INSTRUCTIONS for

OXWELD®

C-60 and C-60-S

MACHINE CUTTING TORCHES and

1700-ACA-1

POWDER CUTTING ATTACHMENT

⚠ CAUTION

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 Welding, Cutting and Heating", Form 2035. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or 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 are listed by Underwriter's Laboratories only when using parts manufactured by ESAB Welding & Cutting Products, to the 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 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 Power Cutting Attachment is only for use with the C-60 torch.

II. INSTALLATION AND CONNECTION

A. INSTALLATION

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, filter (P/N 2116735) 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, "C" size oxygen and acetylene needle valves 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 Power Cutting Attachment (10Y95) on the C-60, the ACV-4 Powder Pinch Valve (16X36) should be installed in the powder hose valve 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.)

Be sure this information reaches the operator. You can get extra copies through your supplier.
SAFETY PRECAUTIONS

1. PROTECT YOURSELF AND OTHERS — Some welding, cutting, and gouging processes are noisy and require ear protection. Hot metal can cause skin burns and heat rays may injure eyes. Training in the proper use of the processes and equipment is essential to prevent accidents. Also:
   a. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, or goggles are also required.
   b. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to prevent against hot sparks and hot metal. A flameproof apron may also be desirable as protection against radiated 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 open pockets eliminated from the front of clothing.
   d. Protect other personnel from hot sparks with a suitable non-flammable partition or curtains.
   e. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can travel considerable distances. Bystanders should also wear goggles over safety glasses.

2. FIRES AND EXPLOSIONS — Heat from a flame can act as an ignition source. Hot sparks or sparks can also cause fires or explosions. Therefore:
   a. Remove all combustible materials away well from the work area or completely cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
   b. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire on the floor below. Make certain that such openings are protected from hot sparks and metal.
   c. Do not weld, cut, or perform any other hot work on materials, containers, or piping until it has been completely cleaned so that no substances on the material can produce flammable or toxic vapors. Refer to AWS F4.1 in item 6 below for specific recommendations.
   d. Do not do hot work on closed containers. They may explode violently and kill you.
   e. Have fire extinguishing equipment handy for instant use, such as a garden hose, a pail of water or sand, or portable fire extinguisher. Be sure you are trained in its use.
   f. After completing operations, inspect the work area to be sure that there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.
   g. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", which is available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

3. FUMES AND GASES — Fumes and gases, particularly in confined spaces, can cause discomfort or injury. Do not breathe fumes or gases from welding or cutting. Therefore:
   a. Always provide adequate ventilation in the work area by natural or mechanical ventilation means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes and gases from these materials.
   b. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work at once and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
   c. Refer to ANSI/ASC Standard Z49.1 in item 6 below for specific ventilation recommendations.

4. EQUIPMENT MAINTENANCE — Faulty or improperly maintained equipment, such as torches, hoses and regulators, can result in poor work, but even more important, it can cause 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 do so.
   b. Keep all oxy-fuel equipment free of grease or oil. Grease, oil, and other similar combustible materials, when ignited, can burn violently in the presence of oxygen.
   c. Do not abuse any equipment or accessories. Keep equipment away from heat and wet conditions, oil or grease, corrosive atmospheres and inclement weather.
   d. Keep all safety devices in position and in good repair.
   e. Use equipment for its intended purpose. Do not modify it in any manner.

5. GAS CYLINDER HANDLING — Gas cylinders, if mishandled, can rupture or explode violently. Sudden rupture of a cylinder, valve, or relief device can injure or kill you. Therefore:
   a. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors to mount the regulator on the cylinder. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting the regulator to the gas cylinder.
   b. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
   c. When not in use, keep cylinder valves closed. Have the valve protection cap in place on top of the cylinder if no regulator is installed. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.
   d. Locate cylinders away from heat, sparks, or flame of a welding, cutting, or gouging operation. Never strike an arc on a cylinder.
   e. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from the Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

6. 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 distributor for a copy of "Precautions and Safe Practices for Gas Welding, Cutting, and Heating", Form 2035. Gas apparatus safety guidelines are also available on VHS video cassettes from your distributor.

The following publications, which are available from the American Welding Society, 550 N.W. LeJoune Road, Miami, FL 33126, are recommended to you:
   a. ANSI/AWS Z49.1 — "Safety in Welding and Cutting"
   b. AWS F4.1 — "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances"
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.

![WARNING]

Flashbacks can cause serious burns.
Be sure gas flow is sufficient for head or nozzle size. Adjust regulators for proper psig pressures. Adjust throttle valves properly. Keep torch in good repair.
DO NOT throttle back gasses to use large head or nozzle on thin material.

III. OPERATION

A. OPERATING PRECAUTIONS

Flow: There must be proper flow of gases for safe operation and full performance. This requires the following three conditions: (1) the regulators that determine the inlet pressure to the hoses must be set to the correct pressure; (2) the hoses and their connectors must have adequate capacity for the job (hoses that are too long, too small or have connectors with small passageways can cause problems); and (3) the throttle valves on the torch must be adjusted with the procedure shown in these instructions.

Note: Items (1) and (2) can be checked by measuring the gas pressures at the torch. Gauge adaptors are available for this purpose.

Backfire: Improper operation of the torch may cause the flames to go out with a loud ‘pop’. Such a backfire may be caused by contact of nozzle with the work, by spatter from the work, by the use of incorrect gas pressures, or by leakage at the cutting nozzle seats due to dirt or nicks on the seats or to a loose nozzle nut.

Flashback: Under certain circumstances, the flame may not ‘pop’ out (backfire) but instead burn back inside the torch with a shrill hissing or squeal. This is called a ‘flashback’. A flashback should never occur if (1) the equipment is in good condition; (2) preheat ports on the cutting nozzles or welding tips are cleaned frequently; (3) operating pressures are correct; and (4) throttle valves are adjusted properly. Should a flashback occur, IMMEDIATELY shut off the torch. Allow it to cool off for at least a minute. Then check your nozzle or tip, gas pressures, readjust regulator if necessary, and relight the torch. If flashback recurs, send the cutting torch with nozzle to your distributor for repair.

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 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 nozzle 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 shutoff 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. Only use 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 ESAB Remanufacturing Center, 411 S. 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 trisodium 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 bell-mouth 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 reassembling the mixer disk and mixer tube in the torch, make sure that the seating surfaces are clean.

1701 Series Acetylene Nozzles

<table>
<thead>
<tr>
<th>Nozzle</th>
<th>Steel Thickness, in.</th>
<th>Gas Pressure, psig</th>
<th>Cutting Oxygen *</th>
<th>Acetylene</th>
<th>Preheat Oxygen</th>
<th>Gas Consumption, cfm</th>
<th>Cleaning Drill Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Part No.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>08Z78</td>
<td>24 - 26</td>
<td>22</td>
<td>10</td>
<td>20</td>
<td>2160</td>
<td>19/64” 53</td>
</tr>
<tr>
<td>40</td>
<td>08Z80</td>
<td>28 - 30</td>
<td>18</td>
<td>10</td>
<td>20</td>
<td>3470</td>
<td>“X” 54</td>
</tr>
<tr>
<td>50</td>
<td>08Z82</td>
<td>35 - 40</td>
<td>12</td>
<td>10</td>
<td>20</td>
<td>4600</td>
<td>1/2” 3/64”</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>Steel Thickness, in.</th>
<th>Gas Pressure, psig</th>
<th>Cutting Oxygen *</th>
<th>Natural Gas</th>
<th>Preheat Oxygen</th>
<th>Gas Consumption, cfm</th>
<th>Cleaning Drill Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Part No.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>460064</td>
<td>24 - 26</td>
<td>22</td>
<td>7 - 15</td>
<td>11 - 25</td>
<td>2160</td>
<td>19/64” 56</td>
</tr>
<tr>
<td>40</td>
<td>596578</td>
<td>28 - 30</td>
<td>18</td>
<td>11 - 16</td>
<td>18 - 25</td>
<td>3470</td>
<td>“X” 46</td>
</tr>
<tr>
<td>50</td>
<td>5470081</td>
<td>35 - 40</td>
<td>12</td>
<td>12 - 17</td>
<td>20 - 26</td>
<td>4600</td>
<td>1/2” 46</td>
</tr>
<tr>
<td>60</td>
<td>5470082</td>
<td>45 - 50</td>
<td>7</td>
<td>14 - 18</td>
<td>25 - 30</td>
<td>5450</td>
<td>19/32” 45</td>
</tr>
<tr>
<td>70</td>
<td>5490062</td>
<td>50 - 60</td>
<td>6</td>
<td>16 - 24</td>
<td>30 - 40</td>
<td>7500</td>
<td>11/16” 43</td>
</tr>
</tbody>
</table>

* Read from gauge mounted on torch.
**Preheat oxygen flow is given as 50% of 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.
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.

HARDWARE

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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>6124-0090</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>Part No.</td>
<td>Description</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>6430-2166</td>
<td>1/2 x 11/16 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 (24 pitch) – 51Z35
(2) Screw – 61103863
(2) Disk – 68Z28
Brackets & Hardware as illustrated
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
A. CUSTOMER SERVICE QUESTIONS: Telephone (803) 664-5540/Fax: (803) 634-7548
Order Entry Product Availability Pricing Hours: 8:30 AM to 5:00 PM EST
Order Changes Saleable Goods Returns Delivery
Shipping Information

B. ENGINEERING SERVICE: Telephone: (803) 664-4416 / Fax: (803) 446-5693
Welding Equipment Troubleshooting Hours: 7:30 AM to 5:00 PM EST
Warranty Returns Authorized Repair Stations

C. TECHNICAL SERVICE: Telephone: (800) ESAB-123/ Fax: (803) 664-4452
Part Numbers Technical Specifications Performance Features Hours: 8:00 AM to 5:00 PM EST
Technical Applications Equipment Recommendations

D. LITERATURE REQUESTS: Telephone: (803) 664-5501 / Fax: (803) 664-5548
Hours: 7:30 AM to 4:00 PM EST

E. WELDING EQUIPMENT REPAIRS: Telephone: (803) 664-4469 / Fax: (803) 664-5557
Repair Estimates Repair Status Hours: 7:30 AM to 3:30 PM EST

F. WELDING EQUIPMENT TRAINING:
Telephone: (803)664-4428 / Fax: (803)664-4476
Training School Information and Registrations Hours: 7:30 AM to 4:00 PM EST

G. WELDING PROCESS ASSISTANCE:
Telephone: (803) 664-4248 / Fax: (803) 664-4454 Hours: 7:30 AM to 4:00 PM EST

H. TECHNICAL ASST. CONSUMABLES:
Telephone: (800) 934-9353 Hours: 7:30 AM to 5:00 PM EST

IF YOU DO NOT KNOW WHOM TO CALL
Telephone: (800) ESAB-123/Fax: (803) 664-4452/Web: http://www.esab.com
Hours: 7:30 AM to 5:00 PM EST