

SINGLE-PORTED GLOBE CONTROL VALVES TYPE Z®

APPLICATIONS:

Single-ported globe control valves type Z® 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 (versions for Western Europe market is marked: BR11).

CHARACTERISTICS:

- range of nominal sizes from DN15 to DN250 for pressure values PN10 to CL300,
- various materials of valve body cast and internal parts, adapted to specific working conditions,
- wide range of flow ratios and control characteristics,
- reduction in aggressive and toxic media emissions to environment through application of bellow seal bonnets or bonnet packings meeting requirements of TA - LUFT,
- easy assembly and dismantling of valve internal parts for maintenance and service
- high durability and reliability due to application of top-class materials and surface improvement processes (burnishing, stellitizing, heat treatment, CrN coatings),
- possibility of mating with reversible action P / R(column) multi-spring actuators and changing the spring range with no extra parts (keeping the number of springs),
- possibility of fitting actuators with top drive,
- possibility of performing diagnostics of "valve-actuator" system due to application of smart electro-pneumatic positioners,
- high tightness of closure due to application of soft valve seats (with PTFE seals in the whole range of flows and characteristics, for valve plugs, balanced and unbalanced,
- same flow ratios and control characteristics for "hard" valve seats (metal-to-metal) and "soft" valve seats (metal-gasket), for valve plugs, balanced and unbalanced,
- reliable actuator-stem and valve seat-body connections,
- small guiding sleeve control forces due to application of balanced valve plugs in valves DN40...250,
- top-class flat and bonnet packings,
- wide range of electric actuators,
- possibility of mating with NN type hand operated drives,
- possibility of special executions for oxygen, hydrogen, gas fuels, low temperature mediums (liquid oxygen, liquid nitrogen), acid gases containing H₂S; explosive atmospheres as per 94/9/EC - ATEX,
- competitive prices – due to simple and functional design of valves and actuators and applied materials,
- design and production process meets the requirements of Quality Management System ISO 9001 and Directive 97/23/EC, and regulations of AD2000 Merkblatt, designated for installation on pipelines,



Z® is a trademark registered

DESIGN AND TECHNICAL SPECIFICATION:

Body (1): single-ported, flanged, cast in cast iron or cast steel.

Nominal sizes: DN15; 20; 25; 32; 40; 50; 65; 80; 100; 125^{*}; 150; 200; 250

^{*}) special execution, technical data according to individual inquiries.

Nominal pressure: PN10; 16; 25; 40 (as per PN-EN 1092-1:2010 and PN-EN 1092-2:1999); CL150; CL300 (as per PN-EN 1759-1:2005).

Steel flanges CL150; CL300 are so designed that they can be assembled with flanges executed per American standards ANSI/ASME B16.5 and MSS SP44. In American standards flanges are identified with nominal values in "Classes", to which nominal pressure (PN) values as per PN-ISO 7005-1:2002 correspond.

Equivalent identification as per PN are: CL150: PN 20 and CL300: PN 50.

Table 1. Flanged end connections

Material	Nominal pressure	Facing of flange types					
		Raised face	Groove	Recess	Ring - joint		
		Identification					
Grey iron	PN10; 16	B ²⁾	-	-	-		
	PN10; 16; 25; 40		-	-	-		
	PN10; 16; 25; 40		D	F	-		
	CL150		-	-	J (RTJ)		
	CL300		DL (D1 ¹⁾	F (F1)			
¹⁾ - only for CL300; ²⁾ - B1 – (Ra=12.5 mm, concentric surface structure "C"), B2 – (Ra as agreed with the customer); () - identification of connections as per ASME B16.5							
Possible execution of flanges per specification and indicated standards							

Face-to-face dimensions: as per PN-EN 60534-3-1; 2000r. - Fig. no. 7 ; Table 19 and 20. Series 1 - for PN10; 16; 25; 40; series 37- for CL150; series 38 - for CL300

- Bonnet (2)**
- non-cast - assembled to body via assembly plate (DN15-100)
 - cast (DN150-250): a) standard, b) extension (for cast steel valves),
c) bellows (for cast steel valves).

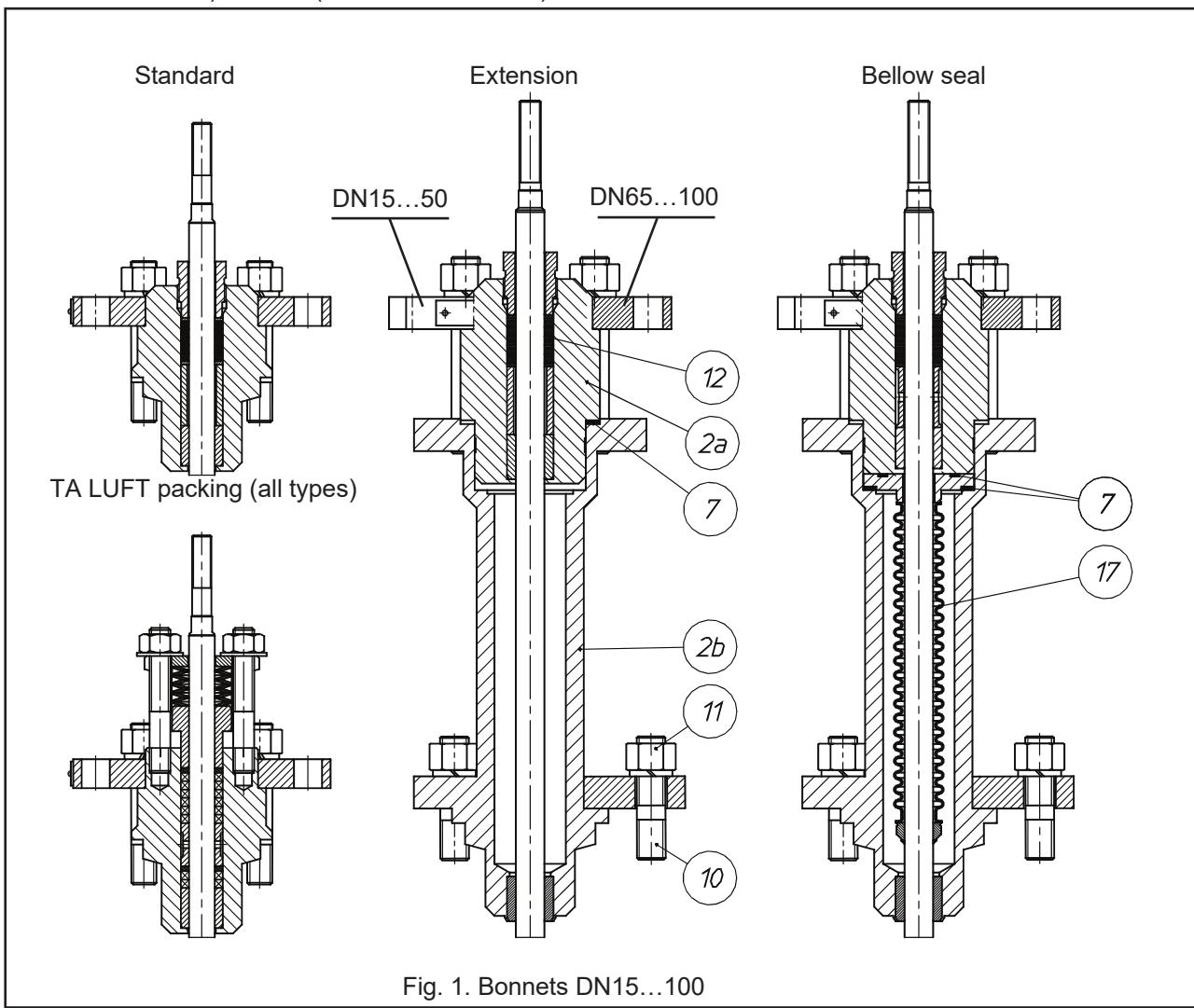


Fig. 1. Bonnets DN15...100

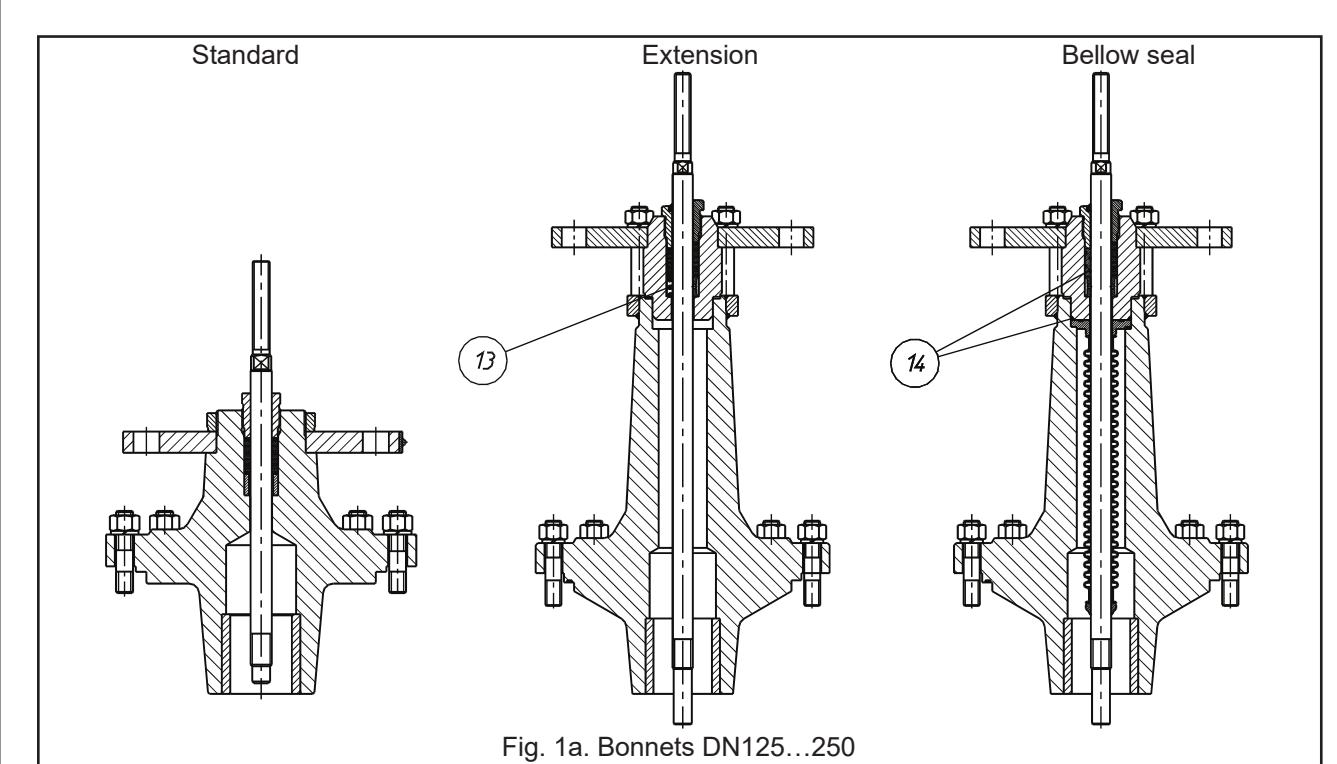
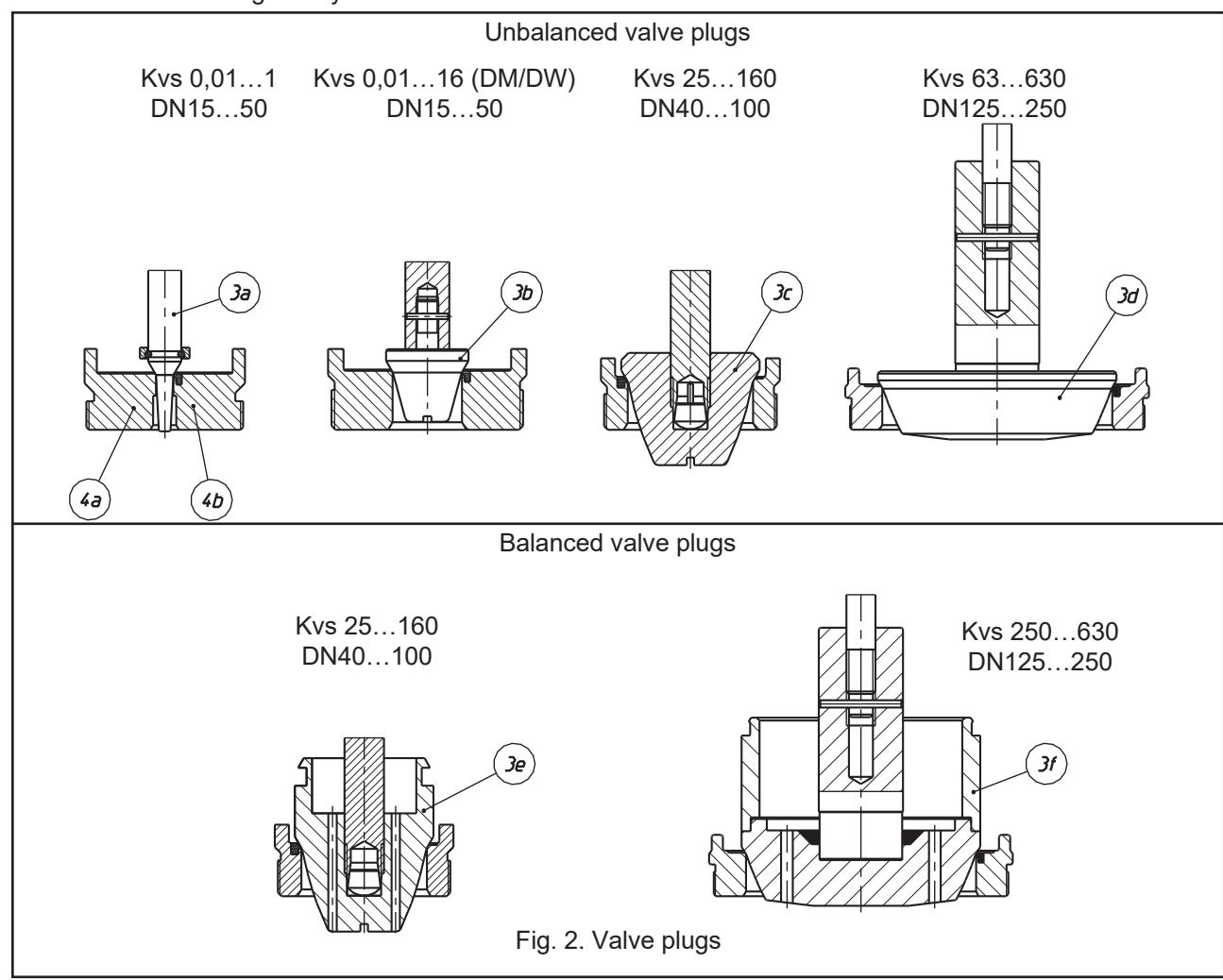


Fig. 1a. Bonnets DN125...250

Valve plug (3) - contoured, balanced, unbalanced

- control characteristics:
 - linear (L)
 - equal percentage (P)
 - quick-opening (S)
 - 50:1
- rangeability:



Valve seat (4) - screwed in, with centering cone, sealing and preventing unscrewing:

- hard version,
- soft version (PTFE packing).

Valve plug stem (5) - burnished or quenched and tempered, polished sealing contact surface

Drain plug (6) - steel or stainless steel: allows cleaning of body interior (delivered separately)

Body gasket (7) - asbestos-free:

- flat – aramid and hardened graphite (1.4571); in metallic casing (1.4571), multiple edges
- bonnet:
 - packings formed in various materials (PTFE-V; PTFE+graphite; expanded graphite; braided graphite);
 - with TA Luft compression springs (PTFE-V; graphite)

Table 2. Packing types with application ranges.

Packing	PN / CL	Temperature [°C]			
		Bonnet			
		Standard	Extension	Bellow	
PTFE-V	PN10...CL300	-46...+200	-198...-46 +200...+300	-100...+200	
PTFE + Graphite					
PTFE-V / TA-LUFT		+200...+300	+300...+450	+200...+400	
Graphite					
Graphite / TA-LUFT					

Leakage class: - basic: Class IV as per PN-EN 60534-4 - hard valve seat
- bubble-tight Class VI as per PN-EN 60534-4 - soft valve seat

Table 3. Listing of components with materials

Item	Component	Materials									
		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				
1	Body	S 355 J2G3 (1.0570)		X6CrNiMoTi 17-12-2 (1.4571)		X6CrNiMoTi 17-12-2 (1.4571)					
2		DN15...100	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)				
3	Plug			X6CrNiMoTi 17-12-2; (1.4571) X6CrNiMoTi 17-12-2; (1.4571) + stellite + CrN X17CrNi 16-2 ; (1.4057) + heat treatment							
4	Seat			X6CrNiMoTi 17-12-2; (1.4571) X6CrNiMoTi 17-12-2; (1.4571) + stellite 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) + stellite + 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			in metal casing X6CrNiMoTi 17-12-2 (1.4571) ; NOVATEC PREMIUM; SIGRAFLEX HOCHDRUCK; MWK-50 SPETOMET							
8	Guiding sleeve			X6CrNiMoTi 17-12-2; (1.4571) + CrN X6CrNiMoTi 17-12-2; (1.4571) + stellite + 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 + GRAFIT; PTFE - „V”; GRAPHITE							
13	Spring			12R10 (SANDVIK)							
14	O-ring			Fluorine rubber (FKM)							
15	Guiding sleeve			X6CrNiMoTi 17-12-2; (1.4571) + CrN X6CrNiMoTi 17-12-2; (1.4571) + stellite + CrN X17CrNi 16-2 ; (1.4057) + heat treatment							
16	Seal ring			PTFE + X6CrNiMoTi 17-12-2 (1.4571); TURCON + X6CrNiMoTi 17-12-2 (1.4571)							
17	Bellow			X6CrNiMoTi 17-12-2; (1.4571)							
Relevant materials standards											
Material		Standard									
EN-GJL 250 ; (EN-JL 1040)		PN-EN 1561									
EN-GJS 400-18 LT ; (EN-JS 1025)		PN-EN 1563									
GP 240 GH ; (1.0619)		PN-EN 10213-2									
WCB		ASTM A 216									
GX5CrNiMo 19-11-2 ; (1.4408)		PN-EN 10213-4									
CF8M		ASTM A 351									
S 355 J2G3 ; (1.0570)		PN-EN 10025									
X6CrNiMoTi 17-12-2 ; (1.4571)		PN-EN 10088									
X17CrNi 16-2 ; (1.4057)		PN-EN 10088									
C45 (1.0503)		PN-EN 10083-1									
X30Cr13 (1.4028)		PN-EN 10088									

NOTE:

Hardening method used for hardening of valve internal parts comprises:

- stellitizing – padding of surfaces with stellite: ~40HRC
- CrN coating – introducing chromium nitride to external layer of detail, to the depth of ca.0.1 mm;~950HV
- heat treatment: plug (~45HRC), seat (~35HRC), stem (~35HRC), guide sleeve (~45HRC)
- Maximum working temperature -200...+250°C (for KEFLOY 25 material), higher temperatures: upon consultation with the manufacturer.

Table 4. Working parameters for special executions of valves.

Valve execution	Working temperature [°C]		Max working pressure [bar]
	Min.	Max.	
With balanced plug	-50	+200	40
With soft valve seat (PTFE)	-100		35
With bellow seal bonnet	-100	+400	35

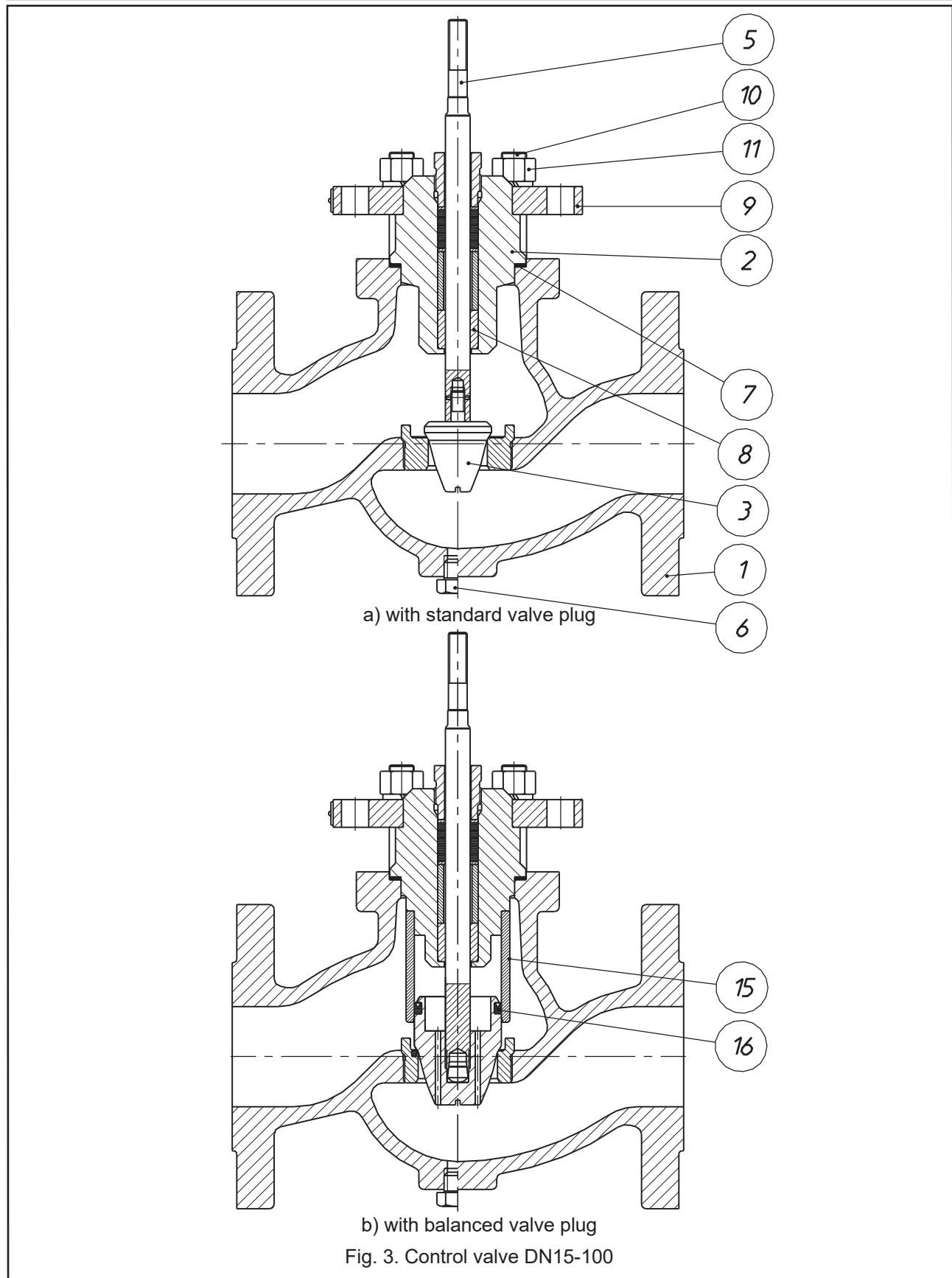
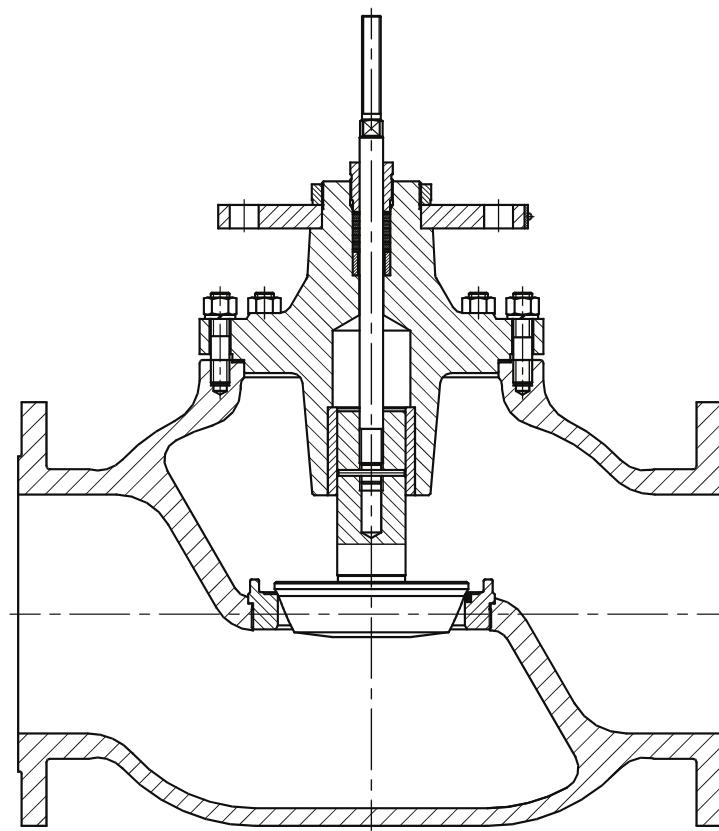
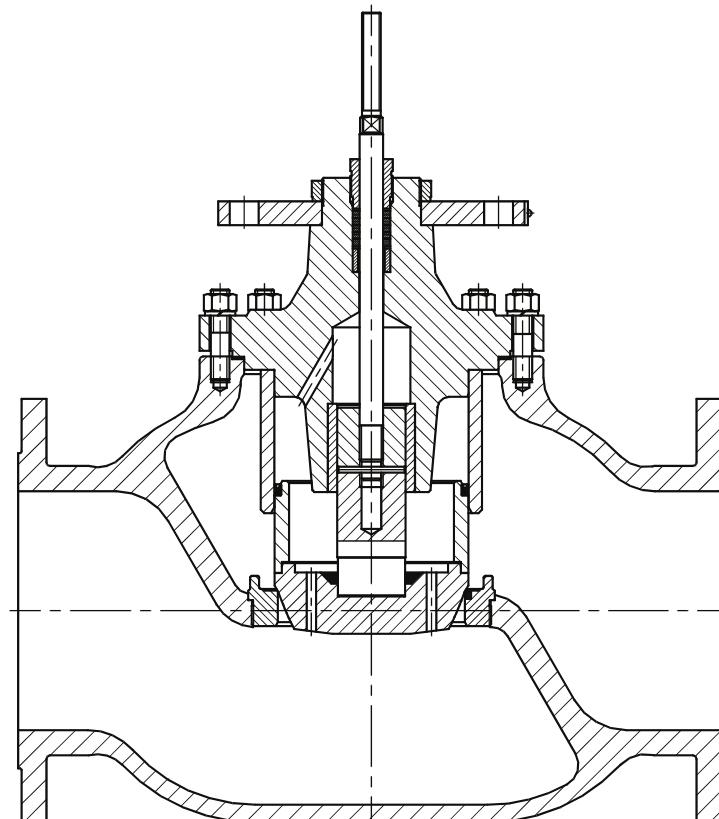


Fig. 3. Control valve DN15-100



a) with standard valve plug



b) with balanced valve plug

Fig. 4. Control valve DN125-250

Table 5...11. Allowable working overpressure for materials at proper temperatures

		Material: EN-GJL 250 as per PN-EN 1561						
PN	Standard	Temperature [°C]						
		-10...120	150	180	200	230	250	300
		Allowable working pressure [bar]						
PN10	PN-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

		Material: EN-GJS 400-18 LT as per PN-EN 1563						
PN	Standard	Temperature [°C]						
		-10...120	150	200	250	300	350	
		Allowable working pressure [bar]						
PN10		10	9,7	9,2	8,7	8	7	
PN16	PN-EN 1092-2	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	

		Material: GP240GH (1.0619) as per PN-EN 10213-2							
PN / CL	Standard	Temperature [°C]							
		-10...50	100	150	200	250	300	350	400
		Allowable working pressure [bar]							
PN10		10	9,2	8,8	8,3	7,6	6,9	6,4	5,9
PN16	EN 1092-1	16	14,8	14	13,3	12,1	11	10,2	9,5
CL150	PN-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	PN-EN 1759-1	45,3	40,1	38,1	36	32,9	29,8	27,8	25,7

		Material: GX5CrNiMo 19-11-2 (1.4408) as per PN-EN 10213-4									
PN / CL	Standard	Temperature [°C]									
		-10...50	100	150	200	250	300	350	400	425	450
		Allowable 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	PN-EN 1759-1	17,9	16,3	14,9	13,5	12,1	10,2	8,4	6,5	5,6	4,7
PN25	EN 1092-1	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	PN-EN 1759-1	46,7	42,5	38,9	35,3	32,9	30,5	28,8	27,6	27,2	26,9

		Material: G20Mn5 (1.6220) wg PN-EN 10213-3						
PN / CL	Standard	Temperature [°C]						
		-40	100	150	200	250	300	
		Allowable 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	

		Material: WCB as per ASTM A216								
PN / CL	Standard	Temperature [°C]								
		-10...50	100	150	200	250	300	350	375	400
		Allowable 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	PN-EN 1759-1	19,3	17,7	15,8	14	12,1	10,2	8,4	7,4	6,5
PN25	EN 1092-1	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	PN-EN 1759-1	50	46,4	45,1	43,9	41,8	38,9	36,9	36,6	34,6

		Material: CF8M as per ASTM A351										
PN / CL	Standard	Temperature [°C]										
		-10...50	100	150	200	250	300	350	375	400	425	450
		Allowable 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	PN-EN 1759-1	18,4	16	14,8	13,6	12	10,2	8,4	7,4	6,5	5,6	4,6
PN25	EN 1092-1	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	PN-EN 1759-1	48,1	42,3	38,6	35,8	33,5	31,6	30,4	29,6	29,3	29	29

NOTES:

- 1. It is allowed to apply spheroidal iron, carbon steel and acid proof cast steel for temperatures lower than given in Tables 5...11, provided that working pressure is reduced respectively, working temperature impact tests are performed and cast is heat treated. Details are to be consulted with manufacturer.
- 2. Working pressure for intermediate temperature values can be calculated by interpolation.

Table 12. Flow ratios Kvs [m^3/h] for unbalanced valve plugs

Kvs [m^3/h]	Stroke [mm]	Valve seat diameter D [mm]	F _D [kN]		Nominal size DN												Characteristics			
			Hard valve seat	Soft valve seat	15	20	25	32	40	50	65	80	100	125 ^{*)}	150	200	250	L	P	S
0,010	20	6,35	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	0,15	0,25													
2,5					12,7	0,2	0,3													
4,0					19,05	0,3	0,5													
6,3					20,64	0,35	0,5													
10					25,25	0,4	0,6													
16					31,72	0,5	0,8													
25					41,25	0,7	1,0													
40					50,8	0,8	1,3													
63	38	88,9	1,4	2,2	66,7	1,1	1,7													
94					125															
125					160															
250	50	107,92	1,7	2,7	320	2,0	3,2													
320					500	2,5	4,0													
500	63	158,72	3,1	4,9	630															
630																				
Calculated ratios: F _L = 0,9 ; X _T = 0,72 ; F _d = 0,46 ; xF _Z = 0,65																				

Table 13. Flow ratios Kvs [m^3/h] for balanced valve plugs

Kvs [m^3/h]	Stroke [mm]	Valve nominal size DN										Characteristics		
		40	50	65	80	100	125 ^{*)}	150	200	250	L	P	S	
25	20													
40														
63	38													
94														
125	50													
160														
250	63													
320														
500														
630														

NOTE:

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

*DN125 - special execution, technical data according to individual inquiries.

ALLOWABLE PRESSURE DROPS Δp .

Pressure drops Δp [bar] in Tables 15 and 16 apply to closed valve and they are calculated for valve drive potential. Actual pressure drops should not exceed 70% of allowable working pressure for given nominal pressure, material execution and working temperature, as per tables 5...11.

$$\Delta p = \frac{F_s - F_D - F_T}{0,785 \cdot 10^{-4} \cdot D^2} \quad \text{or} \quad F_s = 0,785 \cdot 10^{-4} \cdot D^2 \cdot \Delta p + F_D + F_T$$

where

- | | |
|------------------|--|
| Δp [bar] | - calculated pressure drop |
| F_s [kN] | - actuator available force (Table 14) |
| F_D [kN] | - valve plug to valve seat pressure (Table 12) |
| D | - valve seat diameter [mm] (Table 12) |

Table 14. Available force F_s [kN] of pneumatic actuators

Actuator size	Direct actuator P			Reverse 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
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 and data from Tables 12 and 14, taking nominal load capacity as available force F_s , as per actuator catalog chart.
3. For balanced valve plugs available force F_s at least equal to F_D value for soft valve seats in Table 12 should be adopted.

Table 15. Allowable pressure drops Δp [bar] for valves with unbalanced valve plugs and hard valve seats, with pneumatic actuators.

Flow ratio Kvs [m³/h]	Valve nominal diameter DN	Stroke [mm]	Air – to – close						Air – to – open					
			Actuator		Δp [bar]			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	250	20-100 40-200 60-140 80-240 120-280	40	-	-	250	20-100 40-200 60-140 80-240 120-280	23	40	5	2	
6,3	20; 25; 32; 40; 50				24	40	-			7	24	40	12	2
10	25; 32; 40; 50				20	40	-			20	34	40	22	12
16	32; 40; 50				12	40	-			20	34	40	32	22
	65				24	40	-			20	40	40	40	32
25	40; 50; 65; 80		400	20-100 40-200 60-140 80-240 120-280	14	40	-	400	20-100 40-200 60-140 80-240 120-280	4	14	24	34	
40	50; 65; 80; 100; 125				6,5	38	40			40	34	40	40	34
63	65; 80; 100; 125				8,5	40	-			40	34	40	40	34
	150				16	40	-			40	36	40	40	36
94	80; 100; 125		38	20-100 40-200 60-140 80-240 120-280 180-380	4	24	40			40	36	40	40	36
	150; 200				8	32	40			40	31	40	40	31
125; 160	100; 125				2	13	28	630	20-100 40-200 60-140 80-240 120-280 180-380	2	4	6	10	16
	150; 200; 250				4	22	40			40	17	26	40	17
250	150; 200; 250	50	1000	20-100 40-200 60-140 80-240 120-280 180-380	2,5	14	30			40	11	17,5	2,5	6,5
320	150; 200; 250				1,5	10	22			40	8	12,5	40	8
500	200; 250				-	6	14			40	5	7,5	40	5
630	250				-	4	9			40	3	5	40	3

*)DN125 - special execution, technical data according to individual inquiries.

- Note:**
- In Table 15, 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.
 - 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.
 - In valves with balanced valve plugs and hard valve seats for pressure drops up to $\Delta p=40$ [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 16. Allowable pressure drops Δp [bar] for valves with unbalanced valve plugs and soft valve seats, with pneumatic actuators.

Flow ratio Kvs [m³/h]	Valve nominal diameter DN	Stroke [mm]	Air – to – close					Air – to – open			Δp [bar]	
			Actuator		Δp [bar]			Actuator				
			Size	Spring range [kPa]	Supply pressure [kPa]			Size	Spring range [kPa]			
					140	250	400					
do 4	15; 20; 25; 32; 40; 50	20	250	20-100	35	-	-	250	20-100	15	15	
	20; 25; 32; 40; 50				17	35	-		40-200	35	35	
	25; 32; 40; 50				12	35	-		60-140	17	17	
	32; 40; 50				6	35	-		80-240	35	35	
	65				18	35	-		120-280	12	12	
	40; 50; 65; 80		400	40-200	10	35	-	400	60-140	26	26	
	50; 65; 80; 100; 125				3,5	35	-		80-240	26	26	
	65; 80; 100; 125				6	35	-		120-280	35	35	
	150				13	35	-		180-380	18	18	
	80; 100; 125				3	23	35		20-100	3,5	3,5	
63	150; 200	38	630	40-200	7	35	-	630	40-200	9	9	
	100				6	35	-		60-140	15	15	
	150; 200; 250				13	35	-		80-240	19	19	
	100				3	23	35		120-280	31	31	
	150; 200; 250				7	35	-		180-380	35	35	
	150; 200; 250		1000	40-200	-	11	26	1000	40-200	6	6	
	150; 200; 250				2,5	20	35		60-140	12	12	
	150; 200; 250				1,2	13	29		80-240	19	19	
	150; 200; 250				-	9	21		120-280	30	30	
	150; 200; 250				-	5	8		180-380	35	35	
250	200; 250	50	1000	40-200	-	3	8	1000	40-200	-	-	
	200; 250				-	5	8		60-140	2	2	
	200; 250				-	3	8		80-240	4	4	
	250				-	3	8		120-280	8	8	
320	150; 200; 250	63	1000	40-200	-	9	21	1000	120-280	14	14	
	150; 200; 250				-	5	8		180-380	2	2	
	200; 250				-	3	8		20-100	3,5	3,5	
	250				-	3	8		40-200	6,5	6,5	
500	200; 250	63	1000	40-200	-	5	8	1000	120-280	11,5	11,5	
	200; 250				-	3	8		180-380	7	7	
	250				-	3	8		20-100	-	-	
	250				-	3	8		40-200	1	1	
630	250	63	1000	40-200	-	3	8	1000	60-140	2	2	
	250				-	3	8		80-240	4	4	
	250				-	3	8		120-280	8	8	
	250				-	3	8		180-380	4	4	

*)DN125 - special execution, technical data according to individual inquiries.

Note:

1. In Table 16, 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 $\Delta p = 35$ [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].

VALVE DRIVES:**1. Diaphragm multi-spring pneumatic actuators w/o manual drive type P/R or with top-mounted handwheel type P/R-N – as per Tables 17 and 20.**

Table 17. Pneumatic actuators

Size	Diaphragm effective area [cm ²]	Stroke [mm]	Rev per rated stroke (P/R-N)
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 fitting with top-mounted handwheel.

DESIGN AND TECHNICAL SPECIFICATION:

As per Fig. 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.

TECHNICAL SPECIFICATION:

Control air connection: NPT 1/4", NPT 1/2"

Pipe diameter: Ø 6x1, Ø 8x1, Ø 10x1, Ø 12x1

Spring ranges:	20...100 kPa; 40...120 kPa; 60...140 kPa	- 3 springs,
40...200 kPa; 80...240 kPa; 120...280 kPa	- 6 springs,	
180...380 kPa	- 12 springs; (only sizes 630-1000).	

Max supply pressure: actuator size 250...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.

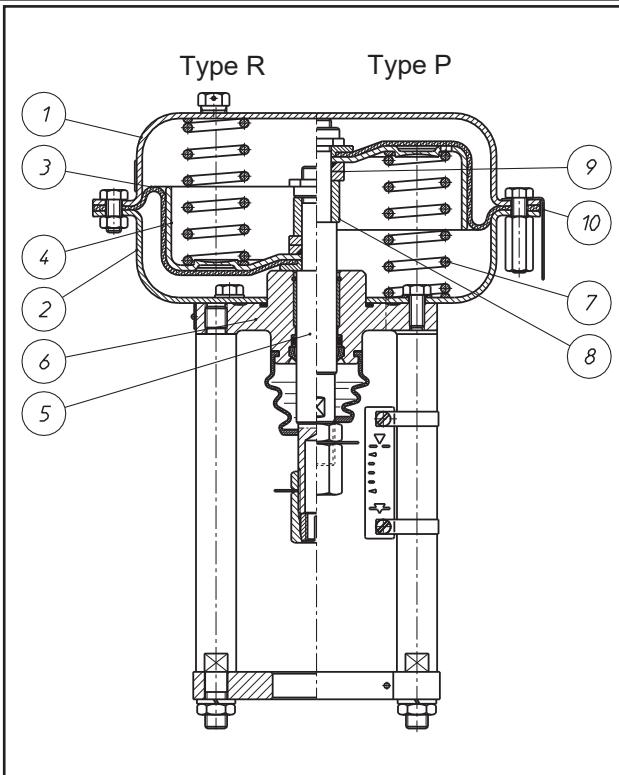


Fig. 5. P/R multi-spring actuator

2. 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.

3. NN manual drives

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

Table 18. Drive sizes.

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

EXTERNAL DIAMETERS AND CONNECTION DIAMETERS, WEIGHTS OF VALVES, PNEUMATIC ACTUATORS AND MANUAL DRIVES

Table 19. Valve connection diameters [mm]

DN	d ₁	d ₃	E	L	L ₁	P	R
15...25				125	111	12,5	110
32...50	M12x1,25	12	44	118	102	16,5	132
						20,5	160
		16	50	122	104	16,5	132
65...100	M16x1,5	20	95	200	180	20,5	160
						24,5	216
125...250				98	138	118	

Note:

- 1) R and ØP 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
- *DN125 - special execution, technical data according to individual inquiries.

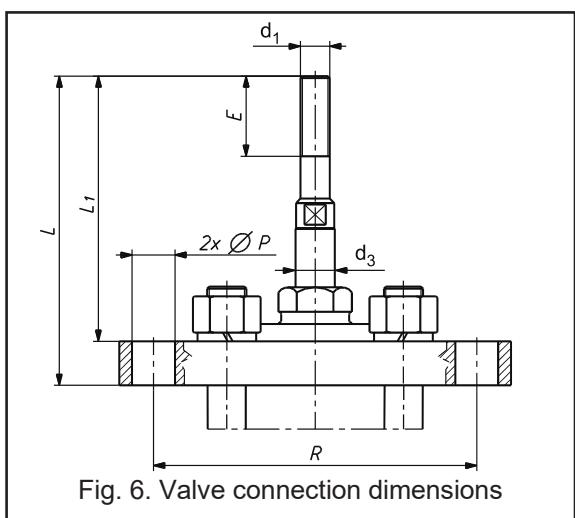


Fig. 6. Valve connection dimensions

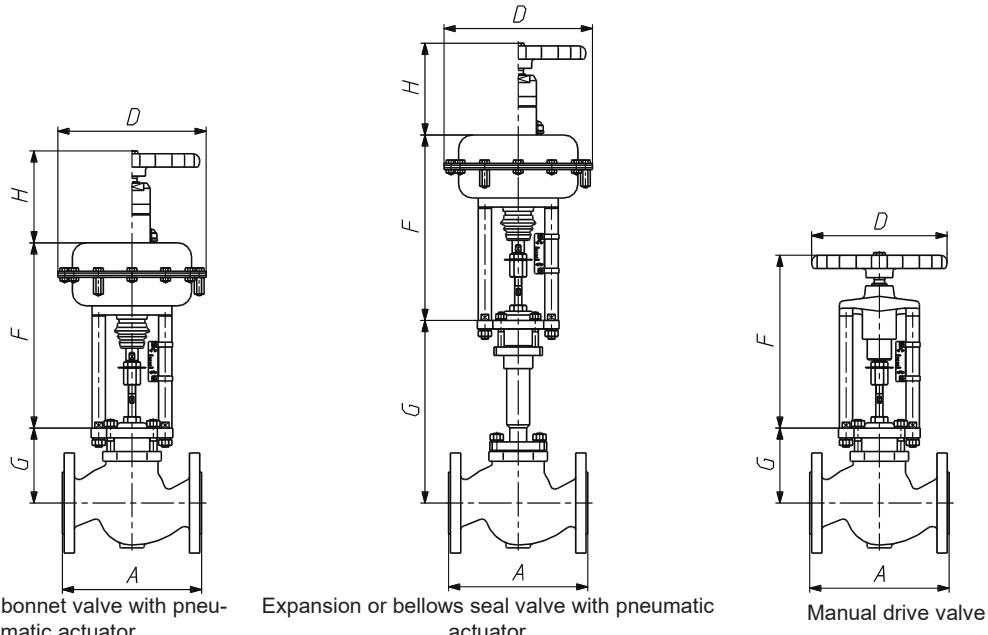


Fig. 7. Valve external dimensions

Table 20. Valve dimensions incl. drives [mm].

DN	A		G		D																H			
			PN10...40	Standard bonnet.	Ext. and bellows seal bonnet	P/R 250	P/R 400	P/R 630	P/R 1000	NN 250	NN 400	NN 630	NN 1000	P/R 160	P/R 250	P/R 400	P/R 630	P/R 1000	NN 250	NN 400	NN 630	NN 1000		
15	184	190	130	107	241	306	-	-	-	290	-	-	-	210	240	-	-	-	225	-	-	-	162	
20	184	194	150	107	241	306	-	-	-	290	-	-	-	210	240	-	-	-	225	-	-	-	162	
25	184	197	160	107	241	306	-	-	-	290	-	-	-	210	240	-	-	-	225	-	-	-	162	
32	200	213	180	114	243	306	-	-	-	290	-	-	-	210	240	-	-	-	225	-	-	-	162	
40	222	235	200	118	253	306	312	-	-	290	290	-	-	210	240	305	-	-	225	225	-	-	162	
50	254	267	230	122	257	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
125	special execution, technical data according to individual inquiries.																							
150	451	473	480	305	510	-	-	-	585	-	-	-	510	-	-	-	-	477	-	-	-	450	240	
200	543	568	600	458	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 A_1 dimension using formulas in Table 21.

Table 21.

Body	Marking		A_1
	PN	ANSI	
Groove CL300	D1	GF	$A_1 = A + 5 \times 2$
Recess CL300	F1	FF	$A_1 = A + 5,5 \times 2$
Ring-joint CL300 DN15	J	RTJ	$A_1 = A + 6,5 \times 2$
Ring-joint CL150			$A_1 = A + 8 \times 2$
Ring-joint CL300 DN20...40			$A_1 = A + 6,5 \times 2$
Ring-joint CL300 DN50...250			$A_1 = A + 8 \times 2$

Table 22. Valve weights w/o drives [kg].

DN	Valve	
	Standard bonnet	Extended and bellow seal bonnet
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
125	110	135
150	120	135
200	180	195
250	320	335

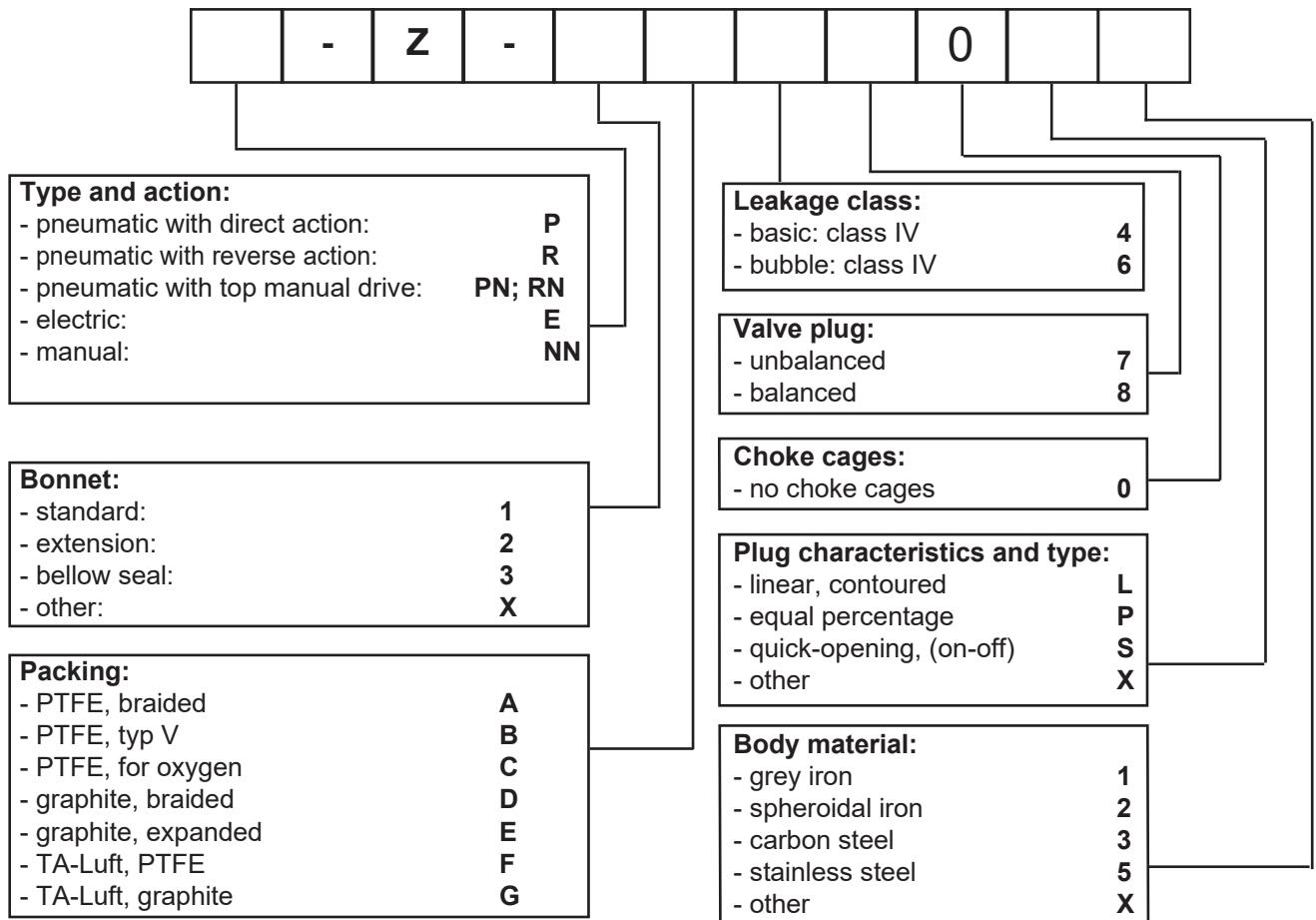
Table 23. Actuator weights [kg]

Actuator	Weight
P / R - 250	10
P / R - N - 250	14,5
P / R - 400	16
P / R - N - 400	20,5
P / R - 630	30
P / R - N - 630	37
P / R - 1000	74
P / R - N - 1000	100

Table 24. Manual drive weights [kg]

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

PARTITION AND MARKING



MARKING EXAMPLE:

Control valve type Z with reverse action pneumatic actuator with top-mounted handwheel, extension bonnet, expanded graphite stem sealing, leakage class IV, equal percentage contoured plug, execution in stainless steel:

RN-Z-2E470P5

Marking is shown on valve nameplate.

Additional information:

- nominal size [DN],
- nominal pressure [PN],
- max working temperature [TS],
- max working pressure [PS],
- test pressure [PT],
- flow ratio [Kvs],
- plug stroke [H],
- plug stroke fluid group [1 or 2],
- serial number and year of manufacture.

ORDERING:

The order should contain all information as per data questionnaire. Full information can be obtained from the Sales and Marketing Department or Technical and Development Department.

NOTES: