ThermOmegaTech®

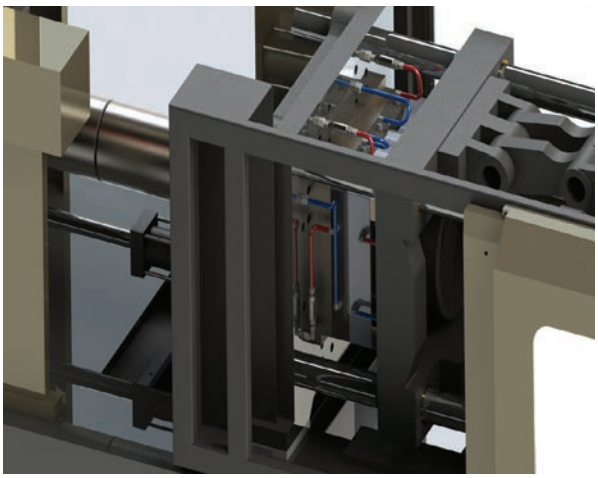
THERMOSTATIC CONTROL VALVES

FOR COOLING BALANCING APPLICATIONS

ThermOmegaTech® designs and manufactures thermostatic temperature control solutions. Our thermally actuated valves utilize our Thermoloid® paraffin wax actuators to automatically regulate flow by modulating the valve open and closed in response to temperature changes.

Cooling Balancing Applications

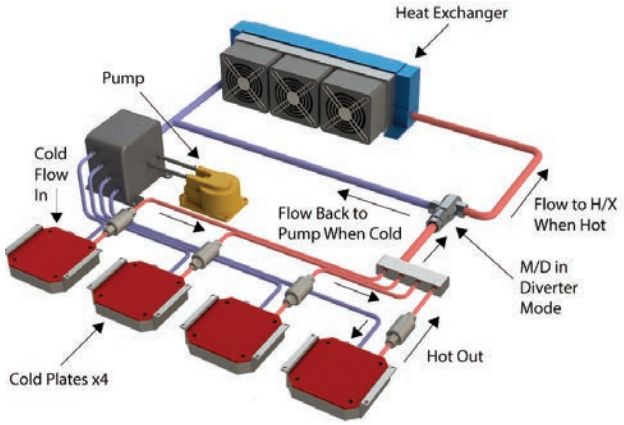
Molding Equipment Cooling
Balance flow of cooling medium for Injection, Rubber, and Plastic molding processes to provide uniform mold temperatures and consistent product quality.



Die Casting Process Cooling and Cooling Platens
Balance flow of cooling medium to provide even temperatures throughout the system and consistent output.

Electronics Cooling
Thermal control of the medium in liquid-cooled plates used in electronics cooling. In large systems, cold plates require balancing to ensure that each cold plate maintains the proper temperature by automatically adjusting the flow to remove variable heat energy.

Battery Cooling
Regulate fluid temperature in thermal management systems to maintain a consistent battery temperature to increase life and performance.



Liquid-Cooled Data Centers
Control cooling liquid temperatures to provide a balanced flow as heat loads change to prevent equipment from overheating and maximum performance levels.

Secondary Refrigeration Systems
Provide balanced cooling temperatures in secondary refrigeration systems.

Why Thermostatic Balancing?

Thermostatic balancing valves are self-powered, eliminating the need for an external power source. They are superior to traditional manual balancing valves used for thermal balancing because they automatically regulate flow by modulating open and closed in response to the fluid temperature in each branch to keep it uniform.

They directly sense the control variable – temperature and modulate the flow in a control branch based on its temperature. As the temperature in a branch increases, the valve proportionally modulates open, increasing the flow in that branch to overcome heat gain.

As the fluid temperature approaches the desired control temperature, the valve proportionally closes, reducing the flow to efficiently maintain the temperature in the branch. It is a temperature device solving a temperature problem – not a flow device indirectly trying to solve a temperature problem.

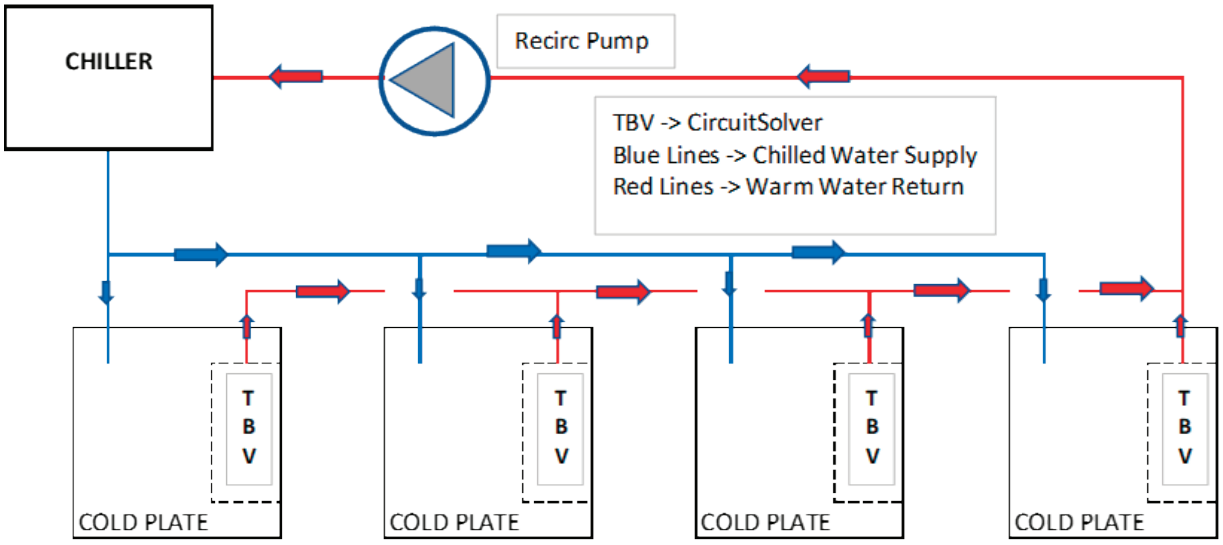
Process conditions for most applications that require temperature balancing are not constant. Multiple variables impact the heat gain of the system, which is continually changing. An optimum balancing valve is dynamic and can alter its flow with changing conditions.

Unlike manual balancing valves, a thermostatic balancing valve is dynamic. It continually reacts to changing conditions and adjusts flow accordingly. A manual balancing valve's position is fixed once it is initially calibrated for an initial set of conditions.

Regardless of environmental changes after the initial calibration, the manual balancing valve's position doesn't change and therefore does not provide a dynamic, sustainable solution such as a thermostatic balancing valve.

Thermostatic Balancing for Cooling Sample

Below is a basic sketch of a thermostatic cooling application utilizing cold plates as the cooling device.



There are four basic elements in the example above – a fluid cooling source, chiller; recirculating pump; cold plate(s) and TBVs, thermostatic balancing valves, and CircuitSolver. The TBV is shown as part of the cold plate as an example of a more integrated solution but can be external to the cold plate.

In most applications, the heat load being cooled by the cold plate changes. For instance, if they are cooling electronics, the energy dissipated by the semi-conductors can vary dramatically, constantly changing the demand for the amount of heat to be removed.

Dynamic heat loads require a dynamic heat removal solution. As the temperature in the cold plate increases, the TBV will proportionally increase its opening, thus increasing the cooling medium's flow rate, allowing more heat to be removed from the specific cold plate. This happens simultaneously and continuously for all cold plates in the system allowing for a balanced, energy-efficient solution which is NOT possible with manual balancing valves.

Replacing a fixed speed recirculating pump with a variable speed pump will add another improved performance level.

BENEFITS & DESIGN FEATURES

- Self-operating – No external power source required
- Economical removal of heat from equipment or a process
- Precise temperature control
- Reduced system wear and improved efficiency
- Maintains consistent product or system quality
- Energy conservation
- Few moving parts
- Long service life
- Maintenance free - no periodic calibration