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Pump

Operation Manual



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Pump

1. Product Overview

From a macro perspective, pump trap belong to steam trap; From a microscopic perspective, pump trap are defined as steam or air powered pumps.

Newton developed this steam or air powered pump based on the working principle of lever ball float steam trap, which can be used independently as a condensate pump or as a condensate recovery pump device.

2. Structure and Performance

- 2.1 The body is made of cast steel, with a special check valve for outlet and inlet.
- 2.2 No need for electric drive or liquid level control device, ensuring safer.
- 2.3 The inner parts are all stainless steel finished, and the sealing parts are made of martensitic stainless steel and are processed by heat treatment, aging treatment, high strength, thus can not deformation, wear resistance.
- 2.4 Under the condition of little water flow falling head (min 300mm).
- 2.5 All parts are installed on the pump cover, online maintenance is very convenient.
- 2.6 Compact structure design minimizes installation space.

3. Working Principle

The operation process of steam or air powered pump is divided into four stages: inflow, pressure boost, discharge, pressure relief. 3.1 Since the pressure in the pump is equal to the pressure in the tank, the condensate flows into the pump by gravity.

3.2 Liquid flows into the pump body, and the float rises with the rise of the liquid level. The linkage mechanism closes the exhaust valve and opens the power medium intake valve.

3.3 Because the power medium pressure is higher than the outlet back pressure of the pump, the outlet check valve is opened and the condensate is discharged through the discharge pipe. With the discharge of condensate, the float loses its buoyancy and drives the linkage mechanism downward to open the exhaust valve and close the intake valve.

3.4 When the intake valve is closed, the exhaust valve is opened, and the condensate flows in again. The process repeats itself.

4. Application

When the steam trap used on steam equipment cannot remove the condensed water inside the equipment, or when delivering condensed water to special occasions where it is impossible to transport condensed water, a steam/air power pump can be used. These special occasions include:

- ① Some steam equipment requires steam at a pressure lower than atmospheric pressure, such as evaporators, which use 'vacuum steam' devices. The condensed water needs to be discharged into atmospheric pressure (outside), that is, the condensed water is discharged from the vacuum zone into the atmosphere.
- ② Discharge condensate water to a location where the pressure is higher than the steam pressure of the steam using equipment. For example, when the condensate in a steam using equipment with a pressure of 1kgf/cm² and the condensate in a steam using equipment that must use 7kgf/cm² share a condensate recovery pipe, the condensate must be discharged from the low-pressure area to the high-pressure area for transportation.
- ③ When the condensed water generated by the device using low-pressure steam rises above the head height equivalent to that pressure. For example, when the condensate water discharged from a steam equipment with a pressure of 0.5kgf/cm² (equivalent to a water head of 5m) needs to be discharged to a height of 9m (equivalent to a pressure of 0.9kgf/cm²), similar situations require lifting water upwards.
- ④ When the steam pressure used fluctuates around atmospheric pressure, the condensed water is discharged into the atmosphere. In the above four situations, the ability of steam trap is impossible to achieve.

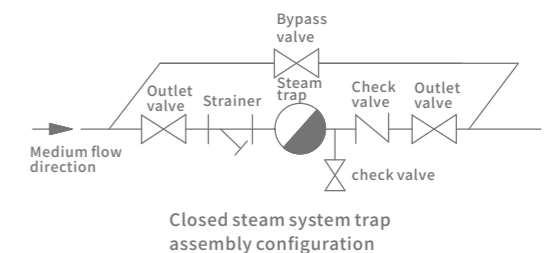
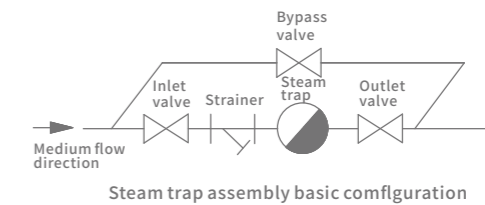
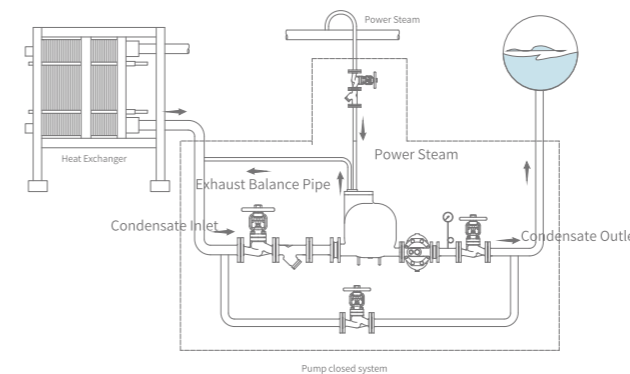
5. Product Standards

The company steam or air powered pump's designs, manufactures, and inspects are in accordance with the application guidelines of GB/T12712-2023 'Technical Management Requirements for Condensed Water Recovery and Steam Traps in Steam Heating Systems' and GB/T22654-2008 'Technical Conditions for Steam Traps'.

6. Installation and Piping

6.1 When it is necessary to transport low-pressure condensed water to high-pressure pipelines or tanks, a single pump, double pump, or triple pump should be configured according to the amount of condensed water transported, back pressure (head), type of power medium, and pressure to form a condensate water recovery device. When the operating medium is steam, the main configuration includes a water collection tank, steam pipeline, steam control valve, steam drain valve, filter, check valve, condensate inlet valve, condensate outlet valve, pressure gauge, thermometer, exhaust valve, etc; When the operating medium is air, the main configuration includes a water collection tank, air pipeline, air control valve, air drain valve, filter, check valve, condensate inlet valve, condensate outlet valve, pressure gauge, thermometer, exhaust valve, etc. After installation, before starting, the control valve for the operating medium (steam or air) must be opened first, and then the condensate inlet valve must be slowly opened. Otherwise, when the pump body is filled with condensed water, it will be difficult for the power medium to enter the pump, making it difficult for the pump to quickly enter the working state. When it is necessary to stop, it is opposite to opening. Close the condensate inlet valve first, and then close other valves.

Pump closed system



7. Technical parameters and energy consumption

Our company's steam or air condensate water pumps are divided into two models, namely PT10 and PT20. We have made a catalog based on technical parameters, operating medium consumption, head of delivery, flow rate, head height, etc. Please refer to the steam trap catalog for details.

8. Maintenance

8.1 When the product is repaired online or the filter is cleaned, the intake valve must be turned off, the operating steam or air must be cut off, and the ball valve controlling the inflow of condensate must be closed. Open the exhaust valve for pressure relief, and disassemble the pump cover when there is no pressure in the pump and the surface temperature of the pump body drops to normal temperature to prevent burns.

8.2 When the product is used for new pipelines, the filter screen needs to be cleaned after one to two weeks of operation. After that, according to the first cleaning situation and the pipeline medium, the filter screen needs to be cleaned again after six months of operation at the latest.

8.3 The failure of pump in use is basically divided into three categories: condensate retention, pump not working, steam leakage. No matter what kind of failure occurs, it must be carefully analyzed and repaired when it is determined to be the fault of the steam trap itself. We list the possible failures and treatment measures of pump in the following table:

Pump

Faults	Analysis	Solutions
Condensate retention	Condensate recovery pipe volume is too small	Replace the large volume collection tank
	Pump discharge capacity is insufficient	Parallel a similar small pump or replace a large displacement pump
	Inlet and outlet check valves are blocked	Check valve inspection
	Head of delivery too high	Increase operating steam/gas pressure
Pump not working	The inlet and outlet check valves are stuck	Check valve inspection
	Operating steam/gas valve stuck	Repair or replace the operating steam/gas valve
	Float break	Replace float
	Linkage blocked	Repair linkage
Steam leakage	The operating steam/gas linkage is damaged	Replace or repair the operating steam/gas linkage
	The float is limited in movement or stuck	Repair the float members
	High pressure condensate emptying flash	Step by step step-down flash utilization to reduce the emptying pressure
	Too little condensation water, no water seal	Replace the small displacement pump

8. Warranty

Warranty period: 18 months after delivery;

During the warranty period, if the user uses, installs, operates, and maintains the product correctly, and the product does not work properly, our company will provide free repair or replacement of the product.

The following situations are not covered by the warranty:

- 1) Faults caused by exceeding the technical parameters specified on the product nameplate;
- 2) Faults caused by incorrect installation, operation, disassembly and maintenance;
- 3) Failure due to impurities or severe corrosion;
- 4) Failure due to natural disasters;