Globe Control Valves

General

The range of Valves was developed to provide a cost effective, reliable and easily maintained control valve capable of working in rigorous environments.

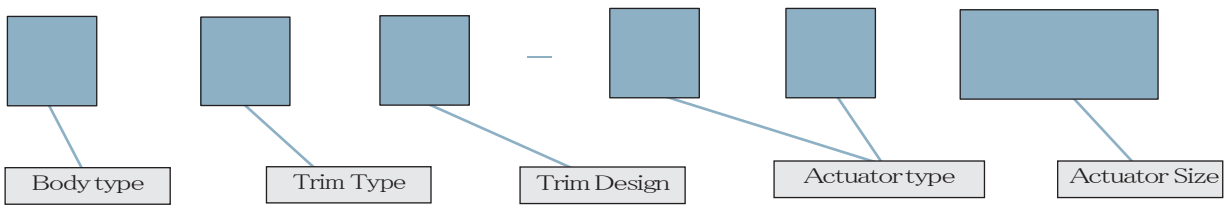
The quick change trim option provides for easily accessible seat and trim components to minimize fitting and parts replacement times.

Stem guided contoured trim in both balanced and non balanced configuration gives excellent rigidity and resistance to vibration and service wear.

The valve is designed to accommodate other products within the Dong Yang F&C Unbalanced Style / Contoured Port Type / Micro Flow Control / Cryogenic Service / Teflon Body / Teflon Port / Quick Change Type /Single Port

Contents

Model Numbering System



G. Globe
A. Angle
F. Teflon

P. Contoured
H. Multi-Step
M. Micro Flow Port

S. Singleport (Unbalanced)
C. Cage type (Balanced)

DD. Diaph. Dir.Action
DR. Diaph.Rev.Action
CS. Spring Cylinder CD. Double Cylinder HS. Hydro. Cylinder EM. Elector.Motor

Design by

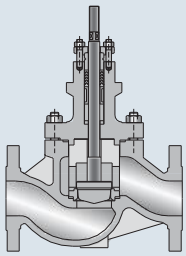
s

Specification

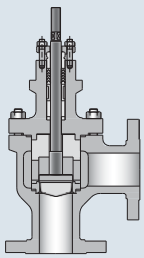
Body	Size 1"to12"
Body Style	Globe, Angle, y-Globe, Micro Flow, Cryogenic, Teflon body
Pressure Rating	ANSI 150 to 2500, 3000, 4500 / DIS
EndConnection	Flanged, Socket welded, Butt welded, Ring joint type, Others.
Trim Design	Unbalanced
Bonnet Type	Bolted design, Pressure seal design
Seat Leakage	ANSI B16.104 / FCI 70.2 Class IV(Standard), V(Optional), VI(Optional, Soft seat) MSS-SP-61(Optional)
Velocity Control Trim	Multi-Hole,Cascade,Contoured
Characteristic	Equal %, Linear, Modified %, Custom engineered
Standard Materials	
Body & Bonnet	A216 WCB / A105, A217 WC6 / A182 F11, A217 WC9 / A182 F22, A182 F91, Stainless steel, Titanium, Monel, Aluminium, Hastelloy, Aulloy, Others.
Trim	316SS, 410SS, 420SS, 420J2 SS, 630SS F-11, F-22, F-91 with Stellite overlay Inconel, Others special materials.
Rangeability	15:1, 30:1, 50:1, 70:1
Actuator	Spring Diaphragm Spring Cylinder Double Cylinder Motor Hydraulic

Valve BodyStyle

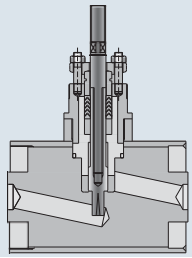
The Dong Yang F&C valve is available in two basic bodystyles of either globe angle many parts are interchangeable with the exception of the valve bodies. The angle pattern has an optional ventri seat which may be specified in order to provide additional protectiontothe valve outlet.



GLOBE BODY/G

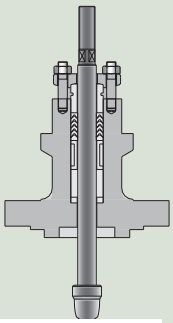


ANGLE BODY/A



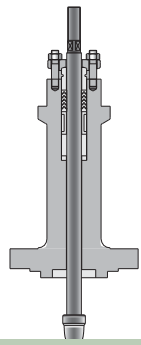
TEFLON BODY/F

The standard bonnet enables the forming of a deep packing box together with a long guide housing there by providing a robust and vibration resistant assembly. Teflon rings are the standard packingup to 250℃



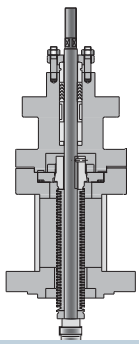
STANDARD BONNET

Protects the packing from excessive heat or cold, which may adverselyaffect valve or packing performance. Application temperature range depends upon valve and bonnet construction materials.



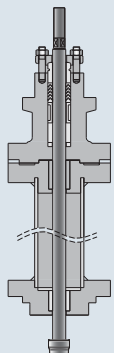
EXTENSION BONNET

Provides for a positive metalic gland seal within the rated pressure and temperature ofthe bellows material selected. Use on hazardous, lethal service an auxiliary packing box in the upper bonnet serves as a back up seal in the unlikely event of a bellows failure



BELLOWS SEAL BONNET

Permits stagnated moderate temperature gas to from within the bonnet which protects the packing from the extremes of temperature produced by the line fluid. Normally constructed in stainless steel it operated to-196℃



CRYOGENIC BONNET

Cryogenic Service Application

Reliability and ease of maintenance are essential features of any good control valve and to this end the Dong Yang F&C range of cryogenic service valves have been kept as simple as possible.
The number of component has been kept to a minimum and ease of access to the trim is straight forward through the removal of the bonnet retaining nut and lifting of the complete bonnet and plug assembly.
Bodies are normally supplied in stainless steel or bronze with a stainless steel extension of the suitable length for the installation position and temperature as low as minus 268℃(450℉). The extension can be fitted with a cold-box flange of any shape size required.
Trim construction is based on the traditional Dong Yang F&C top & retainer guided quick change seat design and incorporates a soft seal in PTFE or RTFE when bubble tight shut-off is required. Other types of trim such as balanced, cage are available when required. End connection can be flanged, screwed, socket or butt-weld end plus pipe stabs as necessary. All body components are cleaned and degreased suitable for oxygen service and the end connection suitably masked after testing to prevent ingress of foreign materials and moisture.

Microflow Control Application

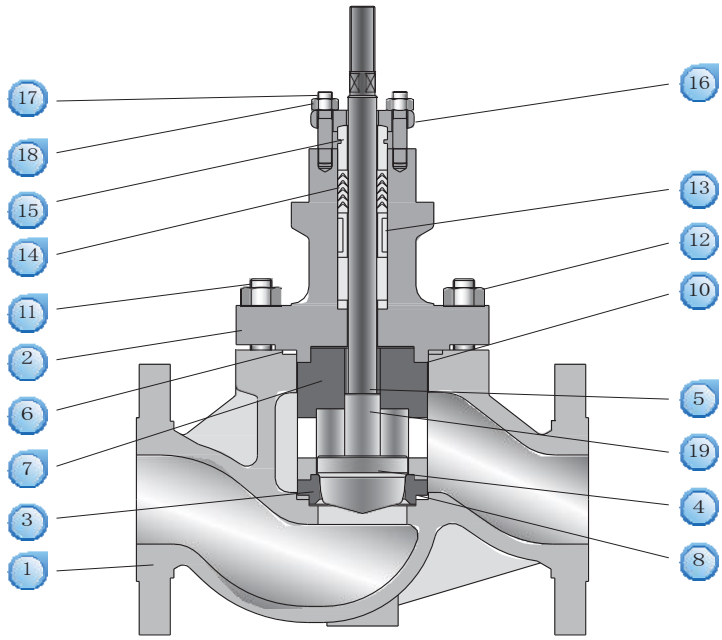
Increasing technical demands by user have persuaded Dong Yang F&C to rethink the standard approach to this specialized field of micro flow control. Possible approaches and solutions were proposed and through the process of testing body under laboratory and field conditions a new solution took from MCV are designed and manufactured for the express purpose of control fractions of the capacity of flow through 1″ and smaller line sized. The preference of the research facilities and process industries for scaled-down dimensions with proportionate economy in cost has been the prime factor in making them available.
No omission has been made in paralleling the design, construction and characteristics of performance, interchangeability or available accessories normally associated with larger valves.
MCV are the highest quality products available for low flow control and are well suited for those applications requiring precise control in very critical areas. The valves proven ability to function under the most adverse condition makes it a vital tool in research and process as the final control element.

Teflon Body Application

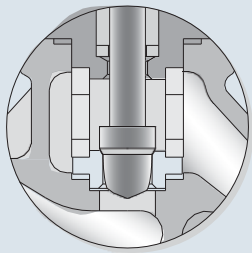
Teflon Body is designed for those applications where severe corrosion resistance is required.
With its varied trim options and configurations, it is a most versatile valve for corrosive services,

features include

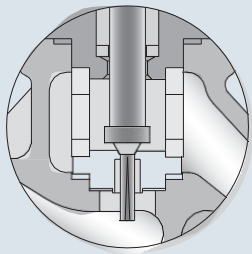
Body Materials



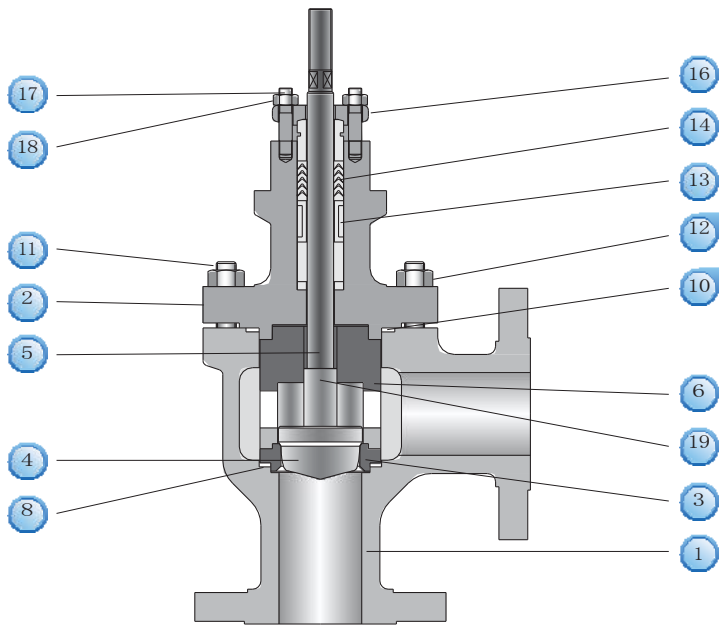
GLOBE VALVE



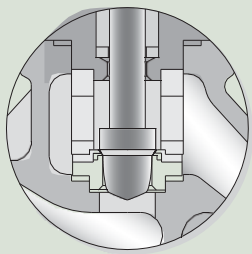
CONTOURED
UNBALANCED TRIM



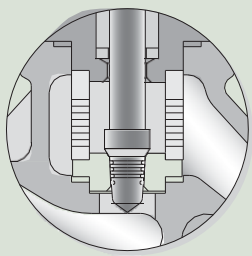
MICRO FLOW TRIM



ANGLE VALVE



CONTOURED
SOFT SEAT TRIM



ANTICAVITATION
LOW NOISE
CONTROL TRIM

Carbon Steel or Low Alloy Steel

Fluid Temperature ► −196 (℃)▽ 350 ▽ 425 ▽ 450 ▽ 565 ▽

Part No.	Valve type	Temperature Range	
1	Body	A216WCB	
		A217-WC6 or A217-WC9	
2	Bonnet	A216WCB	
		A217-WC6 or A217-WC9	
3	Seat Ring	316SS, 316SS+Stellite	
		420J2 SS, 410SS	
		630SS	
4	Plug	316SS, 316SS+Stellite	
		420J2 SS, 410SS	
		630SS	
5	Plug-Stem	316SS	
6	Seat RingRetainer	316SS	
7	Upper Seat-Ring	Retainer : 316SS	
8	Seat Ring Gasket	Spiral wounded	
9+10	Body Gasket	Spiral wounded	
11	Body Stud	A194 B7	A194 B16
12	Body Nut	A194 2H	A194 B4
13	Packing Spacer	316SS	
14	Packing	See Specification Sheet	
15	Gland Follower	316SS	
16	Packing Flange	S25C or 316SS	
17	Packing Stud	316SS	
18	Packing Nut	316SS	

Stainless Steel

Fluid Temperature ► −196 (℃)▽ 350 ▽ 425 ▽ 450 ▽ 565 ▽

Part No.	Valve type	Temperature Range	
1	Body	A351 CF8M, A351 CF8	
2	Bonnet	A351 CF8M, A351 CF8	
3	Seat RingRetainer	316SS, 316SS+Stellite	
4	Seat Ring	316SS, 316SS+Stellite	
5	Plug stem Pin	316SS or 630SS	
6	Upper Seat Ring Retainer	316SS	
7	Plug-Stem	316SS with Cr. Plate	
8	Packing	Spiral wounded	
9+10	Seat Ring Gasket	Spiral wounded	
11	Body Stud	A193 B8	630SS
12	Body Nut	316SS	316SS
13	Micro Flow Cv Chart	S25C or 316SS	
14	Gland Follower	See Specification sheet	
15	Packing Stud	316SS	
17	Packing Nut	316SS	
18	Packing Spacer	316SS	
19	Body Gasket	316SS	

Globe Control Valves

Alloytic Port

A. High hardness, the hardness is very high metal base to form TiC phase abrasion materials of that stuff.
B. High wear resistance and surface hardness is expected to be very excellent.
C. Measurement location can vary greatly depending on the hardness of materials. Big load average is represented by the measured value.
D. The pH of the operating environment is not concerned about the high corrosion resistance but, matrix FT-1 of Cr content is higher in terms of corrosion resistance is believed to be excellent.

1. Name of Material
   - TiC- reinforced ferrous composites alloy steel.
   - Alloy TiC® FT-1

2. Use
   Wear-resistant parts of slaked lime line of valve. (Plug & Seat)

3. Production standards
   - Hardness: Vickers Hardness (940 Hv) over (1 kg Load) or, Rockwell Hardness (Cscale 70)
   - Component: TiC 32 ~ 36 wt% (or, 40~45 vol%) Cr 5.5 ~ 7.0 wt% Mo 1.8 wt% over.

Category Configuration

FT-1(DY F&C)		FT-4 (DY F&C)	
TiC	32~36 wt%	TiC	32~36 wt%
Fe	55~57 wt%	Fe	52~57 wt%
Cr	5.5~7.0 wt%	Cr	1.5~2.5 wt%
Mo	1.8~2.4 wt%	Mo	1.5~2.5 wt%
Other	1 wt%	Cu	1.0~1.5 wt%

Tungsten overlay - Linear(DY F&C)	
BODY	SCS14A(A351,CF8M)
STEM	411SS+Tungsten overlay
SEAT	411SS+Tungsten overlay
CV	Made according to the fluid flow
Delivery	30days / negotiation

Annex A- Component Analysis

Sample	FT1			FT4		
	Macro	matrix	TiC	Macro	matrix	TiC
Fe	49.14	89.56		53.06	95.87	1.28
C	10.3		13.97	10.34		18.64
Ti	30.69	1.87	86.03	31.81	1.25	80.08
Cr	6.78	8.57		1.96	2.88	
Mo	2.48			2.3		
Si	0.6			0.53		

Annex B- Microstructure observation

Test Specimen(FT-

500 Scale		2000 Scale	
Analysis point		Analysis	

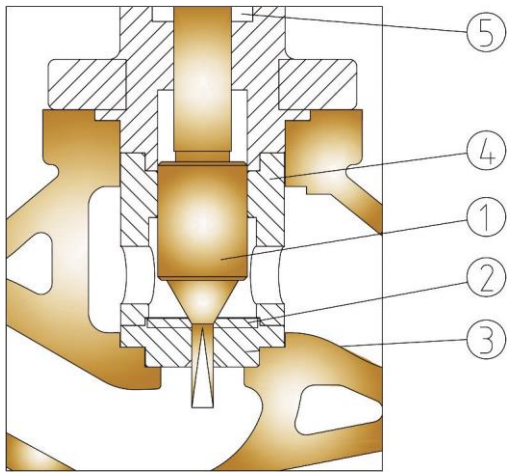
Spe trum	C	Ti	Cr	Fe
Spt1	14.0	86.0		
Spt2		1.9	8.6	89.5

TiC Particle and 3Cr-level combination of Fe-Cr Matrix

Micro-Splined Low Flow Valve

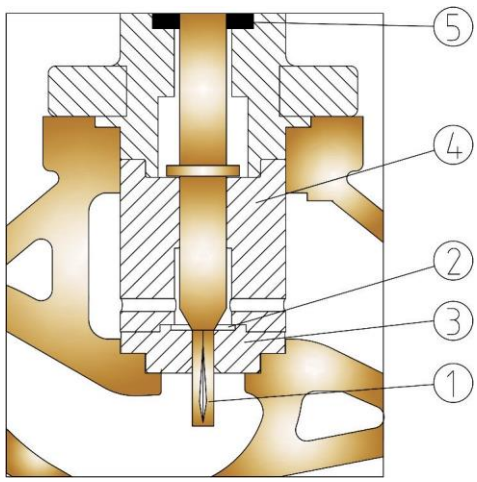
Body–Size : 15A to 25A
Body Material : SCS13A (A351,CF8)
Port Material : 316SS (A351,CF8M)
Seat Material : 316SS (A351,CF8M)
Actuators : Diaphragm Actuator
Pressure Rating : JIS RF / ANSI RF

1-1. Standard Low Flood Trim- Type 1



No.	Parts name	Materials
①	Plug	A351, CF8M
②	Seat ring	METAL / PTFE
③	Seat	A351, CF8M
④	cage	A351, CF8M
⑤	guide	PTFE

1-2. Micro-Splined Low Flow Trim-Type2



No.	Parts name	Materials
①	Plug	A351, CF8M
②	Seat ring	METAL / PTFE
③	Seat	A351, CF8M
④	cage	A351, CF8M
⑤	Guide	PTFE

Teflon Body Globe Valve

Body-Size: 15A to 25A
Body Material : SCS13A (A351,CF8)
+PTFE
Port material: 304SS(A351,CF8)+PFA
Seat material : PTFE
Actuators: Diaphragm Actuator
Pressure Rating : JIS RF / ANSI RF

Lining materials and methods.

The choice of lining materials and the method of lining are critical.

We begin with the purest fluorocarbon materials.

To assure lining integrity and maximum corrosion resistance, Tufline uses only PFA and PEP Fluorocarbons.

PFA

PFA is a fluoropolymer with extended temperature limits. It is a copolymer that combines the carbon-fluorine backbone of fluorocarbons with a perfluoroalkoxy side chain.

PFA offers a variety of attributes and benefits:

- Handles a wide range of fluids
- Heat resistant
- Weather resistant
- Stress-cracking resistant
- Negligible moisture absorption

·Better sealing and wear resistance between parts- because it is moldable and machinable to close tolerances.

·PFA is a true thermoplastic and is melt processible, so it can be locked to the valve components. Blow-out or liner collapse are virtually impossible.

Physical Properties

Property	PFA (perfluoroalkoxy)	
	ASTM method	Value
Melting Point	- --	570-590 F
Tensile strength 73F	D638	3,800 psi
Elongation 73F	D638	300%
Flexural modulus 73F	D790	100,000 psi
Impact strength	D256	No break
Coefficient of liner thermal expansion per F (70 to 212 F)	D696	6.7 × 10
Flammability	D635	Nonflammabl
Weather and chemical resistance	- --	Excellent

3-Way Type Control Globe Valves

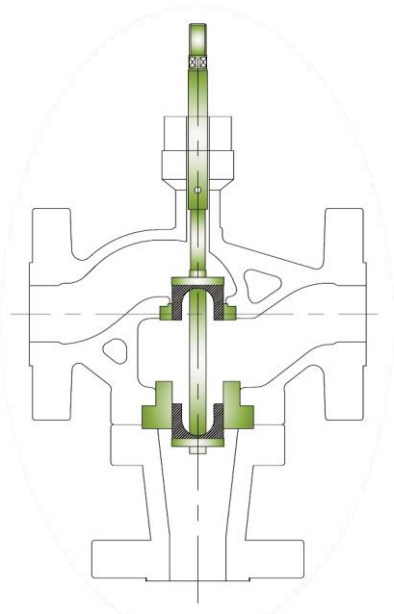
Body-Size: 15A to 300A Body
Material: Spec Reference Port
Material: Spec Reference Seat
Material: Spec Reference
Actuators: Diaphragm Actuator
Pressure Rating: JIS 10K RF/ANSI 150 to 2500

GENERAL

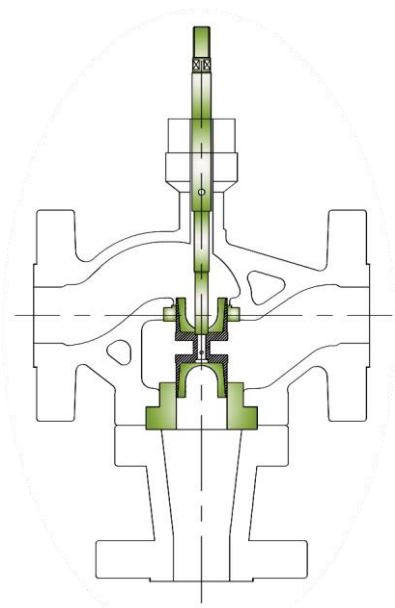
The design of DY F&C 3-Way control globe valves are generally used either to mix flowing medium or to divert on medium into two outlet flows, and are often used when fluid temperature is to be adjusted through heat exchangers.
Mixing-type valves also can be used for diverting service when both the nominal size pressure differential is small. However, the mixing type is more suitable when the nominal size is larger than 4"and the pressure differential is also considerable.
Standard 3-Way valve combine diaphragm actuator with multi-spring.

FEATURES

- LARGE CAPACITY
- REASONABLE FLOW CHARACTERISTICS
- DURABLITY
- ECONOMICAL
- EASY TO INSTALL & MAINTENANCE

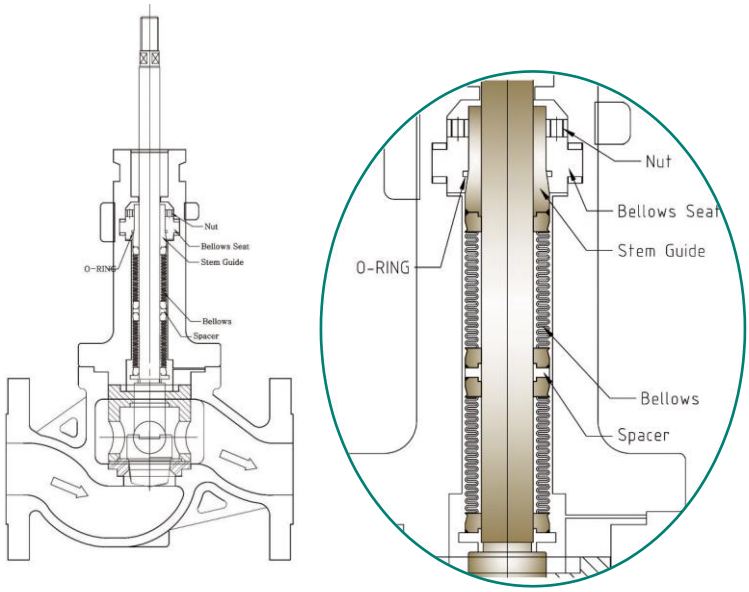


Dividing Type



Mixing Type

Bellows Seal Type 2 -Way & 3-Way Globe Valve



GENERAL

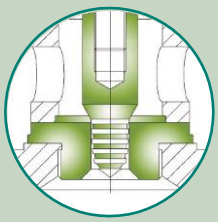
Wasted material, employee safety, environmental concerns all good reasons for today's plant operator to be concerned about fugitive emissions from hazardous processes.
To stop packing leakage from control valves.
Using a formed a formed metal bellows design with minimal welded joint, the design of DY F&C bellows has a full- cycles lift up to 5 a hundred thousand cycles.
This ensures years of safe and reliable operation in hazardous process ranging from−160℃(-230℉)~350℃(688℉) and pressure to 40(kgf/cm2).
A metal should envelopes the bellows acting as a pressure boundary in service, allowing use of a single, pressurized gasket seal and preventing fluid contact with the bellows housing during normal operation.

FEATURES

- Zero-Leakage stem & seal.
- Available with SUS316 or SUS316L bellows.
- No bellows tension
- Bellows is in a relaxed state at valve's closed position.
- No bellows erosion / fluid impingement
- Bellows is out of flow stream
- No special packing requirements
- Uses standard DY F&C V-PTFE packing materials.
- Multiple temperature applications
- Temperature range from -160℃ ~ 350℃.

Cascade Trim (Unbalanced Single)

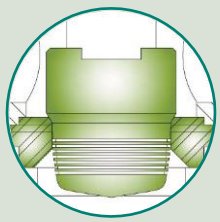
- Single Cascade – type 1



- Description
  A cage guided plug throttling trim designed primarily for high pressure drop water applications where cavitation's, vibration and excessive wear occur with conventional trims.

- Application
  - High press heater–cooling water control.
  - Anti–cavitations, Low noise valve
  - Rangeability = 50:1

- Single Super Cascade – type 2



- Description
  Cage guiding is standard.
  Includes a seating angle of 30″ on the plug and 32″ in the cage seat.
  This material is highly resistant to erosion and has proven most suitable for the service.

- Application
  - High press heater–cooling water control.
  - Anti–cavitations, Low noise valve
  - Rangeability = 50:1 ~ 70:1

SingleSeatGlobe&Angle(Unbalance)

Construction

- A single seated, heavy top & Retainer guided top valve designed to handle a wide variety of process control application.
- Pressure reduction trim of S-Series is noise attenuation and anti-cavitations trim options. It is well suited to handle a wide range process.
- Small size (1/4", 1/2", 3/4", 1") is compact globe & angle style valve designed especially for micro flow control.

Design Flexibility / Option

- Reduced port area & Micro flow control trim
- Various characteristic/EQ%.Linear.Modified%.Quick-change. Others.
- Various trim materials: Hardened trim. Stellite. Heat treatment. Others.
- Soft seat design / Class VI
- Low emission device/ Live loading packing arrangement/ Bellows seal bonnet
- Cryogenic service valve/ Long extension welded Bonnet with cold box application
- Actuator/ Spring Diaphragm. Double Cylinder. Single Cylinder.

Construction	Single-Seated Globe Valve
Size	3/4″ to 12″
Rating	Class 150# to 2500#
Characteristic	Linear, EQ%, Mod%, Q-open.
Seat Leakage	FCI 70-2 Class IV, V, VI
	ANSI B16.104
Rangeability	30:1 50:1 70:1 100:1

Construction	Single Seated Angle Valve
Size	3/4″ to 12″
Rating	Class 150# to 2500#
Characteristic	Linear, EQ%, Mod%, Q-open.
Seat Leakage	FCI 70-2 Class IV, V, VI
	ANSI B16.104
Rangeability	30:1 50:1 70:1 100:1

Cv Chart

Micro Flow Trim

Trim No.	Flow Coefficient Cv								Spring Range	Max. Supply	Critical Flow Min. FL
	Min	Intermediate Cv						Max	psi	psi	
9	0.0016	0.002	0.0024	0.0028	0.0032	0.0036		0.004	3-15	18.0	0.85
8	0.004	0.005	0.006	0.007	0.008	0.009		0.010	3-15	18.0	0.85
7	0.010	0.013	0.016	0.019	0.021	0.023		0.025	3-15	18.0	0.85
6	0.020	0.025	0.030	0.035	0.040	0.045		0.050	3-15	18.0	0.85
5	0.04	0.05	0.06	0.07	0.08	0.09		0.10	3-15	18.0	0.85
4	0.10	0.13	0.16	0.19	0.21	0.23		0.25	3-15	18.0	0.90
3	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	6-24	30.0	0.90
2	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	6-24	30.0	0.92
1	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.3	6-24	30.0	0.92
0	1.5	1.9	2.3	2.6	2.9	3.2	3.8	3.8	6-24	30.0	0.92

Anti-Cavitation Trim - Linear

Trim No.	Flow Coefficient Cv								Spring Range	Max. Supply	Critical Flow Min. FL
	Min	Intermediate Cv						Max	psi	psi	
C6	0.02	0.025	0.030	0.035	0.04	0.045		0.05	6-24	30.0	2900
C5	0.04	0.05	0.06	0.07	0.08	0.09		0.10	6-24	30.0	2900
C4	0.10	0.13	0.16	0.19	0.21	0.23		0.25	6-24	30.0	2900
C3	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	6-24	30.0	1450

Ultra Microflow Trim

Valve Size	Trim No.	CV Coefficients	Rangeability		Orifice Diameter	Port Area m2
			Linear	Eq%		
1/4″ 1/2″ 3/4″	U1	0.001	15 : 1	N/A	0.0625	0.0031
	U2	0.006	15 : 1	N/A	0.0625	0.0031
	U3	0.004	15 : 1	N/A	0.0625	0.0031
	U4	0.00027	15 : 1	N/A	0.0625	0.0031
	U5	0.00018	15 : 1	N/A	0.0625	0.0031
	U6	0.00012	15 : 1	N/A	0.0625	0.0031
	U7	0.00008	15 : 1	N/A	0.0625	0.0031
1/4″	U8	0.00005	15 : 1	N/A	0.0625	0.0014
	U9	0.000036	15 : 1	N/A	0.042	0.0014

Option : Rated Cv 0.000024, 0.000006, 0.000004 Rangeability 15:1 Orifice Dia 0.042″ Port Area 0.0014m²

Cv, FL Tarvel Chart

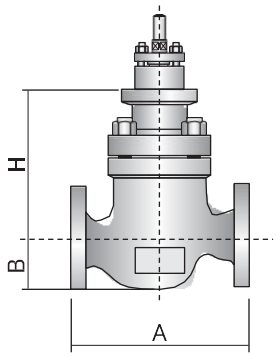
Contoured Trim / Globe & Angle Valves - L i n e a r

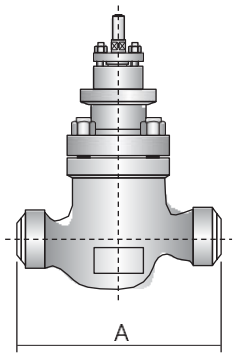
Percent of Travel			10	20	30	40	50	60	70	80	90	100
FL			0.93	0.93	0.92	0.92	0.91	0.91	0.91	0.90	0.90	0.90
Valve Size	Orifice Dia	Travel(mm)	Rated Cv									
3/4, 1″	0.156″	10	0.026	0.045	0.065	0.084	0.103	0.123	0.142	0.161	0.181	0.2
	0.250″	20	0.104	0.181	0.259	0.336	0.413	0.491	0.568	0.645	0.723	0.8
	0.375″		0.455	0.793	1.132	1.470	1.808	2.147	2.485	2.823	3.162	3.5
	0.500″		0.650	1.133	1.617	2.100	2.583	3.067	3.550	4.033	4.517	5.0
	0.750″		1.170	2.040	2.910	3.780	4.650	5.520	6.390	7.260	8.130	9.0
1″	1.000″		2.080	3.627	5.173	6.720	8.267	9.813	11.360	12.167	14.453	16.0
1-1/2″	1″	20/30	3.250	5.667	8.083	10.500	12.917	15.333	17.750	20.167	22.583	25.0
	1.580″		4.550	7.933	11.317	14.700	18.083	21.467	24.850	28.233	31.617	35.0
2″	1.580″	30	4.94	8.61	12.29	15.96	19.63	23.31	26.98	30.65	34.33	38.0
	2.000″		6.11	10.65	15.20	19.74	24.28	28.83	33.37	37.91	42.46	47.0
2-1/2″	2.000″	30/40	6.50	11.33	16.17	21.00	25.83	30.67	35.50	40.33	45.17	50.0
	2.500″		9.49	16.55	23.60	30.66	37.72	44.77	51.83	58.89	65.94	73.0
3″	2.000″	30/40	7.15	12.47	17.78	23.10	28.42	33.73	38.05	44.37	49.68	55.0
	3.000″		13.65	23.80	33.95	44.10	54.25	64.40	74.55	84.70	94.85	105.0
4″	3.150″	40/50	14.30	24.93	35.57	46.20	56.83	67.47	78.10	88.73	99.37	110.0
	4.000″		24.70	43.07	61.43	79.80	98.17	116.53	134.90	153.27	171.63	190.0
9″	4.000	40/50	26.00	45.33	64.67	84.00	103.33	122.67	142.00	161.33	180.67	200.0
	6.000″	50/70	98.67	98.67	129.33	168.00	206.67	245.33	284.00	322.67	361.33	400.0

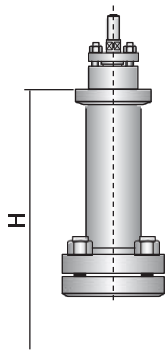
Contoured Trim / Globe & Angle Valves - Equal %

Percent of Travel			10	20	30	40	50	60	70	80	90	100
FL			0.93	0.93	0.92	0.92	0.91	0.91	0.91	0.90	0.90	0.90
Valve Size	Orifice Dia	Travel(mm)	Rated Cv									
3/4, 1″	0.250″	20	0.015	0.200	0.028	0.039	0.055	0.077	0.108	0.152	0.214	0.3
			0.038	0.053	0.074	0.104	0.146	0.205	0.288	0.405	0.569	0.8
	0.375″		0.164	0.230	0.324	0.455	0.639	0.898	1.262	1.773	2.491	3.5
	0.500″		0.234	0.329	0.462	0.650	0.913	1.283	1.802	2.533	3.558	5.0
	0.750″		0.422	0.592	0.832	1.169	1.643	2.309	3.244	4.559	6.405	9.0
1″	1.000″		0.749	1.053	1.480	2.079	2.921	4.105	5.767	8.104	11.387	16.0
1-1/2″	1″	20/30	1.171	1.645	2.312	3.248	4.564	6.413	9.012	12.662	17.792	25.0
	1.580″		1.640	2.300	3.240	4.550	6.390	8.980	12.620	17.730	24.910	35.0
2″	1.580″	30	1.78	2.50	3.51	4.94	6.94	9.75	13.70	19.25	27.04	38.0
	2.000″		2.20	3.09	4.35	6.11	8.58	12.06	16.94	23.81	33.45	47.0
2-1/2″	2.000″	30/40	2.34	3.29	4.62	6.50	9.13	12.83	18.02	25.32	35.58	50.0
	2.500″		3.28	4.61	6.47	9.09	12.78	17.96	25.23	35.45	49.82	70.0
3″	2.000	30/40	3.33	4.67	6.56	9.23	12.96	18.21	25.93	35.96	50.53	71.0
	3.000″		4.92	6.91	9.71	13.64	19.17	26.94	37.85	53.18	74.73	105.0
4″	3.150″	40/50	5.15	7.24	10.17	14.29	20.08	28.22	39.65	55.71	78.28	110.0
	4.000″		8.90	12.50	17.57	24.69	34.69	48.74	68.49	96.23	135.22	190.0
9″	4.000″	40/50	9.18	12.90	18.12	25.48	35.78	50.28	70.65	99.27	139.49	196.0
	6.000″	50/70	18.73	26.32	36.99	51.97	70.59	102.62	144.19	202.60	284.67	400.0

Dimensions







ANSI Class 150-600

unit/mm

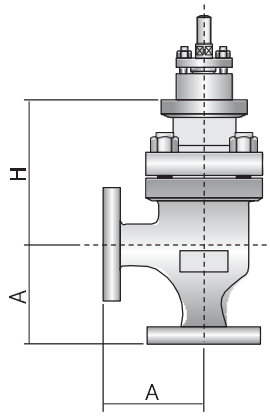
valve Size (Inch)	A						B		H			
	ANSI Class 150		ANSI Class 300		ANSI Class 600		ANSI Class 150~300	ANSI Class 600	ANSI Class 150~300		ANSI Class 600	
	Rf	Welding	Rf	Welding	Rf	Welding			Standard Bonnet	Extension Bonnet	Standard Bonnet	Extension Bonnet
1/2″	184	206	190	206	203	206	50	50	150	260	155	270
3/4″	184	210	194	210	206	210	50	50	155	270	170	296
1″	184	210	197	210	210	210	55	55	155	270	170	296
1.5″	222	251	235	251	251	251	62	72	190	315	206	350
2″	254	286	267	286	286	286	75	80	255	370	270	402
2.5″	276	292	292	292	311	311	90	100	276	380	295	430
3″	298	318	318	318	337	337	110	120	280	390	320	454
4″	352	368	368	368	394	394	110	140	320	440	346	488
6″	451	473	473	473	508	508	170	182	385	451	398	520
8″	543		568		610	610						
10″	673		708		752	752						

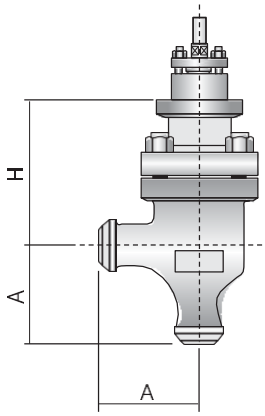
ANSI Class 900-2500

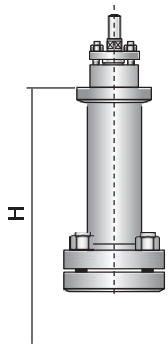
unit/mm

valve Size (Inch)	A						B		H			
	ANSI Class 900		ANSI Class 1500		ANSI Class 2500		ANSI Class 900~1500	ANSI Class 600	ANSI Class 900~1500		ANSI Class 2500	
	Rf	Welding	Rf	Welding	Rf	Welding			Welding	Extension Bonnet	Welding	Extension Bonnet
3/4″	273	279	273	279	318	318	60	70	230	350	280	410
1″	273	279	273	279	318	318	70	80	230	350	280	410
1.5″	333	330	333	330	381	381	80	100	265	390	320	474
2″	375	375	375	375	400	400	100	120	280	440	355	515
2.5″	410	410	410	410	441	441	120	135	324	480	380	568
3″	441	460	460	460	660	660	140	150	360	540	446	630
4″	511	530	530	530	737	737	170	185	405	636	498	715
6″	714	768	768	768	864	864	220	230	510	720	562	850

Dimensions







ANSI Class 150-600

unit/mm

valve Size (Inch)	A						H			
	ANSI Class 150		ANSI Class 300		ANSI Class 600		ANSI Class 150~300		ANSI Class 600	
	Rf	Rf	Rf	Rf	Rf	Rf	Extension Bonnet	Extension Bonnet	Extension Bonnet	Extension Bonnet
3/4″	98	98	98	98	105	210	155	270	170	296
1″	98	98	98	98	105	210	155	270	170	296
1.5″	112	126	126	126	126	251	190	315	206	350
2″	127	132	132	132	143	143	230	370	270	402
2.5″	138	146	146	146	156	156	276	380	295	430
3″	149	159	159	159	169	169	280	390	320	454
4″	176	184	184	184	197	197	320	440	346	488
6″	226	238	238	238	254	254	385	451	398	520

ANSI Class 900-2500

unit/mm

valve Size (Inch)	A						H			
	ANSI Class 150		ANSI Class 300		ANSI Class 600		ANSI Class 150~300		ANSI Class 600	
	Rf	Rf	Rf	Rf	Rf	Rf	Extension Bonnet	Extension Bonnet	Extension Bonnet	Extension Bonnet
3/4″	36	139	136	139	59	159	230	350	280	410
1″	136	139	136	139	159	159	230	350	280	410
1.5″	166	166	166	166	191	191	265	390	320	474
2″	187	187	187	187	205	205	280	440	355	515
2.5″	205	205	205	205	221	221	324	480	380	568
3″	230	230	230	230	330	330	360	540	446	630
4″	265	265	265	265	369	369	405	636	498	715
6″	384	384	384	384	432	432	510	720	562	850

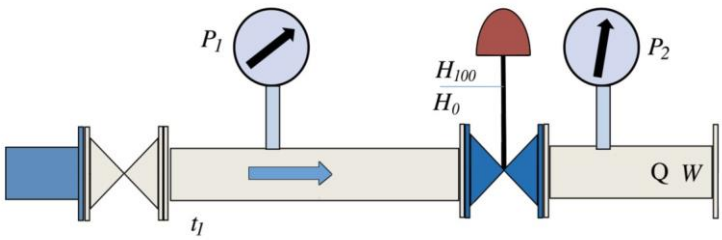
Valve Sizing

Calculating the Ky coefficient

The Ky coefficient is calculated according to DIN EN 60534.
The data sheets contain the necessary device-specific specifications.
A preliminary, simplified calculation may be made with the help of the working equations listed below. They do not take into ac-count the influence of the connecting fittings or choked flow at critical flow velocities.

Selecting the valve

After calculating the Ky coefficient, the corresponding Kys coefficient of the valve type in question is selected from the datasheet.
In case, real operating data are used in the calculation, the following generally applies: Kvmax~ 0.7 to 0.8 - Kvs.



P_1 Pressure upstream of the valve
P_2 Pressure downstream of the valve
H Travel
Q Flow rate in m³/h
W Flow rate in kg/h
ρ Density in kg/m³ (Generally also with liquids)
ρ_1 Upstream density in kg/m³ (with gases and vapors)
t_1 Temperature in °C upstream of the valve

Medium	Liquid		Gases		Steam
pressure drops	m³/h	kg/h	m³/h	kg/h	kg/h
$P_2 > \frac{P_1}{2}$ $\Delta P < \frac{P_1}{2}$	$K_V = Q\sqrt{\frac{\rho}{1000\Delta P}}$	$K_v = \frac{W}{\sqrt{1000\rho\Delta P}}$	$K_v = \frac{Q_G}{519}\sqrt{\frac{\rho_G T_1}{\Delta\rho P_2}}$	$K_v = \frac{W}{519}\sqrt{\frac{T_1}{\rho_G \Delta P P_2}}$	$K_v = \frac{W}{316.2}\sqrt{\frac{V_2}{\Delta P}}$
$P_2 < \frac{P_1}{2}$ $\Delta P > \frac{P_1}{2}$			$K_v = \frac{Q_G}{259.5 P_1}\sqrt{\rho_G T_1}$	$K_v = \frac{W}{259.5 P_1}\sqrt{\frac{T_1}{\rho_G}}$	$K_v = \frac{W}{316.2}\sqrt{\frac{2V^*}{P_1}}$

Including :

P_1	[bar]	Absolute pressure pabs
P_2	[bar]	Absolute pressure pabs
ΔP	[bar]	Absolute pressure pabs
T_1	[K]	273+t1
Q_G	[m³/h]	Flow rate of gas, based on 0°C and 1013 mbar
ρ	[kg/m³]	Density of liquids
ρ_G	[kg/m³]	Density of gases at 0°C and 1013 mbar
V_1	[m³/kg]	Specific volume (v' from stream table) for p1 and t1
V_2	[m³/kg]	Specific volume (v' from stream table) for p2 and t1
V^*	[m³/kg]	Specific volume (v´ from stream table) for $\frac{p_1}{2}$ and t1

$$C_v = q\sqrt{\frac{G_f}{\Delta P}}$$

where
q = gpm(gallons per minute)
G_f = liquid specific gravity
ΔP = pressure drop in psi

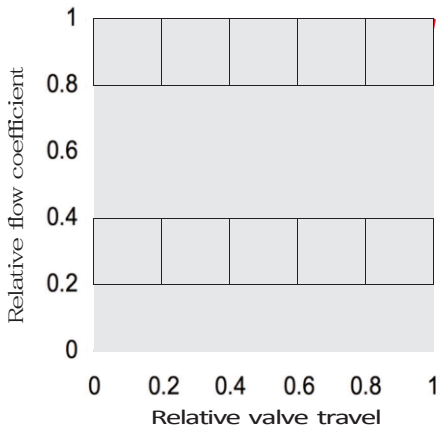
Hence, the sizing standard S75.01. In metric units, with q in cubic meters per hour and pressure drop in bar,

$$\frac{C_v}{1.17} = K_v = q\sqrt{\frac{G_f}{\Delta P}}$$

Then, $C_v = K_v \times 1.17$

Control Valve Inherent Flow Characteristics

Figure A



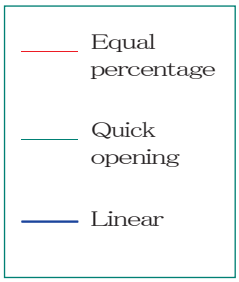
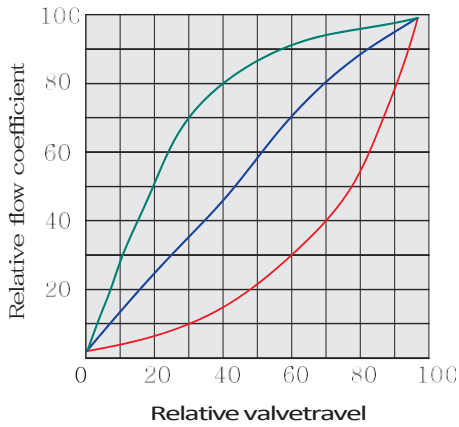


Figure A-1



Flow Characteristics

The flow characteristic of a control valve is the relationship between the flow rate through the valve and the valve travel as the travel is varied from 0 to 100%. Inherent flow characteristic refers to the characteristic observed with a constant pressure drop across the valve. Installed flow characteristic means the one obtained in service where the pressure drop varies with flow and other changes in the system.

Characterizing control valves provides for relatively uniform control loop stability over the expected range of system operating conditions. To establish the flow characteristic needed to match a given system requires a dynamic analysis of the control loop. Analyses of the more common processes have been performed, however, so some useful guidelines for the selection of the proper flow characteristic can be established those guidelines will be discussed after a brief look at the flow characteristics in use today.

Figure A, Figure A-1 illustrates typical flow characteristic curves. The quick-opening flow characteristic provides for maximum change in flow rate at low valve travels with a nearly linear relationship. Additional increases in valve travel give sharply reduced changes in flow rate, and when the valve plug nears the wide open position, the change in flow rate approaches zero. In a control valve, the quick opening valve plug is used primarily for on-off service; but it is also suitable for many applications where a linear valve plug would normally be specified. The linear flow characteristic curve shows that the flow rate is directly proportional to the valve travel. This proportional relationship produces a characteristic with a constant slope so that with constant pressure drop, the valve gain will be the same at all flows.(valve gain is the ratio of an incremental change in valve plug position. Gain is a function of valve size and configuration, system operation conditions and valve plug characteristic.) The linear valve plug is commonly specified for liquid level control and for certain flow control applications requiring constant gain.

In the equal-percentage flow characteristic, equal increments of valve travel produce equal percentage changes in the existing flow. The change in flow rate is always proportional to the flow rate just before the change in valve plug, disk, or ball position is made. When the valve plug, disk, of ball is near its seat, the flow is small; with a large flow, the change in flow rate will be large. Valves with an equal percentage flow characteristic are generally used on pressure control applications and on other applications where a large percentage of the pressure drop is normally absorbed by the system it- self, with only a relatively small percentage available at the control valve. Valves with an equal percentage characteristic should also be considered where highly varying pressure drop conditions can be expected.

[Reference : ISA - Control Valve]