VPE SERIES

Pressure Independent Control Valves

The pressure independent control valve (PICV) integrates the functions of a differential pressure controller, a regulation valve, and a 2-port control valve into a single unit. The VPE Series includes a compact diaphragm-type DPCV designed to maintain a constant differential pressure across the regulating valve's orifice, ensuring a steady flow rate while keeping the differential pressure within the valve's operating limits. When combined with Honeywell actuators, extremely stable flow control is provided. A wide range of maximum flow rates are available to cover application needs.

Honeywell PICV VPE Series

APPLICATION

Because the differential pressure across the valve seat is kept constant, which keeps the flow rate stable and constant, it can be said that the authority of the VPE valve is very close to 1. Due to how the VPE valve maintains the flow rate constant, irrespective of differential pressures in the hydronic system, balancing valves are not needed. Flow rates are maintained at the terminal units regardless of system conditions, making the valve ideal for variable flow systems with inverter driven pumps. Models are available with and without pressure ports, should it be desirable to measure differential pressure at the valve due to new diaphragm technology, the valve can work with dirty water.

FEATURES AND BENEFITS

TEMPERATURE CONTROL

Excellent valve authority to maintain power output from the heat exchanger and subsequent temperature control.

EPD CERTIFIED

Features a third-party verified Environmental Product Declaration (EPD) in accordance with ISO 14025 and EN 15804+A2, ensuring transparent and standardised sustainability reporting. View EPD.

DIFFERENTIAL PRESSURE REGULATOR

Connections to measure the differential pressure across the valve; the user can verify if the start-up pressure has been reached and exceeded.

FAST & EASY MAINTENANCE

Fast, easy maintenance: internal element, (control valve and DPCV), can be removed and cleaned.

ADJUSTABLE VALVE OPENING

Making the valve opening adjustable allows the valve to be preset, and it delivers a range of maximum flow rates. The presetting gear is easily adjusted and works by varying the stroke of the control valve. After presetting, the VPE valve uses its 2-way linear control valve to vary the flow within the preset range. The plug of the linear globe valve is machined to give near linear flow control characteristics.

DIRT RESISTANT FEATURE

The 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 blockage due to excessive friction is reduced.

Honeywell

PART NUMBERS

VPE SERIES PRESSURE INDEPENDENT CONTROL VAVLES PART NUMBERS							
SKU	VALVE SIZE	PRESSURE PORTS	FLOW TYPE	VALVE END CONNECTION	FLOW RATE RANGE (MIN - MAX)	WEIGHT	DIFFERENTIAL PRESSURE RANGE (MIN - MAX)
VPE15F15AV	DN15	Yes	Very low Flow	Internal Threads 15mm (Rp 1/2" F) (EN 10226-1)	19 lph - 150 lph	0.46 kg	25 kPa - 600 kPa
VPE15F15AL	DN15	Yes	Low Flow	Internal Threads 15mm (Rp 1/2" F) (EN 10226-1)	42 lph - 450 lph	0.46 kg	35 kPa - 600 kPa
VPE15F15AH	DN15	Yes	High Flow	Internal Threads 15mm (Rp 1/2" F) (EN 10226-1)	157 lph - 850 lph	0.65 kg	30 kPa - 600 kPa
VPE20F20AL	DN20	Yes	Low Flow	Internal Threads 20mm (Rp 3/4" F) (EN 10226-1)	169 lph - 1000 lph	0.69 kg	30 kPa - 600 kPa
VPE20F20AH	DN20	Yes	High Flow	Internal Threads 20mm (Rp 3/4" F) (EN 10226-1)	276 lph - 1850 lph	0.69 kg	35 kPa - 600 kPa
VPE25F25AL	DN25	Yes	Low Flow	Internal Threads 25mm (Rp 1" Union F) (EN 10226-1)	339 lph - 2500 lph	1.17 kg	30 kPa - 600 kPa
VPE15M15BV	DN15	No	Very low Flow	External Threads - 15mm (G 1/2"M) (ISO 228-1)	19 lph - 150 lph	0.32 kg	25 kPa - 600 kPa
VPE15M15BL	DN15	No	Low Flow	External Threads - 15mm (G 1/2" M) (ISO 228-1)	42 lph - 450 lph	0.32 kg	35 kPa - 600 kPa
VPE20M20BV	DN20	No	Very low Flow	External Threads - 20mm (G 3/4" M) (ISO 228-1)	157 lph - 850 lph	0.33 kg	30 kPa - 600 kPa
VPE20M25BH	DN20	No	High Flow	External Threads - 25mm (G 1" M) (ISO 228-1)	276 lph - 1850 lph	0.58 kg	35 kPa - 600 kPa
VPE25M25BL	DN25	No	Low Flow	External Threads - 25mm (G 1" M) (ISO 228-1)	339 lph - 2500 lph	0.8 kg	30 kPa - 600 kPa

PART NUMBER NOMENCLATURE

PART NUMBER DESCRIPTION - VPE SERIES PICV				
VALVE TYPE	VALVE SIZE	VALVE END CONNECTION TYPE	PRESSURE PORTS	FLOW CAPACITY
VPE				
	15 - DN15			
	20 - DN20			
	25 - DN25			
		F15- 15mm Internal Threads thread		
		F20- 20mm Internal Threads thread		
		F25- 25mm Internal Threads thread		
		M15- 15mm External Threads thread		
		M20 - 20mm External Threads thread		
		M25 - 25mm External Threads thread		
			A - With Pressure Ports	
			B - Without Pressure port	
				V - Very Low Flow
				L - Low Flow
				H - High Flow
VPE	**15**	**F15**	**A**	**V**

PART NUMBERS

ACCESSORIES PARTS	
SKU	**DESCRIPTION**
Adapters (for valves)	
VPE0A7010	A brass adapter designed to be used with VPE series PICV sizes DN15 & DN20.
VPE0A748x	A brass adapter designed to be used with VPE series PICV sizes DN25.
VPEVA64	This plastic adapter needs to be ordered when user wants to use Honeywell M4100E1510 actuator with VPE series PICV size DN15/20
Flow Insert (Spare Parts)	
VPE150	Flow Insert with 150 liters per hour, compatible with DN15 Internal/External configurations.
VPE450	Flow Insert with 450 liters per hour, compatible with DN15 Internal/External configurations.
VPE850	Flow Insert with 850 liters per hour, compatible with DN15 Internal/DN20 External configurations.
VPE1000	Flow Insert with 1000 liters per hour, compatible with DN20 Internal/External configurations.
VPE1850	Flow Insert with 1850 liters per hour, compatible with DN20 Internal/External configurations.
VPE2500	Flow Insert with 2500 liters per hour, compatible with DN25 Internal/External configurations.
Pipe Connections (for External Threads end connections PICV)	
VPE9601010050C	This pipe features an internal 1/2" thread on one end and an external 3/8" thread on the other for connecting valves up to 150 and 450 liters per hour.
VPE9601210050C	This connecting pipe has an internal 3/4" thread at one end and an external 1/2" thread at the other for valves handling flow rates up to 450 and 850 liters.
VPE9602515210C	This pipe connects internal 1" and external 3/4" threads, suitable for valves that accommodate flow rates up to 1850 and 2500 liters per hour.
Insulation Jackets*	
VPEIJF15	Insulating jacket for DN15 PICV with 15mm internal thread to enhance thermal efficiency.
VPEIJF20	Insulating jacket for DN20 PICV with 20mm internal thread to enhance thermal efficiency.
VPEIJF25	Insulating jacket for DN25 PICV with 25mm internal thread to enhance thermal efficiency.

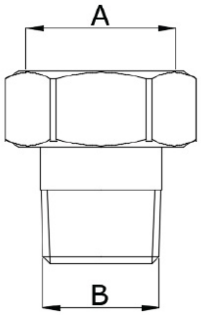
* For more details on Insulating jackets specification, refer section " Insulating cases".

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS HONEYWELL PICV VPE SERIES		
PARAMETER	**SPECIFICATION**	
Valve Type	Pressure Independent Control Valve	
Control Type	Linear	
Size Range:	DN15 - DN25	
Minimum PN Rating	PN25	
Static Pressure	25 bar / 2500 kPa	
Ambient Temperature	-10 °C to +60 °C	
Medium (Fluid)Temperature Range	-10 °C to 120 °C	
Maximum Close-Off Pressure	When closed by electromechanical actuator	6 bar / 600 kPa
	When closed by thermo-electric actuators	3 bar / 300 kPa
Maximum Operational Pressure	25 bar / 2500 kPa	
Flow Characteristic	Linear, can be converted to equal percentage in the actuator	
Leakage	Class IV / IEC 60534-4	
Rangeability	100:1 (at position 9)	
Stroke	DN15 - DN20: 3 mm	
	DN25: 6 mm	
Accuracy *	Up to 1 bar: ± 5%	
	Above 1 bar: ± 10%	
Body Material	DZR Brass (CW602N)	
Flow Balancing	Self Balancing Diaphragm	
Standards	Tested according to BSRIA standard BTS1/2019	
Water Quality Requirements	UNI 8065 / VDI 2035/1	

* At position 9. For different presetting and delta P, please refers to the graph in Flow setting accuracy section. For modulating control with M7410E or M4100 series actuators, the accuracy may be lower when stroke is set below position 8.

PIPE CONNECTIONS



PIPE CONNECTIONS ORDERING INFORMATION		
SKU	**DIMENSIONS (A X B)**	**Descrizione**
VPE9601010050C	A (Pipe Internal 1/2" F) x B (External 3/8" M)	This pipe features an internal 1/2" thread on one end and an external 3/8" thread on the other for connecting valves up to 150 and 450 liters per hour.
VPE9601210050C	A (Pipe Internal 3/4") x B (External 1/2")	This connecting pipe has an internal 3/4" thread at one end and an external 1/2" thread at the other for valves handling flow rates up to 450 and 850 liters.
VPE9602515210C	A (Pipe Internal 1") x B (External 3/4")	This pipe connects internal 1" and external 3/4" threads, suitable for valves that accommodate flow rates up to 1850 and 2500 liters per hour.

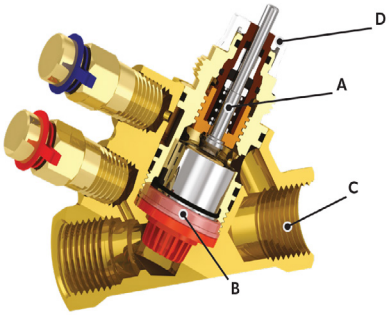
INSULATING CASES

Honeywell offers specially designed insulating jackets as per different sizes of VPE series Pressure Independent Control Valves to enhance thermal efficiency. They provide superior insulation and they are Environmental friendly and custom built. Insulation shells supports to minimize heat loss. See below further information about custom built available insulation cases per valve size.

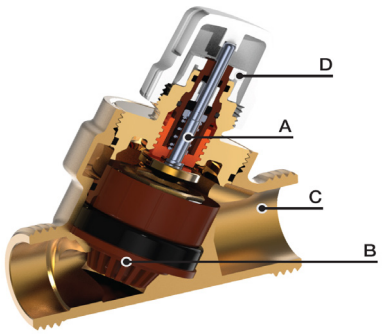
Cases for heating let the headwork and the actuator uncover where as those for cooling cover the actuator too. Insulation sheet has a thin external layer made of polyethylene cross linked foam and a thicker internal layer made of polyethylene cross linked foam.

DETAILS OF INSULATING JACKETS							
SKU	**Description**	**Density**		**Operating temperature range**	**Thermal conductivity**	**Total Thickness (20 mm)**	
		Thick internal layer	**Thin external layer**			**Thick internal layer**	**Thin external layer**
VPEIJF15	Insulating jacket for DN15 PICV with 15mm internal thread to enhance thermal efficiency.	29 kg/m3	80 kg/m3	-60 / +90 °C	0.040 W/mK	18 mm	2 mm
VPEIJF20	Insulating jacket for DN20 PICV with 20mm internal thread to enhance thermal efficiency.	29 kg/m3	80 kg/m3	-60 / +90 °C	0.040 W/mK	18 mm	2 mm
VPEIJF25	Insulating jacket for DN25 PICV with 25mm internal thread to enhance thermal efficiency.	29 kg/m3	80 kg/m3	-60 / +90 °C	0.040 W/mK	18 mm	2 mm

MATERIAL DETAILS



VPE Series PICVs with Internal Threads - End Connections



VPE Series PICVs with External Threads - End Connections

MATERIAL DETAILS	
COMPONENT	**SPECIFICATIONS**
Regulating valve (A)	High resistance polymer Stainless steel 18/8
Diaphragm (B)	High resistance polymer, EPDM-X, WMQ, Silicone, Stainless steel AISI 303, HNBR
Body (C)	DZR Brass (CW602N)
Presetting (D)	Acrylonitrile Butadiene Styrene, Polycarbonate (ABS-PC)
O-rings and Shut-off sealing parts	EPDM-X

ACTUATORS COMPATIBILITY

ACTUATOR SKU*		M400 SERIES	M800 SERIES	M7410A1001	M7410C1007 M6410C2023 M6410C4029 M6410L2023 M6410L4029	ML711CPA-N ML711CPA	ML712CPA-N ML712CPA	M4100E1510 M4100K1515
ADAPTER SKU		VPE0A7010**	VPE0A748X**	VPE0A7010**	VPE0A748X**	VPE0A7010**	VPE0A748X**	VPEVA64***
VPE Series Valves SKU	VPE15F15AV	✓	×	✓	×	✓	×	✓
	VPE15F15AL	✓	×	✓	×	✓	×	✓
	VPE15F15AH	✓	×	✓	×	✓	×	✓
	VPE20F20AL	✓	×	✓	×	✓	×	✓
	VPE20F20AH	✓	×	✓	×	✓	×	✓
	VPE15M15BV	✓	×	✓	×	✓	×	✓
	VPE15M15BL	✓	×	✓	×	✓	×	✓
	VPE20M20BV	✓	×	✓	×	✓	×	✓
	VPE20M25BH	✓	×	✓	×	✓	×	✓
	VPE25M25BL	×	✓	×	✓	×	✓	×
	VPE25F25AL	×	✓	×	✓	×	✓	×

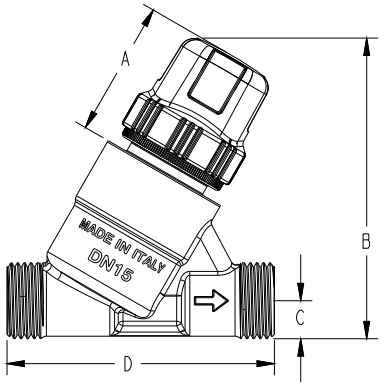
* To be ordered separately. Honeywell is not responsible or liable for any damage caused to the VPE series Pressure Independent Control Valves by use of any non-recommeneded actuators.

** Adapter VPE0A7010 and VPE0A748X will be in the unit pack of all compatible valves.

*** To be ordered separately.

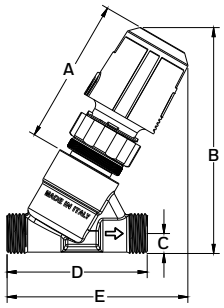
DIMENSIONS

EXTERNAL THREADS END CONNECTIONS VALVES - WITH MANUAL HANDWHEEL



DIMENSIONS WITH MANUAL HANDWHEEL						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15M15BV	150	37.5	82.5	10.5	73.5	-
VPE15M15BL	450	37.5	82.5	10.5	73.5	-
VPE20M20BV	850	36.5	87	13	85.5	-
VPE20M25BH	1850	36.5	91	16.5	84.5	-
VPE25M25BL	2500	40.5	92.5	16.5	108	-

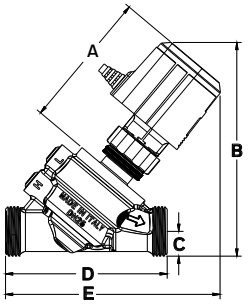
EXTERNAL THREADS - END CONNECTIONS VALVES - WITH M400 SERIES THERMO-ELECTRIC ACTUATOR



DIMENSIONS

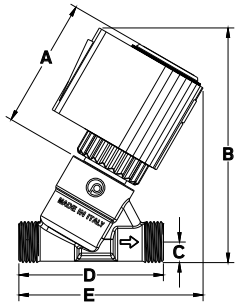
DIMENSIONS WITH M400 SERIES THERMO-ELECTRIC ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15M15BV	150	76.5	118	10.5	73.5	95
VPE15M15BL	450	76.5	118	10.5	73.5	95
VPE20M20BV	850	76	123	13	85.5	103
VPE20M25BH	1850	76	127	16.5	84.5	102

EXTERNAL THREADS - END CONNECTIONS VALVES - WITH M800 SERIES THERMO-ELECTRIC ACTUATOR



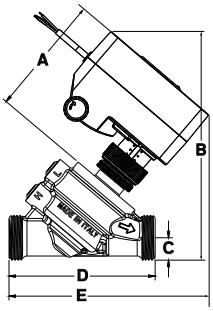
DIMENSIONS WITH M800 SERIES THERMO-ELECTRIC ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE25M25BL	2500	93	143	16.5	108	144

EXTERNAL THREADS - END CONNECTIONS VALVES - WITH M4100E1510 THERMO-ELECTRIC ACTUATOR



DIMENSIONS WITH M4100E1510 THERMO-ELECTRIC ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15M15BV	150	67	120	10.5	73.5	94
VPE15M15BL	450	67	120	10.5	73.5	94
VPE20M20BV	850	65	124	13	85.5	102
VPE20M25BH	1850	66	128	16.5	84.5	102

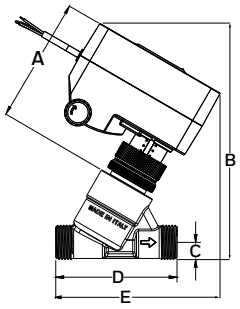
EXTERNAL THREADS - END CONNECTIONS VALVES - WITH ML712CPA-N / ML712CPA ELECTROMOTIVE ACTUATOR



DIMENSIONS WITH ML712CPA-N, ML712CPA ELECTROMOTIVE ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE25M25BL	2500	90.5	168.5	16.5	108	147.5

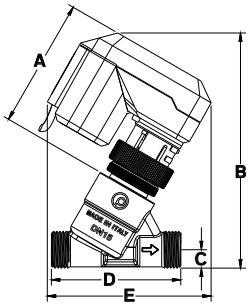
DIMENSIONS

EXTERNAL THREADS - END CONNECTIONS VALVES - WITH ML711CPA-N / ML711CPA ELECTROMOTIVE ACTUATOR



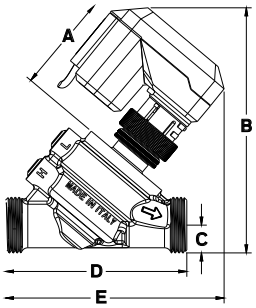
DIMENSIONS WITH ML711CPA-N / ML711CPA ELECTROMOTIVE ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15M15BV	150	86	154	10.5	73.5	106
VPE15M15BL	450	86	154	10.5	73.5	106
VPE20M20BV	850	85	159	13	85.5	113.5
VPE20M25BH	1850	85	162	16.5	84.5	113.5

EXTERNAL THREADS - END CONNECTIONS VALVES - WITH M7410A1001 ELECTROMOTIVE ACTUATOR



DIMENSIONS WITH M7410A1001 ELECTROMOTIVE ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15M15BV	150	74	133	10.5	73.5	93
VPE15M15BL	450	74	133	10.5	73.5	93
VPE20M20BV	850	73	138	13	85.5	99
VPE20M25BH	1850	73	142	16.5	84.5	99

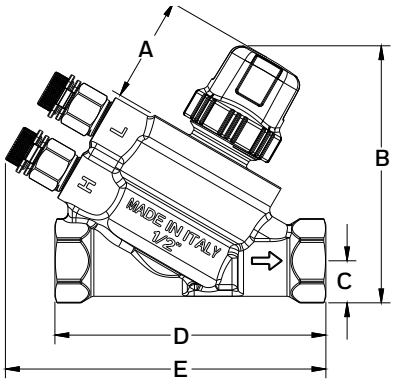
EXTERNAL THREADS - END CONNECTIONS VALVES - WITH M7410C1007 ELECTROMOTIVE ACTUATOR



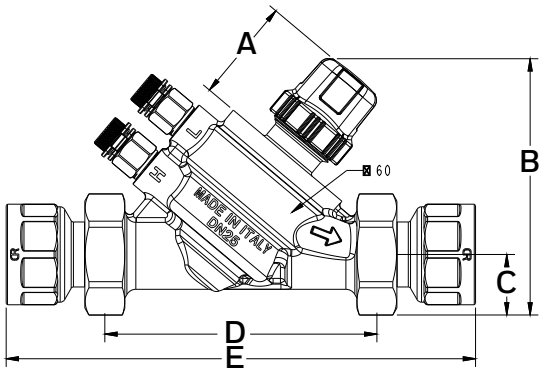
DIMENSIONS WITH M7410C1007 ELECTROMOTIVE ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE25M25BL	2500	78	146	16.5	108	131

DIMENSIONS

INTERNAL THREAD - END CONNECTIONS VALVES - WITH MANUAL HANDWHEEL

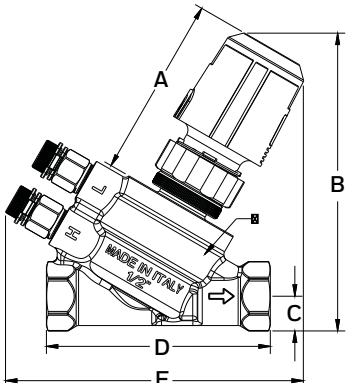


DIMENSIONS WITH MANUAL HANDWHEEL						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15F15AV	150	33	83	14.5	80.5	98
VPE15F15AL	450	33	83	14.5	80.5	98
VPE15F15AH	850	37	89	14.5	93.5	110.5
VPE20F20AL	1000	36	92	17.5	98	116
VPE20F20AH	1850	36	92	17.5	98	116



DIMENSIONS WITH MANUAL HANDWHEEL						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE25F25AL	2500	41	99	23.5	108	182

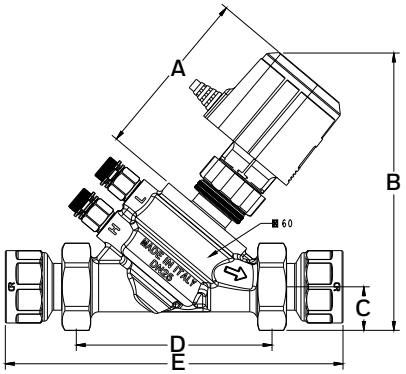
INTERNAL THREAD - END CONNECTIONS VALVES - WITH M400 SERIES THERMO-ELECTRIC ACTUATOR



DIMENSIONS WITH M400 SERIES THERMO-ELECTRIC ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15F15AV	150	77	123	14.5	80.5	118
VPE15F15AL	450	77	123	14.5	80.5	118
VPE15F15AH	850	76	125	14.5	93.5	124
VPE20F20AL	1000	75	127	17.5	98	126
VPE20F20AH	1850	75	127	17.5	98	126

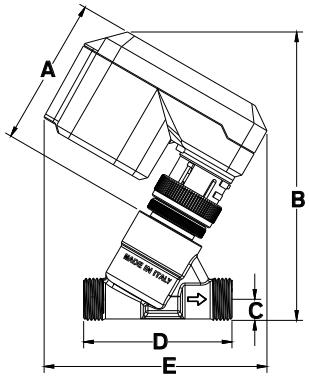
DIMENSIONS

INTERNAL THREAD - END CONNECTIONS VALVES - WITH M800 SERIESTHERMO-ELECTRIC ACTUATOR



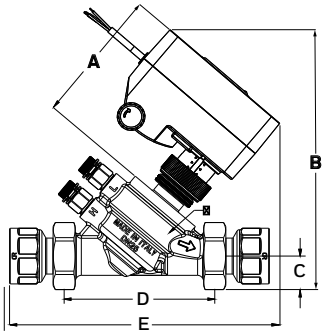
DIMENSIONS WITH M800 SERIES THERMO-ELECTRIC ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE25F25AL	2500	93	151	23.5	108	182

EXTERNAL THREADS - END CONNECTIONS VALVES - WITH M4100E1510 THERMO-ELECTRIC ACTUATOR



DIMENSIONS WITH M4100E1510 THERMO-ELECTRIC ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15F15AV	150	67	125	14.5	80.5	118
VPE15F15AL	450	67	125	14.5	80.5	118
VPE15F15AH	850	67	126	14.5	93.5	124
VPE20F20AL	1000	67	130	17.5	98	124
VPE20F20AH	1850	67	130	17.5	98	124

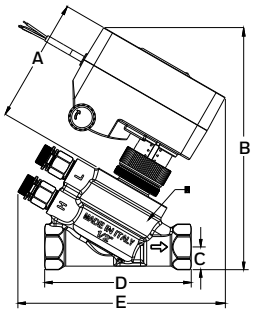
INTERNAL THREAD - END CONNECTIONS VALVES - WITH ML712CPA-N / ML712CPA ELECTROMOTIVE ACTUATOR



DIMENSIONS WITH ML712CPA-N / ML712CPA ELECTROMOTIVE ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE25F25AL	2500	90.5	175.5	23.5	108	182

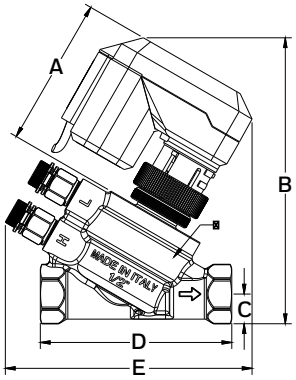
DIMENSIONS

INTERNAL THREAD - END CONNECTIONS VALVES - WITH ML711CPA-N / ML711CPA ELECTROMOTIVE ACTUATOR



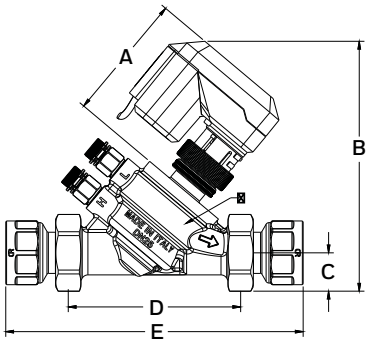
DIMENSIONS WITH ML711CPA-N / ML711CPA ELECTROMOTIVE ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15F15AV	150	86	158	14.5	80.5	128.5
VPE15F15AL	450	86	158	14.5	80.5	128.5
VPE15F15AH	850	85	160	14.5	93.5	135.5
VPE20F20AL	1000	85	163	17.5	98	135
VPE20F20AH	1850	85	163	17.5	98	135

FOR INTERNAL THREAD - END CONNECTIONS VALVES - WITH M7410A1001 ELECTROMOTIVE ACTUATOR



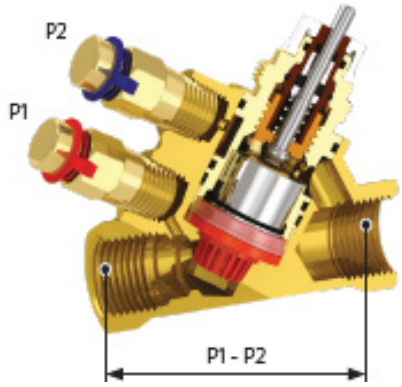
DIMENSIONS WITH M7410A1001 ELECTROMOTIVE ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE15F15AV	150	74	137	14.5	80.5	115
VPE15F15AL	450	74	137	14.5	80.5	115
VPE15F15AH	850	73	141	14.5	93.5	121
VPE20F20AL	1000	73	144	17.5	98	122
VPE20F20AH	1850	73	144	17.5	98	122

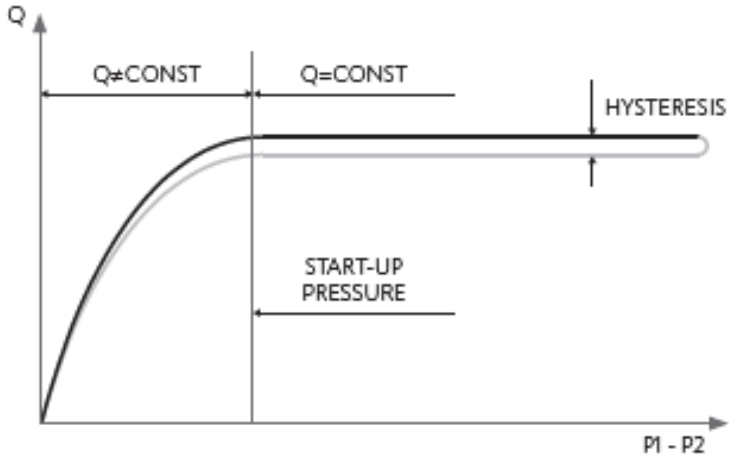
INTERNAL THREAD - END CONNECTIONS VALVES - WITH M7410C1007 ELECTROMOTIVE ACTUATOR



DIMENSIONS WITH M7410C1007 ELECTROMOTIVE ACTUATOR						
PART NUMBER	FLOW RATE (L/H)	A (MM)	B (MM)	C (MM)	D (MM)	E (MM)
VPE25F25AL	2500	78	155	23.5	108	182

START-UP CURVES AND PRESETTING



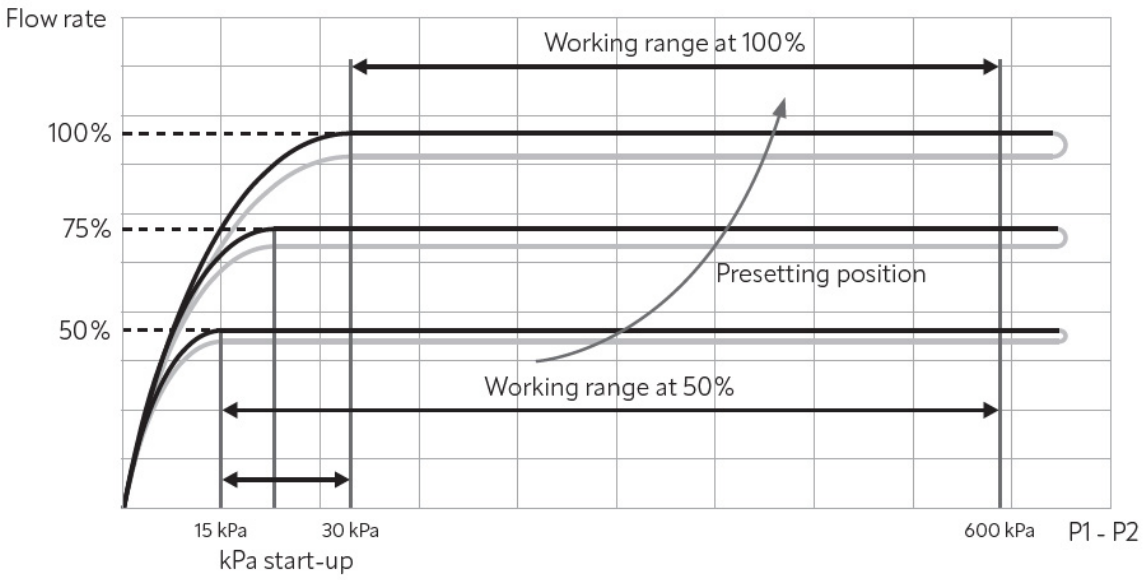


The example above shows a characteristic curve where start-up pressure, hysteresis and accuracy can be evaluated.

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.

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:



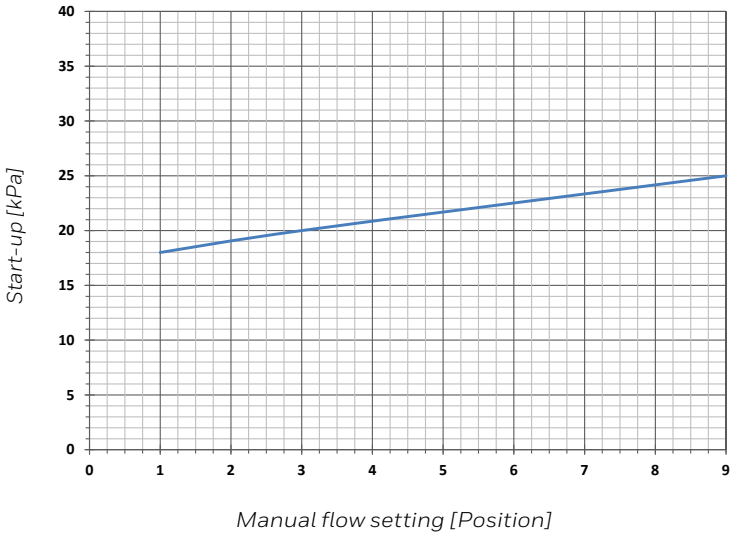
When the valve is set at 100% of nominal (maximum) flow, the curve begins to remain constant at 30 kPa, therefore the suggested working range of the valve is 30 ÷ 600 kPa.

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.

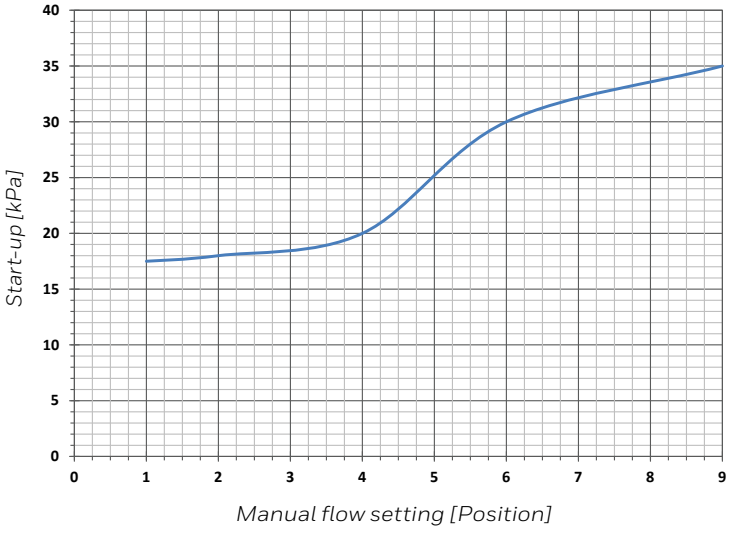
Over 600 kPa the fluid velocity through the valve is extremely high and cavitation may happen due to extreme turbulence of the flow. Because of these phenomena the valve can get damaged. For energy saving reasons, we suggest to continuously work the valve under 600 kPa.

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

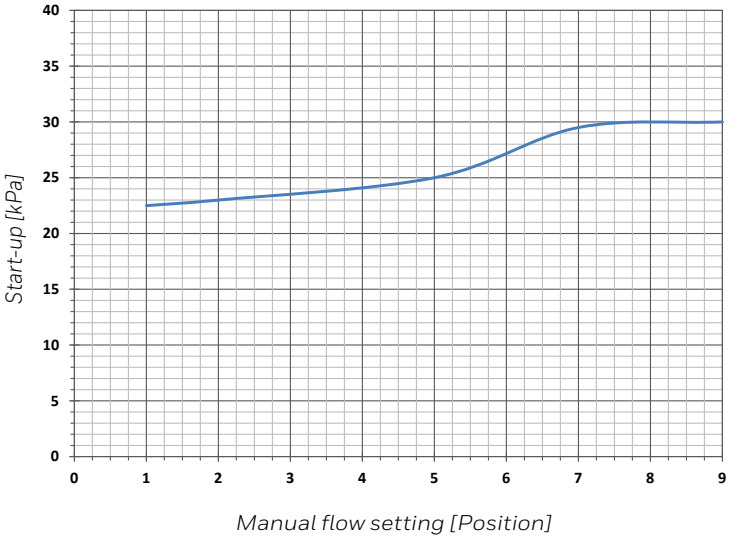
START-UP PRESSURE CURVE CHARACTERISTIC AT DIFFERENT PRESETTING



VPE15F15AV AND VPE15M15BV - 150 LPH			
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		--

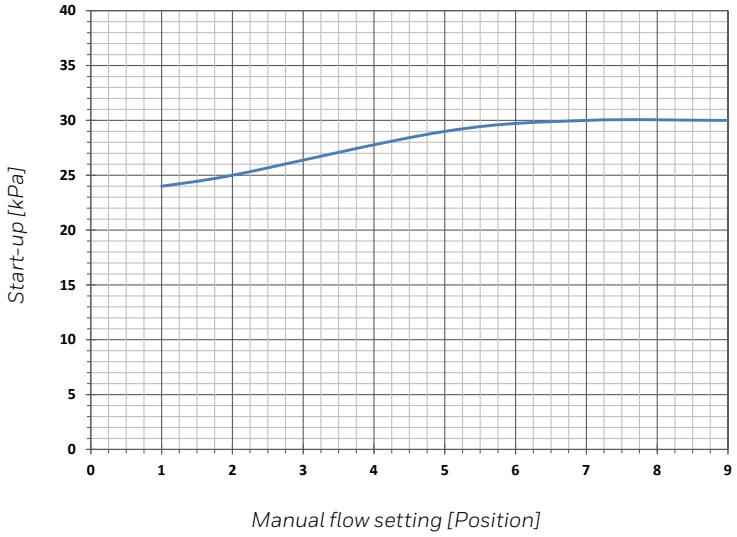


VPE15F15AL AND VPE15M15BL - 450 LPH			
PRESETTING [POSITION]	START-UP [KPA]	PRESETTING [POSITION]	START-UP [KPA]
1	17,5	5.5	28
1.5	17,7	6	30
2	18	6.5	31,25
2.5	18,3	7	32,15
3	18,55	7.5	32,9
3.5	19,05	8	33,55
4	20	8.5	34,25
4.5	22,15	9	35
5	25,2		

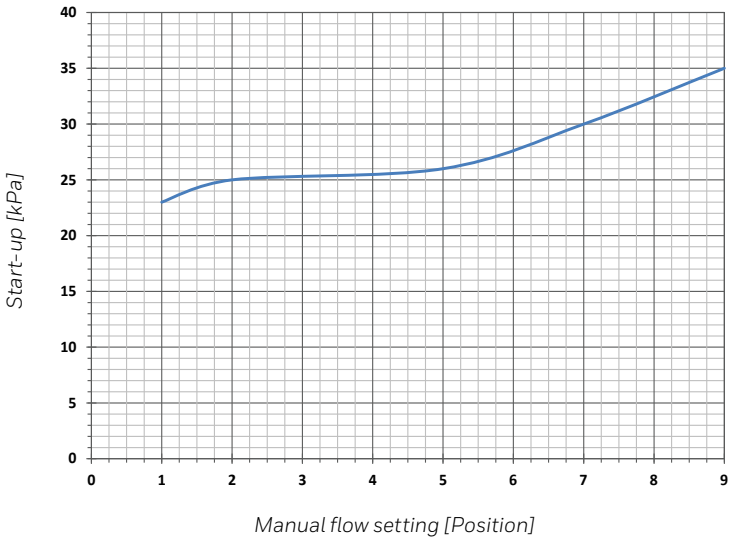


VPE15F15AH AND VPE20M20BV - 850 LPH			
PRESETTING [POSITION]	START-UP [KPA]	PRESETTING [POSITION]	START-UP [KPA]
1	22,5	5.5	25,9
1.5	22,7	6	27,15
2	23	6.5	28,55
2.5	23,3	7	29,5
3	23,5	7.5	29,9
3.5	23,8	8	30
4	24,1	8.5	30
4.5	24,5	9	30
5	25		

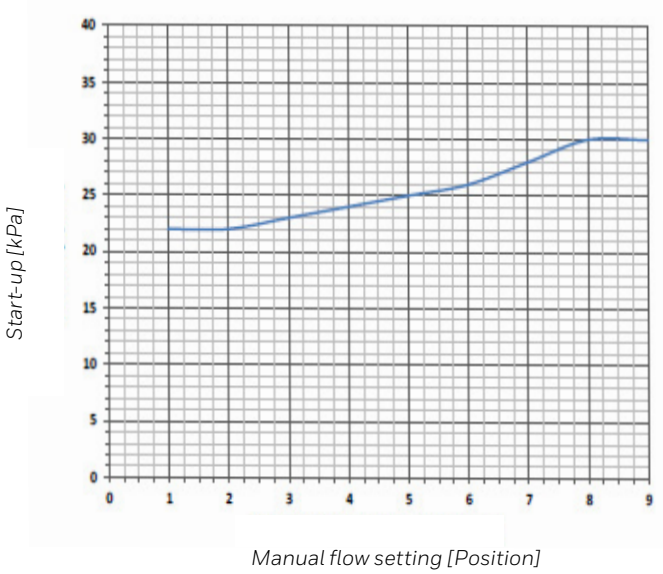
START-UP PRESSURE CURVE CHARACTERISTIC AT DIFFERENT PRESETTING



VPE20F20AL - 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		



VPE20F20AH AND VPE20M25BH - 1850 LPH			
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		



VPE25F25AL AND VPE25M25BL - 2500 LPH			
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		

FLOW RATES FOR PRESETTING

FLOW RATES FOR PRESETTING												
SKU	VPE15F15AV VPE15M15BV		VPE15F15AL VPE15M15BL		VPE15F15AH VPE20M20BV		VPE20F20AL		VPE20F20AH VPE20M25BH		VPE25F25AL VPE25M25BL	
PRESETTING %	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]
9	150	0,043	450	0,125	850	0,236	1000	0,277	1850	0,514	2500	0,694
8	133,2	0,037	387	0,108	774	0,215	911	0,253	1734	0,484	2202	0,612
7	114	0,032	328,8	0,091	689	0,191	804	0,223	1548	0,430	1875	0,521
6	99,6	0,028	261	0,073	606	0,168	722	0,201	1320	0,367	1577	0,438
5	85,2	0,024	207	0,058	496	0,138	573	0,159	1080	0,300	1304	0,362
4	70,8	0,020	165	0,046	393	0,109	451	0,125	846	0,235	1048	0,291
3	55,2	0,015	121,2	0,034	331	0,092	376	0,104	624	0,173	798	0,222
2	39,6	0,011	81,6	0,023	265	0,074	291	0,081	492	0,137	560	0,155
1	19,2	0,005	42	0,012	157	0,044	169	0,047	276	0,077	339	0,094
0	0	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, X1 and X2 (respectively the upper end and the lower ones) and their relative presetting positions Y1 and Y2. Since the difference Y1 - Y2 its always equal to 1, the desired presetting position can be easily calculated as:

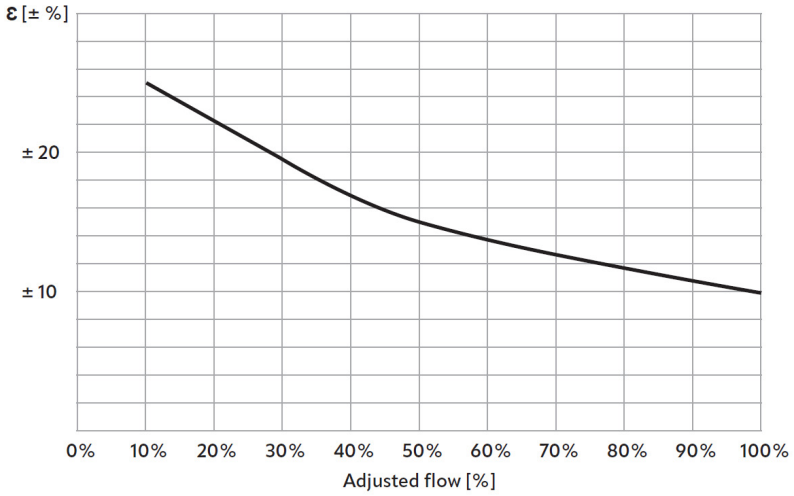
$$Y = Y_2 + \frac{(Y_1 - Y_2) \times (X - X_2)}{(X_1 - X_2)} = Y_2 + \frac{(X - X_2)}{(X_1 - X_2)}$$

Example: We want to obtain the postion at which a VPE25F25AL valve must be presetted in order to have a flow rate of 2000 l/h.From the tables above the extremity flow rate values are 2202 l/h and 1875 l/h which correspond to presetting 8 and 7. The presetting position that must be selected on the valve is:

$$Y = 7 + \frac{(8 - 7) \times (2000 - 1875)}{(2202 - 1875)} = 7 + \frac{(2000 - 1875)}{(2202 - 1875)} = 7.38 = 7.5$$

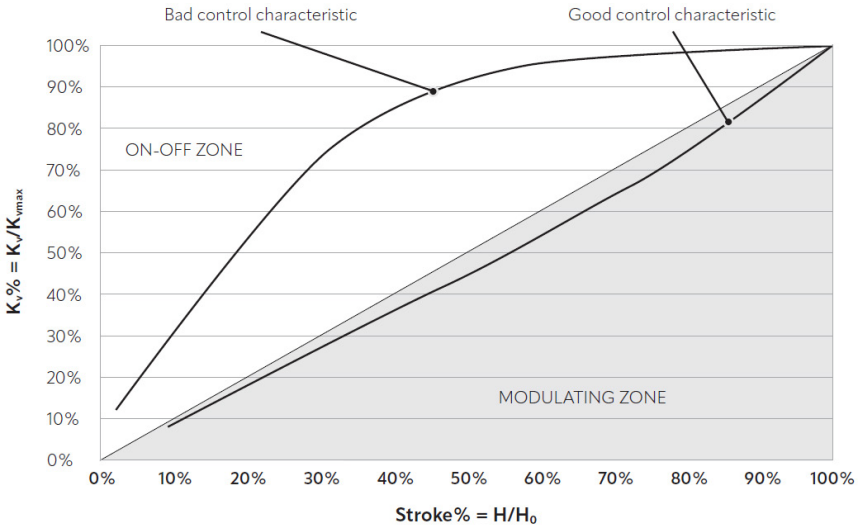
FLOW SETTING ACCURACY

The following graph shows the max flow deviation for differential pressure over 1 bar and presetting below position 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.



CONTROL CURVES

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

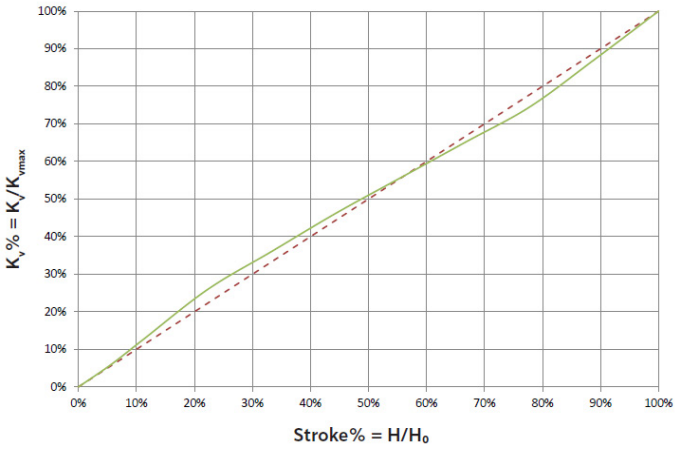


Where:

- 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 H0
- H is the current lift (opening) of the control valve. It will vary from 0 to H0
- K_v is the valve flow factor related to lift H.

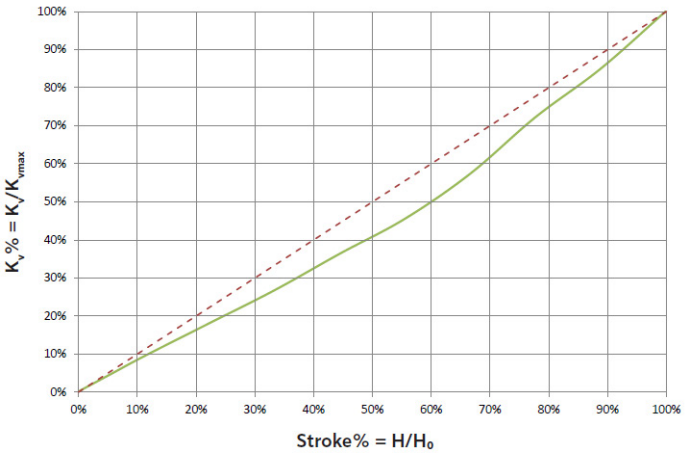
The Honeywell VPE series Pressure Independent Control Valve has an inherent Linear characteristic. Combining the PICV valve characteristic with heat exchanger results in a linear control system. Control curves at maximum flow rate for VPE series valves are shown below (control curve characteristic may change according to valve version):

Control Curve of VPE15F15AV and VPE15M15BV - 150 lph

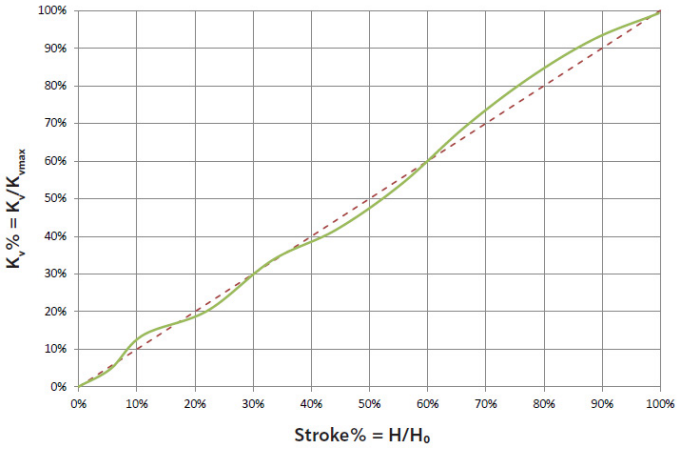


CONTROL CURVES

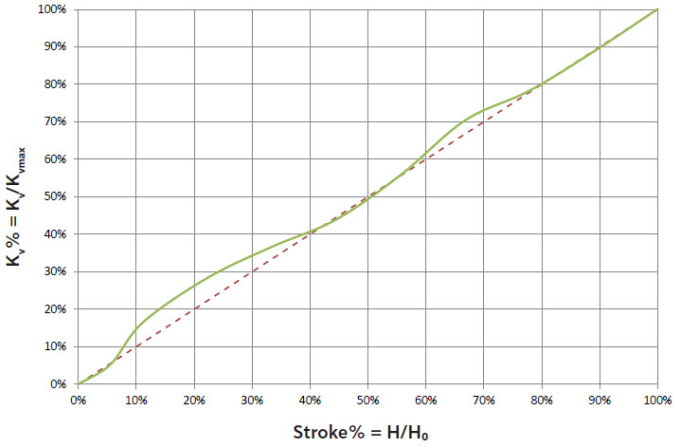
Control Curve of VPE15F15AL and VPE15M15BL - 450 lph



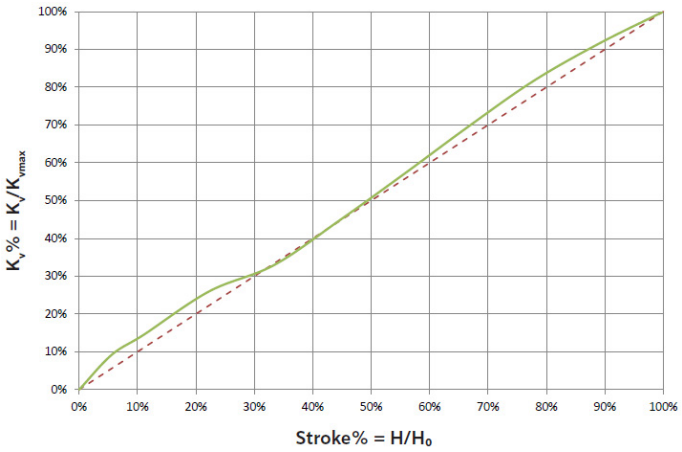
Control Curve of VPE15F15AH and VPE20M20BV - 850 lph



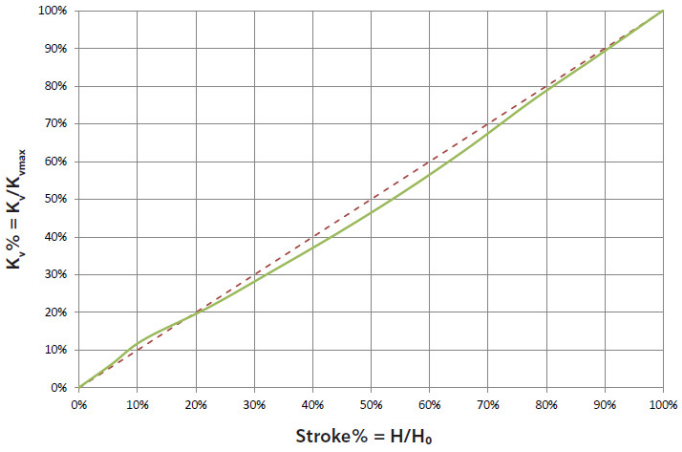
Control Curve of VPE20F20AL - 1000 lph



Control Curve of VPE20F20AH and VPE20M25BH - 1850 lph



Control Curve of VPE25F25AL and VPE25M25BL - 2500 lph



ACTUATORS ORDERING INFORMATION

M400 SERIES - THERMOELECTRIC ACTUATOR

SKU	DESCRIPTION	SUPPLY VOLTAGE	CONTROL TYPE	ACTION	STROKE	RATED FORCE
M400-BO	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Open	4.5 mm	100 N - 140 N
M400-BG	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Closed	4.5 mm	100 N - 140 N
M400-AO-2.5M	Thermoelectric Linear Actuator	24 VAC	On/Off	Normally Open	4.5 mm	100 N - 140 N
M400-AG-2.5M	Thermoelectric Linear Actuator	24 VAC	On/Off	Normally Closed	4.5 mm	100 N - 140 N
M400-BO-2.5M	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Open	4.5 mm	100 N - 140 N
M400-BG-2.5M	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Closed	4.5 mm	100 N - 140 N
M400-AOE-2.5M	Thermoelectric Linear Actuator	24 VAC	On/Off	Normally Open	4.5 mm	100 N - 140 N
M400-AGE-2.5M	Thermoelectric Linear Actuator	24 VAC	On/Off	Normally Closed	4.5 mm	100 N - 140 N

M800 SERIES - THERMOELECTRIC ACTUATOR

SKU	DESCRIPTION	SUPPLY VOLTAGE	CONTROL TYPE	ACTION	STROKE	RATED FORCE
M800-BO	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Open	8 mm	100 N - 140 N
M800-BG	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Closed	8 mm	100 N - 140 N
M800-AO-2.5M	Thermoelectric Linear Actuator	24 VAC	On/Off	Normally Open	8 mm	100 N - 140 N
M800-AG-2.5M	Thermoelectric Linear Actuator	24 VAC	On/Off	Normally Closed	8 mm	100 N - 140 N
M800-BO-2.5M	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Open	8 mm	100 N - 140 N
M800-BG-2.5M	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Closed	8 mm	100 N - 140 N
M800-AOE-2.5M	Thermoelectric Linear Actuator	24 VAC	On/Off	Normally Open	8 mm	100 N - 140 N
M800-AGE-2.5M	Thermoelectric Linear Actuator	24 VAC	On/Off	Normally Closed	8 mm	100 N - 140 N
M800-BOE-2.5M	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Open	8 mm	100 N - 140 N
M800-BGE-2.5M	Thermoelectric Linear Actuator	230 VAC	On/Off	Normally Closed	8 mm	100 N - 140 N

M7410 SERIES - MOTOR ACTUATOR

SKU	DESCRIPTION	SUPPLY VOLTAGE	CONTROL TYPE	MANUAL OPERATION	AUX. SWITCH	STROKE	RATED FORCE
M7410A1001	Motor actuator	24 VAC	3 point / Floating	No	No	4 mm	90 N
M7410C1007	Motor actuator	24 VAC	3 point / Floating	No	No	6.5 mm	180 N

ML7XXCPA SERIES - MOTOR ACTUATOR

SKU	DESCRIPTION	SUPPLY VOLTAGE	CONTROL TYPE	MANUAL OPERATION	POSITION FEEDBACK	STROKE	RATED FORCE
ML711CPA	Motor actuator	24 V AC/DC	Modulating / On-Off	Yes	Yes	Adaptive	100 N
ML711CPA-N	Motor actuator	24 V AC/DC	Modulating / On-Off	No	No	Adaptive	100 N
ML712CPA	Motor actuator	24 V AC/DC	Modulating / On-Off	Yes	Yes	Adaptive	200 N
ML712CPA-N	Motor actuator	24 V AC/DC	Modulating / On-Off	No	No	Adaptive	200 N

M6410 SERIES - MOTOR ACTUATOR

SKU	DESCRIPTION	SUPPLY VOLTAGE	CONTROL TYPE	MANUAL OPERATION	AUX. SWITCH	STROKE	RATED FORCE
M6410C2023	Motor actuator	24 VAC	3 point / Floating	Yes	No	6.5 mm	180 N
M6410C4029	Motor actuator	24 VAC	3 point / Floating	Yes	Yes	6.5 mm	180 N
M6410L2023	Motor actuator	230 VAC	3 point / Floating	Yes	No	6.5 mm	180 N
M6410L4029	Motor actuator	230 VAC	3 point / Floating	Yes	Yes	6.5 mm	180 N

M4100 SERIES - THERMOELECTRIC LINEAR ACTUATOR

SKU	DESCRIPTION	SUPPLY VOLTAGE	CONTROL TYPE	ACTION	STROKE	RATED FORCE
M4100E1510	Thermoelectric Linear Actuator	24 VAC	Modulating	Normallay Closed	4 mm	100 N
M4100K1515	Thermoelectric Linear Actuator	24 VDC	Modulating	Normallay Closed	4 mm	100 N

DIRT RESISTANT FEATURE

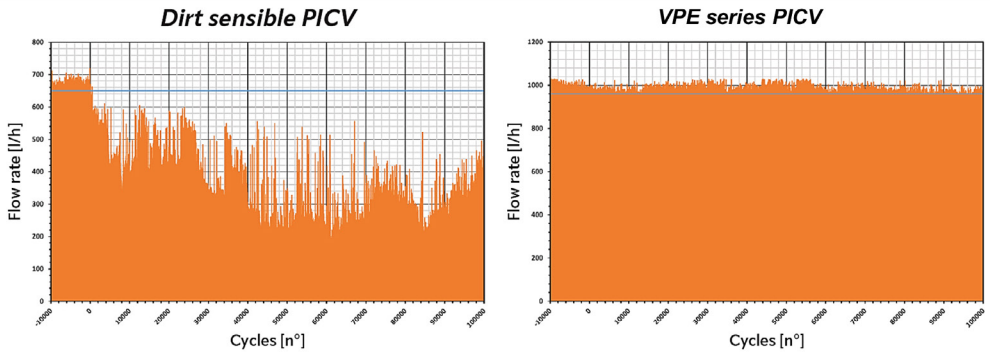
In general, low water quality affects negatively the operation of a PICV. The installation of strainers helps to reduce he problem but nevertheless does not completely cancel it: very small impurities in fact manage to by-pass the filtering meshes. Their accumulation inside the system can thus lead to 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 VPE Series PICV 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 blockage 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 VPE Series PICV 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



Flow rate Characteristics with dirt sensible feature

As it can been seen from the graph, differences are relevant, the PICV VPE Series PICV 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 conditioning 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 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 and complies to VDI 2035 standard to ensure suitable operation of all equipments of HVAC systems.

WATER QUALITY REQUIREMENTS	
PARAMETER	**SPECIFICATIONS**
Standards	UNI 8065 / VDI 2035/1
Maximum permissible limit of Iron and Copper	Fe < 0.5 mg/kg and Cu < 0.1
Maximum permissible limit of iron-oxide	25 mg/kg (25 ppm).

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

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