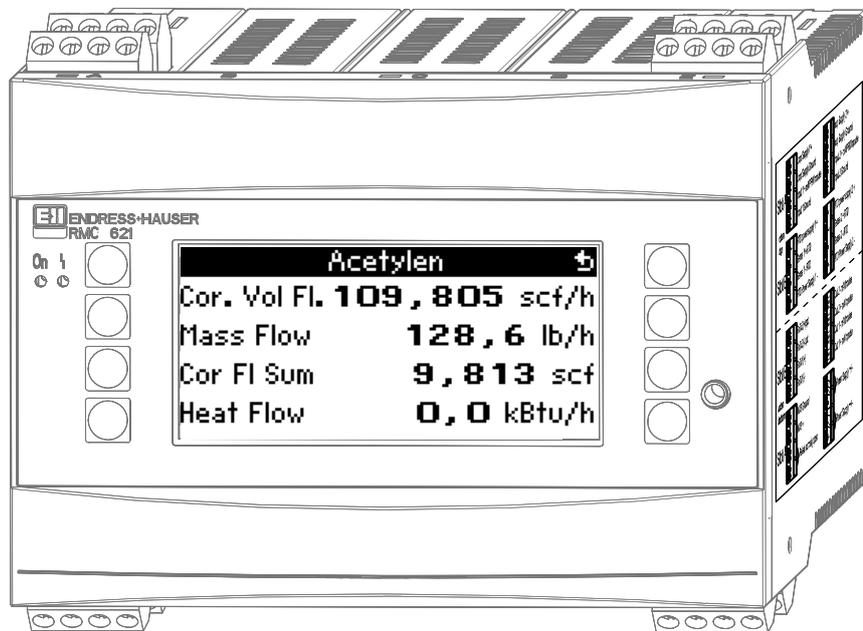|								
Level	Pressure	Flow	Temperature	Liquid Analysis	Registration	Systems Components	Services	Solutions

Operating Instructions

Appendix to the Operating Instructions
Energy Manager RMx621 with M-Bus interface V3.01.00
Connecting the Energy Manager to M-Bus system (two-wire bus in accordance with DIN EN 1434-3)

M-Bus

Endress+Hauser

People for Process Automation

Contents

_____

1 General

1.1 Transport damage

Please inform both your supplier and transport company.

1.2 Scope of delivery

- These Operating Instructions
- Energy Manager RMx621 with M-Bus option (order code:
  RMC621-XxxXXXxx**7**x or RMC621-XxxXXXxx**8**x
  RMS621-xxXXXxx**5**x or RMS621xxXXXxx**6**x)
- Operating Instructions for the RMx621

If anything is missing, inform your supplier immediately!

Please note the following pictograms:

Note: ✎ Recommendations for better installation and commissioning

Caution: ⚠ Failure to observe instructions can cause damage to the device or lead to malfunction!

1.3 Basics

Simultaneous use of the M–Bus interface and the front-side RS232 interface is not possible for devices for the non–hazardous area (order code: RMC621-**A**xxXXXxxxx and all RMS621). If the M–BUS interface is activated, no communication is possible via the RS232 interface (jack socket). The bus interface has to be switched to RS232 at the device if data are transmitted or read out with the PC configuration software.

The M–Bus option for the Energy Computer RMx621 supports communication in accordance with DIN EN 1434–3 (standard for data exchange and interfaces for heat counters).
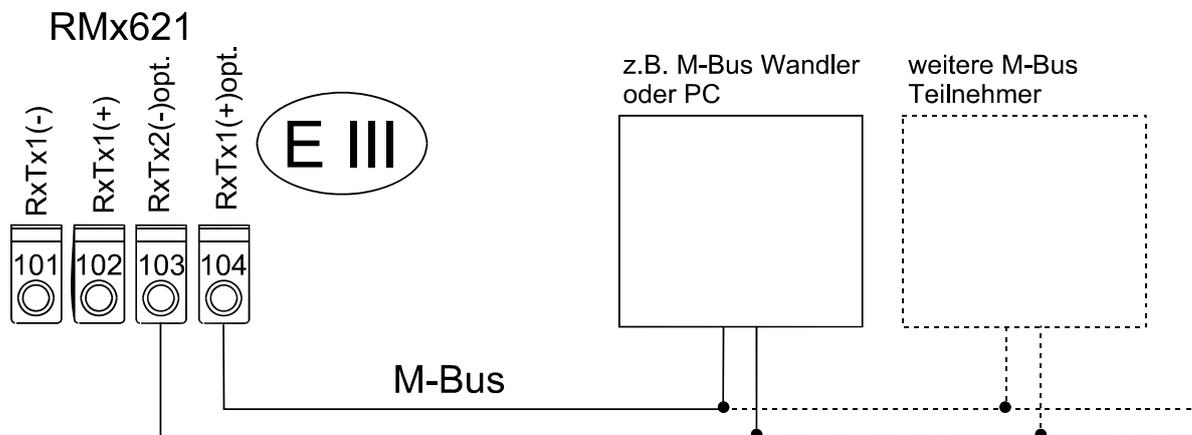
2 Installation

Refer to the installation instructions provided for the Energy Computer RMx621 in the corresponding Operating Instructions.

2.1 Prerequisites

The M–Bus option is available for Energy Manager RMx621 with firmware version V 3.01.00 or later.

2.2 Connections and terminal diagram

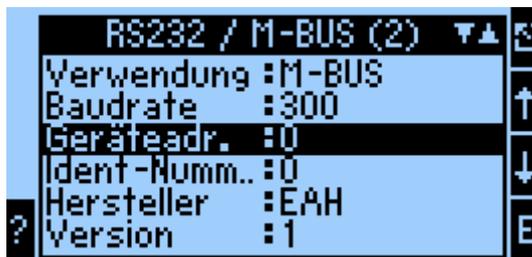Connecting the Energy Manager RMx621 to an M–Bus system.

Inverting the polarity of the M–Bus cable has no effect on the function of the M–Bus. The M–Bus interface (terminals 103, 104) is available only if the energy computer is equipped with the corresponding option.
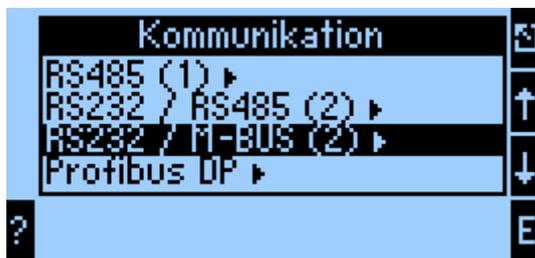
2.3 Setting the unit address

Select "Setup/Communication/RS232/M–Bus (2)" from the menu to set the unit address (slave address).
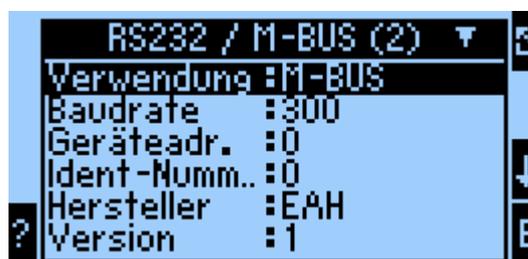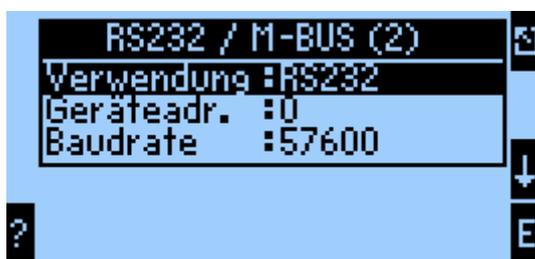
_____

3 Commissioning

3.1 Configuring the M–Bus interface on the Energy Manager RMx621

The "Setup/Communication/RS232/M-Bus (2)" menu item contains all of the parameters relevant to the M–Bus interface.

If you are commissioning the device for the first time, set the "Use" parameter to "M-Bus".

This makes the following parameters visible:

- Baud rate
- Unit address
- Identification number
- Number of values to be transmitted on the M–Bus
- Selection of the values to be transmitted

Function (menu item)	Parameter setting	Description
Use	RS232 M-Bus	Defines the operating mode of the optional interface
Baud rate	300 2400	In "M-Bus" mode, speeds of 300 and 2400 baud are supported
Unit adr.	000	Input of the primary address (maximum 250)
Ident-Nr.	00000000	This, in combination with the manufacturer's ID, version and medium, makes up the secondary address (refer to Chapter 4.2.2). This can be modified by the user.
Manufactur.	EAH	Cannot be modified by the user.
Version	1	Cannot be modified by the user.
Medium	0E	Cannot be modified by the user.
Number	00	Number of values to be transmitted via the M-Bus from the Energy Computer RMx621. A maximum of 36 values can be output.
Values from 01 to 36		Selection of values to be transmitted. It is possible to transmit all values that are measured or calculated in the RMx621.

_____

4 Data transmission

4.1 General

Data format:
- 300 baud or 2400 baud can be set on the device
  (menu item: "Setup/Communication/RS232/M-Bus(2)")
- No automatic baud rate detection
- 8 data bits, EVEN parity (not selectable)

Timeout:
The RMx621 waits 11 bit times before responding after having received a request.

Operating mode:
Generally, **Mode 1** is used, i.e. LSB is transmitted first.

Control characters:
Start character: 10h (short block) or 68h (long block)
End character: 16h

Manufacturer's ID:
The manufacturer's ID is EAH (stands for **E**ndress **A**nd **H**auser)

Medium:
The medium is always 0E (=Bus/System)

The process values are always transmitted in the following basic units:

| Volume flow	l/s
Temperature	°C
Pressure	bar
Quantity of heat	kJ
Heat flow (performance)	kW (kJ/s)
Mass flow	kg/s
Standard volume	(N) l/s
Total volume	l
Total mass	kg
Total standard volume	(N)l
Density	kg/m3
Enthalpy	kJ/kg

The number of process values sent is specified in the configuration of the Energy Manager, see Section 3.1. The minimum is 1 process value (5 byte) and the maximum is 36 process values.

_____

4.2 Addresses

4.2.1 Slave address (primary address)

00	:	New device
01 – 250	:	Available for use
251	:	Reserved
252	:	Reserved
253	:	Addressing via secondary addresses
254	:	All slaves, all respond (only for point–to–point)
255	:	All slaves, none responds

The slave address can be set on the device.
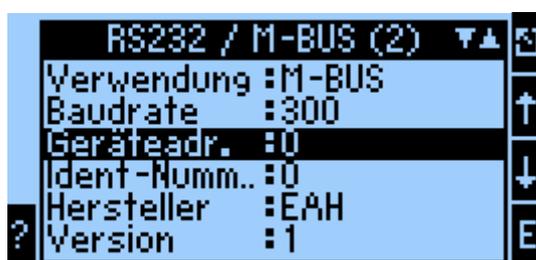
4.2.2 Secondary address

The identification number, manufacturer's ID, version and medium together make up the secondary address. If an RMx621 (slave) is addressed by the master via this address, its secondary address is sent with the primary address 253. The RMx621 (slave) whose secondary address matches the sent secondary address responds with E5h and is now connected to the master via primary address 253. Further responses from the RMx621 (slave) are sent via address 253. A RESET command or the selection of a different bus station (slave) causes the RMx621 (slave) to be deselected. This breaks the connection to the master.

The identification number (for secondary addressing) is a unique, 8–digit number within the device that is factory assigned and, with the RMx621, is generated from the CPU number. This number can be modified on the device, though not via M–BUS.

The identification number can be set using the M–Bus setup function. Here, the manufacturer's ID, version and medium are displayed. Addressing is also possible using wildcards. For the identification number, this is "**F**hex" and for the manufacturer's ID, version and medium, it is "**FF**hex".

_____
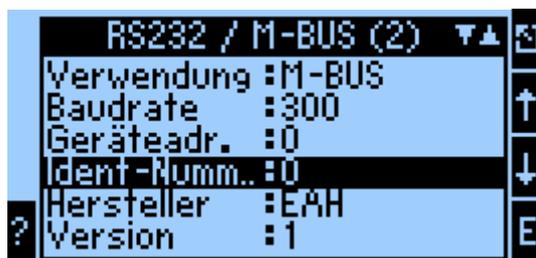
4.3 Commands

4.3.1 Reset
From master (hex):

10 40 sa cs 16

sa:	**Slave address (1 – 250)**
cs:	**Checksum 40h + sa (e.g. 42h for slave address 02h)**

Response from slave on successful transmission: E5h

The **Reset** command returns the access counter to zero and, if secondary addressing is enabled, switches to primary addressing.

4.3.2 Selecting a slave (RMx621) using the secondary address
From master (hex):

68	**Long block control character**
lg	**Length, here always 0B**
lg	**Length, here always 0B**
68	**Long block control character**
53	**C field**
FD	**Slave address always 253**
52	**CI field**
i0 i1 i2 i3	**Identification number (BCD, Low Byte first)**
h0 h1	**Manufacturer's ID (28h and 14h means EAH for Endress And Hauser)**
vv	**Version**
me	**Medium**
cs	**Checksum (addition from inclusive 08 up to the last character before cs)**
16	**End character**

Response from Rx621 (slave) on successful transmission: E5h

4.3.3 Transmitting counter statuses
From master (hex):

10 7B sa cs 16   **(5B instead of 7B also possible)**

sa	**Slave address**
cs	**Checksum (7B + ad, yields, for example, 7Ch for slave address 01)**

_____

Response from RMx621 (slave) on successful request:

68	**Long block control character**
lg	**Length of the data block from inclusive 08 up to exclusive checksum**
lg	**Length of the data block from inclusive 08 up to exclusive checksum**
68	**Long block control character**
08	**C field**
sa	**Slave address**
72	**CI field**
i0 i1 i2 i3	**Identification number (BCD, Low Byte first)**
h0 h1	**Manufacturer's ID (28h and 14h means EAH for Endress And Hauser)**
vv	**Version, is increased by 1 when M–Bus software change implemented**
me	**Medium 0E**
zu	**Number of accesses**
st	**Status 00**
nb	**Not used**
nb	**Not used**
04	**Control character for 32-bit integer**
6D	**Control character date and time**
mm hh dy my	**Date and time, format is set as it is for date/time command**
05	**Control character for 32-bit float**
pe	**Physical unit for the first counter**
w0 w1 w2 w3	**First counter in 32-bit float format**
05 (35)	**Control character for 32-bit float (05: valid value; 35: invalid value)**
pe	**Physical unit for the second counter**
w0 w1 w2 w3	**Second counter in 32-bit float format**
.	
.	
05 (35)	**Control character for 32-bit float (05: valid value; 35: invalid value)**
pe	**Physical unit for the last counter**
w0 w1 w2 w3	**Last counter (format: 32-bit float)**
cs	**Checksum (addition from inclusive 08 up to the last character before the checksum)**
16	**End character**

_____

5 Troubleshooting

5.1 No communication with RMx621

If communication with the RMx621 does not materialize via the M–Bus, please check the following:

- Does the unit address in the RMx621 match the master?
- Are the RMx621 and the master using the same baud rate?
- Was setup in the RMx621 completed correctly?
- Is there more than one device with the same unit address attached to the M–Bus?
- Is the RS232 interface plugged into the front? (Only for non–explosion–proof devices)
- Is the M–Bus connected to the RMx621 correctly?

Endress+Hauser 🖽

www.endress.com/worldwide

Endress+Hauser 🖽

People for Process Automation