

***Valtek FlowTop V738
Control Valve System***

1/2" - 16", Class 150

FCD SAENTBV738 11/14



FlowTop - Features

Actuator

FlowAct is the standard pneumatic linear actuator. Further interfaces for:

- Haselhofer Electric linear Actuator
- PSL Electric linear Actuator
- Linear thrust Unit „light“ or „heavy“ for Electric multi turn Actuator
- Manual Operation

(see page 22, 23)

High quality powder painted carbon steel actuator cases - extremely corrosion resistant. Paint is durable and resistant to chipping or flaking.

Direct air supply is ported through the internal passage in the yoke. Available only with direct mounting positioner or accessories on air to open application. **No tubing is required.**

Compact design up to six Spring Ranges available for use with or without a Positioner.

High quality long life springs properly aligned by spring plates.

Uninterrupted linear travel and no loss of operating force, due to reinforced rolling type diaphragm with minimum area variation during stroke.

A high quality durable solid ductile iron yoke is delivered as standard. It's a universal yoke which accepts different industry standard mountings available on the market.

Packing

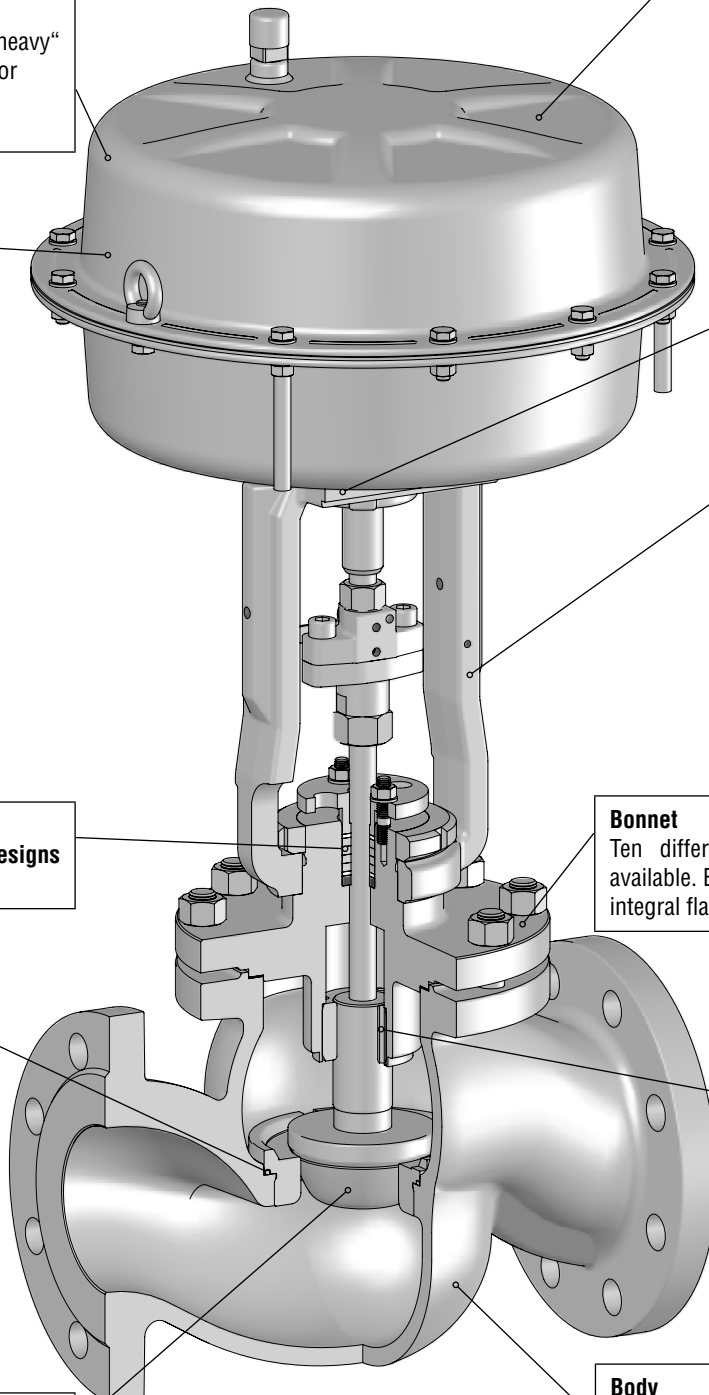
Nine **high quality packing designs** are available. (see page 11)

Bonnet

Ten different bonnet designs are available. Extremely **robust** design integral flange. (see page 9 - 10)

The **gasket seal** provides **practically** between seat and body.

Minimised vibration and wear because of heavy duty **solid, sturdy plug guiding.**



Trim

Eight standard trim designs and fourteen special trim designs are available.

(see page 12 - 19 resp. Special Brochure)

Body

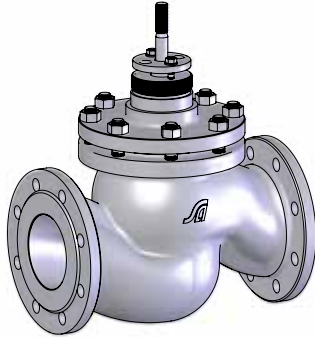
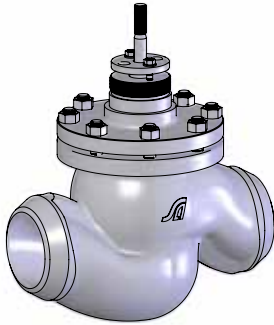
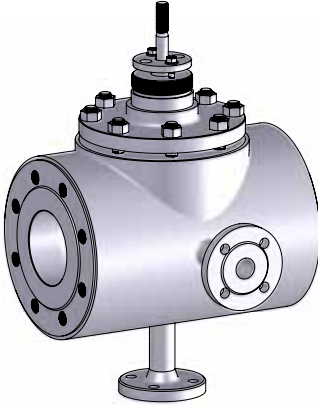
Nine different body designs available. The enlarged gallery enables **higher kvs** per trim and valve size than competitive products.

(see page 4 - 6)

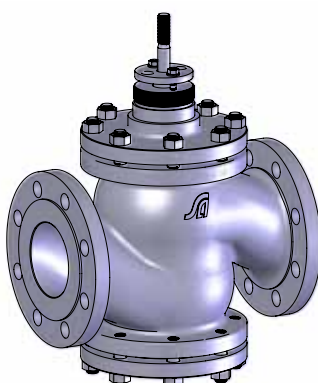
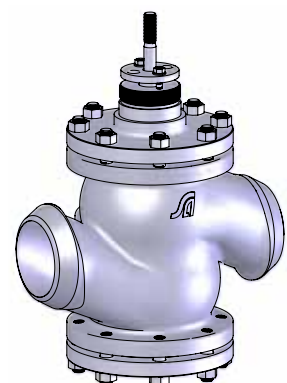
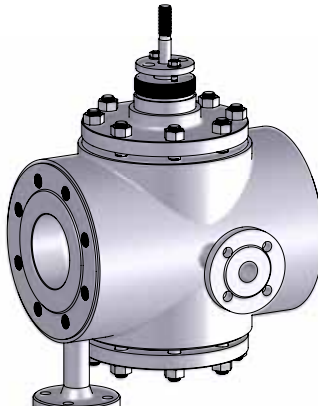
FlowTop - Advantages

Modular Design	The same bodies can be used for various different types of bonnet, packing, trim and actuators. This concept of a modular valve design allows the reduction of spare parts and offers an interchangeable valve for all applications.
Tight Shut - Off	FlowTop control valves offer Class IV shut-off as standard without the need for lapping plug and seat. Class VI shut-off is also available for FlowTop with a soft seat design.
Post guided	One solid guide stabilises the stem and plug during valve travel and minimises vibration and wear. A double plug guiding is also available depending on the service application and the trim selection.
Compact	Designed and engineered for applications with a limited installation envelope.
Low Noise and Anti - Cavitation Trim	SilentPack, MultiStream, Multi - Hole Plug, RLS, Silencer, reducing noise levels generated by vapours and gases and eliminating cavitation.
Versatile Packing Configuration	Available in PTFE and Graphite. Live loading kits are retrofittable without modification to the valve.
Fugitive Emissions Packing	Environmental packing design is available in accordance with „TA-Luft“ up to + 450 °C operating temperature.
Easy of Maintenance	By using a seat ring gasket between the body and the seat, the FlowTop allows faster maintenance without the necessity to remachine the body seat surface. The top entry design allows the valve body to remain in line whilst the trim is changed or replaced.
Wide Variety of Trim Sizes	Up to 17 kvs values per valve size.
Multifunction Yoke	The standard multifunction yoke is designed to accept all of the standard mountings available on the market including NAMUR (IEC 534.6) and the direct VDI / VDE 3847 / 3845 mounting.
High-Thrust Diaphragm	The actuator is compact, light weight and suitable for 6 bar air supply; multiple spring combinations reduces installation size and initial expenditure.
Dynamic Stability	Solid, sturdy plug head guiding minimises vibration and wear.
Certifications and Approvals (sample)	Quality assurance system certificated according to EN ISO 9001:2000 inc. product development. EC-Type - Examination according to PED 97/23/EC Module B + D ATEX - Declaration of Conformity according Derictive 94/9/EC TA-Luft - Certificate and Fugitive Emission according ISO 15848-1 SIL - Certificate according IEC 61508 DVGW - Certificate according EC Type Examination 90/396/EWG TR CU - Certificate according to Derictive TR CU 010/2011 (GOST-R) DNV - Type Approval
Multiple Application Usage	High-performance, general-service control valve used in many process industries including chemical, refinery, power, food and beverage, HVAC.

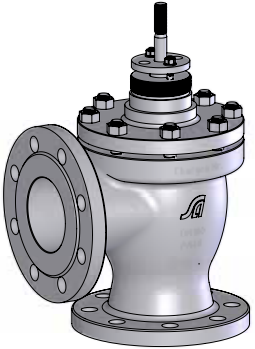
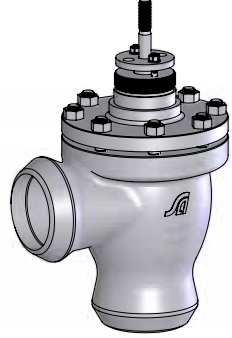
Body Design - „Three Flange“

Body Design	Type (Body) / Size	Body Material	Bonnet Design	Packing Design	Trim Design
3-Flange	<p>D Flanged</p> <p>Class 150</p> <p>ANSI 1/2" 3/4" 1" 1 1/2" 2" 3" 4" 6" 8"</p> 	<p>A216 WCC A352 LCB A351 CF8M A217 WC6 A351 CF8</p>	<p>Without Balancing VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet VI Insulating Bonnet</p> <p>V-Ring Balancing ON Standard Bonnet OK Low Temperature Bonnet OI Insulating Bonnet</p>		
	<p>DS . . . Welded</p> <p>Class 150</p> <p>ANSI 1/2" 3/4" 1" 1 1/2" 2" 3" 4" 6" 8"</p> 	<p>A216 WCC A351 CF8M A217 WC6 A351 CF8</p>	<p>Piston-Ring Balancing KR High Temperature Bonnet</p> <p><i>see page 9 - 10</i></p>	<p>adjustable A PTFE B Graphite Y Oxygen</p> <p>spring loaded N PTFE O Graphite Q PTFE TA-Luft V Graphite TA-Luft W Oxygen</p> <p>S PTFE-V-Ring System</p>	<p>Parabolic Plug PON Standard POD Partial Stellite POK Contour Stellite POW Soft Seated</p> <p>Disk Plug TON Standard TOW Soft Seated</p> <p><i>see page 12 - 19</i></p> <p>Special Trim Equipment see Special Brochure</p>
	<p>H Flanged with Heating Jacket</p> <p>Class 150</p> <p>ANSI 1" 1 1/2" 2" 3" 4" 6" 8"</p> <p>Heating Jacket Class 150 ANSI 1"</p> 	<p>A216 WCC A351 CF8M</p>	<p>Without Balancing VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet</p> <p>V-Ring Balancing ON Standard Bonnet OK Low Temperature Bonnet</p> <p>Piston-Ring Balancing KR High Temperature Bonnet</p> <p><i>see page 9 - 10</i></p>	<p><i>see page 11</i></p>	
	HS . . . Welded with Heating Jacket		On Request		

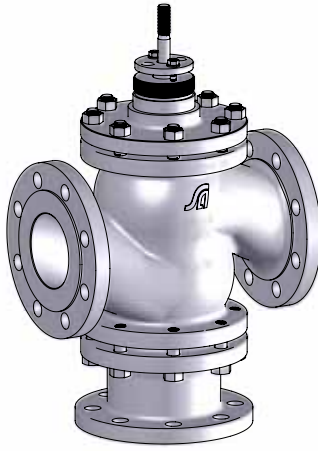
Body Design - „Four Flange“

Body Design	Type (Body) / Size	Body Material	Bonnet Design	Packing Design	Trim Design	
4-Flange	V Flanged Class 150 ANSI 1" 1 1/2" 2" 3" 4" 6" 8" 10" 12" 16"		A216 WCC A352 LCB A351 CF8M A217 WC6 A351 CF8	Without Balancing VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet VI Insulating Bonnet V-Ring Balancing ON Standard Bonnet OK Low Temperature Bonnet OI Insulating Bonnet		
	VS Welded Class 150 ANSI 8" 10" 12" 16"		A216 WCC A351 CF8M A217 WC6 A351 CF8	Piston-Ring Balancing KR High Temperature Bonnet <i>see page 9 - 10</i>	adjustable A PTFE B Graphite Y Oxygen spring loaded N PTFE O Graphite Q PTFE TA-Luft V Graphite TA-Luft W Oxygen S PTFE-V-Ring System <i>see page 11</i>	Parabolic Plug PON Standard POD Partial Stellite POK Contour Stellite POW Soft Seated Disk Plug TON Standard TOW Soft Seated <i>see page 12 - 19</i> Special Trim Equipment see Special Brochure
	G Flanged with Heating Jacket Class 150 ANSI 8" 10" 12" 16" Heating Jacket Class 150 ANSI 1"		A216 WCC A351 CF8M	Without Balancing VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet V-Ring Balancing ON Standard Bonnet OK Low Temperature Bonnet Piston-Ring Balancing KR High Temperature Bonnet <i>see page 9 - 10</i>		
	GS Welded with Heating Jacket		On Request			

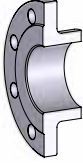

Body Design - „Angle“

Body Design	Type (Body) / Size	Body Material	Bonnet Design	Packing Design	Trim Design
Angle	E Flanged Class 150 ANSI 1" 1 1/2" 2" 3" 4" 6" 8" 10" 12"		A216 WCC A352 LCB A351 CF8M A217 WC6 A351 CF8 Without Balancing VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet VI Insulating Bonnet V-Ring Balancing ON Standard Bonnet OK Low Temperature Bonnet OI Insulating Bonnet Piston-Ring Balancing KR High Temperature Bonnet <i>see page 9 - 10</i>	adjustable A PTFE B Graphite Y Oxygen spring loaded N PTFE O Graphite Q PTFE TA-Luft V Graphite TA-Luft W Oxygen S PTFE-V-Ring System <i>see page 11</i>	Parabolic Plug PON Standard POD Partial Stellite POK Contour Stellite POW Soft Seated Contoured Seat SOH Hardened SOK Contour Stellite Disk Plug TON Standard TOW Soft Seated <i>see page 12 - 19</i> Special Trim Equipment see Special Brochure
	ES . . . Welded Class 150 ANSI 1" 1 1/2" 2" 3" 4" 6" 8" 10" 12"		A216 WCC A351 CF8M A217 WC6 A351 CF8	S PTFE-V-Ring System <i>see page 11</i>	S PTFE-V-Ring System <i>see page 11</i>	S PTFE-V-Ring System see page 11

Body Design - „Three Way“

Body Design	Type (Body) / Sizes	Body Material	Bonnet Design	Packing Design	Trim Design
3-Way	W Flanged Class 150 ANSI 1" 1 1/2" 2" 3" 4" 6" 8" 10" 12"		A216 WCC A352 LCB A351 CF8M A217 WC6 Without Balancing VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet <i>see page 9 - 10</i>	adjustable A PTFE B Graphite Y Oxygen spring loaded N PTFE O Graphite Q PTFE TA-Luft V Graphite TA-Luft W Oxygen S PTFE-V-Ring System <i>see page 11</i>	Mixing MOT Tenifer treated Distributing VOT Tenifer treated <i>see page 12 - 19</i>

Body Connecting Design - „Detail“

Body Design	Type (Body)		New Design
3-Flange 4-Flange Angle 3-Way	. F . . . Raised Face		according to ASME B16.5
3-Flange 4-Flange Angle	. W . . . Butt welded ends		according to B16.25, Sch 40

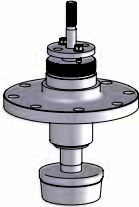
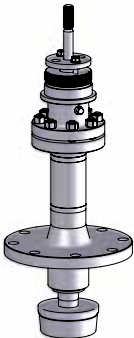
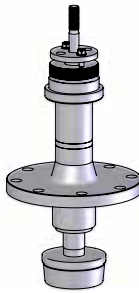
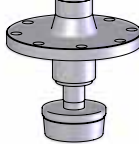
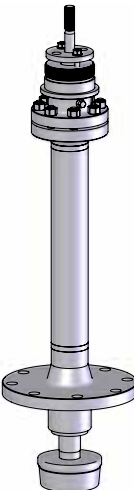
Body Pressure - Temperature Ratings

ANSI Class	Body Material	Service Temperature in	°F	-321	-76	-51	-20	100	212	302	392	482	572	662	752	801	842	932	1000	
			°C	-196	-60	-46	-29	38	100	150	200	250	300	350	400	427	450	500	538	
150	A216 WCC	Working Pressures in	psi				287	287	257	229	200	176	148	122	94	80				
			bar				19,8	19,8	17,7	15,8	13,8	12,1	10,2	8,4	6,5	5,5				
	A352 LCB	Working Pressures in	psi			267	267	267	253	229	200	176								
			bar			18,4	18,4	18,4	17,4	15,8	13,8	12,1								
	A217 WC6	Working Pressures in	psi				287	287	257	229	200	176	148	122	94	78	67	41	20	
			bar				19,8	19,8	17,7	15,8	13,8	12,1	10,2	8,4	6,5	5,4	4,6	2,8	1,4	
	A351 CF8M	Working Pressures in	psi		276	276	276	276	235	215	199	176	148	122	94	78				
			bar		19,0	19,0	19,0	19,0	16,2	14,8	13,7	12,1	10,2	8,4	6,5	5,4				
	A351 CF8	Working Pressures in	psi	276	276	276	276	276	228	206	192	176								
			bar	19,0	19,0	19,0	19,0	19,0	15,7	14,2	13,2	12,1								

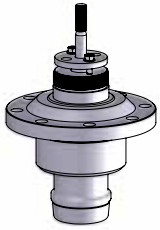
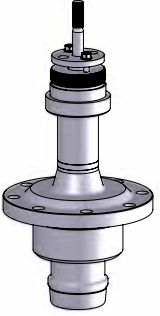
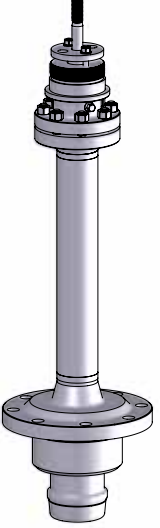
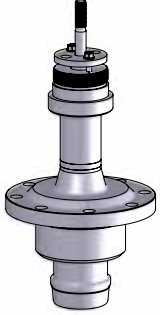
Working Temperature Range depending on Body / Bonnet / Packing in °C and °F

Body Material	Bonnet Design		Adjustable Packing			Spring loaded Packing					
			A	B	Y	N	O	Q	V	W	S
			PTFE	Graphite	Oxygen	PTFE	Graphite	PTFE TA-Luft	Graphite TA-Luft	Oxygen	PTFE V-Ring System
A216 WCC	VN Standard Bonnet	°C	-29 ÷ 250	-10 ÷ 250	-	-29 ÷ 250	-10 ÷ 250	-29 ÷ 250	-10 ÷ 250	-	-29 ÷ 250
		°F	-20 ÷ 482	14 ÷ 482	-	-20 ÷ 482	14 ÷ 482	-20 ÷ 482	14 ÷ 482	-	-20 ÷ 482
	VB Bellows Seal Bonnet	°C	-29 ÷ 250	-10 ÷ 427	-	-29 ÷ 250	-10 ÷ 427	-29 ÷ 250	-10 ÷ 427	-	-29 ÷ 250
		°F	-20 ÷ 482	14 ÷ 800	-	-20 ÷ 482	14 ÷ 800	-20 ÷ 482	14 ÷ 800	-	-20 ÷ 482
	VR High Temperature Bonnet	°C	-	250 ÷ 427	-	-	250 ÷ 427	-	250 ÷ 427	-	-
		°F	-	482 ÷ 800	-	-	482 ÷ 801	-	482 ÷ 801	-	-
	VK Low Temperature Bonnet	°C	-29 ÷ 250	-	-	-29 ÷ 250	-	-29 ÷ 250	-	-	-29 ÷ 250
		°F	-20 ÷ 482	-	-	-20 ÷ 482	-	-20 ÷ 482	-	-	-20 ÷ 482
	ON Standard Bonnet - V-Ring balanced	°C	-29 ÷ 250	-	-	-29 ÷ 250	-	-29 ÷ 250	-	-	-29 ÷ 250
		°F	-20 ÷ 482	-	-	-20 ÷ 482	-	-20 ÷ 482	-	-	-20 ÷ 482
	OK Low Temperature Bonnet - V-Ring balanced	°C	-29 ÷ 250	-	-	-29 ÷ 250	-	-29 ÷ 250	-	-	-29 ÷ 250
		°F	-20 ÷ 482	-	-	-20 ÷ 482	-	-20 ÷ 482	-	-	-20 ÷ 482
KR High Temperature Bonnet - Piston-Ring balanced	°C	-	250 ÷ 427	-	-	250 ÷ 427	-	250 ÷ 427	-	-	
	°F	-	482 ÷ 800	-	-	482 ÷ 801	-	482 ÷ 801	-	-	
A352 LCB	VN Standard Bonnet	°C	-29 ÷ 250	-10 ÷ 250	-	-29 ÷ 250	-10 ÷ 250	-29 ÷ 250	-10 ÷ 250	-	-29 ÷ 250
		°F	-20 ÷ 482	14 ÷ 482	-	-20 ÷ 482	14 ÷ 482	-20 ÷ 482	14 ÷ 482	-	-20 ÷ 482
	VK Low Temperature Bonnet	°C	-46 ÷ 250	-	-	-46 ÷ 250	-	-46 ÷ 250	-	-	-46 ÷ 250
		°F	-51 ÷ 482	-	-	-51 ÷ 482	-	-51 ÷ 482	-	-	-51 ÷ 482
	ON Standard Bonnet - V-Ring balanced	°C	-29 ÷ 250	-	-	-29 ÷ 250	-	-29 ÷ 250	-	-	-29 ÷ 250
		°F	-20 ÷ 482	-	-	-20 ÷ 482	-	-20 ÷ 482	-	-	-20 ÷ 482
	OK Low Temperature Bonnet - V-Ring balanced	°C	-46 ÷ 250	-	-	-46 ÷ 250	-	-46 ÷ 250	-	-	-46 ÷ 250
		°F	-51 ÷ 482	-	-	-51 ÷ 482	-	-51 ÷ 482	-	-	-51 ÷ 482
A351 CF8M	VN Standard Bonnet	°C	-29 ÷ 250	-10 ÷ 250	-29 ÷ 200	-29 ÷ 250	-10 ÷ 250	-29 ÷ 250	-10 ÷ 250	-29 ÷ 200	-29 ÷ 250
		°F	-20 ÷ 482	14 ÷ 482	-20 ÷ 392	-20 ÷ 482	14 ÷ 482	-20 ÷ 482	14 ÷ 482	-20 ÷ 392	-20 ÷ 482
	VB Bellows Seal Bonnet	°C	-60 ÷ 250	-10 ÷ 427	-60 ÷ 200	-60 ÷ 250	-10 ÷ 427	-60 ÷ 250	-10 ÷ 427	-60 ÷ 200	-60 ÷ 250
		°F	-76 ÷ 482	14 ÷ 800	-76 ÷ 392	-76 ÷ 482	14 ÷ 800	-76 ÷ 482	14 ÷ 800	-76 ÷ 392	-76 ÷ 482
	VR High Temperature Bonnet	°C	-	250 ÷ 427	-	-	250 ÷ 427	-	250 ÷ 427	-	-
		°F	-	482 ÷ 801	-	-	482 ÷ 801	-	482 ÷ 801	-	-
	VK Low Temperature Bonnet	°C	-60 ÷ 250	-	-60 ÷ 200	-60 ÷ 250	-	-60 ÷ 250	-	-60 ÷ 200	-60 ÷ 250
		°F	-76 ÷ 482	-	-76 ÷ 392	-76 ÷ 482	-	-76 ÷ 482	-	-76 ÷ 392	-76 ÷ 482
	ON Standard Bonnet - V-Ring balanced	°C	-29 ÷ 250	-	-29 ÷ 200	-29 ÷ 250	-	-29 ÷ 250	-	-29 ÷ 200	-29 ÷ 250
		°F	-20 ÷ 482	-	-20 ÷ 392	-20 ÷ 482	-	-20 ÷ 482	-	-20 ÷ 392	-20 ÷ 482
	OK Low Temperature Bonnet - V-Ring balanced	°C	-60 ÷ 250	-	-60 ÷ 200	-60 ÷ 250	-	-60 ÷ 250	-	-60 ÷ 200	-60 ÷ 250
		°F	-76 ÷ 482	-	-76 ÷ 392	-76 ÷ 482	-	-76 ÷ 482	-	-76 ÷ 392	-76 ÷ 482
A217 WC6	VN Standard Bonnet	°C	-29 ÷ 250	-10 ÷ 250	-	-29 ÷ 250	-10 ÷ 250	-29 ÷ 250	-10 ÷ 250	-	-29 ÷ 250
		°F	-20 ÷ 482	14 ÷ 482	-	-20 ÷ 482	14 ÷ 482	-20 ÷ 482	14 ÷ 482	-	-20 ÷ 482
	VR High Temperature Bonnet	°C	-	250 ÷ 538	-	-	250 ÷ 450	-	250 ÷ 450	-	-
		°F	-	482 ÷ 1000	-	-	482 ÷ 842	-	482 ÷ 842	-	-
	KR High Temperature Bonnet - Piston-Ring balanced	°C	-	250 ÷ 450	-	-	250 ÷ 450	-	250 ÷ 450	-	-
		°F	-	482 ÷ 842	-	-	482 ÷ 842	-	482 ÷ 842	-	-
A351 CF8	VB Bellows Seal Bonnet	°C	-196 ÷ 250	-10 ÷ 250	-196 ÷ 200	-196 ÷ 250	-10 ÷ 250	-196 ÷ 250	-10 ÷ 250	-196 ÷ 200	-196 ÷ 250
		°F	-321 ÷ 482	14 ÷ 482	-321 ÷ 392	-321 ÷ 482	14 ÷ 482	-321 ÷ 482	14 ÷ 482	-321 ÷ 392	-321 ÷ 482
	VI Insulating Bonnet	°C	-196 ÷ 250	-	-196 ÷ 200	-196 ÷ 250	-	-196 ÷ 250	-	-196 ÷ 200	-196 ÷ 250
		°F	-321 ÷ 482	-	-321 ÷ 392	-321 ÷ 482	-	-321 ÷ 482	-	-321 ÷ 392	-321 ÷ 482
	OI Insulating Bonnet - V-Ring balanced	°C	-196 ÷ 80	-	-196 ÷ 80	-196 ÷ 80	-	-196 ÷ 80	-	-196 ÷ 80	-196 ÷ 80
		°F	-321 ÷ 176	-	-321 ÷ 176	-321 ÷ 176	-	-321 ÷ 176	-	-321 ÷ 176	-321 ÷ 176
Dependencies	Trim Material	316SS -> -200 ÷ 450°C all, not for A217 WC6 resp. KR Bonnet									
		1.4122 -> -60 ÷ 450°C for A217 WC6 resp. KR Bonnet, alternate for A216 WCC and VN, VR, VK Bonnet or MultiStream									
		1.4922 -> -10 ÷ 538°C alternate for A217 WC6 resp. VR Bonnet									
	Trim Material 316SS + Soft Seat	PTFE -> -60 ÷ 250°C									
PCTFE -> -200 ÷ 150°C											


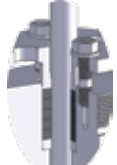
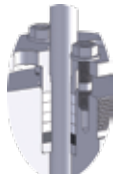






Bonnet Design - „Unbalanced“ for Size 1/2" - 16"

Bonnet Design	Type (Bonnet)	Material		Temperature Range	Application	Packing Design
		Body	Bonnet			
Without Balancing	.. VN . Standard Bonnet		A216 WCC A351 CF8M	A105 A182 F316L	- 29 ÷ + 250 °C -20 ÷ + 482 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Universal use adjustable A PTFE B Graphite Y Oxygen spring loaded N PTFE O Graphite Q PTFE TA-Luft V Graphite TA-Luft W Oxygen S PTFE V-Ring System <i>see page 11</i>
	.. VB . Bellows Seal Bonnet		A216 WCC A351 CF8M A351 CF8	A105 A182 F316L A182 F304	- 60 ÷ + 427 °C -76 ÷ + 800 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Use by toxic, smell strong, fleeing, costly media or vacuum adjustable A PTFE B Graphite Y Oxygen spring loaded N PTFE O Graphite Q PTFE TA-Luft V Graphite TA-Luft W Oxygen S PTFE-V-Ring System <i>see page 11</i>
	.. VR . High Temperature Bonnet		A216 WCC A351 CF8M A217 WC6	A 105 A182 F316L A182 F11	+ 250 ÷ + 538 °C 482 ÷ + 1000 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Use by possible overheating of packing and/or actuator adjustable B Graphite spring loaded O Graphite V Graphite TA-Luft <i>see page 11</i>
	.. VK . Low Temperature Bonnet		A216 WCC A352 LCB A351 CF8M	A 105 A350 LF2 A182 F316L	- 60 ÷ + 250 °C -76 ÷ + 482 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Use by possible icing of the packing adjustable A PTFE Y Oxygen spring loaded N PTFE Q PTFE TA-Luft W Oxygen S PTFE V-Ring System <i>see page 11</i>
	.. VI . Insulating Bonnet		A351 CF8	A182 F304	- 196 ÷ + 250 °C -321 ÷ + 482 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Use by cryogenic service adjustable A PTFE spring loaded N PTFE Q PTFE TA-Luft S PTFE V-Ring System <i>see page 11</i>

Bonnet Design - „Pressure Balanced“ for Size 3" - 16"

Bonnet Design	Type (Bonnet)	Material	Material		Temperature Range	Application	Packing Design
			Body	Bonnet			
V-Ring Balancing	.. ON . Standard Bonnet		A216 WCC A351 CF8M	A105 A182 F316L	- 29 ÷ + 250 °C -20 ÷ + 482 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Universal use	adjustable A PTFE Y Oxygen spring loaded N PTFE Q PTFE TA-Luft W Oxygen S PTFE V-Ring System <i>see page 11</i>
	.. OK . Low Temperature Bonnet		A216 WCC A352 LCB A351 CF8M	A105 A350 LF2 A182 F316L	- 60 ÷ + 250 °C -76 ÷ + 482 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Use by possible icing of the packing	adjustable A PTFE Y Oxygen spring loaded N PTFE Q PTFE TA-Luft W Oxygen S PTFE V-Ring System <i>see page 11</i>
	.. OI . Insulating Bonnet		A351 CF8	A182 F304	- 196 ÷ + 80 °C -321 ÷ + 176 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Use by cryogenic service	adjustable A PTFE Y Oxygen spring loaded N PTFE Q PTFE TA-Luft W Oxygen S PTFE V-Ring System <i>see page 11</i>
Piston-Ring Balancing	.. KR . High Temperature Bonnet		A216 WCC A217 WC6	A105 A182 F11	+ 250 ÷ + 450 °C + 482 ÷ + 842 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Use by possible overheating of packing and/or actuator	adjustable B Graphite spring loaded O Graphite V Graphite TA-Luft <i>see page 11</i>

Packing Design - „Detail“

Packing Design	Type (Packing)	Material	Temperature Range	Application	Approvals
adjustable	.... A PTFE	 <p>Packing Rings Braided PTFE-Yarn impregnated with PTFE-Dispersion</p> <p>Chamber Washers PTFE-Carbon</p>	- 196 ÷ + 250 °C - 321 ÷ + 482 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Universal chemical resistance	FMPA for food application
	.... B Graphite	 <p>Packing Rings Braided Graphite made out of expanded pure Graphite-Yarn lubricated with a slip additive</p>	- 10 ÷ + 538 °C - 14 ÷ + 1000 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Universal chemical resistance. Not suitable for oxidizing media !	-
	.... Y Oxygen	 <p>Packing Rings Braided Graphite resp. 100% PTFE silk yarns, impregnated with PTFE-Dispersion</p>	- 196 ÷ + 200 °C - 321 ÷ + 392 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Oxygen service only!	BAM for gaseous oxygen
spring loaded	.... N PTFE	 <p>Packing Rings Braided PTFE-Yarn impregnated with PTFE-Dispersion</p> <p>Chamber Washers PTFE-Carbon</p>	- 196 ÷ + 250 °C - 321 ÷ + 482 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Universal chemical resistance.	FMPA for food application
	.... Q PTFE „TA-Luft“	 <p>Packing Rings Braided Carbon-Yarn, covered with a sleeve of impregnated and lubricated PTFE-Yarn</p> <p>Chamber Washers PTFE-Carbon</p>	- 196 ÷ + 250 °C - 321 ÷ + 482 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Universal chemical resistance	TA-Luft ISO 15848-1
	.... O Graphite	 <p>Packing Rings Braided Graphite made out of expanded pure Graphite-Yarn lubricated with a slip additive</p>	- 10 ÷ + 450 °C - 14 ÷ + 842 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Universal chemical resistance. Not suitable for oxidizing media !	-
	.... V Graphite „TA-Luft“	 <p>Packing Rings Braided Graphite made out of expanded pure Graphite-Yarn lubricated with a slip additive</p>	- 10 ÷ + 450 °C - 14 ÷ + 842 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Universal chemical resistance. Not suitable for oxidizing media !	TA-Luft ISO 15848-1
	.... W Oxygen	 <p>Packing Rings Braided Graphite resp. 100% PTFE silk yarns, impregnated with PTFE-Dispersion</p>	- 196 ÷ + 200 °C - 321 ÷ + 392 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Oxygen service only !	BAM for gaseous oxygen
	.... S PTFE „V-Ring“ System	 <p>Packing Rings Compression-molded PTFE-Yarn resp. PTFE-Carbon</p>	- 196 ÷ + 250 °C - 321 ÷ + 482 °F <i>see also Working Temperature Range on Page 7 - 8</i>	Universal chemical resistance. Not suitable for abrasive media !	-

Trim Design - „Standard“

Type (Trim) / Material			Medium	Flow	max. allowable Differential Pressure	Noise Reduction
Parabolic Plug Characteristic: G . ↓ mod. equal per. L . ↓ linear	PON standard 316SS or 1.4571		<ul style="list-style-type: none"> • clean • marginally contaminated with particles • low clogging potential for dirty service 	gases, vapors and liquids	$\Delta p_1 < x_{FZ} \cdot (p_1 - p_v)$ $\Delta p_c < x_T \cdot p_1$	none - noise reduction with Special Trim Equipment or Noise Insulating provided by customer
	PON standard 1.4122				$\Delta p_1 < (x_{FZ} + 0,10) \cdot (p_1 - p_v)$ $\Delta p_c < x_T \cdot p_1$	
	POH hardened 1.4122				$\Delta p_1 < (x_{FZ} + 0,15) \cdot (p_1 - p_v)$ $\Delta p_c < x_T \cdot p_1$	
	POD partial stellited (seat surface) 316SS or 1.4571				$\Delta p_1 < (x_{FZ} + 0,10) \cdot (p_1 - p_v)$ $\Delta p_c < x_T \cdot p_1$	
	POK full stellited (contour) 316SS or 1.4571				$\Delta p_1 < (x_{FZ} + 0,15) \cdot (p_1 - p_v)$ $\Delta p_c < x_T \cdot p_1$	
POW soft seated 316SS or 1.4571 +PTFE (-60 ÷ 250°C) (-76 ÷ 482°F) POC +PCTFE (-200 ÷ 150°C) (-328 ÷ 302°F)		$\Delta p_1 < x_{FZ} \cdot (p_1 - p_v)$ $\Delta p_c < x_T \cdot p_1$				
Piston Plug with contoured seat Characteristic: G . ↓ mod. equal per.	SOK full stellited (contour) 316SS or 1.4571		..... I Flow direction over the plug	$\Delta p_1 < (x_{FZ} + 0,20) \cdot (p_1 - p_v)$ $\Delta p_c < x_T \cdot p_1$	
	SOH hardened 1.4122					
Disk Plug with Throttle Lip Characteristic: A . ↓ On / Off	TON standard 316SS or 1.4571		..... G Flow direction under or I over the plug	$\Delta p < MAWP$	
	TON standard 1.4122					
	TOW soft seated 316SS or 1.4571 +PTFE (-60 ÷ 250°C) (-76 ÷ 482°F) TOC +PCTFE (-200 ÷ 150°C) (-328 ÷ 302°F)					
Characteristic values of incompressible fluids $\Delta p_1 \rightarrow x_{FZ} \rightarrow 0,79 - 0,24$ respectively compressible fluids $\Delta p_c \rightarrow x_T \rightarrow 0,82 - 0,61$ according to Flowserve Villach Operation (see also VDI/VDE 2173)						
Noise Reduction Trim Sets see Page 18 and Special Brochure						

Trim Design - „Three Way“

Type (Trim) / Material Characteristic L . → linear		Medium	Flow	max. allowable Differential Pressure	Noise Reduction	
Mixing Plug	MOT tenifer treated 316SS or 1.4571	<ul style="list-style-type: none"> • clean • marginally contaminated with particles • low clogging potential for dirty service 	gases, vapors and liquids	<p>..... G Flow direction under the plug</p>	$\Delta p_i < x_{FZ} \cdot (p_i - p_v)$ $\Delta p_c < x_T \cdot p_i$	none - noise reduction with Special Trim Equipment or Noise Insulating provided by customer
	MON standard 1.4122						$\Delta p_i < (x_{FZ} + 0,10) \cdot (p_i - p_v)$ $\Delta p_c < x_T \cdot p_i$
Distributing Plug	VOT tenifer treated 316SS or 1.4571	<ul style="list-style-type: none"> • low clogging potential for dirty service 	gases, vapors and liquids	<p>..... G Flow direction under the plug</p>	$\Delta p_i < x_{FZ} \cdot (p_i - p_v)$ $\Delta p_c < x_T \cdot p_i$	none - noise reduction with Special Trim Equipment or Noise Insulating provided by customer
	VON standard 1.4122						$\Delta p_i < (x_{FZ} + 0,10) \cdot (p_i - p_v)$ $\Delta p_c < x_T \cdot p_i$

Characteristic values of incompressible fluids $\Delta p_i \rightarrow x_{FZ} \rightarrow 0,79 - 0,24$ respectively compressible fluids $\Delta p_c \rightarrow x_T \rightarrow 0,82 - 0,61$ according to Flowserve Villach Operation (see also VDI/VDE 2173)

Noise Reduction Trim Sets see Page 18 and Special Brochure

Rangeability

EXCLUSION:
Stroke = 10 mm only !

Rangeability		Seat Diameter																											
		3	4	6	8	10	12	16	20	25	34	40	42	50	53	67	80	84	100	105	125	130	150	200	250	300	350		
Standard G L .	1 : 30	•	•																										
	1 : 50		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Special ¹⁾ H .	1 : 70		•	•	•	•	•	•	•																				
	1 : 100									•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		

1) Modified equal percentage Flow Characteristic only!

Piston Plug design with Contoured Seat

Characteristic: modified - equal percentage

1) All materials up to +450°C (Except A217WCB)
With Heavy duty bonnet, only for Body A351 CF8M
2) Body in A216 WCC, A217 WCB up to +450°C

CV (gpm)	kvs (m³/h)	Seat Ø	Guide of Plug	Material / Design		Possible seat diameter depends on nominal size DN																					
				316SS ¹⁾	1.4122 ²⁾	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"													
				K	H	Stroke = 20 mm			40	60	80																
7.3	6,3	20	1	•	•	•	•	•																			
11.6	10	25	1	•	•			•	•																		
18.5	16	34	1	•	•			•	•																		
29	25	42	1	•	•				•	•																	
46	40	53	1	•	•					•	•																
73	63	67	1	•	•						•	•															
116	100	84	1	•	•							•	•														
185	160	100	1	•	•									•													
185	160	105	1	•	•										•												
231	200	125	1	•	•											•											
231	200	130	1	•	•												•										
410	355	150	1	•	•													•							•	•	
520	450	200	1	•	•															•					•	•	
821	710	250	1	•	•																				•	•	

Distributing Plug

Characteristic: linear

CV (gpm)	kvs (m ³ /h)	Seat Ø	Guide of Plug	Material / Design		Possible seat diameter depends on nominal size DN										
				316SS	1.4122 ²⁾	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"		
				tenifer treated	standard	Stroke = 20 mm			40 mm		60 mm	80 mm				
7,3	6,3	25	2	•	•	•										
11,6	10	25	2	•	•	•										
18,5	16	40	2	•	•		•									
29	25	40	2	•	•		•									
29	25	50	2	•	•			•								
46	40	50	2	•	•			•								
73	63	80	2	•	•				•							
116	100	80	2	•	•				•							
116	100	100	2	•	•					•						
185	160	100	2	•	•					•						
208	180	130	2	•	•						•					
289	250	130	2	•	•						•					
520	450	150	2	•	•							•				
821	710	200	2	•	•								•			
1156	1000	250	2	•	•									•		

1) All materials up to + 450°C (Except A217 WC6)
Heavy duty bonnet: only for body in CF8M

2) Body in A216 WCC, A217 WC6 up to + 450°C

Disk Plug with Throttle Lip

Characteristic: on / off

CV (gpm)	kvs (m ³ /h)	Seat Ø	Guide of Plug	Material / Design			Size											
				316 SS ²⁾		1.4122 ¹⁾ 1.4922 ⁴⁾	1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"	16"
				N	W ³⁾	C ⁵⁾	N	Stroke = 20			40	60	80			100		
				standard	soft seated	standard	standard											
7,3	6,3	16	1	•	•	•	•											
10,4	9	20	1	•	•	•		•										
18,5	16	25	1	•	•	•			•									
41	35,5	34	1	•	•	•				•								
61	53	40	1	•	•	•					•							
162	140	50	1	•	•	•						•						
231	200	67	1	•	•	•							•					
462	400	80	1	•	•	•								•				
728	630	100	1	•	•	•									•			
1156	1000	105	1	•	•	•										•		
1850	1600	130	1	•	•	•											•	
3641	3150	350	1	•	•	•											•	

1) Body in A216 WCC, A217 WC6 up to + 450°C

2) All materials up to + 450°C (Except A217 WC6)

3) PTFE (- 60°C to + 250°C)

4) Only with Body in A217 WC6

5) PCTFE (- 195°C to + 150°C) only with Insulating bonnet

Mixing Plug

Characteristic: linear

1) All materials up to +450°C (Except A217 WC6)
 Heavy duty bonnet: only for body in CF8M
 2) Body in A216 WCC, A217 WC6 up to +450°C

cv (gpm)	kvs (m ³ /h)	Seat Ø	Guide of Plug	Material / Design		Possible seat diameter depends on nominal size DN								
				316SS	1.4122 ²⁾	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"
				tenifer treated	standard	Stroke = 20 mm		40 mm		60 mm		80 mm		
7,3	6,3	25	2	•	•	•								
11,6	10	25	2	•	•	•								
18,5	16	40	2	•	•		•							
29	25	40	2	•	•		•							
29	25	50	2	•	•			•						
46	40	50	2	•	•			•						
55	47,5	50	2	•	•			•						
73	63	80	2	•	•				•					
116	100	80	2	•	•				•					
116	100	100	2	•	•					•				
145	125	80	2	•	•				•					
185	160	100	2	•	•					•				
208	180	100	2	•	•					•				
208	180	130	2	•	•						•			
289	250	130	2	•	•						•			
410	355	130	2	•	•						•			
520	450	150	2	•	•							•		
821	710	200	2	•	•								•	
1156	1000	250	2	•	•									•

Seat Leakage

LF = Leakage Factor see Standard IEC 60534-4 Table 3, Remark 2 or ANSI / FCI 70-2-2006 Table 2
 Ø d = Seat Ø

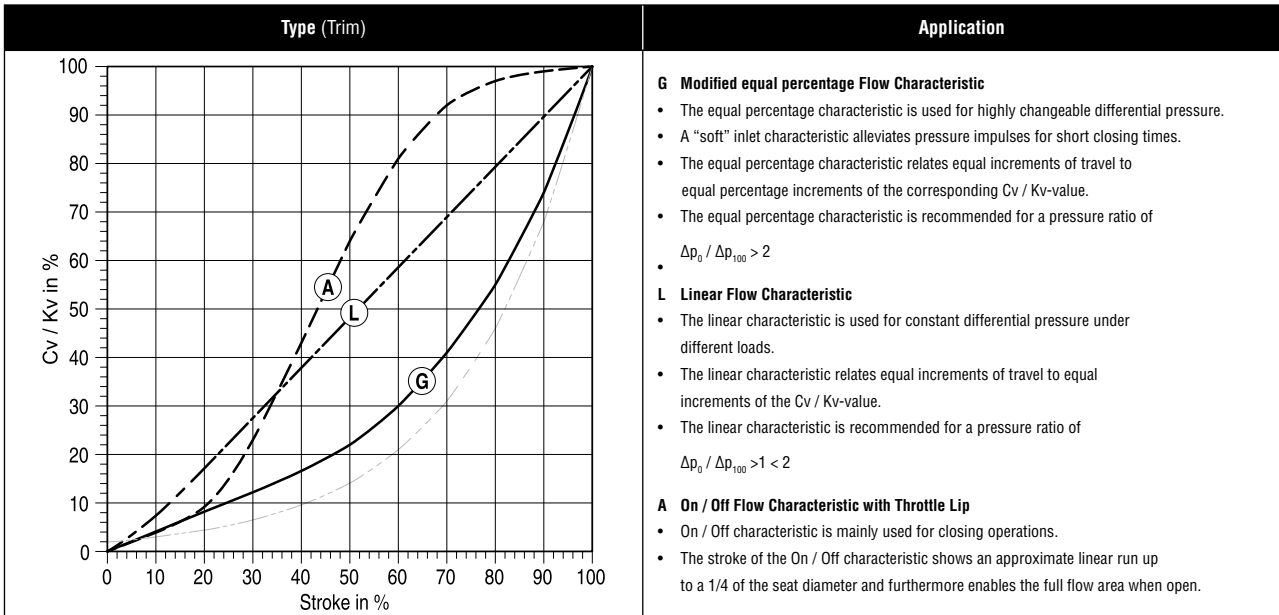
Standard	Balancing	Plug Code	Leakage Class	Test Medium	Test Pressure	max. Seat Leakage	Leakage Code		
IEC 60534-4:2007-06 resp. ANSI / FCI 70-2-2006	Without	metal to metal seated	... P ...	IV	Liquid	Operating Pressure	0,000 1 · kvs 0,000 1 · cv	IV L 2	
			... D ...		Gas	Operating Pressure, max. 3,5 bar Operating Pressure, max. 50.7 psi	0,000 1 · kvs 0,000 1 · cv	IV G 1	
		metal to metal seated increased seal force	... S ...	V	Liquid	Operating Pressure	0,000 018 · Δp · Ø d	V L 2	
			... F ...		Gas	Operating Pressure, max. 3,5 bar Operating Pressure, max. 50.7 psi	0,000 010 8 · Ø d	V G 1	
		soft seated	... T ...	VI	Gas	Operating Pressure, max. 3,5 bar Operating Pressure, max. 50.7 psi	0,3 · Δp · LF	VI G 1	
			V-Ring		metal to metal seated	... P ...	IV	Liquid	Operating Pressure	0,000 1 · kvs 0,000 1 · cv	IV L 2
	... D ...	Gas		Operating Pressure, max. 3,5 bar Operating Pressure, max. 50.7 psi		0,000 1 · kvs 0,000 1 · cv		IV G 1	
	soft seated	... Q ...		IV-S1	Liquid	Operating Pressure	0,000 005 · kvs	IV-S1 L 2	
		... E ...			Gas	Operating Pressure, max. 3,5 bar Operating Pressure, max. 50.7 psi		IV-S1 G 1	
	Piston-Ring	metal to metal seated	... O ...	III	Liquid	Operating Pressure, max. 3,5 bar	0,001 · kvs 0,000 1 · cv	III L 1	
			EN 12266-1:2012-04		Without	metal to metal seated increased seal force	... A ...	P12	Liquid	Operating Pressure · 1,1	no visually leakage	A
	... B ...	Gas		Operating Pressure, max. 6 bar					

Special Trim Equipment - Details see Special Brochure SAENBRNOIS-00

Type (Trim) Characteristic G . → mod. equal per. or L . → linear			Medium	Flow	Differential Pressure	Noise Reduction		
SilentPack	PK		<ul style="list-style-type: none"> • clean • high clogging potential for dirty service	. . . . . G Flow direction under the plug	Type all Standard Trim $\Delta p_c < 0,5 \cdot p_1$	max. - 18 dB(A)		
MultiStream	PC		<ul style="list-style-type: none"> • clean • marginally contaminated with particles 		Gases and Vapors	Type all Standard Trim $\Delta p_c < x_r \cdot p_1$	max. - 10 dB(A)	
	PE						max. - 15 dB(A)	
	PG						max. - 20 dB(A)	
	PD						<ul style="list-style-type: none"> • clean • marginally contaminated with particles 	Type P . N → 316SS or 1.4571 P . W → 316SS or 1.4571 $\Delta p_1 < x_{fz} \cdot (p_1 - p_v)$	max. - 4 dB(A)
	PF		<ul style="list-style-type: none"> • low clogging potential for dirty service 		Liquids	Type P . N → 1.4122 P . D → 316SS or 1.4571 $\Delta p_1 < (x_{fz} + 0,10) \cdot (p_1 - p_v)$	max. - 8 dB(A)	
	PH						Type P . H → 1.4122 P . K → 316SS or 1.4571 $\Delta p_1 < (x_{fz} + 0,15) \cdot (p_1 - p_v)$	max. - 10 dB(A)
	PI						Type P . N → 316SS or 1.4571 P . W → 316SS or 1.4571 $\Delta p_1 < (x_{fz} + 0,10) \cdot (p_1 - p_v)$	max. - 6 dB(A)
	PQ						Type P . N → 1.4122 P . D → 316SS or 1.4571 $\Delta p_1 < (x_{fz} + 0,15) \cdot (p_1 - p_v)$	max. - 12 dB(A)
PW		Type P . H → 1.4122 P . K → 316SS or 1.4571 $\Delta p_1 < (x_{fz} + 0,20) \cdot (p_1 - p_v)$	max. - 16 dB(A)					
Multi Hole Plug	LO		<ul style="list-style-type: none"> • clean • high clogging potential for dirty service	. . . . . G Flow direction under or over the plug for Gases and Vapors G Flow direction over the plug for Liquids only	$\Delta p_1 < (x_{fz} + 0,20) \cdot (p_1 - p_v)$ $\Delta p_c < x_r \cdot p_1$	max. - 15 dB(A)		
RLS Radial Multi-Step System	AO					Gases, Vapors and Liquids	$\Delta p_1 < (x_{fz} + 0,10) \cdot (p_1 - p_v)$ $\Delta p_c < x_r \cdot p_1$	max. - 30 dB(A)
	BO							
	DO							

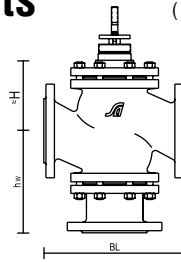
NOTICE → expert knowledge is required for the selection of Trim!
The specified datas are used for a rough orientation only and may not taken for dimensioning !

Valve Characteristic



Dimensions and Weights Three-Way Valve

(Values in Millimeter/ Inch → mm/in. respectively Kilogram/ Pound → kg/ lbs)

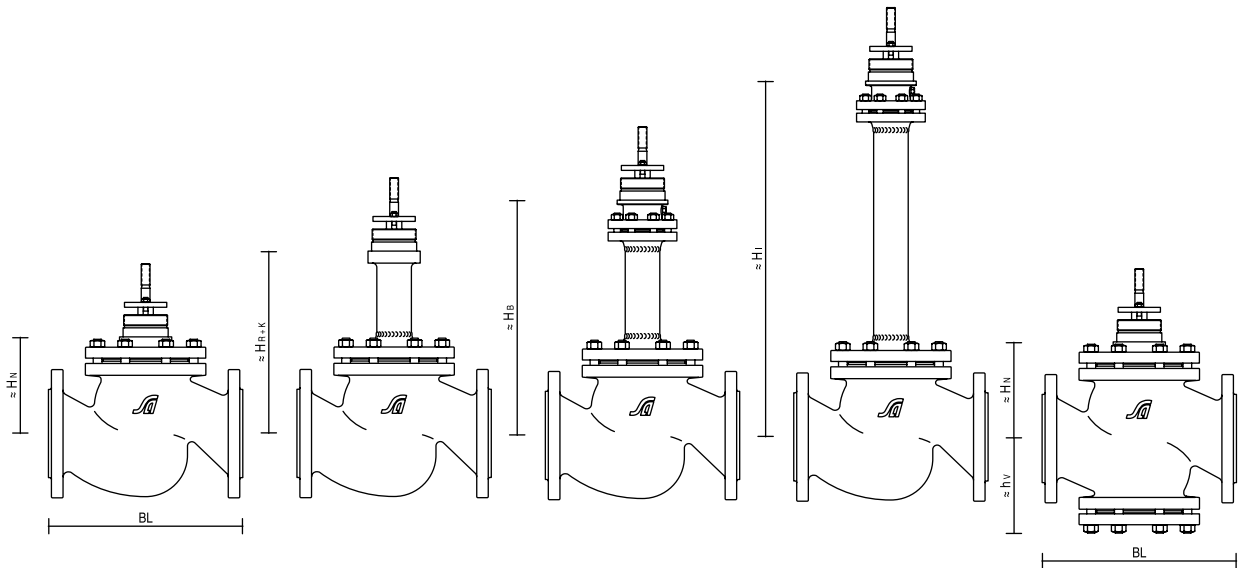


Description	Stroke	Nominal Size										
		1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"		
		20 mm		40 mm		60 mm		80 mm				
BL Face to Face Dimensions acc. to EN 558-1 Basic Line 37 Flange F	in.	7.2	8.7	10	11.7	13.9	17.8	21.4	26.5	29		
	mm	184	222	254	298	352	451	543	673	737		
HW Center to Face Dimensions acc. to EN 558-1 Basic Line 93 / 26 Flange F	in.	5.1	5.9	6.9	8.9	10.2	13.78	32.8	25.6	29.5		
	mm	130	150	175	225	260	350	550	650	750		
≈ Height for Three-Way Valves	H N for Standard Bonnet	lbs	4.1	4.7	4.7	6.7	6.9	10.6	14.6	18.1	19.3	
		kg	105	120	120	170	175	270	370	460	490	
	H B for Bellows Seal Bonnet	lbs	10.3	10.3	10.3	16.5	16.5	26	29.9	30.1	30.3	
		kg	265	265	265	420	420	660	760	765	770	
	H R + K for High / Low Temperature Bonnet	lbs	8.7	8.7	8.7	12.2	12.2	17.5	20.1	23.6	24.8	
		kg	220	220	220	310	310	445	510	600	630	
	H I for Insulating Bonnet	lbs	25.6	25.6	25.6	25.6	25.6	26.4	31.5	31.5	31.5	
		kg	650	650	650	650	650	670	800	800	800	
≈ Weight for Three-Way Valves	and Standard Bonnet	lbs	24.3	46.3	55.1	125.7	174.2	317.5	628.3	1108.9	1578.5	
		kg	11	21	25	57	79	144	285	503	716	
	and Bellows Seal Bonnet	lbs	33.1	52.9	61.7	143.3	191.8	357.2	674.6	1159.6	1627	
		kg	15	24	28	65	87	162	306	526	738	
	and High / Low Temperature Bonnet	lbs	28.7	50.7	59.5	132.3	183	328.5	639.3	1117.7	1587.3	
		kg	13	23	27	60	83	149	290	507	720	
	and Insulating Bonnet	lbs	30.9	52.9	61.7	134.5	185.2	346.1	665.8	1155.2	1622.6	
		kg	14	24	28	61	84	157	302	524	736	
	Flanges drilled and dimensioned acc. to		ANSI B16.5, Form RF									
	Welded ends comply with		ASME B16.25 - 1997, Fig. 2 (b)									

Dimensions and Weights

Three Flange, Four Flange

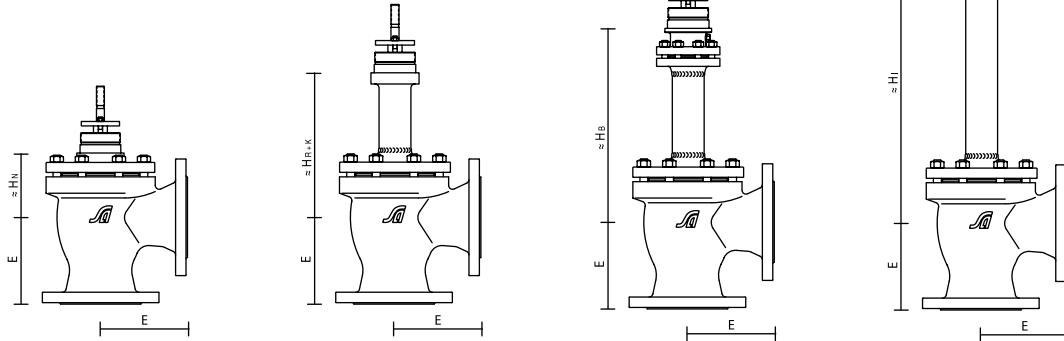
(Values in Millimeter/ Inch → mm/in. respectively Kilogram/ Pound → kg/ lbs)



Description		Stroke	Nominal Size											
			1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"	16"
			20 mm				40 mm		60 mm	80 mm				
BL Face to Face Dimensions acc. to EN 558-1 Basic Line 1		in.	7.2	7.2	7.2	8.7	10	11.7	13.9	17.8	21.4	26.5	29	40
		mm	184	184	184	222	254	298	352	451	543	673	737	1016
≈ h V Centerline to Bottom Flange Dimension		in.	-	-	3.9	4.7	4.9	7.1	7.9	11.2	13.6	16.9	18.5	21.46
		mm	-	-	100	120	125	180	200	285	345	430	470	545
≈ Height	H N for Standard Bonnet	in.	4.1	4.1	4.1	4.7	4.7	6.7	6.9	10.6	14.6	18.1	19.3	22
		mm	105	105	105	120	120	170	175	270	370	460	490	560
	H B for Bellows Seal Bonnet	in.	10.3	10.3	10.3	10.3	10.3	16.5	16.5	26	29.9	30.1	30.3	50.4
		mm	265	265	265	265	265	420	420	660	760	765	770	1280
	H R + K for High / Low Temperature Bonnet	in.	8.7	8.7	8.7	8.7	8.7	12.2	12.2	17.5	20.1	23.6	24.8	27.6
		mm	220	220	220	220	220	310	310	445	510	600	630	700
	H I for Insulating Bonnet	in.	25.6	25.6	25.6	25.6	25.6	25.6	25.6	26.4	31.5	31.5	31.5	31.5
		mm	650	650	650	650	650	650	650	670	800	800	800	800
≈ Weight for Valves with Three-Flange Body	and Standard-Bonnet	lbs	11	13.2	15.4	28.7	35.3	86	112.4	227.1	445.3	-	-	-
		kg	5	6	7	13	16	39	51	103	202	-	-	-
	and Bellows Seal Bonnet	lbs	19.8	22	24.3	35.3	41.9	103.6	130	266.8	491.6	-	-	-
		kg	9	10	11	16	19	47	59	121	223	-	-	-
	and High / Low Temperature Bonnet	lbs	15.4	17.6	19.8	33.1	39.7	92.6	121.3	238.1	456.4	-	-	-
		kg	7	8	9	15	18	42	55	108	207	-	-	-
	and Insulating Bonnet	lbs	17.6	19.8	22	35.3	41.9	94.8	123.5	255.7	482.8	-	-	-
		kg	8	9	10	16	19	43	56	116	219	-	-	-
≈ Weight for Valves with Four-Flange Body	and Standard Bonnet	lbs	-	-	17.6	35.3	46.3	99.2	125.7	280	566.6	1173	1644.6	2742.6
		kg	-	-	8	16	21	45	57	127	257	532	746	1244
	and Bellows Seal Bonnet	lbs	-	-	26.5	41.9	52.9	114.6	138.9	310.9	612.9	1223.6	1693.2	2808.7
		kg	-	-	12	19	24	52	63	141	278	555	768	1274
	and High / Low Temperature Bonnet	lbs	-	-	22	39.7	50.7	103.6	130	282.2	577.6	1181.7	1653.5	2753.6
		kg	-	-	10	18	23	47	59	128	262	536	750	1249
	and Insulating Bonnet	lbs	-	-	24.3	41.9	52.9	105.8	132.3	299.8	604.1	1219.2	1688.7	2764.6
		kg	-	-	11	19	24	48	60	136	274	553	766	1254
Flanges drilled and dimensioned acc. to			ANSI B16.5, Form RF											
Welded ends comply with			ASME B16.25 - 1997, Fig. 2 (b)											

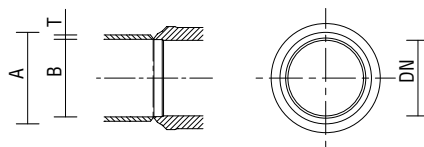
Dimensions and Weights Angle

(Values in Millimeter/ Inch → mm/in. respectively Kilogram/ Pound → kg/ lbs)



Description		Nominal Size									
		Stroke	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"
E Center to Face Dimensions acc. to EN 558-1 Basic Line 40		in.	3.6	4.4	5	5.9	6.9	8.9	10.7	13.3	14.5
		mm	92	111	127	149	176	225	272	337	368
Height ≈	H _N for Standard Bonnet	in.	3.4	3.5	3.5	4.7	5.1	8.1	11	13.6	14
		mm	85	90	90	120	130	205	280	345	355
	H _B for Bellows Seal Bonnet	in.	9.7	9.3	9.1	14.6	14.8	23.6	26.4	25.6	25
		mm	245	235	230	370	375	600	670	650	635
H _{R+K} for High / Low Temperature Bonnet	in.	7.9	7.5	7.3	10.2	10.4	15	16.5	19.1	19.5	
	mm	200	190	185	260	265	380	420	485	495	
H _I for Insulating Bonnet	in.	24.8	24.4	24.2	23.6	23.8	23.8	28	27	26.2	
	mm	630	620	615	600	605	605	710	685	665	
Weight ≈ for Valves with Angle	and Standard-Bonnet	lbs	15.4	26.5	35.3	75	90.4	189.6	299.9	445.3	791.5
		kg	7	12	16	34	41	86	136	202	359
	and Bellows Seal Bonnet	lbs	24.3	33.1	41.9	92.6	108.1	229.3	346.1	496	840
		kg	11	15	19	42	49	104	157	225	381
	and High / Low Temperature Bonnet	lbs	19.8	30.9	39.7	81.6	99.2	200.6	310.9	454.2	800.3
		kg	9	14	18	37	45	91	141	206	363
	and Insulating Bonnet	lbs	22.1	33.1	41.9	83.8	101.4	218.3	337.3	491.6	835.6
		kg	10	15	19	38	46	99	153	223	379
Flanges drilled and dimensioned acc. to		ANSI B16.5, Form RF									
Welded ends comply with		ASME B16.25 - 1997, Fig. 2 (b)									

Preferred Dimensions of Body Welding Ends



ANSI			1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"	16"
Diameter	A	Valve Outside	22	28	35	50	62	91	117	172	223	278	329	413
	B	Valve Inside	B = $\phi D - 2 \times T$											
Class	D	Pipe Outside	21,3	26,7	33,4	48,3	60,3	88,9	114,3	168,3	219,1	273	323,8	406,4
	T	Pipe Thickness	2,75	2,9	3,4	3,7	3,9	5,5	6,0	7,1	8,2	9,2	9,5	12,7

Buttweld ends accord. to ASME B 16.25, Fig. 2 (a), Schedule 40

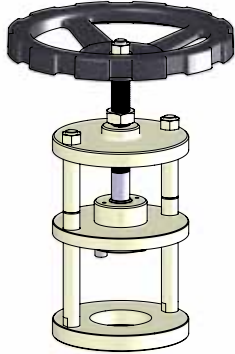
Flanged Body Connecting Dimensions



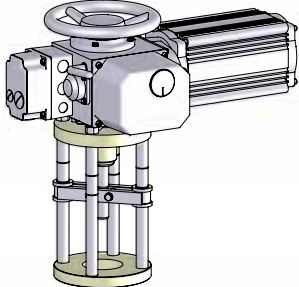
Size			1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"	16"
Class 150	D	Outside Diameter	90	100	110	125	150	190	230	280	345	405	485	595
	K	Pitch Circle Diameter	60,3	69,9	79,4	98,4	120,7	152,4	190,5	241,3	298,5	362	431,8	539,8
	n	Number of Bolts	4	4	4	4	4	4	8	8	8	12	12	16
	L	Hole Diameter	5/8	5/8	5/8	5/8	3/4	3/4	3/4	7/8	7/8	1	1	1 1/8
	Gw	Size of Bolts	1/2 13 UNC	1/2 13 UNC	1/2 13 UNC	1/2 13 UNC	5/8 11 UNC	5/8 11 UNC	5/8 11 UNC	3/4 10 UNC	3/4 10 UNC	7/8 9 UNC	7/8 9 UNC	1 8 UNC

Connecting Dimensions according to ASME B16.5 - 2003 in Inch

Actuator - „Linear Style“

Actuator Design	Type / Size	max. Force	Power Supply	Failure Position	Hand Wheel
hand operated	HB 12 16 20 Manufacturer: Flowserve Villach Operation	 1 300 N ÷ 30 000 N depending on Actuator Size	bi-manual Hand operating Force 200 N	Stem • locked	• top mounted

Actuator - „Multi Turn Style“

Actuator Design	Type	max. Force	max. Torque	Actuator Interface	Actuator
Linear thrust Unit „light“ linked to an electric multi turn actuator	LB 12 16 20 Manufacturer: Flowserve Villach Operation	 10 400 N ÷ 27 700 N depending on Linear thrust Unit Size	30 Nm ÷ 80 Nm depending on Linear thrust Unit Size	Output drive ISO 5210 A Connection Flange ISO 5210 F10	adapted for electrical multi turn actuators with output drives version „stem nut“ with trapezoid thread 24 x 5 left

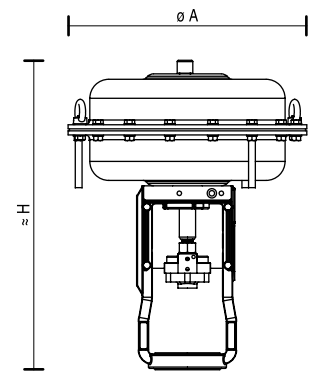
Actuator - „Linear Style“

Actuator Design	Type (Actuator) / Size	max. Force	Air / Power Supply	Failure Position	Hand Wheel	
pneumatic operated	IT 252 502 700 PB 252 502 700 1502 3002 Manufacturer: Flowserve Villach Operation		250 N ÷ 60 000 N depending on Actuator Size	1,2 bar ÷ 6,0 bar depending on Actuator Size	Stem • retracted • extended	<ul style="list-style-type: none"> • without • top mounted (option) • side mounted (option) depending on Actuator Size
	AB 201 202 204 208 210 Manufacturer: PS Automation GmbH „Flowserve Design“							1 000 N ÷ 10 000 N depending on Actuator Size	220 - 240 V → 50 Hz 110 - 115 V → 50 Hz 24 V → 50 Hz 400 V → 50 Hz depending on Actuator Size	Stem • locked	• top mounted
EB 1,2 / 1,2 4,5 / 4,5 8 / 8 12 / 12 20 / 15 20 / 20 25 / 25 Manufacturer: Haselhofer Feinmechanik GmbH „Flowserve Design“		1 200 N ÷ 25 000 N depending on Actuator Size	230 V → 50 Hz 400 V → 50 Hz 24 V DC depending on Actuator Size	Stem • locked	<ul style="list-style-type: none"> • side mounted 	

Pneumatic linear Actuator with multi-function Yoke

(Values in Millimeter → mm respectively Kilogram → kg)

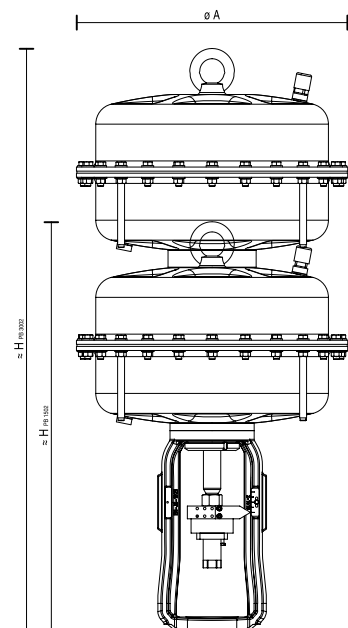
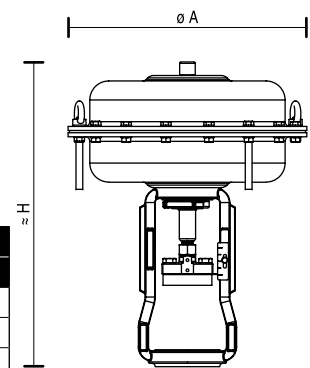
Description	Area (cm ²)	250		500		700	
	Stroke	10 / 20	20	40	20	40	40
∅ A		265	352	352	405	405	405
≈ H		335	455	560	545	545	550
≈ Weight		16	31	40	46	46	46



Pneumatic linear Actuator with NAMUR-Yoke

(Values in Millimeter → mm respectively Kilogram → kg)

Description	Area (cm ²)	250		500		700	
	Stroke	10 / 20	20	40	20	40	60
∅ A		265	352	352	405	405	405
≈ H		330	420	450	545	545	600
≈ Weight		16	31	40	46	46	46

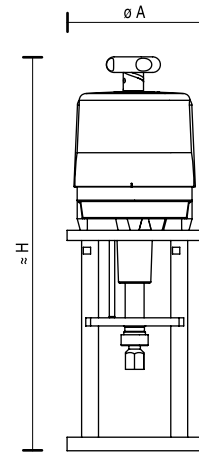


Description	Area (cm ²)	1500	3000
	Stroke	40 / 60 / 80 / 100	40 / 60 / 80 / 100
∅ A		548	548
≈ H		800	1140
≈ Weight		124	240

PSL - Electric linear Actuator

(Values in Millimeter → mm respectively Kilogram → kg)

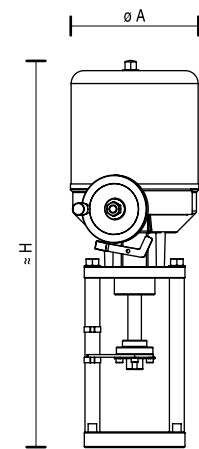
Description	Electric linear Actuator	AB 201	AB 202	AB 204	AB 208	AB 210
	Stroke	20	20	20/40	20/40	20/40
∅ A		219	219	219	236	236
≈ H		462	462	462	585	585
≈ Weight		5,5	5,7	9,5	12	12



Haselhofer - Electric linear Actuator

(Values in Millimeter → mm respectively Kilogram → kg)

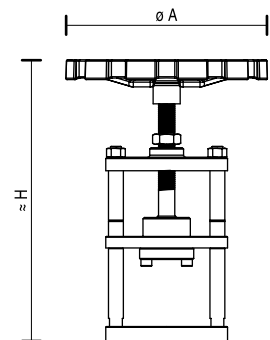
Description	Electric linear Actuator	EB 1,2	EB 4,5	EB 8	EB 12	EB 20	EB 25
	Stroke	10/20/40	20/40	20/40/60/80	20/40/60/80	20/40/60/80/100	20/40/60/80/100
∅ A		145	145	184	184	216	216
≈ H		505	535	570	570	660	660
≈ Weight		6,5	7,5	13	13	19	19



Manual Operation

(Values in Millimeter → mm respectively Kilogram → kg)

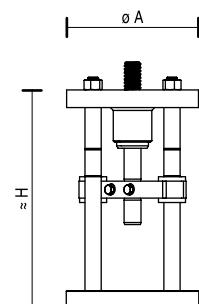
Description	Manual Operation	HB 12	HB 16	HB 20
	Stroke	20	40	60 / 80
∅ A		300	300	400
≈ H		400	450	480
≈ Weight		17	17	18



Linear thrust Unit „light“

(Values in Millimeter → mm respectively Kilogram → kg)

Description	Linear thrust Unit	LB 12	LB 16	LB 20
	Stroke	20	40	60 / 80
∅ A		196	196	196
≈ H		240	320	407
≈ Weight		12	17	20



SPM - Code

Type	DN	PN	Body / Cert.	Plug	Seat	kvs	Trim	Actuator
V738 DKVNA	50	40	1.0619/OAO	PONP1GG	42	40	316SS	

Body Form Three-Flange D Three-Flange with Heating Jacket H Four-Flange V Four-Flange with Heating Jacket G Angle E Three-Way W	Form of Connection ASME B16.5 Raised face F Butt welded ends W	Bonnet Form without Pressure Balancing V with V-Ring Balancing O with Piston-Ring Balancing K with Heavy Duty Design S	Bonnet Assembly Standard Bonnet N Bellows seal Bonnet B HT Extension Bonnet R LT Extension Bonnet K Insulating Bonnet I	Packing Box Assembly PTFE-Rings, adjustable A Graphite-Rings, adjustable B Oxygen Y PTFE-Rings, loaded, N Oxygen live loaded W Graphite-Rings, live loaded O PTFE with Graphite, live loaded, "TA" Q Graphite-Rings, live loaded, "TA" V V-Ring Packing System S	Nominal Size 1/2" - 16" Nominal Pressure Class 150	Body Material A216 WCC A352 LCB A217 WC6 A351 CF8M A351 CF8	Materials acc. to international Standards for Pressure Stressed Parts Standards for Materials DGRL (Standard) O... Certificates for Materials without .O.. 2.2 .Z.. 3.1 (with list of certificates) .B.. 3.1 (CMTR Body+ Bonnet) .D.. 3.1 (CMTR Body+ Bonnet+ Bolting) .E.. 3.1 (Code E+ Trim) .H.. 3.2 .A..	316SS or 1.4571 Plug, Seat 1.4122 Material kvs - Value 0,012 - 3237 Port Size 3 - 350 Flow tend to open G Flow tend to close I	Characterstic modified - equal percentage G linear L on / off A modified - equal percentage with Special Rangeability H	Plug Guiding Top 1 Top and Bottom 2	Seat Leakage Liquid Gas IEC 60534 Class III O - Class IV P D Class IV - S1 Q E Class V S P Class VI - T EN 12 266 LR A A B	Plug Form standard N partial stellited D contour stellited K soft seated (-60 ÷ +250 °C) W (-76 ÷ +482 °C) C soft seated (-200 ÷ +150 °C) H (-328 ÷ +482 °C) T hardened tenifer treated	Plug Cont. Plug without Silent-Set P O with Silentpack P K with MultiStream Type C P C with MultiStream Type D P D with MultiStream Type E P E with MultiStream Type F P F with MultiStream Type G P G with MultiStream Type H P H with MultiStream Type I P I with MultiStream Type Q P Q with MultiStream Type W P W Disk Plug T O Multi-Hole Plug L O RLS-Unit, 2-step, Series I A O RLS-Unit, 2-step, Series II B O RLS-Unit, 3-step, Series II D O Mixing Plug M O Distributing Plug V O	Standards and Certificates for final test Standards for final test DGRL EN 1349 (Standard) . . A . Kat. IV . . M . Certificates for final test EN 10 204 without . . . O 2.2 . . . Z 3.1 . . . B 3.2 . . . A
--	---	---	---	--	---	---	---	---	--	--	---	---	--	---

IT 252 AAD0Z

Safety position at air failure
 Z Spring to close
 A Spring to open
 S Fail in place - Spring to close
 T Fail in Place - Spring to open

Hand Wheel
 O without
 L top, light-weight-variant IT 252 - 502
 H top, heavy-duty-variant IT 252 - 700

Spring Range			
	Actuator Size	Stroke	
AD	0,2 - 1,0	IT 252 / 502	20
AD	0,2 - 1,0	IT 502 / 700	40
BL	0,5 - 1,9	IT 252 / 502	20
BL	0,5 - 1,9	IT 502 / 700	40
MU	0,8 - 1,6	IT 252	10
DY	1,0 - 2,4	IT 252 / 502	20
DY	1,0 - 2,4	IT 502 / 700	40
IY	1,4 - 2,4	IT 252	10
VC	1,5 - 2,7	IT 252 / 502	20
VC	1,5 - 2,7	IT 502 / 700	40
VI	1,5 - 3,8	IT 252 / 252 / 502	20
VI	1,5 - 3,8	IT 502 / 700	40
JC	1,8 - 2,7	IT 700	20
FY	2,0 - 4,8	IT 252 / 502	20
FY	2,0 - 4,8	IT 502 / 700	40
CW	2,7 - 4,1	IT 252	10

Actuator Color
 A blue
 B white
 C yellow

Actuator Size with MULTI-yoke		
	Actuator Size	Stroke
IT 252	250 cm ²	10, 20
IT 502	500 cm ²	20, 40
IT 700	700 cm ²	20, 40

PB 252 ADY0Z

Safety position at air failure
 Z Spring to close
 A Spring to open
 S Fail in place - Spring to close
 T Fail in Place - Spring to open

Hand Wheel
 O without
 L top, light-weight-design PB 252 - 502
 H top, heavy-duty-design PB 252 - 700
 S lateral PB 1502 - 3002
 Z

Actuator Color
 A blue
 B white
 C yellow

Actuator Size with NAMUR-Yoke		
	Actuator Size	Stroke
PB 252	250 cm ²	10 , 20
PB 502	500 cm ²	20 , 40
PB 700	700 cm ²	20 , 40 , 60
PB1502	1500 cm ²	20 , 40 , 60 , 80 , 100
PB 3002	3000 cm ²	40 , 60 , 80 , 100

EB 8/8 ZPO 50A

Stroke
 A-E / M M-10, A-20, B-40, C-60, D-80, E-100

Positioning Speed
 13,5 13,5 mm/min
 17 17 mm/min
 25 25 mm/min
 50 50 mm/min

Positioner
 O without
 M Positioning Electronics, input in mA or V adjustable

Transmitter
 O without
 F 1 additional travel limit switches
 P 1000 Ohm potentiometer Ω
 M 4 - 20 mA positioning feedback

Voltage
 Z 230 V, 50 Hz - AC
 D 400 V, 50 Hz - AC
 G 24 V - DC

Haselhofer - Electric linear Actuator
 EB 1,2/1,2 Actuating Power 1,2 kN
 EB 4,5/4,5 Actuating Power 4,5 kN
 EB 8/8 Actuating Power 8 kN
 EB 12/12 Actuating Power 12 kN
 EB 20/15 Actuating Power 15 kN
 EB 20/20 Actuating Power 20 kN
 EB 25/25 Actuating Power 25 kN

LB 16

Linear thrust Unit „light“				
	Thrust	Stroke	Torque	ISO5210 A
LB 12	10,4 kN	20 mm	30 Nm	F10
LB 16	17,3 kN	≤ 40 mm	50 Nm	F10
LB 20	27,7 kN	≤ 80 mm	80 Nm	F10

HB 16

Manual Operation		
	Thrust	Stroke
HB 12	13 kN	20 mm
HB 16	23 kN	40 mm
HB 20	30 kN	≤ 80 mm

AB 204 ZQ0 30A

Stroke
 A-E / M M-10, A-20, B-40, C-60,

Positioning Speed
 15 15 mm/min A. 201, 202
 27 27 mm/min A. 210
 30 30 mm/min A. 202, 204, 208

Positioning Electronics
 O without
 M Positioning Electronics, input in mA or V adjustable

Positioning Feedback
 O without
 E 2 add. limit switches
 P 1000 Ohm potentiometer Ω
 D 2 - 1000 Ohm potentiometer Ω
 M Transmitter 4 - 20 mA
 Q 1000 Ohm potentiometer Ω with 2 limit switches
 N Transmitter 4 - 20 mA with 2 limit switches

Power
 Z 220 - 240 V 50 Hz - AC
 Y 110 - 115 V 50 Hz - AC
 F 24 V 50 Hz - AC
 D 400 V 50 Hz - AC (A^B 208/10)

PSL - Electric linear Actuator
 . B . . .
 . C . . . Code for three way design only !
 A . 201 Actuating Power 1 kN
 A . 202 Actuating Power 2 kN
 A . 204 Actuating Power 4,5 kN
 A . 208 Actuating Power 8 kN
 A . 210 Actuating Power 10 kN

Spring Range			
		Actuator Size	Stroke
AD	0,2 - 1,0	PB 252 / 502	20
AD	0,2 - 1,0	PB 502 / 700 / 1502 / 3002	40
AD	0,2 - 1,0	PB 700 / 1502 / 3002	60
AD	0,2 - 1,0	PB 1502 / 3002	80
GF	0,4 - 2,0	PB 1502 / 3002	40, 60, 80
BL	0,5 - 1,9	PB 252 / 502	20
BL	0,5 - 1,9	PB 502 / 700	40
BL	0,5 - 1,9	PB 700	60
KI	0,75 - 1,4	PB 1502 / 3002	40, 60, 80
MU	0,8 - 1,6	PB 252	10
HL	0,9 - 1,9	PB 1502 / 3002	100
DY	1,0 - 2,4	PB 252 / 502	20
DY	1,0 - 2,4	PB 502 / 700	40
DY	1,0 - 2,4	PB 700 / 3002	60
DY	1,0 - 2,4	PB 3002	80
NA	1,2 - 2,6	PB 1502 / 3002	100
EP	1,3 - 2,1	PB 3002	60, 80
IY	1,4 - 2,4	PB 252	10
VC	1,5 - 2,7	PB 252 / 502	20
VC	1,5 - 2,7	PB 502 / 700 / 1502	40
VC	1,5 - 2,7	PB 1502	60, 80
VI	1,5 - 3,8	PB 252 / 502	20
VI	1,5 - 3,8	PB 502 / 700	40
VI	1,5 - 3,8	PB 700	60
JC	1,8 - 2,7	PB 700	20
JL	1,8 - 3,8	PB 1502 / 3002 ^{a)}	100
FL	2,0 - 4,3	PB 1502 / 3002 ^{a)}	100
FY	2,0 - 4,8	PB 252 / 502	20
FY	2,0 - 4,8	PB 502 / 700	40
FY	2,0 - 4,8	PB 700	60
FS	2,0 - 3,5	PB 1502 / 3002 ^{a)}	60, 80
FS	2,0 - 3,5	PB 3002 ^{a)}	40
AJ	2,6 - 4,2	PB 1502	60, 80
CW	2,7 - 4,1	PB 252	10

a) Actuator force above 39 kN not suitable for stem diameter 20mm



Valtek FlowTop FCD SAENTBV738 11/14 Printed in Europe

LENNTECH
WATER TREATMENT SOLUTIONS

info@lennotech.com Tel. +31-152-610-900

www.lennotech.com Fax. +31-152-616-289

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can (and often does) provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Operation Maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding any matter with respect to this product. Because Flowserve is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice. Should any question arise concerning these provisions, the purchaser/user should contact Flowserve Corporation at any one of its worldwide operations or offices.

© 2014 Flowserve Control Valves GmbH, Villach, Austria, Europe. Flowserve is a registered trademark of Flowserve Corporation.