

# REGULATING VALVE APPLICATIONS

## General Installation Guidelines

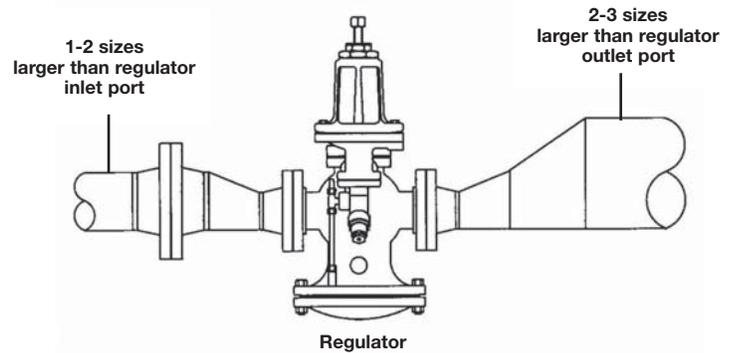
### Regulator Application & Installation Notes

The following are considerations for all steam regulator installations, as system operation is dependent upon proper design, installation, start-up and maintenance procedures:

#### Inlet & Outlet Pipe Sizing

Improperly sized piping can contribute to excessive noise in a steam system. Make certain inlet and outlet piping to the regulator is adequately sized for the flow, velocity and pressure requirements.

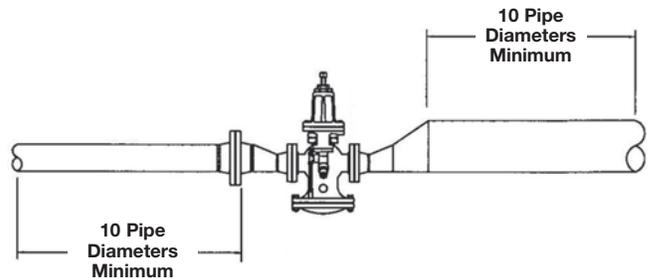
*Inlet piping can be 1-2 sizes larger and outlet piping 2-3 sizes larger than the connection ports of a properly sized regulator.*



#### Straight Run of Pipe Before and After the Valve

Pipe fittings, bends and other accessories contribute to fluid turbulence in a system which can result in erratic control. To limit this and ensure optimum system operation, follow recommended guidelines for minimum straight run lengths of pipe before and after a regulator.

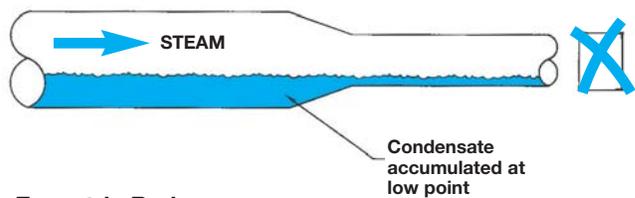
*Note: Any isolation valves or pipeline accessories should be full-ported.*



#### Reducer Selection

Concentric pipe reducers should be avoided on the inlet side of regulators as they can allow entrained condensate to collect, potentially leading to damaging and dangerous waterhammer. Therefore, when reducers are required in the steam piping to accommodate properly sized valves and pipes, use eccentric reducers on regulator inlets and concentric or eccentric reducers on regulator outlets.

#### Concentric Reducer



#### Eccentric Reducer



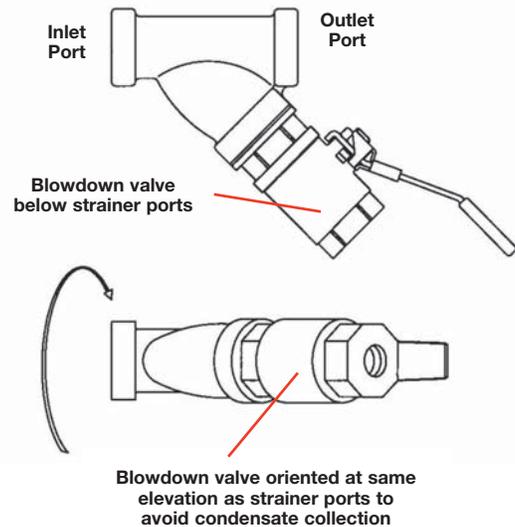
# REGULATING VALVE APPLICATIONS

## General Installation Guidelines

### Strainers with Blowdown Valves

Regardless of any filters provided on a regulator, a strainer with blowdown valve is recommended before (upstream of) all regulator installations. Pipeline debris and scale can damage internal valve components, potentially leading to poor operation and/or failure.

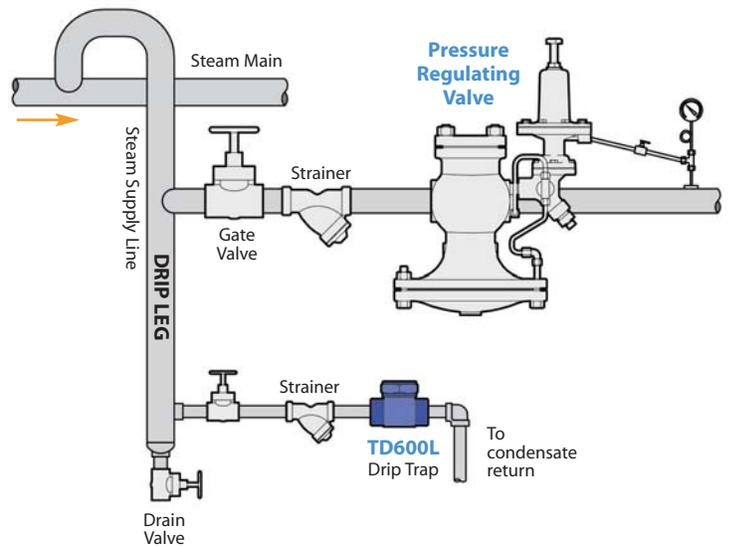
*Note: Consider strainer orientation to avoid collection of condensate (see diagram).*



### Drip Legs & Steam Traps

To prevent condensate accumulated during shutdown from possibly damaging the regulator or piping at start-up, an adequately sized drip leg with steam trap should be installed prior to all regulators. This will also help protect the regulator during normal operation.

*Note: Separators may be necessary when boiler carryover or “wet” steam is a concern.*



### Proper Start-up & Maintenance Procedures

It is important to follow good start-up practices to avoid operational complications and potential system damage. Starting a steam system too quickly or using an improper sequence may lead to a potentially hazardous working environment. Lack of system maintenance over time can also contribute to this situation.

***It is imperative to develop proper start-up and maintenance procedures and train personnel on the importance of following them at all times.***

Consult equipment manufacturers for specific guidelines, if necessary.



# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • Using Spring-Loaded Pilot

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**PURPOSE:** For reducing system inlet pressure to a constant outlet pressure.

**OPERATION:** The pressure reducing valve (PRV) can be easily adjusted to set the desired outlet pressure and modulates to maintain that pressure setting. The PRV requires no external power source.

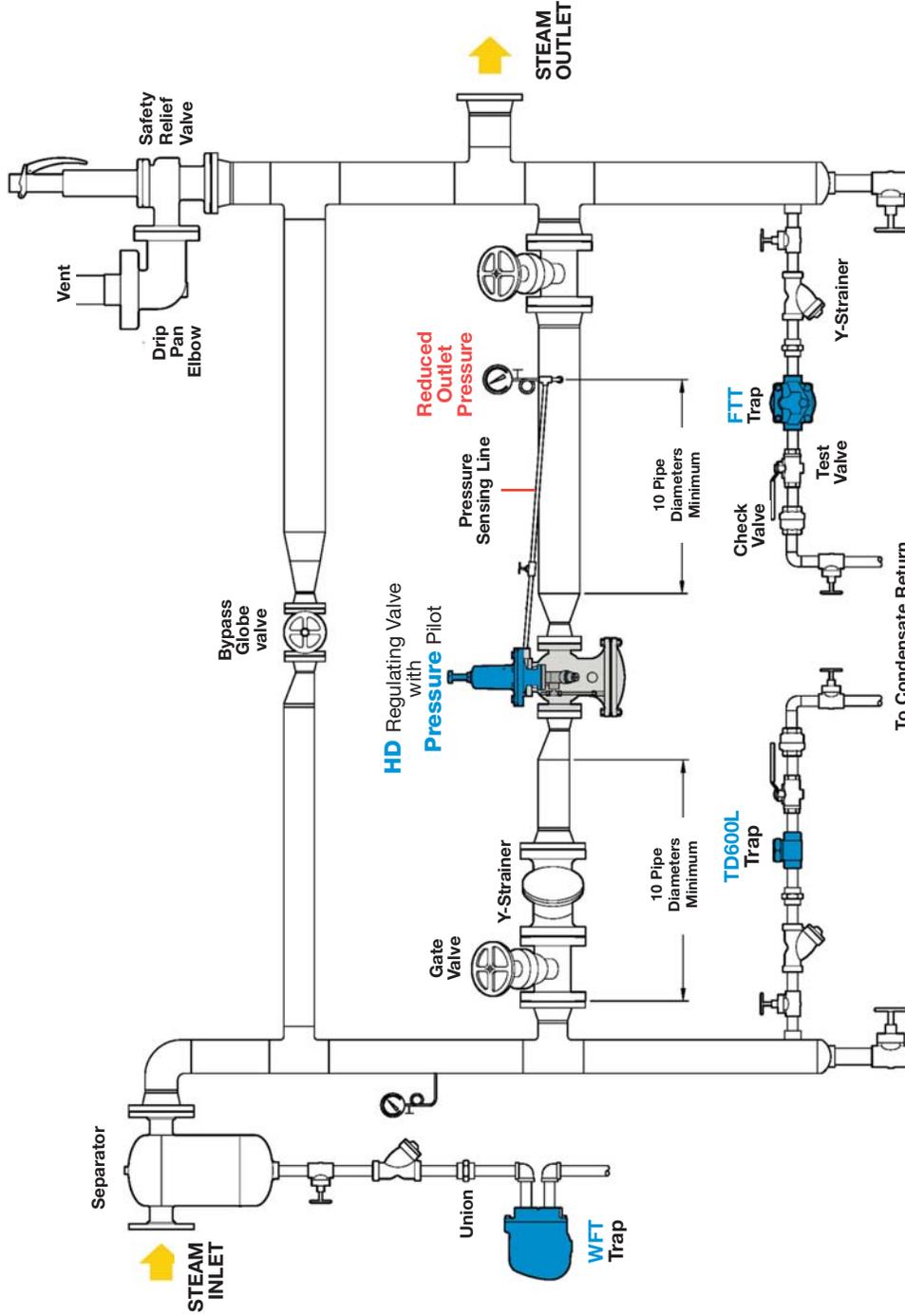
**INSTALLATION GUIDELINES:** (see Figure 5)

- This example depicts a pilot-operated steam PRV, whereby an external sensing line is required to sense downstream pressure. The end of the sensing line is placed away from the turbulent flow of the valve outlet. This helps to improve accuracy of the set pressure. Set pressure is adjusted by turning a screw on the pilot to increase or decrease compression on a balancing spring.
- For optimum operation and service life, maintain recommended minimum piping straight runs before and after the PRV. Inlet pipe diameters could be 1-2 sizes larger and outlet pipe diameters 2-3 sizes larger than the end connections of an appropriately sized PRV. The purpose of increasing the pipe size downstream of the regulator is to keep the steam velocity constant on both sides of the regulator.
- The pressure sensing line should slope downwards, away from the regulator, to prevent condensate from entering the pilot.
- Eccentric reducers, if required, are used on valve inlets to prevent accumulation of condensate which could become entrained with high-velocity steam, possibly resulting in dangerous waterhammer.
- While the separator shown upstream is appropriate for protection of the PRV, it is not always required as a properly sized drip leg with steam trap may be sufficient. It is recommended for systems where steam is known to be “wet” and the entrained moisture could affect valve performance and/or result in component damage.
- Consider installing a properly sized bypass line with globe valve to provide continuous operation should regulator maintenance be required.
- Consider low-cracking pressure (1/4 PSI opening pressure) check valves after steam traps when discharging into condensate return lines. Check valves eliminate the possibility of condensate backing up through the steam trap into the system.
- A safety relief valve (SRV) is appropriate where applicable codes dictate their requirement, or anywhere protection of downstream piping and equipment from over-pressurization is desired. The SRV needs to handle the complete volume of steam from the regulator and bypass loop. Consult the factory for appropriate SRV sizing guidelines.

# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • Using Spring-Loaded Pilot

Figure 5:



**SINGLE STAGE Pressure Reducing Station using Spring-loaded Pilot**  
(HD Regulator Applications)

# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • Using Air-Loaded Pilot

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### PURPOSE:

For reducing system inlet pressure to a constant outlet pressure when valve is located in a remote location and/or using air pressure for control is desired.

### OPERATION:

This combination of HD regulating valve and PA-pilot allows air to be used to control outlet pressure in lieu of the spring of a standard PP-pilot. Using air allows for simple adjustment of control pressure when valve is installed in a remote and/or difficult to access location.

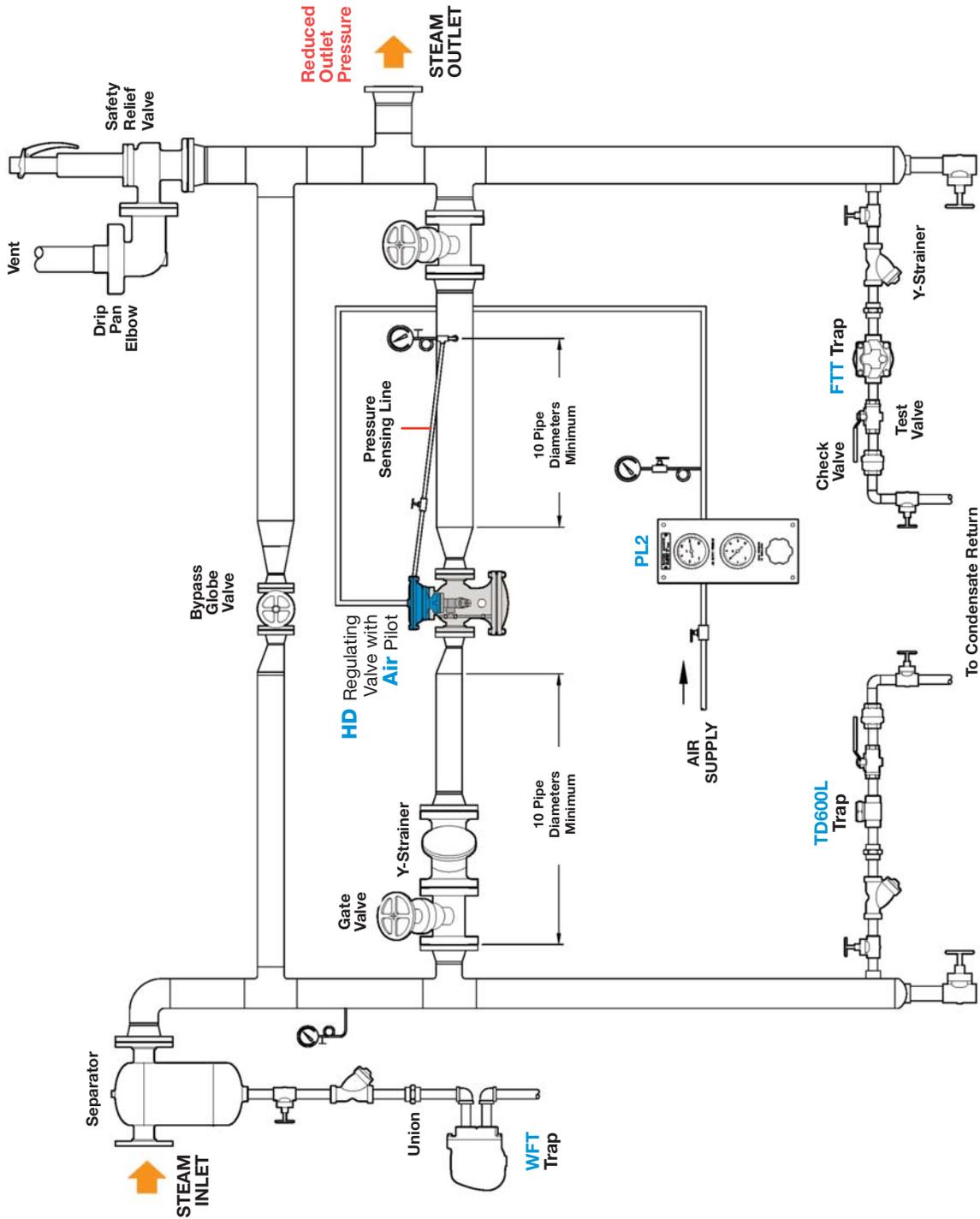
### INSTALLATION GUIDELINES: (see Figure 6)

- The desired set outlet pressure will determine the specific PA-Pilot required as well as the air supply pressure to attain the set pressure. Consult the appropriate section of this catalog or the factory for selection guidelines.
- For optimum operation and service life, maintain recommended minimum piping straight runs before and after the PRV. Inlet pipe diameters could be 1-2 sizes larger and outlet pipe diameters 2-3 sizes larger than the end connections of an appropriately sized PRV. The purpose of increasing the pipe size downstream of the regulator is to keep the steam velocity constant on both sides of the regulator.
- The pressure sensing line should slope downwards, away from the regulator, to prevent condensate from entering the pilot.
- Eccentric reducers, if required, are used on valve inlets to prevent accumulation of condensate which could become entrained with high-velocity steam, possibly resulting in dangerous waterhammer.
- While the separator shown upstream is appropriate for protection of the PRV, it is not always required, as a properly sized drip leg with steam trap may be sufficient. It is recommended for systems where steam is known to be “wet” and the entrained moisture could affect valve performance and/or result in component damage.
- Consider installing a properly sized bypass line with globe valve to provide continuous operation should regulator maintenance be required.
- Consider low-cracking pressure (1/4 PSI opening pressure) check valves after steam traps when discharging into condensate return lines. Check valves eliminate the possibility of condensate backing up through the steam trap into the system.
- A safety relief valve (SRV) is appropriate where applicable codes dictate their requirement, or anywhere protection of downstream piping and equipment from over-pressurization is desired. The SRV needs to handle the complete volume of steam from the regulator and bypass loop. Consult the factory for appropriate SRV sizing guidelines.

# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • Using Air-Loaded Pilot

Figure 6:



Pressure Reducing Station with Air-Loaded Pilot for Remote Installations  
(HD Regulator Applications)

# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • 2-Stage (Series) for High Pressure Turndown

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### PURPOSE:

For reducing steam system inlet pressure to a constant outlet pressure when the pressure drop exceeds the recommended operation of a single-stage pressure regulating valve (PRV). This will help reduce overall velocity, resulting in less noise and improved equipment service life.

### OPERATION:

The 1st stage PRV is selected to reduce the initial steam pressure to a reasonable pressure between the initial inlet and desired outlet delivery pressure. This intermediate pressure is typically selected to ensure that each PRV is within recommended turndown guidelines. However, it is also possible there will be a use for steam at a specific intermediate pressure, which must be considered when evaluating turndown and sizing guidelines. The 2nd stage PRV, installed in series with the 1st stage, then reduces pressure to the final outlet delivery pressure. Individual valve setting and operation is the same as for single-stage applications.

### INSTALLATION GUIDELINES:

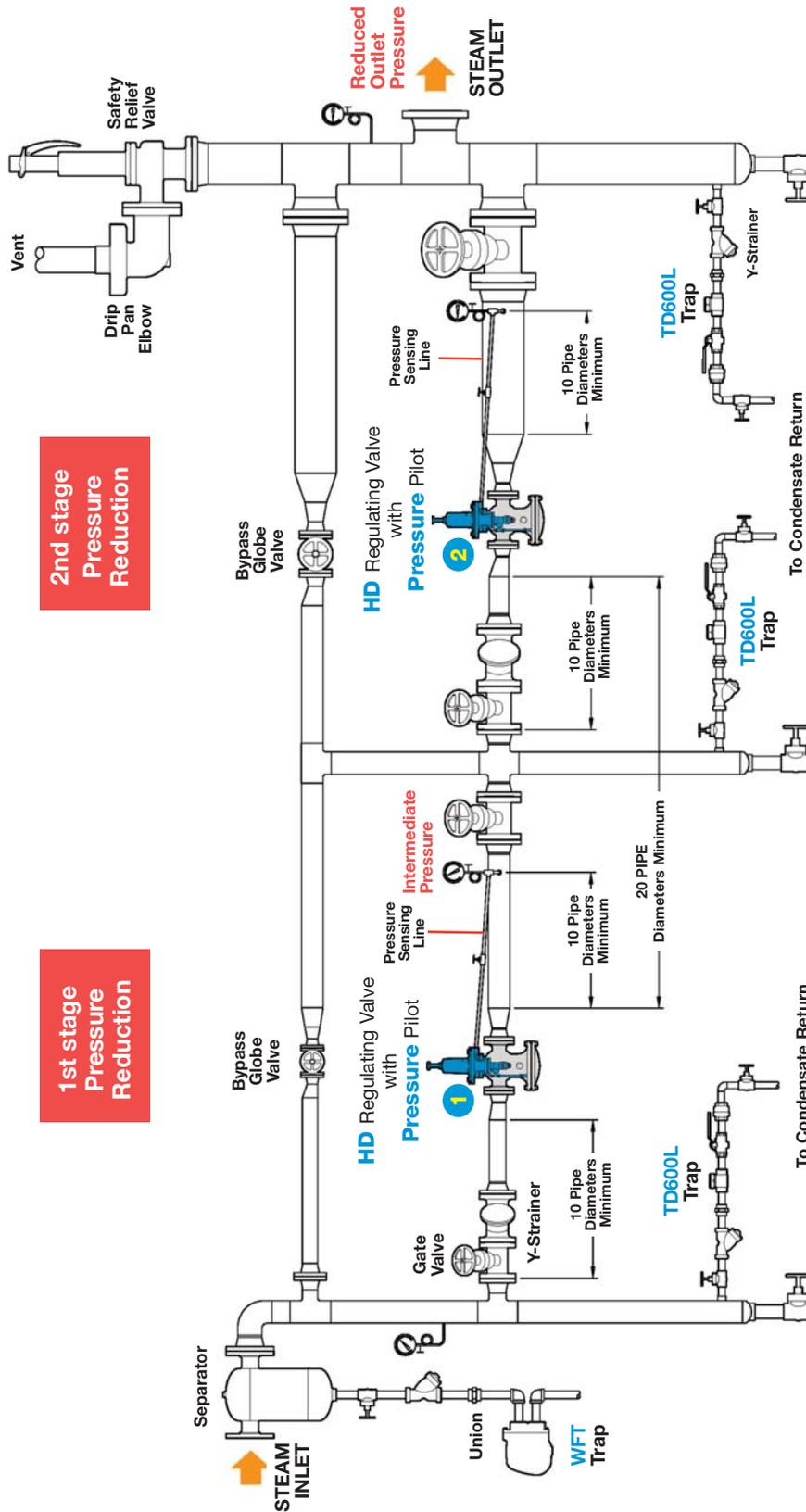
(see Figure 7)

- This example depicts a two-stage (series) pilot-operated steam PRV pressure reducing station using HD Regulators with Pressure Pilot. An external sensing line is required to sense downstream pressure from each regulator. The end of each sensing line is placed away from the turbulent flow at the valve outlet. This helps to improve accuracy of the set pressures. Set pressure for each PRV is adjusted by turning a screw on the pilot to increase or decrease compression on a balancing spring.
- For optimum operation and service life, maintain recommended minimum piping straight runs before and after the PRV. Inlet pipe diameters could be 1-2 sizes larger and outlet pipe diameters 2-3 sizes larger than the end connections of an appropriately sized PRV. The purpose of increasing the pipe size downstream of the regulator is to keep the steam velocity constant on both sides of the regulator.
- Each pressure sensing line should slope downwards, away from the regulator, to prevent condensate from entering the pilot.
- Eccentric reducers, if required, are used on valve inlets to prevent accumulation of condensate which could become entrained with high-velocity steam, possibly resulting in dangerous waterhammer.
- While the separator shown upstream is appropriate for protection of the PRVs, it is not always required, as a properly sized drip leg with steam trap may be sufficient. It is recommended for systems where steam is known to be “wet” and the entrained moisture could affect valve performance and/or result in component damage.
- Consider installing a properly sized bypass line with globe valve on each stage, to provide continuous operation should regulator maintenance be required.
- Consider low-cracking pressure (1/4 PSI opening pressure) check valves after steam traps when discharging into condensate return lines. Check valves eliminate the possibility of condensate backing up through the steam trap into the system.
- A safety relief valve (SRV) is appropriate where applicable codes dictate their requirement, or anywhere protection of downstream piping and equipment from over-pressurization is desired. The SRV needs to handle the complete volume of steam from the regulator and bypass loop. Consult the factory for appropriate SRV sizing guidelines.

# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • 2-Stage (Series) for High Pressure Turndown

Figure 7:



Two-Stage (Series) Pressure Reducing Station  
(HD Regulator Applications)

# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • Parallel for High Flow Turndown

### PURPOSE:

For reducing steam system inlet pressure to a constant outlet pressure when steam flow rates vary widely. This will help improve system rangeability resulting in more accurate control.

### OPERATION:

Because regulators are simple, self-powered devices which do not rely on an external control signal to determine valve steam position, they may not have the flow rangeability of control valves. Therefore, if a system has large flow variations (such as summer and winter loads), multiple regulators should be considered. Typically referred to as a 1/3 - 2/3 system, one valve may be sized for approximately 1/3 of the total maximum load demand and a larger valve for the remaining 2/3. When full load is required, both valves will be open and regulating. The small regulator is typically the primary valve and is set at a pressure 2 psi higher than the larger secondary valve. This allows the small regulator to be the only one flowing when demand is low. When flow increases and the small valve cannot keep up with the demand, the downstream pressure will begin to drop which will allow the larger secondary valve to open in order to help satisfy the demand. Although the smaller regulator is commonly selected as the primary valve, either the smaller or larger regulator may be set as the primary valve based on anticipated load demand requirements. The primary valve should always be set a minimum of 2 psi above the secondary valve.

### INSTALLATION GUIDELINES:

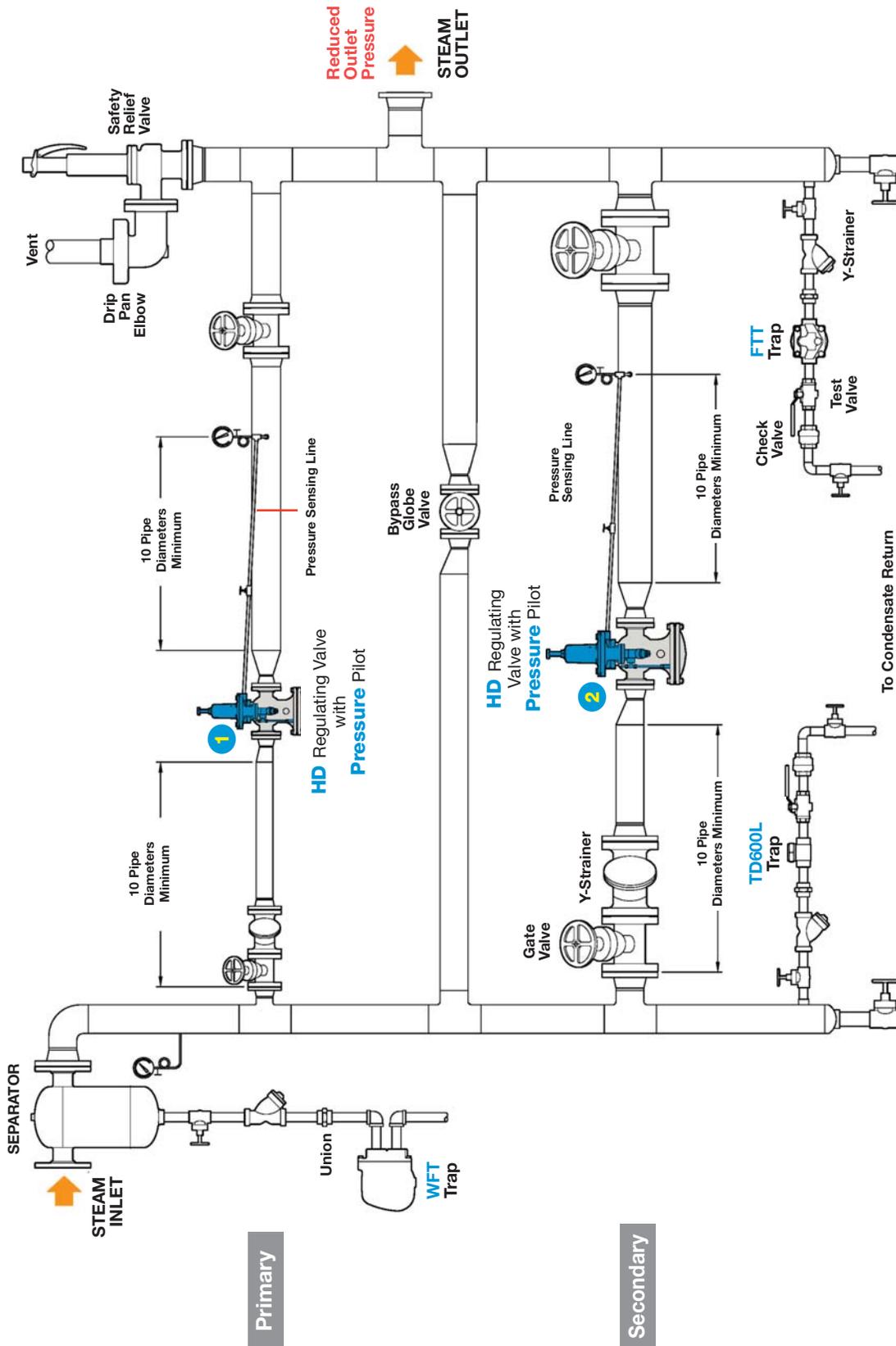
(see Figure 8)

- This example depicts a parallel pilot-operated steam PRV pressure reducing station using HD Regulators with Pressure Pilot. An external sensing line is required to sense downstream pressure from each regulator. The end of each sensing line is placed away from the turbulent flow at the valve outlet. This helps to improve accuracy of the set pressures. Set pressure for each PRV is adjusted by turning a screw on the pilot to increase or decrease compression on a balancing spring.
- Proper setting of the valves is key to proper operation. The chosen primary valve should be set at a pressure approximately 2 PSI higher than that of the secondary valve.
- For optimum operation and service life, maintain recommended minimum piping straight runs before and after the PRV. Inlet pipe diameters could be 1-2 sizes larger and outlet pipe diameters 2-3 sizes larger than the end connections of an appropriately sized PRV. The purpose of increasing the pipe size downstream of the regulator is to keep the steam velocity constant on both sides of the regulator.
- Each pressure sensing line should slope downwards, away from the regulator, to prevent condensate from entering the pilot.
- Eccentric reducers, if required, are used on valve inlets to prevent accumulation of condensate which could become entrained with high-velocity steam, possibly resulting in dangerous waterhammer.
- While the separator shown upstream is appropriate for protection of the PRV, it is not always required, as a properly sized drip leg with steam trap may be sufficient. It is recommended for systems where steam is known to be "wet" and the entrained moisture could affect valve performance and/or result in component damage.
- Consider installing a properly sized bypass line with globe valve to provide continuous operation should regulator maintenance be required.
- Consider low-cracking pressure (1/4 PSI opening pressure) check valves after steam traps when discharging into condensate return lines. Check valves eliminate the possibility of condensate backing up through the steam trap into the system.
- A safety relief valve (SRV) is appropriate where applicable codes dictate their requirement, or anywhere protection of downstream piping and equipment from over-pressurization is desired. The SRV needs to handle the complete volume of steam from the regulator and bypass loop. Consult the factory for appropriate SRV sizing guidelines.

# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • Parallel for High Flow Turndown

Figure 8:



PARALLEL Pressure Reducing Station  
(HD Regulator Applications)

# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • for Combination High Pressure & High Flow Turndown

### PURPOSE:

For reducing steam system inlet pressure to a constant outlet pressure when flow conditions vary widely combined with a high pressure drop (i.e. higher than the recommended range of a single-stage regulator).

### OPERATION:

This system is a combination of Two-Stage (Series) and Parallel pressure reducing stations and operates based on the individual principles of each system. Each series of valves will be sized to handle a portion of the total maximum load demand, typically 1/3 and 2/3 of the total anticipated flow. If the smaller series of valves is determined to operate as the primary, then the 2nd stage valve will be set 2 psi higher than the 2nd stage valve in the secondary series. This allows the primary series to be the only one flowing when demand is low. When flow increases and the primary series cannot keep up with demand, the downstream pressure will begin to drop which will allow the larger secondary series of valves to open in order to help satisfy the demand.

### INSTALLATION GUIDELINES:

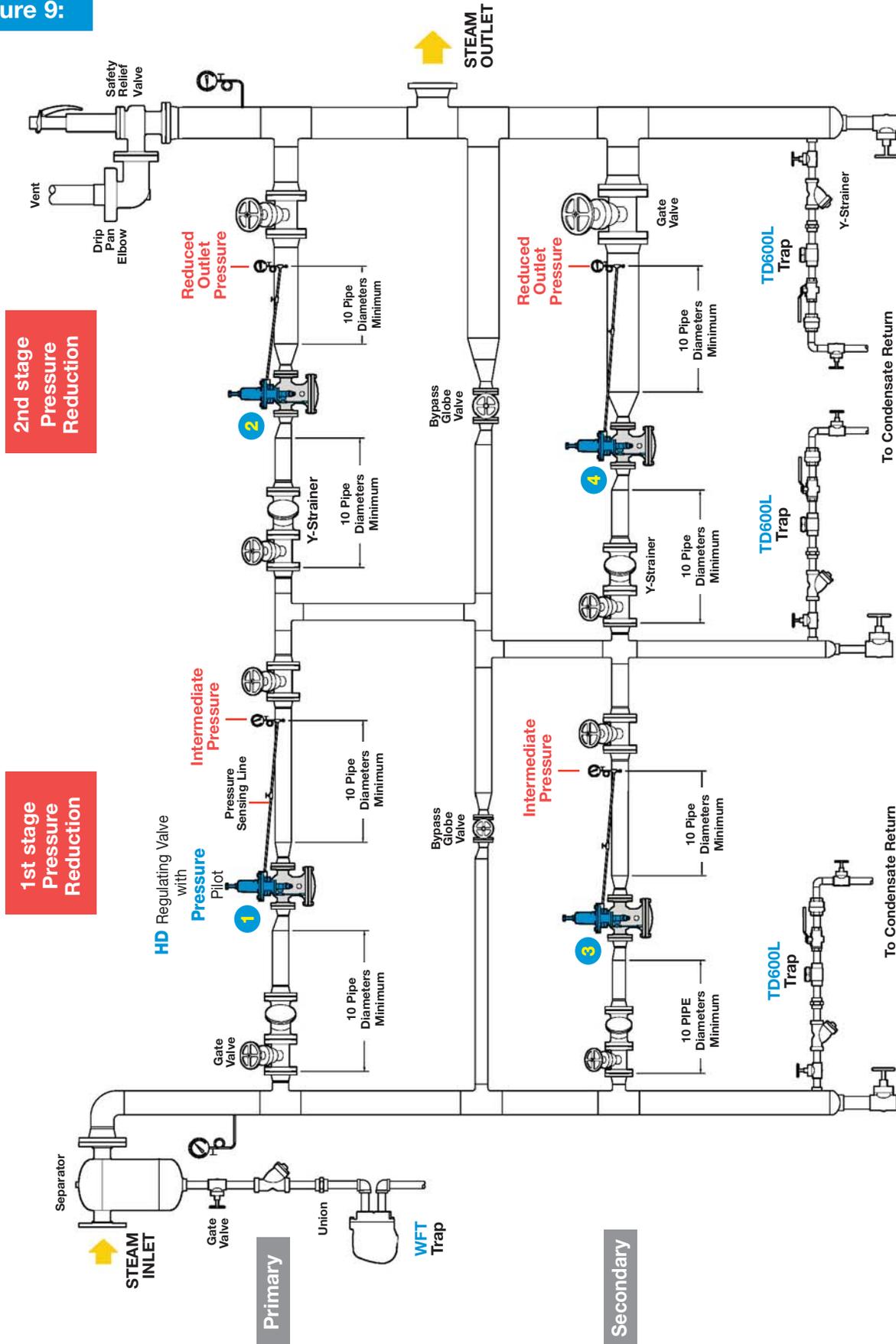
(see Figure 9)

- This example depicts a two-stage parallel pilot-operated steam PRV pressure reducing station using HD Regulators with Pressure Pilot. An external sensing line is required to sense downstream pressure from each regulator. The end of each sensing line is placed away from the turbulent flow at the valve outlet. This helps to improve accuracy of the set pressures. Set pressure for each PRV is adjusted by turning a screw on the pilot to increase or decrease compression on a balancing spring.
- Proper setting of the valves is key to proper operation. The chosen 1st stage primary valve should be set at a pressure approximately 2 PSI higher than that of the 1st stage secondary valve.
- For optimum operation and service life, maintain recommended minimum piping straight runs before and after the PRV. Inlet pipe diameters could be 1-2 sizes larger and outlet pipe diameters 2-3 sizes larger than the end connections of an appropriately sized PRV. The purpose of increasing the pipe size downstream of the regulator is to keep the steam velocity constant on both sides of the regulator.
- Each pressure sensing line should slope downwards, away from the regulator, to prevent condensate from entering the pilot.
- Eccentric reducers, if required, are used on valve inlets to prevent accumulation of condensate which could become entrained with high-velocity steam, possibly resulting in dangerous waterhammer.
- While the separator shown upstream is appropriate for protection of the PRVs, it is not always required, as a properly sized drip leg with steam trap may be sufficient. It is recommended for systems where steam is known to be "wet" and the entrained moisture could affect valve performance and/or result in component damage.
- Consider installing a properly sized bypass line with globe valve on each stage, to provide continuous operation should regulator maintenance be required.
- Consider low-cracking pressure (1/4 PSI opening pressure) check valves after steam traps when discharging into condensate return lines. Check valves eliminate the possibility of condensate backing up through the steam trap into the system.
- A safety relief valve (SRV) is appropriate where applicable codes dictate their requirement, or anywhere protection of downstream piping and equipment from over-pressurization is desired. The SRV needs to handle the complete volume of steam from the regulator and bypass loops. Consult the factory for appropriate SRV sizing guidelines.

# REGULATING VALVE APPLICATIONS

## PRESSURE REDUCING STATION • for Combination High Pressure & High Flow Turndown

Figure 9:



### TWO-STAGE PARALLEL Pressure Reducing Station (HD Regulator Applications)

# REGULATING VALVE APPLICATIONS

## TEMPERATURE CONTROL • of Heat Exchanger with Pressure Limiting Pilot

### PURPOSE:

For accurately controlling both temperature of a product being heated in heat transfer equipment as well as limiting the pressure of the incoming steam, providing optimum heat transfer characteristics.

### OPERATION:

When a pilot-operated HD valve is selected, a single valve can be used for both pressure and temperature control when equipped with a PP-Pilot and PT-Pilot. As temperature at the sensing bulb falls below set point, the valve begins to modulate open to supply steam for heating. Supply pressure to the heat exchanger is then limited by adjusting the pressure pilot to the recommended value for optimum heat transfer and/or a limiting pressure of the heat transfer equipment. The HD Regulator with combination PT & PP Pilots requires no external power source.

### INSTALLATION GUIDELINES:

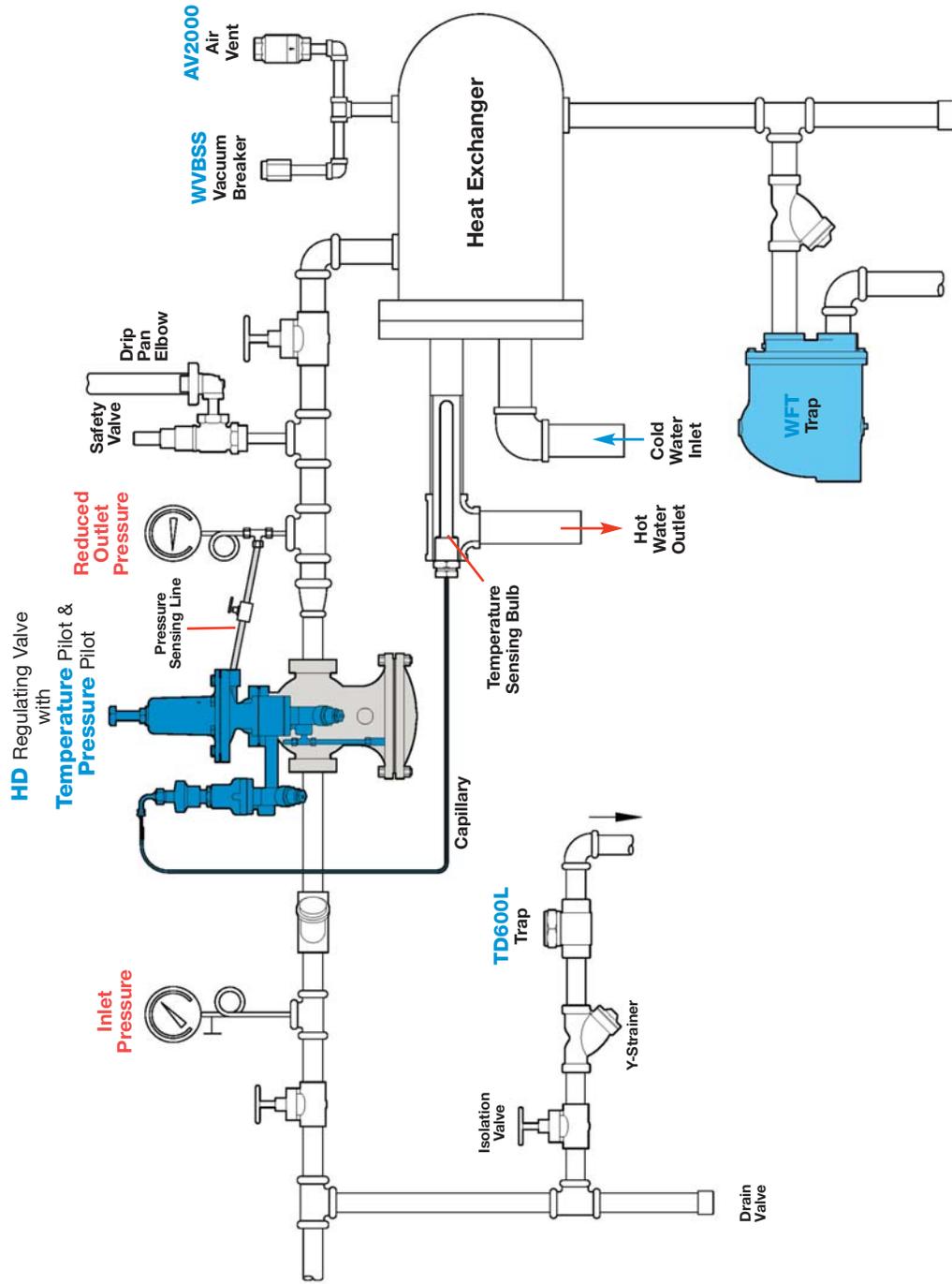
(see Figure 10)

- The temperature and pressure pilots should be set individually, starting slowly and gradually with the PT-pilot.
- <sup>1</sup> Care should be given to the installation of the temperature sensing bulb to ensure full immersion in the liquid. The sensing bulb should be placed as close as possible to the heat exchanger vessel to ensure accurate temperature control of the process fluid.
- For optimum operation and service life, maintain recommended minimum piping straight runs before and after the Regulator. Inlet pipe diameters could be 1-2 sizes larger and outlet pipe diameters 2-3 sizes larger than the end connections of an appropriately sized Regulator. The purpose of increasing the pipe size downstream of the regulator is to keep the steam velocity constant on both sides of the regulator.
- The pressure sensing line should slope downwards, away from the regulator, to prevent condensate from entering the pilot.
- Eccentric reducers, if required, are used on valve inlets to prevent accumulation of condensate which could become entrained with high-velocity steam, possibly resulting in dangerous waterhammer.
- While a separator is appropriate for protection of the Regulator, it is not always required, as a properly sized drip leg with steam trap may be sufficient. It is recommended for systems where steam is known to be “wet” and the entrained moisture could affect valve performance and/or result in component damage.
- Consider low-cracking pressure (1/4 PSI opening pressure) check valves after steam traps when discharging into condensate return lines. Check valves eliminate the possibility of condensate backing up through the steam trap into the system.
- The vacuum breaker and auxiliary air vent located at the top of the heat exchanger vessel promotes proper drainage and optimum heat transfer. The vacuum breaker allows system equalization with atmospheric air to allow gravity condensate drainage when vacuum is formed from condensing steam. The air vent improves heat-up times and overall heat transfer by expelling accumulated air on start-up.
- A safety relief valve (SRV) is appropriate where applicable codes dictate their requirement, or anywhere protection of downstream piping and equipment from over-pressurization is desired. Consult the factory for appropriate SRV sizing guidelines.

# REGULATING VALVE APPLICATIONS

## TEMPERATURE CONTROL • of Heat Exchanger with Pressure Limiting Pilot

Figure 10:



Temperature Control of a Heat Exchanger with Pressure Limiting (HD Regulator Applications)

# REGULATING VALVE APPLICATIONS

## TEMPERATURE CONTROL

### of a BATCH PROCESS with Electrical Time Sequence Programmer (Solenoid Pilot)

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#### PURPOSE:

For accurately controlling temperature of a batch process where on-off operation is to be electronically controlled.

#### OPERATION:

Operation is similar to that of the pressure and temperature combination pilot-operated regulator whereby the temperature (PT) pilot senses the temperature of the heated product (e.g. water) and appropriately modulates the flow of steam. Pressure is limited by the pressure (PP) pilot. The solenoid valve (PS-pilot) is electronically activated to control on-off operation of the batch process.

#### INSTALLATION GUIDELINES:

(see Figure 11)

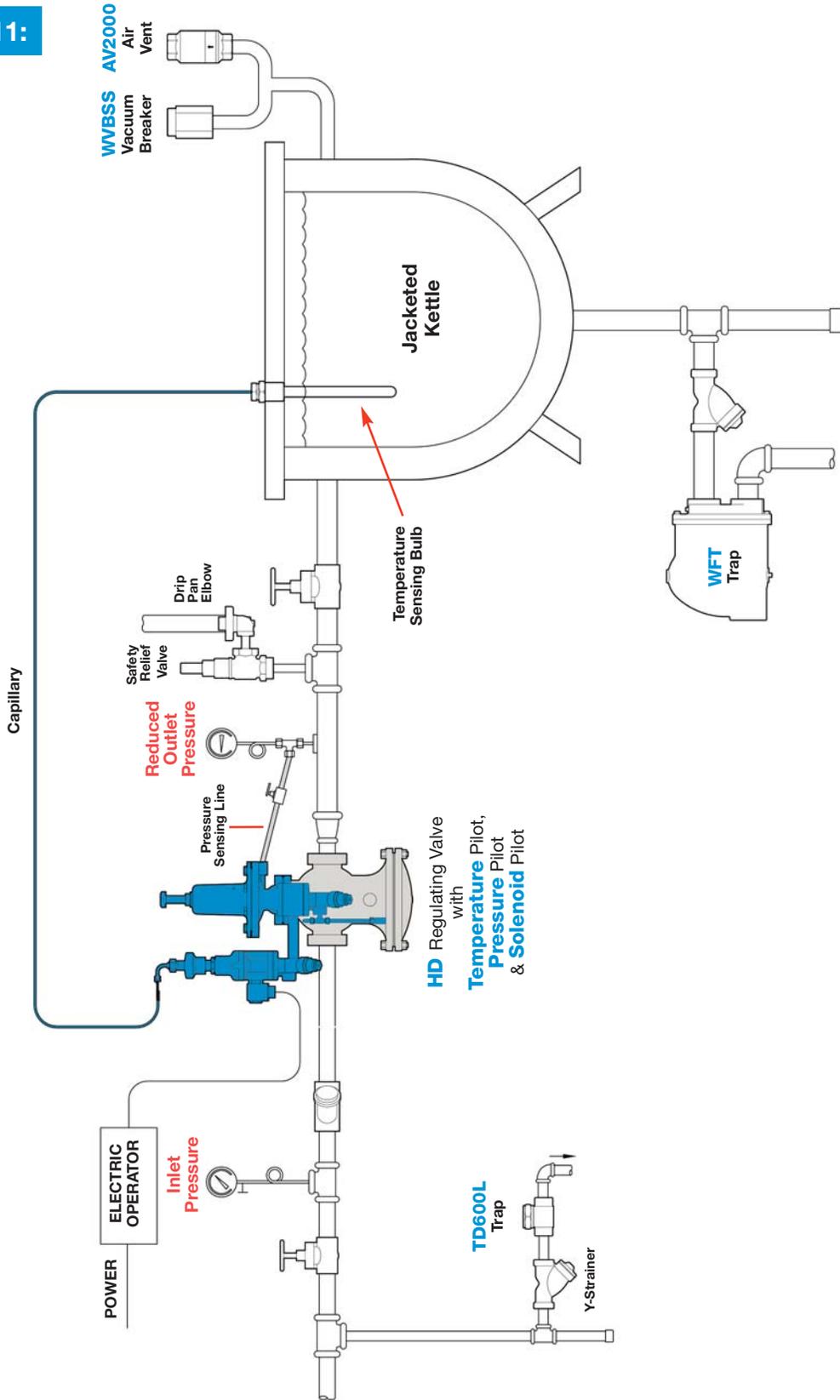
- The temperature and pressure pilots should be set individually, starting slowly and gradually with the PT-pilot.
- For optimum operation and service life, maintain recommended minimum piping straight runs before and after the PRV. Inlet pipe diameters could be 1-2 sizes larger and outlet pipe diameters 2-3 sizes larger than the end connections of an appropriately sized Regulator. The purpose of increasing the pipe size downstream of the regulator is to keep the steam velocity constant on both sides of the regulator.
- The pressure sensing line should slope downwards, away from the regulator, to prevent condensate from entering the pilot.
- Eccentric reducers, if required, are used on valve inlets to prevent accumulation of condensate which could become entrained with high-velocity steam, possibly resulting in dangerous waterhammer.
- While a separator is appropriate for protection of the Regulator, it is not always required, as a properly sized drip leg with steam trap may be sufficient. It is recommended for systems where steam is known to be "wet" and the entrained moisture could affect valve performance and/or result in component damage.
- Consider low-cracking pressure (1/4 PSI opening pressure) check valves after steam traps when discharging into condensate return lines. Check valves eliminate the possibility of condensate backing up through the steam trap into the system.
- The vacuum breaker and auxiliary air vent located at the top of the jacketed kettle vessel promotes proper drainage and optimum heat transfer. The vacuum breaker allows system equalization with atmospheric air to allow gravity condensate drainage when vacuum is formed from condensing steam. The air vent improves heat-up times and overall heat transfer by expelling accumulated air on start-up.
- A safety relief valve (SRV) is appropriate where applicable codes dictate their requirement, or anywhere protection of downstream piping and equipment from over-pressurization is desired. Consult the factory for appropriate SRV sizing guidelines.

# REGULATING VALVE APPLICATIONS

## TEMPERATURE CONTROL

of a BATCH PROCESS with Electrical Time Sequence Programmer (Solenoid Pilot)

Figure 11:



AUTOMATIC TEMPERATURE CONTROL of a BATCH PROCESS with Electrical Time Sequence Programmer (Solenoid Pilot)  
(HD Regulator Applications)

# REGULATING VALVE APPLICATIONS

## TEMPERATURE CONTROL of a SEMI-INSTANTANEOUS HEATER using a Self-Contained Temperature Regulating Valve

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### PURPOSE:

For accurate control of the temperature of a product being heated when the benefits of a self-contained regulator are required.

### OPERATION:

A self-contained temperature regulating valve (TRV) such as the W94, offers response times and characteristics suitable for semi-instantaneous heating applications. The temperature sensing bulb senses the temperature of the liquid being heated and allows modulation of the valve for appropriate supply of steam.

### INSTALLATION GUIDELINES:

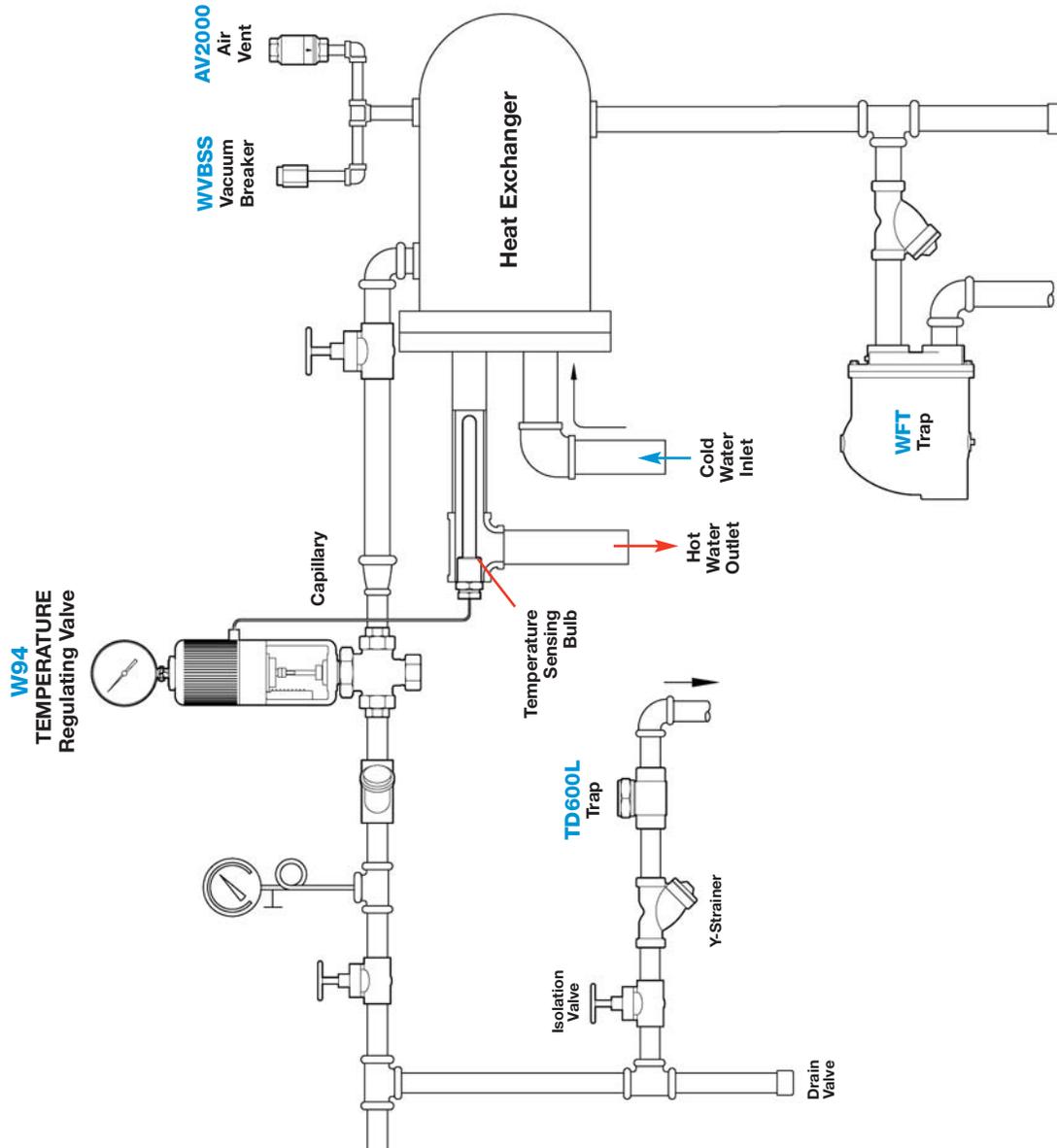
(see Figure 12)

- Care should be given to the installation of the temperature sensing bulb to ensure full immersion in the liquid. The sensing bulb should be placed as close as possible to the heater tank to ensure accurate temperature control of the process fluid.
- All pressure sensing lines should slope downwards, away from the regulator, to prevent condensate from entering the pilot.
- Eccentric reducers, if required, are used on valve inlets to prevent accumulation of condensate which could become entrained with high-velocity steam, possibly resulting in dangerous waterhammer.
- While a separator is appropriate for protection of the Regulator, it is not always required, as a properly sized drip leg with steam trap may be sufficient. It is recommended for systems where steam is known to be “wet” and the entrained moisture could affect valve performance and/or result in component damage.
- Consider low-cracking pressure (1/4 PSI opening pressure) check valves after steam traps when discharging into condensate return lines. Check valves eliminate the possibility of condensate backing up through the steam trap into the system.
- The vacuum breaker and auxiliary air vent located at the top of the heater tank promotes proper drainage and optimum heat transfer. The vacuum breaker allows system equalization with atmospheric air to allow gravity condensate drainage when vacuum is formed from condensing steam. The air vent improves heat-up times and overall heat transfer by expelling accumulated air on start-up.
- A safety relief valve (SRV) is appropriate where applicable codes dictate their requirement, or anywhere protection of downstream piping and equipment from over-pressurization is desired. The SRV needs to handle the complete volume of steam from the regulator and bypass loop. Consult the factory for appropriate SRV sizing guidelines.

# REGULATING VALVE APPLICATIONS

## TEMPERATURE CONTROL of a SEMI-INSTANTANEOUS HEATER using a Self-Contained Temperature Regulating Valve

Figure 12:



Semi-Instantaneous Hot Water Heater with W94 Temperature Regulator  
(Temperature Regulator Applications)