Direct action pressure reducing valve

Thread connection Model 513
Flange connection Model 514

EN ASME/FNPT ASME/ANSI

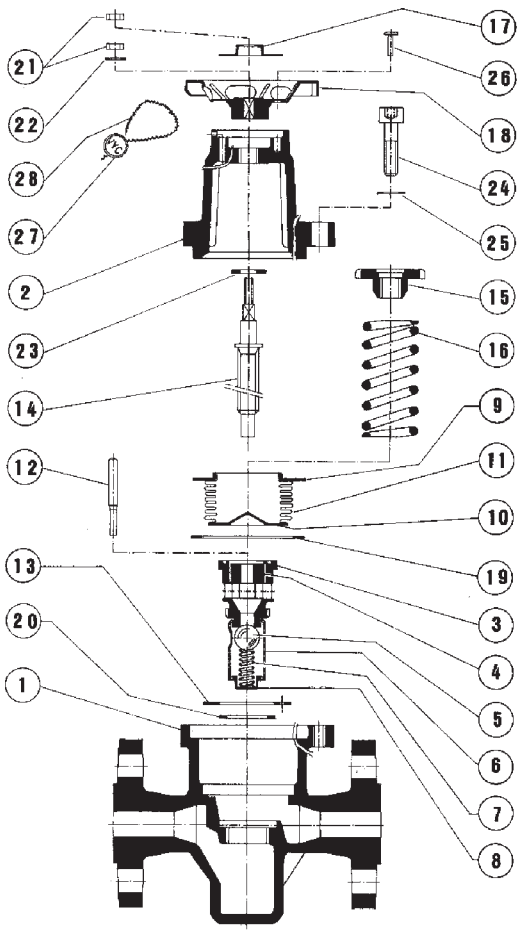
For steam and gases. (For liquids, consult our technical department).
Suitable for application in; ironing machines, laundries and dry cleaners', cooking vats, textile machinery, drying cylinders, autoclaves, steam ovens, distilleries, heat exchangers, the food industry, chemical laboratories, etc.

Specifications

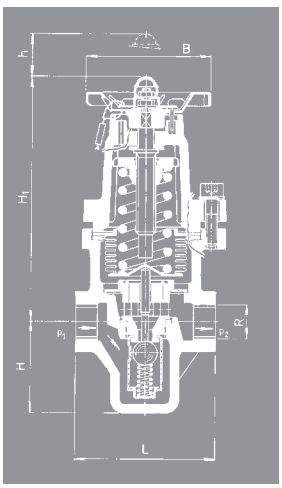
— Materials carefully selected for resistance to wear, extreme temperatures and corrosion. They can be fully recycled, and use a single, non-metallic, asbestos-free joint.
— Simplicity of design, ensuring minimum maintenance requirements.
— Easy installation; may be assembled in any position, even upside down.
— Moderate weight and size.
— Interior design conceived for maximum capacity and performance for size.
— Easy to adjust. The valves are supplied unregulated, but with the corresponding spring, duly identified, for the required pressure reduction.
— Rating plate which identifies the regulation field.
— Three springs, easily interchangeable and identified by colour and code.
— Anchoring system immune to vibrations; may be sealed to prevent manipulation.
— Selft-centring lock, independent of axle, designed to guarantee absolue precision of regulation at the most demanding points.
— Protective filter for the locking surfaces.
— High degree of airtightness of the lock at zero consumption, exceeding the requirements of EN 12266-1.
— Stainless steel bellows welded to the plasma. Airtightness tested with helium, ensuring absolute reliability and long life.
— All valves undergo throrough testing.
— Each component is numbered, registered and inspected. If previously requested, the valve will be accompanied by certificates corresponding to materials, batch, tests and performance.

IMPORTANT
Depending on demand:
— May be manufactured using other materials for specific working conditions (high temperatures, fluids, etc.).
— Other connections.
— Degreased and completely free of oils and greases.

N° PIECE	PIECE	NODULAR IRON	CARBON STEEL	STAINLESS STEEL
1	Body	Nodular iron (EN 5.3105)	Carbon steel (EN-1.0619)	Stainless steel (EN-1.4408)
2	Cover	Aluminium (EN-AC-44200)	Aluminium (EN-AC-44200)	Aluminium (EN-AC-44200)
3	Seating	Stainless steel (EN-1.4542)	Stainless steel (EN-1.4542)	Stainless steel (EN-1.4542)
4	Guide	Graphite PTFE (Teflón)	Graphite PTFE (Teflón)	Graphite PTFE (Teflón)
5	Lock	Stainless steel (EN-1.4034)	Stainless steel (EN-1.4034)	Stainless steel (EN-1.4034)
6	Filter	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
7	Auxiliary spring	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)
8	Cap	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)
9	Bellows ring	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)
10	Bellows disc	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)
11	Bellows	Stainless steel (EN-1.4571)	Stainless steel (EN-1.4571)	Stainless steel (EN-1.4571)
12	Axle	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)
13	Separator disc	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)	Stainless steel (EN-1.4404)
14	Regulation screw	Carbon steel (EN-1.1191)	Carbon steel (EN-1.1191)	Carbon steel (EN-1.1191)
15	Spring press	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)
16	Spring	Chrome-silicon steel (EN-10270-2-FDSiCr)	Chrome-silicon steel (EN-10270-2-FDSiCr)	Chrome-silicon steel (EN-10270-2-FDSiCr)
17	Rating plate	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
18	Handwheel	Aluminium (EN-AC-44200)	Aluminium (EN-AC-44200)	Aluminium (EN-AC-44200)
19	Body joint	Graphite	Graphite	Graphite
20	Seating joint	PTFE (Topchem)	PTFE (Topchem)	PTFE (Topchem)
21	Nut	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)
22	Washer	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)
23	Washer	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)
24	Screw	Carbon steel (EN-1.1191)	Carbon steel (EN-1.1191)	Stainless steel (EN-1.4401)
25	Washer	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Stainless steel (EN-1.4401)
26	Anchoring bolt	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)
27	Seal	Plastic	Plastic	Plastic
28	Sealing wire	Sealing wire	Sealing wire	Sealing wire
R		1/2" to 1" (GAS, NPT)		
DN		15 to 25 (EN, ANSI)		
PN		25	40	40
OPERATING CONDITIONS	PRESSURE IN bar	17	17	17
	MAX. TEMP. IN °C	210	230	230
	MIN. TEMP. IN °C	-10	-10	-60



MODEL																							
R	DN	1/2"			3/4"			1"			15			20			25					
CONNECTIONS		Whitworth gas-tight cylindrical female ISO 228/1 1978 (DIN-259)									I - Flanges PN-25 EN-1092-1/PN-40 EN-1092-2 II - Flanges class 150 lbs ASME/ ANSI B.16.5											
		NPT thread ANSI-B2.1									I		II		I		II		I		II	
H		57			57			57			57			5157			57					
H_1		150			150			150			150			150			150					
h		25			25			25			25			25			25					
L		85			95			105			150			150			160					
B		75			75			75			75			75			75					
D		—			—			—			95			90	105			100	115			110
K		—			—			—			65			60,30	75			69,90	85			79,40
I		—			—			—			14			15,90	14			15,90	14			15,90
b		—			—			—			16			11,20	18			12,70	18			14,30
DRILLS N°.		—			—			—			4				4				4			
WEIGHT IN Kgs	NODULAR IRON	1,98			2,05			2,29			3,60				3,65				4,73			
	CARBON STEEL	2,08			2,15			2,44			3,85				3,95				5,05			
	STAINLESS STEEL	2,13			2,25			2,55			3,95				4,08				5,20			
SPRING REGULATING RANGE IN bar (REDUCED PRESSURE)		0,14 a 1,70		1,40 a 4,00		3,50 a 8,60		0,14 a 1,70		1,40 a 4,00		3,50 a 8,60		0,14 a 1,70		1,40 a 4,00		3,50 a 8,60		0,14 a 1,70		1,40 a 4,00		3,50 a 8,60	
		GAS	NPT	GAS	NPT	GAS	NPT	GAS	NPT	GAS	NPT	GAS	NPT	GAS	NPT	GAS	NPT	GAS	NPT	EN	ANSI	EN	ANSI	EN	ANSI	EN	ANSI	EN	ANSI	EN	ANSI	EN	ANSI	EN	ANSI
CODE	NODULAR IRON 2001-	513.60261	513.602611	513.60262	513.602621	513.60263	513.602631	513.63461	513.634611	513.63462	513.634621	513.63463	513.634631	513.61061	513.610611	513.61062	513.610621	513.61063	513.610631	514.60261	514.602611	514.60262	514.602621	514.60263	514.602631	514.63461	514.634611	514.63462	514.634621	514.63463	514.634631	514.61061	514.610611	514.61062	514.610621	514.61063	514.610631
	CARBON STEEL 2001-	513.80241	513.802411	513.80242	513.802421	513.80243	513.802431	513.83441	513.834411	513.83442	513.834421	513.83443	513.834431	513.81041	513.810411	513.81042	513.810421	513.81043	513.810431	514.80241	514.802411	514.80242	514.802421	514.80243	514.802431	514.83441	514.834411	514.83442	514.834421	514.83443	514.834431	514.81041	514.810411	514.81042	514.810421	514.81043	514.810431
	STAINLESS STEEL 2001-	513.80221	513.802211	513.80222	513.802221	513.80223	513.802231	513.83421	513.834211	513.83422	513.834221	513.83423	513.834231	513.81021	513.810211	513.81022	513.810221	513.81023	513.810231	514.80221	514.802211	514.80222	514.802221	514.80223	514.802231	514.83421	514.834211	514.83422	514.834221	514.83423	514.834231	514.81021	514.810211	514.81022	514.810221	514.81023	514.810231



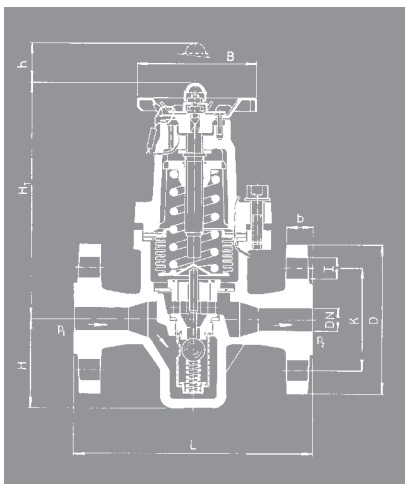
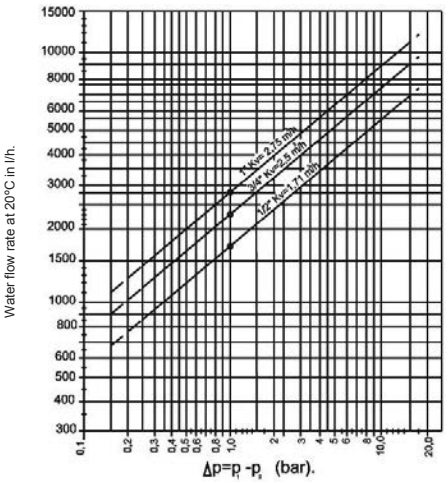
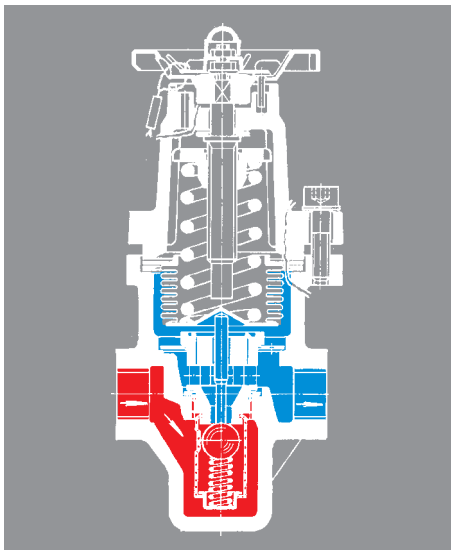


TABLE OF PRESSURES, FLOW COEFFICIENTS AND REGULATION FIELDS					
R			1/2"	3/4"	1"
DN			15	20	25
MAXIMUM INPUT PRESSURE IN bar (P_1 MAX.)			17		
MAXIMUM REDUCTION DIFFERENTIAL IN bar			P1 : 10		
MINIMUM REDUCED PRESSURE IN bar (P_2 MIN.)			0,14		
FLOW COEFFICIENT Kvs m^3/h ÆP= 1 bar			1,50	2,50	3,00
SPRING REGULATING RANGE IN bar (REDUCED PRESSURE)	0,14 to 1,70	CODE	56494		
		IDENTIFICATION COLOUR	White		
	1,40 to 4,00	CODE	56495		
		IDENTIFICATION COLOUR	Pink		
	3,50 to 8,60	CODE	56496		
		IDENTIFICATION COLOUR	Red		

R		1/2"		3/4"		1"	
DN		15		20		25	
PRESSURE IN bar		I- Saturated steam in Kg/h. II- Air at 0°C and 1,013 bar in [Nm³/h]. III-Water flow rate at 20°C in l/h. with a loss of pressure Δp and coefficient Kv.		For other, not so dense liquids, other than water at 20°C apply: $V_L = \sqrt{\frac{\varrho_L}{\varrho_A}} \cdot V_A$ ó $V_A = V_L \sqrt{\frac{\varrho_L}{\varrho_A}}$		V_A = Water flow according to table. V_L = Liquid flow. ϱ_A = Water density at a 20°C (ϱ_A=998 Kg/m³). ϱ_L = Liquid density.	
INPUT P_1	REDUCED P_2	I	II	I	II	I	II
2	0,2	6	8	7	9	10	14
	1	26	35	32	39	42	58
	1,5	30	40	37	48	52	71
3	0,3	12	15	15	18	21	27
	1	30	33	37	49	54	74
	1,5	42	54	52	67	73	101
	2	50	67	64	82	89	123
	2,5	66	75	70	93	99	138
4	0,4	19	25	24	30	32	43
	1	38	49	45	61	69	89
	1,5	50	67	62	82	87	121
	2	62	82	77	100	108	150
	2,5	70	91	87	114	122	172
	3	75	98	92	121	129	189
5	0,5	42	57	52	69	79	98
	2	68	90	85	113	120	168
	3	88	115	108	143	153	213
	4	96	125	120	155	168	232
6	0,6	46	60	57	74	82	108
	2	74	98	92	123	132	181
	3	98	126	120	159	171	236
	4	110	142	136	180	192	265
	5	106	139	132	175	188	260
7	0,7	50	67	63	84	89	119
	2	81	106	102	133	142	194
	3	104	135	131	171	182	254
	4	118	154	148	194	206	288
	6	114	150	142	188	201	278
8	0,8	54	71	67	88	94	129
	2	87	113	108	141	152	213
	3	112	146	138	181	196	272
	4	129	169	162	221	227	314
	6	138	180	173	253	245	338
9	0,9	48	67	63	82	92	125
	2	90	116	120	147	157	216
	3	116	151	145	189	204	280
	4	136	177	170	221	239	333
	5	150	195	187	244	264	363
	7	155	199	194	250	275	374
10	1	58	77	73	95	105	142
	2	92	122	121	151	164	227
	3	120	158	150	196	214	293
	4	142	186	178	233	250	347
	6	170	208	212	277	297	412
	8	178	229	220	286	307	426
11	1,1	66	88	82	108	121	160
	2	96	127	123	159	171	240
	3	130	170	162	212	227	316
	4	158	205	195	255	276	380
	6	196	221	242	317	339	473
	8	214	278	266	347	374	518
	8,6	218	284	271	355	383	530
12	1,2	73	99	95	126	132	186
	2	108	135	128	167	178	249
	3	138	177	170	221	240	332
	4	165	214	205	268	290	398
	6	206	268	255	332	360	492
	8	230	300	285	374	404	578
	8,6	233	305	289	380	414	579
13	1,3	85	111	106	140	148	208
	2	110	141	134	175	187	260
	3	141	185	175	231	249	343
	4	170	224	213	278	298	412
	6	217	283	281	350	382	527
	8	246	325	307	403	435	604
	8,6	251	356	314	412	445	615
15	1,5	92	117	113	148	161	220
	2	112	142	138	179	196	266
	3	144	187	177	236	252	348
	4	172	229	208	285	308	420
	6	202	284	290	365	390	544
	8	222	336	318	419	448	626
	8,6	240	343	355	428	459	639
17	1,7	104	128	123	160	173	239
	2	116	145	141	183	196	270
	3	147	191	181	241	258	355
	4	174	233	221	328	314	429
	8	229	349	340	434	489	650
	8,6	252	359	344	444	478	673

- Valid flow rates for completely opened valve with metal/soft seats.
— Non-recommended working conditions.





Area of influence of input pressure. (P_1)

Area of influence of reduced pressure. (P_2)

The operation of the reducing valve is based on the principle of direct action. The force exerted by the spring displaces the axle and maintains the locking ball open. The fluid exerts an opposite force on the hood as it passes, which tends to reduce the section of passage of the fluid through the seating. The action of the spring and reaction of the pressure on the bellows balance each other, and the reduced pressure is maintained constant.

The fluctuations in consumption affect the reduced pressure. The bellows detects these variations via the balance hole, provoking a change in the passage of fluid as a function of the established reduced pressure.

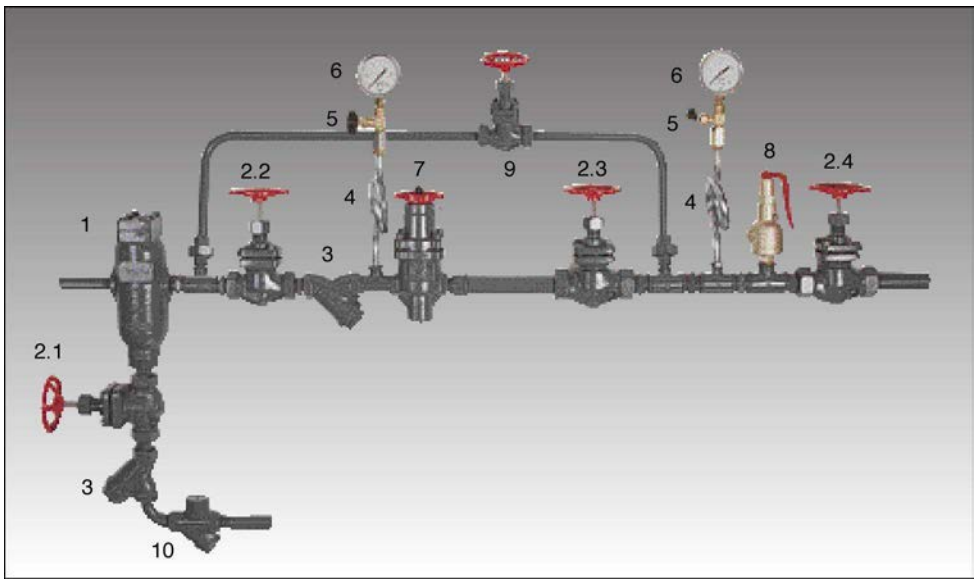
In working conditions with zero consumption, the valve remains closed and completely airtight when there is a slight increase in reduced pressure.

Installation

— Allways install the valve in a section of horizontal tubing, as close as possible to the point of consumption.
— The valve may be assembled in any position, even upside-down.
— Verify that the fluid flows in the direction indicated by the arrow on the body of the valve.
— The input and output tubes must be of the correct size and properly supported, to avoid any fall in pressure or tension.
— The output tubing should ideally have a greater diameter than the input tubing, to avoid excessive velocity of flow of the liquid.
— In accordance with the requirements of “Regulations for pressure devices ITC-MIE-AP 2 5.8”, the pressure reduction facilities in steam circuits will be supplied with:

1- A pressure gauge with syphon tube and three end cock, in accordance with article 11 of the MIE-AP 1 instructions, “Boilers”, located before and after the reduction valve.
2- A safety valve following the reduction valve, capable of evacuating the maximum flow of steam, which permits flow at the level regulated and adjusted to the maximum reduced pressure of service plus a maximum of 10%.

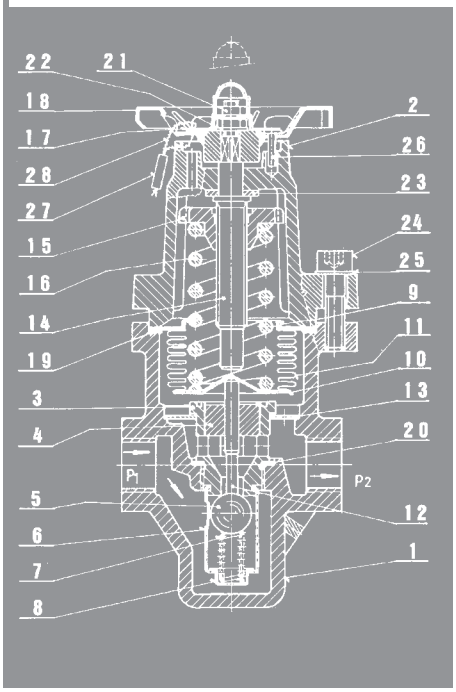
Example of installation for steam

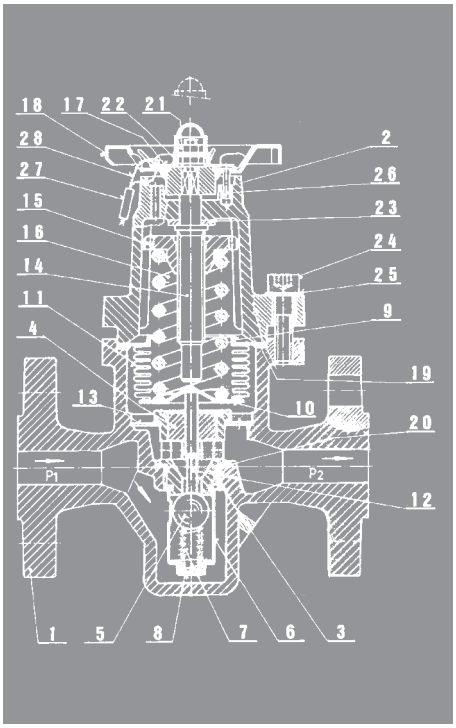


1 Condensate separator.
2 Interruption valve.
3 Filter.
4 Syphon tube.
5 Pressure gauge cock.
6 Pressure gauge.
7 Pressure reducing valve.
8 Safety valve.
9 Interruption valve with adjusting cone.
10 Condensate purger.

IMPORTANT

— The distance between the pressure reducing valve 7 and the interruption valves 2.2 and 2.3 must be 8 ÷ 10 times the diameter of the tube.
— It is advisable to install the separator 1 and the condensate purger 10 using wet steam with dragging.
— We recommend that the reduction device be equipped with a by-pass and interruption valve with an adjusting cone 9.





1- Before start-up, the tubes and the inside of the valve itself should be cleaned, eliminating any residues or impurities, particularly from the locking surfaces.
2- Check the rating plate (17) to verify that the regulation field for the reduced pressure is appropriate and that the spring (16) corresponds to the same range.
3- Remove the nut (21), the rating plate (17) and the anchoring bolt (26).
4- With the input interruption valve fully open and the output interruption valve closed, turn the handwheel (18) gradually from left to right to increase the reduced pressure, or from right to left to decrease it, until the required reduced pressure is obtained at zero consumption.
5- Slowly open the output interruption valve.
6- Readjust the required reduced pressure in consumption conditions.
7- Put the anchoring bolt (26) and the rating (17) in place, and fix with the nut (21).
8- Seal the valve to prevent further adjustments, using the sealing wire (28) and the seal (27).
9- We recommend that the input pressure P_1 and the reduced pressure P_2 be recorded in the corresponding space of the rating plate (17).

Assembly and disassembly

1- Unseal the valve by cutting the wire (28).
2- Remove the nut (21), the rating plate (17) and the anchoring bolt (26).
3- Turn the handwheel (18) from right to left until you notice the spring (16) loosening.
4- Remove the screws (24) along with the washers (25).
5- Separate the cover (2) from the body (1), and you will have access to all the internal components. This enables simple maintenance and replacement of the spring (16), the bellows components (9) (10) (11) and the seating components (3) (4) (5) (6) (7) (8).
6- If the seating has been disassembled, replace the joint (20) with a new one. Put a new body joint in place (19).
7- Put the axle (12) in the guide hole (4) and check that it can move freely and is perpendicular to the bellows disc (10) when the bellows components (9) (10) (11) are put in place.
8- Select the spring (16) corresponding to the reduced pressure.
9- Put the cover (2) on the body (1) and the screws (24) with the washers (25), and screw them in.
10- Finally, proceed as described in “Start-up and adjustment of the reduced pressure”.

Maintenance

Correct installation with interruption valves at the input and output points facilitates maintenance.
The filter (6) should be cleaned regularly.
When assembling the valve, replace the seating joint (20) and body joint (19) with new ones.

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