

NUMBER GS-20-0452	TYPE General Application Specification	Amphenol ICC	
TITLE PwrMAX® Orthogonal Connector		PAGE 1 of 8	REVISION A
		AUTHORIZED BY He, Zhi-Jun	DATE 2021-12-21
CLASSIFICATION UNRESTRICTED			

1.0 OBJECTIVE

This specification provides information and requirements regarding customer application of PwrMAX® Orthogonal Connector. This specification is intended to provide general guidance for application process development. It is recognized that no single application process will work under all customer scenarios and that customers will develop their own application processes to meet their needs. However, if these application processes differ greatly from the one recommended, AFCI cannot guarantee results.

2.0 SCOPE

This specification provides information and requirements regarding customer application of PwrMAX® Orthogonal Connector. Configurations include:

- PwrMAX® Orthogonal Right Angle Plug connector, 2 High Power(HP) contacts, Press-fit type
- PwrMAX® Orthogonal Right Angle Receptacle connector, 2 High Power(HP) contacts, Press-fit & Solder type
- PwrMAX® Orthogonal Vertical Receptacle connector, 2 High Power(HP) contacts, Press-fit type

3.0 DRAWINGS AND APPLICABLE DOCUMENTS

- AFCI PRODUCT SPECIFICATION: GS-12-1342
- AFCI PRODUCT DRAWINGS: 10132640, 10132644 & 10133407 etc.

Product drawings and AFCI's GS-12-1342 Product Specification are available at <https://www.amphenol-icc.com/> In the event of a conflict between this application specification and the drawing, the drawing will take precedence. Customers are advised to refer to the latest revision level of AFCI product drawings for appropriate details.

4.0 APPLICATION REQUIREMENTS

This document is meant to be an application guide. If there is a conflict between the product drawings and specifications, the drawings take precedence.

4.1 PRODUCT APPLICATION

The PwrMAX® Orthogonal Connector has two mating combination – R/A plug mates with R/A Receptacle & R/A Plug mates with Vertical Receptacle. See Figure 1 & 2.

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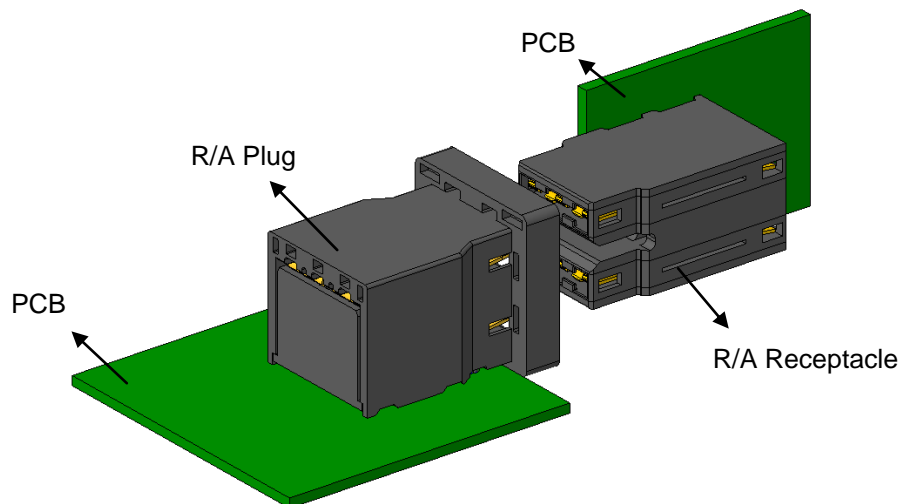


FIGURE 1 R/A Plug to R/A Receptacle

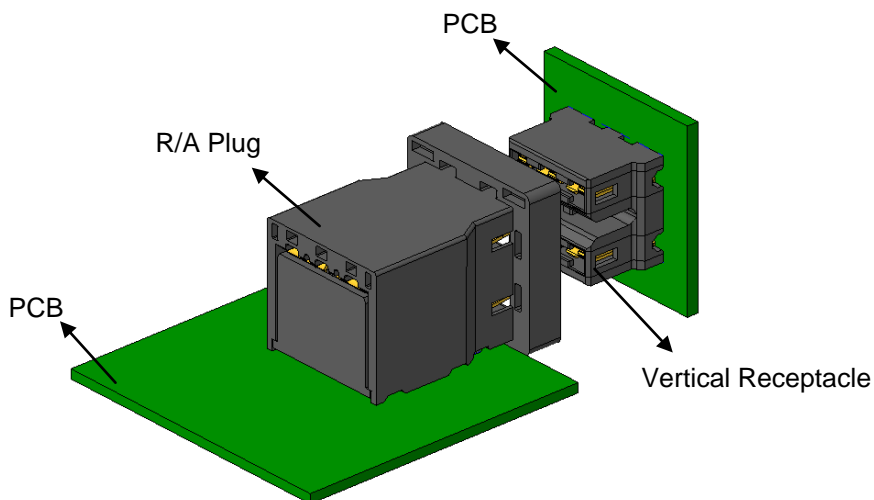


FIGURE 2 R/A Plug to Vertical Receptacle

4.2 CONTACT WIPING LENGTH

Wiping Length = 5.10mm.

4.3 MATING ALIGNMENT

The PwrMAX® Orthogonal Connector allows a maximum gatherability of 3.35mm on the X direction and 2.95mm on the Y direction.

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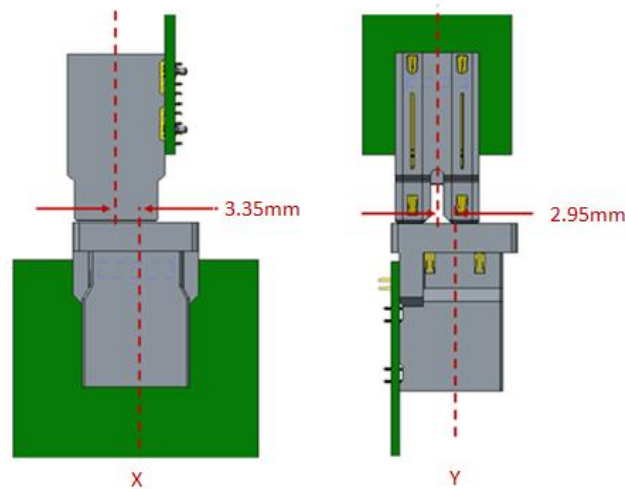


FIGURE 3 The gatherability of PwrMAX® Orthogonal Connector

4.4 MECHANICAL PROPERTIES

4.4.1 Compliant Pin Insertion Force

- Receptacle - Individual compliant Pin
The force required to insert an individual compliant pin into a plated through hole in a tin/OSP printed circuit board at a rate of 5.08mm/minute shall not exceed 67 N.
- Plug - Individual compliant Pin
The force required to insert an individual compliant pin into a plated through hole in a tin/OSP printed circuit board at a rate of 5.08mm/minute shall not exceed 140 N.
- The Insertion force per hold-down shall be less than 27N.

4.4.2 Compliant Pin Retention Force

- Receptacle - Individual compliant Pin.
The retention force in the axial direction opposite that of insertion at a rate of 5.08mm/minute shall not be less than 8 N per press-fit tail.
- Plug - Individual compliant Pin.
The retention force in an axial direction opposite that of insertion at a rate of 5.08mm/minute shall not be less than 20 N.
- The retention force per hold-down shall be greater than 13.5N

4.4.3 Mating/Un-mating Force

TABLE 1

	Mating Force (N) Max. Allowance	Un-mating Force (N) Min. Allowance
One pair of Power Contact	25	6.5

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4.5 VOLTAGE RATING

- a. Voltage ratings for these connectors are based upon UL – 60950 -1 Second Edition Table 2N
- b. Voltage ratings according to Minimum Creep Distance (MCD) on PCB are given in Table 2

TABLE 2

PwrMAX® Orthogonal Maximum Working Voltage Vs. Minimum Creep Distance (Reference UL 60950-1 Second Edition Table 2N)						
Type	Contact Pitch (mm / inch)	Pollution Degree (office Environment)	Material Group of PCB(Base on UL Rating)	MCD (mm)	Maximum Working Voltage (AC RMS)	Maximum Working Voltage (DC/AC Peak)
High Power	10.0 [3.937"]	2	II	6.75	953	1348
		2	IIIb	6.75	675	954

4.6 Touch Proof Testing

Prevention of operator access to energized parts, refer to UL60950 & IEC 60950-1 SECTION 2.1.1.1 Use the test probe to test prevention of operator access to energized conductors (such as powered electrical contacts within an unmated backplane connector).

- a. Test probe (Figure 4)
- b. Test Position (Figure 5)

The following sections show each of these test probes positioned as closely as possible to the mating side contacts of the PwrMAX® orthogonal receptacle, which will be located on the Daughter Card and may be powered in an unmated state.

4.6.1 Test Probe

The Test probe may not make contact with energized parts while the access doors and covers of the system enclosure are open. Separable connectors must be disconnected for this test. The figure 4 shows the dimensions of the Test probe.

4.6.2 Test Position

The requirements for the Probe position are not clearly specified by UL and IEC. However, assuming the worst-case scenario where the connector is accessible, the following 3D model was created. The receptacle connector is tested by test probe in the areas shown in the figure 5.

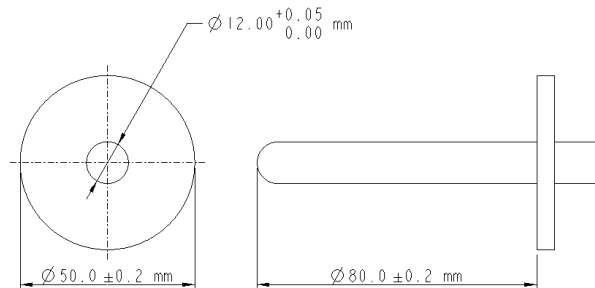


FIGURE 4 DIMENSIONS OF UL Probe

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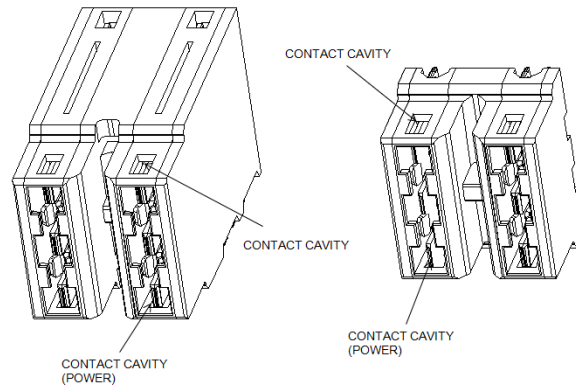


FIGURE 5 TEST POSITION

5.0 REQUIREMENT FOR PCB

5.1 PCB REQUIREMENT

The PC Board material shall be glass epoxy (FR-4 or G-10), or equivalent. The Layout & thicknesses of PCB refer to specified in the product drawing. The recommended PC Board land/pad size is given in table 3

TABLE 3

Description	R/A Plug Power pin		Receptacles Power pin	
	(mm)	(In)	(mm)	(In)
Drilled Hole Diameter	1.680 - 1.730	0.066 - 0.068	0.810 - 0.860	0.032 - 0.034
Copper Plating	0.025 - 0.050	0.001 - 0.002	0.025 - 0.050	0.001 - 0.002
Tin Plating	0.005 - 0.015	0.0002 - 0.0006	0.009 - 0.015	0.0003 - 0.0006
Finished Plating Hole Diameter	1.550 - 1.650	0.059 - 0.065	0.700 - 0.800	0.028 - 0.031
Land / Pad Size	2.292 - 2.445	0.090 - 0.096	1.200 - 1.300	0.047 - 0.051

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5.2 PCB ALIGNMENT & CONNECTOR KEEP OUT ZONE ON PCB

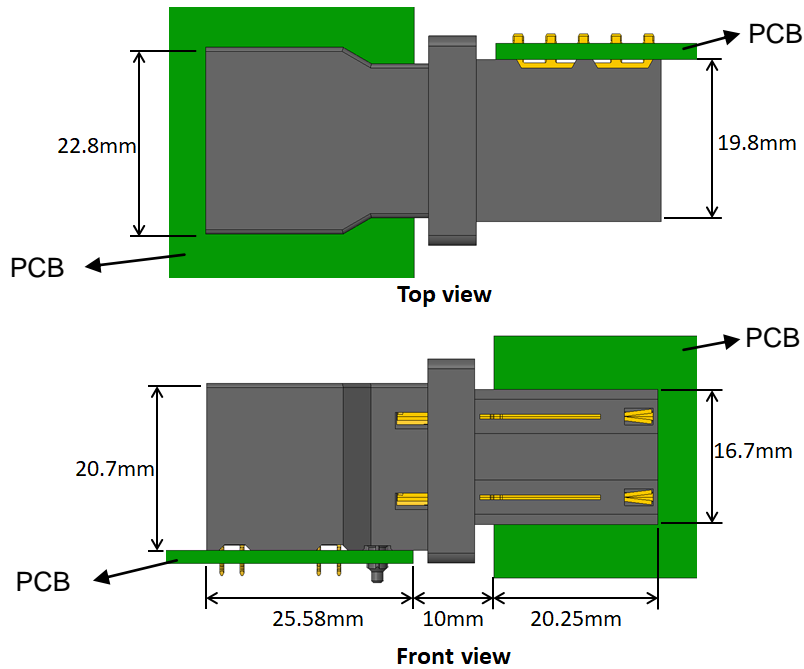


FIGURE 6 R/A Plug to R/A Receptacle

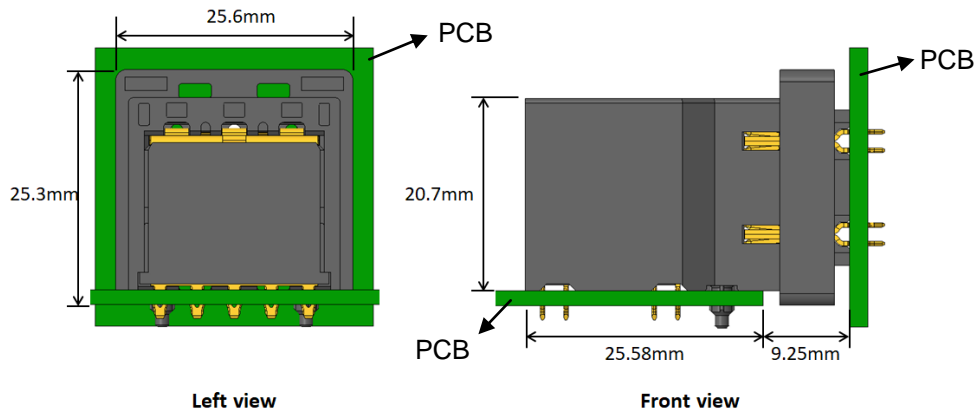


FIGURE 7 R/A Plug to Vertical Receptacle

6.0 APPLICATION TOOLING FOR PRESS-FIT TYPE

Flat rock tooling is best method to apply these connectors to the PC Board or Bus bar (if applicable).

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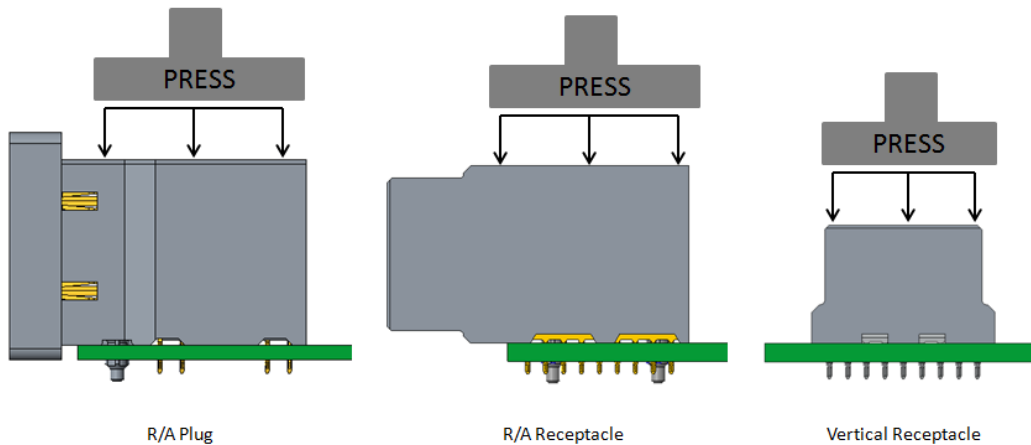


FIGURE 8 Press Process

7.0 REPAIR TOOLING / REMOVAL PROCEDURE

7.1 Solder Type Contacts

Connectors with solder type contacts must be removed from the pc board by standard de-soldering methods.

7.2 Press-Fit Contacts

Connectors with press-fit contacts must be removed from the pc board by using a flat rock (or push bar/pin) and pc board support.

(For reparability, the tips of the contacts must extend below the surface of the pc board by at least 1.02mm [.040"], if not, use a push bar/pin to remove EON from PCB)

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8.0 RECORD RETENTION

REV	PAGES	DESCRIPTION	EC #	DATE
A	All	First release	N/A	01/06/2022