# M-Bus Interface Description

M-Bus

# M-Bus Converter
# for Belimo Energy Valve™ 4 and Thermal Energy Meter

Edition 2024-09

BELIMO®

# Contents

# General notes

| General information | | |
|---|---|---|
| | Date | 15.01.2022 |
| | Vendor Name | BELIMO Automation AG |
| | Vendor ID | 423 |
| | Product Name | Converter M-Bus |
| | Product Model Number | G-22PEM-A01 |
| | Protocol | M-Bus: EN 13757-3:2018 |

| Compatible products M-Bus | | |
|---|---|---|
| | Product Model Number | EV..R2+(K)BAC (Version 4, DN 15...50) |
| | | EV..R2+MID (Version 4, DN 15...50) |
| | | EV..R3+BAC (Version 4, DN 15...50) |
| | | 22PEM-1U.. |
| | | 22PE-1U.. |
| | Transmission Format | 1-8-E-1 |
| | Baud Rates | 300, 600, 1'200, 2'400, 4'800, 9'600 |
| | Primary Address | 0...250 (Default: 0) |
| | Secondary Address | 000000 if no device is connected to it, otherwise calculated form device serial number |
| | Manufacturer | BLM |

**Parametrisation Energy Valve / TEM**

Tool          Through the integrated web server or Belimo Assistand 2

**Important Note:** The Thermal Energy Meters or the Belimo Energy Valves™ must be set to MP-Bus with the Belimo Assistant 2 or the Belimo web server. The corresponding MP address is PP.

**Web server**



**Parametrisation M-Bus**

Tool          commercially available M-Bus tools

**Note:** The system integration of the M-Bus converter on M-Bus and the assignment of the M-Bus address is done with a commercially available M-Bus tool.

**Application reset**

"Application Reset" (CI field: $50_{16}$) message must be issued.
Sub-code must be a hexadecimal number.
$00_{16}$ : Reset to default read out (actual values / metric units / real time data)

**Metric / imperial units**

To select the data units the "Application Reset" ($50_{16}$) message must be issued.
Sub-code must be a hexadecimal number.
$20_{16}$ : metric units (actual and historical values)
$21_{16}$ : imperial units (actual and historical values)

**Historical data**

The converter stores 12 months of data. To select the communication of historical data use the "Application Reset" ($50_{16}$) message, where the code selects the month to be transmitted. If no datas are present in selected month, an ACK message is sent instead of the data message.

$30_{16}$ : request all month (each REQ-UD2 you get one month back for a max. of 12 months)
$31_{16}$: request month 1 (end of last month or January recent past)
$32_{16}$: request month 2
$33_{16}$: request month 3
$34_{16}$: request month 4
$35_{16}$: request month 5
$36_{16}$: request month 6
$37_{16}$: request month 7
$38_{16}$: request month 8
$39_{16}$: request month 9
$3A_{16}$: request month 10
$3B_{16}$: request month 11
$3C_{16}$: request month 12

**Read out data**

REQ-UD2

**M-Bus state**

RSP-UD. Is already partially coded in M-Bus specifications.
The status byte is used to indicate different potential errors in the meter.

| Bit | True | False |
|---|---|---|
| 0,1 | See table below | See table below |
| 2 | Power low | Power OK |
| 3 | Permanent error | No permanent error |
| 4 | Temporary error | No permanent error |
| 5 | Manufacturer specific | Manufacturer specific |
| 6 | Manufacturer specific | Manufacturer specific |
| 7 | Manufacturer specific | Manufacturer specific |

| Bit 1 | Bit 2 | Description |
|---|---|---|
| 0 | 0 | No error |
| 0 | 1 | Application busy |
| 1 | 0 | Any application error |
| 1 | 1 | Abnormal condition / alarm |

**Primary address**

Primary address can be changed by commercially available M-Bus tools.

**Secondary address**

Secondary address can be changed by commercially available M-Bus tools. Therefore, send a "Set Secondary Address" (CI field: $52_{16}$) message. Calculated secondary address will still be available as read out data ID15.

**Change baud rate of M-Bus**

The baud rate can be changed by commercially available M-Bus tools.
Select the "Set Baud rate" (CI field: $B8_{16}$ - $BD_{16}$) function and set the new baud rate.

**Replacement converter**

The protocol converter device can be replaced with a new one. Before replacing the unit, all data must be read out from device, as they will be lost. Then you can replace with a new unit, that will retain the secondary address but will have primary address equal to zero.

**Replacement meter**

The meter connected to the protocol converter device can be replaced with a new one. Before replacing the meter, all data must be read out from protocol converter device, as they will be lost. Then it can be replaced with a new meter. The protocol converter will have a new secondary address derived from the meter serial number and a primary address equal to zero.

# Datapoints overview

| ID | Name | Unit |
|----|------|------|
| 1 | Error flags | – |
| 2 | Operating time | Seconds |
| 3 | Operating time | Seconds |
| 4 | Other software version # | – |
| 5 | Fabrication # (series number meter) | – |
| 6 | Firmware version # | – |
| 7 | Fabrication # (from MP-Bus serial number) | – |
| 8 | Identification # (secondary address) | – |
| 9 | Model version # | – |
| 10 | Volume | l |
| 11 | Volume flow | l/h |
| 12 | Return temperature | °C |
| 13 | Flow temperature | °C |
| 14 | Temperature difference | K |
| 15 | Energy accumulation positive | kWh |
| 16 | Energy accumulation negative | kWh |
| 17 | Power | W |
| 18 | Time point | – |
| 19 | Time point | – |

# Datapoints description

| No. | Datapoint | Description | | | Unit |
|---|---|---|---|---|---|
| 1 | Error flag | Error code | | | - |
| | | **Bit** | **Energy Valve V4** | **Thermal Energy Meter** | |
| | | 0 | No communication to actuator | – | |
| | | 1 | Gear train disengaged | – | |
| | | 2 | Actuator cannot move | – | |
| | | 3 | Reverse flow | Reverse flow | |
| | | 4 | Flow setpoint not reached | – | |
| | | 5 | Flow with closed valve | – | |
| | | 6 | Actual flow exceeds $V'_{nom}$ | Actual flow exceeds $V'_{nom}$ | |
| | | 7 | Flow measurement error | Flow measurement error | |
| | | 8 | Remote temperature error | Remote temperature error | |
| | | 9 | Flowbody temperature error | Flowbody temperature error | |
| | | 10 | Com. to sensor interrupted | Com. to sensor interrupted | |
| | | 11 | Freeze warning | – | |
| | | 12 | Glycol detected | – | |
| | | 13 | Power setpoint not reached | – | |
| | | 14 | – | – | |
| | | 15 | – | – | |
| 2 | Operating time | Working time without error | | | Seconds |
| 3 | Operating time | Accumulated error time | | | Seconds |
| 4 | Other software version number | Software version number | | | – |
| 5 | Fabrication number | Series number meter | | | – |
| 6 | Firmware version number | Firmware version number | | | – |
| 7 | Fabrication number | From MP-Bus serial number | | | – |
| 8 | Identification number | Secondary address | | | – |
| 9 | Model version number | Model version number | | | – |
| 10 | Volume | Total volume | | | l |
| 11 | Volume flow | Actual flow rate | | | l/h |
| 12 | Return temperature | Temperature 2 (integrated / flowbody) | | | °C |
| 13 | Flow temperature | Temperature 1 (external) | | | °C |
| 14 | Temperature difference | Temperature difference | | | K |
| 15 | Energy accumulation negative | Cooling energy | | | kWh |
| 16 | Energy accumulation positive | Heating energy | | | kWh |
| 17 | Power | Power | | | W |
| 18 | Time point | Actual local date time | | | - |
| 19 | Time point | Local date time, error starting date and time | | | - |

# All inclusive.

Belimo as a global market leader develops innovative solutions for the controlling of heating, ventilation and air-conditioning systems. Damper actuators, control valves, sensors and meters represent our core business.

Always focusing on customer value, we deliver more than only products. We offer you the complete product range for the regulation and control of HVAC systems from a single source. At the same time, we rely on tested Swiss quality with a five-year warranty. Our worldwide representatives in over 80 countries guarantee short delivery times and comprehensive support through the entire product life. Belimo does indeed include everything.

The "small" Belimo devices have a big impact on comfort, energy efficiency, safety, installation and maintenance.

In short: Small devices, big impact.

5-year warranty

On site around the globe

Complete product range

Tested quality

Short delivery times

Comprehensive support

**BELIMO Automation AG**
Brunnenbachstrasse 1, 8340 Hinwil, Switzerland
+41 43 843 61 11, info@belimo.ch, www.belimo.com

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