

550A

KOSO

TURBINE BYPASS VALVE



Standard Specifications

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► Overview

550A series high-performance turbine bypass control valve delivers precise steam pressure and temperature control for today's most advanced combined-cycle, thermal power and combined heat and power plants.

► Key Applications

- **550A-180 & 550A-285 : HP bypass to cold reheat**
These models designed for HP bypass to cold reheat applications in combined-cycle power plants and coal fired power plants.
- **550A-60 : Bypass to condenser**
Designed for bypass to condenser, this valve serves:
 - IP bypass in combined-cycle power plants
 - LP bypass in coal-fired reheat units

The outlet incorporates a welded desuperheating section with spray-water distribution via spring loaded nozzles.

► Product Features

High Rangeability & Stable Control	• Smooth modulation across wide load swings • Pressure-balanced trim options to reduce actuator load • Stable control at low steam flows
Compact and Robust Mechanical Design	• Optimal body design for uniform thermal gradient • Clamped cartridge trim is ideal for horizontal installation • Bolted bonnet for ease of maintenance • Fully replaceable quick change trim (plug, seat, stem, cage and diffuser)
Noise Attenuation Built-in	• Multi-stage trim with small drilled-hole cage design • Energy-dissipating diffuser • Configurable to specific plant noise limits
Rugged for High Temperature and Cycling	• Job-rated for temperatures up to 630°C • Designed for frequent start-ups & shutdowns • Material combination selected to combat thermal fatigue, high temperature exposure and erosion
Flexible Actuation	• Pneumatic double-acting actuator with fast response • Spring return type single acting • Hydraulic actuation with ring main and self-contained options • Optional electrical actuators

► Theory Of Operation

Turbine bypass in high-energy steam requires rapid pressure reduction, controlled velocity distribution and efficient temperature moderation. The 550A series integrates multi-stage pressure reduction and high-efficiency desuperheating in a compact angle-style valve.

Multi-Stage Pressure Reduction	• Inlet Cage - Small drilled holes attenuate the initial energy release and equalize flow distribution • Flow diffuser - Final pressure drop and noise control before steam enters the de superheater
Advanced Desuperheating	• Cooling water is introduced downstream through: High-efficiency spring-loaded nozzles • The symmetrical outlet velocity field produced by the unique removable diffuser design ensures: Rapid droplet evaporation Uniform mixing Mitigation of thermal shock risk
Tight Shutoff & Reliability	• 550A employs a pressurized seat (pilot plug design) for tight shutoff (MSS-SP-61 or Class V) • The high seating loads in the closed position prevent leakage even under high pressure drop.

► Standard Specification

► 550A Turbine Bypass Valve Body & Trims

The 550A series is engineered for long term reliability using premium materials and optimized for temperature ranges from 500°C to 630°C.

Model	550A-180 , 550A-285 , 550A-60	
Body / Bonnet	F92 , F91 / C12A / C91, WC9 / F22	
Flow Diffuser	C12A / C91, WC9	
Plug	F92 , F91 / C12A / C91, WC9 / F22 with stellite coating	
Cage	F92, F91 / C12A / C91, WC9 / F22 with Nitriding and / or PVD coating for high temperature applications	
Stem	Alloy 718	
Sizes, Ratings	<u>550A-180 & 550A-285</u> • Design pressure 550A-180 is 190 barG • Design pressure 550A-285 is 290 barG • Plug sizes 3 inch to 10 inch • Stroke: 60–250 mm • Max CV: 140–1000	<u>550A-60</u> • Design pressure is 60 barG • Plug sizes 6 inch to 18 inch • Stroke: 160–340 mm • Max CV: 600–4250
Design Options	• Desuperheater type: Multi nozzle ring type desuperheater • Transition pieces for material/diameter changes • Pre-warming & drain ports • Orientation: no restrictions • Customization is possible for each of the designs for higher pressure & temperature	

► Body & Trim Sectional View

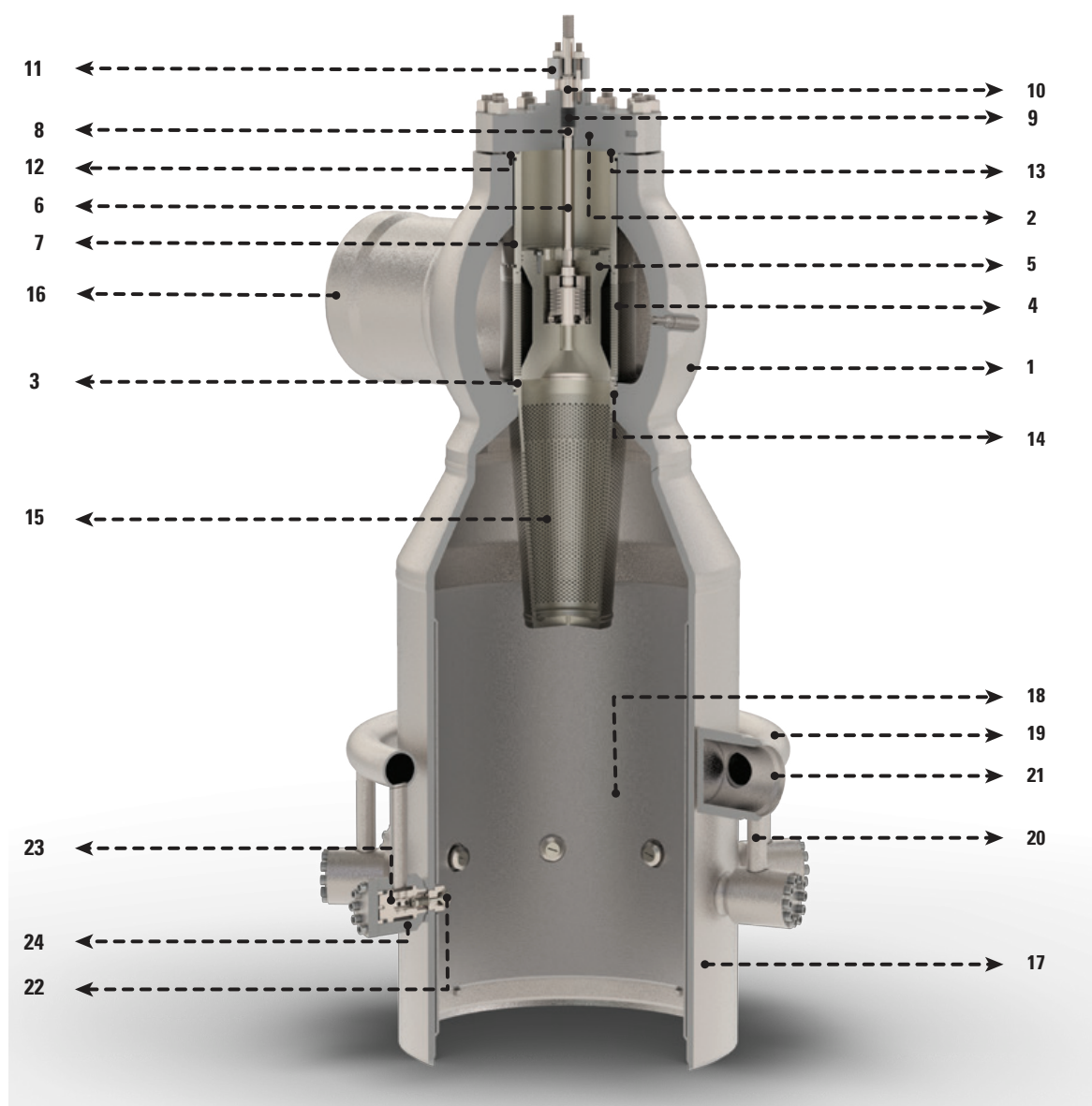


Figure 1: 550A - Body and Trims Cross Sectional View

SR.NO.	LABEL
1	BODY
2	BONNET
3	SEAT RING
4	CAGE
5	PLUG
6	STEM
7	BALANCE CYLINDER
8	PACKING SEAT

SR.NO.	LABEL
9	GLAND PACKING
10	GLAND RING
11	GLAND FLANGE
12	BODY - BONNET GASKET
13	SEAT GASKET
14	BALANCE SEAL
15	DIFFUSER ASSEMBLY
16	INLET SPOOL PIECE

SR.NO.	LABEL
17	STEAM PIPE
18	LINER PIPE
19	RING PIPE
20	FEEDER PIPE
21	WATER STUD
22	NOZZLE ASSEMBLY
23	NOZZLE HOLDER
24	NOZZLE HOUSING BOX

► Engineered for Modern Power Plant Demands

The 550A series turbine bypass valves are designed for increasingly dynamic operating profiles of today's power facilities - frequent starts, rapid load changes and stringent thermal cycling. Combining rugged construction with highly engineered flow paths, advanced trim materials and special coatings, the 550A family provides accurate pressure regulation, efficient desuperheating and exceptional reliability across HP, HRH and LP bypass systems. To perform the turbine protection or full steam conditioning, 550A valves ensure dependable performance during plant start-up, shutdown and emergency turbine trip operation.

► Why 550A?

Compared to traditional steam bypass valve designs and other products available in the market, the 550A series turbine bypass system offers:

- **Lower Maintenance, Fewer Failure Points**
No dependence on welded or screwed seats. All internals can be replaced quickly.
- **Superior Thermal Stability**
The clearances between the moving parts are optimized for wide range of operating temperatures which can give trouble free operation without excessive friction.
- **Installation Flexibility**
Horizontal installations with clamped cartridge trim simplifies maintenance.
- **True Multi-Stage Pressure Control**
Engineered to meet plant acoustic requirements with staged pressure drop and customized cage drilling patterns.
- **Material Excellence**
Wide range of high-temperature alloys and coatings that exceeds typical industry offerings.
- **Proven Global Install Base**
Wide installed base across globe with proven track record.

► Maintenance & Serviceability

- **Quick Service Access**
 - 550A valves are engineered for fast turnaround during outages
 - No welded-in trim components
 - Cartridge-style removable internals for horizontally installed valves
 - Replaceable cages, seats, plug/stem assemblies
 - Minimal specialized tooling required
- **Reliability in Harsh Environments**
 - Hardfacing and coatings (Stellite, Nitriding or PVD - Physical Vapor Deposition)
 - High structural integrity in diffuser and outlet assemblies
 - Wear-resistant cages and seat rings
 - Suitable for high ΔP , high velocity and frequent cycling
- **Actuator Serviceability**
 - Robust pneumatic design
 - Accessible linkage and stem connection

Precision. Innovation. Trust.

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