92 / 92-1

Patent US9910447B2
Patent IT1428884
Patent EP3067772B1

EN Description

The pressure independent control valve (PICV) combines the functions of a differential pressure controller, a regulation valve and a 2 port control valve into a single body.
The **DYNASTY** incorporates a small diaphragm type DPCV in order to keep a constant differential pressure across the orifice of the regulating valve and to provide a constant flow rate whilst the differential pressure is kept in the operating limits of the valve. Beyond these working pressures the valve acts as a fixed orifice. Thanks to the new diaphgram technology, the valve can work also with very dirty water. For more information about that see the "Dirt resistant feature" section.
Making this orifice adjustable allows the valve to be presetted and deliver a range of flow rates (unlike automatic balancing valves). The presetting gear can be easily adjusted and works by varying the stroke of the control valve.
The **DYNASTY** valve also includes a 2 port valve in order to control temperature by means of an oblique pattern globe valve. The plug of the globe valve is machined to give a near linear flow control characteristic. Due to the fact that the differential pressure across the valve seat is constant it can be said that the authority of this control valve is very close to 1.
Due to the way the **DYNASTY** valve controls the flow rate, irrespective of differential pressure branch and sub mains, balancing valves are not required. The flow rate is maintained at the terminal unit regardless of system conditions, making the valve ideal for systems with inverter driven pumps.
The 92-1 model has not the pressure ports: these connections are closed by caps. If desired PT ports can be added later, for more information about that see the "Accesories" section.

EN Valve features

The 92 series PICV valve offers the following functions:

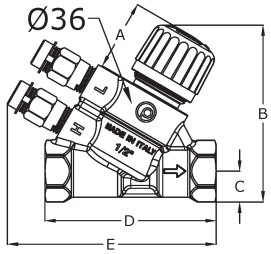
- Good valve authority to maintain temperature control and power output from the terminal unit;
- Maximum design flow limitation: once set, the **DYNASTY** valve maintains design flow regardless of pressure changes in the system;
- It can be easily set up once installed, using the setting ring (with no actuator on);
- Measure by means of specific meter of the differential pressure across the valve: in this way user can verify if the start-up pressure has been reached and overpassed;
- DPCV dirt-resistant: the valve worked during and after a Contaminated Water Test (proprietary test) with high concentration of iron oxide;
- Fast and easy maintenance: internal element (control valve and DPCV) can be easily removed, replaced or cleaned.

ΔP max.	Temperature	Max. working pressure	Stroke (max)			Rangeability	Leakage	Accuracy (0 ÷ 1 bar)*
			DN15-20	DN25-32	DN40-50			
600 kPa / 6 bar	-10 ÷ 120 °C	2500 kPa / 25 bar	3 mm	6 mm	7,5 mm	50÷100 IEC 60534-2-3	Class IV IEC 60534-4	± 5%

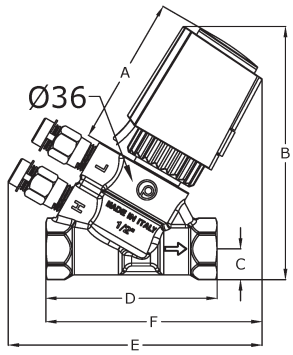
	92VL ½"	92L ½"	92H ½"	92L ¾"	92H ¾"	92L 1"	92H 1"	92H 1 ¼"	92H 1 ½"	92H 2"
	92VL1 ½"	92L1 ½"	92H1 ½"	92L1 ¾"	92H1 ¾"	92L1 1"	92H1 1"	92H1 1 ¼"	92H1 1 ½"	92H1 2"
Flow rate max.	150 l/h 0,042 l/s	450 l/h 0,125 l/s	850 l/h 0,236 l/s	1000 l/h 0,277 l/s	1850 l/h 0,514 l/s	2500 l/h 0,694 l/s	3300 l/h 0,917 l/s	5200 l/h 1,44 l/s	9000 l/h 2,5 l/s	14000 l/h 3,88 l/s
Start-up max.	25 kPa 0,25 bar	35 kPa 0,35 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	40 kPa 0,40 bar	40 kPa 0,40 bar
Connections**	Rp ½" F EN 10226-1	Rp ½" F EN 10226-1	Rp ½" F EN 10226-1	Rp ¾" F EN 10226-1	Rp ¾" F EN 10226-1	Rp 1" Union F EN 10226-1	Rp 1" Union F EN 10226-1	Rc 1 ¼" Union F EN 10226-1	Rp 1 ½" F EN 10226-1	Rp 2" F EN 10226-1
Close off pressure***	600 kPa 6 bar	600 kPa 6 bar	600 kPa 6 bar	600 kPa 6 bar	600 kPa^ 6 bar^	600 kPa 6 bar	600 kPa 6 bar	600 kPa 6 bar	600 kPa 6 bar	600 kPa 6 bar

* At pos. 9. For different presettings and ΔP, please refer to the graph in the "Flow setting accuracy" section. ** Also available with NPT connections according to ANSI B1.20.1. *** Closed by electromotive actuator. ^ 300 kPa / 3 bar with thermo-electric actuators series A5.

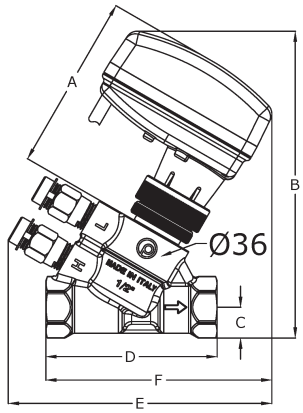
EN Dimensional data



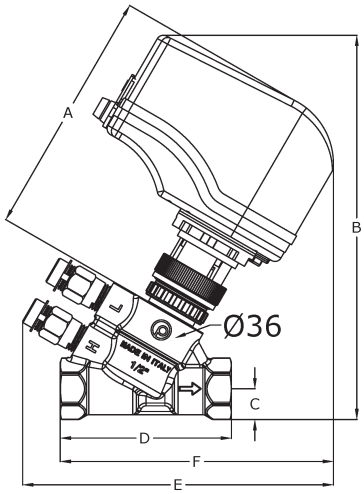
Manual valve						
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**
92VL ½"	150	33	83	14,5	80,5	98
92L ½"	450	33	83	14,5	80,5	98
92VL1 ½"	150	33	83	14,5	80,5	-
92L1 ½"	450	33	83	14,5	80,5	-



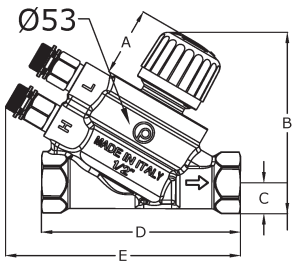
Valve with thermo-electric actuator							
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**	**F [mm]**
92VL ½"	150	70	119	14,5	80,5	119	-
92L ½"	450	70	119	14,5	80,5	119	-
92VL1 ½"	150	70	119	14,5	80,5	-	101,5
92L1 ½"	450	70	119	14,5	80,5	-	101,5



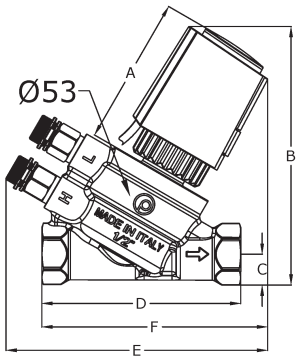
Valve with electromotive actuator							
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**	**F [mm]**
92VL ½"	150	83	144,5	14,5	80,5	124	-
92L ½"	450	83	144,5	14,5	80,5	124	-
92VL1 ½"	150	83	144,5	14,5	80,5	-	106
92L1 ½"	450	83	144,5	14,5	80,5	-	106



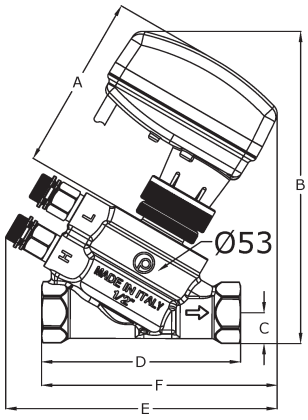
Valve with VM060							
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**	**F [mm]**
92VL ½"	150	116,5	181	14,5	80,5	146	-
92L ½"	450	116,5	181	14,5	80,5	146	-
92VL1 ½"	150	116,5	181	14,5	80,5	-	128
92L1 ½"	450	116,5	181	14,5	80,5	-	128



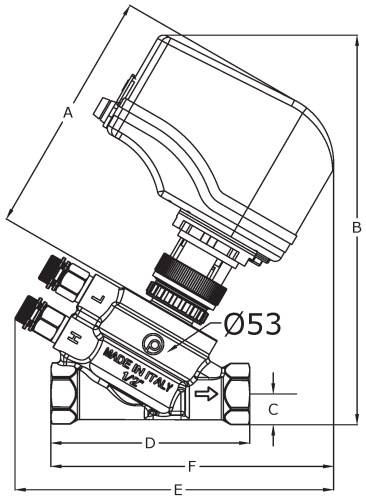
Manual valve						
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
92H ½"	850	33	84,5	14,5	93,5	110,5
92H1 ½"	850	33	84,5	14,5	93,5	-



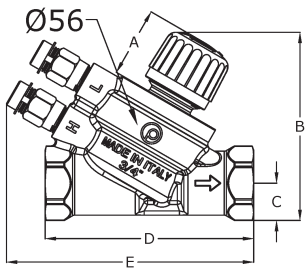
Valve with thermo-electric actuator							
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
92H ½"	850	70	121	14,5	93,5	123	-
92H1 ½"	850	70	121	14,5	93,5	-	106



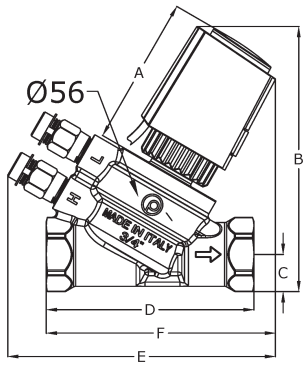
Valve with electromotive actuator							
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
92H ½"	850	83	147	14,5	93,5	127	-
92H1 ½"	850	83	147	14,5	93,5	-	110,5



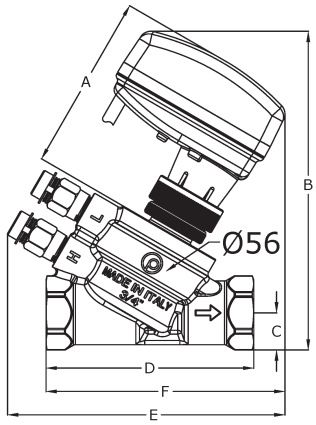
Valve with VM060							
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
92H ½"	850	116,5	184	14,5	93,5	150	-
92H1 ½"	850	116,5	184	14,5	93,5	-	133,5



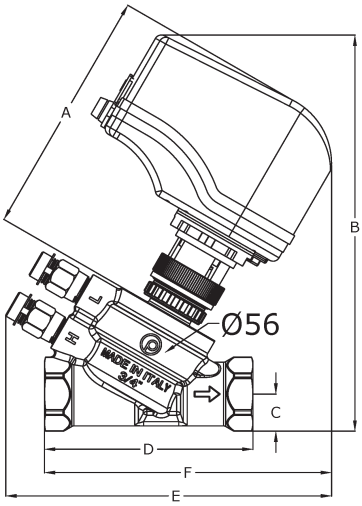
Manual valve						
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
92L ¾"	1000	33	88	17,5	98	116
92H ¾"	1850	33	88	17,5	98	116
92L1 ¾"	1000	33	88	17,5	98	-
92H1 ¾"	1850	33	88	17,5	98	-



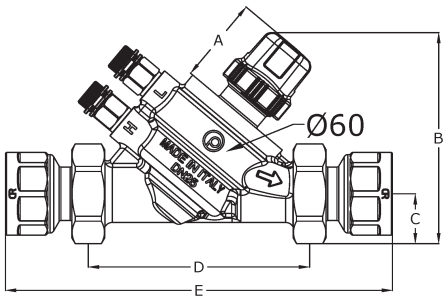
Valve with thermo-electric actuator							
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
92L ¾"	1000	70	125	17,5	98	126	-
92H ¾"	1850	70	125	17,5	98	116	-
92L1 ¾"	1000	70	125	17,5	98	-	108
92H1 ¾"	1850	70	125	17,5	98	-	108



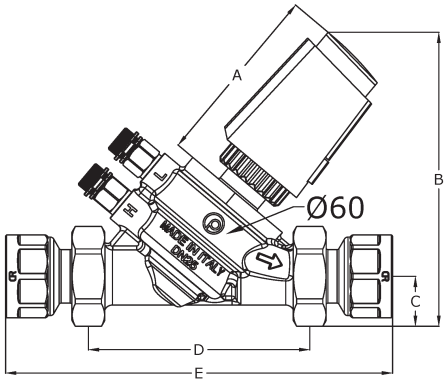
Valve with electromotive actuator							
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
92L ¾"	1000	83	150	17,5	98	131	-
92H ¾"	1850	83	150	17,5	98	131	-
92L1 ¾"	1000	83	150	17,5	98	-	112,5
92H1 ¾"	1850	83	150	17,5	98	-	112,5



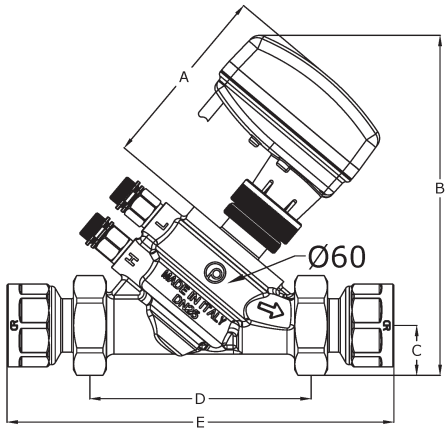
Valve with VM060							
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
92L ¾"	1000	116,5	187	17,5	98	153	-
92H ¾"	1850	116,5	187	17,5	98	153	-
92L1 ¾"	1000	116,5	187	17,5	98	-	135
92H1 ¾"	1850	116,5	187	17,5	98	-	135



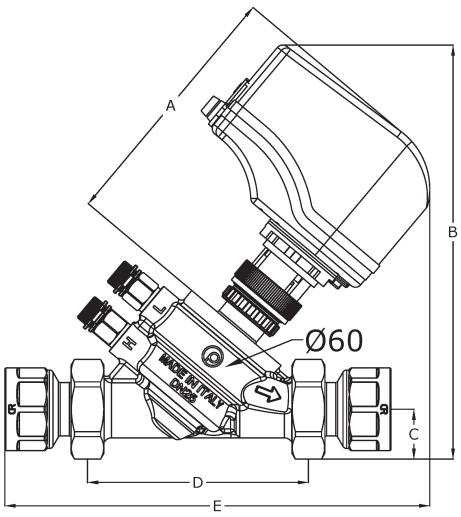
Manual valve						
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**
92L 1″	2500	41	99	23,5	108	182
92H 1″	3300	41	99	23,5	108	182
92L1 1″	2500	41	99	23,5	108	182
92H1 1″	3300	41	99	23,5	108	182



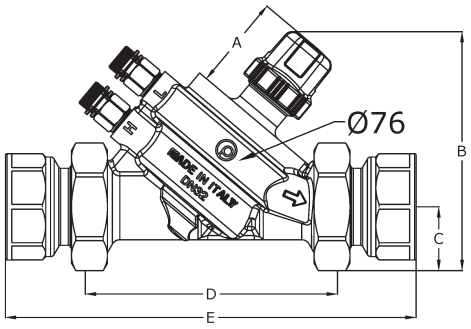
Valve with thermo-electric actuator						
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**
92L 1″	2500	86	138	23,5	108	182
92H 1″	3300	86	138	23,5	108	182
92L1 1″	2500	86	138	23,5	108	182
92H1 1″	3300	86	138	23,5	108	182



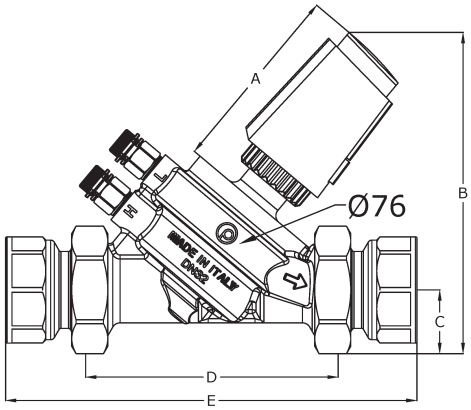
Valve with electromotive actuator						
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**
92L 1″	2500	87,5	160	23,5	108	182
92H 1″	3300	87,5	160	23,5	108	182
92L1 1″	2500	87,5	160	23,5	108	182
92H1 1″	3300	87,5	160	23,5	108	182



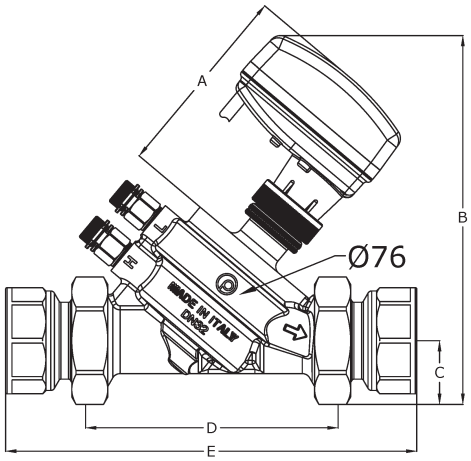
Valve with VM060						
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**
92L 1″	2500	121	195	23,5	108	200
92H 1″	3300	121	195	23,5	108	200
92L1 1″	2500	121	195	23,5	108	200
92H1 1″	3300	121	195	23,5	108	200



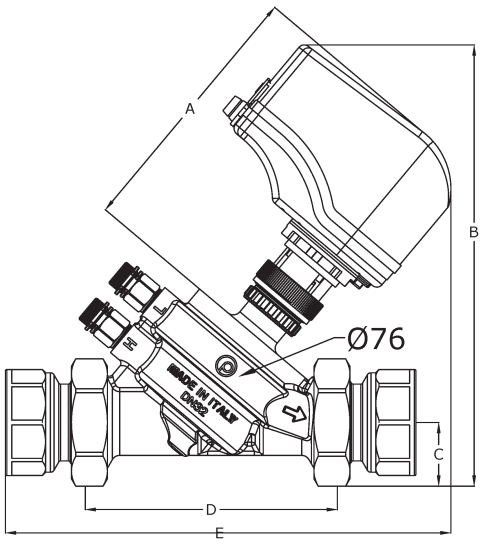
Manual valve						
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
92H 1 ¼"	5200	44,5	107,5	30	119	194
92H1 1 ¼"	5200	44,5	107,5	30	119	194



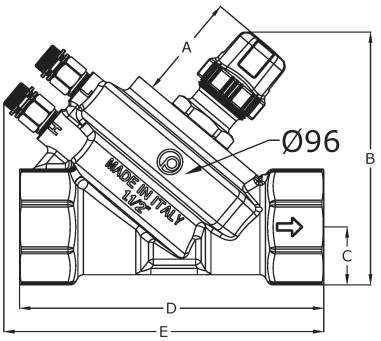
Valve with thermo-electric actuator						
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
92H 1 ¼"	5200	90	151	30	119	194
92H1 1 ¼"	5200	90	151	30	119	194



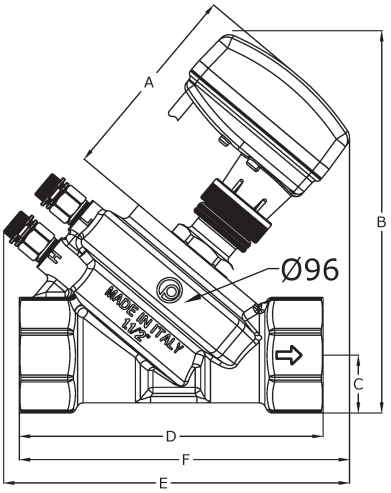
Valve with electromotive actuator						
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
92H 1 ¼"	5200	89	168,5	30	119	194
92H1 1 ¼"	5200	89	168,5	30	119	194



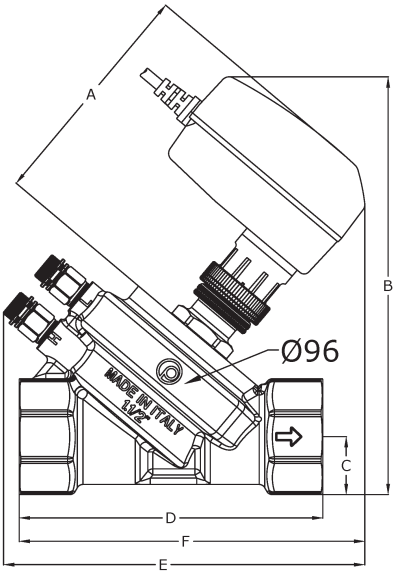
Valve with VM060						
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
92H 1 ¼"	5200	124,5	208	30	119	210
92H1 1 ¼"	5200	124,5	208	30	119	210



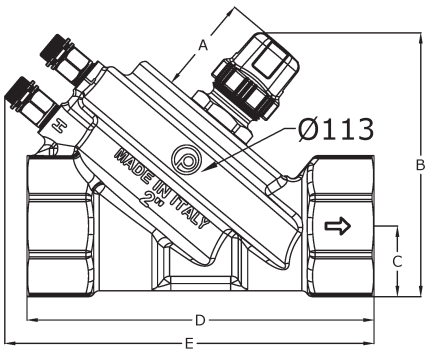
Manual valve						
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
92H 1 ½"	9000	49,5	119	27	143	150,5
92H1 1 ½"	9000	49,5	119	27	143	-



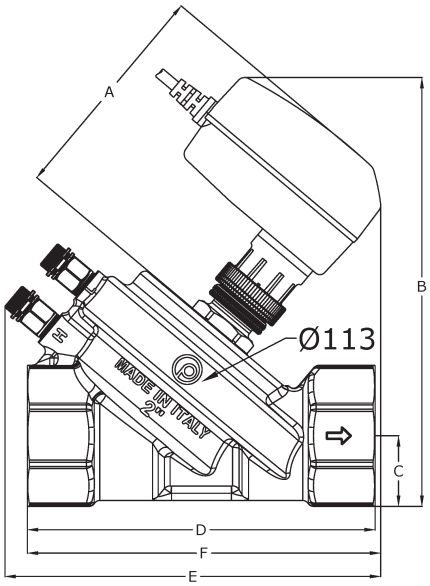
Valve with electromotive actuator VA7493							
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
92H 1 ½"	9000	98,5	181	27	143	165	-
92H1 1 ½"	9000	98,5	181	27	143	-	158



Valve with electromotive actuator RVAZ2							
Figura	Flow rate [l/h]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
92H 1 ½"	9000	109,5	196,5	27	143	170	-
92H1 1 ½"	9000	109,5	196,5	27	143	-	163



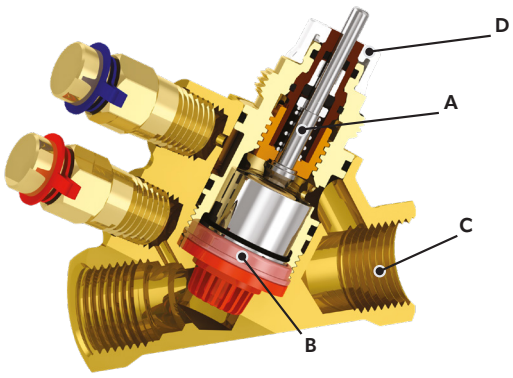
Manual valve						
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**
92H 2"	14000	46	124	33	163,5	174
92H1 2"	14000	46	124	33	163,5	-



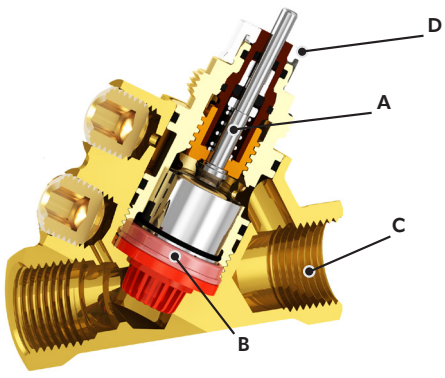
Valve with electromotive actuator RVAZ2							
Figura	**Flow rate [l/h]**	**A [mm]**	**B [mm]**	**C [mm]**	**D [mm]**	**E [mm]**	**F [mm]**
92H 2"	14000	105,5	202	33	163,5	176,5	-
92H1 2"	14000	105,5	202	33	163,5	-	166

EN Materials and weight

DYNASTY 92



DYNASTY 92-1



	Material list
Regulating valve (A)	High resistance polymer Stainless steel 18/8
Diaphragm (B)	High resistance polymer, EPDM-X, WMQ, Silicone, Stainless steel AISI 303, HNBR
Presetting (D)	ABS, PC
Body (C)	Corrosion resistant brass CW602N
Gaskets	EPDM-X

Art.	Weight (kg)
92VL ½″	0,46
92L ½″	0,46
92H ½″	0,65
92L ¾″	0,69
92H ¾″	0,69

Art.	Weight (kg)
92L 1″	1,17
92H 1″	1,17
92H 1 ¼″	1,80
92H 1 ½″	2,06
92H 2″	3,05

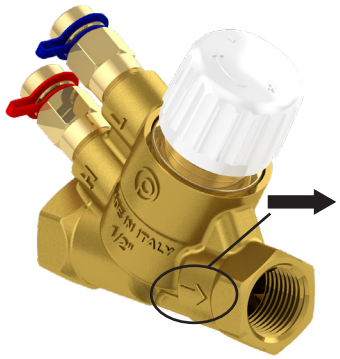
Art.	Weight (kg)
92VL1 ½″	0,43
92L1 ½″	0,43
92H1 ½″	0,63
92L1 ¾″	0,67
92H1 ¾″	0,67

Art.	Weight (kg)
92L1 1″	1,15
92H1 1″	1,15
92H1 1 ¼″	1,78
92H1 1 ½″	2,04
92H1 2″	3,03

EN Installation and maintenance DYNASTY 92

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 are listed in the table below.
To achieve max nominal flow rate on DN40 and DN50 valves (1 ½″ and 2″), remove the protective cap.

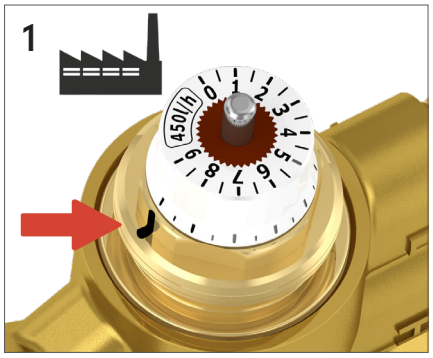


	92VL ½″ 92VL1 ½″	92L ½″ 92L1 ½″	92H ½″ 92H1 ½″	92L ¾″ 92L1 ¾″	92H ¾″ 92H1 ¾″	92L 1″ 92L1 1″	92H 1″ 92H1 1″	92H 1 ¼″ 92H1 1 ¼″	92H 1 ½″ 92H1 1 ½″	92H 2″ 92H1 2″
ΔP Start-up	25 kPa 0,25 bar	35 kPa 0,35 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	30 kPa 0,30 bar	30 kPa 0,30 bar	35 kPa 0,35 bar	40 kPa 0,40 bar	40 kPa 0,40 bar

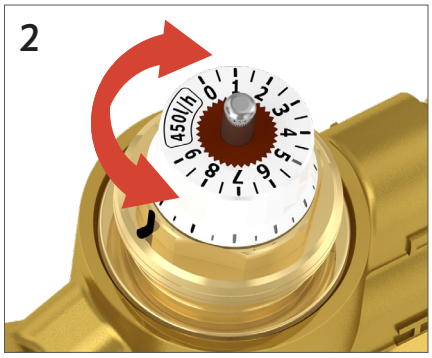
Medium
Water / Water+glycol 30%

2. Flow preset

On the top of the valve there's a black mark which indicates the current position of the presetting. By setting the position of the white selector it is possible to set the desired flow rate, to do that please follow these steps:



Remove the handwheel or the actuator. Default setting: **pos. 9.**

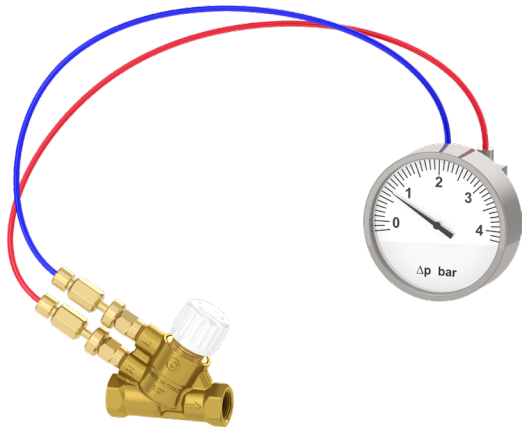


Turn the selector to the target position to set the flow rate.

Re-assembly the handwheel or the actuator.

3. Operating control (not for 92-1 model)

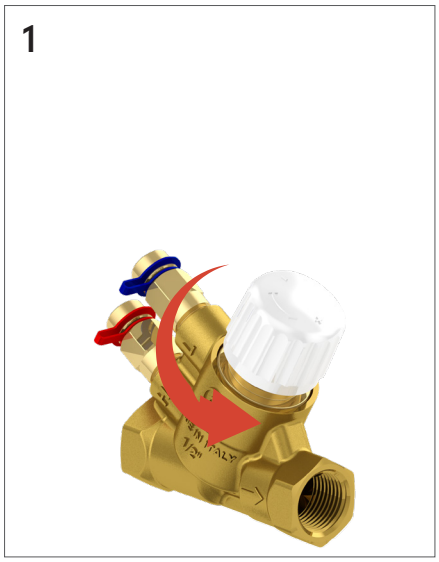
It is necessary to be sure that the valve is actually working in the operating range. In order to verify it, just measure the differential pressure across the valve, as shown in the picture.
If the measured differential pressure is higher than the start-up pressure, the valve is actually keeping the flow constant at the set value.
Pettinaroli **MDPS2** is the device which allows to do it: along with a smartphone and the dedicated app, it can directly give the user the differential pressure compared to the start-up differential pressure of the valve (proper valve has to be selected among all the Pettinaroli catalogue).

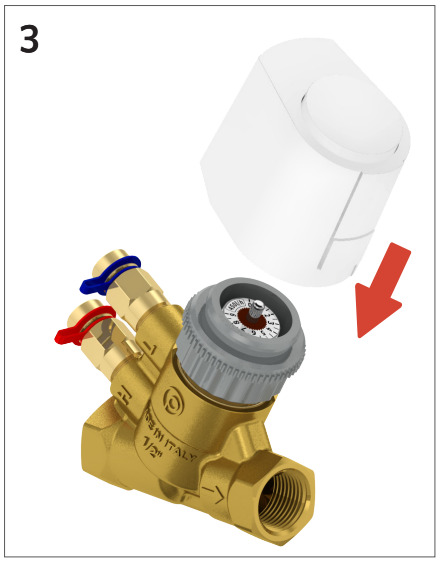


4. Actuator assembly

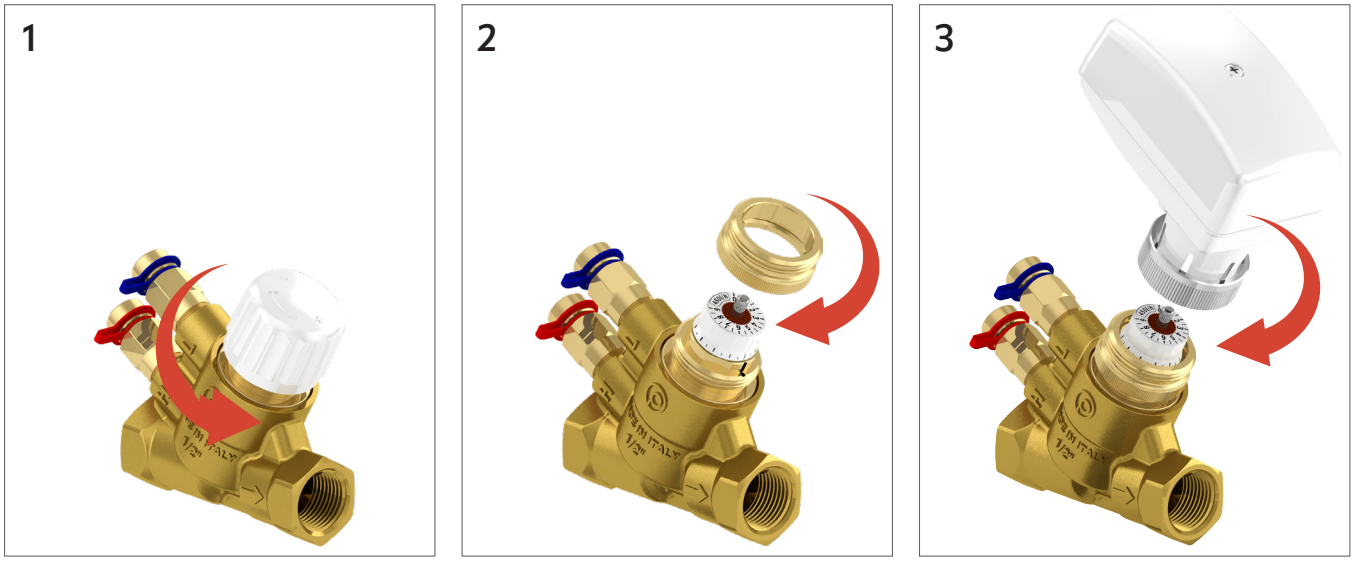
The valve can be equipped with a series of thermo-electric or electromotive actuators, according to the requirements of the system. Actuators come along with an adapter for proper mounting on the valve and for proper functioning of the whole device.

Thermo-electric actuator: not suitable for DN40 and DN50 valves (1 ½" and 2")





Electromotive actuator

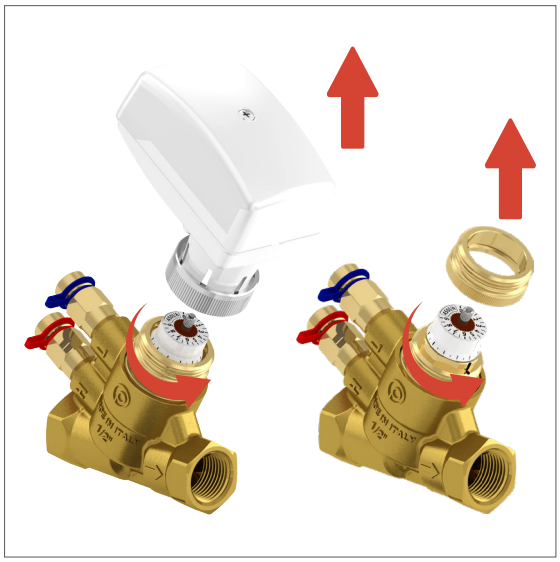


5. Maintenance, cleaning and replacement of the diaphragm of DYNASTY 92 valve

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. Maintenance and cleaning of the differential pressure regulator and the control valve must be carried out as per following instructions:

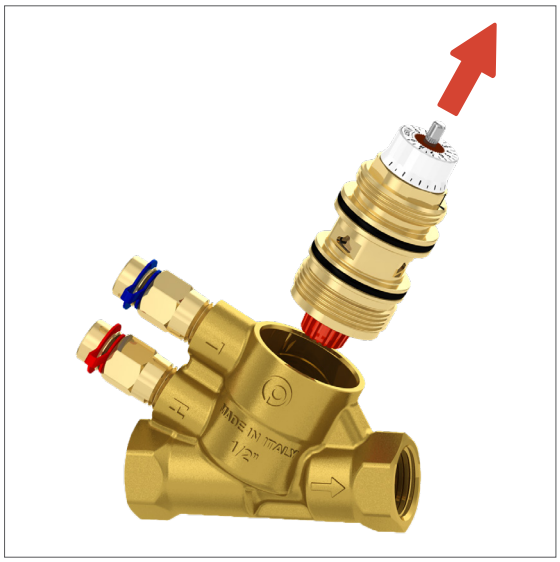
Step 1a: completely remove the knob.

Step 1b: remove the actuator and its adapter.

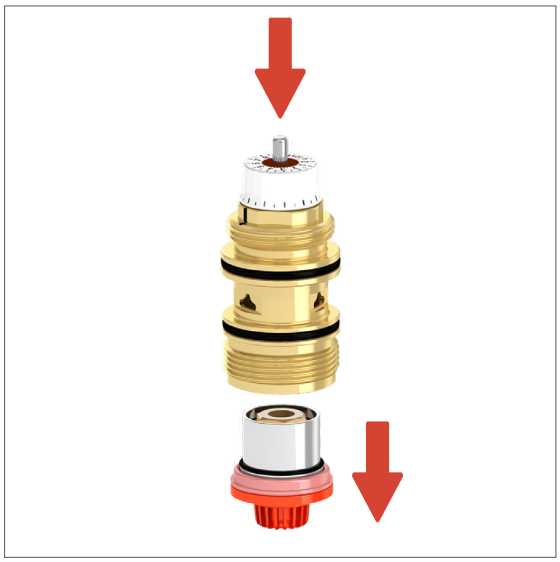


Step 2: using a 21mm (DN15 to DN25) or a 30mm (DN32 to DN50) spanner unscrew the headwork.

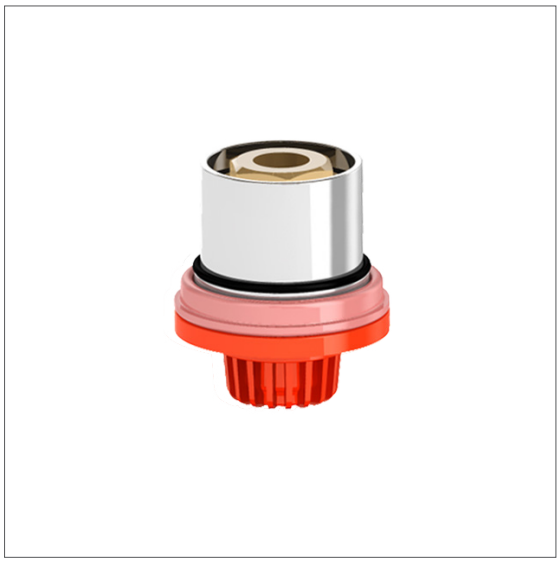
Step 3: remove the headwork.



Step 4: push down the control valve stem and pull the diaphragm out.

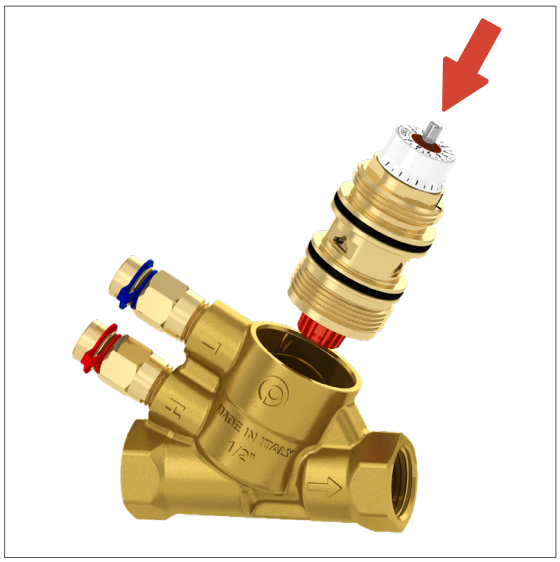


Step 5: clean the diaphragm with water and a cloth. Do not use chemical products.



Step 6: put back the diaphragm in the headwork. Push it in its seat.

Step 7: replace the headwork.

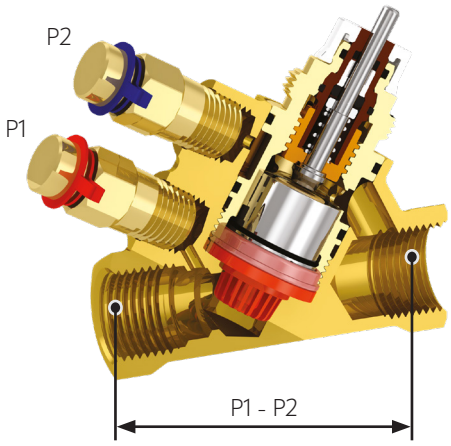


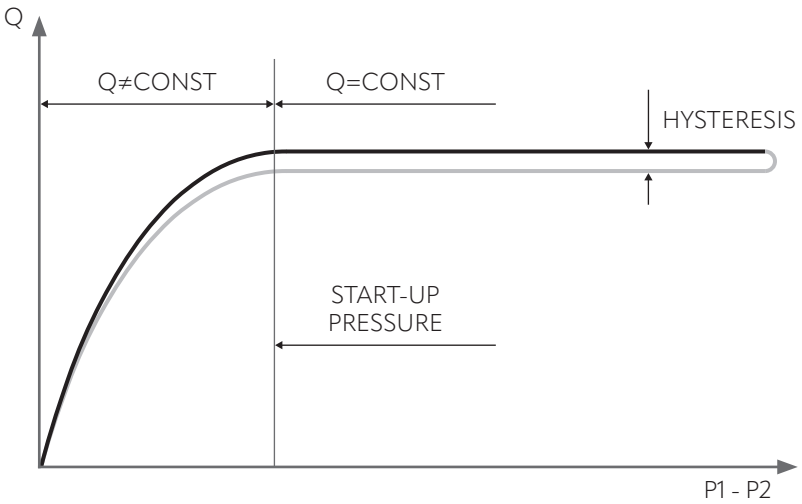
Step 8: screw the headwork with 20 Nm torque (refer to step 2 for dimensions of the tool).

Step 9: place the actuator with its adapter or the knob.

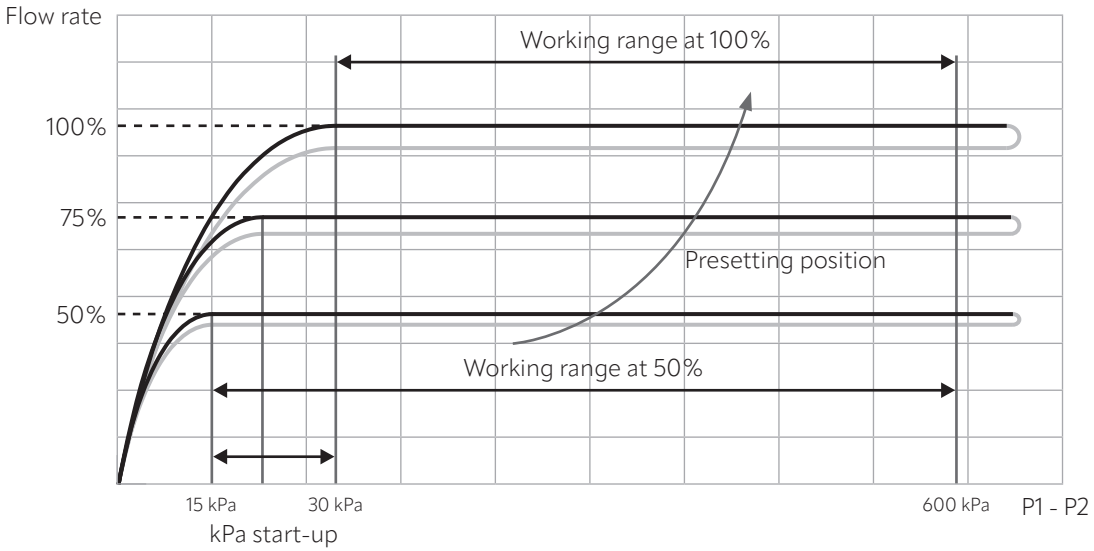
To replace the element control valve-DPCV, follow the instructions above except steps 4, 5 and 6. In step 7, put a new headwork (092DC).

EN Start-up curves and presetting





The example above shows a characterisitc curve where start-up pressure, hysteresis and accuracy can be evaluated.
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 for the presetting position selected. This feature is not available on the DYNASTY 92-1 model but it can be implemented by adding two pressure ports, for more information about that see the "Accesories" section.
If the ΔP measured value is lower than the start-up value, then the valve works as a fixed orifice valve so it doesn't keep the flow rate constant.
Start-up value varies with flow setting of the valve, as shown by the example below:

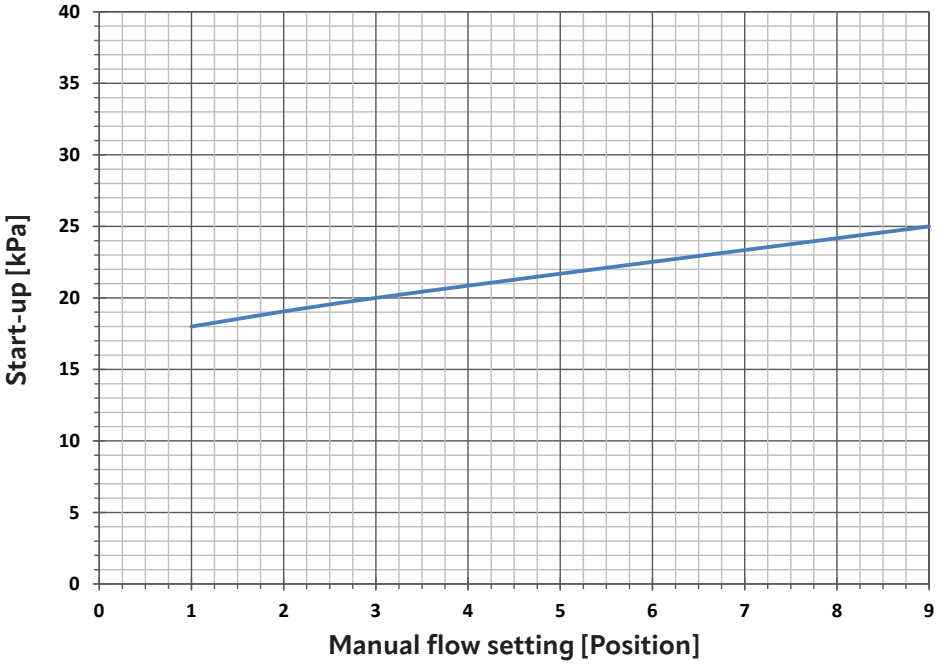


When the valve is set at 100% of nominal (maximum) flow, the curve begins to remain constant at 30 kPa, therefore the suggested working range of the valve is 30 ÷ 600 kPa;

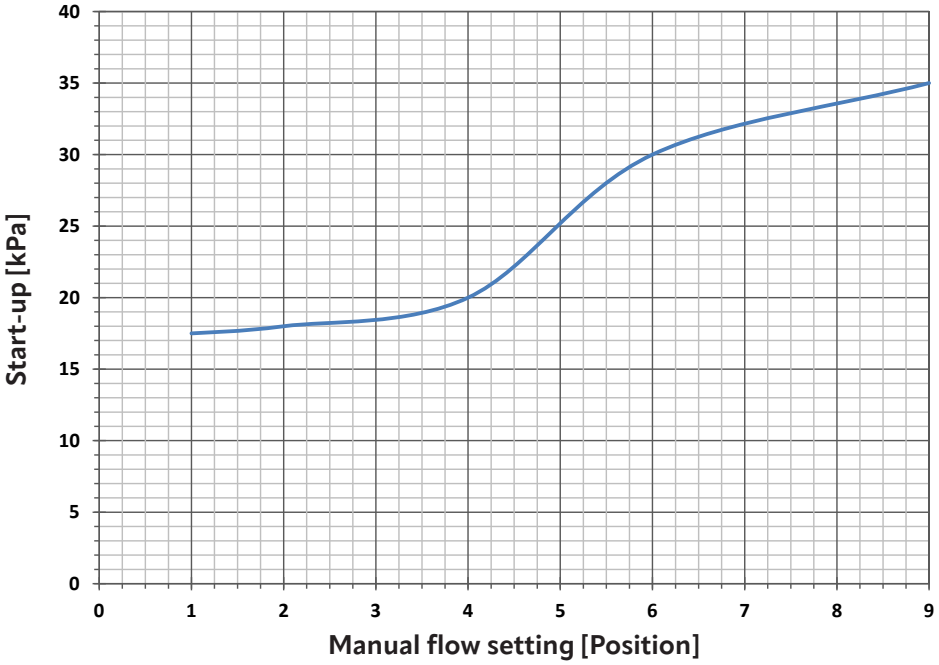
When the valve is set at 50% of nominal flow, the curve begins to remain constant at 15 kPa, therefore the working range of the valve is 15 ÷ 600 kPa.

Over 600 kPa the fluid velocity through the valve is extremely high and cavitation may happen due to extreme turbolence of the flow. Because of these phenomena the valve can get demaged. For energy saving reasons, we suggest to continuosly work the valve under 600 kPa.

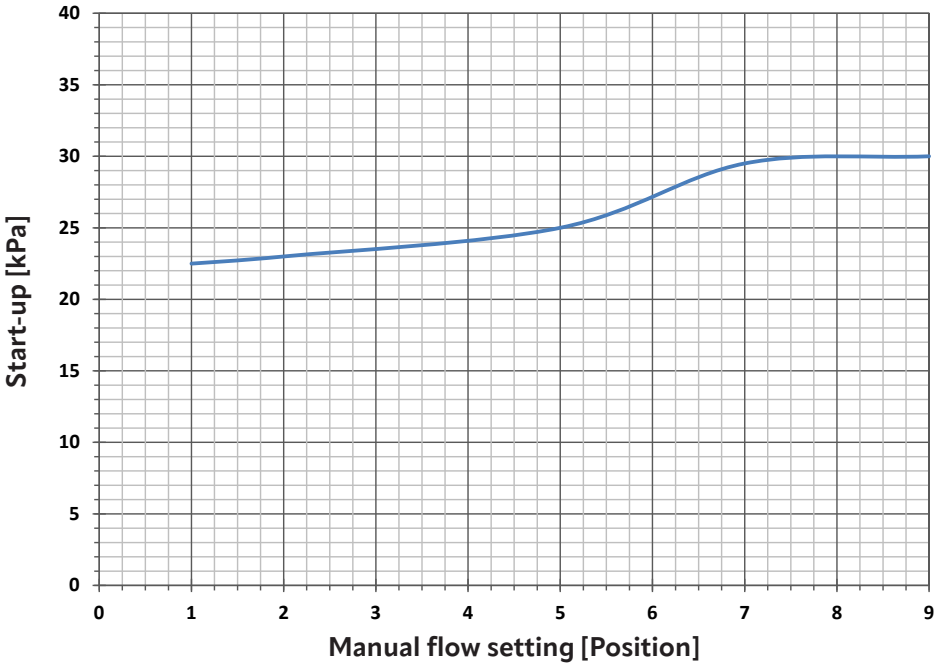
The following diagrams show the start-up pressure at different presetting.



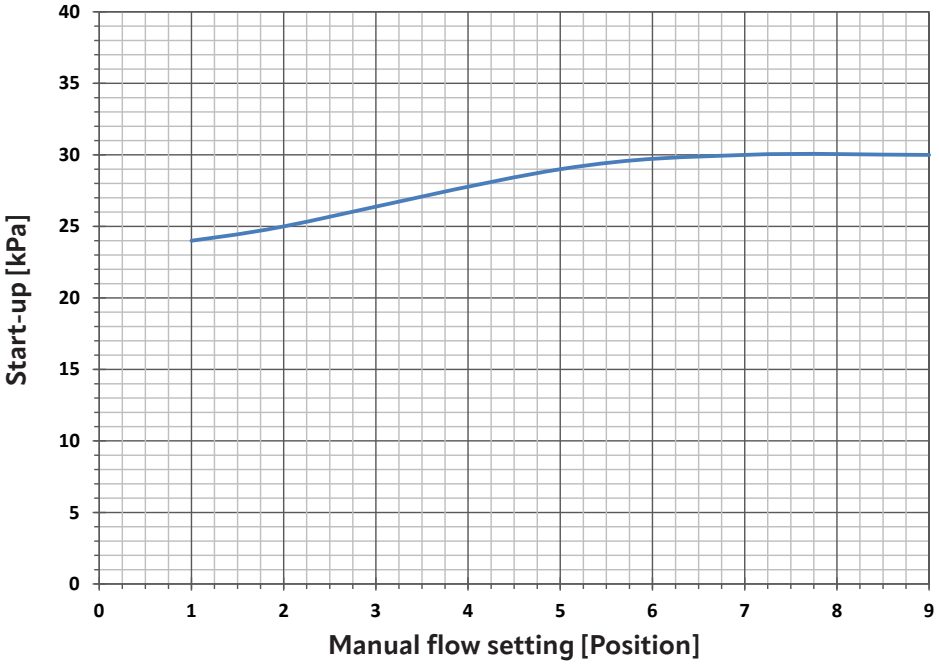
Valve			
92VL ½″ - 150 l/h			
92VL1 ½″ - 150 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	18	5.5	22,1
1.5	18,5	6	22,5
2	19,05	6.5	22,95
2.5	19,55	7	23,35
3	20	7.5	23,75
3.5	20,45	8	24,6
4	20,85	8.5	24,6
4.5	21,3	9	25
5	21,7		



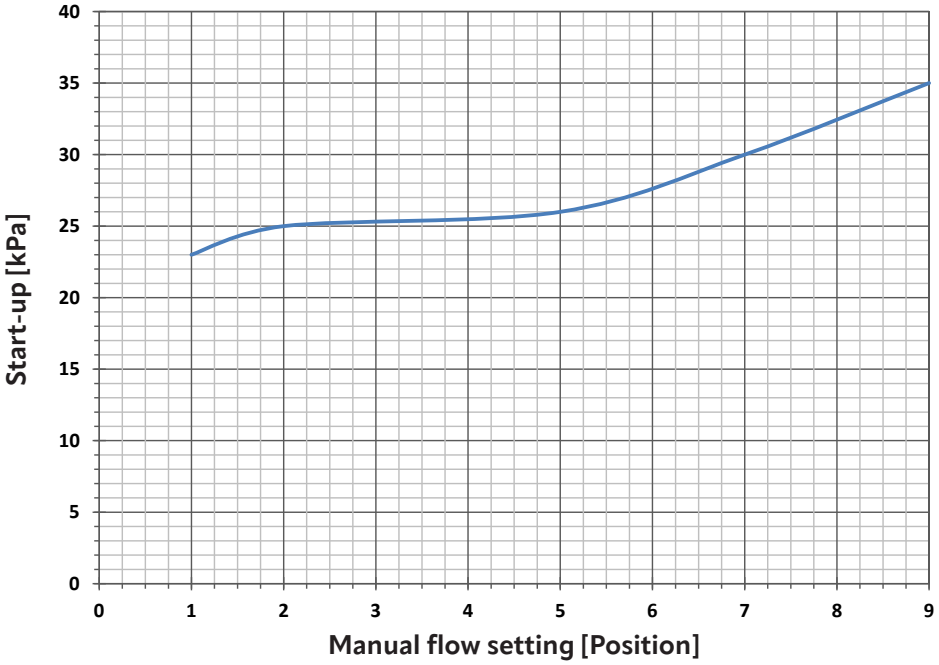
Valve			
92L ½″ - 450 l/h			
92L1 ½″ - 450 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	17,5	5.5	28
1.5	17,7	6	30
2	18	6.5	31,25
2.5	18,3	7	32,15
3	18,55	7.5	32,9
3.5	19,05	8	33,55
4	20	8.5	34,25
4.5	22,15	9	35
5	25,2		



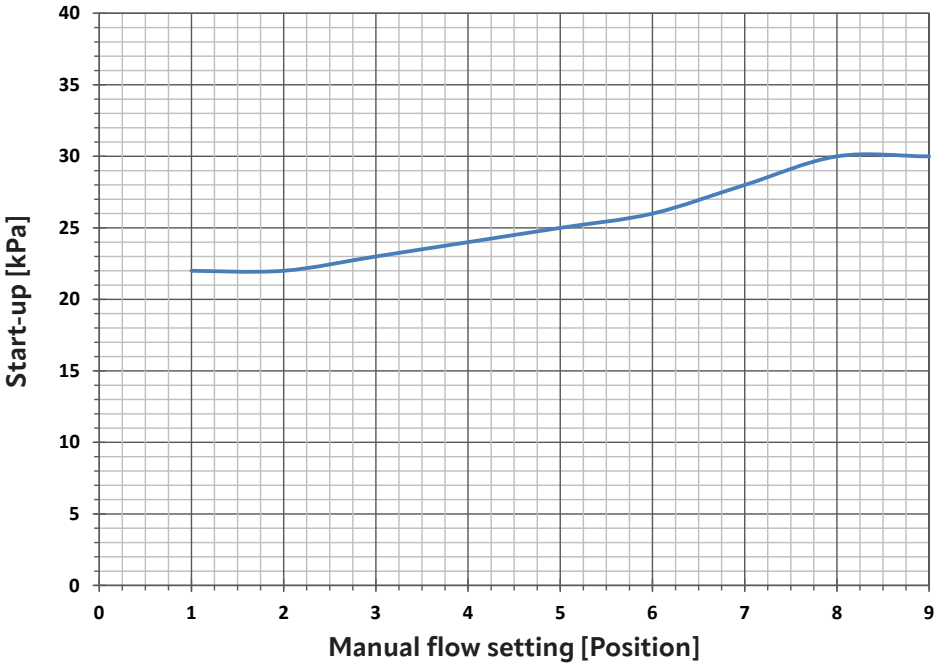
Valve			
92H ½″ - 850 l/h			
92H1 ½″ - 850 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	22,5	5.5	25,9
1.5	22,7	6	27,15
2	23	6.5	28,55
2.5	23,3	7	29,5
3	23,5	7.5	29,9
3.5	23,8	8	30
4	24,1	8.5	30
4.5	24,5	9	30
5	25		



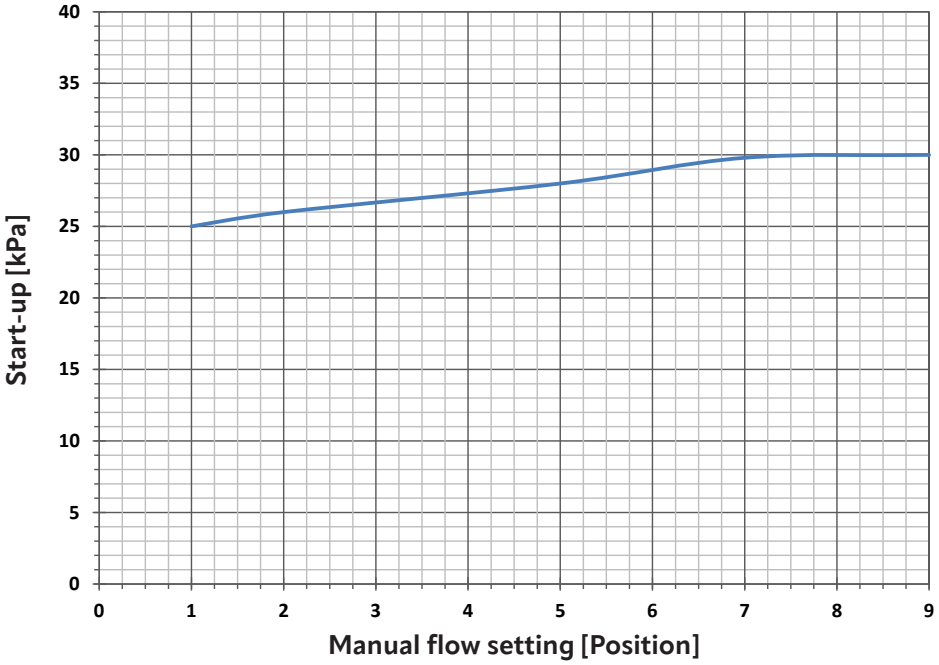
Valve			
92L ¾" - 1000 l/h			
92L1 ¾" - 1000 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	24	5.5	29,45
1.5	24,45	6	29,7
2	25	6.5	29,9
2.5	25,7	7	30
3	26,4	7.5	30
3.5	27,1	8	30
4	27,8	8.5	30
4.5	28,4	9	30
5	29		



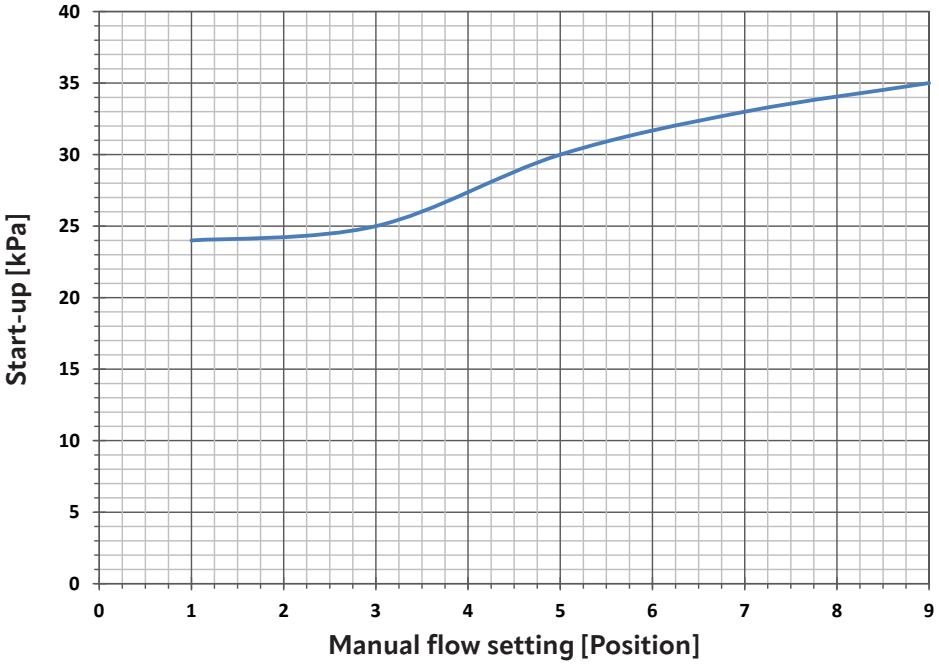
Valve			
92H ¾" - 1850 l/h			
92H1 ¾" - 1850 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	23	5.5	26,7
1.5	24,4	6	27,6
2	25	6.5	28,8
2.5	25,2	7	30
3	25,3	7.5	31,2
3.5	25,4	8	32,4
4	25,5	8.5	33,7
4.5	25,65	9	35
5	26		



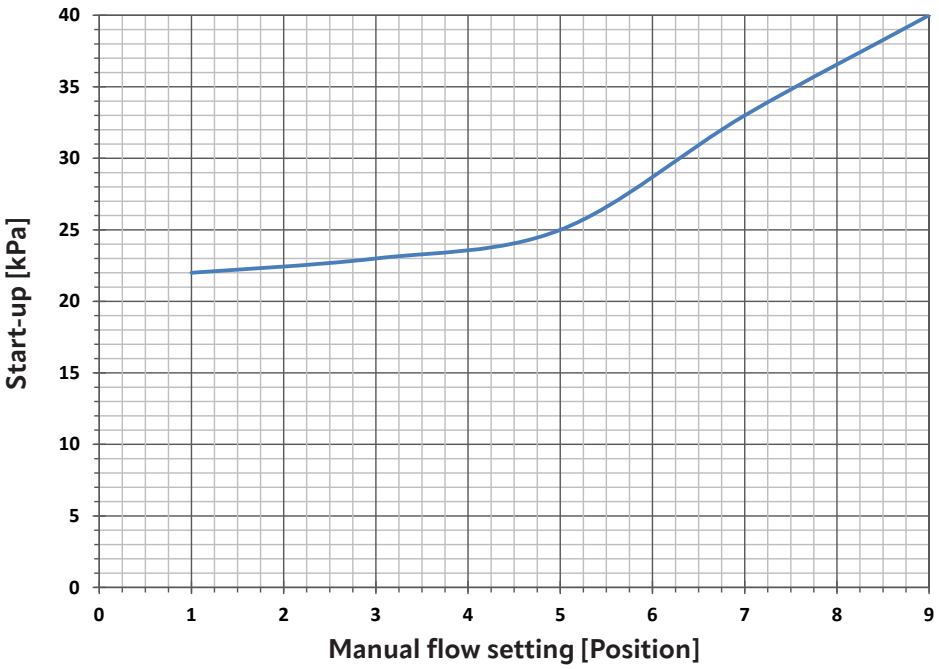
Valve			
92L 1" - 2500 l/h			
92L1 1" - 2500 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	22	5.5	25,5
1.5	22	6	26
2	22	6.5	26,95
2.5	22,45	7	28
3	23	7.5	29,1
3.5	23,5	8	30
4	24	8.5	30
4.5	24,5	9	30
5	25		



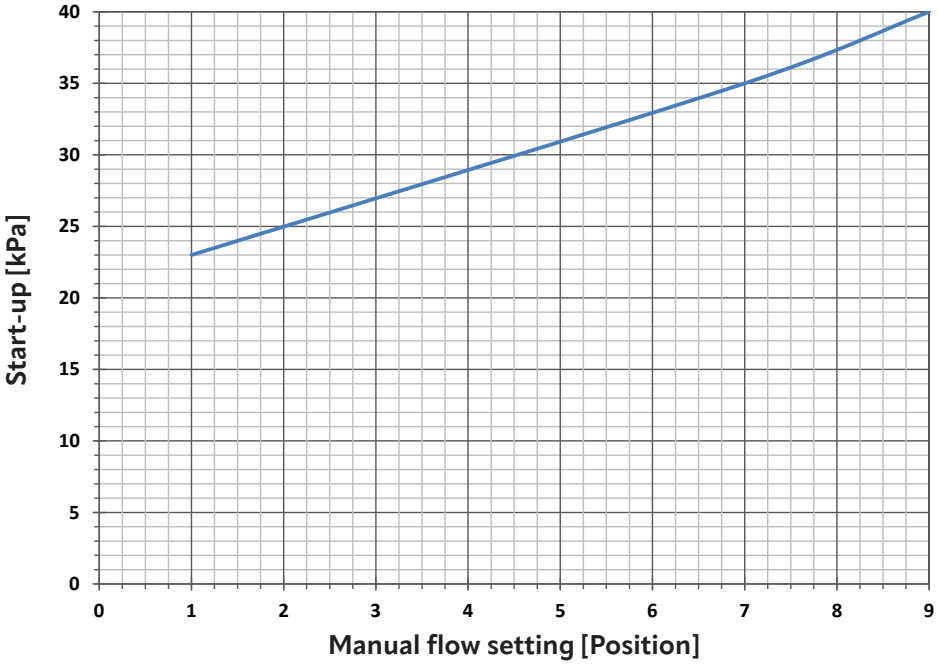
Valve			
92H 1″ - 3300 l/h			
92H1 1″ - 3300 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	25	5.5	28,4
1.5	25,55	6	28,95
2	26	6.5	29,45
2.5	26,35	7	29,8
3	26,65	7.5	29,95
3.5	27	8	30
4	27,3	8.5	30
4.5	27,65	9	30
5	28		



Valve			
92H 1 ¼″ - 5200 l/h			
92H1 1 ¼″ - 5200 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	24	5.5	30,9
1.5	24,1	6	31,7
2	24,2	6.5	32,35
2.5	24,5	7	33
3	25	7.5	33,55
3.5	26	8	34,05
4	27,4	8.5	34,5
4.5	28,8	9	35
5	30		



Valve			
92H 1 ½″ - 9000 l/h			
92H1 1 ½″ - 9000 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	22	5.5	26,6
1.5	22,2	6	28,7
2	22,45	6.5	30,9
2.5	22,7	7	33
3	23	7.5	34,8
3.5	23,3	8	36,55
4	23,6	8.5	38,25
4.5	24,1	9	40
5	25		



Valve			
92H 2″ - 14000 l/h			
92H1 2″ - 14000 l/h			
Presetting [Position]	Start-up [kPa]	Presetting [Position]	Start-up [kPa]
1	23	5.5	31,9
1.5	24	6	32,9
2	24,95	6.5	33,95
2.5	25,95	7	35
3	26,9	7.5	36,1
3.5	27,95	8	37,35
4	28,9	8.5	38,65
4.5	30	9	40
5	30,9		

EN Flow presetting for DYNASTY 92

The following tables collect the flow rate values corresponding to the different presetting that can be set on the valve:

Presetting [Position]	92VL ½″ / 92VL1 ½″		92L ½″ / 92L1 ½″		92H ½″ / 92H1 ½″		92L ¾″ / 92L1 ¾″		92H ¾″ / 92H1 ¾″	
	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
9	150	0,043	450	0,125	850	0,236	1000	0,277	1850	0,514
8	133,2	0,037	387	0,108	774	0,215	911	0,253	1734	0,484
7	114	0,032	328,8	0,091	689	0,191	804	0,223	1548	0,430
6	99,6	0,028	261	0,073	606	0,168	722	0,201	1320	0,367
5	85,2	0,024	207	0,058	496	0,138	573	0,159	1080	0,300
4	70,8	0,020	165	0,046	393	0,109	451	0,125	846	0,235
3	55,2	0,015	121,2	0,034	331	0,092	376	0,104	624	0,173
2	39,6	0,011	81,6	0,023	265	0,074	291	0,081	492	0,137
1	19,2	0,005	42	0,012	157	0,044	169	0,047	276	0,077
0	0	0	0	0	0	0	0	0	0	0

Presetting [Position]	92L 1″ / 92L1 1″		92H 1″ / 92H1 1″		92H 1 ¼″ / 92H1 1 ¼″		92H 1 ½″ / 92H1 1 ½″		92H 2″ / 92H1 2″	
	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
9	2500	0,694	3300	0,917	5200	1,444	9000	2,500	14000	3,88
8	2202	0,612	3046	0,846	4680	1,300	8040	2,233	12780	3,550
7	1875	0,521	2682	0,745	4164	1,157	7200	2,000	11040	3,067
6	1577	0,438	2265	0,629	3582	0,995	6240	1,733	9240	2,567
5	1304	0,362	1849	0,514	2880	0,800	5070	1,408	7620	2,117
4	1048	0,291	1387	0,385	2220	0,617	3954	1,098	5760	1,600
3	798	0,222	884	0,246	1578	0,438	2814	0,782	4260	1,183
2	560	0,155	543	0,151	1026	0,285	2064	0,573	2790	0,775
1	339	0,094	173	0,048	540	0,150	1110	0,308	1560	0,433
0	0	0	0	0	0	0	0	0	0	0

In order to find the presetting position for a general flow rate value which isn't in the tables above it is possible to use the linear interpolation formula. Once the desired flow rate X has been designed, in order to find the corresponding presetting position Y, it is needed to identify the extremity flow rates values, X_1 and X_2 (respectively the upper end the lower ones) and their relative presetting positions Y_1 and Y_2. Since the difference $Y_1 - Y_2$ its always equal to 1, the desired presetting position can be easily calculated as:

$$Y = Y_2 + \frac{(Y_1 - Y_2) \times (X - X_2)}{(X_1 - X_2)} = Y_2 + \frac{(X - X_2)}{(X_1 - X_2)}$$

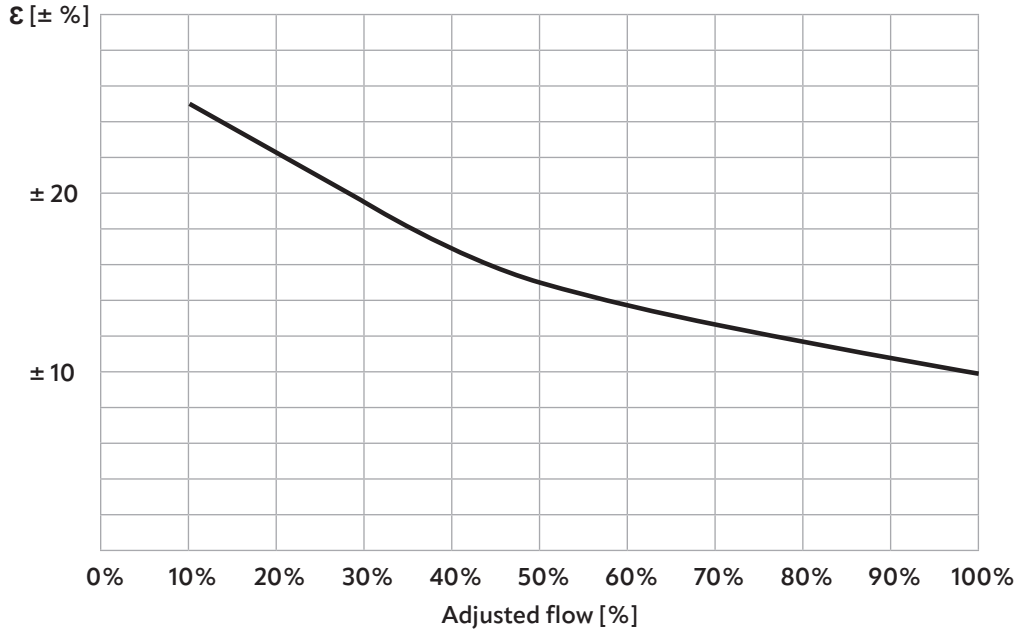
CALCULATION EXAMPLE

We want to obtain the postion at which a 92H 1 ¼″ valve must be presetted in order to have a flow rate of 3200 l/h. From the tables above the extremity flow rate values are 3582 l/h e 2880 l/h which correspond to presetting 6 and 5. The presetting position that must be selected on the valve is:

$$Y = 5 + \frac{(6 - 5) \times (3200 - 2880)}{(3582 - 2880)} = 5 + \frac{(3200 - 2880)}{(3582 - 2880)} = 5.46 = 5.5$$

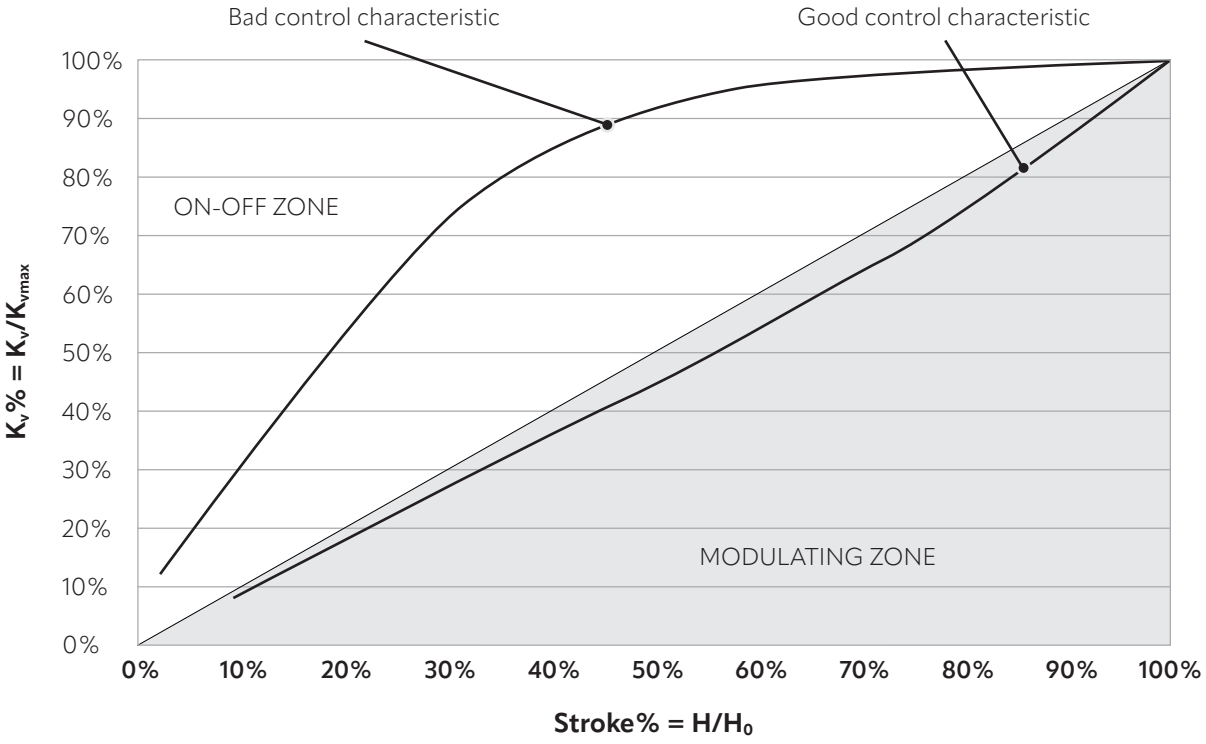
EN Flow setting accuracy

The following graph shows the max flow deviation for differential pressure over 1 bar and presetting below pos. 9. For presetting 9 and ΔP lower than 1 bar the max flow deviation is reduced to ± 5%. Please contact technical department for further informations.



EN Control curves

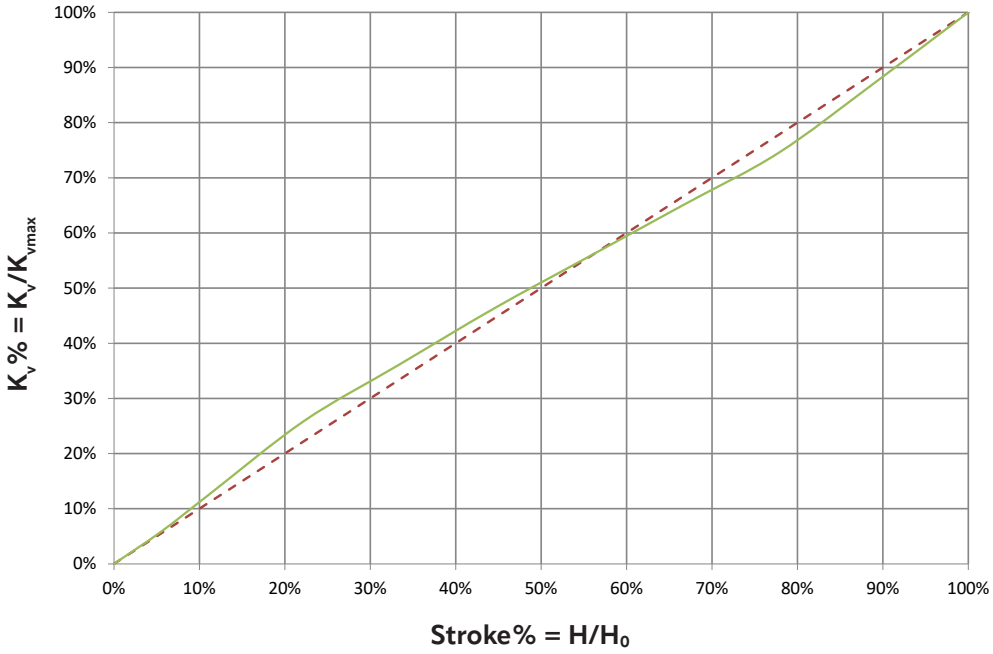
Operating on the position of the regulating valve control stem A will modify the valve K_v, hence the flow rate. Typical relations between K_v and stroke for a control valve are shown below:



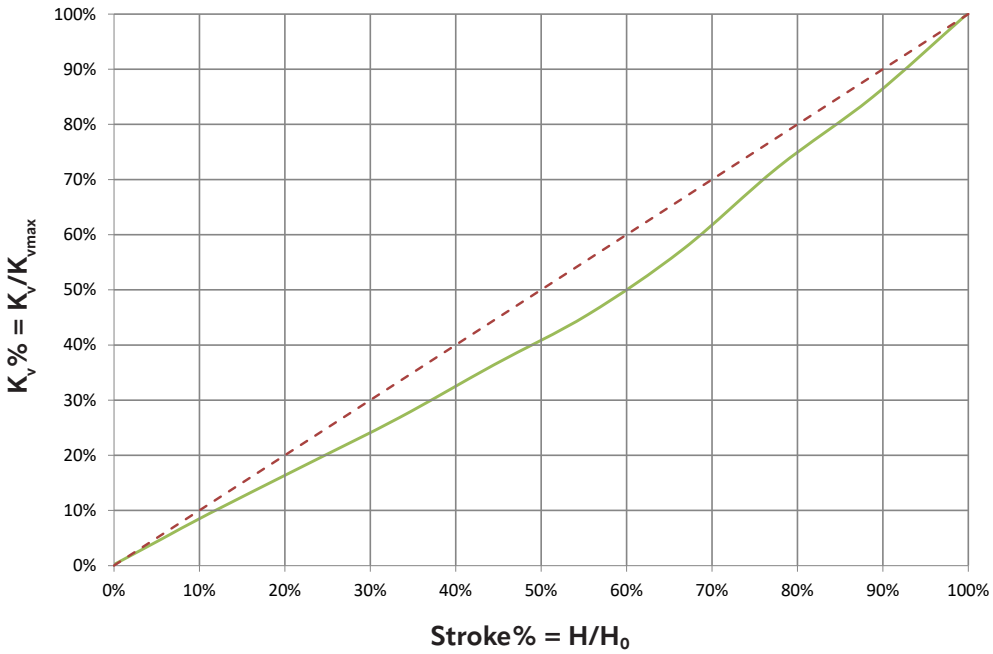
Where:

- H_0 is the maximum lift of the control valve
- K_{vmax} is the valve flow factor when the valve is fully open so at lift equal to H_0
- H is the current lift (opening) of the control valve. It will vary from 0 to H_0
- K_v is the valve flow factor related to lift H

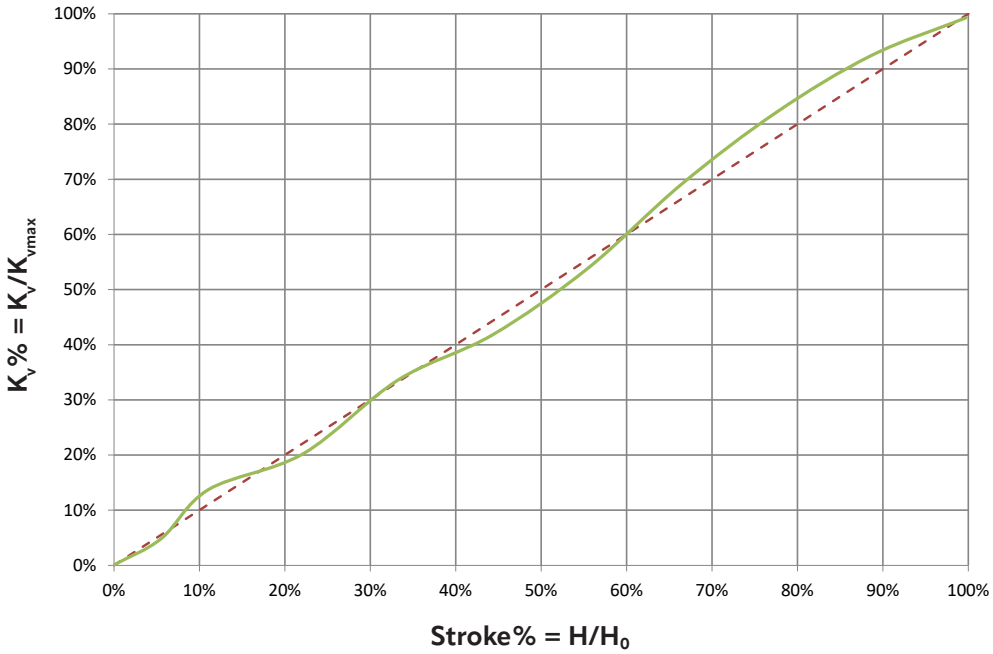
The **DYNASTY 92** valve has an inherent linear characteristic.
Control curves for 92 valves are shown below (control curve characteristic may change according to valve version):



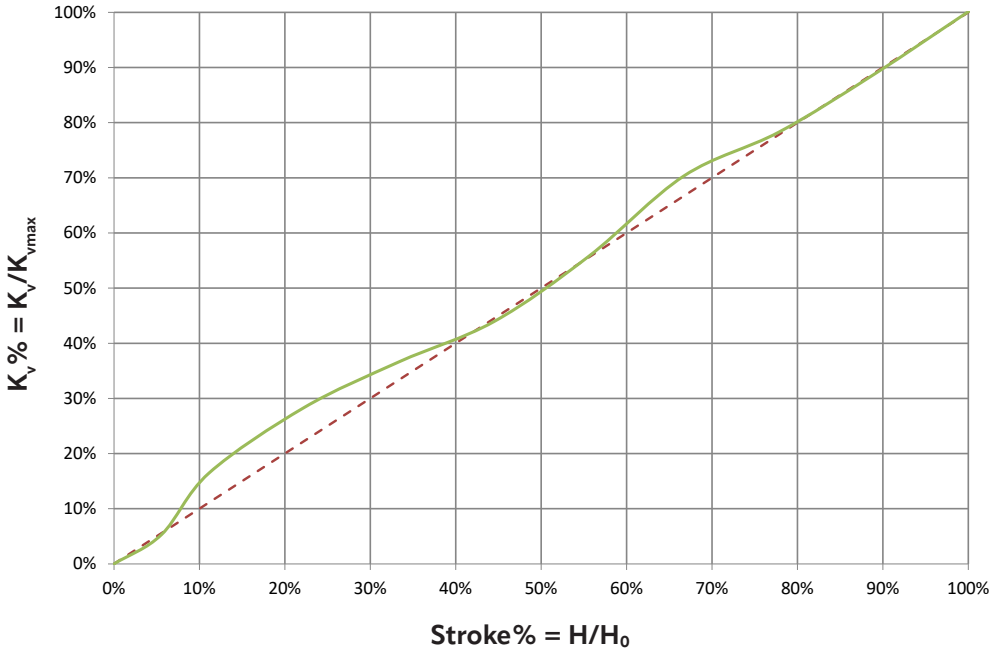
Valve
92VL ½″ - 150 l/h
92VL1 ½″ - 150 l/h
Selected presetting
Position 9



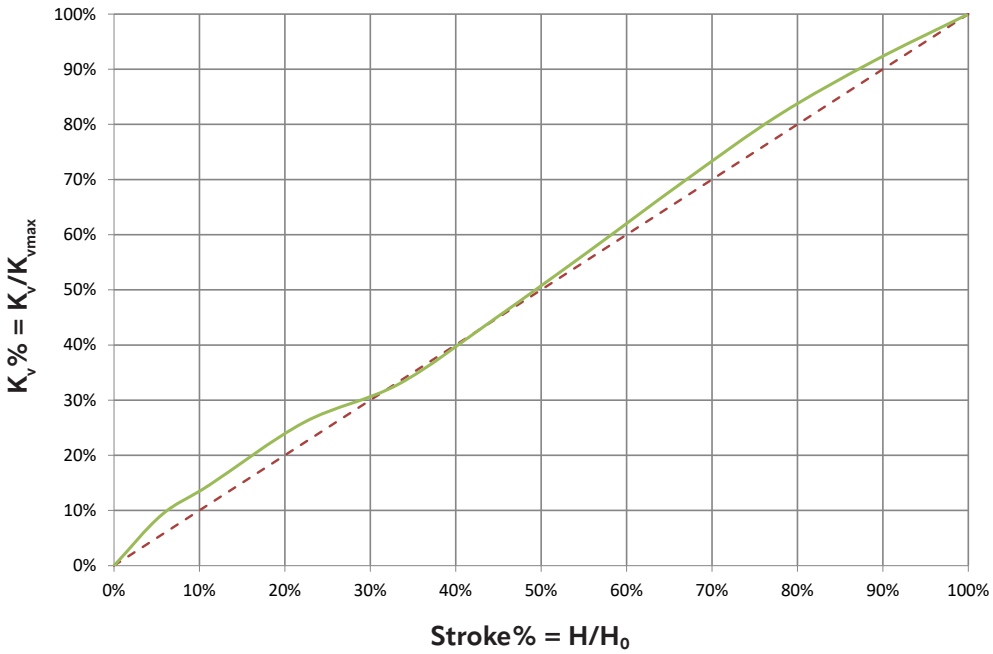
Valve
92L ½″ - 450 l/h
92L1 ½″ - 450 l/h
Selected presetting
Position 9



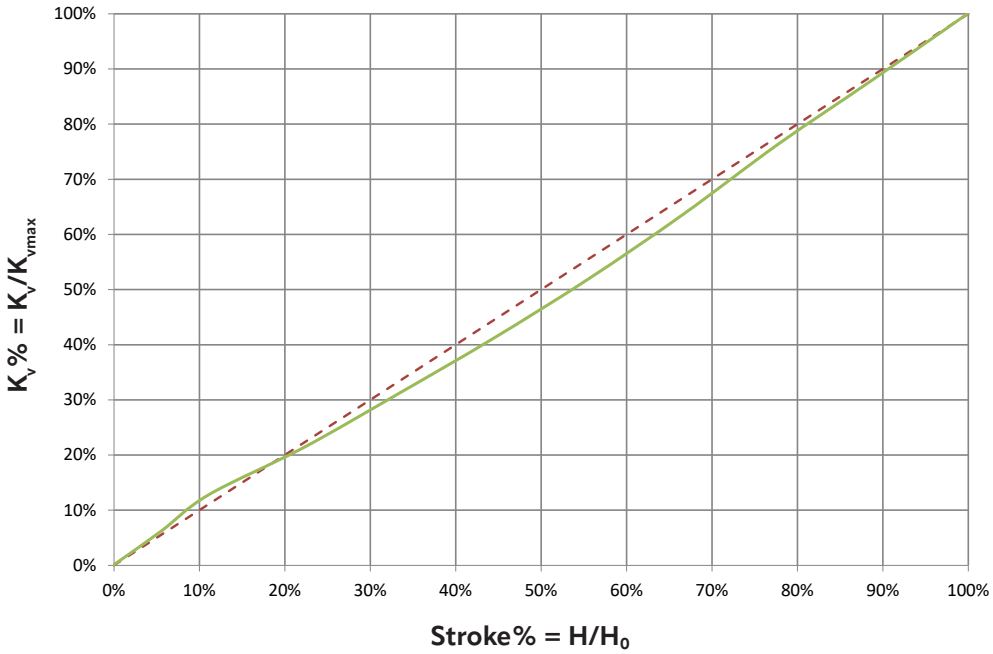
Valve
92H ½″ - 850 l/h
92H1 ½″ - 850 l/h
Selected presetting
Position 9



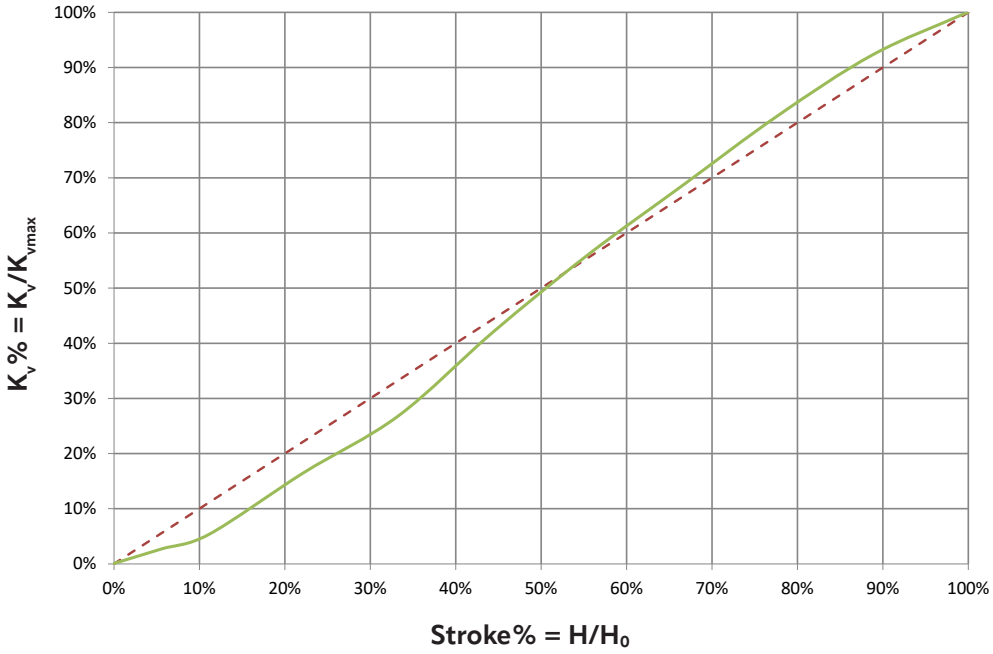
Valve
92L ¾″ - 1000 l/h
92L1 ¾″ - 1000 l/h
Selected presetting
Position 9



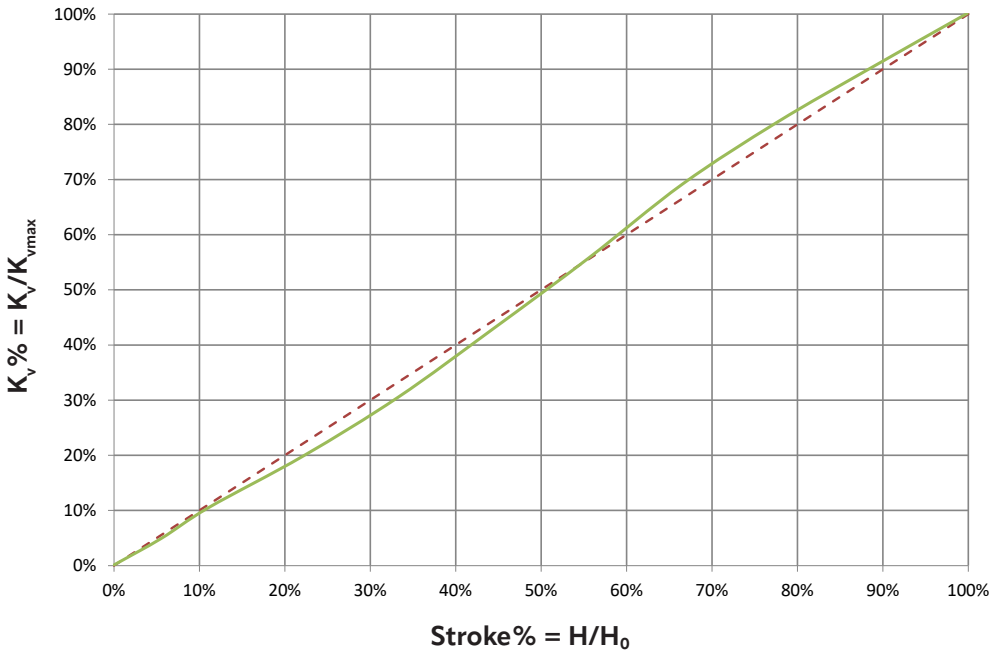
Valve
92H ¾″ - 1850 l/h
92H1 ¾″ - 1850 l/h
Selected presetting
Position 9



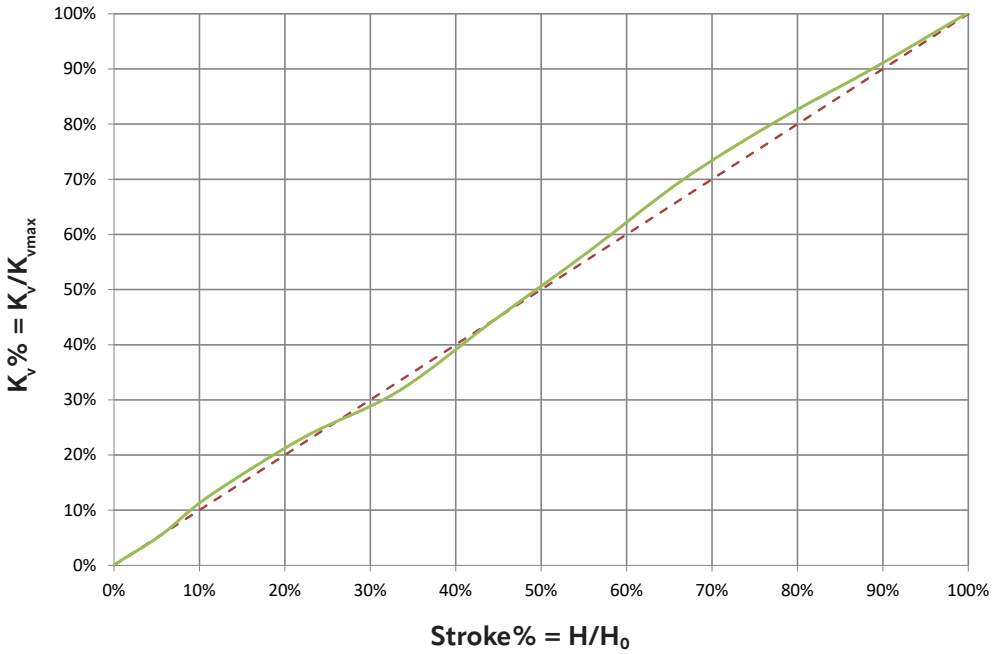
Valve
92L 1″ - 2500 l/h
92L1 1″ - 2500 l/h
Selected presetting
Position 9



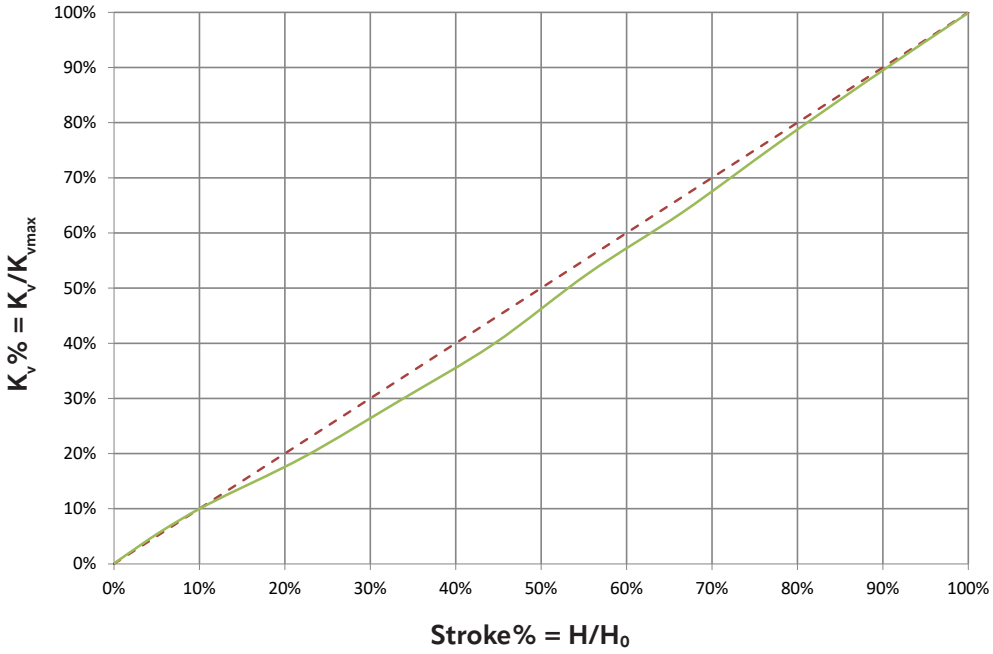
Valve
92H 1″ - 3300 l/h
92H1 1″ - 3300 l/h
Selected presetting
Position 9



Valve
92H 1 ¼″ - 5200 l/h
92H1 1 ¼″ - 5200 l/h
Selected presetting
Position 9



Valve
92H 1 ½″ - 9000 l/h
92H1 1 ½″ - 9000 l/h
Selected presetting
Position 9

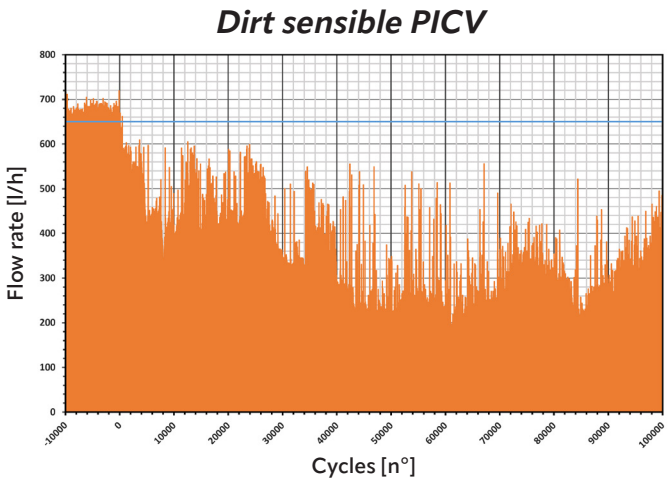


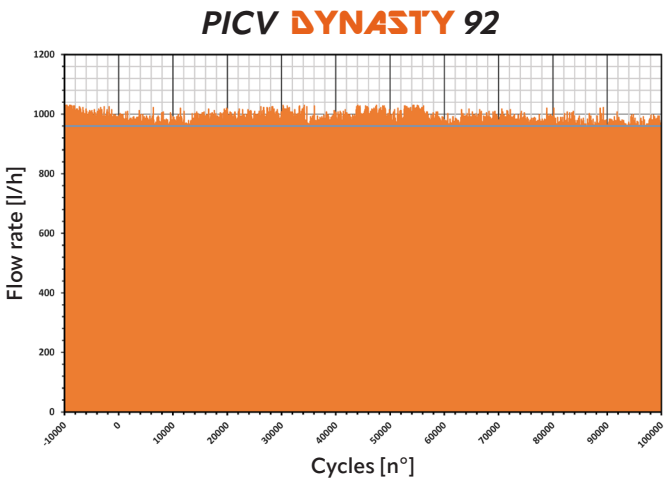
Valve
92H 2″ - 14000 l/h
92H1 2″ - 14000 l/h
Selected presetting
Position 9

EN Dirt resistant feature

In general, low water quality affects negatively the operation of a PICV. The installation of strainers helps to reduce the problem but nevertheless does not completely cancel it: very small impurities in fact manage to by-pass the filtering meshes. Their accumulation inside the system can thus lead to the formation of deposits on moving parts, for example the differential pressure regulator of the PICV, consequently causing blockage.
One of the key features of the DYNASTY 92 range is its ability to work even in dirty water conditions. The inspectable and washable differential pressure regulator has been specifically designed to prevent the valve from blocking even if the heat transfer fluid has micro-particles suspended inside.
The conformation of the differential pressure regulator, combined with the special design of all the components, ensures the minimum friction between the moving and fixed parts: this way the risk of blokcage due to excessive friction is reduced.
In order to evaluate its efficiency, the valve has been tried out with an appropriate internal wear test. The purpose of this latter is in fact to simulate very demanding working conditions to get an experimental confirmation with a proper security factor. The test has been done on a dedicated circuit using water contaminated by ferric oxide Fe_2O_3 at a concentration of 900 ppm. In order to obtain a valid response on the time scale over 100000 opening and closing cycles of the valve have been done in this demanding conditions.
As an example, consider the following graph obtained for a DYNASTY 92H ¾" presetted in position 4.5 (960l/h). It represents the trend of the flow processed by the valve throughout the test which can be divide in two ranges:

- Cycles -10000 → 0: in this range the valve has been tested in clean water conditions
- Cycles 0 → 100000: in this range the valve has been tested in contaminated water conditions





As it can been seen from the graph, differences are revelant, the PICV DYNASTY 92 worked perfectly: there are no flow steps or jumps unlike a common dirt sensible PICV. The flow rate has been kept constant even after the addition of iron oxide (cycle 0).
As previously mentioned, these tests have been done in very demanding conditiong with the aim to obtain an appropriate safety factor for the user.
The manufacturer does not accept any liability for improper or wrong use of this product. PICV DYNASTY series can work as per the specification with maximum iron oxide concentration up to 900 ppm, according to the results of the proprietary test carried out in Fratelli Pettinaroli promises. Fratelli Pettinaroli suggests follow VDI 2035 standard to ensure suitable operation of all equipments of HVAC systems.

EN Valve nomenclature

The nomenclature of the valve depends on the selected model and the desired thread. As an example consider the following table:

With Rp thread		With NPT thread	
With pressure ports	Without pressure ports	With pressure ports	Without pressure ports
92H ½"	**92H1 ½"**	**92HN ½"**	**92H1N ½"**

EN Actuators

The table below shows actuators part numbers for different control types:

Type - Electromotive	Part number	Stroke	Suitable size	Adapter	
24V, 0-10V Proportional, Feedback	VA7483	6,3 mm^	DN15 to DN32	0A7010*	0A748X*
				DN15-20	DN25-32
24V, 0-10V Prop, Feedback, Fail safe	VA7484	6,3 mm^	DN15 to DN32	0A7010*	0A748X*
				DN15-20	DN25-32
24V, 3 Point Floating	VA7481	6,3 mm	DN15 to DN32	0A7010*	0A748X*
				DN15-20	DN25-32
230V, 3 Point Floating	VA7481	6,3 mm	DN15 to DN32	0A7010*	0A748X*
				DN15-20	DN25-32
24V, 0-10V Proportional, Feedback	VA7493	8,7 mm^	DN40	0A7493**	
24V, 0-10V Proportional, Feedback	RVAZ2C	8,5 mm^	DN40, DN50	0A748X*	
24V, 3 Point Floating	RVAZ2	8,5 mm^	DN40, DN50	0A748X*	
120/230V, 3 Point Floating	RVAZ2	8,5 mm^	DN40, DN50	0A748X*	
24V, 0-10V Proportional, Fail Safe	VM060	6.5 mm^	DN15 to DN32	76TE**	

Type - Thermo-electric	Part number	Stroke	Suitable size	Adapter
24V, 0-10V Proportional	A544P3	4 mm	DN15, DN20	VA64**
24V, 0-10V Proportional	A564P3	6.5 mm	DN25, DN32	VA64**
24V, ON-OFF, 2 wires	A544O2	4 mm	DN15, DN20	VA64**
24V, ON-OFF, 4 wires	A544O4	4 mm	DN15, DN20	VA64**
230V, ON-OFF, 2 wires	A542O2	4 mm	DN15, DN20	VA64**
230V, ON-OFF, 4 wires	A542O4	4 mm	DN15, DN20	VA64**
230V, ON-OFF, 2 wires	V542O2	4 mm	DN15, DN20	VA64**
120V, ON-OFF, 2 wires	A551O2	5 mm	DN15, DN20	VA64**
24V, ON-OFF, 2 wires	A564O2	6.5 mm	DN25, DN32	VA64**
120V, ON-OFF, 2 wires	A561O2	6.5 mm	DN25, DN32	VA64**
230V, ON-OFF, 2 wires	A562O2	6.5 mm	DN25, DN32	VA64**

* Adapter NOT included. ** Adapter included. ^ Equipped with stroke detection system.

Fratelli Pettinaroli is not liable for unauthorized use of actuators not shown in the table above.

EN Accessories

T90RB

Pressure ports for temperature and pressure measurement. They can be added at the 92-1 model.

MDPS2

Digital differential manometer Bluetooth® for start-up test of PICV valves and flow rate measurement of Terminator balancing valves and Venturi devices. To be used with specific app installed on a smartphone.

MDP
Digital differential manometer for differential pressure measurement.

EN Insulating cases

UL94 fire rated insulating case for PICV. Available for heating and cooling installations with the following part numbers:

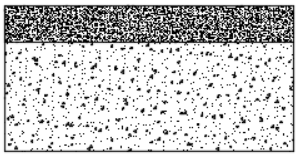
- **092IHV**: case for heating, closure by Velcro®. Size has to be specified.
- **092ICV**: case for cooling, closure by Velcro®. Size has to be specified.

Cases for heating let the headwork and the actuator uncover wheras those for cooling cover the actuator too (all those in the range). The case is made by 2 sheels connected with Velcro® and realised with a sandwich structure:

- **External layer**: made by high density polyetylene cross linked foam (80 kg/m³) to give rigidity at the sheel.
- **Internal layer**: made by low density polyetylene cross linked foam (29 kg/m³) to increase the insulation performances of the sheel.

Total thickness: 20 mm. For more informations about insulating cases please see their dedicated technical specification "Insulating cases".

Feature	Insulating case	
Density [kg/m³]	29	80
Operating temperature range [°C]	-60 / +90	-60 / +90
Thermal conductivity [W/mK]	0.040	0.049
Thickness [mm]	18	2



Cross section insulating sheel

EN General conditions

To ensure the main pipework is cleaned appropriately, flushing by-passes should be used: for effective flushing (suitable water velocity), any flushing through the pressure regulator of the PICV is not suggested, according to BSRIA Guideline BG29.

FRATELLI PETTINAROLI S.p.A.
CLIMATE SYSTEMS TECHNOLOGY

Fratelli Pettinaroli Spa
Via Pianelli, 38 - 28017 San Maurizio d'Opaglio (NO) - Italy
Tel. +39 0322 96217 - +39 0322 96545 - Fax +39 0322 96546
info@pettinaroli.com - www.pettinaroli.com