

M-Bus System

Basic system data

This Data Sheet contains basic information about the M-bus system. It gives an overview of the products used by the system and provides practical data for planning and operation.

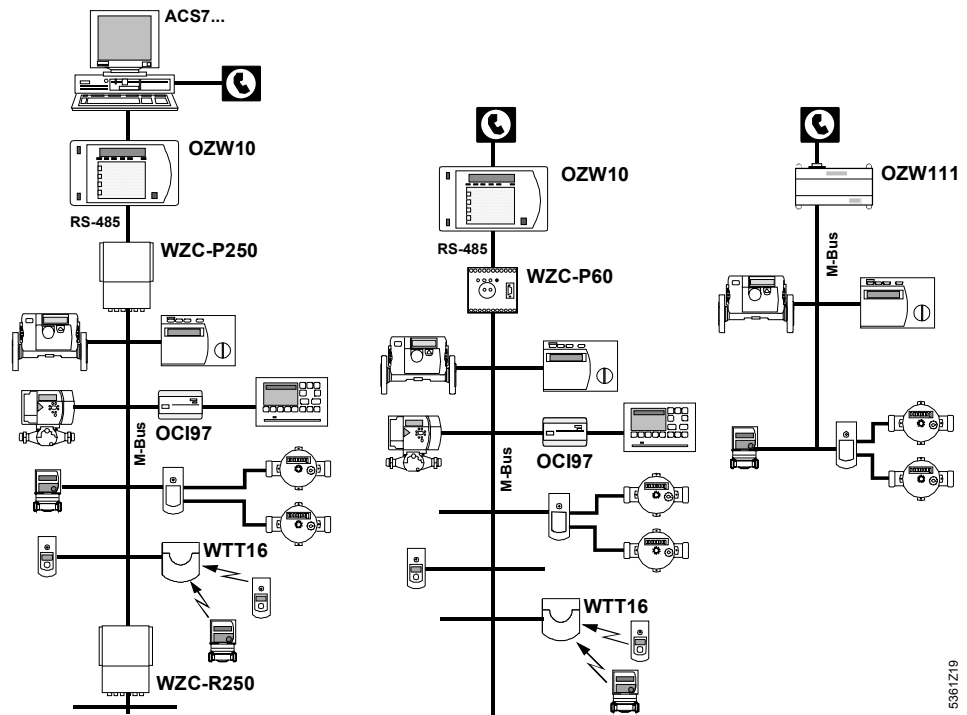
The M-bus system is designed for the remote readout, remote operation and monitoring of consumption meters and controllers featuring an M-bus connection facility conforming to EN 1434-3, and of consumption meters of the Siemeca™ AMR system.

System overview

The OZW10 or OZW111 M-bus central unit is the main unit connected to the M-bus. It communicates with the consumption meters and controllers via the M-bus.

Using the OZW10 M-bus central unit (V4.0 or higher), consumption meters of the Siemeca™ AMR system can also be integrated via WTX16 or WTT16 network nodes.

The M-bus central unit can be connected to a PC with ACS7... plant operating software, either directly or via modem.



5361Z19

Use

The M-bus system is designed for consumption cost billing and the remote supervision of

- community and district heating systems
- multi-family houses

Among other devices, the following M-bus devices can be connected:

Meters:

- SONOHEAT[®], MEGATRON[®]2, SONOGRY[®] energy, and SONOGRY[®] WSD... heat meters
- Consumption meters via AEW21.2 pulse adapters, Relay PadpulsM1
- MEMOTRON[®] WHE21 electronic heat cost allocators

Controllers:

- SIGMAGR[®] RVD2... district heating controllers (OZW10 of V3.0 or higher and OZW111)
- SIGMAGR[®] RVP97 district heating controllers (only OZW10 of V3.0 or higher)

Consumption meters of the Siemeca[™] AMR system can be integrated via WTX16 or WTT16 network nodes (only OZW10 of V4.0 or higher):

- MEGATRON[®]2 heat meters
- VOLUTRON[®]2 water meters
- MEMOTRON[®] WHE26 heat cost allocators
- Consumption meters via AEW36.2 pulse adapter

Other M-bus devices on request.

Functions

The M-bus system offers extremely reliable data transmission and a high standard functionality while keeping the engineering effort for commissioning low:

- Device identification with the help of an automatic search run
- Remote operation of plant from a PC, via modem or direct link
- Acquisition of consumption data
- Remote readout of consumption data via memory card, display of the M-bus central unit, or with the PC
- Remote readout and controller parameter settings
- Visualization of plant diagrams

- Registration and graphic display of processes (trending)
- Detection of device faults and failures
- Alarms on the display of the M-bus central unit, via alarm relay and to a PC
- Status reports
- One-time or periodic execution of batchjobs

Equipment combinations

The following devices can be used in connection with the M-bus system:

<i>PC software</i>	<i>Max. number</i>	<i>Type ref.</i>	<i>Data Sheet</i>
Plant operating software	1	ACS7...	N5640

<i>M-bus plant</i>	<i>Max. number</i>	<i>Type ref.</i>	<i>Data Sheet</i>
M-bus central unit	1	OZW10	N5362
M-bus signal converter for max. 250 devices, or	1	WZC-P250	N5365
M-bus signal converter for max. 60 devices	1	WZC-P60	N5382
M-bus repeater for max. 250 devices	Unlimited ¹⁾	WZC-R250	N5366
M-bus devices	750 ²⁾		

¹⁾ In combination with the WZC-P250

²⁾ The number of M-bus devices are dependent on the type of devices connected

<i>M-bus mini plant</i>	<i>Max. number</i>	<i>Type ref.</i>	<i>Data Sheet</i>
M-bus central unit	1	OZW111	N5363
M-bus devices	5		

For detailed information about planning and engineering, refer to the Basic Documentation P5361. More information about the individual units is given in the relevant Data Sheets.

Fundamentals of engineering

Plant sizes

The **OZW10 M-bus central unit** stores the locally required data of the connected devices. The following numbers of devices can be acquired:

<i>M-bus device</i>	<i>Number of devices (incl. reserve of 10 %)</i>
SONOHEAT [®] 2WR5 heat meter with:	
• M-bus module (up to V1.06)	316
• M-bus module (V2.01 or higher)	171
AEW21.2 pulse adapter (2 meters)	337
MEGATRON [®] 2 heat meter ¹⁾	450
AEW21.2 pulse adapter (1 meter)	675
Pulse adapter Relay PadpulsM1	675
SIGMAGYR [®] RVD2...district heating controller	675

¹⁾ With standard setting application selection = (1, 3, 6)

<i>Combinations</i>	<i>Number of devices (incl. reserve of 10 %)</i>
SONOHEAT [®] 2WR5 ²⁾ and RVD2...	142 each
SONOHEAT [®] 2WR5 ²⁾ and AEW21.2 (1 meter)	148 each
SONOHEAT [®] 2WR5 ²⁾ and AEW21.2 (2 meters)	130 each
SONOHEAT [®] 2WR5 ²⁾ , RVD2... and AEW21.2 (2 meters)	112 each
MEGATRON [®] 2 ¹⁾ and RVD2...	293 each
MEGATRON [®] 2 ¹⁾ and AEW21.2 (1 meter)	319 each
MEGATRON [®] 2 ¹⁾ and AEW21.2 (2 meters)	247 each
MEGATRON [®] 2 ¹⁾ , RVD2... and AEW21.2 (2 meters)	191 each

¹⁾ With standard setting application selection = (1, 3, 6)

²⁾ With M-bus module of version 2.01 or higher

The **OZW111 M-bus central unit** supports a maximum of 5 M-bus devices, independent of the type of device.

Basic M-bus data

The M-bus is specified in EN 1434-3. Within the system, only 1 communication master is permitted (e.g. OZW10 with WZC-P250 signal converter).

Communication is always started by the master. The M-bus devices are periodically prompted by the master.

The cable required is a twisted 2-core cable (e.g. JYSTY 2×2×0.8). Bus topology can be line, tree, star or combinations of them. Not permitted is the ring topology. Bus termination is not needed.

The maximum extension of the network and the maximum rate of transmission are determined by the number of M-bus devices, the kind of protective equipment and the circuits, cable routing and the type of cable. Using repeaters (e.g. WZC-R250), the plant can be subdivided into segments, or can be extended.

The table below contains simple application examples.

<i>Type of plant (data given apply to 1 segment)</i>	<i>Maximum distance</i>	<i>Total cable length</i>	<i>Cable diameter</i>	<i>Number of M-bus devices</i>	<i>Max. rate of transmission*</i>
Smaller residential buildings	350 m	1,000 m	0.8 mm	250	9,600 Baud
Larger residential buildings	350 m	4,000 m	0.8 mm	250	2,400 Baud
				64	9,600 Baud
Smaller housing estates	1,000 m	4,000 m	0.8 mm	64	2,400 Baud
Larger housing estates	3,000 m	5,000 m	1.5 mm ²	64	2,400 Baud
Town, city district	5,000 m	7,000 m	1.5 mm ²	16	300 Baud
Point-to-point connection	10,000 m	10,000 m	1.5 mm ²	1	300 Baud

* Max. cable capacitance 150 nF/km

Basic RS-485 data

The RS-485 connection between the OZW10 M-bus central unit and the signal converter (e.g. WZC-P250) is a twisted 2-core cable.

The maximum permissible cable length with a diameter of 0.8 mm (e.g. JYSTY 2×2×0.8) is 1,000 m.

Lightning protection

Lightning protection is needed whenever the bus cables leave the buildings. For information about engineering and the protective equipment required, refer to the Basic Documentation P5361. Detailed information about the «Installation of Heating Plant in Compliance with EMC Directives» is given in Data Sheet N2034.

Addressing

The primary addresses (max. 250) can be assigned to the M-bus devices during commissioning. Within the system, each primary address may occur only once.

Before leaving the factory, every M-bus device is assigned an unambiguous secondary address, which can practically be changed during commissioning, but it must clearly remain unambiguous within the system.

With the M-bus system, both addressing modes (also mixed) are supported. When setting up the system, the connected M-bus devices are acquired in an automatic search run.

Documentation

Reliable operation and maintenance of an M-bus plant calls for comprehensive and accurate documentation. The following pieces of documentation are a minimum requirement: Plant diagram, bus topology, a list of the different bus sections, a list of the connected devices, connection diagram and the calculations.

Commissioning notes

For detailed information about commissioning the M-bus system, refer to Operating Manual U5362 which covers the M-bus central unit.

Checking the wiring

The wiring must be checked for short-circuits and open-circuits prior to connecting the M-bus devices.

Setting the parameters of the M-bus devices

The settings on the M-bus devices are normally made prior to setting up the system. This applies in particular to the assignment of addresses and to the Baud rate settings. Caution: Even if the parameters of the addresses and the Baud rates can partly be set via the system, wrong presettings can lead to system conflicts that can only be corrected locally on the M-bus devices.

Commissioning the system

The M-bus devices are acquired after checking the wiring and after setting the parameters of the devices. Should problems occur, it is recommended to separate individual plant sections, thus facilitating fault tracing. Starlike wiring simplifies the procedure.

Documentation

Before concluding commissioning, the documentation is produced by generating a billing file on the M-bus central unit or a commissioning protocol with the operating software.