



Certified ISO 9001:2000

# Hand Welding and Cutting Torches and Cutting Attachments

## *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  
1-800-225-0473 or 757-422-8330  
Fax 757-422-3125  
[www.concoa.com](http://www.concoa.com)



This symbol on the product means  
the product is listed by Underwriters **December 2009**  
Laboratories, Inc. **Supersedes April 2000**

**READ ALL INSTRUCTIONS  
BEFORE USE**

## **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. Controls Corporation of America, Inc. (CONCOA) recommends that a telephone or written request for service advice be made to CONCOA Customer Service in Virginia Beach, Virginia, PHONE: 1-757-422-8330; Toll-Free in the U.S. and Canada 1-800-225-0473, FAX: 1-757-422-3125, or E-MAIL: [e-mail@concoa.com](mailto: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.

## **GENERAL SAFETY PRACTICES**

Oxy-fuel welding and cutting torch equipment produces high temperatures to join or change the form of metals. In the process, two elements are present: open flame and flammable or combustion-supporting gases under pressure.

CONCOA equipment is designed to maintain control of these elements. However, when the equipment is improperly used, hazardous conditions are created that may cause accidents. To prevent such conditions, comply with the following instructions:

- a. Before handling or using the equipment, understand and comply at all times with the safe practices prescribed in this manual, in local codes and in the following safety booklets (latest revision) as applicable.
  1. SAFETY IN WELDING AND CUTTING, American National Standard Z49.1, obtainable from the American Welding Society, 2501 NW 7th St., Miami, FL 33125.
  2. CUTTING AND WELDING PROCESSES, NFPA Standard No. 51B, obtainable from the National Fire Protection Association, 470 Atlantic, Boston, MA 02210.
  3. SAFE PRACTICES IN WELDING AND CUTTING, CONCOA booklet ADE 872.
- b. Keep equipment clean and in safe operating condition. Free from oil and grease.
- c. Keep equipment free of gas leaks at all times.
- d. Use equipment a safe distance (at least 25 feet) away from flammable materials and gas cylinders. Where a safe distance can not be maintained use fire-resistant covers or screens to keep sparks from combustibles, or wet combustibles down.

- e. Use equipment in a well-ventilated area, and avoid breathing fumes that may arise from the work. If ventilation is inadequate to prevent harmful accumulation of fumes, or if the work is in a confined space, use an air-supplied respirator. Consul ANS Z49.1, listed (1) in step a, for information on conditions requiring mechanical ventilation.
- f. Wear recommended personal protective equipment, against sparks. Because of sparks and radiation from the flame, the operator must use safety goggles with appropriate filter lenses.
- g. Keep unprotected persons away from area.
- h. Do not weld or cut where chlorinated hydrocarbon vapors from degreasing, cleaning, or spraying can reach, or be drawn into the atmosphere surrounding the operation. The heat of the flame can decompose the vapors to form phosgene, a highly toxic gas, and other irritating decomposition products.
- i. When operation torch fuel or oxygen valves, always point tip, lit or not lit, away from self or other persons to prevent burns or saturation of clothing by gases. Cutting sparks must be similarly respected to prevent burns.
- j. Use torch for designated gas service and pressure only. Use only CONCOA parts designated for the torch when making operating changes (tips, mixers, and cutting attachments) to avoid unsafe or unsatisfactory performance or other problems caused by use of non-CONCOA parts in CONCOA equipment. CONCOA torch listings by Underwriter's Laboratories are based on CONCOA parts only.
- k. Always purge gas lines individually before lighting torch.

- l. Always open cylinder valves slowly.
- m. Before connecting to new oxygen cylinder, completely drain gas from oxygen regulator.
- n. No repair should ever be undertaken by anyone not having qualification described in the SERVICE section of this manual.

# IMPORTANT SAFEGUARDS

Read all instructions

When using Oxy-Fuel Gas Torches, basic safety precautions should always be followed:

- a. Never use Acetylene gas at a pressure over 15 psig.
- b. Never use damaged equipment.
- c. Never use oil or grease on or around Oxygen equipment.
- d. Never use Oxygen or fuel gas to blow dirt or dust off clothing or equipment.
- e. Never light a torch with matches or a lighter. Always use a striker.
- f. Always wear proper welding goggles, gloves and clothing when operating Oxy-Acetylene equipment. Pants should not have cuffs.
- g. Do not carry lighters, matches or other flammable objects in pockets when welding or cutting.
- h. Always be aware of others around you when using a torch.
- i. Be careful not to let welding hoses come into contact with torch flame or sparks from cutting.

j. **SAVE THESE  
INSTRUCTIONS.**

(This page contains Underwriters Laboratories required instructions per UL-123 for products displaying the UL logo)

## INTRODUCTION

### Scope

This manual provides general information for installation, operation, and maintenance of CONCOA oxy-fuel Hand Welding Torches, Cutting Torches and Cutting Attachments.

### Description

A Welding Torch is a complete unit, to which a tip and mixer are added and gas is supplied. A Cutting Attachment and tip can replace the tip (and nut) to transform it into a Cutting Torch.

Cutting Torches are classified into two groups: a torch-mix (or pre-mix) type contains a gas mixer leading to the Torch tip; a tip-mix type mixes gases in the tip. Torches in both groups are otherwise basically similar.

For equipment that is required to complete, or can add to the versatility of a torch installation, refer to the respective torch catalog sheets.

## INSTALLATION

### Safety

Comply with all applicable precautions referenced and listed in the Safety Section and in this section. After installation, check all connections and valves for leaks with an oxygen compatible approved leak test solution. Clean equipment of solution before using.

## Tip

Select a welding or cutting tip style and size for the desired torch use according to: fuel gas type such as acetylene, MAPP<sup>®</sup>, propane or natural gas; and metal composition and thickness. Refer to CONCOA welding and cutting tip guide and the Description paragraphs in the INSTALLATION section.

Before using, check the mating surfaces of tip and torch head seats for distortion, burrs, or damaged that can cause leaks and poor performance. Replace a damaged tip but send a damaged torch or attachment to the nearest authorized repair facility.

Screw on connecting nuts of welding torch tips and hand-tighten; sealing rings provide the seal. Wrench-tighten cutting tip nuts snugly but not excessively, or seats may be damaged. They are finished-reamed for metal to metal seal.

## Hoses

**Use RMA-CGA Grade T hose for fuel gas (including acetylene) to prevent hose failures. Grades R and RM are for use with acetylene only.**

Before using, check the mating seal surfaces of hose glands and torch inlets for distortion, burrs, or damage that can cause leaks and poor performance.

With regulators and hoses attached as directed in the regulator instruction manual, connect the other ends of the hoses to the inlet end of the torch. Green oxygen hose goes on inlet marked OXY or "O", and red fuel hose goes on inlet marked FUEL or "F". Wrench-tighten the nuts. A typical welding torch installation is shown in the accompanying illustration.

**For maximum safety use Flashback Arrestors. Contact CONCOA and request the FLASHBACK ARRESTORS brochure ADC-2194 (latest edition) for more information on Flashback Arrestors.**

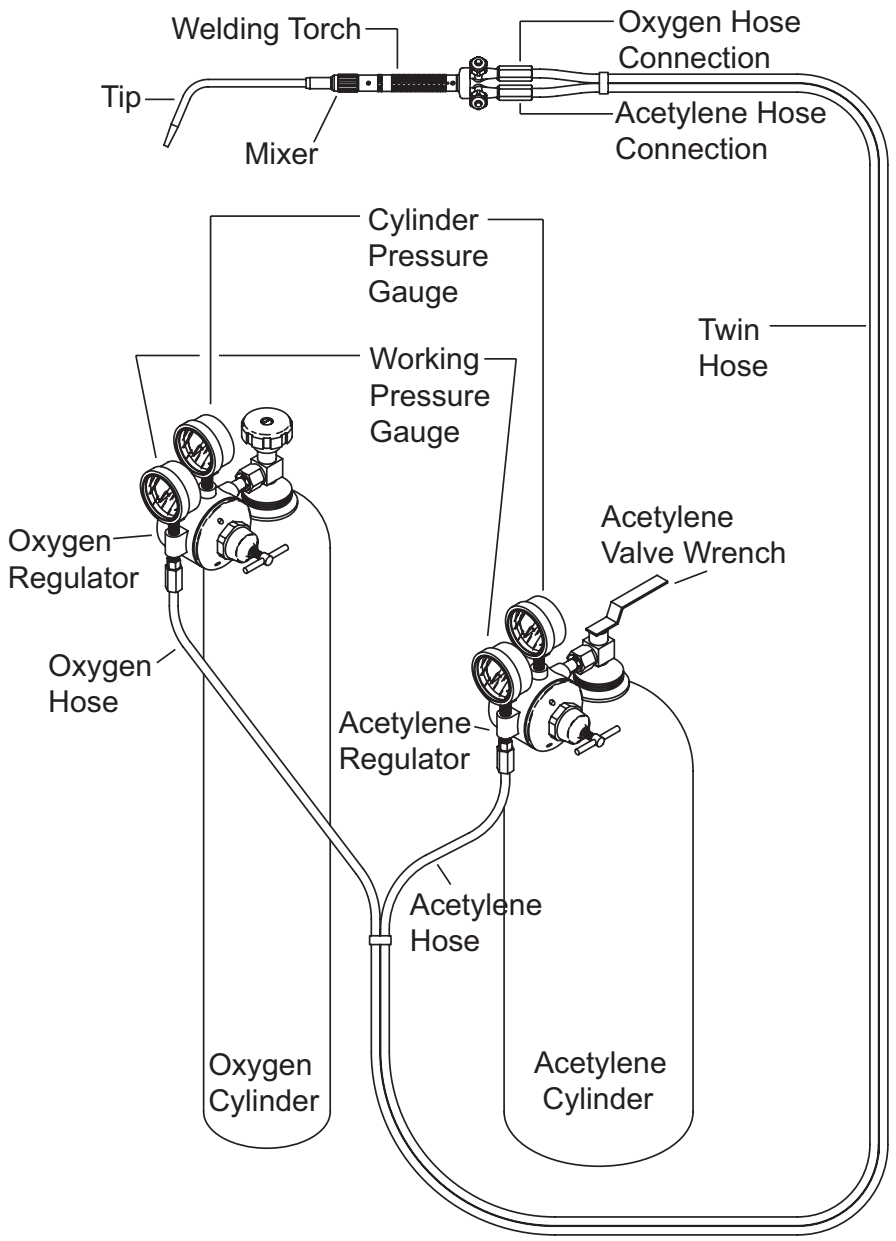
## **Gas Valves**

Tighten packing nuts of all torch packing type preheat-oxygen valves. Packing may relax before initial use and allow gas to escape. For torch valves with O-ring stem seals, no adjustment is possible. If a leak is found in checking, the stem must be replaced.

## **Cutting Attachment**

Unless cutting attachment is connected and tested as instructed below, external or internal leakage may occur, resulting in fire, which could cause personal injury and/or equipment damage.

- a. Inspect the two sealing rings on Attachment torch-head fitting. If damaged or missing, they must be replaced.
- b. Tighten Attachment securely on the Torch by hand.
- c. With torch fuel valve closed, open torch oxygen valve. Pressurize oxygen to 50 PSIG (4.2 kg/cm<sup>2</sup>) and test for leaks at torch joint. Attachment valves, and head outlet. (Submerge in water or leak testing solution.)  
**DO NOT USE TORCH IF CONNECTION OR VALVES LEAK, OR IF GAS FLOWS FROM ATTACHMENT HEAD.**
- d. Close oxygen valve on torch when not in use.
- e. Install cutting tip as described in the Tip paragraph.



Typical Welding Torch Installation

# OPERATION

## **Safety**

Comply with all applicable precautions referenced or listed in the SAFETY Section and in this section.

## **Flame Adjustment**

### General

Set required gas pressures on regulators as recommended in CONCOA welding and cutting guides. Before lighting the torch, purge both gas systems of possible contaminants to the pure supplied gases by opening the torch valves, including the oxygen lever. Readjust gas pressures where necessary while gas is flowing. Close the valves when the pure gases issue from the tip.

## CAUTION

Pure oxygen and fuel systems one at a time, closing the valve of the purged system before opening the other valve.

Never purge in the presence of flame, lit cigarettes, or other ignition sources.

Never purge toward people, clothing or other combustibles.

Always open any gas valve slowly.

After purging and before lighting the torch, check all connections, valves, and regulators for leaks (see SAFETY paragraph, INSTLLATION Section). If any, remedy as follows:

- a. Replace defective O-ring or sealing ring, or tighten or repack valve stem packing as applicable.
- b. Tighten loose connections.
- c. Inspect sealing surfaces in torch, cutting attachment, hose fittings, and tips. Send damaged torch or attachment to the nearest CONCOA repair facility

## **Welding**

To light and adjust a torch flame for welding:

- a. Slowly open the fuel valve about 1/8 of a turn, and WITHOUT DELAY ignite the gas with a sparklighter or pilot light. DO NOT USE MATCHES OR CIGARETTE LIGHTER. HAND BURNS MAY RESULT.
- b. Adjust the fuel valve to obtain full flow without flame blowout at the recommended pressure (re-adjust the fuel regulator if necessary).
- c. Slowly open the oxygen valve to the point where the carburizing tail of the inner cone disappears. The resulting neutral flame is used for most operations. Refer to Process Manual - OXYFUEL WELDING AND CUTTING, ADI 1275, for flame adjustment and other techniques.

## **Cutting**

Light and adjust a cutting torch preheat flame as above for a Welding Torch. The cutting tip usually forms four or more cones, depending upon the tip style. Use the fuel valve at the inlet and preheat-oxygen valve for adjustment. For a cutting attachment torch, leave the oxygen inlet valve on the rear end fully open and use the attachment preheat-oxygen valve for adjustment.

With cutting oxygen flowing, readjust preheat flame for the cutting speed, plate thickness, and quality desired. A too-intense flame will cause meltdown at top edge of cut; a too-weak flame may cause slag at bottom of cut or a lost cut.

## **SHUTDOWN AND DISASSEMBLY**

To shut down for a short period during operation, close preheat oxygen and fuel valves on torch in quick succession.

Before leaving equipment unattended or when shutting down for an extended period (lunch, overnight, etc.)

- a. Close all torch valves.
- b. Close cylinder or supply valves upstream of regulators.
- c. Open torch preheat (and inlet) oxygen valve(s) and press cutting oxygen lever to drain lines, complying with purge CAUTIONS to prevent fire hazards. Release oxygen regulator adjusting screw. Release cutting oxygen lever and close torch preheat (and inlet) oxygen valves.
- d. Open torch fuel valve to drain line, complying with purge CAUTIONS. Release fuel regulator adjusting screw and close torch fuel valve.

### **CAUTION**

**Check that gas is not issuing from tip before leaving torch. Accumulated gas may cause fire or injury if accidentally ignited (as by spark or cigarette) or asphyxiation in an enclosed area.**

## **CUSTOMER SERVICE**

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 details regarding its application.

## **SERVICE**

A unit which is not functioning properly should not be used until all required repairs have been completed and the unit has been tested to ascertain that it is in proper operating order.

Inspection, troubleshooting, and repair of this equipment as indicated in this manual should be undertaken only by an competent individual having at least general experience in the maintenance and repair of equipment. **NO SUCH MAINTENANCE OR REPAIR SHOULD EVER BE UNDERTAKEN OR ATTEMPTED BY ANYONE NOT HAVING SUCH QUALIFICATIONS.**

It is recommended that all servicing be done by a service facility authorized by CONCOA. Contact the CONCOA Customer Service Department in Virginia Beach or the nearest CONCOA District Sales Office for assistance.

If so advised, the unit should be sent to a service facility authorized by CONCOA, adequately packaged, in the original shipping container if possible, and shipped prepaid, with a statement of observed deficiency. The gas service that the equipment has been subjected to must be clearly identified. All equipment must be purged 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 Buyer. In all cases other than where warranty is applicable, repairs will be made at current list price for the replacement part(s) plus a reasonable labor charge.

Test regulator for leaks on a routine schedule.

## GENERAL INFORMATION

### CAUTION

**Shut off gas supplies at the source before attempting inspection, or maintenance except for leak checks.**

Return a defective or leaking torch or cutting attachment to the nearest authorized service facility, as special tools, tests and techniques are required. DO NOT attempt to repair a torch or cutting attachment.

Only replacements of readily-detachable parts - tips nuts, mixers, and cutting attachments - should be made by the user. Observe preceding SERVICE procedure, USER RESPONSIBILITY, and applicable precautions given here and referenced or listed in the SAFETY section.

Observe the following good maintenance practices:

- a. Prevent dirt, oil, and grease from entering the torch or parts when disassembling. Work with clean tools, and keep parts on a clean surface. Clean the parts before reassembly.
- b. Avoid distortion by a wrench by using only enough pressure to hold the torch steady.
- c. Test for leaks frequently and always after tip, mixer or cutting attachment change.
- d. If a torch condition is questionable, do not place it in service; return it to an authorized service facility.

## **Welding Tip and Mixer Replacement**

Nuts on some welding torch mixer-heads are retained by a snap ring. To separate the head nut from the torch head fitting, push nut firmly forward over snap ring.

Handle tips that screw into mixer carefully to protect seat. If damaged, send to an authorized service facility.

Some tip and mixer assemblies are brazed into single units. Send them to an authorized service facility of repair.

## **Cutting Oxygen Valve Leak**

Stop leaks in the cutting oxygen valve as follows:

- a. In Series 3000 Torches, tighten packing nut with provided wrench through slot in handle. If it does not stop valve leak, send torch to an authorized service facility.
- b. Check the lift-pin action of packing-type spring-loaded valves to assure easy operation. Over tightening of packing nut will not allow pin to return and close the valve.
- c. If valve leaks in any torch, send torch to an authorized service facility.

## **Troubleshooting**

A troubleshooting guide is provided to suggest the causes of faulty operation. Adjust a malfunctioning or leaking torch or accessory immediately, or remove it from service.

## Troubleshooting Chart

SYMPTOM	POSSIBLE CAUSE	REMEDY
1. Backfire, flashback, or erratic flame.	<ul style="list-style-type: none"> <li>a. Damaged tip or mixer.</li> <li>b. Insufficient flow.</li> <li>c. Improper gas pressures or flows.</li> <li>d. Loose tip or mixer.</li> <li>e. Dirty or deformed tip.</li> <li>f. Tip too close to work, or overheated.</li> <li>g. Tip or torch head does not seat (cutting torch).</li> <li>h. Failure to purge or use check valves.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace with new tip or mixer</li> <li>b. Readjust pressures. Reduce number of fittings. Increase hose size.</li> <li>c. Readjust pressures or torch valves</li> <li>d. Allow to cool, then tighten, or replace seals.</li> <li>e. Allow tip to cool, then clean and replace.</li> <li>f. Increase distance.</li> <li>g. Discard tip or send torch to service facility for new head.</li> <li>h. Purge lines. Install check valves.</li> </ul>
2. Gas leakage.	<ul style="list-style-type: none"> <li>a. Loose torch or tip nut</li> <li>b. Dirty or damaged seating surfaces between torch and tip.</li> </ul>	<ul style="list-style-type: none"> <li>a. Tighten tip nut.</li> <li>b. Clean or send torch to service facility.</li> </ul>

SYMPTOM	POSSIBLE CAUSE	REMEDY
3. Oxygen or fuel leak through valve stem.	<ul style="list-style-type: none"> <li>a. Loose packing nut.</li> <li>b. Worn packing or O-ring.</li> <li>c. Improper gas pressures or flows.</li> </ul>	<ul style="list-style-type: none"> <li>a. Tighten nut (packing type only).</li> <li>b. Send torch to service facility.</li> <li>c. Send torch to service facility.</li> </ul>
4. Oxygen or fuel leak through valve seat.	<ul style="list-style-type: none"> <li>a. Dirty or damaged valve seat or bent valve stem.</li> <li>b. Damaged body.</li> </ul>	<ul style="list-style-type: none"> <li>a. Clean or send torch to service facility.</li> <li>b. Send torch to service facility.</li> </ul>
5. Cutting oxygen valve leaks.	<ul style="list-style-type: none"> <li>a. Dirt in cutting oxygen valve.</li> <li>b. Damaged cutting oxygen valve seat.</li> <li>c. Worn or damaged valve seat.</li> <li>d. Broken valve spring.</li> </ul>	<ul style="list-style-type: none"> <li>a. Send torch to service facility.</li> <li>b. Send torch to service facility.</li> <li>c. Send torch to service facility.</li> <li>d. Send torch to service facility.</li> </ul>
6. Oxygen leak at cutting oxygen valve stem.	<ul style="list-style-type: none"> <li>a. Damaged cutting oxygen valve O-ring or packing.</li> <li>b. Packing loose.</li> </ul>	<ul style="list-style-type: none"> <li>a. Send torch to a service facility.</li> <li>b. Tighten packing nut.</li> </ul>
7. O-ring type valve stem binds.	<ul style="list-style-type: none"> <li>a. Drag sleeve over tightened.</li> <li>b. Damaged body.</li> </ul>	<ul style="list-style-type: none"> <li>a. Loosen sleeve.</li> <li>b. Send torch to service facility.</li> </ul>
8. Hose/Torch connection leak.	<ul style="list-style-type: none"> <li>a. Damaged seat.</li> </ul>	<ul style="list-style-type: none"> <li>a. Send torch to service facility.</li> </ul>

## For Maximum Safety Use Flashback Arrestors

Regulator Mounted Model 78 Resettable	Regulator Mounted Model 53	Torch Mounted Model 460
801-0786 'B' Size (Oxy) 801-0789 'B' Size (Fuel)	801-0536 'B' Size (Oxy) 801-0539 'B' Size (Fuel)	801-1466 'B' Size (Oxy) 801-1469 'B' Size (Fuel)
UL Listed	Meets OSHA Requirements	Comply with ISO 5175

Contact CONCOA and request the FLASHBACK ARRESTORS brochure ADC-2194 (latest edition) for more information on flashback arrestor use.

# 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.**



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