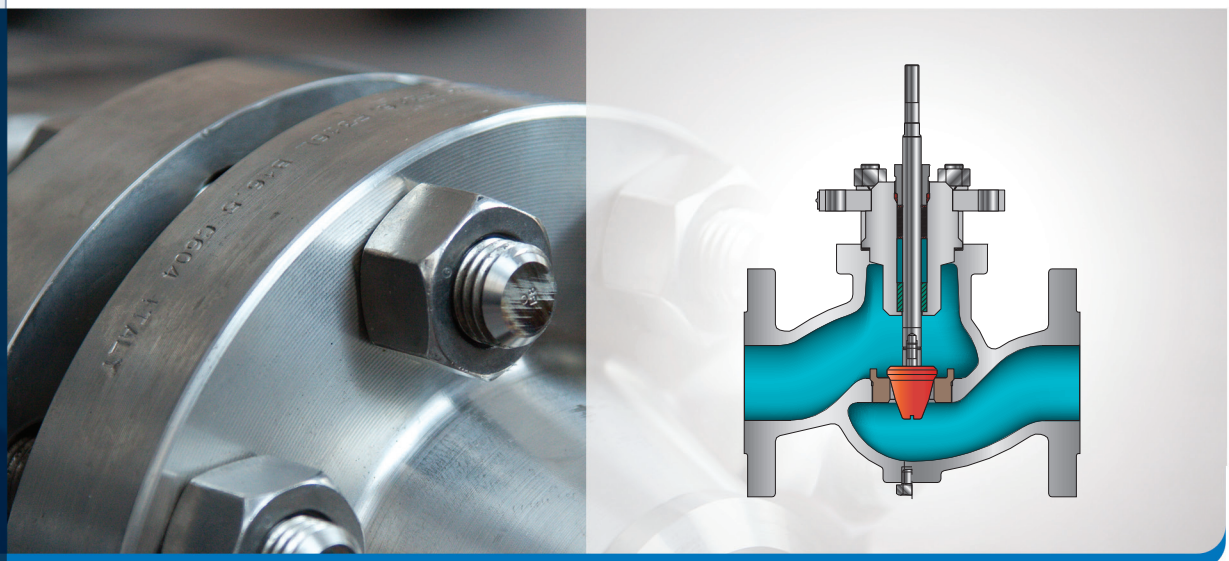
CONTROL VALVE

SERIES VA2011

VALVEA



version 06/2020

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VA2011 - DIRECT CONTROL VALVE

Nominal dimension

- DN 15 - DN 250
- 1/2" - 10"

Nominal pressure

- PN 10 - 40
- Class 150, Class 300

Construction

- single seat valve with balanced plug option
- metal or soft seat

Working temperature range

- -180°C ... +400°C

Flow characteristic, Kvs value

- linear, equipercentage or on/off
- 0,01 - 630 [m^3/h]

Tightness class (IEC 60534 - 4)

- class IV - standard, metal seat
- class V - optional for metal seat
- class VI - optional with soft seat

Body material

- grey cast iron, ductile iron, carbon steel, stainless steel according to EN, DIN or ASTM

Plug and seat material

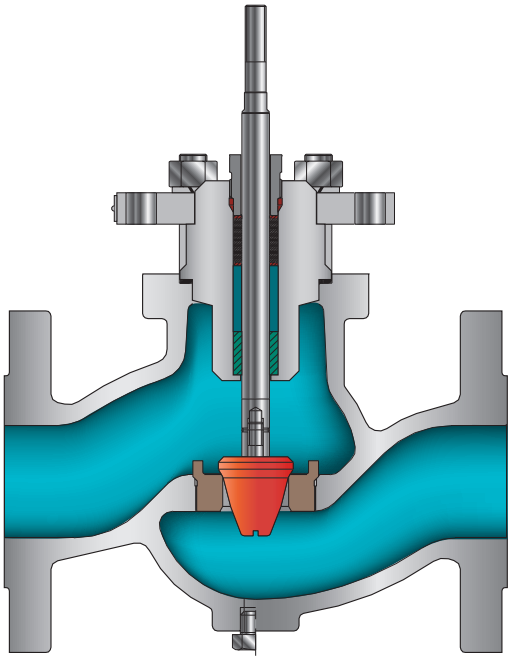
- stainless steel
- stellit or plasma nitridation possibility

End connection

- flange

Actuators

- pneumatic with diaphragm
- electro-hydraulic
- electric
- hydraulic
- manual operated



USE

Single-ported globe control valves type **VA2011** are used in automatic and remote control systems to control flow of gases and liquids. Wide range of material and design versions make the valves widely sought-after in chemical industry, heat and power generation industry, paper industry, food industry, metallurgy and coal mining, etc.

CHARACTERISTIC

- Range of nominal sizes from DN15 to DN250 for pressures up to PN50 (ANSI300).
- Wide range of flow ratios and control characteristics.
- High level of valve tightness due to use of soft seal (with PTFE seal) in whole range of flow and control characteristic for balanced and unbalanced plug.
- Identical flow ratio and control characteristic for "hard" seats (metal-to-metal) and "soft" seats (metal-PTFE), for balanced and unbalanced plug.
- High durability and reliability due to application of top-class materials and surface treatment processes (burnishing, stelliting, heat treatment, CrN coatings).
- Reliable actuator-stem and valve seat-body connection.
- Reduced acting force due to use of balanced plug for valves DN 40 to DN 250.
- Top class flat seals and bonnet packings.
- Assembly with pneumatic actuator, series LP0 with reverse operation and possibility of spring range change - without need of any additional parts (keeping the number of springs).
- Possibility of special designs:
  - for Oxygen
  - for liquid or gas fuels
  - for low temperature media (liquid Oxygen, Nitrogen etc.).
- Competitive prices – due to simple and functional design of valves and actuators and applied materials.

VA2011® – Product trademark registered at the Patent Office.

DESIGN AND TECHNICAL SPECIFICATION

Valve body (1) – flanged, single-ported, casting in cast iron or cast steel.

Nominal sizes: DN15; 20; 25; 32; 40; 50; 65; 80; 100; 150; 200; 250

Nominal pressure and connection depends on material design:

– according to EN 1092-1; EN 1092-2; ANSI B16.5

– During temporary period the flanges may be made according to ISO 7005-1

Table 1.

Material	Pressure	Connection			
		Raised face	Groove	Recess	Ring joint
		Identification			
Grey Cast Iron	PN10; 16	B	–	–	–
Ductile Iron	PN10; 16; 25; 40				
Cast Steel	PN10; 16; 25; 40	B	D	F	–
	PN20 *)	B1	–	–	J
	PN50 *)		D1	F1	

**) Connection marking according to ISO 7005-1*

Body length: according to EN 60534-3-1; 2000y. – fig. 7; table 13 and 14.

Bonnet (2) – bonnet body - rolled steel connected to valve body by assembling plate (fig. 1.a)

– cast (fig. 1.b)

- standard
- extended
- bellows

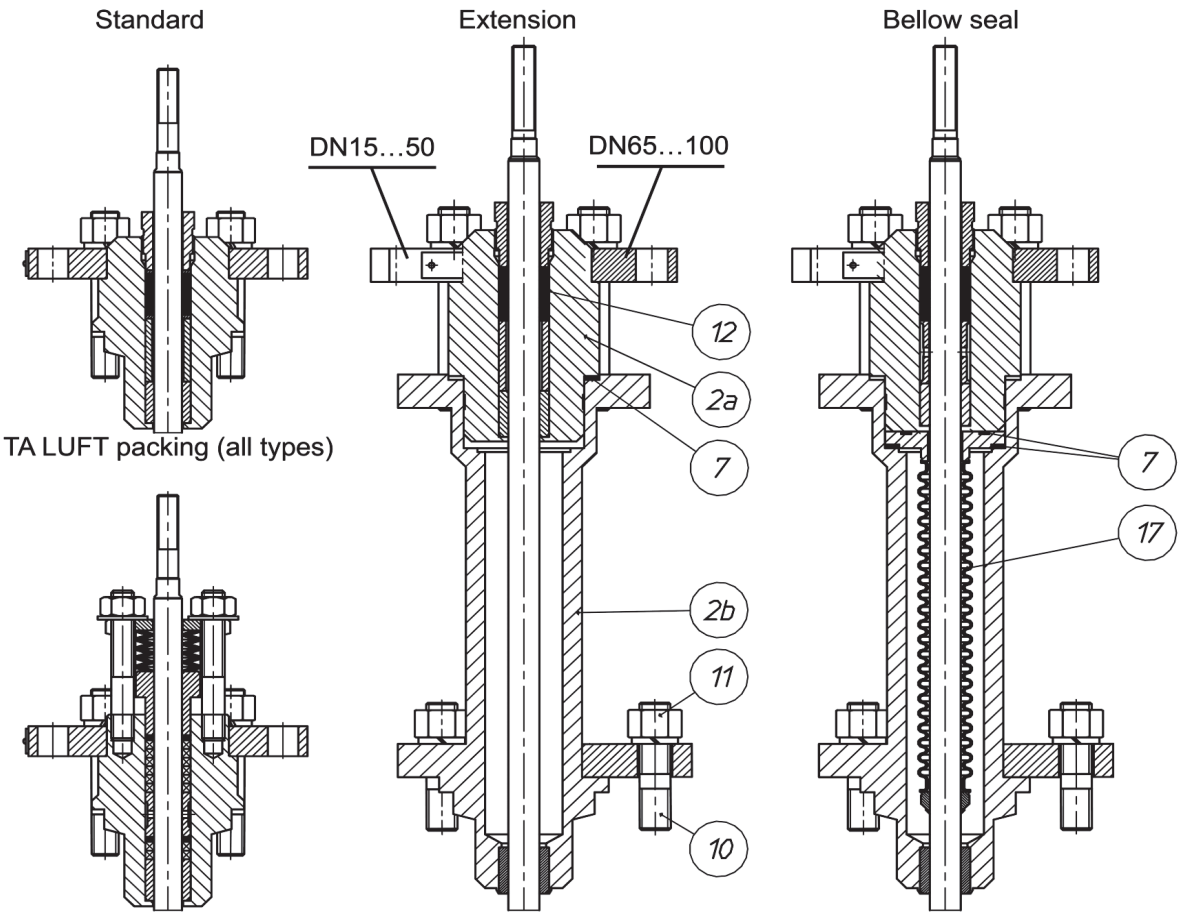


Fig. 1. Bonnets DN15…100

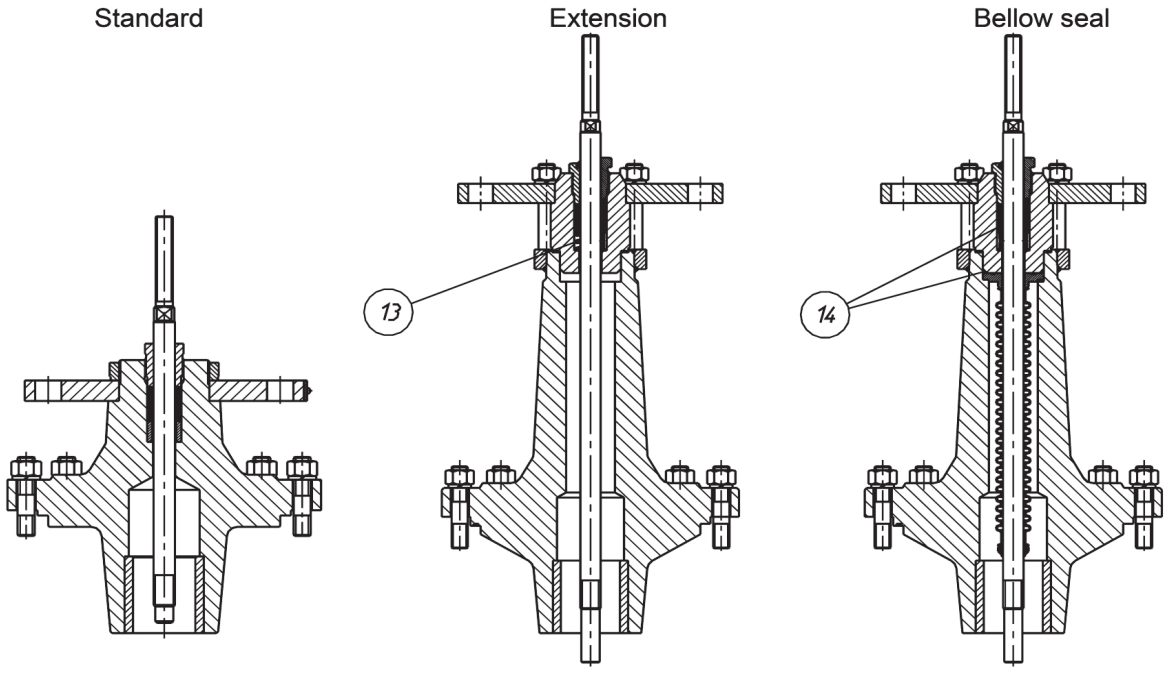


Fig. 1a. Bonnets DN150…250

Valve Plug (3) contoured, balanced or unbalanced

- control characteristic: – linear (L)
  – equipercentage (P)
  – quick opening (S)
- rangeability: – 50:1

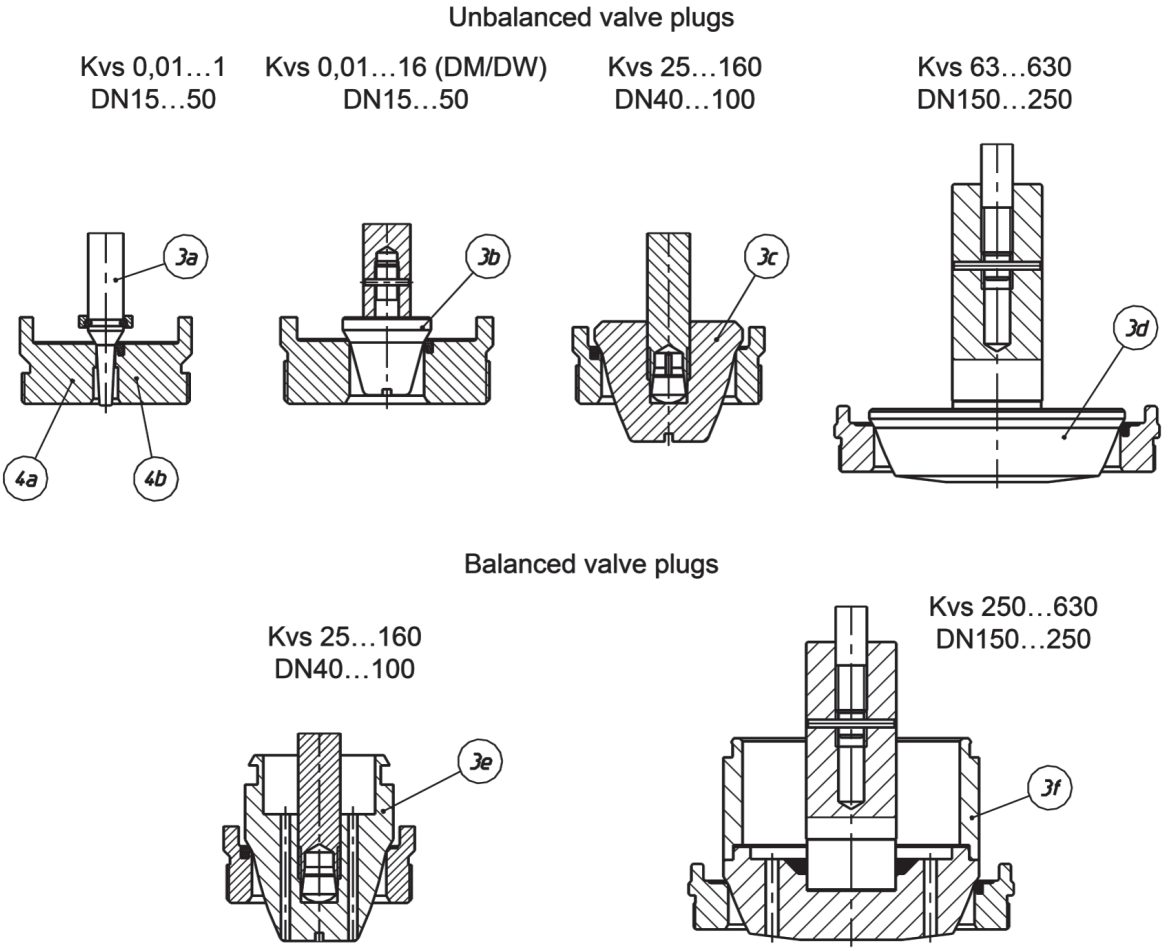


Fig. 2. Valve plugs

Valve seat (4) – screwed, with centering cone and sealing. With unscrewing locking:
- hard
- soft (with PTFE sealing), see table 4

Stem (5) - burnished or quenched and tempered, polished sealing contact surface.

Drain plug (6) – steel or stainless steel: allows cleaning of body interior (delivered on request).

Body gasket (7) – asbestos-free, see table 2:
- flat – aramid and hardened graphite (1.4571); in metallic casing (1.4571), multiple edges
- bonnet: – packing formed from various materials (PTFE-V; PTFE+graphite; expanded graphite; braided graphite)
  – with TA Luft compression springs (PTFE-V; graphite)

Table 2 – Packing types and application ranges.

Packing type	PN	Temperature °C		
		Bonnet type		
		Standard	Extended	Bellows
PVTFE-V	10 ... 50	-46 ... +200	-198 ... -46 +200 ... +300	-100 ... +200
PVTFE + Graphite				
PVTFE-V / TA-LUFT				
Graphite		+200 ... +300	+300 ... +450	+200 ... +400
Graphite / TA-LUFT				

Leakage class:
- basic: class IV according to IEC 60534-4 – hard seat
- bubble-tight: class VI according to IEC 60534-4 – soft seat

Table 3. Component list with material specification.

Item	Part name		Material					
1	Body		EN-GJL 250 (EN-JL 1040)	EN-GJS 400-18 LT (EN-JS 1025)	GP 240 GH (1.0619)	WCB	GX5CrNiMo 19-11-2 (1.4408)	CF8M
2	Bonnet	DN15...100	S 355 J2G3 (1.0570)				X6CrNiMoTi 17-12-2 (1.4571)	
		DN15...250	EN-GJL 250 (EN-JL 1040)	EN-GJS 400-18 LT (EN-JS 1025)	GP 240 GH (1.0619)	WCB	GX5CrNiMo 19-11-2 (1.4408)	CF8M
3	Plug		X6CrNiMoTi 17-12-2 (1.4571) X6CrNiMoTi 17-12-2 (1.4571) + stellit + CrN X17CrNi 16-2; (1.4057) + heat treatment					
4	Seat		X6CrNiMoTi 17-12-2 (1.4571) X6CrNiMoTi 17-12-2 (1.4571) + stellit X6CrNiMoTi 17-12-2 (1.4571) + PTFE X17CrNi 16-2; (1.4057) + heat treatment					
5	Stem		X6CrNiMoTi 17-12-2 (1.4571) X6CrNiMoTi 17-12-2 (1.4571) + stellit + CrN X17CrNi 16-2; (1.4057) + heat treatment					
6	Drain plug		S 355 J2G3 (1.0570)				X6CrNiMoTi 17-12-2 (1.4571)	
7	Body gasket		With metal housing X6CrNoMoTi 17-12-2 (1.4571); NOVATEC PREMIUM; SIGRAFLEX HOCHDRUCK; NWK-50 SPETOMET					
8	Guiding sleeve		X6CrNiMoTi 17-12-2 (1.4571) X6CrNiMoTi 17-12-2 (1.4571) + stellit + CrN X17CrNi 16-2; (1.4057) + heat treatment					
9	Compression plate		C45 (1.0503); X30Cr13 (1.4028); X6CrNiMoTi 17-12-2 (1.4571)					
10	Bolt		8.8				A4 - 70	
11	Nut		8				A4 - 70	
12	Packing		PTFE + GRAPHITE; PTFE - "V"; GRAPHITE					
13	Spring		12R10 (SANDVIK)					
14	„O" ring		Fluorine rubber (FKM)					
15	Guiding sleeve		X6CrNiMoTi 17-12-2 (1.4571) X6CrNiMoTi 17-12-2 (1.4571) + stellit + CrN X17CrNi 16-2; (1.4057) + heat treatment					
16	Seal ring		KEFLOY 25					
17	Bellow		X6CrNiMoTi 17-12-2 (1.4571)					

Material norms	
Material	Norm nr.
EN-GJL 250; (EN-JL 1040)	EN 1561
EN-GJS 400-18 LT; (EN-JS 1025)	EN 1563
GP 240 GH; (1.0619)	EN 10213-2
G20Mn5, (1.6220)	EN 10213-3
WCB	ASTM A 216
GX5CrNiMo 19-11-2; (1.4408)	EN10213-4
CF8M	ASTM A 351
S 355 J2G3 (1.0570)	EN 10025
P355 NL2; (1.1106)	EN 10028-3
X6CrNiMoTi 17-12-2 (1.4571)	EN 10088
X17CrNi 16-2; (1.4057)	EN 10088
C45; (1.0503)	EN 10083-1
X30Cr13; (1.4028)	EN 10088

Note:

Hardening method used for hardening of valve internal parts comprises:

a) stelliting – padding of surfaces with stellite: ~40HRC

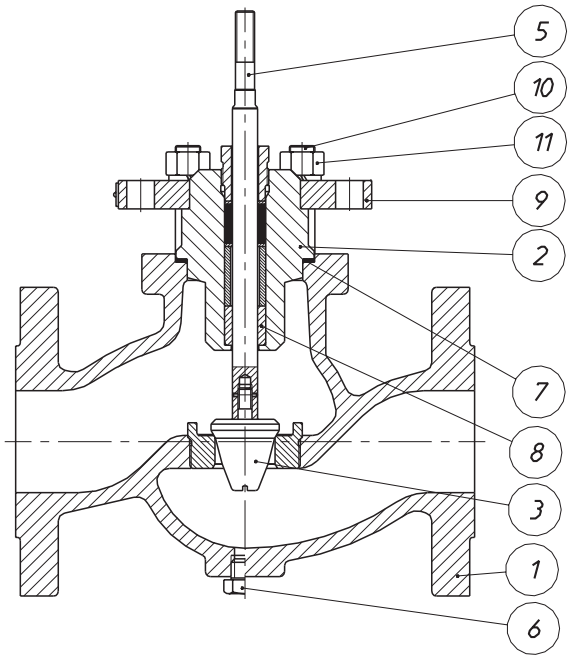
b) CrN coating – introducing chromium nitride to external layer of detail, to the depth of ca.0.1 mm;~950HV

c) heat treatment: plug (~45HRC), seat (~35HRC), stem (~35HRC), guide sleeve (~45HRC)

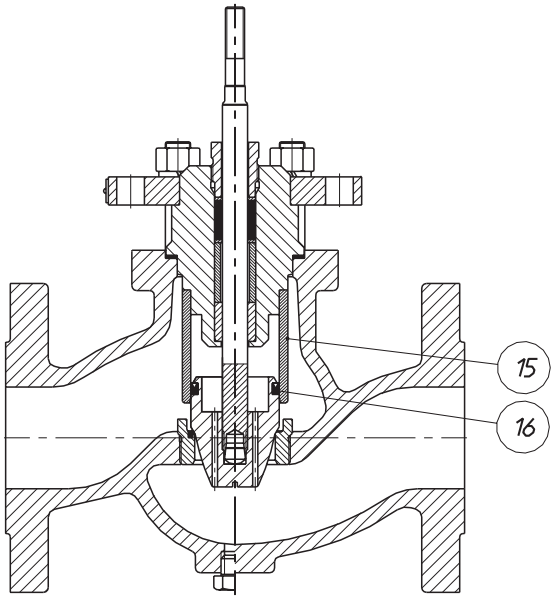
d) max operating temperature -200..+250°C (for material KEFLOY 25), higher temperatures should be discussed with manufacturer.

Table 4. Operation parameters for special design valves

Material norms	Material norms		Max working pressure [Mpa]
	Min.	Max.	
with balanced plug	-50	+200	4
with soft seat (PTPE)	-100		3,5
with bellows bonnet	-100	+400	3,5

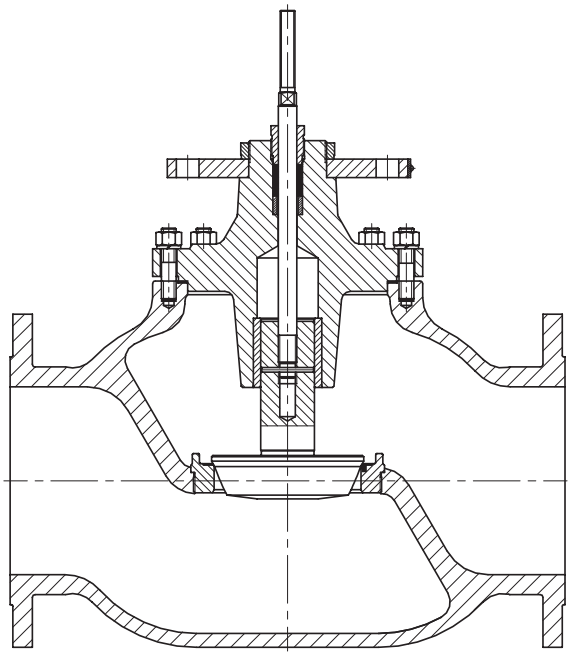


a) with standard valve plug

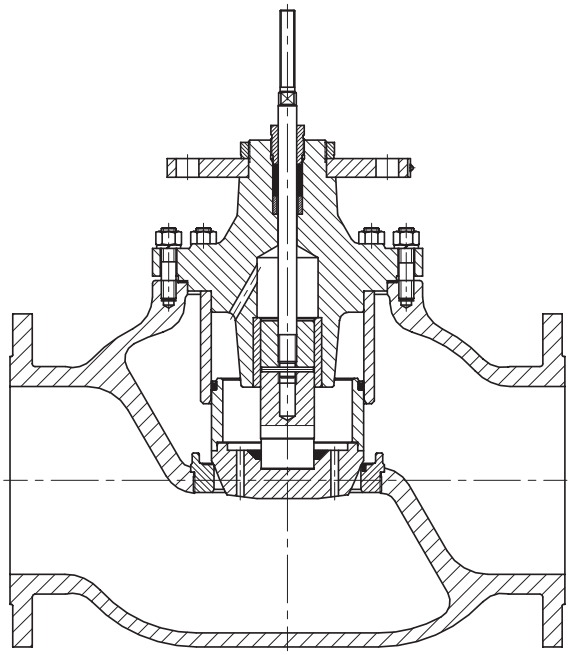


b) with balanced plug

Fig. 3. Control valve DN15-100



a) with standard valve plug



b) with balanced plug

Fig. 4. Control valve DN15-100

Table 4.1

		GP 240 GH (1.0619) / A216 WCB						
PN	Norm	Temperature [°C]						
		-10...120	150	180	200	230	250	300
		Maximum working pressure [bar]						
PN10	EN 1092-2	10	9	8,4	8	7,4	7	6
PN16		16	14,4	13,4	12,8	11,8	11,2	9,6

Table 4.2

		Material: EN-GJS 400-18 LT according to EN 1563					
PN	Norm	Temperature [°C]					
		-10...120	150	200	250	300	350
		Maximum working pressure [bar]					
PN10	EN 1092-2	10	9,7	9,2	8,7	8	7
PN16		16	15,5	14,7	13,9	12,8	11,2
PN25		25	24,3	23	21,8	20	17,5
PN40		40	38,8	36,8	34,8	32	28

Table 4.3

		Material: GP240GH (1.0619) according to EN 10213-2							
PN/CL	Norm	Temperature [°C]							
		-10...50	100	150	200	250	300	350	400
		Maximum working pressure [bar]							
PN10	EN 1092-1	10	9,2	8,8	8,3	7,6	6,9	6,4	5,9
PN16		16	14,8	14	13,3	12,1	11	10,2	9,5
CL150	EN 1759-1	17,3	15,4	14,6	13,8	12,1	10,2	8,4	6,5
PN25	EN 1092-1	25	23,2	22	20,8	19	17,2	16	14,8
PN40		40	37,1	35,2	33,3	30,4	27,6	25,7	23,8
CL300	EN 1759-1	45,3	40,1	38,1	36	32,9	29,8	27,7	25,7

Table 4.4

		Material: GX5CrNiMo (1.4408) according to EN 10213-4									
PN/CL	Norm	Temperature [°C]									
		10...50	100	150	200	250	300	350	400	425	450
		Maximum working pressure [bar]									
PN10	EN 1092-1	10	10	9	8,4	7,9	7,4	7,1	6,8	-	6,7
PN16		16	16	14,5	13,4	12,7	11,8	11,4	10,9	-	10,7
CL150	EN 1759-1	17,9	16,3	14,9	13,5	12,1	10,2	8,4	6,5	5,6	4,7
PN25	EN1092-1	25	25	22,7	21	19,8	18,5	17,8	17,1	-	16,8
PN40		40	40	36,3	33,7	31,8	29,7	28,5	27,4	-	26,9
CL300	EN 1759-1	46,7	42,5	38,9	35,3	32,9	30,5	28,8	27,6	27,2	26,9

Table 4.5

		Material: G20Mn5 (1.6220) according to EN 10213-3					
PN	Norm	Temperature [°C]					
		-40	100	150	200	250	300
		Maximum working pressure [bar]					
PN10	-	6	6	3,8	3,6	3,48	3,4
PN16		16	16	10,1	9,6	9,28	9,07
PN25		25	25	15,8	15	14,5	14,2
PN40		40	28	28	27	26	25

Table 4.6

		Material: WCB according to ASTM A216								
PN/CL	Norm	Temperature [°C]								
		-10...50	100	150	200	250	300	350	375	400
		Maximum working pressure [bar]								
PN10	EN 1092-1	10	10	9,7	9,4	9	8,3	7,9	7,7	6,7
PN16		16	16	15,6	15,1	14,4	13,4	12,8	12,4	10,8
CL150	EN 1759-1	19,3	17,7	15,8	14	12,1	10,2	8,4	7,4	6,5
PN25	EN1092-1	25	25	24,4	23,7	22,5	20,9	20	19,4	16,9
PN40		40	40	39,1	37,9	36	33,5	31,9	31,1	27
CL300	EN 1759-1	50	46,4	45,1	43,9	41,8	38,9	36,9	36,6	34,6

Table 4.7

		Material: CF8M according to ASTM A351										
PN/CL	Norm	Temperature [°C]										
		-10...50	100	150	200	250	300	350	375	400	425	450
		Maximum working pressure [bar]										
PN10	EN 1092-1	8,9	7,8	7,1	6,6	6,1	5,8	5,6	5,5	5,4	5,4	5,3
PN16		14,3	12,5	11,4	10,6	9,8	9,3	9	8,8	8,7	8,6	8,5
CL150	EN 1759-1	18,4	16	14,8	13,6	12	10,2	8,4	7,4	6,5	5,6	4,6
PN25	EN1092-1	22,3	19,5	17,8	16,5	15,5	14,6	14,1	13,8	13,6	13,5	13,4
PN40		35,6	31,3	28,5	26,4	24,7	23,4	22,6	22,1	21,8	21,6	21,4
CL300	EN 1759-1	48,1	42,3	38,6	35,8	33,5	31,6	30,4	29,6	29,3	29	29

Table 5. Flow ratio Kvs [m³/h] – for unbalanced plugs

Kvs [m³/h]	Stroke [mm]	Seat diam.	A [cm²]	F_D [kN]		Nominal valve size DN												Characteristic		
				Hard seat	Soft seat	15	20	25	32	40	50	65	80	100	150	200	250	L	P	S
0,010	20	6,35	0,3	0,1	0,16															
0,016																				
0,025																				
0,040																				
0,063																				
0,10																				
0,16																				
0,25																				
0,40																				
0,63																				
1,0																				
1,6		9,52	0,7	0,15	0,25															
2,5		12,70	1,3	0,2	0,3															
4,0																				
6,3		19,05	2,9	0,3	0,5															
10		20,64	3,3	0,35	0,5															
16		25,25	5,0	0,4	0,6															
25		31,72	7,9	0,5	0,8															
40		41,25	13,4	0,7	1,0															
63	38	50,80	20,3	0,8	1,3															
94		66,70	34,9	1,1	1,7															
125		88,90	62,1	1,4	2,2															
160																				
250	50	107,92	91,5	1,7	2,7															
320		126,95	126,6	2,0	3,2															
500	63	158,72	197,9	2,5	4,0															
630		195,00	198,6	3,1	4,9															
Calculated ratios: F_L=0,9; X_T=0,72; Fd=0,46; xFz=0,65																				

Table 5. Flow ratio Kvs [m³/h] – for balanced plugs

Kvs [m³/h]	Stroke [mm]	Nominal valve size DN								Characteristic		
		40	50	65	80	100	150	200	250	L	P	S
25	20											
40												
63	38											
94												
125												
160												
250	50											
320												
500	63											
630												

Note:

Valve seat diameter for balanced valve plug flow ratio Kvs 250 is 126.95 mm.

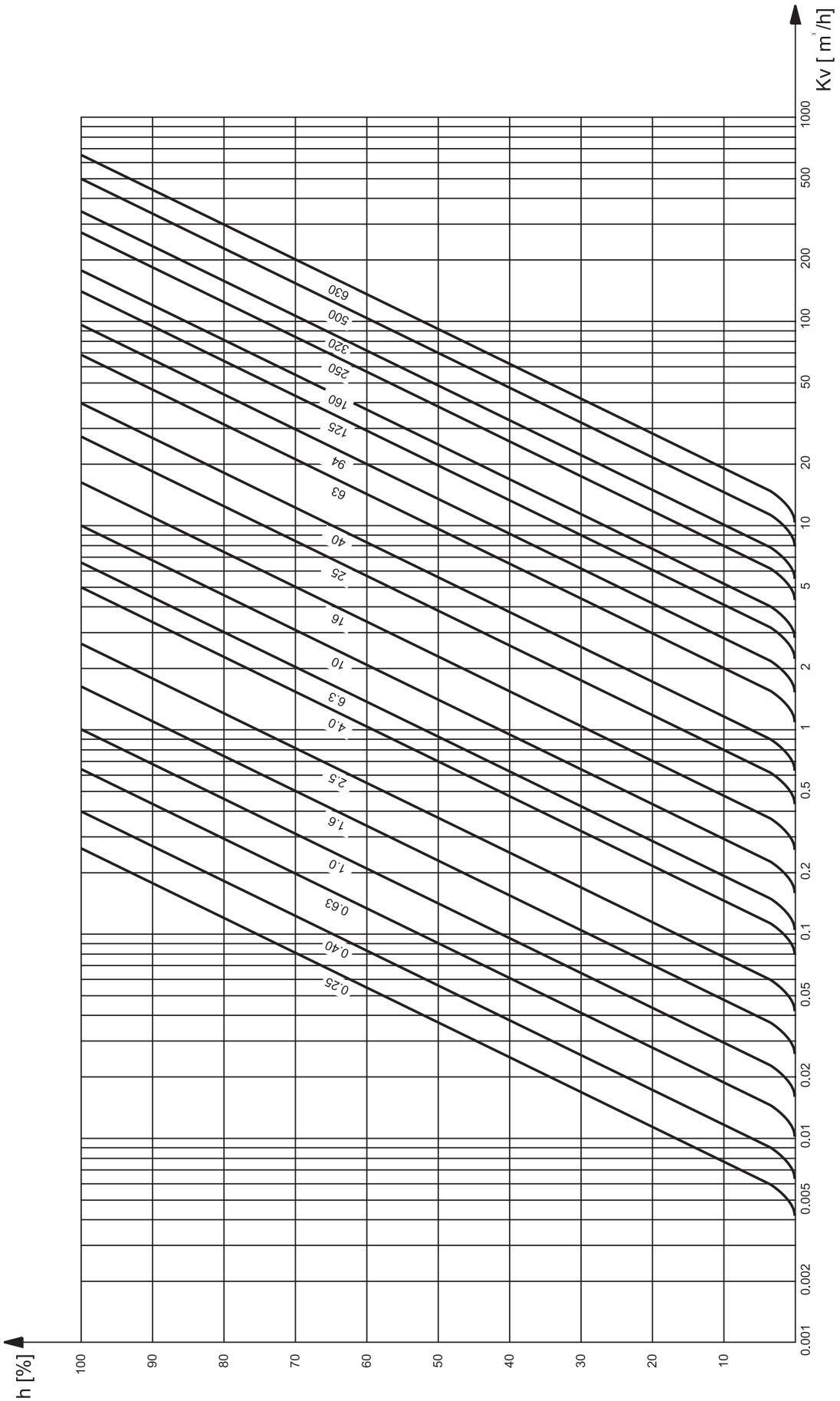


Diagram 1: Equipercentage flow characteristic of control valves Kvs=0,25...630 m³/h

ALLOWED PRESSURE DROP Δp.

Pressure drops Δp [MPa] are valid for closed valve and are calculated related to actuator parameters. Real pressure drops should not exceed 70% of allowable working pressures for given nominal pressure, material design and working temperature according to tables 4.1 to 4.7.

$$\Delta p = \frac{10\ (Fs - F_D)}{A}$$

where: Δp [MPa] – calculated pressure drop
Fs [kN] – actuator available force (tab. 7)
F_D [kN] – valve plug to valve seat pressure (tab. 5)
A – seat area ratio for seat with diameter D [cm2];
D – valve seat diameter [mm] (tab. 5)

$$A = \frac{\pi D^2}{400}\ [cm^2]$$

Table 7. Available force Fs [kN] of pneumatic actuators

Actuator size	Direct function actuator - P			Reverse function actuator - R					
	Supply pressure [kPa]			Spring range [kPa]					
	140	250	400	20 - 100	40 - 120; 40 - 200	60 - 140	80 - 240	120 - 280	180 - 380
160	0,64	2,4	4,8	0,32	0,64	0,96	1,28	1,92	-
250	1,0	3,8	7,5	0,5	1,0	1,5	2,0	3,0	-
400	1,6	6,0	12,0	0,8	1,6	2,4	3,2	4,8	-
630	2,5	9,5	18,9	1,3	2,5	3,8	5,0	7,6	11,3
1000	4,0	15,0	30,0	2,0	4,0	6,0	8,0	12,0	18,0

Note:

1. For direct actuators P adopted spring range is 20 – 100 kPa.
2. For electric and other actuators Δp value can be calculated using above formula, available actuator force taken from the actuator datasheet.
3. For balanced valve plugs available force Fs at least equal to FD value for soft valve seats in Table 5 should be adopted.

Table 8. Allowable pressure drops Δp [bar] for valves with unbalanced plugs and hard seats, with pneumatic actuators.

Flow ratio Kvs [m³/h]	Nominal valve size DN	Stroke [mm]	control pressure increase – Air to Close					control pressure increase – Air to Open		
			Actuator		Δp [MPa]			Actuator		Δp [bar]
			Size	Spring range [kPa]	Supply pressure [kPa]			Size	Spring range [kPa]	
					140	250	400			
do 4	15; 20; 25; 32; 40; 50	20	160	20 - 100	34	-	-	160	20 - 100 40 - 200	9 34
6,3	20; 25; 32; 40; 50				11	40	-		20 - 100 40 - 200 60 - 140	7 11 23
10	25; 32; 40; 50				9	40	-		20 - 100 40 - 200 60 - 140 80 - 240	0,7 9 19 28
16	32; 40; 50				4	40	-		20 - 100 40 - 200 60 - 140 80 - 240 120 - 280	- 4 11 17 30
do 4	15; 20; 25; 32; 40; 50		250		40	-	-	250	20 - 100 40 - 200	23 40
6,3	20; 25; 32; 40; 50				24	40	-		20 - 100 40 - 200 60 - 140	7 24 40
10	25; 32; 40; 50				20	40	-		20 - 100 40 - 200 60 - 140 80 - 240	5 20 34 40
16	32; 40; 50				12	40	-		20 - 100 40 - 200 60 - 140 80 - 240 120 - 280	2 12 22 32 40
	65		400		24	40	-	400	20 - 100 40 - 200 60 - 140	8 24 40
25	40; 50; 65; 80				14	40	-		20 - 100 40 - 200 60 - 140 80 - 240 120 - 280	4 14 24 34 40
40	50; 65; 80; 100				6,5	38	40		40 - 200 60 - 140 80 - 240 120 - 280	6 12 18 29
63	65; 80; 100	38	630		8,5	40	-	630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	9 15 21 34 40
	150		1000		16	40	-	1000	40 - 200 80 - 240 120 - 280	16 36 40
94	80; 100		630		4	24	40	630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	4 8 11 18 29
	150; 200		1000		8	32	40	1000	40 - 200 80 - 240 120 - 280 180 - 380	8 20 31 40
125; 160	100		630		2	13	28	630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	2 4 6 10 16
	150; 200; 250		1000		4	22	40	1000	40 - 200 80 - 240 120 - 280 180 - 380	4 10 17 26
250	150; 200; 250	50			2,5	14	30		40 - 200 80 - 240 120 - 280 180 - 380	2,5 6,5 11 17,5
320	150; 200; 250				1,5	10	22		40 - 200 80 - 240 120 - 280 180 - 380	1,5 4,5 8 12,5
500	200; 250	63			-	6	14		40 - 200 80 - 240 120 - 280 180 - 380	- 2,5 5 7,5
630	250				-	4	9		40 - 200 80 - 240 120 - 280 180 - 380	- 1,5 3 5

Note:

1. In the table theoretical acceptable pressure drops are included. Actual pressure drops with consideration of tolerance of spring manufacture and friction of internal parts of the actuator are lower than those given by 20%. Pressure drops chosen that way guarantee internal tightness of closing of the valves.

2. In air-to-open valves actuator with spring range of 40-200 [kPa] can be replaced with actuator with spring range of 40-120 [kPa], at the same pressure drops.

3. In valves with balanced valve plugs and hard seats for pressure drops up to Δp=40 [bar], actuators are to be selected as below:
   - for air-to-close action: spring range 20-100 [kPa], supply pressure 140 [kPa]
   - for air-to-open action: spring range 40-120 [kPa], or 40-200 [kPa]

Table 9. Allowable pressure drops Δp [bar] for valves with unbalanced plugs and soft seats, with pneumatic actuators.

Flow ratio Kvs [m³/h]	Nominal valve size DN	Stroke [mm]	control pressure increase – Air to Close					control pressure increase – Air to Open		
			Actuator		Δp [MPa]			Actuator		Δp [bar]
			Size	Spring range [kPa]	Supply pressure [kPa]			Size	Spring range [kPa]	
					140	250	400			
do 4	15; 20; 25; 32; 40; 50	20	160	20 - 100	25	-	-	160	20 - 100 40 - 200	- 25
6,3	20; 25; 32; 40; 50				5	35	-		40 - 200 60 - 140	5 16
10	25; 32; 40; 50				3	35	-		40 - 200 60 - 140 80 - 240	3 13 22
16	32; 40; 50				-	35	-		40 - 200 60 - 140 80 - 240 120 - 280	- 6 12 25
do 4	15; 20; 25; 32; 40; 50		250		35	-	-	250	20 - 100 40 - 200	15 35
6,3	20; 25; 32; 40; 50				17	35	-		40 - 200 60 - 140	17 35
10	25; 32; 40; 50				12	35	-		40 - 200 60 - 140 80 - 240	12 26 35
16	32; 40; 50				6	35	-		40 - 200 60 - 140 80 - 240 120 - 280	6 16 26 35
	65		400		18	35	-	400	40 - 200 60 - 140 80 - 240	18 34 35
25	40; 50; 65; 80				10	35	-		40 - 200 60 - 140 80 - 240 120 - 280	10 20 30 35
40	50; 65; 80; 100				3,5	35	-		40 - 200 60 - 140 80 - 240 120 - 280	3,5 9 15 26
63	65; 80; 100	38	630	20 - 100	6	35	-	630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	6 12 19 31 35
	150		1000		13	35		1000	40 - 200 80 - 240 120 - 280	13 33 35
94	80; 100		630		3	23	35	630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	3 7 10 18 28
	150; 200		1000		7	35	-	1000	40 - 200 80 - 240 120 - 280 180 - 380	7 19 30 35
125; 160	100		630		-	11	26	630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	- 2 4 8 14
	150; 200; 250		1000		2,5	20	35	1000	40 - 200 80 - 240 120 - 280 180 - 380	2 9 15 25
250	150; 200; 250	50			1,2	13	29		40 - 200 80 - 240 120 - 280 180 - 380	1 5 10 16
320	150; 200; 250				-	9	21		40 - 200 80 - 240 120 - 280 180 - 380	- 3,5 6,5 11,5
500	200; 250	63			-	5	8		40 - 200 80 - 240 120 - 280 180 - 380	- 2 4 7
630	250				-	3	8		40 - 200 80 - 240 120 - 280 180 - 380	- 1 2 4

Note:

1. In Table, theoretical acceptable pressure drops are included. Actual pressure drops with consideration of tolerance of spring manufacture and friction of internal parts of the actuator are lower than those given by 20%. Pressure drops chosen that way guarantee internal tightness of closing of the valves.
2. In air-to-open valves actuator with spring range of 40-200 [kPa] can be replaced with actuator with spring range of 40-120 [kPa], at the same pressure drops.
3. In valves with balanced valve plugs and soft valve seats for pressure drops up to Δp=35 [bar], actuators are to be selected as below:
   - for air-to-close action: spring range 20-100 [kPa], supply pressure 140 [kPa]
   - for air-to-open action: spring range 40-120 [kPa], or 40-200 [kPa]
4. For rotary actuators – R, supply pressure is to be 40 kPa higher than upper spring range [kPa].

ACTUATORS

• Pneumatic multispring actuators with diaphragm without manual drive series LP0 or with manual drive
– according to table 10 and 13.

Table 10. Pneumatic actuators types.

Size	Diaphragm effective area [cm²]	Stroke [mm]	Number of manual actuatorturns for full stroke
160	160	20	5
250	250	20	5
400	400	20	5
630	630	38	9
1000	1000	38; 50; 63	8; 10; 13

CHARACTERISTICS

- complete reversibility of operation allows changing function P (direct action) and R (reverse action) with no additional parts,
- option of changing spring range (tension) with no additional parts,
- option of pre-tensioning of springs,
- option of using fittings with NAMUR connections,
- option of fitting with top-mounted handwheel.

DESIGN AND TECHNICAL SPECIFICATION:

- see fig. no.: 5

CONSTRUCTION:

Actuator **diaphragm cases** (1) and (2) of steel sheets making pressure chamber
Diaphragm (3) of constant effective area, linear relationship between control actuator pressure and plug movement. Executed in neoprene with polyester spacer.
Diaphragm plate (4) stamped from steel sheet, with spring seats.
Support (6) is used for tightening and operating the stem.
Springs (7) of construction spring steel. There are 3, 6 or 12 springs regarding the required range.
Bushing (8) and **spacers** (9) – used for altering actuator action from direct to reverse and altering spring range.
Warning plates (10) with information on safe disassembly.

PNEUMATIC ACTUATOR TECHNICAL SPECIFICATION:

Control air connection: NPT 1/4”

- pipe diameter: ∅ 6x1 (or ∅ 8x1 – as per request)
- spring ranges: À 20...100 kPa; Á 40...200 kPa; Æ 180...380 kPa; Â 40...120 kPa; Ã 80...240 kPa; Ä 60...140 kPa Å 120...280 kPa – 3 springs – 6 springs – 12 springs, (only for sizes 630…1000).

Max supply pressure: actuator size 160…630 - 600 kPa, for actuator size 1000 - 500 kPa.

Actuator ambient temperature range: -40…+80°C.

OPTIONAL ACCESSORIES:

- top-mounted handwheel
- pneumatic positioner
- electro-pneumatic positioner
- air-set
- three-way solenoid valve
- lock-up
- limit switches
- quick exhaust valve

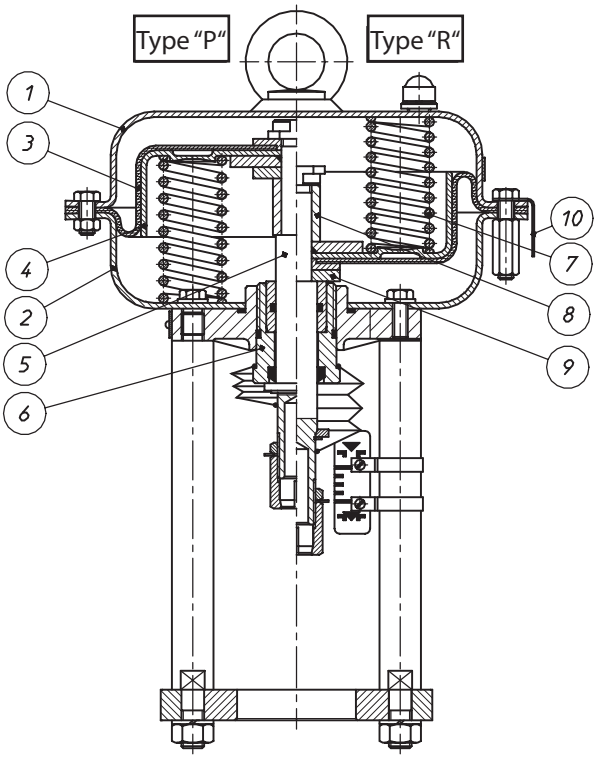


Fig. 5. LP0 multispring pneumatic actuator

Electric actuators

There is a possibility of employing any electric or electro-hydraulic actuator following adjustment of connecting elements. Details and technical specifications of electric actuators as per separate catalog charts.

M manual drives

Drives allowing manual operation of valve, adapted to direct assembly on valve (with no extra parts).

Table 11. Drive sizes.

Size	Stroke [mm]	Turns for rated stroke
250	20	5
400	20	5
630	38	9
1000	38; 50; 63	8; 10; 13

DIMENSIONS AND WEIGHT:

Table 12. Valve connection diameters [mm]

DN	d1	d3	E	L	L1	P	R
15...25	M12x1,25	12	44	125	111	12,5	110
32...50				118	102	12,5	110
						16,5	132
						20,5	160
65...100		16	50	122	104	16,5	132
						20,5	160
150...250	M16x1,5	20	95	200	180		
			80	138	118	24,5	216

Note:

1. R and P can be as per customer request
2. R=160 - for electrical actuators
3. L and L1 - for valve plug location – valve closed
4. L=138 - for electric actuators.

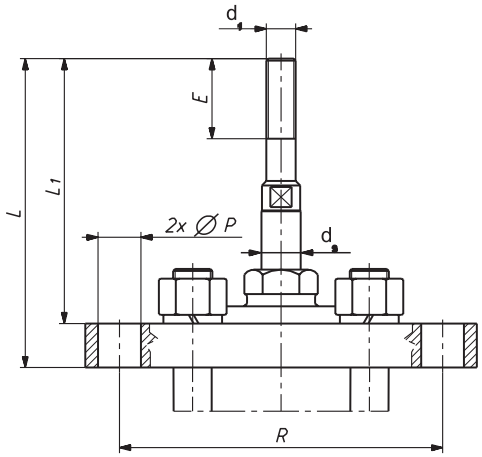
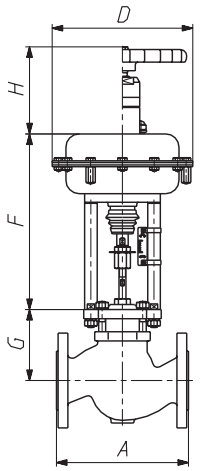
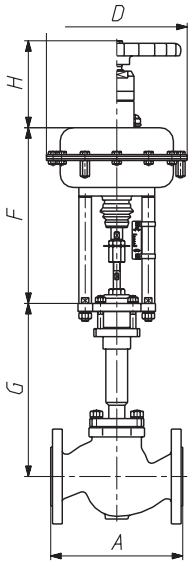


Fig. 6. Valve connection dimensions

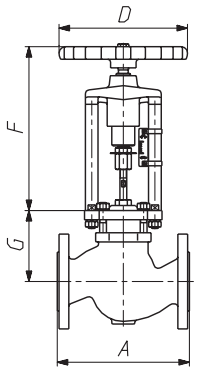
Fig. 7. Valve external dimensions



Standard bonnet valve
with pneumatic actuator



Expansion or bellows seal valve
with pneumatic actuator



Manual driver typ M

Table 13. Valve dimensions incl. actuators [mm].

DN	A			G		F									D									H
	PN20 ANSI 150	PN50 ANSI 300	PN 10...40	ucpávka standardní	ucpávka prodloužená a vlnovcová	160	250	400	630	1000	M 250	M 400	M 630	M 1000	160	250	400	630	1000	M 250	M 400	M 630	M 1000	
15	184	190	130	107	241	288	306	-	-	-	290	-	-	-	210	240	-	-	-	225	-	-	-	162
20	184	194	150	107	241	288	306	-	-	-	290	-	-	-	210	240	-	-	-	225	-	-	-	162
25	184	197	160	107	241	288	306	-	-	-	290	-	-	-	210	240	-	-	-	225	-	-	-	162
32	200	213	180	114	243	288	306	-	-	-	290	-	-	-	210	240	-	-	-	225	-	-	-	162
40	222	235	200	118	253	288	306	312	-	-	290	290	-	-	210	240	305	-	-	225	225	-	-	162
50	254	267	230	122	257	288	306	312	-	-	290	290	-	-	210	240	305	-	-	225	225	-	-	162
65	276	292	290	166	410	-	-	312	402	-	-	290	308	-	-	-	305	375	-	-	225	305	-	162
80	298	317	310	166	410	-	-	312	402	-	-	290	308	-	-	-	305	375	-	-	225	305	-	162
100	352	368	350	173	417	-	-	312	402	-	-	290	308	-	-	-	305	375	-	-	225	305	-	162
150	451	473	480	305	510	-	-	-	-	585	-	-	-	510	-	-	-	-	477	-	-	-	450	240
200	543	568	600	458	623	-	-	-	-	585	-	-	-	510	-	-	-	-	477	-	-	-	450	240
250	673	708	730	475	623	-	-	-	-	585	-	-	-	510	-	-	-	-	477	-	-	-	450	240

Note:

Dimension A for CL150 and CL300 refers to bodies with valve face B or RF. For other body versions you can calculate A1 dimension using formulas in Table 14.

Table 14.

Body	Marking		A_1
	PN	ANSI	
Groove PN50 / ANSI300	D1	GF	A_1= A+5 x 2
Recess PN50 / ANSI300	F1	FF	
Ring-joint PN50 / ANSI 300 DN15	J	RTJ	A_1= A+5,5 x 2
Ring-joint PN20 / ANSI 150			A_1= A+6,5 x 2
Ring-joint PN50 / ANSI 300 DN20...40			
Ring-joint PN50 / ANSI 300 DN50...250			A_1= A+8 x 2

Table 15.
Valve weights w/o drives [kg].

DN	Valve with bonnet	
	standard	extended and bellow
15	6	9
20	7	10
25	7,5	11
32	9,5	13
40	11,5	16
50	14,5	20
65	20	28
80	28,5	36,5
100	42	50
150	120	135
200	180	195
250	320	335

Table 16. Actuator weights [kg]

Actuator	Weight	
	Standard	w. manual drive
LP0 - 160	9	13,5
LP0 - 250	10	14,5
LP0 - 400	16	20,5
LP0 - 630	30	37
LP0 - 1000	74	100

Table 17.
Manual drive weights [kg]

Drive	Weight
M - 250	5,5
M - 400	6,5
M - 630	8,5
M - 1000	40

VALVEA

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