	TYPE	NUMBER	
FCI	APPLICATION SPECIFICATION	GS-20-047	
TITLE		PAGE	REVISION
Application guide DENSI-SHIELD I/O™ cable connector		1 of 10	D
		AUTHORIZED BY	DATE
		L. van Kuijk	06/03/2007
		CLASSIFICATION	
		UNRESTRICTED	

1 OBJECTIVE

This specification provides information and requirements for customer application of the DENSI-SHIELD I/O™ cable connector kits. It is intended to provide general guidance for application 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 process varies greatly from the recommended one, FCI cannot guarantee acceptable results.

2 SCOPE

This specification provides information and requirements regarding application of the DENSI-SHIELD I/O™ cable connector kits (FCI product number: 10044473) into cable assemblies.

3 GENERAL

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

4 DRAWINGS AND APPLICABLE DOCUMENTS

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.

5 APPLICATION REQUIREMENTS

See GS-12-305: “Cable Specification for Densi-Shield I/O connector” for a typical recommended cable construction.

6 APPLICATION TOOLING

Product number	Tool description	Remark
A2000.001	Manual toggle press Type 5 kN	
1000.266.100	Crimp tooling with AWG26 crimp die set Optional: AWG30 crimp die set	
1000.266.200	Soldering jig	
1000.266.300	Rivet tooling	
1000.266.400	Strip tooling	
	Test interface for electrical test	

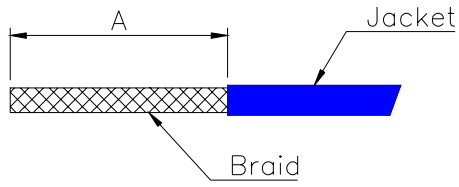
The tooling is available at: Exmore Benelux b.v.b.a., Ketelaarstraat 8, B-2340 Beerse, Belgium
Tel.: +32 (0)14618666, Fax: +32 (0)14618675, http://www.exmore.com

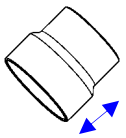
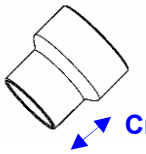
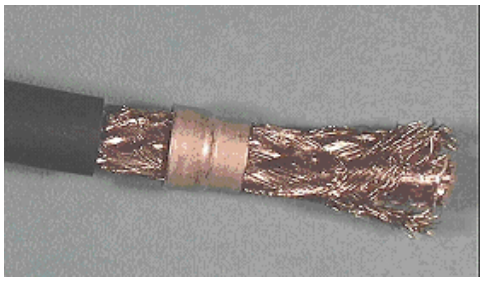
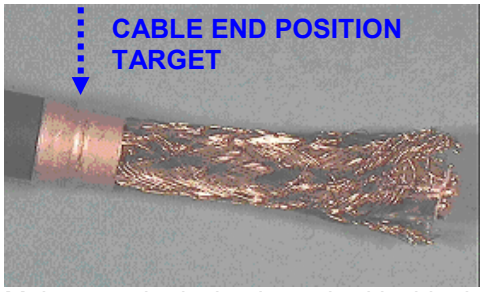
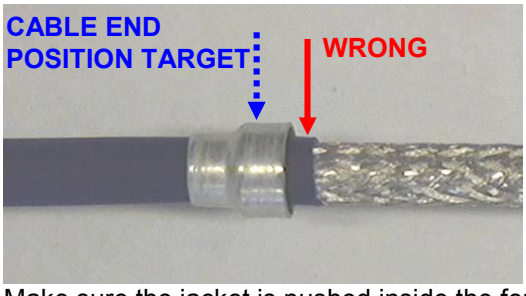
7 APPLICATION PROCEDURE

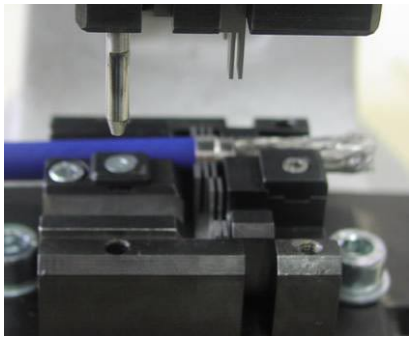
7.1 CABLE PREPARATION AND CRIMPING

Cut the cable to the desired length.

Remove 35 mm of the outer jacket (A) by cutting the jacket. Damage of the cable or loose braid parts must not appear.

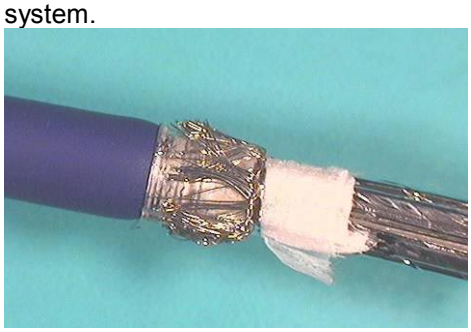


 Inner ferrule for a cable with an outer diameter of 8.0 mm.	 Inner ferrule for a cable with an outer diameter of 5.2 mm.
 Slide the inner ferrule onto the cable.	 Slide the inner ferrule onto the cable
 Make sure the jacket is pushed inside the ferrule.	 Make sure the jacket is pushed inside the ferrule, but not further than the blue dotted arrow.
Crimp the inner ferrule onto the jacket. The crimp diameter for a cable with outer diameter of 8.0 mm is 7.6 mm.	Crimp the inner ferrule onto the jacket. The crimp diameter for a cable with outer diameter of 5.2 mm is 5.2 mm.



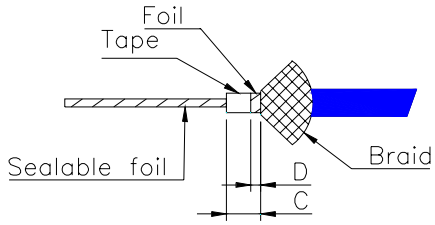
Example: Inner ferrule after crimping

Fold back the braid and cut it ¾ of the length of the ferrule. The braid should not be longer than the ferrule system.



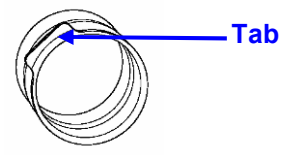
It is important to avoid trimming of the braid close to the termination area, to keep loose braid parts away from the area where they could cause short circuits.

Cut the outer foil flush with the end of the jacket (D=0).

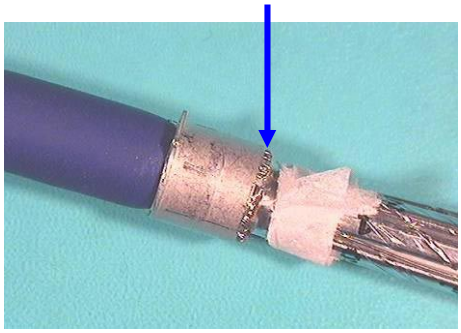


Cut outer tape (C) 4-5 mm from the end of the jacket. If the outer tape opens so that the braid or outer foil can touch the foil of the pairs, then it has to be secured with kapton tape or with shrink tube. This is very important to insure separation of the EMC- and signal shielding.

With the tab part first, slide the outer ferrule over the parallel pairs, and then over the inner ferrule and braid.

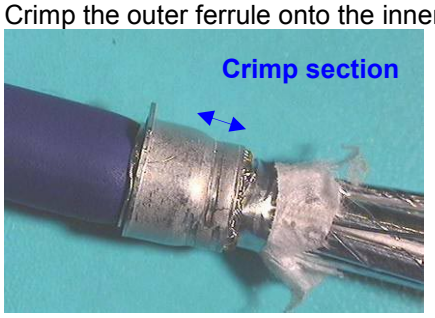


Make sure the braid is tightly folded around the inner ferrule. This will decrease the risk of an improper functioning of the strain relief.
The inner ferrule may protrude from the outer ferrule 0,3 mm ± 0,3 mm.



To simplify wire handling during the soldering operation it is necessary to (pre-) sort the parallel pairs using the numbering on the foil to insure an optimal orientation of the cable into the outer ferrule. The two parallel pairs that are going to be soldered first on the terminal block should lay on the lower side of the inner ferrule. The tabbed part of the outer ferrule should be aligned with these pairs.

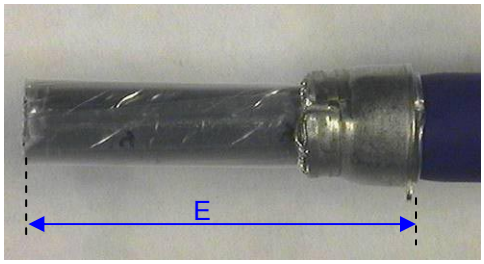
Crimp the outer ferrule onto the inner ferrule. Crimp diameter is 8,0 mm.

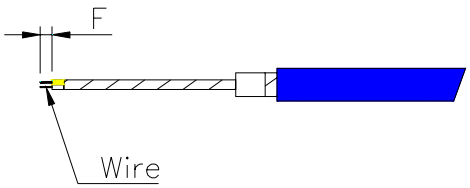


7.2 WIRE PREPARATION

Remove the inner tape.

Sort and position the parallel pairs and cut them to the right length (Recommended E=27,8 mm).



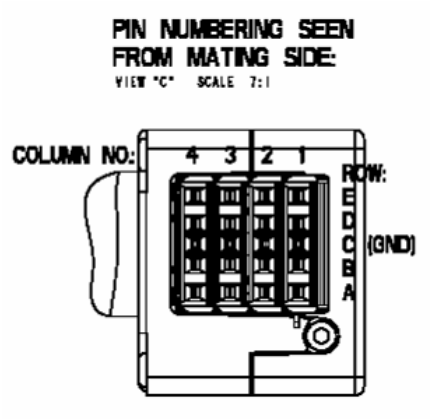


Remove 4 mm of the foil for each pair.
Strip 2 mm of dielectric (insulation; F).

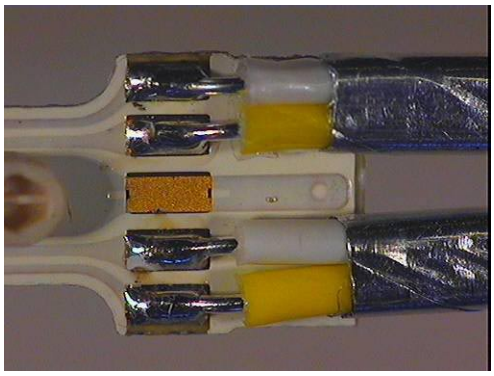
7.3 SOLDERING

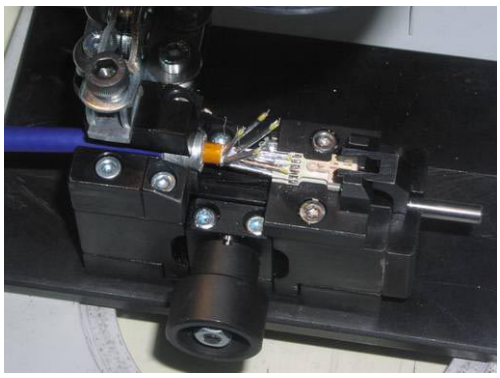
Because of the limited space in the connector, care must be taken with the routing of the pairs, especially for AWG26 wires. FCI recommends using the wiring diagram that is shown below.

RECOMMENDED WIRING DIAGRAM		
Connector A	**Cable**	**Connector B**
A1	PP1	E1
B1	NP1	D1
C1	DW	C1
D1	PP2	B1
E1	NP2	A1
A2	PP6	E2
B2	NP6	D2
C2	DW	C2
D2	PP7	B2
E2	NP7	A2
A3	PP8	E3
B3	NP8	D3
C3	DW	C3
D3	PP3	B3
E3	NP3	A3
A4	PP5	E4
B4	NP5	D4
C4	DW	C4
D4	PP4	B4
E4	NP4	A4



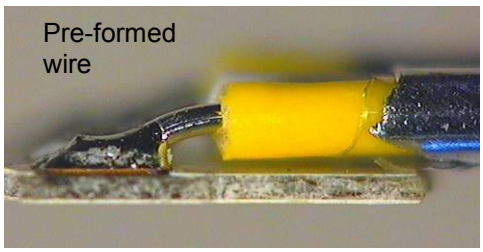
DW = drain wire
PPx = Positive pole pair x
NPx = Negative pole pair x

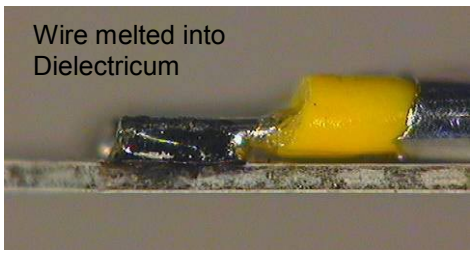




Following the wiring scheme, solder the signal wires to the pcb's first two and last two solder pads. Solder the drain wire to the pcb's middle solder pad.
Stack the next PCB and repeat the steps until all wires are connected.

NOTE 1: In some cables foams are used as dielectric material that can't withstand the heat that is introduced by the soldering operation so well. When the dielectricum is shrinking away too far or when the wire is melted into the dielectricum (see picture) because of the pressure and heat applied on the wire during soldering, it can lead to a too short air distance between the wires and its foil, which can affect the withstanding voltage.
Solve this issue by pre-forming the wires (see picture) before soldering and by keeping the soldering operation as short as possible.

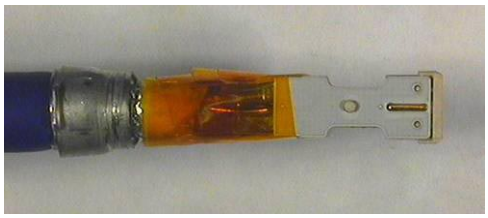




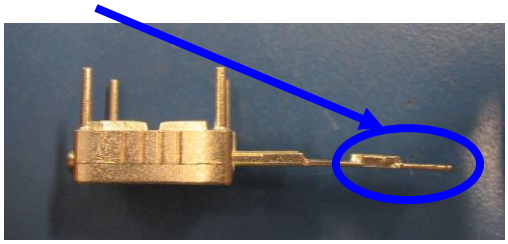
NOTE 2: To prevent short circuits (to the covers) it is very important that the wire and solder is contained within the width and length of the solder pad.

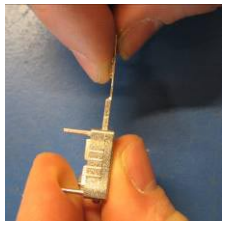
7.4 ASSEMBLING THE CONNECTOR

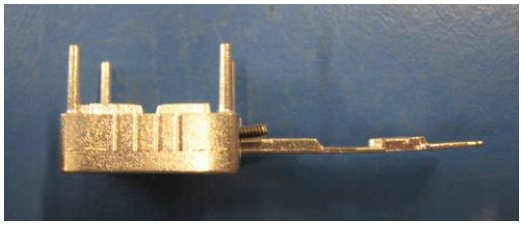
Apply Kapton tape over the pairs and outer tape to provide a separation between signal ground and EMC shield.



Take a lower die cast cover and check if the terminal block support (see picture) is straight.
Make sure that this part stays straight during assembly. To ensure this it's a good practice to bend the front part of the support a little upwards.



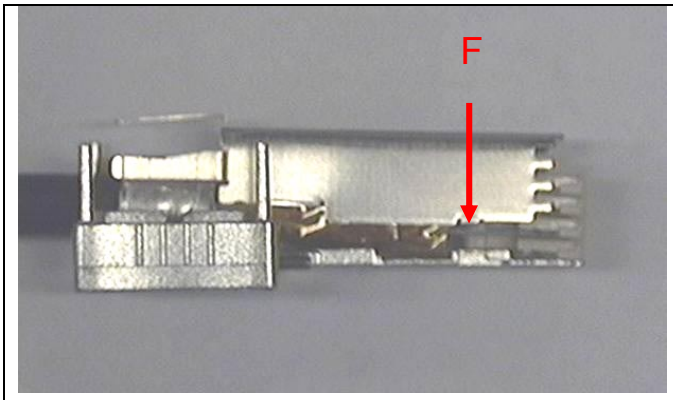


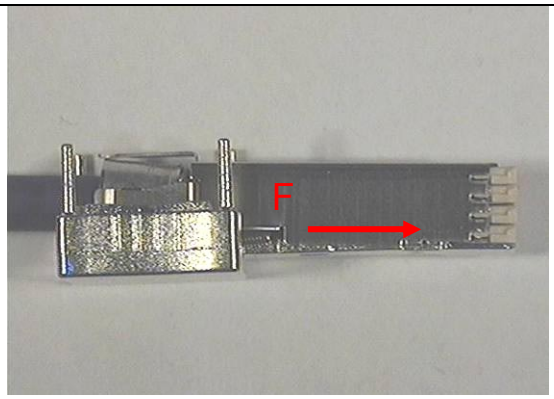


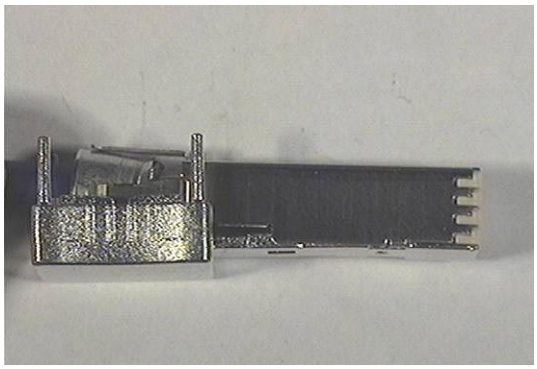
By pushing the outer ferrule tab into the cavity of the lower die cast cover, mount the subassembly in the lower die cast cover.

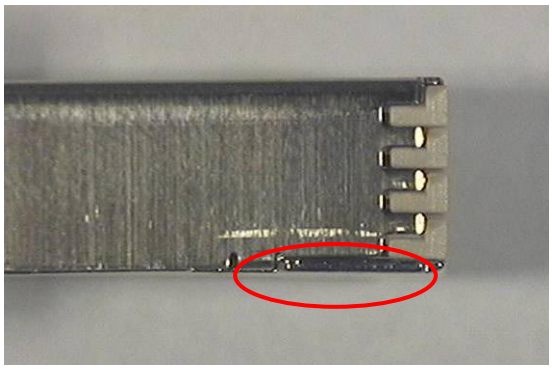
Push the sheet metal cover over the signal wires and slide it in the slots of the terminal block housings.

Avoid damaging the tabs of the plastic housings, and do not apply high forces on the solder joints during this sliding operation.

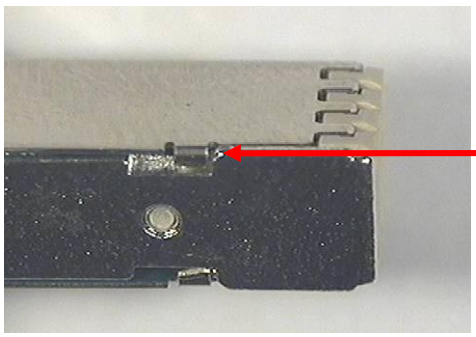




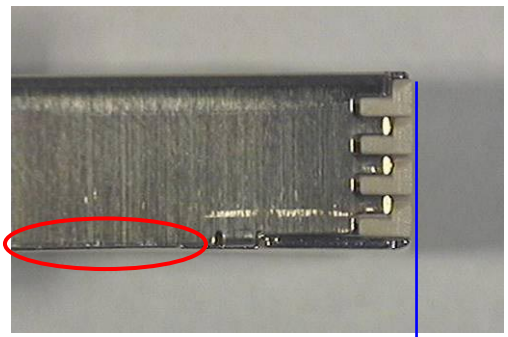




The encircled part of the sheet metal cover should rest upon the lower die cast cover.

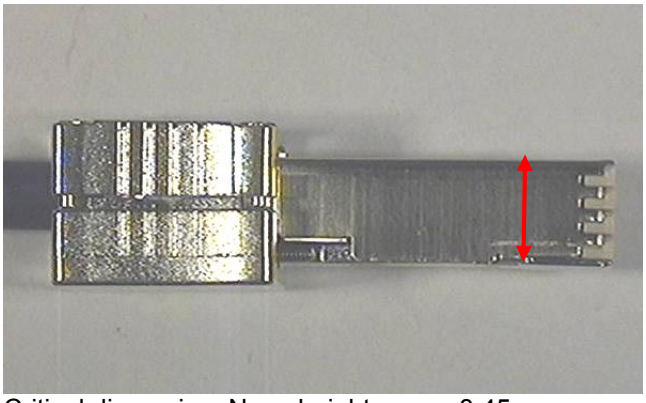


The tabs of the sheet metal cover should be slided forward to the position indicated and they should not be damaged during the mounting of the sm covers.

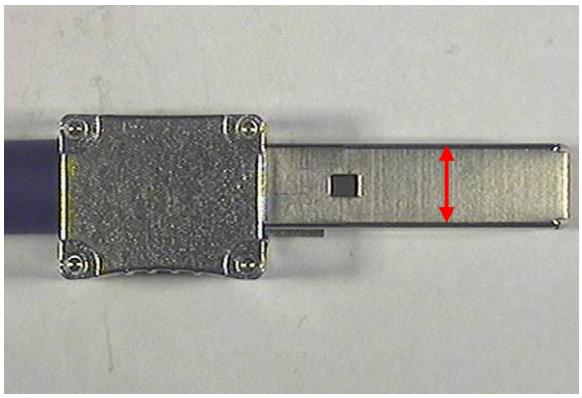


The encircled part of the sheet metal cover should **NOT** rest upon the lower die cast cover and the terminal blocks should be aligned.

Mount the upper die cast cover and close the covers.



Critical dimension: Nose height = max 8,45 mm

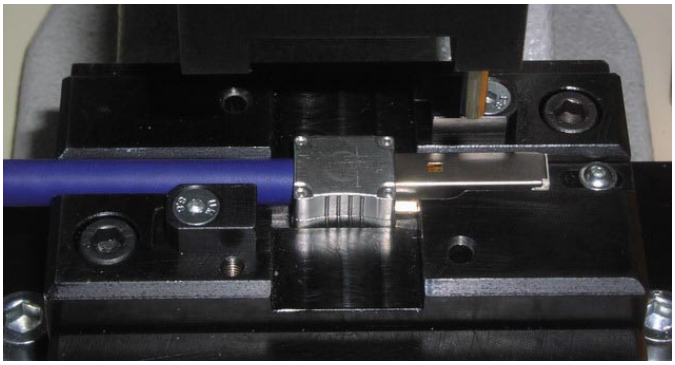


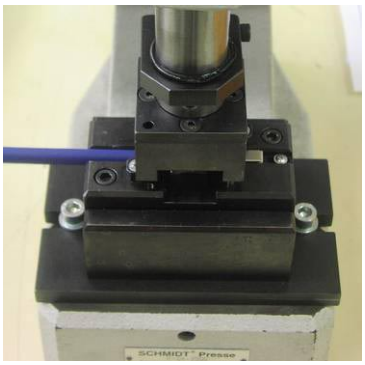
Critical dimension: Nose width = max 7,50 mm

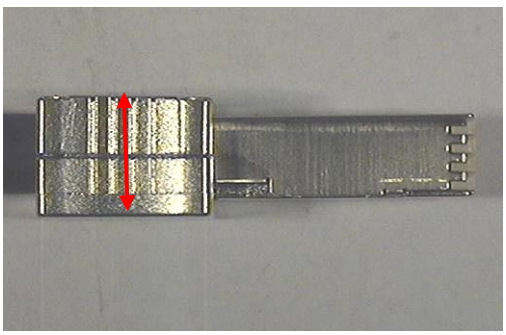
7.5 RIVETTING

Before the riveting operation it is recommended to do an electrical test to insure there are no electrical failures (shorts and opens). The sheet metal cover should not be used twice because there is a high risk that during removal the tabs are damaged or bent. Therefore always use a new sheet metal cover.

Rivet the four pegs. After riveting the heads may not protrude above the die cast cover.







Critical dimension: Covers (box height) = max 12,2 mm

8 REWORK

Once riveted this connector is not repairable, and must be replaced by a new connector.

9 REVISION RECORD

REV	PAGE	DESCRIPTION	ECR#	DATE
A	all	New release		27-05-2005
B	1; 5; 7; 7; 8	Logo changed; Recommended length of wires added; Notes soldering added; Photo Kapton tape changed; comment photo 2 added “alignment of terminal blocks”		15-02-2006
C	All	Updated logo & footer	H06-0100	10-07-2006
D	7; 9	Lower die cast terminal housing support; Nose dimensions switched;		06-03-2007