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Introduction

The **EvoPICV** Pressure Independent Control Valve “PICV” is a combined adjustable constant flow limiter and full stroke, full authority equal percentage temperature control valve.

The **EvoPICV** is suitable for use in variable and constant temperature systems and may be used as constant flow limiter in constant volume systems (without an actuator head) or as a true PICV in variable volume systems.

Operating principle

EvoPICV valve is made by three main parts:

1. differential pressure regulator
2. regulating valve for flow adjustment
3. flow pre-setting knob

1. Differential pressure regulator

The differential pressure regulator is the heart of the pressure independent control valve. By keeping a constant differential pressure across the valve seats constant flow and full authority temperature control can be achieved.

Incoming pressure P_1 is transmitted to the top face of the diaphragm, outgoing pressure P_3 is transmitted to the underside of this same diaphragm. A constant effective differential pressure is maintained between P_2 and P_3 . As P_1 increases relative to P_3 it acts on the diaphragm closing the shutter (A) against a seat (B) thereby lowering the effective differential pressure. As P_1 decreases relative to P_3 the diaphragm acts to open the shutter (A) from the seat (B) thus increasing the effective differential pressure. The diaphragm acts against a spring in order to balance the pressure control and stop the diaphragm oscillating.

2. Regulation valve

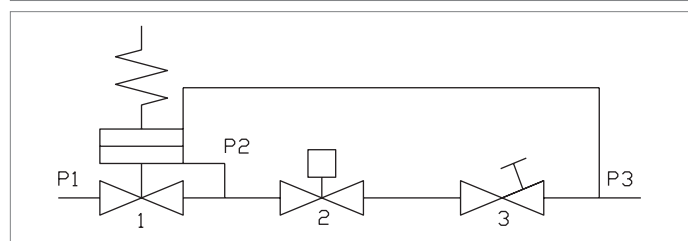
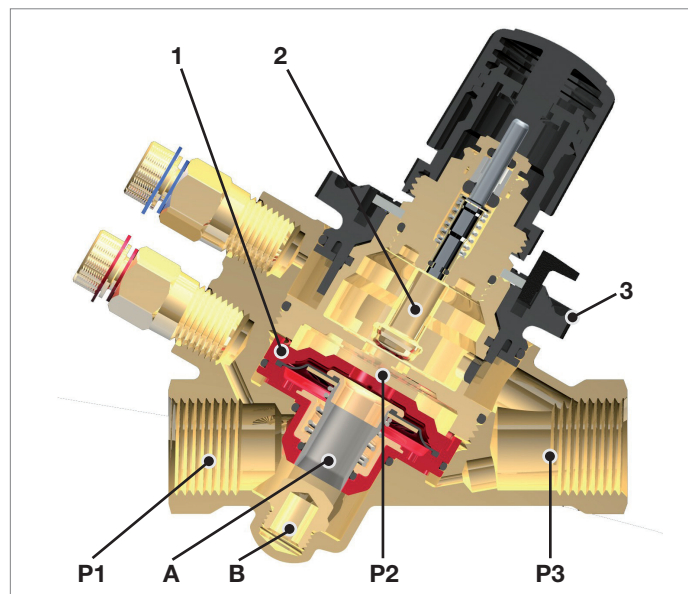
Water flow through a valve varies as a function of the area of passage and the pressure differential across that valve. Due to the incorporation of the differential pressure regulator the differential pressure across the valve seats $P_2 - P_3$ is constant meaning that flow is now only a function of area of passage.

Setting any flow rate value and maintaining it stable is also possible. The regulation valve presents an equal percentage characteristic.

Advantages and user-friendliness

1. Advantages

- **EvoPICV** is a full authority temperature control valve. This means that each individual terminal receives on the flow required even in part load conditions.
- The regulator corrects any differential pressure variation. This leads to a considerable reduction in temperature variations and adjustment movements and to the extension of the life of the moving devices connected to it.
- **EvoPICV** valves offer a remarkable adjustment flexibility. They can be accurately set to a specific flow rate value and they allow precise modulating control.
- The valves always guarantee a suitable flow rate thanks to equalpercentage characteristic, therefore avoiding too high energy consumption.
- Since **EvoPICV** valve performs the functions of two valves (balancing and adjustment), the installation costs are considerably reduced.
- The automatic flow rate limitation eliminates system commissioning costs.
- Since commissioning is very easy to perform, design flow rates can be modified at any time and at low costs.
- Since it is not necessary to commission the valve after its installation, the valve can work immediately after it has been



Functional schematic

3. Adjustment knob

The maximum value of the flow can be preset, choking the outlet section of the control valve, using the graduated adjustment knob.

The percentage value, indicated on the scale, matches the maximum flow rate percentage. This value can be changed turning the adjustment knob until it reaches the selected position (matching the percentage indicated on the scale). A locking mechanism avoids the valve set values from being changed inadvertently.

assembled, for example, on the floors where works are already finished.

2. User-friendliness

In order to adjust the flow rate, just set the selected value using the adjustment knob.

Since flow rate is the only parameter to be considered, choosing the suitable valve is easy and fast.

EvoPICV valve maximum adjustment matches the maximum flow rate allowed by the pipe size, on the basis of the values established by international standards.

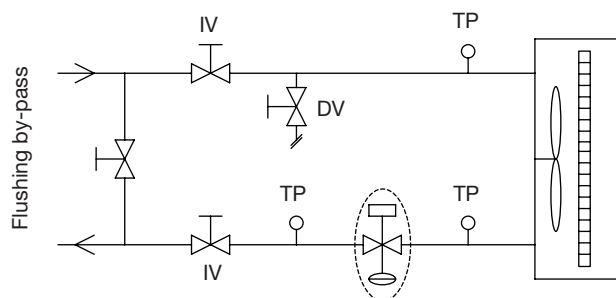
- Setting ratio calculation is not necessary.
- Valve authority calculation is not required.
- Specific devices or knowledge are not necessary.
- Compact design that allows installing the valve also in small spaces such as fan-coils or narrow supply spaces.
- The special adjustment knob allows the flow rate to be set without disassembling the actuator.

Applications examples

1. Systems with variable thermal power

The use of a motorised control valve that automatically limits the flow rate, ensures stable energy supply, independently from the available pressures and, at the same time, thanks to the possibility of controlling the flow rate regulator, it allows effective adjustment of ambient temperature.

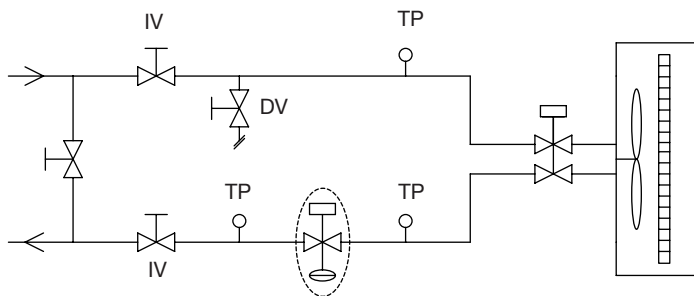
PICV is used as a constant flow limiter and control valve.



2. Systems with constant thermal power

If the valve is used to adjust fan-coil flow, it ensures the required flow rate to the equipment and it favours the hydraulic balance of the system. The exchanger always works in the best conditions possible with any differential pressure and the system is split into hydraulically separated areas.

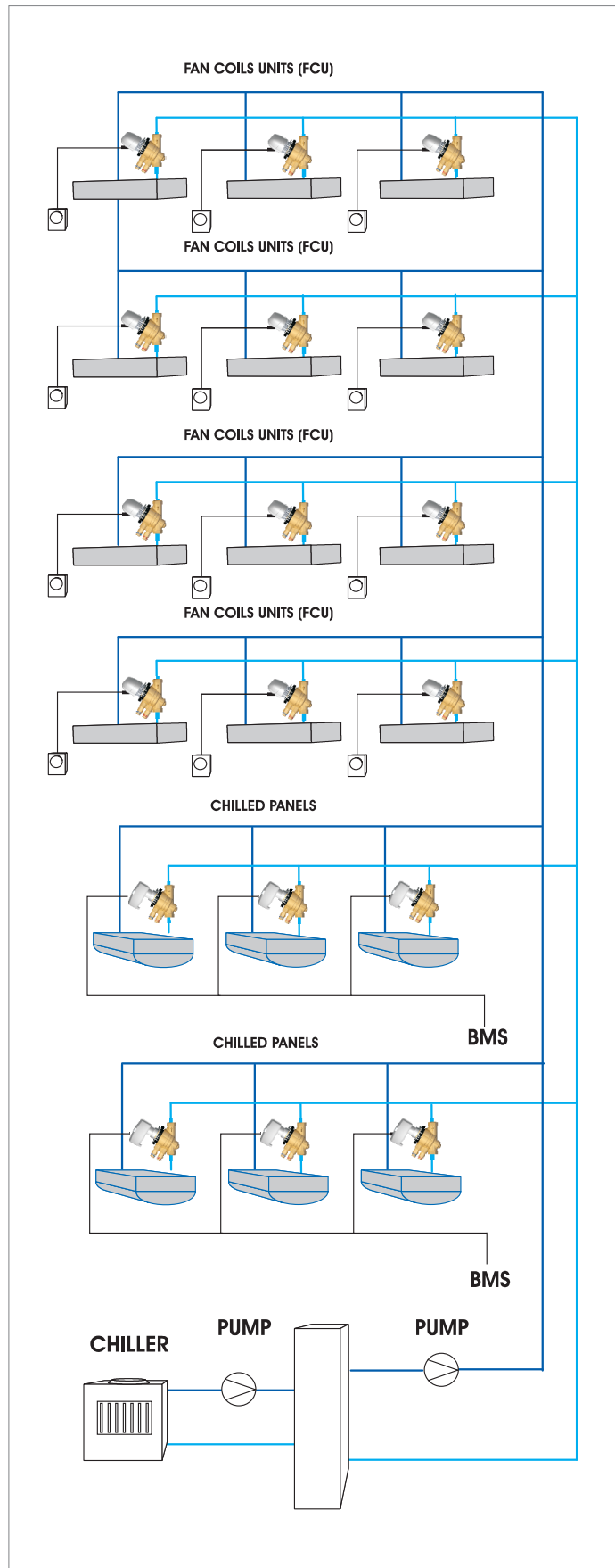
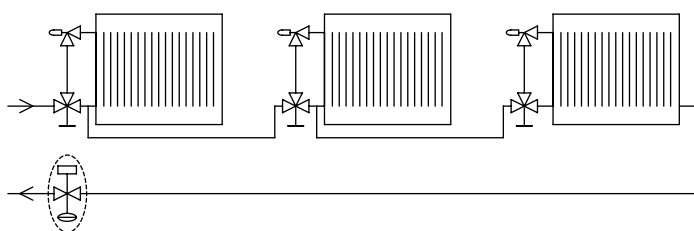
PICV is used as a constant flow limiter.



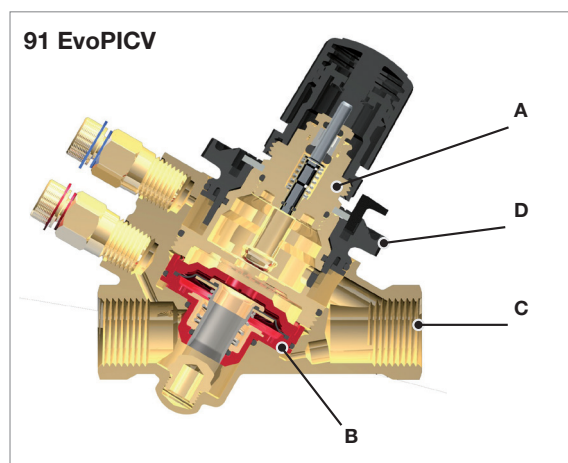
3. Single-pipe heating systems

An automatic valve placed on the system return line ensures a stable flow rate on the main branches at any thermostatic valve opening, thus reducing the possible sudden changes due to pressure variations in the system.

PICV is used as a constant flow limiter.



Technical specifications

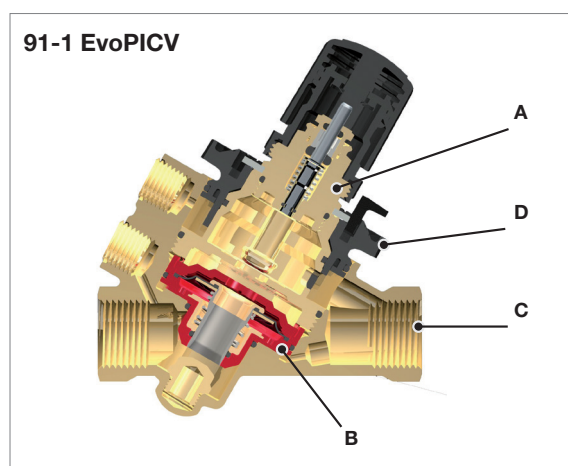


	Material list
Regulating valve (A)	Brass CW614N Stainless steel 18/8
Diaphragm (B)	High resistance polymer - EPDM Stainless steel AISI 303
Presetting (D)	High resistance polymer Brass CW614N
Body (C)	Corrosion resistant brass CW602N
Gaskets	EPDM-x

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	2500 kPa / 25 bar	3 mm	50÷100 IEC 60534-2-3	Class IV IEC 60534-4

	91VL 1/2"	91L 1/2"	91H 1/2"	91L 3/4"	91H 3/4"	91H 1"
Flow rate max.	150 l/h 0,042 l/s	600 l/h 0,167 l/s	780 l/h 0,217 l/s	1000 l/h 0,278 l/s	1500 l/h 0,417 l/s	1500 l/h 0,417 l/s
Start-up max.	20 kPa 0,20 bar	25 kPa 0,25 bar	35 kPa 0,35 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	35 kPa 0,35 bar
Connections	Rp 1/2" F EN 10226-1	Rp 1/2" F EN 10226-1	Rp 1/2" F EN 10226-1	Rp 3/4" F EN 10226-1	Rp 3/4" F EN 10226-1	Rp 1" F EN 10226-1

NPT version available



	Material list
Regulating valve (A)	Brass CW614N Stainless steel 18/8
Diaphragm (B)	High resistance polymer - EPDM Stainless steel AISI 303
Presetting (D)	High resistance polymer Brass CW614N
Body (C)	Corrosion resistant brass CW602N
Gaskets	EPDM-x

NPT version available

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	2500 kPa / 25 bar	3 mm	50÷100 IEC 60534-2-3	Class IV IEC 60534-4

	91VL1 1/2"	91L1 1/2"	91H1 1/2"	91L1 3/4"	91H1 3/4"	91H1 1"
Flow rate max.	150 l/h 0,042 l/s	600 l/h 0,167 l/s	780 l/h 0,217 l/s	1000 l/h 0,278 l/s	1500 l/h 0,417 l/s	1500 l/h 0,417 l/s
Start-up max.	20 kPa 0,20 bar	25 kPa 0,25 bar	35 kPa 0,35 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	35 kPa 0,35 bar
Connections	Rp 1/2" F EN 10226-1	Rp 1/2" F EN 10226-1	Rp 1/2" F EN 10226-1	Rp 3/4" F EN 10226-1	Rp 3/4" F EN 10226-1	Rp 1" F EN 10226-1

* see product technical specification for further information

** closing the valve by means of the actuator

91X EvoPICV


	Material list
Regulating valve	Brass CW614N Stainless steel 18/8
Diaphragm	High resistance polymer - EPDM Stainless steel AISI 303
Presetting	High resistance polymer Brass CW614N
Body	Brass CW617N
Gaskets	EPDM-x

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	2500 kPa / 25 bar	3 mm	50÷100 IEC 60534-2-3	Class IV IEC 60534-4

	91XVL 1/2"	91XL 1/2"	91XH 1/2"
Flow rate max.	150 l/h 0,042 l/s	600 l/h 0,167 l/s	900 l/h 0,250 l/s
Start-up max.	20 kPa 0,20 bar	25 kPa 0,25 bar	30 kPa 0,30 bar
Connections	Rp 1/2" F EN 10226-1	Rp 1/2" F EN 10226-1	Rp 1/2" F EN 10226-1

91X/2 EvoPICV


	Material list
Regulating valve	Brass CW614N Stainless steel 18/8
Diaphragm	High resistance polymer - EPDM Stainless steel AISI 303
Presetting	High resistance polymer Brass CW614N
Body	Brass CW617N
Gaskets	EPDM-x

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	2500 kPa / 25 bar	3 mm	50÷100 IEC 60534-2-3	Class IV IEC 60534-4

	91XVL/2 1/2"	91XL/2 1/2"	91XL/2 3/4"	91XH/2 3/4"
Flow rate max.	150 l/h 0,042 l/s	600 l/h 0,167 l/s	600 l/h 0,167 l/s	900 l/h 0,250 l/s
Start-up max.	20 kPa 0,20 bar	25 kPa 0,25 bar	25 kPa 0,25 bar	30 kPa 0,30 bar
Connections	G 1/2"M (flat face) EN 10226-1	G 1/2"M (flat face) EN 10226-1	G 3/4"M (flat face) EN 10226-1	G 3/4"M (flat face) EN 10226-1

* see product technical specification for further information

** closing the valve by means of the actuator

91X/3 EvoPICV


	Material list
Regulating valve	Brass CW614N Stainless steel 18/8
Diaphragm	High resistance polymer - EPDM Stainless steel AISI 303
Presetting	High resistance polymer Brass CW614N
Body	Brass CW617N
Gaskets	EPDM-x

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	2500 kPa / 25 bar	3 mm	50÷100 IEC 60534-2-3	Class IV IEC 60534-4

	91XVL/3 1/2" x 1/2"	91XL/3 1/2" x 1/2"	91XH/3 1/2" x 1/2"
Flow rate max.	150 l/h 0,042 l/s	600 l/h 0,167 l/s	900 l/h 0,250 l/s
Start-up max.	20 kPa 0,20 bar	25 kPa 0,25 bar	30 kPa 0,30 bar
Connections	1/2" F x 1/2" union M EN 10226-1	1/2" F x 1/2" union M EN 10226-1	1/2" F x 1/2" union M EN 10226-1

91X3S EvoPICV

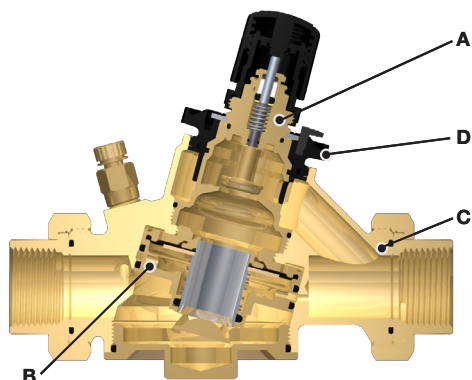

	Material list
Regulating valve	Brass CW614N Stainless steel 18/8
Diaphragm	High resistance polymer - EPDM Stainless steel AISI 303
Presetting	High resistance polymer Brass CW614N
Body	Brass CW617N
Gaskets	EPDM-x

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	2500 kPa / 25 bar	3 mm	50÷100 IEC 60534-2-3	Class IV IEC 60534-4

	91XVL3S 1/2" F x 3/4" M	91XL3S 1/2" F x 3/4" M	91XH3S 1/2" F x 3/4" M
Flow rate max.	150 l/h 0,042 l/s	600 l/h 0,167 l/s	900 l/h 0,250 l/s
Start-up max.	20 kPa 0,20 bar	25 kPa 0,25 bar	30 kPa 0,30 bar
Connections	1/2" F x 3/4" M BS5200 60° EN 10226-1	1/2" F x 3/4" M BS5200 60° EN 10226-1	1/2" F x 3/4" M BS5200 60° EN 10226-1

* see product technical specification for further information

** closing the valve by means of the actuator

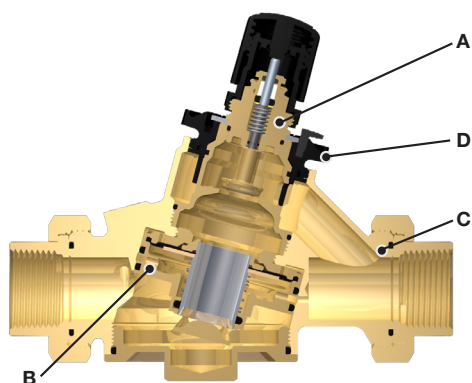
93 EvoPICV


	Material list
Regulating valve (A)	Brass CW614N Stainless steel 18/8
Diaphragm (B)	Brass CW614N - EPDM Stainless steel AISI 303
Presetting (D)	High resistance polymer Brass CW614N
Body (C)	Brass CW602N
Gaskets	EPDM-x

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	2500 kPa / 25 bar	6 mm	100÷150 IEC 60534-2-3	Class IV IEC 60534-4

	93L ¾"	93H ¾"	93L 1"	93H 1"	93L 1 1/4"	93H 1 1/4"
Flow rate max.	2200 l/h 0,611 l/s	2700 l/h 0,750 l/s	2200 l/h 0,611 l/s	2700 l/h 0,750 l/s	2700 l/h 0,750 l/s	3000 l/h 0,833 l/s
Start-up max.	25 kPa 0,25 bar	30 kPa 0,30 bar	25 kPa 0,25 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar
Connections	Rc ¾" union F EN 10226-1	Rc ¾" union F EN 10226-1	Rc 1" union F EN 10226-1	Rc 1" union F EN 10226-1	Rc 1 1/4" union F EN 10226-1	Rc 1 1/4" union F EN 10226-1

NPT version available

93-1 EvoPICV


	Material list
Regulating valve (A)	Brass CW614N Stainless steel 18/8
Diaphragm (B)	Brass CW614N - EPDM Stainless steel AISI 303
Presetting (D)	High resistance polymer Brass CW614N
Body (C)	Brass CW602N
Gaskets	EPDM-x

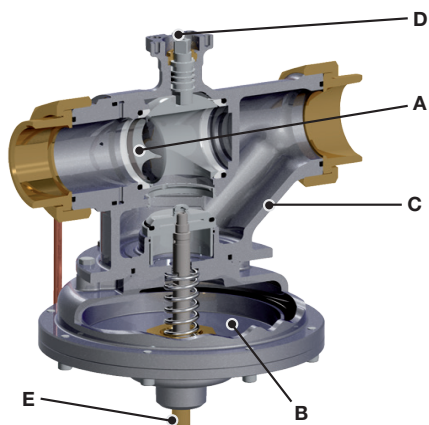
NPT version available

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	2500 kPa / 25 bar	6 mm	100÷150 IEC 60534-2-3	Class IV IEC 60534-4

	93L1 ¾"	93H1 ¾"	93L1 1"	93H1 1"	93L1 1 1/4"	93H1 1 1/4"
Flow rate max.	2200 l/h 0,611 l/s	2700 l/h 0,750 l/s	2200 l/h 0,611 l/s	2700 l/h 0,750 l/s	2700 l/h 0,750 l/s	3000 l/h 0,833 l/s
Start-up max.	25 kPa 0,25 bar	30 kPa 0,30 bar	25 kPa 0,25 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar
Connections	Rc ¾" union F EN 10226-1	Rc ¾" union F EN 10226-1	Rc 1" union F EN 10226-1	Rc 1" union F EN 10226-1	Rc 1 1/4" union F EN 10226-1	Rc 1 1/4" union F EN 10226-1

* see product technical specification for further information

** closing the valve by means of the actuator

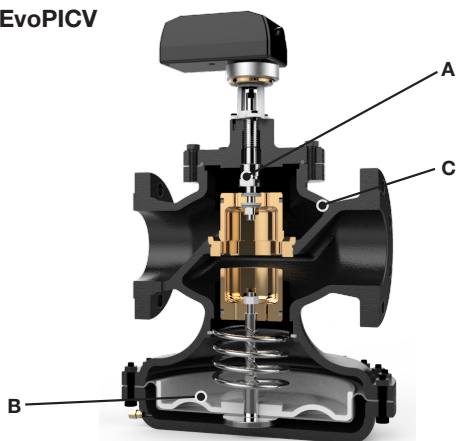
83 EvoPICV


	Material list
Regulating valve (A)	Brass CW617N PTFE
Diaphragm (B)	Brass CW614N - EPDM-X Stainless steel AISI 303
Presetting (D) [PR1 series]	Brass CW617N
Body (C)	Ductile Iron
Gaskets	EPDM-x
Additional manual shut-off device (E)	Brass CW614N

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	1600 kPa / 16 bar	90°	>100 IEC 60534-2-3	Class IV IEC 60534-4

	83HPR1 1 1/4"	83LPR1 1 1/2"	83HPR1 1 1/2"	83VLPR1 2"	83LPR1 2"	83HPR1 2"
Flow rate max.	6000 l/h 1,67 l/s	6000 l/h 1,67 l/s	9000 l/h 2,5 l/s	11000 l/h 3,06 l/s	12000 l/h 3,33 l/s	18000 l/h 5,00 l/s
Start-up max.	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	40 kPa 0,40 bar	35 kPa 0,35 bar	35 kPa 0,35 bar
Connections	Rc 1 1/4" union F EN 10226-1	Rc 1 1/2" union F EN 10226-1	Rc 1 1/2" union F EN 10226-1	Rc 2" union F EN 10226-1	Rc 2" union F EN 10226-1	Rc 2" union F EN 10226-1

NPT version available

94F EvoPICV


	Material list
Regulating valve (A)	Brass CW602N Stainless steel 18/8
Diaphragm (B)	Brass CW602N - EPDM Stainless steel AISI 303
Body (C)	Ductile iron
Gaskets	EPDM-x

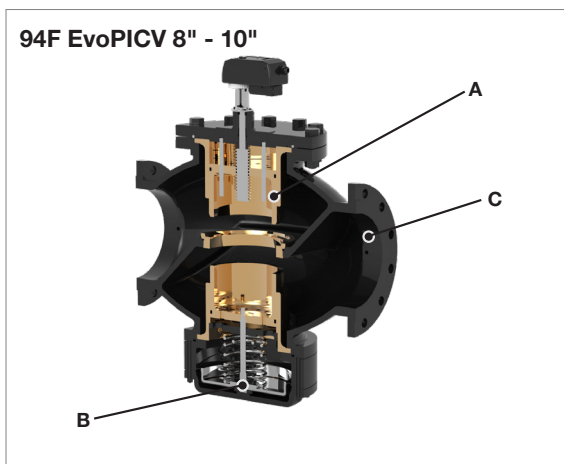
^ANSI B16.1 version available with product name 95F

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
600 kPa / 6 bar	600 kPa / 6 bar	-10 ÷ 120 °C	1600 kPa / 16 bar	15÷22 mm	>100 IEC 60534-2-3	Class IV IEC 60534-4

	^94FH 2"	94FL 2 1/2"	^94FH 2 1/2"	^94FL 3"	^94FL 4"	94FL 5"	94FH 5"	^94FL 6"	^94FH 6"
Flow rate max.	20000 l/h 5,56 l/s	20000 l/h 5,56 l/s	30000 l/h 8,30 l/s	30000 l/h 8,30 l/s	55000 l/h 15,28 l/s	90000 l/h 25,00 l/s	120000 l/h 33,33 l/s	90000 l/h 25,00 l/s	150000 l/h 41,667 l/s
Start-up max.	40 kPa 0,40 bar	40 kPa 0,40 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	35 kPa 0,35 bar	35 kPa 0,35 bar	50 kPa 0,50 bar
Connections	Flanged 2" EN 1092-2 EN 558 (face to face)	Flanged 2 1/2" EN 1092-2 EN 558 (face to face)	Flanged 2 1/2" EN 1092-2 EN 558 (face to face)	Flanged 3" EN 1092-2 EN 558 (face to face)	Flanged 4" EN 1092-2 EN 558 (face to face)	Flanged 5" EN 1092-2 EN 558 (face to face)	Flanged 5" EN 1092-2 EN 558 (face to face)	Flanged 6" EN 1092-2 EN 558 (face to face)	Flanged 6" EN 1092-2 EN 558 (face to face)

* see product technical specification for further information

** closing the valve by means of the actuator



Material list	
Regulating valve (A)	Brass CW602N Stainless steel 18/8
Diaphragm (B)	Brass CW602N - EPDM Stainless steel AISI 304
Body (C)	Ductile iron
Gaskets	EPDM-x

ΔP max. *	Close off pressure **	Temperature	Working pressure max.	Stroke	Rangeability	Leakage
400 kPa / 4 bar	400 kPa / 4 bar	-10 ÷ 120 °C	1600 kPa / 16 bar	15÷22 mm	>100 IEC 60534-2-3	Class IV IEC 60534-4

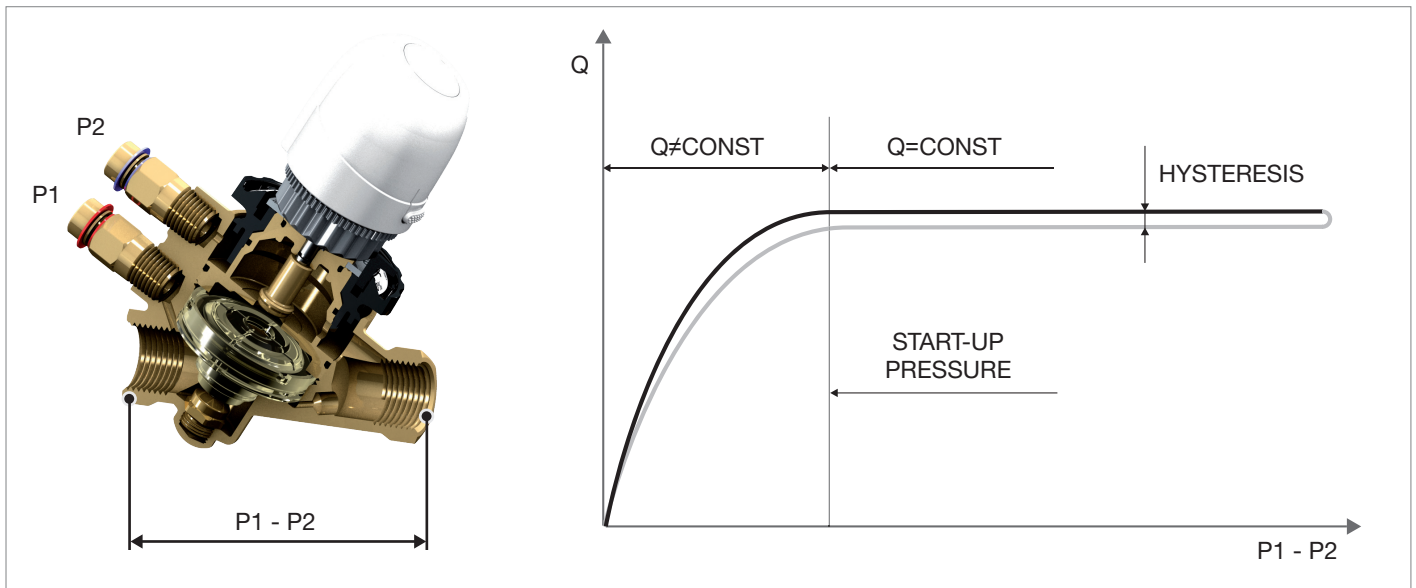
	94FL 8"	94FH 8"	94FL 10"	94FH 10"
Flow rate max.	200000 l/h 55,56 l/s	300000 l/h 83,33 l/s	300000 l/h 83,33 l/s	500000 l/h 138.8 l/s
Start-up max.	40 kPa 0,40 bar	60 kPa 0,60 bar	40 kPa 0,40 bar	65 kPa 0,65 bar
Connections	Flanged 8" EN 1092-2 EN 558 (face to face)	Flanged 8" EN 1092-2 EN 558 (face to face)	Flanged 10" EN 1092-2 EN 558 (face to face)	Flanged 10" EN 1092-2 EN 558 (face to face)

* see product technical specification for further information. Additional tests reports available upon request.

** closing the valve by means of the actuator. Not suitable to be used for end of line service. Additional tests reports available upon request.

Allowed medium in all PICV range
Water / Water+glycol 30%

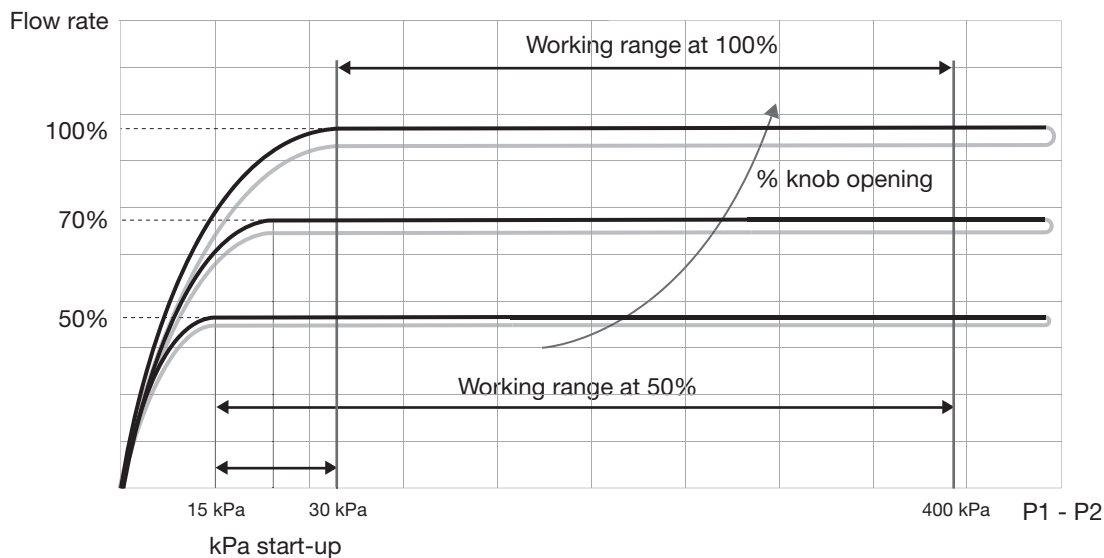
Dynamic characteristic curves



Using a differential pressure gauge to measure the pressure drop the valve absorbs, allows to check whether the valve is in the operating range (and, therefore, whether the flow is constant) by simply verifying that the measured value $P1 - P2$ is higher than the start-up value.

If the ΔP measured value is lower than the start-up value, then the valve works as a fixed orifice valve.

Start-up value varies with flow setting of the valve, as shown by the example below:

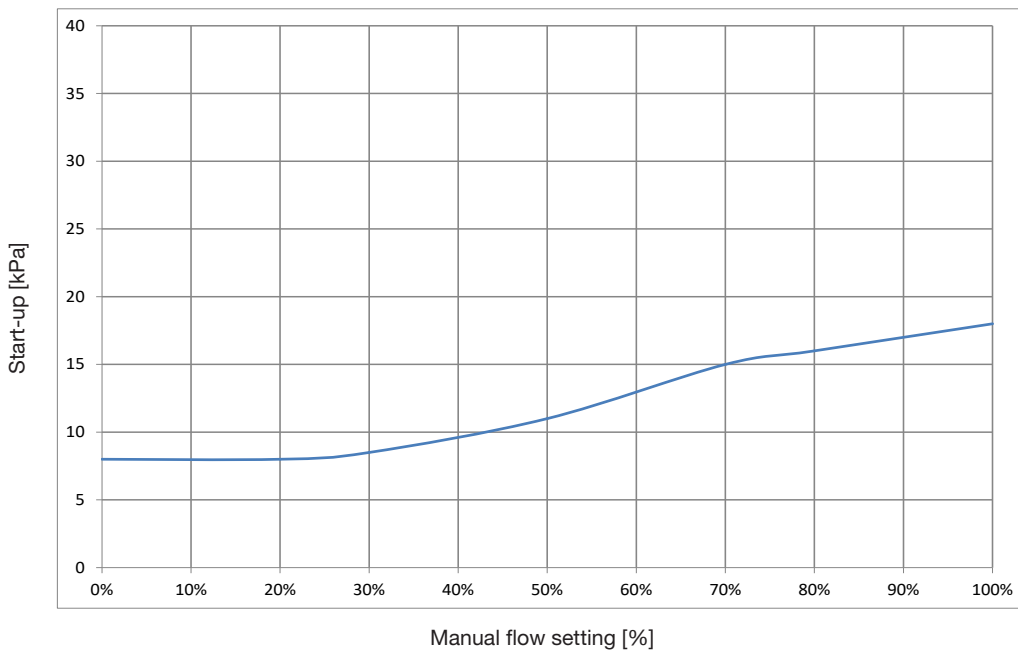


When the valve is set at 100% of nominal (maximum) flow, the curve begins to remain constant at 30 kPa, therefore the working range of the valve is $30 \div 400$ kPa;

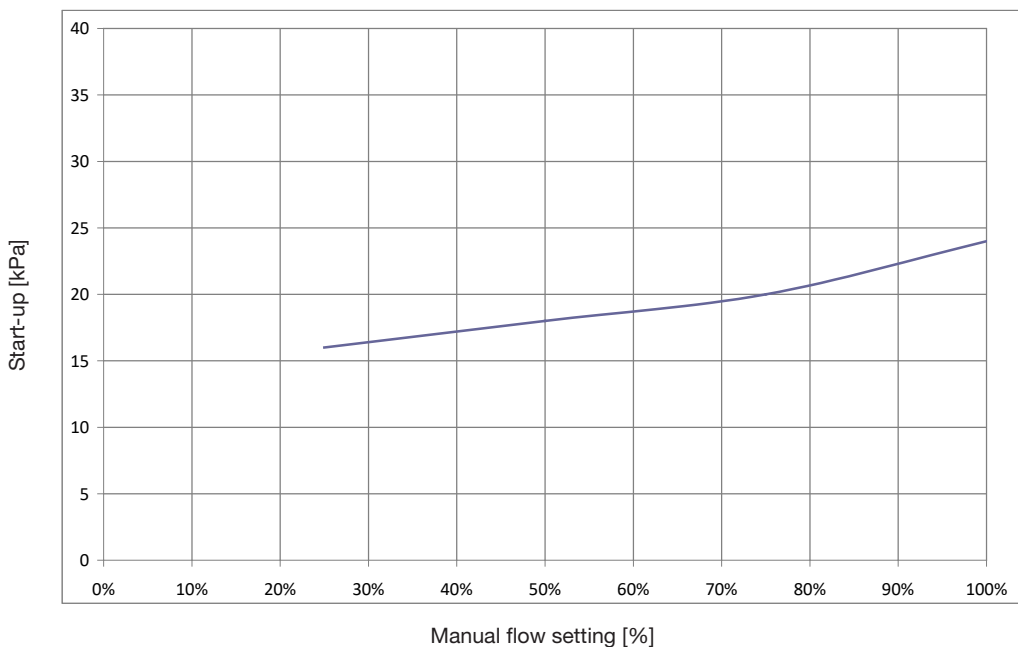
When the valve is set at 50% of nominal flow, the curve begins to remain constant at 15 kPa, therefore the working range of the valve is $15 \div 400$ kPa.

Over 400 kPa the fluid velocity through the valve is extremely high and cavitation may happen due to extreme turbulence of the flow. Because of these phenomena the valve can get damaged. For energy saving reasons, we suggest to continuously work the valve under 400 kPa.

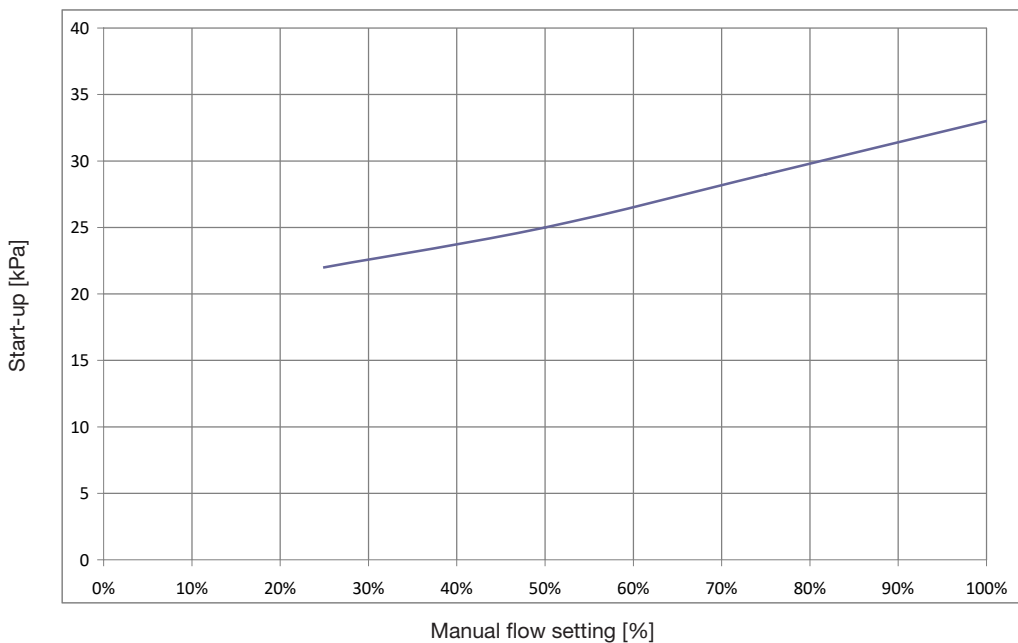
The following charts show how *start-up pressure* changes for each models



Valve model
91VL 1/2" - 150 l/h
91VL1 1/2" - 150 l/h
91XVL 1/2" - 150 l/h
91XVL/3 1/2" - 150 l/h
91XVL3S 1/2" - 150 l/h
91XVL/2 1/2" - 150 l/h

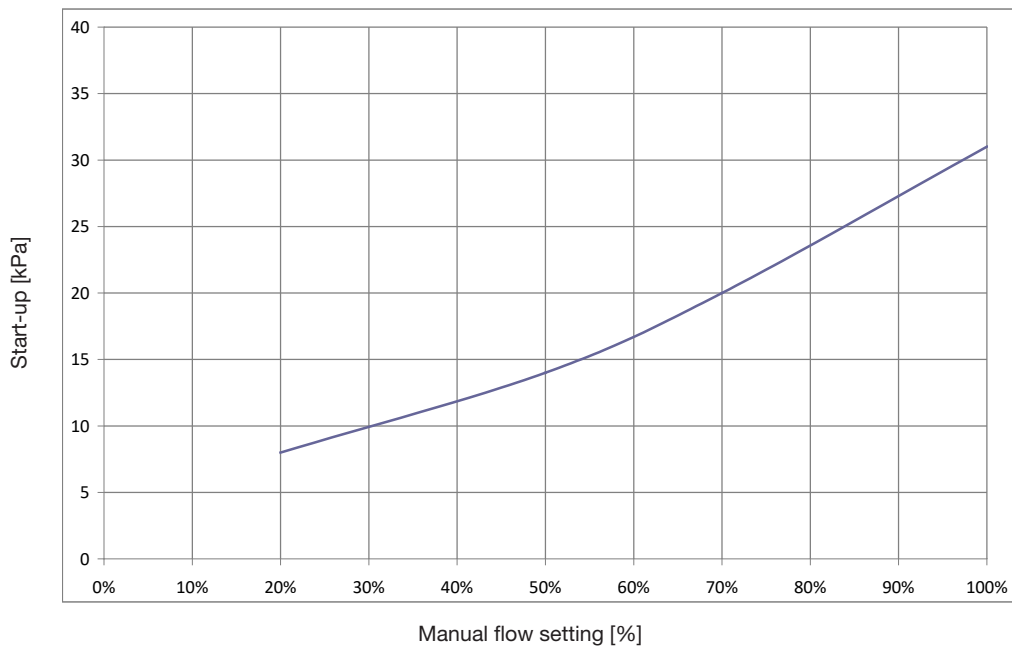


Valve model
91L 1/2" - 600 l/h
91L1 1/2" - 600 l/h
91XL 1/2" - 600 l/h
91XL/2 1/2" - 600 l/h
91XL/3 1/2" - 600 l/h
91XL3S 1/2" - 600 l/h
91XL/2 3/4" - 600 l/h

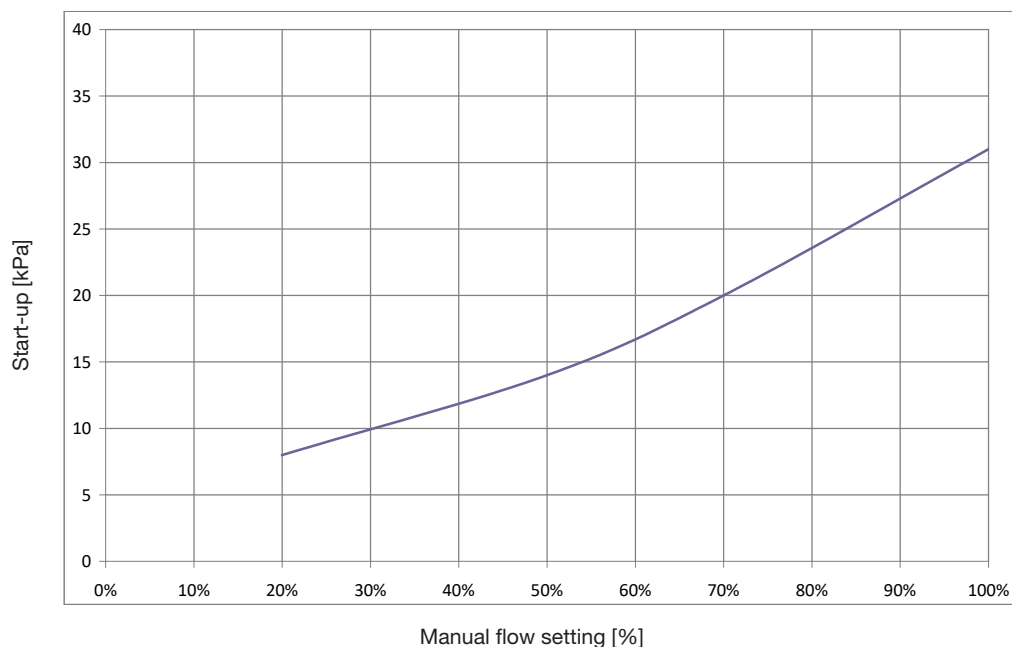


Valve model
91H 1/2" - 780 l/h
91H1 1/2" - 780 l/h

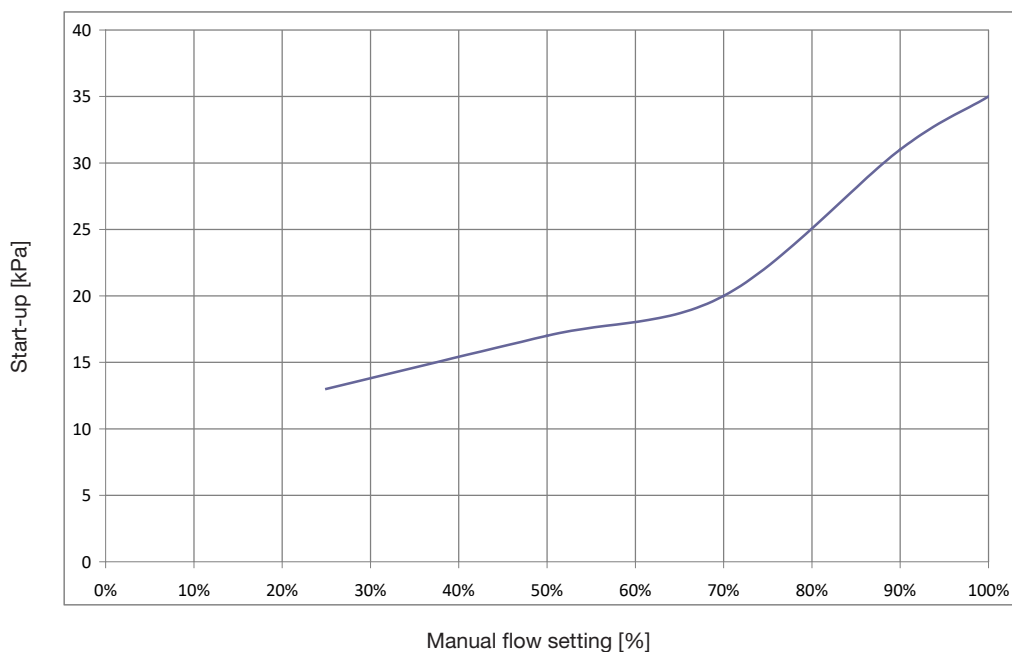




Valve model
91XH 1/2" - 900 l/h
91XH/2 3/4" - 900 l/h
91XH/3 1/2" - 900 l/h
91XH3S 1/2" - 900 l/h

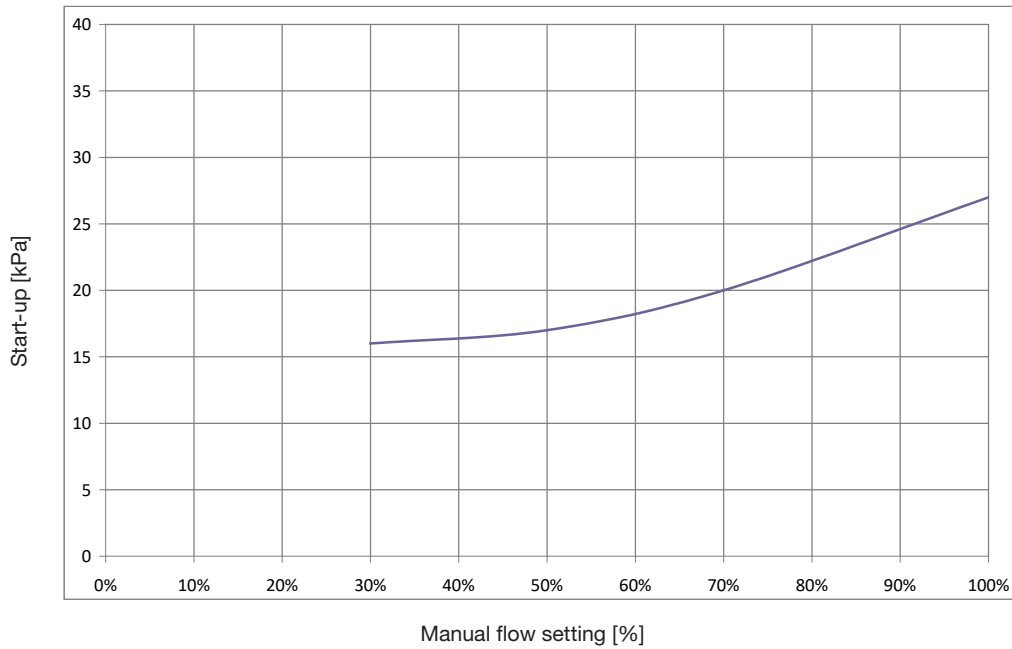


Valve model
91L 3/4" - 1000 l/h
91L1 3/4" - 1000 l/h

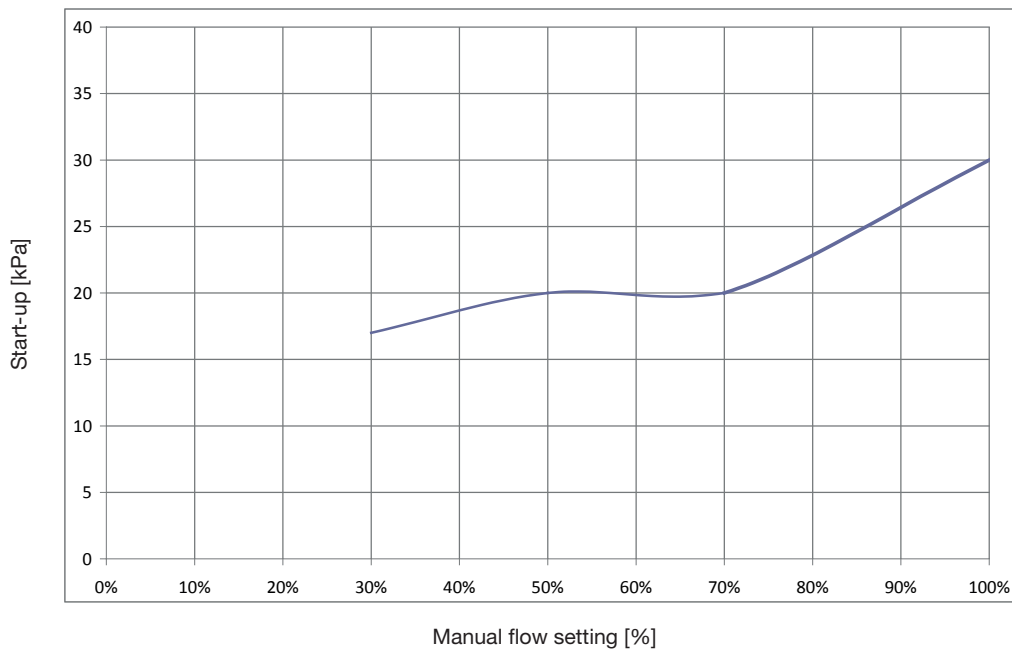


Valve model
91H 3/4" - 1500 l/h
91H1 3/4" - 1500 l/h
91H 1" - 1500 l/h
91H1 1" - 1500 l/h

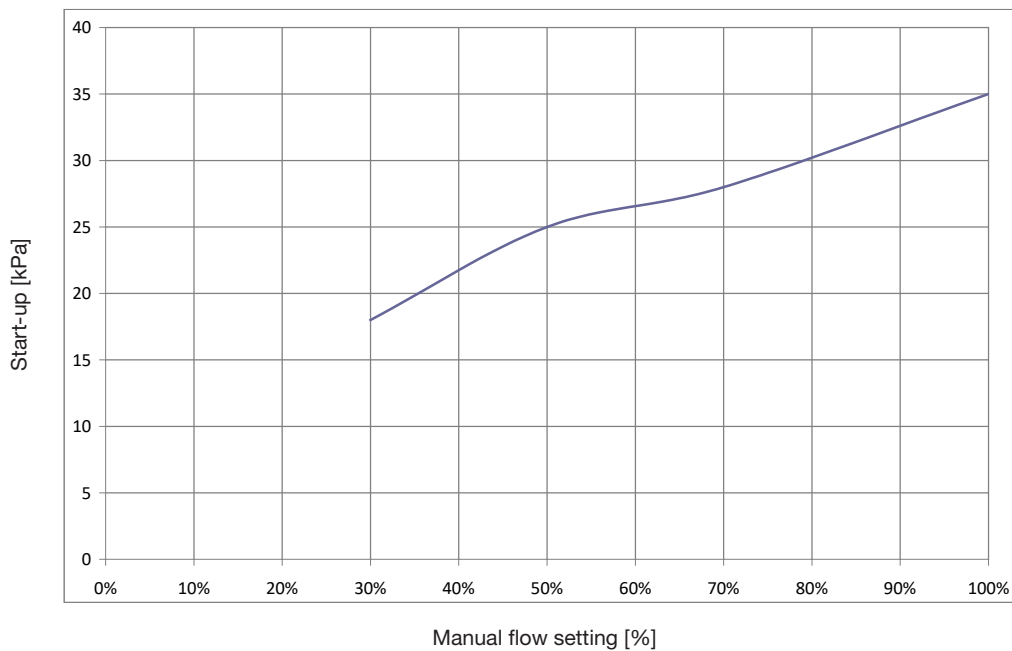




Valve model
93L 3/4" - 2200 l/h
93L1 3/4" - 2200 l/h
93L 1" - 2200 l/h
93L1 1" - 2200 l/h

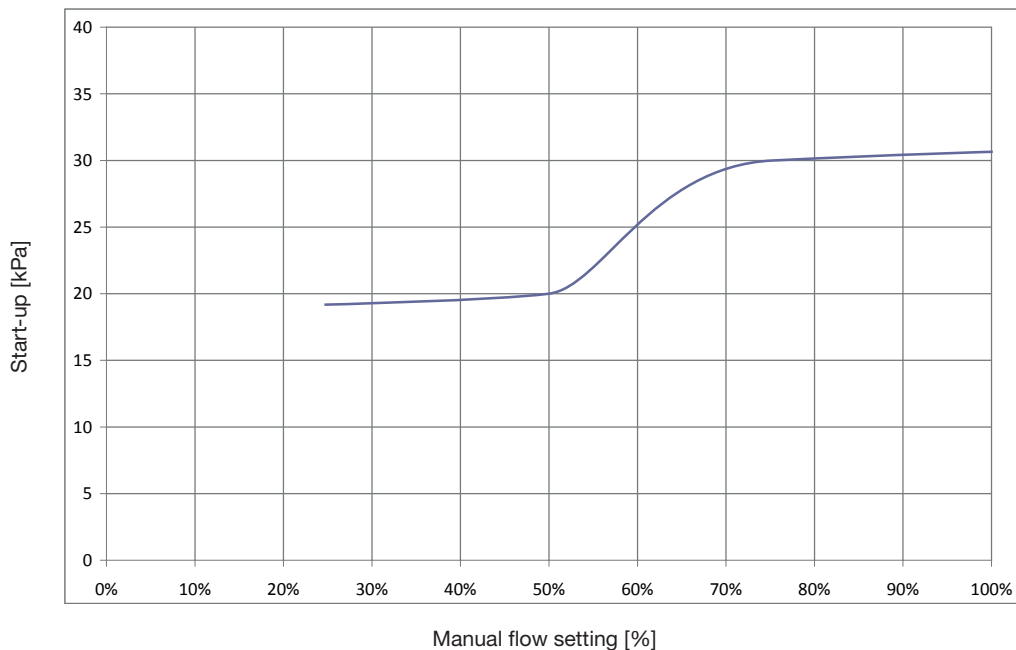


Valve model
93H 3/4" - 2700 l/h
93H1 3/4" - 2700 l/h
93H 1" - 2700 l/h
93H1 1" - 2700 l/h
93L 1 1/4" - 2700 l/h
93L1 1 1/4" - 2700 l/h

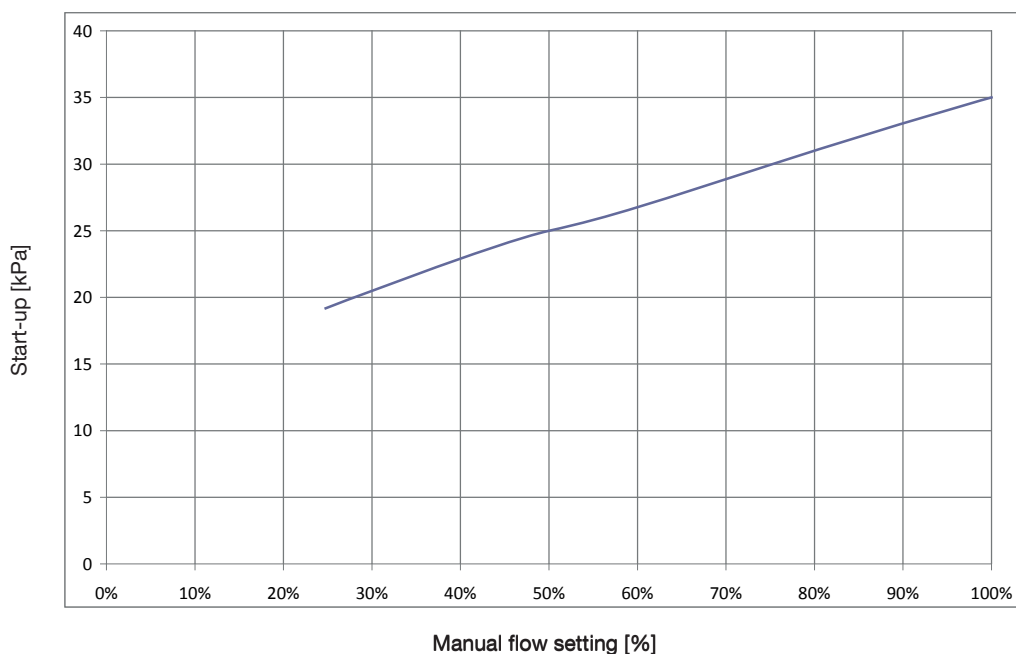


Valve model
93H 1 1/4" - 3000 l/h
93H1 1 1/4" - 3000 l/h

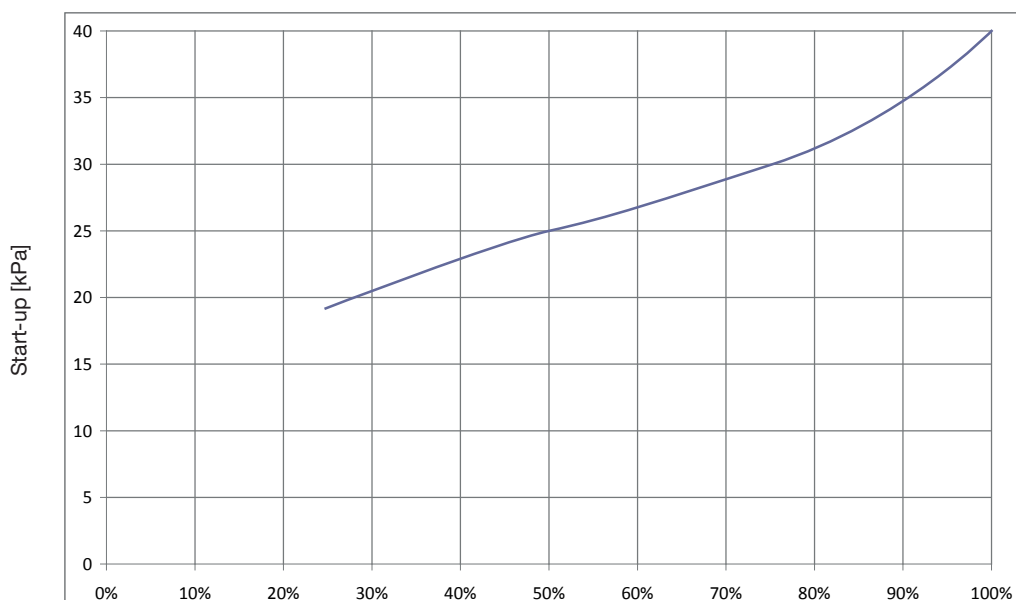




Valve model
 83HPR1 1 1/4" - 6000 l/h
 83LPR1 1 1/2" - 6000 l/h

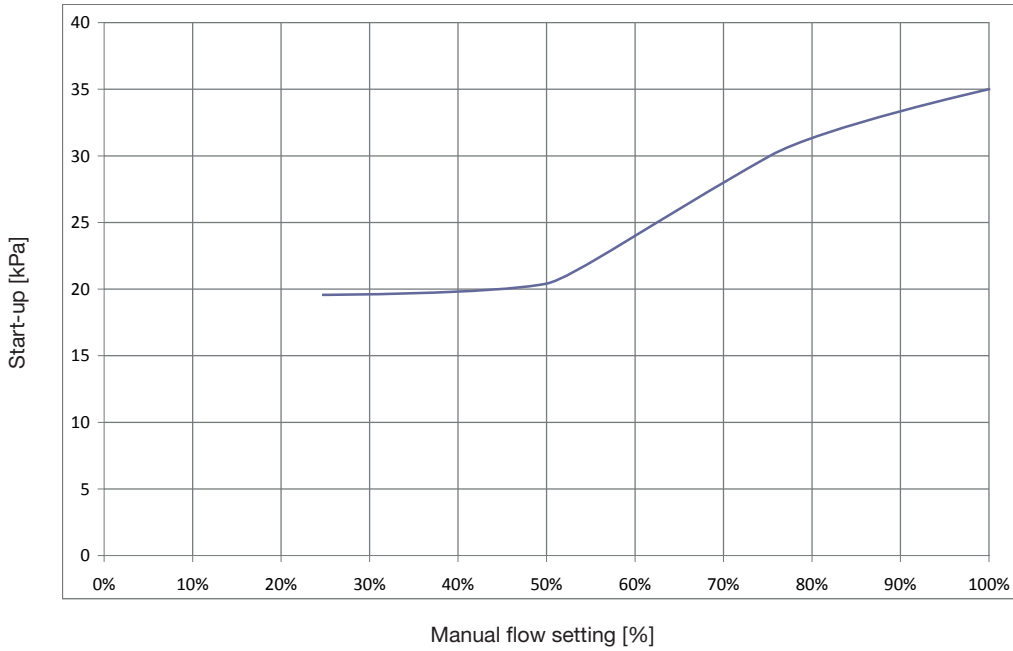


Valve model
 83HPR1 1 1/2" - 9000 l/h

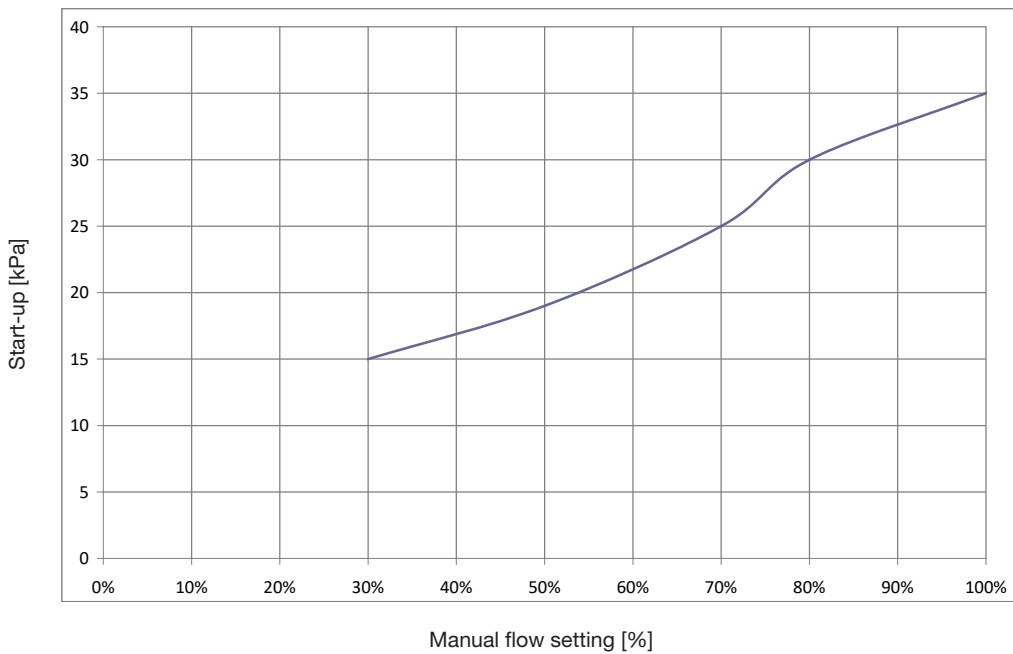


Valve model
 83VLPR1 2" - 11000 l/h

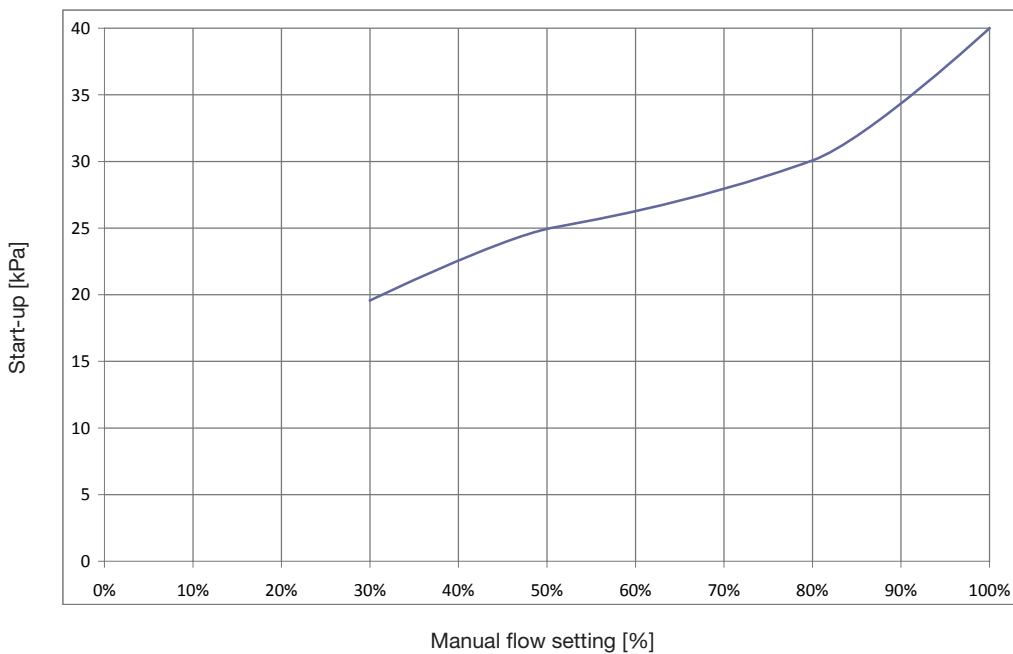




Valve model
83LPR1 2" - 12000 l/h

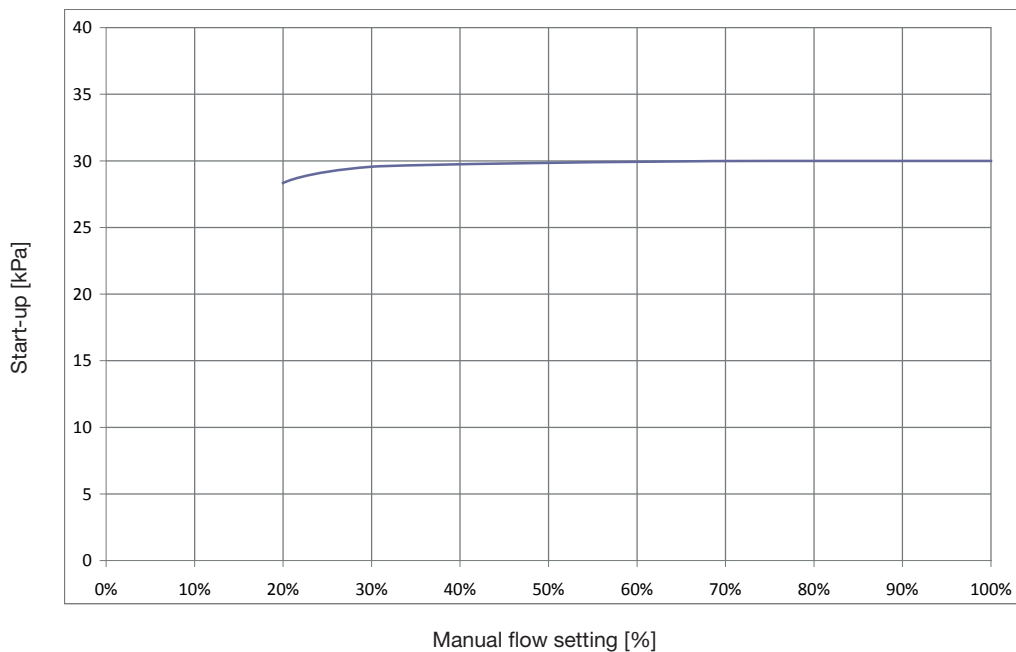


Valve model
83HPR1 2" - 18000 l/h

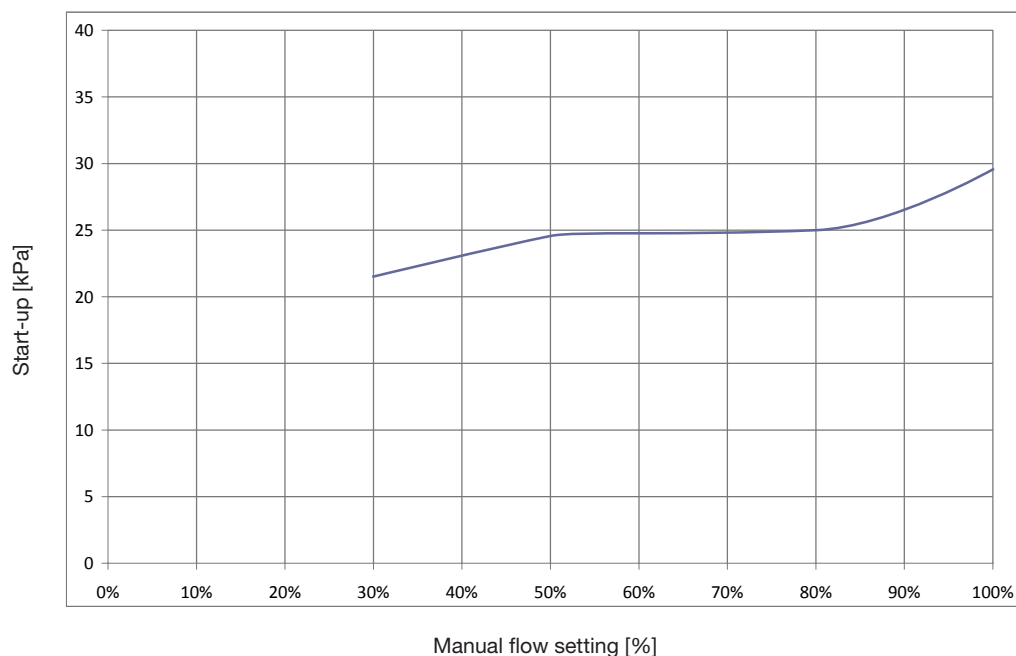


Valve model
94FH 2" - 20000 l/h
94FL 2 1/2" - 20000 l/h

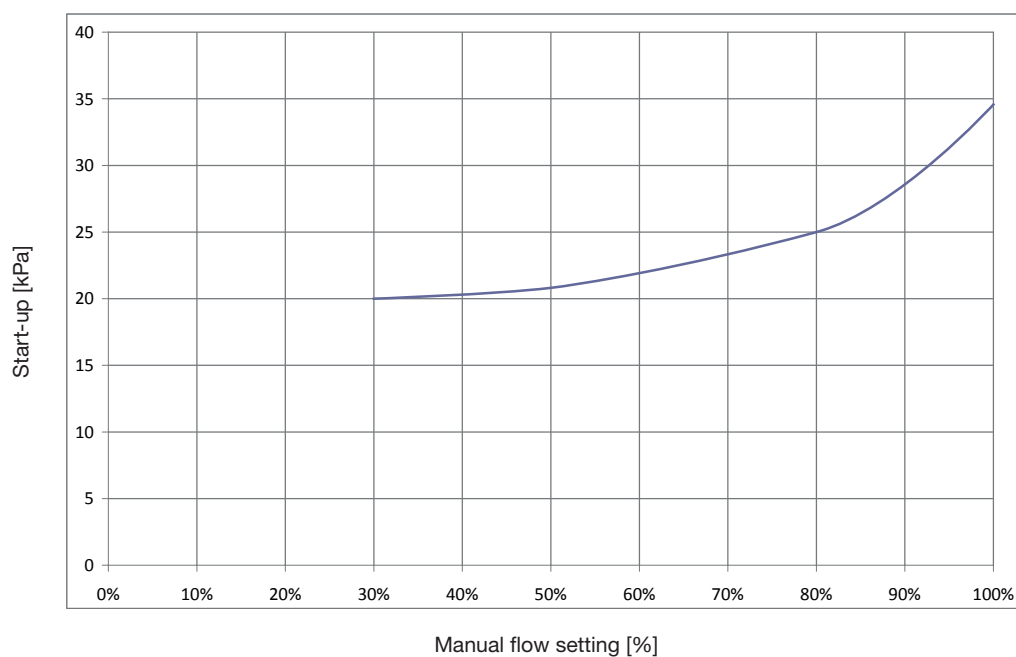




Valve model
94FH 2 1/2" - 30000 l/h
94FL 3" - 30000 l/h

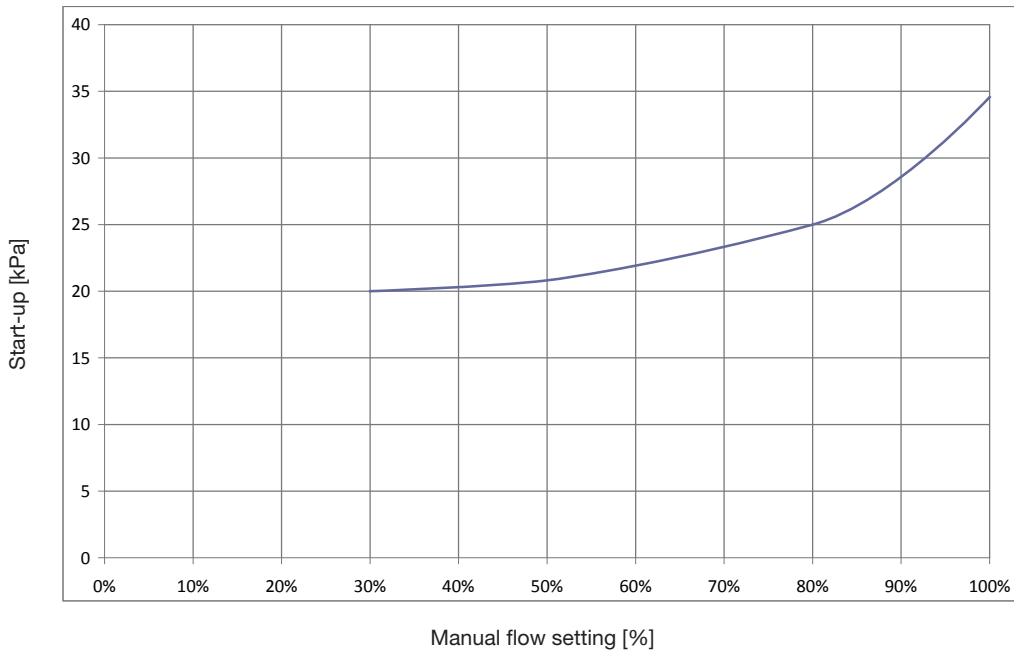


Valve model
94FL 4" - 55000 l/h

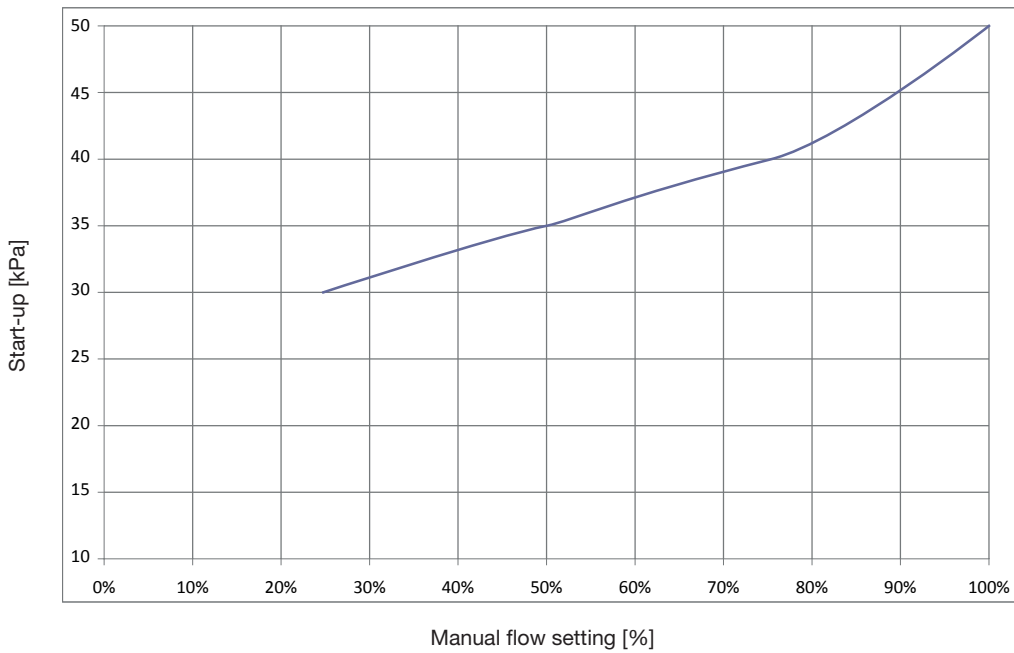


Valve model
94FL 5" - 90000 l/h
94FL 6" - 90000 l/h

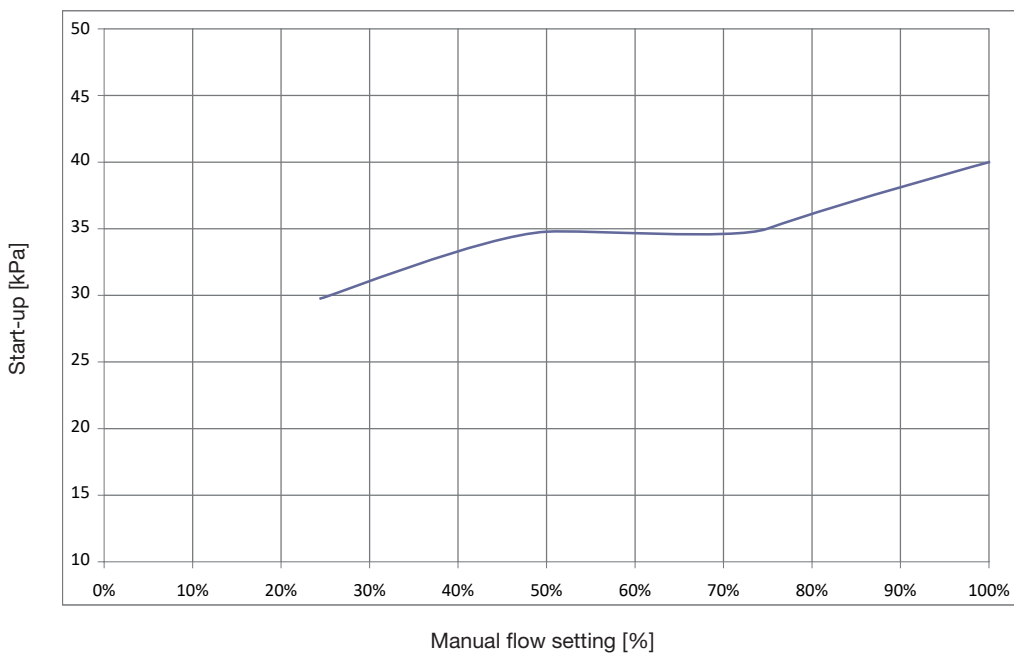




Valve model
94FH 5" - 120000 l/h

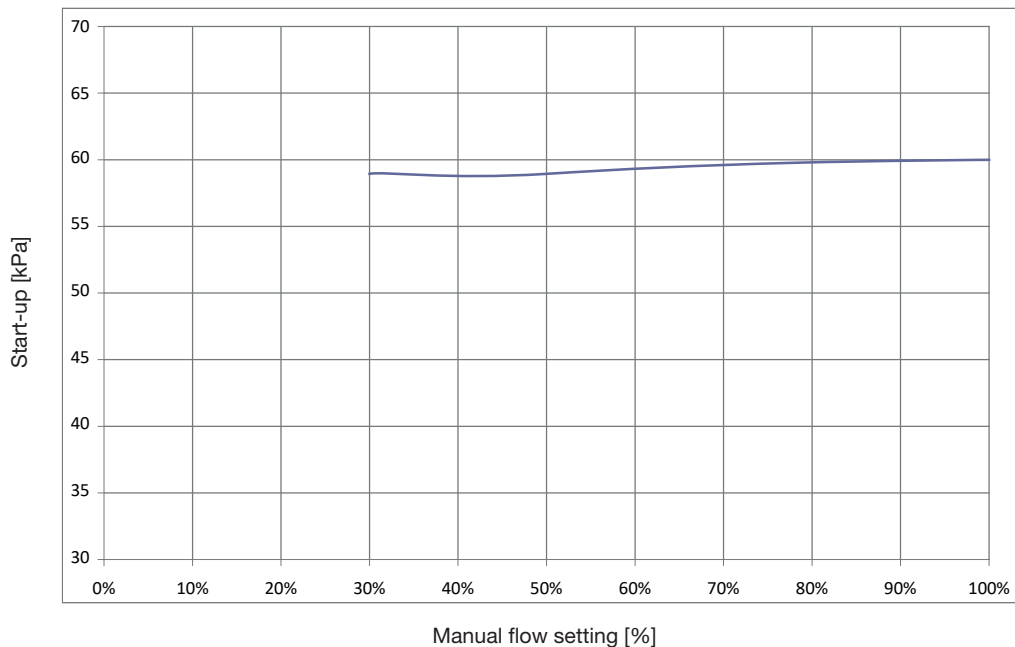


Valve model
94FH 6" - 150000 l/h

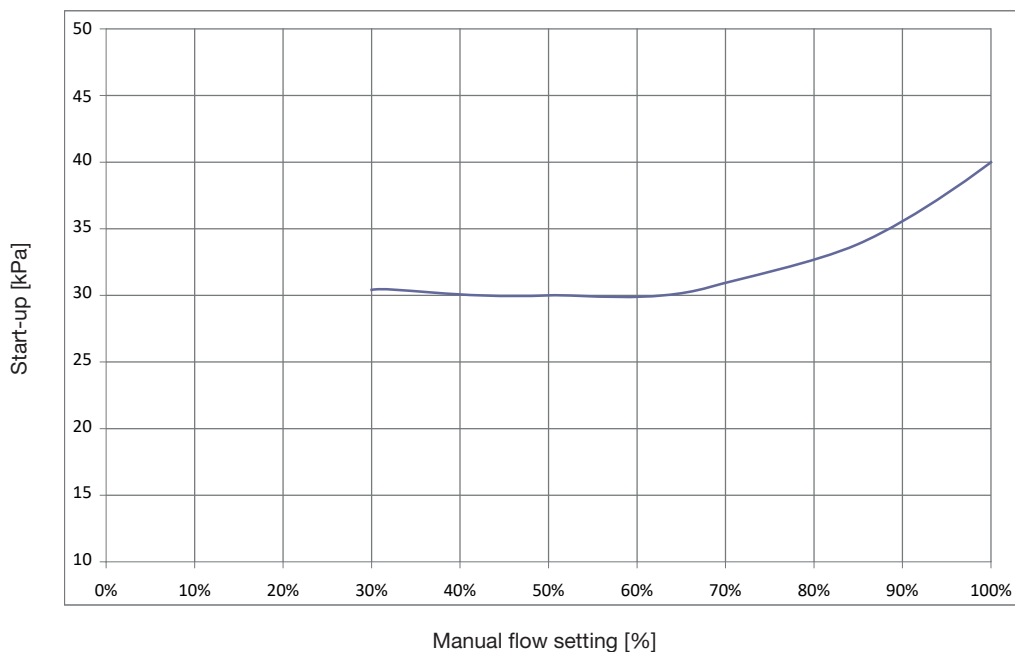


Valve model
94FL 8" - 200000 l/h

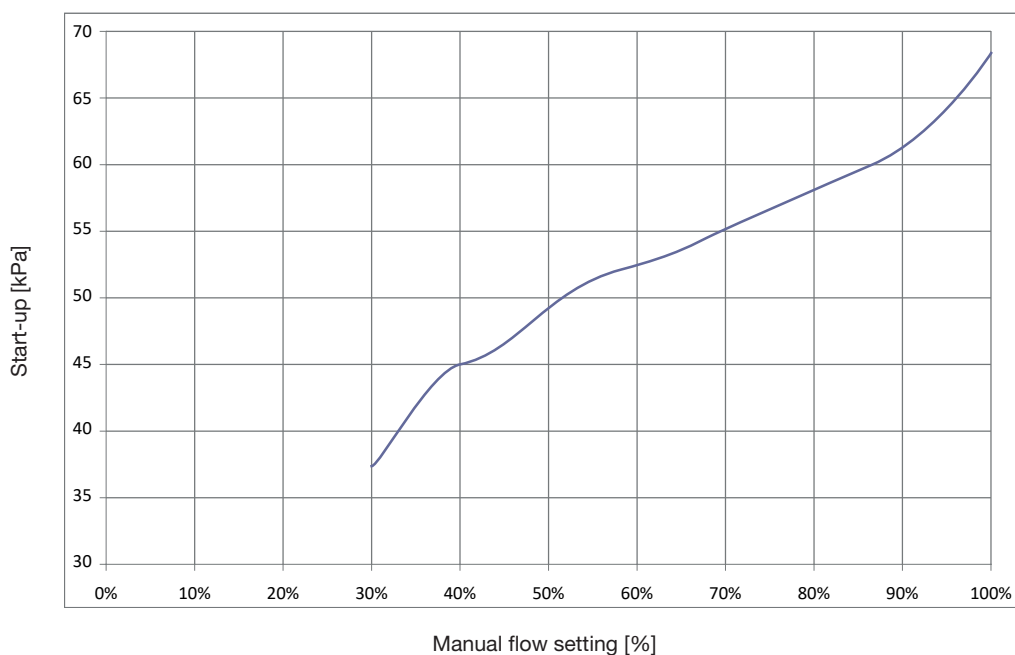




Valve model
94FH 8" - 300000 l/h



Valve model
94FL 10" - 300000 l/h



Valve model
94FH 10" - 500000 l/h



Flow pre-setting 91 - 91-1 EvoPICV

Presetting %	91VL-91VL1 ½"		91L-91L1 ½"		91H-91H1 ½"		91L-91L1 ¾"		91H-91H1 ¾"		91H-91H1 1"	
	Flow rate *		Flow rate		Flow rate		Flow rate		Flow rate		Flow rate	
	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s
100	150	0,042	600	0,167	780	0,217	1000	0,278	1500	0,417	1500	0,417
90	135	0,038	540	0,150	702	0,195	900	0,250	1350	0,375	1350	0,375
80	120	0,033	480	0,133	624	0,173	800	0,222	1200	0,333	1200	0,333
70	105	0,029	420	0,117	546	0,152	700	0,194	1050	0,292	1050	0,292
60	90	0,025	360	0,100	468	0,130	600	0,167	900	0,250	900	0,250
50	75	0,021	300	0,083	390	0,108	500	0,139	750	0,208	750	0,208
40	60	0,017	240	0,067	312	0,087	400	0,111	600	0,167	600	0,167
30	45	0,013	180	0,050	234	0,065	300	0,083	450	0,125	450	0,125
20	30	0,008	120	0,033	156	0,043	200	0,056	-	-	-	-
10	15	0,004	60	0,017	78	0,022	100	0,028	-	-	-	-

* at 0% position the valve regulates between 10 - 13 l/h

Flow pre-setting 91X - 91X/2 - 91X/3 - 91X3S EvoPICV

Presetting %	150 l/h		600 l/h		900 l/h	
	Flow rate *		Flow rate		Flow rate	
	l/h	l/s	l/h	l/s	l/h	l/s
100	150	0,042	600	0,167	900	0,250
90	135	0,038	540	0,150	810	0,225
80	120	0,033	480	0,133	720	0,200
70	105	0,029	420	0,117	630	0,175
60	90	0,025	360	0,100	540	0,150
50	75	0,021	300	0,083	450	0,125
40	60	0,017	240	0,067	360	0,100
30	45	0,013	180	0,050	270	0,075
20	30	0,008	120	0,033	180	0,050
10	15	0,004	60	0,017	90	0,025

* at 0% position the valve regulates between 10 - 13 l/h

Flow pre-setting 93 EvoPICV

Presetting %	93L-93L1 ¾"		93H-93H1 ¾"		93L-93L1 1"		93H-93H1 1"		93L-93L1 1 1/4"		93H-93H1 1 1/4"	
	Flow rate		Flow rate		Flow rate		Flow rate		Flow rate		Flow rate	
	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s
100	2200	0,611	2700	0,750	2200	0,611	2700	0,750	2700	0,750	3000	0,833
90	1980	0,550	2430	0,675	1980	0,550	2430	0,675	2430	0,675	2700	0,750
80	1760	0,489	2160	0,600	1760	0,489	2160	0,600	2160	0,600	2400	0,667
70	1540	0,428	1890	0,525	1540	0,428	1890	0,525	1890	0,525	2100	0,583
60	1320	0,367	1620	0,450	1320	0,367	1620	0,450	1620	0,450	1800	0,500
50	1100	0,306	1350	0,375	1100	0,306	1350	0,375	1350	0,375	1500	0,417
40	880	0,244	1080	0,300	880	0,244	1080	0,300	1080	0,300	1200	0,333
30	660	0,183	810	0,225	660	0,183	810	0,225	810	0,225	900	0,250
20	440	0,122	540	0,150	440	0,122	540	0,150	540	0,150	600	0,167
10	220	0,061	270	0,075	220	0,061	270	0,075	270	0,075	300	0,083

Flow pre-setting 83 EvoPICV

Presetting %	83HPR1 1 1/4"		83LPR1 1 1/2"		83HPR1 1 1/2"		83VLPR1 2"		83LPR1 2"		83HPR1 2"	
	Flow rate		Flow rate		Flow rate		Flow rate		Flow rate		Flow rate	
	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s
100	6000	1,667	6000	1,667	9000	2,500	11000	3,056	12000	3,333	18000	5,000
90	5400	1,500	5400	1,500	8100	2,250	9900	2,750	10800	3,000	16200	4,500
80	4800	1,333	4800	1,333	7200	2,000	8800	2,444	9600	2,667	14400	4,000
70	4200	1,167	4200	1,167	6300	1,750	7700	2,139	8400	2,333	12600	3,500
60	3600	1,000	3600	1,000	5400	1,500	6600	1,833	7200	2,000	10800	3,000
50	3000	0,833	3000	0,833	4500	1,250	5500	1,528	6000	1,667	9000	2,500
40	2400	0,667	2400	0,667	3600	1,000	4400	1,222	4800	1,333	7200	2,000
30	1800	0,500	1800	0,500	2700	0,750	3300	0,917	3600	1,000	5400	1,500
20	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-

Flow pre-setting 94F EvoPICV 2" - 6"

Presetting %	94FH 2"		94FL 2 1/2"		94FH 2 1/2"		94FL 3"		94FL 4"		94FL 5"	
	Flow rate		Flow rate		Flow rate		Flow rate		Flow rate		Flow rate	
	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s
100	20000	5,556	20000	5,556	30000	8,333	30000	8,333	55000	15,278	90000	25,000
90	18000	5,000	18000	5,000	27000	7,500	27000	7,500	49500	13,750	81000	22,500
80	16000	4,444	16000	4,444	24000	6,667	24000	6,667	44000	12,222	72000	20,000
70	14000	3,889	14000	3,889	21000	5,833	21000	5,833	38500	10,694	63000	17,500
60	12000	3,333	12000	3,333	18000	5,000	18000	5,000	33000	9,167	54000	15,000
50	10000	2,778	10000	2,778	15000	4,167	15000	4,167	27500	7,639	45000	12,500
40	8000	2,222	8000	2,222	12000	3,333	12000	3,333	22000	6,111	36000	10,000
30	6000	1,667	6000	1,667	9000	2,500	9000	2,500	16500	4,583	27000	7,500
20	4000	1,111	4000	1,111	6000	1,667	6000	1,667	-	-	18000	5,000
10	-	-	-	-	-	-	-	-	-	-	-	-

Presetting %	94FH 5"		94FL 6"		94FH 6"	
	Flow rate		Flow rate		Flow rate	
	l/h	l/s	l/h	l/s	l/h	l/s
100	120000	33,333	90000	25,000	150000	41,667
90	108000	30,000	81000	22,500	135000	37,500
80	96000	26,667	72000	20,000	120000	33,333
70	84000	23,333	63000	17,500	105000	29,167
60	72000	20,000	54000	15,000	90000	25,000
50	60000	16,667	45000	12,500	75000	20,833
40	48000	13,333	36000	10,000	60000	16,667
30	36000	10,000	27000	7,500	45000	12,500
20	24000	6,667	18000	5,000	30000	8,333
10	12000	3,333	-	-	15000	4,167

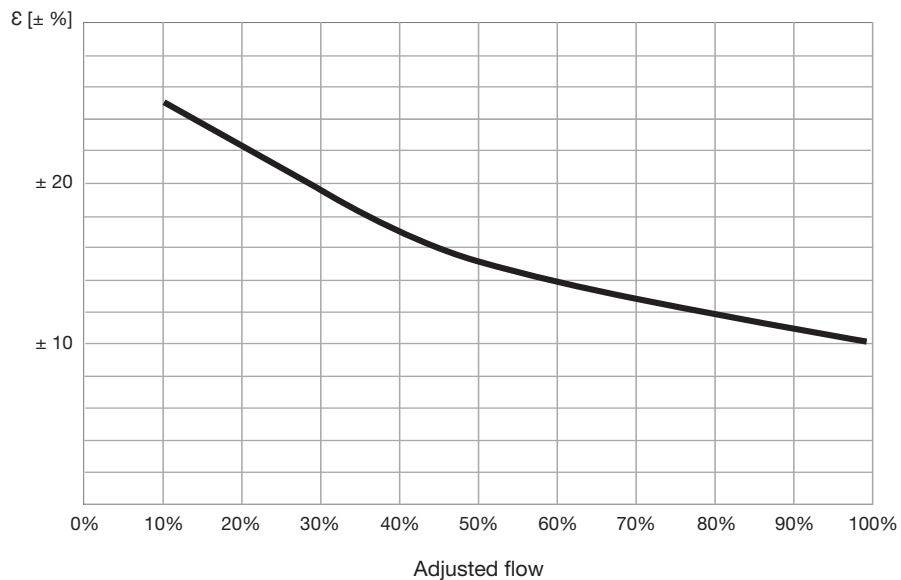


Flow pre-setting 94F EvoPICV 8" - 10"

Presetting %	94FL 8"		94FH 8"		94FL 10"		94FH 10"	
	Flow rate		Flow rate		Flow rate		Flow rate	
	l/h	l/s	l/h	l/s	l/h	l/s	l/h	l/s
100	200000	55,56	300000	83,33	300000	83,33	500000	138,8
90	180000	50,00	270000	75,00	270000	75,00	450000	124,9
80	160000	44,44	240000	66,67	240000	66,67	400000	111
70	140000	38,89	210000	58,33	210000	58,33	350000	97,1
60	120000	33,33	180000	50,00	180000	50,00	300000	83,2
50	100000	27,78	150000	41,67	150000	41,67	250000	69,3
40	80000	22,22	120000	33,33	120000	33,33	200000	55,4
30	60000	16,67	90000	25,00	90000	25,00	150000	41,5
20	-	-	-	-	60000	16,67	-	-
10	-	-	-	-	-	-	-	-

Flow setting accuracy

Max flow deviation at different settings over 1 bar differential pressure.



Some models, in the presetting range between 0-30%, might work with a higher deviation. Please contact technical department for further information.

Flow control and characteristic curves

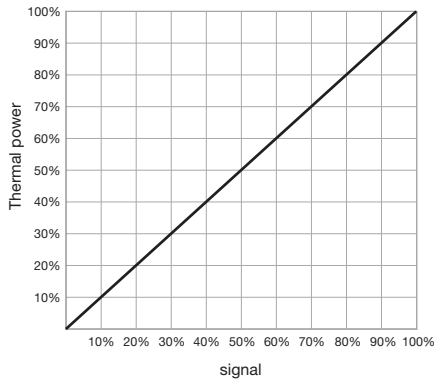
The type of characteristic of the control valve (ON/OFF, linear, equalpercentage) should be chosen according to the heat exchanger and to the type of control to be performed on the system. For ON/OFF control, a valve with ON/OFF curve will be sufficient, while a modulating control requires a linear or equal percentage characteristic.

The following graphs show the optimal characteristic curve for the remote control of a heating / cooling system (A) - considering temperature sensor, controller, actuator, control valve and terminal unit coil -, the typical curve of the heat

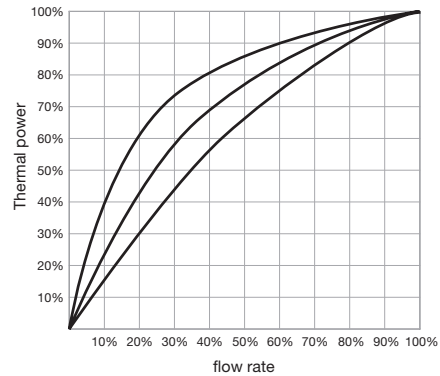
exchangers normally used in thermo-hydraulic systems (B), the typical curves of the control valves of these systems (C) and, finally, the resulting curves (D), obtained joining the curve (B) with the different valve curves (C).

As showed, the curve (D3), obtained combining an equal percentage valve with a heat exchanger, corresponds to the optimal control curve (A). Therefore, equal percentage characteristic is able to prevent overflow and low DeltaT syndrome across the terminal unit. Energy waste is avoided.

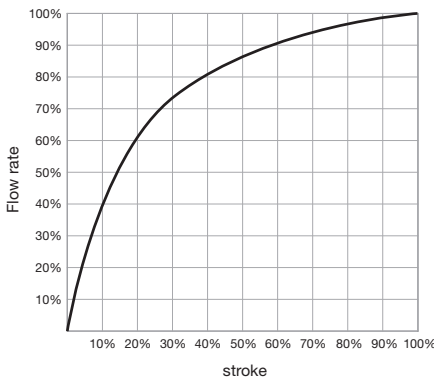
(A) Optimal control characteristic of any heating / cooling system



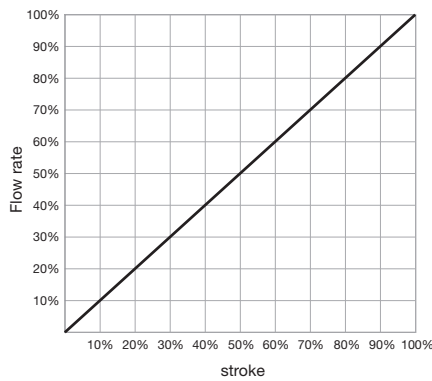
(B) Typical characteristic curve of a generic heat exchanger (thermal output / flow rate)



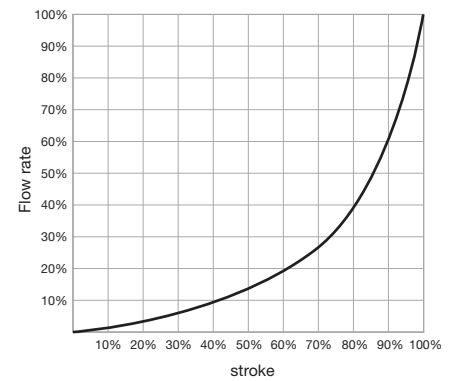
(C1) ON/OFF valve characteristic curve



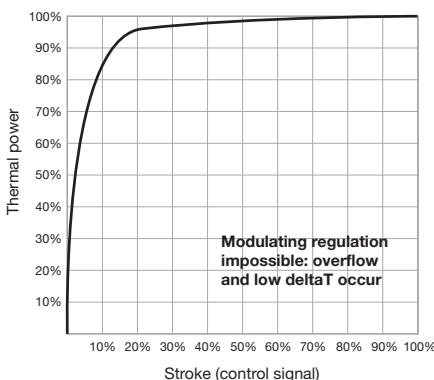
(C2) Linear valve characteristic curve



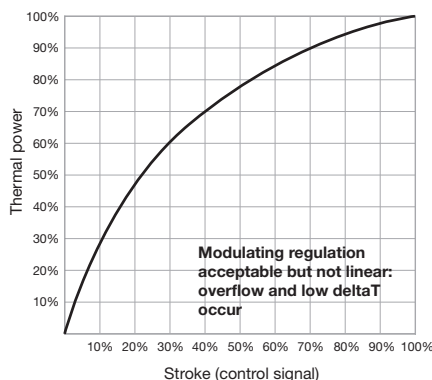
(C3) Equal percentage EvoPICV control valve characteristic curve



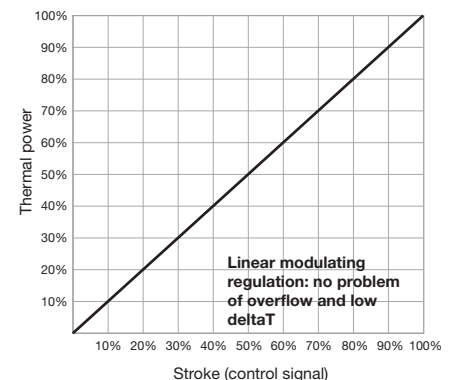
(D1) ON/OFF valve + heat exchanger system resulting graph



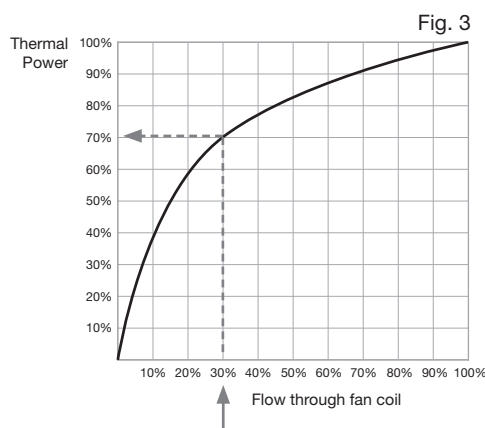
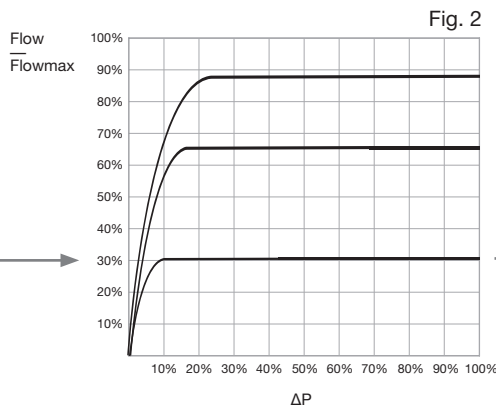
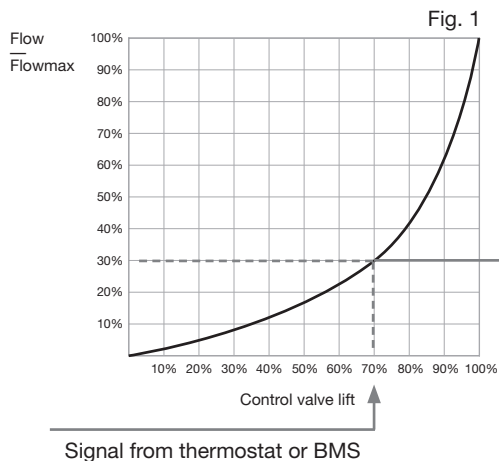
(D2) Linear valve + heat exchanger system resulting graph



(D3) Equal percentage EvoPICV valve + heat exchanger system resulting graph

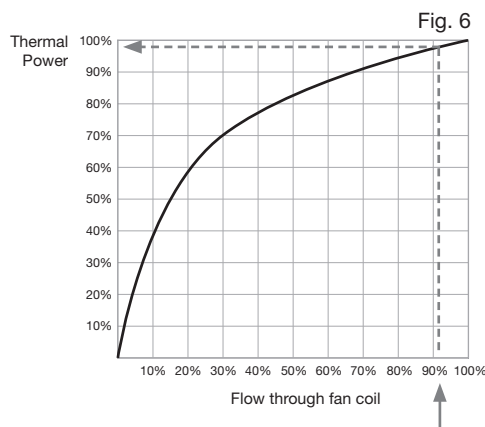
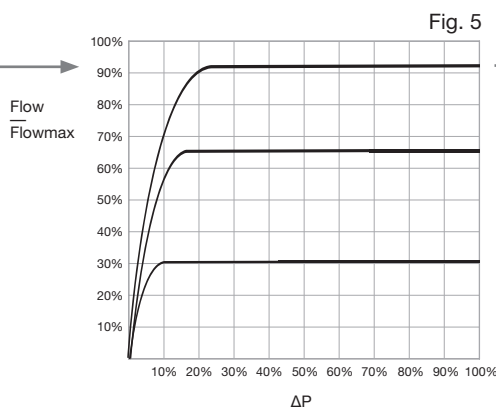
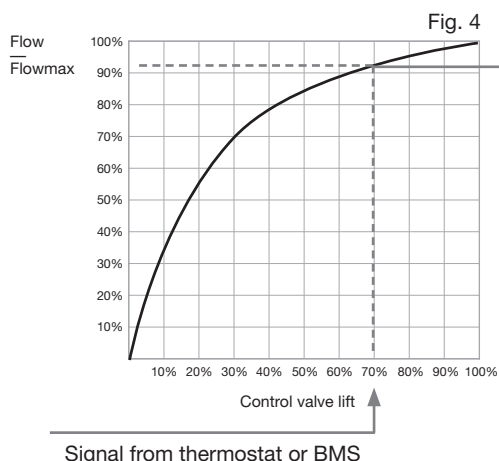


As an example, a control valve with equal percentage characteristic can be considered in figure 1. Should a reduction down to 70% of thermal power be required, control signal will simply drive the valve actuator to 70% of its stroke, thus reducing the valve flow rate down to 30%, see figure 2.



If a control signal of 70% resulted in a reduced flow of 30%, then the fan coil shown on figure 3 will still deliver 70% of maximum thermal power, which correspond to desired reduced output, avoiding any issue of low deltaT and overflow.

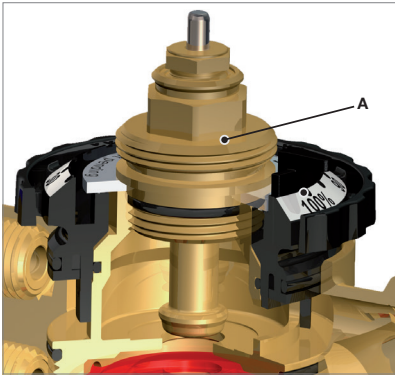
On the other hand, if we consider to use an ON/OFF valve, as shown in figure 4, when driving the actuator down to 70%, valve flow will be reduced down to 92%, as shown in figure 5; If the same fan coil is used, resulting thermal power can be immediately calculated, as shown in figure 6 and it equals to 98%, which correspond to almost no reduction of thermal power.



If a reduction down to 70% of thermal power must be achieved, then ON/OFF control valve of the example, should be driven down to less than 10% of its travelling. low deltaT and overflow will occur.

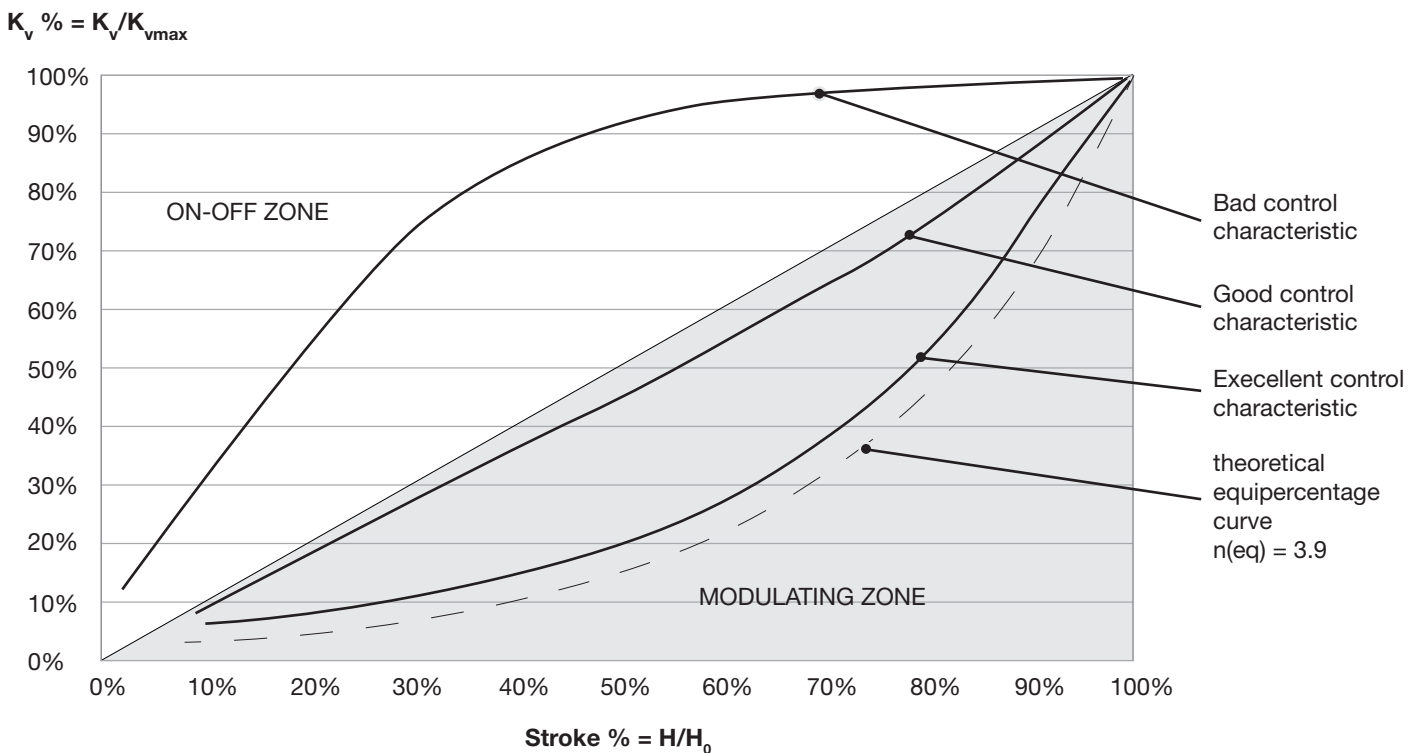


Control characteristic curve



Operating on the position of the regulating valve control stem A will modify the valve K_v , hence the flow rate. The relation between K_v and stroke is shown in the graph below.

Typical control valve characteristic curves



Combining the **EvoPICV** valve characteristic with heat exchanger results in a linear control system. Control curve characteristic may change according to valve version.

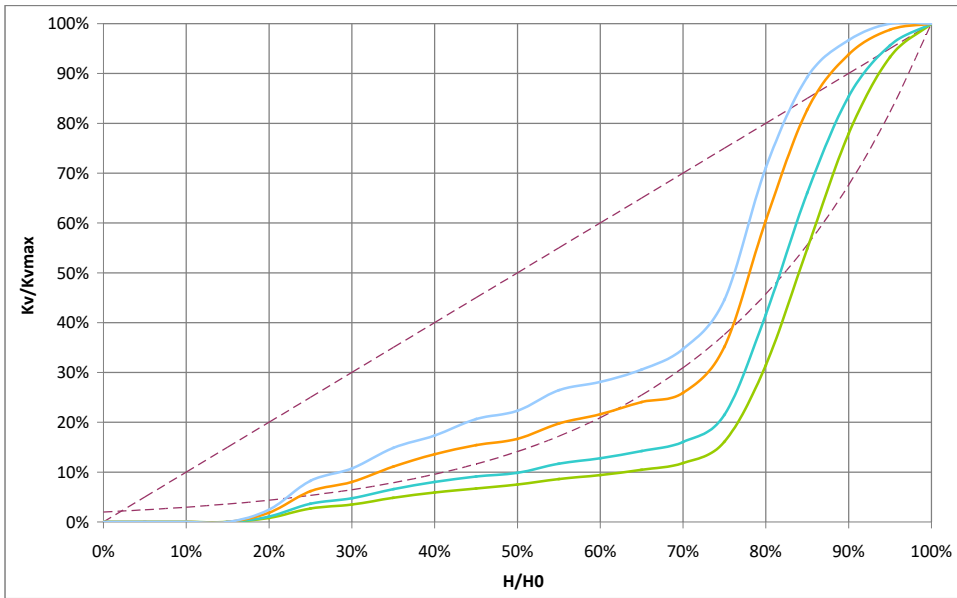
H = current lift (opening) of the control valve; H varies from 0 to H_0
 H_0 = maximum lift of the control valve;
 K_v = valve flow factor at lift = H
 K_{vmax} = valve flow factor at lift = H_0

Thus, H/H_0 and K_v/K_{vmax} ratios state respectively the opening percentage of the control valve and the flow rate percentage with respect to the maximum one set by the presetting knob.

In the next pages, control curves for each valve model are shown.

All valves control characteristic have been tested and plotted according to VDI/VDE 2173 guidelines; valves were driven by following actuators:

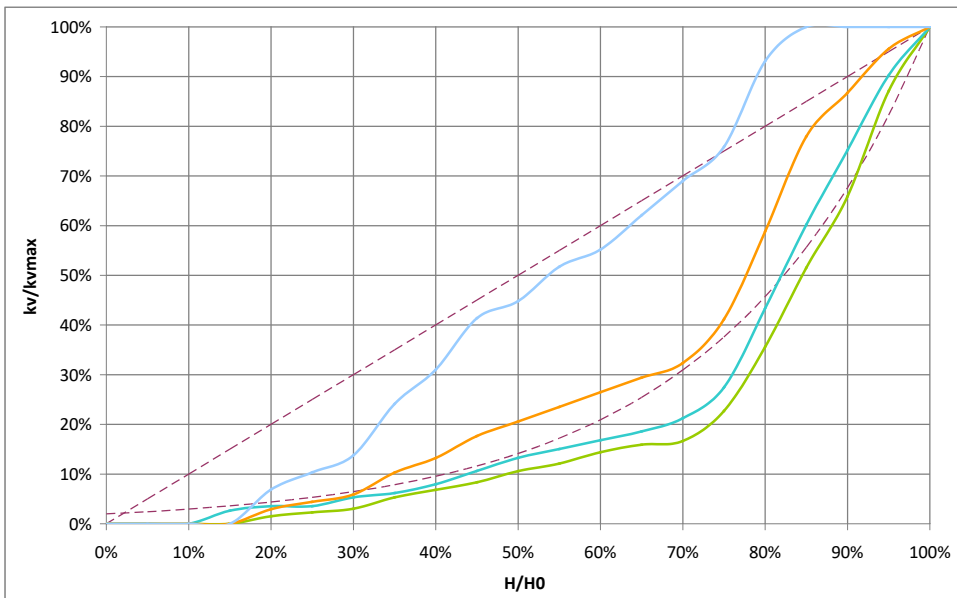
- VA7482 0-10V actuator
- SN08CC 0-10V actuator
- M94F2 0-10V actuator - Eq mode and Linear mode



Valve model
 91VL 1/2" - 150 l/h
 91VL1 1/2" - 150 l/h

Presetting positions

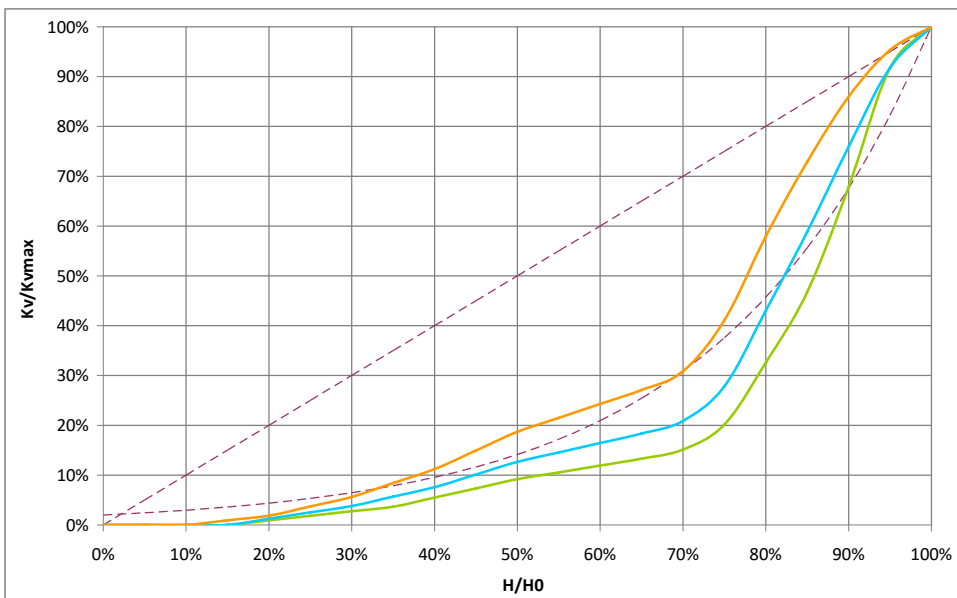
- 100% Open
- 75% Open
- 50% Open
- 25% Open



Valve model
 91L 1/2" - 600 l/h
 91L1 1/2" - 600 l/h

Presetting positions

- 100% Open
- 75% Open
- 50% Open
- 25% Open

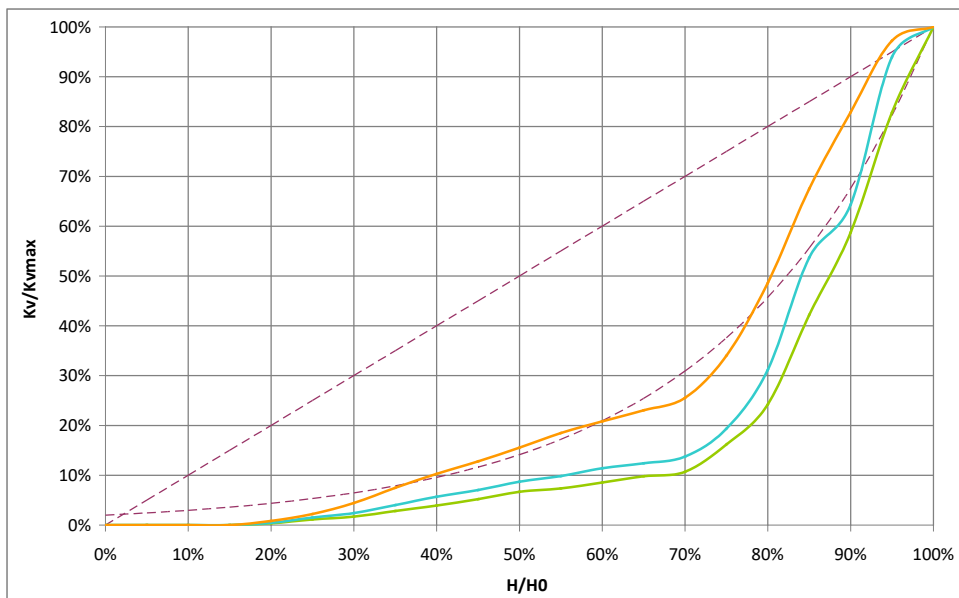


Valve model
 91H 1/2" - 780 l/h
 91H1 1/2" - 780 l/h

Presetting positions

- 100% Open
- 75% Open
- 50% Open

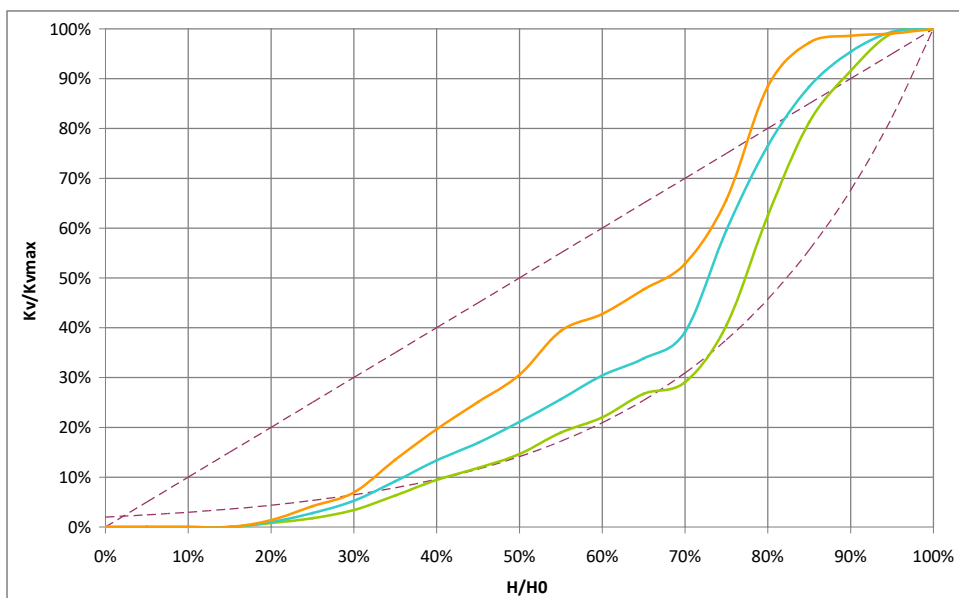




Valve model
 91L 3/4" - 1000 l/h
 91L1 3/4" - 1000 l/h

Presetting positions

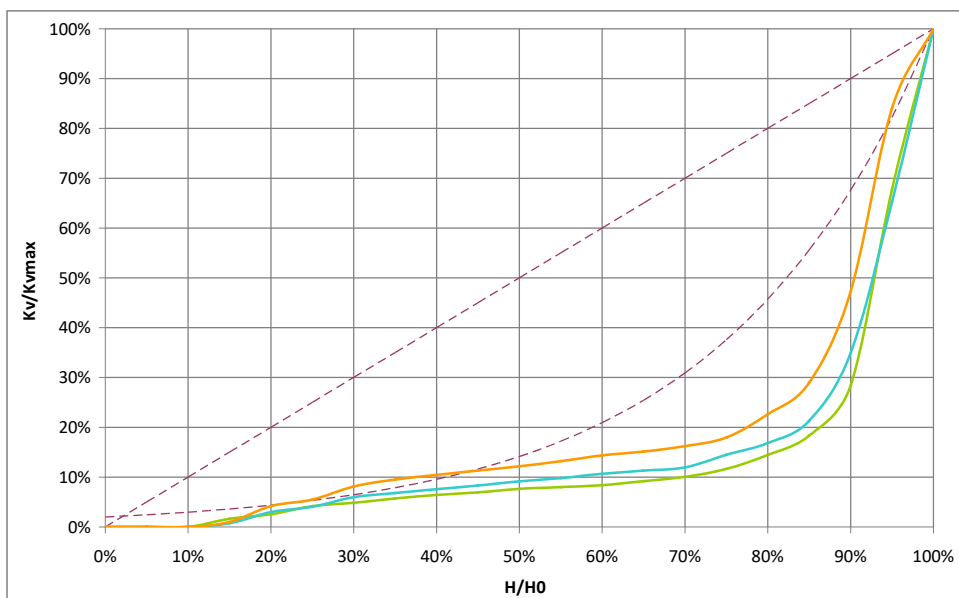
- 100% Open
- 75% Open
- 50% Open



Valve model
 91H 3/4" - 1500 l/h
 91H1 3/4" - 1500 l/h
 91H 1" - 1500 l/h
 91H1 1" - 1500 l/h

Presetting positions

- 100% Open
- 75% Open
- 50% Open

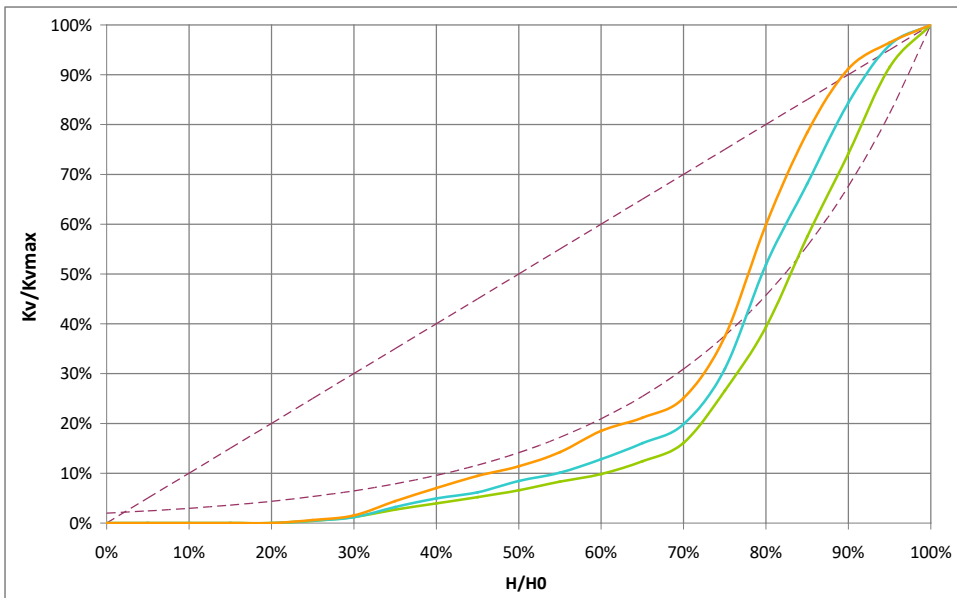


Valve model
 93L 3/4" - 2200 l/h
 93L1 3/4" - 2200 l/h
 93L 1" - 2200 l/h
 93L1 1" - 2200 l/h

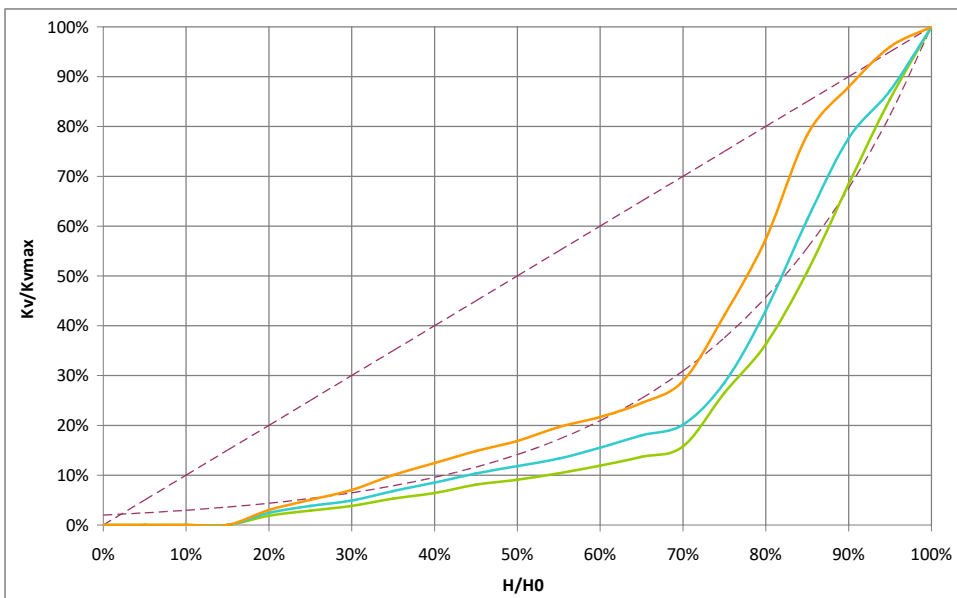
Presetting positions

- 100% Open
- 75% Open
- 50% Open

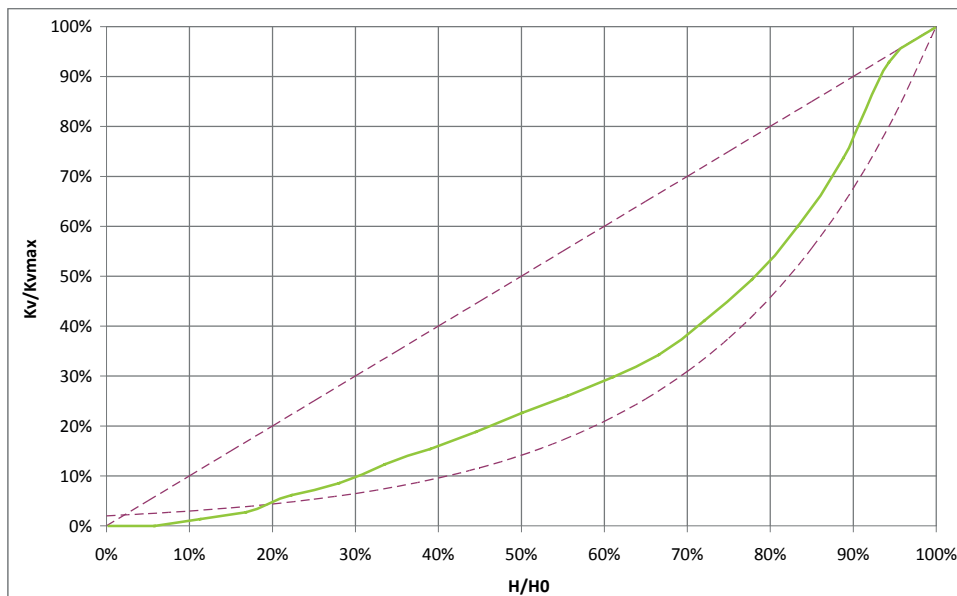




Valve model	
93H 3/4" - 2700 l/h	
93H1 3/4" - 2700 l/h	
93H 1" - 2700 l/h	
93H1 1" - 2700 l/h	
93L 1 1/4" - 2700 l/h	
93L1 1 1/4" - 2700 l/h	
Presetting positions	
—	100% Open
—	75% Open
—	50% Open

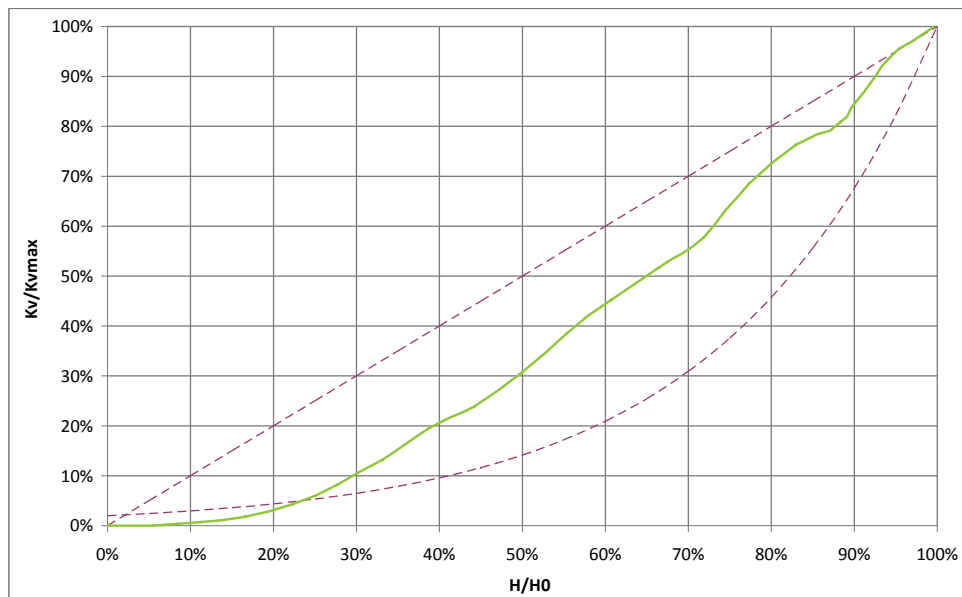


Valve model	
93H 1 1/4" - 3000 l/h	
93H1 1 1/4" - 3000 l/h	
Presetting positions	
—	100% Open
—	75% Open
—	50% Open

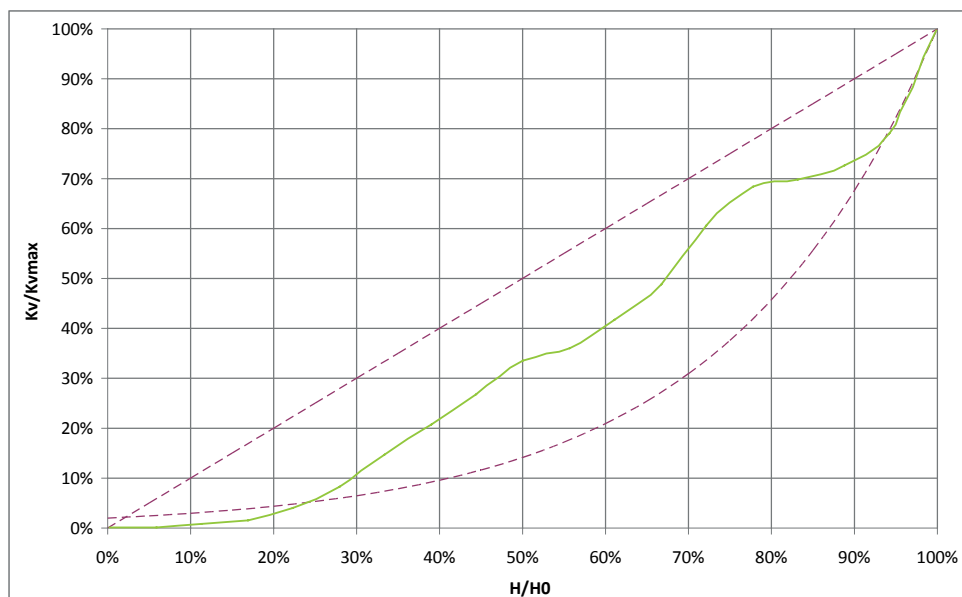


Valve model	
83HPR1 1 1/4" - 6000 l/h	
83LPR1 1 1/2" - 6000 l/h	
Presetting positions	
—	100% Open

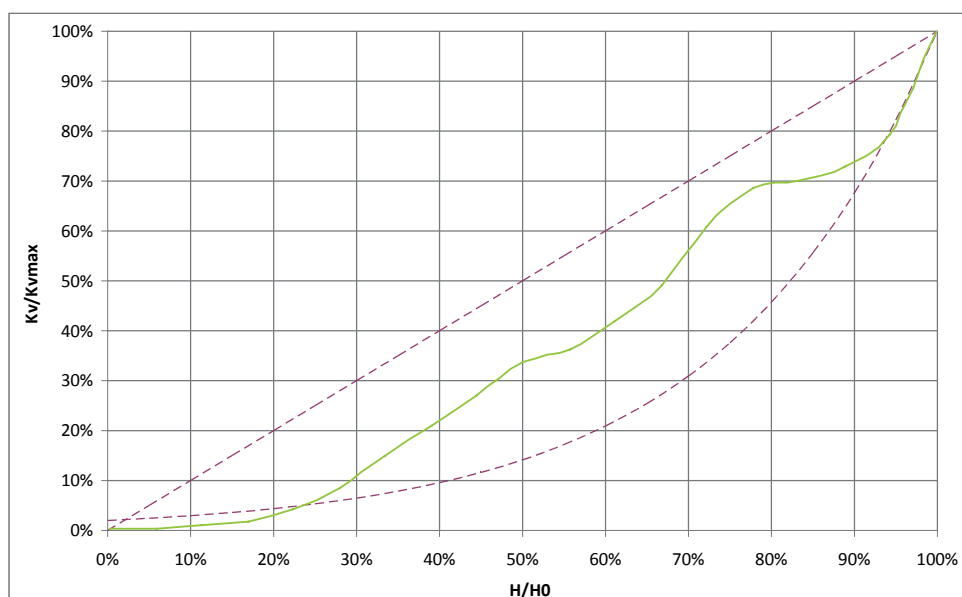




Valve model
83HPR1 1 1/2" - 9000 l/h
Presetting positions
100% Open

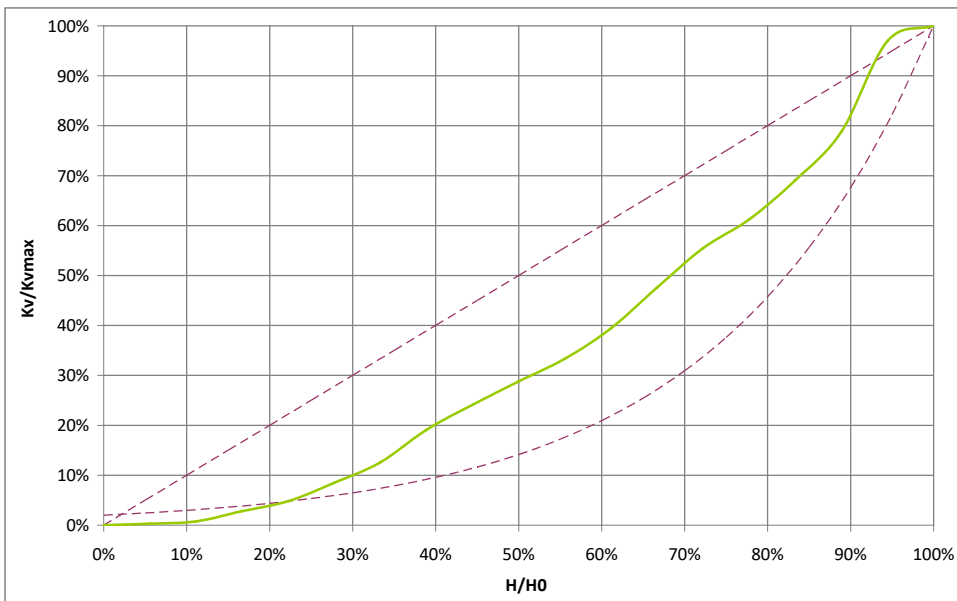


Valve model
83VLPR1 2" - 11000 l/h
Presetting positions
100% Open



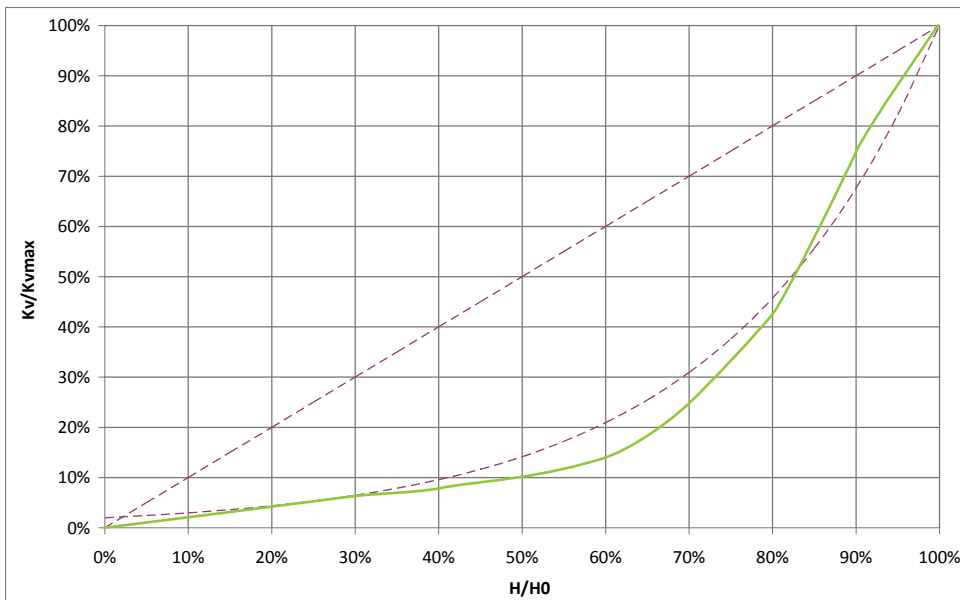
Valve model
83LPR1 2" - 12000 l/h
Presetting positions
100% Open





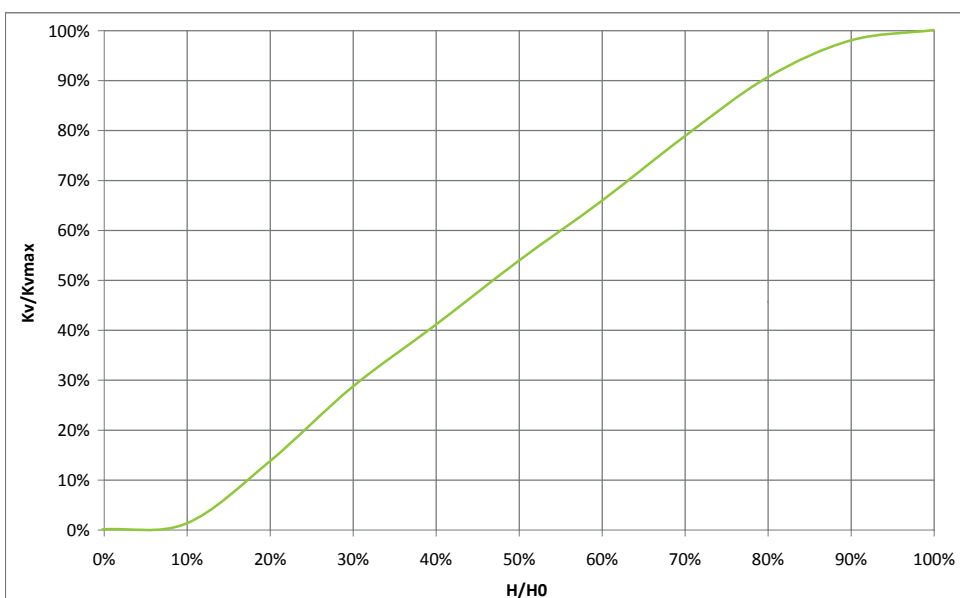
Valve model	
83HPR1 2" - 18000 l/h	
Presetting positions	
	100% Open

Equal percentage mode



Valve model	
94FH 2" - 20000 l/h	
94FL 2 1/2" - 20000 l/h	
94FH 2 1/2" - 30000 l/h	
94FL 3" - 30000 l/h	
94FL 4" - 55000 l/h	
94FL 5" - 90000 l/h	
94FH 5" - 120000 l/h	
94FL 6" - 90000 l/h	
94FH 6" - 150000 l/h	
94FL 8" - 200000 l/h	
94FH 8" - 300000 l/h	
94FL 10" - 300000 l/h	
94FH 10" - 500000 l/h	
Presetting positions	
Any	

Linear mode



Installation and maintenance

Before filling the terminal unit system with water, make sure main pipeline has been flushed and most of dirt and debris have been flushed away. Always comply with local or applicable flushing, however, in order to get the longest life and the best performance from a PICV, Pettinaroli does not accept any liability for improper or wrong use of this product.

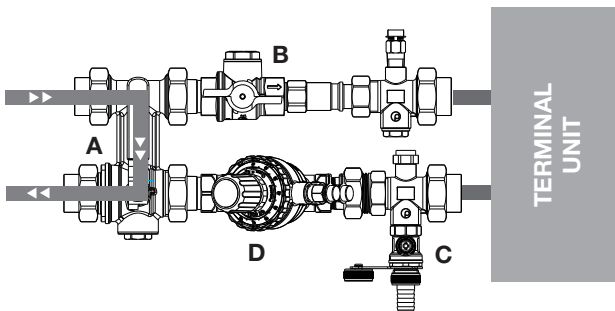
Always protect the pressure regulator by using strainers upstream of the valve and, in any case, make sure water quality complies with UNI 8065 standards ($Fe < 0.5 \text{ mg/kg}$ and $Cu < 0.1 \text{ mg/Kg}$).

Furthermore, maximum iron oxide in the water passing through control valve (PICV) should not exceed 25 mg/Kg (25 ppm).

To ensure the main pipework is cleaned appropriately, flushing by-passes should be used without flushing through the pressure regulator of the PICV thereby preventing debris that might clog the valve.

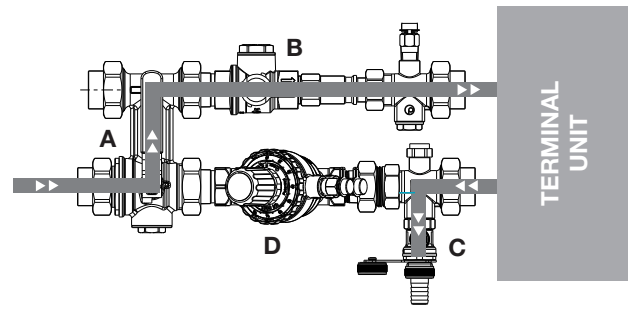
Here is an example, explaining the safest installation arrangement and filling/flushing methods:

Flushing of maine pipe line



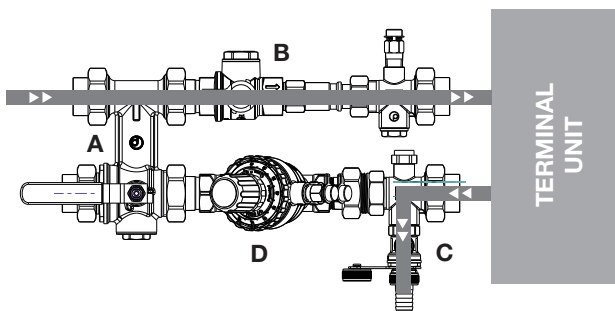
A: Bypass mode B: Closed C: Closed D: Open

Reverse back flushing



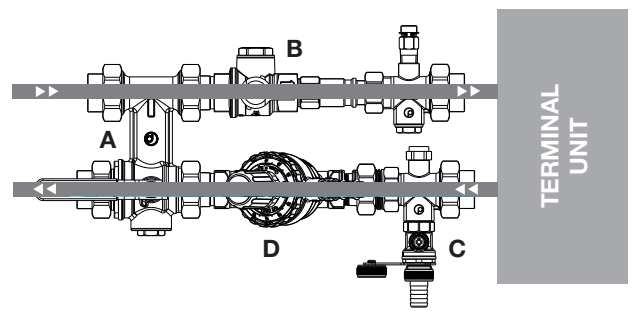
A: Bypass mode B: Open C: Open D: Closed

Direct back flushing



A: Normal mode B: Open C: Open D: Closed

Ready for commissioning



A: Normal mode B: Open C: Closed D: Open

Installation and maintenance - 91 / 91X / 91-1 EvoPICV

1. Use conditions

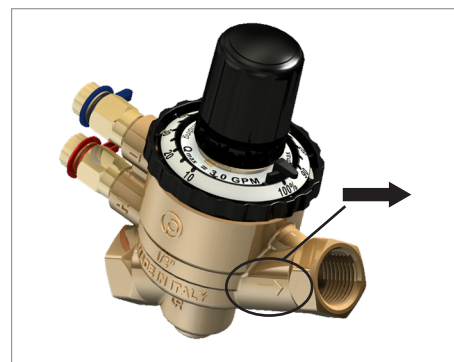
The valve has to be mounted with the arrow in the direction of the flow. Mounting it in the wrong direction may damage the system and the valve itself.

If flow reversal is possible, a non-return valve should be mounted.

Minimum differential pressure above which the valve begins to exercise its regulating effect:

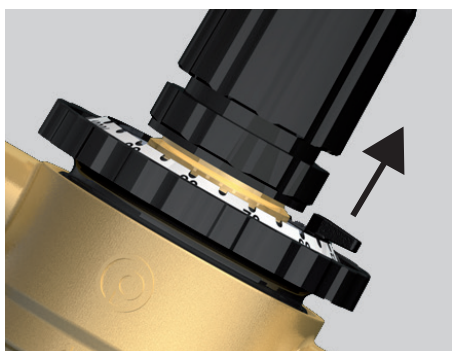
	91VL 1/2"	91L 1/2"	91H 1/2"	91L 3/4"	91H 3/4"	91H 1"
Start-up ΔP	20 kPa 0,20 bar	25 kPa 0,25 bar	35 kPa 0,35 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	35 kPa 0,35 bar

Rounded values. At 100% preset. See also pages 10-11

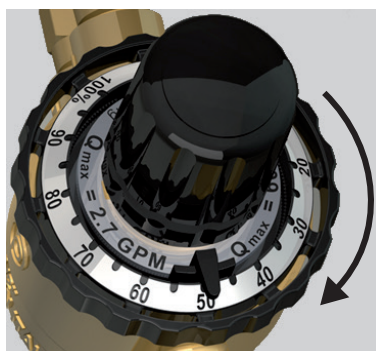


2. Flow preset

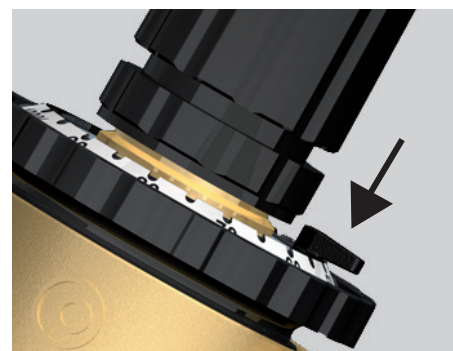
To set the selected flow, follow these steps:



Lift the lock pin to unlock the selector



Turn the selector to the target position



Press the lock pin to lock the selector in the final position

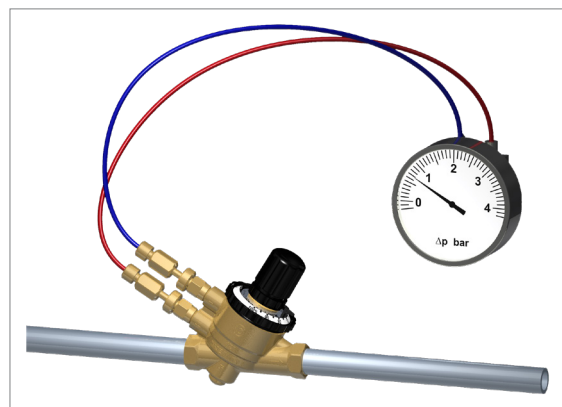
Selector can be adjusted also with the mounted actuator. Patented (EP2488994-B1 and US8985140-B2).

3. Operating control

It is necessary to be sure that the valve is actually working in the operating range. In order to verify it, just measure the differential pressure across the valve, as shown in the picture.

If the measured differential pressure is higher than the start-up pressure, the valve is actually keeping the flow constant at the set value.

This paragraph does not apply to 91X series. We suggest to use Fratelli Pettinaroli devices MDP and MDPS.

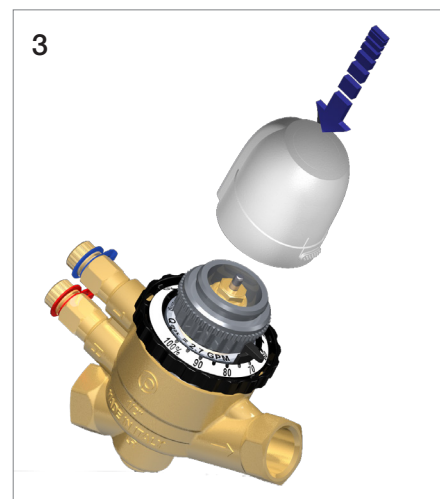
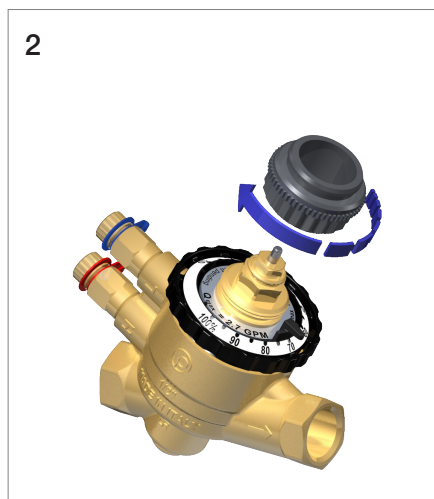
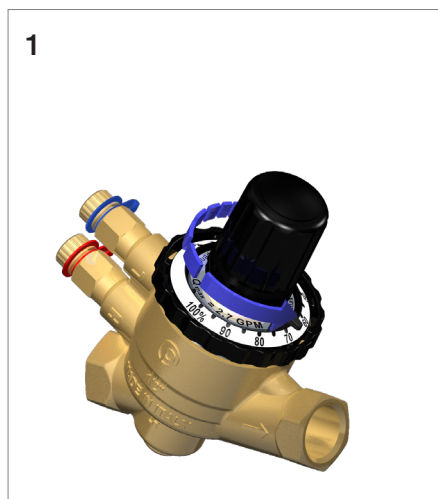


4. Maintenance and cleaning

During valve cleaning operations, use a damp cloth. DO NOT use any detergent or chemical product that may seriously damage or compromise the proper functioning and the reliability of the valve.

5. Actuator assembly

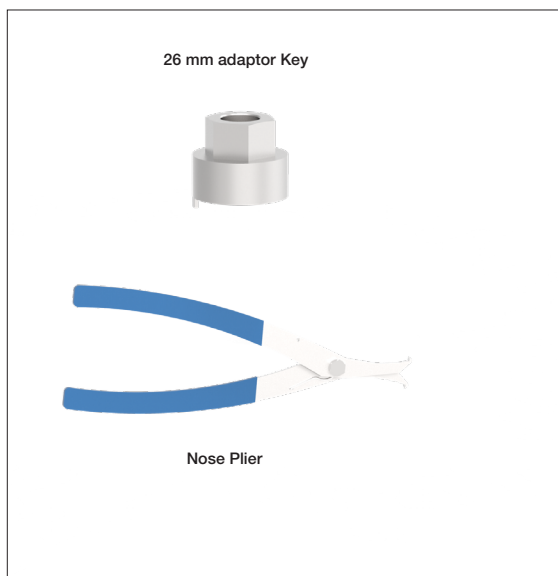
The valve can be equipped with a series of thermal-electric or electro-mechanical actuators, according to the requirements of the system. Actuators come along with an adaptor for proper mounting on the valve and for proper functioning of the whole device.



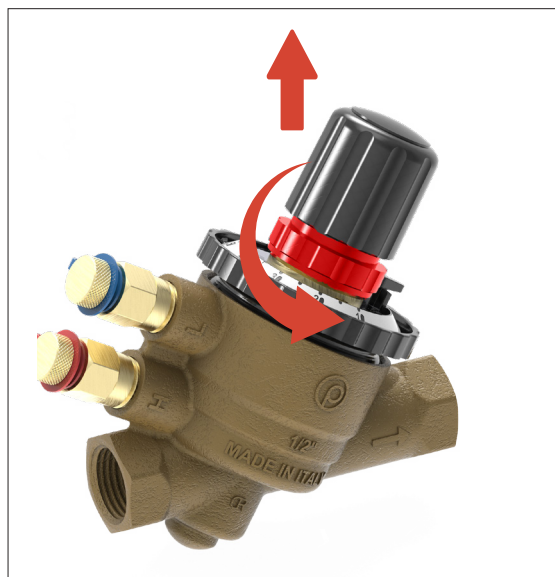
6. Replacement of the diaphragm of EVOPICV valve - 091SET maintenance kit

For further information please refer to instruction 208 - 091SET

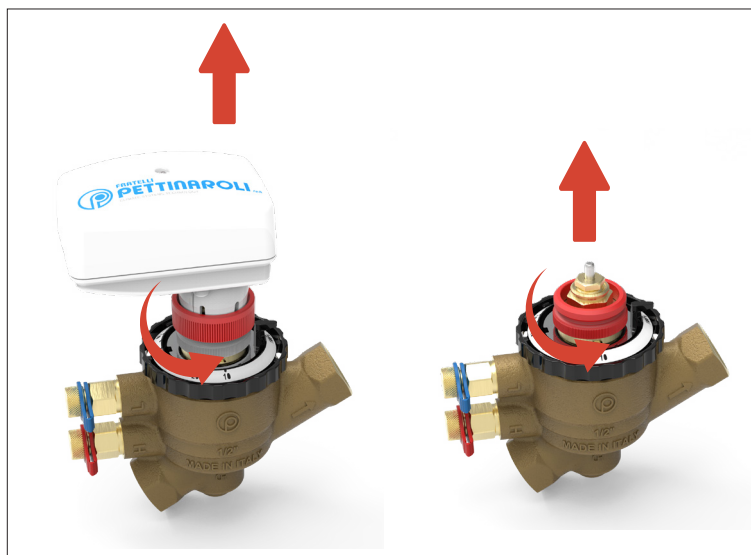
091SET maintenance kit



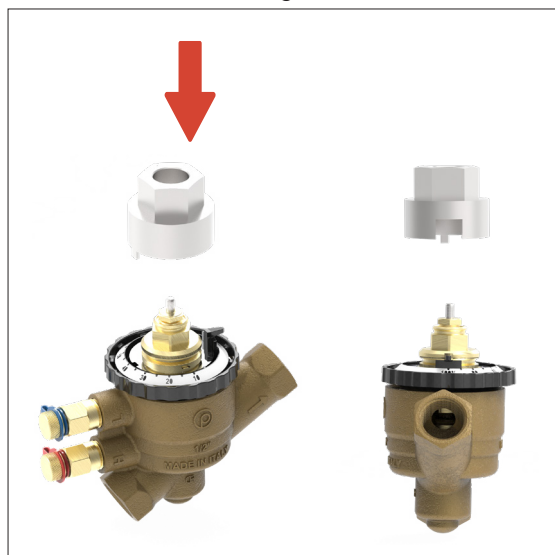
Step 1: remove completely the knob



Step 1a: remove the actuator and the adapter.



Step 2: using the 26mm adaptor key provided to remove the headwork. Align latches.



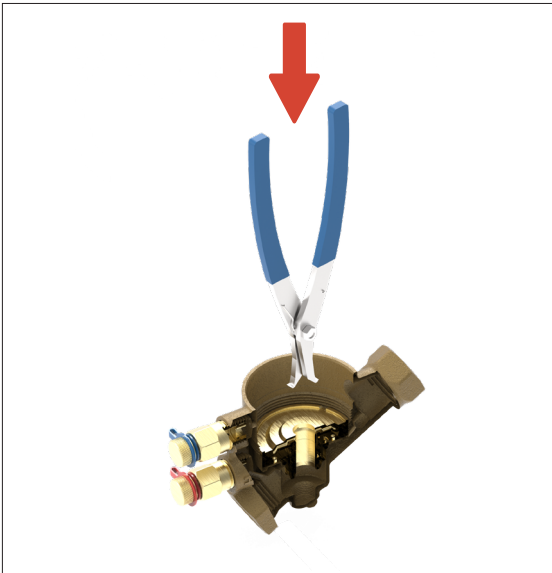
Step 3: using a 26mm spanner unscrew the headwork.



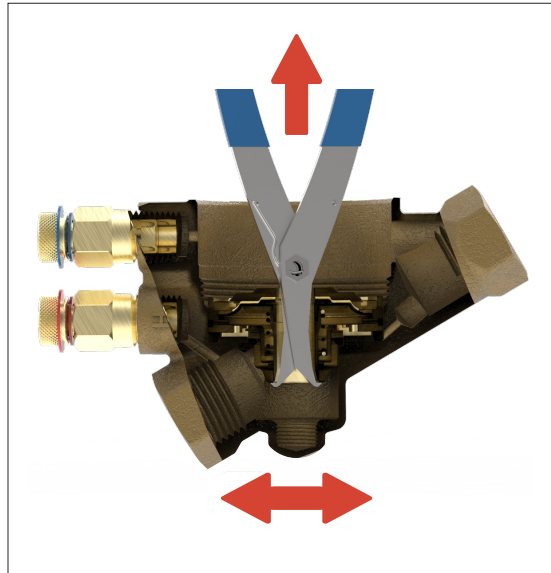
Step 4: remove the headwork.



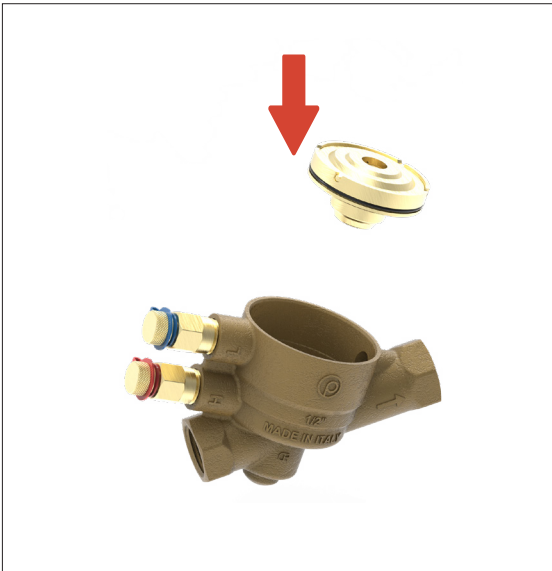
Step 5: Insert the nose pliers through the center of the cartridge



Step 6: open the plier and pull the cartridge up out of the body



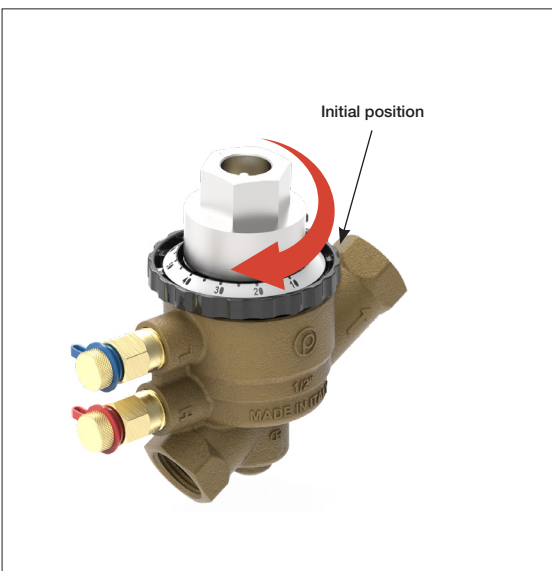
Step 7: Insert the new cartridge



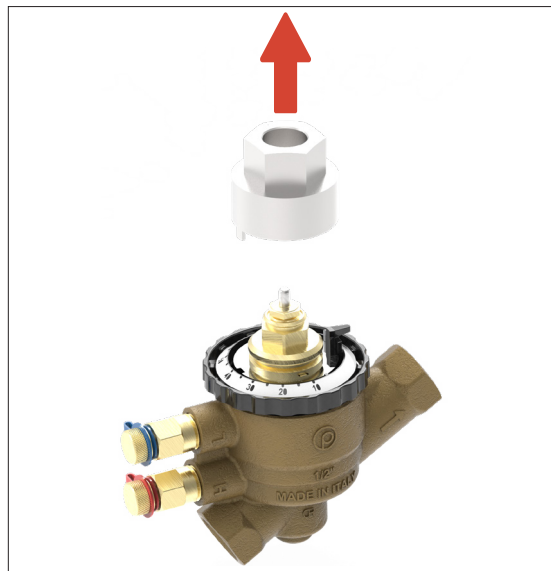
Step 8: Replace the headwork



Step 9: Screw the headwork with 15/20 Nm torque reaching the initial position of the lock pin



Step 10: remove the 26 mm adapter key and replace the actuator a adapter



Installation and maintenance - 93 / 93-1 EvoPICV

1. Use conditions

The valve has to be mounted with the arrow in the direction of the flow. Mounting it in the wrong direction may damage the system and the valve itself.

If flow reversal is possible, a non-return valve should be mounted.

Minimum differential pressure above which the valve begins to exercise its regulating effect:

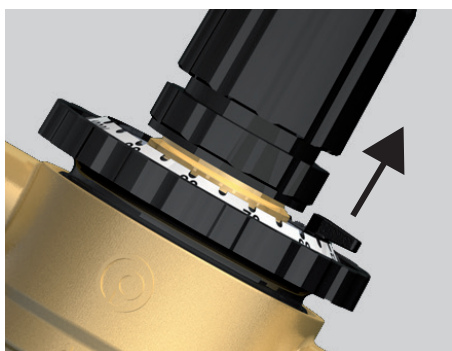
	93L 3/4"	93H 3/4"	93L 1"	93H 1"	93L 1 1/4"	93H 1 1/4"
Start-up ΔP	25 kPa 0,25 bar	30 kPa 0,30 bar	25 kPa 0,25 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar

Rounded values. At 100% preset. See also pages 12

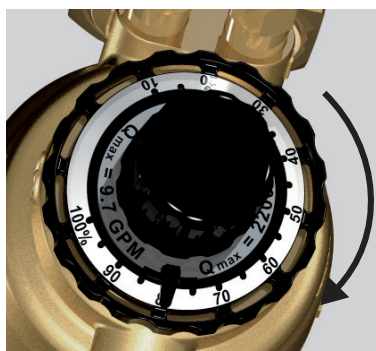


2. Flow preset

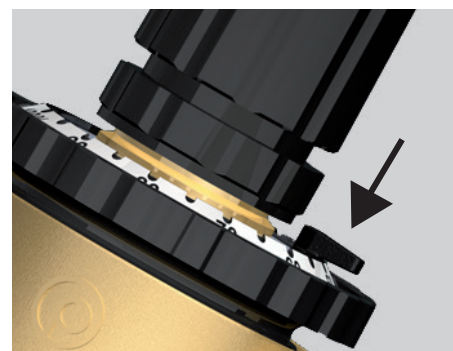
To set the selected flow, follow these steps:



Lift the lock pin to unlock the selector



Turn the selector to the target position



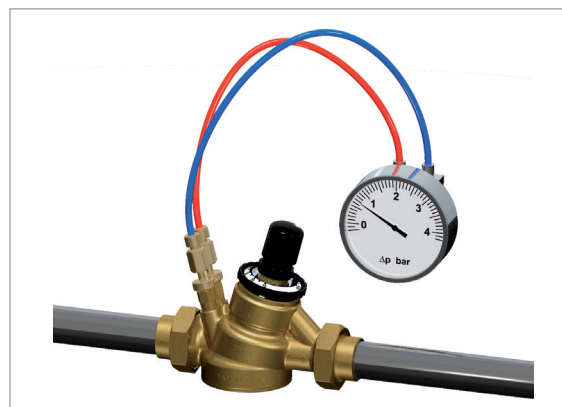
Press the lock pin to lock the selector in the final position

Selector can be adjusted also with the mounted actuator. Patented (EP2488994-B1 and US8985140-B2).

3. Operating control

It is necessary to be sure that the valve is actually working in the operating range. In order to verify it, just measure the differential pressure across the valve, as shown in the picture.

If the measured differential pressure is higher than the start-up pressure, the valve is actually keeping the flow constant at the set value. We suggest to use Fratelli Pettinaroli devices MDP and MDPS.



4. Maintenance and cleaning

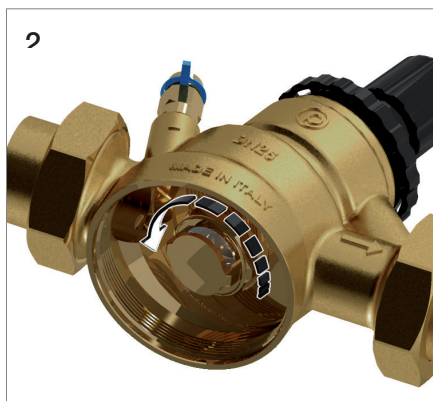
During valve cleaning operations, use a damp cloth. DO NOT use any detergent or chemical product that may seriously damage or compromise the proper functioning and the reliability of the valve.

5. Diaphragm replacement and flushing

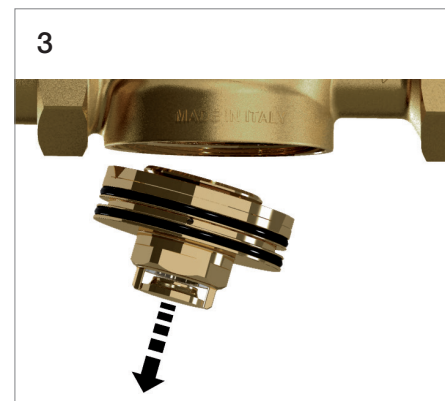
If the Diaphragm (ΔP regulator) needs to be replaced or when flushing the pipework during pre-commissioning, follow instructions below.



Unscrew bottom cap



Unscrew the Diaphragm using an hexagonal socket wrench



Manually pull out the Diaphragm. Wear gloves.

Installation and maintenance - 83 EvoPICV

1. Use conditions

The valve has to be mounted with the arrow in the direction of the flow. Mounting it in the wrong direction may damage the system and the valve itself. If flow reversal is possible, a non-return valve should be mounted. Minimum differential pressure above which the valve begins to exercise its regulating effect:

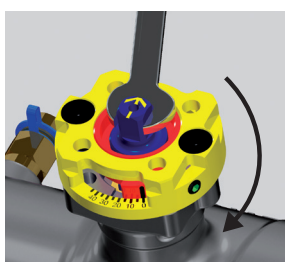


	83HPR1 1 1/4"	83LPR1 1 1/2"	83HPR1 1 1/2"	83VLPR1 2"	83LPR1 2"	83HPR1 2"
Start-up ΔP	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	40 kPa 0,40 bar	35 kPa 0,35 bar	35 kPa 0,35 bar

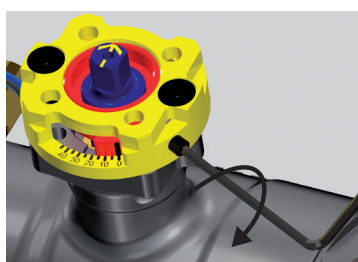
Rounded values. At 100% preset. See also pages 13-14

2. Flow preset

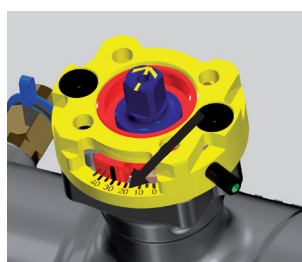
To set the selected flow, follow these steps:



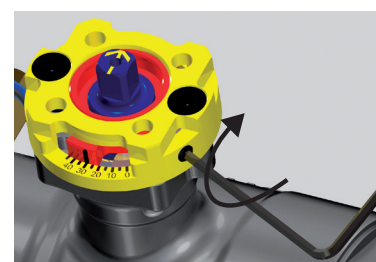
Close the valve



Release locking device



Set maximum flow rate

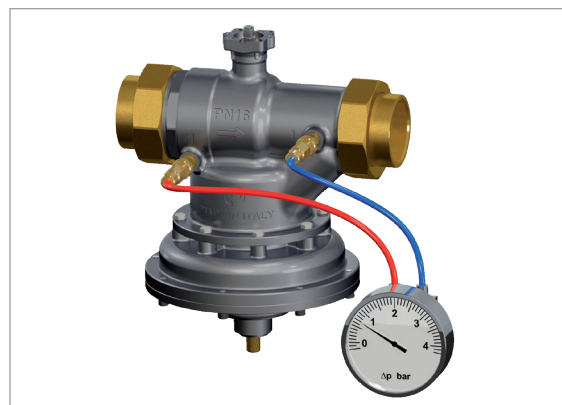


Lock again and re-open the valve. Don't overtighten. Could seriously damage the device. Torque 2÷3 Nm

3. Operating control

It is necessary to be sure that the valve is actually working in the operating range. In order to verify it, just measure the differential pressure across the valve, as shown in the picture.

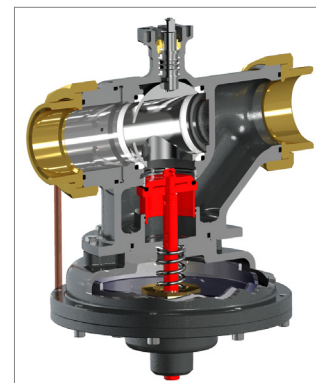
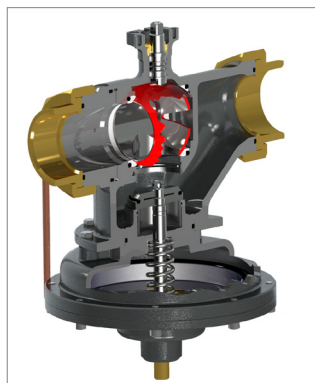
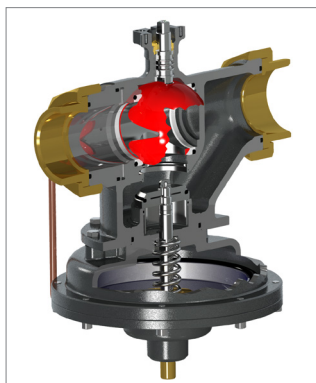
If the measured differential pressure is higher than the start-up pressure, the valve is actually keeping the flow constant at the set value. We suggest to use Fratelli Pettinaroli devices MDP and MDPS.



4. Maintenance and cleaning

During valve cleaning operations, use a damp cloth. DO NOT use any detergent or chemical product that may seriously damage or compromise the proper functioning and the reliability of the valve.

5. Flushing and shut off



Flushing can be made through the valve by turning the valve 180°. The differential pressure reducer is now inhibited and no flow limitation occurs.

Remember to restore the valve in its working position after flushing.

The valve can be closed through the cartridge, should there be the need to do so, by using a 6 mm allen key.

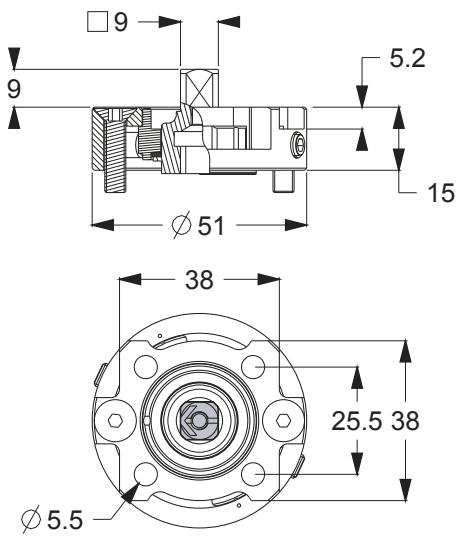
In normal working conditions this shut off device must be fully open.

6. Actuator assembly

The valve can be equipped with electro-mechanical actuators, according to the requirements of the system. The mounting pad is made according to ISO 9210 F04.



Presetting device and mounting pad



Installation and maintenance - 94F EvoPICV 2" - 10"

1. Use conditions

The valve has to be mounted with the arrow in the direction of the flow. Mounting it in the wrong direction may damage the system and the valve itself.

If flow reversal is possible, a non-return valve should be mounted.

Minimum differential pressure above which the valve begins to exercise its regulating effect:

	94FH 2"	94FL 2 1/2"	94FH 2 1/2"	94FL 3"	94FL 4"
Start-up ΔP	40 kPa 0,40 bar	40 kPa 0,40 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	30 kPa 0,30 bar

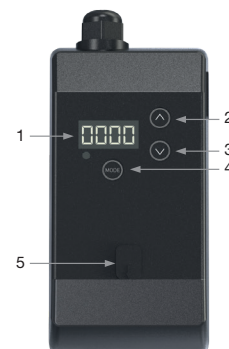
	94FL 5"	94FH 5"	94FL 6"	94FH 6"
Start-up ΔP	35 kPa 0,35 bar	35 kPa 0,35 bar	35 kPa 0,35 bar	50 kPa 0,50 bar

	94FL 8"	94FH 8"	94FL 10"	94FH 10"
Start-up ΔP	40 kPa 0,40 bar	60 kPa 0,60 bar	40 kPa 0,40 bar	65 kPa 0,65 bar



Actuator M94F2

- 1 Display
- 2 Up button
- 3 Mode button
- 4 Down button
- 5 Manual override



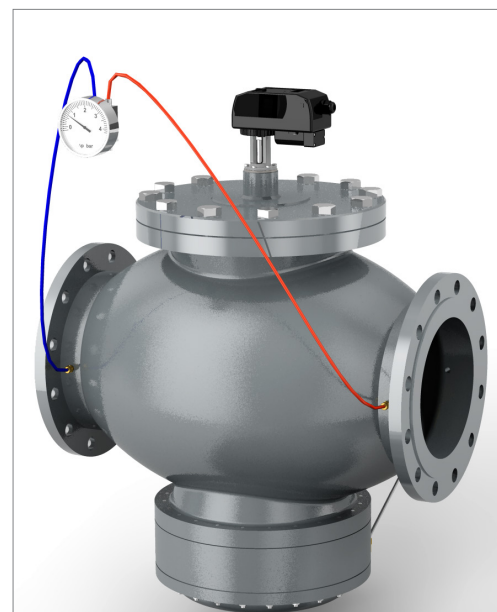
Rounded values. At 100% preset. See also pages 14-17

2. Flow preset

The 94F is set up using the Smart Actuator:

When first powered 'GO 0' is displayed on the LCD. Then wait for '0' to appear. Pressing the 'MODE' button for 2 seconds or longer turns to setting mode. You can then choose the detail indication that's suitable for your on-site installations. When in 'set' mode, press the MODE button again and you can choose another set mode (set 1 - set 14).

- SET1 - Selecting input indication in direct internal control mode
- SET2 - Selecting an input signal
- SET3 - Min. flow setting
- SET4 - Max. flow setting
- SET5 - Selecting parameters display mode during operation
- SET6 - Rotation angle compensation
- SET7 - Flow offset compensation
- SET8 - Power failure mode (not available)
- SET9 - Flow rate units selection
- SET10 - Control curve selection (LIN - EQ)
- SET11 - Min voltage signal in PID control mode
- SET12 - Max voltage signal in PID control mode
- SET13 - Actuator rotation speed
- SET14 - Feedback signal selection



3. Operating control

It is necessary to be sure that the valve is actually working in the operating range. In order to verify it, just measure the differential pressure across the valve, as shown in the picture.

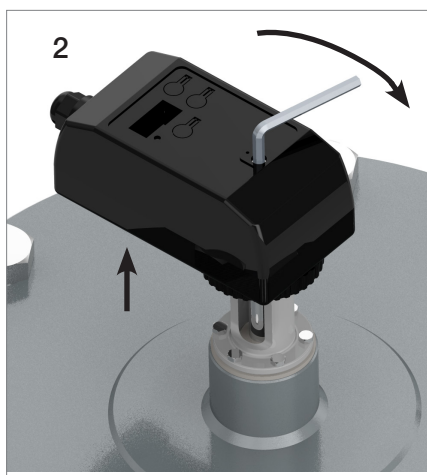
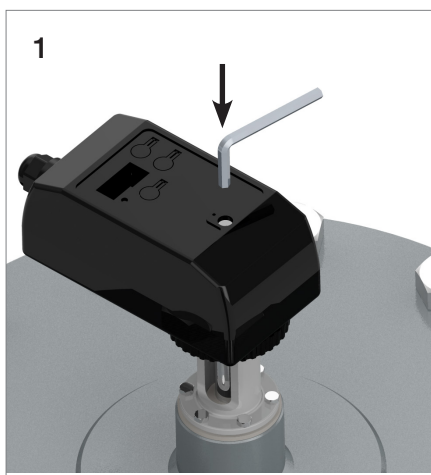
If the measured differential pressure is higher than the start-up pressure, the valve is actually keeping the flow constant at the set value. We suggest to use Fratelli Pettinaroli devices MDP and MDPS.

4. Maintenance and cleaning

During valve cleaning operations, use a damp cloth. DO NOT use any detergent or chemical product that may seriously damage or compromise the proper functioning and the reliability of the valve.

5. Manual override

1. Open the rubber cover on the actuator and insert the 6mm Allen key.
2. Turn the key keeping the released button pushed under the actuator.



6. Actuator fitting

1. Insert the three pins in specific buttonholes on the fixing plate
2. Turn the fixing ring



Setting of parameter SET 4: FLOW RATE PRESETTING

The presetting flow rate of valve 94F can be set through the parameter SET 4 of the M94F2 actuator: the parameter should be set between the max and min presetting flow rate of the valve. SET 3 should be left at 0.

Valve	94FH 2"	94FL 2 1/2"	94FH 2 1/2"	94FL 3"	94FL 4"	94FL 5"	94FH 5"	94FL 6"	94FH 6"
Max presetting flow rate [m3/h]	20	20	30	30	55	90	120	90	150
Min presetting flow rate [m3/h]	4	4	6	6	16.5	18	12	18	15
Model code	F-50	F-64	F-65	F-80	F-100	F-125	F-126	F-150	F-151

Valve	94FL 8"	94FH 8"	94FL 10"	94FH 10"
Max presetting flow rate [m3/h]	200	300	300	500
Min presetting flow rate [m3/h]	60	90	60	150
Model code	F-200	F-201	F-250	F-251

Setting procedure



Other parameters can be set, if necessary, without a preferential path.



7. Parameters of actuator

The table below explains all the parameters that are configurable on M94F2.

	Display indication	Meaning	Operating
SET 1	<i>PErc</i>	Input internal control in %	Selection with UP/DOWN buttons and confirmation with MODE button
	<i>FL0</i> (default)	Input internal control in flow rate	
SET 2	<i>0-10</i>	Voltage control signal	Control with voltage signal
	<i>2-10</i> (default)	Voltage control signal	Control with voltage signal
	<i>0-20</i>	Current control signal	Control with current signal
	<i>4-20</i>	Current control signal	Control with current signal
	<i>on-F</i>	ON/OFF	24 V: open; 0 V: close;
	<i>3-FL</i>	3 points floating	opening giving white wire 24 V closing giving green wire 24 V
	<i>rT</i>	Remote control	Not available
	<i>P-05</i>	PWM 5 s	PWM (0.1 – 5 s)
	<i>P-25</i>	PWM 25 s	PWM (0.1 – 25 s)
	<i>Int</i>	Internal input	Flow rate set by on board display and buttons. Push MODE, wait until “Set” is replaced by flow rate indication (or flow rate %, depending on SET 1), set the flow rate with UP/DOWN buttons and confirm with MODE.
SET 3	Flow rate on display	Min flow rate selection (default: 0)	Selection with UP/DOWN buttons and confirmation with MODE button
SET 4	Flow rate on display	Max flow rate selection (default: depending on model)	Selection with UP/DOWN buttons and confirmation with MODE button
SET 5	<i>St-P</i>	Set flow rate in “%”	Selection with UP/DOWN buttons and confirmation with MODE button Display option during operation: St allows to see the flow rate value required by the controller; Fd allows to see the current flow rate value given by the valve (the progressive change of flow rate values is displayed during valve stem motion)
	<i>St-F</i>	Set flow rate in “flow rate”	
	<i>Fd-P</i>	Current flow rate in “%”	
	<i>Fd-F</i> (default)	Current flow rate in “flow rate”	
SET 6*	Value on display	Rotation angle compensation	Selection with UP/DOWN buttons and confirmation with MODE button
SET 7	Value on display	% flow rate offset (default: 0)	Selezione con tasti SU/GIÙ e conferma con tasto MODE.
SET 8	<i>oPEN</i>	Valve open at power failure	Selection Fail-CLOSE or Fail-OPEN option. Additional battery M94FB needed.
	<i>CLoS</i> (default)	Valve close at power failure	
SET 9	<i>LIt</i> (default)	Unit SI (m ³ /h)	Selection with UP/DOWN buttons and confirmation with MODE button
	<i>GAL</i>	Unit GPM (gal/min)	
SET 10	<i>LIn</i> (default)	Linear control curve	Selection with UP/DOWN buttons and confirmation with MODE button
	<i>EPEr</i>	Equal percentage control curve	
SET 11*	Value on display	Min voltage control signal (signal noise)	Selection min voltage control value with UP/DOWN buttons and confirmation with MODE button
SET 12*	Value on display	Max voltage control signal (signal noise)	Selection min voltage control value with UP/DOWN buttons and confirmation with MODE button
SET 13	<i>PE15</i> (default)	Actuator rotation speed 1.5 RPM	Selection of actuator rotation speed with UP/DOWN buttons and confirmation with MODE button
	<i>PE01</i>	Actuator rotation speed 1 RPM	
	<i>Ruto</i>	Actuator rotation speed automatic	
SET 14	<i>0-10</i>	Voltage feedback signal	Selection of feedback signal type with UP/DOWN buttons and confirmation with MODE button
	<i>2-10</i> (default)	Voltage feedback signal	
	<i>0-20</i>	Current feedback signal	
	<i>4-20</i>	Current feedback signal	

* Contact the manufacturer to modify.

Thermo-electric actuators for 91 series

1. Art. A544O2

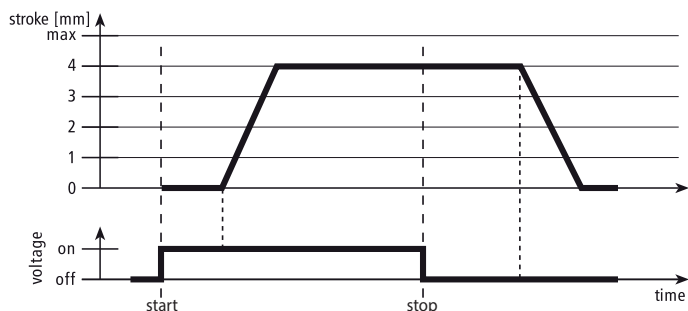
24V AC/DC ON-OFF, normally closed (NC)

Technical features	
Supply voltage	24 AC / DC, +20% ÷ -10%
Absorbed power	1 W
Max current	<300 mA max. 2 min.
Max fluid temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	II (IEC 60730) (with cable connector only)
Actuating force	100 N ± 5 %
Stroke	4 mm

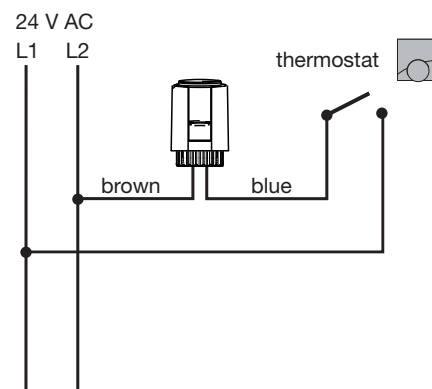


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

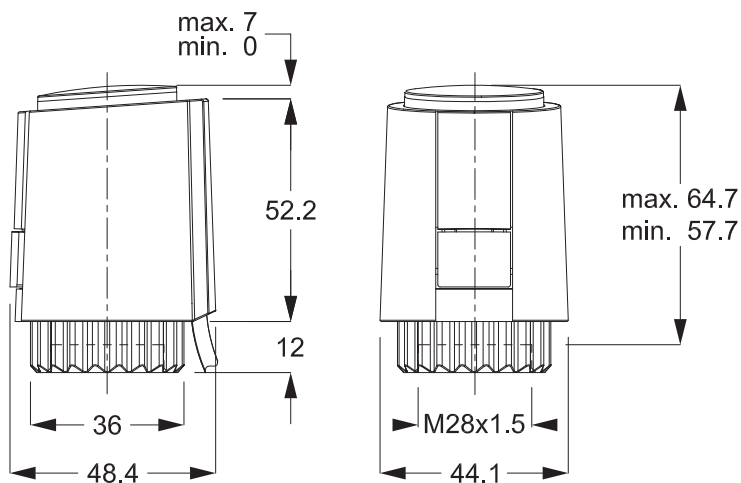


Wiring diagrams



Overall dimensions

Dimensions (mm)



2. Art. A54404

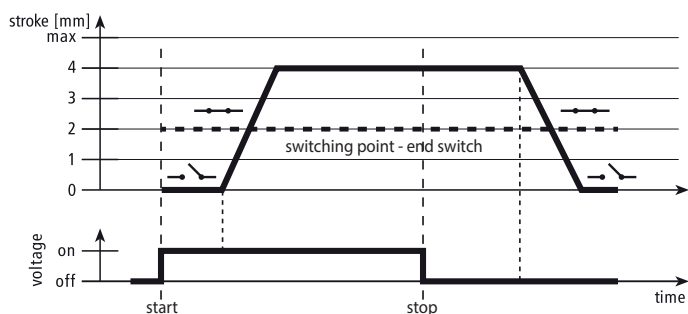
24V AC/DC ON-OFF with integrated micro switch, normally closed (NC)

Technical features	
Supply voltage	24 AC / DC, +20% ÷ -10%
Absorbed power	1 W
Max current	<300 mA max. 2 min.
Max fluid temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	III (IEC 60730) (with cable connector only)
Actuating force	100 N ± 5 %
Stroke	4 mm

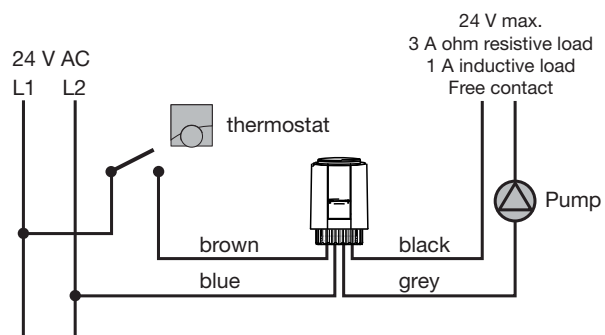


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

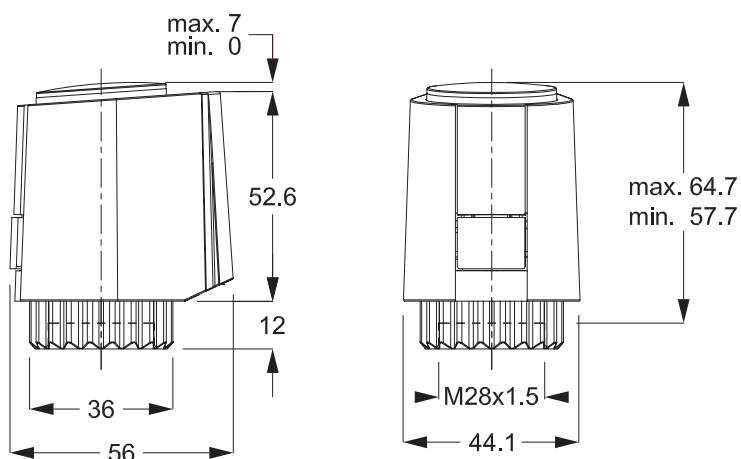


Wiring diagrams



Overall dimensions

Dimensions (mm)



3. Art. A542O2

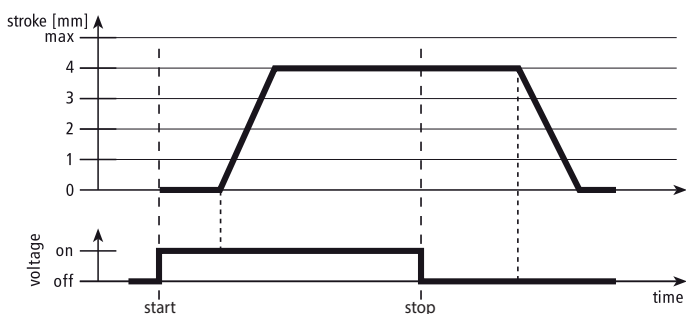
230V AC ON-OFF, normally closed (NC)

Technical features	
Supply voltage	230 Vac ±10%, 50Hz
Absorbed power	1 W
Max current	<550 mA max. 100ms
Max fluid temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	II (IEC 60730) (with cable connector only)
Actuating force	100 N ± 5 %
Stroke	4 mm

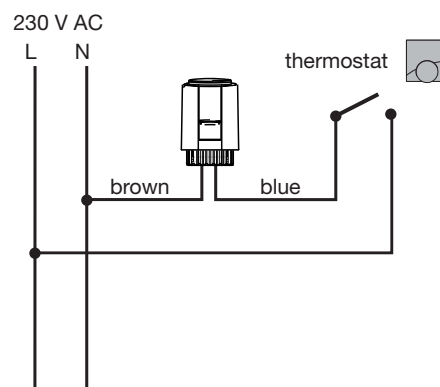


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

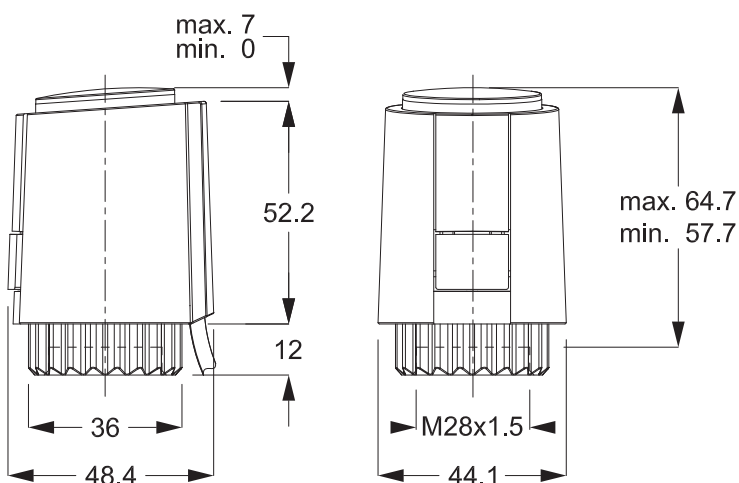


Wiring diagrams



Overall dimensions

Dimensions (mm)



4. Art. A54204

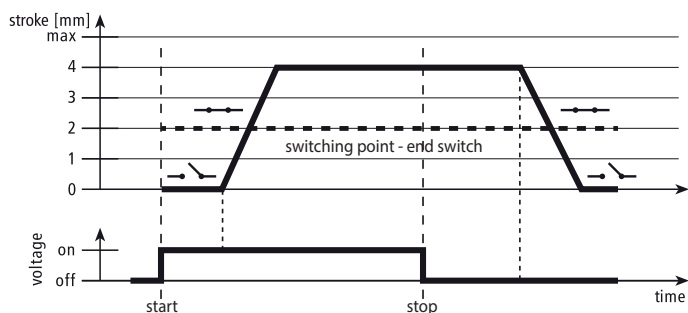
230V AC ON-OFF with integrated micro switch, normally closed (NC)

Technical features	
Supply voltage	230 Vac ±10%, 50Hz
Absorbed power	1 W
Max current	<550 mA max. 100ms
Max fluid temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	II (IEC 60730) (with cable connector only)
Actuating force	100 N ± 5 %
Stroke	4 mm

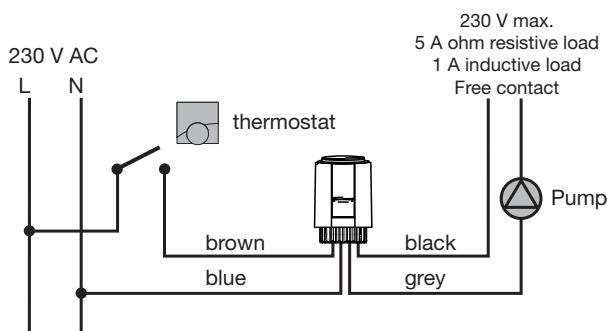


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

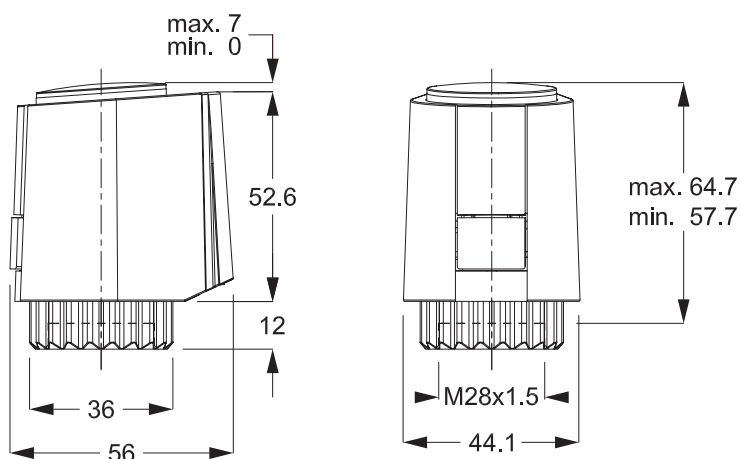


Wiring diagrams



Overall dimensions

Dimensions (mm)



5. Art. A551O2

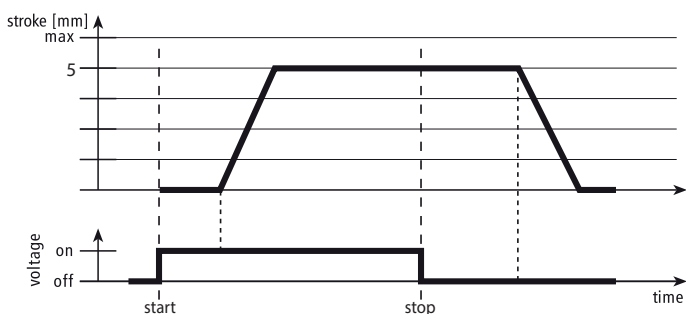
120V AC ON-OFF, normally closed (NC)

Technical features	
Supply voltage	120 Vac ±15%, 50/60Hz
Absorbed power	1 W
Max current	<450 mA max. 100ms
Max medium temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	II (IEC 60730) (with cable connector only)
Actuating force	100 N ± 5 %
Stroke	5 mm

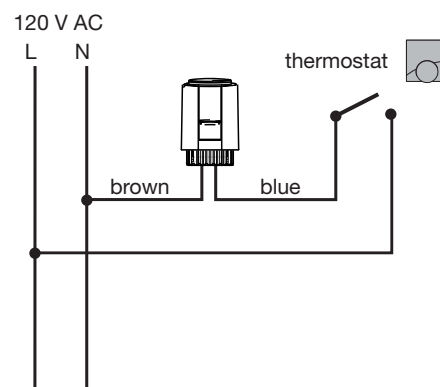


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

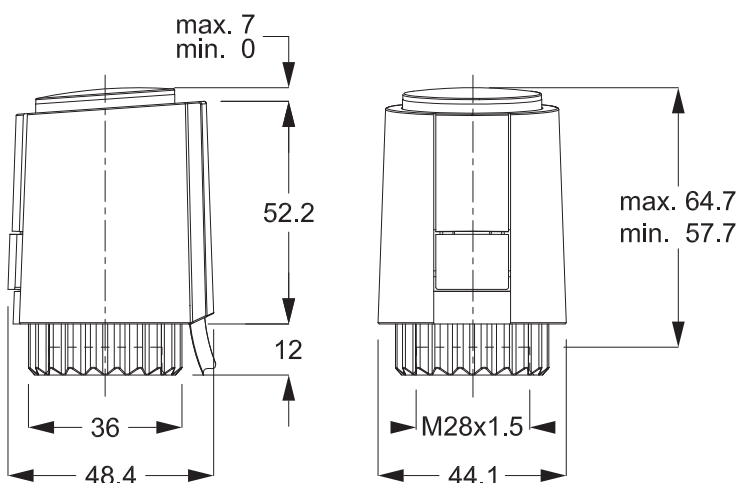


Wiring diagrams



Overall dimensions

Dimensions (mm)



6. Art. A544P3

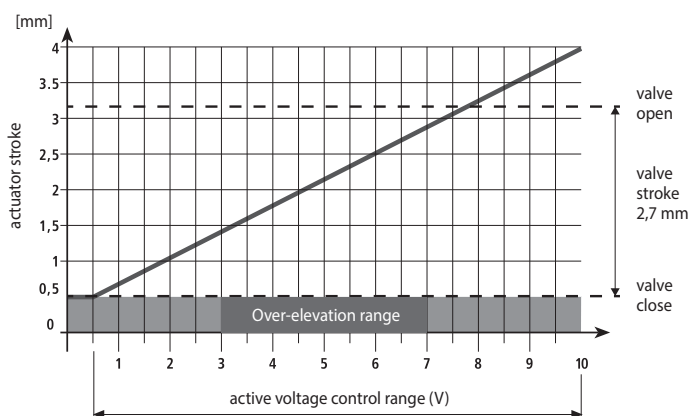
24V AC/DC proportional 0-10V, normally closed (NC)

Technical features	
Supply voltage	24V AC/DC -10% ÷ +20%
Absorbed power	1 W
Max current	< 320 mA max. 2 min.
Operating voltage	0 – 10 V DC 100 kΩ
Max fluid temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	III (IEC 60730)
Actuating force	100 N ± 5 %
Stroke	4 mm
Travelling time	30 s/mm

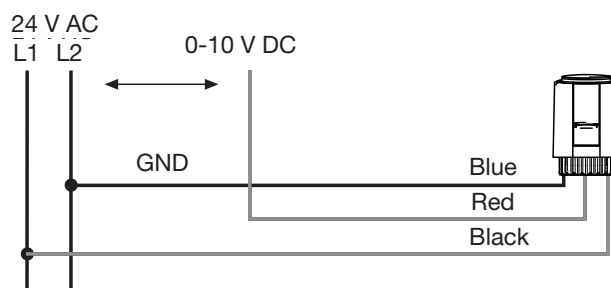


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

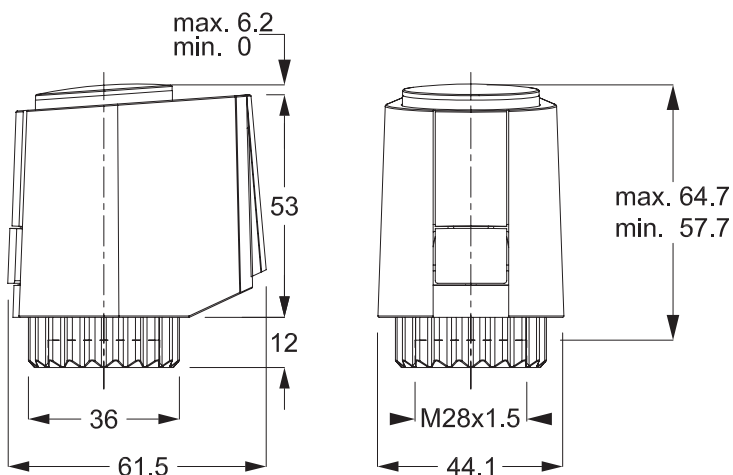


Wiring diagrams



Overall dimensions

Dimensions (mm)



Thermo-electric actuators for 93 series

1. Art. A564O2

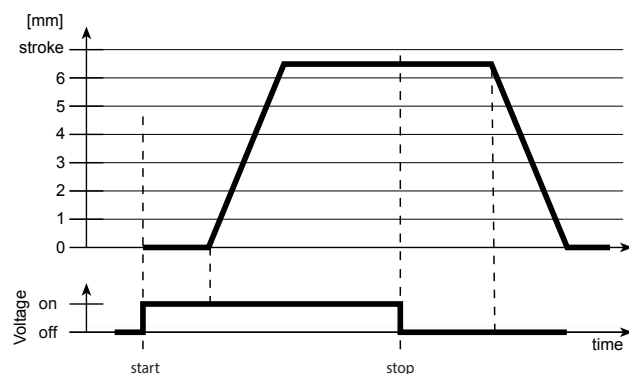
24V AC/DC ON-OFF, normally closed (NC)

Technical features	
Supply voltage	24 AC / DC, +20% ÷ -10%
Absorbed power	1,2 W
Max current	<300 mA max. 2 min.
Max fluid temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	III (IEC 60730) (with cable connector only)
Actuating force	100 N ± 5 %
Stroke	6,5 mm

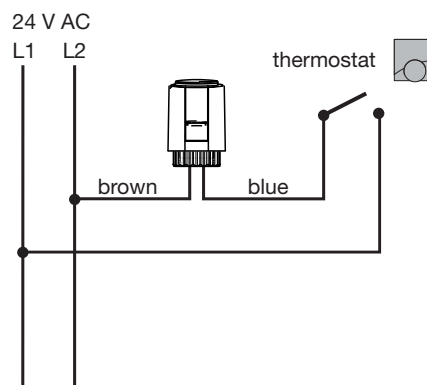


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

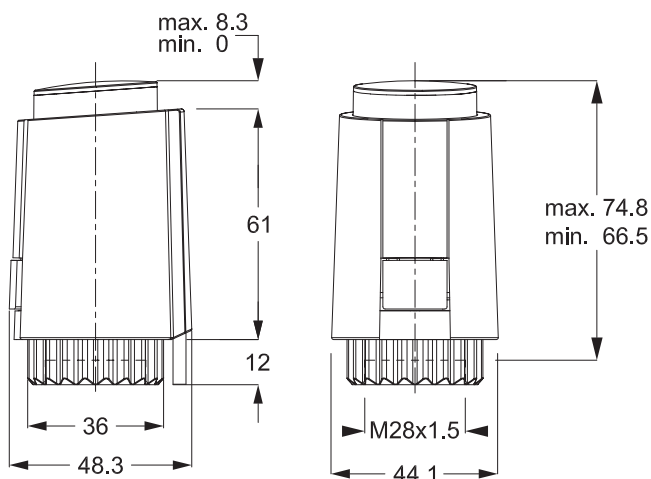


Wiring diagrams



Overall dimensions

Dimensions (mm)



2. Art. A562O2

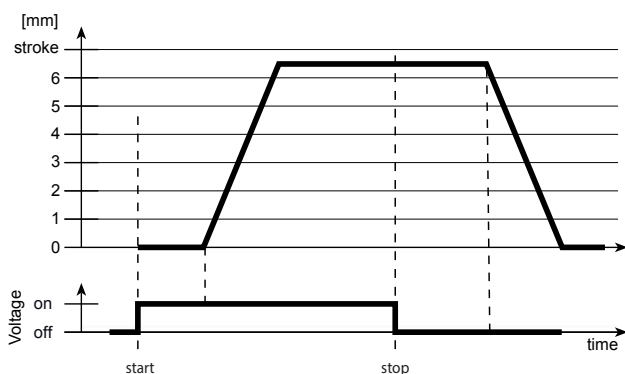
230V AC ON-OFF, normally closed (NC)

Technical features	
Supply voltage	230 Vac $\pm 10\%$, 50Hz
Absorbed power	1,2 W
Max current	<550 mA max. 100 ms
Max fluid temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	II (IEC 60730) (with cable connector only)
Actuating force	100 N $\pm 5\%$
Stroke	6,5 mm

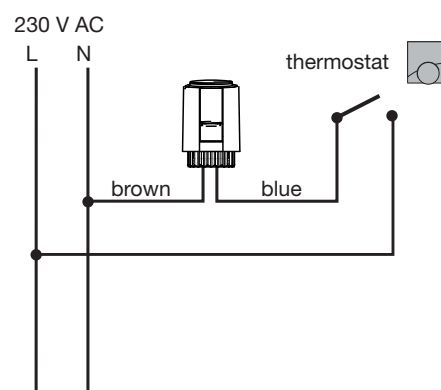


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

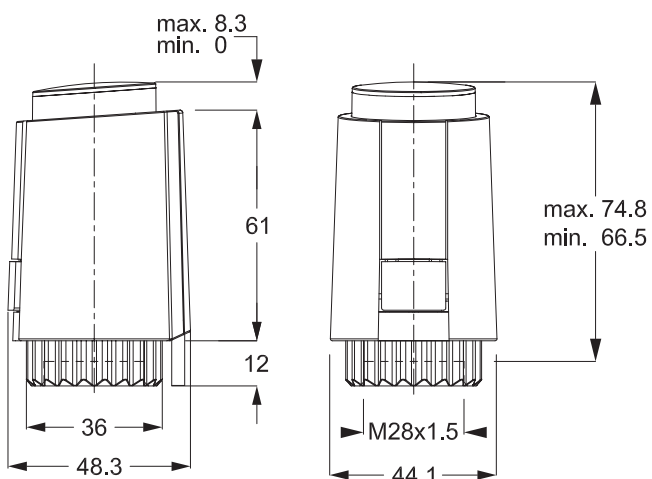


Wiring diagrams



Overall dimensions

Dimensions (mm)



3. Art. A561O2

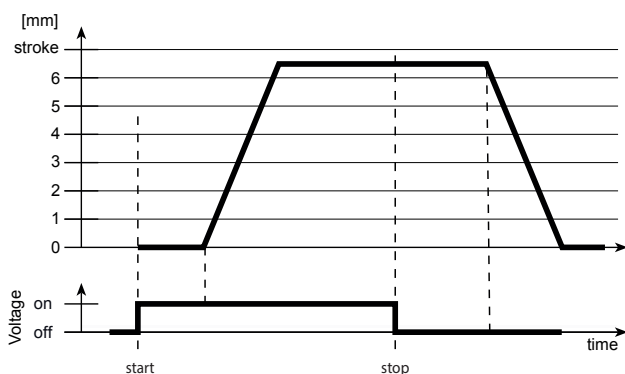
120V AC ON-OFF, normally closed (NC)

Technical features	
Supply voltage	120 Vac $\pm 10\%$, 50/60Hz
Absorbed power	1,2 W
Max current	<450 mA max. 100 ms
Max fluid temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	II (IEC 60730) (with cable connector only)
Actuating force	125 N $\pm 5 \%$
Stroke	6,5 mm

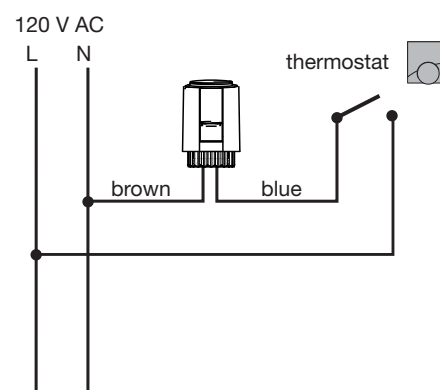


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

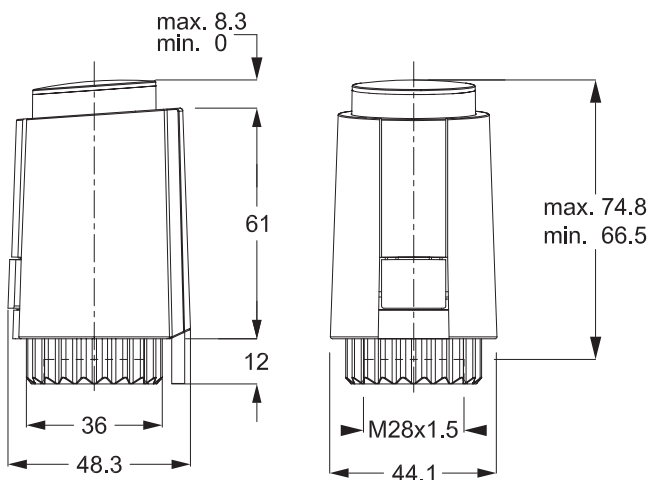


Wiring diagrams



Overall dimensions

Dimensions (mm)



4. Art. A564P3

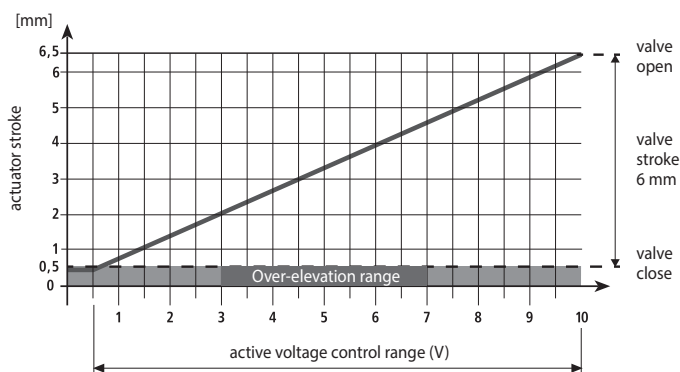
24V AC/DC proportional 0-10V, normally closed (NC)

Technical features	
Supply voltage	24V AC/DC -10% ÷ +20%
Absorbed power	1,2 W
Max current	< 320 mA max. 2 min.
Operating voltage	0 – 10 V DC 100 kΩ
Max fluid temperature	0 - 100 °C
Max ambient temperature	0 - 60 °C
Degree of protection	IP 54 (EN 60529)
Class of protection	III (IEC 60730)
Actuating force	100 N ± 5 %
Stroke	6,5 mm
Travelling time	30 s/mm

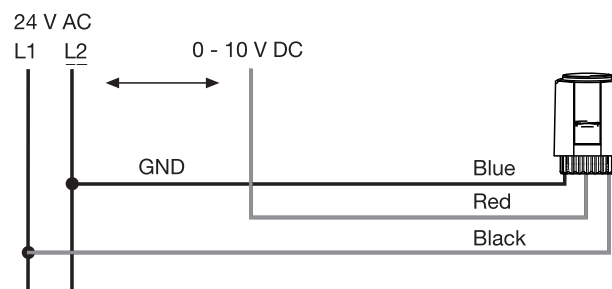


Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

Characteristic curves

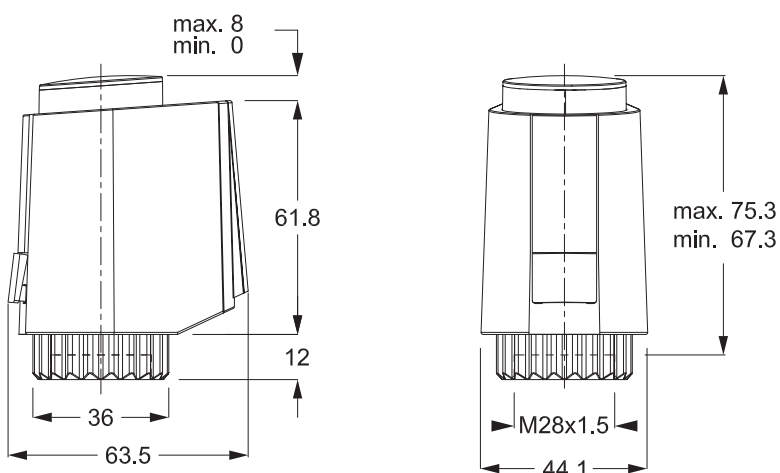


Wiring diagrams



Overall dimensions

Dimensions (mm)



Electromotive actuators

1. Art. VA7481

24V Vac floating model

Technical features	
Supply voltage	24 Vac ± 15%, 50...60 Hz
Absorbed power	1,5 W / 2,5VA
Max fluid temperature	95 °C
Max ambient temperature	0 - 50 °C
Degree of protection	IP 43
Actuating force	120 N +30% -20%
Max mechanical stroke	6,3 mm
Travelling time	8 sec/mm



Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

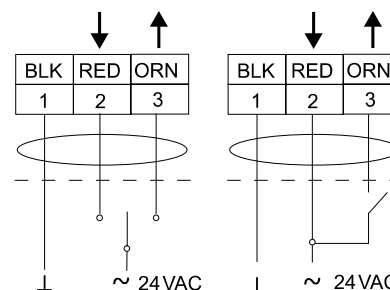
For proper installation of VA7481 - 24V electromotive actuator, the right adapting ring has to be defined (and ordered separately), referring to codes below:

- 0A7010 for EVOPICV series 91 valves
- 0A748X for EVOPICV series 93 valves

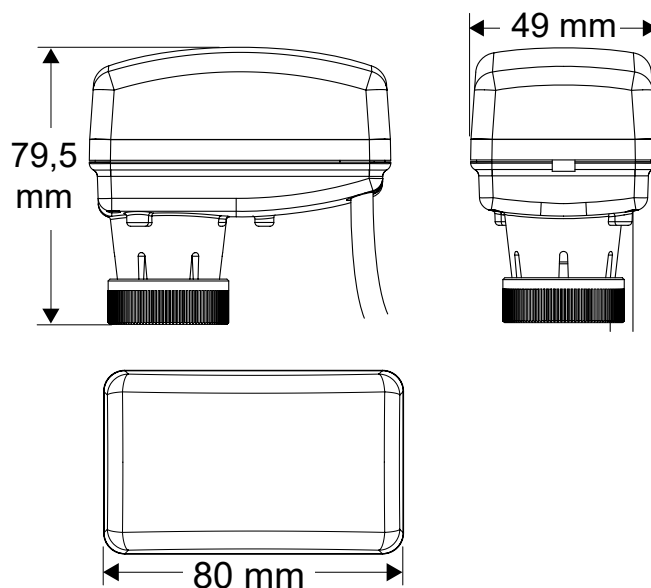
Operating status indication

OFF		No power supply
GREEN BLINKING		Moving to position
GREEN BLINKING		End stroke confirmation
GREEN STEADY ON		End Stroke reached

Connections



Overall dimensions



2. Art. VA7481
230V Vac floating model

Technical features	
Supply voltage	230 Vac ± 10%, 50...60 Hz
Absorbed power	2,2 W / 6,5VA
Max fluid temperature	95 °C
Max ambient temperature	0 - 50 °C
Degree of protection	IP 43
Actuating force	120 N +30% -20%
Max mechanical stroke	6,3 mm
Travelling time	8 sec/mm



Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

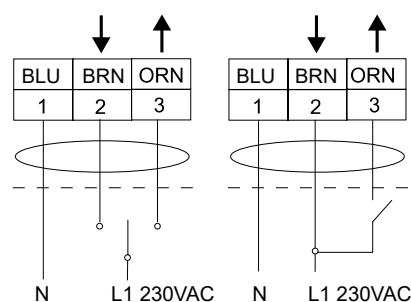
For proper installation of VA7481 - 230V electromotive actuator, the right adapting ring has to be defined (and ordered separately), referring to codes below:

- 0A7010 for EVOVICV series 91 valves
- 0A748X for EVOVICV series 93 valves

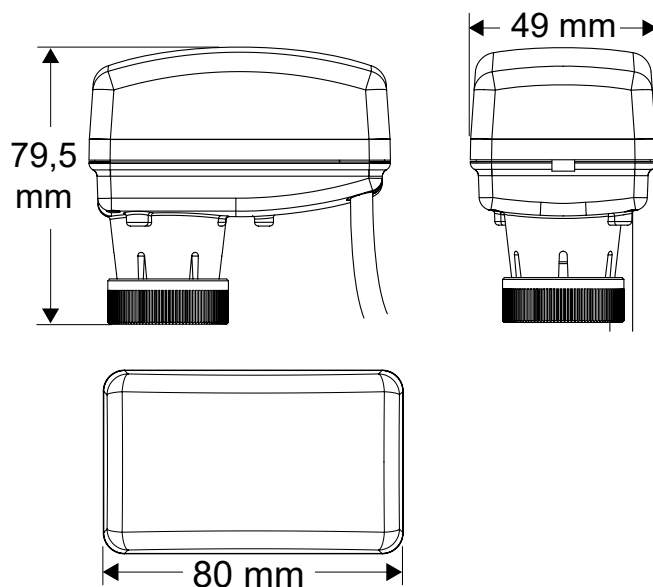
Operating status indication

OFF		No power supply
GREEN BLINKING		Moving to position
GREEN BLINKING		End stroke confirmation
GREEN STEADY ON		End Stroke reached

Connections



Overall dimensions



3. Art. VA7482

24 Vac/Vdc proportional model

Technical features	
Supply voltage	24 Vac/Vdc ± 15%, 50...60 Hz
Absorbed power	1,5 W / 2,5 VA
Input Impedance	Voltage > 100 kΩ - Current 500 Ω
Max fluid temperature	95 °C
Max ambient temperature	0 - 50 °C
Degree of protection	IP 43
Actuating force	120 N +30% -20%
Max mechanical stroke	6,3 mm / 3,2 mm
Travelling time	8 sec/mm



Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

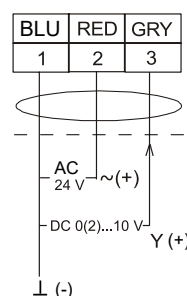
For proper installation of VA7482 - 24V electromotive actuator, the right adapting ring has to be defined (and ordered separately), referring to codes below:

- 0A7010 for EVOPICV series 91 valves
- 0A748X for EVOPICV series 93 valves

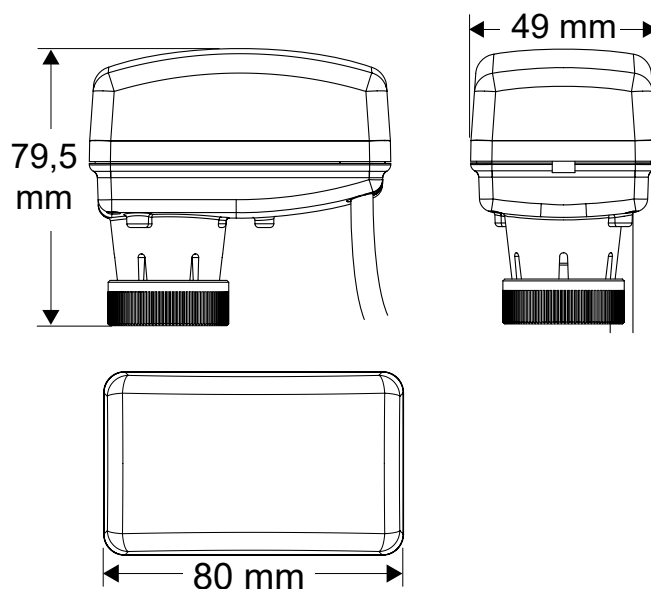
Operating status indication

OFF	○	No power supply
GREEN BLINKING	◐	Moving to position
GREEN BLINKING	◑	End stroke confirmation
GREEN STEADY ON	●	Position reached
RED BLINKING	◐	Cycle
RED STEADY ON	●	4/20 mA or 2/10 Vdc signal lost

Connections



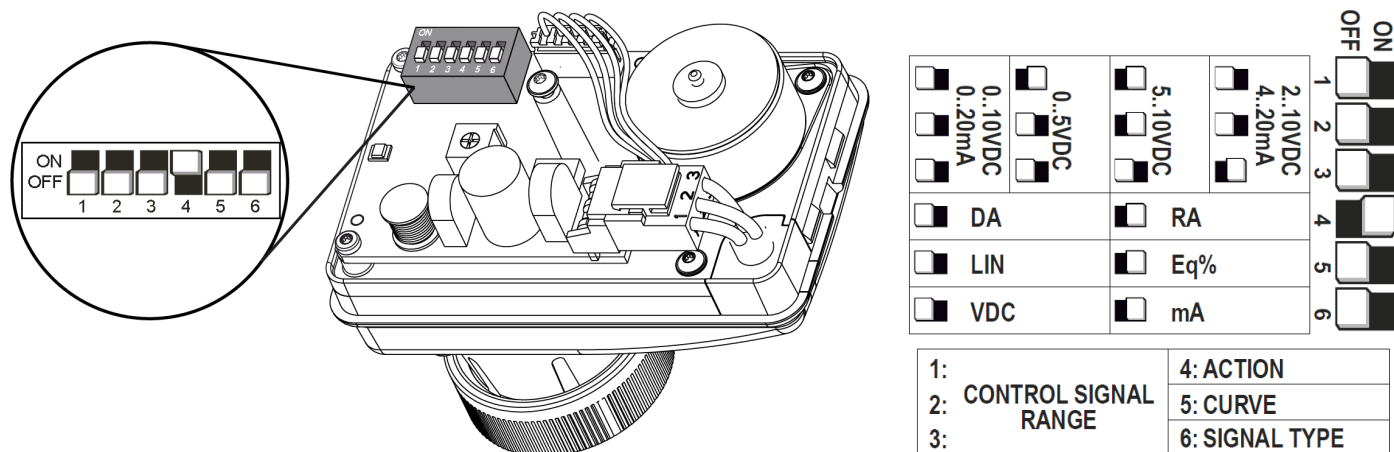
Overall dimensions



Dip switch settings for Proportional model only (VA7482)

All the proportional models have 6 dip switches which allow the user to field configure the actuator.

The actuator is factory released with all the dip switches in OFF position except dip switch n. 4 which is ON.

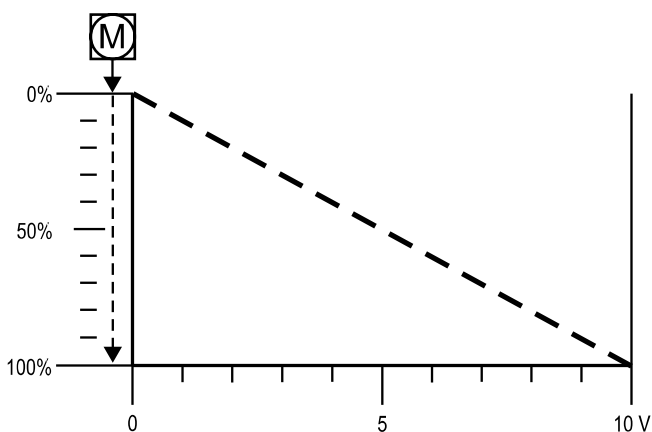


Dip Switch 1 – 2 – 3 – 6

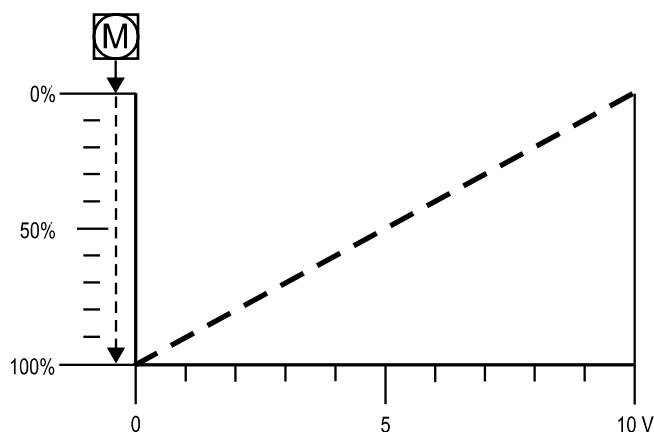
The dip switch 1-2-3 allows the user to change the analogue input ranges. To switch from voltage analog input to current analog input the dip switch 6 has to be set accordingly.

Dip Switch 4

The dip switch 4 allows the user to change the action of the actuator in relation of the analog input. Be aware the **EvoPICV** valve is normally open. Select the action according to the chosen BSM.



The dip switch 4 OFF (Direct Acting – DA)
When the signal increases the actuator stem extends.



The dip switch 4 ON (Reversing Acting – RA) - Default
When the signal increases the actuator stem retracts.

Dip Switch 5

The dip switch 5 allows the user to change the control characteristic of the actuator in order to obtain a combination of valve and actuator linear or almost equal percentage.

The dip switch 5 OFF (Linear)

The dip switch 5 ON (almost EqualPercentage)



4. VM060

Safe return electromotive linear actuator 24V

Technical features	
Minimum Force	120 Nm
Power supply	22 to 26 Vac or 22 to 26 Vdc
Power consumption	10VA peak, 6VA
Electrical connection	4-wire halogen free cable 0.8 mm ² , 1 m long
Control mode & signal	Analog, 0-10Vdc or 2-10Vdc 4-20mA with externally wired 500Ω resistor
Feedback signal	0-10Vdc or 2-10Vdc
Running time	18.5 sec/mm - 120 sec for 6.5mm
Failsafe Running time	9.2 sec/mm - 60 sec for 6.5mm
Maximum stroke	Up to 6.5 mm, self adjustable
Direction	Reversible, normally up position (EvoPICV open) or normally down position (EvoPICV close)
Temperature range	2°C to 50°C
Humidity range	5 to 95 % non condensing
Stock temperature	-30°C to 50°C
Ingress protection	IP54 equivalent to NEMA type 3R



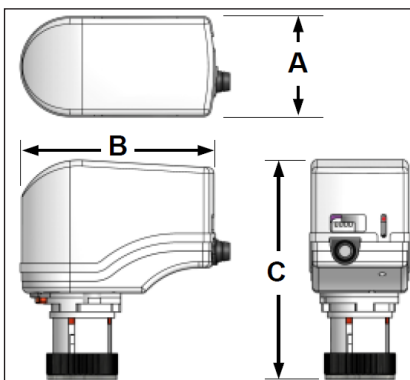
Information is referred to actuator fit onto **EvoPICV 91 - 93**.

Mounting positions: any positions between vertical and horizontal. Upside down mounting (actuator underneath the valve) must be avoided.

In order to correctly install the electromotive actuator VM060, the adaptor 76TE has to be tightened onto the control valve; the adaptor is included.

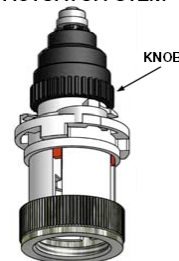
Overall dimensions

- A = 53 mm
- B = 104 mm
- C = 107 mm

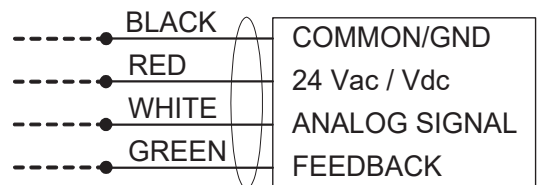


Mounting of the actuator on valve

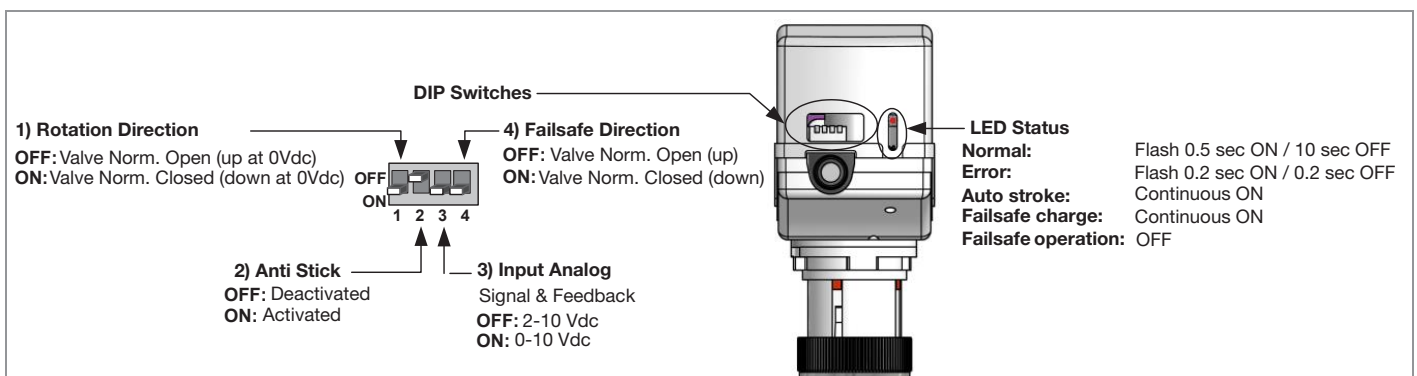
ACTUATOR STEM



Connections



DIP Switches and LED

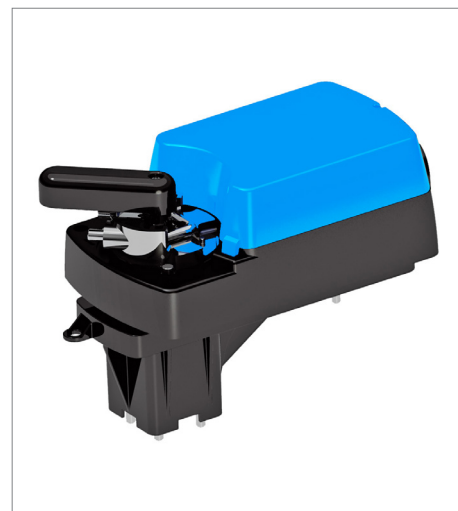


Rotary actuators for 83 series

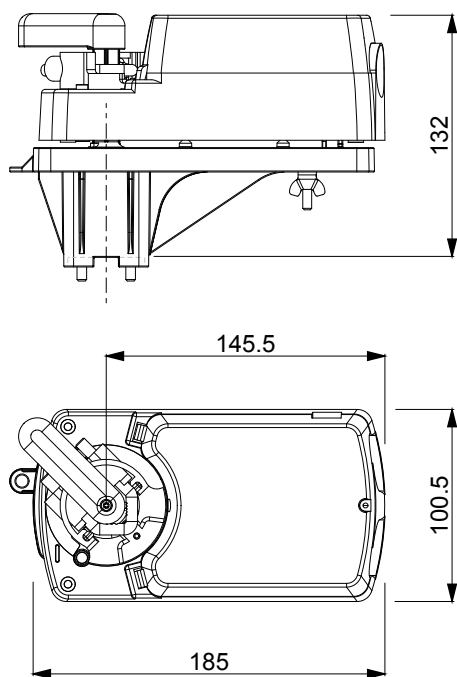
1. SN08 24V

3 point floating control signal

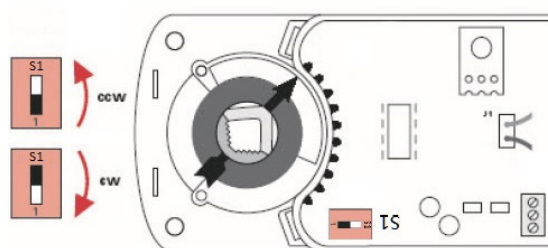
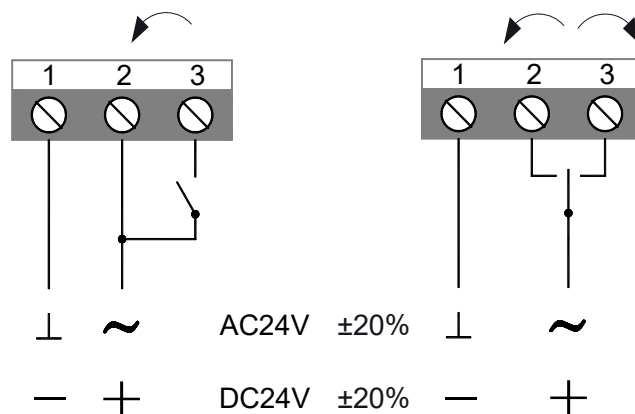
Technical features	
Operating torque	8 Nm Min.
Running time	31 s - 90°
Supply Voltage	24V AC/DC ±20% - 50/60Hz
Consumption	4.5 W - Stand-by 0.3 W
Control Signal	2 point and 3 point
Total rotation	0~90°
Angle limitation	5~85° (5° increment)
Life cycle	60,000 cycle
Protection Class	III
IP protection class	IP54
Temperature range	-20~+50°C
Humidity range	5~95% RH
Stock temperature	-40~+70°C
Certificate	CE



Overall dimensions



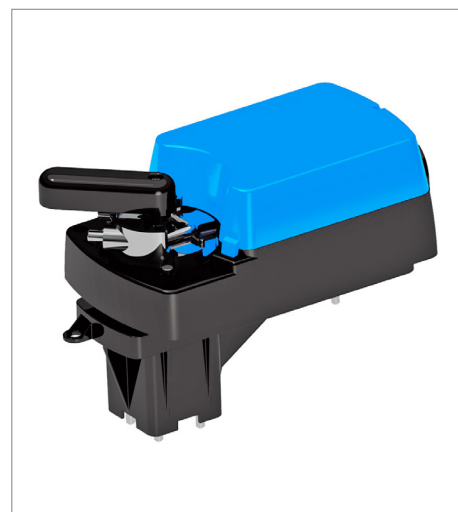
Connections



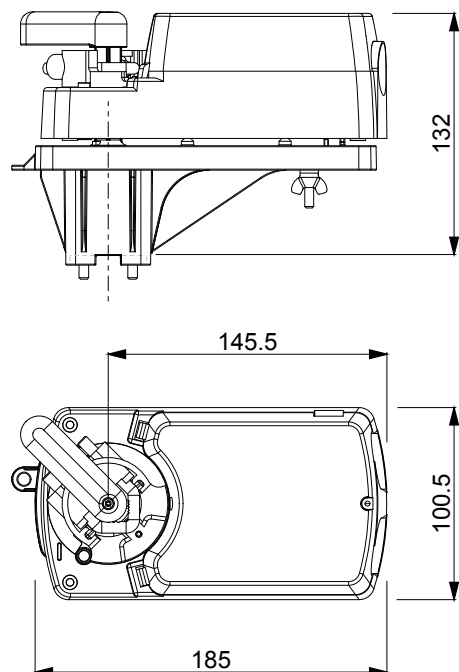
S1 OFF: see wiring

2. SN08 110/240V
3 point floating control signal

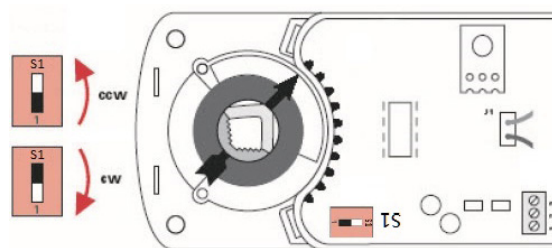
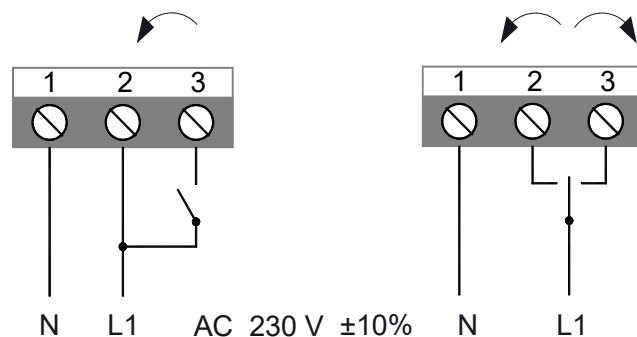
Technical features	
Operating torque	8 Nm Min.
Running time	31 s - 90°
Supply Voltage	110...230V AC ±10% - 50/60Hz
Consumption	4.5 W - Stand-by 0.5 W - 6.5 VA
Control Signal	2 point and 3 point
Total rotation	0~90°
Angle limitation	5~85° (5° increment)
Life cycle	60,000 cycle
Protection Class	II
IP protection class	IP54
Temperature range	-20~+50°C
Humidity range	5~95% RH
Stock temperature	-40~+70°C
Certificate	CE



Overall dimensions



Connections

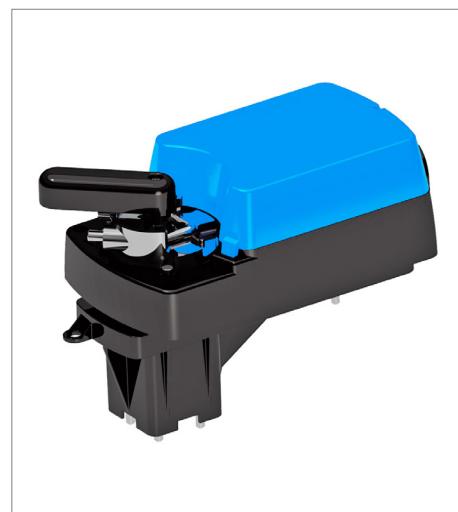


S1 OFF: see wiring

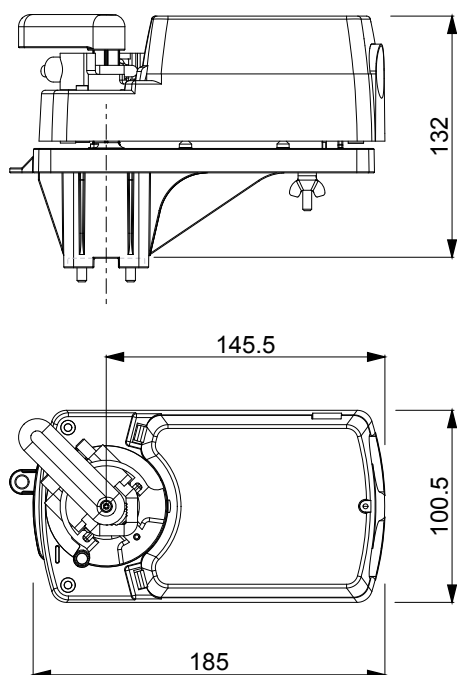
3. SN08CC 24V

Proportional control signal

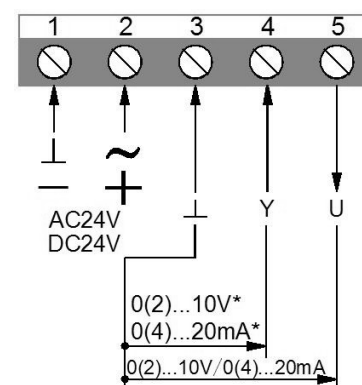
Technical features	
Operating torque	8 Nm Min.
Running time	31 s - 90°
Supply Voltage	24V AC/DC ±20% - 50/60Hz
Consumption	4.5 W - Stand-by 0.5 W
Control Signal	0(2)-10 VDC 0(4)-20 mA
Total rotation	0~90°
Angle limitation	5~85° (5° increment)
Life cycle	60,000 cycle
Protection Class	II
IP protection class	IP54
Temperature range	-20~+50°C
Humidity range	5~95% RH
Stock temperature	-40~+70°C
Certificate	CE



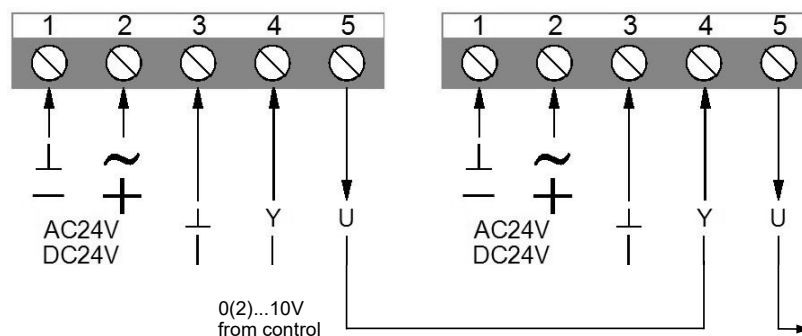
Overall dimensions



Connections



Master/slave control



DIP-Switch setting

Dip-Switch 1: feedback signal type	Dip-Switch 2: control signal range	Dip-Switch 3: control signal type	Dip-Switch 4: rotation direction	Factory setting
OFF: voltage signal 0(2)-10 V	OFF: 0-10 V o 0-20 mA	OFF: voltage signal 0(2)-10 V	OFF: signal increases, counter clockwise rot.	Input: 0-10V Feedback: 0-10V While the signal increases, the actuator rotates clockwise
ON: current signal 0(4)-20 mA	ON: 2-10 V o 4-20 mA	ON: current signal 0(4)-20 mA	ON: signal increases, clockwise rotation	



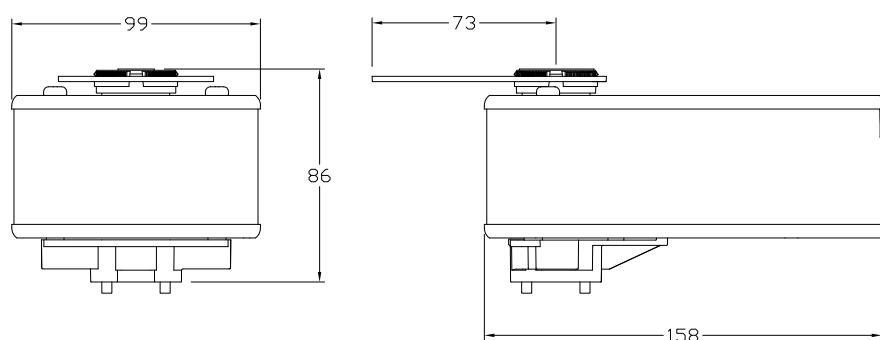
4. VA9208 24V

ON/OFF control spring return

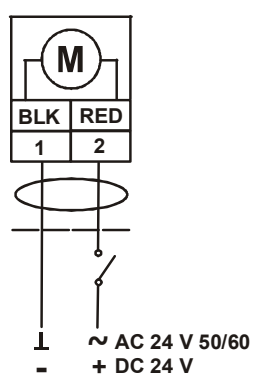
Technical features	
Operating torque	8 Nm power ON - 6÷8 power OFF
Running time	55÷71 s power ON - 13÷26 s power OFF
Supply Voltage	24V AC/DC - 50/60Hz
Consumption	6.1 VA - Stand-by 1.2 VA
Control Signal	ON/OFF
Total rotation	0 - 95°
Life cycle	60,000 cycle
IP protection class	IP54
Temperature range	-20 ÷ +60°C
Humidity range	5~90% RH
Stock temperature	-40 ÷ +85°C
Certificate	CE



Overall dimensions



Connections



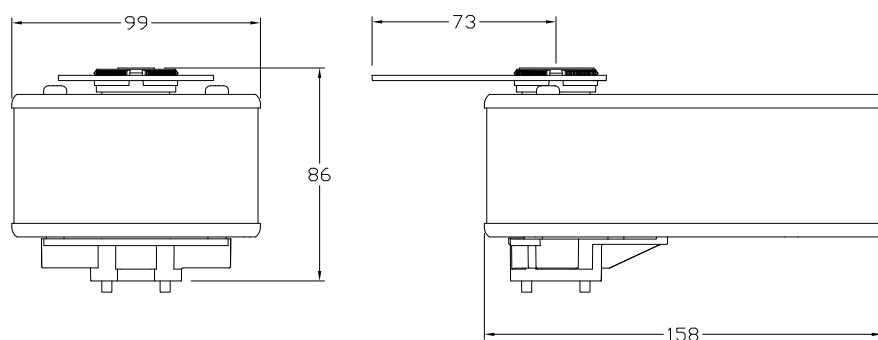
5. VA9208 230V

ON/OFF control spring return

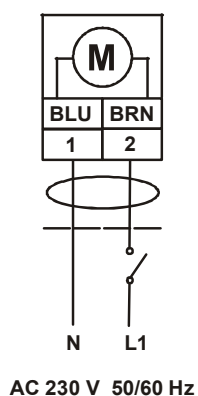
Technical features	
Operating torque	8 Nm power ON - 6÷8 power OFF
Running time	55÷71 s power ON - 13÷26 s power OFF
Supply Voltage	230V AC - 50/60Hz
Consumption	0.04 A - Stand-by 0.03 A
Control Signal	ON/OFF
Total rotation	0 - 95°
Life cycle	60,000 cycle
IP protection class	IP54
Temperature range	-20 ÷ +60°C
Humidity range	5~90% RH
Stock temperature	-40 ÷ +85°C
Certificate	CE



Overall dimensions



Connections



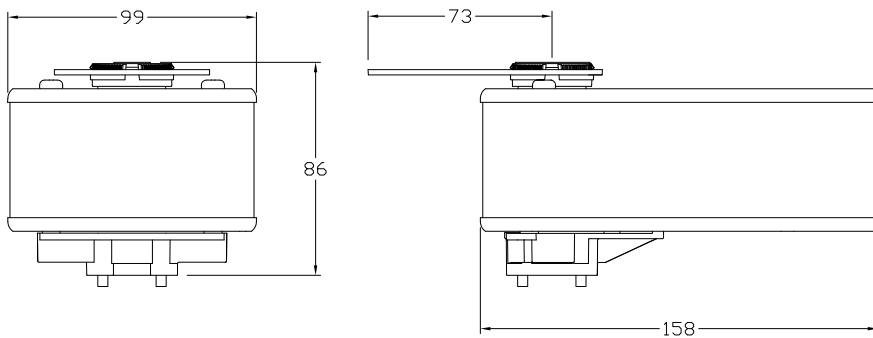
6. VA9208C 24V

Proportional control spring return

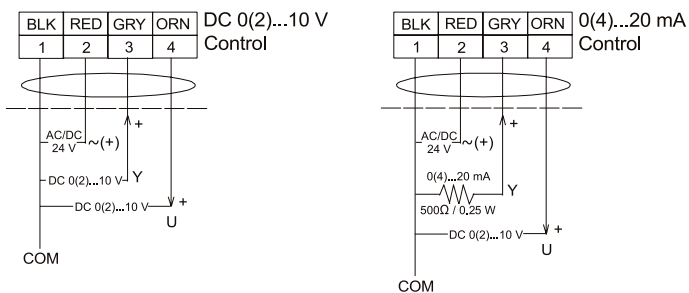
Technical features	
Operating torque	8 Nm
Running time	150 s standard ; 90 s calibration/override 17 ÷ 25 s power OFF
Supply Voltage	24V AC/DC - 50/60Hz
Consumption	7.9 VA - Stand-by 5.5 VA
Control Signal	0-10 V DC
Total rotation	0 - 95°
Life cycle	60,000 cycle
IP protection class	IP54
Temperature range	-40 ÷ +60°C
Humidity range	5~90% RH
Stock temperature	-40 ÷ +85°C
Certificate	CE



Overall dimensions



Connections



M94F2 - SMART actuators for 94F series 2" - 10"



Flow rate can be easily set from the on-board user interface.
Compatible with most used control signals:

- Analogue (current or voltage control)
- PWM
- ON/OFF
- 3 points floating

Position feedback signal, for a total remote management.
Manual override available.
Safe Return function if battery M94FB is connected (optional).
Easy fitting system.

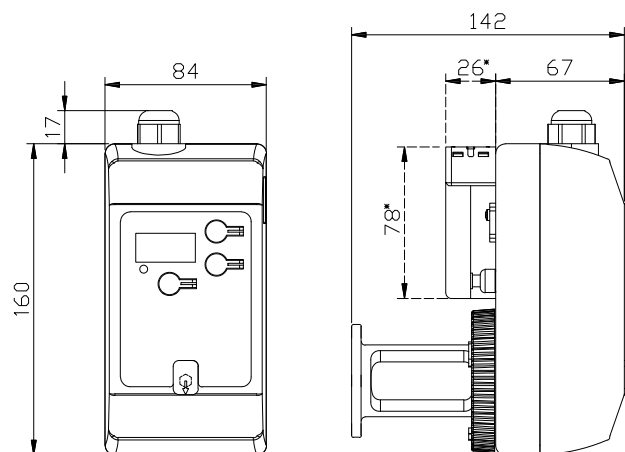


Technical features

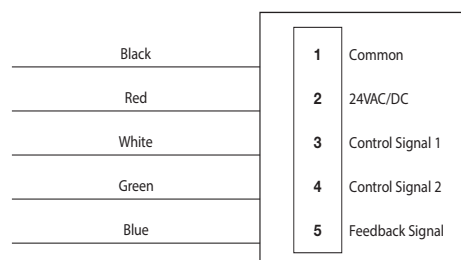
Operating duration	170 sec. (Full Open <-> Full Closed)
Power supply	24V AC/DC - 50/60Hz
Power consumption	1.8 W
Emergency operation	Manual override by means of an Allen key, access on the upper face of the actuator. Button release
Control input	PID Control 0(2)-10VDC PID Control 0(4) – 20mA ON/OFF Control mode 3 point floating PWM Control (0.1 ~ 5 sec/20ms or 25 sec/100ms depending on switch setting)
Torque	10 Nm max. Auto limited at 7 Nm.
Position feedback	0(4)-20mA or 0(2)-10VDC, selectable
Ambient temp.	-20°C ~ 65°C
Wire	18AWG
Cover material	Steel + Plastic
Protection class	II - IP54
Certificate	CE - UL
Lifetime	10.000 hours (tested 50.000 cycles)
Optional battery	For Fail-safe function: rechargeable Lithium-ion battery, 2 x NCR 18650 - 2600 mAh

Overall dimensions

Dimensions (mm)



Valve wiring



Input	Number	1	2	3	4	5	Remarks
	Color	Black	Red	White	Green	Blue	
Internal control	Common	24VAC/DC					Power: cable 1 - 2
Voltage signal	Common	24VAC/DC	0 - 10VDC 2 - 10VDC			Feedback (0)2-10 V (0)4-20 mA	Power: cable 1 - 2 Voltage signal: cable 1 - 3
Current signal	Common	24VAC/DC	0 - 20mA 4 - 20mA			Feedback (0)2-10 V (0)4-20 mA	Power: cable 1 - 2 Current signal: cable 1 - 3
ON / OFF signal	Common	24VAC/DC	24DCV (open) 0V(close)				Power: cable 1 - 2 ON/OFF signal: cable 1 - 3
3 Points floating	Common	24VAC/DC	Opening 24V AC/DC	Closing 24V AC/DC			Power: cable 1 - 2 Floating 3 points: cable 3 - 4
PWM control	Common	24VAC/DC	PWM signal				Power: cable 1 - 2 PWM control: cable 1 - 3

* Optional battery M94FB



Table selection for actuators not safe return

				91 Series	91X Series	93 Series	83 Series	94F Series	
TYPE OF CONTROL SIGNAL	ON/OFF CONTROL	230V	Thermo-electric	A542O2	A542O2	A562O2	---	---	
			Electromotive	VA7481 + 0A7010	VA7481 + 0A7010	VA7481 + 0A748X	SN08 230V	---	
		24V	Thermo-electric	A544O2	A544O2	A564O2	---	---	
			Electromotive	VA7481 + 0A7010	VA7481 + 0A7010	VA7481 + 0A748X	SN08 24V	M94F2	
		FLOATING CONTROL	230V	Thermo-electric	---	---	---	---	---
				Electromotive	VA7481 + 0A7010	VA7481 + 0A7010	VA7481 + 0A748X	SN08 230V	---
	24V		Thermo-electric	---	---	---	---	---	
			Electromotive	VA7481 + 0A7010	VA7481 + 0A7010	VA7481 + 0A748X	SN08 24V	M94F2	
	PROPORTIONAL CONTROL (0-10 V)		230V	Thermo-electric	---	---	---	---	---
				Electromotive	---	---	---	---	---
		24V	Thermo-electric	A544P3	A544P3	A564P3	---	---	
			Electromotive	VA7482 3,2 mm + 0A7010	VA7482 3,2 mm + 0A7010	VA7482 6,3 mm + 0A748X	SN08CC 24V	M94F2	

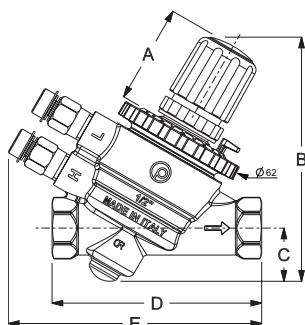


Table selection for actuators safe return

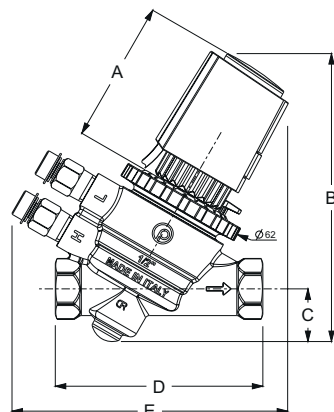
				91 Series	91X Series	93 Series	83 Series	94F Series
TYPE OF CONTROL SIGNAL	ON/OFF CONTROL	230V	Thermo-electric	A542O2	A542O2	A562O2	---	---
			Electromotive	---	---	---	VA9208 230V	---
		24V	Thermo-electric	A544O2	A544O2	A564O2	---	---
			Electromotive	---	---	---	VA9208 230V	M94F2 + M94FB
	FLOATING CONTROL	230V	Thermo-electric	---	---	---	---	---
			Electromotive	---	---	---	---	---
		24V	Thermo-electric	---	---	---	---	---
			Electromotive	---	---	---	---	M94F2 + M94FB
	PROPORTIONAL CONTROL (0-10 V)	230V	Thermo-electric	---	---	---	---	---
			Electromotive	---	---	---	---	---
		24V	Thermo-electric	A544P3	A544P3	A564P3	---	---
			Electromotive	VM060 + 76TE	VM060 + 76TE	VM060 + 76TE	VA9208C	M94F2 + M94FB



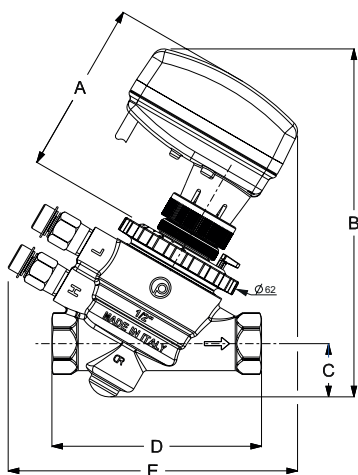
91 EvoPICV dimensional data



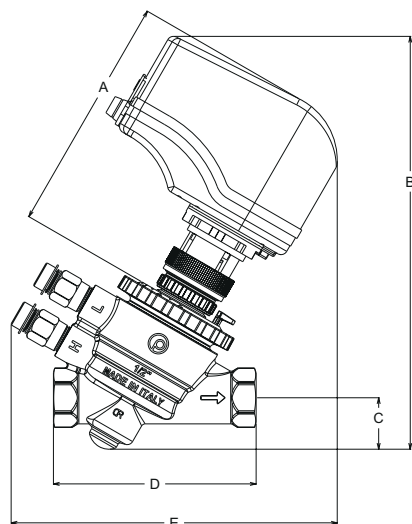
Manual valve						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91VL 1/2"	150	47	115	25	99	120
91L 1/2"	600	47	115	25	99	120
91H 1/2"	780	47	115	25	99	120
91L 3/4"	1000	47	115	25	108	127
91H 3/4"	1500	47	115	25	108	127
91H 1"	1500	47	115	25	130	134



Valve with thermo-electric actuator						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91VL 1/2"	150	68	137,5	25	99	127
91L 1/2"	600	68	137,5	25	99	127
91H 1/2"	780	68	137,5	25	99	127
91L 3/4"	1000	68	137,5	25	108	127
91H 3/4"	1500	68	137,5	25	108	127
91H 1"	1500	68	137,5	25	130	134



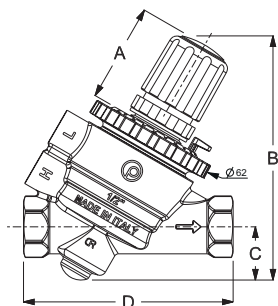
Valve with electromotive actuator						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91VL 1/2"	150	82	164	25	99	137
91L 1/2"	600	82	164	25	99	137
91H 1/2"	780	82	164	25	99	137
91L 3/4"	1000	82	164	25	108	137
91H 3/4"	1500	82	164	25	108	137
91H 1"	1500	82	164	25	130	138



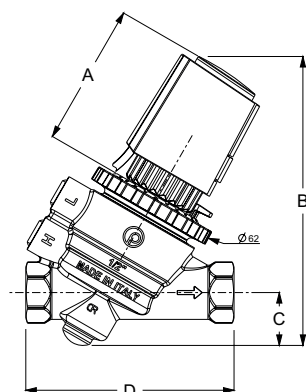
Valve with VM060						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91VL 1/2"	150	116	201	25	99	159
91L 1/2"	600	116	201	25	99	159
91H 1/2"	780	116	201	25	99	159
91L 3/4"	1000	116	201	25	108	166
91H 3/4"	1500	116	201	25	108	166
91H 1"	1500	116	201	25	130	173



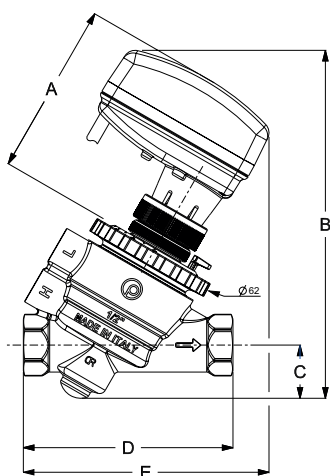
91-1 EvoPICV dimensional data



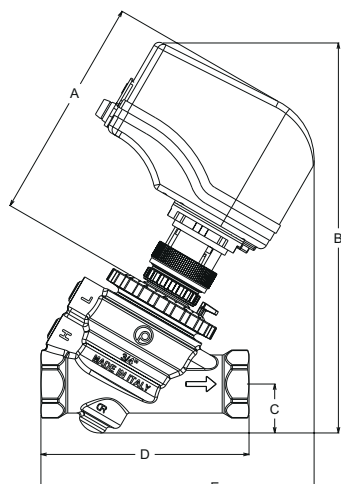
Manual valve					
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)
91VL1 1/2"	150	47	137,5	25	99
91L1 1/2"	600	47	137,5	25	99
91H1 1/2"	780	47	137,5	25	99
91L1 3/4"	1000	47	137,5	25	108
91H1 3/4"	1500	47	137,5	25	108
91H1 1"	1500	47	137,5	25	130



Valve with thermo-electric actuator					
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)
91VL1 1/2"	150	68	137,5	25	99
91L1 1/2"	600	68	137,5	25	99
91H1 1/2"	780	68	137,5	25	99
91L1 3/4"	1000	68	137,5	25	108
91H1 3/4"	1500	68	137,5	25	108
91H1 1"	1500	68	137,5	25	130



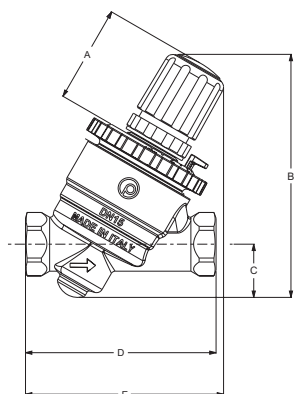
Valve with electromotive actuator						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91VL1 1/2"	150	82	164	25	99	116
91L1 1/2"	600	82	164	25	99	116
91H1 1/2"	780	82	164	25	99	116
91L1 3/4"	1000	82	164	25	108	116
91H1 3/4"	1500	82	164	25	108	116
91H1 1"	1500	82	164	25	130	134



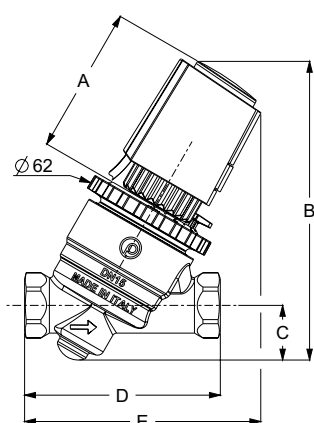
Valve with VM060						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91VL1 1/2"	150	116	201	25	99	139
91L1 1/2"	600	116	201	25	99	139
91H1 1/2"	780	116	201	25	99	139
91L1 3/4"	1000	116	201	25	108	141
91H1 3/4"	1500	116	201	25	108	141
91H1 1"	1500	116	201	25	130	156



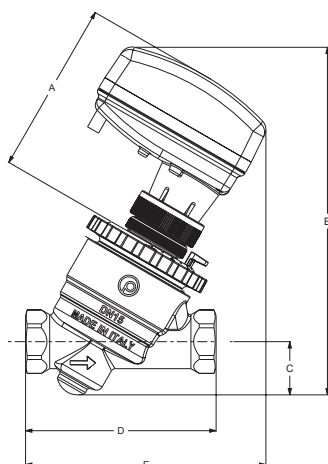
91X EvoPICV dimensional data



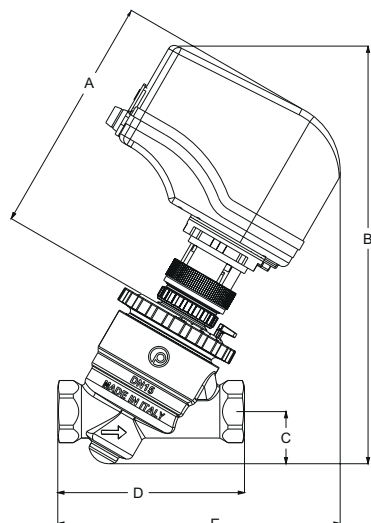
Manual valve						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL 1/2"	150	47	115	25	90	93.5
91XL 1/2"	600	47	115	25	90	93.5
91XH 1/2"	900	47	115	25	90	93.5



Valve with thermo-electric actuator						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL 1/2"	150	68	137,5	25	90	109
91XL 1/2"	600	68	137,5	25	90	109
91XH 1/2"	900	68	137,5	25	90	109

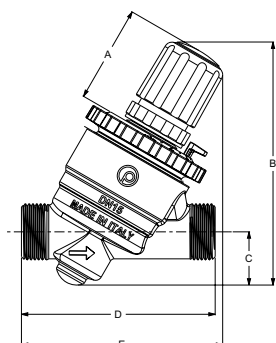


Valve with electromotive actuator						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL 1/2"	150	82	164	25	90	114
91XL 1/2"	600	82	164	25	90	114
91XH 1/2"	900	82	164	25	90	114

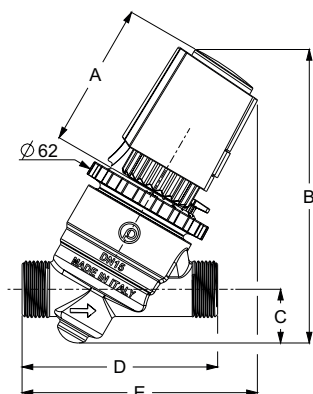


Valve with VM060						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL 1/2"	150	116	201	25	90	136
91XL 1/2"	600	116	201	25	90	136
91XH 1/2"	900	116	201	25	90	136

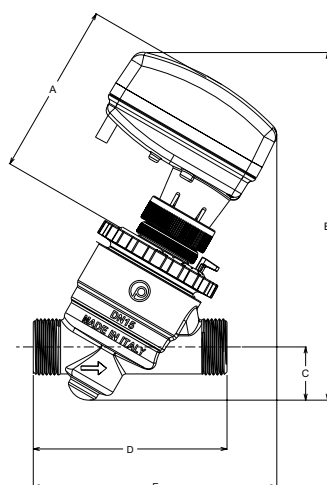
91X/2 EvoPICV dimensional data



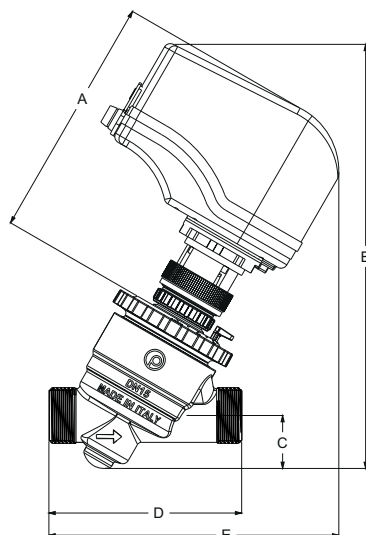
Manual valve						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL/2 1/2"	150	47	115	25	91.5	95
91XL/2 1/2"	600	47	115	25	91.5	95
91XL/2 3/4"	600	47	115	25	91.5	95
91XH/2 3/4"	900	47	115	25	91.5	95



Valve with thermo-electric actuator						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL/2 1/2"	150	68	137,5	25	91.5	110
91XL/2 1/2"	600	68	137,5	25	91.5	110
91XL/2 3/4"	600	68	137,5	25	91.5	110
91XH/2 3/4"	900	68	137,5	25	91.5	110

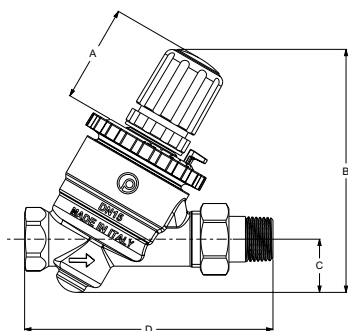


Valve with electromotive actuator						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL/2 1/2"	150	82	164	25	91.5	115
91XL/2 1/2"	600	82	164	25	91.5	115
91XL/2 3/4"	600	82	164	25	91.5	115
91XH/2 3/4"	900	82	164	25	91.5	115

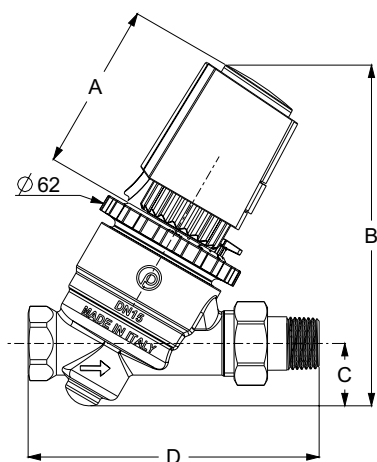


Valve with VM060						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL/2 1/2"	150	116	201	25	91.5	136
91XL/2 1/2"	600	116	201	25	91.5	136
91XL/2 3/4"	600	116	201	25	91.5	136
91XH/2 3/4"	900	116	201	25	91.5	136

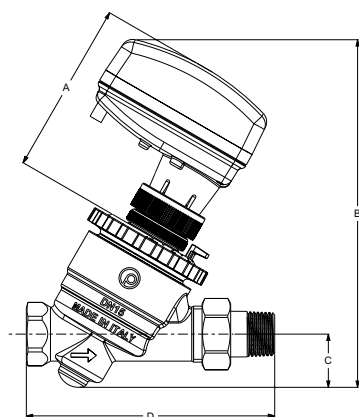
91X/3 EvoPICV dimensional data



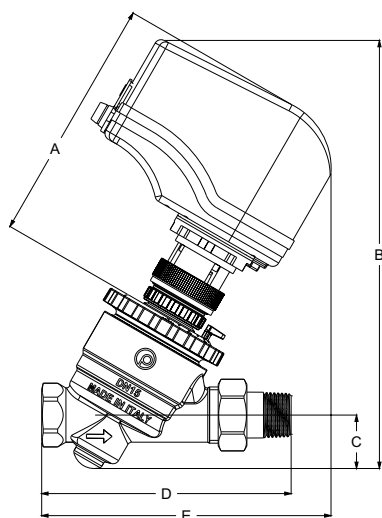
Manual valve					
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)
91XVL/3 1/2"	150	47	115	25	117
91XL/3 1/2"	600	47	115	25	117
91XH/3 1/2"	900	47	115	25	117



Valve with thermo-electric actuator					
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)
91XVL/3 1/2"	150	68	137,5	25	117
91XL/3 1/2"	600	68	137,5	25	117
91XH/3 1/2"	900	68	137,5	25	117

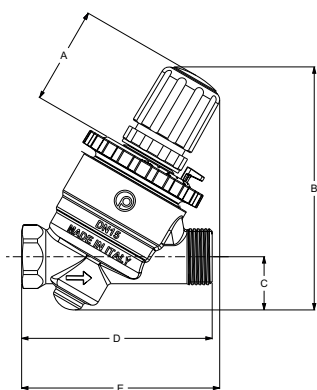


Valve with electromotive actuator					
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)
91XVL/3 1/2"	150	82	164	25	117
91XL/3 1/2"	600	82	164	25	117
91XH/3 1/2"	900	82	164	25	117

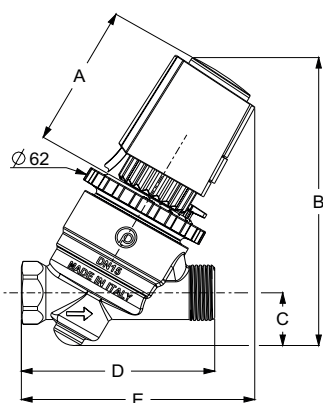


Valve with VM060						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL/3 1/2"	150	116	201	25	117	136
91XL/3 1/2"	600	116	201	25	117	136
91XH/3 1/2"	900	116	201	25	117	136

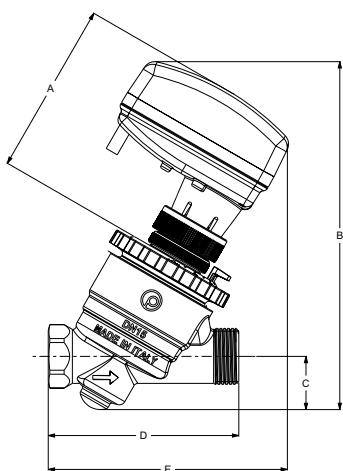
91X3S EvoPICV dimensional data



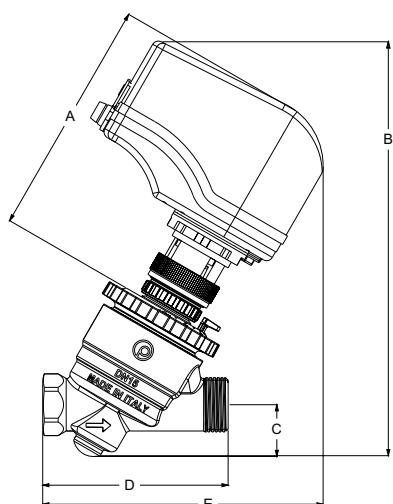
Manual valve						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL3S 1/2"	150	47	115	25	90	93.5
91XL3S 1/2"	600	47	115	25	90	93.5
91XH3S 1/2"	900	47	115	25	90	93.5



Valve with thermo-electric actuator						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL3S 1/2"	150	68	137,5	25	90	109
91XL3S 1/2"	600	68	137,5	25	90	109
91XH3S 1/2"	900	68	137,5	25	90	109

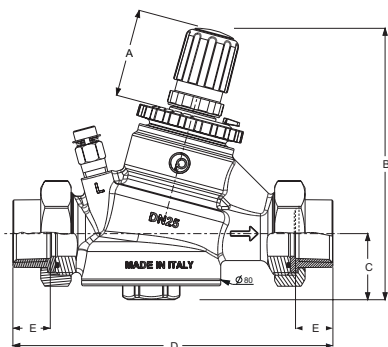


Valve with electromotive actuator						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL3S 1/2"	150	82	164	25	90	114
91XL3S 1/2"	600	82	164	25	90	114
91XH3S 1/2"	900	82	164	25	90	114

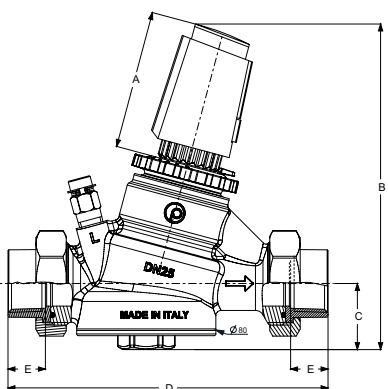


Valve with VM060						
Art.	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
91XVL3S 1/2"	150	82	201	25	90	136
91XL3S 1/2"	600	82	201	25	90	136
91XH3S 1/2"	900	82	201	25	90	136

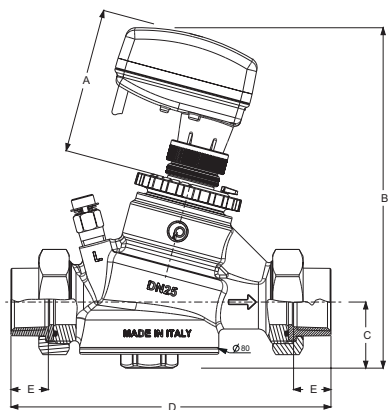
93 / 93-1 EvoPICV dimensional data



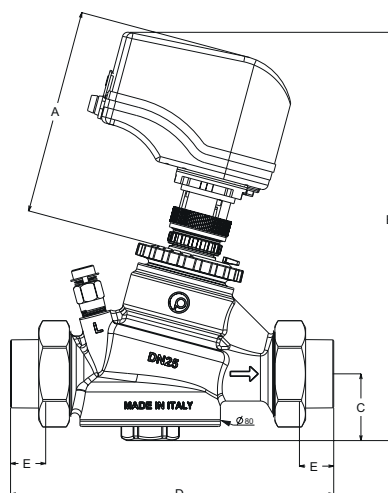
Manual valve							
Art.		Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
93L 3/4"	93L1 3/4"	2200	47	152	38	176	17
93H 3/4"	93H1 3/4"	2700	47	152	38	176	17
93L 1"	93L1 1"	2200	47	152	38	184	21,5
93H 1"	93H1 1"	2700	47	152	38	184	21,5
93L 1 1/4"	93L1 1 1/4"	2700	47	152	38	209	22
93H 1 1/4"	93H1 1 1/4"	3000	47	152	38	209	22



Valve with thermo-electric actuator							
Art.		Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
93L 3/4"	93L1 3/4"	2200	79,5	187	38	176	17
93H 3/4"	93H1 3/4"	2700	79,5	187	38	176	17
93L 1"	93L1 1"	2200	79,5	187	38	184	21,5
93H 1"	93H1 1"	2700	79,5	187	38	184	21,5
93L 1 1/4"	93L1 1 1/4"	2700	79,5	187	38	209	22
93H 1 1/4"	93H1 1 1/4"	3000	79,5	187	38	209	22

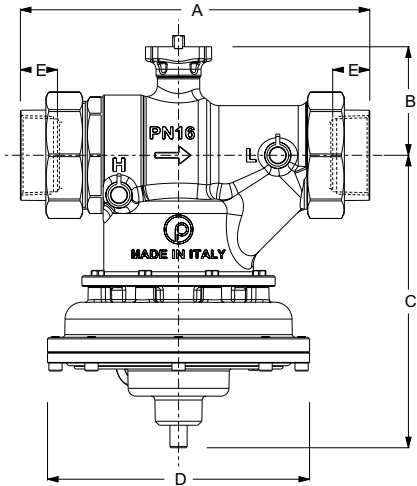


Valve with electromotive actuator							
Art.		Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
93L 3/4"	93L1 3/4"	2200	83	196	38	176	17
93H 3/4"	93H1 3/4"	2700	83	196	38	176	17
93L 1"	93L1 1"	2200	83	196	38	184	21,5
93H 1"	93H1 1"	2700	83	196	38	184	21,5
93L 1 1/4"	93L1 1 1/4"	2700	83	196	38	209	22
93H 1 1/4"	93H1 1 1/4"	3000	83	196	38	209	22



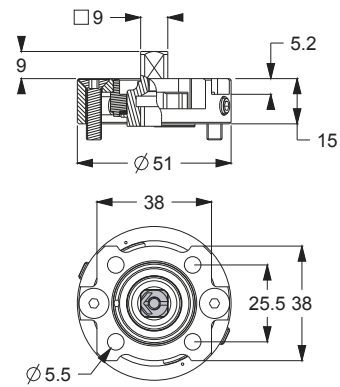
Valve with VM060							
Art.		Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
93L 3/4"	93L1 3/4"	2200	117	233	38	176	17
93H 3/4"	93H1 3/4"	2700	117	233	38	176	17
93L 1"	93L1 1"	2200	117	233	38	184	21,5
93H 1"	93H1 1"	2700	117	233	38	184	21,5
93L 1 1/4"	93L1 1 1/4"	2700	117	233	38	209	22
93H 1 1/4"	93H1 1 1/4"	3000	117	233	38	209	22

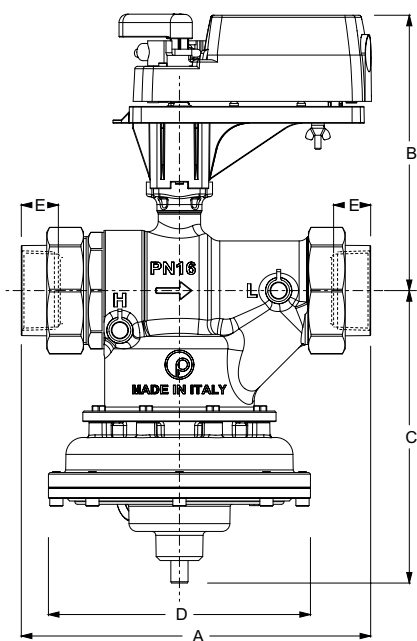
83 EvoPICV dimensional data



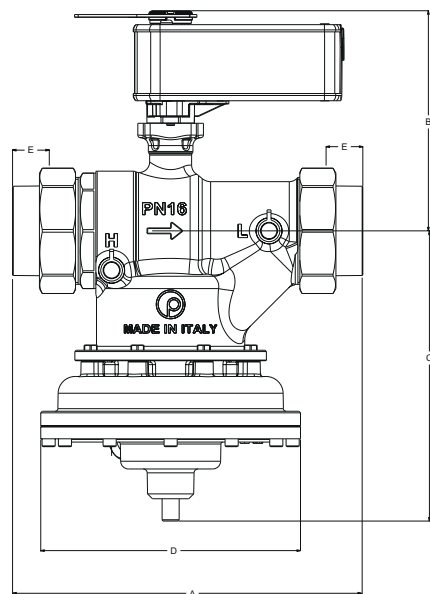
Manual valve with presetting							
Art.	DN	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
83HPR1 1 1/4"	40	6000	232	89	176	158	23,6
83LPR1 1 1/2"	40	6000	231	89	176	158	23,6
83HPR1 1 1/2"	40	9000	231	89	176	158	23,6
83VLPR1 2"	40	11000	278	89	176	158	28,5
83LPR1 2"	50	12000	267	97	221	198	28
83HPR1 2"	50	18000	267	97	221	198	28

mounting pad 83 PR1 series



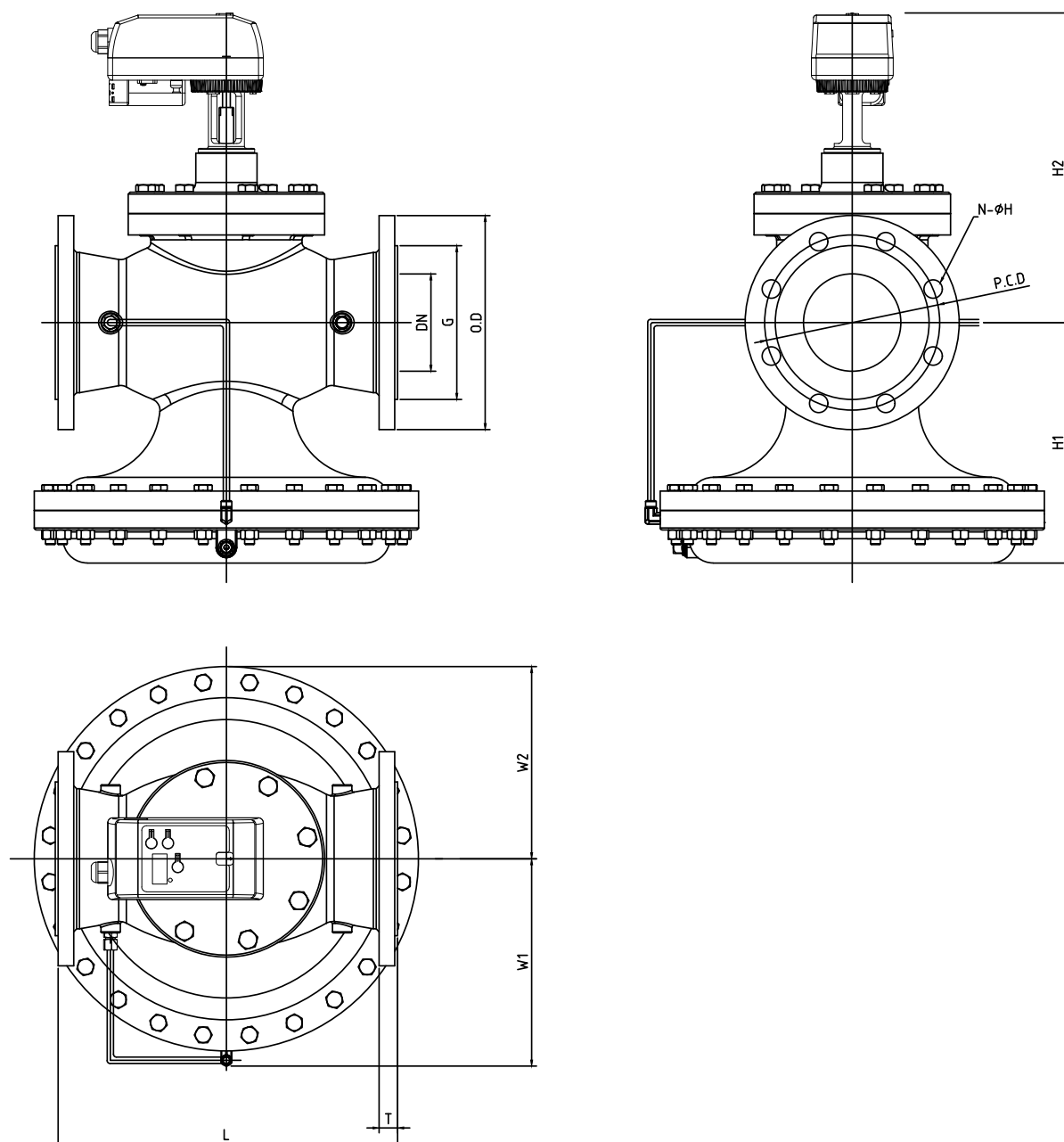


Rotary actuator serie SN08							
Art.	DN	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
83HPR1 1 1/4"	40	6000	232	221	176	158	23,6
83LPR1 1 1/2"	40	6000	231	221	176	158	23,6
83HPR1 1 1/2"	40	9000	231	221	176	158	23,6
83VLPR1 2"	40	11000	278	221	176	158	28,5
83LPR1 2"	50	12000	267	229	221	198	28
83HPR1 2"	50	18000	267	229	221	198	28



Rotary actuator serie VA9208 - VA9208C							
Art.	DN	Flow rate [l/h]	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
83HPR1 1 1/4"	40	6000	232	174	176	158	23,6
83LPR1 1 1/2"	40	6000	231	174	176	158	23,6
83HPR1 1 1/2"	40	9000	231	174	176	158	23,6
83VLPR1 2"	40	11000	278	174	176	158	28,5
83LPR1 2"	50	12000	267	182	221	198	28
83HPR1 2"	50	18000	267	182	221	198	28

94F EvoPICV dimensional data

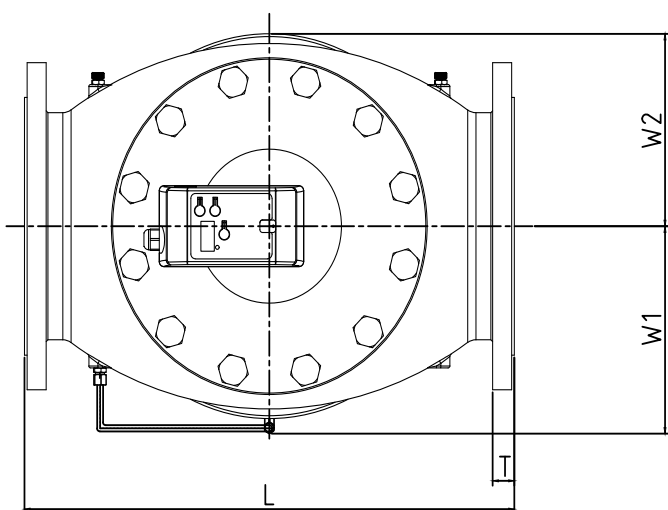
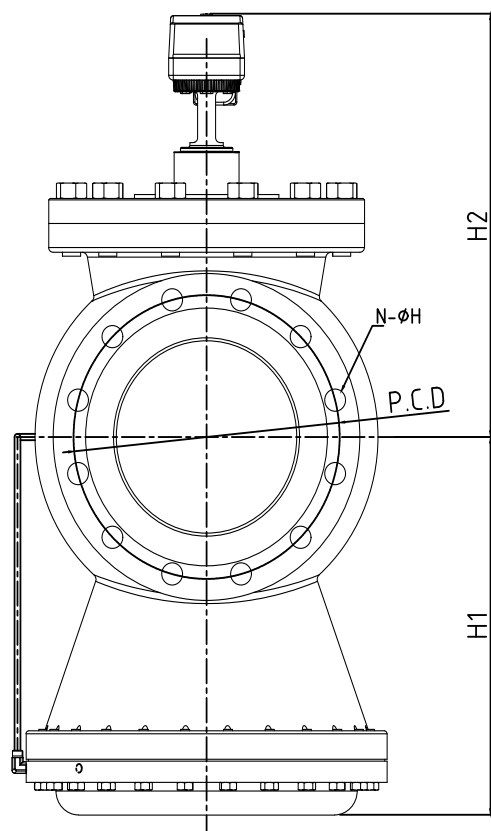
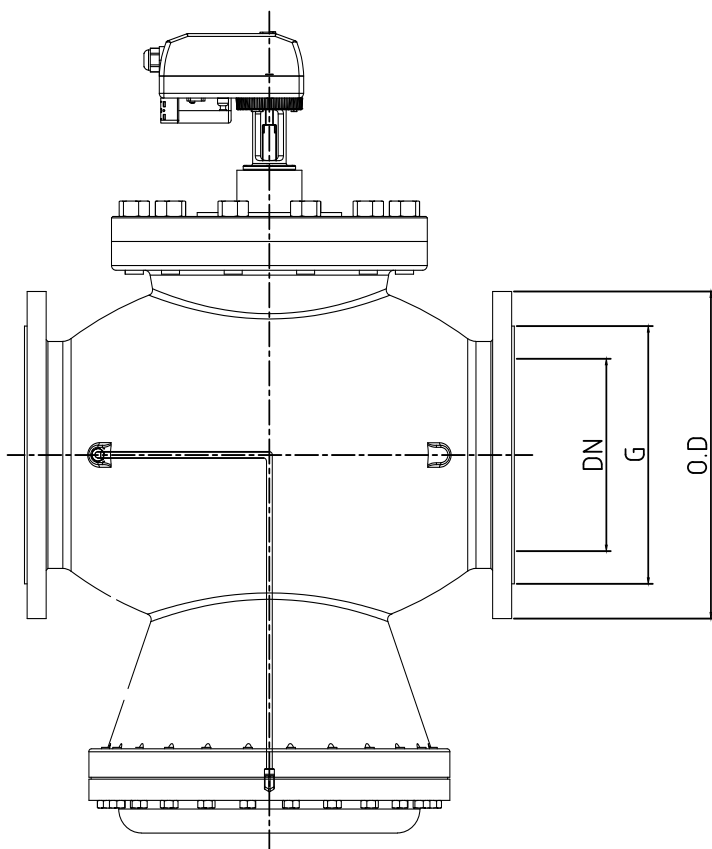


Valve with actuator 24V												
Art.	Flow rate [l/h]	H1 (mm)	H2 (mm)	L (mm)	DN (mm)	W1 (mm)	W2 (mm)	O.D (mm)	P.D.C (mm)	G (mm)	T (mm)	N-ØH (mm)
94FH 2"	20000	190	291	254*	50	155	139	165	125	102	16	4-18
94FL 2 1/2"	20000	190	291	254*	65	155	139	185	145	122	18	4-18
94FH 2 1/2"	30000	183	300	272	65	155	139	185	145	122	18	4-18
94FL 3"	30000	183	300	272	80	155	139	200	160	138	18	8-18
94FL 4"	55000	247	318	352*	100	213	198	220	180	158	18	8-18
94FL 5"	90000	264	347	400***	125	213	198	250	210	188	20	8-18
94FH 5"	120000	264	347	400***	125	213	198	250	210	188	20	8-18
94FL 6"	90000	264	346	400**	150	213	198	285	240	212	22	8-22
94FH 6"	150000	348	397	451*	150	213	198	285	240	212	22	8-22

* EN558 (IEC 60534-3-2 Table 1)

** EN558 (DIN 3202 Part.1 - Series F6)

*** EN558 (DIN 3202 Part.1 - Series F1)

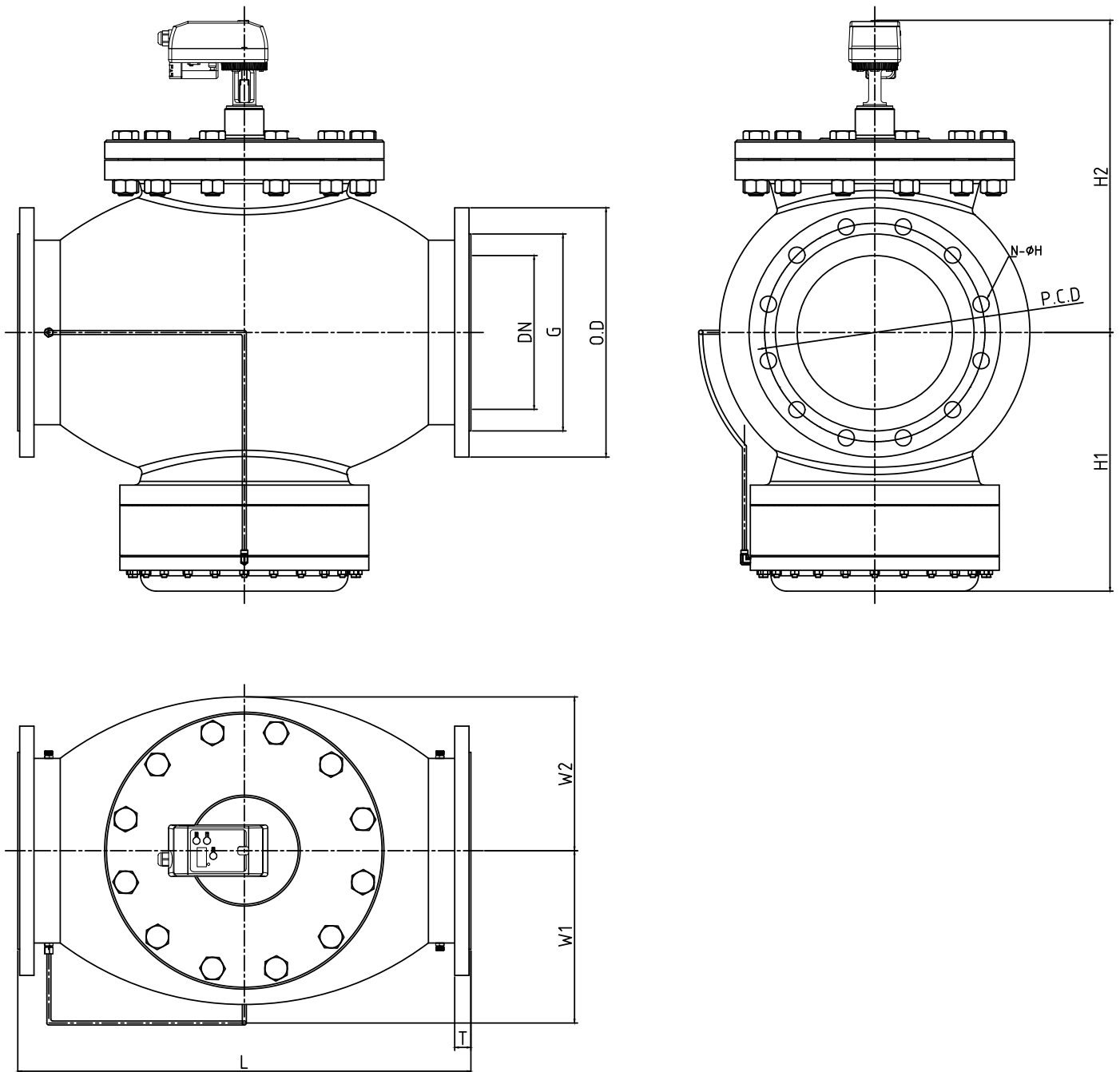


Valve with actuator 24V

Art.	Flow rate [l/h]	H1 (mm)	H2 (mm)	L* (mm)	DN (mm)	W1 (mm)	W2 (mm)	O.D (mm)	P.D.C (mm)	G (mm)	T (mm)	N-ØH (mm)
94FL 8"	200000	393	440	543	200	216	200	340	295	268	22	12-22
94FH 8"	300000	393	440	543	200	216	200	340	295	268	22	12-22

* EN558 (IEC 60534-3-2 Table 1)





Valve with actuator 24V

Art.	Flow rate [l/h]	H1 (mm)	H2 (mm)	L* (mm)	DN (mm)	W1 (mm)	W2 (mm)	O.D (mm)	P.D.C (mm)	G (mm)	T (mm)	N-ØH (mm)
94FL 10"	300000	421	508	730	250	283	250	405	355	320	24	12-26
94FH 10"	500000	421	510	730	250	283	250	405	355	320	24	12-26

* EN558 (DIN 3202 Part.1 - Series F1)

EvoPICV shipping weight information

Art.	Weight (Kg)
91VL 1/2"	0,88
91L 1/2"	0,88
91H 1/2"	0,88
91L 3/4"	0,95
91H 3/4"	0,95
91VL1 1/2"	0,84
91L1 1/2"	0,84
91H1 1/2"	0,84
91L1 3/4"	0,91
91H1 3/4"	0,91
91H 1"	1,05
91H1 1"	1,01

Art.	Weight (Kg)
91XVL 1/2"	0,77
91XL 1/2"	0,77
91XH 1/2"	0,77
91XVL/2 1/2"	0,76
91XL/2 1/2"	0,76
91XL/2 3/4"	0,76
91XH/2 3/4"	0,76
91XVL/3 1/2"	0,84
91XL/3 1/2"	0,84
91XH/3 1/2"	0,84
91XVL3S 1/2"	0,77
91XL3S 1/2"	0,77
91XH3S 1/2"	0,77

Art.	Weight (Kg)
83HJP 1 1/4"	8,30
83LJP 1 1/2"	8,30
83HJP 1 1/2"	8,30
83VLJP 2"	9,00
83LJP 2"	15,50
83HJP 2"	15,50
83HPR1 1 1/4"	8,46
83LPR1 1 1/2"	8,46
83HPR1 1 1/2"	8,46
83VLPR1 2"	9,16
83LPR1 2"	15,66
83HPR1 2"	15,66

Art.	Weight (Kg)
93L 3/4"	2,30
93H 3/4"	2,30
93L 1"	2,40
93H 1"	2,40
93L 1 1/4"	2,60
93H 1 1/4"	2,60

Art.	Weight (Kg)
94FH 2"	33,00
94FL 2 1/2"	40,00
94FH 2 1/2"	40,00
94FL 3"	43,00
94FL 4"	74,00
94FL 5"	93,00
94FH 5"	93,00
94FL 6"	98,00
94FH 6"	140,00
94FL 8"	280,00
94FH 8"	280,00
94FL 10"	385,00
94FH 10"	385,00

Art.	Weight (Kg)
A544O2	0,137
A544O4	0,137
A542O2	0,137
A542O4	0,137
A544P3	0,137
A564O2	0,137
A562O2	0,137
A564P3	0,137
VA7481	0,266
VA7482	0,266
SN08	1,55
SN08CC	1,55
VM060	0,383
VA9208	1,50
VA9208C	1,844
M94F2	0,975
M94FB	0,140

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