

NOTE



All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of ± 0.13 [± 0.005] and angles have a tolerance of $\pm 2^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for the application of PIDG FASTON Tabs and DIAMOND GRIP* Fully-Insulated Receptacles. The contact insulation made of nylon and is color-coded by wire size range to eliminate errors during installation. These contacts are designed to accept a wire size range of 22-10 AWG. Color-coded wire sizes are: 22-18, red; 16-14, blue; and 12-10, yellow.

PIDG FASTON Fully-Insulated Receptacle Contacts are available in series size 6.35 mm [.250 in.]. Application may be done by hand for loose piece contacts and/or machine for tape- or reel-mounted contacts.

When corresponding with Tyco Electronics Personnel, use the terminology provided on this specification to help facilitate your inquiry for information. Basic terms and features of components are provided in Figure 1.

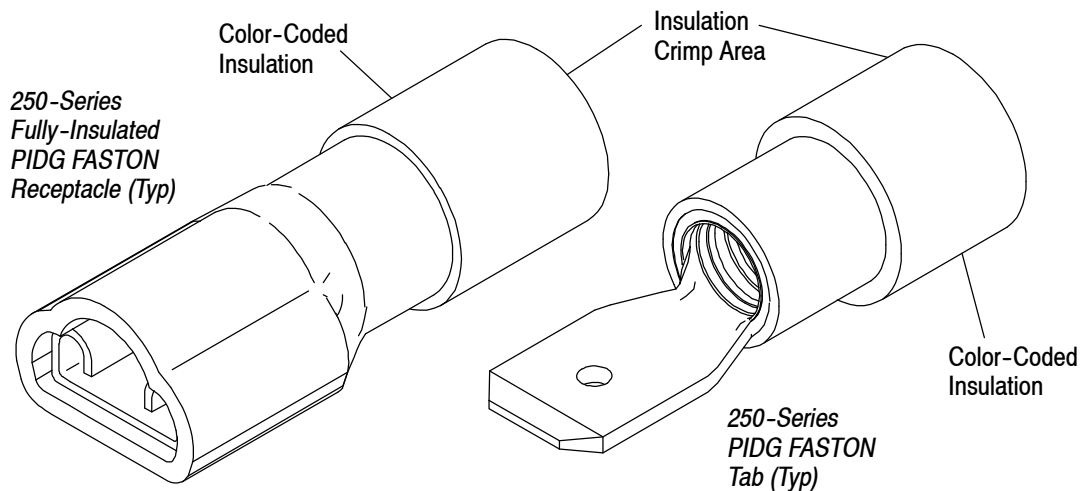


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

- Updated document to corporate requirements

2.2. Customer Assistance

Reference Base Part Number 696357 and Product Code G742 are representative numbers of PIDG FASTON Tabs and Fully-Insulated Receptacles. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local Tyco Electronics Representative or, after purchase, by calling the Tooling Assistance Center or the Product Information Center number at the bottom of this page.

2.3. Drawings

Customer Drawings for specific products are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any technical documentation supplied by Tyco Electronics. Contact the Product Information Center number at the bottom of this page if such a conflict is encountered.

2.4. Instructional Material

The following list includes available instruction sheets (408-series) that provide assembly procedures for product, operation, maintenance and repair of tooling, as well as setup and operation procedures of applicators; and customer manuals (409-series) that provide setup, operation, and maintenance of machines.

<u>Document Number</u>	<u>Document Title</u>
408-2822	Crimping Die Assemblies 59826-1, 59827-1, and 59828-1
408-2823	TETRA-CRIMP* Hand Crimping Tool 59824-1
408-3295	Preparing Reel of Contacts for Application Tooling
408-7424	Checking Terminal Crimp Height or Gaging Die Closure
408-7432	Force Gage 92-100505
408-7903	Hand Crimping Tool 90276-2
408-8044	Miniature Quick-Change Applicators for Tape Mounted Closed Barrel Terminals
408-8059	General Preventive Maintenance for Applicators
408-8063	TETRA-CRIMP HD Miniature Quick-Change Applicators (Side-Feed Type)
408-8082	Miniature Quick-Change Applicators (Side-Feed Type)
408-9252	PRO-CRIMPER Hand Crimping Tool 58433-3
408-9640	Crimp Quality Monitor Applicators for Side-Feed and End-Feed Applications
408-9816	Handling of Reeled Products
409-1993	AMP-TAPETRONIC* Machine 69875
409-5128	Basic AMP-O-LECTRIC* Model "K" Terminating Machine 565435-5
409-5842	AMP-O-LECTRIC Model "G" Terminating Machines 354500-[]
409-5852	AMPOMATOR* CLS III-G Lead Making Machine 122500-[]
409-5866	AMPOMATOR CLS IV Lead-Making Machine 217500-[]
409-5878	AMPOMATOR CLS IV+ Lead-making Machine 356500-[]
409-10016	Entry Level Terminator (ELT) Machine 1338600-[]

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the contacts.

B. Reeled Contacts

When using reeled contacts, store coil wound reels horizontally and traverse wound reels vertically.

C. Shelf Life

The contacts should remain in the shipping containers until ready for use to prevent deformation to the contacts and/or damage to the housings. The contacts should be used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmissions.

D. Chemical Exposure

Do not store contacts near any chemicals listed below, as they may cause stress corrosion cracking in the contacts.

Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur	Nitrites	Tartrates

NOTE *Where the above environmental conditions exist, phosphor-bronze contacts are recommended instead of brass if available.*



CAUTION *An excessively moist or dry environment may adversely affect the hygroscopic material used in the tab and receptacle insulation.*



3.2. Materials

The receptacle and tab bodies are made of brass plated with tin, and the insulation is made of nylon. The insulation is highly resistant to abrasion.

3.3. Special Characteristics

These pre-insulated DIAMOND GRIP (PIDG) receptacles will accept a tab width of 6.35 mm [.250 in.]. Serrations inside the wire barrel provide maximum contact and tensile strength to stranded wire sizes. See Figure 2.

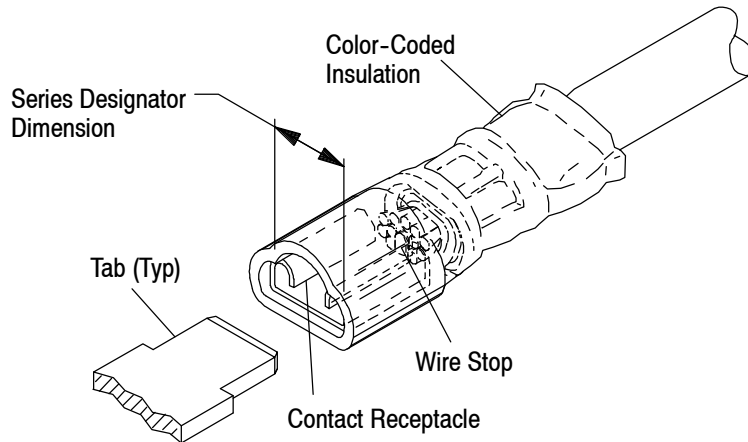


Figure 2

3.4. Wire Size and Preparation

A. Type

The total wire range for PIDG FASTON Fully-Insulated Receptacles is 22 through 10 AWG. See Section 4, QUALIFICATIONS, for specific agency certification and listings.

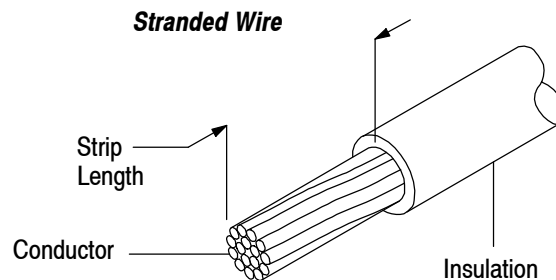
B. Preparation

The wire must be stripped to the dimension provided in Figure 3.

CAUTION Do not nick, scrape, or cut the wire conductor during the stripping operation.

The table in Figure 3 also provides insulation strip lengths as determined by the wire size used. Also listed are acceptable wire insulation outside diameters for the contacts, and color codes used to easily identify loose-piece contacts.

Locate the contact to be crimped in the appropriate tooling according to the instructions packaged with that tooling. Refer to Section 5, TOOLING. Perform the crimping operation.

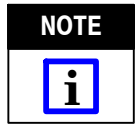


SERIES SIZE	WIRE SIZE, AWG	INSULATION DIAMETER	WIRE STRIP LENGTH RANGE	COLOR CODING
250	22-18	2.03-3.05 [.080-.120]	8.33-7.51 [.328-.296]	RED
	16-14	2.92-4.32 [.115-.170]	8.33-7.51 [.328-.296]	BLUE
	12-10	3.81-6.35 [.150-.250]	9.15-8.33 [.360-.328]	YELLOW

Figure 3

3.5. Tensile Inspection

Crimped contacts should hold the wire firmly and have a pull-test tensile value meeting that specified in the chart in Figure 4.



Adjust tensile testing machine for head travel of 25.4mm [1 inch] per minute. Directly and gradually apply force for 1 minute.

CRIMP PULL-OUT TEST		
Wire Size [AWG]	Minimum Force	
	Newtons	Pounds
22	35.6	8
20	57.8	13
18	89	20
16	133.4	30
14	222.4	50
12	311.4	70
10	355.9	80

Figure 4

3.6. Crimp Requirements

The contacts must be crimped in the appropriate tooling according to the instructions packaged with the tooling.



Terminal insulation shall NOT be cut or broken during the crimping operation. Reasonable care should be taken by tooling operators to provide undamaged terminations.

A. Straightness

There shall be no twist, roll, deformation, or other damage to the mating portion of the crimped contact that will prevent proper mating. See Figure 5.

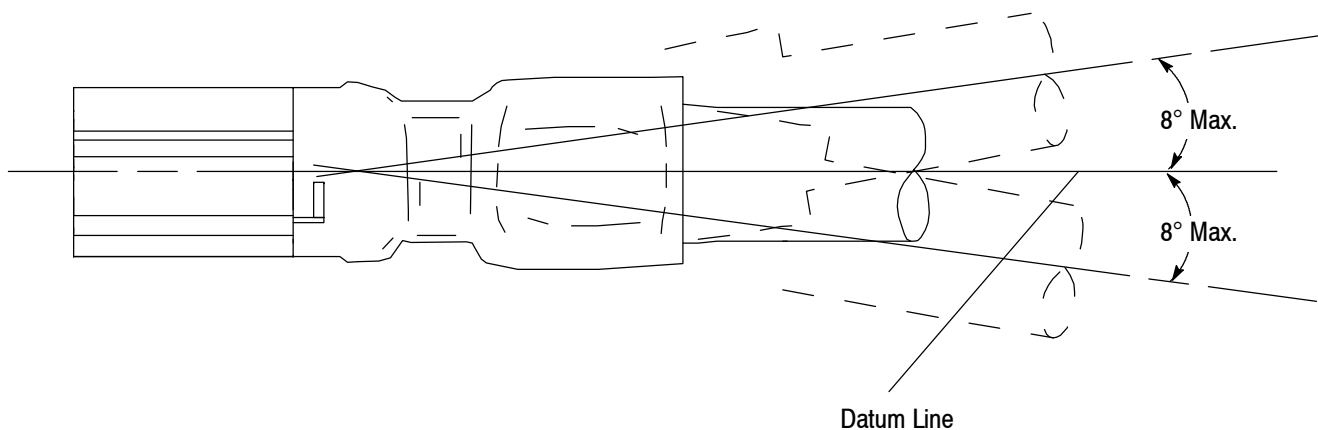


Figure 5

B. Crimp Height Procedure

Because these contacts have insulated wire barrels, crimp height readings cannot be measured. Therefore, to check for proper crimp height, crimp a piece of solid-core solder as specified in Figure 6. Solder with a ratio of 60% tin to 40% lead is recommended for the test. Check the height of the crimped solder against the crimp height dimensions given in the instructional material shipped with the application tooling. Also, refer to Instruction Sheet 408-7424.



The springback of the insulation prevents an accurate direct measurement of the crimped product. DO NOT apply crimp height dimensions directly to the contact. This practice will over-crimp the contact, cracking the wire barrel, and possibly causing damage to the tooling.

WIRE SIZE (AWG)	SOLDER DIA, mm [in.]
22-18	3.18 [.125 (1/8)]
16-14	4.76 [.1875 (3/16)]
12-10	6.35 [.250 (1/4)]

Figure 6

3.7. Terminated Contact

Figure 7 shows a typical contact as it should appear after crimping.

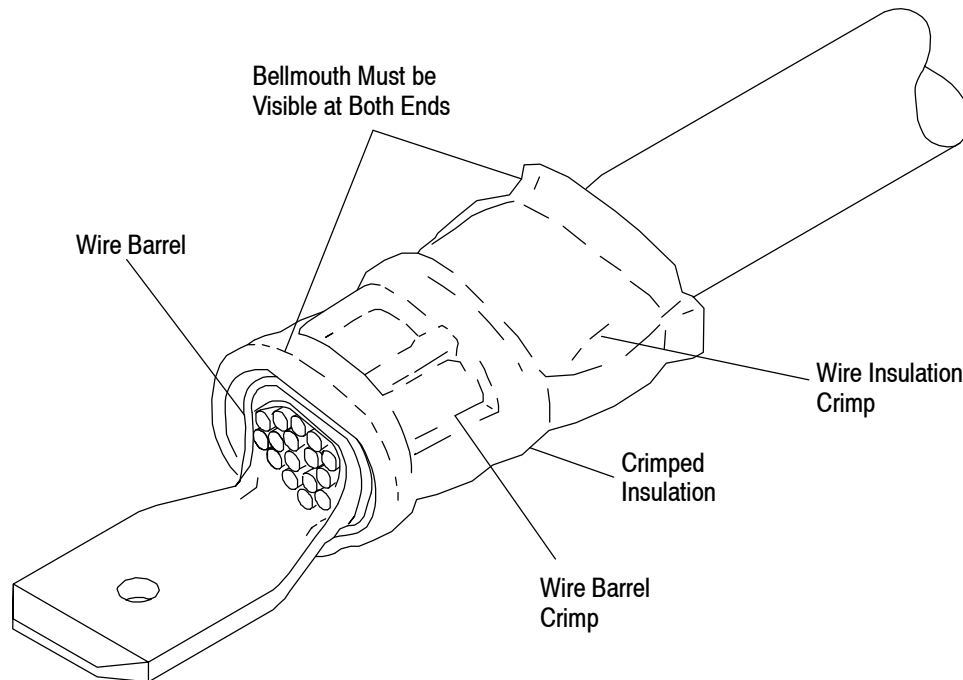
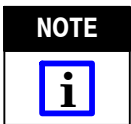


Figure 7



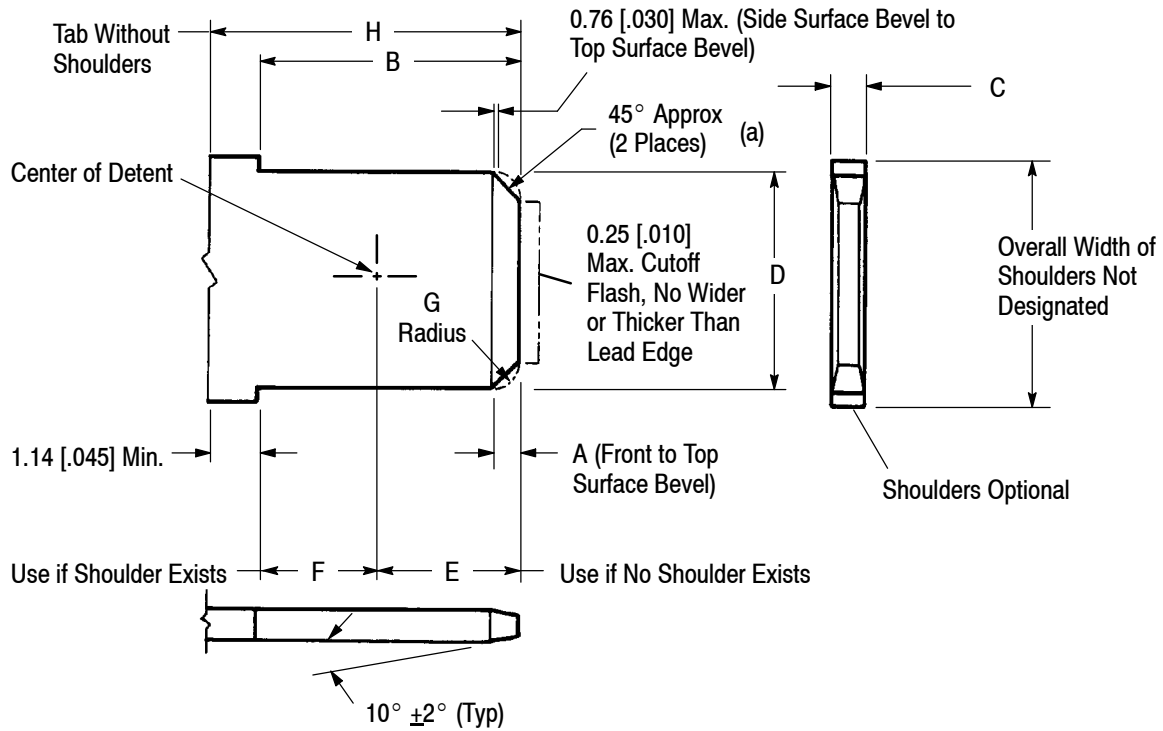
Periodic inspections must be made to ensure crimped contact formation is consistent as shown.



The insulation on pre-insulated contacts shall NOT be cut or broken during the crimping operation. Exercise of reasonable care by tooling operators should be sufficient to provide undamaged terminations.

3.8. Mating Tab Dimensions

Figure 8 shows features and dimensional requirements for tab contacts intended for mating with PIDG FASTON Fully-Insulated Receptacles.



TAB (with Dimple)	A ± 0.13 [.005]	B (MIN)	C ± 0.03 [.001]	D ± 0.08 [.003]	E ± 0.2 [.008]	F ± 0.08 [.003]	G ± 0.51 [.020]	H (MIN)
6.35 x 0.81 [.250 x .032]	0.89 [.035]	7.8 [.307]	0.81 [.032]	6.35 [.250]	3.86 [.152]	4.06 [.160]	1.27 [.050]	8.94 [.352]

NOTE (a) Bevel need not be a straight line if within confines as shown, or a radius of $G \pm 0.51$ mm [.020 in.] may be substituted.

NOTE For detent and hole dimensions J, K, and L, see Figure 9.

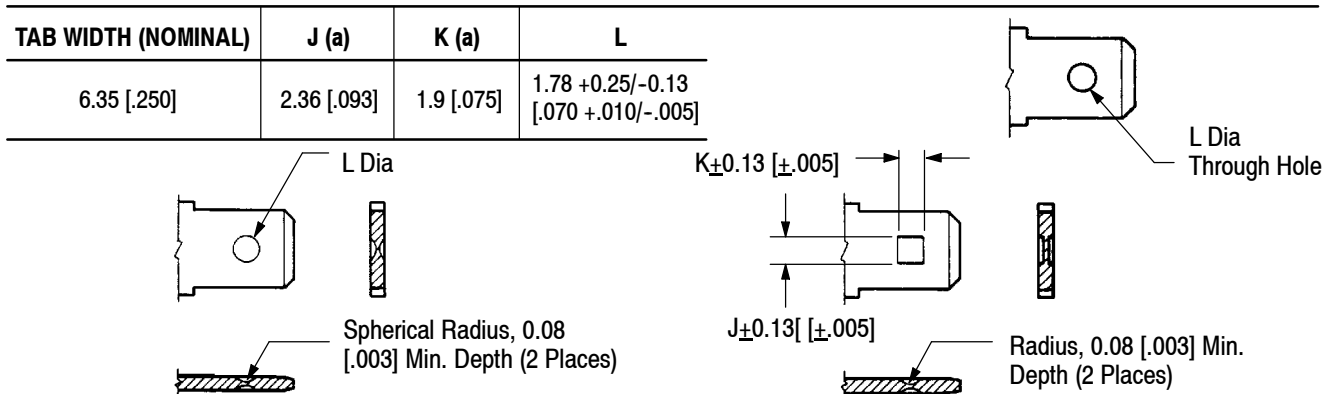
NOTE Top and bottom tab surfaces shall be flat within .1%; and free from burrs greater than 10% of tab thickness, or raised plateaus except as noted in Section 3.8.

NOTE Dimensional measurements shall not include plating, burrs, or flatness tolerance.

Figure 8

3.9. Tab Retention and Detent Configurations

A tab configuration having no locking feature may be used for applications where low mating retention forces are desirable. Where higher forces are sought, a tab with a detent meeting the requirements of Figure 9 should be used. Hole detents provide the greatest retention forces, while dimples provide acceptable medium-range forces. Contact the Product Information Center number listed at the bottom of page 1.



NOTE (a) Dimension applies to dimple detents only.

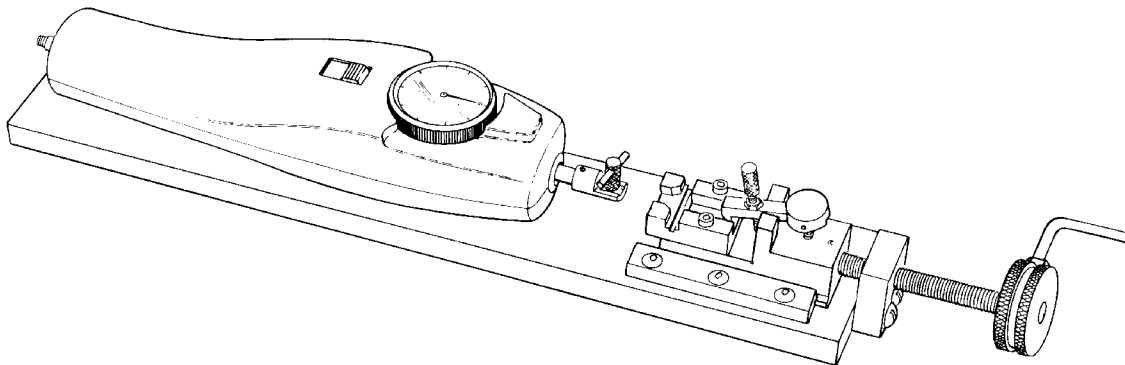
NOTE Hole or dimple detents may be at the same location on the longitudinal centerline if no shoulder or obstruction is present at the base of the tab.

Figure 9

3.10. Mating Testing

The forces required to mate and unmate a test mating tab and receptacle shall be as specified in Figure 10. Measure the force using a testing device capable of holding the reading. It must also provide accurate alignment with slow and steady mating and unmating of the test tab and receptacle. Refer to Instruction Sheet 408-7432.

NOTE *Testing may be done using a gage as described in Residential Controls--Quick-Connect Terminals, ANSI/NEMA No. DC2--1982. Test tabs shall have dimensions as shown in Figure 8 of this specification, except that the "C" dimension shall have a tolerance of ≥ 0.008 mm [$\pm .0003$ in.] for brass tabs (± 0.013 mm [$.0005$ in.] for steel) and raised plateaus around detents shall be limited to a total of 0.03 mm [$.001$ in.] for both sides.*



Example of Insertion/Extraction Test Set-Up

MATING AND WITHDRAW FORCE (NEWTONS [LBS]) FOR TEST TAB AND RECEPTACLES						
TAB SERIES	FIRST INSERTION (MAXIMUM) INDIVIDUAL	FIRST WITHDRAW			SIXTH WITHDRAW	
		(MAX)	(MINIMUM)		(MINIMUM)	
			AVERAGE	INDIVIDUAL	AVERAGE	INDIVIDUAL
250	76 (17)	76 (17)	22 (5)	13 (3)	18 (4)	13 (3)
250●	80 (18)	80 (18)	27 (6)	18 (4)	22 (5)	18 (4)

● Unplated Receptacle

Figure 10

3.11. Repair/Replacement

Contacts are not repairable once a termination has been made. Any defective or damaged contact must be removed and replaced with a new one. The loss of wire length can be minimized if the terminal is cut just above the wire barrel, but below the wire insulation crimp. See Figure 7.

4. QUALIFICATIONS

PIDG FASTON Tabs and Fully-Insulated Receptacles are Recognized under the Component program of Underwriters Laboratories Inc. (UL) in File Number E66717, and Certified by CSA International in File Number LR7189. UL 310 Standard or C22.2 No. 153 Standard for Electrical Quick-Connect Terminals provides product performance requirements and test information.

5. TOOLING

Figure 11 provides tool part numbers and instructional material related to wire size.

NOTE *Tyco Electronics Tooling Engineers have designed machines for a variety of application requirements. For assistance in setting up prototype and production line equipment, contact Tyco Electronics Tool Engineering through your local Tyco Electronics Representative or call the Tooling Assistance Center number at the bottom of page 1.*

- **Hand Crimping Tool**

Hand crimping tools that accommodate the full wire size range are designed for prototype and low-volume applications such as repair of damaged contacts.

NOTE Use only TETRA-CRIMP type tooling for UL and CSA applications.



CAUTION Use of non-TETRA CRIMP type tooling may cause the wire barrel to crack, which reduces the ability of the terminal to retain the wire.



• **Die Assemblies**

Die Assemblies for crimping the contacts are available for the full wire size range. They are designed for easy installation and removal in hand crimping tool frame assemblies or applicators.

• **Applicator**

Applicators are designed for the full wire size range of precision formed contacts which are fed by MYLAR† Tape, and provide for high volume, heavy duty, production requirements. The applicators can be used in bench or floor model power units.

NOTE Each applicator is shipped with a metal identification tag attached. DO NOT remove this tag or disregard the information on it. Also, a packet of associated paperwork is included in each applicator shipment. This information should be read before using the applicator; then it should be stored in a clean, dry area near the applicator for future reference. Some changes may have to be made to the applicators to run in all related power units. Contact the Tooling Assistance Center number located at the bottom of page 1 for specific changes.



• **Power Units**

A power unit is an automatic or semi-automatic device used to assist in the application of a product. Power unit includes the power source used to supply the force or power to an applicator.

SERIES SIZE	WIRE SIZE, AWG	TOOLING			
		HAND TOOL (DOCUMENT)	DIE ASSEMBLY (DOCUMENT)	APPLICATOR (DOCUMENT)	POWER UNIT (DOCUMENT)
250	22-18	59824-1 (408-2823) or 58433-3● (408-9252)	---	---	---
		---	59826-1 (408-2822)	567200-2 (408-8082)	354500-1 (409-5842)
					565435-5 (409-5128)
					1338600-3, -4 (409-10016)
				567200-3 (408-8082)	354500-[] (409-5842)
					1338600-[] (409-10016)
				687658-1 (408-8044)	122500-2, -3 (409-5852)
					217500-[] (409-5866)
		---	---	356500-1, -2 (409-5878)	
		---	---	69875 (409-1993)	
		---	---	466788-3 (408-8063)	122500-2, -3 (409-5852)
					217500-[] (409-5866)
					356500-1, -2 (409-5878)
				466788-4 (408-8063)	354500-1 (409-5842)
565435-5 (409-5128)					
---	---	1338600-3, -4 (409-10016)			

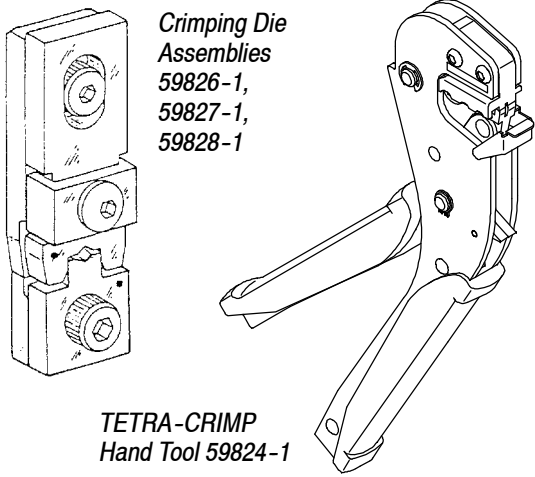
Figure 11 (cont'd)

† Trademark of E. I. du Pont de Nemours and Co. ●PRO-CRIMPER Tool 58433-3 not UL or CSA International approved.

SERIES SIZE	WIRE SIZE, AWG	TOOLING				
		HAND TOOL (DOCUMENT)	DIE ASSEMBLY (DOCUMENT)	APPLICATOR (DOCUMENT)	POWER UNIT (DOCUMENT)	
250	16-14	59824-1 (408-2823) or 58433-3● (408-9252)	---	---	---	
		---	59827-1 (408-2822)	567200-2 (408-8082)	354500-1 (409-5842)	
					565435-5 (409-5128)	
					1338600-3, -4 (409-10016)	
				567200-3 (408-8082)	354500-[] (409-5842)	
					1338600-[] (409-10016)	
					122500-2, -3 (409-5852)	
		687658-1 (408-8044)	217500-[] (409-5866)			
			356500-1, -2 (409-5878)			
			69875 (409-1993)			
		---	---	466789-3 (408-8063)	122500-2, -3 (409-5852)	
					217500-[] (409-5866)	
	356500-1, -2 (409-5878)					
	466789-4 (408-8063)		354500-1 (409-5842)			
			565435-5 (409-5128)			
			1338600-3, -4 (409-10016)			
	12-10	59824-1 (408-2823) or 90276-2 (408-7903) or 58433-3● (408-9252)	---	---	---	
		---	59828-1 (408-2822)	567200-2 (408-8082)	354500-1 (409-5842)	
					565435-5 (409-5128)	
					1338600-3, -4 (409-10016)	
			---	---	567200-3 (408-8082)	354500-[] (409-5842)
						1338600-[] (409-10016)
						122500-2, -3 (409-5852)
		687658-1 (408-8044)	217500-[] (409-5866)			
356500-1, -2 (409-5878)						
69875 (409-1993)						
466790-4 (408-8063)		354500-1 (409-5842)				
		565435-5 (409-5128)				
	1338600-3, -4 (409-10016)					

●PRO-CRIMPER Tool 58433-3 not UL or CSA International approved.

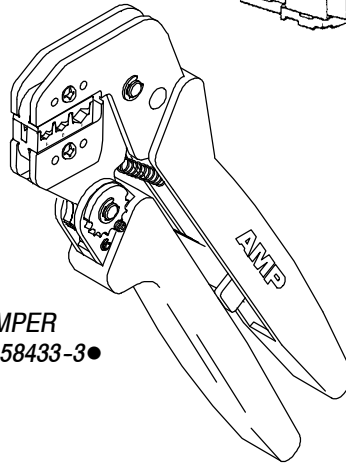
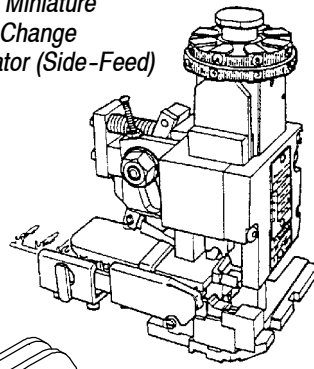
Figure 11 (cont'd)



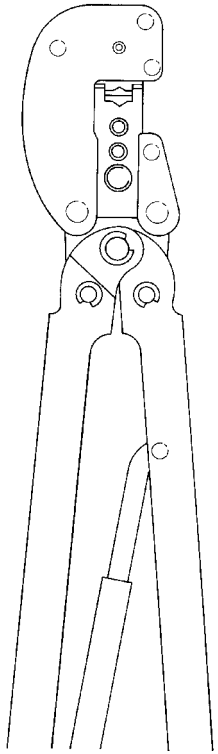
Crimping Die Assemblies
59826-1,
59827-1,
59828-1

TETRA-CRIMP
Hand Tool 59824-1

Typical Miniature
Quick-Change
Applicator (Side-Feed)

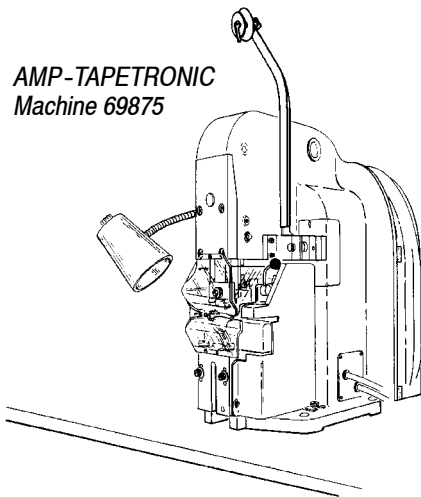


PRO-CRIMPER
Hand Tool 58433-3●

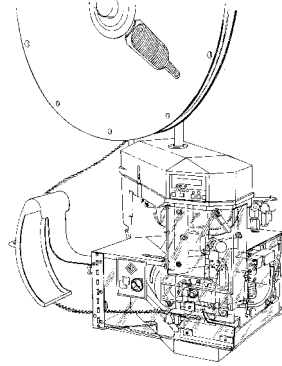


Hand Crimping
Tool 90276-2

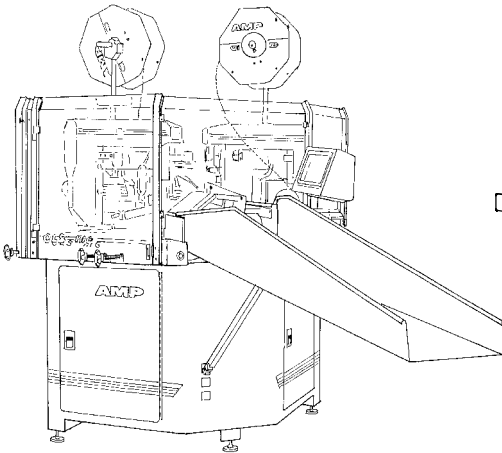
AMP-TAPETRONIC
Machine 69875



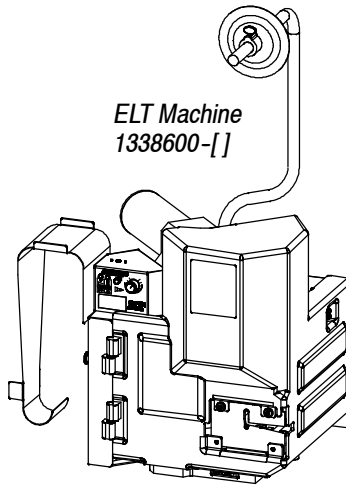
AMP-O-LECTRIC Model "G"
Terminating Machine 354500-[]



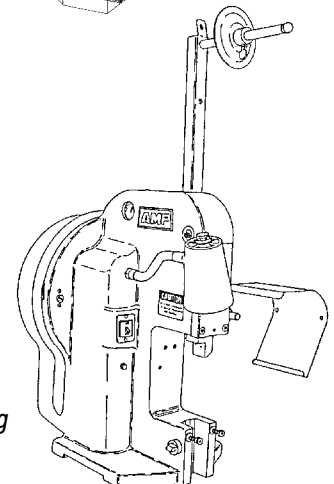
AMPOMATOR CLS
Lead-Making Machines
122500-[]; 217500-[];
356500-[]



ELT Machine
1338600-[]



AMP-O-LECTRIC
Model "K" Terminating
Machine 565435-5



●PRO-CRIMPER Tool 58433-3 not
UL or CSA International approved.

Figure 11 (end)

6. VISUAL AID

Figure 12 shows a typical application of a PIDG FASTON Tab and Fully-Insulated Receptacle. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

PIDG FASTON FULLY-INSULATED RECEPTACLE (Typ)

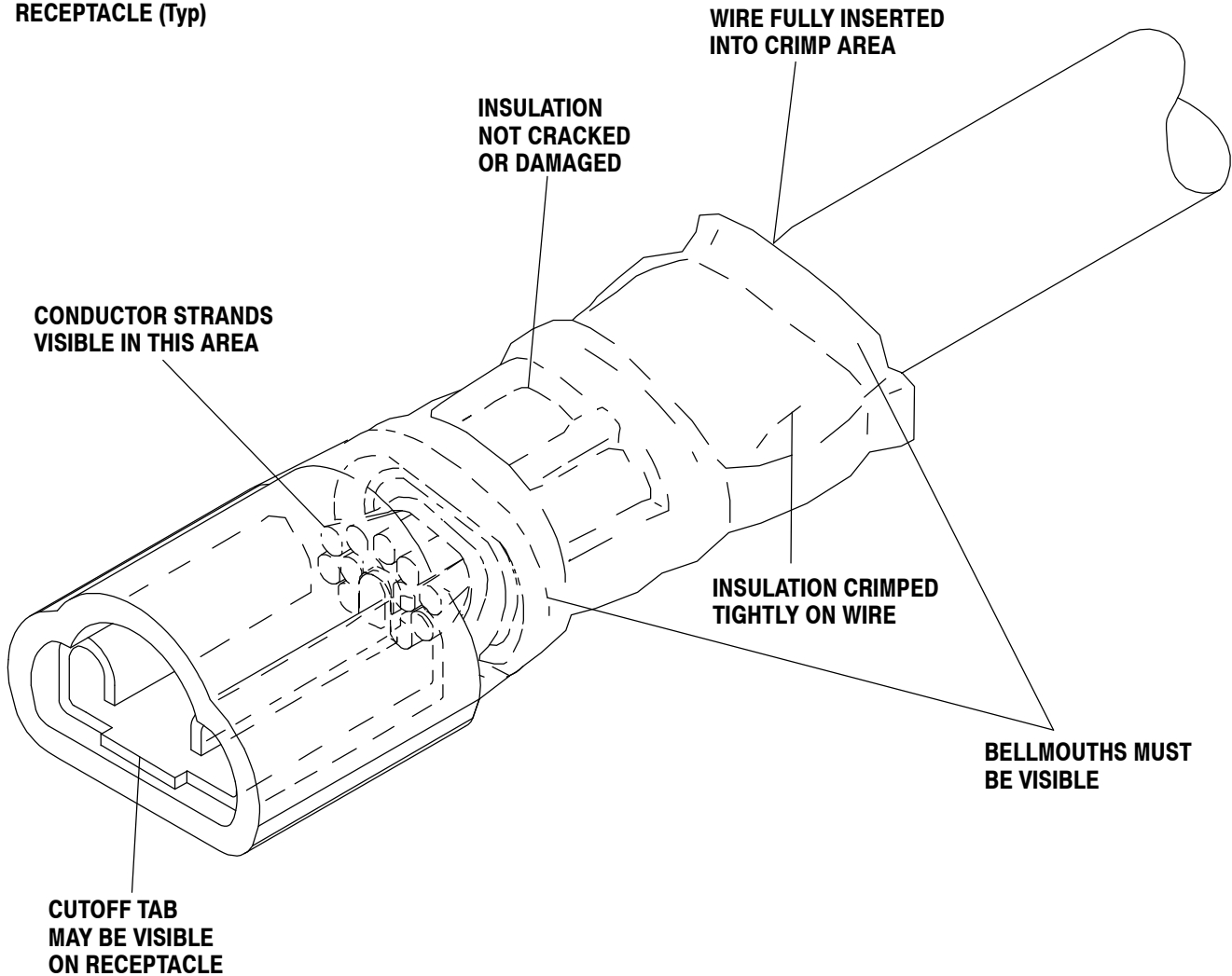


FIGURE 12. VISUAL AID