

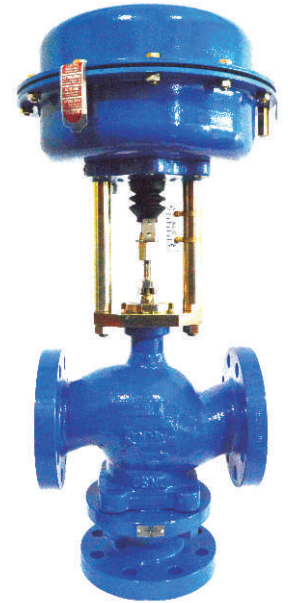
## Application

The 3-Way Control Valves BR13 are used for mixing (BR13M) or diverting (BR13R) service. They are recommended for applications in city heating, HVAC systems and many branches of the industry. The version with bellows allowed the additional use of heat sources (e.g. thermal oil)

**NOTE:** A mixing valve should only be used for low differential pressures or gases and vapors in the ON/OFF function for diverting service.

## Features

- » Nominal Diameters from DN15 up to DN250
- » Nominal Pressure from PN10 up to CL300
- » Face-to-Face length as per DIN EN 60534-3-1 or ANSI/ISA 75.08
- » Temperature range -196°C up to +450°C
- » Leakage Class IV and VI according to DIN EN 60534-4
- » Characteristic: Linear (L)
- » Seat guided Contoured Plug with Slot Plug
- » Rangeability 50:1
- » Design with Flange ends, TA-Luft, Bellows seal bonnet possible
- » Design as per Pressure Equipment Directive 2014/68/EU
- » Conformity CE and EAC
- » Optional certification/confirmation according to ATEX 2014/34/EU, GOST-R (TR) and AD2000 Merkblatt



## Design and technical Specification

Diameters: DN15; 20; 25; 32; 40; 50; 65; 80; 100; 150; 200\*; 250\*  
\* Special executions on request.

Pressure: PN10; 16; 25; 40 as per DIN EN 1092-1:2013 and DIN EN 1092-2:1999  
ANSI CL150; 300 and DIN EN 1759-1:2005

Flanges as per DIN EN 1759-1:2005 can be assembled with flanges execution per standards ANSI / ASME B16.5 and MSS SP44. They correspond to the standard DIN EN 7005-1:2002 following pressure ranges: CL150 ≙ PN20 and CL300 ≙ PN50

Table 1 Flange Versions

Material	Nominal Pressure	Raised Face	Flange Facing		
			Groove	Recess	Ring-Joint
Identification					
Cast Iron	PN10; 16	B <sup>2)</sup>	-	-	-
Ductile Iron	PN10; 16; 25; 40		-	-	-
Carbon Steel Stainless Steel	PN10; 16; 25; 40		D	F	-
	CL150		-	-	J (RTJ)
	CL300	DL (D1 <sup>1)</sup> )	F (F1)		
<sup>1)</sup> only for CL300; <sup>2)</sup> B1 – (Ra = 12,5 mm, concentric surface structure "C"), B2 – (Ra as agreed with the customer); (J) – as per ASME B16.5					

Table 2 Packing and Bonnet Versions

Packing	PN / CL	Temperature [°C]		
		Standard	Valve Bonnet Extended	Bellows Seal
PTFE V-Ring	PN10...CL300	-46*...+200	-196*...-46* +200...+300	-100*...+200
PTFE+Graphit				
PTFE V-Ring / TA-Luft		+200...+300	+300...+400	+200...+400
Graphit				
Graphit / TA-Luft				
* The use of a cryogenic bonnet is necessary from temperature as of -29°C!				

Table 3 Temperature Range depending on Execution

Execution	Operating Temperature [°C]		Max. Operating Pressure [bar]
	Min.	Max.	
Soft seated (PTFE inlay)	-100	+260	35
Bellows Seal Bonnet	-100	+400	35

**Bonnet (1a); Stub (2); Valve Plug (3); Valve Seats (4); Valve Stem (5); Body Gasket (7); Packing (8)**

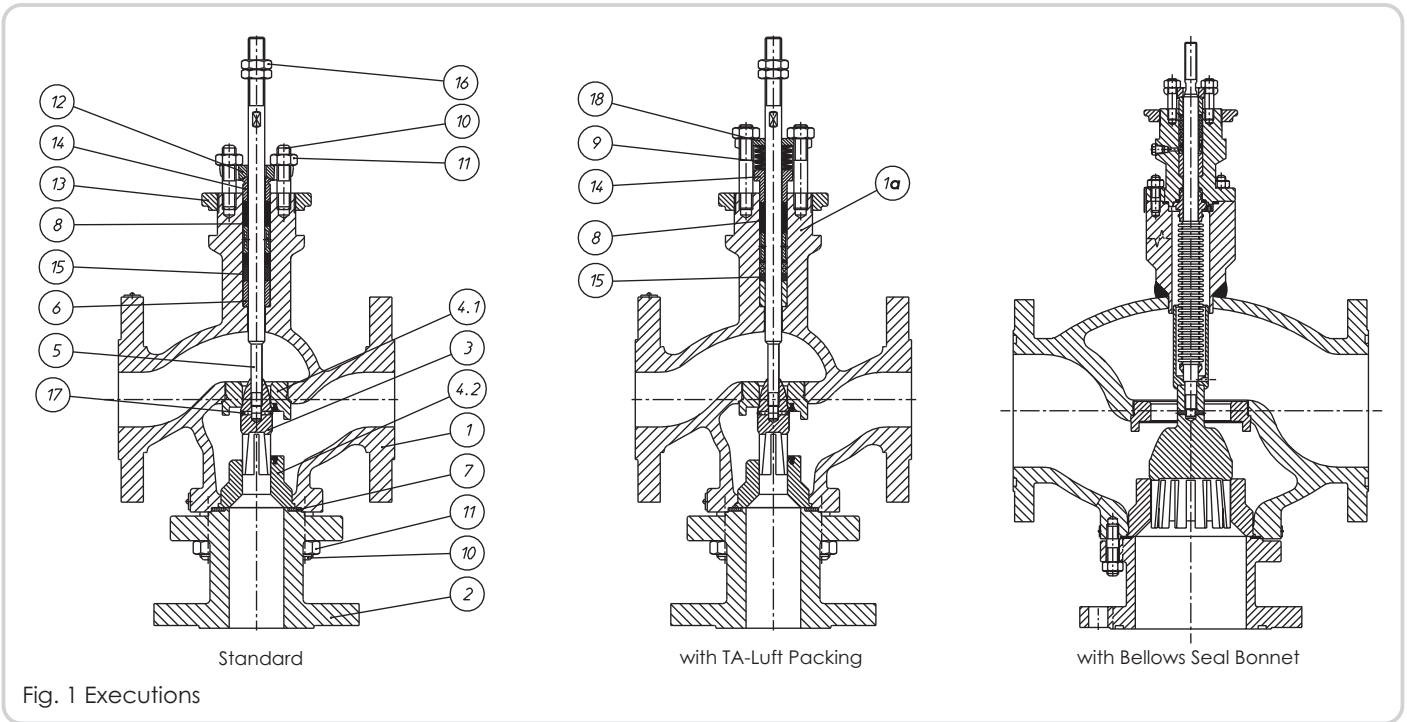


Table 4 Components and Materials

No.	Component	Material					
1	Body	EN-GJL250 (EN-JL 1040)	EN-GJS400-18LT (EN-JS 1025)	GP240GH (1.0619) WCB	G20Mn5 (1.6220)	G17CrMo9-10 (1.7379) WC9	GX5CrNiMo19-11-2 (1.4408) CF8M
1a	Bonnet			S355J2G3 (1.0570)			13CrMo4-4 (1.7335)
2	Stub	S355J2G3 (1.0570)			P355NL2 (1.1106)	G17CrMo9-10 (1.7379) WC9	GX5CrNiMo19-11-2 (1.4408) CF8M
3	Plug	X6CrNiMoTi17-12-2 (1.4571) X6CrNiMoTi17-12-2 (1.4571) + Stellite + Chrom(III)-nitride X17CrNi16-2 (1.4057) + heat treatment					
4.1 4.2	Screwed Seat Fitted-in Seat	X6CrNiMoTi17-12-2 (1.4571) X6CrNiMoTi17-12-2 (1.4571) + Stellite X6CrNiMoTi17-12-2 (1.4571) + PTFE X17CrNi16-2 (1.4057) + heat treatment					
5	Stem	X6CrNiMoTi17-12-2 (1.4571) X6CrNiMoTi17-12-2 (1.4571) + Stellite + Chrom(III)-nitride X17CrNi16-2 (1.4057) + heat treatment					
6	Guiding Sleeve	X6CrNiMoTi17-12-2 (1.4571) X17CrNi16-2 (1.4057) + heat treatment					
7	Body Gasket	Graphite (98%) + 1.4404 (Spiral)					
8	Packing	PTFE+Graphite, PTFE-V, Graphite					
9	Spring	12R10 (SANDVIK)					
10.1 10.2	Bolt	8.8			A4 - 70		
11.1 11.2	Nut	8			A4 - 70		
12	Press Lever	C45					
13	Fixing Nut	X6CrNiMoTi17-12-2 (1.4571)					
14	Press Sleeve						
15	Spacer Sleeve						
16	Nut (lower)	C45			X6CrNiMoTi17-12-2 (1.4571)		
17	Peg	X6CrNiMoTi17-12-2 (1.4571)					
18	Compression Plate						
•	Rec. Spare Parts						

NOTE:

- » Padding of Surface with Stellite: ~ 40HRC
- » Chrom(III)-nitride Coating (~ 0,1 mm): ~ 950HV
- » Heat treatment (quenched & tempered): Plug ~ 45HRC; Seat ~ 35HRC; Stem ~ 35HRC; Guiding Sleeve~ 45HRC

Table 5a...5f Allowable Operating Pressure (DIN)

Table 5a		Material: <b>EN-GJL250 (EN-JL1040)</b> as per DIN EN 1561								
PN	Standard	Temperature [°C]								
		-10...+50	100	150	200	250	300	350	400	450
Max. Operating Pressure [bar]										
PN10	DIN EN 1092-2	10	10	9	8	7	6	-	-	-
PN16		16	16	14,4	12,8	11,2	9,6	-	-	-

Table 5b		Material: <b>EN-GJS400-18 LT (EN-JS1025)</b> as per DIN EN 1563								
PN	Standard	Temperature [°C]								
		-10...+50	100	150	200	250	300	350	400	450
Max. Operating Pressure [bar]										
PN10	DIN EN 1092-2	10	10	9,7	9,2	8,7	8	7	-	-
PN16		16	16	15,5	14,7	13,9	12,8	11,2	-	-
PN25		25	25	24,3	23	21,8	20	17	-	-
PN40		40	40	38,8	36,8	34,8	32	28	-	-

Table 5c		Material: <b>GP240GH (1.0619)</b> as per DIN EN 10213-2								
PN / CL	Standard	Temperature [°C]								
		-10...+50	100	150	200	250	300	350	400	450
Max. Operating Pressure [bar]										
PN10	DIN 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	DIN EN 1759-1	17,3	15,4	14,6	13,8	12,1	10,2	8,4	6,5	-
PN25	DIN 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	DIN EN 1759-1	45,3	40,1	38,1	36	32,9	29,8	27,8	25,7	-

Table 5d		Material: <b>G20Mn5 (1.6220)</b> as per DIN EN 10213-3								
PN	Standard	Temperature [°C]								
		-40	100	150	200	250	300	350	400	450
Max. Operating 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 5e		Material: <b>G17CrMo9-10 (1.7379)</b> as per DIN EN 10213-2								
PN / CL	Standard	Temperature [°C]								
		-10...+50	100	150	200	250	300	350	400	450
Max. Operating Pressure [bar]										
PN10	-	10	10	10	10	10	10	9,7	9,2	8,8
PN16		16	16	16	16	16	16	15,6	14,8	14
CL150	DIN EN 1759-1	19,5	17,7	15,8	14	12,1	10,2	8,4	6,5	4,7
PN25	DIN EN 1092-1	25	25	25	25	25	25	24,4	23,2	22
PN40		40	40	40	40	40	40	39	37,1	35,2
CL300	DIN EN 1759-1	51,7	51,5	50,2	48,3	46,3	42,8	40,2	36,6	33,8

Table 5f		Material: <b>GX5CrNiMo19-11-2 (1.4408)</b> as per DIN EN 10213-4								
PN / CL	Standard	Temperature [°C]								
		-10...+50	100	150	200	250	300	350	400	450
Max. Operating Pressure [bar]										
PN10	DIN 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	DIN EN 1759-1	17,9	16,3	14,9	13,5	12,1	10,2	8,4	6,5	4,7
PN25	DIN 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	DIN EN 1759-1	46,7	42,5	38,9	35,3	32,9	30,5	28,8	27,6	26,9

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Table 5g...5i Allowable Operating Pressure (ASTM)


Table 5g		Material: <b>WCB</b> as per ASTM A216								
PN / CL	Standard	Temperature [°C]								
		-10...+50	100	150	200	250	300	350	400	450
Max. Operating Pressure [bar]										
PN10	DIN EN 1092-1	10	10	9,7	9,4	9	8,3	7,9	6,7	-
PN16		16	16	15,6	15,1	14,4	13,4	12,8	10,8	-
CL150	DIN EN 1759-1	19,3	17,7	15,8	14	12,1	10,2	8,4	6,5	-
PN25	DIN EN 1092-1	25	25	24,4	23,7	22,5	20,9	20	16,9	-
PN40		40	40	39,1	37,9	36	33,5	31,9	27	-
CL300	DIN EN 1759-1	50	46,4	45,1	43,9	41,8	38,9	36,9	34,6	-

Table 5h		Material: <b>WC9</b> as per ASTM A217								
PN / CL	Standard	Temperature [°C]								
		-10...+50	100	150	200	250	300	350	400	450
Max. Operating Pressure [bar]										
PN10	DIN EN 1092-1	10	10	10	10	10	10	10	9,9	9,5
PN16		16	16	16	16	16	16	16	16	15,9
CL150	DIN EN 1759-1	19,5	17,7	15,8	14	12,1	10,2	8,4	6,5	4,6
PN25	DIN EN 1092-1	25	25	25	25	25	25	25	24,8	23,9
PN40		40	40	40	40	40	40	40	40	39,7
CL300	DIN EN 1759-1	51,7	51,5	50,3	48,7	46,3	42,9	40,4	36,5	33,7

Table 5i		Material: <b>CF8M</b> as per ASTM A351								
PN / CL	Standard	Temperature [°C]								
		-10...+50	100	150	200	250	300	350	400	450
Max. Operating Pressure [bar]										
PN10	DIN EN 1092-1	8,9	7,8	7,1	6,6	6,1	5,8	5,6	5,4	5,3
PN16		14,3	12,5	11,4	10,6	9,8	9,3	9	8,7	8,5
CL150	DIN EN 1759-1	18,4	16	14,8	13,6	12	10,2	8,4	6,5	4,6
PN25	DIN EN 1092-1	22,3	19,5	17,8	16,5	15,5	14,6	14,1	13,6	13,4
PN40		35,6	31,3	28,5	26,4	24,7	23,4	22,6	21,8	21,4
CL300	DIN EN 1759-1	48,1	42,3	38,6	35,8	33,5	31,6	30,4	29,3	29

Table 6 Flow Ratios [KV<sub>v</sub>]

KV <sub>v</sub> [m³/h]	Stroke [mm]	Ø Seat D [mm]	F <sub>0</sub> [kN]		Nominal Diameter DN												
			Class IV	Class VI	15	20	25	32	40	50	65	80	100	150			
0,63	20	12,7	0,2	0,25													
1,0			0,3	0,3													
1,6																	
2,5																	
4,0			19,05	0,33	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	38	41,25	0,7	1,0													
40		50,8	0,8	1,3													
63		66,7	1,1	1,7													
94		88,9	1,4	2,2													
125		50	107,92	1,7	2,7												
160			126,95	2,0	3,2												
250																	
320																	
Actuator Type					250		250; 400		400; 630		630		1000				

 = possible

NOTE: Pressure drops should not exceed 70% of allowable operating pressure for given nominal pressure, material execution and operating temperature as per Table 5.

Formula for calculation of ...  
 ... allowable pressure drop:  $\Delta p = \frac{F_s + F_D}{0,785 * 10^{-4} * D^2}$   
 ... needed force [kN]:  $F_s = 0,785 * 10^{-4} * D^2 * \Delta p + F_D$

Pneumatic Actuator Type P/R (optional with top mounted handwheel type -N)

**Features**

completely reversibility - changing of operating mode P [NO] and R [NC] without any additional parts.

Table 7 Actuator forces  $F_s$  [kN]

Size [cm <sup>2</sup> ]	max. allowable Supply Pressure [bar]	Type P (NO, Stem retract) Supply Pressure [bar]			Type R (NC, Stem extends) Spring Range [bar]					
		1,4	2,5	4,0	0,4...1,2		0,6...1,4	0,8...2,4	1,2...2,8	1,8...3,8
					0,2...1,0	0,4...2,0				
250	6,0	1,0	3,8	7,5	0,5	1,0	1,5	2,0	3,0	-
400		1,6	6,0	12	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	5,0	4,0	15	30	2,0	4,0	6,0	8,0	12	18

Table 8 Dimensions & Weight for type P/R & P/R-N; and manual actuator type NN

Size	Diaphragm eff. area [cm <sup>2</sup> ]	Stroke [mm]	Weight [kg] (P/R)	Revolutions per stroke (P/R-N; NN)	Weight [kg] (P/R-N)	Weight [kg] (NN)	H [mm]	H1 [mm]	H2 [mm]	D1 [mm]	D2 [mm]
250	250	20	10	5	14,5	5,5	377	474	304	240	225
400	400		16		20,5	6,5	385	484	306	305	
630	630	38	30	9	37	8,5	477	574	326	375	305
1000	1000	38; 50; 63	74	8; 10; 13	100	40	660	835	530	477	450

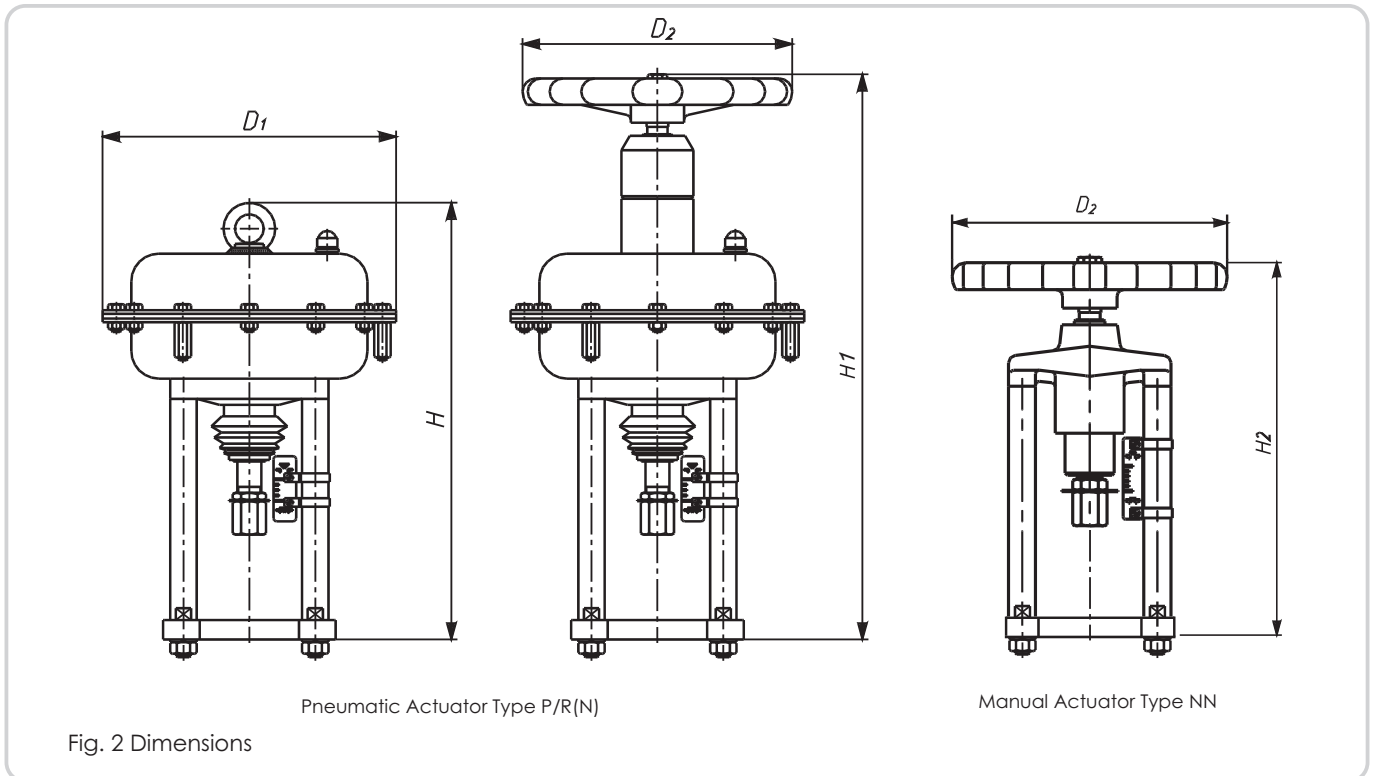


Fig. 2 Dimensions

# 3-Way Control Valve BR13

## Valve Connection Dimensions & Weight

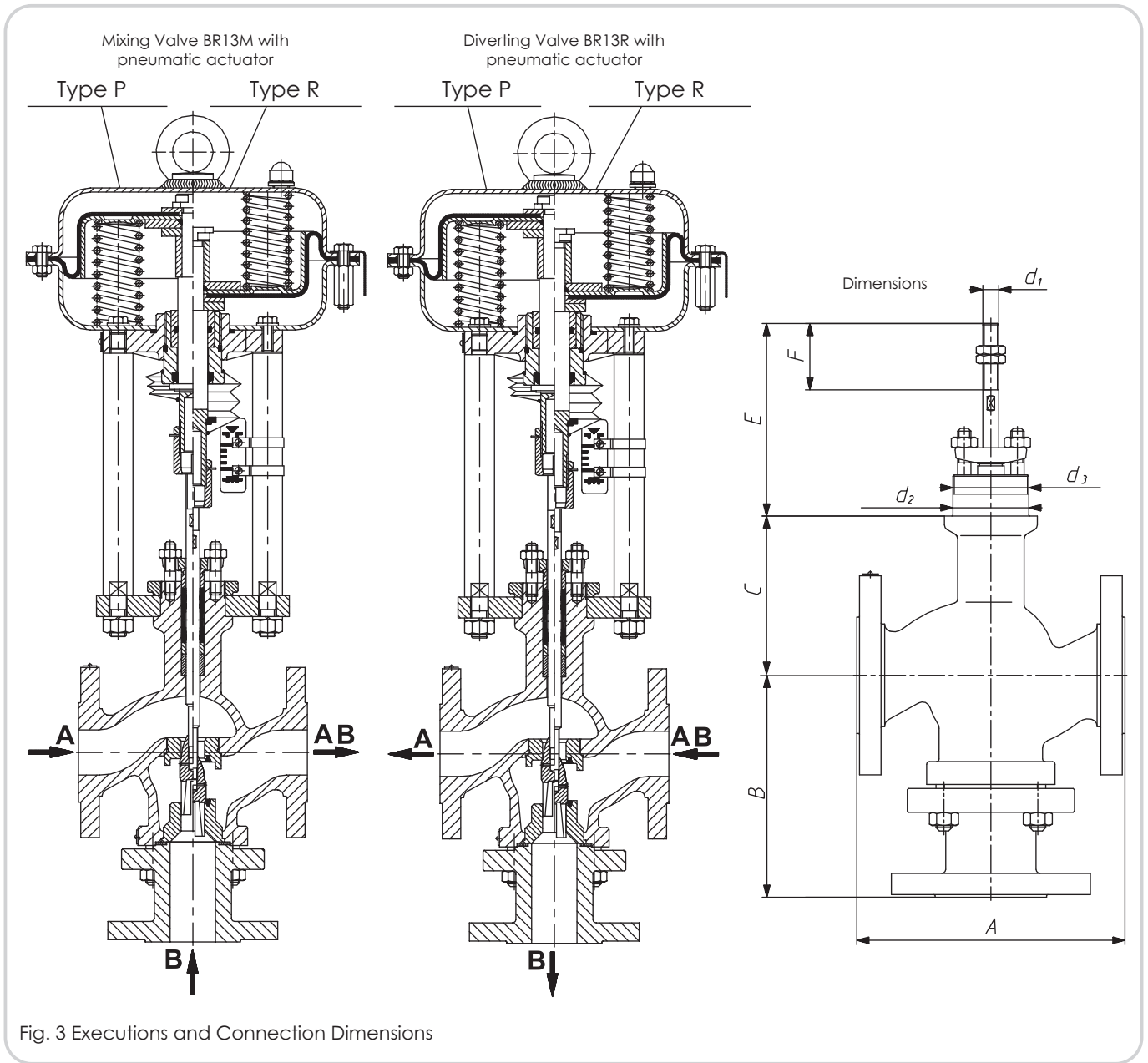


Fig. 3 Executions and Connection Dimensions

Table 9 Valve Dimensions [mm] and Weights [kg]

DN	A			B	C		E <sup>1)</sup>	F	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	Weight [kg]
	CL150	CL300	PN10...40		Standard	Extended Bellows Seal						
15	-	-	130	140	97	297	125	50	M12x1,25	57,15	2 1/4" - 16UN2A	8,5
20	-	-	150									10,5
25	184	197	160									12
32	-	-	180	162	110	310						15
40	222	235	200		117	317						18
50	254	267	230	184	128	328						26,5
65	-	-	290	215,5	140	340						36
80	298	318	310	233,5	146	346						55
100	352	368	350	240	171	346						75
150	451	473	480	295	205	405						195 <sup>1)</sup>

<sup>1)</sup> Valve Position CLOSE <sup>1)</sup> Dimension for P/R-1000