INSTRUCTIONS for Purox W-201 and W-202 Welding Torches and CW-202 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 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. 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.

OPERATING INSTRUCTIONS

CONNECTING:
1. Attach regulators to the oxygen and acetylene cylinders. Follow all instructions supplied with your regulators.
2. Attach oxygen and acetylene hose (see pg. 4 for recommended hose sizes) to the regulators and to the torch handle, after making sure all metal seating surfaces are clean. Tighten all connection nuts with a wrench.
3. Using Welding Head: Remove welding head connection nut from torch handle. Insert welding head into handle using slight back and forth twisting motion as you push. Slip connection nut over the head and hand-tighten to handle.
   Using Cutting Attachment: Set the welding head connection nut aside and insert the cutting attachment to the torch handle in the same manner as the welding head. Remove nozzle nut and insert cutting nozzle into the cutting attachment head. Slip nut over the nozzle and tighten with a wrench.
4. Check valve stem packing nuts for tightness.

TESTING FOR LEAKS:
Every welding and cutting outfit should be thoroughly tested for leaks after it is first hooked up, and at regular intervals thereafter. After all connections have been made, make sure both valves on the torch handle are closed. Then turn in the regulator pressure-adjusting screws clockwise until the oxygen delivery-pressure gauge registers 50 psi, the acetylene delivery-pressure gauge registers 10 psi. Using OXWELD No. 23 Leak Test Solution (Part No. 89420023), or any other solution suitable for oxygen service, check for leaks at the cylinder valves, the cylinder-to-regulator connections, the regulator-to-hose connections, and the hose-to-torch connections. If bubbling at any point indicates leakage, tighten the connection. If this does not stop the leakage, close the appropriate cylinder valve, open the torch valve to remove all pressure from the line, and finally release the regulator pressure-adjusting screw by turning it counterclockwise. Then break the leaky connection, wipe metal seating surfaces with a clean, dry cloth, and examine them for nicks and scratches. Remake the connection(s) and retest. Do not try to light the torch until you are satisfied that all connections are gas-tight.

ADJUSTING GAS PRESSURES:
Acetylene: With oxygen valve closed, open the acetylene valve on the torch handle about one turn. Turn in the pressure-adjusting screw on the acetylene regulator until its delivery-pressure gauge indicates the desired pressure (refer to operating tables on page 4). Then immediately close the torch acetylene valve.

Oxygen, Using Welding Head: Open the torch oxygen valve WIDE (about 1-1/2 turns). Adjust oxygen pressure at the regulator to the desired pressure (refer to Table 1 or 2 on page 4) and then close the torch oxygen valve.

Oxygen, Using Cutting Attachment: Open the torch oxygen valve WIDE and leave the preheat oxygen valve on the cutting attachment closed. Depress the cutting oxygen valve lever on the cutting attachment. Adjust the oxygen pressure at the regulator to the desired pressure (refer to Table 3 on page 4). Shut off the oxygen flow by releasing the cutting oxygen valve lever only.
LIGHTING TORCH:
With Welding Head:
1. Open oxygen valve a fraction of a turn.
2. Open acetylene valve one full turn and light the gas at the torch tip with a friction lighter. DO NOT USE A MATCH.
3. Open the oxygen valve wide and readjust the acetylene valve to secure a neutral flame.

With Cutting Attachment:
1. Make sure the torch handle oxygen valve is WIDE open (at least one and one-half turns) and that the preheat oxygen valve on the cutting attachment is closed.
2. Open the acetylene valve on the torch handle about 1/4 turn, and light the gas at the nozzle with a friction lighter. DO NOT USE A MATCH.
3. When lit, flame will be yellow and quite long. Slowly close the acetylene throttle valve until the yellow flame starts to throw off black smoke (carbon particles).
4. Open preheat oxygen valve SLOWLY until the flame shows only excess acetylene ‘feathers’.
5. Finally, open the cutting oxygen valve and adjust for neutral flames by turning preheat oxygen valve.

The flame now has the proper strength for any cutting job. With this flame, acetylene is being consumed economically and the cutting attachment will be operating at best resistance to flashback.

If greater preheat flame temperature is desired for faster starts or piercing, open the cutting oxygen valve and adjust the preheat oxygen valve until the flame inner cones shorten about 10 percent and become sharply pointed.

After lighting the torch, and adjusting the flames, use leak test solution to check for leakage at all torch valves, and at the connection between the torch handle and the welding head or cutting attachment.

SHUTTING OFF:
Close the acetylene valve first, then the oxygen valve whether you are using a welding head or cutting attachment. However, if the cutting attachment is to be relighted within a half-hour, you may close the oxygen valve on the attachment instead of the oxygen valve on the torch handle.

If operations are to be stopped for several hours, you should release all pressure from regulators. To do this, first close both cylinder valves. Then open the torch valves. Finally, back out the regulator pressure-adjusting screws until they turn freely.

OPERATING PRECAUTIONS:
Backfire: Improper operation of the torch or cutting attachment may cause the flame to go out with a loud ‘pop’. (If you are welding, the flame will often reignite instantly.) Such a backfire may be caused by contact of tip or 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 seats or to a loose nozzle nut. After a backfire, you can normally relight the flames immediately. However, if backfires occur repeatedly, shut off the torch. Check the ‘O’-ring seals between the welding head or cutting attachment and the handle, and the nozzle seats (if cutting). Readjust operating pressures and relight.

Flashback: Under certain exceptional 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 cutting nozzles or welding tips are cleaned frequently; and (3) operating pressures are correct. 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 regulators if necessary, and relight the torch. If flashback recurs, send the torch handle and welding head or cutting attachment to a Linde repair station or to your distributor for repair.

MAINTENANCE INSTRUCTIONS
For all repairs other than those covered below, send the apparatus to the nearest Linde Division apparatus repair station or to your UNION CARBIDE Welding Products distributor. Improperly repaired apparatus is hazardous.

Torch Handle and Cutting Attachment Needle Valves -- Leakage around valve stem can almost always be corrected by tightening the packing nut slightly. If necessary, replace the complete needle valve assembly as directed below.

If a valve will not shut off completely, loosen the packing nut and unscrew the valve stem assembly from the body. Wipe the stainless steel ball seat on the valve stem, and the seating surface in the body, with a clean cloth. Then reinstall the valve, retighten the packing nut, and operate the valve several times, closing it with maximum force. If this does not end the leakage, install a new valve stem assembly. When you do so, tighten the packing nut until you find it extremely difficult to turn the valve wheel. Set the unit aside for a few hours to set the packing. Then loosen the packing nut until the valve stem turns easily.

Cutting Valve -- If leakage is detected around the cutting valve stem, or if the valve does not shut off completely when cutting lever pressure is released, unscrew the lock screw (see illustration below) with a spanner wrench. When the thread is fully disengaged, lift out the valve assembly. Then tilt the attachment and let the valve spring drop out in your hand.

Now pull the lock screw off the valve stem and remove seat and retainer from the stem. Examine the stem carefully. If either the seating surface or the cylindrical section that runs in the valve screw is marred, replace the stem with a new part. Always replace the seat with a new part. Replace the small ‘O’ ring in the lock screw with a new part if there has been leakage around the valve stem. Inspect the large ‘O’ ring and replace it if it is not in excellent condition. Place new seat on stem, slide on the retainer, and insert stem in lock screw (be sure the lock screw has both ‘O’ rings in position). Finally, slide valve spring into body, insert valve assembly, and tighten lock screw.

Cutting Attachment Mixer -- To remove the mixer for cleaning or replacement, back off locknut 56K07 until it reaches the end of the threads on the adaptor (19K07). Continue
turning it, with a wrench, to unscrew the adaptor from the attachment body. Then remove the mixer by grasping the end of the mixer with a pair of pliers and pulling it out. Clean mixer center orifice with a No. 55 cleaning drill and the cross-drillings with a No. 66 drill, or soak the mixer overnight in a solution of OXWELD Nozzle Cleaning Compound (P/N 761F00), rinse, and blow dry with clean air.

Inspect all 'O' rings and replace them if they are not in good condition. Reassemble in reverse order, and tighten locknut against body securely.

Welding Heads and Cutting Nozzles - Welding heads and cutting nozzle orifices should be cleaned by hand, using OXWELD tip cleaners, whenever a flame distortion is noticed. Maintaining clean orifices is highly recommended for reducing any incidence of flashbacks. If you don’t have tip cleaners, twist drills of the correct sizes (see Table 3 on page 4) may be used. Insert the drill carefully, and push it back and forth. DO NOT TWIST THE DRILL.

If a welding tip requires replacement, secure the front end of the mixer throat in a vise and unscrew the tip. Before installing a new tip, be sure it matches the mixer throat in size (both parts are size-stamped). Always tighten the new tip as much as you can without bending it.

To clean a welding head mixer, unscrew it from the mixer throat, soak it overnight in a solution of OXWELD Nozzle Cleaning Compound, rinse with clear water, dry with a jet of air.

Check the condition of ‘O’ rings on the welding heads periodically. If they appear to be in poor condition, or are so worn that the head can be inserted in the handle without noticeable resistance, replace them.

PARTS INFORMATION

All parts which can be replaced without breaking soldered or brazed joints are illustrated below or listed on the next page. When ordering parts, please give both part number and description.

Fig. 1 - Replacement Parts - Torches and Cutting Attachment

Fig. 2 - Replacement Parts - Welding and Heating Head Assemblies
### Table 1 – Acetylene Welding Heads - Operating Data & Parts

<table>
<thead>
<tr>
<th>Size</th>
<th>Part No.</th>
<th>Steel Thickness, in.</th>
<th>Steel</th>
<th>Gas Pressure, psig</th>
<th>Replacement Parts, Part No. (see Fig. 2)</th>
<th>Tip Cleaning Drill Size</th>
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<tr>
<td>40</td>
<td>07L04</td>
<td>1/2 - 5/8</td>
<td></td>
<td></td>
<td>69K37</td>
<td>5 - 7</td>
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<tr>
<td>70</td>
<td>07L05</td>
<td>1/4 - 3/8</td>
<td></td>
<td></td>
<td>70K37</td>
<td>5 - 7</td>
</tr>
<tr>
<td>150</td>
<td>07L06</td>
<td>1/2 - 5/8</td>
<td></td>
<td></td>
<td>71K37</td>
<td>5 - 7</td>
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<tr>
<td>*200 - A</td>
<td>639191</td>
<td>1/8 - 1/16</td>
<td></td>
<td></td>
<td>72K37</td>
<td>5 - 7</td>
</tr>
<tr>
<td>70</td>
<td>07L11</td>
<td>1/2 - 5/8</td>
<td></td>
<td></td>
<td>73K37</td>
<td>5 - 7</td>
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<tr>
<td>150</td>
<td>07L12</td>
<td>1/2 - 5/8</td>
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<td>74K37</td>
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<tr>
<td>*200 - FG</td>
<td>639224</td>
<td>1/8 - 1/16</td>
<td></td>
<td></td>
<td>75K37</td>
<td>5 - 7</td>
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* "Rosebud" Style

**Recommended Hose Sizes:** 1/4" I.D. hoses, 25-ft. long or less, are suitable for operating any welding heads up through size 30 or any cutting nozzle up through size 7. For larger heads or nozzles or if longer hose lengths are required, 3/8" I.D. hoses are recommended.

**Accessories:** Welding and Heating Head Extensions
- 10’ long extension for No. 30 & 40 heads ........ 07M17
- 10’ long extension for No. 55 thru 150 heads .... 07M18
- 14’ long extension for No. 200 head ........... 639194
- Coupling for the 14” long extension .......... 639378

### Table 2 – Multi-flame Heating Heads - Operating Data & Parts

<table>
<thead>
<tr>
<th>Heating Head</th>
<th>Type of Fuel Gas</th>
<th>Gas Pressure, psig</th>
<th>No. of Flames</th>
<th>Avg. Heat Output Btu/hr.</th>
<th>Replacement Parts, Part No. (see Fig. 2)</th>
<th>Tip Cleaning Drill Size</th>
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<tr>
<td>40</td>
<td>07L04</td>
<td>6 - 7</td>
<td>5 - 7</td>
<td>59,000</td>
<td>102,000</td>
<td>147,000</td>
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<tr>
<td>70</td>
<td>07L05</td>
<td>6 - 7</td>
<td>5 - 7</td>
<td>59,000</td>
<td>102,000</td>
<td>147,000</td>
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<td>6 - 7</td>
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<td>102,000</td>
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<td>*200 - FG</td>
<td>639224</td>
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<td>5 - 7</td>
<td>59,000</td>
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<td>147,000</td>
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* "Rosebud" Style

### Table 3 – 4201 & 4202 Series Cutting Nozzles - Operating Data & Part Numbers

(4201 Series nozzles have 4 preheat flames; 4202 Series have 6 preheat flames)

<table>
<thead>
<tr>
<th>Nozzle</th>
<th>Part No. (4201)</th>
<th>Part No. (4202)</th>
<th>Steel Thick., in.</th>
<th>Gas Pressure, psig</th>
<th>Cleaning Drill Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Part No. (4201)</td>
<td>Part No. (4202)</td>
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<td>Acetylene</td>
<td>Preheat</td>
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<td>30 - 40</td>
<td>50 - 100</td>
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<tr>
<td>3</td>
<td>16K05</td>
<td>16K08</td>
<td>1/8 - 1/4</td>
<td>15 - 30</td>
<td>50 - 100</td>
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<tr>
<td>4</td>
<td>16K06</td>
<td>16K09</td>
<td>3/8 - 5/8</td>
<td>21 - 48</td>
<td>50 - 100</td>
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<td>5</td>
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