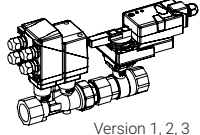
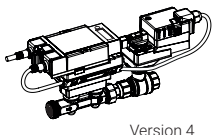


## Data-Pool Values

Where is the Ethernet socket?	
On the actuator	On the flow sensor
 <p>Version 1, 2, 3</p>	 <p>Version 4</p>
<p><b>X</b> See „Data-pool Values Energy Valve (V1, V2, V3)“</p>	<p>Stay with this document <b>✓</b></p>
<p><b>For guidance in replacing an old EV with EV V4 -&gt; see "Replacement Guide V1, V2, V3 vs. V4"</b></p>	

**MP**  **BUS**®

## Energy Valve DN 15...50 (Version 4)

Edition 2024-08 / V4.2.0

**BELIMO**®

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# Data-Pool general notes

## General information

- The device supports the MP Data-Pool functional profile. All available data points are managed in a data pool and accessible with MP read/write commands.
- This document describes all public data pool values of the device. It's divided into process values and configuration values.
- The MP Data-Pool functional profile is specified in the MP Cooperation Documentation. The document is provided to Belimo MP-Partners.
- See the technical datasheet for technical information about the device itself.

## Power-on behaviour

The initialization of the data after power fail takes up to 190 seconds. All values remain 0 during power-on.

## Identification

The connected type can be identified by its series number:

Prefix	Profile type	Profile category	Type
2	1	22	EV..R2+..

## Interface version

This description is valid for these models:

Product Model Number	Remark
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

## Configuration

Configuration data are not password protected. No login is required.

## Timing of MP-Bus queries

Client implementations typically poll the servers in cycles (MP1, MP2, MP3, ...). Reading all data pool values of this node in one cycle are not recommended, because it would reduce the overall MP-Bus performance.

Recommendation:

- Split up the queries into several cycles (e.g. 3 queries per cycle).
- Adjust repetition rates (reading values) according to the rate of change of the value.
- Prevent from reading unused data pool values.

## Signed integer

Signed integers are represented as two's complement.

Example:

Value of ID 40 =  $1111\ 1101\ 1111\ 0010_2 = -526_{10}$

Actual value  
 = value \* scaling factor \* unit  
 =  $-526 * 0.01 * \text{unit}$   
 = **-5.26 unit**

# Data-Pool values overview

## Operation

ID	Name	Access
10	Relative Setpoint [%]	R / W
11	Command	R / W
12	Relative Position [%]	R
13	Absolute Position [°]	R
14	Override Control	R / W
15	Sensor 1 Value [mV] [Ω] [-]	R
16	Setpoint Analog [%]	R
19	Relative Volumetric Flow [%]	R
20	Absolute Volumetric Flow [l/s]	R
22	Absolute Volumetric Flow [selected unit]	R
26	Glycol Concentration [%]	R
27	Temperature 1 (remote) [°C]	R
29	Temperature 2 (flow body) [°C]	R
31	Delta Temperature [K]	R
33	Relative Power [%]	R
34	Absolute Power Cooling [kW]	R
37	Absolute Power Heating [kW]	R
51	Volume [m <sup>3</sup> ]	R
54	Cooling Energy [kWh]	R
57	Heating Energy [kWh]	R
62	Nominal Differential Water Pressure [kPa]	R
65	Absolute Differential Water Pressure Setpoint [kPa]	R / W
68	Absolute Differential Water Pressure [kPa]	R
69	Relative Differential Water Pressure [%]	R
72	Error State	R

Definition Access: R = Read, W = Write

## Service

ID	Name	Access
110	Malfunction & Service information	R
111	Control Mode	R / W
115	Bus Fail Action [%]	R / W
116	Timeout for Bus Watchdog [s]	R / W
117	Setpoint Source	R / W
120	Sensor 1 Type	R / W
121	Sensor 1 Passive Type	R / W
125	Minimum Volumetric Flow Limit ( $V'_{min}$ ) [%]	R / W
129	Maximum Volumetric Flow Limit ( $V'_{max}$ ) [%]	R / W
133	Nominal Volumetric Flow [l/s]	R
140	Absolute Nominal Power ( $P'_{nom}$ ) [kW]	R
143	Maximum Power Limit ( $P'_{max}$ ) [%]	R / W
147	DeltaT Limitation	R / W
148	DeltaT Manager Status	R
151	Unit Selection Flow	R
160	Setpoint Delta Temperature [K]	R / W
162	Setpoint Absolute Flow at DeltaT [l/s]	R / W
200	Energy Meter Serial Number First Digits	R
201	Energy Meter Serial Number Last Digits	R
202	Select Meter Register	R / W

Definition Access: R = Read, W = Write



All writeable datapoints with ID >100 (configuration data) are persistent and are **not** supposed to be written on a regular basis. Designated data points are highlighted in colour in the document.

# Data-Pool values

## Control and general settings

These data-pool values can be used to control and configure the fundamental functionalities and read the corresponding feedback values of the Energy Valve.

No.	Description Comments	Unit	Scaling	Values	Size	Access
10	<b>Relative setpoint</b> The setpoint is related to either the position, the volumetric flow (of $V'_{min}$ , $V'_{max}$ ) or the power (of $P'_{max}$ ). See also ID 125, 129, 143. It is scaled between Min and Max limits. The setpoint is active, if the setpoint is controlled by bus (Setpoint Source = Bus)	%	0.01	0...10'000	2	R / W
11	<b>Command</b> Initiation of actuator functions for service. After command is sent, value changes back to None (0)	–	–	0: None 1: – 2: Sync.	1	R / W
12	<b>Relative position</b>	%	0.01	0...10'000	2	R
13	<b>Absolute position</b>	–	0.01	0...9'600	2	R
14	<b>Override control</b> Overriding the setpoint with defined values	–	–	0: None 1: Open valve 2: Close valve 3: Minimum flow 4: – 5: Maximum flow 6: Nominal flow 7: – 8: – 9: – 10: Motor stop Default: 0	1	R / W
16	<b>Setpoint analog</b> Shows the setpoint in % if the actuator is controlled by analog signal (ID 117). Not considered if forced control (bus, tool and/or analog forced control) is active.	%	0.01	0...10'000	2	R
111	<b>Control mode</b>	–	–	0: Position control 1: Flow control 2: Power control 3: Differential pressure control Default: 1	1	R / W
115	<b>Bus fail action</b> In the event of a breakdown in communication, the actuator enables the bus fail action. The bus monitoring controls the MP-Bus communication. If neither the Setpoint (ID 10) nor the Override Control (ID 14) is renewed before the Timeout for Bus Watchdog (ID 116; Default: 120 s), the actuator controls to the Bus Fail position. Triggered bus monitoring is indicated in the Malfunction and Service Information (ID 110).	–	–	0: None 1: Open 2: Close 3: Max 4: Min 5: – 6: Stop	1	R / W
116	<b>Timeout for bus watchdog</b> If no write request is received within the timeout, the device will execute the action defined in ID 115 (Bus fail action).	s	1	5...3'600 Default: 120	2	R / W
117	<b>Setpoint source</b> Analog: Setpoint from analog signal 0.5...10 V on wire 3 Bus: Setpoint from MP-Bus (ID 10)	–	–	0: Analog 1: Bus Default: 0	1	R / W

## Flow

These data-pool values deal with all values associated with flow control and its feedback, or derivations thereof.

For setpoint see ID 10 "Relative Setpoint" in chapter "Control and general settings".

No.	Description Comments	Unit	Scaling	Values	Size	Access
19	<b>Relative volumetric flow</b> Related to $V'_{\max}$ "Maximum Flow Limit" (ID 129)	%	0.01	0...15'000	2	R
20	<b>Absolute volumetric flow</b>	l/s	0.01	0...1.5* $V'_{\text{nom}}$	2	R
22	<b>Absolute volumetric flow in selected unit</b> → based on selection in ID 151	UnitSel	0.001	0...100 m <sup>3</sup> /s 0...360'000 m <sup>3</sup> /h 0...100'000 l/s 0...6'000'000 l/min 0...360'000'000 l/h 0...1'585'030 gpm 0...211'887.997 cfm	4	R
26	<b>Glycol concentration</b>	%	0.01	0...10'000	2	R
51	<b>Volume</b>	m <sup>3</sup>	0.01	0...21'474'836	4	R
125	<b>Minimum volumetric flow limit (<math>V'_{\min}</math>)</b>	%	0.01	0... $V'_{\max}$	2	R / W
129	<b>Maximum volumetric flow limit (<math>V'_{\max}</math>)</b> Maximum flow limit in % between 25% and 100% of $V'_{\text{nom}}$ . Values below 25% will be adjusted to 25%. The maximum flow setpoint is related to $V'_{\text{nom}}$ "Nominal Volumetric Flow" (ID 133) and is considered when Control Mode = Flow Control or Power Control.	%	0.01	2'500...10'000	2	R / W
133	<b>Nominal volumetric flow</b> ( $V'_{\text{nom}}$ )	l/s	0.01	0...10'000	2	R
151	<b>Unit selection flow</b>	–	1	0: m <sup>3</sup> /s 1: m <sup>3</sup> /h 2: l/s 3: l/min 4: l/h 5: gpm 6: cfm	1	R / W

## Power

These data-pool values can be used to configure and read values related to the Power Management. For Power Setpoint see ID 10 "Relative Setpoint" in chapter "Control and general settings".

No.	Description Comments	Unit	Scaling	Values	Size	Access
33	<b>Relative power</b> Related to $P'_{max}$ "Maximum Power Limit" (ID 143)	%	0.01	0...30'000	2	R
34	<b>Absolute power cooling</b>	kW	0.001	0...21'500'000	4	R
37	<b>Absolute power heating</b>	kW	0.001	0...21'500'000	4	R
140	<b>Absolute nominal Power (<math>P'_{nom}</math>)</b>	kW	0.001	0...21'500'000	4	R
143	<b>Maximum power limit (<math>P'_{max}</math>)</b> The maximum power limit setpoint in % is related to $P_{nom}$ (ID 140) and considered when Control Mode = Power Control.	%	0.01	50...10'000	2	R / W

## Energy

These data-pool values can be used to configure and read values related to the energy monitoring function.

No.	Description Comments	Unit	Scaling	Values	Size	Access
54	<b>Cooling energy</b>	kWh	1	0...21'474'836	4	R
57	<b>Heating energy</b>	kWh	1	0...21'474'836	4	R
200	<b>Energy meter serial number first digits</b>	–	–	0...2'147'483'647	4	R
201	<b>Energy meter serial number last digits</b>	–	–	0...2'147'483'647	4	R
202	<b>Select meter register</b> Value 0 only available for models with MID certification: EV..R2+MID. For non MID certified models value 1 is defined as default. Select between certified meter register and lifetime register. The certified meter register will be reset when the sensor module is replaced. The lifetime register is compensated for glycol (if applicable).  <b>Avoid toggling between the two registers.</b>  The setting influences metering of volume and energy.  Following IDs depend on the selected meter register: ID 51 ID 54 ID 57	–	–	0: Certified meter register 1: Lifetime meter register	1	R / W



## Differential pressure

These data-pool values can be used to configure and read values related to the differential pressure control functionality.

No.	Description Comments	Unit	Scaling	Values	Size	Access
62	<b>Nominal differential water pressure</b> Value range is related to selected dP sensor type	kPa	0.01	0..60'000	4	R
65	<b>Absolute differential water pressure setpoint</b>	kPa	0.01	1000...40'000	4	R / W
68	<b>Absolute differential water pressure</b> Feedback value of absolute differential water pressure	kPa	0.01	0..60'000	4	R
69	<b>Relative differential water pressure</b>	%	0.01	0...10'000	4	R

## Temperature

The measured temperature values can be read out via the data-pool values below.

No.	Description Comments	Unit	Scaling	Values	Size	Access
27	<b>Temperature 1 (remote)</b>	°C	-2'000...15'000	-2'000...15'000	2	R
29	<b>Temperature 2 (flow body)</b>	°C	-2'000...15'000	-2'000...15'000	2	R

## Conversion of sensor signals

These data-pool values can be used to configure the additional Sensor 1 Input on Y3 and read values related to.

No.	Description Comments	Unit	Scaling	Values	Size	Access
15	<b>Sensor 1 value</b> The conversion of passive sensors can be selected by ID 120.  Scaling depends on the sensor type PT1000 / Ni1000 → 1 NTC10K → 10	mV Ω –		0...65'535	2	R
120	<b>Sensor 1 type</b> Additional sensor input Only selectable if SpSource (ID 117) is set to bus.	–	–	0: None 1: Active 2: – 3: Passive 4: Switch Default: 0	1	R / W
121	<b>Sensor 1 passive type</b> Only available if ID 120 Sensor 1 type is set to value 3 "Passive"	–	–	0: None 1: PT1000 2: Ni1000 3: – 4: – 5: – 6: – 7: NTC10k2 8: NTC10k3 Default: 0	1	R / W

## Delta T Manager

These data-pool values can be used to specify the Delta T Manager functionality and read the corresponding values.

No.	Description Comments	Unit	Scaling	Values	Size	Access
31	<b>Delta temperature</b>	K	0.01	0...45'000	2	R
147	<b>DeltaT limitation</b> 0: Disabled: dT-Manager not active 1: dT-Manager: dT-Manager active with no restriction to flow 2: dT-Manager scaling: dT-Manager active with restriction of flow ID 160	–	–	0: Disabled 1: DeltaT-Manager 2: DeltaT-Manager-Scaled	1	R / W
148	<b>DeltaT manager status</b> 1: Standby: dT-Manager activated but not active 2: Active: dT-Manager active 3: Scaling standby: dT-Manager active with no limitation to the flow 4: Scaling active: dT-Manager active with limitation to the flow ID 160	–	–	0: Not selected 1: Standby 2: Active 3: Scaling-standby 4: Scaling-active	1	R
160	<b>Setpoint delta temperature</b> Considered when DeltaT limitation active (not disabled). Check datasheet for further information.	K	0.01	0...5'500	2	R / W
162	<b>Setpoint absolute flow at delta temperature</b> Considered when DeltaT limitation is set to DeltaTManager-Scaled. Check datasheet for further information.	l/s	0.001	0...100'000	4	R / W

## Health State

These data-pool values allow to determine malfunctions, service information and error states of the Energy Valve.

No.	Description Comments	Unit	Scaling	Values	Size	Access
72	<p><b>Error State</b></p> <p>Value is bit-coded. More than one bit can be set to 1. Not all bits mentioned in the enumeration are used for this product range.</p> <p>0: No communication to actuator: Communication with actuator not possible.</p> <p>1: Gear train disengagement: Gear train disengaged button is pressed</p> <p>2: Actuator cannot move: Mechanical overload due to blocked valve, etc. (only available for EV..R+KBAC)</p> <p>3: Reverse flow: Reverse flow is detected</p> <p>4: Flow setpoint not reached: Setpoint cannot be reached within 15 min during flow control</p> <p>5: Flow with closed valve: Flow is measured but position of valve is closed</p> <p>6: Flow actual exceeds flow nominal: Actual flow exceeds the designed nominal flow</p> <p>7: Flow measurement error: Air in the system, error occurred during flow measurement</p> <p>8: Remote temperature error: No connection to external temperature sensor</p> <p>9: Flowbody temperature error: Error with embedded temperature sensor</p> <p>10: Communication to sensor interrupted: Internal communication to flow sensor interrupted</p> <p>11: Freeze warning: Measured temperature &amp; glycol concentration indicate that grease ice can build up</p> <p>12: Glycol detected: Glycol was detected in a MID application</p> <p>13: Power setpoint not reached: Setpoint cannot be reached within 15 min during power control</p> <p>14: Device end of life reached: MID only. The sensor module must be replaced.</p> <p>15: Bus watchdog triggered. No Update of Setpoint / Override within specified time, independent of configured Bus Fail Action.</p> <p>16: No differential pressure detected: No differential pressure detected within 5 min during pressure control</p> <p>17: Differential pressure setpoint can not be reached: Differential pressure setpoint can not be reached within 15 min during pressure control mode</p> <p>18: Minimum position applied: Minimum position (27%) is applied if:</p> <ul style="list-style-type: none"> <li>– The valve is restarted</li> <li>– After a power failure</li> <li>– The manual override was previously operated</li> <li>– Switching from another control mode (e.g. flow control) to control mode differential pressure control</li> <li>– No differential pressure is present at a flow rate <math>&lt; 0.7\% V'_{nom}</math></li> </ul>	–	–	Bitmask = 0: No communication to actuator 1: Gear train disengaged 2: Actuator cannot move 3: Reverse flow 4: Flow setpoint not reached 5: Flow with closed valve 6: Flow actual exceeds flow nominal 7: Flow measurement error 8: Remote temperature error 9: Flowbody temperature error 10: Communication to sensor interrupted 11: Freeze warning 12: Glycol detected 13: Power setpoint not reached 14: Device end of life reached 15: Bus watchdog triggered 16: No differential pressure detected 17: Differential pressure setpoint can not be reached 18: Minimum position applied	4	R
110	<p><b>Malfunction and service information</b></p> <p>Bit 0...15 of ID 72 corresponds with ID 110 for legacy devices. See also Interface Description for older versions of this device.</p>	–	–	–	2	R

Definition Access: R = Read, W = Write

Note: According to the present configuration settings of the Energy Valve (e.g. DN size) the HVAC application may perform a size limitation within the indicated MP-Bus value range. Each Energy Valve may have different HVAC value size limitations.

Subject to technical modifications

# 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.

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