INSTRUCTIONS for OXWELD

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

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 Linde’s free booklet ‘Precautions and Safe Practices’, Form 2035. The same information appears in the ‘Oxy-Acetylene Handbook’ which may be purchased from any Linde Distributor.

I. DESCRIPTION

The Series 2 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 torches are approximately 2-1/2 feet long. The Series 2 1700-ACA-2 Powder 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 Oxweld S-5 filter (P/N 16X33) 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 16X34) is recommended.

Series Note

The instructions in this booklet apply to both Series 1 and Series 2 torches. However, for maintenance and repair purposes, the following differences should be noted:

1. Series 1 C-60 torch mounting tube is welded to the brackets, while the Series 2 torch mounting tube is screwed to the brackets to allow the tube to be rotated. Refer to Maintenance, Section IV paragraph F.

2. The Series 1 powder cutting attachment was equipped with three powder outlet tubes, while the Series 2 incorporates two powder tubes. Refer to Maintenance, Section IV paragraph G.
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 (10Y95) on the C-60, the ACV-4 Powder Pinch Valve (16X36) should be installed in the powder hose line about 6 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 inch cutting oxygen hose with “D” size fittings, 1/2 inch preheat oxygen and fuel gas hoses with “C” size fittings. Use 1/4 inch powder hose for lengths up to 50 feet, if powder is to be used. Powder hose should never exceed 50 feet 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.

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 re-lighted 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 the nearest Linde repair station 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 p.s.i. 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 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. 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 replacements other than those mentioned in these instructions, return the equipment to the nearest Linde repair station.

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 reassembling 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, place a thin, even coat of litharge and water mixture on the new gauge fitting threads and screw the gauge into the block (83Z45). “Teflon” Ribbon Pipe Dope may be used if preferred.

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.

F. Repair of Series 1 C-60 Torches (See Fig. 1)

Some parts used on Series 2 torches may be used, without modification, to repair Series 1 torches. The following parts, however, must be modified before they can be used on Series 1 torches: torch front body; torch mounting tube assembly: front and rear mounting tube brackets. For the required modification consult the nearest Linde repair station.

NOTE: Design Changes on Series 2 Torches.

1. Fig. 1 shows the C-60 and C-60-S Torches as manufactured since June 1, 1975, whereas the oxygen tube (47Z10 and 47Z29) is straight and the mixed gas tubing (47Z09 and 47Z28) has a slight bend. On prior manufactured torches, the oxygen tube had the bend and the mixed gas tubing was straight. If either tube on older torches require replacement, it is recommended to replace both tubes.

2. When new tubes are replaced on older torches, the parallelism between mounting tube and torch will be off by 1/4-in. (about 1/5-deg. on C-60; 1/2-deg. on C-60-S). If this parallelism is critical in a particular application, place a 1/4-in. thick shim between bracket (68Z31) and nozzle body (83Z46).

On the current manufactured torches, the hole for the 1/2-in.-20 screw (61304181) is slotted so that the mounting tube is parallel to the torch when shipped.

G. Repair of Series 1,1700 ACA-2 Powder Cutting Attachment (See Fig. 2)

1. Only one yoke and two powder outlet tubes are used with the current (Series 2) front clamp.

---

### 1701 Series Acetylene Nozzles

<table>
<thead>
<tr>
<th>Nozzle</th>
<th>Steel Thickness, inches</th>
<th>Cutting Oxygen, *</th>
<th>Acetylene</th>
<th>Preheat Oxygen</th>
<th>Cutting Speed, ipm</th>
<th>Gas Consumption, cfm</th>
<th>Cleaning Drill Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>082T78</td>
<td>24 - 26</td>
<td>22</td>
<td>10</td>
<td>20</td>
<td>2 - 3/8</td>
<td>2160</td>
</tr>
<tr>
<td>40</td>
<td>082T80</td>
<td>28 - 30</td>
<td>18</td>
<td>10</td>
<td>20</td>
<td>2 - 3/8</td>
<td>3470</td>
</tr>
<tr>
<td>50</td>
<td>082T82</td>
<td>35 - 40</td>
<td>12</td>
<td>10</td>
<td>20</td>
<td>2 - 3</td>
<td>4600</td>
</tr>
<tr>
<td>60</td>
<td>082T84</td>
<td>45 - 50</td>
<td>7</td>
<td>10</td>
<td>20</td>
<td>2 - 2/8</td>
<td>5450</td>
</tr>
<tr>
<td>70</td>
<td>652T21</td>
<td>50 - 60</td>
<td>6</td>
<td>10</td>
<td>20</td>
<td>2 - 1/4</td>
<td>7500</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 inch acetylene feather which is used for most heavy cutting operations.

### 1702 Series Natural Gas Nozzles

<table>
<thead>
<tr>
<th>Nozzle</th>
<th>Steel Thickness, inches</th>
<th>Cutting Oxygen, *</th>
<th>Natural Gas</th>
<th>Preheat Oxygen</th>
<th>Cutting Speed, ipm</th>
<th>Gas Consumption, cfm</th>
<th>Cleaning Drill Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>460064</td>
<td>24 - 26</td>
<td>22</td>
<td>7 - 15</td>
<td>11 - 25</td>
<td>2 - 3/8</td>
<td>2160</td>
</tr>
<tr>
<td>40</td>
<td>596759</td>
<td>28 - 30</td>
<td>18</td>
<td>11 - 16</td>
<td>18 - 25</td>
<td>2 - 3/8</td>
<td>2470</td>
</tr>
<tr>
<td>50</td>
<td>5470001</td>
<td>35 - 40</td>
<td>12</td>
<td>17 - 17</td>
<td>20 - 25</td>
<td>2 - 3</td>
<td>4600</td>
</tr>
<tr>
<td>60</td>
<td>5470002</td>
<td>45 - 50</td>
<td>7</td>
<td>17 - 18</td>
<td>25 - 30</td>
<td>2 - 2/8</td>
<td>5450</td>
</tr>
<tr>
<td>70</td>
<td>5490002</td>
<td>50 - 60</td>
<td>6</td>
<td>16 - 24</td>
<td>30 - 40</td>
<td>2 - 1/2</td>
<td>7500</td>
</tr>
<tr>
<td>80</td>
<td>641186</td>
<td>60 - 65</td>
<td>5</td>
<td>20 - 30</td>
<td>40 - 50</td>
<td>1/2</td>
<td>8500</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.
2. The current yoke replaces all parts formerly used between the powder inlet tube and the front clamp.

3. The powder outlet tubes formerly used are longer than the current tubes. Replacement must be made in sets of two.

For the required modifications consult the nearest Linde repair station.

HARDWARE

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<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>
<td>6134-0117</td>
<td>5/16-18 x 4-in. Lg. Socket Head Capscrew</td>
</tr>
<tr>
<td>6330-0121</td>
<td>5/16-18 Hex Steel Nut</td>
<td>6130-4181</td>
<td>1/2-20 x 1-in. Lg. Hex Hd. Steel Screw</td>
</tr>
<tr>
<td>6134-0088</td>
<td>1/4-20 x 3/8-in. Lg. Socket Head Capscrew</td>
<td>6330-0121</td>
<td>5/16-18 Hex Steel Nut</td>
</tr>
<tr>
<td>6134-0090</td>
<td>1/4-20 x 1-in. Lg. Socket Head Capscrew</td>
<td>6430-0110</td>
<td>5/16-in. Plain Steel Washer</td>
</tr>
<tr>
<td>6134-0113</td>
<td>5/16-18 x 1-in. Long Socket Head Capscrew</td>
<td>6430-2186</td>
<td>1/2 x 11/64 x 1/16-in. Steel Lockwasher</td>
</tr>
<tr>
<td>6134-0115</td>
<td>5/16-18 x 1-1/2-in. Lg. Sock. Hd. Capscrew</td>
<td>6323619</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1 - C-60 Machine Cutting Torch, Series 2 ........................................ Part No. 02X76
C-60-S Machine Cutting Torch, Series 2 (2-1/2’’ mounting tube) ................. Part No. 02X89
C-60-S Machine Cutting Torch, Series 2 (1-3/8’’ mounting tube) ................. Part No. 02X90
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