

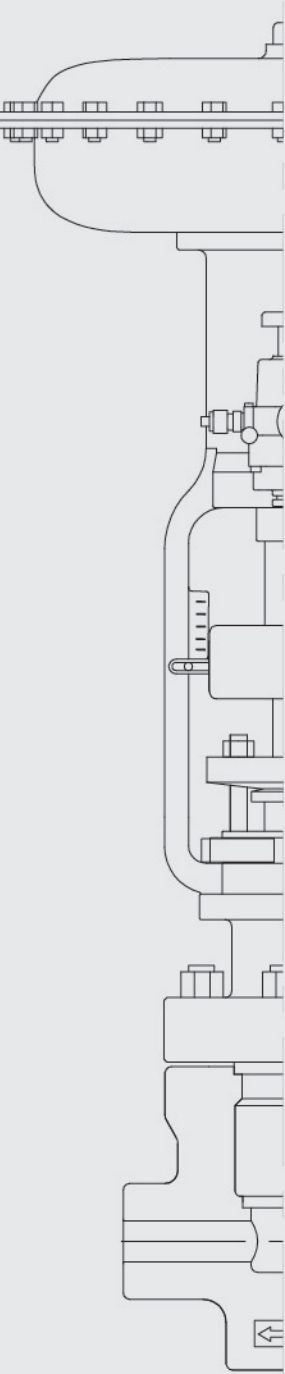
- Innovative principle of pressure reduction and throttling
- Energy efficiency, assurance(the best heat rate assurance)
- Solve application problems with circulatory convection disc mechanism
- Long service life, cost saving

Energy Fluid Technology Solution

Delan 德兰调节阀
DELAN MJ2500 SERIES

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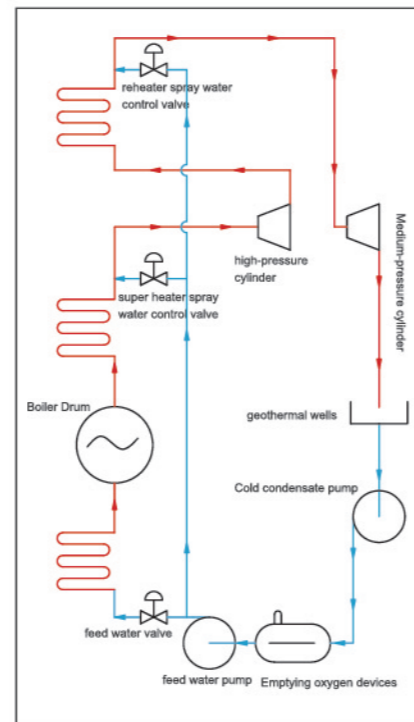
Typical Application



There are different load requirements in many power plants, and thus different steam temperature. Steam temperature control is of great importance for co-generation power plant's safety, reliability and efficient operation. Spray water control valve is used to maintain the desuperheating water flow for the main steam and reheat steam temperature control. They are one of the key components for accurate regulation of steam temperature. Excellent steam temperature control will be able to keep the throttle temperature at the set point and thus ensure the turbine's efficient operation. Spray water control valve can also be applied to the control of high pressure fluid in petroleum and chemical industry.

Requirements for spray water control valve

- Within the whole load range, provide the required spraying quantity precisely in accordance with the control circuit's requirement.
- When operating under the circumstance of high pressure drop (the highest pressure will be 32Mpa or 4641psi), there won't be any damage to the trim assembly.
- Reliable and stable operation.
- Tight shutoff will prevent the valve or downstream facilities (such as turbine and high pressure pipe system) from damage.

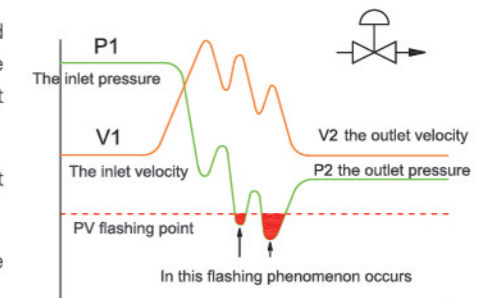


Typical spray water system diagram

Valve Characteristic

Consequences of spray water control valve's failure

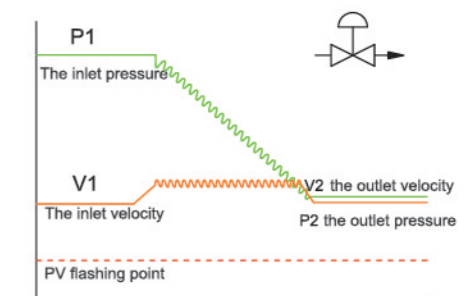
- Heat efficiency lose: due to the drop of throttle steam temperature caused by spray valve leakage, heat efficiency will be affected and extra heat will be needed for the boiler to keep the throttle steam temperature at the set point.
- Temperature control: poor control of the steam temperature may also affect the high pressure steam pipe and turbine.
- When the pressure is higher than 12.4Mpa(1800psi), each temperature change of 19–22°C(34–40°F) would lead to 1% heat efficiency change.
- Higher maintenance cost: frequent replacement and maintenance will be needed due to the plug erosion damage.



general spray water valve cavitation & flash phenomenon

Performance of spray water control valve's failure

- Erosion damage: due to the plug stage deficiency or excessive operation speed.
- Fatigue rupture of the stem: usually caused by frequent stem vibration and fatigue rupture due to excessive plug operation speed.

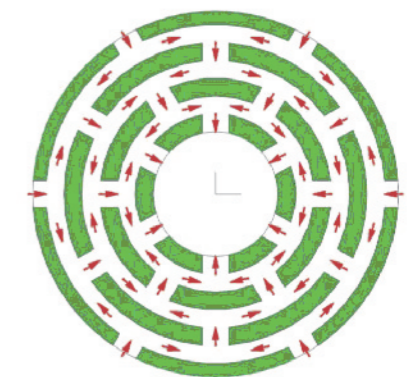


Cycle convection pressure-reducing structure to avoid cavitation and flashing phenomenon

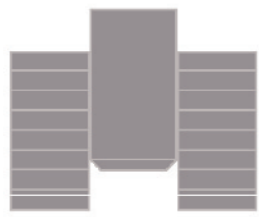
Circulatory convection theory, multi-stage pressure reducing structure

Innovative design concept

- Circulatory convection structure control valve is a new generation of control valve for high pressure difference and anti-cavitation application which is developed from multiple orifice, anti-cavitation sleeve valve, multi-stage plug throttle control valve and labyrinth disc control valve. Circulatory convection disc, as the key component applies special structure and technology. Compared with the popular labyrinth disc, it has the similar appearance but rather different function and mechanism. Labyrinth disc has several independent and tortuous groove passages on the round disc, which can add resistance and reduce pressure gradually through a number of turns, and then prevent cavitation during the process of pressure reducing. Circulatory convection disc also has dozens of groove passages. Fluid makes their way from outer ring to inner ring through the Radial slot. During this process, a portion of the fluid divided while the other portion joined together. The hit, friction and swirl produced by the high speed molecule will consume a large volume of energy and reduce pressure more efficiently. It has a better pressure reducing, anti-cavitation, noise attenuation performance and longer service life compared with labyrinth disc.



circulatory convection mechanism



welding assembly

- Circulatory convection disc ensures precise control and reliable operation under any flow conditions.
- The groove's number and size of each disc are different. Discs with different flow resistance can be designed in accordance with different pressure differential in different systems. "Wavelike" circular flow in the disc stack improves the capability of pressure and velocity reduction and thus ensures the required spraying quantity for the valve of different opening and excellent temperature maintenance.

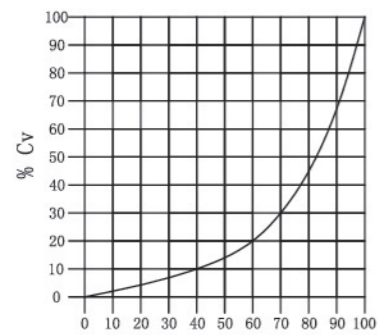
Characteristics of spray water control valve's design



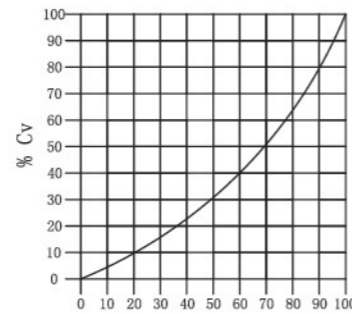
Wave type closure principle

- Multistage pressure reducing structure, avoids cavitation efficiently, prolongs service life.
- All the trims can be quickly removed and replaced, easy to maintain with less cost.
- Excellent seat and plug sealing property of zero leakage ensures reliable, repeatable and long-time closure under great pressure.
- Higher rangeability of temperature, maintains small spraywater flow under normal load while a larger one under low load.

- Valves can be customized to be applied to a wider variation range (%Cv /% stroke)



% stroke equal percent



% improved stroke equal percent

Design Standards

- Design and manufacture: ASME B16.34 JB/T 3595
- Check and test: JB/T 3595, MSS SP61
- Class of design: special, limited, standard
- End connection
 - socket welding ends: ASME B16.11
 - butt welding ends: ASME B16.25
 - flange ends: ASME B16.5

Anatomical Drawing

Garlock Inside

Stem sealing: the use of garlock high pressure packing ensures the best sealing and lubrication performance.

Multi-stage Control Disc

lower pressure, control velocity and erosion, provide better control compared with stock throttle valves.

Flexible Graphite Of High Strength

Flexible Graphite Of High Strength

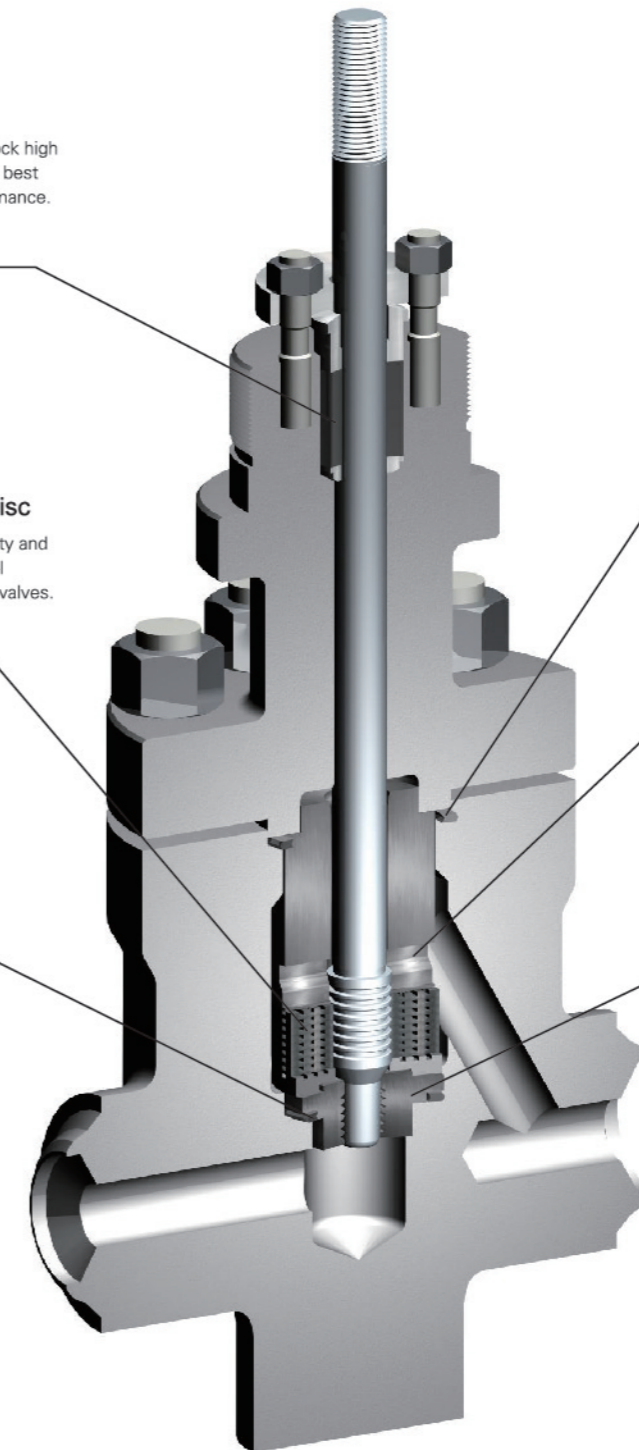
ensure reliable sealing performance

orifice

equal percent orifice

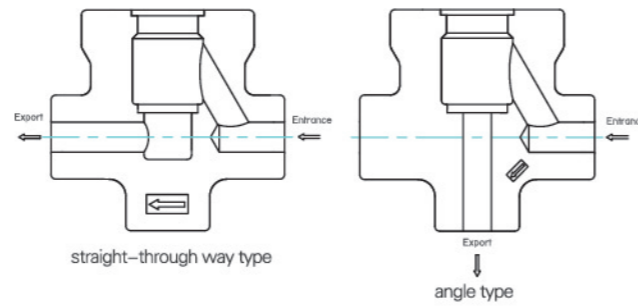
easy-to-handle seat

without welding or grinding, the check, maintenance and replacement of the plug will be quick and easy.



Technical Parameters

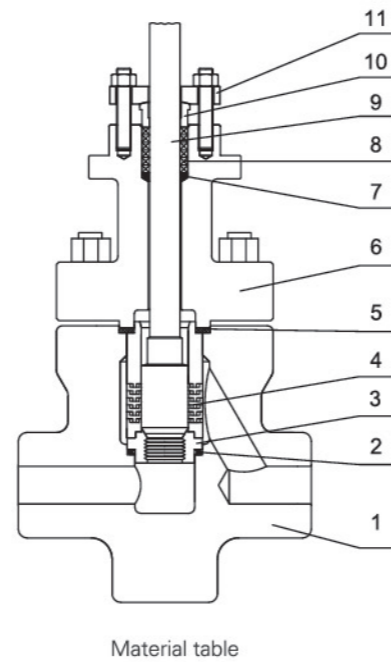
- nominal diameter: 3/4" –6"
- nominal pressure: ANSI 150Lb ~ 4500Lb
- Body type: straight-through way type, angle type
- operation temperature: 150°C~450°C
- Flow characteristics: equal percentage
- Actuator: electric or pneumatic actuator
- Leakage: meet ANSI B16. 104 V leakage (VI level seal is available)



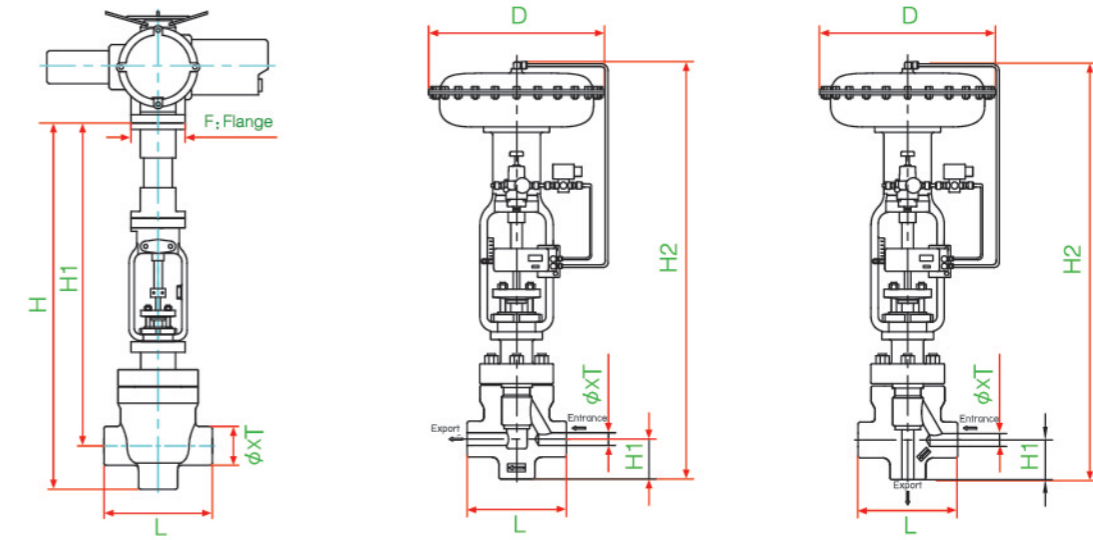
Both the pneumatic and electric valves have handwheels. In condition of gas or power loss manual operation is available to maintain throttling capability.

Material Table

No	Name	Material
1	body	A105
2	seat gasket	flexible graphite with 316 stainless steel wire
3	seat	1Cr13+stellite
4	disc assembly	17-4PH
5	flange gasket	flexible graphite with 316 stainless steel wire
6	bonnet	25
7	packing seat	1Cr13
8	packing	flexible graphite
9	stem	1Cr13+stellite
10	gland	1Cr13
11	plate	45



Dimension and Weight



electric minimum flow valve

pneumatic straight-through way minimum flow valve

pneumatic angle type minimum flow valve

nominal diameter		L	H	H1	F: Flange	H2	H1	D	φxT	weight (KG)
Inch	mm	(mm)	(mm)	(mm)		(mm)	(mm)	(mm)		
3/4"	20	250	950	850	F10	884	100	333	pipe fittings according to user	80
1"	25	250	950	850	F10	884	100	333		80
1-1/2"	40	250	950	850	F10	884	100	333		80
2"	50	250	1035	935	F14	1058	100	406		86
2-1/2"	65	400	1115	1015	F14	1158	122	473		140
3"	80	498	1115	1015	F14	1258	140	473		220
4"	100	575	1320	1190	F14	1332	168	536		340
6"	150	700	1320	1190	F14	1332	212	536		380

Product Model

Size	Type	Pressure Rating	Connection	Body Material
2"	MX	15	F	C
Metric: mm	MX-pneumatic Actuator	1=150LB	W: Butt Weld	C: carbon steel
Imperial: Inch	KX-Electric Actuator	3=300LB	S: Socket Weld	
		6=600LB	F: Flange	
		9=900LB		
		15=1500LB		
		25=2500LB		
		35=3500LB		
		45=4500LB		

Performance Parameters

nominal diameter(mm)	20	25	32	40	50	65	80	100	150
nominal pressure(Mpa)	25, 32								
body structure	straght-through way type, angle type								
direction of flow	flow-to-close								
actuator	electric or pneumatic actuator								
KV	2.5	2.5	6.3	6.3	10	16	25	63	90
rated stroke	38	38	38	38	51	51	51	76	76
control signal	switch value control, 4-20Ma DC analog quantity control								
power source	electric:380V three-phase, single-phase; pneumatic: 0.4-0.7Mpa								