FLOWSERVE

Valtek FlowTop™

High Performance Valve

DN 15 - 400, PN 10 - 40

Experience In Motion

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 19, 20)

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

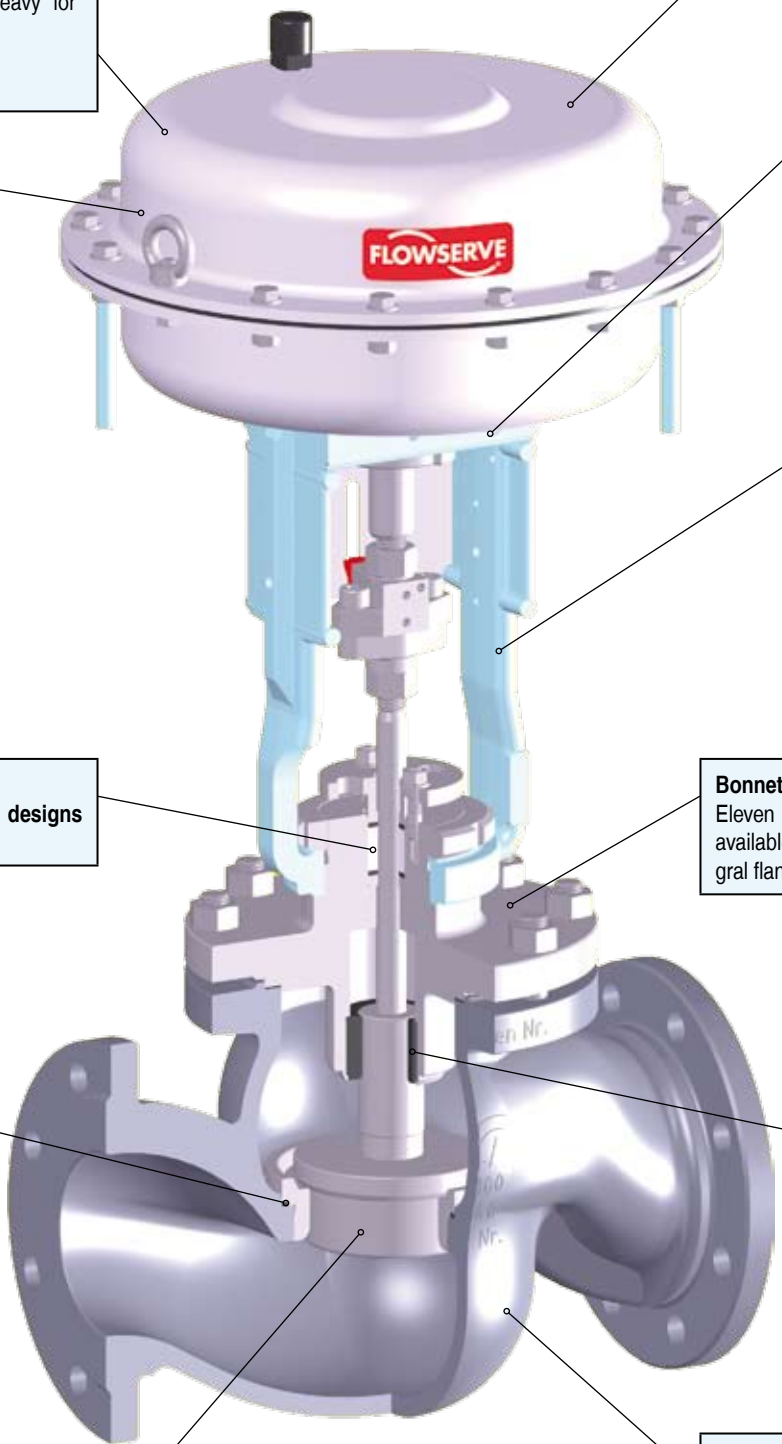
***High quality long life springs** properly aligned by spring plates.*

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

***High quality powder painted** carbon steel actuator cases - extremly corrosion resistant. Paint is durable and resistent 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**.*

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

Bonnet
Eleven different bonnet designs are available. Extremly **robust** design integral flange. *(see page 8 - 10)*

*The gasket seal provides **zero leakage** between seat and body.*

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

Trim
Nine standard trim designs and fourteen special trim designs are available.
(see page 12 - 18 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 3 - 7)

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.
Plug head 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 Teflon and Graphite. Live loading kits are retrofittable without modification to the valve.
Fugitive Emission Packing	Environmental packing design is available in accordance with „TA-Luft“ up to + 450 °C operating temperature.
Easy 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.
Field Reversible Actuator	Failure mode is easily reversed, using standard equipment.
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 RTN - Certificate according Safety Derictive 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	**D** . . . . Flanged PN **10** **16** **25** **40** DN **15** **20** **25** **32** **40** **50** **65** **80** **100** **125** **150** **200** 	1.0619 1.6220 1.4581 1.5419 1.4308	**Without Balancing** VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet VL Double Seal Bonnet VI Insulating Bonnet **V-Ring Balancing** ON Standard Bonnet OK Low Temperature Bonnet OI Insulating Bonnet **Piston-Ring Balancing** KR High Temperature Bonnet **Heavy Duty Design** SN Standard Bonnet *see page 8 - 10*	**adjustable** A Teflon B Graphite **spring loaded** N Teflon O Graphite Q Teflon TA-Luft V Graphite TA-Luft S Teflon-V-Ring System *see page 11*	**Parabolic Plug** PON Standard POD Partial Stellited POK Contour Stellited POW Soft Seated **Disk Plug** TON Standard TOW Soft Seated **Special Trim Equipment** see Special Brochure *see page 12 - 18*
	DS . . . Welded PN **40** DN **15** **25** **40** **50** **80** **100** **150** **200** 	1.0619 1.4581 1.5419 1.4308			
	H . . . . Flanged with Heating Jacket PN **10** **16** **25** **40** DN **25** **40** **50** **80** **100** **150** **200** Heating Jacket PN **25** DN **25** 	1.0619 1.4581	**Without Balancing** VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet VL Double Seal Bonnet **V-Ring Balancing** ON Standard Bonnet OK Low Temperature Bonnet **Piston-Ring Balancing** KR High Temperature Bonnet **Heavy Duty Design** SN Standard Bonnet *see page 8 - 10*		
	HS . . . Welded with Heating Jacket	On Request			

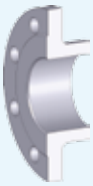
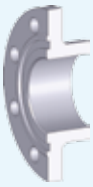
Body Design - „Four Flange“

Body Design	Type (Body) / Size	Body Material	Bonnet Design	Packing Design	Trim Design
4-Flange	**V** . . . . Flanged PN **10** **16** **25** **40** DN **25** **32** **40** **50** **65** **80** **100** **150** **200** **250** **300** **400** 	1.0619 1.6220 1.4581 1.5419 1.4308	**Without Balancing** VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet VL Double Seal Bonnet VI Insulating Bonnet **V-Ring Balancing** ON Standard Bonnet OK Low Temperature Bonnet OI Insulating Bonnet **Piston-Ring Balancing** KR High Temperature Bonnet **Heavy Duty Design** SN Standard Bonnet *see page 8 - 10*	**adjustable** A Teflon B Graphite **spring loaded** N Teflon O Graphite Q Teflon TA-Luft V Graphite TA-Luft S Teflon-V-Ring System *see page 11*	**Parabolic Plug** PON Standard POD Partial Stellited POK Contour Stellited POW Soft Seated **Disk Plug** TON Standard TOW Soft Seated **Special Trim Equipment** see Special Brochure *see page 12 - 18*
	VS . . . Welded PN **10** **16** **25** **40** DN **200** **250** **300** **400** 	1.0619 1.4581 1.5419 1.4308			
	G . . . . Flanged with Heating Jacket PN **10** **16** **25** **40** DN **200** **250** **300** **400** Heating Jacket PN **25** DN **25** 	1.0619 1.4581	**Without Balancing** VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet VL Double Seal Bonnet **V-Ring Balancing** ON Standard Bonnet OK Low Temperature Bonnet **Piston-Ring Balancing** KR High Temperature Bonnet **Heavy Duty Design** SN Standard Bonnet *see page 8 - 10*		
	GS . . . Welded with Heating Jacket	On Request			

Body Design - „Three Way“

Body Design	Type (Body) / Sizes	Body Material	Bonnet Design	Packing Design	Trim Design
3-Way	**W** . . . . Flanged PN **10** **16** **25** **40** DN **25** **32** **40** **50** **65** **80** **100** **150** **200**		1.0619 1.6220 1.4581 1.5419 1.4308	**Without Balancing** VN Standard Bonnet VB Bellow Seal Bonnet VR High Temperature Bonnet VK Low Temperature Bonnet VL Double Seal Bonnet **Heavy Duty Design** SN Standard Bonnet *see page 8 - 10*	**adjustable** A Teflon B Graphite **spring loaded** N Teflon O Graphite Q Teflon TA-Luft V Graphite TA-Luft S Teflon-V-Ring System *see page 11*	**Mixing** MOT Tenifer treated **Distributing** VOT Tenifer treated *see page 16 - 17*

Body Connecting Design - „Detail“

Body Design	Type (Body)		Old Design		New Design	
3-Flange 4-Flange 3-Way	. **K** . . . Raised Face (Form B1)		according to **DIN 2526**	**Form C**	according to **EN 1092-1**	**Form B1**
	. **Q** . . . Groove (Form D)			**Form N**		**Form D**
	. **Y** . . . Recess (Form F)			**Form R 13**		**Form F**
3-Flange 4-Flange	. **S** . . . Welded		according to **EN 12627**			

Body Pressure - Temperature Ratings

NOTICE → according to the relevant version of standards !
[1] MAWP = Maximum Allowable Working Pressure

PN	Body Material	Service Temperature in °C	-200	-60	- 40	-30	-10	20	100	150	200	250	300	350	400	450
10	1.0619	MAWP in bar [1] following EN 10213 AD 2000 W10		7,5	7,5	7,5	10	10	8,5	8,3	7,7	7,0	6,4	6,0	5,7	
	1.6220				10,0	10,0	10,0	10,0	7,5	7,1	6,8	6,6				
	1.4581			7,5	7,5	7,5	10,0	10,0	10,0	9,8	9,3	8,8	8,3	8,0	7,8	
	1.5419						10,0	10,0	10,0	10,0	10,0	9,2	8,0	7,6	6,9	6,4
	1.4308		10,0	10,0	10,0	10,0	10,0	10,0	9,0	8,1	7,4	6,9				
16	1.0619			12,0	12,0	12,0	16,0	16,0	13,7	13,3	12,4	11,3	10,2	9,6	9,1	
	1.6220				16,0	16,0	16,0	16,0	12,0	11,4	10,8	10,5				
	1.4581			12,0	12,0	12,0	16,0	16,0	16,0	15,6	14,9	14,1	13,3	12,8	12,4	
	1.5419						16,0	16,0	16,0	16,0	16,0	14,8	12,9	12,1	11,1	10,2
	1.4308		16,0	16,0	16,0	16,0	16,0	16,0	14,5	13,1	11,9	11,0				
25	1.0619			18,8	18,8	18,8	25,0	25,0	21,4	20,8	19,4	17,7	16,0	15,1	14,2	
	1.6220				25,0	25,0	25,0	25,0	18,8	17,9	16,9	16,4				
	1.4581			18,8	18,8	18,8	25,0	25,0	25,0	24,5	23,3	22,1	20,8	20,1	19,5	
	1.5419						25,0	25,0	25,0	25,0	25,0	23,2	20,2	19,0	17,3	16,0
	1.4308		25,0	25,0	25,0	25,0	25,0	25,0	22,7	20,4	18,6	17,2				
40	1.0619			30,0	30,0	30,0	40,0	40,0	34,2	33,3	31,0	28,3	25,7	24,1	22,8	
	1.6220				40,0	40,0	40,0	40,0	30,1	28,6	27,1	26,3				
	1.4581			30,0	30,0	30,0	40,0	40,0	40,0	39,2	37,3	35,4	33,3	32,1	31,2	
	1.5419						40,0	40,0	40,0	40,0	40,0	37,1	32,3	30,4	27,8	25,7
	1.4308		40,0	40,0	40,0	40,0	40,0	40,0	36,3	32,7	29,9	27,6				

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

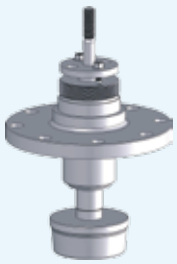
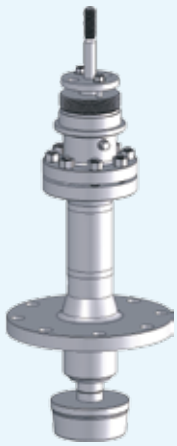
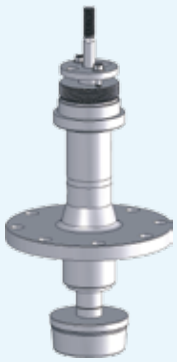
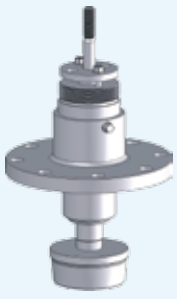
[2] recommended operating conditions, suitable up to - 10°C !

Body Material	Bonnet Design	Adjustable Packing A Teflon	Adjustable Packing B Graphite [2]	Spring loaded Packing N Teflon	Spring loaded Packing O Graphite [2]	Spring loaded Packing Q Teflon TA-Luft	Spring loaded Packing V Graphite [2] TA-Luft	Spring loaded Packing S Teflon V-Ring System
1.0619	**VN** Standard Bonnet	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250
	VB Bellows Seal Bonnet	- 60 ÷ + 250	+ 250 ÷ + 400	- 60 ÷ + 250	+ 250 ÷ + 400	- 60 ÷ + 250	+ 250 ÷ + 400	- 60 ÷ + 250
	VR High Temperature Bonnet	-	+ 250 ÷ + 400	-	+ 250 ÷ + 400	-	+ 250 ÷ + 400	-
	VK Low Temperature Bonnet	- 60 ÷ + 250	-	- 60 ÷ + 250	-	- 60 ÷ + 250	-	- 60 ÷ + 250
	VL Double Seal Bonnet	- 30 ÷ + 250	-	-	-	-	-	-
	ON Standard Bonnet - V-Ring balanced	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250
	OK Low Temperature Bonnet - V-Ring balanced	- 60 ÷ + 250	-	- 60 ÷ + 250	-	- 60 ÷ + 250	-	- 60 ÷ + 250
	KR High Temperature Bonnet - Piston-Ring balanced	-	+ 250 ÷ + 400	-	+ 250 ÷ + 400	-	+ 250 ÷ + 400	-
	SN Standard Bonnet - Heavy Duty Design	- 60 ÷ + 250	+ 250 ÷ + 400	- 60 ÷ + 250	+ 250 ÷ + 400	-	-	-
1.6220	**VK** Low Temperature Bonnet	- 40 ÷ + 250	-	- 40 ÷ + 250	-	- 40 ÷ + 250	-	- 40 ÷ + 250
	ON Standard Bonnet - V-Ring balanced	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250
1.4581	**VN** Standard Bonnet	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250
	VB Bellows Seal Bonnet	- 60 ÷ + 250	+ 250 ÷ + 400	- 60 ÷ + 250	+ 250 ÷ + 400	- 60 ÷ + 250	+ 250 ÷ + 400	- 60 ÷ + 250
	VR High Temperature Bonnet	-	+ 250 ÷ + 400	-	+ 250 ÷ + 400	-	+ 250 ÷ + 400	-
	VK Low Temperature Bonnet	- 60 ÷ + 250	-	- 60 ÷ + 250	-	- 60 ÷ + 250	-	- 60 ÷ + 250
	VL Double Seal Bonnet	- 30 ÷ + 250	-	-	-	-	-	-
	ON Standard Bonnet - V-Ring balanced	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250	-	- 30 ÷ + 250
	OK Low Temperature Bonnet - V-Ring balanced	- 60 ÷ + 250	-	- 60 ÷ + 250	-	- 60 ÷ + 250	-	- 60 ÷ + 250
	SN Standard Bonnet - Heavy Duty Design	- 60 ÷ + 250	+ 250 ÷ + 400	- 60 ÷ + 250	+ 250 ÷ + 400	-	-	-
1.5419	**VN** Standard Bonnet	- 10 ÷ + 250	-	- 10 ÷ + 250	-	- 10 ÷ + 250	-	- 10 ÷ + 250
	VR High Temperature Bonnet	-	+ 250 ÷ + 450	-	+ 250 ÷ + 450	-	+ 250 ÷ + 450	-
	KR High Temperature Bonnet - Piston-Ring balanced	-	+ 250 ÷ + 450	-	+ 250 ÷ + 450	-	+ 250 ÷ + 450	-
	SN Standard Bonnet - Heavy Duty Design	- 10 ÷ + 250	+ 250 ÷ + 450	- 10 ÷ + 250	+ 250 ÷ + 450	-	-	-
1.4308	**VB** Bellows Seal Bonnet	- 200 ÷ + 250	-	- 200 ÷ + 250	-	- 200 ÷ + 250	-	- 200 ÷ + 250
	VI Insulating Bonnet	- 200 ÷ + 250	-	- 200 ÷ + 250	-	- 200 ÷ + 250	-	- 200 ÷ + 250
	OI Insulating Bonnet - V-Ring balanced	- 200 ÷ + 80	-	- 200 ÷ + 80	-	- 200 ÷ + 80	-	- 200 ÷ + 80

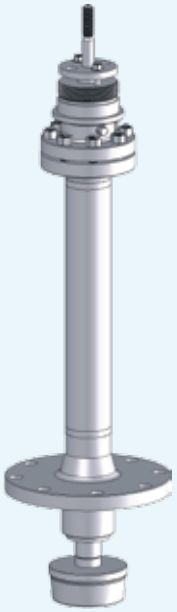
Maximal Allowable Working Temperature are finally depending on the Trim Temperature Range !
316SS or 1.4571 = - 200 ÷ + 450 → 316SS or 1.4571 + PTFE = - 200 ÷ + 250 → 1.4122 = - 60 ÷ + 450 °C

Permissible Ambient / Storage Temperature Range for Valves are - 40 ÷ + 80 °C → finally depending on the used Accessories !

Bonnet Design - „Unbalanced“ for DN 15 - 400

Bonnet Design	Type (Bonnet)		Material	Temperatur Range	Application	Packing Design
Without Balancing	. . **VN** . Standard Bonnet		depending on body material 1.0619 → **1.0460** 1.4581 → **1.4404** or **1.4571** 1.5419 → **1.5415**	- 30 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Universal use	**adjustable** A Teflon **spring loaded** N Teflon Q Teflon TA-Luft S Teflon V-Ring System *see page 11*
	. . **VB** . Bellows Seal Bonnet		depending on body material 1.0619 → **1.0460** 1.4581 → **1.4404** or **1.4571** 1.4308 → **1.4571**	- 200 ÷ + 400 °C *see also Working Temperature Range on Page 7*	Use by toxic, smell strong, fleeting, costly media or vacuum	**adjustable** A Teflon B Graphite **spring loaded** N Teflon O Graphite Q Teflon TA-Luft V Graphite TA-Luft S Teflon-V-Ring System *see page 11*
	. . **VR** . High Temperature Bonnet		depending on body material 1.0619 → **1.0460** 1.4581 → **1.4404** or **1.4571** 1.5419 → **1.5415**	+ 250 ÷ + 450 °C *see also Working Temperature Range on Page 7*	Use by possible overheating of packing and/or actuator	**adjustable** B Graphite **spring loaded** O Graphite V Graphite TA-Luft *see page 11*
	. . **VK** . Low Temperature Bonnet		depending on body material 1.0619 → **1.0460** 1.6220 → **1.0566** 1.4581 → **1.4404** or **1.4571**	- 60 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Use by possible icing of the packing	**adjustable** A Teflon **spring loaded** N Teflon Q Teflon TA-Luft S Teflon V-Ring System *see page 11*
	. . **VL** . Double Seal Bonnet		depending on body material 1.0619 → **1.0460** 1.4581 → **1.4404** or **1.4571**	- 30 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Use by vacuum operation	**adjustable** A Teflon *see page 11*

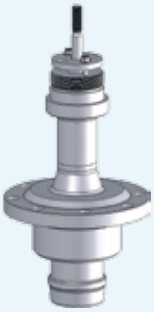
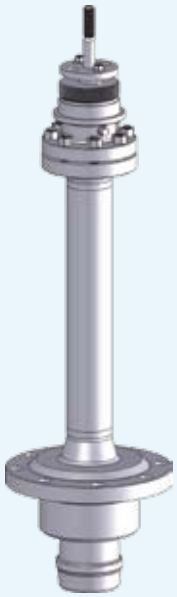
Bonnet Design - „Unbalanced“ for DN 15 - 400

Bonnet Design	Type (Bonnet)	Material	Temperature Range	Application	Packing Design
Without Balancing	. . **VI** . Insulating Bonnet 	depending on body material 1.4308 → **1.4571**	- 200 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Use by cryogenic service	**adjustable** A Teflon **spring loaded** N Teflon Q Teflon TA-Luft S Teflon V-Ring System *see page 11*

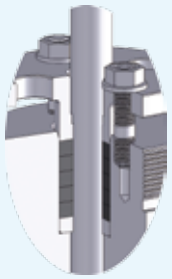
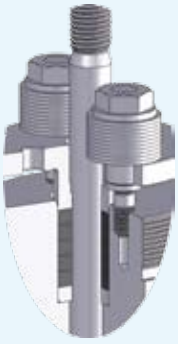
Bonnet Design - „Heavy Duty“ for DN 25 - 400

Bonnet Design	Type (Bonnet)	Material	Temperatur Range	Application	Packing Design
Heavy Duty Design	. . **SN** . Standard Bonnet 	depending on body material 1.0619 → **1.0460** 1.4581 → **1.4404** or **1.4571** 1.5419 → **1.5415**	- 60 ÷ + 450 °C *see also Working Temperature Range on Page 7*	Universal use by Electric multi turn Actuators	**adjustable** A Teflon B Graphite **spring loaded** N Teflon O Graphite *see page 11*

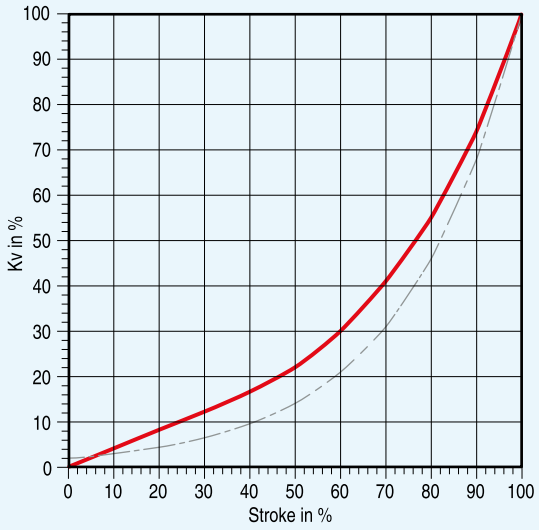
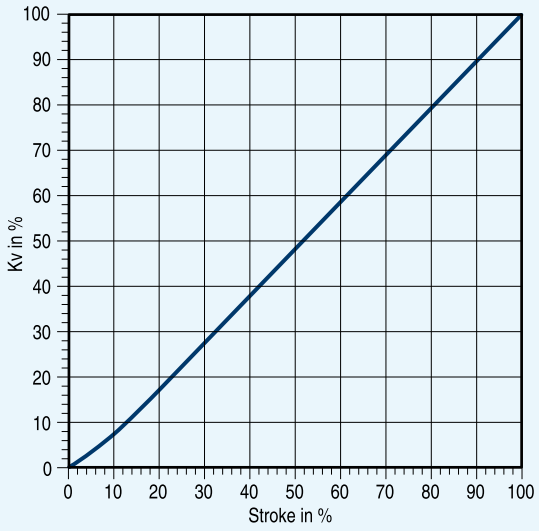
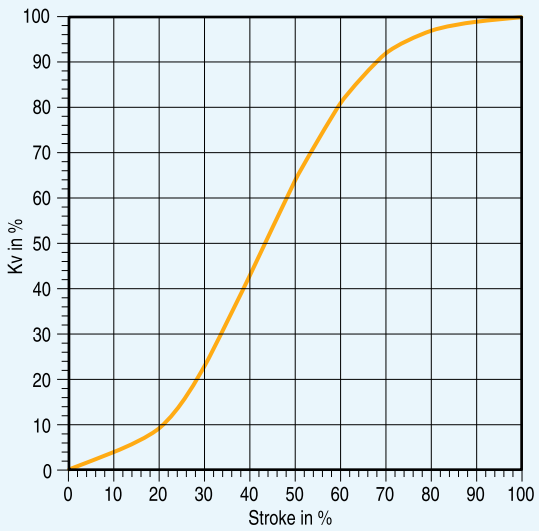
Bonnet Design - „Pressure Balanced“ for DN 65 - 400

Bonnet Design	Type (Bonnet)	Material	Temperature Range	Application	Packing Design
V-Ring Balancing	. . **ON** . Standard Bonnet 	depending on body material 1.0619 → **1.0460** 1.4581 → **1.4404** or **1.4571**	- 30 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Universal use	**adjustable** A Teflon **spring loaded** N Teflon Q Teflon TA-Luft S Teflon V-Ring System *see page 11*
	. . **OK** . Low Temperature Bonnet 	depending on body material 1.0619 → **1.0460** 1.6220 → **1.0566** 1.4581 → **1.4404** or **1.4571**	- 60 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Use by possible icing of the packing	**adjustable** A Teflon **spring loaded** N Teflon Q Teflon TA-Luft S Teflon V-Ring System *see page 11*
	. . **OI** . Insulating Bonnet 	depending on body material 1.4308 → **1.4571**	- 200 ÷ + 80 °C *see also Working Temperature Range on Page 7*	Use by cryogenic service	**adjustable** A Teflon **spring loaded** N Teflon Q Teflon TA-Luft S Teflon V-Ring System *see page 11*
Piston-Ring Balancing	. . **KR** . High Temperature Bonnet 	depending on body material 1.0619 → **1.0460** 1.5419 → **1.5415**	+ 250 ÷ + 450 °C *see also Working Temperature Range on Page 7*	Use by possible overheating of packing and/or actuator	**adjustable** B Graphite **spring loaded** O Graphite V Graphite TA-Luft *see page 11*

Packing Design - „Detail“

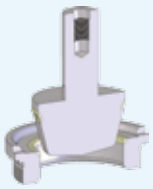
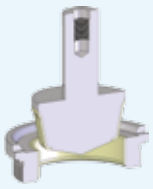
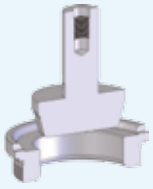
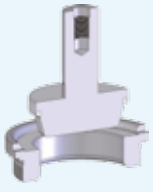
Packing Design	Type (Packing)		Material	Temperature Range	Application	Approvals
adjustable	. . . . **A** Teflon		**Packing Rings** Braided PTFE-Yarn impregnated with PTFE-Dispersion **Chamber Washers** PTFE-Carbon	- 200 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Universal chemical resistance.	BAM for gaseous oxigen FMPA for food application
	. . . . **B** Graphite		**Packing Rings** Braided Graphite made out of expanded pure Graphite-Yarn lubricated with a slip additive	- 10 ÷ + 450 °C *see also Working Temperature Range on Page 7*	Universal chemical resistance. Not suitable for oxidising media !	-
spring loaded	. . . . **N** Teflon		**Packing Rings** Braided PTFE-Yarn impregnated with PTFE-Dispersion **Chamber Washers** PTFE-Carbon	- 200 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Universal chemical resistance.	BAM for gaseous oxigen FMPA for food application
	. . . . **Q** Teflon „TA-Luft“		**Packing Rings** Braided Carbon-Yarn, covered with a sleeve of impregnated and lubricated PTFE-Yarn **Chamber Washers** PTFE-Carbon	- 200 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Universal chemical resistance.	BAM for gaseous oxigen TA-Luft ISO 15848-1
	. . . . **O** Graphite		**Packing Rings** Braided Graphite made out of expanded pure Graphite-Yarn lubricated with a slip additive	- 10 ÷ + 450 °C *see also Working Temperature Range on Page 7*	Universal chemical resistance. Not suitable for oxidising media !	-
	. . . . **V** Graphite „TA-Luft“					TA-Luft ISO 15848-1
	. . . . **S** Teflon „V-Ring“ System		**Packing Rings** Compression-molded PTFE-Yarn resp. PTFE-Carbon	- 200 ÷ + 250 °C *see also Working Temperature Range on Page 7*	Universal chemical resistance. Not suitable for abrasive media !	-

Valve Characteristic

Type (Trim)	**Application**
. . . . . **G** . Modified equal percentage Flow Characteristic *(Equal Percentage 1:50 only on request and shown as an example)*  	• The equal percentage characteristic is used for highly changeable differential pressure. • A „soft“ inlet characteristic alleviates pressure impulses for short closing times. • The equal percentage characteristic relates equal increments of travel to equal percentage increments of the corresponding kv-value. • The equal percentage characteristic is recommended for a pressure ratio of $\Delta p_0 / \Delta p_{100} > 2$
. . . . . **L** . Linear Flow Characteristic  	• The linear characteristic is used for constant differential pressure under different loads. • The linear characteristic relates equal increments of travel to equal increments of the Kv-value. • The linear characteristic is recommended for a pressure ratio of $\Delta p_0 / \Delta p_{100}$ 1 - 2
. . . . . **A** . On / Off Flow Characteristic with Throttle Lip  	• On / Off characteristic is mainly used for closing operations. • The stroke of the On / Off characteristic shows an approximate linear run up to a 1/4 of the seat diameter and furthermore enables the full flow area when open.

Trim Design - „Standard“

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 !

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		• clean • marginally contaminated with particles • low clogging potential for dirty service	gases, vapors and liquids	. . . . . **G** Flow direction **under** the plug	$\Delta p_I < x_{FZ} \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	none - noise reduction with Special Trim Equipment or Noise Insulating provided by customer
	PON . . . . standard 1.4122					$\Delta p_I < (x_{FZ}+0{,}10) \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	
	POH . . . . hardened 1.4122					$\Delta p_I < (x_{FZ}+0{,}15) \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	
	POD . . . . partial stellited *(seat surface)* 316SS or 1.4571					$\Delta p_I < (x_{FZ}+0{,}10) \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	
	POK . . . . full stellited *(contour)* 316SS or 1.4571					$\Delta p_I < (x_{FZ}+0{,}15) \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	
	POW . . . . soft seated 316SS or 1.4571 + PTFE					$\Delta p_I < x_{FZ} \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	
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						

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

Contoured Plug

Characteristic: modified - equal percentage

[1) 2)] if Body Material **1.0619** respectively **1.5419** than Trim Material **316SS** or **1.4571** or **1.4122** !
if Body Material **1.4581** or **1.6220** respectively **1.4308** than Trim Material **316SS** or **1.4571** only !

EXCLUSION:
if Body Material **1.0619** respectively **1.5419** and **SN** Standard Bonnet than Trim Material **1.4122** only !

kvs (m³/h)	Seat Ø	Guide of Plug [4)]	Material / Design						Possible seat diameter depends on nominal size DN															
			316SS [5)] or 1.4571 [1)]				1.4122 [2)]		15	20	25	32	40	50	65	80	100	125	150	200	250	300	400	
			standard	partial stellited	full stellited	soft seated	standard	hardened	Stroke = 20 mm						40 mm			60 mm		80 mm			100	
0,010	3	1			●				●	●	●													
0,016	3	1			●				●	●	●													
0,025	3	1			●				●	●	●													
0,040	3	1			●				●	●	●													
0,063	4	1			●				●	●	●													
0,10	4	1			●				●	●	●													
0,16	4	1			●			●	●	●	●													
0,25	4	1			●			●	●	●	●													
0,40	4	1	●		●		●	●	●	●	●													
0,63	6	1	●		●	● [3)]	●	●	●	●	●													
1,0	8	1	●		●	● [3)]	●	●	●	●	●													
1,6	8	1	●		●	● [3)]	●	●	●	●	●													
2,5	10	1	●		●	●	●	●	●	●	●													
4,0	12	1	●	●	●	●	●	●	●	●	●													
5,6	16	1	●	●	●	●	●	●	●															
6,3	16	1	●	●	●	●	●	●		●	●	●	●											
8,0	20	1	●	●	●	●	●	●		●														
10	20	1/2	●	●	●	●	●	●			●	●	●	●										
14	25	1/2	●	●	●	●	●	●			●													
16	25	1/2	●	●	●	●	●	●				●	●	●										
22,4	34	1/2	●	●	●	●	●	●				●												
25	34	1/2	●	●	●	●	●	●					●	●	●									
31,5	40	1/2	●	●	●	●	●	●					●											
40	42	1/2	●	●	●	●	●	●						●	●	●								
47,5	50	1/2	●	●	●	●	●	●						●										
63	53	1/2	●	●	●	●	●	●							●	●	●	●						
80	67	1/2	●	●	●	●	●	●							●									
100	67	1/2	●	●	●	●	●	●								●	●	●	●					
125	80	1/2	●	●	●	●	●	●								●								
160	84	1/2	●	●	●	●	●	●									●	●	●					
180	100	1/2	●	●	●	●	●	●									●							
200	100	1/2	●	●	●	●	●	●												●				
250	105	1/2	●	●	●	●	●	●										●	●					
355	125	1/2	●	●	●	●	●	●												●	●			
355	130	1/2	●	●	●	●	●	●											●					
450	150	1/2	●	●	●	●	●	●												●	●	●		
710	200	1/2	●	●	●	●	●	●													●	●		
900	200	1/2	●	●	●	●	●	●															●	
1000	250	1/2	●	●	●	●	●	●														●		
1100	250	1/2	●	●	●	●	●	●															●	
1400	300	1/2	●	●	●	●	●	●															●	
1800	350	1/2	●	●	●	●	●	●															●	

EXCLUSION:
Stroke = 10 mm only !

[3)] if Seat ø **< 10 mm** than Soft Seat Facing **= 10,5 mm** only !

[4)] if Guide of Plug = **2** (Top and Bottom) than **4-Flange Body** only !

[5)] 316SS means made of 1.4404 or 1.4571 !

Contoured Plug

Characteristic: linear

[1) 2)] if Body Material **1.0619** respectively **1.5419** than Trim Material **316SS** or **1.4571** or **1.4122** !
if Body Material **1.4581** or **1.6220** respectively **1.4308** than Trim Material **316SS** or **1.4571** only !

EXCLUSION:
if Body Material **1.0619** respectively **1.5419** and **SN** Standard Bonnet than Trim Material **1.4122** only !

kvs (m³/h)	Seat Ø	Guide of Plug [3)]	Material / Design						Possible seat diameter depends on nominal size DN														
			316SS or 1.4571 [1)]				1.4122 [2)]		15	20	25	32	40	50	65	80	100	125	150	200	250	300	400
			standard	partial stellited	full stellited	soft seated	standard	hardened	Stroke = 20 mm						40 mm			60 mm		80 mm			100
4,0	12	1	●	●	●	●	●	●	●	●	●												
5,6	16	1	●	●	●	●	●	●	●														
6,3	16	1	●	●	●	●	●	●		●	●	●	●										
8,0	20	1	●	●	●	●	●	●		●													
10	20	1/2	●	●	●	●	●	●			●	●	●	●									
14	25	1/2	●	●	●	●	●	●			●												
16	25	1/2	●	●	●	●	●	●				●	●	●									
22,4	34	1/2	●	●	●	●	●	●				●											
25	34	1/2	●	●	●	●	●	●					●	●	●								
31,5	40	1/2	●	●	●	●	●	●					●										
40	42	1/2	●	●	●	●	●	●						●	●	●							
47,5	50	1/2	●	●	●	●	●	●						●									
63	53	1/2	●	●	●	●	●	●							●	●	●	●					
80	67	1/2	●	●	●	●	●	●							●								
100	67	1/2	●	●	●	●	●	●								●	●	●	●				
125	80	1/2	●	●	●	●	●	●								●							
160	84	1/2	●	●	●	●	●	●									●	●	●				
180	100	1/2	●	●	●	●	●	●									●						
200	100	1/2	●	●	●	●	●	●												●			
250	105	1/2	●	●	●	●	●	●										●	●				
355	125	1/2	●	●	●	●	●	●												●	●		
355	130	1/2	●	●	●	●	●	●											●				
450	150	1/2	●	●	●	●	●	●												●	●	●	
710	200	1/2	●	●	●	●	●	●													●	●	
1000	250	1/2	●	●	●	●	●	●														●	
1250	200	1/2	●	●	●	●	●	●															●
1800	250	1/2	●	●	●	●	●	●															●
2500	300	1/2	●	●	●	●	●	●															●
2800	350	1/2	●	●	●	●	●	●															●

[3)] if Guide of Plug = **2** (Top and Bottom) than **4-Flange Body** only !

Disk Plug

Characteristic: on / off

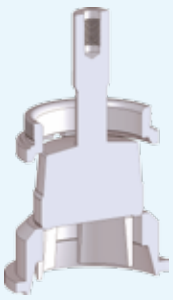
[1) 2)] if Body Material **1.0619** respectively **1.5419** than Trim Material **316SS** or **1.4571** or **1.4122** !
if Body Material **1.4581** or **1.6220** respectively **1.4308** than Trim Material **316SS** or **1.4571** only !

EXCLUSION:
if Body Material **1.0619** respectively **1.5419** and **SN** Standard Bonnet than Trim Material **1.4122** only !

kvs (m³/h)	Seat Ø	Guide of Plug	Material / Design			Possible seat diameter depends on nominal size DN															
			316SS or 1.4571 [1)]		1.4122 [2)]	15	20	25	32	40	50	65	80	100	125	150	200	250	300	400
			standard	soft seated	standard	Stroke = 20 mm						40 mm			60 mm		80 mm			100
6,3	16	1	●	●	●	●														
9	20	1	●	●	●		●													
16	25	1	●	●	●			●												
25	34	1	●	●	●				●											
35,5	40	1	●	●	●					●										
53	50	1	●	●	●						●									
90	67	1	●	●	●							●								
140	80	1	●	●	●								●							
200	100	1	●	●	●									●						
285	105	1	●	●	●										●					
400	130	1	●	●	●											●				
630	150	1	●	●	●												●			
1000	200	1	●	●	●													●		
1600	250	1	●	●	●														●	
3150	350	1	●	●	●															●

Trim Design - „Three Way“

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 !

Type (Trim) **/ Material** Characteristic . . . . . **L** . → linear		**Medium**		**Flow**	**max. allowable Differential Pressure**	**Noise Reduction**
Mixing Plug	**MOT** . . . . tenifer treated 316SS or 1.4571 	• clean • marginally contaminated with particles • low clogging potential for dirty service	gases, vapors and liquids	. . . . . **G** Flow direction **under** the plug	$\Delta p_l < x_{FZ} \cdot (p_1 - p_v)$ $\Delta p_C < x_T \cdot p_1$	none - noise reduction with Special Trim Equipment or Noise Insulating provided by customer
	MON . . . . standard 1.4122				$\Delta p_l < (x_{FZ} + 0{,}10) \cdot (p_1 - p_v)$ $\Delta p_C < x_T \cdot p_1$	
Distributing Plug	**VOT** . . . . tenifer treated 316SS or 1.4571 				$\Delta p_l < x_{FZ} \cdot (p_1 - p_v)$ $\Delta p_C < x_T \cdot p_1$	
	VON . . . . standard 1.4122				$\Delta p_l < (x_{FZ} + 0{,}10) \cdot (p_1 - p_v)$ $\Delta p_C < x_T \cdot p_1$	

Characteristic values of incompressible fluids $\Delta p_l \rightarrow x_{FZ} \rightarrow$ **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)

Mixing Plug
Characteristic: linear

[1) 2)] if Body Material **1.0619** respectively **1.5419** than Trim Material **316SS** or **1.4571** or **1.4122** !
if Body Material **1.4581** or **1.6220** respectively **1.4308** than Trim Material **316SS** or **1.4571** only !

EXCLUSION:
if Body Material **1.0619** respectively **1.5419** and **SN** Standard Bonnet than Trim Material **1.4122** only !

kvs (m^3/h)	Seat Ø	Guide of Plug	Material / Design 316SS or 1.4571 [1)] tenifer treated	1.4122 [2)] standard	Possible seat diameter depends on nominal size DN 25	32	40	50	65	80	100	150	200
					Stroke = 20 mm				40 mm			60 mm	80 mm
6,3	25	2	●	●	●								
10	25	2	●	●	●								
10	34	2	●	●		●							
16	34	2	●	●		●							
16	40	2	●	●			●						
25	40	2	●	●			●						
25	50	2	●	●				●					
40	50	2	●	●				●					
40	67	2	●	●					●				
47,5	50	2	●	●				●					
63	67	2	●	●					●				
63	80	2	●	●						●			
80	67	2	●	●					●				
100	80	2	●	●						●			
100	100	2	●	●							●		
125	80	2	●	●						●			
160	100	2	●	●							●		
180	100	2	●	●							●		
180	130	2	●	●								●	
250	130	2	●	●								●	
355	130	2	●	●								●	
450	150	2	●	●									●

Distributing Plug

Characteristic: linear

[1] [2] if Body Material **1.0619** respectively **1.5419** than Trim Material **316SS** or **1.4571** or **1.4122** !
if Body Material **1.4581** or **1.6220** respectively **1.4308** than Trim Material **316SS** or **1.4571** only !

EXCLUSION:
if Body Material **1.0619** respectively **1.5419** and **SN** Standard Bonnet than Trim Material **1.4122** only !

kvs (m³/h)	Seat Ø	Guide of Plug	Material / Design		Possible seat diameter depends on nominal size DN								
			316SS or 1.4571 [1]	1.4122 [2]	25	32	40	50	65	80	100	150	200
			tenifer treated	standard	Stroke = 20 mm				40 mm			60 mm	80 mm
6,3	25	2	●	●	●								
10	25	2	●	●	●								
10	34	2	●	●		●							
16	34	2	●	●		●							
16	40	2	●	●			●						
25	40	2	●	●			●						
25	50	2	●	●				●					
40	50	2	●	●				●					
40	67	2	●	●					●				
63	67	2	●	●					●				
63	80	2	●	●						●			
100	80	2	●	●						●			
100	100	2	●	●							●		
160	100	2	●	●							●		
180	130	2	●	●								●	
250	130	2	●	●								●	
450	150	2	●	●									●

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	1 : 30	●	●																								
	1 : 50		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Special	1 : 70		●	●	●	●	●	●	●																		
	1 : 100									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Leakage Class for Control Function acc. IEC 60534-4:2006-06 resp. ANSI / FCI 70-2

[1] LF = Leakage rate factor → see IEC 60534-4 Remark 2

Bonnet Design	Type / Trim Design	Leakage Class acc. IEC 60534	Test Medium	Test Pressure (bar)	max. Seat Leakage	Leakage Code
Without Balancing	. . . **P** . . . metal to metal seated	IV	Liquid	Working Pressure	0,000 1 · kvs	IV L 2
	. . . **Q** . . . metal to metal seated, ground in	IV-S1 (IEC only)	Liquid	Working Pressure	0,000 005 · kvs	IV-S1 L 2
	. . . **S** . . . metal to metal seated, ground in, incrased seal force	V	Liquid	Working Pressure	0,000 000 18 · Δp · DN	V L 2
	. . . **T** . . . soft seated	VI	Gas	Working Pressure, max. 4	0,003 · Δp · LF [1]	VI G 1
V-Ring Balancing	. . . **P** . . . metal to metal seated	IV	Liquid	Working Pressure	0,000 1 · kvs	IV L 2
	. . . **Q** . . . soft seated	IV-S1 (IEC only)	Liquid	Working Pressure	0,000 005 · kvs	IV-S1 L 2
Piston-Ring Balancing	. . . **O** . . . metal to metal seated	III	Liquid	Working Pressure	0,001 · kvs	III L 2

Leakage Class for On / Off Function acc. DIN EN 12266-1:2003-06

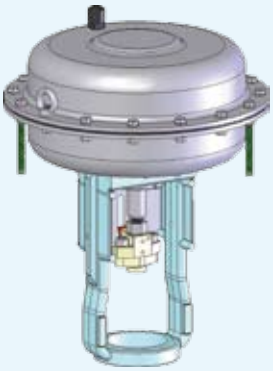
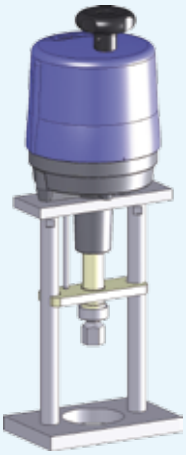
Bonnet Design	Type / Trim Design	Leakage Class acc. EN 12266	Test Medium	Test Pressure (bar)	max. Seat Leakage
Without Balancing	. . . **A** . . . metal to metal seated	A	Liquid	Working Pressure · 1,1	no leakage viewable
	. . . **B** . . . metal to metal seated, ground in		Gas	Working Pressure, max. 6	
	. . . **B** . . . soft seated			Working Pressure, max. 6	

Special Trim Equipment - Details see Special Brochure SAENBRNOIS-00

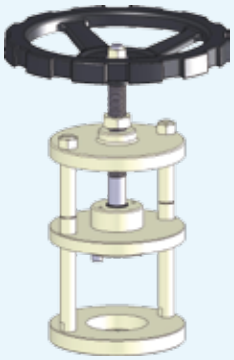
NOTICE → expert knowledge is required for the selection of Trim !
The specified datas are used for a rough orientation only and may not taken for dimensioning !

Type (Trim) Characteristic . . . . . **G** . → mod. equal per. or . . . . . **L** . → linear			**Medium**		**Flow**	**Differenrial Pressure**	**Noise Reduction**
SilentPack	**PK**		• clean • high clogging potential for dirty service	Gases and Vapors	. . . . . **G** Flow direction **under** the plug	Type all Standard Trim $\Delta p_C < 0{,}5 \cdot p_1$	max. - 18 dB(A)
MultiStream	**PC**		• clean • marginally contaminated with particles • low clogging potential for dirty service			Type all Standard Trim $\Delta p_C < x_T \cdot p_1$	max. - 10 dB(A)
	PE						max. - 15 dB(A)
	PG						max. - 20 dB(A)
	PD			Liquids		Type P . N → 316SS or 1.4571 P . W → 316SS or 1.4571 $\Delta p_l < x_{FZ} \cdot (p_1 - p_V)$	max. - 4 dB(A)
	PF					Type P . N → 1.4122 P . D → 316SS or 1.4571 $\Delta p_l < (x_{FZ}+0{,}10) \cdot (p_1 - p_V)$	max. - 8 dB(A)
	PH					Type P . H → 1.4122 P . K → 316SS or 1.4571 $\Delta p_l < (x_{FZ}+0{,}15) \cdot (p_1 - p_V)$	max. - 10 dB(A)
	PI					Type P . N → 316SS or 1.4571 P . W → 316SS or 1.4571 $\Delta p_l < (x_{FZ}+0{,}10) \cdot (p_1 - p_V)$	max. - 6 dB(A)
	PQ					Type P . N → 1.4122 P . D → 316SS or 1.4571 $\Delta p_l < (x_{FZ}+0{,}15) \cdot (p_1 - p_V)$	max. - 12 dB(A)
	PW					Type P . H → 1.4122 P . K → 316SS or 1.4571 $\Delta p_l < (x_{FZ}+0{,}20) \cdot (p_1 - p_V)$	max. - 16 dB(A)
Multi Hole Plug	**LO**		• clean • high clogging potential for dirty service	Gases, Vapors and Liquids	. . . . . **G** Flow direction **under** or . . . . . **I** **over** the plug for Gases and Vapors . . . . . **G** Flow direction **over** the plug for Liquids only	$\Delta p_l < (x_{FZ}+0{,}20) \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	max. - 15 dB(A)
RLS Radial Multi-Step System	**AO**						max. - 30 dB(A)
	BO					$\Delta p_l < (x_{FZ}+0{,}10) \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	
	DO						

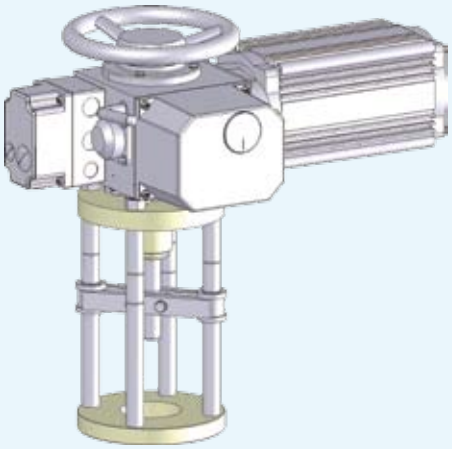
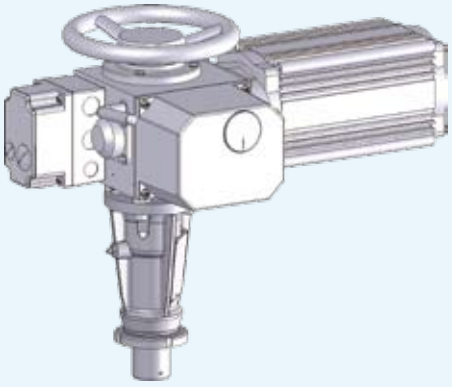
Actuator - „Linear Style“

Actuator Design	Type (Actuator) / Size	min. - max. Force	Air / Power Supply	Failure Position	Hand Wheel
pneumatic operated	**IT 127 252 502 700** **PB 127 252 502 700 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	• without • top mounted *(option)* • side mounted *(option)* *depending on Actuator Size*
electric operated	**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 / 2 4,5 / 4,5 8 / 6 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	• side mounted

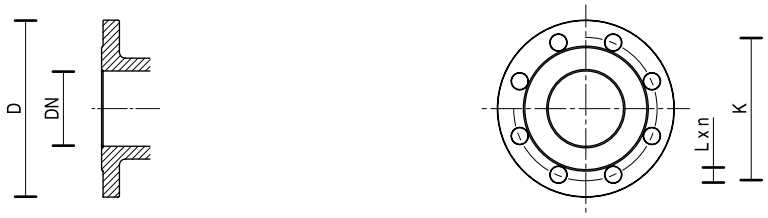
Actuator - „Linear Style“

Actuator Design	Type / Size	min. - 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
Linear thrust Unit „heavy“ only linked to the bonnet **SN** and an electric multi turn actuator	**SI 15** **35** **36** **75** **120** **200** **300** Manufacturer: **Flowserve Villach Operation** 	15 000 N ÷ 288 000 N *depending on Linear thrust Unit Size*	30 Nm ÷ 1700 Nm *depending on Linear thrust Unit Size*	Output drive ISO 5210 B3 Connection Flange ISO 5210 F10 F14 F16 F25 *depending on Linear thrust Unit Size*	adapted for electrical multi turn actuators with output drives version „bore“ with keyway

Flanged Body Connecting Dimensions



DN			15	20	25	32	40	50	65	80	100	125	150	200	250	300	400
Nominal Pressure 10	D	Outside Diameter	Connecting Dimensions see PN 40						Connecting Dimensions see PN 16					340	395	445	565
	K	Pitch Circle Diameter												295	350	400	515
	n	Number of Bolts												8	12	12	16
	L	Hole Diameter												23	23	23	26
	Gw	Size of Bolts												M 20	M 20	M 20	M 24
Nominal Pressure 16	D	Outside Diameter	Connecting Dimensions see PN 40						185	200	220	250	285	340	405	460	580
	K	Pitch Circle Diameter							145	160	180	210	240	295	355	410	525
	n	Number of Bolts							4	8	8	8	8	12	12	12	16
	L	Hole Diameter							19	19	19	19	23	23	28	28	30
	Gw	Size of Bolts							M 16	M 16	M 16	M 16	M 20	M 20	M 24	M 24	M 27
Nominal Pressure 25	D	Outside Diameter	Connecting Dimensions see PN 40									270	300	360	425	485	620
	K	Pitch Circle Diameter										220	250	310	370	430	550
	n	Number of Bolts										8	8	12	12	16	16
	L	Hole Diameter										28	28	28	31	31	36
	Gw	Size of Bolts										M 24	M 24	M 24	M 27	M 27	M 33
Nominal Pressure 40	D	Outside Diameter	95	105	115	140	150	165	185	200	235	270	300	375	450	515	660
	K	Pitch Circle Diameter	65	75	85	100	110	125	145	160	190	220	250	320	385	450	585
	n	Number of Bolts	4	4	4	4	4	4	8	8	8	8	8	12	12	16	16
	L	Hole Diameter	14	14	14	18	18	18	18	18	22	26	26	30	33	33	39
	Gw	Size of Bolts	M12	M12	M 12	M 16	M 16	M 16	M 16	M 16	M 20	M 24	M 24	M 27	M 30	M 30	M 36

Connecting Dimensions according to EN 1092 - 1 : 2007 in Millimeters

Prefered Dimensions of Body Welding Ends

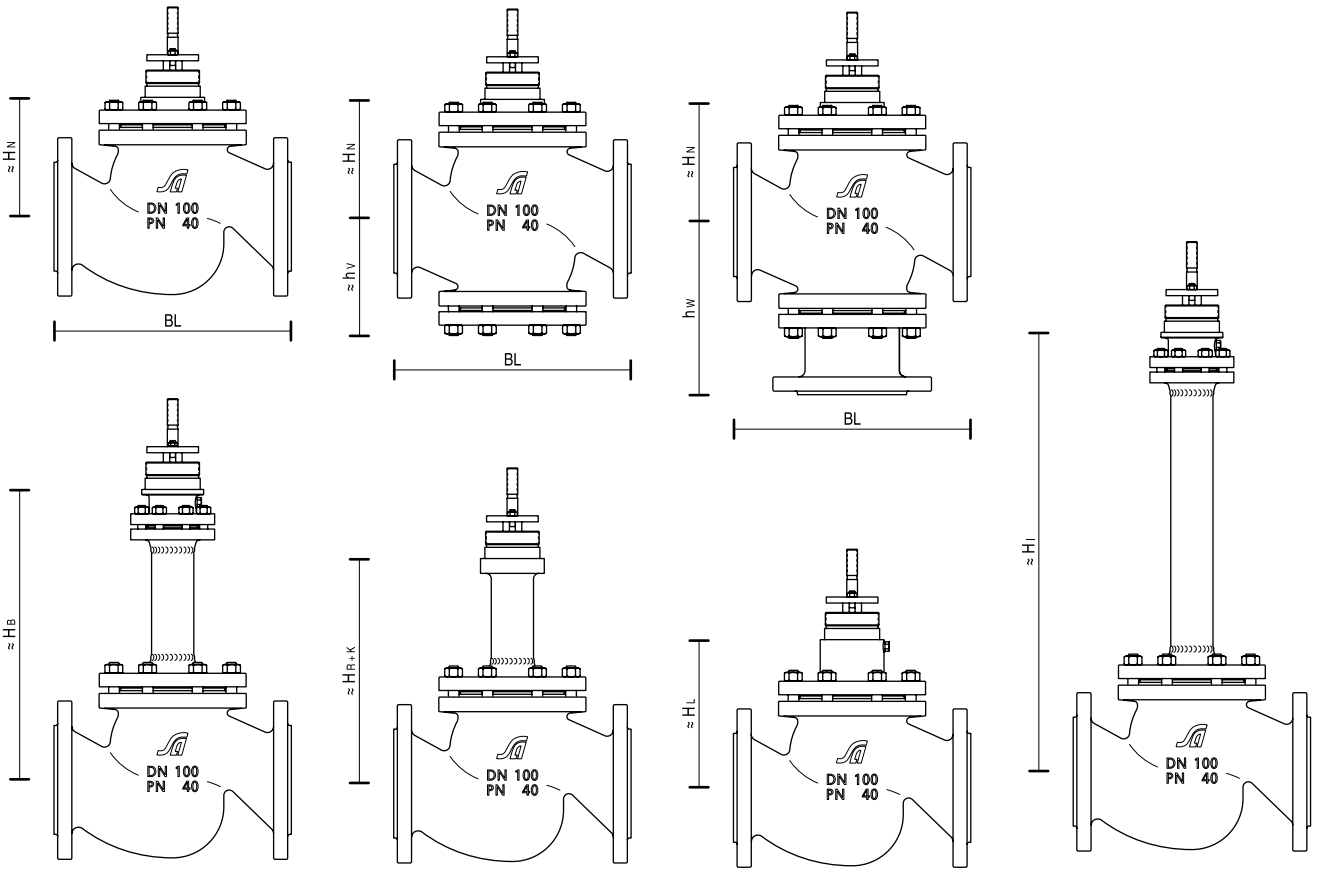
DN			15	20	25	32	40	50	65	80	100	125	150	200	250	300	400
	A	Valve Outside Diameter	22		35		50	62		91	117		172	223	278	329	413
	B	Valve Inside Diameter	17,3		28,5		43,1	54,5		82,5	107,1		159,3	206,5	B = øD - 2xT		
	D	*Pipe Outside Diameter*	*21,3*		*33,7*		*48,3*	*60,3*		*88,9*	*114,3*		*168,3*	*219,1*	*273,0*	*323,9*	*406,4*
Nominal Pressure 10	*T*	*Pipe Thickness*	*2,0*	-	*2,6*	-	*2,6*	*2,9*	-	*3,2*	*3,6*	-	*4,5*	*6,3*	*6,3*	*7,1*	*7,1*
Nominal Pressure 16																	*8,0*
Nominal Pressure 25															*7,1*	*8,0*	*8,8*
Nominal Pressure 40																	*11,0*

Connecting Dimensions according to EN 12627 - Figure 2 : 1999 in Millimeters

Dimensions and Weights

Three Flange, Four Flange, Three-Way Valve

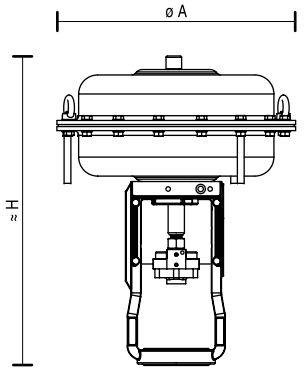
(Values in Millimeter → mm respectively Kilogram → kg)



Description		Nominal Size DN														
		15	20	25	32	40	50	65	80	100	125	150	200	250	300	400
Stroke		20						40			60		80			100
BL	Face to Face Dimensions acc. to EN 558-1 Basic Line 1	130	150	160	180	200	230	290	310	350	400	480	600	730	850	1100
≈ hV	Centerline to Bottom Flange Dimension			95	110	110	115	165	165	175		260	350	430	470	540
hW	Centerline to Flange Tube Dimension			130	150	150	175	225	225	260		350	545			
≈ Height	HN for Standard Bonnet	105	105	105	120	120	120	170	170	175	270	270	370	460	490	560
	HB for Bellows Seal Bonnet	265	265	265	265	265	265	420	420	420	660	660	760	765	770	1280
	HR+K for High / Low Temperature Bonnet	220	220	220	220	220	220	310	310	310	445	445	510	600	630	700
	HL for Double Seal Bonnet	145	145	145	150	150	150	220	220	220	270	295	360	410	410	
	HI for Insulating Bonnet	650	650	650	650	650	650	650	650	650	670	670	800	800	800	800
≈ Weight for Valves with Three-Flange Body	and Standard-Bonnet	5	6	7	11	12	16	30	35	50	70	95	218			
	and Bellows Seal Bonnet	9	10	11	15	16	20	34	39	54	84	109	234			
	and High / Low Temperature Bonnet	7	8	9	13,5	14,5	18,5	32	37	52	74	99	221			
	and Double Seal Bonnet	6	7	8	12,5	13,5	17,5	32	37	52	72	96	220			
	and Insulating Bonnet	8	9	10	14	15	19	33	38	53	83	108	233			
≈ Weight for Valves with Four-Flange Body	and Standard Bonnet			10	14	17	23	38	48	64		120	278	526	694	1355
	and Bellows Seal Bonnet			14	18	21	27	42	52	68		134	297	543	711	1385
	and High / Low Temperature Bonnet			12	16,5	19,5	25,5	40	50	66		124	281	528	697	1360
	and Double Seal Bonnet			11	15,5	18,5	24,5	40	50	66		122	280	528	696	
	and Insulating Bonnet			13	17	20	26	41	51	67		133	297	543	711	1365
≈ Weight for Three-Way Valves	and Standard Bonnet			11	18	19	25	45	51	72		152	320			
	and Bellows Seal Bonnet			15	22	23	29	49	55	76		164	345			
	and High / Low Temperature Bonnet			13	21	22	27	47	53	74		154	327			
Flanges drilled and dimensioned acc. to		EN 1092-1, Form B1, F, D														
Welded ends comply with		EN 12627 - 2														

Pneumatic linear Actuator
with multi-function Yoke

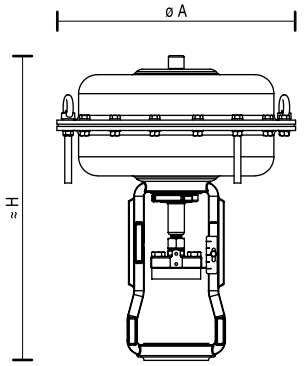
(Values in Millimeter → mm respectively Kilogram → kg)



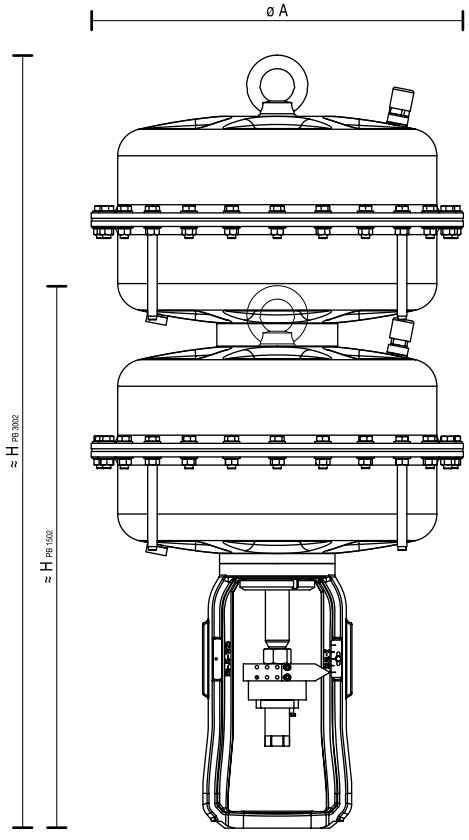
Description	Area (cm²)	125	250	500		700	
	Stroke	10 / 20		20	40	20	40
Ø A		198	265	352	352	405	405
≈ H		320	335	455	560	545	550
≈ Weight		11	16	31	40	46	46

Pneumatic linear Actuator
with NAMUR-Yoke

(Values in Millimeter → mm respectively Kilogram → kg)



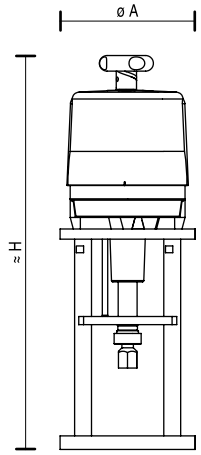
Description	Area (cm²)	250	500		700		
	Stroke	10 / 20	20	40	20	40	60
Ø A		265	352	352	405	405	405
≈ H		330	420	450	545	545	600
≈ Weight		16	31	40	46	46	46



Description	Area (cm²)	1500	3000
	Stroke	20 / 40 / 60 / 80 / 100	40 / 60 / 80 / 100
Ø A		548	548
≈ H		800	1140
≈ Weight		124	240

PSL - Electric linear Actuator

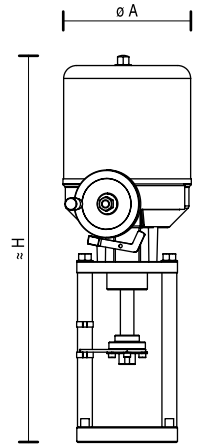
(Values in Millimeter → mm respectively Kilogram → kg)



Description	Electric linear Actuator	AB 201	AB 202	AB 204	AB 208	AB 210
	Stroke	20	20 / 40			
Ø 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

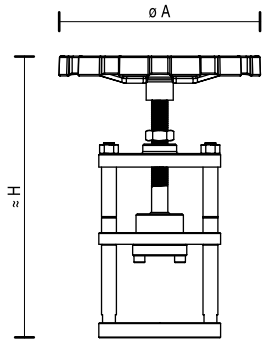
(Values in Millimeter → mm respectively Kilogram → kg)



Description	Electric linear Actuator	EB 1,2	EB 4,5	EB 8	EB 12	EB 20	EB 25
	Stroke	10 / 20	20 / 40 / 60 / 80			40 / 60 / 80	
Ø 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

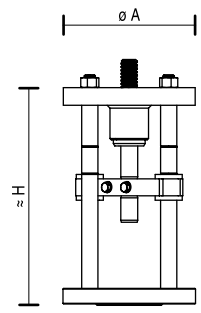
(Values in Millimeter → mm respectively Kilogram → kg)



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

Linear thrust Unit „light“

(Values in Millimeter → mm respectively Kilogram → kg)

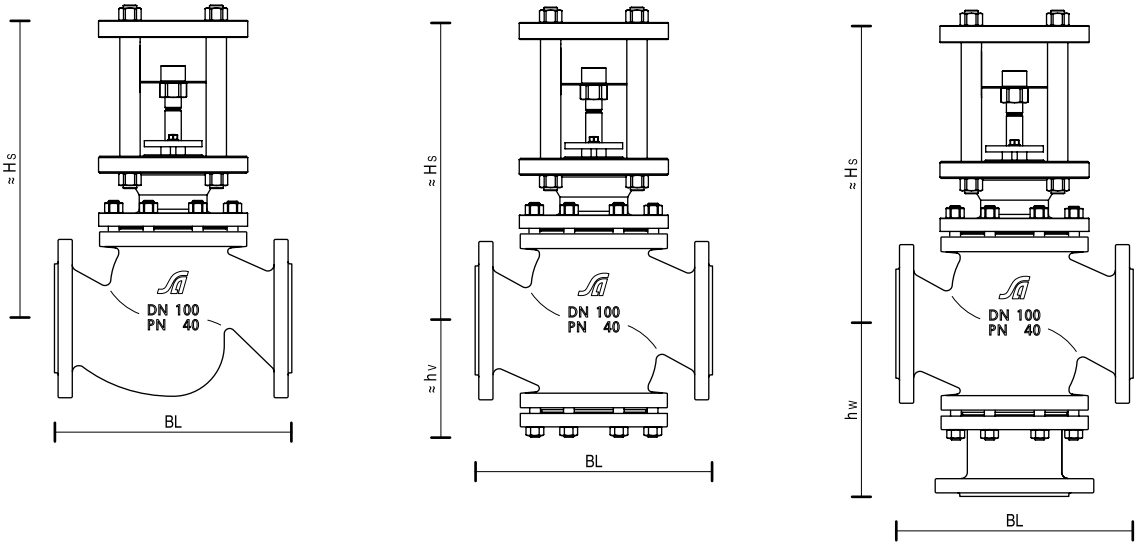


Description	Linear thrust Unit	LB 12	LB 16	LB 20
	Stroke	20	40	60 / 80
Ø A		196	196	196
≈ H		240	320	407
≈ Weight		12	17	20

Dimensions and Weights

Three Flange, Four Flange, Three-Way Valve with „Heavy Duty“ Bonnet only

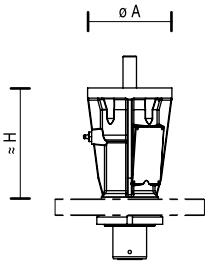
(Values in Millimeter → mm respectively Kilogram → kg)



Description		Nominal Size DN									
		25	40	50	80	100	150	200	250	300	400
Stroke		20			40		60	80			100
BL	Face to Face Dimensions acc. to EN 558-1 Basic Line 1	160	200	230	310	350	480	600	730	850	1100
≈ hv	Centerline to Bottom Flange Dimension	95	110	115	165	175	235	350	430	470	540
hw	Centerline to Flange Tube Dimension	130	150	175	225	260	350	545			
≈ Hs	for Standard Bonnet „Heavy Duty Design“	260	270	275	440	460	585	800	890	930	1000
≈ Weight (kg)	Three Flange Valve and Standard-Bonnet „HDD“	12	16	19	52	62	111	305			
	Four Flange Valve and Standard-Bonnet „HDD“	15	21	26	65	68	136	365	670	915	1500
	Three-Way Valve and Standard-Bonnet „HDD“	16	23	28	68	76	168	405			
Flanges drilled and dimensioned acc. to		EN 1092-1, form B1, F, D									
Welded ends comply with		EN 12627 - 2									

Linear thrust Unit „heavy“

(Values in Millimeter → mm respectively Kilogram → kg)



Description	Linear thrust Unit	SI 15	SI 35	SI 36	SI 75	SI 120	SI 200	SI 300
	Stroke	20 / 40		60 / 80 / 100				
Ø A		125	127	175	175	175	210	300
≈ H		165	165	290	280	280	335	410
≈ Weight		7,5	7,5	25	22	22	46	93

SPM - Code

Type	DN	PN	Body / Cert.	Plug	Seat	kvs	Trim	Actuator
V726 DKVNA	**50**	**40**	**1.0619/OOAO**	**PONP1GG**	**42**	**40**	**316SS**	

Body Form

Three-Flange	D
Three-Flange with Heating Jacket	H
Four-Flange	V
Four-Flange with Heating Jacket	G
Three-Way	W

Form of Connection

Flage acc. to EN 1092-1	Form B1	K
	Form F	Q
	Form D	Y
Flange acc. to DIN 2526	Form C	C
	Form N	N
	Form R	R
Welded Ends acc. to EN 12627 - 2		S

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
Double seal Bonnet	L
LT Extension Bonnet	K
Insulating Bonnet	I

Packing Box Assembly

Teflon-Rings, adjustable BAM	A
Graphite-Rings, adjustable BAM	B
Teflon-Rings, loaded, BAM	N
Graphite-Rings, loaded, BAM	O
Teflon with Graphite, loaded, "TA"	Q
Graphite-Rings, loaded, "TA"	V
V-Ring Packing System	S

Nominal Size 15 - 400

Nominal Pressure

PN 10	10
PN 16	16
PN 25	25
PN 40	40

Body Material

1.0619
1.6220
1.4581
1.5419
1.4308

Materials acc. to international Standards for Pressure Stressed Parts

Standards for Materials

without	DGRL (Standard)	O . . .
TRD 110	AG 2	I . . .
TRB 801	AG A	P . . .
	AG B	R . . .
	AG C2	T . . .

Certificates for Materials

without		. O . .
EN 10 204	2.2	. Z . .
	3.1 (Survay of. Cert)	. B . .
	3.1 (CMTR)	. D . .
	3.2	. A . .

316SS or 1.4571 1.4122 — Plug, Seat Material

kvs - Value 0,01 - 2800

Port Size 3 - 350

Flow under the plug	G
Flow over the plug	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

IEC 60534	Class III	O
	Class IV	P
	Class IV - S1	Q
	Class V	S
	Class VI	T
EN 12 266	LR A (DIN 3230 BN)	A
	LR A (DIN 3230 BO)	B

Plug Form

standard	N
partial stellited	D
contour stellited	K
soft seated	W
hardened	H
tenifer treaded	T

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

without	EN 1349 (Standard)	. . A .
DGRL	Kat. IV	. . M .

Certificates for final test

without		. . . O
EN 10 204	2.2	. . . Z
	3.1	. . . B
	3.2	. . . A

IT 252 AADOZ

Operation on air failure

A	Stem retracted
Z	Stem extracted

Hand Wheel

O	without
L	top, light-weight-variant IT 127 - 502
H	top, heavy-duty-variant IT 127 - 700

Spring Range

		Actuator Size	Stroke
AD	0,2 - 1,0	IT 127 - 502	20
AD	0,2 - 1,0	IT 502 - 700	40
BL	0,5 - 1,9	IT 127 - 502	20
BL	0,5 - 1,9	IT 502 - 700	40
MU	0,8 - 1,6	IT 127 , 252	10
DY	1,0 - 2,4	IT 127 - 502	20
DY	1,0 - 2,4	IT 502 - 700	40
IY	1,4 - 2,4	IT 127 , 252	10
VC	1,5 - 2,7	IT 127 - 502	20
VC	1,5 - 2,7	IT 502 - 700	40
VI	1,5 - 3,8	IT 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 127 - 252	20
FY	2,0 - 4,8	IT 502 , 700	40
CW	2,7 - 4,1	IT 127 , 252	10

Actuator Color

A	blue
B	white
C	yellow

Actuator Size with MULTI-yoke

	Actuator Size	Stroke
IT 127	125 cm²	10 , 20
IT 252	250 cm²	10 , 20
IT 502	500 cm²	20 , 40
IT 700	700 cm²	20 ,40

PB 252 ADYOZ

Operation on air failure

A	Stem retracted
Z	Stem extracted

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

Actuator Color

A	blue
B	white
C	yellow

Actuator Size wiht NAMUR-Yoke

	Actuator Size	Stroke
PB 252	250 cm²	10 , 20
PB 502	500 cm²	20 , 40
PB 700	700 cm²	20 , 40 , 60
PB1502	1500 cm²	20 , 40 , 60 , 80 , 100
PB 3002	3000 cm²	40 , 60 , 80 , 100

EB 8/8 ZPO 50

Positioning Speed

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

Positioning Electronics

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

Positioning Feedback

O	without
P	1000 Ohm potentiometer Ω
M	4 - 20 mA positioning feedback

Power

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 4,5/2	Actuating Power 2 kN
EB 4,5/4,5	Actuating Power 4,5 kN
EB 8/6	Actuating Power 6 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

SI 35

Linear thrust Unit „heavy“

	Thrust	Stroke	Torque	ISO5210 B3
SI 15	15 kN	≤ 40 mm	30 Nm	F10
SI 35	35 kN	≤ 40 mm	100 Nm	F10
SI 36	35 kN	≤ 100 mm	100 Nm	F10
SI 75	77 kN	≤ 100 mm	250 Nm	F14
SI 120	121 kN	≤ 100 mm	500 Nm	F14
SI 200	181 kN	≤ 100 mm	1000 Nm	F16
SI 300	288 kN	≤ 100 mm	1700 Nm	F25

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 ZQO 30

Spring Range

		Actuator Size	Stroke
AD	0,2 - 1,0	PB 252 - 502	20
AD	0,2 - 1,0	PB 502 - 3002	40
AD	0,2 - 1,0	PB 700 - 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
MU	0,8 - 1,6	PB 1502	20
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 - 700	20
VC	1,5 - 2,7	PB 502 - 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
JI	1,8 - 3,8	PB 1502	100
FY	2,0 - 3,5	PB 1502	60, 80
FL	2,0 - 4,3	PB 1502	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
AJ	2,6 - 4,2	PB 1502	60, 80
CW	2,7 - 4,1	PB 252	10

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

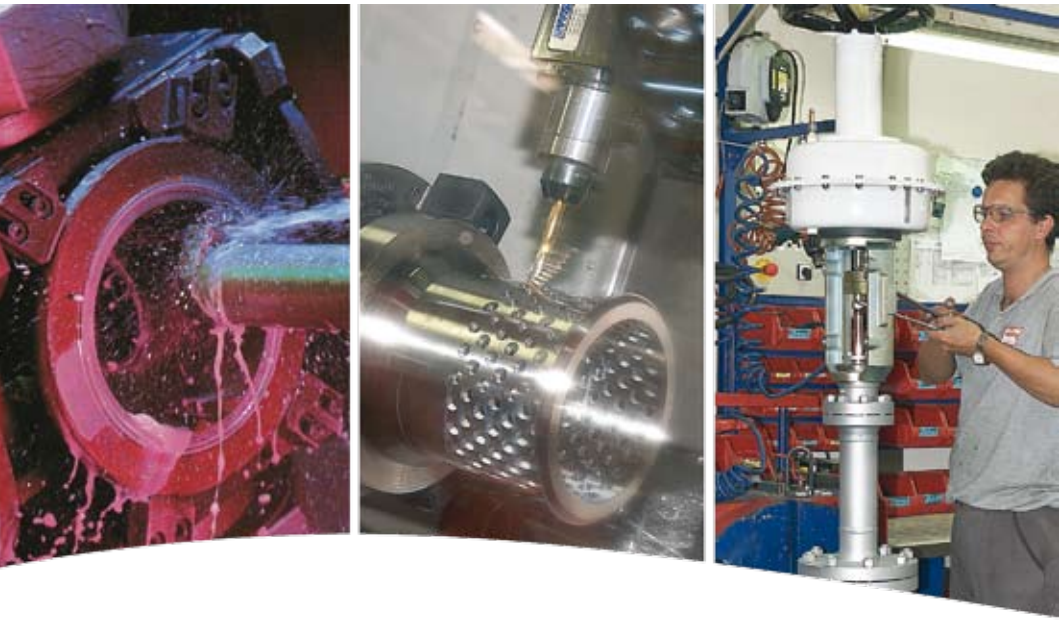
Z	220 - 240 V	50 Hz - AC
Y	110 - 115 V	50 Hz - AC
F	24 V	50 Hz - AC
D	400 V	50 Hz - AC (AB 208/10)

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

FLOWSERVE

Schmidt Armaturen



SAEEBRV726-06 11.08

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PSS 108285 11/08 V726 en

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Experience In Motion