ePICV

Control valves for electronic flow rate control

Modbus

GENERAL DESCRIPTION

Control ball valve for electronic flow rate control.

It improves efficiency in HVAC systems by automatically balancing the system independently of pressure variations.

MAIN FEATURES AND FUNCTIONS

- **Pressure-independent flow rate control**
- **Shut-off function**
- **Flow sensor with Vortex technology**
- **Integrated control panel**
- **Datalogger function**
- **Analogue signal for remote setting of flow rate set-points**
- **ModBus-RTU remote management**

APPLICATIONS AND BENEFITS

HVAC and industrial Heating and cooling systems.

VERSIONS AND CODES

Model	DN	Connection	Q min (2) [m³/h]	Q max (3) [m³/h]	Δp max [bar]	Kvs [m³/h]	PN (4)
EPICV2 x(1)15	15	G1/2"B	0,05	0,9	3,4	1,2	8
EPICV2 x(1)20	20	G3/4"B	0,11	1,9	3,4	2,8	8
EPICV2 x(1)25	25	G1"B	0,21	3,0	3,4	4,7	8
EPICV2 x(1)32	32	G1"1/4B	0,30	5,1	3,4	7,7	8
EPICV2 x(1)40	40	G1"1/2B	0,54	9,0	3,4	12,4	8

Example code EPICV2**2**15

(1) power supply selection: **2** = 230V 50/60 Hz • **4** = 24V 50/60 Hz.

(2) minimum flow rate that can be correctly adjusted.

(3) maximum flow rate that can be correctly adjusted.

(4) maximum pressure for fluid temperature 80°C maximum
pressure 12 bar for fluid temperature 40°C maximum
pressure 16 bar available on request.

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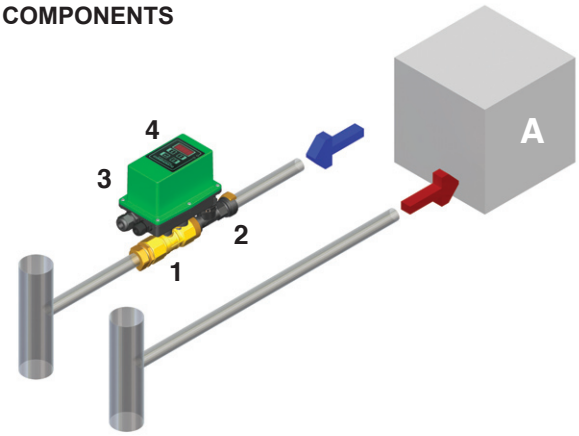
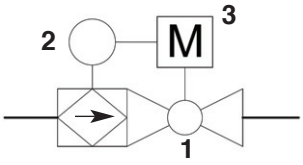
COMPONENTS



1 : 2-way equal percentage control ball valve
2 : Vortex-type flow rate sensor
3 : Actuator with built-in electronics
4 : Keyboard and display

A : Utility

HYDRAULIC DIAGRAM



TECHNICAL FEATURES

Functional data	
Fluid	Water, max. glycol 50%
Fluid temperature	5°C….80°C (100°C at 6 bar)
Maximum operating pressure	8 bar (12 bar at 40°C)
Maximum differential pressure	3,4 bar

Actuator	
Power supply	230 V • 24 V AC ± 15%
Supply frequency	50/60 Hz
Maximum power consumption	15 VA
Operating time (90°)	35 s
Degree of electrical protection	IP65
Electronic adjuster	PID
Flow rate control dead band	0,01 m³/h
Control interface	On-board display and keyboard
Watch buffer battery	Lithium CR2032, service life 10 years
Activation digital input	To be connected to clean contacts (free voltage) - Working voltage 0/5V dc
Activation signalling relay output	CClean contact (free voltage) - External power supply max. 230V Current max.1A
Analogue input set-point range	0-10V DC
Analogue input impedance	20 kΩ
Opening and closing Auxiliary limit switches	Clean contact (free voltage) - Max. current 1A
Serial interface	RS485
Power and control cable length	80 cm

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Flow rate sensor	
Measuring principle	Vortex - piezoceramic sensor
Accuracy	< 2%, glycol 0%
Sensor paddle material	ETFE
Body material	PA6T/6I (40% GF)
Seal material	EPDM/FPM
Electrical connection	M12x1 connector - IP65

Control valve	
Type	Ball valve with regulating disc
Characteristic curve	Equal percentage
Operating angle	90°
Loss class (EN60534-4)	IV (< 0,01% Kvs)
Body, ball and rod material	Brass CW 617N – UNI EN 12420
Ball gasket	P.T.F.E 15% graphite
O-ring	EPDM
Modulator disc	PPA

Communication interface	
Protocol	Modbus-RTU
Standard	EIA-RS 485 half duplex
Baud rate	19.200 baud/s

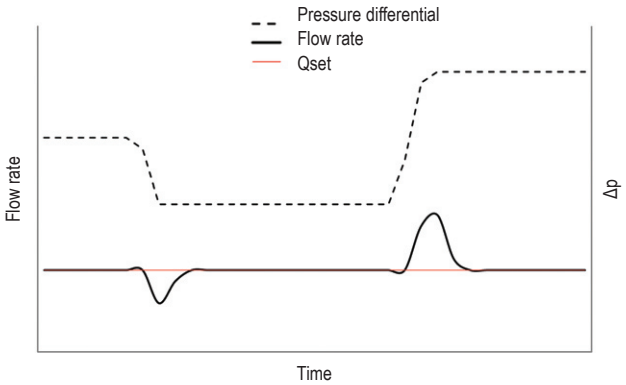
Environmental conditions	
Room temperature	-10°C…50°C, UR max. 85% - no condensation
Storage and transport	-40°C…80°C, UR max 85% - no condensation

Certifications	
EC Low Voltage Directive	2014/35/UE: 26/04/2014
Electromagnetic Compatibility Directive	2014/30/UE
EC Machinery Directive	2006/42/EC

PRESSURE-INDEPENDENT FLOW RATE CONTROL

The **ePICV** control valve receives a flow rate set-point (Q_{set}) via:

- On-board control panel
- 0-10V analogue command from an external controller
- Modbus



The set flow rate value (Q_{set}) is achieved and kept constant by adjusting the valve opening, thus ensuring that the system being controlled is independent of pressure variations.

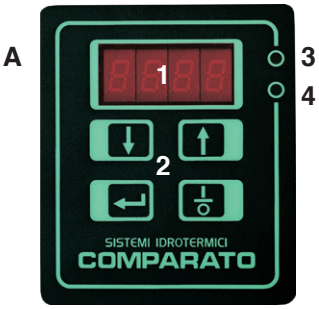
The flow is constantly monitored by the integrated flow rate sensor.

SHUT-OFF

ePICV receives an I/0 activation command from a device equipped with clean contacts: when the system is deactivated, the control valve is instructed to fully close, thus fulfilling the shut-off function of the controlled system.

CONTROL PANEL

Using the device's on-board control panel, the operating status can be displayed, and all setting and commissioning operations can be carried out easily and immediately.



1 : Display
2 : Keyboard
3 : Red LED - activation
4 : Green LED - deactivation

Display blocked

To restrict access to the controller's control parameters, the display can be locked: unlocking is only possible by entering the correct password.

ANALOGUE CONTROL

With a 0-10V dc signal, the set-point value of the flow rate can be adjusted and the extremes of the range can be defined.

MODBUS

By connecting to the RS 485 serial port with the Modbus-RTU protocol, it is possible to access all the regulation parameters provided by the operating logs, supervise the status of the valve and send commands to the valve.

The Modbus address table can be downloaded from www.comparato.com

DATALOGGER

The device stores the activation time. Each day, when 24:00 hours are reached, the following information package is stored:

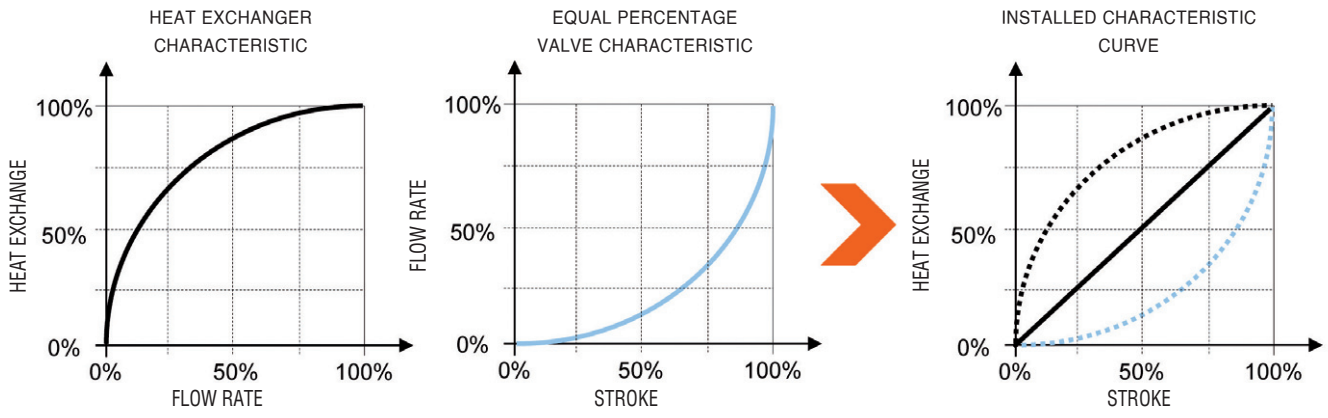
• Date (day/month/year)

• Activation time (hours:minutes)

When the memory is used up, the information packets are overwritten starting with the oldest. Data remain in stored even with no power supply, thanks to the buffer battery, and are transmitted via Modbus-RTU when requested by the network master.

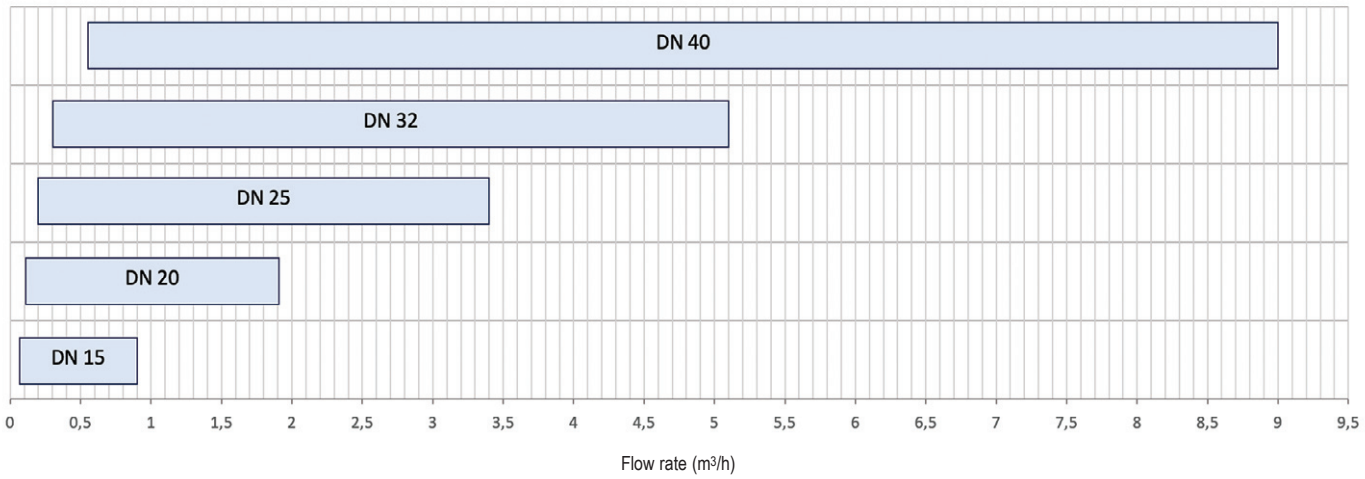
CONTROL FEATURE

The control valve is equipped with an equal percentage characteristic curve, obtained by means of special modulation discs, which makes it possible to compensate for the non-linearity of heat exchange and to obtain a constant-gain system.

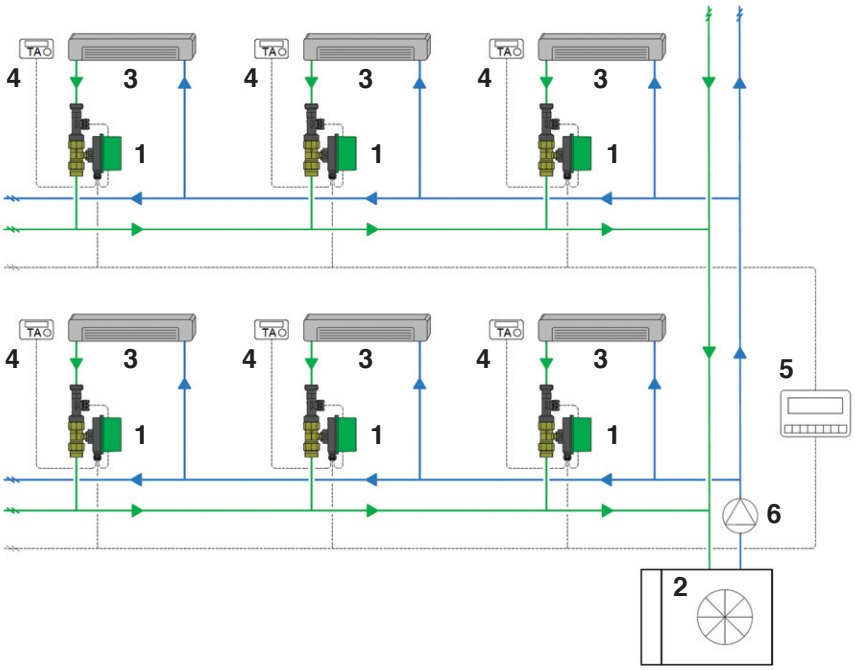


DIMENSIONING

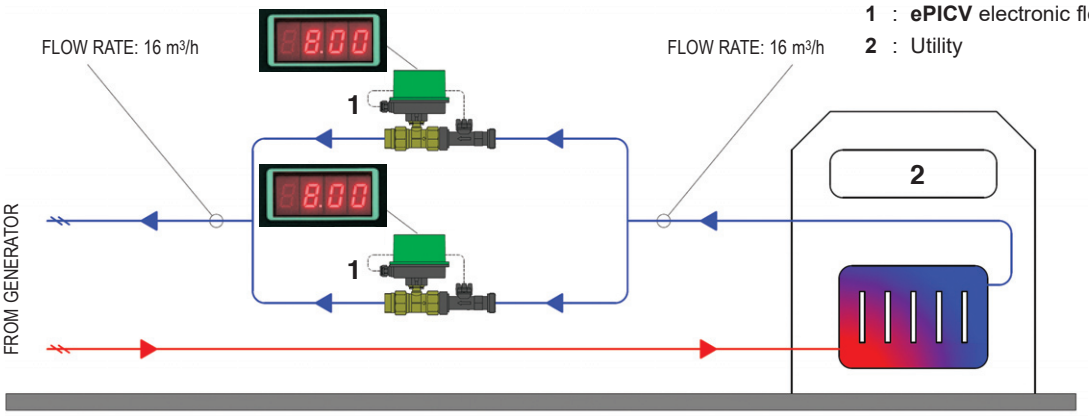
The valve diameter is chosen on the basis of the flow range to be delivered to the utility the **ePICV** valve needs to serve.



APPLICATION EXAMPLES

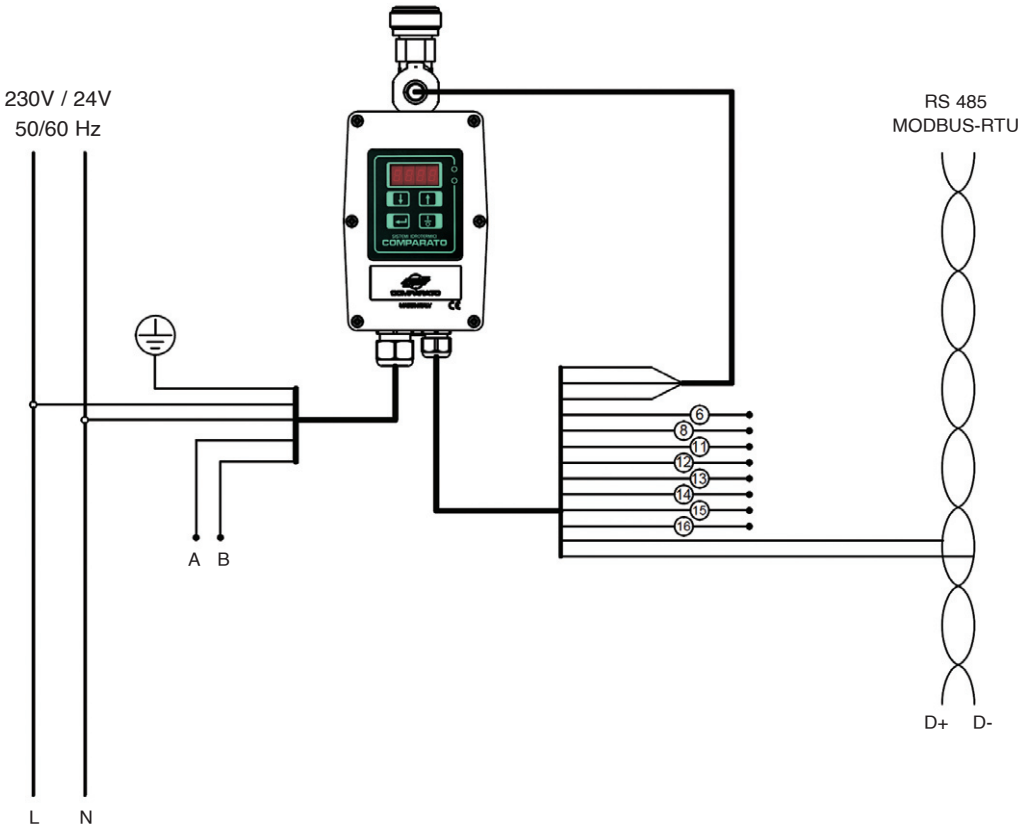


1 : **ePICV** electronic flow rate control valve
2 : Heat pump
3 : Fancoil
4 : Room thermostat
5 : BMS
6 : Circulator



1 : **ePICV** electronic flow rate control valve
2 : Utility

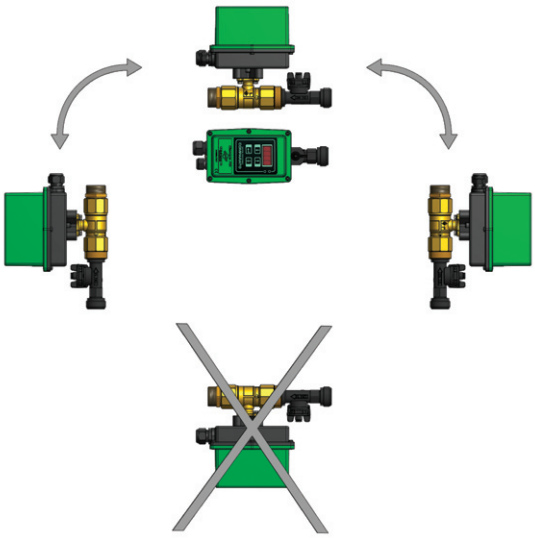
ELECTRICAL CONNECTIONS

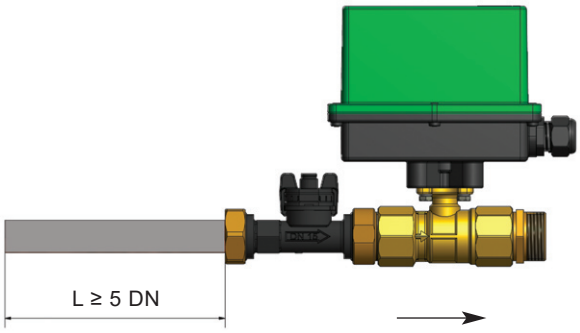


N°	Type	Description
A	Relay output	Activation signal
B	Relay output	Activation signal
6	Digital input	Activation command
8	GND	Common for digital input
11	Analogue input	0-10V (+)
12	Analogue input	0-10V (-)
13	Aux limit switch	Closed valve signal
14	Aux limit switch	Closed valve signal
15	Aux limit switch	Open valve signal
16	Aux limit switch	Open valve signal

Electrical connections must be made inside a suitable derivation box (not included).

INSTALLATION





The device can be installed on both the flow line and the return line.

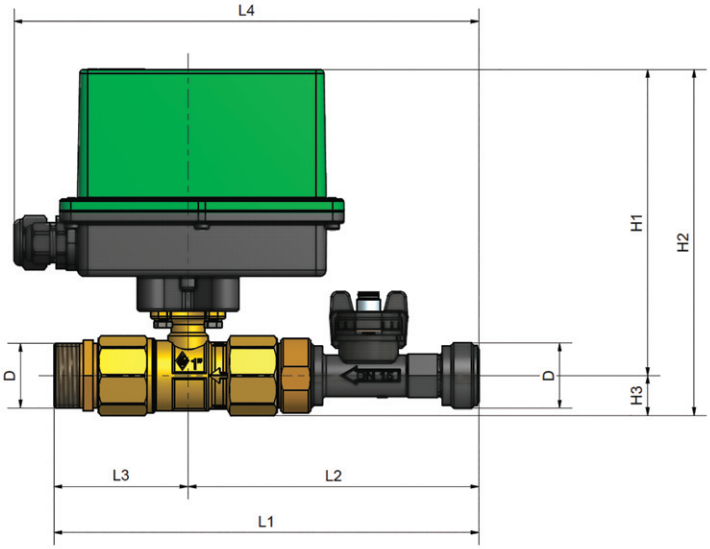
CAVITATION

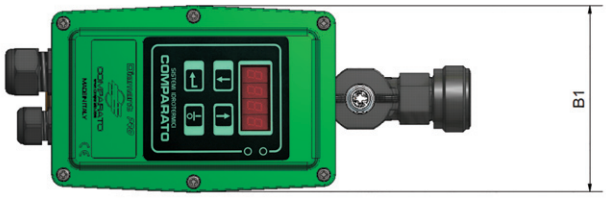
To avoid the phenomenon of cavitation, it is necessary that the static pressure (P_{static}) remains above the value calculated below:

$$P_{static} \geq 5{,}5 * \Delta p$$

$$\Delta p = differential\ pressure = \left(\frac{Flow\ rate}{Kvs}\right)^2$$

OVERALL SIZE





Type	DN (mm)	D	L1	L2	L3	L4	H1	H2	H3	B1
EPCV2_15	15	1/2"	216	161	55	250	154	170	16	95
EPCV2_20	20	3/4"	192	135	57	224	154	170	17	95
EPCV2_25	25	1"	216	148	68	236	156	176	20	95
EPCV2_32	32	1"1/4	256	176	80	265	166	192	26	95
EPCV2_40	40	1"1/2	270	193	77	281	166	195	29	95

ACCESSORIES

Shell insulation

Material: cross-linked closed-cell polyethylene insulation

CODE	DN
INSULATION	
CBCV15	15
CBCV20	20
CBCV25	25
CBCV32	32
CBCV40	40

EXAMPLE OF SPECIFICATIONS

REGULATION VALVE FOR ELECTRONIC FLOW CONTROL EPICV, 2-way equal percentage ball valve with shut-off function, Vortex flow sensor, integrated monitoring and control interface, RS485 serial with Modbus-RTU protocol, DN25, PN8, Kvs 4.7 mc/h, min/max flow. 0.21 ÷ 3.0 mc/h, power supply 230V 50/60Hz.

Brand: **COMPARATO**

Model: **ePICV**

Code: **EPICV2225**