



# MANIFLEX System

52B Series  
52C Series  
52S Series

## **INSTALLATION AND OPERATION INSTRUCTIONS**

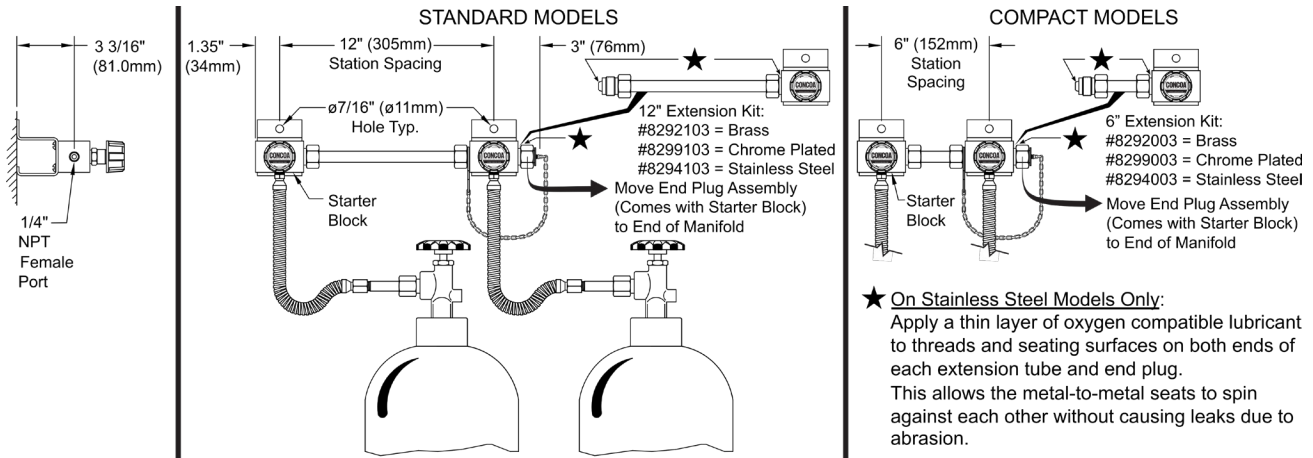
**Before Installing or Operating, Read and Comply with These Instructions**

Controls Corporation of America  
1501 Harpers Road Virginia Beach, VA 23454  
To Order Call 1-800-225-0473 or 757-422-8330 • Fax 757-422-3125  
[www.concoa.com](http://www.concoa.com)

## DESCRIPTION OF PRODUCT

The 52B (brass), 52C (chrome plated brass), and 52S (stainless steel) Series Maniflex Systems are modular gas distribution systems that may be connected to regulators, dual regulator switchovers, CONCOA AutoSwitch systems, CONCOA IntelliSwitch systems, or any other system with a 1/2" NPT female or a 1/4" NPT female inlet port. A modular gas distribution system allows the user to size the inlet capacity of a system so that cylinder changes will not be as frequent. The Maniflex System provides the user with the capability of purchasing an unlimited number of manifold stations connected to a single header, and models are available with either standard 12" (305mm) cylinder station spacing or compact 6" (152mm) cylinder station spacing.

Figure 1. Maniflex Starter Block with One Extension



## USER RESPONSIBILITY

This equipment will perform in conformity with the description 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 for leaks and functionality. Equipment that is not working properly should not be used. Parts that are broken, missing, worn, or distorted should be replaced immediately. CONCOA recommends that a telephone or written request for service advice be made to CONCOA Customer Service in Virginia Beach, Virginia, PHONE: 1-800-225-0473, FAX: 1-757-422-3125, or E-MAIL: e-mail@concoa.com.

This equipment or any of its parts should not be altered without prior written approval by CONCOA. The user of this equipment shall have the sole responsibility for any malfunction that results from improper use, faulty maintenance, damage, improper repair, or alteration by anyone other than CONCOA or a service facility designated by CONCOA.

## **CUSTOMER ASSISTANCE**

In the event of equipment failure, call the CONCOA Customer Assistance Line: 1-800-225-0473. Please be prepared to provide the model number and serial number of the equipment involved, in addition to some details regarding its application. This would include inlet and outlet pressures, flow rate, environmental conditions, and gas service.

### Things to consider before removing the system from the box:

1. Know the properties and special handling requirements of the gas being used. Many specialty gases are quite dangerous (flammable, toxic, corrosive, simple asphyxiant, or oxidizers). Equipment failure or misuse may lead to the sudden release of service gas into the surrounding area. Proper safety measures should be established to handle these and other component failures.
2. Be sure that the assembly purchased is suitable for the gas and type of service intended. The label provides the following information:
  - a. Model Number
  - b. Serial number
3. Be sure that the equipment received conforms to the order specifications. The user is responsible for selecting equipment compatible with the gas in use, and conditions of pressure, temperature, flow, etc.
4. Selection information can be found in CONCOA technical data sheets. In addition, CONCOA representatives are trained to aid in the selection Process.
5. Inspect the assembly upon receipt to be sure that there is no damage or contamination. Pay particular attention to connecting threads. While CONCOA assembles system components to exacting leak-tight standards, the customer should also inspect for any loosening of parts that may occur in shipping or installation. Loose parts may be dangerously propelled from an assembly. If there are adverse signs (leakage or other malfunction), return the assembly to the supplier. While it is advised that soiled components be returned for cleaning, simple external dust or grease may be removed by a clean cloth and if required with aqueous detergent suitable for the application. If there are signs of internal contamination, return to the supplier.



## **GENERAL SAFETY PRACTICES**

1. Before system startup, it is recommended that all systems be pressure tested, leak tested, and purged with an inert gas such as nitrogen. To accomplish this with connections other than a CGA 580, it will be necessary to use an adapter. The recommended use of an adapter is for temporary use, for start-up and system checks only. Adapters should never be used on a permanent basis.
2. Comply with precautions listed in C.G.A. Pamphlet P-1, Safe Handling of Compressed Gases in containers.
3. Consult the cylinder distributor for the proper use of cylinders and for any restrictions on their use (such as flow rate and temperature requirements).
4. Store cylinders with valve caps screwed on, and cylinders chained to a supporting wall or column. Handle cylinders carefully and only with valve caps screwed on. The cap will reduce the chance that the cylinder valve will break off if the cylinder is accidentally dropped or falls over. The cap also protects the cylinder valve from damage to screw threads, which could cause leaky connections.
5. All manifolds used with flammable gases should be provided with approved flashback arrestors to stop any burning gas in the pipeline from getting back to the manifold or cylinders.
6. No smoking should be permitted near oxygen, nitrous oxide, any other oxidizer, flammable gases, or flammable mixtures, or in areas where cylinders are stored..

7. Where oxygen or nitrous oxide is used, the manifold and cylinders must be kept clean. No oil, grease, or combustible substances should come in contact with oxygen or nitrous oxide storage or handling equipment. Such materials in contact with oxygen or nitrous oxide are readily ignitable and when ignited, will burn intensely.
8. Never use an open flame when leak testing.
9. Always open valves slowly when high-pressure gases are being used.
10. Always be sure that a cylinder contains the correct gas before connecting it to any manifold.
11. Always leak-test any manifold or distribution pipeline before using.
12. Always be sure that the gas in a pipeline is the correct gas for the intended use.
13. Always close all cylinder valves before disconnecting cylinders from a manifold.
14. Always remove all empty cylinders from a manifold before connecting full cylinders.
15. Always test cylinders to be sure the cylinders are full before connecting to a manifold.

All gas distribution piping systems must meet the appropriate industrial standards for the intended service and must be thoroughly cleaned before using. For the United States, some applicable safety rules and precautions are listed below:

1. American National Standards Institute standard Z49.1 or Safety in Welding and Cutting, American Welding Society, 2501 NW Seventh Street, Miami, FL 33125.
2. N.F.P.A. Standard 51, Oxygen-Fuel Gas Systems for Welding and Cutting, N.F.P.A., 470 Atlantic Avenue, Boston, MA 02210.
3. N.F.P.A. Standard 51B, Cutting and Welding Processes, (see Address in #2)
4. N.F.P.A. Standard 55, Compressed Gases and Cryogenic Fluids Code
5. CONCOA Publication ADE 872, Safety Precautions in Welding and Cutting.
6. Local ordinances.
7. O.S.H.A. Standard 29 CFR.
8. C.G.A. Pamphlet C-4, American National Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained.\*
9. C.G.A. Pamphlet G-4, Oxygen-Information on the properties, manufacture, transportation, storage, handling, and use of oxygen.
10. C.G.A. Pamphlet G-4.1, Equipment Cleaned for Oxygen Service.
11. C.G.A. Pamphlet C-4.4, Industrial Practices for Gaseous Oxygen Transmission and Distribution Piping Systems.
12. C.G.A. Pamphlet G-5, Hydrogen - Information on the properties, manufacture, transportation, storage, handling, and use of hydrogen.
13. C.G.A. Pamphlet G-6, Carbon Dioxide - Information on the properties, manufacture, transportation, storage, handling, and use of carbon dioxide.
14. C.G.A. Pamphlet G-6.1, Standard for Low Pressure Carbon Dioxide Systems at Consumer Sites.
15. C.C.A. Pamphlet P-1, safe handling of compressed gases in containers.
16. C.G.A. Safety Bulletin SB-2, Oxygen Deficient Atmospheres.

\*C.G.A. pamphlets can be obtained from the Compressed Gas Association: 1235 Jefferson Davis Highway, Arlington, VA 22202-3239, (703) 979-0900. Publications: (703) 979-4341. Fax: (703) 979-0134.

## MANIFOLD LOCATION

Keep all cylinders and manifolds away from any source of high temperature over 120°F (50°C) or possible fire hazards. High-pressure gas contained in a closed cylinder becomes increasingly dangerous when exposed to high temperature because pressure increases and the strength of the cylinder decreases. Manifolds installed in open locations should be protected from weather conditions. During winter, protect the manifold from ice and snow. In summer, shade the manifold and cylinders from continuous exposure to direct sunlight. Always leave access to the manifold for cylinder replacement.

The site chosen for them manifold installation shall be level, well ventilated, and at a safe distance from the sources of flames, sparks, and excessive heat. The manifold should not be placed in an area that may subject the manifold to damage from passing trucks, cranes, or other heavy machines. Oxygen manifolds must not be installed under shafting, belting, or other places where oil can drip on them. For other location guidelines, see NFPA Standard 51.

## INSTALLATION CONSIDERATIONS

1. Be sure to consider all factors when selecting materials.
2. Do not use oil or grease on fittings except for threads and seating surfaces of stainless steel extension tubes and end plugs (see installation instructions).
3. Make sure that all fittings are secure and leak tight. PTFE tape should be used on pipe threads.
4. Purge devices: These devices can be purchased as accessories. Purge devices are used to remove toxic, corrosive, or flammable gases from the customer's system to a safe discharge area. This is particularly helpful when an internal problem occurs such as a regulator malfunction.

## INSTALLING PIPE THREAD CONNECTIONS

Use an open-end wrench, not a pipe wrench, to install accessories to the system. The NPT connections require the use of PTFE tape on the threads to make a gas tight seal. On stainless steel connections, the PTFE tape also helps to prevent the connections from galling together when tightening or loosening. Follow the rules below when using PTFE tape:

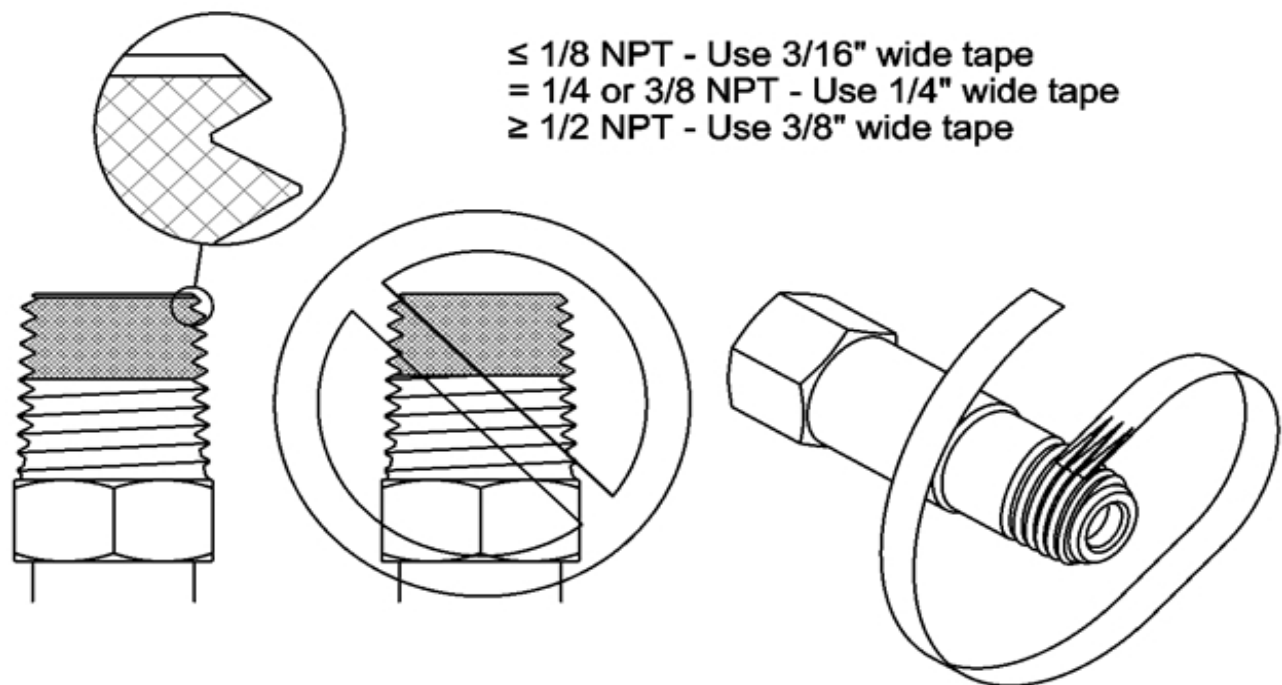


Figure 2. Taping Procedure Diagram

## Taping procedure:

Before applying PTFE tape, inspect the NPT threads, and if necessary, clean the fitting to remove any dirt or thread sealant that remains on the threads. Start the PTFE tape on the first thread leaving a slight section of the chamfer exposed as shown in the Taping Procedure Diagram. Make sure the tape does not overlap the end of the fitting. As the tape is wrapped in the direction of the thread spiral, pull tightly on the end of the tape so that the tape conforms to the threads. Apply at least 2 but no more than 3 layers of tape to the threads. Cut off excess tape, and press the end firmly into the threads.

## INSTALLATION INSTRUCTIONS – SINGLE ROW MANIFOLDS

The Maniflex System is normally installed on a wall with 1 gas cylinder per cylinder station. This arrangement is referred to as “Single Row”. CONCOA has available a variety of manifold connectors to use for connecting your C2 Series Maniflex system to another system. These connectors are shown in the figure below:

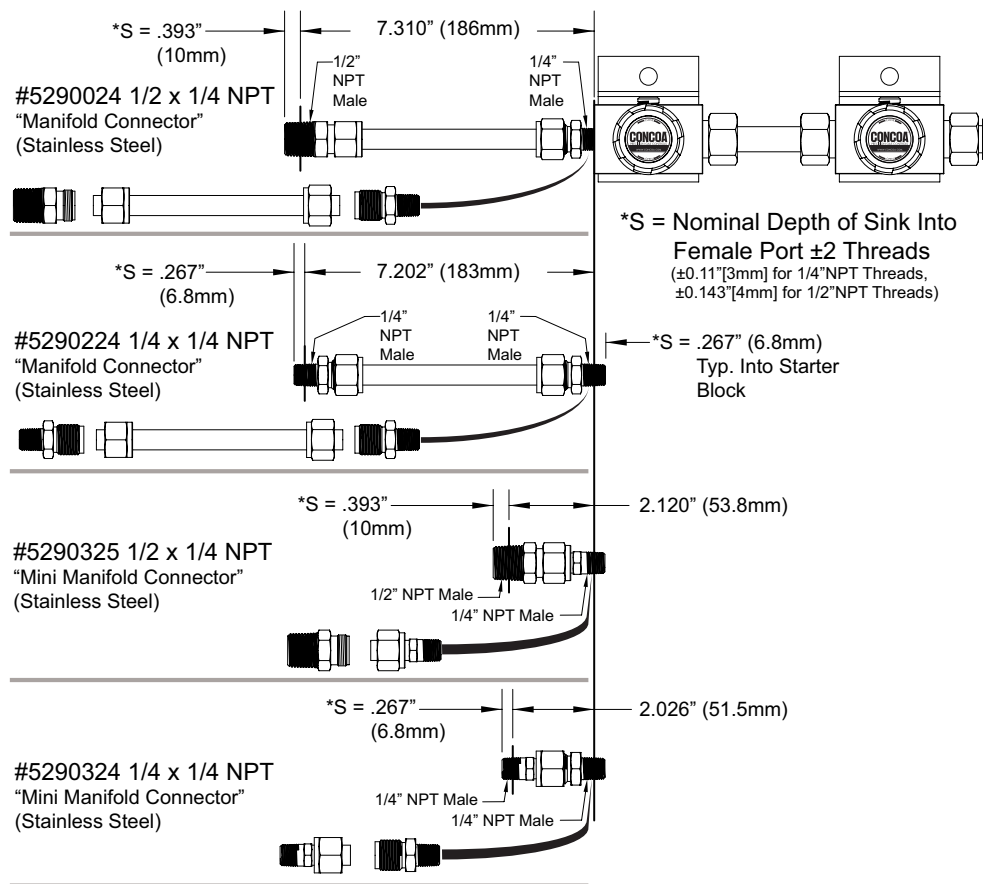


Figure 3. Manifold Connectors

1. Refer to the CONCOA instruction manual for mounting instructions for the system to which you are connecting the Maniflex system.
2. A typical installation for high-pressure cylinders will require the center-line of the system inlet to be at least 66" (1676mm) above the floor.
3. Customer is to provide and use appropriate fasteners for attaching the system to the wall or floor.
4. The manifold connector (see Figure 3) can be disassembled for ease of installation.
5. Wrap the male NPT threads of the manifold connector with PTFE tape according to the instructions in the "Installing Pipe Thread Connections" section above.



6. For systems that have a bulkhead fitting (i.e., the CONCOA AutoSwitch and IntelliSwitch systems), ALWAYS hold the bulkhead fitting with a wrench when installing accessories. Do not allow the bulkhead fitting to turn; otherwise, connections inside the system enclosure may be loosened.
7. Assemble the taped manifold connector fittings into the Maniflex starter block port and into the system inlet port as appropriate.
8. Assemble the mounting bracket to the starter block (see Figure 5).
9. Connect the starter block/manifold connector assembly to the system, and tighten the compression fittings.
10. Ensure that the starter block is level, and mark the wall at the mounting bracket hole.

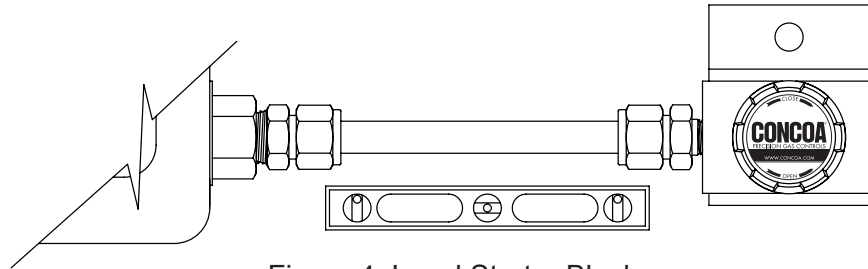
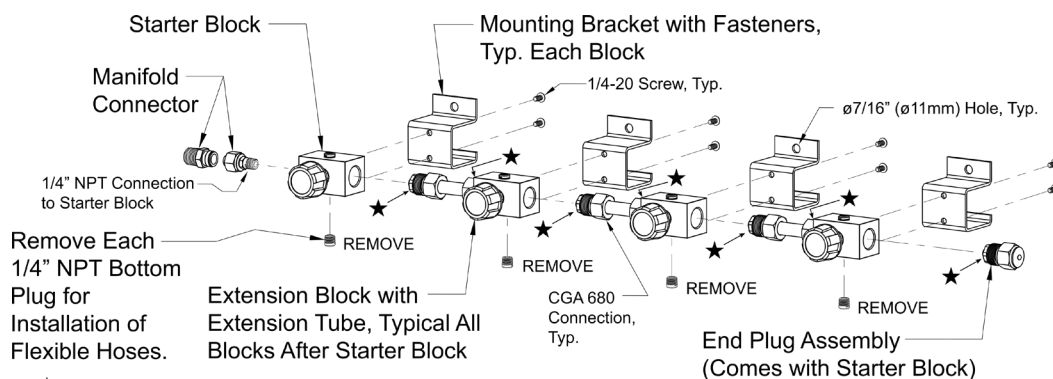


Figure 4. Level Starter Block

11. Secure the starter block assembly to the wall using appropriate fasteners.
12. The starter block will include an end plug assembly. This is to be used on the final block of your Maniflex System.
12. Assemble mounting brackets to the remaining extension blocks.
13. Loosely assemble each extension tube one at a time to each extension block. DO NOT USE PTFE TAPE. On Stainless Steel Models Only: Apply a thin layer of oxygen compatible lubricant to the threads and seating surfaces on both ends of each extension tube and end plug. This allows the metal-to-metal seats to spin against each other without causing leaks due to abrasion.
14. One at a time, level and install each extension assembly. Tighten the compression fittings on both sides of the block before securing the extension block to the wall with appropriate fasteners.
15. Before installing an extension block assembly, ensure that preceding compression fittings have been tightened.
16. With all extensions completely installed, tighten the end plug to the open end of the final extension block.
17. Ensure that all connections are tightened.
19. Remove the pipe plug from the bottom port of each Maniflex station block.
20. Wrap the male NPT thread of each flexible hose with PTFE tape according to the instructions in the "Installing Pipe Thread Connections" section above.
21. Install each pigtail into the bottom port of each Maniflex station.
22. Refer to "Connecting to a Cylinder" instructions below for connecting the pigtail(s) to the cylinder(s).



★ **On Stainless Steel Models Only:**  
Apply a thin layer of oxygen compatible lubricant to threads and seating surfaces on both ends of each extension tube and end plug. This allows the metal-to-metal seats to spin against each other without causing leaks due to abrasion.

Figure 5. Exploded Assembly Detail

## INSTALLATION INSTRUCTIONS – DOUBLE ROW MANIFOLDS

Maniflex Systems can also be installed for use with 2 gas cylinders per cylinder station. This arrangement is referred to as “Double Row”. For floor mounted systems, the customer must provide the means for mounting the system to the floor.

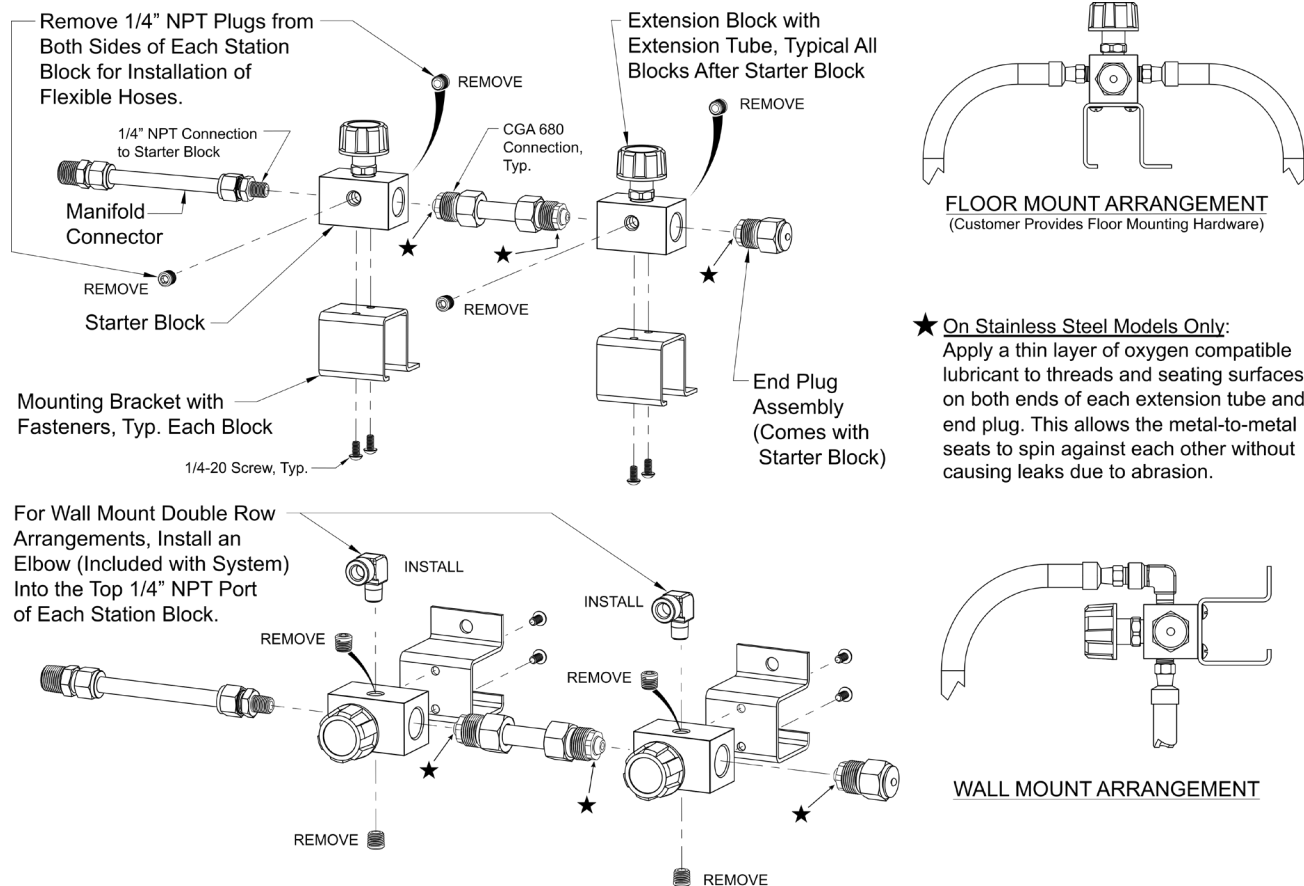


Figure 6. Double Row Installation

## CONNECTING TO A CYLINDER

1. Read the next section before installing the cylinders.
2. Before removing the cylinder cap, move the cylinder of gas to the work site:
  - a. Secure cylinder to the floor, wall, stand, or bench with appropriate chain, strap, or stand to prevent toppling (CONCOA part number 518-1611, cylinder wall bracket is appropriate).
  - b. Remove the cylinder cap.
  - c. Be sure the cylinder valve is tightly closed (clockwise)
  - d. Remove the cylinder valve plug, if any.
  - e. Inspect the cylinder valve and threads for damage or contamination.
3. Secure the cylinder connection to the cylinder in the following manner:
  - a. Thread the nut onto the cylinder connection; it should fit easily. Do not force. If it does not fit, the connection may be wrong for the type of gas being used.
  - b. Left-hand threads are used on some cylinder connections. A notch in the middle of the hex nut typically indicates a left-hand thread.
  - c. Gaskets are used on some inlet connections. Be sure the gasket is in good shape. Do not over-tighten to avoid squashing the gasket into the gas line. Keep extra gaskets on hand.



## CAUTION

**WARNING:** Never use oil or grease on regulator or cylinder fittings, as it may contaminate pure gases, or create a fire hazard.

Before system startup, it is recommended that all systems be pressure tested, leak tested, and purged with an inert gas such as nitrogen. To accomplish this with connections other than a CGA 580, it will be necessary to use an adapter.

The recommended use of an adapter is for temporary use only, for system start up and checks. Adapters should never be used on a permanent basis.\

1. Wear safety glasses and gloves.
2. Connect a nitrogen cylinder to the last pigtail on the manifold. Connect the appropriate gas cylinders to the remaining pigtails. Do not open the cylinder valves yet.
3. Be sure that both ends of all hoses or pigtails are secured before pressurizing. Turn off (clockwise) all manifold header valves with the exception of the header valve for the nitrogen cylinder. Turn the line regulator knob or adjustable regulator knob counterclockwise until the knob stops turning.
4. When first pressurizing, do not stand in front of or contact any regulator or switchover systems. Slowly open the nitrogen cylinder valve. Observe the high pressure gauge or readout on the system to which the Maniflex is connected, and check for a rise in pressure up to full cylinder pressure. **WARNING:** If the attached regulator is preset or the system is a dual regulator switchover without the optional line regulator, gas will escape from the delivery side of the regulator.
5. Keep the hand wheel or wrench on the open cylinder valve at all times to allow prompt emergency shut-off.
6. One at a time, open the other manifold header valves (slowly) to pressurize the pigtails (not the cylinder valves).
7. Inspect all connections for leaks and fix any leaks. A leak detection solution may be applied to the connections (if compatible with the application) that indicates leaks by bubbling. To further check for leaks, or if the leak detection solution cannot be used, close the cylinder valve(s) for a period of time (recommended 24 hours), and observe the high pressure gauge for a drop in pressure. If so indicated, recheck the cylinder connection and all other high-pressure port connections. Never attempt to fix a leak under pressure. If leaks are detected, depressurize the system and retighten the connection. Begin again at step 3.
8. Turn the regulator knob or line regulator knob clockwise to increase the pressure on the delivery side of the system.
9. Check the delivery side for leaks as described in the steps above.
10. When all leaks are fixed, turn off the nitrogen cylinder valve and manifold header valve. Disconnect the nitrogen cylinder and remove the adapter. Connect service gas cylinders to the manifold.

## **OPERATION**

Follow the instructions supplied with the regulator, dual regulator switchover, AutoSwitch, IntelliSwitch, or other system when operating these devices. When removing a cylinder from the manifold, the manifold header valve must be closed first.

## **MAINTENANCE**

At regular intervals, the Maniflex system should be checked for leaks and proper function (see trouble shooting). The pigtail check valve should also be checked for leaks when a depleted cylinder is removed. Note: the system inlet and pigtail should be pressurized when checking for leaks. Any leaks in the system should be corrected immediately.

## **TROUBLESHOOTING**

Typical symptoms listed below indicate Maniflex system malfunctions needing repair. Replace immediately with a clean, repaired and tested, or new system.

1. Gas leakage from any joint.
2. Manifold header valve when closed does not cut off the gas supply to the regulator, dual regulator switchover, or AutoSwitch.
3. The system makes a noise or hums.

## **SERVICE**

A unit that is not functioning properly should not be used. It is recommended that all servicing be done by a service facility authorized by CONCOA. Prior to returning equipment to CONCOA for warranty or non-warranty repair, contact Customer Service in Virginia Beach, Virginia.

If so advised, the unit should be sent to a service facility authorized by CONCOA. Do the following before shipping:

1. Adequately package the system. If possible package in the original shipping container.
2. Ship prepaid.
3. Include a statement of the observed deficiency.
4. Indicate the gas service that the equipment was used on.
5. Purge all equipment before shipment to protect the transporter and service personnel. The purging is particularly important if the equipment has been in hazardous or corrosive gas service.

Return trip transportation charges are to be paid by the Buyer. In all cases where the warranty has expired, repairs will be made at current list price for the replacement part(s), plus a reasonable labor charge.

## **Warranty Information**

This equipment is sold by CONTROLS CORPORATION OF AMERICA under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to the purchase of this equipment directly from CONTROLS CORPORATION OF AMERICA or its Authorized Distributors as new merchandise and are extended to the first Buyer thereof other than for the purpose of resale.

For a period of one (1) year from the date of original delivery (90 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 the same is properly operated under conditions of normal use and that regular periodic maintenance and service is performed or replacements made in accordance with the instructions provided. The foregoing warranties shall not apply if the equipment has been repaired: other than by CONTROLS CORPORATION OF AMERICA or a designated service facility or in accordance with written instructions provided by CONTROLS CORPORATION OF AMERICA, or altered by anyone other than CONTROLS CORPORATION OF AMERICA, or if the equipment has been subject to abuse, misuse, negligence or accident.

CONTROLS CORPORATION OF AMERICA's sole and exclusive obligation and Buyer's sole and exclusive remedy under the above warranties is limited to repairing or replacing, free of charge, at CONTROLS CORPORATION OF AMERICA's option, the equipment or part, which is reported to its Authorized Distributor from whom purchased, and which if so advised, is returned with a statement of the observed deficiency, and proof of purchase of equipment or part not later than seven (7) days after the expiration date of the applicable warranty, to the nearest designated service facility during normal business hours, transportation charges prepaid, and which upon examination, is found not to comply with the above warranties. Return trip transportation charges for the equipment or part shall be paid by Buyer.

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