



# Products for huge installations

Smart Metering rollouts are now taking place in almost every part of the world, and the need for meters and data concentrators is increasing tremendously. In order to optimize rollout costs, it is most effective to increase the number of meters that can be handled and read out with only one data concentrator. Such concentrators must provide good over-all performance regarding physical interfaces, processing performance and memory. However, another important aspect is the set-up time. The MUC500 product family from solvimus hits this point.

## Meter interfacing

There are some standards for interfaces between meters and data concentrators present in the market. They can be divided into two categories: wired and wireless communication. Examples of wireless interfaces include ZigBee and wireless M-Bus, while Power Line Communication, Modbus and wired M-Bus, for example, belong to wired interfaces.

The M-Bus has proven to be the only standard for a real multi-utility approach, and there are two good reasons for this. The first reason is that only the M-Bus is available for every type of medium. Secondly, these standards are clearly defined by the OMS group. This group is a consortium of several vendors and manufacturers of meters and data concentrators. Its main goal is achieving interoperability between all products under the label OMS.

## Typical scenarios in rollouts

Technicians are faced with many challenges during the rollout of Smart Metering projects. There are important topics like wide-area communication or the protocol to the server system. In most cases, standards such as Ethernet and IP-based data protocols can be used out of the box. However, the main issue is the interfacing of all the meters. 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 a maximum, only four metering devices are connected to one concentrator. Consequently, the number of MUC500 devices is nearly the same as the number of meters. This scenario requires the least expensive data concentrator. As rollouts are now mainly taking place in urban areas, this scenario is currently less relevant.

The second scenario is a "detached house neighborhood", which is typical for suburban areas

where there are many small houses (with only a few meter devices) right next to one another. This scenario is similar to scenario one, but regarding costs, it is more efficient to aggregate all the meters in the neighborhood with only a few high-performance data concentrators. In this area, it is

better to use wireless technology between meters and the concentrator.



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

## Challenges for the data concentrator

In installations with a large number of meters, the data concentrator must perform well in both physical and operational aspects.

The two physical layers (wireless or wired) come with different issues. Regarding the wired M-Bus, it is important to know that the data concentrator powers all the connected meters (so it has to power the bus). The more meters there are, the more power is needed. Talking about 100 metering devices, 6 W have to be powered into the bus. In huge installations, this value physically limits the number of meters. There are also other obstacles such as cabling distance and voltage drop on the bus lines.

There is a so-called primary addressing scheme with bus addresses up to 250. This number is the most common upper limit for wired M-Bus devices. Huge installations often use the alternate secondary addressing scheme with much more address space. Consequently, there is a need for higher physical performance than 250.

Regarding the wireless M-Bus, the most demanding part is a high receiving distance. The wireless M-Bus comes with different frequencies: 169, 433 and 868 MHz. A lower frequency allows longer distances, as a rule of thumb, but it admittedly depends on the environment. The most common frequency is 868 MHz, but supporting 433 MHz would also be a good option for data concentrators. Optimum will be supporting both.



Another issue is the encryption on wireless M-Bus. The decryption needs some processing time at the data concentrator. With a rising number of meters per concentrator, this gets more and more important. A built-in hardware decryption unit will do this task quickly and independently from other tasks.

Independent of which physical layer the meters are using to interface to the data concentrator, a higher number of meters always comes with more data to be handled and processed at nearly the same time. Processing performance and memory size of the data concentrator shall be large enough.

### Outstanding physical performance

The MUC500 product family from solvimus offers new opportunities. For the wired M-Bus, solvimus developed a platform for up to 500 Unit Loads (usually 500 metering devices). It is the only available M-Bus master solution which can power about 750 mA into the bus. An intelligent signal processing allows such huge installations to function.

There is also a unique solution for the wireless M-Bus. Solvimus developed another platform (with the same form factor) including two wireless M-Bus receivers, one for 868 MHz and one for 433 MHz. It is possible to connect meters transmitting on the one frequency or the other. Using external antennas increases the receiving distance in an appropriate way.

### Excellent operational performance

Beside the physical part, the operational part shall also be powerful. Solvimus introduced a new processor platform offering much memory, high CPU performance, hardware decryption and more.

It is capable of handling, processing and storing the amount of data related to huge meter installations, especially the decryption of wireless telegrams.

The well-established and considerable user interface is another advantage. The user can set-up its meter installations very easily and effectively. The web-based user interface assists the user with finding and configuring the meters by using a standard web browser. Meter data will be explored and gathered automatically.

Under operation, the devices collect the data automatically, store the data and generate reports with XML- or CSV-based files, which will be pushed to the server system. With this new platform, other report formats can also be integrated optionally.

### Combinations for your satisfaction

The MUC500 product family follows a modular concept. This allows offering different products with same technical specifications but for different applications or with different physical interfaces.

The two main products are the MUC500 M and the MUC500 W1. They integrate the new processor platform for the operational part and the physical layer for supporting up to 500 wired M-Bus meters (version M) or for supporting wireless M-Bus meters (version W1) at 868 or 433 MHz. There is also the version W2 including both RF standards.



As most installations make use of both, wired and wireless meters, the wireless MUC500 W has an additional interface for connecting an external level converter for the wired M-Bus. Solvimus offers the MBUS-PS500. This combination offers both, wired and wireless M-Bus.

What if 500 wired M-Bus metering devices are not enough? Solvimus offers also a bus repeater MBUS-REP500. With respect to general requirements like readout time, this offers the opportunity to enlarge M-Bus networks and to integrate more meters using only one single central gateway.

All the different 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 parameterize 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 in huge installations. Leading-edge physical performance, excessive processing performance and a simple user interface are the basis for getting the complex metering infrastructure into operation easily.

You can find the vast software functionalities on the information sheet: "[Overview of the software features for our data concentrators \(data loggers\)](#)".