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 [±.005] and angles have a tolerance of ±2°. Figures and illustrations are for identification only and are not drawn to scale.*

1. INTRODUCTION

This specification covers requirements for application of AMPLIMITE HD–20 Series 454 and 545 Right–Angle Rear Load Metal Shell Connectors designed for Printed Circuit (PC) Boards. The series designator is the dimension from the center of the first row of solder tines to the back surface of the mounting flange.

These connectors are made in five shell sizes: Size 1 has 9 positions; size 2 has 15 positions; size 3 has 25 positions; size 4 has 37 positions; and size 5 has 50 positions. Connector receptacles are available in 9, 15, 25, 37, and 50 positions in Series 454 and 545. Connector plugs are available in 9, 15, 25, and 37 positions in Series 454 and 545, and 50 positions in Series 545. They have square solder tines. Plugs are available with or without grounding indents. The plugs contain pin contacts and the receptacles contain socket contacts. Standard connectors are available with or without No. 4–40 screws. They can be made available with screwlocks in the support bracket. These connectors can be mated with free hanging cable connectors designed for insulation displacement contacts (IDC) using ribbon cable and crimp, snap–in contacts using discrete wire.

Figure 1 shows the product components and terms of their features. These terms will be referred to throughout this specification. Use these terms when corresponding with Tyco Electronics Representatives to facilitate assistance. The illustrations represent a typical connector plug and receptacle with available mounting options. In actual application, the plug and receptacle connectors may have screwlocks or 4–40 screws in the mounting flanges.

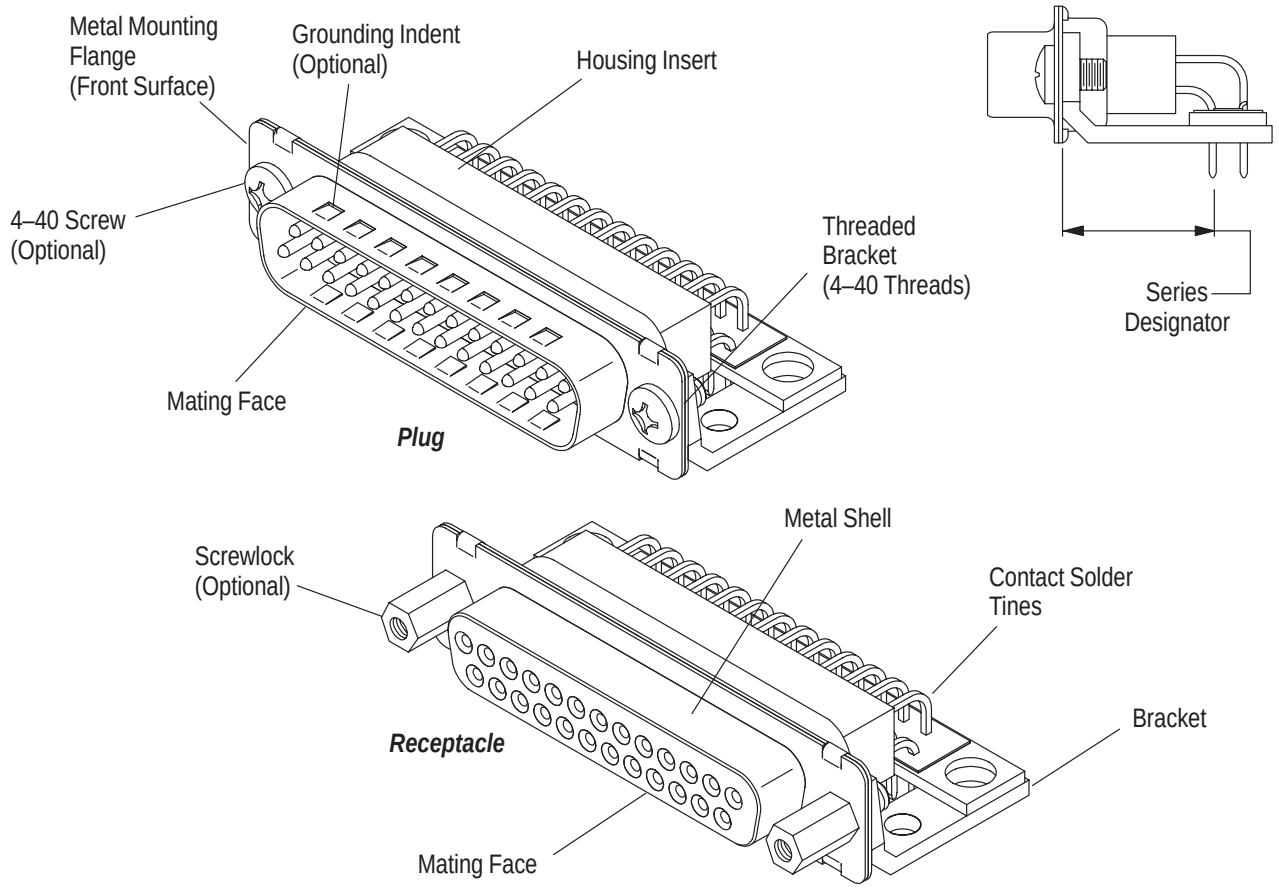

Figure 1

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Other products, logos, and company names used are the property of their respective owners.

2. REFERENCE MATERIAL

2.1. Revision Summary

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

Per EC 0990–1303–03:

- Updated document to corporate requirements
- Changed text in Paragraphs 2.5, the “NOTE” in Paragraph 3.14.B, and Section 4, QUALIFICATIONS
- Changed boardlock–to–boardlock dimension in Figure 6 on Page 7
- Changed artwork in Figure 7

2.2. Customer Assistance

Product Base Part Number 745114 and Product Code 4934 are representative of AMPLIMITE HD–20 Series Right–Angle Rear Load Metal Shell PC Board Connectors. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local Tyco Electronics Representative (Field Service Engineering, Field Applications Engineer, etc.) or, after purchase, by calling the Tooling Assistance Center or FAX/PRODUCT INFO number at the bottom of page 1.

2.3. Drawings

Customer Drawings for each product part number are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any technical documentation supplied by Tyco Electronics.

2.4. Product Specifications

Product Specification 108–40025 provides product performance and test information.

2.5. Soldering Information

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

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

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

B. Shelf Life

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

C. Chemical Exposure

Do not store connectors 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	Sulfur Nitrites	Tartrates

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

3.2. Connector Shell Sizes

There are five industry standard shell sizes available for these connectors. A composite of the five receptacle sizes with the overall dimension for each is provided in Figure 2.

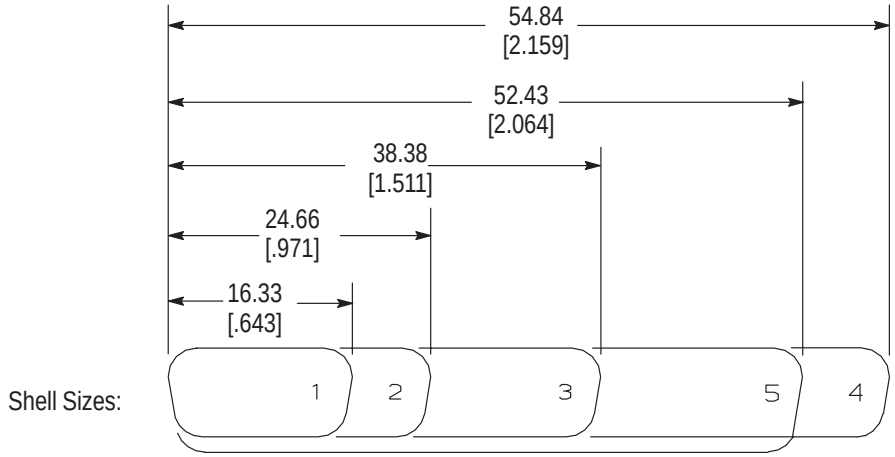
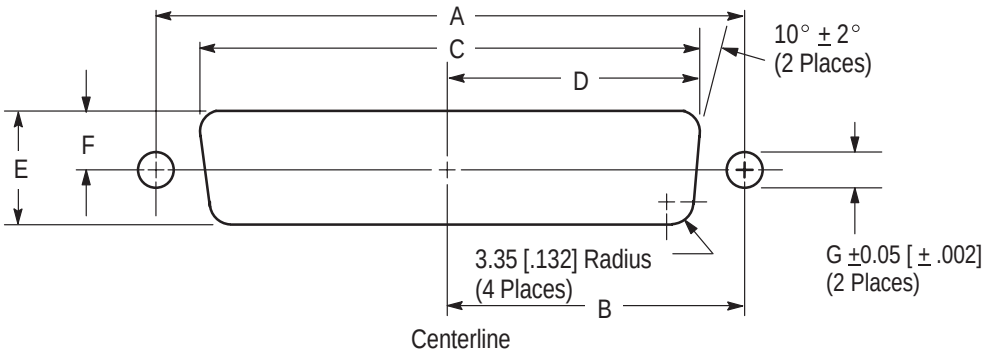


Figure 2

3.3. Panel Mounting Cutout

Panel mounting is optional for AMPLIMITE Right–Angle Rear Load Metal Shell PC Board Connectors. For pc board receptacles, it will provide additional support for the solder joints during mating and unmating of connectors. The pc board receptacles can ONLY be rear mounted. Either front or rear mounting is acceptable for the mating cable connector. The connector mounting bracket flanges have 4–40 internal threads that will accept screwlocks or panel mounting screws. Hardware attached to the connector bracket flange shall be tightened to 0.45 N•m [4 in.–lb] maximum. See Figure 3 for panel cutout dimensions.

Screwlocks are designed to secure a connector to a panel 1.58 [.062] thick. They can be used with thinner panels; however, washers are recommended to make up the thickness difference and provide a bottoming surface for the mating connector flange. Screwlocks should be tightened to a torque of 0.45 N•m [4 in.–lb] maximum. The 4–40 internal threads in the screwlocks will accept commercially available 4–40 threaded screws and jackscrews.



SHELL SIZE	DIMENSIONS						
	A	B	C	D	E	F	G
1	24.99 [0.984]	12.50 [0.492]	20.47 [0.806]	10.24 [0.403]	11.40 [0.449]	5.72 [0.225]	3.05 [0.120]
2	33.32 [1.312]	16.66 [0.656]	28.80 [1.134]	14.40 [0.567]			
3	47.04 [1.852]	23.52 [0.926]	42.52 [1.674]	21.26 [0.837]			
4	63.50 [2.500]	31.75 [1.250]	59.08 [2.326]	29.54 [1.163]			
5	61.11 [2.406]	30.56 [1.203]	56.34 [2.218]	28.17 [1.109]	14.10 [0.555]	7.06 [0.278]	

Figure 3

3.4. Mating Dimensions

The dimensions shown in Figure 4 must be considered when determining method of mounting and thickness of the panel when connectors are to be panel–mounted. This dimension ensures full mating of connectors.

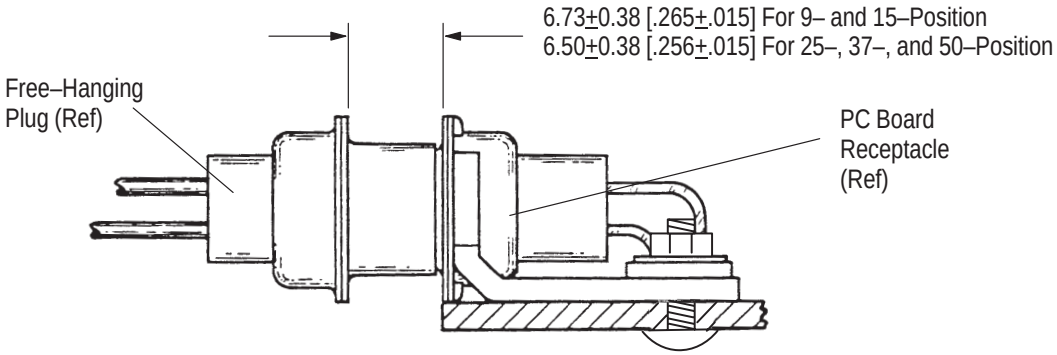


Figure 4

3.5. Connector Spacing

Care must be used to avoid interference between adjacent connectors and/or other components. The dimension is dependent on variable hardware used and the clearance required for mating connectors. The information provided in Figure 5 is to ensure proper mating for manual placement of connectors.

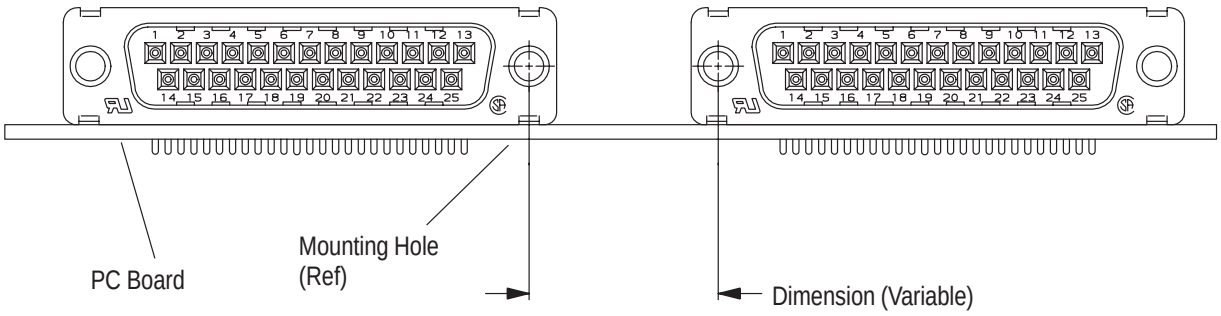


Figure 5

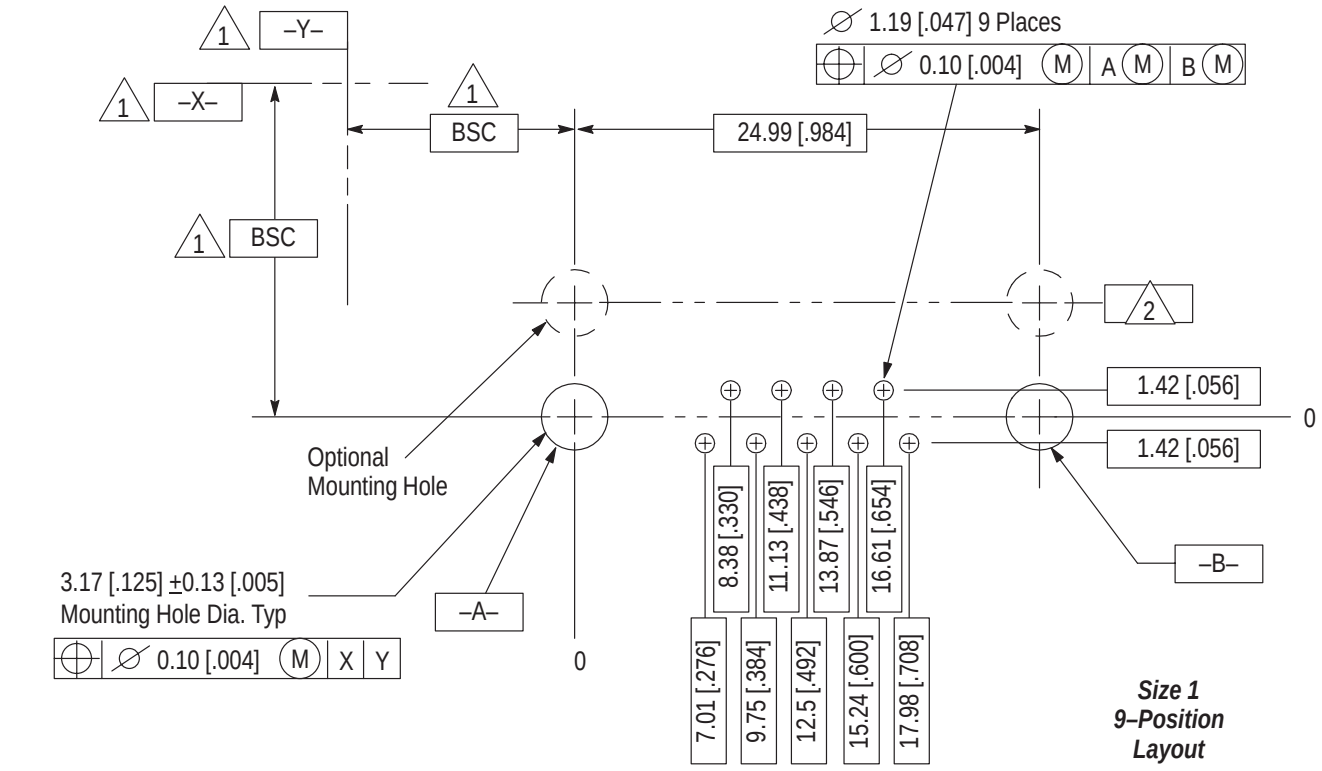
3.6. Printed Circuit Board

A. Thickness

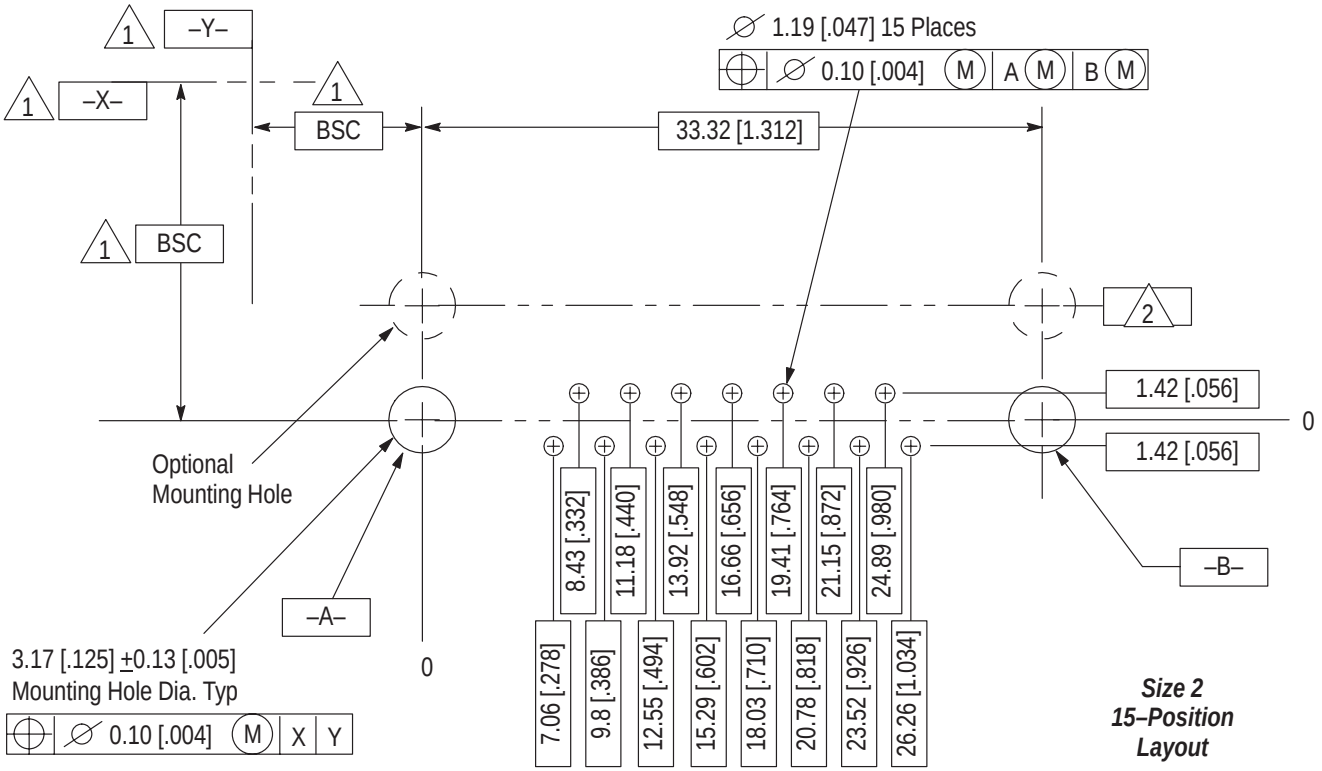
These connectors are designed to accommodate a range of applications. Standard connectors are designed for up to 3.18 [.125] maximum thick pc boards.

B. Layout

Solder tines require precisely drilled holes. See Figure 6 for dimensions.



Size 1 9–Position Layout

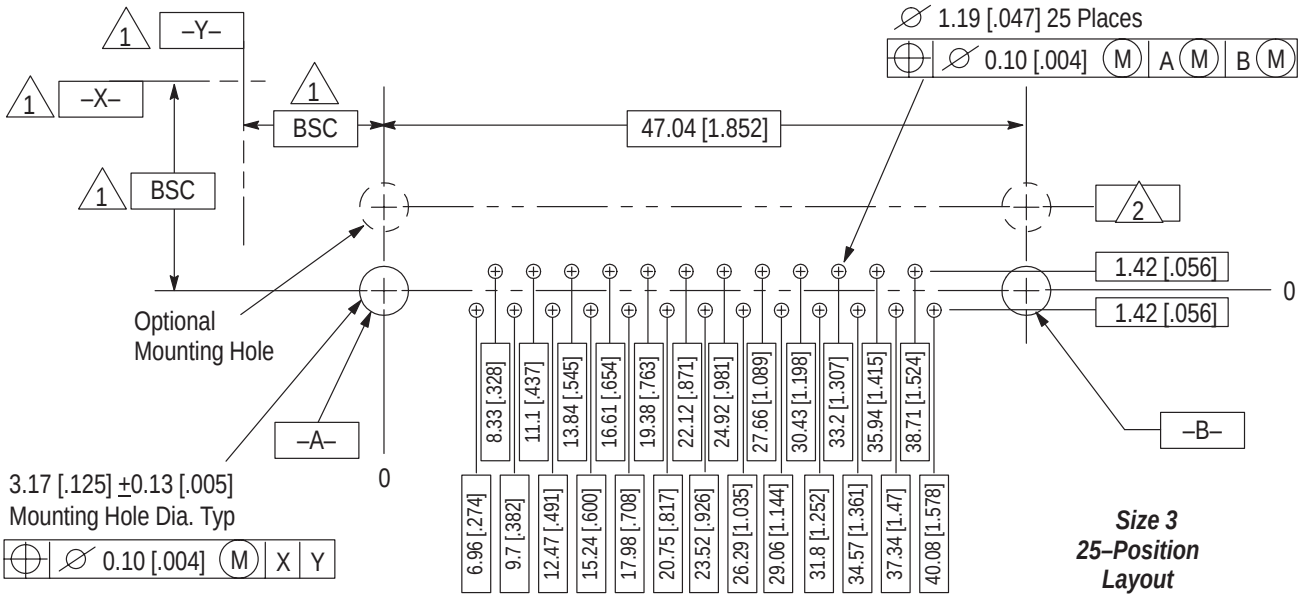


Size 2 15–Position Layout

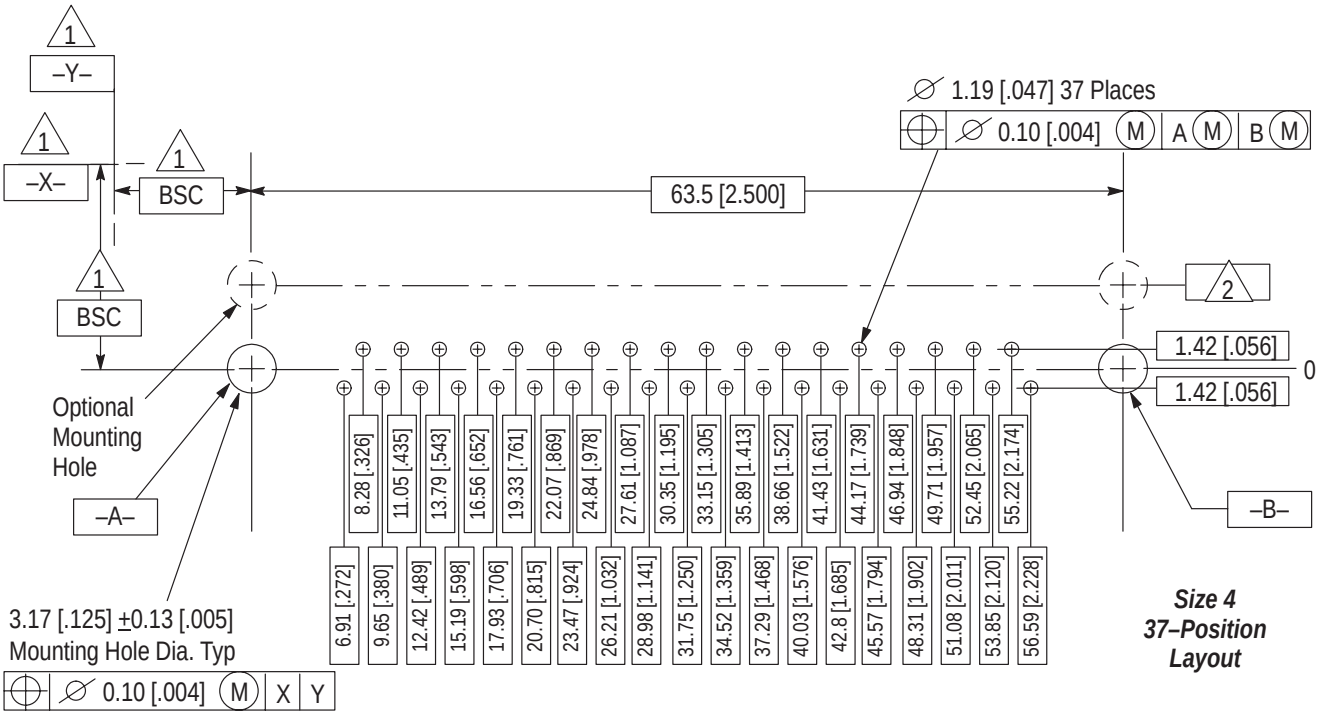
1 Datums and Basic Dimensions Established by Customer

2 6.12 [.241] for Series 454
8.41 [.331] for Series 545

Figure 6 (cont'd)



Size 3
25–Position
Layout



Size 4
37–Position
Layout

1 Datums and Basic Dimensions Established by Customer

2 6.12 [.241] for Series 454
8.41 [.331] for Series 545

Figure 6 (cont'd)

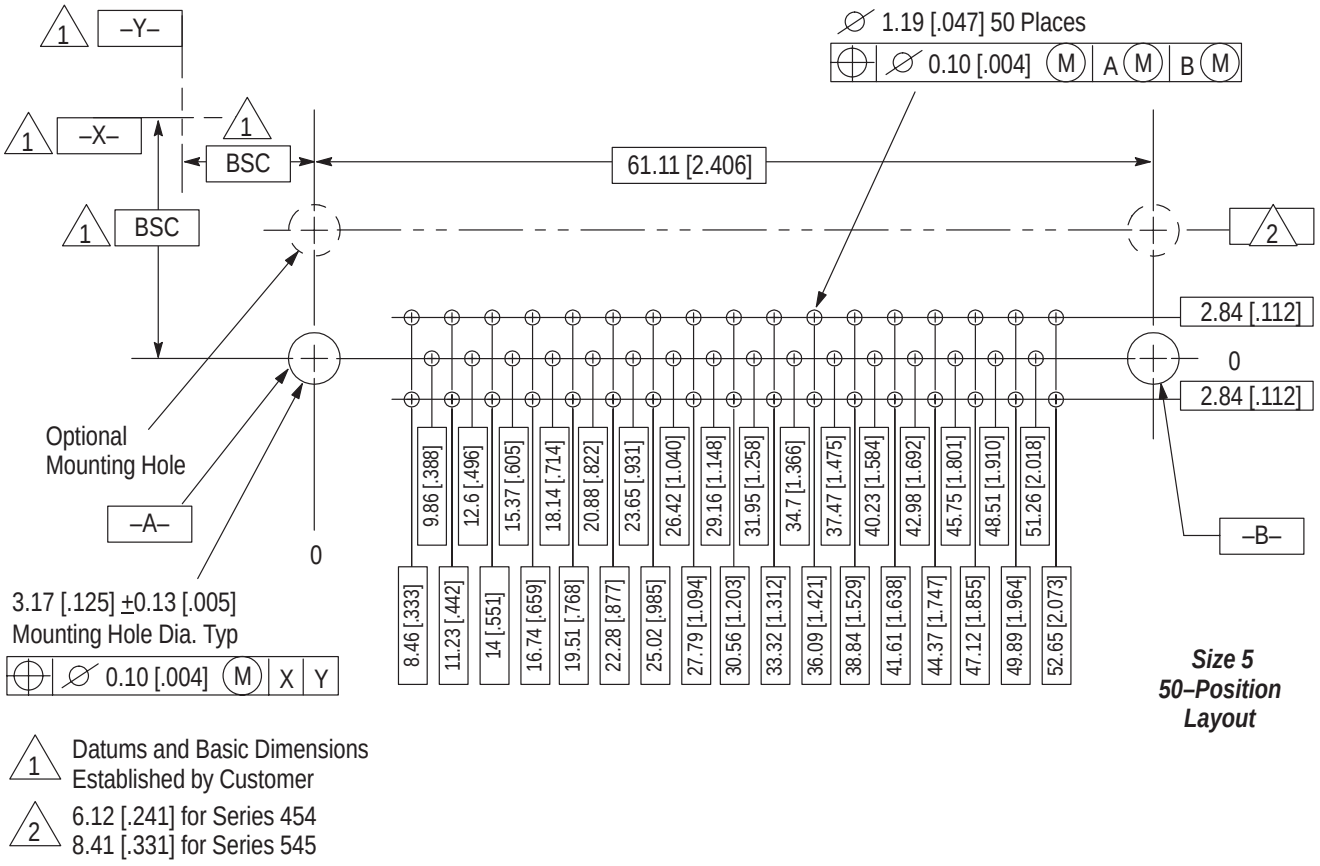


Figure 6 (end)

3.7. PC Board Contact Tine Holes

These connectors may be used with or without plated through holes. If plated, the drilled hole size plating types and plating thickness are dependent on your application requirements. The finished hole size must be as stated to provide unrestricted insertion and ensure adequate application of solder to the tines. See Figure 7.

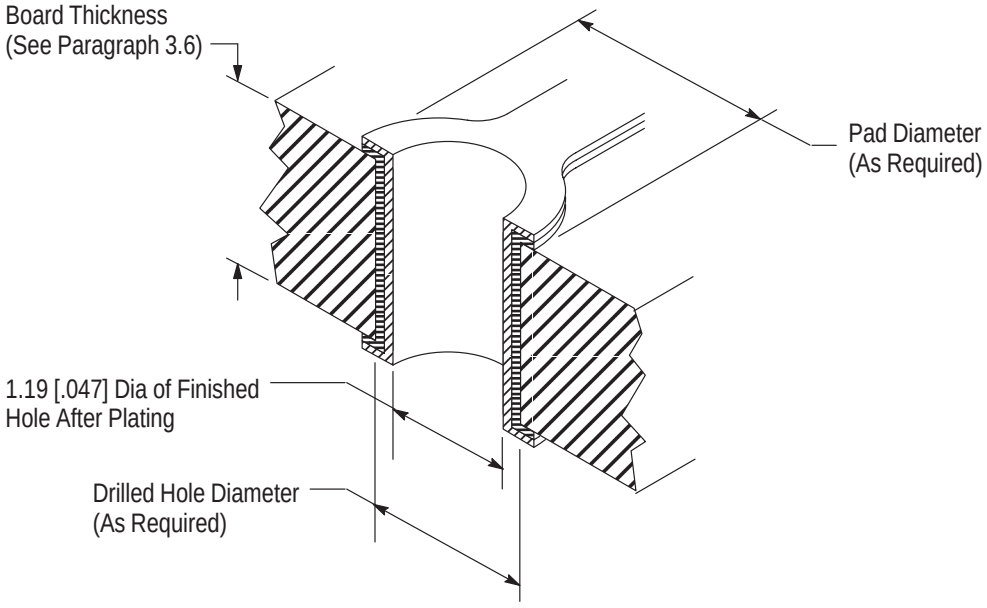


Figure 7

3.8. Limitations

Use the product specification referenced in Paragraph 2.4. for testing procedures and limitations regarding these connectors.

3.9. Polarizing and Keying

The keystone configuration of this connector's mating face prevents the accidental inversion of mating connectors. To prevent mismating of same size connectors, keying plugs may be placed in the receptacle connector. See Figure 8.

NOTE *If keying plug is used, the corresponding pin cavity in the mating plug connector MUST BE EMPTY.*

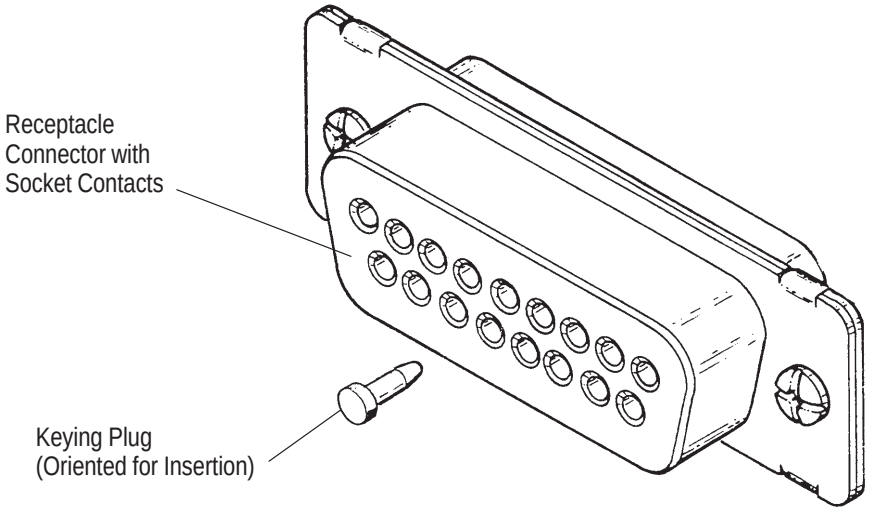


Figure 8

3.10. Integral Mounting Hardware

These connectors have a threaded mounting bracket which allows the connector to be mounted to a panel with 4–40 hardware. The torque limit is 0.45 N•m [4 inch–pounds] applied from the mating face side. The connectors are available with hardware or without for use with commercially available hardware. See Figure 9.

3.11. Ancillary Items

A. Commercial Hardware

Connectors can be attached to the pc board with commercially available screws, washers and nuts, rivets, or similar fastening devices that meet application requirements. Questions concerning specific hardware should be directed to the FAX/PRODUCT INFO number at the bottom of page 1.

B. Screwlocks

Screwlocks are available to provide a means of securing mating connectors with commercially available 4–40 threaded hardware, such as mounting screws for a fixed application and jackscrews for quick disconnect/connect application. The torque limit is 0.23 N•m [2 in–lb] applied from the mating face side.

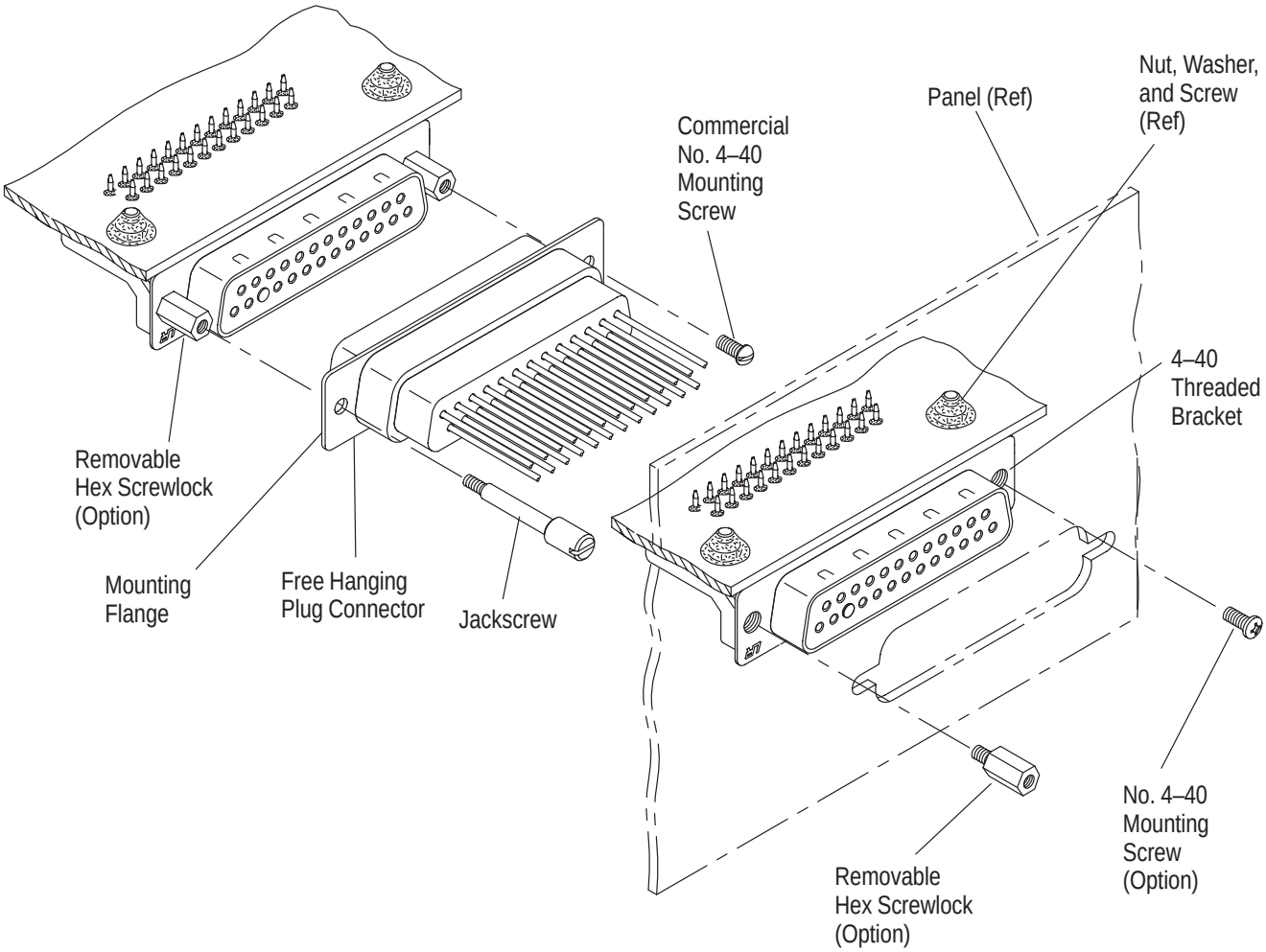


Figure 9

NOTE *The illustrations show a combination of different types of hardware. In an actual application, identical hardware should be used on both mounting flanges.*

3.12. Shielding

These connectors have tin or zinc chromate plated steel shells which provide continuity for EMC (electro–magnetic compatibility) applications.

When the right–angle metal shell connectors are mated with corresponding metal shell connectors, grounding continuity is achieved. Use of screws and nuts provide electrical continuity to any ground path on the pc board including hardware mounting holes. See Figure 10.

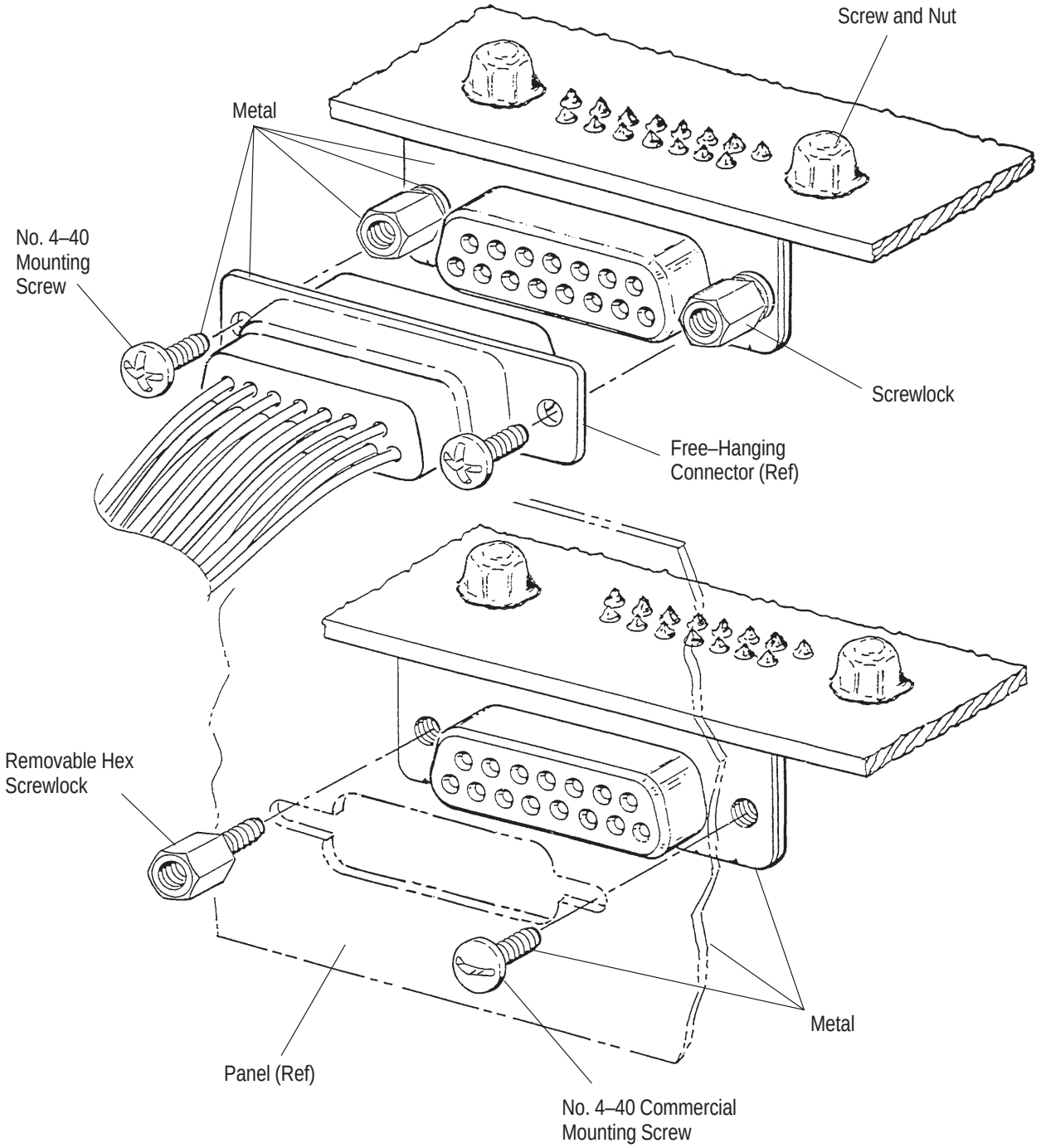


Figure 10

3.13. Connector Placement

CAUTION *The connector should be handled only by the housing to avoid deformation, contamination, or other damage to the contact tines.*

Determine which hole in the pc board is to receive the number one contact tine, then orient the connector so the number one solder tine is aligned with the hole. Start all solder tines into the board; then, press evenly on the connector until the flange and mounting bracket seat on the pc board.

3.14. 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 connectors are provided in Figure 11.

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

Figure 11

B. Soldering Guidelines

AMPLIMITE Right–Angle Rear Load Metal Shell PC Board Connectors can be soldered using wave or equivalent soldering techniques. The temperatures and exposure time shall be within the ranges specified in Figure 12. We recommend using SN60 or SN62 solder for these connectors.

NOTE *Tyco Electronics Manual 402–40 provides some guidelines for establishing soldering practices.*

SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temp)
	CELSIUS	FAHRENHEIT	
WAVE SOLDERING	260⁘	500⁘	5 Seconds

⁘ Wave Temperature

Figure 12

C. 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 connectors for the time and temperature specified. See Figure 13.

Cleaners must be free of dissolved flux and other contaminants. We recommend cleaning with the pc board on its edge. If using an aqueous cleaner, we recommend standard equipment such as a soak–tank or an automatic in–line machine.

DANGER *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 connectors; however Tyco Electronics 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.*

NOTE *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.*

CLEANER		TIME (Minutes)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
ALPHA 2110	Aqueous	1	132	270
BIOACT EC–7	Solvent	5	100	212
Butyl CARBITOL	Solvent	1	Room Ambient	
Isopropyl Alcohol	Solvent	5	100	212
KESTER 5778	Aqueous	5	100	212
KESTER 5779	Aqueous	5	100	212
LONCOTERGE 520	Aqueous	5	100	212
LONCOTERGE 530	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

Figure 13

D. Drying

When drying cleaned connector assemblies, make certain that temperature limitations are not exceeded: –55° to 105°C [–67° to 221°F]. Excessive temperatures may cause housing degradation.

3.15. Checking Installed Connector

The AMPLIMITE Right–Angle Rear Load Metal Shell PC Board Connector must be seated on the pc board to the dimensions shown in Figure 14.

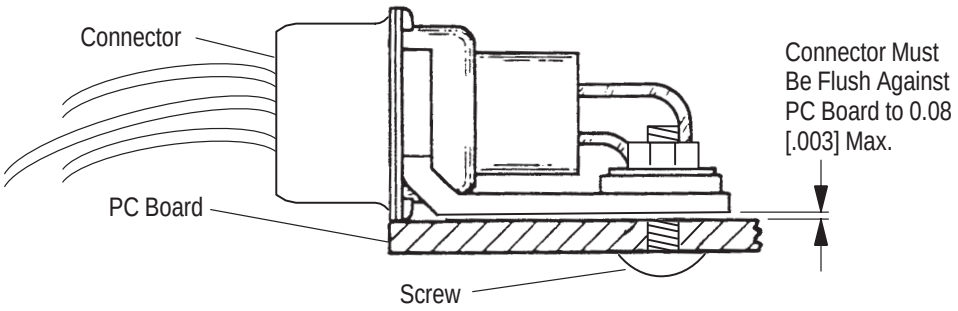


Figure 14

3.16. Repair/Removal

If the connector should become damaged, it must be replaced. The connector may be removed from the pc board by normal desoldering methods and replaced with a new connector.

CAUTION *When repairing or replacing AMPLIMITE Right–Angle Rear Load Metal Shell PC Board Connectors, be careful not to damage other pc board components during the desoldering process.*

4. QUALIFICATIONS

AMPLIMITE HD–20 Right–Angle Metal Shell PC Board Connectors are Recognized under the Component Program of Underwriters Laboratories Inc. (UL), File No. E28476; they are Certified by CSA International under File No. LR 7189.

5. TOOLING

These connectors are designed for hand placement on the pc board and require no special tool when handling them. The only concerns are to handle the connector by the flange only to avoid touching the solder tines which could deform or contaminate the tines, and to provide a backup support that will allow the contact tines to pass through the pc board without deforming them.

6. VISUAL AID

Figure 15 shows a typical application of AMPLIMITE Right–Angle Rear Load Metal Shell PC Board Connector. 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 *A composite of various types of hardware used illustrates available options. In an actual application, hardware used to mount connector will be identical, as will the hardware used for connector mating.*

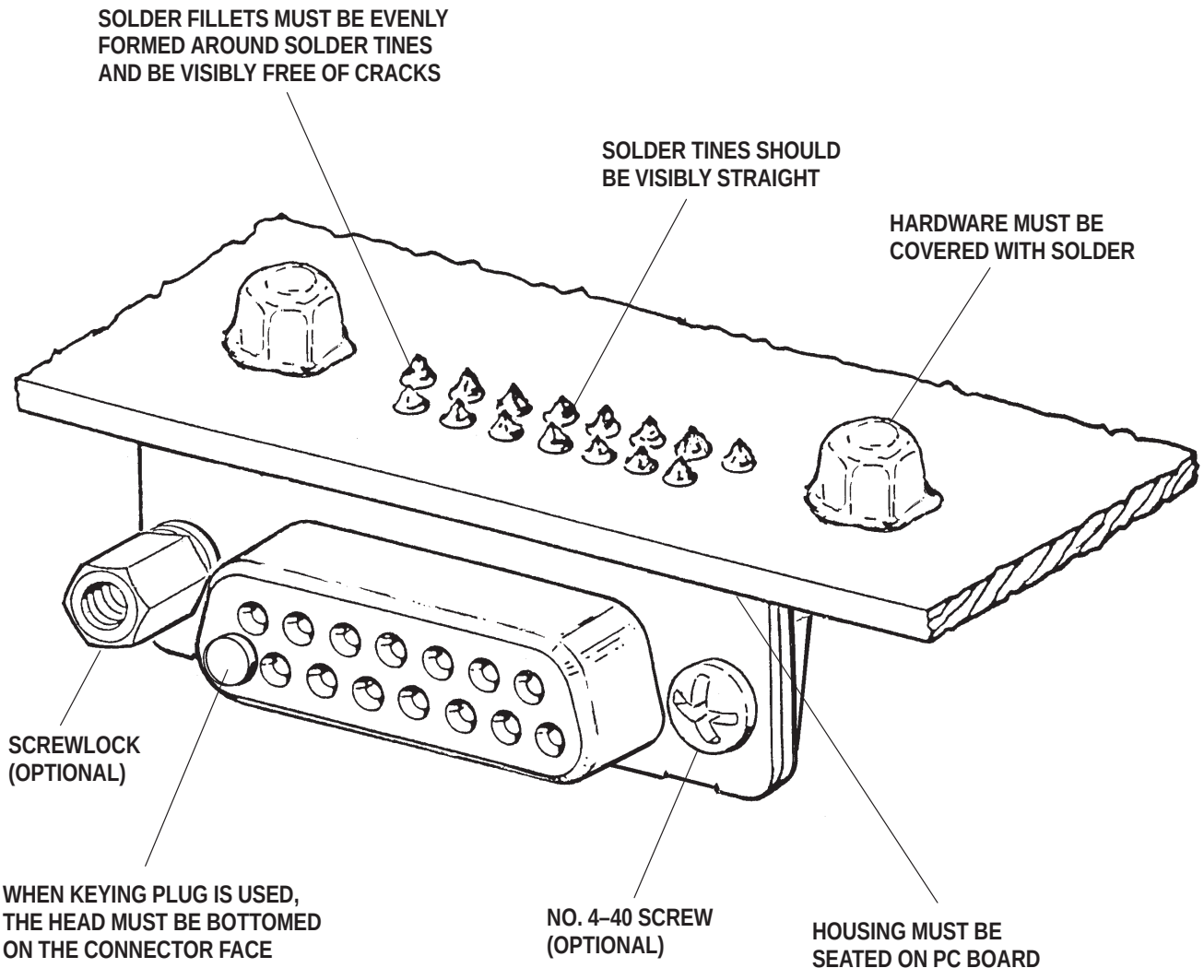


FIGURE 15. VISUAL AID