M-Bus and OMS to Modbus TCP

Reading out meter data via the wired M-Bus and its wireless pendant OMS (wM-Bus) gains more and more in importance. There are some main drivers. On the one hand there is the topic of Smart Metering. On the other hand, the demand for this technology in industrial environments is growing tremendously. There are some main drivers: the requirement for energy efficiency, the need for energy audits, ISO 50001 and the need for optimizing energy costs. In any case, a growing number of intelligent meters are installed in processes, plant, facilities or real estates. For integrating these meters into a control or automation system it is necessary to translate the meter data to the automation world. Modbus TCP as a de-facto standard is suited best for this task.

M-Bus - An easy architecture

The M-Bus is a field bus system which is primarily used for the collection of consumption data. The transfer of the data takes place on a 2-wire bus between a master and the connected slaves (meters or sensors).

M-Bus utilizes a request-response-method and is standardized in the norm EN 13757.

The M-Bus provides baud rates of 300, 2400 or 9600 bps. So, it is possible to manage a bus length of more than 1 km.

Wireless transmission as an alternative

As robust and simple the wired M-Bus is, there are limitations because of the needed infrastructure. In contrast to that, wireless systems are more flexible, ease retrofitting and are better suited in residentials.

These demands are fulfilled by the wireless standard wM-Bus. It uses the 868 MHz frequency band and uses the same data representation as its wired counterpart. Therefore wM-Bus is also standardized in EN 13757.

OMS for interoperability

Standardization always helps to guarantee interoperability. There was also a need for that regarding the collection of consumption data. That is why certain organizations and companies joined the OMS group and developed the "Open Metering System Specification" as an addition to the norm EN 13757.

As a result all OMS meters are speaking the same language, they are interoperable and it does not matter which manufacturer they originate from or which medium they are measuring.

Variable primary communication

The product family MBUS-GEM handles both standards according to EN 13757 and OMS, meaning the wired M-Bus as well the wireless M-Bus with its respective extensions.

When using wired M-Bus, the devices MBUS-GE20M and MBUS-GE80M support the operation of 20 or respectively 80 unit loads (meters) directly. The device MBUS-GEWM is the supplemental gateway for usage with wireless M-Bus communication.

For large installations, our MBUS-GE125M/250M/500M are also available.

The devices are operating as a master in each case and readout meters or respectively receive their data. The data will be further processed and is additionally accessible through a web interface during operation of the device. There is an integrated Ethernet interface which provides web access.

Transparent mode

The transparent mode enables the direct access to the M-Bus meters to parameterize them. For example, it is possible to set the primary address or the baud rate remotely from the PC.

Generic data processing

Besides its own physical layer a special data representation is used by the M-Bus. To facilitate the integration of the data in other systems, it is necessary to pre-process and interpret the M-Bus packets that have been readout before.

For a data interpretation that is compliant to the standard, an extensive and complex software is needed. There is a powerful software stack on all the devices of the MBUS-GEM product family which allows to readout all available meters on the market without

any additional configuration effort. All data can therefore be provided to auxiliary systems at no expense.

Modbus for connecting control systems

Typical control or automation systems and PLCs provide various communication interfaces. A field bus interface for the M-Bus or the wM-Bus is only available in rare cases. In contrast to this, Modbus is a wide-spread standard at this type of systems. Caused by the wide distribution of Ethernet in automation systems, the variant Modbus TCP became widely accepted.

The devices of the MBUS-GEM product family come with a standard Ethernet interface which supports Modbus TCP in slave mode. The controlling system as a Modbus master is therefore able to access the data of the meters directly using Modbus registers via the connected network. This can also be done in remote or distributed applications.

Modbus TCP is a generic protocol that uses a static data alignment of 16 bits width, whereas the M-Bus allows dynamic data alignment and uses a different data representation. Therefore, a translation of the M-Bus data is necessary. This translation happens automatically on the devices of the MBUS-GEM product family. They bring together the dynamic and

variant diversity of M-Bus and the static structure of Modbus.

Configuration of the gateways

All gateways of the MBUS-GEM product family readout meters autonomously and convert their data. This requires a minimum initial configuration which happens in an easy and intuitive way. There is a built-in web server on the devices offering an integrated, platform-independent web interface. The operator can put any M-Bus or OMS meter into operation without

the need for extensive prior knowledge or special software tools. The web service also eases the remote access.

As a rule, the provided standard settings are convenient and the operator only has to start a bus scan for initial operation. All connected M-Bus meters as well as all received OMS meters will be found and their data will be readout. The software will then generate all Modbus registers according to the data of the meters automatically and makes these data directly available for any auxiliary automation system. It is possible to integrate meters or sensors into any control system within a very short time. Therefore, one can call it real "Plug & Play".

As an addition it is also possible to create a printout of all configuration settings as well as a list of connected meters for documentation purposes.

Generic technical data

Architecture	Controller-based gateway
Power supply MBUS-GE20M/80M MBUS-GE125M/250M/500M and MBUS-GEWM	24 VDC, < 300 mA, max. 2.5 mm² 12 – 36 VDC, max. 1500 mA, max. 2.5 mm²
Ethernet connection	100 Mbit, RJ45, shielded
Dimensions MBUS-GE20M/80M/GEWM MBUS-GE125M/250M/500M	35 x 89 x 58 (W x H x D in mm) 54 x 90 x 60 (W x H x D in mm)
Mounting	35 mm DIN rail, IP 20
IP addresses	Static or DHCP
TCP ports	Freely configurable
Web server	Integrated

Wired M-Bus: MBUS-GE500M (-GE250M/125M/80M/20M)

Max. baud rate	19200 bps
Connection of M-Bus	Screw terminals, max. 2.5 mm²
Number of slaves	Max. 500 (250, 125, 80, 20) unit loads

Wireless wM-Bus: MBUS-GEWM

Supported modes	S-, T- and C-mode
Antenna connection	SMA connector, female
Number of slaves	Overall max. 5000 (logically)