



## DeltaPValve® Applications



Over 30 years of DeltaPValve installations, one question seems to come up more than most, as it applies widely to new construction and retrofit projects, chilled water and heating water systems, and all types of heat exchangers, air handling units (AHUs) and terminal devices.

### *Where should a DeltaPValve be installed?*

The initial response is that DeltaPValves are best applied directly at the devices that require flow control, such as at each specific AHU cooling or heating coil. This ensures the precise control is matched to each application for the best performance. However, this question can also be more specific:

### *Should a DeltaPValve be installed on the inlet or outlet side of the device?*

In most situations, the recommendation is **on the outlet / downstream side** of the controlled device. While it's important to note that a *DeltaPValve will still provide precise control when installed either directly before or after the device*, there are several benefits associated with the outlet / downstream location, along with an industry precedent that is shared by ASHRAE, IDEA and other organizations.

### Keep the coil full & pressurized

- Air is the enemy in a hydronic system. With a DeltaPValve fully closed on the outlet side of the device, the coil remains pressurized and eliminates the potential for introducing air into the system via leaks or improper system fill pressure.

### More moderate fluid temperature

- While DeltaPValves are rated for operation using low-temperature solutions and fluids up to 250°F (121°C), coil outlet temperatures will be lower in heating systems and warmer in cooling systems. This minimizes any direct impact on the DeltaPValve components and lowers heat transfer to the associated actuator.
- Valves are more difficult to insulate than pipe, so there is less opportunity for condensation or heat loss/gain from any exposed surfaces on the valve.

### Troubleshooting

- The (3) DeltaPValve Pressure & Temperature (P/T) ports can be used for troubleshooting coil and system pressure issues, with measurements of the DeltaPValve inlet (P1), intermediate (P2) and outlet pressures (p3) at different positions.
- Installation on either side of the coil will not impact using the DeltaPValve for flow metering, as there is no required straight run to maintain precise control or pressure independent operation.
- Gauge pressures (inlet & outlet) to the coil and DeltaPValve will vary depending upon the installed location, but differential pressures across either device will not change, as they are determined by the operating conditions and location within the piping system.
- High differential pressure across a DeltaPValve does not cause cavitation or damage to the control surface, due to the low, internal pressure drop maintained by the mechanical pressure regulator.
- No additional balancing devices are required with installation in either location.

The following industry resources also reference valve installation on the outlet side of a device:

2020 ASHRAE Handbook – HVAC Systems and Equipment  
Section 12: District Heating and Cooling, 12.44

*“In **hot-water systems, control valves are normally installed in the return line** because the lower temperature in the line reduces the risk of cavitation and increases valve life. In **chilled-water systems, control valves can be installed in either location; typically, however, they are installed in the return line** to reduce the potential for condensation on exposed external surfaces and to minimize water turbulence upstream of the flowmeter.”*

2019 ASHRAE Handbook – HVAC Applications  
Section 48: Design and Application of Controls

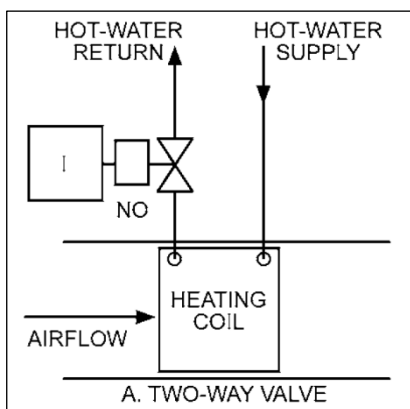


Figure 1: Control of Hot-Water Coils

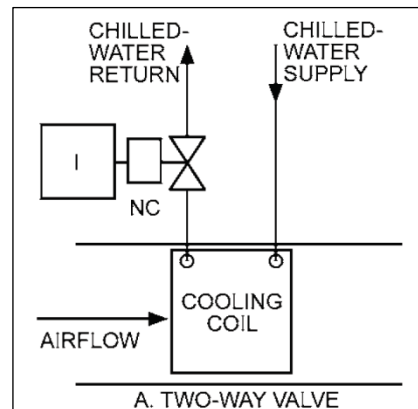


Figure 2: Control of Chilled-Water Coils

2008 International District Energy Association – District Cooling Best Practice Guide  
Chapter 5: Building HVAC Design and Energy Transfer Stations (ETS)

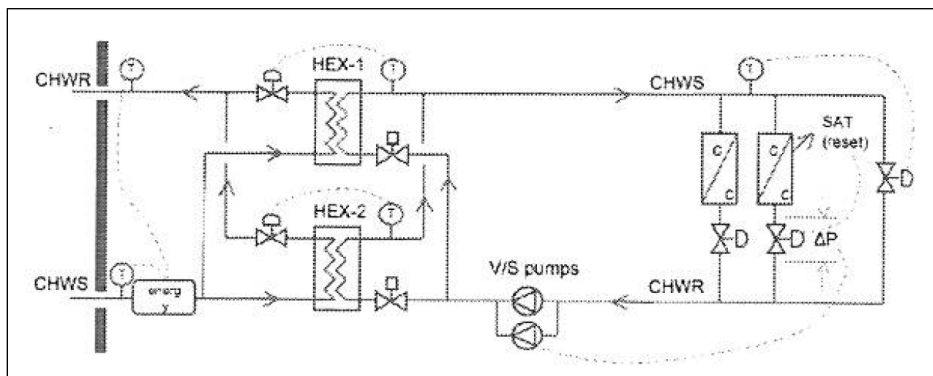


Figure 3: Indirect ETS Configuration (with Dedicated HEX Control Valves)

Flow Control Industries, Inc., DeltaPValve® System Design Manual  
*Coil Piping Schematics*

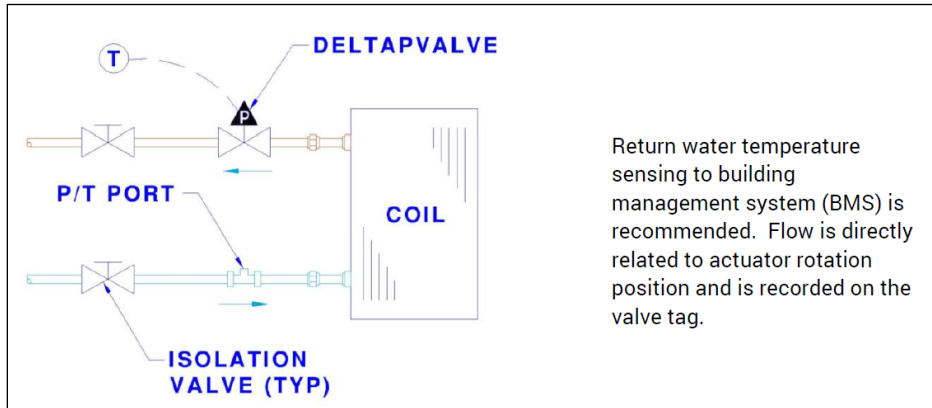


Figure 4: DeltaPValve with Typical Coil

### Summary

Precision flow control can be achieved with a DeltaPValve installed on either the inlet or outlet side of any device, though installation in the outlet / downstream location is recommended.

### References

- Figure 1: 2019 ASHRAE Handbook – HVAC Applications, 48.2, Figure 4
- Figure 2: 2019 ASHRAE Handbook – HVAC Applications, 48.7, Figure 14
- Figure 3: 2008 IDEA District Cooling Best Practice Guide, 5.3.2, Figure 5-5
- Figure 4: FCI DeltaPValve System Design Manual, Coil Piping Schematics, p.16, Figure 9

#### About Us:

Flow Control Industries, Inc. is the premier manufacturer of high-performance pressure independent control valves. Since its introduction in 1990, the DeltaPValve® has revolutionized system design, operation and efficiency through precise flow control.

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