

CONOFLOW HIGH-PRESSURE REGULATOR - HP700 Two Stage Diaphragm Type - High Purity



OPTIONS

Mounting

Line - All variations
Panel Mounting - No panel mounting nuts
Panel Mounting - 2 nuts - Optional

Adjustments

Handwheel (Large)
Knob (Wrench style - with locking device) - Optional
"T" Bar Handle - Optional

Cylinder connections

CGA cylinder connections are available

Gauges

2" and 2-1/2" diameters
Brass, steel and stainless steel construction

HP700 Control Kit:

83700-11 thru 18 - For control setting range 4-25 PSIG (0.03-0.173 MPa)
83701-11 thru 18 - For control setting range 4-50 PSIG (0.03-0.345 MPa)
83702-11 thru 18 - For control setting range 5-100 PSIG (0.04-0.690 MPa)
83703-11 thru 18 - For control setting range 5-150 PSIG (0.04-1.040 MPa)
83704-11 thru 18 - For control setting range 6-250 PSIG (0.04-1.730 MPa)

HP700 Maintenance Kit:

80700-11 thru 18 - For all control setting ranges

HP700 Overhaul Kit:

81700-11 thru 18 - For all control setting ranges

FEATURE SUMMARY

Maximum rated inlet 3500 PSIG (24.2 MPa)
6000 PSIG (41.40 MPa) inlet pressure available
Captured bonnets (Standard)
Leak rate 2×10^{-8} atm cc/sec helium
Brass and stainless steel construction
Optional - VCR, Vacuseal and Ultra Seal welded fittings or high purity internal connections
Control pressure ranges: 4-25, 4-50, 5-100, 5-150, and 6-250 PSIG (0.03-0.173, 0.03-0.345, 0.04-0.690, 0.04-1.04, and 0.04-1.73 MPa)
In-line mounting is standard. Panel mounting hardware is optional.
CGA cylinder connections available.

DIMENSIONAL DATA - ADVERTISING DRAWINGS:

HP700-C1: Standard Unit (Large Handwheel)
HP700-C2: "T" Bar Handle
HP700-C3: Wrench Knob with Locking Device

Conoflow's HP700 Series regulator is a two-stage, high purity unit designed to provide constant outlet pressure regardless of inlet pressure fluctuations. This unit is available in either brass or stainless steel construction. Maximum supply pressure rating for either material is 3500 PSIG (24.2 MPa). To provide optimum performance in specific applications, this unit is offered with relieving, non-relieving, and tied (non-relieving) diaphragm options.

Typical applications for the HP700 regulator are gas chromatography, calibration systems, cylinder gases, and precise regulation of corrosive and non-corrosive media. Adjustment within each of five available ranges is made with a standard large handwheel. A wrench style knob with a locking device and a "T" bar handle are available as optional adjustments.

This unit is supplied with 1/4" inlet and outlet connections. Inlet and outlet gauge ports (1/4" NPT) are standard. High purity internal connections and VCR, Vacuseal and Ultra Seal welded fittings are optional.

Captured bonnets for both stages are standard.

This regulator is designed for reliability with an absolute minimum of maintenance. The characteristics are a result of Conoflow's high standards of manufacturing and years of experience as a leading manufacturer of pneumatic instrumentation.

PRINCIPLE OF OPERATION

The HP700 is a self-contained, spring-loaded, two-stage, pressure reducing regulator. Turning the control knob clockwise will increase the force on the second stage range spring and in turn increase the outlet set pressure. Conversely, turning the control knob counterclockwise will decrease the force on the second stage range spring and in turn decrease the outlet set pressure. In equilibrium, the force exerted by the second stage range spring is balanced by the outlet pressure acting on the second stage diaphragm.

Non-relieving (Tied/Non-relieving)

An unbalance between the outlet pressure and the outlet set pressure will cause corresponding reaction in the diaphragm and valves. If the outlet pressure rises above the set pressure, the second stage diaphragm will lift, allowing the second stage main valve plug to seat. When the second stage main valve plug seats, the interstage pressure will equal the first stage set pressure and the first stage main valve plug will also seat. *When the outlet pressure reaches the set point of the regulator, the diaphragm will rise and the valve will close. When the outlet pressure is above the set point, the diaphragm will be restrained by the main valve and will pull the valve closed against the seat.*

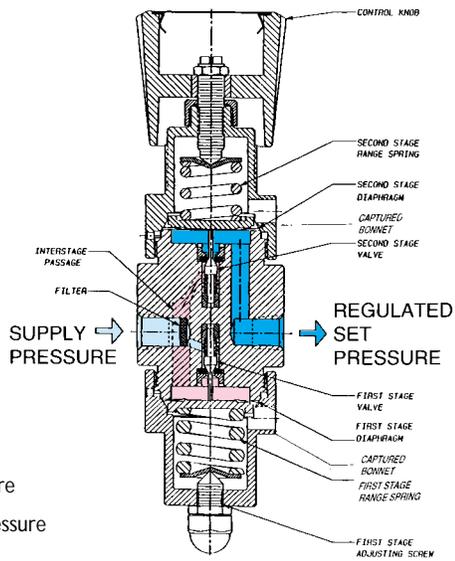
Relieving

An unbalance between the outlet pressure and the outlet set pressure will cause corresponding reaction in the diaphragm and valves. If the outlet pressure rises above the set pressure, the second stage diaphragm will lift, allowing the second stage main valve plug to seat. When the second stage main valve plug seats, the interstage pressure will equal the first stage set pressure and the first stage main valve plug will also seat. *When the outlet pressure is above the set point, the diaphragm will lift, opening the relief valve, and vent the excess outlet pressure into the bonnet.*

If the outlet pressure falls below the outlet set pressure, the force of the range spring will overcome the outlet pressure acting on the second stage diaphragm, allowing the second stage diaphragm to move down and open the second stage valve. When the second stage valve opens, the interstage pressure falls below the first stage set pressure. The unbalance in the first stage allows the first stage diaphragm to move down and unseat the first stage valve plug.

In equilibrium, both the first stage and second stage diaphragms and valve plugs assume positions which will supply the required flow while maintaining the set pressure.

HP700 Series - Non-Relieving Diaphragm



SPECIFICATIONS

- Maximum Supply Pressure:** 3500 PSIG (24.2 MPa)
6000 PSIG (41.40 MPa) available, refer to Control Engineering Data
- Control Setting Ranges:**
 - 4 - 25 PSIG (0.03 - 0.173 MPa)
 - 4 - 50 PSIG (0.03 - 0.345 MPa)
 - 5 - 100 PSIG (0.04 - 0.690 MPa)
 - 5 - 150 PSIG (0.04 - 1.04 MPa)
 - 6 - 250 PSIG (0.04 - 1.73 MPa)
- Proof Pressure:** 150% maximum operating
- Burst Pressure:** 400% maximum operating
- Flow Capacity:** $C_v - 0.14$ (See Flow Graph)
Orifice Diameter: 0.110" (Both Stages)
- Supply Pressure Effect:** 0.03 PSIG (0.0002 MPa) decrease for a 100 PSIG (0.690 MPa) supply decrease
- Operating and Fluid Temperature Range:** -40°F to +165°F (-40°C to +74°C)
- Leakage:** 2×10^{-8} atm cc/sec helium (In Board and Main Valve)
- Maximum Operating Torque:** 35 in-lbs. (40.3 Kg-cm)
30 in-lbs. (34.5 Kg-cm) for brass model
- Ports:** 1/4" NPTF supply and outlet. 1/4" gauge ports (80°). Other porting sizes and configurations available.
- Weight (Without gauges):** 3.25 lbs. (1.5 Kg)

MATERIALS OF CONSTRUCTION

- Body:** Brass/316 SS/316LSS/N.A.C.E 316SS
- Bonnet:** Brass/Plated Brass
- Main Valve Seat:** Kel-F/Teflon (All Kel-F design optional)
- Diaphragm and Trim:** 316 Stainless Steel/Elgiloy - N.A.C.E.
- Inner Friction Bushings:** PFA Teflon
- Filter:** 316SS Screen (120 mesh)

OXYGEN SERVICE

Specification of materials in regulators used for oxygen service is the **user's responsibility**. Cleaning for oxygen service (Per ES8A 01 297) to 3500 PSIG (24.20 MPa) is supplied by ITT Conoflow at no additional cost. Special cleaning may be performed to the user's specifications at an additional cost through an outside source.

HIGH PURITY INTERNAL CONNECTIONS

Available at additional cost. ITT Conoflow High Purity Internal Connections are machined into the regulator body to accommodate 1/4" Vacuseal, VCR, Ultra Seal or equivalent male vacuum fittings (fittings supplied by the customer).

WELDED FITTINGS

Available at additional cost. Straight tubing, 90° elbows, Vacuseal, VCR, Ultra Seal or equivalent compatible fittings are available butt welded in the regulator body (ITT Conoflow to provide fitting).

ELECTRONIC GRADE CLEANING

Available at additional cost. ITT Conoflow will perform electronic grade cleaning to customer supplied specifications. Cost will be advised prior to performing cleaning.

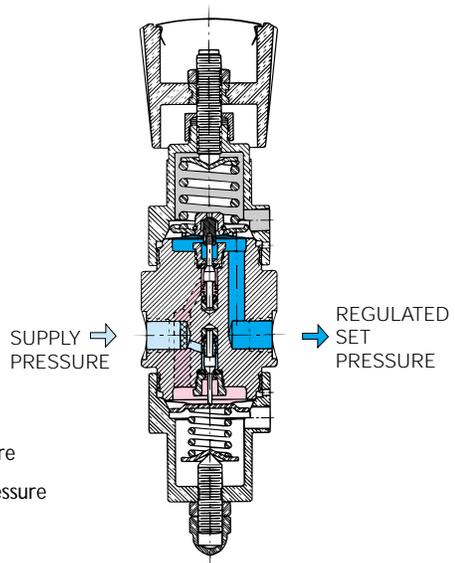
LEAK RATE CERTIFICATION (ES8A 01 295)

Available at additional cost. ITT Conoflow will certify a leak rate to 2×10^{-8} atm cc/sec of helium.

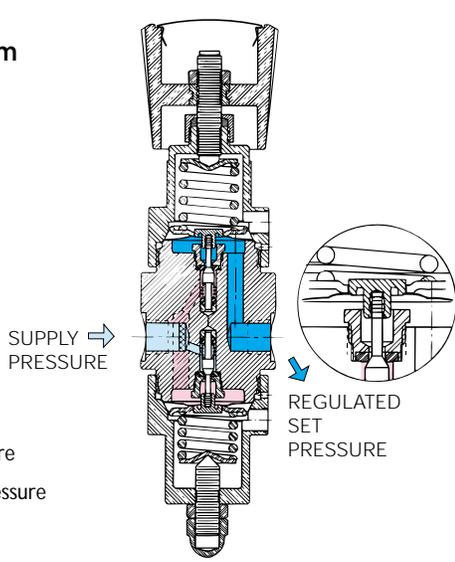
INTERNAL SURFACE FINISH

Available at additional cost. ITT Conoflow can provide an internal surface finish, on wetted components, of 15 Ra microinch. Other surface finishes available, consult the factory.

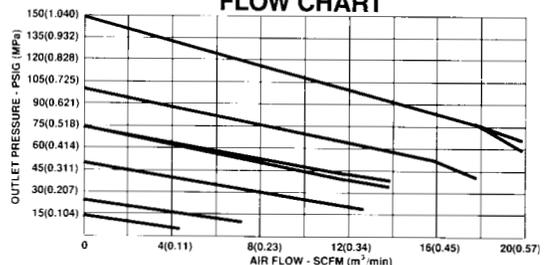
HP700 Series - Relieving Diaphragm

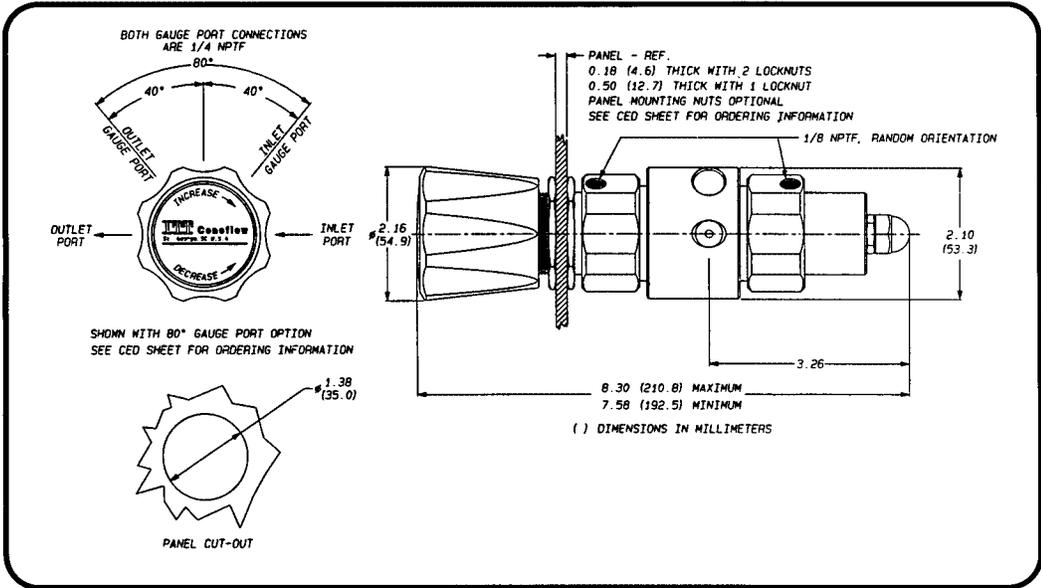


HP710 Series - Tied Diaphragm Non-Relieving

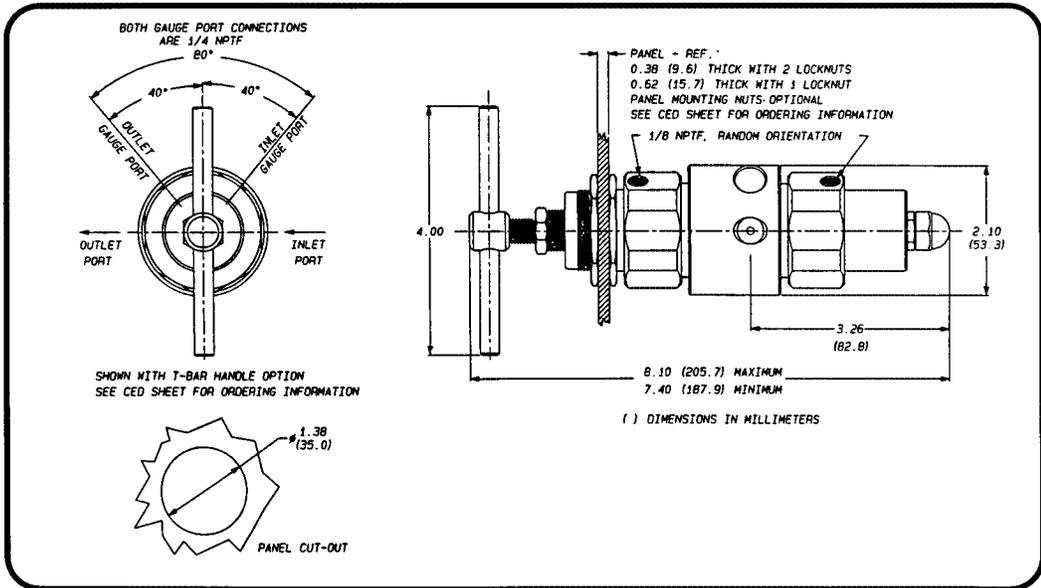


FLOW CHART

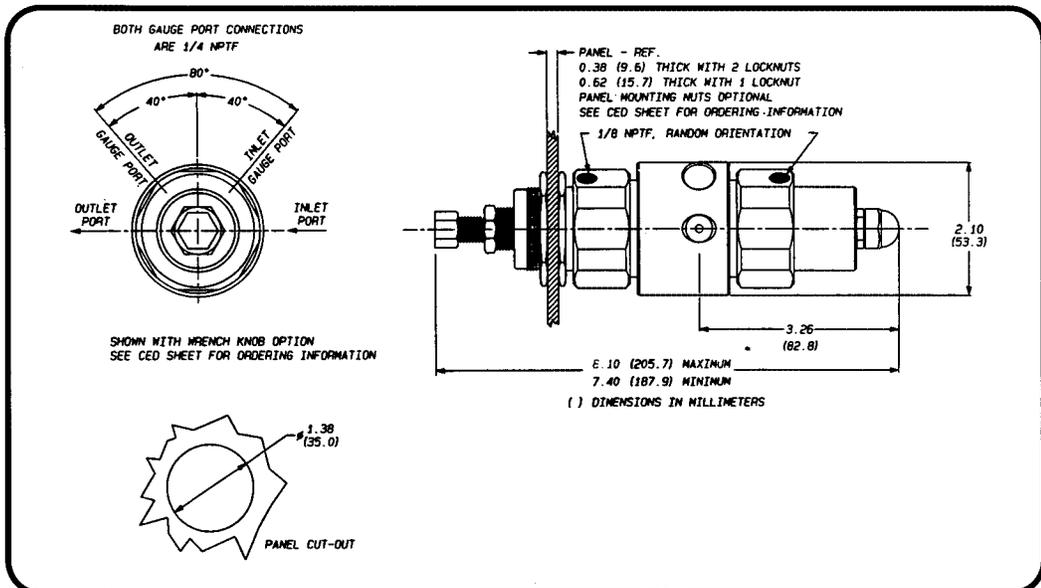




For certified dimensional drawing, refer to HP700-C1.



For certified dimensional drawing, refer to HP700-C2.



For certified dimensional drawing, refer to HP700-C3.