

The 677 Series Stainless Steel High Flow Automatic Switchover System

For Use with
High Purity
Non-Toxic,
Non-Corrosive
Gases

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
To Order Call 1-800-225-0473 or 757-422-8330 • Fax 757-422-3125
www.concoa.com







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DESCRIPTION OF PRODUCT

The stainless steel 677 Series High Flow High Purity Switchover is an automatic switchover system designed to provide a continuous supply of high flow high purity gas at high flow rates. It is designed for use with non-corrosive and non-toxic gases such as Nitrogen, Argon, Helium, Hydrogen, Methane and Oxygen or mixtures of these gases and can be ordered with special Chloroprene Seats for use with Carbon Dioxide and or Nitrous Oxide and certain hydrocarbons which cannot be used with the standard Viton seats. Each side of the switchover may be supplied with gas from cylinder packs, cylinder pallets, or tube trailers or from banks of these gas supply sources. The switchover may be purchased with open inlet ports or with inlet shutoff valves, with or without inlet purge valves, and with or without an integral line regulator (see part number key at end of this document). If constant regulated outlet pressure is required, either the integral line regulator option is required, or a regulator will need to be installed down-stream after the switchover system. If the system includes the optional Altos 2 remote alarm, refer to ADI 0025 for alarm installation and operating instructions.

The "switchover pressure" is the inlet pressure at which the system is designed to switch from a depleted supply on one side to a full supply on the other side.

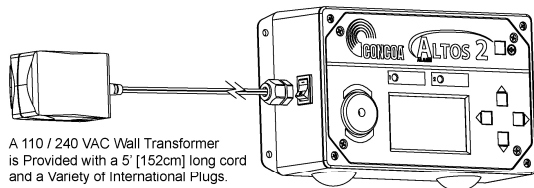
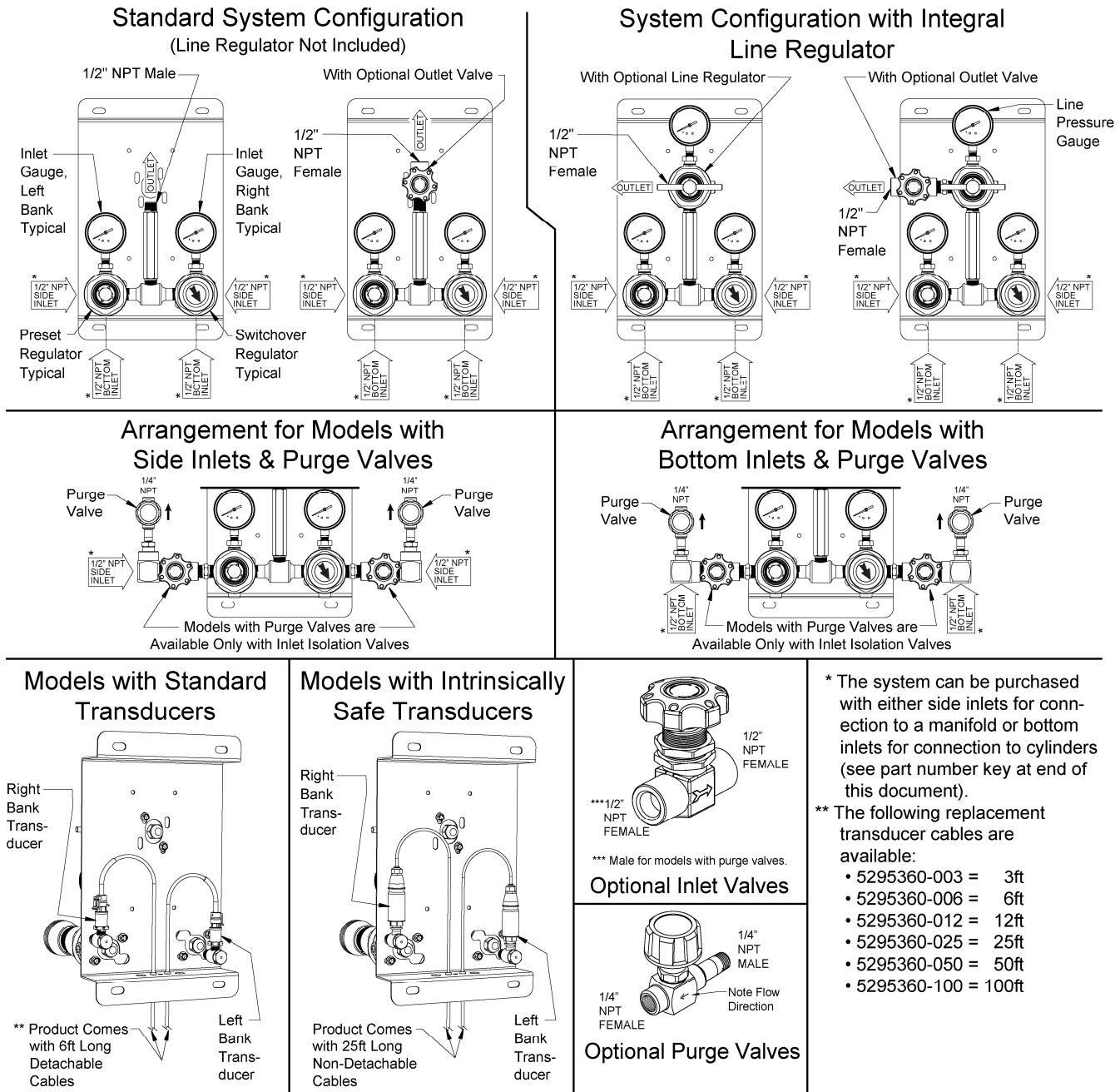
The table below shows the switchover pressures for all models and the outlet pressures for models that do not include the integral line regulator option:

MODEL NUMBER	Switchover Pressure (Applicable to All Models)		Outlet Pressure for Models Without Integral Line Regulator
677 3x_x "0" or "C" in this digit = "Without Line Regulator"	Priority Knob Left 205-245 PSI (14.1-16.9 BAR)	  Priority Knob Right 285-325 PSI (19.7-22.4 BAR)	205-395 PSIG (14.1-27.2 BAR)
677 4x_x "0" or "C" in this digit = "Without Line Regulator"	Priority Knob Left 330-370 PSI (22.8-25.5 BAR)	  Priority Knob Right 410-450 PSI (28.3-31.0 BAR)	330-520 PSIG (22.8-35.9 BAR)
677 7x_x "0" or "C" in this digit = "Without Line Regulator"	Priority Knob Left 580-620 PSI (40.0-42.7 BAR)	  Priority Knob Right 660-700 PSI (45.5-48.3 BAR)	580-770 PSIG (40.0-53.1 BAR)

Models with the integral line regulator option will maintain line pressure set by the user within the limits shown in the table below provided that the selected switchover pressure is greater than the selected line regulator delivery pressure:

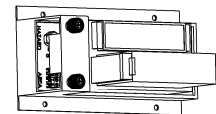
MODEL NUMBER	Line Regulator Delivery Pressure	
677 xx1x or 677 xxDx "1" in this digit = "Without Outlet Valve" "D" in this digit = "With Standard Outlet Valve"	0-125 PSIG	0-8.6 BAR
677 xx2x or 677 xxEx "2" in this digit = "Without Outlet Valve" "E" in this digit = "With Standard Outlet Valve"	0-250 PSIG	0-17.2 BAR
677 xx3x or 677 xxFx "3" in this digit = "Without Outlet Valve" "F" in this digit = "With Standard Outlet Valve"	0-500 PSIG	34.5 BAR

Models with the optional Altos 2 remote alarm provide an audible and visual warning that a switchover is about to occur. Pressing a button on the front of the remote alarm silences the audible alarm. The LEDs and the LCD display on the Altos 2 alarm indicate the status of the left and right banks.



Optional Altos 2 Remote Alarm

Refer to CONCOA Instruction Document #ADI 0025 For Alarm and Barriers Wiring Instructions



Optional Intrinsic Safety Barriers

Figure 1 – System Configuration and Parts

INTENDED USE OF PRODUCT

The stainless steel 677 Series switchover is for use with ultra-high purity gas applications. Please note the safety information shown in the later sections.

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, distorted or contaminated should be replaced immediately. CONCOA recommends that a telephone or written request for service advice should be made to CONCOA Customer Service in Virginia Beach, Virginia:

PHONE: 1-800-225-0473 FAX: 1-757-422-3125

or

E-MAIL: info@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. 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, asphyxiant, oxidizer). The 677 Series is NOT for use with toxic or corrosive gases. Equipment failure or misuse may lead to problems such as release of gas through the regulators' internal seals. Proper safety measures, such as use of gas cabinets or gas detectors, should be established to handle these and other component failures.

2. Be sure that the assembly is suitable for the gas and type of service intended.

IMPORTANT: The 677 Series switchover is available with 2 different internal seat materials. For carbon dioxide, nitrous oxide, and certain hydrocarbons which cannot be used with Viton seats, use code "C" in the last digit of the CONCOA part number (chloroprene seat). For all other gas services, use code "R" in the last digit of the CONCOA part number (Viton seat). Refer to the part number key at the end of this document. The switchover's labeling provides the following information:

a. Model Number

b. Serial Number

c. Maximum Inlet Pressure

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 with the conditions of pressure, temperature, flow, etc. Selection information can be found in CONCOA's *Research & Specialty Gas Catalog* and in the *Research & Specialty Gas* section of the CONCOA web site (www.concoa.com).

3. 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 with a clean cloth and, if required, with aqueous detergent suitable for the application. If there are signs of internal contamination, return the system to the supplier.

4. 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 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.

SAFETY

GENERAL SAFETY PRACTICES

- √ Comply with precautions listed in C.G.A. Pamphlet P-1, Safe Handling of Compressed Gases in Containers.
- √ 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 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.
- √ 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 an oxidizer (such as NO₂ or O₂) 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 lift gas cylinders with a magnetic lifting device.
- √ 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.

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. 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 G-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.G.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:

Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202-3239
(703) 979-0900 Publications: (703) 979-4341 Fax: (703) 979-0134

CAUTION

INSTALLATION

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. Systems installed in open locations should be protected from weather conditions. During winter, protect the system from ice and snow. In summer, shade the system and cylinders from continuous exposure to direct sunlight. Always leave access to the system for cylinder replacement.

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

Consider the following when installing the system:

1. Be sure to consider all factors when selecting materials.
2. Do not use oil or grease on fittings.
3. Be sure that all fittings are secure and leak tight. PTFE tape should be used on pipe threads.
4. If constant delivery pressure is required, a line regulator will need to be installed. If the line regulator is not integral with the switchover system (see part number key at end of this document), then a decision will need to be made regarding where downstream from the switchover outlet a line regulator will be installed.
5. Optional Purge Valves: The purge valves are used to remove flammable or otherwise undesirable gases (the 677 Series is not for use with toxic or corrosive gases) from the customer's system to a safe discharge area. This is particularly helpful when an internal problem occurs such as regulator malfunction.

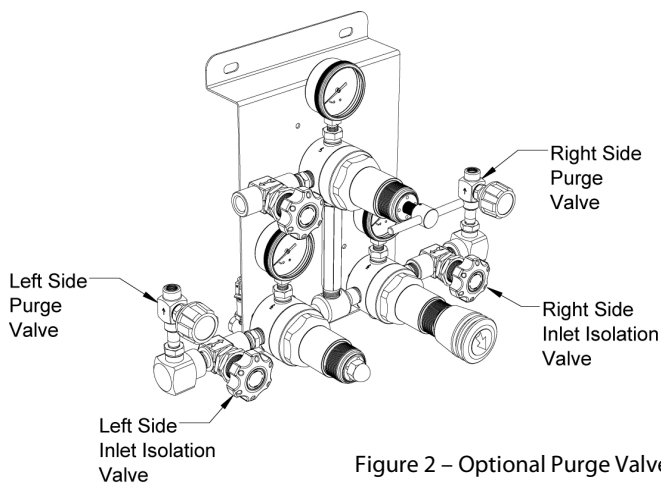


Figure 2 – Optional Purge Valves

Mount the switchover system to a flat surface using the appropriate hardware at hole locations provided in the bracket. Dimensions for these holes are shown in Figure 3. If installing for use with cylinders, provide enough clearance between the top of the cylinders and the switchover system. The typical installation for cylinders needs 66 inches between the floor and the inlet connection ports.

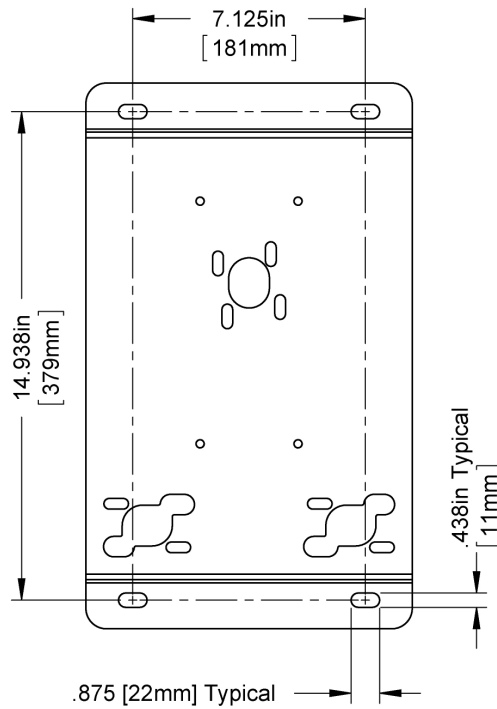


Figure 3 – Wall Mounting Dimensions

Install inlet and outlet connections to the system. Use an open-end wrench, not a pipe wrench, to install accessories to the switchover system. 1/2" 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 prevent the connections from galling together when tightening or loosening. CONCOA uses PTFE tape on all of its system NPT connections.

Follow these rules when using PTFE tape:

Inspect the NPT threads and, if necessary, clean the fitting to remove any dirt or PTFE tape that remains on the threads. Start the PTFE tape on the second thread as shown in Figure 4. 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. Wrap the tape around the threads twice. Cut off the excess tape and press the end firmly into the threads.

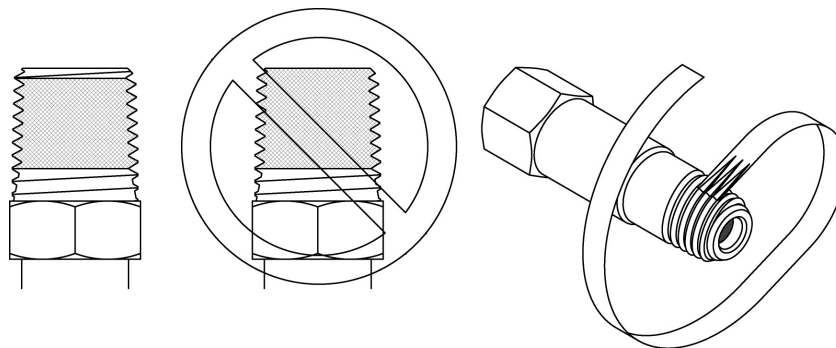


Figure 4 – PTFE Tape Placement

Installing the inlet connection:

The switchover system inlets are ½" female NPT ports. Depending on the options selected, the inlet ports will be on the switchover's regulators, on inlet valves attached to the switchover's regulators, or on the purge valve tees for models with purge valves. The inlet ports may be oriented either at the bottom or at the sides (see the part number key at the end of this document).

Installing the outlet connection:

The switchover system outlet is either a ½" NPT male nipple for models without an integral line regulator and without an outlet valve, or a ½" female NPT port for all other models. The outlet is oriented vertically for models without an integral line regulator or horizontally for models with an integral line regulator (see Figure 1 – System Configuration and Parts).



Pressurizing the system for the first time:

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 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.

1. Wear safety glasses and gloves.
2. Be sure that both ends of all hoses or pigtails are secured before pressurizing. On the system with the line regulator, turn the line regulator captive T-screw counterclockwise until the T-screw stops turning (turn off flow).
3. When first pressurizing, do not stand in front of or contact the switchover system. Slowly open the cylinder valve. Observe the high pressure gauges for a rise in pressure up to full cylinder pressure.

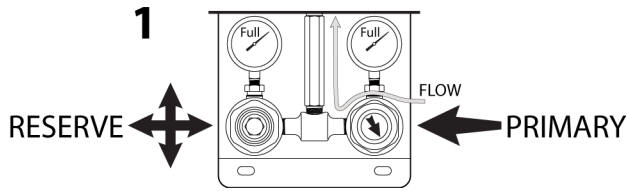
WARNING:

If the system does not include an integral line regulator, the outlet will be pressurized when the cylinder valve is opened.

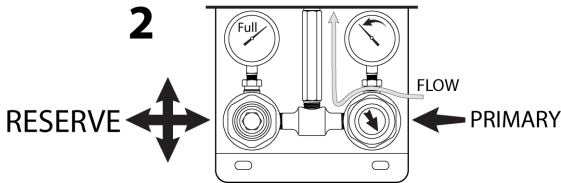
4. Keep the hand wheel or wrench on the open cylinder valve at all times to allow prompt emergency shut-off.
5. Inspect all connections for leaks and fix any leaks. If compatible with the application, a leak detection solution may be applied to the connections which will indicate leaks by bubbling. To further check for leaks, or if the leak detection solution can not be used, close the cylinder valve for a period of time (recommended 24 hours), and observe the high pressure port inlet gauges for a drop in pressure. If a pressure drop is detected, recheck the CGA connections and all other high pressure port connections. If the system does not include an integral line regulator, the outlet connections will also need to be rechecked.
6. Never attempt to fix a leak under pressure. If leaks are detected, depressurize the system and retighten the connections. Begin again at Step 3.
7. If equipped with the optional line regulator, slowly turn the line regulator T-screw clockwise (turn on flow). This will increase the pressure of the line. Adjust to the desired working pressure, and again check for leaks using the methods described above.

OPERATION

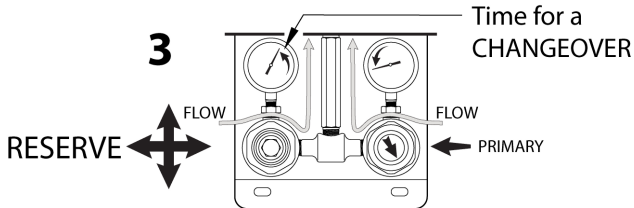
The 677 Series switchover is designed to be operated in such a manner that the "primary" gas supply alternates from one side to the other as described below:



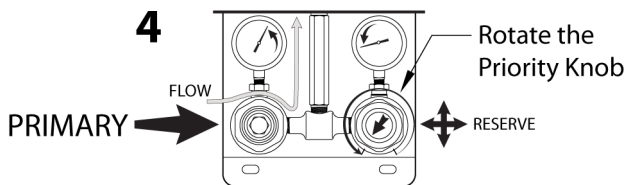
The arrow on the priority knob always points to the "PRIMARY" gas supply.
The opposite side is the "RESERVE" gas supply.



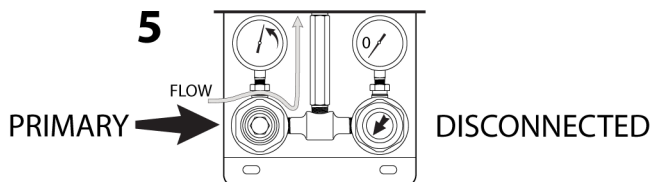
With the gas supplies on both sides filled above the switchover pressure (see table in Description of Product section), gas will flow only from the PRIMARY gas supply.



When the PRIMARY gas supply pressure drops to the switchover pressure (see table in Description of Product section), flow from the PRIMARY gas supply will stabilize, and flow will begin from the RESERVE gas supply.
The inlet pressure drop on the RESERVE side indicates it is time for a gas supply "CHANGEOVER".



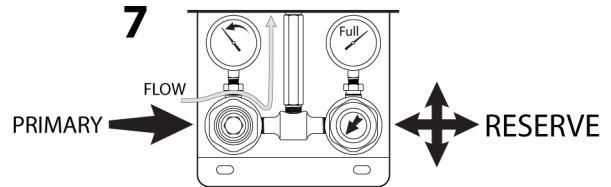
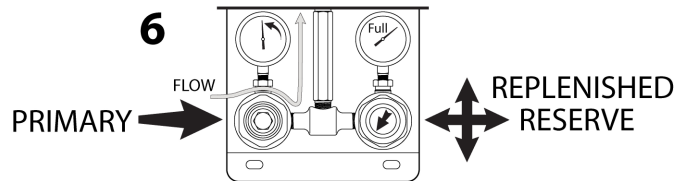
Before disconnecting the depleted gas supply, ALWAYS ROTATE THE PRIORITY KNOB 270° AT CHANGEOVER. This swaps the PRIMARY gas supply to the opposite side.



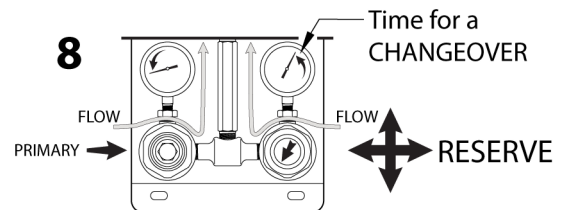
Note that there is no interruption of flow while the depleted gas supply is being replenished.

NOTE:

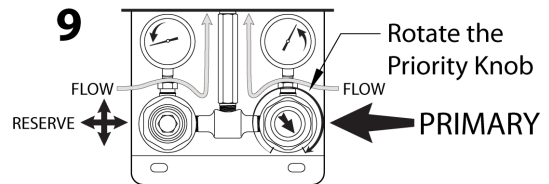
If the system inlets use check valves (i.e., on flexible hoses), inlet pressure will not drop to zero on the disconnected side as shown in steps 5 and 10.



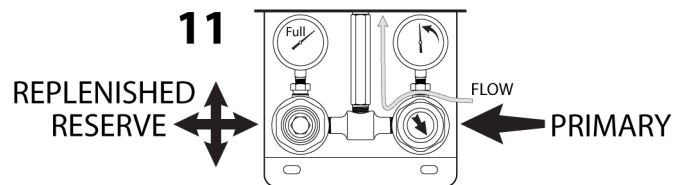
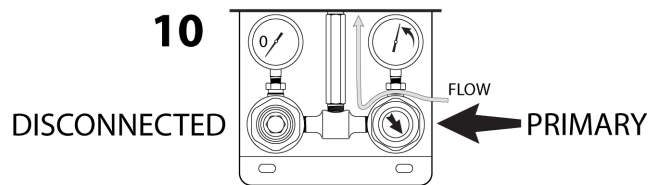
After replenishing the depleted gas supply, gas will continue flowing only from the new PRIMARY gas supply.



As before, when the PRIMARY gas supply pressure drops to the switchover pressure, flow from the PRIMARY gas supply will stabilize, and flow will begin from the RESERVE gas supply.
The inlet pressure drop on the RESERVE side indicates it is time for another gas supply "CHANGEOVER".



Again rotate the priority knob on the priority regulator 270° to swap the PRIMARY gas supply to the opposite side.



Disconnect and replenish the depleted gas supply, and repeat the cycle.

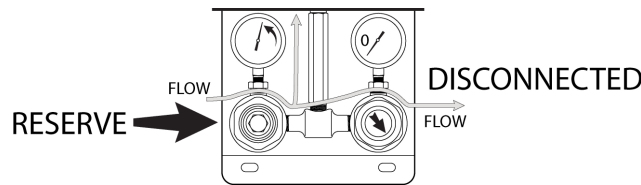
At the "CHANGEOVER" point which occurs at the switchover pressure (see table in the Description of Product section), the depleted gas supply will have the following pressure remaining:

MODEL NUMBER	Depleted Gas Supply Pressure at the Changeover Point (Maximum Line Pressure for Models Without the Integral Line Regulator)	
	Left Side	Right Side
677 3xxx	205-245 PSIG (14.1-16.9 BAR)	375-395 PSIG (25.9-27.2 BAR)
677 4xxx	330-370 PSIG (22.8-25.5 BAR)	500-520 PSIG (34.5-35.9 BAR)
677 7xxx	580-620 PSIG (40.0-42.7 BAR)	750-770 PSIG (51.7-53.1 BAR)

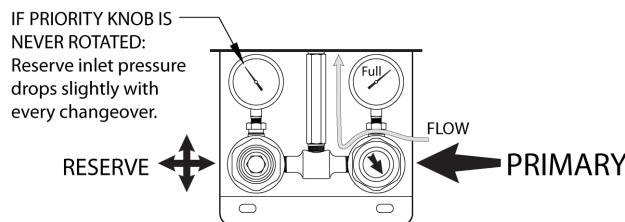
It is helpful to maintain a log of cylinder pressures noting in which direction the priority arrow is pointing. When the primary inlet pressure gauge is very low and the reserve inlet gauge shows that reserve gas has begun to flow, it is time to rotate the priority knob 270° and replenish the reserve gas supply.

Always remember to rotate the priority knob before replenishing the depleted gas supply on either side. If the priority knob is not rotated before the depleted gas supply is replenished, two things can happen:

1. With zero or minimal inlet pressure on the depleted side, gas may flow from the replenished side out through the inlet on the other side. This occurs because the regulator delivery pressure setting is higher on the side to which the priority arrow points. If the arrow is pointing the wrong direction, the delivery pressure from the regulator on the opposite side will not be high enough to close the seat on the opposing regulator.



2. If the priority arrow is pointing the wrong direction at changeovers, flow from the reserve gas supply will occur only briefly between the time at which the depleted gas supply is disconnected and the time at which it is replenished. Thus, reserve gas capacity diminishes with every changeover. Eventually, a point is reached at which the reserve gas supply is nearly depleted and fails to function as an adequate backup for the primary gas supply.



MAINTENANCE

On regular intervals, the system should be checked for leaks and proper function (see trouble shooting). Any leaks in the system should be corrected immediately. At no time should the preset regulator or the priority regulator pressure settings be changed.

TROUBLE SHOOTING

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

1. Gas leakage at the line regulator outlet when the adjusting screw of the line regulator is completely backed-out.
2. With no flow through the system (downstream valves closed and adjusting screw in), line pressure steadily increases above the set pressure.
3. Gas leakage from spring case (adjusting screw/knob end of regulator).
4. Gas leakage from any joint.
5. Excessive drop in working pressure with regulator flowing gas.
6. Gas leakage from relief valve.
7. Gas leakage from gauge.
8. Gauge does not return to zero when not under gas pressure.
9. Gauge does not consistently repeat the same reading.
10. The system makes a noise or hums.

If the switchover system seems to be using gas from the primary and reserve cylinders simultaneously (pressure is decreasing on both inlet gauges at the same time), do the following

1. Make sure the priority knob is turned fully to the right or left.
2. Observe the inlet pressure. It may be necessary to do this during the heaviest use of the system. If the inlet pressure is below the values listed below, replenish the gas supplies. If liquid cylinders are used and the inlet pressure increases significantly when the system is not in use, then the system is over-withdrawing the liquid cylinders. Additional capacity may be added to the system to prevent this.

MODEL NUMBER	Minimum Inlet Pressure
677 3xxx	300 PSIG (20.7 BAR)
677 4xxx	425 PSIG (29.3 BAR)
677 7xxx	675 PSIG (46.5 BAR)

3. If the above does not fix the problem, please contact CONCOA Customer Service personnel. Please be prepared to give the following:

Model Number
Gas Service
Inlet Pressure and Type of Gas Supply
Outlet Pressure

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 all 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 in the original shipping container.
2. Ship prepaid.
3. Include a statement of the observed deficiency.
4. Indicate the gas service in which the equipment was used.
5. Purge all equipment before shipment to protect the transporter and service personnel. The purging is especially important if the equipment has been used in hazardous 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.

677 Series Switchover Part No.:

677 [] [] [] [] -01- [] [] [] []

4th digit 5th digit 6th digit 7th digit

Inlet Connection Code last digit

Gas Service / Seat Material

- R = Not for Carbon Dioxide or Nitrous Oxide Gas Service / Viton Seat
- C = For Carbon Dioxide or Nitrous Oxide Gas Service / Chloroprene Seat

Inlet Connection Type

-001 = 1/2" NPT Port

Transducer Style / Alarm / Inlet Gauges

- 1 = Without Transducers / Without Alarm / 4000 PSI / 28000 KPa Gauges
- 2 = Without Transducers / Without Alarm / 4000 PSI / 280 BAR Gauges
- G = Standard Transducers / With Alarm / 4000 PSI / 280 BAR Gauges
- J = Standard Transducers / Without Alarm / 4000 PSI / 280 BAR Gauges
- L = Intrinsically Safe Transducers & Safety Barriers / With Alarm / 4000 PSI / 280 BAR Gauges
- N = Intrinsically Safe Transducers & Safety Barriers / Without Alarm / 4000 PSI / 280 BAR Gauges

Outlet Styles

- 0 = Without Integral Line Regulator, Without Outlet Valve
- C = Without Integral Line Regulator, With Standard Outlet Valve
- 1 = 0-125 PSI Integral Line Regulator Without Outlet Valve
- 2 = 0-250 PSI Integral Line Regulator Without Outlet Valve
- 3 = 0-500 PSI Integral Line Regulator Without Outlet Valve
- D = 0-125 PSI Integral Line Regulator With Standard Outlet Valve
- E = 0-250 PSI Integral Line Regulator With Standard Outlet Valve
- F = 0-500 PSI Integral Line Regulator With Standard Outlet Valve

Inlet Styles

- 0 = Open 1/2" NPT Bottom Inlet Ports
- 1 = Open 1/2" NPT Side Inlet Ports
- 6 = Bottom Inlets with Standard Inlet Valves
- 7 = Side Inlets with Standard Inlet Valves
- 8 = Bottom Inlets with Standard Inlet Valves & Purge Valves
- 9 = Side Inlets with Standard Inlet Valves & Purge Valves

Switchover Pressure

- 3 = Left: 205-245 psig / Right: 285-325 psig
- 4 = Left: 330-370 psig / Right: 410-450 psig
- 7 = Left: 580-620 psig / Right: 660-700 psig

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 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 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.

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.

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

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