



Figure 1

**1. INTRODUCTION**

This instruction sheet covers the installation and use of Tooling Kit 768900-1, which is used in the CHAMPOMATOR\* 2.5 Bench Terminating Machine to apply discrete-wire cable to AMPLIMITE\* .050 Series III Connectors. This sheet also provides part number information for the tooling required to apply the various connector sizes.

**NOTE**  All dimensions on this sheet are in millimeters [with inch equivalents provided in brackets]. 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 768900-1. Make sure to retain all material in the documentation package for reference. For detailed information on the operation of the CHAMPOMATOR 2.5 Machine, refer to Customer Manual 409-5839, which is supplied with the machine.


Reasons for reissue of this instruction sheet are provided in Section 9, REVISION SUMMARY.

**2. DESCRIPTION** (Figure 1)

The tooling kit consists of two inserter assemblies, a mandrel assembly, two sets of connector nests, one set of connector shrouds, and a set of setup gages (used for adjusting the insertion guide opening). A tie bar, purchased separately, is used to position and secure the connector during machine operation.

The inserter assemblies trim and insert the individual wires into the connector contacts. The mandrel assembly supports the connector during the termination process and helps guide the wires into the inserter assembly termination area.

The connector nest sets locate the connector in the mandrel assembly. One set, designed for plug connectors, polarizes the connector in the mandrel assembly. The other set, designed for receptacle connectors, does not polarize the connector in the mandrel assembly.

**NOTE**  Receptacle connectors **MUST** be correctly located by the operator.

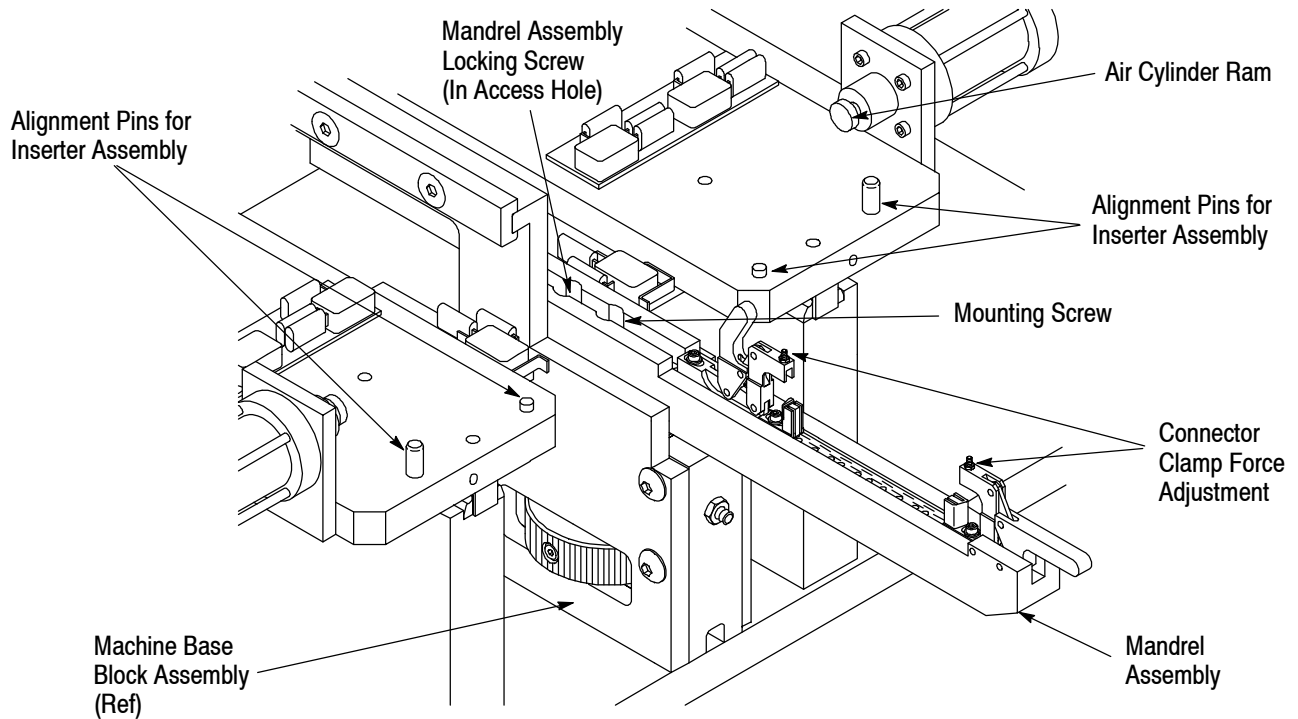


Figure 2

### 3. INSTALLATION

**DANGER** Disconnect the power to the control module and lockout the pneumatic valve **BEFORE** installing the tooling onto the base machine.

**DANGER** For clarity, the illustrations used in this sheet may show the machine without guarding. Be sure to have all guarding in place before operating the machine.

#### 3.1. Mandrel Assembly (Figure 2)

**NOTE** All inserter assemblies must be removed before installing or removing the mandrel assembly.

1. Place the mandrel assembly onto the machine base block assembly.
2. Using a 5/32-in. hex wrench, secure the mandrel assembly onto the base block assembly with the two socket head cap screws supplied with the machine.

#### 3.2. Inserter Assemblies (Figures 2 and 3)

1. Align the inserter assembly T-slot over the air cylinder ram assembly.
2. Locate the base of the inserter assembly onto the two alignment pins on the machine's inserter assembly mounting area.

3. Using a 5/32-in. hex wrench, install the two inserter mounting screws.

### 4. ADJUSTMENTS

**NOTE** Disconnect the power to the control module and lockout the pneumatic valve **BEFORE** adjusting any tooling.

#### 4.1. Mandrel Assembly Height

The mandrel assembly height is adjustable to locate the connector contacts in correct relation to the inserter assemblies' inserter tips. To adjust the height:

1. Place a new (unterminated) connector onto the connector nest, install the tie bar, and lock into place.
2. Using a 1/8-in. hex wrench, remove the machine's front access plate.
3. Using a 5/32-in. hex wrench, loosen the mandrel assembly locking screw, which is located in the center access hole. Refer to Figure 2.
4. With the machine's electrical and air power disabled, manually move the machine's carriage assembly out to the connector termination area, then partially extend the inserter tips on each inserter assembly.
5. Observe the relationship between the connector contacts and the inserter assemblies' guides.

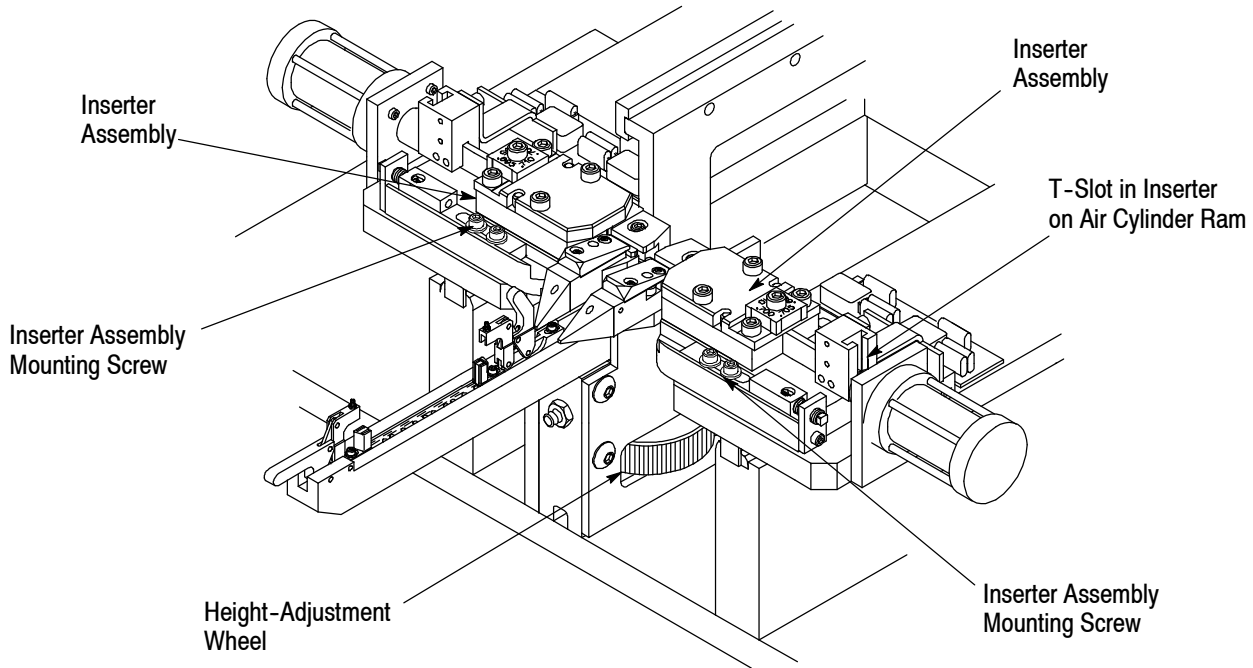


Figure 3

6. Turn the machine's height-adjustment wheel until the height is within the adjustment range, as shown in Figure 4. Turn the wheel **CLOCKWISE** to **RAISE** the mandrel (and connector) and **COUNTERCLOCKWISE** to **LOWER** the mandrel (and connector).

7. Once the desired height has been reached, use a 5/32-in. hex wrench to tighten the mandrel assembly locking screw.

1. Using a 3/32-in. hex wrench, loosen and remove the rear connector clamp and rear nest section.
2. Place the rear nest section on a connector of the new size to be terminated.
3. While holding the rear nest section in the connector, locate the connector over the front nest section.
4. Engage the rear nest section with the rack in the mandrel assembly.
5. Using a 3/32-in. hex wrench, secure the rear nest section with the socket head cap screw.
6. Secure rear clamp assembly behind the rear nest assembly.

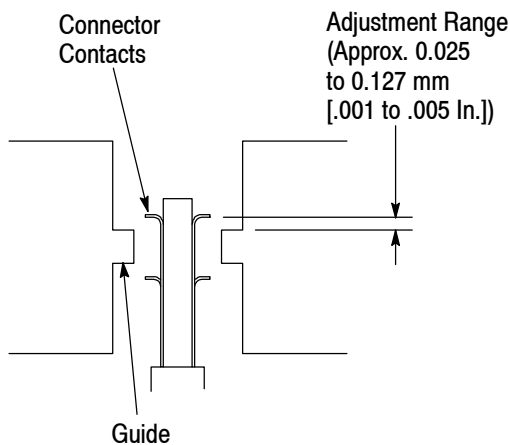


Figure 4

## 4.2. Connector Nest

### A. Connector Size - Same Type

To adjust for different connector sizes of the same type:

**NOTE** *One tooth of the rack must be visible between the nest section and the rear clamp assembly for proper positioning.*



### B. Connector Polarity (Plug Connectors Only)


To adjust the plug connector nest set to accommodate different polarity:

1. Using a 3/32-in. hex wrench, loosen and remove the mounting screws for both connector nest sections, then remove both connector nest sections.
2. Rotate the nest sections and place back onto the rack section of the mandrel assembly.
3. Using a 3/32-in hex wrench, secure the nest sections with the socket head cap screws.


### C. Connector Nest Types - Same Size


To change the type of connector (plug or receptacle) to be terminated:

- Using a 3/32-in. hex wrench, loosen and remove the mounting screws for both connector nest sections, then remove both connector nest sections.
- Replace the connector nest sections with the nest sections of the desired type.


**NOTE**  *When installing the plug nest sections, make sure that the sections are placed to provide correct connector polarity.*

- Using a 3/32-in. hex wrench, secure the nest sections with the socket head cap screws.

**NOTE**  *When installing the receptacle nest, place the shroud on top of the receptacle nest and secure with screw used to secure nest.*

**NOTE**  *Make sure that one tooth of the rack is visible between the nest and the front clamp for proper positioning.*

#### 4.3. Connector Clamp Force

**CAUTION**  *The connector clamps should place sufficient force on the connector to ensure proper location and retention of the connector during termination. The clamps should NOT be set too tightly, or premature wear of the clamp component and damage to the connector and connector nest may occur.*

With a connector loaded onto the mandrel assembly, and with the tie bar in place, proceed as follows:

- Using a 3/16-in. open-end or box wrench, loosen the locking hex nut.
- Using a .035-in. hex wrench, adjust the connector clamp set screws as desired.
- Using a 3/16-in. open-end or box wrench, tighten the locking hex nut, making sure that the flats on the nut align with the flats on the connector clamp.

#### 4.4. Inserter Assemblies

##### A. Inserter Position

The inserter position is important in that the guiding surfaces for the wire must control the wire up to the time it enters the connector contact. To adjust the inserter position:

- Load a connector into the mandrel assembly and secure it in place.

- Index the machine to connector contact No. 1.
- Using a 5/32-in. hex wrench, loosen the two inserter assembly mounting screws.
- Loosen the sliding block mounting screw. Refer to Figure 1.
- While viewing the inserter guiding surfaces, use a 5/32-in. open-end or box wrench and turn the inserter position adjustment screw to move the assembly. Refer to Figure 1. Turn the screw CLOCKWISE to move the assembly AWAY from the connector, and COUNTERCLOCKWISE to move the assembly TOWARD the connector.
- Check that the inserter guiding surface is within the adjustment area, as shown in Figure 5.
- Using a 5/32-in. hex wrench, tighten the sliding block mounting screw and the two inserter mounting screws.

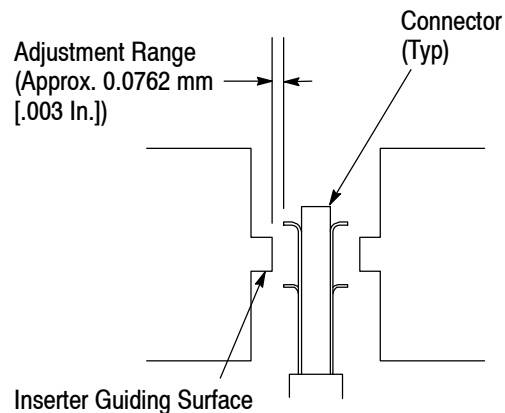


Figure 5

##### B. Wire Insertion Depth

The length of travel of the inserter ram may be adjusted. Normally, the inserters will not require this adjustment unless the insulation diameter is changed. 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.
- Measure the insulation diameter of the wire presently being used, then measure the insulation diameter of the new wire to be used.

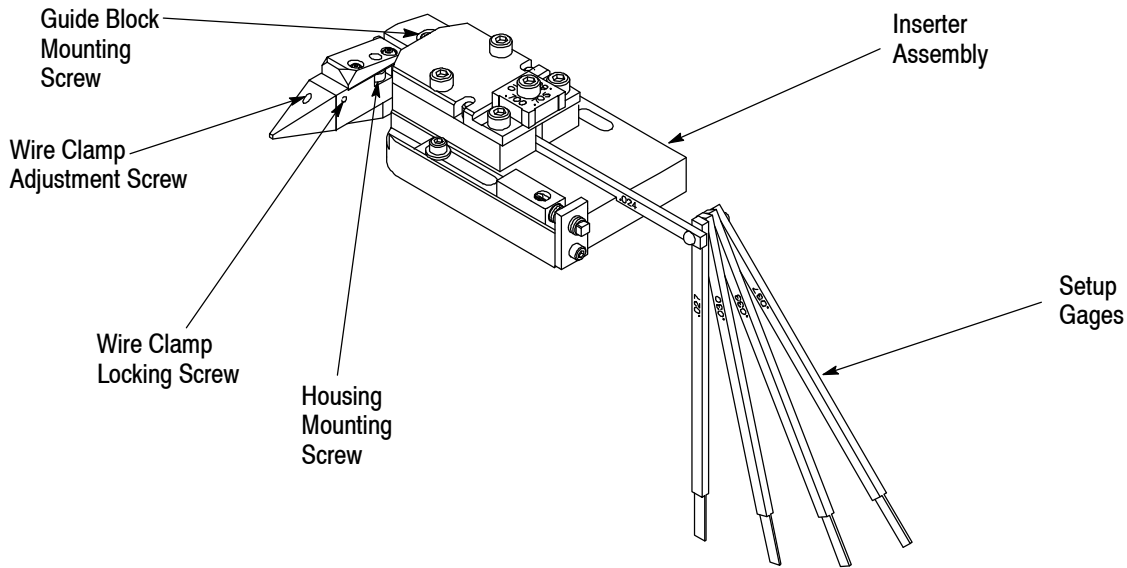
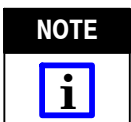


Figure 6



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.

5. 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 of the diameter is increasing, subtract if the diameter is decreasing).
6. Place the correct stop onto the inserter assembly and install the stop mounting screws.
7. Repeat the above procedure for the other inserter assembly.



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:

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

3. Using a 7/64-in. hex wrench, loosen the guide block and housing mounting screws.
4. Measure the outside diameter of the new wire to be used.
5. 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 6.
6. Gently force the guide blocks against the setup gage and secure.
7. Re-install the inserter subassembly.
8. Install the inserter assembly onto the machine as previously described.

### D. Wire Clamp Force (Figure 6)

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:

1. Using a .035-in. hex wrench, loosen the wire clamp locking screw.
2. 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.
3. Terminate several wires to verify the adjustment.
4. Using a .035-in. hex wrench, tighten the wire clamp locking screw.

## 5. OPERATION

1. Load the connector to be terminated onto the connector nest.
2. Place the tie bar (purchased separately; refer to Figure 7) onto the connector.
3. Fasten the front and rear connector clamps onto the tie bar.
4. Load the cable into the cable clamp, if applicable. Refer to the instructions supplied with the clamp.

NUMBER OF CONNECTOR POSITIONS	TIE BAR PART NUMBER
20	762637-1
26	1-762637-1
28	1-762637-2
40	762637-3
50	762637-4
60	762637-5
68	762637-6
80	762637-7
100	762637-9
120	1-762637-0

Figure 7

5. Press the machine's INDEX button. The machine will move to the first connector position to be terminated.
6. Untwist the wire pair designated for the first pair of connector contacts.
7. Place each wire into its own insertion area and actuate the machine's inserter switches. The machine will trim and insert the wires into the contacts, then will automatically index to the next connector position.

## 6. MAINTENANCE

### 6.1. Periodic Cleaning

Clean all debris and insulation buildup from the inserter assemblies.

### 6.2. 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.

## 6.3. 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.

## 7. REPLACEMENT PARTS

Figure 8 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.

<b>EXPENDABLE TOOLING</b>	
PART NUMBER	DESCRIPTION
1-21006-8	Set Screw
21018-3	Hex Nut
768753-1	Inserter Tip
852753-1	Spring (Modified)
856467-1	Lower Shear
<b>RECOMMENDED SPARE TOOLING</b>	
PART NUMBER	DESCRIPTION
354047-1	Front Connector Clamp Assembly
354047-2	Rear Connector Clamp Assembly
354048-1	Plug Nest Set
354049-1	Receptacle Nest Set
768774-1	Adjustment Screw
318618-1	Shroud
318618-2	Shroud

Figure 8



## 8. TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SUGGESTED ACTION
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 Customer Manual 409-5839, which is 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 Customer Manual 409-5839, which is 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 insertor eccentric as described in this sheet.
Wire falling out of contacts.	Wire insertion too short.	Adjust insertor eccentric as described in this sheet.
		Adjust insertor vane using control module's Diagnostic Mode 3. Refer to Customer Manual 409-5791, which is supplied with the module.
		Adjust machine offset. Refer to Customer Manual 409-5839, which is supplied with the machine.

## 9. REVISION SUMMARY

Since the previous release of this sheet, the following changes were made:

- Updated document to corporate requirements.

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