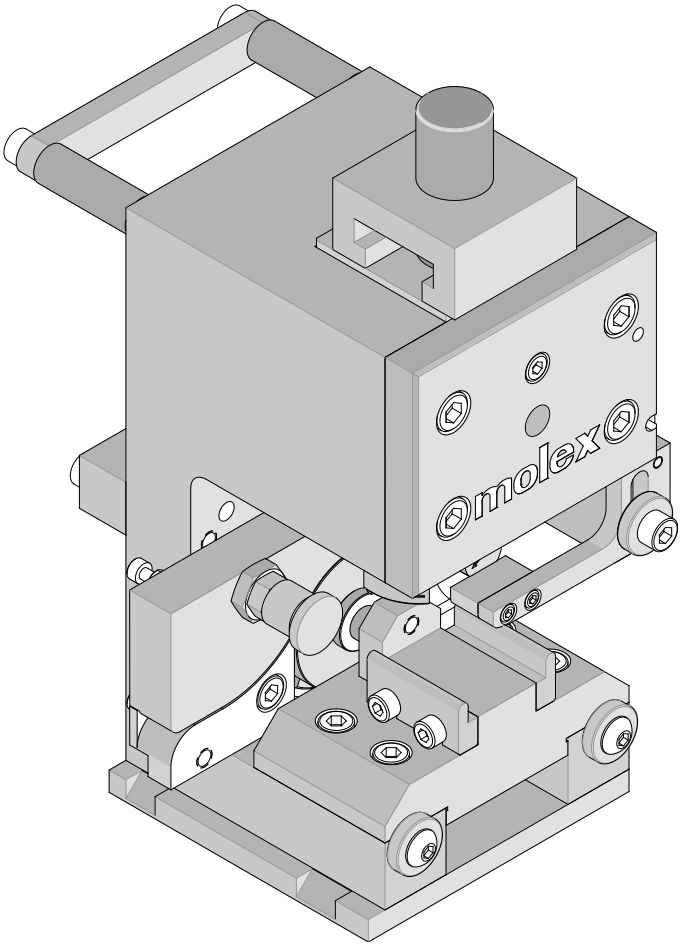


TAPED TERMINAL CRIMP MODULE
Operation Manual
Order No 64016-2000

- Description
- Operation
- Maintenance

Safety Warnings and Information

	**Read** and **understand** all of the instructions and safety information in this manual before operating or servicing this tool. Keep this manual available when using this tool. Replacement manuals are available for download at no charge at www.molex.com.

SAFETY ALERT SYMBOL

This symbol is used to call your attention to hazards or unsafe practices which could result in an injury or property damage. The signal word, defined below, indicates the severity of the hazard. The message after the signal word provides information for preventing or avoiding the hazard.

 **DANGER**	**DANGER:** Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.
 **WARNING**	**WARNING:** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 **CAUTION**	**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. **CAUTION** may also be used to alert against unsafe practices associated with events that could lead to personal injury.

	**WARNING** **Always** wear proper eye protection when operating or servicing this equipment. Failure to wear eye protection could result in serious eye injury from flying debris.
	**WARNING** **Heavy Object** To avoid muscle strain or back injury, use lifting aids and proper lifting techniques when removing or replacing. Failure to observe these precautions may result in injury or property damage.
	**WARNING** **Never** wear clothing or jewelery that is loose or that could potentially hang into the equipement and get caught. Failure to observe this warning could result in severe Injury or death.
	**WARNING** **Never** install or service this machine while connected to any electrical power source. Disconnect power by unplugging the press from its power source. Failure to observe this warning could result in severe injury or death.
	**WARNING** **Never** operate, service, install, or adjust this machine without proper instruction and without first reading and understanding the instructions in this manual and all applicable press and/or wire processing machine. manuals.
	**WARNING** **Always** hand cycle the module in the equipment to ensure the tooling is properly aligned. Failure to observe these precautions may result in injury or property damage.



WARNING

Never use this machine without guards or safety devices that are intended to prevent hands from remaining in the die space.

Failure to observe this warning could result in severe injury or death.

WARNING



Do not use compressed air to clean this equipment.
The forces created by compressed air can force debris into the tool.

Failure to observe these precautions may result in injury or property damage.



WARNING

Always wear proper ear protection when Operating or servicing this equipment.

CAUTION

The Molex crimp module is designed to operate only in the Molex TM-3000 or TM-4000 presses.
Installation in crimp presses with other than standard shut heights can cause severe tool breakage. It is advisable that before installation, a check of the shut height be performed. Molex will not be liable for any damages as a result of installation in a crimp press with nonstandard or improperly set shut height.
Failure to observe these precautions may result in injury or property damage.

CAUTION

Never perform any service or maintenance other than as described in this manual.
Never modify, alter or misuse the equipment
Molex crimp specifications are valid only when used with Molex terminals, applicators and tooling.
Failure to observe this precaution may result in injury and property damage.

Tooling Technical Assistance

Molex offers tooling technical assistance for customers who may need some guidance for tooling adjustments. This support can be obtained by calling either of the two numbers listed below and asking for the Molex Tooling Group.
Call Toll Free 1-800-786-6539 (US) 1-630-969-4550 (Global).

This assistance is limited to the operation and set-up of a customer's Molex Press. Questions with regard to Molex connector products or how to identify the proper tooling and/ or tooling documentation should be directed to your local Molex personnel or Customer Service Representative.

When calling for service on the press a copy of the *Operation Manual* and Specific *Applicator Tooling Specification Sheet* should be present and a person that is familiar with the applicator should be present. Be sure the following information is supplied:

1. Customer name
2. Customer address
3. Person to contact such as (name, title, e-mail, and telephone number
4. Applicator order number (Lease number also if applicable)
5. Serial number (Lease number also if applicable)
6. Molex Connector product order number
7. Urgency of request
8. Nature of problem

Molex Application Tooling Group
2200 Wellington Court
Lisle, IL 60532, USA
Tel: +1 (630) 969-4550
Visit our Web site at http://www.molex.com

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Section 1

General Description

1.1 Description

1.2 Features

1.3 Technical Specifications

1.4 Delivery Check

1.5 Tools

1.6 Specification Sheets

Principal Mechanical Parts of the Taped Terminal Crimp Module

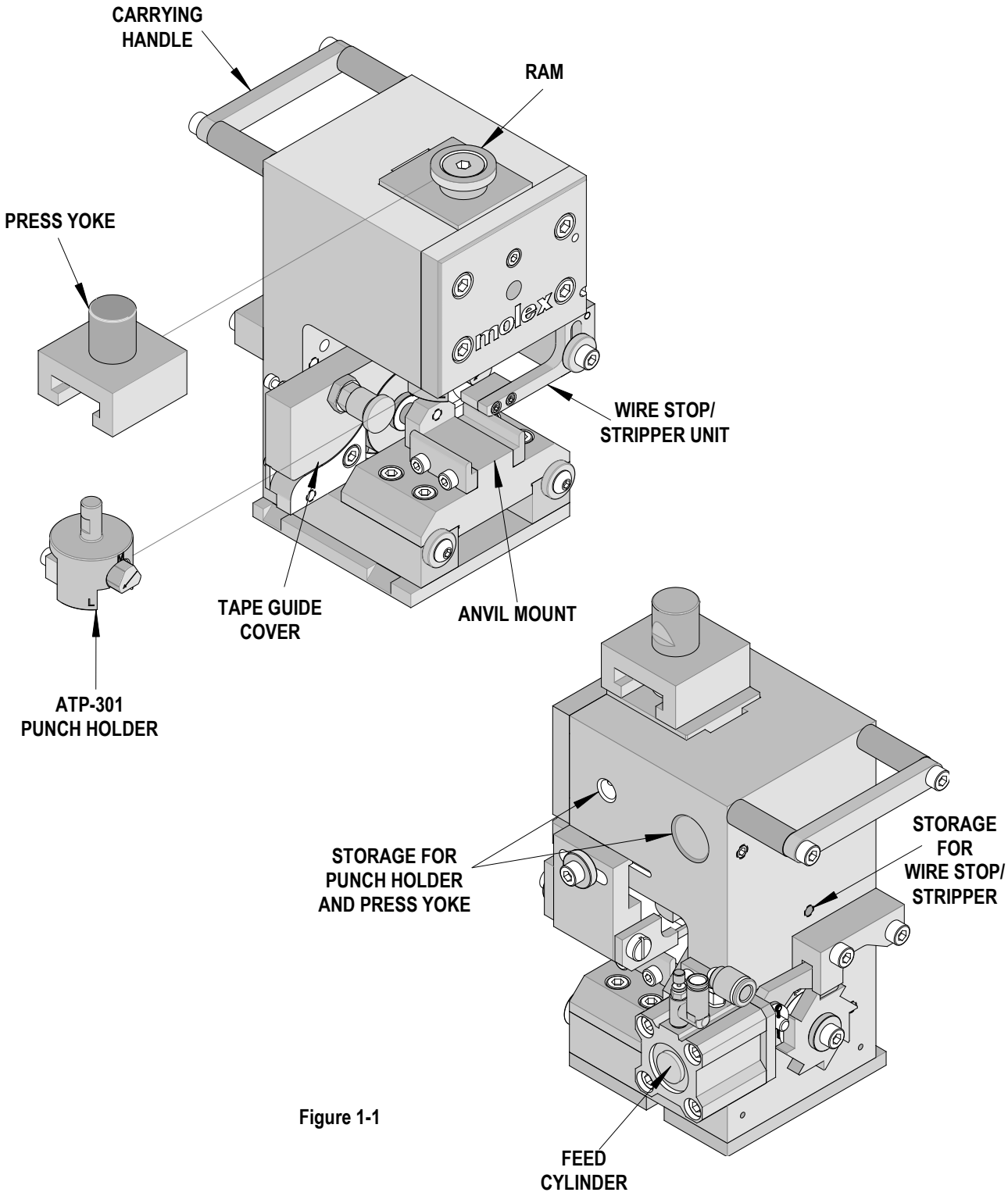


Figure 1-1

General Description

1.1 Description

The taped terminal crimp module provides an effective method of applying a wide range of side feed tape-mounted terminals to pre-stripped discrete wire(s) from 4 to 30 AWG.

The crimp module and press combination replaces the Molex ATP-301 Press (Order No. 19228-0030) and the Molex ATP-201 Press (Order No. 19047-0001).

This crimp module operates only in the Molex TM-3000 and TM-4000 Universal Presses. The crimp module uses quick-change modular tooling, requires little or no adjustments, and is intended for mid-volume to high-volume, semi-automatic operations.

Molex offers the following crimp presses for operating the crimp module:

TM-3000 Universal Press 120V 50-60 Hz. **Order No. 63801-7200**
TM-3000 Universal Press 240V 50-60 Hz. **Order No. 63801-7300**
The TM-3000 should be used for 10-30 AWG terminals.
TM-4000 Universal Press 240V 50-60 Hz. **Order No. 63801-7600**
The TM-4000 should be used for 4-30 AWG terminals.

1.2 Features

- Tooling is accessed from the front of the module, simplifying change over.
- No track adjustment is required.
- Compatible with the Molex TM-3000 and TM-4000 Universal Presses only. **It does NOT fit into Molex TM-40, TM-42, or TM-2000 presses.**
- No terminal feed adjustment is required.
- Uses crimp tooling from existing Molex ATP-201 and ATP-301 crimp presses.

1.3 Technical Specification

Dimensions

Crimp Module Only		
Width:	140mm	(5.5")
Depth:	136mm	(5.3")
Height:	175mm	(6.9")
(ram down)		
Weight 4.1kgf	(9lbf)	

Guarding

The crimp module is intended to be used with the guards supplied on the TM-3000 or TM-4000 Universal Press.
A special retrofit guard kit is available when the crimp module is installed on earlier TM-3000 press models.
See Section 4.3.



Caution: DO NOT operate the crimp module without press guards in place.

1.4 Delivery Check

Carefully remove the crimp module from its shipping container and determine that the following items are included in the package.

Crimp Module	1
Air line Kit	1
Press Guard Kit (if required)	1
Instruction Manual	1

NOTE: Terminal crimp tooling is not included with the crimp module and must be ordered separately.

1.5 Tools

The following tools are recommended for setup and adjustments to the crimp module:

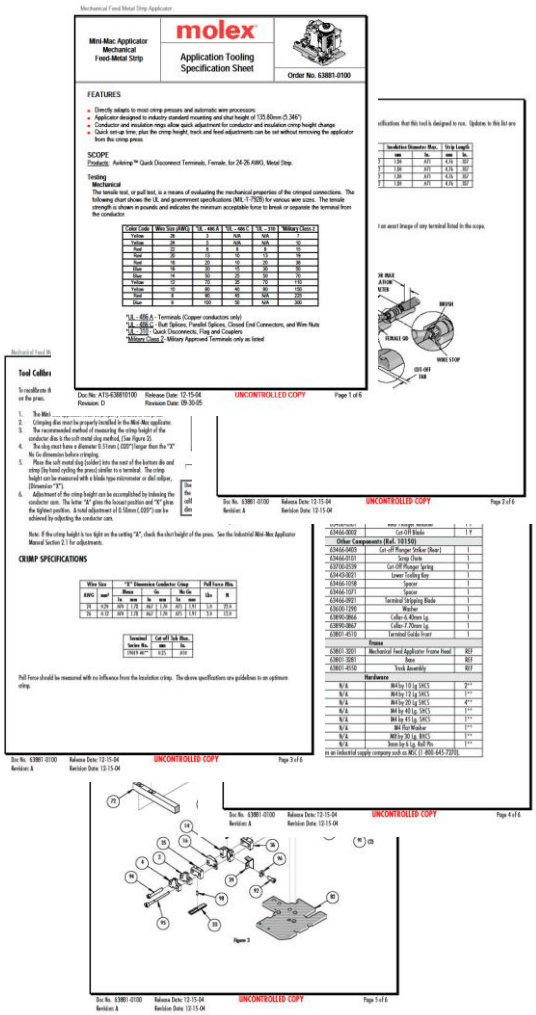
1. Metric standard hex wrench set
2. Inch standard hex wrench set
3. Wire stripper / cutter
4. Crimp Micrometer or caliper

1.6 Specification Sheets

Specification sheets are available for all crimp tooling. The specification sheet contains the following:

- ✓ Applicable terminal numbers
- ✓ Wire AWG ranges
- ✓ Insulation diameter ranges
- ✓ Pull Force specification
- ✓ Strip lengths
- ✓ Slug height specification
- ✓ Tooling parts lists and assembly drawings

The specification sheet is available on the Molex website (www.molex.com).



Section 2

Set-Up and Operation

2.1 Shut Height

2.2 Setup

2.3 Crimp Height Adjustments

2.4 Crimp Tooling Installation and Removal

2.5 Specific Crimp Module Adjustments

2.6 Operation

Read the following instructions before attempting to operate the crimp module.

2.1 Shut Height

The Molex Taped Terminal Crimp Module operates only in the TM-3000 and TM-4000 presses with standard shut height of 135.80mm (5.346"). Installation in crimp presses with other than standard shut heights can cause severe tool damage. **Before installing the crimp module, the press shut height must be verified.** The correct shut height is required for proper crimping without causing tool damage.

The shut height of the TM-3000 and the TM-4000 presses are preset at the factory and labeled on the front of the press. Over time, however, the press may wear causing a change in the shut height.

The shut height of the press can be checked with a shut height gauge, which is calibrated under load to achieve the 135.80mm (5.346") measurement. It is recommended that the shut height be checked monthly. A shut height gauge is available from Molex, order number 63800-7900.

Always turn off and disconnect the power supply to the press.

Measuring Press Shut Height

1. Disconnect the power supply from the press. Remove the machine guards if necessary.
2. Remove the applicator from the press. Make sure that the bottom of the press ram and quick change mounting plate are free of foreign material.
3. Place the shut height gauge into the press on the press quick change mounting plate. See Figure 2-1.

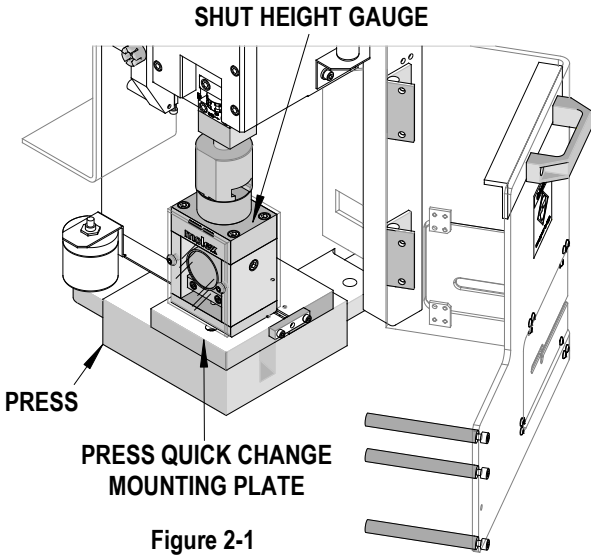


Figure 2-1

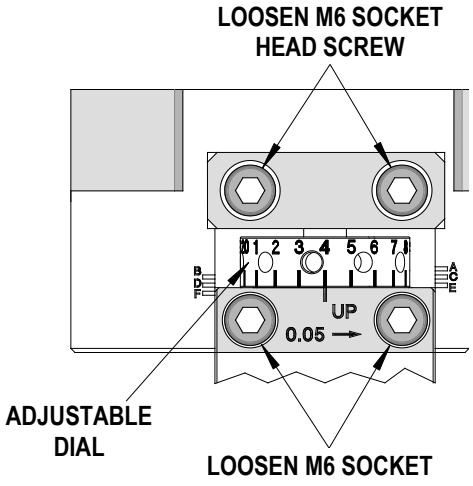


Figure 2-2

4. Manually cycle the press to the full down stroke position. (See the TM-3000 press instructions on manually cycling the press.)
5. Read the shut height measurement from the front of the gauge. Follow gauge instructions; the gauge reads “0” at the correct shut height.
6. If shut height adjustment is necessary:
   a. Loosen the four M6 socket head screws on the front of the press.
   b. Rotate the adjustment dial to the right to raise shut height or to the left to decrease. Dial indicator lines represent increments of .05mm (.002”). See Figure 2-2.
   c. When adjustment is complete, retighten the four M6 socket head screws.
7. Repeat the above steps until the correct shut height is obtained.
8. Shut height gauges must be calibrated on a regular basis.

2.2 Set-Up

The principal mechanical parts of the crimp module are illustrated in the assembly drawings (Section 4-1).

Always turn off and disconnect the power supply to the press.

Crimp Module Installation and Removal

1. Turn off the press and disconnect the power. Open the press guard.
2. Clean the quick-change mounting plate of scrap or chips that may interfere with the crimp module installation.
3. Using a 3mm hex wrench, remove the locking set screw and loosen the set screw holding the press yoke. Pull the press yoke straight down and remove it from the press. (Note: a storage hole is provided on right side of the crimp module frame to keep the press yoke)
4. Install the press yoke furnished with the crimp module in the press ram. Tighten the set screw securely and install the locking screw.
5. Using a 4mm hex wrench, turn the M5 socket head screw clockwise until the locking clamp is fully opened.
6. Visually align the crimp module's base plate slots with the location clamps on the press quick-change mounting plate.
7. Slide the crimp module onto the quick-change mounting plate until the two notches on the left side engage against the stops, and at the same time, guide the ram adapter into the press yoke. See Figure 2-3.
8. To lock the crimp module, turn the M5 socket head screw counterclockwise until tight.
9. Connect the air lines from the feed cylinder to the press air valve. The cylinder port closest to the module frame must be connected to the "normally open" valve port. The other cylinder port (with the flow control valve) must be connected to the "normally closed" valve port.
10. Close the press guard.
11. Remove the crimp module by reversing the previous steps. When storing the crimp module, always leave a strip of terminals in the module on the anvils to prevent damage to the tooling. See Section 3.5 Storage.

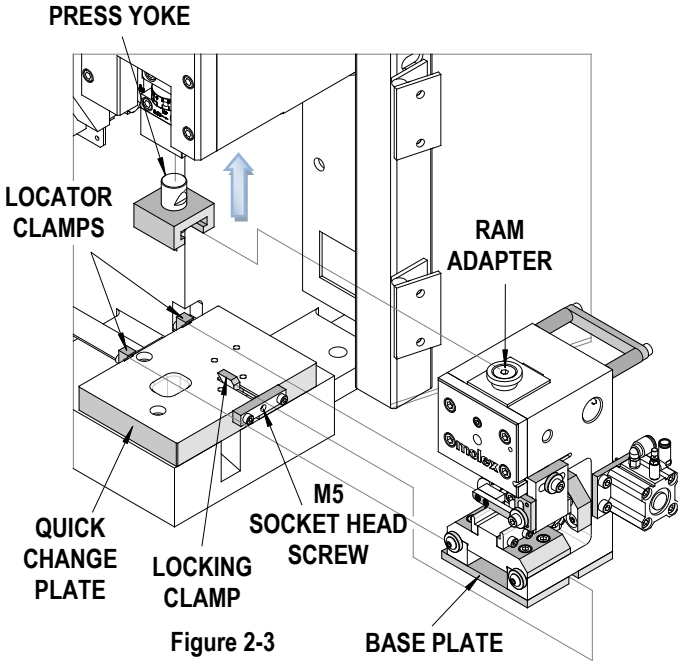


Figure 2-3

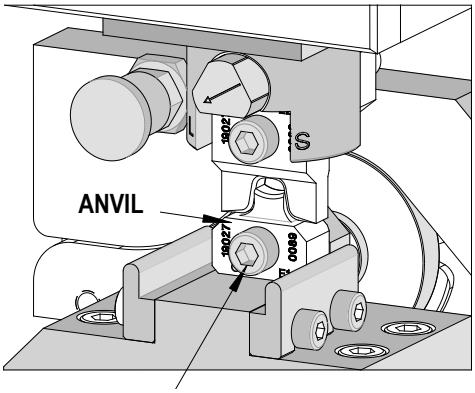


Figure 2-4

Punch and Anvil Alignments

Note: Always clean mounting surfaces of crimp tooling and tooling holders prior to alignment.

1. Disconnect power from the press and open the machine guard.
2. Using a 5/32" hex wrench, slightly loosen the anvil mounting screw. See Figure 2-4.
3. Slowly hand-cycle the ram of the press to bottom of its stroke. With the punches engaging the anvils, securely tighten the anvil mounting screw to ensure alignment of punches and anvils.

4. Hand cycle the press ram to its up position.
5. Close the machine guard and restore power to the press.

2.3. Crimp Height Adjustments

Conductor Crimp Height Adjustment

1. Obtain a piece of solder, approximately 40mm (1.5") long and approximately 0.5mm (.02") larger in diameter than the crimped slug height. If the solder diameter is too large the crimped slug will have large extrusions, making it difficult to measure the overall slug height.
2. With no terminals in the applicator, lay the solder across the anvils and cycle the press (under power).
3. Using a crimp micrometer or dial caliper, measure the solder slug height and compare to specification.
4. If adjustments are necessary, turn off the press and open the machine guard.
5. The conductor crimp height is based on the conductor punch contacting the conductor anvil. If the press shut height was correctly set prior to crimp module installation (see section 2.1) there should be no need to adjust conductor crimp height. However, some of the larger terminal crimps may cause minor press frame deflection which can be compensated by adjusting the press shut height. See section 2.1 for shut height adjustment.

NOTE: Crimp height adjustments for closed-barrel industrial terminals are always based on solder slug heights, not terminal crimp heights.

1. Load the terminals, close the machine guard, and crimp several wires under power.
2. Perform a pull test on the conductor crimp to verify the mechanical integrity of the crimp. See Appendix A-Pull Force Test.

Insulation Crimp Height

1. Place a stripped length of the appropriate wire into the terminal and crimp under power.
2. Observe quality of insulation crimp.
3. If adjustments are necessary, turn off the press. Open the machine guard.
4. Using a 5/32" hex wrench, loosen the #10 socket head screw holding the punches.
5. Rotate the insulation adjusting cam to achieve the desired insulation height. There are three cam positions (marked L, M, and S) for large, medium, and small diameter wires. The cam must be in one of the three positions; do not adjust it between positions. See Figure 2-5.
6. While holding the punches up against the punch holder, securely tighten the #10 socket head screw.
7. Close the machine guards, restore power, and crimp a wire under power. Inspect the insulation crimp and make further adjustments if needed.

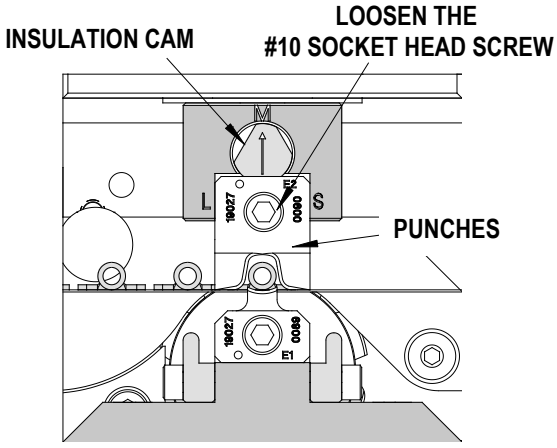


Figure 2-5

Note: Due to the large variety of insulation wall thickness, materials, and durometers, Molex does not specify insulation crimp height on closed –barrel terminals.

2.4 Crimp Tooling Removal and Installation

Caution: Always disconnect power before installing or removing tooling.

Removal and Installation of ATP-301 Style Punches

NOTE: Always clean mounting surfaces of crimp tooling and tooling holders prior to installation.

1. Disconnect power from the press. Open the machine guard.
2. If the ram is down, move it manually to the full up position.
3. To remove the punches, use a 5/32" hex wrench to remove the #10 socket head screw holding the punches to the punch holder. See Figure 2-6.
4. Remove the screw, punches, and O-ring together. Some tool kits may include a spacer plate (behind the conductor punch).
5. To install, place the punches with the spacer (if used) and O-ring against the punch holder and securely tighten the #10 socket head screw. The conductor punch ("E2") goes against the punch holder and the insulation punch ("I2") is stacked on the conductor punch. Make sure the etched "E2" or "I2" on each punch faces outward.

Note: The press should be hand-cycled after installing punches to insure a free fit between punch and anvil. If excessive resistance is felt, check for an incorrectly installed punch and/or anvil misalignment.

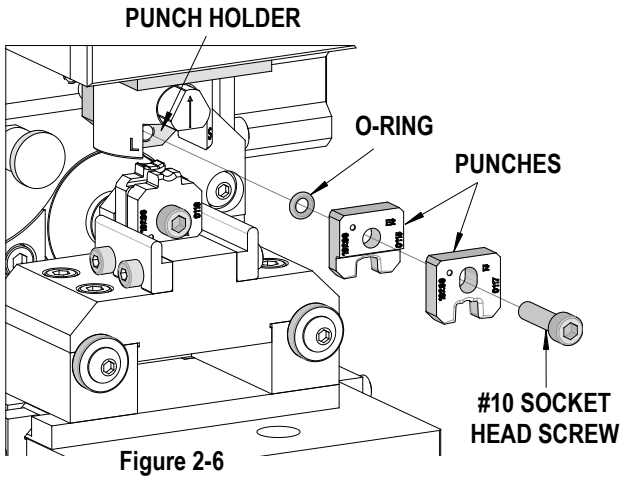


Figure 2-6

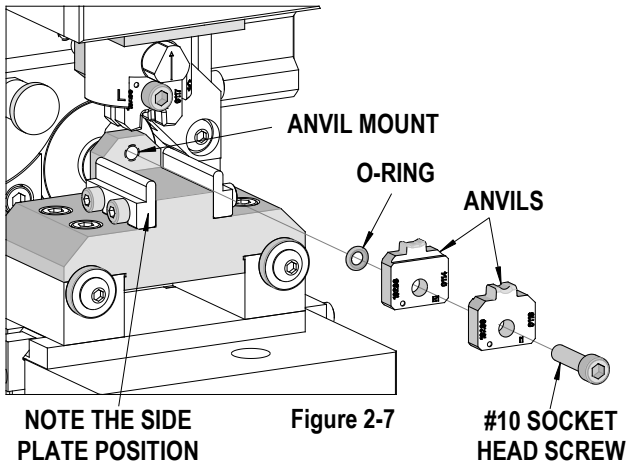


Figure 2-7

Removal and Installation of ATP-301 Style Anvils

NOTE: Always clean mounting surfaces of crimp tooling and tooling holders prior to installation.

1. Disconnect power from the press. Open the machine guard.
2. If the ram is down, move it manually to the full up position.
3. To remove the anvils, use a 5/32" hex wrench to remove the #10 socket head screw holding the anvils to the anvil mount. See Figure 2-7.
4. Remove the screw, anvils, and O-ring together. Some tool kits may include a spacer plate (behind the conductor anvil).
5. To install, place the anvils with the spacer (if used) and O-ring against the anvil mount, leaving the mounting screw slightly loose. The conductor anvil ("E1") is installed first and the insulation anvil ("I1") is stacked onto it. Make sure the etched "E1" or "I1"on each anvil face outward.

WARNING: Use the mounting screws that are furnished with the ATP tool kit. The feed mechanism may become damage when using screws that are too long.

6. The side plates must be a close fit to the width of the anvils. For the ATP-301 style anvils, the step on the side plates must be toward the outside. If it is not, loosen the M4 socket head screw and reverse the side plate.

7. The anvils must be aligned to the punches before tightening the screws. See section 2.2 (Set Up; Punch and Anvil Alignments).

Removal and Installation of ATP-201 Style Punches

1. Disconnect power from the press. Open the machine guard.
2. If the ram is down, move it manually to the full up position.
3. To remove the punch assembly, use a 3mm hex wrench to loosen the set screw on the front of the ram. This screw is accessible through the module's front cover. See Figure 2-8.
4. With the set screw loosened, pull the punch assembly straight down.
5. To install the punch assembly, orient the assembly so the flat on the round stub faces forward. Put the stub into the hole in the bottom of the ram and push the punch assembly up against the bottom of the ram. See Figure 2-9.
6. With the punch assembly in the ram, tighten the set screw securely.

Note: The press should be hand-cycled after installing the punch assembly to insure a free fit between punch and anvil. If excessive resistance is felt, check for an incorrectly installed punch and/or anvil misalignment.

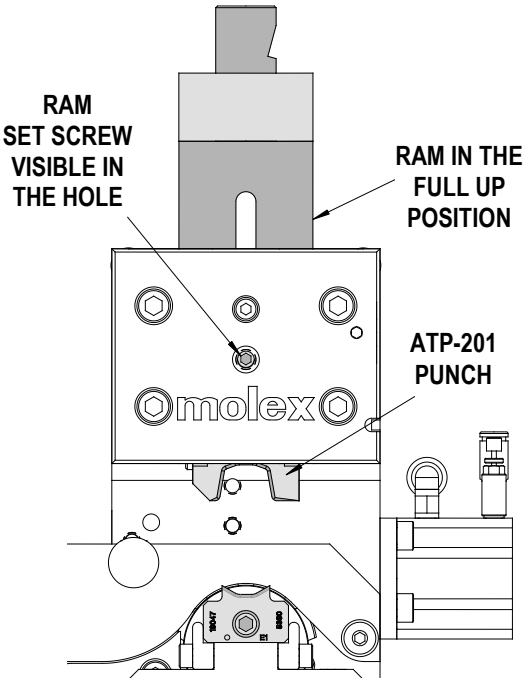


Figure 2-8

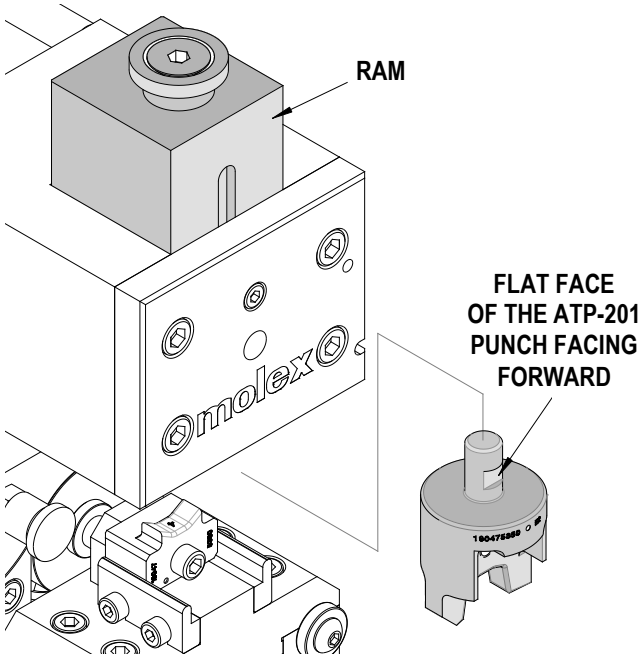


Figure 2-9

Removal and Installation of ATP-201 Style Anvils

Note: Always clean mounting surfaces of crimp tooling and tooling holders prior to installation.

1. Disconnect power from the press. Open the machine guard.
2. If the ram is down, move it manually to the full up position.
3. To remove the anvils, use a 5/32" hex wrench to remove the #10 socket head screw holding the anvils to the anvil mount. See Figure 2-10.
4. Remove the screw, anvil(s), and O-ring together.
5. To install, place the anvil(s) and O-ring against the anvil mount, leaving the mounting screw slightly loose. The conductor anvil ("E1") is installed first and the insulation anvil ("I1") is stacked onto it. Make sure the etched "E1" or "I1"on each anvil face outward.

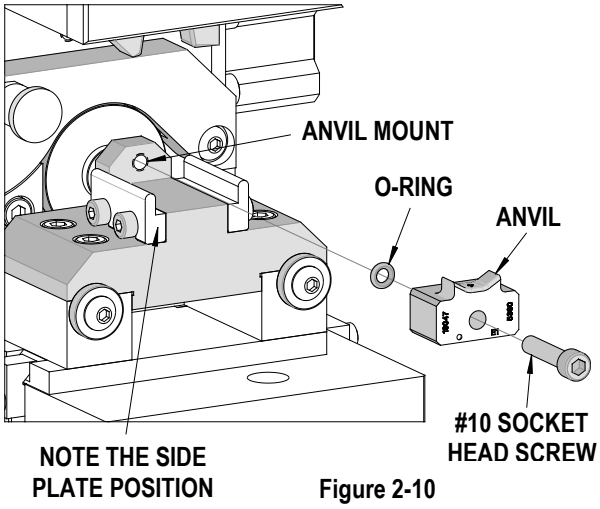


Figure 2-10

WARNING: Use the mounting screws that are furnished with the ATP tool kit. Screws that are to long may damage the feed mechanism.

6. The side plates must be a close fit to the width of the anvils. For the ATP-201 style anvils, the step on the side plates must be toward the inside. If it is not, loosen the M4 socket head screw and reverse the side plate.
7. The anvils must be aligned to the punches before tightening the screws. See section 2.2 (Set Up; Punch and Anvil Alignments).

2.5. Crimp Module Adjustments

Terminal Feed Adjustments

The tape feed mechanism is a ratcheting wheel and has no adjustable features.

Feed Speed Adjustments

Terminal feed speed is controlled by the flow control valve on the feed cylinder. Loosen the locking ring, then turn the adjustment knob clockwise (CW) to reduce the feed speed or counterclockwise (CCW) to increase the feed speed. See Figure 2-11.

Adjustments to the feed speed should be made gradually.

When adjustment is complete, turn the locking ring until it is finger-tight.

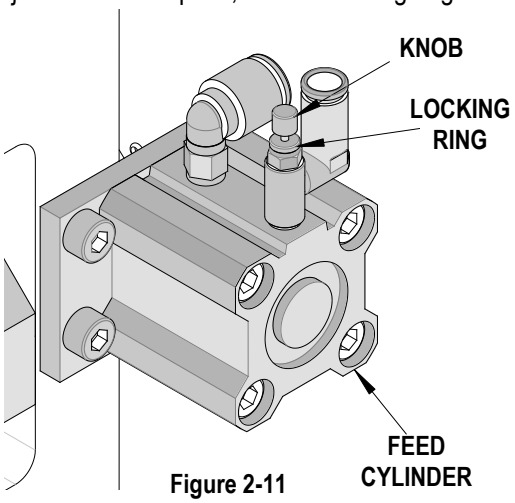


Figure 2-11

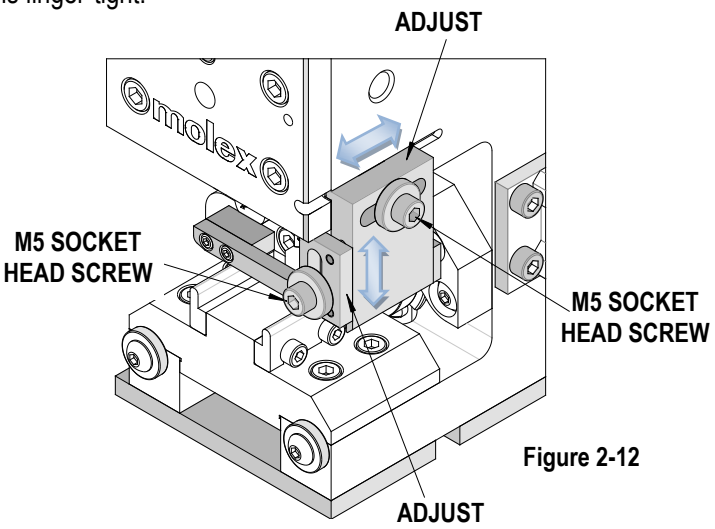


Figure 2-12

Terminal Stripper Adjustment

Some terminals have a tendency to stick in the conductor punch after being crimped. The terminal stripper is used to shed the terminal away from the retracting punches.

1. Disconnect power from the press. Open the machine guard.
2. If the ram is down, move it manually to the full up position.
3. To adjust the stripper in and out, use a 4mm hex wrench to loosen the M5 socket head screw on the side of the stripper. Move the stripper toward the punches, but not too close or it could interfere with the ram stroke. See Figure 2-12. Tighten the M5 socket head screw when adjustment is complete.
4. To adjust the stripper up and down, use a 4mm hex wrench to loosen the M5 socket head screw on the front of the stripper. Move the stripper down until it is just above the taped terminal on the anvils. See Figure 2-11. Tighten the M5 socket head screw when adjustment is complete.
   NOTE: If the stripper is adjusted down too far it may interfere with the terminal feed motion.

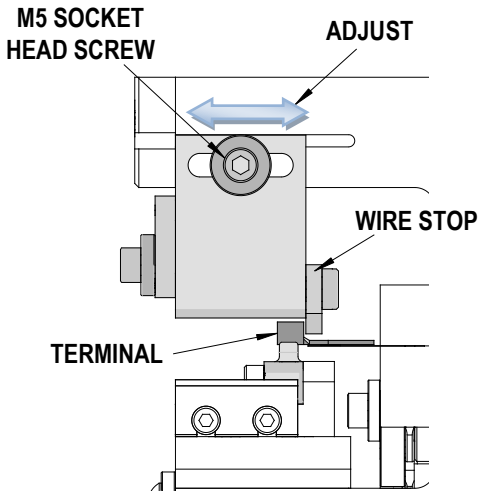


Figure 2-13

Wire Stop Adjustment
The wire stop is used when the terminal being crimped does not have an internal wire stop tab. Some larger ring terminals fall into this category.

1. Disconnect power from the press. Open the machine guard.
2. If the ram is down, move it manually to the full up position.
3. To adjust the wire stop, loosen the M5 socket head screw on the side of the stripper. Move the wire stop in or out until it is near the end of the terminal barrel. See Figure 2-13. Tighten the M5 socket head screw when adjustment is complete.

NOTE: Since they are mounted to the same block, adjustments to the wire stop will also influence the terminal stripper. To achieve full adjustment of the wire stop, the stripping tool may need to be removed from the block.

2.6 Operation

Loading and Unloading Tape

1. Applicable terminals are listed on the Crimp Tooling Specification Sheet. Do not crimp terminals that are not listed on the Specification Sheet.
2. Disconnect power from the press. Open the machine guard.
3. The tape will be easier to "start" in the track if the corner of the tape is trimmed as shown in Figure 2-14.
4. Open the tape track cover by pulling out the spring-loaded knob and lifting the cover up. A hole is provided in the module frame for the knob's pin to enter to hold the track cover open. See Figure 2-15.
5. Load the taped terminal strip from the front of the module, engaging the slots in the tape with the teeth on the feed wheel. Make sure the terminal is also centered above the crimp anvils. See Figure 2-16.
6. Pull out the spring-loaded knob and lower the track cover, allowing the pin to engage the lower hole.
7. Unloading the tape is the reverse process.

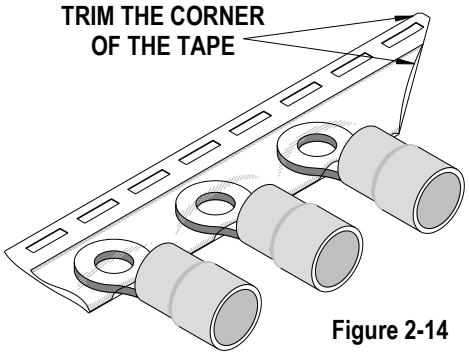


Figure 2-14

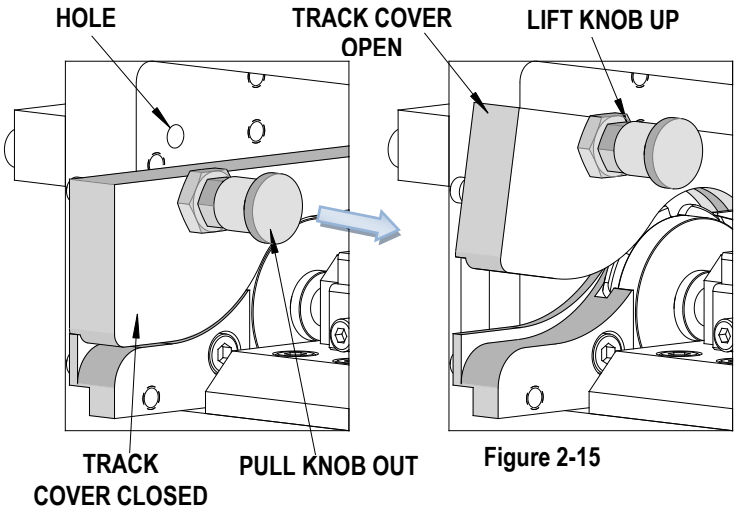


Figure 2-15

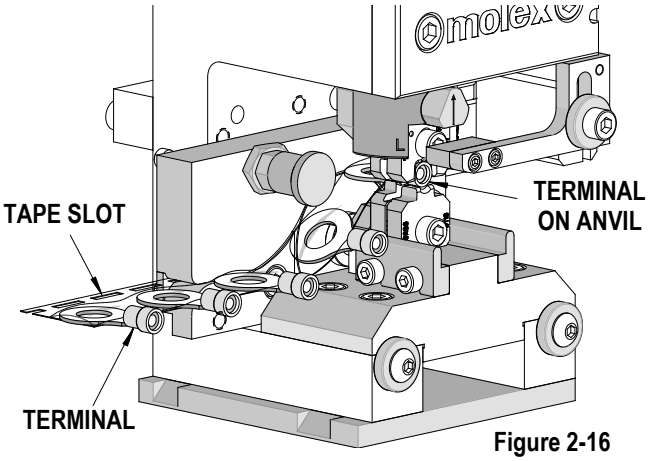


Figure 2-16

Tape De-Reeling Information

The tape reel should be mounted on the reel arm of the press, with the printed side of the reel facing the operator. The tape de-reels counterclockwise (CCW).

To prevent tape feed jams, the tape should enter the press guard below the bottom horizontal bar. If the tape is threaded between the bars, a terminal may become snagged on the bar during feeding. See Figure 2-17.

While operating the crimp module, the tape entering the press should not become taut. The operator should occasionally turn the terminal reel to maintain a slack loop.

The scrap tape exits below the press guard.

Removal of Crimped Terminals from Tape

After being crimped, the tape feed will advance the terminal one position to the right. It is the operator's responsibility to remove the crimped terminal from the tape.

If crimped wires are allowed to accumulate on the tape they will eventually cause a tape feed jam.

To prevent tape damage, the terminal should be pulled off the tape towards the operator's right. This sideways action makes it easier for the terminal to break free from the adhesive holding it to the tape.

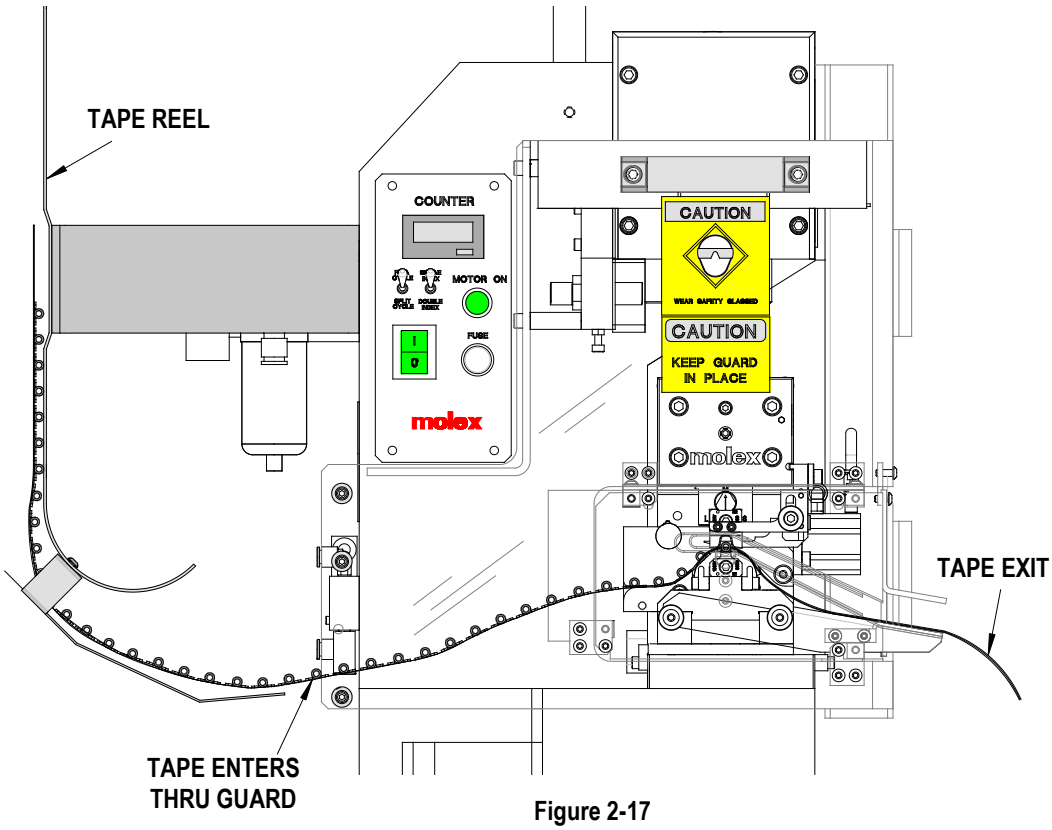


Figure 2-17

Section 3

Maintenance

3.1 Cleaning

3.2 Lubrication

3.3 Spare parts

3.4 Perishable Parts

3.5 Spare Tooling Storage

3.6 Module Storage

CAUTION: Always disconnect power before any maintenance activity

3.1 Cleaning

The crimp module should be cleaned daily. Use a soft bristle brush to remove debris from critical areas such as the crimp tooling and tape track. For best results, remove the tooling from the module. Brush and then use a clean cloth to wipe off the upper and lower tooling mounting areas. Tooling that crimps un-insulated terminals should be inspected for possible plating build-up.

Before reinstalling tooling, wipe all sides of the punches and anvils with a clean cloth.

Do not use compressed air to clean the applicator. The forces created by compressed air can force debris into the tool.

3.2 Lubrication

1. Grease the ram path. Lubricate with multipurpose synthetic lubricant with Teflon or an equivalent. Molex ships its applicators pre-greased with Permatex multi-purpose synthetic grease with Teflon No. 82329.
2. The feed wheel is on a pre-lubricated bearing and should require no further lubrication.

WARNING: Never use penetrants such as WD-40 or Liquid Wrench for any lubrication on the crimp module.

3. Never lubricate the air cylinder. It is designed to run on dry air.

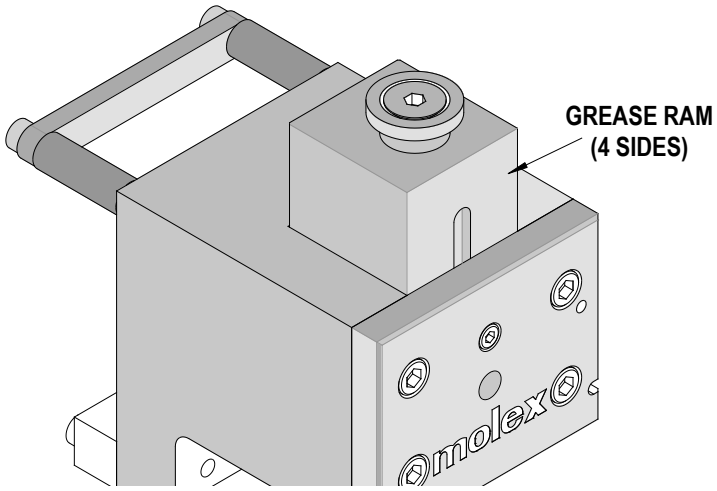


Figure 3-1
RAM LUBRICATION

3.3 Spare Parts

Customers are responsible for maintaining the crimp module. Spare parts are available. Moving and functioning parts can be damaged or wear out over time and will require replacement. Molex recommends that the customer keep some or all spare parts in stock to reduce production down time. These parts are identified in the Parts List. See Section 4.

3.4 Perishable Parts

Perishable parts are those parts that come in contact with the product and will wear out over time. Molex recommends that all customers keep at least one set of the perishable tool kits in stock at all times. This will reduce the amount of production down time. **For the proper perishable tool kit information, refer to the Application Tooling Specification Sheet available at Molex.com.**

An example of a maintenance chart is shown below. Copy and use this chart to track the maintenance of the crimp module or use this as a template to create your own schedule or use your company's standard chart, if applicable.

Preventive Maintenance Chart

Daily: Clean. See Section 3.1.
As Required: Lubricate. See Section 3.2.

CHECK SHEET MONTH_____ YEAR _____

Week	Daily Cycles	Daily Clean	Days of the Week							Solution
			MON	TUE	WED	THU	FRI	SAT	SUN	
1										
2										
3										
4										
Cleaning Reapply grease Reapply oil	25,000	Yes								Soft Brush Industrial Degreaser
Inspect all tooling and terminal feed for wear	25,000	Yes								Replace if signs of wear.

Schedule should be adjusted up or down depending on usage. Molex recommends that a log of preventive maintenance be kept with the press.

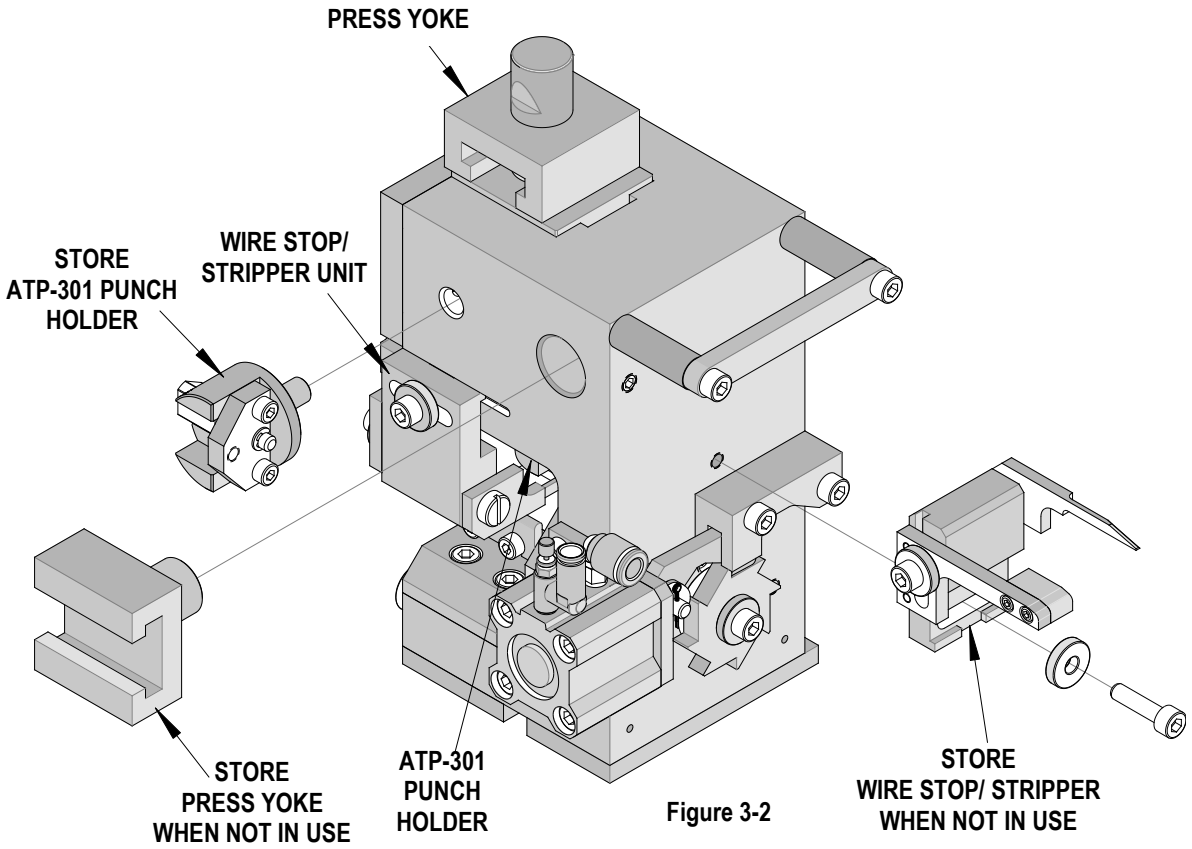


Figure 3-2

3.5 Spare Tooling Storage

To prevent unused tools from getting lost, the following on-module storage is available. See Figure 3-2.

- The ATP301 punch holder can be mounted to the side of the frame.
- The press yoke (or yoke from the TM-3000/TM-4000 Press) can be mounted to the side of the frame.
- The wire stop/stripper unit can be mounted to the rear of the frame.

3.6 Module Storage

Prior to storage, the crimp module should be thoroughly cleaned and lubricated.

To prevent the bottoming of the ram which can cause damage to the crimp punches and anvils, leave a strip of terminals in the applicator or place a piece of wood or rubber between the punches and the anvils.

Section 4

4.1 Parts Lists and Assembly Drawings

4.2 Troubleshooting

4.3 Press Guard Upgrade (For earlier TM-3000 presses)

4.1 Parts Lists and Assemblies

Molex Taped Terminal Crimp Module Figure 4-1				
Item	**Order No**	**Description**	**Quantity**	**Notes**
1	64016-2100	Crimping Module Top Assembly	1	Figure 4-2
2	64016-2200	Crimping Module Track Assembly	1	Figure 4-3
3	64016-2300	Crimping Module Frame Assembly	1	Figure 4-4

Assembly 64016-2000 (Figure 4-1)

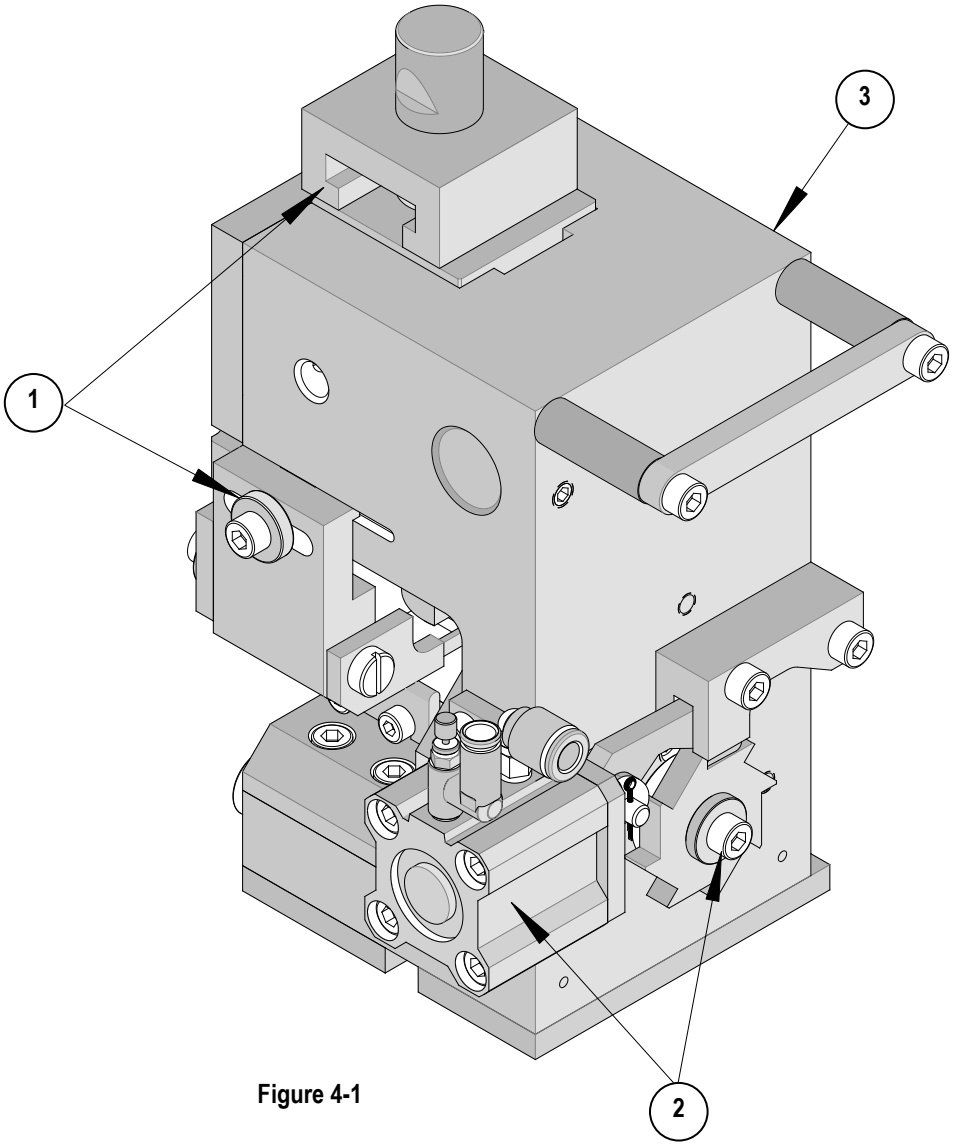


Figure 4-1

Parts List 64016-2100 (Figure 4-2)

Crimping Module Top Assembly 64016-2100					
Item	**Order No**	**Engineering No.**	**Description**	**RSP / PP Parts**	**Quantity**
1	19228-0147	19228-0147	Cam-Insulation Crimp (ATP)		1
2	19228-0240	19228-0240	Back Plate-Upper Punch Hold		1
3	63700-4556	63700-4556	"E"-RING (5/32 Inch)		1
4	63600-3018	63600-3018	Shoulder Bolt		1
5	63600-3025	63600-3025	M5-Hard Washer		2
6	63801-6447	63801-6447	Ram Adapter		1
7	64016-2101	64016-2101	Ram		1
8	64016-2102	64016-2102	Yoke		1
9	64016-2103	64016-2103	301 Punch Holder		1
10	64016-2104	64016-2104	Mount, Wire Stop		1
11	64016-2105	64016-2105	Wire Stop	**RSP**	1
12	64016-2106	64016-2106	Stripper Arm		1
13	64016-2107	64016-2107	Stripper		1
Hardware					
14	N/A	N/A	M2.5 by 6 Long SHCS		2**
15	N/A	N/A	M4 by 14 Long SHCS		2**
16	N/A	N/A	M5 by 14 Long SHCS		1**
17	N/A	N/A	M5 by 20 Long SHCS		1**
18	N/A	N/A	M8 by 25 Long FHCS		1**
19	N/A	N/A	M6 by 12 Long Set Screw		2**
20	N/A	N/A	3mm by 8 Long Dowel Pin		2**
RSP - Part is a Molex **R**ecommended **S**pare **P**art.					
PP - Part is a **P**erishable **P**art.					
** Available from an industrial supply company such as MSC (1-800-645-7270).					

Assembly 64016-2100 (Figure 4-2)

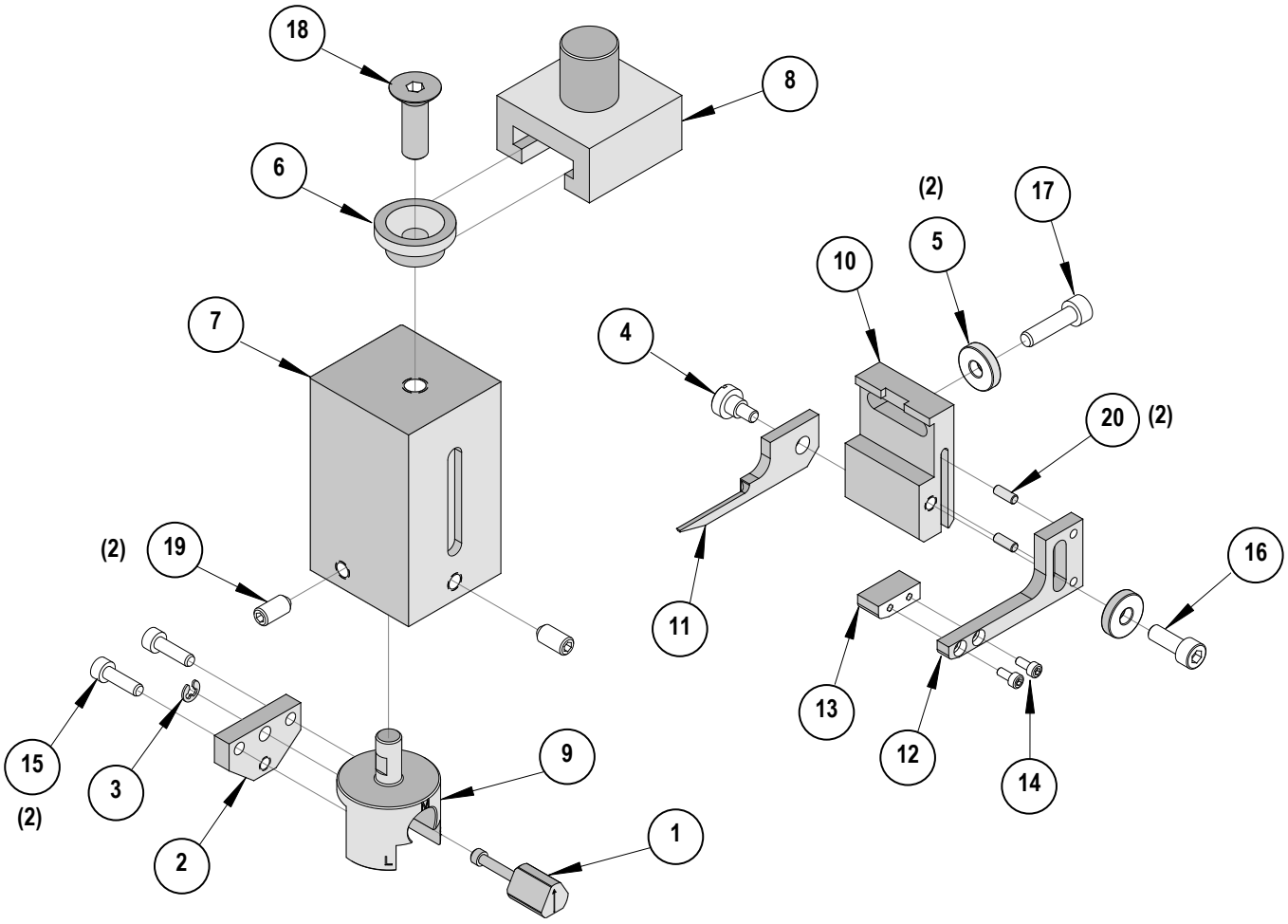


Figure 4-2

Parts List 64016-2200 (Figure 4-3)

Crimping Module Track Assembly 64016-2200					
Item	**Order No**	**Engineering No.**	**Description**	**RSP / PP Parts**	**Quantity**
1	011321058	011321058	Male Elbow Air Fitting		1
2	62500-1584	62500-1584	Flow Control, Cylinder Mount		1
3	63600-3005	63600-3005	Air Cylinder	**RSP**	1
4	63600-3007	63600-3007	Spacer - Washer		1
5	63600-3008	63600-3008	Indexing Plunger		1
6	63600-3009	63600-3009	Spacer - Washer		1
7	63600-3010	63600-3010	Hinge Pin - Pivot		1
8	63600-3014	63600-3014	Washer		2
9	63600-3016	63600-3016	Ball Plunger	**RSP**	1
10	63600-3022	63600-3022	Key - 3mm by 3mm by 6mm Long		1
11	63600-3023	63600-3023	Key - 3mm by 3mm by 10mm Long		1
12	63600-3060	63600-3060	Extension Spring		1
13	63600-3093	63600-3093	Collar		1
14	64016-2201	64016-2201	Tape Track Bottom		1
15	64016-2202	64016-2202	Tape Track Top		1
16	64016-2203	64016-2203	Tape Drive Disk		1
17	64016-2204	64016-2204	Tape Index Wheel	**RSP**	1
18	64016-2205	64016-2205	Tape Drive Shaft		1
19	64016-2206	64016-2206	Ratchet Wheel		1
20	64016-2207	64016-2207	Cam Arm Retainer		1
21	64016-2208	64016-2208	Indexing Cam Arm		1
22	64016-2209	64016-2209	Index Clevis		1
23	64016-2213	64016-2213	Cylinder Mount		1
24	63700-5064	63700-5064	Nylon Tubing		2
Hardware					
25	N/A	N/A	M3 Hex Nut		2**
26	N/A	N/A	M3 by 12 Long SHCS		2**
27	N/A	N/A	M5 by 14 Long SHCS		4**
28	N/A	N/A	M5 by 16 Long BHCS		1**
29	N/A	N/A	M5 by 20 Long SHCS		1**
30	N/A	N/A	M5 by 25 Long SHCS		2**
31	N/A	N/A	M5 by 35 Long SHCS		2**
32	N/A	N/A	M5 by 40 Long SHCS		2**
RSP - Part is a Molex **R**ecommended **S**pare **P**art.					
PP - Part is a **P**erishable **P**art.					
** Available from an industrial supply company such as MSC (1-800-645-7270).					

Assembly 64016-2200 (Figure 4-3)

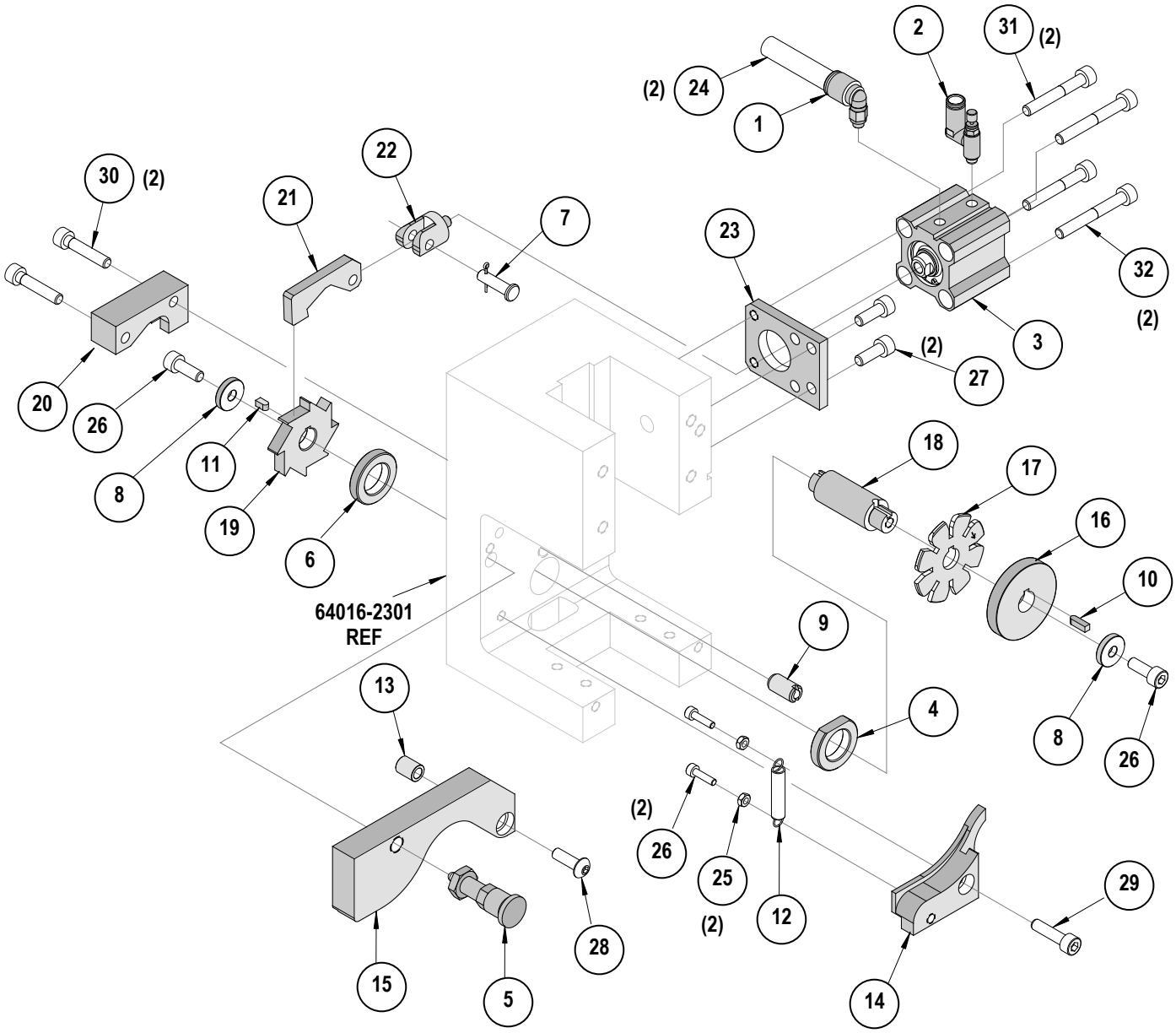


Figure 4-3

Parts List 64016-2300 (Figure 4-4)

Crimping Module Frame Assembly 64016-2300				
Item	**Order No**	**Engineering No.**	**Description**	**Quantity**
1		63600-2003	Pipe Collar	2
2		63600-2004	Link	1
3		63600-2915	5mm Dowel Pin by 10 Long	2
4		63600-3011	Bushing	1
5		63600-3025	M5 Harder Washer	2
6		64016-2301	Frame	1
7		64016-2302	Side Plate	2
8		64016-2303	Anvil Mount	1
9		64016-2305	Adapter Plate	1
10		64016-2306	Front Cover	1
Hardware				
11	N/A	N/A	M4 by 8 Long SHCS	1**
12	N/A	N/A	M4 by 12 Long SHCS	4**
13	N/A	N/A	M5 by 12 Long BHCS	6**
14	N/A	N/A	M5 by 16 Long SHCS	4**
15	N/A	N/A	M5 by 45 Long SHCS	2**
16	N/A	N/A	M6 by 12 Long Set Screw	2**
17	N/A	N/A	M6 by 14 Long SHCS	4**
18	N/A	N/A	M8 by 8 Long Set Screw	1**
** Available from an industrial supply company such as MSC (1-800-645-7270).				

Assembly 64016-2300 (Figure 4-4)

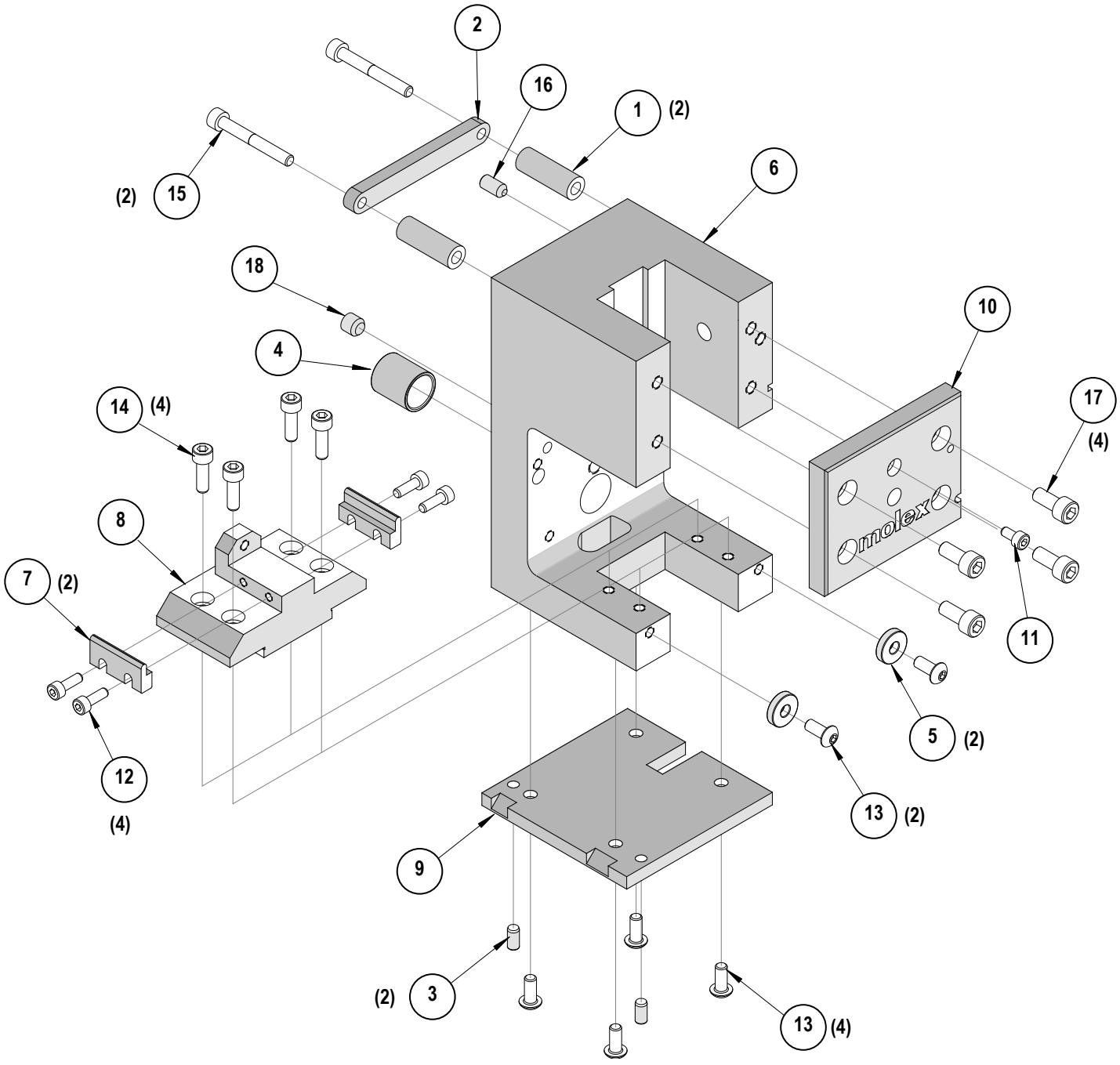


Figure 4-4

4.2 Troubleshooting

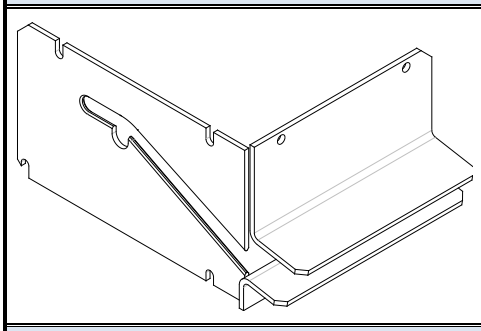
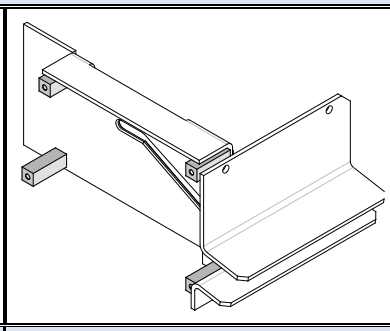
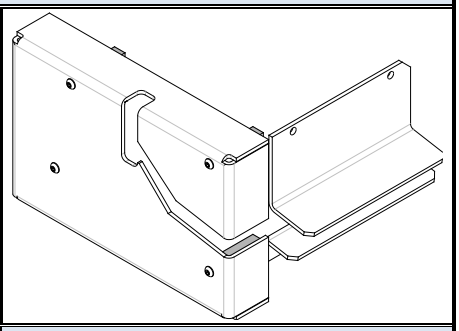
Symptom	▪ Cause	Solution
Tape does not feed	▪ Reel jam or jam at track entry	Check tape entry into track
	▪ Tape jam in track	Reload tape
	▪ Feed cylinder flow too restricted	Adjust flow control open
	▪ Insufficient air pressure to feed cylinder	Adjust air pressure >80psi (0.5MPa)
	▪ Tape splice jammed in track	Clear jam
Tape overfeeds	▪ Feed cylinder advancing too fast	Adjust flow control
Excessive flare (bell mouth) (Un-insulated Product)	▪ Conductor punch worn	Replace
	▪ Tooling backwards	Reverse mounting of Tooling
Conductor crimp is too loose	▪ Worn Tooling	Replace with new tooling
	▪ Wrong tooling	Replace with proper tooling
	▪ Wrong conductor crimp height	Reset conductor crimp height
	▪ Press shut height too high	Calibrate press shut height
Conductor crimp Is too tight	▪ Wrong tooling	Replace with proper tooling
	▪ Wrong crimp height	Reset crimp height
	▪ Punch installed backwards	Reverse mounting of punch
	▪ Press shut height too low	Calibrate press shut height
Terminal sticks during crimping	▪ Stripping blade too high	Lower stripping blade
	▪ Wrong tooling	Replace with proper tooling
	▪ Tooling worn or damaged	Replace tooling
Insulation crimp is too tight	▪ Wire insulation too big for terminal	Check product specification
	▪ Wrong insulation crimp height	Reset insulation crimp height
	▪ Wrong tooling	Replace with proper tooling
	▪ Press shut height too low	Calibrate press shut height
Low Pulls	▪ Dies Backwards	Reverse mounting of Dies
	▪ Worn Tooling	Replace with new tooling
	▪ Crimp specification not achieved	Check solder slug height
	▪ Product location on tape incorrect	Replace with proper product
	▪ Wrong tooling	Replace with proper tooling

4.3 Guarding to be used on a TM-3000 and TM-4000 Press with the Tape Crimp Module Guard (64016-2000)

The Molex TM-3000 and TM-4000 presses come standard with the 64016-2595 guard for industry standard applicator use. However, when installing and using the Molex Tape Crimp Module (64016-2000) in the TM-3000 or TM-4000 presses, the Tape Crimp Module Guard (64016-2800) must be installed to meet OSHA safety regulations by the operator. The 64016-2800 Tape Crimp Module Guard comes with the purchase of the 64016-2000 Crimp Tape Module. Below are instructions on how to install the Tape Crimp Module Guard and the available “point of operation” guards for different wire sizes or replacement. The Tape Crimp Module Guard will only fit into a Molex TM-3000 or TM-4000 crimp press and cannot be used in any other press system.

FEATURES

- An Exit Guide to assist in removing crimped wires and used Mylar tape from the press.
- This feature allows the operator to leave crimped wires attached to the Mylar tape, and then after several more machine cycles, the crimps can be easily removed from the tape, outside of the press guards.
- A choice of easy to install “Point of Operation Guards”, designed to help get wires into the closed barrel contacts for easier crimping. See Chart 1.

Chart 1		
3 possible configurations for the Tape Module Guard Upgrade Kit. ***All Shown with the Exit Guide and Right Guard for reference only***		
		
64016-3360	**64016-3365**	**64016-3370**
Point of Operation Guard Assembly for 16 AWG to 8 AWG Wire Sizes	**Point of Operation Guard Assembly for 18 AWG and Smaller Wirer Sizes**	**Point of Operation Guard Assembly for 6 AWG to 2AWG Wire Sizes**

Preparing the Press for the Tape Crimp Module Guarding

Always turn off and disconnect the power supply to the press when changing over any guarding.

Do Not Use the TM-3000 or TM-4000 Crimp Press without all the correct Guarding installed.

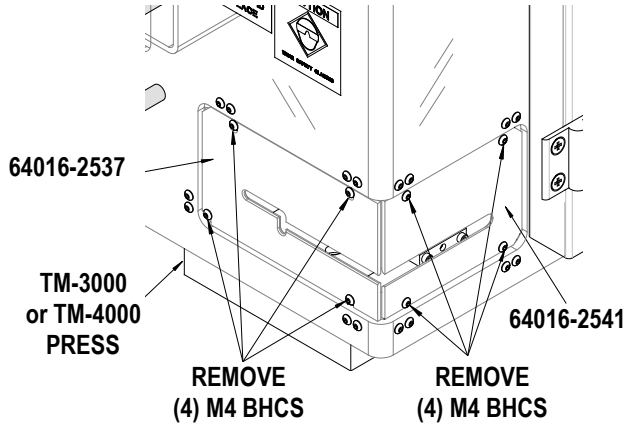


Figure 4-5

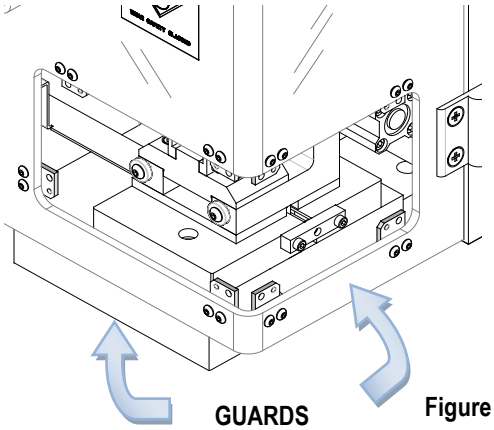


Figure 4-6

1. If the TM-3000 or TM-4000 press was previously set up for use with a standard metal strip applicator, the guard assembly (64016-2590) will need to be changed to the 64016-2595 Safety Guard Upgrade Kit.
2. Remove the (4) M4 BHCS from the Front Guard (Order number 64001-2537) and the (4) M4 BHCS from Right Guard (Order number 64016-2541). See Figure 4-5.
3. Remove the Front and Right Guard and set aside. See Figure 4-6.

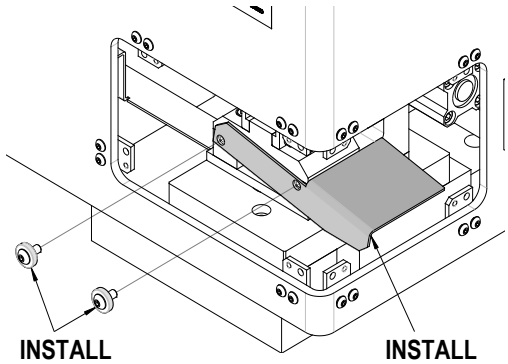


Figure 4-7

For all wire sizes install the guard assembly in the following steps:

1. Install the Exit Guide (Order number 64016-2307).
2. Install the (2) M5 BHCS with the hardened washers into the Exit Guide. See Figure 4-7.
3. Install the Right Guard (Order number 64016-2309) using the threaded holes in the top mounted brackets with (2) M4 BHCS. See Figure 4-8.
4. Install the Guide Extension (Order number 64016-2547) using the threaded holes in the bottom mounted brackets with (2) M4 BHCS. See Figure 4-8.

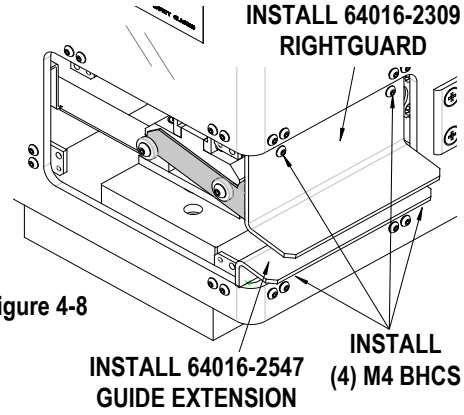


Figure 4-8

Note: The Right Guard, Exit Guide, and the Guide Extension are used with all three Tape Module Point of Operation Guard Assemblies. They do not need to be removed when changing Tape Module Point of Operation Guard Assemblies for different wire sizes.

Installing the 64016-3360 Point of Operation Guard Assembly (For 16 AWG to 8 AWG wire crimping)

1. Install the Point of Operation Guard assembly (Order number 64016-3360) into the threaded holes in the (4) mounting brackets (64016-2523) with (4) M4 BHCS. See Figure 4-9.

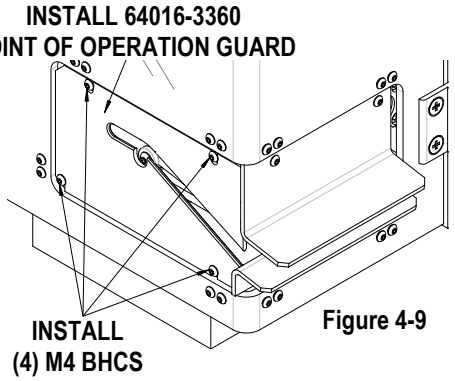


Figure 4-9

Installing the 64016-3365 Point of Operation Guard Assembly (For 18 to and smaller AWG wire crimping)

Note: If using the optional wire stop, (that is stored on the tape module) the terminal stripper may need to be removed before installing the 64016-3365 Point of Operation Guard Assembly.

1. The 64016-3365 Point of Operation Guard Assembly is designed to allow the operator to get closer to the crimping area, when using 18 AWG and smaller wire.
2. Remove the (4) M4 BHCS and any Point Of Operation Guard.
3. Place the 64016-3365 Point of Operation Guard Assembly on the far side of the (4) mounting brackets (64016-2523).
4. Install the (4) M4 BHCS into the *clearance holes* (not the tap holes). See Figure 4-10.

Note: That the 64016-3365 Point of Operation Guard Assembly is recessed inward, for easy access to the crimping area.

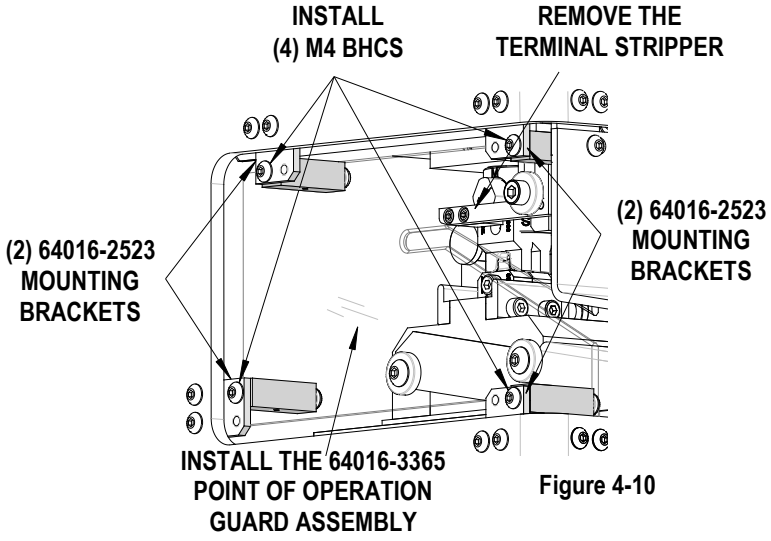


Figure 4-10

Installing the 64016-3370 Point of Operation Guard Assembly (For 6 AWG to 2 AWG insulation wire crimping)

Always turn off and disconnect the power supply to the press when changing over any guarding.

1. Open the front door guard assembly by using the handle mounted on the door. Swing the door approximately 90° so there will be access to backside of the guard door in order to mount the Point of Operation Guard Assembly. See Figure 4-11.
2. Install the Wire Guide Assembly (Order Number 64016-3600) using the (2) M5 BHCS on the front of the 64016-2000 tape module. Adjust the height of the Wire Guide Assembly to best suit the application. See Figure 4-12.

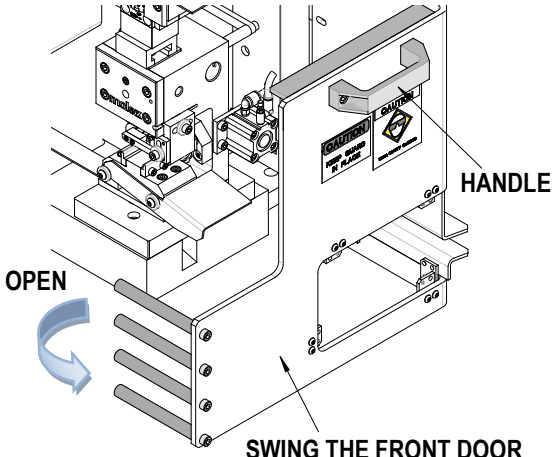


Figure 4-11

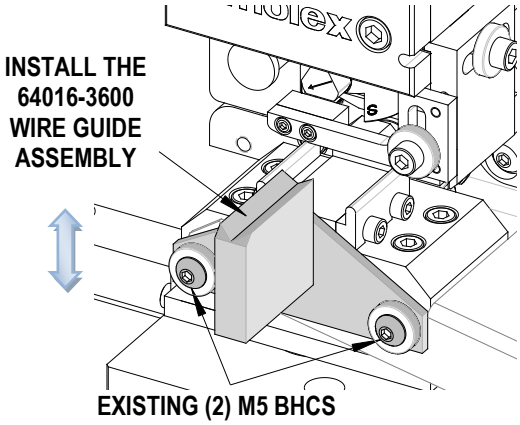


Figure 4-12

3. Place the Point of Operation (Order Number 64016-3370) 6 AWG to 2 AWG Guard Assembly on the outside of the Front Door Guard. See Figure 4-13.
4. From inside of the Front Door Guard, locate the clearance holes of the (4) mounting brackets (64016--2523).
5. Install the Point of Operation (Order Number 64016-3370) 6 AWG to 2 AWG Guard Assembly using (4) M4 BHCS through the mounting brackets and into the (4) square posts. See Figure 4-14.
6. Close the Front Door Guard assembly making sure the magnetic latch secures it shut.

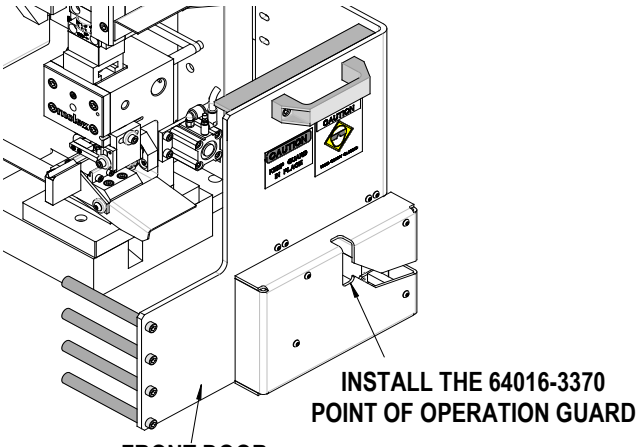


Figure 4-13

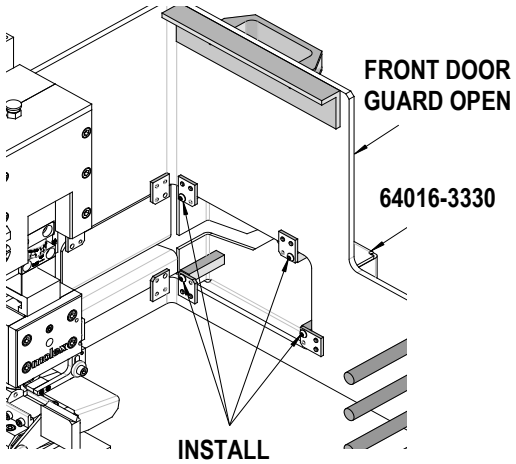


Figure 4-14

Parts List

Tape Crimp Module Guard 64016-2800. See Figure 4-15				
Item No.	**Order No.**	**Eng. No.**	**Description**	**Qty.**
1	64016-2308	64016-2308	Exit Guide	1
2	64016-2309	64016-2309	Right Guard	1
3	64016-2547	64016-2547	Guide Extension	1
4	64016-3360	64016-3360	Point of Operation Guard Assembly Tape Module 16 AWG to 8 AWG	1
5	64016-3365	64016-3365	Point of Operation Guard Assembly Tape Module 18 AWG or Smaller	1
6	64016-3370	64016-3370	Point of Operation Guard Assembly Tape Module 6 AWG to 2 AWG	1
7	64016-3600	64016-3600	Wire Guide Assembly	1

Assembly

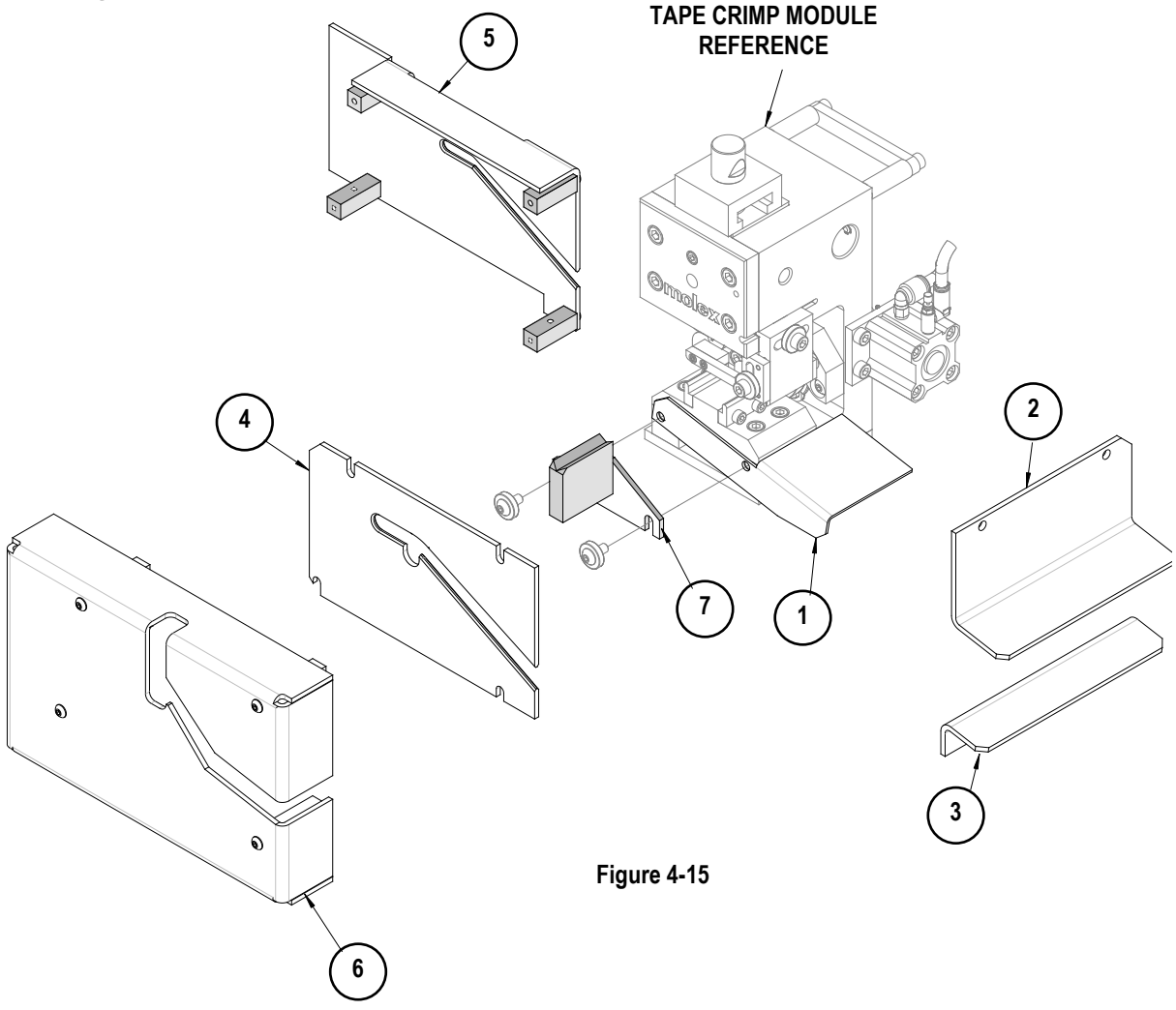
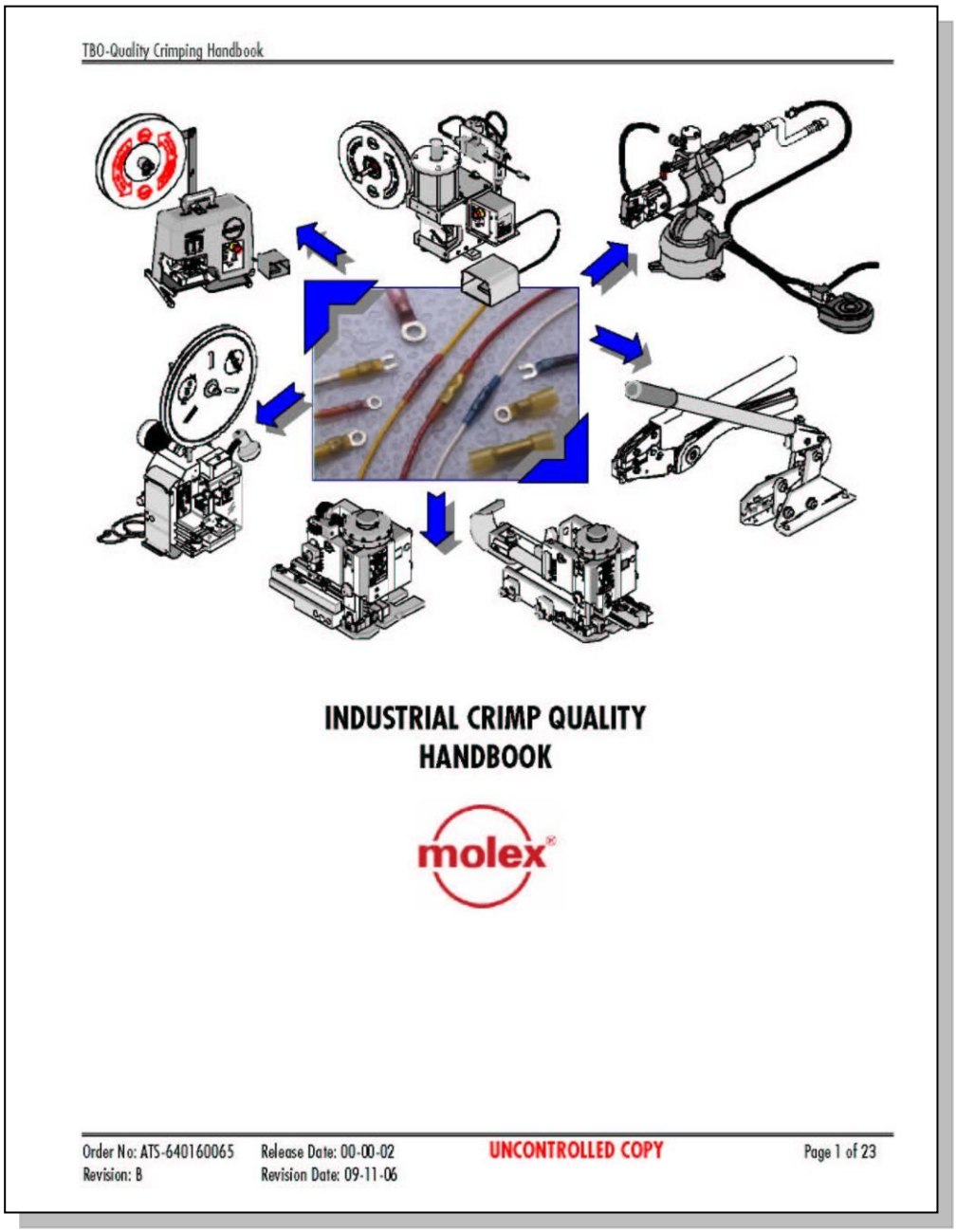


Figure 4-15

For more information use the Industrial Crimp Quality Handbook

There is no charge for this book, which can be found on the Molex website (www.molex.com) or contact your local Molex sales engineer



Appendix A

A.1 Pull Force Procedure

A.2 Pull Force Problems

Pull Force Testing

A.1 Pull Force Procedure

Wire connectors and soldering lugs for use with copper conductors. (Per UL486A October 8, 1991) UL Section 12 Pullout Test.

12.1 The connectors subjected to the static heating test or secureness test shall be subjected to a direct pull of the value specified for one minute. The connector is acceptable if it does not become separated from the conductor or conductors after completion of the test.

12.2 For an insulated connector in which the insulation is assembled to the connector during installation, the test should be conducted with the insulation in place if it is always supplied with the connector by the manufacturer. Otherwise, the test should be conducted without the insulation assembled to the connector. Breaking or tearing of the insulation of an insulated connector is acceptable in the pullout test. The pull is to be exerted by means of a tension testing machine or equivalent, so that there will be no sudden application of force or jerking during the test.

The following is the procedure Molex uses for the qualification of pull force:

1. Cut wire length approximately 150mm (6.0") long.
2. Strip one end to 13mm (.50"), or long enough so no wire insulation is under the insulation grip.
3. Terminate the appropriate terminal to the wire to the nominal crimp height.
4. Visually inspect the termination for wire brush and cut strands.
5. Set pull tester to 25.4mm (1.0") per minute. For most applications, a higher rate will not have a significant impact on the data. Verify higher pull rates with data taken at 25.4mm (1.0") per minute.
6. Knot the non-terminated end of the wire.
7. Regardless of pull tester type, both wire and terminated end must be securely clamped. (Note: The clamp terminal contact interface, do not clamp the conductor crimp. Insulated terminals should have their insulation trimmed back so the contact can be clamped.)
8. Activate pull test.
9. Record a minimum of 25 readings of maximum pull force. After the application has been qualified, a minimum of 5 pull force measurements should be done to confirm each setup.
10. Compare lowest reading to minimum pull force specification.

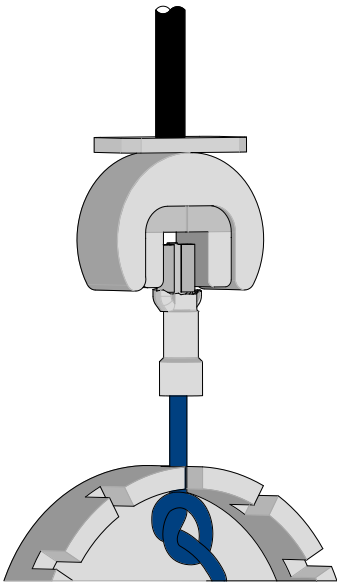
A.2 Pull Test Problems

1. Wire breaks before conductor grip, pull force low

Material Evaluation
Cause: Wire material properties, and/or coatings.
Solution: Test non-terminated wire for breaking strength.

Stripping Evaluation
Cause: Cut or nicked strands from stripping operation.
1) Wire being manually stripped.
2) Poor automatic stripping cutoff.
3) Worn strip tooling.

Solution: 1) Switch to semiautomatic or automatic wire stripping machine.
2) Correct stripping machine setup.



PULL FORCE TESTING

2. Wire pulls out of conductor grip, crimp height good

Material Evaluation
Cause: 1) Terminal material thickness too small.
2) Terminal serration depth/form.
3) Terminal plating thickness.
Solution: 1) Evaluate a new terminal.
2) Or 3) Contact terminal manufacturer.

Stripping Evaluation
Cause: Wrong strip length.
Solution: Adjust strip length.

Tensile Test Value (LB)

Wire Size (AWG)	*Military	**UL- 486A	***UL – 486C	*****UL-310
26	7	3	N/A	N/A
24	10	5	N/A	N/A
22	15	8	8	8
20	19	13	10	13
18	38	20	10	20
16	50	30	15	30
14	70	50	25	50
12	110	70	35	70
10	150	80	40	80
8	225	90	45	N/A
6	300	100	50	N/A
4	400	140	N/A	N/A
2	550	180	N/A	N/A
1	650	200	N/A	N/A
1/0	700	250	N/A	N/A
2/0	750	300	N/A	N/A
3/0	825	350	N/A	N/A
4/0	875	450	N/A	N/A

*Military – Military Approved Terminals
**UL-486A – Terminals (Copper conductors only)
***UL-486C – Butt Splices, Parallel Splices, Closed End Connectors, and Wire Nuts
****UL-310 – Quick Disconnects, Flags and Couplers

Visit our Web site at http://www.molex.com