customer manual

SAFETY PRECAUTIONS READ THIS FIRST ! 2

1. INTRODUCTION 3
   1.1. Specifications 3
   1.2. Restriction on Hazardous Substances (RoHS) Information 5
2. DESCRIPTION 5
   2.1. Physical Description 5
   2.2. Functional Description 8
3. INSTALLATION 10
   3.1. Installing Power Unit onto Machine 10
   3.2. Installing Tool Set onto Power Unit 12
   3.3. Installing Lower Tooling Tip onto Machine 12
   3.4. Loading Terminals 14
   3.5. Manually Opening Inserter Clamp 16
4. REMOVAL 17
   4.1. Removing Power Unit from Machine 17
   4.2. Removing Tool Set from Power Unit 18
   4.3. Removing Lower Tooling Tip from Machine 19
   4.4. Unloading Terminals 20
5. ADJUSTMENTS 20
   5.1. Feed Finger Stroke Adjustment 21
   5.2. Feed Finger Forward Position Adjustment 22
   5.3. Anti–Backup Finger Position Adjustment 23
   5.4. Inserter Assembly Retract Position Adjustment 23
   5.5. Die Cylinder Clevis Adjustment 24
   5.6. Shear Cylinder Clevis Adjustment 24
   5.7. Die Travel Adjustment 25
   5.8. Shear Travel Adjustment 25
   5.9. Shear and Die Position (Terminal Cut–Off Tab) Adjustment 27
   5.10. Lower Tooling Tip Height Adjustment 27
   5.11. Power Unit Height (Terminal Insertion Depth) Adjustment 29
   5.12. Magnetic Cylinder Switch Adjustment 30
   5.13. Inserter Clamp Opening Adjustment 30
   5.14. Terminal Drag Pressure Adjustment 31
6. PREVENTIVE MAINTENANCE 32
   6.1. Cleaning and Inspection 32
   6.2. Lubrication 32
7. REPLACEMENT 35
   7.1. Die Insert Replacement 35
   7.2. Shear Insert Replacement 35
   7.3. Inserter Assembly Replacement 36
   7.4.. Strip Guide Insert Replacement 37
8. REVISION SUMMARY 37

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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

1 INTRODUCTION

The Pin–Barrel AccuSerter 2 Insertion Module (AIM) is designed to be used with the AccuSerter 2 Insertion Machine 1976500–[ ] and a terminal–specific lower tooling tip to apply either the pin or barrel (receptacle) type (with or without a lower leg clinch) reeled terminals onto printed circuit (pc) boards.

NOTE

The machine accepts several types of insertion modules and insertion heads to apply various terminals including posts, tabs, pins, barrels, mini–spring sockets, continuous wire posts, bandolier pins, and clips, as well as terminals for through–hole applications onto pc boards.

The Pin–Barrel AIM (including the terminal specific lower tooling tip) consists of Straight Power Unit 1976415–1 or Rotary Power Unit 1976405–1 and Tool Set 2031100–1. The Straight Power Unit inserts terminals straight into the pc board, and the Rotary Power Unit inserts terminals at different angles into the pc board (the power unit rotates the terminal during the insertion stroke). The power unit and tool set are typically shipped assembled and mounted onto the base of the machine. Figure 1.

There are two types of lower tooling tips available: single–acting and double–acting. The single–acting lower tooling tip is used when the legs of the terminal are not designed to be clinched; such as, press or interference fit. The double–acting lower tooling tip is used when the legs of the terminal are designed to be clinched for positive retention in the pc board.

This customer manual is limited to the operation, adjustments, and maintenance of the Pin–Barrel AIM. Information on the AccuSerter 2 insertion machine can be found in Customer Manual 409–10089. Please read and understand that manual before using the Pin–Barrel AIM.

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

DANGER

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

CAUTION

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

NOTE

Highlights special or important information.

NOTE

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

1.1. Specifications

The following specifications apply to the Straight Power Unit when mounted to the machine:

Height:	583 mm [22.95 in.]
Depth:	316 mm [12.44 in.]
Width:	215 mm [8.46 in.]
Weight:	16.3 kg [36 lbs]
Cycle Time:	90 insertions per minute

NOTE

Cycle time is the maximum rate that the tool set will reliably operate when all conditions are optimal. The rate may be affected by inadequate air supply, accessories that are added to the power unit sequence, excessive table travel required between terminal insertions, or excessive terminal feed pitch.

Pin–Barrel AccuSerter 2 Insertion Module (AIM)

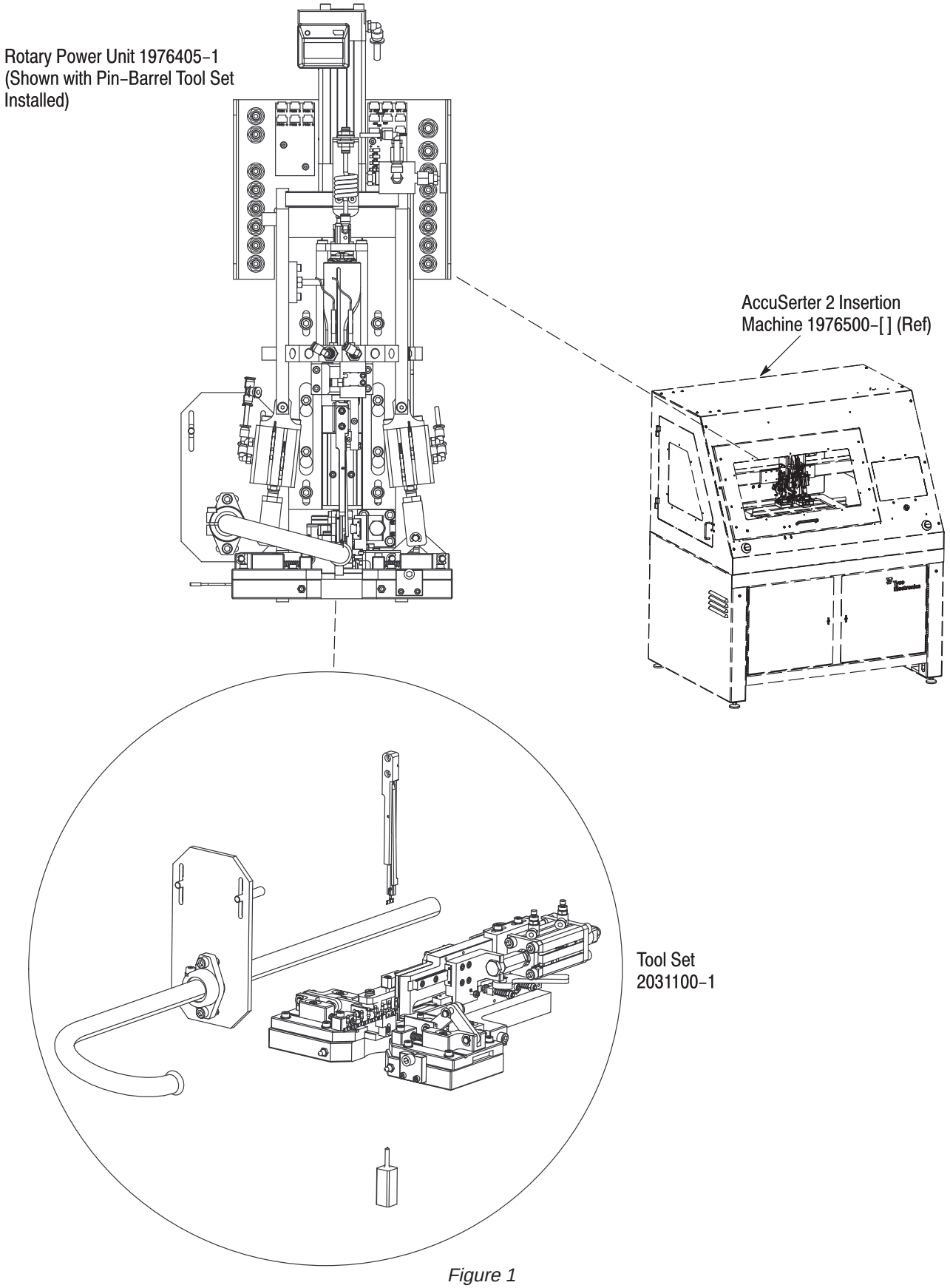


Figure 1

1.2. Restriction on Hazardous Substances (RoHS) Information

Information on the presence and location of any substances subject to RoHS can be found at the following website: http://www.tycoelectronics.com/customersupport/rohssupportcenter

Click on “Find Compliance Status,” and enter the tooling part number.

2. DESCRIPTION

2.1. Physical Description (Refer to Figure 2)

The AIM (power unit and tool set combination) is air operated and electrically controlled. The power unit is fastened to the gantry (or frame) of the machine and connected by multiple air line connections and electrical connectors. The mechanical actions of feeding, gripping, shearing, and inserting terminals are achieved through a series of slides, cams, and links controlled by air cylinders of the power unit and tool set.

Electrical switches, actuated by the extension and retraction of the air cylinders, signal to the machine the state of each cylinder.

The insertion cylinder located on the top of the power unit extends to insert the terminal into the pc board. The insertion cylinder drives a linear slide which is attached to the tool set. The inserter assembly (which consists of an inserter clamp and inserter body) grips the terminal. The inserter clamp pivots to open and allow the terminal to feed into the inserter assembly, then pivots to close to grip the terminal. The method of opening and closing the inserter clamp differs between the Straight Power Unit and the Rotary Power Unit as follows:

- In the Straight Power Unit, the inserter clamp is opened by a cam–operated lever whenever the insertion cylinder is retracted. After the terminal is fed, the die cylinder is actuated which also actuates a cylinder to disengage the lever from the cam and causes the inserter clamp to close, gripping the terminal.
- In the Rotary Power Unit, the inserter clamp is opened and closed by the use of springs, rods, and a small air cylinder mounted on the inserter linear slide.

The die cylinder is used to extend the die slide and pivot the feed package (strip guide) to align the terminal strip with the inserter, allowing the next terminal to be fed into the inserter.

The feed cylinder controls feeding the terminal strip from the supply reel and through the tool set. The terminal strip is guided into a strip guide at the back of the tool set. A feed finger advances the terminal strip. The feed cylinder extends, advancing the feed finger to feed the terminal into the open inserter clamp. The feed cylinder remains extended until the terminal is gripped by the inserter assembly and sheared from the terminal strip, then it is retracted to engage the next terminal on the strip. The terminal drag assembly, located on the feed assembly, applies a slight drag to the terminal strip to ensure consistent feeding of the terminal. An anti–backup finger, located on the feed assembly, prevents the terminal strip from moving backward when the feed finger is retracted.

Straight Power Unit with Tool Set

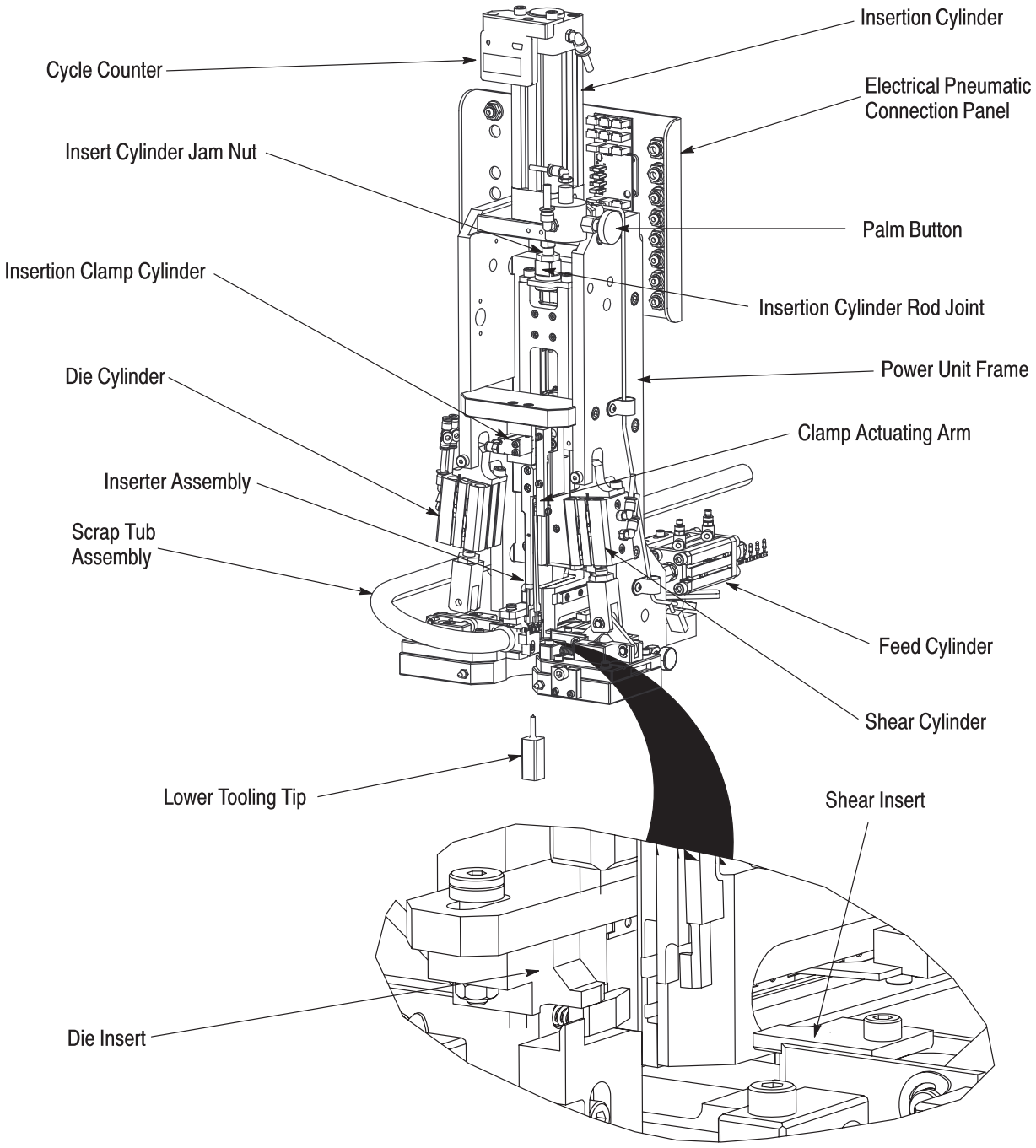


Figure 2 (Cont'd)

Shearing is performed by a shear insert attached to a shear slide, which is operated by the shear cylinder. When the terminal is fed and gripped by the inserter,the shear cylinder extends, cutting the terminal free from the carrier strip (waste). The carrier strip continues to feed into a scrap tube on the front of the tool set. The scrap tube redirects the carrier strip to the rear of the machine, where it can be directed into a waste receptacle (not included) or chopped into smaller waste strips using the (optional) scrap chopper.

Rotary Power Unit with Tool Set

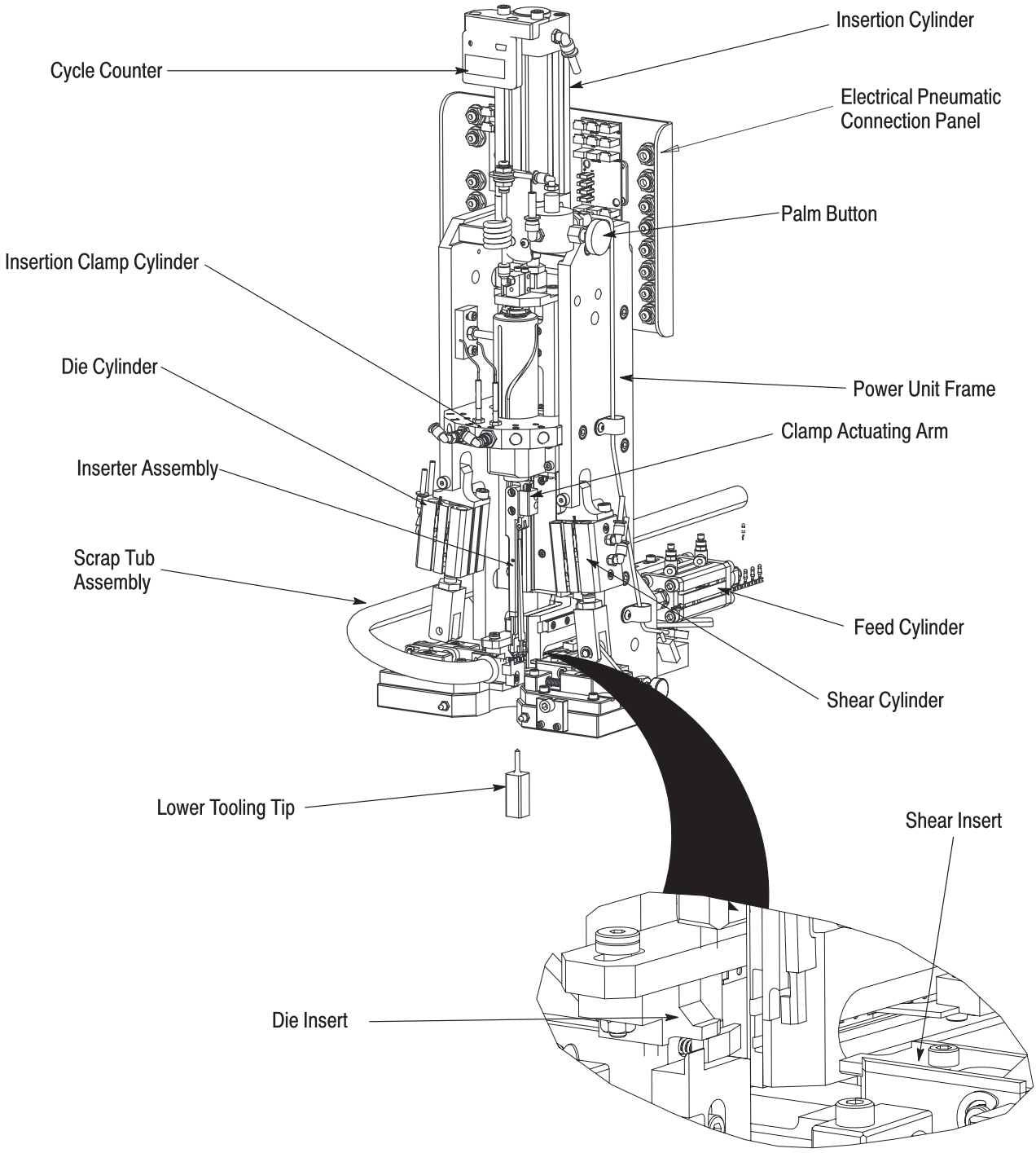


Figure 2 (End)

The terminal is inserted at the beginning of each cycle of the tool set. The next terminal is fed, gripped, and sheared at the end of each cycle. Each cycle involves two terminals: the one being inserted and the one being fed, gripped, and sheared. The terminal specific lower tooling tip (supplied with each tool set) is mounted to the appropriate lower tooling assembly. There are two styles of lower tooling assemblies, single–acting and double–acting. Single acting tooling is used to support the pc board during the terminal insertion (for interference fit products), or to clinch terminals which have a clearance fit with the pc board and do not require board support during insertion.

The double–acting lower tooling is used to both support the pc board, and also to mechanically clinch the legs of the terminal, using a second air cylinder.

A cycle counter located at the top of the power unit records the number of cycles.

2.2. Function Description

The following describes a cycle of the AIM when it is properly mounted, adjusted, and loaded with terminals.

When the AIM is at rest between cycles, the insertion cylinder is retracted and actuating the insert–retract switch; the feed cylinder, die cylinder, and shear cylinder are each retracted and actuating their respective retract switch; the inserter clamp is closed and gripping the terminal that has been fed and sheared from the terminal strip during the previous cycle; and the lower tooling cylinder(s) are retracted.



The condition of a cylinder (extended or retracted) when the AIM is at rest between cycles is called the “rest” position.

When a cycle signal is issued, air is sent to extend the insertion cylinder. The inserter assembly moves down to insert the terminal into the pc board.

The lower tooling cylinder and lower tooling clinch cylinder (if equipped) also actuate during the insert cylinder cycle. The exact timing of the lower tooling operation is dependent on the terminal being applied, and is controlled by the sequence number of the tool set installed on the machine.

When extended, the insertion cylinder actuates the insert–ON switch. If the terminal requires a clinching, the clinch cylinder is then turned ON. After the board support cylinder, insertion cylinder, and if used, clinch cylinder are extended, a terminal–presence check is performed to confirm that the terminal has been applied to the pc board. If troubleshooting is required, this check can be turned OFF at the Run Screen of the machine. Air to the cylinders is then reversed, the board support, clinch tooling, and inserter assembly are returned to their rest position, and the inserter clamp is opened. At this point, the machine positioning table is allowed to move the pc board into position for the next terminal insertion while the AIM completes its cycle.

A complete timing diagram is shown in Figure 3.

Complete Timing Diagram

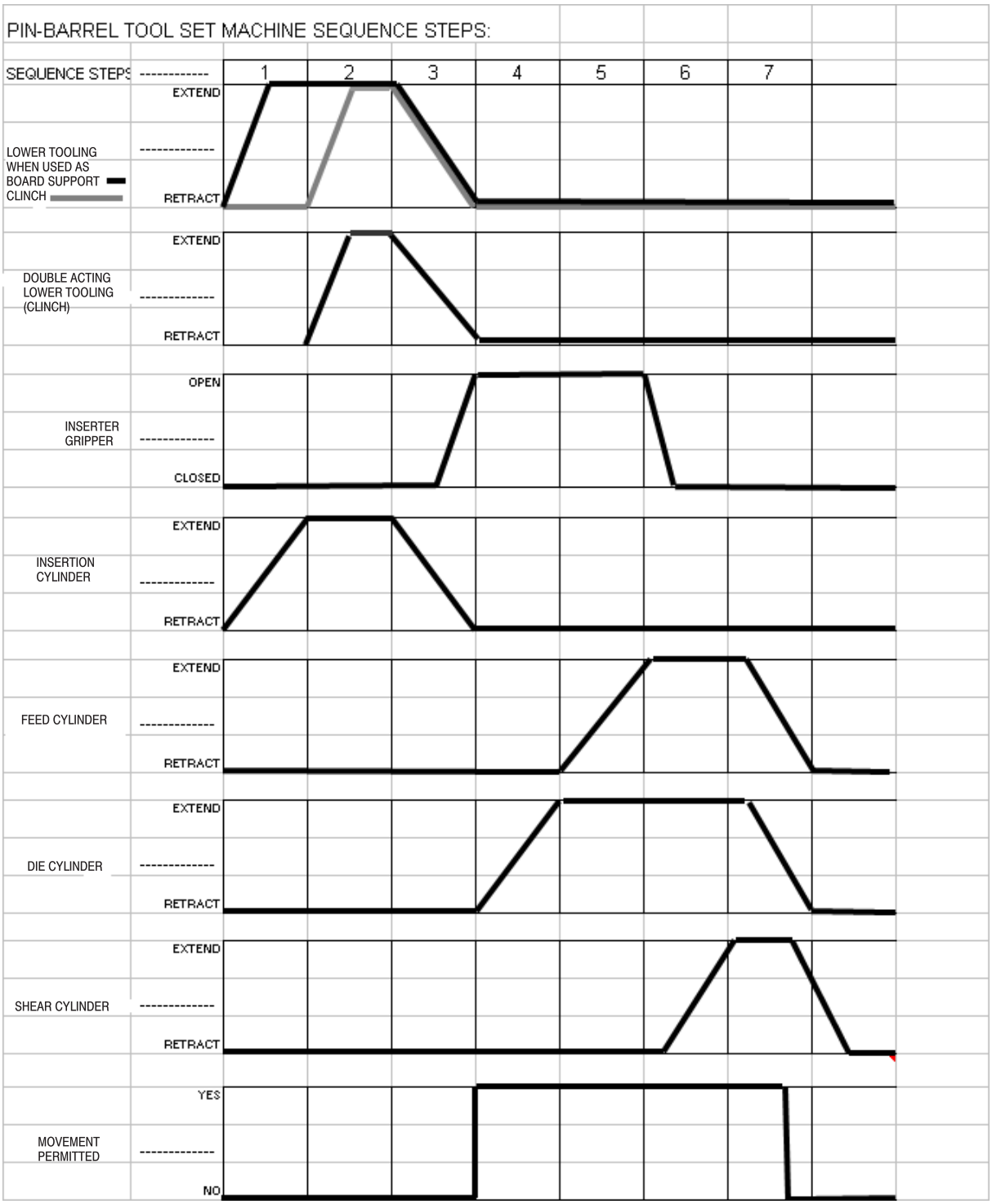


Figure 3

3. INSTALLATION

Verify that the correct lower tooling tip (single–acting or double–acting; terminal specific) and power unit (straight or rotary; application specific) are being used for the tool set and type of terminal being applied (refer to Section 1 for description). For additional information, refer to the assembly drawings included with the tool set documentation.



To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before installing or removing components.

3.1. Installing Power Unit onto Machine

When installing the Rotary Power Unit onto the machine, the machine must be equipped with Rotary Integration Kit 2031280–1. When installing the Straight Power Unit onto a machine equipped with the rotary integration kit, the air lines and electrical connector (which are part of the rotary integration kit) will not be used and must be disconnected and unplugged



To avoid any possible damage to the equipment, remove or secure any unused air and electrical connectors to prevent them from interfering with any moving components.

Proceed as follows:

1. Disconnect the electrical power and air supply from the base machine.



To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before installing the power unit onto the machine.

2. Position the mounting holes of the power unit over the four mounting screws of the machine gantry. Refer to Figure 4.

3. Move the power unit back and downward until it is properly seated on the gantry. Ensure that the dowel pin is properly located in the alignment slot of the gantry.

4. Tighten the four mounting screws.

5. Connect the CPC electrical connector(s) and air lines from the machine to the power unit (numbers are marked on the air lines). For proper connections, refer to Figure 5.

Installing Power Unit Onto Machine

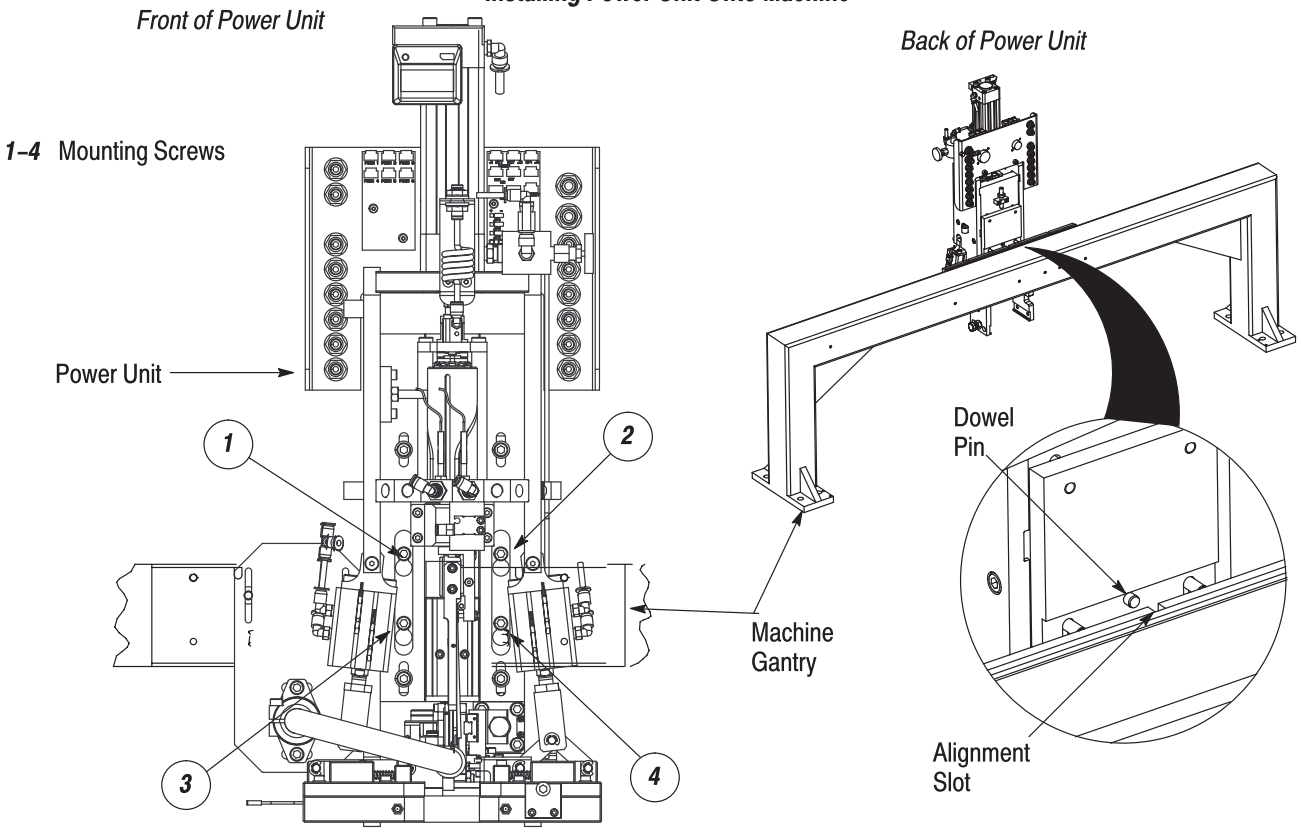


Figure 4

Air Lines and Electrical Connections

Back of Power Unit

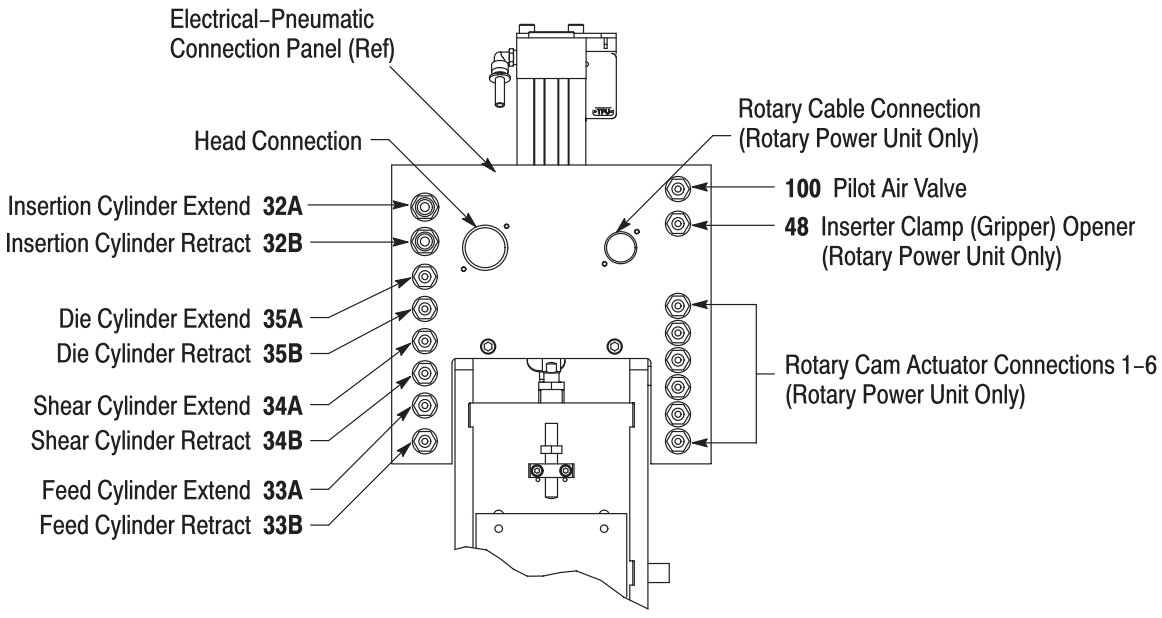


Figure 5

3.2. Installing Tool Set onto Power Unit (See Figure 6)

1. If the power unit is installed onto the machine, disconnect the electrical power and air supply from the base machine.

DANGER

To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before installing the tool set onto the power unit.

2. Remove the inserter assembly from its storage location on top of the strip guide by removing the two mounting screws. Retain the inserter assembly and mounting screws.

3. Remove the two e–clips and two pivot pins from the center of the toggle links shown in Figure 6. DO NOT remove the other pivot pins.

4. Pull and hold the spring–loaded plunger handle, and begin to slide the tool set (feed cylinder end first) into the bottom of the power unit. Release the plunger handle, and continue to slide the tool set until the plunger handle locks into the slot of the tool set.

5. Install and tighten the four mounting screws (two located on each side of the power unit).

6. Secure the toggle links to the shear cylinder clevis and die cylinder clevis using the pivot pins and e–clips.

NOTE

E–Clip Tool 2031651–1 is available to install the toggle link e–clips onto the pivot pins.

7. Install the inserter assembly onto the power unit using the two mounting screws (removed from the strip guide).

8. Connect the two air lines, 33A and 33B, from the power unit to the feed cylinder on the tool set.

9. Connect the two sensor cables from the tool set feed cylinder to the cable located on the side of the power unit.

NOTE

Refer to the customer documentation for air line and sensor cable connection locations.

3.3. Installing Lower Tooling Tip onto Machine (See Figure 7)

The lower tooling tip attaches to the lower tooling assembly of the machine. Proceed as follows:

DANGER

To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before installing the lower tooling tip.

Single–Acting Lower Tooling Tip (Board Support)

1. Disconnect the electrical power and air supply from the base machine.

2. Ensure that the compression spring is installed in the bottom of the lower tooling tip, then thread approximately 10 mm [0.4 in.] of the lower tooling tip onto the lower tooling cylinder.

3. Align the lower tooling tip with the proximity switch bracket as shown in Figure 7, then tighten the jam nut onto the cylinder shaft to lock the lower tooling tip into position.

4. Using the hardware, attach the proximity switch bracket to the lower tooling cylinder as shown in Figure 7.

5. Mount and connect the proximity switch to the machine wiring.

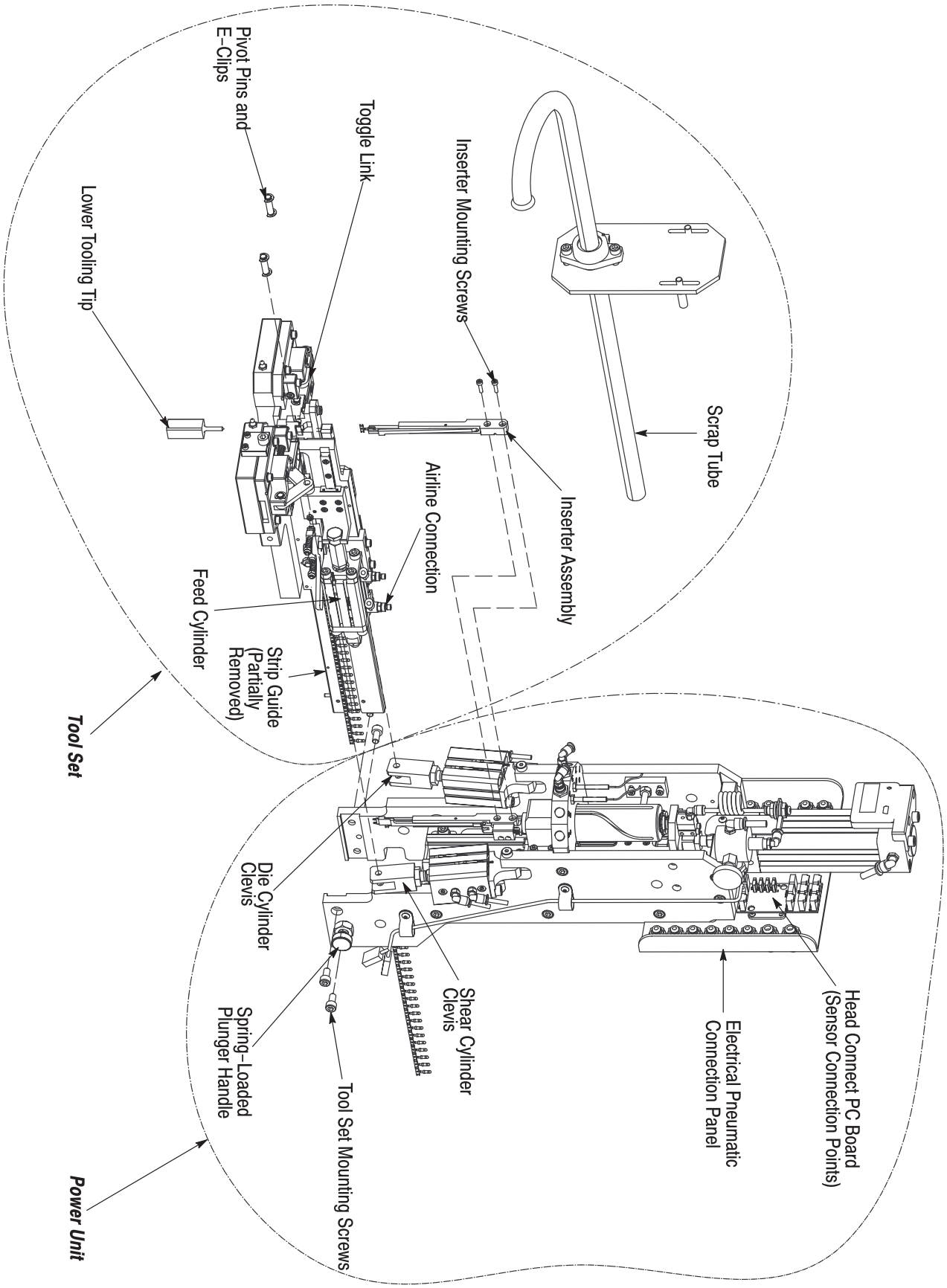

Pivot Pins and E–Clips
Toggle Link
Inserter Mounting Screws
Lower Tooling Tip
Scrap Tube
Inserter Assembly
Airline Connection
Feed Cylinder
Strip Guide (Partially Removed)
Tool Set
Die Cylinder Clevis
Shear Cylinder Clevis
Head Connect PC Board (Sensor Connection Points)
Electrical Pneumatic Connection Panel
Spring–Loaded Plunger Handle
Tool Set Mounting Screws
Power Unit

Figure 6

Double–Acting Lower Tooling Tip

1. Disconnect the electrical power and air supply from the base machine.

2. Hold the board support of the lower tooling tip in the raised position, and thread approximately 10 mm [0.4 in.] of the crimp yoke onto the left cylinder rod. Then, align the board support to the right cylinder rod.

3. Adjust the rod nut located under the board support until the board support tip is aligned with the top of the crimp yoke tip.

4. Tighten the upper jam nut of the board support bracket (right cylinder rod).

5. Tighten the lower jam nut of the crimp yoke (left cylinder rod).

6. Check for smooth operation by manually extending and retracting both cylinder rods. If necessary, loosen and re–adjust the rod nuts to permit smooth operation.

7. Attach the wiring from the lower tooling tip to the base machine.

Single–Acting Lower Tooling Tip (Clinch Type)

1. Disconnect the electrical power and air supply from the base machine.

2. Thread the tooling tip onto the cylinder rod, and tighten jam nut.

3.4. Loading Terminals

Install the terminal reel onto the machine according to the customer manual supplied with the machine, then proceed as follows:

1. Disconnect the electrical power and air supply from the base machine.



To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before loading the terminal strip.

2. Raise the shear cylinder and die cylinder. Depress the palm button located on the power unit, then raise the insertion cylinder.



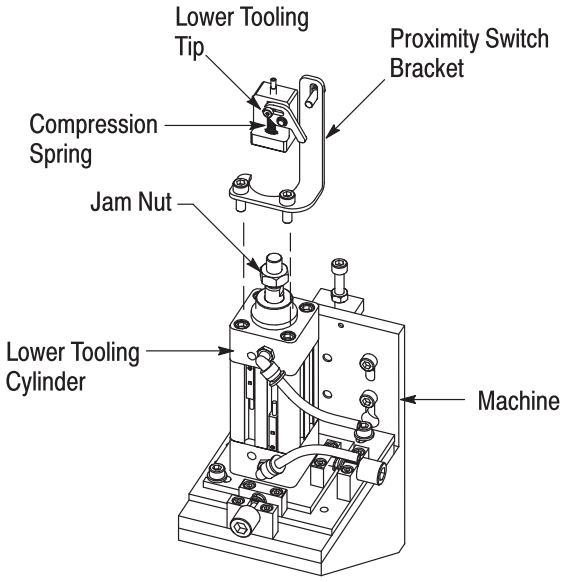
Depressing the palm button before moving the insertion cylinder allows air to escape and the cylinder to move.

3. Unreel 1 to 2 m [3 to 6 ft] of the terminal strip.

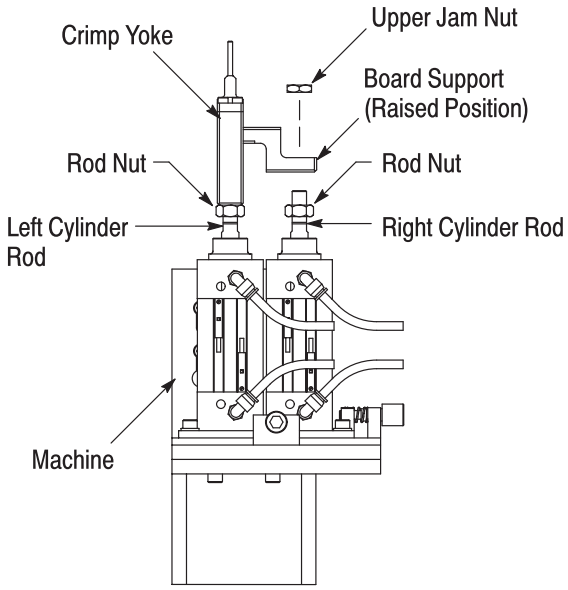
4. If there is no terminal strip in the tool set, proceed to step 5. If there is a strip of terminals in the tool set, cut the carrier strip at the front of the tool set, where it enters the scrap tube. Remove scrap from the scrap tube.

Installing Lower Tooling Tip onto Machine

Single–Acting



Double–Acting



Single–Acting (Clinch–Type)

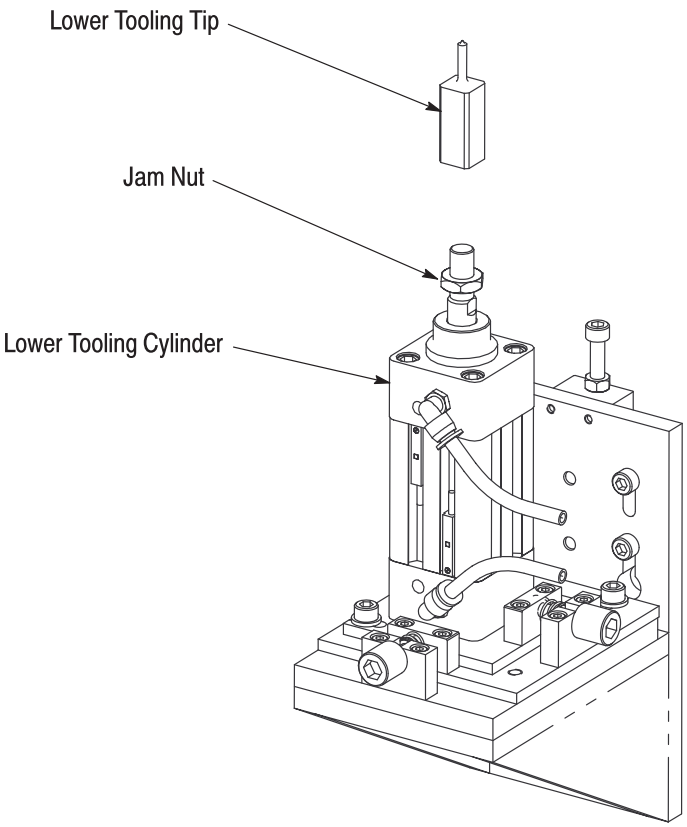


Figure 7

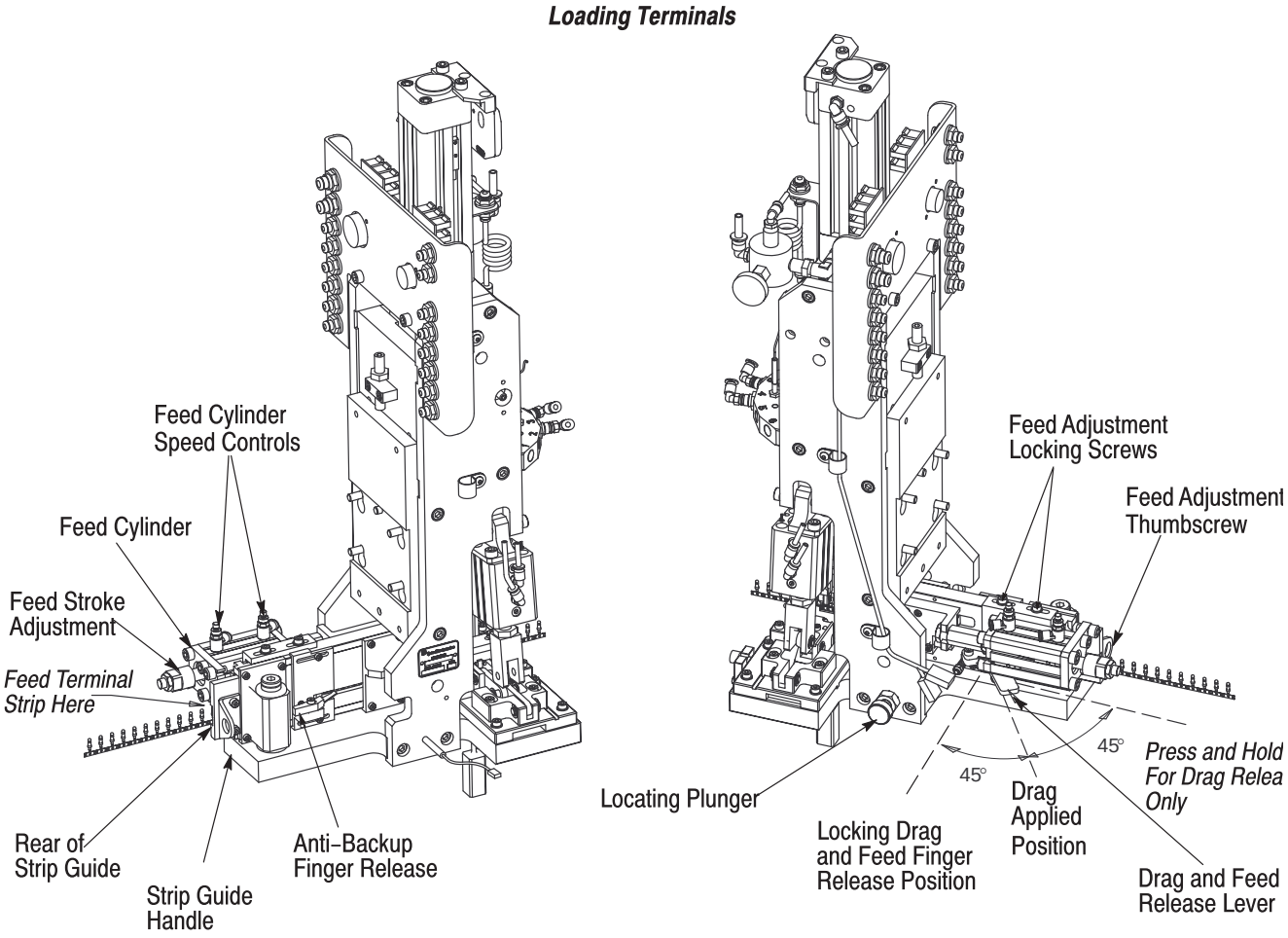


Figure 8

From the rear of the machine, rotate the drag release lever forward until it latches to release both the drag and disengage the feed finger. Refer to Figure 8. Press the rear of the anti back–up finger to disengage the finger, and pull the remaining terminal strip from the rear of the tool set. Return the drag lever to it's applied (run) position.

5. Release the drag by depressing the drag lever inward and under the feed air cylinder.

6. Feed the end of the new terminal strip into the back of the strip guide.

7. Continue to advance the terminal strip until it appears at the front of the strip guide, then retract it slightly until the feed finger engages the terminal strip. Refer to Figure 8.

8. Release the drag release lever so that it returns to the drag applied position. See Figure 8.

3.5. Manually Opening Inserter Clamp



To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before manually opening the inserter clamp.

A. Straight Power Unit

1. Disconnect the electrical power and air supply from the base machine.

2. Squeeze the inserter assembly and clamp actuating arm together at the points indicated in Figure 9, or extend and retract the inserter assembly.

B. Rotary Power Unit

1. Disconnect the electrical power and air supply from the base machine.
2. Push the gripper slide down, or facing the power unit, push the upper part of the inserter clamp to the left.

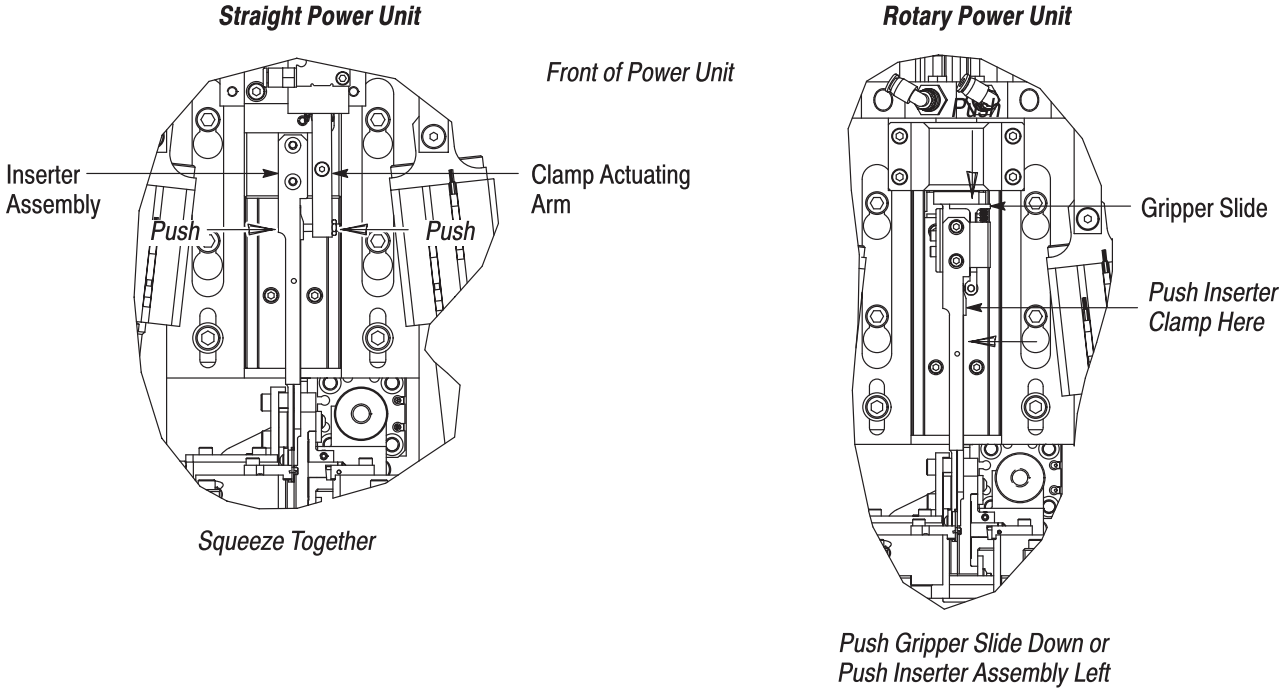


Figure 9

4. REMOVAL

4.1. Removing Power Unit from Machine

1. Disconnect the electrical power and air supply from the base machine.

DANGER

To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before removing the power unit from the machine.

2. If the terminal strip is in the tool set:
   a. Cut the carrier strip at the front of the tool set where it enters the scrap tube. Then remove the scrap from the scrap tube.
   b. From the rear of the machine, rotate the drag release lever forward until it latches, to release the drag and disengage the feed finger. See Figure 8.
   c. Press the rear of the anti–backup finger to disengage the finger.
   d. Pull the terminal strip from the rear of the tool set.
   e. Return drag lever to its applied (run) position.

NOTE

It is recommended that a short section of the terminal strip remain in the tool set during removal and when being placed into storage to help identify the tool set.

3. If equipped, disconnect the suction tube from the tool set.

4. Loosen, but do not remove, the four mounting screws that attach the power unit to the machine gantry (refer to Figure 10).

5. Pull the lower portion of the power unit forward, then lift it up and pull it forward to remove it from the four screws.

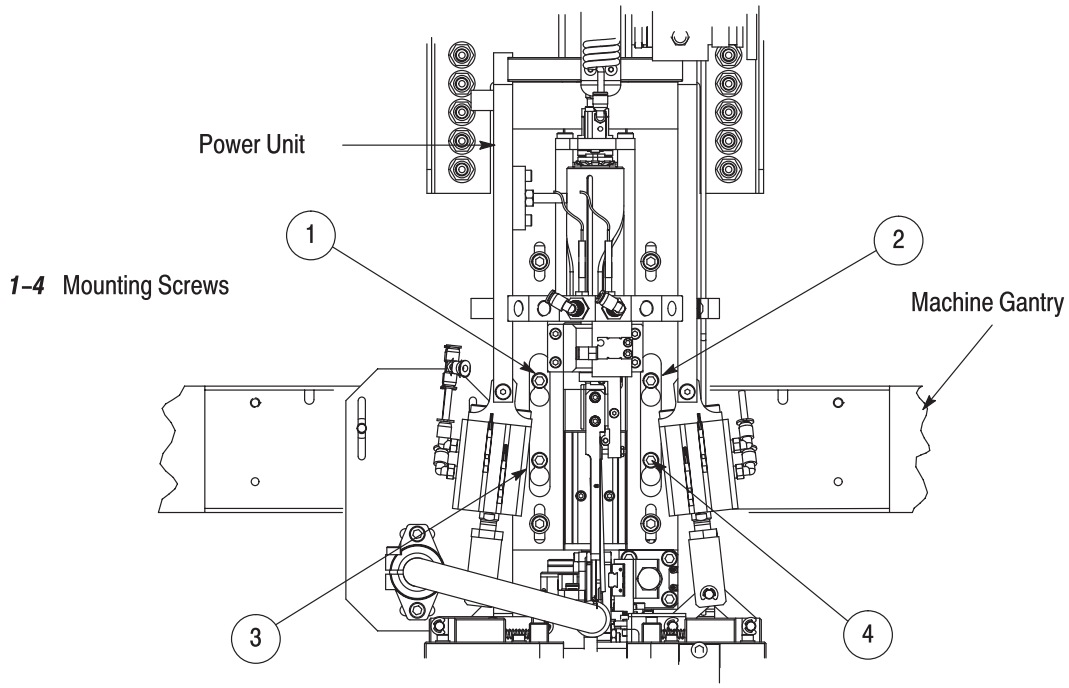


Figure 10

4.2. Removing Tool Set from Power Unit

Remove the tool set from the power unit in the opposite way that it was installed. Refer to Figure 6, and proceed as follows:

1. If the power unit is installed in the machine, disconnect the electrical power and air supply from the base machine.

DANGER

To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before removing the tool set from the power unit.

2. Disconnect the two air lines from the feed cylinder.

3. Disconnect the two feed cylinder sensor cables from the extension cable near the feed cylinder.

4. If the terminal strip is in the tool set, cut the terminal strip at the back of the tool set, and leave the strip in the tool set.

NOTE

It is recommended that a short section of the terminal strip remain in the tool set during removal and when being placed into storage to help identify the tool set.

5. Remove the two mounting screws securing the inserter assembly to the power unit; and remove the inserter assembly. Retain the mounting screws.

6. Remove the e–clips and pivot pins from the die cylinder clevis and shear cylinder clevis. Push the toggle links down to clear the clevises.

7. Remove the four mounting screws (located on each side of the power unit) securing the tool set to the power unit. See Figure 11. Retain the mounting screws.

8. Pull and hold the spring–loaded plunger handle outward from the power unit, and slide the tool set straight out of the power unit. Release the plunger handle.

9. Using the two mounting screws, secure the inserter assembly onto its storage location on top of the strip guide of the tool set to prevent damage or loss.

10. Install the pivot pins and e–clips onto the toggle links.

11. Re–install the four tool set mounting screws (removed in Figure 11) back into the *tool set*. This will help to avoid the loss of the mounting screws.

NOTE

E–Clip Tool 2031651–1 is available to install the toggle link e–clips onto the pivot pins.

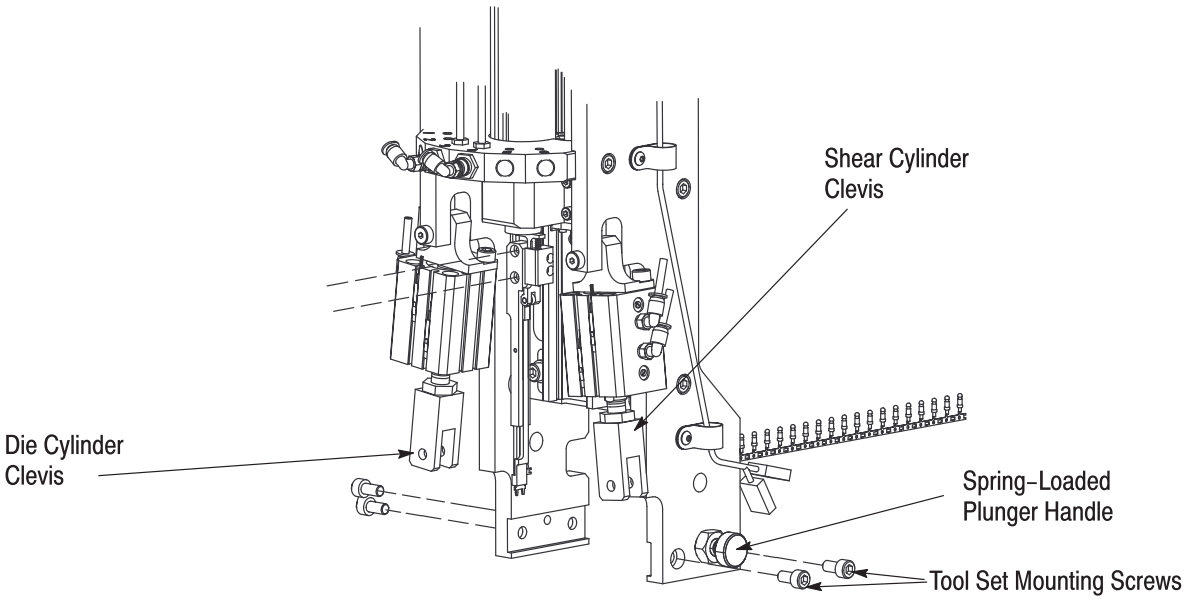


Figure 11

4.3. Removing Lower Tooling Tip from Machine

DANGER

To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before removing the lower tooling tip.

Single–Acting Lower Tooling Tip

1. Disconnect the electrical power and air supply from the base machine.

2. Disconnect and remove the proximity switch from the machine wiring.

3. Remove the hardware, then remove the proximity switch bracket from the lower tooling cylinder (refer to Figure 7).

4. Loosen the jam nut from the lower tooling cylinder shaft, and remove the lower tooling tip; taking care not to lose the compression spring.

Double–Acting Lower Tooling Tip

1. Disconnect the electrical power and air supply from the base machine.
2. Remove the upper jam nut from the board support bracket (right cylinder rod).
3. Loosen the jam nut of the crimp yoke (left cylinder rod).
4. Raise the board support bracket until it is above the right cylinder rod, and unthread then remove the crimp yoke from the left cylinder rod.
5. Remove the lower tooling tip.

4.4. Unloading Terminals

1. Disconnect the electrical power and air supply from the base machine.



To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before unloading the terminal strip.

2. Ensure that the inserter assembly is in the raised position. To raise the inserter assembly, depress and hold the palm button while manually lifting the inserter assembly to its fully raised position, then release the palm button.
3. Cut the terminal strip at the back of the tool set. Cut the carrier strip (waste) at the front of the tool set, where it enters the scrap tube. Remove all scrap from the scrap tube. It is recommended that a section of the terminal strip always remain in the tool set for terminal identification.

5. ADJUSTMENTS

Adjustments may be necessary during normal service or after the power unit or tool set has been disassembled and re–assembled.

If any individual function of the following processes is not performing properly, all succeeding processes will be out of alignment, and the tool set may perform unsatisfactorily. Make sure to perform these adjustments carefully and in the correct sequence. Adjustment to the following processes must be made in the following sequence:

1. Feed finger stroke adjustment (Paragraph 5.1.)
2. Feed finger forward position adjustment (Paragraph 5.2.)
3. Anti–backup finger position adjustment (Paragraph 5.3.)
4. Inserter assembly retract position adjustment (Paragraph 5.4.)
5. Die cylinder clevis adjustment (Paragraph 5.5.)
6. Shear cylinder clevis adjustment (Paragraph 5.6.)
7. Die travel adjustment (Paragraph 5.7.)
8. Shear travel adjustment (Paragraph 5.8.)

The following settings are not effected by any other processes and may be adjusted independently, whenever necessary.

1. Shear and Die Position Adjustment (Paragraph 5.9.)
2. Lower tooling tip height adjustmentPower unit height (terminal insertion depth) (Paragraph 5.10.)
3. Power Unit Height Adjustment (Paragraph 5.11.)
4. Magnetic cylinder switch position (Paragraph 5.12.)
5. Inserter clamp opening (Paragraph 5.13.)
6. Terminal drag pressure (Paragraph 5.14.)

DANGER

To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before making any adjustments to tooling.

5.1. Feed Finger Stroke Adjustment (See Figure 12)

Important: The succeeding process is affected by this adjustment—make sure to adjust the succeeding process after this adjustment. Refer to the beginning of Section 5 for the proper sequence of adjustments.

The stroke of the feed cylinder should be adjusted to 1 mm [.040 In.] more than the die feed length of the terminal. The terminal die feed dimension can be obtained from the terminal drawing, application specification, or from the direct measurement of the terminal strip. The proper stroke can be obtained by setting the gap (see Figure 12) to 1.3mm **LESS** than the die feed.

1. Make sure that the electrical power and air supply is disconnected from the base machine.
2. Push the front of the feed cylinder until the feed cylinder is fully retracted.
3. While holding the cylinder stop with a 14–mm wrench, loosen the jam nut at the back of the feed cylinder.
4. Adjust the cylinder stop to obtain the proper gap between the cylinder stop and the cylinder mount plate.
5. After the proper gap is set, turn the jam nut until it is against the cylinder stop. Then, using two wrenches, one to hold the cylinder stop and the other to rotate the jam nut, tighten the jam nut.

Feed Finger Stroke Adjustment

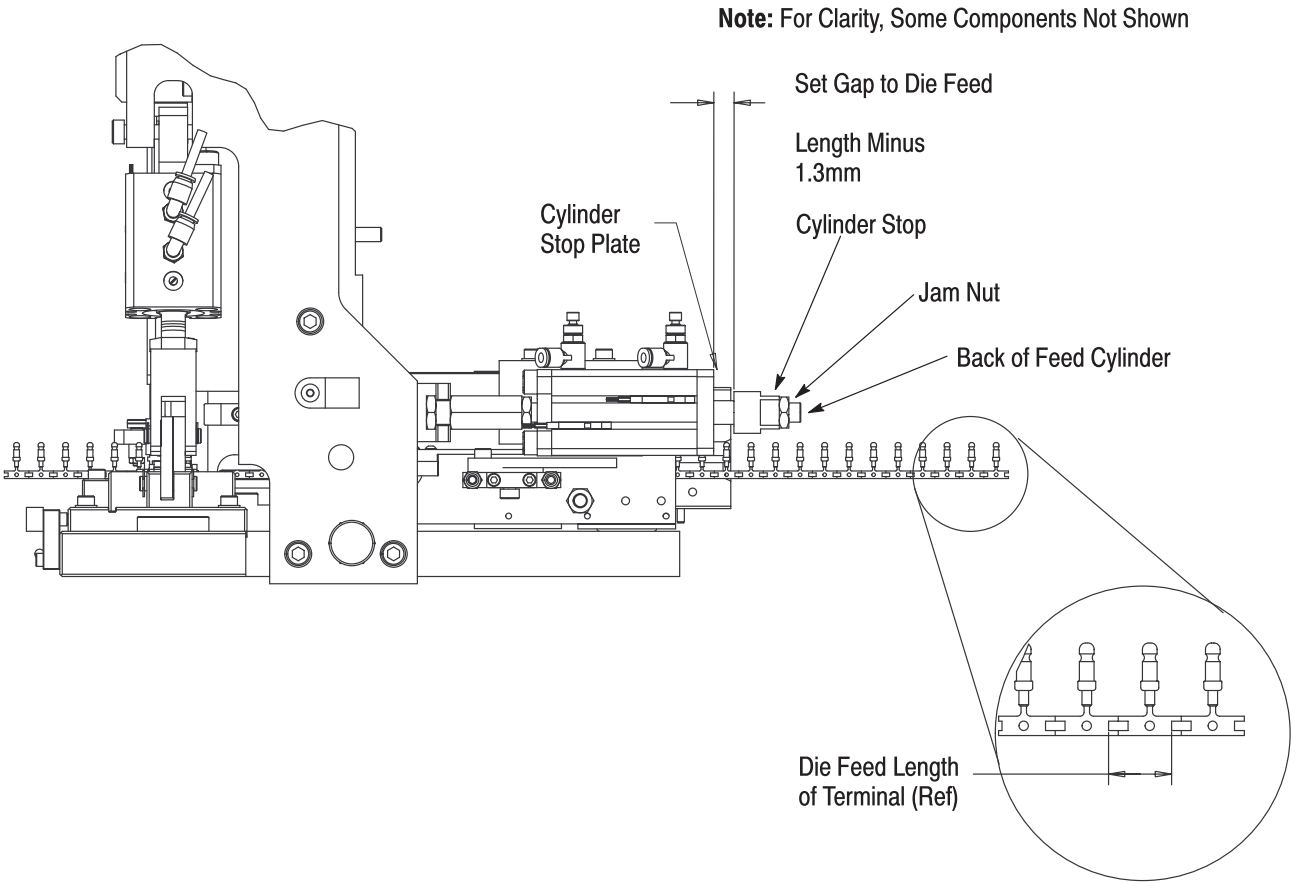


Figure 12

5.2. Checking and Adjusting the Forward Feed Position (See Figure 13)

Important: The succeeding process is affected by this adjustment—make sure to adjust the succeeding process after this adjustment. Refer to the beginning of Section 5 for the proper sequence of adjustments.

1. Check inserter and remove any terminal gripped in the clamp.

2. Use the “MANUAL” screen to open the inserter clamp as follows:

— when using the straight power unit (1976415–1), cycle the inserter one time to open the inserter;

— when using the rotary power unit (1976405–1), use the “GRIPPER OPEN” button on the touch–screen to open the inserter clamp (gripper).

3. Extend the die, using the “DIE EXTEND” button on the touch–screen. (This will extend the die slide and pivot the strip guide to align the terminal strip with the inserter.)

4. With the die extended, feed the terminal strip using the “FEED EXTEND” button on the touch–screen, until a terminal is positioned in the inserter.

5. Close the inserter as follows:

— on the straight power unit (1976415–1), turn off the main air using the “MAIN AIR OFF” button on the touchscreen;

— then depress the cam follower located behind the gripper cylinder, until the gripper snaps closed:

— on the rotary power unit (1976405–1), use the “GRIPPER CLOSE” button on the touchscreen.

6. Turn “off” the main air on the touchscreen (if it is not presently turned “off”).

7. Operate the inserter clamp manually (see Paragraph 3.6), while observing the terminal in the inserter.

The terminal should enter the clamp freely and should not be moved forward or backward by the clamp (gripper). If the terminal is too far forward, the strip is “overfed” and the feed must be adjusted rearward. If the terminal is not fed far enough into the inserter, the strip is “underfed” and the feed must be adjusted forward.

8. To adjust the feed position, loosen the two feed adjustment locking screws and turn the feed adjustment thumbscrew clockwise to move the terminal strip *forward* (if the terminals were underfed), or counterclockwise to move the terminals *to the rear* (if the terminals were overfed). Refer to Figure 13.

9. Manually operate the shear cylinder to cut the terminal free from the terminal carrier strip.

10. Repeat Step 1 through Step 9 until terminals are feeding into the inserter properly.

Forward Feed Position

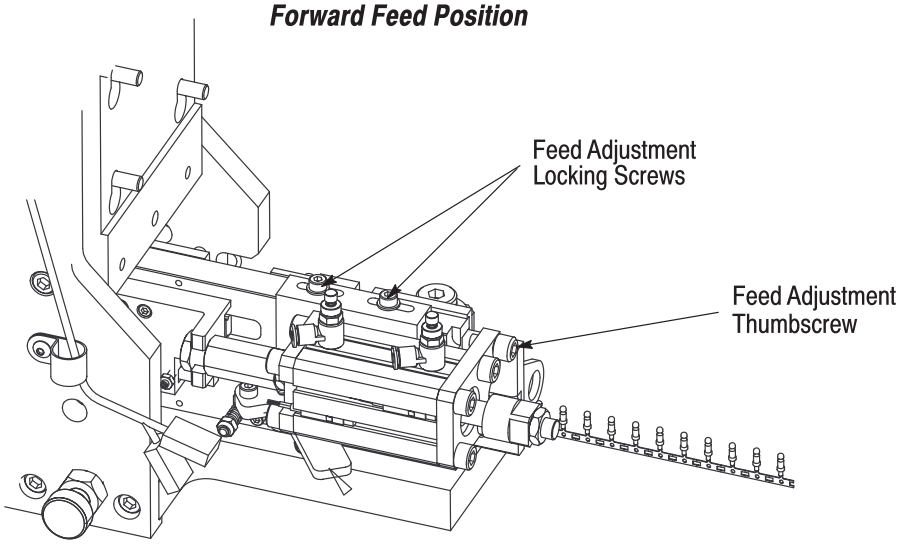


Figure 13

5.3. Anti–Backup Finger Position Adjustment (See Figure 14)

Important: The succeeding process is affected by this adjustment—make sure to adjust the succeeding process after this adjustment. Refer to the beginning of Section 5 for the proper sequence of adjustments.

Verify that the anti–backup finger prevents the feed finger from pulling the terminal strip rearward during its return stroke. If it does not, proceed as follows:

1. Make sure that the electrical power and air supply is disconnected from the base machine.
2. Manually operate the feed cylinder until a terminal is visible under the inserter assembly. Ensure that the feed cylinder is in its forward position (the cylinder stop should be against the rear mounting plate of the feed cylinder).
3. Loosen the two locking screws, and slide the anti–backup finger mount rearward until the anti–backup finger drops into the terminal strip behind a terminal.
4. Tighten the two locking screws.
5. Manually cycle the feed cylinder a few strokes to ensure that the anti–backup finger drops behind a terminal just as the feed cylinder reaches the end of its forward position. If it does not, repeat Steps 2 through 4.

Anti–Backup Finger Position Adjustment

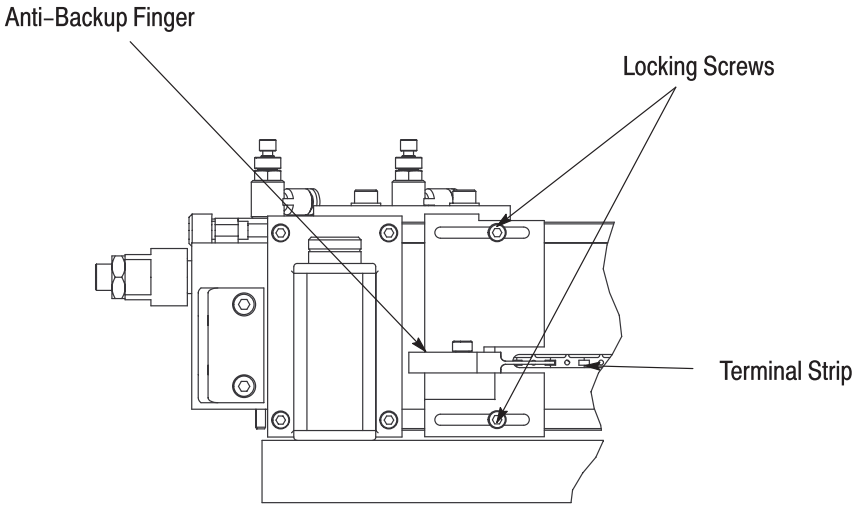


Figure 14

5.4. Inserter Assembly Retract Position Adjustment

Important: The succeeding process is affected by this adjustment—make sure to adjust the succeeding process after this adjustment. Refer to the beginning of Section 5 for the proper sequence of adjustments.

Verify that there is clearance between the tip of the inserter assembly and the top of the terminal within the dimension given in Figure 15. If there is not, proceed as follows:

1. Make sure that the electrical power and air supply is disconnected from the base machine.
2. Raise the inserter assembly to its fully raised position.
3. Manually extend the die cylinder.
4. Manually extend the feed cylinder to feed terminals into the inserter.
5. Loosen the jam nut of the insertion cylinder rod. See Figure 2.

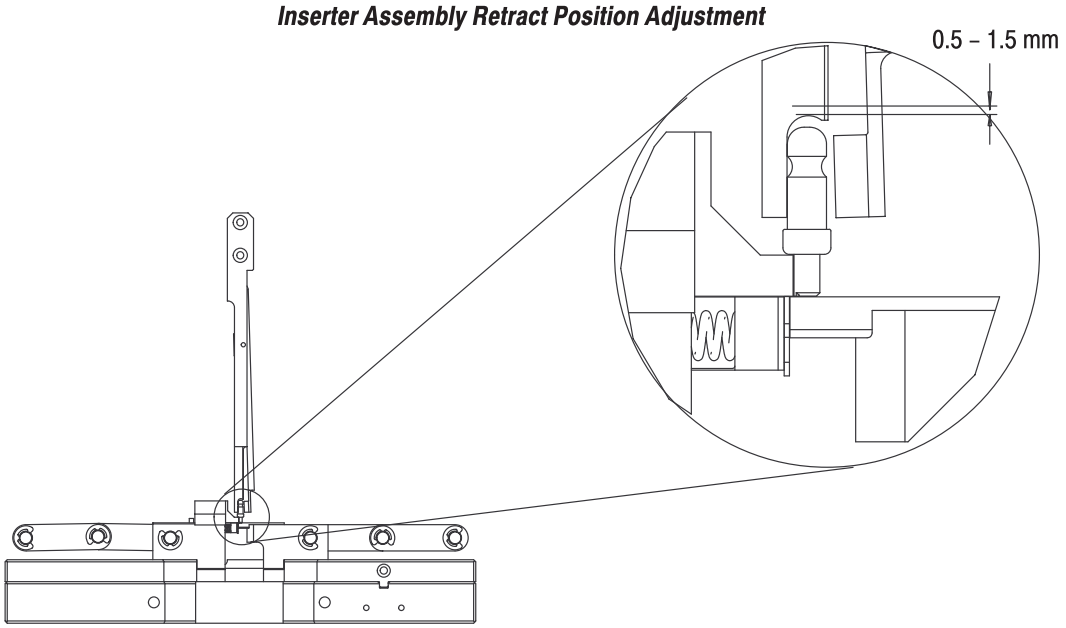


Figure 15

6. Turn the insertion cylinder rod joint until there is 0.5 – 1.5mm of clearance between the tip of the inserter assembly and the top of the terminal. See Figure15.

7. Re–tighten the jam nut.

5.5. Die Cylinder Clevis Adjustment (See Figure 16)

Important: The succeeding process is affected by this adjustment—make sure to adjust the succeeding process after this adjustment. Refer to Section 5 for the proper sequence of adjustments.

1. Make sure that the electrical power and air supply is disconnected from the base machine.
2. Manually raise the inserter assembly to its fully raised position.
3. Manually operate the die cylinder to its fully extended position.
4. Loosen the jam nut of the cylinder rod.
5. Turn the cylinder rod to extend or retract the clevis until the toggle link is parallel to the mount surface.
6. Using two wrenches (one to hold the rod clevis and the other to rotate the jam nut), re–tighten the jam nut.

CAUTION

To avoid damage to the tooling, DO NOT allow the clevis to turn while tightening the jam nut.

5.6. Shear Cylinder Clevis Adjustment (See Figure 16)

Important: The succeeding process is affected by this adjustment—make sure to adjust the succeeding process after this adjustment. Refer to Section 5 for the proper sequence of adjustments.

1. Make sure that the electrical power and air supply is disconnected from the base machine.
2. Manually raise the inserter assembly to its fully raised position.
3. Manually operate the shear cylinder so that it is at its fully extended position.
4. Loosen the jam nut of the shear cylinder.

5. Turn the cylinder rod to extend or retract the clevis, until the toggle links are parallel to the mount surface.

6. Using two wrenches (one to hold the rod clevis and the other to rotate the jam nut), retighten the jam nut.

Die Cylinder Clevis Adjustment and Shear Cylinder Clevis Adjustment

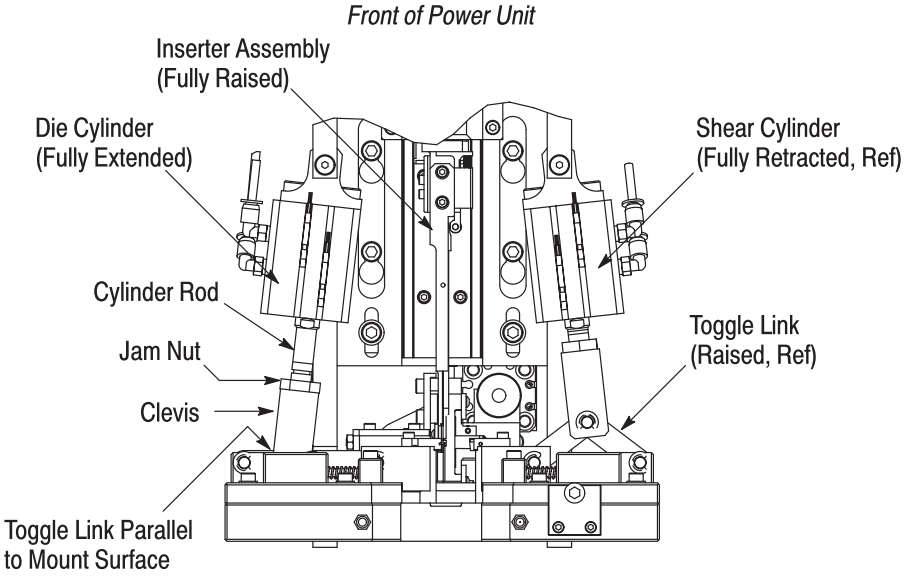


Figure 16

5.7. Die Travel Adjustment (See Figure 17)

Important: The succeeding process is affected by this adjustment—make sure to adjust the succeeding process after this adjustment. Refer to the beginning of Section 5 for the proper sequence of adjustments.

1. Make sure that the electrical power and air supply is disconnected from the base machine.

2. Manually feed a terminal into the inserter. The terminal should feed into the inserter so that it touches the left (fixed) inserter body, without being deflected.

3. Pull the die cylinder clevis down to extend the die slide.

4. Loosen the two locking screws that retain the die lever mount.

5. Turn the die adjustment screw *clockwise* to extend the die insert and *counter–clockwise* to retract the die insert until the terminal in the tool set is just touching the left (fixed) inserter body.

NOTE

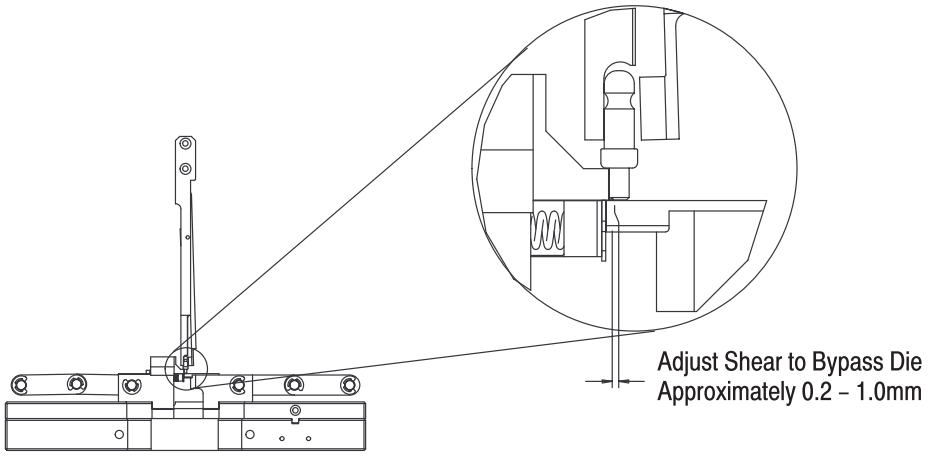
The terminal should just touch the inserter body without causing the terminal strip to deflect.

6. Re–tighten the die lever mount locking screws.

5.8. Shear Travel Adjustment (See Figure 17)

Important: The succeeding process is affected by this adjustment—make sure to adjust the succeeding process after this adjustment. Refer to the beginning of Section 5 for the proper sequence of adjustments.

1. Make sure that the electrical power and air supply is disconnected from the base machine.
2. Loosen the two locking screws that retain the shear lever mount.



Tool Set Shown with Die and Shear tooling Fully Extended (Some Items Not Shown for Clarity)

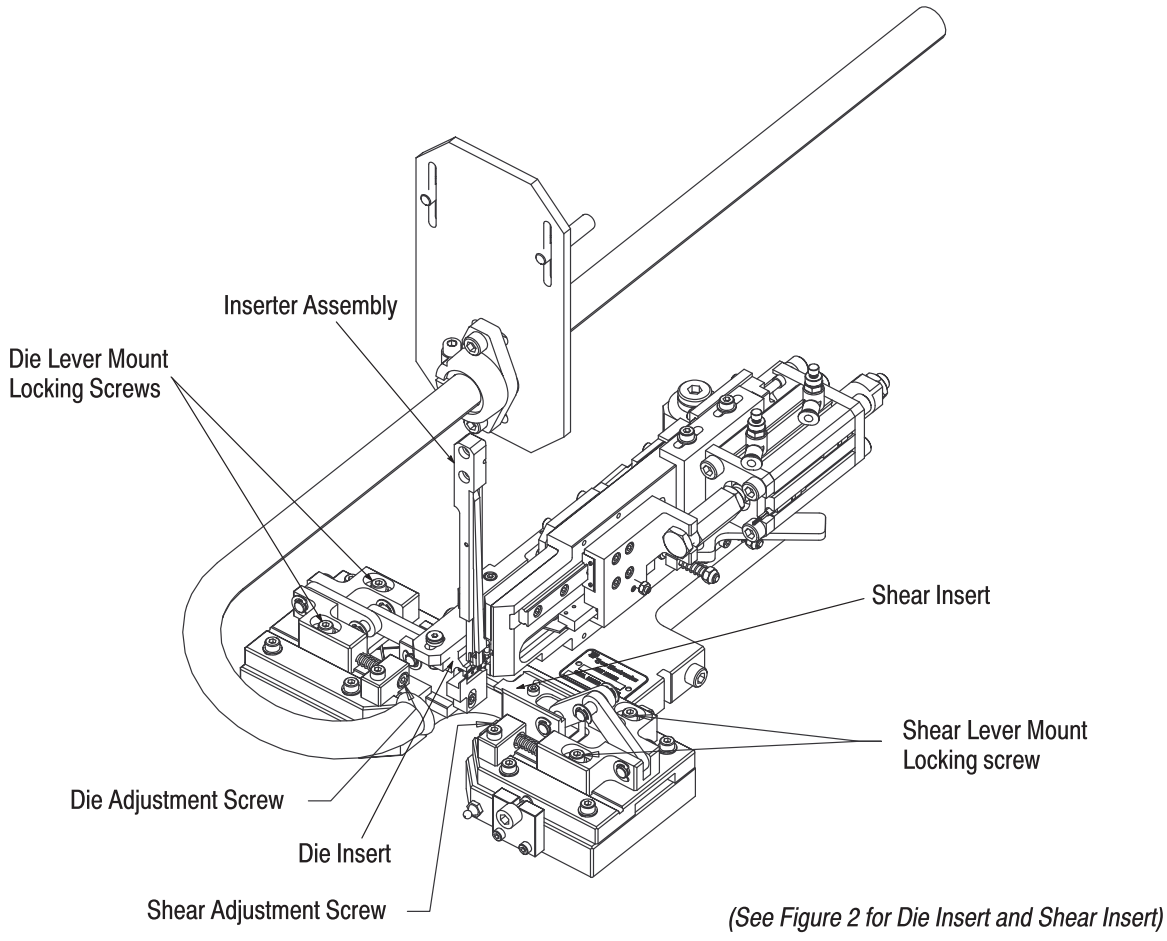


Figure 17

3. With the die cylinder still in the extended position, fully extend the shear cylinder. If necessary, loosen the shear adjustment screw until the shear cylinder can be fully extended.

4. Tighten the shear adjustment screw until the terminal strip is sheared. Then turn the screw one additional rotation after the terminal strip is sheared.

CAUTION

DO NOT allow the shear insert to butt against the die insert. If the shear extends too far, the shear insert could be damaged.

5. Re–tighten the shear lever mount locking screws.

6. Pull the die cylinder clevis up to retract the die slide.

5.9. Shear and Die Position Adjustment

1. Make sure that the electrical power and air supply is disconnected from the base machine.

2. With a terminal properly fed and gripped in the inserter, examine the position of the terminal in relation to the die insert (see Figure 18).

3. It the terminal being sheared is not positioned properly on the die insert, loosen the six gib plate mounting screws (numbered 1 through 6 in Figure 18.

4. If the terminal being sheared is too far forward on the die insert, adjust the die and the shear position forward by turning the adjustment screw clockwise.

5. If the terminal being sheared is too far rearward on the die insert, adjust the die and shear position rearward by turning the adjustment thumbscrew counterclockwise.

6. Re–tighten the six mounting screws attaching the gib plate.

5.10. Lower Tooling Tip Height Adjustment (See Figure 17)

NOTE

For instructions on adjusting the lower tooling tip, refer to Customer Manual 409–10089 (included with the machine).

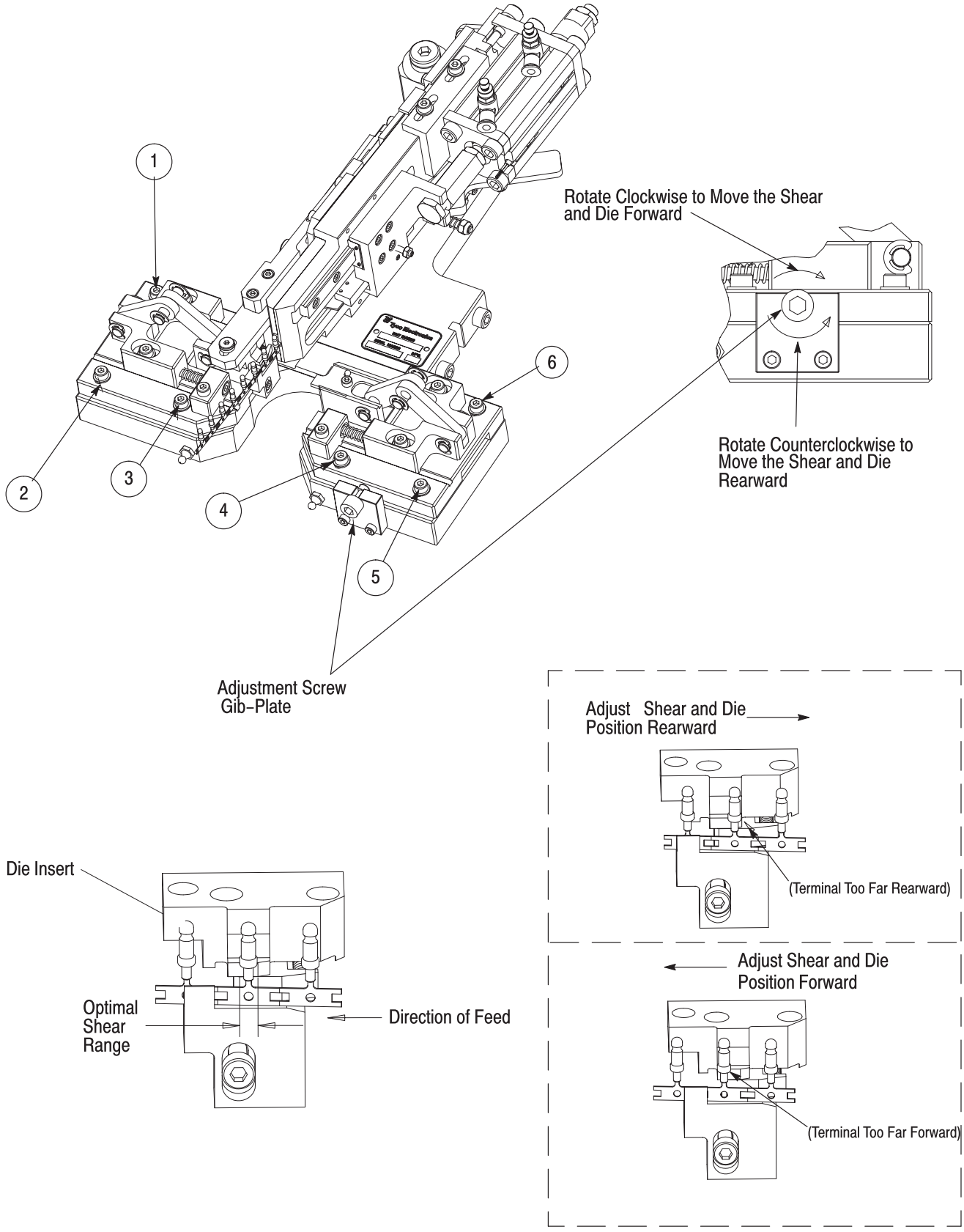

1
2
3
4
5
6
Rotate Clockwise to Move the Shear and Die Forward
Rotate Counterclockwise to Move the Shear and Die Rearward
Adjustment Screw Gib–Plate
Adjust Shear and Die Position Rearward
(Terminal Too Far Rearward)
Adjust Shear and Die Position Forward
(Terminal Too Far Forward)
Die Insert
Optimal Shear Range
Direction of Feed

Figure 18

5.11. Power Unit Height (Terminal Insertion Depth) Adjustment (Refer to Figure 19)

After installing the lower tooling tip (refer to Paragraph 3.2,B) and adjusting the lower tooling position and height (refer to 409–10089), verify that the depth of the terminal into the pc board is accurate. If it is not, proceed as follows:

1. Make sure that the electrical power and air supply is disconnected from the base machine.
2. Loosen the four power unit height adjustment screws located at the front of the power unit. DO NOT loosen the mounting screws that attach the power unit to the machine gantry.
3. Loosen the jam nut located at the back of the power unit.
4. Turn the stop bolt up or down to adjust the power unit height as required. Then, re–tighten the jam nut.
5. Re–tighten the four power unit height adjustment screws.

Power Unit Height (Terminal Insertion Depth) Adjustment

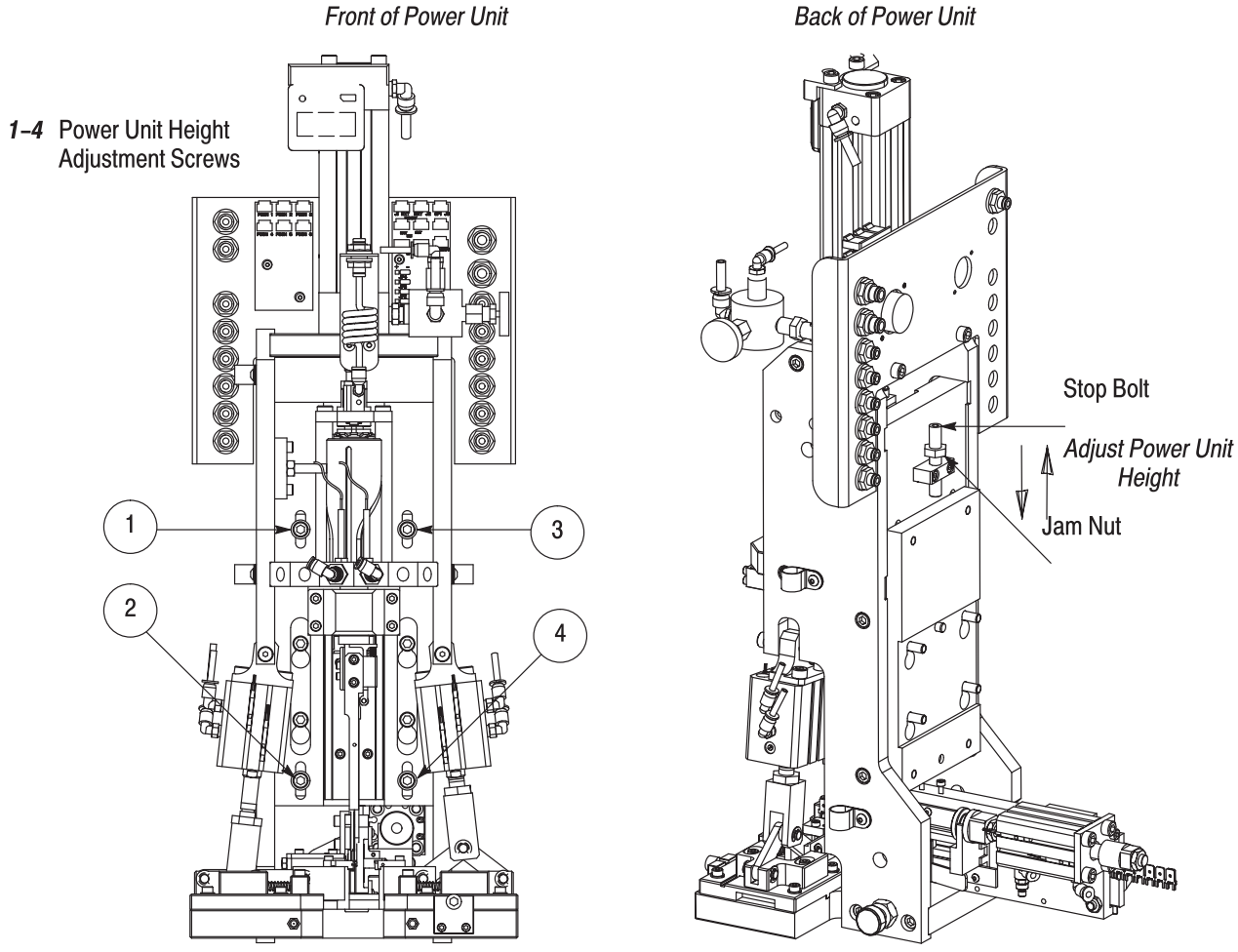


Figure 19

5.12. Magnetic Cylinder Switch Adjustment

Verify that the two switches mounted to the each air cylinder of the power unit are positioned to detect whether the cylinder shafts have fully extended or fully retracted. If they do not, proceed as follows:

CAUTION

To avoid damage to the tooling, the electrical power and air supply must be turned "ON" and "OFF" during the adjustment procedure when indicated in the following steps.

1. Turn the air supply to the base machine "OFF," and turn the electrical power to the base machine "ON."
2. Manually move the inserter cylinder to its fully extended position.
3. Using a small flat blade screwdriver, loosen the switch locking screw, and manually slide the switch along the cylinder track until the LED light on the switch lights "ON", then tighten the switch locking screw.
4. Repeat Steps 2 and 3 for the die cylinder, shear cylinder, and feed cylinder.
5. Make sure all guards are in place, and turn the air supply to the base machine "ON."
6. Using the manual input screen of the machine, extend and retract each cylinder while ensuring that the appropriate cylinder switch is "ON."

5.13. Inserter Clamp Opening Adjustment

The opening of the inserter clamp is pre–set and should not require adjustment; however, if necessary, adjust the inserter clamp opening as follows:

A. Straight Power Unit (Refer to Figure 20)

Verify that the there is space between the inserter clamp and inserter body and that the inserter clamp opens enough so to pass the terminal when it feeds forward. If the inserter clamp does not open to the required distance, proceed as follows:

1. Make sure that the electrical power and air supply is disconnected from the base machine.
2. Manually extend and retract the inserter assembly (refer to Paragraph 3.6) to ensure that the gripper roller is on the cam surface.
3. Loosen the jam nut located on the set screw of the gripper lever.
4. Adjust the set screw to open or close the inserter clamp to the required distance. DO NOT adjust the set screw so that it pushes the inserter clamp against the inserter body; otherwise, damage to the power unit or tool set could occur.
5. Re–tighten the jam nut.

Inserter Clamp Opening Adjustment (Straight Power Unit Only)

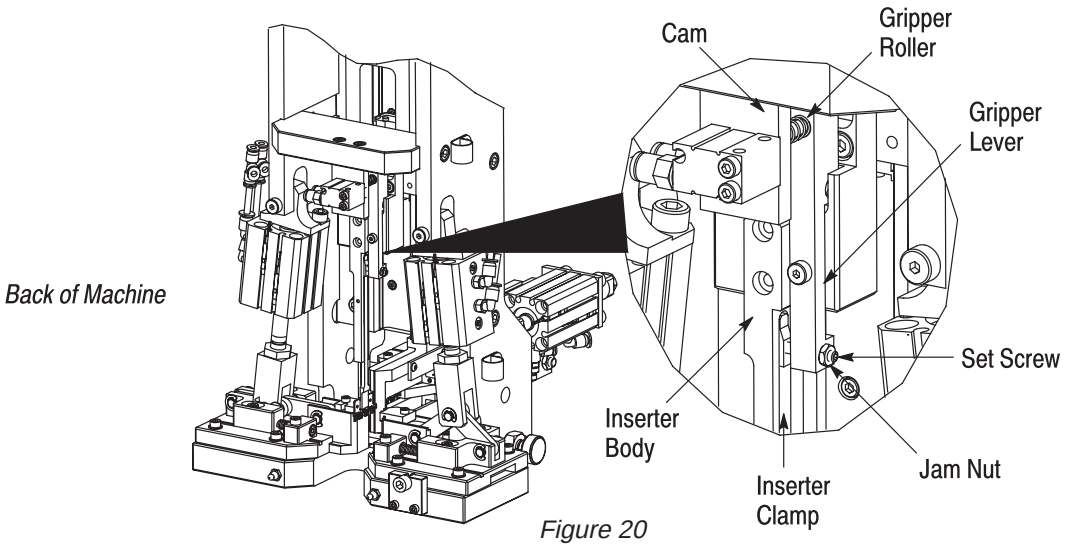


Figure 20

B. Rotary Power Unit

The Rotary Power Unit uses an air cylinder to open the inserter clamp; therefore, the opening of the inserter clamp opening cannot be adjusted.

5.14. Terminal Drag Pressure Adjustment (Refer to Figure 21)

The terminal drag pressure is pre–set and should not require adjustment; however, if necessary, adjust the pressure as follows:

1. Make sure that the electrical power and air supply is disconnected from the base machine.
2. Loosen the jam nut located on the adjustment set screw of the drag housing.
3. Rotate the adjustment set screw *clockwise* (moves “in”) to increase the drag pressure and *counter–clockwise* (moves “out”) to decrease the drag pressure. The drag pressure should be set to the minimum amount required for consistent operation.
4. Re–tighten the jam nut.

Terminal Drag Pressure Adjustment

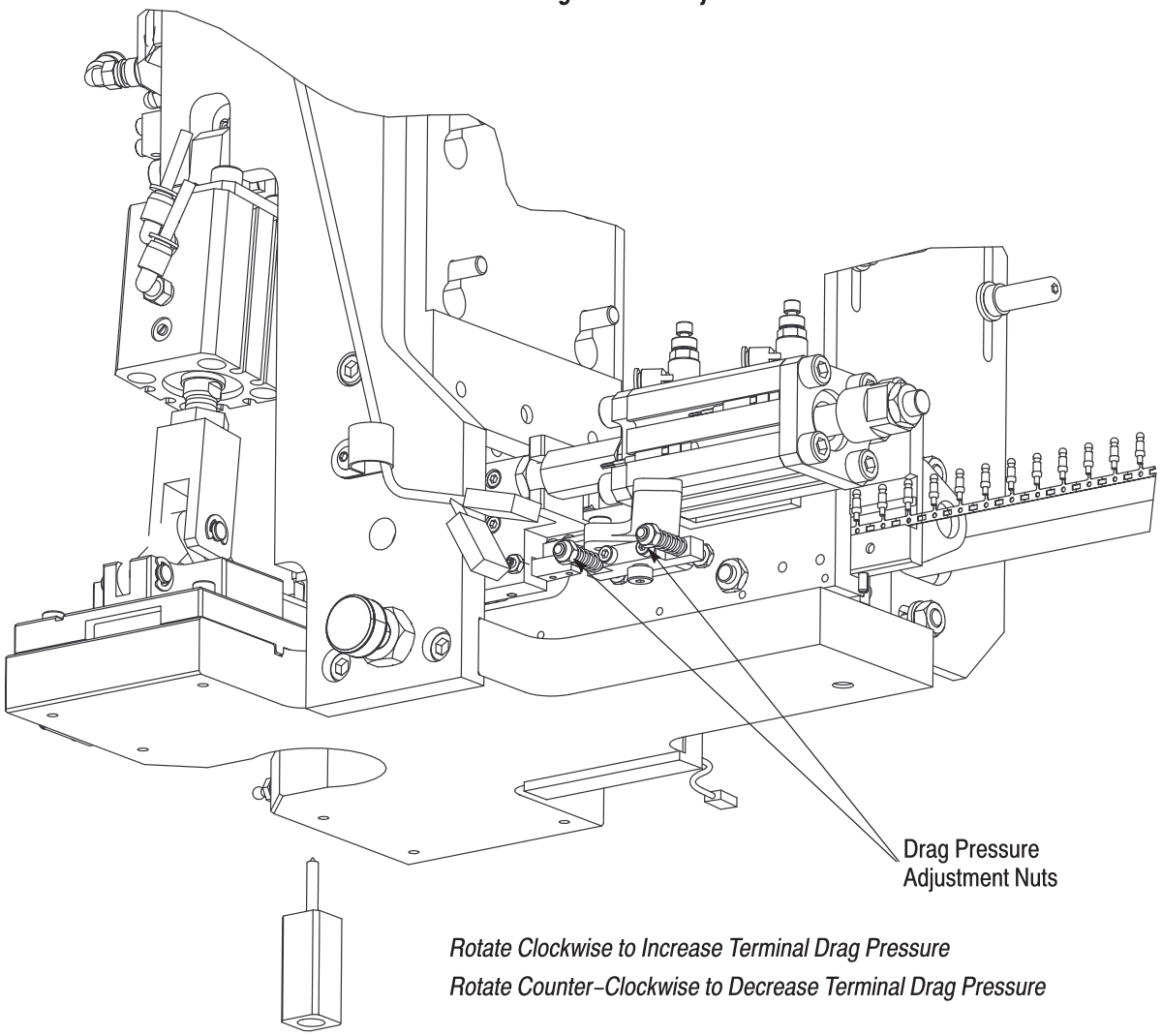


Figure 21

6. PREVENTIVE MAINTENANCE

Preventive maintenance consists of cleaning, inspecting, and lubricating the AIM. A program of regular, scheduled maintenance ensures efficient operation of the AIM with minimum downtime. The maintenance schedule recommended is based on typical operating conditions; however, the schedule may be adjusted, especially if experience shows that lubrication is required more often.



To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before performing any preventive maintenance to tooling.

6.1. Cleaning and Inspection

Clean and inspect the AIM regularly as follows:

A. Daily or Every 100,000 Cycles

1. Disconnect the electrical power and air supply from the base machine.
2. If equipped, check the scrap tube for restrictions twice each shift.
3. Using a soft bristled brush, remove dirt and other contaminants from within the AIM.
4. Using a dry air supply, blow any metal particles from within the AIM.



To avoid personal injury, compressed air used for cleaning must be reduced to less than 200 kPa (30 psi) and effective chip guarding and personal protective equipment (including eye protection) must be used.

B. Weekly or Every 700,000 Cycles

1. Disconnect the electrical power and air supply from the base machine.
2. Inspect all screws and nuts to ensure that they are secure.
3. Check the magnetic cylinder switches. If necessary, adjust them as described in Paragraph 5.10.

C. Monthly or Every 3,000,000 Cycles

1. Disconnect the electrical power and air supply from the base machine.
2. Remove the terminal strip guide, inserter assembly, die insert, and shear insert. Check these parts under magnification for wear or damage. Replace any worn or damaged parts.
3. Visually inspect the remaining components for wear or damage. Replace any worn or damaged parts.



The presence of metal particles within the AIM indicates misaligned parts, damage, or a lack of lubrication.

4. Manually operate the inserter slide, die slide, and shear slide; and check that all slides operate freely without any roughness or excessive side clearance. If there is any indication of wear or roughness, further disassembly and cleaning, lubrication, or replacement of these parts is recommended.
5. Before re–assembling the AIM, thoroughly clean the removed parts with solvent.
6. Re–assemble the terminal strip guide, inserter assembly, die insert, and shear insert.
7. Lubricate the AIM as described in Paragraph 6.2. Make any necessary adjustments before operating the AIM.

6.2. Lubrication

Proper and regular lubrication is essential for optimum performance of the AIM. To keep the AIM operating efficiently, it is just as important to avoid over–lubricating as it is lubricating. The following lubrication schedule

is based on a 24–hour running time or 100,000 cycles. Therefore, if the AIM operates three shifts a day, it should be lubricated every day; if it operates one shift a day, it should be lubricated every third day (or after 100,000 cycles, whichever comes first). Adjustments to this schedule might be required, according to specific operating conditions. If the AIM has not been operated for several days, it should be lubricated before placing it into operation.

Refer to Figure 22, and proceed as follows:

1. Disconnect the electrical power and air supply from the base machine.

2. Verify that the die cylinder and shear cylinder are fully retracted.

3. Using a manually–operated grease gun filled with a a good grade NLGI Grade 2 grease, apply grease to each of the grease fittings located at the front of the tool set. Stop when grease begins to flow from around the die slide and shear slide. DO NOT use an excessive amount of grease. Remove any excess grease.



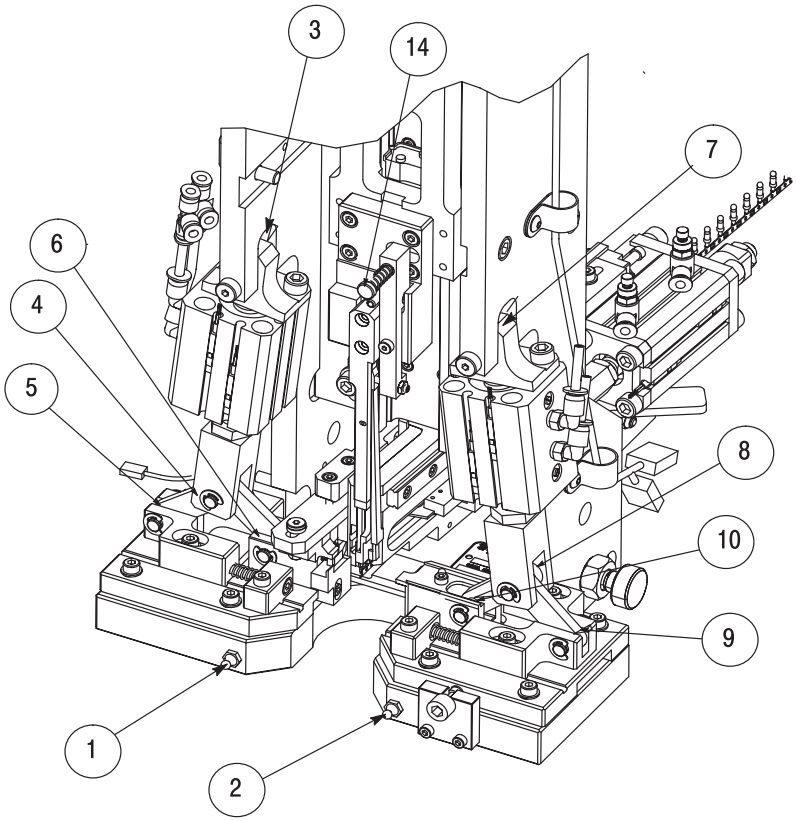
It is NOT recommended to use a pneumatic or automatic grease gun for lubrication. The amount of grease required for proper lubrication is minimal and the use of powered grease guns will likely result in excess lubrication.

4. Apply 1 or 2 drops of light machine oil to each pivot point of the shear linkage, die linkage, feed finger, and anti–backup finger. Remove any excess oil.

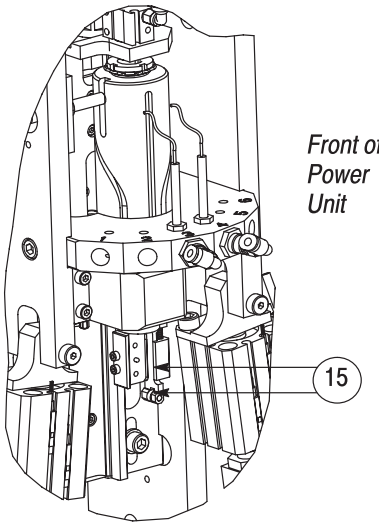
5. Using a small brush or cotton swab, apply grease to the center of the feed slide.

6. For the Straight Power Unit, extend the insertion cylinder, and apply grease to the gripper arm and roller. For the Rotary Power Unit, apply a coating of grease to a small area of the gripper slide and roller bearing.

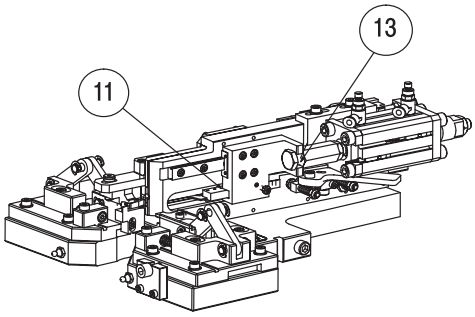
Lubrication Points

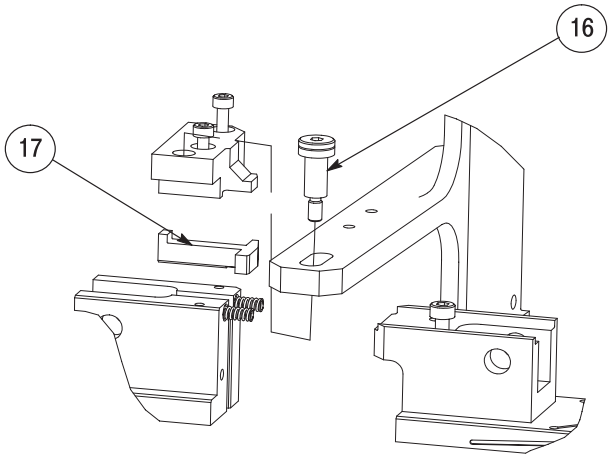


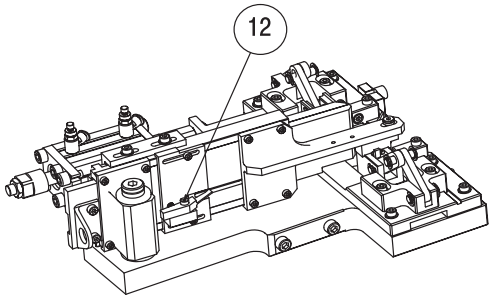
Rotary Power Unit Only



(Inserter Assembly Not Shown)







APPLY GREASE HERE	COMPONENT
1–2	Grease Fittings
13	Grease Cylinder Coupler
14	Gripper Arm and Roller
15	Gripper Slide and Roller Bearing
16	Strip Guide Pivot
17	Stripper Plate

APPLY OIL HERE	COMPONENT
3–6	Pivot Points of Shear Linkage
7–10	Pivot Points of Die Linkage
11	Pivot Point of Feed Finger
12	Pivot Point of Anti–Backup Finger

Figure 22

7. REPLACEMENT



To avoid personal injury, ALWAYS DISCONNECT the electrical power and air supply from the base machine before replacing any parts.

Customer–replaceable parts are listed on the customer drawings and parts lists supplied with the AIM. Spare parts kit is also available for each AIM. The kit contains all of the recommended spare parts. A complete inventory should be stocked and controlled to prevent lost time when replacement of parts is necessary. Parts other than those listed should be replaced by Tyco Electronics Corporation to ensure quality and reliability. Order replacement parts through your representative, or call 1–800–526–5142, or send a facsimile of your purchase order to 717–986–7605, or write to:

CUSTOMER SERVICE (038–035)
TYCO ELECTRONICS CORPORATION
PO BOX 3608
HARRISBURG PA 17105–3608

7.1. Die Insert Replacement (See Figure 23)

1. Disconnect the electrical power and air supply from the base machine.
2. Remove the shoulder bolt and nut holding the strip guide bracket to the die insert.
3. Remove the two screws holding the die insert to the die slide.



The stripper plate is spring loaded and retained by the die insert. Hold on to the die insert when removing the mounting screws.

4. Carefully remove the die insert.
5. Clean the mounting surface on the die slide. The mounting surface must be free of dirt, corrosion and any debris.
6. With the die insert removed, inspect the stripper plate and springs. Remove any debris and lightly grease the stripper plate guide.
7. Remove the protective wax coating (if present) from the new die insert.
8. Carefully install the new die insert. Make sure the insert is properly seated in the die slide, and the stripper plate is properly engaged.
9. Apply a light film of grease to the top of the die insert and the slot in the strip guide bracket. Re–install the shoulder bolt and nut securing the strip guide bracket to the die insert.
10. Manually extend the die cylinder and shear cylinder and check the new insert for clearance with the shear blade.

7.2. Shear Insert Replacement (See Figure 23)

1. Disconnect the electrical power and air supply from the base machine.
2. Remove the screw holding the shear insert to the shear slide.
3. Carefully remove the shear insert.
4. Clean the mounting surface on the shear slide. The mounting surface must be free of dirt, corrosion and any debris.
5. Remove the protective wax coating (if present) from the new shear insert.
6. Carefully install the new shear insert. Make sure the insert is properly seated in the shear slide.
7. Re–install the screw that holds the shear insert.

Die Insert Replacement and Shear Insert Replacement

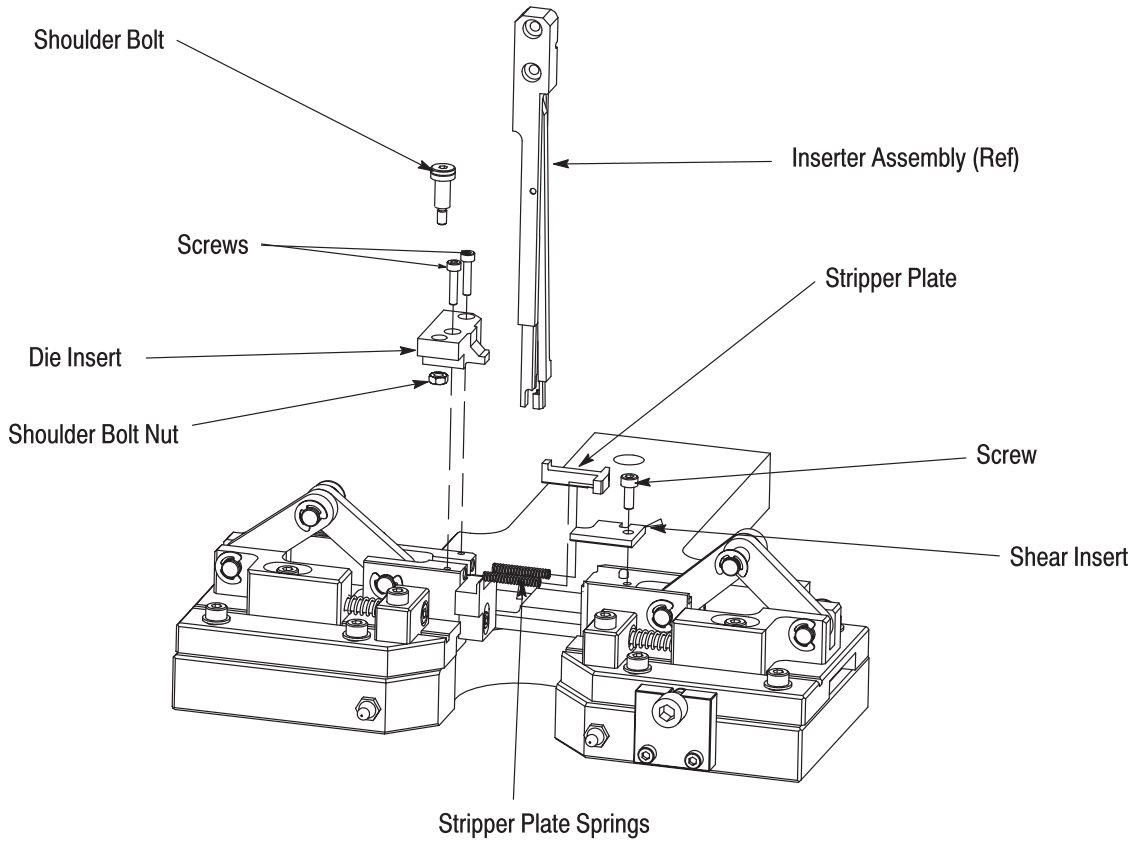


Figure 23

8. Manually extend the die cylinder and shear cylinder and check the new insert for clearance with the die blade. See Figure 23.

7.3. Inserter Assembly Replacement

1. Disconnect the electrical power and air supply from the base machine.

2. Remove the two screws securing the inserter assembly to the power unit. Carefully remove the inserter assembly by pulling it straight forward from the power unit. To avoid damage to the inserter assembly or power unit, DO NOT twist or pry the inserter assembly.

3. For the Rotary Power Unit, inspect the gripper slide for wear and debris. If necessary, replace the gripper slide and/or remove the debris. Lubricate the gripper slide with grease.

4. Clean and inspect the inserter assembly mounting surface of the power unit.

5. Using the two mounting screws, install the new inserter assembly to the power unit.

6. For the Straight Power Unit, check and adjust the inserter clamp opening.

7.4. Strip Guide Insert Replacement

NOTE

Make sure that the new strip guide insert is designed for the terminal being used.

1. Disconnect the electrical power and air supply from the base machine.
2. Rotate the drag release lever outward until it stops.
3. Push and hold the anti–backup finger until it is clear of the strip guide.
4. Using the strip guide handle, pull the strip guide insert to the back of the feed package (refer to Figure 8). Remove the strip guide insert.
5. Push the new strip guide insert into the back of the feed package.
6. Rotate the drag release lever inward until it stops.

8. REVISION SUMMARY

- Initial release of customer manual 409–10093

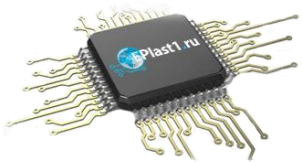
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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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