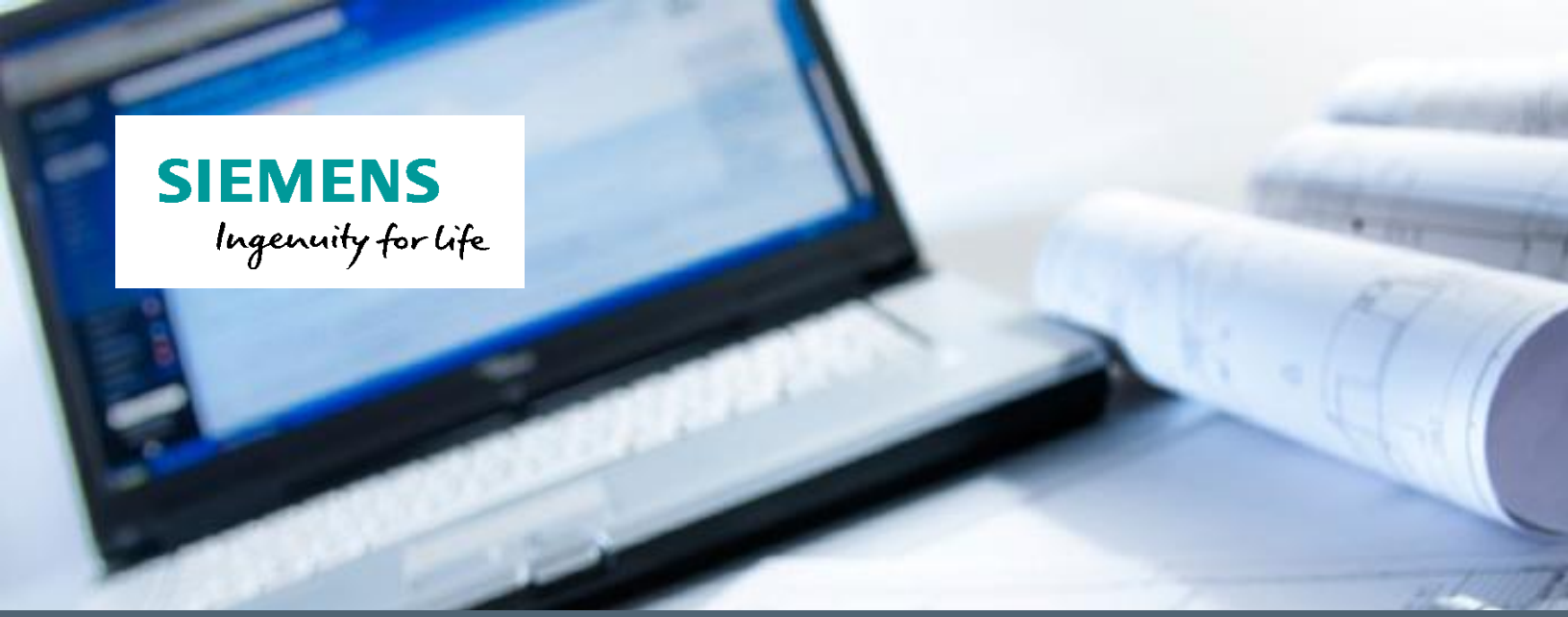


www.siemens.com/engineeringadvantage

EngineeringAdvantage™ Newsletter

April 2017

In This Issue:

FREE Valve and Actuator sizing and selection tool, Siemens SimpleSelect™

Our Valve Sizing and Selection tool, SimpleSelect™, quickly and accurately sizes, selects, schedules and simplifies time-consuming work. The SimpleSelect tool quickly narrows your search from our entire portfolio of valves down to the products you need.

An intuitive, easy-to-use interface helps you quickly size the valve you need with menus that allow you to:

– Select type of valve from the range

– Choose the medium being controlled

– Determine the correct Cv

– Calculate pressure drop and quantity of steam

Welcome back!

Siemens EngineeringAdvantage™ Newsletter

We hope you find the information contained in this and our past newsletters useful. The goal is to periodically provide the engineering community with relevant building automation related information. Each issue will discuss a control system design topic such as equipment sequencing, network design, etc. In addition, a control product will be showcased to demonstrate new technologies and significant devices.

The push for delivering high performance buildings is changing the way facilities and HVAC systems are being designed and implemented. In turn, we must do our part to re-evaluate our traditional control methods and look into options available to us which we may not have embraced in the past. The topic of this newsletter is on such a technology, the Pressure Independent Control Valve (PICV). In this issue, we will discuss how this technology operates in general and how these control valve types have the capability to improve both system optimization and energy efficiency. We will then focus on the specific features and benefits of this Siemens product.

Please feel free to contact us or your local representative if there is a particular topic or product you would like to see included in a future issue or if you would like further information on the topics discussed. Also, please pass this along to colleagues within the industry.

Control System Design

Pressure Independent Control Valves

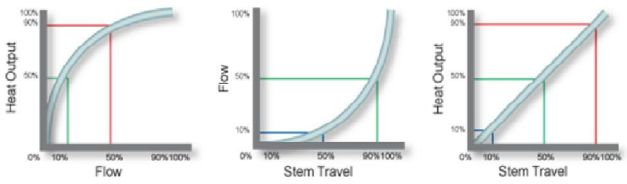
Background:

For many years the standard design for HVAC hydronic systems was a constant volume system using 3-way valves to control the flow of water through a coil or to have portions or the full flow bypass the coil, back to the return. These constant volume systems provide acceptable temperature control, but are very inefficient as they are blind to demand. In order to improve on this inefficiency, the industry moved toward variable flow systems using a variable frequency drive (VFD) on the pump and 2-way control valves at the coils. Variable flow improves efficiency by not only lowering pump horsepower to meet load, but because all of the medium delivered to the loop or branch passes through the coil, heat transfer is improved thus increasing the ΔT (difference between the supply and return temperature in the system).

Conventional Control Valves

Most commercial HVAC modulating control valves are either Globe Valves or Characterized Ball Valves each with equal percentage flow characteristics. Equal percentage flow characteristics produce an exponential flow increase as the valve moves from open to closed. The term "equal percentage" is used because for equal increments of the valve opening, the flow increases by an equal percentage. The flow characteristic of these valve types have traditionally been used to offset the nonlinear coil performance curve to provide the proper heat transfer characteristic.

These are "pressure dependent" valves because system pressure can and will affect the flow characteristic. As the pressure rises across the valve with a fixed stem position, the flow increases. In addition, low differential pressure across the valve rapid changes is flow with small changes in valve positioning may result. When one valve closes the differential pressure on other circuits increase and the associated control valves must close to compensate. So, when one or more loops are instable control problems can spread to other control valves. Pressures change continuously in the system as valves open and close pumps start, stop, and change speed, pump impellers wear, etc. With any change in pressure, there is a change in flow through the control loop, even if the heating or cooling load is constant.



While optimization can be obtained with proper sizing of high performance conventional control valves, pressure independent control valves may often provide better control and additional benefits in certain circumstances.

Pressure Independent Control Valves

Pressure independent control valves, or PICVs, combine the function of a control valve and automatic differential pressure regulator in one device in order to maintain a constant flow proportional to a given load condition. As long as the PICV operates within its rated differential pressure range (e.g. 3-60 psi) it will provide precise flow at each degree of opening, regardless of the systems pressure fluctuations across the valve. It is able to accomplish this due to the differential pressure regulator automatically adjusting to changes in the system to maintain a consistent flow. The result is more accurate control of temperature, enhancing comfort, and lowering energy usage. In addition to pressure independence, the maximum flow set point of PICVs can be field adjustable by either adjusting actuator end stops, programming, or as an independent internal component thereby eliminating the need to remove and replace components as system capacity needs change. Additional advantages of PICVs include:

- Elimination of balancing valves
- As systems change, coils can be added/removed without rebalancing
- Simplified valve sizing as a Cv calculation not required and selection based on full-open flow required. This can be a significant advantage as most pressure dependent valve are not sized properly for the application
- Provides optimum coil performance
- Limited actuator travel may improve actuator longevity
- Minimize Cx and balancing efforts; fewer components

Lunch & Learn Seminars

Siemens has a number of AIA accredited presentations we can provide. Contact us today to arrange for a lunch & learn for your team. The following are just a sample of the many topics available:

- BAS Basics
- Control Strategies Affected by ASHRAE 90.1-2010 & 2013
- Valves and Actuators Basics
- *Cybersecurity for BAS … Coming Soon!*

Control System Product

Siemens PICV Valves

Three in One:
Control valve, adjustable flow limiter and automatic pressure regulator

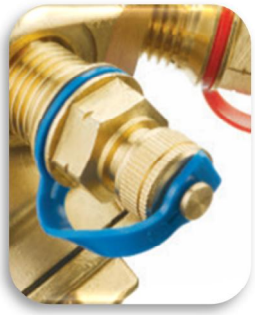
The Siemens Pressure Independent Control Valve is uniquely designed with three functions integrated into one single device: control valve, adjustable flow limiter, and automatic pressure regulator. This 3-in-1 device improves accuracy and reliability -- regardless of pressure fluctuations. Count on them to help prolong maintenance and preserve the life of HVAC equipment, enhance room comfort and optimize energy efficiency. The combination of control valve and differential pressure regulator in one valve simplifies installation and makes commissioning fast and easy. Pair them with trusted Siemens Electronic Valve Actuators and you have the ideal team for renovations, expansions, and new construction projects.

Differential Pressure Regulator

The differential pressure regulator automaticallly adjust to pressure fluctuations in the system, maintaining consistent flow at any given control setting, therby providing better comfort and lower energy consumption. This is the heart of the valve and ensures the selected flow rate is maintained across the entire differential pressure working range. Wide operating range (3-60 psi) provides significant opportunities for lowering pumping energy

Optional Pressure/Temp Test Points

An optional test kit is available for providing straightforward testing and setting of optium differential pressure when commissioning. This P/T plug set also allows simplified trouble-shooting during system commissioning and start-up as well as ongoing operation. This option eliminates the extra cost to install P/T ports in the piping.



Field Adjustable Flow Limiter

The Siemens valves come with a preset maximum flow setting to prevent oversupply to coils. The flow limting device is easily adjustable in the field to adjust maximum flow at any time when usage pattern change. In addition, unlike other manufacturers, the flow limiting is indpendant from the control valve, thereby providing full stroke capabilities and enabling higher control accuracy – No deadband for full controllability.

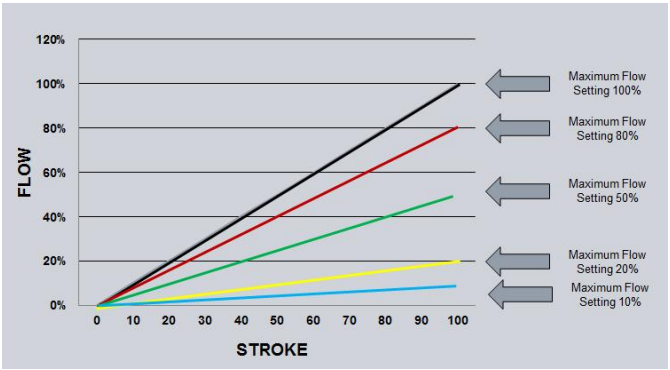


Chart indicating 100% full stroke regardless of presetting

Actuators

Our valve actuators feature a modular design for straightforward and consistent installations across the product offering. Highly dependable, these actuators provide years of precise control. Numerous pairings available for fail-safe operation and control signal options. Spring return and non-spring return actuators to meet most control requirements.

Additional Benefits

- Highest available maximum gpm in the market for most line sizes so smaller valves can be used
- Short face-to-face piping requirments provides installation flexibility

Case Study

Peachtree Center – a fixture of Atlanta, GA's skyline and economy, ***Siemens innovative and cost-effective PICV solution reduces Peachtree Center's energy usage by 13.8%.*** Please contact us for more information!

Where to Find More Info:

Please visit the following Siemens Web Sites

Siemens Pressure Independent Control Valves
Specifically designed for professionals looking for detailed information on Pressure Independent Control Valves.

EngineeringAdvantage™
Designed for Consultants and includes specs, product info & technical resources

Siemens HVAC Catalog
Virtual version of Siemens "HVAC and Controls Components Catalog"

Siemens Product Documentation
Link to search engine for Building Technology Products

Siemens SITRANS
Home page for Siemens industrial flow, level, pressure and temperature devices

Simple Select Valve Tool
Link to download Siemens valve sizing and selection tool

Gamma Lighting Control
Home page for Siemens Gamma Lighting Control System

Siemens SpecWriter™ Tool
SpecWriter™ from Siemens is an efficient specification tool. With SpecWriter you can easily design building automation and fire and life safety systems by creating professional specifications in the latest industry formats.

This publication is intended for informational and business purposes only. If you have an idea for a topic you would like to see covered here, if you would like more information or if we can provide support on your specific project, please contact:

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Thank you!