Products for huge installations

Smart Metering rollouts are now taking place in almost every part of the world for the automatic reading of consumption data. These rollouts fuel the need for meters and data concentrators that can be read remotely. In order to optimize rollout costs, it is most effective to increase the number of meters that can be handled and read out by a single data concentrator. Such concentrators must provide good over-all performance regarding physical interfaces, processing performance and memory. Another aspect is rapid and intuitive commissioning by a partly automated and easy configuration. The MUC500-product family was engineered precisely for this application.

Meter interfaces

Diverse interfaces between smart meters and data concentrators have evolved on the market. They can be divided into two categories: wired and wireless communication. Examples of wireless interfaces include ZigBee and wireless M-Bus. PowerLine, Modbus and wired M-Bus belong to wired interfaces.
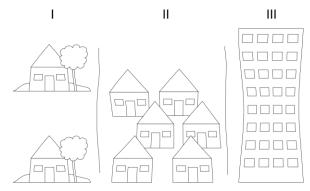
The M-Bus has a particular standing: it is the only meter interface available for all media. This allows a multi-utility approach. The standardisation is governed by the standard EN 13757 and the OMS-Group, a consortium of several manufacturers of meters and data concentrators aiming for interoperability between devices from all manufacturers.

Typical scenarios in rollouts

An important topic is the wide-area communication or the protocol for connecting to the server system. Ethernet and IP-based protocols are standards here, the intricacy lies in the appropriate choice. The unknown here is the communication between meter and data concentrator. Some typical scenarios will provide an overview.

The first scenario is a "distributed single-meter site". This is typical for rural areas where there are at most three meters connected to one data concentrator. This scenario requires the least expensive data concentrator, often limited in its capabilities. We would like to propose here our data concentrator MUC.one which is best suited for this use case.

The scenario II is a "detached house neighbourhood". This is typical for suburban areas: many small dwellings like the ones in scenario I are in proximity to each other. A cost-efficient rollout is possible if a few high-performance data concentrators succeed to read out the distributed meters. Beneficial is the wireless communication between meters and data concentrator.

The third scenario is a "numerous meter property". This is typical for both suburban and urban areas in big buildings with many meters installed. The structure might be a high-rise apartment complex, an office building, a shopping mall or an industrial plant. Regarding costs, the best solution here as well is to gather the metering data with only one high-performance data concentrator. Inside buildings, it is better and more robust to use wired communication between meters and the concentrator.

Challenges for the data concentrator

The larger the quantity of meters, the more powerful must the data concentrator be, in both logical and physical and operational aspects.

The two physical layers, wired and wireless, come with different issues. Regarding the wired M-Bus, it is important to know that the data concentrator powers the bus and all the connected meters. The required power is higher in proportion to the number of connected meters. For instance, 100 meters consume 6 W. In huge installations, this value poses a physical limit to the number of meters. Other aspects to consider are the proper cabling and the voltage drop on (long) bus lines.

The M-Bus usually employs primary addressing, the address space extends to 250. This number is the common upper limit for the number of connected meters. Huge installations often use secondary addressing with a much larger address space. Consequently, there is a need for physically supporting more than 250 meters.

Regarding the wireless M-Bus, the most demanding criterion is the reception range. The wireless M-Bus is available for different frequency bands of 169, 433 and 868 MHz. As a rule of thumb, a lower frequency allows longer distances. However, the actual range depends heavily on the structural conditions. The most common frequency is 868 MHz, but 433 MHz is gaining ground and should therefore also be supported.

Of high relevance is also the encryption of the wM-Bus. The data concentrator has to decrypt the packets. A

coprocessor for the decryption can significantly ease the workload of the CPU.

As a rule, the requirements for the processing performance are more demanding with a growing number of meters and data packets. This must be borne in mind when selecting a data concentrator.

Outstanding physical performance

The platform of the MUC500 product family is able to physically drive up to 500 unit loads at the wired M-Bus, usually equivalent to 500 meters. It is the only available M-Bus solution on the market which can power 750 mA into the bus. An intelligent signal processing is supporting that.

Solvimus developed a unique solution with the same form factor for the wireless M-Bus. These devices feature up to two wM-Bus receivers for 868 MHz and 433 MHz. This enables to receive meter data on both frequency bands or work simultaneously in two of the modes S, T, C and C/T. External antennas allow to adapt the system to the premises.

Excellent operational performance

Solvimus introduced a new processor platform offering much more memory and CPU performance. It is capable of handling the amount of data frequent in huge meter installations and of decrypting wireless telegrams.

The well-known and vast user interface is preserved. The user can quickly and easily set up the configuration via the web-based user interface assisting him in finding and configuring the meters. The meter data are read automatically.

The meter data are queried, interpreted and stored automatically. The devices generate reports in XML or CSV format to be sent to the server system. This new platform allows to integrate other report formats as well.

Unique combinations

The MUC500 product family follows a modular concept. This allows offering data concentrators for diverse applications or with different physical interfaces.

The two main products are the MUC500 M for the wired installation and the MUC500 W1 for the wireless installation operating on a frequency band of 868 or 433 MHz. Both devices merge the new processor platform with the corresponding powerful physical layer. The variant MUC500 W2 is equipped with two wireless receivers for different frequencies or modes.

As most installations are composed of both wired and wireless meters, the wireless MUC500 W has, in addition to the radio receiver, an additional interface for connecting an external level converter for the wired M-Bus. When combined with a level converter MBUS-PS500, both M-Bus and wM-Bus can be read out.

If more than 500 meters must be read via M-Bus, a repeater MBUS-REP500 provides another 500 unit loads. This enlarges the number of meters that can be connected to a central data concentrator, with due consideration of parameters like the readout interval.

All products come in a housing for DIN rail mounting with a width of only 54 mm (3 modular widths). They are supplied by external 12 .. 36 VDC, so a wide range of power supplies can be used.

Transparent mode

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

Conclusion

In short, the MUC500-product family solves the challenges posed by huge installations. It provides cutting-edge physical parameters and superior processing performance. The intuitive user interface simplifies the complex commissioning in the project.

You can find the vast software functionalities on the information sheet "Overview of the software features for our data concentrators (data loggers) and gateways".