

LARCO SAFETY MAT INSTALLATION

(with Active Joiner)

AN OPERATION SUPPLEMENT MANUAL FOR THE
CINCINNATI CNC LASER SYSTEMS

CINCINNATI

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SAFETY MAT INSTALLATION

PREPARATION

INSTALLATION DIAGRAM

A safety mat assembly drawing is included in the assembly drawing package that ships with the laser system. Refer to this drawing when positioning the safety mats, trim and activation strips.

REQUIRED INSTALLATION TOOLS

- ♦ **#10 x 1-1/4 screw and green ramp, joining, blunt anchors:** Used to anchor nonactive trim.
- ♦ **Phillips Head Screwdriver:** Used to fasten trim screws.
- ♦ **Shop Vacuum:** Used to clean mounting surface and remove drilling debris.
- ♦ **Ohm Meter:** Used to test mats.
- ♦ **Drill and Drill Bit 5/16" and 1/4":** Used to drill holes in mat trim and mounting surface.
- ♦ **Wire Stripper:** Used to strip insulation from mat leads for electrical connections.
- ♦ **Hammer:** Used to tap screw anchors into drilled holes.
- ♦ **Loctite 425 Adhesive:** Used to secure screws into screw anchors.

SURFACE PREPARATION

The mat mounting surface should be level, dry and free of debris. Vacuum or sweep the area before beginning installation.

PROPER HANDLING

Except as indicated in this manual, safety mats must not be drilled, nailed or cut because this can lead to irreversible damage. Also, be careful not to impact the edges or corners as this may damage the electrode.

The proper way to handle a mat is to grasp the long edges and lift while causing a slight bow down the length of the mat (see Figure 1). This will prevent the mat from bending across its width which could kink or bend the internal electrode assembly. Large mats should be handled by two people.

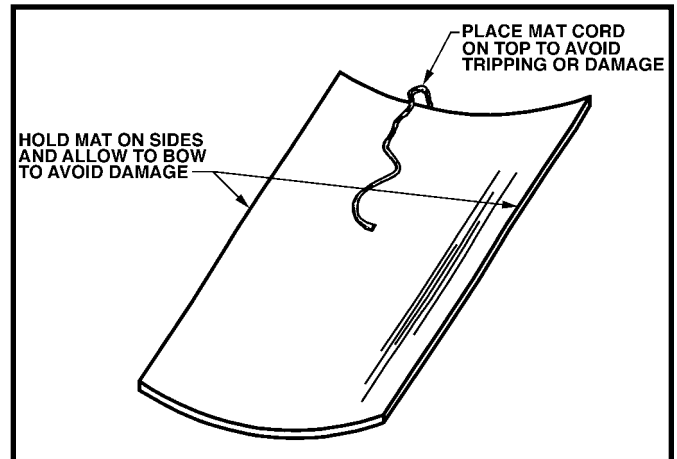


FIGURE 1

MAT INSTALLATION

POSITIONING

Position mats as shown on the safety mat assembly drawing, leaving approximately 11/16" space between mats. Pay attention to the cord locations. Cords should have some slack when installed to prevent damage from kinks and stressing.

TESTING

Use an Ohm meter to check each mat before proceeding. Attach one test lead to a black mat wire and the other test lead to a white mat wire. Check the resistance reading. In a normal state (open circuit), a mat should have more than 1 Meg Ohm (1 million Ohms) resistance. Step on the mat and look for a resistance reading below 1000 Ohms. Readings other than those noted may indicate a damaged mat.

POSITIONING OF ACTIVE JOINER

To prepare the lock lip mats for installation with the "active joiner", use a sharp utility knife and a straight edge to remove the lip from both mats at the point they will join one another. See Figure 2. **ONLY REMOVE THE LIP FROM THE MAT ON THE SIDE THAT IS JOINING ANOTHER MAT.** The lock lip on the other edges may be needed for mounting perimeter anchoring trim.

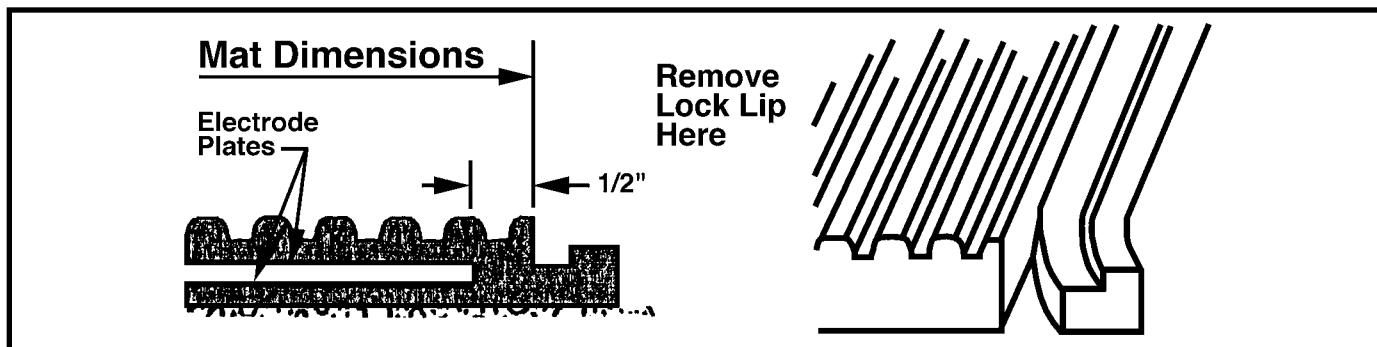


FIGURE 2

After the lock lips have been removed from adjoining edges, do a trial run by putting the safety mats, active joiner strips and perimeter anchoring trim together as shown on the safety mat assembly drawing.

Once proper fit is ensured, expose one adhesive strip and secure the "active joiner" to one of the mats. Be certain to position the edge of the active joiner's vertical mat divider against the edges of the mats as shown in Figure 4. Next, expose the other adhesive strip and put the second mat in place. Go through this process until all mats using the active joiner are joined together.

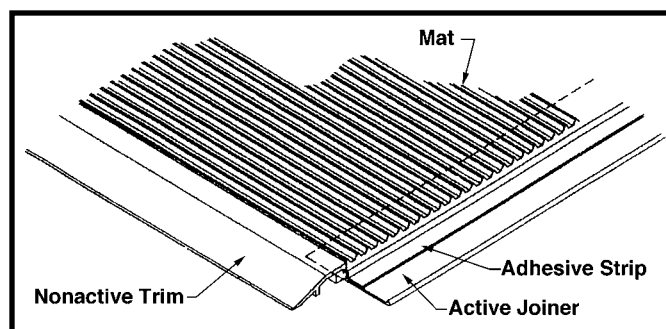


FIGURE 3

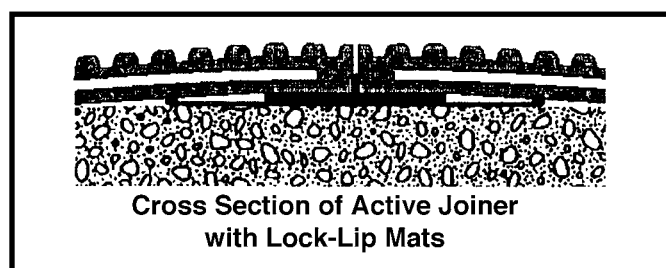


FIGURE 4

POSITIONING OF NONACTIVE TRIM

Install nonactive trim (Figure 5) along the outside perimeter of the safety mats as shown on the safety mat assembly drawing. The trim will fit against the edge of the mat, seated in the recess of the lock

lip. Please note again that the lock lip is only removed at the edges where two mats meet. The lip should not be removed from any other edges.

Note: The use of nonactive trim between adjoining mats will create an unsatisfactory condition of "inactive" or "dead" space.

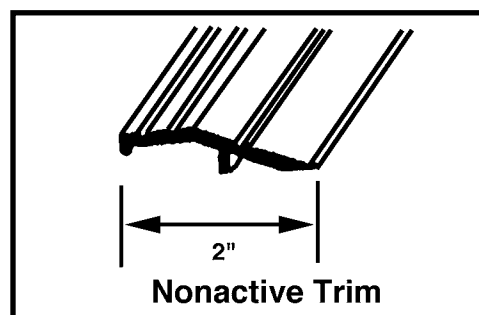


FIGURE 5

MOUNTING

The nonactive trim should be used as a template for anchor hole locations. Drill 90° to the mounting surface with a 1/4" drill bit, drilling approximately 1/4" deep.

Remove the trim, switch to the 5/16" drill bit and finish the hole to a depth of about 1". Remove drilling debris from the application site.

Insert the screw anchors into the drilled holes and add a drop of Loctite 425 adhesive in the screw anchors to prevent the loosening of the anchoring screws.

Reposition the mats, cords and active joiners. Insert anchoring screws through the nonactive trim and into the screw anchors. Tighten each screw until the top surface of the screw head is 1/32" below the surface of the trim. Be careful not to damage any mat cords.

Connect the Ohm meter to each mat. (See "PAGE 1 TESTING".) Confirm that each mat is in an "open" condition. If a mat is "closed", loosen the anchor screws until the mat is open.

The mat circuit should now activate if a 66 pound test piece is applied to the joint between any two mats. If activation does not occur, determine if a heavier load will make activation occur. Report this condition to CINCINNATI INCORPORATED Engineering.

IMPORTANT: *Do not connect the machine control circuit during installation. Make sure the protected equipment is powered down!*

INSTALLATION ON STEEL PLATE PLATFORMS

Flathead machine screws (#10-32 x 1") will be provided for mounting nonactive trim (Larco #216399).

Follow installation procedures. The installation remains the same, except that trim mounting holes now need to be drilled and tapped.

INSTALLATION RECAP

IMPORTANT: *Do not leave active mat edges uncovered. Uncovered edges are susceptible to damage and voids warranty coverage.*

Be sure the area is cleaned of drilling debris before positioning and installation of mat and trim. Route mat wires (if applicable) and mark cord exits on the trim. Notch out the trim for cord clearance and remove any sharp edges. Drop the anchors into the holes and set the trim in place. Begin tightening it down, being careful not to damage mat wires.

CONTROL INSTALLATION AND WIRING

Follow the instructions provided with the Control.

CAUTION

The overall safety of the machine and its protective devices depends on the integrity of the interface between them.

WIRING

This step is critical if your installation will be exposed to any moisture. The mat and cord assembly is hermetically sealed at the factory to be 100% fluid tight. The electrical connections made on the job site must also be 100% fluid tight.

START-UP CHECKLIST

CAUTION

Be certain to test the installation before putting equipment into service and periodically thereafter. It is recommended to test the system daily.

! WARNING !

BE CERTAIN THAT THE PROTECTED MACHINE IS POWERED DOWN DURING START-UP CHECKOUT UNLESS REQUIRED FOR A SPECIFIC TEST.

CAUTION

Start-up checklist should be performed by a person who has been thoroughly trained and has read this entire instruction manual.

The results of the examination should be recorded and copies of this record should be kept by the user.

SYSTEM TESTING

Make certain that all personnel are clear and cannot enter the hazardous area during the testing procedure.

Switch power ON to mat control.

If the mat circuit is ready, both output relays should energize and the LED's on the relays will change state as you step on and off each mat. With pressure applied to the mat, both output relays should de-energize and both lights should turn off. Step off each mat. Lights should turn ON.

Disconnect at least one mat circuit wire to the control. Lights should turn off. Reconnect the wire(s).

POSITIONING

Inspect the position of the Larco Safety Mats to ensure that they are set at the correct distance from the dangerous parts of the guarded machinery.

CONDITIONS

Check that the floor and environmental conditions are suitable for use with the Larco Safety Mat system. The floor should be level and free of debris.

SECURING

Check that the safety mats and aluminum trim are fastened securely in place and do not create a "trip" hazard.

DANGER ACCESS

Check that there are no dead zones providing an access path to the hazard.

POWER SUPPLY

Check that removal of power supply from the Safety Mat Control prevents further operation of the protected machine. It should not be possible to reactivate the machine until power has been restored and the Reset function performed.

RESTART

Check that the dangerous parts of the protected machine cannot be set in motion while an activating force is applied to the Larco Safety Mats. It should not be possible for the dangerous parts to be set in motion again unless the Safety Mat System has been restored to its normal condition and the machine control Reset function performed.

DANGER STOP

Check that actuation of the Larco Safety System during a dangerous phase of the operating cycle results in the dangerous parts being arrested, or assuming an otherwise safe condition before any part of a person can reach them.

OTHER SAFEGUARDS

Confirm that additional safeguards have been provided where necessary to prevent access to the dangerous parts of the machinery from any direction not

protected by the Larco Safety Mat System. If it is possible to stand between the dangerous parts of the machinery and the safety mats, further safety measures are necessary.

INTERFACES

Check the interfaces between the machine and the Safety Mat System. The adequate safeguarding of the machine depends on the integrity of the interface between the machine and its protective devices. Confirm that the machine control circuits and the connections to the Safety Mat System are in accordance with both the machine control instructions and safety mat instructions.

STATUS LIGHTS

Check that all indicator lights are functioning correctly.

MAT ACTIVATION

Check the sensitivity of the safety mats over their entire sensing area. With the machine at rest, apply an activating force to a representative range of positions, including edges, center, active joiner, junction point, etc. Confirm that the mat control has gone to the “off” state.



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