PRESSURE REDUCING VALVES
RP45
(Threaded)

DESCRIPTION

The ADCA RP45 series of 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.
These valves are particularly suitable for reducing steam pressure in all energy and process systems where pressures must be kept under control.

RP45
with sensing pipe on body

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 and adjustment springs.

OPTIONS:	Soft sealing in PTFE/GR for use with steam. Soft sealing in nitrile rubber for use with air and gases. Sensing pipe on body.
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:	RP45S and RP45ST or N – carbon steel. RP45i and RP45iT or N – stainless steel. Suffix T: soft sealed with PTFE/GR. Suffix N: soft sealed with nitrile rubber.
SIZES:	1/2" to 2".
CONNECTIONS:	Female threaded ISO 7 Rp or NPT.
AVAILABLE ACTUATORS:	A1, A10, A11, A12, A3, A4 – 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.

CE MARKING – GROUP 2 (PED – European Directive)	
PN 40	**Category**
1/2" to 1"	SEP
11/2" and 2"	1 (CE marked)

LIMITING CONDITIONS – VALVE (mm)			
MODEL	**RP45S RP45i**	**RP45ST RP45iT**	**RP45SN RP45iN**
Body design conditions	PN 40	PN 40	PN 40
Maximum upstream pressure	25 bar	25 bar	25 bar
Maximum downstream pressure	18 bar	18 bar	18 bar
Minimum downstream pressure	0,15 bar	0,15 bar	0,15 bar
Maximum operating temperature	250 ºC	200 ºC	80 ºC
Maximum reducing ratio	25:1	25:1	10:1
Rangeability	10:1	10:1	10:1
Maximum hydraulic factory valve body test	60 bar	60 bar	60 bar

Remark: Other soft materials and temperature limits on request.

LIMITING CONDITIONS – ACTUATOR (mm)								
ACTUATOR MODEL	**A1 A1i**	**A10 A10i**	**A11 A11i**	**A12 A12i**	**A2 A2i**	**A21 A21i**	**A3 A3i**	**A4 A4i**
Maximum operating pressure (bar)	25	25	25	25	12	18	2,5	1,5
Maximum operating temperature	90 ºC *							

* A water seal pot must be installed in the sensing pipe when operating with steam.

FLOW RATE COEFFICIENTS (m^3/h)					
SIZE	**1/2"**	**3/4"**	**1"**	**11/2"**	**2"**
Kvs	4,8	6,9	9,1	14,4	26,5

SATURATED STEAM CAPACITY TABLE (kg/h)					
INLET (barg)	**SIZE**				
	1/2"	**3/4"**	**1"**	**11/2"**	**2"**
0,5	51	68	90	186	300
0,75	63	84	112	230	360
1	75	100	133	280	430
1,5	100	133	175	360	590
2	126	170	230	450	730
2,5	150	200	260	550	880
3	175	240	310	640	1010
4	220	290	390	800	1300
5	260	350	480	1000	1600
6	330	440	580	1220	1930
7	400	520	700	1430	2300
8	450	600	800	1670	2700
9	500	670	880	1800	2900
10	560	750	980	2000	3200
12	680	900	1180	2500	4000
14	800	1050	1400	2900	4700
16	920	1230	1630	3400	5500
18	1040	1400	1860	3800	6200
20	1170	1540	2100	4200	7000
22	1330	1780	2350	4900	7800
24	1500	2000	2600	5400	8700
25	1600	2150	2800	5700	9200

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 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		A4 A4i		A3 A3i	A2 A2i	A21 A21i	A1 A1i	A10 A10i	A11 A11i	A12 A12i
1/2"	Regulating range (bar)	0,15 to 0,49	0,5 to 0,99	1 to 1,6	1,7 to 3,8	3,9 to 5,5	5,6 to 8,2	–	8,3 to 13	10 to 18
	Spring Nº	66	60	60	60	60	60	–	60	60.1
3/4"	Regulating range (bar)	0,15 to 0,49	0,5 to 0,99	1 to 1,6	1,7 to 3,8	3,9 to 5,5	5,6 to 8,2	–	8,3 to 13	10 to 18
	Spring Nº	66	60	60	60	60	60	–	60	60.1
1"	Regulating range (bar)	0,15 to 0,49	0,5 to 0,99	1 to 1,6	1,7 to 3,8	3,9 to 5,5	5,6 to 8,2	–	8,3 to 13	10 to 18
	Spring Nº	66	60	60	60	60	60	–	60	60.1
11/2"	Regulating range (bar)	0,15 to 0,49	0,5 to 0,99	1 to 1,6	1,7 to 3,8	3,9 to 5,5	5,6 to 8,2	–	8,3 to 13	10 to 18
	Spring Nº	66	60	60	60	60	60	–	60	60.1
2"	Regulating range (bar)	0,15 to 0,49	0,5 to 0,99	1 to 1,9	2 to 4,2	4,3 to 6,9	7 to 8,5	10 to 18	8,6 to 13	–
	Spring Nº	67	61	61	61	61	64	61	64	–

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 11/2", with a capacity of 640 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)

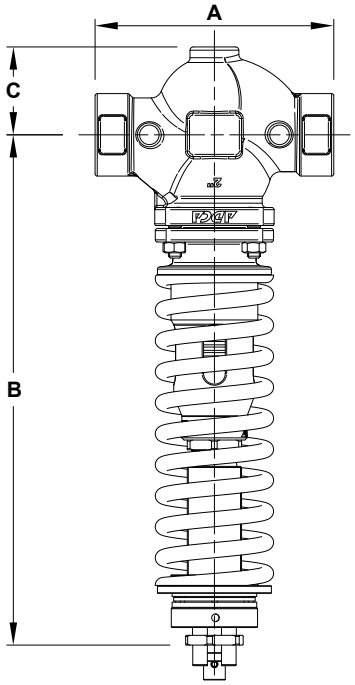
Please consult formulas on IS PV10.00 E or consult manufacturer.

HOW TO ORDER

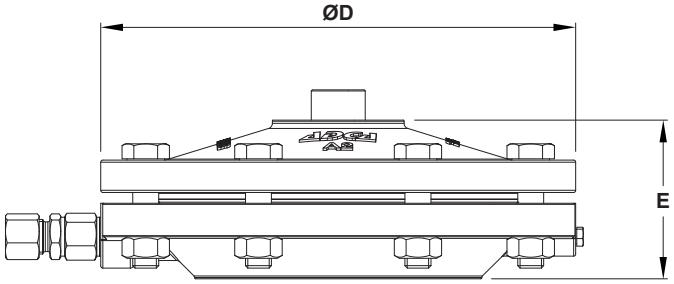
RP45S 11/2" ISO 7 Rp valve complete with spring Nº 60, A2 actuator, condensate vessel and copper sensing pipe.

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.

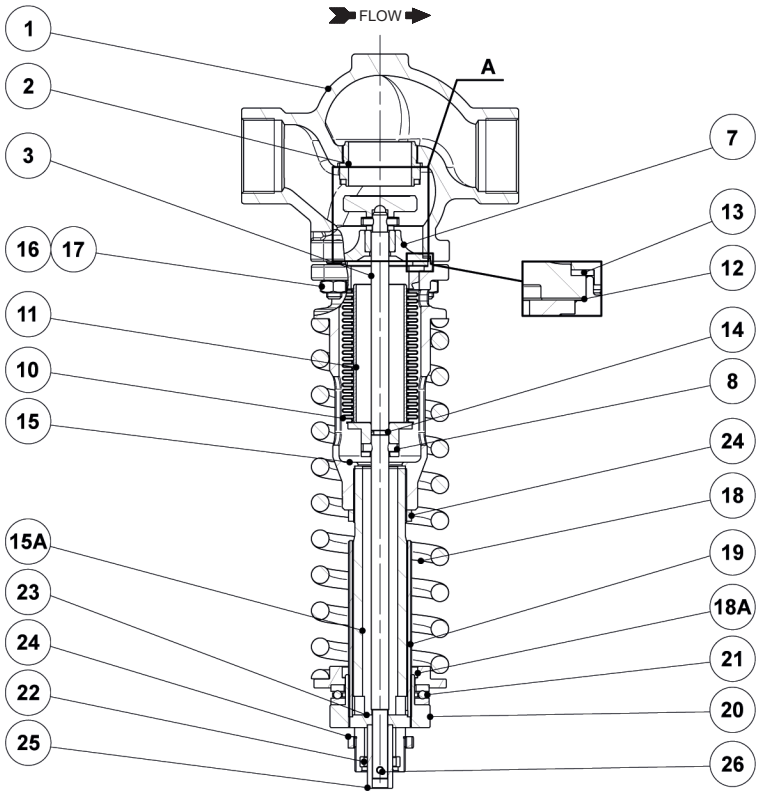


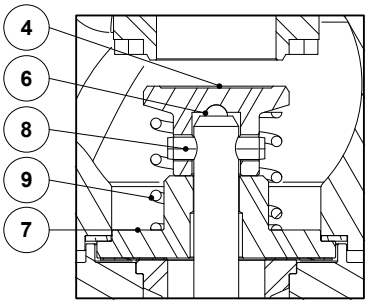
DIMENSIONS – VALVE (mm)					
DIMENSION	**1/2"**	**3/4"**	**1"**	**11/2"**	**2"**
A	100	100	100	190	220
B	364	364	364	384	470
C	38	38	38	65	81
WEIGHT (kg)	7,9	7,9	7,9	12,3	17,4



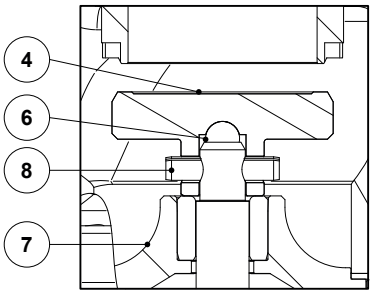
DIMENSIONS – ACTUATOR (mm)								
DIMENSION	**A1 A1i**	**A10 A10i**	**A11 A11i**	**A12 A12i**	**A2 A2i**	**A21 A21i**	**A3 A3i**	**A4 A4i**
ØD	172	172	172	172	220	220	282	340
E	67	67	67	67	74	74	71	81
WEIGHT (kg)	4,3	4,3	4,3	4,3	7,3	7,3	11,3	16,3

MATERIALS





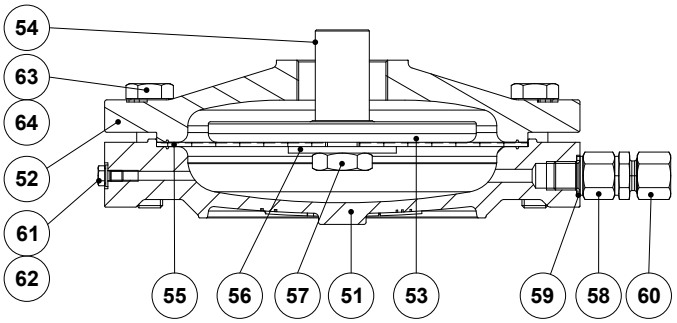
Detail A
(1/2" to 11/2")



Detail A
(2")

MATERIALS – VALVE		
POS. Nº	**DESIGNATION**	**DN 15 to 100**
1	Valve body (RP45S)	A216 WCB / 1.0619
	Valve body (RP45i)	A351 CF8M / 1.4408
2	Seat	AISI 316 / 4.4401
3	Stem	AISI 304 / 1.4301
4	* Valve plug	AISI 420 / 1.4021
6	Ball	AISI 440C / 1.4125
7	Stem guide	AISI 304 / 1.4301
8	Pin	AISI 301 / 1.4310
9	Compensating spring	AISI 302 / 1.4300
10	* Bellows	AISI 316Ti / 1.4571
11	Guide tube	CuZn39Pb3
12	Bellows gasket	Stainless steel / Graphite
13	Body gasket	Stainless steel / Graphite
14	* O-ring	EPDM
15	Piston body (RP45G and RP45S)	A216 WCB / 1.0619
	Piston body (RP45i)	A351 CF8M / 1.4408
15A	Piston body extension (RP45G and RP45S)	P355T1 / 1.0421
	Piston body extension (RP45i)	AISI 304 / 1.4301
16	Stud (RP45G and RP45S)	Steel 8.8; EN 10269 steel
	Stud (RP45i)	Stainless steel A2-70
17	Nut (RP45G and RP45S)	Steel 8.8; EN 10269 steel
	Nut (RP45i)	Stainless steel A2-70
18	* Adjustment spring	Spring steel
18A	Lower spring plate (RP45G and RP45S)	C45E / 1.1191
	Lower spring plate (RP45i)	AISI 304 / 1.4301
19	Threaded tube	CuZn39Pb3
20	Spring adjusting nut (RP45G and RP45S)	C45E / 1.1191
	Spring adjusting nut (RP45i)	AISI 304 / 1.4301
21	Ball bearing	Zinc plated steel
22	Spacer (RP45G and RP45S)	S355JR / 1.0045
	Spacer (RP45i)	AISI 304 / 1.4301
23	Pressure star (RP45G and RP45S)	S235JR / 1.0038
	Pressure star (RP45i)	AISI 304 / 1.4301
24	Lock nut (RP45G and RP45S)	C45E / 1.1191
	Lock nut (RP45i)	AISI 303 / 1.4305
25	Pressure tube (RP45G and RP45S)	C45E / 1.1191
	Pressure tube (RP45i)	AISI 304 / 1.4301
26	Pin	AISI 303 / 1.4305

* Available spare parts.



A series

MATERIALS – ACTUATOR				
POS. Nº	**DESIGNATION**	**A1, A10, A11, A12, A3 and A4**	**A2 and A21**	**A1i, A10i, A11i, A12i, A2i, A21i, A3i and A4i**
51	Lower diaphragm chamber	A216 WCB / 1.0619	GJS-400-15 / 0.7040 A216 WCB / 1.0619	A351 CF8M /1.4408
52	Upper diaphragm chamber	A216 WCB / 1.0619	GJS-400-15 / 0.7040 A216 WCB / 1.0619	A351 CF8M /1.4408
53	Pressure plate	A216 WCB / 1.0619	GJS-400-15 / 0.7040	A351 CF8M /1.4408 AISI 304 / 1.4301
54	Diaphragm plate spindle	A216 WCB / 1.0619	GJS-400-15 / 0.7040	A351 CF8M /1.4408 AISI 304 / 1.4301
55	* Diaphragm	Neoprene reinforced polyamide	Neoprene reinforced polyamide	Neoprene reinforced polyamide
56	Washer	Copper	Copper	AISI 304 / 1.4301
57	Hex nut	CuZn39Pb3	CuZn39Pb3	AISI 304 / 1.4301
58	Flow restrictor	AISI 303 / 1.4305	AISI 303 / 1.4305	AISI 303 / 1.4305
59	Gasket	Copper	Copper	Copper
60	Compression fitting	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
62	Washer	Copper	Copper	AISI 304 / 1.4301
63	Bolt	Zinc plated steel	Zinc plated steel	AISI 304 / 1.4301
64	Nut	Zinc plated steel	Zinc plated steel	AISI 304 / 1.4301

* Available spare parts.