



Experience uninterrupted performance

Proper flow across cold plates with the Belimo Energy Valve™

In the fast-paced world of data centers, reliability, scalability, and efficiency are paramount. The Belimo Energy Valve rises to the challenge, offering a comprehensive solution designed to ensure optimal flow across cold plates, safeguarding your critical infrastructure from potential damage and downtime.

→ Reliable:

- Flow Assurance:** By maintaining differential pressure across the rack, Belimo's Energy Valve ensures the necessary flow across each cold plate, even during server maintenance, providing you with visibility and peace of mind.
- Overflow Prevention:** By limiting maximum flow to the rack, the Energy Valve helps prevent overflow and erosion of cold plate channels, ensuring uninterrupted operations.
- Standalone System:** With differential pressure setpoint configuration directly on the device, the Energy Valve can operate independently, eliminating the need for external control signals.
- Power Efficiency:** The Energy Valve can be powered via Ethernet (POE), eliminating the need for additional transformers near your racks and simplifying installation.



→ Scalable:

- Future-Proof Design:** The Energy Valve can be tailored to meet your evolving cooling needs without compromising performance at current loads, ensuring scalability as your server requirements grow.
- Remote Reprogramming:** As servers are upgraded and require additional cooling, the Energy Valve can be remotely reprogrammed via the Building Management System (BMS) or an optional cloud connection, offering flexibility and adaptability.

→ Efficient:

- Data Rich:** The Energy Valve continuously monitors valve position, flow, water temperature, heat removal, pressure, and more. Leverage this information to make proactive, informed decisions instead of merely reacting to problems as they arise.
- Glycol Monitoring:** By monitoring glycol levels in the system, the Energy Valve ensures optimal usage to maintain heat transfer characteristics while preventing bacterial growth, promoting efficient and sustainable operation.

Effects of proper flow across cold plates

Maintaining proper flow across cold plates is essential to ensuring efficient cooling, system reliability, and the longevity of both the cold plates and the components they cool.

Why is proper flow across a cold plate important?

- **Server Damage:** Too little flow can lead to inadequate cooling on the server, risking potential damage that, if severe enough, could necessitate a replacement costing between \$100,000 and \$250,000 for high-performance models.
- **Unplanned Downtime:** Server freezes or unexpected shutdowns can result in significant financial losses. According to Uptime Institute's 2022 survey, 70% of outages cost \$100,000 or more, with 25% exceeding 1 million USD*.
- **Excessive Flow Risks:** Too much flow can erode cold plate channels, altering heat transfer properties and necessitating replacement. Additionally, excessive flow increases pumping energy consumption.

Challenges to achieving accurate flow across cold plates

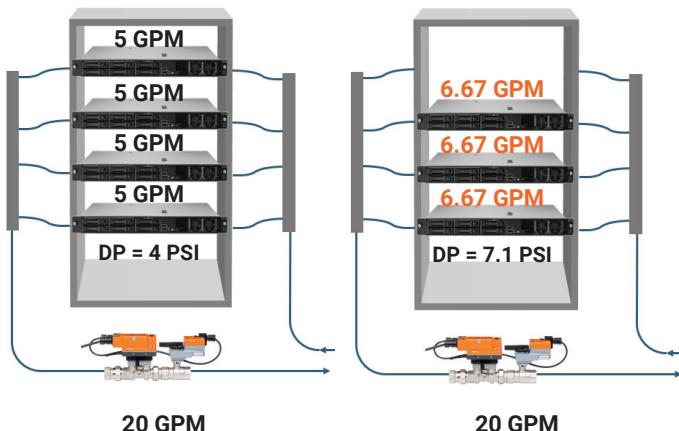
- **Dynamic Environment:** Regular server removals for maintenance change the total flow requirement for the rack, potentially causing overflow to remaining servers.
- **Flow Distribution:** Even with managed total flow, ensuring equal distribution to each cold plate proves challenging.
- **Variable Server Replacements:** Server upgrades or replacements may alter flow requirements, complicating overall flow management.

Using differential pressure to maintain constant flow

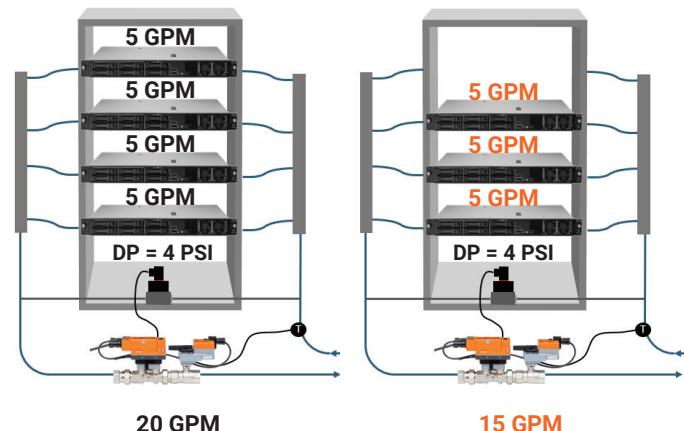
To determine the total flow required to cool the entire rack, sum the flow requirements of each individual cold plate. If the total flow to the rack is controlled and a server is removed for maintenance, this would cause an overflow to the remaining cold plates.

In contrast, maintaining a constant differential pressure across the rack ensures a consistent flow to each cold plate, even if a server is removed.

Variable to be kept constant: TOTAL FLOW



Variable to be kept constant: DIFFERENTIAL PRESSURE



*Uptime Institute. 2022. *Uptime Institute Global Data Center Survey 2022*
<https://uptimeinstitute.com/resources/research-and-reports/uptime-institute-global-data-center-survey-results-2022>