Amphenol ICC	TYPE **APPLICATION SPECIFICATION**	NUMBER **GS-20-0388**	
TITLE **HIGH POWER CARD EDGE (HPCE®) BTB CONNECTOR**		PAGE 1 of 12	REVISION B
		AUTHORIZED BY **Kaka Zhang**	DATE Oct, 30, 2017
		CLASSIFICATION **UNRESTRICTED**	

TABLE OF CONTENTS

Section page no.

1. OBJECTIVE

This specification provides information and requirements for customer application of the HPCE Connector system. It is intended to provide general guidance for process development. 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, FCI cannot guarantee acceptable results.

2. SCOPE

This specification provides information and requirements regarding application of the HPCE BTB receptacle connector to HPCE BTB header connector.

High Power Card Edge Board To Board	**Right Angle Header**
	Right Angle Receptacle, Solder Tail
	Vertical Receptacle, Solder & Press-fit Tail

Table 1

HPCE BTB Connector

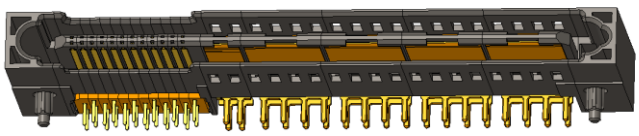


Figure 1

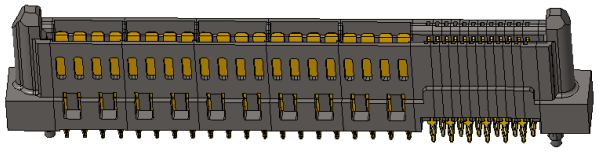


Figure 2

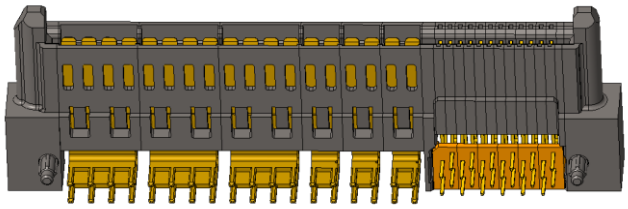


Figure 3

3. DRAWINGS AND APPLICABLE DOCUMENTS

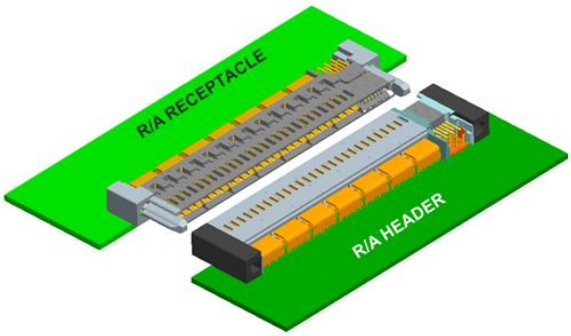
- FCI Product Specification GS-12-1125 (HPCE BTB Connector system).
- UL/CSA File # E66906
- TUV certification #
- Applicable FCI Product Drawings

FCI product drawings and specifications are available by accessing the FCI website or contacting the FCI Technical Service. In the event of a conflict between this specification and the product drawing, the drawing takes precedence. Customers should refer to the latest revision level of FCI product drawings for appropriate product details.

4. GENERAL CUSTOMER INFORMATION

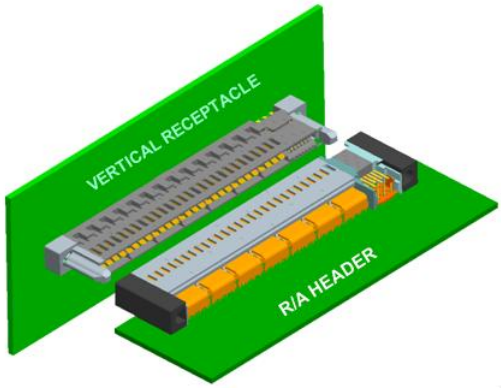
This document is a general application guide. If there is a conflict between the product drawings and this specification, the drawings take precedence.

4.1 PRODUCT APPLICATION



HPCE BTB Application, Right Angle Header with Right Angle Receptacle

Figure 4



HPCE BTB Application, Right Angle Header with Vertical Receptacle

Figure 5

HPCE BTB has two options for connection to Printed Circuit Boards -- Press Fit and Solder to Board, available as follows:

Product Configuration	Solder Tail	Press - Fit Tail
HPCE BTB - R/A Header	Yes	
HPCE BTB - Vertical Receptacle	Yes	Yes
HPCE BTB - R/A Receptacle	Yes	

Table 2

The HPCE BTB Solder to Board Power and Signal contacts are recommended with a wave soldering. They are versatile with many configurations to fit the individual needs of the client.

4.2 WIPE DISTANCE AND CONTACT SEQUENCING

For HPCE BTB system, the nominal wipe distance of the Signal contact is shorter than the Power contact by 1.27mm (0.050 inch). However, the signal and power contacts have short and long pin. 1.50mm minimum wipe is recommended to ensure long term connector reliability.

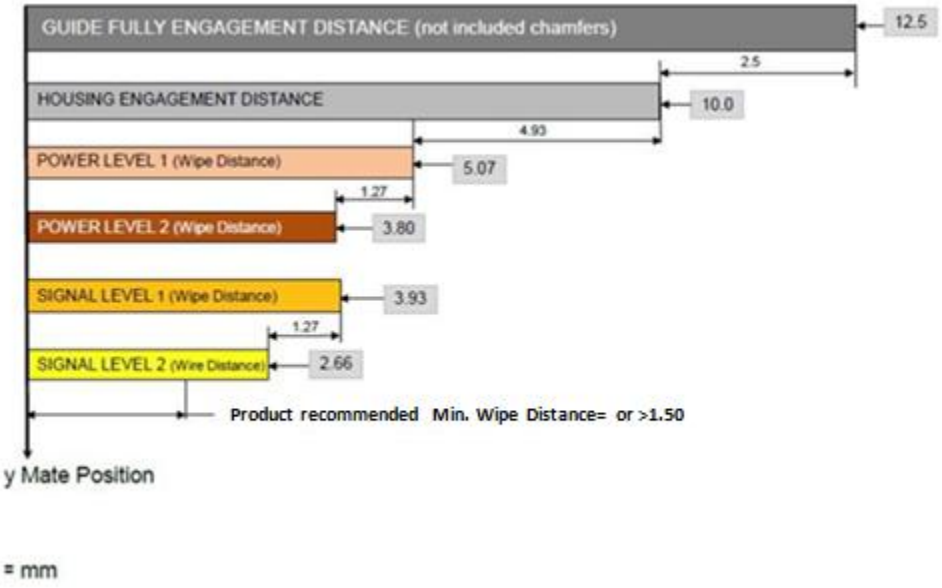


Table 3

4.3. MATING ALIGNMENT

The HPCE BTB series, it is not a blind mate application with the feature guide post in the receptacle site. Please see figure 6 and table 4 for explanation of misalignment allowance

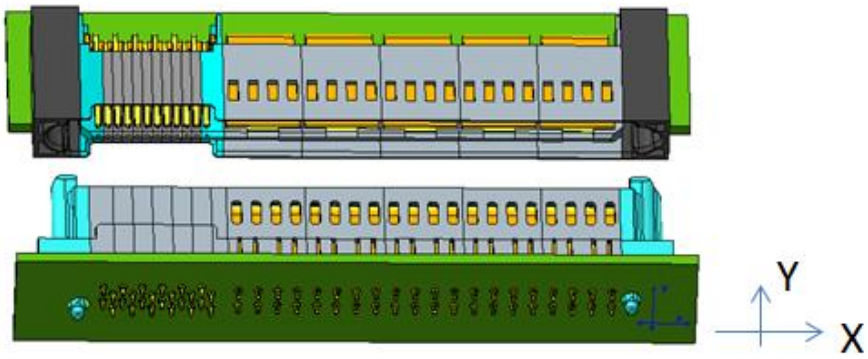


Figure 6

Misalignment Allowance	
X	Y
+/-1.90	+/-1.70

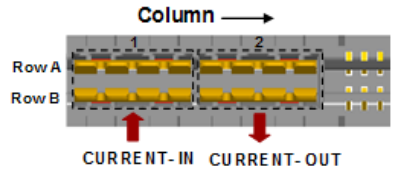
Table 4

4.4 VOLTAGE RATING

The Maximum Working Voltage of the HPCE connector system is rated base on UL 60950-1 Second Edition Table 2N.

- Pollution Degree : 2 (Office Environmental)
- Material Group : 1 (Based on UL rating)

HPCE - VERTICAL				
"DIFFERENT" CURRENT PATH IN THE ROW OF POWER CONTACTS				
POSITION	Tail Pitch (mm) between two contacts	MCD (mm)	AC RMS Working Voltage (Volt)	DC / AC peak Working Voltage (Volt)
Power to Power	2.54	0.7	100	140
	5.08	3.24	639	903
Power to Signal	3.5	2.4	480	679
Signal to Signal	1.27	0.41	12	17
	2.54	1.68	336	475



HPCE - VERTICAL				
"SAME" CURRENT PATH IN THE ROW OF POWER CONTACTS				
POSITION	Tail Pitch (mm) between two contacts	MCD (mm)	AC RMS Working Voltage (Volt)	DC / AC peak Working Voltage (Volt)
Power to Power	2.7	2.1	420	594
Power to Signal	3.5	2.4	480	679
Signal to Signal	1.27	0.41	12	17
	2.54	1.68	336	475

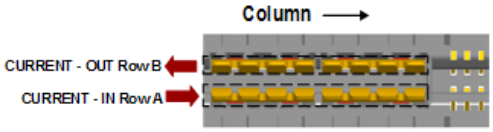
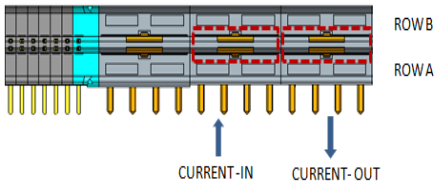


Table 5

HPCE BTB RAH				
DIFFERENT CURRENT PATH IN THE ROW OF POWER CONTACTS				
POSITION	TAIL PITCH (mm) BETWEEN TO CONTACTS	MCD(mm)	AC RMS WORKING VOLTAGE(V)	DC/AC PEAK WORKING VOLTAGE(V)
POWER TO POWER	2.54	0.6	50	70
	5.08	3.14	619	875
POWER TO SIGNAL	3.5	2.4	480	679
SIGGNAL TO SIGNAL	1.27	0.3	10	14
	2.54	1.57	314	444



HPCE BTB RAH				
DIFFERENT CURRENT PATH IN THE ROW OF POWER CONTACTS				
POSITION	TAIL PITCH (mm) BETWEEN TO CONTACTS	MCD(mm)	AC RMS WORKING VOLTAGE(V)	DC/AC PEAK WORKING VOLTAGE(V)
POWER TO POWER	2.54	0.47	18.7	26.4
	5.08	0.47	18.7	26.4
POWER TO SIGNAL	3.5	2.4	480	679
SIGGNAL TO SIGNAL	1.27	1.02	204	288.5
	2.54	1.02	204	288.5

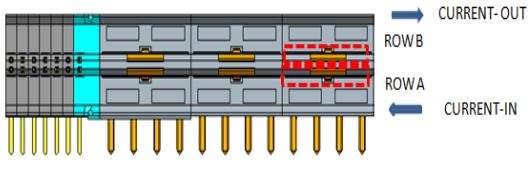


Table 6

4.5 CURRENT RATING

(Refer to FCI Product Specification GS-12-1125 (for additional information)

Following are the current rating values of the HPCE BTB connector system

Power contact current rating(30 °C)					
Contact type	Current (per contact) AMPS				
	2HP Contacts	4HP Contacts	8HP Contacts	10HP Contacts	12HP +4LP Contacts
Power contact	10.5	10	8.5	8.3	8

NOTES:
1. Copper trace weight:
   2 layers, 5oz each layer for header; multi-layers, 2oz each layer for receptacle
2. Ambient condition: still air at lab ambient.
3. Temperature rise 30 °C Max.
4. Signal contact current rating: 1.5A
5. “HP” =high power , “LP”=lower power

Table 7

4.6. MECHANICAL PROPERTIES

Mating/Un-mating forces

Configuration	Mating Force (N) (Max. Allowance)	Un-Mating Force (N) (Min. Allowance)
10HP Contacts+24S	59.76	7.84
Single High Power Contact	5.4	0.64
Single Lower Power Contact	2.7	0.32
Single SIGNAL Contact	0.24	0.06

Table 8

4.7. SAFETY

PREVENTION OF OPERATOR ACCESS TO ENERGIZED PARTS
Reference UL60950 & IEC 60950-1 SECTION 2.1.1.1

UL and IEC specifications define three different probe designs to test for prevention of operator access to energized conductors (such as powered electrical contacts within an unmated connector). The two probes are referred to as follows:

- **Test Finger** (Figure 7)
- **Test Probe** (Figure 7)

The following sections show each of these test probes positioned as closely as possible to the mating side contacts of the Vertical HPCE, which will be located on the PCB and may be powered in an unmated state.

4.7.1 Test Finger

The **Test Finger** 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 figures show the tip of the **Test Finger** inserted into a Vertical HPCE capture window, showing that it is impossible for the probe (shown at the smallest size per specified tolerances) to touch the receptacle contacts.

4.7.2 Test Probe

The requirements for the **Test Probe** conditions are not as clearly specified by UL and IEC. However assuming the worst-case scenario where the HPCE connector is accessible, the following 3D model was created. This model shows that the Test Probe is very large compared to the Test Finger and will never come close to touching a powered contact within the representative receptacle.

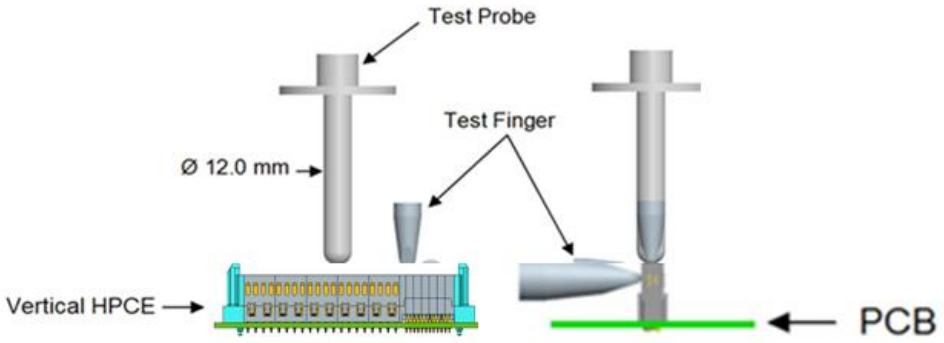


Figure 7

5. REQUIREMENT FOR CUSTOMERS PCB

Note: Generic figures are representative of all product configurations

For specifics of the PCB layout, refer to the customer drawing of the part number being applied.

6 APPLICATION TOOLING

No application tooling is required for the Solder Tail
Application tooling is required for the vertical Press fit. Tooling drawing number is 10125182.

For Solder Tail configuration, the total insertion force of two plastic pegs should not exceed 340 N (76 lbs)

6.1. VERTICAL RECEPTACLE (SOLDER/Press-Fit)

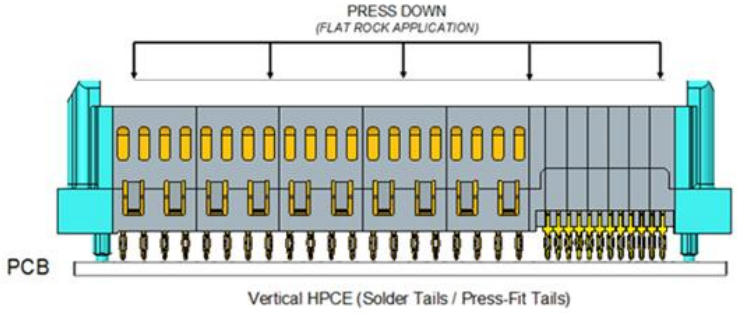


Figure 8

6.2. VERTICAL RECEPTACLE (PRESS-FIT) APPLICATION TOOLING

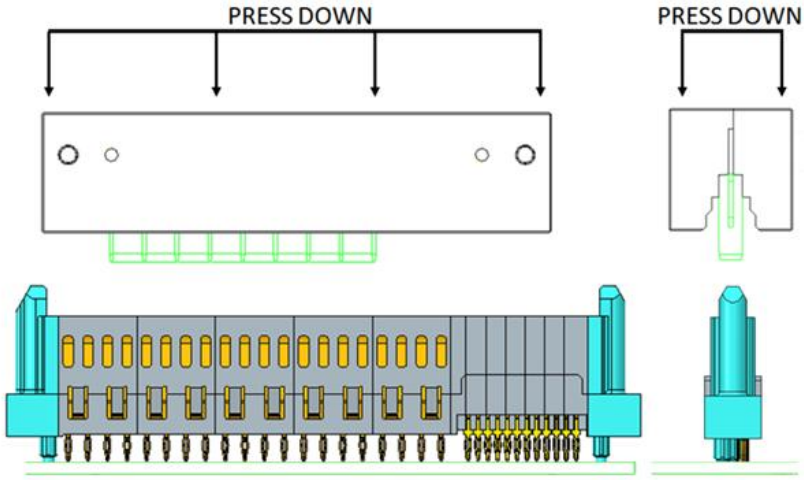


Figure 9

6.3 RIGHT ANGLE RECEPTACLE (STB)

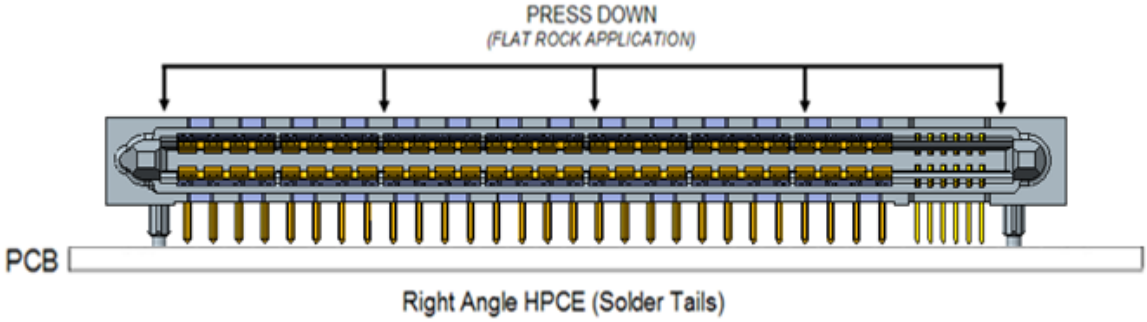
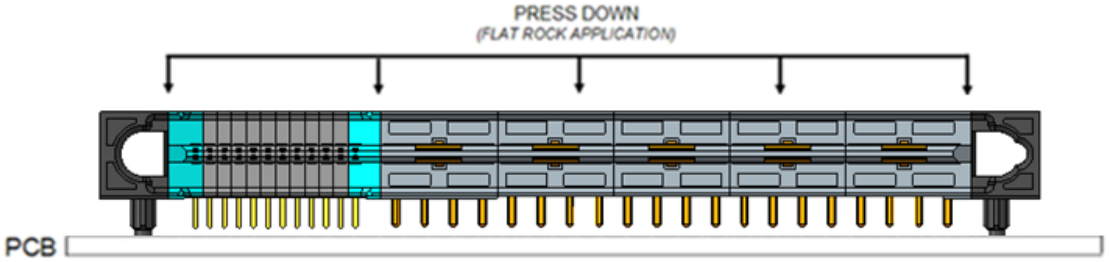


Figure 10

6.4 RIGHT ANGLE HEADER (STB)



Right Angle HPCE (Solder Tails)

Figure 11

7. REVISION RECORD

REV	PAGE	DESCRIPTION	EC #	DATE
A	ALL	RELEASE APPLICATION SPECIFICATION	N/A	11/05/2013
B	ALL	UPDATED 4.2; 4.3	ECN-ELX-DG-28287-1	10/30/2017