



BTG Valves Product Digest





CCI / BTG VALVES

In 2001 BTG Specialty Valves was acquired by CCI and changed its name to CCI Sweden. The products are branded "BTG Valves."

CCI is the world's leading manufacturer of severe-service control valves and hydraulic and pneumatic actuators. CCI provides engineering solutions for control valves in fossil and nuclear power plants, the oil and gas industries, and pulp and paper facilities. With headquarters in Rancho Santa Margarita, California, and sales offices worldwide, CCI also operates major design and manufacturing facilities in Säfte, Sweden; Winterthur, Switzerland; Osaka, Japan; and Kyunggi-Do, the Republic of Korea.

Innovations have played a major part in the BTG Valves success story. For more than 80 years a steady flow of new products has been helping to meet customers' specific needs to improve functionality and reliability while at the same time helping them to optimize the industrial process in general.

In 1929, BTG Valves concluded that combining pressure and temperature reduction in a single valve body was the key to optimal controllability and turndown. In the unique BTG valve, combined valve functions are mastered and long lifetime is assured.

Apart from approved function, combining pressure and temperature reduction in a single valve body means less rigorous requirements for piping downstream from the steam conditioning valves, i.e., shorter and straighter pipe runs and shorter distances to the temperature sensor.

In situations where cooling without pressure reduction is required, a desuperheater is used. Desuperheaters from BTG Valves are designed to optimize the atomization of the cooling water for fast evaporation and maximum rangeability.

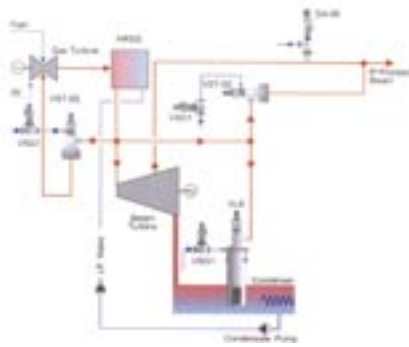
Applications

BTG Valves are primarily designed for pressure and temperature control of steam in severe applications such as:

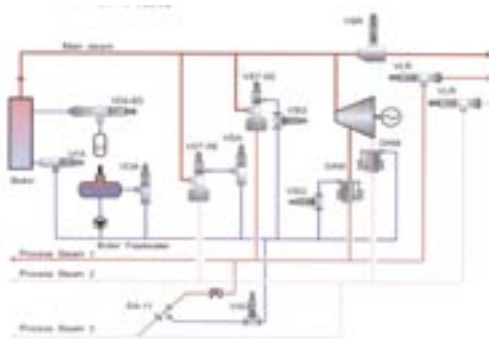
- Turbine Bypass Valves
- Process Steam Conditioning Valves
- Pressure Relief Valves

In addition to steam valves and desuperheaters BTG Valves are used in applications such as:

- Boilerfeed Water Control
- Pump Recirculation
- Spraywater Control
- Boiler Drum Blow Down
- Feedwater Preheater Bypass



Single Pressure - Combined Cycle



Industrial Power Plant



Engineering

Our engineers work in close contact with the CCI worldwide sales and service organizations in the field to ensure that the right products are chosen for particular installations, and that they perform as intended once they are installed.

The continuous commitment to research and product development is our guarantee to customers that we will continue to meet their equipment and instrumentation requirements in the future.



Manufacturing

All BTG Valves steam conditioning equipment, whether forged, fabricated or cast, is manufactured to the highest standards using the most modern manufacturing technology and machinery.

Each valve is manufactured to comply with the requirements of specific industrial standards. These include codes and standards established by the American National Standard Institute (ANSI), the American Society Of Testing and Materials (ASTM), the American Society of Mechanical Engineers (ASME), the British Standards Institute (BS), Deutsche Industrinormen (DIN), Technische Regeln für Dampfkessel (TRD) and the Swedish Institute of Standards (SIS).

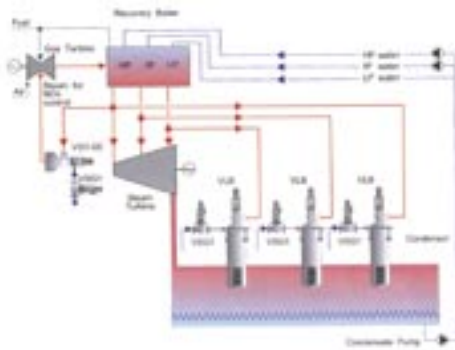
Compliance with other standards is assured where required. It is merely a matter of specification by the customer.

Quality Assurance

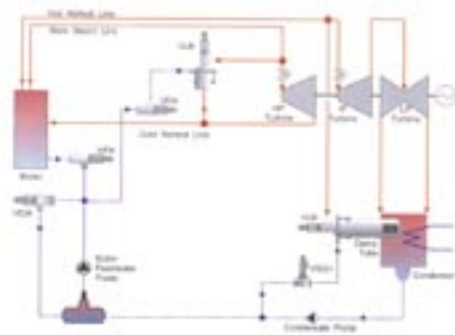
The severe operating conditions under which BTG Valves are designed to function presuppose effective systems of quality assurance.

Therefore, since 1993 the Quality Management System of BTG Valves is certified according to ISO 9001.

The manufacturing processes are certified in accordance with TRD 201, TRB 200/AD-M HP 0 and EN 729-2 by TÜV, UDT, Poland and NASTHOL, Russia.



Combined Cycle, Triple Pressure



Conventional Reheat



VALVE TYPE:

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 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
- Water injection downstream from pressure reduction for extended valve life
- Split pressure class inlet/outlet to minimize thermal stress levels

VST-SE/VST



VLB



Applications:	Process steam, Turbine bypass Turndown 1:20 - 1:70	Turbine bypass Process steam
Body Style:	Angle Fully machined	Angle Fully machined
Body Material:	Forged CrMo-, including X10CrMoVNb91 (F91), or carbon steel	Forged CrMo-, including X10CrMoVNb91 (F91), or carbon steel
Max Pressure Class, Inlet	DIN-PN 640 (ANSI# 4500)	DIN-PN 640 (ANSI# 4500)
Max Pressure Class, Outlet:	DIN-PN 250 (ANSI# 1500)	DIN-PN 250 (ANSI# 1500)
Max Capacity, Kv (Cv):	3300/3600 (3800/4160)	3900 (4500)
Leakage Class:	III-IV	III-V
Plug Design Available:	Cage: Balanced	Cage: Balanced, Balanced tight, Unbalanced tight
Water Injection:	Direct proportioning through stem	Nozzles in valve outlet
Special Design Features:	<ul style="list-style-type: none"> ■ Built in feed forward water injection for maximum plant flexibility and steam quality ■ Cage trim with tube diffusers for low noise and vibration under severe conditions ■ Steam atomization for outstanding turndown ■ Water injection after final steam pressure reduction 	<ul style="list-style-type: none"> ■ High combined turndown with pressure proportioning, variable orifice spraywater nozzles ■ Cage trim with tube diffusers for low noise and vibration under severe conditions ■ Water injection after final steam pressure reduction

VALVE TYPE:

Common Design Features:

- High combined turndown with pressure sensitive, variable orifice spraywater nozzles
- Cage trim with diffuser tubes 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

VSGC



VZ



Applications:	Turbine bypass Process steam	Auxiliary
Body Style:	Globe	Z-configuration
Body Material:	Cast CrMo-, low alloy or carbon steel Fabricated outlet	Forged CrMo-, low alloy or carbon steel
Max Pressure Class, Inlet	DIN-PN 100 (ANSI# 600)	DIN-PN 400 (ANSI# 2500)
Max Pressure Class, Outlet:	DIN-PN 100 (ANSI# 600)	DIN-PN 400 (ANSI# 2500)
Max Capacity, Kv (Cv):	580 (670)	30 (35)
Leakage Class:	III-V	V
Plug Design Available:	Cage: Balanced tight, Unbalanced tight	Cage: Unbalanced tight
Water Injection:	Nozzles in valve outlet	Nozzles in valve outlet
Special Design Features:	<ul style="list-style-type: none"> ■ Similar to VSC-valve but with cast body for lower pressure and temperature 	<ul style="list-style-type: none"> ■ Compact design for low flow applications ■ High quality forged steel body for total integrity of pressure containing parts

VALVE TYPE:

Common Design Features:

- Standardized cast body design with flanged or buttweld end connections means low investment and installation costs
- Easy access to internal parts reduces maintenance costs and system downtime
- Built-in feed forward water injection means maximum plant flexibility and steam quality
- Water injection downstream from pressure reduction for extended valve life

VLBS



VLBO



Applications:	Turbine bypass with integrated stop plug	High pressure turbine bypass valve with safety function. Opens with flow.
Body Style:	Angle Fully machined	Angle Fully machined
Body Material:	Forged CrMo-, including X10CrMoVNb91 (F91), or carbon steel	Forged CrMo-, including X10CrMoVNb91 (F91), or carbon steel
Max Pressure Class, Inlet	DIN-PN 640 (ANSI# 4500)	DIN-PN 640 (ANSI# 4500)
Max Pressure Class, Outlet:	DIN-PN 250 (ANSI# 1500)	DIN-PN 250 (ANSI# 1500)
Max Capacity, Kv (Cv):	3900 (4500)	3800 (4390)
Leakage Class:	V	V
Plug Design Available:	Control Plug: Cage unbalanced tight Stop Plug: On/off unbalanced tight	Cage: Unbalanced tight
Water Injection:	Nozzles in valve outlet	Nozzles in valve outlet
Special Design Features:	<ul style="list-style-type: none"> ■ Stop and control plugs combined in a single valve reduces investment and installation costs ■ Fully redundant stop function with two independently operated valve plugs for increased plant safety ■ See VLB features 	<ul style="list-style-type: none"> ■ Safety function according to TRD 421 ■ Inherent safety valve feature protects or eliminates high pressure safety valves for reduced maintenance and installation costs ■ Water injection at the point of maximum steam velocity independent of stroke

VSC



VSGT



AV-40



Process steam
Turbine bypass

Process steam turndown
1:20 - 1:40

Process steam, Turbine bypass

Globe
Fabricated

Globe

Globe

Forged CrMo-, including
X10CrMoVNb91 (F91),
or carbon steel

Cast CrMo-low alloy or carbon steel

Cast CrMo-low alloy or carbon steel

DIN-PN 640 (ANSI# 4500)

DIN-PN 100 (ANSI# 600)

DIN-PN 250 (ANSI# 1500)

DIN-PN 250 (ANSI# 1500)

DIN-PN 100 (ANSI# 600)

DIN-PN 250 (ANSI# 1500)

3400 (3930)

460 (530)

2000 (2310)

III-V

III-V

II

Cage: Balanced
Unbalanced tight

Cage: Balanced
Unbalanced tight

Countour: Balanced (Double Seat)

Nozzles in valve outlet

Direct proportioning through stem

Direct proportioning through stem

- Similar to the VLB-valve, but designed for straight-through installation (globe)
- See VLB features

- Excellent turndown capability
- Body size DN 25-200 (1"-8")

- Double seat configuration means low investment costs relative to flow capacity
- Excellent turndown capability
- DN 50-350 (2"-14")

VALVE TYPE:

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 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 pressure class inlet/outlet to minimize thermal stress levels

VLR



VLRO



VSR



Applications:	Process steam	High pressure turbine bypass valve with safety function	Process steam
Body Style:	Angle Fully machined	Angle Fully machined	Globe Fabricated
Body Material:	Forged CrMo- including X10CrMoVNb91 (F91), or carbon steel	Forged CrMo- including X10CrMoVNb91 (F91), or carbon steel	Forged CrMo- including X10CrMoVNb91 (F91), or carbon steel
Max Pressure Class, Inlet	DIN-PN 640 (ANSI# 4500)	DIN-PN 640 (ANSI# 4500)	DIN-PN 640 (ANSI# 4500)
Max Pressure Class, Outlet:	DIN-PN 250 (ANSI# 1500)	DIN-PN 250 (ANSI# 1500)	DIN-PN 250 (ANSI# 1500)
Max Capacity, Kv (Cv):	3900 (4500)	710 (820)	3400 (3930)
Leakage Class:	III-V	V	III-V
Plug Design Available:	Cage: Balanced, Balanced tight, Unbalanced tight	Cage: Unbalanced tight	Cage: Balanced, Balanced tight, Unbalanced tight
Special Design Features:	<ul style="list-style-type: none"> ■ Similar to VLB, but without water injection 	<ul style="list-style-type: none"> ■ Safety function according to TRD 421 ■ Inherent safety valve feature protects or eliminates high pressure safety valves for reduced maintenance and installation costs ■ Similar to VLBO, but without water injection 	<ul style="list-style-type: none"> ■ Similar to VLB, but without water injection

VALVE TYPE:

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 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 pressure class inlet/outlet to minimize thermal stress levels

VSGR



VN



Applications:

Process steam

Low pressure process steam for extremely large capacity

Body Style:

Globe

Globe
Fabricated

Body Material:

Cast CrMo-low alloy or carbon steel
Fabricated outlet

CrMo-low alloy
or carbon steel

Max Pressure Class, Inlet

DIN-PN 100 (ANSI# 600)

DIN-PN 25 (ANSI# 150)

Max Pressure Class, Outlet:

DIN-PN 100 (ANSI# 600)

DIN-PN 25 (ANSI# 150)

Max Capacity, Kv (Cv):

580 (670)

15000 (17300)

Leakage Class:

III-V

III-IV. Option Class V

Plug Design Available:

Cage: Balanced, Unbalanced tight

Cage/fixed cage: Balanced

Special Design Features:

- Similar to VSGC, but without water injection

- Large flow handling capacity
- Double seat, balanced control plug permits low cost pneumatic actuators

VALVE TYPE:

Common Design Features:

- "Smooth" body contour resists thermal fatigue
- Easy access to internal parts reduces maintenance costs and system downtime
- High quality forged steel body for total integrity of pressure containing parts

VS



VQS



Applications:

Turbine bypass stop valve
Process steam stop valve
Water stop valve

Turbine quick stop valve

Body Style:

Angle
Fully machined

Angle
Fully machined

Body Material:

Forged CrMo-, including
X10CrMoVNb91 (F91), or carbon
steel

Forged CrMo-, including
X10CrMoVNb91 (F91), or carbon
steel

Max Pressure Class, Inlet

DIN-PN 640 (ANSI# 4500)

DIN-PN 640 (ANSI# 4500)

Max Pressure Class, Outlet:

DIN-PN 250 (ANSI# 1500)

DIN-PN 250 (ANSI# 1500)

Max Capacity, Kv (Cv):

7500 (8660)

7500 (8660)

Leakage Class:

V

V

Plug Design Available:

Contour On/off: Unbalanced tight,
Balanced tight

Contour On/off: Unbalanced tight,
Balanced tight

Special Design Features:

- Flow path in angle body means low pressure drop due to pressure recovery in the outlet cone

- Flow path in angle body means low pressure drop due to pressure recovery in the outlet cone

VALVE TYPE:

Common Design Features:

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

VD/VDA/VDZ



VSG-1/V-30



Applications:

Spraywater control valve, Pump recirculation, Boiler feedwater startup

Pressure control valve for flashing water

Body Style:

VD: Globe
VDA: Angle
VDZ: Z-configuration

Globe
VSG-1 | V-30

Body Material:

Forged CrMo-low alloy or carbon steel

Cast CrMo-low alloy or carbon steel | Cast carbon steel

Max Pressure Class, Inlet

DIN-PN 400 (ANSI# 2500)

DIN-PN 250 (ANSI# 1500) | DIN-PN 40 (ANSI# 150)

Max Capacity, Kv (Cv):

77 (89)

770 (890) | 51.5 (59.5)

Leakage Class:

V

V | IV

Plug Design Available:

Contour: 2-5 stages, depending on pressure drop. Unbalanced tight

Cage contour: Balanced, Unbalanc. tight | Contour: Unbalanc. tight

Special Design Features:

- Multi-stage control plug to eliminate cavitation under severe conditions
- High quality forged steel body design for total integrity of pressure containing parts

- Max 40 bar (600 psi) pressure drop
- Max 15 bar (225 psi) pressure drop
- Standardized cast body design with flanged or butt weld end

VALVE TYPE:

Common Design Features:

- Easy access to internal parts reduces maintenance costs and system downtime
- Seat design for tight shutoff means no damage by “wire-drawing” due to seat leakage
- High quality forged steel body for total integrity of pressure containing parts

VFA/VFZ



VDA-BD



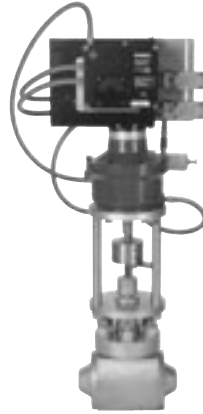
Applications:	Boiler feedwater startup and flow control	Pressure control valve for flashing water
Body Style:	VFA: Angle VFZ: Z-configuration	Angle
Body Material:	Forged CrMo-low alloy or carbon steel	Forged CrMo-low alloy or carbon steel
Max Pressure Class, Inlet	DIN-PN 400 (ANSI# 2500)	DIN-PN 400 (ANSI# 2500)
Max Capacity, Kv (Cv):	3000 (3470)	On request
Leakage Class:	V	V
Plug Design Available:	Cage: HP-version for $\Delta p > 60$ bar	Multi-stage contour
Special Design Features:	<ul style="list-style-type: none"> ■ Excellent control characteristic ■ High resistance to cavitation damage at extreme pressure differences of short duration 	<ul style="list-style-type: none"> ■ The design prevents erosion and cavitation damages

VALVE TYPE:

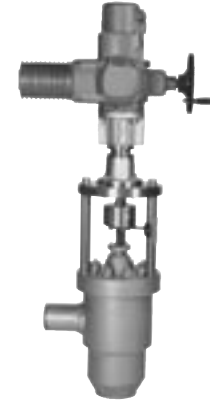
Common Design Features:

- Easy access and exchangeable inner parts reduce maintenance costs and system downtimes
- Seat design for tight shutoff means no damage by “wire-drawing” due to seat leakage

VSG2



VE



Applications:	Spraywater control valve for bypass or boiler	Spraywater control valve for bypass
Body Style:	VSG2: Single-stage globe VSG2-C: Multi-stage globe VSA2/VSA2-C: Single/multi-stage angle	Multi-stage angle
Body Material:	Forged CrMo-low alloy or carbon steel	
Pressure Class:	DIN PN 64 to PN 400 ANSI# 300 to #2500	DIN PN 64 to PN 400 ANSI# 300 to #2500
Max Capacity, Kv (Cv):	30 (35)	25 (29)
Leakage Class:	V	V
Plug Design Available:	Contour ($\Delta p \leq 40$ bar) Cages ($\Delta p \leq 100$ bar)	Cages ($\Delta p \leq 220$ bar)
Special Design Features:	<ul style="list-style-type: none"> ■ Excellent control characteristic (equal %) ■ Inner parts made of special material N700 for highest durability ■ High quality forged steel body for total integrity of pressure containing parts 	<ul style="list-style-type: none"> ■ Excellent control characteristic (equal %) ■ Inner parts made of special material N700 for highest durability ■ High quality forged steel body for total integrity of pressure containing parts

VALVE TYPE:

Common Design Features:

- Easy access to internal parts reduces maintenance costs and system downtime
- Seat design for tight shutoff means no damage by "wire-drawing" due to seat leakage
- High quality forged steel body for total integrity of pressure containing parts

VFR



VFK



Applications:	Feedwater pump recirculation valve	High pressure drop with flashing
Body Style:	Multi-stage Angle or Z-configuration	Multi-stage Angle
Body Material:		
Max Pressure Class, Inlet	DIN PN 64 to PN 400 ANSI# 300 to #2500	DIN PN 64 to PN 400 ANSI# 300 to #2500
Max Capacity, Kv (Cv):	16 (18)	36 (42)
Leakage Class:	V	V
Plug Design Available:	Stop plug with labyrinths ($\Delta p \leq 220$ bar)	Cages ($\Delta p \leq 150$ bar)
Special Design Features:	<ul style="list-style-type: none"> ■ Inner parts are made of special material N700 for highest durability ■ High quality forged steel body for total integrity of pressure containing parts 	<ul style="list-style-type: none"> ■ Excellent control characteristic ■ Easy exchangeable wearing sleeve ■ Inner parts made of special material N700 for highest durability ■ High quality forged steel body for total integrity of pressure containing parts ■ The design prevents erosion and cavitation damages

VSG3**VHB-3****VHB-2**

Boiler feedwater startup and flow control

Feedwater preheater bypass valve

Feedwater preheater stop valve

Globe

Angle and
Z-configuration

Angle

Cast CrMo-low alloy or carbon steel

Forged CrMo-low alloy or carbon steel

Forged CrMo-low alloy or carbon steel

DIN PN 64 to PN 400

DIN-PN 400 (ANSI# 2500)

DIN-PN 400 (ANSI# 2500)

ANSI# 300 to #2500

516 (596)

7500 (8660)

7500 (8660)

IV-V

V

V

Cages: Balanced, Balanced tight or Unbalanced tight

Contour on/off: Unbalanced tight

Contour on/off: Unbalanced tight

- Excellent control characteristic
- High resistance to cavitation damage at extreme pressure differences of short duration

- Plug is designed to minimize the pressure drop
- Possibility for media-operated hydraulic system

- Plug is designed to minimize the pressure drop
- Possibility for media-operated hydraulic system

PNEUMATIC PISTON



Application:

Valves and Desuperheaters

Pneumatic, Piston, Double acting

Supply Pressure:

Max 7 barg (100 psig)

Control Signal:

4-20 mA or 3-15 psi
(to positioner)

Max Diaphragm Diameter:

850 mm (15")

Max Stroke:

320 mm (12.5")

Compact mounted accessories for quick opening, quick closing or stay put function at air failure. Eliminates need of mechanical spring

PNEUMATIC DIAPHRAGM



Application:

Desuperheaters and small water valves

Pneumatic, Diaphragm, Single acting

Supply Pressure:

Max 2, 5 barg (35 psig)

Control Signal:

4-20 mA or 3-15 psi
(to positioner)

Max Diaphragm Diameter:

effective 350 mm (15")

Max Stroke:

50 mm (2")

Available with both spring to open or spring to close

HYDRAULIC



Application:

Valves requiring large actuating forces and high accuracy

Hydraulic, Single- or Double acting

Supply Pressure:

Max 210 barg (3000 psig)

Control Signal:

Max Diaphragm Diameter:

320 mm (12.6")

Max Stroke:

320 mm (12.6")

Standard fluid: Mineral oil
Option: Non flammable fluid

ELECTRO- MECHANICAL



Application:

Valves and Desuperheaters

Electromechanical

Supply Pressure:

Multiple voltage available

Control Signal:

4-20 mA

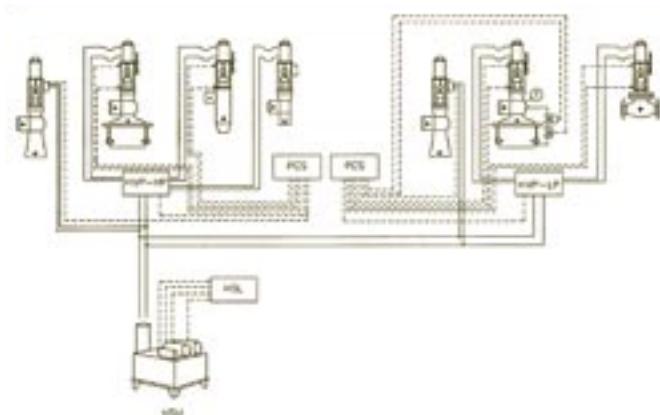
Max Stroking Thrust:

121 kN

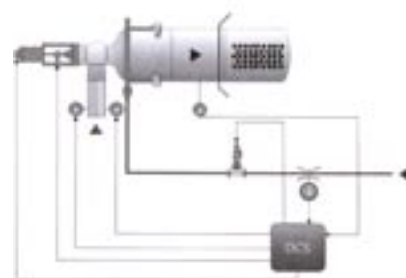
Max Stroke:

320 mm (12.6")

HSU/PCS



DUMP TUBE



Hydraulic Supply Unit (HSU)

Standard fluid: mineral oil
Option: non flammable fluid

Supply Pressure:
Design: 210 barg (3000 psig)
Max Operating: 170 barg (2465 psig)

Power Supply:
380 (440) VAC, 3 phase

Main Components:

- 2 pumps
- Filters
- Accumulator
- Monitoring and control system (HSL)
- Indicators for oil pressure, temperature and level
- Hydraulic valves (Option: mounted on separate panels, HVP)
- Tank

Position Control System (PCS)

Input Signals:

- 4-20 mA set point from controller or DCS
- 4-20 mA actual valve position from position transducer
- All signals galvanically isolated

Output Signals:

- Control signals to solenoids on the hydraulic valves
- 4-20 mA actual valve position

Power Supply:
220 (110) VAC

Feed Forward Temperature Control

In turbine bypass applications, it is common to dump steam into a condenser. A dump tube is used for final pressure breakdown when the steam is dumped into a condenser.

The reason for building up the pressure downstream from the bypass valve is to lower the specific volume of the steam which reduces the pipe diameter.

The temperature of the steam dumped into the condenser is recommended to be controlled by feed forward control.

CCI provides an algorithm that calculates the required spraywater flow based on enthalpy calculations from measured inlet steam pressure and temperature and valve stroke, or downstream pressure using the dump tube as a flowmeter.

Benefits:

The benefits using feed forward control are several:

- Eliminates the need for long routings of large diameter piping between the turbine bypass valve and the condenser as the bypass valve is mounted on the condenser
- Low enthalpy of the steam entering the condenser
- Precise temperature control
- Gives the excellent turndown, that start-up conditions require, 1:40 or more

DESUPERHEATER TYPE:

Common Design Features:

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

DA-4

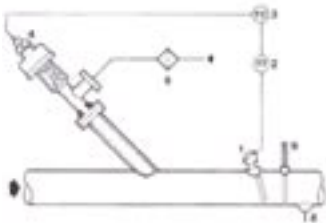
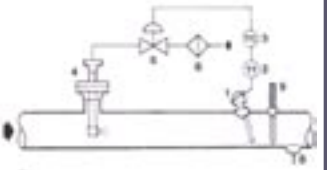
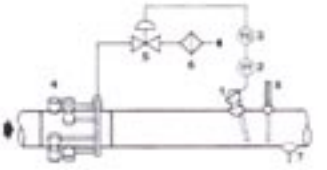


DA-O



DA-M



Type of Automization:	Mechanical	Mechanical	Mechanical
Installation to Steam Line:	Angle 45, Flanged	Perpendicular, Flanged	In-line, welded or flanged
Steam Header:			
Max Size	No limitations	No limitations	No limitations
Min Size	DN 150 mm (6")	DN 100 mm (4")	DN 100 mm (4")
Max Pressure Class:	DIN-PN 400 (ANSI# 2500)	DIN-PN 400 (ANSI# 2500)	DIN-PN 640 (ANSI# 4500)
Integrated Spraywater Control:	Yes	No	No
Actuator:	Yes	N/A	N/A
Leakage Class:	V	N/A	N/A
Nozzle Turndown:	40:1	25:1	25:1
Orifice Type:	Variable	Variable pressure operated nozzle with check valve function	Variable pressure operated nozzle with check valve function
No. of Water Nozzles:	Single	Single	Multi
Typical Installations:			

DA-90



DA-11



MDA-14



MDA-V



Mechanical

Steam

Mechanical

Mechanical

Perpendicular, Flanged

Angle 45, Flanged

Mounting between flanges

Mounting between flanges

No limitations
DN 150 mm (6")No limitations
DN 150 mm (6")DN 100 mm (4")
DN 50 mm (2")DN 100 mm (4")
DN 25 mm (1")

DIN-PN 250 (ANSI# 1500)

DIN-PN 160 (ANSI# 900)

DIN-PN 250 (ANSI# 1500)

DIN-PN 250 (ANSI# 1500)

Yes

No

Yes

No

Yes

N/A

Yes

N/A

V

N/A

V

N/A

30:1

50:1

15:1

15:1

Variable

Fixed

Variable

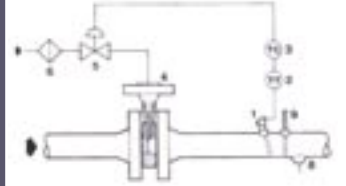
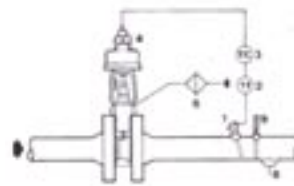
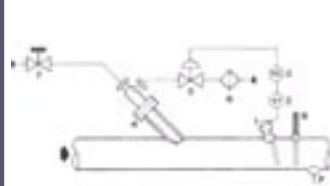
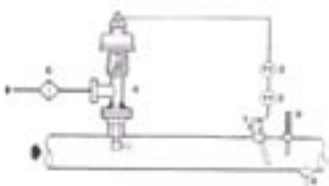
Fixed

Single

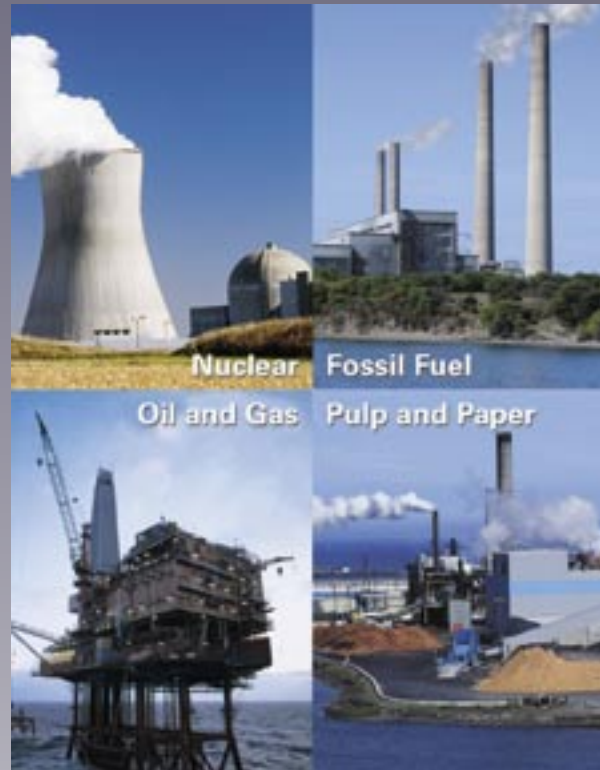
Single

Single

Single



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