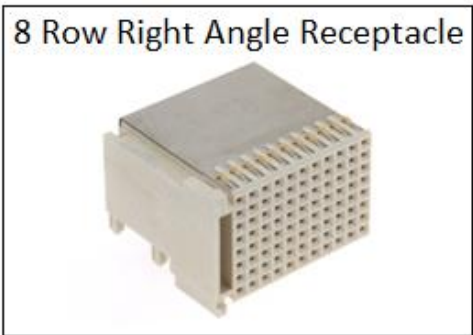
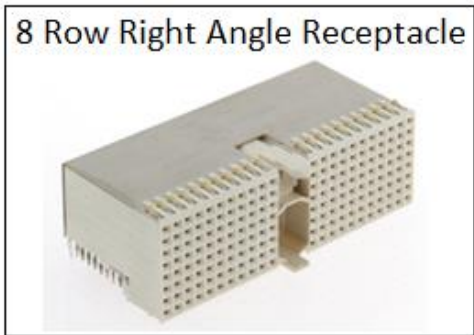
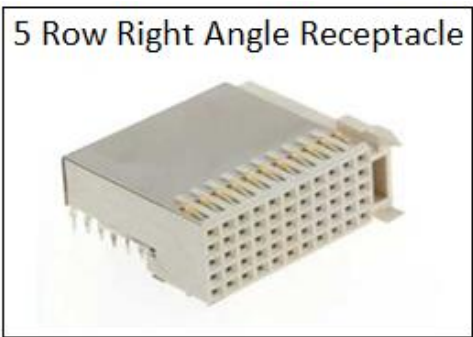
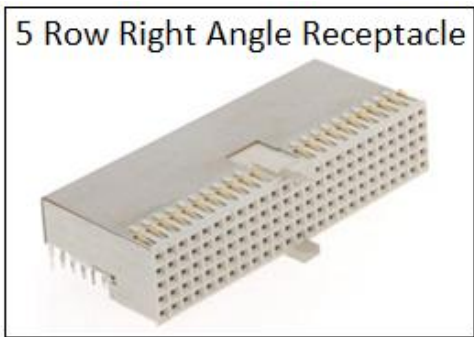


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Application Specification



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1. OBJECTIVE

This specification provides information and requirements for customer application of the Millipacs® HM 5 Row & 8 Row Right angle press-fit Receptacles and 5 Row Straight Receptacles. It is intended to provide general guidance for process development and the use of AFCI application tooling. It should be recognized that no single process will work under all customer applications and that customers should develop processes to meet individual needs. However, if the processes vary greatly from the recommended one, AFCI cannot guarantee acceptable results. Contact your local AFCI representative for additional information.

2. SCOPE

- Product description
- Define product variations
- Define connector outline for circuit board designs.
- Recommended application equipment
- Recommended requirements and procedure for board insertion
- Recommended repair procedures

3. GENERAL

3.1 Method of Specifying

We do not recommend any exceptions unless approval is obtained in advance from the AFCI Engineering Design group. If there is a conflict between the product drawings and this specification the product drawings shall take precedence.

3.2 Workmanship

Workmanship shall be of a level that indicates controlled conditions of manufacture such that Subsequent operations, functionality and performance are not degraded.

3.3 Usage

The Receptacles covered by this instruction are intended for use in a wide variety of Environments and are designed to meet the conditions specified in Bellcore GR-1217-CORE and IEC-61076-4-101

3.4 Visual

Visual examinations shall be performed with a magnification of up to 10x (8 to 10x recommended)

4. PRODUCT DESCRIPTIONS

4.1 General Information on Receptacles

This information applies only to product covered by this specification. The following figures only Show a typical module of each product. Check with your local AFCI representative for the availability of variants.

Below images illustrate important features of the Right Angle Receptacles. Figure 2 illustrates the bottom features that locate and secure the connectors to the PCB. The compliant press-fit tails provide a reliable electrical connection between the connector and the plated through hole (PTH) of the PCB. Press-fit tails eliminate the need for soldering processing of through-board solder tails.

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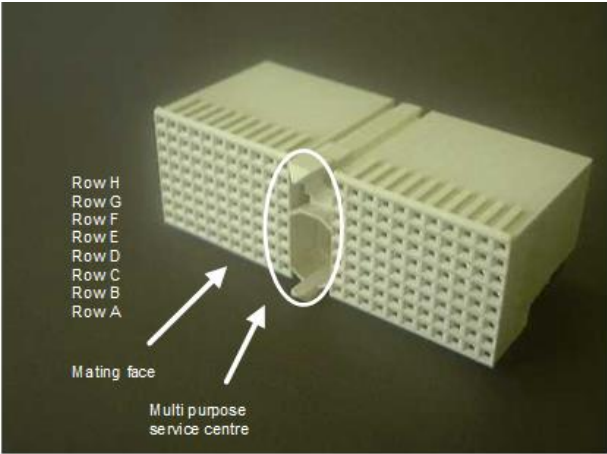


Figure : 1

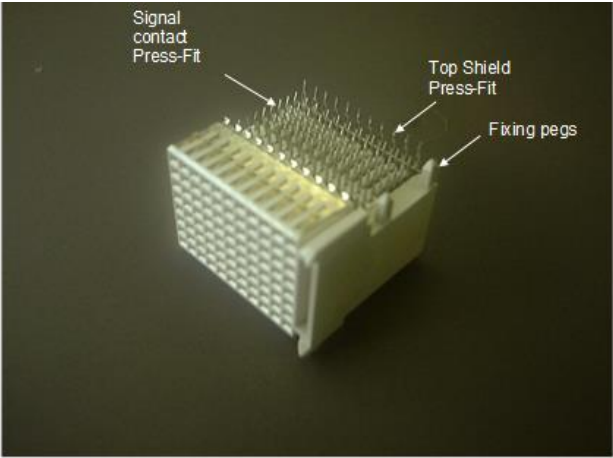


Figure : 2

4.2 Electrical Performance of Connector Systems

4.2.1. Test data and SPICE model

Test data along with SPICE models are available on the AFCI web page or through your local AFCI sales person. Data is available for Impedance, crosstalk, rise time, eye patterns and band width.

4.3 Right Angle and Straight Receptacles

Right Angle Receptacles come in various lengths which are defined by IEC and cPCI specifications. Different types of plating are available based on different performance level. Various stacking heights are available in Straight Receptacles. Power contacts are also available in Receptacles.



5 Row RA Receptacle



8 Row RA Receptacle



5 Row STR Receptacle

4.4 Coding Keys

Coding Keys provides a mechanical feature to define matching intermateable pairs. Interfering Coding keys block off insertion to prevent connector mating and electrical contact. You can use the insertion tool HM2Y197E to easily insert the coding keys.



Coding Keys



HM2Y197E

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5. PRODUCT VARIATIONS

The following information lists the various RA Receptacles that are covered by this application Specification.

5.1 Part numbering overview for Right Angle Receptacles

This table defines the part number format that is used in the products covered by this application.

(MILLIPACS II)													
Millipacs / cPCI Spider Chart (Nomenclature) Right Angle Receptacles													
HM2	R	01	P	A	5	1	0	0	N9	CM	LF - Lead Free		
R	Right Angle Receptacle										(Optional)		
										CM	Customer Marking		
										L	Lubricated		
										L1	Lubricated (Telcordia)		
01	Type A With Pegs									L9 / AB	Telcordia UE		
02	Type B									E9 / AD	Level 1 (500 mating cycles)		
03	Type C With Pegs									N9 / AA	Level 2 (250 mating cycles) Telcordia CO		
05	Type M									Z1	Level 3 (50 mating cycles)		
10	Type A Without Pegs												
20	Type CR With Pegs												
21	Type CR With out Pegs												
26	Type A 11+4												
27	Type A 6+6												
28	Type A 11+6												
29	Type A With Guide Pin Option												
30	Type C With out Pegs												
50	Type M 3Spl+55												
62	Type AB 22 With one polarizing Peg												
64	Type AB 26												
65	Type AB									0	Unshielded		
66	Type AB 22									1	Shielded (2 mm Pitch Top Shield + Bottom Shield)		
67	Type AB 19									8	Shielded (4 mm Pitch Top Shield only)		
69	Type AB 25 With offset guiding									F	Shielded (2 mm Pitch Top Shield only)		
70	Type B 22									x	Other Special shielding		
71	Type B 19												
73	Type B 20									0	Standard		
77	Type B 8 With 3 coding Ribs									x	Other Sequential assignment for custom pattern		
78	Type B 8 With 2 coding Ribs												
79	Type B 8 With 1 coding Rib												
81	Type D Without Pegs									1	Standard		
82	Type FR With Pegs									x	Other Sequential assignment for custom pattern		
83	Type F Without Pegs												
85	Type D 8+8 Without Pegs												
86	Type D 8+8 With Pegs									5	5 row		
87	Type D With Pegs									8	8 row		
88	Type E									x	Other Sequential assignment for custom pattern		
89	Type F												
90	Type FR Without Pegs												
95	Type DE 25									A / E	3.22mm Tails		
96	Type D with Power(4x)												
P	Pressfit												
F	Pressfit - Fire & Smoke (EN45545)												
H	Pressfit - High Temperature / EN45545												

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5.2 Part numbering overview for Straight Receptacles

5.3 Part numbering overview for Right Angle Receptacle Power (Pre – Assembled)

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5.4 Contact Plating overview for Receptacles

This table lists the various plating levels that are be used in the receptacles. Special plating code is Gold over Ni plating for increased resistance to fretting corrosion under high vibration applications.

PLATING CODE		PERFORMANCE
STANDARD	SPECIAL	
L9	AB	TELCORDIA UE
E9	AD	PERFORMANCE LEVEL 1 (500 mating cycles)
N9	AA	PERFORMANCE LEVEL 2 (250 mating cycles) / TELCORDIA C0)
Z1	-	PERFORMANCE LEVEL 3 (50 mating cycles)

6. DESIGN CONSIDERATIONS ON RECEPTACLE CIRCUIT BOARDS

6.1 Guiding Modules

Guide modules are used to provide additional alignment and carry electrical power. They can be used in line with any 5 row Right Angle Receptacles. See the following customer drawings for information

- BSC201911009 – part no : HM2G02LF
- BSC201911014 – part no : HM2G08LF
- BSC201911016 – part no : HM2G09LF

6.2 Circuit Board Layout

Follow the information shown on the product drawing for PCB layout.

6.3 Defining the Receptacles Outline on the Circuit Board

To enable proper application and repair/removal of the receptacles, there are recommended keep-out zones as shown below

6.3.1 Non-Shielded Connectors

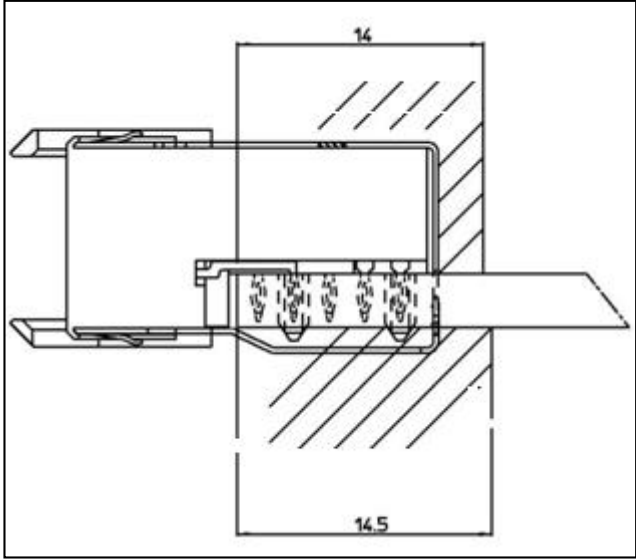
For non-shielded connectors there is no keep-out zones specified.

6.3.2 Shielded Straight Signal Receptacles

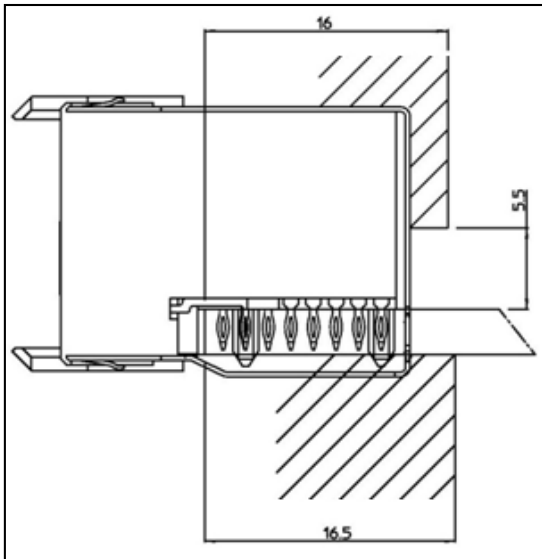
Same keep out zones as the 5 Row Right Angle receptacle connectors.

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6.3.3 5 Row & 8 Row Right Angle Receptacles with one piece cover shield

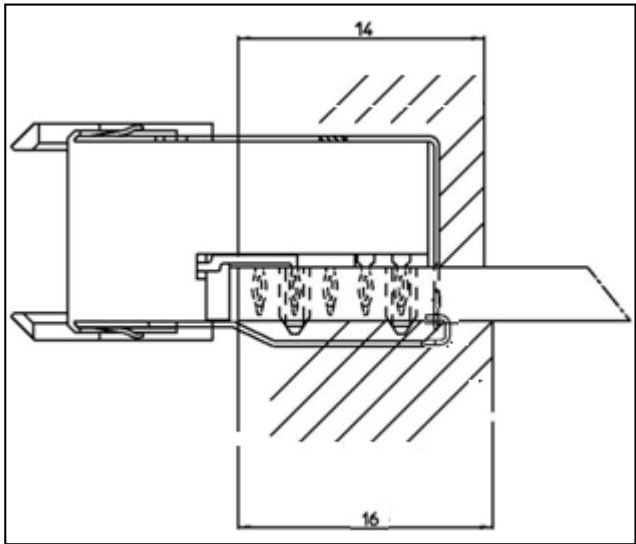


5 Row Keep-out Zones

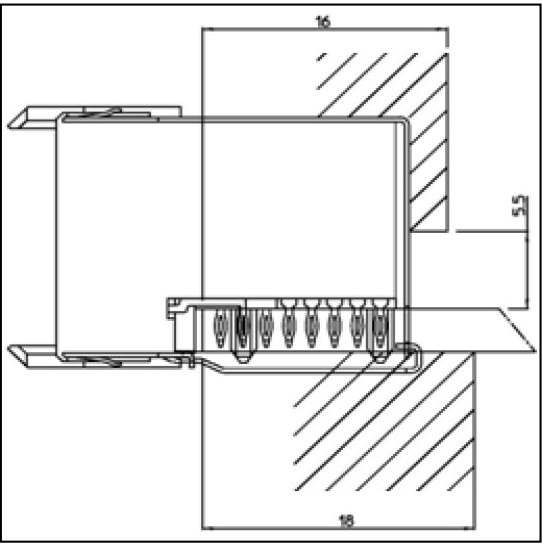


8 Row Keep-out Zones

6.3.4 5 Row & 8 Row Right Angle Receptacle with clip on shield



5 Row Keep-out Zones



8 Row Keep-out Zones

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7. APPLICATION TOOLING

7.1 Brief Summary

In order to properly insert press fit headers and shroud onto a circuit board you need two items:

- A press & Insertion tooling

7.2 Insertion Press

The tooling can work in a variety of presses. The important thing to remember is that you need to have Press with enough force to insert the specific configuration you are working with and that the press table can properly hold the circuit board size. When pressing shielded connectors, the push blade should be sufficiently long to cover the adapter tooling. This will prevent tooling flex.

Typical types of presses are: Manual arbor press & Servo driven electronic press

The preferred type of press to insert the receptacles is the servo driven electrical press. This press gives you the best control during the insertion process and offers the most flexibility. AFCI offers arbor and electric presses. For more information contact your local Sales person.

AFCI provides a range of state-of-the-art press-fit insertion machines. The IMPRESS family has the following offerings

IMPRESS 2000 : A modular based fully automated pick-and-place insertion machine.

IMPRESS 1000 : A semi-automatic step-and-repeat press with motor driven xy-table.

IMPRESS 500E : A hand-operated servo driven C-frame press.

Baby IMPRESS : A flat-bed servo motor driven bench-presses.

IMPRESS 500M+ : A hand-operated C-frame bench-press.

Please refer to the following table for relevant specifications:

Type	2000 XL	1000 XXL	500E	Baby IMPRESS	500M+
Cat. No.	PAH13302	PAH156	PAY284A2	PAY326	PAY479
Press force	40 kN	80 kN	80 kN	20 ... 50 kN	15 kN
Board size (1)	950 x 635 mm	1200 x 625 mm	720 x 580 mm	600 mm between posts of the H-bridge	270 mm throat depth
Max. tool size	160 mm	255 mm	255 mm	255 mm	150 mm
Press cycle per hour (2)	900	700 ... 900	600	500	300
Tool exchange	Automatically	Manually or automatically (option)	Manually	Manually	Manually
Board stuffing	Automatic pick-and-place	Manually	Manually	Manually	Manually
Board positioning	Automatically	Automatically	Manually (LMT-system optional)	Manually	Manually
Board support	Rising post	Rising post	Rising post	Flat bed	Fixed anvil or flat bed
Force controlled	Provided	Provided	Provided	Provided	Not provided

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press stroke					
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- (1): Board size means maximum PCB size. For maximum daughterboard size refer to the specifications.
(2): These capacity figures are only an indication while the real capacity depends on the Board and production parameters.

Note: The tools between the IMPRESS machines (except the IMPRESS 2000) are interchangeable.

7.3 Insertion Tooling

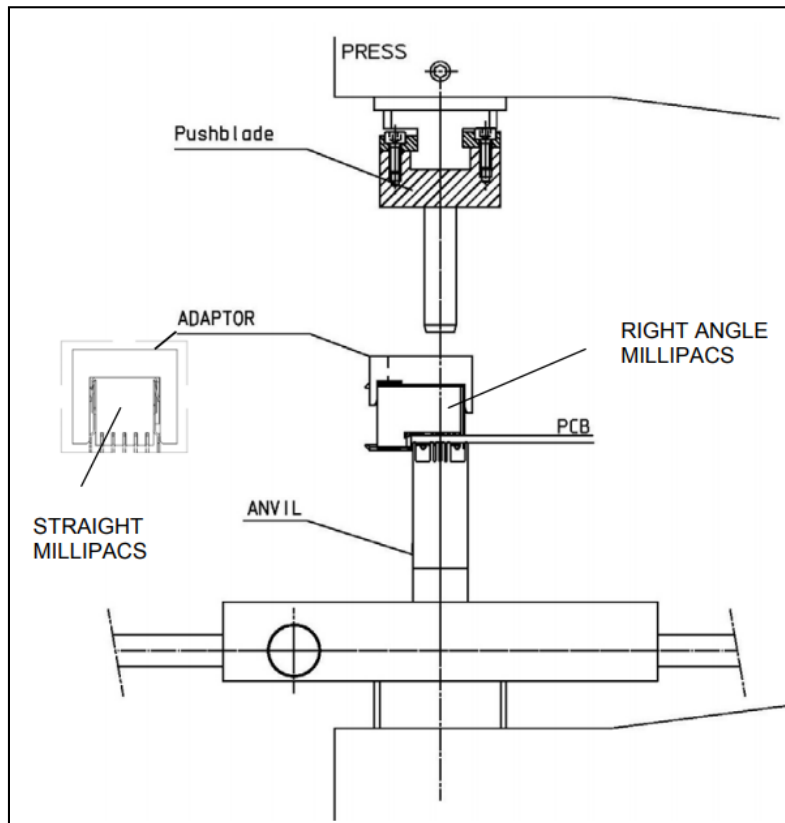
7.3.1 Push blade (Top Tool)

The Push blade is a “flat rock” type of tool. When applying receptacles that are stacked end-to-end, a longer Press Bar can be used. When applying receptacles separated by spaces a custom Press Bar may be required. When applying shielded and non-shielded connectors stacked end-to-end, a custom Press Bar is required.

7.3.2 Anvil (Bottom Tool)

The PCB Support provides a support surface during insertion and includes clearance areas for the press-tails as protrude through the board. When applying receptacles that are stacked end-to-end, a longer Anvil can be used.

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Application Tooling Overview

The application tooling recommended for Receptacles as following.

5 Row Right Angle Receptacles	IMPRESS 500				
	without LMT			with LMT**	
	Anvil	Adapter*	Push blade***	Anvil	LMT-blade
A / B / AB	PAY307A3	10146110-RAR5A	PAY308A2	PAY307A3	PAY308A49
B / AB (19 Pos.)	PAY307A91	10146110-RAR5A19	PAY308A2	PAY307A91	PAY308A68
B / AB (22 Pos.)	PAY307A90	10146110-RAR5A22	PAY308A2	PAY307A90	PAY308A67
C / CR	PAY307A92	10146110-RAR5C	PAY308A2	PAY307A92	PAY308A110
M	PAY307A3	On Request	PAY308A2	PAY307A3	PAY308A49
M (Pre-ass.)	PAY307A68	On Request	PAY308A2	On Request	On Request
L (Pre-ass.)	PAY307A69	On Request	PAY308A2	On Request	On Request
N (Pre-ass.)	PAY307A70	On Request	PAY308A2	On Request	On Request
8 Row Right Angle Receptacles	without LMT			with LMT**	
	Anvil	Adapter*	Push blade***	Anvil	LMT-blade
D / E / DE	PAY307A71	10146110-RAR8D	PAY308A2	PAY307A71	PAY308A30

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F / FR	PAY307A74	10146110-RAR8F	PAY308A2	PAY307A74	PAY308A73
CPCI	without LMT			with LMT **	
	Anvil	Adapter*	Push blade***	Anvil	LMT-blade
B / AB (22 Pos.)	PAY307A45	10146110-RAR5A22	PAY308A2	PAY307A45	PAY308A67
B / AB (19 Pos.)	PAY307A44	10146110-RAR5A19	PAY308A2	PAY307A44	PAY308A68
A	PAY307A3	10146110-RAR5A	PAY308A2	PAY307A3	PAY308A49
5 Row Straight Receptacles	Without LMT			With LMT**	
	Anvil	Adapter*	Push blade***	Anvil	LMT-blade
A / AB	PAY307A1	10146110-VR5A	PAY308A2	On Request	
B	PAY307A1	10146110-VR5B	PAY308A2	On Request	
B (19pos.)	PAY307A44	10146110-VR5B19	PAY308A2	On Request	
B (22pos.)	PAY307A45	10146110-VR5B22	PAY308A2	On Request	
C	PAY307A2	10146110-VR5C	PAY308A2	On Request	
(**) : Not available on IMPRESS 500M+ and Baby IMPRESS					
(***): Push blade PAY308A2 is 50mm long. In case of 19 and 22 pos. on request.					

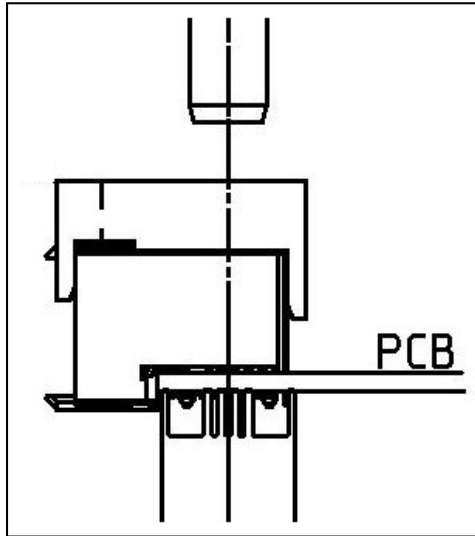
Note : For Right Angle Receptacles adaptors details pls refer drawing No: 10146110-RAR
: For Straight Receptacles adaptors details pls refer drawing No: 10146110-VR
: For more details contact APCI representative.
: Tools for IMPRESS 1000 are same as for the IMPRESS 500 with LMT
: Tools for IMPRESS 2000 are on request.

8. APPLICATION PROCEDURE

The application procedure for receptacles is as follows:

- Place receptacle in the desired location on the PCB taking care to assure that all press-fit tails line up with the proper holes.
- Place the Push blade and Anvil in the proper location with respect to the receptacle and PCB as shown below.

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Insertion Procedure

- To ensure proper insertion, **RECEPTACLES MUST BE CENTERED BENEATH THE PRESS RAM**. Offset loading may result in improper seating of the receptacle and mating problems.
- Actuate insertion press and then remove assembly from press after press returns. AFCI recommends that the insertion force for receptacles to be maximum **45 Newton's per pin**. Actuation of Insertion Press should be slow and controlled. Pressing to a certain change in slope will yield more consistent results than pressing to a set distance due to variances in board thickness. Be sure to follow any safety requirements associated with the application equipment.
- The recommended maximum force per press-fit has been determined to yield acceptable insertion results for Sn PTHs. While it is acceptable to use a lower force per press-fit, steps should be taken to guarantee that the receptacle is fully seated. Force settings may vary with different types of PTH finishes. Customers should develop parameters that best suit individual application requirements.

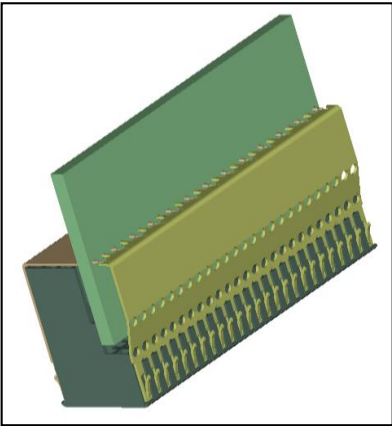
EXAMPLE: For one 5 Row Type A receptacle, there are 110 press-fit tails being inserted into the PC board (signals only). Therefore, the maximum recommended press setting would be 4950 N (110 press-fit tails x 45 N).

EXAMPLE: For one 8 Row Type D receptacle, there are 176 press-fit tails being inserted into the PC board (signals only). Therefore, the maximum recommended press setting would be 7920 N (176 press-fit tails x 45 N).

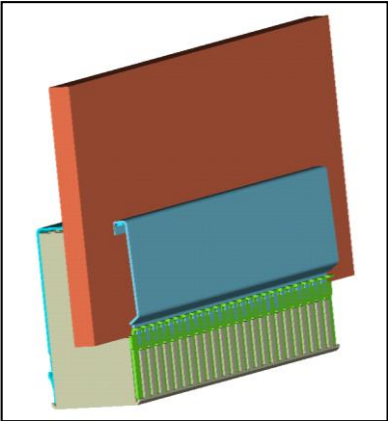
8.1 Cover Shield Installation

The Cover Shield is an optional component and is applied to the bottom side of the PCB opposite the side the connector is mounted on for the purpose of bottom side electrical shielding. There are two Cover Shield designs that are available shown below.

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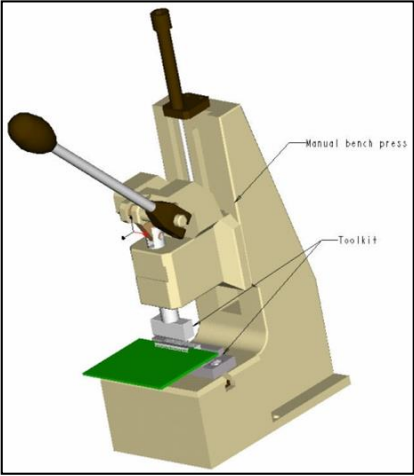
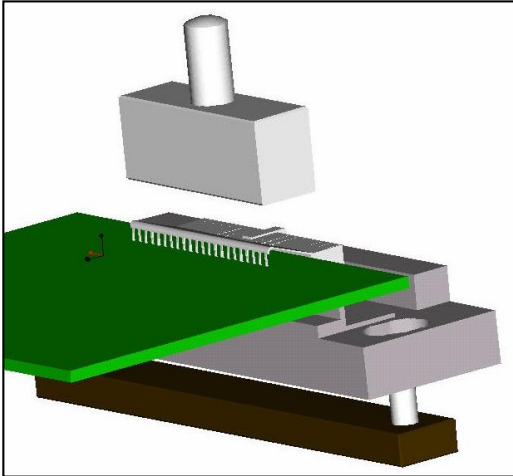


One piece cover shield



Clip on cover shield

8.1.1 One piece cover shield with 5 Row or 8 Row receptacles



One Piece Cover Shield Tool HM2Y509

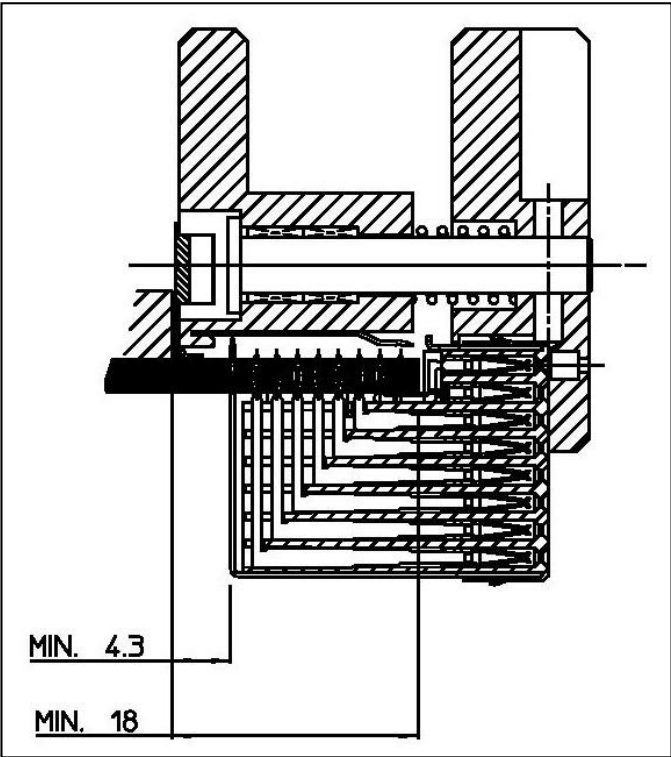
- To install One Piece Cover Shield, AFCI Application tool information below.

Description	Part number
Press	HM1Y291A
Toolkit for 8 row connectors	On request
Toolkit for 5 row connectors	HM2Y509

- Insert the Cover Shield into the Application tool as defined by the application tool instructions.
- Locate the application tool onto the connector as described by the application tool instructions. Attach the Cover Shield to the connector as described by the instruction sheet.

8.1.2 Clip on Cover Shield with 8 row connectors

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Clip on Cover Shield Tool HM2Y290

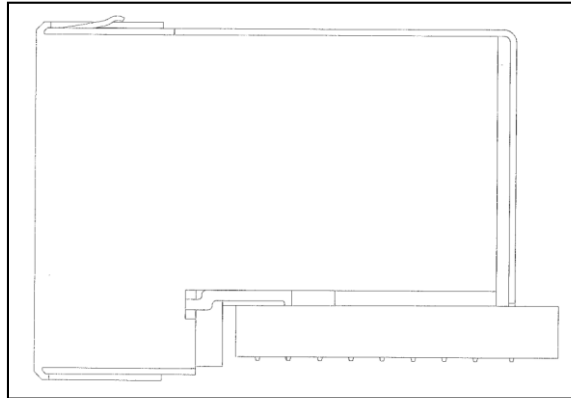
- Use the tool HM2Y290 for placing the Clip on cover shield in the connector
- Manually place the Clip on cover shield in the tool.
- Place the tool with the shield over the connector pins and by squeezing the tool manually the shield is pressed over the press fit pins.
- For more detail information, check the instruction manual of the tool.

9. POST-APPLICATION INSPECTION REQUIREMENTS

Post-application inspection should consist of several simple checks to assure that the receptacle is applied properly.

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- Visually assure that all press-fit tails are seated in the proper PCB holes and that none have been crushed during application.
- Visually assure that the plastic standoffs on the bottom of the assembly are seated within 0.13 mm of flush to the PCB but not crushed (see below Figure). A larger gap beneath the standoffs may indicate that the receptacle is not seated parallel to the board. This can cause receptacle misalignment with adjacent Millipacs® HM components.



Proper Receptacle assembly

10. REMOVAL TOOLING

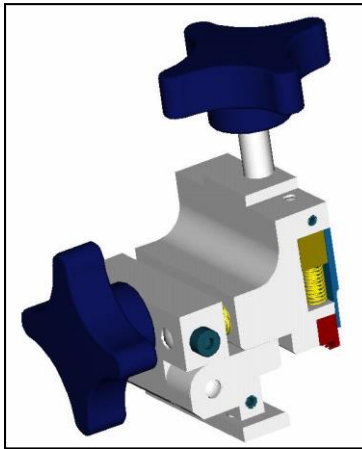
Removal tooling for the 5 Row & 8 Row right angle press-fit receptacles consists of the following:

10.1 Removal tooling for the clip on cover shield

The shield can easily be removed manually.

10.2 Removal tooling for One Piece Cover Shield - HM2Y463

Place the tool over the shielding and by turning the handle the shield will be extracted from the PCB. For more detail information, check the instruction manual of the tool.



10.3 Removal tooling for the 5+8 row connector

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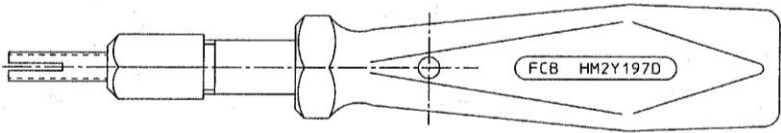


Connector Removal tooling HM2Y350

- It can be used to remove one (1) receptacle connector.
- The connector can be easily removed by cutting it.
- Removal kit includes Xcelite Pliers, a Comb Removal Tool and the Connector Removal Tool. The Xcelite Pliers are for removal of the top shield.
- The hand tool can be adjusted to remove a connector in the middle of the row.
- A manual force of 20 – 30 lbs is required to properly operate the Removal Tool.
- For more detail information, check the instruction manual of the tool.

10.4 Extraction Tools for individual Power contacts of Receptacles – HM2Y197D

For the repair of damaged contacts out of hybrid modules, extraction tools for single contacts are available. Each contact can be removed and replaced individually.



HM2Y197D
Push out Tool for Power and High frequency contacts

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REVISION RECORD

REV	PAGE	DESCRIPTION	EC #	DATE
A	ALL	INITIAL RELEASE	V	16/05/2002
B	4/22	Plating Performance Level Added	I10-0060	23/02/2010
C	ALL	Template Changed Part No Nomenclature updated Straight Receptacles & Power Receptacles Added Adaptor part no's updated	ELX-I-36421-1	20/03/2020
D	ALL	Logo change	ELX-I-57742	21/10/2025