



M-Bus Interface Description

M-Bus

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

Edition 2024-04

BELIMO[®]

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General notes

General information

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| 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.. 1-8-E-1 |
| 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 Assisand App |
|------|---|

Important Note: The Thermal Energy Meters or the Belimo Energy Valves™ must be set to MP-Bus with the Belimo Assistant App 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: 50₁₆) message must be issued.
Sub-code must be a hexadecimal number.
00₁₆ : Reset to default read out (actual values / metric units / real time data)

Metric / imperial units

To select the data units the "Application Reset" (50₁₆) message must be issued.
Sub-code must be a hexadecimal number.
20₁₆ : metric units (actual and historical values)
21₁₆ : 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" (50₁₆) 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.

30₁₆ : request all month (each REQ-UD2 you get one month back for a max. of 12 months)
31₁₆ : request month 1 (end of last month or January recent past)
32₁₆ : request month 2
33₁₆ : request month 3
34₁₆ : request month 4
35₁₆ : request month 5
36₁₆ : request month 6
37₁₆ : request month 7
38₁₆ : request month 8
39₁₆ : request month 9
3A₁₆ : request month 10
3B₁₆ : request month 11
3C₁₆ : 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: 52₁₆) 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: B8₁₆ - BD₁₆) 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 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Bit</th> <th>Energy Valve V4</th> <th>Thermal Energy Meter</th> </tr> </thead> <tbody> <tr><td>0</td><td>No communication to actuator</td><td>-</td></tr> <tr><td>1</td><td>Gear train disengaged</td><td>-</td></tr> <tr><td>2</td><td>Actuator cannot move</td><td>-</td></tr> <tr><td>3</td><td>Reverse flow</td><td>Reverse flow</td></tr> <tr><td>4</td><td>Flow setpoint not reached</td><td>-</td></tr> <tr><td>5</td><td>Flow with closed valve</td><td>-</td></tr> <tr><td>6</td><td>Actual flow exceeds V'_{nom}</td><td>Actual flow exceeds V'_{nom}</td></tr> <tr><td>7</td><td>Flow measurement error</td><td>Flow measurement error</td></tr> <tr><td>8</td><td>Remote temperature error</td><td>Remote temperature error</td></tr> <tr><td>9</td><td>Flowbody temperature error</td><td>Flowbody temperature error</td></tr> <tr><td>10</td><td>Com. to sensor interrupted</td><td>Com. to sensor interrupted</td></tr> <tr><td>11</td><td>Freeze warning</td><td>-</td></tr> <tr><td>12</td><td>Glycol detected</td><td>-</td></tr> <tr><td>13</td><td>Power setpoint not reached</td><td>-</td></tr> <tr><td>14</td><td>-</td><td>-</td></tr> <tr><td>15</td><td>-</td><td>-</td></tr> </tbody> </table> | 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 | - | - | |
| 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 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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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.

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In short: Small devices, big impact.



5-year warranty



On site around the globe



Complete product range



Tested quality



Short delivery times



Comprehensive support



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