

AMP\* MAG-MATE\* Machine  
Modular Assembly

409-5472  
(was CM 5472)  
25 OCT 93 Rev B

**AMP**

***customer  
manual***



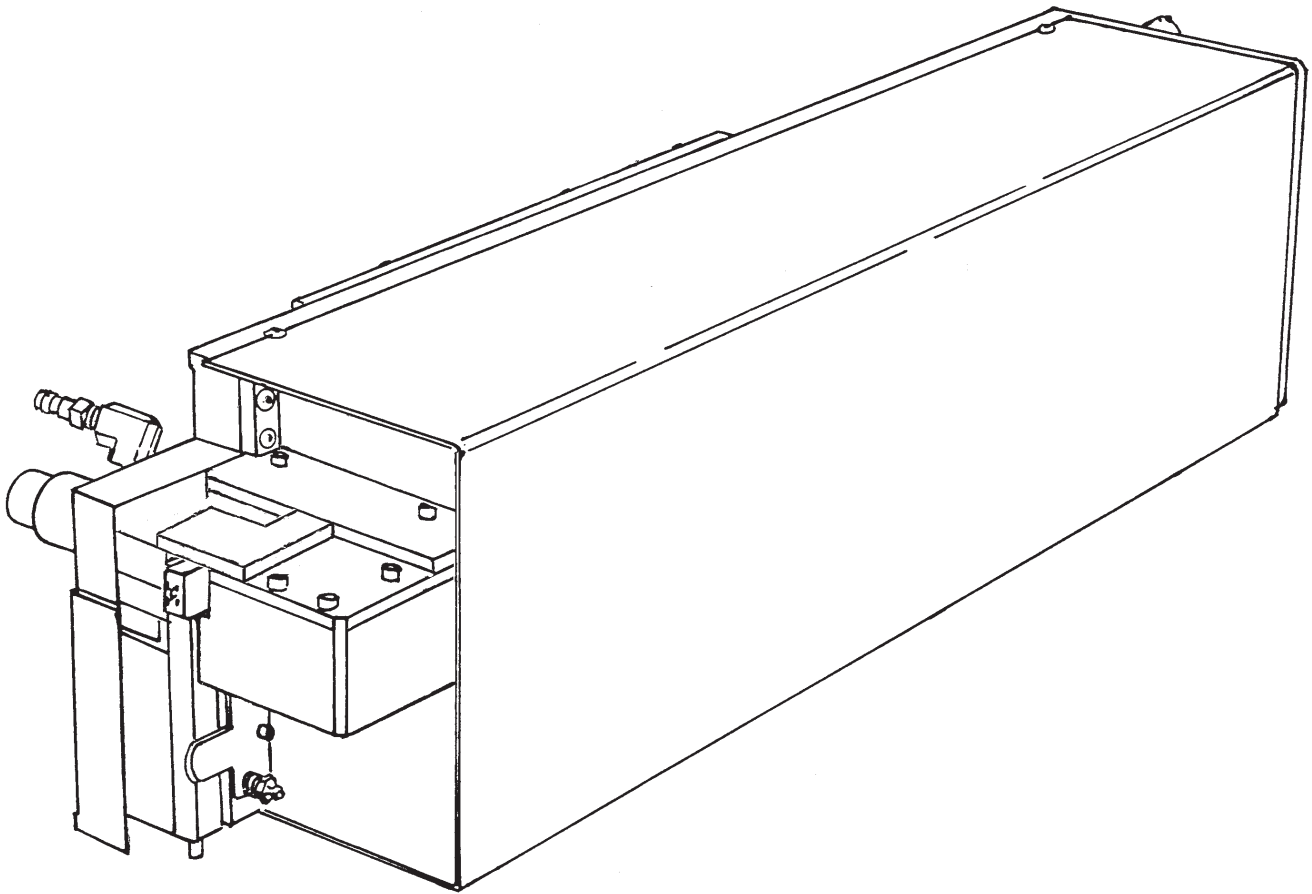
**AMP\* MAG-MATE\* Machine  
Modular Assembly**

Customer Manual  
**409-5472**  
(was CM 5472)  
25 OCT 93 Rev B

---

# *customer manual*

Prepared by  
Corporate Standards and Technical Publications  
AMP Incorporated



*Frontispiece. AMP MAG-MATE Machine Modular Assembly*

**DANGER****SAFETY PRECAUTIONS PREVENT INJURY**

Safeguards are designed into AMP machines to protect operating personnel from most hazards during normal machine operation. However, as with most machinery, certain precautions must be taken by the operator and repairman.

Never insert hands into an installed machine/applicator, or any part of a machine that is operated by electricity or compressed air, without first pulling the machine power cable plug from the outlet receptacle and/or shutting off the compressed air at the line valve and disconnecting the air hose. This will prevent injury in the event that switches or other controls are accidentally activated.

A grounded electrical outlet should always be used to receive the plug on the machine power cable.

To improve clarity, photographs and drawings may not show machine/applicator guards. In some cases, it is impractical to show the variety of guards designed to meet specific safety requirements, as set forth in codes and standards adopted by customers and/or enforced in a given locale.

Though a guard may not be shown, and procedures may not reflect the need for its removal, the guard **must** be in place during normal operation of the machine/applicator.

**TOOLING ASSISTANCE CENTER**

**CALL TOLL FREE 1-800-722-1111**  
(CONTINENTAL UNITED STATES AND PUERTO RICO ONLY)

**GENERAL MACHINE POLICY**

All machines remain the property of AMP Incorporated. The customer shall have no title to the machine(s) and his interest shall be limited to the use of said machine(s) for the purpose indicated, during the stated term, at the specified plant.

No major change or modification shall be made without written consent of AMP Incorporated. Spare and component parts are available at nominal prices.

A list of component parts is included in the instructional material or drawings supplied with each machine.

The customer shall be fully responsible for the maintenance of the machine(s) including servicing, repair, and replacement of damaged or broken parts. Each machine shall be returned in usable condition — reasonable wear and tear excepted. Before returning the machine, contact AMP Incorporated, Harrisburg, Pennsylvania requesting instructions for shipping and disposition.

AMP Field Service Engineers are available to provide assistance in the adjustment or repair of the machine when problems arise which your maintenance personnel are unable to correct. Contact AMP Service Products Business for applicable fees.

**INFORMATION REQUIRED WHEN CONTACTING SERVICE PRODUCTS BUSINESS**

AMP Service Products Business offers the **Tooling Assistance Center** as a means of providing technical assistance when required.

When contacting AMP Service Products Business by telephone regarding service to a machine or tool, it is suggested that a person familiar with the device be present with a copy of the manual (and drawings) to receive instructions. Many difficulties can be corrected in this manner.

When calling the Tooling Assistance Center, be ready with the following information:

1. Customer name
2. Customer address
3. Person to contact (name, title, telephone number and extension)
4. Person calling
5. Machine or tool number (and serial number if applicable)
6. Product part number (and serial number if applicable)
7. Urgency of request
8. Nature of problem
9. Description of inoperative component(s)
10. Additional information/comments that may be helpful

**CONTENTS**

<b>1. INTRODUCTION</b> .....	1
<b>2. DESCRIPTION</b> .....	1
2.1. Physical Description .....	1
2.2. Functional Description .....	2
<b>3. RECEIVING INSPECTION AND INSTALLATION</b> .....	5
3.1. Receiving Inspection .....	5
3.2. Installation .....	5
<b>4. OPERATION</b> .....	5
4.1. Module Loading and Unloading .....	5
4.2. Module Check-Out .....	6
4.3. Operation .....	7
<b>5. PREVENTIVE MAINTENANCE</b> .....	7
5.1. Cleaning .....	8
5.2. Inspection .....	8
5.3. Lubrication .....	8
<b>6. ADJUSTMENTS</b> .....	8
6.1. Switch Adjustment .....	8
6.2. Feed Cylinder Adjustment .....	8
6.3. Terminal Feed Mechanism Adjustments .....	9
6.4. Insertion Tube, Trim Blade, and Inserter Adjustments .....	10
<b>7. REPAIRS AND REPLACEMENT</b> .....	12
7.1. Insertion Tube, Trim Blade, and Inserter Replacement .....	12
7.2. Replacement of Upper Shear Blades .....	13
7.3. Replacement of Lower Shear Blades .....	13
7.4. Feed Finger Replacement .....	13
7.5. Electrical System Repairs .....	13
7.6. Pneumatic System Repairs .....	13
<b>8. REVISION SUMMARY</b> .....	13

**ILLUSTRATIONS**

Frontispiece. AMP Magnet Wire Interconnect Machine Modular Assembly .....	iii
2-1 Typical Module Component Locations (right side) .....	3
2-2 Typical Module Component Locations (left side) .....	4
3-1 Typical Assembly Installation Mounting and Connections .....	6
6-1 Feed Mechanism Adjustment Locations .....	9
6-2 Inserter Mechanism and Target Area .....	11
6-3 Insertion Tube, Trim Blade, and Inserter Adjustment Locations .....	12

## 1. INTRODUCTION

The AMP MAG-MATE Machine Modular Assembly (see Frontispiece) has been designed to insert one or two terminals per cycle into a customer-supplied bobbin (or stator). The modular assembly is designed for mounting on a parent machine that supplies pneumatic pressure and electrical control for operation. The modular assembly is secured to the parent machine by two gibs and a mounting plate on the back of the base plate.

The terminals are supplied in strip form on reels, and are available in several different configurations. When the terminals enter the "target area" of the module, they are sheared from the strip and advanced forward in the insertion tube. Then, each terminal is inserted at a specific depth into the bobbin cavity (or cavities), at which time the excess magnet wire is sheared off and the winding is terminated.

This manual provides information on description, receiving inspection, operation, preventive maintenance, adjustments, and replacement of recommended spares. For information beyond the scope of this manual, contact your local AMP Field Service Engineer, or:

TOOLING ASSISTANCE CENTER  
TOLL FREE 1-800-722-1111  
(CONTINENTAL UNITED STATES  
AND PUERTO RICO ONLY)

When reading this manual, pay particular attention to DANGER, CAUTION, and NOTE statements.

**DANGER** *Denotes an imminent hazard that may result in moderate or severe injury.*

**CAUTION** *Denotes a condition that may result in product or equipment damage.*

**NOTE** *Highlights special or important information.*

Safeguards are designed into AMP modular assemblies to protect operators and maintenance personnel from hazards during normal module operation. Carefully observe the following safety precautions before and during operation of the module:

- ALWAYS disconnect power and air supplies when changing tooling or performing any maintenance on the module.
- ALWAYS keep module covers and guards in place during normal operation of the module.
- ALWAYS keep fingers clear of moving parts when operating module.
- ALWAYS wear eye protection when operating module.

Reasons for reissue of this manual are provided in Section 8, REVISION SUMMARY.

## 2. DESCRIPTION

### 2.1. Physical Description (Figure 2-1)

The pneumatically-powered, electrically-controlled modular assembly is secured to the parent machine by two gibs and a mounting plate on the back of the base plate, and may be mounted in a vertical or horizontal position for operation.

**NOTE** *All references to dimensions and parts location refer to a modular assembly mounted in a horizontal position with the tooling facing front.*

The modular unit conforms to the following specifications:

Module Dimensions (Approx)		
Depth		711.2 mm [28 in.]
Height		190.5 mm [7.5 in.]
Width		203.2 mm [8 in.]
Weight (Approx)		38.6 kg [85 lbs]
Air Requirements		
Pressure		551 kPa [80 psi]
Electrical Requirements		
Voltage		12 Vdc
Current		.5 A

Figure 1-1. Specifications

Both the terminal feed mechanism and the shear mechanism are operated by the feed cylinder mounted at the back of the module. The cylinder is connected to the shear cam which drives the shear blades through the shear lever. Attached to the side of the shear cam is the feed cam which drives the feed finger through the feed lever and main feed block. When the cylinder is in the normal position (retracted), the feed finger is retracted to pick up the next feed point on the terminal strip, and the shear blades are raised.

Modules equipped with the dual feed option contain an alternate feed solenoid which determines the number of terminals that are advanced into the target area (see Figure 6-2). When de-energized, the alternate feed solenoid (L-4) acts as a mechanical stop to limit the travel of the main feed block (see Figure 6-1).

Located between the main feed block and the shear housing is a compression spring which applies a load to the block when actuated forward. The purpose of the spring is to eliminate terminal overrun when advanced into the "target area" (see Figure 6-2). The spring helps to produce equal cutoff tabs (as shown in Figure 6-1).

The insertion cylinder, mounted at the back of the module, operates the insertion mechanism. The insertion air cylinder is connected to the slide block, slide block spacer, top insertion slide, and the tube slide. Mounted on the tube slide is the insertion tube, which contains the insertion tooling. Normal position for the insertion cylinder is retracted.

## 2.2. Functional Description (Figure 2-2)

For this description it shall be assumed that: (1) the parent machine is in the standby condition in relation to the modular assembly; (2) the modular assembly has been properly installed on the parent machine; (3) a terminal(s) has been sheared from the strip and advanced into the insertion tube; and (4) terminal strip is properly loaded into the feed mechanism of the modular assembly, and the feed finger is retracted.

With the modular assembly in the standby condition, air pressure is being supplied by the parent machine to the retraction ports of the insertion and feed cylinders. To begin the cycle of operation, air pressure is stopped to the retraction port and supplied to the extension port of the insertion cylinder. As the cylinder extends, the insertion tube is advanced to "pinch" the bobbin in its holding fixture on the parent machine to maintain alignment. This is followed by the advancement of the trim blade (if applicable) to cut the excess wire ends from the bobbin, and then the inserter is advanced to transfer the terminal(s) from the insertion tube into the bobbin the proper depth to terminate the magnet wire. As the cylinder becomes fully extended, switch (S7) is actuated "closed" to send a signal back to the parent machine, and air pressure is diverted to the retraction port of the insertion cylinder to retract the inserter, trim blade (if applicable), and the insertion tube. When the insertion cylinder is fully retracted, switch (S10) is actuated "closed" to send a signal back to the parent machine, and air pressure is diverted from the retraction port of the feed cylinder to the extension port.

**NOTE** COVER REMOVED FOR CLARITY

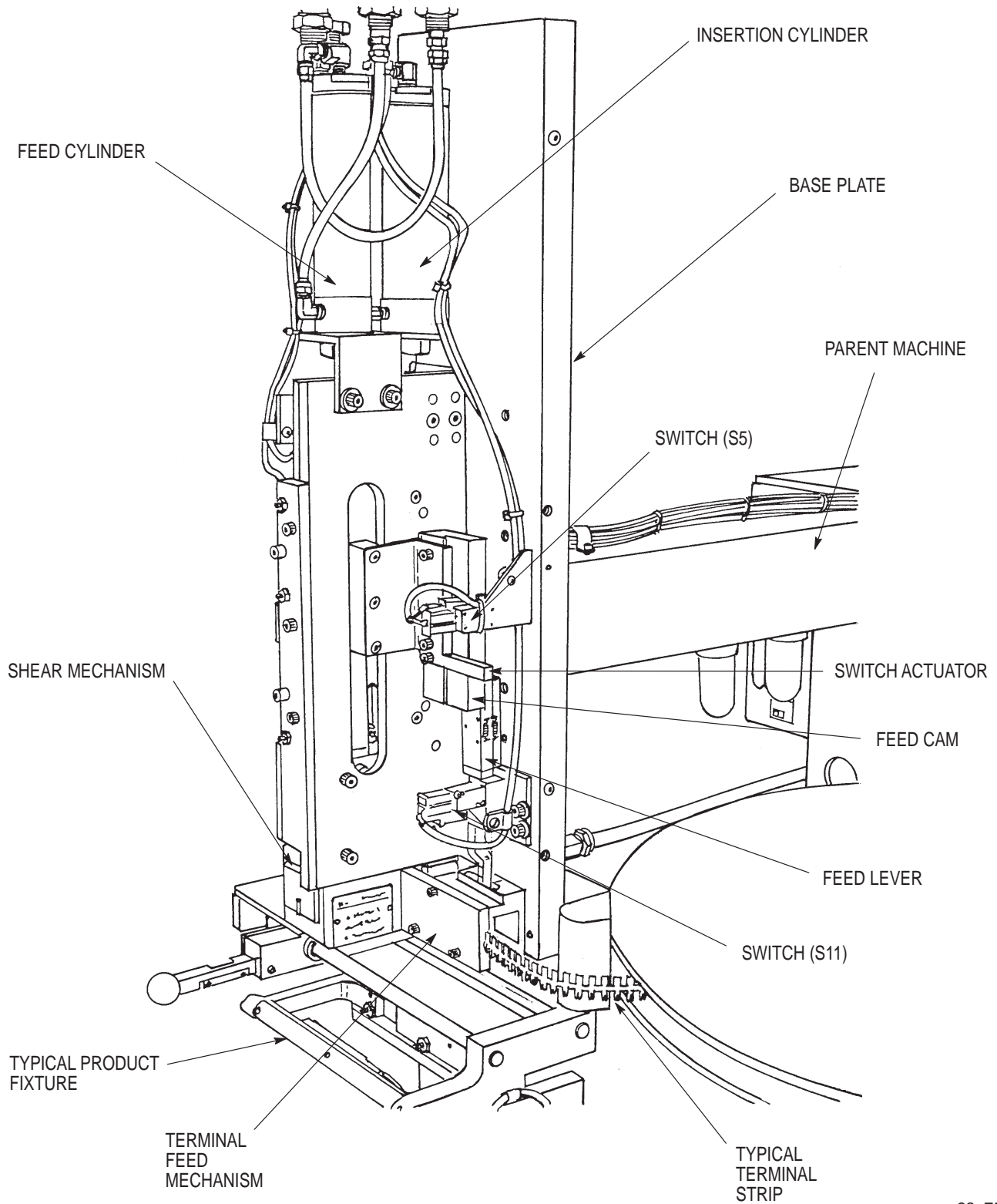


Figure 2-1. Typical Module Component Locations (right side)

93-75

**NOTE** COVER REMOVED FOR CLARITY

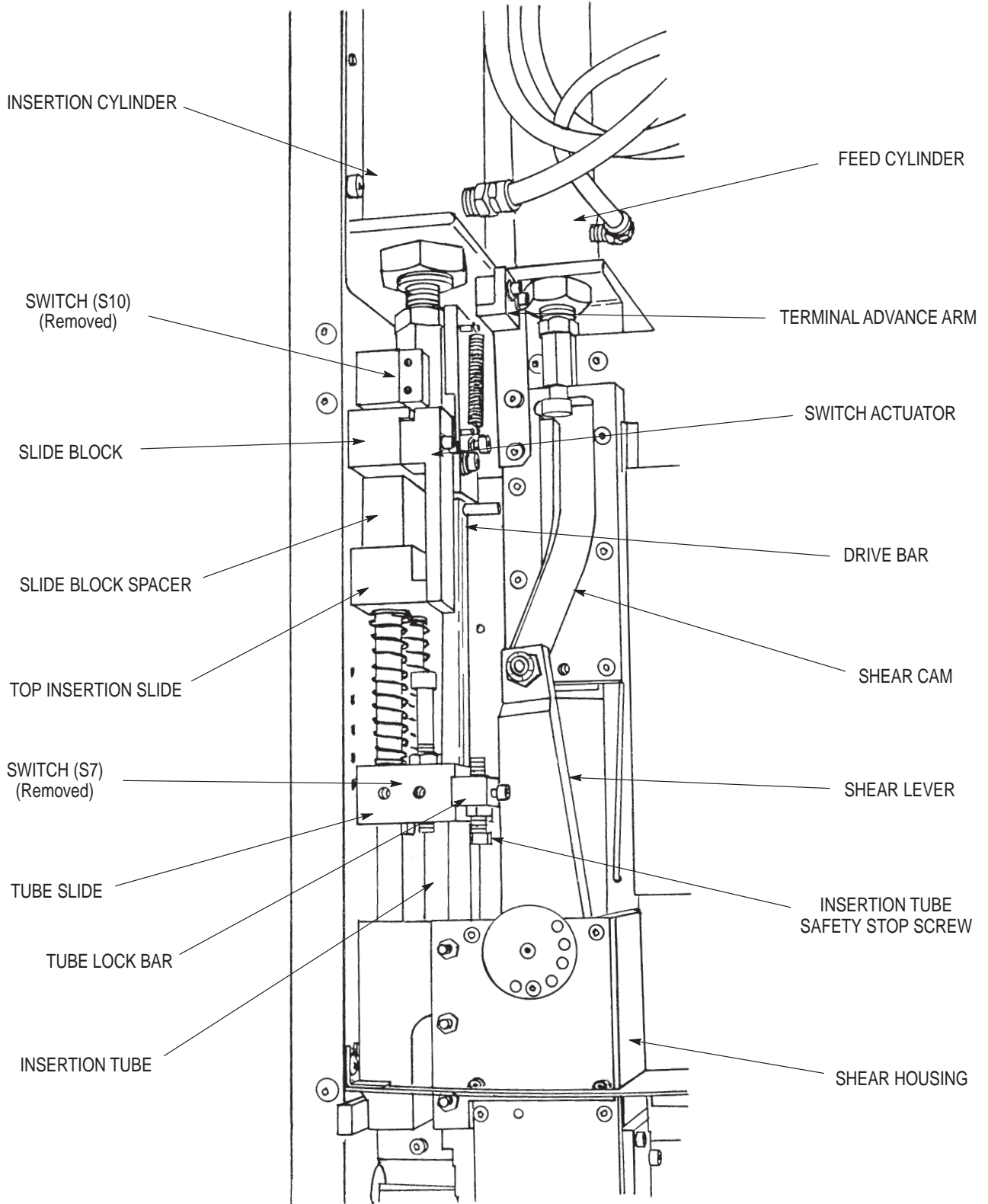


Figure 2-2. Typical Module Component Locations (left side)

93-76

As the feed cylinder is extended, the feed finger feeds the terminal strip to position the lead terminal(s) in the “target area,” then the shear blades are cammed downward to shear the terminal(s) from the strip. As the cylinder becomes fully extended, the inserter is slightly advanced to transfer the sheared terminal(s) from the “target area” into the insertion tube, and switch (S11) is actuated “closed” to send a signal back to the parent machine. Air pressure is diverted from the extension port of the feed cylinder to the retraction port. Retraction of the feed cylinder raises the shear blades, retracts the feed finger to pick up the next feed point in the terminal strip, and actuates switch (S5) “closed” to send a signal to the parent machine, and return the assembly to the standby condition.

### 3. RECEIVING INSPECTION AND INSTALLATION

#### 3.1. Receiving Inspection

The modular assembly is thoroughly inspected during and after assembly. Prior to packaging and shipping, a final series of tests and inspections made to ensure proper functioning. While the module should require no adjustments before placing it into operation, the following inspection should be performed as a safeguard against potential problems generated in transit.

1. Carefully uncrate the module and place it in a location that will permit a careful examination.
2. Thoroughly inspect the entire module for evidence of damage that may have occurred in transit. If the module is damaged in any way, file a claim against the carrier and notify AMP Incorporated immediately.
3. Check all components to be certain that they are secure.
4. Check all wiring (if applicable) for loose connections, cuts, or other possible causes of electrical short circuits.
5. Inspect all pneumatic lines (if applicable) for evidence of loose connections and cuts that may cause leakage.

**NOTE**

*It is important that this manual and other documents (such as drawings and parts lists), as well as any enclosed product samples, remain with the module for the benefit of personnel responsible for installation, operation, and maintenance.*

#### 3.2 Installation (Figure 3-1)

Because the modular assembly is adaptable to various parent machines, and may be installed in a vertical or horizontal position on the parent machine, refer to the customer manual for the particular machine on which it is to be used for the procedure.

### 4. OPERATION

This section describes the loading of terminals into and the unloading of terminals from the module; check-out of the module for operation; and module operation.

#### 4.1. Module Loading and Unloading

**CAUTION**

*Handle terminal strip CAREFULLY to prevent distortion.*

##### A. Loading

**CAUTION**

*BEFORE beginning to load the module with terminal strip, MAKE SURE that any old strip in the upper strip guide plate has been removed and that sheared terminal(s) in the insertion tube have been extracted, or a jam will occur.*

1. Make sure that air supply and electrical power to module are “off.”
2. Install terminal reel on reel support and retain with flange.
3. Release terminal drag and feed terminal strip through the upper strip guide plate until feed finger drops into FIRST feed point in strip.

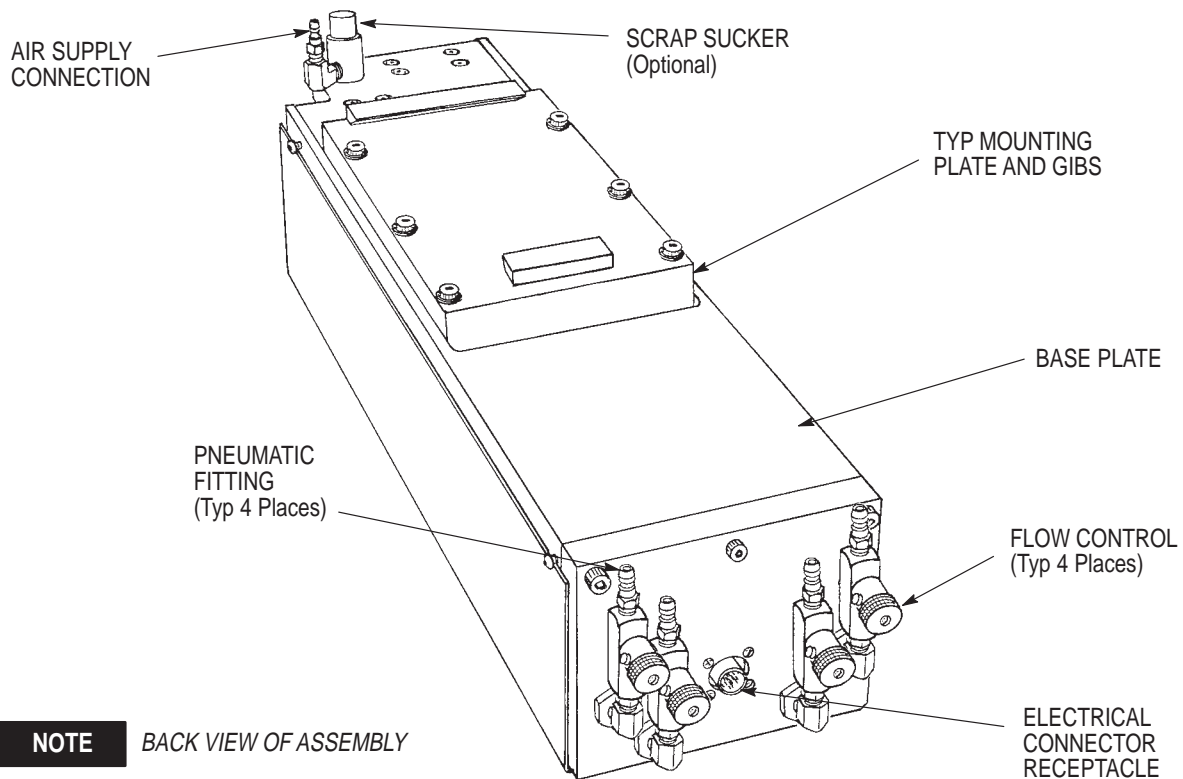


Figure 3-1. Typical Assembly Installation Mounting and Connections

93-77

4. Turn electrical power and air supply "on." Module is now ready for operation as described in Paragraph 4.3, Operation.

**NOTE**

*It may be necessary to cycle the module several times before the lead terminal has advanced far enough into the machine to be sheared from the strip and loaded into the insertion tube.*

## B. Unloading

1. Make sure that electrical power and air supply to module are "off."
2. With one hand, lift up and hold feed finger and release terminal drag while pulling terminal strip with other hand back through the upper strip guide plate until clear.
3. Roll the terminal strip back onto reel to prevent distortion.
4. Remove guard from fixture (if applicable) to gain access, then remove any remaining terminals in the insertion tube.

## 4.2. Module Check-out

Module check-out is required following the replacement of parts to assure all adjustments are correct, before placing the module in production operation. To perform this procedure, it is necessary to remove the cover to gain access to some of the machine adjustments, and to observe module operation. Remove guard from fixture (if applicable).

**DANGER**

*With cover and guard removed, and with air supply and/or electrical power "on," KEEP FINGERS CLEAR of any moving parts and electrical components.*

1. Load machine with terminal strip as described in Paragraph 4.1, Module Loading and Unloading.

2. Connect module to electrical power and air supply, then turn both “on.” Make sure that air pressure gauge reads 551 kPa [80 psi].

**CAUTION**

*BEFORE actuating the FEED CYLINDER each time, as described in Step 3 of this procedure, remove terminals from the insertion tube to prevent a jam from occurring.*

3. To check the feed mechanism and shear blades for proper operation, actuate the feed cylinder several times while observing operation. This also advances the terminals into the insertion tube after being sheared. If equipped with alternate feed solenoid (L4), this function should be repeated with the module in each mode of operation. One terminal should be advanced each cycle when in the *single* mode (alternate feed solenoid de-energized). Two terminals should be advanced each cycle in the *double* mode (alternate feed solenoid energized). Terminals must be advanced far enough into the insertion tube, after being sheared, to clear the “target area” (see Figure 6-2). The terminals should be held in the insertion tube by the tube spring. Sheared terminals should have *equal* cutoff tabs on both sides. If adjustment to the feed mechanism is necessary, refer to Section 6, ADJUSTMENTS.

**NOTE**

*If the terminal cutoff tabs are not equal, or vary between cycles, check for a broken or missing spring between the main feed block and shear housing. The purpose of this spring is to apply load to the slide in one direction. If necessary, replace spring.*

4. Install bobbin in the fixture.

5. To check the insertion tube for proper operation, clear the insertion tube of any terminals. With bobbin in the fixture, actuate the insert cylinder. The insertion tube should extend far enough to slightly “pinch” the bobbin in the fixture. With the bobbin “pinched,” there should be approximately 0.762 mm [.030 in.] clearance between the insertion tube’s safety stop screw and the shear housing (see Figure 2-2). This is necessary to prevent tooling from hitting fixture when extended without a bobbin in place. If adjustment is necessary, refer to Section 6.

6. Load machine with terminals as described in Paragraph 4.1.

7. Cycle the module through a complete insert/feed cycle. KEEP FINGERS CLEAR of any moving parts or electrical components.

8. Remove bobbin and inspect terminal(s) for proper insertion depth, trimming of excess wire, and termination of magnet wire. Make any additional adjustments that may be necessary, then repeat this procedure.

9. Replace the covers.

### 4.3. Operation

Operation of the modular assembly depends on the parent machine for air pressure and electrical control in sequence with the parent machine cycling; because this may differ greatly with each machine, refer to the customer manual for the parent machine on which the modular assembly is being used.

1. Make sure that the terminal reel contains an adequate supply of terminals to start operation. If not, load module as described in Paragraph 4.1, Module Loading and Unloading.

2. Operate the parent machine in a normal manner.

**CAUTION**

*Do NOT allow the end of the terminal strip to go into the terminal feed mechanism – a jam will occur. When the end of a reel is feeding into the module, stop operation and – with the end of the terminal strip still visible – remove it from the feed mechanism. Load a new reel of terminals and resume operation.*

## 5. PREVENTIVE MAINTENANCE

Preventive maintenance of the module is limited to periodic cleaning, inspection, and lubrication. Depending on the amount of use, a maintenance program should be established on a regular basis, then maintained, whether daily, weekly, or monthly. This will greatly reduce downtime for repairs and replacement of parts. When performing preventive maintenance, remove all covers to gain access.

**DANGER**

*When performing preventive maintenance, MAKE SURE that electrical power and air supply are OFF.*

## 5.1. Cleaning

Before operation, or on a daily basis, perform the following procedure:

1. Using a CLEAN dry cloth, wipe the entire module to remove any evidence of dust or other contamination.
2. Using a solvent, or similar cleaning fluid, remove any evidence of oil or grease from areas NOT requiring lubrication, especially in the “target area.”
3. Using a brush or vacuum, clean out any chips or metal particles that may be in the module.

## 5.2. Inspection

1. Inspect entire module for evidence of loose or broken parts. Repair or replace as necessary.
2. Inspect all moving parts for excessive wear. Replace worn parts as may be required.
3. Inspect all air lines and connections for leakage. Repair and/or replace as necessary.
4. Inspect all electrical wiring for loose connections and cracked or worn insulation. Repair and/or replace as necessary.

## 5.3. Lubrication

1. Lubricate all gibs with general purpose grease. Remove any excess before operating module.
2. Lubricate all slides and pivot points with a few drops of SAE No. 20 motor oil. Remove any excess before operating.

**CAUTION** *DO NOT allow any lubricants to enter the “target area” (see Figure 6-2) of the module. Should this occur, thoroughly clean the area immediately.*

## 6. ADJUSTMENTS

The adjustment procedures in this section may be necessary to maintain the module in continuous service, or following the replacement of recommended spare parts listed in the customer drawings accompanying it.

**DANGER** *When making adjustments, MAKE SURE that electrical power and air supply are turned OFF, unless otherwise specified. If covers are removed, and it is specifically stated that air supply and electrical power are to be turned “on,” KEEP FINGERS CLEAR OF MOVING PARTS.*

### 6.1. Switch Adjustment

All mechanically-actuated switches are mounted on brackets containing elongated holes. When it becomes necessary to adjust them, loosen the two screws securing the bracket to the module and move the switch in the direction required. After adjustment, tighten screws to secure bracket. Make sure that switch brackets do not stop cylinder travel. Adjustment of switches should be performed with air supply “on” during module check-out, as described in Section 4.2, Module Check-out.

### 6.2. Feed Cylinder Adjustment (Figure 6-3)

Refer to Figure 6-3 for references and proceed as follows:

1. Check to see if the cylinder adjustment adapter (A) is centered in the slot of the shear cam (B). If it is not centered, adjust by moving the feed cylinder bracket (C). To move the feed cylinder bracket, loosen the bracket mounting screws, make adjustment, and re-tighten screws.
2. With the feed cylinder (D) fully extended, check to see that there is a gap of 3.175 mm [.125 in.] between the shear cam (B) and the shear housing (7). If adjustment is required to achieve the 3.175 mm [.125 in.] gap, loosen the locknut on the cylinder adjustment adapter (A), make the adjustment, and re-tighten the locknut. Make sure that cylinder travel is not being limited by feed switch brackets.
3. Switches (S5) and (S11) may require adjustment after cylinder adjustment. Make sure that feed cylinder stroke is not stopped by interference from switch brackets.

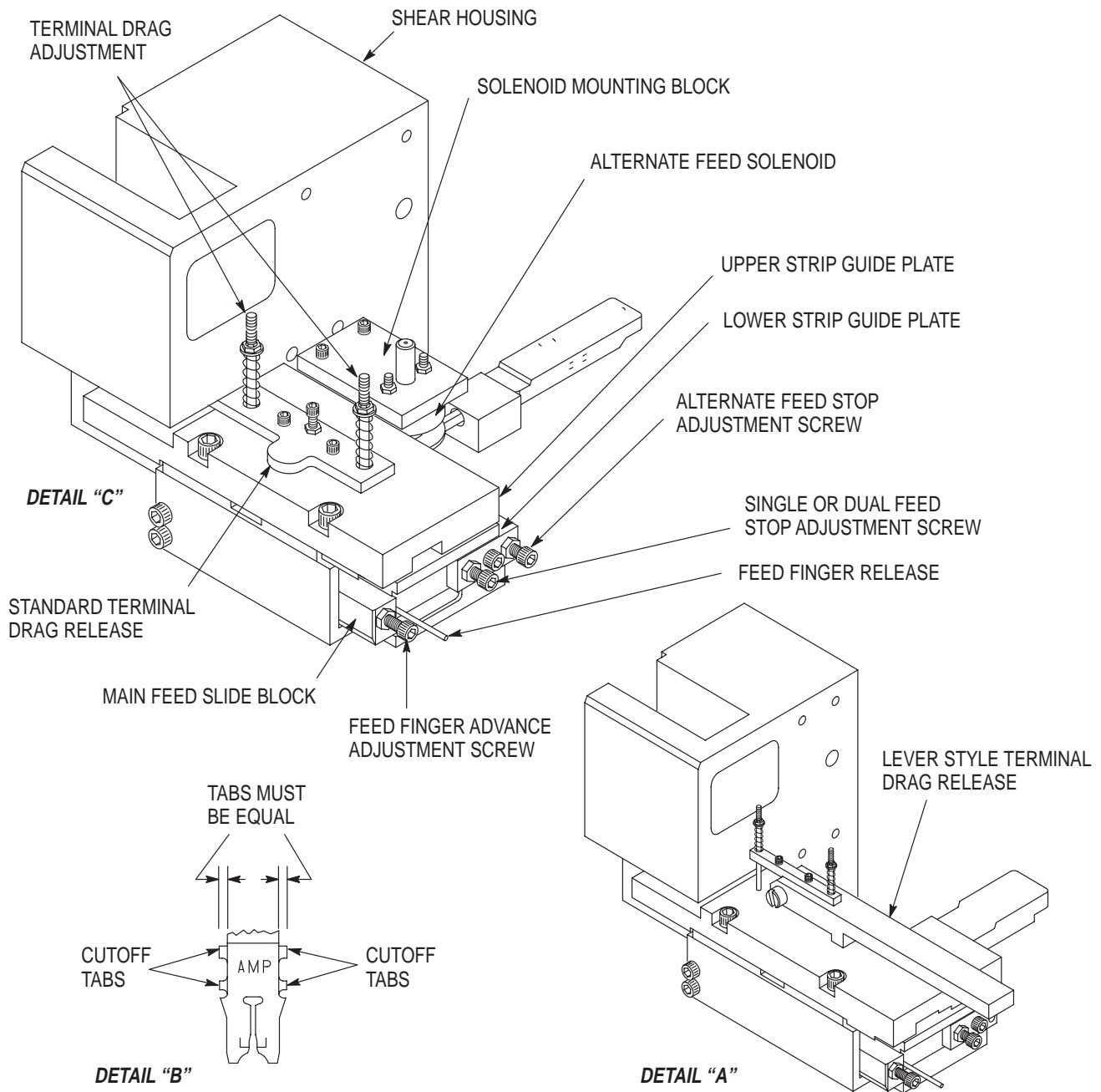


Figure 6-1. Feed Mechanism Adjustment Locations

200-173E

**6.3. Terminal Feed Mechanism Adjustments (Figure 6-1)**

Proper adjustment of the terminal feed mechanism is required to control positioning of the terminals when advanced into the “target area” (see Figure 6-2). The *correct* position is evidenced by equal cutoff tabs on both sides of the terminals when sheared from the terminal strip. If adjustment is required to achieve correct positioning, proceed as follows:

1. The module is equipped with either of two available drag release mechanisms; a standard type or a lever type. The drag release is attached to the terminal drag of the feed mechanism. Check terminal drag adjustment to prevent pullback of terminal strip when feed finger is retracted. If adjustment is required, use locknuts on terminal drag to reset tension on drag so that pullback of terminal strip is minimal.

2. If terminals do not have *equal* cutoff tabs on each side after being sheared from the strip, loosen the locknut on the feed finger advance adjustment screw and turn the screw as required to slightly advance or retract the feed finger when extended. Do not turn the adjustment screw more than 1/10 turn (approximately 0.076 mm [.003 in.]) between test cycles. After producing equal cutoff tabs, tighten locknut to secure adjustment screw. *Make sure* that the spring between the main feed block and shear housing is not broken or missing.

3. Refer to the appropriate following paragraph to adjust the feed for the type of module you are using (not equipped with alternate feed solenoid, or equipped with alternate feed solenoid):

- **Modules Not Equipped with Alternate Feed Solenoid (Figure 6-1)**

If feed mechanism does not properly advance the terminal(s) during module check-out (as described in Paragraph 4.2 of this manual), check to be sure there is a slight overtravel (0.762 to 1.016 mm [.030 to .040 in.]) when the feed finger is retracted to the next feed position on the terminal strip. If adjustment is required, loosen locknut on the single/dual feed stop adjustment screw, then turn adjustment screw clockwise to advance, or counterclockwise to retract, the stop position. Do not turn the screw more than 1/4 turn between test cycles. After obtaining the correct adjustment, secure the screw by tightening the locknut.

- **Modules Equipped with Alternate Feed Solenoid**

If using a module equipped with an alternate feed solenoid (L4) and the feed mechanism does not properly advance one terminal when in the *single* mode, check for slight overtravel (0.762 to 1.016 mm [.030 to .040 in.]) when the feed finger is retracted to the next position on the terminal strip. If adjustment is required, loosen screw securing solenoid mounting block to the back of the feed mechanism, then loosen the locknut on the alternate feed stop adjustment screw. Turn the adjustment screw clockwise to advance, or counterclockwise to retract, the stop position while keeping the solenoid mounting block against the screw. Do not turn the screw more than 1/4 turn between test cycles. After making each adjustment, secure the solenoid mounting block by tightening the screw; then tighten the locknut to retain the adjustment screw.

After adjusting the alternate feed solenoid (L4), switch module to *double* mode and, if two terminals are not properly advanced during check-out procedure, check for slight overtravel (0.762 to 1.016 mm [.030 to .040 in.]) when feed finger is retracted. If adjustment is required, loosen locknut on single/dual feed stop adjustment screw and turn adjustment screw clockwise to advance, or counterclockwise to retract, the stop position. Do not turn the screw more than 1/4 turn between test cycles. After obtaining the correct adjustment, secure the screw by tightening locknut.

4. Repeat module check-out procedure as described in Paragraph 4.2 of this manual to make sure that all adjustments are correct.

#### 6.4. Insertion Tube, Trim Blade, and Inserter Adjustments (Figures 6-2 and 6-3)

There are numerous adjustments that may be required to properly retract and advance the insertion tube, trim blade, and inserter. Following the replacement of recommended spares as described in Section 7 of this manual, and during module check-out, adjustment to the insertion tube, trim blade, and/or the inserter **MUST** be made in proper sequence. The numbers assigned to the various components on Figure 6-3 are in the sequence of checking for proper adjustments.

1. If, during check-out of feed mechanism, it is determined that the terminals are not advanced far enough, or advanced too far into the insertion tube after being sheared in the “target area” (see Figure 6-2), slightly loosen the two screws securing the terminal advance block (1), then loosen the locknut on the backup screw (2). Turn the backup screw as required to correct the terminals position in the insertion tube. The terminals should be clear of the target area, and the tube spring should be holding the terminal(s) in the insertion tube. Tighten the locknut to secure the backup screw and the two screws to secure the terminal advance block.

**NOTE**

*When performing Step 2 of this procedure, keep insertion slide block pushed back toward the insertion cylinder to eliminate any forward clearance that may exist.*

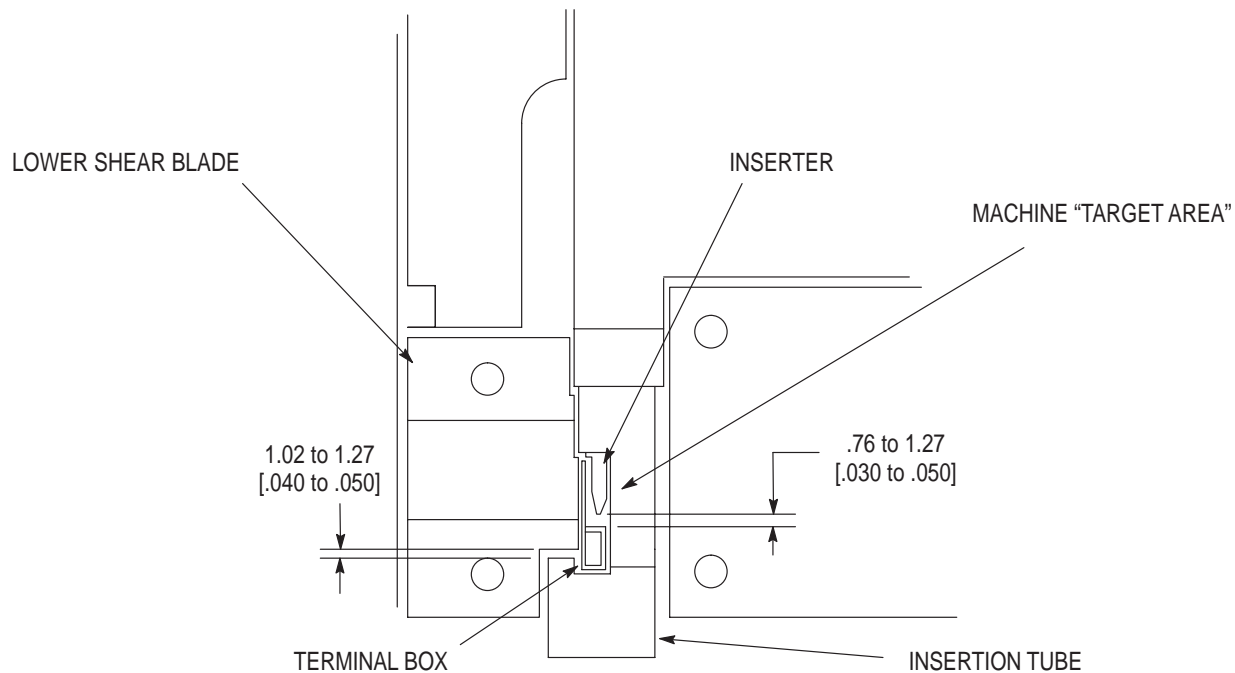


Figure 6-2. Inserter Mechanism and Target Area

200-174E

2. With the insertion cylinder *fully* retracted, check clearance between insertion tube and front edge of lower shear blades. This clearance must be approximately 1.016 to 1.270 mm [.040 to .050 in.] (see Figure 6-2) If adjustment is necessary, loosen locknut (3) on insertion cylinder shaft, then turn adapter on shaft as required until the proper clearance is obtained. Tighten locknut after making adjustment. Make sure that switch bracket (5) is not limiting cylinder travel. Re-adjust switch after making cylinder adjustment.

3. With a terminal(s) fed into the "target area," *but not sheared from the strip*, check clearance between tip of inserter and terminal box. Clearance **MUST** be 0.76 to 1.270 mm [.030 to .050 in.] (see Figure 6-2) with slide block (4) *back*. If clearance is not sufficient for terminal(s) to enter "target area," slightly loosen two screws that secure rear slide cover plate to the slide block (see Detail "A"). Loosen locknut and adjust setscrew on slide block until the required clearance is obtained. After adjustment, tighten locknut on setscrew and two screws to secure rear slide cover plate. See Figure 6-2.

4. If, during module check-out, it is determined that the insertion tube does not properly "pinch" the bobbin when it is extended or the clearance between the insertion tube safety stop screw (6) and the shear housing (7) is not approximately 0.762 mm [.030 in.] when bobbin is "pinched" by insertion tube, loosen the locknut on the insertion tube safety stop screw, adjust the screw until the proper clearance is obtained, and then tighten locknut.

5. If, during module check-out, it is determined that the inserter does not insert the terminals to the correct depth in the bobbin, loosen the locknut on the inserter depth adjustment screw (8) and adjust the screw as required, then tighten the locknut. Make sure that cylinder travel is not limited by switch bracket. It will now be necessary to re-adjust the switch bracket (9) as described in Paragraph 6.1 of this manual.

6. Return the module to the normal condition, then repeat module check-out procedure to be assured that module functions properly. If, due to an adjustment in this procedure, the module does not complete a cycle of operation, determine the switch which has not been actuated, then adjust as described in Paragraph 6.1.

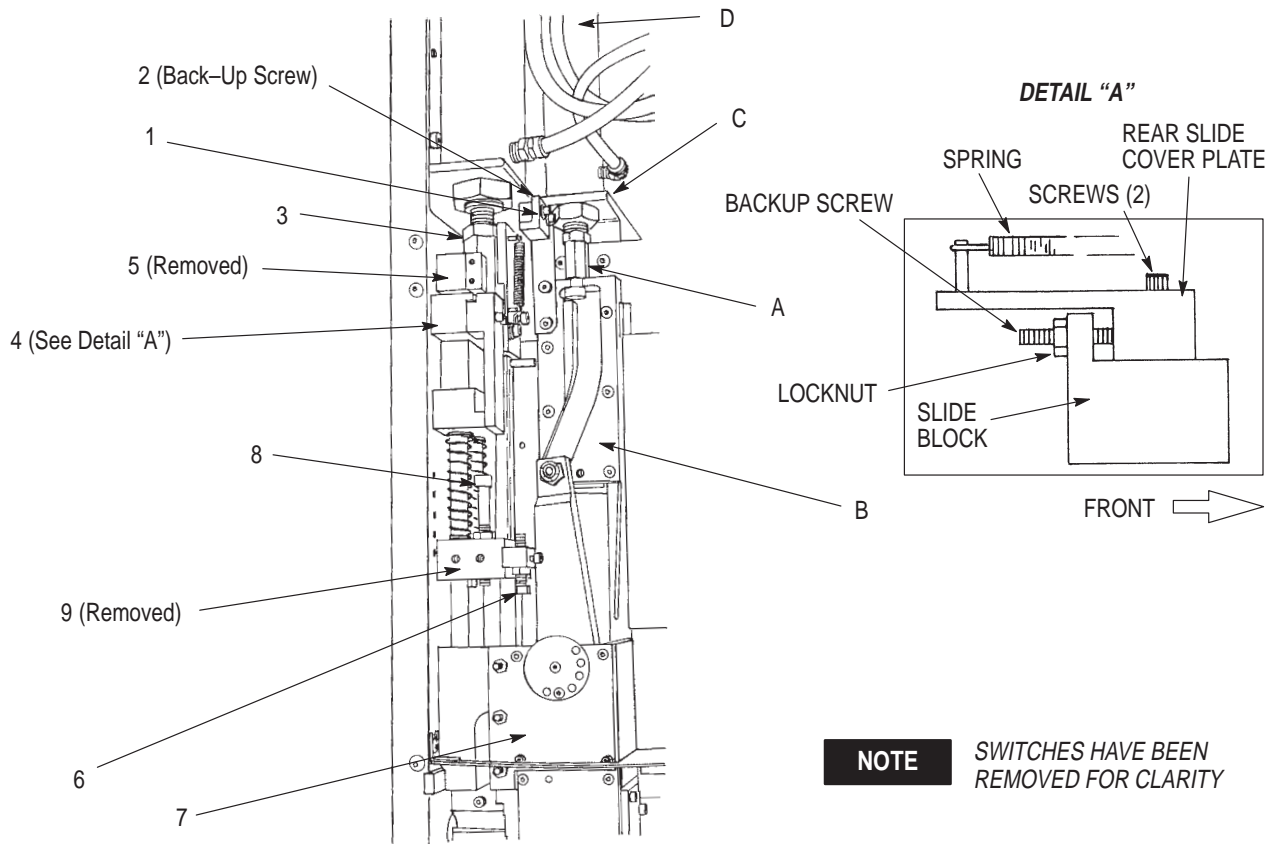


Figure 6-3. Insertion Tube, Trim Blade, and Inserter Adjustment Locations

93-79

## 7. REPAIRS AND REPLACEMENT

This section is limited to minor repairs, and the replacement of recommended spare parts that are the customer's responsibility to stock and replace. Refer to the General Machine Policy in the front of this manual.

**DANGER** MAKE SURE that electrical power and air supply are disconnected BEFORE attempting to make any repairs or replace parts, unless otherwise specified.

### 7.1. Insertion Tube, Trim Blade, and Inserter Replacement (Figure 2-1)

Perform this procedure only to the extent of removing the part(s) requiring replacement. After replacing part(s), perform module check-out as described in Section 4 of this manual to assure that all adjustments are correct before operating module.

**NOTE** It may be necessary to remove the fixture or the module from the parent machine in order to provide the clearance necessary to remove the insertion tube.

1. Remove guard (if applicable) and front cover to gain access.
2. Remove two screws and tube lock bar from top of tube slide, then slide insertion tube forward and remove from the front of module.
3. After removal of the insertion tube, unlatch and remove the trim blade and inserter from the front of the module. To remove the trim blade on modules equipped with the bottom trim feature, the lower shear blades must be removed.
4. Replace part(s) using reverse order of removal.

## 7.2. Replacement of Upper Shear Blades

1. Remove ram cover from shear housing by removing four screws.
2. Remove upper shear blades from ram by removing two screws. Note orientation of shear blades for re-installation.
3. Install new upper shear blades using the reverse order of removal, and as noted in Step 2. Make sure that upper shear blades are pushed against top of ram and against the front of the ram.
4. Perform module check-out as described in Paragraph 4.2 before operating module.

## 7.3. Replacement of Lower Shear Blades

1. Remove insertion tube as described in Steps 1 and 2, Paragraph 7.1.
2. Remove two screws securing lower shear blades and spacer to shear housing, then lift out. Note orientation of lower shear blades for re-installation.
3. Install new lower shear blades using the reverse order of removal, and as noted in Step 2. BEFORE tightening screws, MAKE SURE that blades are properly seated and back against shear housing.
4. Replace insertion tube as described in Paragraph 7.1.
5. Perform module check-out as described in Paragraph 4.2 before operating module.

## 7.4. Feed Finger Replacement

1. Remove guard and front cover to gain access.
2. Remove upper strip guide plate from feed mechanism by removing three screws.
3. Remove lower strip guide plate by removing three screws.
4. To remove feed finger, push feed finger forward to compress spring and then remove the feed finger and block. BE CAREFUL not to lose the spring in front of feed finger block, and the spring under feed finger. Remove feed finger from pin.
5. Replace feed finger using the reverse order of removal. MAKE SURE that all springs are properly installed, and feed lever is properly engaged.
6. Perform module check-out as described in Paragraph 4.2 before operating module. Make any adjustments necessary as described in Section 6.

## 7.5. Electrical System Repairs

If necessary to make repairs to electrical system, refer to electrical assembly drawings supplied with module. If any switches are replaced, make adjustment as described in Section 6.

## 7.6. Pneumatic System Repairs

If necessary to make repairs to pneumatic system, refer to the assembly drawing supplied with the module.

## 8. REVISION SUMMARY

Since the previous release of this customer manual, the following changes and additions were made:

Per EC M-2993:

- Changed manual name from "AMP Magnet Wire Interconnection Machine Modular Assembly."
- Updated text and illustrations to reflect current assembly.
- Deleted references to specific Modular Assembly part numbers.

Per EC 0990-0252-93:

- Updated format to current standard.
- Changed revision level to Rev B.