HARRIS®
SPECIALTY GAS
Equipment

GAS PRESSURE & FLOW CONTROL EQUIPMENT CATALOG

HARRIS® SPECIALTY GAS Equipment

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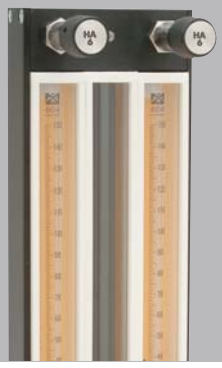

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The Harris Products Group, A Lincoln Electric Company is one of the largest independent manufacturers of pressure and flow control equipment in the world. Harris products are sold and used in over 85 countries.

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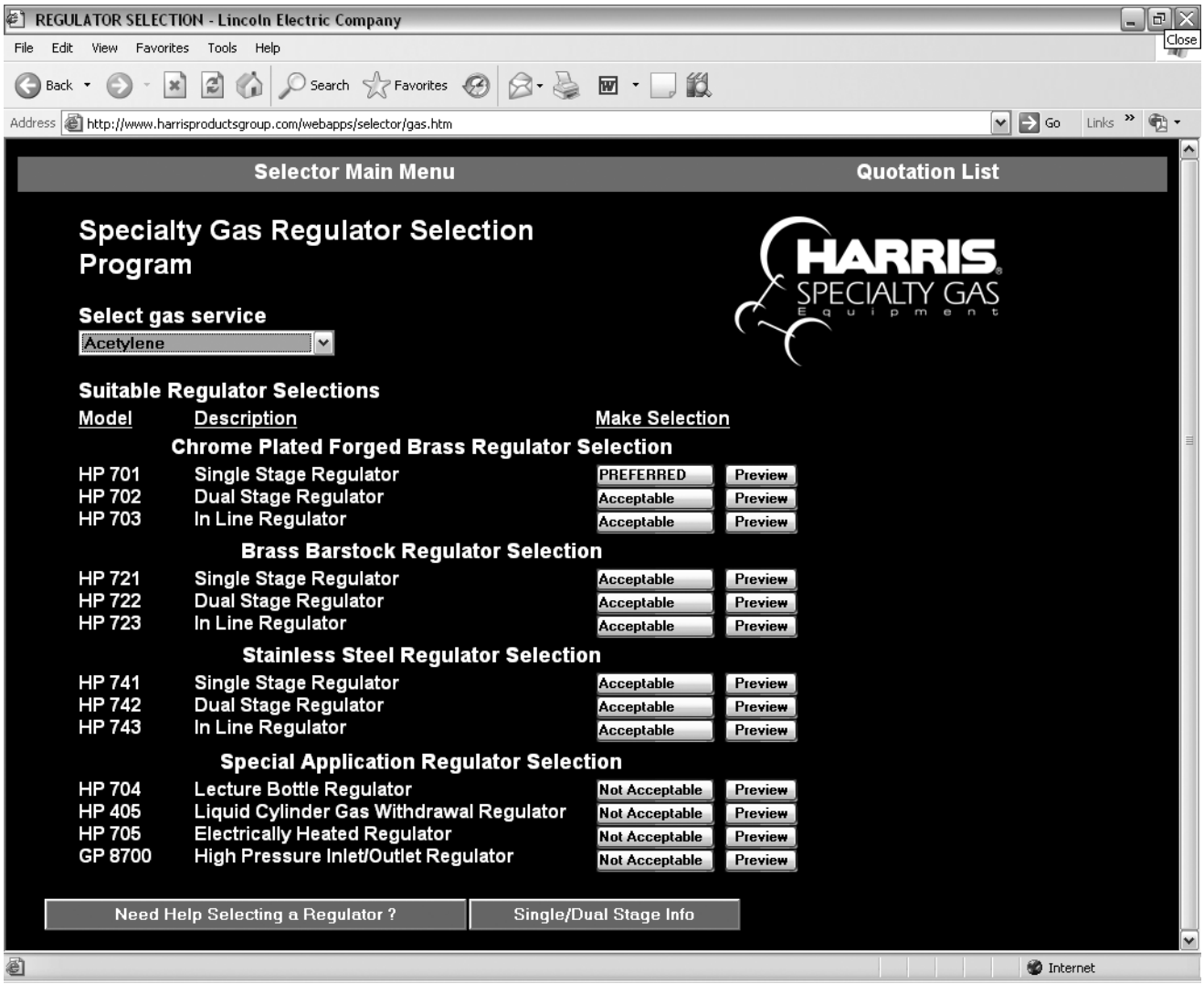
Harris Specialty Gas Equipment Division was founded to provide complete solutions to customer's special gas handling requirements. The breadth of the product line is used in pharmaceutical, chemical processing, research and development, as well as biotechnology. In addition to pressure control equipment, Harris offers complete gas management products for flow control, gas purification, cylinder storage and audio/visual pressure indication.

Harris Specialty Gas Regulator Selection Program

NEW!

The Harris Specialty Gas Regulator Selector Program is available exclusively on the Harris Products Group Website (www.harrisproductsgroup.com). This convenient program allows the user to quickly and easily specify and choose regulators for high purity, toxic or corrosive gas service. Regulators with multiple features can be specified by simply choosing from the various options available. The program allows for multiple regulators to be specified where it then compiles all selections in a list which can be emailed to Harris' customer service department for a quote.

The program features graphical user controls and inputs. It also includes links to informative articles on common terminology and regulator function. The part number is developed by selecting on the desired features such as Gas Service, Pressure Requirements and Accessories.



Harris Specialty Gas Regulator Selection Program

FOLLOW THESE SIMPLE STEPS:

GO TO: WWW.HARRISPRODUCTSGROUP.COM/REGULATOR

STEP 1 - Choose Gas Service

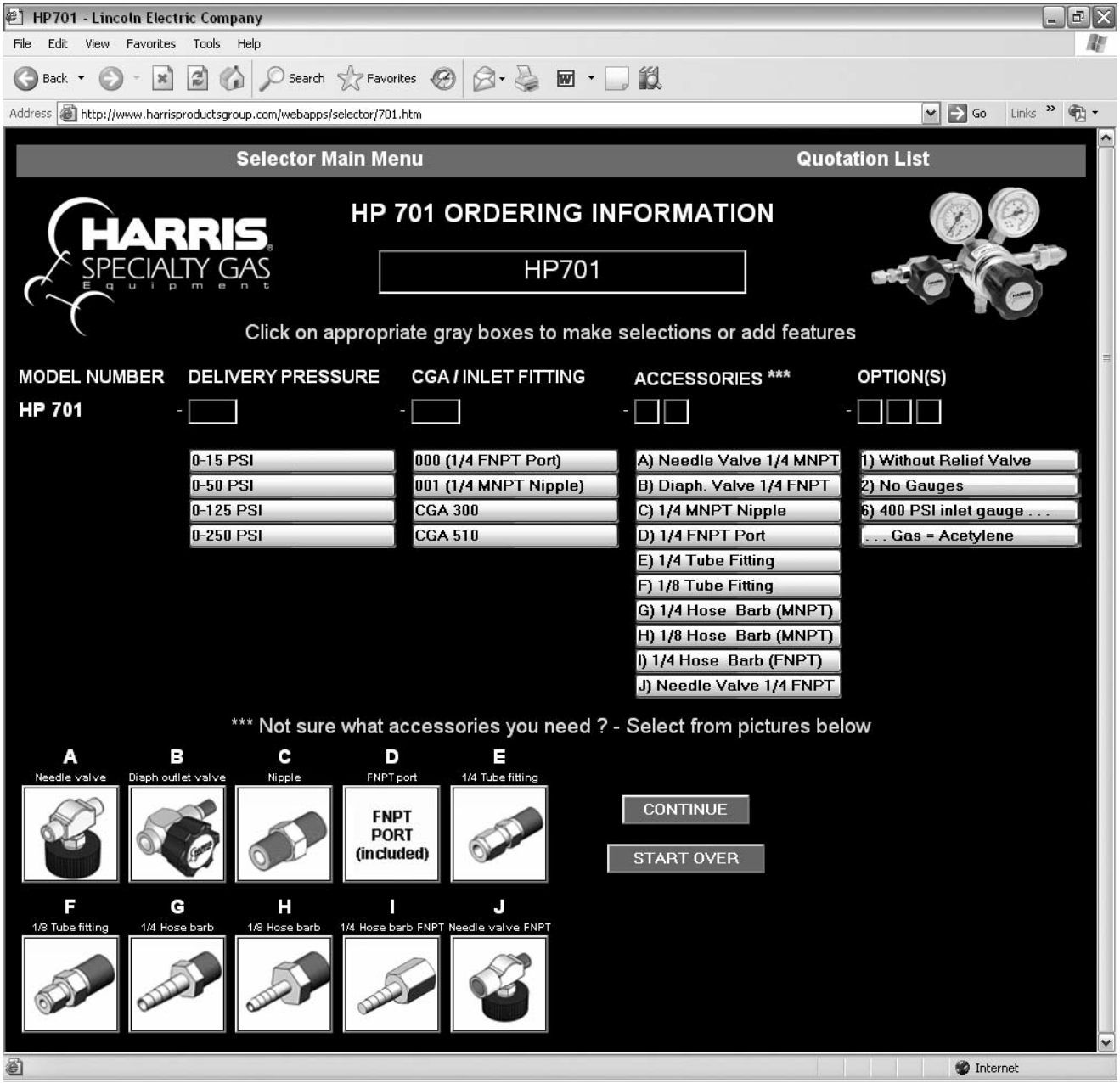
STEP 2 - Select from the appropriate models given

STEP 3 - Select outlet pressure needed

STEP 4 - Select inlet and outlet fittings

STEP 5 - Select additional options or accessories

STEP 6 - Add to quotation page which can be emailed directly to the Harris Customer Service Group.



Selection of High Purity Pressure Regulators

Gases can be supplied in compressed gas high-pressure cylinders, liquid low-pressure cylinders or from low-pressure pipeline supply. The pressure from the supply source must be reduced to the desired working pressure for the application, to accomplish this a pressure reducing valve commonly referred to a regulator needs to be selected. Proper selection is critical for a safe and effective transfer of the gas from the gas supply to the instrument. Regulators are designed to control pressure. Regulators will not measure or control flow. An external device such as a flowmeter or metering valve specifically designed for flow control should be used for that purpose.

Selection of the correct regulator involves many variables. All items must be considered in making the proper regulator selection.

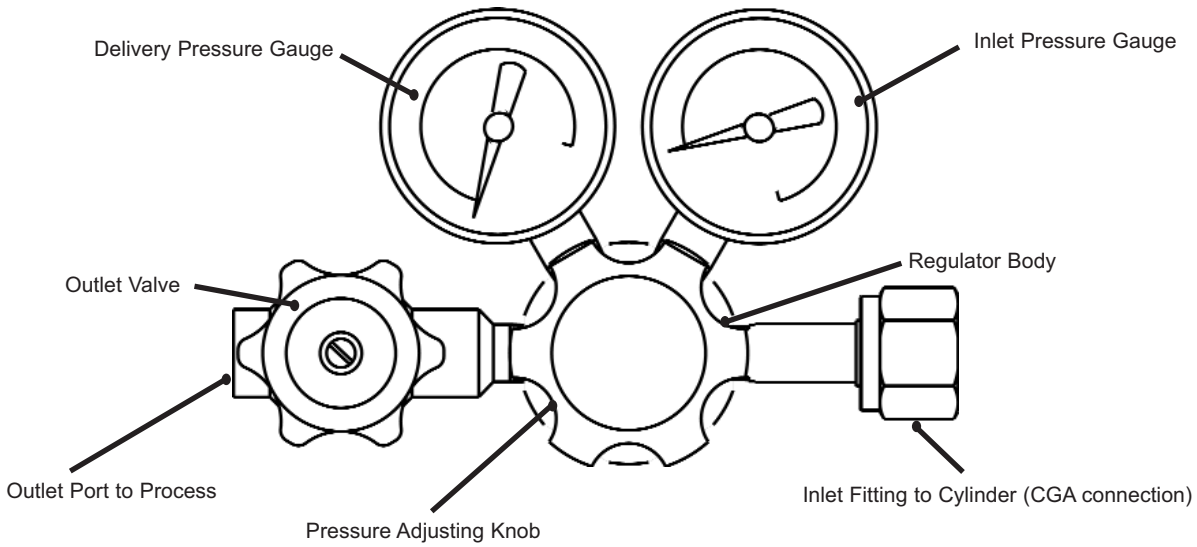
1-Materials Compatibility- Materials used to construct the pressure regulator need to be compatible with the intended gas service. All the wetted areas (parts of the regulator in contact with the gas) must be selected to avoid any reaction with the gas that can cause contamination in the gas stream or deterioration of the regulator components. Refer to Gas Materials Compatibility Table on Page 94.

2-Inlet Pressure Rating- Inlet pressures can range from low pressure in pipeline usage to high pressure from compressed gas cylinders. Regulators used in a pipeline will normally have only one gauge to indicate delivery pressure while a cylinder regulator will have two gauges; one to show inlet pressure and the other to show delivery pressure. An exception to this would be the use of regulators for liquid gas cylinders. In this application, only the delivery pressure gauge would be required since the supply pressure is generally constant. When selecting the regulator it must be capable of handling the incoming inlet pressure. When the gas is supplied from a cylinder the CGA (Compressed Gas Association) inlet connection number will dictate the maximum supply pressure. This pressure can range from 100 PSI to over 6000 PSI.

3-Delivery Pressure Range- The desired working pressure for the operation may range from low pressure up to 15 PSIG to a much higher working pressure (7500-PSIG). The regulator selected must be able to supply the proper working pressure consistent with the requirements of the process.

4-Gas Purity- Maintaining the purity level of the gas is of primary importance in the selection of the regulator. The selected regulator must be resistant to any introduction of contaminants that can be detrimental to the process. In addition to the proper selection of materials for gas compatibility, the design, assembly and testing of the regulator are critical items to consider in the selection process. Clean room assembly and Helium leak testing are common procedures used to insure the integrity of the regulator.

5-Pressure regulation, single-stage or two-stage design- All regulators are designed to reduce the inlet pressure to a desired working pressure. The regulator can reduce the pressure in either one step or two steps. A single-stage regulator reduces the pressure in one step and a two-stage regulator reduces the pressure in two steps, either may be suitable for the application based on the desired pressure control.



Single-Stage regulators are best suited for applications where manual periodic adjustment of the delivery pressure settings is not a problem and the inlet pressure remains constant, such as the case in gas withdrawal from liquid cylinders.

Two-stage regulators are two regulators built into a single regulator body. The first regulator (first stage) is preset at a non-adjustable pressure to reduce the incoming pressure to a lower pressure referred to as the intermediate stage. The second regulator (second stage) is adjustable within the desired delivery range. The two-stage regulator allows for steady delivery pressure without periodic adjustment, well suited for applications requiring constant pressure from full to nearly empty cylinder.

Operation of Pressure Regulators

Single-Stage Regulators

Gas enters the inlet (high-pressure) chamber and its pressure is indicated on the inlet pressure gauge. When the pressure adjusting knob is turned counterclockwise and completely backed out to the stop, a valve and seat assembly located between the inlet chamber and the delivery (low pressure) chamber prevents gas from moving any further. A filter located at the inlet to the valve and seat assembly, removes particulate matter from the gas stream to help protect the seat area.

Turning the pressure-adjusting knob clockwise causes the adjusting screw to push against a spring button that compresses the pressure adjusting spring. The force of the compressed spring, in turn, causes the diaphragm to flex and push against the valve. This opens the regulator allowing gas to flow from the inlet chamber to the delivery chamber of the regulator.

Gas entering the delivery pressure chamber begins to build pressure and creates a counter-force (counter to the pressure adjusting spring) on the diaphragm. This pressure is indicated on the delivery pressure gauge attached to the delivery chamber. When pressure builds sufficiently to counteract the spring tension, it pushes the diaphragm away from the poppet allowing the regulator valve to close. In this manner, pressure in the delivery chamber is controlled or regulated by the amount of spring tension placed on the diaphragm and is selectable by turning the pressure adjusting knob until desired pressure is indicated on the delivery pressure gauge.

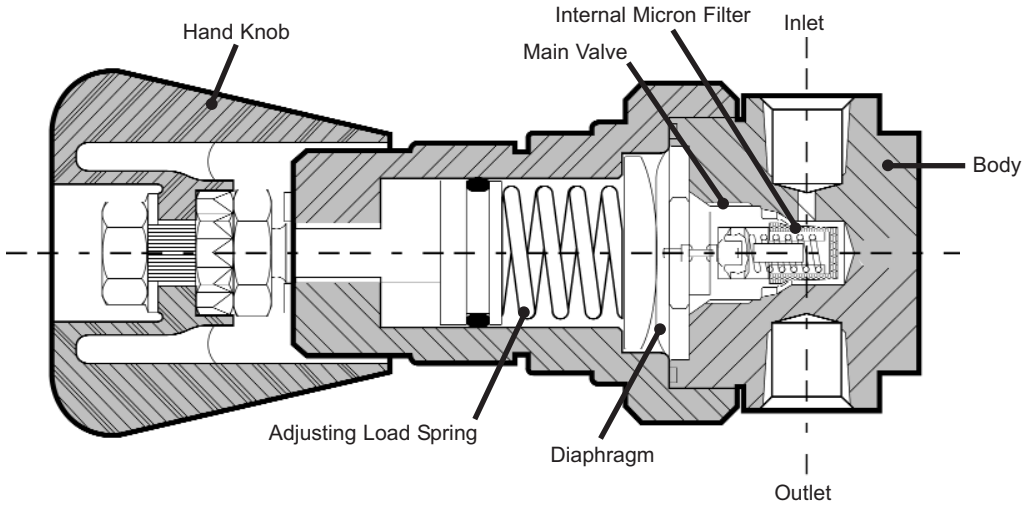
When gas from the delivery pressure chamber is sent to the end process, the resulting decrease in gas volume in the delivery chamber causes a pressure reduction in the chamber. When this occurs, the spring tension again causes the diaphragm to push the valve open, allowing additional gas to enter the delivery chamber.

Two-Stage Regulators

These regulators incorporate all components of a single-stage regulator. In addition, however, they also contain a second pressure adjusting spring, diaphragm, and valve seat assembly. The first stage is not user adjustable with the pressure adjusting spring "pre-compressed" at the factory. This allows the first stage to feed pressure to the second (adjustable) stage. The normal maximum delivery pressure for two-stage regulators is 500 PSI.

The second stage then performs in a manner similar to that of a single-stage regulator, except that the inlet pressure to the second stage is relatively constant. The two-step pressure reduction produces a final delivery pressure showing little effect from changes in cylinder pressure.

SINGLE STAGE REGULATOR



REGULATOR Selection Guide

HIGH PURITY & CORROSIVE GAS - STAINLESS STEEL REGULATOR

740 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
HP 741 - Single Stage	12	Stainless Steel	SS Barstock	Ch. Pl. Br. Barstock
HP 742 - Dual Stage	14	Stainless Steel	SS Barstock	Ch. Pl. Br. Barstock
HP 743 - In Line	16	Stainless Steel	SS Barstock	Ch. Pl. Br. Barstock

HIGH PURITY - BRASS BARSTOCK REGULATOR

720 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
HP 721 - Single Stage	18	Stainless Steel	Brass Barstock	Brass Barstock
HP 722 - Dual Stage	20	Stainless Steel	Brass Barstock	Brass Barstock
HP 723 - In Line	22	Stainless Steel	Brass Barstock	Brass Barstock
HP 721C - Single Stage	18	Stainless Steel	Ch. Pl. Br. Barstock	Ch. Pl. Br. Barstock
HP 722C - Dual Stage	20	Stainless Steel	Ch. Pl. Br. Barstock	Ch. Pl. Br. Barstock
HP 723C - In Line	22	Stainless Steel	Ch. Pl. Br. Barstock	Ch. Pl. Br. Barstock

HIGH PURITY - CHROME PLATED FORGED BRASS REGULATOR

700 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
HP 701 - Single Stage	24	Stainless Steel	Chrome Plated Brass	Chrome Plated
HP 702 - Dual Stage	26	Stainless Steel	Chrome Plated Brass	Chrome Plated
HP 703 - In Line	28	Stainless Steel	Chrome Plated Brass	Chrome Plated

GENERAL PURPOSE - BRASS REGULATOR

400 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
GP 401 - Single Stage	30	Neoprene	Brass	Painted Die Cast
GP 402 - Dual Stage	32	Neoprene	Brass	Painted Die Cast
GP 403 - In Line	34	Neoprene	Brass	Painted Die Cast

HIGH PURITY - LECTURE BOTTLE REGULATOR

704 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
HP 704	36	Stainless Steel	Ch. Pl. Br. Barstock	Ch. Pl. Br. Barstock

REGULATOR Selection Guide

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Stainless Steel	0-15,0-50,0-125, 0-250, 0-500 PSI	High Purity (99.9999) and corrosive gases
10 Micron Stainless Steel	0-15,0-50,0-125, 0-250, 0-500 PSI	High Purity (99.9999) and corrosive gases
10 Micron Stainless Steel	0-15,0-50,0-125, 0-250, 0-500 PSI	High Purity (99.9999) and corrosive gases

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250, 0-500 PSIG	High Purity ($\geq$ 99.999) non-corrosive gases
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250, 0-500 PSIG	High Purity ($\geq$ 99.999) non-corrosive gases
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250, 0-500 PSIG	High Purity ($\geq$ 99.999) non-corrosive gases
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250, 0-500 PSIG	High Purity ($\geq$ 99.999) non-corrosive gases
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250, 0-500 PSIG	High Purity ($\geq$ 99.999) non-corrosive gases
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250, 0-500 PSIG	High Purity ($\geq$ 99.999) non-corrosive gases

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250 PSIG	High Purity ($\leq$ 99.999) non-corrosive gases
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250 PSIG	High Purity ($\leq$ 99.999) non-corrosive gases
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250 PSIG	High Purity ($\leq$ 99.999) non-corrosive gases

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250 PSIG	General Purpose non-corrosive gases
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250 PSIG	General Purpose non-corrosive gases
10 Micron Nickel Plated Bronze	0-15,0-50,0-125, 0-250 PSIG	General Purpose non-corrosive gases

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-15, 0-100 PSIG	Non-corrosive gases & Lecture Bottles

REGULATOR Selection Guide

GENERAL PURPOSE - LECTURE BOTTLE REGULATOR

404 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
GP 404 - Single Stage	38	Neoprene	Brass Barstock	Painted Die Cast

LIQUID CYLINDER REGULATOR

405 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
HP 405	40	Stainless Steel	Chrome Plated Brass	Chrome Plated Brass

ELECTRICALLY HEATED - BRASS BARSTOCK REGULATOR

705 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
HP 705	44	Stainless Steel	Brass Barstock	Ch. Pl. Die Cast

ULTRA HIGH PRESSURE REGULATOR

8700 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
GP 8700	46	Urethene	Brass Barstock	Brass Barstock

HIGH FLOW - TWO GAUGE REGULATOR

3520 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
HP 3520	48	Stainless Steel	Brass Barstock	Brass Barstock

HIGH FLOW - SINGLE GAUGE REGULATOR

3530 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
HP 3530	50	Stainless Steel	Brass Barstock	Brass Barstock

ULTRA HIGH FLOW SERVO DOME REGULATOR

750 & 752 SERIES	PAGE NO.	MATERIALS OF CONSTRUCTION		
		Diaphragm	Body	Bonnet
HP 750-PSI-3K	52	Teflon Coated Neoprene	Brass Barstock	Brass Barstock
HP 750-PSI-5K	52	Teflon Coated Neoprene	Brass Barstock	Brass Barstock
HP 752 Remote	54	Teflon Coated Neoprene	Brass Barstock	Brass Barstock

REGULATOR Selection Guide

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-100 PSIG	Non-corrosive gases & Lecture Bottles

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-125, 0-350, 0-500 PSIG	Laser Assist, Any Liquid Dewar

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-125PSIG	Carbon Dioxide, Nitrous Oxide, CO2 & N2O Mixtures

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-1500, 0-2500, 0-3000, 0-4500, 0-6000 PSIG	Ultra High Delivery Pressure of Non-corrosive gases

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-15, 0-50, 0-125, 0-250, 0-500 PSIG	High Flow of Non-corrosive gases

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-15, 0-50, 0-125, 0-250, 0-500 PSIG	High Flow of Non-corrosive gases

INLET FILTER	DELIVERY PRESSURES RANGES	GAS APPLICATIONS
10 Micron Nickel Plated Bronze	0-250, 0-500, 0-1000 PSIG	Ultra High Flow non-corrosive gases
10 Micron Nickel Plated Bronze	0-250, 0-500, 0-1000 PSIG	Ultra High Flow non-corrosive gases
10 Micron Nickel Plated Bronze	0-500 PSIG	Ultra High Flow non-corrosive gases

HP 741

High Purity - Stainless Steel Barstock Regulator

Model HP 741-015-580-A-4 shown

A single stage stainless steel cylinder regulator for applications where a slight rise in delivery pressure from full to empty cylinder can be tolerated. The Model HP 741 is suitable for:

- Corrosive gas applications
- High purity gas applications
- Research sample systems gases
- Process analyzer gases
- Gas chromatography
- EPA protocol gases
- Laser gas systems
- Emission monitoring systems

Recommended for corrosive gases or purity levels of Grade 6.0 (99.9999) and higher.

MATERIALS

Body	316L Stainless Steel Barstock
Bonnet	Chrome Plated Brass Barstock
Diaphragm	316L Stainless Steel
Nozzle	316L Stainless Steel
Seat	PTFE Teflon
Seals	PTFE Teflon
Filter	Sintered Stainless Steel - 10 Micron
Seat Return Spring	316L Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

- ▣ 1 11/16" 316L stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ▣ One piece encapsulated seat design includes a sintered filter to protect the seat from particulate contamination
- ▣ Chrome plated bonnet, 316L SS body and fittings
- ▣ 2" stainless steel dual scale gauges (psi/bar)
- ▣ 1 x 10^{-9} cc/sec. inboard helium leak rate maintains gas purity levels
- ▣ Front or back panel mountable
- ▣ Maximum inlet 3000 PSIG except for models with CGA 240, 300 and 510, equipped with 400 PSIG inlet gauge

RELATED OPTIONS

Captured Vent Kit P/N: 9100875
Front Panel Mount Kit P/N: 9100871

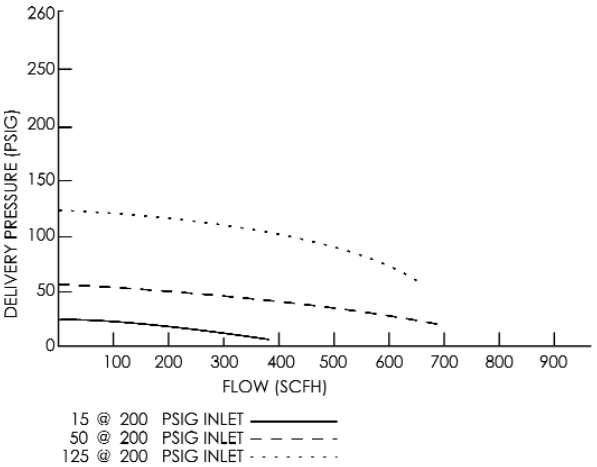
HP 741 ORDERING INFORMATION

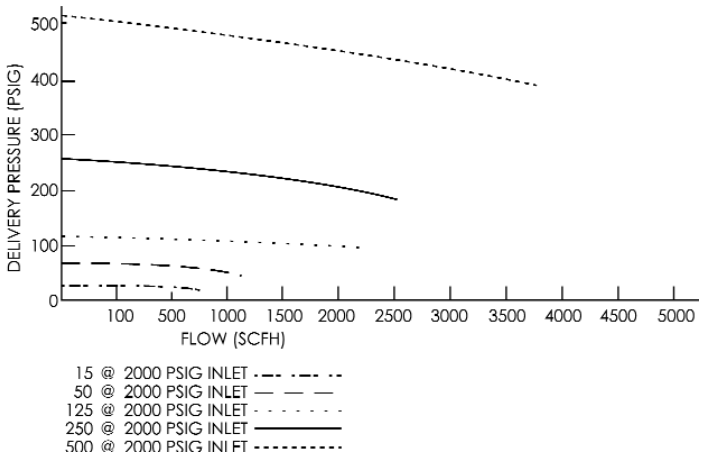
HP 741 - xxx - xxx - xxxx - xxxxx

MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	CGA/INLET FITTING		ACCESSORIES	OPTIONS
HP 741	0-15 PSIG	(30" Hg Vac-30 psi/2 bar)	240	510	A) 1/4" FNPT Diaph. Valve	2) He Leak Cert. (Inboard)
	0-50 PSIG	(30" Hg Vac-100 psi/7 bar)	320	540	B) 1/4" MNPT Nipple	3) No Gauges
	0-125 PSIG	(30" Hg Vac-200 psi/14 bar)	326	580	C) 1/4" FNPT Port	4) With Relief Valve
	0-250 PSIG	(400 psi/28 bar)	330	590	D) 1/4" Tube Fitting	5) He Leak Cert. (Outboard)
	0-500 PSIG	(1000 psi/70 bar)	346	660	E) 1/8" Tube Fitting	6) 400 PSI Inlet Gauge
			350	705	F) Single Regulator Alarm	**Gas Service Must be Specified**
			000 (1/4" FNPT)		G) SG 910 SS Regulator Mounting Station	
			001 (1/4" MNPT)			

HP 741 TECHNICAL SPECIFICATIONS

FLOW DATA

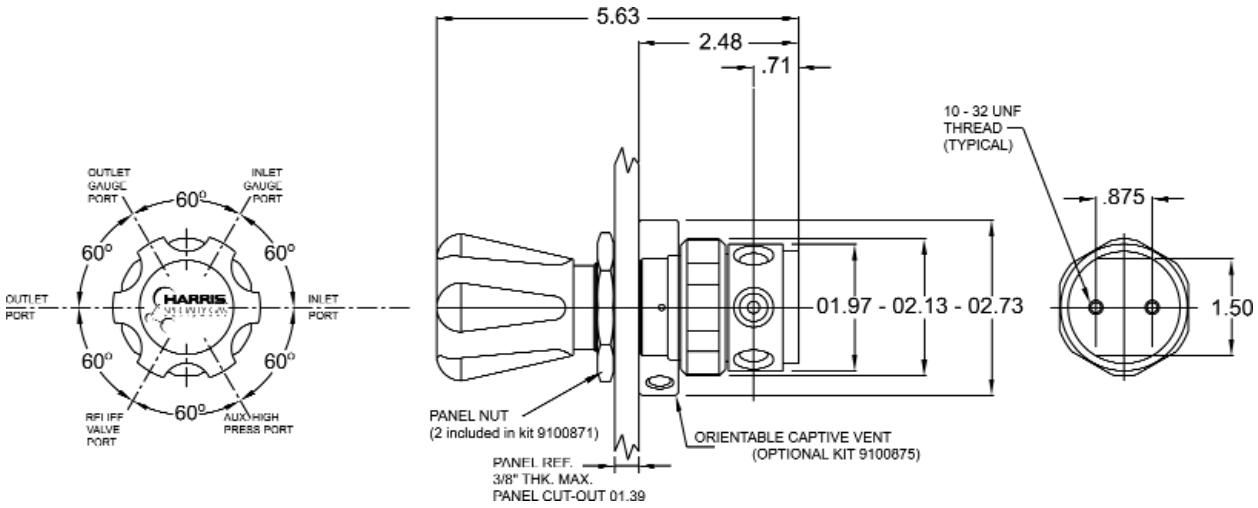




SPECIFICATIONS

- C_V: .08
- Pressure Regulation: 1.8 PSIG/100 PSIG
- Weight: 2.92 Lbs.

DIMENSIONS



HP 742

High Purity - Stainless Steel Barstock Regulator

Model HP 742-125-580-A-4 shown

A two stage stainless steel cylinder regulator for constant delivery pressure from full to near empty cylinder conditions. The HP 742 is suitable for:

- Corrosive gas applications
- High purity gas applications
- Research sample systems gases
- Process analyzer gases
- Gas chromatography
- EPA protocol gases
- Laser gas systems
- Emission monitoring systems

Recommended for corrosive gases or purity levels of Grade 6.0 (99.9999) and higher.

MATERIALS

Body	316L Stainless Steel Barstock
Bonnet	Chrome Plated Brass Barstock
Diaphragm	316L Stainless Steel
Nozzle	316L Stainless Steel
Seat	PTFE Teflon
Seals	PTFE Teflon
Filter	Sintered Stainless Steel - 10 Micron
Seat Return Spring	316L Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

- ⊡ 1 11/16" 316L stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ⊡ One piece encapsulated seat design includes a sintered filter to protect the seat from particulate contamination
- ⊡ Chrome plated bonnet, 316L SS body and fittings
- ⊡ 2" stainless steel dual scale gauges (psi/bar)
- ⊡ 1 x 10^{-9} cc/sec. inboard helium leak rate maintains gas purity levels
- ⊡ Maximum inlet 3000 PSIG except for models with CGA 240, 300 and 510, equipped with 400 PSIG inlet gauge
- ⊡ Front panel mountable

RELATED OPTIONS

Captured Vent Kit P/N: 9100875
Front Panel Mount Kit P/N: 9100871

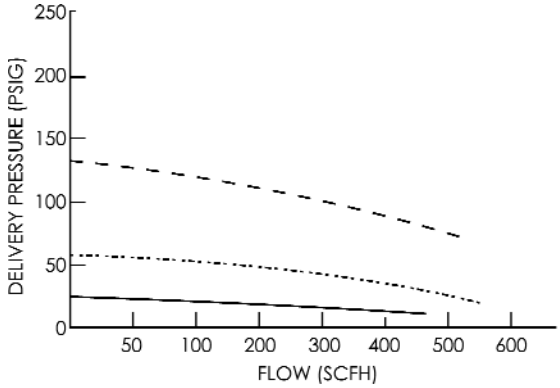
HP 742 ORDERING INFORMATION

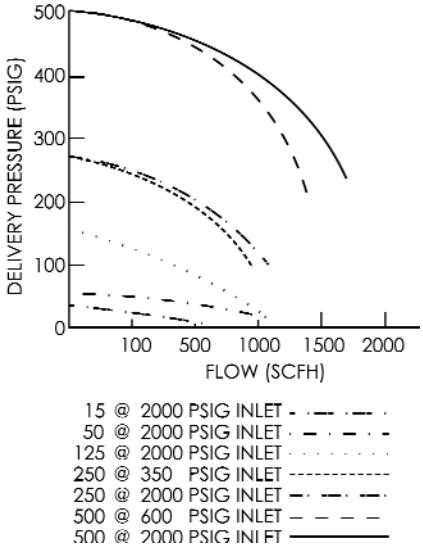
HP 742 - xxx - xxx - xxxx - xxxx

MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	CGA/INLET FITTING		ACCESSORIES	OPTIONS
HP 742	0-15 PSIG	(30" Hg Vac-30 psi/2 bar)	240	510	A) 1/4" FNPT Diaph. Valve	2) He Leak Cert. (Inboard)
	0-50 PSIG	(30" Hg Vac-100 psi/7 bar)	320	540	B) 1/4" MNPT Nipple	3) No Gauges
	0-125 PSIG	(30" Hg Vac-200 psi/14 bar)	326	580	C) 1/4" FNPT Port	4) With Relief Valve
	0-250 PSIG	(400 psi/28 bar)	330	590	D) 1/4" Tube Fitting	5) He Leak Cert. (Outboard)
	0-500 PSIG	(1000 psi/70 bar)	346	660	E) 1/8" Tube Fitting	
			350	705	F) Single Regulator Alarm	
			000 (1/4" FNPT)		G) SG 910 SS Regulator Mounting Station	
			001 (1/4" MNPT)			

HP 742 TECHNICAL SPECIFICATIONS

FLOW DATA

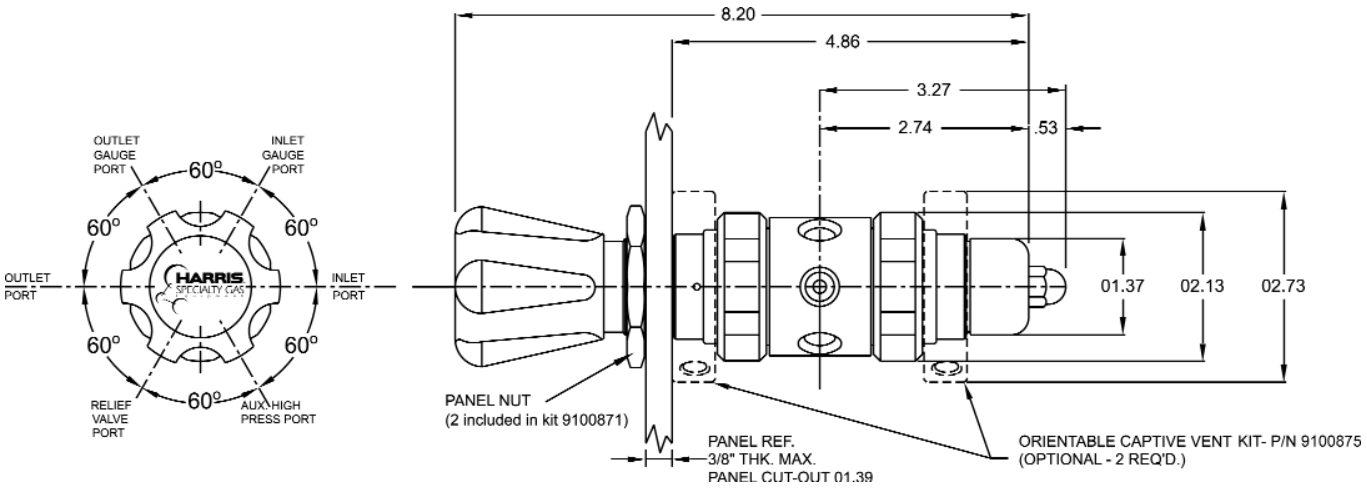




SPECIFICATIONS

- C_V: .06
- Pressure Regulation: .05 PSIG/100 PSIG
- Weight: 4.43 Lbs.

DIMENSIONS



HP 743

High Purity - Stainless Steel Barstock Regulator

Model HP 743-250-000-C-4 shown

A stainless steel pipeline regulator for pipeline and other applications up to 3000 PSIG inlet pressure. The Model HP 743 is suitable for:

- Corrosive gas applications
- High purity gas applications
- Research sample systems gases
- Process analyzer gases
- Gas chromatography
- EPA protocol gases
- Laser gas systems
- Emission monitoring systems

Recommended for corrosive gases or purity levels of Grade 6.0 (99.9999) and higher.

MATERIALS

Body	316L Stainless Steel Barstock
Bonnet	Chrome Plated Brass Barstock
Diaphragm	316L Stainless Steel
Nozzle	316L Stainless Steel
Seat	PTFE Teflon
Seals	PTFE Teflon
Filter	Sintered Stainless Steel - 10 Micron
Seat Return Spring	316L Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

- ☑ 1 11/16" 316L stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ☑ One piece encapsulated seat design includes a sintered filter to protect the seat from particulate contamination
- ☑ Chrome plated bonnet, 316L body and fittings
- ☑ 2" stainless steel single scale gauge (psi/bar)
- ☑ 1 x 10^{-9} cc/sec. inboard helium leak rate maintains gas purity levels
- ☑ Maximum inlet 3000 PSIG
- ☑ Front or back panel mountable

RELATED OPTIONS

Captured Vent Kit P/N: 9100875
Front Panel Mount Kit P/N: 9100871

HP 743 ORDERING INFORMATION

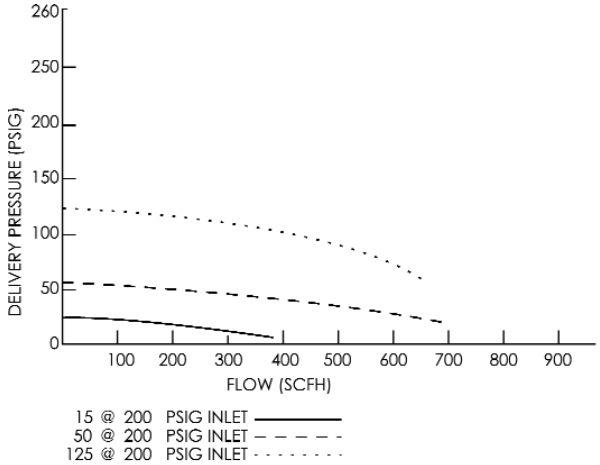
HP 743 - xxx - xxx - xx - xxxx

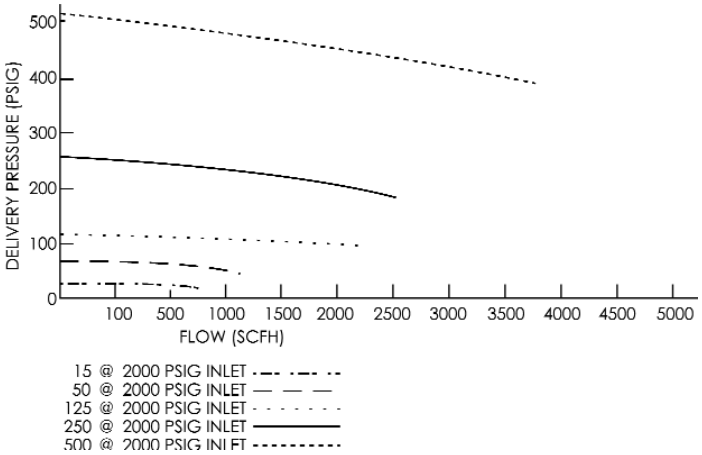
MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	INLET	ACCESSORIES	OPTIONS
HP 743	0-15 PSIG	(30" Hg Vac-30 psi/2 bar)	000 (1/4" FNPT)	A) 1/4" FNPT Diaph. Valve	2) He Leak Cert. (Inboard)
	0-50 PSIG	(30" Hg Vac-100 psi/7 bar)	001 (1/4" MNPT)	B) 1/4" MNPT Nipple	3) No Gauge
	0-125 PSIG	(30" Hg Vac-200 psi/14 bar)		C) 1/4" FNPT Port	4) With Relief Valve
	0-250 PSIG	(400 psi/28 bar)		D) 1/4" Tube Fitting	5) He Leak Cert. (Outboard)
	0-500 PSIG	(1000 psi/70 bar)		E) 1/8" Tube Fitting	

NOTE: Regulators with delivery pressure above 15 PSIG should not be used with acetylene.

HP 743 TECHNICAL SPECIFICATIONS

FLOW DATA

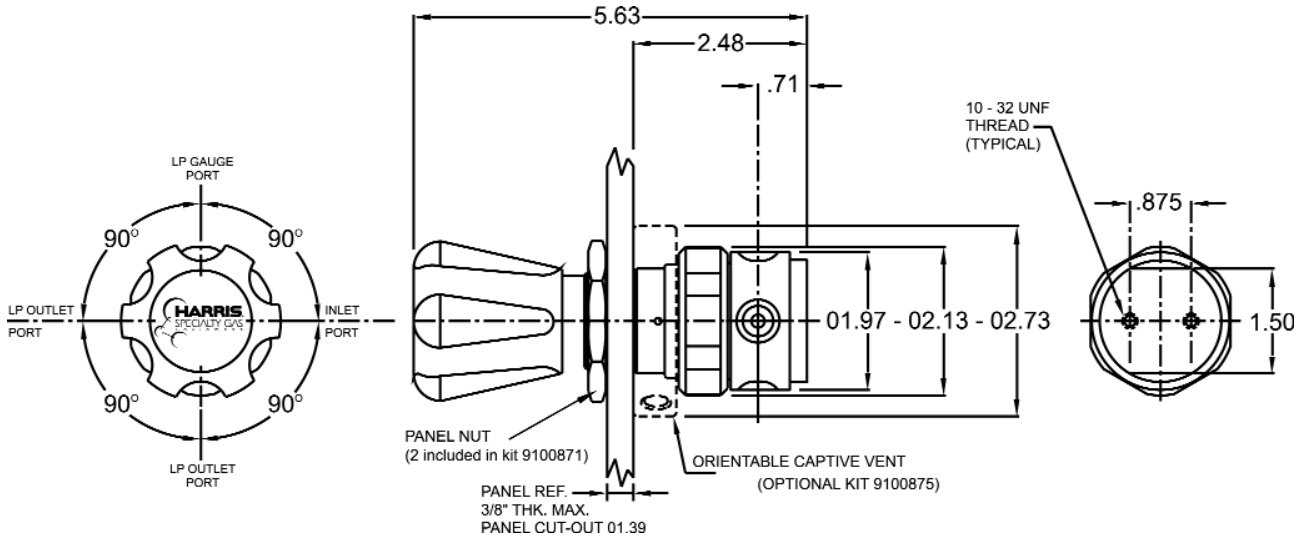




SPECIFICATIONS

- C_V: .08
- Pressure Regulation: 1.8 PSIG/100 PSIG
- Weight: 2.68 Lbs.

DIMENSIONS



HP 721

High Purity - Brass Barstock Regulator

Model HP 721-015-580-B shown

A single stage cylinder regulator available in brass (HP 721) or chrome plated brass (HP 721C) barstock for pressure control of non corrosive gases when pressure rise is not critical. The HP 721 is suitable for:

- High purity gas applications
- Research sample systems gases
- Process analyzer gases
- Gas chromatography
- EPA protocol gases
- Laser gas systems
- Emission monitoring systems

Recommended for gas purity levels of Grade 5.0 (99.999) and higher.

MATERIALS

Body/Bonnet	Brass Barstock
Diaphragm	316L Stainless Steel
Nozzle	Brass
Seat	PTFE Teflon
Seals	PTFE Teflon
Filter	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring	PH17-7 Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

- ☑ 1-11/16" 316L stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ☑ One piece encapsulated seat design includes a sintered filter to protect the seat from particulate contamination
- ☑ 2" dual scale brass gauges (psi/bar)
- ☑ 1 x 10^{-9} cc/sec. inboard helium leak rate maintains gas purity levels
- ☑ Front or back panel mountable
- ☑ Maximum inlet 3000 PSIG except for models with CGA 300 and 510, equipped with 400 PSIG Inlet Gauge
- ☑ External relief valve standard

RELATED OPTIONS

Captured Vent Kit P/N: 9100875
Front Panel Mount Kit P/N: 9100871

HP 721 ORDERING INFORMATION

HP 721 - xxx - xxx - xxxx - xxxxx

MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	CGA/INLET FITTING		ACCESSORIES	OPTIONS
HP 721	0-15 PSIG	(30" Hg Vac-30 psi/2 bar)	300	510	A) 1/4" MNPT Needle Valve	1) Without Relief Valve
HP 721C	0-50 PSIG	(30" Hg Vac-100 psi/7 bar)	320	540	B) 1/4" FNPT Diaph. Valve	2) He Leak Cert. (Inboard)
(chrome plated)	0-125 PSIG	(30" Hg Vac-200 psi/14 bar)	326	580	C) 1/4" MNPT Nipple	3) No Gauges
	0-250 PSIG	(400 psi/28 bar)	346	590	D) 1/4" FNPT Port	5) He Leak Cert. (Outboard)
	0-500 PSIG	(1000 psi/70 bar)	350		E) 1/4" Tube Fitting	6) 400 psi inlet gauge
			000 (1/4" FNPT)		F) 1/8" Tube Fitting	**Gas Service Must be Specified**
			001 (1/4" MNPT)		G) Single Regulator Alarm- (721C only)	
					H) SG 910 BR Regulator Mounting Station	

HP 721 TECHNICAL SPECIFICATIONS

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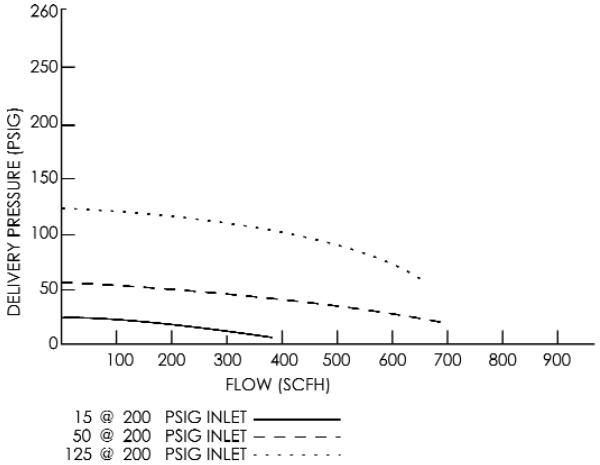
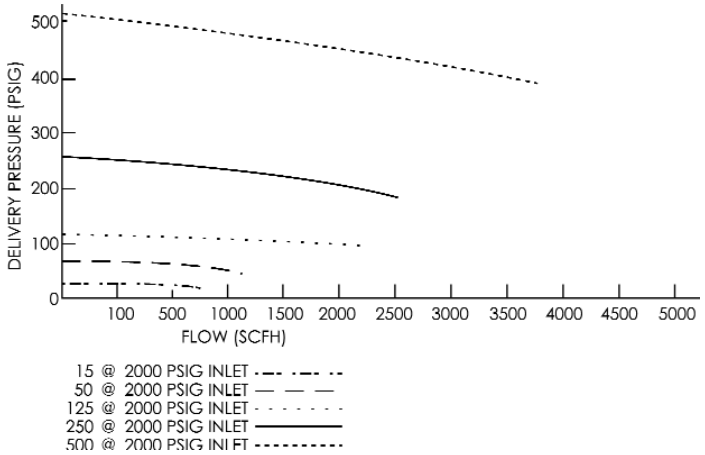
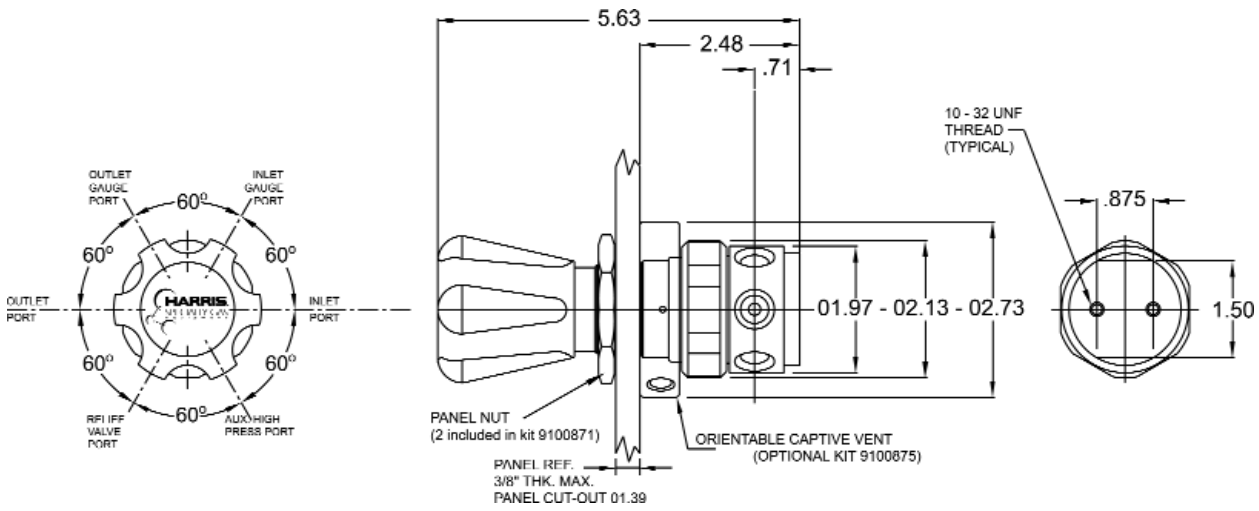




SPECIFICATIONS

- C_V: .08
- Pressure Regulation: 1.8 PSIG/100 PSIG
- Weight: 2.92 Lbs.

DIMENSIONS



HP 722

High Purity - Brass Barstock Regulator

Model HP 722-125-580-B shown

A two stage cylinder regulator available in brass (HP 722) or chrome plated brass (HP 722C) barstock for constant delivery pressure from full to near empty cylinder conditions. The HP 722 is suitable for:

- High purity gas applications
- Research sample systems gases
- Process analyzer gases
- Gas chromatography
- EPA protocol gases
- Laser gas systems
- Emission monitoring systems

Recommended for gas purity levels of Grade 5.0 (99.999) and higher.

MATERIALS

Body/Bonnet . . . . . .Brass Barstock
Diaphragm . . . . . .316L Stainless Steel
Nozzle . . . . . .Brass
Seat . . . . . .PTFE Teflon
Seals . . . . . .PTFE Teflon
Filter . . . . . .Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring . . . . . .PH17-7 Stainless Steel
Adjusting Knob . . . . . .ABS Plastic

FEATURES

- ⊡ 1 11/16" 316L stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ⊡ One piece encapsulated seat design includes a sintered filter to protect the seat from particulate contamination
- ⊡ 2" dual scale brass gauges (psi/bar)
- ⊡ 1 x 10^{-9} cc/sec. inboard helium leak rate maintains gas purity levels
- ⊡ Front panel mountable
- ⊡ Maximum inlet 3000 PSIG except for models with CGA 300 and 510, equipped with 400 PSIG inlet gauge
- ⊡ External relief valve standard

RELATED OPTIONS

Captured Vent Kit P/N: 9100875
Front Panel Mount Kit P/N: 9100871

HP 722 ORDERING INFORMATION

HP 722 - xxx - xxx - xxxx - xxxx

MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	CGA INLET FITTING		ACCESSORIES	OPTIONS
HP 722 HP 722C (chrome plated)	0-15 PSIG 0-50 PSIG 0-125 PSIG 0-250 PSIG 0-500 PSIG	(30" Hg Vac-30 psi/2 bar) (30" Hg Vac-100 psi/17 bar) (30" Hg Vac-200 psi/14 bar) (400 psi/28 bar) (1000 psi/70 bar)	296 300 320 326 346 350 000 (1/4" FNPT) 001 (1/4" MNPT)	510 540 580 590	A) 1/4" MNPT Needle Valve B) 1/4" FNPT Diaph. Valve C) 1/4" MNPT Nipple D) 1/4" FNPT Port E) 1/4" Tube Fitting F) 1/8" Tube Fitting G) Single Regulator Alarm-(722C only) H) SG 910 BR Regulator Mounting Station	1) Without Relief Valve 2) He Leak Cert. (Inboard) 3) No Gauges 5) He Leak Cert. (Outboard)

HP 722 TECHNICAL SPECIFICATIONS

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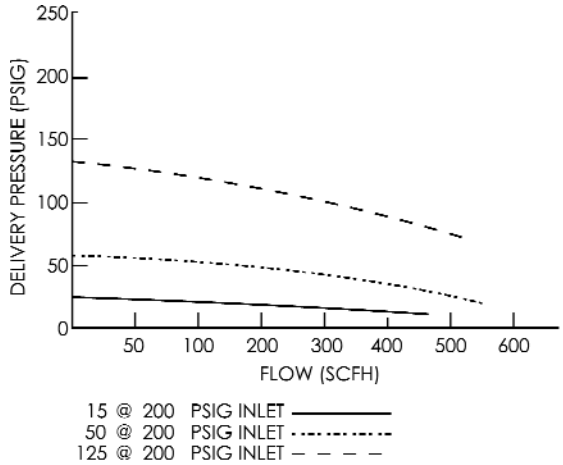
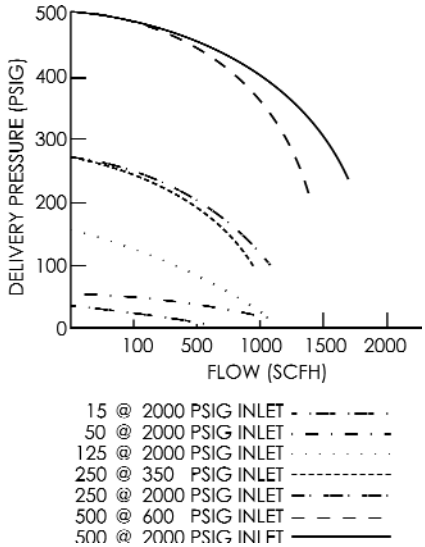
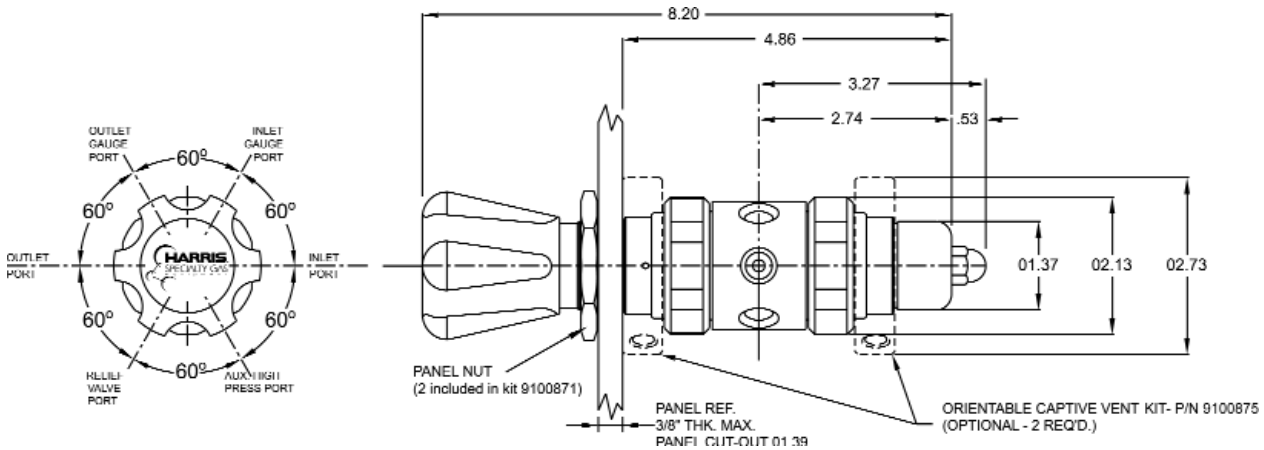




SPECIFICATIONS

- C_V: .06
- Pressure Regulation: .05 PSIG/100 PSIG
- Weight: 4.43 Lbs.

DIMENSIONS



HP 723

High Purity - Brass Barstock Regulator

Model HP 723-050-000-D shown

A single stage pipeline regulator available in brass (HP 723) or chrome plated brass (HP 723C) barstock for:

- High purity gas applications
- Research sample systems gases
- Process analyzer gases
- Gas chromatography
- EPA protocol gases
- Laser gas systems
- Emission monitoring systems

Recommended for gas purity levels of Grade 5.0 (99.999) and higher.

MATERIALS

Body/Bonnet . . . . . .Brass Barstock
Diaphragm . . . . . .316L Stainless Steel
Nozzle . . . . . .Brass
Seat . . . . . .PTFE Teflon
Seals . . . . . .PTFE Teflon
Filter . . . . . .Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring . . . . . .PH 17-7 Stainless Steel
Adjusting Knob . . . . . .ABS Plastic

FEATURES

- ☑ 1 11/16" 316L stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ☑ One piece encapsulated seat design includes a sintered filter to protect the seat from particulate contamination
- ☑ 2" dual scale brass gauge (psi/bar)
- ☑ 1 x 10^{-9} cc/sec. inboard helium leak rate maintains gas purity levels
- ☑ Front or back panel mountable
- ☑ External relief valve standard

RELATED OPTIONS

Captured Vent Kit P/N: 9100875
Front Panel Mount Kit P/N: 9100871

HP 723 ORDERING INFORMATION

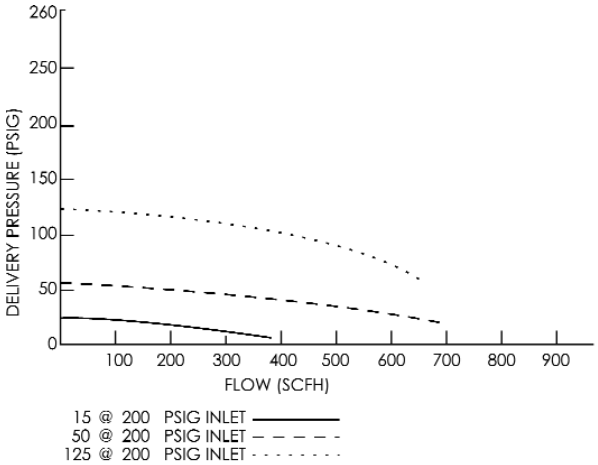
HP 723 - xxx - xxx - xx - xxxx

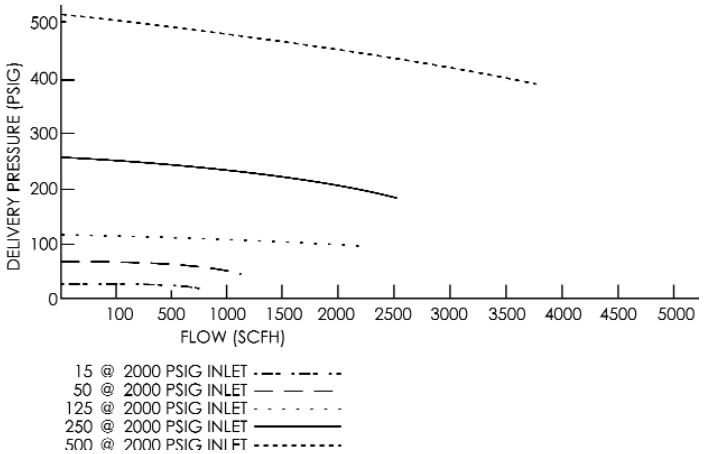
MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	INLET	ACCESSORIES	OPTIONS
HP 723 HP 723C (chrome plated)	0-15 PSIG 0-50 PSIG 0-125 PSIG 0-250 PSIG 0-500 PSIG	(30" Hg Vac-30 psi/2 bar) (30" Hg Vac-100 psi/7 bar) (30" Hg Vac-200 psi/14 bar) (400 psi/28 bar) (1000 psi/70 bar)	000 (1/4" FNPT) 001 (1/4" MNPT)	A) 1/4" MNPT Needle Valve B) 1/4" FNPT Diaph. Valve C) 1/4" MNPT Nipple D) 1/4" FNPT Port E) 1/4" Tube Fitting F) 1/8" Tube Fitting	1) Without Relief Valve 2) He Leak Cert. (Inboard) 3) No Gauge 5) He Leak Cert. (Outboard)

NOTE: Regulators with delivery pressure above 15 PSIG should not be used with acetylene.

HP 723 TECHNICAL SPECIFICATIONS

FLOW DATA

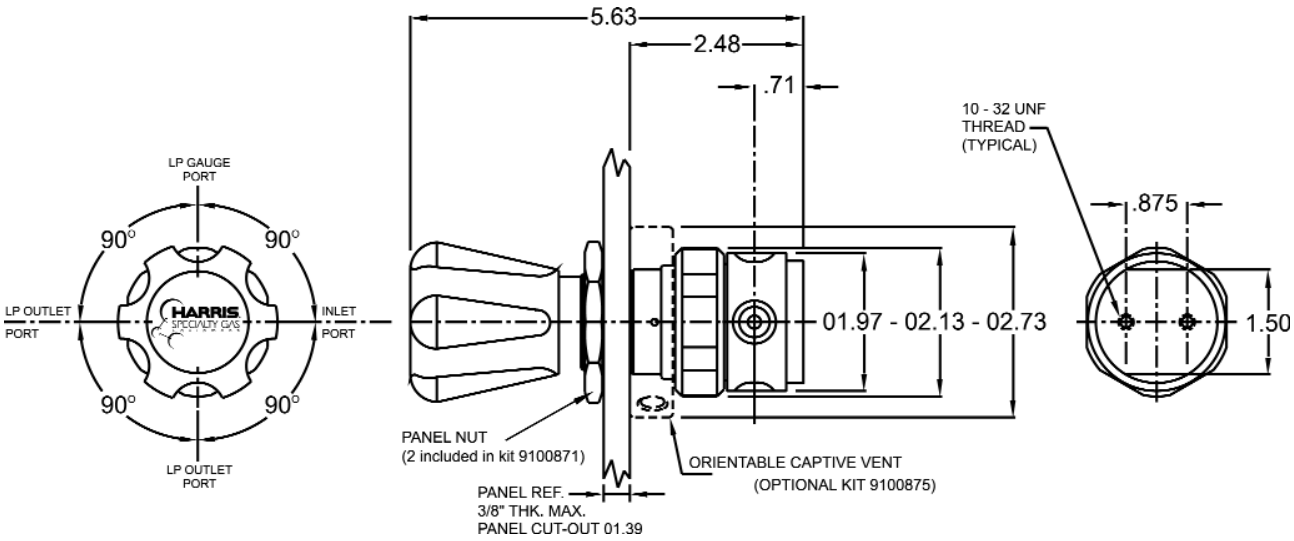




SPECIFICATIONS

- C_V: .08
- Pressure Regulation: 1.8 PSIG/100 PSIG
- Weight: 2.68 Lbs.

DIMENSIONS



HP 701

High Purity - Chrome Plated Brass Regulator

Model HP 701-050-580-BE shown

A chrome plated single stage cylinder regulator with a stainless steel diaphragm for general laboratory use. The HP 701 can be used when a slight pressure rise from full to empty cylinder can be tolerated. The HP 701 is suitable for:

- Non-corrosive gases
- Purging
- Pressure testing
- Blanketing

Recommended for gas purity up to Grade 5.0 (99.999).

MATERIALS

Body	Chrome Plated Brass
Bonnet	Chrome Plated Die Cast
Diaphragm	302 Stainless Steel
Nozzle	Brass
Seat	PTFE Teflon
Seals	PTFE Teflon
Filter	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring	PH-17 Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

- ☑ 2 1/8" 302 stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ☑ One-piece encapsulated seat design to protect seat from particulate contamination
- ☑ Chrome plated bonnet, body and fittings
- ☑ 2" chrome plated dual scale gauges (psi/bar)
- ☑ External relief valve standard
- ☑ 1 x 10^{-8} cc/sec. inboard helium leak rate maintains gas purity levels
- ☑ Maximum inlet pressure 3000 PSIG except for models with CGA 300 and 510 and equipped with 400 PSIG inlet gauge

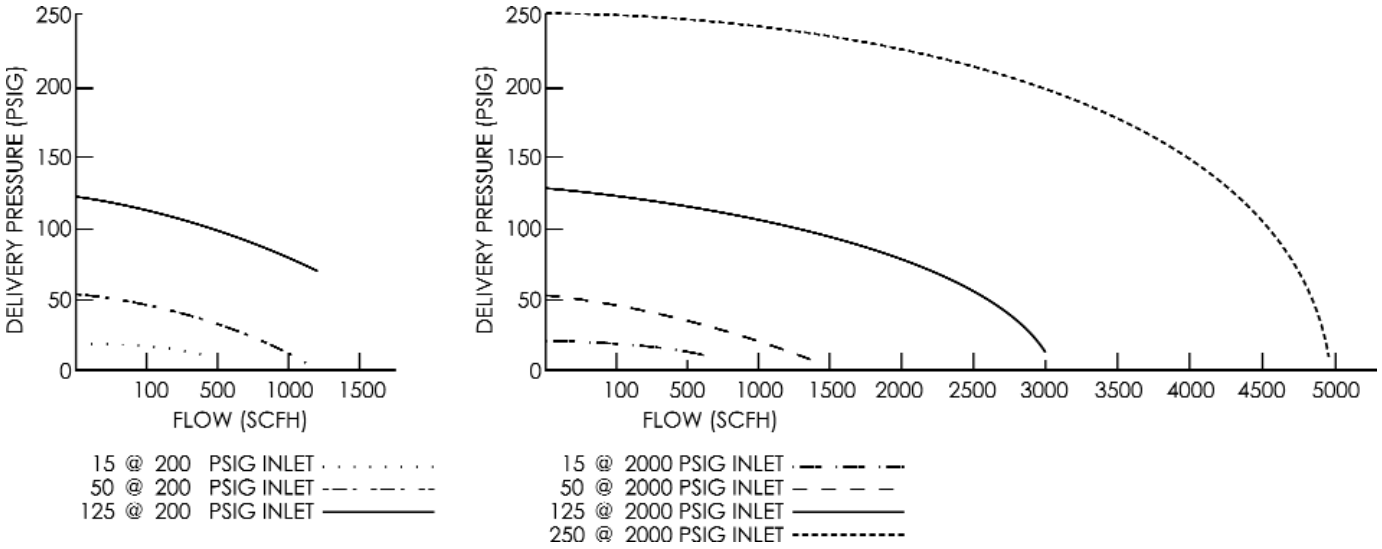
HP 701 ORDERING INFORMATION

HP 701 - xxx - xxx - xxxx - xxx

MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	CGA INLET FITTING		ACCESSORIES	OPTIONS
HP 701	0-15 PSIG	(30" Hg Vac-30 psi/2 bar)	280	350	A) 1/4" MNPT Needle Valve	1) Without Relief Valve
	0-50 PSIG	(30" Hg Vac-100 psi/7 bar)	296	500	B) 1/4" FNPT Diaph. Valve	2) No Gauges
	0-125 PSIG	(30" Hg Vac-200 psi/14 bar)	300	510	C) 1/4" MNPT Nipple	6) 400 psi inlet gauge
	0-250 PSIG	(400 psi/28 bar)	320	540	D) 1/4" FNPT Port	**Gas Service Must be Specified**
			326	580	E) 1/4" Tube Fitting	
			346	590	F) 1/8" Tube Fitting	
			000 (1/4" FNPT)		G) 1/4" MNPT Hose Barb	
			001 (1/4" MNPT)		H) 1/8" MNPT Hose Barb	
					I) 1/4" FNPT Hose Barb	
					J) 1/4" FNPT Needle Valve	
					K) Single Regulator Alarm	
					L) SG 910 BR Regulator Mounting Station	

HP 701 TECHNICAL SPECIFICATIONS

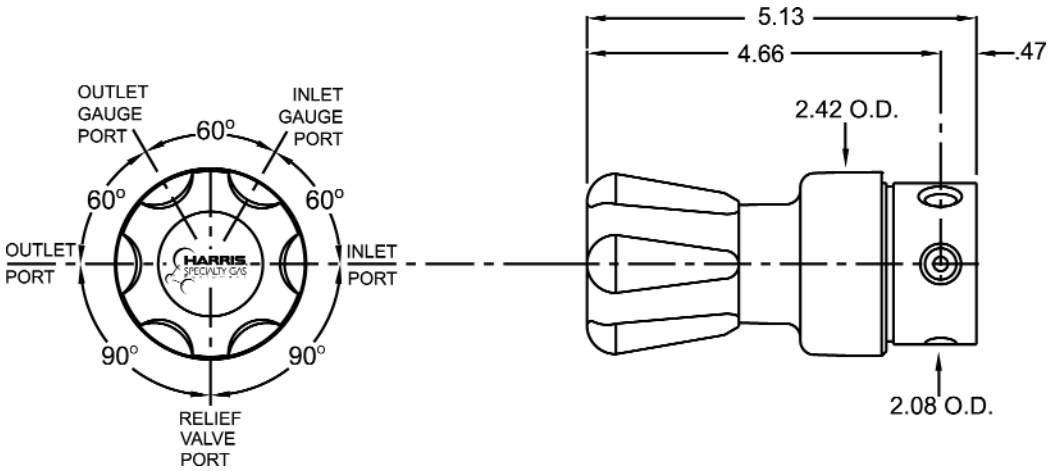
FLOW DATA



SPECIFICATIONS

- C_V: .17
- Pressure Regulation: 1.3 PSIG/100 PSIG
- Weight: 3.5 Lbs.

DIMENSIONS



HP 702

High Purity - Chrome Plated Brass Regulator

Model HP 702-125-580-B shown

A chrome plated brass two stage cylinder regulator with a stainless steel diaphragm for general laboratory use. The HP 702 provides constant delivery pressure from full to near empty cylinder conditions. The HP 702 is suitable for:

- Non-corrosive gases
- Purging
- Pressure testing
- Blanketing

Recommended for gas purity up to Grade 5.0 (99.999).

MATERIALS

Body	Chrome Plated Brass
Bonnets	Chrome Plated Die Cast
Diaphragms	302 Stainless Steel
Nozzles	Brass
Seat	PTFE Teflon
Seals	PTFE Teflon
Filter	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring	PH-17 Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

- ☑ 2 1/8" 302 stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ☑ One-piece encapsulated seat design to protect seat from particulate contamination
- ☑ Chrome plated bonnet, body and fittings
- ☑ 2" chrome plated dual scale gauges (psi/bar)
- ☑ External relief valve standard
- ☑ 1 x 10^{-8} cc/sec. inboard helium leak rate maintains gas purity levels
- ☑ Maximum inlet 3000 PSIG except for models with CGA 300 and 510, equipped with 400 PSIG inlet gauge

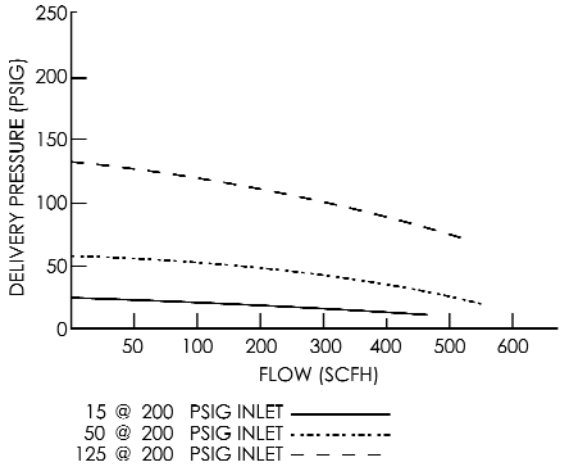
HP 702 ORDERING INFORMATION

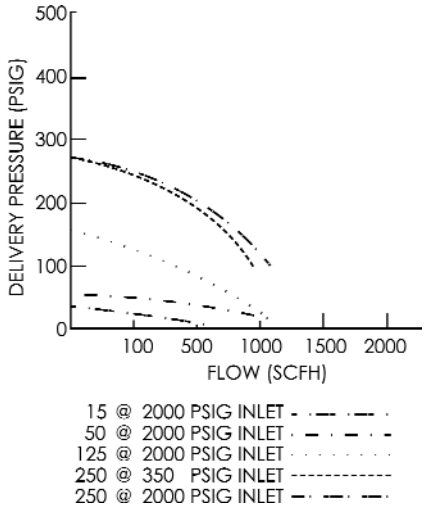
HP 702 - xxx - xxx - xxxx - xx

MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	CGA INLET FITTING		ACCESSORIES	OPTIONS
HP 702	0-15 PSIG	(30" Hg Vac-30 psi/2 bar)	280	350	A) 1/4" MNPT Needle Valve	1) Without Relief Valve
	0-50 PSIG	(30" Hg Vac-100 psi/7 bar)	296	500	B) 1/4" FNPT Diaph. Valve	2) No Gauges
	0-125 PSIG	(30" Hg Vac-200 psi/14 bar)	300	510	C) 1/4" MNPT Nipple	
	0-250 PSIG	(400 psi/28 bar)	320	540	D) 1/4" FNPT Port	
			326	580	E) 1/4" Tube Fitting	
			346	590	F) 1/8" Tube Fitting	
			000 (1/4" FNPT)		G) 1/4" MNPT Hose Barb	
			001 (1/4" MNPT)		H) 1/8" MNPT Hose Barb	
					I) 1/4" FNPT Hose Barb	
					J) 1/4" FNPT Needle Valve	
					K) Single Regulator Alarm	
					L) SG 910 BR Regulator Mounting Station	

HP 702 TECHNICAL SPECIFICATIONS

FLOW DATA

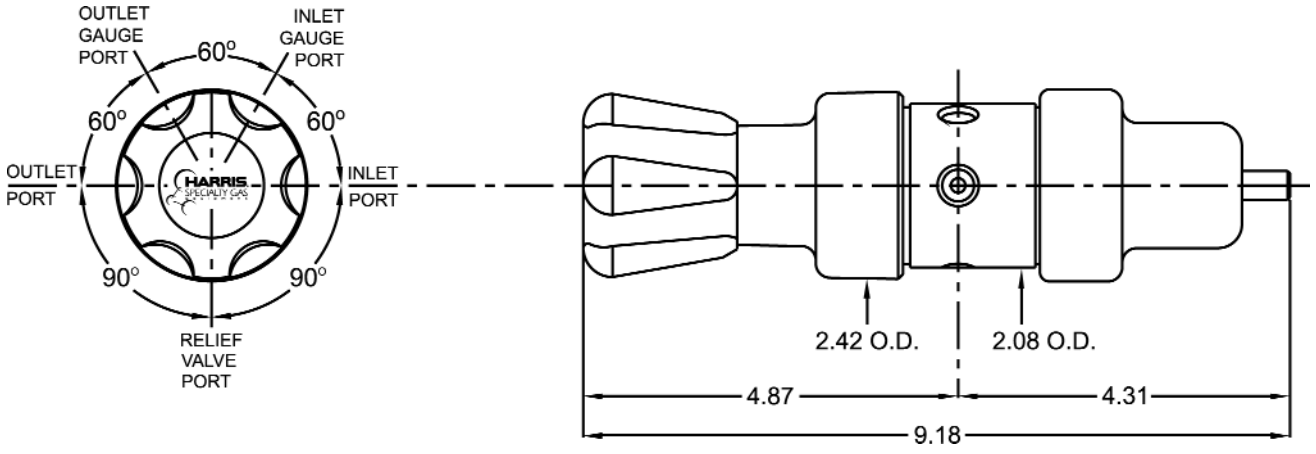




SPECIFICATIONS

- C_V: .15
- Pressure Regulation: 0.9 PSIG/100 PSIG
- Weight:: 4.48 Lbs.

DIMENSIONS



HP 703

High Purity - Chrome Plated Brass Regulator

Model HP 703-125-000-D shown

A chrome plated brass single stage pipeline regulator with a stainless steel diaphragm for general laboratory use. The HP 703 is suitable for:

- Non-corrosive gases
- Purging
- Pressure testing
- Blanketing

Recommended for gas purity up to Grade 5.0 (99.999).

MATERIALS

Body	Chrome Plated Brass
Bonnet	Chrome Plated Die Cast
Diaphragm	302 Stainless Steel
Nozzle	Brass
Seat	PTFE Teflon
Seals	PTFE Teflon
Filter	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring	PH-17 Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

- ☑ 2 1/8" 302 stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ☑ One-piece encapsulated seat design to protect seat from particulate contamination
- ☑ Chrome plated bonnet, body and fittings
- ☑ 2" chrome plated dual scale gauge (psi/bar)
- ☑ External relief valve standard
- ☑ 1 x 10^{-8} cc/sec. inboard helium leak rate maintains gas purity levels

HP 703 ORDERING INFORMATION

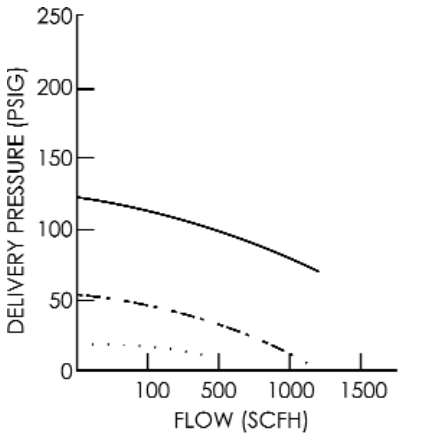
HP 703 - xxx - xxx - xx - xx

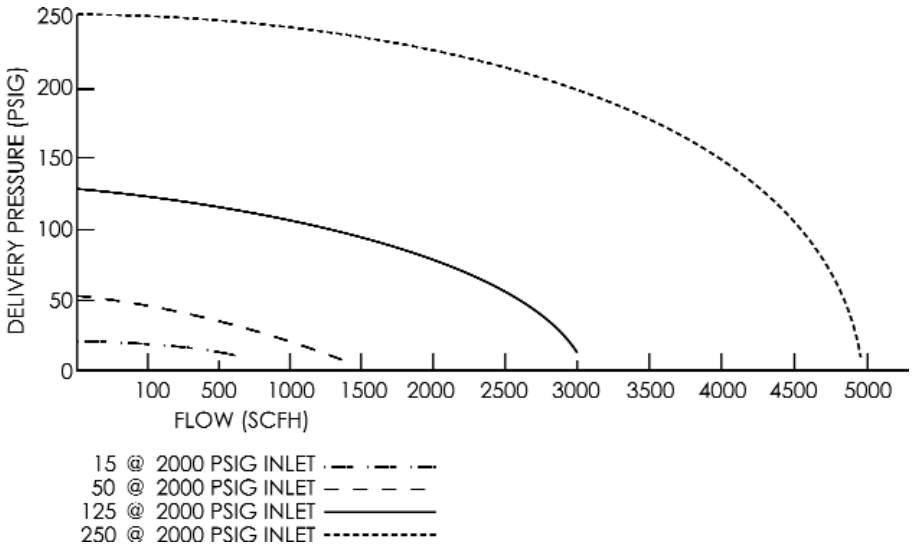
MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	INLET FITTING	ACCESSORIES	OPTIONS
HP 703	0-15 PSIG	(30" Hg Vac-30 psi/2 bar)	000 (1/4" FNPT)	A) 1/4" MNPT Needle Valve	1) Without Relief Valve
	0-50 PSIG	(30" Hg Vac-100 psi/7 bar)	001 (1/4" MNPT)	B) 1/4" FNPT Diaph. Valve	2) No Gauge
	0-125 PSIG	(30" Hg Vac-200 psi/14 bar)		C) 1/4" MNPT Nipple	
	0-250 PSIG	(400 psi/28 bar)		D) 1/4" FNPT Port	
				E) 1/4" Tube Fitting	
				F) 1/8" Tube Fitting	
				G) 1/4" MNPT Hose Barb	
				H) 1/8" MNPT Hose Barb	
				I) 1/4" FNPT Hose Barb	
				J) 1/4" FNPT Needle Valve	

NOTE: Regulators with delivery pressure above 15 PSIG should not be used with acetylene.

HP 703 TECHNICAL SPECIFICATIONS

FLOW DATA

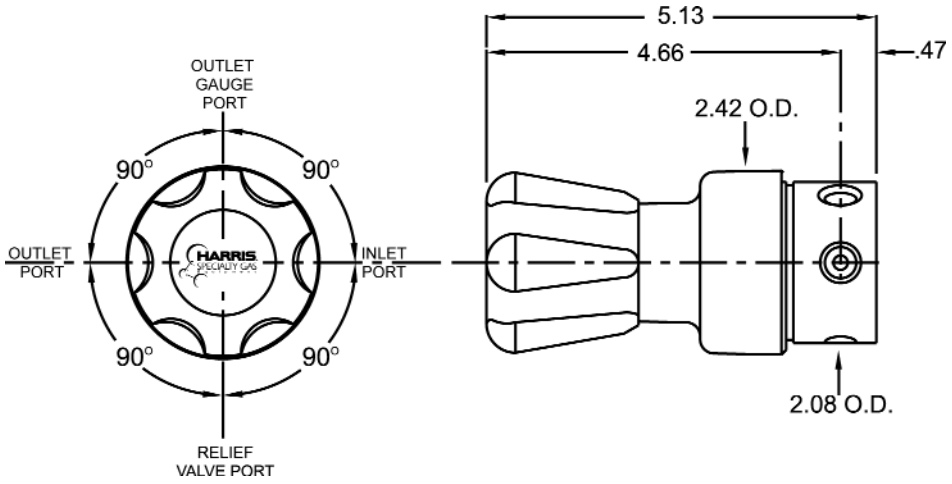




SPECIFICATIONS

- C_V: .17
- Pressure Regulation: 1.8 PSIG/100 PSIG
- Weight: 2.92 Lbs.

DIMENSIONS



GP 401

General Purpose - Brass Regulator

Model GP 401-125-540 shown

A brass single stage regulator with a neoprene diaphragm for general purpose laboratory applications where a slight rise in delivery pressure from a full to near empty cylinder can be tolerated. The GP 401 is not recommended for high purity applications which may be sensitive to contamination due to elastomeric components. The Model GP 401 is suitable for:

- Non-corrosive industrial grade gases
- Purging
- Pressure testing
- Gas shielding

MATERIALS

Body	Brass
Bonnet	Painted Die Cast
Diaphragm	Neoprene
Nozzle	Brass
Seat	PTFE Teflon
Filter	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring	PH 17-7 Stainless Steel
Adjusting Knob	ABS Plastic
Outlet	1/4" MNPT Brass

FEATURES

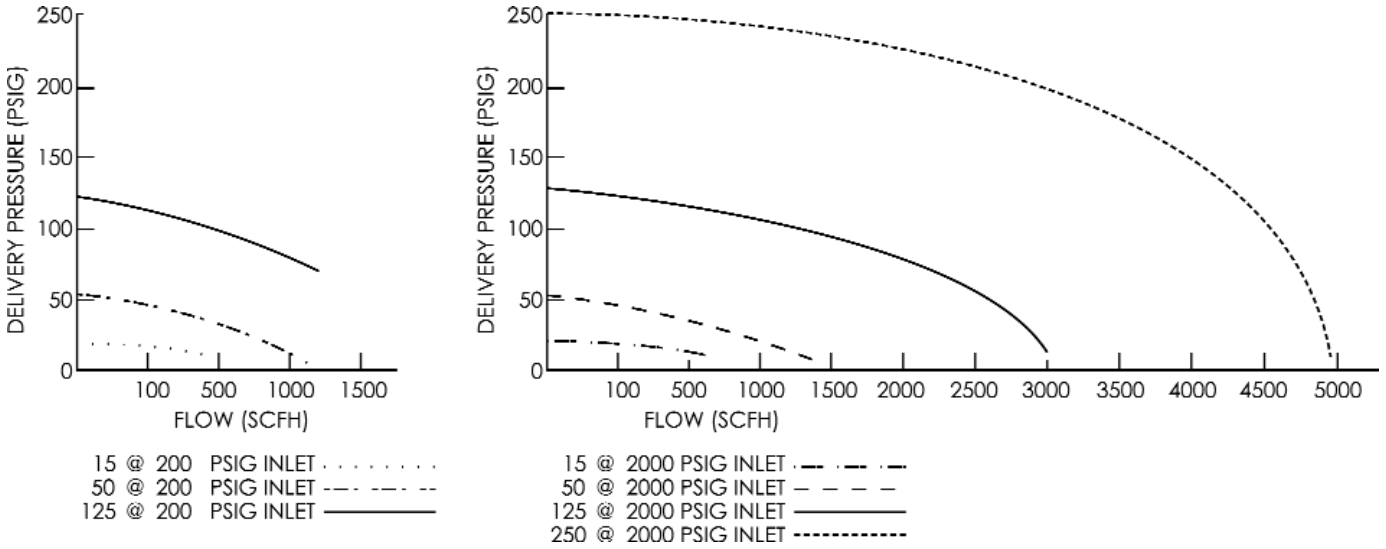
- ☑ 0-15, 0-50, 0-125 and 0-250 PSIG delivery pressure
- ☑ Neoprene diaphragm for greater sensitivity
- ☑ One-piece encapsulated seat design, to protect the seat from particulate contamination
- ☑ Tamper-proof, self reseating internal safety valve
- ☑ 2" dual scale brass gauges (psi/kPa)
- ☑ Conforms to CGA E-4 standard for gas pressure regulators

GP 401 ORDERING INFORMATION

PART NO.	MODEL NO.	GAS	MAX. INLET PSIG	DELIVERY PRESSURE RANGE PSIG	DELIVERY PRESSURE GAUGE PSIG	SUPPLY PRESSURE GAUGE PSIG
3001319	GP401-15-300	Acetylene	500	0-15	30	400
3001320	GP401-15-510	Acet./Fuel Gas	500	0-15	30	400
3001321	GP401-50-510P	Propane	500	0-50	60	400
3001322	GP401-50-540		3000	0-50	60	4000
3001323	GP401-125-540	Oxygen	3000	0-125	150	4000
3001324	GP401-250-540		3000	0-250	400	4000
3001325	GP401-15-580		3000	0-15	30	4000
3001326	GP401-50-580	Ar, He, N_2	3000	0-50	60	4000
3001327	GP401-125-580		3000	0-125	150	4000
3001328	GP401-250-580		3000	0-250	400	4000
3001339	GP401-15-320		3000	0-15	30	4000
3001329	GP401-50-320		3000	0-50	60	4000
3001330	GP401-125-320	Carbon Dioxide	3000	0-125	150	4000
3001331	GP401-250-320		3000	0-250	400	4000
3001332	GP401-15-350		3000	0-15	30	4000
3001333	GP401-50-350		3000	0-50	60	4000
3001334	GP401-125-350	H_2, Methane	3000	0-125	150	4000
3001335	GP401-250-350		3000	0-250	400	4000
3001340	GP401-15-590		3000	0-15	30	4000
3001341	GP401-50-590		3000	0-50	60	4000
3001342	GP401-125-590	Air	3000	0-125	150	4000
3001343	GP401-250-590		3000	0-250	400	4000

GP 401 TECHNICAL SPECIFICATIONS

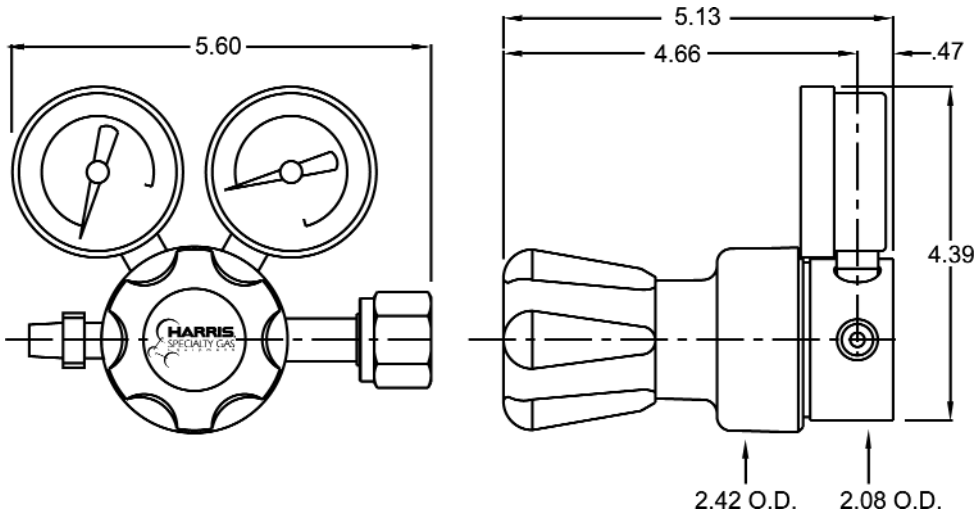
FLOW DATA



SPECIFICATIONS

- C_V: .17
- Pressure Regulation: 1.3 PSIG/100 PSIG
- Weight: 3.5 Lbs.

DIMENSIONS



GP 402

General Purpose - Brass Regulator

Model GP 402-050-580 shown

A brass two stage regulator with neoprene diaphragms for general purpose laboratory applications. The GP 402 maintains a constant delivery pressure from full to near empty cylinder conditions. The GP 402 is not recommended for high purity applications which may be sensitive to contamination due to elastomeric components. The Model GP 402 is suitable for:

- Non-corrosive industrial grade gases
- Purging
- Pressure testing
- Gas shielding

MATERIALS

Body	Brass
Bonnets	Painted Die Cast
Diaphragms	Neoprene
Nozzles	Brass
Seats	PTFE Teflon
Filters	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Springs	PH 17-7 Stainless Steel
Adjusting Knob	ABS Plastic
Outlet	1/4" MNPT Brass

FEATURES

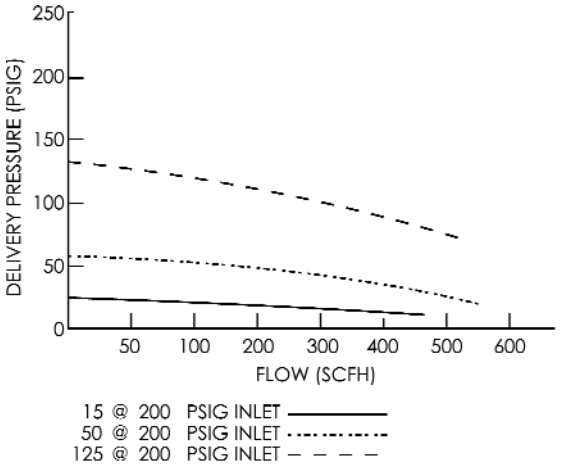
- ⊡ 0-15, 0-50, 0-125 and 0-250 PSIG delivery pressure
- ⊡ Neoprene diaphragms for greater sensitivity
- ⊡ One-piece encapsulated seat design to protect the seat from particulate contamination
- ⊡ Tamper-proof, self reseating internal safety valve
- ⊡ 2" dual scale brass gauges (psi/kPa)
- ⊡ Conforms to CGA E-4 standard for gas pressure regulators

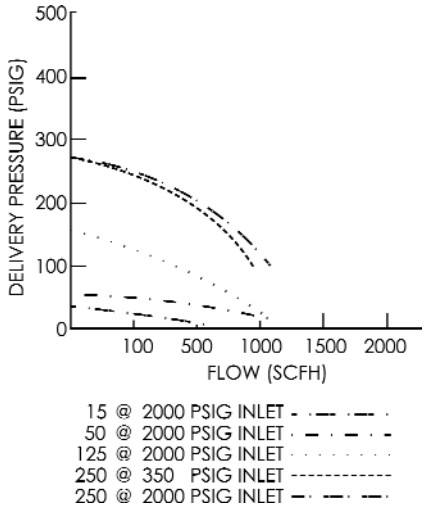
GP 402 ORDERING INFORMATION

PART NO.	MODEL NO.	GAS	MAX. INLET PSIG	DELIVERY PRESSURE RANGE PSIG	DELIVERY PRESSURE GAUGE PSIG	SUPPLY PRESSURE GAUGE PSIG
3301250	GP402-15-300	Acetylene	500	0-15	30	400
3301251	GP402-15-510	Acet./Fuel Gas	500	0-15	30	400
3301252	GP402-50-510P	Propane	500	0-50	60	400
3301253	GP402-50-540		3000	0-50	60	4000
3301254	GP402-125-540	Oxygen	3000	0-125	150	4000
3301255	GP402-250-540		3000	0-250	400	4000
3301256	GP402-15-580		3000	0-15	30	4000
3301257	GP402-50-580	Ar, He, N_2	3000	0-50	60	4000
3301258	GP402-125-580		3000	0-125	150	4000
3301259	GP402-250-580		3000	0-250	400	4000
3301280	GP402-15-320		3000	0-15	30	4000
3301260	GP402-50-320		3000	0-50	60	4000
3301261	GP402-125-320	Carbon Dioxide	3000	0-125	150	4000
3301262	GP402-250-320		3000	0-250	400	4000
3301263	GP402-15-350		3000	0-15	30	4000
3301264	GP402-50-350		3000	0-50	60	4000
3301265	GP402-125-350	H_2, Methane	3000	0-125	150	4000
3301266	GP402-250-350		3000	0-250	400	4000
3301273	GP402-15-590		3000	0-15	30	4000
3301274	GP402-50-590		3000	0-50	60	4000
3301275	GP402-125-590	Air	3000	0-25	150	4000
3301276	GP402-250-590		3000	0-250	400	4000

GP 402 TECHNICAL SPECIFICATIONS

FLOW DATA

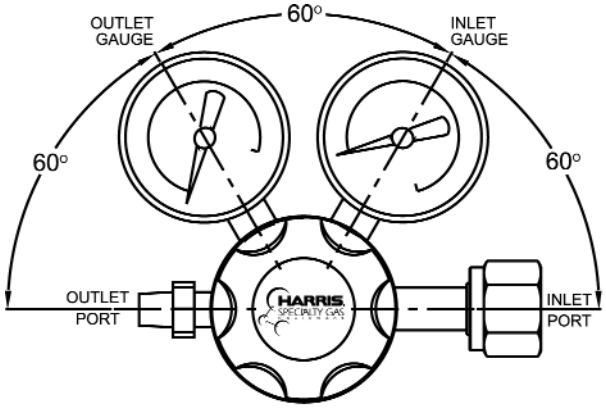


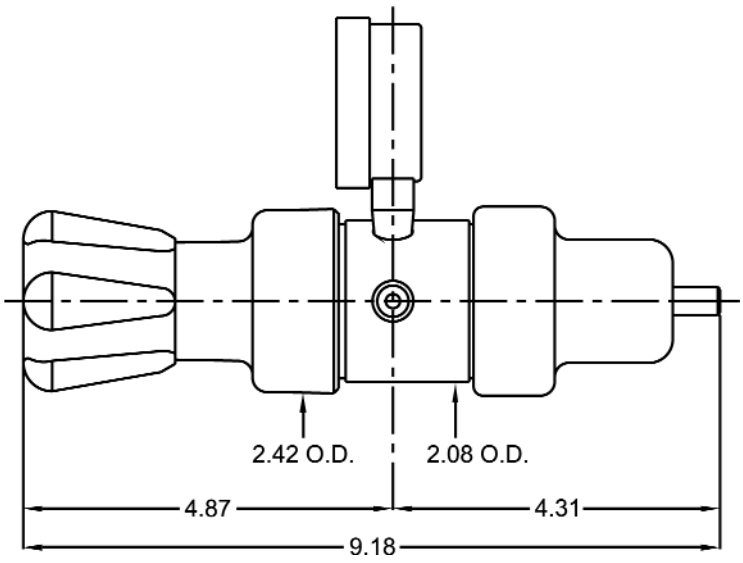


SPECIFICATIONS

- C_V: .15
- Pressure Regulation: .04 PSIG/100 PSIG
- Weight: 4.48 Lbs.

DIMENSIONS





GP 403

General Purpose - Brass Regulator

Model GP 403-125 shown

A brass single stage pipeline regulator with a neoprene diaphragm for general purpose laboratory applications. The GP 403 is not recommended for high purity applications which may be sensitive to contamination due to elastomeric components. The GP 403 is suitable for:

- Non-corrosive industrial grade gases
- Purging
- Pressure testing
- Blanketing

MATERIALS

Body	Brass
Bonnet	Painted Die Cast
Diaphragm	Neoprene
Nozzle	Brass
Seat	PTFE Teflon
Filter	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring	PH 17-7 Stainless Steel
Adjusting Knob	ABS Plastic
Inlet/Outlet	1/4" FNPT

FEATURES

- 0-15, 0-50, 0-125 and 0-250 PSIG delivery pressure
- Neoprene diaphragm for greater sensitivity
- One-piece encapsulated seat design to protect the seat from particulate contamination
- Tamper-proof, self reseating internal safety valve
- 2" dual scale brass gauge (psi/kPa)
- Conforms to CGA E-4 standard for gas pressure regulators

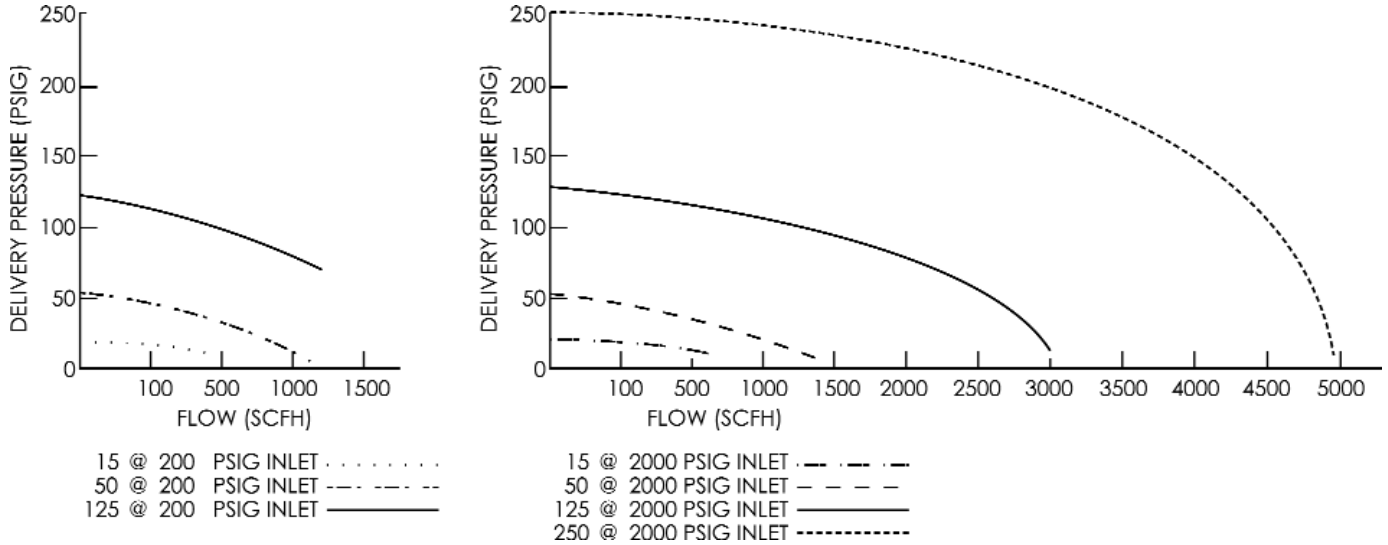
GP 403 ORDERING INFORMATION

PART NO.	MODEL NO.	MAX. INLET PSIG	DELIVERY* PRESSURE RANGE PSIG	DELIVERY PRESSURE GAUGE PSIG
3001315	GP403-15	3000	0-15	30
3001316	GP403-50	3000	0-50	60
3001317	GP403-125	3000	0-125	150
3001318	GP403-250	3000	0-250	400

NOTE: Regulators with delivery pressure above 15 PSIG should not be used with acetylene.

GP 403 TECHNICAL SPECIFICATIONS

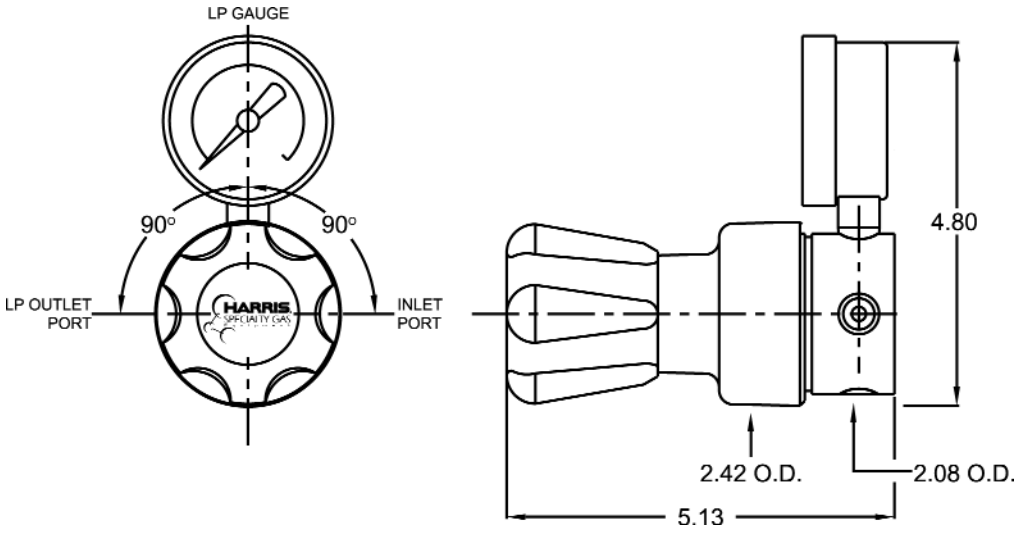
FLOW DATA



SPECIFICATIONS

- C_V: .17
- Pressure Regulation: 1.8 PSIG/100 PSIG
- Weight: 2.92 Lbs.

DIMENSIONS



HP 704

High Purity - Lecture Bottle Regulator

Model HP 704-15-170 A shown

A chrome plated brass single stage regulator for non-corrosive gases for lecture bottles. The Model HP 704 is suitable for:

- High Purity
- Non-corrosive gases
- EPA protocol gases
- Calibration gases
- Sampling gases

FEATURES

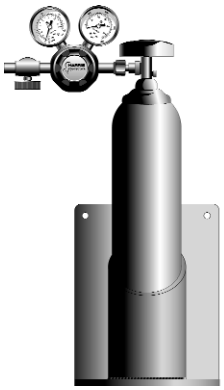
- ⊡ Diffusion resistant stainless steel diaphragm
- ⊡ One-piece encapsulated seat design to protect seat from particulate contamination
- ⊡ 1 1/2" gauges
- ⊡ Conforms to CGA E-4 standard for gas pressure regulators
- ⊡ Relief valve

MATERIALS

Body . . . . . .Chrome Plated Brass Barstock
Bonnet . . . . . .Chrome Plated Brass
Diaphragm . . . . . .316L Stainless Steel
Nozzle . . . . . .Brass
Seat . . . . . .PTFE Teflon
Filter . . . . . .Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring . . . . . .PH-17 Stainless Steel
Adjusting Knob . . . . . .ABS Plastic

RELATED OPTIONS

Laboratory Lecture Bottle Holders



Shown with model G 710
Lecture bottle holder
P/N: 4302678

Shown with model G 700
Lecture bottle holder
P/N: 4302677

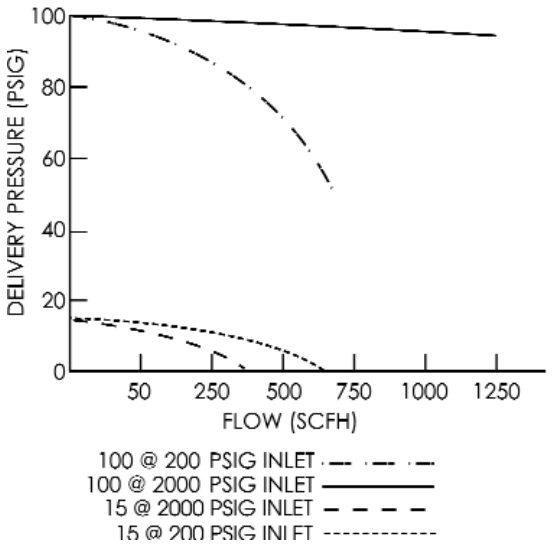
HP 704 ORDERING INFORMATION

HP 704 - xxx - xxx - x - xxxx

MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	CGA/INLET FITTING	ACCESSORIES	OPTIONS
HP 704	0-15 PSIG 0-100 PSIG	(0-30 PSI) (0-150 PSI)	170 180 000 (No Inlet)	A) 1/8" MNPT Needle Valve (P/N: 9100928) B) 1/8" FNPT Port	1) Without Relief Valve 2) He. Leak Cert (inboard) 3) Without Gauges 4) He. Leak Cert (outboard)

HP 704 TECHNICAL SPECIFICATIONS

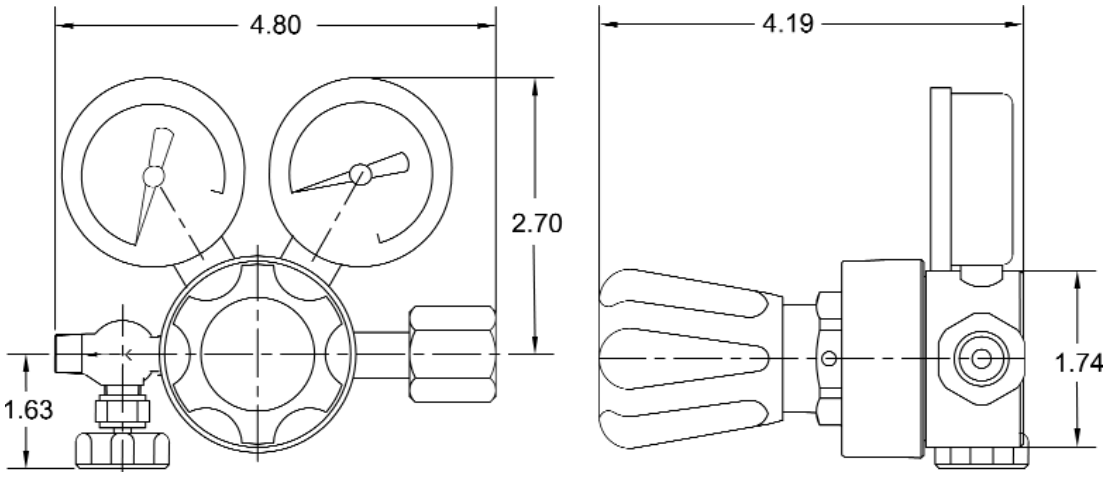
FLOW DATA



SPECIFICATIONS

- C_V: .08 w/valve
- Pressure Regulation: .4 PSIG/100 PSIG
- Weight: 2.0 Lbs.

DIMENSIONS



GP 404

General Purpose - Lecture Bottle Regulator

Model GP 404-100-170 A shown

A brass single stage regulator for non-corrosive gases for lecture bottles. The Model GP 404 is suitable for:

- Non-corrosive gases
- EPA protocol gases
- Calibration gases
- Sampling gases

FEATURES

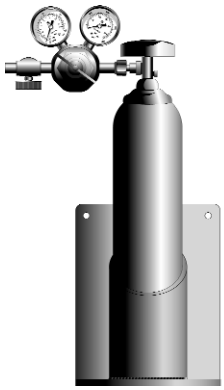
- ☑ Neoprene diaphragm for greater sensitivity
- ☑ One-piece encapsulated seat design to protect seat from particulate contamination
- ☑ 1 1/2" dual scale gauges (psi/kPa)
- ☑ Conforms to CGA E-4 standard for gas pressure regulators

MATERIALS

Body	Brass Barstock
Bonnet	Painted Die Cast
Diaphragm	Neoprene
Nozzle	Brass
Seat	PTFE Teflon
Filter	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring	PH-17 Stainless Steel
Adjusting Screw	Brass

RELATED OPTIONS

Laboratory Lecture Bottle Holders



Shown with model G 710
Lecture bottle holder
P/N: 4302678

Shown with model G 700
Lecture bottle holder
P/N: 4302677

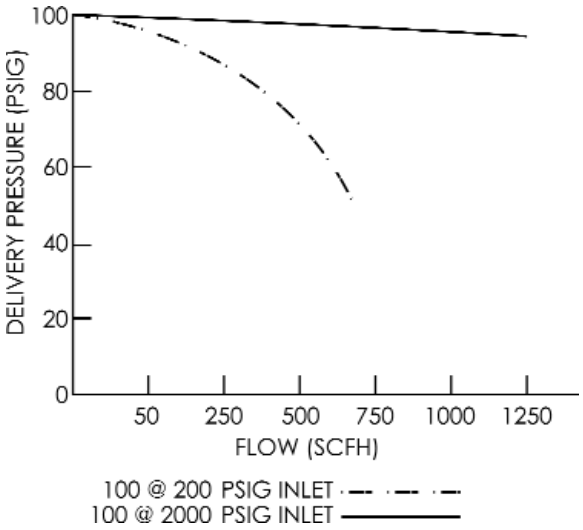
GP 404 ORDERING INFORMATION

GP 404 - xxx - xxx - x

MODEL NO.	DELIVERY PRESSURE DELIVERY (OUTLET GAUGE)	CGA/INLET FITTING	ACCESSORIES
GP 404	0-100 PSIG (0-150 psi/1000 kPa)	170 180	A) 1/8" MNPT Needle Valve (P/N: 9100415) B) 1/8" FNPT Port

GP 404 TECHNICAL SPECIFICATIONS

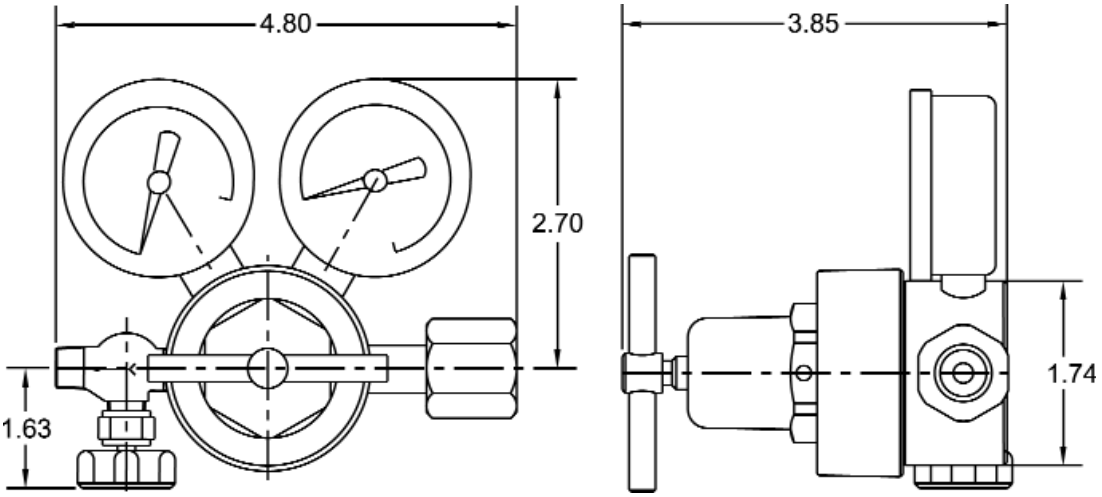
FLOW DATA



SPECIFICATIONS

- C_V: .08 w/valve
- Pressure Regulation: .4 PSIG/100 PSIG
- Weight: 1.8 Lbs.

DIMENSIONS



HP 405

Liquid Cylinder Regulator

Model HP 405-350-580A shown

A chrome plated brass single stage regulator for gaseous withdrawal from liquid cylinders. The HP 405 can also be used on high pressure cylinders and for general pipeline applications. The Model HP 405 is suitable for:

- Laser assist gas
- Purging
- Pressure testing
- Blanketing
- Gas withdrawal from liquid cylinders

MATERIALS

Body	Chrome Plated Brass
Bonnet	Chrome Plated Brass
Diaphragm	302 Stainless Steel
Nozzle	Brass
Seat	PTFE Teflon
Seals	PTFE Teflon
Filter	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring	PH 17-7 Stainless Steel
Adjusting Screw	Brass

FEATURES

- ☑ 0-125, 0-350 and 0-500 PSIG delivery pressure
- ☑ One-piece encapsulated seat design to protect seat from particulate contamination
- ☑ Chrome plated bonnet, body and fittings
- ☑ 2" chrome plated dual scale gauge (psi/bar)
- ☑ Conforms to CGA E-4 standard for gas pressure regulators
- ☑ Maximum inlet 3000 PSIG
- ☑ Tamper-proof, self reseating internal relief valve

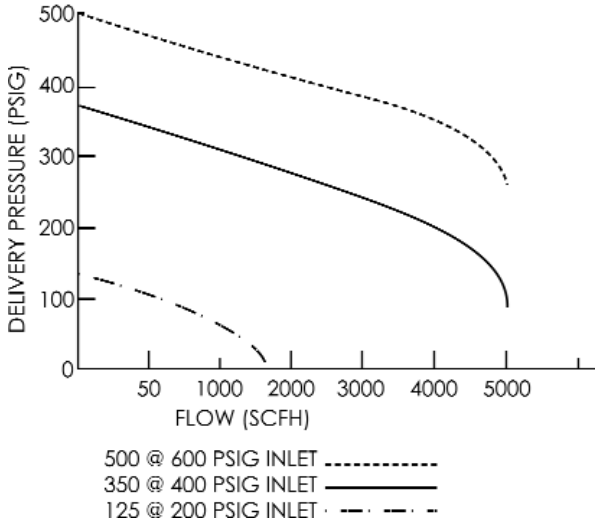
HP 405 ORDERING INFORMATION

HP 405 - xxx - xxx - x

MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	CGA/INLET FITTING	ACCESSORIES
HP 405	0-125 PSIG	(0-200 psi/14 bar)	320	A) 1/4" Tube Fitting (Stainless Steel)
	0-350 PSIG	(0-400 psi/28 bar)	540	B) 1/4" FNPT Port
	0-500 PSIG	(0-1000 psi/70 bar)	580	
			000 (1/4" FNPT)	
			001 (1/4" MNPT)	

HP 405 TECHNICAL SPECIFICATIONS

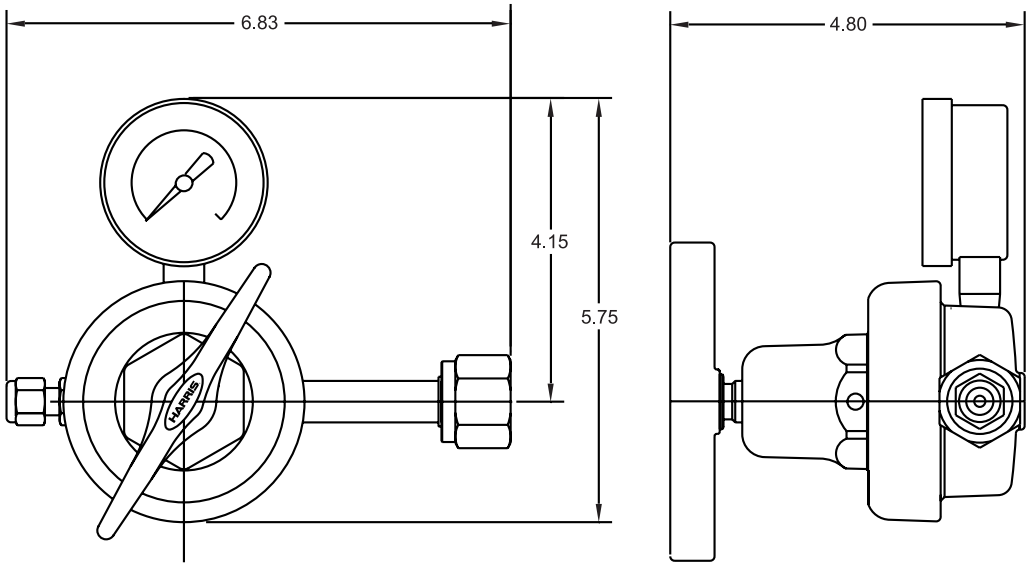
FLOW DATA



SPECIFICATIONS

- C_V: .37
- Pressure Regulation: .9 PSIG/100 PSIG
- Weight: 3.1 Lbs.

DIMENSIONS



LIQUID CYLINDER PERFORMANCE DATA

Specifications

	Size Pressure	160 MP	160 HP	180 MP	180 HP	200 MP	200 HP	230 MP	230 HP	265 MP	265 HP
Capacity											
Liquid(Gross)	(liters)	176	176	196	196	209	209	240	240	276	276
Liquid(Net)	(liters)	165	165	185	185	196	196	230	230	265	265
Gas(N)*	ft3/Nm3	3685/97	3464/91	4099/108	3864/102	4375/115	4072/108	5024/132	4734/124	5769/152	5438/143
Gas(O_2)*	ft3/Nm3	4577/120	4348/114	5096/134	4843/127	5435/143	5048/133	6244/164	5930/156	7186/189	6811/179
Gas(Ar)*	ft3/Nm3	4448/117	4226/111	4961/130	4709/124	5290/139	4932/130	6073/160	5763/151	6982/183	6634/174
Gas(CO_2)*	ft3/Nm3	--	3382/89	--	3766/99	--	4011/105	--	4614/121	--	5305/132
Gas(N_2O)*	ft3/Nm3	--	3207/84	--	3574/94	--	3810/100	--	4378/115	--	5034/132
Performance											
NER(N_2)	% per day	2	2	1.9	1.9	1.85	1.85	1.8	1.8	2	2
NER(O_2-Ar)	% per day	1.4	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.4	1.4
NER(CO_2-N_2O)	% per day	--	0.5	--	0.5	--	0.5	--	0.5	--	0.5
Gas Flow (N_2, CO_2, Ar)	ft3/hr	350/9.2	350/9.2	350/9.2	350/9.2	400/10.5	400/10.5	400/10.5	400/10.5	400/10.5	400/10.5
Gas Flow (CO_2, N_2O)	ft3/hr	--	110/2.9	--	110/2.9	--	110/2.9	--	110/2.9	--	110/2.9
Dimensions & Pressure Ratings											
Relief Valve Setting	psig/bar	230/16	350/24	230/16	350/24	230/16	350/24	230/16	350/24	230/16	350/24
DOT/CTC Rating		4L200	4L292	4L200	4L292	4L200	4L292	4L200	4L292	4L200	4L292
Diameter	in/cm	20/50.8	20/50.8	20/50.8	20/50.8	20/50.8	20/50.8	26/66.0	26/66.0	26/66.0	26/66.0
Height	in/cm	59.6/151.3	59.6/151.3	63.5/161.3	63.5/161.3	65.8/167.1	65.8/167.1	52.9/131.9	52.9/131.9	57.8/146.8	57.8/149.8
Empty Weight	lb/kg	250/113.4	280/126.9	260/117.9	300/136.1	280/126.9	320/145.1	300/136.1	340/154.2	340/154.2	360/163.6
Full Weight (N_2)	lb/kg	517/234	531/241	557/253	580/263	597/271	618/280	664/301	683/310	758/344	754/343
(O_2)	lb/kg	629/285	640/290	682/309	701/318	730/331	747/339	817/370	831/377	935/424	924/420
(Ar)	lb/kg	710/322	717/325	773/351	787/357	827/375	839/380	928/421	936/424	1062/481	1046/475
(CO_2)	lb/kg	--	667/303	--	731/331	--	779/353	--	868/393	--	967/439
(N_2O)	lb/kg	--	647/293	--	709/321	--	756/343	--	841/381	--	936/425

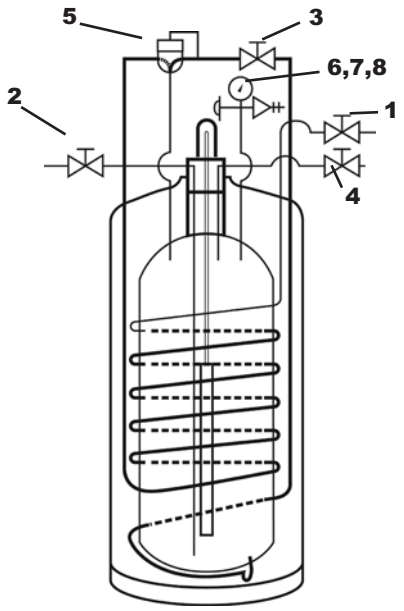
*AT RELIEF VALVE SETTINGS

NOMENCLATURE

1. Gas Use Valves- For gas withdrawal
2. Fill/Liquid Valves- For filling or fluid withdrawal operations
3. Pressure Control Valves- To isolate (on/off) the pressure control regulator
4. Vent Valves- to vent valve
5. Combination Pressure Control Regulator- To automatically control operating pressure
6. Pressure Gauges- Indicates cylinder pressure

7/8. Relief Valves, Rupture Disk

9. Liquid Level Gauge- To approximate the liquid contents of the liquid cylinder



Data provided by CHART® Industries

CO_2 REGULATOR FREEZE UP

Harris Model HP 705 Electrically Heated Regulator

Under certain conditions, users of carbon dioxide gas (from high pressure cylinders), experience "freeze-up" problems on valves, regulators and other compressed gas equipment. The term "freeze up" refers to a pressure regulator becoming clogged with dry ice, snow or crystals, which restrict the flow of gas through the regulator or other pressure control valve. The following explains this phenomenon in an effort to help users avoid problems in CO_2 distribution systems.

Why does a regulator freeze up?

When high pressure CO_2 gas expands through a regulator seat or other flow control orifice, it can be seen downstream of the orifice on the low pressure side of the regulator as a mixture of gas with solid (snow) or liquid CO_2. If the downstream pressure is below 60 PSIG, the mixture is gas and snow, above 60 PSIG, the mixture is gas and liquid.

The amount of solid (snow) or liquid can vary from <1%, at inlet pressures under 800 PSIG when the cylinder is cool, to more than 20% under severe freeze up condition when the pressure is above 1100 PSIG resulting from a warm cylinder. Contrary to what one might expect, the most severe freeze-up conditions with CO_2 exists on warm days when a full cylinder is at 90° F or higher and the cylinder pressure is at least 1100 PSI. At normal room temperature, and full cylinder pressures of 700-900 PSI, the problem exists, but not as severe as under the conditions above.

Solid CO_2 cannot form at pressures above 60 PSIG. It occurs when the gas undergoes the pressure drop at the regulator valve from inlet pressure to a delivery pressure below 60 PSIG, emerging as a mixture of gaseous and solid CO_2 at a temperature in the range of –70° F at 60 PSIG to -100° F at the lower pressures. Under the most severe freeze-up conditions, a significant percentage of the mixture can be solid, requiring about 200 watts of heat /100 scfh of CO_2 to vaporize the solid and raise the gas to room temperature.

Why use a heated regulator?

Unheated regulators, operating at delivery pressures below 60 PSIG, are subject to classic freeze up with solid CO_2. The CO_2 snow and dry ice particles may pass through a regulator if the outlet is wide open. If an orifice or flow control valve is used, a filter is needed to prevent the solid CO_2 particles from clogging the orifice. This can result in the low pressure chamber of the regulator becoming completely filled with solid CO_2. The severity of the problem depends upon the flowrate of CO_2, the inlet conditions, the duty cycle (percentage of time that the gas is flowing) and the physical size of the regulator.

Unheated regulators, even if they avoid the classic problem of freeze up, cannot avoid the refrigerant effect of CO_2. When the pressure drops at the regulator valve, the CO_2 temperature drops sharply to the levels stated above, and at normal flow rates, frost can cover the entire regulator and extend to the downstream system. This frost is a result of the moisture in the air freezing and accumulating on the exterior surface. It is not related to the CO_2 effects described here and typically have no effect on the performance of the valve.

The Solution

Heated regulators can relieve or eliminate freeze-up problems. The Harris Model HP 705 has 200 watts of heat to provide a continuous 100 scfh of CO_2 under the most severe freeze-up conditions and higher flowrates under normal (intermittent) conditions. The regulators are two-stage, to include the advantages of the two-stage regulators discussed above. The first stage cavity serves as a boiler to vaporize CO_2 liquid and eliminate or minimize any CO_2 solids in the second stage. The second stage chamber is then available to heat the CO_2 vapor before it reaches the outlet.

HP 705

Electrically Heated - Brass Barstock Regulator

NEW!

Model HP 705-125-320-A1 shown

An electrically heated dual stage regulator used for non corrosive liquefied gases with up to 3000 PSIG inlet pressure. The Model HP 705 is suitable for:

- Chemical storage blanketing
- CO_2 incubators
- Inert gas purging
- Ph control

Recommended for non-corrosive, liquefied gases or mixtures subject to freeze up.

MATERIALS

Body	Chrome Plated Brass Barstock
Bonnet	Chrome Plated Die Cast
Diaphragm	302 Stainless Steel
Nozzle	Brass
Seat	PTFE Teflon
Seals	Buna-N
Filter	Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring	Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

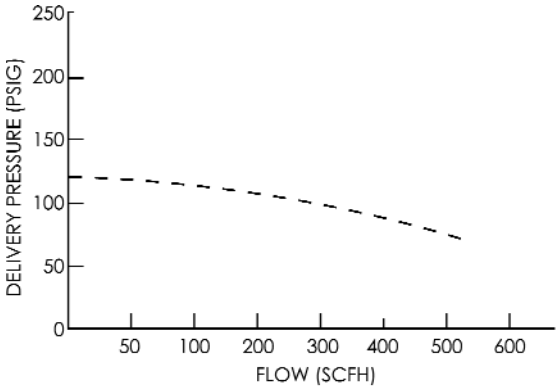
- ⊡ Stainless steel diaphragm
- ⊡ First stage brass piston sensor
- ⊡ One piece encapsulated seat design includes a 10 micron sintered filter to protect the seat from particulate contamination
- ⊡ 2 1/2" chrome plated dual scale gauges (psi/bar)
- ⊡ Maximum inlet 3000 PSIG
- ⊡ Cv of .15
- ⊡ 200 Watt electric heater
- ⊡ 120 or 240 volt
- ⊡ Continuous flow up to 100 SCFH CO_2
- ⊡ All electrical components are UL Listed

HP 705 ORDERING INFORMATION

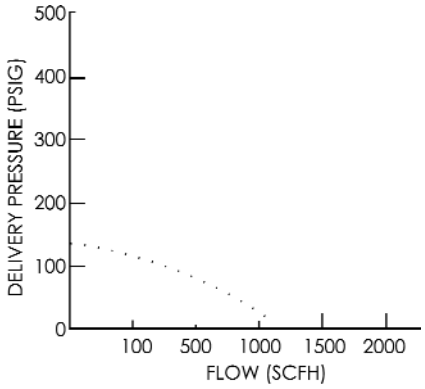
HP 705 - xxx - xxx - xx - x

MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	CGA/INLET FITTING	ACCESSORIES	SPECIFY VOLTAGE
HP 705	125 PSIG	(200 psi/14 bar)	320 326 580 000 (No Inlet)	A) 1/4" MNPT Needle Valve B) 1/4" FNPT Diaph. Valve C) 1/4" FNPT Port D) 1/4" MNPT Nipple E) 1/4" Tube Fitting F) 1/8" Tube Fitting G) 1/4" MNPT Hose Barb H) 1/8" MNPT Hose Barb J) Inert fitting (P/N: 9100986)	1) 120 VAC 2) 240 VAC

FLOW DATA



125 @ 200 PSIG INLET

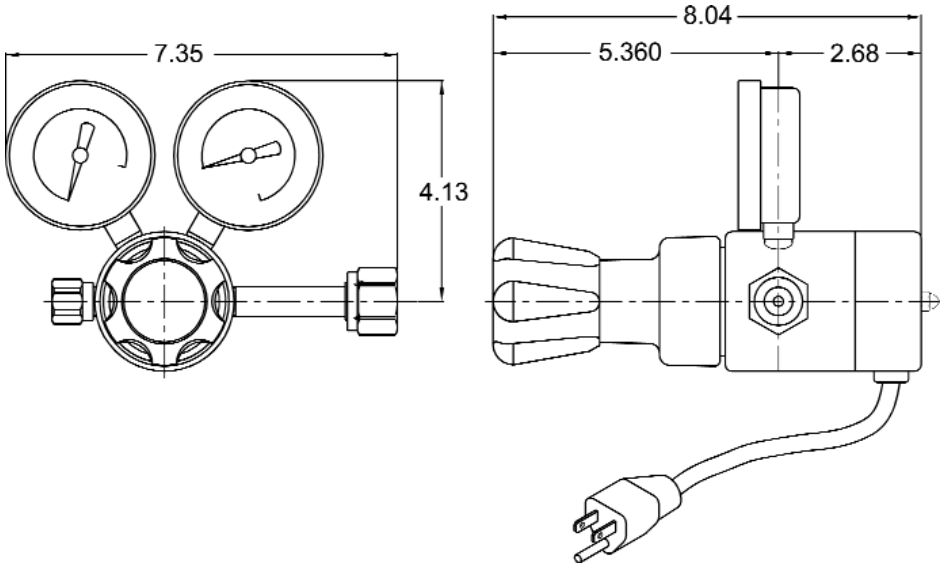


125 @ 2000 PSIG INLET

SPECIFICATIONS

- C_V: .15
- Pressure Regulation: 0.9 PSIG/100 PSIG
- Weight: 6.8 Lbs.

DIMENSIONS



GP 8700

Ultra High Pressure Regulator

Model 8700-6000-677 shown

The Model GP 8700 is a single stage high pressure regulator that is designed to operate on high pressure cylinders up to 7500 PSIG. The Model GP 8700 is suitable for:

- High pressure testing
- Charging accumulators
- Pressurizing aircraft struts

FEATURES

- 0-1500, 2500, 3000, 4500 and 6000 PSIG delivery pressures available
- One piece encapsulated valve design with PCTFE seats and an internal filter
- Ergonomic knob for improved grip
- 1/4" NPT outlet with stainless steel 1/4" tube fitting
- 2 1/2" dual scale gauges (psi/bar)
- Conforms to CGA E-4 standard for gas pressure regulators

*** Models with the following CGA inlet connections are self venting - 346, 347, 580, 590, 677, 680**

MATERIALS

Body . . . . . .Brass Barstock
Bonnet . . . . . .Brass Barstock
Diaphragm . . . . . .Urethane*
Nozzle . . . . . .Brass
Seat . . . . . .PCTFE (Kel-F™)
Filter . . . . . .Nickel-Plated Sintered Bronze - 10 Micron
Seat Return Spring . . . . . .PH 17-7 Stainless Steel
Adjusting Knob . . . . . .ABS Plastic
Outlet . . . . . .1/4" Stainless Steel Tube Fitting

* Neoprene for O_2 models

RELATED OPTIONS

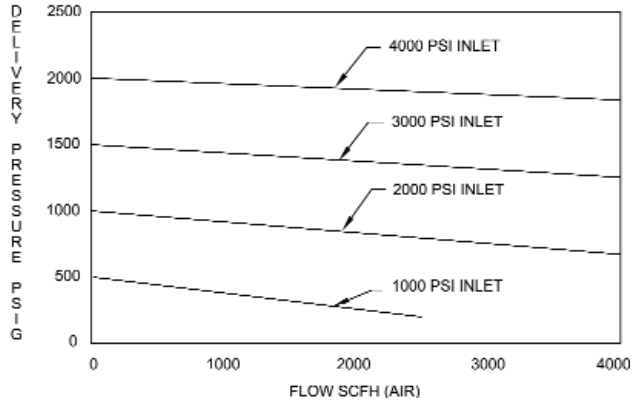
Panel Mount Nut P/N: 9100887

GP 8700 ORDERING INFORMATION

PART NO.	MODEL NO.	GAS	MAX. INLET PSIG	DELIVERY PRESSURE RANGE PSIG	DELIVERY PRESSURE GAUGE PSIG	SUPPLY PRESSURE GAUGE PSIG
3200310	8700-1500-346	Medical Air	3000	0-1500	3,000	4,000
3200311	8700-2500-346		3000	0-2500	3,000	4,000
3200312	8700-1500-347		5,500	0-1500	3,000	6,000
3200314	8700-3000-347		5,500	0-3000	4,000	6,000
3200315	8700-4500-347		5,500	0-4500	6,000	6,000
3200302	8700-1500-350	Hydrogen, Methane	3,000	0-1500	3,000	4,000
3200303	8700-2500-350		3,000	0-2500	4,000	4,000
3200316	8700-1500-695		5,500	0-1500	3,000	6,000
3200318	8700-3000-695		5,500	0-3000	4,000	6,000
3200319	8700-4500-695		5,500	0-4500	6,000	6,000
3200304	8700-1500-590	Industrial Air	3,000	0-1500	3,000	4,000
3200305	8700-2500-590		3,000	0-2500	4,000	4,000
3200306	8700-1500-540	Oxygen	3,000	0-1500	3,000	4,000
3200307	8700-2500-540		3,000	0-2500	4,000	4,000
3200308	8700-1500-540-Surge Guard		3,000	0-1500	3,000	4,000
3200309	8700-2500-540-Surge Guard		3,000	0-2500	4,000	4,000
3200300	8700-1500-580	Nitrogen, Argon, Helium	3,000	0-1500	3,000	3,000
3200301	8700-2500-580		3,000	0-2500	4,000	4,000
3200320	8700-1500-677		7,500	0-1500	3,000	10,000
3200321	8700-3000-677		7,500	0-3000	4,000	10,000
3200322	8700-4500-677		7,500	0-4500	6,000	10,000
3200323	8700-6000-677		7,500	0-6000	10,000	10,000
3200324	8700-1500-680		5,500	0-1500	3,000	6,000
3200326	8700-3000-680		5,500	0-3000	4,000	6,000
3200327	8700-4500-680		5,500	0-4500	6,000	6,000

GP 8700 TECHNICAL SPECIFICATIONS

FLOW DATA



SPECIFICATIONS

Non-Venting Models

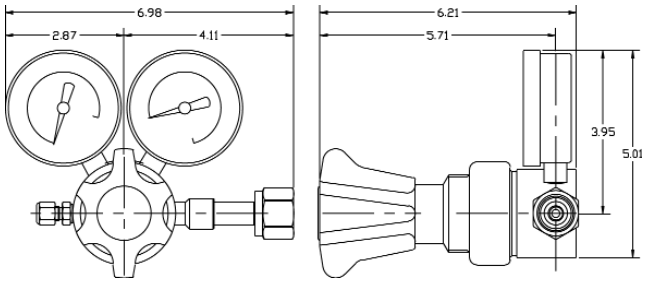
Regulator Weight: 5.8 lbs.
Pressure Rise: 3.3 PSIG per 100 PSIG
C_V: .08

Self-Venting Models

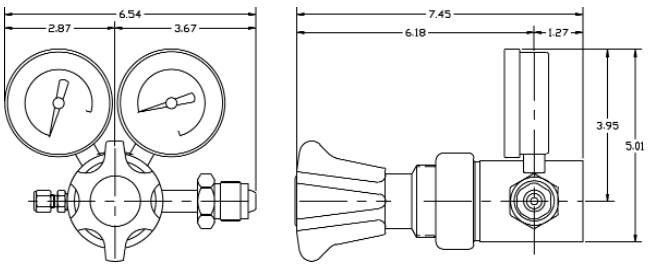
Regulator Weight: 7.0 lbs.
Pressure Rise: 3.3 PSIG per 100 PSIG
C_V: .08

DIMENSIONS

Non-Venting Models



Self-Venting Models



HP 3520

High Flow - Two Gauge Regulator

NEW!

Model HP 3520-250 shown

A brass barstock in-line manifold regulator for pipeline and other applications up to 3000 PSIG inlet pressure. The Model HP 3520 is suitable for:

- Non-Corrosive high flow gas applications
- High purity gas applications
- Research sample systems gases
- Process analyzer gases
- Bulk gas distribution systems
- Laser gas systems
- Emission monitoring systems gases

****Recommended for non-corrosive gases or purity levels Grade 5.0 (99.999) and higher, and delivery pressures up to 500 PSIG**

MATERIALS

Body	Brass Barstock
Bonnet	Brass Barstock
Diaphragm*	302 Stainless Steel
Nozzle	Brass
Seat*	PTFE Teflon
Seals	PTFE Teflon
Filter	Nickel Plated Sintered Bronze - 10 Micron
Seat Return Spring	17-7 Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

- ⊡ 2 3/4" stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ⊡ 1/2" FNPT inlet and outlet
- ⊡ One piece encapsulated seat design includes a sintered filter to protect the seat from particulate contamination
- ⊡ 2 1/2" brass dual scale gauges (psi/bar)
- ⊡ Maximum inlet 3000 PSIG (500 PSIG for 15 PSIG model)
- ⊡ Six port configuration, three high pressure and three low pressure
- ⊡ Self reseating internal relief valve

CYLINDER ADAPTER KITS

- CGA 540 Adapter Kit P/N: 9103615
- CGA 580 Adapter Kit P/N: 9103616
- CGA 680 Adapter Kit P/N: 9103617

HP 3520 ORDERING INFORMATION

PART NO.	MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	INLET /OUTLET FITTING
3003560*	HP 3520	0-15 PSIG	(30 psi/2 bar)	000 (1/2" FNPT)
3003561		0-50 PSIG	(100 psi/7 bar)	
3003562		0-125 PSIG	(200 psi/14 bar)	
3003563		0-250 PSIG	(400 psi/28 bar)	
3003564		0-500 PSIG	(1000 psi/70 bar)	

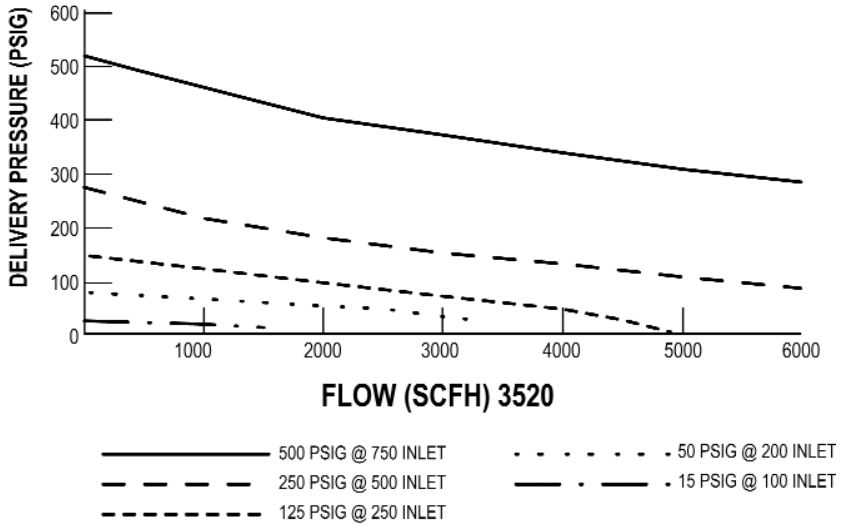
*0-15 PSIG model has neoprene diaphragm and seat

** Does not apply to 15 PSIG model (P/N:3003560)

NOTE: Regulators with delivery pressure above 15 PSIG should not be used with acetylene.

HP 3520 TECHNICAL SPECIFICATIONS

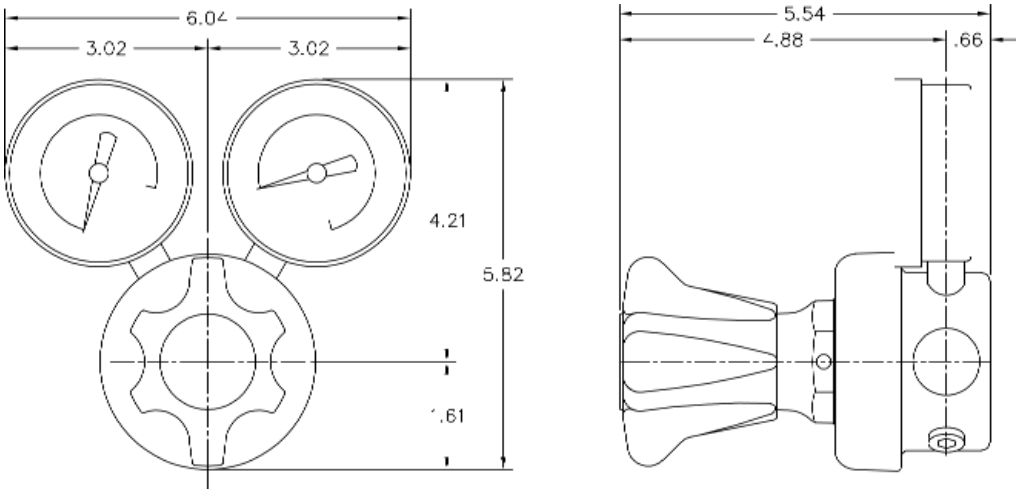
FLOW DATA



SPECIFICATIONS

- Pressure Regulation: 1.6 PSIG/100 PSIG
- Weight: 4.5 Lbs.

DIMENSIONS



HP 3530

High Flow - Single Gauge Regulator

Model HP 3530-250 shown

NEW!

A brass barstock in-line manifold regulator for pipeline and other applications up to 3000 PSIG inlet pressure. The Model HP 3530 is suitable for:

- Non-corrosive high flow gas applications
- High purity gas applications
- Research sample system gases
- Process analyzer gases
- Bulk gas distribution systems
- Laser gas systems
- Emission monitoring systems gases

****Recommended for non-corrosive gases or purity levels Grade 5.0 (99.999) and higher, and delivery pressures up to 500 PSIG**

MATERIALS

Body	Brass Barstock
Bonnet	Brass Barstock
Diaphragm*	302 Stainless Steel
Nozzle	Brass
Seat*	PTFE Teflon
Seals	PTFE Teflon
Filter	Nickel Plated Sintered Bronze - 10 Micron
Seat Return Spring	17-7 Stainless Steel
Adjusting Knob	ABS Plastic

FEATURES

- ⊡ 2 3/4" stainless steel diaphragm eliminates contamination from diffusion or outgassing
- ⊡ 1/2" FNPT inlet and outlet
- ⊡ One piece encapsulated seat design includes a sintered filter to protect the seat from particulate contamination
- ⊡ 2 1/2" brass dual scale gauge (psi/bar)
- ⊡ Maximum inlet 3000 PSIG (500 PSIG for 15 PSIG model)
- ⊡ Four port configuration, one high pressure and three low pressure
- ⊡ Self reseating internal relief valve

CYLINDER ADAPTER KITS

- CGA 540 Adapter Kit P/N: 9103615
- CGA 580 Adapter Kit P/N: 9103616
- CGA 680 Adapter Kit P/N: 9103617

HP 3530 ORDERING INFORMATION

PART NO.	MODEL NO.	DELIVERY PRESSURE DELIVERY	(OUTLET GAUGE)	INLET /OUTLET FITTING
4000800*	HP 3530	0-15 PSIG	(30 psi/2 bar)	000 (1/2" FNPT)
4000801		0-50 PSIG	(100 psi/7 bar)	
4000802		0-125 PSIG	(200 psi/14 bar)	
4000803		0-250 PSIG	(400 psi/28 bar)	
4000804		0-500 PSIG	(1000 psi/70 bar)	

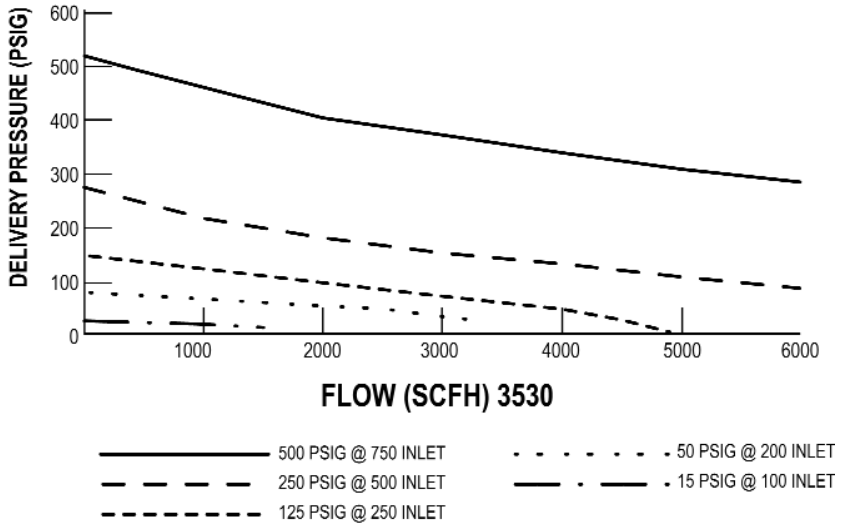
*0-15 PSIG model has neoprene diaphragm and seat

** Does not apply to 15 PSIG model (P/N: 4000800)

NOTE: Regulators with delivery pressure above 15 PSIG should not be used with acetylene.

HP 3530 TECHNICAL SPECIFICATIONS

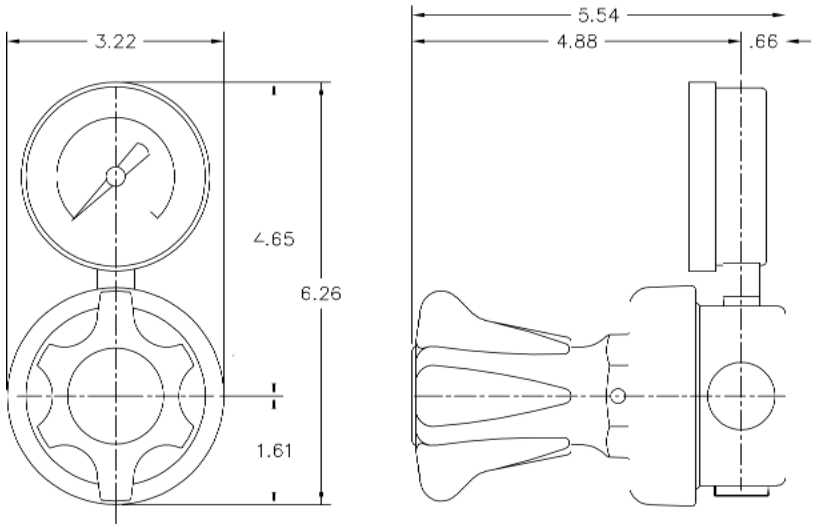
FLOW DATA



SPECIFICATIONS

- Pressure Regulation: 1.6 PSIG/100 PSIG
- Weight: 4.3 Lbs.

DIMENSIONS



HP 750

Ultra High Flow Servo Dome Regulator

Model HP 750-500-3000 shown

The Model HP 750 series regulator is a high pressure, high flow regulator system. The key to the performance of this regulator is the servo-dome load technology. The servo-dome load feature allows the regulator to supply high flow rates with straight line pressure regulation. The HP 750 is suitable for:

- Laser assist gases
- Pressure transfer
- Blanketing & high flow manifold

FEATURES

- ☑ 0-250, 500, or 1000 PSIG delivery pressure
- ☑ 3000 and 5500 PSIG inlet pressures
- ☑ Tamper proof, self-reseating internal safety valve on 250 & 500 models only
- ☑ One piece encapsulated seat design with 10-micron filtration
- ☑ Conforms to CGA E-4 standard for gas pressure regulators

MATERIALS

Body	Brass Barstock
Bonnet	Brass Barstock
Diaphragm	Teflon Coated Nylon Reinforced Neoprene
Nozzle	Brass
Seat	PTFE Teflon
Seal	PTFE Teflon
Filter	Nickel Plated Sintered Bronze - 10 Micron
Adjusting Knob	Noryl Plastic
Inlet	1/2" FNPT
Outlet	1/2" FNPT

RELATED OPTIONS

Panel Mount Kit P/N: 9100887

Cylinder Adapter Kits

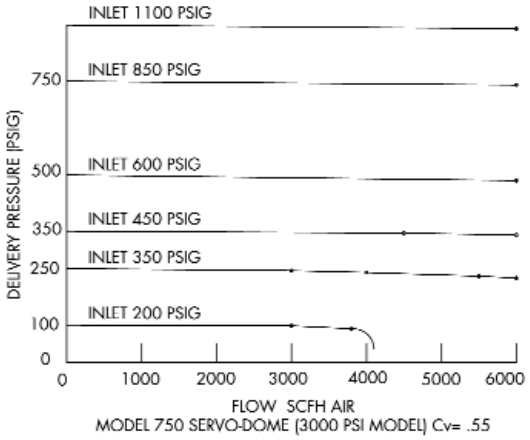
- CGA 540 Adapter Kit P/N: 9103615
- CGA 580 Adapter Kit P/N: 9103616
- CGA 680 Adapter Kit P/N: 9103617

HP 750 ORDERING INFORMATION

PART NO.	MODEL NO.	MAX. INLET PSIG	DELIVERY PRESSURE RANGE PSIG	DELIVERY PRESSURE GAUGE PSIG	SUPPLY PRESSURE GAUGE PSIG
3000860	HP750-500-3000	3000	0-500	600	4000
3000865	HP750-250-3000	3000	0-250	400	4000
3000866	HP750-1000-3000	3000	0-1000	2000	4000
3000867	HP750-250-5500	5500	0-250	400	6000
3000868	HP750-500-5500	5500	0-500	600	6000
3000869	HP750-1000-5500	5500	0-1000	2000	6000

HP 750 TECHNICAL SPECIFICATIONS

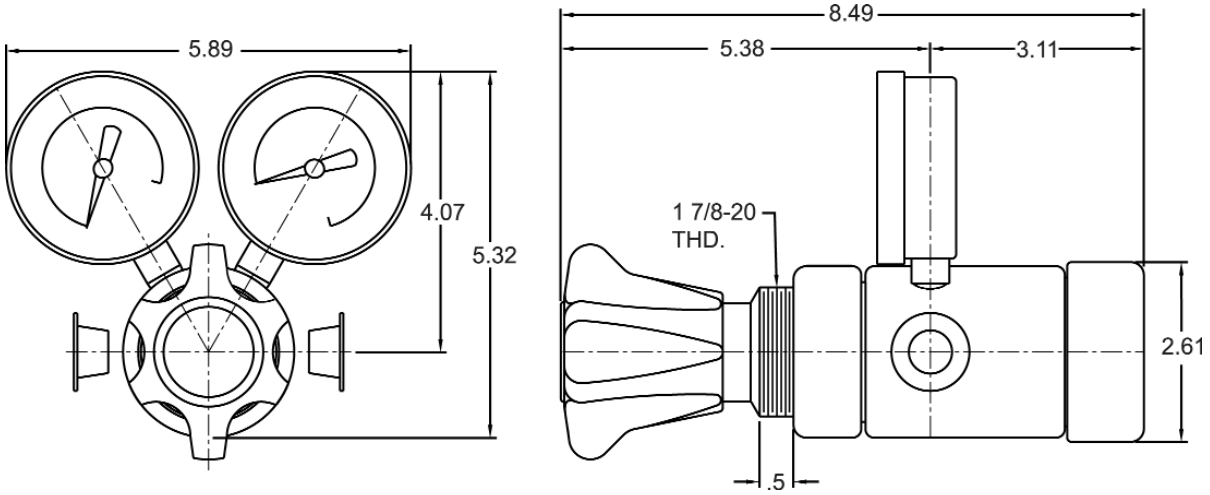
FLOW DATA



SPECIFICATIONS

- C_V: .55 on 3000 psi inlet models; C_V: .4 on 5500 psi inlet models
- Pressure Regulation: 3 PSIG/1000 PSIG for 250 and 500 psi delivery pressure
  5 PSIG/1000 PSIG for 1000 psi delivery pressure
- Weight: 8.5

DIMENSIONS



HP 752

Ultra High Flow Remote Servo Dome Regulator System

NEW!

Model HP 752
P/N: 3000885 - Servo-Dome Regulator

The Model HP 752 series regulator is a remote high pressure, high flow regulator system. The key to the performance of this regulator is the servo-dome load technology. The servo-dome load feature allows the regulator system to supply and control high flow rates with straight line pressure regulation. The HP 752 is suitable for:

- Laser assist gases
- Pressure transfer
- Blanketing & high flow manifold delivery systems

Note: HP 752 requires pilot regulator (included) for proper function (see below).

MATERIALS

Body	Brass Barstock
Bonnet	Brass Barstock
Diaphragm	Teflon Coated Nylon Reinforced Neoprene
Nozzle	Brass
Seat	PTFE Teflon
Seal	Viton, PTFE
Filter	Nickel Plated Sintered Bronze - 10 Micron
Seat Return Spring	Stainless Steel

FEATURES

- 0- 500 PSIG delivery pressure
- Up to 3000 PSIG inlet pressure
- One piece encapsulated seat design with 10-micron filtration
- 1/2" diameter sensing line for precise servo flow control
- 1/4" diameter dome pressure line
- Front panel mount bonnet on remote pilot regulator
- Model 752 inlet & outlet: 1/2" FNPT
- Remote pilot regulator can be mounted up to 100 feet away

RELATED OPTIONS FOR HP 752

Front Panel Mount Kit P/N: 9100887

CYLINDER ADAPTER KITS

- CGA 540 Adapter Kit P/N: 9103615
- CGA 580 Adapter Kit P/N: 9103616
- CGA 680 Adapter Kit P/N: 9103617

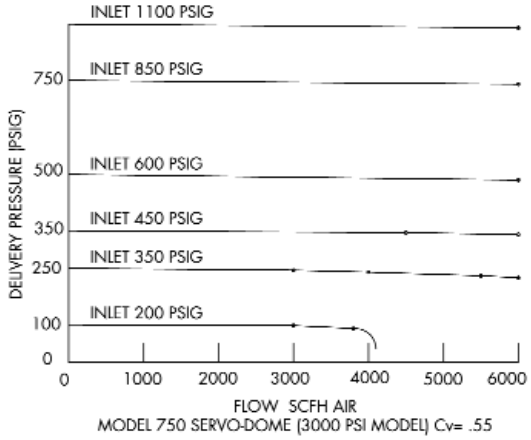
HP 752 ORDERING INFORMATION

PART NO.	MODEL	DESCRIPTION
3000885	Model 752	Servo Dome Regulator w/ Remote Pilot Regulator

Remote Pilot Regulator

HP 752 TECHNICAL SPECIFICATIONS

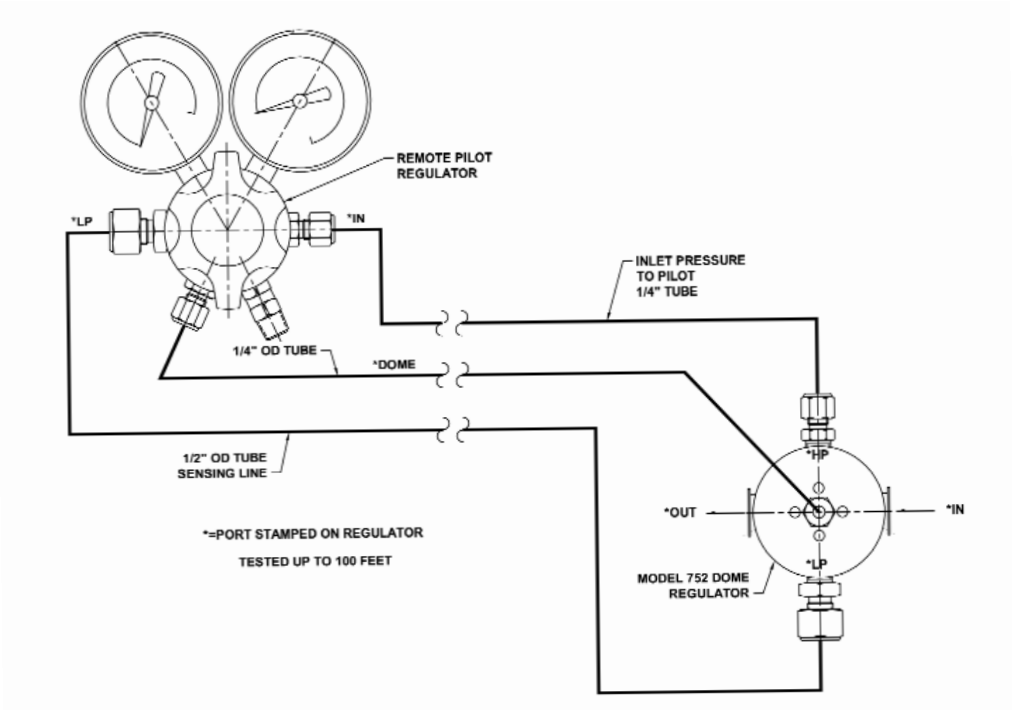
FLOW DATA



SPECIFICATIONS

- C_V: .55
- Pressure Regulation: 3 PSIG/1000 PSIG
- Weight: 4.48 Lbs. - Servo Dome Regulator
  5.8 Lbs. - Remote Pilot Regulator

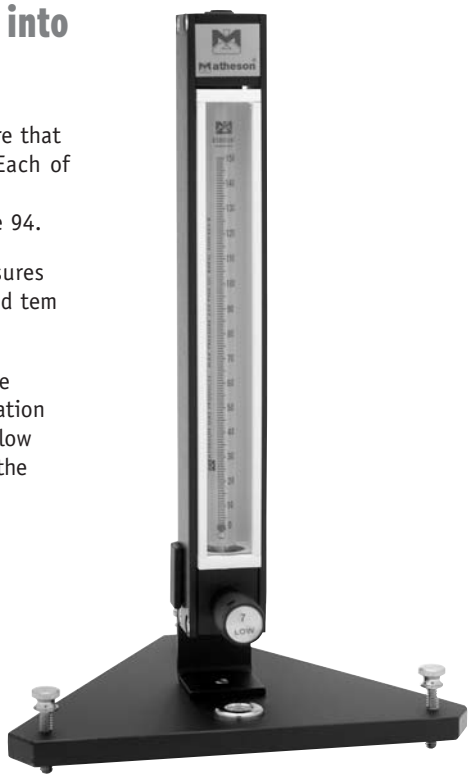
CONFIGURATION SPECIFICATIONS



FLOWMETER Selection Guide

FLOWMETER SELECTION

In selecting a flowmeter, the following should be taken into consideration:



* Shown with optional base plate assembly and 150 SCCM flow tube

1. Materials Compatibility: As with all gas handling equipment, care must be taken to ensure that the materials used to construct the flowmeter are compatible with the service gas. Each of the flowmeters shown in this catalog is provided with a list of its "Materials of Construction". This information should be used with the gas compatibility data on page 94.

2. Pressure and Temperature Ratings: The flowmeter must be capable of handling pressures and temperatures required by the particular application. Maximum operating pressures and tem peratures are provided for each flowmeter under "Specifications."

3. Measuring Range: Flowmeters have specific measuring ranges associated with them. These ranges will vary depending on the flowmeter model as well as the tube and float combination selected. Obviously, the specific flowmeter chosen must be capable of measuring in the flow range required by the process. In general and for the best accuracy, it is suggested that the flowmeter be sized for operation in the upper part of its range.

4. Accuracy: The flowmeter should be accurate to the degree required by the application. Accuracy specifications are listed for each of our flowmeters. Generally, this will be + 5% for high accuracy or ± 10% for high flow of full scale. Full scale accuracy means that the accuracy specification is based on the flowmeter's maximum capacity. For example, a meter with a measuring range of 1-10 SPLM and an accuracy specification of ± 10% will have an actual accuracy of ± 1 SPLM across its entire range that is 10% of the maximum capacity of 10 SPLM.

5. Repeatability: In many gas processes, the ability to duplicate flow measurements over time is more important than the absolute accuracy of the readings. The repeatability specification shown for each flowmeter refers to the degree to which a meter will repeat a previous flow reading. In general, variable area flowmeters have very good repeatability, many as high as t 0.25% of full scale for the SG 1050 and SG 1000.

6. Metering Valves: Flowmeters only measure flow. If adjustments to flow rates are required, a flowmeter equipped with a metering valve should be selected. A standard metering valve is included on the inlet for each flowmeter, optional high accuracy valves are available on the SG 1050 and SG 1000 flowmeters.

FLOWMETER SELECTION GUIDE

MODEL NO.	FLOW RANGES (AIR)	MATERIALS BRASS	MATERIALS ALUMINUM	MATERIALS STAINLESS STEEL	TUBE SCALE	CATALOG PAGE NO.
SG 1000	0.02 - .24 SCFH to 10 - 150 SCFH	N/A	X	X	65 MM	pg. 59
SG 1050	6 - 150 SCCM to 2.4 - 44 SLPM	N/A	X	X	150 MM	pg. 58
SG 1100	0.5-4 SCFM to 1-15 SCFM	X	N/A	X	70 MM	pg. 60
SG 1127	0.2 - 4 SCFM to 1-16 SCFM	X	N/A	X	127 MM	pg. 60
SG 7300	0.13 - 104 SCCM	N/A	X	X	150 MM	pg. 61
SG 7400	0.13 - 104 SCCM	N/A	X	X	150 MM	pg. 61

Basic Flowmeter Principles

How they work:

Flowmeters are used in gas systems to indicate the rate of flow of the gas. They can also control the rate of flow if they are equipped with a flow control valve.

Rotameters are a particular kind of flowmeter based on the variable area principle. They provide a simple, precise and economical means of indicating flow rates in fluid systems.

This variable area principle consists of three basic elements: A uniformly tapered flow tube, a float and a measured scale. A control valve may be added if flow control is also desired.

In operation, the rotometer is positioned vertically in the gas system with the smallest diameter end of the tapered flow tube at the bottom. This is the gas inlet. The float, typically spherical, is located inside the flow tube, and is engineered so that its diameter is nearly identical to the flow tube's inlet diameter.

When fluid gas is introduced into the tube, the float is lifted from its initial position at the inlet, allowing the gas to pass between it and the tube wall. As the float rises, more and more gas flows by the float because the tapered tube's diameter is increasing. Ultimately, a point is reached where the flow area is large enough to allow the entire volume of the gas to flow past the float. This flow area is called the annular passage. The float is now stationary at that level within the tube, as its weight is being supported by the gas forces which caused to rise. This position corresponds to a point on the tube's measurement scale and provides an indication of the gas flow rate.

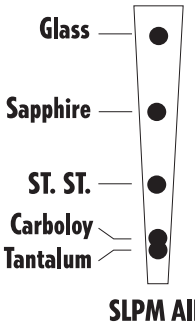
One way to change the capacity, or flow range of a rotameter is to change the float material, and thus its density, while keeping the flow tube and float size constant. Floats which are made from less dense materials will rise higher in the tube and therefore will yield lower flow capacities for the same diameter flow tube.

Selecting the right flowmeter size:

There are certain factors which affect the measurement of a gas flow rate with a rotameter. The gas temperature, pressure and specific gravity all impact gas flow measurements.

Flow capacities (ranges) for the flowmeters described in this catalog are given for air at standard conditions -- 14.7 PSIA (101.3 kPa Abs) and 70° F (21° C). Sizing a meter for a gas other than air, or for your specific application pressure and/or temperature, requires that you first determine the equivalent flow capacity in air at standard conditions. Once determined, the flow capacity tables in this catalog can be applied directly. Reference scale tables can be requested for each flowmeter ordered which will provide conversion to your desired fluid or conditions.

Note that for flowmeters calibrated at standard conditions with a valve on the inlet, readings on the tube are correct provided that the outlet pressure is close to atmospheric. When the valve is on the outlet, readings are correct if the inlet gas pressure is equal to the pressure for which the tube was calibrated.



Floats made from more dense materials will rise less thereby yielding higher flow capacities. Relative flow capacities for some common float materials are shown above.

Another way to change the capacity is to change the diameter of the flow tube and the size of the float.

Flow Rate Factors for Gases other than Air

Acetylene 0.95	Halocarbon-11 . . . . . .2.18	Hydrogen Chloride 1.13
Air 1.00	Halocarbon-12 . . . . . .2.05	Hydrogen Sulfide 1.08
Ammonia 0.77	Halocarbon-13 . . . . . .1.90	Isobutane 1.42
Argon 1.18	Halocarbon-13B 2.27	Isobutylene 1.39
1-3 Butadiene 1.37	Halocarbon-14 . . . . . .1.74	Methane (Natural Gas) . . .0.75
Butane 1.42	Halocarbon-21 . . . . . .1.89	Methyl Fluoride 1.09
1-Butene 1.39	Halocarbon-22 . . . . . .1.73	Monomethylamine 1.04
Carbon Dioxide 1.23	Halocarbon-23 . . . . . .1.56	Neon 0.83
Carbon Monoxide 0.98	Halocarbon-113 . . . . . .2.54	Nitrogen 0.98
Chlorine 1.57	Halocarbon-114 . . . . . .2.43	Nitrogen Dioxide 1.60
Cracked Ammonia 0.54	Halocarbon-116 . . . . . .2.18	Nitrous Oxide 1.23
Cyclopropane 1.21	Halocarbon-115 . . . . . .2.31	Oxygen 1.05
Difluoroethane 1.51	Halocarbon-142B 1.86	Propane 1.23
Dimethyl Ether 1.26	Halocarbon-152A 1.51	Propylene 1.21
Ethane 1.02	Helium 0.37	Sulfur Dioxide 1.50
Ethylene 0.98	Hydrogen 0.26	Sulfur Hexafluoride 2.25

SG 1050

Flowmeter

HIGH RESOLUTION

Shown with optional base plate assembly and 150 SCCM flow tube

The SG 1050 Series Flowmeters provide the most accurate indication and precise control of gases available for a wide range of applications.

All SG 1050 Series glass metering tubes have integral float guides to ensure a guaranteed ±5% of full scale accuracy. The meters are available in a range of 150mm reference indicating scales.

MATERIALS

End Blocks,
Fittings and Internal Parts . . . . . .Aluminum or 316 stainless steel

Seal Materials . . . . . .Buna-N or Viton – standard

Metering Tube . . . . . .Borosilicate glass enclosed

Float Materials . . . . . .Black glass and 316 stainless steel – standard

FEATURES

- ▣ High resolution 150mm scale length
- ▣ Precision tapered, fluted metering tube
- ▣ Standard front panel mounting requires minimum hardware easy installation, quick access
- ▣ Simplified, direct acting, nonrotating compression plug for quick and easy tube sealing
- ▣ Single tube unit

SPECIFICATIONS

Pressure Rating:
250 PSIG maximum operating pressure

Temperature Rating:
250°F maximum operating temperature

Accuracy:
±5% of full scale flow rate

Repeatability:
0.25% of scale reading

Range:
10 to 1, (i.e., 100% to 10% of full scale) mm or linear flow with conversion curves and/or factors

Shipping Weight:
1 Lb - Flowmeter
1 Lb - Base

ORDERING INFORMATION

SG 1050 - xx(xx) - xx(xx) - xxx - xx - xxx

MODEL NO.	END BLOCKS/ SEAL MATERIAL	VALVE TYPES	INLET/OUTLET CONNECTIONS	FLOW TUBE (CAPACITIES) AIR	OPTIONS
SG 1050	1) Aluminum with Buna-N Seals 2) Stainless Steel with Viton Seals	1) Utility Valve on Inlet - std.* 2) Utility Valve on Outlet 3) High Accuracy Valve on Inlet 4) High Accuracy Valve on outlet	1) 1/8" NPT Female - std.* 2) 1/4" NPT Female 3) 1/8" Tube 4) 1/4" Tube	1) 6-150 SCCM 2) 10-270 SCCM 3) 38-840 SCCM 4) 88-1800 SCCM 5) .23-4.6 SLPM 6) .4-7.6 SLPM 7) .88-16 SLPM 8) 2.4-44 SLPM	1) Base Plate Assembly P/N 4300320

* Standard units include valve on inlet and 1/8" NPT connection.
Note: Be sure to request calibration data for the gas(es) you will be measuring.

SG 1000
Flowmeter

The SG 1000 Series Flowmeters incorporate the innovative design of the SG 1050 in a more compact unit without reducing standards of accuracy. The same ±5% full scale accuracy is guaranteed for the 65mm scale length of these flowmeters.

The SG 1000 Series flowmeters are direct reading for air. These flow tubes are fluted to provide better float stability.

COMPACT

Shown with optional base plate assembly and 65 SCFH flow tube

FEATURES

- ⊡ Precision tapered, fluted metering tube
- ⊡ Reflective plastic background and 1.5 X magnification lens for excellent readability
- ⊡ Safety blow-out back panel
- ⊡ Full 10 to 1 (100% to 10% full scale) metering range
- ⊡ Low pressure drop for increased flow rates at low feed pressures

SPECIFICATIONS

Pressure Rating:
250 PSIG maximum operating pressure

Temperature Rating:
250°F maximum operating temperature

Accuracy:
±5% of full scale flow rate

Repeatability:
0.25% of scale reading

Range:
10 to 1, (i.e., 100% to 10% of full scale)

Shipping Weight:
1 Lb - Flowmeter
1 Lb - Base

MATERIALS

End Blocks,
Fittings and Internal Parts . . . . . .Aluminum or 316 stainless steel

Seal Materials . . . . . .Buna-N or Viton – standard

Metering Tube . . . . . .Borosilicate glass enclosed

Float Materials . . . . . .Black glass and 316 stainless steel – standard

BRASS ADAPTOR KIT for direct attachment to regulator
P/N: 9100919

ORDERING INFORMATION

SG 1000 - xx - xx(xx) - xx(xx) - xxx - xxx

MODEL NO.	END BLOCKS/ SEAL MATERIAL	VALVE TYPES	INLET/OUTLET CONNECTIONS	FLOW TUBE (CAPACITIES) AIR	OPTIONS
SG 1000	1) Aluminum with Buna-N Seals 2) Stainless Steel with Viton Seals	1) Utility Valve on Inlet - std.* 2) Utility Valve on Outlet 3) High Accuracy Valve on Inlet 4) High Accuracy Valve on Outlet	1) 1/8" NPT Female - std.* 2) 1/4" NPT Female 3) 1/8" Tube 4) 1/4" Tube	1) .02-.24 SCFH 2) .05-.65 SCFH 3) .2-1.1 SCFH 4) .4-2.2 SCFH 5) .2-2.8 SCFH 6) .2-4.4 SCFH 7) 1-11 SCFH 8) 2-20 SCFH 9) 5-55 SCFH 10) 10-100 SCFH 11) 10-150 SCFH	1) Base Plate Assembly P/N 4300320

* Standard units include valve on inlet and 1/8" NPT connection.
Note: Be sure to request calibration data for the gas(es) you will be measuring.

SG 1100, SG 1127

HIGH FLOW

The Model SG 1100 and SG 1127 Series Flowmeters are offered as a simplified solution to the problem of gas flow indication at higher capacity levels than the SG 1050 and SG 1000 Series Flowmeters. These meters are designed to withstand the physical abuse and environmental corrosion of industrial applications.

The SG 1100 is available in several ranges of 70mm direct reading scales, and the SG 1127 is available in 127mm direct reading scales.

MATERIALS

Wetted End Blocks,
Fittings and Internal Parts . . . . . .Brass or 316 stainless steel

Seal Materials . . . . . .Buna-N or Viton – standard

Metering Tube . . . . . .Borosilicate glass

Float Material . . . . . .316 stainless steel

FEATURES

- ⊡ Precision tapered, fluted metering tube
- ⊡ Fully protected assembly using aluminum meter case
- ⊡ Unobstructed flow path area for low pressure drop increases available flow rates at low feed pressures
- ⊡ Precision machined float
- ⊡ Spring float stops absorb line shock
- ⊡ Float/Scale correlation symbol and float reading edge instructions permanently screened on meter window
- ⊡ Standard units include value on inlet and 3/8 NPT connection

SPECIFICATIONS

Pressure Rating:
200 PSIG maximum operating pressure @ 200°F

Temperature Rating:
250°F maximum operating temperature

Accuracy:
±10% of full scale flow rate

Range:
10 to 1, i.e., 100% to 10% of full scale

Shipping Weight:
2 Lb

ORDERING INFORMATION

SG 1100 - xx(xx) - xx(xx) - xxx - xx
SG 1127

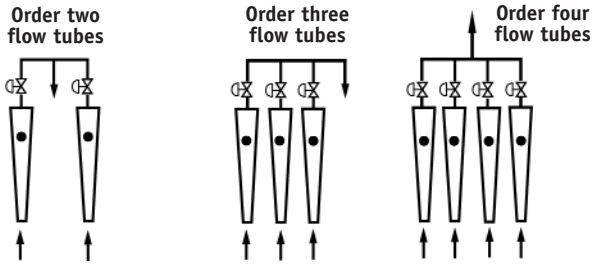
MODEL NO.	END BLOCKS/ SEAL MATERIAL	VALVE TYPES	INLET/OUTLET CONNECTIONS	1100 or 1127 FLOW TUBE (CAPACITIES) AIR	
SG 1100	1) Brass with Buna-N Seals	1) Utility Valve on Inlet - std.*	1) 1/4" FNPT	1) 0.5-4 SCFM	1) 0.2-4 SCFM
		2) Utility Valve on Outlet	2) 3/8" FNPT - std.*	2) 1-9 SCFM	2) 0.5-9 SCFM
SG 1127	2) Stainless Steel with Viton Seals		3) 1/2" FNPT	3) 1-12 SCFM	3) 0.5-11 SCFM
				4) 1-15 SCFM	4) 1-16 SCFM

* Standard units include valve on inlet and 3/8 FNPT connection
Note: Be sure to request calibration data for the gas(es) you will be measuring.

SG 7300, SG 7400

The Model SG 7300 and SG 7400 Series Flowmeters are 150mm multi-tube flowmeter manifolds used for proportioning or mixing multiple gas streams. They are available in three basic configurations.

- Two gases in - One stream out (proportioner)
- Three gases in - One stream out (mixer)
- Four gases in - One stream out (mixer)



Model 7300 Model 7400

Shown with optional base plate assembly

FEATURES

- ⊡ High resolution 150mm scale length
- ⊡ Precision tapered, fluted metering tube
- ⊡ Standard front panel mounting requires minimum hardware for easy installation and quick access
- ⊡ Simplified, direct acting, nonrotating compression plug for quick and easy tube sealing
- ⊡ Single tube unit

SPECIFICATIONS

Maximum Pressure:
200 PSIG

Temperature Ranges:
20° to 250°F (-30° to 120°C)

MATERIALS

Wetted End Blocks,
Fittings and Internal Parts . . .Aluminum, Brass, 316 stainless steel

Seal Materials . . . . . .Buna-N or Viton – standard

Metering Tube . . . . . .Borosilicate glass enclosed

Float Materials . . . . . .Black glass and 316 stainless steel – standard

ORDERING INFORMATION

SG 7300 - x - x - xx - xxxx - xxx
SG 7400

MODEL NO.	END BLOCKS/ SEAL MATERIAL	VALVE TYPES	INLET/OUTLET CONNECTIONS	FLOW TUBE (CAPACITIES) AIR	OPTIONS
SG 7300 SG 7400	1) Aluminum with Buna-N Seals 2) Stainless Steel with Viton Seals	1) Utility Valve on Inlet - std.* 2) Utility Valve on Outlet 3) High Accuracy Valve on Inlet 4) High Accuracy Valve on outlet	1) 1/8" NPT Female - std.* 2) 1/4" NPT Female 3) 1/8" Tube 4) 1/4" Tube	1) 0.13-104 SCCM** 2) 6-60 SCCM** 3) 10-100 SCCM** 4) 38-380 SCCM** 5) 88-880 SCCM**	1) Base Plate Assembly P/N 4300320

* Standard units include valve on inlet and 1/8 FNPT connection
** Order one flow tube for each gas in (reference diagram above)

Note: To ensure that you receive the correct model for your application, please specify: Pressure (20 or 50 PSIG), Total Flow Rate, Percent of Each Gas

SG 910 SS

The SG 910 stainless steel single regulator mounting station can be ordered for one or two cylinders. A variety of outlet regulators are available based on delivery pressure and material requirements.

Single regulator mounting stations can be ordered with outlet regulator or separately. See regulator ordering information.

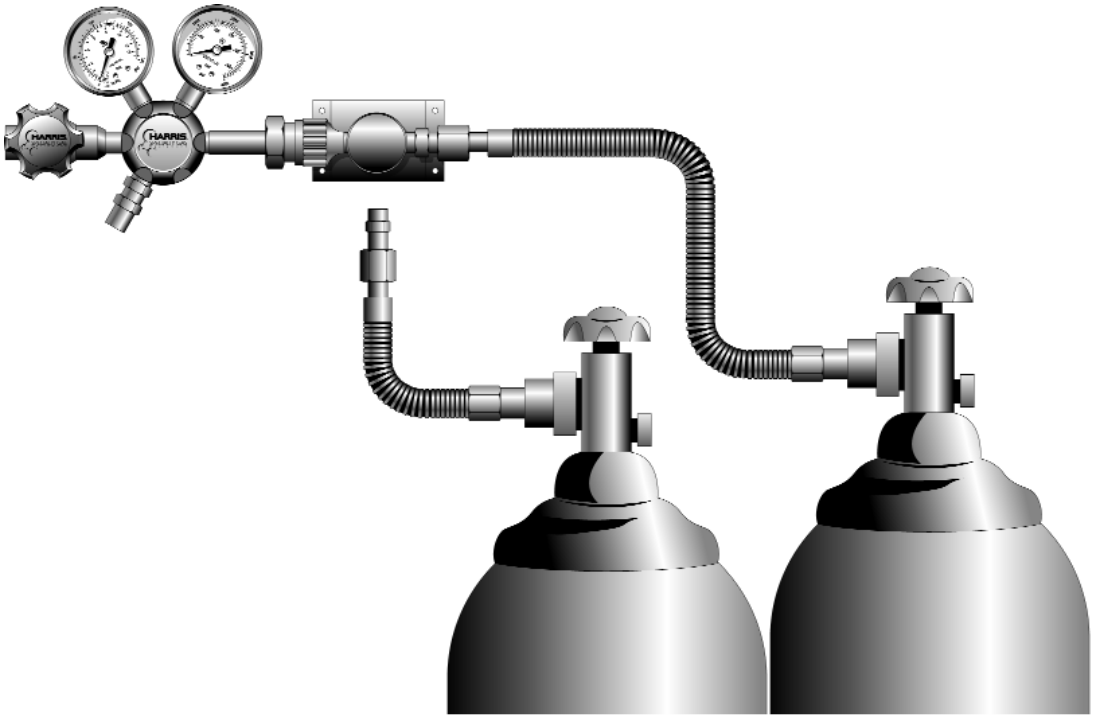
FEATURES

- ▣ Wall bracket included
- ▣ Maximum inlet pressure 3000 PSIG
- ▣ Includes 36" all stainless steel pigtail with stainless steel CGA and integral check valve
- ▣ Select regulator on page 63

Shown with Model 741 Regulator Attached

SG 910SS ORDERING INFORMATION

PART NO.	MODEL NO.	GAS SERVICE	BRACKET ONLY (NO PIGTAIL)
1 Cylinder			
4700480	910SS-1-320	CGA 320-Carbon Dioxide	4702819
4700494	910SS-1-330	CGA 330	4702820
4700481	910SS-1-346	CGA 346- Air (Breathing)	4702821
4700482	910SS-1-350	CGA 350-Hydrogen	4702822
4700483	910SS-1-510	CGA 510-Acetylene	4702823
4700484	910SS-1-540	CGA 540-Oxygen	4702824
4700485	910SS-1-580	CGA 580-N^2/He/Ar	4702825
4700486	910SS-1-590	CGA 590-Air(Industrial)	4702826
4700495	910SS-1-660	CGA 660	4702827
2 Cylinders			
4700487	910SS-2-320	CGA 320-Carbon Dioxide	4702835
4700496	910SS-2-330	CGA 330	4702836
4700488	910SS-2-346	CGA 346-Air (Breathing)	4702837
4700489	910SS-2-350	CGA 350-Hydrogen	4702838
4700490	910SS-2-510	CGA 510-Acetylene	4702839
4700491	910SS-2-540	CGA 540-Oxygen	4702840
4700492	910SS-2-580	CGA 580-N^2/He/Ar	4702841
4700493	910SS-2-590	CGA 590-Air (Industrial)	4702842
4700497	910SS-2-660	CGA 660	4702843



OUTLET RE
ORDERING INFORMATION

Model 741 & Model 742
High Purity - Stainless Steel Regulators

- Stainless steel barstock bodies
- One-piece encapsulated seat
- Stainless steel diaphragm
- C_V = Single stage .08 - Two stage .06

RELATED OPTIONS

DESCRIPTION	PART NO.
Purge Assembly- Stainless Steel see page 70 for P/N	
Rotatable Venting Kit	9100875
Regulator Alarm Kit-	
HP Stainless Steel	4300426
LP Stainless Steel	4300427

Model 741

Single Stage Regulator w/ Diaphragm Valve and Mounting Station

Delivery PSIG	Part Number
0-15	741-015-CGA-A-G
0-50	741-050-CGA-A-G
0-125	741-125-CGA-A-G
0-250	741-250-CGA-A-G
0-500	741-500-CGA-A-G

Model 742

Two Stage Regulator w/ Diaphragm Valve and Mounting Station

Delivery PSIG	Part Number
0-15	742-015-CGA-A-G
0-50	742-050-CGA-A-G
0-125	742-125-CGA-A-G
0-250	742-250-CGA-A-G
0-500	742-500-CGA-A-G

SG 910 BR

The SG 910 brass single regulator mounting station can be ordered for one or two cylinders. A variety of outlet regulators are available based on delivery pressure and material requirements.

Single regulator mounting station can be ordered with outlet regulator or separately. See regulator ordering information.

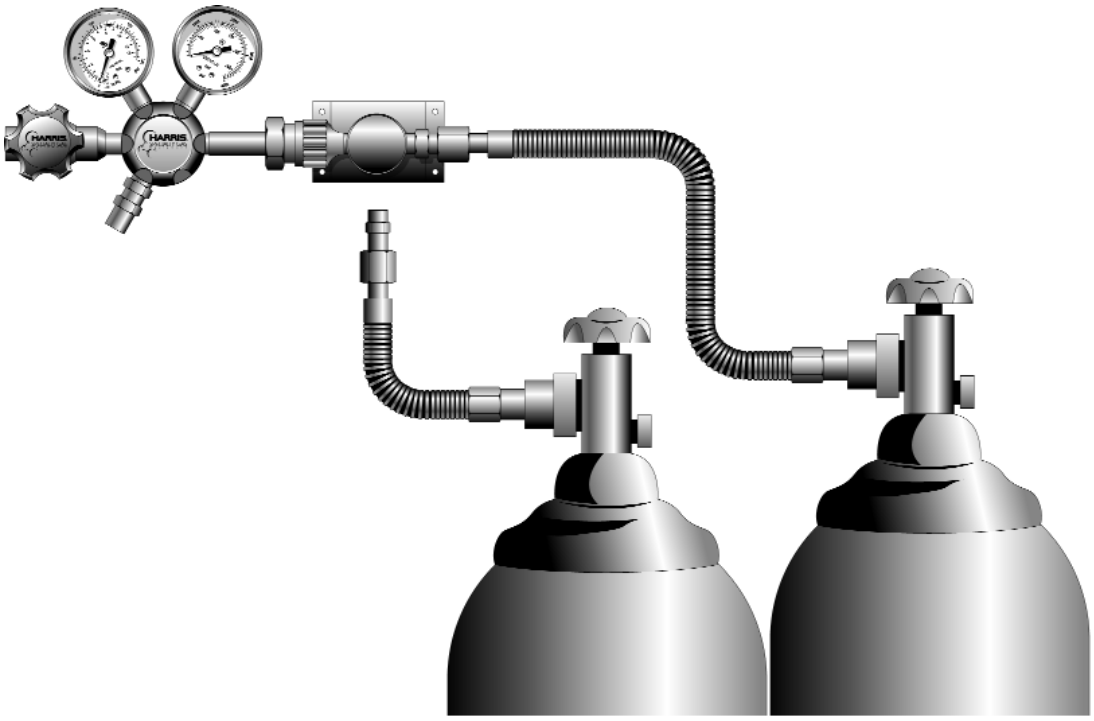
FEATURES

- ⊡ Wall bracket included
- ⊡ Maximum inlet pressure 3000 PSIG
- ⊡ Includes 36" stainless steel lined stainless steel pigtail with CGA integral check valve
- ⊡ Select regulator on page 65

Shown with Model 721 Regulator Attached

SG 910BR ORDERING INFORMATION

PART NO.	MODEL NO.	GAS SERVICE	BRACKET ONLY (NO PIGTAIL)
1 Cylinder			
4700465	910BR-1-320	CGA 320-Carbon Dioxide	4702814
4700466	910BR-1-346	CGA 346- Air (Breathing)	4702815
4700467	910BR-1-350	CGA 350-Hydrogen	4702816
4700468	910BR-1-510	CGA 510-Acetylene	4702817
4700469	910BR-1-540	CGA 540-Oxygen	4702813
4700470	910BR-1-580	CGA 580-N²/He/Ar	4702812
4700471	910BR-1-590	CGA 590-Air(Industrial)	4702818
2 Cylinders			
4700472	910BR-2-320	CGA 320-Carbon Dioxide	4702830
4700473	910BR-2-346	CGA 346-Air(Breathing)	4702831
4700474	910BR-2-350	CGA 350-Hydrogen	4702832
4700475	910BR-2-510	CGA 510-Acetylene	4702833
4700476	910BR-2-540	CGA 540-Oxygen	4702829
4700477	910BR-2-580	CGA 580-N²/He/Ar	4702828
4700478	910BR-2-590	CGA 590-Air(Industrial)	4702834



OUTLET REGULATOR ORDERING INFORMATION

Model 721 & Model 722
High Purity - Brass Barstock Regulators

- Brass barstock bodies
- One-piece encapsulated seat
- Stainless steel diaphragm
- External relief valve
- C_V = Single stage .08 - Two stage .06

RELATED OPTIONS

DESCRIPTION	PART NO.
Purge Assembly- Chrome Plated Brass see page 70 for P/N	
Rotatable Venting Kit	9100875
Regulator Alarm Kit-	
HP Chrome Plated Brass	4300424
LP Chrome Plated Brass	4300425

Model 721

Single Stage Regulator w/ Diaphragm Valve and Mounting Station

Delivery PSIG	Part Number
0-15	721-015-CGA-B-H
0-50	721-050-CGA-B-H
0-125	721-125-CGA-B-H
0-250	721-250-CGA-B-H
0-500	721-500-CGA-B-H

Model 722

Two Stage Regulator w/ Diaphragm Valve and Mounting Station

Delivery PSIG	Part Number
0-15	722-015-CGA-B-H
0-50	722-050-CGA-B-H
0-125	722-125-CGA-B-H
0-250	722-250-CGA-B-H
0-500	722-500-CGA-B-H

SG 770

Generator Back-up Panel

Model SG 770 provides a continuous backup supply of gas in case of generator failure or loss of power. The system automatically switches to a backup cylinder of gas when the generator supply pressure drops below a preset value. The process will automatically reverse when the gas supplied by the generator returns to a normal level. All units include the following:

- 0-125 PSIG line regulator
- High leak integrity diaphragm isolation valves
- Flexible hose for attaching to the cylinder
- Reverse flow check valve

MATERIALS

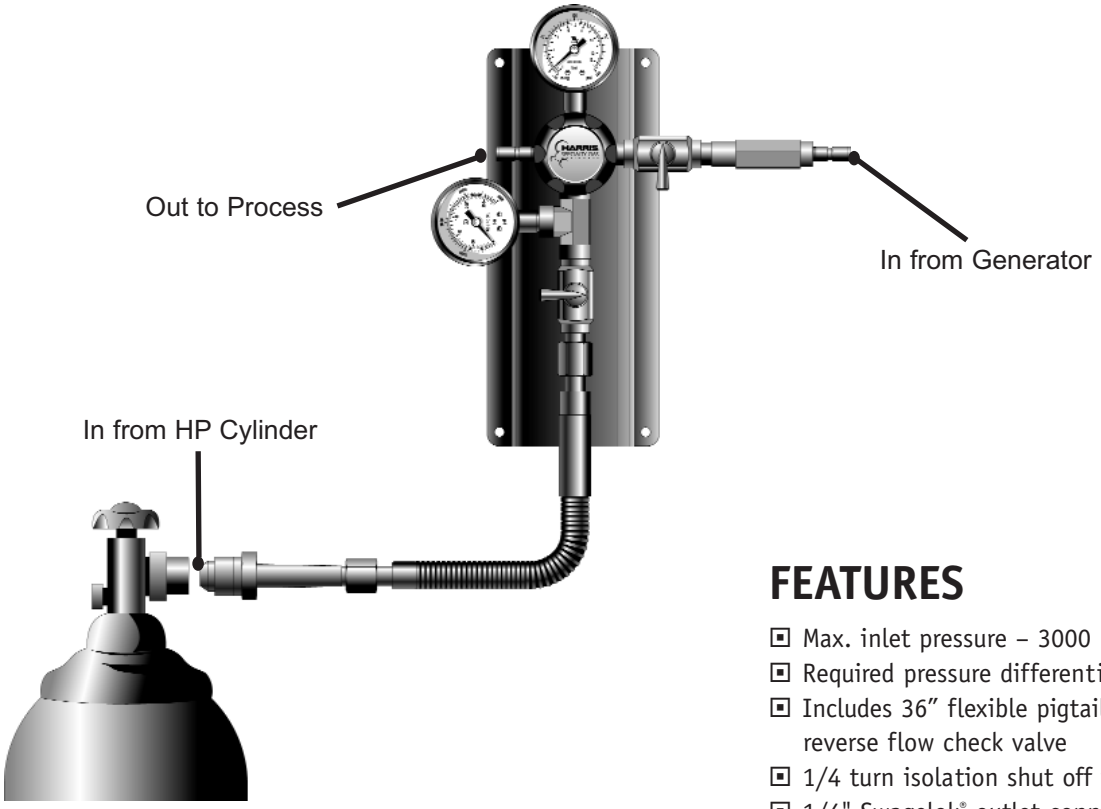
Regulator	Brass
Diaphragm	316 Stainless Steel
Seat	PTFE Teflon
Pigtail	Armor Shielded with SS Inner Core
Panel	302 SS

FEATURES

- ⊡ Includes 36" flexible pigtail with integrated reverse flow check valve
- ⊡ 1/4 turn isolation shut off valves included
- ⊡ 1/4" Swagelok® outlet connection
- ⊡ 1/4" Swagelok® inlet connection with reverse flow check valve
- ⊡ Available for Air, Nitrogen or Hydrogen gas service

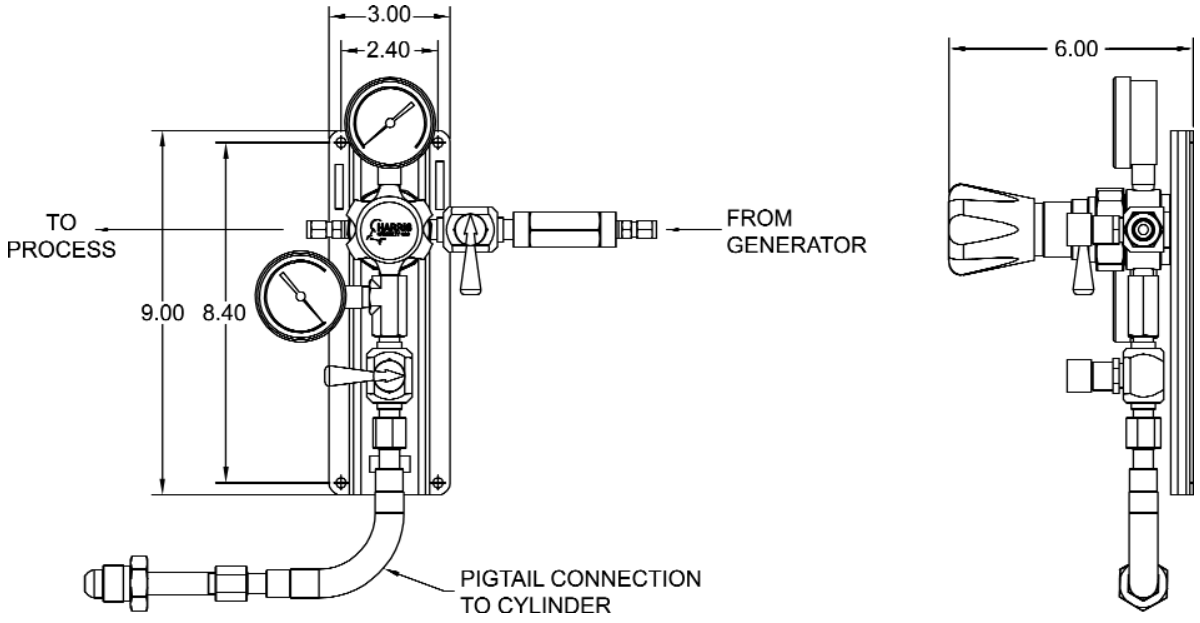
SG 770 ORDERING INFORMATION

PART NO.	MODEL NO.	GAS SERVICE
4702981	SG 770-350	Hydrogen
4702982	SG 770-580	Nitrogen
4702983	SG 770-590	Air (industrial)
4702984	SG 770-346	Air



FEATURES

- Max. inlet pressure – 3000 PSIG
- Required pressure differential 15-20 PSIG
- Includes 36" flexible pigtail with integrated reverse flow check valve
- 1/4 turn isolation shut off valves included
- 1/4" Swagelok® outlet connection
- 1/4" Swagelok® inlet connection with reverse flow check valve
- Available for Air, Nitrogen or Hydrogen Gas Service



PURGES

REGULATOR PURGING

Regulator purging is not always given the attention it deserves in the use of high purity, calibration and other specialty gases. The additional cost of proper purging equipment is sometimes seen as unnecessary. Users must realize, however, that atmospheric contamination into a specialty gas system results every time an empty cylinder is changed out, or every time a regulator is disconnected and reconnected. As a consequence of this, application results will also be negatively affected by the contaminated gas stream. In order to maintain system integrity and obtain the best results possible, the user should purge all regulators. It should be remembered that maintaining the purity of the gas between the cylinder and its end use is dependent on the quality of connecting lines, valves and other equipment as well as the purging procedure.

Purging of regulators is often not done at all, or, is done by simply allowing an arbitrary amount of gas to flow through the regulator. The shortcoming of this method is that in virtually all regulators there are internal "dead" pockets which tend to hold contaminants. Just as a smoke detector in a house cannot function properly if it is installed too close to the junction of the wall and the ceiling, regulator "dead" pockets tend to be unaffected by the flow of purge gas. Better results will be achieved by dilution purging. Dilution purging can be accomplished by alternately pressurizing and depressurizing the regulator with the purge gas. The following procedure details this method.

1. Install a tee or cross purge device between the regulator and the cylinder or a tee purge device between the regulator and the downstream instrument. The main trunk should run to the regulator or instrument and the purge branch should be vented in a safe manner for the gas used. Special precautions will be necessary when using pyrophoric, toxic, corrosive, flammable or oxidizing gases. See your local gas supplier, or contact The Harris Products Group for additional information.

2. Turn the regulator adjustment valve to the fully closed position. Then, close the vent valve and the valve at the instrument and open the valve on the outlet side of the regulator.

3. Slowly open and close the cylinder valve, which will pressurize the inlet side of the regulator to cylinder pressure.

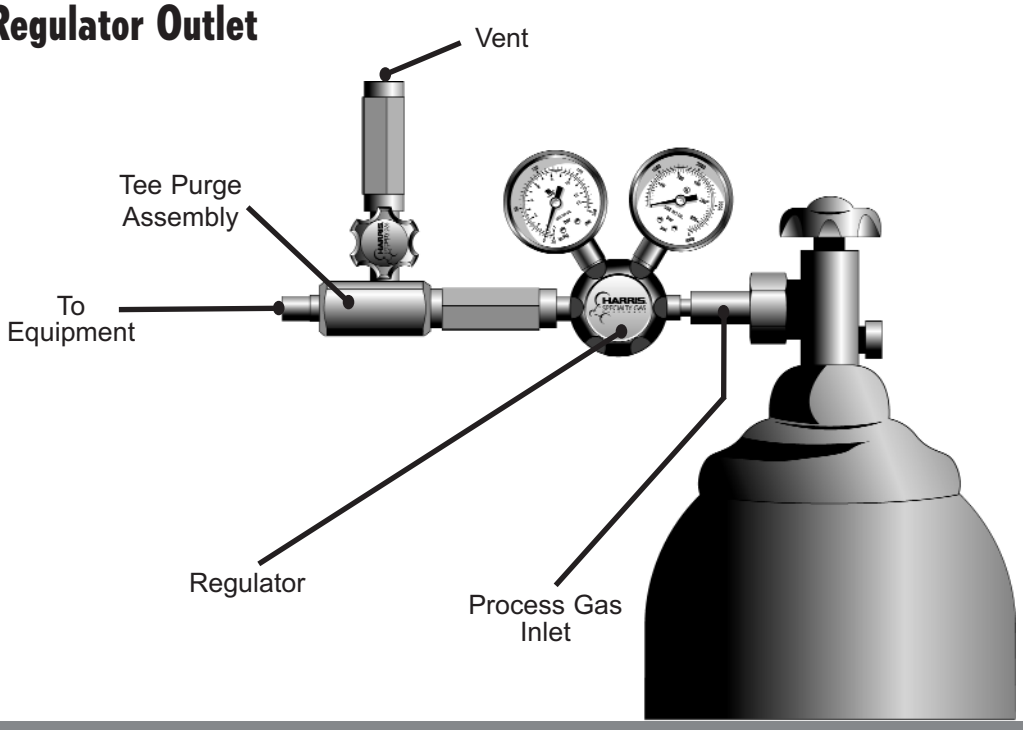
4. Adjust the regulator to the appropriate delivery pressure, then open the vent valve to bleed off the regulator pressure.

5. Steps 2 through 4 represent one purge cycle. This cycle should be repeated 3 to 5 times to ensure that the regulator and connecting line are both properly purged.

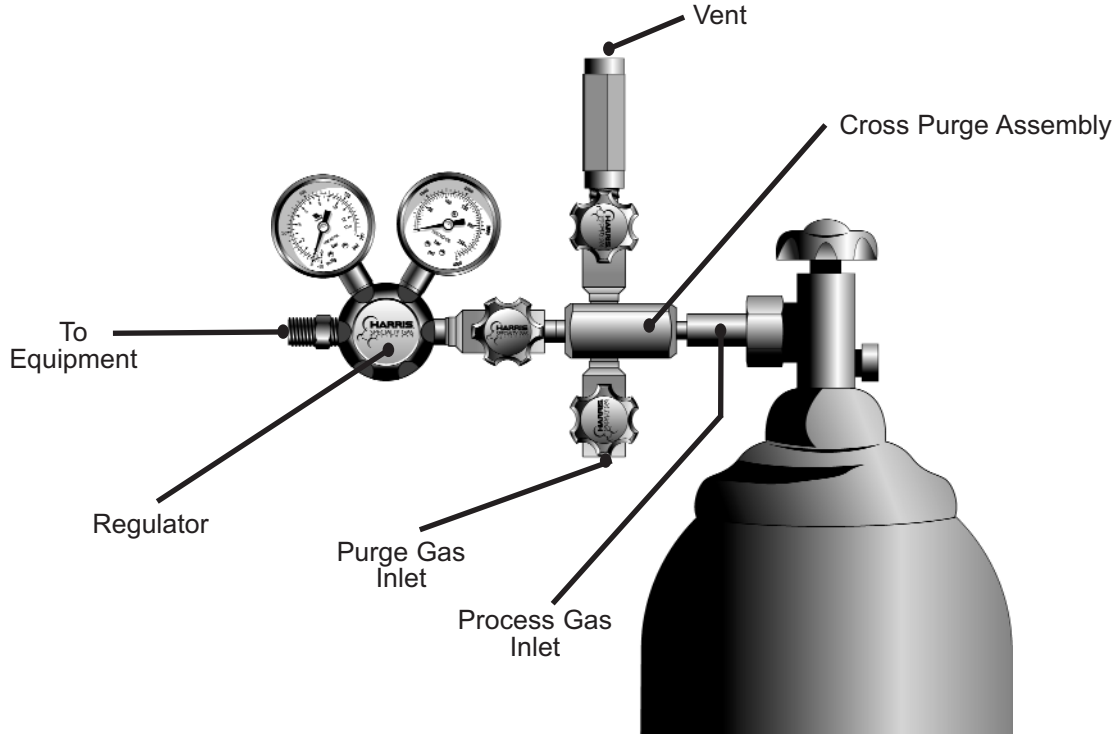
Note: The above procedure is only one type of purging. Information regarding purge assemblies and alternate methods of purging are available from The Harris Products Group.

TYPICAL LAYOUTS

Tee Purge on Regulator Outlet



Cross Purge on Regulator Inlet with Purge Gas Line and Vent



Purge Assemblies

Purging should be performed before system start-ups to remove contaminants such as air and water vapor from the gas delivery system. Also, purging should be done before changing out toxic and corrosive gas cylinders.

P/N: 4300376

Straight Purge Assemblies

The straight purge assembly is connected to the regulator body via an auxiliary high pressure port. The gas is vented through the body to a downstream location.

PART NO.	MATERIAL	DESCRIPTION
4300376	Brass	Straight Purge
4300373	Stainless Steel	Straight Purge

Tee Purge Assemblies

The tee purge can be connected between the cylinder and the regulator, or, between the regulator and the instrument. The system can be flushed with the purging gas to remove contaminants prior to start-up or after a cylinder change. Available with multiturn or 1/4 turn instrument valve.

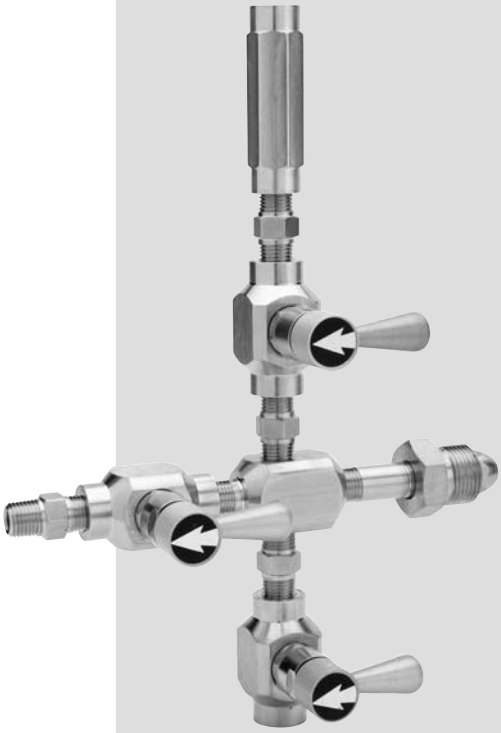
P/N: 4301413

PART NO.	MATERIAL	DESCRIPTION
4300375	Brass	Tee Purge- Assembly, 1/4 NPT, No CGA
4301409	Brass	Tee Purge- Assembly, CGA 320 W/CV
4301410	Brass	Tee Purge- Assembly, CGA 346 W/CV
4301411	Brass	Tee Purge- Assembly, CGA 350 W/CV
4301412	Brass	Tee Purge- Assembly, CGA 540 W/CV
4301413	Brass	Tee Purge- Assembly, CGA 580 W/CV
4301414	Brass	Tee Purge- Assembly, CGA 590 W/CV
4301473	Brass	Tee Purge- Assembly, 1/4 TRN CGA 320 W/CV
4301474	Brass	Tee Purge- Assembly, 1/4 TRN CGA 346 W/CV
4301475	Brass	Tee Purge- Assembly, 1/4 TRN CGA 350 W/CV
4301476	Brass	Tee Purge- Assembly, 1/4 TRN CGA 540 W/CV
4301477	Brass	Tee Purge- Assembly, 1/4 TRN CGA 580 W/CV
4301478	Brass	Tee Purge- Assembly, 1/4 TRN CGA 590 W/CV
4300372	Stainless Steel	Tee Purge- Assembly, 1/4 NPT, No CGA
4301433	Stainless Steel	Tee Purge- Assembly, CGA 320 W/CV
4301434	Stainless Steel	Tee Purge- Assembly, CGA 346 W/CV
4301435	Stainless Steel	Tee Purge- Assembly, CGA 350 W/CV
4301436	Stainless Steel	Tee Purge- Assembly, CGA 540 W/CV
4301437	Stainless Steel	Tee Purge- Assembly, CGA 580 W/CV
4301438	Stainless Steel	Tee Purge- Assembly, CGA 660 W/CV
4301439	Stainless Steel	Tee Purge- Assembly, CGA 330 W/CV
4301440	Stainless Steel	Tee Purge- Assembly, CGA 340 W/CV
4301497	Stainless Steel	Tee Purge- Assembly, 1/4 TRN CGA 320 W/CV
4301498	Stainless Steel	Tee Purge- Assembly, 1/4 TRN CGA 346 W/CV
4301499	Stainless Steel	Tee Purge- Assembly, 1/4 TRN CGA 350 W/CV
4301500	Stainless Steel	Tee Purge- Assembly, 1/4 TRN CGA 540 W/CV
4301501	Stainless Steel	Tee Purge- Assembly, 1/4 TRN CGA 580 W/CV
4301502	Stainless Steel	Tee Purge- Assembly, 1/4 TRN CGA 660 W/CV
4301503	Stainless Steel	Tee Purge- Assembly, 1/4 TRN CGA 330 W/CV
4301504	Stainless Steel	Tee Purge- Assembly, 1/4 TRN CGA 240 W/CV

Cross Purge Assemblies

The cross purge assembly is used between the cylinder and the regulator. In addition to the features on the tee purge, the cross purge assembly allows the use of inert purge gas. Cross purges are available with multi turn or 1/4 turn instrument valves.

PART NO.	MATERIAL	DESCRIPTION
4300377	Brass	Cross Purge- Assembly, 1/4 NPT, No CGA
4301415	Brass	Cross Purge- Assembly, CGA 320 W/CV
4301416	Brass	Cross Purge- Assembly, CGA 346 W/CV
4301417	Brass	Cross Purge- Assembly, CGA 350 W/CV
4301418	Brass	Cross Purge- Assembly, CGA 540 W/CV
4301419	Brass	Cross Purge- Assembly, CGA 580 W/CV
4301420	Brass	Cross Purge- Assembly, CGA 590 W/CV
4301479	Brass	Cross Purge- Assembly, 1/4 TRN CGA 320 W/CV
4301480	Brass	Cross Purge- Assembly, 1/4 TRN CGA 346 W/CV
4301481	Brass	Cross Purge- Assembly, 1/4 TRN CGA 350 W/CV
4301482	Brass	Cross Purge- Assembly, 1/4 TRN CGA 540 W/CV
4301483	Brass	Cross Purge- Assembly, 1/4 TRN CGA 580 W/CV
4301484	Brass	Cross Purge- Assembly, 1/4 TRN CGA 590 W/CV
4300374	Stainless Steel	Cross Purge- Assembly, 1/4 NPT, No CGA
4301441	Stainless Steel	Cross Purge- Assembly, CGA 320 W/CV
4301442	Stainless Steel	Cross Purge- Assembly, CGA 346 W/CV
4301443	Stainless Steel	Cross Purge- Assembly, CGA 350 W/CV
4301444	Stainless Steel	Cross Purge- Assembly, CGA 540 W/CV
4301445	Stainless Steel	Cross Purge- Assembly, CGA 580 W/CV
4301446	Stainless Steel	Cross Purge- Assembly, CGA 660 W/CV
4301447	Stainless Steel	Cross Purge- Assembly, CGA 330 W/CV
4301448	Stainless Steel	Cross Purge- Assembly, CGA 320 W/CV
4301505	Stainless Steel	Cross Purge- Assembly, 1/4 TRN CGA 320 W/CV
4301506	Stainless Steel	Cross Purge- Assembly, 1/4 TRN CGA 346 W/CV
4301507	Stainless Steel	Cross Purge- Assembly, 1/4 TRN CGA 350 W/CV
4301508	Stainless Steel	Cross Purge- Assembly, 1/4 TRN CGA 540 W/CV
4301509	Stainless Steel	Cross Purge- Assembly, 1/4 TRN CGA 580 W/CV
4301510	Stainless Steel	Cross Purge- Assembly, 1/4 TRN CGA 660 W/CV
4301511	Stainless Steel	Cross Purge- Assembly, 1/4 TRN CGA 330 W/CV
4301512	Stainless Steel	Cross Purge- Assembly, 1/4 TRN CGA 240 W/CV

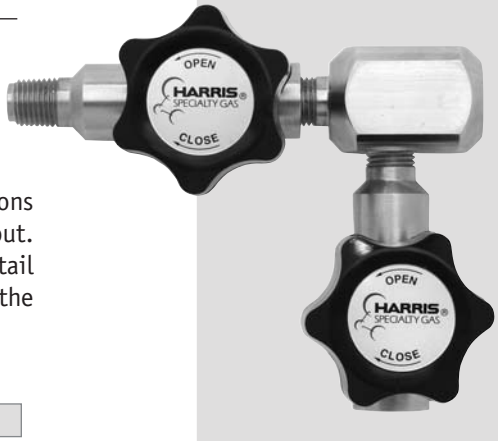


P/N: 4301509

Block & Bleed Purge Assemblies

Block and bleed purges are typically used in manifolds or other applications where atmospheric contaminates need to be purged after cylinder changeout. The purges are typically installed between the CGA connection and the pigtail on the cylinder end. Additional applications could include installation on the regulator inlet or outlet.

PART NO.	MATERIAL	DESCRIPTION
4300428	Chrome Plated Brass	LH Block & Bleed
4300429	Chrome Plated Brass	RH Block & Bleed



P/N: 4300428

ACCESSORIES

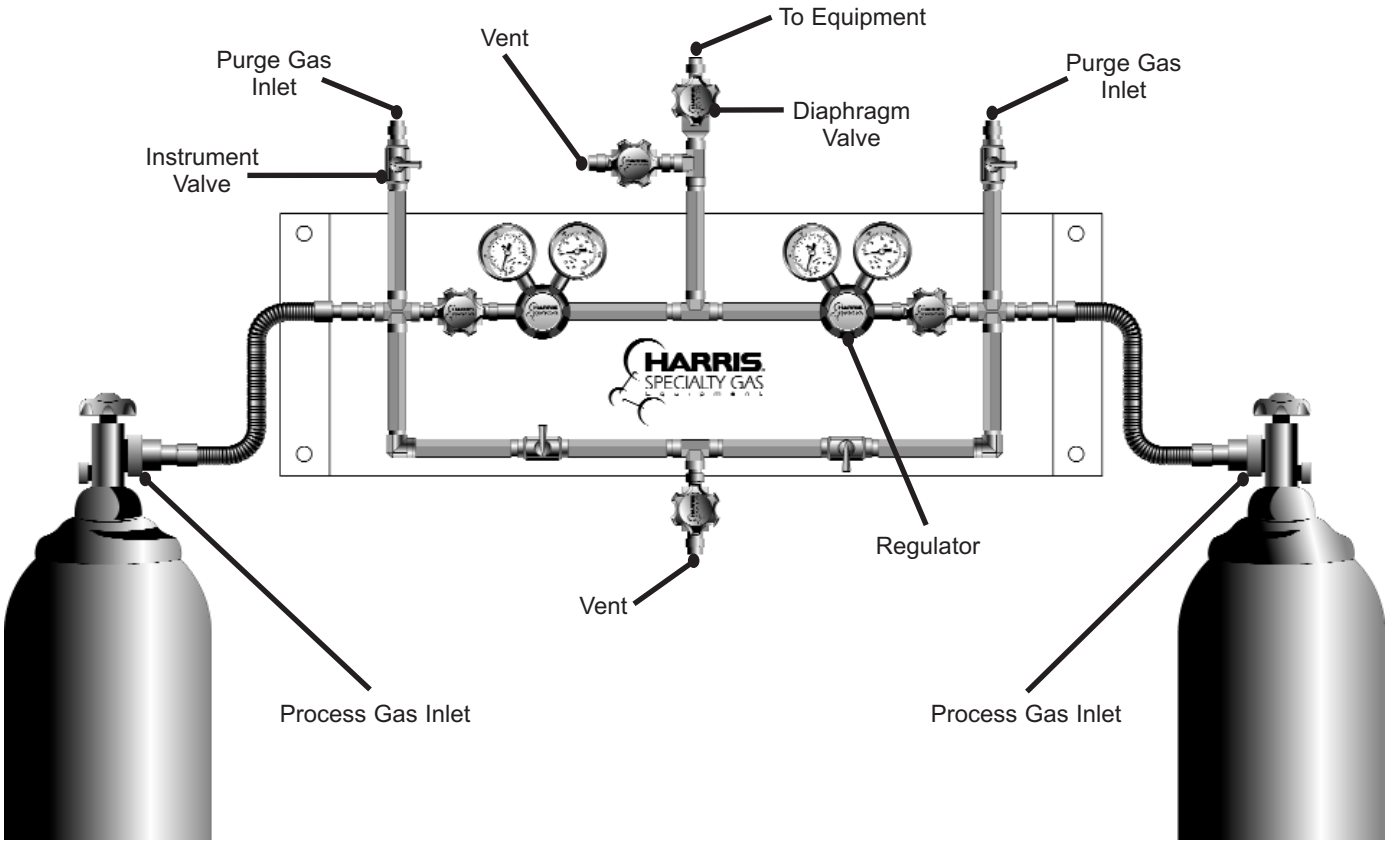
Diaphragm Valves

Diaphragm (packless) valves are used in high purity gas systems where leakage and in-board diffusion of air or moisture must be kept to a minimum. The gas being handled is completely sealed off from the outside environment by a series of 316SS diaphragms. There is no stem in the gas stream thus eliminating stem leakage common in other valve designs.

Harris diaphragm valves are totally free of springs, bellows, packing, o-rings and lubricants in the process wetted area making them ideal for high purity gases. Metal-to-metal seals insure that there is no outgassing of undesirable elements into the flow stream. Polished 316L stainless steel diaphragms maintain the utmost in chemical resistance and life span.

The Harris valve is constructed from the highest quality materials to insure years of unsurpassed performance. Modern design concepts are combined with state of the art manufacturing technology. The Harris diaphragm valve is available as a regulator outlet shut off valve as a means to isolate the regulator from the downstream equipment or as a process isolation valve to be used in purges, gas control panels or other gas control systems. The Harris diaphragm valve is available as a multi-turn valve or 1/4 turn instrument shut off valve. 1/4 turn valves have the advantage of a visual indication of valve position resulting in greater safety, less operator error and potential saving in gas usage. Each version is supplied in brass, chrome plated brass or stainless steel construction to meet the specific application. These diaphragm valves have an in-board helium leakage rate of 2.0×10^{-8} cc/sec.

TYPICAL PANEL WITH DIAPHRAGM VALVES



Diaphragm Valves

3/4 Turn
Instrument
Valve

P/N: 9107070

1/4 Turn
Instrument
Valve

P/N: 9107085

Regulator
Outlet
Valve

P/N: 9107063

1/4 Turn
Instrument
Valve

P/N: 9107082

Regulator Outlet Valve

Max. Inlet Pressure: 3500 PSIG, Flow Coefficient (C_V): 0.13

PART NO.	DESCRIPTION	INLET/OUTLET CONNECTION	BODY MATERIAL	DIAPHRAGM MATERIAL	SEAT MATERIAL
9107061	Regulator Outlet Valve	1/4 NPT male / 1/4 NPT female	Brass	316 SS	PCTFE (Kel-F™)
9107063	Regulator Outlet Valve	1/4 NPT male / 1/4 NPT female	Chrome Plated Brass	316 SS	PCTFE (Kel-F™)
9107062	Regulator Outlet Valve	1/4 NPT male / 1/4 NPT female	316 SS	316 SS	PCTFE (Kel-F™)

3/4 Turn Instrument Valve

Max. Inlet Pressure: 3500 PSIG, Flow Coefficient (C_V): 0.13

PART NO.	DESCRIPTION	INLET/OUTLET CONNECTION	BODY MATERIAL	DIAPHRAGM MATERIAL	SEAT MATERIAL
9107070	3/4 Turn Instrument Valve	1/4 NPT female / 1/4 NPT female	Brass	316 SS	PCTFE (Kel-F™)
9107072	3/4 Turn Instrument Valve	1/4 NPT female / 1/4 NPT female	Chrome Plated Brass	316 SS	PCTFE (Kel-F™)
9107074	3/4 Turn Instrument Valve	1/4 NPT female / 1/4 NPT female	316 SS	316 SS	PCTFE (Kel-F™)

1/4 Turn Instrument Valve

Max. Inlet Pressure: 3500 PSIG, Flow Coefficient (C_V): 0.13

PART NO.	DESCRIPTION	INLET/OUTLET CONNECTION	BODY MATERIAL	DIAPHRAGM MATERIAL	SEAT MATERIAL
9107081	1/4 Turn Instrument Valve	1/4 NPT female / 1/4 NPT female	Brass	316 SS	PCTFE (Kel-F™)
9107082	1/4 Turn Instrument Valve	1/4 NPT female / 1/4 NPT female	316 SS	316 SS	PCTFE (Kel-F™)
9107083	1/4 Turn Instrument Valve	1/4 NPT female / 1/4 NPT female	Chrome Plated Brass	316 SS	PCTFE (Kel-F™)
9107084	1/4 Turn Instrument Valve	1/4 NPT male / 1/4 NPT male	Brass	316 SS	PCTFE (Kel-F™)
9107085	1/4 Turn Instrument Valve	1/4 NPT male / 1/4 NPT male	316 SS	316 SS	PCTFE (Kel-F™)
9107086	1/4 Turn Instrument Valve	1/4 NPT male / 1/4 NPT male	Chrome Plated Brass	316 SS	PCTFE (Kel-F™)

ACCESSORIES

P/N: 9100827

Needle Valves

These valves are used where a shut off feature or some degree of throttling is required.

SPECIFICATIONS

Inlet: 1/4" MNPT
Max. Inlet Pressure: 3000 PSIG
Seat Material: 316 SS
Packing Material: PTFE
Body Material: Brass

PART NO.	BODY MATERIAL	OUTLET	Cv.
9100412	Brass	1/4" MNPT	.37
9100415	Brass	1/8" MNPT	.37
9100827	Chrome Plated Brass	1/4" MNPT	.37
9100927	Chrome Plated Brass	1/4" FNPT	.37

Adjustable Relief Valves

These relief valves may be used as an integral part of a pressure regulator or on equipment downstream of a regulator. The relief valves have a 1/4" MNPT inlet and outlet thread to vent gases either externally or remotely. Cv= .37

STAINLESS STEEL			BRASS			CHROME-PLATED BRASS		
PART NO.	MODEL NO.	PSIG	PART NO.	MODEL NO.	PSIG	PART NO.	MODEL NO.	PSIG
9100856	RV-7050-SS	0-50	9100852	RV-7050-B	0-50	9100861	RV-7050-CHR	0-50
9100857	RV-7100-SS	0-100	9100853	RV-7100-B	0-100	9100863	RV-7100-CHR	0-100
9100858	RV-7250-SS	0-250	9100854	RV-7250-B	0-250	9100864	RV-7250-CHR	0-250
9100859	RV-7500-SS	0-500	9100855	RV-7500-B	0-500	9100865	RV-7500-CHR	0-500
9100877	RV-7800-SS	0-800	9100876	RV-7800-B	0-800	9100878	RV-7800-CHR	0-800

Regulator Alarm System

The Harris Regulator Alarm Kit is used to indicate a near empty cylinder condition for critical applications. The kit comes with an audio/visual alarm box, 12VDC power supply and adjustable alarm switch gauge. It is available for low pressure (up to 400 psi) or high pressure (up to 3000 psi) regulators. The alarm kit can be purchased separately for regulators already in use, or can be added as an option on select Harris regulators.

- 2" Gauge (0-400 psi or 0-3000 psi)
- Chrome Plated or Stainless Steel available
- Switch can be manually adjusted to any pressure on the gauge dial
- Requires 115VAC

PART NO.	MATERIAL	DESCRIPTION
4300424	Chrome Plated Brass	Alarm HP Inlet
4300425	Chrome Plated Brass	Alarm LP Inlet
4300426	Stainless Steel	Alarm HP Inlet
4300427	Stainless Steel	Alarm LP Inlet

ACCESSORIES

Outlet Fittings

PART NO.	TYPE	DESCRIPTION	MATERIAL
9000200		1/4" MNPT x 1/4' MNPT	Brass
9009247		1/4" NPT x 1/4" NPT	Chrome Plated
9007056	Male Hex Coupling	1/4" MNPT x 1/4" MNPT	316 Stainless Steel
9005724		1/4" NPT x 4"	316 Stainless Steel
9005707		1/2" NPT x 2"	Brass
9005704		1/2" MNPT x 4"	Brass
9005752	Adaptors	1/2" MNPT x 1/4" FNPT	Stainless Steel
9005753		1/2" MNPT x 1/4" MNPT	Stainless Steel
9007049		1/4" x 1/4' MNPT	Stainless Steel
9007051	Tube Fittings	1/4" x 1/4" MNPT	Brass
9007050		1/8" x 1/4" MNPT	Stainless Steel
9007052		1/8" x 1/4" MNPT	Brass
9007055		1/4" x 1/4" MNPT	Brass
9007054	Hose Barbs	1/8" x 1/4" MNPT	Brass
9510501		1/4" x 1/4" FNPT	Brass
9005386	Bushing	1/4" MNPT x 1/2" MNPT	Brass
9005806		1/4" FNPT x 1/2" MNPT	Brass

Male Hex Coupling

Adaptor

Tube Fitting

Hose Barb

Flashback Arrestors

Stainless steel flashback arrestors are designed for oxygen, hydrogen and other flammable or fuel gases. Standard with 1/4" FNPT inlet and 1/4" MNPT outlet connections make it easy to adapt in various applications. UL listed.

PART NO.	DESCRIPTION	WORKING PRESSURE	ELASTOMERS
4301637	Hydrogen	50 PSIG	
	LPG/Methane	50 PSIG	Viton
	Acetylene	15 PSIG	
4301638	Oxygen	143 PSIG	Viton

Check Valves

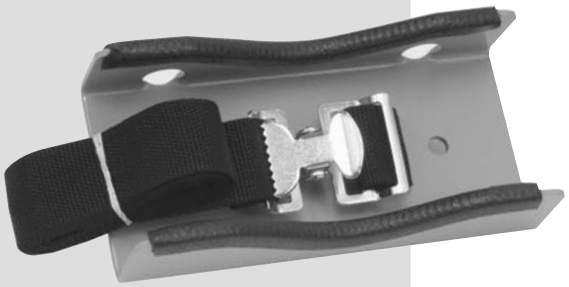
Check valves insure unidirectional flow of compressed gases. They provide a simple, effective way to prevent backflow in gas delivery systems. Check valves are available in brass or 316 stainless steel.

SPECIFICATIONS

Cracking pressure: 1 psi
C_V: 0.15
Operating temperature range: -20F to +300F

PART NO.	CONNECTIONS	MATERIAL	SEAT	MAX WORKING PRESSURE
4300379	1/4" FNPT	Brass	Viton	3000 PSIG
4300380	1/4" FNPT	316SS	Viton	3000 PSIG
4300386	1/4" FNPT	316SS	EPR	3000 PSIG

ACCESSORIES



G 100 Single Cylinder Wall Bracket

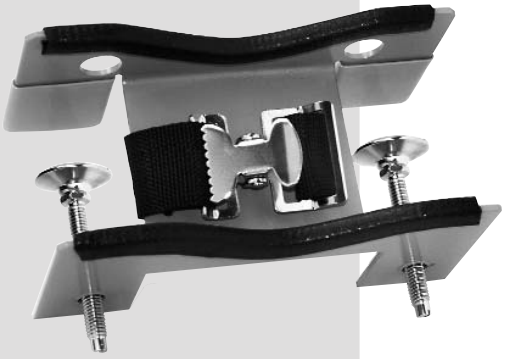
The G 100 is an all steel construction bracket with many quality construction features. The edges are protected with steel reinforced vinyl edge guarding to maintain and protect your cylinders and provide extra grip. Steel parts are sealed with epoxy powder paint to assure long service life and chemical resistance. Straps and cinch style buckles are chosen as primary means of support as they enable the cylinders to be held tight and secure against the brackets. Support straps are 1 1/2" wide by 54" long polypropylene with steel cinch buckle and rate a robust 1200 PSIG strength. Supports hold cylinders from 4" to 12" diameter.

PART NO.	DESCRIPTION	SIZE	WEIGHT
4302650	G 100	4.25"x8"x2.25"	3 lb.
4302652	Optional Chain Set	41"	1 lb.

G 110 Single Cylinder Adjustable Bracket

Molded from reinforced polypropylene, the G 110 bracket can be adjusted to snugly support any cylinder from 4" to 14" diameter. Unit is first set to designated cylinder diameter with recessed set screws locking in width position. Permanently mounts to wall using fasteners (not included). Strap and security chain sets included.

PART NO.	SIZE	WEIGHT
4302653	9"x4"x5"	2 lb.



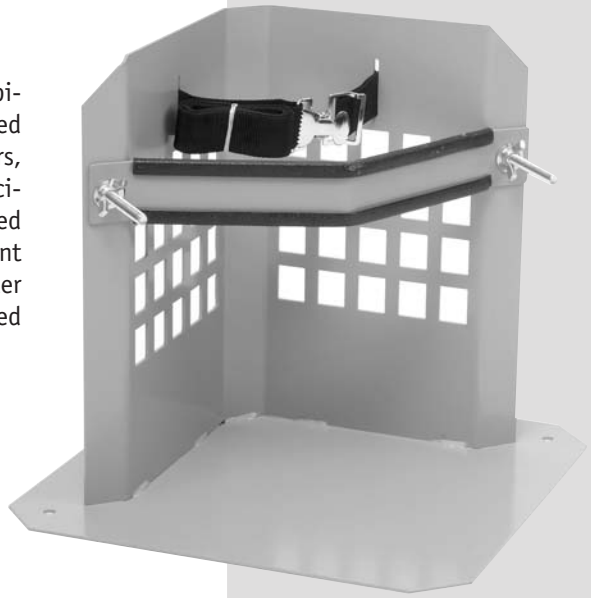
G 150 Single Cylinder Bench Mount Bracket

Bench cylinder bracket G-150: This bench mount single cylinder bracket uses dual mounting posts with swivel feet and non-slip pads to clamp to bench or table tops from 3/8" to 1 3/4" thick. Standard strap set and optional chain set (G-105) secure cylinders 4" to 14" diameter. Especially useful where walls are not accessible to attach brackets or when temporary, safe cylinder supports are required.

PART NO.	DESCRIPTION	SIZE	WEIGHT
4302654	G 150	4.25"x8"x4.25"	4.5 lb.
4302652	Optional Chain Set	41"	1 lb.

G 181 Single Cylinder Floor Stand

The G-181, safely supports 4" through 10" diameter cylinders using a combination of cinch buckle, polypropylene strap, and 10 gauge steel bar. Designed and built for the safe storage of industrial and commercial use gas cylinders, this stationary rack is constructed from cold rolled steel. One cylinder capacity stands share the 1 1/2" polypropylene straps and steel cinch buckles used in our brackets. All welded construction and quality epoxy powder paint finishes provide structural integrity and long service life. As with our cylinder brackets, surfaces coming into direct contact with the cylinders are protected with steel reinforced vinyl edge guards, protecting your equipment.

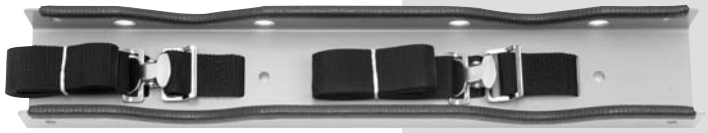


PART NO.	SIZE	WEIGHT
4302655	16"x16"x15"	21 lb.

Wall Mounted Cylinder Brackets

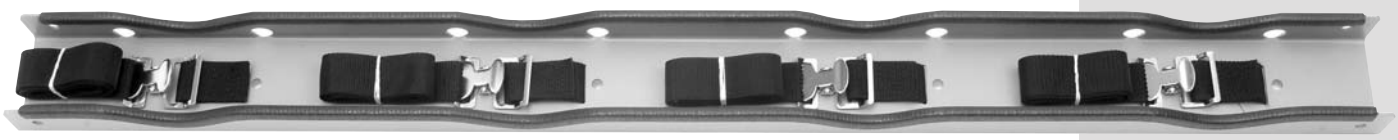
All steel construction brackets and racks share many quality construction features. 11 gauge hot rolled steel form the foundation. Edges are protected with steel reinforced vinyl edge guarding to help maintain your cylinders and provide extra grip. Steel parts are sealed with epoxy powder paint to assure long service life and chemical resistance. Straps and cinch style buckles are chosen as primary means of support as they enable the cylinders to be held tight and secure against the brackets. Support straps are 1 1/2" wide by 54" long polypropylene with steel cinch buckle and rate a robust 1200 PSIG strength. Supports hold cylinders from 4" to 12" diameter.

PART NO.	MODEL NO.	SIZE	WEIGHT
4302656	G200	24"x2"x4"	8 lb.
4302659	G300	4.25"x36"x2.25"	11 lb.
4302662	G401	4.25"x48"x2.25"	14 lb.



G 200 Double Cylinder Wall Bracket

G 300 Triple Cylinder Wall Bracket



G 401 Four Cylinder Wall Bracket

ACCESSORIES

Cylinder Racks & Process Stations

The stationary cylinder floor stands and process stations are designed and built for the safe storage of industrial and commercial use gas cylinders up to a 12" diameter. These stationary racks are constructed from 11 gauge and heavier plate steel. The cylinder capacity racks share the 1.5" polypropylene straps and steel cinch buckles used in our brackets. Fully welded construction and quality epoxy powder paint finishes provide structural integrity and long service life. As with our cylinder brackets, surfaces coming into direct contact with the cylinders are protected with steel reinforced vinyl edge guards, protecting your equipment. Units ship partially disassembled for freight savings.

G 400 Four Cylinder Floor Stand

PART NO.	MODEL NO.	SIZE	WEIGHT
4302661	G400	24"x36.5"x30"	65 lb.
4302665	G600	24"x48.5"x30"	81 lb.

G 277 Two Cylinder Process Station Rack

G 400P Four Cylinder Process Station

G 600P Six Cylinder Process Station

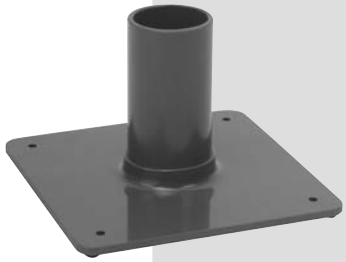
PART NO.	MODEL NO.	SIZE	WEIGHT
4302673	G277	12"x28"x72"	56 lb.
4302675	G400P	24"x36.5"x72"	98 lb.
4302676	G600P	24"x48.5"x30"	119 lb.

Bottle Holders

Due to the round bases on lecture bottles, specially designed bottle holders are recommended to secure them in place at their point of use.

G 700 Laboratory Lecture Bottle Holder

PVC construction units are durable and chemical resistant. Formed heavy PVC walls chemically welded. Sized to fit lb. style (2" diameter) bottles. Stand (P/N G 700) has four bench mounting holes for optional permanent installation.



PART NO.	SIZE	WEIGHT
4302677	5"x8"x8"	1.5 lb.

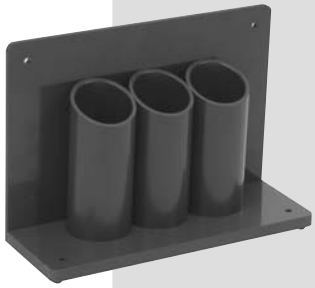
G 710 Laboratory Lecture Bottle Holder

Formed heavy PVC walls chemically welded. Sized to fit lb. style (2" diameter) bottles. The G 710 features wall or bench mounting holes for 1 bottle.

PART NO.	SIZE	WEIGHT
4302678	8"x5"x4"	1.5 lb.

G 730 Triple Laboratory Lecture Bottle Holder

Formed heavy PVC walls chemically welded. Sized to fit lb. style (2" diameter) bottles. P/N G 730 features wall or bench mounting holes for 3 bottles.



PART NO.	SIZE	WEIGHT
4302679	7.5"x11"x4"	4 lb.

G 760 Lecture Bottle Carrier

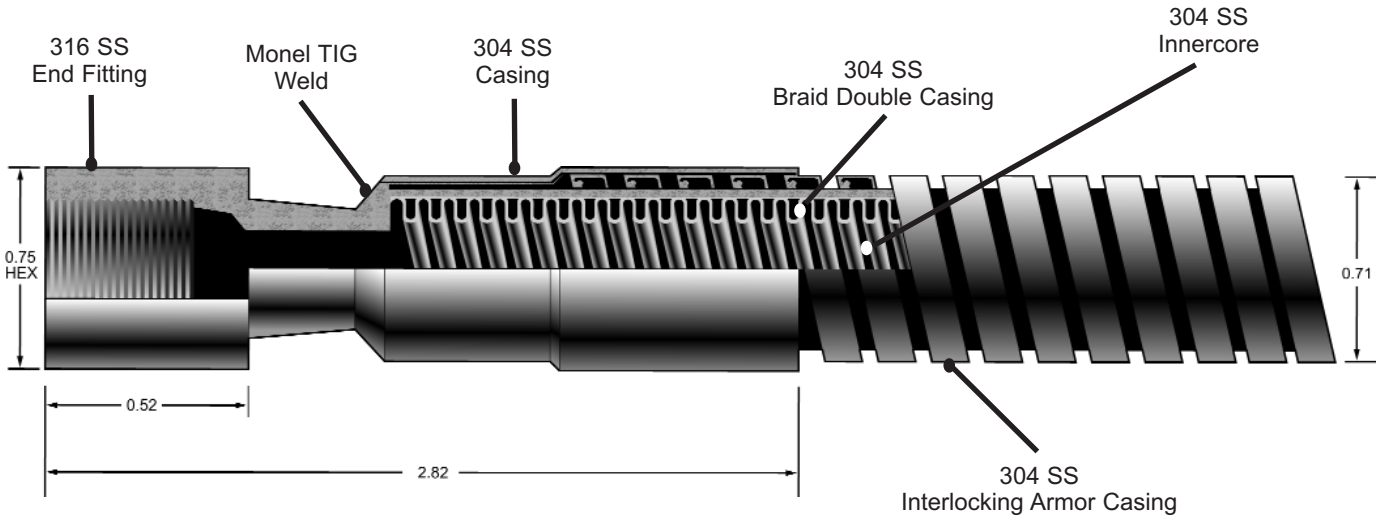
Formed heavy PVC walls chemically welded. The G 760 features loop carry handle. To store or transport six lb. style bottles.

PART NO.	SIZE	WEIGHT
4302680	9"x6"x19"	6 lb.

PIGTAILS

Pigtails are flexible hoses designed for gas systems at pressures up to 3000 PSIG. Harris offers pigtails with a variety of end fittings including common CGA connections with integral non-return check valves. Armor cased pigtails come with an outer armor casing to prevent kinking and whipping in the event of an internal failure.

CROSS SECTIONAL VIEW



PIGTAILS

PART NO.	DESCRIPTION
Armor Case Stainless Steel 1/4" FNPT X 1/4" FNPT	
9005793	24" Armor Case Stainless Steel 1/4" FNPT X 1/4" FNPT
9005794	36" Armor Case Stainless Steel 1/4" FNPT X 1/4" FNPT
9005795	72" Armor Case Stainless Steel 1/4" FNPT X 1/4" FNPT
Armor Case PTFE Lined 1/4" FNPT X 1/4" FNPT	
9005799	48" Armor Case PTFE Lined 1/4" FNPT X 1/4" FNPT
9005800	24" Armor Case PTFE Lined 1/4" FNPT X 1/4" FNPT
9005801	36" Armor Case PTFE Lined 1/4" FNPT X 1/4" FNPT
9005807	72" Armor Case PTFE Lined 1/4" FNPT X 1/4" FNPT
24" Stainless Steel CGA 346 X Brass CGA W/CV	
9103392	PIGTAIL-ASY, 2' CGA 346 TO CGA 320
9103393	PIGTAIL-ASY, 2' CGA 346 TO CGA 326
9103394	PIGTAIL-ASY, 2' CGA 346 TO CGA 346
9103395	PIGTAIL-ASY, 2' CGA 346 TO CGA 350
9103396	PIGTAIL-ASY, 2' CGA 346 TO CGA 540
9103397	PIGTAIL-ASY, 2' CGA 346 TO CGA 580
9103398	PIGTAIL-ASY, 2' CGA 346 TO CGA 590

PART NO.	DESCRIPTION
36" Stainless Steel CGA 346 X Brass CGA W/CV	
9103399	PIGTAIL-ASY, 3' CGA 346 TO CGA 320
9103400	PIGTAIL-ASY, 3' CGA 346 TO CGA 326
9103401	PIGTAIL-ASY, 3' CGA 346 TO CGA 346
9103402	PIGTAIL-ASY, 3' CGA 346 TO CGA 350
9103403	PIGTAIL-ASY, 3' CGA 346 TO CGA 540
9103404	PIGTAIL-ASY, 3' CGA 346 TO CGA 580
9103405	PIGTAIL-ASY, 3' CGA 346 TO CGA 590
24" Stainless Steel 1/4" FNPT X Brass CGA W/CV	
9103410	PIGTAIL-ASY, 2' CGA 320
9103411	PIGTAIL-ASY, 2' CGA 326
9103412	PIGTAIL-ASY, 2' CGA 346
9103413	PIGTAIL-ASY, 2' CGA 350
9103414	PIGTAIL-ASY, 2' CGA 540
9103415	PIGTAIL-ASY, 2' CGA 580
9103416	PIGTAIL-ASY, 2' CGA 590

Note: CGA 346 is Harris' common manifold header connection. These pigtails should be purchased as replacement items for Harris manifold systems.

PIGTAILS

PART NO.	DESCRIPTION
36" Stainless Steel 1/4" FNPT X Brass CGA W/CV	
9103417	PIGTAIL-ASY, 3' CGA 320
9103418	PIGTAIL-ASY, 3' CGA 326
9103419	PIGTAIL-ASY, 3' CGA 346
9103420	PIGTAIL-ASY, 3' CGA 350
9103421	PIGTAIL-ASY, 3' CGA 540
9103422	PIGTAIL-ASY, 3' CGA 580
9103423	PIGTAIL-ASY, 3' CGA 590
72" Stainless Steel 1/4" FNPT X Brass CGA W/CV	
9101996	PIGTAIL-ASY, 72" CGA 320
9101997	PIGTAIL-ASY, 72" CGA 540
9101998	PIGTAIL-ASY, 72" CGA 580
24" Stainless Steel CGA 346 X SS CGA W/CV	
9103459	PIGTAIL-ASY, 2' CGA 346 TO CGA 320 SS
9103460	PIGTAIL-ASY, 2' CGA 346 TO CGA 326 SS
9103461	PIGTAIL-ASY, 2' CGA 346 TO CGA 346 SS
9103462	PIGTAIL-ASY, 2' CGA 346 TO CGA 350 SS
9103463	PIGTAIL-ASY, 2' CGA 346 TO CGA 500 SS
9103464	PIGTAIL-ASY, 2' CGA 346 TO CGA 540 SS
9103465	PIGTAIL-ASY, 2' CGA 346 TO CGA 580 SS
9103466	PIGTAIL-ASY, 2' CGA 346 TO CGA 590 SS
9103487	PIGTAIL-ASY, 2' CGA 346 TO CGA 240 SS
9103488	PIGTAIL-ASY, 2' CGA 346 TO CGA 330 SS
9103489	PIGTAIL-ASY, 2' CGA 346 TO CGA 660 SS
9103490	PIGTAIL-ASY, 2' CGA 346 TO CGA 705 SS
36" Stainless Steel CGA 346 X SS CGA W/CV	
9103467	PIGTAIL-ASY, 3' CGA 346 TO CGA 320 SS
9103468	PIGTAIL-ASY, 3' CGA 346 TO CGA 326 SS
9103469	PIGTAIL-ASY, 3' CGA 346 TO CGA 346 SS
9103470	PIGTAIL-ASY, 3' CGA 346 TO CGA 350 SS
9103471	PIGTAIL-ASY, 3' CGA 346 TO CGA 500 SS
9103472	PIGTAIL-ASY, 3' CGA 346 TO CGA 540 SS
9103473	PIGTAIL-ASY, 3' CGA 346 TO CGA 580 SS
9103474	PIGTAIL-ASY, 3' CGA 346 TO CGA 590 SS
9103491	PIGTAIL-ASY, 3' CGA 346 TO CGA 240 SS
9103492	PIGTAIL-ASY, 3' CGA 346 TO CGA 330 SS
9103493	PIGTAIL-ASY, 3' CGA 346 TO CGA 660 SS
9103494	PIGTAIL-ASY, 3' CGA 346 TO CGA 705 SS

PART NO.	DESCRIPTION
24" Stainless Steel 1/4" FNPT X SS CGA W/CV	
9103441	PIGTAIL-ASY, 2' CGA 320 SS
9103442	PIGTAIL-ASY, 2' CGA 326 SS
9103443	PIGTAIL-ASY, 2' CGA 346 SS
9103444	PIGTAIL-ASY, 2' CGA 350 SS
9103445	PIGTAIL-ASY, 2' CGA 500 SS
9103446	PIGTAIL-ASY, 2' CGA 540 SS
9103447	PIGTAIL-ASY, 2' CGA 580 SS
9103448	PIGTAIL-ASY, 2' CGA 590 SS
9103479	PIGTAIL-ASY, 2' CGA 240 SS
9103480	PIGTAIL-ASY, 2' CGA 330 SS
9103481	PIGTAIL-ASY, 2' CGA 660 SS
9103482	PIGTAIL-ASY, 2' CGA 705 SS
36" Stainless Steel 1/4" FNPT X SS CGA W/CV	
9103449	PIGTAIL-ASY, 3' CGA 320 SS
9103450	PIGTAIL-ASY, 3' CGA 326 SS
9103451	PIGTAIL-ASY, 3' CGA 346 SS
9103452	PIGTAIL-ASY, 3' CGA 350 SS
9103453	PIGTAIL-ASY, 3' CGA 500 SS
9103454	PIGTAIL-ASY, 3' CGA 540 SS
9103455	PIGTAIL-ASY, 3' CGA 580 SS
9103456	PIGTAIL-ASY, 3' CGA 590 SS
9103483	PIGTAIL-ASY, 3' CGA 240 SS
9103484	PIGTAIL-ASY, 3' CGA 330 SS
9103485	PIGTAIL-ASY, 3' CGA 660 SS
9103486	PIGTAIL-ASY, 3' CGA 705 SS
72" Stainless Steel 1/4" FNPT X SS CGA W/CV	
9103457	PIGTAIL-ASY, 72" CGA 540 SS
9103458	PIGTAIL-ASY, 72" CGA 580 SS

TRAPS

Traps are used to remove unwanted contaminants from specialty gases before they reach the instrument. They also can alert the technician that the gas is contaminated. Traps are used to remove oxygen, moisture and hydrocarbons and may be indicating or non-indicating.

Non-indicating traps are usually high capacity replaceable traps used in conjunction with indicating traps. For instance, a cartridge oxygen trap is used with argon-methane mixtures commonly used with electron capture gas chromatographs. A cartridge trap will remove 99% of the oxygen present in a 300 cubic foot gas cylinder (15-ppm 02 level) before replacement of the expended cartridge is required.

An indicating oxygen trap should be installed downstream of the cartridge trap to signal oxygen breakthrough and prevent premature replacement of the getter cartridge. The cartridge trap should be fitted with check valves to prevent contamination of the gas lines with atmospheric oxygen during cartridge replacement.

The indicating trap contains an extremely active reagent, which changes color from a pale green to a deep brown as the catalyst becomes saturated. It serves both to prevent premature replacement of high capacity cartridges and to provide a means to indicate the oxygen status of carrier gases.

Oxygen traps can treat inert gases such as nitrogen, helium, argon and krypton, as well as hydrogen, alkanes and alkenes, aliphatic hydrocarbon gases, low boiling aromatics such as benzene and toluene, carbon dioxide and carbon monoxide.

Indicating moisture traps are designed to remove water, oil and organics from gases commonly employed in, but not limited to gas chromatography. Moisture traps generally use one of two adsorbent fills depending on the application.

For gas chromatographic carrier gas applications that require low moisture concentrations, a molecular sieve adsorbent is used. With its high affinity for carbon dioxide and its ability to adsorb as much as 20% of its weight in water, the molecular sieve is the preferred adsorbent for general gas drying. The indicating sieve is blue when installed and turns buff at 20% relative humidity.

Silica gels, used in general purpose gas carrier applications, is the highest moisture capacity adsorbent available. Silica gel, which can adsorb as much as 40% of its weight in water reduces moisture content of the gas to approximately 5 ppm. The indicating gel turns from a deep blue to pale pink at 40% relative humidity and has a high affinity for hydrocarbons.

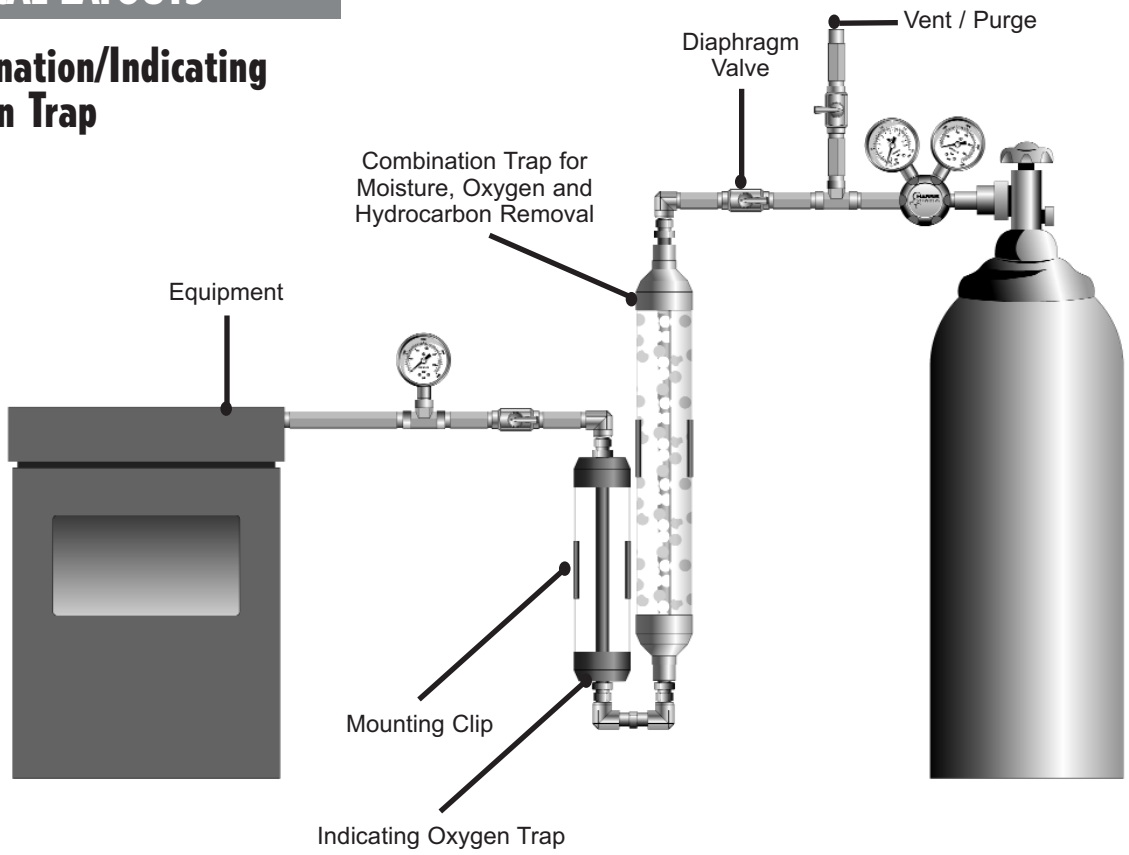
Some applications, such as GC's utilizing electron capture or Hall electrolytic conductivity detectors, require glass indicating moisture traps. The glass body eliminates outgassing typical of reactive plastic bodied traps, which can contribute to unacceptable background levels for extremely sensitive detectors. These traps are used with carrier gases such as methane/argon, hydrogen/argon, nitrous oxide/nitrogen, nitrogen, argon, helium and hydrogen.

Hydrocarbon traps are designed for use in vapor phase applications such as gas chromatography. A typical trap contains very highly active, fine pore structure, high density, high volume activity, coconut shell based activated carbon which is pre-purged prior to packaging to remove any traces of moisture. All metal construction is used to eliminate organic contaminants, which often bleed from traps constructed from plastics. Materials adsorbed include alcohol, ethers, esters, chlorinated hydrocarbon, ketones and aromatics.

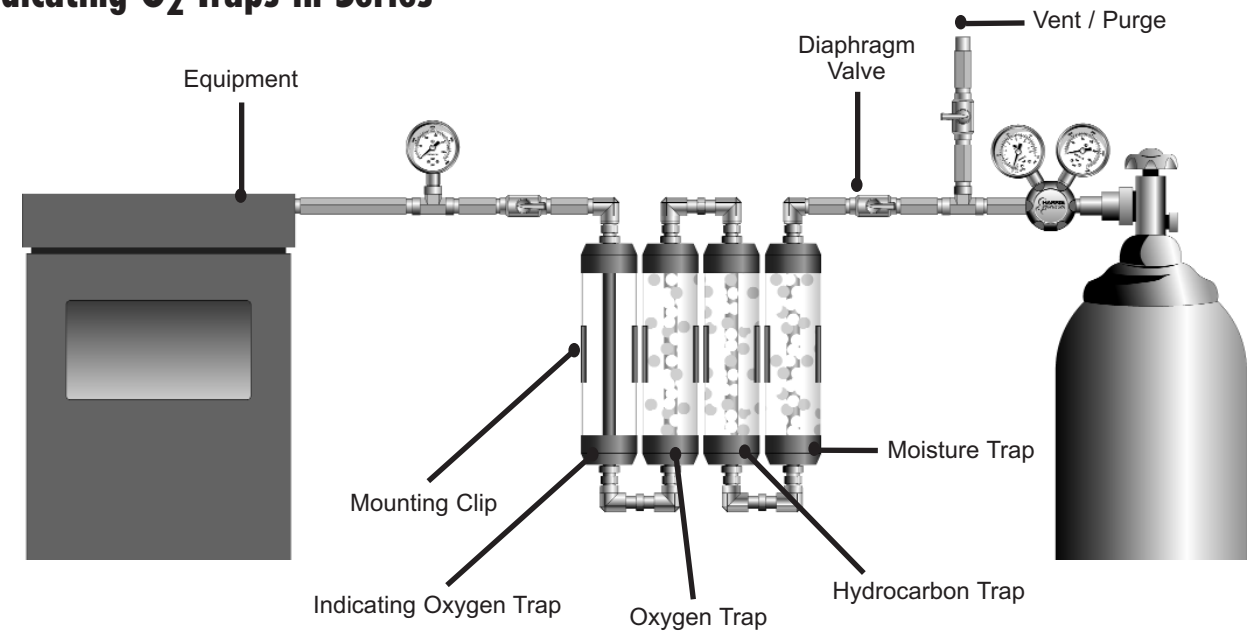
As shown the indicating oxygen trap should be installed between the primary oxygen trap or moisture trap and the instrument. When a hydrocarbon trap is used, it should be installed between the moisture trap and the oxygen trap. This arrangement ensures the most efficient operation of each trap.

TYPICAL LAYOUTS

Combination/Indicating Oxygen Trap



Removable Moisture / THC / O_2 / Indicating O_2 Traps in Series



TRAPS

Moisture Removal Traps- Economy Indicating Refillable Moisture Traps

Indicating moisture traps are designed to remove water, oil, and organics from gases employed in, but not limited to, gas chromatography. Refillable moisture traps are constructed from Lexan brand polycarbonate tubing. Lightweight, chemically resistant and of superior strength when compared to traps manufactured from acrylic.

- Available in three refillable sizes and three different packings
- Both inlet and outlet connectors are equipped with stainless steel frits to prevent particulates from entering the gas stream
- Mixed packing bed makes improper installation impossible
- Easy refillable
- Tested to 150 PSIG (helium)

Refillable Moisture Trap

BLUE INDICATING PART NO.	DRIERITE PART NO.	SILICA GEL PART NO.	SIZE (cc)	FITTING (in.)	MT & MTD MOISTURE REMOVAL CAPACITY (g)	MTS MOISTURE REMOVAL CAPACITY (g)	MAXIMUM EFFLUENT H_2O CONCENTRATION (ppb)		
4302730	4302731	4302732	120	1/8	21.6	31.5	20	22	40
4302733	4302734	4302735	120	1/4	21.6	31.5	20	22	40
4302737	4302738	4302739	200	1/8	36.0	52.5	18	20	39
4302741	4302742	4302743	200	1/4	36.0	52.5	18	20	39
4302746	4302747	4302748	400	1/8	72.0	105.0	14	16	39
4302750	4302751	4302752	400	1/4	72.0	105.0	14	16	39
4302727	4302728	4302782	Adsorbent Refill (1 pint)						
4302726	4302726	4302726	Mounting Clip for 120 & 200cc Traps						
4302788	4302788	4302788	Universal Mounting Clip for 400cc Traps						
4302791	4302791	4302791	Trap Mounting Panel						

MT - Molecular Sieve 13X and Indicating 4Å
The preferred adsorbent for GC gas drying. Blue indicating sieve turns buff at 20% relative humidity.

MTD - Molecular Sieve 5Å and Indicating Drierite
High moisture capacity and simultaneously removes hydrogen sulfide and oil. Indicating Drierite changes dramatically from bright blue to pink as the gas stream approaches 40% relative humidity.

MTS - Silica Gel, Grade 40, and indicating Silica Gel, Grade 42
Highest moisture capacity adsorbent. Adsorbs as much as 40% of its weight in water. High affinity for hydrocarbons. Blue indicating gel turns from a deep blue to a pale pink at 40% relative humidity.

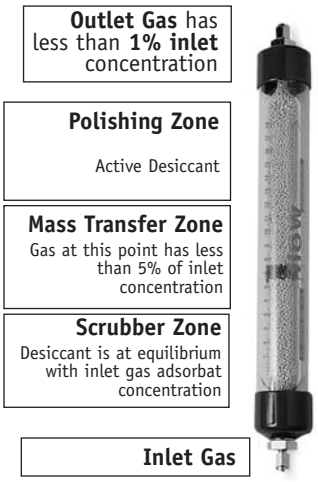
Glass Indicating Moisture Traps

Ideal for GC/MS Systems, Electron Capture Detectors, and Electrolytic Conductivity Detectors

- Molecular Sieve 13X and a band of indicating Molecular Sieve 4Å
- Available in 70 cc, 100 cc and 250 cc sizes
- Heavy wall borosilicate glass tube—no moisture diffusion

Capacity and Efficiency

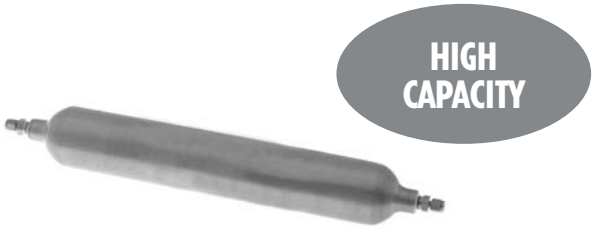
The 100 cc unit will treat 10 standard 200 cu. ft. cylinders with up to 30 ppm water or 16.3 grams to less than 10 ppb. Molecular sieves differ from all other commercially available adsorbents, as they have an extremely high adsorption capacity for water and polar compounds even at relatively low concentrations. The color change takes place in the middle of the trap bed, giving ample warning. In addition to the inherent qualities of the sieve material, we treat the bed material under high vacuum and heat to insure maximum scrubbing efficiency and capacity.



Refillable Glass Moisture Trap

Glass Indicating Moisture Traps (GMT and LGMT Series)

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)	MOISTURE REMOVAL CAPACITY (g)	MAXIMUM EFFLUENT H_2O CONCENTRATION (ppb)
4302701	Glass Indicating Moisture Trap	70	1/8	11.4	7
4302703	Glass Indicating Moisture Trap	70	1/4	11.4	7
4302702	Glass Indicating Moisture Trap	100	1/8	16.3	6
4302704	Glass Indicating Moisture Trap	100	1/4	16.3	6
4302722	Glass Indicating Moisture Trap	250	1/8	40.09	6
4302723	Glass Indicating Moisture Trap	250	1/4	40.09	6
4302700	Molecular Sieve Refill	250			
4302787	Mounting Clip for 70 & 100 cc Traps				
4302788	Mounting Clip for 250 cc Trap				



Big Moisture Traps (BMT Series)

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)
4302691	Big Moisture Trap	750	1/8
4302692	Big Moisture Trap	750	1/4
4302690	Refill for Big Moisture Trap		
4302790	Big Mounting Clip, 2pk		

Big Moisture Traps (BMT)

- Capacity: 130 grams H_20
- Pressure: Up to 250 PSIG
- Efficiency: reduction of H_20 to less than 5 ppb
- Ideal for bulk purification applications or where several instruments are plumbed from a single gas source
- One piece of heavy-walled aluminum tube. This one-piece design eliminates potential leaks.
- Equipped with sintered stainless steel frits to prevent particulate contamination
- Refillable

TRAPS

Oxygen Removal Traps
Indicating Oxygen Traps

This trap actually removes the oxygen rather than converting it to another form of contamination.

- Reduces oxygen to less than 1 ppb
- Environmentally safe
- Available in two sizes, standard and large

Indicating Oxygen Traps (IOT and LIOT Series)

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)
4302718	Indicating 0_2 Trap (IOT)	30	1/8
4302720	Indicating 0_2 Trap	30	1/4
4302724	Indicating 0_2 Trap	150	1/8
4302725	Indicating 0_2 Trap	150	1/4
4302786	Mounting Clip for IOT Trap		
4302787	Mounting Clip for LIOT Trap		

Economy Non-Indicating Oxygen Trap (OT1 Series)

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)
4302755	Oxygen Trap	70	1/8
4302756	Oxygen Trap	70	1/4
4302726	Mounting Clip for OT1 Trap		
4302791	Trap Mounting Panel		

Big Oxygen Traps (BOT Series)

- Capacity: 3 liters 0_2 or 3,200 mg
- Pressure: Up to 250 PSIG
- Efficiency: Reduction of 0_2 to less than 1 ppb
- 750 cubic centimeter gas purifiers
- Ideal for bulk purification applications or where several instruments are plumbed from a single gas source
- One piece of heavy-walled aluminum tube. This one-piece design eliminates potential leaks.
- Equipped with sintered stainless steel frits to prevent particulate contamination

Big Oxygen Traps (BOT Series)

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)
4302693	Big Oxygen Trap	750 cc	1/8
4302694	Big Oxygen Trap	750 cc	1/4
4302789	Big Mounting Clip, 2pk		

Combination Traps-
Oxygen/Moisture Traps (OT3 Series)

Oxygen/moisture adsorbents team up to give you two functionalities in the same trap. Unlike some oxygen/moisture traps, these traps are disposable.

- Optimized for maximum surface area and capacity
- Leak-free, one-piece design—(tested to 2000 PSIG)
- Bed material treated with ultra-high purity helium
- Filter design: prevents channeling, promotes efficient scrubbing

Oxygen/Moisture Traps (OT3 Series)

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)
4302758	Agilent OT3 Trap	100 cc	1/8
4302760	Agilent OT3 Trap	100 cc	1/4
4302726	Mounting Clip		

Big Hydrocarbon Trap

- Capacity: 80 grams of medium to heavy molecular weight hydrocarbons
- Pressure: Up to 250 PSIG
- Efficiency: Reduction of c4 hydrocarbons to less than 15 ppb
- 750 cubic centimeter gas purifiers
- Ideal for bulk purification applications or where several instruments are plumbed from a single gas source
- One piece of heavy-walled aluminum tube. This one-piece design eliminates potential leaks.
- Refillable

Big Hydrocarbon Traps

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)
4302688	Big Hydrocarbon Trap	750 cc	1/8
4302689	Big Hydrocarbon Trap	750 cc	1/4
4302687	Refill for Big Hydrocarbon Trap (enough for 2 refills)		
4302789	Big Mounting Clip, 2pk		

Hydrocarbon Removal Traps
(HT Series)

Our Hydrocarbon Traps offer you flexibility: refill your trap and remove extremely low levels of hydrocarbons.

- Remove organics from carrier gases, air and hydrogen
- High capacity—200 cc of filtering media
- Impregnated carbon filter media
- Refillable

Hydrocarbon Traps (HT Series)

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)
4702715	Refillable Hydrocarbon Trap	100 cc	1/8
4302713	Refillable Hydrocarbon Trap	100 cc	1/4
4302726	Mounting Clip for HT200 Series		
4302686	Adsorbent Refill (1 pint) 2 Recharges for Hydrocarbon Trap		

Capillary Grade Hydrocarbon Traps

- Extremely high surface area, coconut shell-based, activated carbon
- 100 cc of filtering media
- Refillable

Capillary Grade Hydrocarbon Traps

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)
4302711	Capillary Grade Hydrocarbon Trap	100 cc	1/8
4302716	Capillary Grade Hydrocarbon Trap	100 cc	1/4
4302726	Mounting Clip		
4302686	Adsorbent Refill (1 pint) 3 Recharges for Capillary Grade Hydrocarbon Trap		

Hydrocarbon/Moisture Traps
(HMT Series)

Our hydrocarbon/moisture traps offer you flexibility; refill your trap and remove extremely low levels of both moisture and hydrocarbons.

- Replace most mixed bed traps supplied by GC manufacturers
- Refillable

Hydrocarbon/Moisture Traps (HMT Series)

PART NO.	DESCRIPTION	SIZE (cc)	FITTING (in.)
4302708	Refillable Hydro-Moisture Trap	200 cc	1/8
4302709	Refillable Hydro-Moisture Trap	200 cc	1/4
4302726	Mounting Clip		
4302707	Adsorbent Refill (1 pint) 2 Recharges for Hydrocarbon Moisture Trap		

TRAPS

Big Universal Traps—Superior Gas Purifiers

Big Universal Traps utilize a layered, multi-adsorbent bed packing of the most effective, highest capacity adsorbent materials available today for the removal of oxygen, moisture, hydrocarbons, carbon dioxide and carbon monoxide from helium gas streams. The volume of the various adsorbent materials in the Big Universal Trap was developed through rigorous testing and evaluation in order to assure that breakthrough of the five major contaminant groups occurs as simultaneously as possible as each material achieves complete saturation.

Big Universal Traps (RMS Series)

PART NO.	GAS TYPE	FITTING
4302775	Hydrogen	1/8"
4302776	Hydrogen	1/4"
4302773	Helium (Ar/Me)+	1/8"
4302774	Helium (Ar/Me)+	1/4"
4302777	Nitrogen	1/8"
4302778	Nitrogen	1/4"
4302790	Big Mounting Clip, 2/pk	

Universal/External Split Vent Trap

Split vent trap stops environmental pollution. The vent was designed to protect the lab environment from the contaminants released by split injection systems. A replaceable, impregnated carbon filter media traps and eliminates a broad range of contaminants. The traps come with three packs of replacement cartridges each.

PART NO.	DESCRIPTION
4302771	Universal/External Split Vent Trap W/ 3 Cartridges (1/8 in. swagelok fitting)
4302772	Replacement Cartridges (3/pk)

QC + Point of Operation Panel

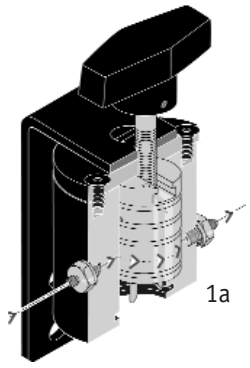
The QC+ Point of Operation Panel contains purifier cartridges that can be quickly changed. The cartridges are removed from the panel without interruption of gas flow to the system, drastically minimizing costly instrument downtime.

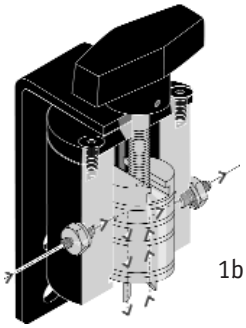
Filter cartridges are of all metal or glass construction, eliminating infusion and resultant signal noise associated with filters constructed from plastics. Cartridges are quickly installed via a simple knurled retaining nut. No wrenches are needed! As many as four cartridges can be replaced in a matter of seconds, and because there is low dead volume, a minimal amount of gas system purge is required after installation.

Each QC+ filter head is equipped with an internal flow valve. This valve serves two functions. In the "down" position, gas is passed through adsorbent filter cartridges for purification. In the "up" position, the gas is diverted through the filter head. With the valve up, the filter can then be easily replaced with a fresh cartridge. But, because the gas continues to flow through the bypass valve, the need to shut down instruments is eliminated while the filter cartridges are removed. QC+ is the only GC purification system with this revolutionary "flow through/bypass" feature.

The QC+ system has a unique D-shaped cartridge top that is self-aligning into the matching slotted filter head, assuring trouble-free installations. As many as four cartridges can be replaced in a matter of seconds without exposing downstream plumbing to atmospheric contaminants.

QC+ systems are available in single-head kits or 2-,3- and 4-head panel configurations, available exclusively with 1/8 in. Swagelok® fittings. QC+ panels can be wall mounted or used "freestanding." Oxygen, water, hydrocarbons and other organics are reduced to low part per billion levels.





Figures 1a and 1b. The "plus" valve (a) features a closed gas path when changing cartridges. When placed in the down position (b), the "plus" valve shifts gas through the cartridge.

Replacement Cartridges

High Capacity Oxygen

The GC-1 oxygen cartridge is an all metal assembly that contains a highly active metal catalyst, supported on an alumina silicate substrate. Oxygen removal efficiency to less than 15 ppb.
P/N: 4302695; Capacity: 396 mg

High Capacity Moisture

The GC-2 moisture cartridge is an all metal assembly that contains 13X molecular sieve, 16-20 mesh sphere size. Water removal efficiency to less than 9 ppb.
P/N: 4302696; Capacity: 15 g

Indicating Moisture

The GC-2-1 indicating moisture cartridge is a glass assembly that contains a combination of 5A molecular sieve and indicating Drierite. This cartridge provides a visual indicator of adsorbent saturation. Water removal efficiency to less than 9ppb.
P/N: 4302697; Capacity: 7 g

Hydrocarbon

The GC-3 hydrocarbon cartridge is an all metal assembly that contains a high surface area and coconut shell-based, activated carbon medium. Efficiencies to low ppb levels for C_2 and heavier compounds. Hydrocarbon removal efficiency to less than 30 ppb.
P/N: 4302698; Capacity: 8 g

Indicating Oxygen

The GC-4 indicating oxygen cartridge is constructed from glass. It contains a manganese oxide adsorbent that experiences a dramatic and progressive color change during adsorption. Oxygen removal efficiency to less than 2 ppb.
P/N: 4302699; Capacity: 40 mg

Replacement Cartridges

PART NO.	DESCRIPTION
4302695	High Capacity Oxygen
4302696	High Capacity Moisture
4302697	Indicating Moisture
4302698	Hydrocarbon
4302699	Indicating Oxygen
4302765	Replacement O-Ring Set

4302770

4302780

4302779

Quick Change Plus (QC+) - Point of Operation Panels

PART NO.	DESCRIPTION	FITTING (in.)
1-head		
4302766	High Capacity Oxygen	1/8
4302764	Indicating Oxygen	1/8
2-head		
4302770	High Capacity Oxygen, Ind. Oxygen	1/8
4302767	Moisture, Hydrocarbon	1/8
4302768	Indicating Moisture & Hydrocarbon	1/8
4302769	Moisture & Indicating Moisture	1/8
3-head		
4302781	Oxygen, Moisture, Hydrocarbon	1/8
4302780	Moisture, Oxygen, Ind. Oxygen	1/8
4-head		
4302779	0_2, Indicating 0_2, HC, H_20	1/8

GAS PURIFIERS

Model 8000 - High Capacity Purifier

The model 8000 gas purifier is equivalent in operation to the model 8010 but is designed for high capacities and lower working pressure.

Material of Construction

Shell: Aluminum Gaskets: Neoprene Strainer Assembly: Monel or Brass

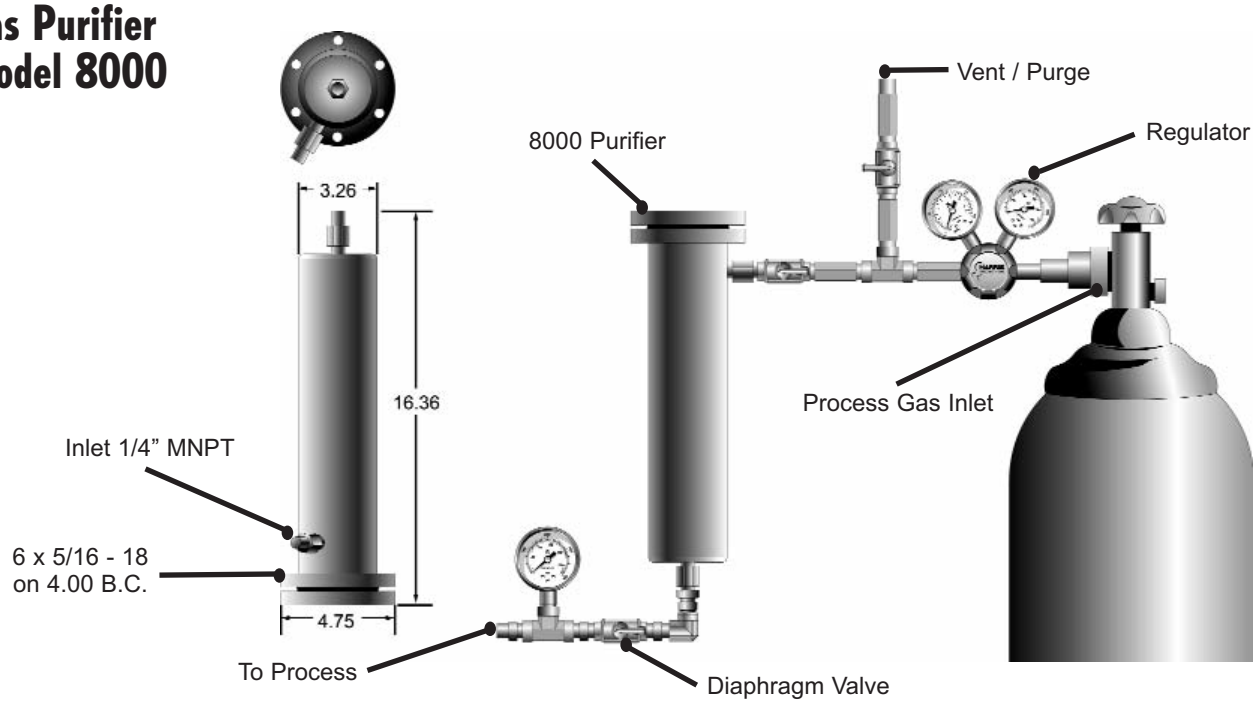
Specifications

Max. operating pressure:	350 psi (2415 kPa)
Max. flow rate:	10 scfm for short periods. 1 to 3 scfm for extended use.
Pressure drop:	0.12 psi for 3 scfm
	1 psi for 7.5 scfm
Temperature range:	-40° to 200° F (-40° to 95° C)
Capacity:	Will dry 1750 std. cu. ft. at 125 psi saturated at 90°
Dew Point Achieved:	-100° F (-75° C)
Dimensions:	4 3/4" dia. X 15 5/8" L
Connections:	1/4" MNPT
Weight:	3.58 lbs.

PART NO.	MODEL	DESCRIPTION
4302796	Purifier	8000
4302797	Cartridge	8000 13X Oil & Water
4302798	Cartridge	8000 4A Water
4302799	Cartridge	8000 Activated Charcoal THC

TYPICAL LAYOUTS

Gas Purifier Model 8000



GAS PURIFIERS

Model 8010 - High Pressure Purifier

The model 8010 gas purifier protects your gas system from contamination of oil and water found in some industrial gases and occasionally even in specialty carrier gases. The small daily operating costs are more than justified by the prevention of a system shut-down and the subsequent cleaning and/or repair costs.

The model 8010 purifier shell must be used with a specially designed replaceable cartridge. These cartridges are shipped in hermetically sealed cans with convenient pull-tap tops for easy opening. This improved packaging ensures full retention of capacity in storage until the time of use.

Materials of Construction

Shell body:	Aluminum anodized blue
Shell Head:	Chrome plated brass
Seal:	Buna N

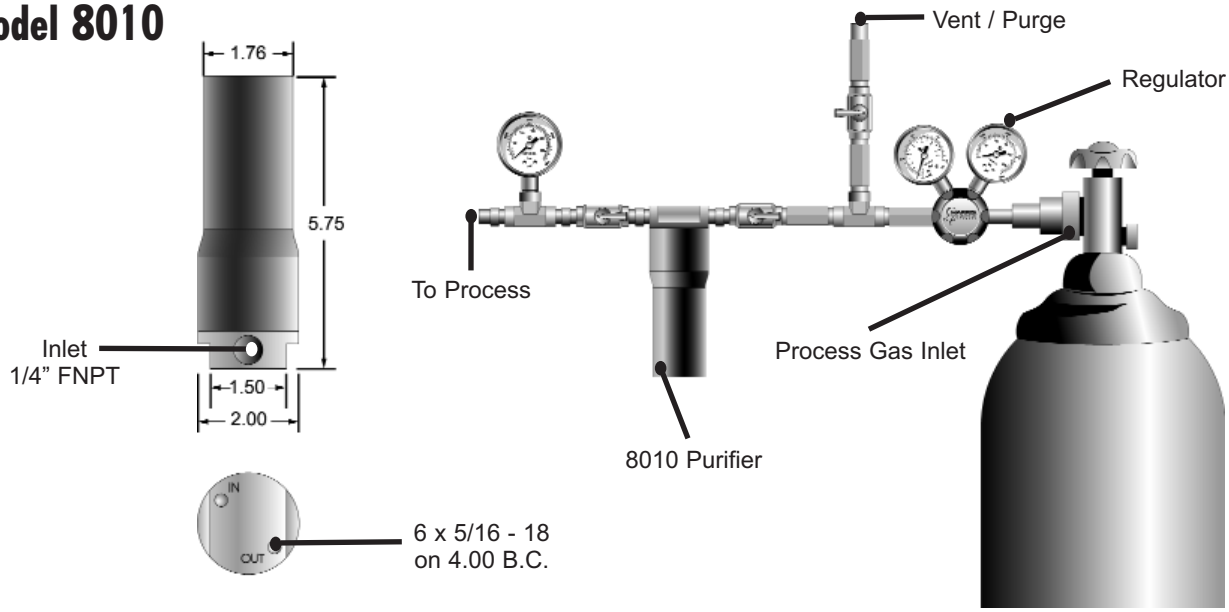
Specifications:

Maximum operating pressure:	2000 PSIG (500 PSIG for oxygen)
Operating temperature range:	40° F to 165° F (40° C to 75° C)
Dew point achievable:	100° F (75° C)
Inlet and outlet ports:	1/4" FNPT
Dimensions:	2" dia x 5 3/4" long
Weight with cartridge:	1.5 Lbs.

PART NO.	MODEL	DESCRIPTION
4302792	Purifier	8010
4302793	Cartridge	8010 13X Oil & Water
4302794	Cartridge	8010 4A Water
4302795	Cartridge	8010 Activated Charcoal THC

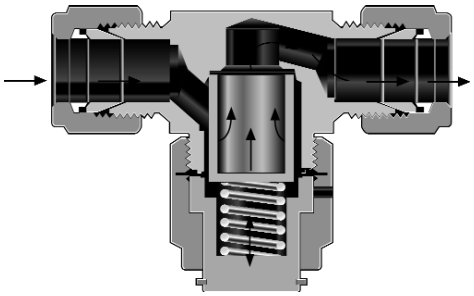
TYPICAL LAYOUTS

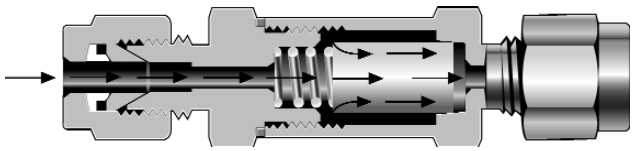
Gas Purifier Model 8010

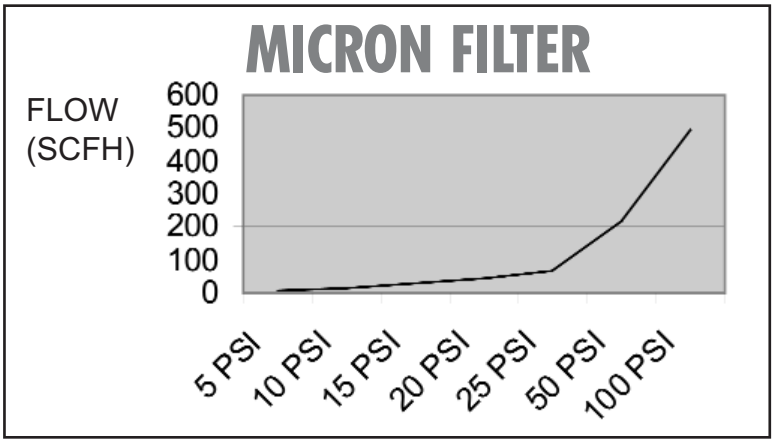


MICRON FILTERS

TEE-TYPE & IN-LINE FILTER FLOW DIAGRAMS







Tee-Type Filters

- Filter element can be replaced without removing body from system
- Replaceable sintered elements are available in 0.5, 2 micron pore sizes
- End connections are 1/4" x 1/4" FNPT

PART NO.	MODEL	DESCRIPTION
4300406	4 FT 0.5	Tee Type Filter 0.5 Micron
4300407	4 FT 2.0	Tee Type Filter 2 Micron

Replacement Elements (for Tee-Type & In-Line)

PART NO.	MODEL	DESCRIPTION
4300408	K4-0.5	Replacement Element 0.5 Micron
4300409	K4-2.0	Replacement Element 2 Micron

In-Line Filters

- Replaceable sintered elements are available in 0.5, 2 micron pore sizes
- End connections are 1/4" x 1/4" FNPT

PART NO.	MODEL	DESCRIPTION
4300404	4F 0.5	In-Line Filter 0.5 Micron
4300405	4F 2.0	In-Line Filter 2 Micron

Pressure Gauges

Two-inch pressure gauges are available in brass, chrome-plated brass and 316 stainless steel. All gauges have a bottom mount 1/4 NPT male connection. All gauges have an accuracy of ±3-2-3% of full scale.

Chrome-Plated Brass Gauges

PART NO.	RANGE	INCREMENTS
9006270	*30" Hg-0-30psi/2bar	1 PSIG
9006271	*30" Hg-0-100psi/7bar	2 PSIG
9006272	*30" Hg-0-200psi/14bar	5 PSIG
9006273	400psi/28bar	10 PSIG
9006274	1000psi/70bar	20 PSIG
9006275	4000psi/280bar	100 PSIG

* Compound gauge 30" Hg VAC to psi/bar

316 Stainless Steel Gauges

PART NO.	RANGE	INCREMENTS
9006282	*30" Hg-0-30psi/2bar	1 PSIG
9006283	*30" Hg-0-100psi/7bar	2 PSIG
9006284	*30" Hg-0-200psi/14bar	5 PSIG
9006285	400psi/28bar	10 PSIG
9006286	1000psi/70bar	20 PSIG
9006287	4000psi/280bar	100 PSIG

* Compound gauge 30" Hg VAC to psi/bar

Brass Gauges

PART NO.	RANGE	INCREMENTS
9006276	*30" Hg-0-30psi/2bar	1 PSIG
9006277	*30" Hg-0-100psi/7bar	2 PSIG
9006278	*30" Hg-0-200psi/14bar	5 PSIG
9006279	400psi/28bar	10 PSIG
9006280	1000psi/70bar	20 PSIG
9006281	4000psi/280bar	100 PSIG

* Compound gauge 30" Hg VAC to psi/bar

Cylinder Inlet Connections

CGA	BRASS			CHROME PLATED BRASS		STAINLESS STEEL		
	Nut	Stem	Stem /CV	Nut	Stem	Nut	Stem	Gasket
240	-	-	-	-	-	-	9100752	-
300	9002984	9005168	9005732	9003017	9005184	-	-	-
300P	9002989	9005168	9005732	-	-	-	-	-
320	9002986	9005114	9005746	9002987	9005365	9003062	9005188	9002908
326	9002966	9005170	9005733	9002967	9005364	9003063	9005189	-
330	-	-	-	-	-	9003019	9005185	9003097
346	9002969	9000319	9005734	9002970	9005181	9003064	9005190	-
350	9003006	9005145	9005735	9003012	9005179	9003033	9005191	-
510	9002972	9005109	9005736	9002973	9005174	9003035	9005194	-
510P	9002974	9005109	-	9000429	9005174	-	-	-
540	9002950	9005110	9005737	9002952	9005363	9003067	9005193	-
580	9003048	9005109	9005736	9003050	9005174	9003036	9005194	-
590	9003052	9005109	9005736	9003061	9005174	9003037	9005194	-
660	9003089	9005207	-	-	-	9003023	9005186	9003098
705	-	-	-	-	-	9003024	9005187	9003099

MATERIALS COMPATIBILITY

The compatibility data shown on the following pages has been compiled to assist in evaluating the appropriate materials to use in handling various gases. Prepared for use with the dry (anhydrous) gases at normal operating temperature of 70° (21° C), information may vary if different operating conditions exist.

Directions:
Locate the gas you are using in the first column.

Compare the materials of construction for the equipment you intend to use with the materials of construction shown in the Compatibility Chart. Then use the Key to Materials Compatibility to determine the compatibility.

KEY TO MATERIALS COMPATIBILITY

- • Satisfactory for use with the intended gas
- U Unsatisfactory for use with the intended gas
- I Insufficient data available to determine compatibility with the intended gas
- R1 Satisfactory with brass having a low copper content
- R2 Satisfactory with acetylene, however, cylinder gas is dissolved in a solvent (generally acetone) which may be incompatible with these elastomers
- R3 Satisfactory with brass, except where acetylene or acetylides are present
- R4 Generally unsatisfactory, except where specific use conditions have proven acceptable
- R5 Satisfactory below 3000 PSIG (206.9 bar) where gas velocities do not exceed 30 ft./sec.
- R6 Compatibility depends on condition of use

COMPATIBILITY GUIDE

COMMON NAME	CHEMICAL FORMULA	MATERIALS OF CONSTRUCTION: METALS					PLASTICS		ELASTOMERS			
		Brass	Stainless Steel	Aluminum	Zinc	Copper	PCTFE	Teflon®	Viton®	Buna-N	Neoprene	Polyurethane
Acetylene	C_2H_2	R1	•	I	U	U	•	•	R2	R2	R2	R2
Air	-	•	•	•	•	•	•	•	•	•	•	•
Allene	C_3H_4	•	•	•	I	U	•	•	•	•	•	I
Ammonia	NH_3	U	•	•	U	U	•	•	U	•	•	U
Argon	Ar	•	•	•	•	•	•	•	•	•	•	•
Arsine	AsH_3	•	•	R4	I	•	•	•	•	•	•	U
Boron Trichloride	BCl_3	U	•	U	I	•	•	•	I	I	I	I
Boron Trifluoride	BF_3	•	•	•	I	•	•	•	I	I	I	I
1,3-Butadiene	C_4H_6	•	•	•	•	•	•	•	•	U	•	U
Butane	C_4H_{10}	•	•	•	•	•	•	•	•	•	•	•
1-Butene	C_4H_8	•	•	•	•	•	•	•	•	•	•	•
cis-2-Butene	C_4H_8	•	•	•	•	•	•	•	•	•	•	•
trans-2-Butene	C_4H_8	•	•	•	•	•	•	•	•	•	•	•
Carbon Dioxide	CO_2	•	•	•	•	•	•	•	•	•	•	U
Carbon Monoxide	CO	•	•	•	•	•	•	•	I	•	•	•
Carbonyl Sulfide	COS	•	•	•	I	•	•	•	•	I	I	I
Chlorine	Cl_2	U	•	U	U	U	•	•	•	U	U	U
Deuterium	D_2	•	•	•	•	•	•	•	•	•	•	•
Diborane	B_2H_6	•	•	U	I	•	•	•	I	I	I	I
Dichlorosilane	H_2SiCl_2	I	•	I	I	I	•	•	I	I	I	I
Dimethyl Ether	C_2H_6O	•	•	•	•	•	•	•	•	•	•	I
Ethane	C_2H_6	•	•	•	•	•	•	•	•	•	•	•
Ethyl Acetylene	C_4H_6	I	•	•	I	U	•	•	•	I	•	I
Ethyl Chloride	C_2H_5Cl	•	•	U	I	•	•	•	•	•	•	U
Ethylene	C_2H_4	•	•	•	•	•	•	•	•	•	•	I
Ethylene Oxide*	C_2H_4O	R3	•	R4	I	U	•	•	U	U	U	U
Ethylene Oxide/Carbon Dioxide Mixtures*		R3	•	I	I	U	•	•	U	U	U	U
Ethylene Oxide/Halocarbon Mixtures*		R3	•	I	I	U	•	•	U	U	U	U
Ethylene Oxide/HCFC-124		R3	•	I	I	U	•	•	U	U	U	U
Halocarbon 11	CCl_3F	•	•	R4	I	•	•	•	•	•	U	U
Halocarbon 12	CCl_2F_2	•	•	R4	I	•	•	•	•	•	•	•
Halocarbon 13	$CClF_3$	•	•	R4	I	•	•	•	•	•	•	•
Halocarbon 13B1	CBF_3	•	•	R4	I	•	•	•	•	•	•	•
Halocarbon 14	CF_4	•	•	R4	I	•	•	•	•	•	•	•

COMPATIBILITY GUIDE CONT.

COMMON NAME	CHEMICAL FORMULA	MATERIALS OF CONSTRUCTION: METALS: Brass	Stainless Steel	Aluminum	Zinc	Copper	PLASTICS: PCTFE	Teflon®	ELASTOMERS: Viton®	Buna-N	Neoprene	Polyurethane
Halocarbon 21	$CHCl_2F$	•	•	R4	I	•	•	•	U	U	•	•
Halocarbon 22	$CHClF_2$	•	•	R4	I	•	•	•	U	U	•	U
Halocarbon 23	CHF_3	•	•	R4	I	•	•	•	I	I	I	•
Halocarbon 113	CCl_2FCClF_2	•	•	R4	U	•	•	•	•	•	•	•
Halocarbon 114	$C_2Cl_2F_4$	•	•	R4	I	•	•	•	•	•	•	•
Halocarbon 115	C_2ClF_5	•	•	R4	I	•	•	•	•	•	•	•
Halocarbon 116	C_2F_6	•	•	R4	I	•	•	•	I	I	I	•
Halocarbon 142B	$C_2H_3ClF_2$	•	•	R4	I	•	•	•	U	•	•	•
Halocarbon 152A	$C_2H_4F_2$	•	•	R4	I	•	•	•	U	•	•	•
Halocarbon C-318	C_2F_8	•	•	R4	I	I	•	•	•	•	•	•
Halocarbon 502	$CHClF_2/CClF_2$-CF_3	I	•	R4	I	I	•	•	•	•	•	•
Halocarbon 1132A	$C_2H_2F_2$	•	•	R4	I	•	I	•	I	I	I	•
Helium	He	•	•	•	•	•	•	•	•	•	•	•
Hydrogen	H_2	•	•	•	•	•	•	•	•	•	•	•
Hydrogen Chloride	HCl	U	•	U	U	U	•	•	•	U	U	U
Hydrogen Sulfide	H_2S	U	•	•	I	I	•	•	U	•	•	•
Isobutane	C_4H_{10}	•	•	•	•	•	•	•	•	•	•	•
Isobutylene	C_4H_8	•	•	•	I	•	•	•	•	•	•	I
Isopentane	C_5H_{12}	•	•	•	•	•	•	•	•	•	•	•
Krypton	Kr	•	•	•	•	•	•	•	•	•	•	•
Methane	CH4	•	•	•	•	•	•	•	•	•	•	•
Methyl Chloride	CH_3Cl	•	•	U	U	•	•	•	•	U	U	U
Methyl Mercaptan	CH_3SH	•	•	U	I	U	•	•	I	I	•	I
Neon	Ne	•	•	•	•	•	•	•	•	•	•	•
Nitric Oxide	NO	U	•	•	I	•	•	•	I	I	•	I
Nitrogen	N_2	•	•	•	•	•	•	•	•	•	•	•
Nitrogen Dioxide	NO_2	I	•	•	I	I	•	•	U	U	U	U
Nitrous Oxide	N_2O	•	•	•	•	•	•	•	•	•	•	•
Oxygen	O_2	•	R5	R4	•	•	•	•	R6	R6	R6	•
Perfluoropropane	C_3F_8	•	•	•	I	•	•	•	I	•	•	I
Phosphine	PH_3	I	•	•	I	I	•	•	I	I	I	I
Phosphorous Pentafluoride	PF_5	I	•	I	I	I	•	•	I	I	I	I
Propane	C_3H_8	•	•	•	•	•	•	•	•	•	•	•
Propylene	C_3H_6	•	•	•	•	•	•	•	•	U	U	U
Propylene Oxide	C_3H_6O	I	•	I	I	I	•	•	U	U	U	U
Refrigerant Gases	See Halocarbons											
Silane	SiH_4	•	•	•	I	•	•	•	•	•	•	•
Silicon Tetrachloride	$SiCl_4$	I	•	U	I	I	•	•	I	I	I	I
Silicon Tetrafluoride	SiF_4	•	•	•	I	•	•	•	•	•	•	•
Sulfur Dioxide	SO_2	U	•	•	U	U	•	•	•	U	U	•
Sulfur Hexafluoride	SF_6	•	•	•	I	•	•	•	•	•	•	•
Trichlorosilane	$HSiCl_3$	I	•	U	I	I	•	•	I	I	I	I
Vinyl Methyl Ether	C_3H_6O	•	•	•	I	U	•	•	I	I	I	I
Xenon	Xe	•	•	•	•	•	•	•	•	•	•	•

CONVERSION FACTORS

Pressure

TO OBTAIN

	atm	bar	ft of H_2O	in of hg	in of H_2O	kg/cm^2	kPa	mm of Hg	PSI
MULTIPLY				**BY**					
atm	....	1.01325	33.932	29.921	407.1827	1.0332	101.3171	760	14.696
bar	0.98692	....	33.4883	29.530	401.8596	1.019716	100	750.062	14.50368
Ft. of H_2O	0.02947	0.029891	....	0.882646	12	0.03048	2.9890	22.4198	0.433107
in of Hg	0.03342	0.033864	1.1340	....	13.6	0.034532	3.376895	25.4	0.49115
in of H_2O	0.00246	0.002499	0.083333	0.073556	....	0.00254	0.0249089	1.86832	0.03609
kg/cm^2	0.9678	0.980665	32.8084	28.95903	393.7008	....	98.03922	735.5592	14.22334
kPa	0.00987	0.010	0.33456	0.29613	4.01472	0.01020	....	7.5006	0.14504
mm of Hg	0.00132	0.001333	0.044603	0.03937	0.535240	0.001360	0.133322	....	0.019337
PSI	0.06805	0.068948	2.3089	2.0360	27.70851	0.070307	6.89465	51.175	....

Flow

TO OBTAIN

	cm^3/min	cm^3/sec	ft^3/hr	ft^3/min	m^3/hr	m^3/min	L/hr	Lpm
MULTIPLY				**BY**				
cm^3/min	....	0.0166667	0.0021189	0.0000353	0.00006	0.000001	0.06	0.001
cm^3/sec	60	....	0.1271340	0.0021189	0.0036	0.00006	3.6	0.06
ft^3/hr	471.9474	7.865790	....	0.0166667	0.0283168	0.0004719	28.31685	0.4719474
ft^3/min	28,316.85	471.9474	60	....	1.699008	0.0283168	1699.008	28.31686
m^3/hr	16,666.67	277.7778	35.31467	0.5885777	....	0.0166667	1000	16.66667
m^3/min	1,000,000	16,666.67	2118.876	35.31467	60	....	60,000	1000
L/hr	16.66667	0.2777778	0.0353147	0.0005885	0.001	0.0000167	....	0.0166667
Lpm	1000	16.66667	2.118876	0.0353147	0.06	0.001	60	....

Density

TO OBTAIN

	gms/cm^3	kg/m^3	lbs/ft^3	lbs/in^3	lbs/U.S. gal
MULTIPLY			**BY**		
gms/cm^3	....	1000	62.428	0.0361273	8.3454
kg/m^3	0.001	....	0.062428	3.61273×10^{-5}	0.0083454
lbs/ft^3	0.0160185	16.018463	....	5.78704×10^{-4}	0.13368
lbs/in^3	27.679905	27.679.9	1728	....	231
lbs/U.S. gal	0.1198264	119.8264	7.4805195	0.004329	....

MOISTURE CONVERSION

Dew Point °C	Dew Point °F	Vapor Pressure (Water/Ice in Equilibrium) mm of Mercury	PPM on Volume Basis at 760 mm of Hg Pressure	Relative Humidity at 70 F%	PPM on Weight Basis in Air
-90	-130	0.00007	0.0921	0.00037	0.057
-88	-126	0.0001	0.132	0.00054	0.082
-86	-123	0.00014	0.184	0.00075	0.11
-84	-119	0.0002	0.263	0.00107	0.16
-82	-116	0.00029	0.382	0.00155	0.24
-80	-112	0.0004	0.562	0.00214	0.33
-78	-108	0.00056	0.737	0.003	0.46
-76	-105	0.00077	1.01	0.0041	0.63
-74	-101	0.00105	1.38	0.00559	0.86
-72	-98	0.00143	1.88	0.00762	1.17
-70	-94	0.00194	2.55	0.0104	1.58
-68	-90	0.00261	3.43	0.014	2.13
-66	-87	0.00349	4.59	0.0187	2.84
-64	-83	0.00464	6.11	0.0248	3.79
-62	-80	0.00614	8.08	0.0328	5.01
-60	-76	0.00808	10.6	0.043	6.59
-58	-72	0.0106	13.9	0.0565	8.63
-56	-69	0.0138	18.2	0.0735	11.3
-54	-65	0.0178	23.4	0.0948	14.5
-52	-62	0.023	30.3	0.123	18.8
-50	-58	0.0295	38.8	0.157	24.1
-48	-54	0.0378	49.7	0.202	30.9
-46	-51	0.0481	63.3	0.257	39.3
-44	-47	0.0609	80	0.325	49.7
-42	-44	0.0768	101	0.41	62.7
-40	-40	0.0966	127	0.516	78.9
-38	-36	0.1209	159	0.644	98.6
-36	-33	0.1507	198	0.804	122.9
-34	-29	0.1873	246	1	152
-32	-26	0.2318	305	1.24	189
-30	-22	0.2859	376	1.52	234
-28	-18	0.351	462	1.88	287
-26	-15	0.43	566	2.3	351
-24	-11	0.526	692	2.81	430
-22	-8	0.64	842	3.41	523
-20	-4	0.776	1020	4.13	633
-18	0	0.939	1240	5	770
-16	3	1.132	1490	6.03	925
-14	7	1.361	1790	7.25	1110
-12	10	1.632	2150	8.69	1335
-10	14	1.95	2570	10.4	1596
-8	18	2.326	3060	12.4	1900
-6	21	2.765	3640	14.7	2260
-4	25	3.28	4320	17.5	2680
-2	28	3.88	5100	20.7	3170
0	32	4.579	6020	24.4	3640
2	36	5.294	6970	28.2	4330
4	39	6.101	8030	32.5	4990
6	43	7.013	9230	37.4	5730
8	46	8.045	10590	42.9	6580
10	50	9.029	12120	49.1	7530
12	54	10.52	13840	56.1	8600
14	57	11.99	15780	63.9	9800
16	61	13.63	17930	72.6	11140
18	64	15.48	20370	82.5	12650
20	68	17.54	23080	93.5	14330

WARRANTY

This equipment is sold by The Harris Products Group under the warranties and policies set forth in the following paragraphs. The warranty is extended only with respect to the purchase of this equipment directly from The Harris Products Group or its authorized distributor network as new merchandise and is extended to the first buyer thereof other than for the purpose of resale.

The warranty period is one (1) year from the date of original delivery to the buyer with the following exception for equipment use in corrosive gas service. Equipment used in corrosive gas service will have a warranty of ninety (90) days from the date of original delivery. The equipment is warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in the product manual and any associated labels, inserts or instructions provided that the equipment is properly operated under conditions of normal use and that recommended regular maintenance and service is performed in accordance with the instructions provided.

The warranty for such equipment shall not apply if the equipment has been altered by any third party. The Harris Products Group or its designated service facility shall only perform repairs to the equipment. If the equipment has been subject to abuse, misuse, negligence or accident the stated warranty will not apply.

The Harris Products Group sole obligation to the buyer and the buyer's sole remedy is limited to the repair or replacement of the equipment free of charge at The Harris Products Group's option. The authorized distributor from which it was purchased must report the request for return or repair to The Harris Products Group. The request must include the observed deficiency, the part number or assembly number, gas service used and the proof of purchase. The request for return or repair must occur no later than seven (7) days after the expiration of the warranty period (One year and seven days for non-corrosive equipment and ninety seven (97) days for equipment in corrosive gas service). Transportation charges are to be prepaid for the return of the equipment and upon examination the equipment is found defective due to no fault of the buyer the equipment will be replaced or repaired and returned to the original buyer at no charge. If the product is found to be defective due to negligence of the buyer or his customer the product will be repaired or replaced and returned to the original buyer only after authorization has been received to pay for any such repairs and all transportation charges.

The Harris Products Group shall not be liable for any damages including but not limited to incidental damages, consequential damages or other damages which may occur due to negligence, breach of warranty of other wise.

There are no expresses or implied warranties that extend beyond the warranties set forth by The Harris Products Group.

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