



All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of ± 0.13 [$\pm .005$] and angles have a tolerance of $\pm 2^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers requirements for application of AMPLIMITE HD-20 Series 454 and 545 right-angle rear load metal shell pc board connectors. The connectors are available in receptacles and plugs having 9, 15, 25, 37, and 50 positions and are made in five industry standard shell sizes that correspond to the number of contact positions. The connectors contain square solder-type contacts—receptacles have pin contacts and plugs have socket contacts. The plugs are available with or without grounding indents.

Each connector features a support bracket used along with commercially available fastening devices to mount the connector to a pc board and a mounting flange used to mount the connector to a panel. The connectors are supplied with No. 4-40 mounting screws in the mounting flange or removable female screwlocks as part of the mounting flange. In addition, the female screwlocks can be used along with commercially available No. 4-40 screws or jackscrews to secure mating connectors. Panel mounting is optional for these connectors, but provides additional support for the solder joints during mating and unmating of connectors. The series designator is the dimension measured from the center of the first row of contact solder tails to the back surface of the mounting flange.

These connectors can be mated with free-hanging cable connectors designed for insulation displacement contacts (IDC) with ribbon cable and crimp snap-in contacts with discrete wire.

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.

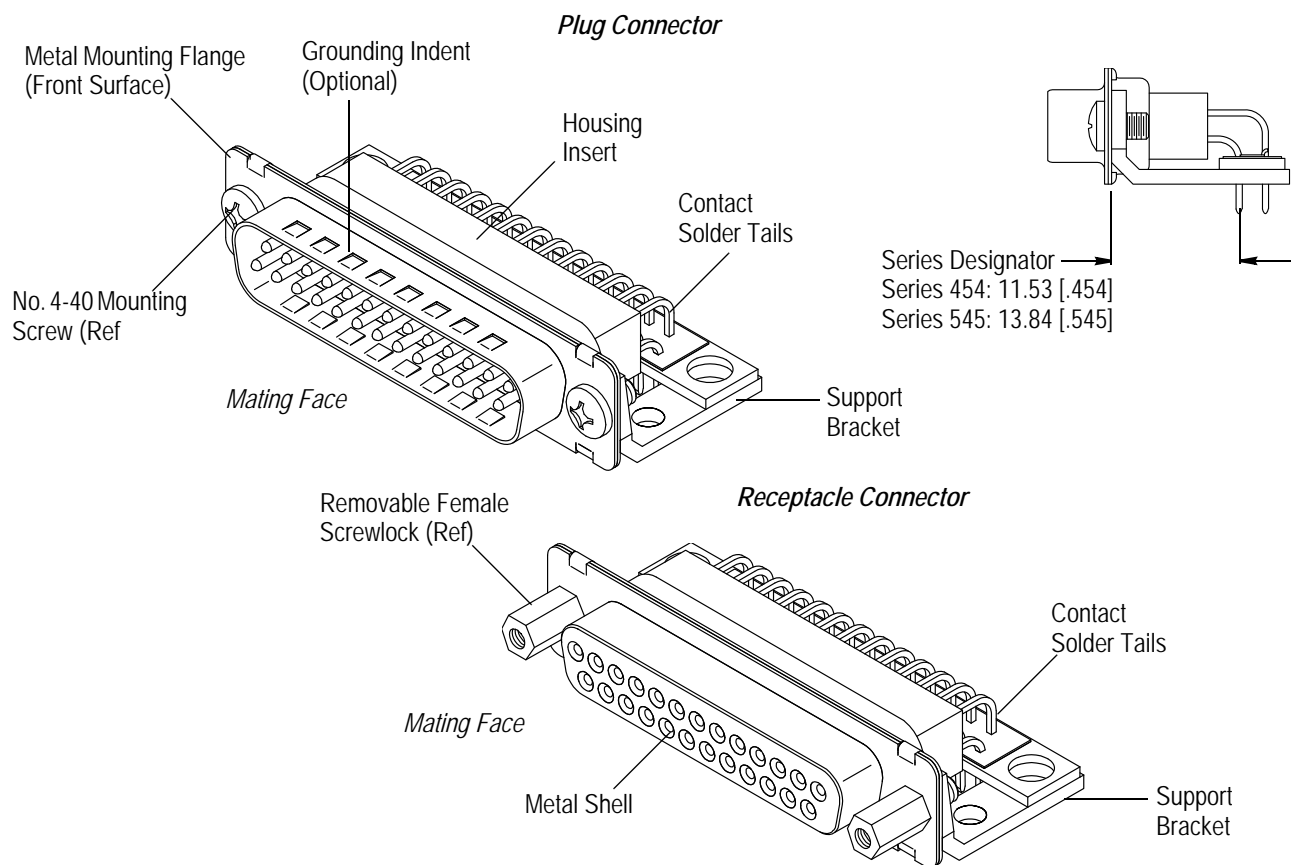


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Revisions to this application specification include:

- Updated application specification to corporate requirements
- New logo
- Changed time in Figure 8

2.2. Customer Assistance

Reference Product Base Part Number 5745114 and Product Code 4934 are representative of AMPLIMITE HD-20 Series 454 and 545 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 Representative or, after purchase, by calling PRODUCT INFORMATION at the number at the bottom of page 1.

2.3. Drawings

Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or with any other technical documentation supplied, the information contained in the Customer Drawings takes priority.

2.4. Specifications

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

2.5. Manuals

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, flux removal procedures, and a guide for information on soldering problems.

2.6. Instructional Material

Instruction Sheets (408-series) provide product assembly instructions or tooling setup and operation procedures and Customer Manuals (409-series) provide machine setup and operating procedures. At the time of publication of this document, there is no instructional material available that pertains to this product.

3. REQUIREMENTS

3.1. Limitations

The product specification referenced in Paragraph 2.4 contains limitations regarding these connectors.

3.2. Storage

A. Ultraviolet Light

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

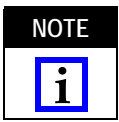
B. Shelf Life

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

C. Chemical Exposure

Do not store connectors near any chemical listed below as they may cause stress corrosion cracking in the 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.

3.3. Connector Shell Sizes

A composite of the five connector shell sizes with the overall dimension for each is provided in Figure 2.

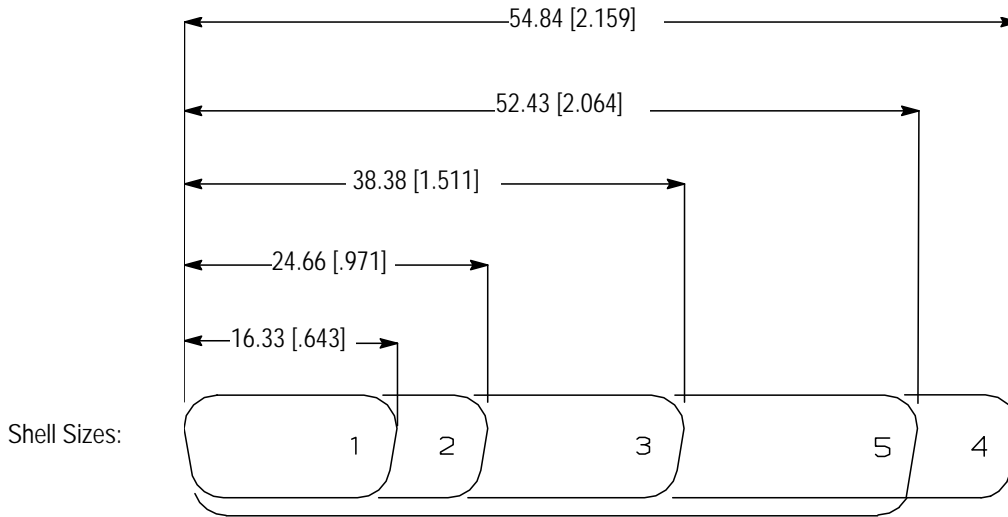


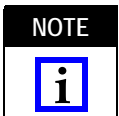
Figure 2

3.4. Shielding

These connectors have tin or zinc chromate plated steel shells which provide continuity for electromagnetic compatibility (EMC) applications. When connectors are mated with corresponding metal shell connectors, grounding continuity is achieved. Use of commercially available screws and nuts to secure the connectors together provide electrical continuity to any ground path on the pc board including the mounting holes.

3.5. Polarizing and Keying

The keystone configuration of the connector mating face prevents accidental inversion of mating connectors. To prevent mismatching of same size connectors, keying plugs can be placed in empty contact cavities of the receptacle. See Figure 3.



If keying plugs are used, the corresponding contact cavity in the mating plug **MUST BE EMPTY**.

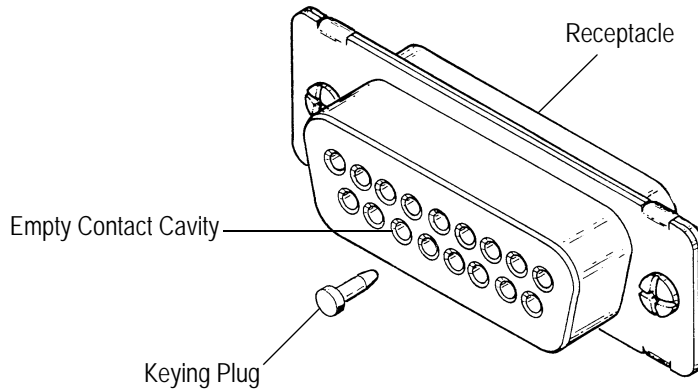


Figure 3

3.6. Connector Spacing

Care must be used to avoid interference between adjacent connectors and/or other components. Spacing is dependent on variable hardware used and the clearance required for mating connectors. The minimum allowable distance between connectors to ensure proper mating is provided in Figure 4.

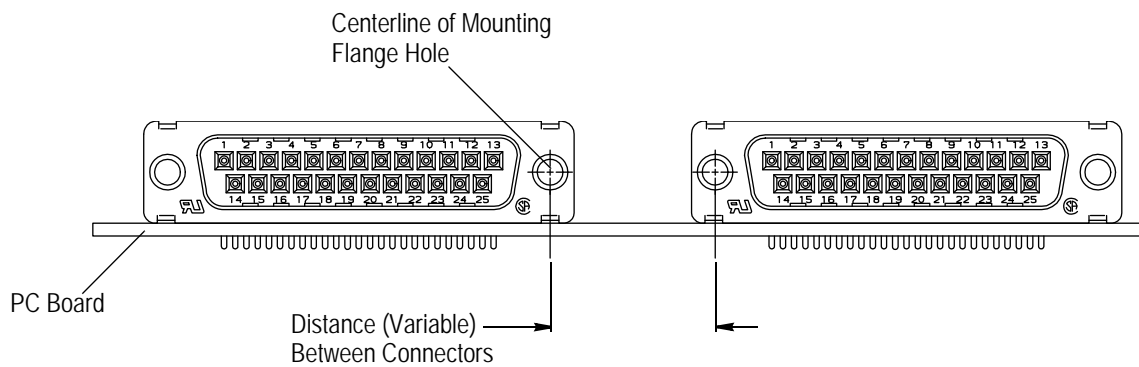


Figure 4

3.7. PC Board

A. Thickness

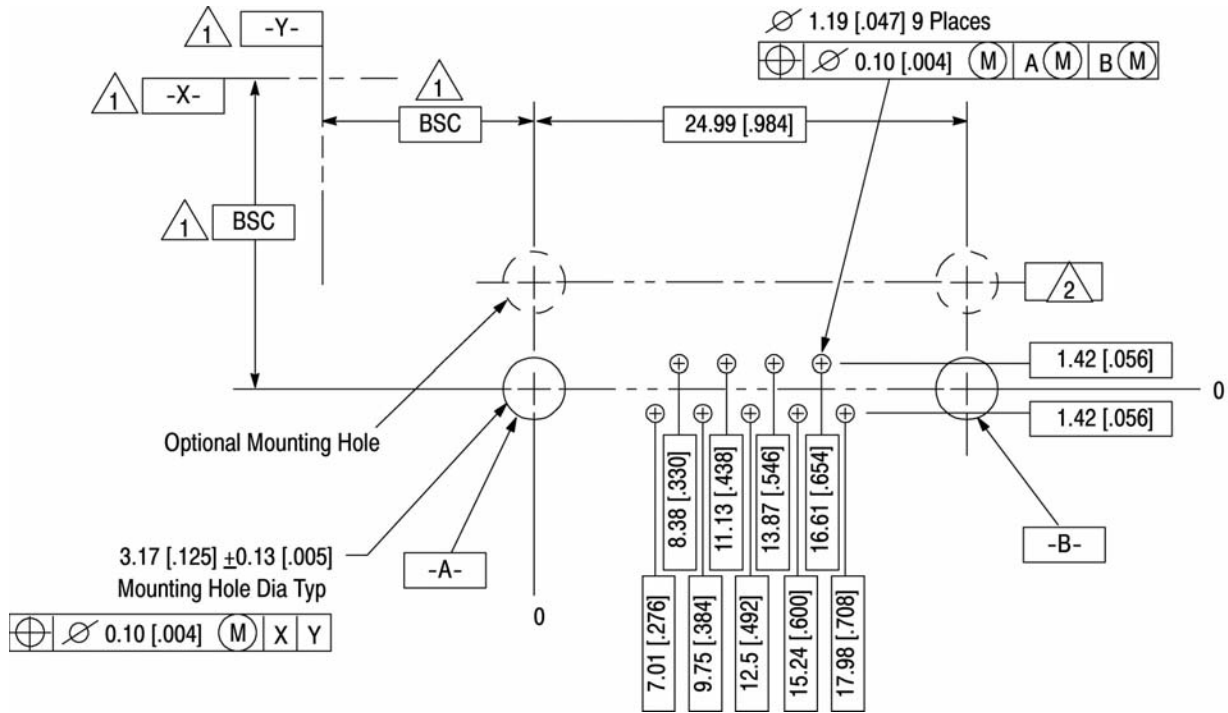
The maximum pc board thickness shall be 2.36 [.093] nominal.

B. Layout

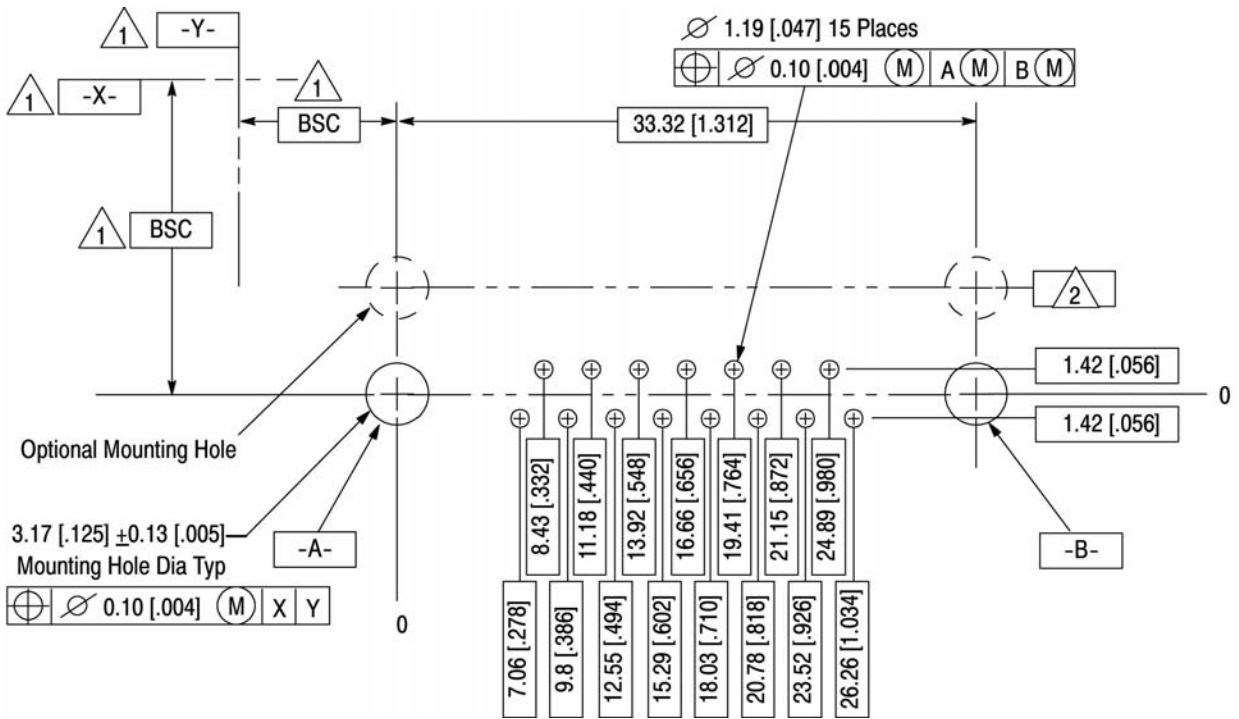
The support bracket hardware holes and contact tail holes in the pc board must be precisely located to ensure proper placement and optimum performance of the connector. The pc board layout must be designed using the dimensions provided on the customer drawing for the specific connector. Recommended pc board layouts are shown in Figure 5.

Recommended PC Board Layout

Size 1 (9-Position) Connector



Size 2 (15-Position) Connector

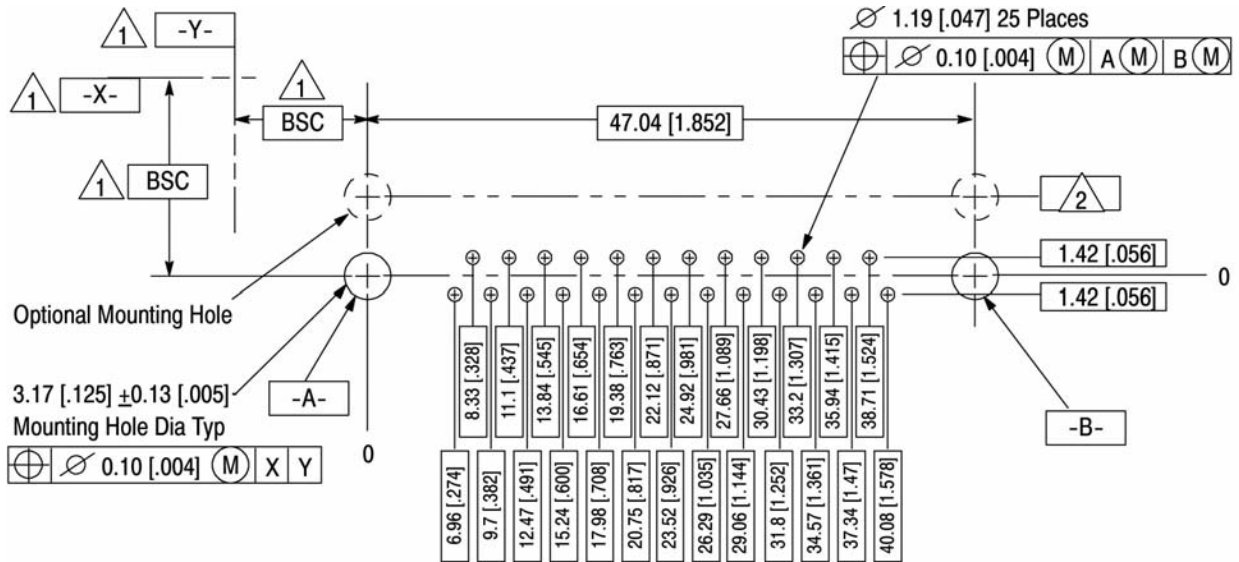


$\triangle 1$ Datums and Basic Dimensions Established by Customer

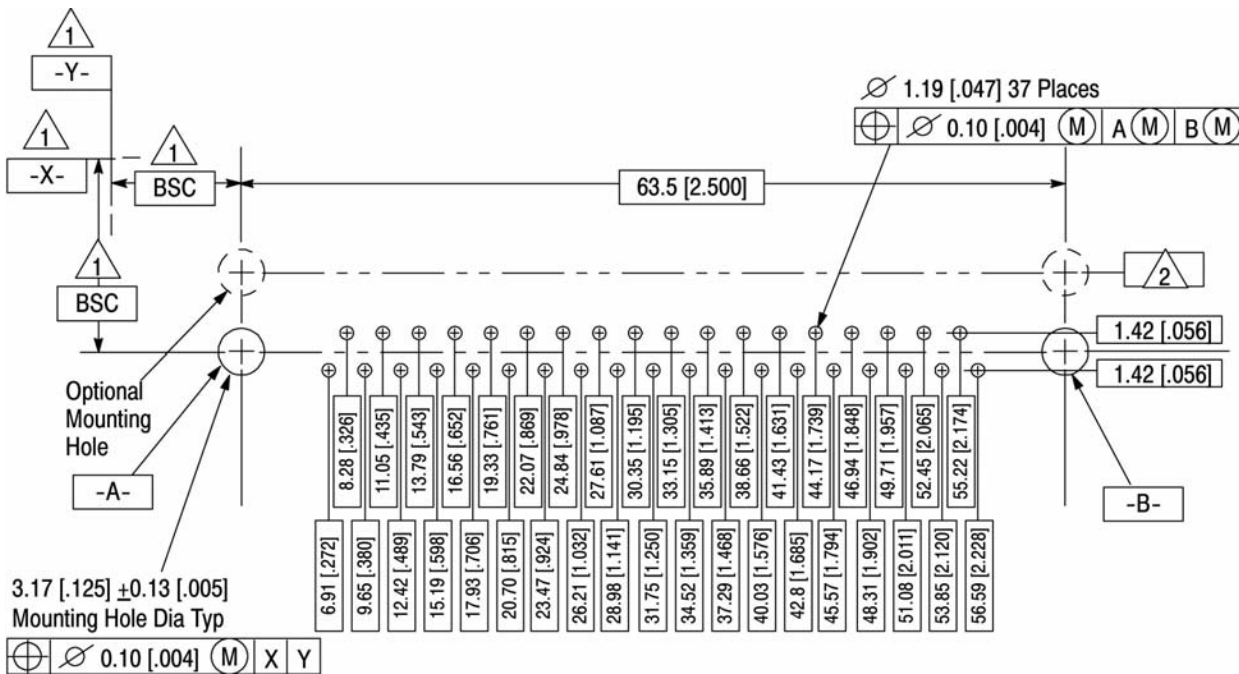
$\triangle 2$ 6.12 [0.241] for Series 454
 8.41 [0.331] for Series 545

Figure 5 (Cont'd)

Size 3 (25-Position) Connector



Size 4 (37-Position) Connector

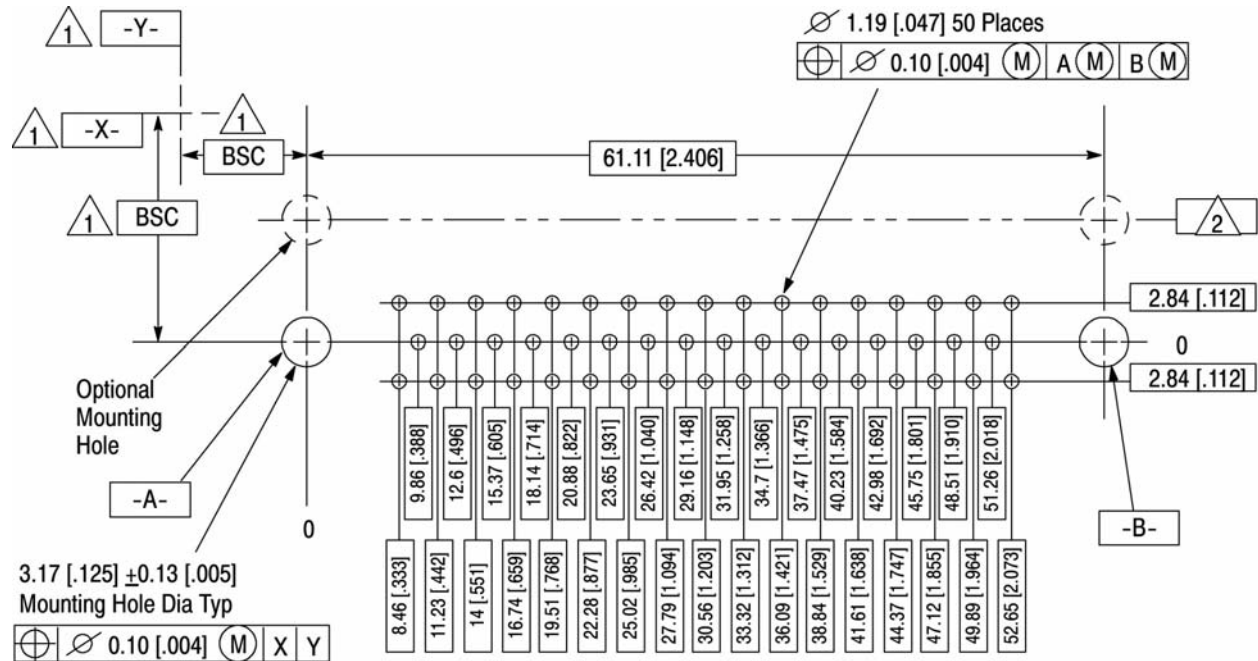


1 Datums and Basic Dimensions Established by Customer

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

Figure 6 (Cont'd)

Size 5 (50-Position) Connector



1 Datums and Basic Dimensions Established by Customer

2 6.12 [0.241] for Series 454
8.41 [0.331] for Series 545

Figure 6 (End)

C. Holes

The contacts and support bracket hardware may be used with or without plated through holes. If plated, the drilled hole size, plating types, and plating thickness are dependent on the application requirements. The finished hole size for hardware and each contact tail must be as stated to provide unrestricted insertion and ensure adequate application of solder. See Figure 7.

3.8. Connector Placement



The connector should be handled only by the housing to avoid deformation, contamination, or damage to the contact tails.

The connector must be oriented with the pc board so that the number one contact solder tail is aligned with the number one pc board hole. All solder tails must be started into the pc board holes; then, the connector must be press upon evenly until the bottom edge of the mounting flange is seated on the pc board.

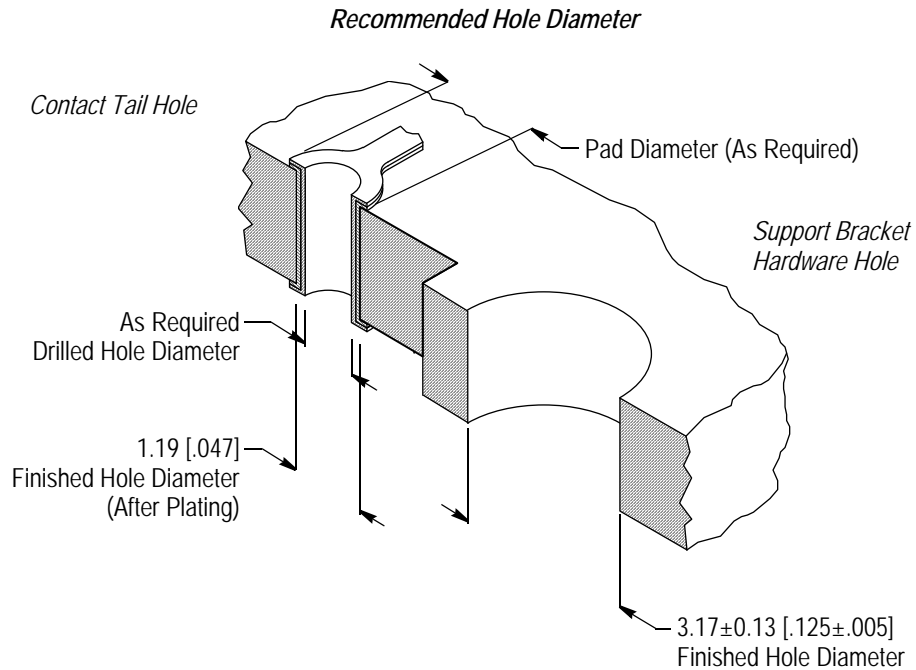


Figure 7

3.9. Soldering

Observe guidelines and procedures when soldering contacts. Solder, clean, and dry all wire leads to contacts according to the following:

A. Flux Selection

Contact solder tails 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.

B. Process

The connectors can be soldered using wave soldering or equivalent soldering techniques. Manual 402-40 provides guidelines for establishing soldering practices. The temperatures and exposure time shall be as specified in Figure 8.

SOLDERING PROCESS	WAVE TEMPERATURE	TIME (At Max Temperature)
Wave	265 ±5° C [509 ±9° F]	12 Seconds (Max)

Figure 8

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. Cleaners must be free of dissolved flux and other contaminants. Common cleaning solvents with times and temperatures that will not affect these connectors is specified in Figure 9.

It is recommended that cleaning takes place with the pc board on its edge. If using an aqueous cleaner, it is recommended using standard equipment such as a soak-tank or an automatic in-line machine.

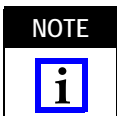


Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer's Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and Methylene Chloride is not recommended because of harmful occupational and environmental effects. Both are carcinogenic (cancer-causing).

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	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	Solvent		

ALPHA, BIOACT, CARBITOL, KESTER, and LONCOTERGE are trademarks.

Figure 9



If a particular cleaning solvent is not listed, contact *PRODUCT INFORMATION* at the number at the bottom of page 1.

D. Drying

When drying cleaned assemblies, temperature limitations must not be exceeded: -55 to 105°C [-67 to 221°F]. Excessive temperatures may cause housing degradation.

3.10. Checking Installed Connector

The connectors must be seated on the pc board to the dimension given in Figure 10.

Hardware used in the support bracket of the connector to secure the connector to the pc board must be tightened to a maximum torque of 0.23 N [2 in.-lbs].

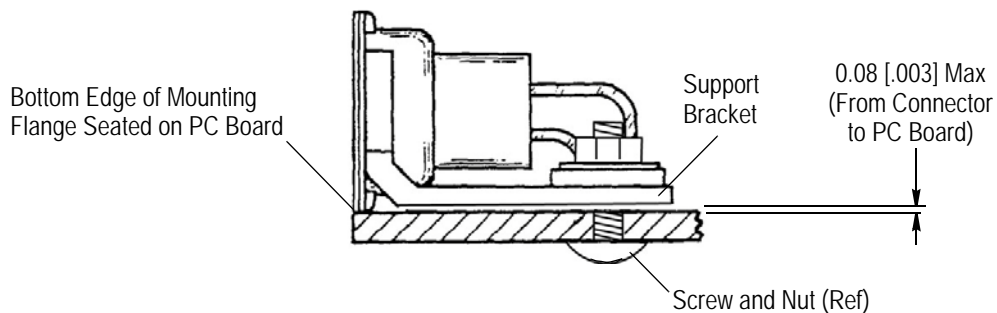


Figure 10

3.11. Panel

A. Mounting

When mounting connectors to a panel, the distance between the mating connector mounting flanges must be considered when determining the method of mounting and thickness of the panel to ensure full mating of connectors. The mounting flange hole location on the panel must also be considered to avoid interference when the connector is mounted to the panel.

These connectors are designed for rear panel mounting ONLY. For the mating cable connector, either front or rear mounting is acceptable.

Hardware used in the mounting bracket of the connector (No. 4-40 mounting screws or removable female screwlocks) shall be tightened to a maximum torque of 0.45 Nm [4 in.-lb] applied to the connector mating face side of the panel.

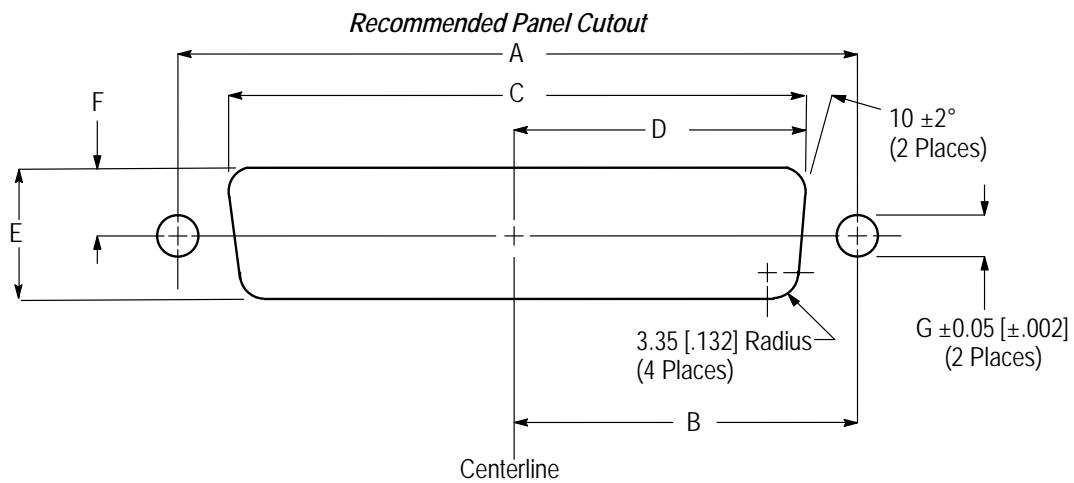
B. Thickness

Panel thickness is limited by the distance required between the mounting flanges of the connectors to ensure full mating of connectors (refer to Paragraph 3.12, Mating).

When using the female screwlocks, the connector can be secured to a panel having a thickness of 1.58 [.062]. Thinner panels can be used; however, washers are recommended to make up the thickness difference and provide a bottoming surface for the mounting flange of the mating connector.

C. Cutout

Panel cutout dimensions are provided in Figure 11.



CONNECTOR SHELL SIZE	DIMENSION						
	A	B	C	D	E	F	G
1	24.99 [.984]	12.50 [.492]	20.47 [.806]	10.24 [.403]	11.40 [.449]	5.72 [.225]	3.05 [.120]
2	33.32 [1.312]	16.66 [.656]	28.80 [1.134]	14.40 [.567]			
3	47.04 [1.852]	23.52 [.926]	42.52 [1.674]	21.26 [.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 [.555]	7.06 [.278]	

Figure 11

3.12. Mating

The required dimension between mating connectors is provided in Figure 12.

Mating Dimension

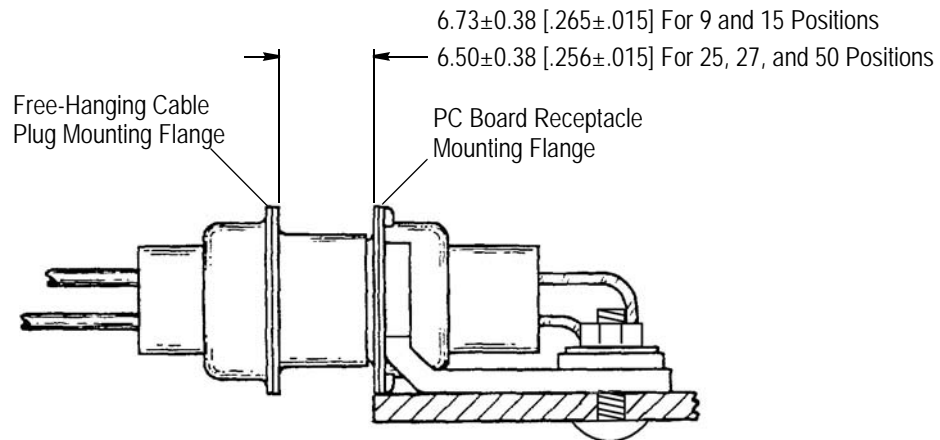


Figure 12

3.13. Ancillary Items

Types of hardware used to secure the connector to the pc board, mount the connector to the panel, and secure mating connectors are shown in Figure 13.

For advice concerning hardware, contact **PRODUCT INFORMATION** at the number on the bottom of page 1.

A. Commercial Hardware

Connectors can be secured to the pc board using commercially available screws, washers, and nuts, rivets, or similar fastening devices (installed in the support bracket).

Jackscrews or No. 4-40 screws (installed in the removable female screwlocks) can be used to secure mating connectors.

B. Hardware Included with Connector

The removable female screwlocks or the No. 4-40 mounting screws are used to mount the connector to a panel for fixed applications.

The removable female screwlocks (along with commercially-available jackscrews) are used to secure mating connectors for quick disconnect/connect applications. The removable female screwlocks can also be used with commercially-available No. 4-40 screws to secure mating connectors.

3.14. Repair and Removal

Damaged or defective connectors **MUST NOT** be used. Connectors will require desoldering of all contact solder tails. The contacts are not removable.



When removing connectors from the pc board, care must be taken not to damage other pc board components during the desoldering process.

Note: A composite of different types of hardware is shown.
In application, identical hardware should be used in both holes of the mounting flange of the connector.

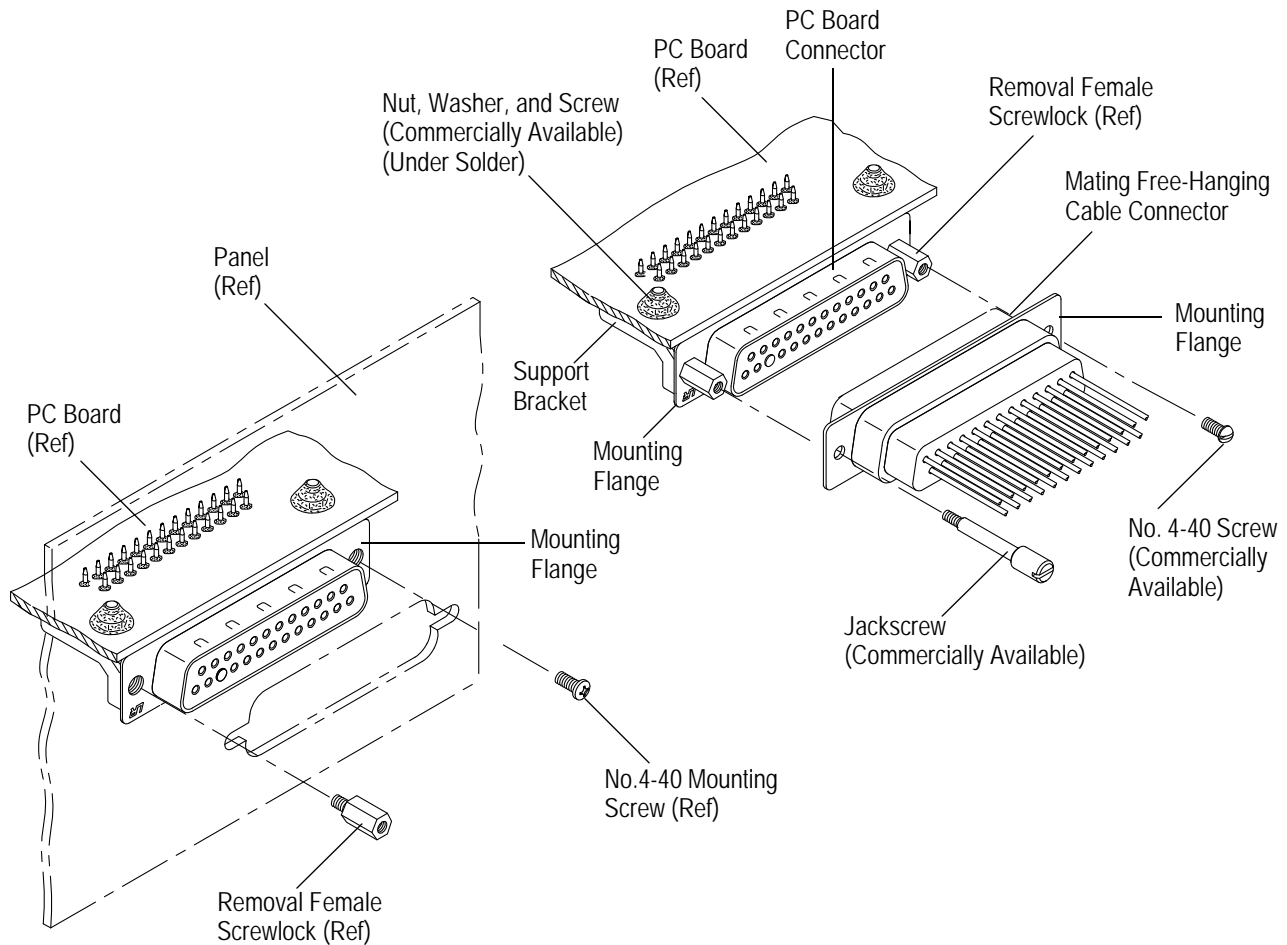


Figure 13

4. QUALIFICATION

AMPLIMITE HD-20 Series 454 and 545 right-angle rear load metal shell pc board connectors are Recognized under the Component Program of Underwriters Laboratories Inc. (UL) in File E28476 and Certified by CSA International in File LR 7189.

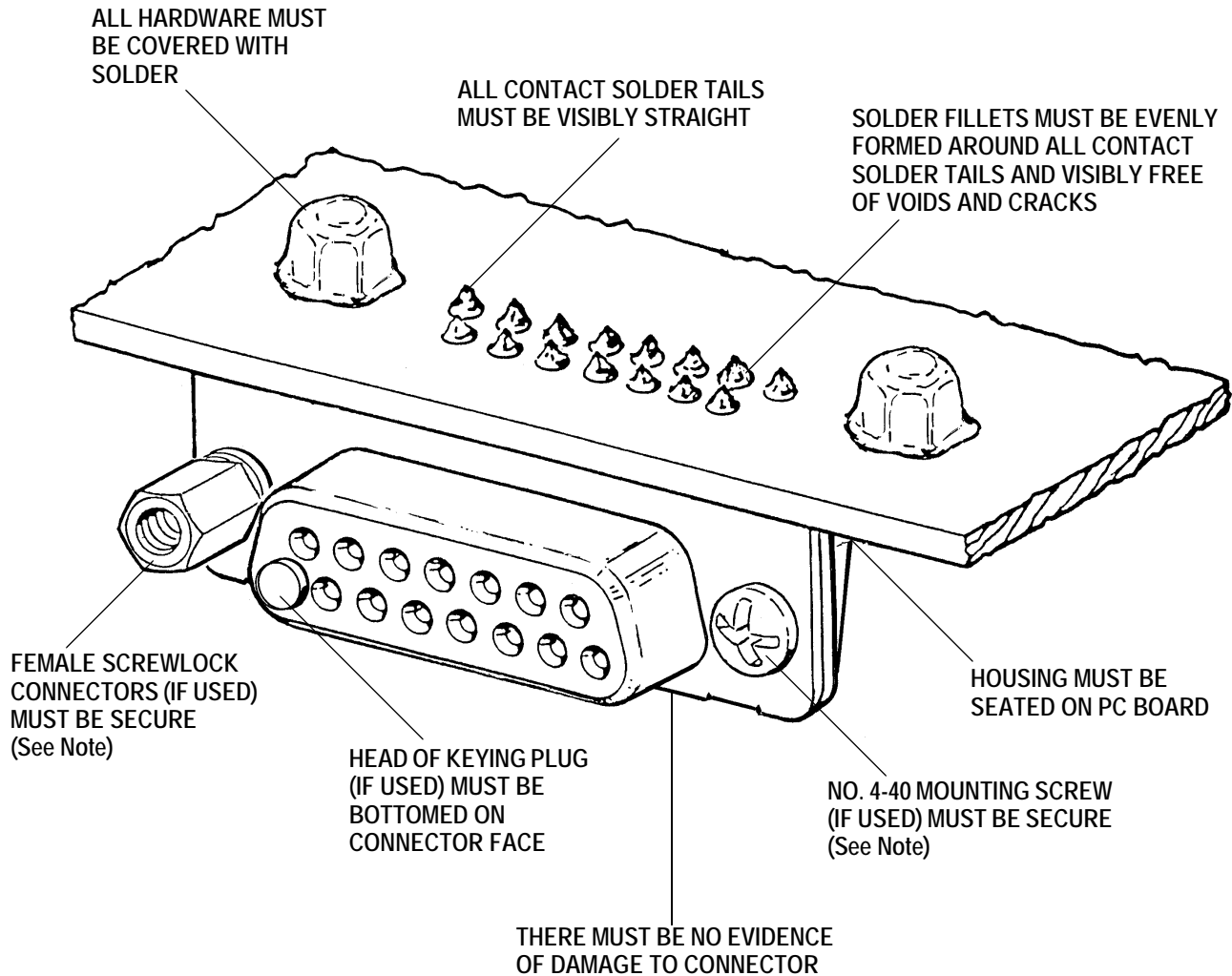
5. TOOLING

These connectors are designed for hand placement on the pc board and require no special tool when handling them. The only concerns are:

- the connector must be handled by the mounting flange only to avoid touching the contact solder tails which could deform or contaminate the tails
- during seating of the connector on the pc board, a backup support must be provided that will allow the contact solder tails to pass through the pc board holes without deforming the tails

6. VISUAL AID

The illustration below shows a typical application of AMPLIMITE HD-20 Series 454 and 545 right-angle rear load metal shell pc board connectors. 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 different types of hardware is shown. In application, identical hardware should be used in both holes of the mounting flange of the connector.

FIGURE 14. VISUAL AID