W-201 and W-202 Welding Torches and CW-202 Cutting Attachment

The W-201 and W-202 are general-duty torches designed to cover the full range of oxy-acetylene welding. They are alike in design except for certain handle, the W-202 being the longer of the two. The W-202 is recommended for heavy welding and for heating because its greater length permits better balance with the larger size welding heads, and also keeps the operator's hand further from the heat zone.

Where the volume of cutting does not warrant the purchase of a separate cutting torch, the CW-202 cutting attachment can be used with either the W-201 or W-202 torches. The CW-202 is designed for cutting steel up to 8 inches thick.

I. Operating Instructions - Welding Torches

A. To Connect the Torch

1. Attach the proper size welding head to the torch (see table on page 6). Hand-tighten the connection nut. Do NOT use a wrench.

2. Attach the oxygen and acetylene hoses to the torch and to the regulators. Tighten all hose connections with a wrench.

3. If necessary, adjust the packing nuts on the torch for the desired tightness. (Note: The packing nuts are pretightened at the factory. If the valve is too tight, loosen the packing nut slightly.)

B. To Adjust Gas Pressures

1. Oxygen
   a. Open the torch oxygen valve one full turn.
   b. Screw in the pressure-adjusting screw on the oxygen regulator until the desired delivery pressure is indicated on the delivery-pressure gauge. (See table on page 6.)
   c. Close the torch oxygen valve.

2. Acetylene
   a. Open the torch acetylene valve one full turn.
   b. Screw in the pressure-adjusting screw on the acetylene regulator until the desired delivery pressure is indicated on the delivery-pressure gauge. (See table on page 6.)
   c. Immediately close the torch acetylene valve.

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Be sure this information reaches the operator. You can get extra copies through your supplier.
C. To Light the Torch

1. Open the torch oxygen valve one-quarter of a turn.
2. Open the torch acetylene valve one full turn. Using a friction lighter, light the gas at the tip. Do NOT use a match.
3. Open the torch oxygen valve slowly until a neutral flame is obtained. Then carefully readjust the valves to obtain the flame length desired.

NOTE: If the flame pops out: (1) increase the acetylene valve opening and immediately relight the torch; (2) adjust the oxygen valve to obtain a neutral flame.

D. To Shut Off the Torch

1. Close the torch acetylene valve.
2. Close the torch oxygen valve.

II. Operating Instructions for the CW-202 Cutting Attachment

A. To Connect the Cutting Attachment

1. Attach the cutting attachment to the W-201 or W-202 torch in the same manner as a welding head. Hand-tighten the connection nut. Do NOT use a wrench.
2. Attach the proper size nozzle to the cutting attachment (see cutting table on page 6).

B. To Adjust Gas Pressures

1. Oxygen
   a. Open the torch oxygen valve wide. This valve must be kept FULLY open when the cutting attachment is being used. Partially closing the valve will affect the flow of cutting oxygen.
   b. Open the cutting-oxygen valve fully. Holding the valve fully open, screw in the pressure-adjusting screw on the oxygen regulator until the desired delivery pressure is indicated on the delivery-pressure gauge (see Cutting Table on page 6 for correct operating gas pressures).
   c. Close the cutting-oxygen valve.

2. Acetylene
   a. Open the torch acetylene valve one full turn.
   b. Screw in the pressure-adjusting screw on the acetylene regulator until the desired pressure is indicated on the delivery-pressure gauge (see Cutting Table on page 6 for correct operating gas pressures).

C. To Light the Cutting Attachment

1. Open the preheat-oxygen valve a fraction of a turn.
2. Open the torch acetylene valve fully. Using a friction lighter, light the gas at the nozzle. Do NOT use a match.
3. Open the cutting-oxygen valve and adjust the flames to neutral with the preheat-oxygen valve. Then carefully readjust the valves to obtain the flame length desired.

NOTE: If the flames burn away from the end of the nozzle or blow off: (1) decrease the acetylene valve opening and immediately relight the cutting attachment; (2) adjust the preheat-oxygen valve to obtain a neutral flame.

D. To Shut Off the Cutting Attachment

1. Close the cutting-oxygen valve.
2. Close the torch acetylene valve.
3. Close the preheat-oxygen valve.
4. Close the torch oxygen valve.

III. To Test for Leaks

Using a soapy water solution, test hose connections, torch oxygen and acetylene valve stems, and welding head or cutting attachment connections. In addition, on cutting attachment, test cutting-oxygen valve and preheat-oxygen valve. Always use a grease-free soap, such as Ivory brand.

IV. Operating Precautions

A. Backfire

Improper operation of the torch or cutting attachment may cause the flame to go out with a loud pop. This is called "backfire." The flames of the W-201, W-202, and CW-202 are resistant to the occasional backfires normally caused by the use of very short flames, or by overheating of the head or nozzle. Other common causes of backfires are:

1. Operating the torch or cutting attachment at incorrect pressures.
2. Touching the work with the tip of the welding head or with the nozzle.
3. A loose welding head connection or a loose nozzle.

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4. Dirt on the head seat or on the nozzle seat.

**NOTE:** Do NOT relight the torch or cutting attachment after a backfire until the trouble has been located and corrected.

B. **Flashback**

When the flame burns back inside the torch or cutting attachment, usually with a shrill hissing or squealing, it is called a "flashback." The advanced design of the W-201, W-202, and CW-202 makes flashbacks almost impossible. However, if a flashback should occur, proceed as follows:

1. **For Torch**
   
a. Immediately close the torch oxygen valve.

b. Close the torch acetylene valve.

c. After a moment, relight the torch in the usual manner.

2. **For Cutting Attachment**
   
a. Immediately close the preheat-oxygen valve.

b. Close the torch acetylene valve.

c. After a moment, relight the cutting attachment in the usual manner.

**NOTE:** If flashbacks continue to occur, send the torch or cutting attachment to the nearest Linde Company repair station or Linde Distributor.

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V. **Maintenance Instructions for the W-201 and W-202 Welding Torches**

For all repairs and replacements other than those mentioned below, send the apparatus to the nearest Linde Company repair station or Linde Distributor. The specific repair information shown on the drawing is provided for experienced and qualified persons engaged in the repair of this apparatus. Improperly repaired apparatus may be hazardous. Economical repair service is available from the nearest Linde Distributor or through any Linde Company sales office.

A. **Valve Packing Nut Leakage**

If leakage develops around the valve packing nut, proceed as follows:

1. Tighten the valve packing nut with a wrench until the valve is difficult to turn, or cannot be turned at all. If possible, set the torch aside for 3 or 4 hours, preferably overnight.

2. Back off the packing nut slightly until the proper friction is obtained for satisfactory valve adjustment. Retest for leakage around the nut and stem.

   If this does not stop the leak, replace the packing washer as follows:

3. Unscrew the packing nut and valve stem until the complete valve stem assembly can be removed.

4. Cut the valve packing washer off the valve stem.

5. Place the split replacement washer around the stem, and push it into the packing recess in the nut. Screw the valve assembly into the body.

6. Repeat steps 1 and 2.

B. **Leakage through the Valve**

If either torch valve does not shut off completely:

1. Remove the valve stem assembly.

2. Wipe the seating portions of the valve stem and body with a clean cloth.

3. If the valve stem is marred or bent, or if its seating surfaces are nicked, replace it with a new valve stem assembly.

4. If the valve still leaks, reform the seat by closing the valve with excessive force. The hardened steel ball in the end of the stem will usually coin a new seat. If leakage persists, send the torch to the nearest Linde Repair Station or Linde Distributor for reseating of the valve body.

C. **Clogging in the Welding Tip**

1. Always clean a welding or heating tip by hand. Use OXWELD tip cleaners. The next best cleaning tool is the correct size twist drill (see chart on Page 6). Never turn a twist drill when inserted in the flame port; a back and forth motion of the drill along the axis of the flame port will clear the port without removing metal.

2. If the welding tip is so badly worn or damaged that replacement is necessary, secure the front section of the mixer tube in a vise and unscrew the tip by gripping it at the bent section and turning counter-clockwise.

3. Screw the new tip into the mixer tube and tighten it so that the connection is gas-tight. The size of the mixer and the size of the tip should always correspond. NEVER use a different size tip and mixer.

D. **To Clean the Mixer**

1. Unscrew the mixer from the mixer tube.

2. Soak the mixer in a solution of OXWELD Nozzle Cleaning Compound, then rinse it in clear water and blow out the passages with an air jet.

**NOTE:** Inspect the two sealing "O" rings for nicks, cracks, excessive distortion or flatness. Replace if defective. "O" rings should provide a noticeable resistance to the insertion of the welding head in the handle. Whenever there is any doubt as to their condition, they should be replaced.
VI. Maintenance Instructions for the CW-202 Cutting Attachment

A. Preheat Valve Packing Nut Leakage
Follow the instructions in Paragraph V-A.

B. Leakage through the Preheat Valve
If the preheat valve does not shut off completely, follow the same procedure as in steps 1 through 4, section V-B.

C. Cutting Valve Leakage
If leakage develops around the valve or valve stem:
1. Unscrew the cutting valve assembly from the body. The valve spring (23K06) will fall out in your hand when the body is inverted.
2. Remove the valve lock screw (57K02) from the valve stem (09K13). Remove the valve stem from the valve seat retainer (57K03) and valve seat (32Z01). Examine the seating surface of the valve stem shank for scratches, rough spots, and excessive wear. If this section is not smooth, replace the valve stem with a new part.
3. Replace the small "O" ring (85W11) on the lock screw with a new part. Inspect the large "O" ring (14K07) for nicks, cracks, excessive distortion, and flatness. Replace if defective.
4. To reassemble, slide the valve stem into the valve seat and valve seat retainer; push the valve lock screw on to the valve stem (the valve stem should offer some resistance as the valve lock screw is pushed on).
5. Place the valve spring in the body and screw in the cutting valve assembly.

D. Leakage at the Nozzle Seat
1. Clean the seating surfaces on the nozzle and in the cutting attachment head.
2. If this does not stop leakage, check the seat by inserting a new nozzle in the head.
3. If leakage persists, send both the cutting attachment and the cutting nozzle to a LINDE repair station for reseating of the head.

E. Clogging
1. If the gas passages become clogged, they can be cleared by blowing oxygen backwards through the attachment.
2. Use oxygen at about 20 lbs. pressure with only one valve open at a time, then with both valves open.

F. To Clean the Mixer
1. Unscrew the locknut (56K07) located at the rear of the cutting attachment body.
2. With the cutting attachment connected to the torch and the connecting nut (12K12) tight, unscrew the adaptor (19K07) from the rear body of the cutting attachment.
3. Ordinarily, the mixer should come out of the mixer tube when the adaptor is removed. The mixer can then be removed from the adaptor by a gentle pull. If the mixer remains in the attachment body when the adaptor is removed, invert the attachment body and tap the rear end lightly on a block of wood or wooden bench.
4. Clean the mixer passages with a No. 55 cleaning drill or soak the mixer in a solution of OXWELD Nozzle Cleaning Compound, then rinse it in clear water and blow out the passages with an air jet.
5. Inspect the five "O" rings on the mixer and adaptor for nicks, cracks, excessive distortion, and flatness. Replace defective rings with new parts.
6. To reassemble, reverse steps one through three.
### REPLACEMENT PARTS AND CLEANING DRILL SIZES FOR WELDING HEADS

<table>
<thead>
<tr>
<th>Size</th>
<th>Part No.</th>
<th>Mixer †</th>
<th>Drill Sizes</th>
<th>Part No.</th>
<th>Drill Size</th>
<th>Part No.</th>
<th>Drill Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mixer †</td>
<td>Center Orifice</td>
<td>Outside Orifice</td>
<td>Mixer †</td>
<td>Center Orifice</td>
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### REPLACEMENT PARTS AND CLEANING DRILL SIZES FOR BENDABLE WELDING HEADS

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<th>Size</th>
<th>Part No.</th>
<th>Mixer †</th>
<th>Drill Sizes</th>
<th>Part No.</th>
<th>Drill Size</th>
<th>Part No.</th>
<th>Drill Size</th>
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<td>Mixer †</td>
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<td>9</td>
<td>06L37</td>
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† "O" Rings Part Nos. 14K05 and 14K06 are not included with replacement mixer and must be ordered separately.

### REPLACEMENT PARTS AND CLEANING DRILL SIZES FOR MULTIFLAME HEATING HEADS

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<thead>
<tr>
<th>Head Complete</th>
<th>Part No.</th>
<th>Gas Used</th>
<th>Part No.</th>
<th>Drill Sizes</th>
<th>Part No.</th>
<th>Drill Size</th>
<th>Part No.</th>
<th>Drill Size</th>
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<td>Mixer †</td>
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† "O" Rings Part Nos. 14K05 and 14K06 are not included with replacement mixer and must be ordered separately.

### WELDING CHART

<table>
<thead>
<tr>
<th>Thickness of Metal (inches)</th>
<th>32 to 36 gauge</th>
<th>25 gauge to 1/32</th>
<th>1/32 to 1/16</th>
<th>1/16 to 3/32</th>
<th>3/32 to 1/8</th>
<th>1/8 to 3/16</th>
<th>3/16 to 1/4</th>
<th>1/4 to 3/8</th>
<th>3/8 to 1/2</th>
<th>1/2 to 5/8</th>
<th>3/4</th>
<th>Over 1 in. and Heating</th>
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<tr>
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<td>40</td>
<td>55</td>
<td>70</td>
<td>85 or 100</td>
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<tr>
<td>Oxy. and Acet. Pressures, lb. per sq. in.</td>
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<td>5-7</td>
<td>5-7</td>
<td>5-7</td>
<td>5-7</td>
<td>5-7</td>
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<td>6-8</td>
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### CUTTING CHART (for 4201 or 4202 Series Nozzles)

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<th>Steel Thickness, in.</th>
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<th>1/4</th>
<th>3/8</th>
<th>1/2</th>
<th>5/8</th>
<th>3/4</th>
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<tr>
<td>Oxygen Pressure, lb. per sq. in.</td>
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<td>25-31</td>
<td>31-38</td>
<td>41-48</td>
<td>25-31</td>
<td>31-38</td>
<td>41-48</td>
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<td>52-60</td>
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<td>63-68</td>
<td>90-100</td>
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<tr>
<td>Total Acetylene Flow, cfm*</td>
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<td>11</td>
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<td>13</td>
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<td>18</td>
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<td>22</td>
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<td>32</td>
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<tr>
<td>Total Oxygen Flow, cfm*</td>
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<td>234</td>
<td>317</td>
<td>390</td>
<td>464</td>
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*Acetylene and oxygen flows listed are maximum, based on the use of the maximum oxygen and acetylene pressures shown in the table. In normal cutting, choose a point midway in the oxygen pressure range indicated for the particular thickness of steel being cut. When cutting clean steel, a lower point in the range may be used. When cutting dirty or heavily scaled steel, a higher point in the range should be used.

All pressures at the regulators are based on 25-ft. lengths of ½-in. hose. Longer lengths will require somewhat higher pressures.

### CUTTING NOZZLE DRILL SIZES (Series 4201 & 4202)

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<thead>
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<th>Nozzle Size</th>
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<tr>
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<td>Cutting Drill Size</td>
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