



**PROPER USE GUIDELINES**

Cumulative trauma disorders can result from the prolonged use of manually powered hand tools. Hand tools are intended for occasional use and low-volume applications. A wide selection of powered application equipment is available for extended-use production operations.

**1 Introduction**

This instruction sheet describes product application and maintenance for the TERMASHIELD Ferrule Crimping listed in Table 1. These dies are used to crimp TERMASHIELD ferrules on single- and multiple-conductor shielded wires with a primary conductor insulation range of .033" to .270".

*Table 1: Tooling*

Tools	Crimping dies		
59500	45061-3	45065-3	45240-2
	45062-3	45066-3	45241-2
69270-1	45063-3	45238-2	—
	45064-3	45239-2	—

This document provides basic instructions on the use of these tools and dies. For further information related to the pneumatic tool and hand tool, refer to the instructions packaged with those tools.

Section 8, **Maintenance and inspection**, explains how to establish and maintain a die certification program. These instructions can be used for dies not listed in Table 2, but accompanied by this 408 series document. For unlisted dies, strip the wire and crimp in the same manner as for identical size dies.

## 2 Selecting dies, ferrules, and insulating caps

### 2.1 Single-conductor shielded wire

To determine which dies, ferrule, and insulating cap to use with single conductor shielded wire, refer to Table 2.

1. Determine the outside (insulation) diameter of the primary conductor.
2. Use Table 2 to identify the crimping die, ferrule, and insulating cap to use for that diameter.



**NOTE**

*Crimping dies, ferrules, and insulating caps are color coded. For example: Use dies color coded green to crimp a green ferrule. Place a green insulating cap on the green ferrule after crimping.*

Table 2: Dies, ferrule, and insulating cap for single conductor shielded wire

Tool	Primary conductor insulation diameter (in.)	Crimping die	Ferrule number			Insulation cap	Color code
			Zinc-plated with inspection hole	Tin-plated without inspection hole	Tin-plated with inspection hole		
59500 69270-1	.033 maximum	45061-3	327192	2-327192- 1	—	327768	Green
	033 -.059	45062-3	323930	2-323930-1	2-32930-2	325009	Violet
	.059 -.085	45063-3	323931	2-323931-1	2-323931-2	325010	White
	085 -.095	45064-3	323932	2-323932-1	2-323932-2	325011	Brown
	.095 -.115	45065-3	323933	2-323933-1	2-323933-2	325012	Orange
	.115 -.130	45066-3	323934	2-323934-1	2-323934-2	325013	Green
59500	.130 -.145	45238-2	327137	2-327137-1	2-327137-2	328224	Violet
	.145 -.184	45239-2	327138	2-327138-1	2-327138-2	328225	White
	.184 -.220	45240-2	327139	2-327139-1	2-327139-2	328226	Brown
	.220 -.245	45241-2	327140	2-327140-1	2-327140-2	328227	Orange
	.245 -.270	45158-2	327141	2-327141-1	2-327141-2	328228	Green

## 2.2 Multiple-conductor shielded wire

To determine which dies, ferrule, and insulating cap to use with a shielded wire that has two or more conductors, multiply the outside (insulation) diameter of one primary conductor by the factor listed in Table 3 for that number of conductors. For example:

1. For a three-conductor shielded wire, you measure the outside (insulation) diameter of one conductor as .082 inches.
2. In Table 3, look up the number of conductors (3). The multiplying factor is 2.17.
3. Multiply the outer diameter of the one conductor (.082 inches) by this factor (2.17). The result is .177. This is the primary conductor insulation diameter of the three-conductor shielded wire.
4. In Table 2, look in the **Primary conductor insulation diameter** column for the appropriate range of values. Your value of .177 falls into the diameter range .145 - .184. That row of the table lists the part numbers of the tool, crimping die, ferrule, and insulating cap to use with your wire.

*Table 3: Factor values, by number of conductors*

Number of conductors	2	3	4	5	6	7	8	9	10	11	12	13
Factor	2.00	2.17	2.42	2.57	2.82	3.04	3.25	3.45	3.64	3.81	3.98	4.15

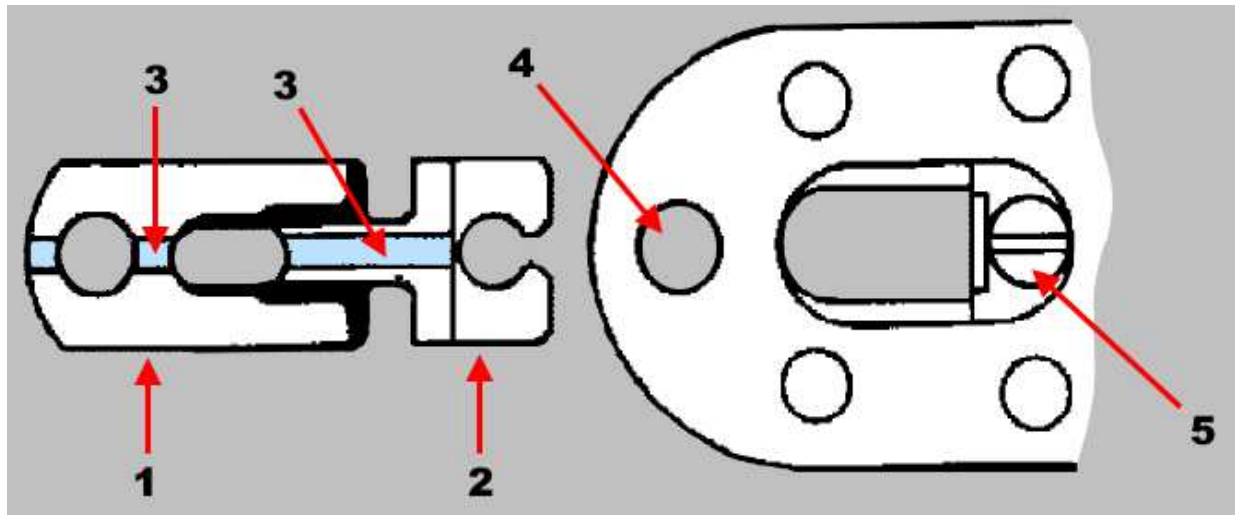
Number of conductors	14	15	16	17	18	19	20	21	22	23	24	25
Factor	4.30	4.45	4.60	4.75	4.88	5.01	5.14	5.27	5.39	5.52	5.63	5.75

### 3 Inserting dies

#### 3.1 Hand tool 59500

Dies are coated with oil to prevent rust and corrosion. Wipe this oil from the dies, particularly from the crimping area. Each set of dies consists of a male die and a female die (Figure 1).

Figure 1: Dies



- 1 Female die
- 2 Male die
- 3 Color-coded groove
- 4 Hole for female die locking pin
- 5 Male die lock screw

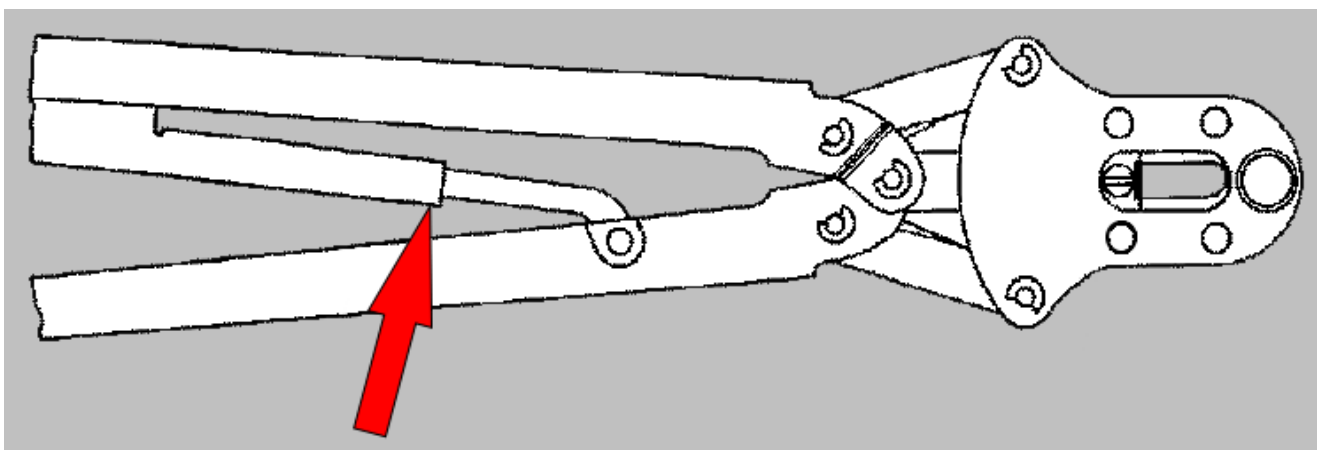
1. Close the tool handles until CERTI-CRIMP™ tool ratchet (Figure 2) releases, then open the handles.



**NOTE**

After the ratchet engages, the handles cannot be opened until they are fully closed.

Figure 2: CERTI-CRIMP ratchet



2. Pull the female die locking pin out of the tool.
3. Close the handles until the male die lock screw is visible.
4. Turn the die lock screw to the position shown in Figure 1.

5. Insert the male die into the head of the tool with the color-coded groove facing you.



**NOTE**

*Do not attempt to insert both dies into the tool at the same time. Insert each die separately.*

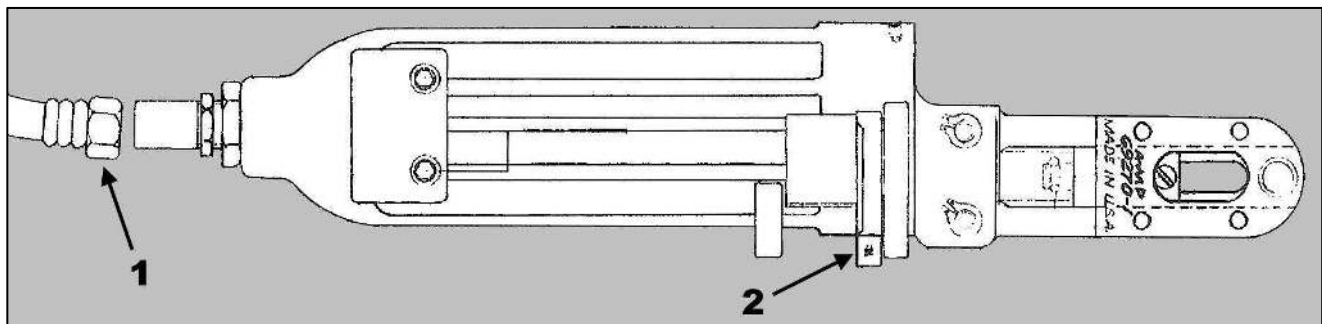
6. Insert the female die into the head of tool with the color-coded groove facing you. Both color-coded grooves should now be visible as shown in Figure 1.
7. Rotate the male die lock screw 1/4 turn to the left or right.
8. Open the handles slightly.
9. Adjust the female die so that the hole in the die lines up with the hole in the head.
10. Insert the female die locking pin.

### 3.2 Pneumatic tool 69270-1 model 2

Dies are coated with oil to prevent rust and corrosion. Wipe this oil from the dies, particularly from the crimping area. Each set of dies consists of a male die and a female die (Figure 1).

Pneumatic tool 69270-1, Model 2 is equipped with a pneumatic die take-up lever (Figure 3). This lever is used to hold the ferrule in the proper position prior to crimping.

Figure 3: Pneumatic tool 69270-1 model 2



- 1** Air supply
- 2** Die take-up lever

1. Connect the 85 to 100 psi air supply (Figure 3).
2. Pull the female die locking pin out of the tool.
3. Depress the take-up lever until male die lock screw is visible.
4. With the take-up lever depressed, turn the die lock screw to the position shown in Figure 1.
5. Insert the male die into the head of the tool with the color-coded groove facing toward you.



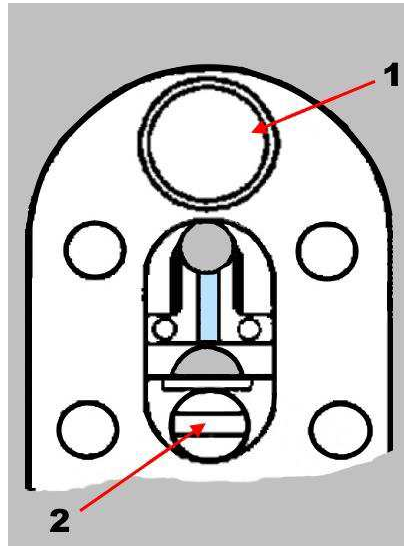
**NOTE**

*Do not attempt to insert dies into the tool while holding dies together. Dies are inserted into the tool separately.*

6. Insert the female die into the head of the tool. Both color-coded grooves should now be facing you.

7. Turn the male die lock screw to the position shown in Figure 4.

Figure 4: Installing the die in pneumatic tool 69270-1 mod 2



- 1 Female die locking pin installed
- 2 Die lock screw slot

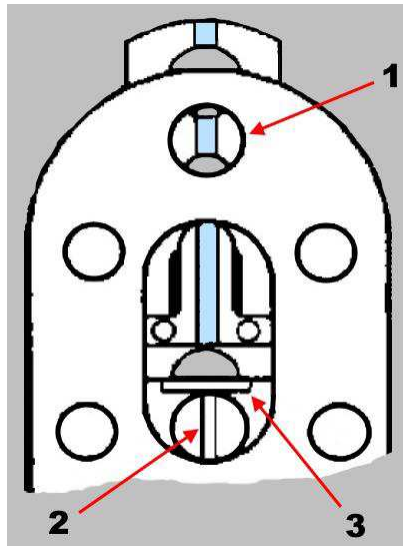
8. Release the take-up lever.
9. Push the female die down until the hole in the female die lines up with the hole in the tool.
10. Insert female die locking pin as shown in Figure 4.

## 4 Removing dies

### 4.1 Hand tool 59500

1. Remove the female die locking pin.
2. Close the handles until the male die lock screw is visible (Figure 5).

Figure 5: Removing the die from hand tool 59500



- 1 Female die locking pin removed
- 2 Die lock screw slot
- 3 Die ejection slot

3. Turn the male die lock screw slot to the position shown in Figure 5.
4. Insert a small screwdriver or drift pin into the die ejection slot (Figure 5) and push the die set up far enough that the female die can be pulled out of the tool.
5. Remove the male die.
6. Insert the die locking pin back into the tool.

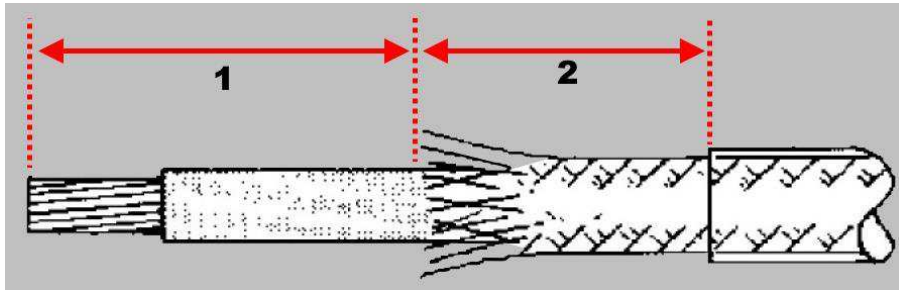
### 4.2 Pneumatic tool 69270-1 model 2

1. Remove female die holding pin.
2. Depress take-up lever until male die holding screw is visible.
3. With take-up lever depressed, turn male die holding screw slot in a vertical position.
4. Use a small screwdriver or drift pin to push the die set out of the head far enough for you to pull the female die out of the tool.
5. Remove the male die.
6. Insert the die holding pin back into the tool.

## 5 Stripping the wire

- Strip the shielded wire as shown in Figure 6.

Figure 6: Stripping the shielded wire



- 1** Required length
- 2** 3/8 minimum

- Strip the ground wire to the dimensions listed in Table 4.

Table 4: Stripping dimensions for ground wire

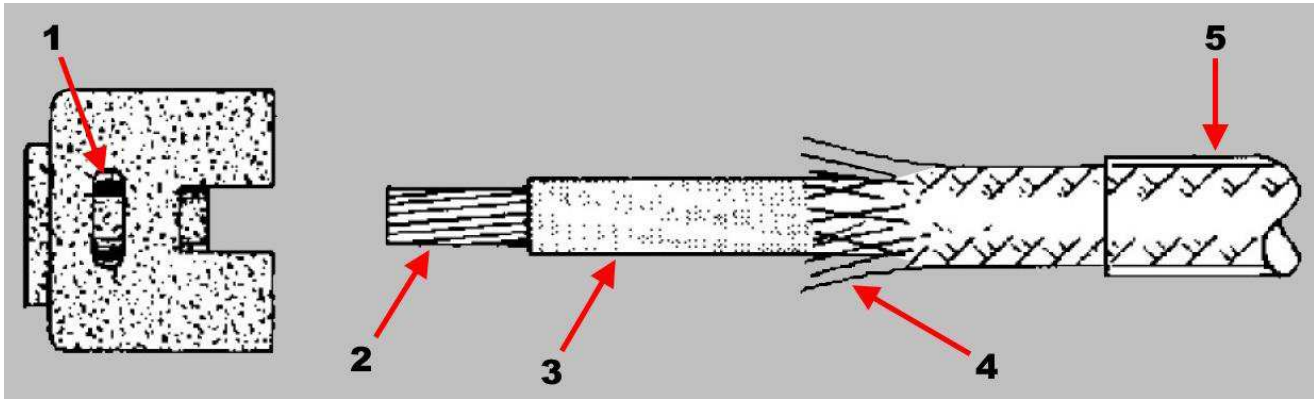
Ferrule		327192			323930 - 323934			327137 - 327141				
Recommended ground	Number of wires	1	2	1	1	1	2	1	1	2	1	2
	Wire size	#24	#24	#22	#20	#22	#22	#18	#20	#20	#22	#22
	Maximum insulation diameter	.063	.065	.068	.078		.068	No limit				
Strip length (minimum)		1/4 inch						7/16 inch				



## 6 Crimping

1. Place the ferrule on the shielded wire as shown in Figure 7.

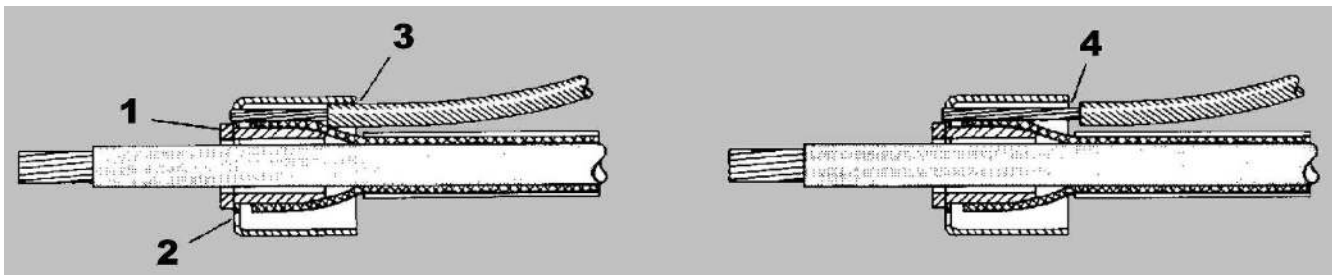
Figure 7: Placing the ferrule on the shielded wire



- 1 Braid inspection hole
- 2 Conductor
- 3 Conductor insulation
- 4 Flared braid
- 5 Insulation jacket

2. Flare the braid so that it can pass over and around the support sleeve of the ferrule.
3. Insert the ground wire into the ferrule (Figure 8).
  - On six smaller ferrules (part number 327192 and 323930 through 323934), slide the ground wire insulation under the ferrule skirt approximately 1/16 inch.
  - On five larger ferrules (part number 327137 through 3271410), do **not** slide the ground wire insulation under the ferrule skirt.

Figure 8: Inserting the ground wire into the ferrule

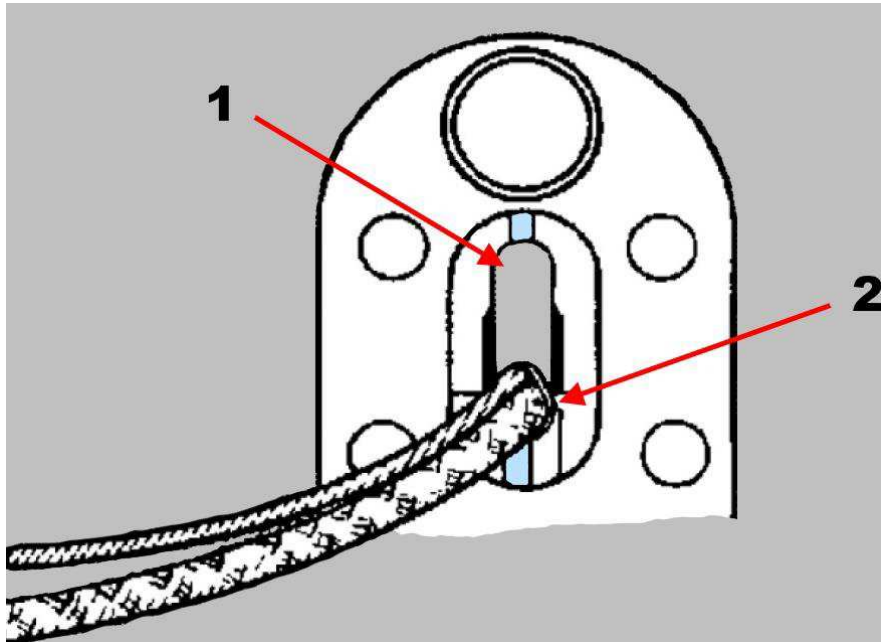


- 1 Front of ferrule
- 2 Ground wire inspection hole
- 3 Slide insulation under skirt of smaller ferrule
- 4 Do not slide insulation under skirt of larger ferrule

## 6.1 Hand tool 59500

1. Open the tool handles all the way. Ensure that the ground wire inspection holes are in line with the color-coded grooves in the dies.
2. Place the ferrule with the shielded wire and the ground wire attached in the lower crimp area of the dies (Figure 9).

Figure 9: Inserting the ferrule into the tool



- 1 Upper crimp area
- 2 Lower crimp area

3. Push the ferrule all the way into the tool.
4. Hold the ground wire and the shielded wire in position and close the handles until the CERTI-CRIMP tool ratchet releases. Open the handles and remove the crimped ferrule.

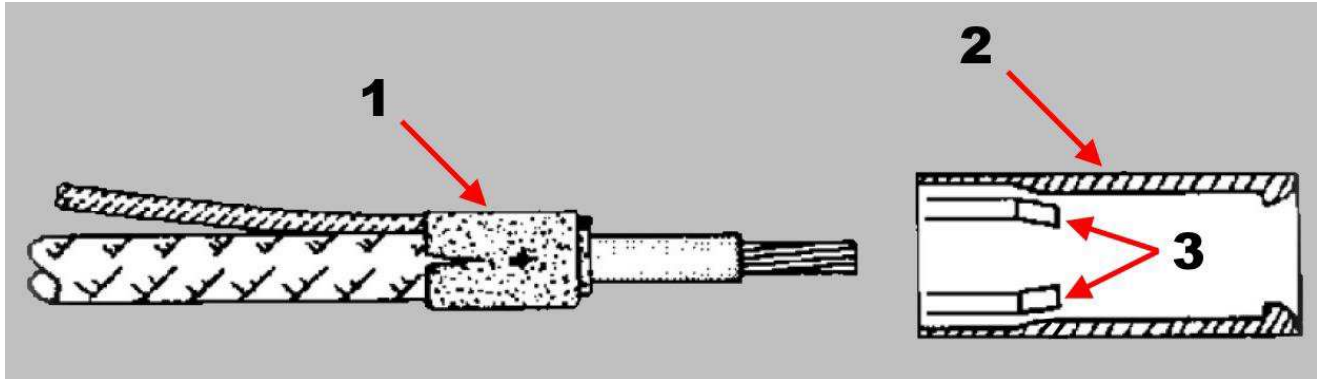
## 6.2 Pneumatic tool 69270-1 model 2

1. Place the ferrule, with the shielded wire and the ground wire attached, in the lower crimp area of the dies. Push the ferrule all the way into the tool (Figure 9).
2. Hold the ground the wire and the shielded wire in position and depress the take-up lever to hold the ferrule in place.
3. Simultaneously release the take-up lever and depress the trigger to complete the crimp. Release the trigger and remove the crimped ferrule.

## 7 Ferrule insulating caps

The insulating caps (Figure 10) are color-coded for easy matching with the ferrule. To select the correct insulating cap, refer to Table 2.

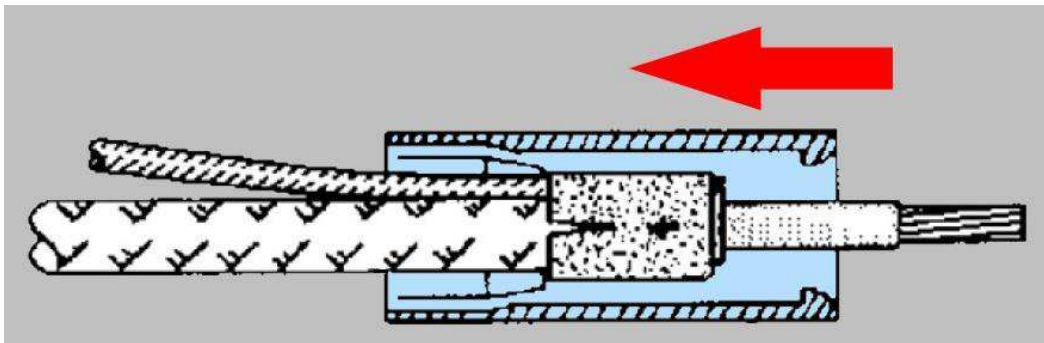
Figure 10: Ferrule insulating cap



- 1 Crimped ferrule
- 2 Insulating cap
- 3 Locking tabs

Place the insulating cap on the ferrule as shown in Figure 11.

Figure 11: Placing the insulating cap on the ferrule



## 8 Maintenance and inspection

TE Connectivity recommends that a maintenance-inspection program be performed periodically. This is necessary to assure that continued use of the dies will result in the same dependable and uniform terminations for which the dies were designed.

We recommend an initial frequency of inspection of once a month. This frequency can be adjusted to suit your requirements through experience. The frequency of an inspection is dependent upon:

- The care, amount of use, and handling of the dies.
- The type and size of the products crimped.
- The degree of operator skill.
- The presence of abnormal amounts of dust and dirt.
- Your own established standards.

With proper maintenance and inspection, these dies will give years -of satisfactory service.

All TE Connectivity dies are thoroughly inspected before being shipped from the factory, however, since there is a possibility of die damage in shipment, it is recommended that new dies be inspected in accordance with Section 3 when received in your plant.

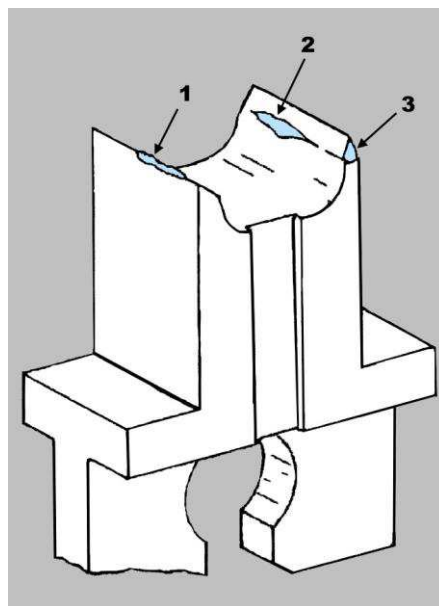
### 8.1 Cleaning

Do not allow deposits of dirt, grease, and foreign matter to accumulate in the die closure area and on the bottoming surfaces of the dies. These deposits can prevent the dies from bottoming fully and can also cause excessive wear in the die closure surfaces, thereby affecting the quality of the crimp. The dies should be wiped clean frequently with a clean cloth.

### 8.2 Visual inspection

Visually inspect the die closure surfaces for broken or chipped conditions. Although dies can gage within permissible limits, worn or damaged die closure surfaces are objectionable and can affect the quality of the crimp. Examples of possible damaged die surfaces are shown in Figure 12.

*Figure 12: Damaged die surfaces*



- 1** Broken edge
- 2** Chipped
- 3** Broken corner

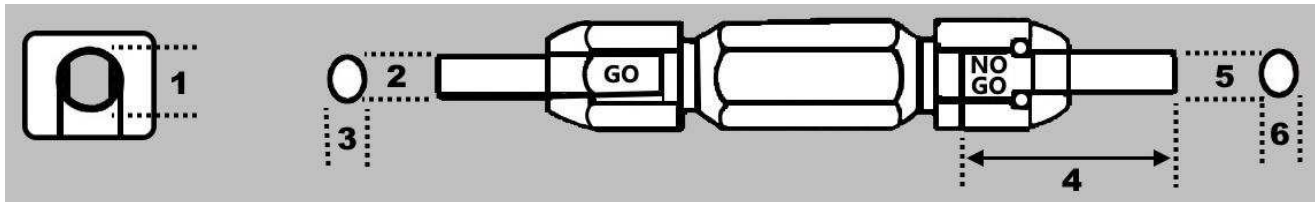
### 8.3 Gaging the crimping chambers

This inspection requires the use of plug gages similar to the one shown in Figure 13. The GO and NO GO gage elements have an elliptical cross section, with a long and short axis. The dimensions of these axes are listed in Table 5.


**NOTE**

TE Connectivity does not manufacture or market these gages. Refer to [408-7424](#) for ordering information and for additional information regarding the use of a plug gage.

Figure 13: Recommended plug gage design



- 1 Jaw closure height
- 2 GO element long axis
- 3 GO element short axis
- 4 1 inch minimum (typical)
- 5 NO GO element long axis
- 6 NO GO element short axis

Table 5: Gage element dimensions (in inches)

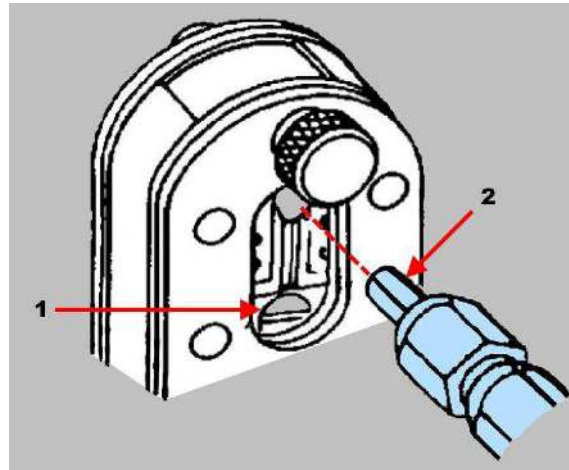
Die set	Jaw closure height		Gage element long axis		Gage element short axis (maximum)
	GO	NO GO	GO	NO GO	
45158-2	.3770	.3830	.3770-.3773	.3829-.3830	.374
45238-2	.2580	.2910	.2850-.2853	.2909-.2910	.170
45239-2	.3070	.3130	.3070-.3073	.3129-.3130	.180
45240-2	.3310	.3370	.3310-.3313	.3369-.3370	.220
45241-2	.3550	.3610	.3550-.3553	.3609-.3610	.280
45061-3	.1220	.1280	.1220-.1223	.1279-.1280	.100
45062-3	.1490	.1550	.1490-.1493	.1549-.1550	.090
45063-3	.1740	.1800	.1740-.1743	.1799-.1800	.090
45064-3	.1920	.1980	.1920-.1923	.1979-.1980	.160
45065-3	.2190	.2250	.2190-.2193	.2249-.2250	.110
45066-3	.2340	.2400	.2340-.2343	.2399-.2400	.090

To gage the crimping chamber, complete the following steps:

1. Remove traces of oil or dirt from the die crimping area and plug gage elements.
2. Insert the dies in the tool.
3. Bottom the dies.
  - When inspecting the hand tool, close the handles of the tool until the dies bottom. Do not apply additional pressure to the tool handles.
  - When inspecting the pneumatic tool, reduce the air supply pressure to 15-20 psi. Press the trigger to bottom the dies.

4. Align the GO element with the crimping chamber (Figure 14).

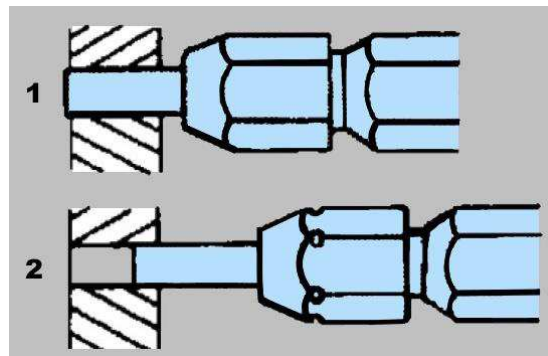
Figure 14: Aligning the GO element



- 1 Dies are bottomed, but not under pressure.
- 2 Flats on gage must be parallel to length of tool.

5. Gently push the element straight into the crimping chamber. The GO element must pass completely through the crimping chamber (Figure 15).

Figure 15: Gaging the dies



- 1 GO element
- 2 NO GO element

6. Align the NO GO element and try to insert it straight into the same crimping chamber. The NO GO element can start entry, but it must not pass completely through the crimping chamber (Figure 15).
  - If the crimping chamber conforms to the gage inspection, the tool is considered dimensionally correct. Lubricate it with a thin coat of any good SAE 20 motor oil.
  - If not, return the tool to TE for further evaluation and repair. Refer to section 9, **Replacement and repair**.

### 8.4 Inspecting the CERTI-CRIMP tool ratchet

Inspect the CERTI-CRIMP ratchet to verify that the ratchet does not release prematurely, allowing dies to open before they have fully bottomed.

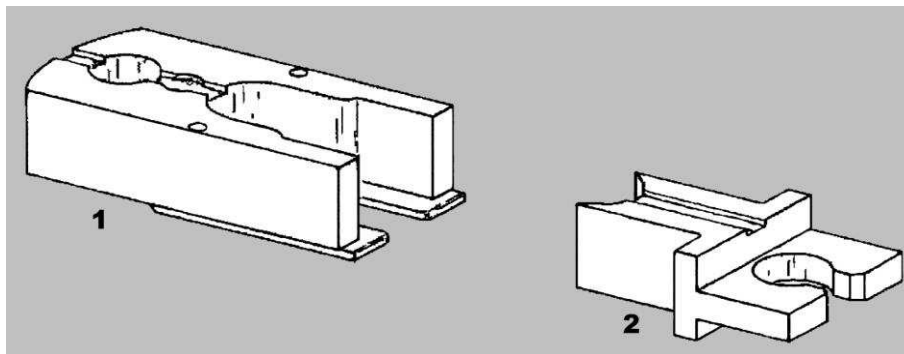
To inspect the ratchet, complete the following steps.

1. Make a test crimp using ferrule, shielded wire, and ground wire as outlined in section 6.
2. Close the handles until the ratchet is free, but **do not relax pressure on the tool handles**.
  - If a .001” or smaller shim can be inserted between the bottoming surfaces of the dies, or if there is no opening at all, the ratchet is acceptable.
  - If the clearance between the die surfaces is greater than .001, the dies are not bottoming. Contact your local TE Connectivity field service representative.

## 9 Replacement and repair

The parts listed in Table 6 are customer-replaceable. Stock and control a complete inventory to prevent lost time when replacement of parts is necessary.

Figure 16: Replacement parts



- 1 Female die
- 2 Male die

Table 6: Replacement part numbers

Die set	Female die	Male die
45158-2	304803-6	2-2306144-6
45238-2	45250-2	2-306144-2
45239-2	45251-2	2-306144-3
45240-2	45252-2	2-306144-5
45241-2	45252-2	2-306144-4
45061-3	304803-7	2-306144-1
45062-3	45253-2	2-306144-5
45063-3	304803-7	4-306144-1
45064-3	59656	45902-8
45065-3	596	45902-9
45066-3	59656-2	1-45902-0

Order replacement parts through your TE representative. You can also order parts by any of the following methods:

- Go to [TE.com](http://TE.com) and click the **Shop TE** link at the top of the page.
- Call 800-522-6752.
- Write to:

CUSTOMER SERVICE (038-035)  
TE CONNECTIVITY CORPORATION  
PO BOX 3608  
HARRISBURG PA 17105-3608

For customer repair services, call 800-522-6752.

## 10 Revision summary

Since the last revision of this document, the following changes were made:

- Reformatted and edited to conform to current standard for instruction sheets.