

FlowCon High Flow



The High Flow Valve Series

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Automatic, Dynamic Balancing Valves



The FlowCon high flow series of valves are designed to meet the higher capacity flow limiting requirements of pumps, chillers, boilers, condensers, heat exchangers, cooling towers and filters.

Product Range

The high flow series cover Uni-Flange, AHU-Wafer, Wafer and Grooved End. Applications are many and each product covers several different ones from air handling units and boiler flow control in common HVAC systems over multiple chillers / multiple heat exchangers or pump balancing system in high-rise buildings to fueling, industrial process and filtration applications.

Features and Benefits

- **Automatic balancing**, the correct flow rate for each circuit is achieved automatically.
- **Dynamic balancing**, the correct flow rate is maintained as each valve compensates for pressure fluctuations in the system.
- **Pre-set stainless steel insert(s)** with few moving parts, ensure high reliability.
- **Accuracy** of $\pm 5\%$.
- **Wide range of sizes and flow rates**, max. 1000mm and 2286.9 l/sec.
- **Pressure / temperature measurements plugs** for verifying operating pressure differential range.

Principle of Operation

The FlowCon high flow valves utilize precision calibrated stainless steel flow rate inserts to achieve the desired flow rate. Each insert is manufactured to deliver a specific flow rate over a wide operating range of differential pressures at a tolerance of $\pm 5\%$. This is done by automatically adjusting the open orifice area of the insert in reaction to change in pressure.

High flow valves requiring more flow than achieved by a single insert, utilize multiple inserts mounted in parallel into webbing within the valve body. The sum of the flow rates of the inserts within any valve equals the total flow rate for the valve. For instance a 150mm (6") wafer containing four inserts, i.e. two at 4.00 l/sec and two at 5.05 l/sec, will have a total flow rate of 18.1 l/sec.

As shown in the picture on next page, the insert is simply a fixed orifice device below its pressure differential range. This allows a modulating valve in the same circuit to operate with valve authority up to the flow rate specified.

Once in the pressure differential range, the spring mounted cup of the insert actually slides within the insert housing adjusting the effective open orifice area of the insert to the exact point, where the specified flow rate will be delivered. As the pressure differential across the valve increases, the orifice area closes; as it decreases, the orifice area opens. In multi-insert valves, all inserts will operate simultaneously.

When the pressure differential range is exceeded, the valve again becomes a fixed orifice device. This ensures that, even under extreme conditions, no part of the system is starved or shut down.



Selection

In selecting a FlowCon high flow valve, the following information is needed: 1) flow rate, 2) pressure differential range and 3) pipe size.

1) Flow Rate Selection

In determining the flow rate, it must be decided whether the circuit will be a constant flow or modulating system.

If the valve is being fit into a constant flow system, simply select the flow rate from the Flow Rate Selection Chart (see FlowCon tech notes or the Inserts Catalogue) closest to the designed rate. If the valve is being installed in a variable flow application (used in series with a modulating control valve), simply select the flow rate closest to the designed maximum flow rate of the circuit. The FlowCon high flow valve will then limit the flow to that specific maximum rate. Below the maximum, the valve will add minimal pressure loss to the system. This allows the modulating valve to have authority up to the maximum flow rate designed for that circuit.

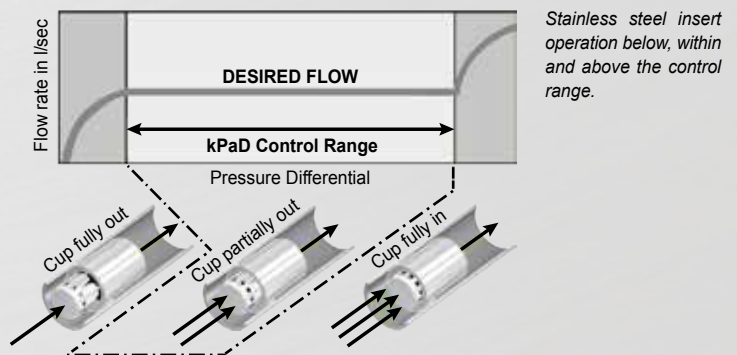
For applications controlling the flow of fluids other than water, the specific gravity, viscosity and operating temperature are needed for proper selection. The flow rate inserts are calibrated for water at approximately 16°C. For questions concerning other fluids and temperatures, please contact your FlowCon representative or one of the FlowCon offices.

2) Pressure Differential Range Selection

The high flow valves are available in four different operational pressure differential ranges, 10-135 kPaD, 22-210 kPaD, 40-390 kPaD and 90-880 kPaD. This is the pressure differential across the valve itself.

To select which range of operation is applicable for a particular circuit, determine the minimum and maximum pressure drops that the valve will experience during operation. The maximum typically occurs when the other circuits are closed, and the minimum when the other circuits are open. Then select one of the operating ranges which is wider than the range of pressure differential fluctuation calculated. In most heating and air conditioning systems either 22-210 kPaD or 40-390 kPaD are sufficient.

Verification of the temperature, pressure and pressure differential across the valve is possible through the pressure / temperature test plugs.



Stainless steel insert operation below, within and above the control range.

Below the control range, the insert acts as a variable flow device allowing flow to vary below the rated amount.

Within the wide control range, the insert modulates in response to change in pressure to maintain a fixed flow rate within $\pm 5\%$ accuracy.

Above the control range, the insert acts as a variable flow device, allowing flow to vary above the rated amount.

3) Size Selection

The FlowCon high flow valves are available in sizes from DN50 to DN1000 depending on type. All high flow types are for use with either flanges or grooved end clamps. The size of the valve in some applications may be dependent on the flow rate required. If a FlowCon valve larger than the system pipe size is selected, a reducing flange are required.

Valve Location

The hydronic function of the valve is not affected by whether it is installed on the supply or return side of the unit, and the valves may be installed either horizontally or vertically. It is, however, important that the flow arrow of the valve be pointing in the flow direction. Flow in the "wrong" direction will not be controlled. The orientation of valve should allow for access to the test plugs. Extensions are available for use in insulated applications.

Applications

Energy efficient heating and cooling systems require accurate flow control to ensure proper operation of primary plant equipment. The FlowCon high flow valves have been specifically designed to control flow and solve balancing problems in such large hydronic systems. Under typical conditions in such a system, pressures may vary by 350 kPa to 700 kPa as pumps are switched on or circuits are isolated. A dynamic reacting valve is required to safeguard equipment and ensure that flow through every active circuit remains constant and predictable.

Condenser Systems

Proper flow rate to a cooling tower is essential for adequate removal of heat from the condenser section of a chiller. Use of dynamic valves maintains even distribution to each condenser and prevents cooling tower flooding.

Primary / Secondary Systems

Primary chillers and pumps are usually designed in parallel to allow equipment staging. This arrangement allows chillers to come on-line only when required during peak cooling hours, thus conserve energy. A FlowCon high flow valve placed at each chiller prevents excess flow caused by over pumping during light load conditions. Installing dynamic balancing valves also protects equipment warranties as flow rates are assured to be in the range specified by the manufacturer. Varying pressures caused by opening and closing of modulating valves are accurately compensated for by the modulating action of the FlowCon high flow valves.

Parallel Pumping

In systems with pumps in parallel, the use of a dynamic balancing valve is essential as the slightest difference in pump characteristics will result in one pump overload and system inefficiency. Dissimilar or different sized pumps accentuate this problem. The FlowCon high flow valves will ensure that the pump is operating at the designed point of its curve by adding the required amount of pressure loss to achieve the designed flow rate.

Technical Data

For further information please see FlowCon tech notes. For latest updates please see www.flowcon.com

	Wafer DN100-1000	Uni-Flange DN65-80	AHU-Wafer DN50-80	Grooved End DN50-500
Static Pressure (kPa)	3400	1030	2500	2500
	(psi)	493	149	360
Temperature Rating (°C)	+175	+135	+135	+95
	(media) (°F)	+347	+275	+275
Pressure Drop Data	NOTE: For pump head calculations, add the minimum pressure differential for the index circuit to the other components pressure losses (i.e. valves, coil, etc.)			
Valve Kv-value	N/A	105	N/A	N/A
	Cv-value	N/A	121.8	N/A
Stainless Steel Insert	F324xxxx	F3C2xxxx	F324xxxx	F324xxxx
Insert Size (mm)	80	50	80	80
	(inch)	3	2	3
Pressure (kPaD)	10-880	10-880	10-880	10-880
Differential (psid)	1-128	1-128	1-128	1-128
Flow Rate (l/sec)	0.883-2286.9	0.757-21.6	0.883-10.1	0.883-642.6
	(GPM)	14.0-36300	12.0-342	14.0-160



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