

Figure 1

1. INTRODUCTION

Miniature Quick-Change Applicators, of the end-feed type, are designed to crimp end-feed strip terminals to prestripped wires. Each applicator is set up to accept the strip form of certain specific terminals. These terminals are identified on the Applicator Parts List (Applicator Log) for each applicator. The terminal number on the data plate indicates the terminal that was specified when the applicator was ordered.

Although each applicator will accept only certain terminals, a valuable measure of application flexibility is provided by means of a wire crimp that can be readily adjusted for as many as four different wire sizes, and an insulation crimp that can be adjusted to accept eight variations of insulation diameter. These applicators are adaptable to various machines, provided that the machine has the correct stroke and is properly equipped.

NOTE



Use this instruction sheet, with the parts list and exploded view drawing packaged with the applicator, and the appropriate machine manual (409-5128 for the Basic AMP-O-LECTRIC* Machine, or 409-5289 for the Model "T" Terminating Unit).

NOTE



All dimensions on this document are in metric units [with U.S. customary units in brackets]. Figures and illustrations are for identification only and are not drawn to scale.

2. DESCRIPTION

Major components of the applicator are identified in Figures 1 and 2. The terminal strip is inserted into the applicator, "barrel end" (wire end) first, between the front (outer) and rear (inner) strip guides. It then passes under the stock drag, and the LEAD terminal is positioned ahead of the feed finger. The feed finger advances the terminal strip one terminal length during each cycle of the machine (unit). This is accomplished by mechanical action of the feed cam on the ram assembly and the feed finger.

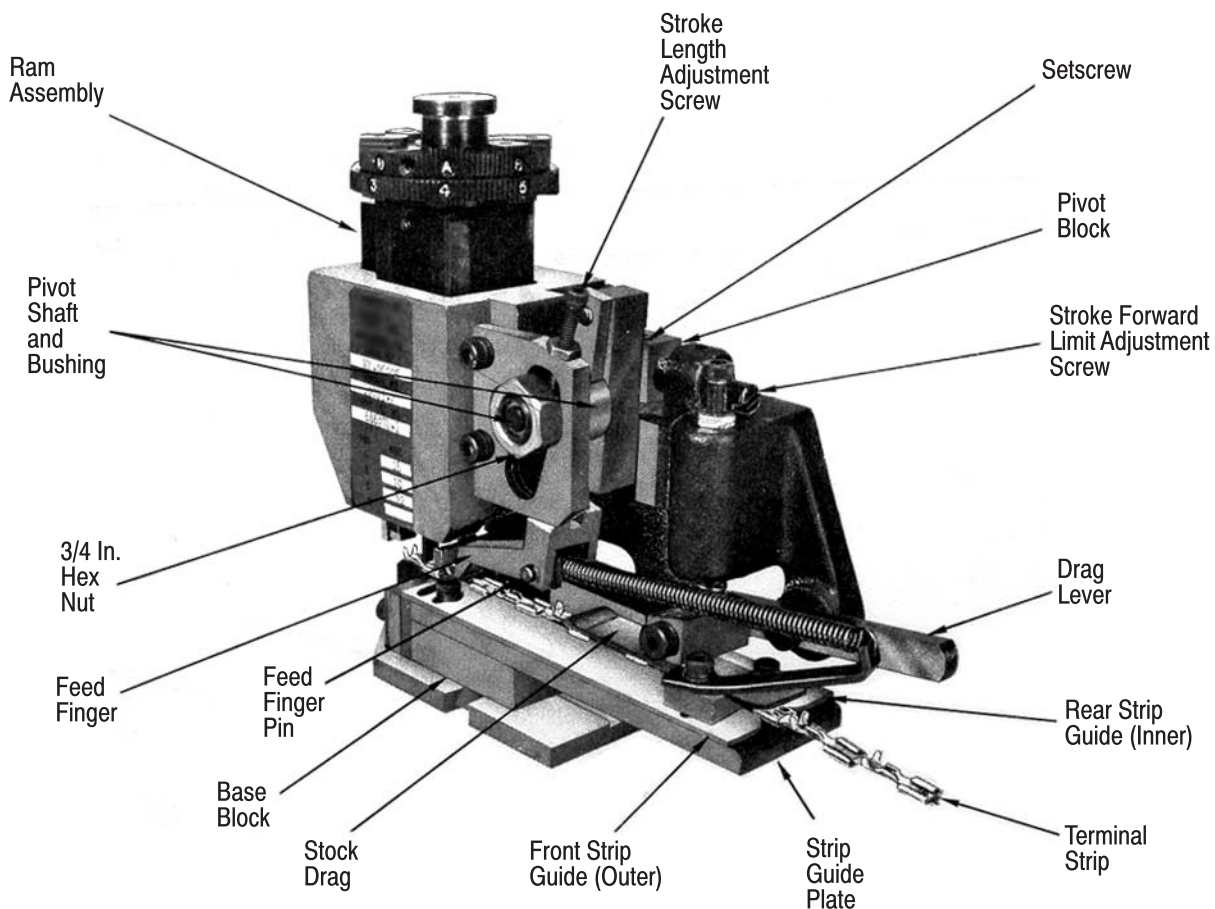


Figure 2

Two lengths of feed cams are available for this applicator, and the feed cam to be used is dependent upon the machine stroke. For example, a machine with a 28.6 mm [1 1/8 in.] stroke MUST use an applicator with a SHORT feed cam (39.7 mm [1 9/16 in.] long), while a machine with a 41.3 mm [1 5/8 in.] stroke MUST use an applicator with a LONG feed cam (52.4 mm [2 1/16 in.] long). Feed cams of both lengths are available in the POST-FEED type. Only the short cam is available in the PRE-FEED type. Note, however, that ONLY the LONG POST-FEED type can be used in applicators installed in automated equipment. The POST-FEED type cam advances the lead terminal over the anvil on the DOWNWARD stroke of the ram assembly, which leaves the anvil clear when the machine is in the at-rest position. The PRE-FEED type cam advances the lead terminal over the anvil on the UPWARD movement of the ram assembly, which results in a terminal always being over the anvil when the machine is at rest.

The ram mounting post of the ram assembly (shown in Figure 3) engages with the post adapter of the machine ram, and it is the machine ram that actuates the applicator. Just below the ram mounting post is a

wire disc and an insulation disc. The wire disc has as many as four pairs of pads, with each pair being of a different height. By rotating the disc, each of the several pairs can be aligned with the two bosses on the machine ram (post adapter) to vary the depth of stroke of the wire crimper over the anvil (refer to Figure 3).

The insulation disc contains eight pads of differing heights. Rotating this disc aligns the different individual pads with the insulation adjustment block, to vary the insulation crimp height in relation to the ram assembly and wire crimper stroke.

Attached to the bottom of the ram assembly is the wire crimper, retained in a preset position by the crimper bolt. The insulation crimper is also retained by the crimper bolt, but is free to move vertically in order that the insulation crimp may be adjusted in relation to the wire crimp. Also attached to the bottom of the ram assembly is the shear blade, which shears the lead terminal from the strip. Some applicators require a hold-down, which also attaches to the bottom of the ram assembly, to prevent the terminals from rising during the crimping process.

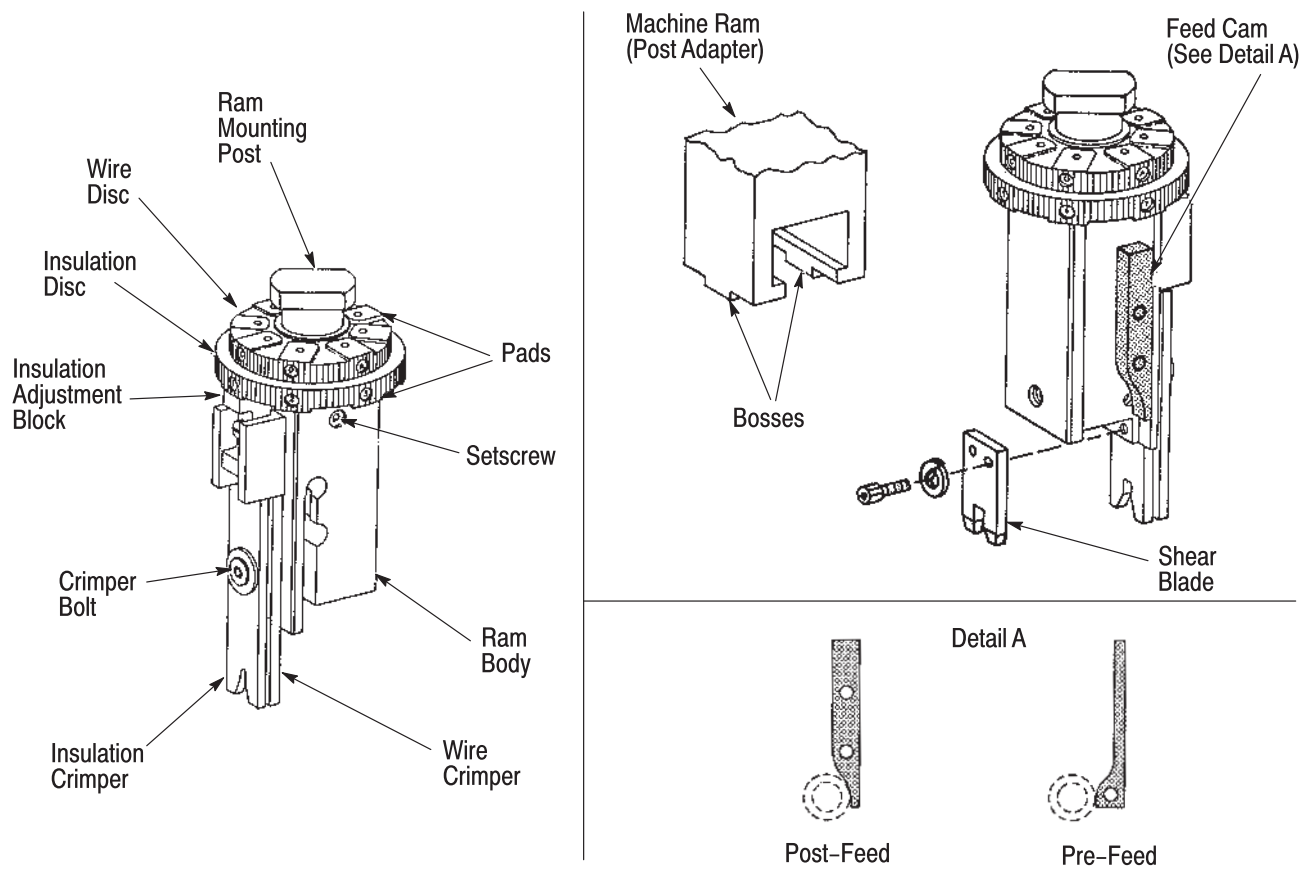


Figure 3

The applicator’s mounting surface is its base plate, and it is to this plate that the base block, strip guide plate, strip guides, front and rear shear plates, strip hold-down plate, and the anvil are secured. The anvil backs up the terminal during the crimping process. The shear plates are spaced to allow the shear blade to pass between and cut the lead terminal from the strip, or remove the connecting tab from between the lead terminal and the second terminal.

3. APPLICATOR INSTALLATION AND REMOVAL



With the applicator installed, NEVER ATTEMPT to cycle machine under power WITHOUT terminals properly loaded, as described in Section 4, APPLICATOR LOADING AND UNLOADING. To do so may result in damage to the tooling.

3.1. AMP-O-LECTRIC Terminating Machine

In order for the applicator to be used in an AMP-O-LECTRIC machine, the machine must first be equipped with Machine Conversion Kit 690675-2. This kit contains all of the necessary parts, and applicator Instruction Sheet 408-8022, which includes the procedures for installation and removal of the applicator.

3.2. Model “T” Terminating Unit

The Model “T” unit **MUST** be equipped with a Quick-Change Base Plate for Miniature Applicators. Applicator installation and removal is accomplished as follows:

1. Turn “off” or disconnect power to unit (machine).
2. Push IN the release bar on the quick-change base plate. Locking latch will pivot downward.
3. Place applicator on the quick-change base plate, then slide it back until the two notches engage the stops at back of plate. At the same time, guide the ram mounting post into the machine ram (post adapter).
4. Flip locking latch UP to secure applicator in place.
5. To remove applicator, cut strip one or two terminals from entry to strip guides. Then perform Step 2 and slide applicator forward until clear of machine ram.



If applicator is not to be immediately reinstalled, prepare for storage as described in Section 8, APPLICATOR STORAGE.

4. APPLICATOR LOADING AND UNLOADING

4.1. Terminal Strip Loading



Before attempting to load the terminal strip in the applicator, be CERTAIN the installed applicator is the proper one for the terminal to be applied. Compare the terminal number with the numbers listed on the applicator parts list.

1. Turn "off" or disconnect power to machine.
2. Be certain ram assembly is fully raised. If necessary, hand-cycle machine to obtain this condition (see applicable machine manual).
3. Remove the length of strip left in the applicator by grasping the terminal over the anvil with needle-nose pliers and pulling the strip straight out the front of the applicator.
4. With reel of terminals installed on reel support, feed terminal strip into applicator between two strip guides.



Be CERTAIN terminal strip enters strip guides with "barrel end" (wire end) first and open side up.

5. Depress drag lever, and feed terminals under stock drag and toward the feed finger.



Note that terminals are advanced in POST-FEED applicators on the DOWN stroke of the ram assembly, while in PRE-FEED applicators they are advanced on the UP stroke.

6. Raise feed finger and advance strip until feed finger engages proper feed area behind the SECOND terminal.
7. Be certain applicator is properly adjusted, as described in Section 5, ADJUSTMENTS, by performing several test cycles.

4.2. Terminal Strip Unloading

1. Cut the terminal strip at Or near the entry to the strip guides.



It is recommended that the applicator never be unloaded per se, but rather, that a section of terminal strip always be left in the unit. As it is not necessary to remove the strip section for cleaning, lubrication, or repair, its removal will normally occur only as a part of the loading procedure.

2. If terminals are POST-FED, depress drag lever, raise feed finger, and advance the lead terminal to a position over the anvil.

5. ADJUSTMENTS

5.1. Wire Crimp Adjustment

1. Refer to data plate, and select pad letter (A, B, C, or D) for AWG wire size to be used.
2. Rotate applicator's wire disc (upper disc) to align selected pad letter with bosses on machine ram (post adapter). See Figure 3. This will provide proper crimp height for that wire size.
3. After making Insulation Crimp Adjustment described in Paragraph 5.2, perform several test cycles and inspect the terminations CLOSELY for the following:

a. Evidence of rough and/or sharp edges around crimped barrels, deformed crimps, bent terminals, or other defects caused by worn or broken tooling. If necessary, replace tooling as described in Section 6, REPAIR OR REPLACEMENT OF COMPONENTS.

b. If terminations appear normal, measure the crimp height of each termination as described in Instruction Sheet 408-7424, packaged with the applicator. Crimp heights must agree with measurement specified on parts list for the particular wire size being used. Record and retain crimp height dimensions for reference.

c. If crimp heights are INCORRECT, remove applicator and install an applicator that is KNOWN to produce terminations of CORRECT crimp height. Make several test cycles and repeat Step b. If crimp heights are INCORRECT for this applicator, the problem is the machine shut height, and corrective information may be obtained from the appropriate machine manual. If crimp heights are CORRECT, the problem is in the original applicator, and corrective measures are presented in Paragraph 6.5, Adjustable Crimp Height Repair.


4. During extensive operation, periodically repeat Step 3 to ensure that applicator is producing correct terminations.

5.2. Insulation Crimp Adjustment

To adjust the insulation crimp height, rotate the insulation disc (lower disc) to align the number (1 through 8) with the top of the insulation adjustment block on the ram assembly. No. 8 makes the tightest crimp and No. 1 the loosest, a difference of approximately 1.78 mm [.070 in.], providing a wide variation. To find the desired insulation crimp, start with No. 1 and make test crimps, then increase the setting one number at a time until the proper insulation crimp height is obtained.

5.3. Terminal Strip Feed Adjustment

1. With terminal strip properly loaded in applicator as described in Paragraph 4.1, check position of lead terminal in relation to shear blade by actuating the applicator to advance the feed finger to the forward limit of its stroke. The shear blade **MUST** shear the tab between the **LEAD** and **SECOND** terminal – without deforming either terminal.
2. If forward limit of the feed finger stroke is correct, proceed to Step 5, otherwise continue with Step 3.
3. Loosen setscrew on top of pivot block. Turn the stroke forward limit adjustment screw **CLOCKWISE** to **SHORTEN** the forward limit, or **COUNTERCLOCKWISE** to **LENGTHEN** the forward limit. Tighten setscrew on top of pivot block.
4. If necessary, repeat Steps 1 and 2. When adjustment is correct, proceed to Step 5.
5. Observe movement of feed finger as the machine is hand-cycled several times. It should have sufficient – but not excessive – overtravel on the backstroke to pick up the next terminal.

NOTE
 If pickup point is contact end of wire barrel, the backstroke overtravel should approximate the length of the transition between wire barrel and contact portion (see Figure 4). For other types of terminals (e.g. ring tongue), the overtravel should be proportionate to the Figure 4 example – with due consideration given contact features and configuration (e.g. stud hole).

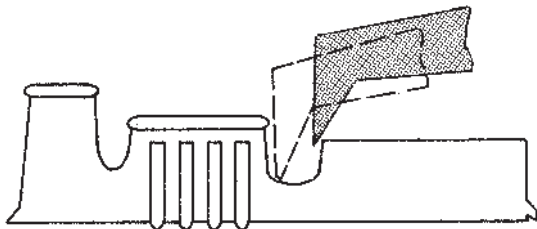



Figure 4


NOTE
 If feed finger stroke length is satisfactory, proceed with Step 10 – otherwise continue with Step 6.


6. Loosen slightly the 3/4-in. hex nut, on side of applicator, to permit movement of pivot shaft in slot (see Figure 2).
7. Loosen locknut on stroke length adjustment screw, and turn the screw **IN** to **SHORTEN** the stroke or **OUT** to **LENGTHEN** the stroke. Tighten locknut to secure screw.

8. Be certain pivot shaft bushing is **UP AGAINST** stroke length adjustment screw, then tighten 3/4-in. hex nut. Repeat Step 5 to check for proper stroke length.
9. Repeat Steps 6 through 8 until proper stroke length is obtained. Then recheck Step 1 (forward limit) before proceeding to Step 10.
10. Hand-cycle machine several times, and check lateral centering of **LEAD** terminal on anvil. If centered, adjustments are complete; if not centered, perform Step 11.
11. Loosen screws securing strip guides, and move both guides in the desired direction. Tighten screws, and check guides for being parallel and for free movement of strip without excessive side clearance. Recheck lateral centering by repeating Step 10.

6. REPAIR OR REPLACEMENT OF COMPONENTS


The following procedures cover those applicator parts which most commonly require repair and/or replacement due to wear. It is necessary to remove the applicator from the press prior to attempting any type of maintenance.

DANGER
 Be **CERTAIN** power to machine is “off” and/or power cord is disconnected. It is advisable to have the machine ram in the raised position.

NOTE
 In all procedures involving the removal and replacement of parts, wipe the parts individually with a clean, dry cloth as they are removed. Then, in the process of replacement, wipe the mating surfaces of all parts with your fingers to ensure that all lint and other foreign matter is no longer present.

6.1. Anvil Replacement

1. From bottom side of base plate, remove screw which secures the anvil.
2. Remove anvil from groove in the top side of base plate.

NOTE
 If the section of terminal strip is in the way, depress drag lever, raise feed finger, and pull strip back so lead terminal is between strip guides.

3. Install anvil using reversed procedure. If a new anvil is required, be sure part number of new anvil corresponds with number on applicator parts list.
4. Realign crimpers as described in Paragraph 6.3.

6.2. Shear Plate Replacement

1. Depress drag lever, raise feed finger, and pull section of terminal strip back so lead terminal is between strip guides.

2. Remove two screws that secure shear plates, and spacers (if used) to the base block.
3. Remove parts from applicator. Note position of front and rear shear plates, for reinstallation purposes.
4. Check the worn plate(s) to see if it can be reoriented to provide an additional shearing edge as follows:

Rear Shear Plate – Most rear plates are identical front and rear. If so, and the second side is not worn, turn the plate front-to-rear making certain that the widest part of the chip clearance groove is down.

Front Shear Plate – If the front plate is COMPLETELY symmetrical, orient any unused edge at the top rear.

If the front plate does NOT require spacers – and is identical top and bottom – it can be turned top-to-bottom (if the bottom edge is not already worn). Be sure the grooves are facing the rear shear plate.

5. With the old plates reoriented, or new plates properly oriented, reinstall the shear plates, and spacers (if used), and secure them with the two screws.
6. Hold the top of the ram assembly with one hand, while you manually actuate the feed finger with the other, enabling you to lower the ram assembly slowly to check the alignment of shear blade with shear plates.
7. If lateral alignment is required, loosen the two screws securing shear plates, and shift the plates laterally to attain proper alignment. Retighten screws.
8. If front-to-back alignment is required, lay the applicator carefully on its side and loosen slightly those four screws which secure the base block to the base plate. Move the block on the plate in the required direction until the shear blade will enter freely and fully between the shear plates. With the shear blade between the shear plates, retighten the four screws.
9. Set the applicator upright, and raise the ram assembly until the shear blade is clear of the shear plates. Then lower and raise the ram assembly several times to be certain that the shear blade moves in and out of the shear plates freely.
10. Depress drag lever, raise feed finger, and slide the strip section forward until the lead terminal is over the anvil.

6.3. Crimper Replacement

1. Remove ram assembly from applicator by pulling upward. It may be necessary to actuate feed finger manually to release the ram assembly.
2. Remove crimper bolt which secures the insulation crimper, crimper pin, spacer, and wire crimper to the ram assembly. Note position of parts for reinstallation.
3. Reinstall parts using reversed procedure, but do NOT tighten crimper bolt more than finger tight until specified. Notch in wire crimper MUST mate with pin in ram.

NOTE



Except for some splices and flag-type terminals, insulation crimpers may be oriented either way. The insulation crimpers for some splices and flag-type terminals have legs of unequal length which require that they be installed in only one way.

4. Reinstall ram assembly in applicator, and applicator in machine. Remove section of terminal strip as directed in Step 3 of Paragraph 4.1.
5. Form a piece of heavy paper over the anvil, and then hand-cycle the machine while observing alignment of crimpers with anvil. When ram assembly has reached bottom of stroke, tighten the crimper bolt.

6.4. Shear Blade Replacement

1. Remove ram assembly from applicator by pulling upward. It may be necessary to actuate feed finger manually to release the ram assembly.
2. Remove two screws which secure hold down (if used), spacer, and shear blade to the ram assembly.
3. Remove parts, noting their positions for reinstallation.
4. Reinstall parts using reversed procedure. The shear blade can only be installed in one way because of offset holes. It is essential that the shear blade does NOT protrude beyond the edge of recessed area for cam follower, and that it is squarely seated on the ram.
5. Reinstall ram assembly in applicator. Then depress drag lever, raise feed finger, and pull section of terminal strip back so lead terminal is between strip guides.
6. Hold the top of the ram assembly with one hand, while you manually actuate the feed finger with the other, enabling you to lower the ram assembly slowly to check alignment of shear blade with shear plates.

7. If lateral alignment is required, loosen the two screws securing shear plates, and shift the plates laterally to attain proper alignment, Retighten screws.

8. If front-to-back alignment is required, lay the applicator carefully on its side and loosen slightly those four screws which secure the base block to the base plate. Move the block on the plate in the required direction until the shear blade will enter freely and fully between the shear plates. With the shear blade between the shear plates, retighten the four screws.


9. Set the applicator upright, and raise the ram assembly until the shear blade is clear of the shear plates. Then lower and raise the ram assembly several times to be certain that the shear blade moves in and out of the shear plates freely.

10. Depress drag lever, raise feed finger, and slide the strip section forward until the lead terminal is over the anvil.

6.5. Adjustable Crimp Height Repair (Figure 3)


Beneath the insulation disc is a laminated washer which may break and/or compress, thus causing the applicator to produce terminations with a greater crimp height than specified. To correct this problem, perform the following steps:

1. Subtract the specified nominal crimp height from the average crimp height recorded and retained as a part of 5.1, Wire Crimp Adjustment. This difference will be the thickness of washer(s) (No. 690125-1) to be ADDED under the insulation disc.

NOTE
 Washer No. 690125-1 is a peel-type, laminated washer consisting of five layers, with each layer being .05 mm [.002 in.] thick.

2. Remove ram assembly from applicator, and loosen setscrew (in side of applicator ram) that secures the ram mounting post.

3. Unscrew ram body from ram mounting post, leaving the wire disc and insulation disc in place. If necessary, the end of the ram mounting post may be secured in a vise to free both hands for turning the ram body.


CAUTION
 DO NOT REMOVE wire disc and/or insulation disc from ram mounting post. Detent balls and springs will pop out and may become lost if discs are removed.

4. Place washer(s) of the thickness determined in Step 1 on ram mounting post. If old washer is broken and must be replaced, measure thickness of broken washer with a micrometer. Add this

measurement to amount to be added (determined in Step 1), and select new washer(s) of this thickness. Place new washer(s) on ram mounting post.

5. Replace ram body on ram mounting post, and tighten by hand until snug.

6. Check that numbers on wire disc and letters on insulation disc align properly over the insulation adjustment block. Discs are retained in position by ball detents. If necessary, turn ram body back slightly until proper alignment is attained, and then tighten setscrew to secure ram mounting post.

NOTE
 Rotate wire and insulation discs individually to other positions. When the "click" of the detent ball is heard, check for centering of letter or number over the insulation adjustment block.

7. Re-install ram assembly in applicator.

8. Install applicator in machine and make some test crimps. Measure crimp height, and check it against crimp height specified on applicator parts list. If crimp heights are within specified tolerances, the applicator may be placed in operation. If not, repeat this procedure starting with Step 1.


7. CLEANING AND LUBRICATION

For optimum performance and minimum down time, the applicator should be cleaned and inspected after each eight hours of operation, and each time it is removed from the machine to be placed in storage.


7.1. Cleaning

1. Remove applicator from machine as described in Paragraph 3.2.

2. Remove ram assembly from applicator by pulling upward. It may be necessary to manually actuate feed finger to release the ram assembly.

NOTE
 It is NOT necessary to remove the section of terminal strip for proper applicator cleaning.

3. Using a clean, dry cloth and/or air hose, remove all evidence of dirt, chips, or other foreign matter from applicator components. If desired, the entire applicator can be immersed in a suitable commercial solvent (that will not affect paint or plastic material) to flush out chips, then dried with an air hose.

DANGER
 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.

4. Lubricate the applicator, as described in Paragraph 7.2, before reassembling.
5. Replace ram assembly in applicator, and install applicator in machine.

7.2. Lubrication

The applicator components are to be lubricated at the following points using SAE No. 20 motor oil (non-detergent) or – where specified – light grease.



Do NOT use an excessive amount of lubricant on the applicator. Any excess MUST be removed prior to placing the applicator back in service. Avoid lubricants between the wire and insulation discs.

1. With ram assembly removed, apply a thin film of grease to four corners of ram, and to feed cam – after they have been thoroughly cleaned.
2. Lay the applicator carefully on its side and apply one drop of oil to the bushing within the 3/4-in. hex nut. Then apply a drop of oil to the feed finger pin. Wipe excess oil from feed finger pin and hex nut.
3. Apply a drop of oil to the stroke forward limit adjustment screw, and to the feed rod into which it is turned.

4. Replace ram assembly in applicator, and remove any excess lubricant.

8. APPLICATOR STORAGE



When applicator is to be placed in storage, or removed from the machine for any reason, the following precautions should be taken to prevent tooling damage caused by bottoming of ram assembly.

1. Cut terminal strip one or two terminals from entry to strip guides.
2. Remove applicator from machine as described in Section 3, APPLICATOR INSTALLATION AND REMOVAL. Clean and lubricate as presented in Paragraph 7.
3. Bottom the ram assembly to retain the lead terminal between crimpers and anvil. This will also identify the type of terminal to be used when applicator is reinstalled in machine.

9. REVISION SUMMARY

Revisions to this instruction sheet include:

- Updated document to corporate requirements.
- New format

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