Válvula Reductora de Presión RP45 – DIN

DESCRIPTION

The ADCA RP45 series pressure reducing valves are single seated, bellows sealed controllers that operate without auxiliary energy.
Designed for use with steam, compressed air, and other gases compatible with the construction.
They are particularly suitable for reducing steam pressure in all energy and process systems where pressures must be kept under control.

MAIN FEATURES

Specially designed high durability bellows, providing pressure balancing and frictionless plug stem.
Robust construction (fit-and-forget).
Suitable for use with high pressure turndowns.
Interchangeable actuators.

OPTIONS:	Soft sealing version in PTFE/GR for use with steam. Nitrile rubber soft sealing version for air and gas applications, where tight shut-off is required. Low-noise flow divider.
USE:	Steam, compressed air and other gases compatible with the construction. Limited use with liquids. Consult manufacturer before installing the valve with liquids.
AVAILABLE MODELS:	RP45G and RP45GT or N – PN 16 SG iron. RP45S and RP45ST or N – PN 16 cast steel. RP45S and RP45ST or N – PN 40 cast steel. RP45i and RP45iT or N – stainless steel (all wetted parts free of ferrous metal or in stainless steel. Only available from DN 15 to DN 100). Suffix T: soft sealed with PTFE/GR. Suffix N: soft sealed with nitrile rubber.
SIZES:	DN 15 to DN 150.
CONNECTIONS:	RP45G – Flanged EN 1092-2 PN 16. RP45S and RP45i – Flanged EN 1092-1 PN 16 or PN 40. Standard PN 16 DN 65 flanges are supplied with 4 holes. 8 holes, according to EN 1092-1/-2 on request.
AVAILABLE ACTUATORS:	A1, A10, A11, A12, A3, A4, B1, B3, B4 and C11 – carbon steel. A2, A21, B2 and B21 – SG iron or carbon steel. A1i, A10i, A11i, A12i, A2i, A21i, A3i and A4i – stainless steel.
INSTALLATION:	See IMI – Installation and maintenance instructions.



RP45
DN 15 to DN 100



RP45i
DN 15 to DN 100



RP45
DN 125 to DN 150



RP45i
DN 15 to DN 100
with sensing pipe on body

CE MARKING – GROUP 2 (PED – European Directive)		
PN 16	**PN 40**	**Category**
DN 15 to 50	DN 15 to 32	SEP
DN 65 to 150	DN 40 to 100	1 (CE marked)
–	DN 125 to 150	2 (CE marked)

LIMITING CONDITIONS									
Valve model	**RP45G RP45S**	**RP45S**	**RP45i**	**RP45GT RP45ST**	**RP45ST**	**RP45iT**	**RP45GN RP45SN**	**RP45SN**	**RP45iN**
Body design conditions	PN 16	PN 40	PN 40	PN 16	PN 40	PN 40	PN 16	PN 40	PN 40
Maximum upstream pressure	13 bar	25 bar	25 bar	13 bar	25 bar	25 bar	13 bar	25 bar	25 bar
Maximum downstream pressure (DN 15 to 100)	13 bar	18 bar	18 bar	13 bar	18 bar	18 bar	13 bar	18 bar	18 bar
Maximum downstream pressure (DN 125 to 150)	12 bar	16,5 bar	16,5 bar	12 bar	16,5 bar	16,5 bar	12 bar	16,5 bar	16,5 bar
Minimum downstream pressure	0,15 bar	0,15 bar	0,15 bar	0,15 bar	0,15 bar	0,15 bar	0,15 bar	0,15 bar	0,15 bar
Maximum operating temperature	200 ºC	250 ºC	250 ºC	200 ºC	200 ºC	200 ºC	80 ºC	80 ºC	80 ºC
Maximum reducing ratio	25:1	25:1	25:1	25:1	25:1	25:1	10:1	10:1	10:1
Rangeability	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1	10:1
Maximum hydraulic factory valve body test	24 bar	60 bar	60 bar	24 bar	60 bar	60 bar	24 bar	60 bar	60 bar

Remarks: Other soft materials and temperature limits on request.

Actuator model	**A1 A1i**	**A10 A10i**	**A11 A11i**	**A12 A12i**	**A2 A2i**	**A21 A21i**	**A3 A3i**	**A4 A4i**	**B1**	**B2**	**B21**	**B3**	**B4**	**C11**
Maximum operating pressure (bar)	25	25	25	25	12	18	2,5	1,5	25	13	18	2,5	1,5	25
Maximum operating temperature	90 ºC *													

* The water seal pot must be installed in the sensing pipe when operating with steam or liquids at temperatures above 90 ºC.

FLOW RATE COEFFICIENTS (m³/h)										
SIZE	**DN 15**	**DN 20**	**DN 25**	**DN 32**	**DN 40**	**DN 50**	**DN 65**	**DN 80**	**DN 100**	**DN 125**	**DN 150**
Kvs	4,8	6,9	9,1	11,8	14,4	26,5	51,5	79,5	129,5	150	204

SATURATED STEAM CAPACITY TABLE (kg/h)											
INLET (barg)	**SIZE**										
	DN 15	**DN 20**	**DN 25**	**DN 32**	**DN 40**	**DN 50**	**DN 65**	**DN 80**	**DN 100**	**DN 125**	**DN 150**
0,5	51	68	90	118	186	300	460	800	1250	1500	1800
0,75	63	84	112	146	230	360	580	1000	1550	1750	2350
1	75	100	133	175	280	430	700	1200	1850	2250	3200
1,5	100	133	175	240	360	590	910	1600	2500	3000	4000
2	126	170	230	290	450	730	1160	2000	3050	3500	4700
2,5	150	200	260	350	550	880	1390	2400	3600	4500	6500
3	175	240	310	400	640	1010	1600	2700	4300	5500	8500
4	220	290	390	510	800	1300	2000	3400	5400	7000	10000
5	260	350	480	620	1000	1600	2500	4200	6500	8000	12000
6	330	440	580	760	1220	1930	3000	5100	8000	9500	14000
7	400	520	700	910	1430	2300	3600	6100	9500	11500	16000
8	450	600	800	1040	1670	2700	4100	7100	11000	13000	18000
9	500	670	880	1180	1800	2900	4600	7800	12000	15000	20000
10	560	750	980	1300	2000	3200	5100	8500	13500	17000	22000
12	680	900	1180	1540	2500	4000	6100	10500	16300	20000	25000
14	800	1050	1400	1850	2900	4700	7200	12600	19000	23000	29000
16	920	1230	1630	2150	3400	5500	8300	14600	22000	26000	33000
18	1040	1400	1860	2450	3800	6200	9500	16600	25000	30000	38000
20	1170	1540	2100	2700	4200	7000	10800	18600	28000	33000	42000
22	1330	1780	2350	3050	4900	7800	12200	21000	32000	36000	45000
24	1500	2000	2600	3400	5400	8700	13700	23500	36000	40000	48000
25	1600	2150	2800	3600	5700	9200	14500	25500	38000	42000	50000

Remark: For pressure ratios where P2 > 0,7 P1 and/or when the operating medium is superheated steam, a correction factor must be applied. See next page.

CORRECTION FACTORS

Pressure ratio:
The capacities given in the “Saturated steam capacity table” are applicable in scenarios where P2 < 0,7 P1.
In the remaining scenarios a correction factor must be applied:

PRESSURE RATIO * P2 / P1	CORRECTION FACTOR f
≥ 0,7	1,25
≥ 0,8	1,6
≥ 0,9	2,25

* Pressure ratio in bar abs (barg + 1)

Superheated steam:
When the medium is superheated steam, instead of saturated steam, a correction factor must also to be applied. The required mass flow must be multiplied by the following factor:

Vh, where Vh = specific volume of superheated steam, and
Vs Vs = specific volume of saturated steam.

ACTUATOR AND SPRING SELECTION TABLE

SIZE		ACTUATOR															
		A4 A4i		A3 A3i	A2 A2i	A21 A21i	A1 A1i		A10 A10i	A11 A11i	A12 A12i	B4	B3	B2	B21	B1	C11
DN 15	Spring range (bar)	0,15-0,49	0,5-0,99	1,0-1,6	1,7-3,8	3,9-5,5	5,6-8,2	–	–	8,3-13	10-18	–	–	–	–	–	–
	Spring Nº	66	60	60	60	60	60	–	–	60	60.1	–	–	–	–	–	–
DN 20	Spring range (bar)	0,15-0,49	0,5-0,99	1,0-1,6	1,7-3,8	3,9-5,5	5,6-8,2	–	–	8,3-13	10-18	–	–	–	–	–	–
	Spring Nº	66	60	60	60	60	60	–	–	60	60.1	–	–	–	–	–	–
DN 25	Spring range (bar)	0,15-0,49	0,5-0,99	1,0-1,6	1,7-3,8	3,9-5,5	5,6-8,2	–	–	8,3-13	10-18	–	–	–	–	–	–
	Spring Nº	66	60	60	60	60	60	–	–	60	60.1	–	–	–	–	–	–
DN 32	Spring range (bar)	0,15-0,49	0,5-0,99	1,0-1,6	1,7-3,8	3,9-5,5	5,6-8,2	–	–	8,3-13	10-18	–	–	–	–	–	–
	Spring Nº	66	60	60	60	60	60	–	–	60	60.1	–	–	–	–	–	–
DN 40	Spring range (bar)	0,15-0,49	0,5-0,99	1,0-1,6	1,7-3,8	3,9-5,5	5,6-8,2	–	–	8,3-13	10-18	–	–	–	–	–	–
	Spring Nº	66	60	60	60	60	60	–	–	60	60.1	–	–	–	–	–	–
DN 50	Spring range (bar)	0,15-0,49	0,5-0,99	1,0-1,9	2,0-4,2	4,3-6,9	7-8,5	–	10-18	8,6-13	–	–	–	–	–	–	–
	Spring Nº	67	61	61	61	61	64	–	61	64	–	–	–	–	–	–	–
DN 65	Spring range (bar)	0,15-0,49	0,5-0,99	1,0-1,9	2,0-4,2	4,3-6,9	7-8,5	–	10-18	8,6-13	–	–	–	–	–	–	–
	Spring Nº	67	61	61	61	61	64	–	61	64	–	–	–	–	–	–	–
DN 80	Spring range (bar)	0,15-0,45	0,46-0,99	1,0-1,9	2,0-5,0	5,1-8,9	9-13	11-18	–	–	–	–	–	–	–	–	–
	Spring Nº	68	62	62	62	62	65	62	–	–	–	–	–	–	–	–	–
DN 100	Spring range (bar)	0,15-0,45	0,46-0,99	1,0-1,9	2,0-6,0	6,1-13,0	–	11-18	–	–	–	–	–	–	–	–	–
	Spring Nº	69	63	63	63	63	–	63	–	–	–	–	–	–	–	–	–
DN 125	Spring range (bar)	–	–	–	–	–	–	–	–	–	–	0,5-1,5	1,1-2,5	1,5-5,5	4-8,5	6-12	8-16,5
	Spring Nº	–	–	–	–	–	–	–	–	–	–	70	70	70	70	70	70
DN 150	Spring range (bar)	–	–	–	–	–	–		–	–	–	0,5-1,5	1,1-2,5	1,5-5,5	4-8,5	6-12	8-16,5
	Spring Nº	–	–	–	–	–	–		–	–	–	70	70	70	70	70	70

HOW TO SIZE (USING STEAM TABLE)

Example:
Required saturated steam capacity: 300 kg/h; Upstream pressure: 3 bar; Required downstream pressure: 2 bar.

Solution:
First determine correction factor for pressure ratio: (2+1) / (3+1) = 0.75 → f=1.25,
Then multiply the given capacity: 300 × 1,25 = 375 kg/h
Afterwards, refer to the cell with the number “3” in the column “INLET” of the saturated steam capacity table. In that line, the values for selection of the pressure reducing valve size can be found. In this particular scenario, a value equal to or higher than 375 kg/h is required, and the right selection would be DN 32, with a capacity of 400 kg/h.
On the actuator and spring selection table, for a downstream pressure of 2 bar, the recommended actuator is the A2, and the regulating spring is Nº 60.

Remarks: Never size the valve according to the pipe diameter in which it has to be fitted, but according to the actual flow required. Pipe sizing must also respect the maximum recommended flow velocities, according to the medium.

HOW TO SIZE (USING Kvs)

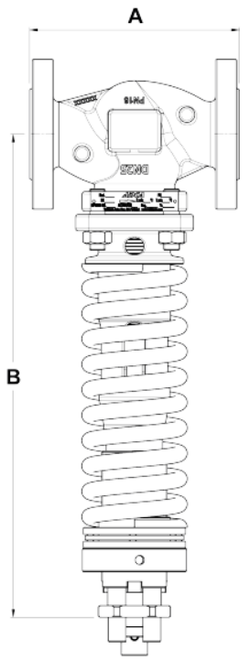
Please consult formulas on IS PV10.00 E or consult manufacturer.

HOW TO ORDER

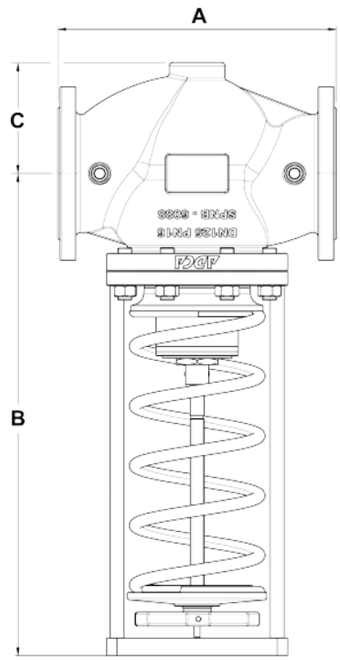
RP45G DN 32 PN 16 valve complete with spring Nº 60, A2 actuator, condensate vessel and copper sensing pipe.

INSTALLATION

Horizontal installation with the actuator vertically, pointing downwards.
Installation with the actuator pointing upwards is possible only when the medium temperature is below 90 ºC.
The sensing pipe, if not fitted on the valve body, must be installed downstream of the valve at a minimum of 1 meter away or 15 pipe diameters.
In steam applications, a “Y” strainer, humidity separator and steam trap should be installed upstream of the valve.



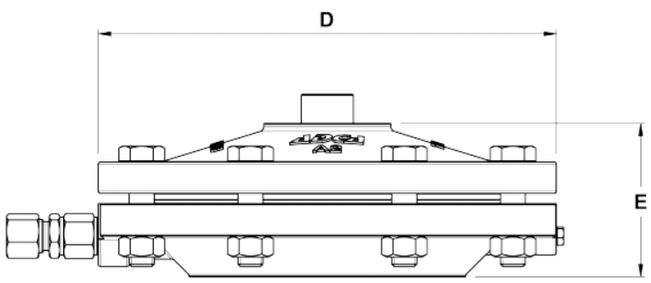
DN 15 – DN 100



DN 125 – DN 150

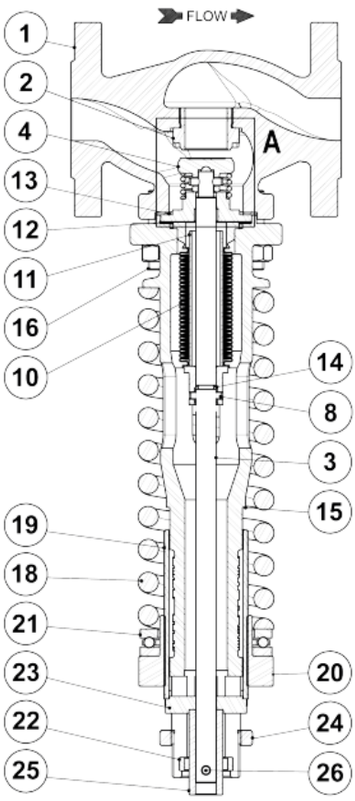
DIMENSIONS – VALVE (mm)											
DIMENSION	SIZE										
	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
A	130	150	160	180	200	230	290	310	350	400	480
B	366	366	371	377	384	470	495	556	597	694	710
C	–	–	–	–	–	–	–	–	–	160	180
WEIGHT (kg)	9,5	10,2	11,2	14	15,5	21,7	32,2	45,4	53,3	91,3	113

DIMENSIONS – VALVE (mm)											
DIMENSION	SIZE										
	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
A	130	150	160	180	200	230	290	310	350	400	480
B	366	366	371	377	384	470	495	556	597	694	710
C	–	–	–	–	–	–	–	–	–	160	180
WEIGHT (kg)	9,5	10,2	11,2	14	15,5	21,7	32,2	45,4	53,3	91,3	113

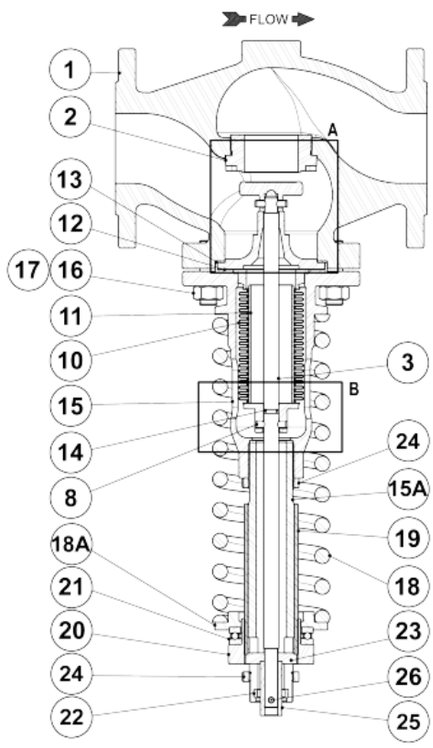


DIMENSIONS – ACTUATOR (mm)														
DIMENSION	ACTUATOR													
	A1 A1i	A10 A10i	A11 A11i	A12 A12i	A2 A2i	A21 A21i	A3 A3i	A4 A4i	B1	B2	B21	B3	B4	C11
D	172	172	172	172	220	220	282	340	172	220	220	283	340	145
E	67	67	67	67	74	74	71	81	80	86	86	88	98	93
WEIGTH (kg)	4,3	4,3	4,3	4,3	7,3	7,3	11,3	16,3	4,4	7,4	7,4	11,6	18,6	2,3

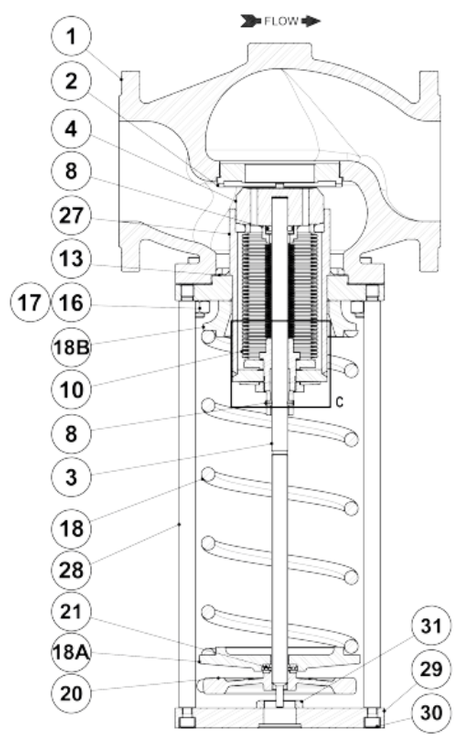
MATERIALS



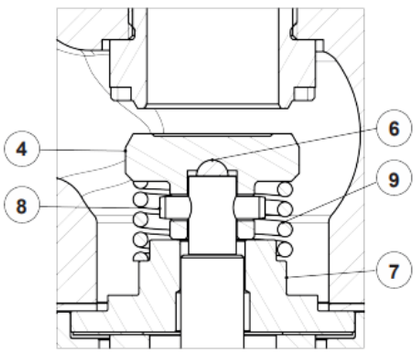
DN 15 – DN 50



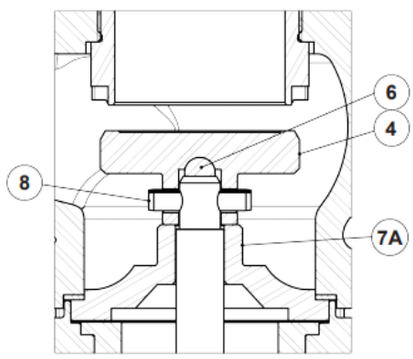
DN 65 – DN 100



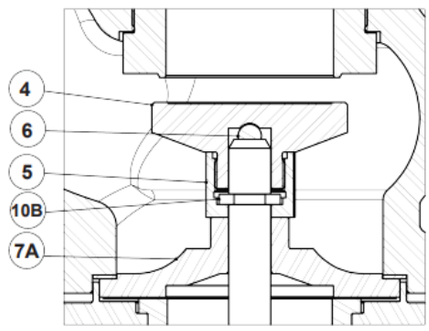
DN 125 – DN 150



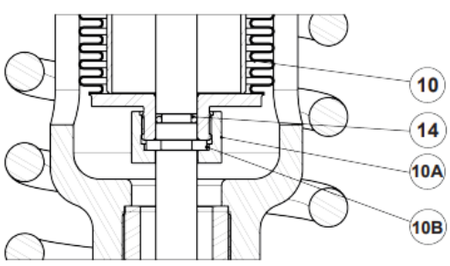
Detail A
(DN 15 - DN 40)



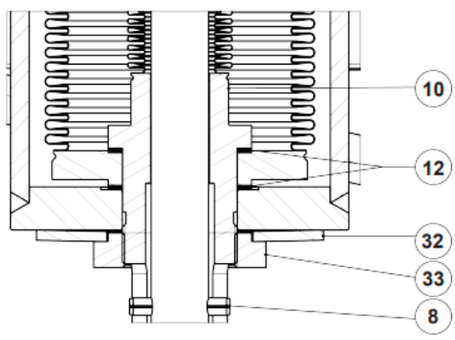
Detail A
(DN 50 - DN 65)



Detail A
(DN 80 - DN 100)



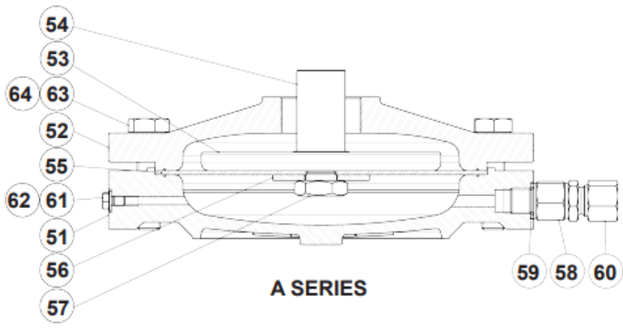
Detail B
(DN 80 - DN 100)



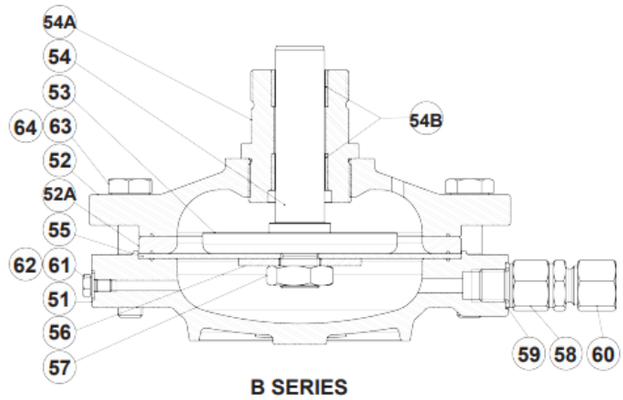
Detail C
(DN 125 - DN 150)

MATERIALS – VALVE			
POS. Nº	**DESIGNATION**	**DN 15 – DN 100**	**DN 125 – DN 150**
1	Valve body (RP45G)	GJS-400-15 / 0.7040	GJS-400-15 / 0.7040
	Valve body (RP45S)	A216 WCB / 1.0619	A216 WCB / 1.0619
	Valve body (RP45i)	A351 CF8M / 1.4408	A351 CF8M / 1.4408
2	Seat	AISI 316 / 4.4401	AISI 316 / 4.4401
3	Stem	AISI 304 / 1.4301	AISI 304 / 1.4301
4	* Valve plug	AISI 420 / 1.4021	AISI 316 / 4.4401
5	Nut	AISI 316 / 1.4401	AISI 316 / 4.4401
6	Ball	AISI 440C / 1.4125	–
7	Stem guide	AISI 304 / 1.4301	–
7A	Stem guide	Bronze	–
8	Pin	AISI 301 / 1.4310	AISI 304 / 1.4301
9	Compensating spring	AISI 302 / 1.4300	–
10	* Bellows	AISI 316Ti / 1.4571	AISI 316 / 1.4401
10A	Nut	AISI 316 / 1.4401	–
10B	Split ring	AISI 316 / 1.4401	–
11	Guide tube	CuZn39Pb3	–
12	Bellows gasket	Stainless steel / Graphite	Stainless steel / Graphite
13	Body gasket	Stainless steel / Graphite	Stainless steel / Graphite
14	O-ring	EPDM	–
15	Piston body	A216 WCB / 1.0619	–
15A	Piston body extension	P355Ti / 1.0421	–
16	Studs	34CrNiMo6 / 1.6582	34CrNiMo6 / 1.6582
17	Nuts	Zinc plated steel	Zinc plated steel
18	* Adjustment spring	Spring steel	Spring steel
18A	Lower spring plate	C45E / 1.1191	A216 WCB / 1.0619
18B	Upper spring plate	–	S235JG2R / 1.0038
19	Threaded tube	CuZn39Pb3	–
20	Spring adjusting nut	C45E / 1.1191	A216 WCB / 1.0619
21	Ball bearing	Zinc plated steel	Zinc plated steel
22	Spacer	S355J2G3 / 1.0570	–
23	Pressure star	S235JR / 1.0038	–
24	Lock nut	C45E / 1.1191	–
25	Pressure tube	C45E / 1.1191	–
26	Pin	AISI 303 / 1.4305	–
27	Bellows housing	–	S355J2G3 / 1.0570
28	Pillars	–	C45E / 1.1191
29	Pillars flange	–	C45E / 1.1191
30	Bolts	–	Zinc plated steel
31	Stem nut	–	A351 CF8 / 1.4308
32	Belleville washer	–	P235GH / 1.0345
33	Tightening nut	–	S235JRG2 / 1.0038

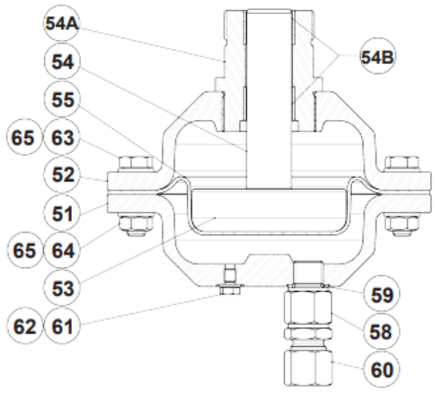
* Available spare parts.



A SERIES



B SERIES



C SERIES

MATERIALS – ACTUATOR							
POS. Nº	**DESIGNATION**	**A1 / A10 / A11 / A12 / A3 / A4**	**A2 / A21**	**A1i / A10i / A11i / A12i / A2i A21i / A3i / A4i**	**B1 / B3 / B4**	**B2 / B21**	**C11**
51	Lower diaph. chamber	A216 WCB / 1.0619	GJS-400-15 / 0.7040 A216 WCB / 1.0619	A351 CF8M /1.4408	A216 WCB / 1.0619	GJS-400-15 / 0.7040 A216 WCB / 1.0619	S235JR / 1.0038
52	Upper diaph. chamber	A216 WCB / 1.0619	GJS-400-15 / 0.7040 A216 WCB / 1.0619	A351 CF8M /1.4408	A216 WCB / 1.0619	GJS-400-15 / 0.7040 A216 WCB / 1.0619	S235JR / 1.0038
52A	Spacer ring	–	–	–	S355J2G3 / 1.0570	S355J2G3 / 1.0570	–
53	Pressure plate	A216 WCB / 1.0619	GJS-400-15 / 0.7040	A351 CF8M /1.4408 AISI 304 / 1.4301	S355J2G3 / 1.0570	S355J2G3 / 1.0570	C45E / 1.1191
54	Diaph. plate spindle	A216 WCB / 1.0619	GJS-400-15 / 0.7040	A351 CF8M /1.4408 AISI 304 / 1.4301	AISI 420 / 1.4021	AISI 420 / 1.4021	AISI 420 / 1.4021
54A	Guide	–	–	–	C45E / 1.1191	C45E / 1.1191	C45E / 1.1191
54B	* Plain bearing	–	–	–	Bronze	Bronze	Bronze
55	* Diaphragm	Neoprene reinforced polyamid	Neoprene reinforced polyamid	Neoprene reinforced polyamid	Neoprene reinforced polyamid	Neoprene reinforced polyamid	Reinforced NBR
56	Washer	Copper	Copper	AISI 304 / 1.4301	Copper	Copper	–
57	Hex nut	CuZn39Pb3	CuZn39Pb3	AISI 304 / 1.4301	CuZn39Pb3	CuZn39Pb3	–
58	Flow restrictor	AISI 303 / 1.4305	AISI 303 / 1.4305	AISI 303 / 1.4305	AISI 303 / 1.4305	AISI 303 / 1.4305	AISI 303 / 1.4305
59	Gasket	Copper	Copper	Copper	Copper	Copper	Copper
60	Compression fitting	AISI 316Ti / 1.4571	AISI 316Ti / 1.4571	AISI 316Ti / 1.4571	AISI 316Ti / 1.4571	AISI 316Ti / 1.4571	AISI 316Ti / 1.4571
61	Vent screw	Zinc plated steel	Zinc plated steel	AISI 304 / 1.4301	Zinc plated steel	Zinc plated steel	Zinc plated steel
62	Washer	Copper	Copper	AISI 304 / 1.4301	Copper	Copper	Copper
63	Bolts	Zinc plated steel	Zinc plated steel	AISI 304 / 1.4301	Zinc plated steel	Zinc plated steel	Zinc plated steel
64	Nuts	Zinc plated steel	Zinc plated steel	AISI 304 / 1.4301	Zinc plated steel	Zinc plated steel	Zinc plated steel
65	Washer	–	–	–	–	–	Zinc plated steel