



**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  $\pm 0.13$  [ $\pm .005$ ] 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 MAG-MATE Series 187 Terminals which are designed for a housing with a terminal cavity depth approximating 4.75 mm [.187 in.]. The terminals are insulation displacement type with wire slot beams. They are designed to accept a wire size range of 33 through 20 AWG solid, round copper magnet wire or 33 through 27 AWG solid, round aluminum magnet wire. Terminals are made with 1.78 mm [.070 in.] maximum space between beams. Some terminals are designed for one wire and some are designed for two. Those for two wires require wires of the same material and size.

There is a front and back slot for each wire, and four locking barbs on each terminal to ensure retention in your housing. Several terminal interfaces are available; Solder Tine, Wire Crimp Barrel, and 2.79 x 0.51 mm [.110 x .020 in.] FASTON\* Tabs.

A special varnish resistant coating is available for application on terminal interfaces which are exposed to varnishing processes. This coating prevents polyester type varnishes from adhering to contact interface surfaces and causing electrical discontinuities. Compatibility with non-polyester type varnishes should be evaluated by the user.

When corresponding with TE Connectivity 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.

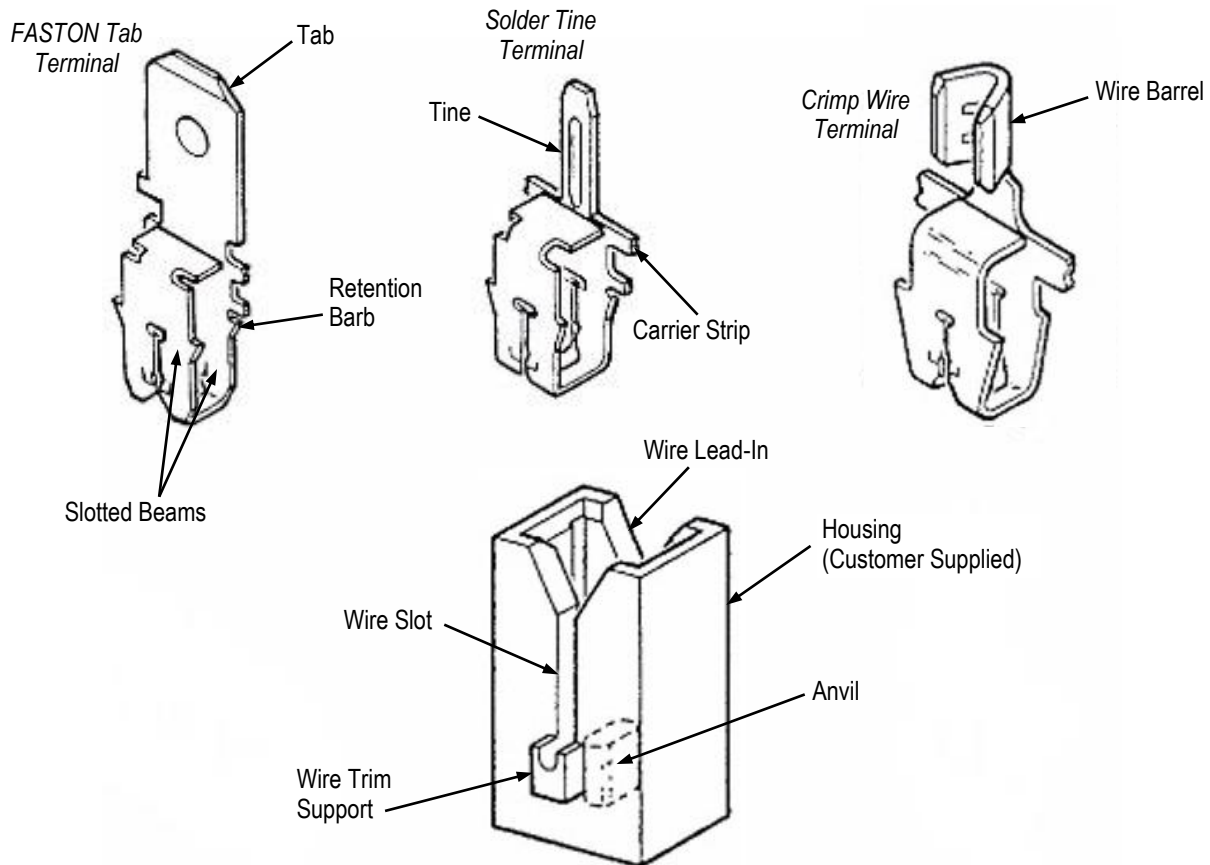


Figure 1

---

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

- Updated document to corporate requirements
- New format and layout
- Complete rework of document

### 2.2. Customer Assistance

Reference Product Base Part Number 62938 and Product Code 1039 are representative numbers of the MAG-MATE Series 187 Terminals. Use of these numbers will identify the product line and help you to obtain product and tooling information when visiting [www.te.com](http://www.te.com) or calling the PRODUCT INFORMATION number at the bottom of page 1.

### 2.3. Customer Drawings

Customer drawings for product part numbers are available from [www.te.com](http://www.te.com). The information contained in Customer drawings takes priority if there is a conflict with this specification or with any technical documentation supplied by TE.

### 2.4. Specifications

Product Specification [108-2012](#) provides product performance and test results.

### 2.5. 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 provides setup, operation, and maintenance of machines. Handbooks (410-series) are written for operator training and reference material for customers on various product lines and procedures.

<u>Document Number</u>	<u>Document Title</u>
<a href="#">408-3295</a>	Preparing Reel of Contacts For Application Tooling
<a href="#">408-6652</a>	Insertion Tool 274249-1
<a href="#">408-8040</a>	Heavy Duty Miniature Quick-Change Applicators
<a href="#">408-9816</a>	Handling of Reeled Products
<a href="#">409-5842</a>	AMP-O-LECTRIC* Model "G" Terminating Machine 354500-[ ]
<a href="#">410-5483</a>	MAG-MATE Interconnect System

## 3. REQUIREMENTS

### 3.1. Safety

Do not stack product shipping containers so high that the containers buckle or deform.

### 3.2. Storage

#### A. Ultraviolet Light

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

#### B. Shelf Life

The product should remain in the shipping containers until ready for use to prevent deformation to components. The product should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

### C. Chemical Exposure

Do not store product near any chemical 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



**NOTE**

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

### 3.3. Terminal Housing

Single or multiple terminal cavity housings can be designed with a concealed or exposed wire end feature and a controlled flash wire slot to help retain the wire in the housing prior to insertion of the terminal. The multiple terminal housings can be designed with or without commoned cavities.

All housings must have an open end slot on the trim side to allow protrusion of the wire. The protruding wire end and wire support should be trimmed flush with the housing by the terminal insertion machine trim blade. See Figure 2.

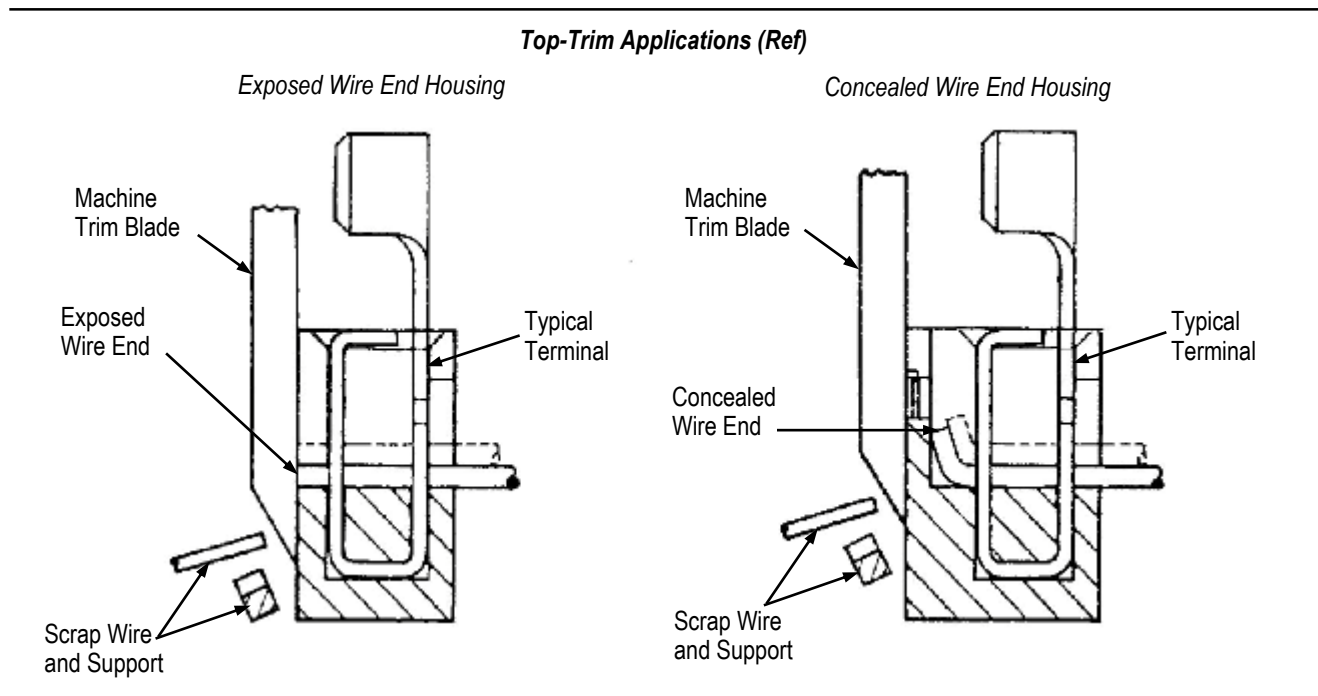


Figure 2

The external design of the housing will depend on your requirements. Internal cavity designs must conform to the dimensions provided in Figures 3, 4, or 5. Pre-design consultation with TE Engineering is necessary to be sure the cavity configuration will be functional and that it will be compatible with automatic insertion machines.

#### A. Housing with Exposed Wire End

This housing design has a wire support that is even with the anvil to permit the wire end to be exposed after the wire is trimmed.

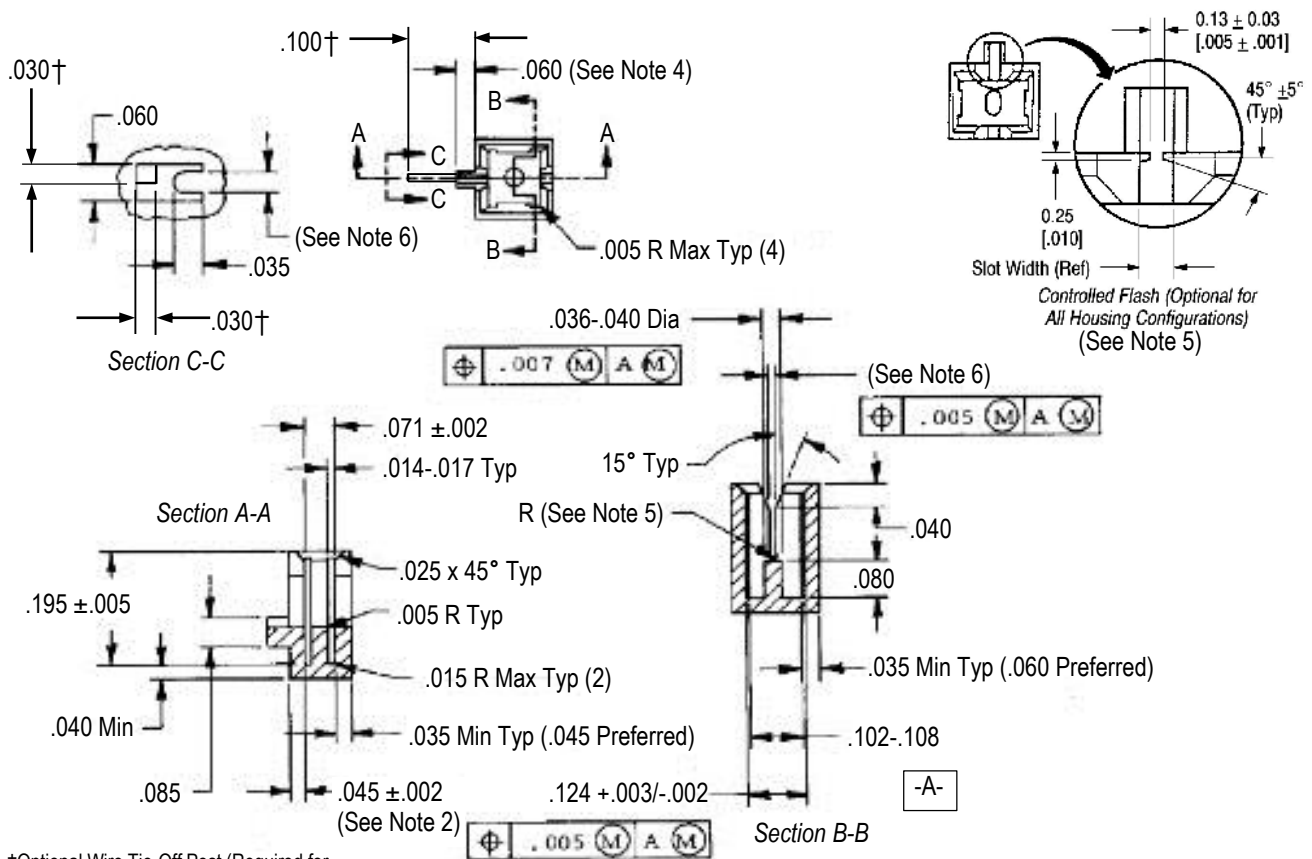
#### B. Housing with Concealed Wire End

This housing design has a wire support above the anvil that allows the wire to be cut before the terminal is fully seated. As the terminal is seated, it pulls the wire end down and conceals it in the pocket behind the wire support. All the dimensions given for the exposed wire end cavity in Figure 3 apply, except for those that appear in Figure 4.


**NOTE**

The following Notes apply to the housings shown in Figures 3 and 4:

- (1) Housings must be glass-filled polyester material or approved equivalent.
- (2) The wire trim side of the housing shall have an even thickness to prevent damage to the housing when trimming excess wire.
- (3) Coil windings and other components must not extend above the wire slot or otherwise obstruct seating of the terminal or wire.
- (4) The housing must have a wire trim support if automatic machine insertion is used. It is not necessary for the housing to have a wire trim support if inserting the wire with a hand insertion tool.
- (5) Controlled flash may be used in the wire slot at wire end to provide retention and stability for a broad range of wire sizes. See controlled flash detail, Figure 3.
- (6) Cavity Slot Width Recommendations:  
0.36-0.64 mm [27-22 AWG] Copper and Aluminum  
 (Single and Two-Wire Terminations)  
 Cavities without Wire Tie-Off Post: Slot width should be 0.025-0.075 mm [.001-.003 in.] smaller than the insulated magnet wire to hold wire in place.  
 Cavities with Wire Tie-Off Post: Slot width should be 0.01-0.09 mm [.0005-.0035 in.] larger than diameter of the largest insulated magnet wire within the specified range of the terminal.  
0.18-0.32 mm [33-28 AWG] Copper and Aluminum  
 Cavities with Wire Tie-Off Post are Required:  
 (Single Wire Terminations)  
 Slot width should be 0.01-0.09 mm [.0005-.0035 in.] larger than diameter of the largest insulated magnet wire being terminated within the specified range of the terminal.  
 (Two Wire Terminations)  
 Slot width should be 0.01-0.09 mm [.0005-.0035 in.] larger than diameter of specific insulated magnet wire being terminated.
- (7) Features that include draft must maintain the dimension and tolerance over the entire length of that feature.



†Optional Wire Tie-Off Post (Required for #33-28 AWG Wire Sizes) (See Note 6)

Figure 3

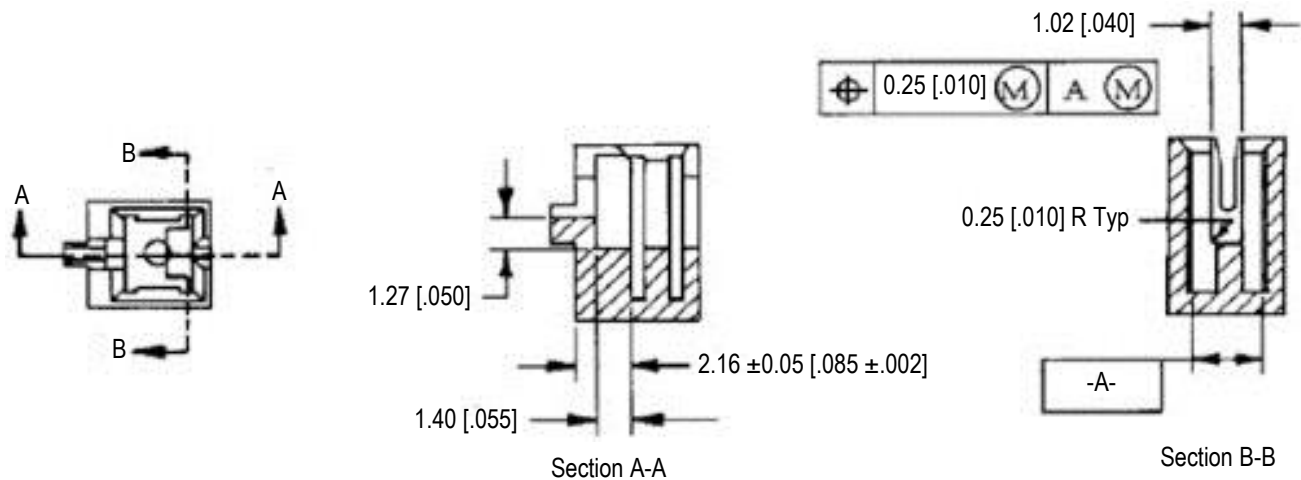


Figure 4

### C. Commoned Multiple Cavity Housings

Multiple cavity housings can be made with exposed or concealed wire ends and wire slots with or without controlled flash as defined by the dimensions in Figures 3 and 4. They can also be made to accommodate commoned terminals by using a shorter wall between cavities. See Figure 5.

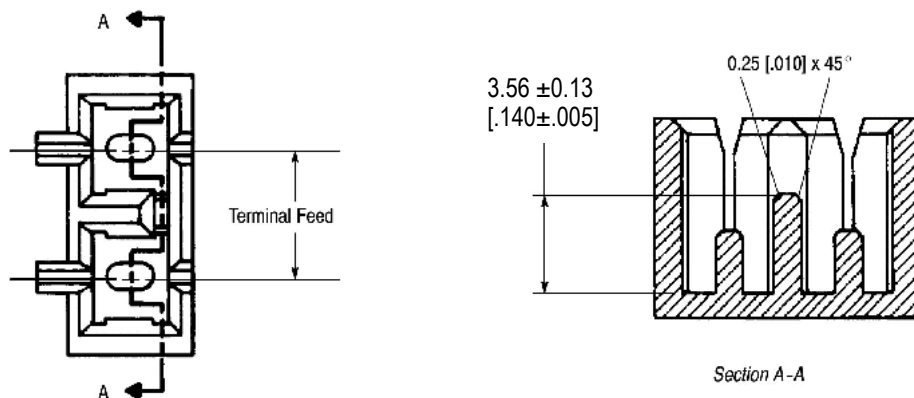


Figure 5

### D. Housing for Application of Protective Gel to Aluminum Magnet Wire Terminations

For applications involving termination of aluminum magnet wire, it is often necessary to apply a protective gel to exposed bare wire at the IDC interface and wire trim areas. The housing option shown in Figure 6 includes enhanced lead-in to facilitate injection of gel down inside the terminal to coat the IDC interface areas. Also shown is a special wire trim tray option where the excess magnet wire can be trimmed off and still leave a tray for application and retention of gel at the exposed wire end. If there is no room for a wire trim tray, the concealed wire end option as shown in Figure 4 also provides a good solution. All the dimensions in Figure 3, Section A-A and B-B apply except for those that appear in Figure 6.

### 3.4. Wire Selection

Only magnet wire may be terminated in the insulation displacement beam terminals. The magnet wire size for each terminal is provided on the Customer Drawing.

Only insulated, solid, or stranded lead wire may be terminated in the wire barrel of crimp type terminals. The wire size for crimp terminals is provided on the Customer Drawing. When stripping these wires, make sure that you do not nick, scrape, or cut the conductors. The crimp height and strip length for each wire size is provided in Figure 7.

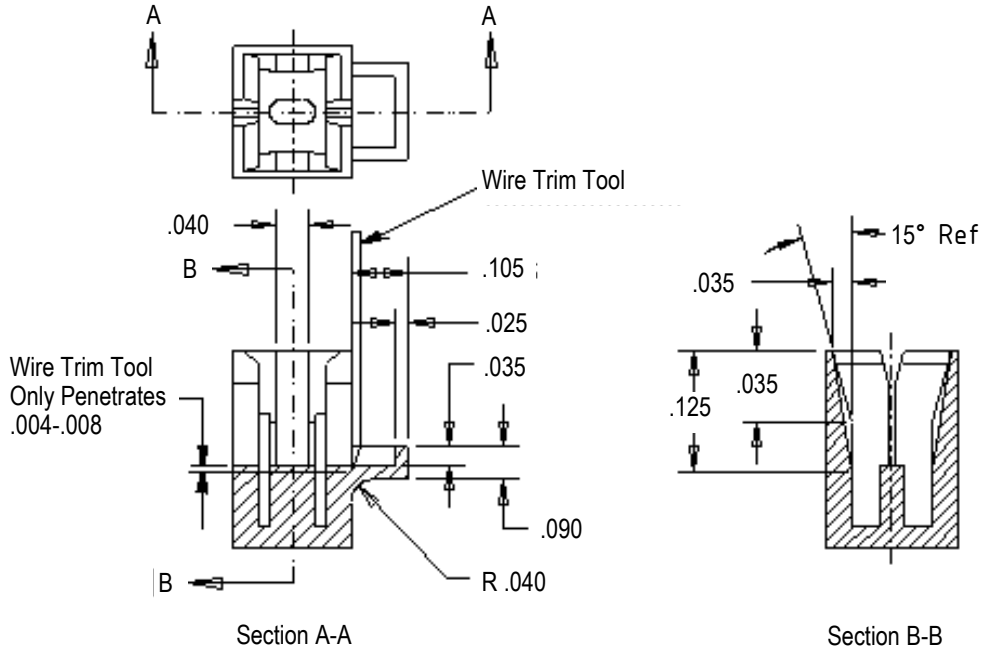


Figure 6

### A. Crimp Wire

Terminals with a crimp barrel are for solid or stranded copper or aluminum wire within the range of 26 through 18 AWG.

"F" CRIMP INTERFACE REQUIREMENTS

PART NUMBER	LEAD WIRE		STRIP LENGTH ±.015	WIRE BARREL CRIMP	
	QTY	SIZE		WIDTH	HEIGHT ±.002
62039	1	26	.115	.055	.028
	1	24			.028
	1	22			.033
62608	1	26	.115	.055	.033
	1	24			.033
	1	22			.038
62609	1	26	.115	.055	.033
	1	24			.033
	1	22			.038
62610	1	26	.115	.055	.033
	1	24			.033
	1	22			.038
63036	1	26	.115	.055	.033
	1	24			.033
	1	22			.038
63856	1	22	.140	.070	.043
	1	20			.047
	1	18			.052

Figure 7

## B. Magnet Wire

There are terminals designed with insulation displacement slots for solid, round, film-coated magnet wire with a copper wire range of 33 through 20 AWG and aluminum wire range of 33 through 27 AWG. The magnet wire should be straight and free of any sharp bends, kinks, or twists.

### 3.5. Terminating Crimp Wire (Figure 8)



#### NOTE

The crimp wire can be crimped to the terminal before OR after the magnet wire is installed.

#### A. Conductor Location

The end of the crimped wire may be flush or it may protrude up to 1.02 mm [.040 in.] from the end of the wire barrel and no insulation should be crimped in the wire barrel.

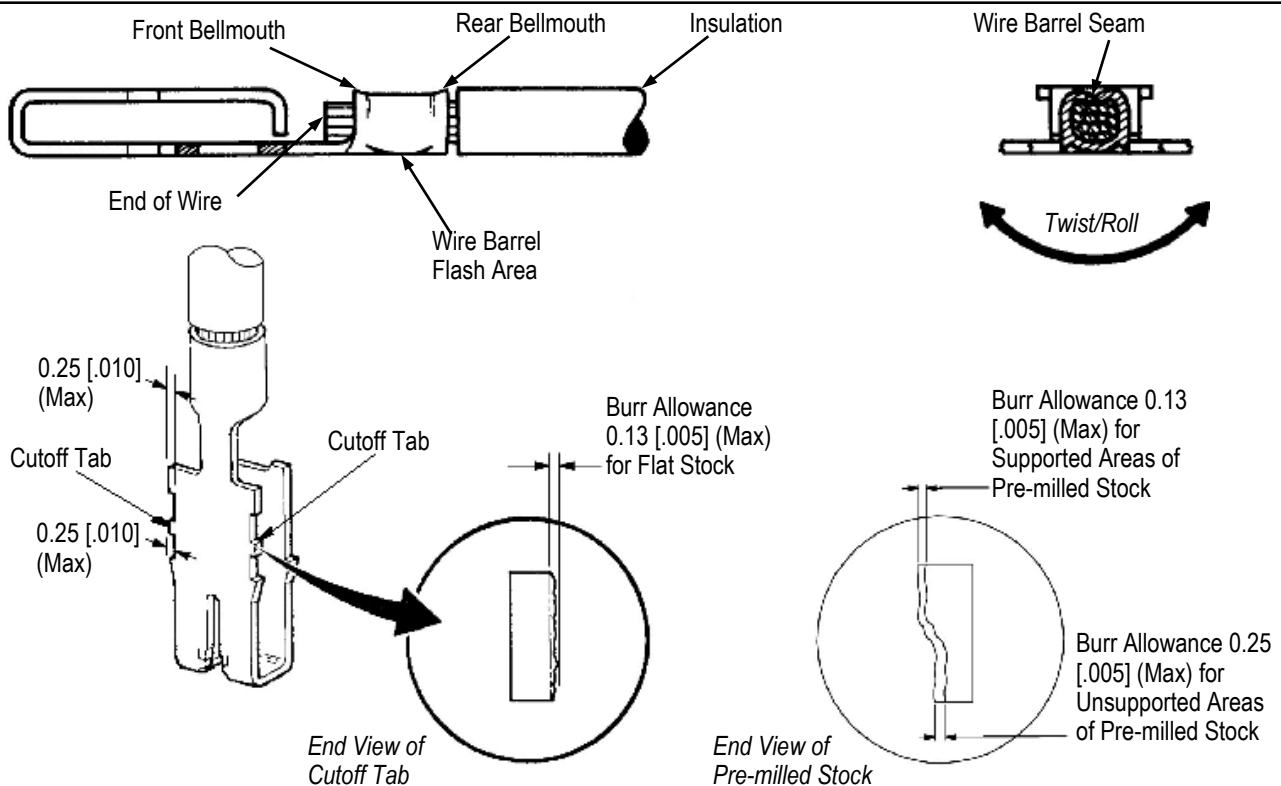


Figure 8

#### B. Wire Barrel Flash

Wire barrel flash is the formation that may appear on both sides of the wire barrel as the result of the crimping process. It shall not exceed 0.13 mm [.005 in.].

#### C. Wire Barrel Seam

The wire barrel seam must be closed with no evidence of loose wire strands visible in the seam.

#### D. Bellmouth

A bellmouth may appear at the front and rear of the crimped wire barrel. The front bellmouth shall not exceed 0.51 mm [.020 in.] and the rear bellmouth should be 0.25 to 0.76 mm [.010 to .030 in.].

#### E. Insulation

No insulation should be crimped in the wire barrel and should be free of nicks or cuts.

## F. Cutoff Tab

Cutoff tabs are the portion of the carrier strip that remain after the terminal is cut from the carrier strip. They should not exceed 0.25 mm [.010 in.] on either side of the terminal.

## G. Burrs

The burr which remains at the bottom of the cutting edge on the tabs should not exceed 0.13 mm [.005 in.] except 0.25 mm [.010 in.] max burr is permissible in areas where pre-milled stock is unsupported during cutoff.

## H. Twist and Roll

There should be no twist or roll of the wire barrel, in relation to the insulation displacement beams, that would cause overstress, or impair usage.

### 3.6. Terminating Magnet Wire

#### A. Wire Placement

The magnet wires from the field assembly, coil, or bobbin must be pre-laced in the plastic cavity prior to terminal insertion. The wire must be pre-laced into the slots of the cavity so that it contacts the top of the anvil which protrudes from the middle of the cavity floor. The wire may rebound from the anvil but must remain within the narrow slots of the cavity; it must not rest in the lead-in area of the slots, or outside the cavity opening. Sufficient slack must exist between the winding and the terminal housing. This is necessary to prevent stretching the magnet wire during terminal insertion. See Figure 9.



#### NOTE

*There must be sufficient slack in the wire to allow any necessary movement of the components within your system.*

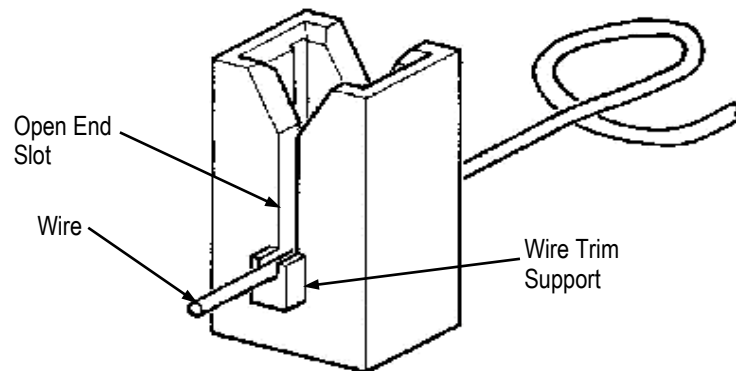


Figure 9

#### B. Terminal Insertion Depth

The terminal shall be inserted into the housing until the wire beams are within  $0.25 \pm 0.25$  mm [.010  $\pm$  .010 in.] as specified in Figure 10.



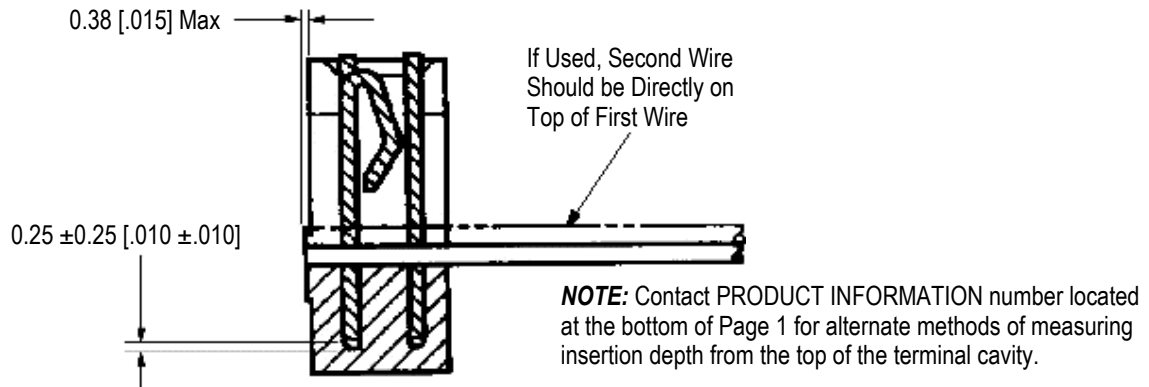


Figure 10

### C. Terminated Wire Position

The wire shall be in contact with the anvil in the terminal cavity of the housing as indicated in Figure 11.

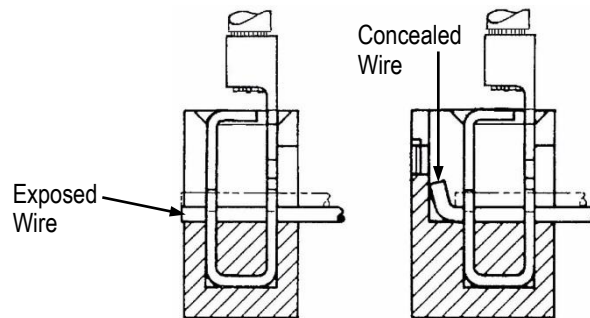


Figure 11

### 3.7. Solder Tine Termination

Wire can be attached to the solder tine using standard heat and reflow soldering techniques.

### 3.8. Tab Terminal Termination

After inserting a tab terminal, bend the tab as indicated in Figure 13 to avoid pull/push force during insertion and extraction of a receptacle terminal. TE has a wide variety of FASTON Receptacle Terminals that will mate with the available tab sizes. We suggest that you consult with your local TE Representative who can assist you in making the best selection.

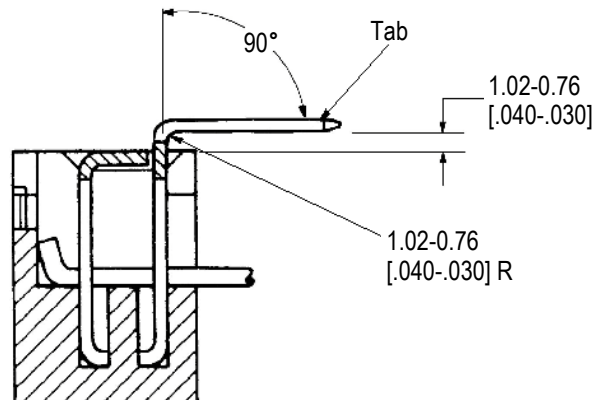


Figure 12

### 3.9. Repair/Replacement



**CAUTION**

Damaged product should not be used. If a damaged terminal is evident, it should be cut from the wire and replaced with a new one. Terminals should not be re-terminated.

### 4. QUALIFICATION

MAG-MATE Series 187 Terminals are Recognized in the Component Recognition Program of Underwriters Laboratories, Inc. (UL) in File Number E13288.

### 5. TOOLING

Figure 13 provides typical tooling part numbers and the corresponding instructional material.



**NOTE**

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

#### 5.1. Crimp-Type Wire Applications

Applicators have been designed to terminate crimp-type terminals in manual and automatic wire feed power sources. Applicators 466569-2 and 567136-1 are recommended for use in the manual wire feed AMP-O-LECTRIC Machine 354500-1.



**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. Read this information 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 **PRODUCT INFORMATION** at the number on the bottom of page 1 for specific changes.

#### 5.2. Magnet Wire Applications

Loose-piece terminals can be inserted with Hand Tool 274249-1. Strip terminals can be inserted with a variety of tools and machines designed for your specific application. Since the exterior design of the housing must meet the requirements of the equipment in which the housing is going to be used, tooling must be designed for each specific application.

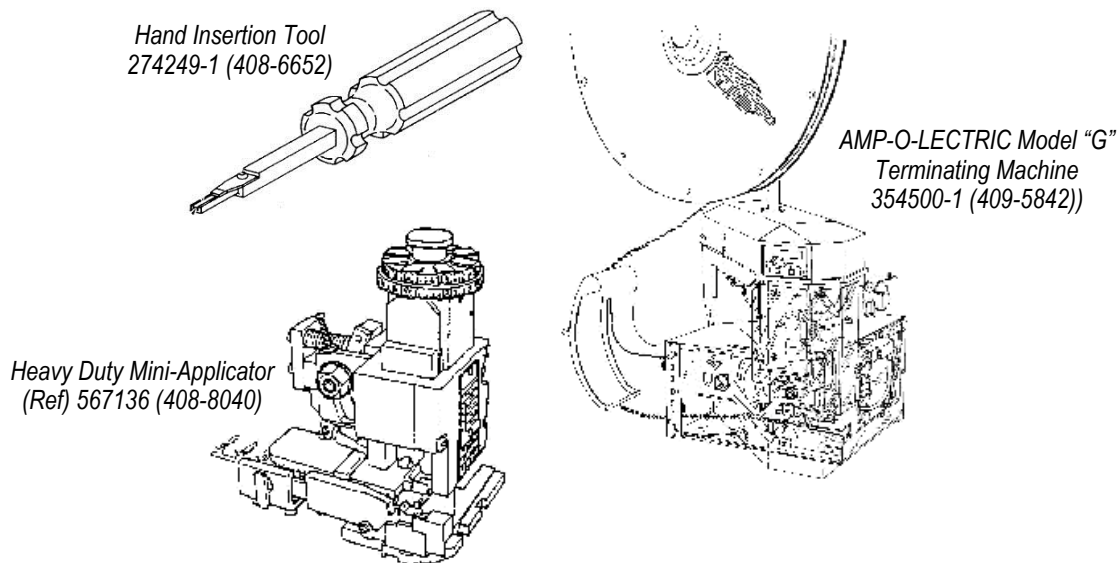
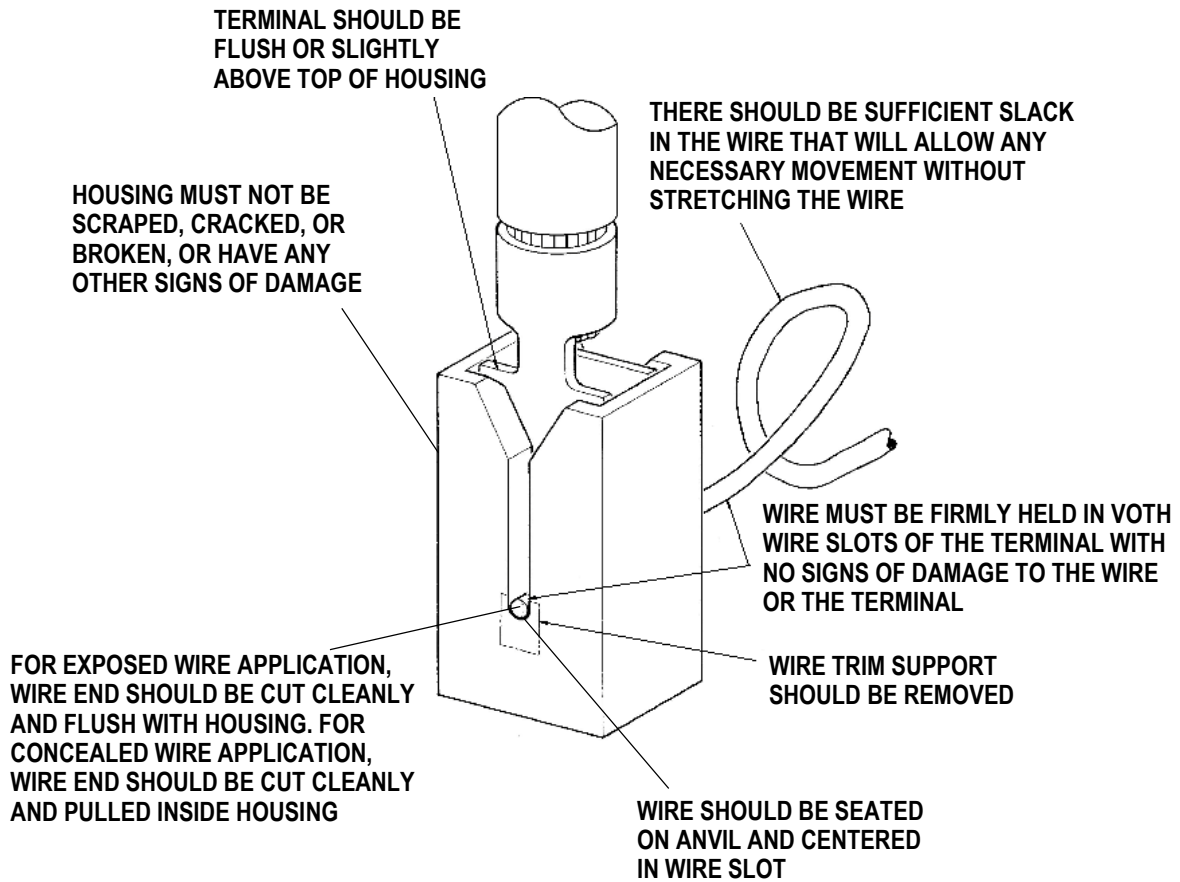


Figure 13

**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 14. VISUAL AID**