INSTRUCTIONS for

C-60 and C-60-S
MACHINE CUTTING TORCHES and
1700-ACA-2
POWDER CUTTING ATTACHMENT

IMPORTANT
These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for oxy-fuel gas equipment, we urge you to read our booklet “Precautions and Safe Practices for Gas Welding, Cutting, and Heating”, Form 2035. Do NOT permit untrained persons to operate this equipment. Do NOT attempt to operate this equipment until you have read and fully understand these Instructions. If you do not fully understand these Instructions, contact your supplier for further information.

The cutting torches covered by these instructions have been approved by Underwriter’s Laboratories only when using parts manufactured by the L-TEC Welding & Cutting Systems, to the exact specifications on file with Underwriter’s Laboratories, Inc., and when they are used in the gas service for which they are designed and listed. The use of other parts voids the Underwriter’s Laboratories Listing and the manufacturer’s warranty.

I. DESCRIPTION

The C-60 and C-60-S Machine Cutting Torches are for use with any of the commonly used fuel gases such as acetylene, natural gas, propane and many of the proprietary gases. A minimum of 10 psi fuel gas pressure is required for proper operation.

The basic difference between the C-60 and C-60-S torches is in their overall length. The C-60 torch is approximately 6 feet long, while the C-60-S is approximately 2-1/2 feet long. The 1700-ACA-2 Powder Cutting Attachment is only for use with the C-60 torch.

II. INSTALLATION AND CONNECTION

1. A filter designed to screen out dirt and scale should be installed upstream of the cutting oxygen regulator which supplies the C-60 Torch. Use of a filter reduces the possibility of accidental hose burnouts.

The 1-in. NPT Pipeline Filter Assembly (P/N 2116734) is recommended if the cutting oxygen supply regulator is an Oxweld R-52 feeding a single cutting station. In the case of multiple torch installations supplied by a single oxygen regulator, such as an Oxweld R-83, The Oxweld S-6 filter (P/N 16X43) is recommended.

2. A 1-in. quick opening full flow shutoff valve should be installed in the cutting oxygen hose line at least 6 feet ahead of the torch and convenient to the operating position.

3. For control of the preheat gases, OXWELD “C” size oxygen and acetylene needle valves (21Y15 and 21Y13) or their equivalent, should be inserted in the preheat oxygen and fuel gas hose lines at least 6 feet ahead of the torch.

Standard commercial valves can be used after they are cleaned and lubricated, to oxygen standards, as described in maintenance procedures.

4. If using the 1700-ACA-2 Powder Cutting Attachment (10Y96) on the C-60, the ACV-4 Powder Pinch Valve (16X36) should be installed in the powder hose line about 5 feet ahead of the torch and convenient to the operator.

5. Connect the front clamp of powder cutting attachment to front body of torch. Connect the two rear clamps to the cutting-oxygen tube on the torch. (See Fig. 2.)

B. CONNECTION

1. Hoses — Use 3/4-in. cutting oxygen hose with “D” size fittings, 1/2-in. preheat oxygen and fuel gas hoses with “C” size fittings. Use 1/4-in. powder hose for lengths up to 50-ft., if powder is to be used. Powder hose should never exceed 50-ft. in length.

NOTE: If new hose is used, use compressed air to clear hose of dirt, dust, etc.

2. Torch — Attach the preheat oxygen, cutting oxygen, and fuel gas hoses to the torch. Attach the powder hose, when used, to the powder attachment. Make certain all connections are gas-tight. Attach the desired nozzle to the torch.
SAFETY PRECAUTIONS

WARNING: These Safety Precautions are for your protection. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below. Failure to observe these Safety Precautions can result in personal injury or death.

1. PERSONAL PROTECTION - Heat rays (infrared radiation) from an oxy-fuel flame or hot metal can injure your eyes. Therefore:
   a. Wear shaded safety goggles made for gas welding and cutting purposes for protecting your eyes from radiation burns as well as sparks or spatter. WARN bystanders not to watch the flame and do not expose themselves to the rays of the flame or hot metal.
   b. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a cap for hair protection, to protect against hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiant heat and sparks.
   c. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and pockets eliminated from front of clothing.
   d. Protect other nearby personnel from rays and hot sparks with a suitable non-flammable partition.
   e. Always wear safety glasses or goggles when in a work area. Use safety glasses with side shields or goggles when chipping slag or grinding. Chipped slag may be hot and can travel considerable distances. Bystanders should also wear safety glasses or goggles.
   f. Some gouging and cutting processes produce excessively high noise levels and require ear protection.

2. FIRE PREVENTION - Hot sparks or sparks can cause serious fires when in contact with combustible solids, liquids or gases. Oxygen causes fire to burn more rapidly. Fuel gas can explode in air or oxygen. Therefore:
   a. Remove all combustible materials well away from the work area or completely cover the materials with a protective non-flammable covering. Such combustible materials include wood, clothing, sawdust, gasoline, kerosene, paints, solvents, natural gas, acetylene, propane, and similar combustible articles.
   b. Use sparks or hot metal can fall into cracks in floors or wall openings and cause a hidden smoldering fire. Make certain that such openings are protected from hot sparks and metal.
   c. Do not weld, cut, or perform other hot work until the workpiece has been completely cleaned so that there are no substances on the workpiece which might produce flameable or toxic vapors.
   d. For fire protection, have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher.
   e. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire.

3. VENTILATION - Fumes, particularly in confined spaces, can cause discomfort and physical harm. Do not breathe fumes. Therefore:
   a. At all times provide adequate ventilation in the work area by natural or mechanical ventilation means. Do not weld, cut, or heat materials such as galvanized steel, zinc, lead, beryllium, cadmium, etc. unless positive mechanical ventilation is provided.
   b. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
   c. Refer to AWS Standard Z49.1 in Item 5 for specific ventilation recommendations.

4. EQUIPMENT MAINTENANCE - Faulty or improperly maintained equipment can result in poor work, but most importantly it can cause physical injury or death through fires. Therefore:
   a. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not operate or repair any equipment unless you are qualified to perform such work.
   b. Keep all oxy-fuel equipment free of grease or oil. Grease, oil and other similar combustible materials once ignited can burn violently in the presence of oxygen.
   c. Maintain torches, hoses, and regulators in safe working order. Do not operate any equipment in faulty condition.
   d. Do not abuse equipment or accessories. Keep equipment away from excessive heat and wet conditions, oil or grease, corrosive atmospheres and inclement weather.
   e. Keep all safety devices in position and in good repair.
   f. Use equipment for its intended purpose. Do not modify it in any manner.

5. ADDITIONAL SAFETY INFORMATION - For more information on safe practices for setting up and operating oxy-fuel welding and cutting equipment and on good working habits, ask your welding equipment supplier for a copy of "Precautions and Safe Practices for Gas Welding, Cutting, and Heating", Form 2035. The following publications, which are available from the American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126, are recommended to you:
   a. "Safety in Welding and Cutting" - AWS Z49.1 (ANSI)
   b. Recommended Safe Practices for the Preparation for Welding and Cutting of Containners and Piping That Have Held Hazardous Substances" - AWS F4.1

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III. OPERATION

A. OPERATING PRECAUTIONS

Improper handling of the torch may make the flame backfire -— go out with a loud snap. This may be caused by touching the work with the nozzle, by overheating the nozzle, or by dirt on the nozzle seat. The torch may be relighted immediately after a backfire if the trouble has been corrected.

Should the flame flashback — burn back inside the torch with a "whistle" — immediately close the preheat oxygen valve. Then close the fuel gas valve and the cutting oxygen valve. After a moment, relight the torch in the usual manner. Flashbacks can be kept to a minimum by maintaining the correct gas pressure. If flashbacks occur repeatedly, the torch and nozzles should be sent to L-TEC Remanufacturing Center, Ebenezer Road, Florence, SC 29501, for a complete checkup.

B. ADJUSTMENT OF CUTTING OXYGEN PRESSURE

Open the cutting oxygen control valve wide. Turn in the pressure-adjusting screw on the cutting oxygen regulator until the pressure gauge on the torch indicates the correct cutting oxygen pressure. Close the cutting oxygen valve.

C. ADJUSTMENT OF PREHEAT GAS PRESSURE

Open the throttle valve in the preheat lines. Turn in the pressure-adjusting screw on the preheat oxygen regulator until the delivery pressure gauge indicates the correct oxygen pressure. Adjust the fuel gas pressure the same way,

but do not leave the valves open any longer than necessary. Make sure there are no sparks or flame near the nozzle flame ports during adjustment of pressure.

D. ADJUSTMENT OF POWDER DISPENSER, WHEN USING POWDER

Open the dispenser bleeder valve wide. Adjust the air regulator to provide approximately 5 psi pressure at the hopper. Gradually reduce the bleeder valve opening until powder flow from the two outlet tubes on the powder cutting attachment becomes steady. A slight adjustment of hopper pressure may now be necessary to obtain the desired powder flow rates. Check the powder flow rate by collecting, in a container, the powder discharged for 1 minute. If weighing facilities are not available, a household measuring cup may be used to approximate the weight of powder discharged. One cup contains approximately 24 ounces of loosely packed powder.

E. LIGHTING AND SHUTOFF OF TORCH

Open the preheat oxygen valve a small fraction of a turn. Open the fuel gas valve about 1/4 turn and light the gas at the nozzle with a friction lighter. Adjust the flames with the preheat oxygen valve. If the flames are shorter than desired, open the fuel gas valve and preheat oxygen valve to secure flames of the desired length. If the flames burn away from the end of the nozzle, or blow off as soon as lighted, or if the flame length is greater than desired, close the fuel gas valve slightly and readjust the preheat oxygen valve.
To shut off the torch, first close the cutting oxygen valve, then the fuel gas valve and finally the preheat oxygen valve. When powder is used, shut off the air supply line valve to the dispenser or back out the air regulator adjusting screw. Vent the dispenser by opening the petcock on the cover.

IV. MAINTENANCE

**WARNING**

To prevent fires do not use common oil or grease on this equipment. Use only the lubricants specifically indicated in the text and illustrations.

A. GENERAL

Equipment should be inspected at frequent intervals by a competent operator. Use only standard parts listed herein. For repairs or replacement other than those mentioned in these instructions, return the equipment to L-TEC Remanufacturing Center, Ebenezer Road, Florence, SC 29501.

B. CLEANING COMMERCIAL SHUTOFF VALVES TO OXYGEN STANDARDS

Disassemble the valve. Scrub or immerse the parts in a hot solution of sodium carbonate or tri-sodium phosphate mixed in the proportions of 1 lb. to 3 gallons of water. Note that 1 lb. of soda ash or 2-3/4 lb. of sal soda washing soda may be substituted for the sodium carbonate. Thoroughly scrub all surfaces of the parts. If immersion treatment is used, continuously stir the parts in the solution for at least 10 minutes.

After washing, thoroughly rinse the parts with clear water. Repack the valve with valve packing approved for oxygen service.

C. MIXER DISK

If necessary, the torch mixer disk can be removed for cleaning as follows: Remove the two hex nuts and cap screws used to bolt the preheat mixer body to the cutting oxygen block. Using a wrench, unscrew the mixer tube connecting nut. Remove the mixer body and invert it. The mixer disk will then fall out.

To clean the mixer disk center orifice, use a No. 5 drill. To clean the outer orifices use a No. 51 drill. Other cleaning tools tend to enlarge or bellmouth the orifices, and should not be used.

If the mixer disk is distorted or the seating surfaces marred or scratched, it should be replaced with a new one. In assembling the mixer disk and mixer tube in the torch, make sure that the seating surfaces are clean.

D. GAUGE

When replacement of the cutting oxygen pressure gauge is necessary, apply a single turn of Teflon tape on the new gauge fitting threads and screw the gauge into the block (83Z45).

E. CLEANING OF NOZZLES

If orifices of the cutting nozzles become clogged, clean them by hand with the correct size drills or soft brass or copper wire. Cleaning drill sizes for nozzles are listed in Cutting Tables. No other tools should be used, as they might enlarge or bell-mouth the orifices.

### 1701 Series Acetylene Nozzles

<table>
<thead>
<tr>
<th>Nozzle</th>
<th>Part No.</th>
<th>Steel Thickness, in.</th>
<th>Gas Pressure, psig</th>
<th>Cutting Speed, ipm</th>
<th>Gas Consumption, cfm</th>
<th>Cleaning Drill Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td></td>
<td></td>
<td></td>
<td>Cutting Oxygen Acetylene Preheat Oxygen</td>
<td>Cutting Oxygen Acetylene Preheat Oxygen **</td>
<td>Cutting</td>
</tr>
<tr>
<td>30</td>
<td>08278</td>
<td>24 - 26</td>
<td></td>
<td>22 10 20</td>
<td>2160 213 170</td>
<td>19/64&quot; 53</td>
</tr>
<tr>
<td>40</td>
<td>08280</td>
<td>28 - 30</td>
<td></td>
<td>18 10 20</td>
<td>3470 272 217</td>
<td>&quot;X&quot; 54</td>
</tr>
<tr>
<td>50</td>
<td>08282</td>
<td>35 - 40</td>
<td></td>
<td>12 10 20</td>
<td>4600 330 264</td>
<td>1/2&quot; 3/64&quot;</td>
</tr>
</tbody>
</table>

* Read from gauge mounted on torch.
** Preheat oxygen flow is given as 80% of acetylene flow. This oxygen/acetylene ratio produces an 18-in. acetylene feather which is used for most heavy cutting operations.

### 1702 Series Natural Gas Nozzles

<table>
<thead>
<tr>
<th>Nozzle</th>
<th>Part No.</th>
<th>Steel Thickness, in.</th>
<th>Gas Pressure, psig</th>
<th>Cutting Speed, ipm</th>
<th>Gas Consumption, cfm</th>
<th>Cleaning Drill Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td></td>
<td></td>
<td></td>
<td>Cutting Oxygen Natural Gas Preheat Oxygen</td>
<td>Cutting Oxygen Natural Gas Preheat Oxygen **</td>
<td>Cutting</td>
</tr>
<tr>
<td>30</td>
<td>460064</td>
<td>24 - 26</td>
<td></td>
<td>22 7 - 15 11 - 25</td>
<td>2160 190 - 380 285 - 570</td>
<td>19/64&quot; 5/64&quot;</td>
</tr>
<tr>
<td>40</td>
<td>596578</td>
<td>28 - 30</td>
<td></td>
<td>18 11 - 16 18 - 25</td>
<td>3470 275 - 400 410 - 600</td>
<td>&quot;X&quot; 46</td>
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<tr>
<td>50</td>
<td>5470001</td>
<td>35 - 40</td>
<td></td>
<td>12 12 - 17 20 - 26</td>
<td>4600 380 - 450 570 - 675</td>
<td>1/2&quot; 46</td>
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<tr>
<td>60</td>
<td>5470002</td>
<td>45 - 50</td>
<td></td>
<td>7 14 - 18 25 - 30</td>
<td>5450 450 - 525 675 - 790</td>
<td>19/32&quot; 45</td>
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<tr>
<td>70</td>
<td>5490002</td>
<td>50 - 60</td>
<td></td>
<td>6 16 - 24 30 - 40</td>
<td>7500 525 - 650 790 - 975</td>
<td>11/16&quot; 43</td>
</tr>
</tbody>
</table>

* Read from gauge mounted on torch.
** Preheat oxygen flow is given as 50% more than natural gas flow for a 1.5 oxygen to 1.0 natural gas ratio. This oxygen/natural gas ratio produces a long inner cone flame length which is used for most heavy cutting operations.
HARDWARE

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6110-3863</td>
<td>6—32 x 7/16-in. Lg. Flat Head Brass Screw</td>
</tr>
<tr>
<td>6330-0121</td>
<td>5/16—18 Hex Steel Nut</td>
</tr>
<tr>
<td>6134-0086</td>
<td>1/4—20 x 3/8-in. Lg. Socket Head Capscrew</td>
</tr>
<tr>
<td>6134-0090</td>
<td>1/4—20 x 1-in. Lg. Socket Head Capscrew</td>
</tr>
<tr>
<td>6134-0113</td>
<td>5/16—18 x 1-in. Long Socket Head Capscrew</td>
</tr>
<tr>
<td>6134-0115</td>
<td>5/16—18 x 1-1/2-in. Lg. Sock. Hd. Capscrew</td>
</tr>
<tr>
<td>6134-0117</td>
<td>5/16—18 x 4-in. Lg. Socket Head Capscrew</td>
</tr>
<tr>
<td>6130-4181</td>
<td>1/2—20 x 1-in. Lg. Hex Hd. Steel Screw</td>
</tr>
<tr>
<td>6330-0121</td>
<td>5/16—18 Hex Steel Nut</td>
</tr>
<tr>
<td>6430-0110</td>
<td>5/16-in. Plain Steel Washer</td>
</tr>
<tr>
<td>6430-2583</td>
<td>5/16 x 1/8 x 3/32 Steel Lockwasher</td>
</tr>
<tr>
<td>6430-2186</td>
<td>1/2 x 11/64 x 1/16-in. Steel Lockwasher</td>
</tr>
</tbody>
</table>

OPTIONAL ACCESSORIES

MOUNTING TUBE, 2-1/2" dia. (C-60-S) - 24Z91
Requires:  
RACK (16 pitch) - 68Z43  
3 SCREW - 61340086  
3 WASHER - 87W66  
DISKS, BRACKETS, & HARDWARE AS ILLUSTRATED

MOUNTING TUBE, 1-3/8" dia. (C-60-S) - 24Z92
Requires:  
RACK (32 pitch) - 51Z35  
2 SCREW - 61103883  
DISK - 68Z28  
BRACKETS & HARDWARE AS ILLUSTRATED

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Fig. 1 - C-60 Machine Cutting Torch, Series 2 (Illustrated) Part No. 02X76
C-60 Machine Cutting Torch, Series 2 (without mounting tube) Part No. 687541
C-60-S Machine Cutting Torch, Series 2 (without mounting tube) Part No. 687990

Fig. 2 - 1700-ACA-2 Powder Cutting Attachment, Series 2, Part No. 10Y95

L-TEC Welding & Cutting Systems
P.O. Box F-6000, Florence, SC 29501