

PROPER USE GUIDELINES

Cumulative Trauma Disorders can result from the prolonged use of manually powered hand tools. Hand tools are intended for occasional use and low volume applications. A wide selection of powered application equipment for extended-use, production operations is available.

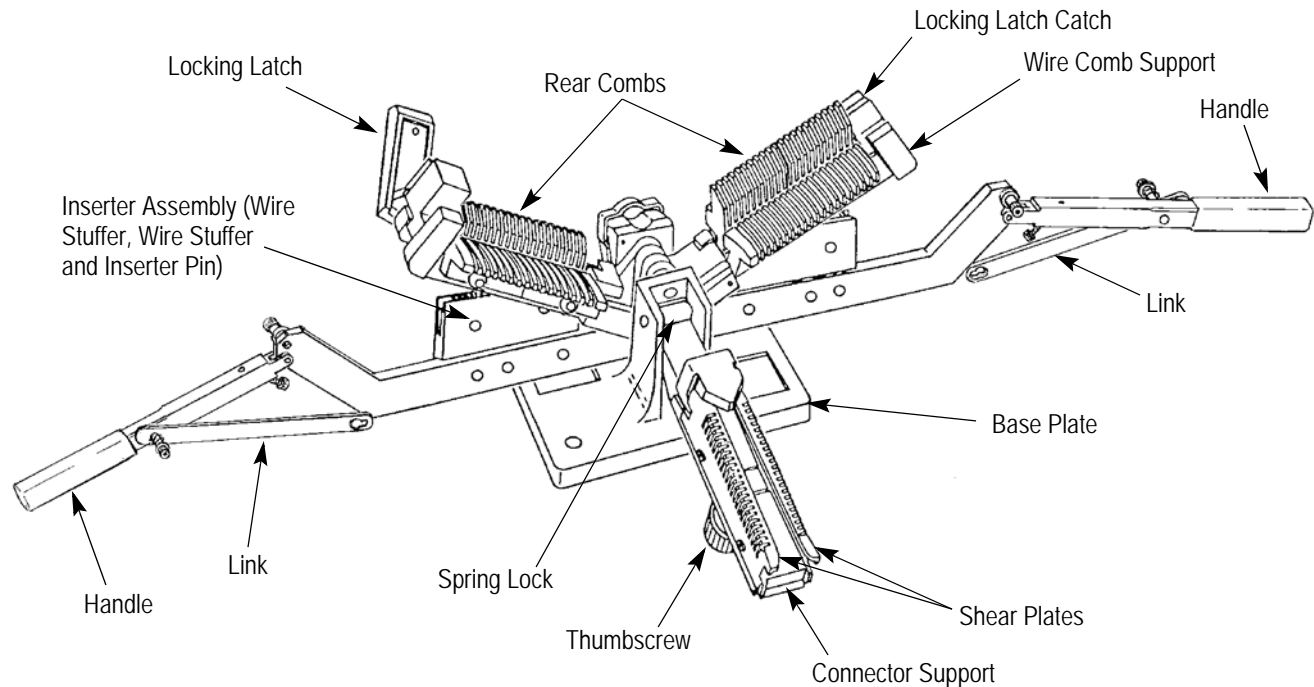


Figure 1

1. INTRODUCTION

The CHAMP Portable Hand Operated Tool 231880-2 (MI-1) is designed to terminate 64-position CHAMP connectors using the insulation displacement crimp technique. It can also terminate 14-, 24-, and 36-position CHAMP connectors without modification or conversion. In its marketed form, tool 231880-2 is not capable of terminating 50-position CHAMP connectors.



All dimensions on this sheet are in millimeters [with inch equivalents in brackets]. Figures and illustrations are for identification only and are not drawn to scale.

Refer to Catalog 82008 for CHAMP connector part numbers.

Reasons for reissue of this document are provided in Section 12, REVISION SUMMARY.

2. DESCRIPTION

MI-1 hand tool 231880-2 contains a fixed wire comb feature and will produce a 90° cable dress. Each tool contains the following (Figure 1):

Base Plate - Supports functional components of the tool. The base plate can be secured to the work bench.

Handles - Retain wire stuffers/inserters and provide insertion force. Stops on handles prevent over-insertion during the terminating process.

Connector Support - Holds connector in proper position and provides surface (shear plates) for cutting off excess wire.

Spring Lock - Affords positive lock when connector support is in the UP position.

Thumbscrew - Secures connector to the connector support.

Wire Combs - Consist of two rear combs and two front combs. The combs separate and hold wires that are laced into the tool.

Wire Comb Supports - Support wire combs and locking latch.

Cable Clamp - Holds cable in position on the tool during lacing procedure.

Locking Latch - Holds wire comb supports together during termination of wires.

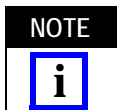
Inserters and Wire Stuffers - Cuts and simultaneously inserts wires between contact slots.

3. TOOL PLACEMENT

Select a sturdy work bench that is a convenient height for the operator. When positioning the tool on the bench be sure there is sufficient space at the back of the tool to permit handling of the cable bundle. **Be sure the tool handles can open fully.** Secure the tool base-plate to the work bench.

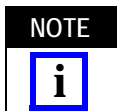
Be sure that the work area is well-lighted, and that the area around the tool is kept clear for operation of the handles.

4. CABLE PREPARATION (Figure 2)



The following procedure has been prepared for standard color coded wires. The same method of operation will apply for nonstandard color coded wires - however, the wire groups must be defined in some manner.

1. Remove approximately 203.20 [8.000] of sheathing from the cable end. Do NOT nick or cut the insulation of the individual wires.



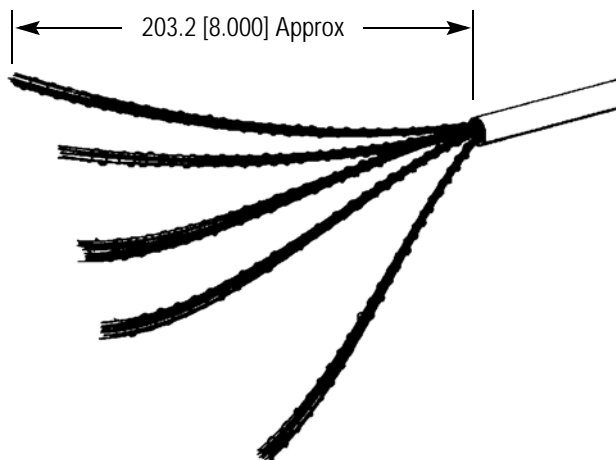
If using connector with short tapered cover, slit cable sheathing back 25.4 [1.000] - then fold sheathing back over itself before placing cable in tool.

2. Separate wires into color groups (predominantly white in one group, predominantly red in one group, etc.)
3. Wrap a piece of wire around each group to keep the groups separated.

5. TERMINATING PROCEDURE

5.1. Wire and Connector Placement

1. Fully open the tool handles.
2. Push on the left side of locking latch until it snaps open, then push on the right side to open the latch completely. See Figure 1.
3. Rotate both wire comb supports outward and move connector support down. The tool is now ready to receive the connector and wires.



*Preparation of Cable
(Five Color Groups Shown)*

NOTE: No standard code exists for 64-position assemblies.

WIRE INSULATION DIAMETER (MAX)
1.42 [.056]

Figure 2

4. Loosen thumbscrew by turning it COUNTERCLOCKWISE.

5. Select the appropriate plug or receptacle connector size for the application. Align connector with the FRONT of connector support. Make sure the connector is oriented properly - LOW contact position numbers should be to the LEFT.

6. Insert the connector between shear plates and into connector support until it bottoms.

7. Turn the thumbscrew CLOCKWISE until the connector is secured.

8. Open the cable clamp and position cable so that the sheathing extends at least 12.7 [.500] above the base plate.

9. Hold cable in position and close the cable clamp. See Figure 3.

10. Pull the first group of wires forward and remove the piece of wire used to prepare the cable (Section 4, Step 3). Separate wires by tracer and body color (ring and tip). Place ring wires to the LEFT and tip to the RIGHT.

11. Lace wires into combs, starting in the center.

- Lace wire from one side (LEFT or RIGHT) through rear comb teeth and into the corresponding position in front teeth.
- While keeping the wire tight, bend the wire under front comb and around the inside of wire comb supports. See Figure 3.

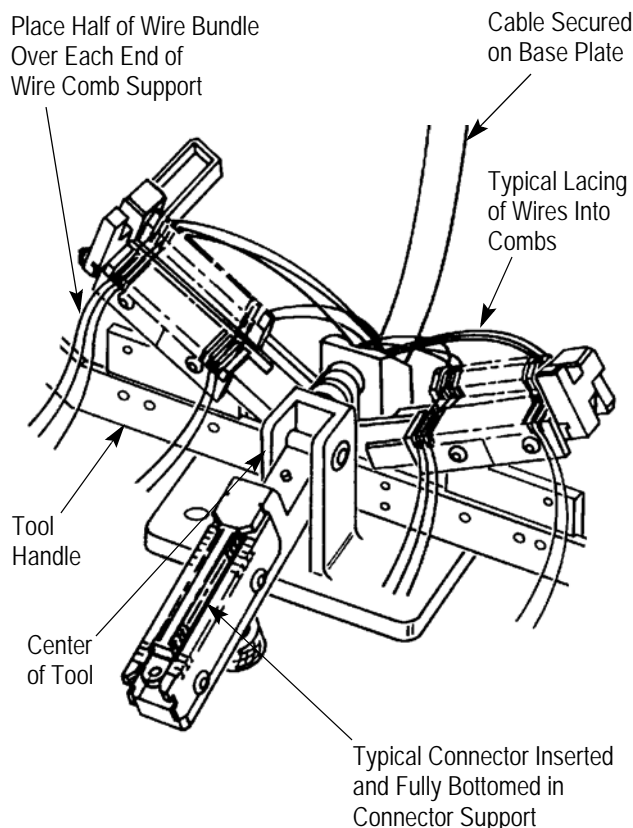


Figure 3

12. Lace mating wire from opposite side of tool (lacing fixture) through combs in same manner. Visually check to make sure wires are properly laced through combs.

13. Repeat Steps 11 and 12 until half of the wire bundle is laced into the combs.

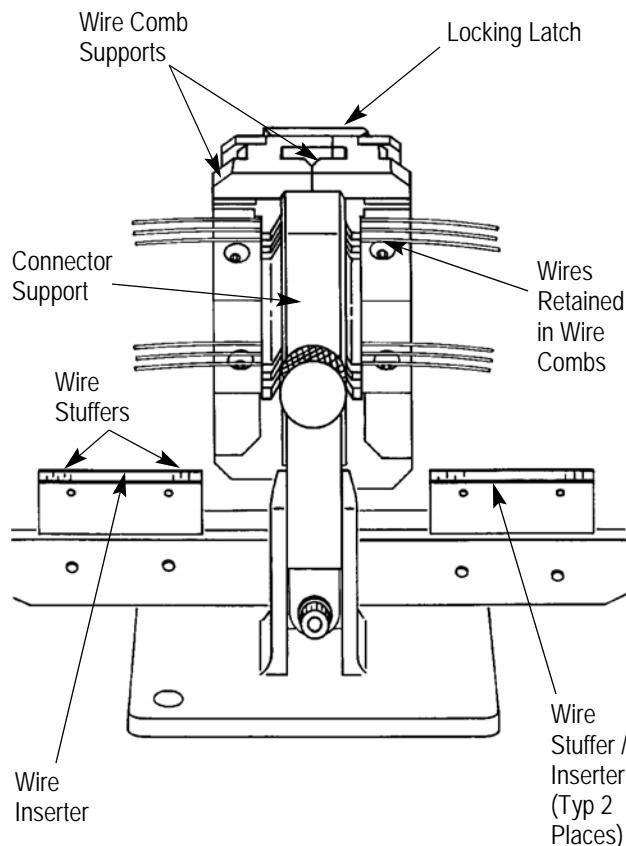
14. After bending first half of wire bundle around the inside of the wire comb supports (toward the center of the tool), change direction and bend second half of wire bundle around the outside of wire comb supports (toward tool handles).

5.2. Tool Operation (Figure 4)

1. Check to be sure all wires are parallel in the combs. Make sure connector is bottomed in connector support.
2. Raise connector support to vertical position.
3. Be careful that the wires remain in the combs. Raise one wire comb support to a vertical position and, while holding it in place, raise the other wire comb support to the vertical position.

4. Hook locking latch onto RIGHT wire comb support. Press LEFT side of locking latch until it is secure.

5. Look into the sides of both wire comb supports to check alignment of wires. **Note that each conductor must be aligned with a single contact.**



NOTE: Typical tool closed and ready to terminate in connector.

Figure 4

6. Raise handles and latch side links as shown in Figure 5.

7. Push handles downward as shown in Figure 6. Downward movement of the handles will stop when crimp is complete.

8. Unlatch the side links and open the handles.

9. Loosen the thumbscrew by turning it COUNTERCLOCKWISE.

10. Open locking latch and rotate wire comb supports downward.

11. Open cable clamp. Slide terminated connector straight out of connector support.

12. Inspect all terminations as described in Section 6.

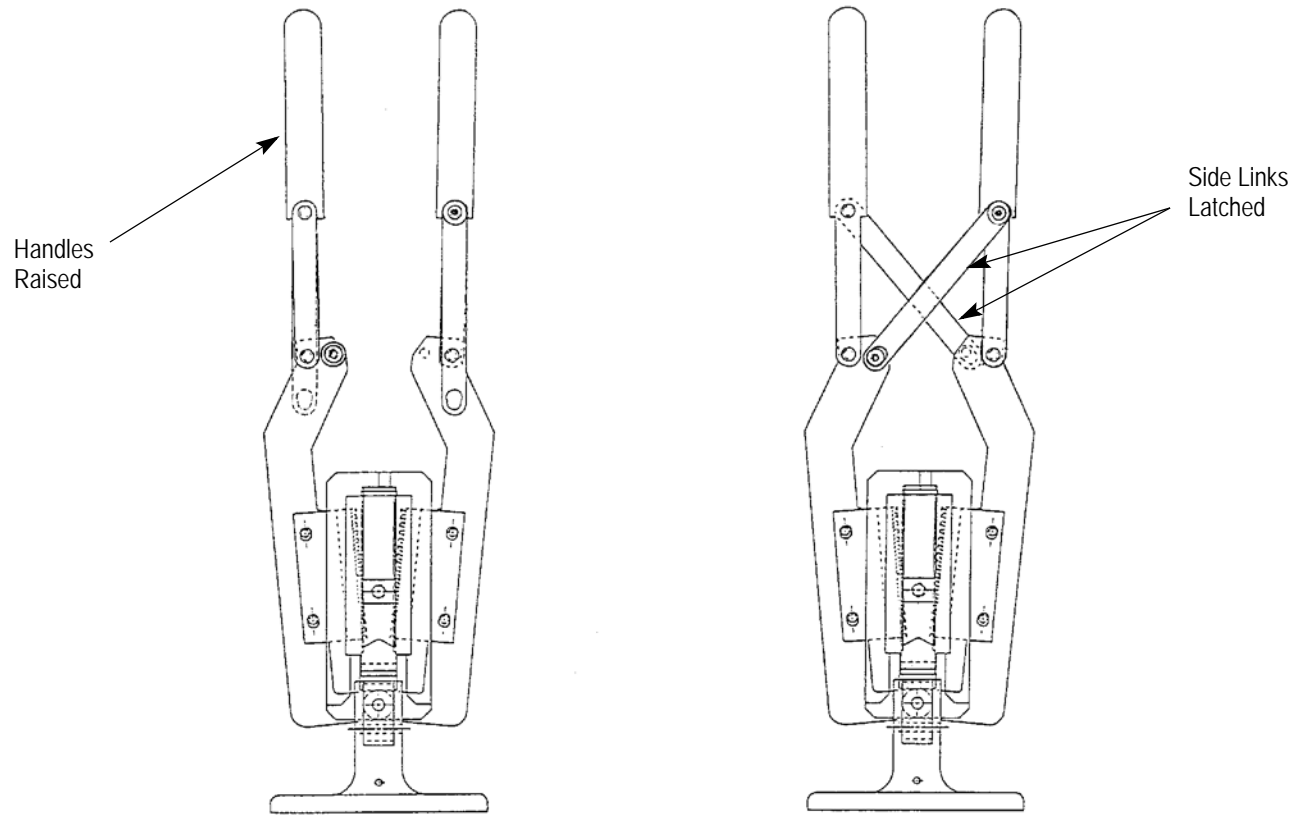


Figure 5

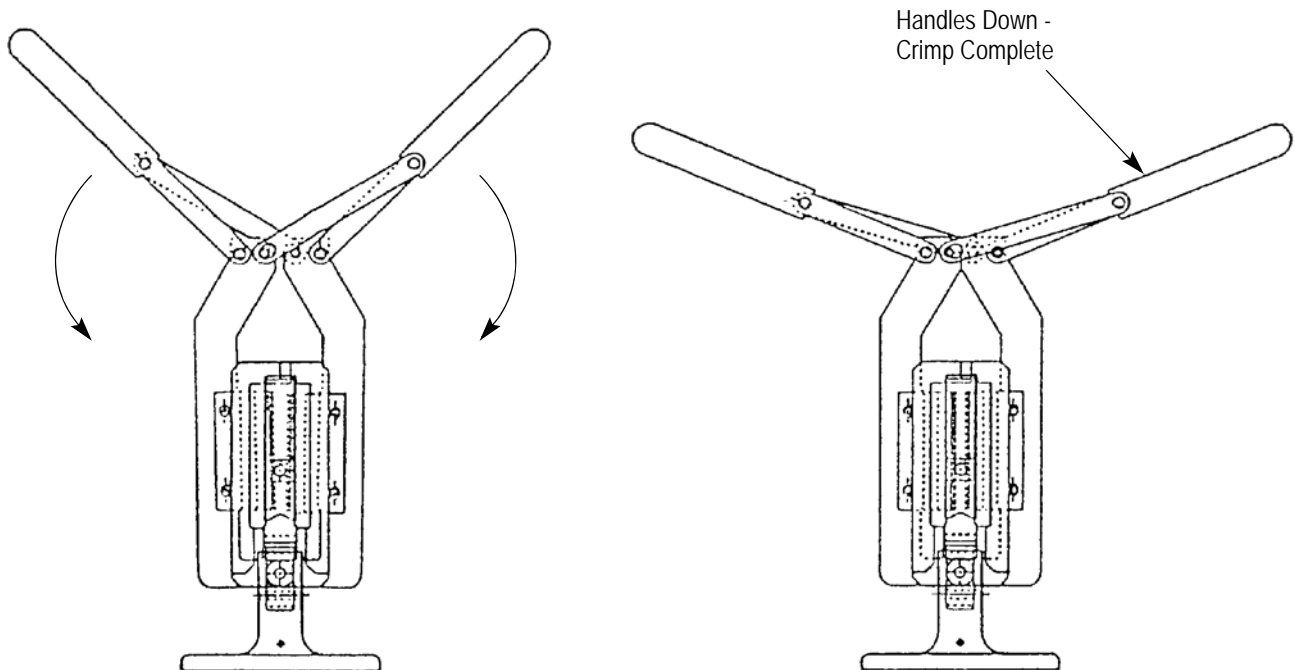


Figure 6

6. INSPECTION OF TERMINATIONS

Visually inspect the wire terminations in the connector.

1. Be certain the wire is inserted evenly so that the insulation is below the "V" shaped lead-in on both the contact slot and the strain relief slot. See Figure 7.

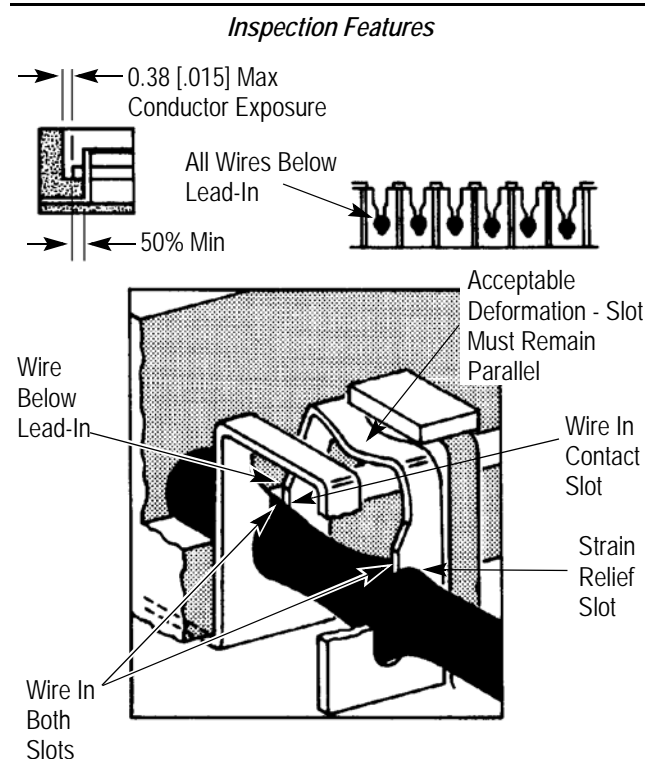



Figure 7

2. Check to be sure all wires have been sheared off to the proper length. (The wire should extend at least half the distance between the contact slot and the housing.) Be sure the sheared wires contain no more than 0.381 [.015] maximum conductor exposure.
3. Check to be sure the insulation is NOT cut in an area other than the insertion area.
4. Check to be sure the contacts are NOT deformed or crushed.
5. Make certain the conductors have NOT been cut above the strain relief slot in the contacts.

NOTE  If any of the wires are NOT properly terminated, re-insert them using the T-Handle Insertion Tool 229384-1. For tool usage, refer to Instruction Sheet 408-7558 packaged with the tool.

NOTE  For additional inspection information refer to Application Specification 114-6041.

7. TOOL INSPECTION

CHAMP MI-1 Tool 231880-2 should be inspected upon its arrival at your facility, and at regularly scheduled intervals.

The parts listed in Figure 8 are Recommended Spares, and should be stocked by the customer to prevent downtime due to lack of parts. The **Quantity Per Tool** column indicates the number of each item required for the tool. The **Recommended Spares** column indicates the quantity of each column required to maintain up to 10 tools for a period of one year under normal circumstances.

Additional tools or replacement parts can be ordered through your TE Representative, or call 1-800-526-5142, or send a facsimile of your purchase order to 1-717-986-7605, or write to:

CUSTOMER SERVICE (038-035)
TYCO ELECTRONICS CORPORATION
PO BOX 3608
HARRISBURG PA 17105-3608

For customer repair service, call 1-800-526-5136.


8. DAILY MAINTENANCE

Each operator of the tool should be responsible for the following steps of daily maintenance.

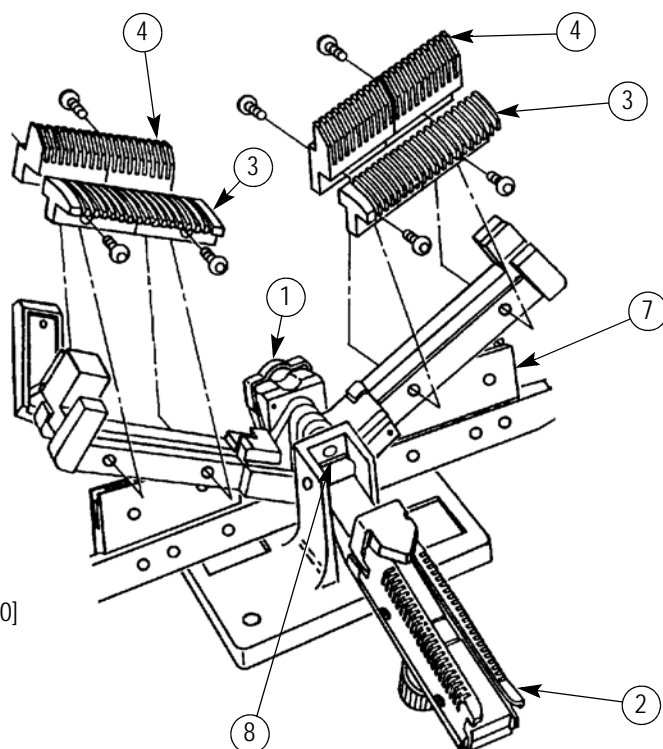
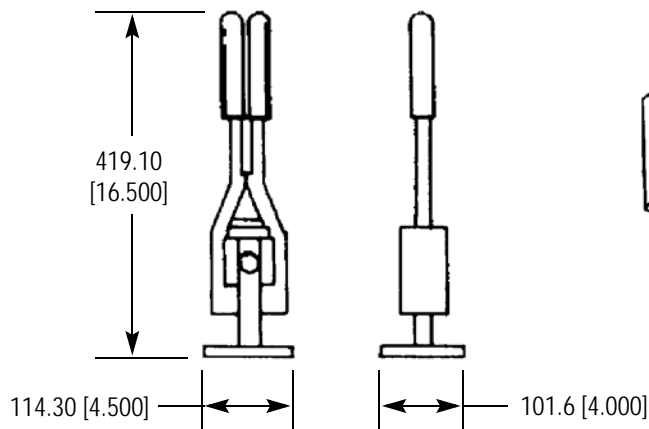
1. Clean the tool with a soft-bristle brush or soft, clean cloth. DO NOT use any type of solvent to clean the tool.
2. Lubricate pivot points in the center of the tool with a few drops of light machine oil. Apply a thin coat of lubricant to sides of the insert. Do NOT lubricate excessively.
3. Frequently inspect the tool for wear or other damage. If required, replace parts in accordance with the information provided in Section 9, **REPLACING WORN OR DAMAGED PARTS**.
4. When the tool is not in use, store it in a clean, dry area with a connector in the connector support, and the tool handles in the closed position.

9. REPLACING WORN OR DAMAGED PARTS

This section covers parts replacement procedures for recommended spares which require special or detailed procedures for removal, installation, and alignment.

NOTE  During parts replacement, use a threadlocker sealant (Part No. 23419, or equivalent) on all screw retention threads.

Approximate Weight
with Carrying Case
3.825 kg [8 lb 5 oz]



REPLACEMENT PARTS				
ITEM	PART NUMBER	DESCRIPTION	QTY PER TOOL	RECOMMENDED SPARES
1	229622-1	CLAMP, Cable	1	2
2	231873-2	PLATE, Shear	2	2
3	229399-3	COMB, Front	2	2
4	229406-3	COMB, Rear	2	2
7	231879-3	INSERTER ASSEMBLY	2	2
--	231878-1 [†]	INSERTER, Standard	2	2
--	230037-4 [†]	STUFFER, Standard	2	2
--	229405-1 [†]	PIN, Inserter	4	4
8	229403-1	SPRING, Lock	1	0

[†]Part of inserter assembly, but can be ordered separately.

Figure 8

9.1. Wire Combs

If misalignment of the wires dictates comb adjustment, proceed as follows:

1. Loosen the screws securing the rear combs. See Figure 8. Raise the wire comb support to the vertical position.
2. Look into the side of the tool and align the comb with the shear plate. Tighten the rear comb screws.
3. Loosen the screws securing the front combs (Figure 8) and align the front combs with the rear combs.

4. Tighten screws securing the front combs when the combs are aligned.

9.2. Shear Plates



CAUTION NEVER attempt to re-face the shear plates. This will destroy the flatness required for shearing all the wires.

1. With tool handles and wire comb supports fully opened, remove the two screws attaching the shear plate (Figure 8) to the connector support.

2. Position new shear plate on connector support against the stop and tighten the two screws.
3. With connector support open, push down and back on shear plate to seat it on the shoulder of the connector support. Hold shear plate in position and tighten the two screws.
4. Repeat this procedure on the opposite shear plate if the opposite shear plate is to be replaced.

9.3. Wire Stuffers

The wire stuffers are part of the inserter assembly (Figure 8) and can be ordered separately. It is NOT necessary to remove the inserters from the tool for this procedure.

This procedure applies to both sides of the tool.

1. Support the inserter on a flat surface with tool handles opened and wire comb supports latched in the vertical position.
2. Using a drift punch, remove the two inserter pins securing the wire stuffer.
3. Remove the wire stuffer from the inserter.
4. Position a new wire stuffer (Figure 8) in the inserter and align the holes.
5. Again, support inserter on solid flat surface. Then insert two new inserter pins (Figure 8).
6. Unlatch wire comb supports and lower connector support. Insert connector into the connector support until it bottoms. Then tighten the thumbscrew.
7. Raise the connector support and wire comb supports to the vertical position. Secure with locking latch.
8. Operate the respective tool handle several times to assure proper alignment of wire stuffer with contacts. If alignment is incorrect, adjust the inserter as described in Section 9.4.

9.4. Inserters

The wire inserters are part of the inserter assembly and can be ordered separately. Use this assembly on both sides of the tool.

NOTE



It may not be necessary to replace both inserters. If the replacement of both is required, do NOT remove both at the same time.

A. Inserter Replacement

1. With tool fully opened, remove the two screws and flat washers used to secure the inserter assembly to the handle.
2. Remove the inserter assembly.

NOTE



Check the wire stuffer for damage. If the stuffer is not damaged, replace old stuffer in new inserter.

3. Replace inserter as described in Section 9.3. ALWAYS use new inserter pins.
4. Position inserter on the handle against locating block. Push the inserter down against the locating block (Figure 9) and back against the handle.
5. Tighten the two screws (Figure 9). The inserter should now be aligned.

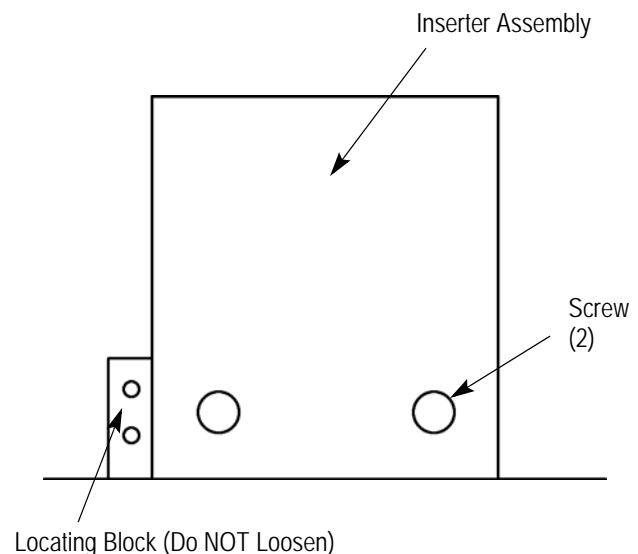


Figure 9

B. Inserter Alignment (If Locating Block is Loose or Missing)

1. Raise the connector support to vertical position and insert connector into the connector support until it bottoms.
2. Tighten the thumbscrew.
3. Raise wire comb supports to the vertical position and secure with locking latch.
4. Loosen (approximately one turn) the screws that secure the back-up plates. See Figure 10.
5. CAREFULLY raise the tool handle until the new inserter begins to enter the connector.
6. Move the inserter - up or down - to align the wire stuffer with contacts.
7. With stuffers and contacts aligned, fully close the tool handles and tighten screws.
8. If opposite wire inserter is to be replaced, repeat replacement and alignment procedures.

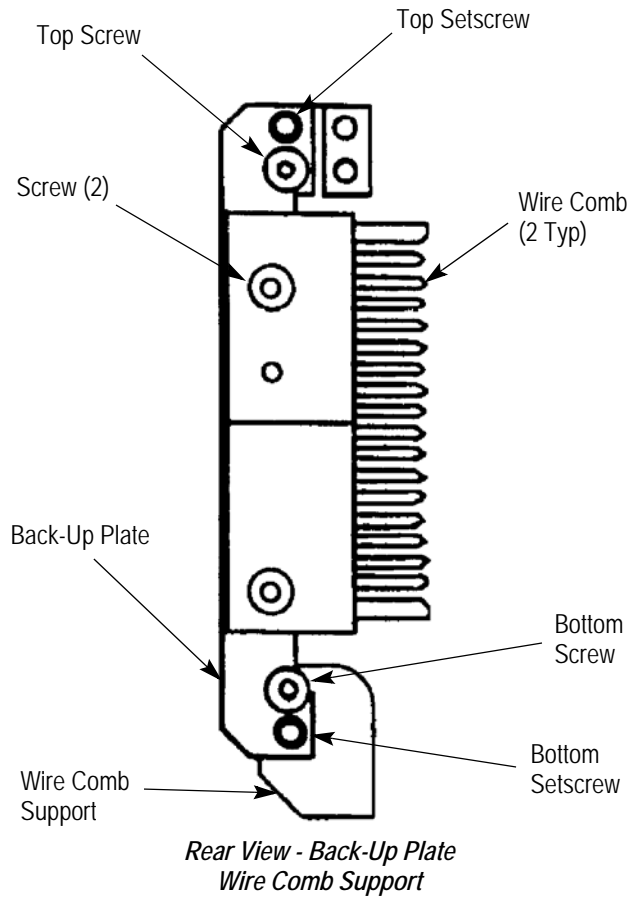


Figure 10

10. ADJUSTING TOOL FOR PROPER WIRE CUTTING

Raise the connector support and then wire comb supports to the vertical position. Secure with locking latch.

Begin to slowly raise the handles. If the inserter binds or has excessive drag, **STOP movement**. Re-open handles and adjust the backup plate as described below. DO NOT FORCE handles closed.

1. Lower the tool handles.

2. Grip connector support and wire comb support with one hand and release locking latch.

3. Loosen TOP screw and setscrew; and BOTTOM screw and setscrew, securing backup plate to wire comb support. See Figure 10.

4. Move inserter (handle) in and out of the shear housing, and simultaneously squeeze the backup plate until a slight even drag is apparent.

5. Hold the backup plate in position and tighten the TOP and bottom setscrews until slight outward pressure is detected.

6. Release pressure on the backup plate and secure TOP and BOTTOM screws.

7. Check for slight drag on the inserter. If drag is not even, alternately adjust both the TOP and BOTTOM screws and setscrews until proper adjustment is obtained.

8. Repeat this procedure for the opposite side, if necessary.

9. Terminate several connectors and inspect terminations as described in Section 6.

11. TROUBLESHOOTING

Use Figure 11 to assist in isolating troubles.

12. REVISION SUMMARY

Since the previous version of this document, the following changes were made:

- Removed third-party trademark references in Section 8, Step 2 and Section 9, first note.
- Updated return/repair information in Section 7.
- Updated document to corporate requirements

TROUBLE	POSSIBLE CAUSE	REMEDY
Crushing Contacts	Inserter Misalignment	Refer to Section 9.4.
	Combs Misalignment	Refer to Section 9.1.
	Wire Size Not Within Specified Tolerance	Refer to Section 4 for Specification.
	Connector Not Properly Seated on Connector Holder	Make Sure Connector is Bottomed against the Stop; Be Sure Thumbscrew is Tightened.
Cutting Improperly	Tool Not Properly Adjusted	Refer to Section .
	Inserter Cutting Edge Damaged	Replace Inserters (See Section 9.4).
	Tool Not Properly Cleaned	Clean the Tool as Described in Section 8.
Wires Not Held in Combs	Wire Insulation Diameter Too Small	Refer to Section 4 for Specification.

Figure 11