

The 650 Series AutoBlend™

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

February 2003
New Release

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INTENDED USE OF PRODUCT

The CONCOA gas mixer has been designed to mix two non-flammable and noncorrosive gases. The gas mixer can be wall mounted in an indoor location.

EXPLANATION OF MODEL NUMBER

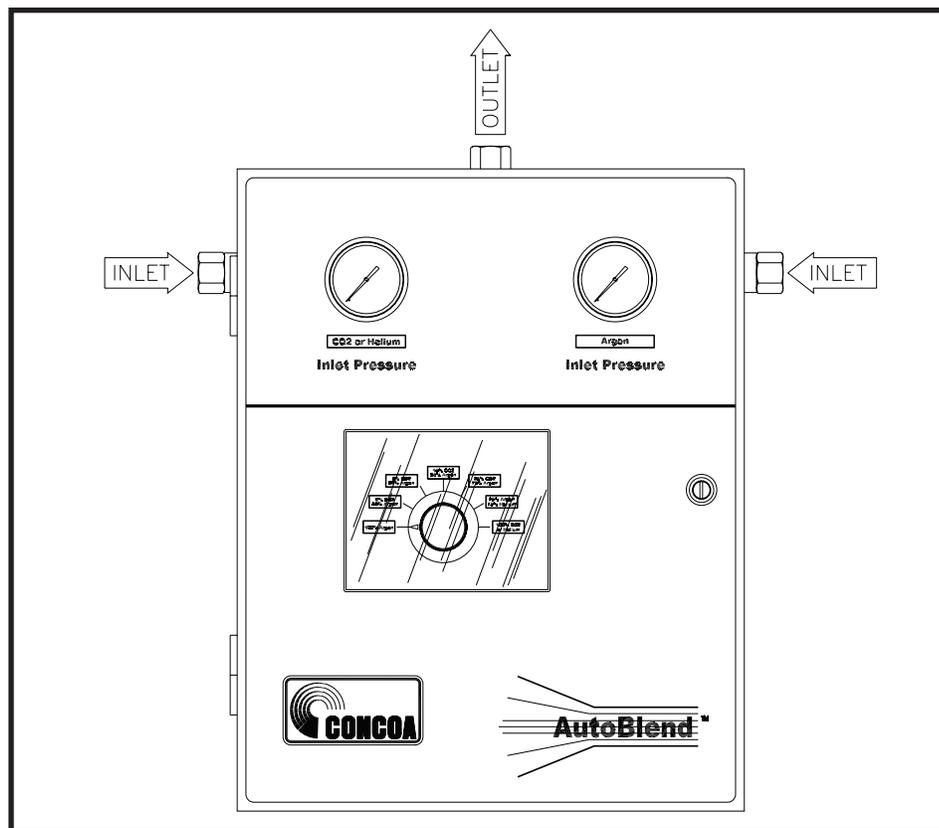
Series 650 AutoBlend™

SPECIFICATION SHEET

The specification sheet is a summary of the important technical information about the gas mixer. This includes the inlet/outlet pressure conditions, pressure settings, voltage requirements and pressure alarm options. This data sheet also lists the major parts and recommended spare parts.

MECHANICAL DESCRIPTION

Located on the front panel of the mixer are gauges for the major gas inlet pressure, minor gas inlet pressure.



The gas inlets are located on each side of the gas mixer, designed for inlet pressure of 100 - 125 PSI. Each of these gas inlets is a 1/2 inch female NPT fitting and is labeled for a specific gas. On the top of the enclosure is a 1/2 inch NPT female outlet header.

Following the check valves is the pressure equalization subsystem. This system reduces and equalizes the major and minor gas pressures to within ± 1 psig. The pressure equalizing subsystem contains 40-micron filters. The equalized pressure gases then flow through the dual metering valve subsystem into the mixing chamber where they are precisely mixed.

OPERATING PRINCIPLE

Constant mixture percent is accomplished by maintaining equal flowrate at equal pressures across the major and minor gas flow control devices, regardless of the delivery flowrate. One of up to seven (7) selector settings can be chosen by dialing to the proper point and hearing an audible click.

WARNING: Do not allow any liquid gases to enter the gas mixer. Liquid gases will damage the internal parts and may cause personal injury.

CARBON DIOXIDE REGULATOR FREEZE UP

Regulators flowing carbon dioxide may “freeze” due to the pressure drop of the carbon dioxide in the regulator. If this “freeze” should occur, a manifold heater assembly or heated regulator should be used. Contact CONCOA customer service.

GAS STORAGE SYSTEMS

Bulk liquid tanks are excellent supply sources for gas mixers provided that the diameter of the piping to the gas mixer is adequate. High-pressure cylinders manifolded together are also an acceptable supply system. The high pressure must be reduced by using the high pressure kit to the lower pressures (100 - 125 PSIG maximum) required by the gas mixer.

MANIFOLDS

CONCOA manifold systems are adequate in capacity for the gas mixer. CONCOA automatic change over systems are recommended to ensure that a continuous supply of gas is available to the gas mixer.

WARNING Most gases, such as carbon dioxide, argon, and nitrogen are colorless and odorless. These gases can displace the oxygen in a confined area and cause death or injury by asphyxiation. Therefore, the gas mixer should not be placed in a confined area without ventilation. Leaks from the mixing system or associated piping could cause oxygen deficiency in such an area.

USE OF PRODUCT

The mixer is intended for use in non-corrosive gas applications. Please note the safety information shown in later sections. This product is not intended for use in toxic or corrosive applications.

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 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.

USER RESPONSIBILITY

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 SERVICE

In the event of equipment failure, call CONCOA Customer Service. Please be prepared to provide the model number and serial number of the equipment involved, in addition to details regarding its application. This would include inlet and outlet pressures, flow rate, environmental conditions, and gas service.

INSTALLATION PLANNING

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). This product is not intended for use in toxic or corrosive applications. Equipment failure or misuse may lead to problems such as a release of gas through the relief valve or regulator diaphragm. Please note the enclosure is not sealed and may leak gas from faulty components. 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 specification label provides the following information:
 - a. Model number
 - b. Serial number
 - c. Selection inlet pressure range
 - d. mixture components

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.

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 and tests 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.
4. Before system start-up, it is recommended that all systems be pressure tested, leak tested, and purged with an inert gas such as nitrogen.

Comply with precautions listed in C.G.A. Pamphlet P-I, 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.

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.

GENERAL SAFETY PRACTICES

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.

WARNING GAS MIXER HAZARDS

Only use the gases shown on the labels in the gas mixer. These gas mixers are not designed to accept flammable or corrosive gases. Use of these types of gases could damage the gas mixer and cause personal injury.

Do not replace any parts on oxygen models unless they have been cleaned for oxygen service. Use only the parts specified by CONCOA.

The gas mixers are not designed to accept liquid gases. Exposure to liquid gases will damage the internal parts and may cause personal injury.

Any damage caused by high-pressure gases or liquid gases is not covered by the warranty.

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. 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. 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.

INSTALLATION

The site chosen for the 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 trucks, cranes, or other heavy machines. The optional oxygen system must not be installed under shafting, belting, or other places where oil can drip on them. For other location guidelines, see NFPA standard 51.

Installing the system:

- Be sure to consider all factors when selecting materials.
- Do not use oil or grease on fittings.
- Be sure that all fittings are secure and leak tight. Teflon tape should be used on pipe threads.
- Relief valve: The purpose of the relief valve is to protect the system and its components only. If there is pressure sensitive equipment downstream of the system, It is recommended that a relief valve (534 Series) be installed to protect this equipment.**

Mount the system to a flat surface using the appropriate hardware at hole locations provided in the bracket. Dimensions for these holes are shown in Figure 2.

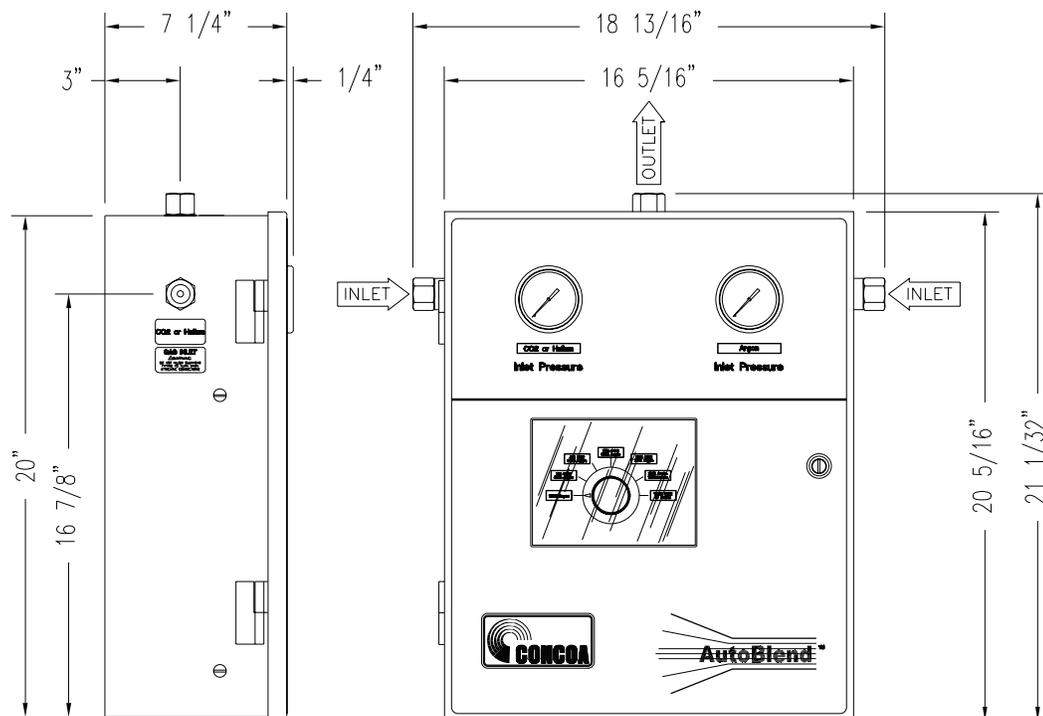


Figure 2. Dimensions for the 650 Series AutoBlend™

OPERATION

INSTALLING INLET AND OUTLET CONNECTIONS:

Use an open-end wrench, not a pipe wrench, to install accessories to the system. ALWAYS hold the bulkhead fitting with a wrench when installing the accessories. Do not allow the bulkhead fitting to turn; otherwise, connections inside the enclosure may be loosened. The NPT connections require Teflon tape on the threads to make a gas tight seal. On stainless steel connections, the Teflon tape helps prevent the connections from galling when tightening or loosening. Follow these rules when using Teflon tape.

Before applying Teflon 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 Teflon tape on the second thread as shown above; 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 tape so that the tape conforms to the threads. Apply two overlapping layers of Teflon tape. Cut off the excess tape and press the end firmly into the threads.

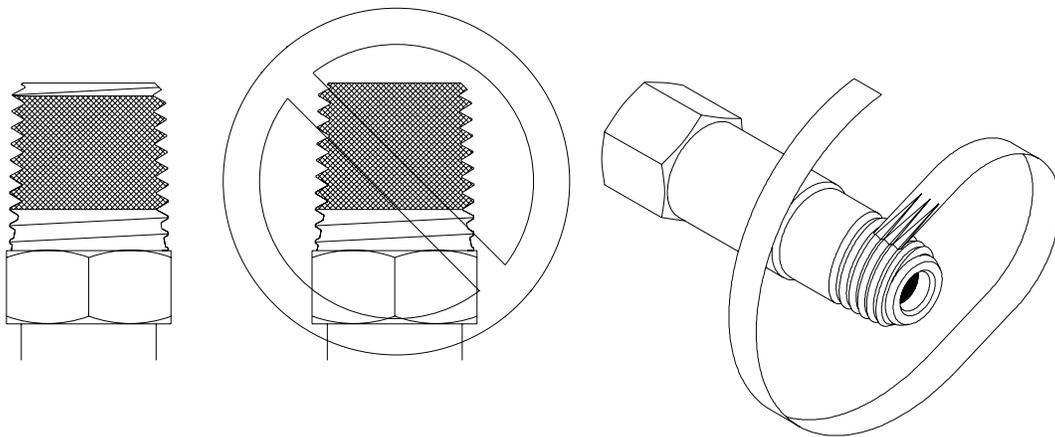


Figure 3. Teflon Tape Placement

Connecting to a cylinder:

1. Before removing the cylinder cap, move the cylinder of gas to the work site:
 - a. Secure cylinder to the floor, wall, or bench with appropriate chain, strap, or stand to prevent toppling.
 - 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.
2. Secure the cylinder connection to the cylinder in the following manner:
 - a. Threading the nut onto the cylinder connection should be easy. 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 overtighten to avoid squashing the gasket into the gas line. Keep extra gaskets on hand.
 - d. Never use oil or grease on regulator or cylinder fittings, as it may contaminate pure gases, or create a fire hazard.

Installing the outlet connection:

The system has the outlet connection at the top of the box. The connection is a 1/2" NPT. Connect tubing to the system that is compatible with the application and is capable of handling the pressure required. Follow the instructions given at the end of this booklet when making up the tube connection.

START UP

Pressurizing the system for the first time:

Before system start-up, it is recommended that all systems be pressure tested, leak tested and purged with an inert gas such as nitrogen.

1. Wear safety glasses and gloves.
2. Be sure that both ends of all hoses or pigtailed are secured before pressurizing. Turn the line regulator knob counterclockwise until the knob stops turning,
3. When first pressurizing, do not stand in front of or contact the system. Slowly open the cylinder valve. Observe the high pressure gauge for a rise in pressure up to full cylinder pressure.
4. Keep the hand wheel or wrench on the open cylinder valve at all times, to allow prompt emergency shut-off. With aid of a regulator increase pressure into the system until 100 - 125 PSI is reached
5. 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 the leak detection solution can not be used - after pressurizing the system - close the cylinder valve for a period of time (recommended 24 hours), and observe the high pressure gauge for a drop in pressure. If so indicated, recheck the port connections. Never attempt to fix a leak under pressure. If leaks are detected, depressurize the system and retighten the connection. Begin again.

WARNING: While CONCOA assembles the system components to exacting leak-tight standards, the customer should also inspect for any loosening of internal parts that may occur in shipping or installation by completing the pressure decay test detailed above.

NOTE: It is recommended that shutoff valves and pipe unions be installed on the inlet gas pipelines and a union installed on the mixed gas pipeline to allow the gas mixer to be easily removed if necessary.

6. Dial to the desired mixture ratio.
7. Turn on and adjust the supply pressure for both gases to 100 - 125 PSI.

WARNING When opening valves in oxygen pipelines, open valves slowly. Rapid opening of oxygen valves can produce large instantaneous increase in temperature, which can cause violent explosions and/or fire.

8. If a shutoff valve has been placed on the outlet piping, it should be turned off. If there is no shutoff valve present, you may shutoff the flow by turning the adjustment knob on the down stream pressure regulator.
9. Crack open the shutoff valve or begin to open the outlet pressure regulator to get a flow through the gas mixer. The mixing system should begin to cycle. The entire piping system will need to be purged upon start-up to displace any ambient air. During cycling the inlet pressure gauges should stay above 100 PSIG at all times.

CHANGING THE GAS MIXTURE

To change the gas mixture the operator selects the mixture adjustment to the appropriate dial setting. The dial shows the gas mixture selected. The AutoBlend will instantly start producing the new blend. However, depending on the volume of the piping system, the residual mixes will need to be displaced by the new selection.

MAINTENANCE

The system should be checked for leaks and proper function at regular intervals (see TROUBLESHOOTING).

Any leaks in the system should be corrected immediately.

The gas mixer requires minimum maintenance. All the moving parts in the gas mixer are expected to last several years under normal conditions, To obtain a list of the recommended spare parts, contact CONCOA or refer to the specification page.

TROUBLE SHOOTING

CHECKING THE GAS MIXTURE

If the gas mixture is in question, the mixer should be checked with an analyzer. Allow the gas mixer to flow for two (2) minutes between each change in setting to get a correct reading. Be careful to follow the analyzer manufacturers operating instructions. If there is any question about the operation or the suitability of a particular gas analyzer for the gas mixture, please consult CONCOA.

If the gas mixer seems to be producing an incorrect mixture, follow these steps.

It is suggested that each of the following steps be taken in sequence. To avoid possible misadjustment, after each step test the mixer to determine if the problem has been fixed. If so, make no more adjustments.

The following information uses the standard pressure settings; some gas mixers may be built with non-standard pressure settings. Refer to the specifications to determine the actual pressure settings.

1. Check to be sure that the inlet pressures stay above 100 PSIG at all times. If either inlet pressure drops below this figure, the gas mixer will be starved for the particular gas and an improper mixture will be created. If it is found that the inlet pressures are dropping below 100 PSIG, the inlet pressure to the mixer must be increased. This may require a higher regulator setting at the manifold or the liquid storage tank. Also, look for blockages in the incoming pipeline such as filters and undersized regulators. Do not use smaller than ½” piping for the major gas.

If the previous step do not rectify the problem, you may call CONCOA for help. For troubleshooting help with a gas mixer, the following information is required.

1. Model and serial number of the gas mixer.
2. Inlet major and minor gas pressure in flowing condition which is shown on gauges on front of gas mixer.
3. Gases used.

The phone number is 1-800-225-0473. Ask for gas mixer service help.

Typical symptoms listed below indicate regulator malfunctions needing repair.

Replace with a clean, repaired and tested, or new regulator obtained from CONCOA.

1. With no flow through the system (downstream valves and regulator closed and adjusting screw in) line pressure steadily increases.
2. Gas leakage from bonnet.
3. Gas leakage from any joint.
4. Gas leakage from relief valve.
5. Gas leakage from any gauge.
6. Gauge does not return to zero when not under gas pressure.
7. Gauge does not consistently repeat the same reading.
8. 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. (See sample return request form on page 14.) For items not covered by the warranty, contact the nearest CONCOA District Sales Office or distributor 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 that the equipment was used on.
5. Purge all equipment before shipment to protect the transporter and service personnel. The purging is especially 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.

Pressure Equipment Return Form

Controls Corporation of America, Inc.

1501 Harpers Road

Virginia Beach, VA 23454 USA

(757) 422-8330

Toll Free 1-800-225-0473

FAX: (757) 422-3125

www.concoa.com

NOTE: Please return (via FAX) to the factory for a Return Authorization Number

Assigned RMA No.: R-_____

(valid for 90 days after date of issuance)

Has this equipment been used with hazardous material? NO () YES () If yes, please give complete details:

SUBSTANCES HAZARDOUS TO HEALTH: In view of the toxic/hazardous nature of some of the gases and vapors handled by the equipment we sell, a statement will be required from the user advising us that the equipment returned is now safe to work on. Any equipment arriving at Controls Corporation of America, Inc. (CONCOA), without the accompanying statement, will be double-bagged and placed in external stores until a statement has been obtained. These requirements are not only in the interest of the continuing good health of our employees, but also that of yours and your carrier's.

PRODUCTS EXPOSED TO RADIOACTIVE MATERIAL CANNOT BE ACCEPTED BY CONCOA UNDER ANY CIRCUMSTANCES.

I declare this equipment has been purged/cleaned and is safe to handle

Signature: _____ Printed Name: _____

Position: _____ Date: _____

NOTE: All products and services of CONCOA are provided in accordance with our standard commercial terms and conditions.

FAX: _____

Company: _____ Contact: _____ Phone: _____

Billing Address: _____

Shipping Address: _____ Attn: _____

Are These Services Taxable? _____ Preferred Shipping Method: _____ Account No.: _____

Model No.: _____ Serial No.: _____ P.O. No.: _____

Description of Problem: _____

Gas Service: _____ Application(s) _____
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<u>Levels of Service</u> () 15-day turnaround (Standard) () 5-day turnaround (PO# required up front. Expedite fee will apply.)
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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.

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.



Controls Corporation of America
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