Installation and Operations Manual

Diaphragm Sensed Gas Pressure Reducing Regulators

Caution: The customer is entirely responsible for product selection and it should be based upon the customer's own analysis regardless of any recommendations, published or communicated, by Pure T. Products must also be installed, operated and maintained correctly for safe, problem free usage.

General Information

This document applies to all Pure T diaphragm sensed gas pressure regulators. Refer to the specific data sheet for the complete product information.

Terms used in this document

Source pressure: gas applied to the high-pressure side of the regulator, also called inlet pressure.

Delivery pressure: the gas pressure on the outlet side of the regulator, also called outlet pressure, downstream pressure, control pressure.

Regulator: Pressure reducing regulator.

SPE: supply pressure effect. The change in outlet pressure caused by changes in the source pressure.

Product Selection

Before installing the regulator, the following must be confirmed:

1. Materials of construction are compatible with the application process gas.
2. Regulator specifications are appropriate for the application requirements.
3. If accessories, such as pressure gauges, are installed on the regulator, confirm the accessories meet the application requirements, including pressure rise above outlet rating due to SPE.

Product Installation

 Caution: A regulator should not be used as a shut off device. Proper valves should be used for shutoff.

1. Confirm the pressure ratings and specifications of the regulator meet application requirements.
    a. If the regulator is installed with gauges, confirm the gauges are above the application pressures. If an outlet pressure gauge is installed on the regulator, confirm the gauge pressure range is large enough for both the delivery pressure set point and delivery pressure change caused by SPE.
2. Inspect the regulator to determine the proper installation and flow direction.
    a. The source (inlet) port(s) has a HP mark near the high-pressure, source port.
    b. The low pressure (outlet) port(s) has an LP marking near the low-pressure port(s).
    c. Only connect the source gas to high pressure (HP) port and outlet side to low pressure (LP) ports.

 Connecting the source gas to the delivery pressure port can damage the regulator and leakage may result.

3. Based upon the connection type that has been selected, install the regulator per one of the appropriate methods stated below.
    a. Tube stubs or tube extensions: weld gas system components to regulator per industry standard practices (refer to Semi standard F78).
    b. Face seal connections: assemble and tighten connection per fitting manufacturer's recommendations.
    c. NPT and BSPT connections: Apply an application compatible thread sealant, such as Teflon tape prior to threading connections together and tightening per industry standards.
    d. Compression fittings: assemble and tighten fittings per fitting manufacturer's recommendations.
4. Regulator mounting: Regulators generally have mounting holes on the bottom of the body for mounting, refer to product data sheet for details.

If installing regulator with the panel mount option, refer to the regulator panel mount instructions posted to the PureT website.

5. Leak testing: after installation an industry standard leak test is recommended to test the connections. Typical industry standard leak tests are an inboard or outboard helium leak test, pressure decay test or a bubble leak test. It is recommended that you select the proper leak test based upon requirements.

Pressure Reducing Regulator Operation

1. **Preset Regulators**: preset regulators are adjusted at the factory to deliver a specific outlet pressure at a specific source pressure in a static, no flow condition. The preset pressures are specified by the customer when ordering the regulator.
    a. If a preset regulator must be adjusted, please refer to the PureT website for adjustment instructions.
2. **Manually Adjustable Regulators:**
    a.  Caution: do not rotate the wheel counterclockwise with delivery pressure trapped and no flow. Locking delivery pressure in the regulator can cause damage to the regulator and leakage may result.
    b.  Caution: pressurize the regulator outlet only by clockwise rotation of the wheel. Pressurizing the outlet by other means can cause damage to the regulator and leakage may result.
    c. Follow the following steps for proper regulator operation.
        i. Before applying source pressure confirm the wheel to fully counterclockwise.
        ii. Slowly open the source pressure valve to pressurize the regulator high pressure port.
        iii. Rotate the wheel clockwise to increase the delivery pressure to the desired setpoint.
        iv. To reduce the delivery pressure setpoint follow the following steps.
            1. Open downstream valve to allow flow through the regulator.
            2. Adjust wheel counterclockwise until flowing setpoint is below desired setpoint.

3. Close downstream valve.
4. Rotate wheel clockwise until new setpoint is achieved.

d. Follow the following steps to properly close the regulator.
   i. Close source valve.
   ii. Open downstream valve and vent delivery pressure to zero.
   iii. Turn wheel fully counterclockwise.

3. Pneumatic Actuated Regulator Operation

a.  Caution: do not reduce the actuation pressure with an outlet pressure set point and no flow. Locking delivery pressure in the regulator can cause damage to the regulator and leakage may result.

b.  Caution: pressurize the regulator outlet only by slowly applying actuation pressure. Pressurizing the outlet by other means can cause damage to the regulator and leakage may result.

c. Follow the following steps for proper regulator operation.
   i. Before opening source valve confirm that there is no pneumatic control pressure to the regulator actuator.
   ii. Slowly open the source pressure valve to pressurize the regulator high pressure port.
   iii. Slowly apply pneumatic pressure until desired delivery pressure set point is achieved.
   iv. To reduce the delivery pressure setpoint follow the following steps.
      1. Open downstream valve to allow flow through the regulator.
      2. Reduce pneumatic pressure until flowing setpoint is below desired setpoint.
      3. Close downstream valve.
      4. Slowly increase pneumatic pressure until new setpoint is achieved.
   v. Follow the following steps to properly close the regulator.
      1. Close source valve.
      2. Open downstream valve and vent delivery pressure to zero.
      3. Vent pneumatic pressure to zero.

4. **Static and Dynamic pressure adjustment**
    i. Regulator outlet pressure set point can be adjusted statically, with no flow, or dynamically with flow, per adjustment procedures stated above.
    ii. Adjusting statically will result in a pressure decrease with flow due to droop.
    iii. Adjusting dynamically will result is a pressure increase as flow stops due to droop.