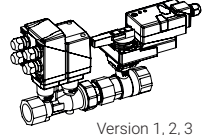
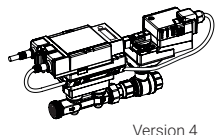


Modbus Interface Description

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



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

Edition 2024-09 / V4.2.0

Contents

Modbus general notes

General information	
Modbus RTU	
Modbus TCP	
Parametrisation	4
Register implementation	
Supported commands	
Command "Read Discrete Inputs"	
Interpret values in the registers	5
32-bit values in two registers	

Modbus register overview

Operation	6-7
Service	8-10

Modbus register description

11-19

Modbus general notes

General information

Date	25.04.2024
Product Name	Energy Valve
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)
Protocol	Modbus RTU over RS-485, Modbus TCP over Ethernet

Modbus RTU

Transmission Formats	1-8-N-2, 1-8-N-1, 1-8-E-1, 1-8-O-1 (Default: 1-8-N-2)
Baud Rates	9'600, 19'200, 38'400, 76'800, 115'200 Bd (Default: 38'400 Bd)
Address	1...247 (Default: 1)
Number of Nodes	Max. 32 (without repeater)
Terminating Resistor	120 Ω

Modbus TCP

Port	Open (Default: 502)
------	---------------------

Parametrisation

Tool	Belimo Assistant 2 or through the integrated web server
------	--

Register implementation

All data is arranged in a table and addressed by 1..n (Register No.) or 0..n-1 (Address). No distinction is made between data types (Discrete Inputs, Coils, Input Registers and Holding Registers). As a consequence, all data can be accessed with the two commands for Holding Register. The commands for Discrete Inputs and Input Registers can be used as an alternative.

Supported commands

Standard commands:	Optional Commands:
Read Holding Registers [3]	Read Discrete Inputs [2]
Write Single Register [6]	Read Input Registers [4]
	Write Multiple Registers [16]

Command "Read Discrete Inputs"

The command reads one or more bits and can alternatively be used for Register No. 105 (Malfunction and Service Information).

Example:

The start address to be used is 1664 → **104** (Register No.) * **16** (Bit) = **1664**

Interpret values in the registers

All values in the register are unsigned integer data types. Exceptions are marked with **. Signed integers are represented as two's complement.

Example unsigned integer:	Example signed integer:
Read (Function 03, 1 Register) Value Register No. x = 0001 1010 1100 1000 ₂ = 6,856 ₁₀	Read (Function 03, 1 Register) Value Register No. x = 1111 1101 1111 0010 ₂ = -526 ₁₀
Actual value = value * scaling factor * unit = 6,856 * 0.01 * unit = 68.56 unit	Actual value = value * scaling factor * unit = -526 * 0.01 * unit = -5.26 unit

32-bit values in two registers

Values that exceed 65,535 are stored in two consecutive registers and have to be interpreted as "little endian byte swap" / LSW (Least Significant Word) first. Note: While the regular "little endian" interpretation refers to the each byte (8 bit Word) per register, the additional "byte swap" interpretation leads to where "little endian" refers to the 16 bit Word of one register.

Both registers have to be written at once with function „Write Multiple Registers [16]“. It cannot be written together with other registers.

Example:

Register No. x (Value LowWord)	Register No. x + 1 (Value HighWord)
= 14,551 ₁₀	= 19 ₁₀
= 0011 1000 1101 0111 ₂	= 0000 0000 0001 0011 ₂

Value LowWord = 14,551 = 0011 1000 1101 0111 ₂	Value HighWord = 19 = 0000 0000 0001 0011 ₂
--	---

32-bit value
= 0000 0000 0001 0011 0011 1000 1101 0111₂
= 1,259,735₁₀
= **1,259.735 unit**

Math formula:

32-bit value = (Value HighWord * 65,536) + Value LowWord
32-bit value = (19 * 65,536) + 14,551
= 1,259,735
= **1,259.735 unit**

Deactivated registers

If a register is not supported by a device or by a device setting, this is indicated by 65,535 (1111 1111 1111 1111₂).

Modbus register overview

Operation

No.	Address	Register	Access
1	0	Relative Setpoint [%]	R / W
2	1	Override Control	R / W
3	2	Command	R / W
4	3	Device Type	R
5	4	Relative Position [%]	R
6	5	Absolute Position [°] [mm]	R
7	6	Relative Volumetric Flow [%]	R
8	7	Absolute Volumetric Flow [l/s]	R
9	8	Absolute Volumetric Flow [gpm]	R
10	9	Absolute Volumetric Flow [selected unit]	LowWord
11	10		HighWord
12	11	Setpoint Analog [%]	R
13	12	Sensor 1 Value [mV] [Ω] [-]	R
14	13	Sensor 1 Temperature [°C] **)	R
15	14	Sensor 1 Temperature [°F] **)	R
16	15	Setpoint Absolute Volumetric Flow [l/s]	R
17	16	Setpoint Absolute Volumetric Flow [gpm]	R
18	17	Setpoint Absolute Volumetric Flow [selected unit]	LowWord
19	18		HighWord
20	19	Temperature 1 (remote) [°C] **)	R
21	20	Temperature 1 (remote) [°F] **)	R
22	21	Temperature 2 (flow body) [°C] **)	R
23	22	Temperature 2 (flow body) [°F] **)	R
24	23	Delta Temperature [K]	R
25	24	Delta Temperature [°F]	R
26	25	Glycol Concentration [%]	R
27	26	Relative Power [%]	R
28	27	Absolute Power Cooling [kW]	LowWord
29	28		HighWord
30	29	Absolute Power Cooling [kBTU/h]	LowWord
31	30		HighWord
32	31	Absolute Power Cooling [selected unit]	LowWord
33	32		HighWord
34	33	Absolute Power Heating [kW]	LowWord
35	34		HighWord
36	35	Absolute Power Heating [kBTU/h]	LowWord
37	36		HighWord

**) signed integer

No.	Address	Register	Access
38	37	Absolute Power Heating [selected unit]	LowWord
39	38		HighWord
40	39	Setpoint Delta Temperature [K]	R / W
41	40	Setpoint Delta Temperature [°F]	R / W
42	41	Setpoint Absolute Flow at DeltaT [l/s]	LowWord
43	42		HighWord
44	43	Setpoint Absolute Flow at DeltaT [gpm]	LowWord
45	44		HighWord
46	45	Setpoint Absolute Flow at DeltaT [selected unit]	LowWord
47	46		HighWord
48	47	Absolute Differential Water Pressure [selected unit]	LowWord
49	48		HighWord
50	49	Relative Differential Water Pressure [%]	LowWord
51	50		HighWord
52	51	Absolute Differential Water Pressure [psi]	LowWord
53	52		HighWord
58	57	Absolute Differential Water Pressure [kPa]	LowWord
59	58		HighWord
60	59	Volume [m ³]	LowWord
61	60		HighWord
62	61	Volume [gal]	LowWord
63	62		HighWord
64	63	Volume [selected unit]	LowWord
65	64		HighWord
66	65	Cooling Energy [kWh]	LowWord
67	66		HighWord
68	67	Cooling Energy [kBTU]	LowWord
69	68		HighWord
70	69	Cooling Energy [selected unit]	LowWord
71	70		HighWord
72	71	Heating Energy [kWh]	LowWord
73	72		HighWord
74	73	Heating Energy [kBTU]	LowWord
75	74		HighWord
76	75	Heating Energy [selected units]	LowWord
77	76		HighWord

Definition Access: R = Read, W = Write

Modbus register overview

Service

No.	Address	Register	Access
100	99	Bus Termination	R
101	100	Series Number 1 st Part	R
102	101	Series Number 2 nd Part	R
103	102	Series Number 4 th Part	R
104	103	Firmware Version	R
105	104	Malfunction and Service Information	R
106	105	Minimum Volumetric Flow Limit (V'_{min}) [%]	R / W
107	106	Maximum Volumetric Flow Limit (V'_{max}) [%]	R / W
..	..	-	-
109	108	Bus Fail Action	R / W
110	109	Timeout for Bus Watchdog [s]	R / W
111	110	Nominal Volumetric Flow [l/s]	R
112	111	Nominal Volumetric Flow [gpm]	R
113	112	Nominal Volumetric Flow [selected unit]	LowWord
114	115		HighWord
..	..	-	-
117	116	Control Mode	R / W
118	117	-	-
119	118	Setpoint Source	R / W
120	119	-	-
121	120	Sensor 1 Type	R / W
122	121	Sensor 1 Passive Type	R / W
..	..	-	-
130	129	Minimum Volumetric Flow Limit (V'_{min}) [l/s]	R / W
131	130	Minimum Volumetric Flow Limit (V'_{min}) [gpm]	R / W
132	131	Minimum Volumetric Flow Limit (V'_{min}) [selected unit]	LowWord
133	132		HighWord
134	133	Maximum Volumetric Flow Limit (V'_{max}) [l/s]	R / W
135	134	Maximum Volumetric Flow Limit (V'_{max}) [gpm]	R / W
136	135	Maximum Volumetric Flow Limit (V'_{max}) [selected unit]	LowWord
137	136		HighWord
..	..	-	-
148	147	Unit Selection Flow	R / W
149	148	Unit Selection Power	R / W
150	149	Unit Selection Volume	R / W
151	150	Unit Selection Energy	R / W
152	151	Unit Selection Pressure Difference	R / W
..	..	-	-

No.	Address	Register	Access
158	157	Error State	LowWord
159	158		HighWord
160	159	Absolute Nominal Power (P'_{nom}) [kW]	LowWord
161	160		HighWord
162	161	Absolute Nominal Power (P'_{nom}) [kBTU/h]	LowWord
163	162		HighWord
164	163	Absolute Nominal Power (P'_{nom}) [selected unit]	LowWord
165	164		HighWord
166	165	Maximum Power Limit (P'_{max}) [%]	R / W
167	166	Absolute Maximum Power Limit (P'_{max}) [kW]	LowWord
168	167		HighWord
169	168	Absolute Maximum Power Limit (P'_{max}) [kBTU/h]	LowWord
170	169		HighWord
171	170	Absolute Maximum Power Limit (P'_{max}) [selected units]	LowWord
172	171		HighWord
173	172	Absolute Differential Water Pressure Setpoint [selected unit]	LowWord
174	173		HighWord
175	174	Absolute Differential Water Pressure Setpoint [psi]	LowWord
176	175		HighWord
177	176	Absolute Differential Water Pressure Setpoint [kPa]	LowWord
178	177		HighWord
..	..	-	-
180	179	DeltaT Limitation	R / W
181	180	DeltaT Manager Status	R / W
182	181	Status of the Differential Water Pressure Sensor	R
183	182	Differential Water Pressure Control Status	R
..	..	-	-
185	184	Nominal Differential Water Pressure [selected unit]	LowWord
186	185		HighWord
187	186	Nominal Differential Water Pressure [psi]	LowWord
188	187		HighWord
189	188	Nominal Differential Water Pressure [kPa]	LowWord
190	189		HighWord
..	..	-	-
201	200	Energy Meter Serial Number First Digits	LowWord
202	201		HighWord
203	202	Energy Meter Serial Number Last Digits	LowWord
204	203		HighWord

No.	Address	Register	Access
205	204	Select Meter Registers	R / W

Definition Access: R = Read, W = Write



All writeable registers >100 are persistent and are **not** supposed to be written on a regular basis.

Modbus register description

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
1	0	Relative setpoint The setpoint is related to either the position, the volumetric flow (of V'_{min} , V'_{max}) or the power (of P'_{max}). See also Register No. 106, 107, 166.	0...10'000 Default: 0	%	0.01	R / W
2	1	Override control Overrides 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
3	2	Command Initiation of actuator functions for service. After command is sent, value changes back to None (0).	0: None 1: – 2: Sync.	–	–	R / W
4	3	Device type	0: Device not connected 1: Air/Water 2: VAV / EPIV 3: Fire 4: Energy Valve / Flow Sensor 5: 6-way EPIV	–	1	R
5	4	Relative position	0...10'000	%	0.01	R
6	5	Absolute position	0...max angle	° mm	0.01	R
7	6	Relative volumetric flow Related to V'_{max} "Maximum Flow Limit" (Register No. 107)	0...15'000	%	0.01	R
8	7	Absolute volumetric flow	0...1.5* V'_{nom}	l/s	0.01	R
9	8	Absolute volumetric flow	0...16'000	gpm	0.1	–
10	9	Absolute volumetric flow in selected unit → Unit can be selected by Register No. 148	0...100 0...360'000	m ³ /s m ³ /h	0.001	R
11	10		0...100'000 0...6'000'000 0...360'000'000	l/s l/min l/h		
12	11	Setpoint analog Shows the setpoint in % if actuator is controlled by analog signal, Setpoint Source Register No. 119 = 0: Analog. Not considered if forced control (bus, tool and/or analog forced control) is active.	0...10'000	%	0.01	R
13	12	Sensor 1 value The conversion of passive sensors can be selected by Register No. 122. Scaling depends on the sensor type PT1000 / Ni1000 → 1 NTC10K → 10	0...65'535	mV Ω –	1 1 / 10 0 / 1	R
14	13	Sensor 1 temperature	–400...24'800	°C	0.01	R
15	14	Sensor 1 temperature	–400...24'800	°F	0.01	R
16	15	Setpoint absolute volumetric flow	0...10'000	[l/s]	0.01	R
17	16	Setpoint absolute volumetric flow	0...16'000	gpm	0.1	R

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
18	17	Setpoint absolute volumetric flow in selected unit → Unit can be selected by Register No. 148	0...100	m ³ /s	0.001	R
			0...360'000	m ³ /h		
			0...100'000	l/s		
			0...6'000'000	l/min		
19	18		0...360'000'000	l/h		
			0...1'585'030	gpm		
			0...211'887.997	cfm		
20	19	Temperature 1 (remote)	-2'000...15'000	°C	0.01	R
21	20	Temperature 1 (remote)	-400...30'200	°F	0.01	R
22	21	Temperature 2 (flow body)	-2'000...15'000	°C	0.01	R
23	22	Temperature 2 (flow body)	-400...30'200	°F	0.01	R
24	23	Delta temperature	0...14'000	K	0.01	R
25	24	Delta temperature	0...25'200	°F	0.01	R
26	25	Glycol concentration	0...10'000	%	0.01	R
27	26	Relative power Related to P' _{max} "Maximum Power Limit" Register No. 166	0...30'000	%	0.01	R
28	27	Absolute power cooling	0...21'500'000	kW	0.001	R
29	28					
30	29	Absolute power cooling	0...74'150'000	kBTU/h	0.001	R
31	30					
32	31	Absolute power cooling in selected unit	0...741'500'000	UnitSel	0.1	R
33	32	→ Unit can be selected by Register No. 149				
34	33	Absolute power heating	0...21'500'000	kW	0.001	R
35	34					
36	35	Absolute power heating	0...74'150'000	kBTU/h	0.001	R
37	36					
38	37	Absolute power heating in selected unit	0...74'150'000	UnitSel	0.1	R
39	38	→ Unit can be selected by Register No. 149				
40	39	Setpoint delta temperature	0...5'500	K	0.01	R / W
41	40	Setpoint delta temperature	0...9'900	°F	0.01	R / W
42	41	Setpoint absolute flow at DeltaT	0...100'000	l/s	0.001	R / W
43	42					
44	43	Setpoint absolute flow at DeltaT	0...158'503	gpm	0.01	R / W
45	44					
46	45	Setpoint absolute flow at DeltaT in selected unit → Unit can be selected by Register No. 148	0...100	m ³ /s	0.001	R / W
			0...360'000	m ³ /h		
			0...100'000	l/s		
			0...6'000'000	l/min		
			0...360'000'000	l/h		
47	46		0...1'585'030	gpm		
			0...211'887.997	cfm		

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
48	47	Absolute differential water pressure in selected unit Feedback value of differential pressure relative to dp setpoint max	0...60'000'000 0...600 0...5'801.51	Pa bar psi	0.01	R
49	48	relative to dp setpoint max → Unit can be selected by Register No. 152	0...600'000 0...60'000	mbar kPa		
50	49	Relative differential water pressure Feedback value of differential pressure relative to dp setpoint max	0...10'000	%	0.01	R
51	50					
52	51	Absolute differential water pressure Feedback value of absolute differential water pressure	154.04...5'801.51	psi	0.01	R
53	52					
..	..	-	-	-	-	-
58	57	Absolute differential water pressure Feedback value of absolute differential water pressure	1'000...60'000	kPa	0.01	R
59	58					
60	59	Volume Accumulated volume	0...2'147'483'600	m ³	0.01	R
61	60					
62	61	Volume Accumulated volume	0...2'147'483'647	gal	1	R
63	62					
64	63	Volume in selected unit Accumulated volume	0...42'000'000 0...42'000'000'000	m ³ l	1	R
65	64	→ Unit can be selected by Register No. 150	0...11'095'226'199 0...1'483'216'002.3	gal cf		
66	65	Cooling energy	0...2'147'483'647	kWh	1	R
67	66					
68	67	Cooling energy	0...2'147'483'647	kBTU	1	R
69	68					
70	69	Cooling energy in selected unit → Unit can be selected by Register No. 151	0...2'147'483'647	-	1	R
71	70					
72	71	Heating energy	0...2'147'483'647	kWh	1	R
73	72					
74	73	Heating energy	0...2'147'483'647	kBTU	1	R
75	74					
76	75	Heating energy in selected unit → Unit can be selected by Register No. 151	0...2'147'483'647	-	1	R
77	76					
..	..	-	-	-	-	-
100	99	Bus termination Indicates if bus termination (120 Ω) is enabled. Bus termination can be set with configuration tools.	0: Disabled 1: Enabled Default: 0	-	-	R

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access	
101	100	<p>Series number 1st part</p> <p>Each device has an unambiguous series number, which is either impressed on or glued to the housing. The series number consists of 4 segments, although only parts 1, 2 and 4 are displayed on Modbus.</p> <p>Example: 00839-31324-064-008 1st part: 00839 2nd part: 31324 4th part: 008</p>	–	–	–	R	
102	101	Series number 2nd part	–	–	–	R	
103	102	Series number 4th part	–	–	–	R	
104	103	<p>Firmware version</p> <p>Firmware version of communication module Example: 400, version 4.00 For details see firmware history</p>	–	–	–	R	
105	104	<p>Malfunction and service information</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>Bitmask =</p> <p>0: No communication to actuator: Communication with actuator not possible 1: Gear train disengagement: Gear train disengaged button is pressed 2: Actuator cannot move: Mechanical overload due to blocked valve, etc. (only available for EV..R+KBAC) 3: Reverse flow: Reverse flow is detected 4: Flow setpoint not reached: Setpoint cannot be reached within 15 min during flow control 5: Flow with closed valve: Flow is measured but position of valve is closed 6: Flow actual exceeds flow nominal: Actual flow exceeds the designed nominal flow 7: Flow measurement error: Air in the system, error occurred during flow measurement 8: Remote temperature error: No connection to external temperature sensor 9: Flowbody temperature error: Error with embedded temperature sensor 10: Communication to sensor interrupted: Internal communication to flow sensor interrupted 11: Freeze warning: Measured temperature & glycol concentration indicate that grease ice can build up 12: Glycol detected: Glycol was detected in a MID application 13: Power setpoint not reached: Setpoint cannot be reached within 15 min during power control 14: Device end of life reached (MID only): The sensor module must be replaced. 15: Bus watchdog triggered: No update of Setpoint/Override within specified time, independent of configured Bus Fail Action.</p>	<p>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</p>	–	–	R
106	105	Minimum volumetric flow limit (V'_{min})	0... V'_{max} Default: 0	%	0.01	R / W	

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
107	106	Maximum volumetric flow limit (V'_{max}) Maximum flow limit in % between 25% and 100% of V'_{nom} . Values below 25% will be adjusted to 25%. The maximum flow setpoint is related to V'_{nom} "Nominal Volumetric Flow" (Register No. 111, 112, 113/114) and is considered when Control Mode = Flow Control or Power Control.	2'500...10'000 Default: 10'000	%	0.01	R / W
109	108	Bus fail action In the event of a breakdown in communication, the actuator enables the bus fail action. The bus monitoring controls the Modbus communication. If neither the Setpoint (Register No. 1) nor the Override Control (Register No. 2) is renewed before the Timeout for Bus Watchdog (Register No. 110; Default: 120 s), the actuator controls to the Bus Fail Position. Triggered bus monitoring is indicated in the Malfunction and Service Information (Register No. 105).	0: None 1: Open 2: Close 3: Max 4: Min 5: – 6: – Default: 0	–	–	R / W
110	109	Timeout for bus watchdog If no write request is received within the timeout, the device will execute the action defined in Register No. 109 (bus fail action).	5...3'600 Default: 120	s	1	R / W
111	110	Nominal volumetric flow (V'_{nom})	0...10'000	l/s	0.01	R
112	111	Nominal volumetric flow (V'_{nom})	0...15'850	gpm	0.1	R
113	112	Nominal volumetric flow (qp) in selected unit (V'_{nom}) → Unit can be selected by Register No. 148	0...100	m ³ /s	0.001	R
114	113		0...360'000 0...10'000 0...6'000'000 0...360'000'000 0...1'585'030 0...211'887.997	m ³ /h l/s l/min l/h gpm cfm		
..	..	–	–	–	–	–
117	116	Control mode	0: Position control 1: Flow control 2: Power control 3: Differential pressure control Default: 1	–	–	R / W
119	118	Setpoint source Analog: Setpoint from analog signal 0.5...10V on wire 3 Bus: Setpoint from Modbus (Register No. 1)	0: Analog 1: Bus Default: 0	–	–	R / W
..	..	–	–	–	–	–
121	120	Sensor 1 type Additional sensor input Only selectable if SpSource (Register No. 119) is set to bus.	0: None 1: Active 2: – 3: Passive 4: Switch Default: 0	–	–	R / W
122	121	Sensor 1 passive type Only available if Register No. 121 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	–	–	R / W

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
..	..	-	-	-	-	-
130	129	Minimum volumetric flow limit (V'_{min})	0... V'_{max}	l/s	0.01	R / W
131	130	Minimum volumetric flow limit (V'_{min})	0... V'_{max}	gpm	0.1	R / W
132	131	Minimum volumetric flow limit (V'_{min})	0... V'_{max}	UnitSel	0.001	R / W
133	132	Minimal volumetric flow in selected unit → Unit can be selected by Register No. 148				
134	133	Maximum volumetric flow limit (V'_{max})	25% of V'_{nom} ... V'_{nom}	l/s	0.01	R / W
135	134	Maximum volumetric flow limit (V'_{max})	25% of V'_{nom} ... V'_{nom}	gpm	0.1	R / W
136	135	Maximum volumetric flow limit (V'_{max})				
137	136	Maximal volumetric flow in selected unit → Unit can be selected by Register No. 148	25% of V'_{nom} ... V'_{nom}	UnitSel	0.001	R / W
..	..	-	-	-	-	-
148	147	Unit selection flow	0: m ³ /s 1: m ³ /h 2: l/s 3: l/min 4: l/h 5: gpm 6: cfm Default: 4	-	-	R / W
149	148	Unit selection power	0: W 1: kW 2: MW 3: BTU/h 4: kBTU/h 5: ton Default: 1	-	-	R / W
150	149	Unit selection volume	0: m ³ 1: Litre 2: Gallon 3: cf Default: 0	-	-	R / W
151	150	Unit selection energy	0: J 1: kJ 2: MJ 3: GJ 4: Wh 5: kWh 6: MWh 7: BTU 8: kBTU 9: ton Default: 5	-	-	-
152	151	Unit selection pressure difference	0: Pa 1: bar 2: psi 3: mbar 4: kPa Default: 1	-	-	R / W
..	..	-	-	-	-	-

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
158	157	Error state		–	–	R
159	158	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.	Bitmask =			
		0: No communication to actuator: Communication with actuator not possible.	0: No communication to actuator			
		1: Gear train disengagement: Gear train disengaged button is pressed	1: Gear train disengaged			
		2: Actuator cannot move: Mechanical overload due to blocked valve, etc. (only available for EV..R+KBAC)	2: Actuator cannot move			
		3: Reverse flow: Reverse flow is detected	3: Reverse flow			
		4: Flow setpoint not reached: Setpoint cannot be reached within 15 min during flow control	4: Flow setpoint not reached			
		5: Flow with closed valve: Flow is measured but position of valve is closed	5: Flow with closed valve			
		6: Flow actual exceeds flow nominal: Actual flow exceeds the designed nominal flow	6: Flow actual exceeds flow nominal			
		7: Flow measurement error: Air in the system, error occurred during flow measurement	7: Flow measurement error			
		8: Remote temperature error: No connection to external temperature sensor	8: Remote temperature error			
		9: Flowbody temperature error: Error with embedded temperature sensor	9: Flowbody temperature error			
		10: Communication to sensor interrupted: Internal communication to flow sensor interrupted	10: Communication to Sensor interrupted			
		11: Freeze warning: Measured temperature & glycol concentration indicate that grease ice can build up	11: Freeze warning			
		12: Glycol detected: Glycol was detected in a MID application	12: Glycol detected			
		13: Power setpoint not reached: Setpoint cannot be reached within 15 min during power control	13: Power setpoint not reached			
		14: Device end of life reached: MID only. The sensor module must be replaced.	14: Device end of life reached			
		15: Bus watchdog triggered. Timeout for the Bus watchdog expired.	15: Bus watchdog triggered			
		16: No differential pressure detected: No differential pressure detected within 5 min during pressure control	16: No differential pressure detected			
		17: Differential pressure setpoint can not be reached: Differential pressure setpoint can not be reached within 15 min during pressure control mode	17: Differential pressure setpoint can not be reached			
		18: Minimum position applied: Minimum position (27%) is applied if: – The valve is restarted – After a power failure – The manual override was previously operated – Switching from another control mode (e.g. flow control) to control mode differential pressure control – No differential pressure is present at a flow rate < 0.7% V'nom	18: Minimum position applied			
160	159	Absolute nominal Power (P'nom)	0...21'500'000	kW	0.001	R
161	160					
162	161	Absolute nominal Power (P'nom)	0...73'361'045	kBTU/h	0.001	R
163	162					

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
164	163	Absolute nominal power (P'_{nom}) in selected unit → Unit can be selected by Register No. 149	0...215'000'000	W	0.1	R
165	164		0...215'000 0...215 0...733'610'451.1 0...733'610.5 0...61'134.2	kW MW BTU/h kBTU/h ton		
166	165	Maximum power limit (P'_{max})	0.5...100%	%	0.01	R / W
167	166	Absolute maximum power limit (P'_{max})	0.5% of P' _{nom} ...P' _{nom}	kW	0.001	R / W
168	167					
169	168	Absolute maximum power limit (P'_{max})	0.5% of P' _{nom} ...P' _{nom}	kBTU/h	0.001	R / W
170	169					
171	170	Absolute maximum power limit (P'_{max}) in selected unit → Unit can be selected by Register No. 149	0.5% of P' _{nom} ...P' _{nom}	UnitSel	0.01	R / W
172	171					
173	172	Absolute differential water pressure setpoint in selected unit → Unit can be selected by Register No. 152	1'000'000...40'000'000	Pa	0.01	R / W
174	173		10...400 145.04...5'801.51 10'000...400'000 1'000...40'000 Default: 4'000'000 Pa	bar psi mbar kPa		
175	174	Absolute differential water pressure setpoint	145.04...5'801.51	psi	0.01	R / W
176	175		Default: 580.15			
177	176	Absolute differential water pressure setpoint	1'000...40'000	kPa	0.01	R / W
178	177		Default: 4'000			
..	..	-	-	-	-	-
180	179	DeltaT limitation 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 Register No. 140	0: Disabled 1: dT-Manager 2: dT-Manager scaling Default: 0	-	-	R / W
181	180	DeltaT manager status 0: Not selected: dT-Manager deactivated 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 Register No. 140	0: Not selected 1: Standby 2: Active 3: Scaling standby 4: Scaling active	-	-	R
182	181	Status of the differential water pressure sensor	0: OK 1: Differential pressure not detected	-	1	R
183	182	Differential water pressure control status	0: OK 1: Differential pressure setpoint cannot be reached 2: Minimum position applied	-	1	R
..	..	-	-	-	-	-
185	184	Nominal differential water pressure Value range is related to selected dP sensor type → Unit can be selected by Register No. 152	0...6'000'000	UnitrSel	0.1	R
186	185		0...60 0...580.1 0...60'000 0...6'000			

No.	Address	Description Comment	Range, enumeration	Unit	Scaling	Access
187	186	Nominal differential water pressure				
188	187	Value range is related to selected dP sensor type	0...580.1	psi	0.1	R
189	188	Nominal differential water pressure				
190	189	Value range is related to selected dP sensor type	0...6'000	kPa	0.1	R
..	..	-	-	-	-	-
201	200	Energy meter serial number first digits				
202	201	ProductionOrderNumber	-	-	1	R
203	202	Energy meter serial number last digits				
204	203	ProductionSequenceNumber	-	-	1	R
205	204	Select meter register 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). Avoid toggling between the two registers as this will affect data logging. Following registers depend on the selected meter register: Register No. 60/61 Register No. 62/63 Register No. 64/65 Register No. 66/67 Register No. 68/69 Register No. 70/71 Register No. 72/73 Register No. 74/75 Register No. 76/77	0: Certified meter register 1: Lifetime meter register Default: 0	-	-	R / W

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 Modbus value range.
Each Energy Valve may have different HVAC value size limitations.

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



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