Energy valves are new Internet of Things (IoT) devices to help reduce air conditioning energy usage by better controlling chilled water and heating hot water flows, reducing chiller, boiler, pumping and fan energy.

What are Energy Valves?

Energy Valves are web connected Chilled Water (CHW) and Heating Hot Water (HHW) control valves that include an electronic flow meter along with water temperature sensors to produce detailed system operational data. Advanced cloud-based analytics can be used to analyse this real-time information to monitor, control and manage cooling and heating coil performance.

Energy Valves typically have multiple control settings including flow, thermal power and delta-T management, all adjustable through an in-built web server. Delta-T refers to the temperature difference between the water inlet and the water outlet of a cooling or heating coil in an air-handling device.

These valves provide useful dynamic system flow and energy information, but their greatest benefit is in combating what is known as “low delta-T syndrome”.

What is “Low Delta-T Syndrome”? 

“Low delta-T Syndrome” occurs when the temperature difference across a CHW or HHW coil is consistently lower than the desired value.

Low delta-T syndrome results in air-handling units demanding relatively high CHW or HHW flows for relatively longer periods of time, in order to maintain space temperature set-points. Consequently, pumps consume more energy in circulating water through the field, chillers may stage on more frequently and operate less efficiently with lower return water temperatures, and variable speed fans can operate at higher flows for longer. The overall result is poor system efficiency and excess energy consumption. In some systems, this can be as much as 8-10% of total HVAC system energy.

Typical causes of low delta-T syndrome include oversized coils or valves, fouled or degraded coils, poor system water balance or improperly controlled valves.

How do Energy Valves fix Low Delta-T Syndrome?

Utilising their embedded flow meter, supply and return water temperature sensors, as well as cloud based analytics capability, Energy Valves actively modulate water flow to maintain desired coil Delta-T, optimising the heat transfer from the coil conditioning the air.

Leveraging IoT to remotely monitor and control performance

The new Energy Valves analytics capability can leverage the captured system energy data. A static IP address can be assigned to a valve, giving building operators and maintainers the ability to remotely monitor valve and coil flow performance via a web interface. The IP address can also be assigned to a DDC network, enabling technicians to remotely check system parameters and make changes to flow rates. Tablet devices can be used to check valve readings while in the field.

Can Energy Valves be retrofitted?

In most cases, yes. It is recommended that an informed assessment be carried out first to ensure that installation is feasible and to quantify the extent of likely energy savings and improvements to indoor conditions for the particular building. A common practical installation hurdle is the requirement for a straight pipe section upstream of the valve, of at least five times the pipe diameter, to ensure the accuracy of measured data.

Energy Valves - Key Benefits and Outcomes

- Improved cooling or heating coil heat transfer efficiency due to increased delta T across coils
- Reduced pumping energy for both secondary and variable primary water systems
- Reduced air handling unit fan energy due to improved heat transfer of coils
- Reduced chiller demand and, depending on configuration, reduced chiller stage-up frequency
- Reduced boiler demand
- Diagnostic capabilities can provide projections of future energy consumption
- Enables maintenance technicians to monitor and react quickly to system variables and to diagnose problems that impact both occupant comfort and energy savings
- Simple pay back of implementation costs by energy savings can be between 12 and 24 months over and above the replacement cost of non-energy valves.

For more information on Energy Valves and how they can improve your building’s energy efficiency performance, please contact:

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