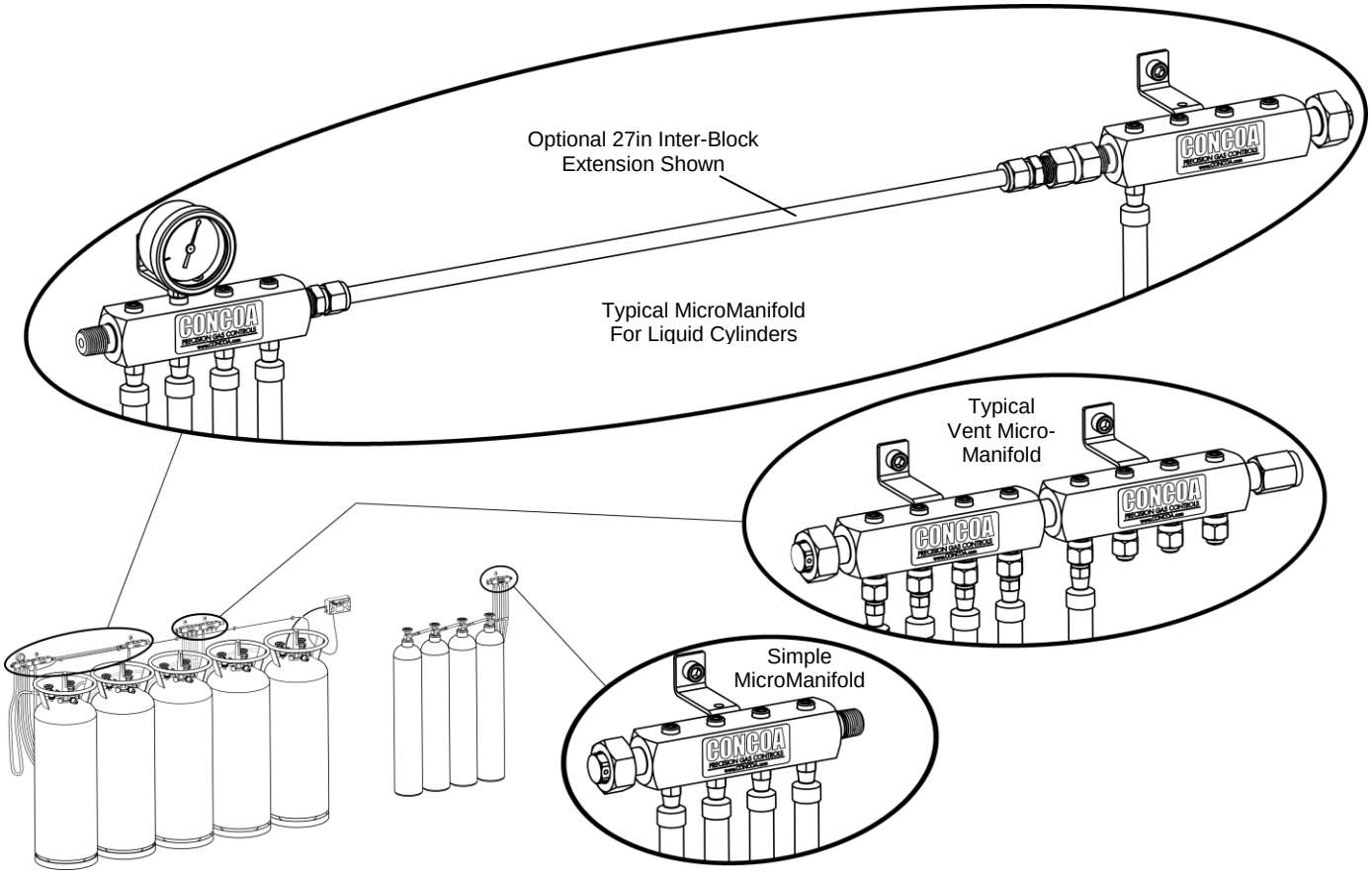
ADI 3221-C

CONCOA
PRECISION GAS CONTROLS
Certified ISO 9001

52L / 629 Series
MicroManifolds & Vent Kits



INSTALLATION AND OPERATING INSTRUCTIONS

Before Installing or Operating, Read and Comply with These Instructions

Controls Corporation of America
1501 Harpers Road Virginia Beach, VA 23454
Telephone 1-800-225-0473 or 757-422-8330 • Fax 757-422-3125
www.concoa.com

July 2023
Revision C

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. Improperly working equipment 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 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. Selection information can be found in CONCOA technical data sheets. In addition, CONCOA representatives are trained to aid in the selection process.
4. 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 regulators 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.
5. 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.

Comply with precautions listed in C.G.A. Pamphlet P-1, Safe Handling of Compressed Gases in Containers.

GENERAL SAFETY PRACTICES

Consult the cylinder distributor for the proper use of cylinders and for any restrictions on their use such as flow rate and temperature requirements.

Store high pressure cylinders with valve caps screwed on, and cylinders chained to a supporting wall or column.

Handle cylinders carefully and, for high pressure cylinders, 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.

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.

No smoking should be permitted near oxygen, nitrous oxide, any other oxidizer, flammable gases, or flammable mixtures, or in areas where cylinders are stored.

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.

Never use an open flame when leak testing.

Always open valves slowly when high-pressure gases are being used.

Always be sure that a cylinder contains the correct gas before connecting it to any manifold. Always leak-test any manifold or distribution pipeline before using.

Always be sure that the gas in a pipeline is the correct gas for the intended use.

Always close all cylinder valves before disconnecting cylinders from a manifold.

Always remove all empty cylinders from a manifold before connecting full cylinders.

Always test cylinders to be sure the cylinders are full before connecting to a manifold.

Always secure cylinders, whether in use or in reserve.

Handling Liquid Gases

Under no circumstances should liquid product be allowed into the 52L / 629 Series hoses or manifold.

Nitrogen is a colorless, odorless, and tasteless gas. Liquid nitrogen (LN2) is a potential asphyxiate and may cause severe frostbite. Please observe all proper safety precautions to ensure proper handling of LN2. Consult your local LN2 dealer for detailed handling instructions.

Cryogenic liquid containers (dewars) must be operated in accordance with the manufacturer's instructions. Dewars must be kept in a well-ventilated space where they are protected from the weather and are away from any sources of heat.

Liquid gases are potential asphyxiants that can cause rapid suffocation without warning. Store and use them in areas with adequate ventilation. DO NOT vent the container or system in confined spaces. DO NOT enter confined spaces where gas may be present unless the area has been well ventilated. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, supplemental oxygen may be required. SEEK MEDICAL ATTENTION IMMEDIATELY.

Liquid gases such as LN2 can cause severe frostbite to the eyes or skin. DO NOT touch frosted pipes, hose assemblies or valves. In case of frostbite, consult a physician at once. If a physician is not readily available, warm the affected areas with water that is near body temperature.

Never place liquid gas in a sealed container without a pressure relief device. For example, the expansion of LN2 to N2 gas is approximately 1 to 700. When handling liquid gases, the most important safety aspects to consider are adequate ventilation and eye and skin protection. Although liquid gases such as LN2 may be non-toxic, they are dangerous in that the gas will displace the oxygen in ambient air. Therefore, it is imperative that liquid gas supply and storage dewars be stored and operated in open and well-ventilated areas. Oxygen Deficiency Monitoring Equipment should be used in areas where use of liquid gas poses the risk of creating an oxygen deficient atmosphere. Never enter a space where oxygen deficiency is detected.

Persons transferring liquid gas should make every effort to protect the eyes and skin from accidental contact with liquid or cold gas. Protect the eyes with a full-face shield. Safety glasses are not adequate. Always wear cryogenic gloves or equivalent when handling anything that is or may have been in contact with the liquid, cold gas, cold pipes, or cold equipment. Long sleeve shirts and trousers without cuffs that are of sufficient length to prevent liquid from entering the shoes are recommended.

The vent manifold models of the 52L / 629 Series use 72" long hoses (5290240-01-295, 5290241-01-440, and 5290242-01-622) which are intended to connect to the dewar's gaseous vent use valve only. Use with any other gas phase is not safe. A typical liquid has a common flare connection for both the liquid use and vent use valves. Extreme caution must be taken to avoid cryogenic phase exposure to these hoses. Potential personal injury may be a result.

The vent manifold models of the 52L / 629 Series also include flow restrictors for each hose. Do not remove these flow restrictors which are installed into the vent manifold. The restrictors are designed to prevent the hose from whipping while being depressurized.

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, Safety in Welding and Cutting, American Welding Society, 2501 NW Seventh Street, Miami, Florida 33125
2. N.F.P.A. Standard 51, Oxygen-Fuel Gas systems for Welding and Cutting, N.F.P.A., 470 Atlantic Avenue, Boston, Massachusetts 02210
3. N.F.P.A. Standard 51B, Cutting and Welding Processes (same address as #2).
4. CONCOA publication ADE 872, Safety Precautions in Welding and Cutting.
5. Local Ordinances
6. O.S.H.A. Standard 29 CFR
7. C.G.A. Pamphlet C-4, American National Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained.
8. C.G.A. Pamphlet G-4, Oxygen – Information on the properties, manufacture, transportation, storage, handling, and use of oxygen.
9. C.G.A. Pamphlet G-4.1, Equipment Cleaned for oxygen service.
10. C.G.A. Pamphlet G-4.4, Industrial Practices for Gaseous Oxygen Transmission and Distribution Piping Systems.
11. C.G.A. Pamphlet G-5, Hydrogen – Information on the properties, manufacture, transportation, storage, handling, and use of hydrogen.
12. C.G.A. Pamphlet G-6, Carbon Dioxide – Information on the properties, manufacture, transportation, storage, handling, and use of carbon dioxide.
13. C.G.A. Pamphlet G-6.1, Standard for Low Pressure Carbon Dioxide Systems at Consumer Sites.
14. C.G.A. Pamphlet P-1, Safe Handling of Compressed Gases in Containers.
15. 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.

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.

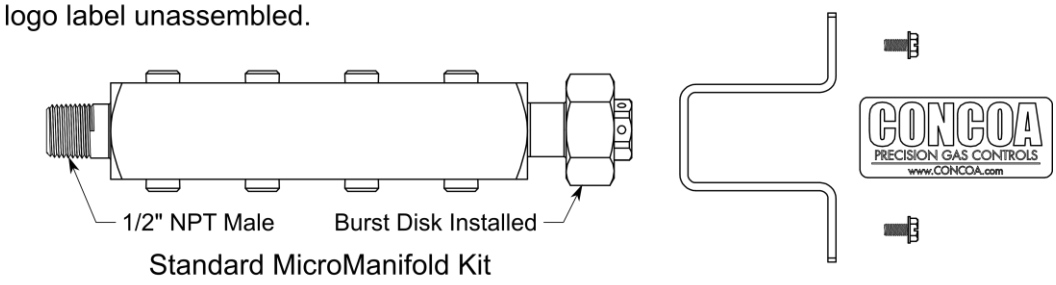
The site chosen for the manifold installation shall be level, well ventilated, and at a safe distance from sources of flames, sparks, and excessive heat. The manifold should not be placed in an area that may subject the manifold to damage from passing trucks, cranes, or other heavy machines. Oxygen manifolds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

PRODUCT DESCRIPTION

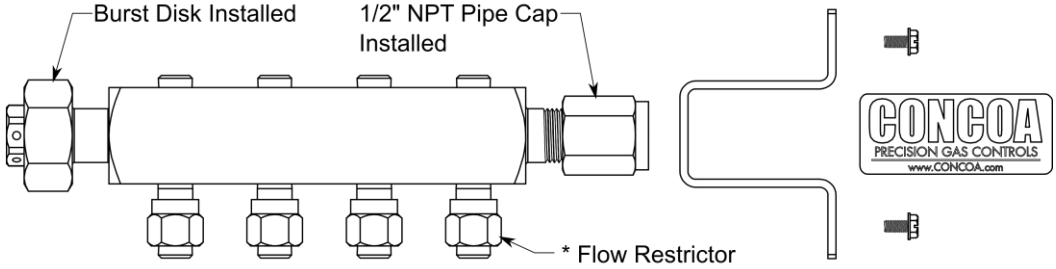
The 52L / 629 Series gas distribution systems are available in two configurations:

1) 52L or 629 **1**xxx / **3**xxx / **4**xxx / **5**xxx / **6**xxx / **7**xxx / **8**xxx Series systems are “standard” MicroManifolds designed to distribute gaseous product from either liquid cans or high-pressure cylinders to a CONCOA pressure control device.
2) 52L or 629 **2**xxx Series systems are “vent” MicroManifolds designed to be used in conjunction with liquid cylinders on a standard 52L/629 Series MicroManifold or on a 628 Series gas manifold. The vent MicroManifolds provide headspace equalization via a common connection for multiple liquid cylinder vent use valves. The vent MicroManifolds use 72” long hoses (5290240-01-295, 5290241-01-440, and 5290242-01-622) with a ¼” NPT Male manifold connection and an appropriate connection for the vent use valves. The vent MicroManifolds also feature flow restrictors at each hose manifold connection, providing additional safety to prevent hose whip during a cylinder exchange.

MicroManifold blocks are provided in kits as shown with all ports plugged, a burst disk assembled in the 1/2" female NPT port, and with the bracket, screws, and logo label unassembled.

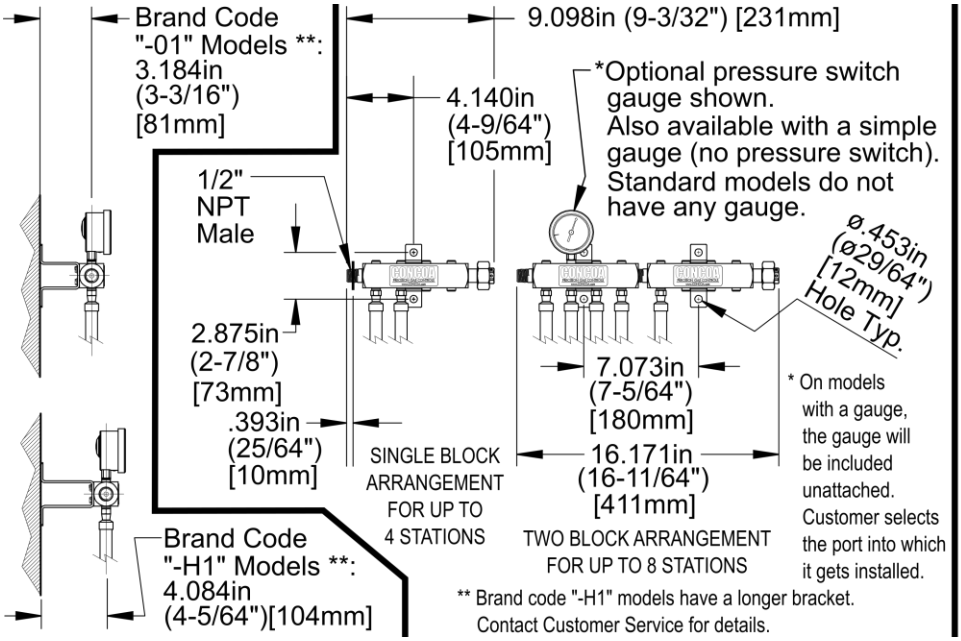


Standard MicroManifold Kit

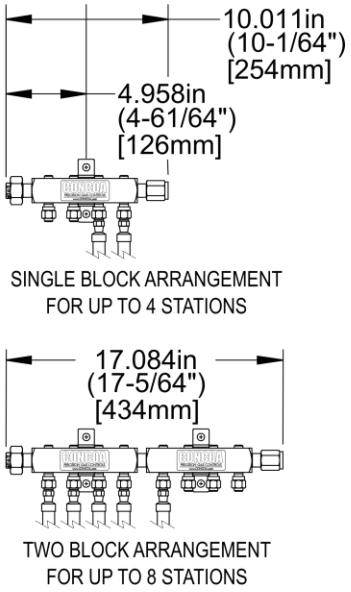


Vent MicroManifold Kit

* Vent MicroManifolds are Not Left or Right Handed

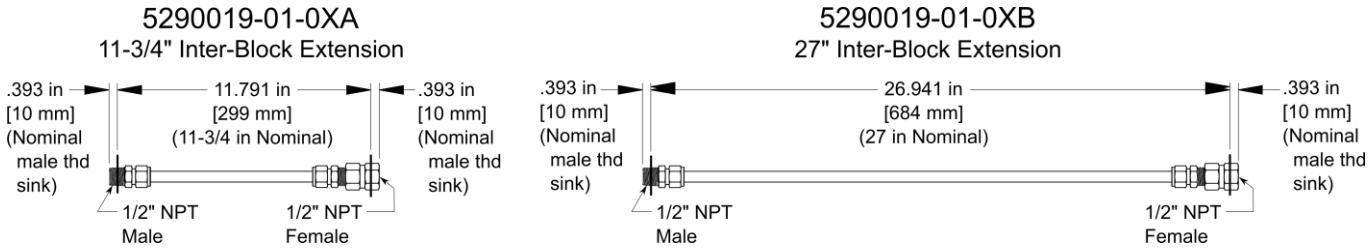


Standard MicroManifolds



Vent Micro-Manifolds

Optional Equipment Available for Purchase Separately



CYLINDER RACKS	
Part No.	***Description***
5185011	HP Cylinder Rack, 1 Wide x 1 Deep
5185012	HP Cylinder Rack, 1 Wide x 2 Deep
5185013	HP Cylinder Rack, 1 Wide x 3 Deep
5185014	HP Cylinder Rack, 1 Wide x 4 Deep
5185021	HP Cylinder Rack, 2 Wide x 1 Deep
5185022	HP Cylinder Rack, 2 Wide x 2 Deep
5185023	HP Cylinder Rack, 2 Wide x 3 Deep
5185024	HP Cylinder Rack, 2 Wide x 4 Deep
5185031	HP Cylinder Rack, 3 Wide x 1 Deep
5185032	HP Cylinder Rack, 3 Wide x 2 Deep
5185033	HP Cylinder Rack, 3 Wide x 3 Deep
5185034	HP Cylinder Rack, 3 Wide x 4 Deep
5185041	HP Cylinder Rack, 4 Wide x 1 Deep
5185042	HP Cylinder Rack, 4 Wide x 2 Deep
5185043	HP Cylinder Rack, 4 Wide x 3 Deep
5185044	HP Cylinder Rack, 4 Wide x 4 Deep
5185051	HP Cylinder Rack, 5 Wide x 1 Deep
5185052	HP Cylinder Rack, 5 Wide x 2 Deep
5185053	HP Cylinder Rack, 5 Wide x 3 Deep
5185054	HP Cylinder Rack, 5 Wide x 4 Deep
5185C01	22in Dia. Liquid Cylinder Rack, 1 Wide x 1 Deep
5185C02	22in Dia. Liquid Cylinder Rack, 2 Wide x 1 Deep
5185C0A	33in Dia. Liquid Cylinder Rack, 2 Wide x 1 Deep
5185C0B	33in Dia. Liquid Cylinder Rack, 1 Wide x 2 Deep
Other modelsare available including stainless steel models and models with process rails. Contact CONCOA Customer Service for details.	


5185011


5185034

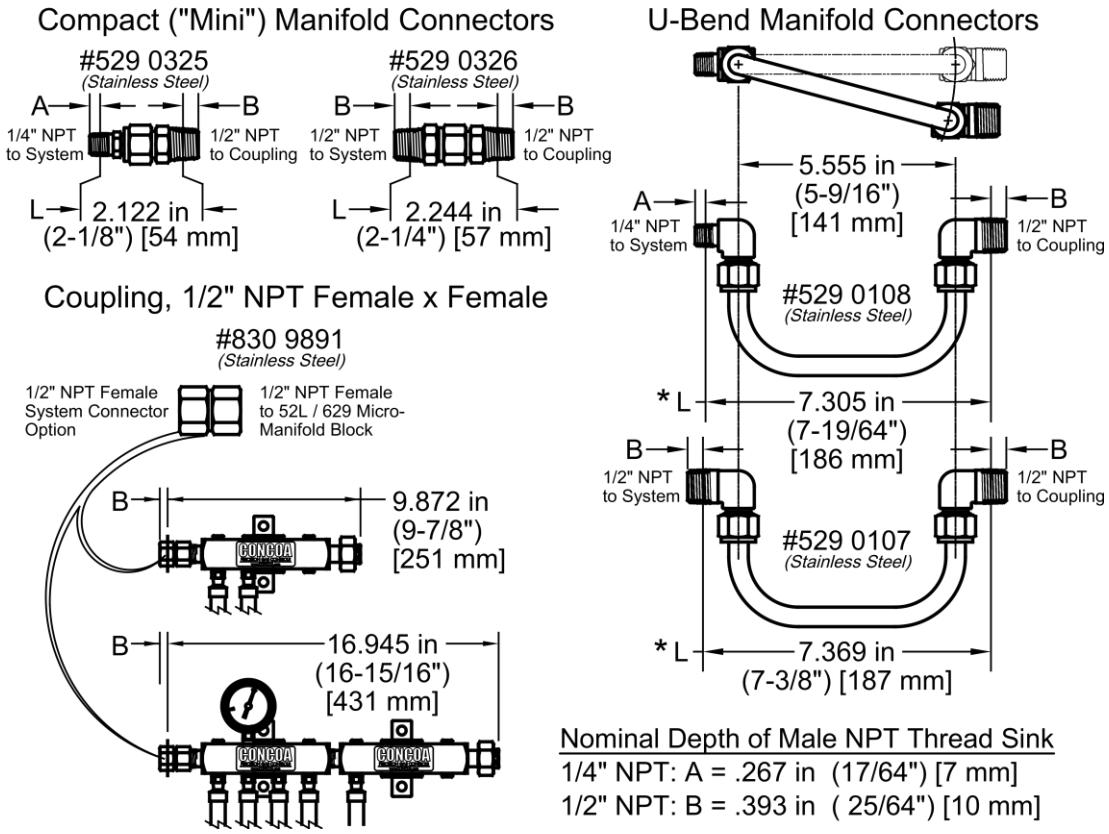

5185041


5185C01


5185C02

The ½" NPT male end of standard 52L / 629 Series MicroManifolds may be screwed directly into the ½" NPT female inlet port of a compatible system, or hookup may be achieved with one of the following system connection options:

SYSTEM CONNECTION OPTIONS



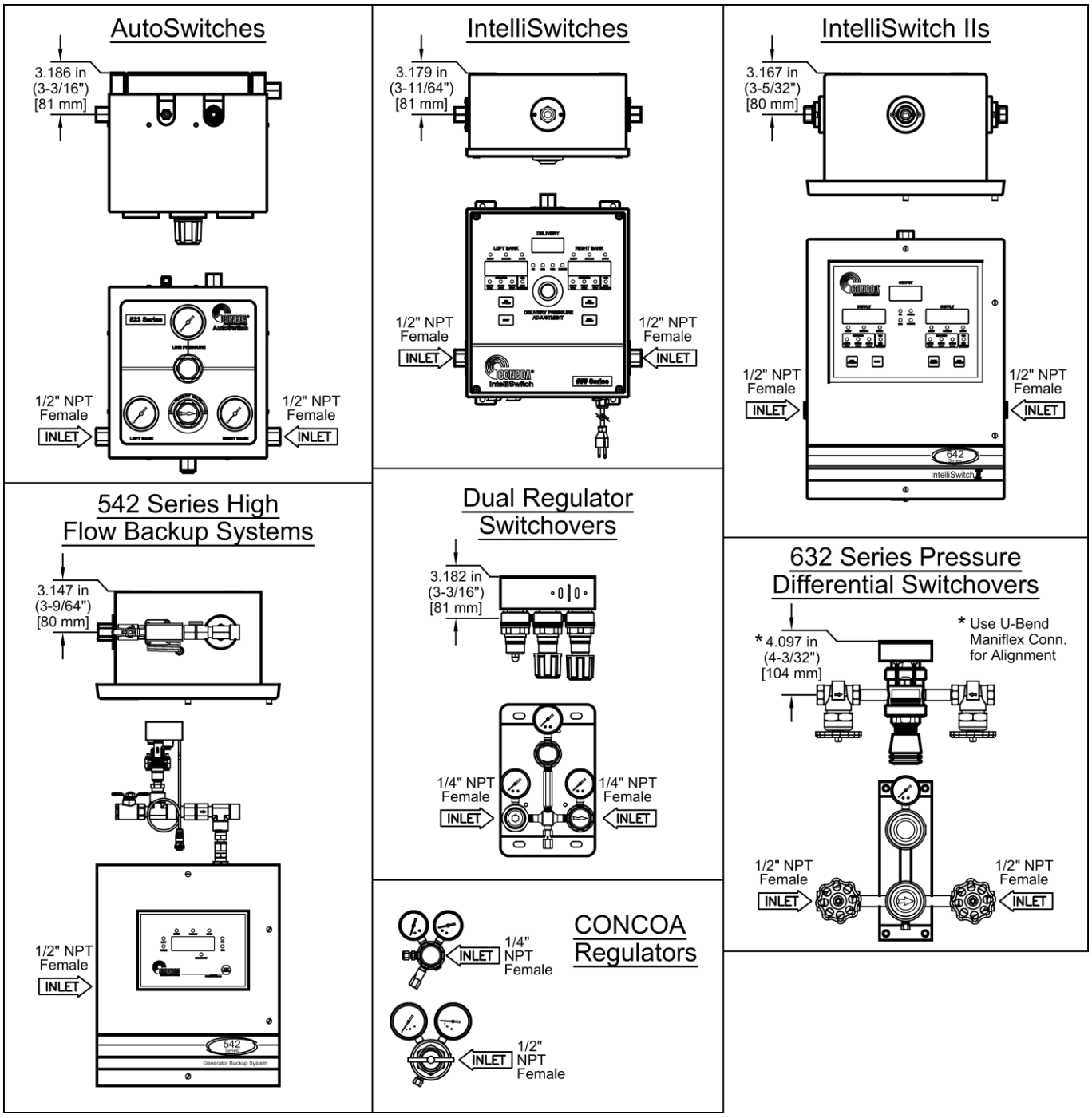
Nominal Depth of Male NPT Thread Sink
1/4" NPT: A = .267 in (17/64") [7 mm]
1/2" NPT: B = .393 in (25/64") [10 mm]

COMPATIBLE CONCOA SYSTEMS

The CONCOA 52L/629 Series MicroManifold is compatible with the CONCOA systems shown in the table below and in the illustrations on the following pages. Refer to the CONCOA instructions documents listed in the table or included with your product for instructions on how to mount your system to the wall or for other installation arrangements.

Series	Description	Instructions Document
AutoSwitches		
522	Brass Switchover System for (2) High Pressure Cylinder Banks, With or Without Remote Alarm Outputs	99063196 [ADI 3196]
635	High Flow Brass Switchover System for (2) High Pressure Cylinder Banks, Without Remote Alarm Outputs	99063206 [ADI 3206]
636	High Flow Brass Switchover System for (2) High Pressure Cylinder Banks, With Remote Alarm Outputs	
637	High Flow Brass Switchover System for (1) Left Hand Liquid Cylinder Bank + (1) Right Hand High Pressure Cylinder Bank, With Remote Alarm Outputs	99063208 [ADI 3208]
Dual Regulator Switchovers		
526	Brass Switchover System, Without Remote Alarm Outputs or With Pressure Switch Gauges	99063166 [ADI 3166]
	Brass Switchover System, With Transducer Remote Alarm Outputs	99060526 [ADI 0526]
High Flow Backup Systems		
542	High Flow Gas Generator Backup System	99069519 [ADI 9519]

Series	Description	Instructions Document
IntelliSwitches		
539	Electronic Switchover, Arrangements for High Purity Applications	99069501 [ADI 9501]
640	Electronic Switchover, Arrangements for Industrial Applications	
IntelliSwitch IIs		
538	Electronic Switchover, Arrangements for High Purity Applications	99069515 [ADI 9515]
642	Electronic Switchover, Arrangements for Industrial Applications	
544	Electronic Bank Switching Valve (No Pressure Reduction)	99069527 [ADI 9527]
CONCOA Regulators		
Many Series and Instruction Documents. Refer to the CONCOA Web Site or contact Customer Service.		



INSTALLATION

INSTALLING INLET AND OUTLET CONNECTIONS:

When installing the system:

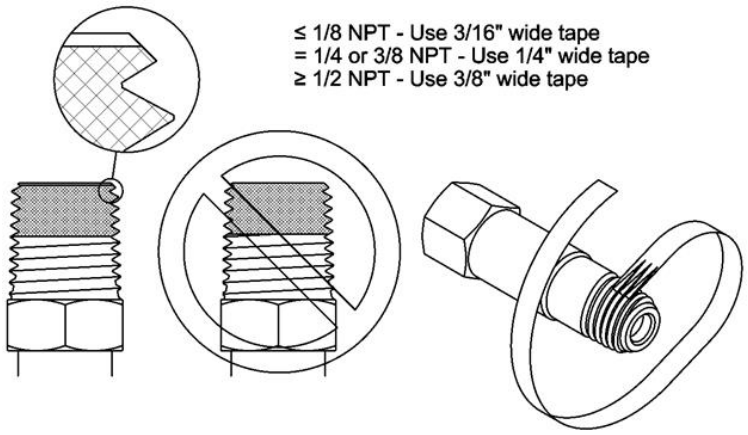
a. Be sure to consider all factors when selecting materials.
b. Do not use oil or grease on fittings.
c. Be sure all fittings are secure & leak tight. PTFE tape must be used on pipe threads.
d. Purge devices: These devices can be purchased as accessories. Purge devices are used to remove hazardous gases from a customer's system to a safe discharge area. This is particularly helpful when an internal problem occurs (such as regulator malfunction).

Use an open-end wrench, not a pipe wrench, to install accessories to the system.

PTFE TAPING PROCEDURE:

Be sure that all fittings are secure and leak tight. PTFE tape must be used on NPT threads to ensure a gas-tight seal. Avoid impinging on the gas stream. On stainless steel connections, PTFE tape also helps to prevent the connections from galling together when tightening or loosening. Follow the following rules when using PTFE tape:

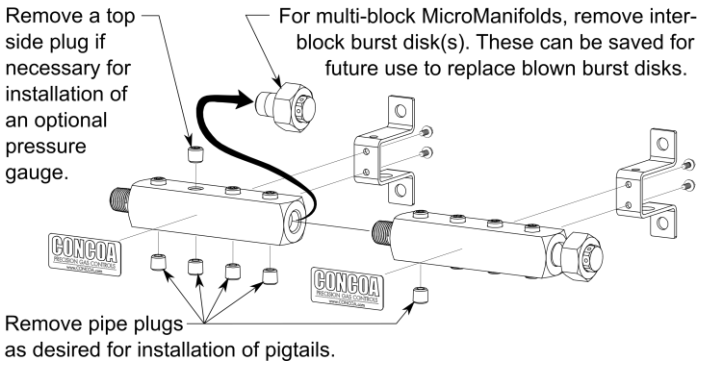
a. Before applying PTFE tape, inspect the NPT threads, and, if necessary, clean the fitting to remove any dirt or thread sealant that remains on the threads.
b. Start the PTFE tape on the first thread leaving a slight section of the chamfer exposed as shown in the detail. Make sure the tape does not overlap the end of the fitting.
c. 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.
d. Apply at least 2 but no more than 3 layers of tape to the threads.
e. Cut off excess tape, and press the end firmly into the threads.



ASSEMBLING THE MICROMANIFOLD:

1. Apply PTFE tape in accordance with the taping instructions to the ½" MPT on the MicroManifold block(s).
2. <u>If the manifold capacity is five or more cylinders, you will need more than one manifold block</u>:
   For standard MicroManifolds: a) remove the burst disk from one manifold block; b) clean PTFE tape out of the female NPT port; c) and install the block onto the ½" MPT of another manifold block.
   For Vent MicroManifolds: a) remove the burst disk from one manifold block; b) remove the NPT cap from another manifold block; c) clean PTFE tape off of the male NPT thread and out of the female NPT port; d) assemble the blocks together.
   DO NOT REMOVE THE FLOW RESTRICTORS ON VENT MICROMANIFOLD MODELS.
   All removed parts can be saved for future use.
3. Using a wrench, secure the inlet fitting on the system to which you are connecting the MicroManifold, and screw the MicroManifold block into the system inlet.
4. Attach a bracket to the back of each MicroManifold block with the hardware provided.
5. Using appropriate hardware, anchor each MicroManifold bracket to the wall, and ensure all connections are tightened.
6. For each pigtail being installed, remove a pipe plug from a bottom port on the manifold block(s) in desired locations, apply PTFE tape per the taping instructions to the male NPT on each pigtail, and install the pigtails into the manifold block(s).
7. For models with an optional pressure gauge, remove one of the top pipe plugs in the desired location, clean PTFE tape out of the gauge port, apply PTF tape per the taping instructions to the male NPT on the gauge, and install the gauge in the chosen port.
8. Refer to "Connecting to a Cylinder" for directions on connecting the pigtail(s) to cylinder(s).
9. Refer to "Pressure Testing the System" to confirm that there are no leaks in the system.

The assembly shown here is for a right side inlet connection.
A left side inlet connection would be a mirror image of this.



CONNECTING TO A CYLINDER

Read the next section before installing cylinders. The standard MicroManifold models are designed to deliver gaseous phase from either liquid or high-pressure cylinders (3,000 PSI maximum).
NEVER CONNECT BOTH LIQUID AND HIGH PRESSURE CYLINDERS TO THE SAME MANIFOLD.

CONNECTING HIGH PRESSURE CYLINDERS:

Read the "Pressure Testing a Standard MicroManiold" section before installing cylinders.

1. Before removing the cylinder cap, move the cylinder with a cylinder cart to the work site:
   a. Secure cylinder to the floor, wall, stand or bench with the appropriate chain or strap, to prevent toppling.
   b. Remove the cap on the high-pressure cylinder.
   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.
2. On the high-pressure cylinder, secure the pigtail cylinder connection to the cylinder valve in the following manner:
   a. Thread the nut into the cylinder valve CGA connection. Do not cross thread or 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 left-hand cylinder connections. They can be identified by the notch in the middle of the hex nut.
   c. PTFE or other plastic material gaskets or washers are used on some inlet connections, such as carbon dioxide (CGA 320). Be sure the gasket is in good shape. Do not over-tighten to avoid deforming the gasket, which may create a leak or failure.
3. Open each cylinder gas use valve after all new cylinders have been properly connected and secured.
4. The MicroManifold is ready for use.

CONNECTING LIQUID CYLINDERS TO A STANDARD MICROMANIFOLD:

1. Before removing the cylinder cap, move the cylinder with a cylinder cart to the work site:
   a. Secure cylinder to the floor, wall, stand or bench with the appropriate chain or strap, to prevent toppling.
   b. The large diameter ring located at the top of a liquid cylinder protects the cylinder valves instead of a 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.
2. If the gas supply source is a liquid cylinder, identify the gas use valve before making a connection.
   a. **WARNING: Connect ONLY to GAS USE Valve.**
   b. **WARNING: The carbon dioxide liquid cylinder incorporates a CGA 320 connection on both the gas use and liquid fill valves. Premature pigtail failure may occur if a polymer lined pigtail is exposed to cryogenic liquid temperature.**
   c. **WARNING: Never use oil or grease on regulator or cylinder fittings, as it may contaminate pure gases, or create a fire hazard.**
3. Secure the pigtail cylinder connection to the liquid cylinder gas phase use valve in the following manner:
   a. Close the gas use valve (clockwise) of each liquid cylinder connected to the gas phase manifold.
   b. If replacing an empty cylinder, loosen the pigtail flare connection to the cylinder's gas phase use valve a quarter turn to depressurize the vent manifold. A restrictive flow orifice has been installed between the manifold block and the pigtail to prevent whipping during a cylinder exchange.
   c. Finish removing the cylinder connection.
   d. Replace the empty cylinders.
4. Open each cylinder gas use valve after all new cylinders have been properly connected and secured.
5. If using a liquid cylinder, open the liquid cylinder pressure building (PB) valve and adjust the PB regulator at least 50 psi above the pressure control device line pressure. A greater pressure differential may be required for higher flow requirements
6. The MicroManifold is ready for use.

CONNECTING LIQUID CYLINDERS TO A VENT MICROMANIFOLD:

Read the "Pressure Testing a Vent MicroManiold" section before installing cylinders.

52L / 629 Series vent MicroManifolds are to be used in conjunction with a standard MicroManifold or a 628 Series gas manifold. The vent manifold is designed to provide headspace equalization via a common connection for multiple liquid cylinder vent use valves.

1. Move the liquid cylinder with a cylinder cart to the work site:
   a. Secure cylinder to the floor, wall, stand or bench with the appropriate chain or strap to prevent toppling.
   b. The large diameter ring located at the top of the liquid cylinder protects the piping and valves.
   c. Be sure all cylinder valves are tightly closed. (Clockwise)
   d. Remove the cylinder valve plug, if any.
   e. Inspect valves and threads for damage or contamination.
2. Secure the pigtail cylinder connection to the liquid cylinder vent use valve in the following manner:
   a. Close the vent use valve (clockwise) of each liquid cylinder connected to the vent manifold.
   b. If replacing an empty cylinder, loosen the pigtail flare connection to the cylinder's vent use valve a quarter turn to depressurize the vent manifold. A restrictive flow orifice has been installed between the manifold block and the pigtail to prevent whipping during a cylinder exchange.

   WARNING: The operator should secure the pigtail with one hand until exhausting of gas has subsided.
   c. Finish removing the flare connection.
   d. Replace the empty cylinders.
   e. Thread the pigtail flair nut onto the vent use valve CGA 295 or 440-flare connection of each cylinder. Do not cross thread or force. If it does not fit, the connection may be wrong for the type of gas being used.

   WARNING: Connect ONLY to VENT USE Valve.

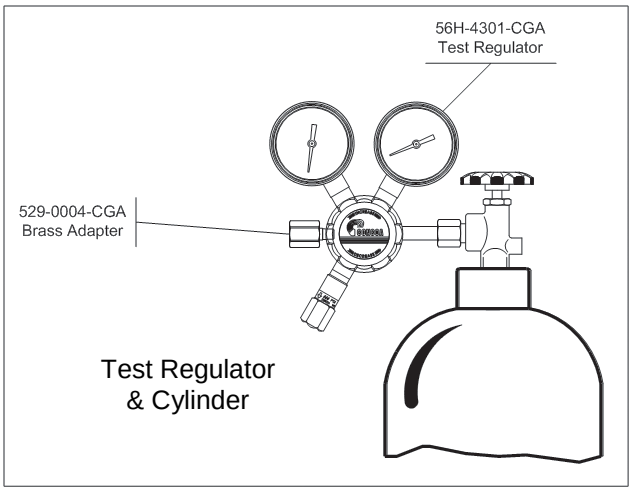
   WARNING: Use extra caution when reconnecting the pigtail to the new liquid cylinder vent use valve. Both the vent and liquid use valves incorporate the same connection.
   f. After all vent cylinders are attached to the vent manifold, open each vent use valve (counterclockwise).
   g. Open the liquid cylinder pressure building (PB) valve and adjust the PB regulator at least 50 psi above the pressure control device line pressure. A greater pressure differential may be required for higher flow requirements.
   h. The vent manifold is ready for use.

PRESSURE TESTING A STANDARD MICROMANIFOLD

Before system startup, it is recommended that all systems be pressure tested, leak tested, and purged with a clean, dry inert gas like helium or argon.

1. Wear safety glasses and gloves.
2. Connect last pigtail on the manifold to a test cylinder regulated to 50 psi as illustrated in the "Test Regulator and Cylinder" figure. Do not open the cylinder valve yet.
3. Make sure all pigtails have been properly secured to the MicroManifold.
4. Isolate the outlet of the pressure control device (Regulator or Switchover) from the piping leading to the point of use. This will allow you to confirm that the MicroManifold and pressure control device is leak free. It is not uncommon for there to be a small leak in the pipe line or point of use.
5. When first pressurizing, do not stand in front of or in contact with the regulator or switchover system. **Warning: If the attached regulator is preset, gas will escape from the delivery side of the pressure control device.**
6. Turn the adjusting screw or knob of the test regulator counterclockwise until it disengages the adjusting spring.
7. Slowly open the test cylinder valve.
8. Next, adjust the test regulator to 50 psi.
9. Wait 5-10 seconds for the system pressure to equalize.
10. Close the test cylinder valve.
11. Inspect all connections for leaks and fix any leaks. A leak detection solution may be applied to the connections if compatible with the application which indicates leaks by bubbling. To further check for leaks or if a leak detection solution can not be used, keep test cylinder valve closed for a period of time (24 hours) and observe the test regulator's low pressure gauge for a drop in pressure.
12. If a drop in pressure is observed, recheck all connections.

13. Depressurize the system at the point of use to atmosphere by opening the delivery line regulator and isolation valves. Once pressure is relieved, close regulator and isolation valve. Fix leaking connection. Never attempt to fix a leak under pressure.
14. Once all connections are secure and leak free, continue to the next step.
15. Now set the outlet pressure of the pressure control device, and open any isolation valve to allow the pipe line to pressurize.
16. Repeat steps 5-14.
17. When all leaks are fixed, close the test cylinder valve. Bleed system pressure to zero.
18. Disconnect the test cylinder and regulator.
19. Connect service gas cylinders to the manifold by following the section titled “Connecting to a Cylinder”.
20. Open service gas cylinder valves and repeat steps 11 - 15 until all leaks are eliminated.
21. System is ready for use.



PRESSURE TESTING A VENT MICROMANIFOLD

Before system startup, it is recommended that all systems be pressure tested, leak tested, and purged with a clean, dry inert gas like helium or argon.

1. Wear safety glasses and gloves.
2. Follow the “Connecting to a Cylinder” section and connect all cylinders to the vent manifold.
   *** Do not open the liquid cylinder gas use valves.
3. Make sure all pigtails have been properly secured to the vent MicroManifold.
4. Slowly open the vent use valve on the last liquid cylinder.
5. Next, wait 5-10 seconds for the vent manifold system pressure to equalize.
6. Close the cylinder vent use valve.
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 which indicates leaks by bubbling.
8. If a leak is observed, depressurize the system and fix the leaking connection. Loosen the pigtail flare connection to the cylinder's vent use valve a quarter turn to depressurize the vent MicroManifold. A restrictive flow orifice has been installed between the manifold block and the pigtail to prevent whipping during a cylinder exchange. Never attempt to fix a leak under pressure.
   WARNING: The operator should secure the pigtail with one hand until exhausting of gas has subsided.
9. Once all connections are secure and leak free, the vent MicroManifold is ready for use.

OPERATION

Follow the instructions supplied with the product to which you are connecting the MicroManifold when operating these devices. When removing a cylinder from the MicroManifold, the manifold header valve must be closed first.

MAINTENANCE

At regular intervals, the MicroManifold system should be checked for leaks and proper function (see Troubleshooting). 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 MicroManifold system malfunctions needing repair. Immediately clean, repair, and test the system, or replace it with a new system.

1. Gas leakage from any joint.
2. The system includes a manifold header valve that, when closed, does not cut off the gas supply to the compatible system.
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. Contact CONCOA Customer Service in Virginia Beach, Virginia for systems still covered by the warranty. For items not covered by the warranty, contact the nearest CONCOA District Sales Office for assistance. 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 it 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. Purging is especially important if the equipment has been in hazardous gas service.
6. CONCOA MicroManifolds must not be used in toxic or corrosive gas service. CONCOA will not service the product if it has been used with toxic or corrosive gas.

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 warrantied 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 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 operated under improper conditions or outside published specifications; or if the equipment has been damaged or does not function due to improper installation, improper supply of required utilities, accident, abuse, misuse, natural disaster, insufficient or excessive electrical supply, abnormal mechanical or environmental conditions, or debris or particles in the gas or liquid source of supply.

CONTROLS CORPORATION OF AMERICA's sole and exclusive obligation and Buyer's sole and exclusive remedy under the above warranties is limited to repairing using new or reconditioned parts or replacing, free of charge except for labor if permanently installed for the continuous supply of gas by other than a technician certified by CONTROLS CORPORATION OF AMERICA specifically to do so, at CONTROLS CORPORATION OF AMERICA's option, the equipment or part, which is either (1) 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 with return trip transportation charges for the equipment or part paid by Buyer or (2) in the case of designated equipment permanently installed for the continuous supply of gas, reported to an Authorized Service Center with proof of initial installation no later than seven (7) days after the expiration date of the applicable warranty, and which is evaluated for compliance with the above warranties by technician certified by CONTROLS CORPORATION OF AMERICA, and which is determined by CONTROLS CORPORATION OF AMERICA based on said evaluation to be non-compliant.

CONTROLS CORPORATION OF AMERICA 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.

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