Ecotrol®

Operational Economy with Optimum Control
Control Valves for Process Optimization

Operational Economy with Optimum Control

Forbes Marshall ARCA **ECOTROL**® valves are robust, compact, control valves that come with a pneumatically operated, easy field reversible diaphragm actuator and a sturdy, pipeless smart digital positioner. The actuator can be optionally equipped with a fully enclosed emergency hand wheel which is in compliance with general safety precautions.

Why the Ecotrol®

1 Reliability

On highest priority. This product is backed by over 60 years of experience

2 Develop what the Customer Requires

We evaluated customer feedback and incorporated the result into the design of this control valve

3 Progress

A second generation digital positioner with the option of bidirectional communication.

4 Flexibility

A unique, compact, pipeless and vibration resistant positioner mounting which guarantees quick assembly and high reliability for all actuator functions

5 Cost of Ownership

Reduction in operating and maintenance cost. The SWS-seat (quick changeable trim combination) offers the option of a double-side use by reversing the seat ring

6 Environmental Awareness

A stem sealing that meets today's requirements by providing a corrosion resistant stuffing box area

7 Efficiency

Double use of auxiliary energy by using the tried and tested pneumatic multi-spring diaphragm actuator with the option of permanent spring case ventilation

8 Universal

Design in accordance with ANSI standardised trims

9 Precision

State-of-the-art CNC manufacturing techniques avoid misalignment between actuator and valve guiding

10 Control of the "Magic Triangle"

Shortening the delivery time, minimising costs and at the same time greater technical value, improvements and quality

Upgraded Features

The highlight of this valve series is the Forbes Marshall ARCA-double-life trim (quick-changeable trim combination) with the option of a double-side use by reversing the seat ring. Because of its simple geometry, the valve seat can be economically produced in different materials with or without soft sealing. For soft seating, the PTFE-element is flexibly supported by an additional Elastomer O-Ring located in the seat ring. The additional metal-to-metal sealing of plug and seat ring ensures that the PTFE-disc suitable for double sided use is not plastically deformed by excessive loads.

The difference between the common screwed-in seat ring and this unique quick-changeable trim combination, shown in the figures hereinafter, is because of the principle of retaining and sealing the seat ring in the valve body. With a screwed-in seat ring, the sealing between seat and valve body is provided by the metal-to-metal contact of two conical faces.

The conical counter-face in the valve body has a slightly different angle so that there is only a theoretical circumferential line contact. The required torque to screw-in the seat ring is individually different depending on the construction and the operating conditions. With the **ECOTROL**® valve series, the seat sealing is purely axial and achieved by the method of initial compression.

The compression of the sealing elements (6, 11) is limited by the precisely sized recess in the body for containment of the flat gasket. This limits the gasket's compressive loading and guarantees a perfect alignment between the sealing surfaces of plug and seat ring.

The self-aligning seat ring (10) is held by the retaining cage (9). The tightness is achieved by transferring a portion of the bonnet-to-body bolting force via the retaining cage to the seat ring. The valve body (12), retaining cage, and seat ring are manufactured on special CNC-machining centres to meet the stringent tolerance of each part. This guarantees the required compression of the sealing elements. Excellent stem guiding is performed by two special guide bushings (4, 8) located as far as possible from each other.

"New"- the standard spring energised stem seal configuration includes a PTFE-V-ring packing set (5) with an additional micro-sealing element and wiper ring (3). The PTFE-V-ring packing set is pre-loaded with a stainless steel spring and pressed against the valve stem and the bonnet insert (7). The packing set acts as primary sealing and as a wiper. The valve stem is guided at two locations right before and behind the stem sealing (5). Besides, the extremely reliable sealing performance even under varying operating temperatures, the stem sealing provides minimised static and sliding friction forces in comparison to conventional stuffing box packing.

Cost Saving Benefits

Excellent performance in liquid and gas applications

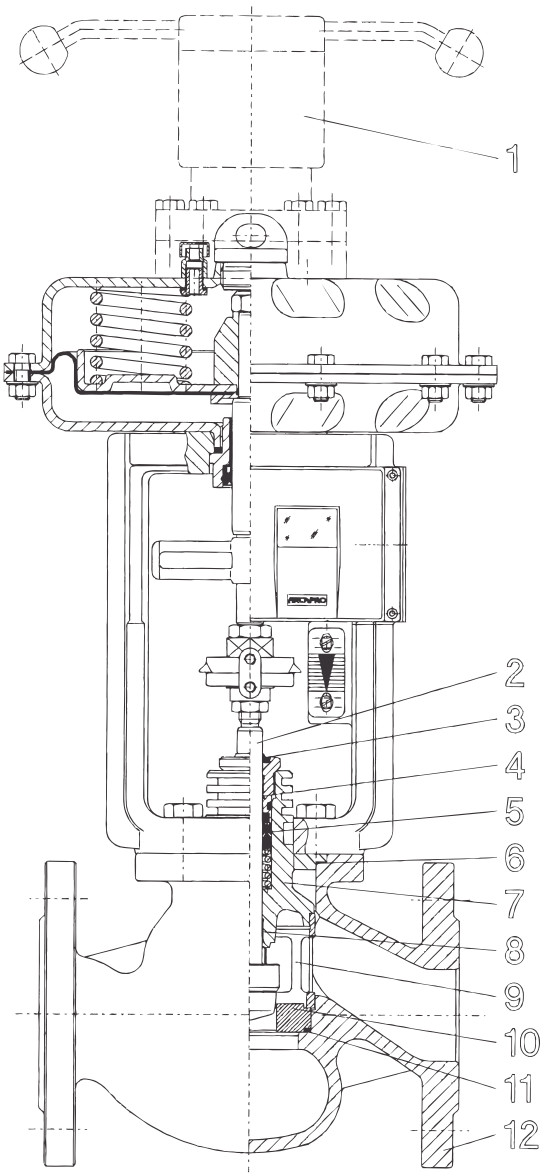
Extended lifetime due to double-side use by reversing the seat ring (upper and lower side)

Easy and fast assembly, maintenance without any special tools

Prevention of leakage and bypass leakage by a limited compressive load acting on both encapsulated gaskets

Optional: PTFE-soft seat sealing with back-up O-Ring and metal-to-metal end stop

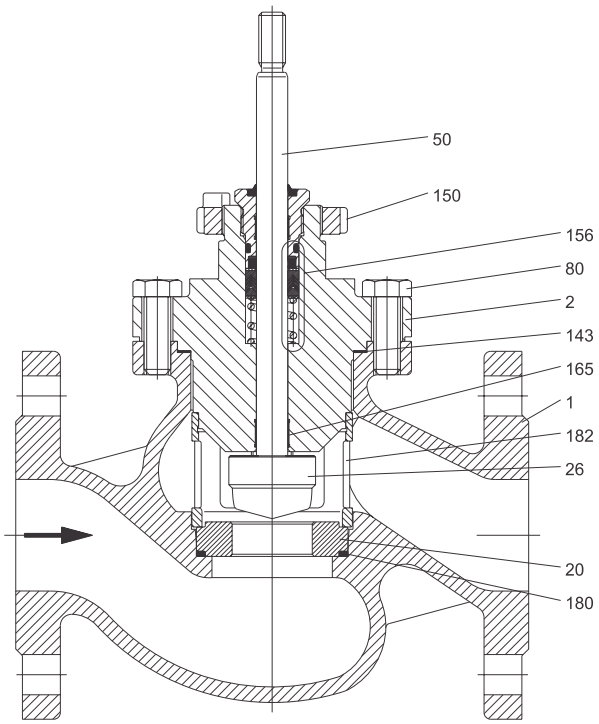
Alternate to the pipeless positioner mounting : mounting acc. to DIN IEC 534 T6 (NAMUR)



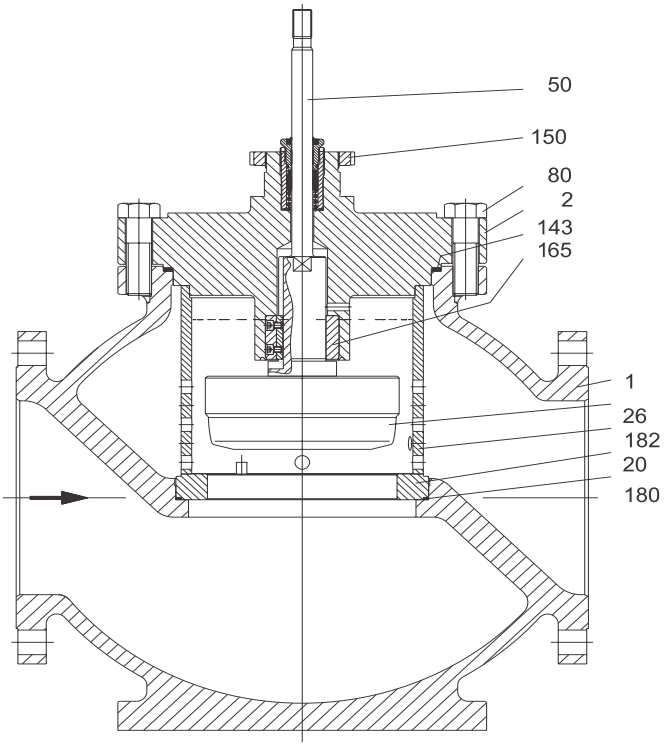
Part No.	Name
1	Handwheel assembly
2	Spindle
3	Wiper ring
4	Slide bearing
5	Packing set
6	Body gasket
7	Bonnet
8	Guide bush
9	Cage
10	Seat
11	Gasket
12	Body

Assembly Drawings for 8C,6N and 6H with Part List

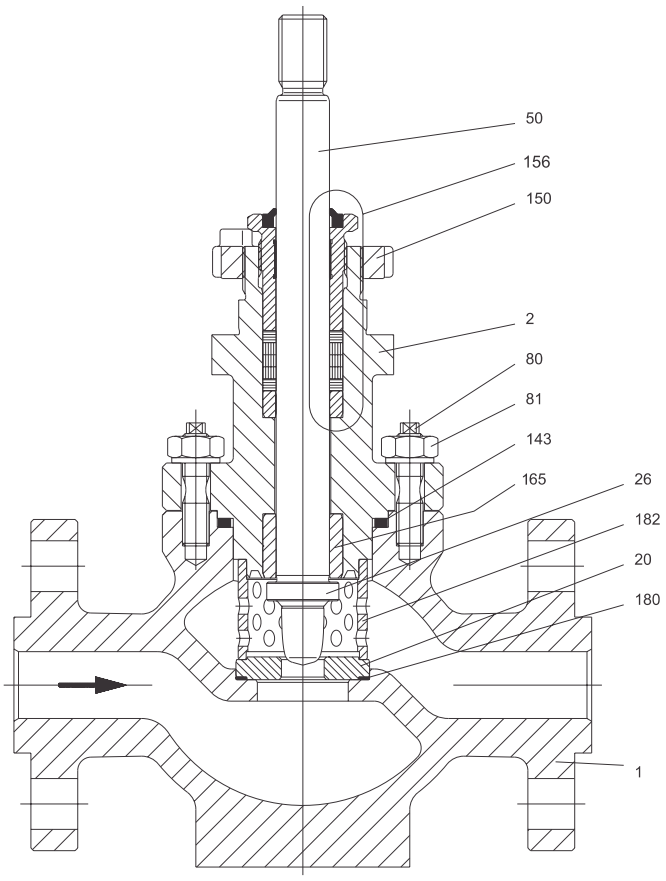
Type 8C

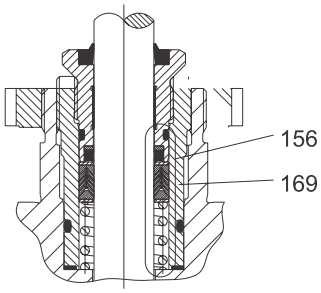


Type 6N



Type 6H

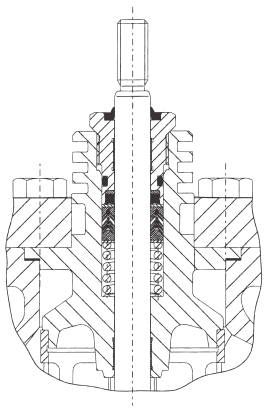




Part no.	Description
1	Body
2	Bonnet
20	Seat ring
26	Plug
50	Stem
80	Bolts / nuts
143	Bonnet gasket
150	Slotted nut
156	Packing
165	Stem guide
169	Packing sleeve
180	Seat seal
182	Seat retainer

Stem Sealing

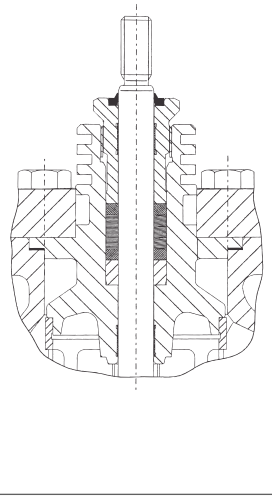
Depending on the operating conditions, the stem sealing consists of a special sealing configuration to ensure lowest fugitive emission and minimised friction. The stem and the packing bore provide a super finished surface manufactured by the so called roller burnishing process. This process compresses the surface and increases its hardness.



The Standard Maintenance-free PTFE-V-ring Packing with a Micro-sealing Element

To guarantee sealing performance at very low pressures, the PTFE-V-ring packing set is preloaded by a corrosion resistant spring. In a normal operation the sealing lips are pressed against the stem and the packing bore relative to the fluid pressure (pressure energised). To resist the internal pressure resulting from alternating operating conditions the V-Ring set is made of different compounds. The outer packing consists of PTFE with a graphite filling and the centre ring is made of pure PTFE.

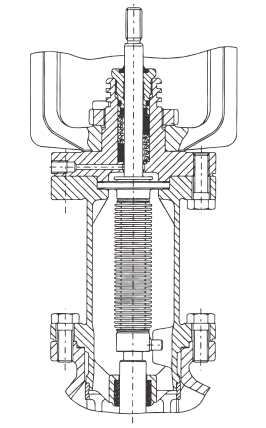
The bottom base ring in the V-Ring set acts as a wiper and just allows a small amount of fluid to reach the micro-sealing element. This final sealing element is made of a special elastomer material. Its distance from the top wiper ring is equal to the maximum stroke length. While the valve remains in open position, dirt or any kind of stain may accumulate on the stem part right above the top wiper ring. When the stem moves to the closed position some stain may pass the wiper ring, however, it will never approach the micro-sealing element and cause this element to fail.



Graphite Stuffing Box

A reliable and safe packing assembly requires a homogeneous compression of the entire set of graphite packing. The screwed stuffing box transfers the compressive load to each packing in the stuffing box. This is similar to the hydro- static principle of pressure distribution in a fluid. To achieve a steady homogeneous compression of all packing, the lower rings must be compressed more than the upper ones during assembly. To realise this, the patented ARCA-OPTIPRESS pre-loading device, activated by the actuator, is recommended.

If the packing loading is simply done by tightening the screwed stuffing box there is a risk of an unequal compression of each packing. In such a case, the upper rings are compressed more than the lower ones due to frictional forces. This leads to an unfavourable non-homogeneous compression of each ring. Since only the top packing seals tightly, it comes to an early leakage in service and the torque demand also increases. As a consequence, the torque transferred from the screwed stuffing box must be applied with care, so that the packing sealing becomes effective, while the hysteresis does not become too high.

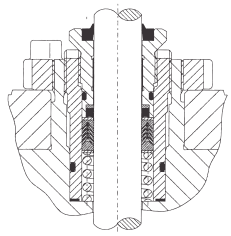


Bellows Seal Bonnet

Hermetically sealing bellows are available for process fluids when no stem leakage can be tolerated (eg toxic fluids). The pressure-proof and elastic stainless steel bellows is tightly seal-welded to the valve stem and the upper adapter ring. For safety reasons, the construction includes a standard stem sealing as back-up in case of a bellows failure. Between bellows and packing a tapped hole with a plug screw is optionally supplied, either to be used as leak detection, bleed-off, or for inserting a blocking gas.

The voluminous bellows housing provides a The voluminous bellows housing provides a reasonable flow velocity around the bellows and, therefore, reduces the susceptibility of the bellows against crystallising fluids or polymers. The design is equipped with a built-in twist protection that safely keeps the torque caused either by fluid forces or by improper handling away from the bellows, a guarantee against sudden bellows failure and the resulting shutdown and repair costs. Of course, the Forbes Marshall ARCA bellows sealing is in full compliance with IS015848.

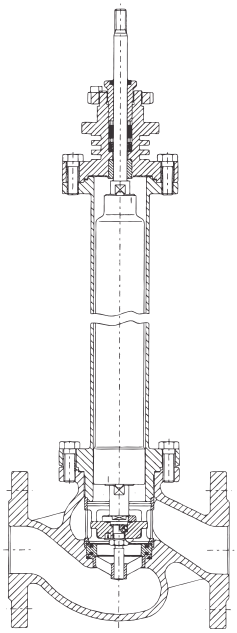
Stem Sealing



Wear Resistant Bushing

To prevent galvanic corrosion between the bonnet stuffing box (carbon steel) and the packing (graphite), all bonnets of valves larger than DN 50 (NPS 2") offer a special treated stainless steel bushing. For valves equal or less than DN 50, the bonnet is always made of stainless steel.

The bushing with a straight through bore allows a super finish of the surface which ensures perfect sealing between packing or sealing ring and bushing. The stainless steel bushing avoids or minimises any corrosion and spoiling in the vicinity of the sealing.

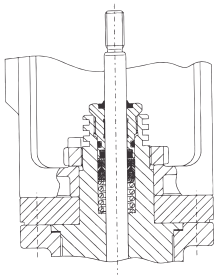


Bonnet Extension for Cryogenic Service

The cross sectional drawing shows the principle design of the newly developed ECOTROL® control valve for cryogenic service. The valve plug and stem extension are double guided. The bottom guiding is located right below the valve seat. This guarantees a reliable sealing performance, a vibration free guiding of the plug, and an easy replacement of the guide bushing. Every part that is subject to wear can be individually replaced. The seat is axially restrained by the retaining cage and the top flange.

The bonnet extension prevents icing of the packing area. The thin walls of the insulation column and of the stem extension allow only a very low conductive heat flow. In addition, the stem extension pipe is filled with perlite to reduce convective heat loss to a minimum. The bonnet extension length is based on customer requirements.

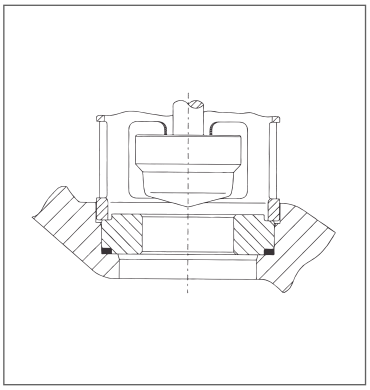
All cryogenic valves, apart from Forbes Marshall ARCA's standard valves, are assembled in a clean-room environment. Here, the valves undergo a thorough cleaning process in a subsonic bath followed by a complete dehydration in an air circulating dryer.



PED Top Flange Design (8C1)

To be in compliance with the European Pressure Equipment Directive (PED) the valve's top flange and actuator yoke (material: austenitic stainless steel) are made of two individual parts. The top flange is permanently attached to the body and untying is unnecessary for dismounting the actuator.

Trim Styles

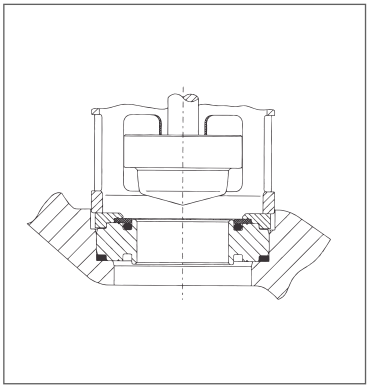


Parabolic Plug (Standard)

Metal-seated quick-changeable trim combination

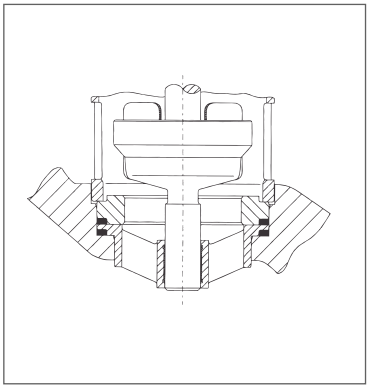
Insensitive to impurities with low cavitation design

Fast and easy to produce due to its rotational symmetry



Parabolic Plug with Soft Sealing and Secondary Metal-to-metal Sealing

Soft-seated quick-changeable trim combination, the PTFE-soft sealing (for unrestricted use on both sides) is flexibly supported by an additional Elastomer O-Ring. The additional metal-to- metal sealing of plug and seat ring ensures that the PTFE of plug and seat ring ensures that the PTFE disc is not plastically deformed by excessive loads when the plug reaches its final closed position.



Parabolic Plug Double-guided

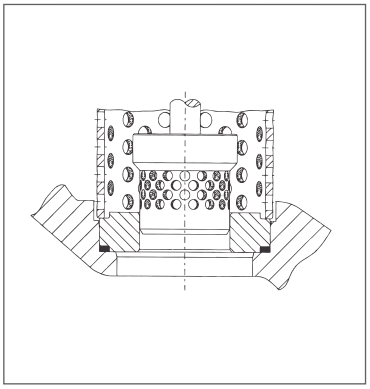
Metal-seated quick-changeable trim combination with top and bottom guiding.

This double guiding construction stabilizes stem and plug over the full travel range. Therefore, it is recommended for high pressure drop applications.

The additional guiding is located right below the seat ring and can be easily replaced.

Most conventional body designs with top and bottom guided trim have a bolted bottom flange which requires an extra body gasket plus the risk of additional external leakage.

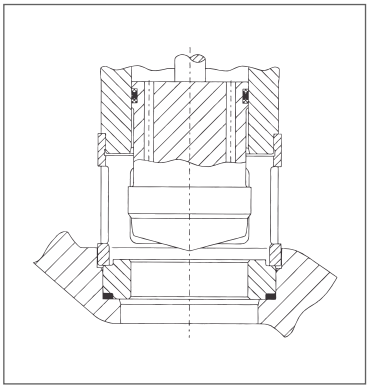
The ECOTROL® one-piece body design eliminates this problem and ensures optimum tightness.



Perforated Plug / Perforated Low Noise Cage

Metal-seated quick-changeable trim combination, particularly effective for liquids and compressible fluids at high pressure drop ratios. Liquid flow can cause erosion by cavitation. The flow, directed through the holes of the trim, is divided into numerous jets of cavitating liquid.

In the centre of the cage, the jets impact and the vapour bubbles collapse. Here, they do not cause any damage to the valve internals and the noise level is also considerably reduced. For more noise abatement, a perforated low noise cage is available for all trim designs.



Balanced Trim

Valves with balanced trims require much lower control forces than valves without balancing. As sealing elements we offer:

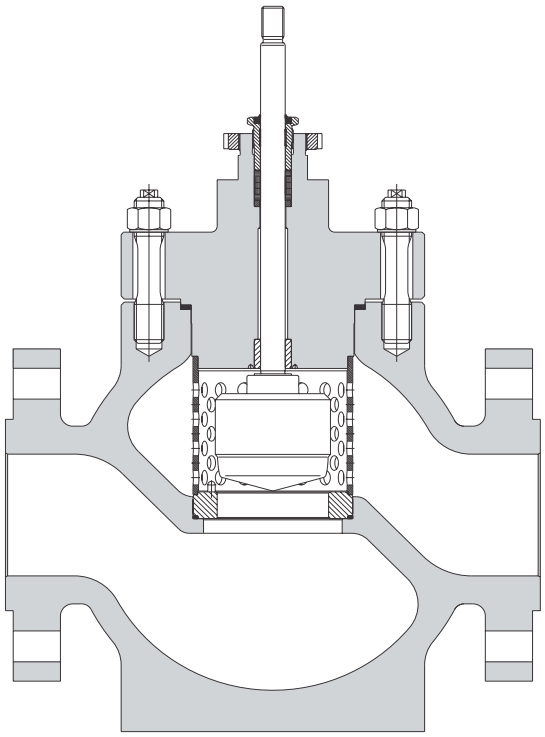
Metallic piston rings

Elastomer quadrings with PTFE support

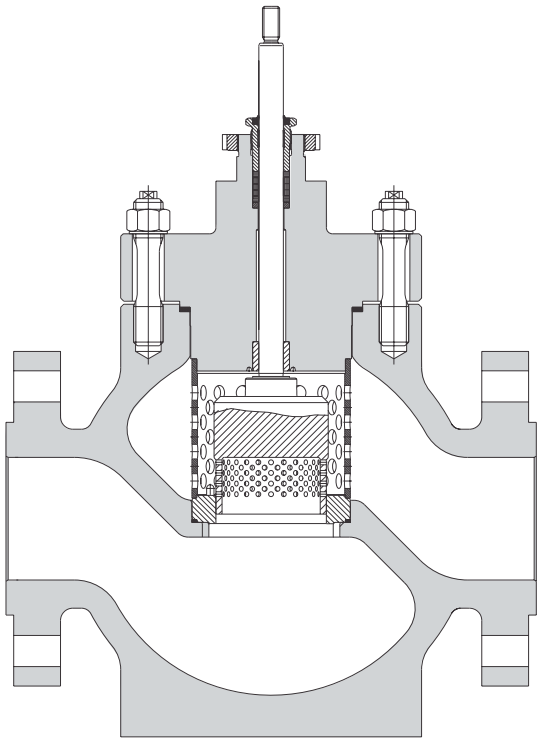
Pure graphite

Trim Design

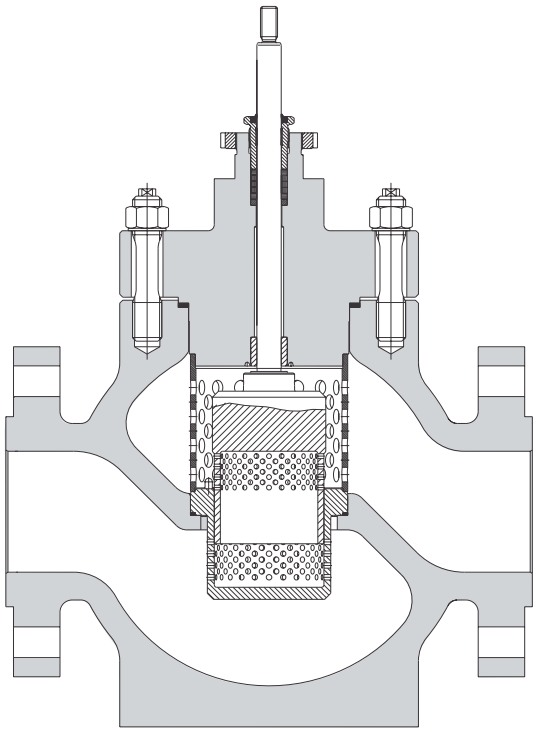
Trim Type P1



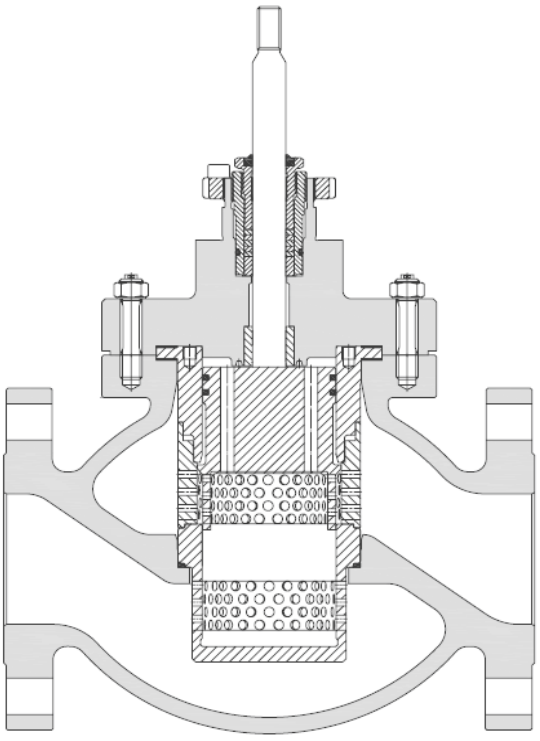
Trim Type L1



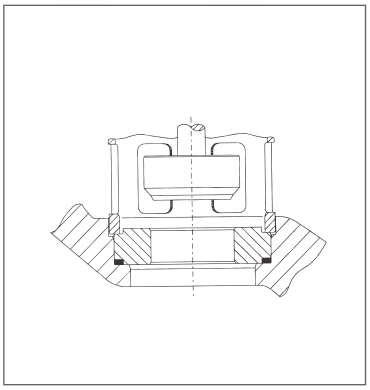
Trim Type L2



Trim Type L3

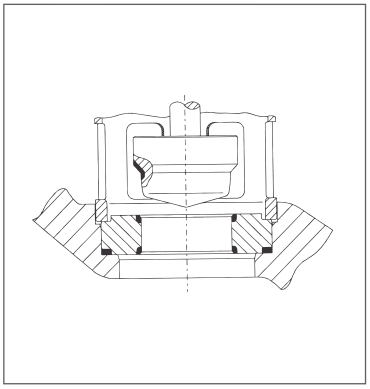


Trim Styles / Precautions Against Wear and Tear



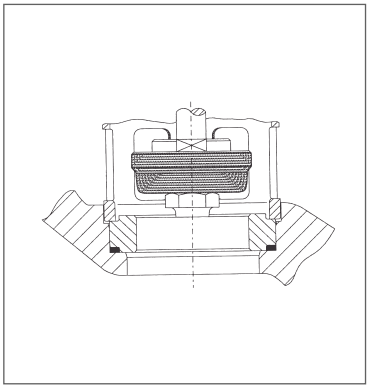
On/off Plug (soft-sealing / double-guided also available)

This plug is designed where a significant flow rate must be quickly established; also available with soft seat and top and bottom guiding.



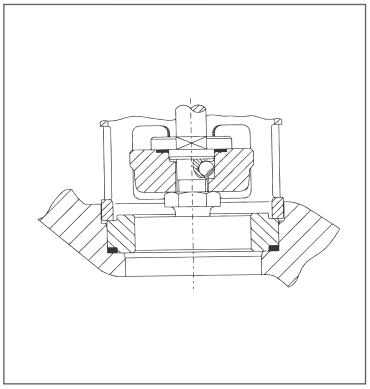
Stellited Seating Surfaces

(Hardened to 39-43 Rockwell C for elevated applications).



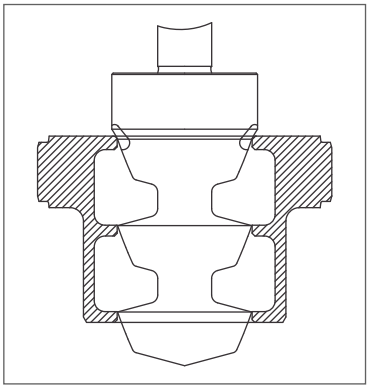
Excellent Wear Resistant Trim

Material SS440C (hardened to > 58 Rockwell C) other harder alloys or special ceramics for extreme applications on request (hardened up to 2000/2600 HVI).



Quick Changeable Trim

Parabolic and perforated plug. Quick and easy exchange of throttle without any special tools. Several material combinations possible, in particular for hard metal and ceramic execution.



P3 Trim

The position of the 3-stage valve plug determines the free area between the valve Seats and plugs and hence the pressure drop or flow rate through the valve. The pressure drop occurs in stages so that critical operating conditions like cavitation, excessive wear and high noise emissions are avoided. Additionally, the plug stem is either top or dual guided for added stability and to limit vibrations.

Technical Data and Materials

Nominal size	½" - 16"	
Pressure rating	ANSI 150-1500	
Material of body	ASTM	for temperatures
	A 216 WCB	-28ºC to 427ºC
	A 351 CF8M	-196ºC to 400ºC
	A 351 CF8	-196ºC to 400ºC
	A 352 LCB	-50ºC to 400ºC
	A 217 WC6	-28ºC to 500ºC
	A 217 WC9	-28ºC to 550ºC
Material of bonnet	≤ DN 50 bonnet material CF8M (SS316) / CF8 (SS304) ≥ DN 80 bonnet material is same as body, but with sealing bushing of SS316	
Characteristics of plug	Standard: Equal percentage, linear and On / Off Optional : Modified linear	
Rangeability	1) 8C - 1:50 2) 6N, 6H - 1:40	
Double guiding	Optional : Integrated double guiding available 1½ - 16", Kvs > 40	
Seat leakage	Metal-to-Metal: Leakage Class IV (<0.01%kvs); optional leakage rate class V Leakage Class VI (0 - 180ºC) (ANSI 150 and 300 only)	
Bellows sealing	SS316 weldless double layer or optional in Hastealloy C / Monel Available for ANSI 150 and ANSI 300, other pressure classes on request	
Heating jacket	Connections ½" or 1" ANSI 300 socket screwed or flanged and other on request	

Standard Trims

Material code no.	Parabolic plug	Parabolic plug P1 Integrated double guiding*	Perforated plug L1 / L2 / L3	Seat	Seat sealing type	Temperature of fluid
1	SS316	-	-	SS316	metal-to-metal	acc. to stem sealing
2	-	SS316	SS316 nitrided	SS316	metal-to-metal	acc. to stem sealing
3	-	-	SS440C nitrided	SS410	metal-to-metal	acc. to stem sealing
4	SS440C hardened	SS440C hardened	SS440C hardened	SS440C hardened	metal-to-metal	acc. to stem sealing
5	1.4922	1.4922 nitrided	1.4922 nitrided	1.4922	metal-to-metal	acc. to stem sealing
6	SS316	-	-	SS316	PTFE/EPDM	-50 ~140ºC
7	SS316			SS316	PTFE	-196 ~180ºC

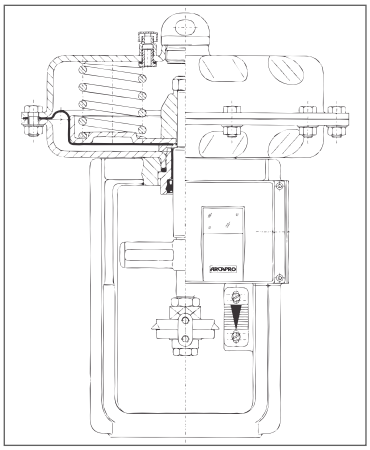
* Only from ≥ DN50 ≥ kvs 40

Diaphragm Actuator (MF Series)

Description

This is a pneumatically operated multi-spring diaphragm actuator of the new generation. The actuator is easily field reversible without the need of disassembly. The instrument air supply between positioner and actuator is attained through bores inside the yoke providing more reliability in comparison to conventional designs. This method ensures a safe air supply to the actuator and enormously simplifies the positioner mounting. Furthermore, the combination with the positioner provides the option of a permanent ventilation of the spring case by clean exhaust instrument air.

During operation, there is a minimal overpressure against atmosphere on the rear of the diaphragm plate (spring chamber). This guarantees that during stroke movement no ambient air can be sucked into the spring chamber. This protects the essential inner parts against aggressive atmosphere (like sea air).



Materials

Component	MOC
Diaphragm housing	Press steel
Diaphragm	Purbunan rubber
Springs	Oil tempered high carbon stainless steel
Spindle	Stainless steel
Yoke	Cast iron

Technical Information

Temperature range	-20ºC to 80ºC
Max. operating pressure	6 bar
Linearity	< 3%
Hysterisis	Max. 3%
Air supply conn.	1/8” BSP for MFI 1/4” BSP for MFIII

Thrust force (kN) – Air to Open

Size	Stroke (mm)	No. of springs	Diaphragm area (cm)^2	Air Pressure Range from(bar)	to(bar)	Thrust Force (kN)
MFI-20	20	3	320	0.8	1.5	2.4
		6		1.5	3.0	4.8
MFI-30 (pre-loading)		3		1.0	1.5	3.3
		6		2.0	3.0	6.5
MFI-30	30	3		0.8	1.5	2.4
		6		1.5	3.0	4.8
MFIII-30		3	720	0.7	1.5	5.0
		6		1.5	3.0	10.0
		9		1.8	3.7	13.0
		12		2.2	4.4	16.0
MFIII-60		3		1.1	1.5	8.0
		6		2.2	3.0	16.0
		9		2.7	3.6	19.0
		12		3.1	4.3	23.0
MFIII-60	60	3		0.7	1.5	5.0
		6		1.4	3.0	10.0
		9		1.7	3.6	12.0
		12		2.0	4.3	14.0

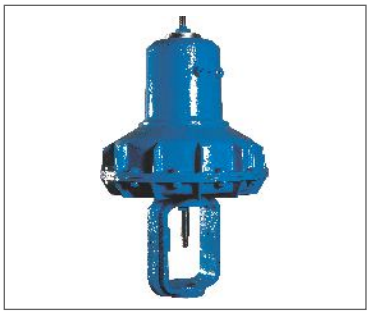
Thrust force (kN) – Air to Close

Size	Stroke (mm)	No. of springs	Diaphragm area (cm)^2	Minimum Air pressure (bar)	Thrust Force (kN) depending on air pressure 2.0 bar	3.0 bar	4.0 bar	5.0 bar	6.0 bar
MFI-20	20	3	320	1.5	1.6	4.8	8.0	11.2	14.4
		6		3.0			3.2	6.4	9.6
MFI-30	30	3		1.5	1.6	4.8	8.0	11.2	14.4
		6		3.0			3.2	6.4	9.6
MFIII-30		3	720	1.5	3.6	10.8	18.0	25.2	32.4
		6		3.0			7.2	14.4	21.6
		9		3.7			2.2	9.4	16.6
		12		4.4				4.3	11.5
MFIII-60	60	3		1.5	3.6	10.8	18	25.2	32.4
		6		3.0			7.2	14.4	21.6
		9		3.6			2.9	10.1	17.3
		12		4.3				5.0	12.2

Universal Diaphragm Actuator - Series UI, UIII and UV

High actuating power at affordable cost

Forbes Marshall universal diaphragm actuator series U0, UI, UIII and UV features a pneumatic actuator designed for applications that demand high actuating power. Its optional reinforced spring with compact air chamber delivers up to 14000 lbf thrust force for extreme pressure control applications. These diaphragm actuators can be fitted with standard accessories like positioner, feed-back transmitter, limit switches and air-filter regulator. Optional hand wheel is provided for emergency operations.



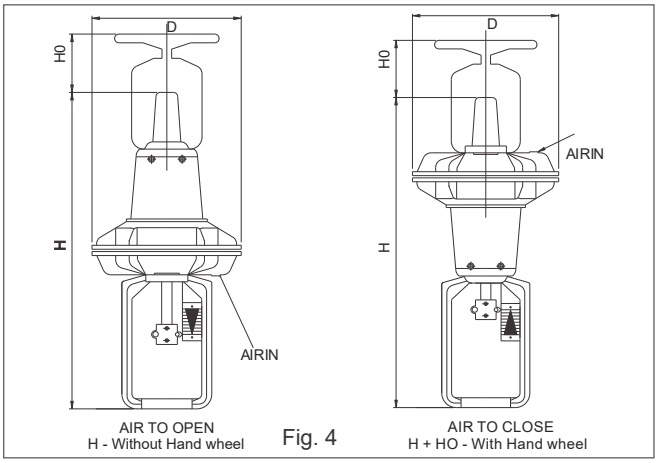
Actuator Technical Information

Temperature range	-13ºC to 90ºC
Maximum operating pressure	6 bar (g)
Linearity	< 2%
Hysterisis	Max. 3%
Air supply connection	¼" NPT*

*Others available on request

Materials

Diaphragm housing	Diecast Aluminium
Diaphragm	Purbunan Rubber
Springs	Stainless Chrome Steel
Spindle	Stainless Chrome Steel
Yoke	S G Iron



	H+HO	H	D
U0-20	560	440	230
UI-20	630	495	270
UI-30	640	505	270
UIII-30	920	723	392
UIII-60	950	753	392
UV-60	1290	995	530
UV-100	1300	1005	530
UV-120	1315	1020	530

Features:
Field reversible - flexible control action
High thrust forces - usable inextreme pressure reductions
Low maintenance - less inventory
Cast aluminum housing - light weight and corrosion resistance

Thrust force (Kgs) - Air to Close

Air Supply Range Bar	Standard U0-20 0.2-1.0 Bar	Standard UI-20 UI-30 0.2-1.0 Bar	Standard UIII-30 UIII-60 0.2-1.0 Bar 0.2-1.0 Bar	Standard UV-60 UV-100 UV-120
2.8	370	560	1270	2540
3.0	410	620	1410	2820
3.5	515	776	1760	3525
4.0	620	930	2115	4230
4.5	725	1085	2470	4935
5.0	830	1240	2820	5640
5.5	935	1395	3170	6345
6.0	1040	1550	3525	7050

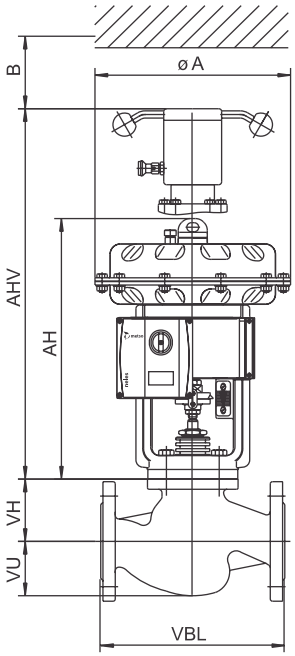
Thrust force (Kgs) - Air to Open

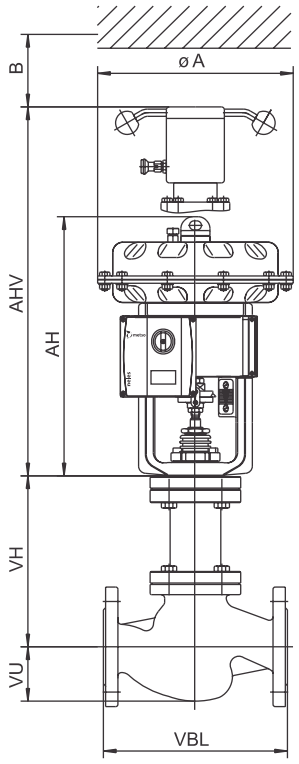
Actuator Model	Spring Range (Bar g) From	Spring Range (Bar g) To	Diaphragm Area (sq. cm)	Air to Open Spring to Close Thrust Force (Kgs)	Weight With Handwheel Kgs	Weight With Handwheel Lbs	Weight Without Handwheel Kgs	Weight Without Handwheel Lbs
U0-20.n	0.2	1		40				
	1	1.8		200				
U0-20.v	0.4	2	210	80	9.5	21	8	18
	1.4	3		284				
UI-20.n	0.2	1		60				
UI-20.n	0.4	1.2		125				
UI-20.n	0.6	1.4		185				
UI-20.n	0.8	1.6		250				
UI-20.n	1	1.8		310				
UI-20.v	1.2	2.25		370				
UI-20.v	1.4	2.45		435				
UI-20.v	1.6	2.65	320	500	19	42	16.8	37
UI-20.v	1.8	2.25		560				
UI-30.n	0.2	1		60				
UI-30.n	0.4	1.2		125				
UI-30.n	0.6	1.4		185				
UI-30.n	0.8	1.6		250				
UI-30.n	1	1.8		310				
UI-30.v	1.2	2.8		370				
UI-30.v	1.4	3		435				
UIII-30.n	0.2	1		140				
UIII-30.n	0.4	1.2		280				
UIII-30.n	0.6	1.4		425				
UIII-30.n	0.8	1.6		565				
UIII-30.n	1	1.8		705				
UIII-30.v	1.2	2		845				
UIII-30.v	1.4	2.2		985				
UIII-30.v	1.6	2.4		1130				
UIII-30.v	1.8	2.6	720	1270	49	108	45	99
UIII-30.v	2	2.8		1410				
UIII-30.v	2.2	3		1550				
UIII-60.n	0.2	1		140				
UIII-60.n	0.4	1.2		280				
UIII-60.n	0.6	1.4		425				
UIII-60.n	0.8	1.6		565				
UIII-60.v	1	2.6		705				
UIII-60.v	1.2	2.8		845				
UIII-60.v	1.4	3		990				
UV-60.n	0.2	1		280				
UV-60.n	0.4	1.2		565				
UV-60.n	0.6	1.4		845				
UV-60.n	0.8	1.6		1130				
UV-60.n	1	1.8		1410				
UV-60.v	1.2	2.45		1690				
UV-60.v	1.4	2.65		1975				
UV-60.v	1.6	2.85	1440	2255	105.6	233	99.8	220
UV-60.v	1.75	3		2465				
UV-60.v	2.4	4.5		2800				
UV-60.v	2.9	4.55		3000				
UV-100.n	0.2	1		280				
UV-100.n	0.4	1.2		565				
UV-100.n	0.6	1.4		845				
UV-100.v	0.8	2.8		1130				
UV-100.v	1	3		1410				
For 10",12" and 14"								
UV-120.n	0.2	1		280				
UV-120.n	0.4	1.2		570				
UV-120.n	0.6	1.4	1440	845	105.6	233	99.8	220
UV-120.v	0.8	2.8		1130				
UV-120.v	1	3		1410				
For 16"								
UV-120.n	0.2	1.2		250				
UV-120.n	0.4	1.5	1440	650	105.6	233	99.8	220
UV-120.v	0.6	3		840				

Note:
1) Side mounted handwheel available on request.
2) Actuator weight remains same irrespective of spring range and actuator action.
3) Above spring ranges are applicable for parabolic trims. For perforated, pressure balanced and three way trims spring ranges will be selected on a case to case basis

Dimensions and Weights

Globe Valve Series 8C with Pneumatic Actuator (MF Series)





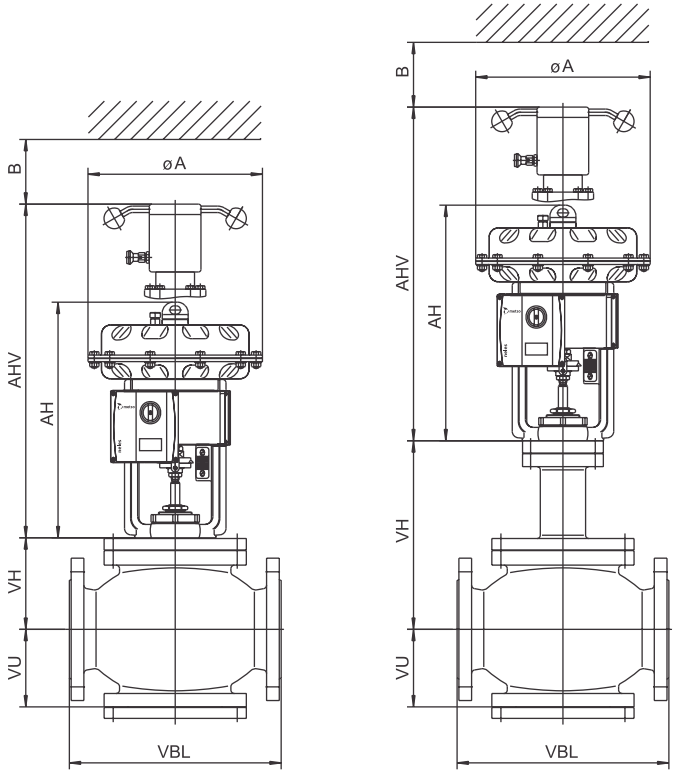
Principle dimensions (in mm) for flanged bodies acc. to ANSI class 150/300 RF

Valve	DN		1/2”	1”	1 1/2”	2”	2 1/2”	3”	4”
	VBL Class 150	RF	178	184	222	254	276	298	352
	VBL Class 300	RF	190	197	235	267	292	317	368
	VH	Standard bonnet	114		105			156	181
		Extended bonnet	170		167			248	267
		Bellow bonnet	228		233			365	389
		Balanced std. bonnet	NA		NA			196	221
		Balanced ext. bonnet	NA		NA			261	286
	VU		48	62	78	83	83	106	136
Actuator	ØA	MFI	270						
	AH	MFIII	400						
		MFI	346					404	
		MFIII	489						
	AHV	MFI	493					551	
		MFIII	651						
	B		130					150	
	Weight	MFI	20.5	23	31	33		70	93
	approx. kg	MFIII	96						119

Note : weight = valve + actuator without handwheel

Dimensions and Weights

Globe Valve Series 6N with Pneumatic Actuator (MF Series)

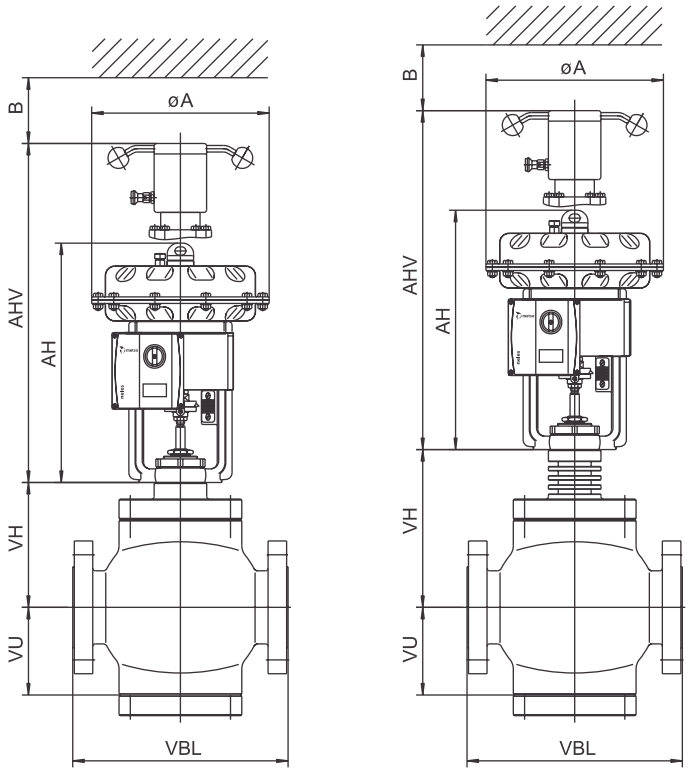


Principle dimensions (in mm) for flanged bodies acc. to ANSI class 150/300 RF								
Valve	DN		6”	8”	10”	12”	14”	16”
	VBL Class 150	RF	451	543	673	737	889	1016
	VBL Class 300	RF	473	568	708	775	927	1057
	VH	Standard bonnet	260	292	357	394	462	518
		Extended bonnet	355	407	506	543	611	667
		Bellow bonnet	on request					
		Balanced std. bonnet	260	292	357	394	462	518
		Balanced ext. bonnet	355	407	506	543	611	667
	VU	3FL	189	239	305	335	395	443
Actuator	ØA	MFIII	400					
		UV	530					
	AH	MFIII	625					
		UV	1006		1135			
	AHV	MFIII	888					
		UV	1323		1452			
	B		200		340			
	Weight approx. kg	MFIII	190	250				
		UV	225	285	355	655	745	1395

Note : weight = valve + actuator without handwheel

Dimensions and Weights

Globe Valve Series 6H with Pneumatic Actuator (MF Series)



Principle dimensions (in mm) for flanged bodies acc. to ANSI class 600/900/1500 RF

Valve	DN		1”	1 1/2”	2”	3”	4”	6”	8”
	VBL Class 600	RF	216	241	292	356	432	559	660
	VBL Class 900	RF	254	305	368	381	457	610	737
	VBL Class1500	RF	254	305	368	470	576	705	832
	VH	Standard bonnet	132	159	178	220	255	342	357
		Extended bonnet	167	239	243	300	332	402	447
		Bellow bonnet	on request						
		Balanced std. bonnet				220	255	342	357
		Balanced ext. bonnet				330	332	402	447
		3FL	68	103	113	153	178	228	260
	VU	4FL			174	219	254	314	366
Actuator	ØA	MFI	270						
		MFIII			400				
		UV						530	
	AH	MFI	361						
		MFIII				489		625	
		UV						1006	
	AHV	MFI	508						
		MFIII				657		888	
		UV						1323	
	B		130			150		200	
	Weight approx. kg	MFI	34	42	72	101	136		
		MFIII			98	127	162	317	607
		UV						335	645

Note : weight RTJ flanged and weld end connection available on request

Applicable Standards

Standards

ASME / ANSI	B16.5	Flange dimensions for Cl. 150, 300, 600, 900 and 1500 flanges (RF, RTJ)
ASME / ANSI	B16.25	Valves - buttwelding ends
ASME / ANSI	B16.34	Valves - flanged, threaded and welding ends
ASME / ANSI	FCI 70.2	Control valve - Seat leakage
ISA / ANSI	75.01	Control valve sizing

Testing

Unmachined material	NDT in accordance with applicable technique following of the order specification	ASME B 16.34
Finished component	Visual testing Hydrostatic test of all pressure containing parts (1, 5 x PN)	ASME B 16.34
ASME	Valves - Seat leakage	ASME B 6.104

Standard Kv Values

8C (1/2”- 4”#150 / #300) Parabolic

Valve size	Lift	Seat dia	Maximum Kv values
			Linear and Equal percentage
1/2”, 1”		3	0.06
		4	0.1
			0.16
	16	5	0.25
			0.4
			0.63
		8	1
		10	1.6
		12	2.5
		15	4
1”, 1 1/2”	16	20	6.3
1”, 1 1/2”, 2”	16	25	10
1 1/2”, 2”	16	30	16
		36	25
2”	16	46	40
2 ½”	16	36	25
		46	40
		50	63
3”	30	46	40
3”, 4”		50	63
	30	80	100
4”	30	100	160

Seat dia for Pr. Bal. valve (8C)
3”#150/300 – 80mm
4”#150/300 – 100mm

8C (1/2”- 4” #150/#300) Perforated L1, L2, L3

Valve size	Lift	Seat dia	Available Kv values		Max available Kv values	
			Linear (L1)	Equal percentage (L1)	Linear (I2)	Linear (I3)
1/2", 1"	20	20	1.25		4.1	2.6
			2.5			
1", 1 1/2"	20	25	-	4	6.1	3.2
			6.3			
1 1/2", 2"	20	36	10		10.6	5.4
			16			
2"	20	46	25		12.2	6.4
		50	40		NA	NA
2 ½”	20	36	16	16	NA	NA
		46	25	25	NA	NA
		50	40	NA	NA	NA
3"	30	50	40	25	23.5	12.1
3", 4"	30	80	40	25	35.3	18.2
			63	40		
			100	55		
4"	30	100	63	40	47.1	24.2
			100	55		
			120	63		

Seat dia for Pr. Bal. (8C)
3”#150/300 – 80mm
4”#150/300 – 100mm

Standard Kv Values

6N (6”-16”#150/#300) Parabolic

Valve size	Lift	Seat dia	Maximum Kv values
			Linear and Equal percentage
6”	60	90	150
6”, 8”	60	113	260
		143	380
8”	60	172	650
10”	100	143	380
10”, 12”	100	172	650
		220	900
14”	100	220	900
12”,14”	100	282	1300
14”	100	313	1800
16”	120	282	1300
		313	1800
		400	2500

Seat dia for Pr. Bal. (6N)	
6”#150/300 – 143mm	12”#150/300 – 282mm
8”#150/300 – 172mm	14”#150/300 – 313mm
10”#150/300 – 220mm	16”#150/300 – 400mm

6H (1”-12”#600/#900/#1500) Parabolic

Valve Size	Lift	Seat dia	Maximum Kv values
			Linear and Equal percentage
1”	20	3	0.04
			0.06
			0.1
			0.16
		4	0.25
		5	0.4
		6	0.63
		7	1
		8.5	1.6
		11	2.5
		16	4
		19	7
		24	11
1 1/2”	20	24	11
		32	18
		37	26
2”	30	32	18
		37	26
		48	43
3”	30	48	43
3", 4"	30	62	68
		73	100
4”	30	90	150
6”	60	90	150
6", 8"	60	113	260
		143	380
8”	60	172	650

* Please contact for Kv values of 10” and 12”.

Seat dia for Pr. Bal. (6H)
3”#600/900/1500 – 73mm
4”#600/900/1500 – 90mm
6”#600/900/1500 – 143mm
8”#600/900/1500 – 172mm

6N (6”-16”#150/#300) Perforated L1, L2, L3

Valve Size	Lift	Seat Dia	Available Kv values		Max available Kv values	
			Linear (L1)	Equal percentage (L1)	Linear (l2)	Linear (l3)
6”	60	90	170	125	103	53
6", 8"	60	113	260	150	132	67
			170	125	171	88
		143	260	150		
			380	210		
8"	60	172	260	150	209	107
			380	210		
			450	260		
10"	100	143	380	320	270	140
10", 12"	100	172	650	380	395	203
		220	380	320	476	245
			650	380		
			900	520		
14”	100	220	900	520	476	245
12", 14"	100	282	650	380	687	353
			900	520		
			1300	720		
14"	100	313	900	520	*	*
			1300	720		
			1800	850		
16"	120	282	1400	750	*	*
		313	1800	900	*	*
		400	1400	750	1180	507
			1800	900		
			2500	1250		

Seat dia for Pr. Bal. (6N)	
6”#150/300 – 143mm	12”#150/300 – 282mm
8”#150/300 – 172mm	14”#150/300 – 313mm
10”#150/300 – 220mm	16”#150/300 – 400mm

6H (1”-12”#600/#900/#1500) Perforated L1, L2, L3

Valve Size	Lift	Seat dia	Max available Kv values		Max available Kv values	
			Linear (L1)	Equal percentage (L1)	Linear (l2)	Linear (l3)
1”	20	19		4	4.1	2.6
		24		7	6.1	3.2
		24	10	-		
1 1/2”	20	37	18	11	10.6	5.4
			27	16		
2”	30	37	26	21	17.9	9.7
		48	43	35	23.5	12.1
3”	30	48	55	38	23.5	12.1
3”, 4"	30	62	60	43	30.6	15.7
		73	80	55	35.3	18.2
4”	30	90	110	68	47.1	24.2
6”	60	90	170	125	103	53
6", 8"	60	113	260	150	132	67
		143	380	210	171	88
8”	60	172	450	260	209	107

* Please contact for Kv values of 10” and 12”.

Seat dia for Pr. Bal. (6H)
3”#600/900/1500 – 73mm
4”#600/900/1500 – 90mm
6”#600/900/1500 – 143mm
8”#600/900/1500 – 172mm

ECOTROL® Codification Guide

Example		
8C	**3**	**L1**
Low pressure DN 15-100 / PN 10-40, ASME 1/2"- 4" class 150 and 300	Extended Bonnet	Perforated plug, 1 stage pressure reduction

	Valve Series and Size / Pressure Class
8C	Low pressure DN 15-100 / PN 10-40, ASME 1/2"- 4" class 150 and 300
6N	Low pressure DN 150-400 / PN 16-40, ASME 6"-16" class 150 and 300
6H	High pressure DN 25 to 300 / PN 63-160, ASME 1" – 12" class 600, 900 and 1500

1	Standard bonnet.
3	Extended bonnet.
4	Bellow sealed.
7	Standard bonnet with pressure balancing.
8	Extended bonnet with pressure balancing.

	Trim Design
P1	Parabolic plug, 1 stage pressure reduction
P3	Parabolic plug, 3 stage pressure reduction
L1	Perforated plug, 1 stage pressure reduction
L2	Perforated plug, 2 stage pressure reduction
L3	Perforated plug, 3 stage pressure reduction
S	On/off plug

Ordering information

Type of fluid and its properties (density, viscosity, specific heat ratio, compressibility factor, etc.)

Fluid flow rate, inlet pressure and temperature (min/nor/max)

Fluid outlet pressure / pressure drop in case of pressure control

Line size

Material of construction

Accessories and their make (if any specific)

Actuator air failure action

Valves with Various Actuations

Valve with E/P positioner
(with external tubing)

Valve with electric actuator

Valve with std. bonnet
FM Smart Positioner + hand wheel.

Valve with U-Series actuator
and Roboter-902

Section view of valve with
smart positioner (Tubeless mounting)

Valve with sandwich
bonnet with hand wheel

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Krohne Marshall
Forbes Marshall Arca
Codel International
Forbes Vyncke
Forbes Marshall Steam Systems

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