

- *Online* – the converter can be accessed through the network and the configuration can begin.
4. The configuration of the converter through the web interface can done using the Device Installer tool or by entering the IP address into the web browser. The configuration through the web-interface starts with a login screen. There is no password by default and the login can continue just by pressing the OK button.

Configuring further settings:

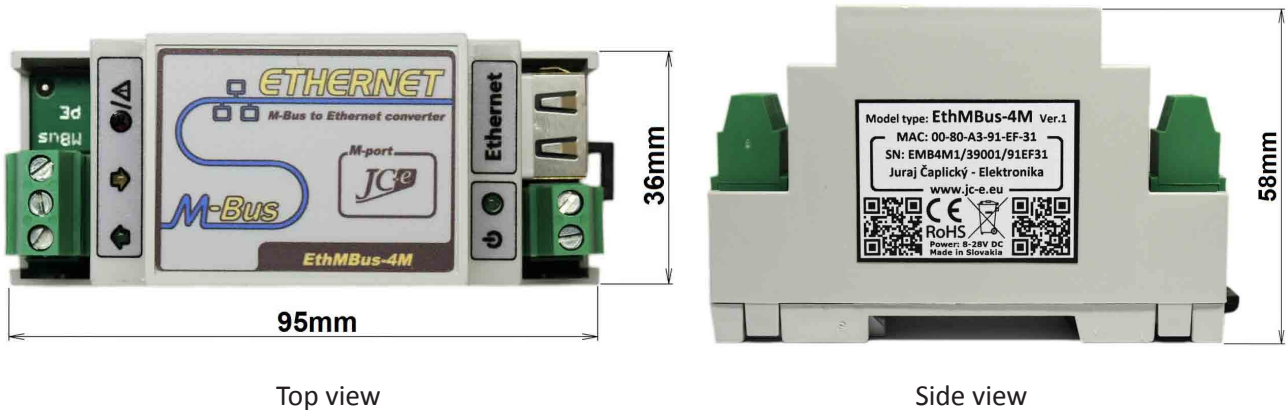
- *Network* menu – check the *Use the following IP configuration and fill in the IP address, Subnet mask and if necessary Default gateway and DNS server address. Click OK to confirm the configuration.*
- *Serial Settings* menu – set the Protocol to *RS485 - 2 wire*, Flow Control to *CTS/RTS (Hardware)*, Baud rate to *2400* and Parity to *Even*. Click OK to confirm the configuration.
- *Configurable Pins* menu – set the Function CP 0 to *RS485 Tx Enable* and set Active Level to *High*. Click OK to confirm the configuration.
- It is necessary to confirm the entire configuration by choosing the *Apply Settings* menu item. Doing so will prompt the converter to save the configuration into its internal memory followed by a restart with the new settings. After the restart it will be possible to connect to the converter again by entering the new IP address into the web browser or by re-discovering the converter with the *Search* button in the Device Installer application.

The Lantronix application can be downloaded from the Lantronix website [www.lantronix.com](http://www.lantronix.com).

*Note:* The web configuration doesn't work correctly in the Google Chrome web browser.

## Mechanical parameters of the converter

The converter is built in a standard plastic box designed for mounting on a 35 mm DIN rail. The converter has a very small width of just 36mm. The use of plug-in terminals eases the mounting and subsequent maintenance of the entire system.



Top view

Side view

## EMC compatibility

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

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 61000-4-4	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 / ± 0,5kV
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.*	± 2kV / ± 1kV
EN 61000-4-6	CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS 0,15MHz - 80 MHz. Power line and M-Bus line.	10 V

\* Test carried out at the request of the manufacturer. The M-Bus port has an increased durability against overvoltage. Carrying out this type of test is not required with the use of shield cable. Reaching a high level of protection on the M-Bus port also guarantees a very high 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

- A 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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