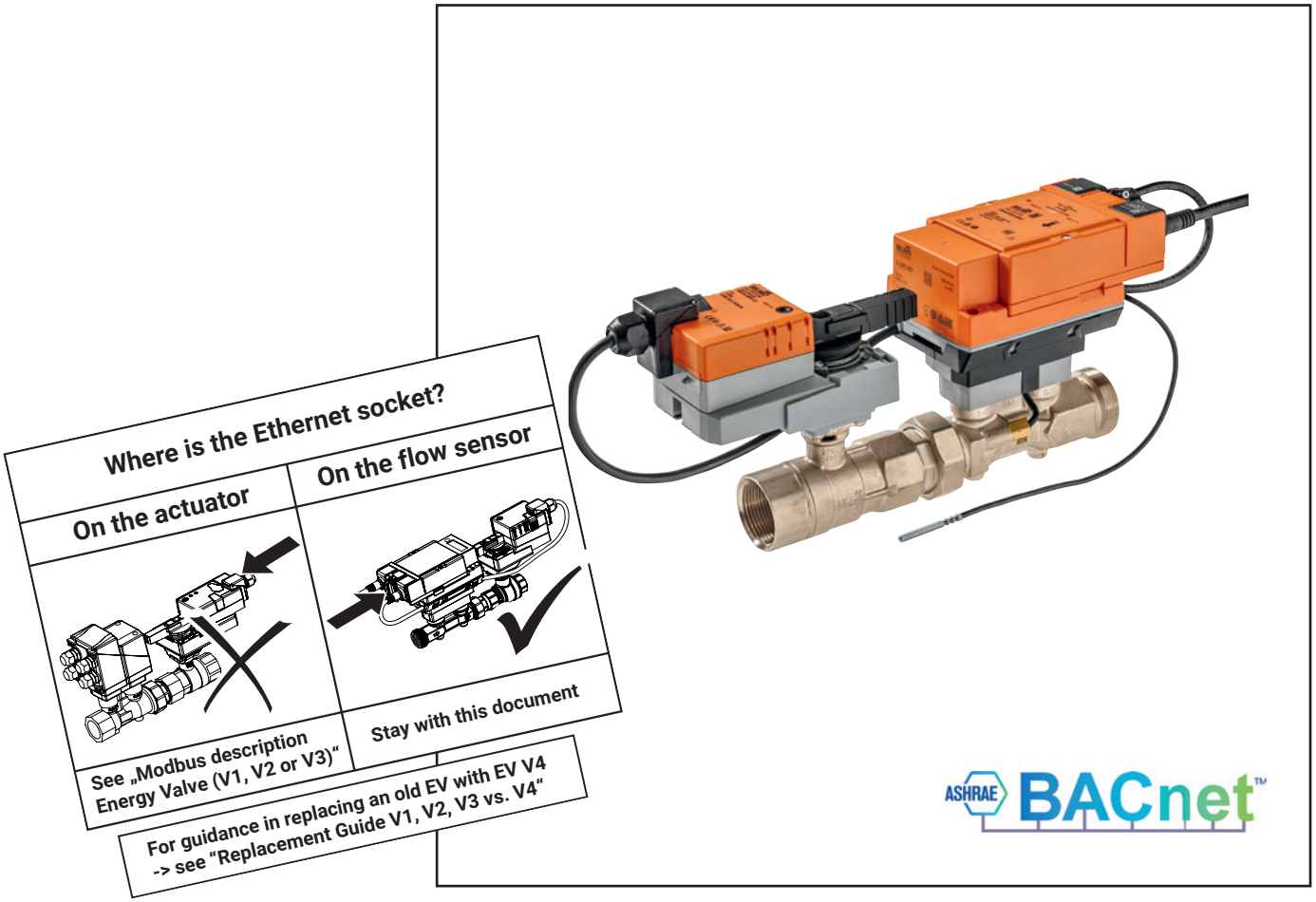

Energy Valve DN 15...50 (Version 4)

Contents

Protocol Implementation Conformance Statement – PICS

General information	Date	15.01.2022
	Vendor Name	BELIMO Automation AG
	Vendor ID	423
	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)
	Application Software Version	04.01.0000
	Firmware Revision	14.10.0002
	BACnet Protocol Revision	1.14
	Product Description	Electronic pressure-independent characterised control valve with energy monitoring
	BACnet Standard Device Profile	BACnet Application Specific Controller (B-ASC)
	Segmentation capability	No
	Data Link Layer Options	MS/TP master BACnet IP, (Annex J) BACnet IP, (Annex J), Foreign Device
	Device Address Binding	No static device binding supported
	Networking Options	None
	Character Sets Supported	ISO 10646 (UTF-8)
	Gateway Options	None
	Network Security Options	Non-secure device
	Conformance	Listed by BTL
BACnet Interoperability Building Blocks supported BIBBs	Data sharing – ReadProperty-B (DS-RP-B) Data sharing – ReadPropertyMultiple-B (DS-RPM-B) Data sharing – WriteProperty-B (DS-WP-B) Data sharing – COV-B (DS-COV-B) Device management – DynamicDeviceBinding-B (DM-DDB-B) Device management – DynamicObjectBinding-B (DM-DOB-B) Device management – DeviceCommunicationControl-B (DM-DCC-B)	
BACnet MS/TP	Baud rates	9’600, 19’200, 38’400, 76’800, 115’200 (Default: 38’400)
	Address	0...127 (Default: 1)
	Number of nodes	Max 32 (without repeater), 1 full busload
	Terminating resistor	120 Ω
BACnet IP	Port	open (Default: 47’808)
Parameterisation	Tool	Belimo Assistant App or integrated webserver

All writeable objects with instance number ≥ 90 are persistent and are **not** supposed to be written on a regular base.

Protocol Implementation Conformance Statement - PICS

Standard Object Types Supported

Object type	Optional properties	Writeable properties
Device	Description Location Active COV Subscriptions Max Master Max Info Frames Profile Name	Object Identifier Object Name Location Description APDU Timeout (1'000…60'000) Number of APDU Retries (0...10) Max Master (1...127) Max Info Frames (1...255)
Analog Input [AI]	Description COV Increment	COV Increment
Analog Output [AO]	Description COV Increment	Present Value COV Increment Relinquish Default
Analog Value [AV]	Description COV Increment	Present Value COV Increment
Binary Input [BI]	Description Active text Inactive Text	
Multi-state Input [MI]	Description State Text	
Multi-state Output [MO]	Description State Text	Present Value Relinquish Default
Multi-state Value [MV]	Description State Text	Present Value
Positive Integer Value [PIV]	Description	

The device does not support the services CreateObject and DeleteObject.
The specified maximum length of writable strings is based on single-byte characters.
- Object name 32 char
- Location 64 char
- Description 64 char

Service processing

The device supports the DeviceCommunicationControl and ReinitializeDevice services. No password is required.
A maximum of 6 active COV subscriptions with a lifetime of 1…28'800 sec. (max. 8 hours) are supported.

BACnet Object Description

Object Name	Object Type [Instance]	Description Comment *Status_Flags*	Values	COV Increment	Access
Device	Device [Inst.Nr]		0…4'194'302 *Default: 1*	–	W
RelPos	AI[1]	Relative Position in % *Overridden = true, if the gear is disengaged*	0...100	0.01...100 *Default: 1*	R
SpAnalog	AI[6]	*If SetpointSource MV[122] is not 1: Analog then Out_Of_Service is TRUE* *Overridden = true, if forced control (bus, tool and analog forced control) is active*	0...100	0.01...100 *Default: 1*	
Sens1Active_Volt	AI[20]	Sensor 1 as Voltage in V *If Sens1Type MV[220] is not 2: Active then Out_Of_Service is TRUE*	0...15	0.01...15 *Default: 1*	R
Sens1Passive_ Ohm	AI[21]	Sensor 1 as Resistor in Ohm *If Sens1Type MV[220] is not 4: Passive then Out_Of_Service is TRUE*	0.1...1'000'000	0.1...1'000'000 *Default: 1*	R
T1_UnitSel	AI[22]	Temperature 1 (remote) in selected unit Unit can be selected with object MV[127]	-20…120	0.01…252 *Default: 1*	R
T2_UnitSel	AI[23]	Temperature 2 (Flow Body) in selected unit Unit can be selected with object MV[127]	-20…120	0.01…252 *Default: 1*	R
SpRel	AO[1]	Setpoint Relative in % The set point is related to either the position, the flow (of V`min, Vmax) or the power (of Pmax). See also AV[90], AV[94], MV[100], AV[110] *Overridden = true, if forced control (bus MV[1], tool and analog forced control) is active*	0...100 *Default: 0*	0.01…100 *Default: 1*	C
AbsPos	AV[2]	Absolute Position in ° *Overridden = true, if the gear is disengaged*	0...96	0.01...96	R
RelFlow	AV[10]	Relative Flow in %	0…150	0.01…150 *Default: 1*	R
SpAbsFlow_ UnitSel	AV [17]	Setpoint Absolute Flow in selected unit Unit can be selected with object MV[123] *Overridden = true, if forced control (bus, tool and analog forced control) is active*	0…1,5*Vnom	0…1,5*Vnom	R
AbsFlow_UnitSel	AV[19]	Absolute Flow in selected unit Unit can be selected with object MV[123]	0…1,5*Vnom	0…1,5*Vnom	R
Sens1Temp_ UnitSel	AV [20]	Sensor 1 as Temperature in selected unit Unit can be selected with object MV[127] *If Sens1PassiveType MV[221] is 1: None or Sens1Type MV[220] is not 3: Passive then Out_Of_Service is TRUE*	-20…248	0.01...252 *Default: 1*	R
DeltaT_UnitSel	AV[22]	Delta Temperature in selected unit Unit can be selected with object MV[128]	0...140	0.01…810 *Default: 1*	R
RelPower	AV[40]	Relative Power in %	0...300	0.01…300 *Default: 1*	R
CoolingPower_ UnitSel	AV[45]	Cooling Power in selected unit Unit can be selected with object MV[124]	0…74'150'000	0.1…73'361'050 *Default: 1*	R
HeatingPower_ UnitSel	AV[46]	Heating Power in selected unit Unit can be selected with object MV[124]	0…74'150'000	0.1…73'361'050 *Default: 1*	R
CoolingEnergy_ UnitSel	AV[47]	Cooling Energy in selected unit Unit can be selected with object MV[125]. See also MV[200]	0…2'147'483'641	1…1.35E12 *Default: 1*	R
HeatingEnergy_ UnitSel	AV[48]	Heating Energy in selected unit Unit can be selected with object MV[125]. See also MV[200]	0…2'147'483'641	1…1.35E12 *Default: 1*	R
VolumeDecimal_ UnitSel	AV[50]	Decimal Number of the Volume_m3 Object Resolution of 0.01m3 of the Object PIV[50]. See also MV[200]	0.01-0.99	0.01-0.99	R
Volume_UnitSel	AV[52]	Accumulated Volume in selected unit Unit can be selected with object MV[126]. See also MV[200]	0…2'147'483'641	1…4.2E10 *Default: 1*	R
GlycolConcentration	AV[60]	Glycol concentration in % Measured value or override value in settings	0…100	0.01…100 *Default: 1*	R
Vmin	AV[90]	Minimum Flow Limit in %	0…100	0.01…100 *Default: 1*	W
Vmin_UnitSel	AV[93]	Minimum Flow Limit in selected unit Unit can be selected with object MV[123]	0…360'000	0…360'000 *Default: 1*	W

BACnet Object Description

Object Name	Object Type [Instance]	Description Comment *Status_Flags*	Values	COV Increment	Access
Vmax	AV[94]	Maximum Flow Limit in %	0…100	0.01…100 *Default: 1*	W
Vmax_UnitSel	AV[97]	Maximum Flow Limit in selected unit Unit can be selected with object MV[123]	0…360‘000	0…360‘000 *Default: 1*	W
Vnom_UnitSel R	AV[100]	Nominal Flow in selected unit Unit can be selected with object MV[123]	0…360‘000	0…360‘000 *Default: 1*	R
Pmax	AV[110]	Maximum Power Limit in %	0…100	0.01…100 *Default: 1*	W
Pmax_UnitSel	AV[113]	Maximum Power Limit in selected unit Unit can be selected with object MV[124]	0...74‘150‘000	0.01…73‘361‘050 *Default: 1*	W
Pnom_ UnitSel	AV[116]	Nominal Power in selected unit Unit can be selected with object MV[124]	0…21‘500	0.01…73‘361‘050 *Default: 1*	R
SpDeltaT_UnitSel	AV[120]	Setpoint Delta Temperature in selected unit Unit can be selected with object MV[128]	0…99	0.01…99 *Default: 1*	W
SpAbsFlowDeltaT_ UnitSel	AV[127]	Setpoint Absolute Flow at Delta T in selected unit Unit can be selected with object MV[123]	0…360‘000	0…360‘000 *Default: 1*	W
BusWatchdog	AV[130]	Timeout for Bus Watchdog in s **Non functional. Reserved for future extension**	0…3600 *Default: 0*	0.01…120 *Default: 1*	W
ErrorState	AV[140]	Error State No communication to actuator: Communication with actuator not possible. Gear disengagement: Gear disengaged button is pressed Actuator cannot move: Mechanical overload due to blocked valve, etc. *(only available for EV..R+KBAC)* Reverse flow: Reverse flow is detected Flow setpoint not reached: Setpoint cannot be reached within 15 min during flow control Flow actual exceeds flow nominal: Actual flow exceeds the designed nominal flow Flow measurement error: Air in the system, error occurred during flow measurement Remote temperature not OK: No connection to external temperature sensor Flowbody temperature not OK: Error with embedded temperature sensor Communication to sensor interrupted: Internal communication to flow sensor interrupted Freeze warning: Measured temperature & glycol concentration indicate that grease ice can build up Glycol detected: Glycol was detected in a MID application Power setpoint not reached: Setpoint cannot be reached within 15 min during power control	Bit 0: No communication to actuator Bit 1: Gear disengaged Bit 2: Actuator cannot move Bit 3: Reverse flow Bit 4: Flow setpoint not reached Bit 5: Flow with closed valve Bit 6: Flow actual exceeds flow nominal Bit 7: Flow measurement error Bit 8: Remote temperature not OK Bit 9: Flowbody temperature not OK Bit10: Communication to Sensor interrupted Bit11: Freeze warning Bit12: Glycol detected Bit13: Power setpoint not reached Bit14: not used Bit15: not used	1…16‘383 *Default: 1*	R

Object Name	Object Type [Instance]	Description Comment *Status_Flags*	Values	Access
Sens1Switch	BI [20]	Sensor 1 as Switch *If Sens1Type MV[220] is not 5: Switch then Out_Of_Service is TRUE*	0: Inactive 1: Active	R
BusTermination	BV[99]	Bus Termination	0: Disabled 1: Enabled	R
Override	MV[1]	Override Control Overrides setpoint with defined valves.	1: None 2: Open Valve 3: Close Valve 4: Minimum 5: - 6: Maximum 7: Nominal 8: - 9: - 10: - 11: Motor Stop *Default: 1*	C
SummaryStatus	MV[99]	Summary Status Summarizes all status MV[102] – MV[107]	1: Ok 2: Warning 3: Not Ok	R
ControlMode	MV[100]	Control Mode This value defines the interpretation of the setpoint A Reset will be performed, if the state of this object is changed.	1: Position Control 2: Flow Control 3: Power Control Default: 2	W
DeltaT_Limitation	MV[101]	DeltaT Limitation Disabled: dT-Manager not active dT-Manager: dT-Manager active with no restriction to flow dT-Manager scaling: dT-Manager active with restriction of flow → AV 120]	1: Disabled 2: dT-Manager 3: dT-Manager scaling Default: 1	W
StatusDeltaTMgr	MV[102]	Status DeltaT Manager Not selected: dT-Manager deactivated Standby: dT-Manager activated but not active Active: dT-Manager active Scaling standby: dT-Manager active with no limitation to the flow Scaling active: dT-Manager active with limitation to the flow → AV[120]	1: Not selected 2: Standby 3: Active 4: Scaling standby 5: Scaling active	R
StatusSensor	MV[103]	Status Sensor Indicates informations within the flow sensor and both temperature sensors Flow measurement error: Air in the system, error occurred during flow measurement Remote temperature not OK: No connection to external temperature sensor Flowbody temperature not OK: Error with embedded temperature sensor Communication to sensor interrupted: Internal communication to flow sensor interrupted	1: OK 2: Flow measurement error 3: Flowbody temperature not OK 4: Remote temperature not OK 5: Communication to flow sensor interrupted	R
StatusFlow	MV[104]	Status Flow Actual flow exceeds nominal flow: Actual flow exceeds the designed nominal flow. Flow in closed position: Flow is measured but position of valve is closed Flow not reached: Setpoint cannot be reached within 3min during flow control Reverse flow detected: Energy Valves detected a reverse flow	1: OK 2: Actual flow exceeds nominal flow 3: Flow with closed valve 4: Flow setpoint cannot be reached 5: Reverse flow	R
StatusMedia	MV[105]	Status Media Freeze warning: Measured temperature & glycol concentration indicate that grease ice can build up Glycol detected: Glycol was detected in a MID application	1: OK 2: Glycol detected 3: Freeze warning	R
StatusActuator	MV[106]	Status Actuator Actuator cannot move: Mechanical overload due to blocked valve, etc. *(only available for EV..R+KBAC)* Gear disengaged: Gear disengaged button is pressed No communication to actuator: Communication with actuator not possible	1: OK 2: Actuator cannot move 3: Gear disengaged 4: No communication to actuator	R
StatusPower	MV[107]	Status Power Power not reached: Setpoint cannot be reached within 15 min during power control	1: OK 2: Power not reached	R
Command	MV[120]	Initiate Function Initiation of actuator functions for service and test. After command is sent, value returns to None(1).	1: None 2: - 3: Synchronization *Default: 1*	W
SpSource	MV[122]	Setpoint Source If Analog(1) then actuator is controlled by analog signal 0...10 V on wire 3. If Bus(2) then setpoint via bus SpRel AO[1]	1: Analog 2: Bus *Default: 1*	W

Object Name	Object Type [Instance]	Description Comment *Status_Flags*	Values	Access
UnitSelFlow	MV[123]	Unit Selection Flow The selected unit is valid for AV[17], AV[19], AV[93], AV[97], AV[100], AV[127]	1: m3/s 2: m3/h 3: l/s 4: l/min 5: l/h 6: gpm 7: cfm *Default: 5*	W
UnitSelPower	MV[124]	Unit Selection Power The selected unit is valid for AV[45], AV[46], AV[113], AV[116]	1: W 2: kW 3: MW 4: BTU/h 5: kBTU/h 6: ton *Default: 2*	W
UnitSelEnergy	MV[125]	Unit Selection Energy The selected unit is valid for AV[47], AV[48], PIV[31], PIV[32]	1: J 2: kJ 3: MJ 4: GJ 5: Wh 6: kWh 7: MWh 8: BTU 9: kBTU 10: tonh *Default: 6*	W
UnitSelVolume	MV[126]	Unit Selection Volume The selected unit is valid for AV[50], AV[52], PIV[50]	1: m3 2: litre 3: gallon 4: cubic foot *Default: 1*	W
UnitSelTemperature	MV[127]	Unit Selection Temperature Sensors The selected unit is valid for AV[20], AI[22], AV[23]	1: degree C 2: K 3: degree F *Default: 1*	W
UnitSelDeltaT	MV[128]	Unit Selection Delta T The selected unit is valid for AV[22]	1: degree C 2: K 3: degree F *Default: 2*	W
SelectMeterRegisters	MV[200]	Select between certified meter register and lifetime register. Value 1 only available for models with MID certification EV..R2+MID For non MID certificied models Values 2 is defined as default. 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.	1: Certified meter register 2: Lifetime meter register *Default: 1 (2)*	W
Sens1Type	MV[220]	Sensor 1 Type Additional Sensor input. Only selectable if SpSource MV[122] is set to Bus.	1: None 2: Active Volt 3: - 3: Passive 4: Switch *Default: 1*	W
Sens1TempType	MV[221]	Sensor 1 Passive Type	1: None 2: PT1000 3: Ni1000EU 4: - 5: - 6: - 7: - 8: NTC10k2 9: NTC10k3 *Default: 1*	W

Object Name	Object Type [Instance]	Description Comment *Status_Flags*	Values	Access
CoolingEnergyPIV_ UnitSel	PIV[31]	Cooling Energy in selected unit Unit can be selected with object MV[125] *See also MV[200]*	0.. 2'147'483'647	R
HeatingEnergyPIV_ UnitSel	PIV[32]	Heating Energy in selected unit Unit can be selected with object MV[125] *See also MV[200]*	0.. 2'147'483'647	R
VolumePIV_ UnitSel	PIV[50]	Accumulated Volume in selected unit Unit can be selected with object MV[126] *See also MV[200]*	0.. 2'147'483'647	R
MeterSerialNo_ Part1	PIV[201]	Energy Meter Serial Number First Digits	-	R
MeterSerialNo_ Part2	PIV[202]	Energy Meter Serial Number Last Digits	-	R

Access: R = Read, W = Write, C = Commandable with priority array

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