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		GUARDIAN (VERIFIED BY) N. Eppley	DATE 2016-01-15
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1.0 OBJECTIVE

This specification provides information and requirements regarding customer application of the BarGuide™ connector system with press-fit termination. 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, FCI cannot guarantee acceptable results.

2.0 SCOPE

This specification provides information and requirements regarding customer application of the BarGuide™ connector system with press-fit termination.

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.

3.1 **Product Description and Features**

BarGuide™ connectors provide a high current power interconnection with quick connect/disconnect function for space constrained pcb-to-pcb, pcb-to-busbar, and busbar-to-busbar applications. BarGuide plug and receptacle connectors are available with press-fit tails for mounting on pcbs and busbars. BarGuide pin and socket connectors press directly into busbars.

3.2 **Compatibility with Hard Metric Products**


BarGuide™ plug and receptacle connectors are compatible with hard metric standards in that the connectors can be positioned on the pcb/busbar so that the distance between the backplane and front edge of the daughter card is 12.5mm for back panel applications. This distance must include a 0.05 mm nominal gap between the mating faces of the plug and receptacle.

3.3 **Connector Guide Features**

Axial Gatherability: Maximum connector-to-connector misalignment at initial point of mating contact.

Axial Permanent Misalignment: Maximum connector-to-connector misalignment when fully mated.

Table 1 below shows the amount of gatherability and permanent misalignment in each direction.

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Connector type	Maximum Axial Gatherability	Maximum Axial Permanent Misalignment
3.6mm Stepped Socket	± 3.7mm	± 0.33 mm
3.6mm Knurled Socket	± 4.7 mm	± 0.33 mm
5.7mm Socket	± 3.6 mm	± 0.50 mm
3mm Bottom Entry Receptacle & Plug	± 1.5 mm	± 0.17 mm
3.6mm Vertical Receptacle & Plug	± 2.8 mm	± 0.33 mm
6mm Vertical Receptacle & Plug	± 2.5 mm	± 0.33 mm
8mm Right Angle Receptacle & Plug	± 3.0 mm	± 0.33 mm

Table 1: Connector Guidance


The maximum Angular Misalignment of the mating connectors is ± 1°.

3.4 Contact Mating and Connector Mating Sequence

The BarGuide™ connector system is capable of providing a wide range of wipe lengths. Wipe length is dependent on the mating pin length and location of each connector on the pcbs/busbars. Note that the top surface of the Bottom Entry vertical receptacle is covered, so the mating pin can not pass through the receptacle and the wipe distance is limited. See Table 2 as well as customer drawings for additional details.

Connector Type	Recommended Minimum Wipe Distance	Maximum Wipe Distance
3.6mm Stepped Socket	1.0mm	unlimited
3.6mm Knurled Socket	1.0mm	unlimited
5.7mm Socket	1.0mm	unlimited
3mm Bottom Entry Vertical Receptacle	1.0mm	5.0mm
3.6mm Vertical Receptacle	1.0mm	unlimited
6mm Vertical Receptacle	1.0mm	11.0mm
8mm Right Angle Receptacle	1.0mm	unlimited

Table 2: Contact Mating Details

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4.0 PRINTED CIRCUIT BOARD & BUSBAR LAYOUT INFORMATION

4.1 PCB Thickness

The minimum nominal PCB thickness recommendation is 1.5mm. There is no maximum thickness recommendation.

4.2 Busbar Thickness

The minimum nominal busbar thickness recommendation is 1.5mm. There is no maximum thickness recommendation.

4.3 Connector to Connector Spacing

PCB layout information is included on the customer drawings.

4.4 Keep-Out Zones for Application and Removal Tooling

There are no keep-out zones necessary for application tooling because these tools fit within the outside envelope of the connector assemblies.

Keep-out zones for connector removal tooling: TBD.

5.0 APPLICATION PROCEDURE

5.1 Connector Insertion Tooling

The BarGuide™ Vertical Receptacle, Right Angle Receptacle and Right Angle Plug connectors are designed for “flat rock” insertion and do not require any special insertion tooling.

The BarGuide™ Vertical Plug connectors are intended to be applied utilizing a “flat rock” along with one of the special insert tools listed in Table 3 below.

Connector Type	Insertion Tool Product Number
3mm Vertical Plug	TBD
3.6mm Vertical Plug	TBD
6mm Vertical Plug	TBD


Table 3: Insertion Tool Product Numbers

If a connector’s press-fit tails are longer than the thickness of the printed circuit board that the connector is being applied to, a special bottom support tool will be necessary. This tool could be a PCB with oversized holes or a custom tool designed by the user.

5.2 Insertion Presses

Several important items to consider when selecting an insertion press include:

- The press must have sufficient force capabilities
- The press ram should be large enough to cover the insertion tooling

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- The press table should be large enough to properly accommodate the PCB size.

Typical press types include:

- Manual arbor press
- Pneumatic press
- Hydraulic press
- Servo driven electronic press *

*** Although the connector can be applied using any of the press types mentioned above the preferred press type is the servo driven electronic press. This press gives the best control during the insertion process and offers the most flexibility. An example of this type of press would be ASG's BMEP-5T.**

5.3 Recommended Insertion Forces

The maximum insertion force is 60 Newtons per press-fit tail. The maximum insertion force per connector is found by taking the total number of press-fit tails in the connector assembly and multiplying it times the 60 N maximum requirement. Refer to the example below.

EXAMPLE: A 3mm BarGuide™ connector has 16 press-fit tails being inserted into the pcb/busbar. Therefore, the maximum recommended press setting would be 960 N (16 press-fit tails x 60 N).

This maximum force is based on PCB/busbar holes within FCI's recommended guidelines.


5.4 Board Insertion Procedure for Receptacle and Plug Connectors

- Carefully locate the connector onto the printed circuit board or busbar, taking care to assure that all press-fit tails are aligned with the proper PCB holes.
- Using a flat rock surface and an insertion press, apply force to the top of the insert tool (or top of connector if no tool required). Actuation of the press should be slow and controlled, not fast like a punch press. Inserting to a specified force will yield more consistent results than inserting to a set distance. To ensure proper insertion, connectors must be centered beneath the press ram. An offset in the loading may result in improper seating of the connector.
- Remove the connector assembly from the insertion press and inspect for proper application (refer to section 5.5).

5.5 Post-Application Inspection Procedures

The post-application inspection should consist of several simple checks to assure that the connector is applied properly and is not damaged.

- Visually assure that all press-fit tails are seated in the proper PCB/busbar holes and that none have been crushed during application.
- Visually check that the standoffs on the bottom of each assembly are seated within 0.10 mm of being flush with the PCB/busbar. A larger gap beneath the standoffs or retainer may indicate that the connector is not seated fully or is not seated parallel to the board.

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5.6 Connector Removal Tooling

Table 4 below identifies FCI removal tool part numbers for BarGuide™ connectors.

BarGuide™ Connector	Removal Tool PN
3mm Vertical Receptacle and Plug	TBD
3.6mm Vertical Receptacle and Plug	TBD
6mm Vertical Receptacle and Plug	TBD
8mm Right Angle Receptacle and Plug	TBD


Table 4: BarGuide™ Removal Tools

5.7 Removal Tool Description

The connector removal tool is a hand tool used to remove BarGuide™ connectors from the back side of the pcb/busbar by pressing on the EON tails. A hand operated arbor press and bottom support tool (not included with removal tool) are required to actuate the tool and provide support around the connector during the removal process.

5.8 Connector Removal Procedure

- With the connector to be removed facing downward, place the board assembly over a bottom support tool (not included) that is appropriate for the board layout. Make sure that the support tool extends along the entire length of two opposing sides of the connector. Also make sure that no small components (chip resistors, chip capacitors, etc.) are between the board and the support tool.
- From the back side of the board, roughly align the A1 side of the tool with the A1 via location on the PCB/busbar.
- Final-align the tool so that all the pins protruding from the face of the tool are inserted into the vias belonging to the connector that you wish to remove. **DO NOT TRY TO PUSH PINS INTO AREAS WHERE THERE ARE NO VIAS. THE PINS WILL BUCKLE AND BREAK.**
- Actuate the press so that the tool is compressed. Apply pressure evenly and slowly, not with a quick motion. Stop applying pressure when the force drops or the press handle becomes easy to move. This will indicate that the EONs have released from the printed circuit board/busbar. The connector should be lying on the bench or can be easily removed by hand.

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6.0 REFERENCE DOCUMENTS

- FCI PRODUCT SPECIFICATION GS-12-1260
- FCI PRODUCT CUSTOMER DRAWINGS
- FCI PACKAGING SPECIFICATION GS-14-920 (Lead Free Labeling)

FCI product drawings and specifications can be obtained by accessing the FCI website www.fci.com or contacting FCI Technical Service. 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 FCI product drawings for appropriate details.

7.0 RECORD RETENTION

REV	PAGES	DESCRIPTION	EC #	DATE
A	All	Initial release	-	07/29/2015
B	3,4,6	Add 3.6mm plug and receptacle to tables; Revise 3.6 plug & receptacle misalignment to +/- .33mm		1/15/2016