



M-Bus via Ethernet

Regarding Smart Metering, the need of M-Bus (Meter-Bus) is growing and growing. Simple wiring and the power supply by the bus allows easy installation of utility meters. Using an available Ethernet infrastructure offers the possibility to bypass long distances between utility meters and the processing unit. The devices MBUS-GE20V and MBUS-GE80V combine metering and Ethernet.

Meter-Bus – simple architecture

The M-Bus is a field bus for reading out consumption data. It works by a serial communication on a two-wire line between the master and the connected slaves (meters or sensor systems).

The M-Bus is specified in the European standard EN 13757 and uses request-and-response operation. The master sends requests via the voltage modulation on the bus wires. The low level of the bus voltage (logical 0) is 24 V and the high level (logical 1) is 36 V. The slave which should respond to the request is selected via its bus address. This slave responds via current modulation. A low signal (logical 0) is represented by 11-20 mA, a high signal (logical 1) is represented by approximately 1.5 mA. This 1.5 mA are called "unit load".

The common baud rates for the M-Bus are 300, 2400 or 9600 bps. Via the simple two-wire line, a distance of more than 1 km can be bypassed. In general, the baud rate 2400bps is used. The switching of baud rates is possible and is initiated by the master. The power supply of the M-Bus slaves is provided by the master.

To handle the M-Bus communication conforming to EN 13757, the M-Bus master modulates the bus voltage between 24 V and 36 V while sending. For the power modulation, 24 V as well as 36V have to be provided on the master. To simplify power supply, both devices generate these necessary voltages internally.

The slaves are powered by the master. So, the master has to provide the needed power. A unit load of 1.5 mA represents approximately 50 mW.

20 meters generate a stand-by power of 1 W. The efficient bus master of the MBUS-GE80V can drive approximately 140 mA. Up to 80 slaves (80 unit loads) can be operated directly at one device. The MBUS-GE20V allows the operation of up to 20 slaves. Both devices are designed to handle also big capacitive loads (e.g. long cables).

While receiving the data, the current modulation of the slaves must be detected in order to get the bit sequence. As six meters cause an idle current (logical 1) of 9 mA ($6 \times 1,5 \text{ mA}$), a logical 0 can be detected by a threshold of at least 11 mA to differentiate.

This method is not suitable for more than six slaves. The master requires more smartness. Only this enables the device to read out large installations. The M-Bus level converters are operating according to such a smart procedure and are detecting current changes directly on the bus wires. Avoiding fixed thresholds, the reception capacity of MBUS-GE20V and MBUS-GE80V is only limited by the number of supported standard loads.





Compact Ethernet solution

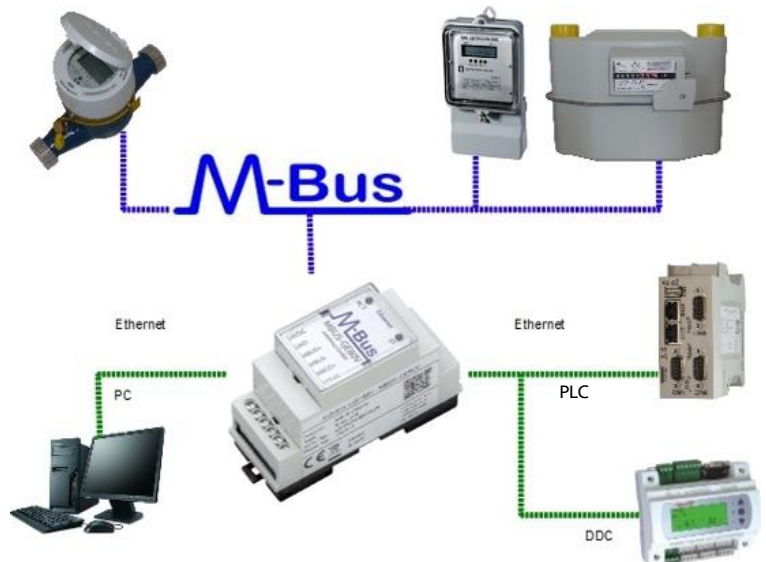
Usually a PC or a PLC/DDC is used for the data processing. Therefore, it is necessary to convert the M-Bus physics to appropriate interfaces. The easiest way is to use a RS-232 level converter like the MBUS-PS80 from solvimus. The level converter offers the possibility to read out data of utility meters directly by a serial interface.

The high acceptance of the Ethernet technology allows using this network structure for data transmission. The readout of locally distributed utility meters benefits from this fact. The devices MBUS-GE20V and MBUS-GE80V are two compact Ethernet level converters for the M-Bus. These level converters combine a powerful bus master and an Ethernet device with a width of only 35 mm (2 modular spacings).

The MBUS-GE20V and MBUS-GE80V read out the data and forward it. They can potentially also handle the data processing. By using a virtual COM port, they simply operate like a standard level converter. The devices MBUS-GE20V and MBUS-GE80V are the basis for metering via Ethernet networks.

Multifunctional software options

After initial configuration of network settings and baud rate, they are ready for connecting the M-Bus directly to a TCP/IP socket. Optionally, the devices can also be addressed directly by the host system using a virtual COM-port driver. We recommend the driver from company Eltima (which has been tested by us on current operating systems).



Technical data MBUS-GE80V (-GE20V)

Supply	24 VDC, < 250 mA, max. 2.5 mm ²
Connector M-Bus	Screw terminal, max. 2.5 mm ²
Connector Ethernet	100 Mbit, RJ45, shielded
Dimensions	35 x 90 x 59 (B x H x D in mm)
Mounting	DIN rail 35 mm, IP30
Max. baud rate	19200 bps
Number of slaves	Max. 80 (20) unit loads
Ethernet address	Freely configurable or via DHCP
Ethernet port	Freely configurable

