

Hi-Fluidic[®] High Energy Service Valves

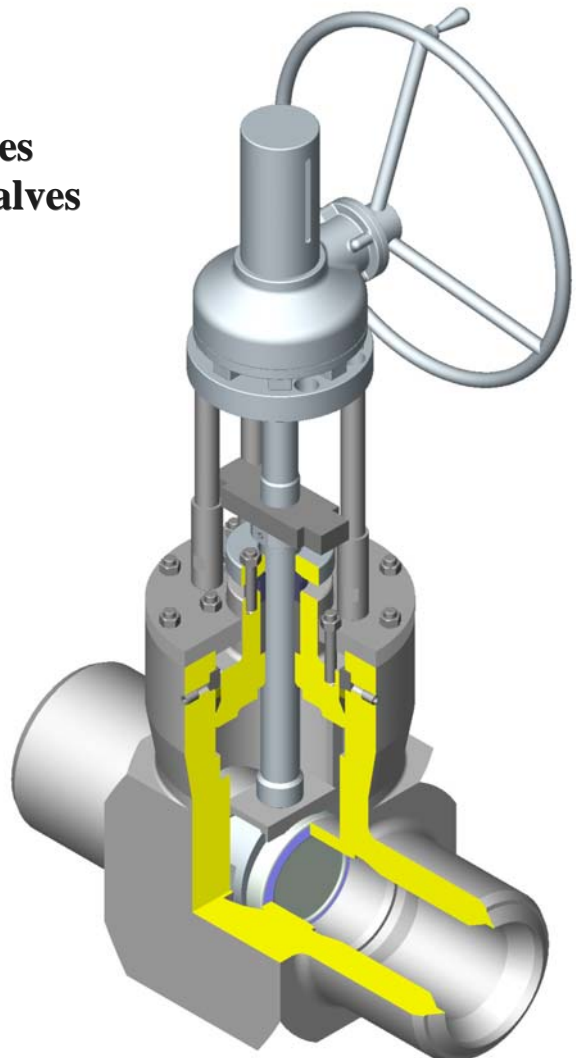
**ASME CLASS 600~4500Lbs, Sizes 1/2"(DN15) ~ 24"(DN600)
Pressure Sealed Bonnet**

Gate Valves

- Cast Steel Parallel Slide Gate Valves
- Forged Steel Parallel Slide Gate Valves

Check Valves

- Forged Steel Swing Check Valves
- Forged Steel Tilting Check Valves
- Cast Steel Stop Check Valves



Key Valve Technologies Limited

www.keyvalve.com

KVT masterpiece product

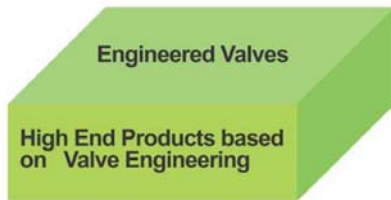


Key Valve Technologies Ltd.

Key Valve Technologies

KVT's Wishes

KVT(Key Valve Technologies Ltd.,)'s business is to share valve technology with valuable customers, new and innovative valve designs with reliable safety and quality, and adopting new technology of relative field of science.



KVT as a specialist of valve engineering is now providing with customers the best product of good design of proper fluid flow control, the use of high quality materials, and the competitive price in the valve market.

History

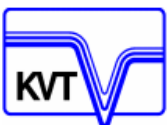
KVT was founded in 1998 to provide high quality valve products in area of high energy process industry. KVT's products have focused to the niche marketing of high technology needs such as severe duty service process of high energy.

Brand Policy

KVT's Brand should be recognized as a good quality products by the customers. The KVT's total brand spirits are based on the total confidence in the product quality of design (functional integrity) and manufacturing process.

KVT's Brands are,

KVT(Hi-Fluidic®)



Key Valve Technologies Ltd.

Business Area

● Valve Manufacturing Part - Products

- Parallel Slide Gate Valves
- Control Valves - Globe Valves
- Fluid Flow Control Devices
- Blow Down Valves
- Swing Check Valves
- Tilting Check Valves
- Y-Stop Check Valves
- Nozzle Check Valves
- Steam Conditioning Valves
- Special Valves
- Actuators
- Hydraulic Actuating Systems (HiFSEHS)

● Engineering Service Parts

- Valve Sizing
- Actuator Sizing
- Analysis of the Valves and Actuators
- Analysis Fluids Flow
- Evaluation of Safety - Air Operated Valves
- Design of the Special Valves
- Design of the Customized Valves
- Research and Development of the Valves

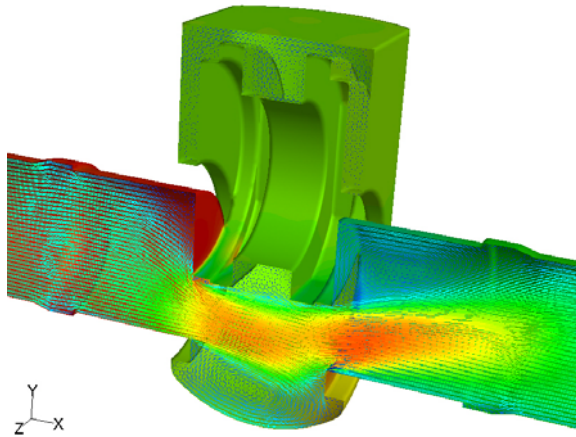
Range of Industry Sectors



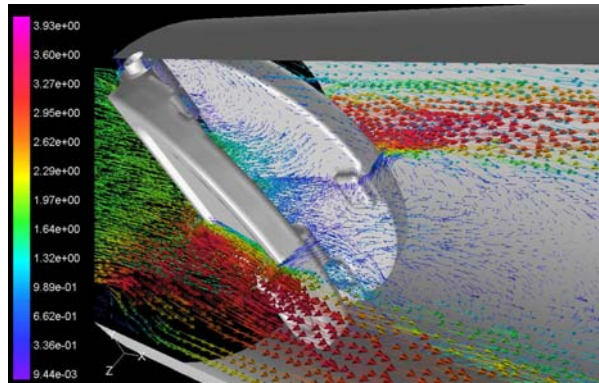
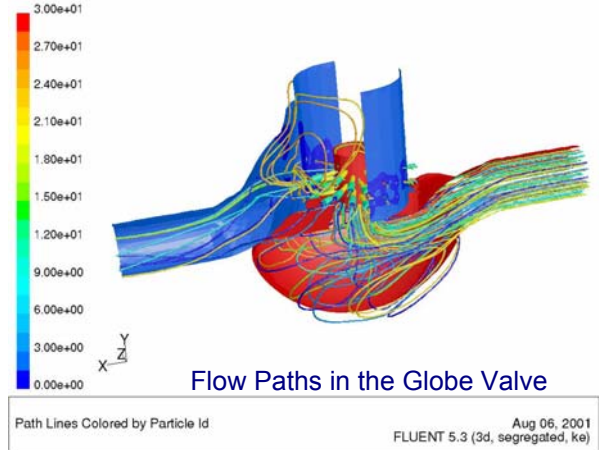
- ◆ Power Generation
- ◆ General Industrial
- ◆ Oil & Gas Production
- ◆ Steel Industry
- ◆ Petrochemical & Chemical
- ◆ Desalination
- ◆ High-pressure Gas Industrial

Available of Engineering Software

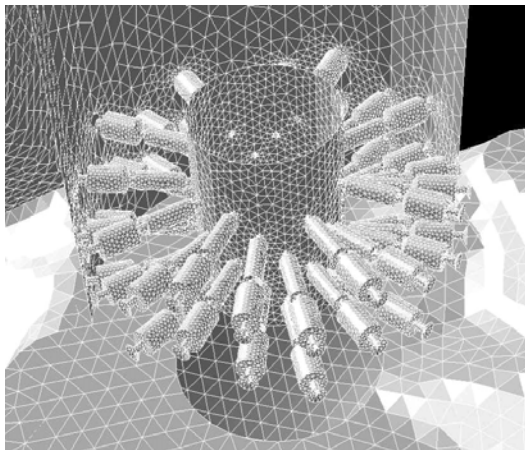
- Computational Fluid Dynamics/CFD Tools
- FEA Tools / Linear, Thermal, Dynamics,
- Fluid Flow & Network
- Flow Instrumentation Sizing Program



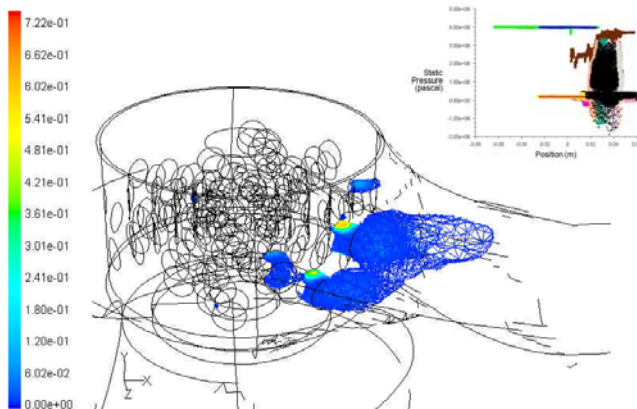
CFD Analysis of the PSGV



Fluid Flow Simulation of Dual Disc



Modeling for CFD Analysis in the Anti-Cavitation



Vapor Formation in the Valve Trim

Facilities

- Valve Comprehensive Testing and Inspection Equipments
- Valve Assembler & Welding Machines
- Valve Flow Capacity and Pressure Drop Inherent Measuring Equipment
- Hydrostatic Shell & Seat Leakage Tester
- Universal Milling Machine & Lathes, and Others



Hydrostatic Shell & Seat Leakage Tester

Products

Gate Valves

Cast Steel / Forged Steel
Parallel Slide Gate Valve

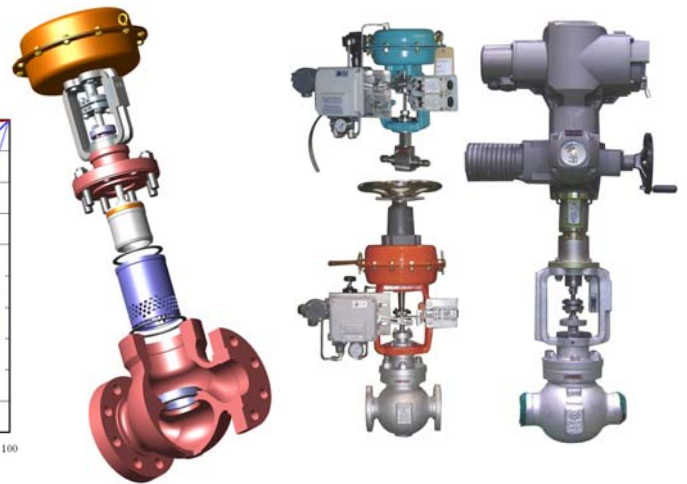
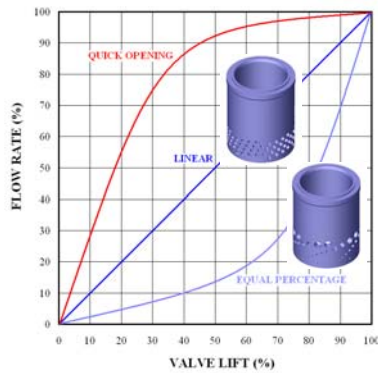
Advanced
Pneumatic, Electrical,
Hydraulic Power Operated Parallel Slide
Control Gate Valves




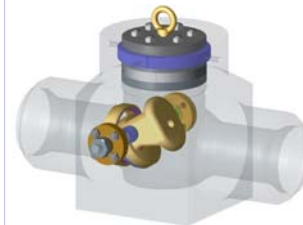

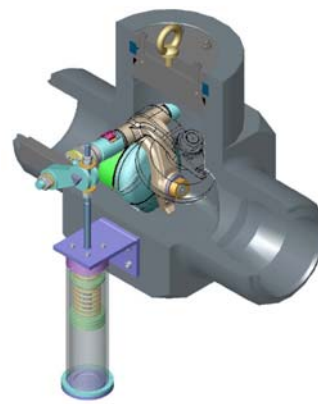

Globe Control Valves

General Service Type
Severe Duty Type

Quick Change Trim
Cage Trim
Single Stage
Multi Stage



Check Valves

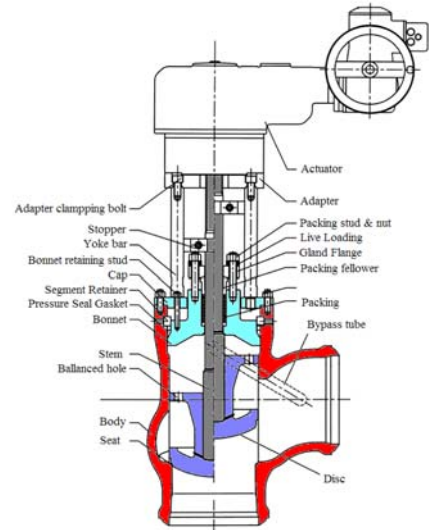
<p>Swing Check Valves</p> 	<p>Tilting Check Valves</p> 	<p>Nozzle Plug Check Valves</p> 	<p>Swing Check Valves with Assistance Actuator</p> 
<p>Custom Designed Check Valves Check Valves for High Temperature Services</p> 			



Key Valve Technologies Ltd.

Stop Check Valves

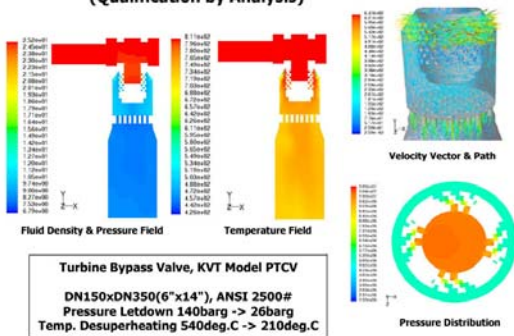
Y-Stop Check Valves
Angle Stop Check Valves



Steam Conditioning Valves

Steam Pressure (Reducing) and Temperature (Desuperheating) Conditioning

Pressure & Temperature Conditioning Valve
(Qualification by Analysis)



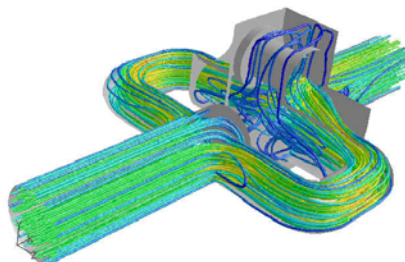
Twin Disc Parallel Slide Gate Valve

Pressure Compensated & Balanced for Very High Pressure System

APPLICATIONS

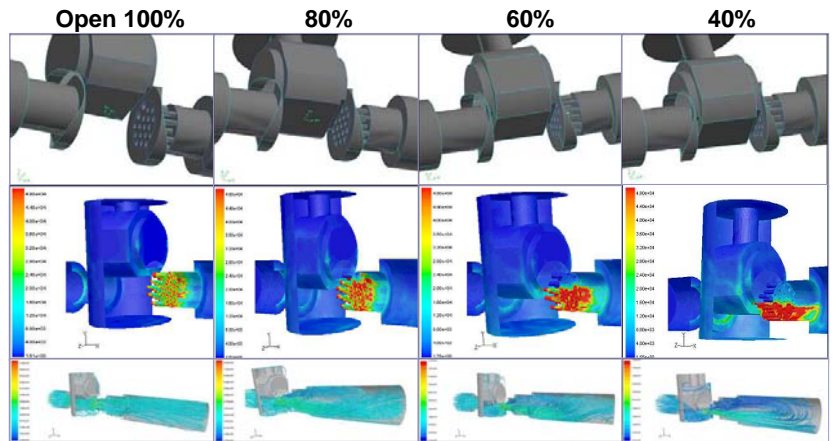
- DESCALING VLAVE
- HI-PRESSURE FREQUENTRY ON/OFF VLAVES

PATENT 10-0729798



Valve Engineering Service

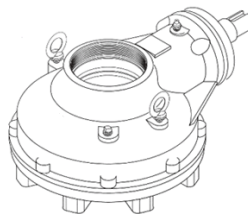
- ◇ Flow Test Loop
- ◇ Refurbishment Re-engineering
- ◇ Reliable Maintenance Engineering
- ◇ Engineering Service - CFD / CAE



CFD Model of PSGV Control

Actuator System

- ◇ Gear Actuators
- ◇ Electrical Actuators
- ◇ Piston Actuators
- ◇ Diaphragm Actuators
- ◇ Special Large Capacity Pneumatic Actuators



HiFSEHS

Hi-Fluidic® Safety Electro-Hydraulic Actuator System

Ex d IIB T5 (AC220V, 60Hz, 250W, 10.5A)

Temperature Range : -25~ +80°C others on

Request Required Power : 0.25 - 0.50 KW dependent on torque output

Power Supply : 24 V DC, 115 V AC, 230 V AC (50/60 Hz), others on request

Solenoid Valve Power Demand : 12 Watt (operating voltage as needed)

Operating Voltage Internal : 24 V DC

Failsafe Operation : Bladder Accumulator

Emergency Operation : Hand Pump

Control System Pressure (Min/Max) : 60/100 bar(101.97 kgf/cm²)





Key Valve Technologies Ltd.

Cast Steel/Forged Steel Parallel Slide Gate Valves

Hi-Fluidic® Gate Valves

Cast Steel Parallel Slide Gate Valves

ASME CLASS 600/900/1500/2500

Sizes: 2 1/2"-24"(DN65 - DN600)

Forged Steel Parallel Slide Gate Valves

ASME CLASS 900/1500/2500/4500

Sizes: 1/2"-2"(DN15 - DN50)

ASME CLASS 1500/2500

Sizes: 2-1/2"-24"(DN150 - DN600)

Consult Factory for Other Classes or Sizes, Materials.



Why? Hi-Fluidic® Parallel Slide Gate Valves

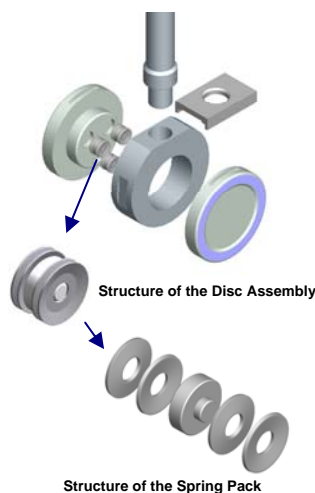
- ◇ Lower pressure drop characteristic than wedge gate valves
- ◇ Improved seating assisted by line pressure and Not torque at seating position
- ◇ Low operating torque, reduced actuator size, especially cost than wedge gate valve
- ◇ While wedge type gate valves are susceptible to thermal binding or over pressurization, parallel slide gate valves are not.
- ◇ Low cost maintenance, Easy disassembly for repair and interchangeable parts
- ◇ Self cleaning action between disc and seat
- ◇ Applied Inconel® cone springs, not coil springs, therefore It easy assemble disc assembly in the body, no special adapting fixture and enhance long life, as below

- ◇ **Wide applications**
 - Boiler Feed Pump Isolation
 - L.P. Steam Isolation
 - Steam Turbine Inlet Isolation
 - Spay Water
 - Bypass
 - Steam Blow and Start Up
 - Blow Down Service
 - Blow Off Service
 - Water, Gas, Oil and others...

Design Features

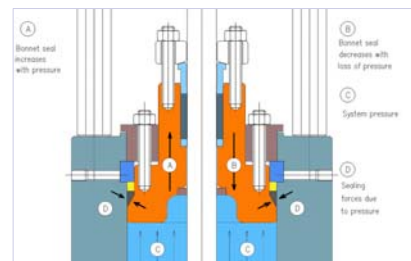
- * Pressure sealed bonnet using high density pure graphite gasket (Delta formed)
- * To protect bonnet over pressure introducing pressure relieving device
- * Spring pack loaded parallel sliding discs
- * Wide flat seats and wide seat diameter relatively
- * Travel stop on the yoke
- * Non-rotating stem by stopper
- * Different hard-facing on seating surfaces, no galling
Different hardness (~ 5 HRc) on seating surfaces :
Discs – Stellite® #6, Seats – Stellite® #12
- * Integral back seat in bonnet – conical type
- * Flow is bidirectional
- * Two thrust bearings and Al-Bronze bushing
- * Available structure for the bypass piping

Spring Pack Loaded



Graphite Seal Gasket

- * The higher the internal pressure, the greater the seating force.
- * We recommend the use of graphite pressure seal gaskets, in lieu of standard soft iron gaskets, in high temperature and frequently temperature-cycled applications.



Parallel Slide Gate Valves Structure and Parts

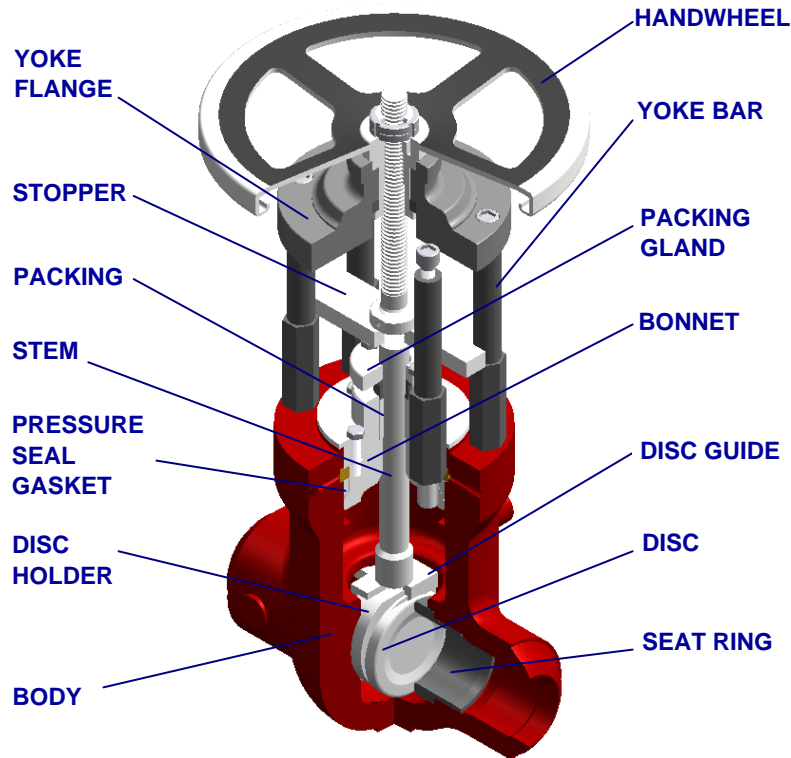


Fig.1 Structure and Parts

Hi-Fluidic® PSGV SERIES CAST STEEL & FORGED STEEL PARALLEL SLIDE GATE VALVES

• Table 1. Materials of construction

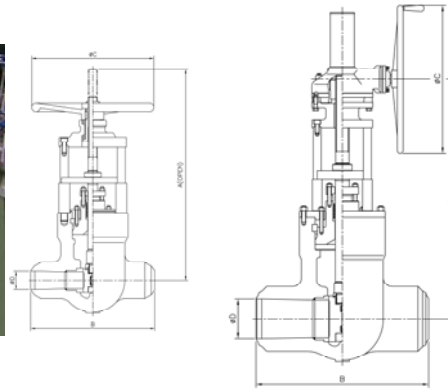
	Carbon Steel	Alloy Steel			Stainless	
BODY	A216-WCB (A105N)	A217-WC6 (A182 - F11)	A217-WC9 (A182 - F22)	A217-C12A (A182 - F91)	A315-CF8M (A182 - F316)	A182-F51 A240 Gr. S31803
BONNET	A216-WCB	A217-WC6	A217-WC9	A217-C12A	A315-CF8M	A240 Gr. S31803
DISK	SS410/A105+STL	WC6/F11+STL	WC9/F22+STL	C12A/F91+STL	SS316/CF8M+STL	F51/A240+STL
STEM	A276-410	A276-410	A276-410/431	A276-410/431	A276-316/17-4Ph	A276-316
SEAT RING	C/S 1020+STL	A182-F11+STL	A182-F22+STL	A182-F91+STL	SS316+STL	A276-316L+STL
GASKET	Mold Graphite	Mold Graphite	Mold Graphite	Mold Graphite	Mold Graphite	Mold Graphite
PACKING	Graphite	Graphite	Graphite	Graphite	Graphite	Graphite
PACKING GLAND	C/S 1020	A276-410	A276-410	A276-410	A276-316	A276-316
BONNET BOLT	A193-B7	A193-B16	A193-B16	A193-B16	A193-B8	A193-B8
BONNET CLAMP	C/S 1045	C/S 1045	C/S 1045	C/S 1045	SS304	SS316
RETAINER	SS410	SS410	SS410	SS410	SS316	SS316
ADAPTOR RING	SS410	SS410	SS410	SS410	SS316	SS316

CAST STEEL PARALLEL SLIDE GATE VALVES - Hi-Fluidic PSGV SERIES



Key Valve Technologies Ltd.

Cast Steel Parallel Slide Gate Valve



• Table 2. Cast Steel PSGV Standard Design Data

Class	Valve Size (inch)	2 ½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
600	DN (mm)	65	80	100	150	200	250	300	350	400	450	500	600
	Seat Diameter (mm)	62	76	102	152	200	238	285	322	374	394	435	525
	Stem Diameter (mm)	19	22	28	36	40	42	44	50	52	62	70	80
	Thread (TR)	16×4	20×4	26×5	32×6	36×6	38×6	40×7	46×8	48×8	55×9	65×10	75×10
	RUN (Turns)	17.8	21.3	22.6	27.7	35.5	41.7	43.2	42.7	49	46.2	46.2	55.6
	C _v (Flow Capacity)	280	590	1,100	2,530	4,500	6,480	9,460	12,220	16,730	18,660	22,970	33,480
900	DN (mm)	65	80	100	150	200	250	300	350	400	450	500	600
	Seat Diameter (mm)	53	70	92	127	178	238	282	295	338	376	418	500
	Stem Diameter (mm)	22	28	32	40	42	42	50	52	62	70	70	80
	Thread (TR)	20×4	26×5	28×5	36×6	38×6	38×6	46×8	48×8	55×9	65×10	65×10	75×10
	RUN (Turns)	15.2	16.3	21	25	31.5	41.7	36.6	39.1	39.5	40	44.6	53.2
	C _v (Flow Capacity)	280	500	880	1,740	3,520	6,480	9,250	10,170	13,530	16,920	21,120	30,760
1500	DN (mm)	65	80	100	150	200	250	300	350	400	450	500	600
	Seat Diameter (mm)	53	70	92	127	178	222	247.5	271.4	328	349	390.8	468
	Stem Diameter (mm)	22	28	32	40	42	50	50	62	70	80	90	95
	Thread (TR)	20×4	26×5	28×5	36×6	38×6	46×8	46×8	55×9	65×10	75×10	85×12	90×12
	RUN (Turns)	15.2	16.3	21	25	31.5	28.8	33.4	32.5	34.7	37.4	34.8	41.9
	C _v (Flow Capacity)	280	500	880	1,740	3,520	5,600	7,040	8,540	12,590	14,470	18,340	26,100
2500	DN (mm)	65	80	100	150	200	250	300	350	400	450	500	600
	Seat Diameter (mm)	44.6	57	73	104.3	146	175	219	241	259.5	292.5	325	375
	Stem Diameter (mm)	22	32	36	42	50	52	62	70	80	90	90	95
	Thread (TR)	20×4	28×5	34×6	38×6	46×8	48×8	58×7	65×10	75×10	85×12	85×12	90×12
	RUN (Turns)	13.7	14	14.5	17.1	20.1	23.7	34.2	26	28	26.2	29.6	33.5
	C _v (Flow Capacity)	190	300	510	1,150	2,330	3,400	5,440	6,650	7,740	9,910	12,460	16,600

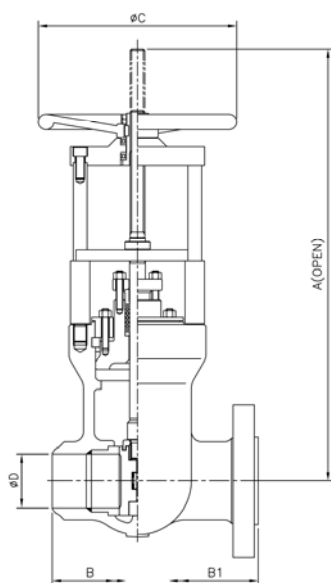
Consult Factory for Class 300 Lbs and Lower.

CAST STEEL PARALLEL SLIDE GATE VALVES - Hi-Fluidic PSGV SERIES ASME CLASS 600



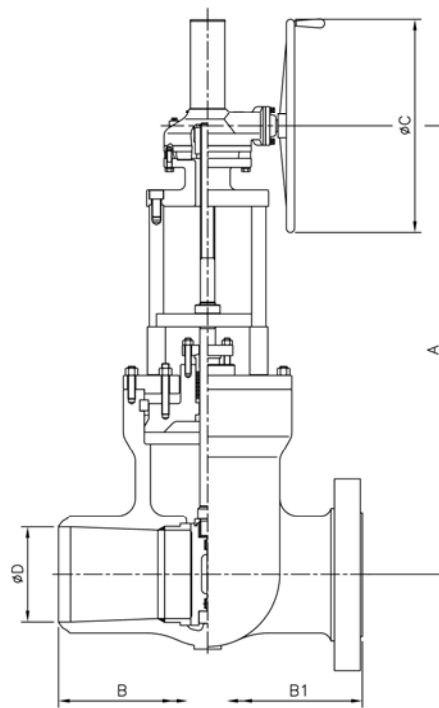
PARALLEL SLIDE GATE VALVE PRESSURE SEAL BONNET CARBON OR STAINLESS STEEL

ASME CLASS 600 , 2 1/2"-24"(DN65 - DN600)



Top Mounted Hand-wheel

Product Number : KKM00ADB, KKM00ADR
Valve Size : 65A(2 1/2") - 200A(8")



Side Mounted Hand-wheel

Product Number : KKG00ADB, KKG00ADR
Valve Size : 250A(10") - 600A(24")

● **Table 3. Cast Steel Parallel Slide Gate Valve Dimension (CLASS 600/PN100)**

Nominal Size		A		B ⁽¹⁾		B1 ⁽²⁾		C		D		Weight (B.W/R.F)	
DN	in	mm	in	mm	in	mm	in	mm	in	mm	in	Kg	lb
65	2 1/2	505	19.88	216	8.50	330	13.00	250	9.84	62	2.44	42/47	93/104
80	3	565	22.24	254	10.00	356	14.00	250	9.84	76	2.99	53/57	114/130
100	4	780	30.71	305	12.00	432	17.00	350	13.78	102	4.02	92/222	203/489
150	6	1140	44.88	457	18.00	559	22.00	450	17.72	152	5.98	210/255	463/562
200	8	1400	55.12	584	23.00	660	26.00	500	19.69	200	7.87	380/456	838/1005
Top Mounted Hand-wheel													
Side Mounted Hand-wheel													
250	10	1182	46.54	711	28.00	787	31.00	400	15.75	238	9.37	648/793	1429/1748
300	12	1264	49.76	813	32.00	838	33.00	500	19.69	284	11.18	710/865	1565/1907
350	14	1542	60.71	889	35.00	889	35.00	500	19.69	322	12.68	938/1093	2068/2410
400	16	1730	68.11	991	39.00	991	39.00	630	24.80	374	14.72	1487/1735	3278/3825
450	18	1776	69.92	1092	43.00	1092	43.00	710	27.95	398	15.67	1980/2250	4365/4960
500	20	1834	72.20	1194	47.00	1194	47.00	710	27.95	435	17.13	2635/3010	5809/6636
600	24	2105	82.87	1397	55.00	1397	55.00	800	31.50	525	20.67	3730/4260	8223/9392

(1) Per ASME B16.10 Short pattern

(2) Per ASME B16.10 Long pattern

● Flange dimensions on page 56

● Butt welding end dimensions on page 59

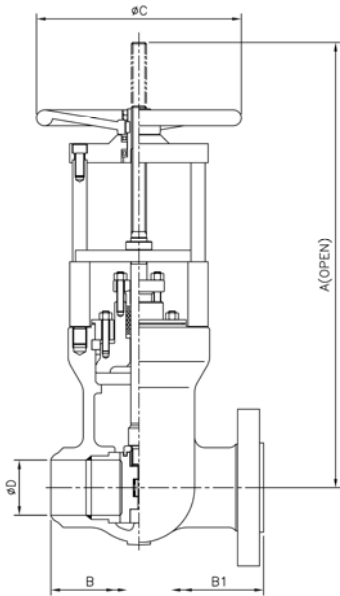
CAST STEEL PARALLEL SLIDE GATE VALVES Hi-Fluidic PSGV SERIES ASME CLASS 900



Key Valve Technologies Ltd.

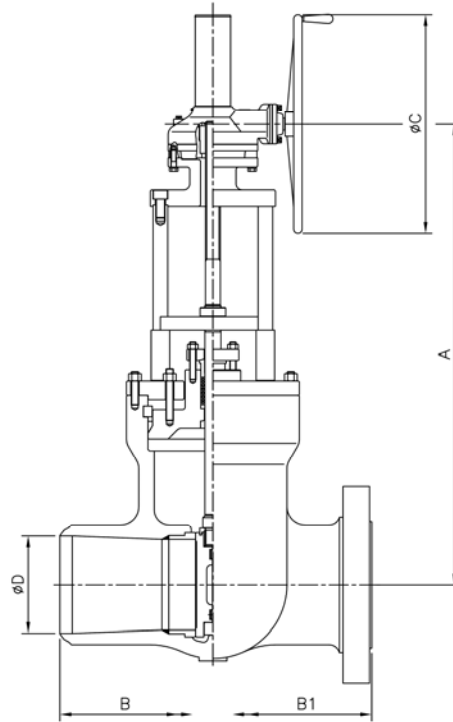
PARALLEL SLIDE GATE VALVE PRESSURE SEAL BONNET CARBON OR STAINLESS STEEL

ASME CLASS 900 , 2 1/2"-24"(DN65 - DN600)



Top Mounted Hand-wheel

Product Number : KKM00AFB, KKM00AFR
Valve Size : 65A(2 1/2") – 200A(8")



Side Mounted Hand-wheel

Product Number : KKG00AFB, KKG00AFR
Valve Size : 250A(10") – 600A(24")

Table 4. Cast Steel Parallel Slide Gate Valve Dimension (CLASS 900/PN150)

Nominal Size		A		B ⁽¹⁾		B1 ⁽²⁾		C		D		Weight (B.W/R.F)	
DN	in	mm	in	mm	in	mm	in	mm	in	mm	in	Kg	lb
65	2 1/2	495	19.49	254	10.00	419	16.50	250	9.84	53	2.09	45/55	99/121
80	3	650	25.59	305	12.00	381	15.00	350	13.78	70	2.76	80/92	176/203
100	4	810	31.89	356	14.00	457	18.00	400	15.75	92	3.62	140/185	309/408
150	6	1080	42.52	508	20.00	610	24.00	500	19.69	137	5.39	282/367	622/809
200	8	1260	49.61	660	26.00	737	29.00	500	19.69	178	7.00	410/560	904/1235
Top Mounted Hand-wheel													
Side Mounted Hand-wheel													
250	10	1205	47.44	787	31.00	838	33.00	500	19.69	238	9.37	694/860	1530/1896
300	12	1330	52.36	914	36.00	965	38.00	630	24.80	268	10.55	1027/1252	2264/2760
350	14	1500	59.06	991	39.00	1029	40.50	630	24.80	295	11.61	1213/1475	2674/3252
400	16	1625	63.95	1092	43.00	1130	44.50	710	27.95	338	13.31	1510/1885	3329/4156
450	18	1720	67.72	1219	48.00	1219	48.00	800	31.50	376	14.80	1750/2020	3858/4453
500	20	1840	72.44	1321	52.00	1321	52.00	800	31.50	418	16.46	2380/2680	5247/5908
600	24	2310	90.94	1549	61.00	1549	61.00	900	35.43	500	19.69	3650/4260	8047/9392

(1) Per ASME B16.10 Short pattern

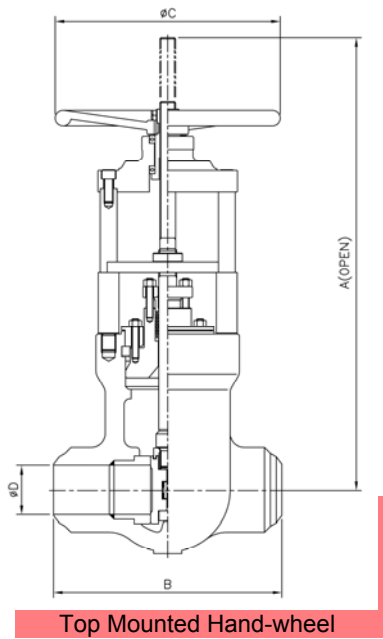
(2) Per ASME B16.10 Long pattern

• Flange dimensions on page 56

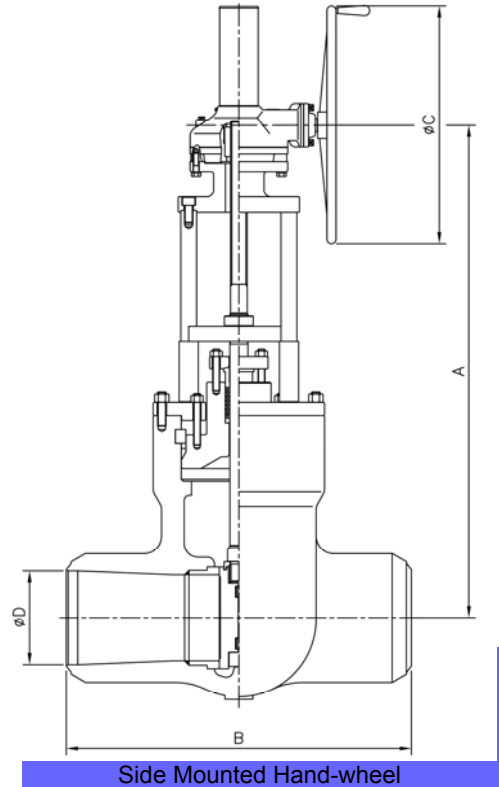
• Butt welding end dimensions on page 59

PARALLEL SLIDE GATE VALVE
PRESSURE SEAL BONNET
CARBON OR STAINLESS STEEL

ASME CLASS 1500 , 2 1/2"-24"(DN65 - DN600)



Product Number : KKM00AGB
 Valve Size : 65A(2 1/2") - 150A(6")



Product Number : KKG00AGB
 Valve Size : 200A(8") - 600A(24")

Table 5. Cast Steel Parallel Slide Gate Valve Dimension (CLASS 1500/PN250)

Nominal Size		A		B ⁽¹⁾		C		D		Weight (B.W)	
DN	in	mm	in	mm	in	mm	in	mm	in	Kg	lb
65	2 1/2	495	19.49	254	10.00	250	9.84	53	2.10	55	121
80	3	650	25.59	305	12.00	350	13.78	70	2.76	80	176
100	4	810	31.89	406	16.00	400	15.75	92	3.62	142	313
150	6	1095	43.11	559	22.00	500	19.69	137	5.40	350	772
Top Mounted Hand-wheel											
Side Mounted Hand-wheel											
200	8	1052	41.42	711	28.00	500	19.69	178	7.00	540	1190
250	10	1260	49.61	864	34.00	630	24.80	222	8.74	963	2123
300	12	1320	51.97	991	39.00	630	24.80	248	9.76	1182	2606
350	14	1395	54.92	1067	42.00	710	27.95	270	10.63	1410	3109
400	16	1660	65.35	1194	47.00	800	31.50	328	12.91	2230	4916
450	18	1705	67.13	1346	53.00	900	35.43	349	13.74	2915	6426
500	20	1890	74.41	1473	58.00	900	35.43	391	15.39	4040	8907
600	24	2020	79.53	1676 ⁽²⁾	66.00 ⁽²⁾	1000	39.37	468	18.43	6375	14054

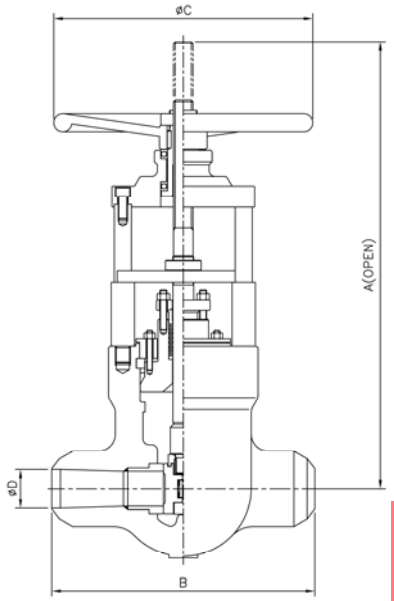
(1) Per ASME B16.10 Short pattern
 (2) Per ASME B16.10 Long pattern
 • Butt welding end dimensions on page 59
 • Alternatives are available on request.



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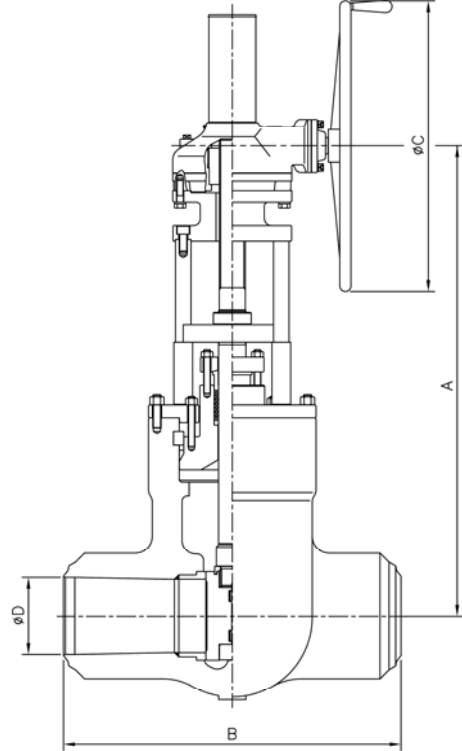
PARALLEL SLIDE GATE VALVE
PRESSURE SEAL BONNET
CARBON OR STAINLESS STEEL

ASME CLASS 2500 , 2 1/2"-24"(DN65 - DN600)



Top Mounted Hand-wheel

Product Number : KKM00AHB
 Valve Size : 65A(2 1/2") - 150A(6")



Side Mounted Hand-wheel

Product Number : KKG00AHB
 Valve Size : 200A(8") - 500A(20")

Table 6. Cast Steel Parallel Slide Gate Valve Dimension (CLASS 2500/PN420)

Nominal Size		A		B ⁽¹⁾		C		D		Weight (B.W)	
DN	in	mm	in	mm	in	mm	in	mm	in	Kg	lb
65	2 1/2	505	19.88	330	13.00	250	9.84	45	1.77	76	168
80	3	620	24.41	368	14.50	400	15.75	57	2.24	110	243
100	4	775	30.51	457	28.00	450	17.72	73	2.87	160	353
150	6	1055	41.53	610	24.00	500	19.69	104	4.10	446	983
Top Mounted Hand-wheel											
Side Mounted Hand-wheel											
200	8	975	38.38	762	30.00	630	24.80	146	5.75	615	1356
250	10	1145	45.08	914	36.00	710	27.95	175	6.90	1050	2315
300	12	1330	52.36	1041	41.00	800	31.50	219	8.60	1650	3638
350	14	1395	54.92	1181	44.00	800	31.50	241	9.50	1910	4211
400	16	1490	58.66	1245	49.00	900	35.43	260	10.23	2915	6426
450	18	1660	65.35	1397	55.00	900	35.43	293	11.53	3880	8554
500	20	1800	70.87	1473 ⁽²⁾	58.00 ⁽²⁾	1000	39.37	325	12.80	5250	11574

(1) Per ASME B16.10 Short pattern

(2) Dimension is manufacture standard.

- Butt welding end dimensions on page 59
- Alternatives are available on request.

FORGED STEEL PARALLEL SLIDE GATE VALVES SMALL SIZES Hi-Fluidic PSGV SERIES

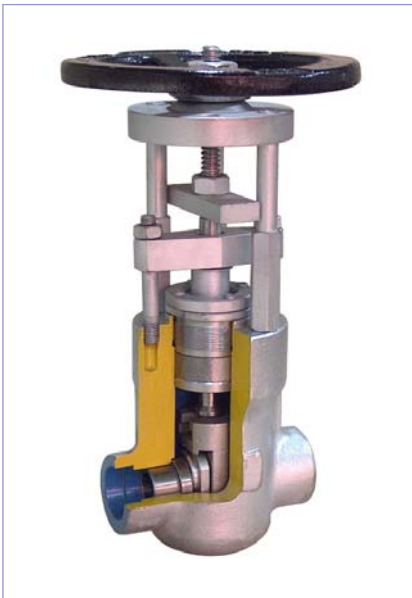


SMALL SIZES PARALLEL SLIDE GATE VALVE PRESSURE SEAL BONNET DIE FORGED CARBON, ALLOY OR STAINLESS STEEL

ASME CLASS 900/1500/2500/3500/4500, 1/2"-2"(DN15 - DN50)

Forged Steel Body

As compared with castings, forged steel valve bodies offer the advantages of more uniform structure, greater density, higher strength integrity, enhanced dimensional characteristics and closer dimensional tolerances.



Product Number : KJPM, KJPP



● Table 7. Materials of construction

BODY	A105	F22	F316
BONET	A105	F22	F316
DISK	SS410	SS410/SS431	SS316
STEM	SS410/HF	SS410/SS431/HF	SS316/HF
SEAT RING	CS+HF	F22+HF	SS136+HF
GASKET	Expanded Graphite	Expanded Graphite	Expanded Graphite
GUIDE FLANGE	SS410/GN-HT	SS410/GN-HT	SS304/GN-HT
YOKE	SS410	SS410	SS410
DISK HOLDER	CF8M	CF8M	CF8M

● Table 8. PSGV Standard Design Data - ASME CLASS 900/1500/2500/3500/4500, 1/2"-2"(DN15 - DN50)

Class	Valve Size (inch)	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
600 900 1500	DN (mm)	15	20	25	32	40	50
	Seat Diameter (mm)	12	15	20	31	31	45
	Stem Diameter (mm)	14	14	14	19	19	19
	Thread (TR)	12x3	12x3	12x3	16x4	16x4	16x4
	RUN (Turns)	7	7	9	9.4	9.4	13.4
	C _v (Flow Capacity)	5	7	19	71	71	180
2500	DN (mm)	15	20	25	32	40	50
	Seat Diameter (mm)	12	15	20	31	31	45
	Stem Diameter (mm)	14	14	16	19	19	22
	Thread (TR)	12x3	12x3	14x3	16x4	16x4	20x4
	RUN (Turns)	7	7	9	9.4	9.4	13.4
	C _v (Flow Capacity)	5	7	19	71	71	180
4500	DN (mm)	15	20	25	32	40	50
	Seat Diameter (mm)	10	10	15	19	19	25
	Stem Diameter (mm)	14	14	16	19	19	22
	Thread (TR)	12x3	12x3	14x3	16x4	16x4	20x4
	RUN (Turns)	5.5	5.5	7.5	6.7	6.7	8.5
	C _v (Flow Capacity)	3	3	7	16	16	39

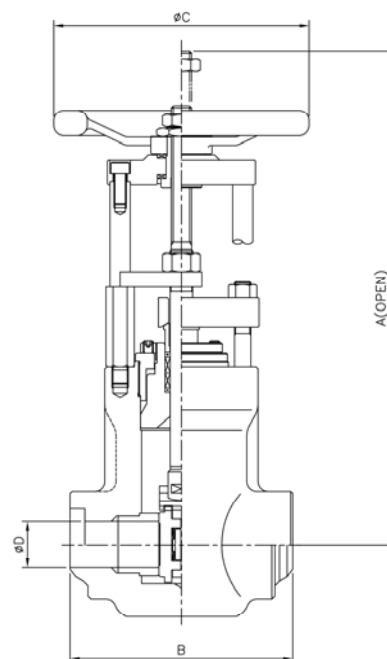
FORGED STEEL PARALLEL SLIDE GATE VALVES SMALL SIZES Hi-Fluidic PSGV SERIES - Dimension



Key Valve Technologies Ltd.

SMALL SIZES PARALLEL SLIDE GATE VALVE PRESSURE SEAL BONNET DIE FORGED CARBON, ALLOY OR STAIN- LESS STEEL

ASME CLASS 900/1500/2500/3500/4500, 1/2"-2"(DN15 - DN50)



Product Number : KJPM, KJPP

● **Table 9.** Forged Steel Parallel Slide Gate Valve Dimension (CLASS 900/1500/2500/3500)

Nominal Size		CLASS	A		B ⁽¹⁾		C		D		Weight	
DN	in		mm	in	mm	in	mm	in	mm	in	Kg	lb
15	1/2	900/1500	285	11.22	117	4.61	175	6.89	12	0.47	8	18
		2500/3500	298	11.73	130	5.12	175	6.89	12	0.47	10	22
20	3/4	900/1500	285	11.22	117	4.61	175	6.89	15	0.59	8	18
		2500/3500	298	11.73	130	5.12	175	6.89	15	0.59	10	22
25	1	900/1500	308	12.13	130	5.12	175	6.89	20	0.79	10	22
		2500/3500	335	13.19	165	6.50	200	7.87	20	0.79	16	35
32	1 1/4	900/1500	384	15.12	165	6.50	200	7.87	31	1.22	16	35
		2500/3500	435	17.13	203	7.99	250	9.84	31	1.22	30	66
40	1 1/2	900/1500	384	15.12	165	6.50	200	7.87	31	1.22	16	35
		2500/3500	435	17.13	203	7.99	250	9.84	31	1.22	30	66
50	2	900/1500	468	18.43	203	7.99	250	9.84	45	1.77	28	62
		2500/3500	485	19.09	218	8.58	250	9.84	45	1.77	40	88

● **Table 10.** Forged Steel Parallel Slide Gate Valve Dimension (CLASS 4500)

Nominal Size		A		B ⁽¹⁾		C		D		Weight	
DN	in	mm	in	mm	in	mm	in	mm	in	Kg	lb
15	1/2	298	11.73	130	5.12	175	6.89	10	0.39	14	31
20	3/4	298	11.73	130	5.12	175	6.89	10	0.39	14	31
25	1	335	13.19	165	6.50	200	7.87	15	0.59	22	49
32	1 1/4	435	17.13	203	7.99	250	9.84	19	0.75	35	77
40	1 1/2	435	17.13	203	7.99	250	9.84	19	0.75	35	77
50	2	485	19.09	218	8.58	250	9.84	25	0.98	46	101

(1) Dimensions are manufacture standard

- Butt welding end dimensions on page 59
- Socket welding dimensions on page 62
- Alternatives are available on request.

FORGED STEEL PARALLEL SLIDE GATE VALVES
Hi-Fluidic PSGV SERIES 2½"-24"



Hi-Fluidic®

**PARALLEL SLIDE GATE VALVE, PRESSURE SEAL BONNET
 FORGED CARBON, ALLOY OR STAINLESS STEEL**

ASME CLASS 1500/2500, 2½"-24"(DN65 - DN600)

FEATURES	
DESIGN	CONSTRUCTION PRESSURE SEAL BONNET AND INTEGRAL BACKSEAT
OPTIONS	AUXILIARY CONNECTIONS AND/OR PROTECTION AGAINST FLUID THERMAL EXPANSION
OPERATION	HANDWHEEL - GEARBOX (RECOMMENDED FOR ITEMS WITH *) - ELECTRIC OR PNEUMATIC ACTUATOR
ACCESSORIES	LIMIT SWITCHES - LOCKING DEVICE - POSITION INDICATOR - STEM COVER (OTHERS ON REQUEST)
MATERIALS	BODY / BONNET SA105 - SA216 WCB - SA217 WC6 - SA217 WC9 - SA217 C12A (OTHERS ON REQUEST)
DESIGN	ASME B16.34 - (BS-EN 10434) - API 600 - EN 12516
BUTTWELDING ENDS	ASME B16.25 - DIN-EN 9692-1 - EN 12627
END-TO-END / FACE-TO-FACE DIM	ASME B16.10 - EN 12982 / EN 558-2
PRESSURE TESTING	ASME B16.34 - API 598 - DIN 3230 - EN 12266



 **Key Valve Technologies Ltd.**
www.keyvalve.com

FORGED STEEL PARALLEL SLIDE GATE VALVES Hi-Fluidic PSGV SERIES 2½"-24"



Key Valve Technologies Ltd.

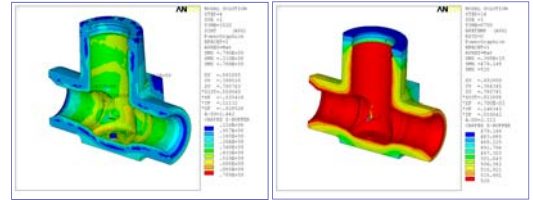
Hi-Fluidic®

PARALLEL SLIDE GATE VALVE , PRESSURE SEAL BONNET FORGED CARBON, ALLOY OR STAINLESS STEEL

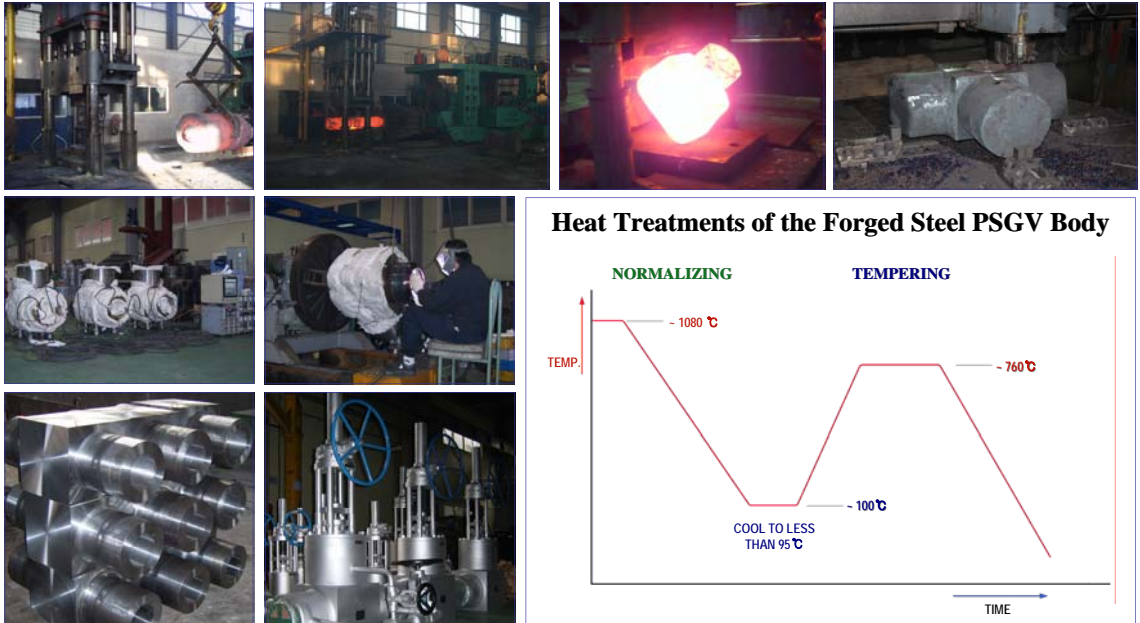
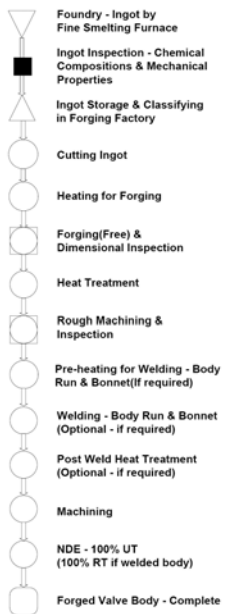
ASME CLASS 1500 / 2500, 2½"-24"(DN100 - DN600)

Hi-Fluidic® Forged Steel PSGV

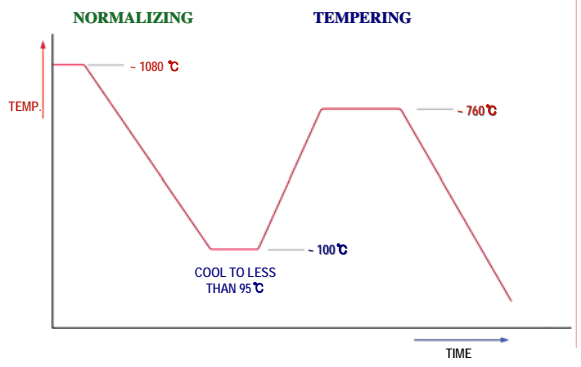
When compared with castings, forged valve bodies offer the advantages of more uniform structure, greater density, higher strength integrity, enhanced dimensional characteristics and closer dimensional tolerances.



Forged Valve Body Manufacturing Process



Heat Treatments of the Forged Steel PSGV Body



● **Table 11. Forged Steel PSGV Standard Design Data**

Class	Valve Size (inch)	2.5"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
1500	DN (mm)	#	80	100	150	200	250	300	350	400	450	500	#
	Seat Diameter (mm)		64	86	125	167	207	248	268	310	349	383	
	Stem Diameter (mm)		28	32	40	42	50	52	62	70	80	90	
	Thread (TR)		26×5	28×5	36×6	38×6	46×8	48×8	58×9	65×10	75×10	85×12	
	RUN (Turns)		14.8	20.0	22.9	30.2	28.2	33.8	32.2	33.5	37.7	34.4	
	Cv (Flow Capacity)		410	765	1,675	3,080	4,840	7,065	8,310	11,280	14,465	17,580	
2500	DN (mm)	65	80	100	150	200	250	300	350	#	450	#	
	Seat Diameter (mm)	45	54	69	104	138	173	210	226		286		
	Stem Diameter (mm)	28	32	36	42	50	52	62	70		90		
	Thread (TR)	26×5	28×5	34×6	38×6	46×8	48×8	58×9	65×10		85×12		
	RUN (Turns)	11.0	13.2	13.8	20.4	19.4	24.5	25.8	25.4		26.6		
	Cv (Flow Capacity)	195	285	480	1,140	2,065	3,315	4,980	5,810		9,525		

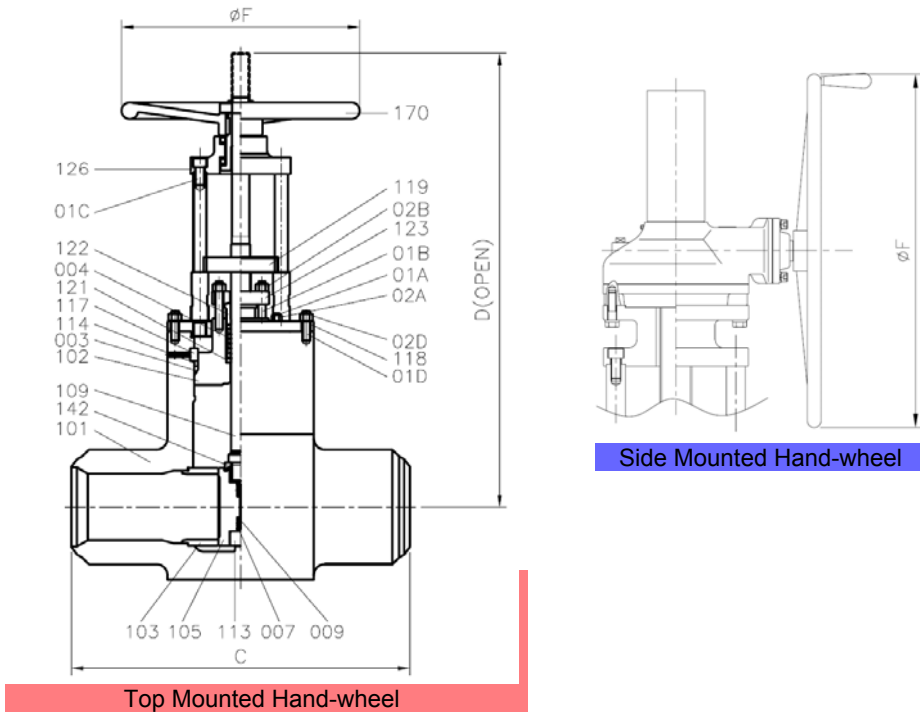
Consult Factory and for Other Classes or Sizes, Materials.

FORGED STEEL PARALLEL SLIDE GATE VALVES

Hi-Fluidic PSGV SERIES 2½”-24”



MATERIALS				
101 BODY	ASTM A105	1)SEE BELOW	102 BONNET	ASTM A105
103 SEAT RING	ASTM A105 + STELLITE		105 DISC	ASTM A105 + STELLITE
109 STEM	ASTM A276 - 410		121 PACKING RING	ASTM A276 - 410
114 THRUST GUIDE RING	13CR		117 SEGMENTAL THRUST RING	13CR
122 GLAND	ASTM A276 - 410		123 GLAND FLANGE	ASTM A105
170 HANDWHEEL	NODULAR CAST IRON		004 STEM PACKING	GRAPHITE
003 GASKET	GRAPHITE		YOKE SLEEVE	B148
BOLT / NUT	ASTM A193 B7 / A194 2H			



● **Table 12.** Forged Steel Parallel Slide Gate Valve Dimension (CLASS 1500/2500)

Nominal Size		CLASS	C		D		F	
DN	inch		mm	Inch	mm	inch	mm	inch
150	6"	1500	559	22	1,095	43	500	20
		2500	610	24	1,055	42	500	20
Top Mounted Hand-wheel								
Side Mounted Hand-wheel								
200	8"	1500	711	28	1,052	41	500	20
		2500	762	30	975	38	630	25
250	10"	1500	864	34	1,260	50	630	25
		2500	914	36	1,145	45	710	28
300	12"	1500	991	39	1,320	52	630	25
		2500	1,041	41	1,330	52	800	31
350	14"	1500	1,067	42	1,395	55	710	28
		2500	1,118	44	1,395	55	800	31
400	16"	1500	1,194	47	1,660	65	800	31
		2500	1,245	49	1,490	59	900	35
450	18"	1500	1,346	53	1,705	67	900	35
		2500	1,397	55	1,660	65	900	35
500	20"	1500	1,473	58	1,890	74	900	35
		2500	1,473	58	1,800	71	1,000	39
600	24"	1500	1,676	66	2,020	80	1,000	39

● Butt welding end dimensions on page 59

1) Alternatives (Materials and Sizes, Classes) are available on request.



Design Features of Spring Pack Loaded (SPL)

- **Hi-Fluidic[®]** Parallel Slide Gate Valves (PSGV) are designed for more reliable seating tightness and valve operation in fluid flow control. As a final control component the reliable tight shutoff function in the valve is one of the most important control factors.
KVT introduces a long lifetime of the valves with freedom from most problems. Each PSGV in this brochure is based on the principles of parallel slide gate design with independent discs; wide flat seats, variable numbers of spring pack to be allowed proper seating forces and a sharp shaped edge on the discs.
More than just assuring fluid seating tightness, KVT PSGV design provides freedom from sticking or binding results by thermal effects associated with wedge gate valves.
- No tendency to mark, notch or indent the seating surfaces, even in presence of girth and positive contacting loads, because parallel slide gate valves close with a sliding action, not by compression. This results in better tightness and a longer maintenance free lifetime of the discs/seats seating surfaces.
- Wide flat seating surface of the discs with face to face have a cleaning action with intimate contact on the seats during the closing action.
Any polluted impurities on the seats/discs are eliminated and the seating contact is free from undesirable particles. It also reduces seat bearing stress and guarantees long life. The wide flat seating can minimize the effect of minor damage to the surface as seating occurs over the entire surface.
- Since seating is obtained by sliding, not by compression, there is no need for final surge of torque to make the seating leak tightly. No additional power is required for the first effort in unseating the discs.
Therefore, actuator size of the parallel slide gate valve can be much smaller than the wedge type. Also hammering or impacting hand-wheels are not usual on the parallel slide gate valves.
- Because of the low required torque in operation, the stress and fatigue on the trim is less on parallel slide gate valves which results in longer lifetime and greater leak tight reliability.
- Since seating is obtained by sliding, not by compression, the exact position of stem is not critical when the valve is closed. As a result, there is no problem with the differences of the thermal expansion coefficient of the materials. Also the actuators can be stopped with general position switches.
- It is possible that wedge gate valves have a tendency to jam as a result of body contraction, if they are closed while hot, and cooled afterwards. Undesirable malfunction like this never occurs with parallel slide gate valves.
- In wedge gate valves, the wedge must have positioning guides on its sides to keep it in line while closing under full flow condition. These guides are not usually made of any hard material, and tend to wear, and eventually may cause jamming. This never occurs in KVT designed parallel slide gate valves, as the disc is guided only by its Stellite[®] Hard-faced seating surface.

Another Advantages of SPL Parallel Slide Gate Valve

The unique SPL (Spring Pack Loaded) disc or gate unit comprises all of the operating parts of sliding discs. No wedging effects and much smaller contacting stresses on the seating mechanism. In high temperature service and high pressure service, the valve is never subjected to thermal binding since the SPL gate trim unit absorbs irregular thermal expansion due to the structural discontinuity of valve body.

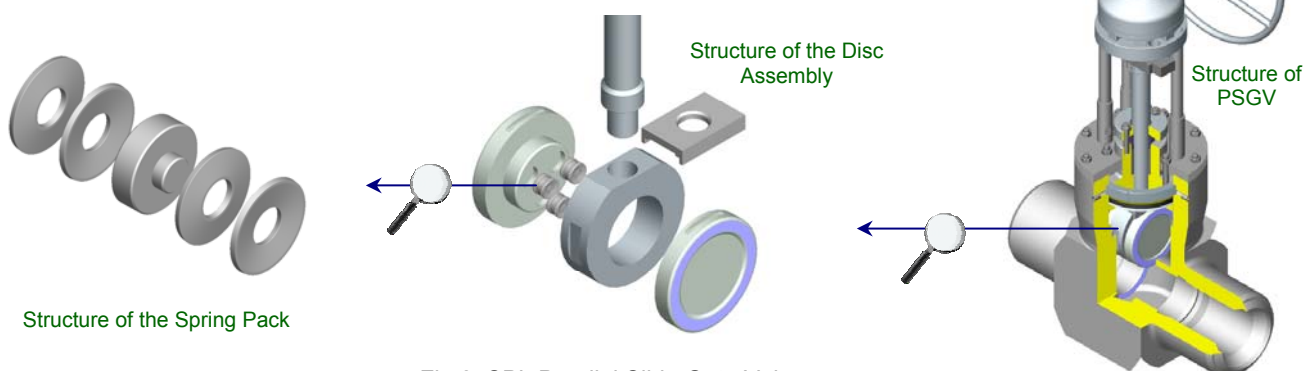


Fig.2 SPL Parallel Slide Gate Valve

PARALLEL SLIDE GATE VALVES - Operating Tips & Caution



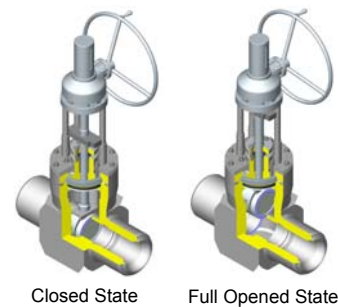
To avoid the seat wear problems, the disc and seat are hard-faced to keep a different hardness with Stellite® #6 and Stellite® #12 respectively. Remarkable different hardness is kept to minimize a galling & its built-up effects on sliding metal surfaces. It results in long life cycle of the valve.

The SPL centralized Inconel® cone springs which distribute uniformly loading on both seats as well as compensating for irregular expansion of seats and seat wear. Also the precision guiding system in gate trim unit and stem connection eliminate vibration (due to flow turbulence) of gate trim unit even the disc position in partially open. KVTs' SPL parallel slide gate valves can be flow throttling in any form of flowing condition.

Operating Tips and Cautions of SPL Parallel Slide Gate Valves

Operating Tips for long life service the parallel slide gate valves

- Operate the valves at least every three months.
- Keep the stem clean and lubricated (to avoid the corrosion of valves).
- Inspect the valves regularly per service importance level predefined.
- Lap seats promptly if the valve leaks.
- Do not use the hammer blow and/or impacting leverages.
- Check the packing regularly.



General Cautions when operating the parallel slide gate valves

Since open/close thrust of the parallel slide gate valves is remarkably lower than other types of gate valves, no need to use hammer blow hand wheel or big sized hand wheel or impact type leverage. Also do not over torque the stem and watch carefully the stopper not bent when the stopper reaches the yoke pillars.

In case of electric motor actuated valves, a torque value calculated is only determined to select an appropriate size of motor actuator. The limits of stem travel are determined solely by limit switches.

Only allows limit switch setting for closed position (seating position) and for open position will be set with torque switch in electric motor actuator.

At all the times it is never necessary to use extra force at the end of the stroke to make seal for parallel slide gate valves.

For valves fitted with a bypass, which are electrical actuated, the motor actuated operators shall be sequenced as following cycles,

- With main and bypass closed, it shall not be possible to open the main valve until the bypass valve has been opened.
- When main valve has opened fully, the bypass valve shall be closed automatically.
- With the main valve open, the signal for it to close shall be automatically cause the bypass valve to open.
- When the main valve reaches the shut position fully, the bypass valve shall be automatically closed and then the cycles will be completed.

For valves fitted with a pressure equalizing valve in addition to the normal bypass valve, the equalizing valve is manually operated and is locked in the open position during normal operation.

Bypass Valves, Equalizing Valves, and Equalizing Devices

Bypass valves are used to reduce the traversing differential pressure across the valve seat.

This reduces the size of the operating device force, resulting in considerable savings. Also bypass valve provides convenient means for the initial warming through pipe line.

Equalizing devices are used to relieve the fluid trapped between the seat faces, and provide outlet for the fluid displaced by the valve stem traversing to the shut position in non compressible fluid such as boiler feed water system.

Also the equalizing devices are useful for steam service due to steam condensation.

When bypass valve be used, it provides a fitting for an equalizing connection from main valve, through the bypass and to the main line.

For equalizing inside of the valve a hole (drilled hole in seat or disc) or connecting flow passage on the trim can be used as an equalizing device. Alternatively, relief valve mounted on bonnet is used to relieve the high pressurized trappings.



Key Valve Technologies Ltd.

Equalizing & Bypassing Devices

WEDGE GATE AND PARALLEL SLIDE GATE VALVES FAIL TO OPEN

under certain process conditions may be attributed to an increase in the required un-wedging thrust to open the valve due to the following phenomena:



Figure 3 3-Way Center Cavity Automatic Balancer Valves.

OVER PRESSURIZATION

may result when liquid, entrapped in the center cavity of valves, is heated.

- The trapped fluid expands and the resultant increase in pressure may make the valve inoperable. In extreme cases, a breach of the pressure boundary may occur.
- Each 1°F rise in temperature results in a pressure increase of 150 psi.
- Over pressurization may occur in both pressure seal and bolted bonnet type valves and is not restricted to valve size.
- A length of pipe isolated at both ends by a valve may also suffer from over pressurization.

PRESSURE LOCKING

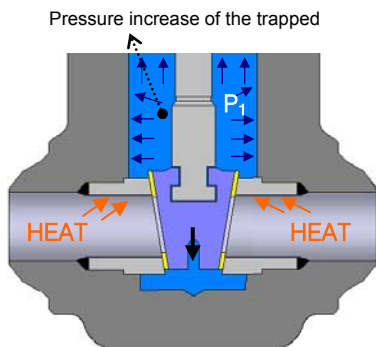
when P_1 is significantly larger than P_a or P_b , pressure locking occurs.

- The potential for **pressure locking** is greater in parallel slide valves (double disc gate) due to the effective area on which the entrapped pressure acts.

THERMAL BINDING

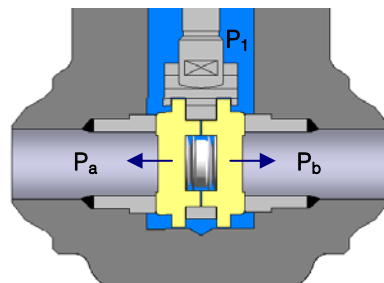
may occur in wedge type gate valves between the wedge and seats due to temperature differential between inlet and outlet of the valve, when the valve was closed hot and the system cools down.

- It may make the valve inoperable.
- The stem expansion and other stresses, mechanical or thermal, may also contribute as valve bodies are not rigid.
- Thermal binding is more common in high temperature applications.
- While wedge type gate valves are susceptible to thermal binding, **parallel slide valves are not.**



P_1 = Pressure of trapped liquid between seats

Fig.4 Over-Pressurization



P_1 = Pressure of trapped liquid between seats
 P_a or P_b = Line Pressure

Fig.5 Pressure Locking

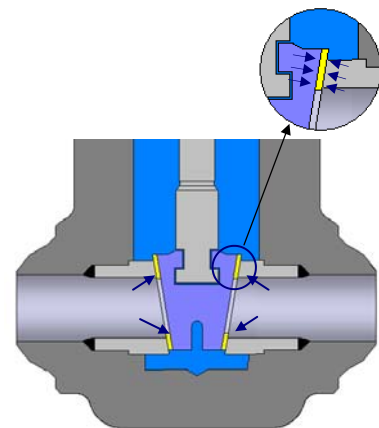


Fig.6 Thermal Binding

RECOMMENDATIONS

1. OVERPRESSURIZATION AND PRESSURE LOCKING

After evaluating and determining that the potential for problems exist, the solution for over-pressurization and pressure locking is to provide pressure relief from the body cavity. This can be done in several ways:

- An internal hole in the disc face (Fig. 7), or in the seat (Fig. 8), connecting the body cavity to the high pressure side of the valve. The valve however will seal only in one direction.
- An equalizing-pipe and equalizing-valve (Fig. 9), connecting the body cavity to the high pressure side of the valves, the valve must be open to provide relief.
- Relief valve (Fig. 10 & 11), connecting the body cavity to the atmosphere, is another way to provide pressure relief, however the exhaust from the self-activating type relief-valve must be piped to a safe location.

Caution must be used when opening the drain type relief-valve.

2. THERMAL-BINDING (Fig. 12)

- Bypass-pipes and a valve will allow warm up of both sides of the wedge. (Warm-up lines located far away from the valve do not have a significant impact on thermal equalization.)

3. COMBINED EFFECTS OF OVERPRESSURIZATION

PRESSURE LOCKING AND THERMAL BINDING (Fig. 13-16)

When evaluation determines that thermal binding may exist in combination with over-pressurization and/or pressure locking, the solution will require combination of both equalizing and bypass pipes and valves.

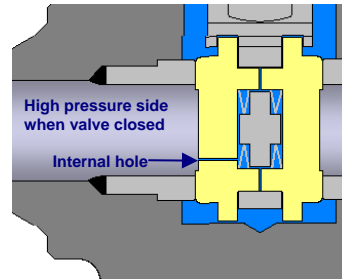


Fig. 7

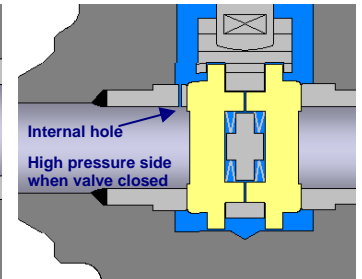


Fig. 8

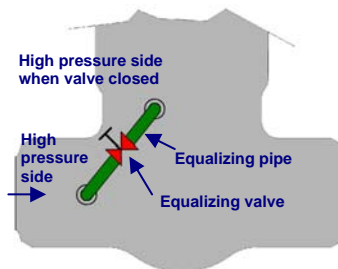


Fig. 9

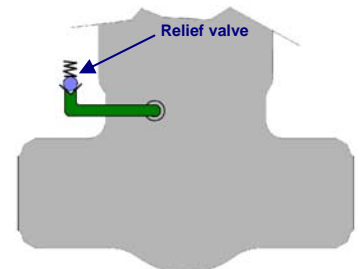


Fig. 10

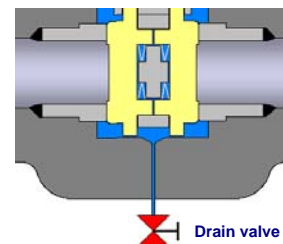


Fig. 11

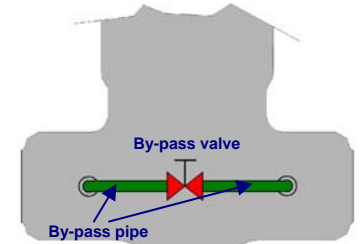


Fig. 12

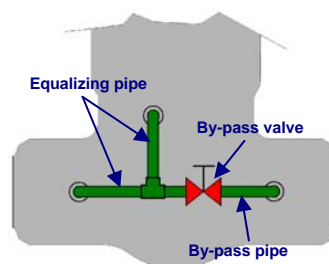


Fig. 13

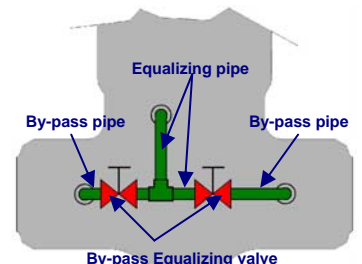


Fig. 14

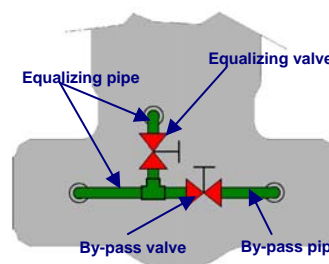


Fig. 15

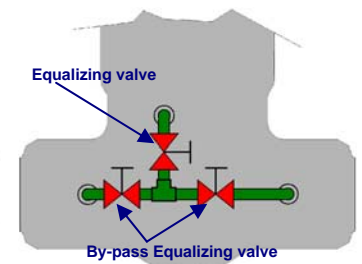


Fig. 16



Key Valve Technologies Ltd.

Equalizing & Bypassing Devices

4. OTHER RECOMMENDATIONS

- Verify the process to see if ΔT between closing and opening can be reduced.
- After closing a wedge type gate valve, back up the stem (1/8" to 1/4" turn) to allow room for stem expansion. This is only practical in manual valves or electronically controlled motor operated valves.
- Adequate pipe supports can reduce piping stresses.
- Stroke the valves a few times, immediately after closure, if practical, to allow for wedge to warm up, or close valve slowly.
- Under exceptional circumstances for electrically actuated valves opt for position seating instead of torque seating on closure. This must be discussed with the KVT for warranty considerations.
- Consider the use of parallel slide gate valves, which are not subject to thermal binding.
It is, however important to realize that they are more susceptible to pressure locking, higher seat wear, as well as difficulties in positive seating at low pressures.
- Contact the KVT for specific design solutions.

3-WAY CENTER-CAVITY AUTOMATIC BALANCER

We offer a self-actuating pressure-relief device, connected to the body cavity and the inlet/outlet of the valve.

Description of Operation,

Port **A** is connected to one valve pipe side.

Port **B** is connected to the body centre cavity.

Port **C** is connected to the other valve pipe side.

High Pressure on the "A" Port Side: (Figure 14)

- The shuttle is pushed to seat on the LP side.
- The pressure is then equalized between the HP side "A" and the body cavity "B".

High Pressure on "B" Port (Body Cavity):

- The pressure will escape to "A" port, preventing overpressure build-up in the body cavity.

Reverse Pressure: (Figure 15)

- The shuttle is pushed to seat on the Low Pressure side.
- The pressure is then equalized between the High Pressure side "C" and the body cavity "B".

High Pressure on "B" port (Body Cavity):

- The pressure will escape to the "C" port, preventing overpressure build-up in the body cavity.

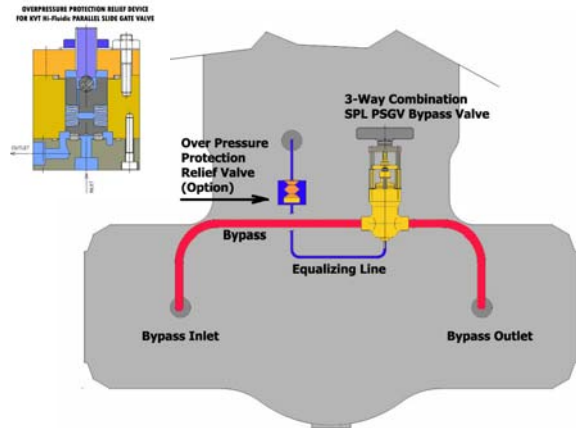


Fig. 12 3-Way Center Cavity Balancer Valve.



Fig. 13: 3-Way Center Cavity Automatic Balancer Valve.

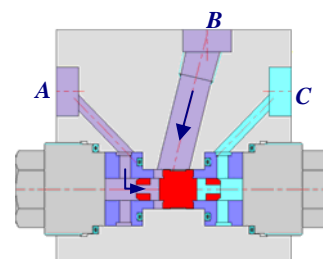


Fig. 14 Cut showing the check valve operation.

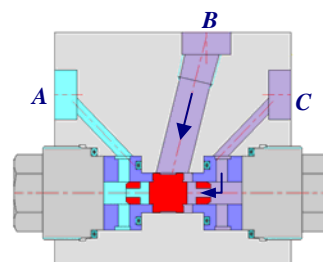


Fig. 15 Cut showing the check valve operation.

Bypassing Devices

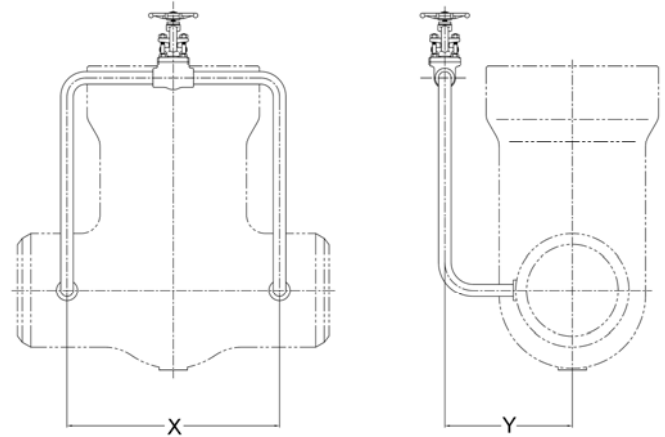
Bypasses - MSS SP 45

Bypasses are used in steam service for warming up before the main line is opened and for balancing pressure where the lines are of limited volume. Bypasses are attached at the side of the main valve with the steam of both valves parallel, pointing vertically upward as shown right.

When other Bypass configuration are required, a sketch or drawing must accompany the order.

By-pass and Drains usually can be supplied as required.

Sample as below photo.



Bypass Sizes & Dimensions

Class	Main Valve Size (NPS)	X		Y		Bypass Size (NPS)	
		inch	mm	inch	mm		inch
300	16		395	15.55	580	22.83	1
	18		445	17.52	700	27.56	1
	20		475	18.70	700	27.56	1
	24		505	19.88	750	29.53	1
	30		535	21.06	800	31.50	1
	36		565	22.24	850	33.46	1
600	10		300	11.81	530	20.87	1
	12		360	14.17	580	22.83	1
	14		380	14.96	580	22.83	1
	16		420	16.54	660	25.98	1
	18		465	18.31	730	28.74	1
	20		495	19.49	970	38.19	1
900	24		525	20.67	1200	47.24	1
	8		315	12.40	500	19.69	3/4
	10		340	13.39	530	20.87	1
	12		375	14.76	580	22.83	1
	14		395	15.55	660	25.98	1
	16		420	16.54	730	28.74	1
1500	18		480	18.90	750	29.53	1
	20		540	21.26	850	33.46	1
	8		305	12.01	400	15.75	3/4
	10		335	13.19	420	16.54	1
	12		370	14.57	520	20.47	1
	14		390	15.35	570	22.44	1
2500	16		445	17.52	650	25.59	1
	18		500	19.69	670	26.38	1
	20		560	22.05	700	27.56	1
	6		290	11.42	420	16.54	3/4
	8		350	13.78	430	16.93	3/4
	10		390	15.35	510	20.08	1
3500	12		450	17.72	600	23.62	1
	14		450	17.72	700	27.56	1
	16		500	19.69	750	29.53	1
	18		550	21.65	800	31.50	1
	6		370	14.57	340	13.39	3/4
	8		420	16.54	500	19.69	3/4
	10		450	17.72	550	21.65	1





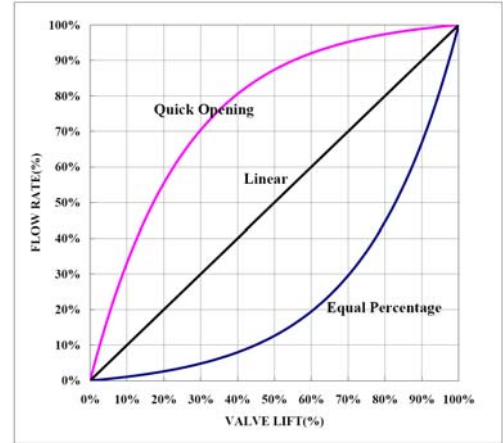
Key Valve Technologies Ltd.

Parallel Slide Gate Control Valves

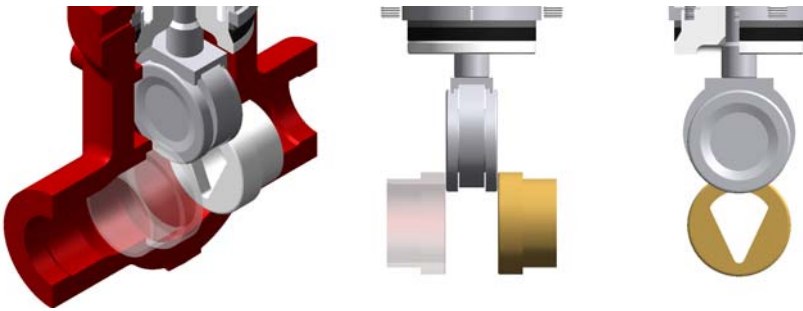
Parallel Slide Gate Control Valves;

These are the stop valves added control valve function. Usually the seat on outlet has the flow cross shape by flow characteristics flow. It has the advantage to combine with one. But it is not proper to control the flow rate frequently or high velocity flow.

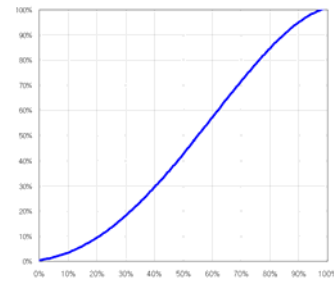
Parallel Slide Gate Control Valves can be supplied as required flow characteristics in reduced trim.



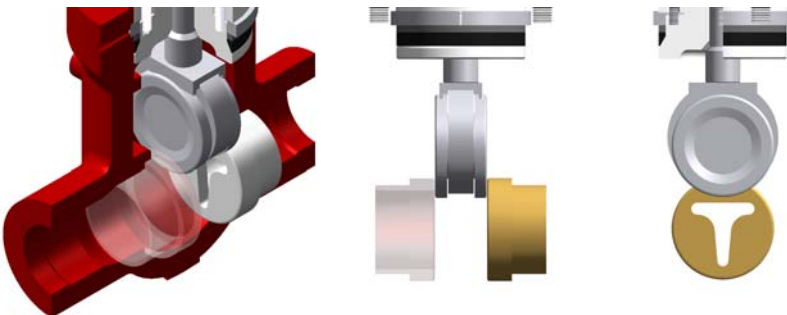
Parallel Slide Gate Control Valves



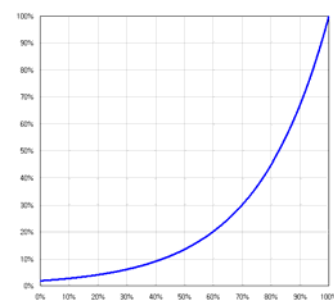
- Linear Characteristic



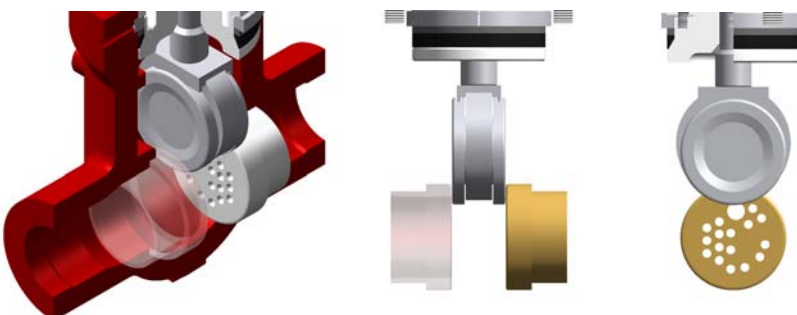
Parallel Slide Gate Control Valves



- EQ% Characteristic



Parallel Slide Gate Control Valves



- Pressure Let-Down



FORGED STEEL SWING CHECK VALVES

Hi-Fluidic SERIES



Hi-Fluidic®

FORGED STEEL SWING CHECK VALVE, PRESSURE SEALED BONNET

ASME CLASS 1500/2500, 6"-24" (DN150 - DN600) - Custom Designed available Sizes: 2.5" - 36"

Check valves are used for prevention of fluid flow reversal. Two typical reverse-flow prevention applications are at pump discharge and at places where different portions of a piping joint a common header.

STRUCTURE & PARTS of SWING CHECK VALVE

SWING CHECK DESIGN FEATURES :

Hinge Pin

Stellite® hard faced bearings for hinge pin. A sturdy disc hinge moves on four Stellite® bearings, supporting the hinge pin and preventing binding.

Cover

Easy in-line service; Once the covers are removed, all parts are easily accessible for maintenance. Seating faces can be re-lapped.

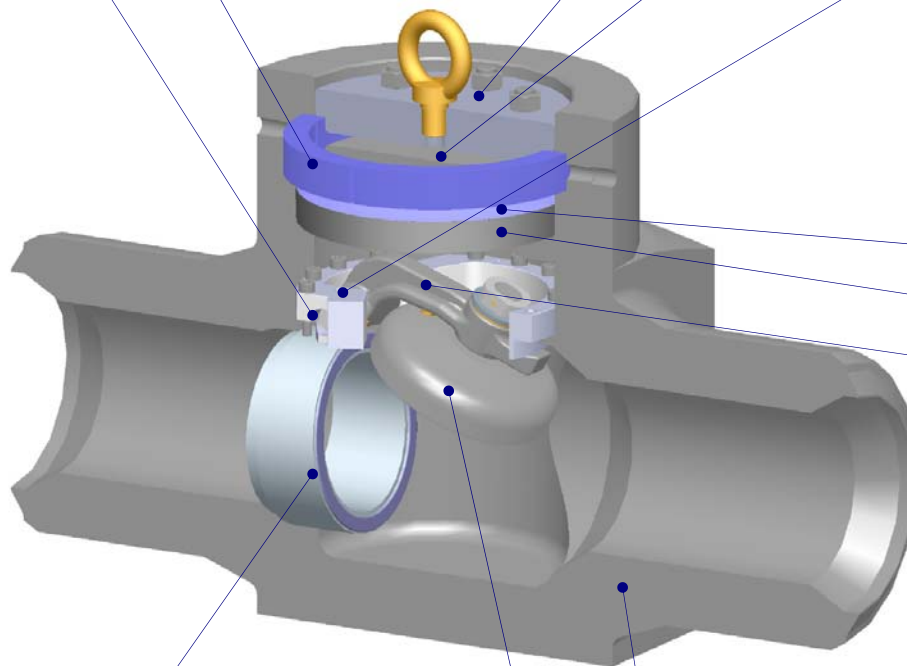
Compact cage unit; All moving parts are attached to the carrier and can be removed easily for service.

No penetration of hinge pin to outside in small sizes. Eliminates pin seal leakage and provides in-line service.



Segmental Thrust Ring

Bonnet

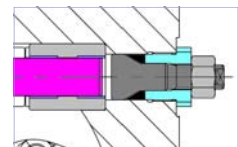


Thrust Guide Ring

Pressure Seal Gasket

Disc Arm

Complete non-leakage of the hinge pin to outside by applied pressure seal gasket for high pressure. Eliminate the friction of hinge pin and body to outside and prevent a leakage through the hinge pin.



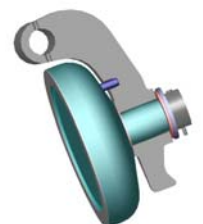
Forged Steel Body

Seat

Forged seat is Stellite® hard-faced, ground and lapped to a mirror finish for maximum erosion resistance and long service life. It is seal-welded to the body.

Disc

Disc has a Stellite® hard-faced seat lapped to a mirror finish and accurately guided into seat contact. Disc can partially rotate for tight shutoff. In the fully open position, it rests against a stop.



FORGED STEEL SWING CHECK VALVES Hi-Fluidic SERIES



Key Valve Technologies Ltd.

Hi-Fluidic®

FORGED STEEL SWING CHECK VALVE, PRESSURE SEALED BONNET

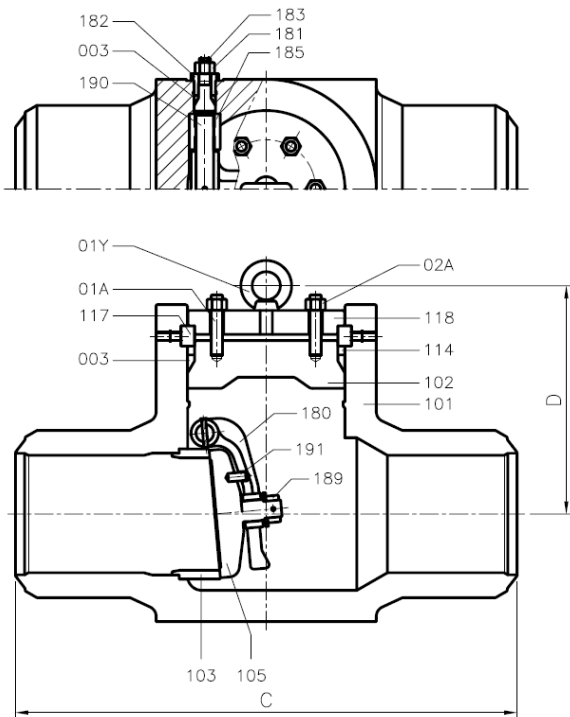
ASME CLASS 1500/2500, 6"-24" (DN150 - DN600)

FEATURES

DESIGN CONSTRUCTION SWING CHECK VALVE WITH PRESSURE SEALED BONNET
ALTERNATIVES TILTING DISC OR SPRING ASSISTED PISTON TYPE CHECK VALVES
OPTIONS AUXILIARY CONNECTIONS
ACCESSORIES WEIGHT AND DASHPOT (OTHERS ON REQUEST)

MATERIALS BODY / BONNET SA105-SA216 WCB (OTHERS ON REQUEST)

DESIGN ASME B16.34 - (BS-EN 10434) - API 600 - EN 12516
BUTTWELDING ENDS ASME B16.25 - DIN-EN 9692-1 - EN 12627
END-TO-END / FACE-TO-FACE DIM ASME B16.10 - EN 12982 / EN 558-2
PRESSURE TESTING ASME B16.34 - API 598 - DIN 3230 - EN 12266



MATERIALS

101 BODY	ASTM A105 (OR ALLOYS)
102 BONNET	SA216 WCB
103 SEAT RING	ASTM A105 + STELLITE
105 DISC	ASTM A216 WCB + STELLITE
114 THRUST GUIDE RING	ASTM A276 - 410
117 SEGMENTAL THRUST RING	ASTM A276 - 410
118 COVER	ASTM A216 WCB
180 HINGE	ASTM A216 WCB
185 BEARING BLOCK	ASTM A276 410 + STELLITE
189 DISC NUT	ASTM A194 2H
190 HINGE PIN	ASTM A276 431 + H.T
191 STOP PIN	ASTM A276 - 410
003 GASKET	GRAPHITE + 304
01A/02A BONNET BOLT / NUT	ASTM A193 B7 / A194 2H

Nominal Size		CLASS	C		D	
DN	inch		mm	inch	mm	inch
150	6"	1500	559	22	301	
		2500	610	24	281	
200	8"	1500	711	28	325	
		2500	762	30	305	
250	10"	1500	864	34	458	
		2500	914	36	450	
300	12"	1500	991	39	488	
		2500	1,041	41	484	
350	14"	1500	1,067	42	550	
		2500	1,118	44	545	
400	16"	1500	1,194	47	650	
		2500	1,245	49	640	
450	18"	1500	1,537		685	
		2500	1,397	55	670	
500	20"	1500	1,664		718	
		2500				
600	24"	1500	1,943		800	

- Butt welding end dimensions on page 59
- Alternatives are available on request.

FORGED STEEL SWING CHECK VALVES WITH ASSISTANCE ACTUATOR

Hi-Fluidic SERIES



Hi-Fluidic®

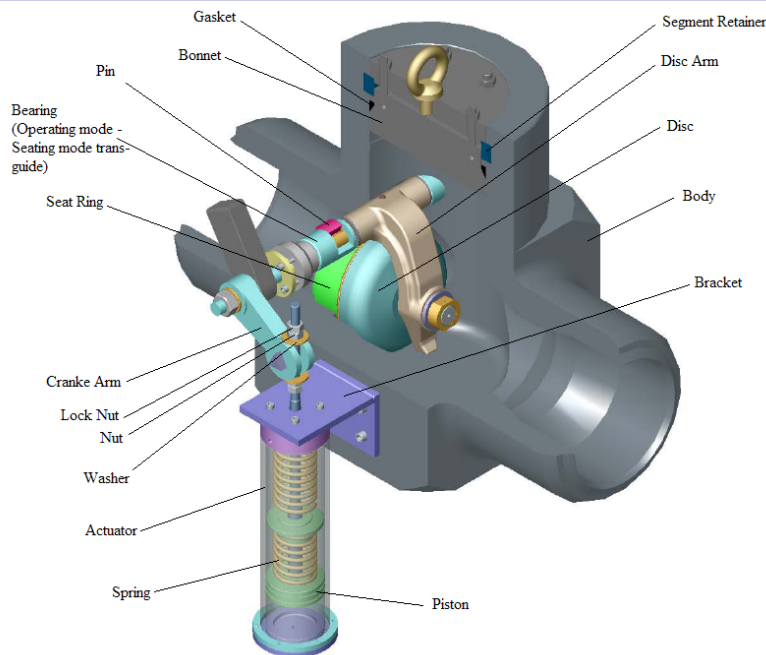
FORGED STEEL SWING CHECK VALVE, PRESSURE SEALED BONNET WITH ASSISTANCE ACTUATOR

ASME CLASS 1500/2500, 6"-24"(DN150 - DN600)

Check valves usually are installed at outlet of a centrifugal pump to prevent reverse-flow of fluid from a higher elevation when the pump is not operating on. Reverse-flow causes the pump impeller to turn backward at a higher than normal speed, with possible damage to the pump. Although swing check valves can be used at the various applications because it has low pressure drop, It doesn't useful when the length is short between the pump and check valve or when the pump is trip. Therefore these ask for more positive closing acting check valve with assistance actuator. The needs of positive closing have the area of applications as high pressure boiler feed pumps operating at high speed and low inertia and protection to extraction steam turbine.

Hi-Fluidic® forged steel swing check valves with assistance actuator have satisfied this function. When the piston of the closing cylinder is pushed upward by air pressure, the disc assembly of the valve is free to swing from a closed to a wide open position solely in response to feed water flow. Disc movement is completely independent of the shaft. The stop on the back of the disc holds it at a slight incline into the flow when the valve is wide open. Normal velocities swing the disc to the full open position and the stop prevents undesired fluttering or vibrating.

STRUCTURE & PARTS of SWING CHECK VALVE



Valve Design Conditions & Material Specification

Design Pressure	295.7 kg/cm ²	(4,350 psig, 30 Mpa)
Design Temperature	343.3°C	(650°F)
Body Material	A105	
Bonnet Material	A105	
Disc Material	A105	
Shaft Material	SS420 +HT	
Seat Material	A105 +HF	
Disc Arm Material	A216-WCB	

Listed Pressure Rating – ANSI Standard Class 2500 lb
Reference ANSI B16.34 Table 2-1.1A

This valve will comply with the Standard Design Rules of ASME III



14"(350A) A105 ANSI2500

FORGED STEEL TILTING CHECK VALVES Hi-Fluidic SERIES



Key Valve Technologies Ltd.

Hi-Fluidic®

FORGED STEEL TILTING CHECK VALVE, PRESSURE SEALED BONNET

ASME CLASS 1500/2500, 6"-24" (DN150 - DN600)

FEATURES

UTILTING DISC CHECK DESIGN FEATURES :

The tilting disc check valve is designed for high piping velocities, turbulence flow, quick and quiet closing pre-

Hi-Fluidic® forged steel tilting disc check valve is better-suited for frequent flow reversals than is the swing check valve and is less prone to slamming because of the shorter travel and inertia of the disc.

Forged seat is Stellite® hard-faced, ground and lapped to a mirror finish for maximum erosion resistance and long service life. It is seal-welded to the body.

Disc has a Stellite® hard faced seat lapped to a mirror finish and accurately guided into seat contact. Disc can partially rotate for tight shutoff. In the fully open position, it rests against a stop. **Good tightness:** Conical, lapped-in hard-faced seating is self-aligning. It can be used even in vertical piping with flow up.

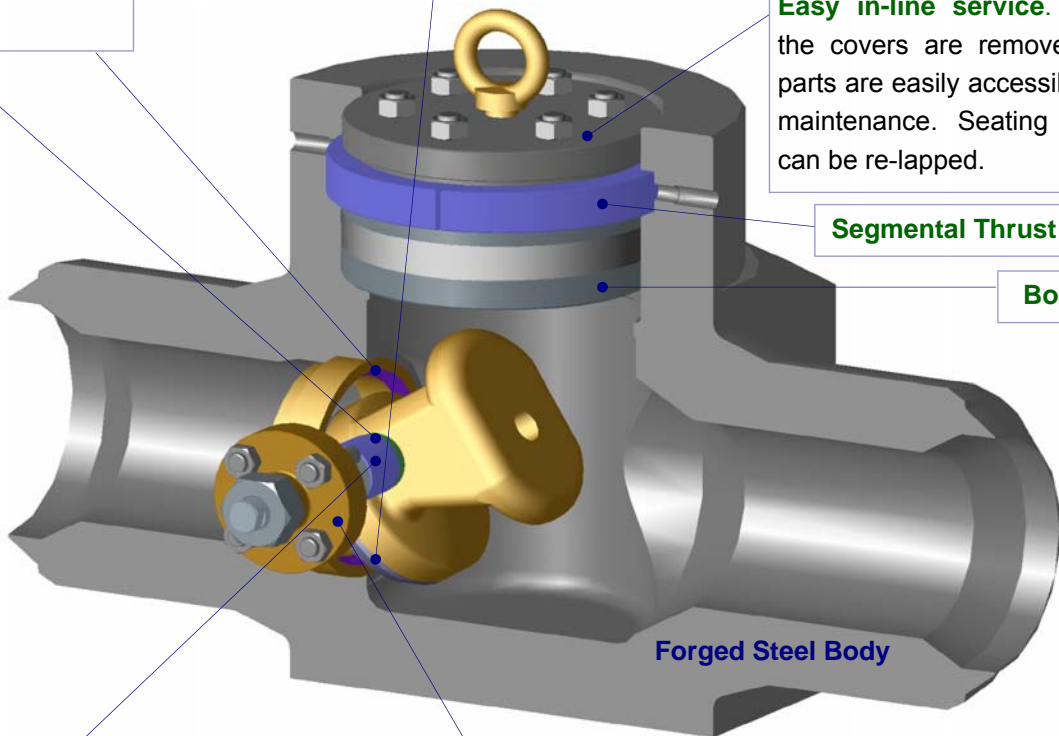
Stellite® hard-faced bearings for hinge pin.

A sturdy disc hinge moves on four **Stellite®** bearings, supporting the hinge pin and preventing binding.

Easy in-line service. Once the covers are removed, all parts are easily accessible for maintenance. Seating faces can be re-lapped.

Segmental Thrust Ring

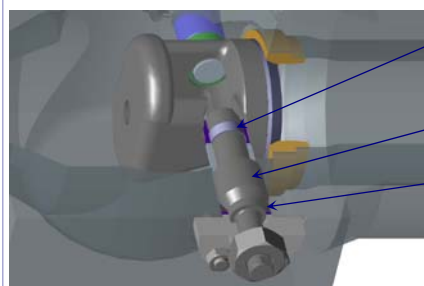
Bonnet



Efficient operation. The hinge pin located near the center of gravity allows the conical seating face of the disc to move out and into the seat rapidly without sliding or wear. The disc pivots through a small arc preventing back flow and "water hammer".

Machined hinge pin holes by pre-assembly. The hinge pin hole of the disc and body can be machined outside the valve before entire assemble by pre-assembly. It's prevents miss-alignment caused seating leakage.

Complete non-leakage of the hinge pin to outside by applied pressure seal gasket for high pressure. Eliminate the friction of hinge pin and body to outside and prevent a leakage through the hinge pin.



Stellite® Hard-faced Double Bearings

Hinge Pin

Pressure Seal Gasket

FORGED STEEL TILTING CHECK VALVES

Hi-Fluidic SERIES



Hi-Fluidic®

FORGED STEEL TILTING CHECK VALVE, PRESSURE SEALED BONNET

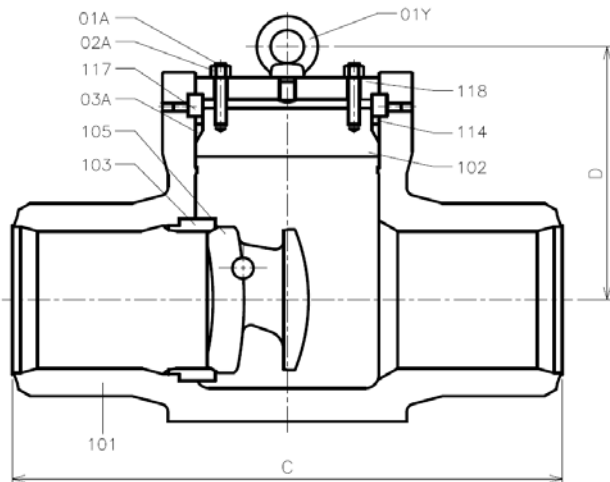
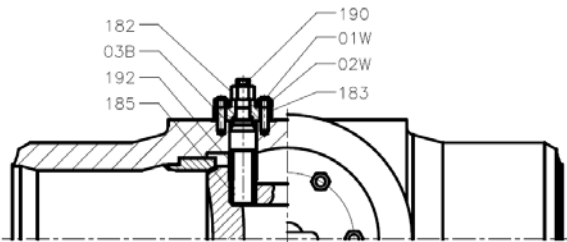
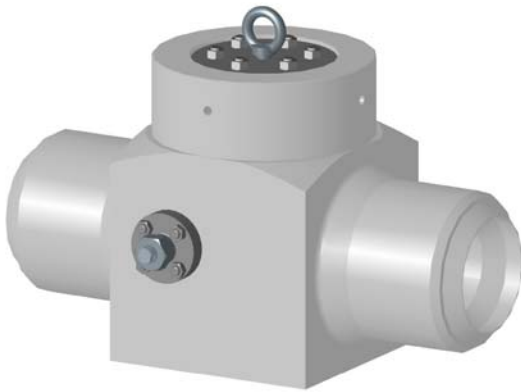
ASME CLASS 1500/2500, 6"-24"(DN150 - DN600)

FEATURES

DESIGN CONSTRUCTION TILTING CHECK VALVE WITH PRESSURE SEALED BONNET

MATERIALS BODY / BONNET SA105 - SA216 WC6 - SA217 WC9 - SA217 C12A (OTHERS ON REQUEST)

DESIGN ASME B16.34 - (BS-EN 10434) - API 600 - EN 12516
BUTTWELDING ENDS ASME B16.25 - DIN-EN 9692-1 - EN 12627
END-TO-END / FACE-TO-FACE DIM ASME B16.10 - EN 12982 / EN 558-2
PRESSURE TESTING ASME B16.34 - API 598 - DIN 3230 - EN 12266



MATERIALS

101 BODY	ASTM A105 (OR ALLOYS)
102 BONNET	SA216 WCB
103 SEAT RING	ASTM A105 + STELLITE
105 DISC	ASTM A216 WCB + STELLITE
114 THRUST GUIDE RING	ASTM A276 - 410
117 SEGMENTAL THRUST RING	ASTM A276 - 410
118 COVER	ASTM A216 WCB
185 BEARING BLOCK	ASTM A276 - 410 + STELLITE
190 HINGE PIN	ASTM A276 431 + H.T
01A/02A STUD BOLT / NUT	ASTM A193 B7 / A194 2H
03A GASKET	GRAPHITE

Nominal Size		CLASS	C		D	
DN	inch		mm	inch	mm	inch
150	6"	1500	559	22	301	
		2500	610	24	281	
200	8"	1500	711	28	325	
		2500	762	30	305	
250	10"	1500	864	34	458	
		2500	914	36	450	
300	12"	1500	991	39	488	
		2500	1,041	41	484	
350	14"	1500	1,067	42	550	
		2500	1,118	44	545	
400	16"	1500	1,194	47	650	
		2500	1,245	49	640	
450	18"	1500	1,537		685	
		2500	1,397	55	670	
500	20"	1500	1,664		718	
		2500				
600	24"	1500	1,943		800	

- Butt welding end dimensions on page 59
- Alternatives are available on request.



Key Valve Technologies Ltd.

Hi-Fluidic® STOP CHECK VALVE, PRESSURE SEALED BONNET ASME CLASS 1500/2500, 6"-24"(DN150 - DN600)

FEATURES

DESIGN CONSTRUCTION STOP CHECK VALVE WITH PRESSURE SEALED BONNET
ALTERNATIVES MOTOR OPERATED OR SPRING ASSISTED PISTON TYPE CHECK VALVES

MATERIALS BODY / BONNET SA216 WCB - SA217 WC6 - SA217 WC9 - SA217 C12A (OTHERS ON REQUEST)

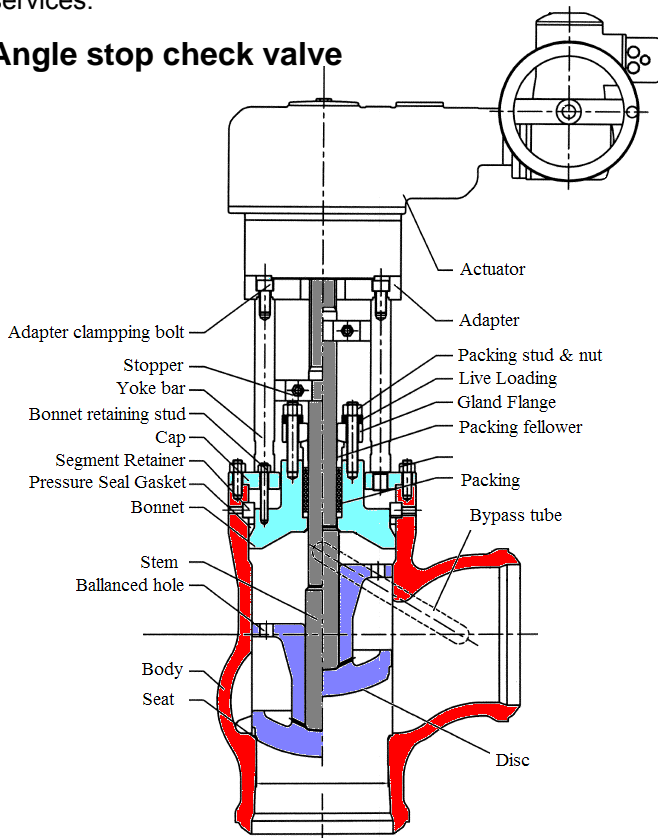
DESIGN ASME B16.34 - (BS-EN 10434) - API 600 - EN 12516
BUTTWELDING ENDS ASME B16.25 - DIN-EN 9692-1 - EN 12627
END-TO-END / FACE-TO-FACE DIM ASME B16.10 - EN 12982 / EN 558-2
PRESSURE TESTING ASME B16.34 - API 598 - DIN 3230 - EN 12266

Check valves are also used to isolate separate services connected to a common header to prevent fluid flow from one service to another. In power plant, more than one boiler is connected to a main steam header, a check valve is installed in the line between each boiler and the header. When the stem is in the open position, the valve acts as a check valve and prevents flow of steam from the header back to a boiler during boiler start-up or shut-down. When the stem is closed, tight sealing is assured, making it safe to work on isolated boiler at same time the other boilers remain service. **Hi-Fluidic® stop check valves, angle stop and Y-type stop check valve** will satisfy these services.

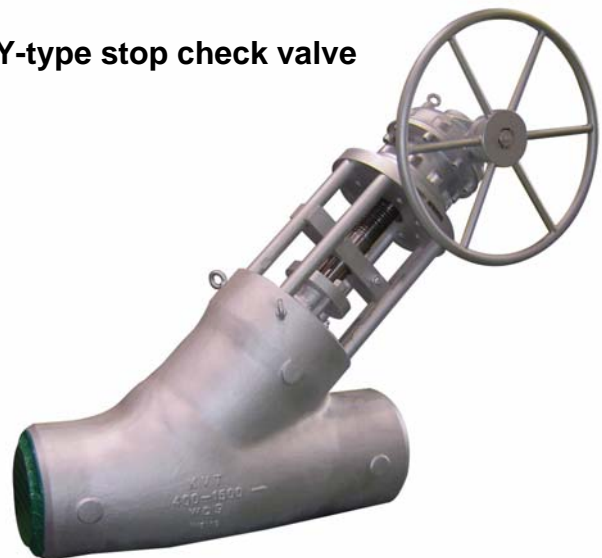
MATERIALS

BODY	SA216 WCB (OR ALLOYS)
BONNET	SA216 WCB
SEAT	ASTM A216 WCB + STELLITE
DISC	ASTM A216 WCB + STELLITE
STEM	ASTM A276 - 410
THRUST GUIDE RING	13CR
SEGMENTAL THRUST RING	13CR
COVER	ASTM A216 WCB
GASKET	GRAPHITE
STUD BOLT / NUT	ASTM A193 B7 / A194 2H

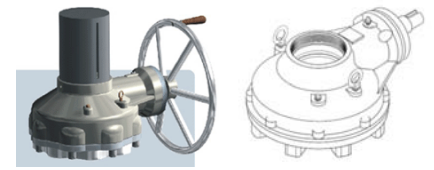
Angle stop check valve



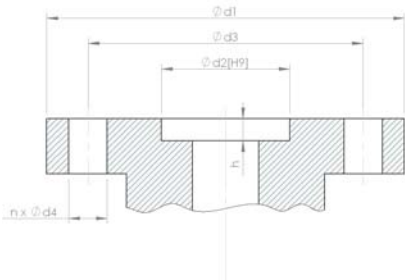
Y-type stop check valve



MANUAL GEARED ACTUATORS



ISO 5211



Arrangements of holes(Ød3)

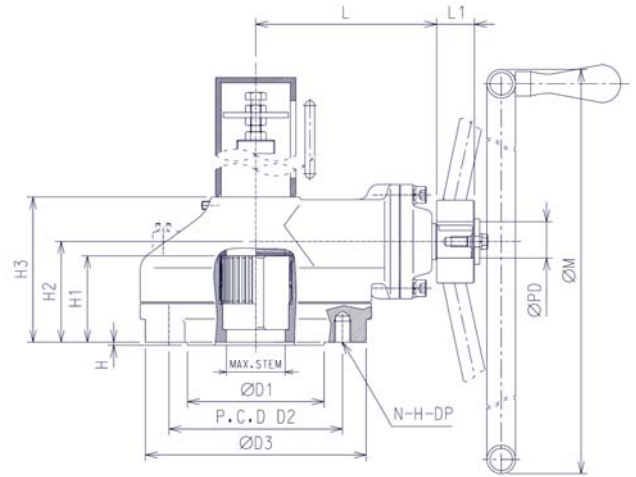
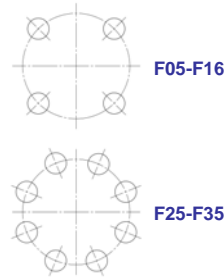


Table 13. MOUNTING DIMENSIONS

Dimensions in millimeters

Flange type	d1	d2 [H9]	d3	d4	h1 max.	h2 min.	Number of screws, studs or bolts	Maximum flange torque Nm
F05	65	35	50	7	3	9	4	125
F07	90	55	70	10	3	12	4	250
F10	125	70	102	12	3	15	4	500
F12	150	85	125	14	3	18	4	1,000
F14	175	100	140	19	4	24	4	2,000
F16	210	130	165	23	5	30	4	4,000
F25	300	200	254	19	5	24	8	8,000
F30	350	230	298	23	5	30	8	16,000
F35	415	260	356	34	5	45	8	32,000

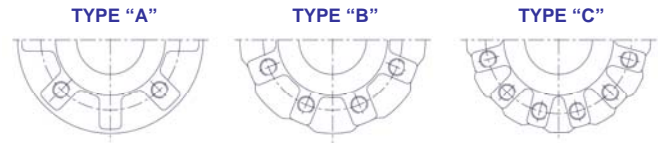


Table 14. MANUAL GEARED ACTUATORS

DIM MODEL	BASE PART						EXTERNAL PART				INPUT SHAFT PART		HAND WHEEL ØM	STEM COVER	GEAR RATIO	MAX. Stem Acceptance		MAX. Thrust Capacity		MAX. Torque Capacity		WEIGHT Kg									
	TYPE	FLANGE SIZE	ØD1	P.C.D		ØD3	H	H1	H2	L	L1	ØPD				KEY	TW	KEY	kN	Kgf	N·m		Kgf·m								
				D2	N-H-DP																										
SB-VS10	A	F-10	70	102	4-M10-17 4-3/8"-17	140	3	50	68	121	34	26	8×7	PF2"	2.5 : 1	28	23 (8×7)	75.5	7690	216	22	8									
SB-VS20		F-12	85	125	4-M20-20 4-1/2"-20	155		60	75	131						32	10×8	400	PF2 1/2"	3.25 : 1	36	30 (10×8)	113	11500	363	37	11				
SB-V0		F-14	100	140	4-M16-25 4-5/8"-25	180		70	76	160											500	1000	PF 8"	6.5 : 1	46	35 (10×8)	127	12900	589	60	16
SB-V1		F-16	130	165	4-M20-30 4-3/4"-30	210		82	96	183															54	43 (12×8)	141	14400	932	95	24
SB-V2	B	(F-20)	140	102	8-M16-30 8-5/8"-30	245	3	94	105	209	34	32	10×8	PF 3"	4 : 1	62	52 (16×10)	190	19400	1491	152	33									
SB-V3		F-25	200	125	8-M16-32 8-3/4"-32	285		103	109	237						800	PF 5"	5.5 : 1	95	80 (22×14)	402	41000	5101	520	113						
SB-V35		F-30	230	140	4-M20-35 4-3/4"-35	340		124	138	268																900	PF 6"	6 : 1	110	95 (25×14)	512
SB-V4		F-30	230	165	8-M20-40 8-3/4"-40	370		137	153	303						58	50	16×10	1000	PF 8"	6.5 : 1	125	110 (25×16)	1110	113000						
SB-V5		F-35	260	165	4-M30-45 8-1 1/4"-45	425		166	178	350																645	5	215	223	430	PF 8"
SB-V6		F-40	300	165	8-M36-55 8-1 3/8"-55	485		189	200	384						645	5	242	258	495	PF 10"	8 : 1	160	145 (36×20)	1430						
SB-V7		C	F-48	370	483	8-M36-55 8-1 3/8"-55		535	215	223																430	58	50	16×10	1000	PF 8"
SB-V8						8-M36-55 8-1 3/8"-55		645	242	258						495	58	50	16×10	1000	PF 10"	8 : 1	160	145 (36×20)	1430	146000	25506	2600	605		



Key Valve Technologies Ltd.

ELECTRIC ACTUATORS

Electric Actuators

In many applications, operation of valves may require the use of electric, pneumatic or hydraulic actuators. Such applications include those where the valve

- (1) is too large or has too high a differential shut-off pressure for manual operation;
- (2) is not accessible for manual operation;
- (3) is part of a system requiring simultaneous operation of many valves;
- (4) must be triggered from a remote location, as is often essential for emergency shut-off in hazardous areas.

We will gladly furnish any type or make of actuator you specify, or make recommendations for your particular service conditions. All KVT's gate, globe and non-return valves can be supplied with electric, air, gas or hydraulic driven motor actuators or cylinder actuators.

ROTORK



AUMA



Motor Actuators

Motor actuators for moving the stem of the valve can be powered by air, gas, hydraulic or electric power. The most common method of actuation is the electric motor actuator, as it is generally the most cost effective.

Electric motor actuated valves can be provided to meet the broadest range of requirements including operating cycle time, use of integral or remote controls, starters and indicators, and a wide range of power sources. They are less readily adaptable to fail-safe operation than cylinder actuators because they generally require more stored energy.

Air motor actuators are often specified in very hazardous locations where electric power is not available or permitted. The major disadvantage of this type of actuator is air consumption, particularly when applied to large valves. The combination of high gear ratio and long stroke can drain an entire air system unless the air supply system is specially designed to accommodate this type of actuator. Like electric motor actuators, these are not readily adaptable for a fail-safe mode.

Information Required to Quote Motor Actuators

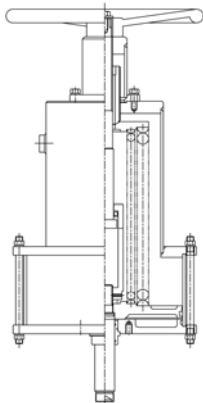
1. Valve size, figure number or description.
2. Valve operating conditions (pressure, temperature, flow rate and fluid).
3. Maximum differential (shut-off) pressure.
4. Primary power supply:
 - a) electric-voltage, phase cycles,
 - b) gas or hydraulic-fluid, available flow rate, maximum and minimum pressure.
5. Control voltage.
6. Valve stem position.
7. Closing time and frequency.
8. Required construction (NEMA, etc.) or local environment.
9. Auxiliary equipment:
 - a) push-button stations,
 - b) reversing controllers,
 - c) position indicators,
 - d) other (i.e., stem covers, etc.)
10. Special requirements (i.e., radiation, seismic, etc.)
11. Preference for specific manufacturer, if any.

PNEUMATIC PISTON ACTUATORS

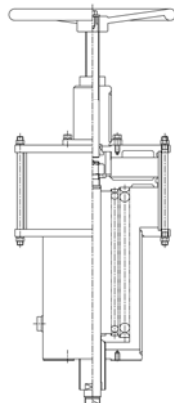
- ◆ Air Supply : 4bar ~ 10bar
- ◆ Spring Range : available application
- ◆ Temperature : -20°C ~ 120°C
- ◆ Material : Cylinder - BLACK AMALGA
Cover - Carbon Steel
Piston - Al. Alloy
Stem- SS410(Ni-Plating)
- ◆ Model : P200 Series
- ◆ Cylinder Diameter Range : $\Phi 160$ ~ $\Phi 600$
- ◆ PT : 1/4" ~ 1"
- ◆ Type : Reverse Acting with bevel Gear, Direct Acting, Direct Acting with Handwheel, Double Acting, Tandem Piston, Reverse Acting, Reverse Acting with Handwheel



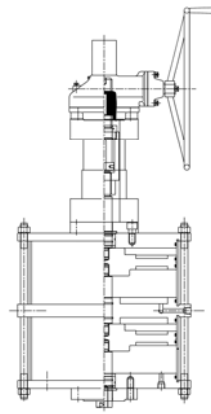
KVT MODEL P200-450TA
TANDEM PISTON ACTUATOR
THRUST FORCE = 152KN



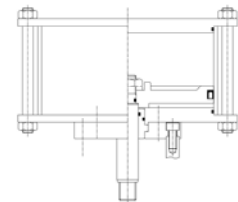
Reverse Acting with Handwheel



Direct Acting with Handwheel



Tandem Piston



Double Acting

Information Required to Quote Cylinder or Diaphragm Actuators

1. Valve size, figure number or description.
2. Operating conditions (pressure, temperature, flow rate and fluid).
3. Maximum differential (shut-off) pressure.
4. Primary power supply-air or hydraulic-available maximum and minimum pressure and source.
5. Failure mode (open, closed, as is).
6. Control voltage and enclosure designations (NEMA, etc.).
7. Auxiliary equipment:
 - a) limit switches,
 - b) solenoids,
 - c) positioners,
 - d) manual over-rides.
8. Valve orientation.
9. Preference for specific manufacturer, if any.



Key Valve Technologies Ltd.

PRODUCT CODING SYSTEM

Code	1	2	3	4	5	6	7	8	9
	K	K	B	G	1 A	A D	R	A	N N S

1

Code 1

Products

K : KVT PRODUCTS
M : MAINTENANCE SERVICE
O : OTHER & OEM PRODUCTS

2

Code 2

Valve Body Types

A : ANGLE GLOBE VALVES
B : BALL VALVES
C : CAST STEEL CHECK VALVES
D : FORGED STEEL CHECK VALVES
E : INSTRUMENT NEEDLE(BAR STOCK TYPE) GLOBE OR MANIFOLD VALVES
F : FORGED GLOBE VALVES
G : CAST GLOBE VALVES
H : BELLOWS SEALED GLOBE VALVES
J : FORGED PARALLEL SLIDE GATE VALVES
K : CAST PARALLEL SLIDE GATE VALVES
L : FORGED TILTING DISC CHECK VALVES
M : AUTOMATIC RECIRCULATION VALVE(ARV)
P : NOZZLE PLUG CHECK VALVES
R : 3-WAY(CAST-GLOBE STYLE) VALVES
T : OTHER TYPES OF GATE VALVES
U : BUTTERFLY VALVES
W : WEDGE GATE VALVES
X : SPECIAL TYPES
Y : Y-GLOBE CHECK VALVES
Z : Y-STOP CHECK VALVES

3

Code 3

Valve Bonnet Types

B : BOLTED BONNET
C : EXTENDED FINNED TYPE BONNET(CRYOGENIC)
S : SCREWED-IN SEAL WELD BONNET
P : PRESSURE SEALED BONNET
W : WELDED BONNET
E : EXTENDED FOR HOT TEMPERATURE SERVICE
F : FLANGED JOINT FOR NOZZLE CHECK VALVES
N : NON-SPECIFIED BONNET SUCH AS BUTTERFLY/ BALL VALVES
O : BELLOWS SEALED

K K B G 1A A D R A N N S

1. KVT PRODUCTS
2. Valve Body Type ; **CAST PARALLEL SLIDE GATE VALVES**
3. Bonnet Type ; **BOLTED BONNET**
4. Operating Power Types ; **MANUAL - GEARED OPERATED**
5. Valve Body Size ; **100mm(4")**
6. Pressure Rating ; **ANSI-600**
7. Connection Type ; **RAISED FACED**
8. Body Construction Materials ; **A105N/A216-WCB**
- 9-1. Function ; **General Purpose Operation**
- 9-2. Function - By-pass & Equalizing ; **INTERNAL EQUALIZING**
- 9-3. Application ; **STEAM SERVICE**

Application Code 9.1

In case Code 2-J, K

Application Code 9.2

Otherwise Code 2-J, K

4

Code 4-A

Operating Power Types

D : DIAPHRAGM-PNEUMATIC POWER OPERATED
E : MOTOR(ELECTRIC) OPERATED
G : MANUAL - GEARED OPERATED
H : HYDRAULIC-ELECTRIC OPERATED
M : MANUAL OPERATED
P : PISTON - PNEUMATIC POWER OPERATED
R : REGULATING - NO POWER REQUIRED
W : MANUAL-HANDWHEEL & LEVER OPERATED
X : BARE STEM DESIGN

Code 4-B

Self Operating Types

A : SWING CHECK
B : TILTING DISC CHECK
C : NOZZLE CHECK
L : LIFT CHECK
T : STOP CHECK
S : SAFETY/RELIEF VALVE

HOW TO ORDER PRODUCT CODING



Key Valve Technologies Ltd.

5

Code 5

Valve Body Sizes

00 : ALL SIZES COVER
 08 : 8mm (1/4")
 10 : 10mm (3/8")
 15 : 15mm (1/2")
 20 : 20mm (3/4")
 25 : 25mm (1")
 32 : 32mm (1-1/4")
 40 : 40mm (1-1/2")
 50 : 50mm (2")
 65 : 65mm (2-1/2")
 80 : 80mm (3")
 1A : 100mm(4")
 1B : 125mm(5")
 1C : 150mm(6")
 2A : 200mm(8")
 2B : 250mm(10")
 3A : 300mm(12")
 3B : 350mm(14")
 4A : 400mm(16")
 4B : 450mm(18")
 5A : 500mm(20")
 5B : 550mm(22")
 6A : 600mm(24")
 6B : 650mm(26")
 7A : 700mm(28")
 7B : 750mm(30")
 8A : 800mm(32")
 8B : 850mm(34")

6

Code 6

Pressure Rating

KA : KS/JIS-10K
 KB : KS/JIS-20K
 KC : KS/JIS-30K
 KD : KS/JIS-43K

 AA : ANSI-125/150
 AB : ANSI-250/300
 AC : ANSI-400
 AD : ANSI-600
 AE : ANSI-800
 AF : ANSI-900 (PN150)
 AG : ANSI-1500(PN250)
 AH : ANSI-2500(PN420)
 AI : ANSI-3500
 AJ : ANSI-4500

* In case medium class,
 Select with low class.
 That is, in case 2250#
 Select with 1500#.

7

Code 7

End Connection

S : SOCKET WELDED
 B : BUTT WELDED
 R : RAISED FACED
 T : RING/TONGUE JOINT
 N : NOT SPECIFIED

8

Code 8

Body Construction Materials

A : A105N/A216-WCB
 B : A182-F11,F12/A217-WC6
 C : A182-F22/A217-WC9
 D : A182-F51/DUPLEX, 6% Mo Steel
 E : A182-F91/A217-C12A
 F : A182-F304/A351-CF8
 G : A182-F304L/A351-CF3
 H : A182-F316/A351-CF8M
 I : 182-F316L/A351-CF3M
 J : A182-F317
 K : A182-F321
 L : A182-F347
 M : MONEL
 N : INCONEL 625

* In case 3-Ways Valve, Select Standards with Inlet Diame-

9

Code 9.1 Parallel Slide Gate Valves

Option Code per Valve Types

First digit - Function

N : General Purpose Operation
 Q : Fast Acting
 C : Throttling

Second digit - Function - By-pass & Equalizing

N : INTERNAL EQUALIZING
 (OR NO EQUALING HOLE)
 ON THE DISC & WITHOUT BY-PASS
 1 : INTERNAL EQUALIZING & BY-PASS PIPING
 (ONE VALVE) - UNI DIRECTIONAL
 2 : BY-PASS PIPING AND EXTERNAL EQUALIZING
 LINE(TWO VALVES) - UNI DIRECTIONAL
 3 : BY-PASS PIPING AND EXTERNAL EQUALIZING
 LINE(THREE VALVES) - BI DIRECTIONAL
 4 : OVER PRESSURE PROTECTION
 - RELIEF VALVE ONLY - BI DIRECTIONAL
 5 : RELIEF VALVE & BY-PASS PIPING
 (3-WAY PSGV) - BI DIRECTIONAL
 6 : BY-PASS PIPING & DRAIN VALVE
 7 : EQUALIZING, BY-PASS PIPING & DRAIN VALVE

Third digit - Application

S : STEAM SERVICE
 W : WATER SERVICE
 L : LIQUID SERVICE EXCEPT WATER
 G : GASEOUS SERVICE
 N : NOT SPECIFIED
 H : High Temperature
 - Extension Bonnet Required (above 600 °C)

9

Code 9.2 Globe Style Control Valves

Option Code per Valve Types

First digit - Function

N : On-Off Control
 Q : Fast Acting or Emergency Shut-off Action
 C : Flow Modulating or E/P Control
 S : Stop Check or Check Valve
 - Non-return Check Function
 B : Blowdown (Pressure Letdown) Control
 E : Instrumentation Purpose
 D : Desuperheating Control (PTCV)
 T : Double Block & Bleed

Second digit - Function - By-pass & Equalizing

N : No Options
 1 : Equalizing piping or Holes
 2 : Drains
 3 : Explosion Proof
 4 : Special Options Required
 5 : Orifice Attached in the Valve Outlet

Third digit - Application

S : STEAM SERVICE
 W : WATER SERVICE
 L : LIQUID SERVICE EXCEPT WATER
 G : GASEOUS SERVICE
 N : NOT SPECIFIED
 H : High Temperature
 - Extension Bonnet Required (above 600 °C)



Key Valve Technologies Ltd.

Sihwa-kongdan 4Ba-702, Seonggok-dong
Danwon-gu, Ansan-si, Gyeonggi-do, Korea,
425-836

Tel : +82 31 432 0752

Fax : +82 31 432 0752

Email: keyvalve.com

www.keyvalve.com