



Three-way valves
for control and on/off function,
mixing and flow dividing



First advantage: pneumatic and electric actuators



Pressure control- and mixing valve for hot water in a teleheating station DN 50, PN 100, with electric actuator series 853.



Three-way valve DN 200, PN 40, with bellows sealing.

Three-way valves up to DN 500 in cast bodies.

In all thermodynamic processes ARCA three-way valves are applied.

Example 1:
cooling system of motor ships.

Example 2:
heating and cooling systems for chipped wood and plate pressing, vulcanizing and other presses.

Example 3:
high pressure three-way gas valves for transferring-, compressing- and pre-heating stations in gas-pipeline-systems.



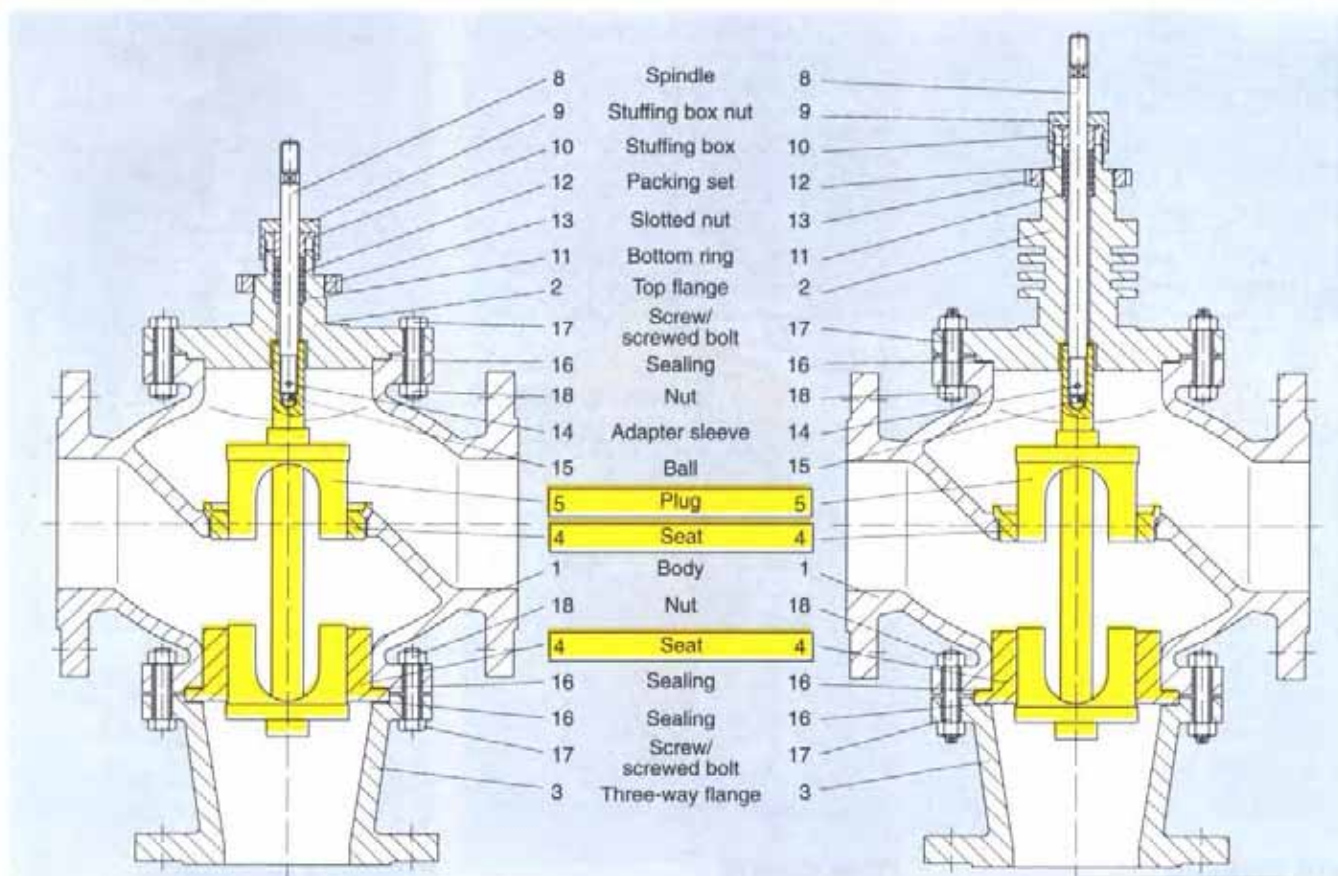
Up to 1 million strokes per year.

For extremely short on/off cycles in the cooling spray lines of wire rolling mills we developed these three-way on/off valves. Already for several years they are performing excellently under these severe conditions.



Series 200

Standard executions



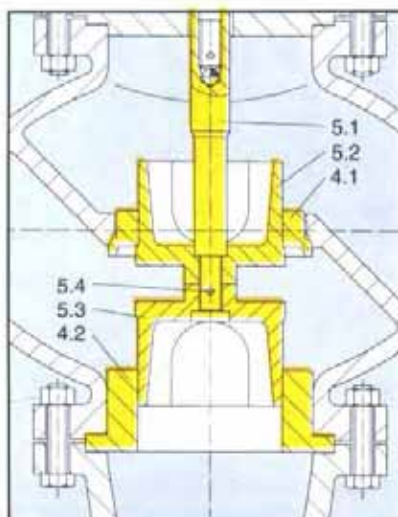
Three-way control valve Series 201 (flow dividing valve)

Top flange in standard execution

Variations of inner parts

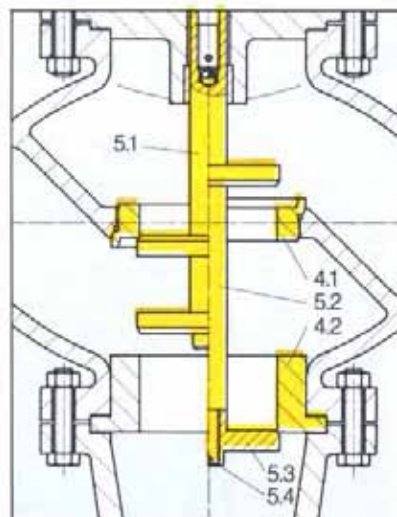
A Control plug flow divisor

- 4.1 Top seat
- 4.2 Bottom seat
- 5.1 Plug shaft
- 5.2 Slotted cone
- 5.3 Slotted cone
- 5.4 Adapter sleeve



B On/Off plug

- 4.1 Top seat
- 4.2 Bottom seat
- 5.1 Mixer
- 5.2 Upper-part divisor
- 5.3 Lower-part divisor
- 5.4 Adapter sleeve

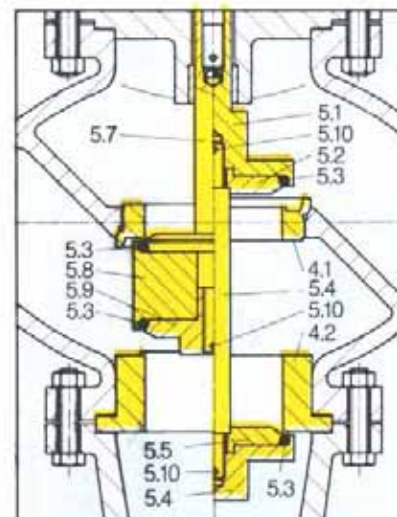


Three-way control valve Series 203 (flow dividing valve)

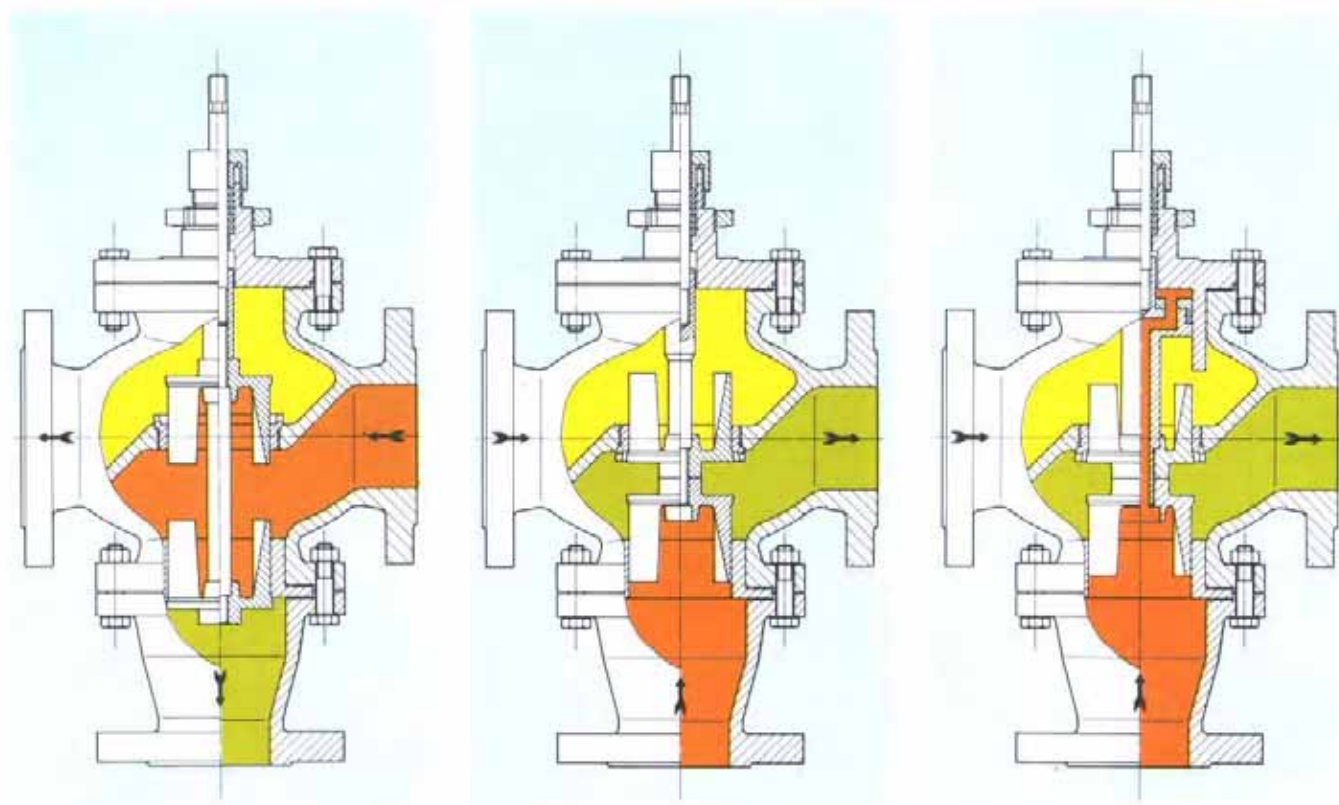
Top flange with cooling fins

C On/Off plug with soft-sealing

- 4.1 Top seat
- 4.2 Bottom seat
- 5.1 Upper-part plug
- 5.2 Plug plate
- 5.3 O-ring
- 5.4 Plug shaft
- 5.5 Plug plate
- 5.6 Lower-part plug
- 5.7 Upper-part plug
- 5.8 Plug plate
- 5.9 Lower-part plug
- 5.10 Adapter sleeve



Second advantage: optimal hydrodynamics for mixing and flow dividing



Flow dividing

The flow AB is divided into two exit flows A and B.

In both series the **direction** of the flow is always **against the plug**. The **"bathtub" effect** and the water-hammers caused thereby can be **avoided**. Standard diaphragm actuators can be used without special devices as for instance hydraulic brakes. The plugs are guided directly in the upper and lower seat, in the best way.

Flow mixing

The entrance flows A and B are mixed to a single exit flow AB. Typical application: temperature control.

Both types, mixing and dividing, **are built from the same parts of the modular parts system**. The bodies are chosen from the standard straight-through valve bodies, which grants a quick delivery. The plugs for mixing and dividing are identical. With some additional parts (spindle, distance bushing) you can convert one type into the other. The seats remain unchanged.

Pressure balanced, if necessary

If the required differential pressures are higher than those admitted in our technical data sheet (see pages 6 and 7) it is possible to build pressure balancing in.

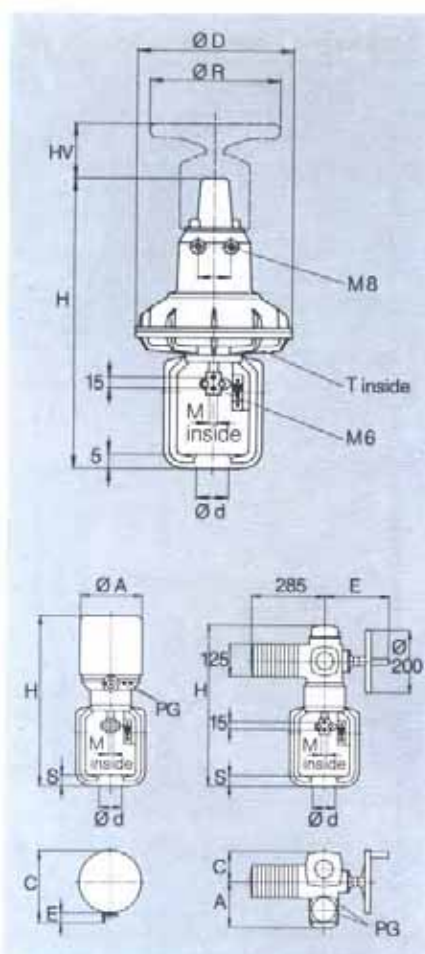
Example 1:
(BSK 1709) mixing valve DN 250 for hot water $dp = 6$ bar.

Example 2:
(1220/137) dividing DN 200 for emulsion $dp = 15$ bar in return flow.

Example 3:
(1220/129) dividing DN 350 for hot water $dp_{max} = 10$ bar.

Series 200 and 220

Dimensions of the valves and actuators



Diaphragm actuator 811

Size/stroke	ØD	H	HV	R	S	T	Ød	M
UO - 20	230	438	110	180	20	G 1/4	48	M12
UI - 20	270	495	135	225	20	G 1/4	48	M12
UI - 30		510			25		56	M18 x 1,5
UIII - 30	392	722	197	320	25	G 1/2	56	M18 x 1,5
UIII - 60		752			30		72	
UV - 60	530	1006	295	400	30	G 1/2	72	M18 x 1,5
UV - 100		1026						

Electric actuator

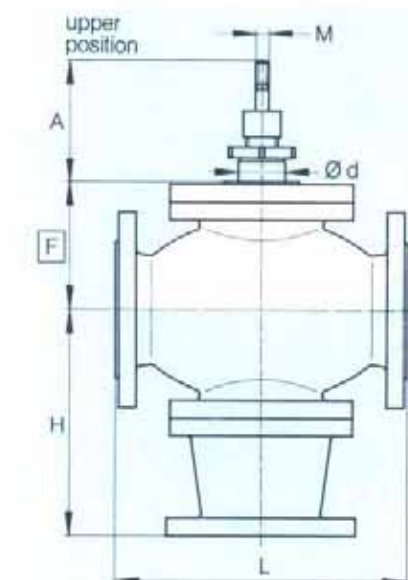
Size/stroke	A	C	E	H	S	PG	Ød	M
E 0 - 20	148	187	37	440	20	2 x PG 9/11 1 x PG 9	48	M12
E 1 - 20				440	20		48	M12
E 1 - 30				510	25		56	M18 x 1,5
E 3 - 30	190	255	55	570	25	2 x PG 9/11 2 x PG 9	56	M18 x 1,5
E 3 - 60				650	30		72	
E 5 - 30	220	280	60	630	25	2 x PG 9/11 2 x PG 9	56	M18 x 1,5
E 5 - 100				710	30		72	
SAR - 07.1	247	115	250	517	20	2 x PG 21 1 x PG 13,5	48	M12
SAR - 07.5				595	25		56	M18 x 1,5
SAR - 10.1				651	30		72	

Series 200

DN	L	H	F. 1	F. 2	F. 3	F. 4	A	M	Ød
25	160	130	85	180	180	245	120	M12	48
32	180	140	95	190	190	255			
40	200	150	100	195	195	260			
50	230	195	120	220	220	380	142	M18 x 1,5	56
65	290	210	140	240	240	400			
80	310	230	145	245	245	405			
100	350	250	155	255	255	415			
125	400	305	180	310	310	580	192	M18 x 1,5	72
150	480	355	210	340	340	610			
175	550	385	230	360	360	630			
200	600	420	250	380	380	830			
250	730	530	310	440	440	910	232	M27 x 2	72
300	850	630	370	500	500	960			
350	980	700	410	540	540	1010			
400	1150	850	510	700	700	1400			

Series 220

DN	L	H	F. 1	F. 2	F. 3	F. 4	A	M	Ød
40	260	190	140	140	165	295	120	M12	48
50	300	240	135	135	190	350	142	M18 x 1,5	56
65	340	255	190	190	210	385			
80	380	295	195	195	245	450			
100	430	340	210	210	300	490			
125	500	370	260	260	330	610	192	M18 x 1,5	72
150	550	460	275	275	350	625			
200	700	585	340	340	512	700			
250	775	620	385	385	530	720			
300	900	690	440	440	630	1100	232	M27 x 2	72



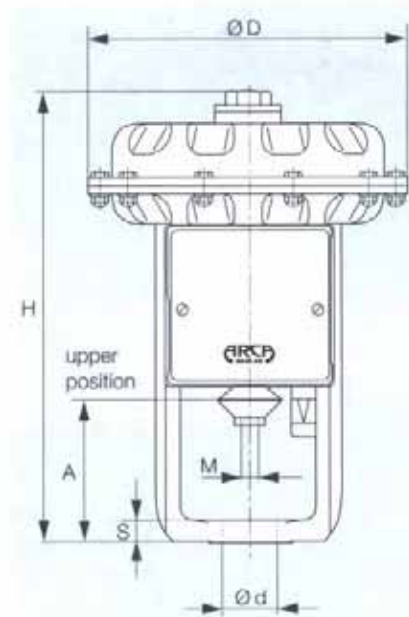
Height F:

- F...1 Standard flange
- F...2 Top flange with sealing gland
- F...3 Top flange with cooling fins upper part
- F...4 Top flange with bellows sealing and security stuffing box

The coordination actuator/valve can be taken from the differential pressure schedule.

Series 200 and 220

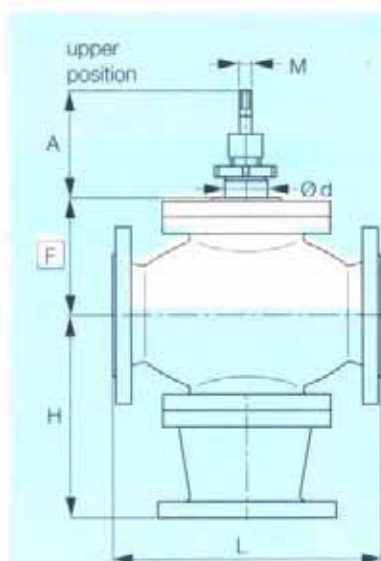
Dimensions of the valves and actuators



Diaphragm actuator 812

Type	Stroke	Ø D	Ø d	S	A	H	M
812 - 22	20	270	48	20	120	376	M12
812 - 23	30		56	25	142	420	M18 x 1,5
812 - 33		482					
812 - 34	60	400	72	30	192	618	

The assignment actuator/valve is shown in the table of differential pressures.



Series 200

DN	L	H	F. 1	F. 2	F. 3	F. 4	A	M	Ø d	
25	160	130	85	180	180	245	120	M12	48	
32	180	140	95	190	190	255				
40	200	150	100	195	195	260				
50	230	195	120	220	220	380	142	M18 x 1,5	56	
65	290	210	140	240	240	400				
80	310	230	145	245	245	405				
100	350	250	155	255	255	415	192		72	
125	400	305	180	310	310	580				
150	480	355	210	340	340	610				
175	550	385	230	360	360	630	192	M18 x 1,5	72	
200	600	420	250	380	380	830				

Series 220

DN	L	H	F. 1	F. 2	F. 3	F. 4	A	M	Ø d
40	260	190	140	140	165	295	120	M12	48
50	300	240	135	135	190	350	142	M18 x 1,5	56
65	340	255	190	190	210	385			
80	380	295	195	195	245	450			
100	430	340	210	210	300	490	192	M18 x 1,5	72
125	500	370	260	260	330	610			
150	550	460	275	275	350	625			
200	700	585	340	340	512	700	192	M18 x 1,5	72

Total height F:

- F1** Standard flange
- F2** top flange with sealing gland

- F3** top flange with cooling fin top
- F4** top flange with bellows sealing and safety stuffing box

Maximum admissible differential pressures Δp [bar] for diaphragm actuators 812



Max. admissible differential pressures Δp [bar], mixer or flow divider.

The admissible operating pressure for the valve must not be exceeded.

DN				25	32	40	50	65	80	100	125	150	200
Actuator				Control pressure [bar]									
Spring set				Kv-values and nominal widths coordination									
				11	18	26	43	68	100	150	260	380	650
Opening function or closing function	25 up to 40	812 - 22	1,95	3	11,8	6,6	3,2						
			3,9	6	39	24,5	14,7						
	50 up to 100	812 - 23	2,9	3			5,3	2,4	1,1	0,3			
			5,8	6			16,7	9,2	5,6	3,2			
	50 up to 100	812 - 33	2,2	3			19,6	10,9	6,7	3,9			
			4,5	6			48,9	28,2	18,1	11,2			
			5,5	9			59,9	34,7	22,4	13,9			
	125 up to 200	812 - 34	2,2	3							2,1	1,2	0,4
			4,4	6							6,2	4,1	2,0
			5,3	9							8	5,3	2,7

Maximum admissible differential pressures Δp [bar] for diaphragm actuators 811



Max. admissible differential pressures Δp [bar], mixer or flow divider.

The admissible operating pressure for the valve must not be exceeded.

DN					25	32	40	50	65	80	100	125	150	200	250	300	350
Opening function or closing function		Actuator size and number	Control pressure [bar]	Actuator spring and number	Kv-values and nominal widths coordination												
					11	18	26	43	68	100	150	260	380	650	900	1300	1800
					24,3	14,8	8,5										
Opening function or closing function	25 up to 40	U0 - 20 A	2,8	standard N 54610	24,3	14,8	8,5										
		811.12	4,4	reinforced N 54611	37,5	23,5	14										
	25 up to 40	UI - 20	2,8	standard N 54620	43,1	27,3	16,4										
		811.21	5,0	reinforced N 54622	92,1	59,6	37,1										
	50 up to 100	UI - 30	2,8	standard N 54621				9,8	5,1	2,9	1,4						
		811.22	4,4	reinforced N 54622				16,3	8,9	5,5	3,1						
	50 up to 100	UIII - 30	3,2	standard N 54630				36,7	21	13,4	8,2						
		811.31	5,2	reinforced N 54633				72,9	42,4	27,5	17,2						
	125 up to 200	UIII - 60	2,4	standard N 54632								2,7	1,7	0,68			
		811.33	4,4	reinforced N 54633								6,1	4	2			
	125 up to 200	UV - 60	2,8	standard N 54650								9,6	6,4	3,4			
		811.41	4,8	reinforced N 54658								18,2	12,4	6,7			
	250 up to 350	UV - 100	2,0	standard N 54652											0,82	0,46	0,26
		811.43	4,0	reinforced N 54658											2	1,3	0,85

*DN 400 on request

Maximum admissible differential pressures Δp [bar] for electro-actuators

Flow against closing direction of the plug.

It is not allowed to exceed the admissible control pressure of the valve.

DN →			25	32	40	50	65	80	100	125	150	200	250	300	350
	Actuator type	Control force limit	Kv-values and nominal widths coordination												
	Number	[kn]	11	18	26	43	68	100	150	260	380	650	900	1300	1800
Compact execution 856	E0-30 856.11-14	1,2	1	14	7,5	4,9	2,7	1,3	0,8	0,3					
			2	20	11	7	3,8	1,9	1,1	0,5					
	E1-30 856.21-24	3,5	1	50	27	19	11	6,0	4,2	2,3					
			2	72	39	28	16	8,5	6,0	3,4					
	E3-30 856.32-34	8,0	1	119	66	49	28	16	11,5	7,5					
			2	170	95	71	41	24	17	11					
	E3-100 856.35-36	8,0	1					11,5	7,5	4,5	3,2	1,7	0,9	0,7	0,5
			2					17	11	6,6	4,6	2,5	1,4	1,0	0,8
	E5-30 856.43-44	20	1				75	44	32	21					
			2				108	64	46	30					
	E5-100 856.45-47	20	1							12	9	5	3,1	2,0	1,2
			2							18	13	7,2	4,5	3,0	1,8
Heavy execution 853	SAR (07.1) 850 F...	10	1	147	83	60	35	21	15	8,5					
			2	220	124	92	54	32	23	15					
	SAR (07.5) 850 F...	20	1							12,6	9	5			
			2							17	12,2	6,7			
	SAR (10.1) 850 F...	32	1										5,0	2,7	2,0
			2										6,0	4,0	3,0

1 = admissible differential pressure

2 = admissible differential pressure with On/Off Function

*DN 400 on request

Third advantage: Optimal adaptation to your process

The K_v -values

of the valve trims are determined by the slot width in the plug sleeve. In this manner it is also possible to realize two different K_v -values in the upper and lower passage of the same three-way valve.

Materials:

For bodies the same materials are possible as for other valve series, (see DS 140, page 4).
Standard: GS-C25, GG-20, G-CuSn 10.
Trim: 13 % chrome-steel, bronze, brass or stainless steel.

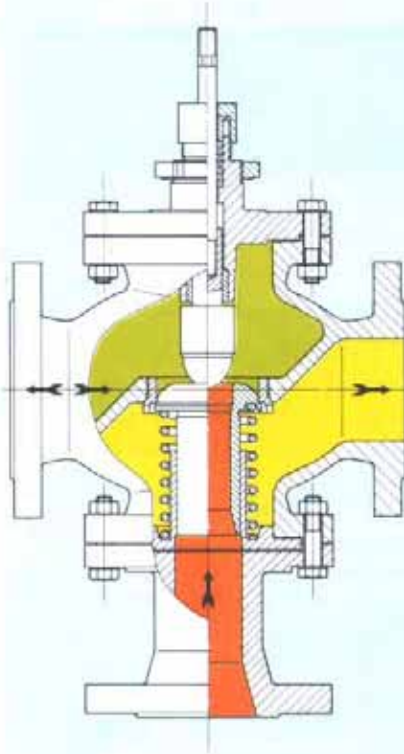
Other technical data for connections, stuffing box, leakage rate you will also find in bulletin DS 140.
The characteristic is generally linear acc. to VDI 2173 with a rangeability of 50:1.

Dimensioning

For the dimensioning of the valves we have data sheets with K_v values ($C_v = 1,17 K_v$) and allowable differential pressures, dimensional drawings and K_v -formula cards, as well as our valve dimensioning program "ARCA-VENA" ready for you.

Indicate medium (specific weight, viscosity etc.), quantity of flow, temperature, upstream and downstream pressure.

On request we work out the dimensioning for you.



Special construction:

Sealing steam control valve – two valves in one –

Three-way valve with closed middle position. This valve is used for control of supply and exhaust steam of sealing systems at turbines. Upper part of valve stroke controls supply steam, lower part of stroke exhaust steam.

Series 440
PN 40 DN 40/25–150/80

Type keys Series 200

- 201 Control valve with slotted cone, standard top flange
- 202 Control valve, top flange with sealing gland
- 203 Control valve, top flange with cooling fins
- 204 Control valve, top flange with bellows sealing
- 205 Control valve, top flange with insulation pillar

Series 200 PN 10 - 40
DN 25 - 500

Series 220 PN 63 - 160
DN 40 - 300