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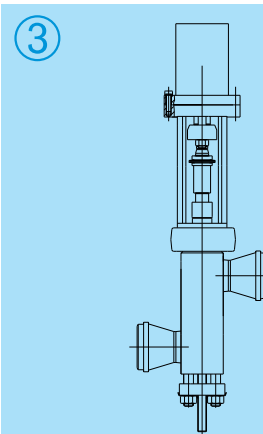
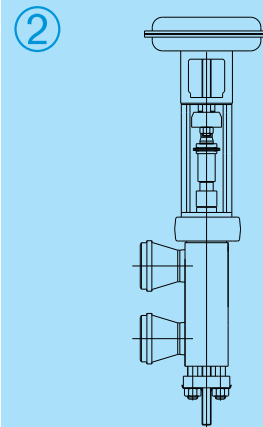
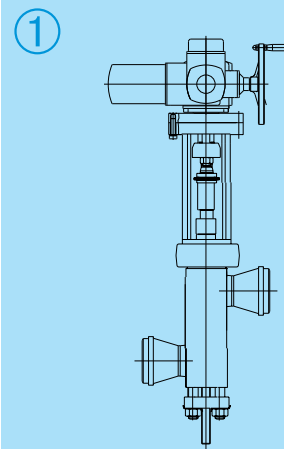
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Leak-off Valve

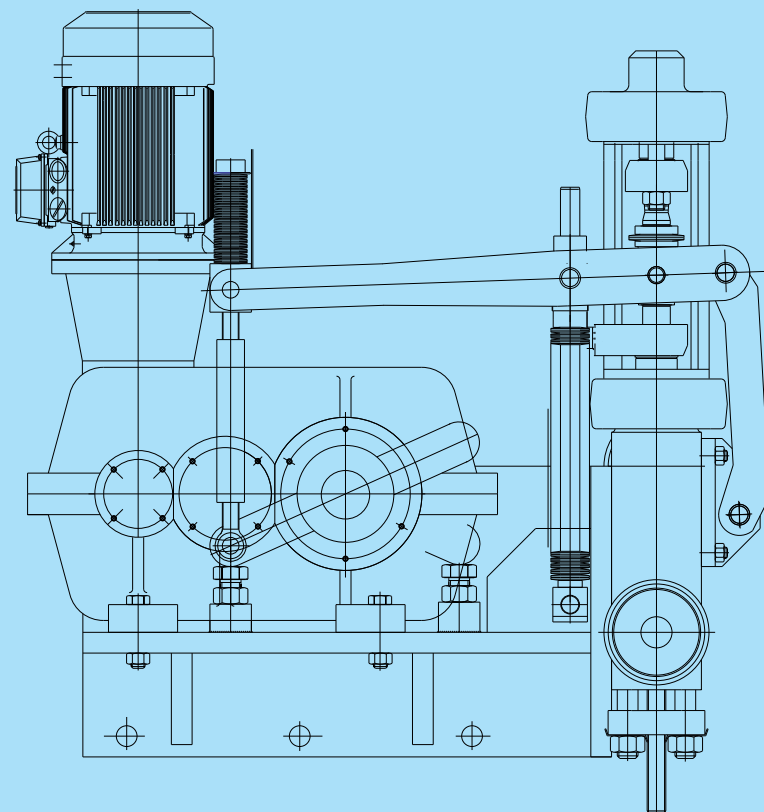
Spraywater Control Valve

Application

In HP-Feed pump Operation fixed flow must be ascertained. Throughput below this fixed minimum flow causes overheating of the feed water; consequently formation of steam may result in cavitation damage. If the boilerfeed falls below the minimum flow, the differential flow must be discharged through bypass-line which is accomplished via the minimum flow valve.



④



Controlling

In practice two types of minimum flow control valves have proven successful.

Two-step control: If the flow required falls below the minimum flow, the minimum flow valve opens fully.

Modulating control: If the flow required falls below the minimum flow, the minimum flow valve opens controlled. Flow required plus discharged minimum flow equals the corresponding necessary minimum flow.

The advantage of the two-step control is based on the simple interruption-free construction. It can be properly used for operations in small and medium sized plants. The permanent control is more profitable as it saves more energy for large-sized plants and for plants being often started and stopped. For speed-governed feed pumps operation the minimum flow can be adjusted to the rpm of the pump.

The basic construction of a minimum flow plant can be seen on the above drawing.

The Volumetric delivery is obtained via an orifice plate or a nozzle. The switching equipment signals a contact-impulse to the two-step control via a pressure-drop variator. The limit contacts which are operated directly or indirectly for opening and closing of the minimum flow valve. Similarly the valves are operated by permanent control.

For example, the switching equipment is replaced by a permanent Controller that can also be locked into the corresponding variable-command of the applied rpm-controlled pumps. The minimum flow valve is controlled according to the minimum flow of the required throughput, so that the total necessary minimum flow does not fall below the set limit.

Valve construction and Operation

The basic construction of the fittings is shown in the illustrations.

The throttling of the feed water is effected in several stages. The minimum flow valve features a control-cone fitted upstream of the throttling device. Through suitable shaping and corresponding stepping of the total pressure on the individual throttles, noise and cavitation are controlled. Elements prone to severe duty are made of resistant material. Through a practical design of the valve, wear parts are easily replaceable.

Typical Design

- ① electric actuator
- ② pneumatic diaphragm actuator
- ③ hydraulic piston
- ④ electric „fail safe open, spring return“