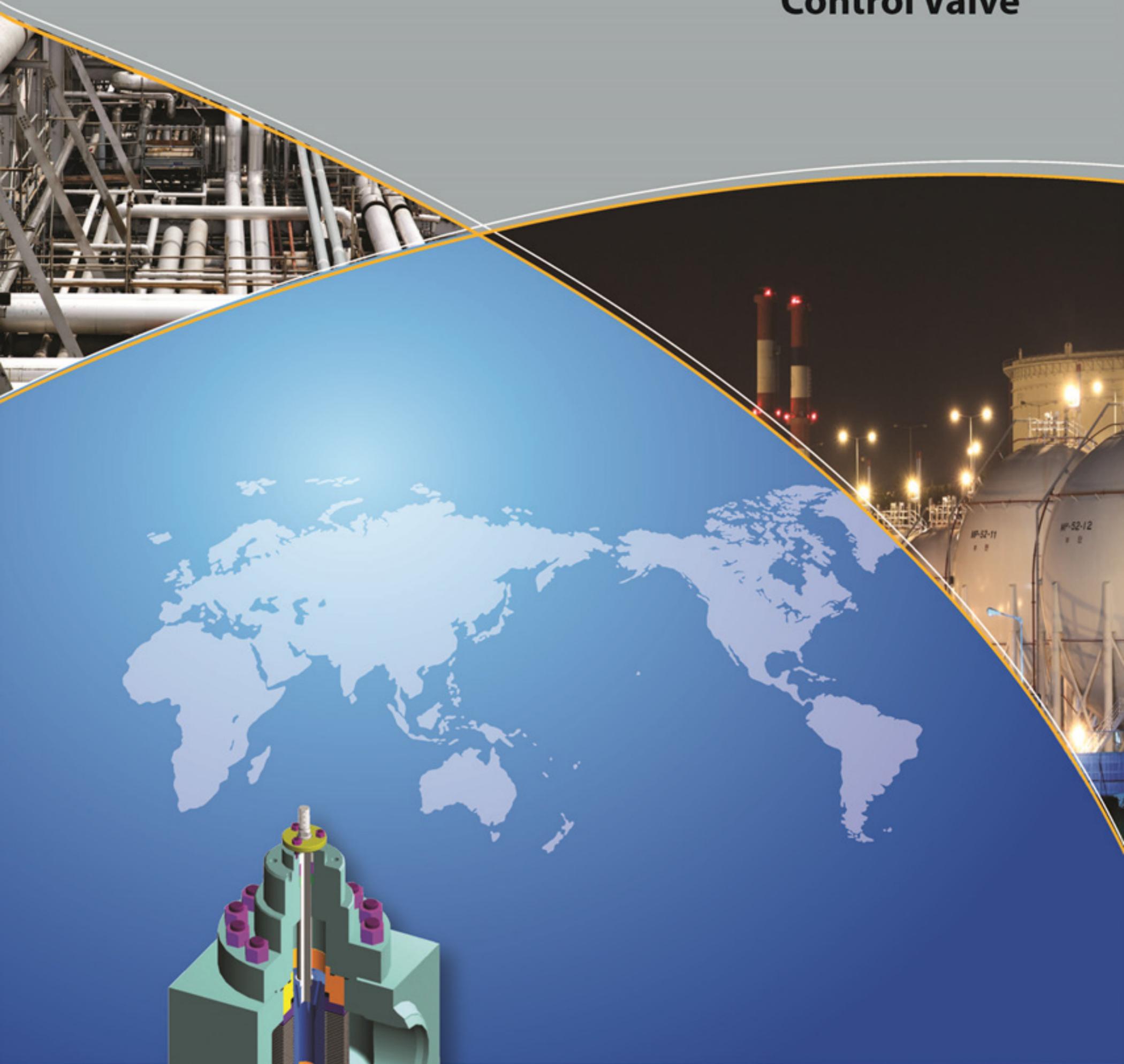


DV300-Series X(iks)-TRIM[®]

Severe Service Application
Control Valve



DV300-Series X [iks]-Trim®

X[iks]-Trim® is severe service application line high performance special trim that offers a proven solution to those severe service applications, where a true velocity control trim is the best or possible the only answer.

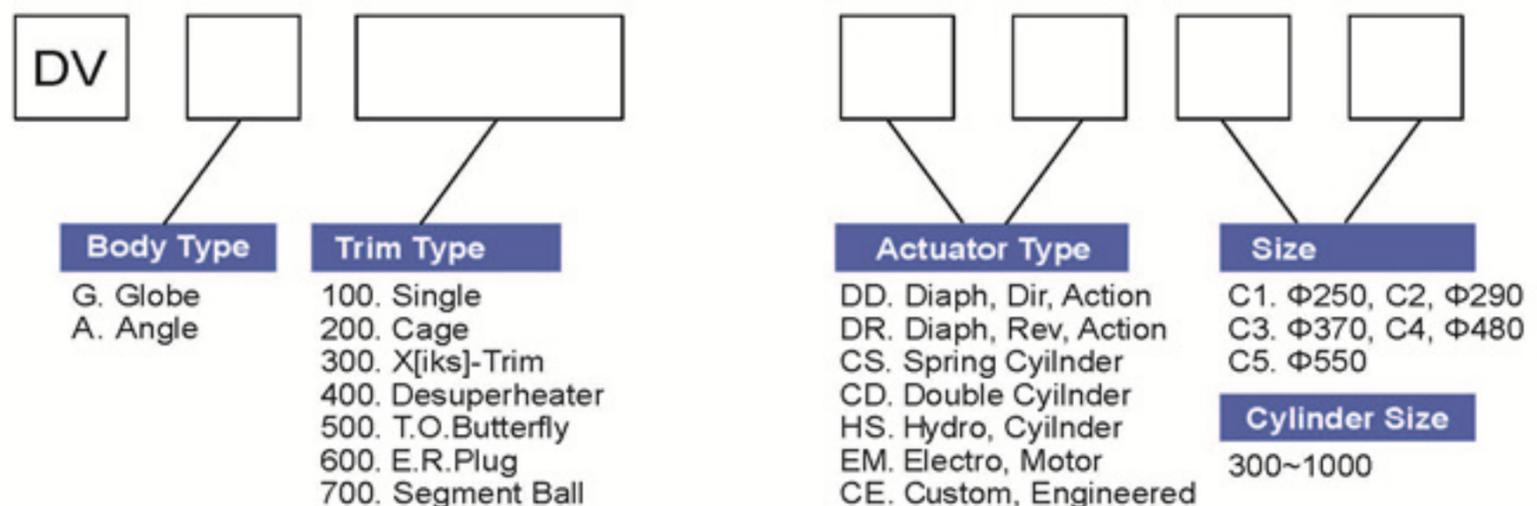
By limiting the fluid velocity inside the valve, X[iks]-Trim® disk stack design precludes those problems typically associated with high velocity such as erosion, noise vibration and poor control.

Every X[iks]-Trim® disc stack is custom-designed to meet the needs of the toughest liquid, Steam and gas service in the power and process industries.

Contents

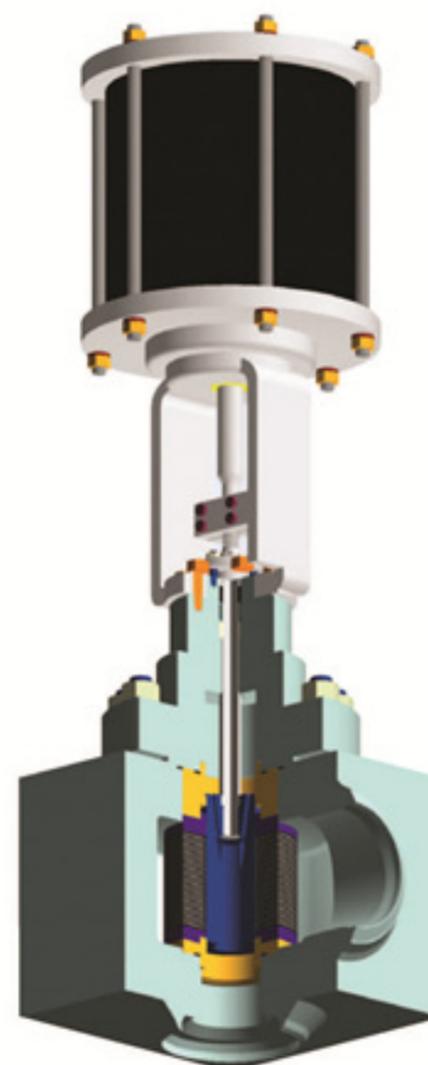
Introduction & Contents	2
Specification	3
Technology & Application	4/5
Body Materials & Temperature limits	6/7
Severe Service Application	8/9
Body Dimensions	10/11
Actuator Dimensions	12
Other type of Trim	13
Retrofit Program	14
Quality Assurance Requirement	15

DV Series Selection Guide



Specification

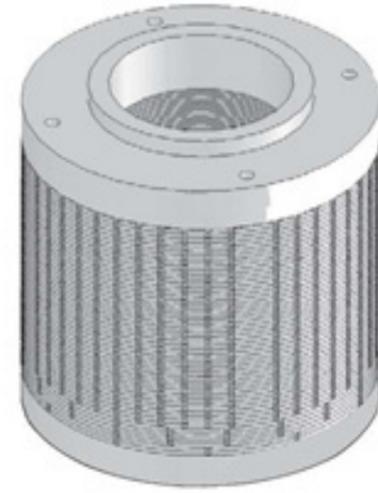
Body Size	1" to 36"
Body Style	Globe, Angle, Y-Globe
Pressure Rating	ANSI Class 150~2500 LBS
End Connection	Flanged, Socked welded, Butt welded Ring type joint, Others.
Trim Design	Unbalanced, Balanced and Auxiliary pilot
Bonnet Type	Bolted design, Pressure seal design
Seat Leakage	ANSI B16.104 CLASS IV (Standard), V (Optional), VI (Optional, Soft seat) Mss-sp-61 (Optional)
Turns	to 60 turns (Custom engineered)
Characteristic	Equal-%, Linear, Modified-% Custom engineered
Standard Materials	
Body & Bonnet	A216WCB / A105, A217 WC6 / A182 F11 A217WC9 / A182 F22, A182 F91 Stainless Steel, Tungsten, Titanium, Monel, Hastelloy, Others.
Trim (Stack, Plug & Seat)	316 SS, 410 SS, 420 SS, 420J2 SS, 630 SS F-11, F-22, F-91 with Stellite overlay Inconel, Other special materials
Balance Seal	RTFE "U" Seal Carbon with Metal seal Graphite+Inconel seal
Flow Coefficient(Cv)	Custom engineered
Rangeability	30:1 up to 800:1 Custom engineered



DV300-Series X[iks]-Trim® Disc Stack Application

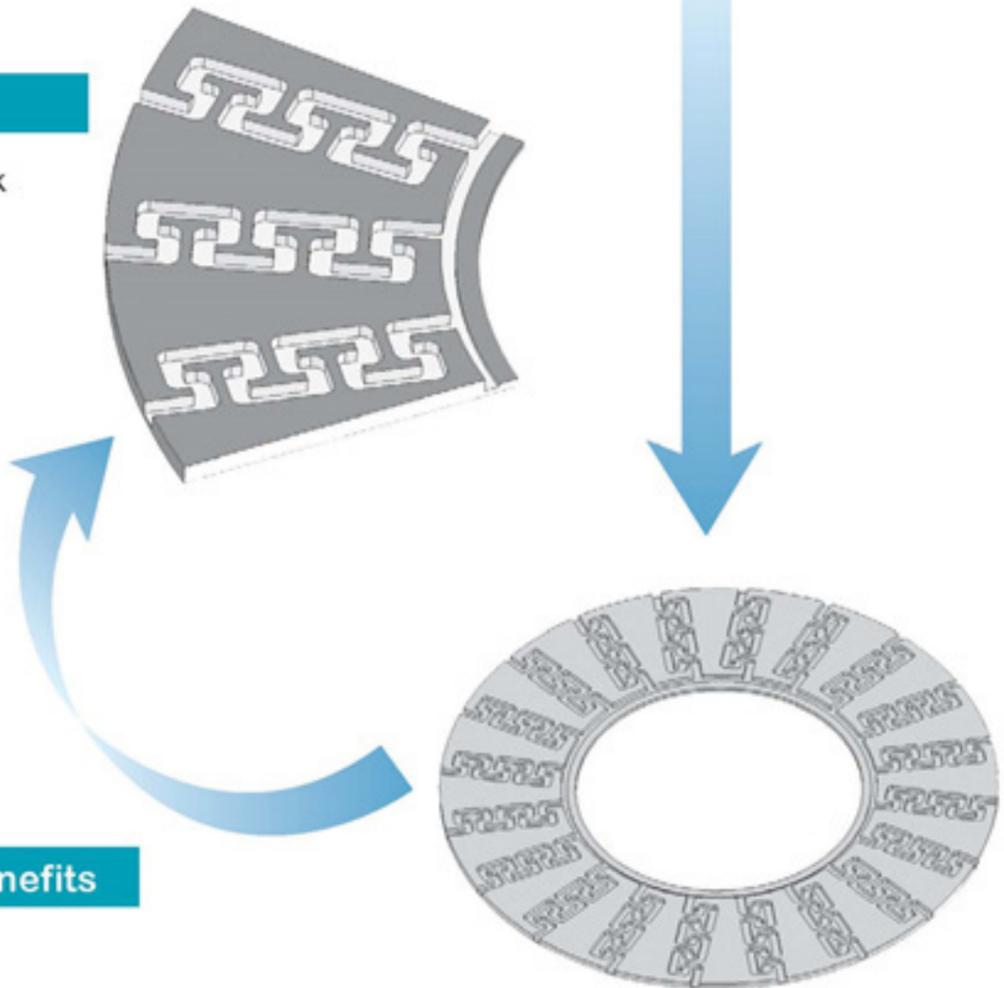
Severe Service Power Plant

- Main & Start-up feed pump recirculation
- Main & Booster feed water recirculation
- Condensate booster pump recirculation
- Deaerator level control
- Turbine by-pass steam generator blow down
- Auxiliary steam shoot blower control
- Boiler start-up main steam spray
- Pressurizer PORV/CVCS letdown
- HP coolant injection
- Atmospheric steam dump
- Atmospheric venting silencer



Severe Service for Oil & Gas

- Compressor recycle & Anti-surge / kick back
- Pump minimum flow & Recirculation
- Blow down discharge to vent flare
- Reactor depressurization
- Turbo expander by-pass
- Gas injection lift control
- Gas storage pressure letdown
- Gas flow regulation
- Pipeline anti-surge
- Heavy oil letdown
- Ethylene letdown
- Steam vent to atmosphere
- Gas choke valves



DV300 X[iks]-Trim Application Benefits

- Prolonged trim life
- Eliminates downtime
- Effective noise control
- Reduction of pipe fatigue
- Flexible characterization
- Control valve vibration
- Reduced maintenance cost
- Faster start-up

DV300-Series X[iks]-Trim®

Disk Stack

The DV300 X[iks]-Trim® disk stack incorporates a unique advanced design that is super at limiting flowing velocities to low levels resulting in valves providing service that is quiet, non-cavitations and non-erosive.

DV300 X[iks]-Trim® disk stack low velocity is achieved through the use of a trim cage made by bonding together a series of individual disks. Each disk has a pattern of carefully controlled orifices and channels with a multitude of sharp turns etched into its surface. As the trim plug travels within the cage the fluid is throttled and forced to travel an extremely torturous path with each turn effecting a stage of pressure drop.

The combined effect of numerous narrow flow channels, each with many sharp turns and a continually expanding flow path, removes kinetic energy from the fluid while gradually lowering its pressure. In doing so, abrupt velocity increases that are the source of noise are avoided.

The additional benefit for liquid flow is the elimination of cavitations and the damage it can do a valve, its trim and the down stream piping.

By its vary design, DV300 X[iks]-Trim® disk stack allows for many more stages of drop than conventional tortuous path times.

Resolves existing problems for both compressible and incompressible fluid flow applications, echnology benefits

- Increased plant production

- Reduced maintenance costs

- Elimination of damage from cavitation, noise and pipe vibration

- Prolonged trim life

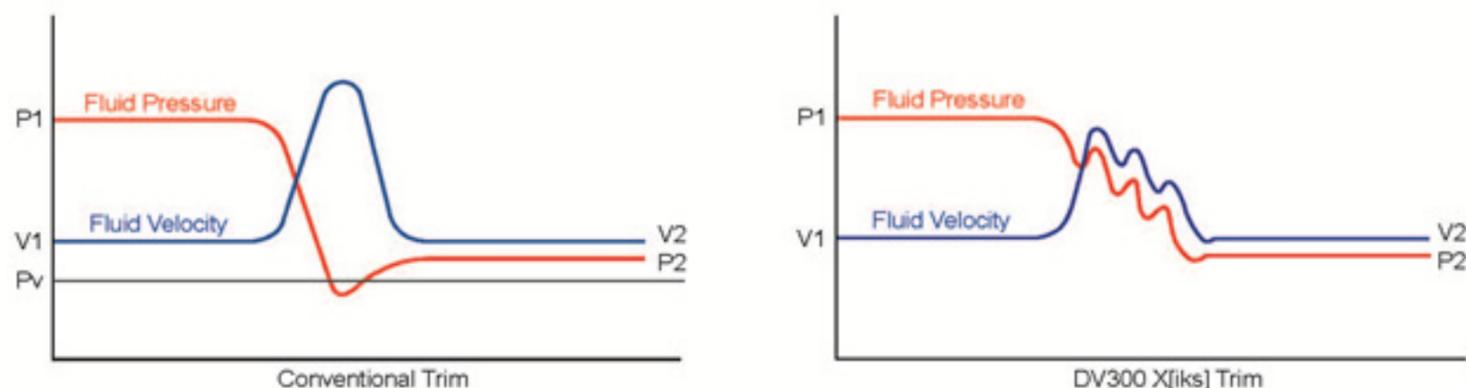
- Custom engineered valve designs to fit your piping construction.

- Simpler trim maintenance ; it's the trim structure of stack type (X[iks]-Trim®) and can be disassembled completely.

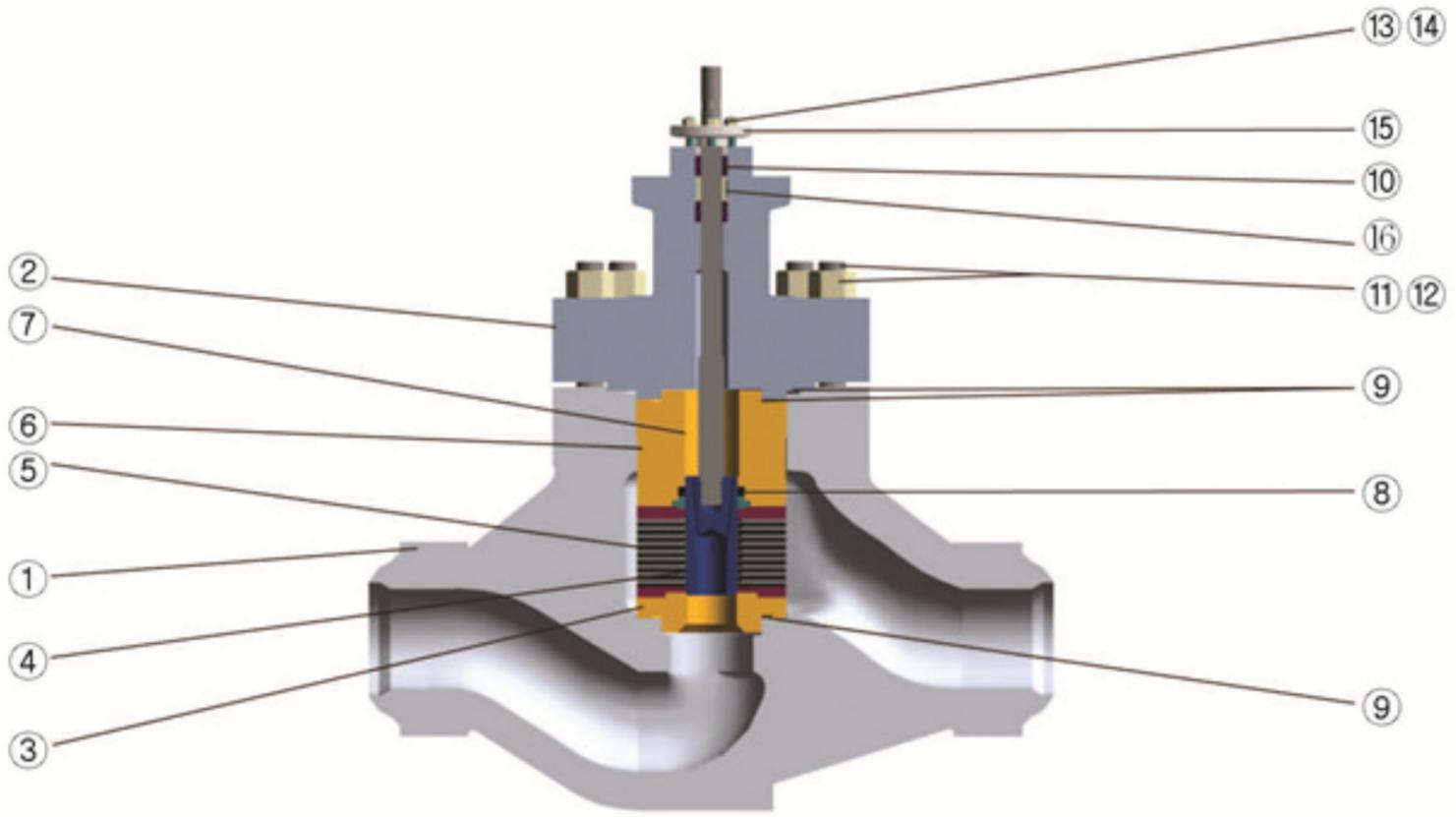
Therefore it can be required easily when a partial damages on the stack occurs or a dust flow in.

DV300 X[iks]-Trim® technology is recognized as the optimum severe service solution available today, and is custom engineered to solve severe service problems.

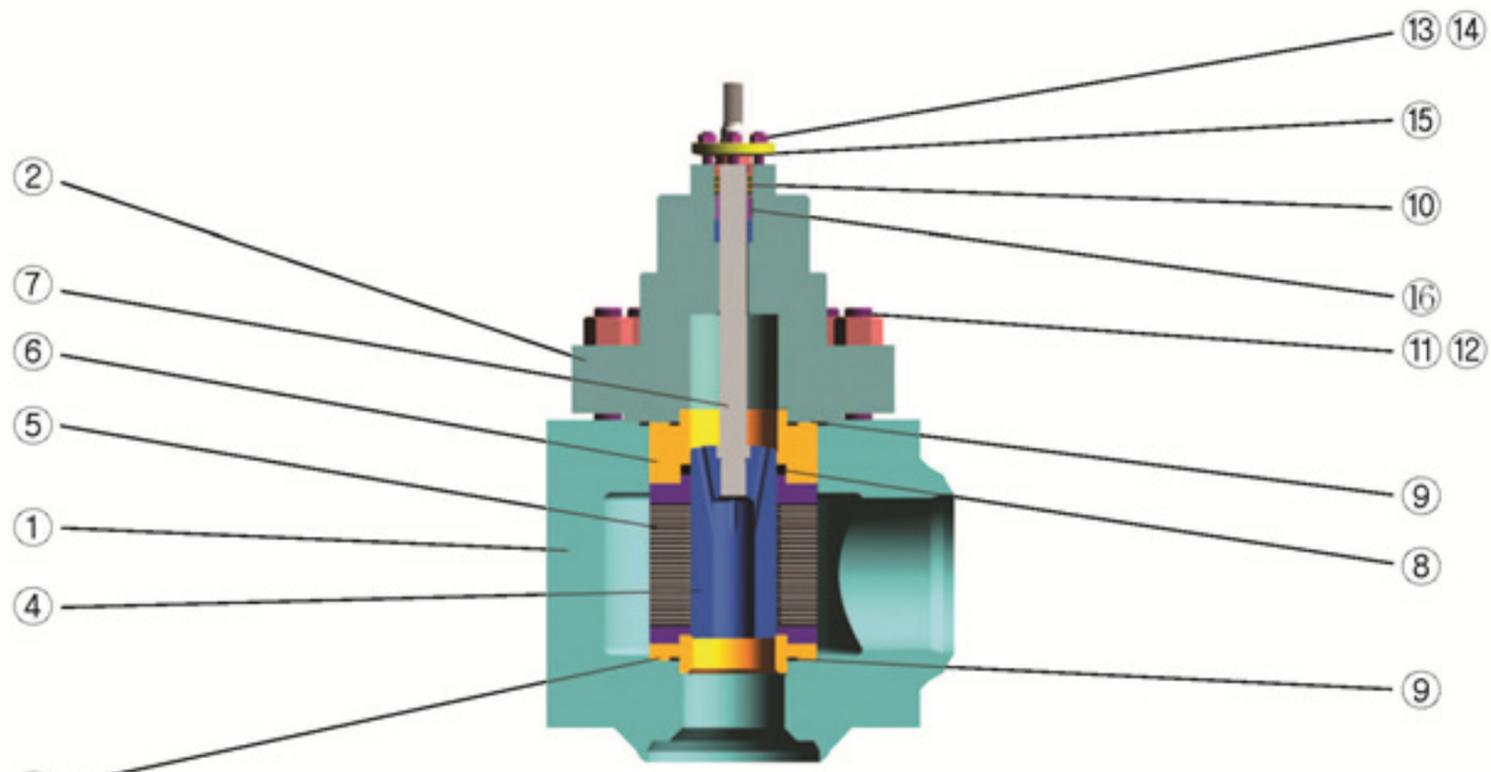
Pressure Drop & Velocity Change Profile Through the Valve



Body Materials



GLOBE VALVE



ANGLE VALVE

Carbon Steel or Low Alloy Steel

1.2	Body & Bonnet	A216WCB / A105	
		A217WC6,WC9 / A182F11,F22	
		F91	
11	Body Stud	A193 B7	A193 B16
12	Body Nut	A194 2H	A194 Gr.4
3.4	Plug & Seat	400 Ser. 630SS	
		F11, F22w / Stellite	
		F91 w / Stellite	
		Inconel 718	
5	Cage / Disk stack	400 Ser.	
		Inconel 718	
8	Balance Seal	PTFE+316SS	
		Carbon Ring w / Metal Ring Insert	
		Inconel+Graphite	
9	Gasket	316SS+PTFE	
		Free Asbestos	
		316SS+Graphite	
10	Packing	PTFE	
		Free Asbestos	
		Graphite	
13, 14	Packing Stud / Nut	B8 / 304SS	
15	Packing Flange	304SS	
16	Packing Spacer	304SS	
7	Plug Stem	17-4PH	Inconell

Consult us to Detail

Stainless Steel

1, 2	Body & Bonnet	A351 CF8, CF8M	
11	Body Stud	A193 B8	
12	Body Nut	A194 8M	
4	Plug	316SS Solid Stellite(~4") or A351 CF8M w/Stellite(6"~)	
3	Seat	316SS Solid Stellite	
5	Disk Stack	316SS or 304SS	
6	Balance Cylinder	316SS or 304SS	

Other Material

X[iks]-Trim® Applications

Nuclear Applications

In nuclear facilities, the highest level of equipment reliability is required to insure plant and public safety. X[iks]-Trim® valves provide this dependability with design for class 1, 2 and 3 applications that range from hand-operated 3/8" (10mm) to 20" (500mm) pressure rating ANSI Class 1500 LBS. These application involve various flow media, temperature and pressure drop.

| Steam

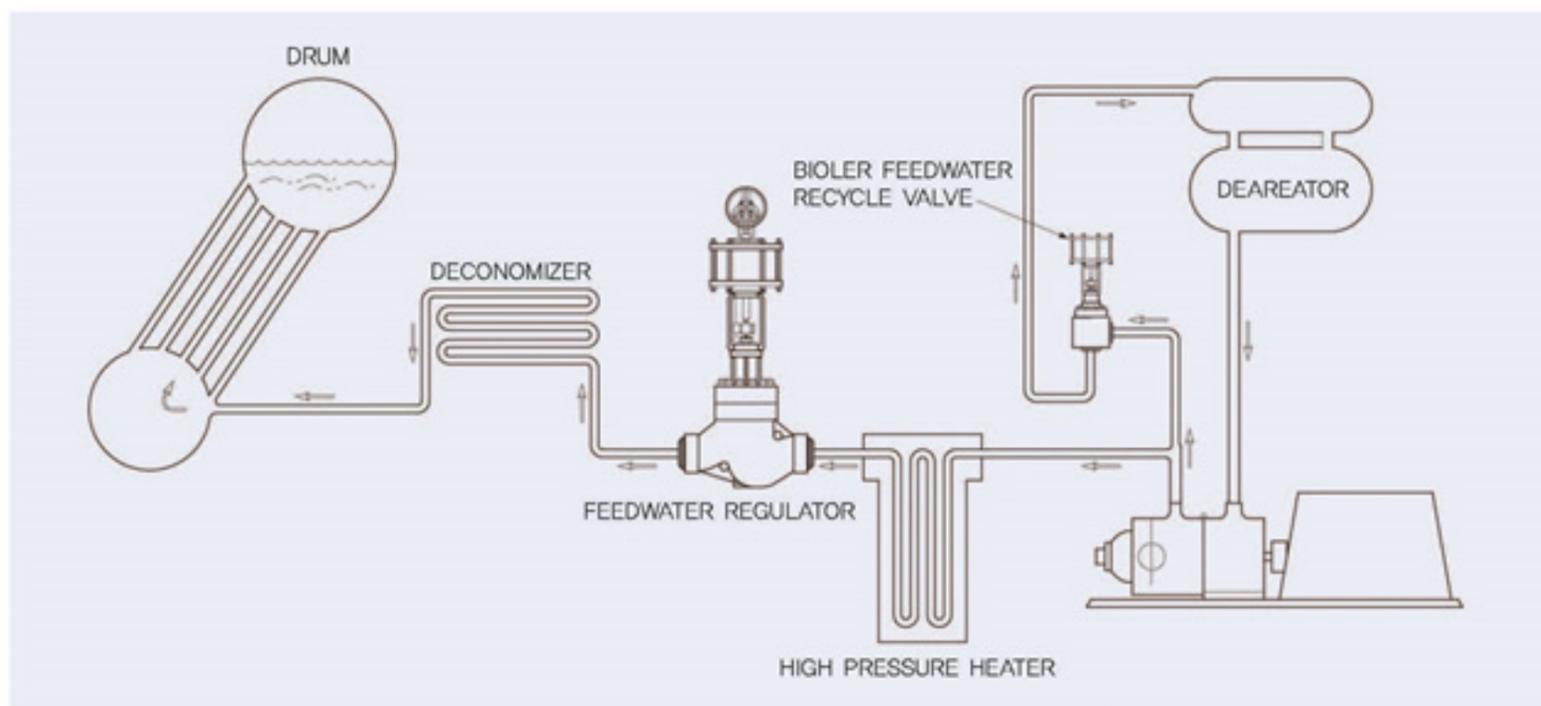
- On-off main steam atmospheric dump & condenser dump.
- Modulating main steam atmospheric dump & turbine by-pass to condenser.
- Pilot operated valve.
- Pressurizer relief valve.
- Steam generator blow down.

| Water

- Main feed water control & minimum flow control.
- Feed pump recirculation. Heater drains. High pressure injection control.
- Letdown flow control. Make-up flow control. Trim feed control.
- Reactor pump seal. Residual heat removal.
- Boric acid flow control. Condensate clean up circulation.
- Condensate feed pump recirculation. Decay heat removal.
- Diesel generator coolant control.

Fossil Power Applications

- Combined cycle & Cogeneration power : 1500 class
- Drum boiler : 3000 class, Sub critical pressure class
- Once through Boiler : 4500 class super critical pressure class boiler
- Boiler feed pump minimum flow control, Feed water control
- Turbine by-pass & Start-up control valves
- Other valves.



X[iks]-Trim® Applications

Severe service choke valves

X[iks]-Trim® Technology : 3D flow path punched disk stack application.

Fluid velocity is the predominant factory in erosion. Erosion rates will vary as a third-to-fifth power function of velocity

X[iks]-Trim® Materials : Solid tungsten carbide trim

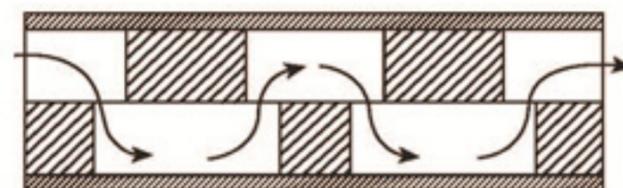
Severe service choke may be made with a variety of different trim materials for the more erosive services, especially when entrained sand is present we recommend solid tungsten carbide trim.

• Unstable Line Fluids

The adverse effects of combined liquid and gaseous flows can be demonstrated in choke valves which are passing unstable crude oil, particularly if that crude contains produced condensate or sand.

On throttling, the crude 'gasses off' causing local velocity increases and subsequent acceleration of the sand and condensate particles, eventually leading to rapid erosion of valve trim and body.

Unless careful attention is paid to controlling the fluid expansion rate and to suitable materials so that energy absorption can be attributed to the trim ; noise, vibration and subsequent rapid deterioration of both choke valve and pipework will result.



Punch Stack Flow Direction

Anti-surge applications

Quick response : X[iks]-Trim® valve with a fast acting pneumatic double-acting piston actuator that will stroke in less than 1 sec.

Tight shut-off : X[iks]-Trim® valve for compressor recycle / anti-surge service are designed with an ANSI class VI soft seat, class V metal seat to assure repeatable tight valve closure at shut-off. / MSS-SP-61

Noise control : The disk stack surrounds the plug throughout its travel from closed to wide open. Thus the velocity head throughout valve is controlled regardless of plug position. Velocity head ($\rho v^2 / 2gc$) through this disk stack is limited to 70psi (480KPa) to minimize noise level to 85dBA or below at 1 meter to comply with the current noise abatement regulations.

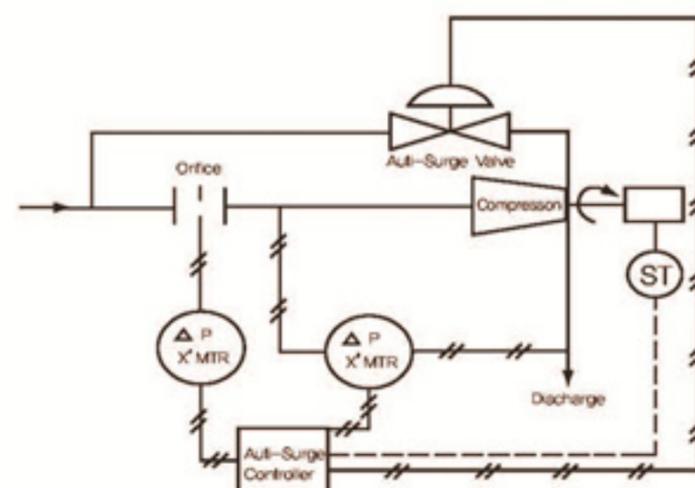
• Compressor Recycle valve Configuration

Normally gas flow through a X[iks]-Trim® recycle valve is under the plug, gas flow passes through the plug seat-ring area under full compressor discharge pressure before entering the energy-dissipating stack.

This configuration takes into account the expanding gas volume as it passes from the inside diameter of the disks to the large outside diameters. For this same reason compressor recycle valve are usually provided with larger outlet than inlet nozzles. These inlet and outlet nozzles are sized to hold velocity heads below 30psi.

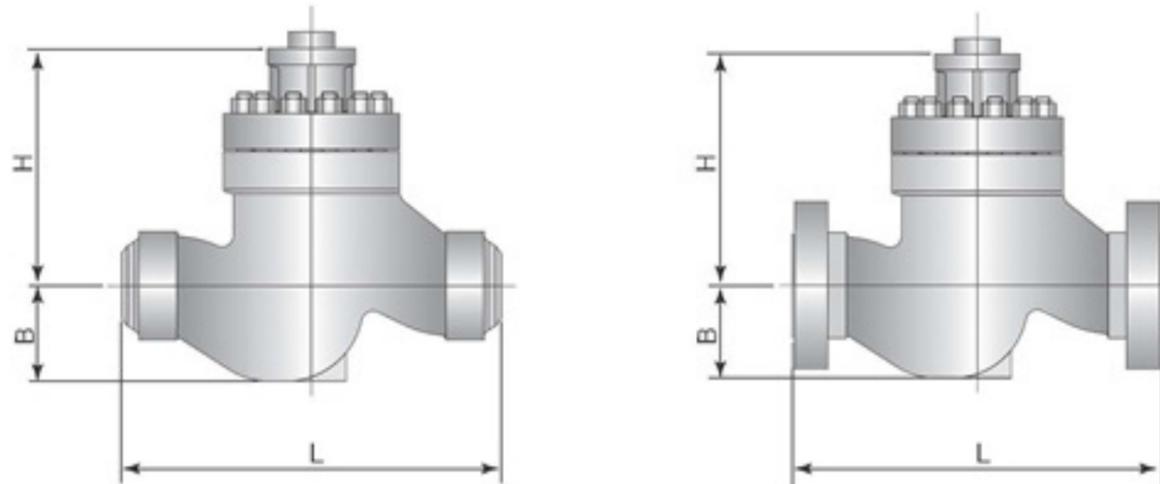
• Compressor Recycle Valve Actuation

In an upset situation, recycle valve must rapidly stroke from full closed to full open to adequately protect the compressor from severe damage. In many cases this means a valve stroke travel of up to 24 in less than two seconds.



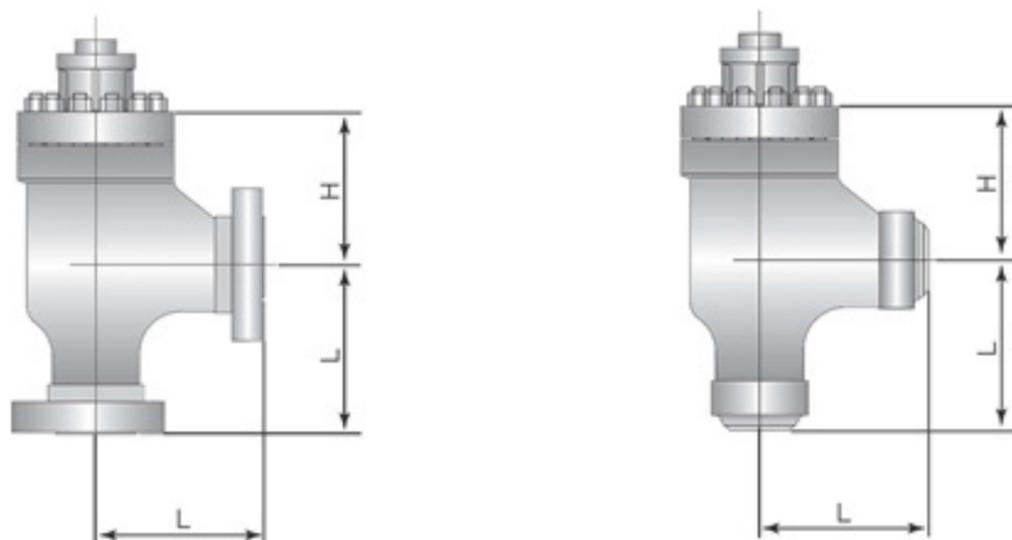
Typical Antisurge System

Dimension – Globe Body



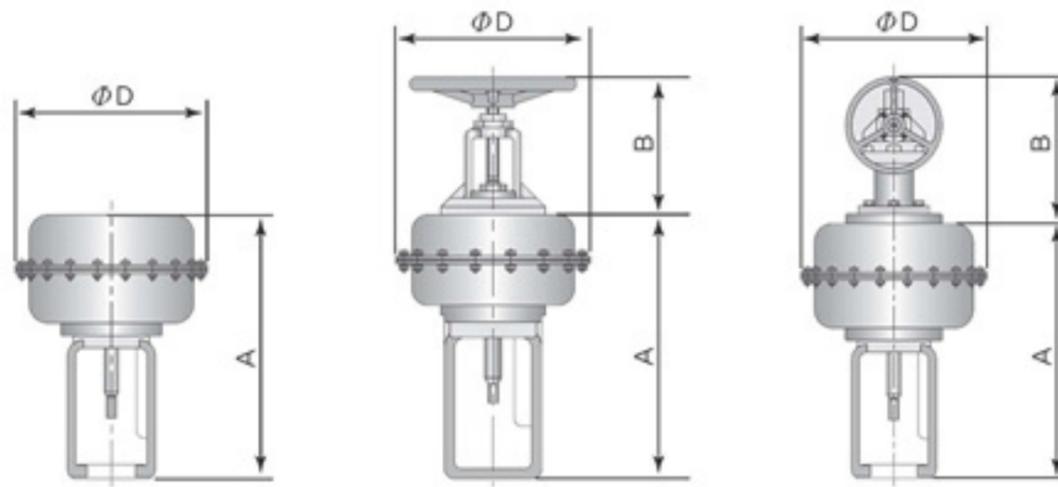
Valve Size(in)		1-1/2"	2"	2-1/2"	3"	4"	6"	8"	10"	12"
ANSI CLASS 150/300	L(RF)	222/235	254/267	276/292	298/318	352/308	451/473	543/568	673/708	737/775
	L(BW)	251	286	292	318	368	473	568	708	775
	H	70	80	100	120	140	180	210	250	280
	B	60	75	90	100	110	150	200	230	280
ANSI CLASS 600	L(RF)	251	286	311	337	394	508	610	752	819
	L(BW)	251	286	311	337	394	508	610	752	819
	H	200	270	290	320	345	400	490	560	700
	B	70	80	100	120	140	180	215	260	300
ANSI CLASS 900	L(RF)	333	375	410	441	511	714	972	991	1,130
	L(BW)	330	375	410	460	530	768	972	991	1,130
	H	265	280	320	360	405	510	540	590	650
	B	80	100	120	140	170	220	260	310	360
ANSI CLASS 1500	L(RF)	333	375	410	460	530	768	972	991	1,130
	L(BW)	330	375	410	460	530	768	972	991	1,130
	H	265	280	320	360	405	510	540	590	650
	B	80	100	124	140	170	220	260	310	360
ANSI CLASS 2500	L(RF)	381	400	441	660	737	864	1,022	1,270	1,321
	L(BW)	381	400	441	660	737	864	1,022	1,270	1,321
	H	320	355	380	445	500	560	640	690	740
	B	80	100	120	140	170	220	263	310	360

Dimension – Angle Body



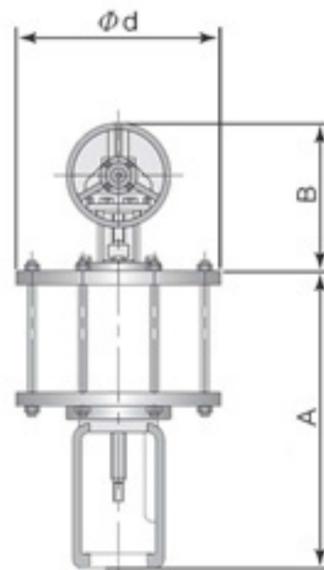
Valve Size(in)		1-1/2"	2"	2-1/2"	3"	4"	6"	8"	10"	12"
ANSI CLASS 150/300	L(RF)	111/118	127/133	138/146	149/159	176/184	226/237	272/284	336/354	369/387
	L(BW)	126	143	146	159	184	237	284	354	388
	H	70	80	100	120	140	180	210	250	280
ANSI CLASS 600	L(RF)	126	143	156	169	197	254	305	370	410
	L(BW)	126	143	156	169	197	254	305	370	410
	H	200	270	290	320	345	400	490	560	700
ANSI CLASS 900	L(RF)	167	188	205	221	256	357	486	490	565
	L(BW)	167	188	205	221	256	357	486	490	565
	H	265	280	320	360	405	510	540	590	605
ANSI CLASS 1500	L(RF)	167	188	205	230	265	384	486	496	565
	L(BW)	167	188	205	230	265	384	486	496	565
	H	265	280	320	360	405	510	540	590	650
ANSI CLASS 2500	L(RF)	190	200	222	330	369	432	511	635	660
	L(BW)	190	220	222	330	369	432	511	635	600
	H	320	355	380	445	500	500	640	600	740

Dimension – Diaphragm Actuator



ACTUATOR SIZE	D	A	B	C
S1	220	300	250	-
S2	290	350	250	-
S3	370	470	250	-
S4	480	655	-	380
S5	550	700	-	400

Dimension – Cylinder (Option)



ACTUATOR SIZE	D	A	B
TA	400	700	600
TB	450	900	700
TC	550	1000	800
TD	600	1100	900
Special	Custom	Engineerd	

Cylinder Materials : Glass fiber reinforced epoxy resin offering(Amalgon)
 - Superior corrosion resistance & high import resistance
 - Internal surface finish of 5~15 micro-inch & self lubrication.



Control Valve Retrofit

Valve retrofits bring cost down and system performance up.

Immediately you'll experience higher efficiency from your system. Over the long haul, you'll enjoy higher up time and reduced maintenance. You may even be able to streamline your valve system, thanks to the X[iks]-Trim[®] high turn down ratio. X[iks]-Trim[®] accommodates pressure reduction 350kg/cm² to 30kg/cm² in a single valve. Often eliminating the need for two or three parallel valves and associated control calibration. Readily tailored to fit other manufacturer valves and our valves previously supplied without X[iks]-Trim[®].

Contact our distributors & Aftermarket dept for details.

DJC X[iks]-Trim[®] Online Retrofit

DJC is capable of retrofitting valves that were previously installed by other manufacturers. In many instances, conventional control valves, supplied by other manufacturers can be upgraded to a custom designed X[iks]-Trim[®], to meet the One-line needs of the system.

The retrofit process includes an engineering review of the entire operating system and quality after market support and service.

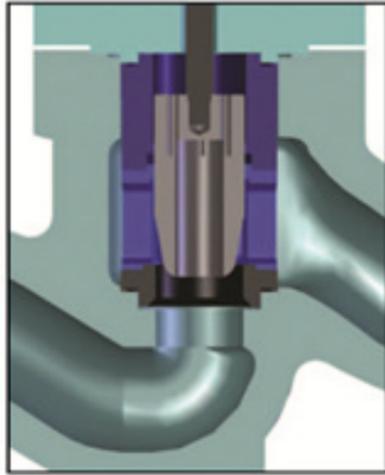
The benefits of X[iks]-Trim[®] technology

Without the burden of valve replacement

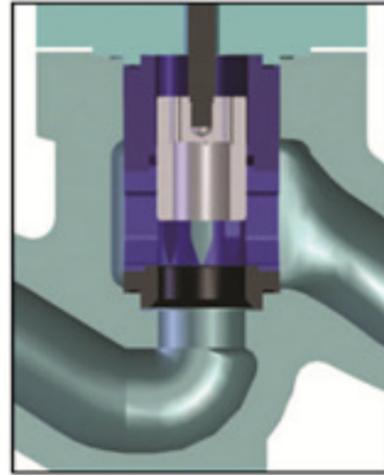
- Improved performance over existing hardware.
- Lower installation costs ; no cutting, welding, NDE or hydrostatic test as required by valve replacement.
- Utilize the maintenance budget versus capital budget.
- Plant down-time is reduced.
- Replaces older valve parts that are no longer available.
- Increase output and reduce maintenance.

Trim "X" also incorporates a tortuous path flow design. That is, pressure energy is dissipated at a constant, controlled velocity head through the use of multiple, right-angle turns in a stack of individual disk. These disks are either etched in lower gas-flow applications or punched in high gas flow applications.

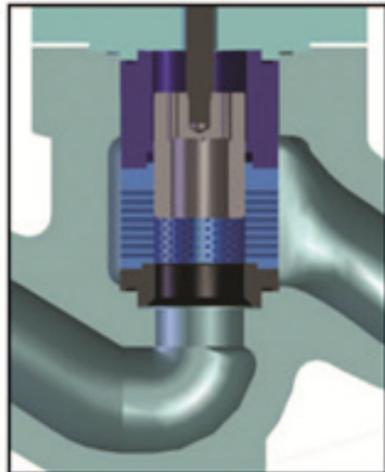
Other Type of Trim-General Service Applications



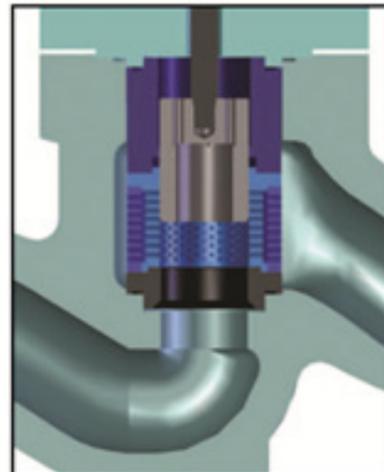
CONTOURED P-PORT



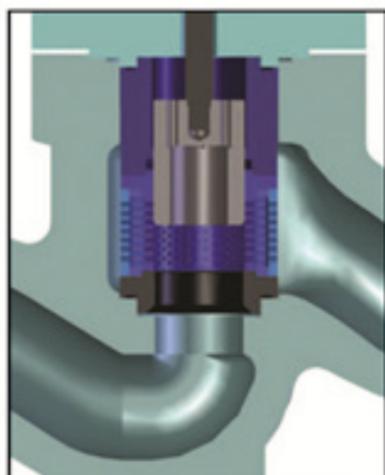
CONVENTIONAL CAGE



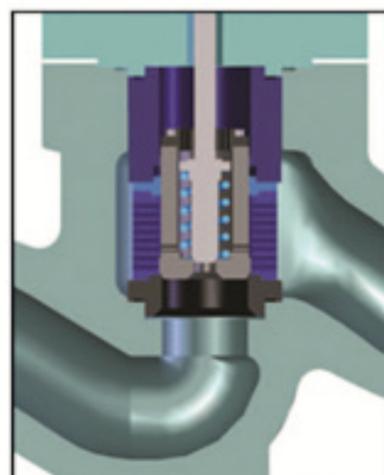
MULTI-HOLE 1 STAGE



MULTI-HOLE 2 STAGE



MULTI-HOLE 3 STAGES



AUXILIARY PILOT TRIM

Quality Assurance Requirement

Code & Standards : The following codes & standards are, or maybe, referenced in the fabrication of DJC valves.

- **ANSI** : American National Standard Institute
- **API** : American Petroleum Institute
- **ASTM** : American Society for Testing Materials
- **CSA** : Canadian Z Standard
- **ASME** : Aamerican Society Mechanical Engineers / Boiler & Pressure Vessel Codes.
- **IEEE** : Institute of Electrial and Electronics Engineers.
- **MSS-SP** : Manufacturers Standardzation Society Speeificaion.
- **NACE** : National Association of Corrosion Engineers.
- **DIN** : Deutsches Institute Normung.
- **ISA** : Instruments Society America
- **ISO9001**
- **IEC** : Instruments Electrotechnical Commission.
- **NRC** : Nuclear Regulatory Commission.
- **NEMA** : National Electrical Manufacturing Association.
- **SNT-TC-LA** : American Society of Non Destructive Testing Recommdded Praticce
- **KS** : Korean Standards
- **JIS** : Japanese Industrial Standards.

www.aov.kr



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