



# **SOLVIMUS**

METERING SOLUTIONS

## **solvimus ... we solve.**

Our claim corresponds to our company name: **we solve.**

solvimus GmbH was founded in 2007 and since then, the focus of our company is on the development and the distribution of customer-specific embedded systems. This is the key philosophy and appears in our company name "solvimus", Latin for "we solve".

We are your solution provider for the sector Embedded Systems, communication technology and Smart Metering. Our main focus is on Smart Metering.

Our slogan metering solutions describes our range: We are a partner for smart meters, readout infrastructure, consulting on projects and training about M-Bus. Apart from our own products, like data concentrators (data loggers) and gateways we also offer the development of customised solutions as well as new and further development. We also support metering projects of our customers by trainings, consulting and services in the particular premises on-site.

Use our competence in the matter of M-Bus and Smart Metering for your own products and services.



Executive directors Sebastian Bauer, Remo Reichel and Thomas Brand

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# 1 Product portfolio



**Advice:** These icons function as a guide through our catalogue. This will help you to identify which product is most suitable for each application.



## Solutions for reading of instantaneous values

Do you want to read meter data very often and continuously and the application is in the field of controlling and monitoring? In this case, our gateways are the best option for it. Alternatively, also the data concentrators (data loggers) can supply instantaneous values or, if connected to a PLC or a PC, simple level converters are used.



## Solutions for reading on due dates

Do you want to read meter data at the end of a period and the application is in the field of monitoring, energy management and submeter billing? In this case, our data concentrators (data loggers) are suitable for you. They collect meter data, e.g. via M-Bus or wM-Bus and make a consolidated data export at the end of a certain interval via network or mobile communication.



## Our ideal solutions

Are you lacking a control cabinet for the installation of our devices, or your projects demand an independently encased installation?



Six standardized boxes are available with our data concentrators MUC.easy<sup>plus</sup> and MUC500 M, fully equipped and ready to be mounted on the wall.



## Project support

Do you want to realise projects in the field of Smart Metering and you need support? We can advise you on selection, installation, debugging or data processing. Our advisory spectrum is versatile.

- Technical support
- Conception
- Training
- Planning support
- Assessment / troubleshooting



## 2 Overview of product advantages

You ask ... we solve.



### Not enough space in the cabinet?

Our compact design saves space in your cabinet.



### Commissioning annoys you and takes a long time?

Just push the scan button for the automatic meter search and be done with it.



### Again, no experts on the hotline?

Fast and straightforward help from specialists via remote as well as on-site.



### Again, some meters are missing?

100% meter compatibility.

All M-Bus and wM-Bus meters and sensors are being read out.



### Product only fits 90 % as always?

We turn it into 100%.

Customer-specific through adaptation of hardware and software.



### Problems with IT?

Our intelligent products integrate their own web server. Simply use a

standard web browser for configuration and visualisation. Additional

software or licences are not necessary.

## 3 M-Bus level converters

Level converters are devices which are transferring the data transparently from one side to the other without changing the content. At the same time, they are also changing the signal levels, this means the physical representation of logical 1 or 0.

Our M-Bus master level converters are **directly attached to a control system or any other kind of host system**. In combination with a software module for the M-Bus master, this is the easiest way to get the communication running.

These devices impress by the ease of their installation and configuration. The host system is the only thing that needs to be configured. All the settings are automatically recognised by the level converters. Integrated status LEDs show the operational state.

All the devices are interfacing the M-Bus to a **RS-232** port at the host system.

Find more information on our accessories on our website.

Level converters		
		
Product   Order number	MBUS-PS6   500374 MBUS-PS32   500375 MBUS-PS64   500383	MBUS-PS125   500359 MBUS-PS250   500360 MBUS-PS500   500351
Brief description	Master level converter RS-232 to M-Bus	Master level converter RS-232 to M-Bus
Characteristics	Status LEDs signalling transmission, receiving and collisions on the M-Bus;  M-Bus and RS-232 interface are galvanically isolated;  M-Bus is short circuit protected using electronic resettable fuse	Status LEDs signalling transmission, receiving and collisions on the M-Bus;  M-Bus and RS-232 interface is galvanically isolated;  M-Bus is short circuit protected using electronic resettable fuse
Power supply	24 VDC, max. 250 mA (depending on bus load)	12 – 36 VDC, max. 1500 mA (depending on bus load)
Interfaces	M-Bus according to EN 13757-2, screw terminal; RS-232, screw terminal	M-Bus according to EN 13757-2, screw terminal; RS-232, screw terminal
Dimensions	18 x 90 x 60 (W x H x D) in mm; 1 module width	54 x 90 x 60 (W x H x D) in mm; 3 modules width
Mounting / Protection class	DIN-rail, 35 mm; IP30	DIN-Rail, 35 mm; IP30
Maximum baud rate	19200 bps	9600 bps
Number of connectable meters	Max. 6 UL (MBUS-PS6); Max. 32 UL (MBUS-PS32); Max. 64 UL (MBUS-PS64)	Max. 125 UL (MBUS-PS125); Max. 250 UL (MBUS-PS250); Max. 500 UL (MBUS-PS500)
Weight	Approx. 58 g	Approx. 130 g
Wiring cables	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules

There are further level converters. For remote applications, the MBUS-GE20V / GE80V are the best choice.

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

The MBUS-PU3 is a small level converter to be plugged into a USB port and is ideally suited **for mobile applications and for the field service** directly on mobile devices. An external software (not included) is required to access the data of the M-Bus participants.

Find more information on our accessories on our website.

**Advice:** Ideal for service.

Level converters		
		 
Product   Order number	MBUS-GE20V   500332 MBUS-GE80V   500333	MBUS-PU3   500358
Brief description	Master level converter Ethernet to M-Bus	Master level converter USB to M-Bus
Characteristics	Direct interfacing to a host system (e.g. PC, PLC) via TCP communication and Ethernet, optionally via virtual COM port; 2 LEDs (activity & status); M-Bus is short circuit protected using electronic resettable fuse	Compact design like USB stick with status LEDs signalling transmission, receiving and power; Requires an appropriate USB COM port driver (e.g. CP210x Universal Windows Driver) in the host system; M-Bus is short circuit protected using resettable fuse (polyfuse)
Power supply	24 VDC, max. 250 mA (depending on bus load)	5 VDC directly via USB 2.0, max. 100 mA (depending on bus load)
Interfaces	M-Bus according to EN 13757-2, screw terminal; Ethernet 100 Mbit, RJ-45	M-Bus according to EN 13757-2, spring terminals; USB male plug type A, USB transceiver SiLabs CP2104
Dimensions	35 x 90 x 59 (W x H x D) in mm; 2 modules width	19 x 12 x 80 (W x H x D) in mm
Mounting / Protection class	DIN-rail, 35 mm; IP30	Direct plug-in; IP30
Maximum baud rate	19200 bps	9600 bps
Number of connectable meters	Max. 20 UL (MBUS-GE20V); Max. 80 UL (MBUS-GE80V)	Max. 3 UL
Weight	Approx. 80 g	Approx. 15 g
Wiring cables	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules	0.75 mm <sup>2</sup> solid / stranded wire

## 4 Data concentrators for Smart Metering

Automated data acquisition is the starting point for Smart Metering.

The product series **MUC.easy<sup>plus</sup>** and **MUC500** are a family of data concentrators (data loggers) for Smart Metering. They and the **MUC.one** are offering a quick and easy commissioning even without expert knowledge regarding the operation and the characteristics of M-Bus communication. The devices come with an integrated and easy to use configuration web page, without need of external software. Only a few settings might need to be changed before starting the scan procedure for finding the meters. After that, the readout procedure and the data processing are completely automated.

The devices are collecting the data on their own, no matter which type of meter and which type of medium is involved. The stored data then gets standardised by the data concentrators (data loggers) and is provided to other systems. It is like Plug and Play, saving time and saving effort.

The MUC.easy<sup>plus</sup> has an integrated M-Bus interface according to EN 13757. On top of that, it comes with three S0 pulse inputs and a serial interface (RS-485). This enables the user to read out further meters directly or by using an optical probe.

For **wireless communication** with meters, there is an wM-Bus interface, according to the OMS standard (Open Metering Systems).

A major component of our data concentrators (data loggers) is the integrated and very powerful communication software. It is responsible for all the data processing and meter recognition. Its universal operation follows the EN 13757 without being based on meter libraries. This omits the time-consuming maintenance of such libraries. In the same breath, it allows to **read out all the meters in the market**, independent of which manufacturer and which medium it is. All the values, units and also the metadata are recognised and represented on the device. In addition, there is an extra data field "User label" for entering unique identifiers related to your data collection system. These systems can be connected via Ethernet and in some variants also via mobile communication. It is your choice.

A so-called system meter offers monitoring or logging system states in addition to the other meter values. For a better fault analysis, the time of the last readout is visualised, and the export interface has been extended by a **scripting system**. This allows the customer to use a versatile tool to individualise the data export even more and to make it more flexible.

With the feature **Extended Maintenance**, logged communication history and system events, such as status messages of reports, error codes and user logins, can be analysed. This means that the customer can do the failure mode analysis on his own and solve it more easily. Additionally, there is a filter function and a file export. Furthermore, our MUC.easy<sup>plus</sup> also offers **Multi-Channel-Reporting (MCR)**. It is possible to set up 10 different configurations for sending meter data, which are executed in parallel.

The products of the **MUC500 family** are specialised data concentrators (data loggers). They are focused on only one physical interface and are addressing **huge meter installations**. The performance of the physical layer and the CPU is consequently high.

Handling including MCR is the same as above. An integrated web server offers a smart configuration web page. Meters are allocated by simply scanning the M-Bus.

Regarding wired M-Bus communication, the MUC500 M offers up to 500 unit loads on the bus lines. For the wireless M-Bus, there are up to two receivers integrated in the MUC500 W. This enables the parallel usage of different modes like S, T, C and C/T on the same frequency or even different frequencies with the same device. Besides the common 868 MHz, there are also solutions for 433 MHz and 169 MHz. Other frequencies are possible on request.

In addition, the MUC500 W has an integrated RS-232 interface. So, an external level converter can be used for reading out wired and wireless infrastructures at once.

All devices solve the challenges in huge installations and are able to handle more than 5000 meters logically.

The **MUC500 RS** expands our MUC500 family with a device specifically engineered for applications with RS-485 communication.

Find more information on our accessories on our website.

Data concentrators		
		
Product   Order number	MUC.easy <sup>plus</sup>   500361	MUC.easy <sup>plus</sup> 4G   500367 MUC.easy <sup>plus</sup> NB   500373
Brief description	Powerful data concentrator with 4 GB storage; Metering interfaces are M-Bus, wM-Bus (OMS), Modbus (RTU, TCP), a serial interface RS-485 and three pulse counting inputs (S0). The MUC.easy <sup>plus</sup> communicates via Ethernet.	Powerful data concentrator with 4 GB storage; Metering interfaces are M-Bus, wM-Bus (OMS), Modbus (RTU, TCP), a serial interface RS-485 and three pulse counting inputs (S0). The devices communicate via Ethernet and WAN interface (LTE or NB-IoT).
Characteristics	Configuration via integrated web server and browser, automated bus scan, easy selection of data points, encrypted or unencrypted data transmission via FTP, MQTT, SMTP (e-mail) and TCP to an energy management system, billing system or for visualisation purposes, CSV, XML and JSON are integrated as standard data formats, Multi-Channel-Reporting (sending data to up to 10 different instances) and an extensive management of user access rights;  LEDs signalling power, status and activity;  M-Bus is short circuit protected using electronic resettable fuse;  The following extensions are optional: Modbus TCP, BACnet/IP or BACnet/SC, DLMS, load profile	Configuration via integrated web server and browser, automated bus scan, easy selection of data points, encrypted or unencrypted data transmission via FTP, MQTT, SMTP (e-mail) and TCP to an energy management system, billing system or for visualisation purposes, CSV, XML and JSON are integrated as standard data formats, Multi-Channel-Reporting (sending data to up to 10 different instances) and an extensive management of user access rights;  LEDs signalling power, status, activity and WAN information;  M-Bus is short circuit protected using electronic resettable fuse;  The following extensions are optional: Modbus TCP, BACnet/IP or BACnet/SC, DLMS, load profile
Power supply	90 – 260 VAC, 2 W idle, 10 W max.	90 – 260 VAC, 2 W idle, 10 W max.
Interfaces	M-Bus according to EN 13757-2, screw terminal; wM-Bus according to EN 13757-4 and OMS, SMA female socket for external antenna, 868 MHz, other frequencies on request; S, T, C, C/T modes; 3x S0 according to IEC 62053-31, screw terminal; RS-485, screw terminal; Ethernet 100 Mbit, RJ-45; 1x digital output 24 VDC, screw terminal	M-Bus according to EN 13757-2, screw terminal; wM-Bus according to EN 13757-4 and OMS, SMA female socket for external antenna, 868 MHz, other frequencies on request; S, T, C, C/T modes; 3x S0 according to IEC 62053-31, screw terminal; RS-485, screw terminal; Ethernet 100 Mbit, RJ-45; 1x digital output 24 VDC, screw terminal; LTE or NB-IoT modem, SMA female socket for external antenna, slot for mini-SIM card (NB) and micro-SIM card (4G)
Dimensions	72 x 91 x 61 (W x H x D) in mm, without antenna connector; 4 modules width	72 x 91 x 61 (W x H x D) in mm, without antenna connector; 4 modules width
Mounting / Protection class	DIN-rail, 35 mm; IP30	DIN-rail, 35 mm; IP30
Maximum baud rate	19200 bps (M-Bus)	19200 bps (M-Bus)
Number of connectable meters	M-Bus: max. 80 UL; S0: max. 3; RS-485: max. 32; Overall max. 5000 (logically)	M-Bus: max. 80 UL; S0: max. 3; RS-485: max. 32; Overall max. 5000 (logically)
Weight	Approx. 180 g	Approx. 190 g
Wiring cables	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules

Data concentrators		
		
Product   Order number	MUC500 M 125   500410 MUC500 M 250   500411 MUC500 M 500   500405	MUC500 W1   500406 MUC500 W2   500407
Brief description	Powerful data concentrator with 4 GB storage; Metering interfaces are M-Bus and Modbus TCP. The MUC500 communicates via Ethernet.	Powerful data concentrator with 4 GB storage; Metering interfaces are up to two independent wM-Bus (OMS) channels and Modbus TCP. The MUC500 communicates via Ethernet.
Characteristics	<p>Configuration via integrated web server and browser, automated bus scan, easy selection of data points, encrypted or unencrypted data transmission via FTP, MQTT, SMTP (e-mail) and TCP to an energy management system, billing system or for visualisation purposes, CSV, XML and JSON are integrated as standard data formats, Multi-Channel-Reporting (sending data to up to 10 different instances) and an extensive management of user access rights;</p> <p>2 status LEDs and 3 LEDs signalling transmission, receiving and collisions / overload on the M-Bus;</p> <p>M-Bus is short circuit protected using electronic resettable fuse;</p> <p>The following extensions are optional: Modbus TCP, BACnet/IP or BACnet/SC, load profile</p>	<p>Configuration via integrated web server and browser, automated bus scan (with external level converters), easy selection of data points, encrypted or unencrypted data transmission via FTP, MQTT, SMTP (e-mail) and TCP to an energy management system, billing system or for visualisation purposes, CSV, XML and JSON are integrated as standard data formats, Multi-Channel-Reporting (sending data to up to 10 different instances) and an extensive management of user access rights;</p> <p>2 status LEDs and 3 LEDs signalling power and reception on the wM-Bus;</p> <p>RS-232 interface for connecting an external level converter for the M-Bus;</p> <p>The following extensions are optional: Modbus TCP, BACnet/IP or BACnet/SC</p>
Power supply	12–36 VDC, max. 1500 mA (depending on bus load)	12–36 VDC, max. 100 mA
Interfaces	M-Bus according to EN 13757-2, screw terminal; Ethernet 100 Mbit, RJ-45	wM-Bus according to EN 13757-4 and OMS, SMA female socket for external antenna; S,T,C,C/T modes; W1:868 MHz, W2: 868 and 433 MHz, other frequencies on request; RS-232, screw terminal; Ethernet 100 Mbit, RJ-45
Dimensions	54 x 90 x 60 (W x H x D) in mm; 3 modules width	54 x 90 x 60 (W x H x D) in mm, without antenna connectors; 3 modules width
Mounting / Protection class	DIN-rail, 35 mm; IP30	DIN-rail, 35 mm; IP30
Maximum baud rate	9600 bps	–
Number of connectable meters	Max. 125 UL (MUC500 M 125); Max. 250 UL (MUC500 M 250); Max. 500 UL (MUC500 M 500); Overall max. approx. 5000 (logically)	Overall max. approx. 5000 (logically)
Weight	Approx. 150 g	Approx. 110 g
Wiring cables	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules

NEW

Another family member of the MUC500 series is the MUC500 RS. It is focused on applications exploiting a **RS-485 interface** to read out data from numerous remote units. Commonly, Modbus RTU is employed as protocol in the metering field. But also DLMS uses the physics of RS-485.

The distinctive feature of the MUC500 RS is that it combines three RS-485 drivers and can thus be

connected to up to 92 devices. This permits to connect a large number of meters via RS-485. The ubiquity of this constellation **in building automation makes this product attractive** for reading RS-485-based meter data via the BACnet extension within a building management system.

Data concentrators	
Product   Article number	MUC500 RS   500455
Brief description	Powerful data concentrator with 4 GB storage; Metering interfaces are RS-485 and Modbus TCP. The MUC500 communicates via Ethernet.
Characteristics	Configuration via integrated web server and browser, easy selection of data points, encrypted or unencrypted data transmission via FTP, MQTT, SMTP (e-mail) and TCP to an energy management system, billing system or for visualisation purposes, CSV, XML and JSON are integrated as standard data formats, Multi-Channel-Reporting (sending data to up to 10 different instances) and an extensive management of user access rights; 2 status LEDs and 3 LEDs signalling transmission, receiving and power; The following extensions are optional: Modbus TCP, BACnet/IP or BACnet/SC, DLMS
Power supply	12–36 VDC, max. 200 mA
Interfaces	RS-485 according EIA-485, screw terminal; Ethernet 100 Mbit, RJ-45
Dimensions	54 x 90 x 60 (W x H x D) in mm; 3 modules width
Mounting   Protection class	DIN-rail, 35 mm; IP30
Maximum baud rate	115200 bps
Number of connectable meters	Max. 96 UL; Overall max. approx. 5000 (logically)
Weight	Approx. 150 g
Wiring cables	2.5 mm <sup>2</sup> solid/stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules

## 5 NB-IoT data concentrator for small installations

At present, our products contribute substantially to enhance energy efficiency in industry and commerce, while the end-use consumer with his single meter has not benefitted as of now. A disproportionate cost-benefit ratio and an ensuing high price sensitivity governs this market.

The MUC.one fill this gap and is ideal for transmitting M-Bus or wM-Bus data from **individual meters via NB-IoT**.

The design optimising both investment and functions combined with globally acknowledged standard technologies aims to enter the mass market. The ease of operation of our data concentrators (data loggers) is preserved. The configuration is assured via WLAN/WiFi.

Data concentrators		
		
Product   Article number	MUC.one M   500381	MUC.one W   500382
Brief description	<p>Compact data concentrator for M-Bus for transmission of data from single meters via NB-IoT.</p> <p>Meter interface is M-Bus. The MUC.one is configured locally via WLAN.</p>	<p>Compact data concentrator for wM-Bus (OMS) for transmission of data from single meters via NB-IoT.</p> <p>Meter interface is wM-Bus (OMS). The MUC.one is configured locally via WLAN.</p>
Characteristics	<p>Configuration via integrated web server and browser, easy creation of meter, selection of data points and selection of CSV, JSON or XML format, data transmission via HTTP(S) or MQTT(S);</p> <p>Hinged housing for mounting the cables and to insert the micro-SIM card;</p> <p>M-Bus is short circuit protected using resettable fuse (polyfuse)</p>	<p>Configuration via integrated web server and browser, easy creation of meter, selection of data points and selection of CSV, JSON or XML format, data transmission via HTTP(S) or MQTT(S);</p> <p>Hinged housing for mounting the cables and to insert the micro-SIM card;</p>
Power supply	90–260 VAC, 1 W idle, max. 3 W	90–260 VAC, 1 W idle, max. 3 W
Interfaces	<p>M-Bus according to EN 13757-2, spring terminals;</p> <p>WLAN (WiFi): 802.11 b/g/n, internal antenna;</p> <p>NB-IoT (LTE CAT-NB), internal antenna, micro-SIM</p>	<p>wM-Bus according to EN 13757-4 and OMS, internal antenna, 868 MHz;</p> <p>WLAN (WiFi): 802.11 b/g/n, internal antenna;</p> <p>NB-IoT (LTE CAT-NB), internal antenna, micro-SIM</p>
Dimensions	80 x 113 x 60 (W x H x D) in mm, without cable entries	80 x 113 x 60 (W x H x D) in mm, without cable entry
Mounting   Protection class	Wall mounting; IP 67	Wall mounting; IP 67
Maximum baud rate	9600 bps	–
Number of connectable meters	Max. 3	Max. 3
Weight	Approx. 300 g	Approx. 290 g
Wiring cables	1,5 mm <sup>2</sup> spring terminals, D = 3 mm ... 6,5 mm	1,5 mm <sup>2</sup> spring terminals, D = 3 mm ... 6,5 mm

NEW

The MUC.only is our **battery-powered data concentrator** for flexible usage at any spot void of a power supply or wherever a cable is perturbing. Robust and in a stylish housing, it is optimized for usage in the building sector, but also for demanding environments.

The intuitive software appeals to simple handling and, combined with instant readiness, permits rapid commissioning.

A typical use case is the reliable detection of **leakages in the water network** via measurement in transfer chambers with water meters, the surveillance of flow rates in elevated tanks and in distant locations like fields, forests and grassland.

The MUC.only is also interesting to the **construction industry**: it is an essential component for automated meter reading and thus lays the foundation for the interim consumption information and the utilities statement.

Data concentrators		
Product   Article number	MUC.only M   500390	MUC.only W   500391
Brief description	<p>Compact data concentrator for M-Bus for transmission of data from single meters via NB-IoT.</p> <p>Meter interface is M-Bus. The MUC.only is configured locally via WLAN.</p>	<p>Compact data concentrator for wM-Bus (OMS) for transmission of data from single meters via NB-IoT.</p> <p>Meter interface is wM-Bus (OMS). The MUC.only is configured locally via WLAN.</p>
Characteristics	<p>Configuration via integrated web server and browser, easy creation of meter, selection of data points, scriptable transmission formats to implement JSON, XML and CSV and more, data transmission via MQTT(S);</p> <p>Hinged housing for mounting the cables and to insert the micro-SIM card;</p> <p>M-Bus is short circuit protected using resettable fuse (polyfuse)</p>	<p>Configuration via integrated web server and browser, easy creation of meter, selection of data points, scriptable transmission formats to implement JSON, XML and CSV and more, data transmission via MQTT(S);</p> <p>Hinged housing for mounting the cables and to insert the micro-SIM card</p>
Power supply	2 lithium batteries, < 100 nA quiescent current	2 lithium batteries, < 100 nA quiescent current
Interfaces	M-Bus according to EN 13757-2, spring terminals; WLAN (WiFi): 802.11 b/g/n, internal antenna; NB-IoT (LTE CAT-NB), internal antenna, micro-SIM	wM-Bus according to EN 13757-4 and OMS, internal antenna, 868 MHz; WLAN (WiFi): 802.11 b/g/n, internal antenna; NB-IoT (LTE CAT-NB), internal antenna, micro-SIM
Dimensions	125 x 151 x 60 (W x H x D) in mm, without cable entry	125 x 151 x 60 (W x H x D) in mm
Mounting   Protection class	Wall mounting; IP 67	Wall mounting; IP 67
Maximum baud rate	9600 bps	–
Number of connectable meters	Max. 3	Max. 10
Weight	Approx. 580 g (with batteries)	Approx. 580 g (with batteries)
Wiring cables	1,5 mm <sup>2</sup> spring terminals, D = 3 mm ... 6,5 mm	1,5 mm <sup>2</sup> spring terminals, D = 3 mm ... 6,5 mm

## 6 Data concentrators as second M-Bus masters

The MBUS-GSLE plays a special role in our next-generation devices family.

The specialty are its physical interfaces while the software capabilities are comparable to those of the other data concentrators (data loggers). It is a **unique combination of an M-Bus master and an M-Bus slave**. The field of application are existing M-Bus installations. The MBUS-GSLE can be installed between the existing master and the connected meters. From now

on, it will read the meters instead of the former master. In addition, shorter readout cycles can be realised, and further meter data points are available without affecting the function of the existing system.

The M-Bus slave interface is used for representing the meter data also to the former master.

Find more information on our accessories on our website.

Data concentrators	
	
Product   Article number	MBUS-GSLE125   500366 MBUS-GSLE250   500371 MBUS-GSLE500   500372
Brief description	Compact data concentrator with 4 GB storage, especially for already existing M-Bus installations; M-Bus master and slave interface integrated, the MBUS-GSLE communicates via Ethernet. Additionally, meters can also be connected via Modbus TCP.
Characteristics	Configuration via integrated web server and browser, automated bus scan, easy selection of data points, Multi-Channel-Reporting (sending data to up to 10 different instances) and an extensive management of user access rights; M-Bus is short circuit protected using electronic resettable fuse; Encrypted or unencrypted data transmission via FTP, MQTT, SMTP (e-mail) and TCP to an energy management system, billing system for visualisation purposes and to existing master units (M-Bus); CSV, XML and JSON are integrated as standard data formats; 2 status LEDs and 3 LEDs signalling transmission, receiving and collision / overload on the M-Bus; M-Bus slave und M-Bus master are galvanically isolated; The following extensions are optional: Modbus TCP, BACnet/IP or BACnet/SC
Power supply	12 – 36 VDC, max. 1500 mA (depending on bus load); Current consumption M-Bus slave 2 UL
Interfaces	M-Bus according to EN 13757-2, screw terminal, master und slave; Ethernet 100 Mbit, RJ-45
Dimensions	54 x 90 x 60 (W x H x D) in mm; 3 modules width
Mounting   Protection class	DIN-rail, 35 mm; IP30
Maximum baud rate	9600 bps
Number of connectable meters	Max. 125 UL (MBUS-GSLE125); max. 250 UL (MBUS-GSLE250); max. 500 UL (MBUS-GSLE500); Overall max. 5000 (logically)
Weight	Approx. 150 g
Wiring cables	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules

## 7 Our ideal solutions – The MUC.BOXes

NEW

A control cabinet is lacking for the installation of our devices, or projects demand an independently enclosed installation?

It is precisely for these cases that we have designed our MUC.BOXes. We offer **six standardized solutions for our MUC.easy<sup>plus</sup> and MUC500 M variants**. Assembled in a closed distribution board, the MUC.BOXes are intended to be mounted on a wall. Precisely on the spot where required, independent of existing installation options.

All MUC.BOXes contain an internally pre-wired power supply with circuit breaker. A cable gland on the box

assures a strain relief of the 230 VAC supply line. A suitable cable with a safety plug can be ordered as accessory. For a direct access, the Ethernet connector is routed to the outside on the bottom side of the distribution board. The same applies to the antenna connector in the variants with a MUC.easy<sup>plus</sup>.

Internally wired rail-mount terminal blocks for the M-Bus lines facilitate their connection. These and other lines can be guided into the MUC.BOXes through the membrane seals at the bottom side of the distribution board.

Please contact us should you have other requirements on prefabricated boxes!

Data concentrators		
		
Product   Article number	MUC.BOX.EP   500525 MUC.BOX.EP 4G   500526 MUC.BOX.EP NB   500527	MUC.BOX.500 M 125   500528 MUC.BOX.500 M 250   500529 MUC.BOX.500 M 500   500530
Brief description	Distribution board 12 TE with MUC.easy <sup>plus</sup>   MUC.easy <sup>plus</sup> 4G   MUC.easy <sup>plus</sup> NB	Distribution board 12 TE with MUC500 M 125   MUC500 M 250   MUC500 M 500
Characteristics	Pre-wired connectors for simple commissioning	Pre-wired connectors for simple commissioning
Power supply	230 VAC	230 VAC
Equipment	Circuit breaker 6 A, tripping characteristic B; Rail-mount terminal blocks for wire cross sections from 0.14 mm <sup>2</sup> to 2.5 mm <sup>2</sup> : • 3 x for 230 VAC supply lines (L, N, PE) • 2 x for M-Bus lines • 2 x for RS-485 lines; 1 x cable gland M20 x 1.5 for 230 VAC line; 1 x RJ-45 connector at the distribution board; SMA connector(s) at the distribution board for wM-Bus (and mobile radio communication); Magnetic mount antenna(s) for wM-Bus (and mobile radio communication) for connection to SMA connector	Circuit breaker 6 A, tripping characteristic B; 24 VDC 1.75 A power supply; Rail-mount terminal blocks for wire cross sections from 0.14 mm <sup>2</sup> to 2.5 mm <sup>2</sup> : • 3 x for 230 VAC supply lines (L, N, PE) • 2 x for M-Bus line; 1 x cable gland M20 x 1.5 for 230 VAC line; 1 x RJ-45 connector at distribution board
Dimensions	250 x 200 x 122 (W x D x H) in mm	250 x 200 x 122 (W x D x H) in mm
Mounting	Wall mounting	Wall mounting
Weight	Approx. 1500 g	Approx. 1600 g
Wiring cables	Cable gland for 230 VAC line: D = 8 mm ... 13 mm; Additional cable entries at distribution board (double membrane seals and knockouts) from M20 to M40	Cable gland for 230 VAC line: D = 8 mm ... 13 mm; Additional cable entries at distribution board (double membrane seals and knockouts) from M20 to M40

## 8 M-Bus gateways

Our gateways are intelligent devices that operate autonomously, reading out data via M-Bus and providing them to downstream systems. They are ideally suited for the reading of instantaneous values. The meter data are processed in the device, and thus no special M-Bus software is required in the upstream system.

Other benefits are the compact design as well as an **intuitive and easy to operate web interface**. It is like Plug and Play, saving time and saving effort. The gate-

ways are translating M-Bus data to quite common communication standards. The de facto standard in automation is the Modbus protocol. Our Modbus gateways are **translating the M-Bus data into the Modbus TCP standard**.

Our MBUS-GE125M / 250M / 500M are also available for huge installations.

Find more information on our accessories on our website.

Gateways		
		
Product   Article number	MBUS-GE20M   500337 MBUS-GE80M   500338	MBUS-GE125M   500408 MBUS-GE250M   500409 MBUS-GE500M   500403
Brief description	Gateway M-Bus-Master to Modbus TCP Metering interfaces are M-Bus and Modbus TCP. The devices communicate via Ethernet.	Gateway M-Bus-Master to Modbus TCP Metering interfaces are M-Bus and Modbus TCP. The devices communicate via Ethernet.
Characteristics	An integrated web server offers complete configuration via a standard web browser, some features are automated bus scan, register assignment and data evaluation of connected M-Bus slaves, automated Modbus register allocation and an extensive management of user access rights; 2 LEDs (activity & status); M-Bus is short circuit protected using electronic resettable fuse	An integrated web server offers complete configuration via a standard web browser, some features are automated bus scan, register assignment and data evaluation of connected M-Bus slaves, automated Modbus register allocation and an extensive management of user access rights; 2 status LEDs and 3 LEDs signalling transmission, receiving and collision/overload on the M-Bus; M-Bus is short circuit protected using electronic resettable fuse
Power supply	24 VDC, max. 250 mA (depending on bus load)	12–36 VDC, max. 1500 mA (depending on bus load)
Interfaces	M-Bus according to EN 13757-2, screw terminal; Ethernet 100 Mbit, RJ-45, Modbus TCP / UDP	M-Bus according to EN 13757-2, screw terminal; Ethernet 100 Mbit, RJ-45, Modbus TCP / UDP
Dimensions	35 x 90 x 59 (W x H x D) in mm; 2 modules width	54 x 90 x 60 (W x H x D) in mm; 3 modules width
Mounting   Protection class	DIN-rail, 35 mm; IP30	DIN-rail, 35 mm; IP30
Maximum baud rate	19200 bps	9600 bps
Number of connectable meters	Max. 20 UL (MBUS-GE20M); Max. 80 UL (MBUS-GE80M)	Max. 125 UL (MBUS-GE125M); Max. 250 UL (MBUS-GE250M); Max. 500 UL (MBUS-GE500M)
Weight	Approx. 80 g	Approx. 150 g
Wiring cables	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules

The demand for the M-Bus technology in facility management and building automation is growing tremendously. There are two main drivers: the requirement for energy efficiency and the need for optimising energy costs. In any case, a growing number of intelligent meters are installed in facilities, buildings or real estates. For integrating these meters into a modern control or automation system **using BACnet/IP or BACnet/SC**, it is necessary to translate

the meter data from M-Bus to this world. **Our BACnet gateways** are translating the M-Bus data into BACnet objects.

Our MBUS-GE125B / 250B / 500B are also available for huge installations.

Find more information on our accessories on our website.

Gateways		
Product   Article number	MBUS-GE5B   500334 MBUS-GE20B   500352 MBUS-GE80B   500353	MBUS-GE125B   500426 MBUS-GE250B   500427 MBUS-GE500B   500404
Brief description	Gateway M-Bus-Master to BACnet/IP or BACnet/SC Metering interfaces are M-Bus and Modbus TCP. The devices communicate via Ethernet.	Gateway M-Bus-Master to BACnet/IP or BACnet/SC Metering interfaces are M-Bus and Modbus TCP. The devices communicate via Ethernet.
Characteristics	An integrated web server offers complete configuration via a standard web browser, some features are automated bus scan, object assignment and data evaluation of connected M-Bus slaves, automated BACnet object allocation and an extensive management of user access rights;  EDE files exportable, Change of Value;  2 LEDs (activity & status);  M-Bus is short circuit protected using electronic resettable fuse	An integrated web server offers complete configuration via a standard web browser, some features are automated bus scan, object assignment and data evaluation of connected M-Bus slaves, automated BACnet object allocation and an extensive management of user access rights;  EDE files exportable, Change of Value;  2 status LEDs and 3 LEDs signalling transmission, receiving and collision / overload on the M-Bus;  M-Bus is short circuit protected using electronic resettable fuse
Power supply	24 VDC, max. 250 mA (depending on bus load)	12 – 36 VDC, max. 1500 mA (depending on bus load)
Interfaces	M-Bus according to EN 13757-2, screw terminal; Ethernet 100 Mbit, RJ-45, BACnet/IP or BACnet/SC	M-Bus according to EN 13757-2, screw terminal; Ethernet 100 Mbit, RJ-45, BACnet/IP or BACnet/SC
Dimensions	35 x 90 x 59 (W x H x D) in mm; 2 modules width	54 x 90 x 60 (B x H x T) in mm; 3 modules width
Mounting   Protection class	DIN-rail, 35 mm; IP30	DIN-rail, 35 mm; IP30
Maximum baud rate	19200 bps	9600 bps
Number of connectable meters	Max. 5 UL (MBUS-GE5B) Max. 50 BACnet objects; Max. 20 UL (MBUS-GE20B) Max. 500 BACnet objects; Max. 80 UL (MBUS-GE80B) Max. 5000 BACnet objects	Max. 125 UL (MBUS-GE125B); Max. 250 UL (MBUS-GE250B); Max. 500 UL (MBUS-GE500B); Max. 5000 BACnet objects
Weight	Approx. 80 g	Approx. 150 g
Wiring cables	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules

## 9 Wireless M-Bus gateways

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 residential.

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.

Our two gateways are translating M-Bus data to quite common communication standards in **industrial automation** like Modbus TCP or in **building automation** like BACnet/IP or BACnet/SC.

Find more information on our accessories on our website.

Gateways		
		
Product   Article number	MBUS-GEWM   500450	MBUS-GEWB   500451
Brief description	Gateway wireless M-Bus (OMS) to Modbus TCP. Metering interfaces are wM-Bus and Modbus TCP. The devices communicate via Ethernet.	Gateway wireless M-Bus (OMS) to BACnet/IP or BACnet/SC. Metering interfaces are wM-Bus and Modbus TCP. The devices communicate via Ethernet.
Characteristics	An integrated web server offers complete configuration via a standard web browser, register assignment and data evaluation of connected wM-Bus slaves, automated Modbus register allocation and an extensive management of user access rights;  2 LEDs (activity & status)	An integrated web server offers complete configuration via a standard web browser, object assignment and data evaluation of connected wM-Bus slaves, automated BACnet object allocation and an extensive management of user access rights;  EDE files exportable, Change of Value; 2 LEDs (activity & status)
Power supply	12–36 VDC, max. 430 mA	12–36 VDC, max. 430 mA
Interfaces	wM-Bus according to EN 13757-4, OMS, SMA female socket for external antenna, 868 MHz, other frequencies on request;  S, T, C, C/T modes;  Ethernet 100 Mbit, RJ-45, Modbus TCP / UDP	wM-Bus according to EN 13757-4, OMS, SMA female socket for external antenna, 868 MHz, other frequencies on request;  S, T, C, C/T modes;  Ethernet 100 Mbit, RJ-45, BACnet/IP or BACnet/SC
Dimensions	54 x 90 x 60 (W x H x D) in mm, without antenna connectors; 3 modules width	54 x 90 x 60 (W x H x D) in mm, without antenna connectors; 3 modules width
Mounting   Protection class	DIN-rail, 35 mm; IP30	DIN-rail, 35 mm; IP30
Number of connectable meters	Overall max. approx. 5000 (logically)	Overall max. approx. 5000 (logically); Max. 5000 BACnet objects
Weight	Ca. 100 g	Ca. 100 g
Wiring cables	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules	2.5 mm <sup>2</sup> solid / stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules

# 10 Further M-Bus components

Typical devices for the M-Bus are level converters or the meters themselves. There is a rising market for additional system components which are pushing the benefits and the coverage of the M-Bus technology. Such components also complete our portfolio. We are using modular building blocks for creating different devices for DIN rail mounting with a footprint of 3 modules width.

Alongside with diverse customer-specific components, we are offering the **MBUS-REP** as a standard device. It is a repeater for the M-Bus and **reconditions the signals** like typical repeaters are doing. As a result,

**larger networks and longer distances** can be used and a **higher number of meters** can be connected to the M-Bus. The MBUS-REP combines a slave interface to the logical bus master on the one side and an own master interface to the slaves or meters on the other side. The data is transparently transmitted in both directions. As the repeater powers its subnet, the physical load of the logical master is clearly reduced.

Find more information on our accessories on our website.

Components	
Product   Article number	MBUS-REP125   500414 MBUS-REP250   500417 MBUS-REP500   500402
Brief description	Repeater for the M-Bus with transparent data transmission
Characteristics	Repeater for reconditioning the bus signals by an additional bus injection, physical extension of existing installations, further slaves can be added to the M-Bus master; M-Bus is short circuit protected using electronic resettable fuse; Status LEDs signalling transmission, receiving and collisions on the M-Bus; M-Bus slave and M-Bus master are galvanically isolated
Power supply	12–36 VDC, max. 1500 mA (depending on bus load); Current consumption M-Bus-Slave 2 UL
Interfaces	M-Bus according to EN 13757-2, screw terminal, master und slave
Dimensions	54 x 90 x 60 (W x H x D) in mm; 3 modules width
Mounting   Protection class	DIN-rail, 35 mm; IP30
Maximum baud rate	9600 bps
Number of connectable meters	Max. 125 UL (MBUS-REP125); Max. 250 UL (MBUS-REP250); Max. 500 UL (MBUS-REP500)
Weight	Approx. 130 g
Wiring cables	2.5 mm <sup>2</sup> solid/stranded wire; 1.5 mm <sup>2</sup> stranded wire with ferrules

# 11 Our services

Our standard products do not meet your requirements 100%? Do you need assistance with your projects in the field of acquiring consumption data? Or do you want customised packaging and do not want to care about shipping formalities?

We are experts in M-Bus technology. We are manufacturing innovative products, developing custom-specific solutions and are offering additional services. We are passionate about being your partner. We will assist you in product consulting and also in consultancy regarding the installation of a metering infrastructure. On top of that, we will develop customer-specific devices, which are made for your individual needs. We also support you with the logistics of your products and shipping formalities.



## Support

Our Support is glad to help you with words and deeds in all technical aspects and support-related questions. We also stop at your premises and inspect your infrastructure on-site and eliminate sources of defect. As the first step, we will alternatively analyse and troubleshoot your M-Bus installation by remote access.



## Hardware

One of our key activities since the company was founded is the development of hardware. Working on customers' projects, we have gathered vast experience and a deep knowledge of the current market. With that background we can assess customers' needs and put them into practice.

Adapting and developing new products for the metering market is another focus of our work. A team of professionals attends you from conception, via development process until production. Everything with one goal: developing the ideal product for your needs.



## Training | Consulting

Knowledge transfer is an important point of our consulting service. We offer individual trainings especially about Smart Metering via M-Bus and wM-Bus. Depending on audience and customer requirement, the trainings are application- or technology-oriented and take place in our training facilities or on your site.



## White | Brand Labeling

If it is important to you to position your own brand on the Smart Metering market, we are also offering White Labeled goods. Benefit from the usage of your brand and the usage of our technology. If required, we can design our Smart Metering products according to your corporate design: from the logo, the company colours up to the software. solvimus takes a back seat and allows your brand to be in the public eye.



### Assessment | fault-clearing

With the increasing size and proliferation of automatic Smart Metering systems, errors occur more often in ongoing operations. Our team of experts is also available to assist you here. At your site we inspect your infrastructure, search for error sources and try to resolve them if necessary.



### Script solutions

In order to be able to import the read meter data comfortably while preserving them in an importable format into the respective downstream system, individual solutions are required in some applications. These are created on the basis of defined customer requirements. Depending on the application we create the following scripts:

- Reporting script
- Formatting script
- System counter/measurement script



### Our ideal solutions

We offer six standardized solutions in the form of boxes for our MUC.easy<sup>plus</sup> and MUC500 M data concentrators (data loggers). Assembled in a closed distribution board, the MUC.BOXes are intended to be mounted on a wall. They are ideal for applications without control cabinet or for projects demanding an independently encased installation.



### Logistics

Flexible and individual – we also take care of logistics for you. Whether customer-specific packaging, included inserts, delivery in a package or on a pallet: we adapt the packaging according to your requirements and deliver our products as you require them. In this way, we ensure that your ordered products are delivered on time and according to your requirements.



### Shipping and export

For shipping, we work with different forwarding agents according to your needs. If required, delivery can also be made directly and individually to your construction sites. We commission the forwarding agents for the transport and, when necessary, take care of the customs formalities in export. We are also happy to assist you with the import by providing the necessary documents.



### If you have any questions, please do not hesitate to contact us.

Sales: +49 3677 7613066 or [sales@solvimus.de](mailto:sales@solvimus.de)

Support: +49 3677 7613065 or [support@solvimus.de](mailto:support@solvimus.de)

## Trainings / Workshops / Webinars – From us, for you

You have acquired devices from us and seek assistance when commissioning? Or you want to educate your team more profoundly and benefit from the ultimate possibilities from our devices?

Our experts come to your site, adapt the training programme individually to your needs and address questions personally – till all topics are well understood and you feel optimally advised!

What is more, we offer workshops several times per year, tailored to diverse subjects, both in person and in a shorter form as a webinar.

And in the meantime, we recommend our youtube channel: from commissioning to updates, you find brief captivating video sequences and tutorials for self-study.

### Our team for training & customer projects



**Technical consultant Erik Osse, Executive director Remo Reichel and Project manager Daniel Czaniera**

### Project management

You need assistance in reading your energy data or are charged with the implementation? Just talk to us!

Ranging from an inspection of the site via the assessment of your needs to the individually configured device: Our project management team assists you to bring your idea to life and advises you comprehensively on a superior level.

Through close and transparent communication in every project phase, we ensure that your requirements and our services are ideally matched to each other.

We are glad to help you solve your challenges!

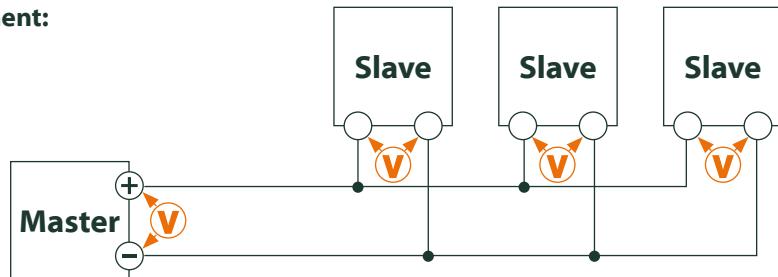
## 12 M-Bus cabling troubleshooting

A broken wiring is one of the most frequent reasons for troubles regarding the automated readout via M-Bus networks. Debugging the wiring is then needed. A good starting point for analysing the network are wiring diagrams with details on cable lengths

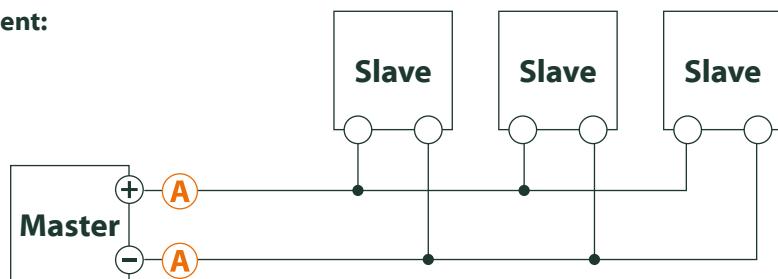
and position of junction boxes. In general, it is recommended to use a cable of type J-Y-ST-Y 2 x 2 x 0.8 mm.

Elementary faults can easily be detected and located by using a multimeter.

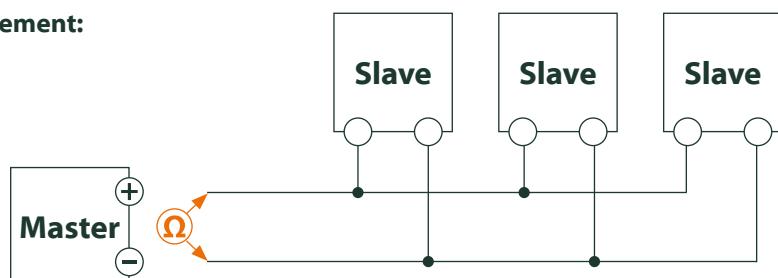
### Voltage measurement:



### Current measurement:



### Resistance measurement:



The following measurements are showing the normal case. If these simple investigations are not successful, we can also offer a more detailed on-site analysis.

Measurement	Valid range   target value
Voltage at master	Approx. 30..40 VDC
Voltage at meter	≥24 VDC
Current through one wire	≤400 mA (at 250 unit loads)
Differential current through wires	<1 mA
Resistance M-Bus	>>470 Ohm
Resistance to protective earth	>20M Ohm



**Advice:** Do not hesitate to call our support or arrange an on-site appointment.

# Contact



## Support

**Jane Karpawitz & Erik Osse**

[support@solvimus.de](mailto:support@solvimus.de)  
+49 3677 7613065



## Sales

**Mareike Petermann, Thomas Wessel-Ellermann, Michelle Ertner, Matthias Gläser**

[sales@solvimus.de](mailto:sales@solvimus.de)  
+49 3677 7613066



**solvimus GmbH**  
Ratsteichstraße 5  
98693 Ilmenau, Germany

Phone: +49 3677 7613060  
E-Mail: [info@solvimus.de](mailto:info@solvimus.de)

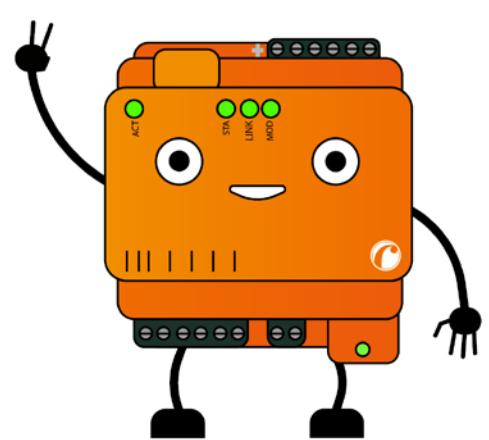
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## Notes





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**solvimus GmbH**

Ratsteichstr. 5 | 98693 Ilmenau | Germany | +49 3677 7613060 | [www.solvimus.de](http://www.solvimus.de) | [info@solvimus.de](mailto:info@solvimus.de)  
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