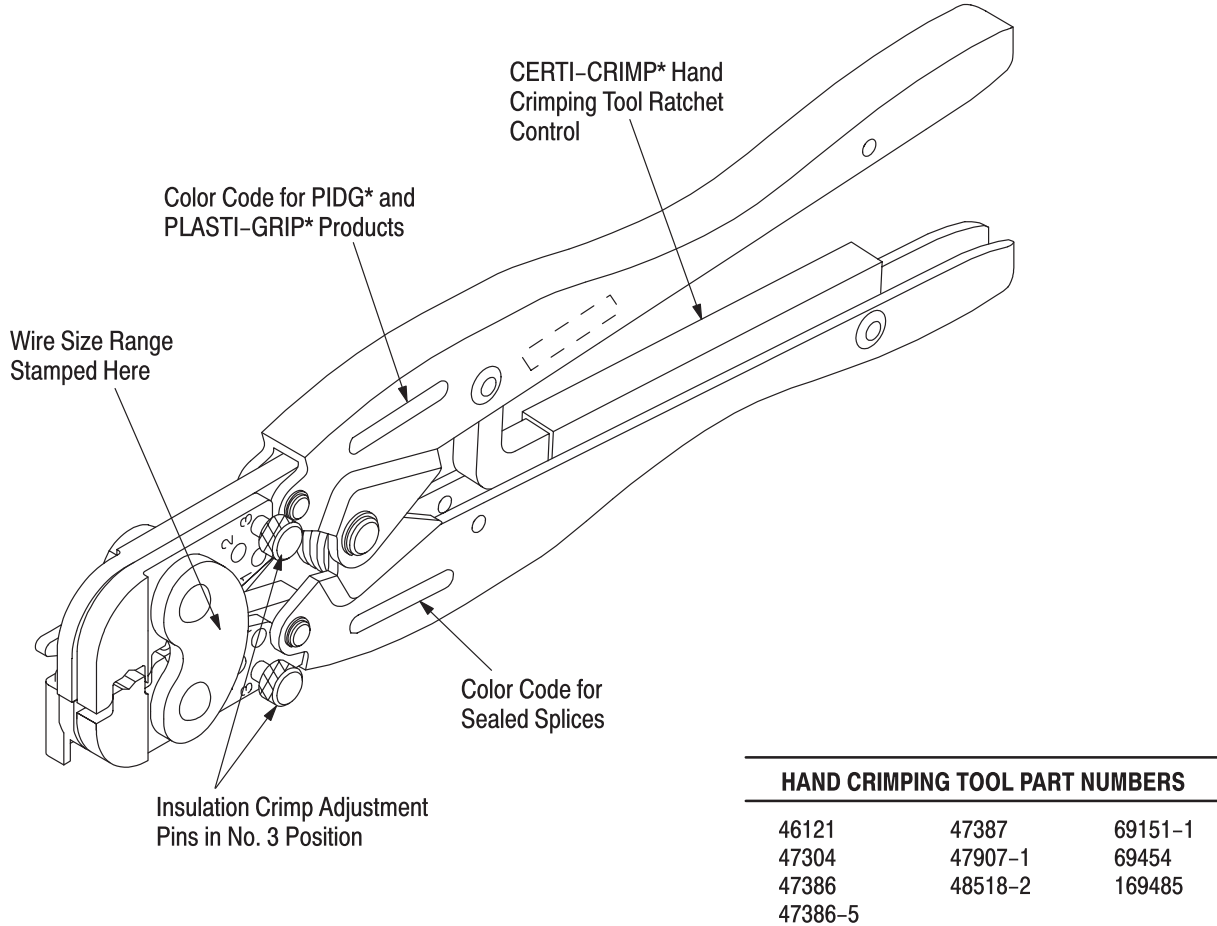


## Hand Crimping Tools

### 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 for extended-use, production operations is available.



#### HAND CRIMPING TOOL PART NUMBERS

46121	47387	69151-1
47304	47907-1	69454
47386	48518-2	169485
47386-5		

Figure 1

## 1. INTRODUCTION

This instruction sheet covers the Hand Crimping Tools listed in Figure 1, which are used to crimp the terminal types listed in Figure 2.

### NOTE



*Dimensions on this sheet are in millimeters [with inch-equivalent dimensions in brackets]. Figures and illustrations are for identification only and are not drawn to scale.*

Reasons for reissue are provided in Section 9, REVISION SUMMARY.

## 2. DESCRIPTION (Figure 1)

The handles and label (if applicable) of the crimping tools are color-coded to match the color coding of the

connectors to be applied, as listed in Figure 3. The crimping tools may show more than one color code. Check Figure 3 to be sure that the correct tool/connector combination is being used.

For example, tool 47386 can be used to apply PIDG terminals and splices with a yellow color code, as well as spare wire caps with a red color code.

Figure 3 lists the number of dots (or rib) that appear embossed on a crimped item when the connector is crimped in the correct tooling.

The CERTI-CRIMP hand crimping tool ratchet control ensures full crimping of terminals and splices. Once engaged, the ratchet will not release until the tool handles have been FULLY closed.

CONNECTOR TYPE	WIRE TYPE	WIRE SIZE [AWG]
PIDG Terminals and Splices	Solid or Stranded Copper	30-14
PIDG Insulation Restricting Nylon Terminals	Stranded Copper	26-14
PIDG Radiation Resistant Terminals and Splices	Stranded Copper	27-14
PIDG FASTON* Receptacles, Part Nos 641321-1 (.187 Series) and 641324-1 (.110 Series)	Stranded Copper	26-24
PLASTI-GRIP Terminals	Solid or Stranded Copper	22-14
PLASTI-GRIP Butt Splices	Solid or Stranded Copper	26-22
Spare Wire Caps	Stranded Copper	22-14

Figure 2



The crimping areas bottom before the crimping tool ratchet releases. This is a design feature that assures maximum tensile performance of the crimp. Do NOT re-adjust the ratchet.

### 3. CRIMPING PROCEDURE



Refer to Section 5 for information on the insulation crimp adjustment.

#### 3.1. For PIDG and PLASTI-GRIP Terminals and Splices

1. Strip the wire to the dimension provided in Figure 3, being careful to avoid nicking or damaging the conductor(s).



Do NOT use wire with nicked or missing conductors.

2. Open the tool jaws by closing the tool handles until the ratchet releases, then allow the handles to open fully.
3. Place the terminal or splice in the dies as shown in Figure 4 or Figure 5.
4. Close the tool handles until the terminal or splice is held firmly in place. Do NOT deform the terminal or splice wire barrel.

5. Insert properly stripped wire(s) into the terminal or splice, as shown in Figure 4 or Figure 5.



Do NOT allow wire insulation to enter the terminal or splice wire barrel.

6. Complete the crimp by closing the tool handles until the ratchet releases.
7. Release the tool handles, allow the handles to open fully, and remove the crimped terminal or splice.
8. To crimp the other half of a splice, re-position the uncrimped half of the splice in the tool as shown in Figure 5. Follow the procedure used to crimp the first splice half.
9. Refer to Section 4 and Figure 7 for terminal and splice crimp inspection procedure.

#### 3.2. For Spare Wire Caps

1. Strip the wire to the dimensions provided in Figure 3.

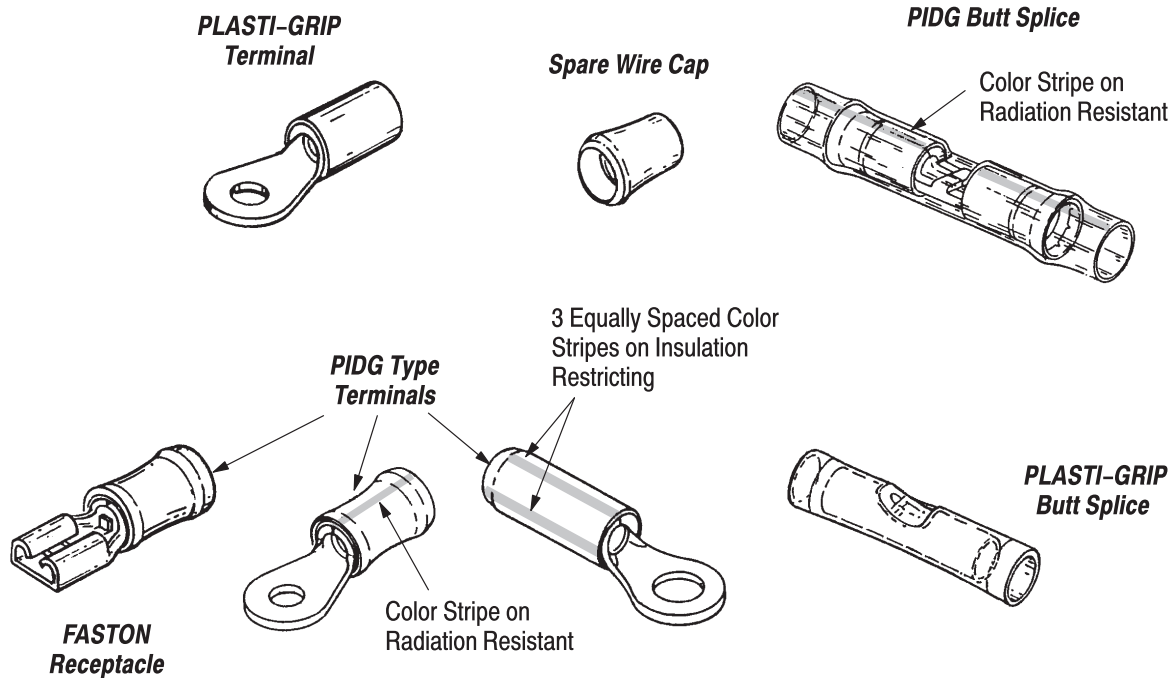


Do NOT use wire with nicked or missing conductors.



Make sure that the color coding on the spare wire cap and the tool match.

2. Place the crimping tool's insulation adjustment pins in the No. 3 position.
3. Close the tool handles until the crimping jaws partially close, but leave enough space for the cap to be inserted between the dies.
4. Raise the locator so that the end of the cap rests against the recessed surface of the locator, as shown in Figure 6.
5. Close the tool handles until the cap is held firmly in place. Do NOT deform the cap wire barrel.
6. Insert the properly stripped wire into the cap until the wire bottoms.
7. Hold the wire in position and complete the crimp by closing the tool handles until the ratchet releases.
8. Release the tool handles, allow the handles to open fully, and remove the crimped spare wire cap.
9. Refer to Section 4 and Figure 7 for spare wire cap crimp inspection procedure.



TOOL NUMBER AND DESCRIPTION	WIRE RANGE (AWG)	TOOL COLOR AND DOT CODE	PRODUCT	PRODUCT INSULATION COLOR CODE	WIRE STRIP LENGTH			
					TERMINALS		SPLICES	
					MIN.	MAX.	MIN.	MAX.
46121 169485	26-22	RED AND YELLOW ONE DOT	PIDG TERMS. SPLICES AND PLASTI-GRIP BUTT SPLICES	YELLOW	4 [5/32]	4.8 [3/16]	4.4 [11/64]	5.2 [13/64]
47304●		YELLOW	PIDG TERMINALS					
47907-1	24-20	BLUE AND WHITE TWO DOTS	PIDG TERMS. & SPLICES PIDG RADIATION RESISTANT TERMINALS & SPLICES	NATURAL COLOR TRANSLUCENT (RADIATION RESISTANT HAS WHITE STRIPE)	4.8 [3/16]	5.6 [7/32]	5.6 [7/32]	6.4 [1/4]
47386 47386-5	26-24	YELLOW AND RED ONE DOT	PIDG TERMINALS MS 25036-143 THRU -147	YELLOW	5.2 [13/64]	6 [15/64]	—	—
			PIDG RADIATION RESISTANT TERMINALS MS 7928/4-143 THRU -147	NATURAL COLOR WITH YELLOW STRIPE				
47386 47386-5	22-16	RED	PIDG TERMS. & SPLICES & PLASTI-GRIP TERMINALS	RED (RADIATION RESISTANT — NATURAL COLOR TRANSLUCENT WIRED STRIPE)	5.2 [13/64]	6 [15/64]	6.4 [1/4]	7.1 [9/32]
69151-1●								
69454	22-18	RED 1 DOT AND 1 RIB						
47387	16-14 20-16HD	BLUE AND GREEN TWO DOTS	PIDG RADIATION RESISTANT TERMINALS AND SPLICES	1.04-2.62 [16-14] BLUE 0.41-1.65 [20-16 HD] GREEN (RADIATION RESISTANT — NATURAL COLOR TRANSLUCENT W/BUE STRIPE)				

● TIGHT INSULATION SUPPORT FOR WIRES WITH THIN WALL INSULATION

Figure 3 (cont'd)

TOOL NUMBER AND DESCRIPTION	WIRE RANGE (AWG)	INSUL DIA. RANGE mm [in.]	TOOL COLOR AND DOT CODE	PRODUCT	PRODUCT INSULATION COLOR CODE	WIRE STRIP LENGTH			
						MIN.	MAX.		
46121 169485 47304●	26	0.66-1.40 [.026-.055]	RED AND YELLOW ONE DOT	PIDG INSULATION RESTRICTING NYLON TERMINALS	YELLOW W/3 BLACK STRIPES	4.8 [3/16]	5.6 [7/32]		
	24	0.79-1.40 [.031-.055]			YELLOW W/3 BLUE STRIPES				
47386 47386-5	26	0.66-1.40 [.026-.055]		PIDG INSULATION RESTRICTING NYLON TERMINALS MS 7928/1-1 THRU -10	YELLOW W/3 BLACK STRIPES	6.4 [1/4]	7.1 9/32		
	24	0.79-1.40 [.031-.055]			YELLOW W/3 BLUE STRIPES				
47386 47386-5 69151-1●	22	0.97-2.79 [.038-.055]	YELLOW AND RED ONE DOT (TOOL NO. 69151-1 MOD. F IS CODED RED ONLY)	RED W/3 GREEN STRIPES	PIDG INSULATION RESTRICTING NYLON TERMINALS			6.4 [1/4]	7.1 9/32
	20	1.17-2.79 [.046-.110]		RED W/3 RED STRIPES					
	18	1.42-2.79 [.056-.110]		RED W/3 WHITE STRIPES					
47387	16	1.60-3.30 [.063-.130]	BLUE AND GREEN TWO DOTS		BLUE W/3 BLUE STRIPES				

● TIGHT INSULATION SUPPORT FOR WIRES WITH THIN WALL INSULATION

TOOL NUMBER AND DESCRIPTION	WIRE RANGE (AWG)	TOOL COLOR AND DOT CODE	PRODUCT	PRODUCT INSULATION COLOR CODE	WIRE STRIP LENGTH	
					MIN.	MAX.
47386 47386-5	22-18	YELLOW AND RED ONE DOT	SPARE WIRE CAP NO. 328307	RED	8 [5/16]	8.7 [11/32]
47387	16-14	BLUE AND GREEN TWO DOTS	SPARE WIRE CAP NO. 328308	BLUE		

TOOL NUMBER AND DESCRIPTION	WIRE RANGE (AWG)	PRODUCT	PRODUCT INSULATION COLOR CODE	WIRE STRIP LENGTH	
				MIN.	MAX.
48518-2	26-24	PIDG FASTON RECEPTACLES P/N 641321-1 (187 SERIES) AND P/N 641324-1 (110 SERIES)	YELLOW NOTE: Color code is for reference only. Always order correct tool by supplying part numbers of receptacles being crimped.	4.8 [3/16]	5.6 [7/32]

Figure 3 (end)

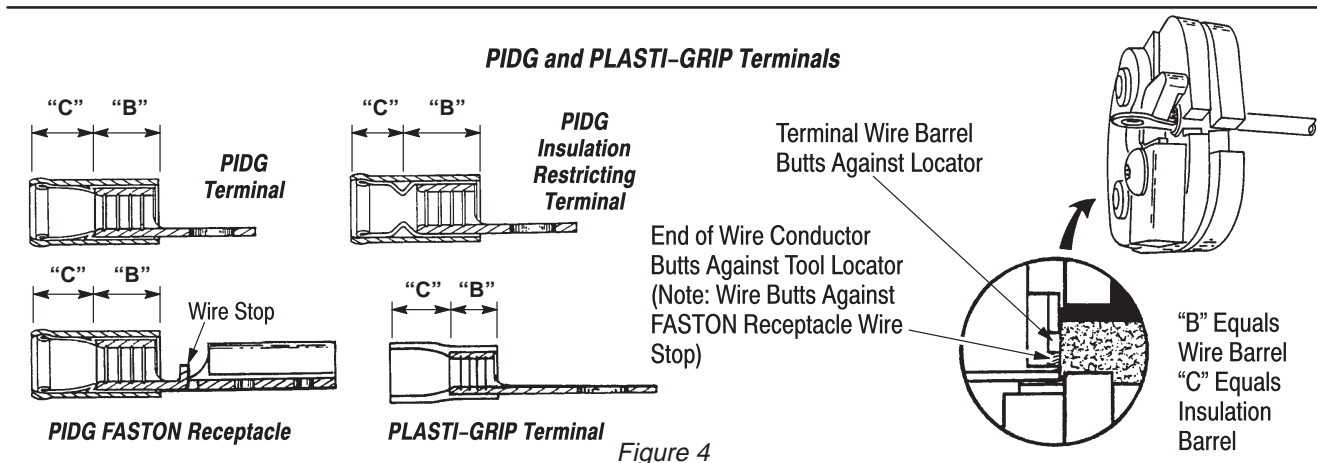


Figure 4

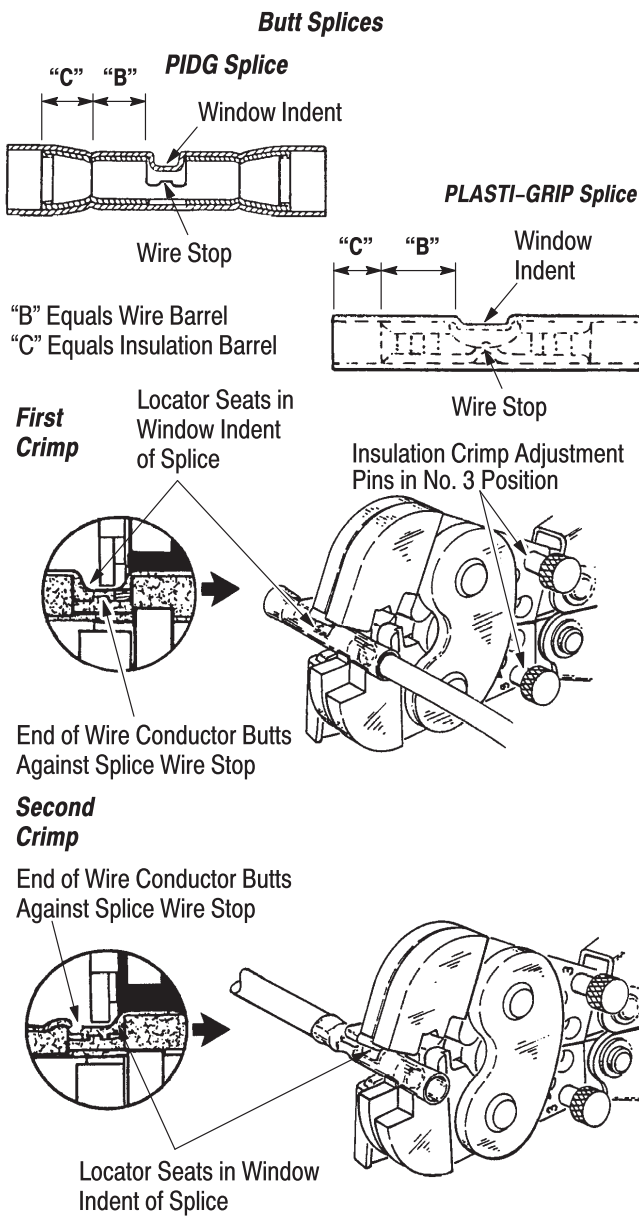


Figure 5

**4. CRIMP INSPECTION**

Inspect crimped terminals and splices by checking the features described in Figure 7. Terminals and splices not meeting these conditions should NOT be used.

**5. INSULATION CRIMP ADJUSTMENTS**

**5.1. For PIDG Terminals and Splices**

**NOTE** *PIDG terminals and splices feature a wire "insulation grip."*

The insulation crimping section of the hand tool has three positions: 1 (tight), 2 (medium), and 3 (loose). To adjust the section:

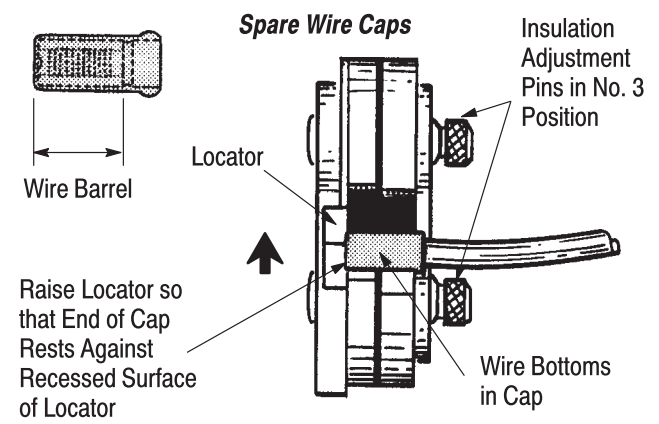


Figure 6

1. Insert the insulation crimp adjustment pins into the No. 3 position. Refer to Figure 1 or Figure 5.
2. Place the terminal or splice into the crimping jaws as shown in Figure 4 or Figure 5.
3. Insert the UNSTRIPPED wire into ONLY the insulation barrel (refer to Figure 4 or Figure 5) portion of the terminal or splice.
4. Close the tool handles to complete the crimp.
5. Remove the crimped terminal or splice and check the insulation crimp by bending the wire back and forth once. The terminal or splice should retain its grip on the wire insulation. If the wire pulls out, set the insulation crimp adjustment pins to the next higher position (No. 2).
6. Perform another crimp and repeat the adjustment as necessary until the correct insulation grip is attained. Do not use a tighter setting than required.

**CAUTION** *Make sure that both insulation crimp adjustment pins are in the same position.*

**5.2. For PLASTI-GRIP Terminals and Splices**

**NOTE** *PLASTI-GRIP terminals and splices feature a wire "insulation support" only. The terminal or splice insulation should ideally be in contact with the wire insulation.*

1. Set adjustment pins in position No. 3 for wire having a large insulation diameter.
2. Set adjustment pins in position No. 2 for wire having a medium insulation diameter.
3. Set adjustment pins in position No. 1 for wire having a small insulation diameter.

**CAUTION** *Make sure that both insulation crimp adjustment pins are in the same position.*



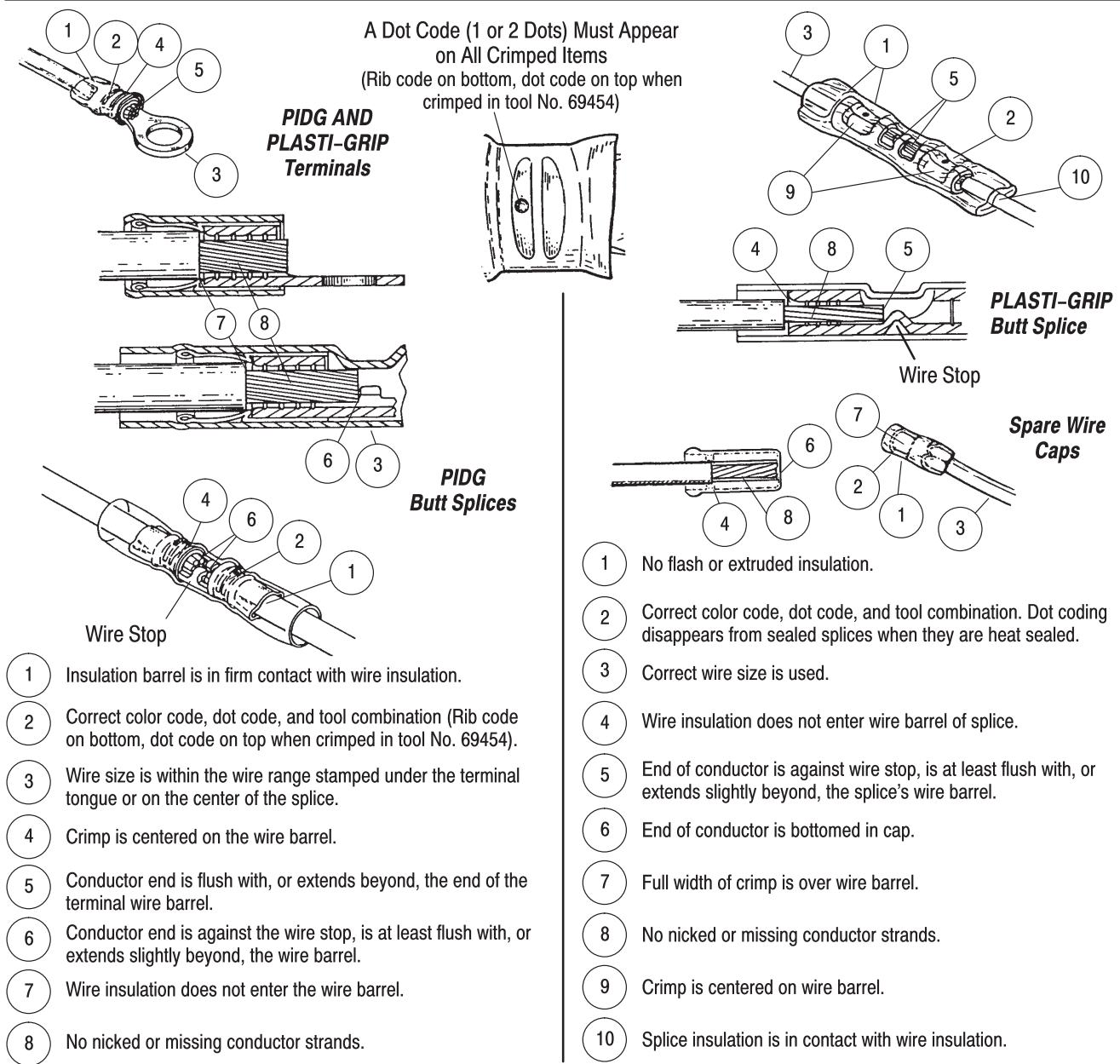


Figure 7

## 6. INITIAL TOOL INSPECTION

Hand crimping tools are inspected before shipment. The tool received should be inspected immediately upon arrival to ensure that the tool has not been damaged during shipment, and that it performs according to the criteria described in this sheet. If a tool is damaged upon arrival, retain the shipping container, file a claim with the carrier, and notify Tyco Electronics immediately.

## 7. MAINTENANCE/INSPECTION

### 7.1. Daily Maintenance

1. Remove dust, moisture, and other contaminants

from the tool with a clean brush or a soft, lint-free cloth. Do NOT use objects that could damage the tool.

2. Make sure that the proper retaining pins are in place and are secured with the proper retaining rings.

3. Make certain that all pins, pivot points, and bearing surfaces are protected with a THIN coat of any good SAE 20 motor oil. Do NOT oil excessively.

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

**7.2. Periodic Inspection**

Regular inspections should be performed by quality control personnel. A record of scheduled inspections should remain with the tool and/or be supplied to supervisory personnel responsible for the tool. Though recommendations call for at least one inspection per month, the inspection frequency should be based on the amount of use, working conditions, operator training and skill, and established company standards. These inspections should be performed in the following sequence:

**A. Visual Inspection**

1. Remove all lubrication and accumulated film by immersing the tool (handles partially closed) in a suitable commercial degreaser that will not affect paint or plastic material.
2. Make certain that all retaining pins are in place and are secured with retaining rings. If replacements are necessary, refer to the parts list in Figure 11.

3. Inspect crimping areas for pitted or chipped surfaces.

4. Close the tool handles until the ratchet releases, then allow handles to open freely. If they do not open quickly and fully, the spring is defective and must be replaced. Refer to Section 8, REPLACEMENT AND REPAIR.

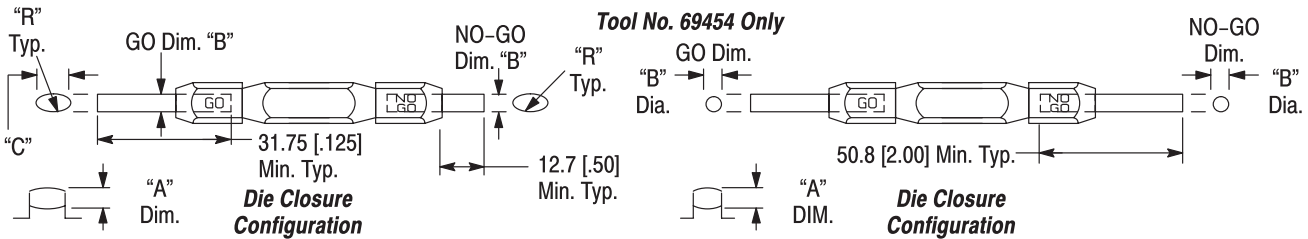
**B. Gaging the Crimping Areas**

This inspection requires the use of plug gages conforming to the dimensions listed in Figures 8 and 9. Tyco Electronics does not manufacture or market these gages.

To gage the crimping area(s), refer to Figure 10 and proceed as follows:

1. Close the crimping areas by squeezing the tool handles together until the crimping dies have bottomed, and then HOLD the tool handles in this position. Do not force the dies beyond initial contact.

**SUGGESTED PLUG GAGE DESIGN — WIRE BARREL CRIMP**

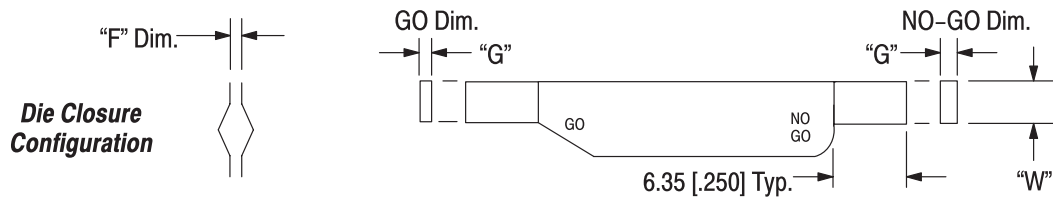


TOOL NUMBER	DIE CLOSURE DIM'S. "A"†		GAGE ELEMENT†† DIM'S. "B" DIA.		"C" MAX.	"R" RADIUS
	GO	NO-GO	GO	NO-GO		
46121	1.600	1.753	1.600-1.608	1.750-1.753		
169485	[.0630]	[.0690]	[.0630-.0633]	[.0689-.0690]		
47304	1.600	1.753	1.600-1.608	1.750-1.753		
	[.0630]	[.0690]	[.0630-.0633]	[.0689-.0690]		
47386	2.768	2.921	2.768-2.776	2.918-2.921		
47386-5	[.1090]	[.1150]	[.1090-.1093]	[.1149-.1150]		
47387	3.022	3.175	3.022-3.030	3.172-3.175		
	[.1190]	[.1250]	[.1190-.1193]	[.1249-.1250]		
47907-1	2.260	2.413	2.260-2.268	2.410-2.413		
	[.0890]	[.0950]	[.0890-.0893]	[.0949-.0950]		
48518-2	1.600	1.753	1.600-1.608	1.750-1.753		
	[.0630]	[.0690]	[.0630-.0633]	[.0689-.0690]		
69151-1	2.768	2.921	2.768-2.776	2.918-2.921		
	[.1090]	[.1150]	[.1090-.1093]	[.1149-.1150]		
69454	2.616	2.718	2.616-2.624	2.715-2.718	3.962	3.454
	[.1030]	[.1070]	[.1030-.1033]	[.1069-.1070]	[.156]	[.136]

† Die closure dimensions apply when wire barrel jaws are bottomed, but not under pressure.  
 †† Material—Tool Steel.

Figure 8

**SUGGESTED PLUG GAGE DESIGN — INSULATION CRIMP**



TOOL NUMBER	DIE CLOSURE DIM'S. "F"† (Set Insulation Adjustment Pins at No. 1 Position)		GAGE ELEMENT †† DIM'S. "G"		WIDTH "W" (Max.)
	GO	NO-GO	GO	NO-GO	
46121 169485	0.762 [.0300]	1.27 [.0500]	0.762-0.77 [.0300-.0303]	1.267-1.27 [.0499-.0500]	3.18 [.125]
47304	0.762 [.0300]	1.27 [.0500]	0.762-0.77 [.0300-.0303]	1.267-1.27 [.0499-.0500]	3.18 [.125]
47386 47386-5	0.762 [.0300]	1.27 [.0500]	0.762-0.77 [.0300-.0303]	1.267-1.27 [.0499-.0500]	3.18 [.125]
47387	1.016 [.0400]	1.524 [.0600]	1.016-1.024 [.0400-.0403]	1.521-1.524 [.0599-.0600]	4.75 [.187]
47907-1	0.762 [.0300]	1.27 [.0500]	0.762-0.77 [.0300-.0303]	1.267-1.27 [.0499-.0500]	2.36 [.093]
48518-2	0.762 [.0300]	1.27 [.0500]	0.762-0.77 [.0300-.0303]	1.267-1.27 [.0499-.0500]	3.18 [.125]
69151-1	0.762 [.0300]	1.27 [.0500]	0.762-0.77 [.0300-.0303]	1.267-1.27 [.0499-.0500]	3.18 [.125]
69454	0.762 [.0300]	1.27 [.0500]	0.762-0.77 [.0300-.0303]	1.267-1.27 [.0499-.0500]	3.18 [.125]

† Die closure dimensions apply when wire barrel jaws are bottomed, but not under pressure.  
 †† Material—Tool Steel.

Figure 9

2. Align the GO element of the gage with the appropriate crimping area to be checked. Refer to Figure 10. Push the element straight into the area without using force. The GO element must pass completely through the crimping area.

3. Align the NO-GO element of the gage with the same crimping area, and try to insert the element. The NO-GO element may start entry, but it must not pass completely through the crimping area.

4. Repeat the gage inspection procedure for each crimping area, making sure to use the correct plug gage for each inspection.

If the crimping areas conform to the gage inspection, the tool is considered dimensionally correct. If the crimping areas do not conform to the inspection, the tool must be repaired. Refer to Section 8, REPLACEMENT AND REPAIR.

For additional information concerning the use of the plug gage, refer to instruction sheet 408-7424.

**C. CERTI-CRIMP Hand Crimping Tool Ratchet Control Inspection**

Obtain a .025-mm [.001-in.] shim that is suitable for checking the clearance between the bottoming surfaces of the crimping dies. To inspect the ratchet control:

1. Refer to Figure 3 and select a terminal or splice and wire (maximum size).
2. Position the terminal or splice in the appropriate crimping area, according to the method described in Paragraph 3.1, Steps 1 through 5.
3. While holding the wire in place, squeeze the tool handles together until the ratchet releases. Hold the tool in this position, maintaining just enough pressure to keep the dies closed.



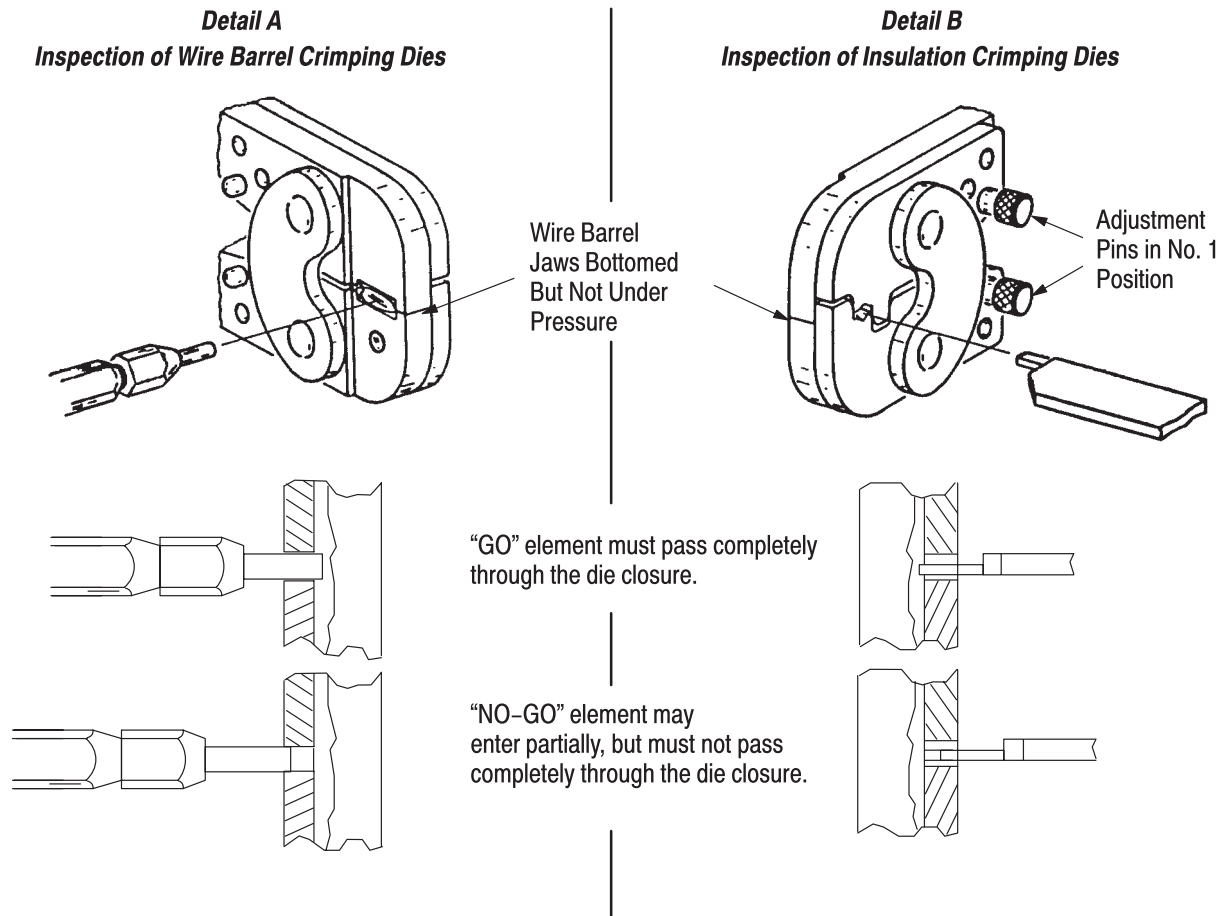


Figure 10

4. Check the clearance between the bottoming surfaces of the crimping dies. If the clearance is .025 mm [.001 in.] or less, the ratchet is satisfactory. If clearance exceeds .025 mm [.001 in.], the ratchet is out of adjustment, and must be repaired. Refer to Section 8, REPLACEMENT AND REPAIR. If the tool conforms to these inspection procedures, lubricate it with a THIN coat of any good SAE 20 motor oil and return it to service.

## 8. REPLACEMENT AND REPAIR

Replacement parts are listed in Figure 11. Parts other than those listed in Figure 11 should be replaced by Tyco Electronics to ensure quality and reliability of the tool. Order replacement parts through your Tyco Electronics Representative, or call 1-800-526-5142,

or send a facsimile of your purchase order to 1-717-986-7605, or write to:

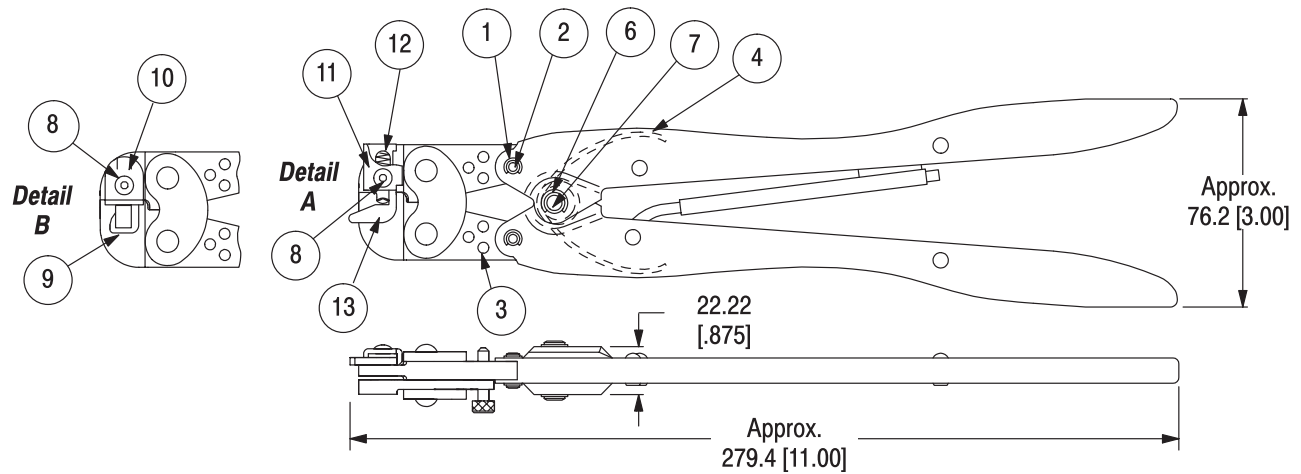
CUSTOMER SERVICE (38-35)  
 TYCO ELECTRONICS CORPORATION  
 P.O. BOX 3608  
 HARRISBURG, PA 17105-3608

For tool repair service, please contact a representative at 1-800-526-5136.

## 9. REVISION SUMMARY

Since the previous release of this sheet, the following changes were made:

- Updated document to corporate requirements
- Added part number 47386-5 to tables in Figures 1, 3, 8, 9, and 11



ITEM NO.	DESCRIPTION	TOOL NUMBERS, DETAIL REF., AND COMPONENT PART NUMBERS				
		46121 DETAIL A	47304 DETAIL B	47386, 47386-5 DETAIL A	47387 DETAIL A	47907-1 DETAIL A
1	RING, Retaining	21045-3	21045-3	21045-3	21045-3	21045-3
2	PIN, Retaining	1-23619-6	1-23619-6	1-23619-6	1-23619-6	1-23619-6
3	PIN, Adjustment	39207	39207	39207	39207	39207
4	SPRING	39364	39364	39364	39364	39364
6	RING, Retaining	21045-6	21045-6	21045-6	21045-6	21045-6
7	PIN, Retaining	2-23620-9	2-23620-9	2-23620-9	2-23620-9	2-23620-9
8	SCREW	3-306105-9	3-21016-4	9-305927-1	9-305927-1	9-305927-1
9	SUPPORT	--	39193	--	--	--
10	STOP	--	302765	--	--	--
11	HOUSING LOCATOR	302994	--	302994	302994	302994
12	SPRING	301201	--	301201	301201	301201
13	LOCATOR	3-304052-6	--	302993	45965-6	303542

ITEM NO.	DESCRIPTION	TOOL NUMBERS, DETAIL REF., AND COMPONENT PART NUMBERS			
		169485 DETAIL A	48518-2 DETAIL A	69151-1 DETAIL A	69454 DETAIL A
1	RING, Retaining	21045-3	21045-3	21045-3	21045-3
2	PIN, Retaining	1-23619-6	1-23619-6	1-23619-6	1-23619-6
3	PIN, Adjustment	39207	39207	39207	39207
4	SPRING	39364	39364	39364	39364
6	RING, Retaining	21045-6	21045-6	21045-6	21045-6
7	PIN, Retaining	2-23620-9	2-23620-9	2-23620-9	2-23620-9
8	SCREW	9-305927-1	3-306105-9	9-305927-1	9-305927-1
9	SUPPORT	--	--	--	--
10	STOP	--	--	--	--
11	HOUSING LOCATOR	302994	302994	302994	302994-1
12	SPRING	301201	301201	301201	2-304668-6
13	LOCATOR	575960-4	125644-7	302993	4-304052-6

Figure 11