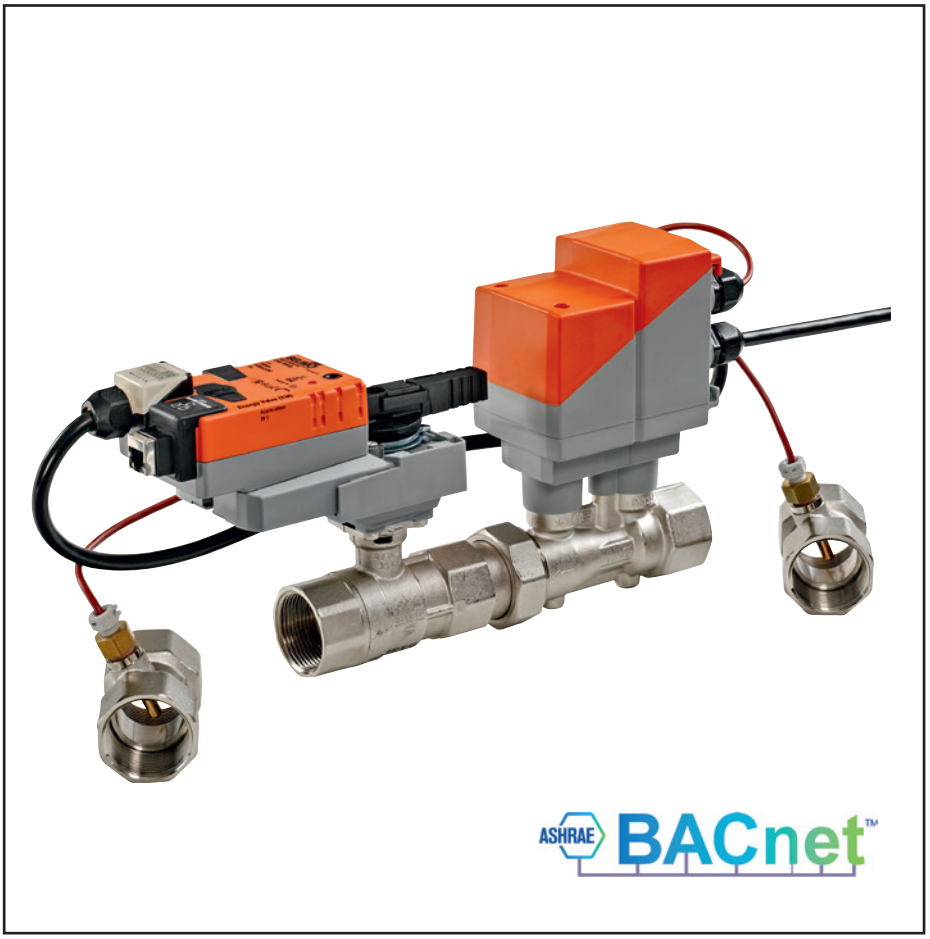

Energy Valve

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Protocol Implementation Conformance Statement – PICS

General information	Date	26.01.2018
	Vendor Name	BELIMO Automation AG
	Vendor ID	423
	Product Name	Energy Valve
	Product Model Number	EV..R+(K)BAC, EV..R3+BAC, EV..F+(K)BAC
	Applikations Software Version	03.02-0000
	Firmware Revision	12.25
	BACnet Protocol Revision	1.12
	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 (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	through the 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

Objekt 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	
Analog Output [AO]	Description COV Increment	Present Value
Analog Value [AV]	Description	Present Value
Binary Input [BI]	Description Active text Inactive Text	
Binary Valve [BV]	Description Active text Inactive Text	Prresent Value
Multi-state Input [MI]	Description State Text	
Multi-state Output [MO]	Description State Text	Present Value
Multi-state Value [MV]	Description State Text	Present Value

The device does not support the services CreateObject and DeleteObject.
The specified maximum length of writable strings is based on single-byte characters and support up to 252 characters.

Service processing

The device supports the DeviceCommunicationControl and ReinitializeDevice services. No password is required.
A maximum of 5 active COV subscriptions with a lifetime of 1…43'200 sec. (12 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 %	0...100	5	R
AbsPos	AI[2]	Absolute Position in degree	0...90	5	R
SpAnalog_V	AI[5]	Analog Setpoint in Volt	0...10.00	1	R
RelFlow	AI[10]	Relative Flow in %	0...100	5	R
AbsFlow_lmin	AI[11]	Absolute Flow in l/min	0...100'000	1	R
AbsFlow_m3h	AI[12]	Absolute Flow in m3/h	0...600	0.1	R
AbsFlow_gpm	AI[13]	Absolute Flow in gpm	0...100'000	1	R
AbsFlow_ls	AI[14]	Absolute Flow in l/s	0...100'000	0.1	R
AbsFlow_lh	AI[15]	Absolute Flow in l/h	0...100'000	100	R
T1_C	AI[20]	Temperature 1 (remote) in C	-10...+120	1	R
T2_C	AI[21]	Temperature 2 (embedded) in C	-10...+120	1	R
DeltaT_K	AI[22]	Delta Temperature in K	0...130	1	R
T1_F	AI[25]	Temperature 1 (remote) in F	14...248	1	R
T2_F	AI[26]	Temperature 2 (embedded) in F	14...248	1	R
DeltaT_F	AI[27]	Delta Temperature in F	0...266	1	R
AbsPower_kW	AI[30]	Power in kW	0...2.147e+6	10	R
E_Cooling_kWh	AI[31]	Cooling Energy in kWh	0...2.147e+9	10	R
E_Heating_kWh	AI[32]	Heating Energy in kWh	0...2.147e+9	10	R
E_Cooling_MJ	AI[33]	Cooling Energy in MJ	0...2.147e+9	10	R
E_Heating_MJ	AI[34]	Heating Energy in MJ	0...2.147e+9	10	R
AbsPower_kBTUh	AI[35]	Power in kBTU/h	0...2.147e+6	10	R
E_Cooling_kBTU	AI[36]	Cooling Energy in kBTU	0...2.147e+9	10	R
E_Heating_kBTU	AI[37]	Heating Energy in kBTU	0...2.147e+9	10	R
RelPower	AI[40]	Relative Power in %	0...300	5	R
AbsPower_ton	AI[45]	Power in ton refrigeration	0...2.147e+6	1	R
E_Cooling_tonh	AI[46]	Cooling Energy in ton*h	0...2.147e+9	1	R
E_Heating_tonh	AI[47]	Heating Energy in ton*h	0...2.147e+9	1	R
E_CoolReset_kWh	AI[50]	Cooling Energy in kWh, resettable with BV[31]	0...2.147e+9	1	R
E_HeatReset_kWh	AI[51]	Heating Energy in kWh, resettable with BV[32]	0...2.147e+9	1	R
E_CoolReset_kBTU	AI[52]	Cooling Energy in kBTU, resettable with BV[31]	0...2.147e+9	1	R
E_HeatReset_kBTU	AI[53]	Heating Energy in kBTU, resettable with BV[32]	0...2.147e+9	1	R
GlycolConcentration	AI[60]	Glycol concentration in % Measured value or override value from webserver	Measured value: 0...40 Override value: 0...80	1	R
ErrorState [1)]	AI[100]	Error State Error Sensor T1: Error with remote temperature sensor Error Sensor T2: Error with embedded temperature sensor Error Flow Sensor: Error with the flow sensor Actuator can't move: Mechanical overload due to blocked valve, etc. Flow with closed valve: Flow is measured but position of valve is closed Airbubbles: Air bubbles in the hydronic system Flow not reached: Setpoint cannot be reached within 3min during flow control Power not realized: Setpoint cannot be reached within 3min during power control Gear disengagement active: Gear disengaged button is pressed Reverse flow detected: Reverse flow is detected MP communication faulty: Internal communication between sensor and actuator faulty Freeze warning: Measured temperature & glycol concentration indicate that grease ice can build up	Bit 0: Error Sensor T1 Bit 1: Error Sensor T2 Bit 2: Error Flow Sensor Bit 3: Actuator cannot move Bit 4: Flow with closed valve Bit 5: Air bubbles Bit 6: Flow not reached Bit 7: Power not realized Bit 8: Gear disengaged Bit 9: Reverse flow detected Bit 10: MP communication faulty Bit 11: Freeze warning	1	R
SpAbsFlow_lmin	AI[111]	Setpoint Absolute Flow in l/min	0...100'000	1	R
SpAbsFlow_m3h	AI[112]	Setpoint Absolute Flow in m3/h	0...600	0.1	R
SpAbsFlow_gpm	AI[113]	Setpoint Absolute Flow in gpm	0...100'000	1	R
SpAbsFlow_ls	AI[114]	Setpoint Absolute Flow in l/s	0...100'000	0.1	R
SpAbsFlow_lh	AI[115]	Setpoint Absolute Flow in l/h	0...600	100	R
SpRel	AO[1]	Setpoint Relative in % The set point is related either to the position, the flow (of Vmax) or the power (of Pmax). See ControlMode for more information →MV[100]	0...100 Default: 0	1	C
Vmax_lmin	AV[90]	Maximum Flow Limit in l/min	30%Vnom…Vnom Default: Vnom	-	W
Vmax_gpm	AV [91]	Maximum Flow Limit in gpm	30%Vnom…Vnom Default: Vnom	-	W
Pmax_kW	AV [95]	Maximum Power Limit in kW	0.5%Pnom…Pnom Default: Pnom	-	W

BACnet Object Description

Object Name	Object Type [Instance]	Description Comment Status_Flags	Values	COV Increment	Access
Pmax_kBTUh	AV [96]	Maximum Power Limit in kBTU/h	0.5%Pnom…Pnom Default: Pnom	-	W
Vmax	AV [100]	Maximum Flow Limit in %	30…100 Default: 100	-	W
Vnom_lmin	AV [101]	Nominal Volume Flow in l/min	Vnom	-	W
Vnom_gpm	AV [102]	Nominal Volume Flow in gpm	Vnom	-	W
SpDeltaT_K	AV [103]	Setpoint DeltaT in K	1…55 Default: 10	-	W
SpDeltaT_F	AV [104]	Setpoint DeltaT inF	2…100 Default: 18	-	W
Pmax	AV [105]	Maximum Power Limit in %	0.5…100 Default: 100	-	W
Pnom_kW	AV [106]	Nominal Power in kW	Pnom	-	R
Pnom_kBTUh	AV [107]	Nominal Power in kBTU/h	Pnom	-	R
SpFlow_DeltaT lmin	AV [108]	Setpoint Flow at DeltaT in l/min	0...Vnom Default:Vnom	-	W
SpFlow_DeltaT gpm	AV [109]	Setpoint Flow at DeltaT in gpm	0...Vnom Default:Vnom	-	W

Object Name	Object Type [Instance]	Description Comment Status_Flags	Values	Access
SpPosReached	BI [1]	Setpoint Position reached	0: No 1: Yes	R
SummaryStatus	BI [101]	Summary Status Summarizes all status from MI 103 - 107	0: OK 1: Not OK	R
RstCoolEnergy	BV [31]	Reset Cooling Energy Sets the Cooling Energy (AI[50] / AI[52]) to zero	0: None 1: Reset	W
RstHeatEnergy	BV [32]	Reset Heating Energy Sets the Heating Energy (AI[51] / AI[53]) to zero	0: None 1: Reset	W
RstErrCount	BV [100]	Reset Error Counters	0: None 1: Reset	W
DeltaT_ MgrStatus	MI [102]	DeltaT Manager Status 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[108]	1: Not selected 2: Standby 3: Active 4: Scaling standby 5: Scaling active	R
StatusSensor	MI [103]	Status Sensor Indicates informations within the flow sensor and both temperature sensors	1: OK 2: Flow sensor not OK 3: T1 not OK 4: T2 not OK	R
StatusFlow	MI [104]	Status Flow Reverse flow detected: Energy Valves detected a reverse flow Flow not reached: Setpoint cannot be reached within 3min during flow control Flow in closed position: Flow is measured but position of valve is closed	1: OK 2: Reverse flow detected 3: Flow not reached 4: Flow in closed position	R
StatusMedia	MI [105]	Status Media Airbubbles: Airbubbles in the hydronic system. As long as there are airbubbles in the system, position control mode is active, regardless off control mode setting (ControlMode MV[100]). Freeze warning: Measured temperature & glycol concentration indicate that grease ice can build up	1: OK 2: Airbubbles 3: Freeze warning	R
StatusActuator	MI [106]	Status Actuator Actuator cannot move: Mechanical overload due to blocked valve, etc. Gear disengaged: Gear disengaged button is pressed	1: OK 2: Actuator cannot move 3: Gear disengaged	R
StatusPower	MI [107]	Status Power Power not reached: Setpoint cannot be reached within 3min during power control	1: OK 2: Power not reached	R

Override	MO [1]	Override Control Overrides setpoint with defined valves. It will change back to None (1) after 2 hours.	1: None 2: Close 3: Open 4: Vnom 5: Vmax 6: MotStop 7: Pnom 8: Pmax Default: None(1)	C
ControlMode	MV [100]	Control Mode This value defines the interpretation of the setpoint	1: Position Control 2: Flow Control 3: Power Control Default: Flow control(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 108]	1: Disabled 2: dT-Manager 3: dT-Manager scaling Default: Disabled(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: Analog(1)	W