



All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  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 Type "M" Coaxial Cable Contacts. These contacts are used in a variety of connector housings, including Type "M" Eurocard, and Z-PACK\* 2 mm HM Connectors.

Contact designs include two printed circuit (pc) board and three crimp-to-cable versions. The pin contact will fit into Eurocard Receptacles and the socket contact is used in the right-angle pin assemblies. In 2 mm HM, these contacts are reversed with the coaxial pin contacts fitting into the male connector and the socket contacts fitting into the female connector.

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.

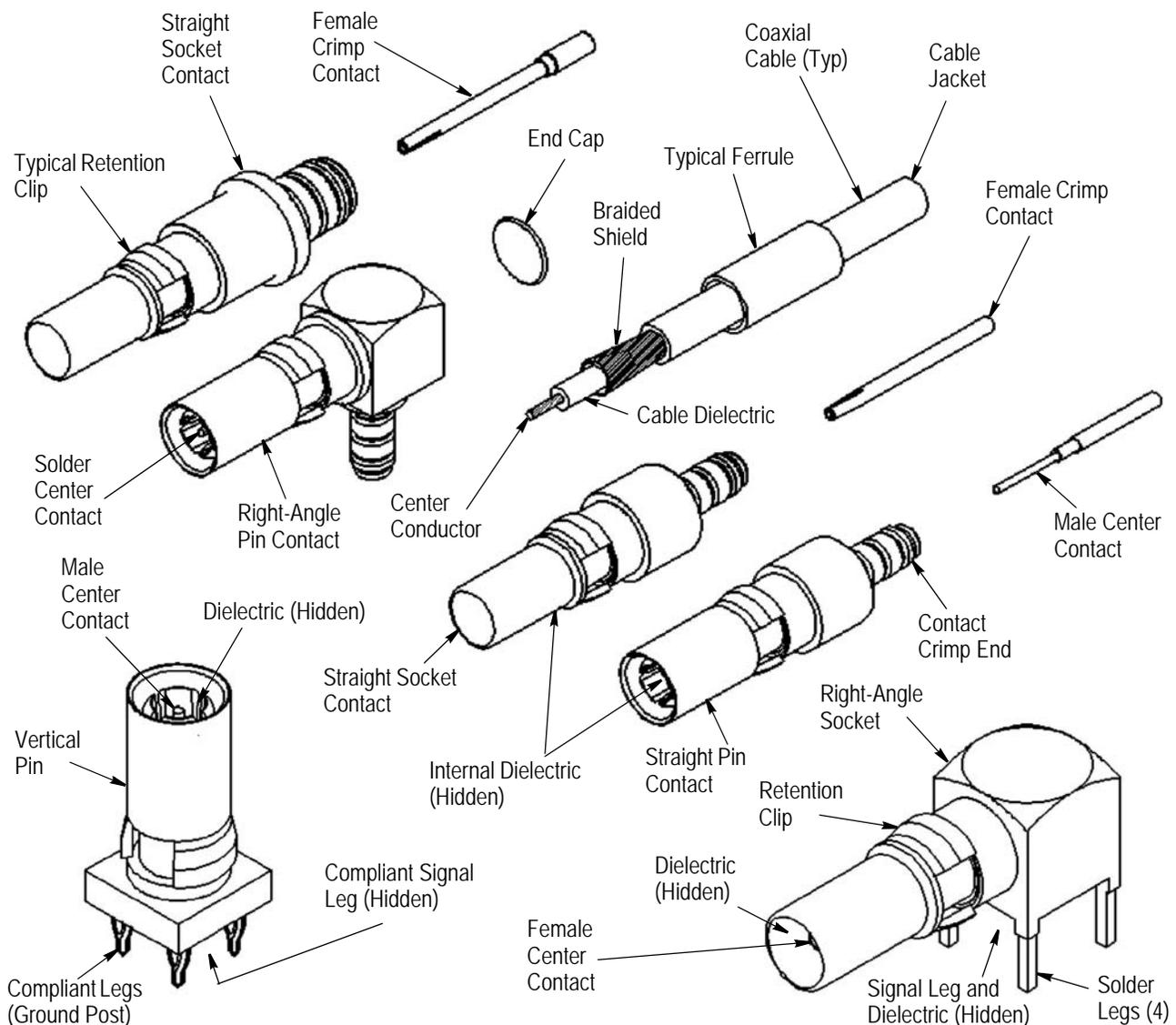


Figure 1

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

Revisions to this application specification include:

- Updated document to corporate requirements
- New logo

### 2.2. Customer Assistance

Reference Product Base Part Number 148253 and Product Code 7200 are representative of Type “M” Coaxial Cable Contacts. Use of these numbers will identify the product line and help you to obtain product and tooling information. Such information can be obtained through a local TE Representative, by visiting our website at [www.te.com](http://www.te.com), or by calling PRODUCT INFORMATION or the TOOLING ASSISTANCE CENTER at the numbers 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 TE.

### 2.4. Manuals

Manual 402-40 is available upon request and can be used as a guide in soldering. This manual provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

### 2.5. Specifications

German Standard DIN 41626 covers the performance, tests, and quality requirements for Type “M” Coaxial Cable Contacts for use in special cavities of multi two-part pc board connectors.

### 2.6. Instructional Material

The following list includes available instruction sheets (408-series) that provide assembly procedures for product, and 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.

408-7516	Screw Machine Contacts and Application Tooling
408-7777	Manual Arbor Frame Assembly 91085-2
408-9614	Flameless Heat Gun 600655-2
408-9623	Seating Tool 535072-1 for Type “C” Eurocard Receptacle Connectors with ACTION PIN* Contacts
408-9657	75-Ohm Hex Crimp Die Assemblies 58425 and 58436
408-9830	Triple Hex Crimping Die Assembly 58483-1
408-9930	PRO-CRIMPER* III Hand Crimping Tool Frame Assembly 354940-1
409-5495	10 Ton “H” Frame Power Unit Machine 803880-[ ]
409-5626	SM-3 Machine No. 814700-[ ]

## 3. REQUIREMENTS

### 3.1. Storage

#### A. Shelf Life

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

#### B. Chemical Exposure

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

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



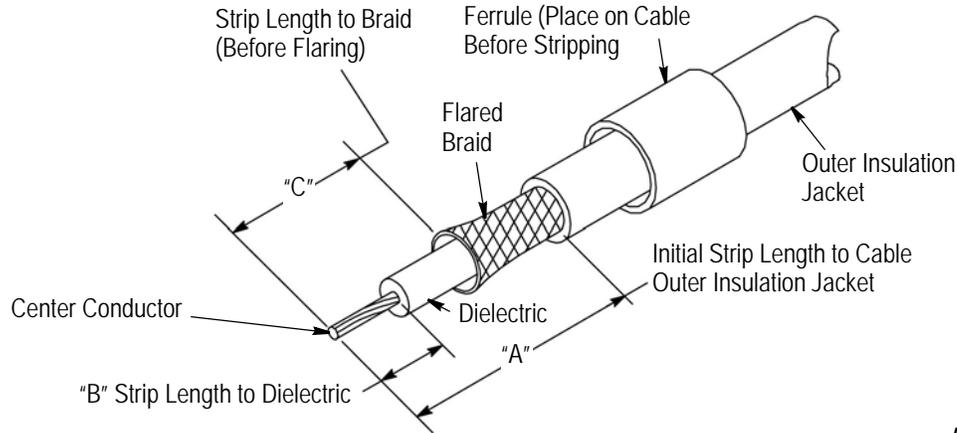
Where the above environmental conditions exist, phosphor-bronze contacts are recommended instead of brass if available.

### 3.2. Cable Selection and Preparation

Figure 2 lists the various cables and strip lengths which may be used with Type "M" Coaxial Cable Contacts.



DO NOT nick or cut the center conductor or braid when stripping the cable. After cable is stripped, center conductor strands should be twisted tightly together to eliminate loose wire strands.



**NOTE:** Not to Scale.

CABLE NUMBER	STRIP LENGTH	DIM "A"	DIM "B"	DIM "C"
RG-179 RD-179 RG-316 RD-316	Straight Contacts	10.5 ±0.2	2.5 ±0.2	5.5 ±0.2
RG-142 LMR200	Right-Angle Contacts	10.5 ±0.2	2.0 ±0.2	5.5 ±0.2

Figure 2

### 3.3. Center Contact Crimp Requirements

Strip the cable to the proper lengths as shown in Figure 2. The center contact must be fully seated against the cable dielectric prior to crimping. See Section 5, TOOLING for proper tooling according to wire size. Figure 3 provides center contact crimp requirements.



Right-angle contacts have a solder center contact and an end cap which installs in the rear of the connector shell. Refer to Paragraph 3.9 for soldering information.

CABLE NUMBER	DANIELS POSITIONER		CRIMP HEIGHT
	SOCKET	PIN	
RG-179	K1219	K1220	0.67-0.51
RD-179	K1219	K1220	0.67-0.51
RG-316	K1221	K1222	0.92-0.76
RD-316	K1221	K1222	0.92-0.76
RG-142	TP1207	TP1207	1.3-1.13
LMR200	TP1207	TP1207	1.3-1.13

Daniels is a trademark.

Figure 3 (Cont'd)

NOTE: Not to Scale.

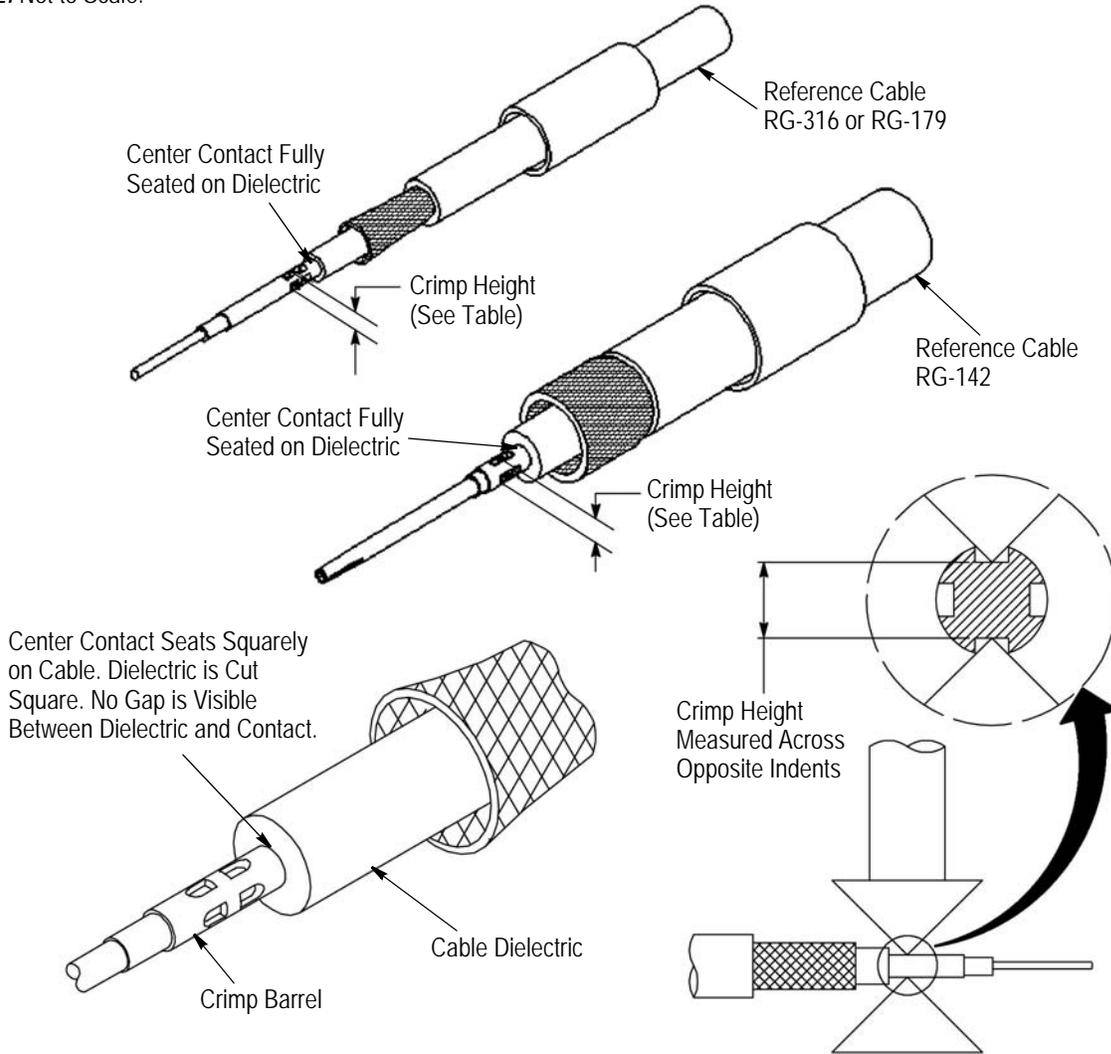


Figure 3 (End)

### 3.4. Crimp Tensile Test

Crimped Type “M” Coaxial Cable Contacts shall not separate from their respective coaxial cable when subjected to forces given in the table in Figure 4.

NOTE

Adjust tensile testing machine for head travel of 25.4 mm per minute. Directly and gradually apply force for one minute.

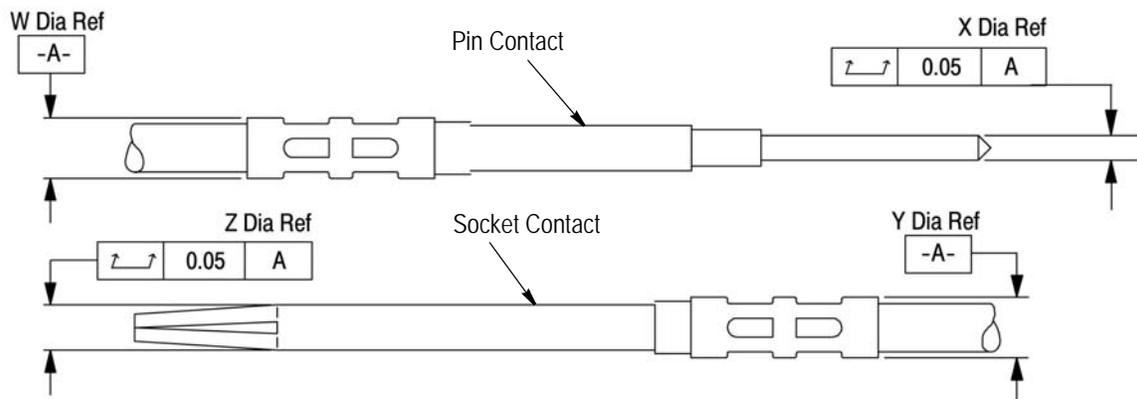


CABLE NUMBER	MINIMUM FORCE Newtons [Pounds]
RG-179	20 [4.5]
RD-179	20 [4.5]
RG-316	20 [4.5]
RD-316	20 [4.5]
RG-142	50 [11.25]
LMR200	50 [11.25]

Figure 4

### 3.5. Axial Concentricity

The Total Indicator Reading (TIR) of a crimped contact must be within the tolerance specified after crimping. See Figure 5.



CABLE SIZE	PIN CONTACT DIA REF		SOCKET CONTACT DIA REF		TIR
	W	X	Y	Z	
RG-179	0.711	0.38	0.711	0.711	0.05
RD-179	0.711	0.38	0.711	0.711	0.05
RG-316	0.947	0.05	0.947	0.947	0.05
RD-316	0.947	0.05	0.947	0.947	0.05
RG-142	1.420	0.05	1.420	0.947	0.05
LMR200	1.5	0.05	1.5	0.947	0.05

Figure 5

### 3.6. Contact Assembly

The cable dielectric and crimped center contact must be fully inserted into the crimp end of the pin/socket assembly until the cable dielectric bottoms on the internal dielectric of the assembly. In larger coaxial cable contacts, such as for RG-142 cable, the center contact will bottom against the internal dielectric of the assembly. Figure 6 shows a cable, properly crimped center contact fully inserted into a pin/socket assembly.

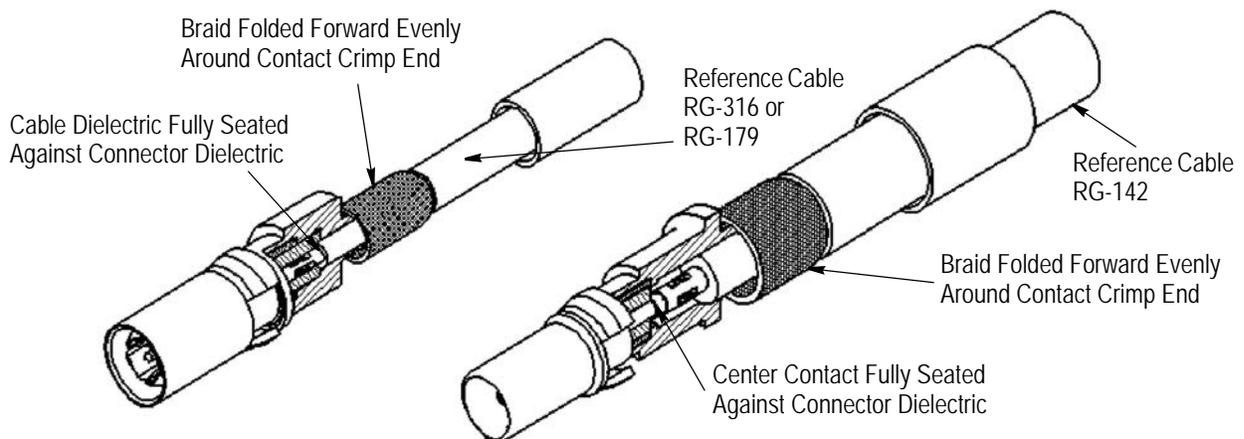
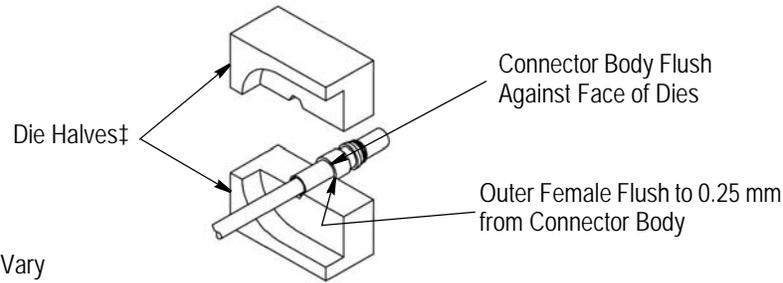


Figure 6

### 3.7. Ferrule Crimp Requirements

Slide the ferrule over the braid until it bottoms against the contact body. Crimp the ferrule according to the directions furnished with the proper tooling as provided in Section 5, TOOLING. See Figure 7.



‡Configuration of Dies May Vary

Figure 7

You may use another manufacturer's equivalent tooling; however, the crimp measurement across the hex flats must conform to the dimension given in Figure 8.

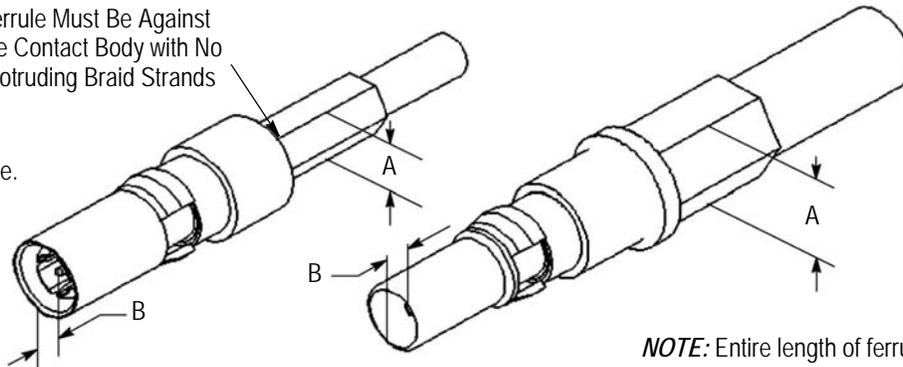
**NOTE**

A maximum gap of 0.25 mm is permitted between the ferrule and the contact body.



Ferrule Must Be Against the Contact Body with No Protruding Braid Strands

NOTE: Not to Scale.



NOTE: Entire length of ferrule must be crimped.

CABLE NO.	DANIELS TOOL	DANIELS DIE SET	CRIMP POSN.	TE TOOL	TE DIE SET	CRIMP POSN.	FERRULE CRIMP HEIGHT DIM "A"	CONTACT LOCATION DIM "B"					
								PIN	SOCKET				
RG-179	HX4	Y196	A	354940-1	58483-1	B	3.35-3.15	0.975-0.655	1.45-1.15				
		Y137	B										
RD-179	HX4	Y138	B	354940-1	58483-1	C	3.94-3.74			0.975-0.655	1.45-1.15		
RG-316	HX4	Y196	A	354940-1	58483-1	B	3.35-3.15						
		Y137	B										
RD-316	HX4	Y138	B	354940-1	58483-1	C	3.94-3.74					0.975-0.655	1.45-1.15
RG-142	HX4	Y197	A	354940-1	58436-1	B	5.56-5.31						
		Y205	A										
		Y142	B										
LRM200	HX4	Y197	A	354940-1	58436-1	B	5.56-5.31						

Figure 8

### 3.8. Right-Angle Contact Requirements

Strip the cable to the proper lengths as shown in Figure 2. Make sure the ferrule is placed on the cable before stripping. The braid must be flared away from the dielectric. Slide the center conductor and dielectric of the cable inside the inner ferrule until located within the slot of the center contact.

The end of the conductor must extend past the center of the solder slot, but not past the edge of the center contact. The flared braid must be outside the inner ferrule. See Figure 9.

Daniels is a trademark.

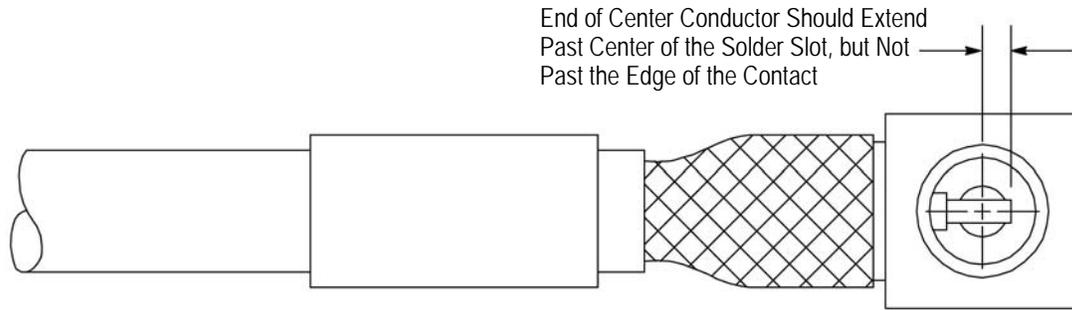


Figure 9

### 3.9. Solder Application

The center conductor of the cable must be soldered to the center contact of right-angle connectors. See Figure 10. The solder joint must be fluxed, cleaned, and dried using the information provided in Paragraph 3.15 of this specification.

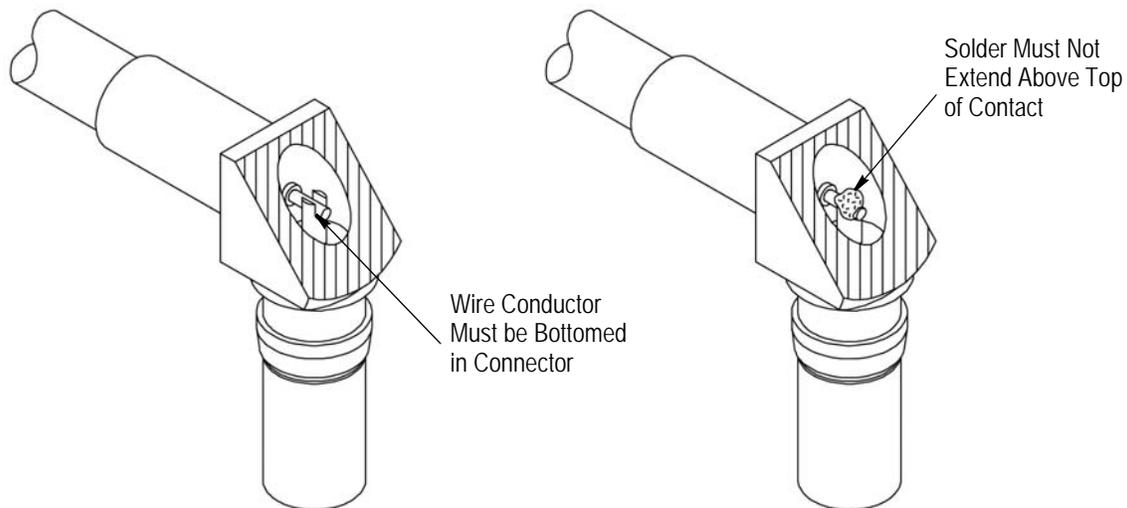
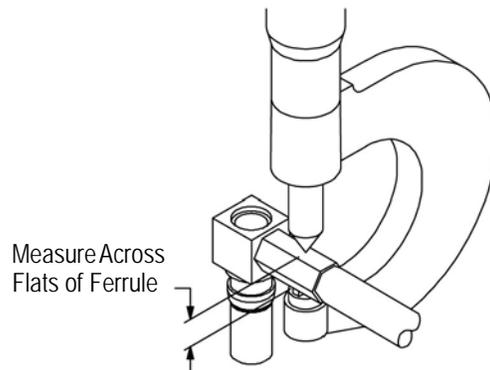


Figure 10

### 3.10. Ferrule Crimp Requirements

Crimp the ferrule according to the directions furnished with the proper tooling as provided in Section 5, TOOLING. Figure 8 provides ferrule crimp requirements. For the proper placement for measuring crimp height, see Figure 11.



NOTE: For Crimp Height, See Figure 8

Figure 11

### 3.11. End Cap Assembly

The end cap on right-angle connectors must be located as shown in Figure 12 before securing it in position, using a commercially available flat end punch tool.

**NOTE:** Place end cap into opening of connector body with convex side out. Depress convex side of end cap with flat end punch tool to secure in place.

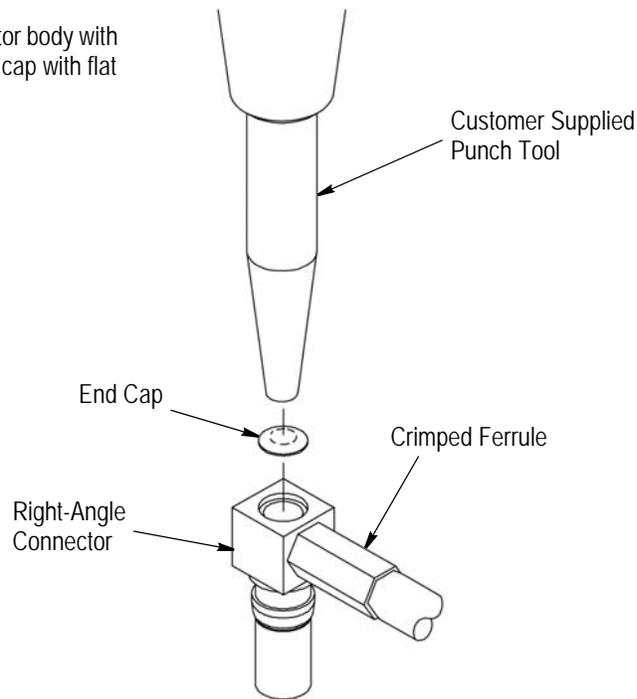


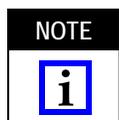
Figure 12

### 3.12. Wire Bend Allowance

It is important not to restrict contacts in any way that may adversely affect the wire dress of the cable. TE recommends that individual cables should be dressed to a bend radius of not less than ten times the cable outside diameter. Likewise, cable bundles should be dressed to a bend radius of not less than ten times the diameter of the bundle.

### 3.13. Heat Shrink Tubing/Strain Relief

In applications where the strain relief is necessary due to high torque or severe or repeated flexing of the cable, use heat shrink tubing. Call the Product Information number at the bottom of page 1 for information regarding heat shrink tubing sold by TE. The tubing is pre-cut to the proper length, but longer lengths of tubing are also available if you wish to cut it yourself.



*When using heat shrink tubing as a strain relief, the tubing must be placed over the cable before the stripping operation is performed.*

Exposed-flame heat sources may be used in applications where flammable materials are not present. However, the flameless heat gun remains the recommended heat source. Call the Tooling Assistance Center number or the Product Information number, on page 1, for information on the Flameless Heat Gun 600655-2 or other heat guns which are available for applying heat shrink tubing.

### 3.14. PC Board Requirements

#### A. PC Board Material

Board materials will be glass epoxy (FR-4, G-10). Consult TE for suitability of other board materials.

#### B. PC Board Thickness

Board thickness shall be 1.6-2.36 mm. For suitability of other board thicknesses, consult TE.

### C. PC Board Layout

The recommended pc board layout, dimensions, and tolerances are shown in Figure 13.

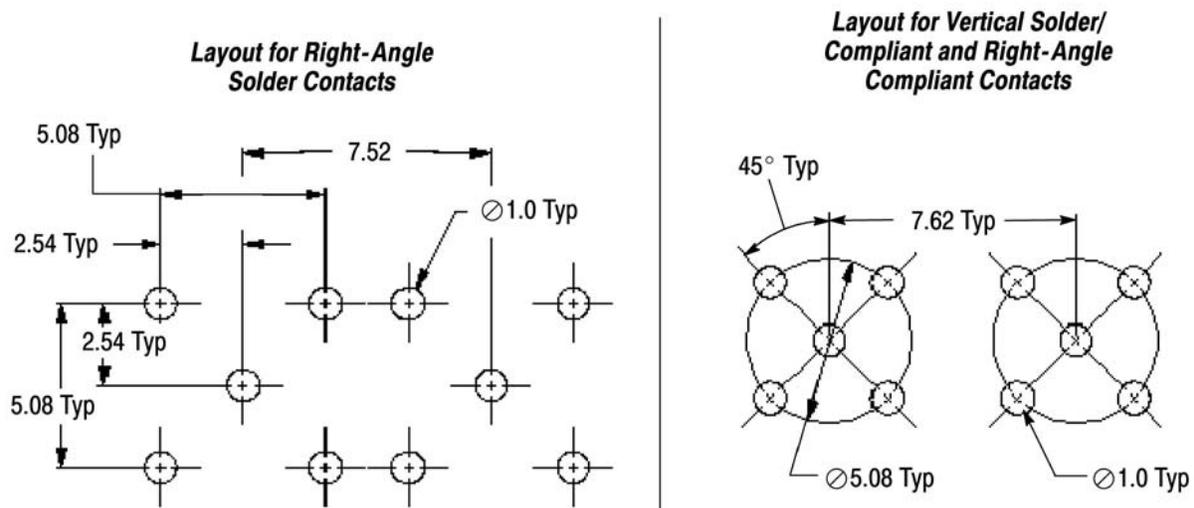


Figure 13

### D. PC Board Contact Seating

Seated pc board contacts shall meet the requirements shown in Figure 14.

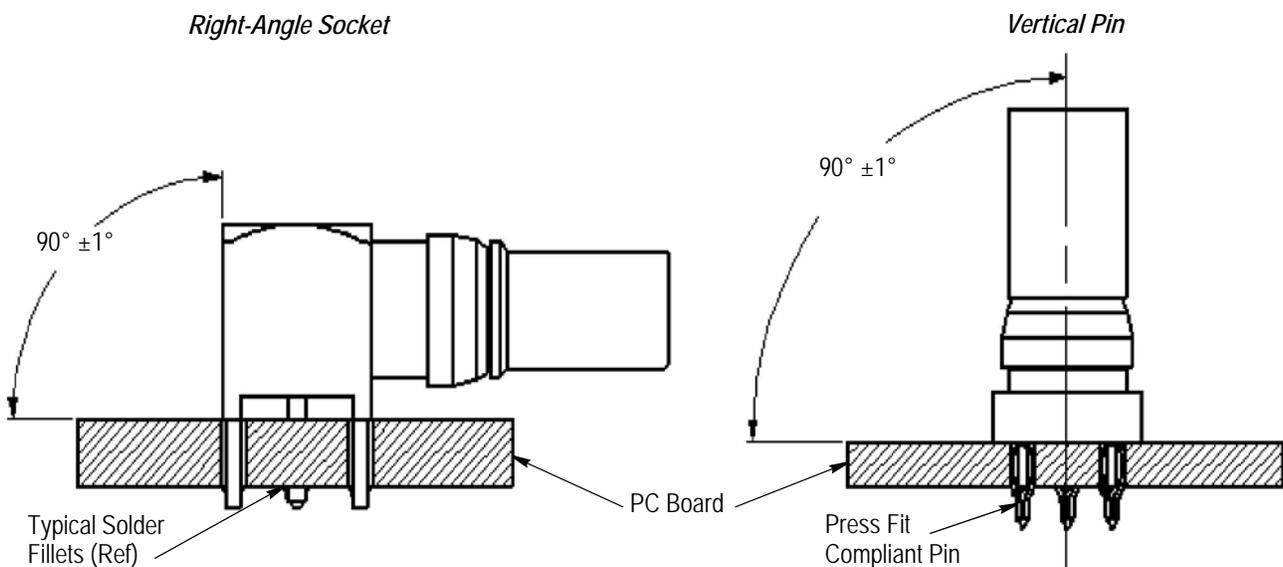


Figure 14

## 3.15. Soldering

### A. Flux Selection

Contact solder tines must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call the Product Information phone number at the bottom of page 1 for consideration of other types of flux. Some fluxes that are compatible with these pc board contacts are provided in Figure 15.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
RMA (Mildly Activated)	Mild	Noncorrosive	186	611

Figure 15

### B. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. The following is a listing of common cleaning solvents that will not affect the contacts for the time and temperature specified. See Figure 16.



Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer's Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and Methylene Chloride can be used with no harmful affect to the contacts; however TE does not recommend them because of the harmful occupational and environmental effects. Both are carcinogenic (cancer-causing) and Trichloroethylene is harmful to the earth's ozone layer.



If you have a particular solvent that is not listed, contact the Tooling Assistance Center or Product Information number at the bottom of page 1.

### C. Drying

When drying cleaned assemblies and printed circuit boards, make certain that temperature limitations are not exceeded: -55° to 105°C [-67° to 221°F] for standard temperature products. Excessive temperatures may cause degradation.

CLEANER		TIME (Minutes)	TEMPERATURE (Maximum)
NAME	TYPE		
ALPHA 2110	Aqueous	1	132°C [270°F]
BIOACT EC-7	Solvent	5	100°C [212°F]
Butyl CARBITOL	Solvent	1	Ambient Room
Isopropyl Alcohol	Solvent	5	100°C [212°F]
KESTER 5778	Aqueous		
KESTER 5779	Aqueous		
LONCOTERGE 520	Aqueous		
LONCOTERGE 530	Aqueous		
Terpene	Solvent		

Figure 16

### D. Soldering Guidelines

Type "M" Coaxial Cable Contacts can be soldered using wave or equivalent soldering techniques. The temperatures and exposure time shall be within the ranges specified in Figure 17. We recommend using SN60 or SN62 solder for these contacts.

Manual 402-40 provides some guidelines for establishing soldering practices. Refer to Paragraph 2.4, Manuals.

SOLDERING PROCESS	WAVE TEMPERATURE	TIME (At Max Temperature)
Wave	260°C [500°F]	5 Seconds

Figure 17

ALPHA, BIOACT, CARBITOL, LONCOTERGE, and KESTER are trademarks of their respective owners.

### 3.16. Mating Alignment

When contacts are used with housings in board-to-board applications, it is important to maintain proper mating alignment. This can be done by the following recommendations:

#### A. PC Board Solder Contacts

Create a dummy pc board with either mating connector. This dummy assembly can now be used as an alignment fixture to ensure proper alignment of the coaxial contacts while soldering.

#### B. PC Board Compliant Pin Contacts

Use the appropriate TE seating tool assembly as referenced in Section 5, TOOLING.

### 3.17. Repairability

Contacts can be easily removed from snap-in type housings using Extraction Tool 106242-1. Contacts may be removed from the pc board by standard de-soldering methods. Crimp contacts that are damaged must be removed and re-terminated with a new one.

## 4. QUALIFICATIONS

This product meets the requirements of DIN 41626 and is compatible with DIN 41612 Type "M" Eurocard Connectors.

## 5. TOOLING

Type "M" Coaxial Cable Contacts are terminated using hand application tooling. The pc board contacts are applied using seating tooling and semi-automatic equipment. See Figure 18.

- **Hand Crimping Tool Frame**

Hand crimping tool frames make it possible to terminate the full wire range of the loose-piece, precision formed contacts using one tool with exchangeable dies sets. They are designed for prototype and low-volume applications.

- **Crimping Die Assemblies**

Crimping 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.

- **PC Board Support**

A pc board support must be used to prevent bowing of the pc board during the placement of a contact on the board. It should have flat surfaces with holes or a channel wide enough and deep enough to receive the contact solder tines or attaching hardware during installation of the contact on the board.

- **Seating Tools**

Seating tools have been designed to push on the contact and seat it on the pc board.

- **Extraction Tool**

Extraction tool is designed to remove the contact from snap-in type housings.

- **Positioners and Turret Heads**

Positioners and turret heads have been designed specifically to the configuration of the screw machine pin and socket contacts. They are used with 4/8 indent hand crimping tools.

- **4/8 Indent Hand Crimping Tools**

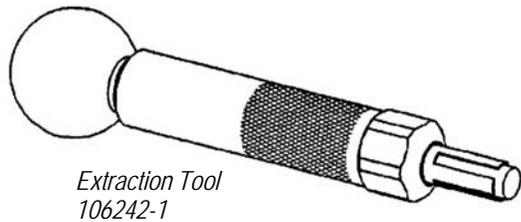
These tools have been designed to form indents to the proper depth in the contact wire barrel. They must be used in conjunction with the positioner or turret head designed for the contact. They are intended for prototype and low-volume applications.

- **Power Unit**

The semi-automatic power units are designed for the source of power to terminate the contacts. These power sources accommodate the seating tools for insertion of the contacts into the pc board.

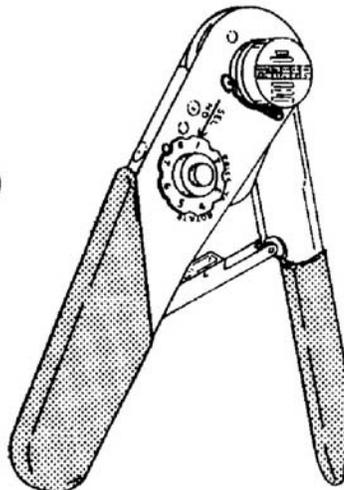
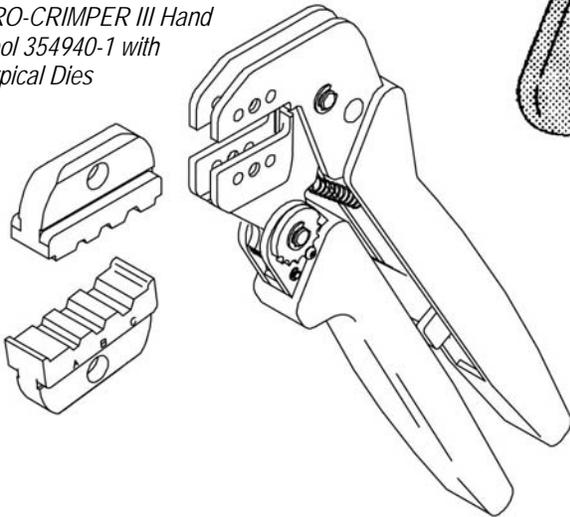
- **Arbor Frame Assembly**

The Arbor Frame Assembly may be either manual or semi-automatic for accommodating the seating tools used to insert the contact into the pc board.

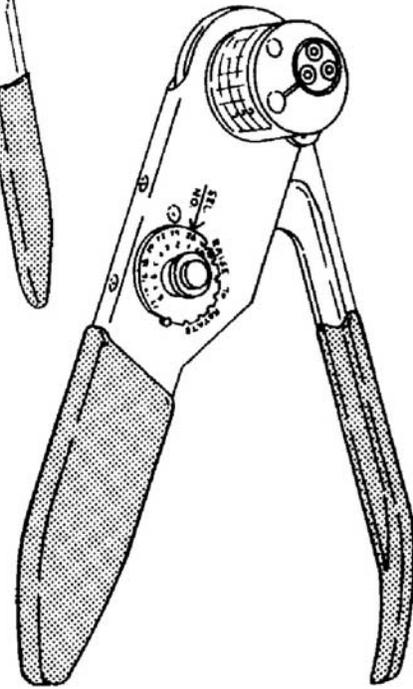


Extraction Tool  
106242-1

PRO-CRIMPER III Hand  
Tool 354940-1 with  
Typical Dies



Daniels Hand Tool  
M22520/2-01  
(TE PN 601966-1) and  
Typical

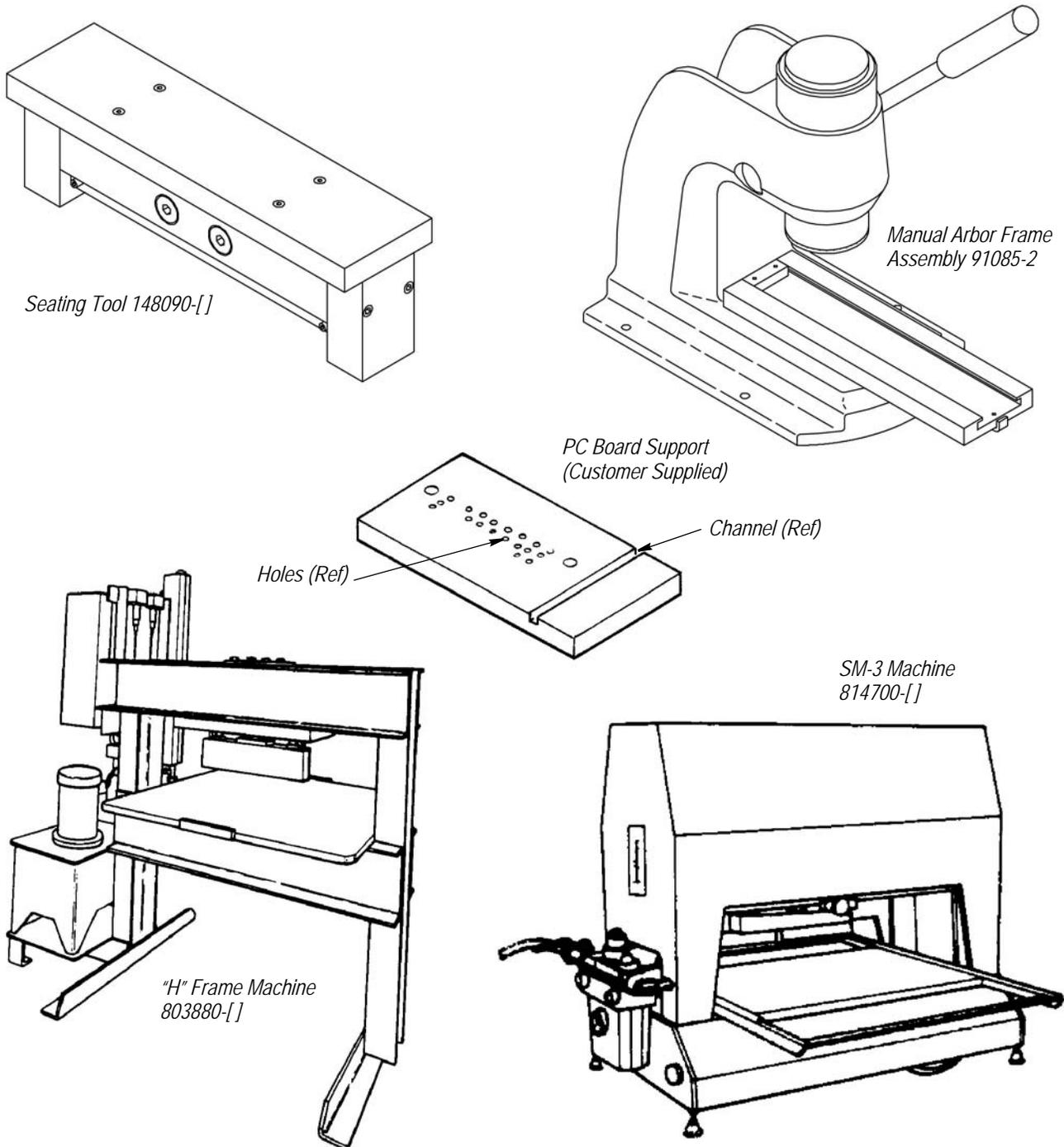


Daniels Hand Tool  
M22520/1-01  
(TE PN 601967-1) and  
Typical Turret Head

CABLE NO.	CENTER CONTACT CRIMP				FERRULE CRIMP			
	DANIES TOOL TE TOOL PN (408-7516)	DANIELS POSITIONER PN		SELECTOR SETTING	TE PRO-CRIMPER III 354940-1 (408-9930)		DANIELS TOOL HX4 (M22520/5-01)	
		SOCKET	PIN		DIE SET (DOCUMENT)	POSN	DIE SET	POSN
RG-316	AFM8 (22520/2-01) 601966-1	K1221	K1222	5	58483-1 (408-9830)	B	Y196 Y137	A B
RD-316	AFM8 (22520/2-01) 601966-1	K1221	K1222	5	58483-1 (408-9830)	C	Y138	B
RG-179	AFM8 (22520/2-01) 601966-1	K1219	K1220	3	58483-1 (408-9830)	B	Y196 Y137	A B
RD-179	AFM8 (22520/2-01) 601966-1	K1219	K1220	3	58483-1 (408-9830)	C	Y138	B
RG-142	AF8 (M22520/1-01) 601967-1	TP1207	TP1207	4	58436-1 (408-9657)	B	Y197	A
LMR200	AF8 (M22520/1-01) 601967-1	TP1207	TP1207	5	58436-1 (408-9657)	B	Y197	A

Figure 18 (Cont'd)

Daniels is a trademark.

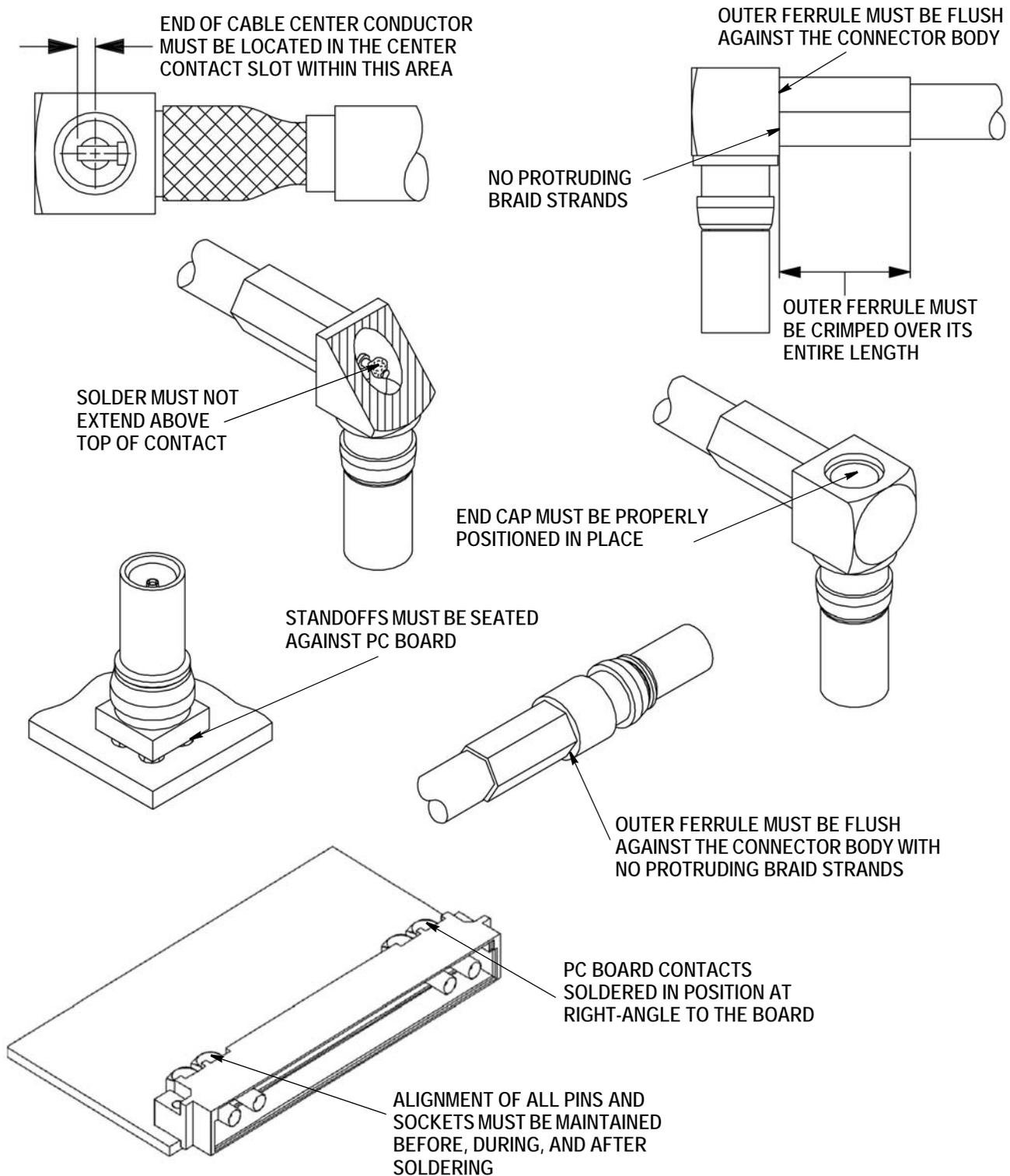


EUROCARD RECEPTACLE POSITIONS	SEATING TOOL (408-9623)	POWER UNIT
78	148090-1	91085-2 (408-7777), 803880-[] (409-5495, 409-5567), 814700-[] (409-5626)
60	148090-2	
42	148090-3	
24	148090-4	

Figure 18 (End)

## 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 19. VISUAL AID**