

CONOFLOW HIGH-PRESSURE REGULATOR - HP100

Pressure Reducing - Diaphragm Type



Conoflow's HP100 High Pressure Regulators are precision units designed to regulate any gas compatible with the materials of construction. Typical applications are dead ended systems, instrumentation sampling systems, component testing, research laboratories, pressure calibration systems and other applications where sensitive pressure adjustment is required.

The HP100 is a self-contained, pressure reducing regulator which utilizes an elastomer diaphragm that provides for quick response and sensitive regulation. This standard unit is supplied as a non-relieving regulator. A relieving outlet and captured bonnet are options that are available for this model. The HP110 Regulator offers these same features, but provides a balanced valve to offset supply pressure effect.

This unit is available in aluminum, brass and stainless steel construction. N.A.C.E. constructed units are also available upon request. The maximum supply pressure rating for stainless steel units is 6000 PSIG (41.4 MPa) and the aluminum/brass units are rated to 5000 PSIG (34.5 MPa). Regulated output ranges are offered from 3-50 to 6-500 PSIG (0.02-0.35 to 3.45 MPa).

In the standard configuration, the HP100 has 1/4" NPT inlet and outlet connections. 1/4" gauge ports are optional. Other connection sizes and porting configurations are available upon request. These units can be line or panel mounted (supplied with two panel mounting nuts).

FEATURE SUMMARY

Accurate and sensitive regulation
 Non-Relieving - Standard
 Multiple Porting Configurations
 NPT - SAE - MS33649 - AMINCO - SLIMLINE - CGA
 Available in brass, stainless steel, aluminum and N.A.C.E. constructions
 Balanced valve optional
 Captured bonnet optional
 CGA cylinder connections available
 Regulators are cleaned to ITT Conoflow Specification (ES8A 01 294)

OPTIONS:

MOUNTING:

Line - All variations (Supplied with plain bonnet)
 Panel - Two panel mounting nuts

ADJUSTMENTS:

Handwheel (Large) - For non-panel mounted applications
 Handwheel (Small) - For panel mounted applications
 Knob (Wrench style with locking device) - Optional
 "T" bar handle - Optional

GAUGES:

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

CYLINDER CONNECTIONS:

CGA Cylinder connections are available

HP100/HP110 CONTROL KIT:

83100-11 For control setting range 3-50 PSIG (0.02-0.345 MPa)
 83101-11 For control setting range 4-150 PSIG (0.03-1.04 MPa)
 83102-11 For control setting range 5-250 PSIG (0.04-1.73 MPa)
 83103-11 For control setting range 6-500 PSIG (0.04-3.45 MPa)

HP100 MAINTENANCE KIT - (FOR ALL CONTROL SETTING RANGES):

80100-11, 12, 15 & 16 = Standard & 60° Ports/Non-Relieving
 80108-11, 12, 15 & 16 = 90° Ports/Non-Relieving
 80101-11, 12, 15 & 16 = Standard & 60° Ports/Relieving
 80109-11, 12, 15 & 16 = 90° Ports/Relieving

HP110 (BALANCED VALVE) MAINTENANCE KIT - (FOR ALL CONTROL SETTING RANGES):

80110-11, 12, 15 & 16 = Standard & 60° Ports/Non-Relieving
 80118-11, 12, 15 & 16 = 90° Ports/Non-Relieving
 80111-11, 12, 15 & 16 = Standard & 60° Ports/Relieving
 80119-11, 12, 15 & 16 = 90° Ports/Relieving

HP100 OVERHAUL KIT - (FOR ALL CONTROL SETTING RANGES):

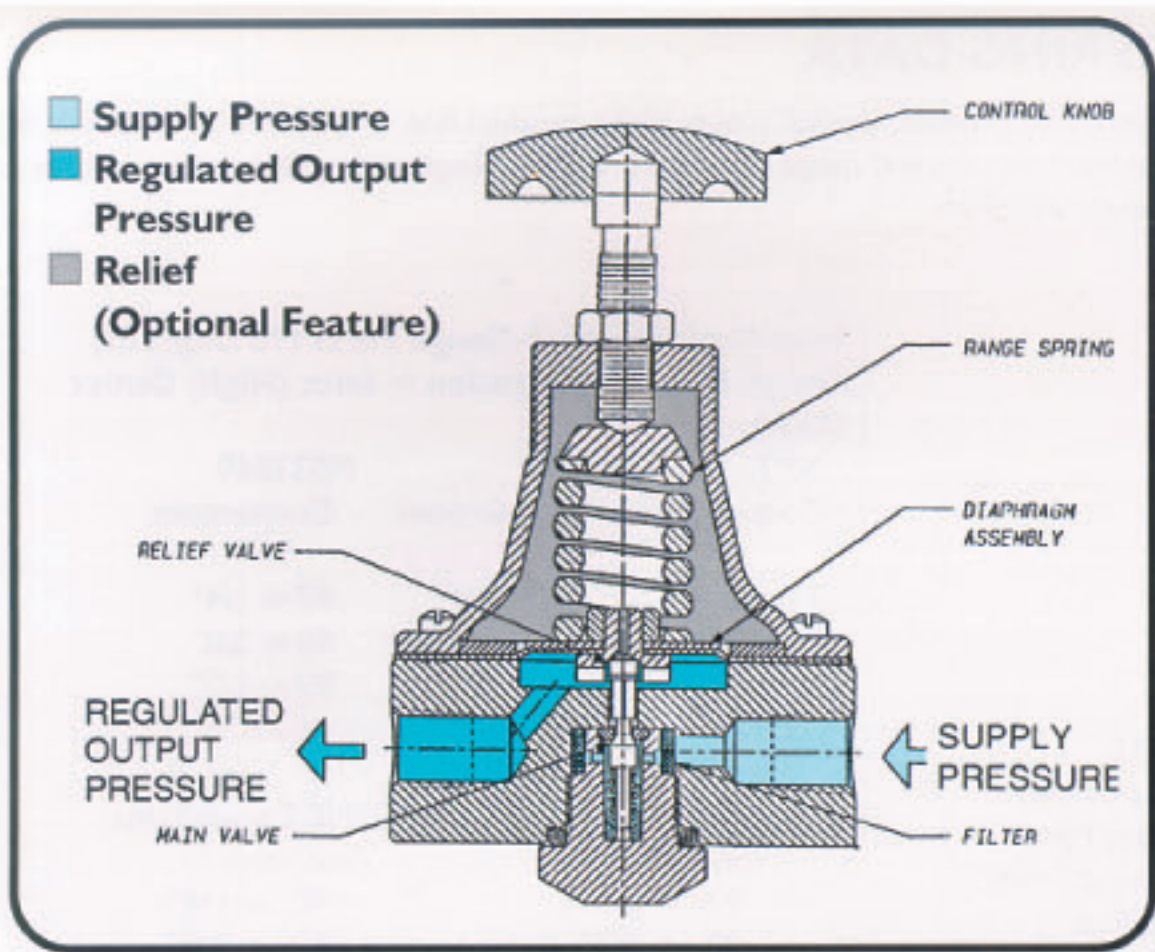
81100-11, 12, 15 & 16 = Standard & 60° Ports/Non-Relieving
 81108-11, 12, 15 & 16 = 90° Ports/Non-Relieving
 81101-11, 12, 15 & 16 = Standard & 60° Ports/Relieving
 81109-11, 12, 15 & 16 = 90° Ports/Relieving

HP110 (BALANCED VALVE) OVERHAUL KIT - (FOR ALL CONTROL SETTING RANGES):

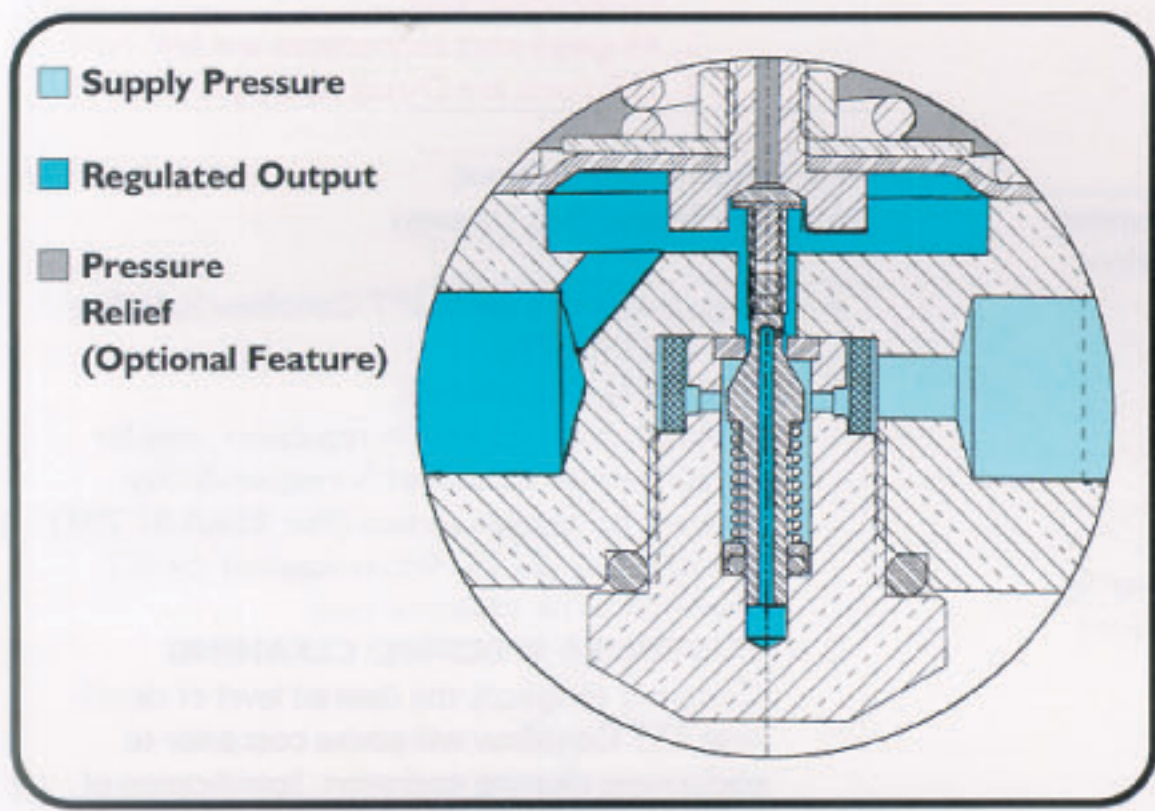
81110-11, 12, 15 & 16 = Standard & 60° Ports/Non-Relieving
 81118-11, 12, 15 & 16 = 90° Ports/Non-Relieving
 81111-11, 12, 15 & 16 = Standard & 60° Ports/Relieving
 81119-11, 12, 15 & 16 = 90° Ports/Relieving

DIMENSIONAL DATA - ADVERTISING DRAWINGS:

HP100-C1: Unit for panel mounting (Small Handwheel)
 HP100-C2: Unit for non-panel mounting (Large handwheel)
 HP100-C3: "T" bar handle
 HP100-C4: Wrench knob w/locking device



HP100 Series - Relieving Diaphragm



HP100 Series - Balanced Valve

PRINCIPLE OF OPERATION

Turning the control knob clockwise will increase the force on the range spring and, in turn, the outlet set pressure. Conversely, turning the control knob counter-clockwise will decrease the force on the range spring and decrease the outlet set pressure. In equilibrium, the force provided by the range spring is balanced by the outlet pressure acting on the diaphragm.

An unbalance between the outlet pressure and the set pressure causes a corresponding reaction in the diaphragm and valve. If the outlet pressure rises above the set pressure, the diaphragm will lift allowing the valve to seat. If the outlet pressure falls below the set pressure, the range spring will push the diaphragm down and unseat the valve. This allows supply pressure to flow through the main valve to the downstream port increasing the output pressure. The output pressure increases until it balances the force on the diaphragm assembly by the range spring. At equilibrium, the valve plug assumes a position which supplies the required flow while maintaining the outlet pressure at the set pressure.

With the relieving option, the HP100 contains an additional valve to reduce the outlet pressure in closed systems. When the outlet pressure is greater than the set pressure, the diaphragm will rise seating the main valve and unseating the relief valve. Unseating the relief valve will vent excess pressure to atmosphere until equilibrium is reached. As the outlet pressure approaches the set pressure, the diaphragm will move down and close the relief valve.

HP110 BALANCED VALVE PRINCIPLE OF OPERATION

This regulator valve reduces the effect of changing supply pressure on the HP110 Regulator output pressure by offsetting (or balancing) the forces created across the valve seat with an additional set of forces acting across the o-ring at the opposite end of the valve plug. In operation, the differential pressure between the inlet and outlet acting upon the valve seating area is balanced by an identical differential pressure (between inlet and outlet) acting in the opposite direction across the o-ring sealing area of the valve.

As differential pressure changes (due to changing supply pressure), the forces are balanced against each other, which sharply reduces the changing force of the valve element against the regulator's diaphragm. The result of using a balanced valve design is significant reduction (and even a slight reversal) in supply pressure effect.

SPECIFICATIONS

Maximum Supply Pressure

Stainless Steel: 6000 PSIG (41.4 MPa)
 Brass and Aluminum: 5000 PSIG (34.5 MPa)
 Balanced Valve (Regardless of Material)
 3000 PSIG (21.2MPa)

Control Setting Ranges:

3 - 50 PSIG (0.02-0.35 MPa)
 4 - 150 PSIG (0.03-1.04 MPa)
 5 - 250 PSIG (0.04-1.73 MPa)
 6 - 500 PSIG (0.04-3.45 MPa)

Proof Pressure: 150% Maximum operating

Burst Pressure: 400% Maximum operating

Flow Capacity: $C_v = 0.12$ (See Flow Graph)

Orifice Diameters:

HP100 0.110"

HP110 0.128"

Supply Pressure Effect: 1.1 PSIG (0.008 MPa) increase for a 100 PSIG (0.690 MPa) supply decrease

Operating and Fluid Temperature Range:

-65°F to +165°F (-54°C to +74°C).

Leakage: Bubble tight (In Board and Main Valve)

Maximum Operating Torque: 40 in. lbs. (46 Kg-cm)

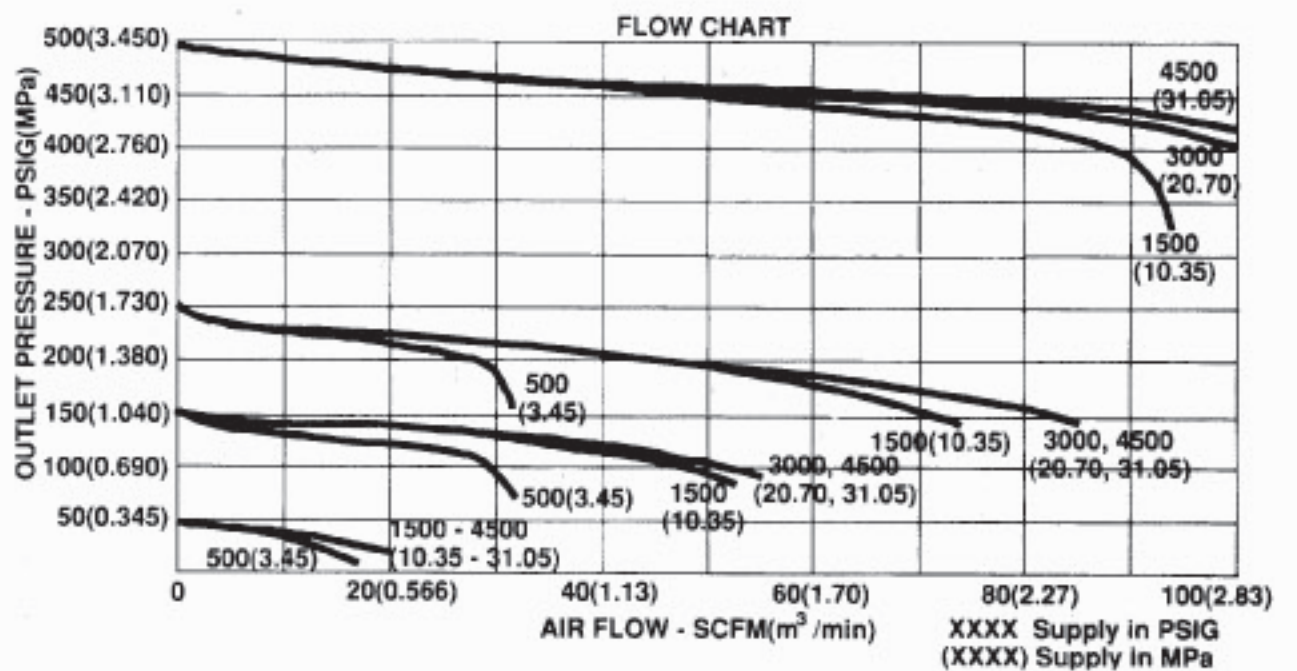
Ports: 1/4" NPTF supply and outlet

1/4" NPTF gauge ports optional (60° or 90°). Other porting sizes and configurations available.

Weight (Without gauges):

Brass & Stainless: Steel 5.2 lbs. (2.36 Kg)

Aluminum 1.8 lbs.: (0.82 Kg)



MATERIALS OF CONSTRUCTION

Body: 303SS/Brass/Aluminum/N.A.C.E. 316SS

Valve Body: 303SS/Brass/Aluminum/N.A.C.E. 316SS

Bonnet: 316SS/Brass

Main Valve Seat: Kel-F (Vespel - Optional)

Relief Valve Plug: Buna N (Viton - Optional)

Diaphragm: Buna N - Nylon Reinforced

Trim: 300 Series Stainless Steel

Seals: Buna N (Viton - Optional)

Filter: 316L SS (40 Micron Rating)

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.

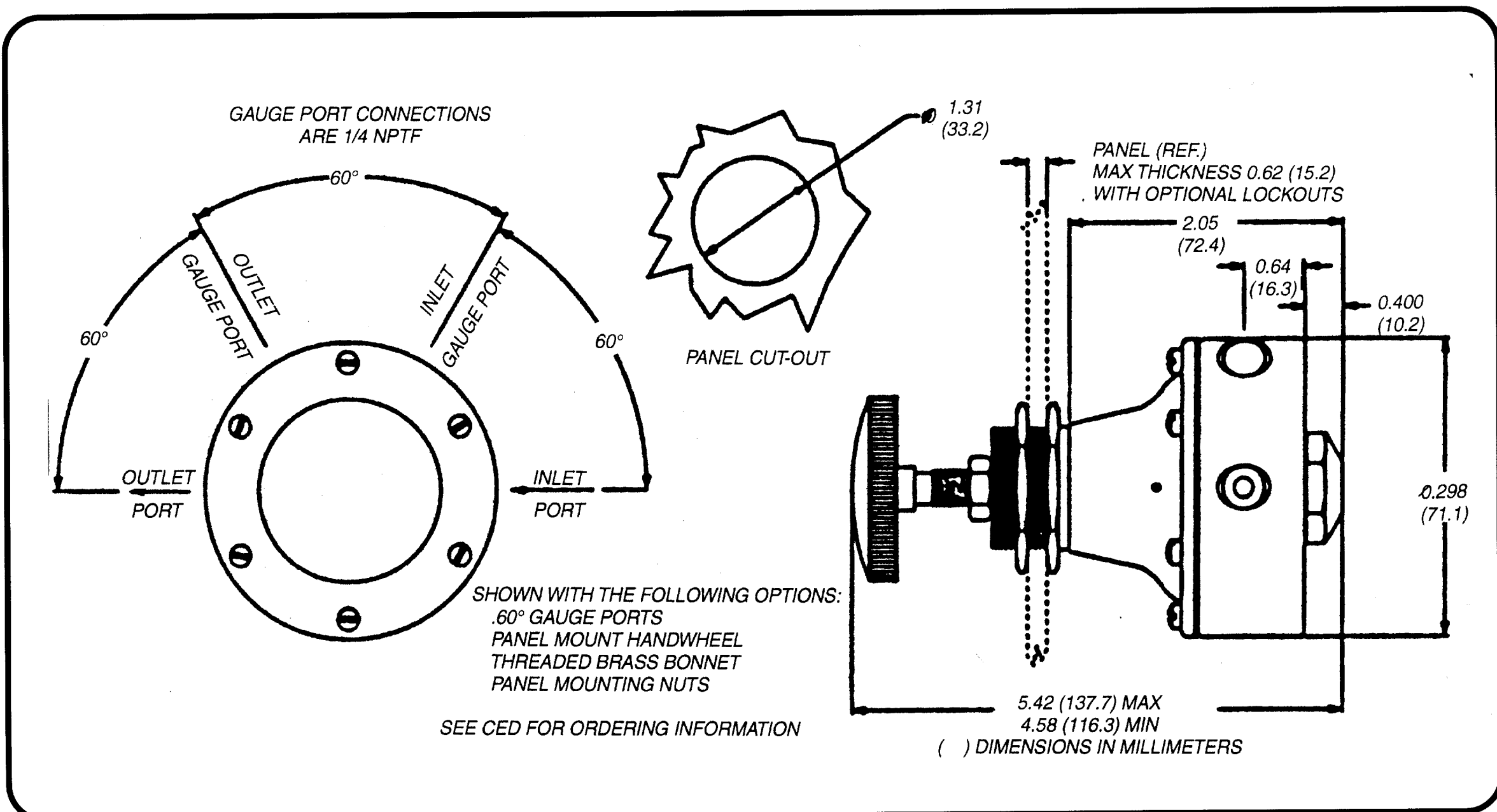
NOTE: 1. Catalog numbers as received must contain fifteen (15) characters.

1-5 Models	HP100 = Pressure Reducing Regulator Diaphragm Type HP110 = Pressure Reducing Regulator - Balanced Valve/Diaphragm Type		Inlet/Outlet Ports 2-Gauge Ports (90 Degrees) Gauge Port Configuration = Inlet (High) Outlet (Low) - See Note 2 NPT SAE MS33649 Connections Connections Connections (See Note 3) 91 = 1/4" 94 = 1/4" 97 = 1/4" 92 = 3/8" 95 = 3/8" 98 = 3/8" 93 = 1/2" 96 = 1/2" 99 = 1/2" (Note 1) (Note 1) (Note 1)																				
6 Materials of Construction	Body/Bonnet/Trim A = 2024 Aluminum/Brass/300 Stainless Steel D = 2024 Aluminum/316 Stainless Steel/ 300 Stainless Steel - See Note 1 B = Brass/Brass/300 Stainless Steel C = Brass/316 Stainless Steel/300 Stainless Steel - See Note 1 S = 303 Stainless Steel/300 Stainless Steel N = N.A.C.E. 316SS/316SS/316SS - See Note 2 NOTES: 1. These options are used when a capture bonnet is required. 2. National Association of Corrosion Engineers. 3. Maximum supply pressure must not exceed the maximum pressure rating of the supply connection and supply gauge connection.	10-11 Inlet/Outlet/Gauge Ports (Cont'd. from previous column)	AMINCO Connections SLIMLINE Connections (See Note 1) (See Note 1) 9A = 1/4" 9C = 1/4" 9B = 3/8" 9D = 3/8" NOTES: 1. 1/2" ports and Aminco and Slimline connections are offered in stainless steel construction only. 2. All gauge port connections are 1/4" NPT 3. SAE ports are O-ring boss style.																				
7-8 Elastomers and Diaphragms	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Seals & Diaphragm</th> <th style="text-align: left;">Main Valve Seat(s)</th> <th style="text-align: left;">Relief Valve Plug</th> <th style="text-align: left;">O-Ring(s)</th> </tr> </thead> <tbody> <tr> <td>11 = Buna-N</td> <td>Kel-F</td> <td>Buna-N</td> <td>Buna-N (Standard)</td> </tr> <tr> <td>12 = Buna-N</td> <td>Vespel</td> <td>Buna-N</td> <td>Buna-N</td> </tr> <tr> <td>15 = Buna-N</td> <td>Kel-F</td> <td>Viton</td> <td>Viton</td> </tr> <tr> <td>16 = Buna-N</td> <td>Vespel</td> <td>Viton</td> <td>Viton</td> </tr> </tbody> </table>	Seals & Diaphragm	Main Valve Seat(s)	Relief Valve Plug	O-Ring(s)	11 = Buna-N	Kel-F	Buna-N	Buna-N (Standard)	12 = Buna-N	Vespel	Buna-N	Buna-N	15 = Buna-N	Kel-F	Viton	Viton	16 = Buna-N	Vespel	Viton	Viton	12 Mounting Options	P = Panel Mounting (2-nut) S = Plain Bonnet (No Threads)
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16 = Buna-N	Vespel	Viton	Viton																				
9 Relieving Options	N = Non-relieving (Standard) R = Non-Relieving, captured bonnet (Optional) See Note 1 V = Relieve to atmosphere (Optional) C = Relieving - Captured bonnet (Optional) See Note 1 NOTE 1. When options C and R are chosen a stainless steel bonnet is required. Refer to options C, D, N and S in position 6.	13 Cleaning Options	A = Regulator is cleaned to ITT Conoflow Specification ES8A 01 294. B = OXYGEN CLEANING. Specification of material 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.																				
10-11 Inlet/Outlet/Gauge Ports (Cont'd. in next column)	Inlet/Outlet Ports (No Gauge Ports) NPT SAE MS33649 Connections Connections Connections (See Note 3) N1 = 1/4" SA = 1/4" M1 = 1/4" N2 = 3/8" S2 = 3/8" M2 = 3/8" N3 = 1/2" S3 = 1/2" M3 = 1/2" (Note 1) (Note 1) (Note 1) AMINCO Connections SLIMLINE Connections (See Note 1) (See Note 1) A1 = 1/4" L1 = 1/4" A2 = 3/8" L2 = 3/8"	14 Adjustment Selections	B = Handwheel (Non-panel mounted - Option S chosen in position 12) H = Handwheel (Panel mounting - Option P chosen in position 12) K = Wrench knob with locking device (Optional) T = "T" bar handle (Optional)																				
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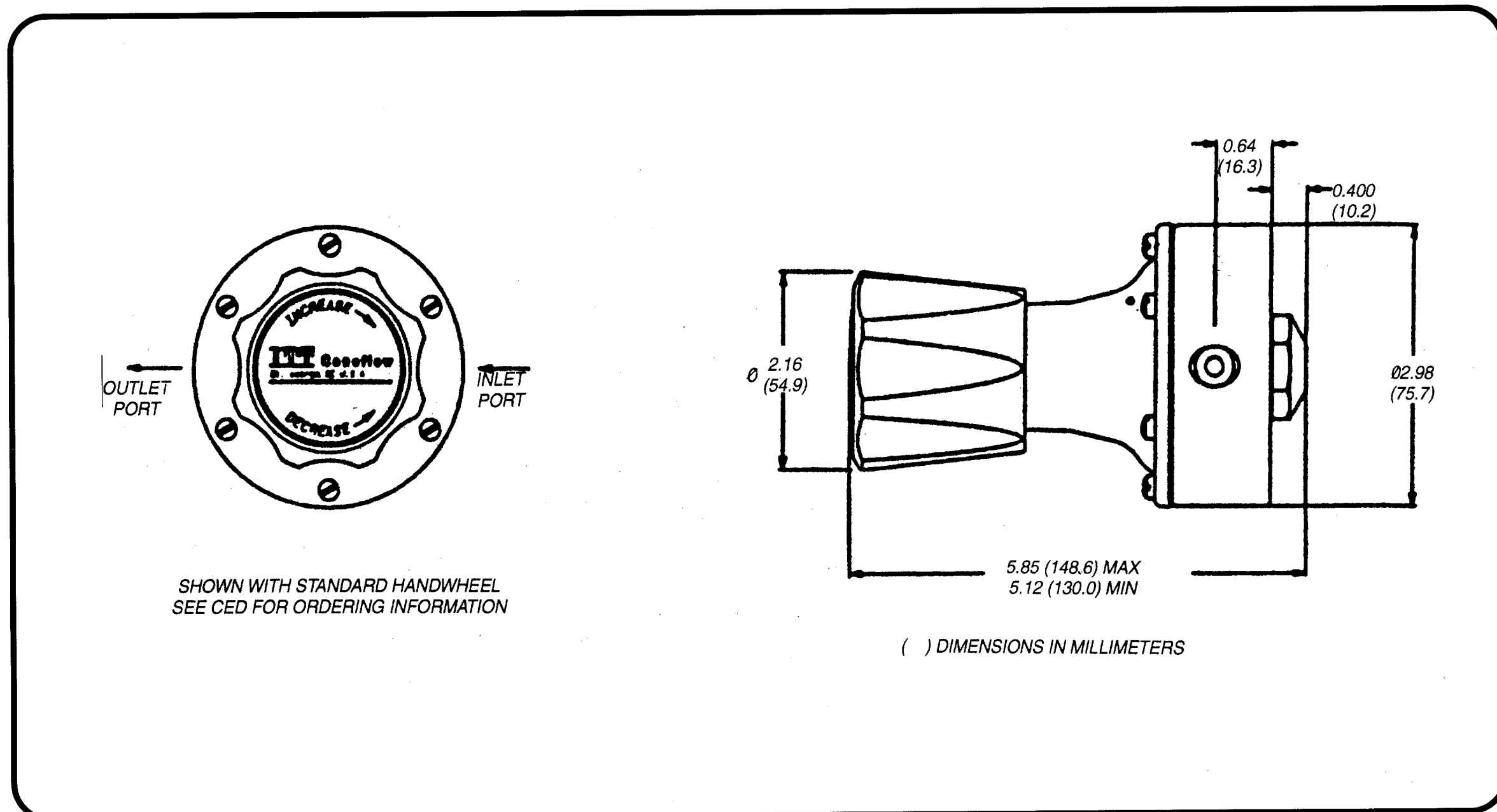
OXYGEN SERVICE

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

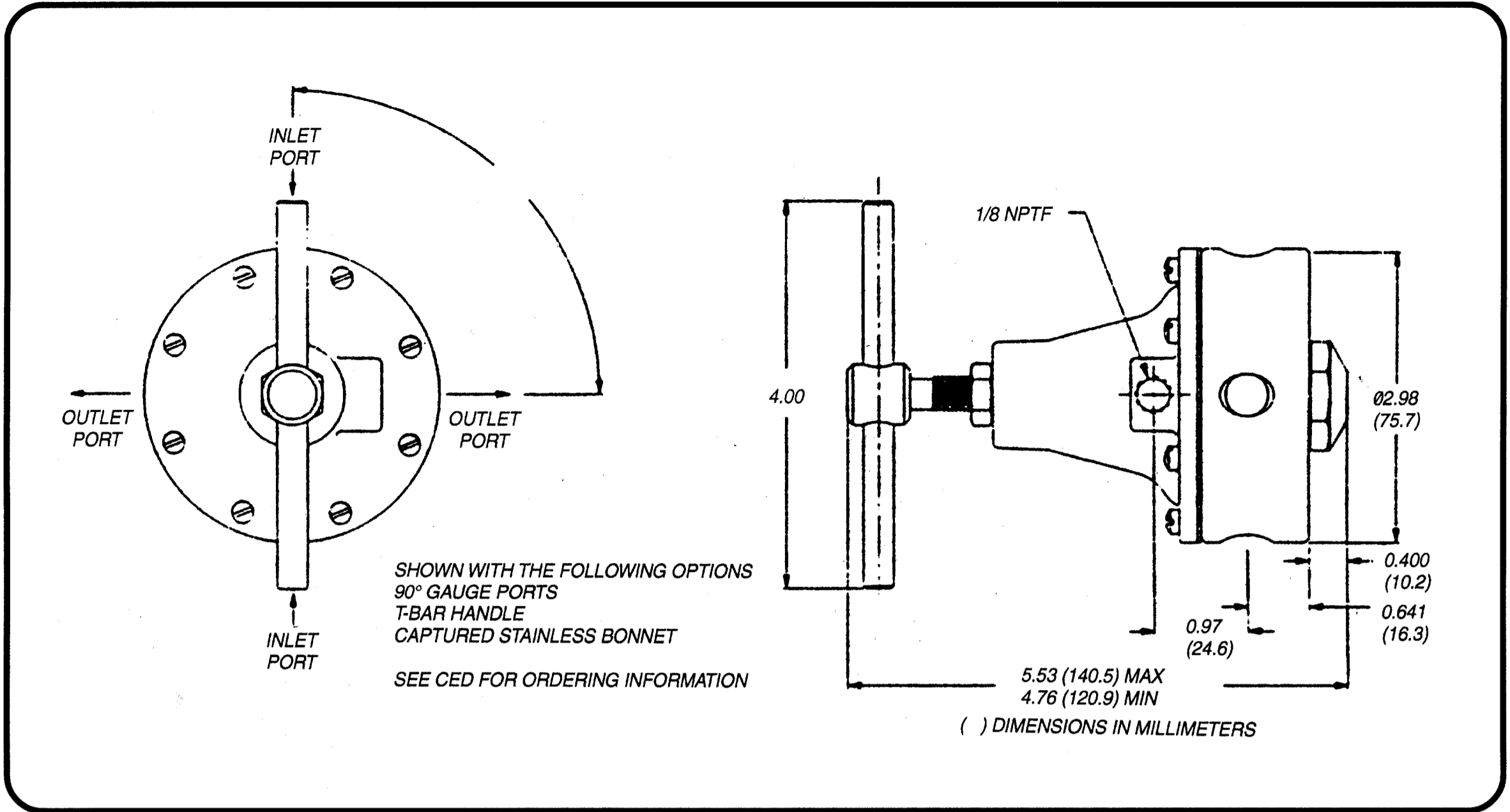
additional cost through an outside source. For special cleaning requirements, the customer must supply specifications for desired level of cleanliness. Cost will be advised prior to performing the cleaning operation.



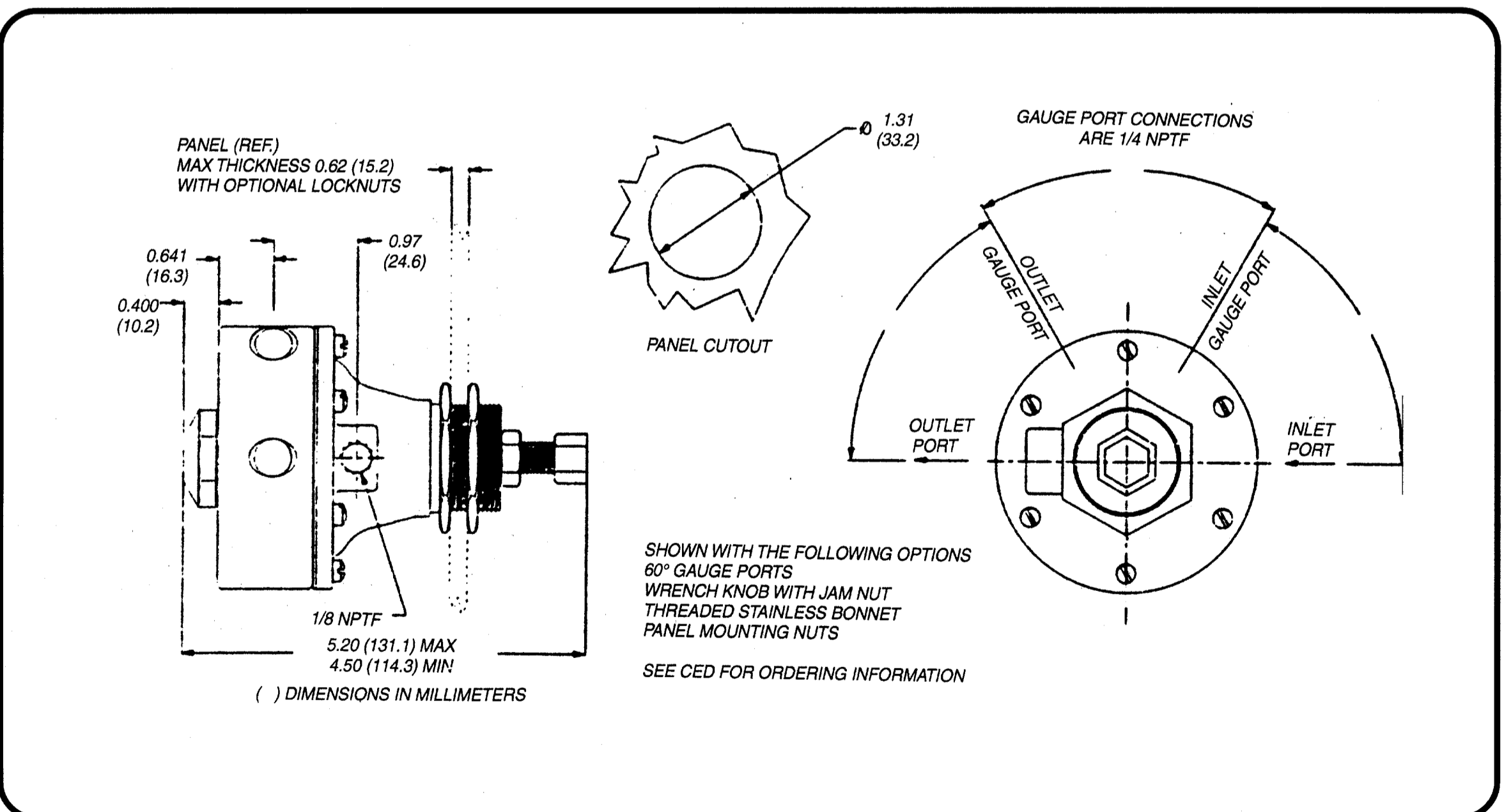
For Certified Dimensional Drawing, refer to HP100-C1



For Certified Dimensional Drawing, refer to HP100-C2



For Certified Dimensional Drawing, refer to HP100-C3.



For Certified Dimensional Drawing, refer to HP100-C4.