



CONOFLOW HIGH-PRESSURE REGULATOR - HP500

Pressure Reducing - Diaphragm Type - High Purity

The HP500 Regulator is a self-contained, diaphragm sensing high purity regulator. A broad offering of materials of construction and five control pressure ranges allow use of this unit in applications that include the regulating of specialty gases, gas chromatography, research labs as well as the regulation of corrosive and non-corrosive gases and liquids.

Material options include brass, 316 stainless steel and 316L stainless steel. N.A.C.E., monel and hastelloy constructions are available upon request. The brass units are rated for a maximum supply pressure of 5,000 PSIG (34.5 MPa) and the stainless steel units are rated to 6,000 PSIG (41.4 MPa). Optional 15 Ra microinch wetted surfaces are available.

This high purity, pressure regulator is designed to accurately control pressure ranges of 4-25, 4-50, 5-100, 6-250, and 10-500 PSIG (0-0.173, 0-0.345, 0-0.690, 0-1.73, and 0-3.45 MPa). The HP500 has 1/4" NPT inlet and outlet connections. Gauge ports are optional. To suit high purity applications, Vacuseal, VCR and Ultra Seal welded fittings are available. Adjustments within each range are made with a standard large handwheel. A wrench style knob with a locking device and a "T" bar handle are optional adjustments.

These products are guaranteed by Conoflow's high standards of manufacture and years of experience as a leading producer of precision instruments.

Mounting:

Line - All variations (Supplied with plain bonnet)
Panel - (2 Panel mounting nuts) - Optional
Rear Mounting - Standard

Adjustments:

Handwheel (Large) - Standard
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

HP500 Control Kit: (NON-RELIEVING DIAPHRAGM)

83500-11 thru 16 - For control setting range 4-25 PSIG (0.03-0.173 MPa)
83501-11 thru 16 - For control setting range 4-50 PSIG (0.03-0.345 MPa)
83502-11 thru 16 - For control setting range 5-100 PSIG (0.04-0.690 MPa)
83503-11 thru 16 - For control setting range 6-250 PSIG (0.04-1.730 MPa)
83504-11 thru 16 - For control setting range 10-500 PSIG (0.069-3.450 MPa)

HP500 Control Kit: (RELIEVING DIAPHRAGM)

83510-11 thru 13 - For control setting range 4-25 PSIG (0.03-0.173 MPa)
83511-11 thru 13 - For control setting range 4-50 PSIG (0.03-0.345 MPa)
83512-11 thru 13 - For control setting range 5-100 PSIG (0.04-0.690 MPa)
83513-11 thru 13 - For control setting range 6-250 PSIG (0.04-1.730 MPa)
83514-11 thru 13 - For control setting range 10-500 PSIG (0.069-3.450 MPa)

HP500 Maintenance Kit: (NON-RELIEVING DIAPHRAGM)

80500-11 thru 16 - For all control setting ranges

HP500 Maintenance Kit: (RELIEVING DIAPHRAGM)

803510-11 thru 13 - For all control setting ranges

HP500 Overhaul Kit: (NON-RELIEVING DIAPHRAGM)

81500-11 thru 16 - For all control setting ranges

HP500 Overhaul Kit: (RELIEVING DIAPHRAGM)

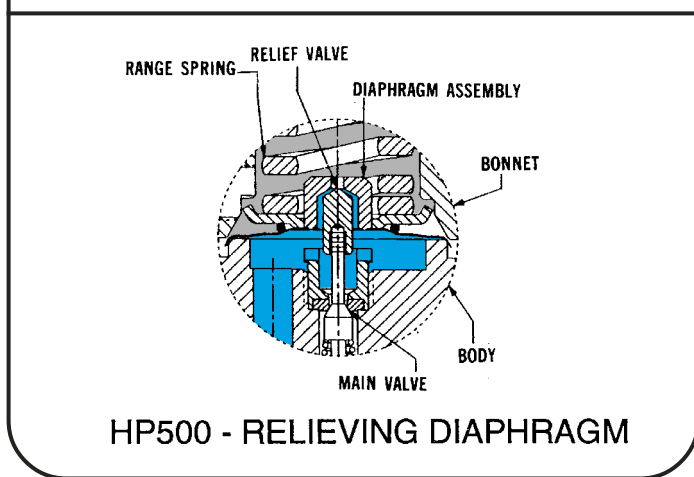
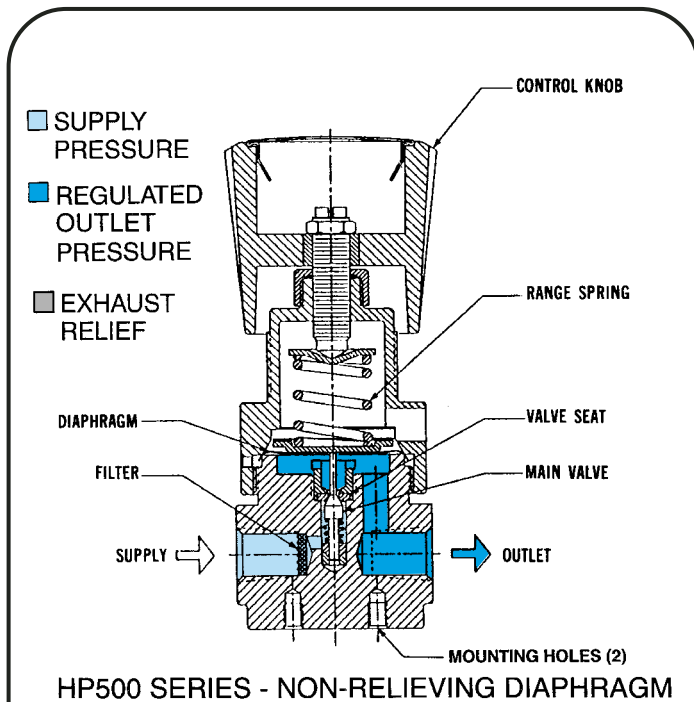
813510-11 thru 13 - For all control setting ranges

FEATURE SUMMARY

Relieving and non-relieving diaphragms offered
Brass, 316 SS, 316 L SS, N.A.C.E., Monel and Hastelloy constructions available
Design leak rate 2×10^{-8} atm cc/sec of helium
High purity internal connections optional
Vacuseal, VCR, Ultra Seal welded fittings optional
Five regulated outlet ranges from 4-25 PSIG to 10-500 PSIG (0.03-0.173 MPa) to 0.069-3.45 MPa)
15 Ra microinch wetted surfaces available
Optional 1/4" NPT gauge ports
Metal-to-metal diaphragm to body seal
Line and rear mountings are standard
Panel mounting is optional
Regulator cleaned to ITT Conoflow Specification (ES8A 01 294)
CGA cylinder connections available

DIMENSIONAL DATA - ADVERTISING DRAWINGS:

HP500-C1: Standard Unit (Large Handwheel)
HP500-C2: "T" Bar Handle
HP500-C3: Wrench Knob with Locking Drive



PRINCIPLE OF OPERATION

The HP500 is a self-contained, spring loaded, high-purity pressure regulator. Turning the control knob clockwise will increase the force on the range spring and in turn the outlet set pressure will increase. With a relieving option, when the outlet pressure is greater than the set pressure, the diaphragm will rise and unseat the relief valve. As the outlet pressure approaches the set pressure, the diaphragm will move down and close the relief valve. Conversely, turning the control knob counterclockwise will decrease the outlet set pressure. In equilibrium, the force exerted by the range spring is balanced by the outlet pressure.

An unbalance between the outlet pressure and the set pressure causes a corresponding reaction in the diaphragm and main valve. If the outlet pressure rises above the set pressure, the metal diaphragm will lift allowing the main valve to seat. If the outlet pressure falls below the set pressure, the range spring will push the diaphragm down, unseating the main valve, allowing supply pressure to flow through the main valve to the downstream port increasing the set pressure.

At equilibrium, the valve plug assumes a position which supplies the required flow while maintaining the outlet pressure.

SPECIFICATIONS

Maximum Supply Pressure:

Stainless Steel: 6,000 PSIG (41.4 MPa)

Brass: 5,000 PSIG (34.5 MPa)

Control Setting Ranges:

4 - 25 PSIG (0.3 - 0.173 MPa)

4 - 50 PSIG (0.3 - 0.345 MPa)

5 - 100 PSIG (0.04 - 0.690 MPa)

6 - 250 PSIG (0.04 - 1.73 MPa)

10 - 500 PSIG (0.069 - 3.45 MPa)

Proof Pressure: 150% maximum operating

Burst Pressure: 400% maximum operating

Flow Capacity: $C_v = 0.16$ (See Flow Graph)

Orifice Diameter:

HP500 (Non-Relieving) 0.110"

HP50 (Relieving) 0.128"

Supply Pressure Effect: 1.0 PSIG (0.007 MPa) increase 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)

Ports: 1/4" NPTF supply/outlet. 1/4" gauge ports optional (80°). Other porting sizes and configurations available.

Weight (Without gauges): 2.0 lbs. (0.91 Kg)

MATERIALS OF CONSTRUCTION

Body: Brass/316 SS/316LSS

N.A.C.E./monel/hastelloy

Bonnet: Brass/Plated Brass/316SS

Main Valve Seat: Kel-F (Teflon/Vespel optional)

Diaphragm and Trim: 316 Stainless Steel/Elgiloy - N.A.C.E.

Inner Friction Bushing: PFA Teflon

Filter Screen: 316 Stainless Steel (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. Cleaning for service above 3500 PSIG (24.20 MPa) may be performed to the user's specifications at an additional cost through an outside source.

For special cleaning requirements, the customer must supply specifications for desired level of cleanliness. Cost will be advised prior to performing the cleaning operation.

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.

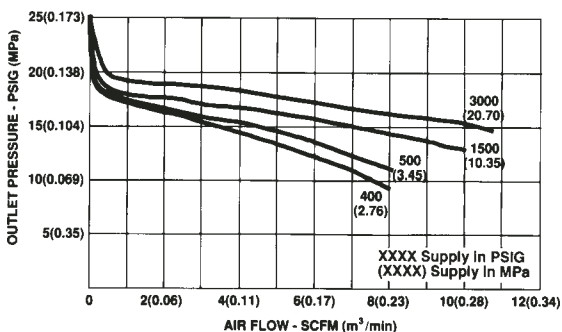
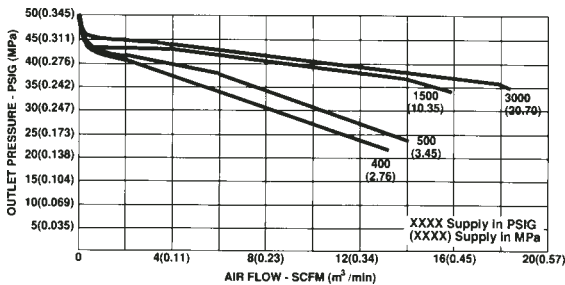
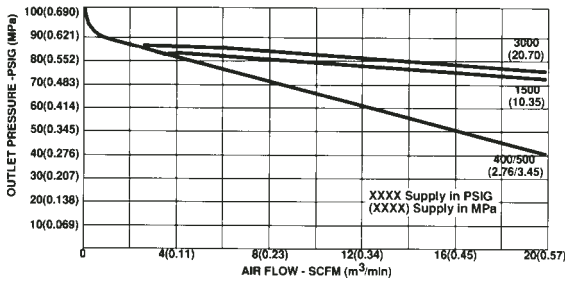
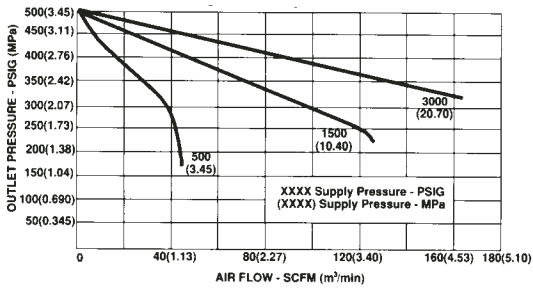
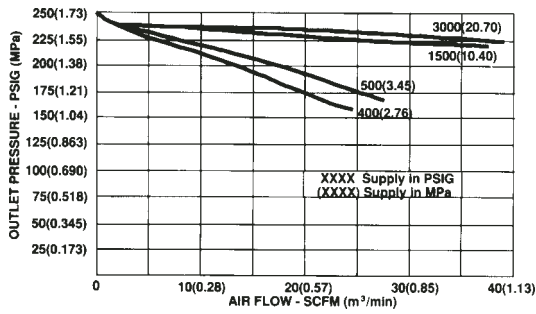
LEAK RATE CERTIFICATION (ES8A 01 295)

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.

FLOW CHARTS



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, diaphragm and elastomer 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. All catalog numbers as received must contain fifteen (15) characters.

1-5
Model

HP500 = Pressure Reducing Regulator
High Purity - Diaphragm Type

6
Materials of
Construction

Body/Bonnet/Trim

F = Brass/Brass/316SS
M = Brass/316SS/316SS
B = Brass/Nickel Plated Brass/316 SS
H = 316SS/Nickel Plated Brass/316SS
3 = 316SS/Nickel Plated Brass/316SS - 15Ra
(See Note 3)
R = N.A.C.E. 316LSS/Nickel Plated Brass/316SS
(See Note 1)
P = 316SS/316SS/316SS
7 = 316SS/316SS/316SS - 15Ra (See Note 3)
N = N.A.C.E. 316SS/316SS/316SS (See Note 1)
L = 316LSS/Nickel Plated Brass/316SS (See Note 4)
5 = 316LSS/Nickel Plated Brass/316SS - 15Ra
(See Notes 3 & 4)
J = N.A.C.E. 316LSS/Nickel Plated Brass/316SS
(See Notes 1 & 4)
T = 316LSS/316SS/316SS (See Note 4)
8 = 316LSS/316SS/316SS - 15Ra (See Notes 3 & 4)
W = N.A.C.E. 316LSS/316SS/316SS
(See Notes 1 & 4)
E = Monel/Nickel Plated Brass/Monel & Inconel
K = Hastelloy/Nickel Plated Brass/Hastelloy & Inconel

NOTES:

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

7-8
Elastomers &
Diaphragms

Diaphragm

11 = 316 Stainless Steel
12 = 316 Stainless Steel
13 = 316 Stainless Steel
14 = Elgiloy (See Notes 2 & 3)
15 = Elgiloy (See Notes 2 & 3)
16 = Elgiloy (See Notes 2 & 3)

Main Valve Seat(s)

Kel-F
Teflon (Optional)
(See Note 1)
Vespel
Kel-F
Teflon (See Note 1)
Vespel

NOTES:

1. Utilizing this option will reduce the maximum supply pressure rating to 400 PSIG (2.76 MPa)
2. A relieving diaphragm is not available in Elgiloy.
3. Elgiloy diaphragm required for N.A.C.E.

9
Relieving
Options

R = Non-relieving, captured bonnet
V = Relieving, captured bonnet

NOTE:

1. Maximum supply pressure rating is 3000 PSIG (20.7 MPa) if relieving option is chosen, unless a Teflon main valve seat is also chosen.

Inlet/Outlet Ports (No Gauge Ports)
 NPT Connections Butt Welded Tubing Connections
 (See Note 6)
 NI = 1/4" B1 = 316L Stainless Steel 1/4"x4"
 Tubing welded per port
 B2 = 316L Stainless Steel 1/4"x4"
 Tubing welded per port
 I5Ra microinch finish

Field Welded Connectons (See Note 1)
 W1 = 1/4" Butt weld preparation
 W2 = 1/4" Socketweld preparation

High Purity Internal Connections (See Note 5)
 H1 = 1/4" Vacuseal - Preparation
 H2 = 1/4" VCR - Preparation
 H3 = 1/4" Ultra Seal - Preparation

Butt Weld (Zero Clearance) - High Purity Connections
 (See Notes 2 and 6)
 Z1 = 1/4" Vacuseal
 Z2 = 1/4" VCR
 Z3 = 1/4" Ultra Seal

Butt Weld 90 Degree Elbow (See Notes 3 and 6)
 91 = 1/4" ButtWeld 90 Degree Elbow

Inlet/Outlet/2-Gauge Ports (80 Degrees)
Gauge Port Configuration=Inlet (High) Outlet (Low)

NPT Connections Butt Welded Tubing Connections
 (See Note 6)
 81 = 1/4" 82 = 316L Stainless Steel 1/4"x4"
 Tubing welded per port
 83 = 316L Stainless Steel 1/4"x4"
 Tubing welded per port
 I5Ra microinch finish

Field Welded Connectons (See Note 1)
 84 = 1/4" Butt weld preparation
 85 = 1/4" Socketweld preparation

High Purity Internal Connections (See Note 5)
 86 = 1/4" Vacuseal - Preparation
 87 = 1/4" VCR - Preparation
 88 = 1/4" Ultra Seal - Preparation

Butt Weld (Zero Clearance) - High Purity Connections
 (See Notes 2 & 6)
 89 = 1/4" Vacuseal
 8A = 1/4" VCR
 8F = 1/4" Ultra Seal

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

- NOTES:**
1. Weld preparation 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 port connections are 1/4" NPT.
 5. Customer to supply fitting(s).
 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
 Options

R = Rear Mounting (Standard)
 P = Panel Mounting (2-nut) (Optional)

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.**

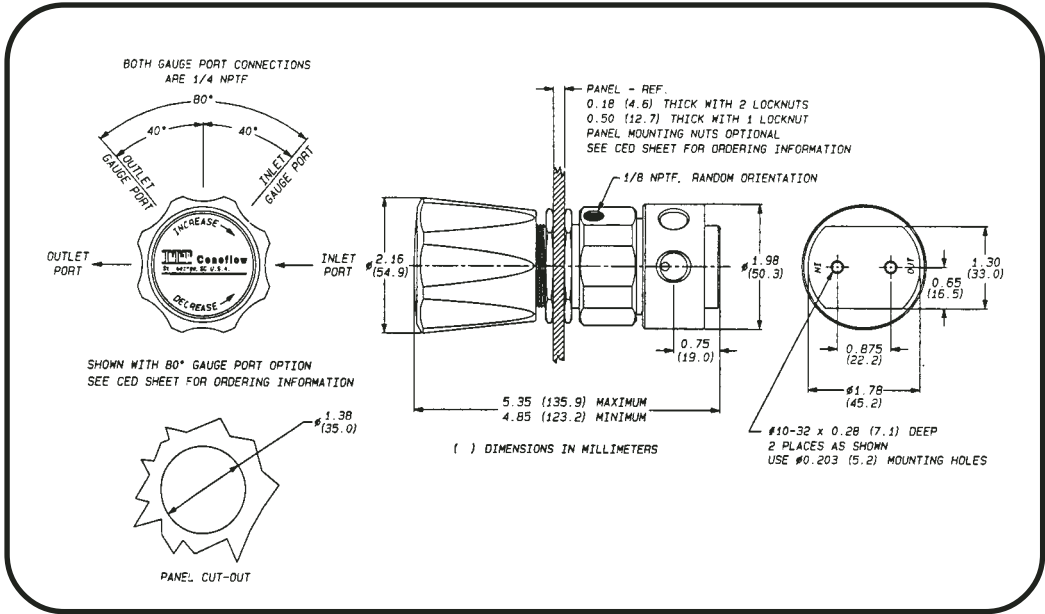
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 Adjustment
 Selections

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

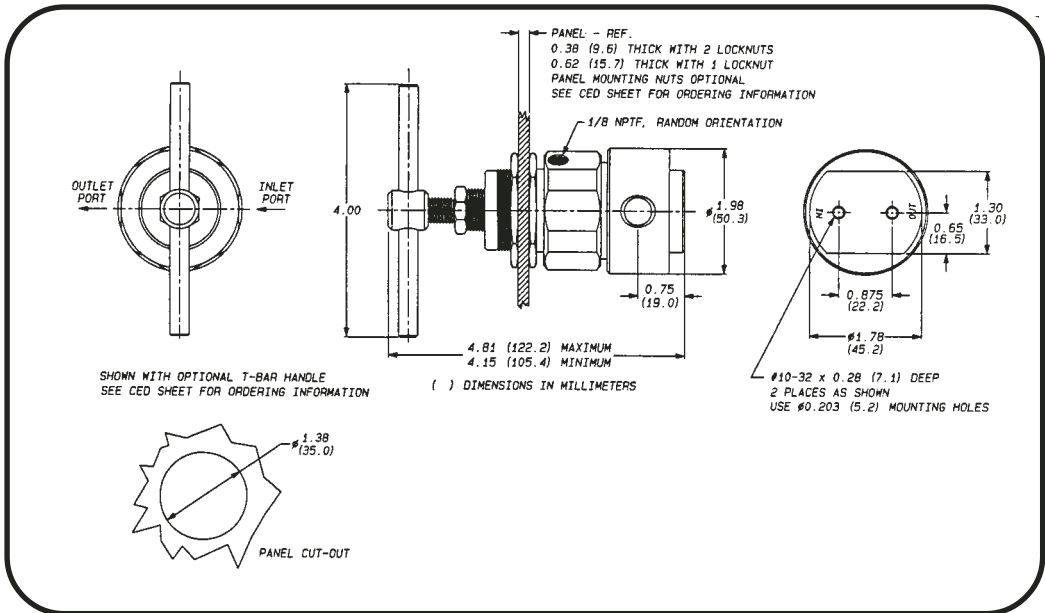
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 Control
 Setting
 Ranges

A = 4-25 PSIG (0.03 - 0.173 MPa)
 B = 4-50 PSIG (0.03 - 0.345 MPa)
 C = 5-100 PSIG (0.04 - 0.690 MPa)
 E = 6-250 PSIG (0.04 - 1.730 MPa)
 F = 10-500 PSIG (0.069 - 3.450 MPa)

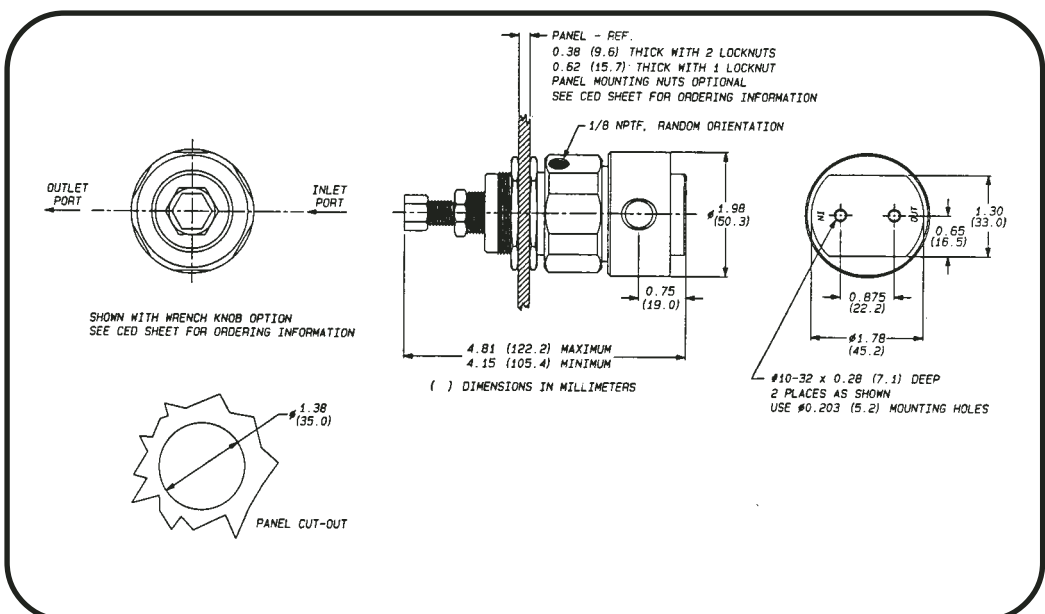
10-11
 Inlet/Outlet/
 Gauge Ports



For certified dimensional drawing, refer to HP500-C1.



For certified dimensional drawing, refer to HP500-C2.



For certified dimensional drawing, refer to HP500-C3.