Nitrogen Supply

Praxair: 55 lb high pressure gas cylinder
Harris: pressure regulator #25-80P-580
Western Enterprises: Flexible Pigtail #PF2-4-72
Western Enterprises: Safety Relief Valve #WMV-4-100

- No maintenance is required on the mechanics of the equipment. Replace Safety Relief Valve annually.
- Inspect the supply hose with each use of the vessel. Immediately replace if the hose shows any sign of wear or deterioration. The hose is designed for many years of service.
- **Do not crimp or over bend the supply hose**. The hose must never be bent past a 6" radius.
- Inspect the dials on the regulator with each use of the vessel.
- **Do not over pressure the actuator; use 80 lb operating pressure.**
- **REFILL NITROGEN SUPPLY BOTTLE AS SOON AS SUPPLY PRESSURE DROPS UNDER 200 PSI**.

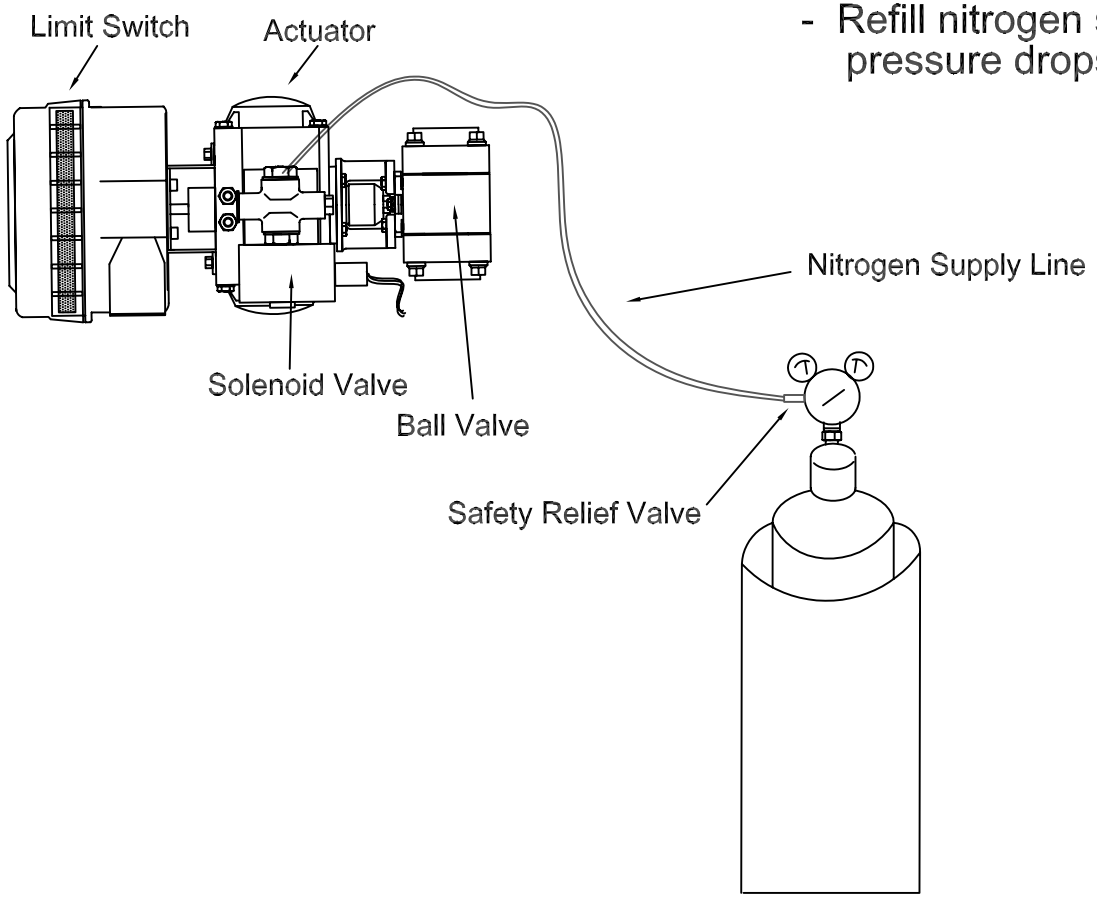
Nitrogen Supply System

ChlorTainer - Total Containment System

TGO Technologies, Inc

Santa Rosa, CA 707-576-7778

- DO NOT over pressure the actuator
- Use 80 lb operating pressure
- Refill nitrogen supply bottle when supply pressure drops under 200 psi



Not Drawn to Scale

HARRIS

Instruction Manual
Manuel d' Instruction
Manual de Instrucciones

Industrial Single Stage & Multi-Stage® Compressed Gas Regulators
Reguladores Industriales de Gas Comprimido de Una Etapa y de Etapas Múltiples®
Détendeur industriel de gaz comprimé à un étage et à plusieurs étages®

IMPORTANT

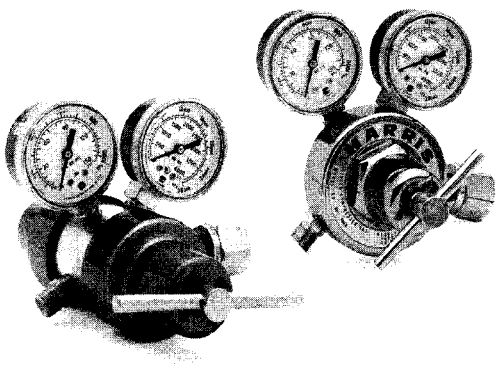
For your own safety, read these instructions. Failure to do so could lead to serious injury.

IMPORTANT

Pour votre propre sécurité, veillez à lire ces instructions. Omettre de les lire peut entraîner des blessures graves.

IMPORTANTE

Por su propia seguridad lea estas instrucciones. El no seguir estas instrucciones podría resultar en lesiones severas.



HARRIS

LINCOLN ELECTRIC

Introduction

These instructions are for experienced operators. It is essential that you keep your equipment free of oils, greases, and flammable materials. For further information, refer to the following publications:

AWS C-4.2-78 "Operator Manual for Oxy-Fuel Gas Cutting" American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126

ANSI Z49.1 "Safety in Welding and Cutting" American National Standards Institute, 1430 Broadway, New York, NY 10018

Compressed Gas Association (CGA), 1235 Jefferson-Davis Highway, Arlington, VA 22202

- **Safety Bulletin SB-8** - "Use of Oxy-Fuel Gas Welding and Cutting Apparatus"
- **Pamphlet E-1** - "Standard Connections for Regulator Outlets"
- **CGA Standard V-1** - "Compressed Cylinder Valve Inlet and Outlet Connections"

Description

Note: Each type of regulator is designed and assembled for specific gases and for definite inlet and delivery pressure ranges.

Multi-Stage Regulators

Multi-stage regulators are two regulators in series using a common body. The first stage (high pressure) reduces the inlet pressure approximately 90% and is preset at the factory. The second stage (low pressure) is adjustable to the desired delivery pressure.

Single-Stage Regulator

A cylinder regulator reduces the cylinder pressure to the delivery pressure and maintains a constant pressure to assure an accurate flow rate.

Pipeline Regulator

A pipeline regulator operates from a source of lower pressure, usually 200 PSI or less; and normally has only one gauge, which indicates the outlet pressure. Pipeline regulators must not be used on or with high pressure gas cylinders.

Gaugeless Regulators

Gaugeless regulators are used where rough use and gauge damage are a problem. The cylinder (inlet) pressure is shown by the piston-type indicator. The delivery pressure is set by the adjusting knob and shown by the calibrations marked on the bonnet.

Clockwise rotation of the adjusting knob (or key) increases the delivery pressure. Counterclockwise rotation decreases the delivery pressure.

The regulator inlet connections are designed for the gas to be used in accordance with CGA Standard V-11. The threaded outlet connections are 9/16"-18 male CGA Standard 022 (R.H.) and 023 (L.H.) (formerly Class B)2. Fuel gas threads are left hand.
1 CGA Standard V-1 "Compressed Gas Cylinder Valve Inlet and Outlet Connections"
2 CGA Pamphlet E-1 "Standard Connections for Regulator Outlets"

Safety Instructions

1. Handle cylinder with care. Chain or otherwise secure cylinders to a permanent fixture. Take care when moving. To transport cylinders (except when in cylinder carts), remove regulators and replace with valve cap. Never use any cylinder in other than an upright position.
2. Use "good housekeeping" in work areas. Keep sparks and flame away from combustibles. Prepare your work area before welding or cutting.
3. Do not oil or grease equipment. The equipment does not require lubrication. Oil or grease is easily ignited and burns violently with oxygen.
4. "Crack" cylinder valve before installing regulator. Open valve slightly and then close. This will clear valve of dust or dirt which may be carried to the regulator and cause damage or accident. Do not discharge flow of gas at any person or flammable material.
5. Be sure all connections are tight. Don't force connections. Never test for leaks with a flame. Use a soapy water solution to check for leaks.
6. Use recommended pressure settings. Improper pressures are wasteful. Extreme pressure build up in regulators is a warning they need repair.
7. Do not work with damaged or leaking equipment. Use soapy water when checking for leaks. Do not use frayed or damaged hose.
8. Handle equipment with care. Its continued good service and your safety depend upon it.

9. Keep work area well ventilated. Flammable materials burn violently in an oxygen atmosphere. Flames and glowing materials (tobacco smoking) must be avoided.
10. When working with acetylene, never use at pressures over 15 PSIG (Pounds Per Square Inch Gauge).
11. DO NOT FORCE connectors and threads. The differences are intentional for the various gases.

NOTE: SAVE THESE INSTRUCTIONS

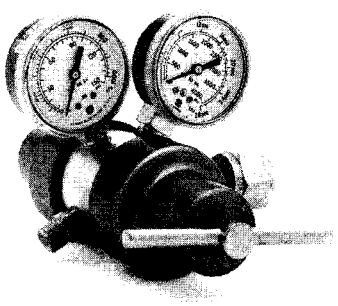
Set-Up Instructions

1. Secure gas cylinder in a vertical position; valve end up.
2. Remove cylinder valve cap.
3. Open cylinder valve momentarily to blow out any dust and dirt. Do not discharge flow of gas at any person, flames or flammable material.
4. Attach regulator to cylinder using proper CGA connection.
5. Properly connect equipment to outlet connection of regulator.
6. Close off all valves downstream of the regulator.
7. Turn the pressure adjusting knob (or key) counterclockwise until it feels free. The regulator outlet is now closed.
8. Slowly open the supply valve. When full inlet pressure is indicated, open line valve or non-flammable cylinder valve wide. Fuel gas cylinder valves should not be opened more than one turn. Hand wheels or valve wrenches should be kept on the valve to permit quick emergency shutdown.
9. Slowly turn the regulator adjusting knob (or key) clockwise to obtain the desired delivery pressure.
10. Tests for gas leakage should be made at this time. Use a soapy water solution at all connections and check for bubbles. Tighten connections as required and wipe off the soap solution.

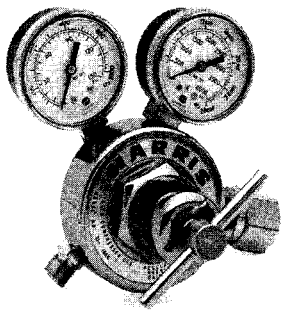
Functional Test of Regulator

An internal leak may be detected as follows:

1. Close the regulator by turning the adjusting key counterclockwise.
2. Close cylinder valve.



Multi-Stage™ Regulator



Single Stage Regulator

3. Drain downstream line.
4. The low pressure gauge will indicate zero. The cylinder (high pressure) gauge will read full pressure. Any pressure drop will indicate leakage. Repair before use, or replace with a properly functioning unit.
5. A gauge should read zero when all the pressure is removed. If it does not, it may be damaged. Locate and correct the cause of the damage and replace the gauge.

Shutdown

1. Close downstream valves.
2. Close supply valve on the cylinder or line.
3. Bleed off gases - oxygen first, then close down stream valves.
4. Turn pressure adjusting key counterclockwise until free.
5. Remove regulator from cylinder.

Maintenance Instructions

1. When not in use, store the regulator in a clean and safe place.
2. Inspect and test at least every 6 months after first use.
3. Have only qualified repairmen service, test and clean the regulator.
4. The gauge lenses are made of Lexan1. Use only soapy water to clean, then wipe dry using soft cloths. DO NOT USE SOLVENTS.
5. Use thread sealants that are compatible with the gas being used.

1A General Electric Polycarbonate

Repair

Have only qualified repairmen service, test and clean the equipment.

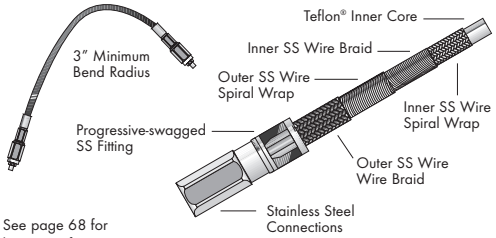
Extra Copies

Extra copies of these instructions are available. Call your distributor or contact Harris Calorific.

THERMOPLASTIC FLEXIBLE PIGTAILS, NYLON LINED, BRASS CONNECTIONS

PART NO.	DESCRIPTION	MAX PSIG	GAS SERVICE
COMPLETE ASSEMBLIES 100% TESTED			
PFS-83	Hydrogen, LH F	0-3000	CGA-350
PFS-83CV	with Check Valve, Inlet Side		
PFS-92	Helium, RH M	0-3000	CGA-580
PFS-92CV	with Check Valve, Inlet Side		

STAINLESS STEEL FLEXIBLE PIGTAILS, TEFLON LINED, STAINLESS STEEL CONNECTIONS



See page 68 for hose specifications

PART NO.	DESCRIPTION	MAX PSIG	SERVICE
COMPLETE ASSEMBLIES 100% TESTED & OXYGEN CLEANED			
PF-346SS	Air, RH F	3000	CGA-346
PF-347SS	High Pressure Air, RH F	5500	CGA-347
PF-350SS	Hydrogen, Natural Gas, LHF	3000	CGA-350
PF-540SS	Oxygen, RH F	3000	CGA-540
PF-580SS	Argon, Nitrogen, Etc, RH M	3000	CGA-580
PF-590SS	Air, Nitrogen, Etc, LH M	3000	CGA-590
PF-4SS	1/4" NPT Female to 1/4" NPT F	6000	–
PH-3	Chrome Plated brass Handle with Set Screw, Prevents Twisting when Tightening		

STAINLESS STEEL FLEXIBLE PIGTAILS, BRASS CONNECTIONS

PRESSURES TO 3000 PSIG (20,700 kPa)

No Specials Available

PART NO.	DESCRIPTION	LENGTH
100% TESTED & CLEANED FOR OXYGEN * INDIVIDUALLY POLY BAGGED 3" MINIMUM BEND RADIUS		
PF2-4-12	1/4" NPT Female End Connections	12"
PF2-4-18	1/4" NPT Female End Connections	18"
PF2-4-24	1/4" NPT Female End Connections	24"
PF2-4-36	1/4" NPT Female End Connections	36"
PF2-4-48	1/4" NPT Female End Connections	48"
PF2-4-60	1/4" NPT Female End Connections	60"
PF2-4-72	1/4" NPT Female End Connections	72"

See page 68 for hose specifications

STAINLESS STEEL FLEXIBLE PIGTAILS, STAINLESS STEEL CORRUGATED INNER CORE, STAINLESS STEEL CONNECTIONS

PRESSURES TO 3000 PSIG (20,700 kPa)

See page 66 for hose specifications

PART NO.	DESCRIPTION	LENGTH
100% TESTED & CLEANED FOR OXYGEN * INDIVIDUALLY POLY BAGGED 2-3/4" MINIMUM BEND RADIUS		
HPF-4-18	1/4" NPT F x 1/4" NPT F	18"
HPF-4-24	1/4" NPT F x 1/4" NPT F	24"
HPF-4-36	1/4" NPT F x 1/4" NPT F	36"
HPF-4-48	1/4" NPT F x 1/4" NPT F	48"

SPECIFICATIONS FOR PIGTAIL ASSEMBLIES

FOR 3000 PSIG STAINLESS STEEL BRAID/TEFLON HOSE PIGTAILS FITTED WITH BRASS CONNECTIONS

Design & Material Data:

- Core consists of Teflon (polytetrafluoroethylene) with two outer reinforcing jackets of stainless steel braid (Teflon is inert to most chemicals and solvents, except molten alkali metals and fluorine at elevated temperatures and pressures)
- 1/4" nominal I.D.
- Braid consists of Type 304 full hard drawn stainless steel wire
- Teflon withstands temperatures from –65°F (54C) through +450°F (232C)
- Burst pressure rating at room temperature: 12,000 PSIG
- Minimum bend radius of 3 inches provides for maximum life and safe performance
- Maximum 3000 PSIG working pressure on tubing
- Brass cylinder connections machined to CGA specifications for applicable gases
- All pigtails 100% tested before shipping and labelled for gas service and pressure rating
- Pressure ratings limited by CGA connection standards–the lowest pressure rating prevails

Notes:

- Burst pressure ratings for pigtails are determined at room temperature with the hose in a straight line. A safety factor of 4:1 or 5:1 should be used for normal applications. Impulse and shock pressure applications may require a higher safety factor.
- Do not apply heat to pigtails.

FOR 6000 PSIG STAINLESS STEEL BRAID/TEFLON HOSE PIGTAILS FITTED WITH STAINLESS STEEL CONNECTIONS

Design & Material Data:

- Core consists of high pressure, reinforced Teflon (polytetrafluoroethylene) hose (Teflon is inert to most chemicals and solvents, except molten alkali metals and fluorine at elevated temperatures and pressures)
- Teflon fluid and ambient temperature range: -65°F (54 C) through +450°F (232°C)
- 1/4" nominal I.D.
- .229" Minimum I.D.
  .495" Maximum O.D.
- Conductive; extruded Teflon dissipates static charges
- Braid consists of inner layer with type 304 SS stainless steel, two layers of stainless steel spiral wrap, plus an outer braid of stainless steel
- Burst pressure rating at room temperature: 24,000 PSIG (see note below)
- Type 316 stainless steel used for primary tube fittings with swaged design
- Most CGA cylinder connections machined of stainless steel to specifications for applicable gases
- Minimum bend radius of 3" provides for maximum life and safe performance
- All pigtails100% tested and labeled for gas service and pressure rating

HOW TO SPECIFY A SPECIAL ORDER WESTERN PIGTAIL

TUBE/HOSE TYPE & SIZE		INLET END CONNECTION		INLET END CONN. FINISH		OPTIONAL FEATURES	
PF	–	346N	–		–	HTP	X

Rigid Tube
P4 =1/4" OD
P =5/16" OD
P6 =3/8" OD*
PB =5/16" OD
PB6 =3/8" OD*
PS =1/4" OD

Flex Hose
PF =1/4" ID
PFS =1/4" ID
PF6 =.229" ID

All Styles
CGA No. +N=
CGA Nut/Nipple
Example: 540N
CGA No. +B=
CGA VO or Body
Example: 540B
Fraction +M or F=
ANSI Pipe Thread
Example: 1/4F

All Styles
Blank = Brass
PL = Plated
SS = S Steel

All Styles
Blank (None)
CV =Check Valve
FA =Flash Arrestor*
HTP =Hand Tight N/N w/Plastic Grip
HTB =Hand Tight N/N w/Brass H/T Nut

GA =Gauge
PH =Brass Handle
VA =Shutoff Valve
EL =90° Elbow

Model P - 3000 PSIG (20,700kPa),....Rigid Copper Pigtail
Model PB - 3000 PSIG (20,700kPa),....Rigid Brass Pigtail
Model PS - 6000 PSIG (41,300kPa),....Rigid Stainless Steel Pigtail
Model PF - 3000 PSIG (20,700kPa),....Flexible Teflon-Lined Pigtail
Model PFS - 3000 PSIG (20,700kPa),....Flexible Nylon-Lined Pigtail
Model PF6 - 6000 PSIG (41,300kPa),....Flexible Teflon-Lined Pigtail

*Use with 3/8" OD Flash Arrestor option.

Made In The U.S.A
For more information, call Western Customer Service at **1-800-783-7890**

SAFETY RELIEF VALVES

For Gaseous or Liquid Nitrogen, Oxygen, Air and other Cryogenic Fluids

- Use in cryogenic, pressure vessel, manifold and other demanding applications
- Silicone seat provides superior sealing/resealing
- Heavy duty brass construction resists corrosion

1/4" NPT RELIEF VALVE

- Accurate Cracking Pressure:
  ± 3 PSIG to 70 PSIG
  4% of set pressure over 70 PSIG
- Temperature Range:
  -100°F to +165°F
  -73°C to +74°C
- Pressure Settings (PSIG)
  22, 35, 50, 100, 125, 230, 235, 350
  (others available upon request)
- Orifice Size: 1/4" Diameter
- Flow Coefficient
  (Cv Factor): .65 Typical

1/2" NPT RELIEF VALVE

- Accurate Cracking Pressure:
  ± 5 PSIG to 100 PSIG
  ± 10 PSIG of set pressure over 100 PSIG
- Temperature Range:
  -100°F to +165°F
  -73°C to +74°C
- Pressure Settings (PSIG)
  60, 75, 100, 150, 200, 250, 375
  (others available upon request)
- Orifice Size: 5/16" Diameter
- Flow Coefficient
  (Cv Factor): 1.3 Typical

PART NO.	DESCRIPTION
1/4" NPT Inlet Relief Valves	
WMV-4-22	22 PSIG Setting
WMV-4-35	35 PSIG Setting
WMV-4-50	50 PSIG Setting
WMV-4-100	100 PSIG Setting
WMV-4-125	125 PSIG Setting
WMV-4-230	230 PSIG Setting
WMV-4-235	235 PSIG Setting
WMV-4-350	350 PSIG Setting
WMV-4-7	Pipe-away Adaptor, All Models
1/2" NPT Inlet Relief Valves	
WMV-8-60	60 PSIG Setting
WMV-8-75	75 PSIG Setting
WMV-8-100	100 PSIG Setting
WMV-8-150	150 PSIG Setting
WMV-8-200	200 PSIG Setting
WMV-8-250	250 PSIG Setting
WMV-8-275	275 PSIG Setting
WMV-8-7	Pipe-away Adaptor, All Models

SAFETY RELIEF VALVES, BRASS