

NUMBER OF CONNECTOR POSITIONS	APPLICABLE CONNECTOR PART NUMBERS	
	Plugs	Receptacles
14	97-12140-11 97-12140-11A 97-12140-01 97-12140-01A	97-22140-12 97-22140-12A 97-22140-02 97-22140-02A
24	97-11240-11 97-11240-11A 97-11240-01 97-11240-01A	97-22240-12 97-22240-12A 97-22240-02 97-22240-02A
36	97-12360-11 97-12360-11A 97-12360-01 97-12360-01A	97-22360-12 97-22360-12A 97-22360-02 97-22360-02A
50	97-12500-11 97-12500-11A 97-12500-01 97-12500-01A 157-19500-2	97-22500-12 97-22500-12A 97-22500-02 97-22500-02A 157-29500-2
64	97-12640-11 97-12640-11A 97-12610-01 97-12610-01A	97-22640-12 97-22640-12A 97-22640-02 97-22640-02A

Figure 1

**NOTE**

Connectors with a "97" prefix (97-12140-11) are IDC, Superibon™ Connectors; a "157" prefix (157-29500-2) designates an All-Plastic Micro-Pierce® Connector.

™ Trademark of Cinch Connector, Inc., Lombard IL

® Trademark of Amphenol Corporation, Wallingford, CT

## 1. INTRODUCTION

This instruction sheet covers the installation and use of Tooling Kit 1-768900-4, which is used in conjunction with bench-top machines that apply discrete-wire, jacketed cable to the connectors listed in Figure 1.

Read this sheet thoroughly before installing or using the tooling kit.

**NOTE** *Dimensions on this sheet are in millimeters [with inch equivalents in brackets], unless otherwise indicated. Figures and illustrations are for identification only and are not drawn to scale.*

**NOTE** *These instructions are supplied in the documentation package for Tooling Kit 1-768900-4. Be sure to retain all material in the documentation package for reference. For detailed information on the operation of the bench-top discrete wire terminating machine, refer to customer manuals supplied with the machine.*

## 2. DESCRIPTION

The tooling kit consists of a mandrel assembly and two inserter assemblies. The mandrel assembly includes two connector clamps, which secure the connector to a fixture (purchased separately).

**NOTE** *A specific fixture must be used for each size and type of Small Computer Systems Interface (SCSI) connector. For information on selecting the appropriate fixture, refer to Paragraph 4.4, Changing the Fixture.*

During the machine operation, the operator selects a wire and moves the wire down to the proper side of the mandrel. As each wire is brought into the wire-receiving slot of its inserter, a sensor is triggered. The air cylinder on that connector side is then fired.

**NOTE** *When only one wire is being terminated, only one air cylinder is fired.*

When the air cylinder is fired, it pushes the inserter forward, which pushes the wire into the contact. As the wire is inserted, the inserter trims the wire to the correct length.

**CAUTION** *Never operate the machine without a connector securely clamped in the mandrel assembly. The inserter assemblies clear the mandrel clamps only when the assemblies are closed. Allowing the clamps to remain open will damage the tooling.*

The air cylinder then retracts the inserter, permitting the carriage to move to the next connector position.

## 3. INSTALLATION PROCEDURE

**DANGER** *It will be necessary to open or remove machine covers to perform the following procedures. To prevent personal injury, be sure to turn off the machine and disconnect power before removing the covers. Replace all covers before operating the machine.*

### 3.1. Mandrel

**CAUTION** *Both inserter assemblies MUST be removed prior to mounting or removing the mandrel.*

The mandrel is held in place by two hex head cap screws. Refer to Figure 2. To mount the mandrel, proceed as follows:

1. Make sure that the two mounting screws are removed from the mandrel mounting area of the machine.
2. Place the mandrel on the machine, with the connector-fixture end of the mandrel facing outward. Align the mounting holes on the mandrel with the threaded mounting holes on the machine.
3. Insert the mounting screws through the mandrel, and into the machine, then evenly tighten the screws with a 5/32-in. hex wrench.
4. Adjust the clamp adjustment screws (Figure 1)
  - a. To run an IDC, Superribbon Connector, (fully) back out the clamp adjustment screws and lock the hex nuts.
  - b. To run an All-Plastic, Micro-Pierce Connector, turn the clamp adjustment screws in (approximately 2 1/4 turns) until the connector is fully bottomed in the nest/fixture. Then lock the hex nuts.

### 3.2. Inserter Assemblies

Each inserter assembly is positioned with two alignment pins, and is held in place by two hex head cap screws. Refer to Figures 2 and 3. To install the inserter assemblies, proceed as follows:

1. Make sure that the mounting screws are removed from the carriage surface.
2. Position each inserter assembly so that the ram on the air cylinder engages the inserter shaft, as shown in Figure 3. Locate the inserter assembly over the two alignment pins (refer to Figure 2).

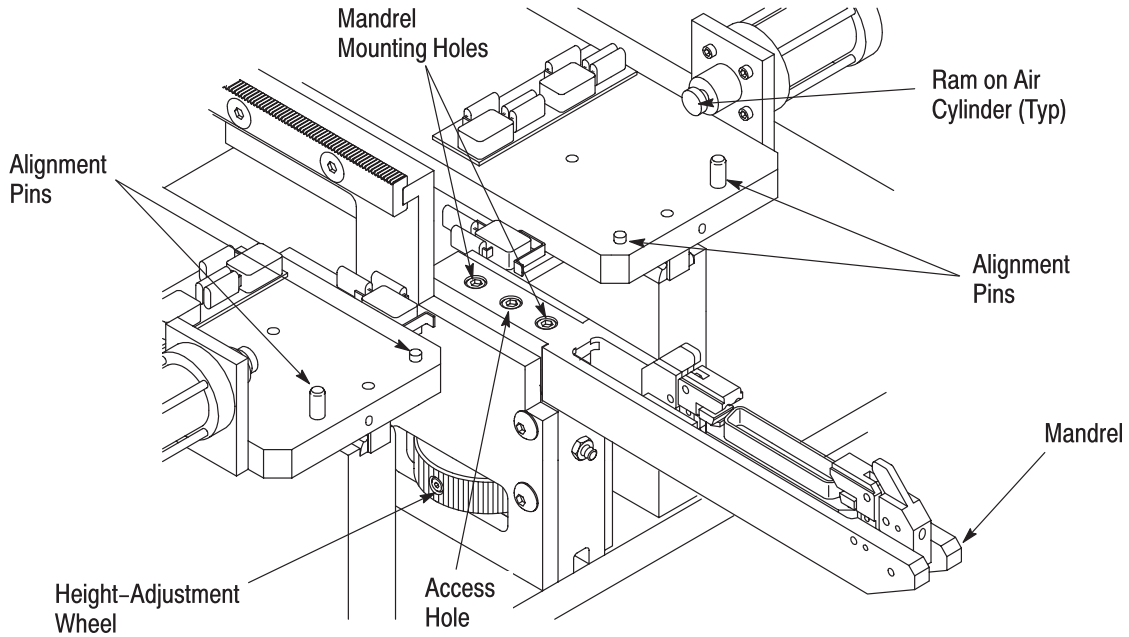


Figure 2

3. Insert, but do NOT tighten the two mounting screws for each inserter assembly.
4. Push the inserters toward the mandrel, then tighten the mounting screws with a 5/32-in. hex wrench.

### 3.3. Cable Clamp

The cable clamp, supplied separately, is capable of 90° or 180° cable dress styles. For information on installing and adjusting the cable clamp, refer to the instructions supplied with the clamp.

## 4. TOOLING ADJUSTMENTS

**DANGER**

*It may be necessary to open or remove machine covers to perform the following procedures. To prevent personal injury, turn off the machine and disconnect the power before removing the covers. Replace all covers before operating the machine.*

**DANGER**

*Do NOT make adjustments to the machine or the inserter assembly while the machine is operational. To prevent personal injury, turn off the machine and disconnect the machine's air and electrical supplies to disable the machine, preventing it from moving while the adjustments are being made.*

### 4.1. Connector/Mandrel Height

To ensure optimum termination, the mandrel height must be properly set. To check the mandrel height:

1. Turn off the power to the machine and disconnect the machine's air supply.
2. Place an unterminated connector onto the fixture.
3. Manually move the machine's carriage assembly until the inserters align with the connector's contact slot.
4. Manually extend the inserter tips until they are near, but not inserted into, the contacts. The inserter tips should align with the contacts as shown in Figure 4. If not, the mandrel height must be adjusted.

**NOTE**

*It may be necessary to remove the housing and the guide tooling, as well as some of the plastic from the connector housing to see the relationship described in Step 4. If the housing or guide tooling is removed, the inserter assembly should be gaged, as described in Paragraph 4.5.*

To adjust the mandrel height:

1. Locate the locking screw, which is reached through an access hole in the back of the mandrel. Refer to Figure 2. Loosen the locking screw by turning the screw counterclockwise with a 5/32-in. hex wrench.

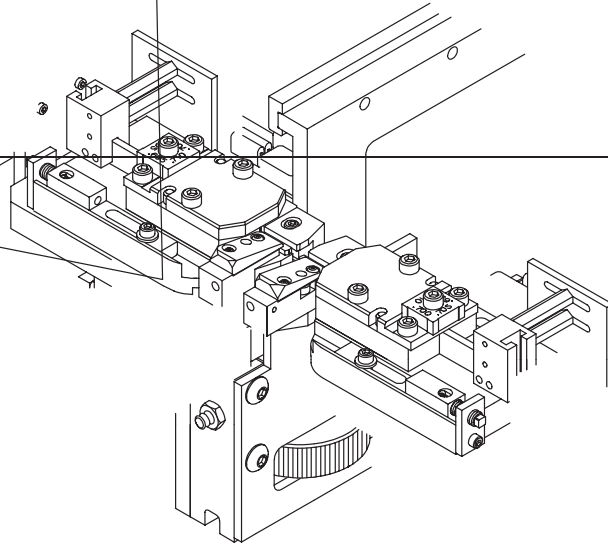


Figure 3

- Using a 5/32-in. hex wrench, tighten the sliding block mounting screw and the two inserter mounting screws.

### B. Wire Insertion Depth

The length of the inserter may be adjusted. Normally the inserters will not require this adjustment unless the connector type or insulation diameter is changed. After changing connector types, make sure the inserter cover marked “R” is installed for running receptacles or “P” for plugs. To adjust the depth, refer to Figure 1 and proceed as follows:

- Look at the top of the inserter assembly and read the wire insertion depth stop currently in use.
- Using a 5/32-in. hex wrench, remove the stop mounting screw, and remove the stop from the inserter assembly.
- Determine the stop dimension from the marking on the top of the stop directly over the inserter tip.

**NOTE** *Each stop is designed with four stop dimensions. For example, the 18.034 mm [.710 in.] stop also includes a 17.907 mm [.705 in.] section, a 17.780 mm [.700 in.] section, and a 17.653 mm [.695 in.] section.*

- Measure the insulation diameter of the wire presently being used, then measure the insulation diameter of the new wire to be used.
- Determine the difference between the two insulation diameters, then subtract one half of this difference. Use the resulting number to determine the dimension of the new stop (add the figure to the old stop dimension if the diameter is increasing, subtract if the diameter is decreasing).
- Place the correct stop onto the inserter assembly and install the stop mounting screws.

**NOTE** *Make sure that the inserter vane switches “make” in the inserted position by using Diagnostic Mode 3 on the control module. Refer to the customer manual supplied with the module.*

### C. Inserter Guide Opening

The inserter guide opening helps control the placement of the wire into the connector contacts. This gap should be adjusted to accommodate changing wire outside diameter. To adjust the opening:

- Remove the inserter assembly from the machine by removing the two inserter mounting screws.
- Remove the inserter tip subassembly from the inserter assembly.

- Using a 7/64-in. hex wrench, loosen the guide block and housing mounting screws.
- Measure the outside diameter of the new wire to be used.
- Locate the setup gage that is the same size as, or that is one size larger than, the measured wire. Insert the setup gage into the inserter assembly until the gage bottoms against the guide block. Refer to Figure 5.
- Gently force the guide blocks against the setup gage and secure.
- Re-install the inserter subassembly.
- Install the inserter assembly onto the machine as previously described.
- Repeat the above procedure for the other inserter assembly.
- Extend the plunger to secure the connector.
- Load the cable into the cable clamp, if applicable. Refer to the instructions supplied with the clamp.

### D. Wire Clamp Force (Figure 5)

The clamp force exerted on the wire during the termination process controls the wire’s vertical placement in the connector contacts. Excessive clamp force will tend to extrude the wire insulation during termination, resulting in poor termination quality. To adjust the force:

- Using a .035-in. hex wrench, loosen the wire clamp locking screw.
- Using a .050-in. hex wrench, turn the wire clamp adjustment screw. Turning the screw CLOCKWISE will INCREASE the clamp force, and turning the screw COUNTERCLOCKWISE will DECREASE the clamp force.
- Terminate several wires to verify the adjustment.
- Using a .035-in. hex wrench, tighten the wire clamp locking screw.
- Refer to Figure 6 and select the appropriate fixture for the connector type and size to be used.
- Place one end of the new fixture over the retaining screw at the inner (fixed) connector clamp end of the fixture mounting area.
- Slide the rear connector clamp up to the fixture, and locate the end of the fixture over the locating screw (with the clamp open).
- With the fixture in position, tighten the rear connector clamp locking screw with a 5/32-in. hex wrench.

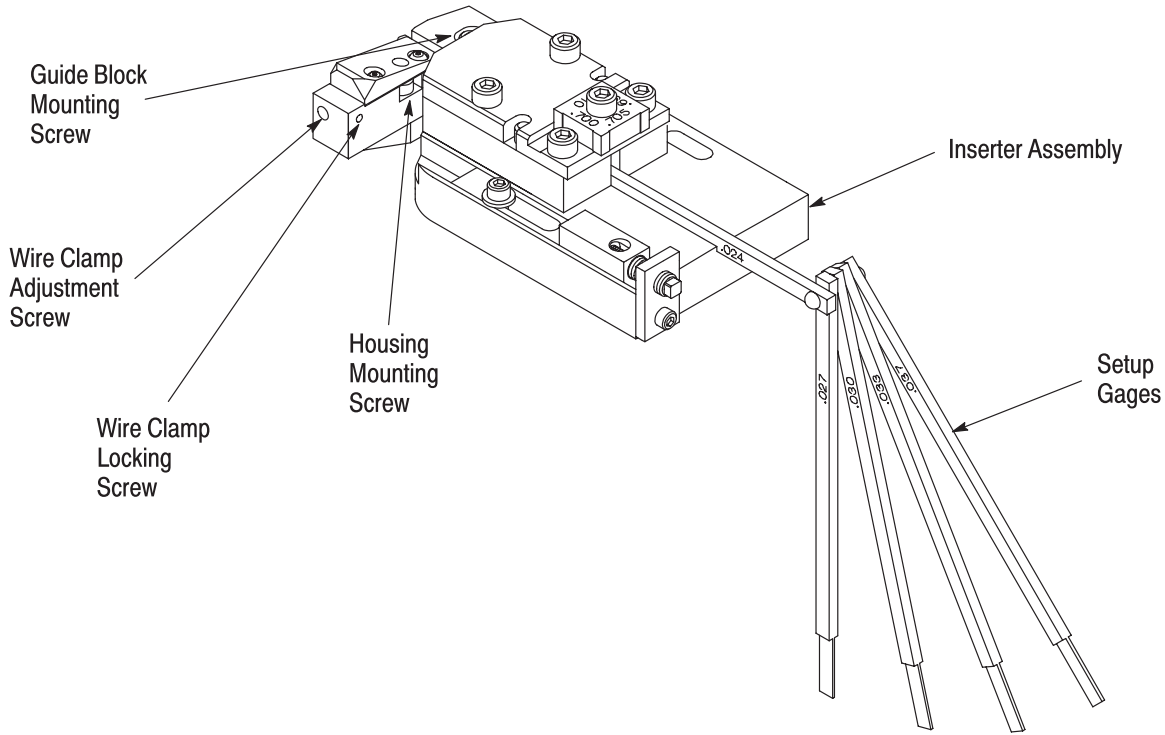


Figure 5

### 4.3. Changing the Fixture

The tooling kit can be used for a variety of Small Computer Systems Interface (SCSI) connector types and sizes by placing the corresponding fixture into the mandrel assembly. The mandrel is designed to permit the rear connector clamp to be moved, allowing for the installation of other fixture types and sizes. To change the fixture:

1. Using a 5/32-in. hex wrench, loosen, but do not remove, the locking screw on the back of the rear connector clamp. Refer to Figure 2.
2. Lift the end of the fixture and slide the rear connector clamp away from the fixture mounting area.
3. Remove the screw holding the grounding strap.
4. Remove the existing fixture.
5. Refer to Figure 6 and select the appropriate fixture for the connector type and size to be used.
6. Place one end of the new fixture over the retaining screw at the inner (fixed) connector clamp end of the fixture mounting area.

7. Slide the rear connector clamp up to the fixture, and locate the end of the fixture over the locating screw (with the clamp open).
8. With the fixture in position, tighten the rear connector clamp locking screw with a 5/32-in. hex wrench.

NUMBER OF CONNECTOR POSITIONS	FIXTURE FOR TERMINATING RECEPTACLES	FIXTURE FOR TERMINATING PLUG
14	762638-1	762638-6
24	762638-2	762638-7
36	762638-3	762638-8
50	762638-4	762638-9
64	762638-5	1-762638-0

Figure 6

**NOTE**

Only the 50 position fixtures listed are included in the tooling kit. They rest may be purchased separately.

For additional adjustment information, contact an ATS Representative at 1-877-671-2955.

**5. MAINTENANCE**

**5.1. Periodic Cleaning**

Clean all debris and insulation buildup from the inserter assemblies.

**5.2. Lubrication**

Remove the cover plate and place a few drops of light oil onto the wire clamp slide. Cycle several times and wipe off excess oil before terminating wires.

**5.3. Visual Inspection**

1. Inserter tip – check for cracks, chips, or burrs. Remove or replace as necessary.
2. Guide block housing – check for burrs or gouges. Remove burrs.
3. Shear blade – check for chips or burrs. Replace as necessary.
4. Inserter mounting plate – check for cracks, specifically around the lower shear mounting slot. Replace as necessary.

**6. REPLACEMENT PARTS**

Figure 7 lists the items that are recommended as either expendable tooling or spare tooling. Expendable tooling, which includes items that are subject to wear, should be inspected regularly and replaced, if necessary.

Recommended spare tooling includes items that should be stocked to prevent machine downtime in the event that they become damaged.

For detailed information on the location of these items, and other replacement parts, refer to the drawings supplied in the tooling kit's documentation package.

PART NUMBER	DESCRIPTION
1424938-1	Inserter Tip
852753-1	Spring (Modified)
856467-1	Lower Shear

*Figure 7*

## 7. TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	REMEDY
Connector contacts being damaged.	Incorrect mandrel height.	Adjust height as described in this sheet.
	Insertor assembly out of adjustment.	Adjust insertor assembly as described in this sheet.
	Machine's offset not set correctly.	Adjust offset. Refer to the customer manual supplied with the machine.
	Damaged insertor tip.	Inspect/replace insertor.
	Connector clamp too tight.	Adjust connector clamp force as described in this sheet.
Wire shear length varying.	Insertor guide opening not properly set.	Adjust opening as described in this sheet.
	Wire clamp force not correct.	Adjust force as described in this sheet.
	Insertor assembly out of adjustment.	Adjust insertor assembly as described in this sheet.
	Damaged insertor tip or lower shear.	Inspect/replace insertor or shear as necessary.
Insulation extruded.	Wire clamp force too great.	Adjust force as described in this sheet.
	Insertor guide opening not properly set.	Adjust opening as described in this sheet.
Damage to wires above contact's wire insertion area.	Insertor assembly position too close to connector.	Adjust insertor assembly position as described in this sheet.
	Cable breakout too low.	Raise position of cable (and wire breakout) on cable clamp.
Wire not centered in contact's wire insertion area.	Insertor guide opening not properly set.	Adjust opening as described in this sheet.
	Machine's offset not set correctly.	Adjust offset. Refer to the customer manual supplied with the machine.
	Damaged insertor tip.	Inspect/replace insertor.
	Damaged connector clamps.	Inspect/replace connector clamps.
Wire strands cut.	Wire insertion too deep.	Adjust wire insertion depth as described in this sheet.
Wire falling out of contacts.	Wire insertion too short.	Adjust wire insertion depth as described in this sheet.
		Adjust insertor vane using the control module's Diagnostic Mode 3. Refer to the customer manual supplied with the module.
		Adjust machine offset. Refer to the customer manual supplied with the machine.

## 8. REVISION SUMMARY

This is a new release of a 416-8 per EC 0990-1568-04. This document supercedes 408-8489.