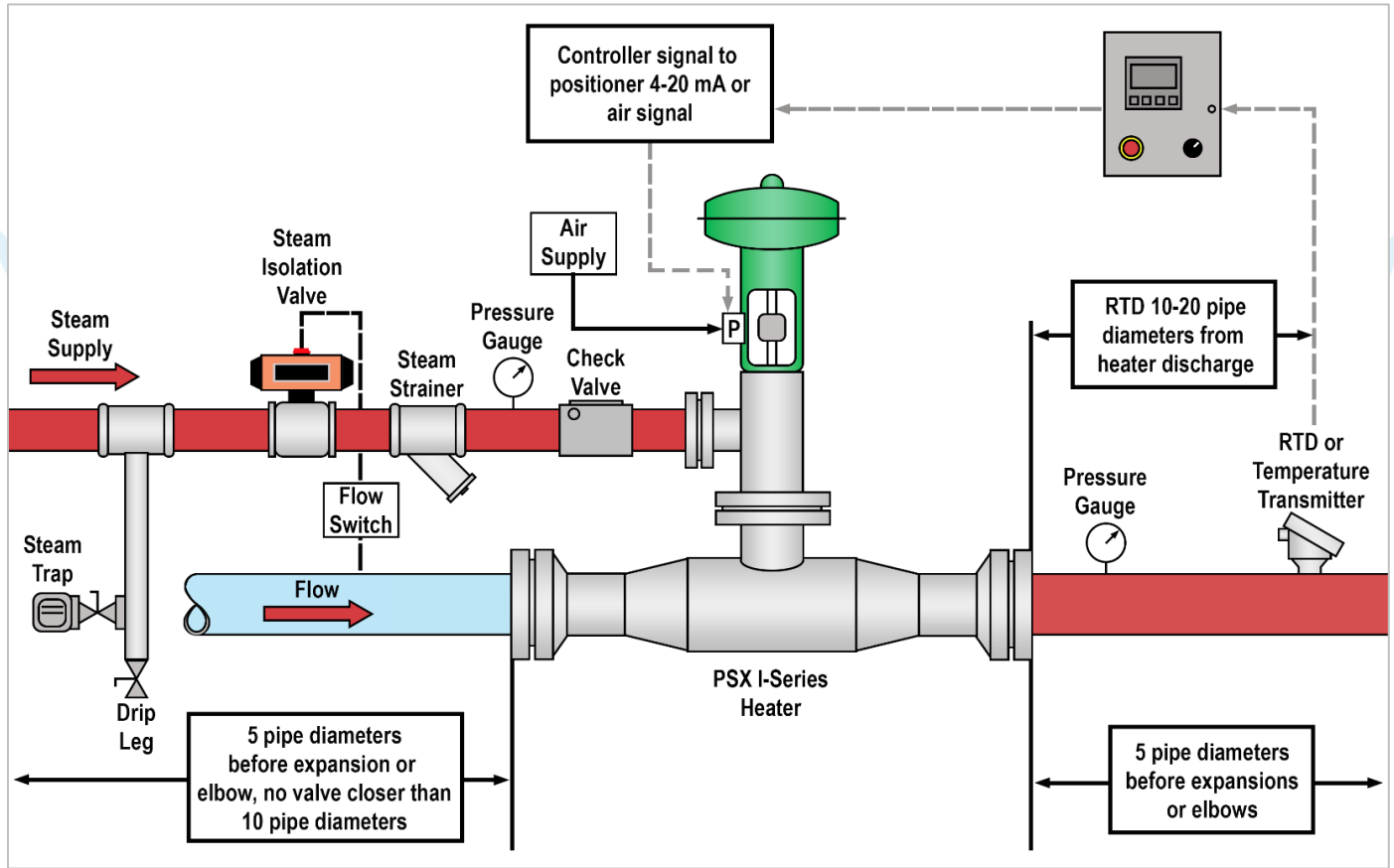


PSX Technical Bulletin



Process and Installation Recommendations:

- **Steam Pressure** – Steam supply pressure should be stable. If the steam supply varies by more than +/- 10% of the design pressure, a steam pressure regulating valve should be installed to stabilize steam pressure. A loss of steam pressure or spikes in steam pressure can cause unstable operation. **Do not** regulate steam pressure to control temperature, just to maintain stable steam supply to heater.
- **Steam Line** – Sized to maintain steam pressure at the steam flow shown in the heater sizing worksheet. Generally, no smaller than heater steam inlet.
- **Steam Quality** – Steam should be dry and filtered. Up to 75°F of superheat can be present. Please advise if superheat exceeds this or if temperatures exceed 450°F.
- **Fluid Pressure** – Liquid pressure should be < 80% of the steam supply, with the recommended design pressure at 70% or less of the steam pressure to allow for process variations.
- **Pump** – The pump should operate with a steady output flow to maintain continuous flow to the PSX heater. Reduction in liquid flow rate, especially rapid reductions, should be considered. Changes in flow rate or temperature should allow the temperature control loop to stabilize.
- **Orientation** – The steam inlet can be rotated 360° to meet the incoming steam line. The heater can be mounted horizontally or vertically.
- **Flow Monitor** – A low-flow alarm should isolate the steam supply.
- **Downstream** – Allow a minimum of 5 pipe diameters of straight pipe after the heater before any instrument, elbow, or valve installation, and 10 pipe diameters on the inlet before valve placement.
- **Supports** – Verify proper pipe supports to independently support the piping from the heater, and then the heater independently from the piping. Do not weld to the heater. **Do not** support actuator independently from the heater.

Note – Consult the ProSonix heater Owner's Manual prior to installation or operation.

Steam Strainer Sizing Guidelines (inches)			
Heater Steam Inlet	Max. Opening	Heater Steam Inlet	Max. Opening
1.0	0.020	4.0	0.030
1.5	0.020	6.0	0.050
2.0	0.020	8.0	0.063
3.0	0.030	10.0	0.125

Recommended Installation Components

Temperature Probe

The temperature probe is a vital element in successfully controlling the PSX heater. The PSX heater will typically be among the fastest-responding elements in the control system. As such, it is vital that the temperature response from the probe be as fast as possible. The following recommendations will apply to most installations:

1. Place the probe in a location where it will see well-established flow.
2. Place the probe no more than 20 pipe diameters from the PSX heater.
3. Use reduced-tip thermo-wells or bare sensors if the system will allow them.
4. RTDs or thermocouples may be used.
5. Temperature transmitters, if used, should be designed to fail at high-temperature output to prevent the heater from overheating the process upon failure.

Steam Traps & Blow Down

Steam will cool and condense in the pipe during normal operation. A well-insulated pipe will minimize this effect. The condensed steam travels at high velocity and may cause damage to the PSX heater or steam piping. Condensate may be removed using a device known as a steam trap. A valve may also be used to purge water from a low spot in the pipe.

1. A steam trap and drop leg with blow-down valve should be installed on the steam inlet piping, upstream of the check valve.
2. Steam piping should be blown down after any extended shutdown to ensure all condensate has been purged from the steam line. Install a trap in the steam supply line close to the PSX heater to remove any condensate before it can cause noise and vibration in the PSX heater.

Steam Strainer

The PSX Inline heater utilizes a Jet Diffuser for smooth operation, so a strainer should be installed on the steam line to ensure the diffuser does not plug. In general, the steam strainer should have openings no larger than the amount shown in the above table unless allowed by ProSonix technical personnel. The total capacity of the strainer should be large enough to ensure that the minimum steam pressure to the heater meets the steam requirements for the stated steam pressure at which the PSX heater was sized.

Steam Isolation Valve

Because the PSX heater is not a positive shutoff valve, a full-port tight shutoff isolation (on/off) valve should be used to provide complete shutoff of steam during extended downtime or for PSX heater maintenance. A ball or butterfly valve sized for low-pressure drop is recommended. The isolation valves should be closed to isolate the supply line from the PSX heater when the PSX heater is not in operation for an extended period.

Note: A steam control valve should not be used to regulate or vary steam flow to the PSX heater. The PSX heater is designed to operate at full design steam pressure and will control the mass flow of steam into the fluid via the variable-opening PSX Jet Diffuser.

Check Valve

A check valve should be placed approximately 5 pipe diameters from the PSX heater steam inlet. The check valve should be sized appropriately for minimal pressure drop into the heater. During times of PSX heater shutdown, if water pressure is maintained in the PSX heater, the water will flood the steam piping if no check valve is present. Upon opening the steam block valve when restarting the system, steam hammer may occur in the inlet piping.

Flow Monitor (Low Flow Alarming)

A flow switch is necessary when there is intermittent flow or the risk of loss of flow. If a flow meter is present in the system, the flow signal can be used as a means of detecting low-flow conditions and shutting down the heater and closing the steam valve. Simply program a low-flow alarm into the control system. If there is a pump supplying the water and there is little risk of loss of supply to the pump, a switch on the pump motor or VFD can also provide low-flow protection. A flow switch is the most reliable way of protecting the system from a low-flow condition. A thermal flow switch, such as the Ameritrol FX series or an IFM Efector SI series, has no moving parts and provides good protection.

Note: The above-referenced components are not included with the PSX heater unless otherwise stated in the proposal. Please refer to the ProSonix O&M manual for complete guidelines for use and installation.