

RepeaterMBusXL

Repeater for the M-Bus communication interface

- > M-Bus repeater
- > 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

The M-Bus repeater is used to extend an M-Bus communication line over the standard distance (suitable for cca. over 1km) or galvanic separation of individual M-Bus line sections.

The repeater splits the M-Bus line into two galvanically separated M-Bus lines and enables message transfer between these two lines without message content changes.

Depending on model the M-Bus master 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 M-Bus master line and the repeater are evaluated and monitored by a processor. Error states are indicated by status LEDs which simplify identification of the repeater's current state and possible causes of a malfunction. The LEDs indicate functionality of the repeater, power source state, M-Bus line loading and possible error states on the line.

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

Technical parameters

M-Bus slave communication interface

Power consumption	2 slave devices (2UL)
Protection	overvoltage protection TVS 600W
Galvanic separation	>1kV from power supply, 1kV from the M-Bus master 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.
Galvanic separation	1kV from power supply, 1kV from the M-Bus slave line

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, repeater model. Consumption falls to min. value during short and overload on M-Bus line.

Temperature

Operating range	-40°C to 70°C
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Mechanical parameters

The repeater is made from a robust aluminium box which ensures excellent mechanical durability, enhanced interference resistance and improved heat dissipation from the repeater to the environment. The repeater is designed to be mounted on a 35 mm DIN rail (EN 50022 top hat rail). Weight of the repeaters 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	Repeater 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 repeater error.
Power LED flashing + turned on Err./Coll. LED	External voltage on M-Bus line or Internal repeater error.
Err./Coll. LED flashing or turned on	Repeater 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 repeater error or capacitive overload on M-Bus line.

EMC compatibility

EMC compatibility of the M-Bus repeater 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, RS232 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, RS232 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 repeater 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 repeater. The M-Bus interface often poses the greatest risk of overvoltage and the ensuing destruction of the repeater.

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