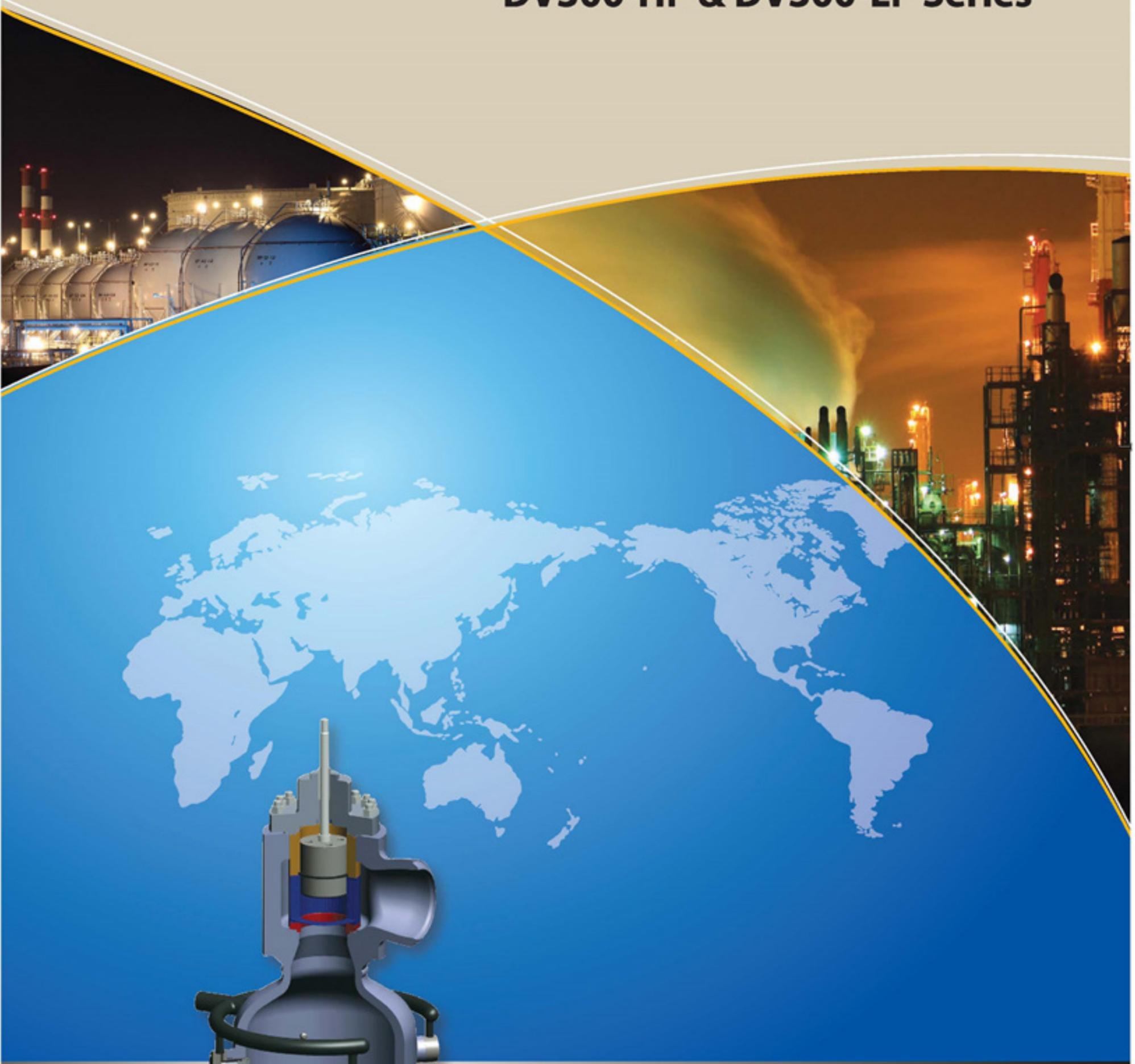


DV300-Series Turbine Bypass Valve

HP, IP, LP Steam Turbine Application

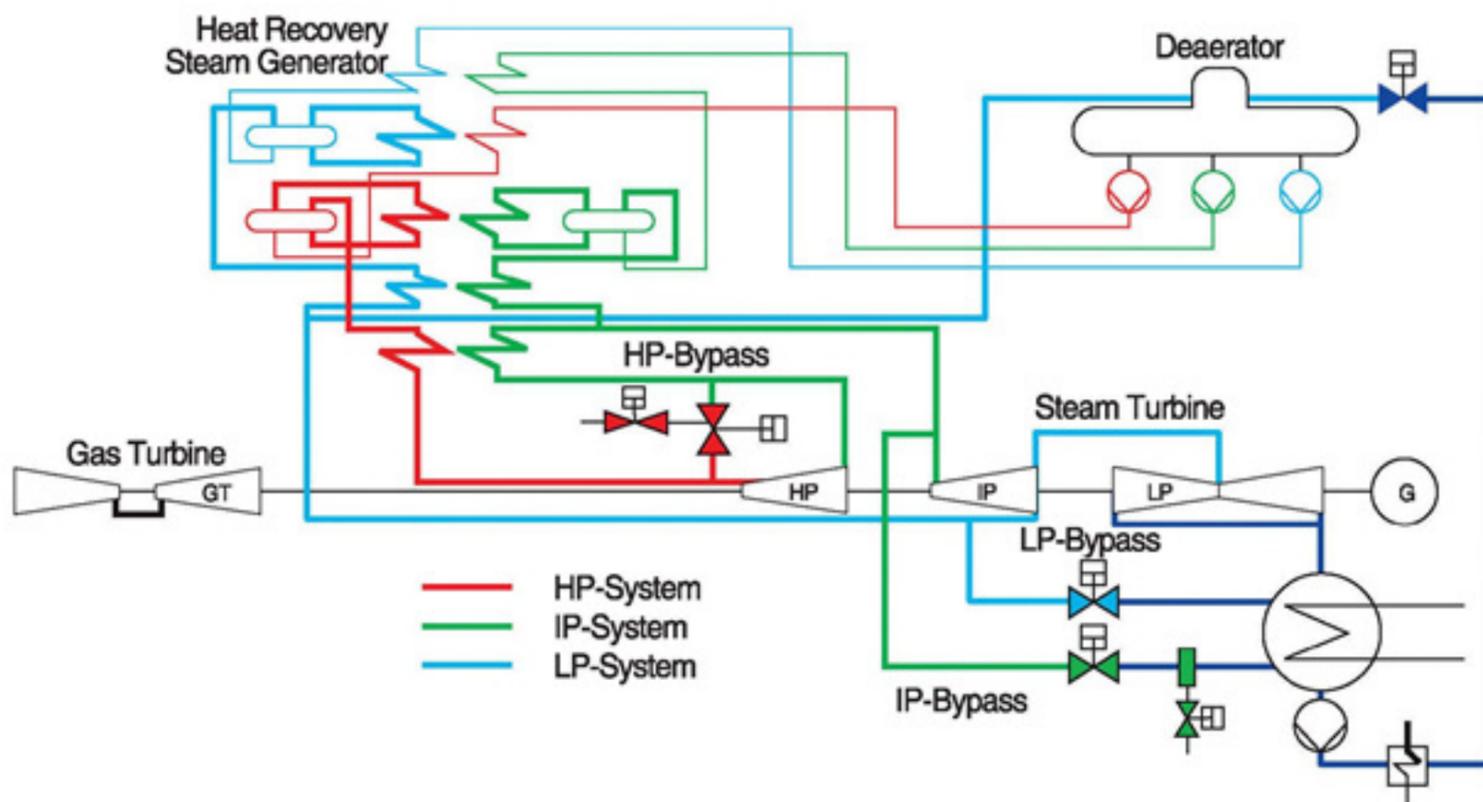
DV300-HP & DV300-LP Series



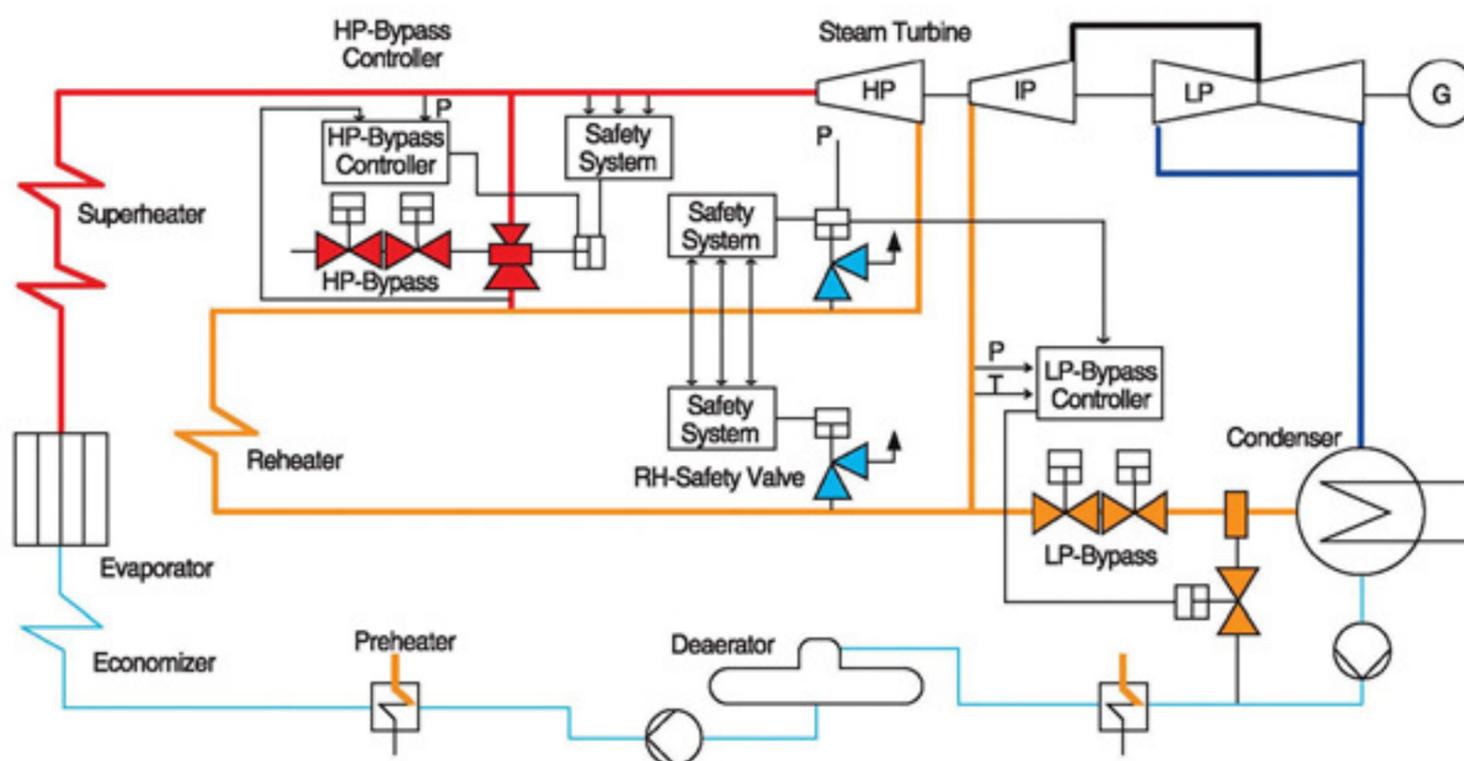


DJC turbine bypass systems are recognized around the world as the best turbine-bypass systems for faster start-up, preventing needless energy loss, lengthening trouble-free plant life and increasing plant reliability.

Typical Combined Cycle Power Plant Schematic



Typical Coal Fired Supercritical Plant Schematic



General Information

H.P. Bypass Valve Trim / X[iks]-trim

Steam pressure and flow are controlled by the position of the valve plug within control cage.

A signal from the pressure control loop to the valve actuator moves the valve plug within the control cage to increase or decrease the amount of free flow area. The control cage has an array of calibrated orifices to provide the control characteristic specified. As the plug is lifted from the seat, steam is permitted to pass in to the center of the control X[iks]-trim cage and out through the seat ring.

The outlet section of the valve has a combination cooler and silencer section. As the steam leaves the seat ring, it enters a diffuser designed to further decrease steam pressure energy in a controlled-velocity expansion. Flow is directed radially through the multiple-path & Multi-turns Disk-Stack {X[iks]-trim} cage or multiple orifice cage diffuser, exiting in to the enlarged outlet pipe section. This section has been sized to accommodate the large change in specific volume associated with the pressure drop of the steam and to keep steam velocities within limits to control noise generation.

The outlet section is outfitted with a water supply manifold. The manifold (Multiple manifolds are also possible) provides cooling water flow to a number of individual spray nozzle installed in the pipe wall of the outlet section. The result is a fine spray mist injected into the high turbulence of the radial steam flow. The combination of large surface area contact of the water and high turbulence in the steam make a for very efficient mixing and almost immediate vaporization.

L.P. & I.P. Turbine Bypass Valve Trim/Multi-Hole Cage

The LP-TB valve uses multi-hole cage technology to provide system noise attenuation through frequency shifting is a proven method of noise attenuation recognized by ISA Technical Standard SP 75.07 and by the IEC in Technical Standard 544-8-3.

In frequency shifting the main flow stream is separated into hundreds of tiny jets. The size of jets, which are primarily based on hole size, determine the resulting noise frequency-the smaller the size of the jet or multi-hole, the higher the frequency, which in turn produces a lower turn mitted dBA level. Multi-hole cage technology is ideally suited for intermediate pressure combined-cycle and low pressure drum boiler turbine bypass applications.

Unlike traditional multi-hole cage on the market today, the multi-hole trim uses over one thousand multi-holes spaced a part in a special pattern designed to ensure full jet separation, structural integrity, and maximum noise attenuation.

Pressure Reducing Valve

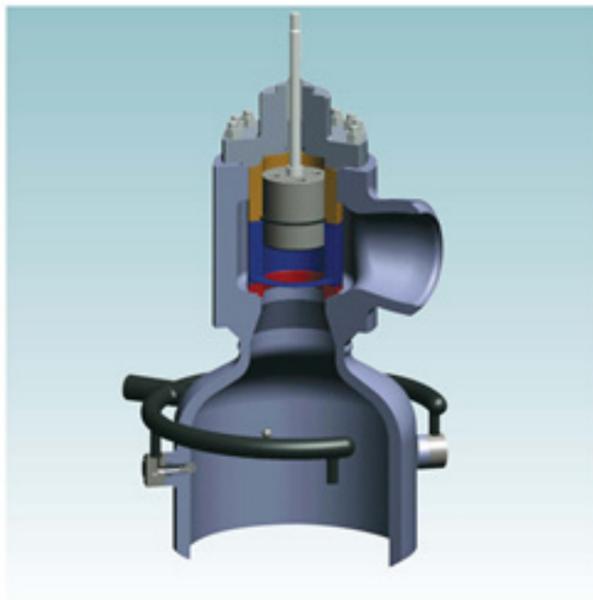
The solution to the performance of the functions. Flow admission to the hydraulically operated valve is opposed to the closing direction of plug. The multi-path multi-turn(X[iks]-trim) throttle group is designed for sub-critical expansion and thus allows reliable low-noise pressure reduction. In the valve outlet, a spray atomizer Desuperheater is installed which lowers the steam temperature to CRH conditions. In this area of the valve a protection sleeve is inserted which protects the pipe wall from thermal shock. There different opinions about the necessity of this measure. However, considering the importance of functional reliability of this bypass station for operation of the overall plant, particularly during continuous operation the expenditure for the protection sleeve appears to be low in relation to possible outages and cost.



General Information

DV300-HP Series

- Flow Direction
 - Flow to Close
- Trim Application
 - X[iks]-trim
 - Pressure Reduction eliminates noise, vibration & erosion.
- Materials
 - Body : A105[WCB], F11[WC6], F22[WC9], F91
 - Trim : F11 +Stellite, Inconel
- Pressure Rating
 - ANSI 600~ 4500 LBS



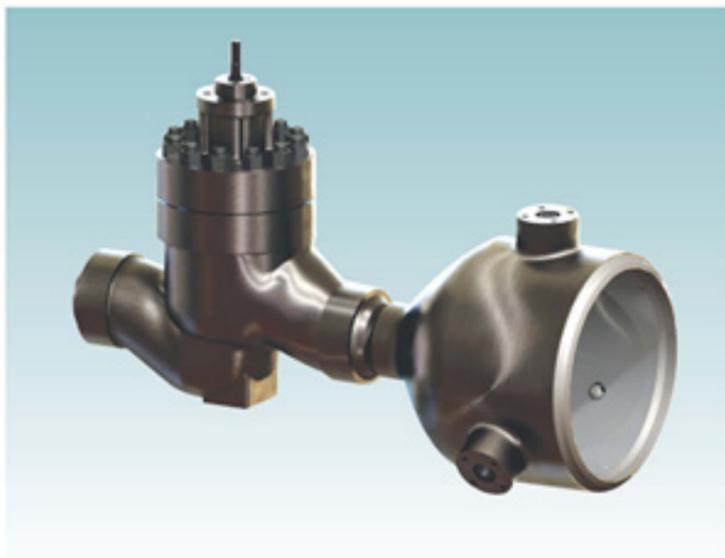
DV300-LP Series

- Flow Direction
 - Flow to Open [up]
- Trim Application
 - Multi-Hole Cage
 - Frequency shifting to maximize noise attenuation.
- Materials
 - Body : A105[WCB], F11[WC6], F22[WC9], F91
 - Trim : 410 SS, F11 +Stellite, Inconel
- Pressure Rating
 - ANSI 300~1500 LBS



DVG300 & DVG200 Application PRDS

- Flow Direction
 - Flow to Open [up]
- Trim Application
 - X[iks]-trim
 - Multi-Hole Cage
- Materials
 - Body : A105[WCB], F11[WC6], F22[WC9], F91
 - Trim : 410ss, F11 +Stellite, Inconel.
- Pressure Rating
 - ANSI 150~4500 LBS



STANDARD VALVE BODY SIZE & TRIM SIZE, Cv VALUE

DV300-LP Series / Turbine Bypass Valve

Size : unit / inch

Valve Type	Globe		Angle		Angle			Angle		Angle	
Inlet Size	8, 10		8, 10		12, 14, 16			16, 18, 20		20, 22, 24	
Outlet Size	10, 12		10, 12		16, 18, 20			22, 24, 26		26, 28, 30	
Trim Size	8	10	8	10	8	10	12	12	14	16	18
Cv	590	775	640	830	1400	2300	3700	3700	4600	6000	7700

*Option : Larger size inlet & outlet

DV300-HP Series / Turbine Bypass Valve

Size : unit / inch

Valve Type	Angle								
Inlet Size	3	4	6	8	8	10	10	12	
Outlet Size	8, 10, 12	8, 10, 12	14, 16	14, 16	16, 18, 20	16, 18, 20	22, 24, 26	22, 24, 26	
Trim Size	3	3	4	4	5	5	6	6	
Cv	122	122	246	246	390	390	629	629	

*Option : Larger size inlet & outlet (20" & 48")

DVG300 & DVG 200/ Turbine Bypass Valve

Size : unit / inch

Valve Type	Globe								
Inlet Size	3	4	6	8	8	10	10	12	
Outlet Size	8, 10, 12	8, 10, 12	14, 16	14, 16	16, 18, 20	16, 18, 20	22, 24, 26	22, 24, 26	
Trim Size	3	3	4	4	5	5	6	6/8	
Cv	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA

*Option : Larger size inlet & outlet (20" & 48")

FEATURES & BENEFITS

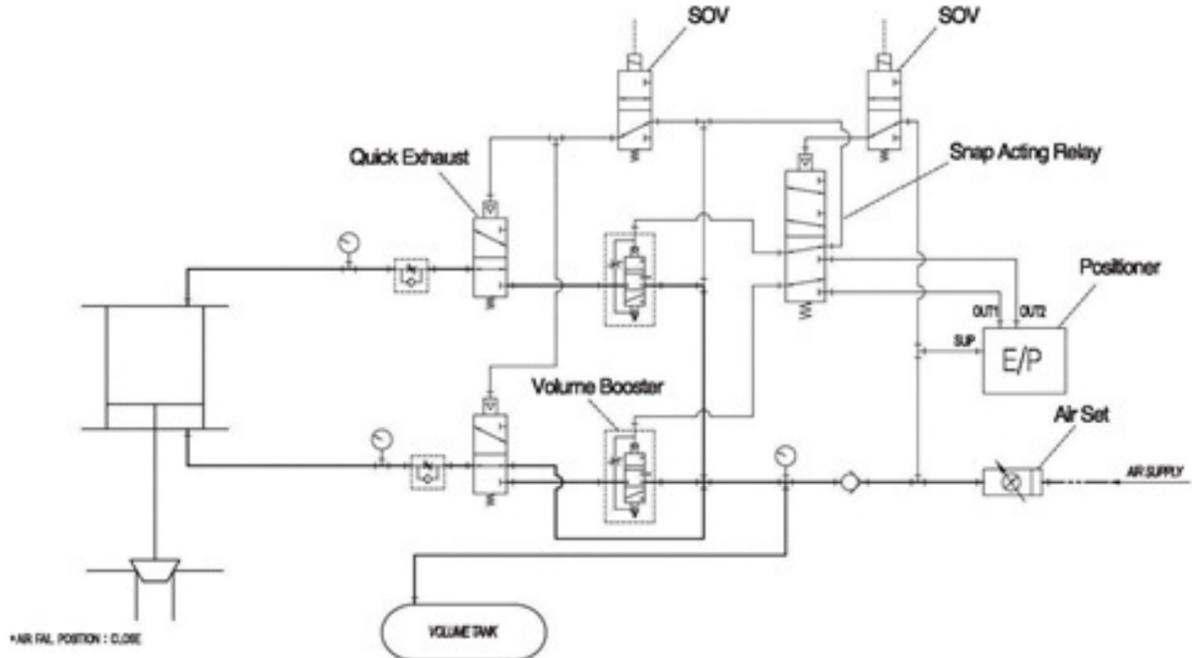
- Tight shut-off through the use of single seat design.
- Pressure and temperature control within +/-1% of controller range.
- Temperature control within 7deg. C of saturation.
- Fixed water to steam ratio for feed forward control provides.
- Uniform temperature control over full range of steam flow.
Instantaneous and precise temperature control.
- Seat designed as thermal shield to reduce temperature induced stresses.
- Uniquely designed nozzle optimizes water injection and evaporation.
As a result temperature sensors can be located within 6M of the valve outlet.
- Designed for low noise generation.



ACTUATOR SYSTEM

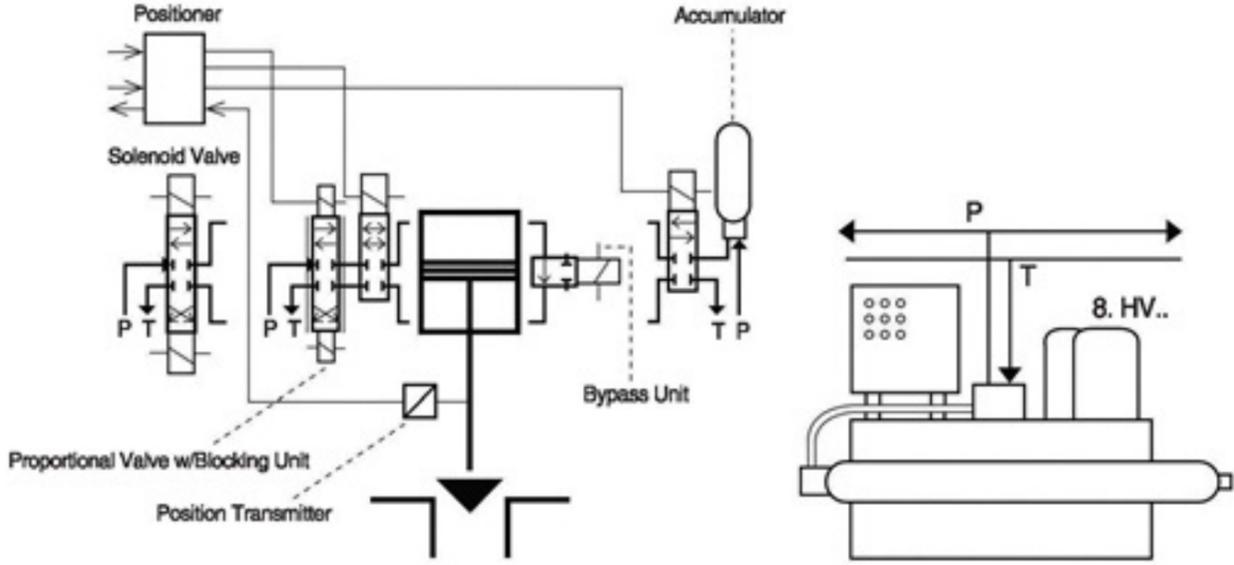
Pneumatic Cylinder Actuators

DJC Pneumatic actuators feature a double acting cylinder designed to meet the application requirements for stroke, speed, actuating force, and positional accuracy. The actuator is equipped with quick acting components to achieve stroke speeds for bypass applications of one second.



Electro-Hydraulic Actuators

Electro-Hydraulic Cylinder Actuators are well suited for applications requiring high force and high stroking speeds with precise control. DJC provides the complete system consisting of hydraulic cylinders, control devices, positioners and hydraulic power units. The hydraulic power unit meet oil safety requirements and consist of a fluid tank, pumps, filters, accumulators, and the necessary monitoring and controls. Our electro-hydraulic systems and controls are recognized as the original, long-lasting technology for hydraulic actuators.



Hydraulic Diagram

STEAM DESUPERHEATER

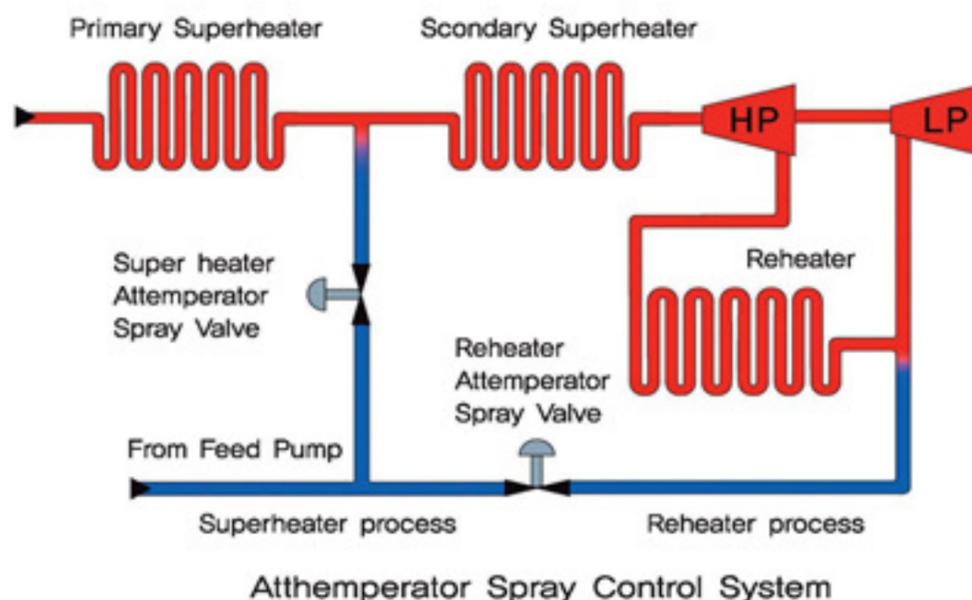
Water Injection Nozzle

Spring Loaded Nozzle Desuperheating HP&LP desuperheating features. Integral spring-loaded water injection nozzle that optimize water injection over a wide range of flow rates at low pressures.

With a rangeability of up to 50:1, the spring loaded water injection nozzles vary the water flow as required to achieve the fine water droplet size needed for atomization. The spring loaded water injection nozzle design provides the smallest water droplet size possible without steam assist.



Variable Nozzle / Rangeability 50:1



DV400 Series / SNSD.MNSD.

For Precise and economical control of steam temperature, the DJC desuperheater automatically introduces cooling water into steam flow in response to a pneumatic or electric signal. The DJC desuperheater represents a major advance in the design of this type of equipment. It has an unusually high turn-down-ratio double that of units previously available. This permits its use in systems with wide fluctuations in steam flow unit. Small enough to mount through a 3" [80A] flange in the steam live, it includes features previously found only in larger, more space consuming desuperheater units. Water pressure 3.4 Bar to 62 Bar above steam pressure is the spring loaded water injection nozzles. The fine sprays evaporate rapidly in the steam, thereby minimizing the tendency for spray water to accumulate in the line.



Single-Nozzle Steam Desuperheater (DV400-SNSD)

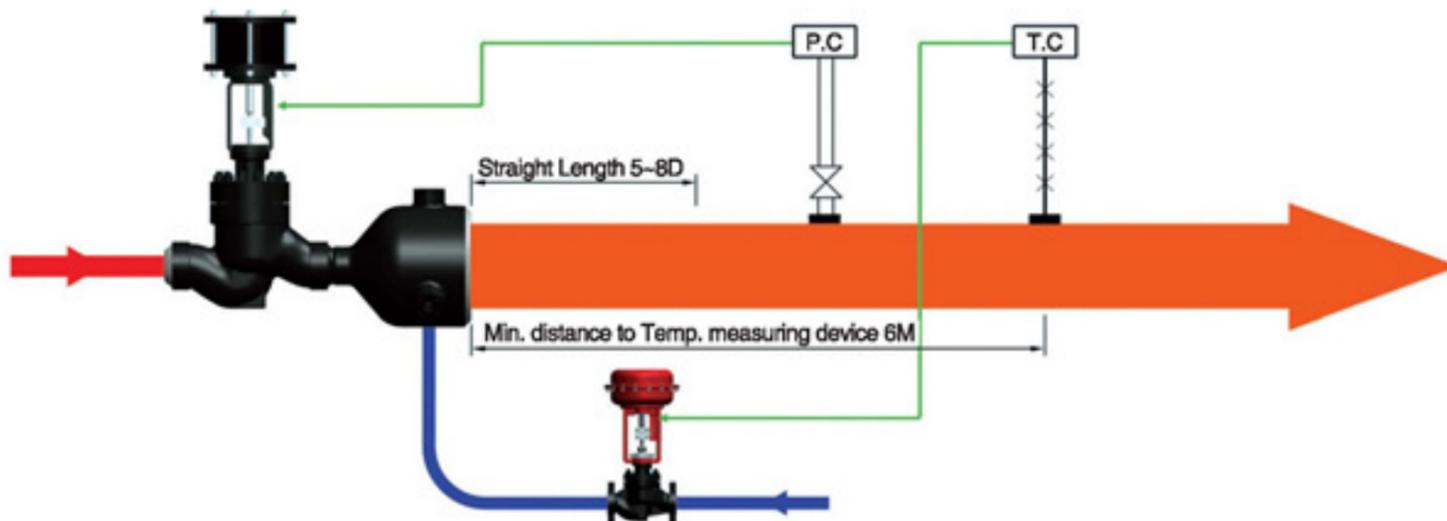


Multi-Nozzle Steam Desuperheater (DV400-MNSD)

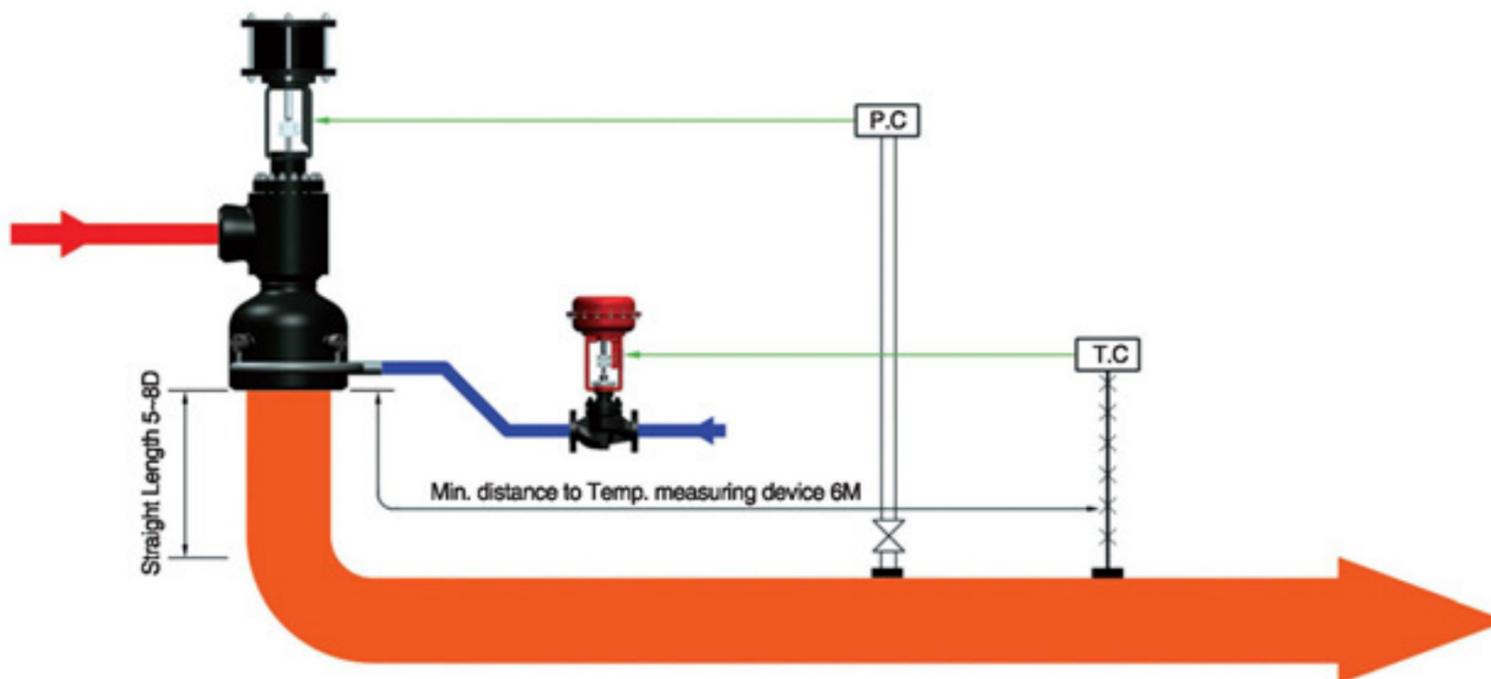


INSTALLATION & SCHEMATIC

Typical Installation of a Turbine Bypass Valve System / Globe Valve Type



Typical Installation of a Turbine Bypass Valve System / Angle Valve Type



DV300-HP, DV300-LP Series Specification

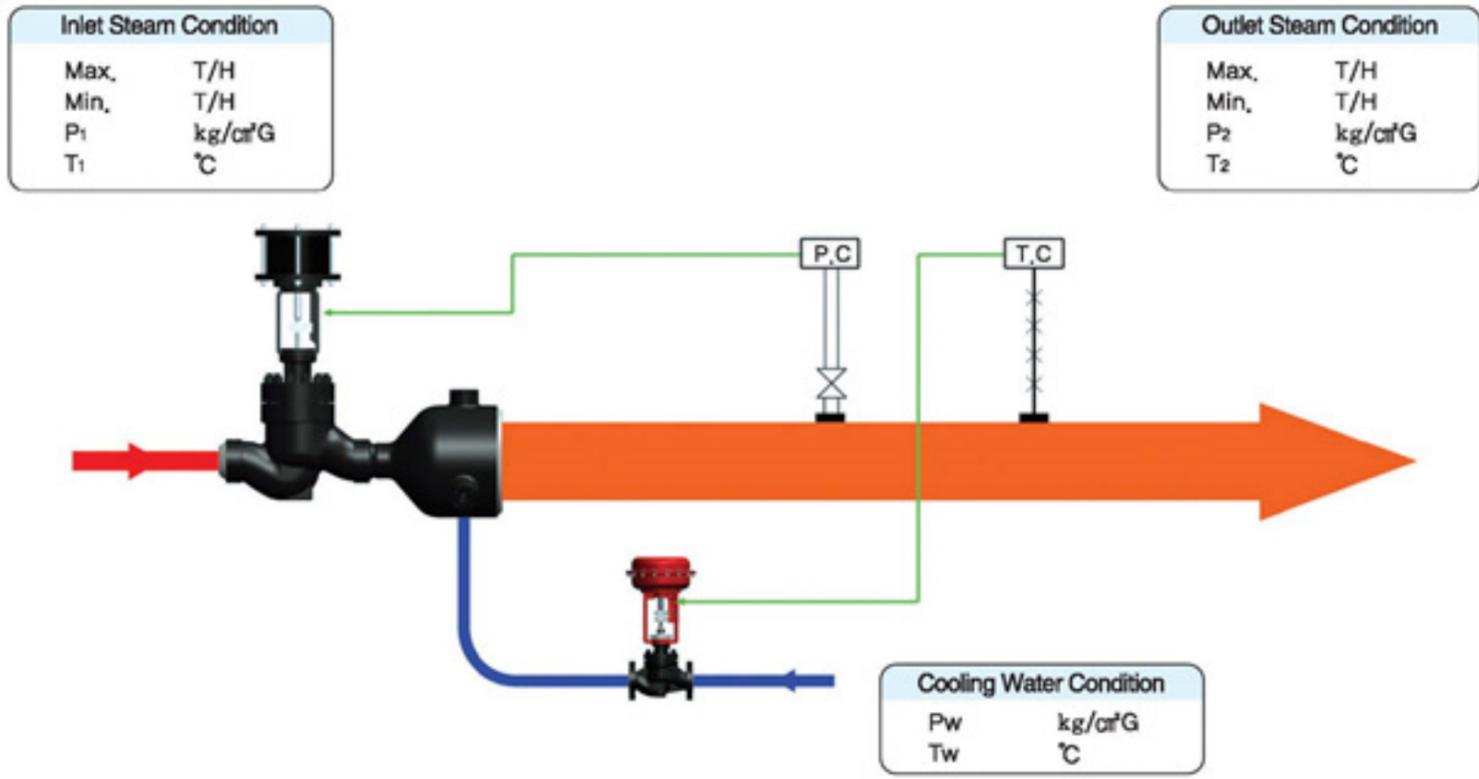
DV300-HP Series		DV300-LP Series
	BODY SIZE	
1" to 20"	Inlet	1" to 20"
2" to 48"	Outlet	2" to 48"
	ANSI RATING	
ANSI Class 1500~2500 LBS		ANSI Class 150~1500 LBS
	END CONNECTION	
SW, BW, RF, RTJ, Others		SW, BW, RF, RTJ, Others
	BONNET	
Class 150~2500 LBS	Bolted	Class 150~1500 LBS
Class 150~4500 LBS	Pressure Seal	Class 1500 LBS
	RANGEABILITY	
Up to 100:1		Up to 50:1
	TRIM DESIGN	
Balanced, Auxiliary Pilot Plug.		Balanced, Auxiliary Pilot Plug.
	CHARACTERISTIC	
Linear, EQ-%, Modified-%		Linear, EQ-%, Modified-%
	SEAT LEAKAGE	
FCI 70-2 Class V, MSS-SP-61		FCI 70-2 Class V, MSS-SP-61
	MATERIALS	
A217-WC9, A182-F22, A182-F91	Body	A217-WC6/F-11WC9/F-22.WCB/A105
A182-F22 or F91 with Stellite, Inconel 718	Plug	Alloy Steel with Stellite
Inconel 718	Stem	Inconel 718, 17-4PH
Inconel 718	X[iks]trim/CAGE	Alloy Steel with Stellite
A182-F91 with Stellite	Seat-Ring	Alloy Steel with Stellite
316 SS	Water Spray System	316 SS
	STEAM CONDITION	
Above 300Bar with 610°C		92Bar with 565 C
	ACTUATORS	
Balanced Trim Design	Pneumatic Cylinder	Balanced Trim Design
Unbalanced Trim Design	Hydraulic Cylinder	Unbalanced Trim Design
Balanced Trim Design	Electric Motor	Balanced Trim Design

DV400 Series Specification

DV400-SNSD		DV400-MNSD
Variable	Type	Variable
Single Nozzle	Nozzle	Multi Nozzle
50:1	Rangeability	50:1
ANSI Class 150~2500 LBS	Pressure	ANSI Class 150~4500 LBS
Class 1500~4500 LBS		Class 150~1500 LBS
	Materials Body	
Below 430°C Carbon Steel		Over 430°C Low Alloy Steel



▼ DV300-HP, DV300-LP Bypass Valve Ordering Information



- 1) Steam Flow, Kg/Hr [Inlet/Outlet]
- 2) Inlet/ Outlet Pressure. Mpa
- 3) Inlet/ Outlet Temperature, degree C
- 4) Cooling Water Pressure. Mpa
- 5) Cooling Water Temperature, degree C
- 6) Required Noise Level, dBA
- 7) Pipeline Size & Schedule. Inch [Inlet/Outlet]
- 8) Turndown Ratio Required.
- 9) Actuator Type & Input Signal. Stroke Time.
-Pneumatic Hydraulic Motors

RETROFIT for DV300-HP/LP Seires TURBINE BYPASS VALVE

If the control valves in your facility are performing below expectation experiencing poor flow controllability, vibration, control deficiencies or seat leakage the high price you may be paying for maintenance isn't the only expense consuming your budget. For example, seat leakage can erode valve trim, as well as result in costly energy loss to your operation. In plants where other major control valve suppliers have tried unsuccessfully to provide relief. DJC has implemented long-term solutions through retrofit. Using cutting-edge technology and 20 years engineering experience in the design and manufacture of severe service control valves. DJC velocity control X[iks]-trim is packaged into line while the valve's original trim is removed and replaced. Performance is improved immediately, without the expense associated with new valve installation and related piping changes.

DJC successful record of retrofitting includes more than 50 recently completed valve retrofits in Power Plant. For more information on DJC retrofit suitability analysis of your valves, contact DJC Tech Engineering Team, Or your local sales representative.

www.aov.kr



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