Ball segment valve

Si-110 EN

Edition: 2008-12

Type KVTW / KVXW		**Wafer type**
Type KVTF / KVXF		**Flanged**
Nominal pressure	–	**PN 25/20/16/10**
Nominal size	–	**DN 80 -500**
Material	–	**Stainless steel**

- **Control and shut-off valve**
- **High capacity**
- **One-piece shaft gives a torque transmission free of backlash**
- **Excellent tightness irrespective of differential pressure**
- **Easy maintenance**

- **Option:**

KVM-ball segment with V-groove for high fibre concentrations

LN (Low Noise) Ball segment with low noise trim for high ΔP

The SOMAS ball segment valve type KVTW with a centrically mounted shaft, and KVXW with an eccentrically mounted shaft are of wafer design. Type KVTF is a flanged version with centrically mounted shaft while KVXF is flanged and eccentric design.

The valve body is in one piece. Shaft device is also in one piece for torque transmission free of backlash. The spring-loaded seat is available in three alternative materials (PTFE, PTFE 53 and HiCo).

The valves can be used for control, as well as for shut-off applications on practically every type of media within a wide temperature range. Choose KVT for liquids, media containing impurities etc. For dry and clean media choose KVX. In the KVX-valve the ball segment is eccentrically mounted and rotates out from the seat when the valve is opened. This reduces the wear on seat and segment.

Low noise trim is available as an option. The designation "LN" indicates that the ball segment is equipped with a network of bars that are used to split up the pressure drop across the valve. This results in less pressure recovery, thereby reducing the noise and potential damage due to cavitation.

Note! Capacity factors will be reduced for valves with LN-trim

Ball segment with V-groove is available for use at high fibre concentrations. The V-groove design prevents dewatering at small opening angles.

The SOMAS valves are delivered ready for installation and operation. The valve assemblies are delivered factory tested as complete units with actuators, positioners and accessories.

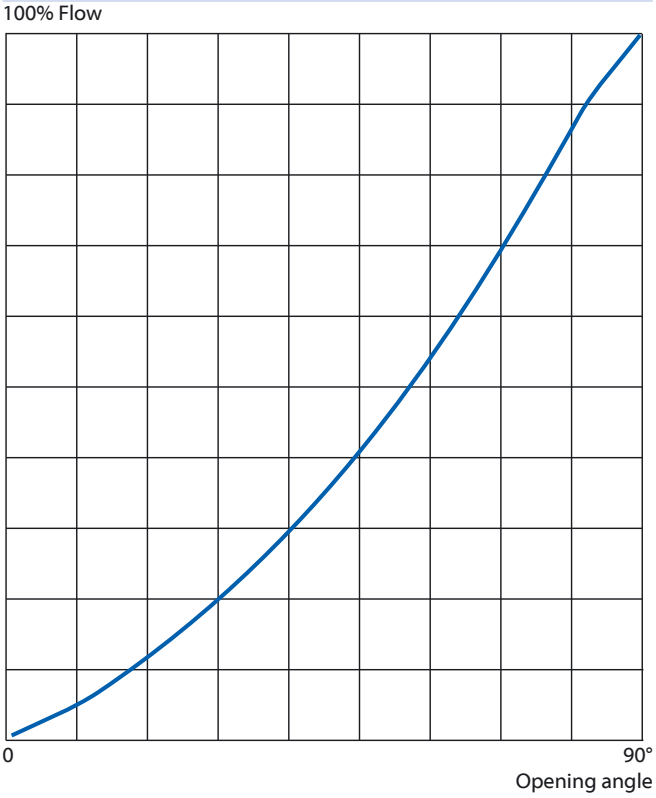
Tightness class

The tightness class is related to the chosen material in the seat ring.

PTFE-seat (Code A) IEC 534-4 VI (ANSI B16-104 Class VI)
PTFE 53-seat [1] (Code B) IEC 534-4 VI (ANSI B16-104 Class VI)
HiCo seat (Code T) IEC 534-4 V (ANSI B16-104 Class V)

[1] 50% PTFE + 50% 1.4435 powder (percentage by weight)

Flow characteristics



Factor F_{LP}

	Opening angle								
	10°	**20°**	**30°**	**40°**	**50°**	**60°**	**70°**	**80°**	**90°**
F_{LP1}	0.85	0.82	0.78	0.75	0.70	0.66	0.60	0.55	0.50
F_{LP2}	0.85	0.82	0.78	0.73	0.68	0.62	0.56	0.50	0.45
F_{LP3}	0.85	0.82	0.78	0.73	0.67	0.61	0.54	0.49	0.43

F_{LP1} = One dimension bigger pipe size
F_{LP2} = Two dimensions bigger pipe size
F_{LP3} = Three dimensions bigger pipe size

Pressure and temperature rating

(According to the material in the seat)

Seat ring	Max. working pressure* (bar at °C)				
Code	**150**	**170**	**200**	**350**	**>350**
A	25	25	—	—	Note 1
B	25	25	15	—	Note 1
T	25	25	25	15	Note 1

10 bar = 1 MPa Note. 1: Check with Somas

NB! Do not exceed working pressure for the valve.

Liquid pressure recovery factor F_L

	Opening angle								
Factor	**10°**	**20°**	**30°**	**40°**	**50°**	**60°**	**70°**	**80°**	**90°**
F_L	0.85	0.82	0.80	0.77	0.74	0.71	0.67	0.64	0.60

Pipe geometry factor F_P *(KVTW/KVXW)*

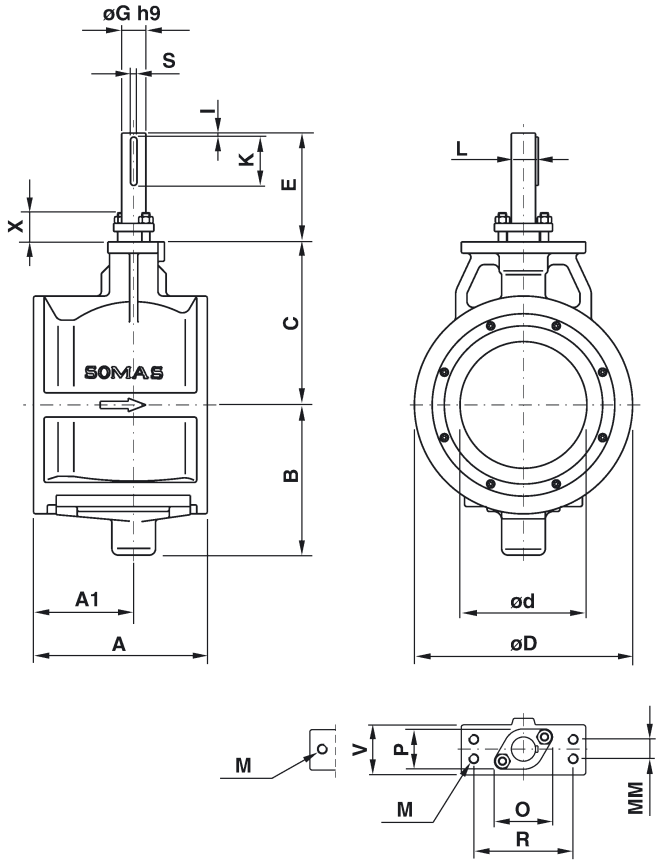
Valve	Pipe				Opening angle					
DN	**DN**	**10°**	**20°**	**30°**	**40°**	**50°**	**60°**	**70°**	**80°**	**90°**
	100				0.98	0.97	0.95	0.93	0.80	0.76
80	150	1.0	0.99	0.98	0.94	0.90	0.85	0.78	0.70	0.65
	200				0.93	0.87	0.80	0.73	0.64	0.59
	150				0.97	0.94	0.90	0.86	0.80	0.76
100	200	1.0	0.99	0.97	0.94	0.90	0.84	0.78	0.70	0.65
	250				0.93	0.88	0.82	0.75	0.66	0.61
	200				0.99	0.97	0.96	0.93	0.90	0.87
150	250	1.0	0.99	0.99	0.97	0.95	0.91	0.87	0.81	0.77
	300				0.96	0.93	0.88	0.83	0.76	0.72
	250				0.99	0.98	0.97	0.96	0.93	0.91
200	300	1.0	1.0	0.99	0.98	0.96	0.94	0.91	0.86	0.82
	350				0.97	0.95	0.91	0.87	0.81	0.77
	300				0.99	0.99	0.98	0.97	0.95	0.94
250	350	1.0	1.0	0.99	0.99	0.97	0.95	0.93	0.89	0.87
	400				0.98	0.96	0.93	0.90	0.85	0.81

Pipe geometry factor *(KVTF/KVXF)*

Valve	Pipe				Opening angle					
DN	**DN**	**10°**	**20°**	**30°**	**40°**	**50°**	**60°**	**70°**	**80°**	**90°**
	100				0.98	0.97	0.95	0.93	0.80	0.76
80	150	1.0	0.99	0.98	0.94	0.90	0.85	0.78	0.70	0.65
	200				0.93	0.87	0.80	0.73	0.64	0.59
	150				0.97	0.94	0.90	0.86	0.80	0.76
100	200	1.0	0.99	0.97	0.94	0.90	0.84	0.78	0.70	0.65
	250				0.93	0.88	0.82	0.75	0.66	0.61
	150				0.98	0.96	0.92	0.89	0.84	0.81
125	200	1.0	0.99	0.99	0.97	0.94	0.90	0.86	0.80	0.76
	250				0.93	0.86	0.78	0.76	0.74	0.72
	200				0.99	0.97	0.96	0.93	0.90	0.87
150	250	1.0	0.99	0.99	0.97	0.95	0.91	0.87	0.81	0.77
	300				0.93	0.86	0.78	0.76	0.74	0.72
	250				0.99	0.98	0.96	0.93	0.90	0.87
200	300	1.0	1.0	0.99	0.98	0.96	0.93	0.88	0.85	0.78
	350				0.97	0.95	0.90	0.84	0.78	0.73
	300				0.99	0.98	0.96	0.95	0.92	0.90
250	350	1.0	1.0	0.99	0.98	0.97	0.94	0.92	0.86	0.83
	400				0.98	0.96	0.92	0.89	0.88	0.77
	350				0.99	0.98	0.96	0.95	0.92	0.90
300	400	1.0	1.0	0.99	0.98	0.97	0.94	0.92	0.86	0.83
	450				0.98	0.96	0.92	0.89	0.82	0.77
	400				0.99	0.99	0.97	0.95	0.92	0.91
350	450	1.0	1.0	0.99	0.99	0.98	0.94	0.91	0.88	0.85
	500				0.98	0.96	0.92	0.87	0.83	0.79
	450				0.99	0.99	0.97	0.96	0.95	0.94
400	500	1.0	1.0	0.99	0.99	0.98	0.94	0.92	0.89	0.87
	600				0.97	0.95	0.90	0.86	0.81	0.77
500										

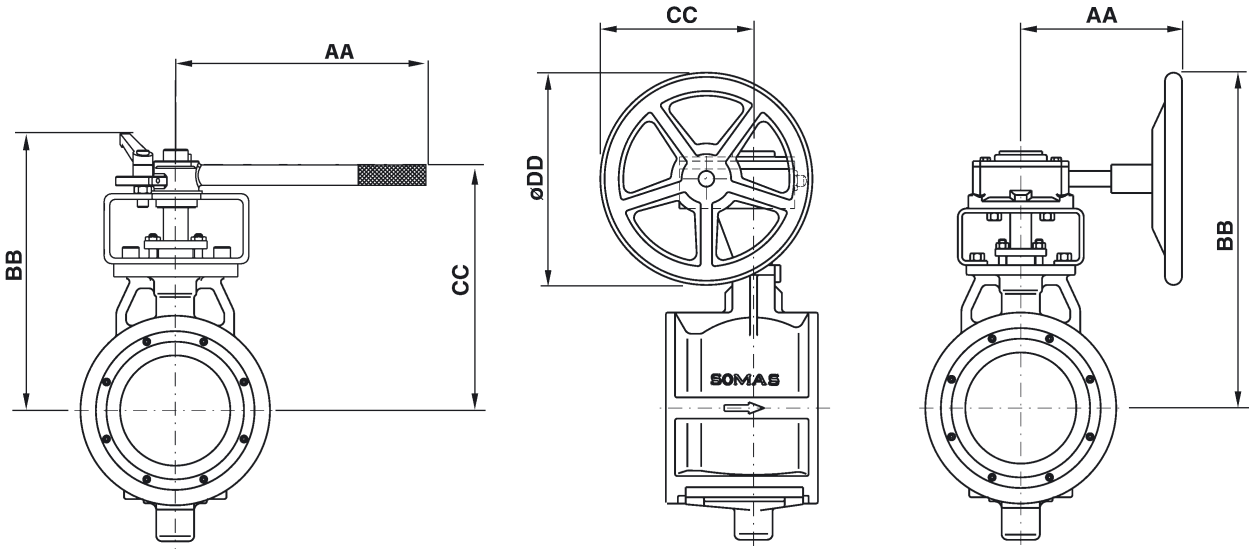
Relation between Kv and Cv: Kv = 0.86 Cv

Wafer design



Ball segment valve type KVTW/KVXW *(valve body in one piece)*

DN	A	A1	B	C	ød	øD	E	øG	H	I	K	L	M	MM	O	P	R	S	V	X	Weight
80	111	64	102	115	75	140	115	20	125	5	45	22.5	M12	—	61	42	98	6	48	30	8.5
100	125	73	116	140	92	162	115	20	125	5	45	22.5	M12	—	61	42	98	6	48	30	11.5
150	170	101	151	176	124	216	115	25	125	5	45	28	M12	—	66	47	98	8	50	30	24
200	215	124	187	202	156	270	135	30	155	5	60	33	M12	24	77	50	123	8	62	35	44
250	260	150	230	242	189	324	135	35	155	5	50	38	M12	24	85	55	123	10	65	50	71

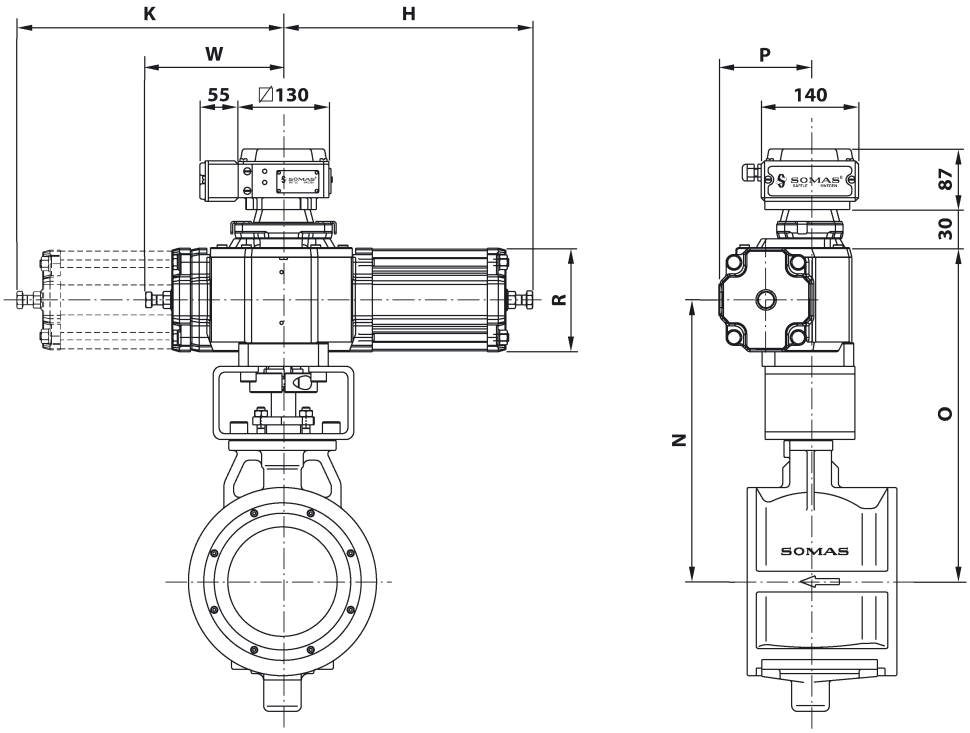


Type KVTW/KVXW with hand lever

DN	Type	AA	BB	CC	Weight
80	**HSR20**	355	240	210	11.5
100	**HSR20**	355	265	135	14.5
150	**HSR25**	355	301	271	27

Type KVTW/KVXW with gear unit

DN	Type	AA	BB	CC	øDD	Weight
80	**M10/F07**	190	350	190	255	16
100	**M10/F07**	190	380	190	255	19
150	**M10/F07**	190	410	190	255	32
200	**M12/F12**	228	475	230	305	56
250	**M12/F12**	228	515	230	305	83

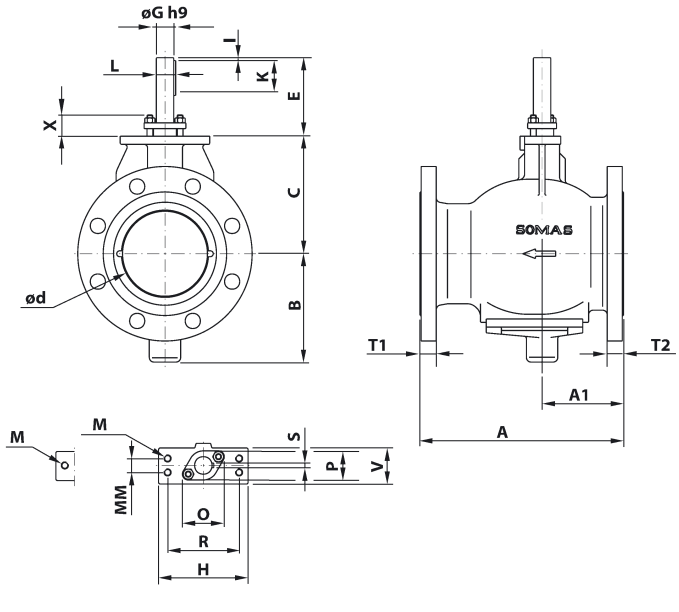


Ball segment valve KVTW/KVXW with actuator type A-DA										Actuator type A-SC/SO									
DN	Type	H	K	N	O	P	R	W	Weight	DN	Type	H	K	N	O	P	R	W	Weight
80	**A21**	255	––	260	340	94	106	140	18	**80**	**A23-X**	415	––	260	320	117	152	140	25
80	**A22**	255	260	260	320	94	106	––	20	**100**	**A23-X**	415	––	285	345	117	152	140	28
100	**A21**	255	––	285	345	94	106	140	21	**150**	**A24-X**	415	420	320	385	117	152	––	50
100	**A22**	255	260	285	345	94	106	––	23	**200**	**A33-X**	660	––	400	485	183	228	215	103
150	**A22**	255	260	320	385	94	106	––	35	**250**	**A33-X**	660	––	440	525	183	228	215	130
150	**A23**	305	––	320	385	117	152	140	41										
200	**A24**	305	310	345	410	117	152	––	61										
200	**A31**	380	––	400	485	144	152	215	69										
250	**A31**	380	––	440	525	144	152	215	96										
250	**A32**	380	395	440	525	144	152	––	102										

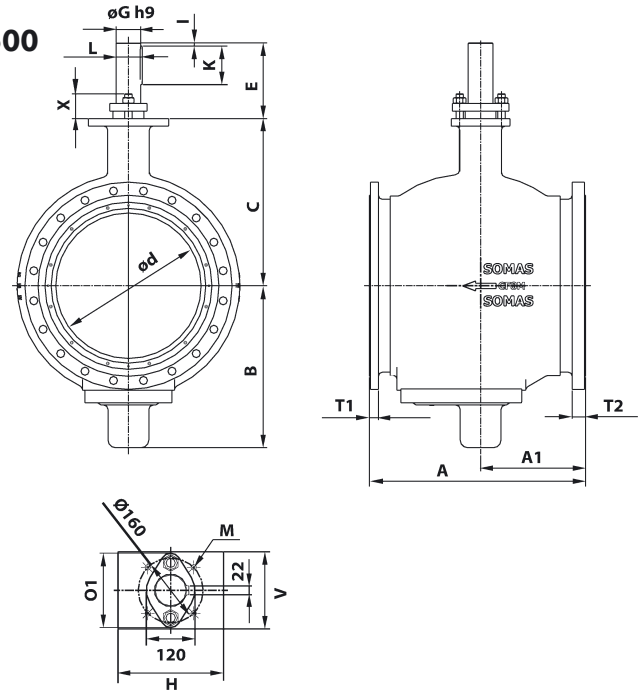
For units with the positioner type SP405, add 2 kg.
For units with the positioner type SPE405, add 3 kg.

X = SC – Spring closes
X = SO – Spring opens

Flanged design
DN 80-400

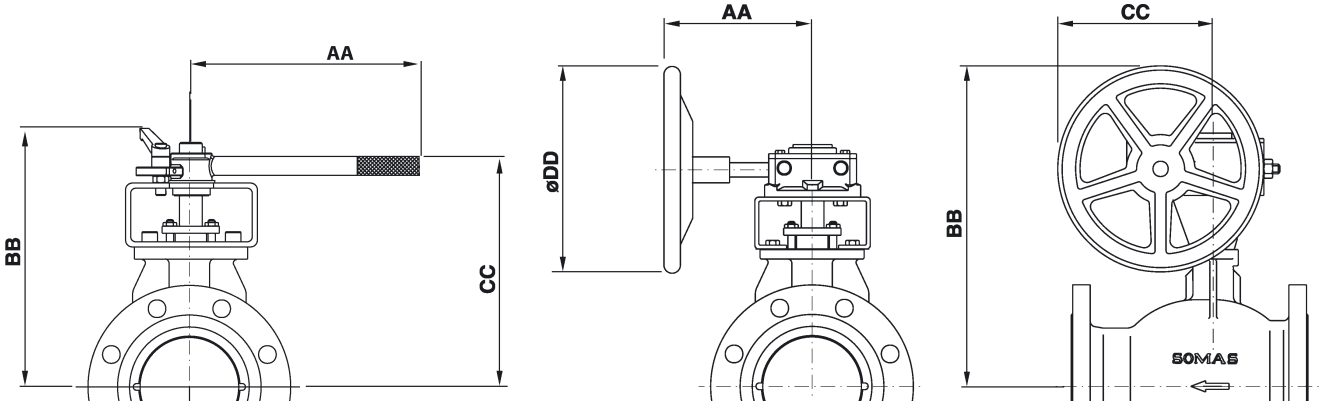


DN 500



Ball segment valve type KVTF/KVXF *(valve body in one piece)*

DN	A	A1	B	C	ød	E	øG	H	I	K	L	M	MM	O	O1	P	R	S	T1	T2	V	X	Weight
80	280	82	102	115	75	115	20	125	5	45	22.5	M12	—	61	—	42	98	6	24	24	48	30	18
100	300	94	116	140	92	115	20	125	5	45	22.5	M12	—	61	—	42	98	6	26	26	48	30	26
125	325	118	151	176	124	115	25	125	5	45	28	M12	—	66	—	47	98	8	26	26	50	30	38
150	350	140	187	202	145	135	30	155	5	60	33	M12	24	77	—	50	123	8	28	28	62	35	61
200	400	159	230	242	189	135	35	155	5	50	38	M12	24	85	—	55	123	10	30	39	62	50	95
250	450	191	281	297	232	155	40	170	5	50	43	M12	40	94	—	75	123	12	34	45	85	50	154
300	500	210	340	353	282	200	50	180	5	80	53.5	M16	55	105	—	85	136	14	37	46	95	50	214
350	550	241	385	393	326	210	60	225	5	90	64	M20	70	115	—	105	150	18	41	50	128	60	304
400	600	269	449	447	370	225	70	220	6	110	75	M16	113	162	—	112	113	20	43	52	154	60	395
500	700	340	525	540	470	245	80	260	10	120	85	M16	—	—	183	—	—	22	30	44	220	75	520

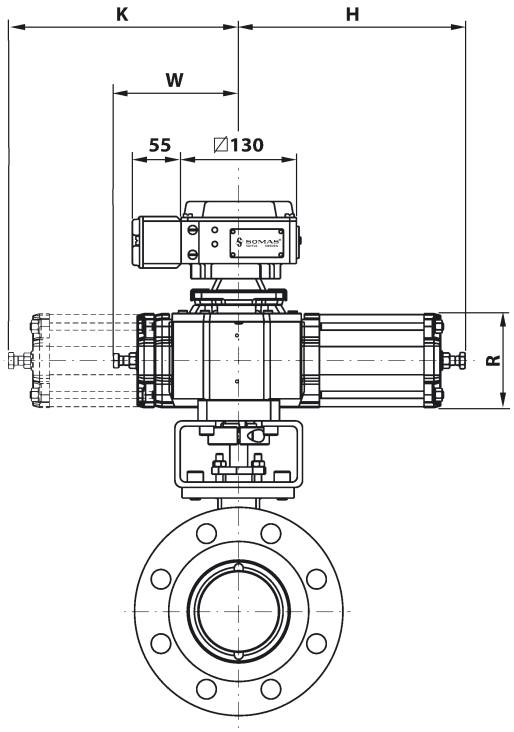


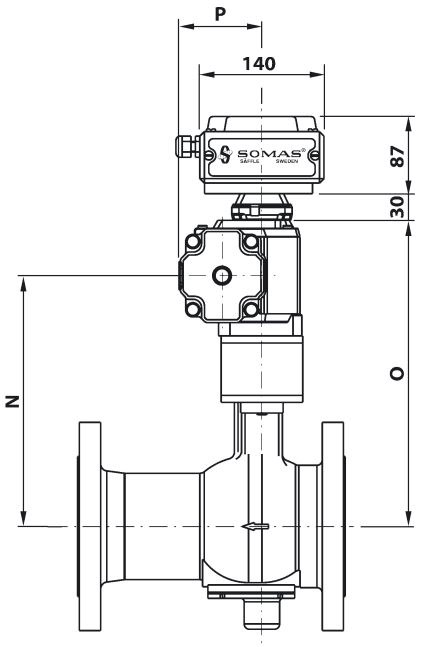
Type KVTF/KVXF with hand lever

DN	Type	AA	BB	CC	Weight
80	**HSR20**	355	240	210	21
100	**HSR20**	355	265	135	29
125	**HSR25**	355	301	271	41

Type KVTF/KVXF with gear unit

DN	Type	AA	BB	CC	øDD	Weight
80	**M10/F07**	190	380	190	255	25.5
100	**M10/F07**	190	380	190	255	33.5
125	**M10/F07**	190	415	190	255	45.5
150	**M12/F12**	228	475	230	305	73
200	**M12/F12**	228	515	230	305	107
250	**M12/F12**	228	555	230	305	166
300	**M14/F14**	250	700	265	350	235
350	**M15/F16**	385	795	353	460	342
400	**M20/F25**	450	942	395	610	440
500	**M20/F25**	450	1035	395	610	565





Ball segment valve KVTF/KVXF with actuator type A-DA										Actuator type A-SC/SO									
DN	**Type**	**H**	**K**	**N**	**O**	**P**	**R**	**W**	**Weight**	**DN**	**Type**	**H**	**K**	**N**	**O**	**P**	**R**	**W**	**Weight**
80	**A21**	255	––	260	320	94	106	140	27	**80**	**A23-X**	415	––	260	320	117	152	140	35
80	**A22**	255	260	260	320	94	106	––	29	**100**	**A23-X**	415	––	285	345	117	152	140	43
100	**A21**	255	––	285	345	94	106	140	35	**125**	**A24-X**	415	310	320	380	117	152	––	64
100	**A22**	255	260	285	345	94	106	140	37	**150**	**A33-X**	660	––	350	415	183	228	215	120
125	**A22**	255	260	320	380	94	106	––	49	**200**	**A33-X**	660	––	420	480	183	228	215	155
125	**A23**	325	––	320	380	117	152	140	54	**250**	**A34-X**	665	680	455	515	183	228	––	210
150	**A31**	380	––	350	415	144	152	215	87	**300**	**A43-X**	920	––	595	750	279	354	315	380
200	**A31**	380	––	420	480	144	152	215	121	**350**	**A43-X**	920	––	635	790	279	354	315	470
200	**A32**	380	395	415	475	144	152	––	127	**400**	**A44-X**	925	935	690	845	279	354	––	615
250	**A32**	380	395	455	520	144	152	––	185										
300	**A41**	550	––	595	750	211	228	315	290										
350	**A41**	550	––	635	790	211	228	315	380										
350	**A42**	545	560	635	790	211	228	––	395										
400	**A42**	545	560	690	845	211	228	––	490										
500	**A43**	680	––	813	939	279	354	315	662										

For units with the positioner type SP405, add 2 kg.
For units with the positioner type SPE405, add 3 kg.

X = SC - Spring closes
X = SO - Spring opens

Torque/*KVTW*

Valve DN	**Shaft dia.** *(mm)*	**Necessary closing torque** Min. *(Nm)*	Max. *(Nm)*
80	20	120	200
100	20	150	200
150	25	250	370
200	30	400	640
250	35	600	1000

Torque/*KVTF*

Valve DN	**Shaft dia.** *(mm)*	**Necessary closing torque** Min. *(Nm)*	Max. *(Nm)*
80	20	120	200
100	20	150	200
125	25	250	370
150	30	400	640
200	35	550	1000
250	40	800	1500
300	50	1400	2800
350	60	2000	5000
400	70	2800	7500
500	80		

Capacity factor Kv and Resistance factor ζ for ball segment valve type KVTW/KVXW

Valve DN	Opening angle 10°	20°	30°	40°	50°	60°	70°	80°	90°	ζ 90°
80	15	39	67	102	138	184	231	295	340	0.57
100	23	58	101	154	208	276	348	444	510	0.62
150	43	109	189	288	390	519	652	817	925	0.44
200	66	167	288	439	594	790	994	1268	1450	0.45
250	97	245	425	646	875	1162	1463	1866	2150	0.44

Capacity factor Kv and Resistance factor ζ for ball segment valve type KVTF/KVXF

Valve DN	Opening angle 10°	20°	30°	40°	50°	60°	70°	80°	90°	ζ 90°
80	15	39	67	102	138	184	231	295	340	0.57
100	23	58	101	154	208	276	348	444	510	0.62
125	43	109	185	288	390	519	652	817	925	0.44
150	60	153	264	402	544	725	910	1123	1295	0.42
200	100	253	437	665	901	1197	1507	1923	2210	0.42
250	155	390	677	1030	1395	1853	2333	2976	3425	0.40
300	219	552	959	1459	1977	2626	3303	4216	4850	0.38
350	308	780	1355	2058	2793	3708	4667	5952	6843	0.38
400	385	878	1698	2580	3497	4645	5845	7482	8570	0.38
500										

Relation between Kv and Cv: Kv = 0.86 Cv

Flange standard

SOMAS ball segment valves type KVTW and KVXW are flangeless and should be clamped between flanges. The valves type KVTF and KVXF are flanged and can be drilled according to the table below.
When ordering, please state the pressure rating of the counter flanges. See the valve specification system, code 11.

Nominal pressure valve body

DN	Wafer design	Flanged design
80-100	PN 10/16/20/25/ANSI150	PN 10/16/20/25/ANSI150
125	——	PN 10/16/20/25/ANSI150
150-250	PN 10/16/20/ANSI150	PN 10/16/20/25/ANSI150
300-400	——	PN 10/16/20/25/ANSI150
500		PN 10/16/20/25

Face to face dimension

Flanged type of valves according to EN558-1, Series 15.

For details see the various tables.

Further technical information

Technical data for the materials used in the Somas valves, flange standard, steam data, etc. can be found in section 6 of the Somas catalogue.

Actuators and accessories

The valves can be fitted with SOMAS manual, on/off or control actuators in accordance with the selection table. The valves will then be delivered as tested shut-off or control units ready for installation.

Check sections 4 and 5 of the SOMAS catalogue, where positioners, limit switches and solenoid valves are also presented.

We can also fit other types of actuators and accessories in accordance with your specification.

Option

Within the process industry and the energy sector there are a number of applications where process data in combination with standard control valves will end up with problems such as high noise level and erosion. These problems are mostly related to cavitation and high flow velocities inside the valve.

Note! By using a standard ball segment valve and add a noise reduction trim many of the above mentioned problems can be solved.

See data sheet Si-108 for more theoretical information.

For controlling suspensions with high fibre concentrations it can be advantageous to use valves with a V-groove to reduce the risk of dewatering at small opening angles.

Capacity factors and remaining factors for valves with LN-trim and valves with V-groove are available in the valve sizing program SOMSIZE.

80	20	A21	A22	A23-SC	A23-SC	A23-SO	A23-SOL	HSR020	M10/F07
100	20	A21	A22	A23-SC	A23-SC	A23-SO	A23-SOL	HSR020	M10/F07
150	25	A22	A23	A24-SC	A24-SC	A24-SO	A24-SOL	——	M10/F12
200	30	A31	A24	A33-SC	A33-SC	A33-SO	A33-SOL	——	M12/F12
250	35	A31	A32	A33-SC	A33-SC	A33-SO	A33-SOL	——	M12/F12

80	20	A21	A22	A23-SC	A23-SC	A23-SO	A23-SOL	HSR020	M10/F07
100	20	A21	A22	A23-SC	A23-SC	A23-SO	A23-SOL	HSR020	M10/F07
125	25	A22	A23	A24-SC	A24-SC	A24-SO	A24-SOL	——	M10/F07
150	30	A31	A31	A33-SC	A33-SC	A33-SO	A33-SOL	——	M12/F12
200	35	A31	A32	A33-SC	A33-SC	A33-SO	A33-SOL	——	M12/F12
250	40	A32	A32	A34-SC	A34-SC	A34-SO	A34-SOL	——	M12/F12
300	50	A41	A41	A43-SC	A43-SC	A43-SO	A43-SOL	——	M14/F14
350	60	A41	A42	A43-SC	A43-SC	A43-SO	A43-SOL	——	M15/F16
400	70	A42	A42	A44-SC	A44-SC	A44-SO	A44-SOL	——	M20/F25
500	80								M20/F25

Valve specification system

KVTW - A 5 - A K A - B 1 1 - DN... - PN...

1 2 3 4 5 6 7 8 9 10 11

1 Type of valve

Wafer design
KVTW (Centrically mounted segment)
KVXW (Eccentrically mounted segment)
KVTW LN (Cent. mounted segment, LN-design)
KVXW LN (Eccent. mounted segment LN-design)
KVMW (Segment med V-groove)
Flanged design
KVTF (Centrically mounted segment)
KVXF (Eccentrically mounted segment)
KVTF LN (Cent. mounted segment, LN-design)
KVXF LN (Eccent. mounted segment, LN-design)
KVMF (Segment with V-groove)

2 Valve body design

A = Wafer design
B = Flanged design (body in one piece)

3 Nominal pressure

5 = PN 25
4 = PN 20

4 Material – valve body

A = CF8M
B = CF8M, hard chromed
C = 1.4409

5 Material – ball segment

J = 1.4460*
K = 1.4460*, hard chromed
L = 1.4460*, HiCo coated

6 Material – seat

A = PTFE (10% carbon)
B = PTFE 53 [1]
T = HiCo (High Cobolt Alloy)

7 Material – shaft

A = 1.4460*
B = 1.4460*, hard chromed
G = 1.4435, hard chromed

8 Bearings – valve body/shaft

1 = Without bearing
4 = Rulon
7 = 1.4539

9 Stuffing box

1 = Graphite
2 = PTFE

10 Valve size, DN

11 Drilling, counter flanges

[1] 50% PTFE + 50% 1.4435 powder – percentage by weight *2324-12 for DN 200-400

SOMAS reserves the right to make improvements without prior notice.

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