HAYS

MESURFLO®
TECHNICAL OVERVIEW

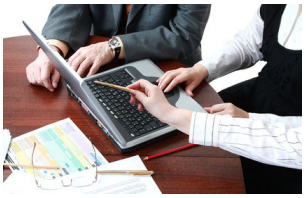
Energy cost reduction with MESURFLO® valves

15% to 40%
OR MORE IN ENERGY SAVINGS

Hays MESURFLO® automatic balancing valves offer an economical and powerful energy saving opportunity for commercial buildings

Of the many advantages of Hays **MESURFLO®** versus manual valves, the most tangible is the reduction in pump energy consumption that is achieved through the use of automatic balancing valves. With a properly installed system using **MESURFLO®** valves, energy savings of 15% to 40% or more can be realized with absolutely no reduction in occupant comfort.

The false assumption of proper flow — a hidden energy thief



Since water flow in a hydronic system is difficult and expensive to physically observe on a constant basis, it is often taken for granted that the system is properly balanced when in reality it is using significant amounts of excess energy. Even if a manually balanced system provided proper flow when the facility was new, over time factors like load changes or adding and removing terminal units can result in the system being completely out of balance.

Even new buildings with the “latest and greatest” energy designs often do not operate at maximum efficiency due to inadequate manual balancing. This situation can be avoided with the use of automatic balancing valves at the time of construction or renovation.

MESURFLO® valves — the silent hero in reducing energy consumption

Computerized energy management systems and other “high-tech” energy reduction measures get the headlines and LEED points, but they typically require constant programming. Over time, their benefits fade as users and occupants override programs and find ways around the system.

Automatic balancing valves are the complete opposite - once **MESURFLO®** valves are installed, they continue to operate for years and decades, without human intervention of any kind. They are rarely overridden because no one is aware of them. They are the silent heroes of energy cost reduction.

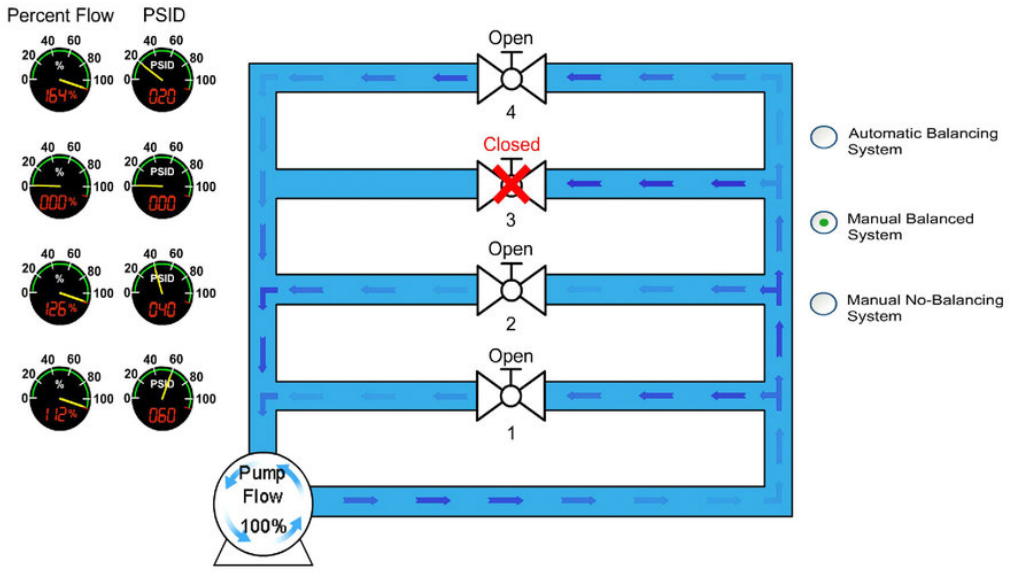
> **“We exist to make people’s lives more comfortable by providing superior fluid control solutions”**

01 / THE PROBLEM

Outdated manual control valves waste electrical pump energy

The diagram shows a four branch system with a constant speed pump. In a manually balanced system, a balancing contractor adjusts the flow at each terminal unit at 100% of design flow when all units are operating. The flaw in this arrangement is that all terminal units do not run at all times – the space served by one or more terminal units will be satisfied and the temperature control valve will shut off flow.

In this example, terminal unit #3 has been shut off because the space temperature in that area has been satisfied.



Manual balancing / constant speed pump

Information Source: PIPE-FLO Professional Engineered Software, Inc.

112%	126%	164%
UNIT 1	UNIT 2	UNIT 4

Since the pump continues to operate and water takes the path of least resistance, the terminal units that are still running will experience overflow. In the example shown, water flows are 112%, 126% and 164% over design flow to those units. This increased flow not only results in noise and erosion of the heat exchanger, but wastes considerable pump energy.

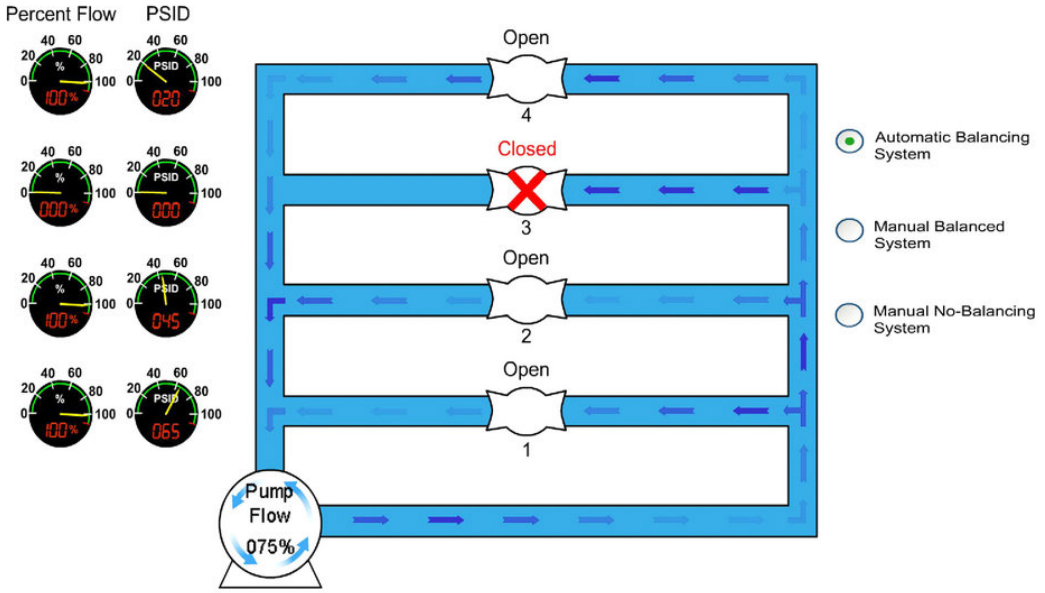
Manually balanced systems fail to take into account the day-to-day operations of terminal units, which cycle on and off constantly to meet the needs of the space. Only when all terminal units are operating exactly at design conditions does a manually balanced system run efficiently, which is a very rare occurrence in a commercial facility.

02 / THE SOLUTION

Hays MESURFLO® automatic balancing valves or Hays PICV

An economical, reliable solution to the shortcomings of manual balancing is the use of automatic balancing valves. Automatic balancing valves are set to the required flow rate for the units on which they are installed. When pressure in the branch line increases (as happens when a terminal unit in another branch turns off), the automatic balancing valve responds by limiting flow through the valve to the design flow amount.

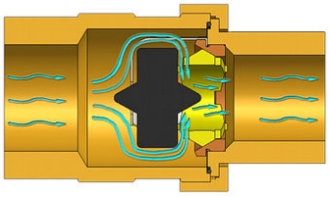
In the diagram below, note that when the same terminal unit is shut off as in the previous example, the flow to other units using **MESURFLO**® valves is limited to the design flow. This results in less energy consumption by the pump, since overflows are eliminated.



75%

PUMP FLOW

Note reduced pump energy consumption



Automatic balancing / flow limited to design conditions

Information Source: PIPE-FLO Professional Engineered Software, Inc.

How MESURFLO® valves work

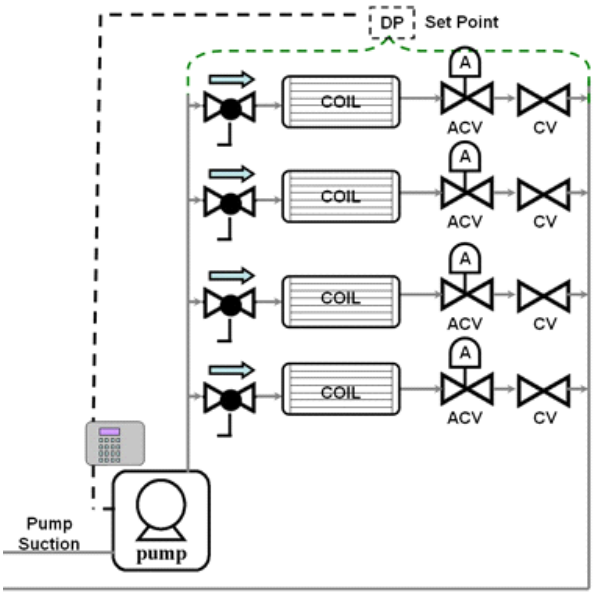
MESURFLO® controls flow to the selected GPM regardless of pressure changes in the system. It maintains constant flow as low as 2 PSID and up to 80 PSID with an accuracy of +/-10%.

Under normal pressure the **MESURFLO**® valve acts as an open orifice. The rubber disc backs away from the orifice to provide constant flow. In conjunction with modulating control valves, the modulating control has authority.

Increased pressure forces the diaphragm to push against the orifice, which results in limited flow. The greater the pressure, the more the diaphragm closes the orifice space available. This is why the **MESURFLO**® adapts to pressure increases.

SYSTEM PERFORMANCE

Using MESURFLO® with variable speed pumps with variable frequency drives (VFD)



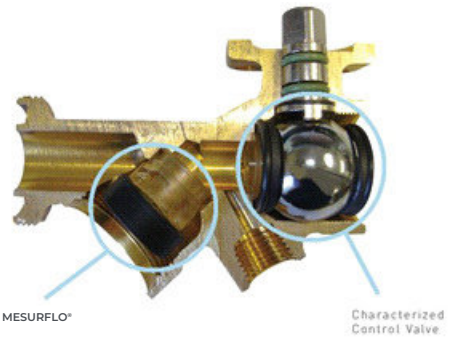
Variable speed pumps control main loop pressure by inserting one or more differential pressure sensors at strategic points, usually in the furthest branch or a key branch. However, a VFD does not ensure proper flow to every branch – its only concern is making sure the main loop has sufficient flow. Water will still follow the path of least resistance, and while the branch with the sensor may have sufficient flow, other branches will almost certainly experience overflows and maximum energy savings will not be realized.

Combining **MESURFLO®** valves with a variable speed pump provides the best of all worlds – loop flow is optimized by the VFD and correct flow to the various branches is ensured by the **MESURFLO®** valves. This results in maximum system energy savings.

PICV versus automatic balancing valves

The latest innovation in automatic balancing technology is the Pressure Independent Characterized Valve, often referred to as a PICV. The PICV combines a modulating temperature control actuated valve with a flow control valve that utilizes a characterized disk to convert the valve and heat exchanger characteristics to a linear output*.

The **MESURFLO®** selection of PICV valves offer a tremendous value to building owners, providing an economical, reliable solution to optimum flow control at a fraction of the cost of competitive PICV valves.



Hays Pressure Independent Control Valve, the newest member of the **MESURFLO®** family of automatic flow control valves

* For more information, refer to the "**MESURFLO®** Pressure Independent Control Valve Technical Overview"