CONOFLOW HIGH-PRESSURE REGULATOR - HP600

Pressure Reducing
Tied Diaphragm Type - High Purity

The HP600 High Purity model is a self-contained, pressure reducing regulator which incorporates a tied diaphragm design.

This style of mechanical link between the diaphragm and main valve assists in preventing pressure "creep" even when media accumulation has occurred on the valve seat. Applications for this regulator are high purity gas handling, regulation of HCL, silane, phosphine and ammonia, semiconductor manufacturing, research labs, and regulation of corrosive and specialty gases.

The 316SS constructed unit has a maximum supply pressure rating to 3000 PSIG (20.7 MPa). The convoluted 316SS diaphragm provides accurate and reliable regulation over four control setting ranges from 2-25, 3-50, 3-100, and 4-150 PSIG (0.014-0.173, 0.021-0.345, 0.021-0.690, and 0.028-1.04 MPa).

Pressure adjustments are made with a large handwheel or by an optional wrench style knob with a locking device or an optional "T" bar handle.

The HP600 has 1/4" NPT inlet and outlet connections. Inlet and outlet gauge ports are standard. High purity internal connections and VCR, Vacuseal and Ultra Seal welded fittings are available upon request. Line and rear mounting are standard for this regulator.

FEATURE SUMMARY

316SS, 316LSS and N.A.C.E. constructions available
High purity internal connections - optional
VCR, Vacuseal, Ultra Seal welded fittings - optional
Leakage to 2 x 10^{-8} atm cc/sec helium
Multiple control ranges available
In-line and rear mounting are standard
Non-Relieving, positionable captured bonnet (Standard)
Regulator cleaned to ITT Conoflow Specification (ES8A 01 294)
CGA cylinder connections available
5000 PSIG (34.50 MPa) inlet pressure available.

DIMENSIONAL DATA -ADVERTISING DRAWINGS:

HP610-C1: Standard Unit

OPTIONS:

MOUNTING:
Line - All variations
Rear Mounting (Standard)

ADJUSTMENTS:
Handwheel (Large)
Knob (Wrench style - with locking device) - Optional
“T” bar handle - Optional

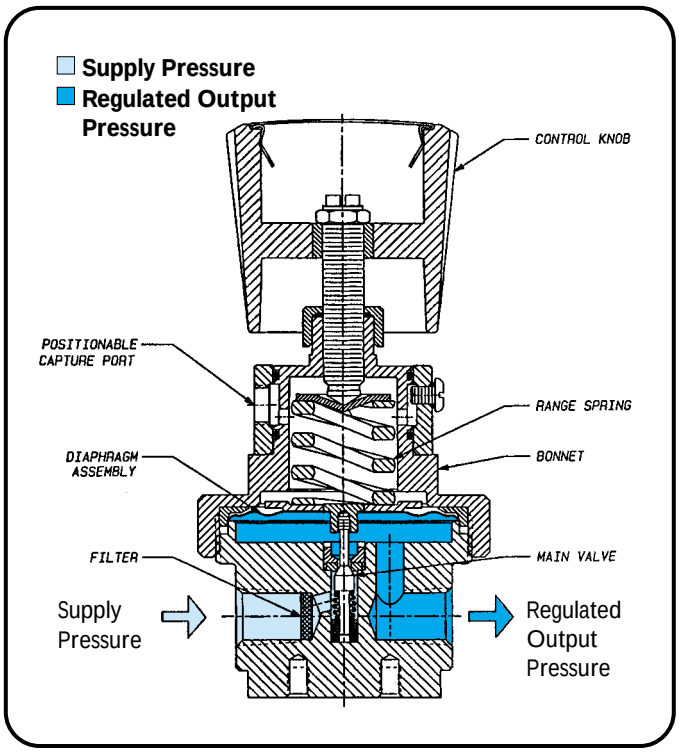
Cylinder Connections:
CGA cylinder connections are available

GAUGES:
2” and 2-1/2” diameters
Brass, steel and stainless steel construction

HP600 CONTROL KIT:
83600-11 For control setting range 2-25 PSIG (0.014-0.173 MPa)
83601-11 For control setting range 3-50 PSIG (0.021-0.345 MPa)
83602-11 For control setting range 3-100 PSIG (0.021-0.690 MPa)
83603-11 For control setting range 5-150 PSIG (0.028-1.040 MPa)

HP600 MAINTENANCE KIT:
80600-11 For all control setting ranges

HP600 OVERHAUL KIT:
81600-11 For all control setting ranges



HP600 Series - Non-Relieving Diaphragm

SPECIFICATIONS

Maximum Supply Pressure: 3000 PSIG (20.70 MPa)
5000 PSIG (34.50 MPa) available, refer to Control Engineering Data
Control Setting Ranges:
2 - 25 PSIG (0.014 - 0.173 MPa)
3 - 50 PSIG (0.021 - 0.345 MPa)
3 - 100 PSIG (0.021 - 0.690 MPa)
4 - 150 PSIG (0.028 - 1.04 MPa)
Proof Pressure: 150% maximum operating
Burst Pressure: 400% maximum operating
Flow Capacity: C_V 0.15 (See Flow Graph)
Orifice Diameter: 0.128"
Supply Pressure Effect: 0.8 PSIG (0.005 MPa) increase for 100 PSIG (0.690 MPa) supply decrease
Operating and Fluid Temperature Range:
-40°F to +165°F (-40°C to +74°C)
Leakage: 2 x 10^{-8} atm cc/sec helium (In Board and Main Valve)
Ports: 1/4" NPTF supply and outlet. Two gauge ports at 60°. Other porting sizes and configurations available.
Weight (Without gauges): 3.0 lbs. (1.35 Kg)

MATERIALS OF CONSTRUCTION

Body: 316 SS/316LSS/N.A.C.E.
Bonnet: Brass, Nickel Plated
Main Valve Seat: Kel-F (Teflon/Vespel optional)
Diaphragm and Trim: 316 Stainless Steel/Elgiloy - N.A.C.E.
Filter: 316L SS (40 micron)

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.

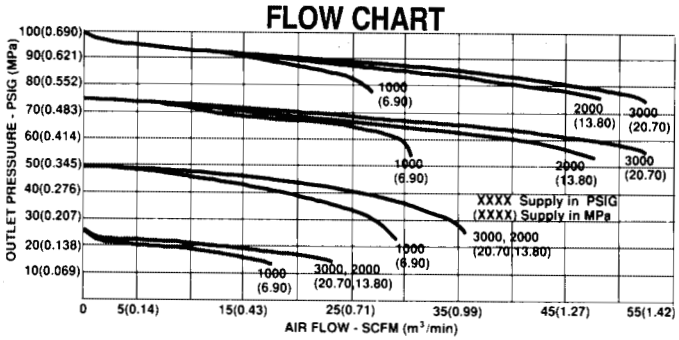
PRINCIPLE OF OPERATION

Turning the control knob clockwise will increase the force on the internal range spring and in turn increase the outlet set pressure. Conversely, turning the control knob counterclockwise will reduce the force on the range spring and reduce the outlet set pressure.

An unbalance between the force of the range spring and the outlet pressure acting upon the diaphragm will cause a corresponding reaction in the main valve. When the force of the range spring overcomes the force exerted on the diaphragm by the outlet pressure, the diaphragm will move down and open the main valve.

The difference between the supply pressure and the outlet pressure will allow flow when the main valve opens. When the outlet pressure reaches set pressure, the force exerted by the outlet pressure acting on the diaphragm will balance the force of the range spring at the set pressure position and permit the diaphragm to rise. As the diaphragm rises, the main valve moves toward the closed position. When the main valve closes, the flow path will close and flow will cease.

When the outlet pressure acting on the diaphragm exceeds the force on the range spring, the diaphragm will rise beyond the valve closed position. Since the diaphragm is positively linked (tied) to the main valve plug, the additional load of the outlet pressure acting on the diaphragm will pull the valve plug against the seat. With the valve positively closed, no flow can occur.



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 x 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.

CONTROL ENGINEERING DATA

Control Engineering Data is intended to provide a single source from which one can determine, in detail, the full scope of the product line. In addition to materials of construction and diaphragm selection, it also provides all necessary data, regarding adjustment options and range selections. Control Engineering Data also provides a means of communicating, by way of a code number, which is fully descriptive of the product selection.

NOTE: 1. Catalog numbers as received must contain fifteen (15) characters.

1-5 Model

HP600 = Pressure Reducing Regulator - High Purity Tied Diaphragm Type

NOTE: 1. For a maximum inlet pressure rating of 5000 PSIG (34.50 MPa), refer to positions (7-8) Elastomers and Diaphragms.

6 Materials of Construction

Body/Bonnet/Trim

H = 316 SS/Nickel Plated Brass/316SS
3 = 316 SS/Nickel Plated Brass/316SS-15Ra (See Note 2)
R = N.A.C.E. 316SS/Nickel Plated Brass/316SS (See Note 1)
L = 316L SS/Nickel Plated Brass/316 SS (See Note 3)
5 = 316L SS/Nickel Plated Brass/316 SS - 15Ra (See Notes 2 and 3)
J = N.A.C.E. 316L SS/Nickel Plated Brass/316SS (See Notes 2 and 3)

NOTES:
1. National Association of Corrosion Engineers.
2. These options are offered when a 15 Ra micro-inch finish is required. This finish will apply to the wetted surfaces only. Refer to price sheets for list price adder.
3. 316L Stainless Steel is required for welded con nections. Refer to position 10-11.
4. Maximum supply pressure must not exceed the maximum pressure rating of the supply connection and supply gauge connection.

7-8 Elastomers and Diaphragms

	Diaphragm	Main Valve Seat(s)
11 =	316 Stainless Steel	Kel-F (Standard)
12 =	316 Stainless Steel	Teflon (See Note 1)
13 =	316 Stainless Steel	Vespel (See Note 3)
14 =	Elgiloy (See Note 2)	Kel-F
15 =	Elgiloy (See Note 2)	Teflon (See Note 1)
16 =	Elgiloy (See Note 2)	Vespel (See Note 3)

NOTE:
1. Utilizing this option will reduce the maximum supply pressure rating to 400 PSIG (2.76 MPa)
2. Elgiloy diaphragm required for N.A.C.E.
3. The use of a Vespel main valve seat increases the maximum inlet pressure rating to 5000 PSIG (34.50 MPa).

9 Relieving Options

R = Non-Relieving, captured bonnet

NOTE: 1. Captured bonnet vent is positionable.

10-11 Inlet/Outlet/Gauge Ports

Inlet/Outlet Ports 2-Gauge Ports (60 Degrees)
Gauge Port Configuration = Inlet (High) Outlet (Low)

NPT Connections (See Note 4)
61 = 1/4"

Butt Weld Tubing Connections (See Note 6)
62 = 316L Stainless Steel 1/4"x4" Tubing welded per port
63 = 316L Stainless Steel 1/4"x4" Tubing welded per port 15 Ra microinch finish

Field Welded Connections - (See Note 1)
64 = 1/4" Butt weld preparation
65 = 1/4" Socketweld preparation

High Purity Internal Connections - (See Note 5)
66 = 1/4" Vacuseal - Preparation
67 = 1/4" VCR - Preparation
68 = 1/4" Ultra Seal - Preparation

Butt Weld (Zero Clearance) - High Purity Connections (See Note 2)
69 = 1/4" Vacuseal
6A = 1/4" VCR
6F = 1/4" Ultra Seal

Butt Weld 90 Degree Elbow - (See Note 3)
8H = 1/4" Butt Weld 90 Degree Elbow

NOTES:
1. Weld prepration to standard tubing tolerance.
2. Fitting(s) supplied by ITT Conoflow. (Female Nuts)
3. Fittings are installed down away from control handle.
4. All gauge connections are 1/4" NPT.
5. Customer to supply fittings.
6. The maximum pressure rating of 1/4" welded connections is 3500 PSIG (24.2 MPa) to assure a minimum of a 4:1 safety factor.

12 Mounting

R = Rear Mounting (Standard)

13 Cleaning Options

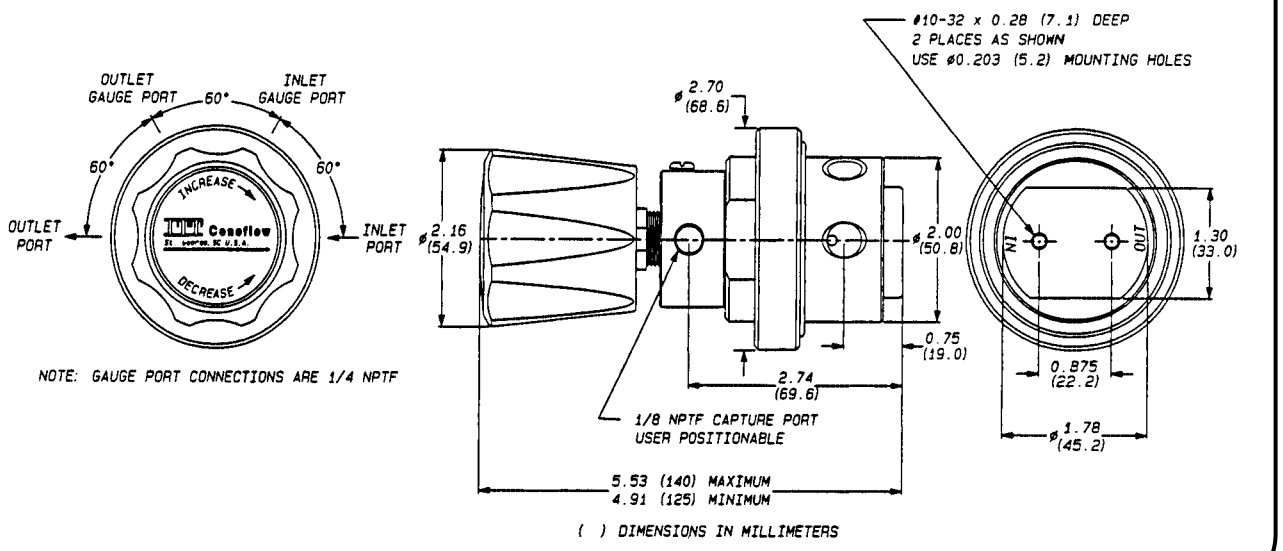
A = Regulator is cleaned to ITT Conoflow Specification ES8A 01 294.
B = **OXYGEN CLEANING** Specification of materials in regulators used for oxygen service is the **USER'S RESPONSIBILITY.** Cleaning for oxygen service **(Per ES8A 01 297)** to 3500 PSIG (24.20 MPa) is supplied by ITT Conoflow at no additional cost.
C = **CUSTOMER SPECIFIED CLEANING** Customer to specify the desired level of cleanliness. ITT Conoflow will advise cost prior to performing cleaning operation. Specification of materials is the **USER'S RESPONSIBILITY.**

14 Adjustment Selections

B = Handwheel (Large)
K = Wrench knob with locking device (Optional)
T = "T" bar handle (Optional)

15 Control Setting Ranges

A = 2-25 PSI (0.014-0.173 MPa)
B = 3-50 PSI (0.021-0.345 MPa)
C = 3-100 PSI (0.021-0.690 MPa)
D = 4-150 PSI (0.028-1.73 MPa)



For certified dimensional drawing, refer to HP600-C1