1.0 OBJECTIVE

This specification provides information and requirements regarding customer application of PwrMAX® IO Cable to board Connector System. 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® IO Cable to board connector system**.** Configurations include:

TABLE 1

PwrMAX®	Application	Description of available configuration
PwrMAX® IO	Board connector mates to Cable connector	Squeeze to release Right Angle Header, Solder Type
		Squeeze to release Cable Receptacle

3.0 GENERAL

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

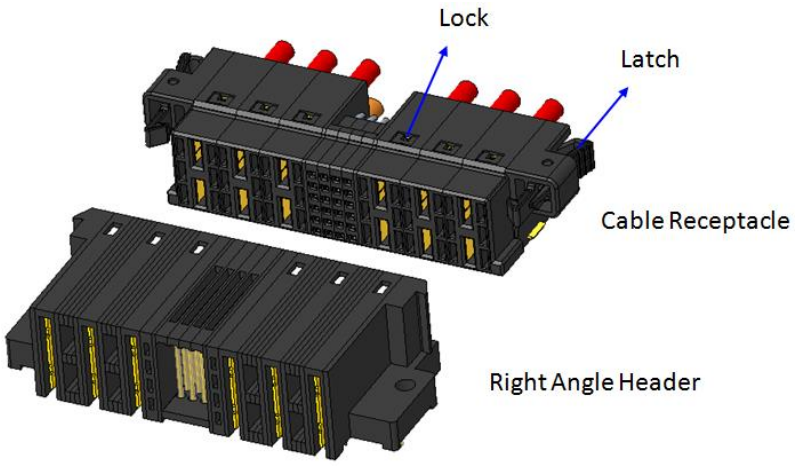

Figure 1
Board-to-Cable
R/A Header to Cable Receptacle

PwrMAX® IO Header side have one option for connection to Printed Circuit Boards -- Solder to Board. The PwrMAX® Solder contacts are compatible with wave soldering. The maximum overall length allowed for the connector is 87.2mm [3.433”]. Combinations of up to 12 power contacts and 24 signal contacts can be used-provided the allowable length is not exceeded.

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4.0 DRAWINGS AND APPLICABLE DOCUMENTS

- AFCI PRODUCT SPECIFICATION GS-12-1687
- AFCI PRODUCT DRAWINGS 10159715, 10159717 etc.

Product drawings and AFCI's GS-12-1687 Product Specification are available at https://www.amphenol-cs.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.

5.0 APPLICATION REQUIREMENTS

5.1 Operating Temperature

Operating Temperature Range = -55℃ ~ +95℃

5.2 Voltage rating

Voltage ratings for these connectors are based upon UL 60950 -1 Second Edition Tale 2N.
Voltage ratings according to Minimum Creep Distance (MCD) of 2.50mm (Signal pitch) and 9.00mm (Power pitch) on PCB are given in Table 2.
Voltage ratings according to Minimum Creep Distance (MCD) of 8.74mm (Power pitch) on connector is given in Table 2.

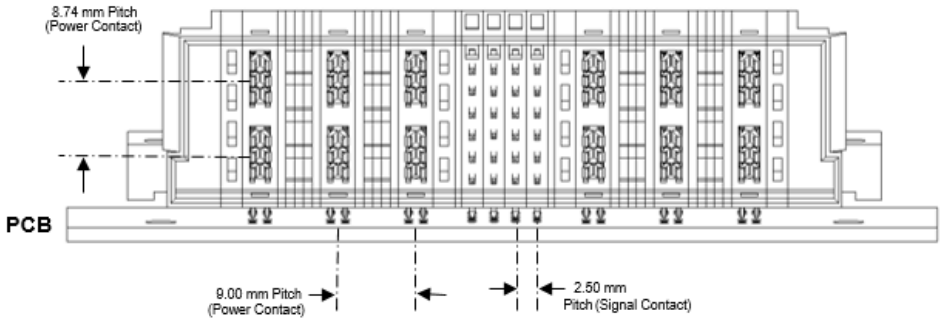

Figure 2 Options of Contact Pitch

TABLE 2

PwrMAX® 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 (Base on UL Rating)	MCD (mm)	Maximum Working Voltage (AC RMS)	Maximum Working Voltage (DC/AC Peak)
Signal	2.50 [.0984"]	2	II	0.90	80	113
Power	9.00 [.3543"]			5.72	816	1153
	8.74 [.3441"]			3.65	507	716
Signal	2.50 [.0984"]	2	IIIa & IIIb	0.90	37	52
Power	9.00 [.3543"]			5.72	572	808
	8.74 [.3441"]			3.65	365	516

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5.3 Current Rating

TABLE 3

Wire size	Power contact (12 contacts)	Signal contact (24S)
6AWG	50A/contact (2contacts/column;100A/column)	/
8AWG	40A/contact (2contacts/column;80A/column)	/
22AWG	/	1A

5.4 Compatibility

5.4.1 PwrMAX® IO contact sequencing compatibility

There are three available mating lengths and associated wipe distances, which are controlled by changing the length of signal contact of header and power contact of receptacle.

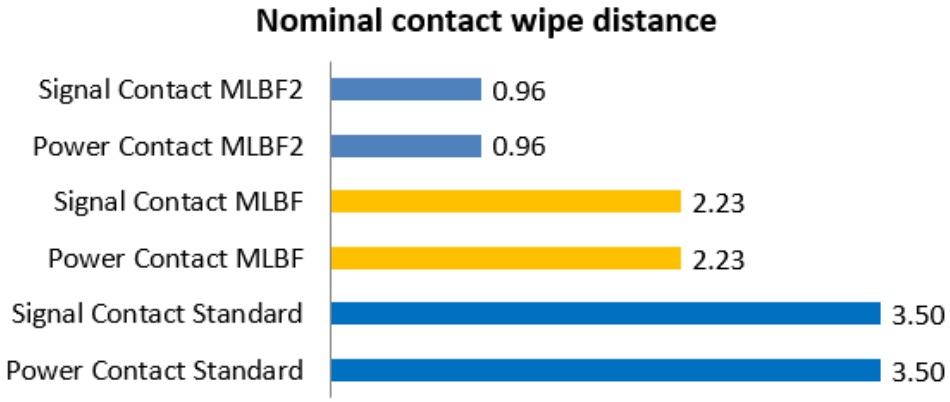

Figure 3 Nominal Contact Wipe Distance

Notes:

1. Contact wipe distances in Figure 3 do not include tolerance associated with board-to-board distance.
2. PwrMAX® IO Signal MLBF Pin or MLBF2 Pin can be used as a detect pin if the following condition is met:
   a. The difference in contact wipe distance between the chosen detect pin and the shortest power contact must not be less than 1.27mm.
      EXAMPLE:
      If PwrMAX® Signal MLBF Pin is used as a detect pin, then the Power Standard Pin can be selected, since the difference in their Nominal Wipe Distances is 3.50-2.23=1.27mm.

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5.4.2 Lead-free Processing

PwrMAX® IO Header Connector is compatible with waving soldering, and withstands peak processing temperatures of 260˚C for a period of 10 seconds without affecting form, fit, or function.

5.5 Mechanical Properties

5.5.1 Insertion/Retention forces (Hold-Down)

a. The Insertion force for single hold-down shall be less than 27N.
b. The retention force for single hold-down shall be greater than 13.5 N.

5.5.2 Latch Strength

Latch strength after cable connector mating to board connector without contacts shall withstand an axial load of 85 N minimum.

5.5.3 Mating/Un-mating Force

TABLE 4

Contact type	Mating Force (Maximum)	Un-mating Force (Minimum)
One pair of Power Contact	7 N	2.2 N
One pair of Signal Contact	1 N	0.2 N

5.5.4 Crimp Tensile Strength

The force required to pull the properly crimped wire from the terminal shall not be less than the value specified in Table. If terminals are equipped with an insulation barrel, they should not be crimped to have an effect on this test. Reference ─ SAE/USCAR21 or UL 486A. If terminals are equipped with an insulation barrel, they should not be crimped to have an effect on this test.

TABLE 5

Cable Size (AWG)	6*	8	22
Crimping Pull Force (N) min.	445	350	50

Notes: The specification for 6 AWG refer to UL 486A.

5.6 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)

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

5.6.1 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.

5.6.2 Test Position

The requirements for the Probe position are not clearly specified by UL and IEC. However, assuming the worst-case scenario where the backplane connector is accessible, the following 3D model was created. The receptacle connector is tested by test probe in the areas shown in the figure 4.

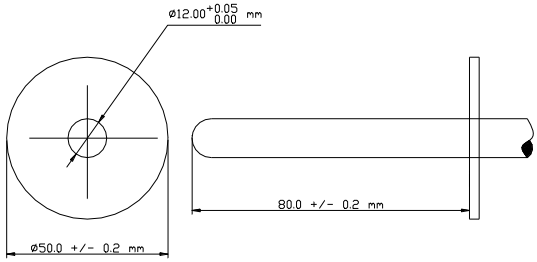

Figure 4 Dimension of UL Probe

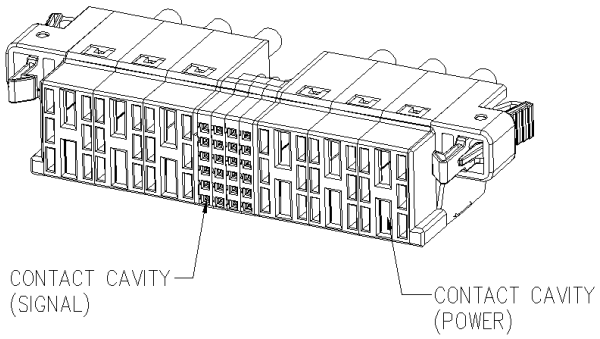

Figure 5 Test Position

6.0 REQUIREMENTS FOR PCB

6.1 PCB requirement

6.1.1 PCB Layout

Regarding specifics of PCB layout, refer to the customer drawing of the specified part number.

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6.1.2 PCB Land/Pad size

Table 6 Recommended PCB Land/Pad size

Description	Signal and Power Contact	
	(mm)	(In)
Drilled Hole Diameter	1.125 - 1.175	0.044 - 0.046
Copper Plating	0.025 - 0.075	0.001 - 0.003
Tin Plating	0.009 - 0.015	0.002 - 0.006
Finished Plating Hole Diameter	0.940 - 1.100	0.037 - 0.043
Land / Pad Size	1.440 - 1.600	0.056 - 0.063

6.1.3 Recommended PCB thickness

Regarding Solder tail termination, the PCB thicknesses are recommended as Table 7.

TABLE 7

Tail Type	Contact tail length(mm)	Recommended PCB thickness
Solder	3.43 +/- 0.40	2.36 +/- 0.24
	2.50 +/- 0.40	1.60 +/- 0.16

6.2 PCB Dimension

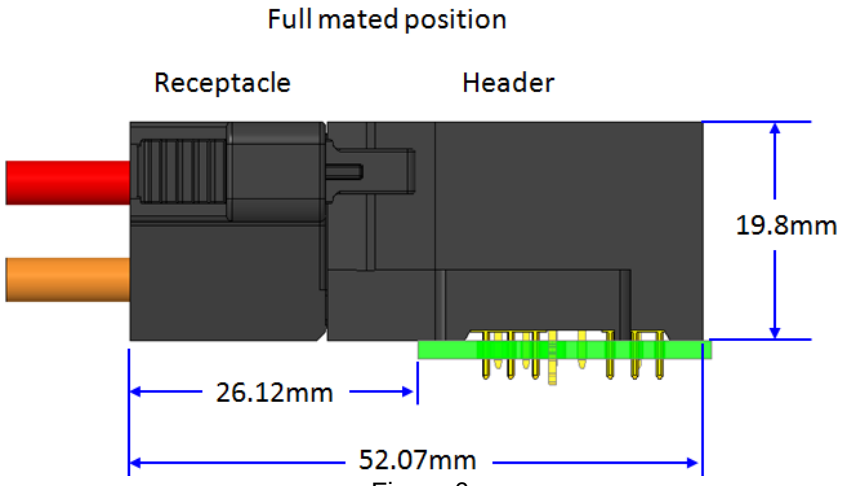

Figure 6

7.0 APPLICATION TOOLING

Regarding the solder type, no application tooling is required to assemble the connector to PCB.

8.0 APPLICATION INSPECTION REQUIREMENTS

Application inspection should consist of several checks to assure that the product is applied properly and is not damaged.

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a. Visually assure that all Solder tails are seated in the proper PCB holes and that none have been crushed during application.

b. Visually assure that the plastic standoffs on the bottom of the assembly are seated within 0.20 mm of flush to the PCB but not crushed (see Figure 7). A larger gap beneath the standoffs may indicate that the product is not seated parallel or perpendicular to the board. In the case of the plug, this can cause misalignment with adjacent components.

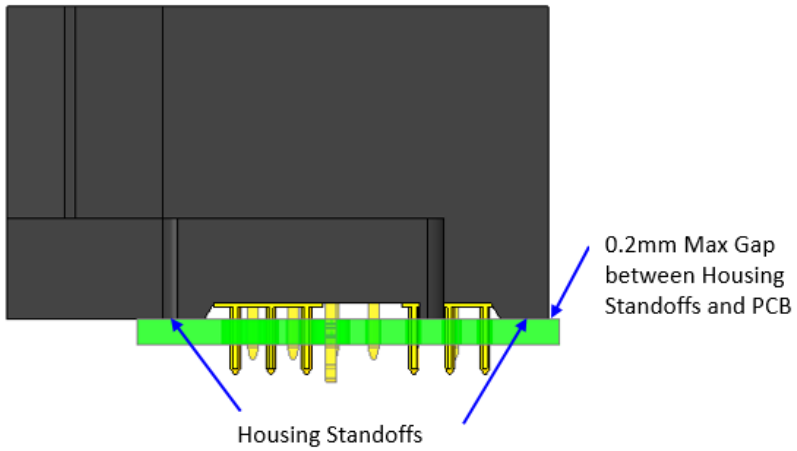

Figure 7

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9.0 RECORD RETENTION

REV	PAGE	DESCRIPTION	EC #	DATE
A	ALL	Initial release	N/A	2022-11-28

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