

AMP

***customer
manual***



AMP* Mylar† Strip Miniature Spring Socket
Insertion Heads 813960-[]

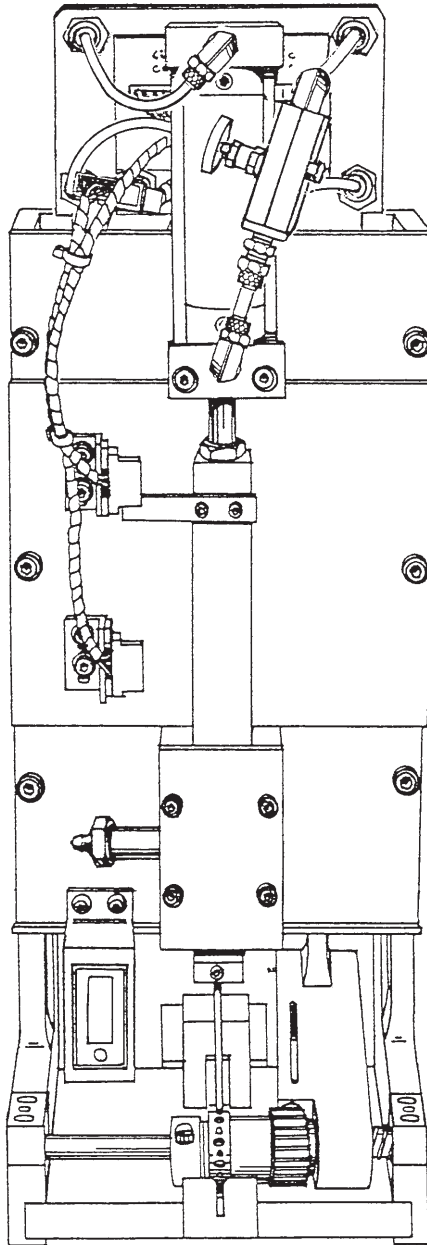
Customer Manual

409-5737

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customer manual

Prepared by
Corporate Standards and Technical Publications
AMP Incorporated
P.O. Box 3608
Harrisburg, PA 17105-3608



Frontispiece: AMP Mylar Strip Miniature Spring Socket Insertion Head 813960-[]

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 Incorporated 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

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1. INTRODUCTION

AMP Mylar Strip Miniature Spring Socket Insertion Heads 813960-[] (see Frontispiece) insert AMP miniature spring sockets into printed circuit (pc) boards from Mylar carrier strip. Except for differences to accommodate the various socket sizes, all heads are identical. Figure 1-1 summarizes the sockets inserted by the heads and includes the pc board hole diameter required for each. Consult AMP Engineering for specific socket part numbers.

NOTE

All dimensions on this sheet are in metric units [with U.S. customary equivalent units in brackets.]

HEAD PART NUMBER	SOCKET SERIES	STRIP GUIDE	PC BOARD HOLE DIA mm [INCHES]	SOCKET STRIP PART NUMBER	
				With Sealant	Without Sealant
813960-1	I LONG I SHORT	809809-1 809809-6	1.066 ± .08 [.042 ± .003]	645949 645947	645950 645948
813960-2	II LONG II SHORT	809809-2 809809-7	1.32 ± .08 [.052 ± .003]	645955 645953	645946 645954
813960-3	III LONG III SHORT	809809-3 809809-8	1.57 ± .08 [.062 ± .003]	645986	645990
813960-4	IV LONG IV SHORT	809809-4 809809-9	1.82 ± .08 [.072 ± .003]	645501	645502
813960-5	V LONG V SHORT	809809-5 1-809809-0	2.56 ± .08 [.101 ± .003]	645991	645979
1-813960-1	(SAME AS -1 EXCEPT FOR 5.08 mm [.200 IN.] DIA INSERTER FOOTPRINT)				

NOTE: TWO STRIP GUIDES (809809) ARE INCLUDED WITH ALL INSERTION HEADS. SEE TABLE ABOVE FOR PROPER USE.

Figure 1-1. Heads/Product/Hole Sizes

AMP Mylar Strip Miniature Spring Socket Insertion Heads are part of the AMP Fixed Head Insertion System, a series of product insertion applicators designed for use on the AMP Comp-U-Sertor Machine.

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

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

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

NOTE Highlights special or important information.

For information beyond the scope of this manual, contact your local AMP field service engineer or AMP:

TOOLING ASSISTANCE CENTER
1-800-722-1111
(Continental United States and Puerto Rico Only)

1.1. Specifications

Height: 445 mm [17 1/2 in.]

Depth: 178 mm [7 in.]

Width: 149 mm [5 7/8 in.]

Weight: 20.6 kg [45 1/2 lb]

1.2. Additional AMP Documentation

This manual is limited to the miniature spring socket insertion heads listed in Figure 1-1. Additional information on the Comp-U-Sertor machine, bench machine, and sockets may be found in the following AMP publications:

- **Customer Manuals**

409-5375 AMP Fixed Head Insertion System Bench Machine

409-5691 AMP Comp-U-Sertor Machine

- **Application Specification**

114-26004 Application of Bullet Nose and Flat Bottom Miniature Spring Sockets on Mylar Strip

Copies of any of these publications may be obtained from your local AMP representative or by calling:

AMP FAX 1-800-522-6752

2. DESCRIPTION

2.1. Physical Description (Figure 2-1)

The insertion head is air operated and electrically controlled. The head is mounted on the machine frame by two gibs, and is functionally linked to it by four air line connections and an electrical connector. Two air cylinders control the feeding and insertion of sockets. Solid state magnetic vane switches, which are actuated by extension or retraction of the air cylinders, signal to the machine the state of each cylinder.

The insertion cylinder, in the upper front, extends to insert the socket. A ram drives the socket down through the slide assembly, which provides support and guidance for the socket. The ram is guided by a bushing, and the strip of sockets is fed beneath it. When the insertion cylinder extends, the ram pushes the socket through the two guides in the slide assembly. O-rings hold the guides together at the bottom. As the socket passes through the guides, they are forced apart to allow the socket to continue down to the pc board.

The feed cylinder, in the upper rear of the head, controls the feed. Feed is accomplished by a sprocketed feed wheel. The sprockets engage holes in the Mylar strip. The feed roller, attached to the feed cylinder by a connecting rod, rotates the feed wheel by means of a ratchet finger when the cylinder extends. The roller clutches in the feed wheel prevent the feed mechanism from rotating during the cylinder's retraction.

The strip of sockets is fed into the bottom rear of the head and through the drag housing. A spring-loaded drag lever maintains pressure on the strip to ensure proper feeding. The used Mylar strip is fed into a scrap tube that carries it to the rear of the machine.

A socket is inserted at the beginning of a head cycle. The next socket is fed at the end of a cycle. Each cycle, therefore, involves two sockets: one is inserted and the other is fed.

The lower tooling on the AMP Comp-U-Sertor Machine has an anvil that extends to support the board during insertion of the socket. On the bench machine, the lower tooling is fixed; it contains an air-supported locator pin which is used to position the board holes under the insertion ram.

2.2. Functional Description

This section describes a cycle of the head. It assumes that the head is properly mounted, loaded with sockets, and adjusted.

When the head is at rest between cycles, the insertion cylinder is retracted and the feed cylinder is extended. The insertion cylinder actuates the insert-rest switch; the feed cylinder actuates the feed-rest switch. A socket, which was fed forward during the previous cycle, is positioned under the ram.

NOTE

The state of an air cylinder (extended or retracted) when the head is at rest between cycles is called the rest position. The switch actuated is the rest switch. The opposite state of the cylinder is the on position; and the related switch is the on switch.

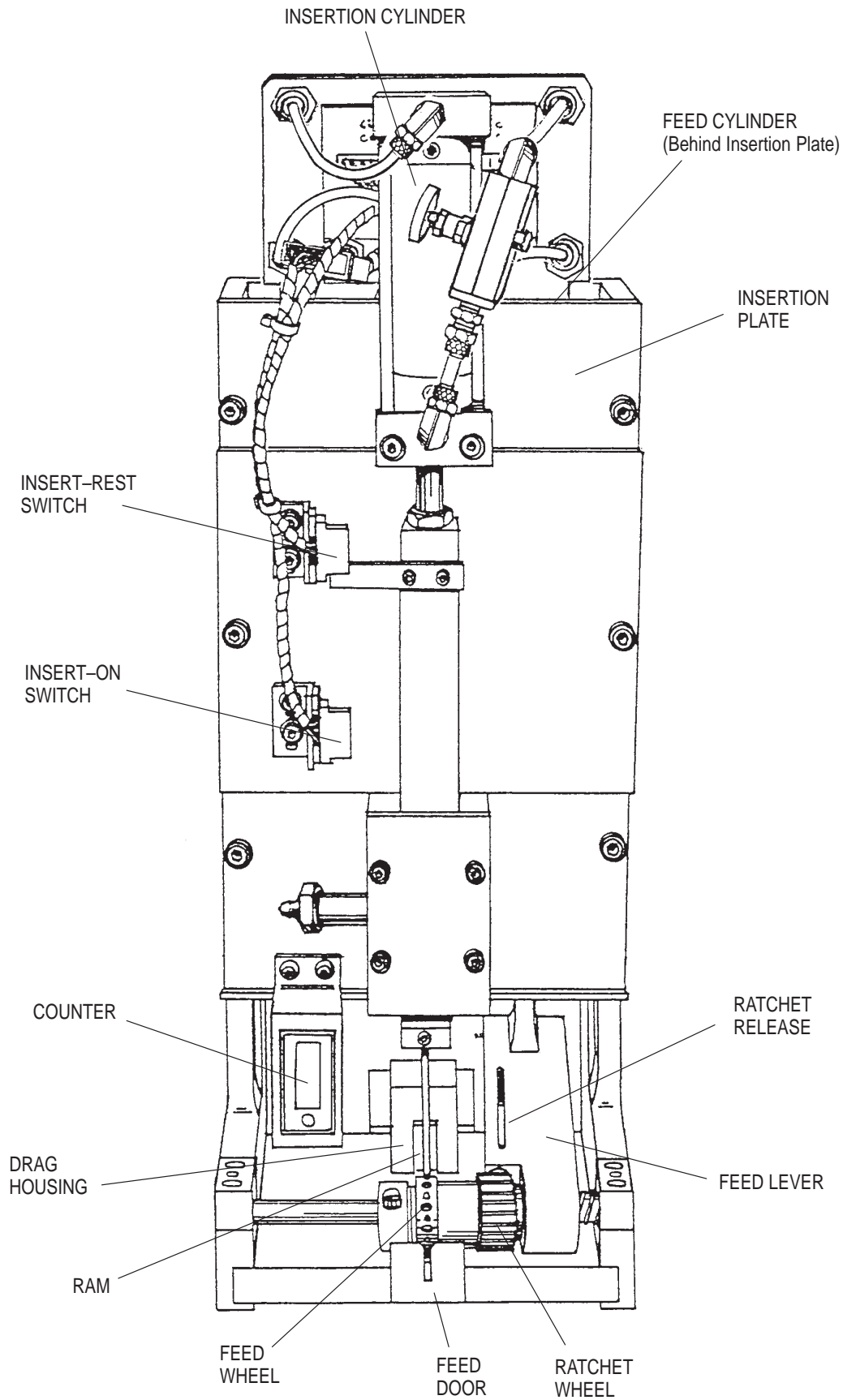


Figure 2-1. Component Identification

93-250

When a head-cycle signal is issued, the lower tooling on the Comp-U-Sertor Machine extends the anvil to support the board and air is sent to extend the insertion cylinder. The ram drives the socket down into the pc board. At the bottom of the cylinder's stroke, the cylinder actuates the insert-on switch. Air to the cylinder is reversed. The insertion cylinder, the lower tooling cylinder, and the feed cylinder retract. The retracted insertion cylinder actuates the insert-rest switch. The retracted feed cylinder actuates the feed-on switch.

After all the cylinders are retracted, the table of the machine moves to the next insertion position. At the same time, the feed cylinder extends, feeding another socket under the ram. When the feed cylinder is extended and is actuating the feed-rest switch, the cycle is complete.

Figure 2-2 is a sequence diagram for the head.

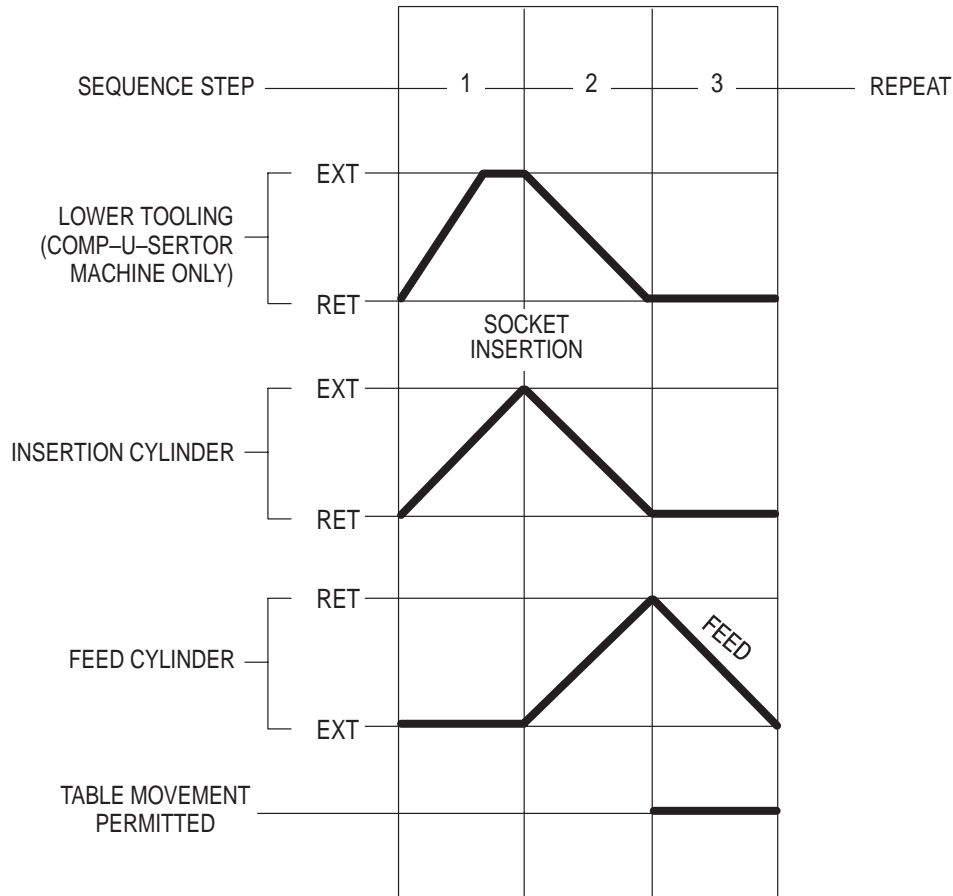


Figure 2-2. Sequence Diagram

200-101E

2.3. Head Sequence

The following are the three steps in the head cycle (including the lower tooling).

<u>STEP</u>	<u>ACTION</u>
1.	Lower tooling on and insert on.
2.	Lower tooling off, insert off, feed on.
3.	Feed off (with table movement).

The lower tooling step is not part of the sequence on the bench machine. The sequence for the bench machine is:

<u>STEP</u>	<u>ACTION</u>
1.	Insert on.
2.	Insert rest.
3.	Feed on.
4.	Feed rest.

3. BOARD REQUIREMENTS AND PRODUCT APPLICATION

Sockets may be inserted into boards already containing other components. These components, however, must not interfere with table movement or the actual insertion of sockets. Each insertion head and lower tooling has its own particular "footprint" that defines a clearance envelope that must be maintained around the board hole. The envelope allows access for the inserter and lower tooling anvil when they extend.

CAUTION

Components within the envelope will be hit by the tooling, damaging the components, board, or tooling. The height of components must also be considered: overly-tall components will strike the head when the table moves.

The minimum center-to-center spacing for the socket holes is 2.54 mm [.100 in.] or 5.08 mm [.200 in.] in both X and Y axes — 2.54 mm X 2.54 mm [.100 by .100 in.] or 5.08 mm X 5.08 mm [.200 in. by .200 in.] — depending on which socket series is being used.

Figure 3-1 shows the details of the footprint for the inserter and lower tooling. Notice that the lower tooling footprint differs somewhat for the bench machine and Comp-U-Sertor Machine.

4. HEAD INSTALLATION AND SOCKET LOADING AND UNLOADING

4.1. Head Installation

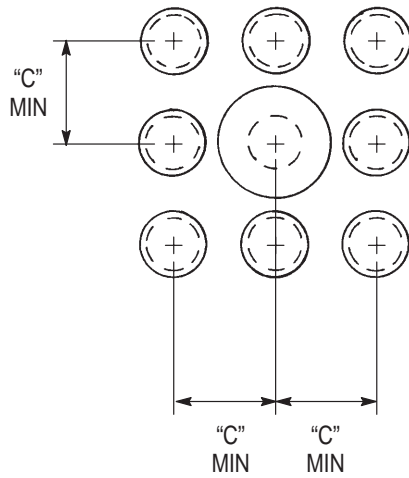
The following is the procedure for mounting the head to the machine.

1. With the two screws on the lower gib loosened, slide the insertion head over the gibs on the machine frame.
2. Tighten the two screws to secure the lower head gib.
3. Connect the four air lines.
4. Plug in and secure the electrical connector from the machine. The connector is polarized to prevent improper mating.

CAUTION

Never connect or disconnect the electrical connector with the power "on." Doing so could damage the electronics.

5. Check the head and lower tooling X-Y alignment. See Paragraph 6.1 of this manual for the procedure and, if required, adjustments.
6. Check the lower tooling height adjustment. See Paragraph 6.3 for the procedure.
7. Check the head height adjustment. See Paragraph 6.6 for the procedure.



MYLAR STRIP MINIATURE SPRING SOCKET PRODUCT	"A" DIM. mm [In.]	"B" DIM. mm [In.]	"C" DIM. mm [In.]
Series I, II, and III	6.604 [.260]	7.620 [.300]	2.540 [.100]
Series IV and V	8.128 [.320]	9.194 [.362]	5.08 [.200]

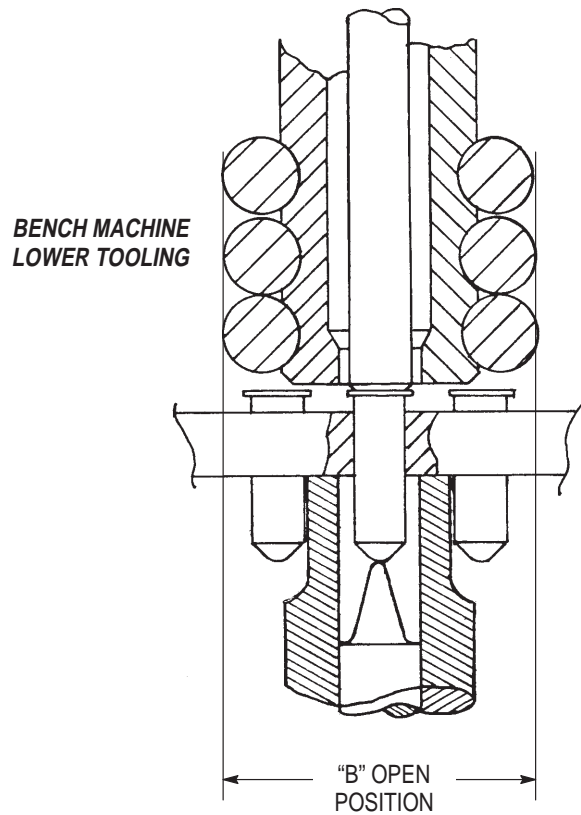
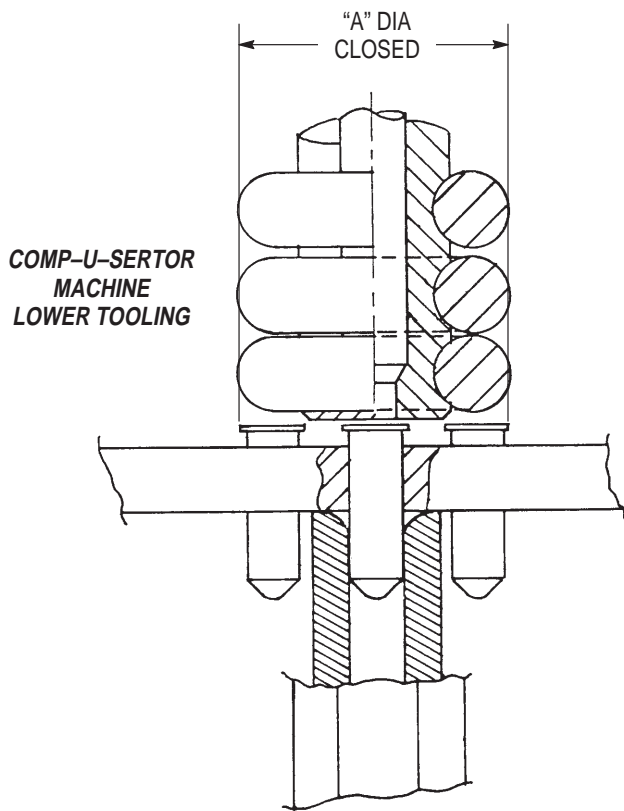


Figure 3-1. Tooling Footprint and Board Layout

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4.2. Socket Loading (Figure 4-1)

The following is the procedure for loading the head with a strip of sockets:

1. Place a reel of sockets on the reel holder. The hole in the reel must fit on the stud of the brake. The sockets must unreel from the rear.
2. Secure the reel with the flange. Tighten the thumbscrew.
3. Open the feed door by pulling it down.
4. Remove the first three inches of sockets from the strip.
5. Press down on the drag lever and feed the strip into the head and through the drag housing and strip guide until it emerges at the feed door.
6. Pull outward and upward on the strip until the sprockets on the feed wheel engage the holes on the strip.

CAUTION *Make sure that the sprockets engage the feed holes and not the socket hole.*

7. Close the feed door.

NOTE *Make sure that the empty strip enters the scrap tube during head operation.*

8. Hand cycle to ensure proper feed before operating under power.

4.3. Socket Unloading (Figure 4-1)

1. Open the feed door.
2. Cut the used strip between the head and the scrap tube.
3. Pull down on the strip to disengage it from the feed wheel.
4. Push down on the drag lever and pull the strip out the back of the head.
5. Close the feed door.
6. Rewind the reel.

5. PREVENTIVE MAINTENANCE

Preventive maintenance consists of cleaning, inspecting, and lubricating the insertion head. A program of regular, scheduled maintenance ensures efficient operation of the head, with minimum downtime. The maintenance schedule recommended here is based upon typical operating conditions. It may be necessary to adjust the schedule to suit your operating conditions, especially if experience shows that lubrication is required more often.

DANGER *Always turn off the electrical power and air supply to the head when performing maintenance.*

5.1. Cleaning and Inspection

The insertion head must be cleaned and inspected regularly, as follows:

A. Daily or Every 100,000 Cycles

1. Check the scrap tube for restrictions twice each shift.
2. Use a soft-bristled brush to remove dirt and other contaminants from within the head.
3. Use a dry air supply to blow any metal particles from within the head.

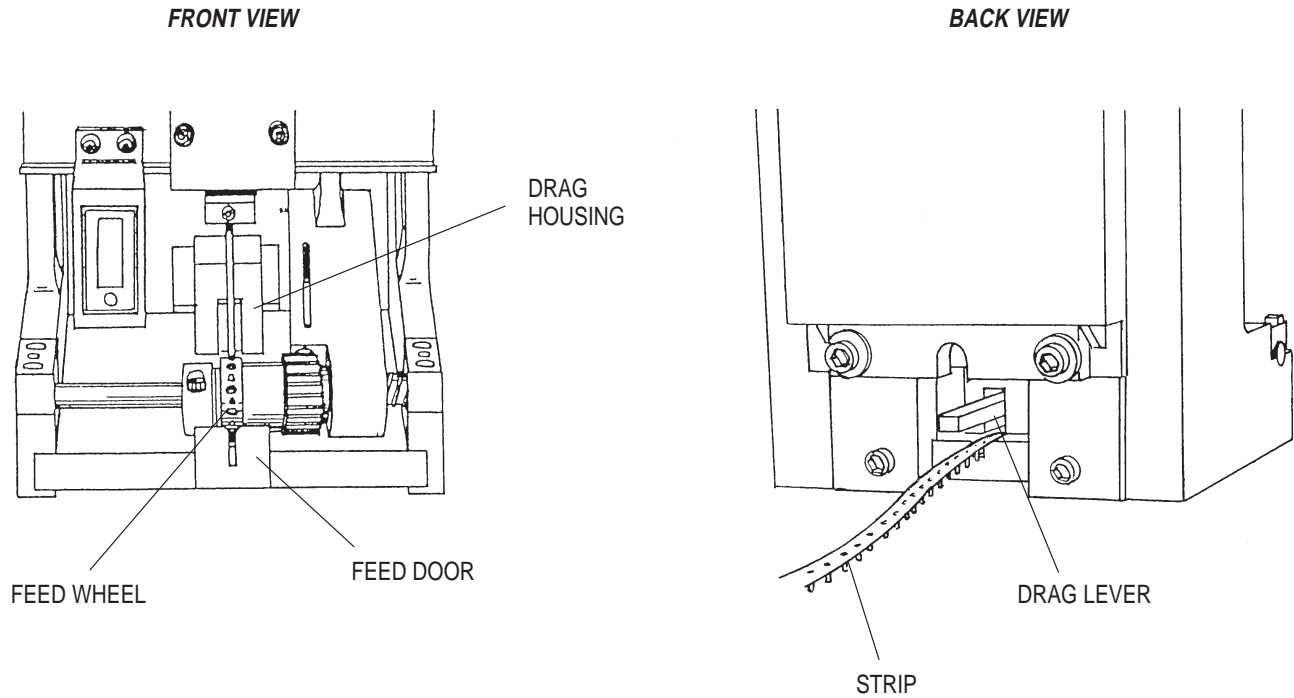


Figure 4-1. Socket Loading and Unloading

93-253

DANGER

Compressed air used for cleaning must be reduced to less than 207 kPa [30 psi], and effective chip guarding and personal protective equipment (including eye protection) must be used.

B. Weekly or Every 700,000 Cycles

1. Inspect all screws and nuts for tightness.
2. Check the adjustment of the magnetic vane switches. Adjust them if necessary. Refer to Paragraph 6.7 for the procedure.

C. Monthly or Every 3,000,000 Cycles

1. Partially disassemble the head and check sliding surfaces, inserter assembly, and air lines for wear or damage.

NOTE

The presence of metal particles within the head indicates misaligned parts or the need for lubrication.

2. Replace any worn, damaged, or missing parts.
3. Before reassembling the head, thoroughly clean the parts with a commercially available solvent which will not affect paint or plastic materials, then lubricate the parts. See Paragraph 5.2 for lubrication instructions.
4. Make any necessary adjustments before operating the head.

5.2. Lubrication

Proper and regular lubrication is essential to head operation. To keep the head operating efficiently, it is as important not to overlubricate it as it is to lubricate it properly. The following lubrication schedule is based on a 24-hour running time or 100,000 cycles. Thus, if the head operates three shifts a day, it should be lubricated every day. If it operates one shift a day, it should be lubricated every third day (unless it runs 100,000 cycles first). Finally, check to see if the specific operating conditions require any adjustment in lubrication frequency.

If the head has not been operated for several days, a good policy is to lubricate it before placing it in operation.

Experience shows that the best results are obtained by using the following lubricants:

9102 Syntemp●

Almagard 3751●

Figure 5-1 is a list of parts requiring lubrication. The following symbols are used as a key to lubrication requirements:





9102 Syntemp applied as a thin coating



Almagard 3751 applied with a grease gun to the two grease fittings

After lubrication, wipe off any excess lubricant with a clean, dry cloth.

LUBRICATION SYMBOL	PART NUMBER	DESCRIPTION
(oil spray) 	804158-1	Feed Wheel
(grease) 	804159-1	Insertion Slide
	804161-1	Insertion Slide Housing
	804162-1	Feed Slide
	804167-1	Housing Cover Plate
	804184-1	Slide Plate
	804185-1	Feed Slide Housing■

■ Use a grease gun if your insertion head has grease fittings.

Figure 5-1. Parts To Be Lubricated

6. ADJUSTMENTS

The following adjustments may be necessary during normal service or after the head has been taken apart and reassembled.

DANGER Unless instructed otherwise during a procedure, ALWAYS turn off the electrical power and air supply when making an adjustment.

6.1. Head and Lower Tooling Alignment on an AMP Comp-U-Sertor Machine

This section describes the procedure for aligning the head and lower tooling on the Comp-U-Sertor Machine. The head can be aligned to the lower tooling in the Y (in/out) axis only.

● Lubrication Engineers, Inc. Fort Worth, TX 76111

DANGER

Disconnect air supply at the valve located on the rear of the machine.

1. Load product and hand-cycle the head to properly feed a socket into position under the ram.
2. Manually extend the lower tooling cylinder.
3. Manually extend the ram until a socket begins to exit the guide tubes.
4. Move the head to bring the tip of the socket into proper alignment with the lower tooling tip.
 - a. Loosen the two screws on the lower head gib.
 - b. Use a rubber mallet to move the head as necessary.
 - c. Tighten the two screws on the lower head gib and recheck alignment.
5. If the lower tooling tip is not properly aligned with the socket in the X Axis:
 - a. Loosen the four screws which mount the cylinder.
 - b. Adjust as necessary.
 - c. Tighten the screws cross corner to ensure the cylinder does not tilt.
6. Retract the ram and lower tooling cylinders.

6.2. Head and Lower Tooling Alignment on an AMP Bench Machine

The head can be aligned to the lower tooling in the x axis only.

DANGER

Disconnect air supply at the valve located on the rear of the machine and disconnect electrical power.

1. Load product and hand-cycle the head to properly feed a socket into position under the ram.
2. Manually extend the ram until a socket begins to exit the guide tubes.
3. Move the head to bring the tip of the socket into proper alignment with the lower tooling locator pin.
 - a. Loosen the two screws on the lower head gib.
 - b. Use a rubber mallet to move the head as necessary.
 - c. Tighten the two screws on the lower head gib and recheck alignment.
4. If the lower tooling locator pin is not properly aligned with the socket in the Y Axis:
 - a. Loosen the four screws securing the two clamps.
 - b. Move the anvil as necessary to align the tip of the socket to the tip of the locator pin.
 - c. Tighten the four screws to secure the clamps and recheck alignment.

6.3. Lower Tooling Height Adjustment on a Comp-U-Sertor Machine

DANGER

Disconnect air supply at the valve located on the rear of the machine and disconnect electrical power.

1. Manually position the table to place the lower tooling tip in one of the corners of the workboard holder.
2. Manually extend the lower tooling cylinder shaft.
3. Place a straight edge "cross corner" on the workboard holder above the lower tooling tip.
4. The lower tooling tip must be level with the top of the workboard holder. If adjustment is necessary:
 - a. Loosen the jam nut on the cylinder shaft.
 - b. Rotate the lower tooling tip CLOCKWISE to lower or COUNTERCLOCKWISE to raise.
 - c. Tighten the jam nut and recheck adjustment.
 - d. Manually retract the lower tooling cylinder shaft.

NOTE

There is no adjustment of the Lower Tooling Height on an AMP Bench Machine. The board support must be adjusted so the board is level when held by the board support and resting on the anvil.

6.4. Ram Adjustment (See Figure 6-1)

When the insertion cylinder is fully extended, the ram must extend out of the guide tubes 0.13 mm – 0.25 mm [.005 in.–.010 in.]. This ensures that the socket fully clears the end of the guide tubes.

DANGER *Disconnect air supply at the valve located on the rear of the machine.*

1. Manually extend the ram the full length of the cylinder stroke.
2. Check the distance the ram extends out of the guide tubes. If adjustment is necessary:
 - a. Loosen the jam nut on the insertion cylinder shaft.
 - b. Turn the cylinder shaft into or out of the the clevis until the ram extends out of the guide tubes 0.13–0.25 mm [.005–.010 in.]:
 - **into** the clevis to **decrease** the distance;
 - **out of** the clevis to **increase** the distance;

NOTE *Between adjustments, always retract the air cylinder then re-extend.*

- c. Tighten the jam nut on the cylinder shaft.
3. Extend the ram again to verify adjustment.

6.5. Feed Adjustment (See Figure 6-2)

1. Unload the product strip from the head.
2. Cut the Mylar strip directly in front of the first socket and retain the strip for evaluation.
3. Remove approximately 150 mm [6 in.] of sockets from the strip. (These sockets may be used for rework or repair.)

NOTE *Using empty Mylar strip eliminates the possibility of a product jamming the head during this adjustment.*

4. Load the empty strip into the head as described in section 4.2, Socket Loading.
5. After hand-cycling the feed cylinder, manually extend and then retract the insertion ram.
6. Completely hand-cycle the head several times then unload the strip and compare it to the strip removed in Step 2. Does the feed appear to be the same?
 - **No** Feed adjustment may not be required. Look into other possibilities.
 - **Yes** Determine if the strip is under- or over-fed and adjust as follows:
 - a. Loosen the two jam nuts on the feed connector rod.
 - b. Turn the connector rod into or out of the rod end bearings:
 - **into** will **decrease** the feed;
 - **out of** will **increase** the feed;
 - c. Tighten the two jam nuts on the feed connector rod.
 - d. Mark the Mylar strip for a position reference and load into the head.
 - e. Repeat steps 5 and 6 until feed is proper. Hand-cycle the head until sockets are ejected and verify that the feed is still proper.

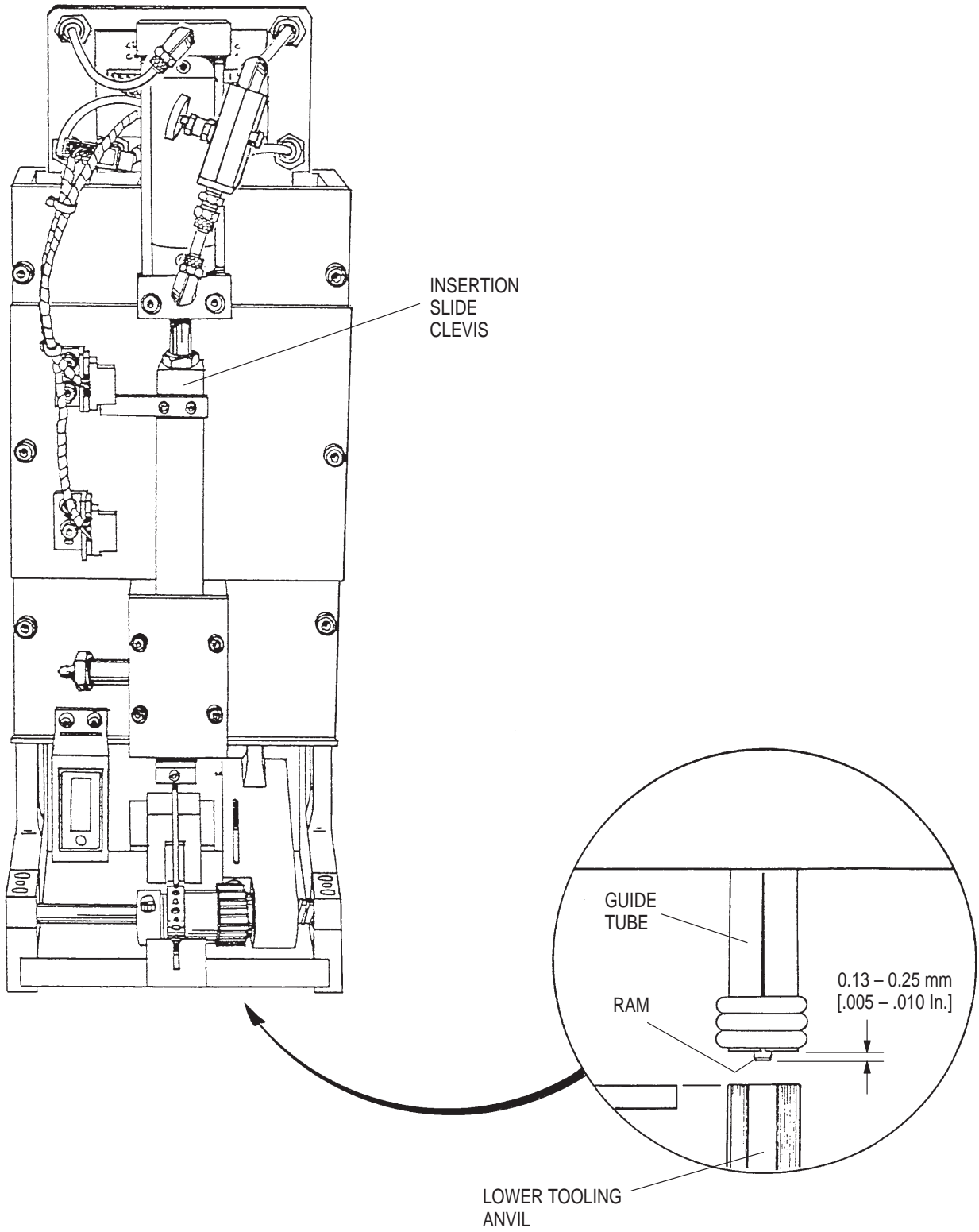


Figure 6-1. Ram Adjustment

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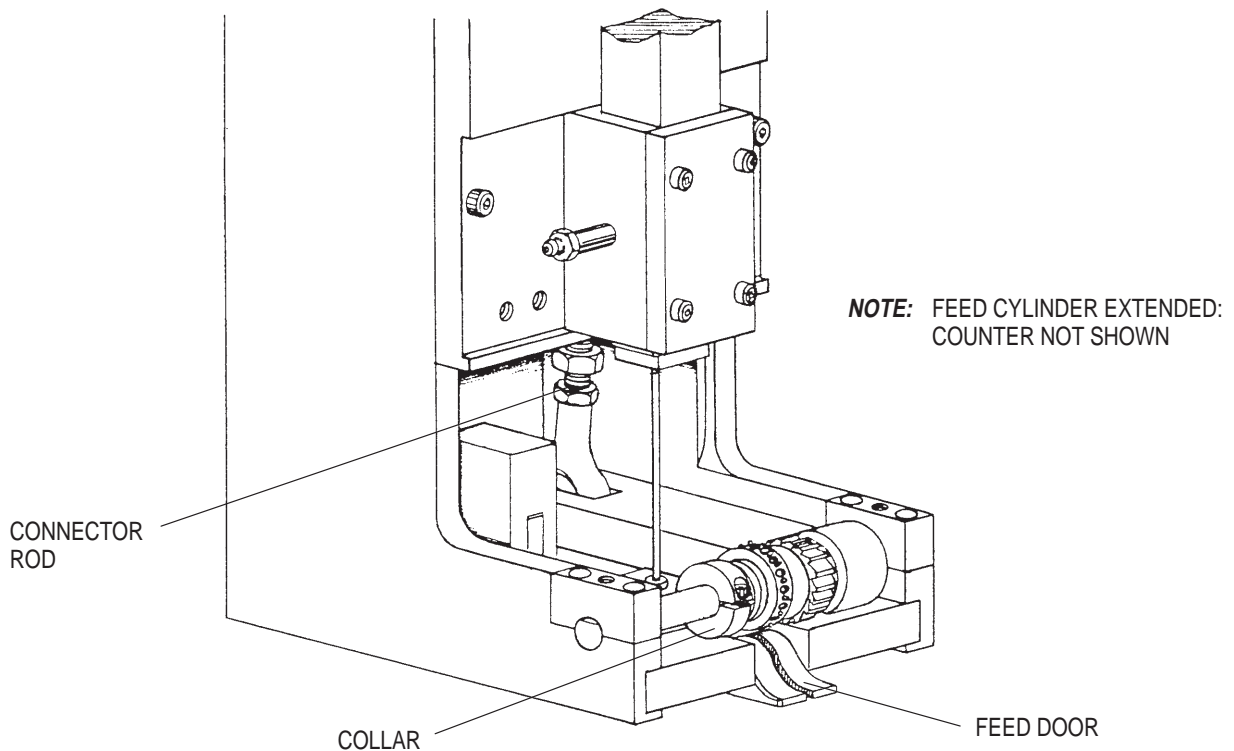


Figure 6-2. Feed Adjustment

93-258

6.6. Head Height Adjustment (Figure 6-3)

The height of the head above the board determines the insertion depth of the sockets. When a socket is correctly inserted, its top should be 0.56 – 1.14 mm [.022 – .045 in.] above the board. In making the head height adjustment, use a nominal socket height of 0.84 mm [.033 in.]. Before making this adjustment, perform the ram adjustment (Paragraph 6.4) and the feed adjustment (Paragraph 6.5).

CAUTION

NEVER extend the insertion cylinder under power when the board holding fixture is directly under the ram. If the ram strikes the fixture, the ram and guide tubes may be badly damaged.

A. On the Comp-U-Sertor Machine:

1. Turn the machine power switch to OFF.
2. Manually extend the ram and remove the socket from the guide tubes, then retract the ram.
3. Manually extend the lower tooling cylinder.
4. Place the printed circuit board to be used on the board holding fixture and position the board under the ram.
5. Manually extend the ram and check for the nominal dimension of 0.84 mm [.033 in.] between the ram and the top of the printed circuit board, then retract the ram.

To **INCREASE** the gap:

- a. Ensure that the head height adjustment screw is down against the upper head gib.
- b. Loosen the six hex head bolts securing the adjustment plate to the head.
- c. Lift up on the head and slide the appropriate shim stock between the head height adjustment screw and the upper head gib.
- d. Gently lower the head onto the shim stock and tighten the six screws to secure the head to the adjustment plate.
- e. Remove the shim stock and ensure that the head height adjustment screw is once again against the upper head gib.

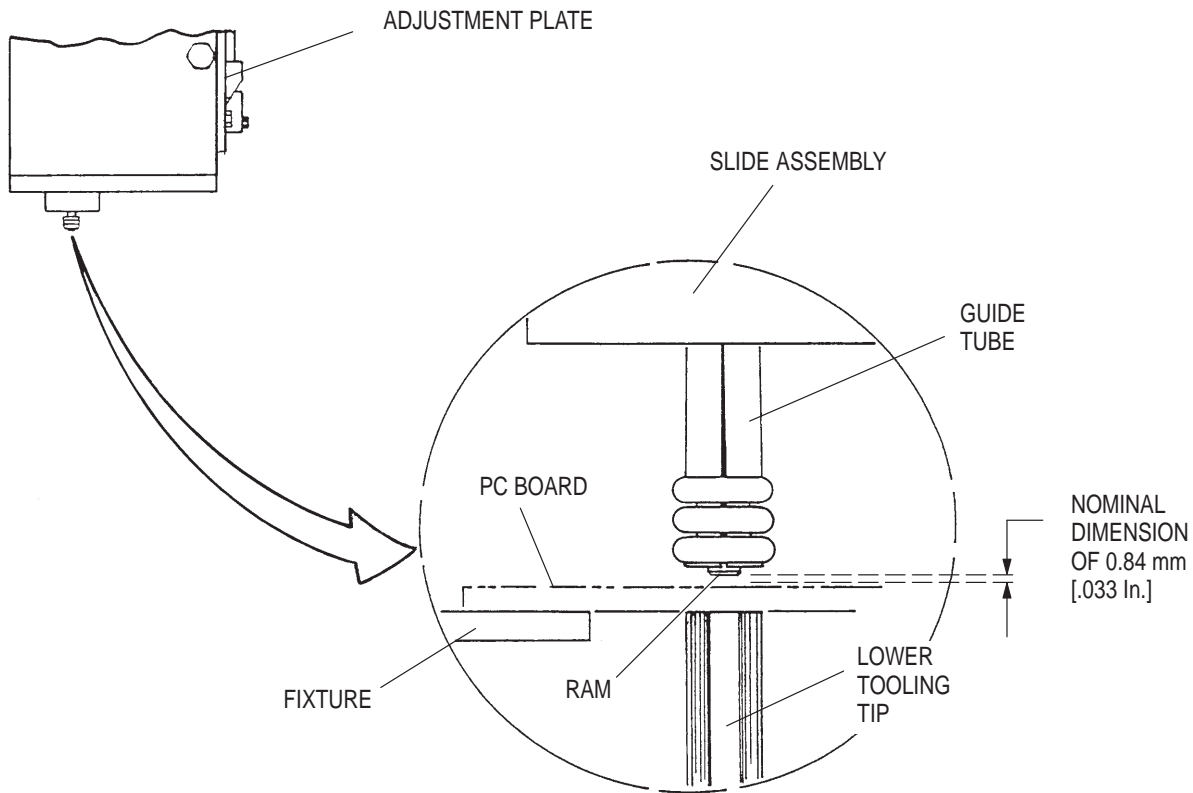


Figure 6-3. Head and Lower Tooling Height Adjustment

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To **DECREASE** the gap:

- a. Ensure that the six hex head bolts are securing the adjustment plate to the head.
 - b. Insert the appropriate shim stock between the head height adjustment screw and the upper head gib. Remove the shim stock, creating an air gap of the desired decrease.
 - c. Loosen the six hex head bolts securing the adjustment plate to the head.
 - d. Ensure that the head dropped and the adjustment screw is now against the upper head gib.
 - e. Tighten the hex head bolts securing the head to the adjustment plate.
6. Turn the machine ON and cycle the head using MANUAL INSERT until sockets are ejected.
 7. Insert several sockets into the printed circuit board and check for proper insertion. Make further adjustments to the head height as necessary.

B. For Head Height Adjustment on the AMP Bench Machine:

1. Remove air using the valve located on the rear of the machine.
2. Manually extend the ram and remove the socket from the guide tubes, then retract the ram.
3. Place the printed circuit board to be used in the board support and rest it on the anvil.
4. Manually extend the ram and check for the nominal dimension of 0.84mm [.033 in.] between the ram and the top of the printed circuit board.
5. If adjustment is required, the procedure is the same as described for the Comp-U-Sertor Machine.
6. Insert several sockets into the printed circuit board and check for proper insertion. Make further adjustments to the head height as necessary.

6.7. Switch Adjustment (Figure 6-4)

The vanes should actuate the switches when the air cylinders are fully extended or retracted. The switches are mounted through elongated holes. To adjust a switch, simply loosen its mounting screws, move the switch until it is actuated by the vane, and tighten the mounting screws.

CAUTION

Never connect or disconnect electrical connectors with the power "on." Doing so could damage the electronics in the interface.

AMP Switch Test Box 806757-1 aids in checking switch adjustments. The battery-operated test box has an ON/OFF switch and a light-emitting diode (LED) that indicates the state of the switch. The following is the procedure for adjusting switches with the test box.

1. Unhook the white connector on the switch assembly to be adjusted.
2. Connect the test box connector to the switch assembly.
3. Turn the test box "on." When the vane is actuating the switch, the LED is "off." When the vane is not actuating the switch, the LED is "on."
4. Manually set the air cylinder to the required position (retracted or extended).
5. If the LED is still lit, loosen the switch mounting screws, move the switch until the LED goes "out," and tighten the mounting screws.
6. Turn the test box "off" and disconnect it.
7. Reconnect the white connector to the switch.

NOTE

To reach the feed-rest and feed-on switches, the insertion plate must be removed.

NOTE

Switch adjustments can also be made by using the LEDs on the input CPC board on the Comp-U-Sertor Machine controller drawer. Adjust the switch to light the appropriate LED on the input CPC board.

6.8. Feed Alignment (Figure 6-2)

The sprockets on the feed wheel must be in line with the holes in the carrier strip. The feed mechanism is held in alignment by spring pressure pushing the parts against a shaft collar. If the feed wheel is not correctly aligned with the carrier strip, loosen the collar, move the parts of the feed mechanism to bring the feed wheel in-line with the holes in the carrier strip, and secure the collar.

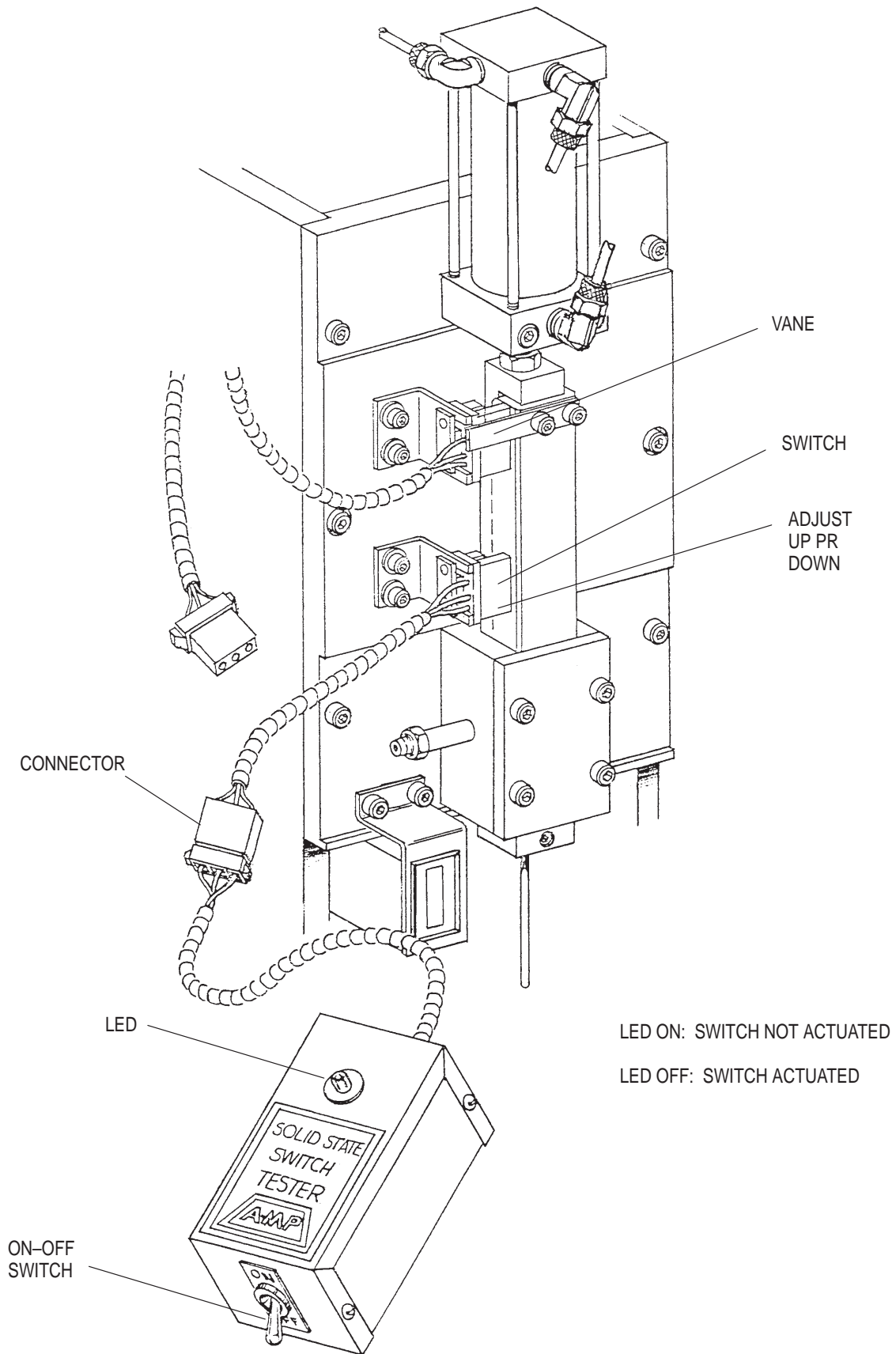


Figure 6-4. Switch Adjustment

93-254

7. PARTS REPAIR AND REPLACEMENT

Figure 7-1 is a list of spare parts which the customer should keep in stock. These are wear items that should be stocked for immediate availability when replacement is required. For insertion head 813960-[], refer to the assembly drawings that are shipped with the head. When ordering parts, specify the part number, part description, and quantity desired.

PART NUMBER	DESCRIPTION
568645-1	RAM (-1 Head)
568645-2	RAM (-2 Head)
568645-3	RAM (-3 Head)
568645-4	RAM (-4 Head)
568645-5	RAM (-5 Head)
808908-1	PACKAGE, Inserter Guide (-1 Head)
19256-1	O-RING (-1, -2, and -3 Head)
808908-2	PACKAGE, Inserter Guide (-2 Head)
808908-3	PACKAGE, Inserter Guide (-3 Head)
808908-4	PACKAGE, Inserter Guide (-4 Head)
808908-5	PACKAGE, Inserter Guide (-5 Head)
19256-2	O-RING (-4 Head)
19256-3	O-RING (-5 Head)
19843-3	AIR CYLINDER (Insert)
812073-1	AIR CYLINDER (Feed)
19042-6	SPRING, Guide Tube Return

Figure 7-1. Recommended Spare Parts

When replacing parts, use the assembly drawings shipped with the head as a guide for parts location and disassembly procedures. Be sure to clean and lubricate all sliding parts before re-assembly and to check all adjustments before operating the head.

The remainder of this section provides parts replacement procedures both for spare parts and for other parts that may require replacement. The procedures assume the head has been removed from the machine.

DANGER

Always turn off the electrical power and air supply when replacing parts or removing the head from the machine.

7.1. Ram Replacement

1. Remove two socket head screws that secure the insertion cylinder.
2. Slide the cylinder to the right, separating the cylinder clevis and the insertion slide.
3. Pull the insertion slide up and out of the slide housing.
4. Loosen the setscrew securing the ram to the ram holder.
5. Remove the old ram.
6. Push the top of the new ram up into the ram holder until it bottoms against the insertion slide.
7. Tighten the setscrew to secure the ram.
8. Insert the slide assembly into the slide housing. *Be sure the ram is located in the guide bushing.*
9. Re-install the insertion cylinder.

7.2. Guide Tube Replacement

CAUTION *Inserter guides must always be replaced in pairs.*

1. Remove the guide tube stop by removing four screws.
2. Remove O-rings from the subassembly.
3. Remove the subassembly from the guide tube stop. Be careful not to lose the spring.
4. Remove small dowel pins from the subassembly. Note relationship of guide tubes to the guide tube bushing.
5. Remove the old guide tube (one pair) from the guide tube bushing.
6. Install the new guide tube (one pair) in reverse order.
7. Replace the old O-rings with new O-rings.
8. Replace the guide tube stop and secure it with four screws.

7.3. Insertion Cylinder Replacement

1. Disconnect the two air lines where they mount at the top of the head.
2. Remove the two screws that secure the cylinder to the insertion plate.
3. Slide the cylinder and clevis to the right.
4. Remove the two elbows with their air lines and install them on the new cylinder.
5. Remove the clevis and jam nut and install them on the new cylinder. At this time do not tighten the jam nut.
6. Slide the new cylinder and clevis onto the insertion plate connecting it to the insertion slide.
7. Secure the cylinder to the insertion plate with the two screws. Make sure the slide moves freely before tightening the screws.
8. Connect the two air lines to the top of the head.
9. Perform the Ram Adjustment procedure described in Paragraph 6.4, Ram Adjustment.

7.4. Feed Cylinder Replacement

1. Disconnect the four air lines where they mount at the top of the head.
2. Disconnect vane switch connectors numbered 1 and 2.
3. Remove the six socket head cap screws that secure the insertion plate to the housing.
4. Slide the insertion plate up to expose the ram tip and lift away from the housing.

NOTE *Locate the wires attached to the rear of the counter. Make note of their location and disconnect.*

5. Manually retract the feed cylinder. The clevis should clear the feed slide housing.
6. Remove the two screws that secure the cylinder to the housing and slide the cylinder and clevis out of the housing.
7. Remove the two elbows with their air lines and install them on the new cylinder.
8. Before removing the clevis and jam nut, count the number of exposed threads above the nut on the cylinder shaft. Remove the clevis and jam nut and install them on the new cylinder to expose the same number of threads. At this time do not tighten the jam nut.
9. Slide the new cylinder and clevis into the housing connecting it to the feed slide.

10. Secure the cylinder to the housing with the two screws. Make sure the slide moves freely before tightening the screws.
11. Manually extend the feed cylinder and ensure that the rod end bearing does not hit the bottom housing plate. Adjust the cylinder shaft into or out of the clevis as necessary.
12. Connect the two air lines to the top of the head.
13. Reconnect the two wires to the counter and install the insertion plate. Ensure the plate rests against the dowel pin in the right side of the housing. Secure with the six socket head cap screws.
14. Connect the two air lines to the top of the head.
15. Connect the vane switch connectors.
16. Perform the Feed Adjustment described in Paragraph 6.5, Feed Adjustment.

7.5. Ratchet Finger Repair

If the tip of the ratchet finger becomes worn, it may be repaired by grinding it. Figure 7-2 shows the dimensions to use when grinding.

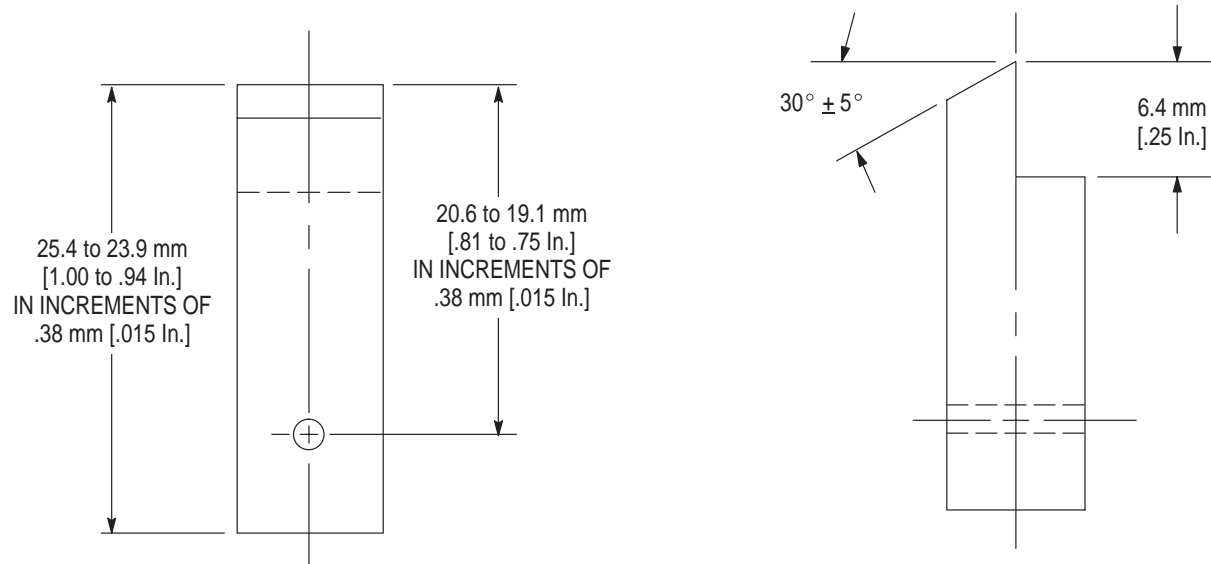


Figure 7-2. Ratchet Finger Grinding Dimensions

8. TROUBLESHOOTING

The following is a brief guide to aid in troubleshooting and isolating problems in the insertion head.

PROBLEM	ACTION
If sockets are inserted into the board either too deeply, or not deeply enough:	a. Check the head height (Paragraph 6.6). b. Check the lower tooling height (Paragraph 6.3). c. Check the hole sizes in the pc board to ensure that they conform to applicable specifications.
If sockets stick in the guide tube upon retraction of the ram:	a. Check the ram adjustment (Paragraph 6.4). b. Check the hole sizes in the pc board to ensure that they conform to applicable specifications.
If the sockets do not come out of the guide tube:	a. Check the Mylar strip to make sure that a splice has not torn. b. Look at the Mylar strip at the point at which it exits the head and check to see that the feed is correct. If the ram is not going through the center of the socket hole, adjust the feed (Paragraph 6.5). c. Remove the slide assembly and check for debris in the guides.
If a large percentage of sockets miss the hole:	a. Check the Mylar strip at the point at which it exits the head to see if the ram is going through the center of the hole. If not, adjust the feed (Paragraph 6.5). b. Check alignment of socket to hole. c. Check for broken or missing O-rings on the guide tubes.
If the sockets consistently miss the hole:	Check the head alignment (Paragraph 6.1).
If the cylinders hesitate between extension and retraction, or if the feed cylinder hesitates before acting:	Check the switch adjustments (Paragraph 6.7).
If the head stops in mid cycle:	a. Check for an insertion ram jam. b. Check the electrical and air line connections. c. Check the switch adjustments (Paragraph 6.7).