NOTE

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 ±0.13 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 the requirements for the application of Z-PACK 2 mm HM Interconnection System for Board- to- Board Connections and provides information on the standard modules (Types A, B, C, A/B) .

The Z-PACK 2 mm HM Interconnection System is a two part connector system intended to connect free boards (daughterboards, printed circuit (pc) boards) to a fixed board (motherboard, backplane or back panel); and to feed this connection through the fixed board. Also the connection of the free boards and the connection of cables to pc boards allows for multiple configurations.

The Z-PACK 2 mm HM Interconnection System consist of the combinations shown in Figure 1.

1.1. Board-to-Board Connections

Free Board to Fixed Board Connections

Standard Connections

(a) Standard (= Right-Angle) Female Connector on the Free Board
(b) Standard (= Vertical) Male Connector on the Fixed Board

1.2. Components

All pc board connectors are connected to pc boards by miniaturized EON pin contacts. In order to meet the signal requirements, connectors can be stacked along the edge of the pc board as specified in Paragraph 3.4.

All complete pc board connectors are equipped with guide and polarization posts. Connectors are also available with a Multi-Purpose Center (MPC) which can be used with a coding device as specified in Paragraph 3.6. These alignment features can also be used to guide connectors (Types B) which do not have any alignment features.

Thirteen different Types (styles) of connector modules are defined:

- Type A:110 signal contacts, 50 mm length, with MPC, guiding and polarization
- Type B:125 signal contacts, 50 mm length/110 44 mm/95 38 mm
- Type C:55 signal contacts, 25 mm length, with guiding and polarization
- Type A/B: 125 signal contacts, 50 mm length with guide and polarization/110 44 mm /95 38 mm

Male connectors of Type A, B, C, A/B have 5 rows of signal contacts, Optionally they can have 2 additional rows for ground return. Female connectors of these types always have 5 rows, a two - part ground return shield is also offered. Refer to Paragraph 3.7 or Application Specification 114-19036 for ground return shield details.

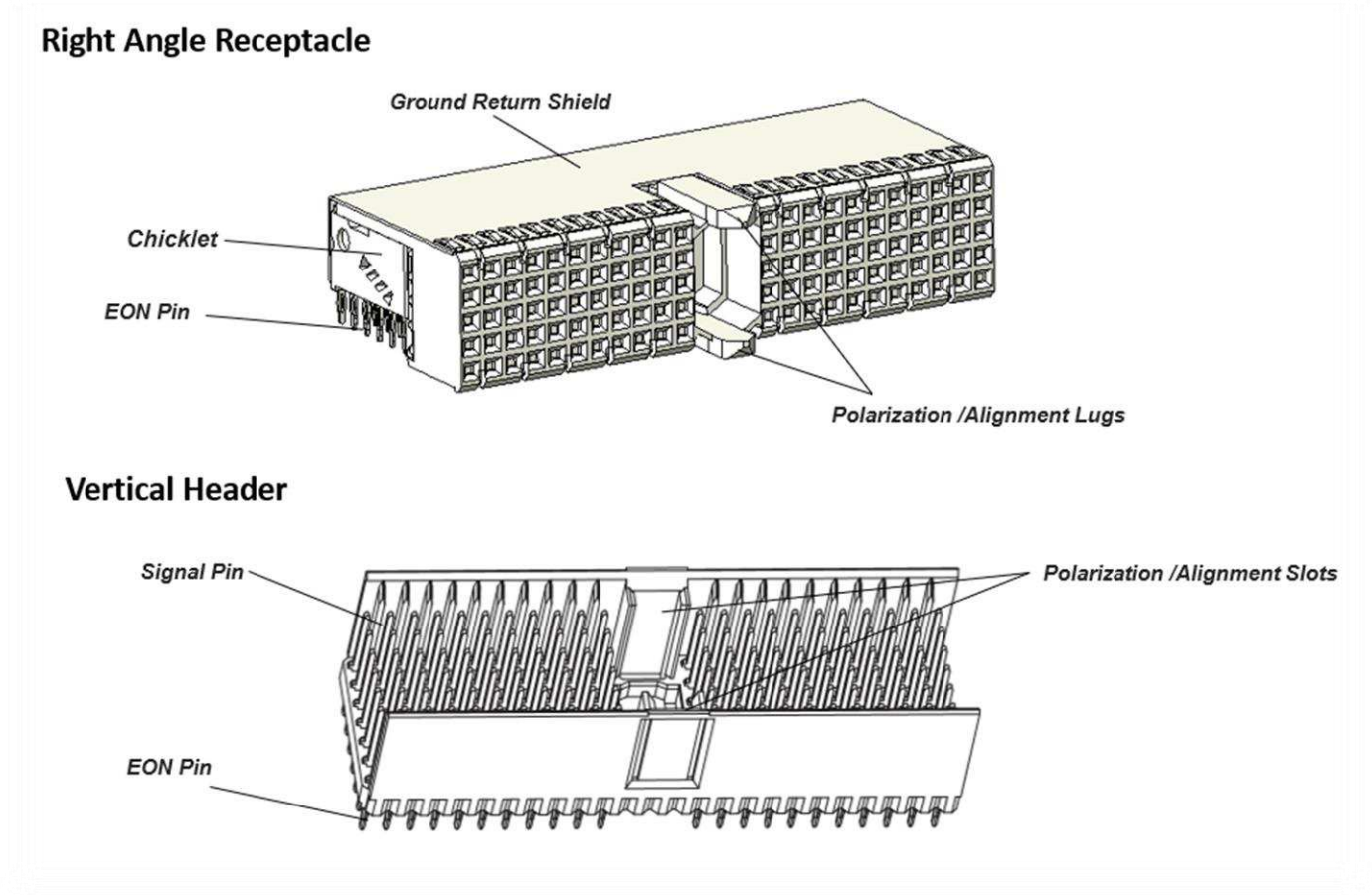
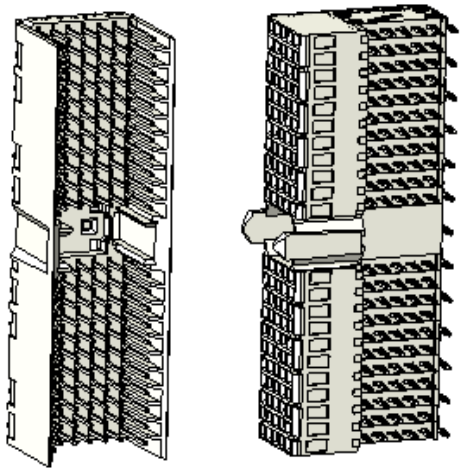
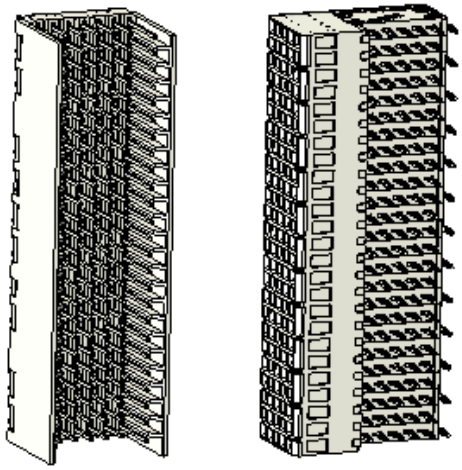

Right Angle Receptacle
Ground Return Shield
Chicklet
EON Pin
Polarization /Alignment Lugs
Vertical Header
Signal Pin
Polarization /Alignment Slots
EON Pin

Figure 1

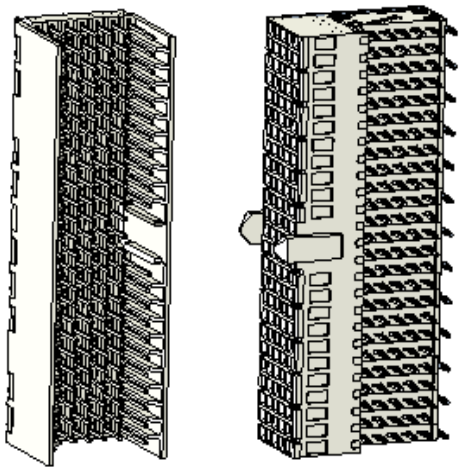
Figures 2 shows the different types of connector modules for the standard free – to- fixed board connection.



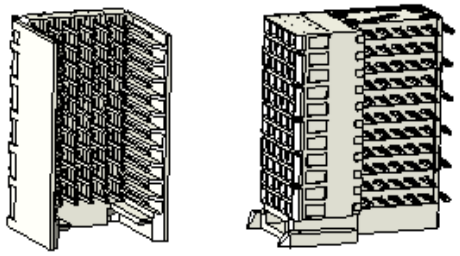
Connector Module Style A



Connector Module Style B



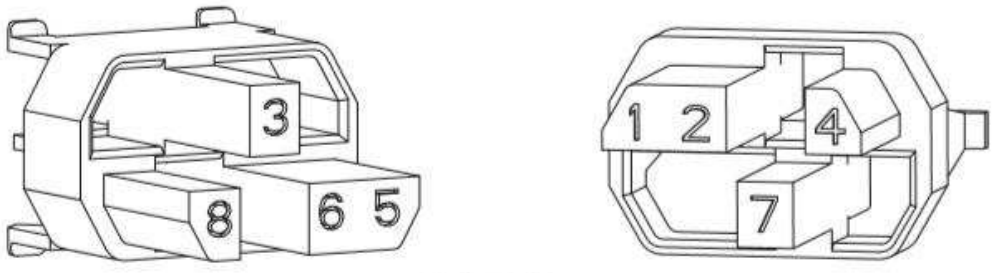
Connector Module Style AB



Connector Module Style C

Figure 2

The MPC coding device is shown in Figure 3.



Coding Devices

Figure 3

2. REFERENCE MATERIAL

2.1. Customer Assistance

Reference Base Part Numbers 2391870, 2392557, and Product Codes 6250 and 6251 are representative numbers of the Z-PACK 2 mm HM Interconnection System. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product information. Such information can be obtained through a local Tyco Electronics Representative or, after purchase, by calling the Tooling Assistance Center 1-800-722-1111 or the Product Information Center 1-800-522-6752.

2.2. Drawings

Customer Drawings for each connector 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.

2.3. Specifications

The Z-PACK 2 mm HM Interconnection System complies fully with the (International Electrotechnical Commission) IEC917, and IEC 61076-4-101 requirements based on experience in connector applications; is compatible with the (German Institute for Standardization) DIN 41626 and 43356; and the (Institute of Electrical and Electronic Engineers) IEEE 1301.

Product Specifications 108-19082 provides performance requirements and test results for 5 row products respectively.

2.4. Reports

Technical Report R 041-1566 level 2 and R041-1738 level 1 cover the release test of the Z-PACK 2 mm Signal Contact Connector System. R041-1654 covers the release test of the press-in connections of the connector system.

2.5. Instructional Material

The following list of instruction sheets provides information on operation, maintenance, and repair of related tooling. Refer to Section 5, TOOLING for additional instructional material associated with termination tooling in the table in Figure 10.

Document Number	Document Title
411-19296	Single Feed Contact Removal Tool, 5-Row, Z-PACK HM Male, P/N 434814-1
411-19298	Housing Support, Anvil, Auxiliary Tool to Remove Z-PACK, P/N 434857-1
411-19299	Housing Removal Tool, Z-PACK HM, Female, P/N 434865-1
411-19301	All Feed To Contact Removal Tool, 7-Row, Z-PACK HM, Male, P/N 434811-1
411-19356	Instruction for Contact Removal Tool

3. REQUIREMENTS

3.1. Safety

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

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 connector performance.

C. Chemical Exposure Limitations

Do not store connectors or components near any chemical 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

3.3. Product Materials

All Z-PACK 2 mm HM Connector housings and chicklets are molded of UL94V-O rated, glass-filled polyesters.

The signal pin contacts are phosphor bronze and plated at the contact interface with gold. The signal receptacle contacts are copper alloy and plated at the contact interface with gold. All contacts have a nickel underplate and tin or tin-lead plated press-fit leads.

Ground contacts are phosphor bronze and plated at the contact interface with gold. All contacts have a nickel underplate and tin or tin-lead plated press-fit leads.

3.4. Stacking of Connectors

A complete connector is composed by stacking one or more connector modules, end to end. All types of modules can be stacked provided the following rules are obeyed:

2. A module without guiding and polarization posts (Types B), shall only be used between modules with guiding and polarization posts, otherwise it cannot cope with the allowed transverse and angular misalignment.
3. Extension modules (Types C) shall only be used at the bottom end of a connector, together with at least one module with Multi-Purpose Center.
4. All modules are 50 mm long, except the extension modules, which are 25 mm, 38 mm, and 44 mm long.
5. Every module with a guiding and polarizing post has all the features of a complete connector and can be used on its own.

3.5. Sequencing

In order to have an earlier engagement of specific contacts, three levels of contacts are defined. The following rules apply to the usage of these levels:

8. Contact row b shall only be loaded with male contacts level 1 and 2. This is because the available insertion depth of the free board connector is restricted in row b by the edge of the PC-board.

The use of level 3 contacts in row b will definitely lead to stubbing problems when used with right-angle receptacles.

8. To neutralize the effect of inclination on the sequencing, the contacts of a specific level shall be located at the outer corners of the complete connector.

3.6. Coding

Coding devices are clicked into the Multi-Purpose Centers of the connector modules. They are polarized and have sufficient clicking latches for fixed and free modules. A pair of tweezers is sufficient for easy mounting. The coding devices are extractable by releasing the latches. This can be done by any object with a sharp point, (e.g.) a small screwdriver. Only matching coding devices shall be equipped on mating connectors.

3.7. Shielding/Grounding

In case of the ground return connection the grounding rows (f and z) of the Male connectors shall be equipped with level 3 contacts. Female connectors can be purchased with the upper ground return shield pre-applied.

3.8. PC Boards

A. Material

The allowed material for pc boards is glass-epoxy (NEMA grade G10, G11, FR 4, FR 5) corresponding to DIN 7735 Hgw-Types or DIN 40802 EP-Types.

B. PC Board Thickness

Fixed boards shall have a thickness between 1.4 and 5.6 mm, free boards shall have a thickness between 1.4 and 4.2 mm.

C. PC Board Layouts

Figure 4 shows typical layouts of pc boards.

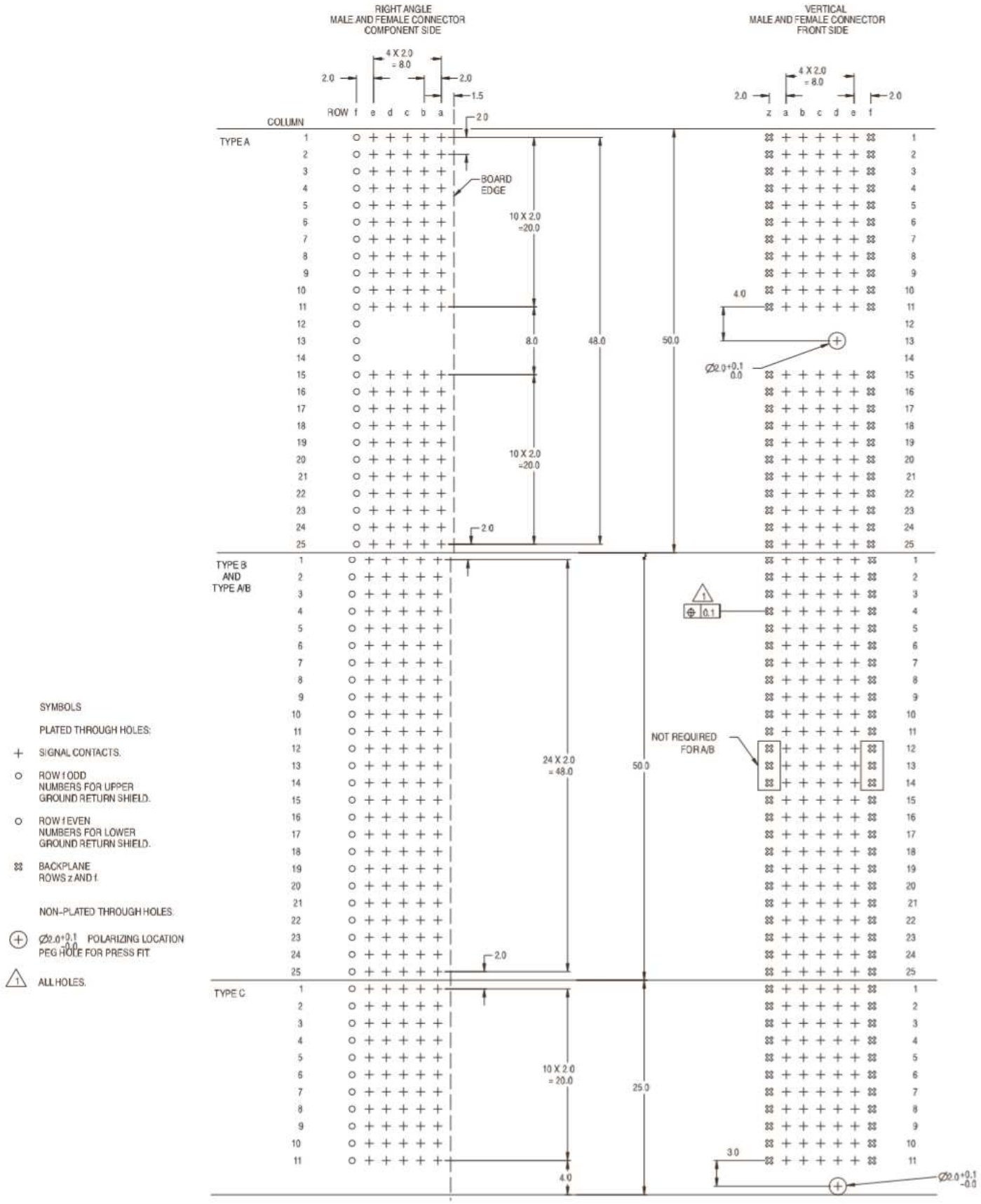


Figure 4 (cont'd)

3.9. Contact Hole Configuration

The holes in the pc board for all contacts must be drilled and plated through to the dimensions shown in Figure 5.

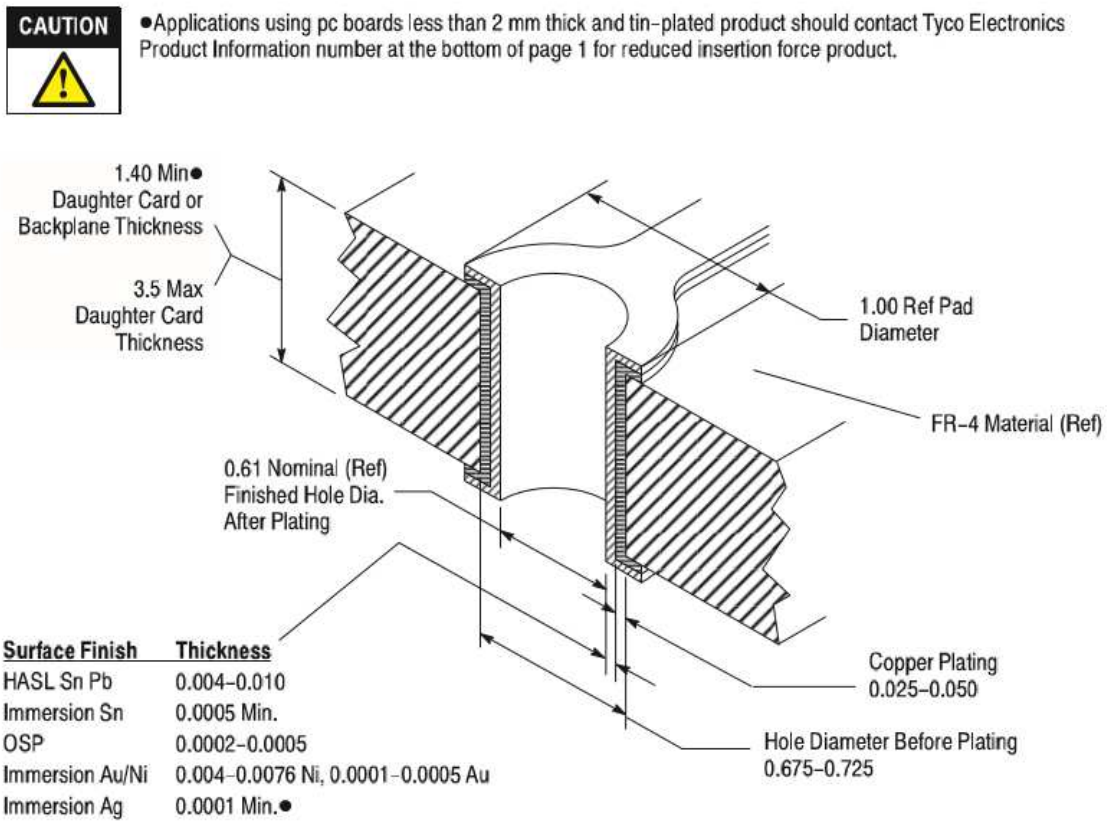


Figure 5

3.10. Connector Seating

The fixed board connectors are attached to the backplane and pressed into the pc board. These connectors can only be mounted one way on the board. All modules, except modules B, A/B have a location peg for this purpose and Type B, A/B modules can only be stacked in one way to them because the modules are polarized. Care has to be taken to mount the Type B, A/B, connectors in the proper direction.

Connectors must be inserted in such a way that a max. distance of 0.2 mm between the pc board surface and the connector is obtained and a maximum difference in insertion depth of 0.1 mm between adjacent connectors. Refer to Figure 6. Connectors must be inserted parallel to the board. For free board connectors care should be taken to prevent exerting force on the front housing. The free board connector modules are mounted along the edge and pressed into the pc board.

Where the board connector modules are sufficiently held on the pc board by their EON PIN contact termination, location pegs are not provided. Fixed board connectors Type A, C only have a location peg to prevent wrong assembly.

Pressing the connectors in the pc board shall only be done by special tools. These tools can be mounted in various insertion machines. See Section 5, TOOLING.

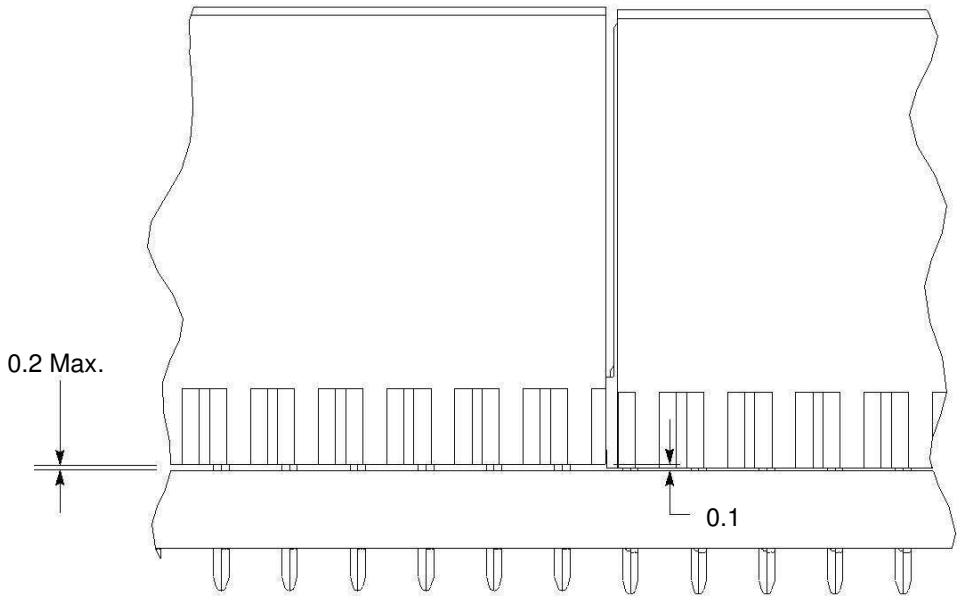


Figure 6

3.11. Shield Installation

A. Ground Return Shield

Ground return shields are only applied to the standard female connector. The upper shield is applied to the connector by Tyco Electronics. Figure 7 shows the connector with upper shields applied.

Right-Angle Receptacle

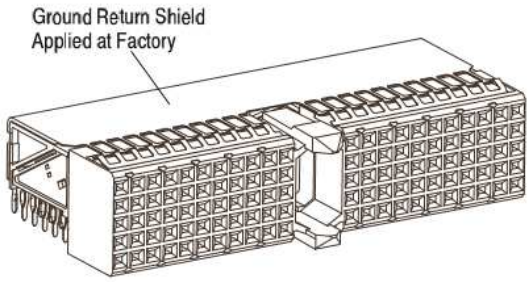


Figure 7

3.12. Mating

Before mating or un-mating connectors, electrical current shall be disconnected.

A. Misalignment and Inclination

In the direction perpendicular to the mating direction a misalignment of 2 mm may exist without any effect. An inclination of 2° around the normal axis will not effect proper mating of the connectors. Tolerances can be seen in Figure 8 and apply only when connectors with guide lugs are separated by only one Type B without lugs. Guiding and polarizing lugs at the MPC are of Types A at the ends of Types C and also in the middle of Types A/B. .

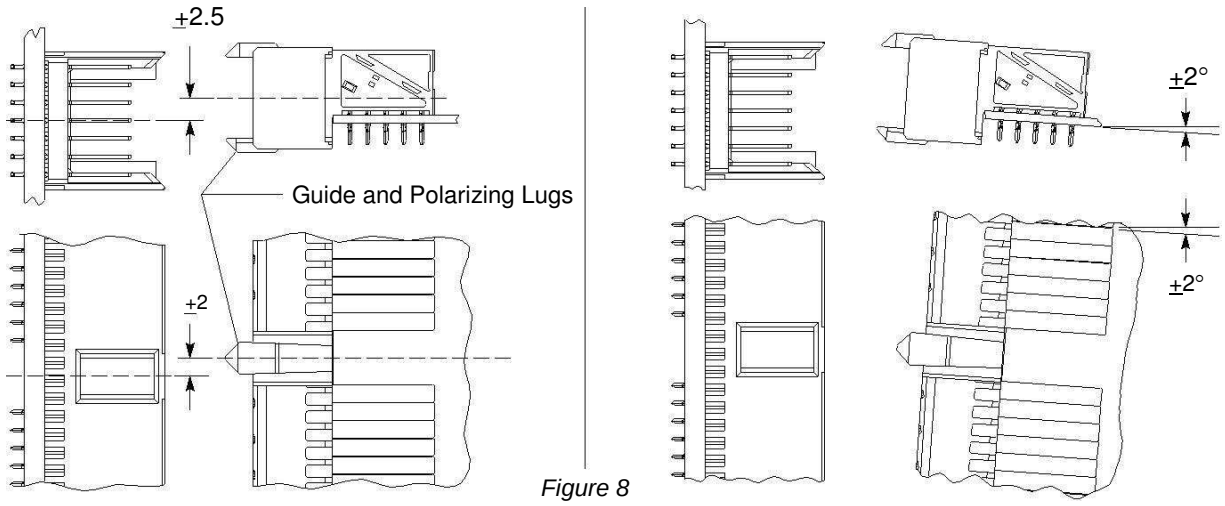


Figure 8

B. Mating Dimension

Full mating of connectors is necessary to ensure a good connection and to obtain the maximum signal transmission performance. The fully-mated dimension from the top surface of the pc board to which the pin header is mounted and the first row of contacts in the receptacle is given in Figure 9.

Standard Connection

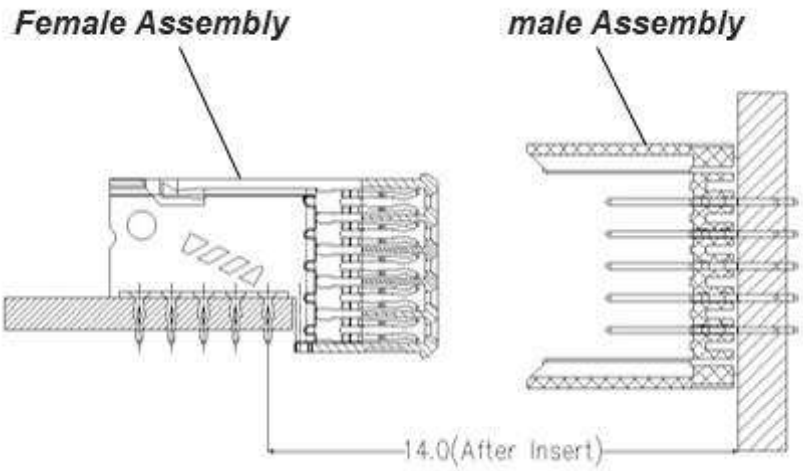


Figure 9

3.13. Repair/Replacement

A. Signal Contacts

Damaged signal contacts must not be used. If a damaged signal contact is evident, it must be removed and replaced with a new one. Signal contacts can only be replaced in male connectors.

B. Connectors

Damaged connectors and chicklets must not be used. If a damaged connector or chicklet is evident, the entire connector must be removed and replaced with a new connector. To ensure plated through-hole integrity, connectors should only be replaced no more than two times, or a max of three insertions per pc board. Tools for removing connectors from pc boards are provided in Section 5, TOOLING.

4.QUALIFICATIONS

4.1 General

The Z-PACK 2 mm HM Interconnection System is qualified according to IEC 60512.

4.2. Part Qualification Levels

Tyco Electronics offers four different levels of performance based on industry standard qualifications. A connector's performance level is distinguished by its dash number as shown below in increasing level of performance:

xxx-1	IEC 61076-4-101 performance level 2

5. TOOLING

Figure 10 provides tooling part numbers related to the Z-PACK 2 mm HM Interconnection System.

- **PC Board Support**

A pc board support must be used to prevent bowing of the pc board during the insertion of a connector into the board. It should have flat surfaces with holes or a channel wide and deep enough to receive any contact pins that may protrude below the pc board surface during installation of the connector.

- **Seating Tools**

Seating tools have been designed to push on the contact and seat the connector on the pc board. The tool will prevent contacts from backing out of the housing and prevent damage to the housing.

- **Power Units**

Power units are automatic or semi-automatic machines used to assist in the application of a product. A power unit supplies the force to seat the connector onto the pc board using seating tools. Power for the insertion tool must be provided by application tools (with a ram) capable of supplying a minimum downward force of 50 N [11.23 lbs] per contact. Total insertion force is dependent on the size of the connector and number of connectors being simultaneously inserted.

- **Arbor Frame Assembly**

Manual arbor frame assemblies are used to exert a downward force used to apply connectors to a pc board using seating tools. Commercially made arbor frame assemblies are available.

CONNECTOR INSERTION TOOLING - •FLAT ROCK STYLE"				
CONNECTOR STYLE/SEX	CONNECTOR TYPE (COLUMNS)	UPPER INSERTION TOOLING	SUPPORT TOOLING	INSERTION TOOLING DOCUMENT
Vertical Male	A	90753-1	Customer Supplied	408-9912
	A/B	91346-1		
	A/B (22)	91346-2		
	A/B (19)	91346-3		
	B	90755-1		408-9914
	B (22)	90755-2		
	B (19)	90755-3		
	C	90757-1		408-9916
Unshielded Right-Angle Female	A	122559-1	122561-1	408-4216
	B (All Columns) †			
	C †			
	A/B (All Columns) †			
Shielded Right-Angle Female	A (Except TDM J4)	122562-1	122561-1	408-4382
	B (All Columns) †			
	C †			
	A/B (All Columns) †			
	A (For TDM J4)	91316-1		

† Tool length may exceed connector length; check that tool does not interfere with other components.

Figure 10(cont'd)

CONNECTOR INSERTION TOOLING - •QUICK CHANGE"

CONNECTOR STYLE/SEX	CONNECTOR TYPE (COLUMNS)	UPPER INSERTION TOOLING	SUPPORT TOOLING	INSERTION TOOLING DOCUMENT
Vertical Male	A	438001-1	438051-1	411-19312
	B	438002-1		411-19313
	B (22)	438002-2	438051-4	
	B (19)	438002-3	438051-6	
	C	438003-1	438051-2	411-19314
Unshielded-Right-Angle Female	A	438031-1	438051-1	411-19324
	B (All Columns) †			411-19325
	C	438032-1	438051-2	411-19326
Shielded Right-Angle Female	A (Except TDM J4)	438036-1	438051-2	411-19334
	B			
	A/B			
	B (19)	438036-3	438051-6	411-19437
	A/B (19)			
	B (22)	438036-2	438051-4	
	A/B (22)			
	A (For TDM J4)	1115335-1	438051-1	411-19334
	C	438037-1	438051-2	411-19437

† Tool length may exceed connector length; check that tool does not interfere with other components.

Figure 10 (end)

6. VISUAL AID

Figure 11 shows a typical application of Z-PACK 2 mm HM Interconnection System. 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.

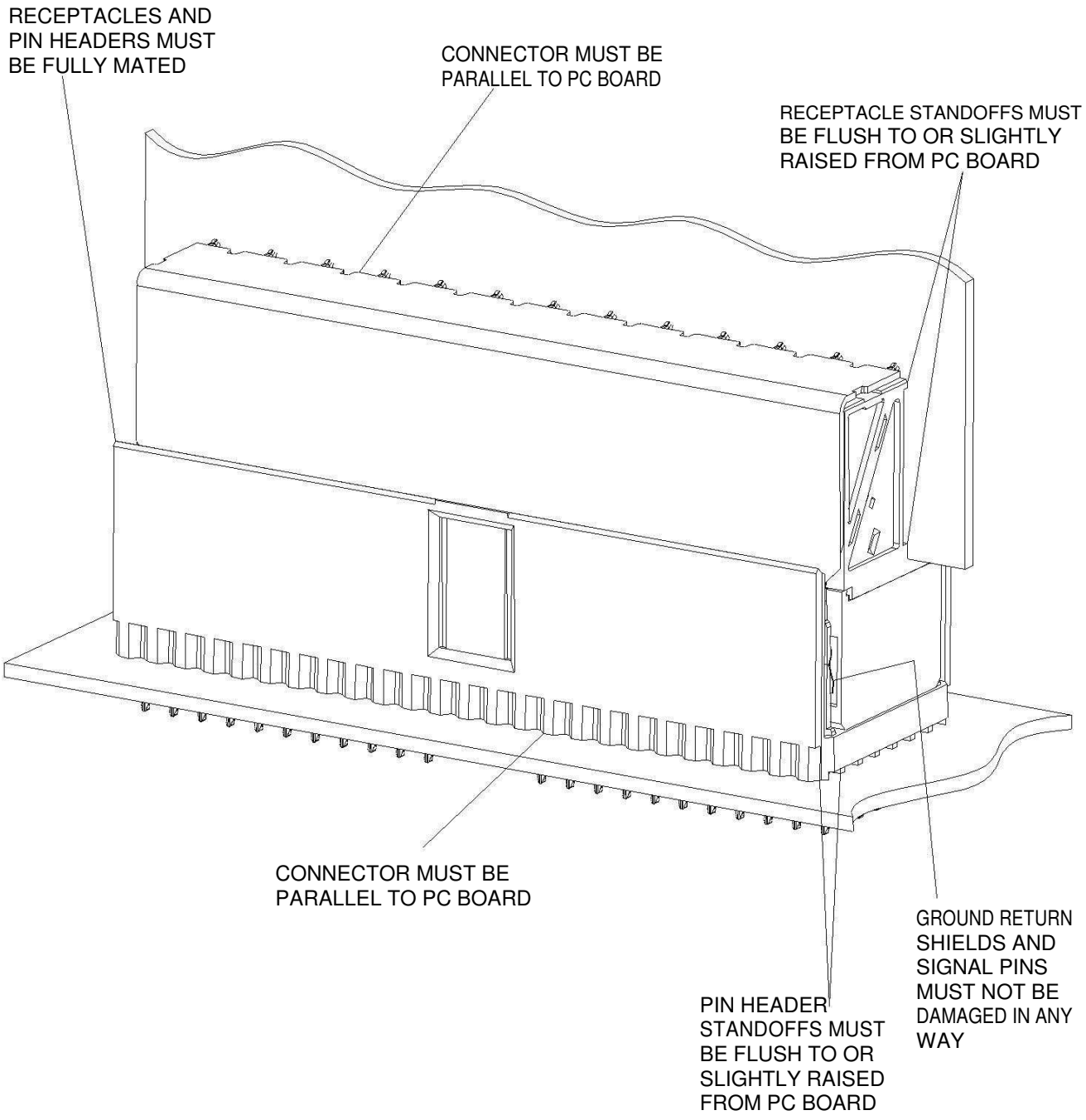


FIGURE 11. VISUAL AID