



639 Series Switchover System

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
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DESCRIPTION OF PRODUCT

The 639 series switchover is an automatic switchover system designed to provide a continuous supply of gas. This unit may be used with one cylinder per side, or used with a manifold that has increased storage capacity. The inlet of the switchover system may be purchased with open ports or flexible pigtailed. The system, when configured with manifold connectors, is for use with the 628 Series Maniflex system. If constant outlet pressure is required, an optional line regulator is included as part of the switchover system. The standard switchover system will maintain a variable line pressure within the values shown in the table below. With the optional line regulator, the user will be able to maintain a constant line pressure by adjusting the line regulator knob.

	<u>DELIVERY PRESSURE</u>	<u>SWITCHOVER POINT RANGE</u>
639 5XXX	0-400 PSIG/ 0-28 BAR	450-500 PSIG/ 31-34 BAR
639 7XXX	0-600 PSIG/ 0-42 BAR	650-700 PSIG/ 45-48 BAR

When configured with the remote alarm, the remote alarm provides audible and visual warning that a changeover is about to occur. Pressing a button on the front of the remote alarm silences the audible alarm. The LED's on the remote alarm indicate the status of the left and right banks.



Figure 1. Optional remote alarm for the 639 Series Switchover.

INTENDED USE OF PRODUCT

This product is intended for use with Laser assist gases such as nitrogen and oxygen. This system is not intended for use with flammable gases. Alarm systems cannot be used with flammable gases.

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 ASSISTANCE

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 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 gases are quite dangerous (flammable, toxic, corrosive, simple asphyxiant, or oxidizers). Equipment failure or misuse may lead to problems such as a release of gas through the relief valve or regulator diaphragm. 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 system label 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 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 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 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.

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. Pressure switch/alarm models cannot be used with flammable gases.

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 strike an electric arc on a gas cylinder of any kind.

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. 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.

INSTALLATION

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 that all fittings are secure and leak tight. Teflon tape should be used on pipe threads.
- d. If there is pressure sensitive equipment downstream of the autoswitch system, it is recommended that a relief valve be installed in the line to protect this equipment.

Installing the inlet connection:

639 Systems are configured for multiple cylinders per side: ½" NPT connections require the use of Teflon tape on the threads to make a gas tight seal. On stainless steel connections, the thread sealant helps prevent the connections from galling together when tightening or loosening. CONCOA uses Teflon tape on all of its regulator NPT connections. Follow these rules when using 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 in Figure 1; 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. Wrap the tape around the threads twice. Cut off the excess tape and press the end firmly into the threads.

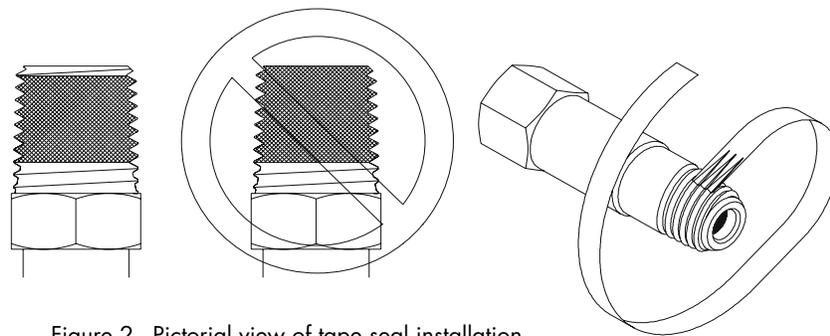


Figure 2 - Pictorial view of tape seal installation

The CGA or foreign inlet connection available at the other end of the pigtail is dependent on the purchased system. The cylinder connection is specific to the particular cylinder of gas to be used. Some cylinder connections do require the use of a gasket. Please note that the material of the gasket must also be compatible with the type of gas being used. Be familiar with the type of connection being used, and its proper procedures for installation. Also note that the pigtails supplied with the system have check valves installed on the cylinder connection end.

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 doesn't fit, the connection may be wrong for the type of gas being used.
 - b. Left-hand threads are used on some cylinder connections. A notch in the middle of the hex nut typically indicates a left-hand thread.
 - c. Gaskets are used on some inlet connections. Be sure the gasket is in good shape. Do not over-tighten to avoid squashing the gasket into the gas line. Keep extra gaskets on hand.
 - 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:

CAUTION

*DO NOT ALLOW OUTLET BULKHEAD TO TURN WHEN ATTACHING OUTLET FITTINGS.
(Models with Delivery Regulators)*

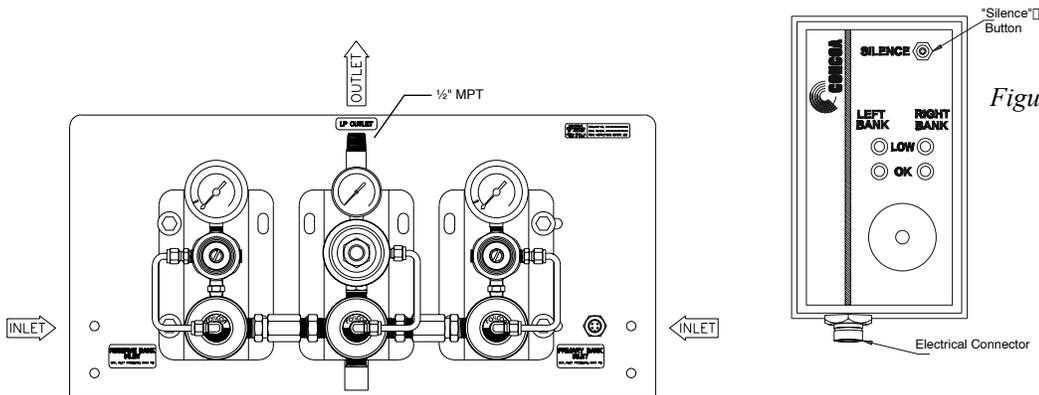
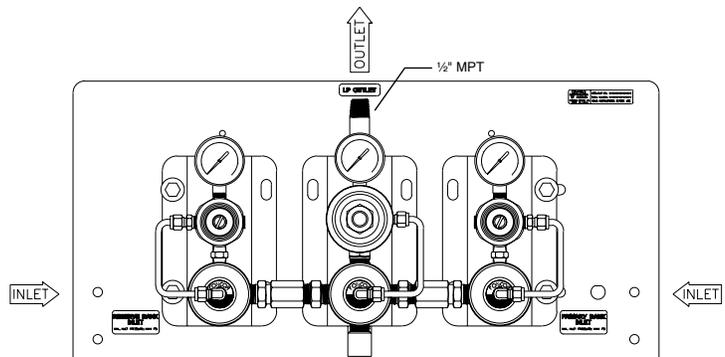


Figure 3. 639 with delivery regulator with 1/2" MPT outlet fitting, remote alarm, and pressure switches.

Figure 4. 639 with delivery regulator with 1/2" MPT outlet fitting, no remote alarm or pressure switches.



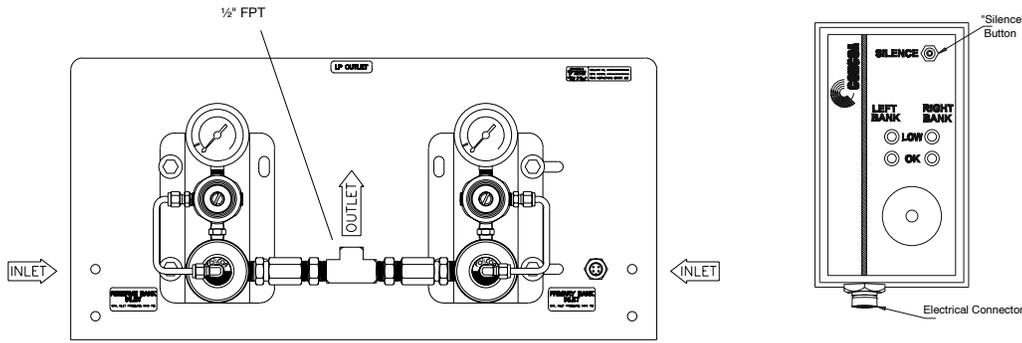


Figure 5. 639 without delivery regulator, with 1/2" FPT outlet tee-fitting, remote alarm and pressure switches.

Figure 6. 639 without delivery regulator, with 1/2" FPT outlet tee-fitting, no remote alarm or pressure switches.

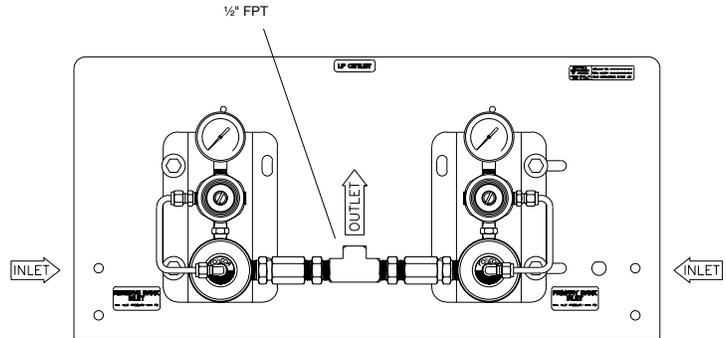
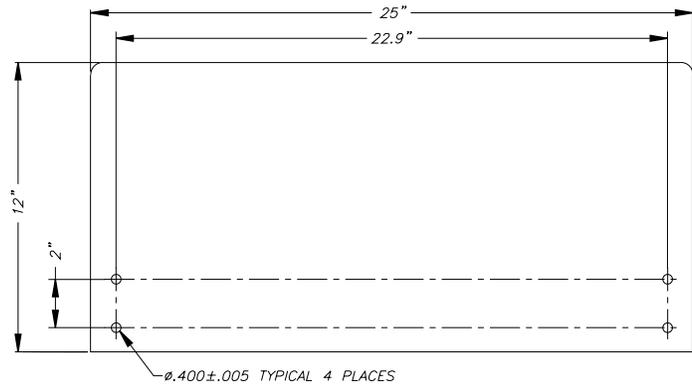


Figure 7. 639 Series mounting dimensions.



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 a CGA 580, it will be necessary to use an adapter. The recommended use of an adapter is for temporary use only, for system start up and checks. Adapters should never be used on a permanent basis.

1. Wear safety glasses and gloves.
2. Be sure that both ends of all hoses or pigtails are secured before pressurizing. On systems with the optional line regulator, turn the line regulator knob counterclockwise until the knob stops turning. (Do Not Force.)
3. When first pressurizing, open primary cylinders first. Do not stand in front of or contact the switchover system. Slowly open the cylinder valve. Observe the high pressure gauge for a rise in pressure up to full cylinder pressure. Warning - if this system is not equipped with the optional line regulator, the gas will flow from the outlet 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. 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 CGA connection and all other high-pressure port connections. If equipped without the 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 connection. Begin again at step 3.
7. If equipped with the optional line regulator, slowly turn the line regulator knob clockwise. This will increase the pressure on the delivery side of the system. Adjust to the desired working pressure and again check for leaks using the methods described above.

OPERATION

As the gas in the primary side is depleted, there will not be a drop in gas pressure on the left gauge until the cylinders are empty. When the inlet pressure drops to the pressure setting of the reserve side regulator, flow will begin from the reserve cylinder. This is called a changeover. At this point, the gas pressure on the reserve side will drop. This indicates that its time to change the cylinders on the primary side. Remove the depleted cylinder and replace with a full cylinder. Before removing the cylinder, be sure to close the cylinder valve and any other valves that connect the cylinder to the system. Note: while changing cylinders on one side, there will be no interruption in flow. When primary cylinders are reattached and reopened, flow will resume from primary side and stop from the reserve side.

WARNING: After several changeover cycles, it is possible that the reserve cylinder may not have sufficient reserve capacity. Periodically check the pressure/contents of the reserve cylinders. Maintain enough gas in the high pressure cylinders so that when a changeover occurs, the system will not run out of gas before the liquid cylinders are replaced.

MAINTENANCE

At 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's pressure settings be changed.

TROUBLESHOOTING

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 set pressure.
3. Gas leakage from spring case (adjusting screw/knob end off regulator).
4. Gas leakage from any joint.
5. Excessive drop in working pressure with regulator flowing gas.
6. Gas leakage from gauge
7. Gauge does not return to zero when not under gas pressure
8. Gauge does not consistently repeat the same reading.
9. The system makes a noise or hums.

SERVICE

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

1. 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, replace the high-pressure cylinders. 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 must be added to the system to prevent this.

	<u>PRESSURE</u>
639 5XXX	650 PSIG/ 45 BAR
639 7XXX	850 PSIG/ 57 BAR

2. If the above does not fix the problem, please contact CONCOA customer service. Please be prepared to give the following:
 - Model number
 - Gas service
 - Inlet pressure and type of gas supply (high pressure or liquid)
 - Outlet pressure
 - Approximate gas usage

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 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.

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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.

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