ThermOmegaTech

The Most Advanced, Reliable and Compact Self Contained Valves Available for Temperature Control, Freeze Protection, Steam Tracing and Conservation of Energy

For over 30 years, ThermOmegaTech has been providing temperature control solutions for industry through forward thinking and innovation.

FREEZE PROTECTION:

- Automated
- Self-contained
- Completely Mechanical
- Self-modulating

IN-LINE CONTROL BASED ON TEMPERATURE

- Overtemperature protection
- Sub-cooled steam trapping
- Afterflow / outflow control
- Direct or reverse acting
- Heating or cooling
- Steam, water, gas, other media

TEMPERATURE CONTROL

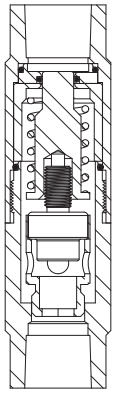
- Automated tracing
- Instrument enclosures
- Unit heaters
- Ambient or surface sensing
- Loop control
- Direct or reverse
- Heating or cooling
- Steam or heat transfer media

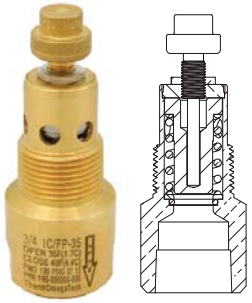
MIXING/DIVERTING

- Steam/water mixing
- Water/water mixing
- Water tempering
- Temperature controlled tank sparging
- Cooling water control
- Air conditioning Applications
- Water conservation

Freeze Protection

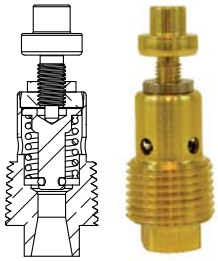
HAT/FP (Freeze Protection) valves are ideal for protection of piping, valves, fittings, pumps, condensate systems, safety showers, fire lines, spray nozzles, freeze sensitive equipment, or as backup protection on traced systems or equipment.





¾" and ½" IC/FP (Freeze Protection) valves are ideal for the protection of piping, safety showers, solar collectors & piping, condensate systems, fire lines, spray nozzles, or as backup protection on traced systems, where an unrestricted flow is required under normal operating conditions. Its sensitivity to water temperature makes this valve ideal for applications where water conservation or wastewater disposal are a prime concern.

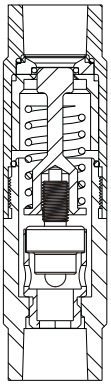
¾" IC/FP

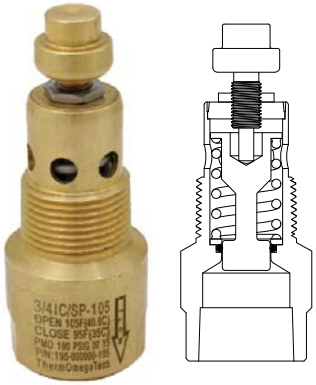


½" IC/FP

Scald Protection

HAT/SP valves continually sense and automatically bleed excessively hot water from safety shower/eyewash systems. Solar radiation or overheating caused by steam or electric tracing can cause extremely high temperatures at the point of use, resulting in a safety hazard for plant personnel. When installed in safety showers, eyewash stations, and other locations exposed to the same source of overheating as the system, the HAT/SP will be heated just as the pipe system. The valve will open to establish flow until the over temperature water is eliminated and it will then modulate closed.





IC/SP (Scald Protection) valves can provide fluid sensing freeze and over-temperature protection (as described under HAT valves) with an economical and easily replaceable cartridge. IC valves can be installed with a 1" or 1-1/4" tee anywhere in a pipe where protection is required without restricting flow through the pipe. Available with 3/4" NPT connections.

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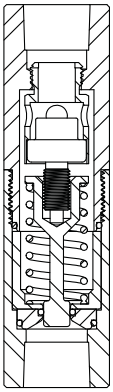
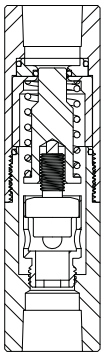
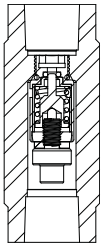
Inline Temperature Control



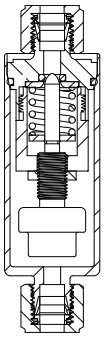
HAT (Heat Actuated Trap) valves are a compact, reliable way to optimize steam use, prevent pipe damage due to freezing, eliminate over-temperature water, or otherwise control flow based on media temperature. ThermOmegaTech's unique design provides bubble-tight shut-off and eliminates the clogging problems encountered with other type designs. **HAT** valves are available in 1/2" or 3/4" NPT sizes.



The **HST** valve is used to sense the sample temperature after the sample cooler. The sample passes through this normally open valve whenever the sample temperature is below the valve set point. If the sample temperature exceeds the valve set point, the **HST** valve closes to protect expensive and delicate analyzers and other instruments from over temperature damage.

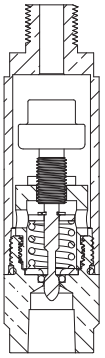


TV/HAT (Tube Valve/Heat Actuated Trap) valves are ideal for use in conjunction with tubing and tracing systems using pre-traced tubing bundles. These versatile valves are ideal for replacing conventional steam traps on winterization tracing, instrument tracing, condensate return system freeze protection, process tracing and other applications requiring in-line flow control based on temperature. Reverse-acting valves (open on temperature rise) are also available. **TV/HAT** valves are available with 1/4", 3/8" or 1/2" tube compression fittings and set points from 55°F to 240°F (13°C to 116°C).

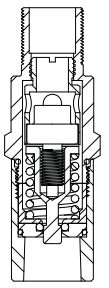


ECONO/HAT-RA valves are commonly used to provide thermal relief for booster pumps. Pumps must be sized for maximum expected flow rates so much of the time, pumps are idling against a dead head or much lower than design flow. In such cases, the pump energy is transferred into heating the water in the pump casing. When pumps run under such reduced flow conditions, the water temperature inside the pump casing can easily reach dangerous temperatures. The result can be damaged seals or even more serious pump damage.

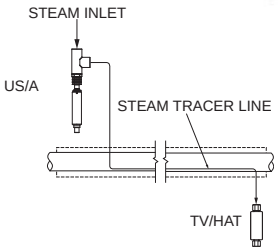
The ECONO/HAT-RA valves are self-operating so no power or signal connections are required. If the water temperature exceeds the valve setpoint, the valve automatically opens to allow cooler supply water to refill the pump as the hot water is discharged. The ECONO/HAT-RA will automatically close when water temperature falls below the setpoint to conserve water and reduce waste.



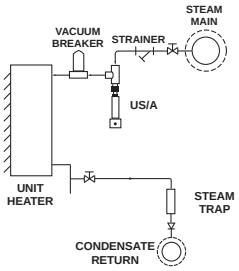
The HAT/RA-HP (Heat Actuated Trap/Reverse Acting - High Pressure) valve is commonly used as a thermal pump relief valve on high pressure water pumps. It can also be used to regulate the flow of glycol, water or other media in critical applications or to economically remove heat from equipment or a process. These valves save space and are easy and inexpensive to install. The unique ram-type plug & seat provide reliable, tight shut off longer than any other design available.



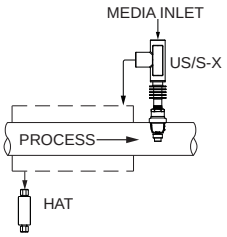
Ambient, Surface and Loop Temperature Control

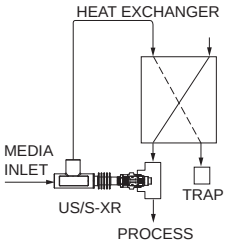


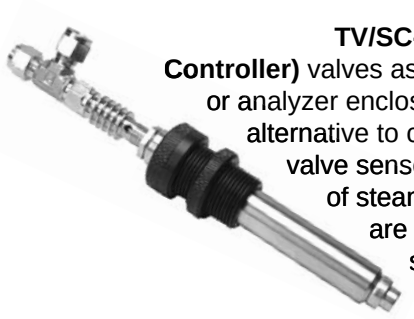
US/A & US/A-R: (Ambient-Sensing Control) At any chosen setpoint from 30°F to 140°F (-1°C to 60°C), these valves can economically automate a system in response to ambient temperature for control of steam, air, gas or liquids compatible with Teflon@ and stainless steel. Applications include automation of winterization steam tracing lines, control of pneumatically operated pumps for injection of antifreeze liquids, ambient sensing water line freeze protection, etc. They also offer maximum economy as unit heater controls. They are also ideal for controlling steam heated drum heater enclosures, plate or panel coil clad tanks, etc. US/A-R (Reverse acting) valves can be used to automate cooling sprinklers, cooling baths, etc.



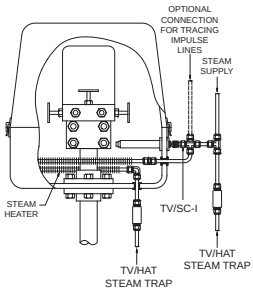
US/S-X& US/S-XR (Surface or Fluid-Sensing Control) These compact self contained control valves can affect very close temperature control of any number of control loops using steam, liquid phase heat transfer media such as Dowtherm®, hot water, hot oil, etc. The reverse acting model (US/S-XR) can be used to control cooling media to economically remove heat from equipment or a process. The sensor/controller element may be placed against the process line or pipe with the optional weld-o-let or band-o-let or in the line with the integral 3/4" NPT bushing offering unlimited piping variations. This allows the temperature element to be in contact with the process, regulating the in flow of heating media (or cooling media with the US/S-XR). Input temperatures or steam supply can vary widely, and yet the control temperature is maintained within desired limits.



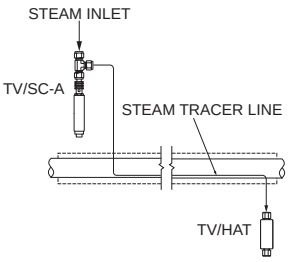




TV/SC-I (Instrument Enclosure or Analyzer Housing Temperature Controller) valves assures extremely accurate temperature control in an instrument or analyzer enclosure. This self-contained unit provides a reliable, economical alternative to costly hazardous electric heating. The compact thermostatic control valve senses enclosure temperature and automatically regulates the flow of steam to maintain the desired temperature. These economical valves are available with set points from 40°F to 180°F (4°C to 82°C). Higher setpoints temperatures available. Available with 3/8" and 1/2" tube compression fittings, single or double outlets.



TV/SC-A: (Tube Valve/Steam Control-Ambient Sensing) There are literally hundreds of applications for these compact, self-contained, automatic control valves. Tubing connections allow quick installation at low cost. Ambient sensing valves can be used to turn on steam, air, gas or liquids compatible with Teflon® and stainless steel in response to ambient temperature change. Applications include automation of steam trace lines, operation of pneumatically operated pumps for injection of anti-freeze liquids, etc. Available with 3/8" or 1/2" tube compression fittings, single outlets.



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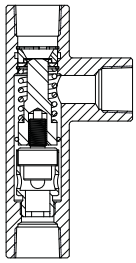
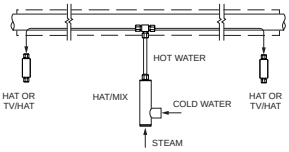
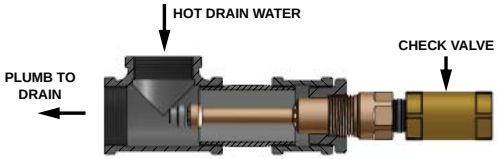
Tempering, Mixing and Diverting

HAT/MIX (Water-Water & Steam-Water Mixer) valves can be used in any application in which a constant outflow of water at a specific temperature is desired. These self-contained valves are designed around our exclusive Thermoloid sensor/controller that automatically adjusts the steam or hot water component to temper outflow water to the specified temperature. The devices are factory set and are not user adjustable, therefore tamper-proof. The valve is designed to yield outflow temperatures within a given range; if water is inadvertently not turned on, the Thermoloid sensor/controller turns off the steam flow at the set point temperature preventing the typical “hose full of steam” problem. **HAT/MIX** valves are perfect for hot water tracing when used in conjunction with **HAT** or **TV/HAT** valves.





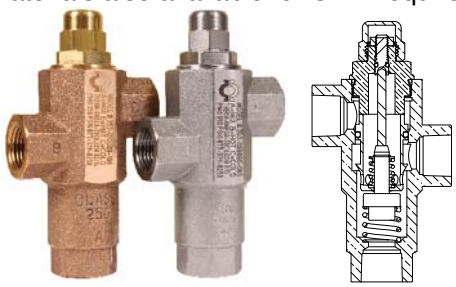
DTV: This valve can be used in applications where a discharge flow to a drain or sewer must be tempered with cold water to reduce temperature. In some areas, plumbing codes dictate a maximum allowable sewer discharge temperature. The DTV provides a convenient, economical, and easy to use method of tempering hot effluent flows. Since the DTV is open only when the effluent exceeds the specified setpoint temperature, it also conserves water by automatically turning off cold water when not needed.



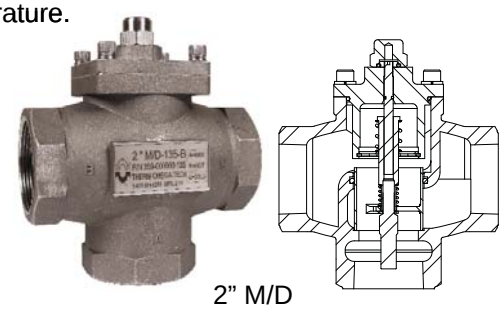
The hot effluent to be tempered is connected to the drain/sewer line using a suitably sized tee fitting and piping sized to handle the effluent flow rates. The hot effluent passes over the thermal actuator of the DTV valve and this actuator controls the cold water inlet port. If the hot effluent is above the specified setpoint, the DTV opens the cold water inlet port to allow injection of cold water. As the hot effluent cools, the DTV valve automatically modulates to reduce the cold water inlet flow.

3 WAY MIXING/DIVERTING VALVES (M/D) valves have internal port switching devices which automatically mix or divert fluids in proportion to temperature in any fluid based system. They come in stainless steel and bronze housings, with NPT sizes from 1/2” to 2”. Adjustable and pre-calibrated models available. Special connections, configurations or materials also available for OEM requirements. Nominal operating temperatures from 55°F to 240°F (13°C to 116°C).

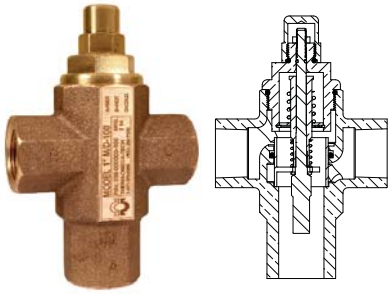
For mixing applications, the M/D will proportion the flow from two inlet ports to produce the desired outlet port temperature. For diverting applications, the M/D will divert or switch the inlet flow to either of two outlet ports depending on the fluid temperature.



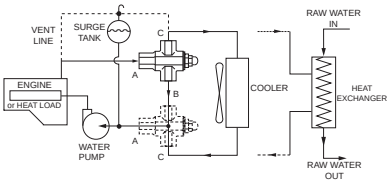
1/2” M/D Bronze and Stainless

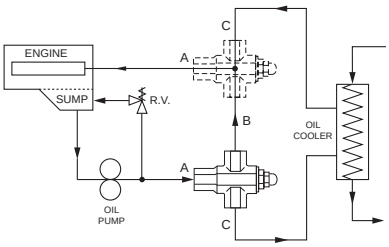


2” M/D



1” M/D

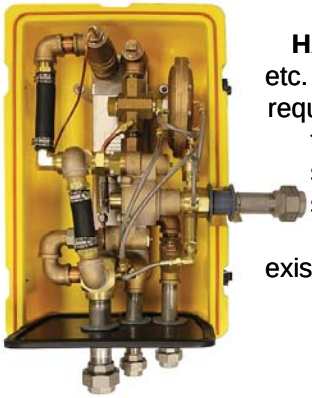




Thermostatic Mixing Systems

STVM® WASHDOWN STATION has been designed to put the safety of your operators first, thanks to its innovative technology. The system utilizes a thermal element located in the downstream leg of the mixing valve. The thermal element is designed to throttle steam flow should the temperature set point be exceeded and will completely shut down at 15°F above set point or if cold water flow is interrupted. The thermal element will not re-open until cold water flow is restored.

Conventional hosedown stations, utilizing old pressure balancing technology that rely on multiple moving parts are prone to premature failure due to mineral deposits and scaling. The necessary regular maintenance of these units to keep them running safely is very time consuming and costly. The rugged **STVM® Washdown Station** is unique in that it has only one moving part, a thermal actuator within the mixing valve cartridge. The patented vortex design ensures long uninterrupted use even if there is high mineral content in the water.



HAWS Axion® 9400: Instant Tepid Water Supply for Safety Showers & Eyewash Stations, etc. All weather instant tepid water supply specifically designed to surpass ANSI and OSHA requirements for safety shower/eyewash stations. Uses a compact high-capacity heat exchanger to produce a constant 85°F (29°C) output (regardless of water input temperature) from plant steam and water. Steam and water do not mix. No insulated tanks or expensive recirculation systems required.

Compact, light-weight design. Durable, high visibility, NEMA 4 enclosure. Easily retrofits to existing units or installed on new units.

Locomotive & Passenger Car Freeze Protection

The **Magnum GURU®** Plug is a higher discharge capacity version of the standard GURU® Plug. The Magnum GURU® Plug is a self-operating thermostatic drain valve that responds to engine coolant temperature and will pop open and drain when coolant reaches the setpoint (40°F). This provides almost a full 1.2 inch bore to rapidly drain a locomotive before freeze damage can occur.

The **GURU® DL 2.1 Plug** may be thought of as an automatic freeze-out plug with one important difference: The stainless steel GURU® Cartridge releases itself from its body at a pre-set water temperature (either 47°F or 40°F), rather than being forced out by the tremendous pressure of expanding ice. This provides almost a full one inch bore to rapidly drain the typical locomotive before damage can occur. Resetting and rearming the Magnum GURU® Plug is easily accomplished by simply reheating the cartridge and utilizing the slotted actuator feature (AKA "penny pincher"). This feature prevents the GURU® Plug from triggering open again while refilling the cooling system with cold water.

Passenger car water systems, piping and tanks, are usually protected while car heat is functioning, but supplemental freeze protection is required for circumstances where car power/heat is not available. The ***GURU® PC*** valve provides reliable freeze protection and do not require any power or signal to operate.

An optional heater assembly (shown) is available for the ***GURU® PC*** which keeps it warm enough to prevent nuisance activation when car power is on. This valve heater also allows for quickly closing the valve after a freeze activation so that the water system can be refilled and the car put back in service as quickly as possible.

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Freeze Basics

Most people, regardless of their background, are aware of some of the basic elements of freezing. This paper contains some of the less well-known, less obvious facts about how and why things freeze and what happens as a result. It is our hope that there will be something new here for everyone that will, perhaps, make dealing with freezing and its prevention easier.

Through the use of anecdotal examples, we will provide a reference usable throughout industry for anyone who needs to deal with almost any form of freeze protection. We hope that you will feel free to utilize this "primer" on freezing as you look for solutions to problems which might include locomotive cooling systems freezing, industrial process systems freezing, solar collector systems freezing and others.

Facts About Water Freezing

Water, when it freezes, changes from liquid to solid. As the temperature drops, the molecules become less energetic, moving more slowly, until they reach a point at which the molecular structure changes, followed by the transformation into ice, or solid water. Unlike most substances which shrink in volume as they freeze, water expands since ice's molecular structure takes up more space than water. Conversely, when you heat water, the molecules become more excited until they reach the point where the water vaporizes and becomes steam.

There is a misconception that if water can be kept moving, it won't freeze. Wrong! Water freezes at 32°F (0°C). Period.

Since the expansion of water as it freezes is a fact of life, what things should we know about this process in order to create effective means of dealing with it in industry? Water that has frozen in piping systems does more than simply clog the system and shut off the flow. Because ice takes up more room than liquid, when freezing occurs in a confined space like a steel pipe, the ice will build up extreme internal pressure which is often enough to break the pipe and its associated valves and fittings.

Damage from a burst pipe or valve can escalate beyond just replacing the broken parts, into labor costs for the repair and time/money lost from "down-time" in the affected area. Before effective measures can be taken to prevent such disasters, we need to learn about and understand what is happening.

The Physical Principles of Freezing

What are the underlying principles that determine whether the water in a given device (pipe, valve, etc.) will freeze? We already know that water freezes at 32°F. To arrive at this temperature, heat must be removed (transferred) from the water (Remember - heat always travels from high temperature areas to lower temperature areas). Heat transfer, or the removal of heat from one place to another (i.e. from the 45°F water inside a pipe to the 25°F air outside a pipe) is one of the basic laws of nature. Heat is a form of energy. Others include chemical, electrical, mechanical and nuclear, and each is convertible from one form to another. In the USA, heat is usually measured in BTUs, or British Thermal Units. One BTU is the amount of energy which, when added to one pound of water, will raise the temperature of that water by one Fahrenheit degree (as from 65°F to 66°F).

This process is also totally reversible. By transferring one BTU of energy out of one pound of water, the temperature will decrease by one Fahrenheit degree. If you transfer enough heat energy out of a given amount of water, the temperature will drop until it reaches 32°F and the water freezes. The amount of water involved will affect the decrease in temperature. Based on the definition of BTU, it becomes obvious that with two containers full of water, one of which contains twice as much water as the other, twice as much heat will need to be removed from the larger container to lower its temperature the same amount as the smaller container. One good example of this is a pond. Ponds tend to fill fairly shallow depressions in the earth, and range from a few inches deep at their edges to several feet deep near their centers. Where the water is shallow, it freezes solid very quickly. Where the water is deeper, the freezing process occurs more slowly. The greater amount of water near the center of the pond requires more heat to be removed, so it takes longer for the water temperature to reach the freezing point.

At its most basic, if freezing is to occur, it will be determined by both the amount of water present and the rate of heat loss from the water. Some of the most important factors that influence the rate of heat loss from a pipe are:

- The thermal resistance of the pipe wall
- The outside surface area of the pipe
- The wind velocity over/around the pipe
- The temperature difference between the water in the pipe and the outside air.

Both the "surface area" and "temperature difference" factors are directly proportional to the heat loss rate. If you double either of these factors, the rate of heat loss will double. By the way, adding heavy insulation to a non-flowing pipe will greatly decrease the rate of heat loss (you are increasing the thermal resistance of the pipe), but it will not stop it (no insulation is perfect), and the water in the pipe will still eventually freeze.

Some Applied Solutions

"An ounce of prevention is worth a pound of cure."
Benjamin Franklin

There are two basic techniques used to prevent frozen water lines in industry: tracing and bleed/drain.

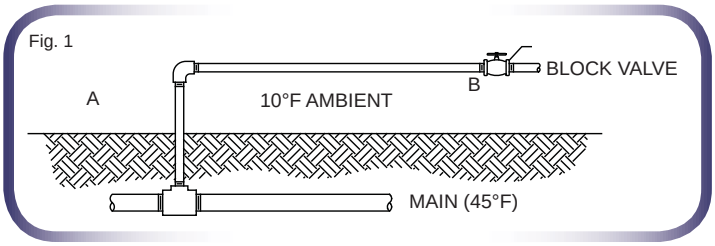
With the tracing technique one of two systems is generally applied. In the first, "electric tracing", an electrical heating cable is fastened to the underside of the pipe, beneath the insulation. The heat generated by the cable off-sets the heat loss of the pipe so that the pipe and the water it contains are kept safely above freezing.

In large installations this might not be practical because of the cost of both the cable and the electricity used to generate the heat, as well as the possibility for breakage of the cable, which would leave everything beyond the break vulnerable. Additionally, the use of electricity in a facility handling combustible substances is dangerous due to the possibility of sparks. In the second system, "steam tracing", the electric cable is replaced with small diameter copper tubing, which is connected to a steam supply. While cheaper to run, this system must rely on steam traps located at the end of the tracing line. These traps can fail and leave the pipe line unprotected.

The bleed/drain technique, which avoids the expense of heating pipe lines, uses a temperature sensitive valve to "bleed" or "drain" the water from the system involved. Which method, bleed or drain, is used depends on the nature of the water system: Fixed volume or Re-supply.

Re-Supply Systems

When water is lost from this system, it is replaced, or "re-supplied" by the pressurizing source. A very obvious and simple example is your garden hose. As the water comes out of the nozzle, or is



"lost", it is replaced, or re-supplied, from the house spigot. Three examples of industrial re-supply systems include:

1. The potable water system in a lab or office
2. Safety showers in potentially dangerous work areas
3. The fire-fighting water system in a factory or petro-chemical plant.

In all these systems, the water originates with a reservoir or well. It is pressurized by elevation or a pump and can flow for several miles underground until it surfaces at or near the point of use. It is here, as the water enters the local area piping system, that freeze protection becomes necessary. (see FIG.1 - schematic representation of system) The pipe above ground (from A to B) gradually loses heat to the 10°F air. The temperature of the water inside the pipe drops, assuming that the block valve (B) is closed, until the water freezes.

Now consider what would happen if, as the water temperature at point B reached 40°F, the valve were to be opened very slightly. Water would begin to flow from the main, which is underground and at 45°F, through the above ground length and out the valve. If the flow were just right, the water entering at 45°F would cool to no less than 40°F at the valve. If the temperature dropped further, or a strong wind were to blow across the pipe (see the previous section on principles of freezing), the valve would have to be opened further to increase the flow of warmer water and keep the temperature at 40°F at the outlet. The warmer water from underground purges the colder water from the system through the open valve.

It would be ridiculous to station a person at each valve with a thermometer to be able to adjust the valve with each change in water temperature. For this reason Therm-Omega-Tech,Inc. has engineered and manufactured a line of high-quality and utterly reliable valves that do all of the above automatically. They do this by sensing the water temperature in the pipe near the valve and gradually opening as needed to establish a flow which will prevent freezing. As the air temperature, wind velocity or other factors which affect the rate of heat loss from the pipe change, the valves automatically adjust the flow rate of the water to maintain temperature and prevent freezing. Since the temperature sensors (thermostats) in the valves also serve as the actuators that move the valve plug, no external source of power is needed. These "modulating" type valves, which open and close to regulate flow to maintain temperature, are part of Therm-Omega-Tech's family of HAT/FP freeze protection devices.

Please Note: Freeze protection valves must be installed as close to the far end of the exposed pipe as possible, since any water downstream from the valve will not be purged and could freeze. (Please see FIG.2 for proper placement of the valve.) Also, any side branches attached to the exposed run of pipe must each have a freeze protection valve at their far ends, and the discharge from the valve must not be piped to the drain, as that pipe might freeze and block the purging flow.

Recommended Do's And Don'ts

These are specifically intended for the HAT series valves and for re-supply systems. Due to the peculiarities inherent in locomotive configurations (see Fixed Volume Systems), we suggest that you contact Therm-Omega-Tech directly for application suggestions.

- **DO** locate the Therm-Omega-Tech freeze protection valves at the extreme ends of any pipe lines.
- **DON'T** insulate any Therm-Omega-Tech valve. It should be placed so as to have the quickest cooling rate so as to reach opening temperature before any other part of the pipe line reaches freezing temperature. In a sense, these valves act like circuit breakers in an electrical system. They must be the most sensitive components in the system and are the first to react to a circuit abnormality and save the system from damage.
- **DON'T** locate the HAT valve near a heat source, such as a steam line (even if it is insulated). The radiant heat from the steam pipe could warm the valve just enough to prevent operation, even though a portion of the pipe not near the steam line is starting to freeze.
- **DO** test HAT valves before each cold season. A simple test consists of slipping an ice-filled can up and around the valve. In several minutes the can should start to overflow, which indicates that the valve is opening. Remove the can, and in a few minutes the valve should close. If it performs this way, it is fine.
- **DO** calculate the proper HAT valve size for your pipe application. There is a sample calculation in the appendix of the Therm-Omega-Tech catalog. (See Application Profile #3 or Therm-Omega-Tech's "FreezePro" Valve Sizing Software)
- **DO** call Therm-Omega-Tech at 1-877-379-8258 if you have any questions.

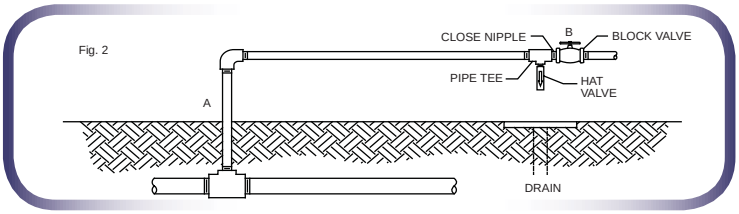
Fixed Volume Systems

This system is defined by its name: fixed volume. It has a definite volume of water in it which does not fluctuate. It may be separately pressurized or operate under its own head pressure. The cooling systems in use on US and Canadian diesel locomotives are fixed volume systems. Because it is not economical to use an anti-freeze solution due to heat transfer efficiency of the engine, these railroads use all-water cooling. As a result, should the engine be shut down for any reason during sub-freezing weather, there is a definite danger of freeze damage that could reach thousands of dollars in parts and labor. The engine cooling system is a closed loop, with a pump circulating the water from the engine, where the water absorbs heat, to the radiators, where the heat is dissipated, and back to the engine.

Therm-Omega-Tech's railroad freeze protection valves, called GURU Plugs, were developed expressly for this application, for which a patent was granted. This valve should be installed at the lowest point in the cooling system. Since this valve, or plug, is designed to sense both water and air temperatures, when the engine is running, the very warm water passing by the valve keeps the valve shut. After engine shutdown, the whole system cools down. At some time before a series of small tubes in the system can freeze, the air sensing qualities of the GURU Plug cause it to snap open. This drains the whole system rapidly before any freeze can occur. This snap acting valve must be used because there is no source of warmer water to purge the system, as there was in the re-supply system. By installing the valve at the lowest point in the loop, complete drainage is ensured.

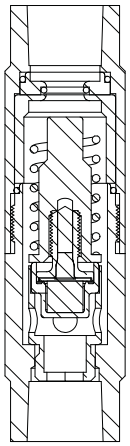
Two Brief Case Histories

For over twenty five years, Therm-Omega-Tech, Inc. has manufactured and sold tens of thousands of freeze protection



valves all over the United States and Canada. They are protecting millions of dollars worth of railroads, factories and petro-chemical plants. Because every valve is calibrated and tested before it is shipped, our reliability is second to none. The following examples serve to illustrate two of hundreds of possible applications of our freeze protection technology.

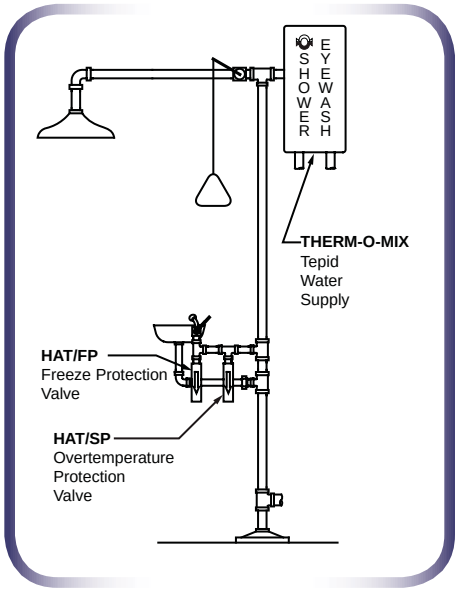
Several major railroads located in the northeast and midwestern U.S. (a part of the country where freezing is a fact of life for at least five months of the year if not longer), have installed GURU



Plugs on nearly all their locomotives. One of their managers told us that he was pleasantly surprised to find out that these “snap-acting” plugs do exactly what they are supposed to do. As the temperature of the cooling water in the piping dropped to near freezing in one of their locomotives in shut-down mode (unintentionally left for too long), the plug snapped open, draining the system of its water and thereby eliminating any possibility of a damaging freeze within the system. After refilling the system and re-inserting the warmed cartridge into the Guru Plug, the locomotive was back in operation within hours, quickly and efficiently. Had the “dump” not occurred, thousands of dollars worth of damage could (more likely would) have been done, taking the locomotive out of operation for a long period of repair. In the past, the only sure way of avoiding freezes without such system protection was to leave the engines running constantly, resulting in a tremendous waste of fuel and energy and contributing unnecessarily to air pollution. Guru Plugs, by their very nature, reduce fuel expenditures, creating yet another form of economy by avoiding unnecessary energy usage.

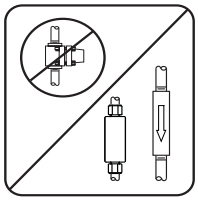
Most major emergency eyewash/safety shower manufacturers are currently using Therm-Omega-Tech’s HAT/FP for freeze protection of their safety showers and eyewash stations, as well as HAT/SP’s for overtemperature protection.

Remember that freezing water can cause extensive damage to equipment but it is possible to reduce or eliminate the possibility of freezing through application of Therm-Omega-Tech technology. Should you have any questions concerning a particular application of freeze protection technology for your plant or railroad, do not hesitate to call Therm-Omega-Tech’s engineers at 1-877-379-8258 or FAX your request to 1-215-674-8594.



These applications represent only a small sampling of the many uses for Therm-Omega-Tech valves. Please contact us toll free at 1-877-379-8258 if we can be of help with your particular application.

AS A STEAM TRAP REPLACEMENT

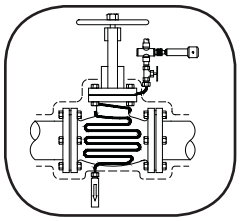


The HAT or TV/HAT can be used to replace unreliable traps that waste steam after only a short service period. Available in NPT or tube compression fittings. In general, they may be used in any light load situation, such as: • Steam tracing • Ahead of block valves in steam tracing • Drip traps on distribution lines • Start-up vents for hammer plagued systems • To eliminate live steam loss, reduce maintenance.

AUTOMATE WINTERIZATION TRACING

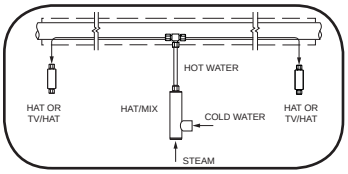
THERM-OMEGA-TECH’s **US/A** valves are used to effectively automate your winterization tracing based on ambient temperature, turning on the steam supply to the tracer lines only when there is a danger of freezing. This can result in savings of up to 90% (30-60% typical).

Sub-cooled **HAT** or **TV/HAT** valves can be used to efficiently trace any number of critical components in your process. Because the **HAT** regulates condensate outflow temperature, any available steam pressure up to 300 PSI may be used without worry that the tracer will be too hot for the process or component.



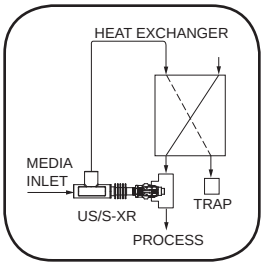
HOT WATER TRACING

The **HAT/MIX** and **HAT** or **TV/HAT** can be used to trace critical components that must stay warm but, below steam temperature. The **HAT/MIX** is connected to cold water and steam lines to produce a constant supply of hot water that is then regulated at the outflow of the tracer by the **HAT** or **TV/HAT** valves. This method provides a low cost, explosion proof alternative to more hazardous methods of tracing.



SAMPLE TEMPERATURE CONTROL

The **US/S-XR** and **TV/US-XR** valves are self-operating temperature actuated valves often used to control cooling water or other cooling medium flow to sample coolers. In some cases, the samples must be cooled to specific temperatures; in other cases, the samples must be cooled to levels that will not damage expensive analyzers and other instruments. These valves typically sense the sample temperature at the outlet of the sample cooler and will regulate cooling medium flow to maintain the sample within the setpoint range of the valve. Accurate sample temperatures and minimum cooling water consumption are two major benefits.



ThermOmegaTech, Inc. is an Industry Expert and Leading Manufacturer of Custom Thermostatic Valves, Actuators and Controls serving domestic and international markets for over 30 years.

ThermOmegaTech®

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For sales and technical assistance:

Call: 1-877-379-8258 or 215-674-9992

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