Energy Efficient Valve for Green Design

- Constant flow regardless of pressure variations in the system, performing a continual balancing function to maintain system performance at varying loads.
- Stainless steel characterizing disc standard – superior material for a wide range of media and long service life.
- No maintenance required.
- Simplified valve sizing and selection, no Cv calculations required.
- Equal percentage and linear flow characteristics
- 5 year warranty.
Belimo is ready to help you! Welcome to the Belimo family! We value you as a customer. Belimo stands behind its products and has plenty of resources ready to help you should you need it.

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Pressure independent valves compensate for pressure variations, performing a continual balancing function to maintain system performance at varying loads.

Precise flow control eliminates over-pumping and provides favorable energy savings.

Equal percentage flow characteristics leads to system controllability.

Linear flow is used when controlling applications different than cooling/heating coils; like bypass control.

Pressure independent valve prevent energizing additional chillers by maintaining desirable Delta T.

Constant flow performance significantly reduces actuator movement, providing less hunting and wear on the valve assembly.

Pressure independent valves are selected based on coil flow rate and no Cv calculations are needed.

The ePIV is a two-way valve which is unaffected by pressure variations in a system. The ePIV directly measures flow by combining a magnetic flow meter and a 2-way control valve.

The actuator has a powerful algorithm that modulates the control valve to maintain the flow setpoint set by the controller. The flow reading is reported back to the controller using a standard signal, and this value can be used by the Building Automation System to perform advanced control and energy strategies. The ePIV is a valve designed specifically for HVAC applications.

The ePIV complements the existing line of Pressure Independent Characterized Control Valve (PICCV) to offer a complete range of pressure independent valves.

Features and Benefits

- Simplified valve sizing and selection, no Cv calculations required.
- Real flow measured and provided as feedback using a standard signal (0-10 VDC) providing high stability across the whole load range.
- Constant flow performance significantly reduces actuator movement, providing less hunting and wear on the valve assembly
- Magnetic flow sensor, no maintenance required and no moving parts.
- Accuracy is not affected by temperature or media, up to 50% glycol.
- The flow characteristic can be changed from equal percentage to linear with Belimo’s PC-Tool without using any hardware.

Valve Specifications

<table>
<thead>
<tr>
<th>Service</th>
<th>chilled or hot water, 50% glycol (open loop/steam not allowed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow characteristic</td>
<td>equal percentage/linear</td>
</tr>
<tr>
<td>Controllable flow range</td>
<td>90° rotation</td>
</tr>
<tr>
<td>Size</td>
<td>2½”, 3’’ (4”, 5”, 6”*)</td>
</tr>
<tr>
<td>Type of end fitting</td>
<td>pattern to mate with ANSI 125 flange</td>
</tr>
</tbody>
</table>

Materials

| Body | cast iron - GG25 and ductile iron - GGG50 |
| Ball | stainless steel |
| Seat | PTFE |
| Characterizing disc | stainless steel |
| Packing | 2 EPDM O-rings, lubricated |

Body pressure rating | according to ANSI 125, standard class B |
Media temp. range | 36°F to 250°F [2°C to 120°C] |
Conductivity | Min. 20uS/cm (no fully desalinated systems) |
Differential pressure range (ΔP) | 5 to 50 psid |
Leakage | 0% |
Inlet length required in front of valve | 5x DN |
Power supply for the flow sensor | sensor is powered by the actuator |

Today!
ePIV Applications

ePIV valves directly control the water flow required by the coil and are not affected by pressure fluctuations in the system. The valves are selected based on the GPM requirements of the coil and no Cv calculations are needed. By precisely controlling the flow, the ePIV valves eliminate the need for balancing valves, thus reducing the installation and balancing cost. The ePIV eliminates overflow thru the coil thus saving energy for the building owner. Overflow wastes energy by over pumping and is the main cause of the low Delta T syndrome in chilled water systems.

ePIV is used to regulate flow through air handling, heating and cooling coils, fan coil units, unit ventilators and VAV re-heat coils.

Flow Pattern
Flow Tolerance of the ePIV:
From 25% to 100% V’nom +/-10% of the actual Flow
From 2.5% to 25% V’nom +/-10% of the Flow at 25% +/-2.5% of V’nom.

V’nom = flow rating of valve as listed in catalog

Functionality
The ePIV directly measures flow by combining a magnetic flow meter and a 2-way control valve. The actuator has a powerful algorithm that modulates the control valve to maintain the flow setpoint set by the controller. The flow reading is reported back to the controller using a standard signal. ePIV is designed for building automation system to perform control and energy strategies.

Installation
ePIVs shall be installed with flow in the direction of the arrow on the valve body. The valve assembly can be installed in a vertical or horizontal arrangement, as long as the actuator is positioned to avoid condensation from dripping onto the actuator. The ePIV requires a section of straight pipe on the valve inlet to guarantee sensor accuracy. The length should be at least 5 diameters long. No requirements for outlet length. Elbows can be installed directly after the valve.

Piping
The ePIV is recommended to be installed on the return side of the coil. This diagram is for typical applications only. Consult engineering specification and drawings for particular circumstances. P/T ports are recommended on either side of the valve and the supply side of the heat transfer device to allow for pressure/flow measurement/calculation. Refer to Belimo documentation for flow verification and commissioning procedures.

<table>
<thead>
<tr>
<th>ACTUATOR PART #</th>
<th>ARB24-PI-65</th>
<th>ARB24-PI-80</th>
<th>ARB24-PI-100</th>
<th>GRB24-PI-125</th>
<th>GRB24-PI-150</th>
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<tbody>
<tr>
<td>Control type</td>
<td>Proportional</td>
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<td>Proportional</td>
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<tr>
<td>Manual override</td>
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<td>•</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Noise level</td>
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<td>&lt;45 dB(A)</td>
<td>&lt;45 dB(A)</td>
<td>&lt;45 dB(A)</td>
<td>&lt;45 dB(A)</td>
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**ELECTRICAL CONNECTION:**
3 ft cable, ½" conduit fitting

<table>
<thead>
<tr>
<th>ePIV Model #</th>
<th>Flow Rate GPM</th>
<th>Flow Rate Liter/Min</th>
<th>Valve Nominal Size Inches DN mm</th>
<th>Close-off psi</th>
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<tbody>
<tr>
<td>P6230S-127</td>
<td>127</td>
<td>480</td>
<td>2½</td>
<td>65</td>
</tr>
<tr>
<td>P6300S-180</td>
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<td>680</td>
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<td>P6500S-495</td>
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<td>1875</td>
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<td>125</td>
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<td>P6600S-713</td>
<td>713</td>
<td>2700</td>
<td>6</td>
<td>150</td>
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Note: ARX, GRX model also available for custom options. Call Belimo for details.
What is Pressure Independent (PI) technology?
PI technology such as that incorporated into Belimo’s Pressure Independent Characterized Control Valve (PICCV) combines the function of an automatic balancing valve and control valve into one self-contained unit. The PICCV is designed to maintain stable flow (and thus temperature differential) through a coil despite any and all pressure fluctuations that occur in a typical system with multiple control valves and interactive circuits.

How does PI Technology save money?
PI Technology has been shown reduce both installation and operational costs by:
1. Eliminating the need for a separate balancing valve
2. Eliminating the labor associated with installing a separate balancing valve.
3. Eliminating the need for start-up and routine balancing required in systems with interactive circuits.
4. Accurately minimizing flow during low load periods so less pump energy is required.
5. Reducing the size of both pumping equipment and piping due to the fact that PI valves help minimize overall flow requirement through the system. Less flow means less friction loss through equipment!
6. Helping owners realize the full benefit of variable flow pumping systems.

Is it true that PI valves cost as much as 5 times more than a conventional valve?
No! Clearly a valve that incorporates self-balancing is going to be more expensive than a valve that does not, however it is unlikely that you would encounter such an extreme price difference. In most cases, the savings achieved by applying PI technology will substantially surpass any initial materials cost. This includes the savings achieved through the elimination of a separate balancing valve, additional installation labor, and balancing labor. Most importantly, the goal of PI technology is to achieve more efficient performance over the life of the system so operational savings is continuous.

What is the significance of Delta T when it comes to evaluating valve performance?
For optimum efficiency, control valves should maintain consistent Delta T across the coil that is at or near design, regardless of pressure fluctuations in the system. If the design Delta T is 12° but 6° of differential is being achieved, then energy (and money) is being wasted. This is where PI saves. As independent testing has shown, PI technology consistently maintains high Delta Ts despite varying conditions.

Do all systems require some sort of balancing?
Virtually any system with multiple, interactive circuits requires start-up and routine balancing – even those that are considered to be “tightly” designed. There are two main reasons for this:
• First, mechanical systems are rarely designed to perfection. Most are designed (or updated) with one or more of the following imperfections: inappropriately sized coils, oversized pumps, improper piping. All of these items lead to pressure fluctuations which impact overall performance and efficiency. Therefore balancing (and rebalancing) is necessary unless PI technology is used.
• Second, normal pressure fluctuations in a system WILL occur as a result of constant load changes due to outdoor air temperatures, humidity, building occupation, etc.
While there has been some investigation into the viability of pressure dependent systems that do not employ balancing, we do not consider this realistic alternative for buildings with multiple, interactive circuits.