

AMP\* Miniature Spring Socket Insertion  
Hand Tool 58278-2, 59876-1, -2, and -3,  
59940-1, -2, -3, -4, and -5

409-5564  
1/88 Rev B

**AMP**



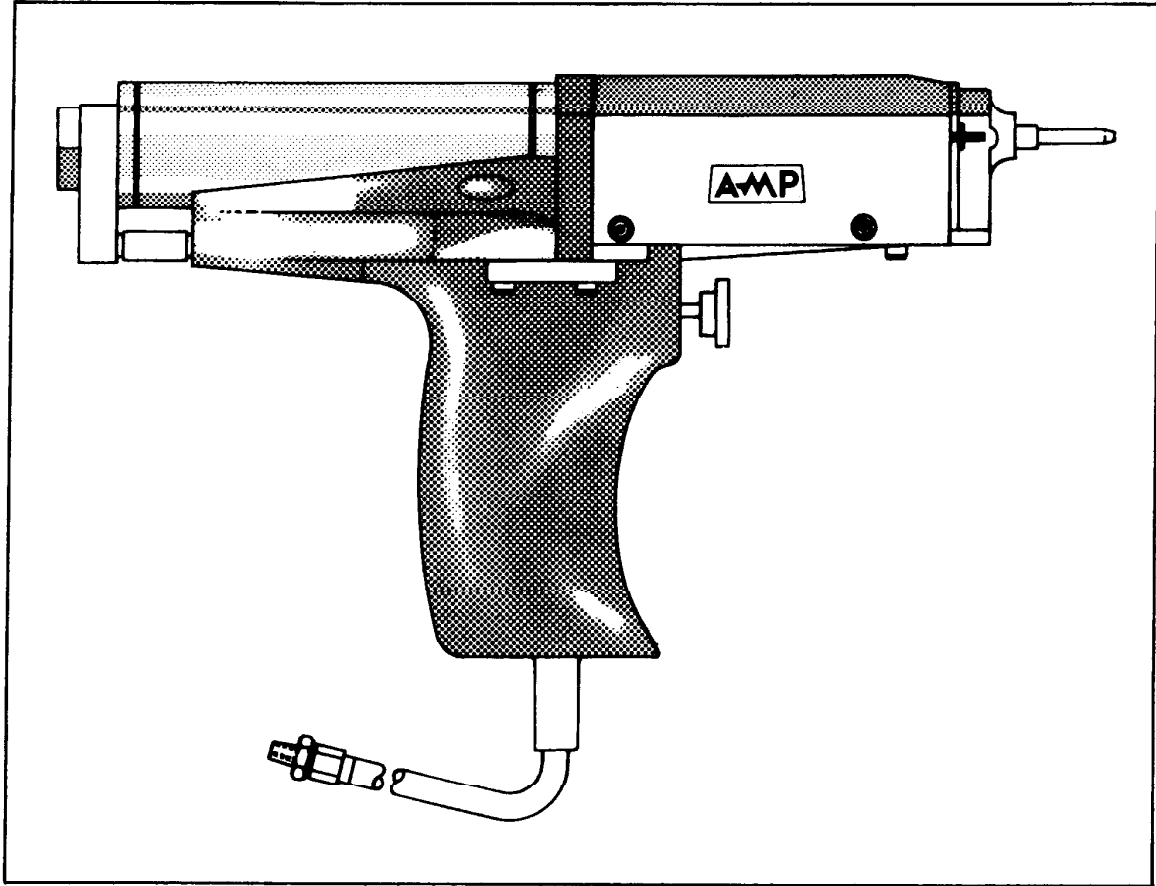
*customer  
manual*

**CM 5564**  
**Rev B**

**AMP\* Miniature Spring Socket**  
**Insertion Hand Tool**  
**58278-2**  
**59876-1, -2, and -3**  
**59940-1, -2, -3, -4, and -5**

**1/88**

**Prepared by  
Technical Publications,  
AMP Incorporated**



**Frontispiece. Miniature Spring Socket Insertion Hand Tool**

## WARNING

### SAFETY PRECAUTIONS PREVENT INJURY

Safeguards are designed into AMP tools to protect operators and maintenance personnel from hazards during normal tool operation. As with most tooling, certain precautions must be taken by the operator and repairman to avoid personal injury or damage to the tool. Carefully observe the following safety precautions before and during operation of the tool:

- ALWAYS disconnect air supply when performing any maintenance on the tool.
- ALWAYS keep fingers clear of product guide tube when operating the tool.
- ALWAYS be sure that the correct type and size product is used.
- NEVER allow air pressure to exceed 90 psi when operating tool.
- NEVER allow air pressure to exceed 90 psi when operating tool.
- NEVER allow air pressure to exceed 30 psi when cleaning tool with factory air.

#### CUSTOMER HOTLINE

#### TOOLING/PRODUCT SERVICE

**CALL TOLL FREE 1 800 722-1111**

**(CONTINENTAL UNITED STATES AND PUERTO RICO ONLY)**

### WARRANTY POLICY FOR AMP TOOLS

#### SCOPE

This policy states the warranty under which AMP hand tools are sold. "Tools" as used herein does not include interchangeable tooling.

Other terms and conditions governing the sale of AMP hand tools are set forth on the front and reverse sides of AMP acknowledgement/invoice forms.

#### WARRANTY

AMP warrants that the hand tools shall be free from defects in material, workmanship, and fabrication at the time of delivery. This warranty shall extend for a period of ninety (90) days after date of delivery of the hand tools to the customer. AMP makes no warranty, express, implied (including but not limited to warranties of merchantability and fitness for intended use), or statutory, other than foregoing express warranty. Failure of customer to submit any claim hereunder within ninety (90) days after receipt of hand tools shall be an admission by customer and conclusive proof that items are in every respect as warranted and shall release AMP from any and all claims for damage or loss sustained by customer. In the event customer timely submits a claim for breach of warranty, customer's sole and exclusive remedies shall be limited to the repair or replacement of defective hand tools or a refund of the price of the defective hand tools. In no event shall AMP be liable for incidental or consequential damages.

Tools which are repaired or replaced under the AMP tool warranty shall continue to be warranted for the remaining effective period of the original tool warranty.

Customer shall perform preventive maintenance and make adjustments and repairs as outlined in this customer manual.

AMP shall not be responsible for any loss, damage, cost, injury, death, or other liability or expense of whatsoever nature resulting from—and customer shall bear the entire expense of adjustments, repairs, or replacements which become necessary due to—negligence, misuse, or abuse of the tool by customer, either directly or indirectly, or in the event that such problems arise by reason of customer's use of products supplied by vendors other than AMP.

#### PROCEDURE

All tools to be returned in accordance with the warranty policy should be shipped prepaid to:

AMP Incorporated, Tool Repair  
1523 North Fourth Street  
Harrisburg, PA 17102-1604

A packing list indicating the quantity and catalog number for each type of tool in the packing case should accompany the shipment. The reason for return (nature of malfunction) of each tool should be noted on the packing list.

Warranty will not cover any tool returned with missing parts or deemed to be customer abused, regardless of when purchased.

All tools returned to customer will be shipped FOB our factory by the most economical surface transportation.

If any questions arise about this policy and its application to your tooling, contact your local AMP Representative or AMP Incorporated, Harrisburg, PA 17105-3608.

#### NOTE

*The above information is subject to change without notice.*

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AMP Application Specification 114-26004—Socket, Miniature Spring Polyester Strip

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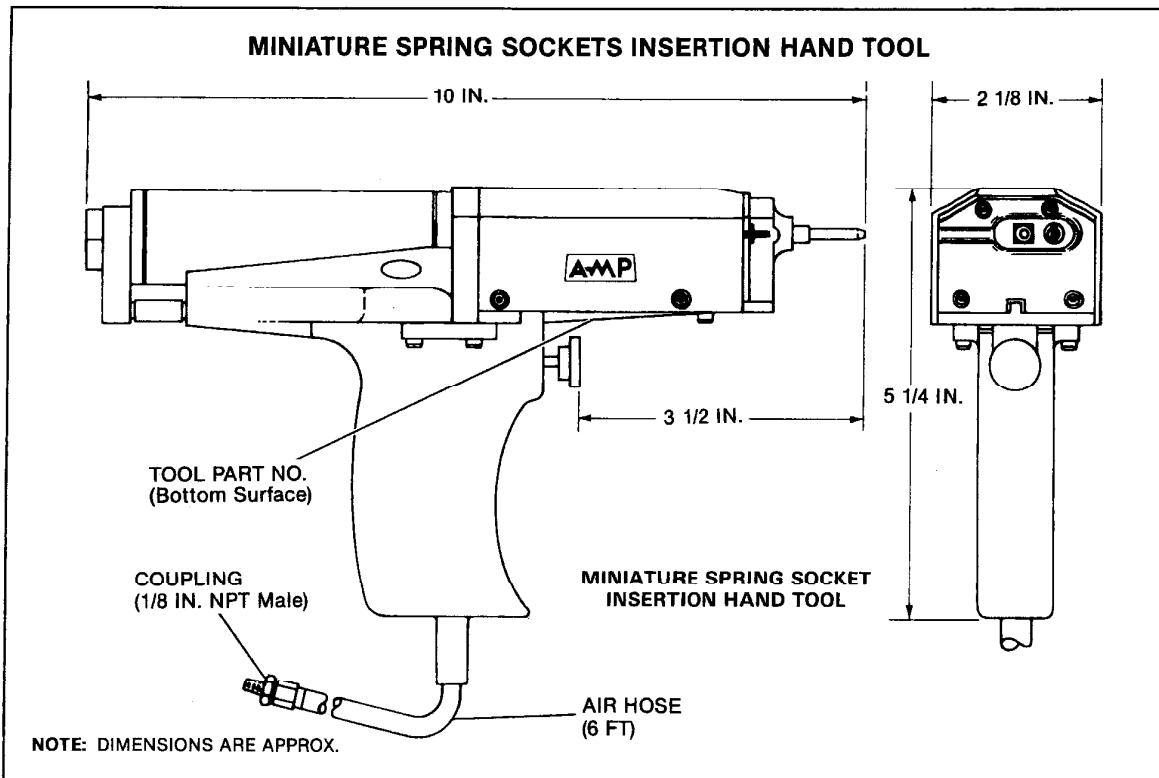
## 1. INTRODUCTION

AMP Miniature Spring Socket Insertion Hand Tools 58278-2; 59876-1, -2, and -3; and 59940-1, -2, -3, -4, and -5 (see Frontispiece) insert AMP miniature spring sockets into printed circuit (pc) boards. The hand-held pneumatic tools are loaded with a polyester strip of sockets (carrier strip), and the tools insert sockets into pc boards at rates of up to 2,000 per hour. The insertion tools are almost identical, with the exception of a few parts in each that are designed to insert spring sockets of different sizes and styles. The specific insertion tool to be used to insert a particular miniature spring socket is identified in Figure 3-1

Miniature spring sockets are used as receptacles for wire leads or pins of integrated circuit modules and other electronic components.

The dimensions and specifications for the insertion hand tools are shown in Figures 1-1 and 1-2.

When reading this manual, pay particular attention to WARNING, CAUTION, and NOTE statements. A WARNING informs you of possible hazards that could cause bodily injury. a CAUTION advises you of precautions to take to avoid damage to the tool, and a NOTE highlights special or important operation.



**Fig. 1-1. Dimensions**

Air Supply Pressure	.....70 psi (min) to 90 psi (max)
Tool Weight	.....Approx 2 lb
Tool Dimensions	.....See Figure 1-1
Air Volume Required	.....3.5 cu in per cycle

**Fig. 1-2. Specifications**



## 2. DESCRIPTION

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

The aluminum- and plastic-framed pneumatic hand tool is 10 in. long and just over 5 in. high, and it weighs approximately 2 lb.

A 6-ft-long air hose connects the tool to the factory air supply, and a button trigger activates the four-way control valve, inside the upper portion of the handle, which in turn controls the air flow to the air cylinder that cycles the tool. A feed slot for the socket carrier strip is located on the right side of the hand tool in front of the face plate.

The guide tube that projects from the front of the tool is targeted to the pc board hole for each spring socket insertion.

### 2.2. Functional Description

Factory air flows through a 6-ft-long hose to the input port of the four-way control valve, which is located inside the upper handle of the hand tool. When you squeeze the button trigger, air flows through the control valve and an air fitting into the rear of the air cylinder—a single action, spring-return, single-end-rod type, with a 2-in. stroke.

Air entering the air cylinder pushes the cylinder rod, the cam, and the attached ram forward. The ram forces the miniature spring socket from its carrier strip, then into and through the guide tube to its ready-for-insertion position at the tube's tip. This completes the first cycle of the two-cycle insertion operation.

Another trigger squeeze initiates the second cycle. The cam completes its forward motion and bottoms against the slide housing. The ram advances to its forward-most position in the guide tube, and inserts the spring socket into the pc board. After the socket is inserted, the cam return motion activates the cam link and slide link which index the next socket into position. The cylinder rod, cam, and ram return to their rest positions, and the tool is ready for another two-cycle insertion operation.

## 3. OPERATION

Before starting the insertion process, it is important to position the fixture on which the board will be placed to best suit the application. Generally, it has been established that the fixture/board assembly be positioned at 45° to the work bench, enabling you to easily apply the sockets to the board. The height at which you will be sitting should also be considered. These factors will reduce operator fatigue and increase efficiency.

When using the hand tool for the first time, you should practice the necessary movements with it, without having factory air connected to it. First, hold the tool securely in either hand, with index finger positioned over trigger. Try to get used to the weight and feel of the tool. Practice aiming and moving the tool over the holes in the pc board (see Figure 3-7).

### **WARNING**

*Never hold tool's projecting guide tube against hand or body when squeezing trigger. The guide tube must be clear of all objects, or properly positioned on pc board when tool is actuated.*

### 3.1. Product and Tool Compatibility

Make sure that the miniature spring socket you select is compatible with the tool you are using (see Figure 3-1). Also ensure that the mounting holes in the pc board are within the required diameter range, as specified on the AMP customer drawing for the sockets you select.

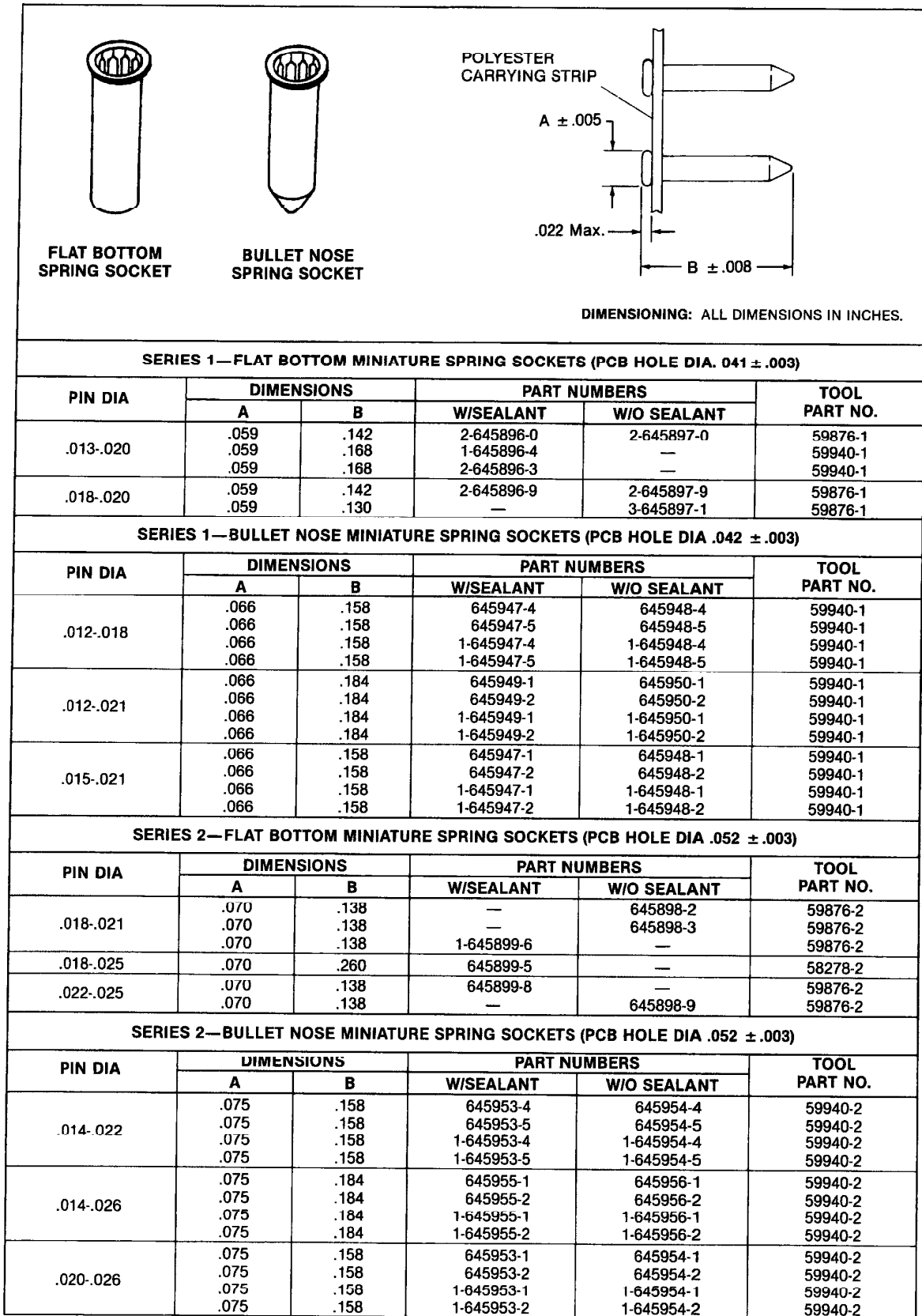


Fig. 3-1. Tool and Product Compatibility (Sheet 1 of 2)

SERIES 3—FLAT BOTTOM MINIATURE SPRING SOCKETS (.059 TO .062 PCB HOLE DIA)					
PIN DIA	DIMENSIONS		PART NUMBERS		TOOL PART NO.
	A	B	W/SEALANT	W/O SEALANT	
.026-.033	.080	.257	645994-1	—	59940-3
	.080	.257	645994-3	645992-1	59940-3
.022-.025	.080	.257	645994-4	—	59940-3
.026-.029	.080	.138	645994-5	—	59876-3
.030-.033	.080	.138	645994-2	645992-2	59876-3
SERIES 3—BULLET NOSE MINIATURE SPRING SOCKETS (PCB HOLE DIA .063 ± .003)					
PIN DIA	DIMENSIONS		PART NUMBERS		TOOL PART NO.
	A	B	W/SEALANT	W/O SEALANT	
.028-.033	.080	.290	645986-1	645990-1	59940-3
	.080	.290	645986-2	645990-2	59940-3
	.080	.290	1-645986-1	1-645990-1	59940-3
	.080	.290	1-645986-2	1-645990-2	59940-3
SERIES 4—BULLET NOSE MINIATURE SPRING SOCKETS (PCB HOLE DIA .072 ± .003)					
PIN DIA	DIMENSIONS		PART NUMBERS		TOOL PART NO.
	A	B	W/SEALANT	W/O SEALANT	
.037-.041	.088	.260	645501-1	645502-1	59940-4
	.088	.260	645501-2	645502-2	59940-4
	.088	.260	1-645501-1	1-645502-1	59940-4
	.088	.260	1-645501-2	1-645502-2	59940-4
SERIES 5—BULLET NOSE MINIATURE SPRING SOCKETS (PCB HOLE DIA .104 ± .003)					
PIN DIA	DIMENSIONS		PART NUMBERS		TOOL PART NO.
	A	B	W/SEALANT	W/O SEALANT	
.042-.049	.118	.308	645991-1	645979-1	59940-5
	.118	.308	645991-2	645979-2	59940-5
	.118	.308	1-645991-1	1-645979-1	59940-5
	.118	.308	1-645991-2	1-645979-2	59940-5

**Fig. 3-1. Tool and Product Compatibility (Sheet 2 of 2)**

### 3.2. Air Line Requirements

The use of an air line filter and regulator is recommended for the pneumatic hand tool. This equipment is not manufactured or sold by AMP Incorporated. The position of the recommended equipment is shown in Figure 3-2. The filter and moisture separator, and the regulator are to be located on the factory (stationary) air line (see Figure 3-2).

Clean, dry air, regulated between 70 and 90 psi, flows to the tool's four-way control valve which, when triggered, applies air to the air cylinder.

**CAUTION**

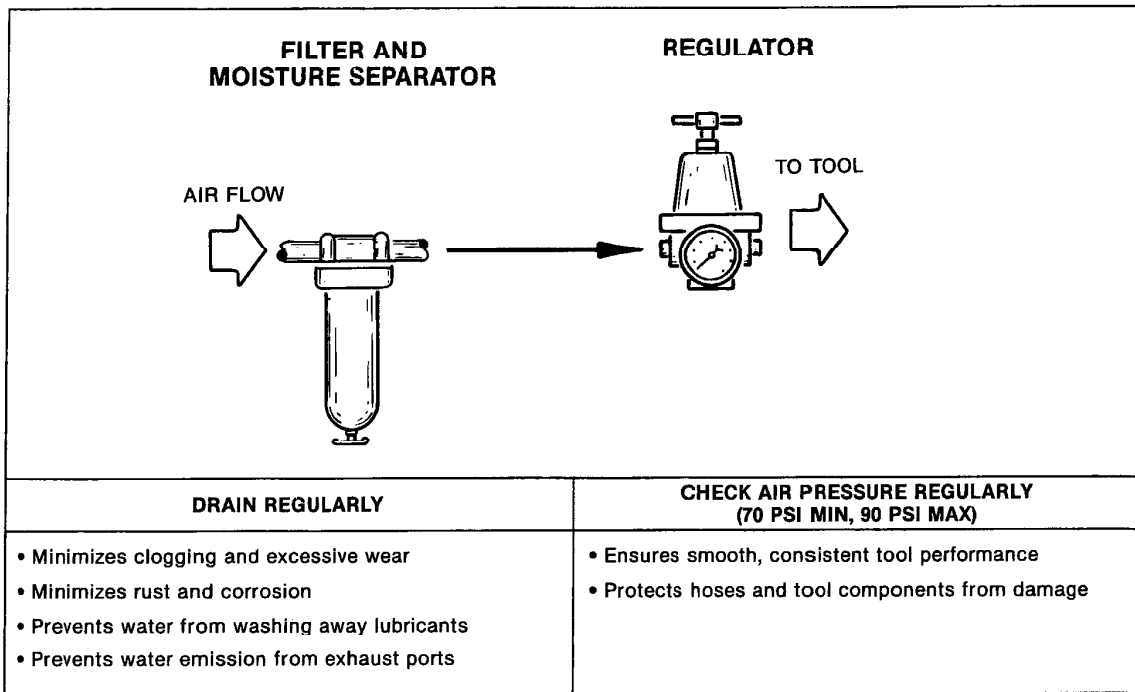
*The air pressure must be maintained constantly between 70 and 90 psi. Pressure under 70 psi is insufficient for the socket insertion operation. Pressure over 90 psi may cause damage to the tool, product, or printed circuit board.*

If air pressure is below 70 psi:

1. Check air compressor and air line regulators for proper settings and mechanical condition.
2. Check for clogged or "kinked" air lines, hoses, or filters.
3. Check air lines, hoses and fittings or couplings for correct size.
4. Check compressor for sufficient capacity and mechanical condition.

If air pressure is above 90 psi:

1. Do NOT operate the tool.
2. Check air compressor and air line pressure regulators for proper settings and mechanical condition.



**Fig. 3-2. Air Line Requirements**

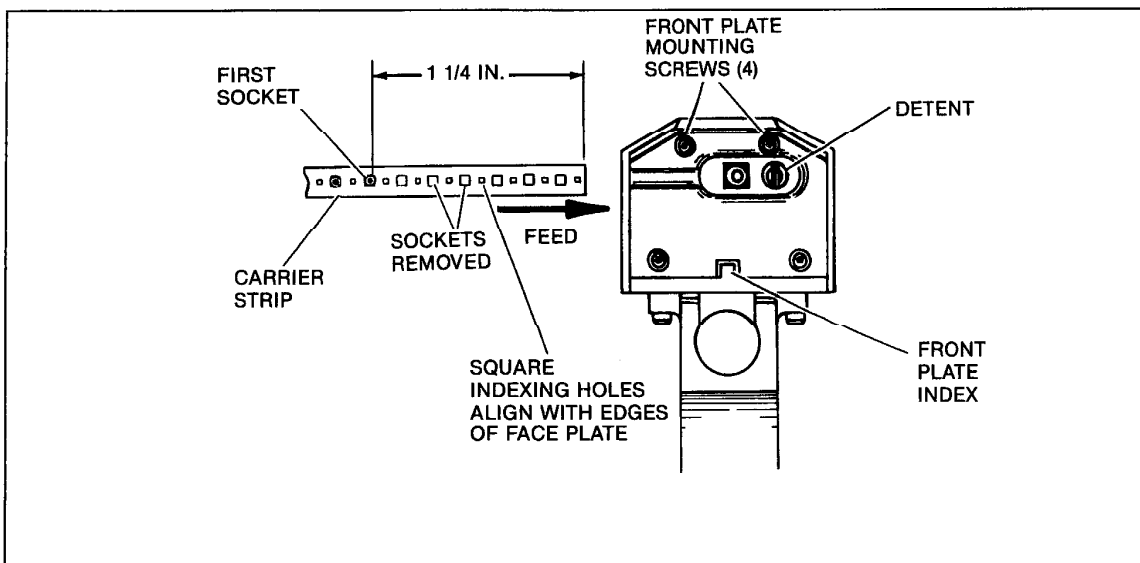
### 3.3. Tool Loading

Sockets are assembled to a thin, continuous plastic carrier strip and are supplied on 50,000-socket reels. Sockets are strip-fed through a feed slot in the right side of the insertion tool (see Figure 3-3). A convenient strip length, about 10 to 12 in., may be cut from the reel for loading, or continuous feeding from the reel may be used. Load product into the tool as follows:

1. Remove six sockets from approximately 1 1/4 in. at end of carrier strip as shown in Figure 3-3.

**NOTE**

*Sockets are spaced at .200-in. intervals, with a square indexing (feed) hole between each socket.*



**Fig. 3-3. Hand Tool Loading**

2. Carefully insert end of carrier strip into carrier strip feed slot with socket bodies in line with spring socket feed slot (see Figure 3-4).
3. Push carrier strip in until first socket enters spring socket feed slot—you will feel slight resistance as carrier strip moves past a spring-loaded detent. Continue pushing carrier strip until carrier strip appears on left side of hand tool.

**NOTE**

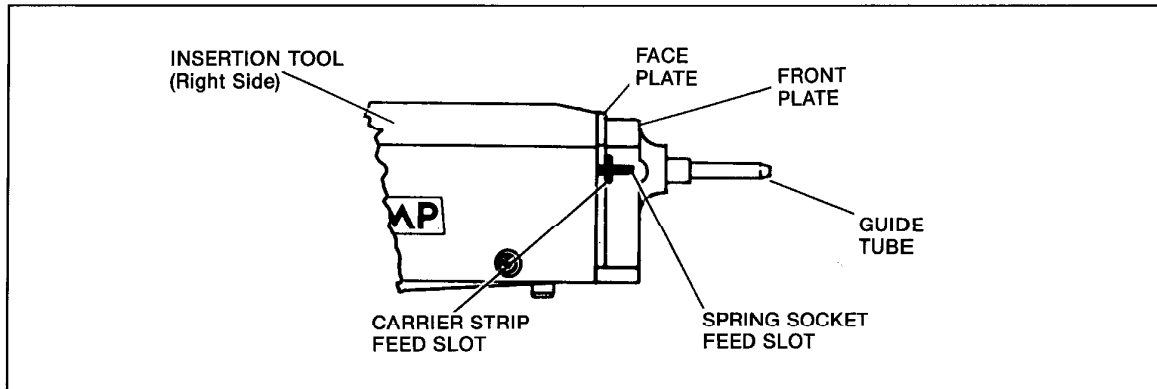
*You will hear a clicking sound as holes in carrier strip pass by index finger inside tool.*

4. When you see the carrier strip on other side of hand tool, stop pushing carrier strip and ensure that square indexing holes (not holes from which sockets were removed) appear on both sides of face plate, equally spaced from face plate (see Figure 3-5). If not, push carrier strip for one more click, and again check for proper alignment.

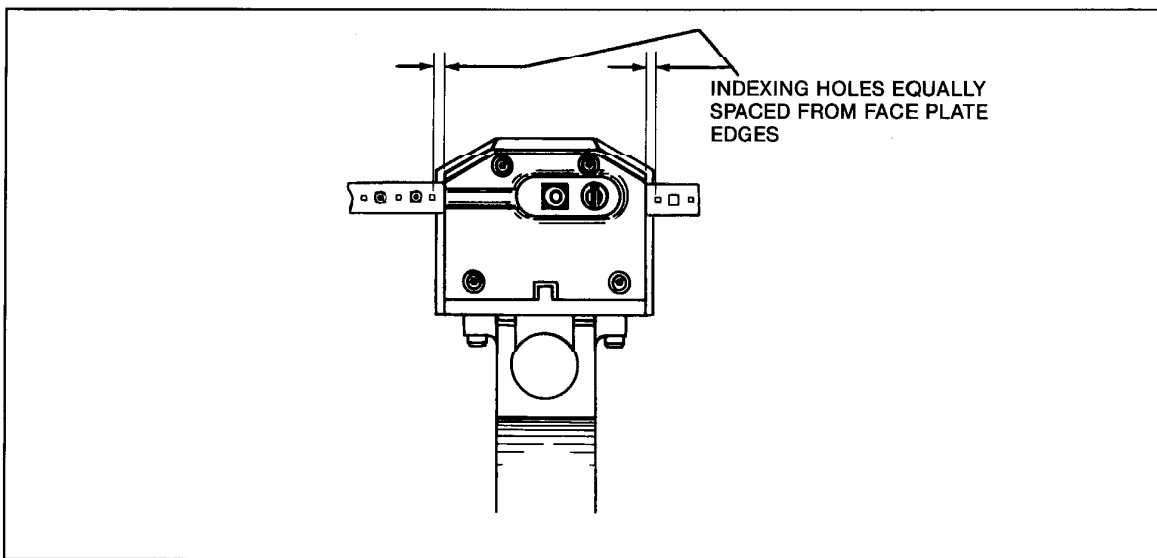
**NOTE**

*This alignment ensures that index finger, which automatically feeds sockets into hand tool by moving carrier strip during cycling, is properly engaged in indexing hole, not in hole where socket was removed.*

5. Connect insertion tool to an air supply line which meets specifications given in Paragraph 3.2.



**Fig. 3-4. Carrier Strip Feed Slot**



**Fig. 3-5. Carrier Strip Alignment**

**WARNING**

*Never hold front of insertion tool against hand or body when squeezing trigger. Guide tube must be clear of all objects, or properly positioned in hole on pc board, when tool is actuated.*

6. Firmly squeeze trigger as often as necessary until socket appears at end of guide tube. Insertion tool is now ready for socket insertion.

**NOTE**

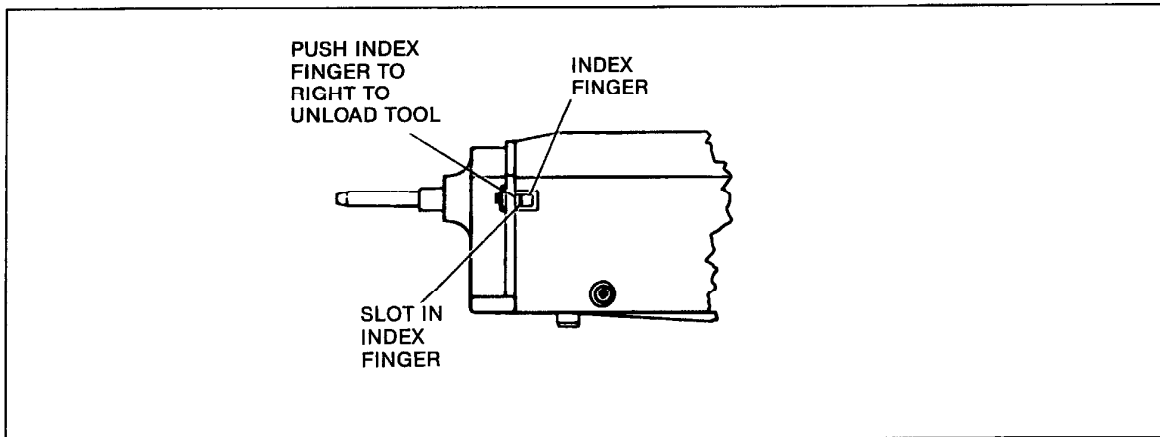
*Two cycles are required for each socket insertion. The first cycle forces socket from carrier strip through guide tube into position for operator to insert socket into mounting hole in pc board. The second cycle inserts socket to required depth in pc board.*

**3.4. Tool Unloading**

1. Ensure that tool has completed second cycle—no socket is present at end of guide tube.
2. Insert scribe, or similar pointed instrument, into slot in index finger (accessible through opening in left side of tool cover, as shown in Figure 3-6).
3. Push index finger to right (toward rear of tool), releasing index finger from carrier strip, and pull socket carrier strip out of feed slot on loading side of tool.

**NOTE**

*If tool jams or it is difficult to load or unload, front plate can easily be removed by removing four mounting screws (see Figure 3-3). Front plate contains no loose parts and it is indexed for correct positioning during re-assembly to hand tool.*



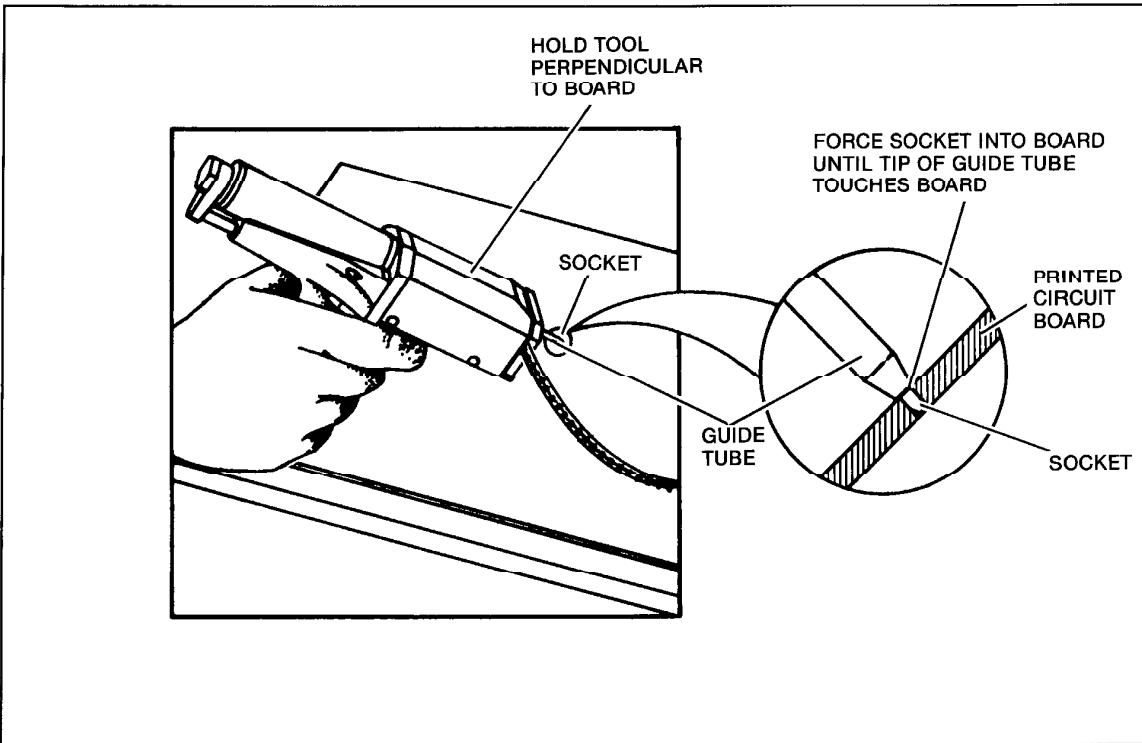
**Fig. 3-6. Hand Tool Unloading**

**3.5. Socket Insertion****NOTE**

*When using insertion tool for first time, insert several sockets into practice board having same size mounting holes before inserting sockets into production boards. Bullet nose sockets are easier to insert than flat bottom sockets since the shape of the nose facilitates in the socket "finding" its way into the hole.*

Insert sockets as follows:

1. Firmly press and hold trigger (first cycle) to force spring socket into position at end of guide tube. Do NOT hold tool against board or line up guide tube hole for this step.



**Fig. 3-7. Hand Tool Position Over PC Board**

2. With trigger still depressed, hold hand tool firmly and perpendicular to board. Then push end of socket into selected mounting hole, making sure tool remains perpendicular to board. Force socket into hole until tip of guide tube touches board. See Figure 3-7.

**WARNING**

*It is important that the guide tube of tool touch board so that, during second cycle, socket will be inserted to a uniform depth of approximately .022 in. (top of eyelet to board). Depending on hole diameter, moderate pressure on tool will be required to push socket into board to the point where guide tube touches the board.*

3. Release trigger.

4. Still holding tool firmly and perpendicular to board, press and hold trigger (second cycle) to fully insert socket into hole in board.

**CAUTION**

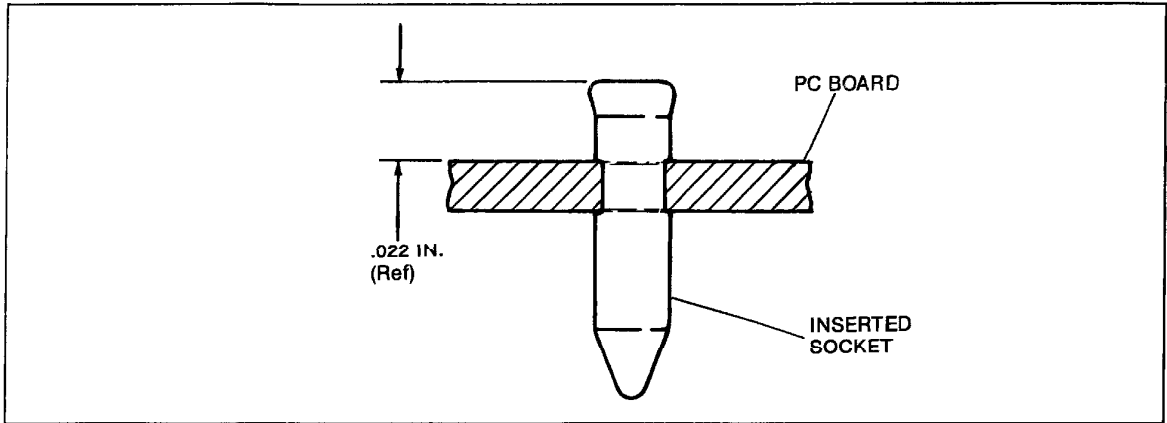
*Do NOT release trigger before you back the tool away from the board. The socket heads may be pulled out of position if you release the trigger before the guide tube clears the socket head.*

5. With trigger still depressed, remove tool from inserted socket.

**NOTE**

*Inserted sockets must be straight and inserted to uniform depth of approximately .022 in., as noted in Step 2. Socket insertion depth is not adjustable. If socket is damaged or improperly inserted, carefully pull (or push) it out of hole and repeat above procedure to insert another socket. (See Figure 3-8.)*

6. Release trigger.



**Fig. 3-8. Socket Insertion Depth**

## 4. MAINTENANCE

### 4.1. Cleaning

The hand tool should be cleaned periodically, and its weekly operational time is a good measure as to how often it should be cleaned. Generally, cleaning once a week is sufficient for moderate production schedules. But whenever the tool is partly disassembled, for repairs or parts replacement, cleaning and lubrication can be done efficiently at the same time.

Clean the hand tool as follows:

1. Unscrew four button head screws, two on each bottom side of cover, and remove cover.

#### **WARNING**

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

2. Use compressed air (less than 30 psi) to blow out particles of dirt, dust, and carrier strip bits from inside housing, cleaning in and around cam, cam link, slide link, and other parts.
3. Check inside of housing for contamination. If necessary, use cloth and industrial solvent to remove excess.

#### **CAUTION**

*When using a solvent for cleaning, do not let the solvent contact plastic tool components.*

4. Unscrew four socket head screws from front plate and remove plate.
5. Blow out debris from track slots on face plate, especially in and around compression springs of guide tube.

### 4.2. Lubrication

Regular lubrication is essential for efficient and reliable hand tool performance. The frequency of lubrication depends on the number of operating hours each week, but weekly lubrication is adequate for normal use.

Lubricate point where side of cam (Item 65, Figure 1-1) and cam link (Item 18) make contact—use MOLYKOTE† 557 Lubricant. Lubricate the track under the housing cover using the same lubricant.

#### **NOTE**

*Do NOT let lubricant contact ram, product carrier strip, or guide tube. Lubricant can change pc board electrical characteristics.*

The hand tool should be cleaned and lubricated as necessary to prevent an accumulation of contamination or carrier strip particles.

† Trademark of Dow Corning Corporation



## 5. ADJUSTMENTS

**WARNING**

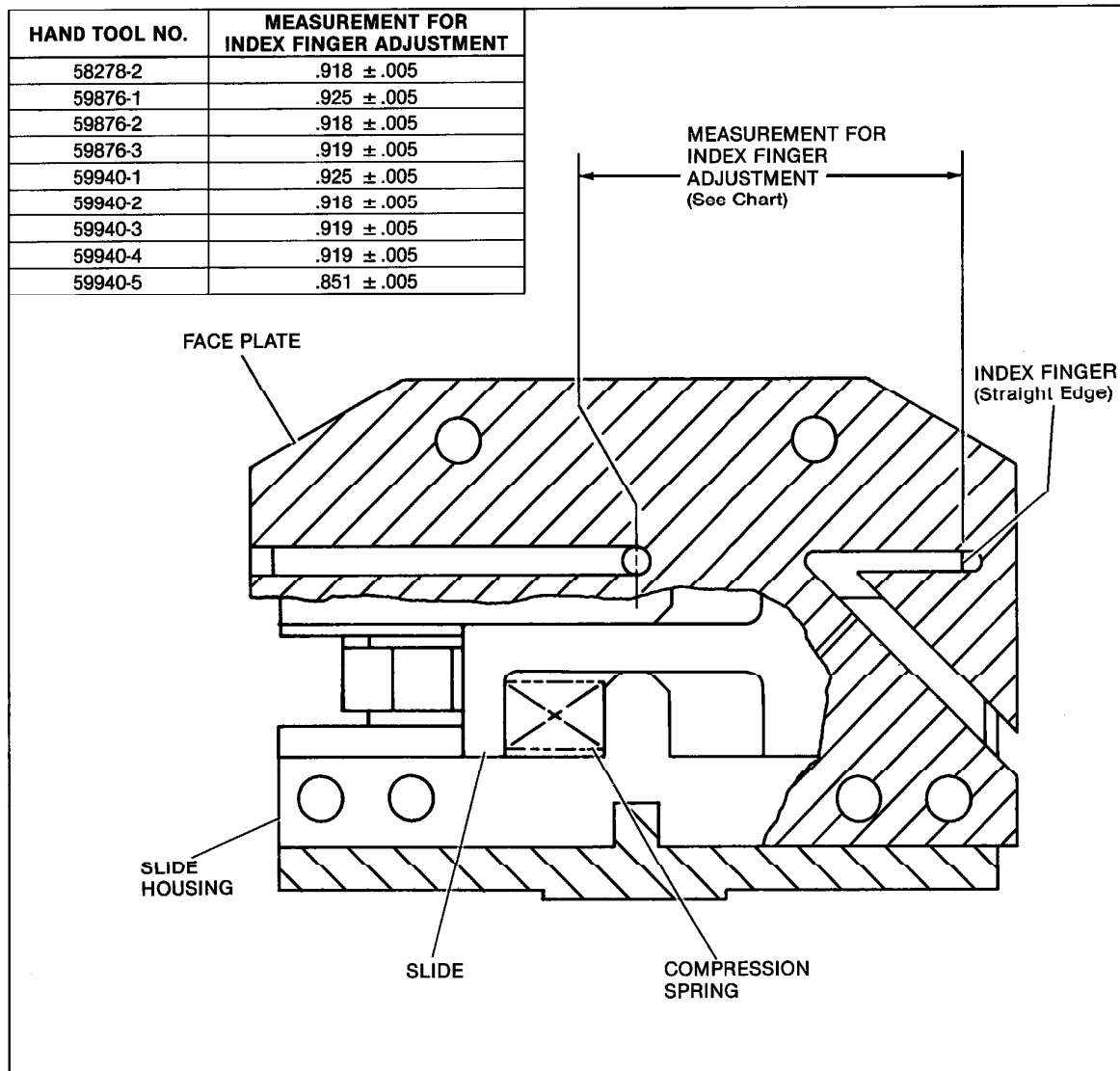
Ensure that the tool is disconnected from factory air before making adjustments.

Adjustment of the index finger on face plate ensures proper indexing of the product strip for the insertion process. With the front plate removed and the cam in its fully retracted position, adjust the index finger as follows:

1. Place a pin, with the same diameter as the ram, into ram hole of face plate.
2. Use a caliper to measure the distance between the straight edge of the index finger and the pin in the face plate to determine if index finger is set properly (see Figure 5-1). Add half the diameter of the pin to the caliper measurement to determine this distance. The correct total measurements are listed in the chart in Figure 5-1.

If an adjustment is necessary, proceed as follows:

3. Remove cover from tool.
4. Loosen two screws (Item 12, Figure 7-1) on slide link so that slide link moves.



**Fig. 5-1. Index Finger Adjustment**

5. Use pin and caliper (Steps 1 and 2 above) and adjust screw (Item 13, Figure 7-1) until proper measurement is obtained. A clockwise adjustment lengthens the dimension.
6. Tighten two screws (Item 12, Figure 7-1) and repeat Steps 1 and 2 to confirm measurement.
7. Remove measurement pin and replace cover on tool.
8. Re-install front plate.

## 6. TOOL REPAIR AND PARTS REPLACEMENT

### 6.1. Repairing the Jammed Tool

**WARNING** *Disconnect tool from factory air before attempting repairs or parts replacements.*

If the insertion hand tool jams and will not cycle, proceed as follows:

1. Insert scriber or other pointed object into slot of index finger (Figure 3-6). Push index finger to the right and toward rear of tool. Pull out product strip from right of tool about 1/2 in.
2. Use compressed air (less than 30 psi) to blow out index finger (hole on left side of tool) and face plate track (hole on top of front plate), removing any product strip bits that may be jamming the tool.

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

3. Push product carrier strip back into feed slot until index finger clicks.
4. Re-attach factory air to hand tool and test insertion operation.
5. If tool is still jammed, follow tool unloading procedures (see Paragraph 3.4). Release index finger from socket carrier strip by inserting scriber into slot and moving index finger to the right and toward the rear of tool. Pull out product strip, and cut off strip to point where product begins. Punch out about six miniature spring sockets and feed strip back into tool. Listen for clicking sound that indicates the index finger is engaged in square index hole of strip. See Figure 3-5 for proper alignment check.
6. Again test insertion operation.
7. If hand tool is still jammed, disconnect tool from factory air, remove four mounting screws on front plate, and remove plate and product carrier strip. Examine product strip, face plate, and index finger. Clean face plate tracks with compressed air (less than 30 psi). Place and position product carrier strip onto face plate.
8. Check to see if first miniature spring socket aligns with ram hole at the same time that index finger is in square index hole in product strip. If it does, remove carrier strip, re-attach front plate to face plate with four mounting screws, reload the tool, reconnect factory air, and begin insertion process. If index alignment is off, follow procedures in Paragraph 5 for index finger adjustment.

### 6.2. Ram Replacement (Figure 7-1)

**WARNING** *Disconnect tool from factory air supply when changing tooling or performing maintenance.*

Replace the damaged or broken ram as follows:

1. Loosen four screws (40) and remove cover (19) from tool.
2. Remove four socket head screws that attach front plate to face plate and remove front plate.
3. Remove two socket head cap screws (23) and track (89).

4. Manually push cam (65) forward so that ram is at full extent of travel.
5. Loosen setscrews (20) in top and bottom of cam.
6. Grasp ram with fingers and pull ram out through face plate.
7. Insert new ram through hole in face plate and push ram in until it enters hole in cam and bottoms against pin (66) that supports cam.
8. Tighten setscrews in top and bottom of cam to secure ram in pin slot.
9. Attach front plate to face plate by inserting and tightening four socket head screws.
10. Replace track and two screws.
11. Replace cover and tighten four screws.

### 6.3. Guide Tube Replacement (Figure 7-1)

The guide tube through which the ram inserts the spring sockets may have to be replaced because of wear or damage. Replace guide tube as follows:

1. Remove front plate from face plate by removing four socket head screws.
2. With a punch, drive out two pins (49) that hold guide tube in square hole of front plate.
3. Hold two halves of guide tube together by exerting finger pressure on them while removing guide tube from rear of front plate.
4. Slowly release tension on two halves of guide tube over bench so that the two compression springs between them do not pop out and get lost.
5. Carefully insert compression springs between two halves of new guide tube, insert tube through rear of front plate, and drive in two small retaining pins.
6. Attach front plate to face plate by inserting and tightening four socket head screws.

### 6.4. Air Cylinder Replacement (Figure 7-1)

Replace the air cylinder as follows:

1. Remove end cap (28) from air fitting (29) at rear of tool.
2. Pull off air fitting and air tube (30) from end of tool.
3. Remove cover (19) and track (89).
4. Remove large shoulder screw (14) from cam link/slide link combination (items 18 and 10), and remove cam link/slide link.
5. Remove setscrew (20) from top of cam (65). Turn cam and piston combination 1/4 turn to left and remove other setscrew (20) to free the ram. Push ram forward, out of the way, into guide tube.
6. Push out pin (66) holding cam to air cylinder piston, and remove cam from piston.
7. Using a wrench on end of cylinder (25), turn air cylinder counterclockwise to unscrew it from tool housing.
8. Ensure that two O-rings (21 and 22) are in position.
9. To install new air cylinder, reverse Steps 1 through 7.

#### NOTE

*When assembling ram to cam (Step 4), ensure that the ram is seated against pin in cam. (Refer to Paragraph 6.2., Step 7.)*

### 6.5. Four-Way Control Valve Replacement

Replace four-way control valve as follows:

1. Remove four screws that attach handle to tool body, two on each side of handle, and remove handle.

#### NOTE

*Remove two O-rings (24) inset in base of tool to avoid losing them.*

2. Remove control valve block/trigger assembly from handle by pushing air hose through bottom of handle.
3. Use a 1/4-in. wrench to unscrew pipe-to-hose fitting on air tube subassembly (77) and remove fitting from control valve block (32).
4. Remove button (41) from old control valve block, and attach it to new valve block.
5. Connect the new control valve block to the pipe-to-hose fitting. Apply pipe sealer to threads of pipe-to-hose fitting.
6. Push new control valve block down into handle and re-attach handle to tool body with four screws.

**NOTE**

*ENSURE that two O-rings are in place on bottom of tool body before re-assembling body and handle.*

### 6.6. Other Parts Replacement

Should other parts in the tool housing need replacement—for example cam, cam link, slide link, front stop link, back stop link, or swing link—refer to Figure 7-1. Generally, all these parts can be removed and replaced by unscrewing socket head screws or by driving out slotted spring pins.

**NOTE**

*Do NOT lose the two extension springs (15) that provide tension and movement to the front stop link (61) and back stop link (64).*

## 7. PARTS LIST AND DRAWING

This section contains a parts list and tool drawing (see Figure 7-1) which cover the AMP Miniature Spring Socket Insertion Hand Tools.

When it is necessary to replace any parts, first locate the parts on the illustration, then refer to the parts list by the item number assigned, to obtain the AMP part number and description. When ordering parts, DO NOT order by the item number. Order parts by the AMP part number and description. The USED ON MODEL column on the parts list indicates which tool(s) each part is used on. When a part is used on all tools, no entry appears in this column. The N/A entry indicates that the part is not used. The quantity (QTY) column indicates the number of parts required per tool.

ITEM NO	AMP PART NUMBER	DESCRIPTION	USED ON MODEL			QTY
			59940 -1, -2, -3, -4, -5	58278-2	59876 -1, -2, -3	
1	311740-1	FRAME				1
2	1-21000-6	SCREW, Skt Hd Cap 4-40 UNC x .625" L				2
3	1-21000-7	SCREW, Skt Hd Cap 4-40 UNC x .750" L				2
4	313316-2	HOUSING, Slide	-1	N/A	-1	1
5	313316-3	HOUSING, Slide	-2	N/A	-2	1
6	313316-4	HOUSING, Slide	-3	N/A	-3	1
7	311516-4	PLATE, Face	-1	N/A	-1	1
8	311516-5	PLATE, Face	-2	N/A	-2	1
9	311516-6	PLATE, Face	-3	N/A	-3	1
10	311512-1	LINK, Slide				1
12	1-21000-5	SCREW, Skt Hd Cap 4-40 UNC x .500" L				2
13	311506-1	SCREW, Adjustable				1
14	1-21989-1	SCREW, Skt Hd Shldr 8-32 UNC x .500" L				1
15	2-22487-6	SPRING, Extension .094" OD x .438" L				2
16	21028-6	PIN, Slotted Spring .062" Dia x .500" L				2
18	311513-1	LINK, Cam				1
19	313319-1	COVER				1
20	2-21012-8	SETSCREW, Skt 6-32 UNC x .188 L				2
21	21086-9	O-RING .063 Thk x .625" ID				1
22	1-21086-5	O-RING .063 Thk x 1.000" ID				1

**Fig. 7-1. Parts List and Drawing, Miniature Spring Socket Hand Tool (Sheet 1 of 3)**

ITEM NO	AMP PART NUMBER	DESCRIPTION	USED ON MODEL			QTY
			59940 -1, -2, -3, -4, -5	58278-2	59876 -1, -2, -3	
23	1-21000-4	SCREW, Skt Hd Cap 4-40 UNC x .380" L				10
24	3-21086-9	O-RING .063 Thk x .125" ID				2
25	311511-1	CYLINDER, Air				1
26	4-21086-5	O-RING .063 Thk x .375" ID				1
27	21086-7	O-RING .063 Thk x .500" ID				1
28	265327-1	CAP, End				1
29	265326 1	FITTING, Air				1
30	27319-4	TUBE, Air .562 L				1
31	311741-1	HOUSING, Cylinder				1
32	24401-1	VALVE, Control, 4-Way				1
39	311524-1	HANDLE				1
40	1-21002-4	SCREW, Btn Hd Skt Cap 4-40 UNC x .375"				4
41	25575-2	BUTTON				1
46	3-23147-4	SPRING, Compression .088" OD x .250" L				2
47	311522-1	PLATE, Front	-1,-2		-1,-2	1
48	311522-2	PLATE, Front	-3	N/A	-3	1
49	21028-4	PIN, Slotted Spring .062" Dia x .375" L				4
50	313458-1	TUBE, Guide	-1	N/A	N/A	2
51	313459-1	TUBE, Guide	-2		N/A	2
52	313457-4	TUBE, Guide	-3	N/A	N/A	2
53	22278-3	SPRING, Compression .120" OD x .375" L				1
54	311509-1	DETENT				1
55	311514-1	FINGER, Index				1
56	2-23147-0	SPRING, Compression .057" OD x .375" L				1
57	21919-6	PIN, Dowel .0625" Dia x .625" L				1
58	313320-1	RAM				1
59	313320-2	RAM				1
60	313320-3	RAM	-3			1
61	313317-1	LINK, Front Stop				1
62	21028-1	PIN, Slotted Spring .062" Dia x .188" L				1
63	311510-1	LINK, Swing				1
64	311520-1	LINK, Back Stop				1
65	311503-1	CAM				1
66	313280-1	PIN, Drive				1
67	311515-1	SLIDE				1
68	22280-7	SPRING, Compression .240" OD x .750" L				1
69	312313-1	SPACER				1
70	2-21002-1	SCREW Btn Hd Cap 8-32 UNC x .375" L				2
72	313282-1	SCREW, Slotted Hd Shldr				2
74	313321-1	ROD, Tiedown				2
75	2-21006-5	SETSCREW, Skt Hd 4-40 UNC x .500" L				2
76	7-21000-8	SCREW, Skt Hd Cap 4-40 UNC x 1.00" L				2
77	312622-1	AIR TUBE SUBASSEMBLY				1
78	313320-4	RAM				1
79	313320-5	RAM	-5	N/A	N/A	1
80	313316-5	SLIDE, Housing	-4			1
81	313316-6	HOUSING, Slide	-5	N/A	N/A	1
82	313516-7	PLATE, Face	-4			1
83	311516-8	PLATE, Face	-5	N/A	N/A	1
84	313457-7	TUBE, Mylar Guide	-4			2
85	313457-5	TUBE, Guide	-5	N/A	N/A	2
86	311522-3	PLATE, Front	-4			1
87	311522-4	PLATE, Front	-5	N/A	N/A	1
88	313147-1	FINGER, Index	-5	N/A	N/A	1
89	313281-1	TRACK				1
90	313457-1	TUBE, Guide	N/A	N/A	-1	2
91	313457-2	TUBE, Guide	N/A	N/A	-2	2
92	313457-3	TUBE, Guide	N/A	N/A	-3	2
93	313457-6	TUBE, Guide	N/A		N/A	2
94	313457-7	TUBE, Guide	-4	N/A	N/A	2
95	311522-3	PLATE, Front	-4	N/A	N/A	1
96	311516-7	PLATE, Face	-4	N/A	N/A	1
97	313316-5	HOUSING, Slide	-4	N/A	N/A	1
98	313320-4	RAM	-4	N/A	N/A	1

Fig. 7-1. Parts List and Drawing, Miniature Spring Socket Hand Tool (Sheet 2 of 3)

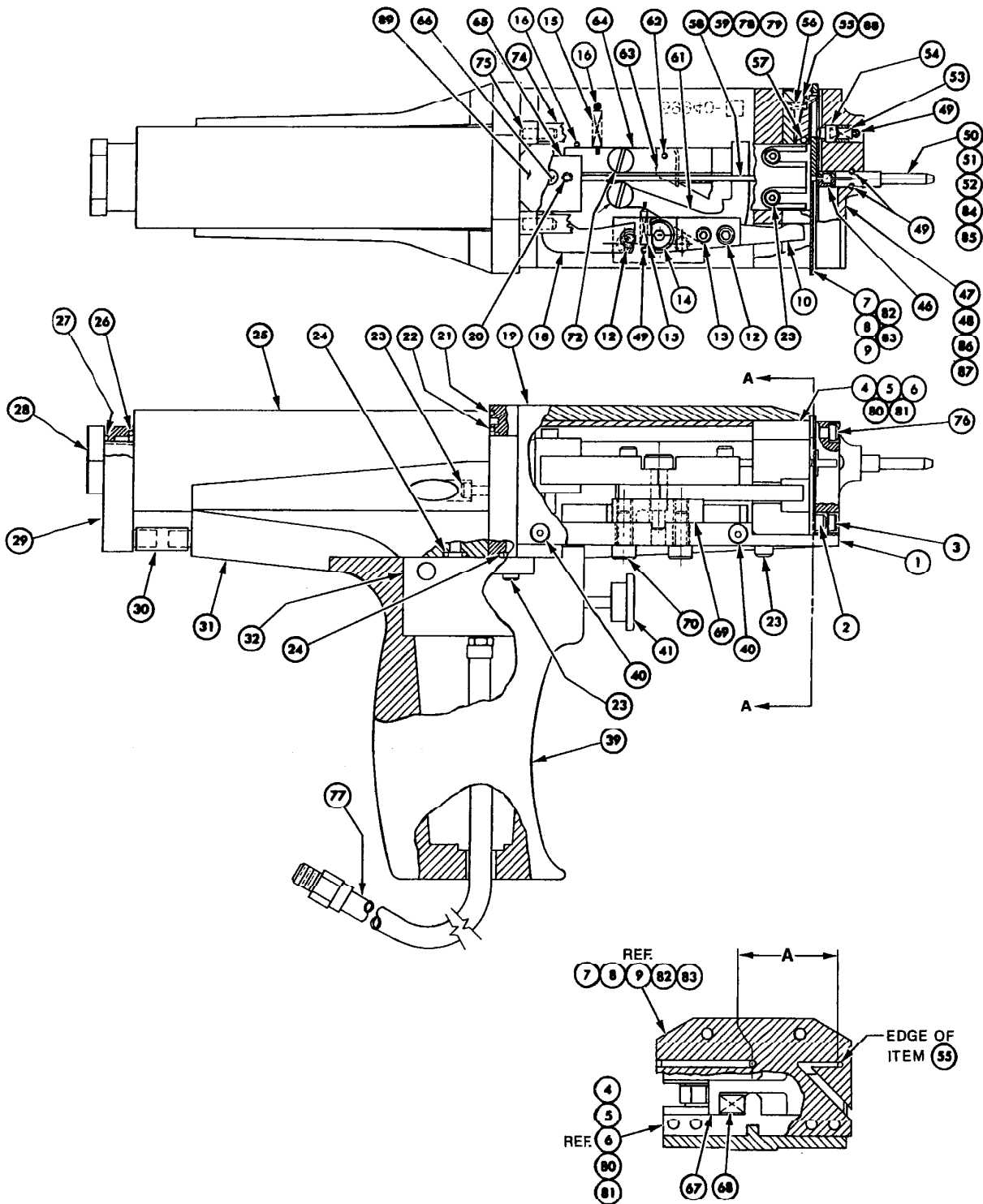


Fig. 7-1. Parts List and Drawing, Miniature Spring Socket Hand Tool (Sheet 3 of 3)



# APPENDIX





**NOTE**

All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  [.005] and angles have a tolerance of  $\pm 1^\circ$ .

**1. INTRODUCTION**

This specification covers the requirements for application of AMP\* Miniature Spring Sockets on polyester strip. These requirements are applicable to hand or machine application tooling.

Basic terms and features of components are provided in Figure 1.

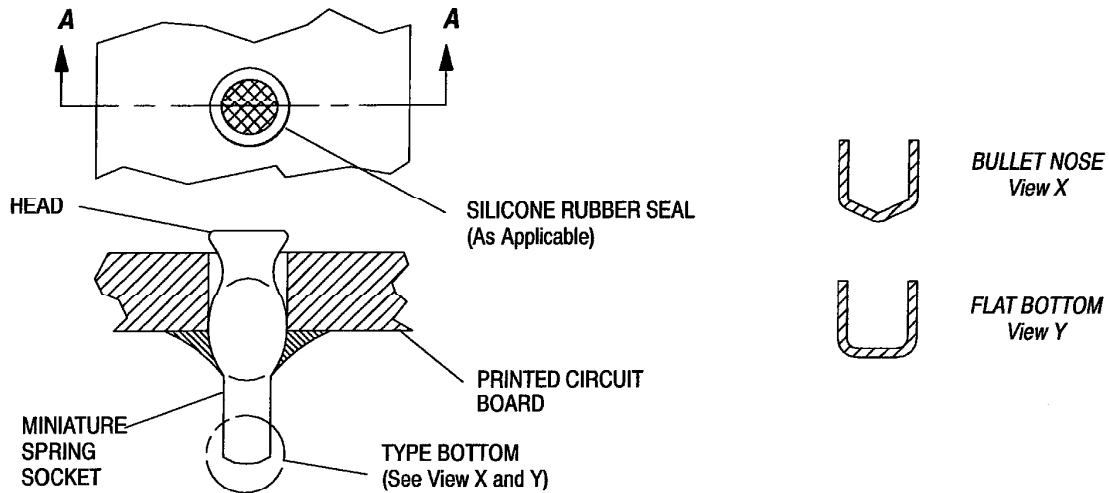


Figure 1

**2. REFERENCE MATERIALS****2.1. Revision Summary**

This paragraph is reserved for a revision summary covering the most recent additions and changes made to this specification which include the following:

Per EC 0160-3572-93:

- Change socket protrusion dimension for hand tool application in Figure 3
- Remove hole size dimensions from Figure 3 chart
- Remove old hand tool part numbers from Figure 3 chart
- Add new hand tool part numbers to Figure 3 chart

Per EC 0990-7823-92:

- Updated format
- Added metric units
- Added this paragraph (2.1, Revision Summary) and renumbered paragraphs accordingly

**2.2. Customer Assistance**

Reference Part Number 645955-1 and Product Code 3084 are representative numbers of the AMP Miniature Spring Socket product line. Use of these numbers will identify the product line and expedite your inquiries through an AMP service network established to help you obtain product and tooling information. Such information can be obtained through a local AMP Representative (Service Products Business, Field Service Engineer, etc.) or, after purchase, by calling the Technical Assistance Center or the AMP FAX/Product Information number at the bottom of this page.

**2.3. Engineering Drawing**

Customer Drawings for specific products are available from the responsible AMP Engineering department via the service network. The information contained in the Customer Drawings takes priority if there is a conflict with this specification or with any other technical documentation supplied by AMP Incorporated.

**2.4. Specifications**

AMP Product Specification 108-14008 provides information about performance, tests, and quality requirements for the miniature spring sockets.

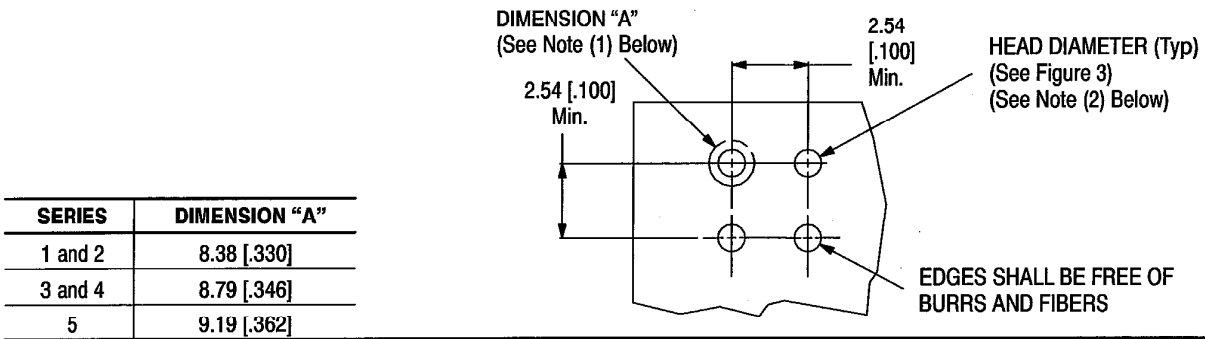
**2.5. Instruction Material**

AMP Corporate Bulletin No. 52 is available upon request and can be used as a guide in soldering. This bulletin provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is attached to the bulletin as a guide for information on soldering problems.

**3. REQUIREMENTS**

**3.1. Printed Circuit (PC) Board**

- A. PC boards may be single sided or double sided, with or without plated through holes.
- B. Thickness shall be a minimum 0.79 mm [.031 in.] (nominal).
- C. The layout shall be as indicated in Figure 2.



**NOTES**

- (1) For components other than miniature spring sockets mounted on the pc board, the clearance envelope for the applicator tooling shall be Dimension "A" (see Chart, Figure 2) minimum diameter on head side of pc board and 2.90 mm [.114 in.] minimum diameter on the other side. (If footprint is needed for inserting miniature spring sockets beside other components, refer to AMP Drawing No. 818000.)
- (2) For plated through holes, tin-lead plating shall not exceed 0.02 mm [.001 in.] to ensure minimum retention.
- (3) PC board should be supported around hole when inserting sockets.

Figure 2

**3.2. Security**

Sockets shall withstand 2.2 N [0.5 lb] minimum retention force prior to soldering.

**3.3. Insertion**

Sockets shall meet the requirements specified in Figure 3 after insertion.

**3.4. Soldering Procedures**

**A. Flux Selection**

The sockets must be fluxed prior to soldering. Selection of the proper flux will depend on the type of pc board and other components, if any, mounted on the board. The flux must be compatible with the wave solder line, as well as manufacturing and safety requirements.

**B. Cleaning**

After soldering, removal of fluxes, residues, and activators is necessary. Consult the supplier of the solder and flux for recommended cleaning solvents.

**DANGER** Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners.

**C. Soldering Guidelines**

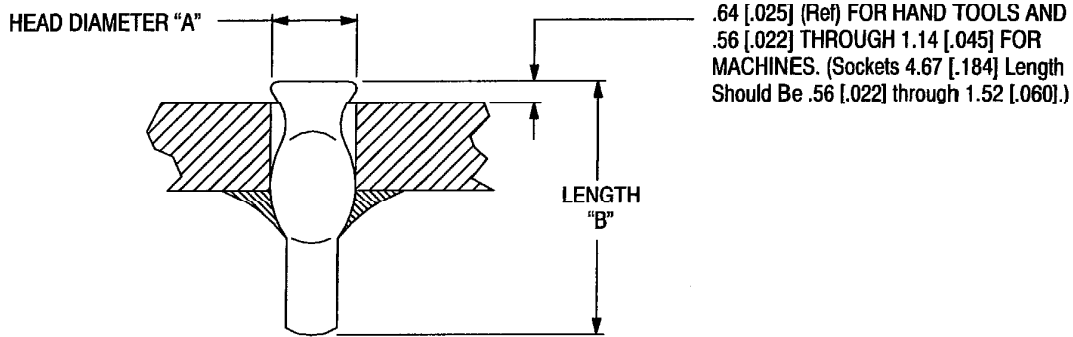
Refer to Paragraph 2.5 for instructional material that is available for establishing soldering guidelines.

**3.5. Workmanship**

There shall be no deformation of the socket during the insertion operation that will affect the performance.

**4. TOOLING**

The tooling listed in the chart portion of Figure 3 will accommodate the available variety of miniature spring socket head diameters and body lengths. The tooling selected will depend on application requirements.



MINIATURE SPRING SOCKET				HAND INSERTION TOOL (1)	BENCH TOP MACHINE (2) "U" SERTOR	
TYPE BOTTOM	SERIES NO. (3)	HEAD DIA "A" (Max.)	LENGTH "B" ± .20 [.008]			
Flat	1	1.50 [.059]	3.30 [.130]	354700-1	N/A	
			3.30 [.130]			
			3.61 [.142]			
			4.27 [.168]			
	2	1.78 [.070]	3.50 [.138]	354700-2		
			3.50 [.138]			
			6.60 [.260]			
3	2.03 [.080]	3.50 [.138]	354700-3			
3	2.03 [.080]	6.53 [.257]	354700-3			
Bullet Nose	1	1.68 [.066]	4.07 [.158]	354700-1	817917-1	
	1	1.68 [.066]	4.67 [.184]	354700-1	817917-1	
	2	1.78 [.070]	4.27 [.168]	354700-2	817917-2	
			1.91 [.075]			4.01 [.158]
			1.91 [.075]			4.67 [.184]
	3	2.03 [.080]	7.37 [.290]	354700-3	817917-3	
	4	2.24 [.088]	6.60 [.260]	354700-4	817917-4	
	5	3.05 [.120]	7.82 [.308]	354700-5	817917-5	

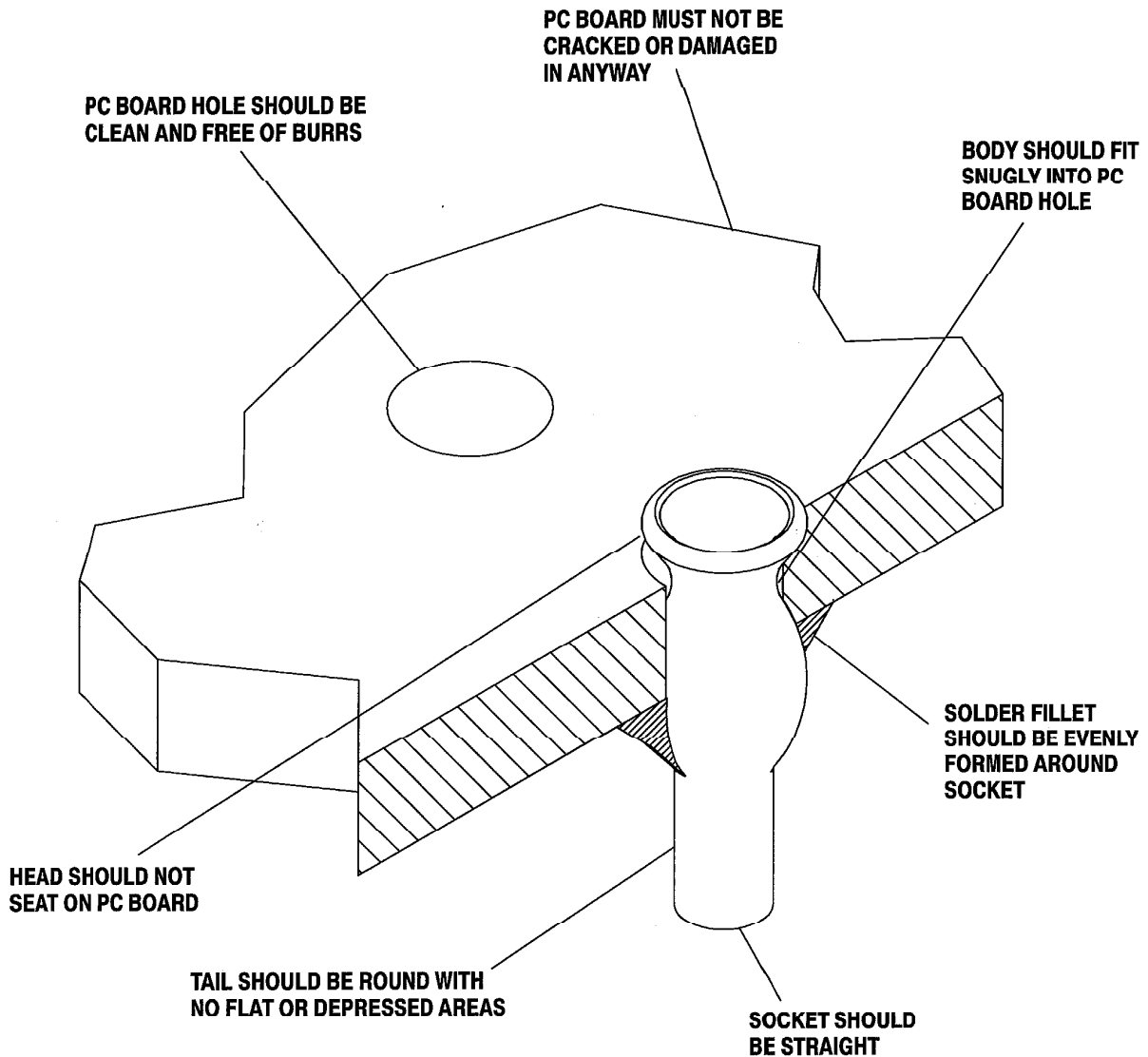
**NOTES**

- (1) Inserted height is not adjustable with the hand tools. For special applications, consult AMP Engineering.
- (2) Inserted height listed covers the variable product limits of the application tooling. If there are no special customer requirements, set the machine to insert product to .64 mm [.025 in.].
- (3) For the recommended pc board hole size, refer to the applicable customer drawing.

Figure 3

**5. VISUAL AID**

The illustrations depict, in general, the conditions that an assembler should check to visually ensure proper installation. For dimensional inspection, refer to the details in the preceding pages of this specification.



**FIGURE 4. VISUAL AID**