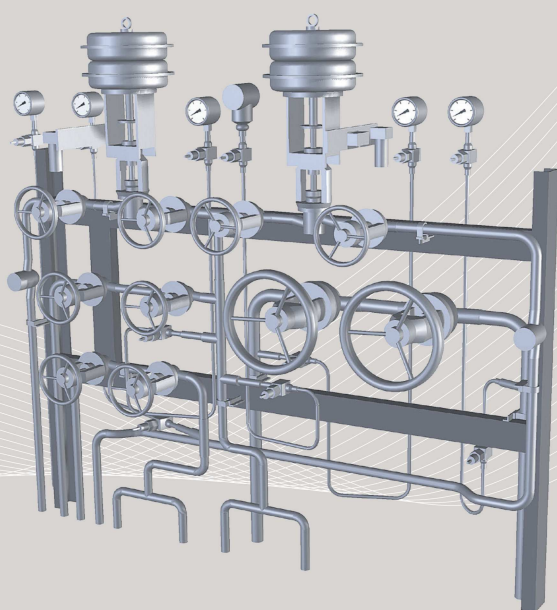


## HSTV Bypass System of High Pressure Feed-Water Exchangers



Single-frame SAR system

### Application

It is design to protect high pressure feed-water exchangers in case of tube system failure or sudden cutoff of condensate from the heater (if condensate level in any heater exceeds given maximum, the protection system will shut off the feed-water supply).

### Description

WP security system of high pressure feed-water exchangers consists of: SAR (bypass system of high pressure feed-water exchangers), HSVT1 three-way quick closing valve, and three-way quick closing check valve. The latter can be SAR controlled (HSVT2 type) or work as typical check valve controlled by pressure differences which affect the main plug (T482 model).

#### ■ SAR (Description)

The whole system (i.e., drain valves and the controls) is assembled on single frame, except three-way valves. Drain valves may have any actuators, in standard version they are pneumatic ones.

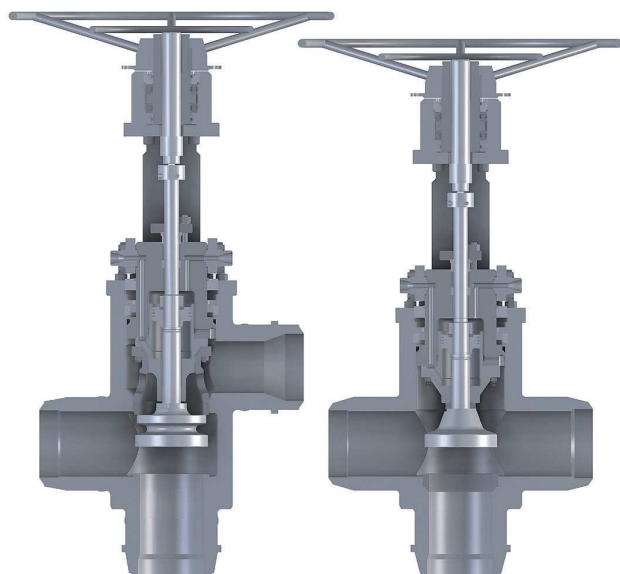


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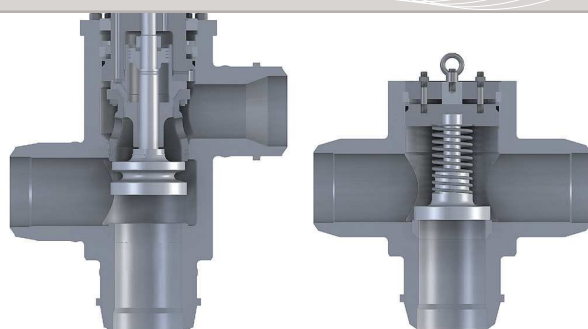
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## HSTV Bypass System of High Pressure Feed-Water Exchangers



HSV1

HSV2



HSV1

T482

### ■ Operation of HSVT1 Valve

In normal operation the plug of the valve is safely hold by its stem in upper position (open, i.e., standby). Feed-water flows from valve's inlet toward the exchangers. The opening of drain valves of SAR system causes stem and its plug to move into closing position. Feed-water flow passes the bypass pipeline. The manual drive allows blocking valve's stem in lower position (feed-water is responsible for hydraulic control of the valve).

### ■ Operation of HSVT2 Valve

In normal operation the plug of the valve is safely hold by its stem in upper position (open, i.e., standby). Feed-water flows from the exchangers toward valve's outlet. Bypass pipeline is also open, but remains cut off the HSVT1 valve. The opening of drain valves of SAR system causes stem and its plug to move into closing position, thus stopping feed-water's flow from the exchangers. The manual drive allows blocking valve's stem in lower position (feed-water is responsible for hydraulic control of the valve).

### ■ Operation of T482 Valve

During normal operation of HSVT1 valve (open, i.e., standby), feed-water from the heaters flows under the plug of T482 valve. Safely holds it in open position and flows toward the valve's outlet connection pipe. Bypass pipeline remains open, but is cut off the HSVT1 valve. If the latter valve closes, feed-water flow passes the bypass pipeline. It causes the pressure drop in high pressure feed-water pipelines and the plug of T482 valve automatically prevents any inflow from the heaters.

### ■ Purpose

The system has to provide an alternate flow path and isolate high pressure feed water exchangers if condensate level in any single heater exceeds given maximum. It is achieved by quick automatic switching of three-way valves.

## Technical data of the HSVT1, HCVT2 and T482 valves

Nominal diameter	DN80÷DN500			
Nominal pressure	PN250÷PN400			
Connections	welding ready			
Body	1.0460 (P250GH)	1.5415 (16Mo3)	1.7335 (13CrMo4-5)	1.6368 (15NiCuMoNb5-6-4)
Plug	1.0460 (P250GH)	1.5415 (16Mo3)	1.7335 (13CrMo4-5)	1.6368 (15NiCuMoNb5-6-4)
Seat	1.0460 (P250GH)	1.5415 (16Mo3)	1.7335 (13CrMo4-5)	1.6368 (15NiCuMoNb5-6-4)
Plug and seat faces	stellite			
Leakage class	V (improved), metal/metal sealing			
Body's gland	trapezoid, graphite			
Seal bushing	graphite			



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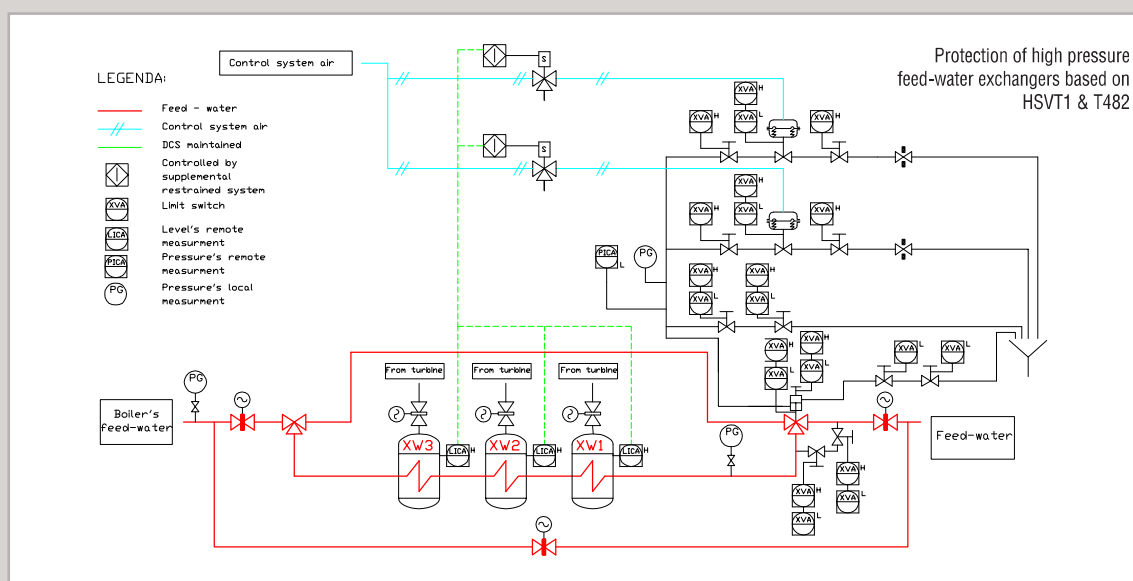
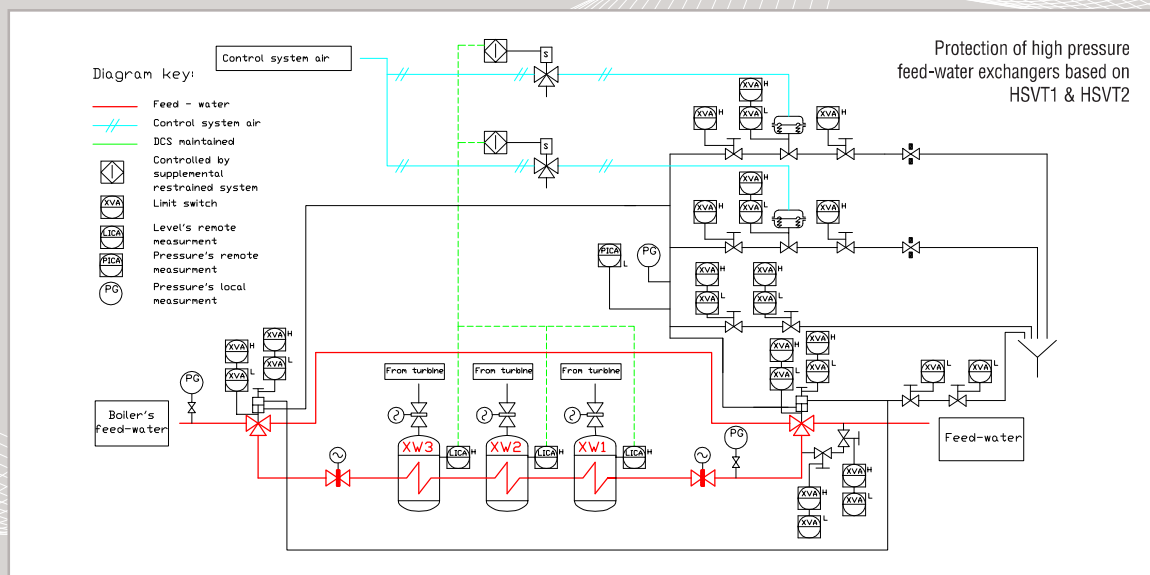
## HSTV Bypass System of High Pressure Feed-Water Exchangers

### ■ System activation

It is simply the result of drain valves' shutdown upstream of the feed-water. Tubing of the high pressure water heater fills up thanks to bypass of the HSVT1 three-way valve. On heater's side the pressure over and under the plugs of HSVT1 i HSVT2 valves becomes even. Water leakage between piston and bushing results in filling the space under actuator's piston. Pressure under and above becomes even. Because actuator's plug and stem are directly influenced by the atmospheric pressure, appears the force shifting upward the plug of HSVT1 valve, and thus its opening. Feed-water flows toward outlet valve (HSVT2), which remains open (thanks to the same phenomena as HSVT1). In case of T482 three-way valve its opening is up to increased pressure in the tubing of a feed water heater.

### ■ System deactivation

If condensate level exceeds given maximum in any single heater, the protection system automatically will open the drain valves and empty spaces under the pistons of actuators controlling HSVT1 and HSVT2 three-way valves. The resulted pressure differences would push the pistons down. Both three-way valves shut down, simultaneously opening the bypass tubings. T482 valve adjusts automatically, following HSVT1 shifting into the bypass mode. Drain valves coupled with pneumatic actuators, and orifice valves with replaceable nozzle allow to adjust open/close response time of three-way valves between 2 and 15 seconds.



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