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customer manual

ORIGINAL INSTRUCTIONS

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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 approved eye protection while operating equipment.



Always wear appropriate ear protection while using equipment.



Moving parts can crush and cut. Always keep guard(s) in place during normal operation.



Electrical shock hazard.



Always turn off the main power switch and disconnect the electrical cord from the power source when performing repair or maintenance on the equipment.



Never insert hands into installed equipment. Never wear loose clothing or jewelry that may catch in moving parts of the equipment.



Never alter, modify, or misuse the 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.

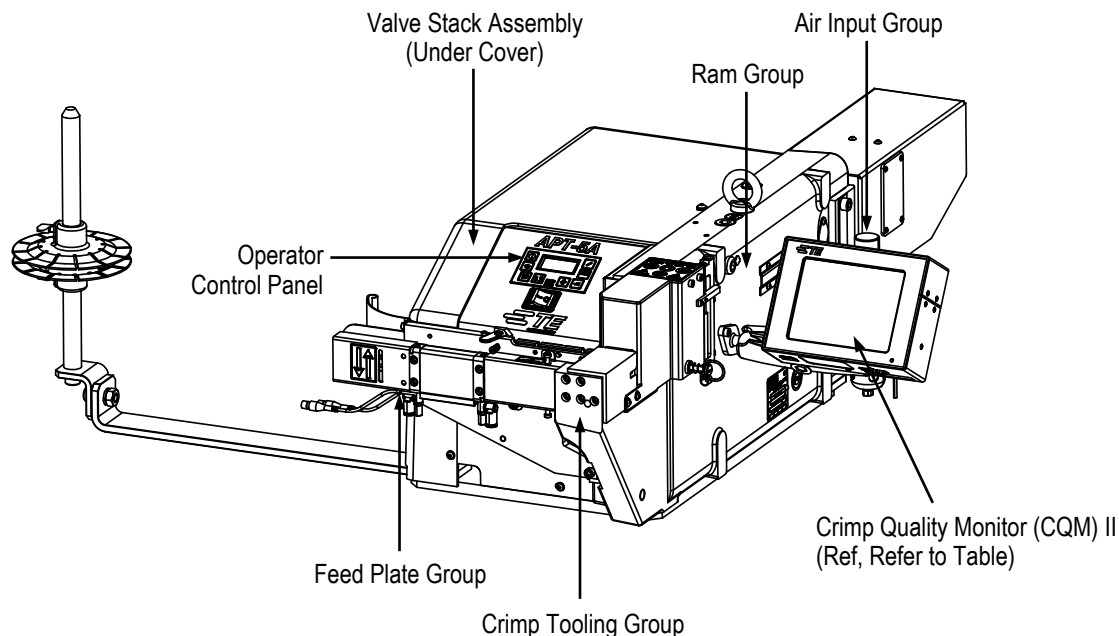
In addition, Field Service Specialists are available to provide assistance in the adjustment or repair of the application equipment when problems arise which your maintenance personnel are unable to correct.

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



AMPLIVAR PRODUCT TERMINATOR			
TYPE	MODEL	PART NUMBER	DESCRIPTION
Splice	APT-5E (Economy)	2161900-[]	Has precision manual crimp height adjustment.
	APT-5A (Automatic)	2161800-[]	Used with CQM II and has automatic crimp height adjustment and automatic sequencing.
	APT-5E HF (Economy High Force)	2217700-[]	Has precision manual crimp height adjustment with high force capacity.
	APT-5A HF (Automatic High Force)	2217600-[]	Used with CQM II and has automatic crimp height adjustment and automatic sequencing with high force capacity.
Direct Connect	APT-5E DC (Economy)	2161950-[]	Has precision manual crimp height adjustment.
	APT-5A DC (Automatic)	2261850-[]	Used with CQM II and has automatic crimp height adjustment and automatic sequencing.

Note: Refer to 409-10100 for information for the CQM II.

Figure 1

1. INTRODUCTION

This manual provides information concerning the setup, operation, and maintenance of the AMPLIVAR product terminator shown in Figure 1. Terminator variations are given in Figure 1. These terminators apply AMPLIVAR pigtail splices and AMPLIVAR cluster receptacles to pre-stripped wires and unstripped magnet wire.

i NOTE
Dimensions in this manual are in metric units [with U.S. customary equivalents in brackets] unless otherwise indicated.

Serrations in the splices cut through the magnet wire insulation to make electrical contact. This eliminates a time-consuming stripping operation. Splices are applied with uniformly high mechanical strength and electrical conductivity at high-volume production pin rates.

Each AMPLIVAR product terminator weighs approximately 71 kg [156 lbs] and requires a power source of 100 to 240 Vac, 50/60 Hz 3 A, single phase, depending on the model of the terminator. Compressed air at a minimum pressure of 620.5 to 689.5 kPa [90 to 100 psi] for standard (E, A, and DC) terminators and 760 to 830 kPa [110 to 120 psi] for high force (HF) terminators is required for proper operation.

Optional wire stuffer assembly 2161635-1 can be used with this terminator to eliminate the need to change AMPLIVAR splices if the combined circular mil area (CMA) of the wires to be crimped is less than the specified minimum of the splice used.

**NOTE**

An air amplifier may be required if the available compressed air supply does not meet the minimum requirements. Refer to Paragraph 2.1 D.

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

**DANGER**

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

**CAUTION**

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

**NOTE**

Highlights special or important information.

For information beyond the scope of this manual, contact the Tooling Assistance Center at the number at the bottom of page 1.

**NOTE**

Dimensions in this customer manual are in metric units [with U.S. customary units in brackets]. Figures are not drawn to scale.

2. DESCRIPTION

AMPLIVAR product terminators automatically feed terminals into position in the crimping area, crimp the terminals to magnet wire, and trim the scrap wire from the terminals. Unlike many standard bench-type crimping machines, the primary crimping motions on the terminator occurs in the horizontal plane, and not vertically, as in many other TE automatic machines.

The crimp tooling is nearly flush with the right-hand surface of the terminator, allowing the operator to hold the wire close to the tooling for splicing very short leads.

During production operation, the operator places magnet wire and lead wire in the barrel of the terminal in the "target area" of the terminator, then depresses the foot switch. The terminator automatically shears the terminal from its strip, crimps the terminal onto the wire, shears off the excess wire, and advances the next terminal into the crimping position. The terminator electrical circuit prevents double-tripping; that is, the foot switch cannot be actuated when a cycle is in progress. The amount of time the foot switch is depressed is not critical.

The large number of wire combinations that can be joined with the splices requires some tooling changes, although design features minimize the number of changes required. Refer to drawing 216175 for tooling combinations. Only two different feed plates are required to terminate the entire range of splices. Two or three wires may be joined in one splice and combinations of magnet wire and lead wire (stranded, solid, or fused stranded) can be used.

**NOTE**

Magnet wire should always be placed on the bottom of the terminal wire barrel so that the serrations pierce the magnet wire varnish for an acceptable termination.

Wire stuffer assembly 2161635-1 is also available. This device is used when the customer CMA is less than the minimum published CMA for the AMPLIVAR product being terminated. The wire stuffer provides additional magnet wire CMA to the terminated CMA to meet the specified CMA range for a given AMPLIVAR product.

**NOTE**

CMA is the cross-sectional circular area of a magnet wire. For example, when terminating two .040-in. diameter magnet wires, each wire would have a CMA of 40 mils squared or 1600 CMA per wire for a total CMA of 3200. CMA for stranded wire is the diameter of a single strand in mils squared times the number of strands.

2.1. Major Groups

The four major terminator groups, or subassemblies, are: 1) the feed plate group, 2) the crimp tooling group, 3) the ram group, and 4) the air input and valve stack assembly. Refer to Figure 1.

A. Feed Plate Group

A.1. For Splice Terminators

Two feed plates are available to accommodate the full range of terminals. Each feed plate contains a groove that guides the terminal strip to the "target area." The feed finger, driven by the air feed cylinder, advances the terminal strip. Each cycle of the terminator advances the strip one position. The terminal strip drag prevents the strip from being pulled back as the feed finger retracts to pick up the next feed point in the strip. The hold down secures and controls the terminal strip through the feed plate. See Figure 2.

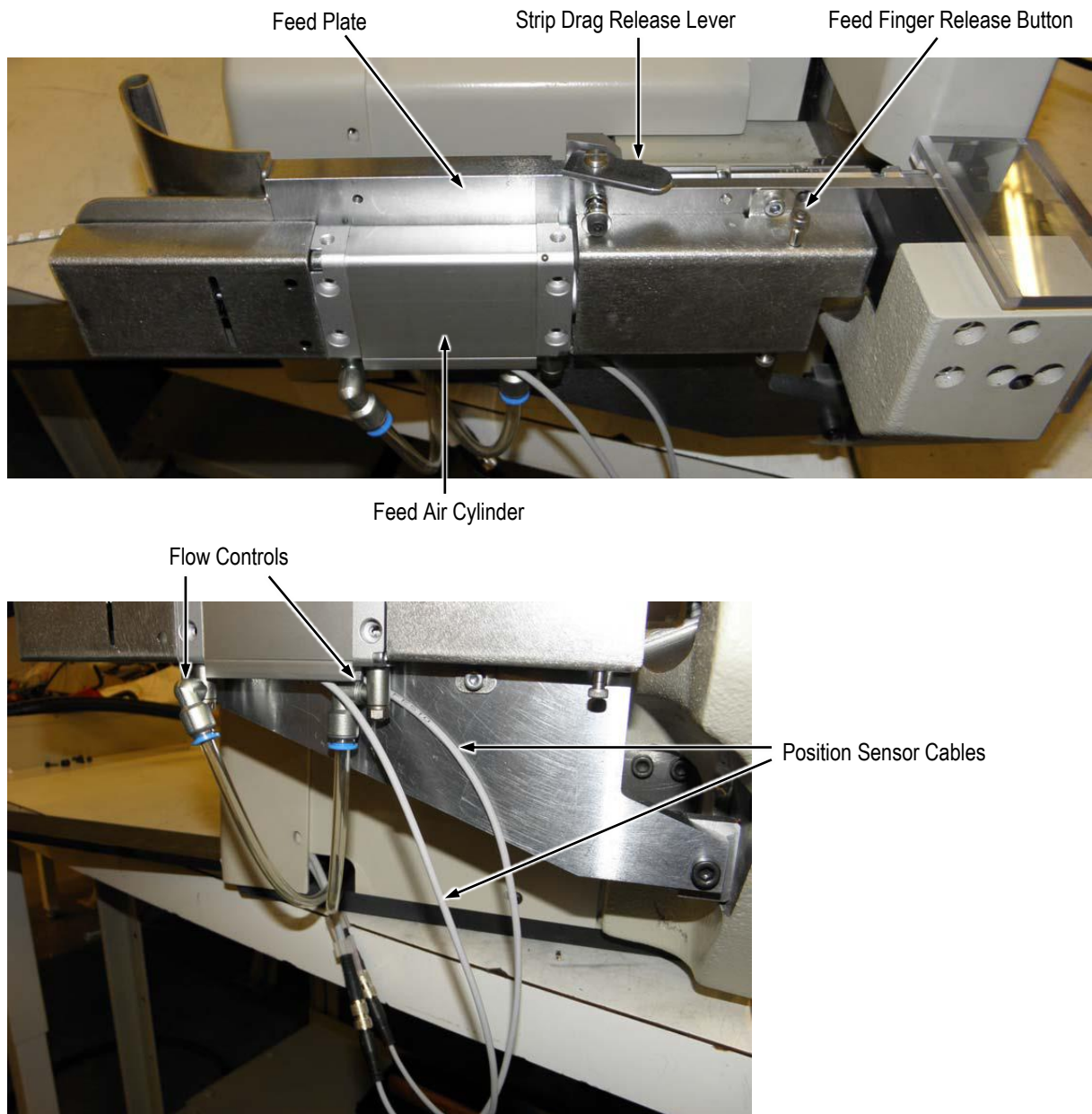


Figure 2

A.2. For Direct Connect Terminators

Two feed plates are available to accommodate the full range of terminals. Each feed plate contains a groove that guides the terminal strip to the "target area." The feed finger, driven by the air feed cylinder, advances the terminal strip. Each cycle of the terminator advances the strip one position. The terminal strip drag prevents the strip from being pulled back as the feed finger retracts to pick up the next feed point in the strip. The hold down secures and controls the terminal strip through the feed plate. See Figure 3.

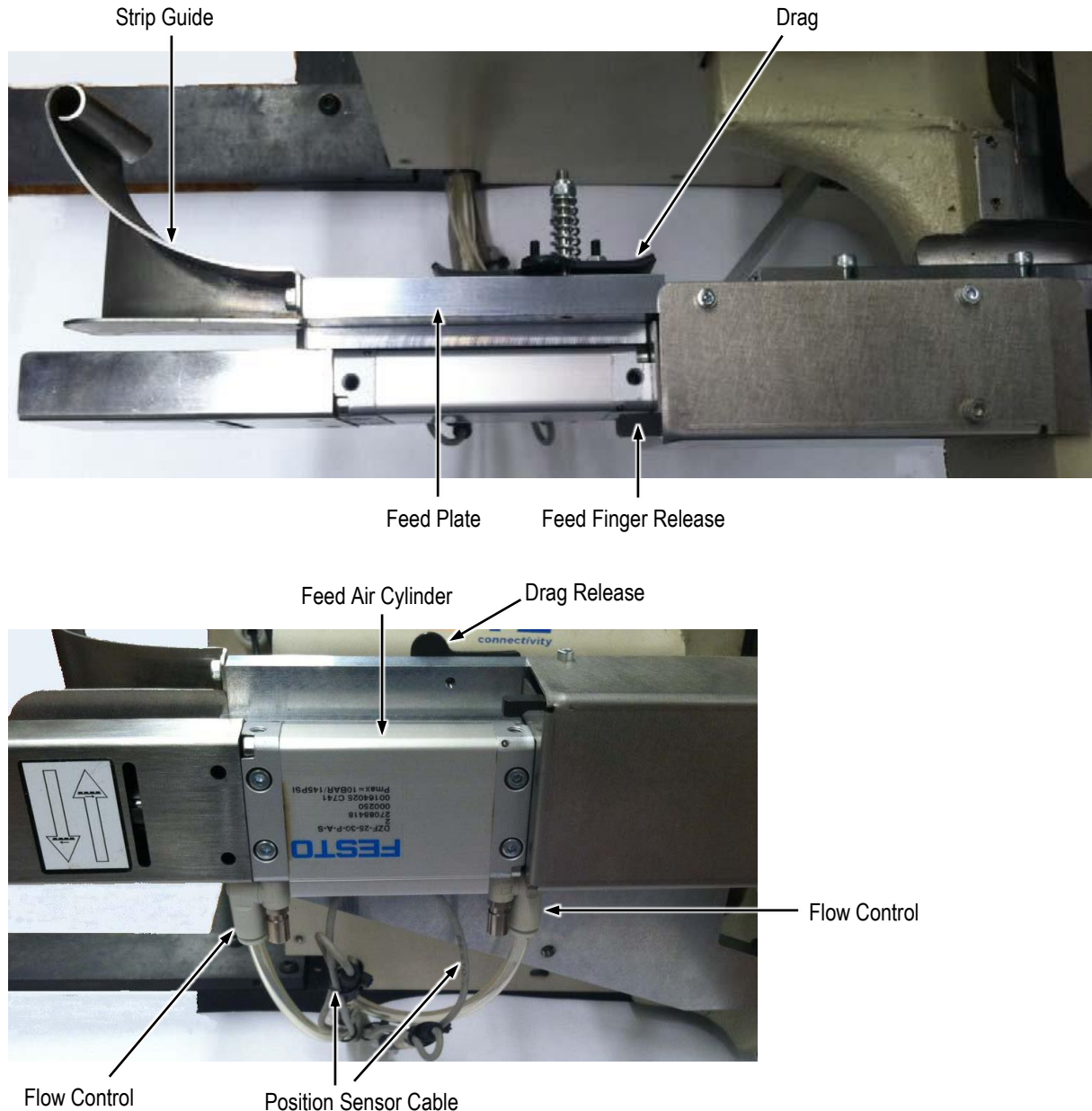


Figure 3

FESTO is a trademark.

B. Crimp Tooling Group

B.1. For Splice Terminators

The crimp tooling group for splice terminators consists of the crimper holder, the shear blade, and the crimper.

The crimper holder is attached to the ram with two screws. The crimper and the shear blade are attached to the crimper holder with two screws. The sides opposite the crimping and shear surfaces must be seated against the crimper holder. The anvil holder is mounted to the terminator frame. The anvil is held in place in the anvil holder by the stripper guide plate. The guide shear is mounted on the anvil holder and helps ensure that the wire is positioned for a perfect crimp. The crimper guide is engaged with the anvil holder at all times and eliminates crimper-anvil adjustment in one direction. See Figure 4.

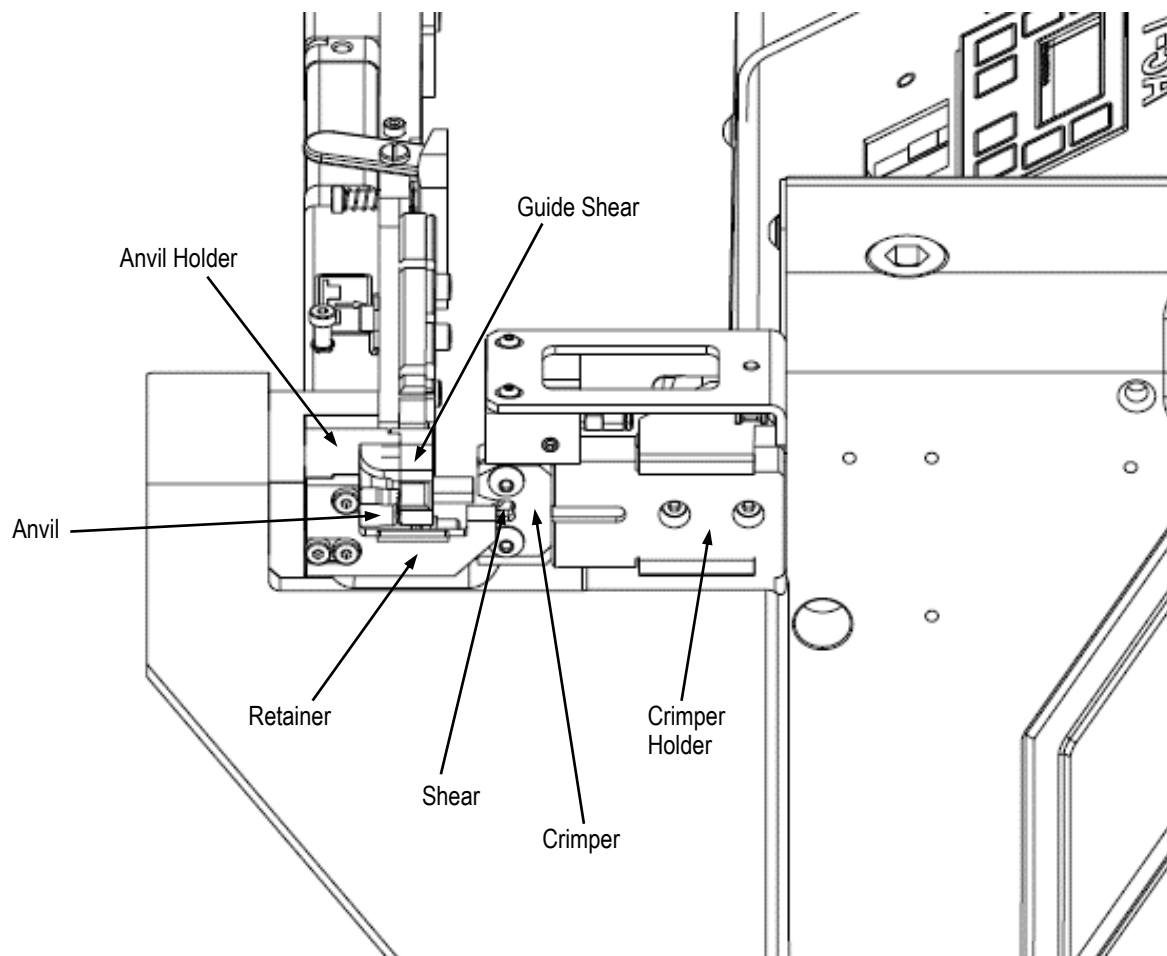


Figure 4

When the ram advances, the shear blade trims the scrap wire and at the same time shears the terminal from the strip. As the ram retracts, the stripper plate strips the crimped terminal from the crimper. As the ram reaches the fully retracted position, a preset blast of air is directed at the anvil to clear scrap wire and chips from the "target area." When the ram is fully retracted, the feed finger extends and the cycle is complete.

B.2. For Direct Connect Terminators

The crimp tooling group for direct connect terminators consists of the insulation and wire crimper with insulation disc and spacer attached to the ram with a button head screw. The slug blade is attached to the ram with two socket head cap screws. The wire anvil and insulation anvil lock into the anvil holder with the retainer plate. The product guide attaches to the anvil holder with two, socket head cap screws. The wire shear attaches to the product guide with two socket head cap screws. The product hold down attaches to the feed plate with two button head screws. The anvil holder attaches to the frame with three socket head cap screws. See Figure 5.

When the ram advances, the slug blade pre-trims the wire with the product hold down and the wire shear. The wire crimper and product guide then perform a final wire trim, and the slug blade and front shear cut the connecting carrier from the terminal strip. The feed finger retracts to pick up another terminal.

Product is crimped when the ram is fully extended. The ram retracts and a preset blast of air is directed at the anvil to clear scrap wire and chips from the "target area." With the ram fully retracted, the feed finger feeds a terminal into position for crimping and the cycle is complete.

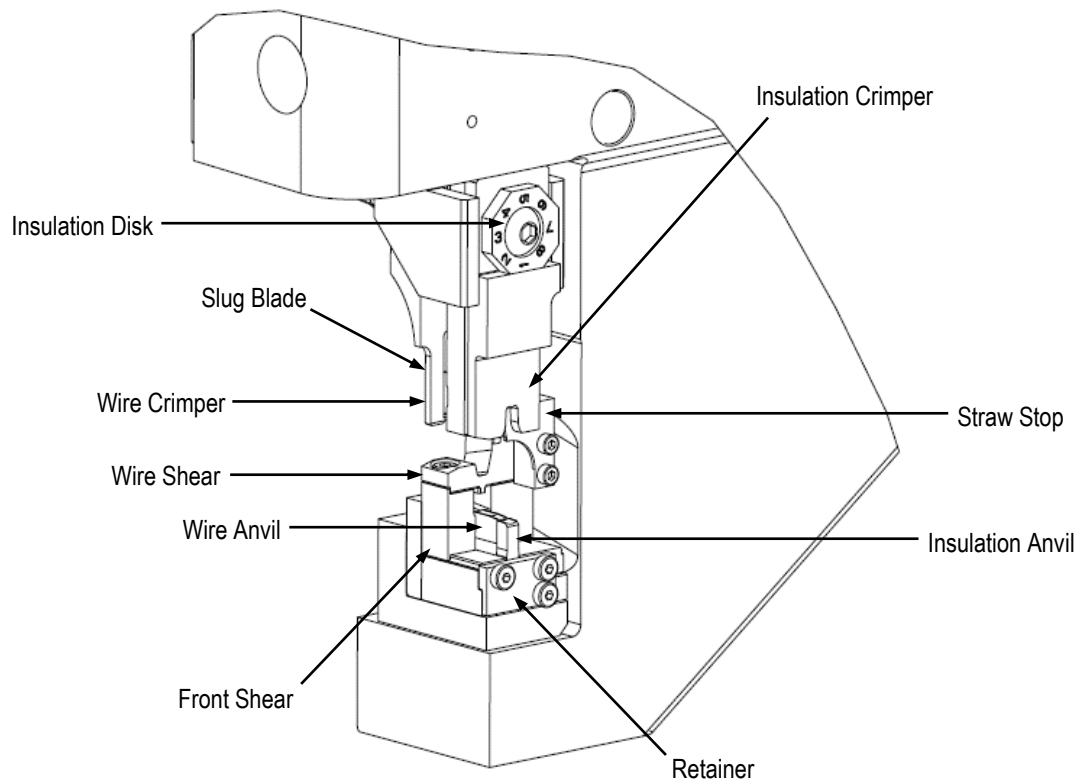


Figure 5

C. Ram Group

The ram group provides the force required for the crimper to crimp terminals. The ram group consists of the terminator frame, ram air cylinder, link, ram bell crank, and the ram. When the ram air cylinder is fully retracted, the ram is also fully retracted by the linkage which connects the two components. See Figure 6.

Refer to Paragraph 4.3,C for further details on checking the ram stroke.



Figure 6

D. Air Input and Valve Stack Assembly

Compressed air supplied to the terminator passes through air filters to provide clean air for the air valves and air cylinders. See Figure 7.

The main components of this system are the lockout valve, air filter, coalescing filter, main solenoid valve, regulator, gage, and manifold assembly. Refer to the pneumatic diagram in Figure 8 for a functional description of the valve operation in relation to the air cylinders.



Air Input, Filter, and Regulator

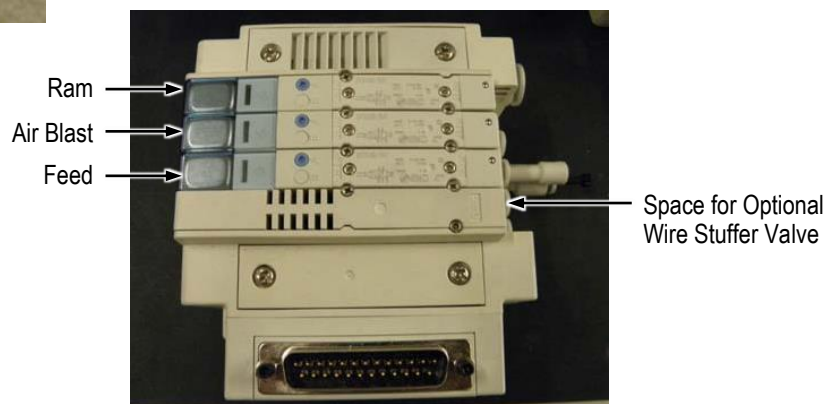


Figure 7

Pneumatic Diagram

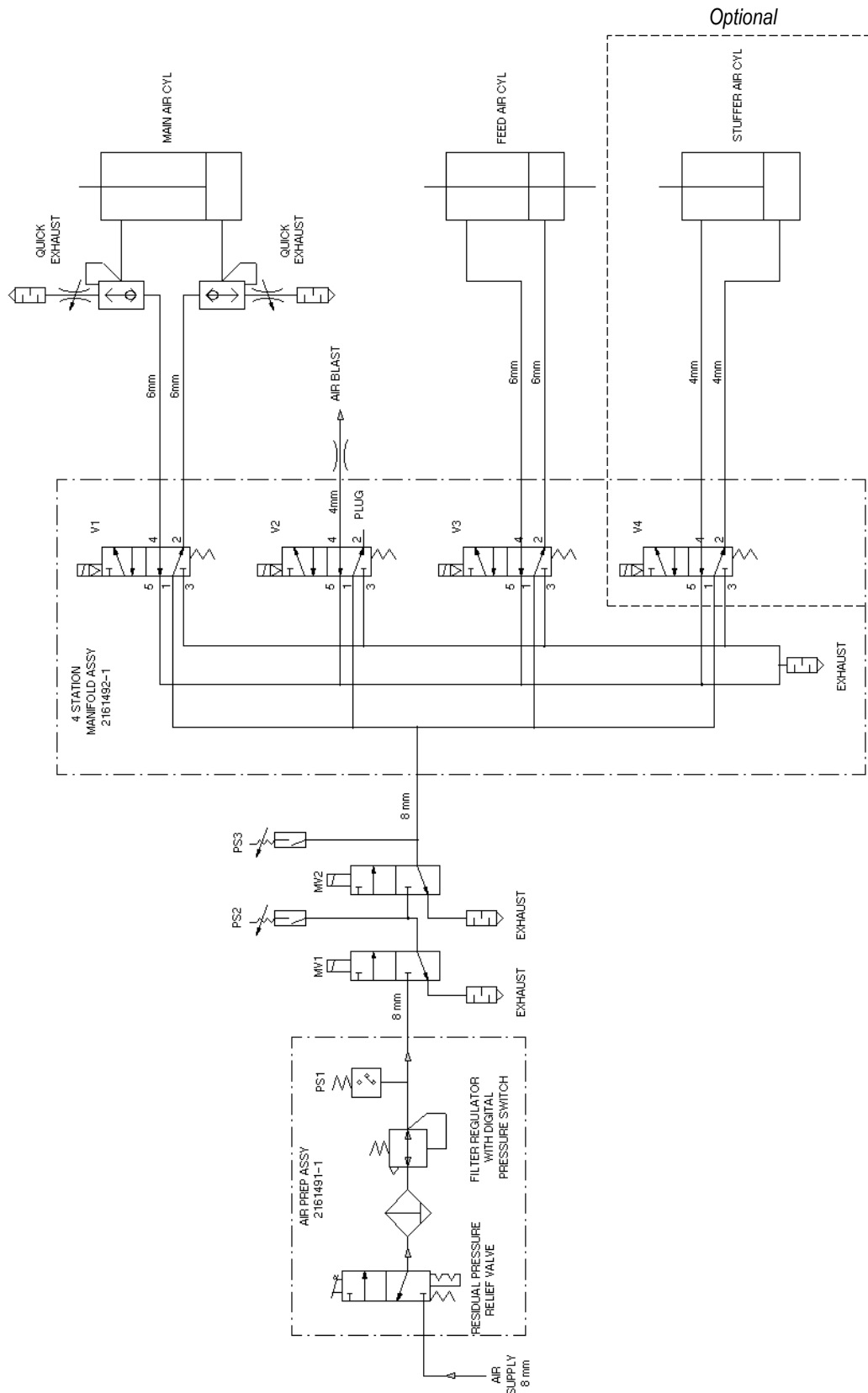


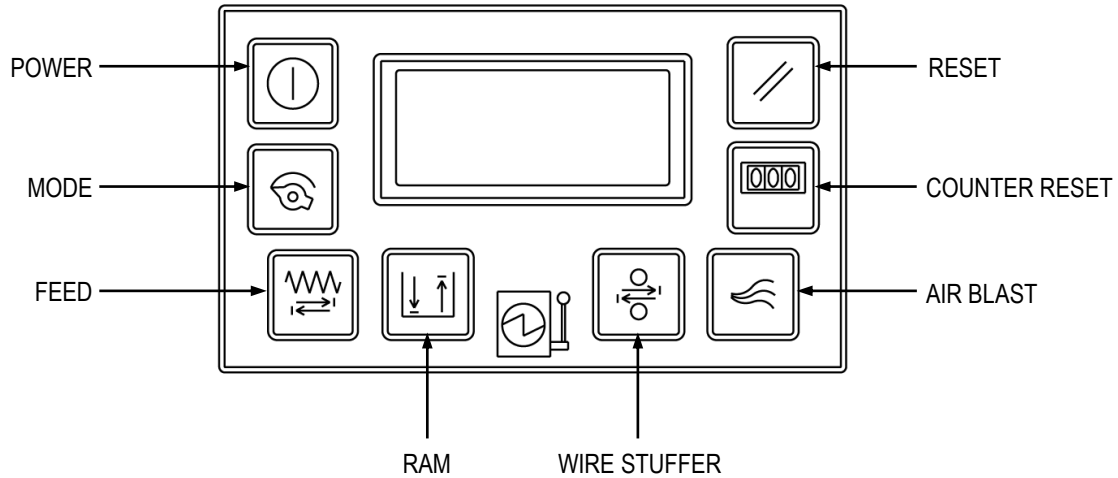
Figure 8

2.2. Switches and Controls

The operator control panel, located at the front of the terminator, contains all the switches and controls necessary for operation. See Figure 1.

A. Normal Key Functions

See Figure 9.



KEY	FUNCTION
POWER	Turns power "on" and "off." POWER off dumps the main air supply and turns off the electric supply. Note that the air supply must be available (LOCKOUT ON) to turn the power on.
MODE	Sequences the terminator through possible conditions of operation. The terminator is in the RUN mode when first powered on. — RUN mode is used to cycle the terminator automatically. — MANUAL mode is used to perform selected tooling moves. The keypad is used to cycle the terminator in the MANUAL mode.
FEED	Feeds product to the crimp tooling. It can be used only in the RUN or MANUAL modes.
RAM	Cycles the crimping ram. It can be used in the MANUAL mode only.
WIRE STUFFER	Cycles the optional wire stuffer. It can be used in the MANUAL mode only.
AIR BLAST	Cycles the air blast to the "target area." It can be used in the RUN or MANUAL mode.
ERROR RESET	Resets the terminator after errors.
COUNT RESET	Resets the current crimp cycle count.

Figure 9

B. Special Key Functions

The functions listed in Figure 10 are performed with the power on and can be performed with guards open.



DANGER

Be sure to keep clear of moving equipment while these functions are performed.

KEY	FUNCTION AND DESCRIPTION
POST-FEED or PRE-FEED	To toggle between the two terminator combinations, proceed as follows: 1. Press and hold the MODE key. 2. Press and hold the FEED key. 3. Release the MODE key 4. Release the FEED key (the current state is briefly displayed when the FEED key is released).
AIR BLAST TIME MODE and ADJUSTMENT MODE	To enter the mode whereby the air blast time (duration) can be adjusted, proceed as follows: 1. Press and hold the MODE key. 2. Press and hold the AIR BLAST key. 3. Release the MODE key. 4. Release the AIR BLAST key. The message “Air Blast Time xxx ms” will be displayed. The minimum time is 0 milliseconds. The maximum time is 1000 milliseconds. Adjust the air blast as follows: — Press the FEED key to decrease the air blast time by 5 milliseconds. — Press the RAM key to increase the air blast time by 5 milliseconds. — Press the COUNT RESET key or the WIRE STUFFER key to increase the air blast by 100 milliseconds. — Press RESET to decrease the air blast time by 100 milliseconds. 5. Press the MODE key to exit the AIR BLAST TIME ADJUSTMENT MODE.

Figure 10

C. Foot Switch

Depressing the foot switch enables the terminator to complete one cycle of operation. The terminator cannot be cycled again until the foot switch is released. Once a cycle is in progress, it must be completed before another cycle can occur.

2.3. Functional Description

For a description of the terminator pneumatic functions, refer to Figure 8 (pneumatic diagram) and the pneumatic drawings shipped with the terminator.

3. RECEIVING INSPECTION AND INSTALLATION

3.1. Receiving Inspection

The terminator is thoroughly inspected during and after assembly. Prior to packaging and shipping, a final series of tests and inspections is made to ensure proper functioning of the terminator. Although the terminator should require no adjustments before placing it into operation, the following inspection should be performed as a safeguard against potential problems generated in transit.

1. Carefully uncrate the terminator, and place it on a sturdy bench or table with proper light to permit a careful examination.

2. Thoroughly inspect the entire terminator for evidence of damage that may have occurred in transit. If it is damaged in any way, file a claim against the carrier and notify TE immediately.
3. Check all components to be certain that they are secure.
4. Check all wiring for loose connections, cuts, or other possible causes of electrical short circuits.
5. Inspect all pneumatic lines for evidence of loose connections and cuts that may cause leakage.

**NOTE**

It is important that this manual and other documents (such as drawings and parts lists), as well as any enclosed product samples, remain with the terminator for the benefit of personnel responsible for installation, operation, and maintenance.

3.2. Considerations Affecting Terminator Placement

The location of the terminator in relation to the operator is essential to both safety and efficiency. Studies have repeatedly shown that fatigue will be reduced and efficiency increased if particular attention is paid to the bench, the operator's chair, and the placement of the foot switch (if used).

**NOTE**

If the terminator is mounted to base 2161367-1, make sure to bolt the terminator base to the table.

A. Bench

A sturdy bench, 711 to 762 mm [28 to 30 in.] high, aids comfort by allowing the operator's feet to rest on the floor. The operator's weight and leg position can be easily shifted. The bench should have rubber mounts to reduce noise. The open area under the bench should allow the chair to slide in far enough for the operator's back to be straight and supported by the back rest.

B. Terminator Location on Bench

The terminator should be located near the front of the bench and the tooling area (the area where product is applied) should be 152 to 203 mm [6 to 8 in.] from the front edge. Access to the back of the terminator must be provided.

C. Operator's Chair

The operator's chair should swivel, and the seat and back rest should be padded and independently adjustable. The back rest should be large enough to support the back both above and below the waist.

In use, the chair should be far enough under the bench so that the operator's back is straight and supported by the back rest.

D. Foot Switch

When the operator is correctly positioned in front of the terminator, the foot should rest on the switch comfortably and easily. The operator's back must be straight and supported by the chair and the upper arms in direct line with the torso. The switch should be placed on a rubber mat. This allows the switch to be movable and permits the operator to shift positions to minimize fatigue. At the same time the mat prevents the switch from sliding unintentionally.

The preference for locating the switch varies among operators. Some like the switch located so that their foot rests on the switch when their legs are in the natural sitting position (calf perpendicular to the floor). Others prefer it slightly in front of the natural position. It is important that the foot be approximately 90 degrees to the calf when resting on the switch. Those who prefer the switch slightly forward may require a wedge-shaped block placed under it.

Figure 11 shows typical layout for the efficient handling of materials.

3.3. Installation

The terminator can be used in several different configurations, with and without the CQM II. Refer to customer manual [409-10100](#) for installation instructions.

Typical Plan View to Illustrate Convenience of Handling Materials Afforded by Proper Setup

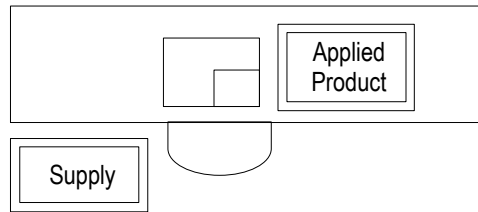


Figure 11

4. SETUP

This section contains procedures for setting up the terminator and checking it out prior to performing production operation. Proper terminator setup will assure that all alignments and adjustments are correct in order to produce terminations of the proper crimp height for the type of terminal and size wire being used. If procedures are not carried out in detail, especially following the initial installation of the terminator, damage may result to the tooling. Also included in this section is the manual cycling procedure. Note that this procedure is referenced throughout this manual.

4.1. Pre-Loading Alignment Check



CAUTION

DO NOT perform this procedure except when specified within another procedure, and then only in the proper sequence. Otherwise, damage to the tooling may result due to misalignment and/or wrong adjustments.

1. Before connecting the air or electric, completely close the air regulator by turning the regulator knob *counterclockwise* until it is snug.
2. Connect the electrical plug and air supply to the terminator.
3. Depress the power key (shown in Figure 9).



DANGER

To avoid personal injury, keep hands clear of the feed plate and the "target area" at all times.

4. Depress the mode key.
5. Press the ram key, then slowly open the regulator by turning the knob *clockwise*. This will allow the ram to advance slowly.
6. Closely observe the shear and crimper assembly as it nears the anvil. If the shear and crimper assembly are not aligned, immediately close the regulator by turning the knob *counterclockwise*. Make any necessary adjustments before proceeding.
7. After the ram has fully extended, open the regulator knob (turn *clockwise*) until the gage reads 621 kPa [90 psi]. The ram will remain fully extended under pressure.
8. Press the ram key again to retract the ram.
9. Depress the feed key.
10. Depress the mode key to enter the run mode.
11. Depress the power key, then disconnect the electrical plug and air supply.

4.2. Tooling Alignment Procedure

This procedure is necessary when replacing anvil holders or any time the screws securing the anvil holders are loosened. See Figure 17.



DANGER

To avoid personal injury, be sure the electrical and air supply are disconnected before starting this procedure. Accidentally cycling the terminator could result in personal injury.

1. Open the guards.
2. Remove the three screws securing the anvil holder to the frame.
3. Remove retainer from the anvil holder, and remove the anvil; then slide new anvil holder over the crimper guide, and loosely install the three screws to the anvil holder.
4. Install the anvil and retainer (for direct connect terminators, install both anvils). *For direct connect terminators only*, move the anvil holder until the product guide is against the slug blade.
5. Place one thickness of paper over the anvil(s), and center the anvil below the crimper.
6. Slowly advance the ram by performing the pre-loading alignment check described in 4.1.
7. Tighten the screws securing the anvil holder to the frame, and tighten the screws in the retainer to secure the retainer to the anvil holder.
8. Close the guards on the terminator
9. Retract the ram by pre-loading alignment check described in Paragraph 4.1.

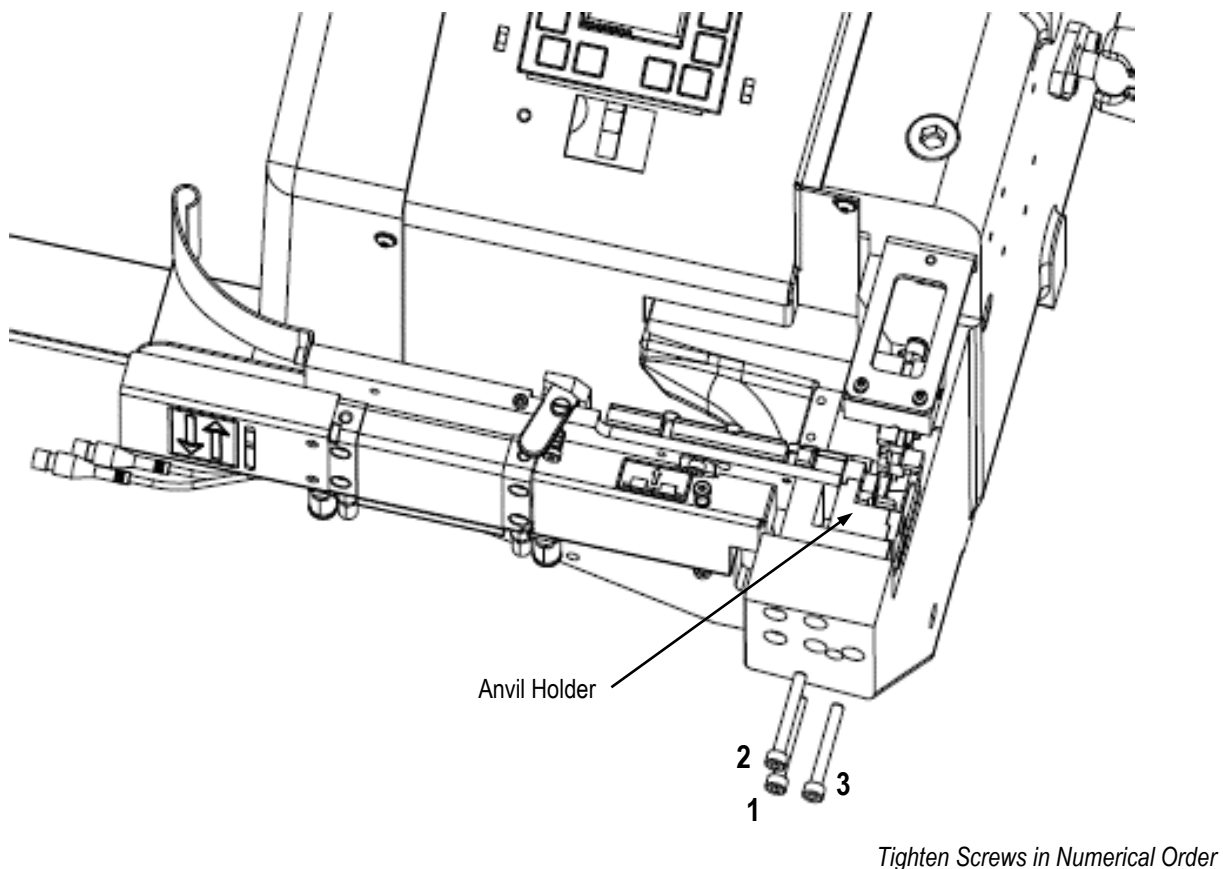


Figure 12

4.3. Terminal Strip Loading

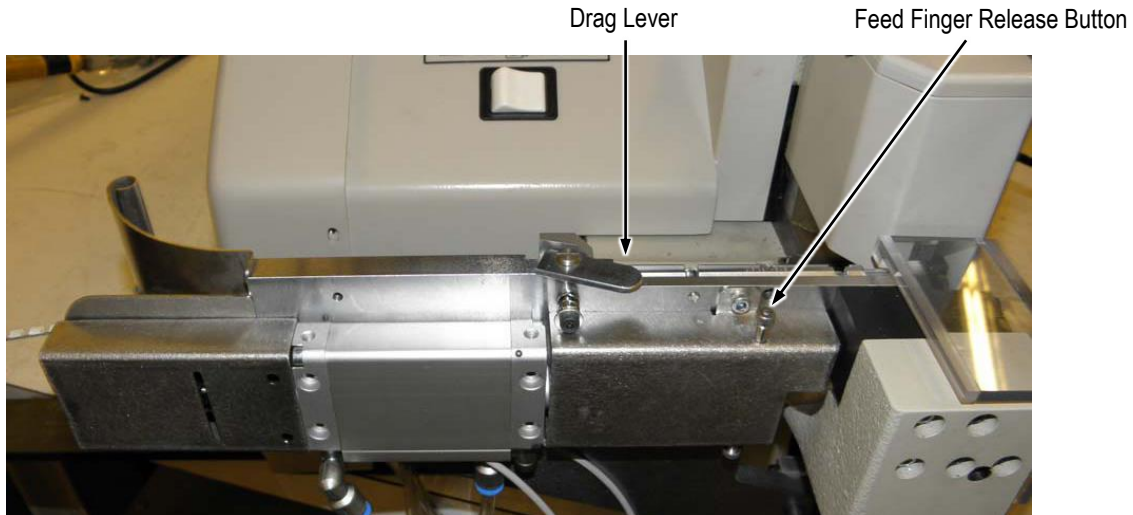
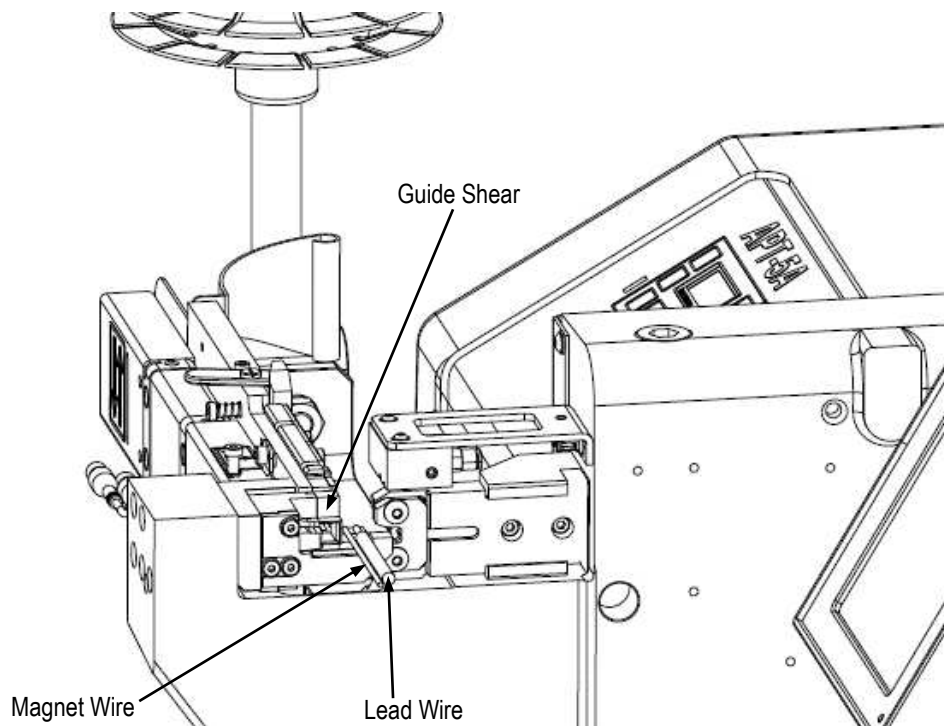
A. For Splice Terminator



DANGER

To avoid personal injury, be sure the electrical plug and air supply are disconnected. Accidentally cycling the terminator could cause personal injury.

1. Place a reel of the correct type of terminals on the reel support so the terminal strip enters the groove in back of the feed plate with the open "U" toward the back of the terminator.
2. Rotate the drag lever to release and hold the drag open (back), then feed the terminal strip through the strip guide and groove in the feed plate until the end reaches the feed finger. See Figure 13.
3. Depress and hold the feed finger release button on front of the feed plate while feeding the terminal strip through until the first terminal has passed the tip of feed finger. Then release the button to engage the feed finger. Pull back slightly on the terminal strip to ensure that the feed finger is indexed against the first terminal. Refer to Figure 14.

*Figure 13**Figure 14*

B. For Direct Connect Terminator



DANGER

To avoid personal injury, be sure the electrical plug and air supply are disconnected. Accidentally cycling the terminator could cause personal injury.

1. Place a reel of the correct type of terminals on the reel support so the terminal strip enters the groove in back of the feed plate with the open "U" toward the back of the terminator.
2. Lift the drag plate to release and hold the drag open, then feed the terminal strip through the strip guide and groove in the feed plate until the end reaches the feed finger (shown in Figure 3).
3. Feed the terminal strip through until the first terminal has passed the tip of feed finger and is over the lower tooling (anvil). Then, pull back slightly on the terminal strip to ensure that the feed finger is indexed against the first terminal. Refer to Figure 15.

Direct Connect Terminator

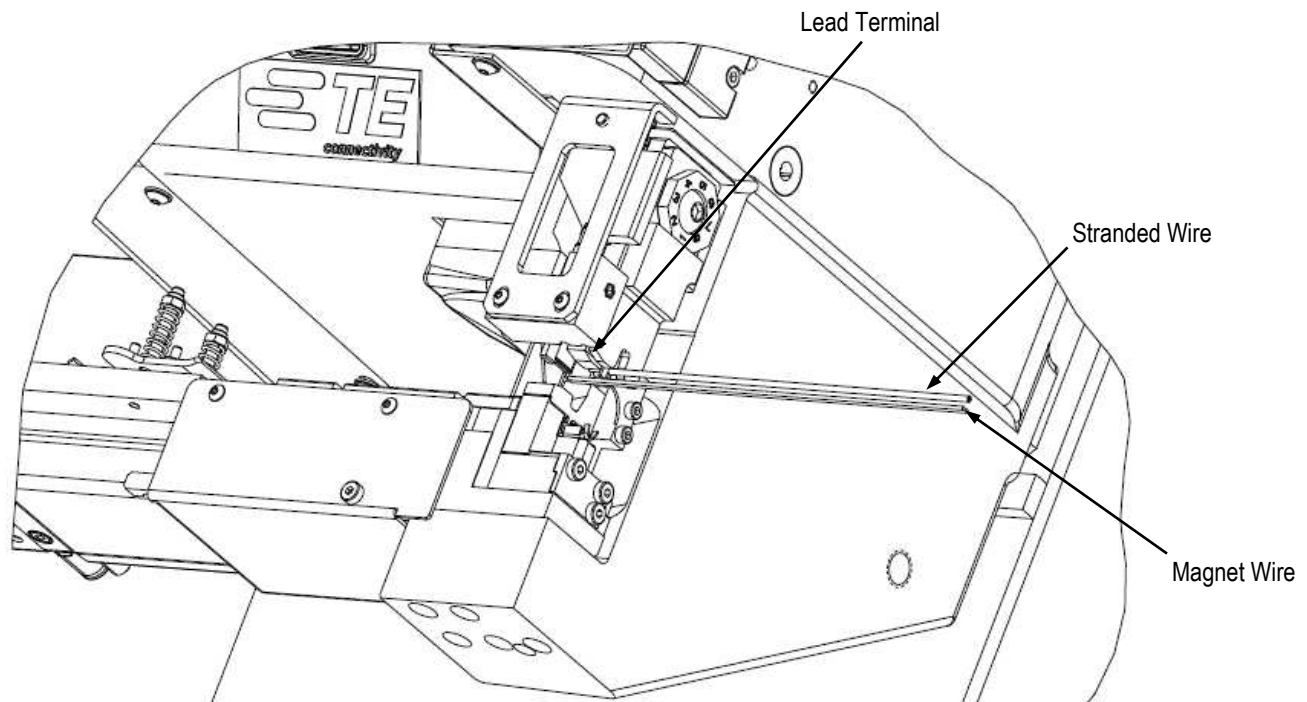


Figure 15

4.4. Terminator Checkout

A. Terminal Strip Feed Check

With the terminal strip loaded into the terminator as described in Paragraph 4.3, disengage and hold the feed finger while checking the drag on the terminal strip. The drag must be adjusted so that it applies enough pressure to prevent pull-back of the strip by the feed finger. If adjustment is required, refer to Paragraph 6.2. After checking the drag, re-position the first terminal as described in Paragraph 4.3.

Perform the following procedure in the manual mode:

1. Connect the electrical plug and air supply.
2. Toggle the on/off switch to on (located on the operator control panel just below the normal keys).

3. Depress the power key.
4. Depress and release the feed key. The terminal strip should advance one terminal length. Continue to depress and release the feed key until the first terminal is centered on the anvil. If the terminal *does not* stop directly centered on the anvil, adjust the feed as described in Paragraph 6.2.
5. At completion of this check, perform the ram cylinder/ram linkage check as described in Paragraph 4.4.B.

B. Ram Cylinder/Ram Linkage and Switch Check

1. Remove the terminator cover by removing the screws and washers.



DANGER

To avoid personal injury, keep hands clear of the terminator interior while performing this check.

2. Connect the electrical plug and air supply. Depress the power key on to assure the retraction side of the ram cylinder is pressurized.
3. Check the ram rest switch on the ram cylinder to be sure it is actuated closed. If necessary, adjust the switch as described in Paragraph 6.3.B.
4. Enter the manual mode by depressing the mode key.
5. Press the ram key to extend the ram cylinder.
6. Check the ram extended switch on the ram cylinder. If necessary, adjust the switch as described in Paragraph 6.3.A.
7. Re-install the terminator cover.
8. Perform the manual crimping check as described in Paragraph 4.4.C.

C. Manual Crimping Check

1. With the electrical plug and air supply connected, depress the power key.
2. With a terminal in the "target area," place the magnet wires or a combination of stranded wire and magnet wire in position with the magnet wire toward the front bottom of the terminal.
3. Manually cycle the terminator as described in Paragraph 4.1. Observe the ram advancement and the shearing and crimping of the terminal in the "target area."
4. After the ram has fully retracted, remove the terminal and inspect it in accordance with Paragraph 4.5. If necessary, make any adjustments that may be required.
5. At completion of this check, perform the automatic crimping check as described in Paragraph 4.4.D.

D. Automatic Crimping Check

The automatic crimping check is performed in the same manner as the manual crimping check described in Paragraph 4.4.C, except that the air regulator must be fully open. The terminator must be in the run mode and the foot switch must be depressed to cycle the terminator. Terminations must conform to the requirements given in Paragraph 4.5. If necessary, make any adjustments that may be required as described in Section 6.

If the terminations obtained from the manual crimping check and the automatic crimping check conform to all requirements, the terminator is ready for production operation as described in Section 5.

If the terminator is not to be operated immediately, depress the power key, then disconnect the electrical plug and air supply.

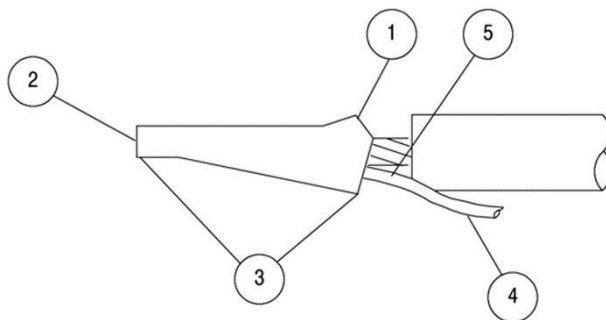
4.5. Termination Inspection

All terminations produced by the terminator must conform to quality and crimp height requirements as follows:

1. Inspect the termination for conformance to the requirements given in Figure 16, Detail A.

Detail A

ITEM	REQUIREMENT
1	This area of terminal must be bellmouth in shape.
2	The sheared end must be clearly cut off.
3	The wires must extend through the crimped terminal.
4	The magnet wire must lie in the bottom of the terminal.
5	When 2 magnet wires are seated, they must be side by side.



Detail B

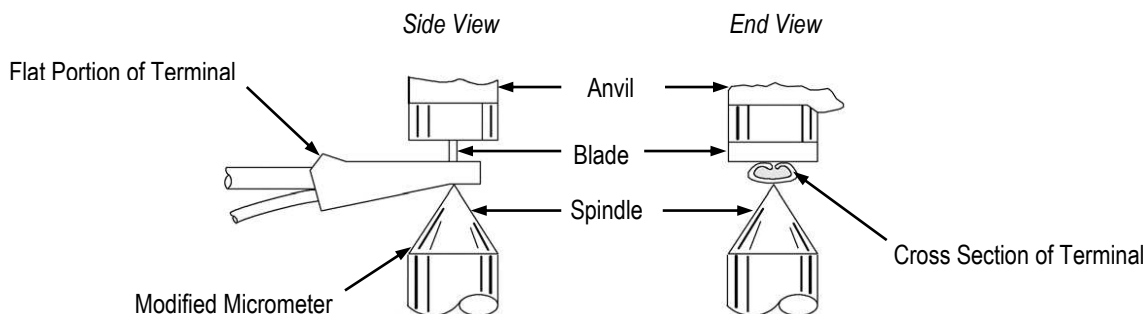


Figure 16

- Using a crimp height micrometer, measure the crimp height of the termination as shown in Figure 16, Detail B. The crimp height must be within ± 0.08 mm [$\pm .003$ in.] of the measurement specified for the type of terminal and wire size being used.


NOTE

TE recommends the use of a modified micrometer. A typical micrometer is the Mitutoyo Series 342 micrometer. Refer to instruction sheet [408-7424](#) for crimp height information.

5. PRODUCTION OPERATION

Before placing the terminator in production operation, be sure it has been properly setup and checked out according to procedures in Section 4. Operate the terminator as follows.

- Connect the terminator to the air supply.
- Plug the electrical plug into the electrical outlet. Be sure all guards and covers are in place.


CAUTION

Never operate the terminator without a terminal over the anvil and wires in the "target area".

- Depress the power key.


NOTE

Personnel who have not previously operated the terminator should manually cycle it several times, as described in Paragraph 4.1, while observing the operation and travel of the feed finger and ram before proceeding.

- Place wires in the "target area," aligned with the terminal. When using stranded and magnet wire, position it as shown in Figure 14 (splice terminator) or Figure 15 (direct connect terminator). When splicing two or three magnet wires, they may be in any position with respect to each other. The crimp tooling will automatically position them side-by-side in the bottom of the terminal as crimping occurs.

5. With wires in position, depress the foot switch. The terminator will cycle only once regardless of how long the foot switch is held down.


NOTE

At periodic intervals during production operation, perform the termination inspection described in Paragraph 4.5.

6. At completion of the production operation, depress the power key. Disconnect the electrical plug and air supply.

6. ADJUSTMENTS

The following procedure may be necessary when adjusting the terminator, during production operation, or following the replacement of parts.

6.1. Crimp Height Adjustment (Tooling Increments)

Crimp height adjustment may be necessary to produce actual desired crimp height.

- Aligning the vertical line of the indicator plate with the radial thumb wheel groove and the horizontal line of the indicator plate with the axial thumb wheel zero groove will produce a maximum crimp height for all products. See Figure 17.
- Each vertical line on the indicator plate represents one thumb wheel revolution or a 0.406-mm [.016-in.] adjustment.
- To *decrease* the crimp height, turn the thumb wheel *clockwise*. To *increase* the crimp height, turn the thumb wheel *counterclockwise*. Note that these are tooling increments, which may not reflect the actual crimp height changes.

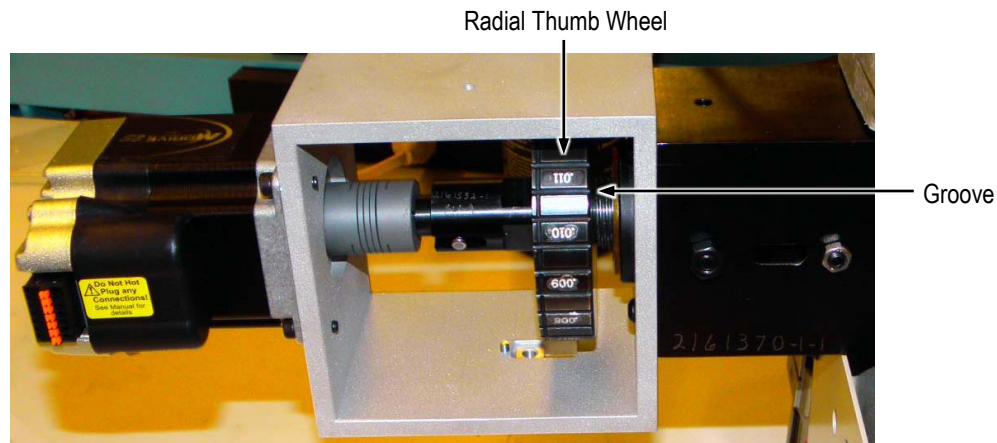


Figure 17

6.2. Feed Adjustments

A. For Splice Terminators


DANGER

To prevent personal injury when making adjustment, disconnect the power.

A.1. Feed Finger Engagement


NOTE

It is not necessary for the speed to be fast. Normally, the operator cannot remove a completed termination and insert wires for the next termination before another terminal is in position.

When replacing the feed finger (2161391-1) or when converting from one terminal part number to another, the feed finger engagement should be checked and adjusted if necessary. To set the feed finger engagement, perform the following steps.

1. Remove the feed guard (2161526-1).
2. Load the terminal strip until it just reaches the feed finger. DO NOT load the terminal strip beyond the feed finger. See Figure 18.
3. Adjust the torque locking hex nut (986965-7) until the feed finger is adjusted. See Figure 18.
4. Push the terminal strip forward to ensure that the terminals “click” past the feed finger, and then pull back on the terminal strip to ensure that the feed finger engages the terminal strip firmly.
5. Re-install the feed guard.

For Splice Terminators

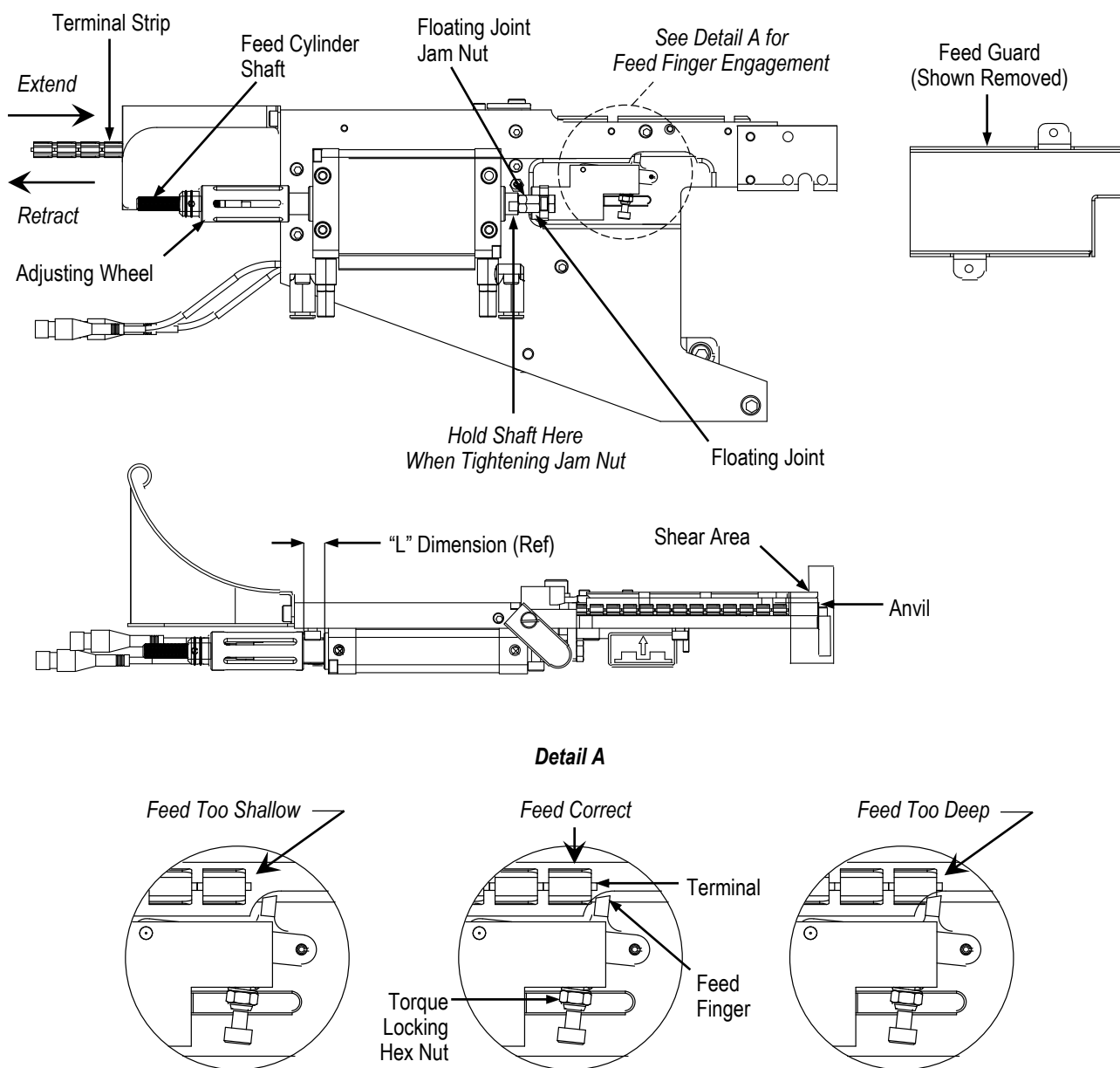


Figure 18

A.2. Flow Control Valves

The flow control valves located on the port fittings of the feed cylinder, should be adjusted in such manner as to slow the feed finger, advancement and retraction, and prevent it from slamming at the end of the stroke. This also helps prevent overfeeding.

To adjust the speed of the feed, turn the valve adjustment *in* to slow the cylinder action; turn it *out* for faster action.



NOTE

It is not necessary for the feed speed to be fast. Normally the operator cannot remove a completed termination and insert wires for the next termination before another terminal is in position.

A.3. Terminal Strip Drag

The drag must apply sufficient pressure to the terminal strip to prevent pullback of the strip by the feed finger when it is retracted to pick up the next feed point. If necessary, see Figure 18, and adjust as follows:

1. Loosen the locknut on the drag setscrew. With the drag lever released, turn the setscrew as required until the drag rests evenly on the terminal strip.
2. While holding the setscrew in the adjusted position, tighten the locknut.
3. Rotate the drag lever to lift the drag from the terminal strip. The drag should pivot on the setscrew.

A.4. Initial Feed Stroke and Position Adjustment

1. Remove the feed guard (2161526-1).
2. Move the feed cylinder shaft to the fully retracted position.
3. Turn the adjusting wheel (2161481-1) to the appropriate "L" dimension for the terminal being processed. See Figure 18. Refer to drawing 2161490 for the "L" dimension for AMPLIVAR terminals. If data is not available, set the "L" to the terminal pitch plus half of the gap between terminals. See Figure 19.

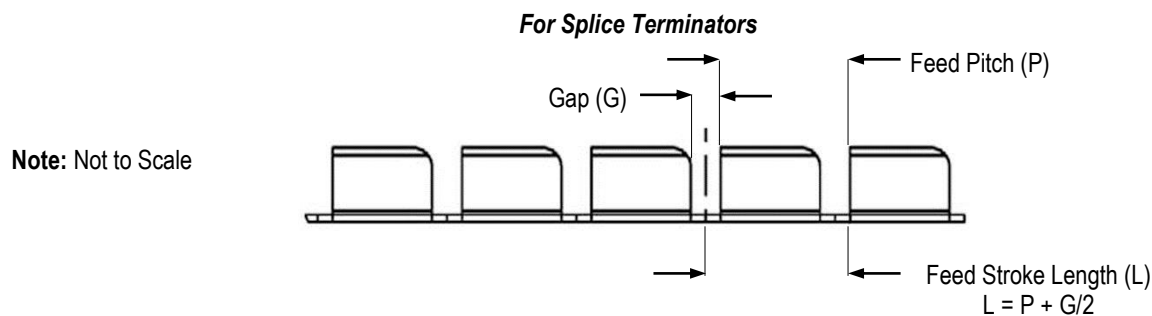


Figure 19

4. Load the terminal strip, and manually feed the strip by pushing the feed cylinder shaft to the full extend and full retract position until a terminal is located over the anvil.
5. Loosen the locknut (18029-3) on the floating joint (2168420).



NOTE

The cylinder shaft must be held using the wrench flats when tightening or loosening the jam nut or damage to the cylinder may occur.

6. Hold the feed cylinder shaft fully extended and adjust the floating joint until the terminal cutoff area aligns with the shear tooling.
7. Tighten the jam nut on the floating joint.
8. Install all guards.

9. Connect the electrical and pneumatic power to the terminator.
10. Perform several crimps, and measure the terminal cut-off.
11. If the cutoff tabs (front and back) of each terminal differ by more than 0.05 mm [.002 in.], disconnect the electrical and pneumatic power, remove the feed guard, and repeat steps 5 through 10 until the cutoff tabs differ by 0.05 mm [.002 in.] or less.
12. When the cutoff tabs differ by less than 0.05mm [.002 in.], perform a fine adjustment procedure.

A.5. Feed Position Fine Adjustment



NOTE

Terminal cutoff tabs may start to vary for several reasons, such as prolonged operation, tooling replacement, new terminal reel, or normal wear. If the cutoff tabs become uneven, a fine adjustment may be made using the adjustment wheel.

To make a fine adjustment, follow these steps:

1. Inspect a crimped terminal, and determine if the terminal strip needs more or less feed. If tab A is longer than tab B, the feed needs to increase. If tab B is longer than tab A, the feed must decrease.
2. Insert a 3-mm hex wrench or similar sized screwdriver through the access slot in the rear feed guard and into a slot in the adjustment wheel (see Figure 20).
3. Turn the adjustment wheel in the desired direction to increase or decrease the feed distance (see Figure 20).



NOTE

The adjustment wheel has detent positions which engage every 15 degrees of rotation. Each 15 degrees of rotation will increase or decrease the feed (cutoff) position by 0.02 mm [.0008 in.].

4. Crimp and inspect additional terminals, and repeat steps 2 and 3 until the cutoff tabs are even.

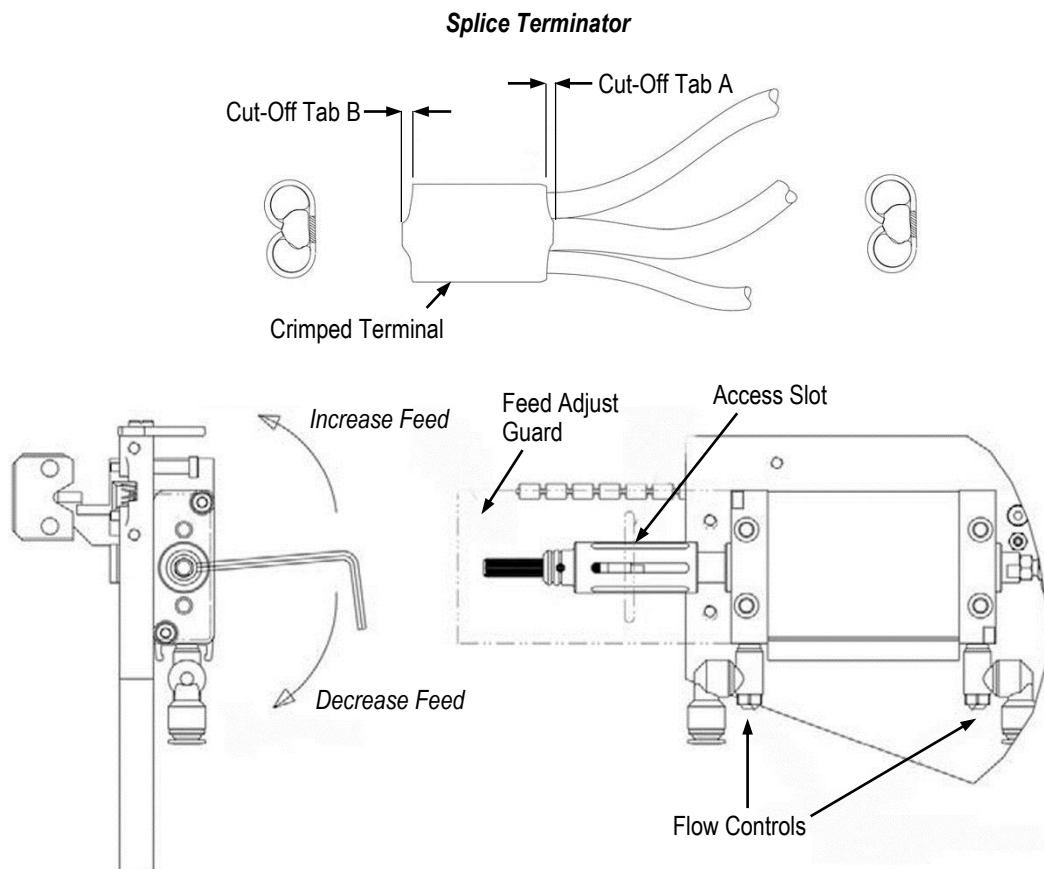


Figure 20

B. For Direct Connect Terminators



DANGER

To prevent personal injury, disconnect the power.

B.1. Feed Finger Engagement



NOTE

It is not necessary for the speed to be fast. Normally, the operator cannot remove a completed termination and insert wires for the next termination before another terminal is in position.

When replacing the feed finger or when converting from one terminal part number to another, the feed finger engagement should be checked and adjusted, if necessary. To set the feed finger engagement, follow these steps:

1. Remove the feed guard (2161780-1).
2. Load the terminal strip until it just reaches the feed finger. Do not load the terminal strip beyond the feed finger.
3. Push the terminal strip forward to ensure that the terminals “click” past the feed finger, and then pull back on the terminal strip to ensure that the feed finger engages the terminal strip firmly. See Figure 21.
4. Re-install the feed guard.

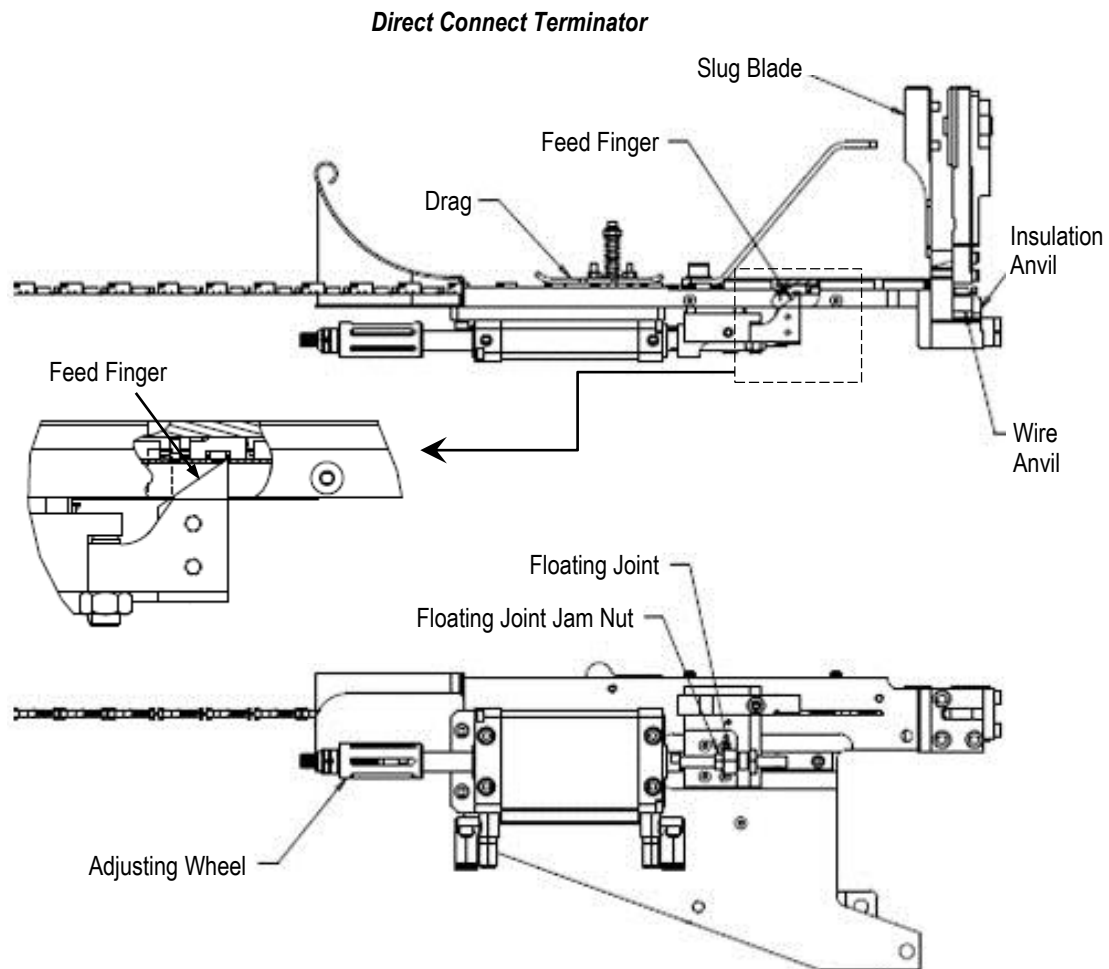


Figure 21

B.2. Flow Control Valves

The flow control valves located on the port fittings of the feed cylinder should be adjusted in such a manner as to slow the feed finger, advancement/retraction, and prevent it from slamming at the end of the stroke. This also helps prevent overfeeding.

To adjust the speed of the feed, turn the valve adjustment *in* to slow the cylinder action, and turn it *out* for faster action.



NOTE

It is not necessary for the feed speed to be fast. Normally the operator cannot remove a completed termination and insert wires for the next termination before another terminal is in position.

B.3. Terminal Strip Drag

The drag must apply sufficient pressure to the terminal strip to prevent pullback of the strip by the feed finger when it is retracted to pick up the next feed point. If necessary, adjust as follows:

1. Increase or decrease drag pressure by compressing or releasing the drag compression springs. The flex nuts, which contain the spring, should be in the same relative position on the drag stud in order to balance spring pressure.
2. The two drag setscrews in the drag are to hold the drag away from the feed plate and assist in the installation of terminals. The setscrews must not be set so that they inhibit terminal drag.
3. Rotate the drag lever to lift the drag from the terminal strip. The drag should pivot on the setscrew.

B.4. Initial Feed Stroke and Position Adjustment

1. Remove the feed guard (2161529-1).
2. Move the feed cylinder shaft to the fully retracted position.
3. Turn the adjusting wheel to the appropriate “L” dimension for the terminal being processed. Refer to the customer drawing for the “L” dimension for AMPLIVAR terminals. If data is not available, set the “L” to the terminal pitch plus half of the gap between the terminals. See Figure 22.

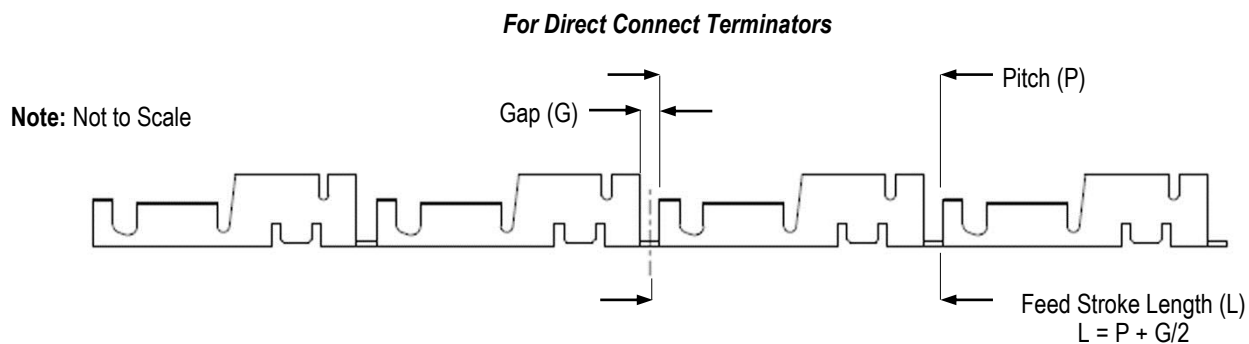


Figure 22

4. Load the terminal strip, and manually feed the strip by pushing the feed cylinder shaft to full extend and full retract position until a terminal is located over the anvil.
5. Loosen the locknut (18029-3) on the floating joint (2168420).



CAUTION

The cylinder shaft must be held using the wrench flats when tightening or loosening the jam nut; otherwise, damage to the cylinder may occur.

6. Hold the feed cylinder shaft fully extended, and adjust the floating joint until the terminal cutoff area aligns with the shear tooling.