

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 [$\pm .005$] 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 application of FASTON 187 Series flag receptacles with "C" crimp feature for wire-to-wire applications. This receptacle features a wire barrel with a lip that wraps around and captures the wire when crimped. The wire barrel forms the "C" crimp which provides reliable electrical and mechanical performance. The wire barrel also features serrations that help retain the wire to the receptacle after crimping. These receptacles are available with a stock thickness of 0.36 [.014] or 0.40 [.016].

The receptacles accept a mating tab with a width of 4.75 [.187] (the series designator) and thicknesses of 0.51 [.020] or 0.81 [.032]. The receptacles are available in reeled form for terminating with automatic and semi-automatic machines.

The receptacles feature a round detent that, when mated, engages the mating tab to provide the required retention force.

When corresponding with personnel, use the terminology provided in this specification to facilitate your inquiries for information. Basic terms and features of this product are provided in Figure 1.

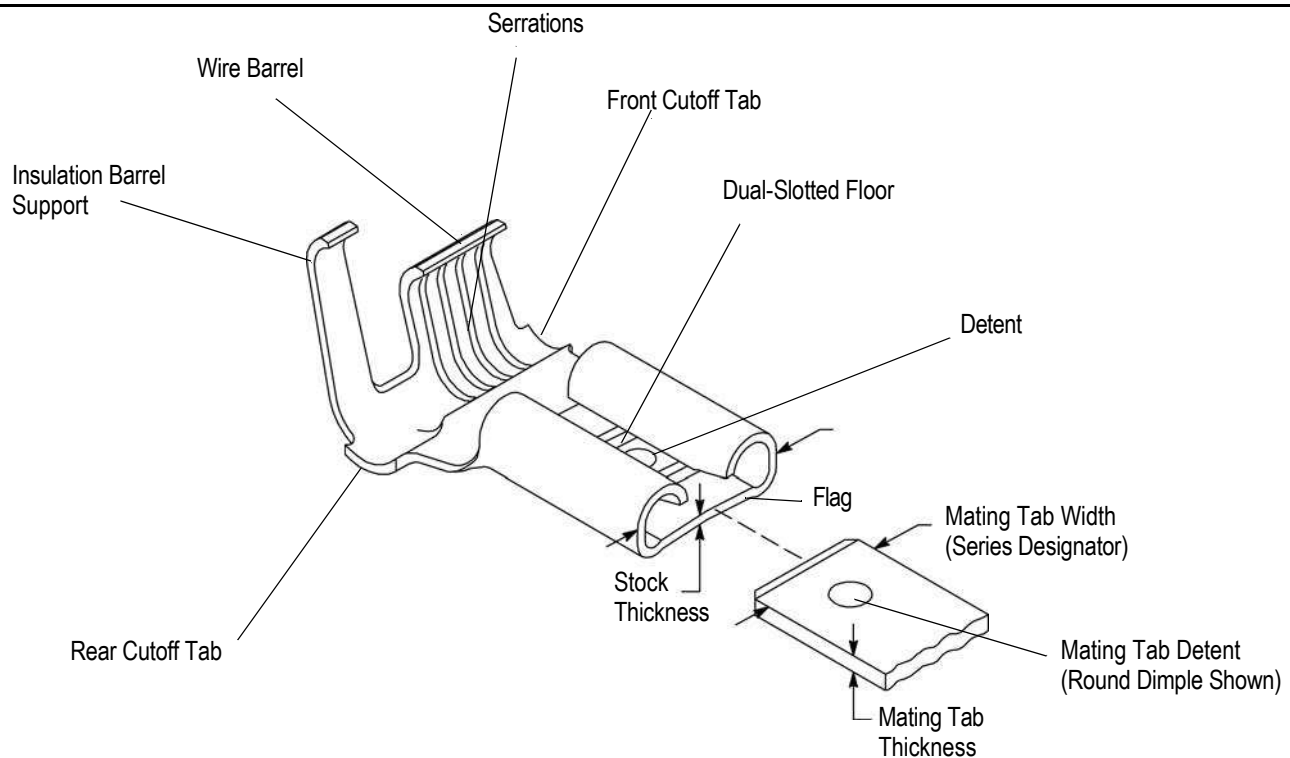


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

- Updated document to corporate requirements.

2.2. Customer Assistance

Reference Product Part Number 1217009 and Product Code 1089 are representative of FASTON 187 Series flag receptacles with "C" crimp feature. 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 Representative (Field Service Engineer, Field Applications Engineer, etc.) or, after purchase, by calling PRODUCT INFO at the number at the bottom of page 1.

2.3. Drawings

Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or with any other technical documentation supplied, call PRODUCT INFO at the number at the bottom of page 1.

2.4. Instructional Material

Instruction Sheets (408-series) provide product assembly instructions or tooling setup and operation procedures and Customer Manuals (409-series) provide machine setup and operation procedures. Documents available which pertain to this product are:

408-3295	Preparing Reel of Contacts for Applicator Tooling
408-8039	Heavy Duty Miniature Quick-Change Applicators (End-Feed Type)
408-8053	Conversion Guide for Miniature Quick-Change Applicators
408-9816	Handling of Reeled Products
409-5128	AMP-O-LECTRIC* Model "K" Terminating Machine 565435-5
409-5842	AMP-O-LECTRIC Model "G" Terminating Machine 354500-[]
409-5852	AMPOMATOR* CLS III-G Lead Making Machine 122500-1
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-[]
409-10027	Stripping Modules 1490500-[] and 1490502-[]
409-10029	Stripping Modules 1490501-[] and 1490503-[]

2.5. Terminal Voltage Rating

Voltage rating is based upon dielectric strength between the terminal and other voltage potential conductors. For these un-insulated terminals, this dielectric strength is determined by 1) the wire insulation used, 2) the housing used (if any), and 3) the application spacings. These appliance business unit terminals with an insulation barrel crimp are designed for UL 1015 wire with insulation rated for 600 volts; so, this is the voltage rating assigned to these terminals. Clearly, if higher dielectric strength wire insulation, larger spacings, and possibly an optional housing are used, larger voltages can be used.

3. REQUIREMENTS

3.1. Plating

These receptacles are made of brass or phosphor-bronze available unplated or plated with tin.

3.2. Storage

A. Shelf Life

The receptacles should remain in the shipping containers until ready for use to prevent damage. The receptacles should be used on a first in, first out basis to avoid storage contamination.

B. Reeled Receptacles

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

C. Chemical Exposure

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

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



Where the above environmental conditions exist, phosphor-bronze receptacles are recommended instead of brass.

3.3. Wire Selection and Preparation

A. Selection

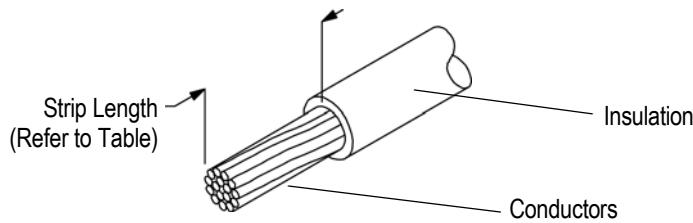
The receptacles accept stranded wire size range of 20 through 14 AWG with an insulation diameter range of 1.90 through 3.94 [.075 through .155]. Selection is based on the application requirements (i.e., power- or signal-carrying parameters).

B. Preparation

Proper strip length is necessary to properly insert the wire into the receptacle. The strip length of the wire is shown in Figure 2.



Care must be taken to avoid scraping, nicking, or cutting the wire conductors during the stripping operation. Care must also be used when handling the wire to prevent cracking or breaking of the conductor and insulation.



Note: Not to Scale

WIRE		
SIZE RANGE (AWG)	INSULATION DIAMETER RANGE	STRIP LENGTH
20 - 16	2.29 - 3.30 [.090 - .130]	3.96 - 4.78 [.156 - .188]
18 - 14	1.90 - 3.94 [.075 - .155]	4.78 - 5.56 [.188 - .219]

Figure 2

3.4. Crimp Requirements

The receptacle must be crimped following the instructions packaged with the applicable tooling.



Wire insulation shall NOT be cut or broken during the crimping operation. Reasonable care should be taken to provide undamaged wire terminations.

A. Cutoff Tab and Burr

Cutoff tabs are the remaining portion of the carrier strip after the receptacle is cut from the strip. The following dimensional requirements will ensure proper application for these receptacles.

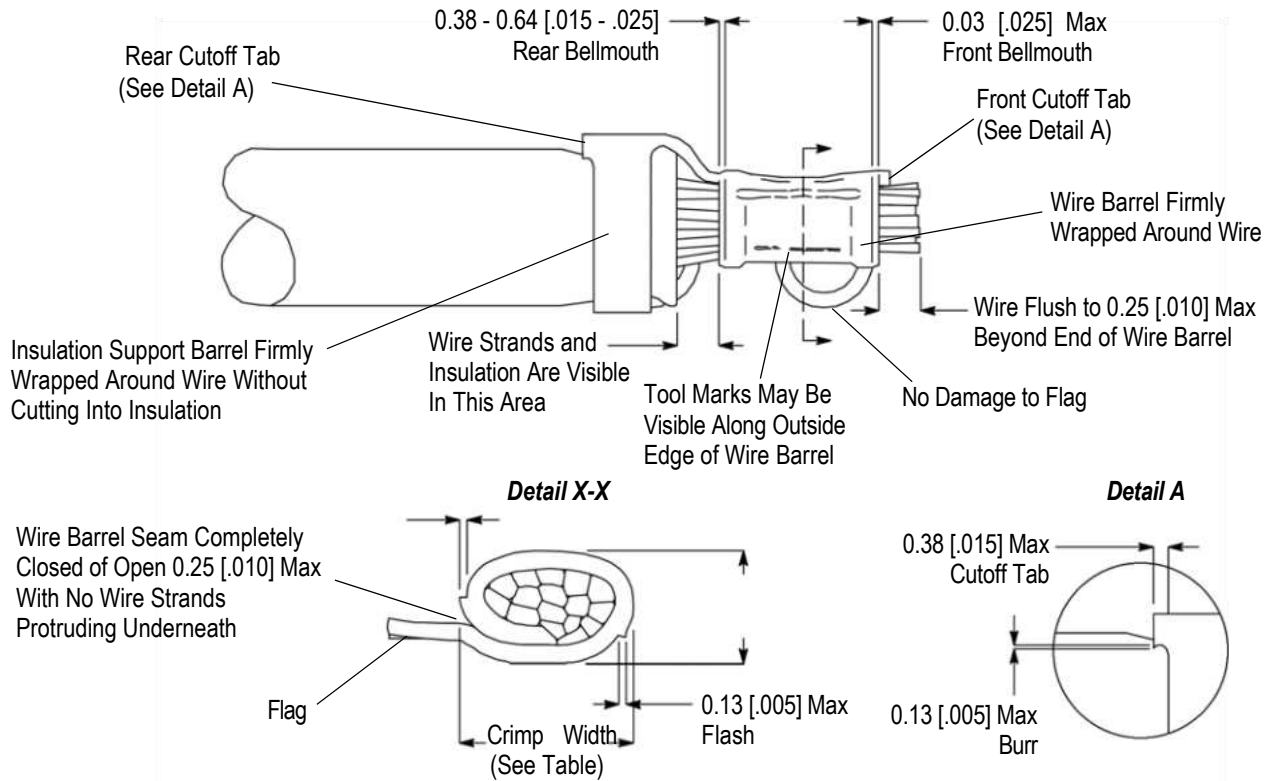
1. The front cutoff tab and rear cutoff tab must not exceed the dimension shown in Figure 3.
2. The burr resulting from the cutoff tab shearing must not exceed the dimension shown in Figure 3.

B. Wire Barrel Seam

There must be no evidence of loose wire strands or wire strands visible in the seam of the wire barrel. The seam must be completely closed or open not exceeding the dimension shown in Figure 3.

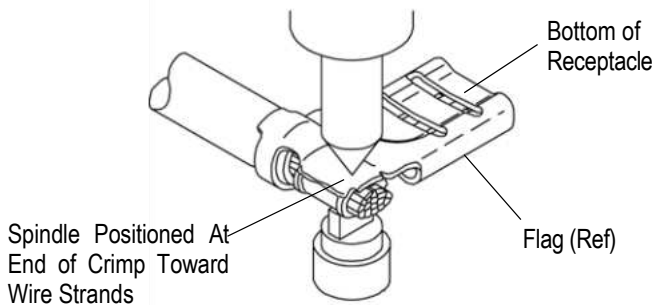
C. Bellmouths

The front bellmouth and rear bellmouth shall conform to the dimensions shown in Figure 3.

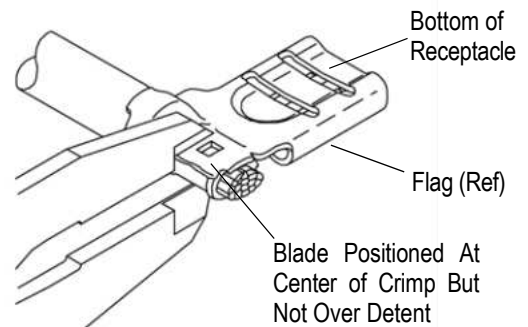


Measuring Crimp Height

Receptacles with Wire Size 20-16 AWG
Use Crimp Height Micrometer



Receptacles with Wire Size 18-14 AWG
Use Vernier, Dial, or Digital Calipers



WIRE		RECEPTACLE			
SIZE (AWG)	INSULATION DIAMETER RANGE	STOCK THICKNESS	WIRE BARREL CRIMP		INSULATION SUPPORT CRIMP WIDTH (Ref)
			HEIGHT ± 0.05 [.002]	WIDTH (Ref)	
20	2.29 - 3.30 [.090 - .130]	0.36 [.014]	1.45 [.057]	2.3 [.090]	3.3 [.130]
18			1.50 [.059]		
16			1.60 [.063]		
18	1.90 - 3.94 [.075 - .155]	.040 [.016]	1.90 [.075]	2.9 [.114]	4.3 [.170]
16			1/98 [.078]		
14			2.08 [.082]		

Figure 3

D. Wire Barrel Crimp

The crimped wire barrel must be firmly wrapped around the wire to form a tight crimp. The crimp applied to the wire barrel is the most compressed area and is most critical in ensuring optimum electrical and mechanical performance of the crimped receptacle. The wire insulation must not enter the contact wire barrel. Tool marks may be visible along the outside edge of wire barrel. The crimp height and width must be within the dimensions provided in Figure 3.

NOTE *The developed crimp configurations result from using the specific tooling described in Section 5, TOOLING.*



When checking crimp height, the measurement must be taken perpendicular to the flag of the receptacle. A crimp height micrometer must be used to measure receptacles with wire size 20 through 16 AWG as shown in Figure 3.

A detent will be formed on the bottom of receptacles with wire sizes 18 through 14 AWG. A vernier, dial, or digital caliper must be used to measure these receptacles as shown in Figure 3.

E. Wire Barrel Flash

Flash is the formation that may appear on both sides of the wire barrel as the result of the crimping process. It must not exceed the dimension provided in Figure 3.

F. Insulation Support Barrel Crimp

The insulation support barrel must be firmly wrapped around the wire without cutting into the insulation. The tip of the barrel must not touch the dual-slotted floor of the receptacle. Refer to Figure 3.

G. Wire Conductor and Insulation Location

All conductors must be held firmly inside the wire barrel. No strands can be folded back over the wire insulation. The wire insulation must not enter the wire barrel. Wire conductors and insulation must be visible within the transition area. Conductor ends must be flush with the end of the wire barrel or extend beyond the end of the wire barrel to the dimension shown in Figure 3.

H. Crimp Pull-Out Test

Crimped receptacles must hold the wire firmly and have a crimp pull-out test value meeting that specified in Figure 4.

NOTE *Tensile testing machine must be adjusted for head travel of 25.4 [1.0] per minute. Force must be applied directly and gradually for one minute.*

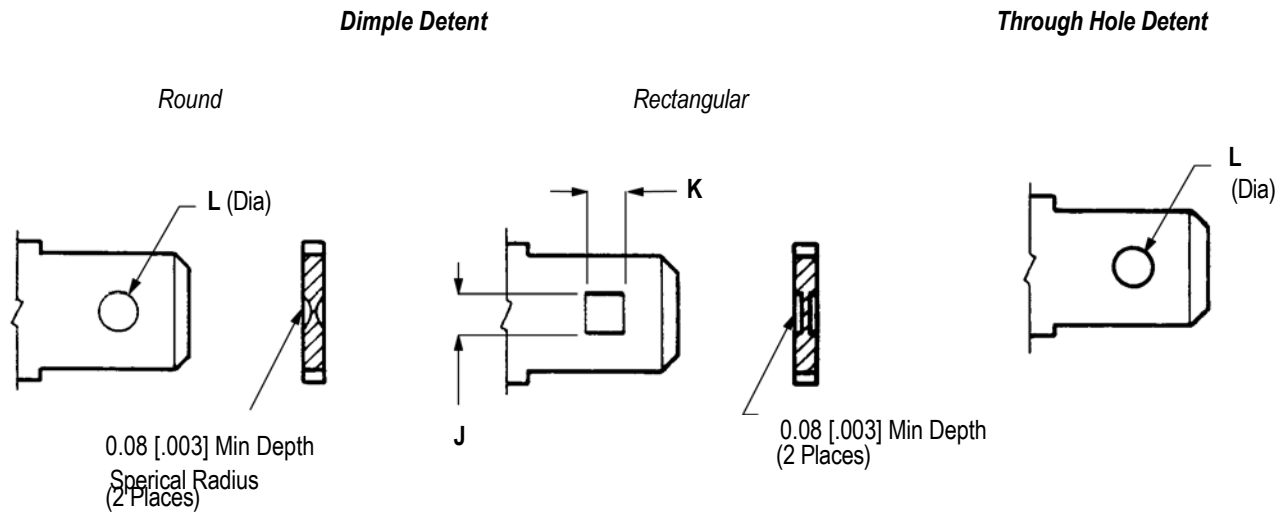


WIRE SIZE (AWG)	MINIMUM TENSILE FORCE, N [lb]
20	58 [13]
18	89 [20]
16	133 [30]
14	223 [50]

Figure 4

3.5. Mating Tab Detent

A mating tab having no locking feature may be used for applications where low mating retention forces are desirable. Where higher forces are sought, a mating tab with a detent meeting the requirements shown should be used. Holes provide the greatest retention forces, while dimples provide acceptable medium-range forces. Refer to Figure 5.

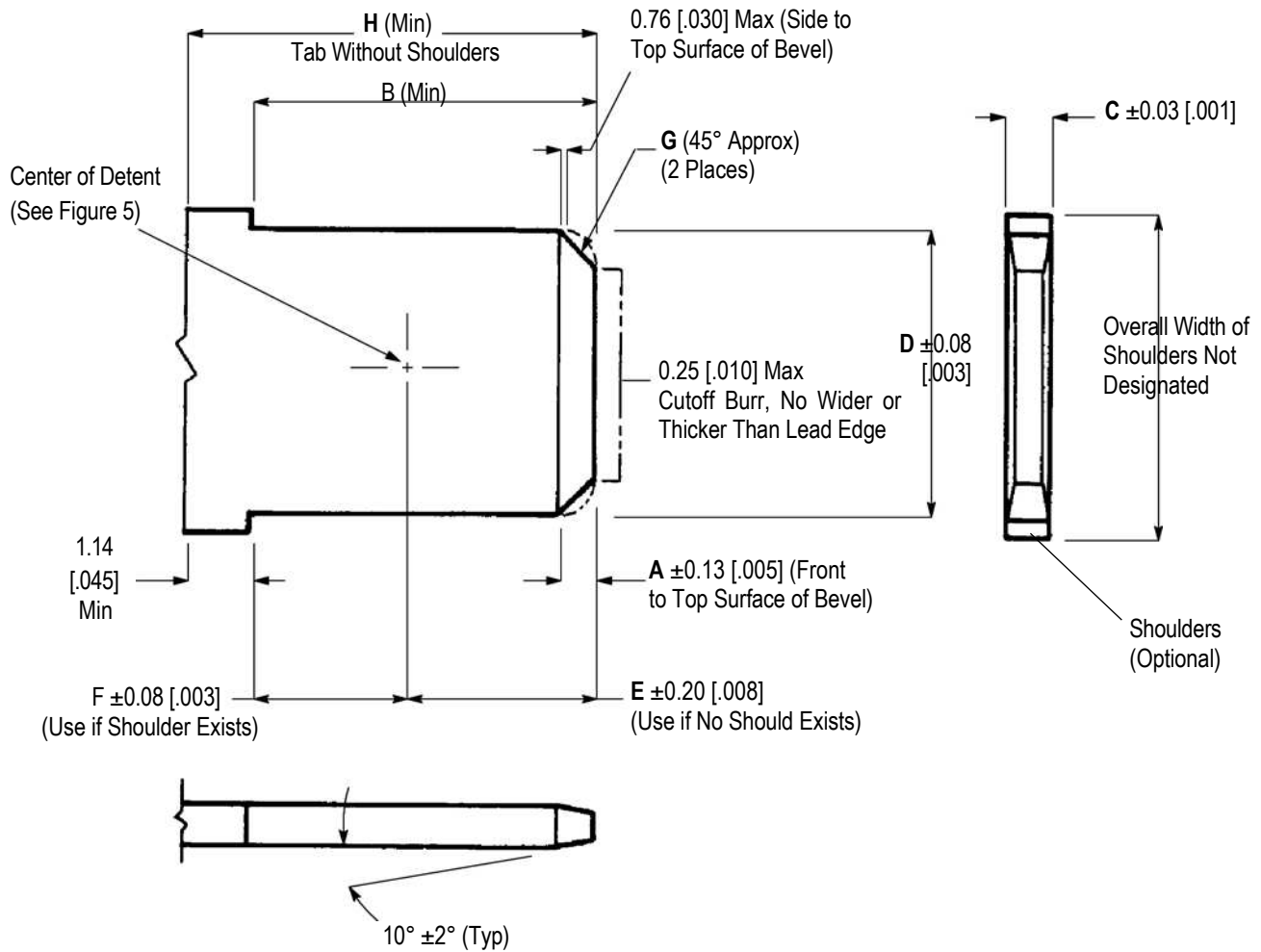


MATING TAB WIDTH (Nominal)	RECTANGULAR DIMPLE DETENT DIMENSION ± 0.13 [.005]		ROUND DIMPLE OR THROUGH HOLE DETENT DIAMETER
	J	K	L
4.75 [.187]	1.57 [.062]	1.37 [.054]	1.40 ± 0.13 [.005 \pm .005]

Figure 5

3.6. Mating Tab Dimensions

Features and dimensional requirements for the mating tabs are shown in Figure 6.


Notes:

1. Bevel may be a straight line or a radius within Dimension $G \pm 0.51$ [.020].
2. Tab shall be flat (0.03 mm/mm [.001 in./in.]) and free from burrs greater than 10% of tab thickness or raised plateaus, except for testing as described in Paragraph 3.6.
3. Measurements shall not include plating, burrs, or flatness tolerance.

MATING TAB WIDTH AND THICKNESS (Nominal) AND DETENT TYPE	DIMENSION							
	A	B	C	D	E	F	G	H
4.75 x 0.81 [.187 x .032] With Dimple	0.89 [.035]	6.22 [.245]	0.81 [.032]	4.75 [.187]	2.54 [.100]	3.81 [.150]	1.27 [.050]	7.37 [.290]
4.75 x 0.81 [.187 x .032] With Hole	0.89 [.035]	6.22 [.245]	0.81 [.032]	4.75 [.187]	3.17 [.125]	3.17 [.125]	1.27 [.050]	7.37 [.290]
4.75 x 0.51 [.187 x .020] With Dimple	0.76 [.030]	6.22 [.245]	0.51 [.020]	4.75 [.187]	2.54 [.100]	3.81 [.150]	1.14 [.045]	7.37 [.290]
4.75 x 0.51 [.187 x .020] With Hole	0.76 [.030]	6.22 [.245]	0.51 [.020]	4.75 [.187]	3.17 [.125]	3.17 [.125]	1.14 [.045]	7.37 [.290]

Figure 6

3.7. Mating Testing

The force required to mate and unmate test mating tabs and receptacles must be measured 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 mating tab and receptacle. Force shall be as specified in Figure 7.



The mating tabs may be tested according to Underwriters Laboratories Inc. (UL) 310, "Electrical Quick-Connect Terminals." Test mating tabs shall be dimensioned as shown in Figures 5 and 6 of this specification, except that the tab thickness (Dimension C in Figure 6) shall have a tolerance of 0.008 [0.003] for brass tabs and 0.013 [0.005] for steel tabs; and raised plateaus around detents shall be limited to a total of 0.025 [0.01] for both sides. Test tabs meeting these requirements and assuring accurate test results are available. For availability, call PRODUCT INFO at the number at the bottom of page 1.

TEST MATING TAB WIDTH	FORCE [†] , N [lb]				
	FIRST MATING (Max) INDIVIDUAL	FIRST UNMATING (Min)		SIXTH UNMATING (Min)	
		AVERAGE	INDIVIDUAL	AVERAGE	INDIVIDUAL
4.75 [.187]	67 [15]	22 [5]	13 [3]	13 [3]	9 [2]

[†] Mating with unplated or plated receptacle

Figure 7

3.8. Repair

These receptacles are not repairable. Any damaged or defective receptacle must NOT be used. A terminated receptacle MUST NOT be re-used by removing the wire.

4. QUALIFICATION

FASTON 187 Series flag receptacles with "C" crimp feature meet UL 310, "Electrical Quick-Connect Terminals," are Listed by UL in File E66717, and Certified by CSA International in File LR 7189.



UL does not qualify this type of receptacle for application to wire size 24 AWG and smaller.

5. TOOLING

Tooling part numbers and instructional material packaged with the tooling are shown in Figure 8.



Modified designs and additional tooling concepts may be available to meet other application requirements. For assistance in setting up prototype and production line equipment, call the TOOLING ASSISTANCE CENTER at the number at the bottom of page 1.

5.1. Applicator

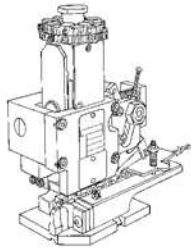
The applicators are designed to crimp the reeled receptacles onto pre-stripped wire. These applicators must be installed onto a power unit.

5.2. Power Unit

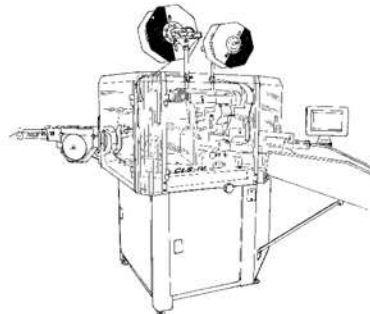
Automatic and semi-automatic machines for power assisted application of the reeled receptacles are available to cover the full wire size range. These machines provide the force required to drive the applicator. The semi-automatic machines provide for medium-volume applications and are designed to be bench mounted. The automatic machines provide for high-volume, heavy duty production requirements and are designed to be floor standing.

5.3. Stripping Module

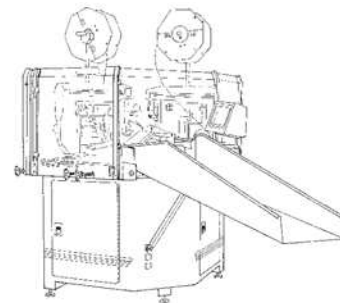
The stripping module is a pneumatically driven, microprocessor controlled, in-line stripping mechanism which will prepare discrete wire by stripping the insulation from the conductor for preparation of crimping onto the receptacle. Stripping modules are available as factory installed or field retrofit for the Model "G" terminating machine and ELT machine.



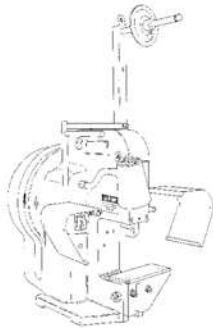
Heavy-Duty Miniature Quick-Change Applicator (End-Feed Type) (Refer to Table) (408-8039)



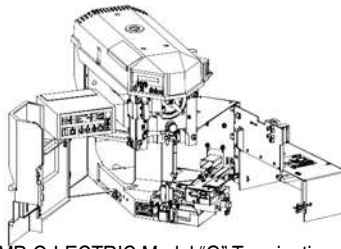
AMPOMATOR CLS IV Lead-Making Machines 217500-[] (409-5866)
AMPOMATOR CLS IV+ Lead-Making Machines 356500-[] (409-5878)



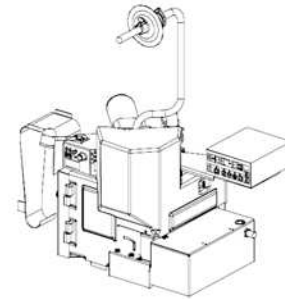
AMPOMATOR CLS III-G Lead-Making Machines 122500-[] (409-5852)



AMP-O-LECTRIC Model "K" Terminating Machine 565435-5 (409-5128)
No Longer Manufactured New



AMP-O-LECTRIC Model "G" Terminating Machine 354500-[] (409-5842) With Optional Stripping Module 1490501-[] (Factory Installed) or 1490503-[] (Field Retrofit) (409-10029)



ELT Machine 1338600-[] (409-10016) With Optional Stripping Module 1490500-[] (Factory Installed) or 1490502-[] (Field Retrofit) (409-10027)

WIRE		APPLICATOR	POWER UNIT
SIZE RANGE (AWG)	INSULATION DIAMETER RANGE		
20 - 16	2.29 - 3.30 [.090 - .130]	680535-1	CLS III-G Machine 122500-2 or -3
			CLS IV Machine 217500-1 or -2
			CLS IV+ Machine 356500-1 or -2
		680535-2	Model "G" Machine 354500-1
			Model "K" Machine 565435-5
			ELT Machine 1338600-3 or -4
680535-3	Model "G" Machine 354500-[]		
	ELT Machine 1338600-[]		
18 - 14	1.90 - 3.94 [.075 - .155]	138057-1	CLS III-G Machine 122500-2 or -3
			CLS IV Machine 217500-1 or -2
			CLS IV+ Machine 356500-1 or -2
		138057-2	Model "G" Machine 354500-1
			Model "K" Machine 565435-5
			ELT Machine 1338600-3 or -4
		138057-3	Model "G" Machine 354500-[]
			ELT Machine 1338600-[]

Figure 8

6. VISUAL AID

The illustration below shows a typical application of this product. 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.

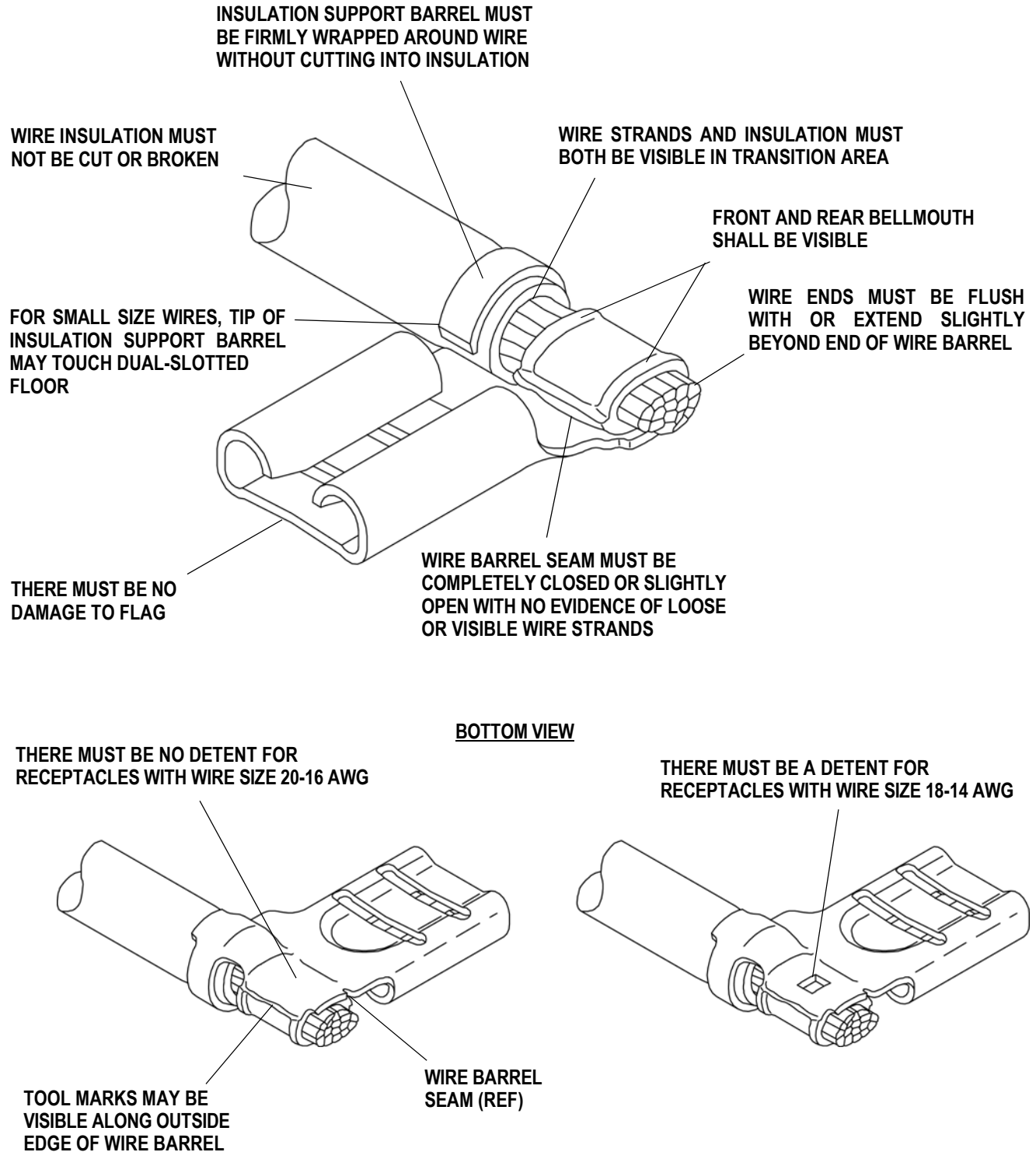


FIGURE 9. VISUAL AID