INSTALLATION INSTRUCTIONS

for the

Oxweld

Trade-Mark

AUTOMATIC TRACER

"OXWELD"
AUTOMATIC TRACER

FORM 9460 - A

CONTENTs

DESCRIPTION OF TRACER 2

TYPES OF INSTALLATION 2

I. INSTALLATION AS ORIGINAL DRIVE UNIT ON CM-15-36 2

II. INSTALLATION AS ORIGINAL DRIVE UNIT ON CM-15-18 6

III. CONVERSION OF FIELD CM-15-36 TO AUTOMATIC TRACER DRIVE 7

IV. CONVERSION OF FIELD CM-15-18 TO AUTOMATIC TRACER DRIVE 7

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DESCRIPTION OF TRACER

The automatic tracer is an electronically-controlled drive unit recommended for use with OXWELD CM-15 shape-cutting machines. The main difference between the automatic tracer and strip-template and magnetic tracers is that it reproduces intricate shapes from low-cost, easy-to-make sheet templates. The templates are prepared at a small fraction of the time and cost of preparing strip and magnetic templates. In addition, the sheet templates and electronic steering control permit smooth and accurate tracing of highly irregular shapes.

Three principal components are included in the basic tracer unit: the drive head, electronic control and lift linkage. The drive head does the actual sheet-template tracing. Contact is maintained with the template through a stylus which is propelled along the template edge. As the stylus encounters changes in template contour, corrective electric impulses are sent out from the electronic control to the steering motor in the drive head. In this way, cut pieces are kept in strict conformity to template contours. The lift linkage is a mechanical device for raising and lowering the drive head. For additional information on operation of the automatic tracer (including instructions for sheet-template fabrication), refer to Form 9437, "Instructions and Parts List for OXWELD Automatic Tracer."

The automatic tracer requires a 115-volt, 60-cycle, single-phase, a.c. power supply for proper operation. Direct current and 25-cycle current tracers are not available.

TYPES OF INSTALLATION

The automatic tracer is installed on CM-15 machines as original equipment, or as conversion drive units for CM-15's now in service with line- and strip-template drive heads. This booklet contains installation instructions for such installations, as follows:

1. Installation of automatic tracer as original drive unit on CM-15-36 (Part No. 01E50).
2. Installation of automatic tracer as original drive unit on CM-15-18 (Part No. 01E49).

I. Installation as Original Drive Unit on CM-15-36, Part No. 01E50

Install the CM-15-36 as outlined in Form 9114. Ignore references to the line- and strip-template drive unit since that assembly is not shipped with machines intended for use with the automatic tracer (unless separately ordered). Also disregard the instructions on electrical connections.

The machine carriage and blowpipe assembly, as installed above, is now ready to receive the automatic tracer. Remove the tracer components from their individual shipping containers, exercising particular care in unpacking the drive head and electronic control. Both contain parts and adjustments that could be damaged by rough handling. Proceed with the tracer installation according to the instructions given below.

A. ELECTRONIC CONTROL

Four mounting ears are located at the corners of the electronic control, and are integral parts of the assembly. Center-to-center dimensions of the mounting holes are 18 in. x 10-1/2 in. Installation procedure is described below.

1. Select a suitable location for the electronic control. This location should allow free movement of the 20-ft. cables which connect the electronic control to the drive head. The cables must not interfere with machine travel, but must allow for maximum travel. The control may be located above the machine or on an adjacent wall or post, or it can be mounted on the side of the tracing table, as shown in Figure 1.

2. Lay out and drill four holes in the supporting framework or customer-built brackets. These holes will correspond with the holes in the mounting ears. (The ears may be used as a template for this purpose.)

3. Mount the electronic control, using suitable attaching screws or bolts.

B. LIFT LINKAGE

1. Bolt adaptor plate 21V20 to the cutting-machine arm, using the 5-1/2-in. long 1/2-in.-13 cap screws, with nuts, lock washers and flat washers provided. See Figure 2. The mounting holes in the arm of the cutting machine are the same as those used for mounting other drive units.

2. Bolt the lift linkage to the adaptor plate using four of the 1-in. long 3/8-in.-24 cap screws.
Do not tighten these screws; they will be fully tightened after the leveling procedure outlined in paragraph C.

3. Bolt the extension plate (21V21) to the lift linkage so that the plate extends below the linkage. Use four of the 1-in. long 3/8-in.-24 cap screws and lock washers.

C. DRIVE HEAD

1. Place the drive head on the tracing table, allowing it to rest on the drive wheel and the guard ring (Fig. 3).

2. Line up the lowest four holes in the extension plate with the corresponding four holes in the back of the drive head. Using the four 1-1/4-in. long 3/8-in.-24 cap screws, four lock washers and the four spacers provided (Fig. 2), bolt the drive head to the extension plate. The spacers are placed between the extension plate and the drive head. Do not fully tighten these mounting screws.

3. Note the position of the spirit level bubble in the guide wheel (Fig. 3). Adjust the lift linkage and drive head on the loose mounting bolts until the bubble lies centered under the circle in the sight glass.

4. Tighten the mounting screws, making certain that the position of the bubble remains centered under the circle.
D. POWER CONNECTIONS

1. Run the three 20-ft. cables from the rear of the drive head (Fig. 3) to the bottom of the electronic control unit. Position the cables to allow for maximum machine travel. Insert the cable plugs into corresponding receptacles in the electronic control.

2. Run the 10-ft. power cable from the bottom of the electronic control to a 115-volt, 60-cycle a.c. power supply. See that the "ON-OFF" switch is turned to "OFF" and the drive head Operating Switch is in its center, "OFF," position. Insert the cable plug into the power receptacle and attach the ground wire to ground. Two fuses, of 5 amperes each, protect the motor and wiring circuits.

CAUTION: Do not run the power or connecting cables along the floor, or in any other location where they may be exposed to oil or water. Do not lay the cables where they may be run over by hand trucks, dollies, etc.

E. REMOTE CONTROLS

The CM-15-36 with automatic tracer has its operating controls at the drive head. Additional accessory controls are available to permit remote steering, raising and lowering, and drive motor operation from the blowpipe position. Customers ordering remote controls for the automatic tracer will receive the parts listed under Remote Controls, Part No. 21V31. Remote control connections are shown in Fig. 4.

On a standard machine installation, with the cutting blowpipe on the right-hand side of the machine, the controls will be installed on the right-hand side of the drive unit. On a machine installed to perform cutting on both sides of the machine, the remote controls can be installed on either the right-hand or the left-hand side of the drive head, as desired. On an installation for cutting on the left-hand side of the machine only, the controls will be installed on the left-hand side of the drive head as shown in Fig. 6. The instructions below are for a right-hand installation. For a left-hand installation, follow the same procedure except:

i. Under item 1, install the bracket on the left-hand extension arm instead of the right-hand extension arm.

ii. Under item 2, omit steps (a) and (b).

iii. Under item 3, omit step (a).

iv. Under item 4, omit steps (a) through (h).

1. REMOTE CONTROL BRACKET. Mount just inside of the thumbscrew of the R.H. Arm Extension Assembly (Fig. 5).

(a) Place the top part of the bracket over the arm extension, with the bracket holes on the same side of the arm as the drive head.

(b) Insert the four 3/8-in.-16 cap screws through the bolt holes in the bracket.

(c) Slip the bottom plate of the bracket over the ends of the cap screws. Thread four nuts onto these screws, tightening the nuts until the bracket is held securely to the arm extension.
2. LIFT HANDLE

(a) Remove the lift lever (Fig. 3) from its shaft by loosening the screw in the lever hub and pulling the lever off the shaft.

(b) Replace the lift lever on the left side of this shaft and tighten the hub screw.

(c) Remove the rollpin from the outer end of the coupling on the remote lifting shaft. Keep the rollpin for use in step (e).

(d) Remove the handle from the remote lifting shaft. Slip the shaft through the top hole of the remote control bracket and replace the handle.

(e) Slide the coupling, at the other end of the lifting shaft, over the end of the lift lever shaft on the linkage (Fig. 5). Connect the coupling and shaft with the rollpin.

3. SWITCH HANDLE

(a) Remove the operating-switch knob from its shaft (Fig. 4) by loosening the screw in the knob collar and pulling the knob off the shaft. Place it in its alternate position on the other end of the shaft (at the back of the drive head).

(b) Remove the rollpin from the outer end of the coupling on the remote switch control shaft. Keep the rollpin for use in step (e).

(c) Remove the knob and rod from the remote switch shaft by loosening the setscrew and pulling the rod out of the shaft.

(d) Slip the rod through the center hole in the remote control bracket and insert it back into the shaft.

(e) Slide the coupling, at the other end of the remote switch shaft, over the operating switch shaft on the drive head. Connect the coupling and shaft with the rollpin.

4. STEERING HANDLE

This control is installed after moving the steering-extension shaft assembly from the left side to the right side of the drive head.

(a) Pull the guide wheel (Fig. 3) off its shaft after loosening the collar screw.

(b) Remove the four screws holding the top panel (Fig. 4) to the drive head. Lift the panel over the guide wheel shaft and place it to one side so that the two bevel (steering) gears are exposed.

(c) Remove the two screws holding the spring plate to the drive head.

(d) Loosen the setscrew in the vertical bevel gear. Withdraw the steering extension shaft from the drive head, taking with it the spring and plate.

(e) Knock out the plug button from the alternate steering extension socket on the right side of the drive head. Snap it in place in the steering extension socket on the left side of the drive head.

(f) Insert the steering extension shaft assembly into the alternate (right) steering shaft socket. Screw the plate back to the drive head.

(g) Replace the vertical bevel gear on the inside end of the shaft and tighten the setscrew.

(h) Screw the top panel back in place, then replace the guide wheel on its shaft.
(i) Remove the rollpin from the outer end of the coupling on the remote steering shaft. Keep the rollpin for use in step (1).

(j) Remove the knob and rod from the remote steering shaft by loosening the setscrew and pulling the rod out of the shaft.

(k) Slip the steering rod through the remaining hole in the mounting bracket and insert it back into the shaft.

(l) Slide the coupling, at the other end of the steering handle, over the end of the steering extension shaft. Connect the coupling and shaft with the rollpin.

II. Installation as Original Drive Unit on CM-15-18, Part No. 01E49

Installation of the automatic tracer on a CM-15-18 follows a procedure very similar to that for the CM-15-36. Install the CM-15-18 machine as outlined in Form 9114. Ignore references to the standard line-tracer head since that assembly is not shipped with machines intended for use with the automatic tracer. Also disregard instructions for electrical connections.

The carriage and blowpipe assembly, as installed above, is now ready to receive the automatic tracer assemblies. Remove the tracer components from their individual shipping containers, exercising particular care in unpacking the drive head and electronic control. Both contain delicate parts that could be damaged by rough handling. Proceed with the tracer installation according to the instructions given below.

A. ELECTRONIC CONTROL
The procedure for mounting the electronic control is exactly the same for CM-15-18 and CM-15-36 machines. See Section I-A.

B. LIFT LINKAGE
1. Place the adaptor bracket (21V25) on the tracer arm as shown in Fig. 7. Adjust the bracket radially so that the bracket face (containing 4 threaded holes) is parallel to the tracer arm.

2. Insert the two 1/2-in.-13 x 5-1/2-in. long cap screws through the holes in the base of the bracket.

3. Place the bracket clamp (45N67) over the ends of the cap screws. The side with the raised land should be facing down.

4. Using the hex nuts, flat washers and lock washers provided, tighten the bracket and plate to the tracer arm. Make sure that the bracket face remains parallel to the tracer arm.

5. Bolt the lift linkage to the mounting bracket, using four of the 1-in. long 3/8-in.-24 cap screws provided. Do not tighten these screws; they will be fully tightened after the leveling procedure outlined in paragraph C.

6. Bolt the extension plate (21V19) to the lift linkage so that the plate extends below the linkage. Use four of the 1-in. long 3/8-in.-24 cap screws and lock washers.

C. DRIVE HEAD
The procedure for mounting and leveling the drive head is the same for CM-15-18 and CM-15-36 machines. See Section I-C.

D. POWER CONNECTIONS
See Section I-D.

The CM-15-18 shape-cutting machine with automatic tracer is now set up for regular tracing operations.
III. Conversion of Field CM-15-36 to Automatic Tracer Drive

A. EQUIPMENT REQUIRED
All items needed for converting the standard CM-15-36 to automatic tracing are included in the Automatic Tracer Conversion Kit, Part No. 21V33. The kit consists of the following:

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>QUAN.</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>21V14</td>
<td>1</td>
<td>OXWELD Automatic Tracer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consists of Drive Head, Lift Linkage, Stylus, Connecting Cables, Electronic Controls (including tubes).</td>
</tr>
<tr>
<td>21V26</td>
<td>1</td>
<td>Accessory Kit</td>
</tr>
<tr>
<td>21V20</td>
<td>1</td>
<td>Adaptor Plate</td>
</tr>
<tr>
<td>21V21</td>
<td>1</td>
<td>Extension Plate</td>
</tr>
<tr>
<td>45N57</td>
<td>1</td>
<td>Straight-Line Guide</td>
</tr>
<tr>
<td>45N45</td>
<td>2</td>
<td>VINYLITE Sheet</td>
</tr>
</tbody>
</table>

Part No. 21V26 contains all items needed for templet fabrication.

Instructions for sheet-templet fabrication and tracer operation and maintenance are contained in Form 9437, "Instructions and Parts List for OXWELD Automatic Tracer." Instructions for installing the automatic tracer on a CM-15-36 now in service are outlined below.

B. REMOVING THE STRIP-TEMPLET TRACER
1. Throw the motor switch to the ‘‘OFF’’ position and remove the motor plug from its receptacle on the carriage arm (Fig. 8).
2. Remove the nuts and washers from the four cap screws that hold bracket 34W67 to the carriage arm. The entire drive unit can now be slipped off the carriage arm. Save the screws, nuts and washers for mounting the automatic tracer.

C. INSTALLING THE AUTOMATIC TRACER
The automatic tracer can now be installed as outlined in Section I, paragraphs A through E, with the following exceptions:

1. The electrical connection between the carriage assembly and the shop power supply should be broken. Remove the plug from the power receptacle. Wind cable assembly 20V41 into a neat coil and secure it to the carriage frame.
2. When mounting adaptor plate 21V20 to the carriage arm, use the cap screws, nuts and washers from the standard drive mounting.

IV. Conversion of Field CM-15-18 to Automatic Tracer Drive

A. EQUIPMENT REQUIRED
All items needed for converting the standard CM-15-18 to automatic tracing are included in the Automatic Tracer Conversion Kit, Part No. 21V32. The kit consists of the following:

<table>
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<tr>
<th>PART NO.</th>
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<tr>
<td>21V19</td>
<td>1</td>
<td>Extension Plate</td>
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<tr>
<td>21V25</td>
<td>1</td>
<td>Adaptor Bracket</td>
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<td>1</td>
<td>Bracket Clamp</td>
</tr>
<tr>
<td>45N57</td>
<td>1</td>
<td>Straight-Line Guide</td>
</tr>
<tr>
<td>45N45</td>
<td>2</td>
<td>VINYLITE Sheet</td>
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</tbody>
</table>

Part No. 21V26 contains all items needed for templet fabrication.

Instructions for sheet-templet fabrication and tracer operation and maintenance are contained in Form 9437, "Instructions and Parts List for OXWELD Automatic Tracer." Instructions for installing the automatic tracer on a CM-15-18 now in service are outlined below.

B. REMOVING THE STRIP-TEMPLET TRACER
CAUTION: Throw the motor switch to the “OFF” position before proceeding further.

1. Pull out the Drive Barrel Stop Assembly (Fig. 9) and lower the tracer unit until it rests on the table.
2. Raise the leather boot on the drive barrel and remove the three screws (34W50) which secure the tracer wheel assembly to the drive barrel.
3. Raise the drive barrel, allowing the tracer unit to slip off the barrel.
4. Remove the leather boot by pulling it downward.
5. Remove the Woodruff key from the side of the drive barrel.
6. Unscrew and remove the two bearing lock rings (33W68) which hold the drive unit in its bracket.
7. Lift the drive unit out of its bracket. Be careful not to lose the 2 carbon brushes which project from the underside of the brush block (20V24).
8. Remove the upper and lower bearings (34W45 and 34W46) by exerting a slight pressure on the bearings.

C. INSTALLING THE AUTOMATIC TRACER

The automatic tracer can now be installed as outlined in Section II, paragraphs A through D.

NOTE: The electrical connection between the carriage assembly and the shop power supply should be broken. Remove the plug from the power receptacle. Wind cable assembly 20V41 into a neat coil and secure it to the carriage frame.