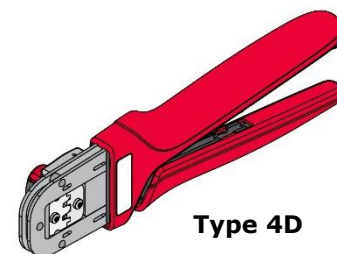


**Order Number**  
**223863-4500**

**molex**

## Application Tooling Specification



**Type 4D**

### FEATURES

- A full cycle ratcheting hand tool ensures complete crimps
- Ergonomic soft grip handles for comfortable crimping
- Right- and left-handed applications
- Easy handling due to outstanding force ratio
- A precision user-friendly terminal locator with wire stop that holds terminals in the proper crimping position
- This tool is IPC/WHMA-A-620 compliant
- Tooling can be installed in the 63816-1920 Power Crimp Head, which is installed into the 63816-0270 (110 V) or 63816-0280 (220 V) Battery Powered Tools and the 63816-1900 Electric Crimp Machine
- This tool is RoHS compliant; however, RoHS compliance is not required

### SCOPE

**Products:** Milli-Grid Crimp Terminal, 22-28 AWG, UL1007 and UL1061 Wires.

Terminal Series No.	Terminal Order No.	Wire Size	Wire Style (2)	Insulation Diameter				Strip Length	
				Terminal ◆		IPC/WHMA-A-620 ◆◆◆			
	Reel (1)	AWG		mm	In.	mm	In.	mm	In.
87396	87396-8051 87396-8999 87396-9051	22	UL1061	1.40 Max	.055 Max	1.07-1.37	.042-.054	1.3-1.8	.05-.07
		24	UL1007	1.40 Max	.055 Max	1.10-1.40	.043-.055		
		26	UL1007	1.40 Max	.055 Max	1.07-1.27	.042-.050		
		28	UL1007	1.40 Max	.055 Max	0.97-1.27	.038-.050		

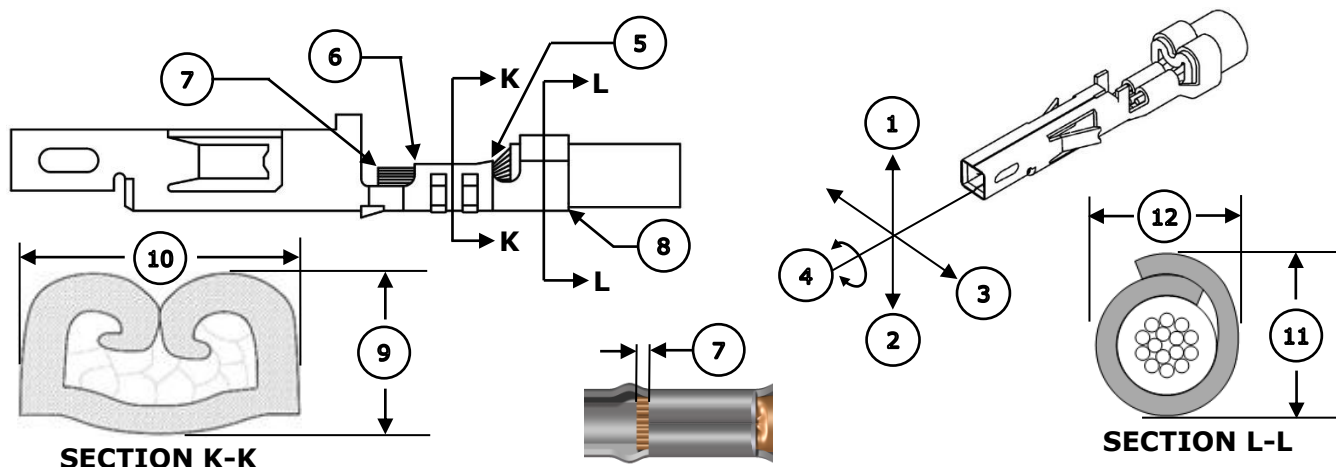
(1) Customer to cut off terminal from reel: 0.15mm (.006") maximum cut-off tab.

(2) Wire Style shown was used to validate the crimp tooling. It is the responsibility of the end user to choose the wire style that is appropriate for their needs. Other wire styles may not meet the same range for IPC/WHMA-A-620.

♦ Overall insulation OD specification for terminal.

♦♦ To achieve optimum IPC/WHMA-A-620 insulation crimps, use this insulation OD range.

## DEFINITION OF TERMS



## CRIMP SPECIFICATION

(Terminal shown above is a generic representation and may not look like a Scope terminal.)

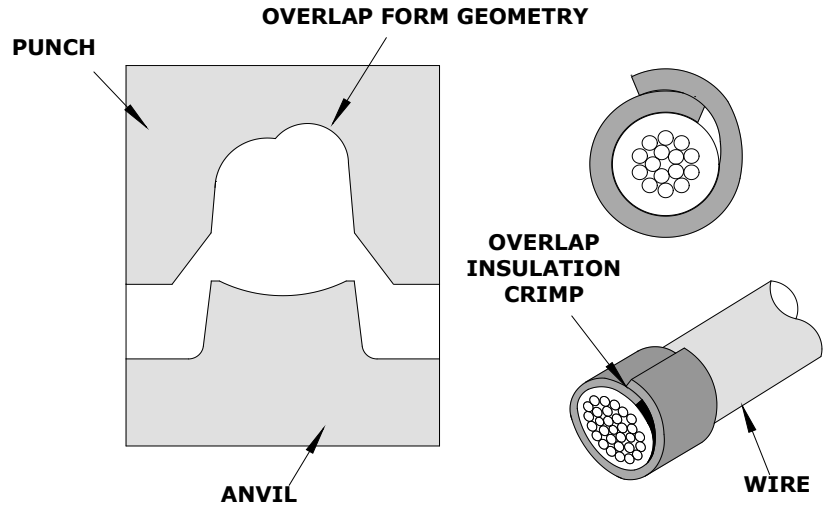
After crimping, the crimp profiles should measure the following:

Feature	Requirement								
1. Bend Up	4° Max								
2. Bend Down	3° Max								
3. Twist	3° Max								
4. Roll	4° Max								
5. Bell Mouth Rear	0.05-0.35mm (.002-.014")								
6. Bell Mouth Front	NA								
7. Conductor Brush	0-0.50mm (0-.019")								
8. Cut-Off Tab	0.15mm Max (.006" Max)								
Conductor Crimp	Terminal Series No.	Wire		9. Crimp Height		10. Crimp Width (Ref.)			
		Size	Style						
	87396	22 AWG	UL1061	0.75-0.80mm	.029-.031 In.	1.20-1.30mm	.047-.051 In.		
		24 AWG	UL1007	0.66-0.71mm	.026-.028 In.	1.20-1.30mm	.047-.051 In.		
		26 AWG	UL1007	0.61-0.66mm	.024-.026 In.	1.20-1.30mm	.047-.051 In.		
28 AWG		UL1007	0.57-0.62mm	.022-.024 In.	1.20-1.30mm	.047-.051 In.			
Insulation Crimp (see Note)	Terminal Series No.	Wire		11. Crimp Height (Ref.)		12. Crimp Width (Ref.)			
		Size	Style						
	87396	22 AWG	UL1061	1.35-1.45 mm	.053-.057 In.	1.45-1.55mm	.057-.061 In.		
		24 AWG	UL1007	1.35-1.45 mm	.053-.057 In.	1.45-1.55mm	.057-.061 In.		
		26 AWG	UL1007	1.35-1.45 mm	.053-.057 In.	1.45-1.55mm	.057-.061 In.		
28 AWG		UL1007	1.35-1.45 mm	.053-.057 In.	1.45-1.55mm	.057-.061 In.			
Pull Force	Terminal Series No.	Wire		Minimum Force		Profile			
		Size	Style			A	B	C	D
	87396	22 AWG	UL1061	39.2 N	8.8 lb.		X		
		24 AWG	UL1007	29.4 N	6.6 lb.			X	
		26 AWG	UL1007	19.6 N	4.4 lb.				X
28 AWG		UL1007	9.8 N	2.2 lb.	X				

### Insulation Crimp Note

Due to the terminal's insulation grip design or insulation diameter range, this tool uses overlap form geometry in the insulation punch. This produces an overlap insulation crimp (A-620-compliant). Although the insulation punch profile may appear lopsided, this is a normal condition for this tool. See figure to the right.

Insulation crimps from the 22 AWG, 24 AWG, 26 AWG, and 28 AWG crimp profiles will have an overlap appearance.



### Tool Qualification Notes

1. (Ref) means that the dimension provided is approximate because of the wide range of wires, conductor stranding, insulation diameter and insulation hardness.
2. An occasional conductor crimp height measurement should be performed, and it should be used as the final criterion for an acceptable crimp. It must lie between the minimum and maximum crimp height specification. Refer to Molex Quality Crimping Handbook 63800-0029 for additional information on crimping and crimp testing.
3. In addition, an occasional pull force test may be performed. It must exceed the minimum pull force specification. Pull force should be measured with no influence from the insulation crimp. To ensure this, strip the wire long enough so the terminal insulation grips do not contact the wire insulation.

### Notes

1. This tool should only be used for the terminals and wire gauges specified on this document.
2. Variations in tools, terminals, wire stranding and insulation types may affect crimp height.
3. This tool is intended for the conductor sizes specified on this document. It may not give good insulation crimp support for insulation sizes outside of the specified range.
4. Molex does not repair hand tools. See warranty on page 8. The replacement parts listed are the only parts available for repair. If the handles or crimp tooling become damaged or worn, a new tool must be purchased.

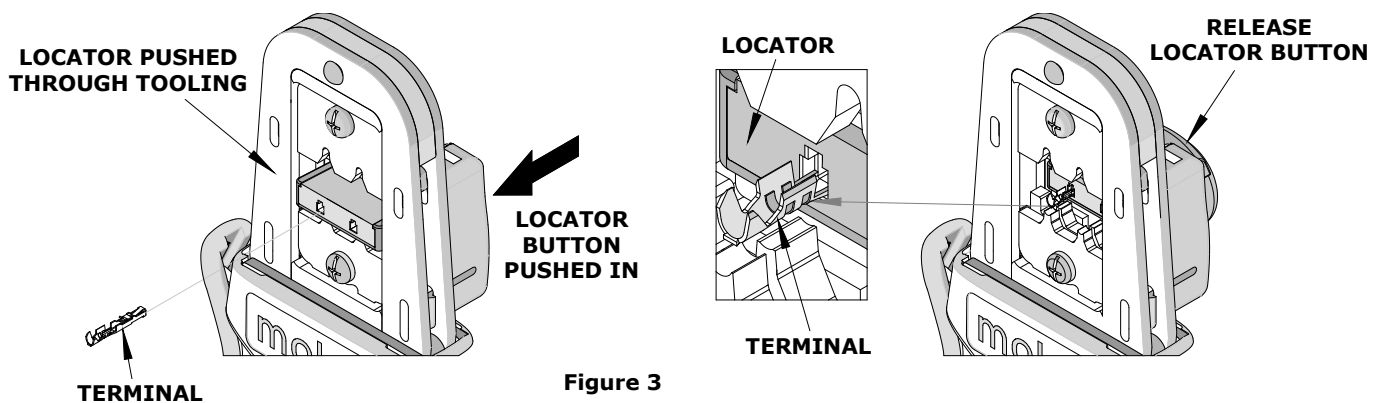
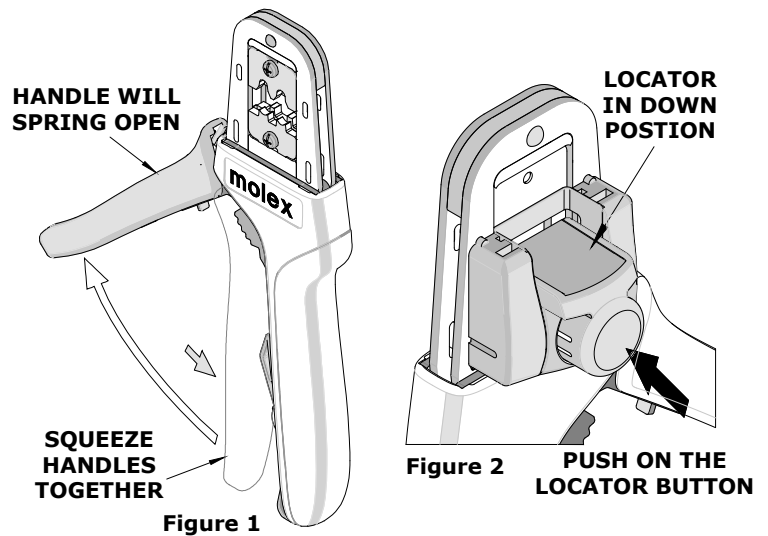
**CAUTION:** Crimp only Molex terminals listed in the Scope of this tool. Do not crimp hardened objects as damage can occur to the tool or die.

## OPERATION

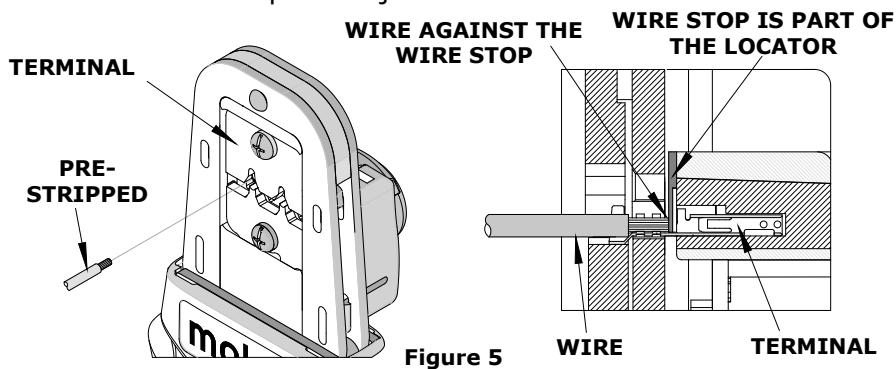
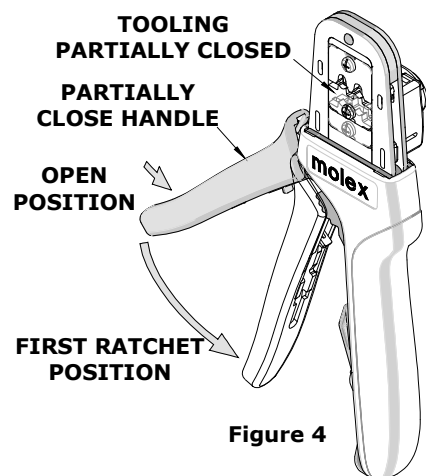
Open the tool by squeezing the handles together. At the end of the closing stroke, the ratchet mechanism will release the handles and the hand tool will spring open. See Figure 1.

### Crimping Terminals

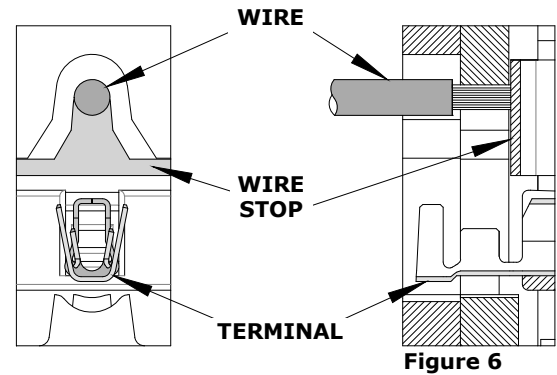
1. Select the desired terminal listed in the preceding charts.
2. Make sure the center of the locator is in the down position. With the locator attached, push the locator button on the back of the hand tool to bring the locator forward through the tooling. See Figure 2.
3. While holding the locator button in, load the terminal into the proper nest opening in the locator based on the wire gauge or terminal type markings on the hand tool. See Figure 3.



4. Release the locator button, allowing the locator to return to the crimping position.
5. Close the tool handle until the first ratchet position engages. See Figure 4.
6. Insert the properly stripped wire through the terminal and against the locator. See Figure 5.
7. Crimp the terminal by squeezing the tool handles until the ratchet mechanism cycle has been completed. Release the handles to open the jaws.



8. Remove the crimped terminal from the terminal locator by pulling on the wire.
9. Visually inspect the crimped terminal for proper crimp location.
10. On some large O.D. wires, it may not be possible to insert the wire with the tool partially closed. Those wires should be inserted with the hand tool in the open position. Insert the wire above the terminal in the punch and against the wire stop, and then close the tool. See Figure 6.



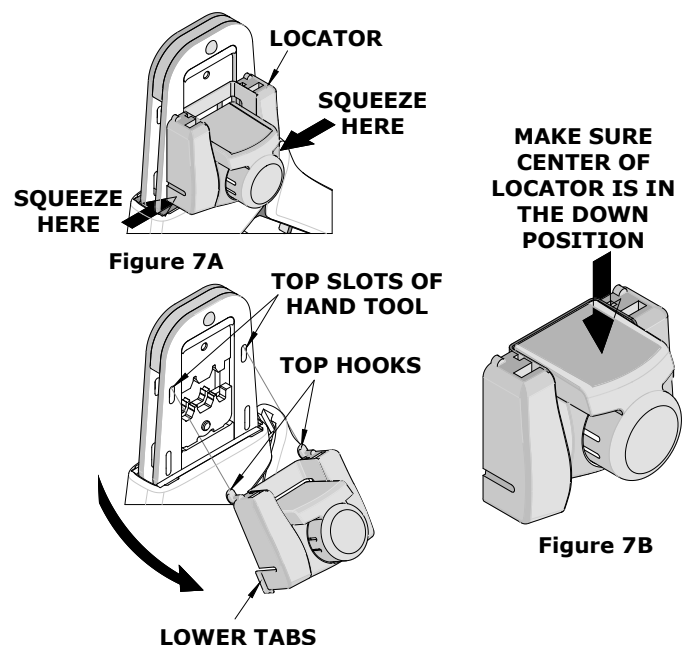
**Note:** The tamper-proof ratchet action will not release the tool until it has been fully closed.

**Note:** To maintain good brush control and a consistent bell mouth, the crimping instructions must be followed.

## Locator Installation

See the parts list on the last page of this document for the proper locator order number. Follow the steps below to replace the locator:

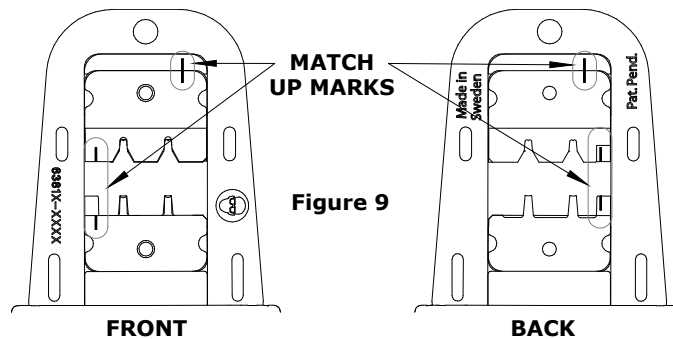
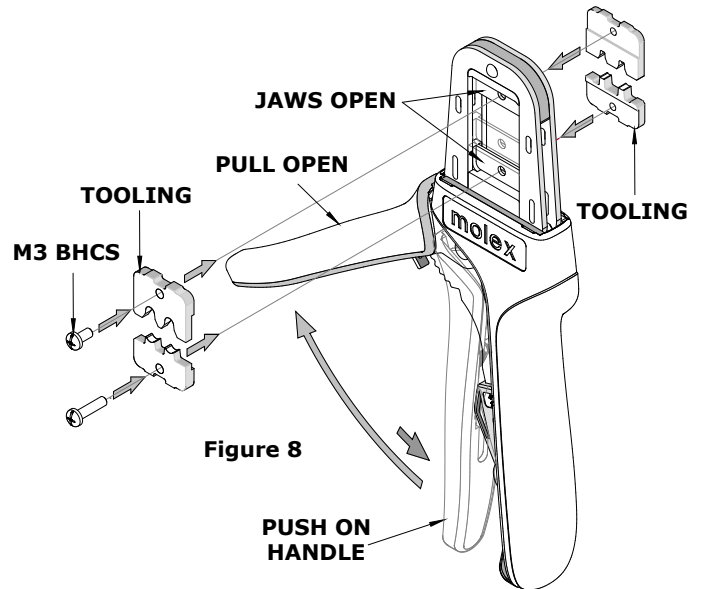
1. Open the hand crimp tool.
2. Squeeze gently on the lower area shown in Figure 7A with your thumb and index finger. The lower tabs of the locator should disengage from the hand tool.
3. Lift and pull away from the hand tool. The top locator hooks should slip out of the top slots easily. See Figure 7A.
4. To reinstall the locator, make sure the hand tool is in the open position.
5. Press the center of the locator down as far as it will go as shown in Figure 7B.
6. Holding onto the lower part of the locator with your thumb and index finger, insert the locator's top hooks into the hand tool's top slots.
7. Rotate the locator down and press the lower tabs into the two bottom slots of the hand tool. To secure the locator into place, the lower tabs must snap into place on the hand tool frame.



## Right- or Left-Handed Operation

This hand tool can be converted from a right-handed application to a left-handed application. It is necessary to reverse the tooling if using the left-handed application along with the locator. Follow the steps below:

1. The locator must be removed before reversing the tooling.
2. Remove the M3 BHCS that is holding the upper tooling.
3. Flip the upper tooling to the opposite side and replace the M3 BHCS. Make sure the small markings on the front and back of the hand tool frame match up and are on the outside of the hand tool frame. See Figures 8 and 9.
4. Do the same thing with the lower tooling and tighten the M3 screws. Be sure the small markings line up.
5. Reinstall the locator by following the instructions in the locator replacement section.



## MAINTENANCE

It is recommended that each operator of the tool be made aware of and responsible for the following maintenance steps:

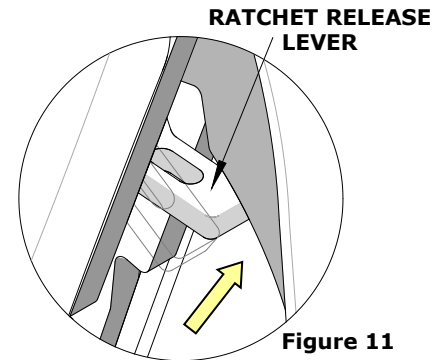
1. Remove dust, moisture and other contaminants with a clean brush or a soft, lint-free cloth.
2. Do not use any abrasive materials that could damage the tool.
3. Make certain all pins, pivot points and bearing surfaces are protected with a thin coat of high-quality machine oil. Do not oil excessively. The tool was engineered for durability, but like any other equipment, it needs cleaning and lubrication for a maximum service life of trouble-free crimping. Light oil (such as 30-weight automotive oil) used at the oil points every 5,000 crimps or 3 months will significantly enhance the tool life. See Figure 10.
4. Wipe excess oil from the hand tool, particularly from crimping area. Oil transferred from the crimping area onto certain terminations may affect the electrical characteristics of an application.



5. When the tool is not in use, keep the handles closed to prevent objects from becoming lodged in the crimping dies, and store the tool in a clean, dry area.

### Miscrimps or Jams

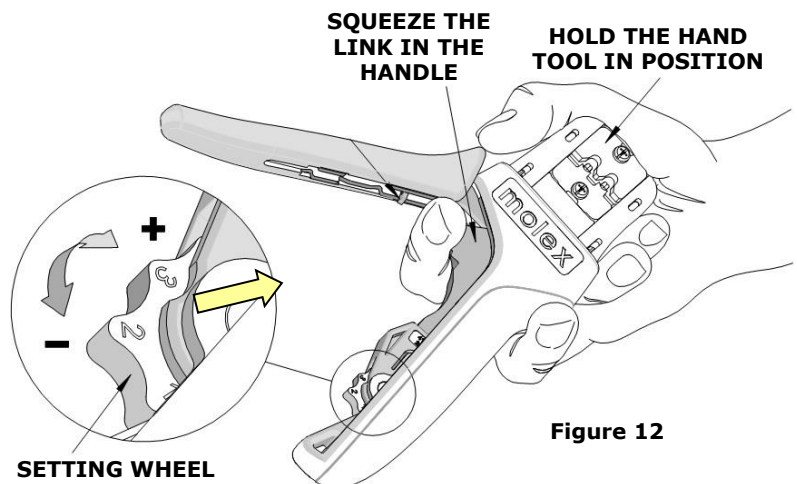
Should this tool ever become stuck or jammed in a partially closed position, **do not force the handles open or closed**. The tool will open easily by pressing up on the ratchet release lever in the movable handle. See Figure 11.



### How to Adjust Tool Preload (See Figure 12)

Hand tool frame preload is factory preset to ensure crimp quality. It may be necessary over the life of the tool to adjust tool handle preload force. Listed below are the steps required to adjust the crimping force of the hand tool to obtain proper crimp conditions:

1. Open the hand tool.
2. Hold the hand tool in the palm of your hand as shown in Figure 12. Using your index finger, squeeze the link toward the top of the hand tool frame. This will release the preload setting wheel.
3. Rotate the setting wheel counterclockwise (CCW) to increase handle force. The numbers will display higher. To decrease handle force, rotate the setting wheel clockwise (CW).
4. Release the link to lock the setting wheel in place.
5. Check the crimp specifications and conduct a pull test after tool handle preload force is adjusted.





## WARRANTY

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This tool is for electrical terminal crimping purposes only. This tool is made of the best quality materials. All vital components are long-life tested. All tools are warranted to be free of manufacturing defects for a period of 30 days. Should such a defect occur, Molex will repair or exchange the tool free of charge. This repair or exchange will not be applicable to altered, misused or damaged tools. This tool is designed for hand use only. Any clamping, fixturing or use of handle extensions voids this warranty.

**CAUTION:** Molex crimp specifications are valid only when used with Molex terminals and tooling.

### CAUTIONS:

1. Manually powered hand tools are intended for low-volume use or field repair. This tool is **NOT** intended for production use. Repetitive use of this tool should be avoided.
2. Insulated rubber handles are not protection against electrical shock.
3. Wear eye protection at all times.
4. Use only the Molex terminals specified for crimping with this tool.

**CAUTION:** Molex crimp specifications are valid only when used with Molex terminals and tooling.

## CERTIFICATION

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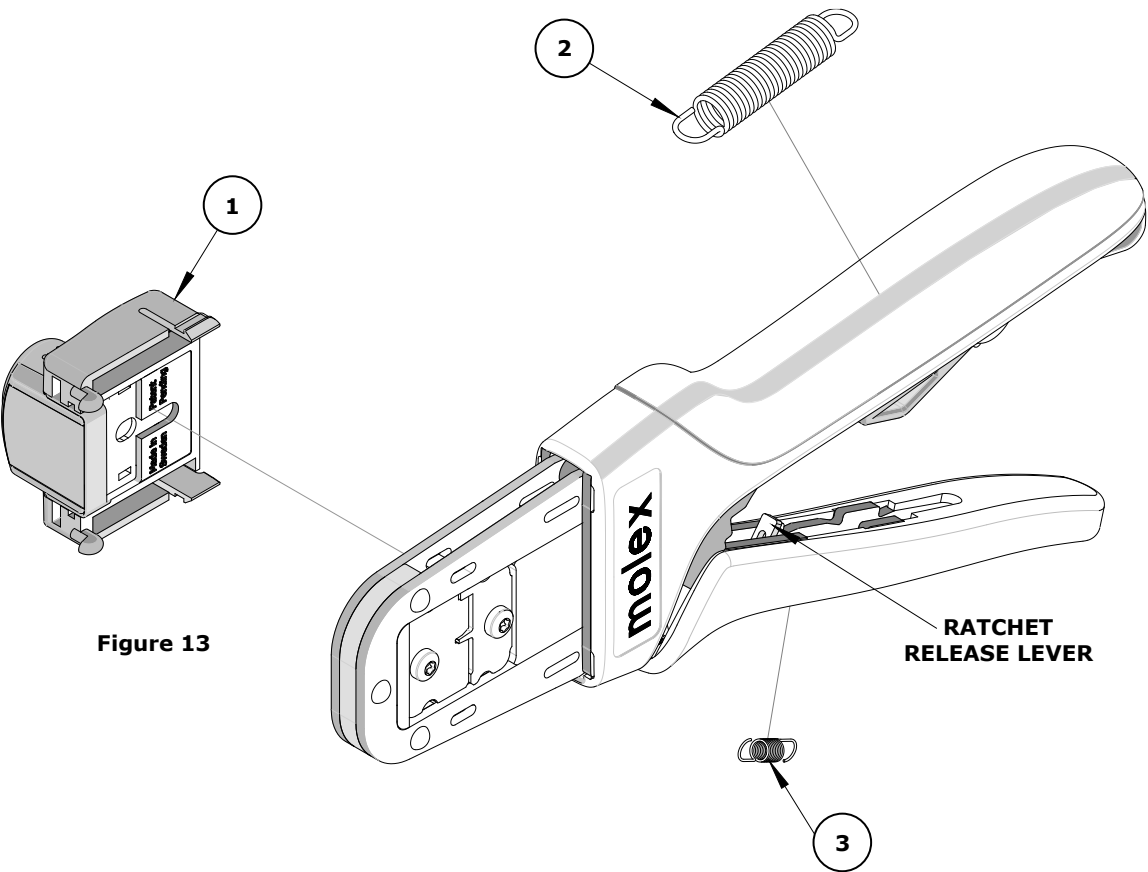
Molex does not certify or re-certify commercial grade hand tools but rather supplies the following guidelines for customers to re-certify hand tools or determine tool life:

- If the tool does not meet minimum conductor crimp height, then the handle preload should be increased, and the conductor crimp height re-evaluated. (See How to Adjust Preload). When the hand tool is no longer capable of achieving minimum conductor crimp height, it should be taken out of service and replaced.
- The tool frame is very difficult to disassemble and reassemble. Customer repair is not recommended.



PARTS LIST

Item Number	Order Number	Description	Quantity
REF	223863-4500	Hand Crimp Tool	Figure 13
1	223863-4575	Locator Assembly	1
2	63810-0104	Spring, Return	1
3	63810-0105	Spring, Ratchet	1



Application Tooling Support

**E-Mail:** [toolingsupport@molex.com](mailto:toolingsupport@molex.com)  
**Website:** [www.molex.com/applicationtooling](http://www.molex.com/applicationtooling)

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