



**MATHESON
TRI•GAS**

ask. . .The Gas Professionals™

**INSTALLATION AND OPERATION MANUAL
MODEL 53 AND 54 SERIES MANIFOLDS**

166 Keystone Drive
Montgomeryville, PA 18936
Telephone: 215-641-2700
Fax: 215-641-2714

TABLE OF CONTENTS

Limited Warranty.....	3
User Responsibility.....	3-4
General Service.....	4
Safety Precautions.....	4-5
Product Overview.....	6
How to Order.....	7
One-Station Manifold Illustration.....	8
Two through Six Station Manifold Illustration.....	9
Installation.....	10
Installation Illustration – One-Station.....	11
Installation Illustration – Two through Six Station.....	12
Gas Cylinder Installation.....	13
Start-Up and Operation.....	13-14
Cylinder Replacement and Manifold Shutdown.....	14
Spare Parts.....	15

LIMITED WARRANTY

This equipment is sold by Matheson Tri-Gas (MTG) under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to the purchase of this equipment directly from Matheson or Matheson's Authorized Agent as new merchandise and are extended to the first Buyer thereof other for than the purpose of resale.

For a period of one year from date of original delivery (ninety days in corrosive service) to Buyer or to Buyer's order, this equipment, is warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in this manual and any accompanying labels and/or inserts, provided that this equipment is properly operated under the conditions of normal use and that regular and periodic maintenance and service is performed or replacements are made in accordance with the instructions provided. Expendable parts of this equipment are similarly warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in this manual and any accompanying labels and/or inserts. The foregoing warranties shall not apply if the equipment has been repaired other than by MTG or a service facility designated by MTG, or if this equipment has not been operated and maintained in accordance with written instructions provided by MTG, or has been altered by anyone other than MTG, or if the equipment has been subject to abuse, misuse, negligence or accident.

MTG's sole and exclusive obligation and the Buyer's sole and exclusive remedy under the above warranties is limited to repairing or replacing, free of charge, at MTG's sole discretion, the equipment or part which is telephonically reported to be a problem to the local MTG Branch Location, and which if so advised, is returned with a written statement of the observed deficiency, not later than seven days after the expiration of the applicable warranty, to the Matheson Tri-Gas Equipment Technology Center during normal business hours, transportation charges prepaid, and which, upon examination, is found to comply with the above warranties. Return trip transportation charges for the equipment or part shall be paid by the Buyer.

MTG SHALL NOT BE OTHERWISE LIABLE FOR ANY DAMAGES INCLUDING BUT NOT LIMITED TO INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES, OR SPECIAL DAMAGES, WHETHER SUCH DAMAGES RESULT FROM NEGLIGENCE, BREACH OF WARRANTY OR OTHERWISE.

THERE ARE NO EXPRESS OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREINABOVE SET FORTH. MATHESON MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE EQUIPMENT OR PARTS THEREOF.

ACCEPTANCE OF THE EQUIPMENT BY THE FINAL BUYER INDICATES THE FINAL BUYER'S ACCEPTANCE OF ALL WARRANTIES AND LIMITATIONS SET FORTH ABOVE.

USER RESPONSIBILITY

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically, with the frequency of such inspections depending upon the scope of use. Damaged, worn or contaminated equipment should not be used. Parts that are broken, missing, plainly worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, MTG recommends that a telephonic or written request for service advice be made to the MTG Equipment Engineering Group in Montgomeryville Pennsylvania or to the nearest MTG Branch location.

This equipment or any of its parts should not be altered without the prior written approval of MTG Equipment Engineering Group. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than MTG or a service facility designated by MTG. Further, the ultimate user of the equipment is responsible for the training and safe operation of the equipment by personnel in his/her employ.

GENERAL SERVICE

A unit which is not functioning in a normal manner should be removed from service until such time that repairs or replacement can be made. Upon completion of repair, full testing should be performed to assure the user that the regulator has been returned to its original operating parameters. MTG offers a repair service to its customers for all products that MTG sells. To arrange for repair service, call 215-641-2700 and ask for the Warranty Administrator. **NO PRODUCT WILL BE RECEIVED BY MTG WITHOUT INDICATION OF GAS SERVICE AND WITHOUT PROPER RETURN MATERIAL AUTHORIZATION PROVIDED BY THE WARRANTY ADMINISTRATOR. (All repairs must be made by MTG or an assigned and approved facility to maintain any warranties or guarantees)**

If the unit is under an applicable warranty, return the unit to Matheson for repair or replacement. To arrange for warranty service, call 215-641-2700 and ask for the Warranty Administrator. **NO PRODUCT WILL BE RECEIVED BY MATHESON WITHOUT INDICATION OF GAS SERVICE AND WITHOUT PROPER RETURN MATERIAL AUTHORIZATION PROVIDED BY THE WARRANTY ADMINISTRATOR.**

If advised by the Warranty Administrator to return the product to MTG, prepare the product for shipment and write, in large lettering the RMA Number assigned by the Warranty Administrator on the outside of the box. Also, if required by the Warranty Administrator, supply the completed RMA form with the product. Make sure that the product is adequately packaged, in the original shipping container if possible, and shipped prepaid (MTG will not accept COD freight) with a description of the observed deficiency to the attention of the:

Matheson Tri-Gas
RMA# _____
166 Keystone Drive
Montgomeryville, PA 18936

The user is expected to periodically inspect the product for leaks, loose or worn parts, broken or non-functioning components and to address those situations immediately. If the user would require verbal assistance in ascertaining the potential of a problem with any MTG product, contact the local Matheson branch for assistance or your MTG Sales Representative.

SAFETY PRECAUTIONS

1. Many Specialty Gases are hazardous in nature. It is important that the user of the equipment carefully review the hazards associated with the gas to be used with the manifold. **BEFORE INSTALLING THE MANIFOLD FOR USE WITH ANY CYLINDER OF COMPRESSED OR LIQUIFIED GAS, REFER TO THE MSDS THAT WAS SHIPPED WITH THE GAS, OR ON FILE IN YOUR FACILITY, AS TO THE SPECIFIC HAZARDS ASSOCIATED WITH THE GAS TO BE USED. ALSO, REFER TO ALL APPLICABLE INSERTS CONTAINED WITH THE EQUIPMENT FOR ADDITIONAL PRECAUTIONS AND OPERATING INSTRUCTIONS.**
2. Before using any manifold on toxic, corrosive, pyrophoric, flammable or other type of hazardous gas, test the leak integrity of the manifold using an inert gas.
3. Make certain that the manifold purchased is suitable for the application intended. All manifolds supplied by MTG have a serial number, a model number, and a pressure limitation label and/or stamping. Carefully review this information to establish the system fit for service in the desired application.
4. Make certain that the equipment purchased or delivered to the ultimate end user conforms to the specifications of the user. The user is responsible for selecting equipment compatible with gases that are to be used, physical parameters of operation and performance and normal material compatibilities. Selection information can be found in MTG Catalogs, MTG Tech Briefs and in the MTG Gas Data Book. In addition, any MTG representative would be pleased to aid in the selection of specific equipment.

5. Before installation of the manifold for use with cylinders of compressed or liquified gas, carefully inspect the manifold for visible signs of damage or contamination. Close attention should involve visual inspection of all exposed and connecting threads for visible signs of wear and abuse. Also examine the manifold for any loose parts outside of those that must swivel for connection to gas cylinder(s), pigtail(s) to manifold(s), outlet line(s). Also examine the manifold for signs of contamination with dirt, grease or any other foreign material. Close attention should be given to the external appearance and the views of the manifold from all inlets and the outlets. If any foreign materials are present and cannot be removed easily with a cloth, or if the threads of any connection to the manifold appear to be abused as indicated above, or any of the components appear to be loose, return the manifold immediately for service.
6. Before connection of the manifold with cylinders of compressed or liquified gas, move the cylinder(s) to the work location and secure the cylinder before removing the cylinder valve cap. Check the cylinder valve as in step 5 for possible contamination and defective or loose parts. If for any reason the cylinder appears to be faulted as noted here, return the cylinder cap to the top of the cylinder, tighten down and remove the cylinder from the work area and call the supplier of the cylinder for immediate pick-up.
7. When using any hazardous gas, the cylinder(s) of the gas should be placed under an exhaust hood or be placed in a suitable safety enclosure.
8. Before connection of the manifold with cylinders of compressed or liquified gas, make certain that the CGA connection on the cylinder matches the CGA connection attached to the pigtails (if provided) of the manifold. CGA connections are fitted to the pigtails to limit the services in which the manifold can be used. **THE USE OF ADAPTORS OR ALTERATIONS TO THE MANIFOLD TO CHANGE SERVICES CAN BE EXTREMELY DANGEROUS AND SHOULD NOT BE ATTEMPTED.** If a conversion of a product is required, consult MTG before attempting.
9. MTG produces and markets several different types of manifolds for use with gases and liquified gases. MTG manifolds are used to increase the capacity of gas needed for a given application by combining the contents of two or more cylinders in a common distribution line. A manifold is to be used with only one gas. Manifolds should not be used for mixing gases, filling gas cylinders (unless the user is licensed for that activity) or refilling empty cylinders not owned by the user.
10. The manifolds should only be used with gases that are compatible with the materials of construction of the manifolds and processes that do not require complete purging of the cylinder connector (pigtail) before and after the cylinder exchange. When complete purging is required, a Tee or Cross Purge may utilized in conjunction with the manifold.

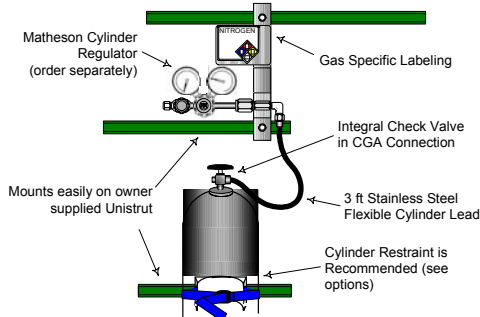
PRODUCT OVERVIEW

The 53 and 54 series manifolds are available in one through six stations. The one-station manifold provides a convenient method to mount a regulator independent of the cylinder, resulting in convenient cylinder change-outs. The two through six station manifold provides a method to increase capacity and reduce the number of cylinder change-out events.

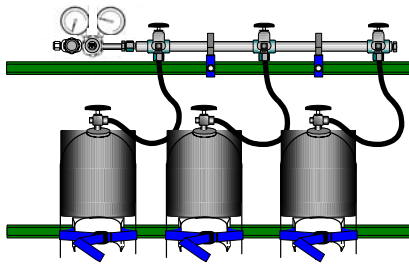
Standard Features – One-Station Manifold						
Header:	316SS barstock construction w/stainless-steel wall bracket					
Pigtail:	316SS flexible hose, 3-ft					
Cylinder connection:	CGA with integral check valve with Viton o-ring					
Outlet connection:	CGA outlet adapter					
Mounting hardware:	Stainless-steel bracket with slots for 3/8" bolts					
Other:	NFPA label on stainless-steel mounting plate					
Standard Features – Two through Six Station Manifold						
Header:	Brass with barstock and tubing construction, silver brazed, or 316SS with barstock and pipe construction, welded					
Station valves*:	Brass or 316SS packless diaphragm with CTFE seat					
Pigtails:	316SS flexible hose, 3-ft.					
Manifold connections:	CGA 346					
Cylinder connection:	CGA with integral check valve with Viton o-ring					
Outlet connection:	CGA outlet adapter					
Mounting hardware:	L-bracket with slot for 3/8" bolt and U-style pipe clamp					
Other:	NFPA label on stainless-steel mounting plate					
*Brass valves Teflon taped, SS valves welded						
Specifications						
Maximum working pressure:	The lesser of 3000psig or the maximum allowed by the CGA connection.					
Operating temperature range:	-4°F to 158°F (-20 to 70°C)					
Weight:***	1-STA.	2-STA.	3-STA.	4-STA.	5-STA.	6-STA.
	8 lbs.	13 lbs.	22 lbs.	31 lbs.	40 lbs.	49 lbs.
Available CGA/Gases						
Acetylene, 510	Carbon Monoxide, 350	Nitrous Oxide, 326**				
Air, 590	Helium, 580	Oxygen, 540				
Zero Air, 590	Hydrogen, 350	Propane, 510				
Argon, 580	Methane, 350	P5, 350				
Carbon Dioxide, 320	Nitrogen, 580	P10, 350				
Not available with integral check valve. *Optional items may increase weight.						
Options						
Brass or 316SS rigid pigtail No check valve 6-Ft. flex hose Cylinder holder(s) with strap Cylinder holder(s) with strap and chain Left side version (2 thru 6 station only) Certified leak test No NFPA Label						

HOW TO ORDER

ONE CYLINDER STATION MANIFOLD



MULTI - CYLINDER MANIFOLDS



PRODUCT FEATURES

- ❑ Eliminates handling the regulator during cylinder changeouts
- ❑ Reduces atmospheric contamination during cylinder changeouts
- ❑ Reduces stress on tubing connections
- ❑ One cylinder or as many as six
- ❑ Supports high-purity applications
- ❑ Models for both stainless steel and brass regulators
- ❑ Other gases, features, and options are available. For additional selections contact your local Customer Service Representative or Sales Engineer or call 215-641-2700



STATION MANIFOLD & MULTI-CYLINDER MANIFOLDS

- Simple
- Low Cost
- Minimal Installation
- Improves safety, purity integrity, and cylinder change convenience

.340
1990

Product Type
5 = Cylinder Manifold

Metal Type
3 = Brass
4 = Stainless Steel

No. of Cylinders
1 = One
2 = Two
3 = Three
4 = Four
5 = Five
6 = Six

Gas & CGA #
0 B = Air/590
0 C = Zero Air/590
0 D = Argon/580
0 G = Helium/580
0 J = Hydrogen/350
0 K = Methane/350
0 M = Nitrogen/580
0 P = Oxygen/540
0 R = P5 5%Ar/CH4/350
0 S = P10 10%Ar/CH4/350

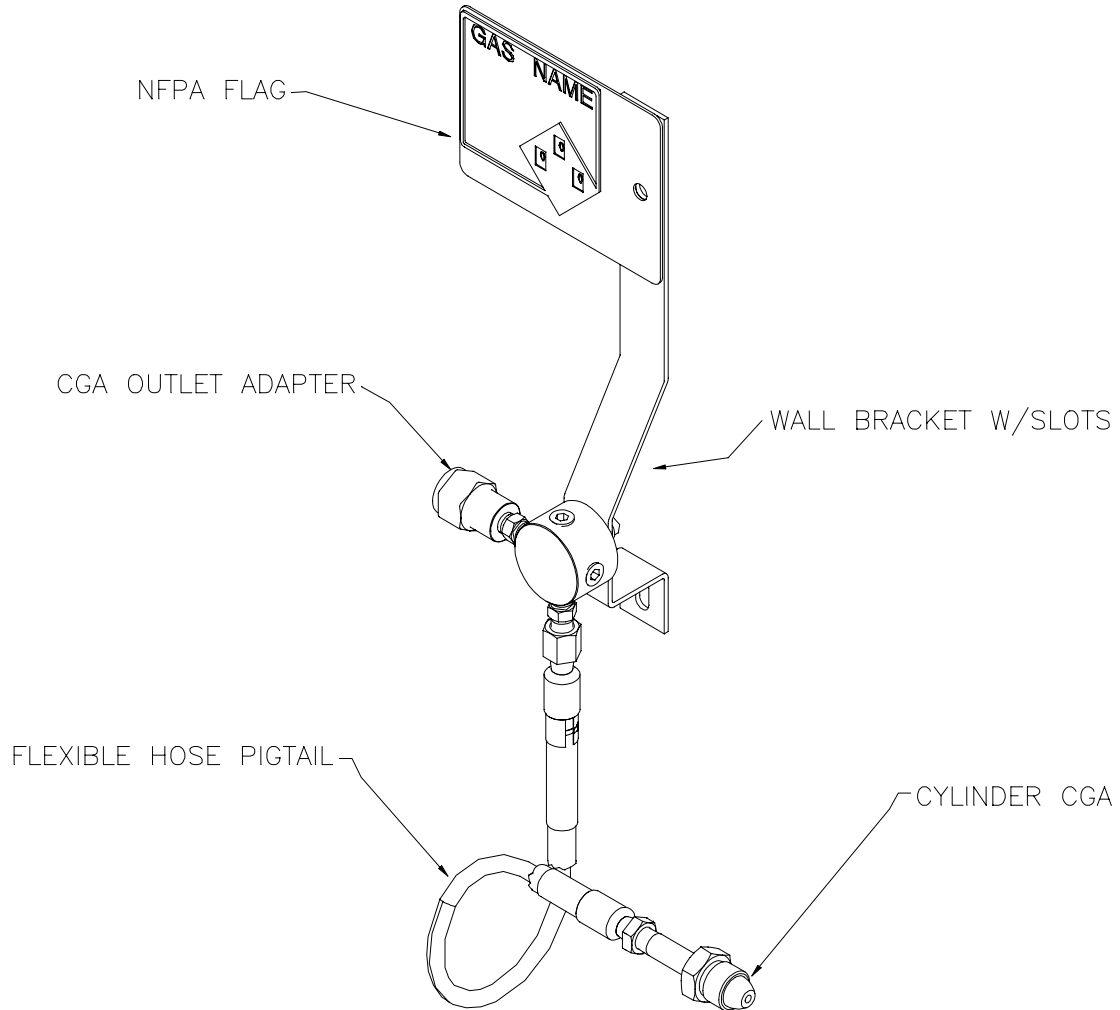
HOW TO ORDER:

Options

- 1 = Rigid Pigtails
- 2 = No Check Valve
- 3 = 6ft Flex Hose
- 5 = Cyl Holder w/Chain
- 6 = Certified Leak Check

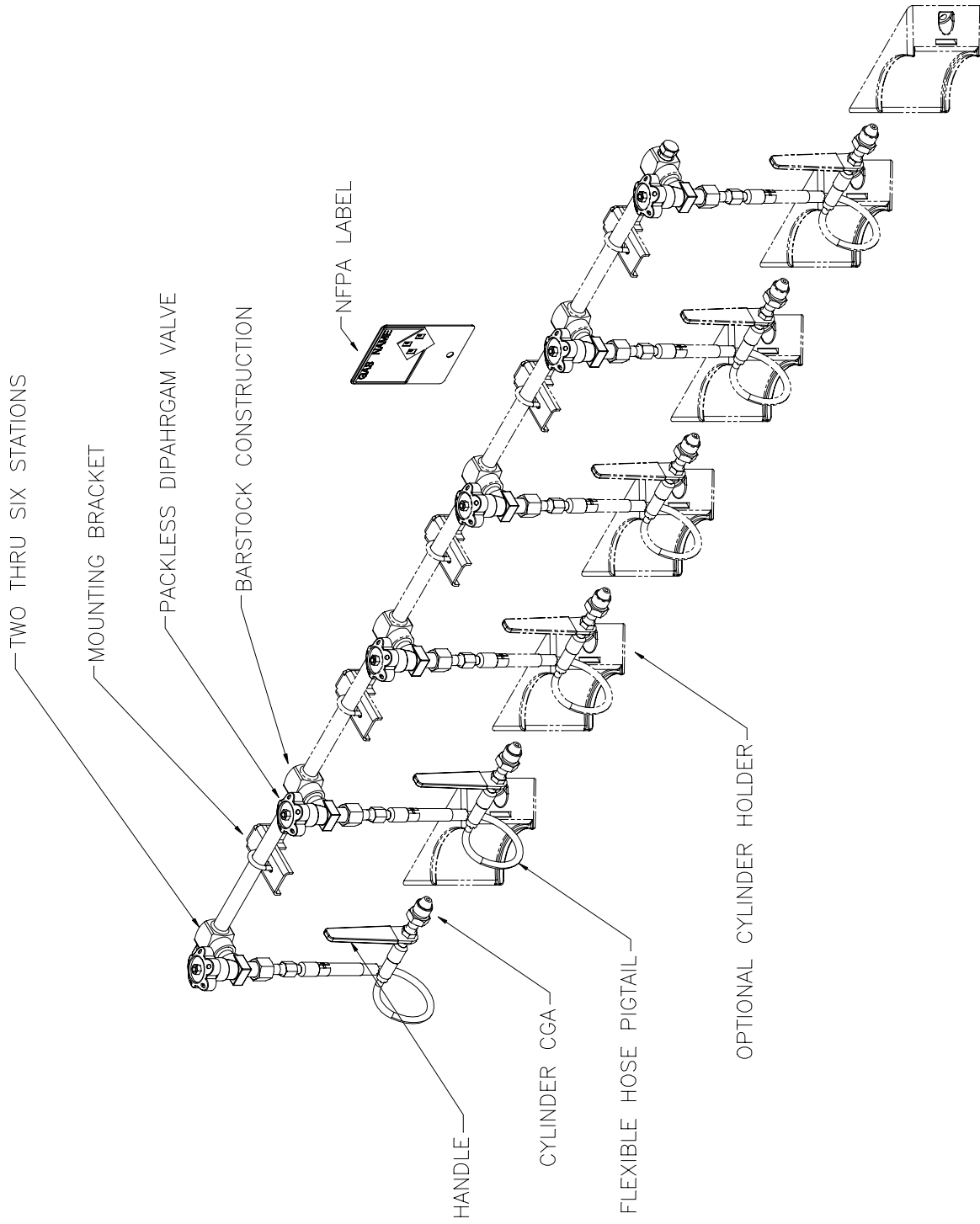
5 4 - 3 0 M 5

ONE-STATION MANIFOLD



STANDARD ONE-STATION MANIFOLD

TWO THOUGH SIX STATION MANIFOLD



TWO THOUGH SIX STATION MANIFOLD

MANIFOLD INSTALLATION

One-Station Manifold

(Reference “ONE-STATION MANIFOLD INSTALLATION” illustration on page 11.)

1. Determined the appropriate location for the manifold considering both accessibility and safety.
2. Determine the mounting height based on cylinder size and user accessibility. For a recommended mounting height based on 51” tall cylinders see illustration on page 11. Adjust accordingly for other size cylinders. The use of a cylinder shelf may be required for shorter cylinders.
3. Using the upper and lower slots on the mounting bracket, secure the manifold to the wall or strut system using 3/8” bolts.
4. Confirm the manifold is securely mounted.

Two though Six Station Manifold

(Reference “TWO THOUGH SIX STATION MANIFOLD INSTALLATION” on page 12.)

1. Determined the appropriate location for the manifold considering both accessibility and safety.
2. Determine the mounting height based on cylinder size and user accessibility. For a recommended mounting height based on 51” tall cylinders see illustration on page 12. Adjust accordingly for other size cylinders. The use of a cylinder shelf may be required for shorter cylinders.
3. Using the L-brackets and U-clamps, secure the manifold to the wall or strut system using 3/8” bolts.
4. Confirm the manifold is securely mounted.
5. Next install the flexible hose pigtails (or optional rigid pigtails.) The pigtail-manifold connection is a CGA 346. This is a two-piece nut and nipple swivel connection used in the compressed gas industry. The male nut has right-hand threads and should be stamped 346. Be aware of the following precautions:

A WRENCH SHOULD BE EMPLOYED on both the nut of connecting pigtail and on the nut or valve body of the mating connection on the manifold. These connections should thread together easily. If there is any resistance, it is possible that the wrong end of the pigtail is being used for attachment.

DO NOT FORCE. The connection should be made easily. If it cannot be made easily, most likely the user has the wrong pigtail connection for the gas service.

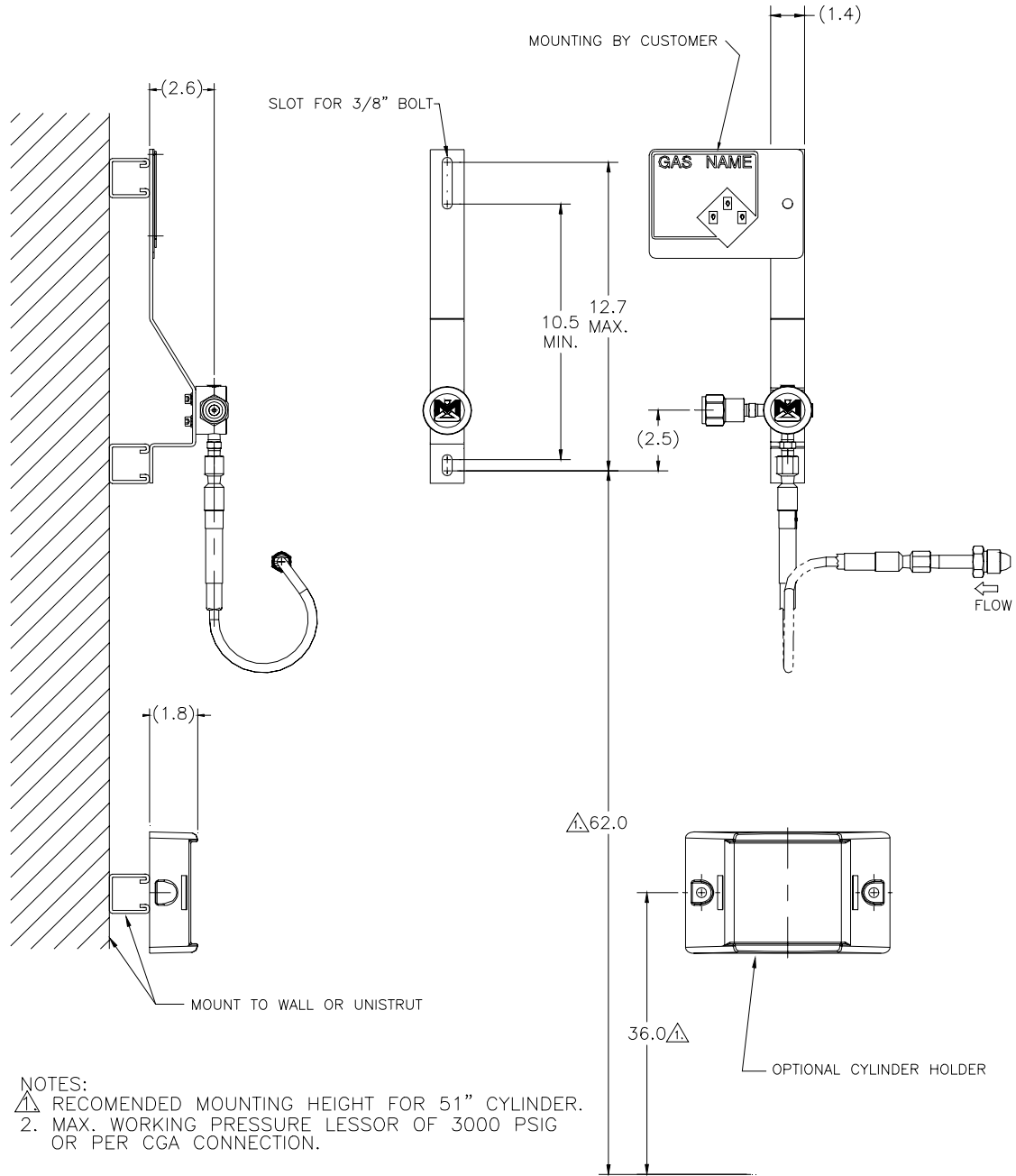
NEVER USE LUBRICANTS OF ANY TYPE on the pigtail or manifold to aid in connection.

NEVER USE TEFLON TAPE to aid in the sealing of the pigtail fitting to the manifold.

RIGID PIGTAILS SHOULD NOT BE BENT or repositioned more than a few inches from its original shape. Excessive bending will cause unnecessary stresses in the metal resulting in failure of the pigtail.

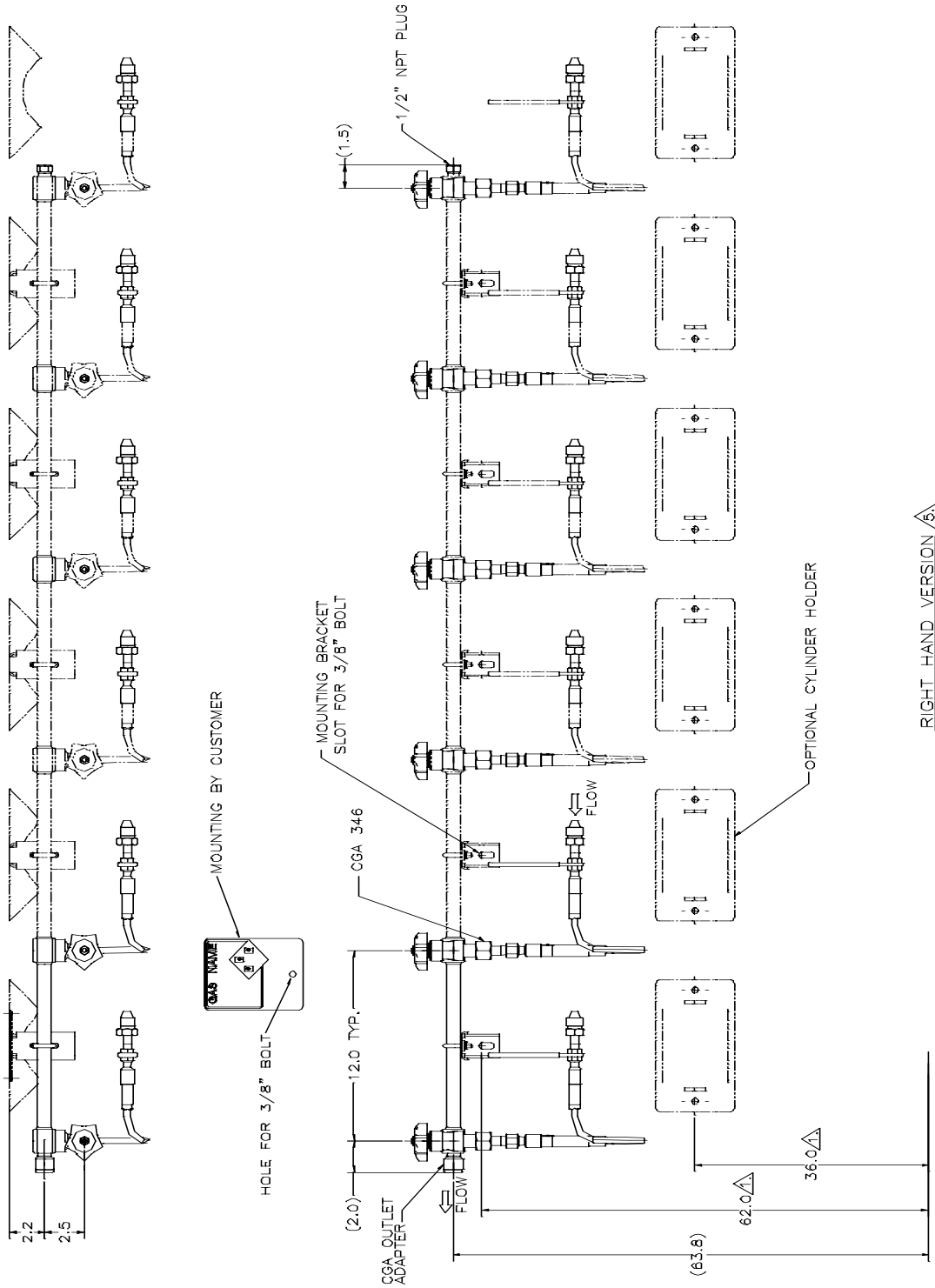
Note: If you have purchased the optional cylinder holder(s), mount the holder to the wall or strut system using 3/8” bolts. For a recommended mounting height based on 51” tall cylinders see illustration on page 11 or 12. Adjust accordingly for other size cylinders.

ONE-STATION MANIFOLD - INSTALLATION



ONE-STATION MANIFOLD INSTALLATION

TWO THOUGH SIX STATION MANIFOLD - INSTALLATION



- NOTE:
- 1. RECOMMENDED MOUNTING HEIGHT FOR 51" TALL CYLINDERS.
 - 2. TWO STATION INCLUDES TWO (2) MOUNTING BRACKETS.
 - 3. MAX. WORKING PRESSURE LESSOR OF 3000 PSIG OR PER CGA CONNECTION.
 - 4. STANDARD MANIFOLD ASSEMBLY INCLUDES FLEXHOSE PIGTAIL AND CGA WITH INTEGRAL CHECK VALVE.
 - 5. ON LEFT HAND VERSION LOCATION OF CGA OUTLET ADAPTER AND PLUG ARE REVERSED.
 - 6. PIGTAILS SHIPPED LOOSE.

GAS CYLINDER INSTALLATION

1. Move the cylinder(s) of gas to the work site:
 - a. Secure the cylinder as to prevent accidental toppling
 - b. Remove the cylinder cap
 - c. Make certain that the cylinder valve is tightly closed
 - d. Remove the cylinder plug, if present
 - e. Inspect the cylinder valve for contamination or abuse
2. Close the all valves of the manifold by rotating the adjusting knobs or handles in a clockwise direction.
3. Connect the pigtail(s) to the cylinder valve(s). Be aware of the following precautions:

DO NOT FORCE. The connection should thread easily. If it cannot be threaded easily, most likely the user has the wrong pigtail connection for the gas service.

LEFT HAND THREADS are used on some CGA connections. These are identified by notches in the middle of the hex nut on the CGA connection.

GASKETS are used in conjunction with some CGA connections. If the connection requires a gasket, one has been supplied with each pigtail. Inspect the gasket for signs of contamination and abuse. Do not over-tighten the connection using a gasket as this will force the gasket to extrude into the gas stream.

NEVER USE LUBRICANTS OF ANY TYPE on the regulator or cylinder valve to aid in connection.

NEVER USE TEFLON TAPE to aid in the sealing of the CGA fitting to the cylinder valve.

4. Complete the installation of the regulator or switchover at the outlet adapter of the manifold if this has not already been done. Follow the same precautions listed above for the CGA connections.
5. Before operation of the manifold and associated equipment, **IT IS STRONGLY RECOMMENDED** that the user leak check the entire system to be pressurized using an inert gas and an approved method.

START-UP AND OPERATION

1. Confirm that all valves are closed as described in "GAS CYLINDER INSTALLATION" section above.
2. The user should then put on appropriate safety apparel such as, but not limited to, safety glasses and gloves.
3. The user should then position himself/herself with the cylinder between themselves and the manifold. **DO NOT REST HANDS ON OR APPLY FORCE TO THE PIGTAIL DURING THE FOLLOWING CHARGING OPERATIONS.**
4. To avoid damage to the manifold's internal parts, open the cylinder valve(s) SLOWLY to allow gas into the system. Open the valves only partially.
5. Observe all high pressure connections in the pressurized system for leaks:

An approved soap solution, if compatible with materials and applications in use, can be used to check connections for leaks.

An approved leak detecting device can be used to check for leaks. Consult the manufacturer's instructions for applications and hazards associated with the gas to be used in the system.

If a leak is indicated, by any of the methods listed above, recheck the CGA connection to the cylinder and all other high pressure connections.

6. If the system has been leak checked and is found to be acceptable, open the cylinder valve(s) completely, then close ¼ turn (UNLESS THE MANIFOLD IS TO BE USED IN ACETYLENE SERVICE,) in order to form a good seal within the cylinder valve. Keep the hand wheel or wrench (if required for this particular cylinder valve type) available at all times to allow for prompt shut-off in emergency situations.
7. SLOWLY open the Station Valves located where the pigtailed attach to the manifold one by one until they are all open. If all of the cylinders are not to be used at once, IT IS REQUIRED THAT THE MANIFOLD BE SUPPLIED WITH PIGTAILS CONTAINING CHECK VALVES. MAKE SURE THAT THE ITEMS DELIVERED TO THE USER MEET THIS CRITERIA.

CYLINDER REPLACEMENT AND SHUT-DOWN

Changing Depleted Cylinders

1. After the cylinder(s) connected to the manifold have been depleted, determined by the loss of original cylinder pressure within the system or by the loss of weight when using a liquified gas, perform the following steps for cylinder replacement.
2. Turn all valves on the manifold to the off position by rotating the hand knob or lever clockwise until it stops.
3. Close all of the cylinder valves completely on the expended cylinders.
4. If possible, vent the manifold of any residual gas in the system.
5. Disconnect the pigtail(s) from the cylinder by slowly loosening the cylinder connection. Some residual pressure in the pigtail may escape if there is no check valve in the pigtail. Listen for continuous gas seepage. If leaking is evident, re-tighten the cylinder connection immediately and check the cylinder valve for proper closure. If the cylinder valve is in the closed position, and the manifold has been drained of all gases, but leaking persists, contact the GAS SUPPLIER immediately and notify him of the situation.
6. Replace the plug into cylinder valve outlet (where applicable). Replace the cap on the cylinder over the valve. Remove the cylinder from the work place and put the cylinder into a safe storage area. Replace the empty cylinder with a new one per the GAS CYLINDER INSTALLATION section.

Manifold Shutdown

1. Shut off the gas cylinder valve(s) completely.
2. Shut down any additional gas supplies that may be supplying gas to the system.
3. Open the system and allow the gas to vent from the system in a safe manner consistent with the user's experience or safety requirements.
4. Purge the manifold when necessary in a safe manner consistent with the user's experience or safety requirements.
5. Isolate the manifold from the line system and downstream equipment.
6. For a long term shutdown, disconnect the pigtailed from the cylinders, close and cap the cylinder valve, and store the cylinders in a safe location as dictated by your facility's cylinder handling procedures.

SPARE PARTS

Maintenance of the equipment should be executed by trained personnel only. Contact customer service for pricing and availability.

Item	Part number
Brass station valve repair kit	MKIT-0519-BO
Stainless-steel station valve repair kit*	MKIT-0520-SA
Brass station valve	MVLV-1478-BO
Mounting bracket	MBRA-0537-UE
U-clamp	MCLM-0006-UG
3-ft flex hose (no CGA fittings)	M6043
6-ft flex hose (no CGA fittings)	M6046
Brass pigtail (no CGA fittings)	MPGT-0925-BO
Stainless-steel pigtail (no CGA fittings)	MPGT-0926-SA
Pigtail handle, vinyl coated	MHAN-0303-XX
Station valve handle, vinyl coated	MHAN-0090-XX
*Stainless-steel valves welded into manifold and can not be replaced. For individual CGA cylinder connection replacements contact customer service with the model number of your manifold.	

For a complete flexible hose or rigid pigtail assembly with CGA connectors and handle, contact customer service for model numbers, pricing and availability.