

Pressure Differential Bypass Valve





HZNK Self-Operated Pressure Differential Bypass Valve

Unlike electric pressure differential bypass valves, the HZNK self-operated pressure differential bypass valve is a self-contained dynamic pressure regulating device. It can be installed between the supply and return water pipelines of a water circulation system as required. When the differential pressure across both ends of the device reaches the preset value, the valve will open automatically, connecting the pipelines at both ends. The differential pressure and flow rate within the system will change accordingly, thereby achieving multiple functions such as balancing system differential pressure, optimizing flow distribution, reducing system energy consumption, and ensuring system safety.

Application Range of Pressure Differential Bypass Valve

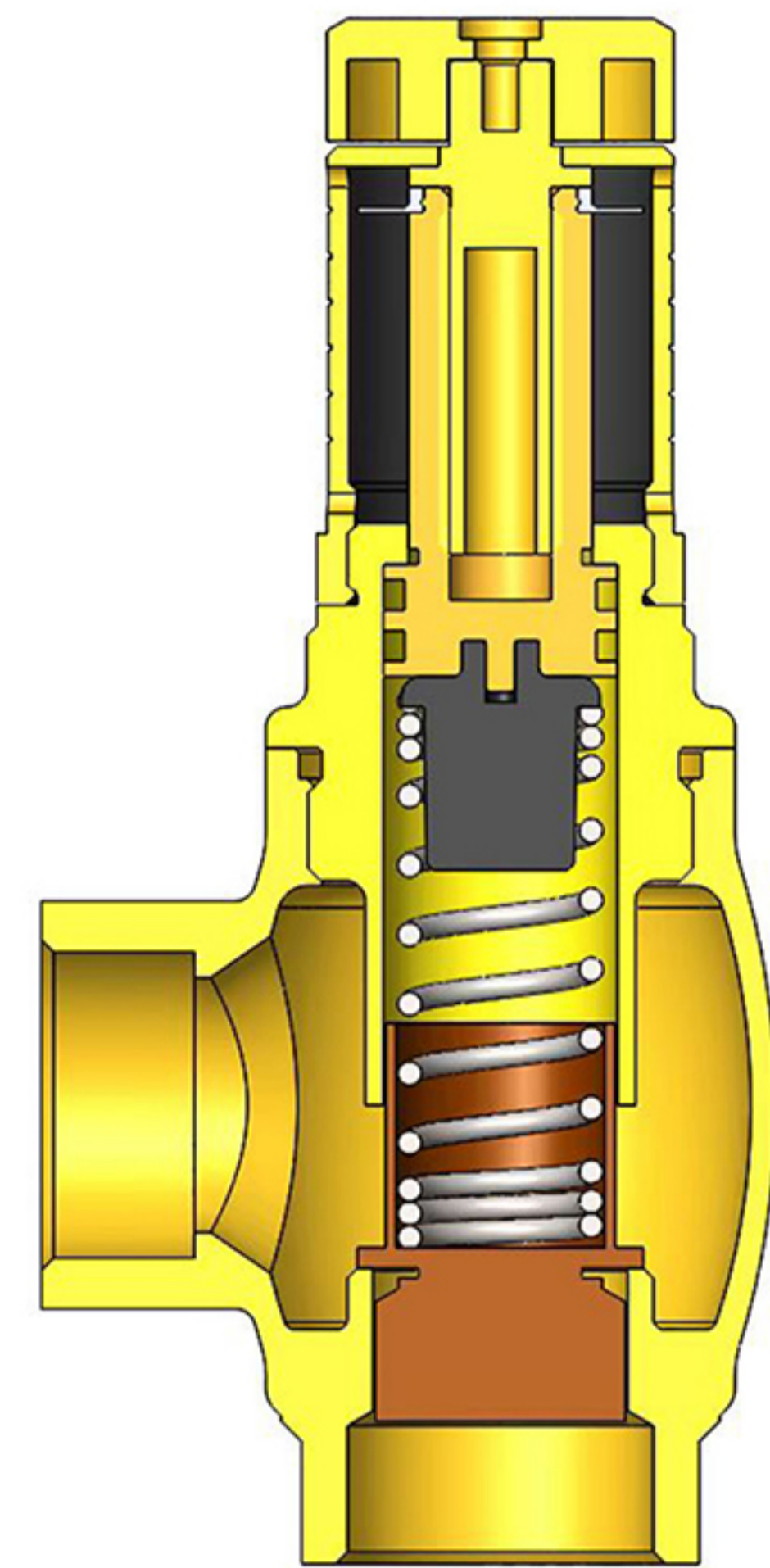
- Heat pump heating and cooling system
- Boiler system for underfloor heating system and radiator system



HZNK Self-Operated Pressure Differential Bypass Valve

The HZNK pressure differential bypass valve forms a mechanical structure in the direction of fluid flow through its unique structural design. The spring installed in the flow passage is the core working component. Rotating the adjustment knob exerts a specific force on the spring, and the magnitude of this force determines the force required for the fluid to push open the valve disc.

Therefore, when the force exerted by the fluid on the flow passage exceeds the spring force, the valve disc is pushed open, reducing the inlet pressure. As the inlet pressure drops, the spring force drives the valve disc to close down. With the continuous adjustment of the valve disc position, the system pressure and bypass flow rate change accordingly, enabling the system to achieve a relatively stable operating condition through this dynamic regulation process.



HZNK Self-Operated Differential Pressure Bypass Valve Functions

- **Protects the chiller/heat pump unit**
Ensures adequate return water flow to the unit through dynamic regulation, preventing the risk of plate heat exchanger freeze damage caused by insufficient return flow.

- **Protects end-use valves and actuators**
Balances the supply and return differential pressure in the system, preventing valves and actuators from failing to close due to operation under excessively high differential pressure.

- **Optimizes system operation**
Reduces hydraulic interference caused by load changes at the system terminals through dynamic response.

- **Energy saving and noise reduction, enhances comfort**
Regulates flow rates across different parts of the system to maintain pipe flow velocity within a reasonable range, achieving energy savings and noise reduction.

HZNK Self-Operated Differential Pressure Bypass Valve – Five Advantages

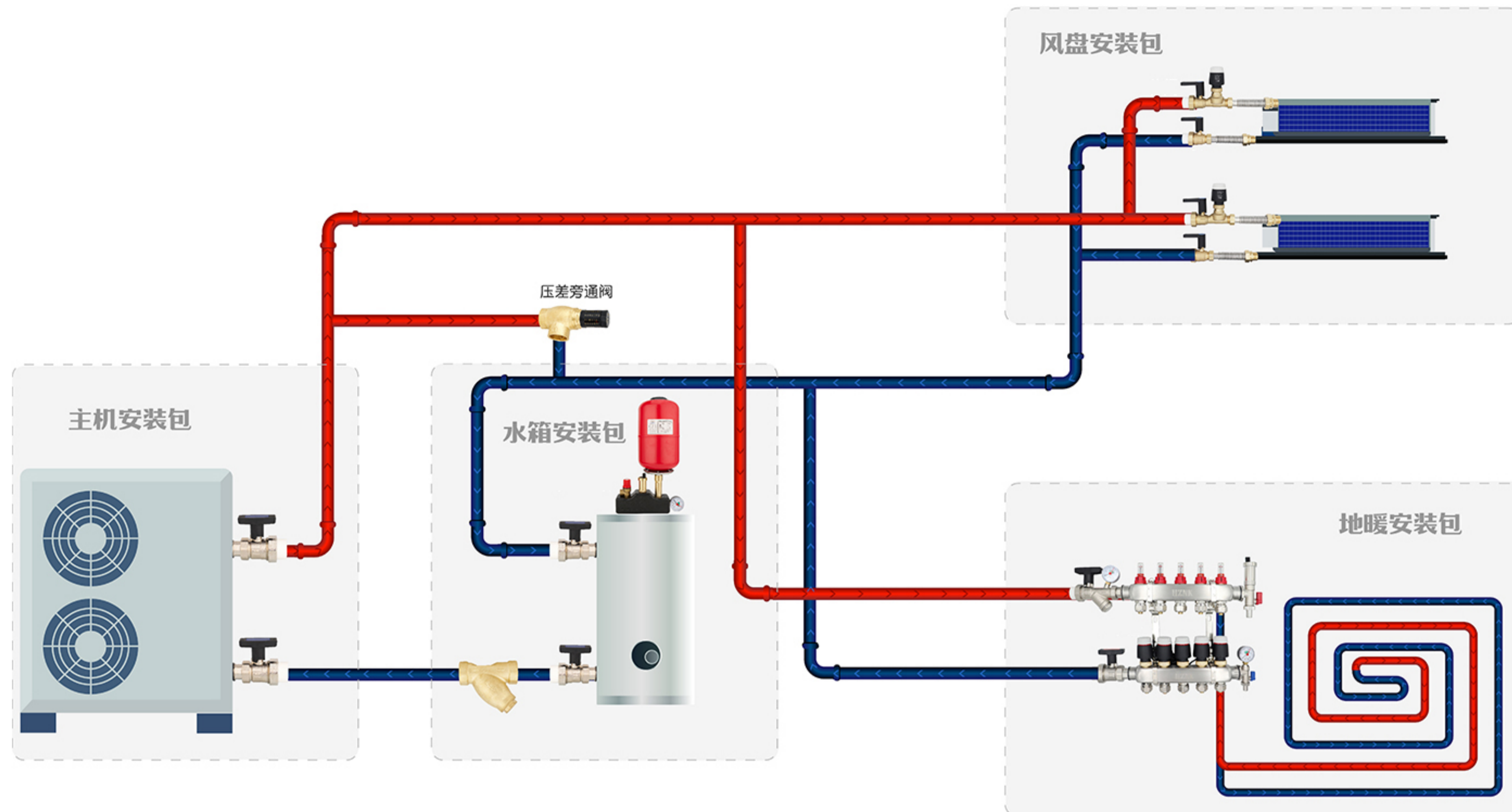
- 1 More precise opening and closing, faster response speed, eliminating the risk of sticking.**
 We use a plastic valve disc as the actuating mechanism for valve opening and closing. The weight of the plastic valve disc is significantly lighter than that of a copper and rubber composite valve disc, greatly reducing the impact of the disc's own weight on setting accuracy and pressure response. It also eliminates the risk of adhesion between the copper-rubber composite disc and the copper sealing surface.

- 2 More reasonable internal dynamic sealing.**
 We adopt an upper-spring dynamic sealing structure, where the sealing position is located above the spring. The sealing position only moves during adjustment. In contrast, in a lower-spring dynamic sealing structure, the sealing position is located below the spring and constantly moves during valve operation, making it difficult to ensure a long service life.

- 3 More reasonable spring selection.**
 The spring is one of the key components of the differential pressure bypass valve. We have made significant efforts in dimensional design and material selection, resulting in better bypass capacity, higher adjustment accuracy, and longer service life under the same operating conditions.

- 4 More reasonable adjustment visibility.**
 The 360-degree scale dial ensures that no matter how the valve is installed, the user always has a good viewing angle for convenient adjustment. In contrast, a 180-degree scale dial only has front and rear windows, which does not comply with ergonomic principles.

- 5 More reasonable external structure.**
 The all-copper external structure ensures the mechanical strength of all valve components while significantly extending the valve's service life. In contrast, a copper-plastic composite external structure is difficult to maintain durability when used in outdoor environments.



Selection of HZNK Self-Operated Differential Pressure Bypass Valve

Several factors need to be considered when selecting a differential pressure bypass valve, including the chiller/heat pump unit's water flow rate, pump power and external head, connection type, and other aspects.

When selecting the HZNK differential pressure bypass valve for a typical two-pipe system, pay attention to the following points:

- First, compare the bypass capacity of the differential pressure bypass valve with the heat pump unit's water flow rate to check whether the bypass capacity can cover 70% of the unit's flow rate.
- Second, compare the adjustment range to verify whether the valve's range covers the external residual head of the pump.
- Third, the unit's built-in connection size and pipe diameter can also be used as reference.

Three Commissioning Methods for HZNK Self-Operated Differential Pressure Bypass Valve

Effective Load Commissioning Method:

First, turn on the indoor units that match the outdoor unit's load, preferably selecting the most unfavorable loop, and adjust the differential pressure bypass valve setting to the minimum. Then start the outdoor unit. Gradually increase the differential pressure bypass valve setting until no water flows through the bypass valve (a slight leakage is permissible). Whether water is flowing through can be determined using the pressure gauge installed on the main supply pipe. During adjustment, the pressure gauge reading will increase as the setting is raised. When the pressure gauge reading no longer shows a significant increase, it indicates that no water is flowing through the bypass valve. The value obtained at this point can be used as the initial setting.

Alarm-Based Commissioning Method:

Select and turn on the most unfavorable loop. Adjust the differential pressure bypass valve setting from low to high until the water flow switch no longer triggers an alarm. Then, based on this value, continue to lower the setting by 0.2 bar. The value obtained at this point can be used as the initial setting.

Empirical Setting Method:

For users who lack on-site conditions or have insufficient commissioning experience, the initial setting of the differential pressure bypass valve can be set to approximately 0.7 bar, followed by fine-tuning based on the system's operating conditions.

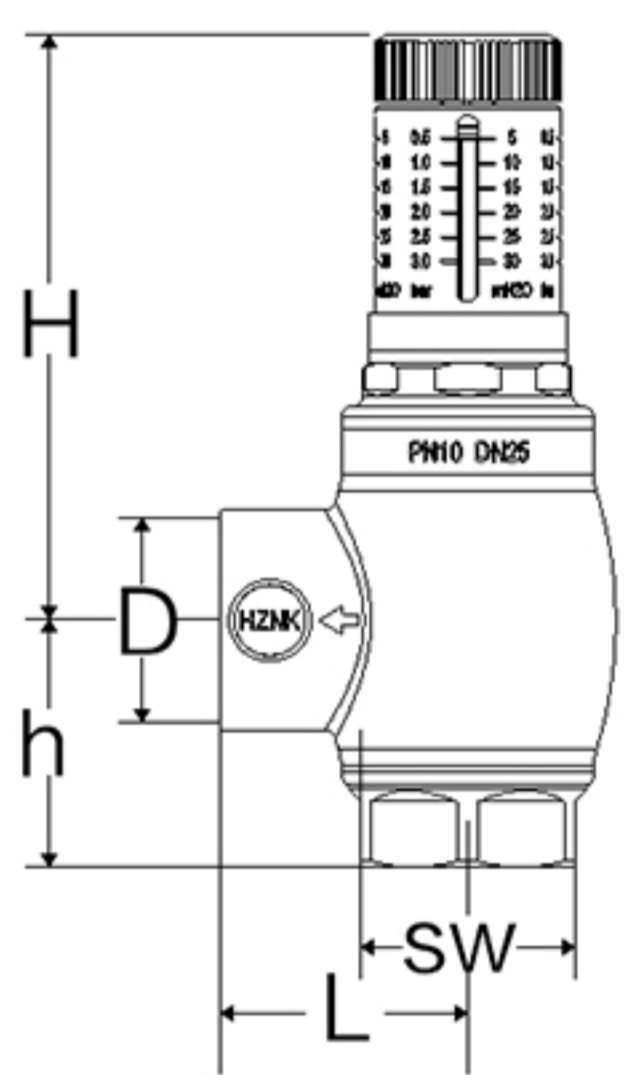
Note: The above commissioning methods are applicable only to HZNK differential pressure bypass valves. For other brands, please use with caution.

Specifications of HZNK Pressure Differential Bypass Valve

Applicable Media:

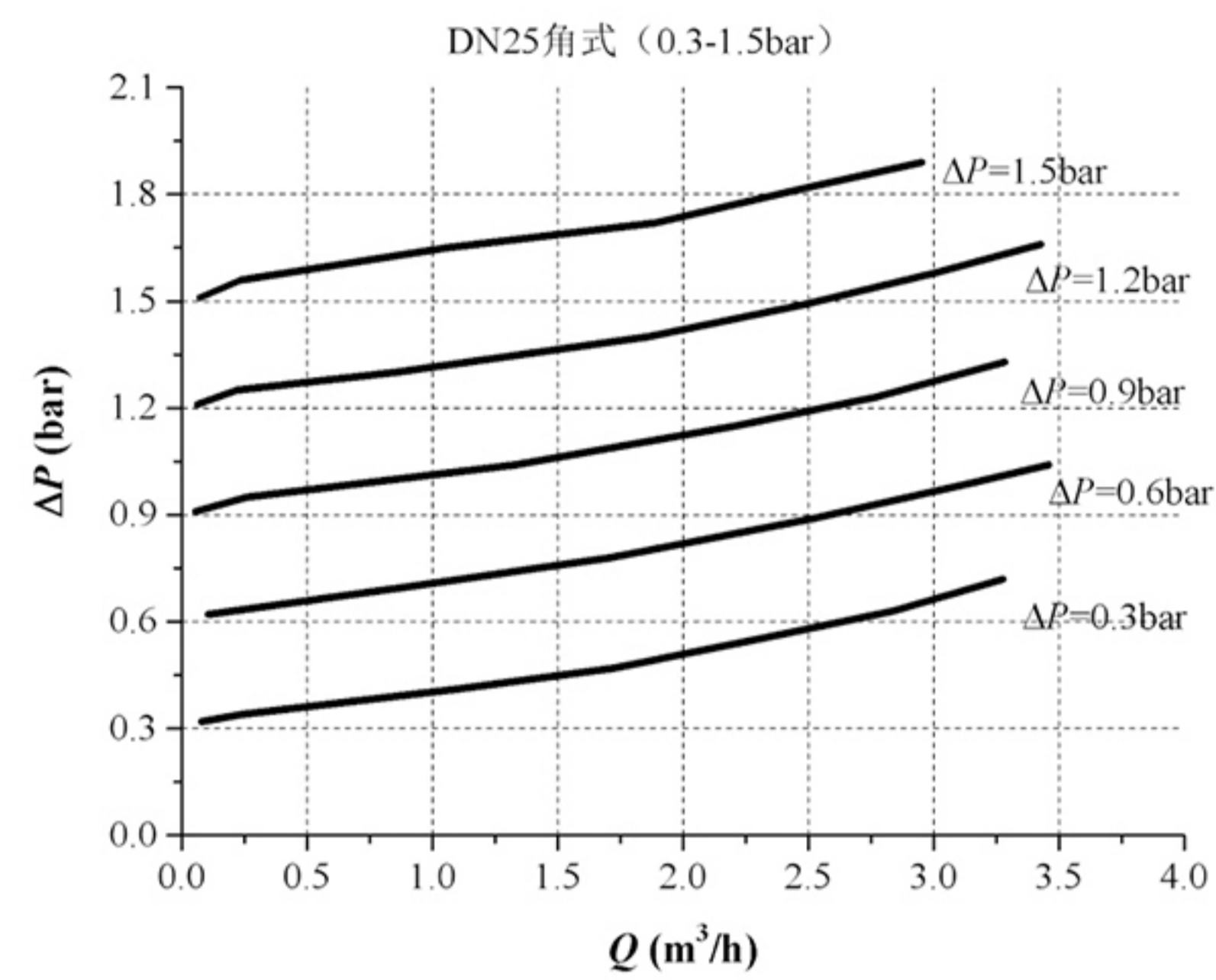
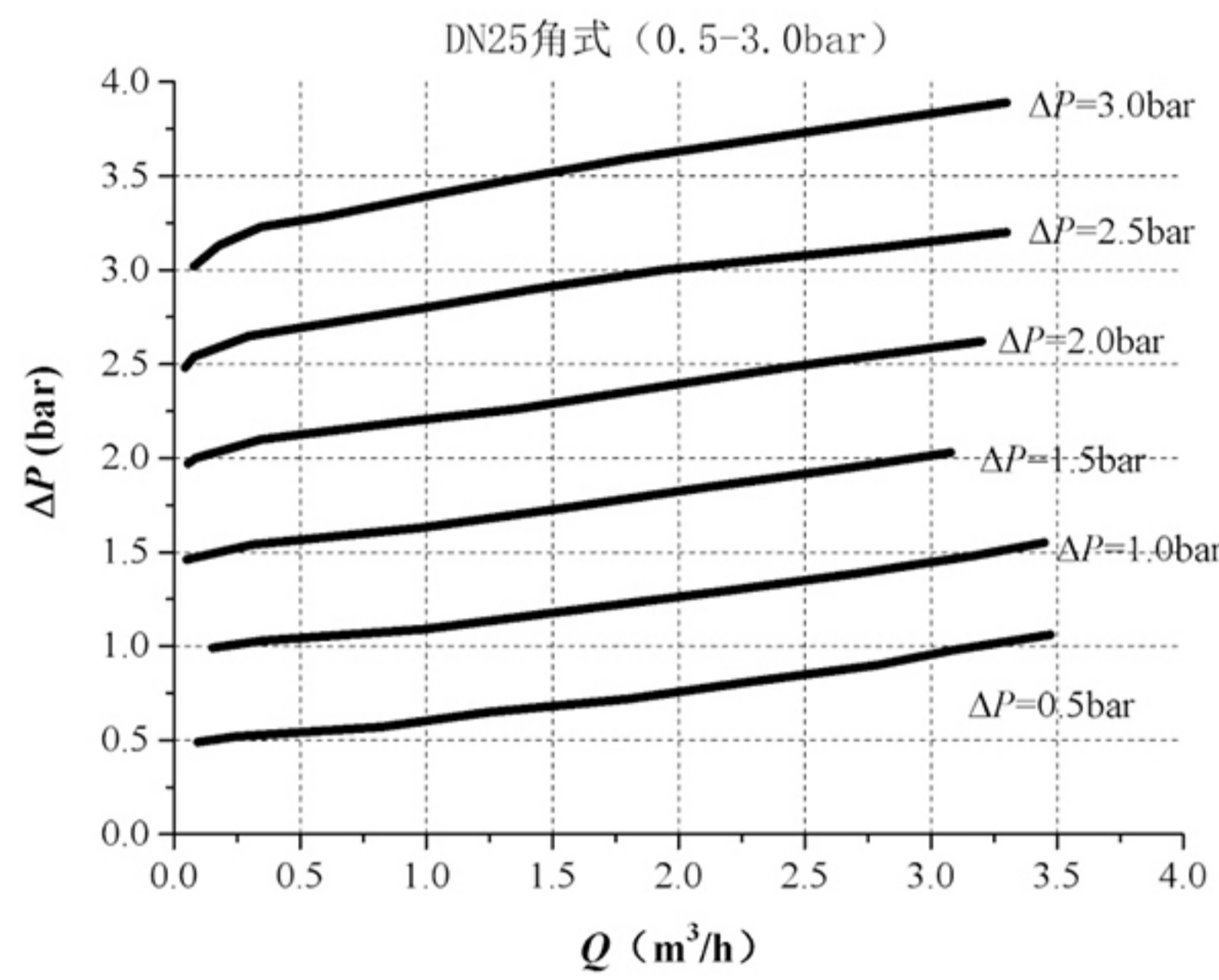
Water, Antifreeze, Oil
Maximum Working Pressure: 10bar
Operating Temperature Range: 0-95° C

SIZE:



DN	D	L	H	h	sw	Adjustment Range (bar)
20	Rp3/4	37	83	31	33	0.1-0.5
						2.0-1.0
						0.3-1.5
25	Rp1	45	105	49	42	0.1-0.5
						2.0-1.0
						0.3-1.5
						0.5-2.5
32	Rp1 1/4	49	111	48	48	0.1-0.5
						2.0-1.0
						0.3-1.5
						0.5-3.0
40	Rp1 3/4	52	129	55	54	0.5-2.0

DN25 Pressure Differential Bypass Valve Flow Characteristic Curve



DN32 Pressure Differential Bypass Valve Flow Characteristic Curve

