

TVV



Engineering
GREAT Solutions

Turbine Ventilation Valve

TVV - Turbine Ventilation Valve

The Turbine Ventilation Valve (TVV) is used for large steam turbines, which are started up through the intermediate pressure (IP) turbine. While in IP turbine operation mode, the high pressure (HP) turbines require cooling. This cooling is provided by cold steam flow through the HP turbine.

Key features

> HP Turbine cooling during start-up (Reverse Flow mode)

- During the start-up sequence of the power plant, the HP Turbine Control Valves as well as the Turbine Shut-off Valves are closed in order to eliminate any damage to the HP-Turbine caused by improper steam conditions. Meanwhile the HP Turbine Bypass Stations are in operation, leading the steam to the IP/LP Turbine for the start-up process (up to approx. 7% load).

During this process, the HP turbine requires continuous cooling in order to avoid overheating. Opening the Reverse Flow Valve (RFV) bypasses the Turbine Check Valve. Opening the Turbine Vent Valve (TVV) at the same time forces steam to circulate from the cold reheater line through the HP Turbine to the condenser, providing the required cooling effect.

> HP Turbine depressurising at turbine trip or full load rejection (depressurisation mode)

- In case of load rejection or turbine trip, the Turbine Safety Valves close immediately and the HP Bypass System takes over the steam flow. To avoid overheating of the still rotating HP turbine, the turbine must be depressurised immediately. The Turbine Control System usually triggers Turbine Safety Valves and the Turbine Vent Valve at the same time. Opening the Turbine Vent Valves will evacuate the trapped steam to the condenser, which leads to an immediate depressurisation of the turbine.



Compact, robust design

Benefits

- > Compact, robust design
- > Safe opening by spring force
- > Designed for frequent start-ups
- > Custom design for conditions up to 300 bar / 600 °C
- > Redundant control systems available
- > Shortest stroking times

Function

The valve is kept closed by a hydraulic actuator, fed through the turbine's own hydraulic actuation system whereas it opens by spring force. The hydraulic pilot system – triggered through the turbine safety

system – shuts the hydraulic pressure line and bypasses the upper and lower chamber of the actuator, allowing the pre-tensioned spring to open the Vent Valve in less than 1 second. The unique hydraulic control unit

allows the mounting of multiple and/or different types of solenoid in order to fulfill customer-specified redundancy requirements.

Design

The Turbine Ventilation Valve is an angle body type, incorporating a pressurised seal bonnet. Usually in flow-to-close configuration, it can also be supplied in a flow-to-open configuration.

With the range of available body materials, the Turbine Ventilation Valve can be applied for the operating temperatures of today's most advanced thermal power plants. The valve body with its spherical shape is designed for cyclic operation and frequent start-ups.

Material concentrations and abrupt changes of wall thickness are avoided.

A welded-in, replaceable seat provides leakage rates according to ANSI/FCI Class V as a minimum.

In order to keep opening forces low and predictable, the stem is sealed by labyrinths with single or double exhaust.

Product specification

Body Style

Angle, flow-to-close or flow-to-open
Spherical shaped body
Pressurized seal bonnet

Pipe Connection

For steam pipes: butt-welding according to customer's requirements

For exhaust: flanged according to DIN or ASME

Steam data range

Temperature range : ~ 500 - 600 °C
Pressure: 300 bar

Trim

Unbalanced, welded-in or clamped seat
pressure seal bonnet

Seat/stem tightness

ANSI B16-104, class V
DIN 3230, rate 2 / MSS-SP61 (optional)

Actuation

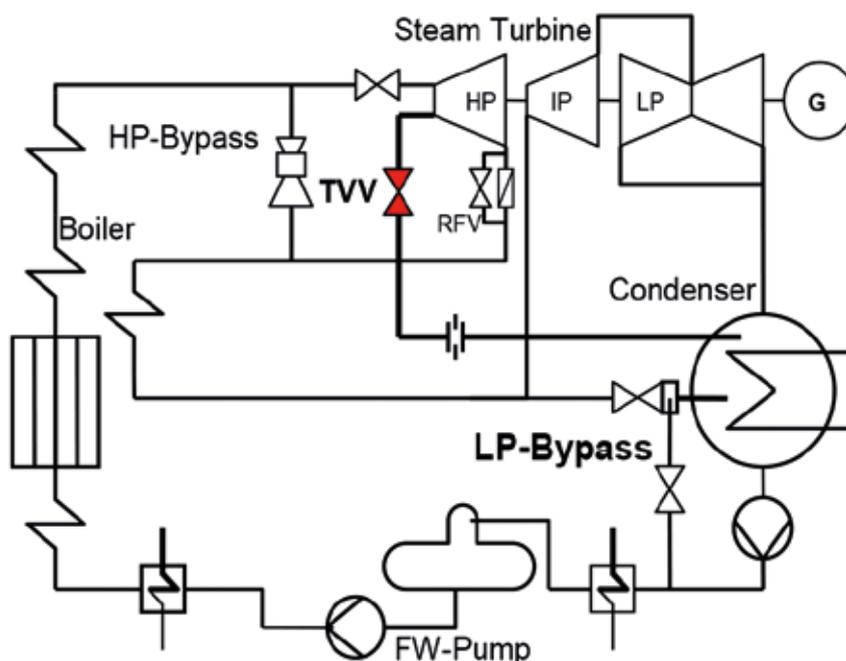
Double-acting hydraulic piston actuator for closing
Spring to open the valve

Options

Transition pieces for large pipe diameters and material compatibility
Prewarming and drain connection available on request

Orientation

No restrictions



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