

customer manual

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SAFETY PRECAUTIONS AVOID INJURY

Safeguards are designed into this application equipment to protect operators and maintenance personnel from most hazards during equipment operation. However, certain safety precautions must be taken by the operator and repair personnel to avoid personal injury, as well as damage to the equipment. For best results, application equipment must be operated in a dry, dust-free environment. Do not operate equipment in a gaseous or hazardous environment.

- Carefully observe the following safety precautions before and during operation of the equipment:
- ALWAYS wear appropriate ear protection.
- ALWAYS wear approved eye protection when operating powered equipment.
- ALWAYS keep guard(s) in place during normal operation.
- ALWAYS insert power plug into a properly grounded receptacle to avoid electrical shock.
- ALWAYS turn off the main power switch and disconnect electrical cord from the power source when performing maintenance on the equipment.
- NEVER wear loose clothing or jewelry that may catch in moving parts of the application equipment.
- NEVER insert hands into installed application equipment.
- NEVER alter, modify, or misuse the application equipment.

TOOLING ASSISTANCE CENTER

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

The **Tooling Assistance Center** offers a means of providing technical assistance when required.

In addition, Field Service Specialists are available to provide assistance in the adjustment or repair of the application equipment when problems arise which your maintenance personnel are unable to correct.

INFORMATION REQUIRED WHEN CONTACTING THE TOOLING ASSISTANCE CENTER

When calling the Tooling Assistance Center regarding service to equipment, 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 avoided 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. Equipment 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

PROPER USE GUIDELINES

Cumulative Trauma Disorders can result from the prolonged use of manually powered hand tools. Hand tools are intended for occasional use and low volume applications. A wide selection of powered application equipment for extended-use, production operations is available.

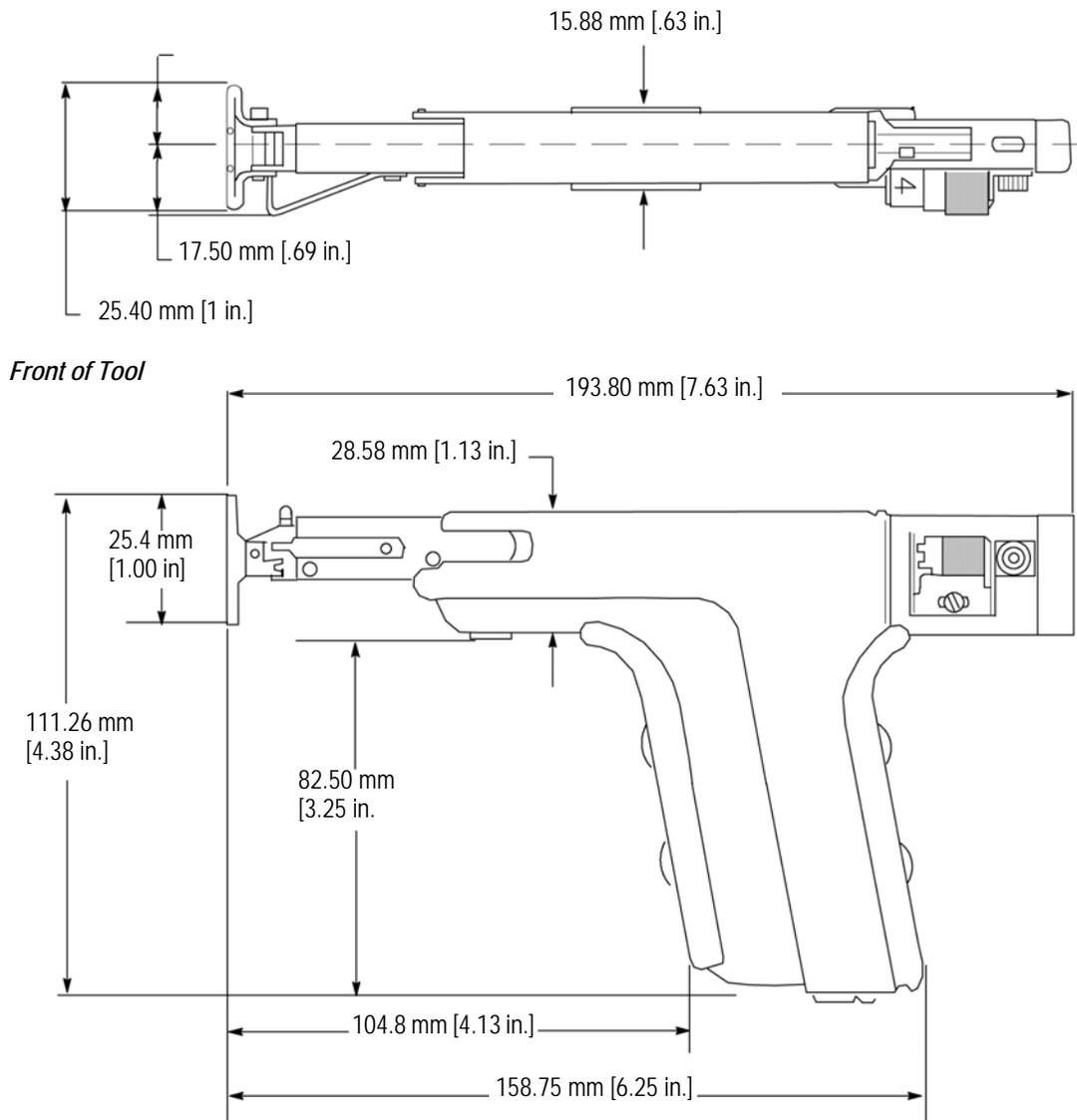


Figure 1

1. INTRODUCTION

TE TERMI-POINT Strip-Fed Tool 69702 (Figure 1) uses the interchangeable mandrels listed in Figure 2 to terminate wires onto rectangular posts with TERMI-POINT .031 in. x .093 in. clips. These clips are automatically fed into the tool in strip form.

NOTE



This tool was designed primarily for use in maintenance and repair work and not for production line use. The following instructions are to be used as a general operating and maintenance procedure for the TERMI-POINT strip-fed manual application tool.

Reasons for revision to this manual are provided in Section 8, REVISION SUMMARY.

Read this manual thoroughly before operating the TERMI-POINT tool. The performance of the tool will depend largely upon the intelligent use of the information contained in this manual.

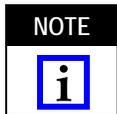
When reading this manual, pay particular attention to **DANGER**, **CAUTION**, and **NOTE** statements.



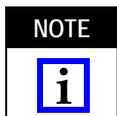
Denotes an imminent hazard which may result in moderate or severe injury.



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



Highlights special or important information.



Dimensions in this manual are in metric units [with U.S. customary units in brackets].

2. PRODUCT / TOOLING CROSS-REFERENCE

TERMI-POINT MANUAL SERVICE TOOL 69702				
WIRE (AWG) SOLID OR STRANDED (7 STRANDS)	INSULATION DIAMETER RANGE (mm [in.])	MANDREL	ELECTRO-TIN PLATED CLIP [40 Strips 25 Each]	MANDREL AND CLIP COLOR CODE
20	1.17-1.65 [.046-.065]	69561	2-330854-4	Yellow
	1.68-2.16 [.066-.085]	69561-1		
24	1.40-1.65 [.055-.065]	69561-4	4-330854-1	Red

MANUAL SERVICE TOOL 69562-2						
WIRE (AWG) SOLID OR STRANDED (7 STRANDS)	INSULATION DIAMETER RANGE (mm [in.])	MANDREL	CLIPS [40 Strips / 25 Each]			MANDREL AND CLIP COLOR CODE
			TIN PLATED	GOLD PLATED	TIN-NICKEL PLATED	
22	0.99-1.14 [.039-.045]	69551-8	4-330495-4	5-330495-1	4-330495-4	Orange
	1.14-1.65 [.045-.065]	1-69411-4				
24	0.84-1.14 [.033-.045]	69551-9	2-330495-4	--	2-330495-4	Red
	1.14-1.65 [.045-.065]	1-69411-3				
26	0.71-1.14 [.028-.045]	69551-6	1-330495-5	--	1-330495-5	Brown
	1.14-1.40 [.045-.055]	1-69411-9				
28	0.61-1.14 [.024-.045]	69551-5	--	330495-1	--	Black

Figure 2

3. OPERATING INSTRUCTIONS



Avoid unnecessary cycling of an empty tool to prevent damage to the tool.

3.1. Pre-Operation Check

Prior to operation be sure to check the following items and make any necessary adjustments to the tool.

1. Be sure the mandrel is properly installed, as described in Paragraph 3.2.
2. Be sure the tool is properly loaded with product, as described in Paragraph 3.3.
3. Be sure the clip positioning adjustment is set (Paragraph 3.4) and the clip positioning assembly adjustment is correct (Paragraph 6.4).
4. Be sure the insulation stripping adjustment is correct, as described in Paragraph 6.2.
5. Be sure the push rod adjustment is correct (Paragraph 6.3,B) and the distance between the clip and the mandrel is as specified in Figure 17.

3.2. Mandrel Installation

1. Remove the mandrel holding screw and the alignment foot from the front of the tool. See Figure 3.
2. Pull the insulation ejector away from the tool to permit installation of the mandrel.
3. Insert the mandrel into the front of the tool. Install the mandrel so that, with clips in the tool, the tail of the mandrel enters the open portion of the first clip.
4. Replace the alignment foot and the mandrel holding screw.



Tighten the mandrel holding screw only enough to hold the mandrel in place. Excessive tightening may distort the front of the tool.

5. Align the insulation ejector with the insulation slot in the mandrel.

3.3. Loading/Unloading

A. Loading

1. Select product for the tool, mandrel, and wire size being used. Refer to the tables in Figure 2.
2. Insert the clips into the clip feed slot. See Figure 4. The insulation support (strain relief) of the clip must be "up" and facing toward the front of the tool.

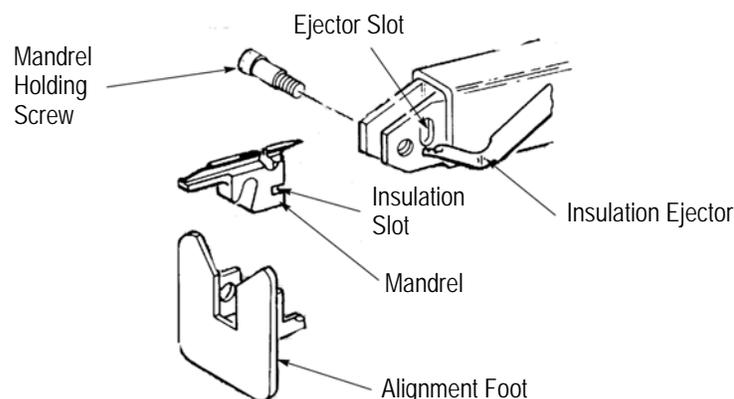


Figure 3

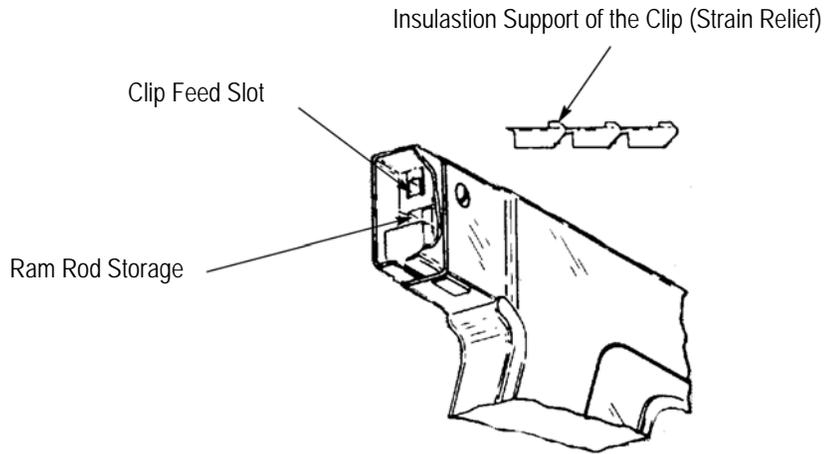


Figure 4

3. Use the ram rod loader, attached to the cap on the end of the tool, to push the strip into the clip feed slot until the strip is visible in the hole in the side of the tool. **DO NOT FORCE CLIPS.** See Figure 5.
4. Squeeze the trigger, then use the ram rod loader to feed clips forward until clip snaps into position behind the mandrel.
5. Return the ram rod loader to the ram rod storage section of the tool. See Figure 6.

B. Unloading

1. Remove the mandrel.
2. Partially depress the trigger, then push the cap (on the end of the tool) forward to reset the clip feed mechanism.

NOTE *If the trigger is fully depressed, a clip will be cut from the clip train strip.*



3. Repeat Step 2 as many times as necessary to remove the unused portion of the clip train strip from the tool.

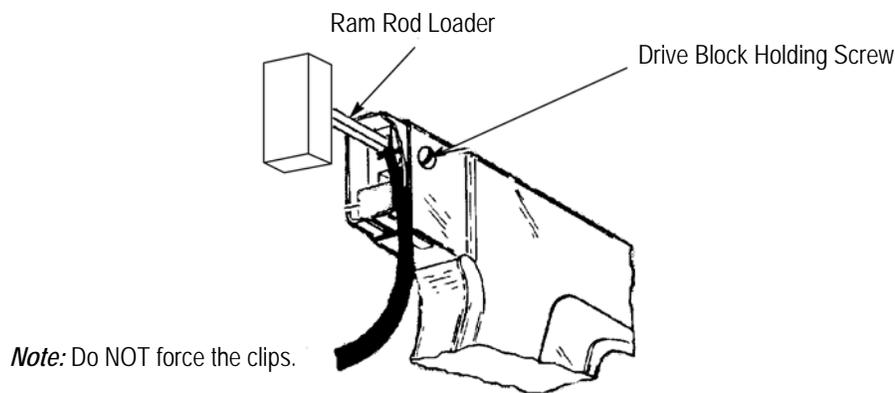


Figure 5

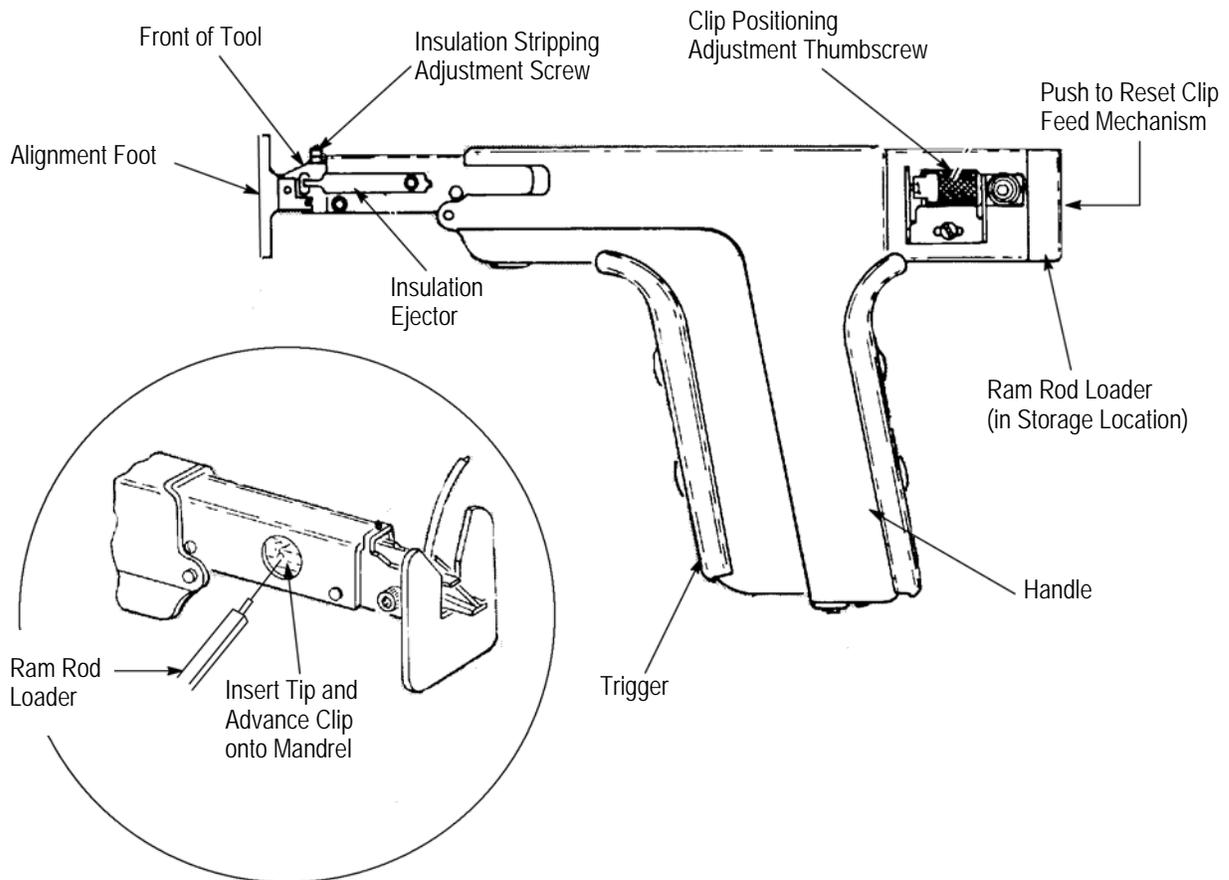


Figure 6

3.4. Clip Positioning Adjustment

The clip positioning adjustment thumbscrew (Figure 6) controls the position of the clip when it is applied to the post. When applying three clips to a post, set the positioning adjustment thumbscrew to "3." This positions the first clip at the bottom of the post. Then set the positioning adjustment thumbscrew to "2" in order to place the second clip in the middle of the post. Finally, set the positioning adjustment to "1" to position the third clip on the top of the post. When applying two clips to a post, begin with the "2" setting, and when applying one clip to a post, use the "1" setting. Use the following procedure to make an adjustment.

1. Refer to Figure 7 to determine the maximum number of clips to be applied to a post.
2. Rotate the positioning adjustment thumbscrew so that the desired number appears, as shown in Figure 7. The table in Figure 7 indicates the maximum number of clips to be applied to a post. If less than the maximum is desired, (i.e., two clips on a three clip post, allowing space at the bottom for wire routing) set the adjustment to the number required less than post capacity.

MAXIMUM POST HEIGHT	MAXIMUM NUMBER OF CLIPS	Clip Positioning Adjustment Setting
Tool 69702		
12.70mm [.50 in.]	1	
19.05mm [.75 in.]	2	
25.40mm [1.0]	3	

Figure 7

NOTE

If the clip positioning assembly requires adjustment, refer to Paragraph 6.4, Clip Positioning Assembly Adjustment.



3. The tool is now ready to apply clips.

3.5. General Operating Procedure

1. Insert unstripped wire into the hole in the top of the mandrel. See Figure 8.

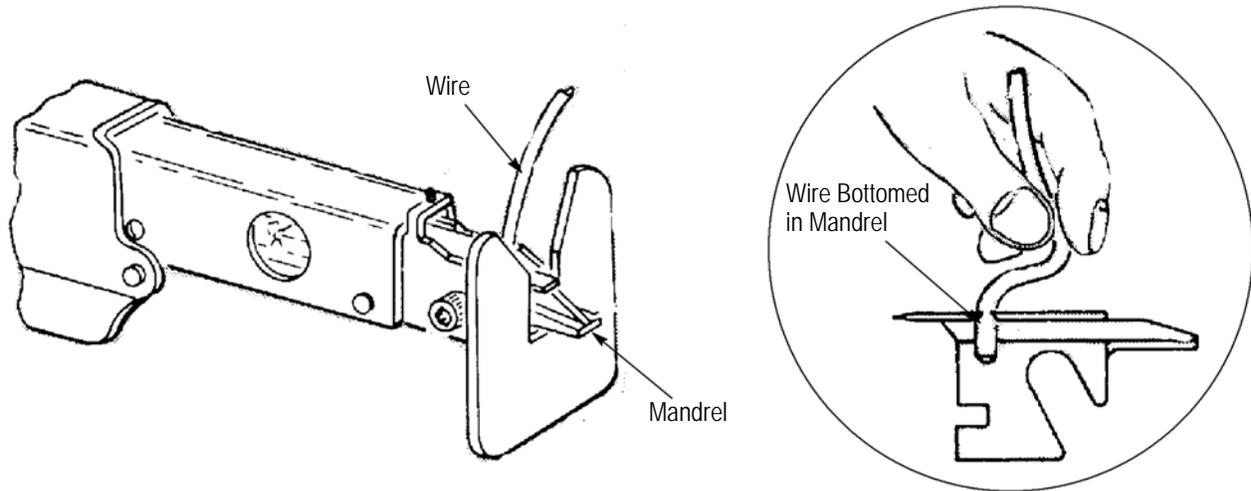


Figure 8

2. Slowly squeeze the trigger until it bottoms against the handle, then release the trigger. The clip is now ready to be applied to the post.

3. Hold the tool perpendicular to the panel and slip the exposed clip over the end of the post. See Figure 9.

NOTE

The alignment foot rests on the post(s) and aids in maintaining both vertical and horizontal alignment of the tool with the post(s).

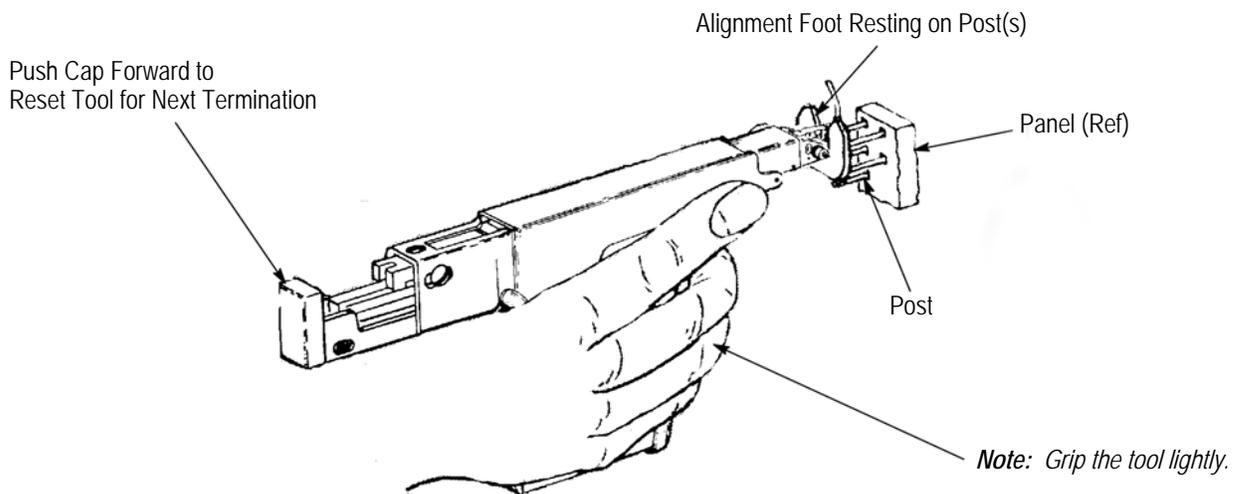


Figure 9

4. Grip the tool lightly, then push, using a steady even pressure until the clip reaches the desired position on the post.



Always complete a termination after the trigger has been depressed. If the tool is reset and the trigger is depressed a second time without completing a termination, two clips will be fed onto the mandrel, causing a jam.

5. Remove the tool from the post. A properly terminated post should appear as shown in Figure 10. Be certain that stripped conductor, not insulation, is visible at the back end of the clip.

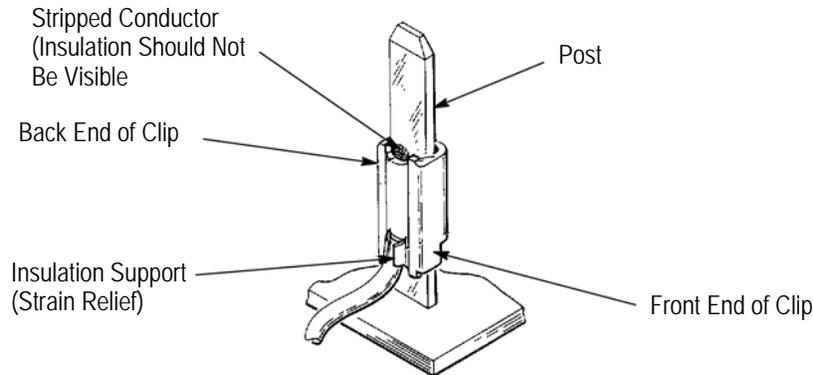


Figure 10

6. With the trigger released, push the cap on the back of the tool (Figure 9) fully forward to reset the tool for the next termination.

7. Push the insulation ejector to remove the stripped insulation from the tool before inserting the next wire. Refer to Figure 11.

8. Repeat Steps 1 through 7 for the next termination.

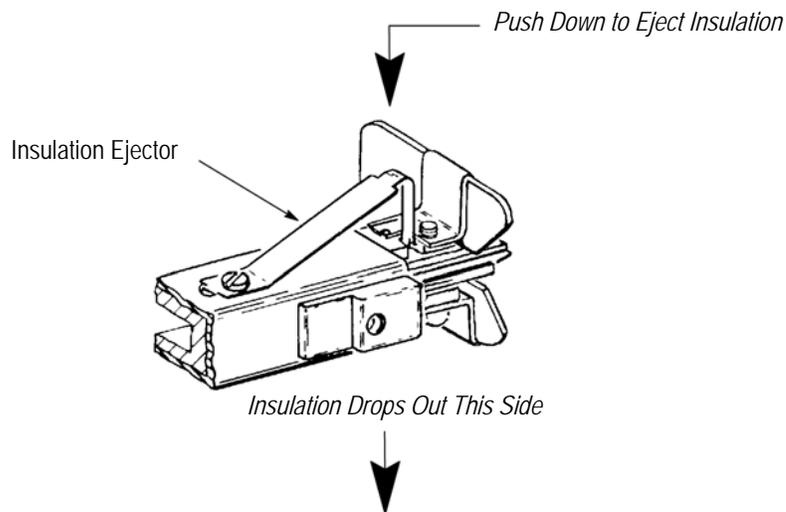


Figure 11

4. PREVENTIVE MAINTENANCE

The following items should be checked periodically to ensure proper operating efficiency of AMP TERMI-POINT tooling.

4.1. Tool Inspection

1. Be certain the screws (Figure 19, Items 6, 10, 26 and 27) are tight.
2. Clean the tool and remove insulation scraps on a regular basis.
3. Cycle the tool and observe the operation of the tool. If binding of moving parts is noted, lubricate the tool as described in Paragraph 4.3.

4.2. Mandrel Inspection

Check the mandrel for nicks and burrs. Refer to Figure 12. Nicks and burrs on the mandrel can cause clip jams and damage to other related parts.

1. Remove the mandrel and mandrel tail or anvil clip from the tool.
2. Use a magnifying glass or a fingernail to detect the location of nicks and burrs.

CAUTION

Avoid the following causes for nicks and burrs on the mandrel:

- *Cycling the tool continuously without clips installed*
- *Inserting a scribe or sharp object in the stripping groove area to remove stripped insulation*
- *Using a scribe or sharp object improperly to remove the jammed clips from the mandrel*
- *Inserting a scribe or sharp object in the stripping groove area to remove the mandrel from the tool*
- *Cycling the tool continuously with clips jammed on the mandrel*

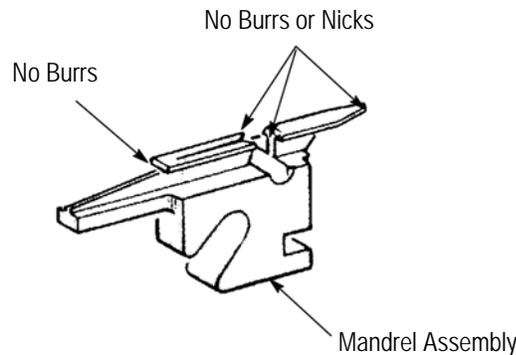


Figure 12

3. Use a suitable oilstone to grind the burrs off the exterior edges of the mandrel.

CAUTION

Always move the stone lengthwise along the mandrel. See Figure 13.



4. Clean the repaired parts and re-assemble the tool.

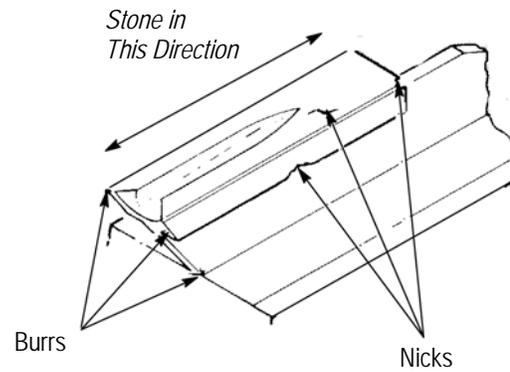


Figure 13

4.3. Lubrication

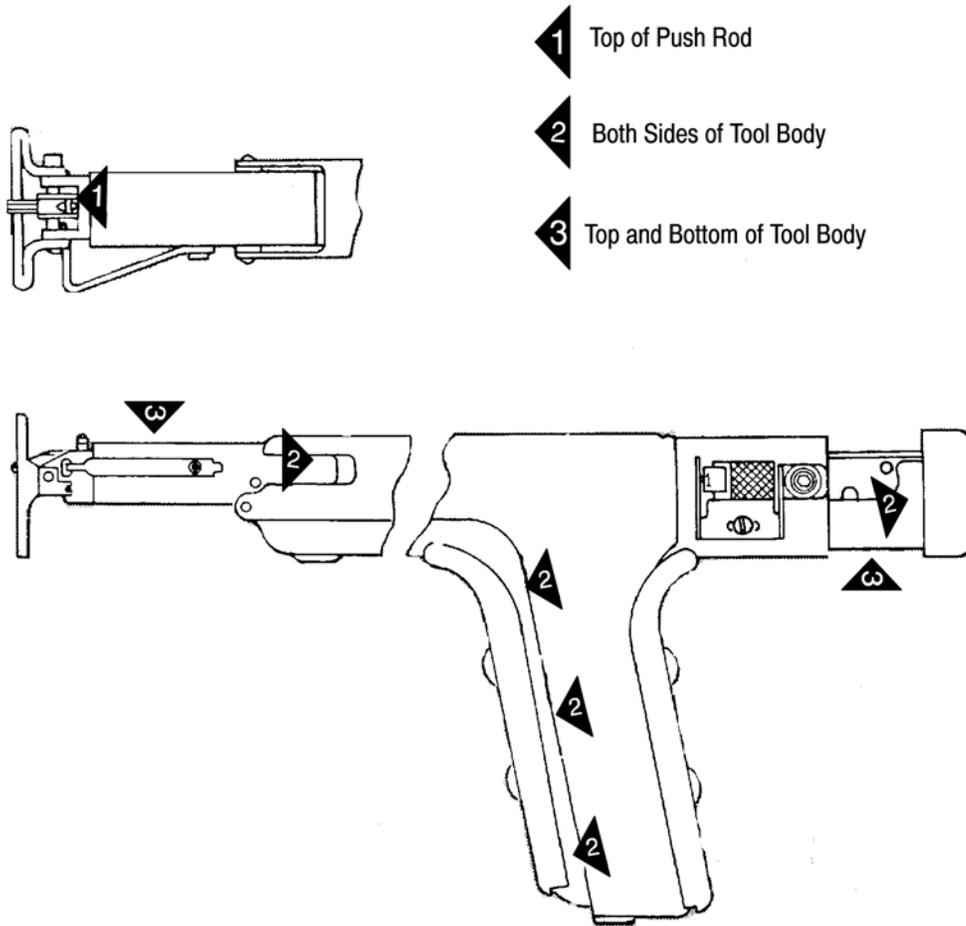
A periodic lubrication schedule, using any good grade SAE 20 motor oil, should be maintained at the interval specified in Figure 14.

1. Squeeze the tool handles to expose the push rod.
2. Apply a light coat of lubricant to the top of the push rod.



Do not allow the lubricant to contact the clips or clip contact surfaces (such as the mandrel).

3. Lubricate the tool body in the areas shown in Figure 14.



AREA	LOCATION	LUBRICATION INTERVAL
Push Rod	1	Every 500 Terminations
Tool Body	2 3	Every 1000 Terminations

Figure 14

5. TROUBLESHOOTING

Every TERMI-POINT tool is thoroughly inspected before leaving the factory and should be in perfect operating condition when it reaches the customer. If, at anytime, the tool does not function properly, follow the troubleshooting chart in Figure 15 and the adjustments in Section 6.

Replacement parts can be found in Section 7.

SYMPTOM	PROBABLE CAUSE	REMEDY
Clips do not feed from tool	<ol style="list-style-type: none"> 1. Clips not properly seated in the tool 2. Incorrect clip or mandrel 3. Broken or bent push pin 4. Push rod riding over clips 5. Broken clip train 	<ol style="list-style-type: none"> 1. Refer to Paragraph 3.3,A, Loading. 2. Be certain the correct clip, mandrel, and wire combination is being used. See Figure 2. 3. Refer to Paragraph 6.3, Push Rod Replacement. 4. Correct insulation stripping adjustment (Para. 6.2.) 5. Refer to Paragraph 3.3,A, Loading.
Clips jam in the tool	<ol style="list-style-type: none"> 1. Clip improperly inserted into tool 2. Incorrect clip or mandrel 3. Incorrect application 4. Push rod riding over clips 	<ol style="list-style-type: none"> 1. Refer to Paragraph 3.3,A, Loading. 2. Be certain the proper clip, mandrel and wire combination is being used. See Figure 2. 3. Refer to Paragraph 3.5, General Operating Procedure. 4. Correct the insulation stripping adjustment (Paragraph 6.2)
Clips index onto the mandrel.	Incomplete cycling of tool	Always complete a termination after the trigger has been depressed.
Clip is mangled or distorted when applied to post	Incorrect clip or mandrel	Be certain the proper clip, mandrel, and wire combination is being used. See Figure 2.
Wire is not stripped cleanly or completely.	<ol style="list-style-type: none"> 1. Incorrect clip, wire or mandrel. 2. Worn or broken mandrel 3. Incorrect insulation stripping adjustment 	<ol style="list-style-type: none"> 1. Be certain the proper clip, mandrel, and wire combination is being used. See Figure 2. 2. If badly worn or broken, replace the mandrel as described in Paragraph 6.1. 3. Correct the insulation stripping adjustment (Paragraph 6.2.)
Nicked or cut conductor.	<ol style="list-style-type: none"> 1. Incorrect clip, wire or mandrel. 2. Worn or broken mandrel 3. Incorrect insulation stripping adjustment 	<ol style="list-style-type: none"> 1. Be certain the proper clip, mandrel, and wire combination is being used. See Figure 2. 2. If badly worn or broken, replace the mandrel as described in Paragraph 6.1. 3. Correct the insulation stripping adjustment (Paragraph 6.2.)
Clips do not stack properly.	Incorrect clip positioning adjustment	Refer to Paragraph 3.4, Clip Positioning Adjustment.
Clip has low tensile strength.	<ol style="list-style-type: none"> 1. Incorrect clip, wire or mandrel 2. Incorrect insulation stripping adjustment 	<ol style="list-style-type: none"> 1. Be certain the proper clip, mandrel, and wire combination is being used. See Figure 2. 2. Correct the insulation stripping adjustment adjustment (Paragraph 6.2).

Figure 15

6. MAINTENANCE AND ADJUSTMENTS

6.1. Mandrel Replacement

If a mandrel becomes broken or worn, it will become necessary to replace the mandrel to insure proper clip application. Refer to Figure 2 to select the appropriate mandrel. Be certain the correct part number is specified when ordering.

6.2. Insulation Stripping Adjustment

The TERMI-POINT tool has an adjustment screw (shown in Figure 6) to control the stripping action provided when the push rod forces the clip over the mandrel. These tools are set at the factory and should not require adjustment. However, if the tool is not stripping the wire properly (i.e, nicked conductor strands or insulation not stripped from the wire), adjust the tool as follows:

1. Turn the insulation stripping adjustment screw clockwise to increase the strip depth, or counterclockwise to decrease the strip depth.
2. Make a test termination to check the stripping action.
3. Repeat Step 1 and Step 2 until the desired stripping action is obtained.

6.3. Push Rod Replacement/Adjustment

NOTE

Refer to Figure 19 for an exploded view drawing and parts identification list of TERMI-POINT tool 69702.



A. Push Rod Replacement

If clips do not feed from the tool, the push rod may be broken or bent. Refer to Figure 19, Item 2. The push rod can be replaced without completely dismantling the tool. However, the clips must be removed from the tool, as described in Paragraph 3.3.B, Unloading. Remove the push rod as follows:

1. Remove the ram rod loader.
2. Remove two screws (Figure 19, Item 6 and Item 26) from the rear of the tool.
3. Extract the push rod, push rod plate, and drive block from the rear of the tool.

Replace the push rod as follows:

1. Squeeze and hold the trigger until it bottoms against the handle. *Do not release the trigger. See Figure 16, Detail A.*
2. Insert the push rod plate, wide end first, into the rear of the tool. Be sure that the hooks on the push rod plate engage in the left and right side plates. See Figure 16, Detail A.
3. Slide the push rod along the top of the push rod plate until the flange on push rod is even with the rear of the tool. See Figure 16, Detail B.
4. Install the drive block so that the flanges on the push rod engage the notches on on the drive block.

NOTE

The push rod plate must be positioned between the drive block and the push rod. See Figures 16, Detail B and Figure 16, Detail C.



5. Insert the assembled push rod, drive block, and push rod plate in the rear of the tool so that the front end of the push rod enters the push rod groove. See Figure 16, Detail D.
6. Replace removed screws.
7. Replace the ram rod loader.

B. Push Rod Adjustment

The push rod can be adjusted to control the amount of travel during clip application. The tools are set at the factory and the push rod should not normally require further adjustment. However, if improper feed or positioning occurs, or if the push rod has been replaced, perform the following check and make the adjustment as required.

Check the push rod adjustment as follows:

1. With the tool loaded, squeeze and hold the handle to keep the push rod fully extended onto the mandrel.
2. With the push rod fully extended, measure the distance from the front of the clip to the front of the mandrel. See Figure 17. If the dimension is not within the range specified in Figure 17, adjustment is required.

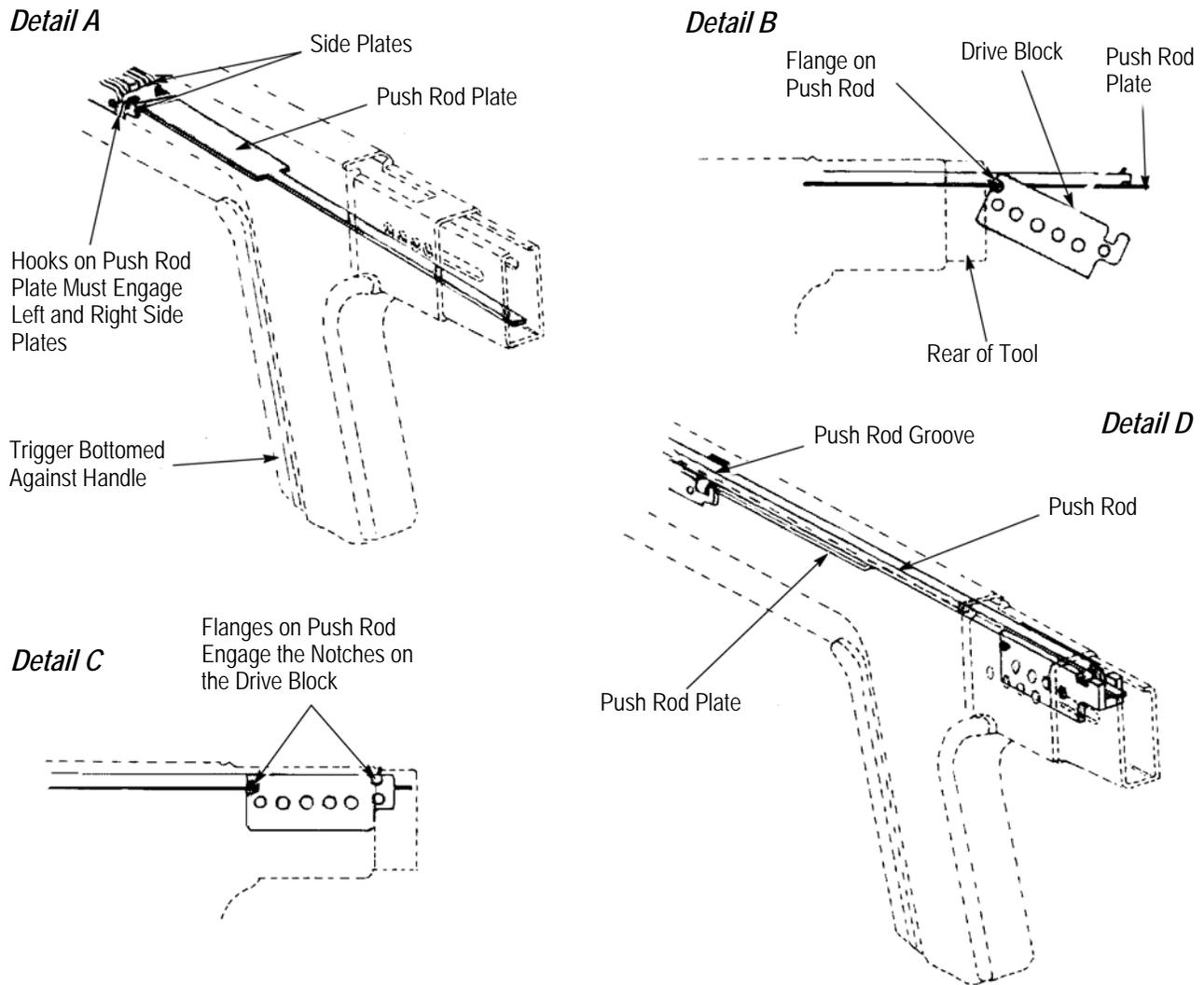


Figure 16

Adjust the push rod as follows:

1. Remove the loading tool, break the clip train strip as it enters the rear of the tool, and remove the reel holder (reel bracket).
2. Loosen the adjustment screw behind the clip positioning adjustment thumbscrew. See Figure 18.
3. Move the push rod and drive block forward or backward as required to obtain the required dimension shown in Figure 17.
4. Tighten the adjustment screw behind the clip positioning adjustment thumbscrew. See Figure 18.
5. Install the reel holder and replace the loading tool.
6. Push the cap on the back of the tool forward to reset the tool. The tool is now ready for operation. Use the clips remaining on the strip inside the tool, and then reload the tool with a clip strip from the reel. Refer to Paragraph 3.3.

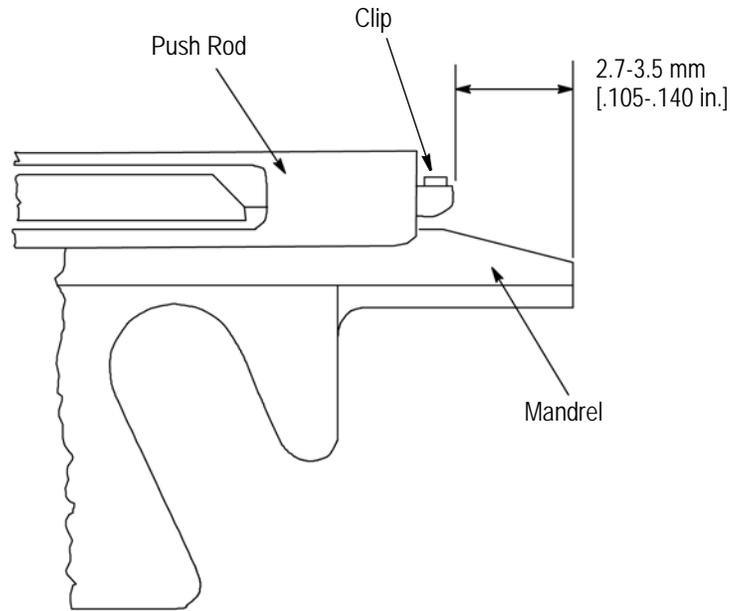


Figure 17

6.4. Clip Positioning Assembly Adjustment

The TERMI-POINT tool has an adjustment to control the distance travelled by the first clip onto a post. These tools are preset at the factory and should require no further adjustment. However, adjustment may be necessary when replacing the push rod. Use the following procedure to make the clip positioning adjustment.

1. Loosen the clip positioning assembly adjustment screws. Refer to Figure 18.
2. Slide the clip positioning assembly toward the rear of the tool to increase the distance travelled by the clip; slide the clip positioning assembly toward the front of the tool to decrease the distance travelled by the clip.
3. Move the clip positioning assembly gradually, tighten the adjustment screws, and make test terminations to check the clip position. Refer to Figure 18.
4. Repeat Step 2 and Step 3 until the required position is achieved.

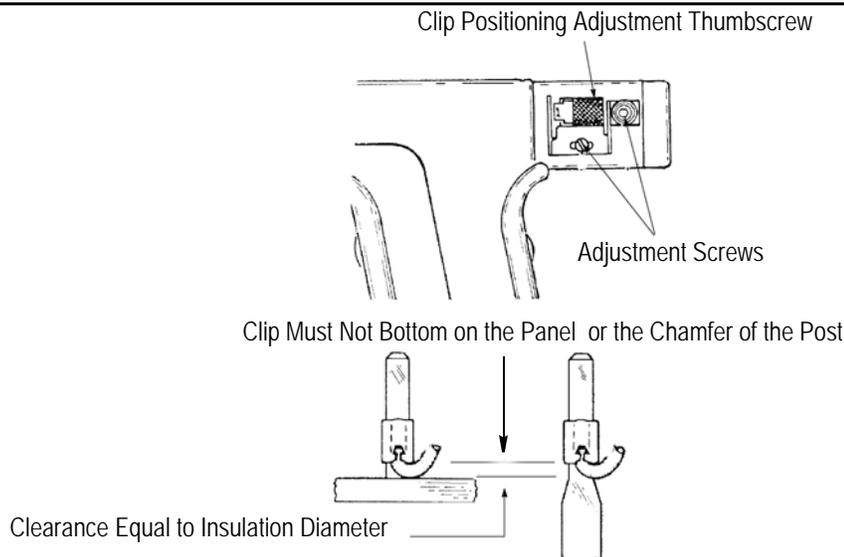


Figure 18

7. REPLACEMENT

Refer to Figure 19 for TERMI-POINT Tool 69702. The first sheet of each figure contains part numbers, item identifications, and descriptions. the second sheet contains exploded view drawings.

8. REVISION SUMMARY

Since the previous release, the inch dimension in Figure 17 was changed from .195 inches to .105 inches.

TERMI-POINT Tool 69702

ITEM	PART NUMBER	PART DESCRIPTION	QTY PER ASSY
1	239494	PLATE, Push Rod	1
2	239484-1	PUSH ROD ASSEMBLY	1
3	239480-1	DRIVE BLOCK	1
4	239487-1	BODY ASSEMBLY	1
5	21028-5	PIN, Roll, .062 in. x .437 in. L	2
6	4-24364-1	SCREW, Machine, Pan Head	1
7	241469	SPRING, Insulation Ejector	1
8	21060-1	SCREW, Self-Tapping, No.2 x .125 in. L	1
9	8-22140-6	SCREW, Ski Hd Cap	1
10	6-21000-4	SCREW, Mandrel Holding	1
11	(Refer 10 Figure 2)	MANDREL	1
12	306535-1	ALIGNMENT FOOT	1
21	241477-3	LOADER, Ram Rod	1
24	240413-2	SPACER	2
25	21026-1	LOCKWASHER, Heavy, NO. 4	1
26	240447-1	SCREW, Ski Hd Cap, 4-40 UNC x .128 in. L	1
27	21060-1	SCREW, Self-Tapping, No.2 x .125 in. L	1
28	246555-3	CLIP POSITIONING ASSEMBLY	1
29	265501-1	PIN, Spiral, .062 in x .375 in. L	4
30	239493	SIDE PLATE, Left	1
31	239489-1	BRACKET, Left	1
32	239490	PLATE, Support	2
33	239491	LEVER CATCH, Left	1
34	239491	LEVER CATCH, Right	1
35a	239752-1	GUIDE, Rib Support	1
35b	239492-1	GUIDE, Rib	1
36	239495	SPRING, Lever Calch	1
37	239489-2	BRACKET, Right	1
38	239488	SIDE PLATE, Right	1
39	21028-6	PIN, Roll, .062 in. x .50 in. L	1
40	241451-1	BODY	1
41	241485-2	HANDLE ASSEMBLY, Sliding	1
42	239723-1	HANDLE ASSEMBLY, Fixed	1
43	241470	PIN	1
44	2-21986-7	RING, Relining	1
45	21055-4	SPACER	2

Figure 19 (Cont'd)

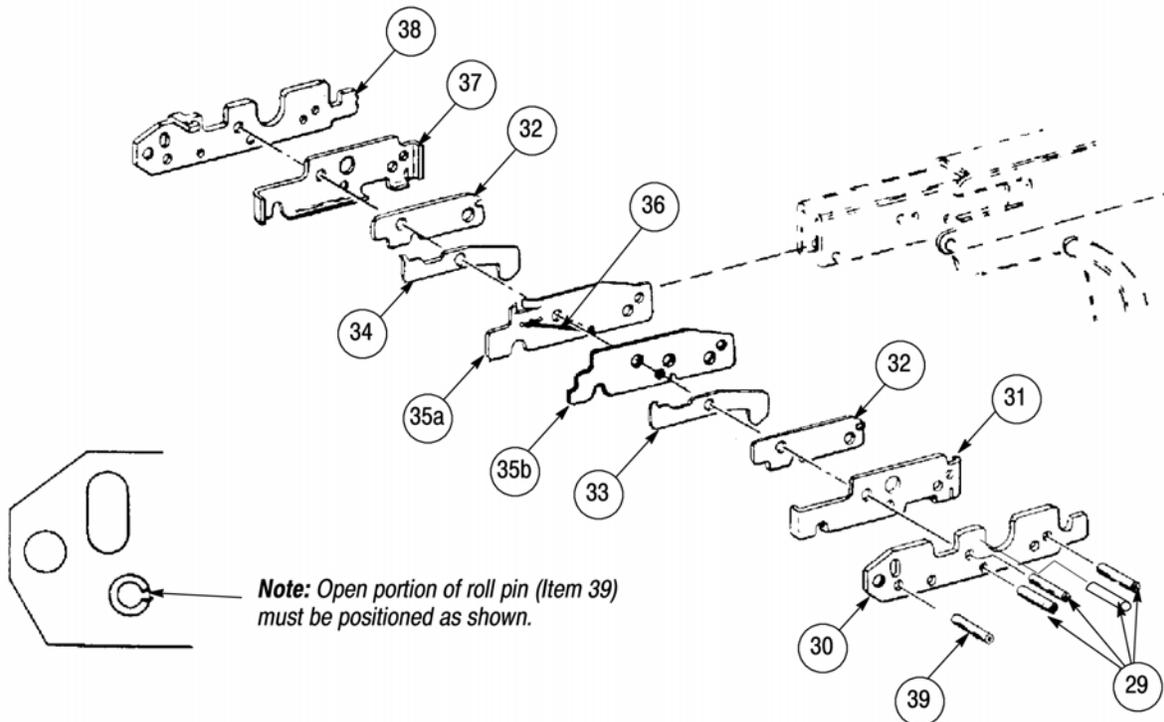
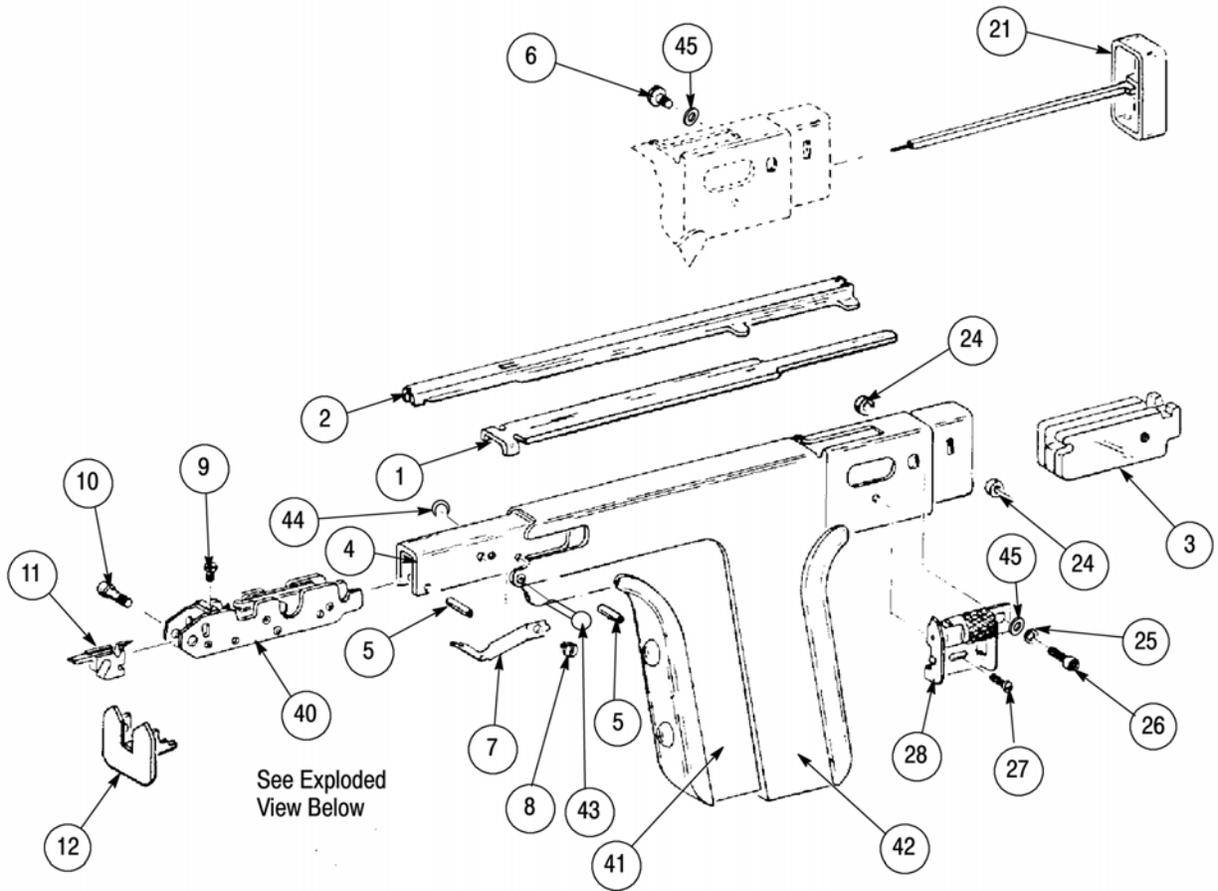


Figure 19 (End)