

Technical Reference Material

Index

Safety Warning	Inside Front Cover
Mass Spectrometer Helium Leak Certification	1
Subatomic Units of Measure	2
Flow Calculations for GO Regulator Products	3
CGA Connection Chart	5
Typical Pressure Regulator Applications	8
Disclaimers	Inside Back Cover



technical data

GO Regulator

PO Box 4866 • Spartanburg, SC 29305-4866

(864) 574-7966

www.goreg.com • sales-go@circor.com

For Your Safety

It is solely the responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation, and maintenance of these products. When selecting products, the total system design must be considered to ensure safe, trouble-free performance. Material compatibility, product ratings and application details should be considered in the selection. Improper selection or use of products described herein can cause personal injury or property damage.

Contact your authorized GO Regulator sales and service representative for information about additional sizes and special alloys.

SAFETY WARNING:

GO Regulator products are designed for installation only by professional suitably qualified licensed system installers experienced in the applications and environments for which the products are intended. These products are intended for integration into a system. Where these products are to be used with flammable or hazardous media, precautions must be taken by the system designer and installer to ensure the safety of persons and property. Flammable or hazardous media pose risks associated with fire or explosion, as well as burning, poisoning or other injury or death to persons and/or destruction of property. The system designer and installer must provide for the capture and control of such substances from any vents in the product(s). The system installer must not permit any leakage or uncontrolled escape of hazardous or flammable substances. The system operator must be trained to follow appropriate precautions and must inspect and maintain the system and its components including the product(s) and at regular intervals in accordance with timescales recommended by the supplier to prevent unacceptable wear or failure. We recommend that the regulators will be serviced every 5 Years after first installation.

Mass Spectrometer Helium Leak Certification

Mass spectrometer helium leak certification is available on all products manufactured by GO Regulator. With this service, we can provide test certification up to 2×10^{-10} standard cc/sec helium. The choice of inboard or outboard testing is also available.

When requesting test certification, specify the desired leak specification and whether inboard or outboard testing is to be performed.

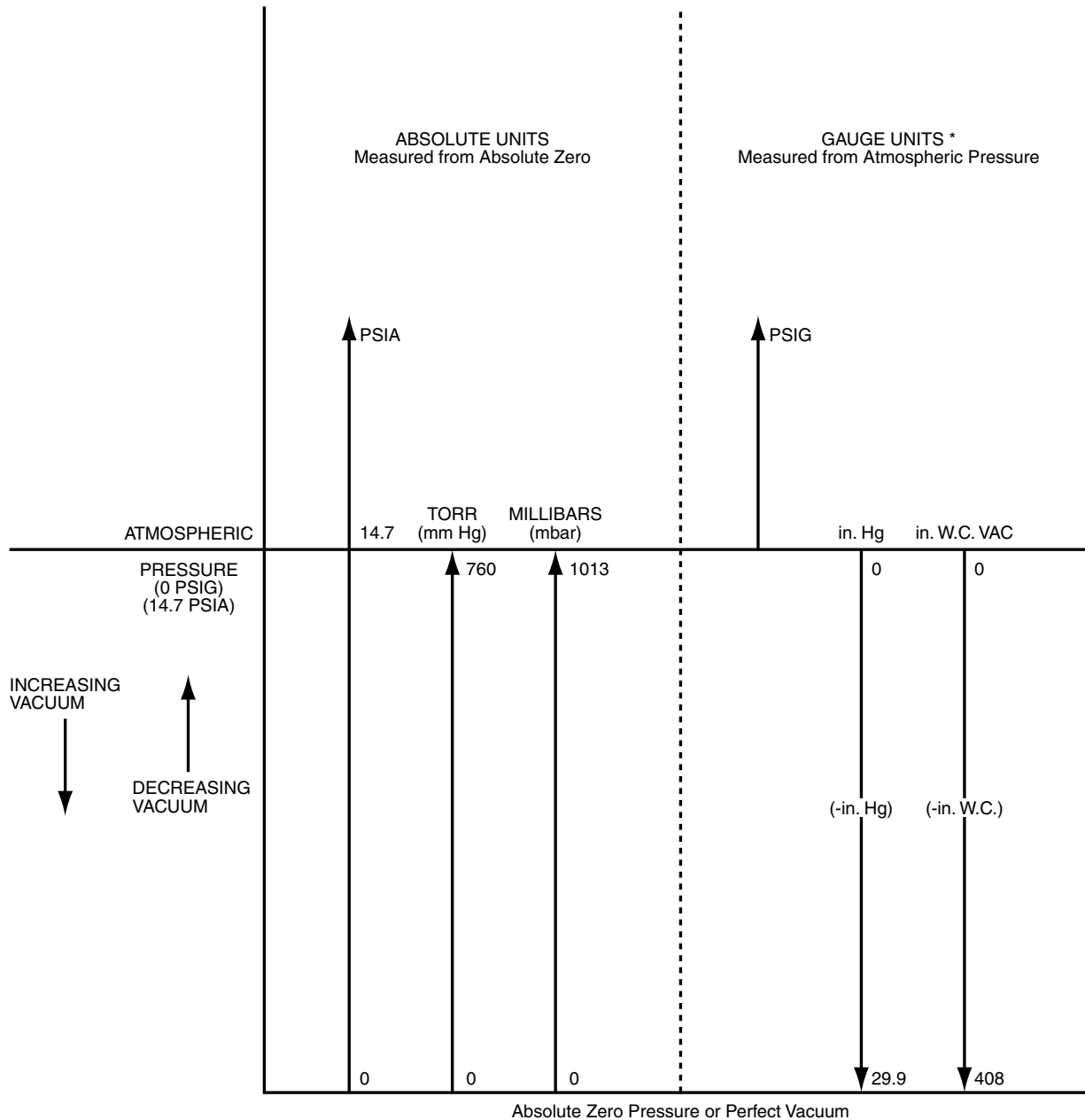
For Your Safety

It is solely the responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation, and maintenance of these products. Material compatibility, product ratings and application details should be considered in the selection. Improper selection or use of products described herein can cause personal injury or property damage.

SAFETY WARNING:

HOKE® products are designed for installation only by professional suitably qualified licensed system installers experienced in the applications and environments for which the products are intended. These products are intended for integration into a system. Where these products are to be used with flammable or hazardous media, precautions must be taken by the system designer and installer to ensure the safety of persons and property. Flammable or hazardous media pose risks associated with fire or explosion, as well as burning, poisoning or other injury or death to persons and/or destruction of property. The system designer and installer must provide for the capture and control of such substances from any vents in the product(s). The system installer must not permit any leakage or uncontrolled escape of hazardous or flammable substances. The system operator must be trained to follow appropriate precautions and must inspect and maintain the system and its components including the product(s) and at regular intervals in accordance with timescales recommended by the supplier to prevent unacceptable wear or failure. We recommend that the regulators will be serviced every 5 Years after first installation.

Subatmospheric Units of Measure



* Gauge unit values are shown as minus (-) values.
This minus sign is not used in normal industry practice

technical data

Flow Calculations for GO Regulator Products

Formulas and Examples

Liquid Flow Formulas:

$$C_v = \frac{Q_L \sqrt{S_L}}{\sqrt{\Delta P}} \therefore Q_L = \frac{C_v \sqrt{\Delta P}}{\sqrt{S_L}}$$

Example: Determine liquid flow (assume water) through a regulator in gallons per minute with the following conditions:

Given:

$$P_1 = 1000 \text{ psia}$$

$$P_2 = 600 \text{ psia}$$

$$S_L = 1.0$$

$$C_v = 0.8$$

$$Q_L = \frac{C_v \sqrt{\Delta P}}{\sqrt{S_L}} = \frac{0.8 \sqrt{1000 - 600}}{\sqrt{1}} = \frac{0.8 \times 20}{1} = \mathbf{16 \text{ GPM (Water)}}$$

Gaseous Flow Formulas:

$$\text{a } C_v = \frac{Q_g \times 2 \sqrt{S_g}}{P_1} \qquad \text{b } C_v = \frac{Q_g \sqrt{S_g}}{\sqrt{\Delta P \times P_1}}$$

Example: Determine C_v required for a regulator when inlet pressure (P_1) is equal or greater than two times outlet pressure (P_2) and the following items are known:

Given:

$$P_1 = 1000 \text{ psia}$$

$$P_2 = 400 \text{ psia}$$

$$Q_g = 400 \text{ SCFM}$$

$$S_g = 1.0 \text{ (assume air in this example)}$$

$$C_v = \frac{Q_g \times 2 \sqrt{S_g}}{P_1} = \frac{400 \times 2}{1000} = \mathbf{0.8 C_v}$$

* **Caution:** When sizing components for flow applications, attention must also be directed to the size of the plumbing. When flow requirements are at low pressures, the plumbing may be the flow limiting item rather than the regulator or valve.

technical data

Flow Calculations for GO Regulator Products

Definitions:

C_v:	Flow coefficient for regulators and valves that expresses flow capabilities of a unit at full open condition. For liquids, this coefficient is defined as the flow of water at 60° F in gallons per minute at a pressure drop of one psig. For gases, this coefficient is defined as the flow of air at standard conditions in standard cubic feet per minute for each psig of inlet pressure.
S_L:	Specific gravity of liquids relative to water, both at standard temperature of 60° F. (Specific gravity of water = 1.0 @ 60° F).
S_g:	Specific gravity of a gas relative to air; equals the ratio of the molecular weight of the gas to that of air. (Specific gravity of air = 1.0 @ 60° F).
P:	Line pressure (psia).
P₁:	Inlet pressure expressed in psia.
P₂:	Outlet pressure expressed in psia.
DP:	Differential pressure ($P_1 - P_2$).
psia:	Absolute pressure which is gauge pressure (PSIG) plus 14.7 (atmospheric pressure).
Q_L:	Liquid flow in gallons per minute (GPM).
Q_g:	Gas flow in standard cubic feet per minute (SCFM). (At standard conditions of 60° F and 14.7 psia).
Q:	Volume flow rate in cubic feet per minute (CFM).
M:	Mass flow rate in pounds per minute (lbs/min.).

CGA Connection Chart

CYLINDER GAS TYPE	CHEMICAL SYMBOL	CGA CONNECTION	
		STANDARD	ALTERNATIVE
Acetylene	C ₂ H ₂	510	300
Air	—	590	346
Allene	CH ₂ :C:CH ₂	510	
Ammonia anhydrous	NH ₃	240	705
Ammonia (VHP)	—	660	
Antimony pentafluoride	SbF ₅	330	
Argon	Ar	580	
Argon (research grade)	—	590	
Arsine	AsH ₃	350	660
Boron trichloride	BCl ₃	660	330
Boron trifluoride	BF ₃	330	
Bromine pentafluoride	BrF ₅	670	
Bromine trifluoride	BrF ₃	670	
Bromoacetone	BrCH ₂ COCH ₃	330	660
Bromochlorodifluoromethane	CBBrClF ₂	668	660
Bromochloromethane	CH ₂ BrCl	668	660
Bromotrifluoroethylene	BrFC:CF ₂	510	660
Bromotrifluoromethane	CBBrF ₃	668	320, 660
1, 3-butadiene	CH ₂ :CHCH:CH ₂	510	
Butane	CH ₃ CH ₂ CH ₂ CH ₃	510	
Butenes	CH ₃ CH ₂ CH:CH ₂	510	
Carbon dioxide	CO ₂	320	
Carbon monoxide	CO	350	
Carbonyl fluoride	COF ₂	660	750
Carbonyl sulfide	COS	330	
Chlorine	Cl ₂	660	
Chlorine pentafluoride	ClF ₅	670	
Chlorine trifluoride	ClF ₃	670	
Chlorodifluoroethane	CH ₃ CClF ₂	510	660
Chlorodifluoromethane	CHClF ₂	660	668
Chlorofluoromethane	CH ₂ ClF	510	
Chloroheptafluorocyclobutane	C ₄ F ₇ Cl	660	668
Chloropentafluoroethane	C ₂ ClF ₅	668	660
Chlorotrifluoromethane	CClF ₃	668	320, 660
Cyanogen	C ₂ N ₂	750	660
Cyanogen chloride	CNCl	750	660
Cyclobutane	C ₄ H ₈	510	
Cyclopropane	C ₃ H ₆	510	
Deuterium	D ₂	350	
Deuterium chloride	DCl	330	
Deuterium fluoride	DF	330	
Deuterium selenide	D ₂ Se	350	330
Deuterium sulfide	D ₂ S	330	
Diborane	B ₂ H ₆	350	
Dibromodifluoroethane	C ₂ H ₂ Br ₂ F ₂	668	660
Dibromodifluoromethane	CBBr ₂ F ₂	668	660
1, 1-difluoroethylene	FCH:CHF	320	
Dichlorosilane	H ₂ SiCl ₂	330	510
Diethylzinc	(C ₂ H ₅) ₂ Zn	750	
Dimethylamine	(CH ₃) ₂ NH	705	240
Dimethyl ether	CH ₃ OCH ₃	510	
2, 2-dimethylpropane	C(CH ₃) ₄	510	
Diphosgene	ClCO ₂ CCl ₃	750	660
Ethane	C ₂ H ₆	350	

technical data

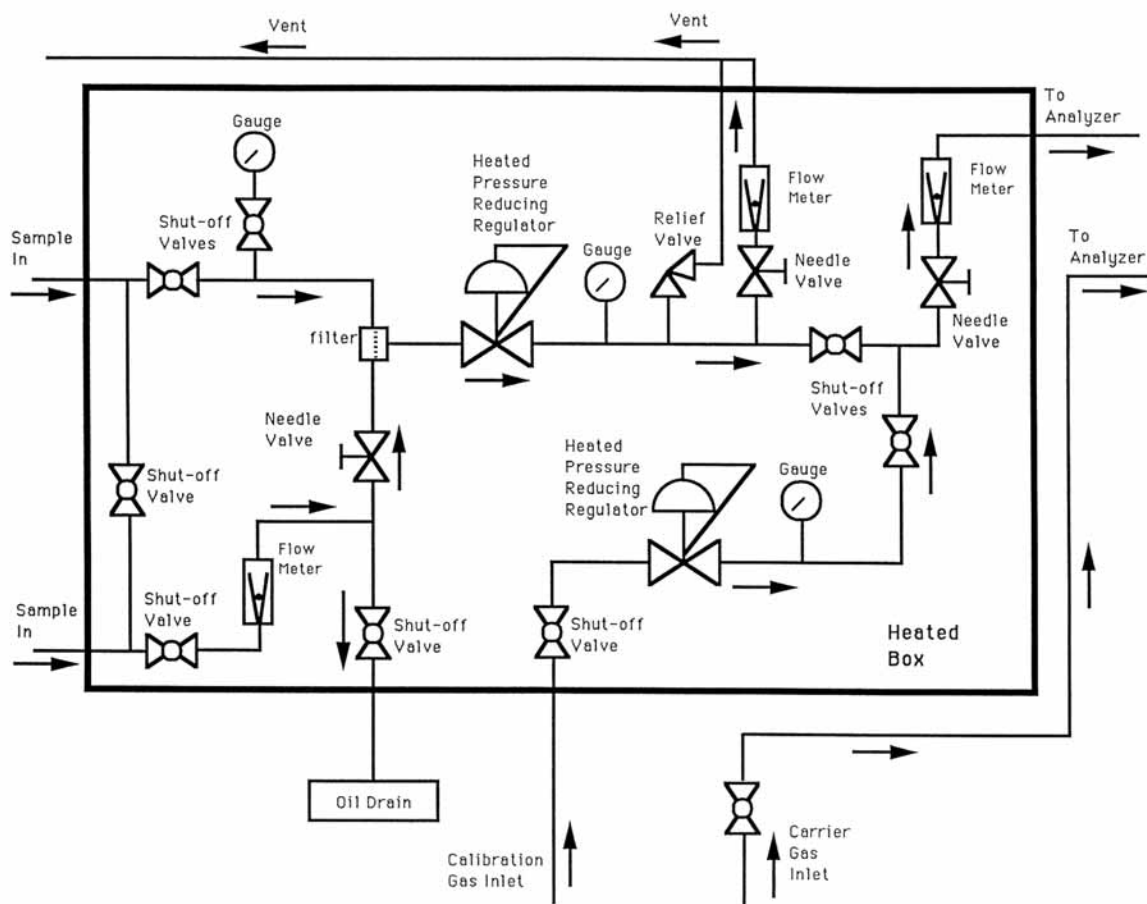
CGA Connection Chart

Ethane (research grade)	—	350	
Ethylacetylene	$\text{CH}_3\text{CH}_2\text{C}\equiv\text{CH}$	510	
Ethylchloride	$\text{CH}_3\text{CH}_2\text{Cl}$	510	300
Ethylchloroarsine	$\text{C}_2\text{H}_5\text{AsCl}_2$	750	660
Ethylene	$\text{CH}_2=\text{CH}_2$	350	
Ethylene oxide	$\text{C}_2\text{H}_4\text{O}$	510	
Ethyl ether	$(\text{C}_2\text{H}_5)_2\text{O}$	510	
Ethyl fluoride	$\text{C}_2\text{H}_5\text{F}$	750	660
Fluorine	F_2	679	670
Freon® 12 (dichlorodifluoromethane)	CCl_2F_2	660	
Freon® 13 (chlorotrifluoromethane)	CClF_3	320	
Freon® 13B1 (bromotrifluoromethane)	CBrF_3	320	
Freon® 14 (tetrafluoromethane)	CF_4	320	
Freon® 22 (chlorodifluoromethane)	CHClF_2	660	620
Freon® 114 (1, 2-dichlorotetrafluoroethane)	$\text{ClF}_2\text{CCClF}_2$	660	
Freon® 116 (hexafluoroethane)	C_2F_6	320	
Freon® C318 (octafluorocyclobutane)	C_4F_8	660	
Genetron® 21 (dichlorofluoromethane)	CHCl_2F	660	
Genetron® 23 (fluoroform)	CHF_3	320	
Genetron® 115 (monochloropentafluoroethane)	BrF_2CCF_3	660	
Genetron® 152A (1, 1-difluoroethane)	$\text{FCH}_2\text{CH}_2\text{F}$	660	
Germane	GeH_4	660	750
Helium	He	580	677
Heptafluorobutyronitrile	$\text{C}_4\text{F}_7\text{N}$	750	660
Hexafluoroacetone	$\text{C}_3\text{F}_8\text{O}$	660	330
Hexafluorocyclobutene	C_4F_6	750	660
Hexafluorodimethyl peroxide	CF_3OOCF_3	755	660
Hexafluoroethane	C_2F_6	660	668
Hexafluoropropylene	$\text{CF}_3\text{CF}=\text{CF}_2$	668	660
Hydrogen	H_2	350	
Hydrogen bromide	HBr	330	
Hydrogen chloride	HCl	330	
Hydrogen cyanide	HCN	750	160
Hydrogen fluoride	HF	330	660
Hydrogen iodide	HI	330	660
Hydrogen selenide	H_2Se	350	660
Hydrogen sulfide	H_2S	330	
Iodine pentafluoride	IF_5	670	
Isobutane	C_4H_{10}	510	
Isobutylene	C_4H_8	510	
Krypton (research grade)	Kr	590	
“Manufactured gas B”	—	350	
“Manufactured gas C”	—	350	
Lewisite	$\text{ClCH}=\text{CHAsCl}_2$	750	660
Methane	CH_4	350	
Methylacetylene	$\text{CH}_3\text{C}\equiv\text{CH}$	510	
Methyl bromide	CH_3Br	320	660
3-methyl 1-butene	$(\text{CH}_3)_2\text{CHCH}=\text{CH}_2$	510	
Methyl chloride	CH_3Cl	660	510
Methyldichloroarsine	CH_2AsCl_2	750	
Methylene fluoride	CH_2F_2	320	
Methyl ethylether	$\text{CH}_3\text{OC}_2\text{H}_5$	510	
Methyl fluoride	CH_3F	350	
Methyl formate	HCOOCH_3	510	660
Methyl mercaptan	CH_2SH	330	750
Monoethylamine	$\text{CH}_3\text{CH}_2\text{NH}_2$	240	705
Monomethylamine	CH_3NH_2	240	705
Mustard gas	$\text{S}(\text{C}_2\text{H}_4\text{Cl})_2$	750	350
Natural gas	—	350	677
Neon	Ne	590	580
Nickel carbonyl	$\text{Ni}(\text{CO})_4$	320	750
Nitric oxide	NO	660	750, 160
Nitrogen	N_2	580	
Nitrogen (research grade)	—	590	
Nitrogen dioxide	NO_2	660	160
Nitrogen trifluoride	NF_3	679	
Nitrogen trioxide	N_2O_3	660	160
Nitrosyl chloride	NOCl	660	330
Nitrosyl fluoride	NOF	330	
Nitrous oxide	N_2O	326	
Nitryl fluoride	NO_2F	330	
Octafluorocyclobutane	C_4F_8	660	668

CGA Connection Chart

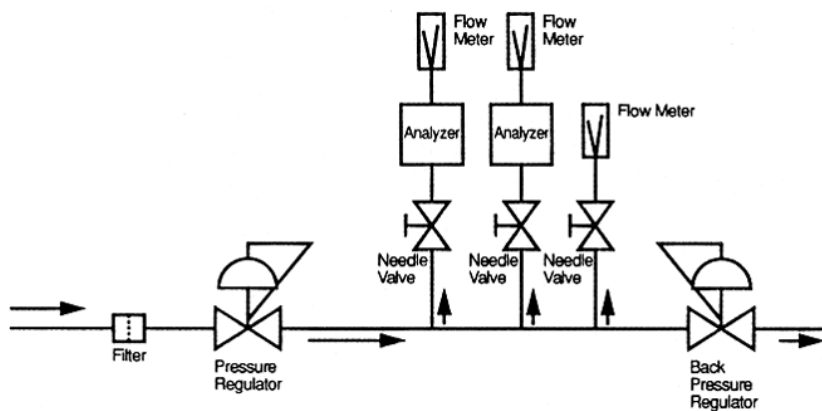
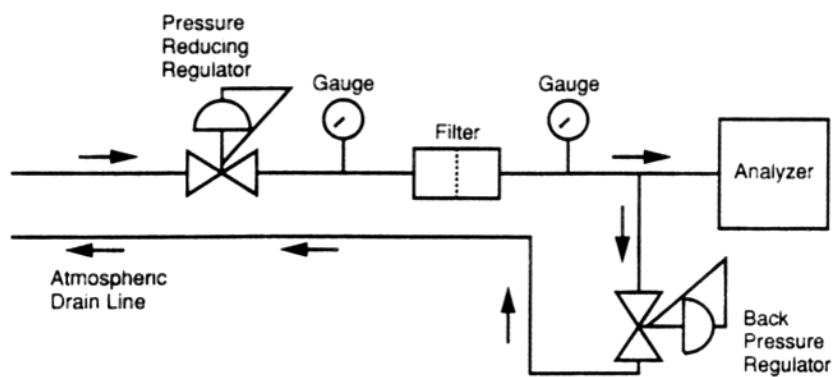
Octafluoropropane	C ₃ F ₈	660	668
Oxygen	O ₂	540	
Oxygen difluoride	OF ₂	679	
Ozone	O ₃	660	755
Pentaborane	B ₅ H ₉	660	750
Pentachlorofluoroethane	CCl ₃ CCl ₂ F	668	660
Pentafluoroethane	CF ₃ CHF ₂	668	660
Pentafluoroethyl iodide	CF ₃ CF ₂ I	668	660
Pentafluoropropionitrile	CF ₃ CF ₂ CN	750	660
Perchloryl fluoride	ClO ₃ F	670	
Perfluorobutane	C ₄ F ₁₀	668	
Perfluorobutene-2	C ₄ F ₈	660	
Phenylcarbylamine chloride	C ₆ H ₅ N:CCl ₂	330	660
Phosgene	COCl ₂	660	
Phosphine	PH ₃	660	350
Perfluoropropane	—	660	
Phosphorous pentafluoride	PF ₅	330	
Phosphorous trifluoride	PF ₃	330	
Propane	C ₃ H ₈	510	
Propylene	C ₃ H ₆	510	
Silane	SiH ₄	350	510
Silicone tetrafluoride	SiF ₄	330	
Stibine	SbH ₃	350	
Sulfur dioxide	SO ₂	660	668
Sulfur hexafluoride	SF ₆	590	668
Sulfur tetrafluoride	SF ₄	330	
Sulfuryl fluoride	SO ₂ F ₂	660	330
1, 1, 1, 2-tetrachlorodifluoroethane	C ₂ Cl ₄ F ₂	668	660
1, 1, 2, 2-tetrafluorochloroethane-1	C ₂ HClF ₄	668	660
Tetrafluoroethylene	C ₂ F ₄	350	660
Tetrafluorohydrazine	N ₂ F ₄	679	
Tetrafluoromethane	CF ₄	580	320
Tetramethyllead	(CH ₃) ₄ Pb	750	350
Trichlorofluoromethane	CCl ₃ F	668	660
Trichlorotrifluoroethane	CF ₃ CCl ₃	668	660
Triethylaluminum	(C ₂ H ₅) ₃ Al	750	350
Triethylborane	(C ₂ H ₅) ₃ B	750	350
Trifluoroacetonitrile	CF ₃ CN	750	350
Trifluoroacetyl chloride	CF ₃ COCl	330	
1, 1, 1-trifluoroethane	CH ₃ CF ₃	510	
Trifluoroethylene	C ₂ F ₃ H	510	
Trifluoromethyl hypofluorite	CF ₃ OF	679	
Trifluoromethyl iodide	CF ₃ I	668	660
Trimethylamine	(CH ₃) ₃ N	240	705
Trimethylstibine	(CH ₃) ₃ Sb	750	350
Tungsten hexafluoride	WF ₆	330	670
Uranium hexafluoride	UF ₆	330	
Vinyl bromide	C ₂ H ₃ Br	290	510
Vinyl chloride	C ₂ H ₃ Cl	290	510
Vinyl fluoride	C ₂ H ₃ F	320	350
Vinyl methyl ether	C ₂ H ₃ OCH ₃	290	510
Xenon	Xe	580	677
Xenon (research grade)	—	590	

Typical Pressure Regulator Applications

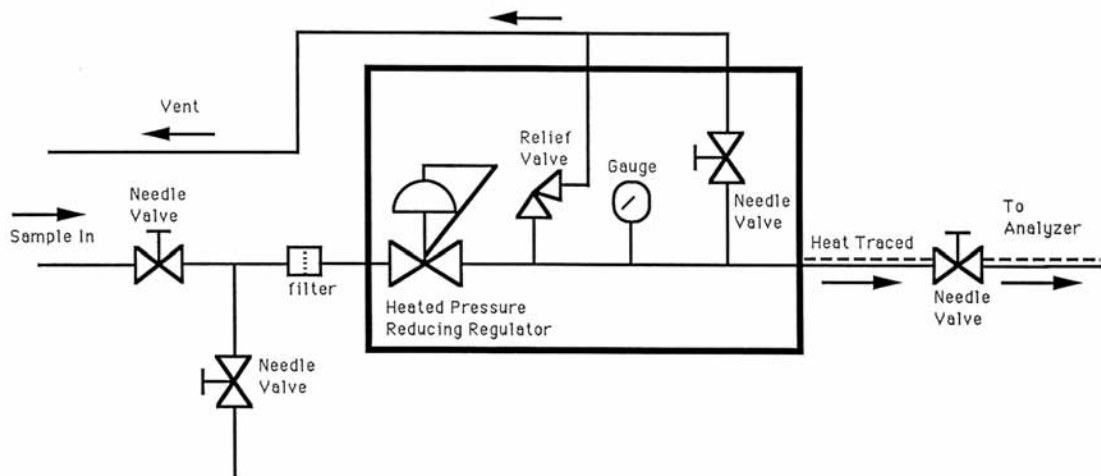
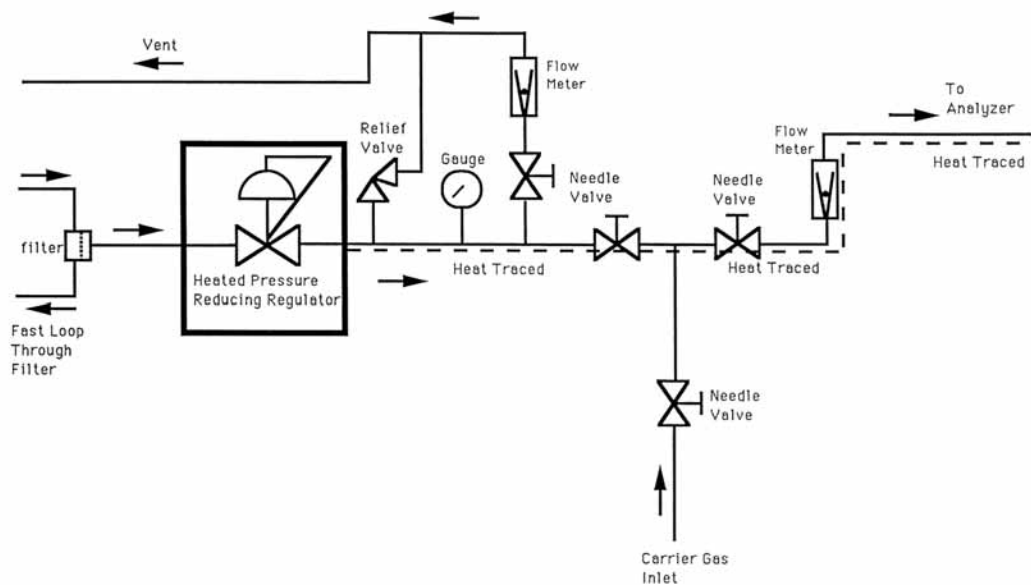
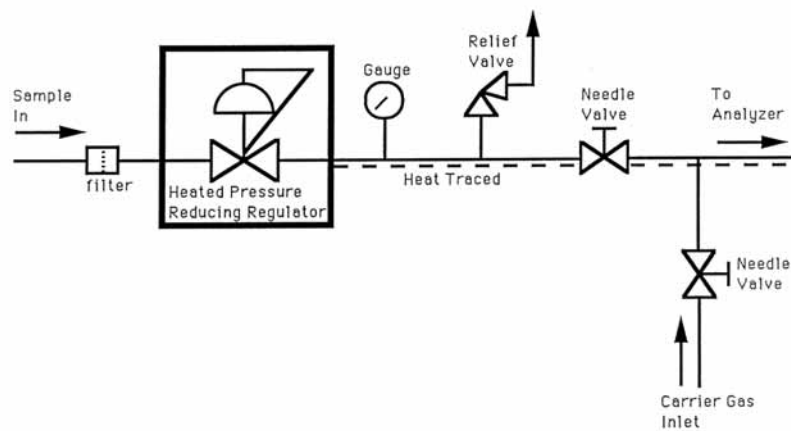


technical data

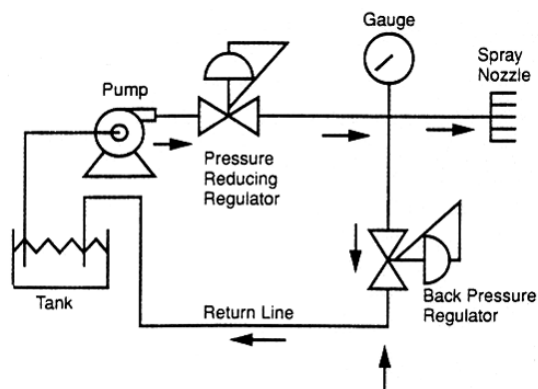
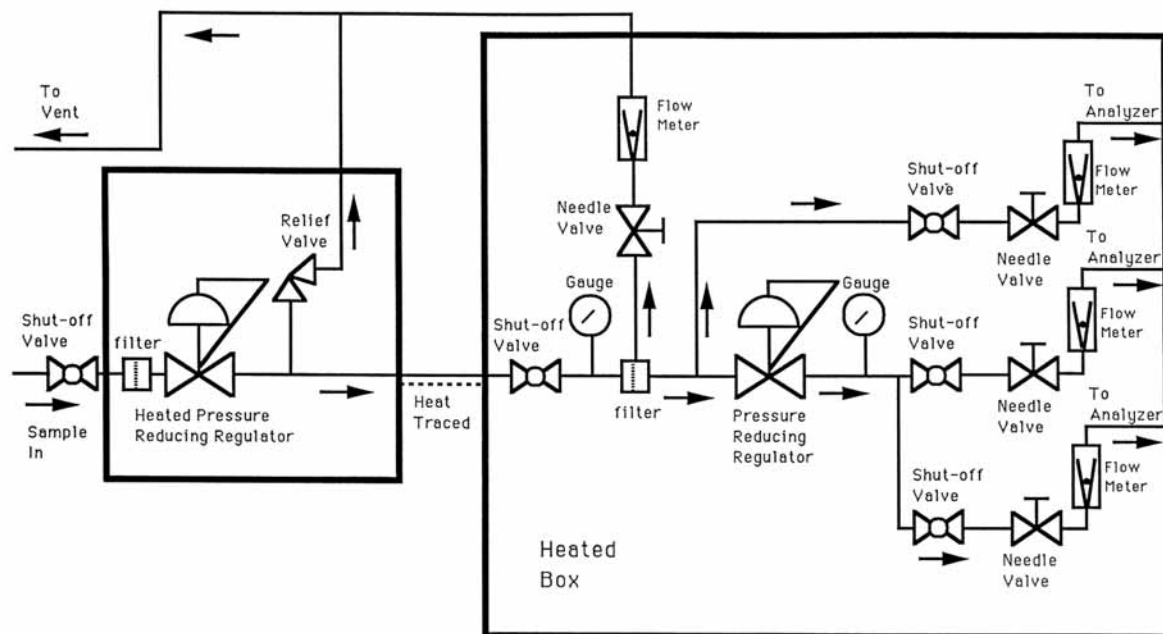
Typical Pressure Regulator Applications



Typical Pressure Regulator Applications



Typical Pressure Regulator Applications



Notes

GO Regulator Literature and Published Information - Disclaimer:

Catalog, literature and other published information such as drawings, charts and website content is for informational purposes only. Dimensions are for reference only and are subject to change. Each reader of the information should consult with his or her own qualified engineer prior to using the whole or any part of the information.

CIRCOR Instrumentation makes every effort to maintain the accuracy and quality of the information provided in our Catalogs, literature, digital resources and other published information such as drawings, charts, and website content. However, CIRCOR Instrumentation cannot guarantee and assumes no legal liability nor responsibility for the accuracy or completeness of the information provided. The information contained in printed or published literature or digital resources is for general guidance only. You should neither act, nor refrain from action, on the basis of any such information. You should take appropriate professional advice on your particular circumstances because the application of our equipment may vary depending on particular circumstances.

Copyright Disclaimer:

The copyright of all content in this catalog and other published literature or digital resources is owned by CIRCOR Instrumentation and/or the various manufacturers of our equipment. No part of our catalogs, published literature and digital resources may be changed, reproduced, stored in or transmitted on any website or medium without the prior written permission of CIRCOR Instrumentation. Requests to republish any material must be sent to sales-go@circor.com.

In case of any questions or remarks, feel free to contact us.



The Small Bore
Instrumentation Specialists



The GO Regulator Brand is just one product offering manufactured and supplied by CIRCOR Instrumentation (CI) a division of CIRCOR International (NYSE:CIR).

CI is a global manufacturer that specializes in developing highly engineered, technically superior small bore instrumentation solutions that consistently deliver benchmark performance, quality & safety for general-to-severe service liquid & gas flow applications.

We specialize in small bore instrumentation products up to 2" that deliver benchmark performance quality & safety; provide the broadest array of superior alloy offerings in the market; decades of proven success in a wide range of industries; a roster of "who's who" customers & projects globally; original "Best Solution" engineering & designs; and are focused on continuous improvement in all aspects of our business.

PO Box 4866
Spartanburg, SC 29305-4866 USA
+1-864-574-7966

Our headquarters and manufacturing
facilities are located at:
405 Centura CT
Spartanburg, SC 29303-6603 USA

www.goreg.com
sales-go@circor.com

Proudly Distributed By:

