

**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 the application of AMPLIMITE HDP-22 Crimp Snap-In Contact Connectors with all-plastic contact retention and the 22DF Contacts used in the connectors. These connectors will mate with any size 22 Subminiature D connector that has dimensions complying with MIL-C-24308. AMPLIMITE HDP-22 Connectors are available in shell sizes 1 through 5. These connectors are designed with cavity identification and features for easy polarization and mating. See Figure 2.

The connectors have centerlines of 2.29 x 1.98 mm [.090 x .078 in.] for shell sizes 1, 2, and 3; 2.41 x 1.98 mm [.095 x .078 in.] for shell size 4; and 2.41 x 2.08 mm [.095 x .082 in.] for shell size 5. The contacts will accept a wire size range of 28 to 22 AWG with an insulation diameter range of 0.76–1.02 mm [.030–.040 in.]. The wire strip length shall be 3.97 mm [5/32 in.] if hand stripped and 3.56 mm [.140 in.] if digital stripping equipment is used. AMPLIMITE HDP-22 Connectors have a variety of shielded and unshielded cable clamps, covers, mounting hardware, retainers, locking posts, screwlocks, slide and spring latches, and latching blocks to choose from for your mounting requirements. Contacts, inner and outer ferrules can be applied by hand or machine, depending on your termination requirements.

When corresponding with TE 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.

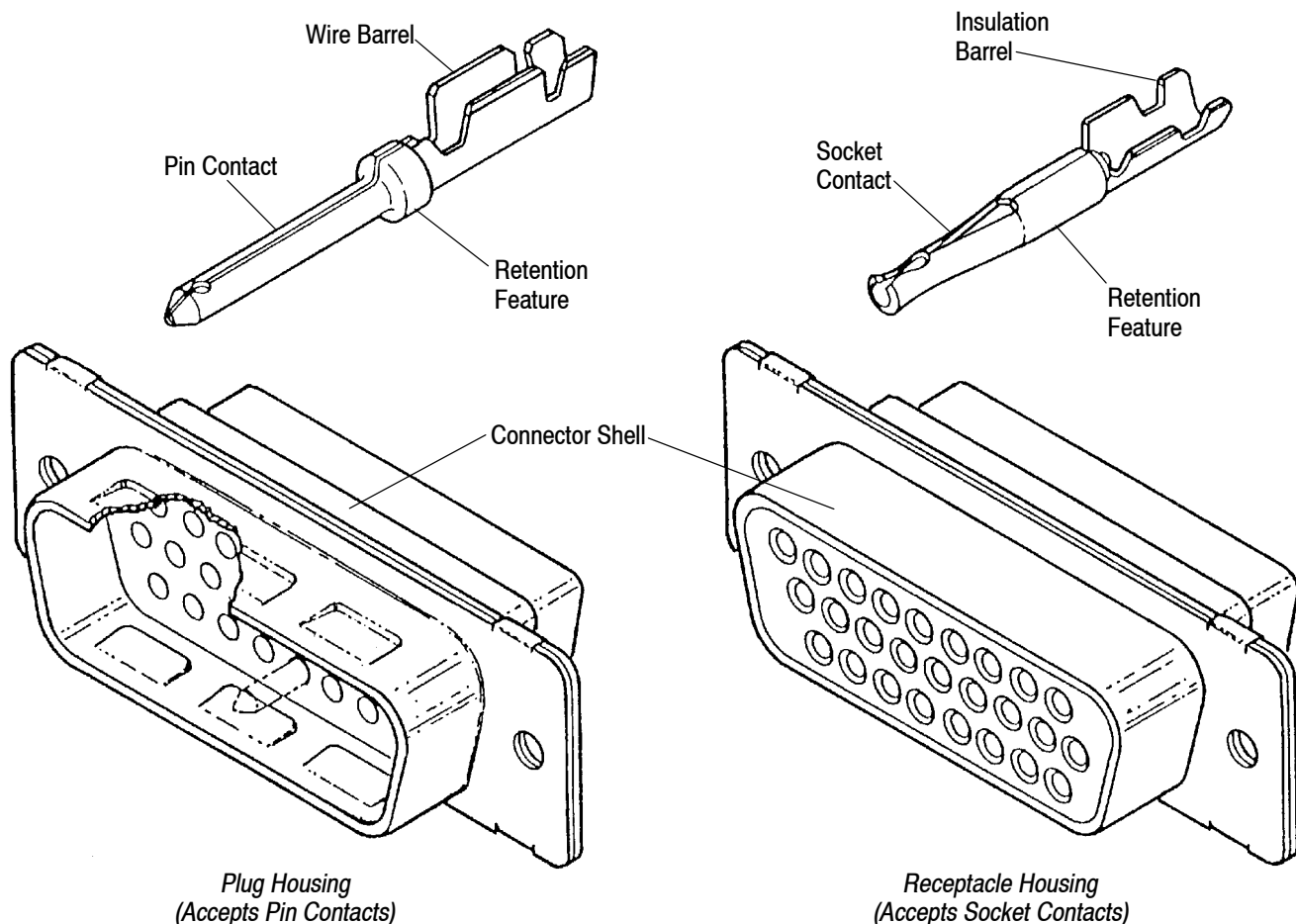


Figure 1

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

This paragraph is reserved for a revision summary of the most recent additions and changes made to this specification which include the following:

- Updated specification to corporate requirements
- Deleted obsolete documents and added new documents in Paragraphs 2.4.B and 2.5
- New logo and format

### 2.2. Customer Assistance

Reference Part Number 748333 and Product Code 4868 are representative numbers of AMPLIMITE HDP-22 Connectors and High-Density 22DF Contacts. 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 TE Representative or, after purchase, by calling the Tooling Assistance Center or Product Information number at the bottom of page 1.

### 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 other technical documentation supplied by Tyco Electronics.

### 2.4. Specifications

#### A. Product Specifications

Product Specification 108-1268 provides product performance requirements and test information. Product Specification 108-1092 provides related AMPLIMITE Connector Printed Circuit (PC) Board requirements.

#### B. Application Specifications

The following Application Specifications provide design, inspection and assembly procedures for related AMPLIMITE HD-22 Connectors:

| <u>Document Number</u> | <u>Document Title</u>                                    |
|------------------------|----------------------------------------------------------|
| 114-13198              | AMPLIMITE HD-22 Right-Angle Front Metal Shell Connectors |
| 114-13199              | AMPLIMITE HD-22 Straight Front Metal Shell Connectors    |

#### C. Military Specifications

These assembled connectors conform to the requirements of MIL-C-24308.

### 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.

| <u>Document Number</u> | <u>Document Title</u>                                                     |
|------------------------|---------------------------------------------------------------------------|
| 408-2498               | Crimping Head Cross Reference for Pneumatic Tools                         |
| 408-3295               | Preparing Reel of Contacts for Application Tooling                        |
| 408-4007               | PRO CRIMPER* II Hand Tool Assembly 90800-1 with Die Assembly 90800-2      |
| 408-4106               | Straight Action Crimp Head Adapter                                        |
| 408-4190               | C-Head Pneumatic Adapter 318161-1                                         |
| 408-4390               | Applicator 2000 (For Side-Feed Applications)                              |
| 408-6551               | Slide Latch Kits and Locking Post Kits                                    |
| 408-6609               | AMPLIMITE HD-20 Shielded Cable Clamp Kits                                 |
| 408-6769               | AMPLIMITE HDP-20, HDP-22, and HDE-20 R/A, Metal Shielded Cable Clamp Kits |
| 408-7424               | Checking Terminal Crimp Height or Gaging Die Closure                      |
| 408-7555               | Cable Clamp Assemblies for AMPLIMITE HD-20 and HD-22 Connectors           |
| 408-7837               | Female Screwlock Kits and Male Screw Retainer Kits                        |
| 408-8040               | Heavy Duty Miniature Quick-Change Applicators (Side-Feed Type)            |
| 408-8053               | Conversion Guide for Miniature Quick-Change Applicators                   |
| 408-8083               | Ferrule Applicator Assembly No. 812407-1                                  |

| Document Number | Document Title                                                                |
|-----------------|-------------------------------------------------------------------------------|
| 408-9128        | AMPLIMITE Latching Blocks                                                     |
| 408-9130        | Two-Piece Spring Latches for AMPLIMITE Connectors with Cable Clamps           |
| 408-9131        | Two-Piece Spring Latches for AMPLIMITE Connectors w/Post Molded Strain Relief |
| 408-9199        | Shielding Enclosure Expansion Tool Kits 58241-1, -2, and -4                   |
| 408-9238        | Universal Cable Clamp Kits for AMPLIMITE Connectors                           |
| 408-9315        | Hand Crimping Tool 543344-1                                                   |
| 408-9318        | Die Assemblies 543013-[ ]                                                     |
| 408-9375        | Hand Crimping Tool 90430-1                                                    |
| 408-9381        | AMPLIMITE HDP-22 Connectors (Plugs and Receptacles) with Crimp-Type Contacts  |
| 408-9404        | Insertion/Extraction Tool 91285-1 and Replacement Tip Kits 543382-[ ]         |
| 408-9816        | Handling of Reeled Products                                                   |
| 409-5128        | Basic AMP-O-ELECTRIC* Model "K" Terminating Machine                           |
| 409-5842        | AMP-O-ELECTRIC Model "G" Terminating Machine                                  |
| 409-5852        | AMPOMATOR* CLS III-G Lead Making Machine                                      |
| 409-5855        | AMP-O-MATIC* Side Feed Stripper Crimper Model II Machine No. 854040-3 and -4  |
| 409-5862        | 626 Pneumatic Tool Assemblies 189721-[ ] and 189722-[ ]                       |
| 409-5878        | AMPOMATOR CLS IV+ Lead-Making Machine                                         |

### 3. REQUIREMENTS

#### 3.1. Storage

|                                                                                                              |                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>NOTE</div> <div></div> | <p><i>Due to the design of the connector, some corrosion may occur on the metal shell near the crimp tabs and on the ends of the shell. This condition does not affect the aesthetics, form, fit, or function of the connector or adjacent components and is considered to be acceptable by Tyco Electronics.</i></p> |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

##### A. Ultraviolet Light

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

##### B. Reel Storage

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

##### C. Shelf Life

The contacts and housings should remain in the shipping containers until ready for use to prevent deformation to those components. The components 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, housings, or accessories near any chemicals listed below as they may cause stress corrosion cracking in the components.

|          |            |          |            |          |                  |
|----------|------------|----------|------------|----------|------------------|
| Alkalies | Ammonia    | Citrates | Phosphates | Citrates | Sulfur Compounds |
| Amines   | Carbonates | Nitrites | Sulfides   | Nitrites | Tartrates        |

#### 3.2. Special Characteristics

AMPLIMITE HDP-22 Connectors come in a variety of sizes for your production needs and are adaptable to a variety of mounting and hardware requirements. See paragraph 3.4 for contact positions. Using a keystone mating face configuration, these connectors incorporate multiple polarization and mating alignment features, allowing flexibility in system design. The plug connector has an integral hood which protects the inserted pin contacts. See Figure 2.

Crimped DF-22 Contacts, with retention shoulders, are inserted into the cavities in the BACK of the connector housing and snap into place. The cavity rows are number-coded for your convenience. If your design does not require the use of all cavities, the contacts should be distributed evenly throughout the connector.

**NOTE**

After inserting a contact into the housing, pull back *LIGHTLY* on the wire to make sure the contact is fully seated.

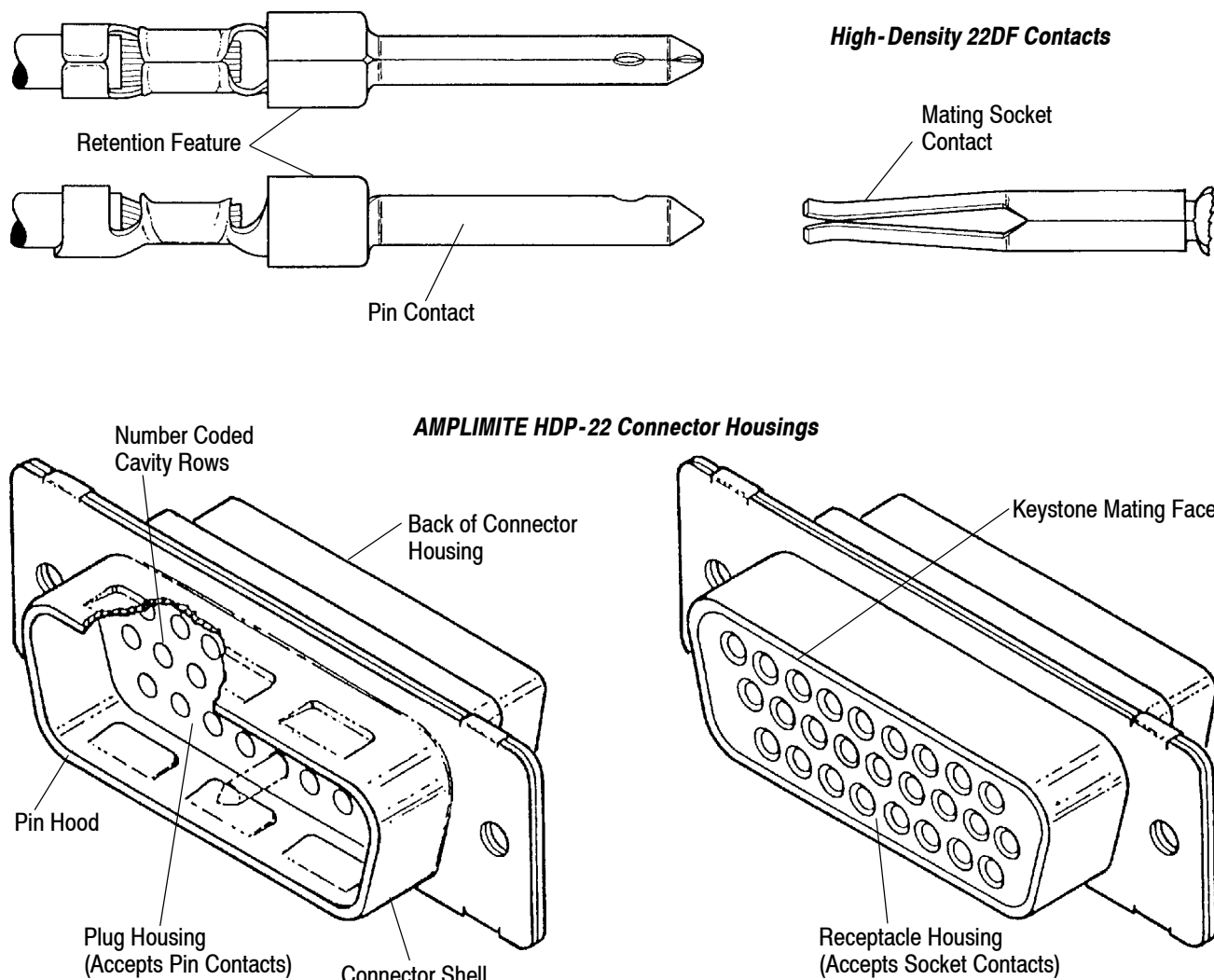


Figure 2

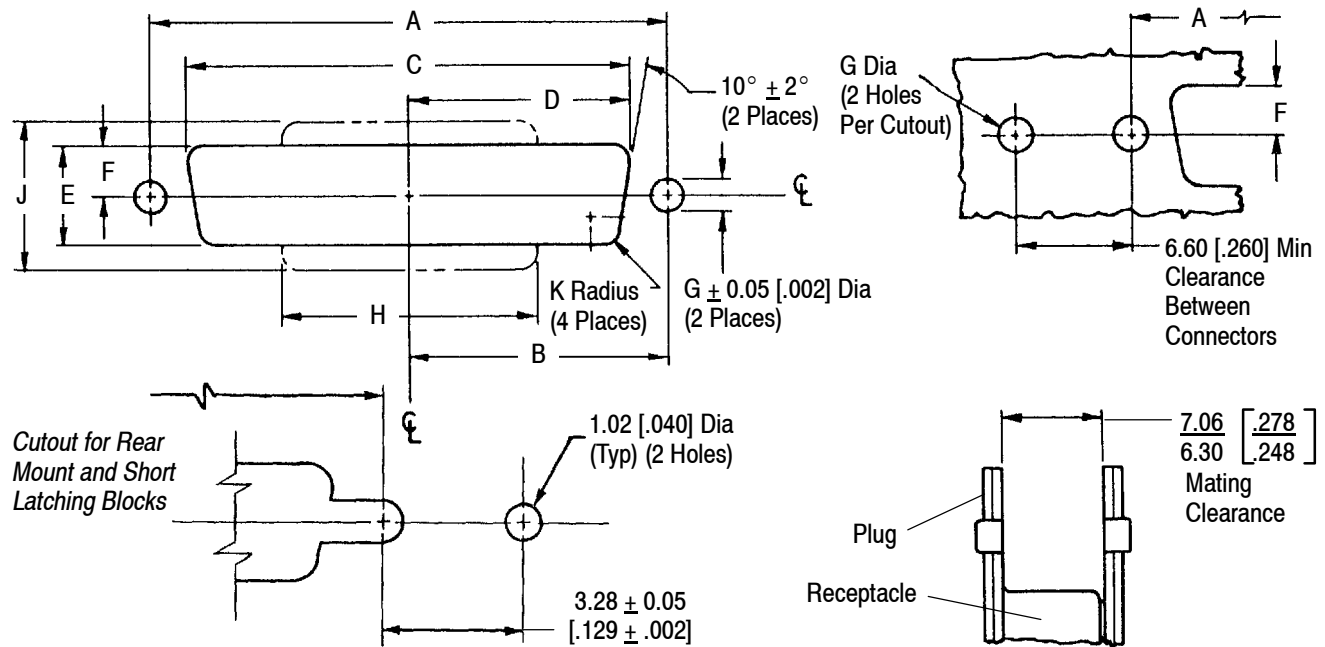
### 3.3. Panel Mounting Requirements

HDP-22 Connectors are designed for rack and panel, free-hanging, or combination of free-hanging and panel mounting applications. The plug should be mounted in the panel, and the receptacle in the rack. Refer to Figure 3 for mating clearance requirements, dimensions, and layout for the mounting requirements.

**NOTE**

Dimensions H and J apply when *FRONT-MOUNTING* the connector, or when using cable clamps or latching blocks.





| CONNECTOR POSITIONS AND SHELL SIZE | PANEL MTG POSN | FLOATING BUSHING | DIMENSIONS ±0.05 [.002] |              |               |              |              |             |             |               |              |             |
|------------------------------------|----------------|------------------|-------------------------|--------------|---------------|--------------|--------------|-------------|-------------|---------------|--------------|-------------|
|                                    |                |                  | A                       | B            | C             | D            | E            | F           | G           | H●            | J●           | K           |
| 15 Position Size 1                 | Front          | Yes              | 24.99 [.984]            | 12.50 [.492] | 23.01 [.906]  | 11.51 [.453] | 13.84 [.545] | 6.93 [.273] | 2.24 [.088] | ---           | ---          | 2.11 [.083] |
|                                    |                | No               |                         |              | 22.20 [.874]  | 11.10 [.437] | 13.03 [.513] | 6.53 [.257] | 3.05 [.120] | ---           | ---          |             |
|                                    | Rear           | Yes              |                         |              | 21.29 [.838]  | 10.64 [.419] | 12.22 [.481] | 6.12 [.241] | 2.24 [.088] | ---           | ---          | 3.35 [.132] |
|                                    |                | No               |                         |              | 20.47 [.806]  | 10.24 [.403] | 11.40 [.449] | 5.72 [.225] | 3.05 [.120] | 13.97 [.550]  | 19.05 [.750] |             |
| 26 Position Size 2                 | Front          | Yes              | 33.32 [1.312]           | 16.66 [.656] | 31.34 [1.234] | 15.67 [.617] | 13.84 [.545] | 6.93 [.273] | 2.24 [.088] | ---           | ---          | 2.11 [.083] |
|                                    |                | No               |                         |              | 30.53 [1.202] | 15.27 [.601] | 13.03 [.513] | 6.53 [.257] | 3.05 [.120] | ---           | ---          |             |
|                                    | Rear           | Yes              |                         |              | 29.62 [1.166] | 14.81 [.583] | 12.22 [.481] | 6.12 [.241] | 2.24 [.088] | ---           | ---          | 3.35 [.132] |
|                                    |                | No               |                         |              | 28.80 [1.134] | 14.40 [.567] | 11.40 [.449] | 5.72 [.225] | 3.05 [.120] | 18.54 [.730]  | 19.05 [.750] |             |
| 44 Position Size 3                 | Front          | Yes              | 47.04 [1.852]           | 23.52 [.926] | 45.08 [1.775] | 22.56 [.888] | 13.84 [.545] | 6.93 [.273] | 2.24 [.088] | ---           | ---          | 2.11 [.083] |
|                                    |                | No               |                         |              | 44.27 [1.743] | 22.15 [.872] | 13.03 [.513] | 6.53 [.257] | 3.05 [.120] | ---           | ---          |             |
|                                    | Rear           | Yes              |                         |              | 43.33 [1.706] | 21.67 [.853] | 12.22 [.481] | 6.12 [.241] | 2.24 [.088] | ---           | ---          | 3.35 [.132] |
|                                    |                | No               |                         |              | 42.52 [1.674] | 21.26 [.837] | 11.40 [.449] | 5.72 [.225] | 3.05 [.120] | 32.28 [1.275] | 19.05 [.750] |             |

●Dimensions H and J apply when using cable clamps or latching blocks. Connectors with floating bushings are for use in drawer applications, or other difficult alignment situations.

Figure 3 (cont'd)

| CONNECTOR POSITIONS AND SHELL SIZE | PANEL MTG POSN | FLOATING BUSHING | DIMENSIONS $\pm 0.05$ [.002] |                  |                  |                  |                 |                |                |     |     |                |
|------------------------------------|----------------|------------------|------------------------------|------------------|------------------|------------------|-----------------|----------------|----------------|-----|-----|----------------|
|                                    |                |                  | A                            | B                | C                | D                | E               | F              | G              | H●  | J●  | K              |
| 62 Position Size 4                 | Front          | Yes              | 63.50<br>[2.500]             | 31.75<br>[1.250] | 61.54<br>[2.423] | 30.78<br>[1.212] | 13.84<br>[.545] | 6.93<br>[.273] | 2.24<br>[.088] | --- | --- | 2.11<br>[.083] |
|                                    |                | No               |                              |                  | 60.73<br>[2.391] | 30.38<br>[1.196] | 13.03<br>[.513] | 6.53<br>[.257] | 3.05<br>[.120] |     |     |                |
|                                    | Rear           | Yes              |                              |                  | 59.79<br>[2.354] | 29.90<br>[1.177] | 12.22<br>[.481] | 6.12<br>[.241] | 2.24<br>[.088] | --- | --- | 3.35<br>[.132] |
|                                    |                | No               |                              |                  | 59.08<br>[2.326] | 29.54<br>[1.163] | 11.40<br>[.449] | 5.72<br>[.225] | 3.05<br>[.120] |     |     |                |
| 78 Position Size 5                 | Front          | Yes              | 61.11<br>[2.406]             | 30.56<br>[1.203] | 59.16<br>[2.329] | 29.59<br>[1.165] | 16.64<br>[.655] | 8.33<br>[.328] | 2.24<br>[.088] | --- | --- | 2.11<br>[.083] |
|                                    |                | No               |                              |                  | 58.34<br>[2.297] | 29.18<br>[1.149] | 15.82<br>[.623] | 7.92<br>[.312] | 3.05<br>[.120] |     |     |                |
|                                    | Rear           | Yes              |                              |                  | 57.15<br>[2.250] | 28.58<br>[1.125] | 14.91<br>[.587] | 7.47<br>[.291] | 2.24<br>[.088] | --- | --- | 3.35<br>[.132] |
|                                    |                | No               |                              |                  | 56.34<br>[2.218] | 28.17<br>[1.109] | 14.10<br>[.555] | 7.06<br>[.278] | 3.05<br>[.120] |     |     |                |

●Dimensions H and J apply when using cable clamps or latching blocks. Connectors with floating bushings are for use in drawer applications, or other difficult alignment situations.

Figure 3 (end)

### 3.4. Hardware and Accessories (Placement and Assembly)

AMPLIMITE HDP-22 connectors are available with the mounting hardware and accessories shown in Figure 4. For more information on these or other hardware and accessories, call the Product Information number at the bottom of page 1.

Instruction material listed with each accessory provides details for product selection and assembly procedures. Some of the instructions were written for the AMPLIMITE HDP-20 Connector product line, however, HDP-22 connectors use the same outer shell size, enabling the same accessories to be used with both product lines. Figure 4 is a cross-reference by shell size to guide you in selecting the proper accessories for the size connector you wish to use.

#### NOTE



Refer to Paragraph 2.5, Instructional Material, for procedures on using the following assembly and mounting hardware.

#### NOTE



Before securing cable clamp halves, make sure you have sufficient slack in the wire to prevent the wire from being taut.

#### A. Plastic Cable Clamp

Cable clamp assembly kits are available in straight/45° and straight/90° versions. The clamp assemblies can be mated using spring latches and latching blocks, or using screwlocks and retainers.

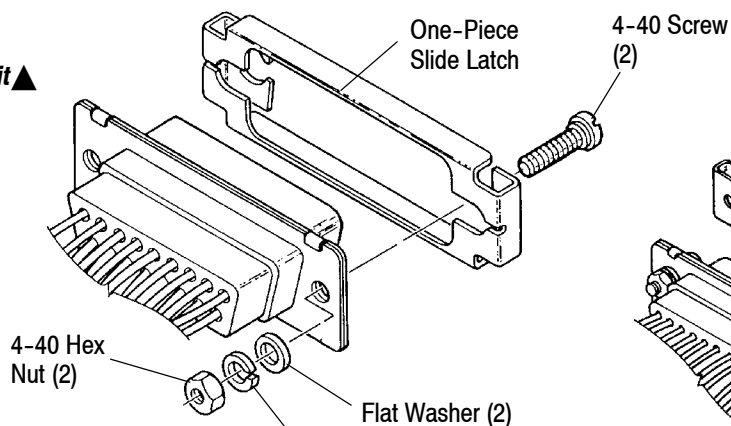
#### B. Metal Cable Clamp

Metal RFI/EMI Shielded Cable Clamp Assemblies come in two-piece kits, and are available in both straight-exit and 90°-exit versions. The straight-exit shield is attached to the connector using saddle screws. The 90°-exit shield is attached using slide latches and screws.

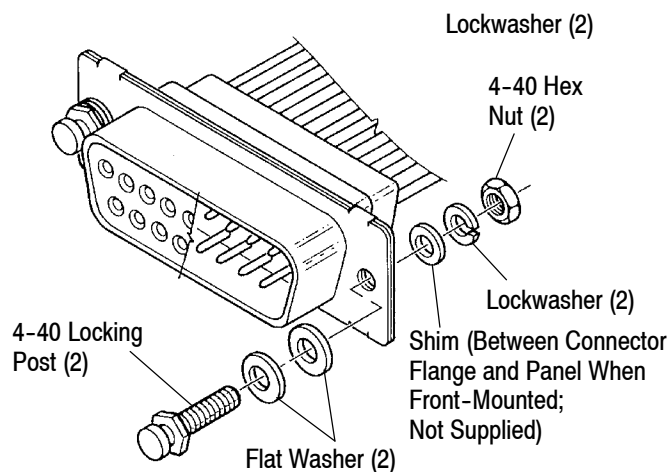
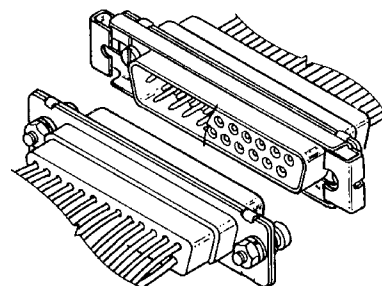
#### C. Universal Cable Clamp

Universal cable clamp kits are available for size 3 connectors ONLY. Each kit consists of two cable clamp halves, a two-piece braid termination clamp set (shielded versions only), a cable clamp wedge set, and screws.

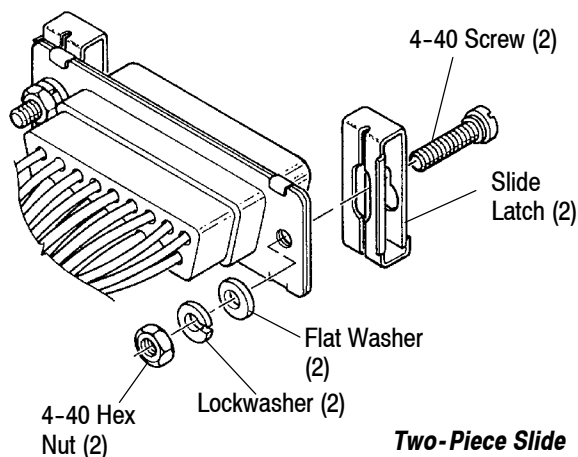
**One-Piece Slide  
Latch Assembly Kit ▲**



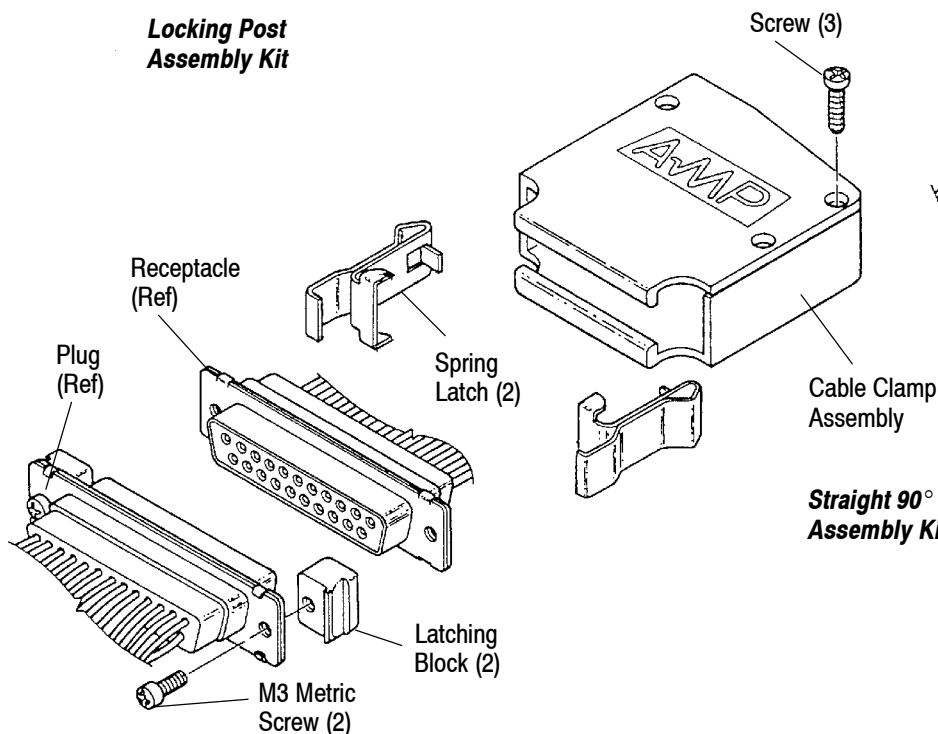
**Typical Slide  
Latch Application**



**Locking Post  
Assembly Kit**



**Two-Piece Slide  
Latch Assembly Kit**



**Straight 90° Cable Clamp  
Assembly Kit (Assembled)**

▲ One-piece slide latches for shell sizes 1 and 4 cannot be used with cable clamps that extend beyond the front of the connector flange.

Figure 4 (cont'd)

### Cable Clamp Assembly with Screwlocks and Retainers

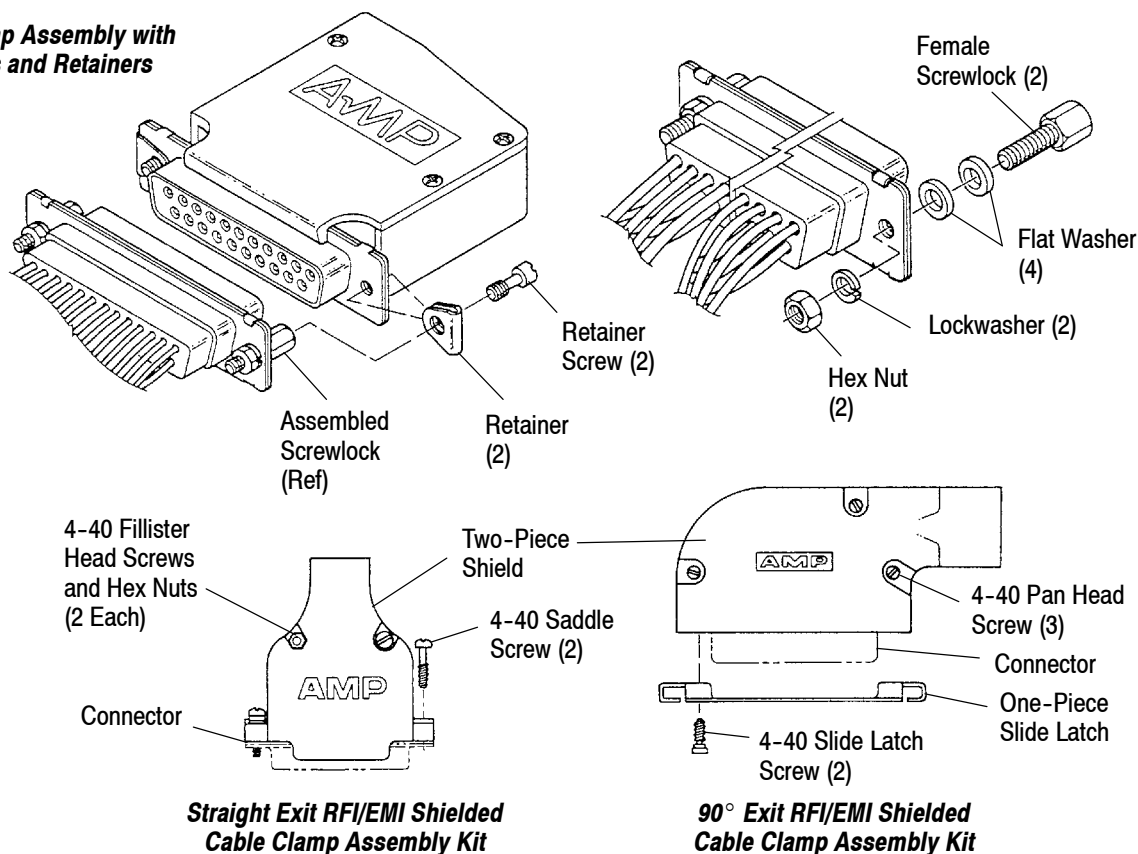


Figure 4 (end)

### D. Slide Latch Assembly

One-piece slide latch assemblies and two-piece slide latch clips attach to the connector mating face. The mating connector uses locking post assemblies onto which the slide latch assembly will latch.

### E. Ferrules

For applications using jacketed shielded cable with AMPLIMITE shields, three types of ferrules are available. Split-ring ferrules are used with foil or braided shields and are not crimped. Inner and outer crimped ferrules are for use on braid-shielded cable only. See Figure 5.

#### CABLE DIAMETER RANGE

| SHELL SIZE | INNER AND OUTER FERRULES      | SPLIT-RING FERRULES           |
|------------|-------------------------------|-------------------------------|
| 1          | 4.83 - 9.40<br>[.190 - .370]  | 4.06 - 9.40<br>[.160 - .370]  |
| 2          | 4.83 - 10.92<br>[.190 - .430] | 4.70 - 10.92<br>[.185 - .430] |
| 3          | 4.83 - 13.46<br>[.190 - .530] | 6.10 - 13.46<br>[.240 - .530] |
| 4          | 4.83 - 16.51<br>[.190 - .650] | 7.87 - 16.51<br>[.310 - .650] |
| 5          | 4.83 - 19.05<br>[.190 - .750] | 8.51 - 19.05<br>[.335 - .750] |

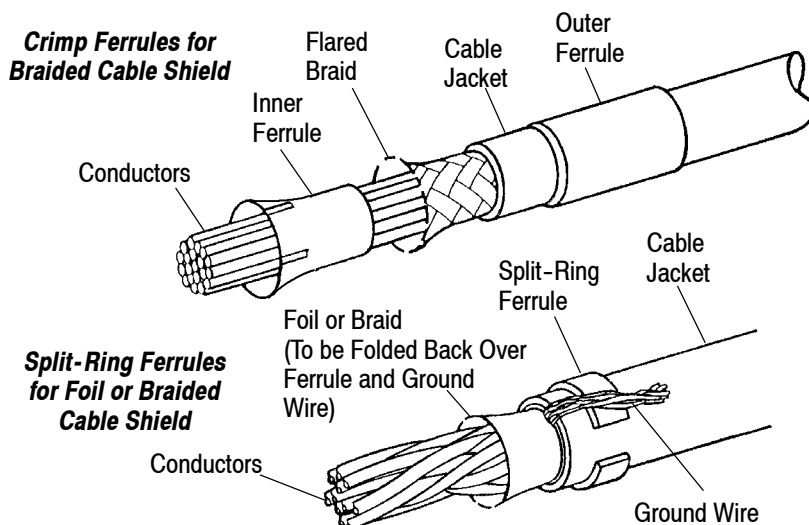


Figure 5

### 3.5. Wire Selection and Preparation

#### A. Types

The contact will accept discrete copper solid, fused-stranded, or stranded conductor wire within the range of 28 through 22 AWG.

#### B. Preparation

##### NOTE

Position the crimp ferrule over the cable jacket before stripping wire.



The wire must be stripped to the dimension provided in Figure 6.

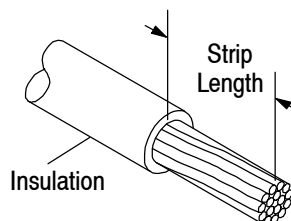
##### CAUTION

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



Figure 6 provides information on insulation strip lengths as determined by the size contact used. Also listed are acceptable wire insulation outside diameters for the contacts, crimp width, and crimp height. Crimp the contact in the appropriate tooling according to the instructions packaged with that tooling.

**NOTE:** Not to Scale



| WIRE SIZE,<br>AWG | INSULATION<br>DIAMETER   | STRIP<br>LENGTH                   | WIRE BARREL CRIMP     |                          | INSULATION BARREL CRIMP  |                |
|-------------------|--------------------------|-----------------------------------|-----------------------|--------------------------|--------------------------|----------------|
|                   |                          |                                   | HEIGHT●               | WIDTH                    | WIDTH                    | HEIGHT (REF)   |
| 28                | 0.76-1.02<br>[.030-.040] | 3.56 [.140]<br>or<br>3.97 [.156]† | 0.58-.074 [.023-.029] | 1.22-1.02<br>[.048-.040] | 1.47-0.97<br>[.058-.038] | 1.45<br>[.057] |
| 26                |                          |                                   | 0.64-0.74 [.025-.029] |                          |                          |                |
| 24                |                          |                                   | 0.71-0.84 [.028-.033] |                          |                          |                |
| 22                |                          |                                   | 0.74-0.91 [.029-.036] |                          |                          |                |

●The crimp height range listed in each row represents the entire range for all available tooling. The crimp heights and tolerances specified in specific tooling instruction material or applicator logs supercedes the values in this table. †Hand Stripping Only

Figure 6

### 3.6. Tensile Inspection

Crimped contacts should hold the wire firmly and have a crimp pull-out test value meeting that specified in the chart in Figure 7.

##### NOTE

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



| CRIMP PULL OUT TEST |                                |
|---------------------|--------------------------------|
| WIRE SIZE, AWG      | MINIMUM FORCE NEWTONS (POUNDS) |
| 28                  | 12.01 [2.7]                    |
| 26                  | 20.02 [4.5]                    |
| 24                  | 35.56 [8.0]                    |
| 22                  | 53.38 [12.0]                   |

Figure 7

### 3.7. Crimped Contact Requirements

#### A. Axial Concentricity

The axial concentricity of a crimped contact shall be within an area defined by the diameter of a circle that has the same center as the centerline of the contact. The diameter of the circle will depend on the wire size. The contact, including the cutoff tab and burr, shall pass through a 15.88 mm [.625 in.] long, straight tube with an inside diameter of 1.60 mm [.063 in.]. After inserting the mating end of the crimped contact into the tube, the contact shall pass through the tube without interference between the inside diameter of the tube and the contact insulation barrel or the cutoff tab. See Figure 8.

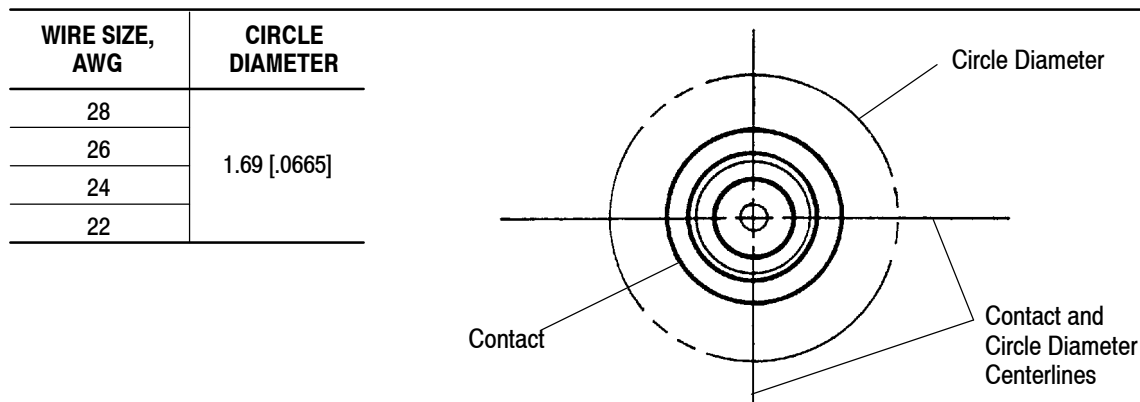
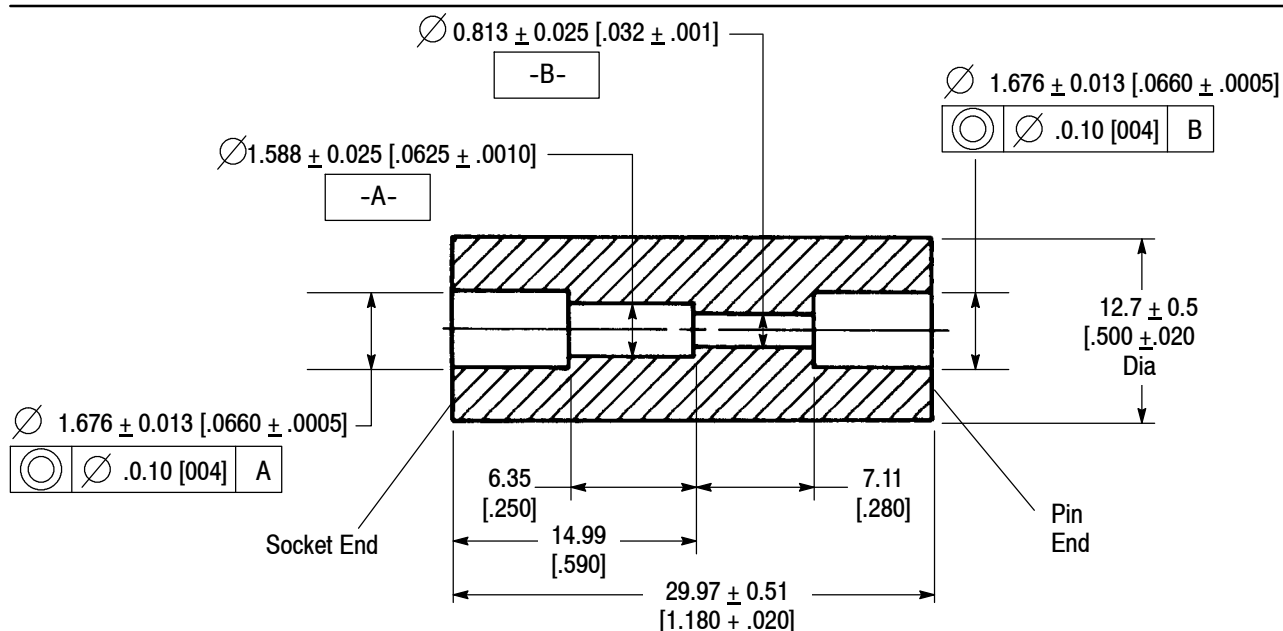


Figure 8

#### B. Twist and Roll

There shall be no twist, roll, deformation, or other damage to the mating portion of the crimped contact that will prevent proper insertion into the connector housing or that will prevent mating with its counterpart contact. Test questionable contacts using a straightness gage manufactured to the specifications of Figure 9. To be considered acceptable for use, a contact must fully enter the gage without binding.



**NOTES:** Material: Tool Steel, AISI Type 01 or 02  
Hardness: Rockwell B99 Maximum  
Finish: Black Oxide

Figure 9

Figure 10 shows a typical contact as it should appear after crimping. Figure 6 lists proper crimp dimensions.

**NOTE**

Periodic inspections must be made to ensure crimped contact formation is consistent as referenced in Figure 10.


**C. Crimp Location**

For optimum crimp effectiveness, the crimp must be within the area shown and must meet the crimp requirements provided in Figure 6. Effective crimp length shall be 2.06 mm [.081 in.] minimum, and is defined as that portion of the wire barrel, excluding bellmouth(s), fully formed by the crimping tool. Instructions for adjusting, repairing, and inspecting tools are packaged with the tools.

**D. Conductor Extension**

The conductor may extend beyond the wire barrel to the maximum shown.

**E. Wire Barrel Seam**

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

**F. Conductor/Insulation**

The conductor and insulation must both be visible in the area between the insulation barrel and the wire barrel.

**G. Bellmouths**

Front and rear bellmouths shall be formed and adhere to the dimensions given.

**H. Cutoff Tab**

The cutoff tab shall not be longer than 0.25 mm [.010 in.].

**I. Burrs**

The burr on the cutoff tab shall not exceed 0.13 mm [.005 in.].

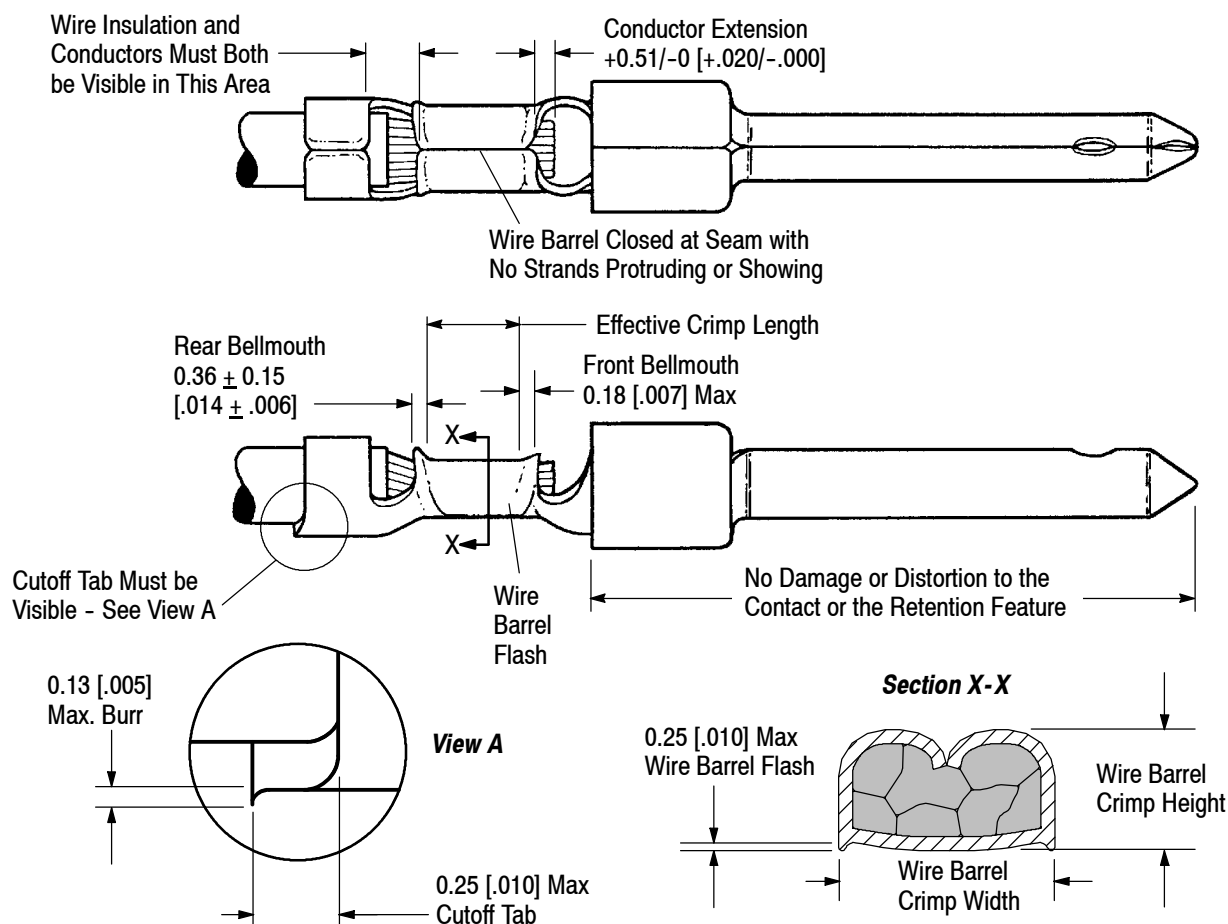


Figure 10

## J. Flash

The wire barrel flash shall not exceed the dimensions shown in Section X-X. See Figure 10.

## K. Straightness

The contact, including the cutoff tab and burr, shall not be bent above or below the datum line more than the amount shown. The side-to-side bending of the contact shall not exceed the limits specified. See Figure 11.

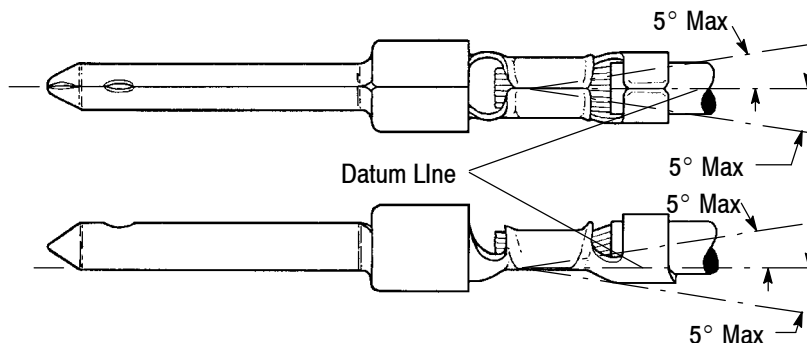


Figure 11

## 3.8. Precautions



*Do not over-tighten, or use excessive force in mating connector housings or mounting hardware. Push testing is not recommended as it could damage the locking tines in the housing.*

## 3.9. Repair/Replacement



*Do NOT re-use damaged contacts.*

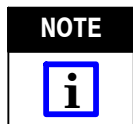
Contacts are not repairable once a termination has been made. Any defective contact should be removed and replaced with a new one. Damaged contacts can be removed from the housing by using Insertion/Extraction Tool 91285-1. Refer to Instruction Sheet 408-9404 for extraction procedures.

## 4. QUALIFICATIONS

AMPLIMITE HDP-22 Connectors are Listed by Underwriters Laboratories Inc. (UL) in File Number E81956 and Recognized with the Component Program in file No. E28476, and Certified by CSA International in File Number LR 16455. These connectors are also Mil-Spec Qualified with MIL-C-24308.

## 5. TOOLING

A listing of tooling recommendations covering the full wire size range is provided in Figure 12. The listing includes semi-automatic and automatic machines for power assisted application of strip form contacts. Modified designs and additional tooling concepts may be available to meet other application requirements. For additional information, contact one of the service groups at the bottom of page 1.



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

### • Applicators

Applicators are designed for the full wire size range of strip-fed, precision formed contacts, 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 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.

**NOTE**


The Model "K" AMP-O-ELECTRIC Terminating Machine PN 565435-5 has been superseded by the Model "G" Terminating Machine PN 354500-1 for new applications. For existing applications, the Model "K" is still recommended because of the large number of installed machines.

- **Hand Tools**

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

- **Crimping Die Assemblies**

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

- **Expansion Tools**

Expansion tools are recommended for expanding the cable exit hole in the shielding enclosure to ease insertion of the jacketed cable into the enclosure.

- **Insertion/Extraction Tools**

Insertion/Extraction tools are designed for contacts crimped to small fragile wire. They are designed to stabilize the contact during insertion. The extraction tip is used to release the contacts inside the connector housings without damaging the housing or contacts.

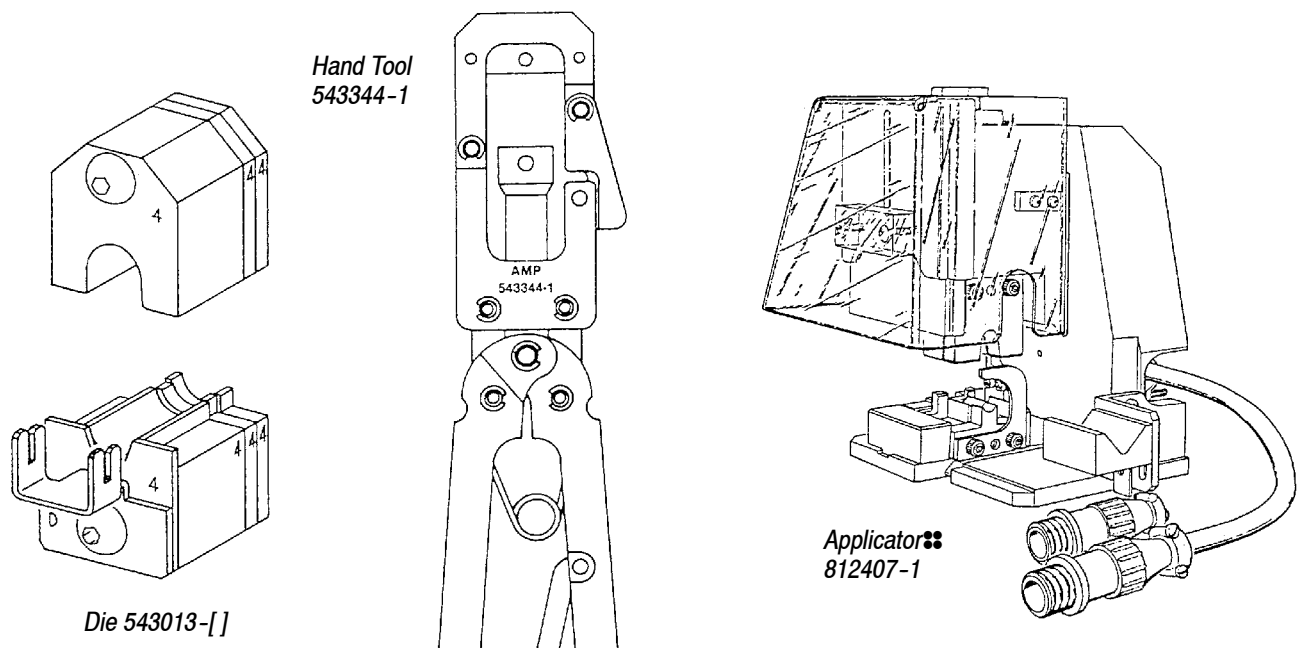
| WIRE SIZE,<br>AWG | INSULATION<br>DIAMETER   | HAND TOOL<br>(DOCUMENT)                              | CRIMPING<br>DIES<br>(DOCUMENT) | HEAD<br>(DOCUMENT)     | PNEUMATIC<br>HOLDER<br>(DOCUMENT)    | APPLICATOR<br>(DOCUMENT) | POWER UNIT<br>(DOCUMENT)                                                                                            |
|-------------------|--------------------------|------------------------------------------------------|--------------------------------|------------------------|--------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------|
| 28                | 0.76-1.02<br>[.030-.040] | ---                                                  | ---                            | ---                    | ---                                  | 567906-1                 | 854040-3<br>(409-5855)                                                                                              |
| 28-22             | 0.76-1.02<br>[.030-.040] | 90430-1<br>(408-9375)<br>or<br>90800-1<br>(408-4007) | ---                            | ---                    | ---                                  | ---                      | ---                                                                                                                 |
|                   |                          | 189721-1<br>(409-5862)                               | 90430-2                        | 217201-1<br>(408-4106) | 189928-1<br>(408-2498)<br>(408-4190) | ---                      | ---                                                                                                                 |
|                   |                          | ---                                                  | ---                            | ---                    | ---                                  | 466975-1, -5‡            | 854040-3<br>(409-5855)                                                                                              |
|                   |                          |                                                      |                                |                        |                                      | 567243-1<br>(408-8040)   | 122500-2, -3<br>(409-5852)<br>356500-1, -2<br>(409-5878)<br>662700-[ ]<br>(409-5884)<br>1213400-1, -2<br>(409-5878) |

‡Designed to meet IBM crimp specification, only 28-24 wire size range.

Figure 12 (cont'd)

| WIRE SIZE,<br>AWG | INSULATION<br>DIAMETER   | HAND TOOL<br>(DOCUMENT) | CRIMPING<br>DIES<br>(DOCUMENT) | HEAD<br>(DOCUMENT) | PNEUMATIC<br>HOLDER<br>(DOCUMENT) | APPLICATOR<br>(DOCUMENT)   | POWER UNIT<br>(DOCUMENT)                                                                                            |
|-------------------|--------------------------|-------------------------|--------------------------------|--------------------|-----------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------|
| 28-22             | 0.76-1.02<br>[.030-.040] | ---                     | ---                            | ---                | ---                               | 567243-2<br>(408-8040)     | 354500-1<br>(409-5842)<br>565435-5<br>(409-5128)                                                                    |
|                   |                          |                         |                                |                    |                                   | 567243-3<br>(408-8040)     | 354500-[ ]<br>(409-5842)                                                                                            |
|                   |                          |                         |                                |                    |                                   | 567809-1                   | 854040-4<br>(409-5855)                                                                                              |
|                   |                          |                         |                                |                    |                                   | 1016013-[ ]■<br>(408-4390) | See Note■                                                                                                           |
|                   | 1.90-2.16<br>[.075-.085] | ---                     | ---                            | ---                | ---                               | 567429-1<br>(408-8040)     | 122500-2, -3<br>(409-5852)<br>356500-1, -2<br>(409-5878)<br>662700-[ ]<br>(409-5884)<br>1213400-1, -2<br>(409-5878) |
|                   |                          |                         |                                |                    |                                   | 567429-2<br>(408-8040)     | 354500-1<br>(409-5842)<br>565435-5<br>(409-5128)                                                                    |

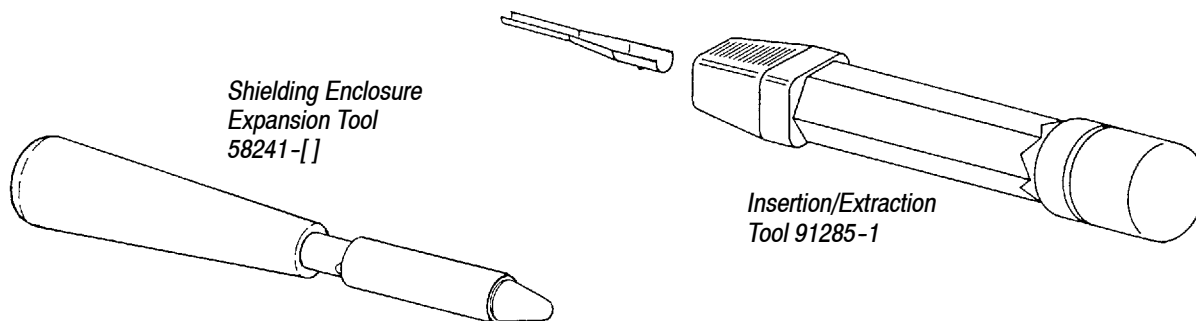
### Ferrule Crimp Tooling



**NOTE:**•Applicator 2000 will fit most available power units. Contact the Tooling Assistance Center number at the bottom of page 1 for specific machines, documentation, and conversion information. ■Use with die set 813809 and machine 565435-5 or 354500-1.

Figure 12 (cont'd)

### Miscellaneous Tooling



### HD22 Contact Crimp Tooling

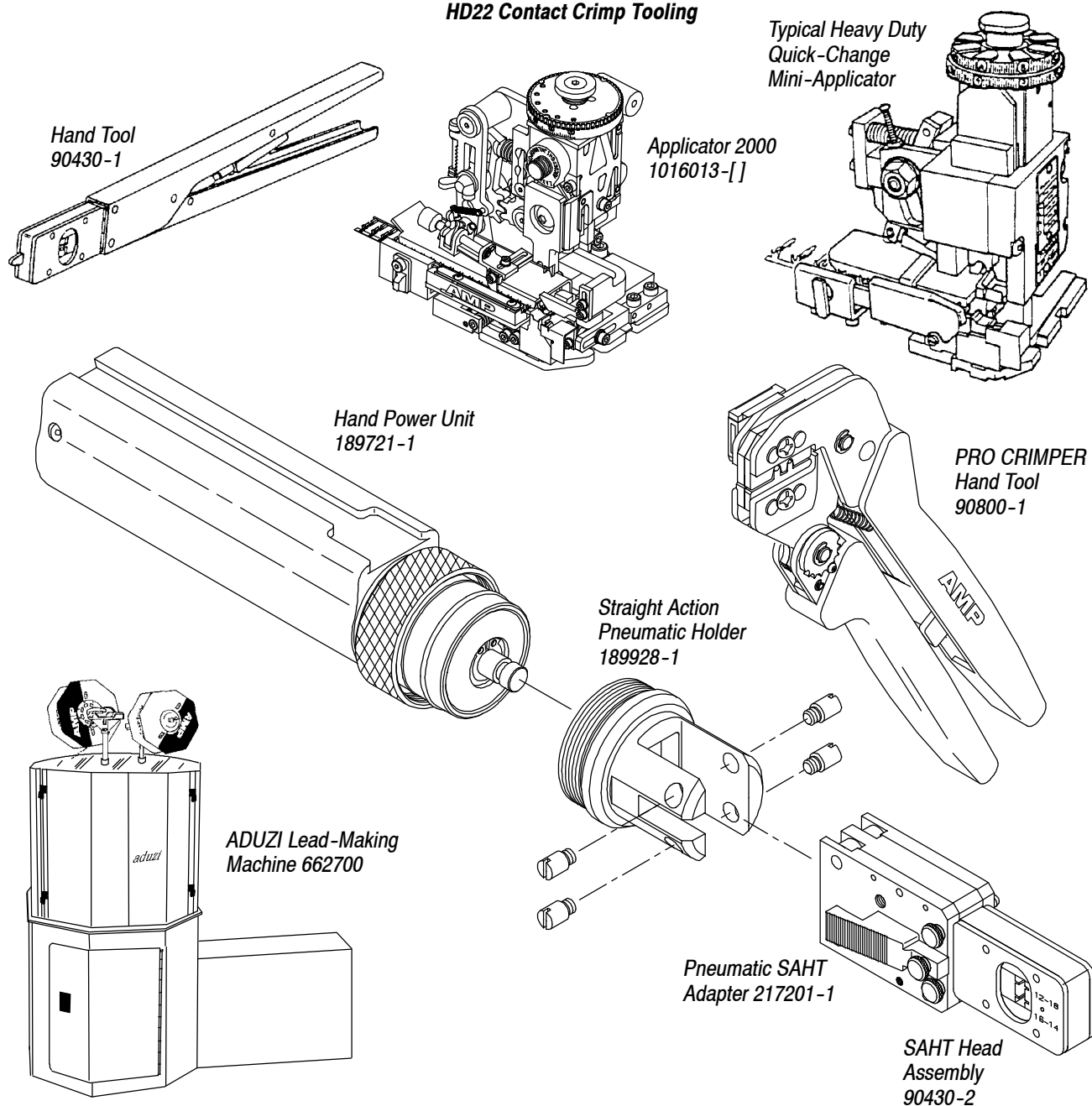
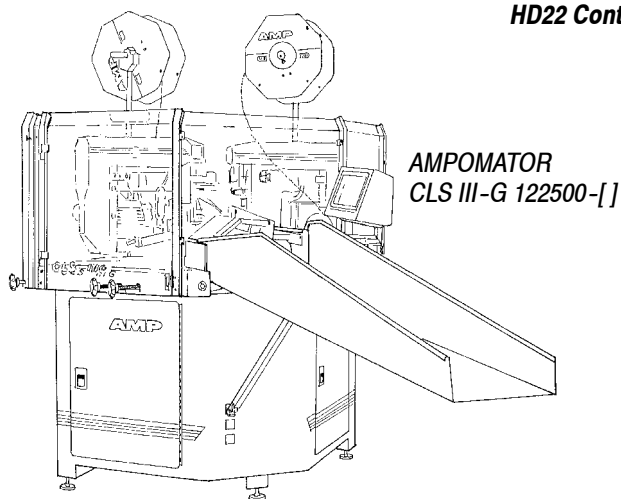
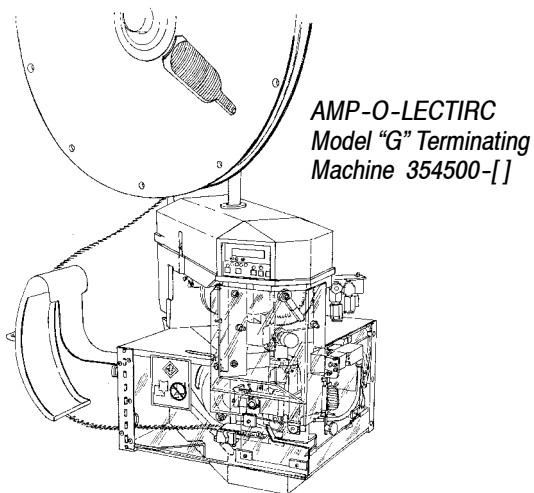
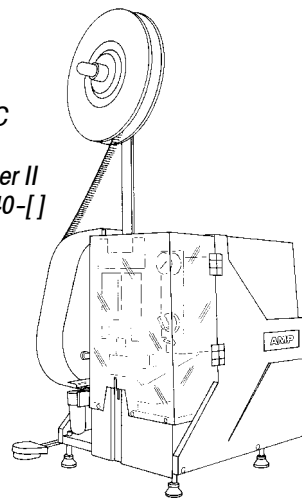


Figure 12 (cont'd)

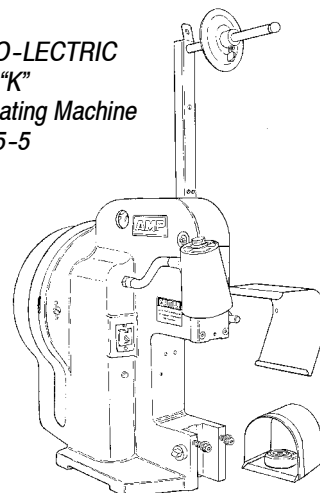
# **HD22 Contact Crimp Tooling**



AMP-O-MATIC  
Side Feed  
Stripper-Crimper II  
Machine 854040-[]



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



AMPOMATOR CLS IV+  
Lead-Making Machines  
356500-[], 1213400-1, -2

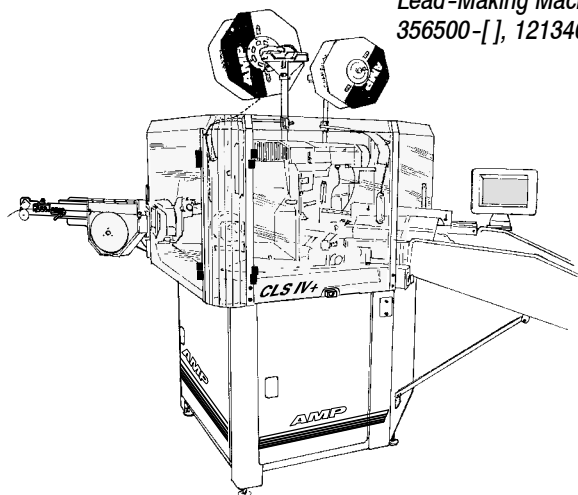
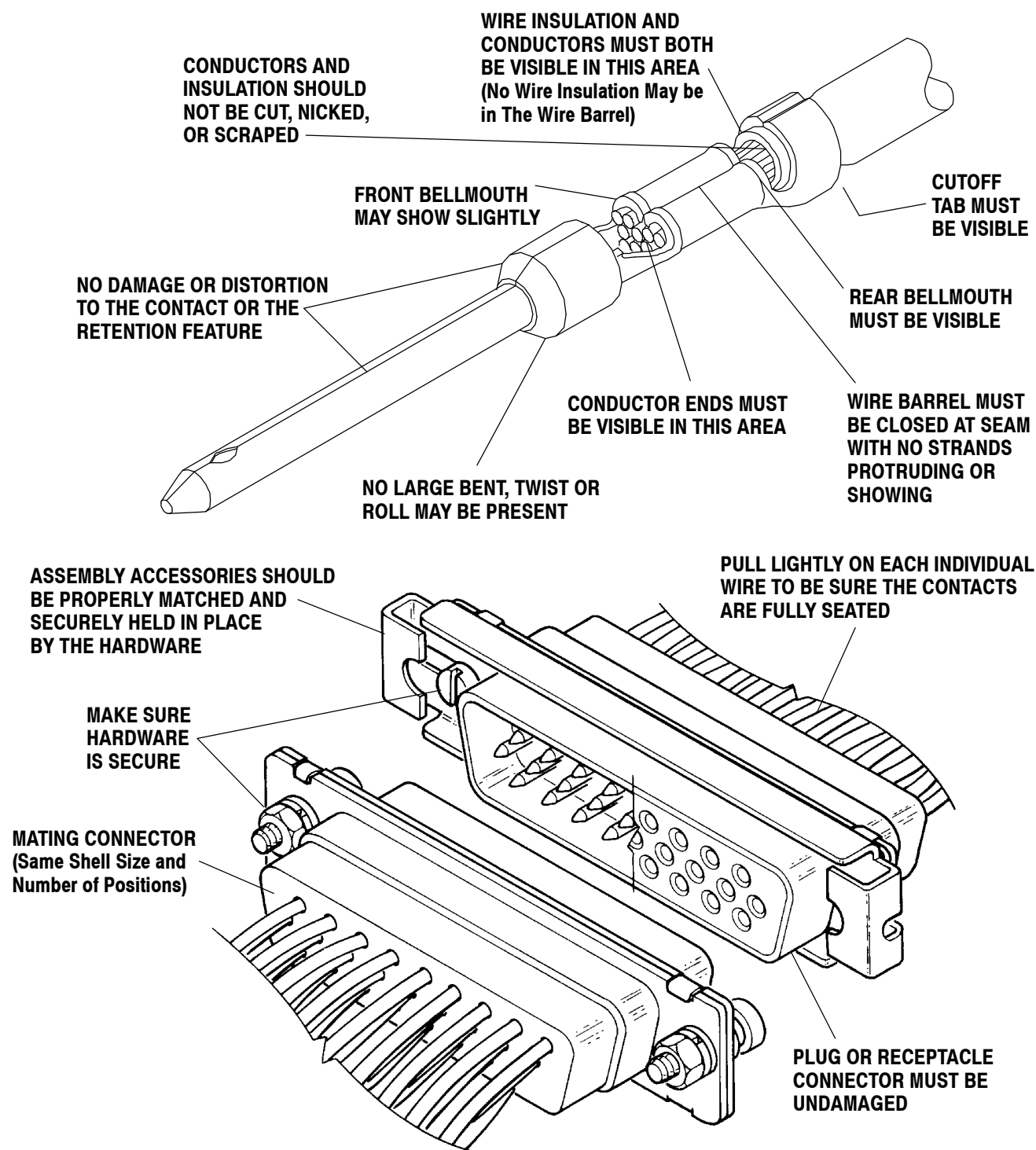


Figure 12 (end)

## 6. VISUAL AID

Figure 13 shows a typical application of AMPLIMITE HDP-22 Connectors and High-Density 22DF Contacts. 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.



**NOTE: TYPICAL APPLICATION SHOWS FREE-HANGING CONNECTORS WITH LOCKING POSTS AND SLIDE LATCH**

**FIGURE 13. VISUAL AID**