

EXO Industries

Specialty Valves

Steam Conditioning Valves

Turbine Bypass Valves

Feedwater Control Valves

Spraywater Control Valves

Quick Open PRDS Valves

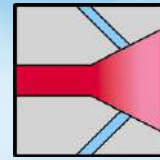
Desuperheaters

Startup Vent Valves

Control valves



Specialty Valves



EXO

EXO INDUSTRIES

EXO is one of the leading manufacturer of steam conditioning valves, de-superheaters, Ballvalves, Industrial valve, Industrial process control equipment in area of Oil and Gas, Power generation, pulp and paper, chemical, Sugar Industries.

Modern Manufacturing plant in GOA, as well as insider's knowledge of process and control equipments enabled EXO to serve each and every industry need in highly efficient manner

With state of art research and development and 30 years of innovation, helped EXO to meet customer's specific needs in functionality and reliability

Steam conditioning Equipment

The Development, design, manufacture, sales and service of steam conditioning valves and Desuperheaters has been EXO's core strength developed over 30 years. Combined steam pressure and temperature reduction in one body proved only solution for optimal controllability and rangeability.

For controlling the steam temperature where pressure reduction is not required, EXO desuperheaters are used. EXO desuperheaters are designed to optimize the atomization of the cooling water for fast evaporation and maximum rangeability.

Applications

EXO's specialty valve products are designed for pressure and temperature control of steam in severe applications such as

- Turbine bypass valves
- Process steam conditioning valves
- Attenuators, steam assisted Desuperheaters
- Pressure relief Valves

In addition to steam valves and de-superheaters EXO has also developed

- Feed water control valves
- Recirculation valves
- Spray water control valves

Engineering

EXO's engineers maintain close contact with sales and service team of organization. This ensures correct product chosen for the installation, performs intended functions. EXO's continuous commitment to research and product development is its guarantee to customer that it will continue to meet their equipment and instrumentation requirement in future

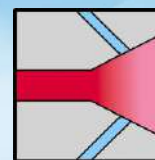
Manufacturing

All EXO's steam conditioning equipments, forged, cast, or fabricated is manufactured using state of the art manufacturing facility in Goa where CNC machines, VMC, HMC machines are installed

Steam conditioning equipment manufactured comply to international codes, ASME, DIN, IBR, CE.

Raw material procurement is from well known Forges, Foundries which are approved by Engineers India Ltd, IBR and international bodies

Specialty Valves



EXO

Steam conditioning valves

Valve Type

ESB Multi stage reduction

ESC through stem injection

Common design features

- High quality forged steel body for total integrity of pressure containing parts
- "smooth" body contour resists thermal fatigue
- Easy access to internal parts reduces maintenance cost and system downtime
- Valve inlet and outlet connections adaptable to all pipe diameters
- Advanced seat design assures no energy loss in stand-by condition
- Water injection downstream from pressure reduction for extended valve life
- Split pressure class inlet/outlet to minimize thermal level



Applications

Turbine bypass
Process steam

Turbine bypass (low flow)
Process steam

Body style

Angle
Fully machined

Angle
Fully machined

Body material

Forged CrMo-low alloy or carbon steel
Optional 13% Cr-steel, F91

Forged CrMo-low alloy or carbon steel
Optional 13% Cr-steel, F91

Pressure class inlet

ANSI # 600-2500, Option # 4500

ANSI # 600-2500, Option # 4500

Pressure class outlet

(ANSI # 150-1500)

(ANSI # 150-1500)

Max Capacity ,Kv(Cv)

4000 (4680)

2500 (2920)

Leakage class

III-V

III-V

Plug design

Cage
Balanced
Balanced tight
Unbalanced

Cage
Balanced

Water Injection

Nozzles in valve outlet

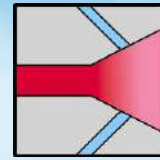
Nozzles below seat ,through spindle

Special design features

- High combined turndown with pressure proportioning ,variable orifice spray-water nozzles
- Cage trim with diffusers for low noise and vibration under severe conditions

- Built –in feed forward water injection for maximum plant flexibility
Cage trim with optional diffusers for low noise and vibrations
Steam atomization for outstanding turndown

Specialty Valves



EXO

Steam conditioning valves

Valve Type

EGSC straight cast

EZ Z form PRDS

Common design features

- High combined turndown with pressure sensitive, variable orifice
Spray water nozzles
- Cage trim with diffusers for low noise and vibration
- Easy access to internal parts reduces maintenance costs and system downtime
- Water injection downstream from pressure reduction for extended valve life



Application

Turbine bypass
Process steam

Auxiliary steam

Body style

Globe

Z-configuration

Body material

Cast, CrMo-low alloy or carbon steel
Fabricated outlet

Forged CrMo-low alloy or carbon steel

Pressure class, inlet

ANSI# 150-2500

ANSI# 150-2500

Pressure class, outlet

ANSI# 150-1500

ANSI# 150-1500

Max capacity, Kv (Cv)

4000 (4680)

27 (32)

Leakage class

III-V

V

Plug design available

Cage
Contour
Balanced
Unbalanced

Cage
Unbalanced

Water injection

Nozzles in valve outlet

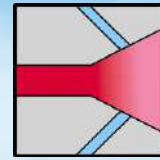
Nozzles in valve outlet

Special design features

- Standardized cast body design with flanged or butt weld end connections means low investment and installation costs
- Outlet connection larger than inlet to allow for high pressure ratio

- Compact design for low flow applications
- High quality forged steel body for total integrity of pressure containing parts
- Advanced seat design assures no energy loss in stand by condition

Specialty Valves



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Pressure Reducing Valves

Valve Type

ESR High Pressure PRV

ESS High Pressure Cast PRV

Common design features

- High quality steel body for total integrity of pressure containing parts
- "Smooth" body contour resists thermal fatigue
- Easy access to internal parts reduces maintenance costs and system downtime
- Valve inlet and outlet connections Adaptable to all pipe diameters
- Advanced seat design assures no energy loss in stand-by condition
- Split pressures class inlet/outlet to minimize thermal stress levels



Application

Controlled pressure relief
Process steam
Turbine bypass

Controlled pressure relief
Process steam
Turbine bypass

Body style

Angle
Fully machined

Globe
Fabricated

Body material

Forged CrMo-low alloy or carbon steel
Optional 13% Cr-steel,F91

CrMo-low alloy or carbon steel

Pressure class, inlet

ANSI # 600-2500,Option # 4500

ANSI # 600-2500

Pressure class, outlet

ANSI# 150-1500

ANSI# 150-1500

Max capacity, Kv (Cv)

4000 (4680)

4000 (4680)

Leakage class

III-V

III-V

Plug design available

Cage
Balanced
Balanced tight
Unbalanced

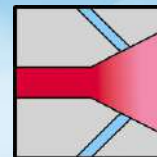
Cage
Balanced
Balanced tight
Unbalanced

Special design features

- Cage trim with diffusers for low noise and vibration under severe conditions

- Standardized cast body design with flanged or butt weld end connections means low investment and installation costs
Outlet connection larger than inlet to allow for high pressure ratio

Specialty Valves



EXO

Actuators

Diaphragm Reverse/Direct



Application:
Desuperheaters and small water valves

Pneumatic: Diaphragm

Supply pressure:
Max 2.5 barg (35 psig)

Control signal:
4-20 mA, or 3-15 psi (to positioner)

Size 11inch ,13 Inch ,15 inch

Max stroke:
50 mm (2")

Stroking speed:
Slow

Air to open – Reverse .
Air to close –Direct .

Piston DSL,DSR/ springreturn



Application:
Steam conditioning valves and large
Desuperheaters and water valves

Pneumatic, Piston, Double acting,double
acting spring closing

Supply pressure:
Max 7 barg (100psig)

Control signal:
4-2-MA, or 3-15 psi (to positioner)

Max cylinder dia 600 NB

Max stroke:
350 mm

Stroking speed:
Moderate, less than 1 sec when required

Alternative piston actuators:
STI

Hydraulic system



Application:
Turbine bypass and other applications
Which require large actuating force
and fast and accurate control

Hydraulic

Supply pressure:
Max 210 barg (3000 psig)
Operating 160 barg (2350 psig)

Control signal:
4-20-mA, or 3-15 psi (to PCS)

10 to 12 Valves per system

Max stroke:
350 (14")

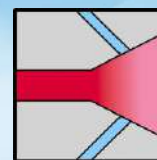
Max stroke:
Fast (less than 1 sec. if required)

Standard fluid: Mineral oil.
Option: Fire resistant fluid.

Used together with:

- Hydraulic Supply Unit, HSU
- Position Control System, PCS
- Position Feedback System, PFS
- Hydraulic Valve Panel, HVP

Specialty Valves



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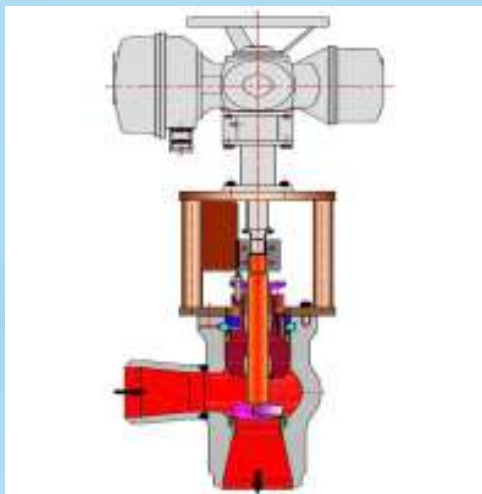
Stop Valve, Vent Valve

Valve type

Common design features

- "Smooth" body contour thermal fatigue
- Easy access to internal parts reduces maintenance costs and system downtime

ES



Turbine bypass stop valve
Process steam stop valve
Water stop valve

Angle
Fully machined

Forged CrMo-low alloy or carbon steel
Optional 13% Cr-steel, F91

ANSI # 600-2500, Option # 4500

ANSI# 600-2500, Option # 4500

7500 (8700)

V

Contour On/Off
Unbalanced
Balanced tight

Special design features

- High quality body design for total integrity of Pressure containing parts
- Integral hard surfaces seat assures tight shut-off
- Flow path in angle body means low pressure drop due to pressure recovery in the outlet cone

ESV



Start up vent ,
No load vent

Angle
Fully machined

Forged CrMo-low alloy or carbon steel
Optional 13% Cr-steel, F91

ANSI # 600-2500, Option # 4500

ANSI# 600-2500, Option # 4500

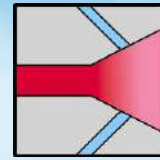
7500 (8700)

V

Contour On/Off
Unbalanced
Balanced tight

- High quality body design for total integrity of Pressure containing parts
- Integral hard surfaces seat assures tight shut-off
- Flow path in angle body means low pressure drop due to pressure recovery in the outlet cone

Specialty Valves



EXO

Water Pressure Reducing Valves

Valve type

EWA

EGC

Common design features

- Easy access to internal parts reduces maintenance costs and system downtime
- Seat design for tight shut-off mean no damage by "wire-drawing" due to seat leakage



Main applications

Spraywater control valve
Pump recirculation
Boiler feed water start-up

Spray water control valve
Process water
Fluid control valve

Body style

EWA Angle, EWZ : Z-configuration
Machined

Globe

Body material

Forged CrMo-low alloy or carbon steel

Cast

Max pressure class

ANSI # 2500

ANSI 150 -2500 #

Max body size

DN 200mm (8")

DN 300

Max capacity, Kv (Cv)

100 (118)

800 (940)

Leakage class

V

IV-V

Plug design available

Counter, 2-5 stages, depending on pressure drop.
Unbalanced

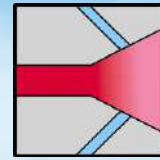
Single stage contour, single stage Cage
Two stage contour+cage
Balanced Tight

Special design features

- Multi-stage control plug to eliminate cavitation under severe conditions
- High quality forged steel body for total integrity of pressure containing parts
- Jet breaker cage takes a final pressure drop and protects the seat and valve body from erosion to extend valve life (optional)

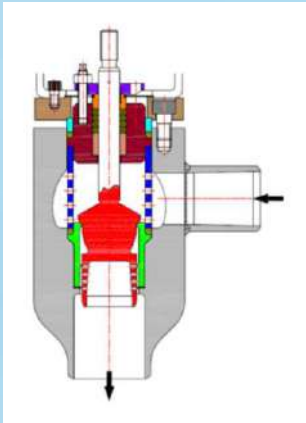
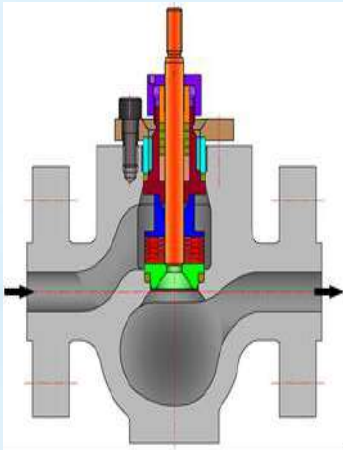
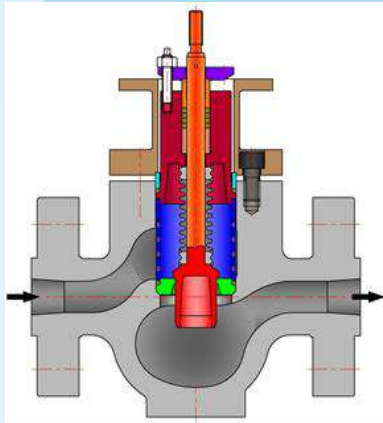
Standardized cast body with flanged Butt weld design
Also available for steam service
Available for other fluids as control valve

Specialty Valves

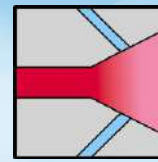


EXO

Feedwater control valves, Recirculation valves, Bellow seal valves

Valve type	EFC	EDD	EBC
Common design features <ul style="list-style-type: none"> High flow water 			
Main applications	Feed water control	Recirculation high pressure drop	Inflamable fluid control Fluid control valve
Body style	Angle configuration Cast Globe for low flow	Angle configuration Cast Globe for low flow	Globe
Body material	Forged CrMo-low alloy or carbon steel	Forged CrMo-low alloy or carbon steel	Cast
Max pressure class	ANSI # 2500	ANSI # 2500	ANSI 150 -2500 #
Max body size	300mm (12 inch)	100 mm (4 inch)	DN 300
Max capacity, Kv (Cv)	4000 (4720)	80 (95)	800 (940)
Leakage class	V	V	IV-V
Plug design available	Contour Cage	Labyrinth Multipatch	Single stage contour, single stage Cage Two stage contour+cage Balanced Tight
Special design features	<ul style="list-style-type: none"> Suitable for feed water Body remains intact from erosion . Long Life 	Multipath reduction	Standardized cast body with flanged Butt weld design Also available for steam service Available for other fluids as control valve

Specialty Valves



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Desuperheater

Desuperheater type

Common design Features

- High nozzle turndown
- System turndown depends on steam velocity for mechanical desuperheaters
- Optimal water atomization
- Excellent reliability
- Easy maintenance
- Requires low pressure differential between spraywater and steam pressure

Type of atomizing

Installation to steam line

Steam header
Max size
Min size

Max pressures class

Integrated spraywater control Actuator

Leakage class

Nozzle turndown

Orifice type

No of water nozzles

Typical installations

EDSE (Steam Assisted)



Steam

Perpendicular
Flanged

No limitations
DN 150 mm(6")

ANSI # 2500

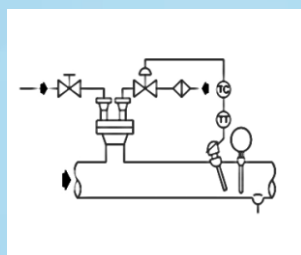
No
N/A

N/A

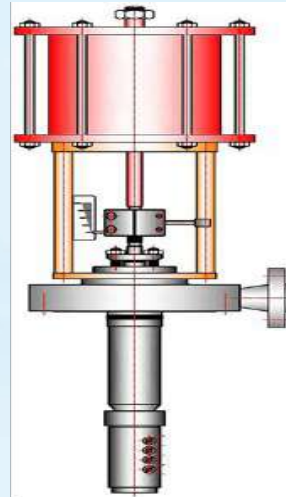
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Fixed

Single



EDPM (Probe type Multi Nozzle Integral)



Mechanical

Perpendicular
Flanged
Pressure sealed connection

No limitations
DN 100 mm (4")

ANSI # 2500

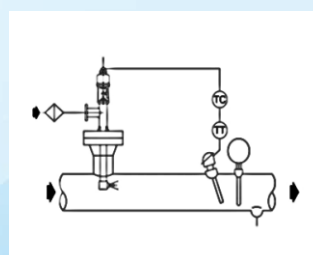
Yes
Pneumatic

V

40:1

Variable

Multi



Ed7 (Inclined single Nozzle Integral)



Mechanical

Angle 45 °
Flanged

No limitations
DN 150 mm (6")

ANSI # 2500

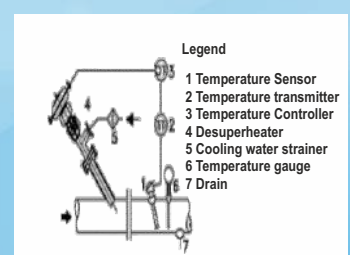
Yes
Pneumatic

V

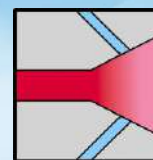
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Variable

Single



Specialty Valves



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DeSuperheaters

EDP (Spring Type Spring Loaded)



Mechanical

Perpendicular
Flanged

No limitations
DN 150 mm (6")

ANSI # 2500

No
N/A

N/A

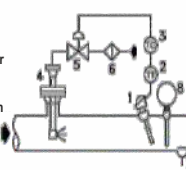
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Variable pressure operated
nozzle with check valve function

Single

Legend

- 1 Temperature Sensor
- 2 Temperature transmitter
- 3 Temperature Controller
- 4 DeSuperheater
- 5 Valve for water injection
- 6 Cooling water strainer
- 7 Drain
- 8 Temperature Gauge



EDM (Multi Spring Nozzle Ring Type)



Mechanical

In-line
Welded or flanged

No limitations
DN 150mm (6")

ANSI # 2500

No
N/A

N/A

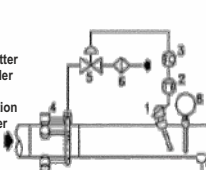
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Variable pressure operated
nozzle with check valve function

Multi

Legend

- 1 Temperature Sensor
- 2 Temperature transmitter
- 3 Temperature Controller
- 4 DeSuperheater
- 5 Valve for water injection
- 6 Cooling water strainer
- 7 Drain
- 8 Temperature Gauge



EVI (Venture type Integral)



Mechanical

Mounting between flanges

DN 150 mm (6")
DN 50mm (2")

ANSI # 1500

Yes
Pneumatic

V

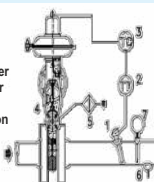
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Fixed

Single

Legend

- 1 Temperature Sensor
- 2 Temperature transmitter
- 3 Temperature Controller
- 4 DeSuperheater
- 5 Valve for water injection
- 6 Cooling water strainer
- 7 Drain
- 8 Temperature Gauge



EV (Venturi)



Mechanical

Mounting between flanges

DN 100 mm (4")
DN 25mm (1")

ANSI # 2500

No
N/A

N/A

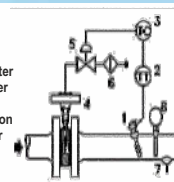
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Fixed

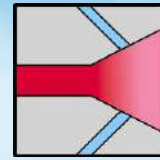
Single

Legend

- 1 Temperature Sensor
- 2 Temperature transmitter
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- 7 Drain
- 8 Temperature Gauge



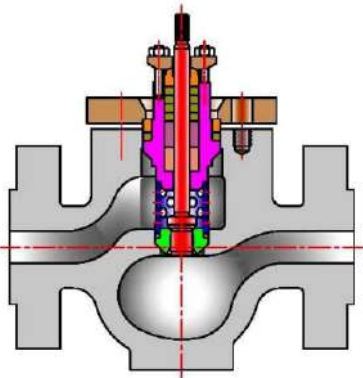
Specialty Valves



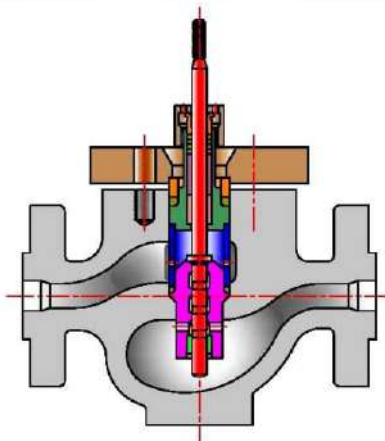
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Steam, Water Valve Construction

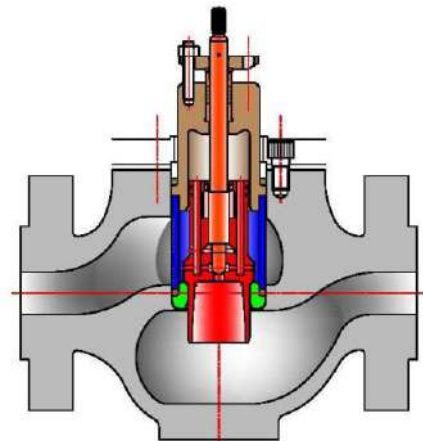
**Bolted Bonnet
Single Belt**



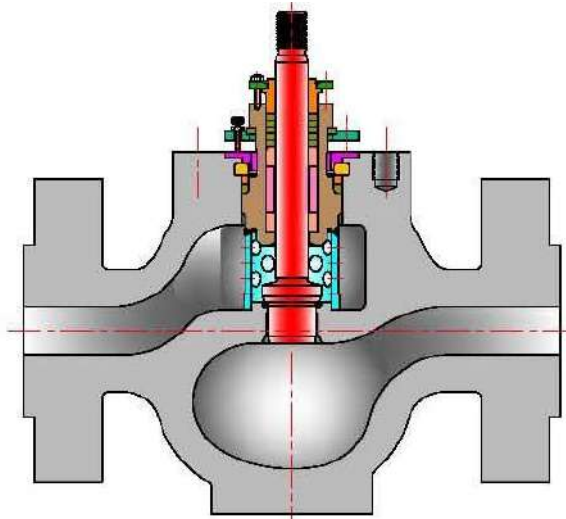
**Bolted Bonnet
Multistage Valve**



**Bolted Bonnet
Balance Tight
Design Size**



Pressure seal bonnets
sizes >80mm



Control Valve Schematic Cross Section View

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