WIRE FINISH SHEET FOR JN1130C (J62.720) CONTACT AND ASSEMBLY OF MULTI WAY FIBRE OPTIC CONNECTOR

1. SCOPE

1.1 This wire finish sheet covers the stripping and preparation of fibre optic cable to JN1008B (J61.610) and the crimping and assembly of the fibre optic contact to JN1130C (J62.720).

1.2 The connector example shown is the free plug. The accessories shown on within this document are common to all shell sizes for both plugs and receptacles.

1.3 All tool part numbers referenced within the procedure are from DEUTSCH LTD. Consumables are either from DEUTSCH LTD or 3M's. See paragraph 6 for a full listing.

1.4 The drawings are for information only and are not to scale.
All dimensions shown are in millimetres.

1.5 The contact (JN1130C), consists of the contact itself and a crimp sleeve, see Figure 1.

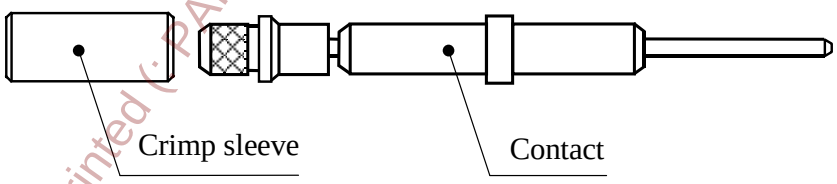

Figure 1

2. PROCEDURE – CABLE PREPARATION AND CONTACT FITMENT

2.1 Cut the fibre optic cable to length and ident in accordance with J56.024 and INS501.

2.2 Slide the crimp sleeve over and back along the cable.

2.3 Prepare the epoxy, part number JN1055P (454802 - Epotek 353ND).

2.3.1 Remove the plastic divider from the sachet and thoroughly mix the epoxy.

2.3.2 When mixed, pour the epoxy into a syringe (454297) fitted with a 0,8mm diameter needle with a squared off end.

2.3.3 Stand the syringe vertically to allow any air bubbles to be expelled from the adhesive.

2.4 Strip the cable to the dimensions shown in Figure 2.

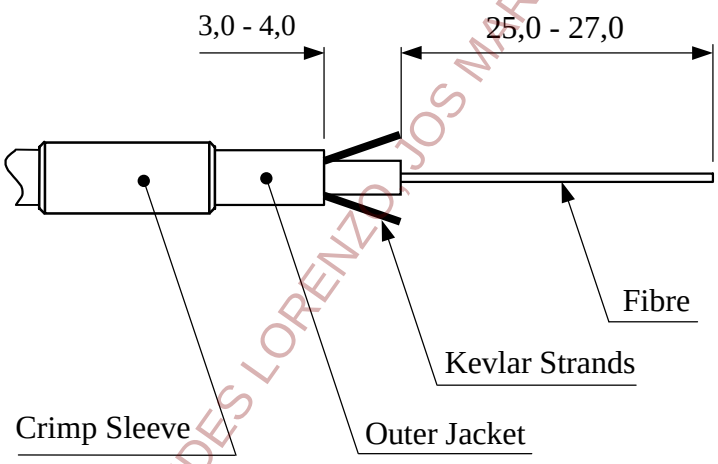

Figure 2

2.4.1 Carefully strip off the outer jacket, in increments of 4,0mm to 5,0mm, to a length of 27,0mm max, using the stripping tool 457419 (cutter size 1,6mm).
DO NOT attempt to strip the full length off in one go.

2.4.2 Remove the cotton wrap from the Kevlar strain relief strands and trim the strands back to the end of the sheath using a sharp scalpel blade (454299) or scissors.

2.4.3 Carefully strip off a further 3,0mm to 4,0mm of the outer jacket, using the stripping tool 457419 (cutter size 1,6mm), exposing the Kevlar strands again.

2.4.4 Strip off the excess fibre buffer, in increments of 4-5mm, using stripping tool 457301 (26AWG cutter size), to the full 25,0mm to 27,0mm length.
To avoid fibre breakage, DO NOT strip the buffer in one attempt.

2.4.5 Remove the primary (Acrylate) coating from the fibre using Dichloromethane applied to the exposed fibre for 2 to 5 minutes. Using a tissue pull off the stripped coating.
Caution: When using stripping solutions avoid contact with skin and eyes.

2.4.6 As an alternative to the manual stripping method covered by para 2.4.4 to 2.4.5, the fibre optic cable may be stripped by automatic means using the Schleuniger FO 7030 stripping machine with the following settings:

- **Setting 9 for 140ºC.**
- **Setting 0 for 1.5 seconds duration.**

2.4.7 Clean the fibre and inner sheath with an alcohol (isopropyl) moistened, lint free tissue. **This is essential.**

2.4.8 Dry fit the fibre into the ferrule to ensure that the fibre is compatible with the ferrule optical hole.
Slide the crimp sleeve forward over the outer jacket and Kevlar strands to check the fit.
Remove the contact from the fibre.

2.5 Contact fitment

2.5.1 Clean the optical end face of the ceramic contact with a tissue or lint free cloth moistened with isopropyl alcohol then dry.

2.5.2 Carefully place the syringe needle into the ferrule bucket and rear of the contact as far as the needle will go. Observing the mating face of the ceramic contact, apply gentle pressure to the syringe until a small amount of epoxy resin shows on the contact face. Refer to Figure 3.
As soon as the resin appears immediately release the pressure from the syringe and withdraw the needle from the contact.

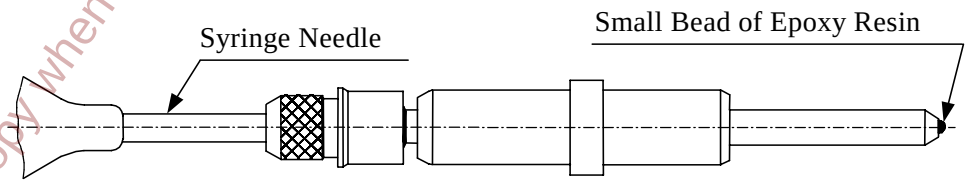

Figure 3

2.5.3 Fully push the contact onto the fibre by rotating and counter rotating through 90° with respect to the fibre. The buffer end **MUST** enter the rear of the contact to its fullest extent with the cable sheath approximately 1mm from the back of the ferrule. Refer to Figure 4

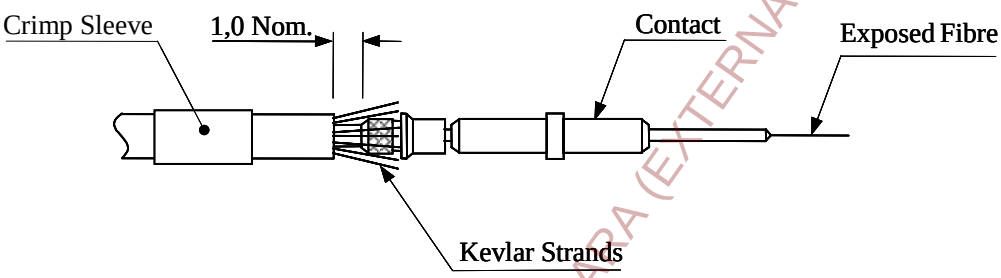

Figure 4

2.5.4 Apply small drops of Omnifit 230L contact adhesive to moisten the exposed Kevlar strands. Fold the strands forward and spread them evenly around the knurled diameter of the ferrule. Slide the crimp sleeve forward over the Kevlar strands to the rear of the ferrule body trapping the Kevlar strands.

2.5.5 Using crimp tool 451716 together with crimp dies 457440 code B (2,74/2,84 A/F) crimp along the length of the crimp sleeve. Position the dies as shown in Figure 5 crimping both the Kevlar and cable outer sheath.

2.5.6 Carefully clean off any excess epoxy resin and/or adhesive from the contact.

Note:
When crimping, ensure that the crimp tool jaws are fully closed before releasing the tool.

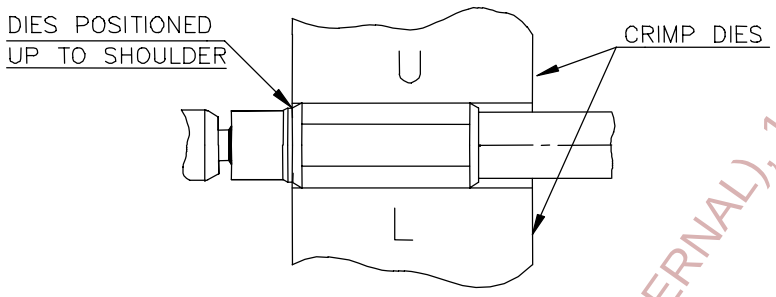

Figure 5 Positioning of Crimp Jaws

2.5.7 Apply a **SMALL** bead of epoxy resin to the front of the optical face of the contact (where the fibre emerges), to support the fibre during the curing and polishing processes. See figure 6.

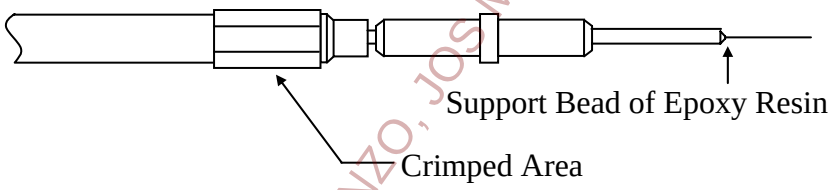

Figure 6 Resin Support Bead

2.6 Curing

2.6.1 Cure the terminations using the Fibretron Multi-Cure Heater for a period of 30 minutes ± 5 minutes, at 90°C ± 5°C, followed by a further period of 30 minutes ± 5 minutes at 150°C ± 5°C. Allow the heater to reach the required temperature before commencing the cure time.

2.6.2 If the higher temperature of 150°C cannot be achieved, then use a reduced temperature of 125°C ± 5°C for a period of 60 minutes ± 5 minutes. After curing, allow the terminations to cool to room temperature (20°C).

Note:

For higher production quantities, two multi cure heaters may be employed, one for each temperature level. To avoid the sprig from breaking away and damaging the termination, it may be removed by cleaving before placing the termination in the second oven. See para 2.6.3.

2.6.3 Carefully cleave and remove the fibre, protruding from the end of the contact optical face, using cleaving tool 453228 or equivalent. The fibre should be cleaved as close to the epoxy resin bead as possible. See Figure 7.

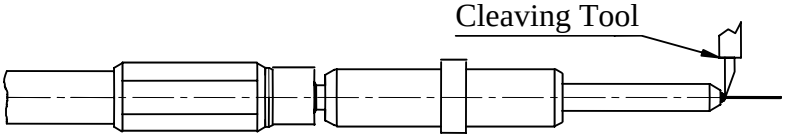

Figure 7 Cleaving the Excess Fibre

3. PROCEDURE – POLISHING THE CONTACT FACE

3.1 Manual Polish.

3.1.1 Holding the contact in the hand, rub the face back and forth over a 30 micron lapping film (green aluminium oxide). Complete sufficient strokes to remove the majority of the exposed fibre and epoxy resin.

3.1.2 Abraid the remainder of the fibre and epoxy resin in the same manner, using 9 micron lapping film (blue aluminium oxide). Complete sufficient strokes until the fibre is wafer thin and level with the end of the contact. **Do not remove the epoxy resin bead completely.** See Figure 8.

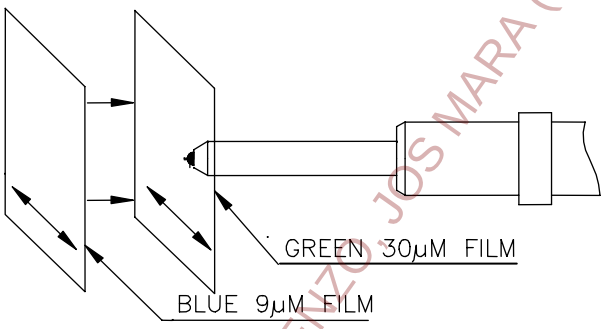

Figure 8 Lapping the Optical Face

3.1.3 Place a 454483 polishing disc onto one of the polishing pads (455801) and a 455170 polishing disc onto the other polishing pad.

3.1.4 Fit the MC5 termination into the polishing dolly (455367). Refer to Figure 9. Apply a few drops of water on the diamond medium DM disc (454483) mounted on the rubber polishing pad. Using light pressure, polish the optical face of the contact for 10 cycles in figure 8 movements on the disc. See Figure 10. Wipe the disc and contact end face clean to remove debris using a tissue or lint free cloth moistened with isopropyl alcohol.

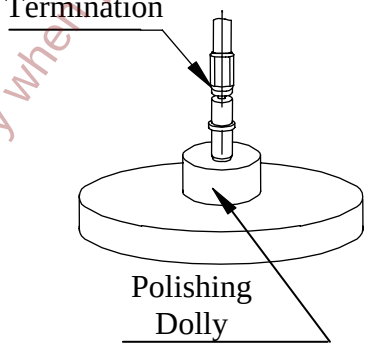

Figure 9 Polishing Dolly

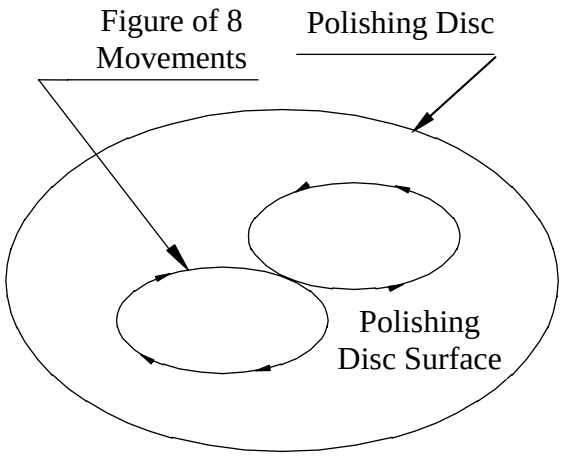

Figure 10 Polishing Movements

3.1.5 Examine the termination optical end face using a bench microscope or the Priorscope 452964 fitted with adaptor 457278. Repeat step 3.1.4 until the surface does not show any non acceptable defects. Figures 11 & 12 are used for comparison.

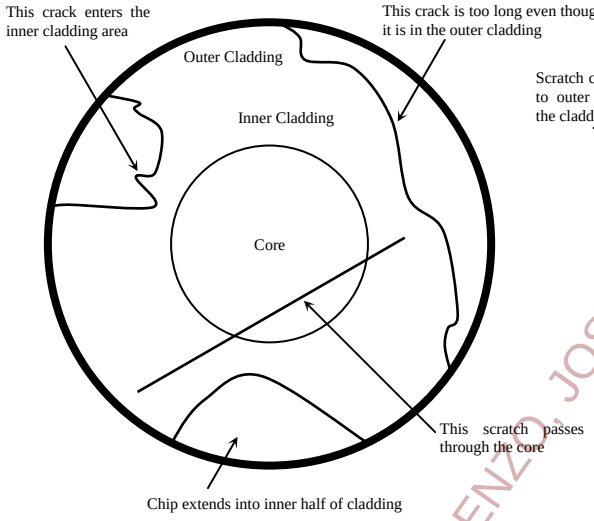

Figure 11 Non Acceptable Defects

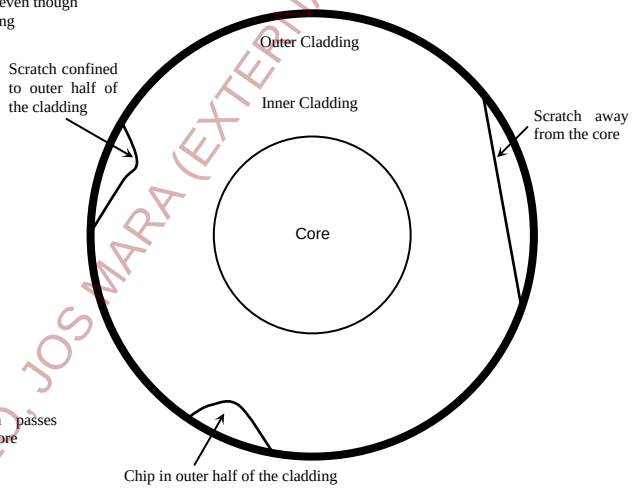

Figure 12 Acceptable Defects

3.1.6 Continue to polish and examine the contact optical face as above until the desired optical finish is achieved. This is defined as being free of pitting, chips, scratches and cracks etc.

3.1.7 Clean the surface of the disc frequently using a tissue or lint free cloth, moistened with isopropyl alcohol, to avoid cross contamination of debris causing scratching of the fibre face.

3.1.8 To achieve the optimum finish, complete 5 to 10 ‘figure of 8 cycles’ of polishing using an ultra fine grade (yellow 455170) disc on a rubber polishing pad. Apply a few drops of water to the disc before commencing polishing using moderate pressure.

3.1.9 Examine the optical face after polishing to 3.1.8 using the Priorscope and adaptor. The optical face **SHALL** be completely free of scratches and pitting and have a uniform surface finish. Repeat the polishing procedure 3.1.8 as necessary to achieve this finish.

3.10 Final Inspection Stage.

3.10.1 Examine the end face of the ceramic contact using a Priorscope. The recommended magnification is x200. Ensure that the following criteria are met:

- The ferrule end face has a uniform surface finish.
- The ferrule and fibre end are in the same plane (i.e. the fibre is not proud or recessed from the ferrule).
- The fibre cladding is free from cracks, heavy scratches and pitting.
- The finished length is as specified in Figure 13.

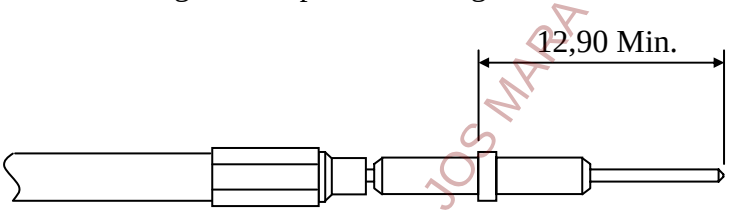

Figure 13 Finished Length

3.10.2 If the contact is found to be below the minimum length specified in Figure 13 due to 'over polishing', it shall be rejected as the performance of the connector to which it is fitted will be unsatisfactory.

3.10.3 Perform an insertion loss test as per J56.019 and ensure that the loss is within the limits specified.

3.10.4 Clean the optical face of the contact and fit a protective cap until required to be fitted to a connector.

4. CONNECTOR / HARNESS ASSEMBLY PROCEDURE

4.1 Method 1 – Using Peek conduit for harness protection.

4.1.1 Slide an appropriate size and length of JN1096G Peek conduit and PAN6480K heatshrink tubing over the fibre optic bundle.

4.1.2 Unscrew the two mounting screws and remove the two clamp bars from the cable clamp.

4.1.3 Slide the cable clamp assembly (consisting of JN1130H cable clamp and JN1130L backshell adapter) over the fibre optic bundle as shown in Figure 14.

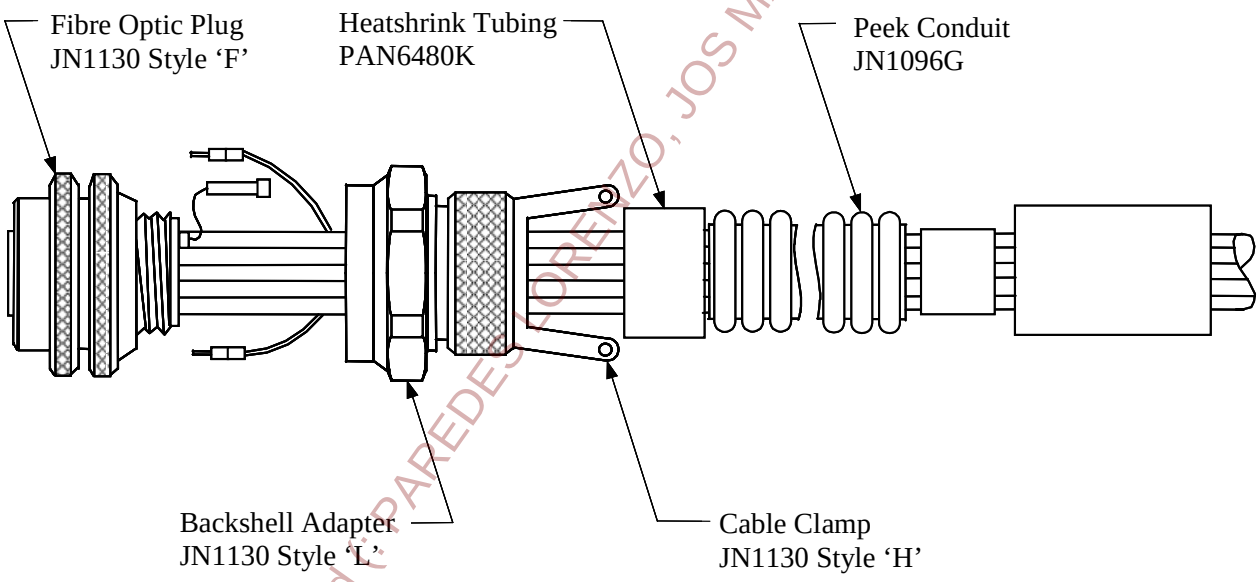

Figure 14

4.1.4 Insert the contacts into the connector starting from the centre and working to the outside All unused cavities shall be fitted with JN1130J dummy contacts. The tools used for insertion and extraction are as detailed in Table I.

4.1.5 Slide the PAN6480K heatshrink tubing and JN1096G conduit towards the rear of the connector and shrink in accordance with INS501. See figure 15

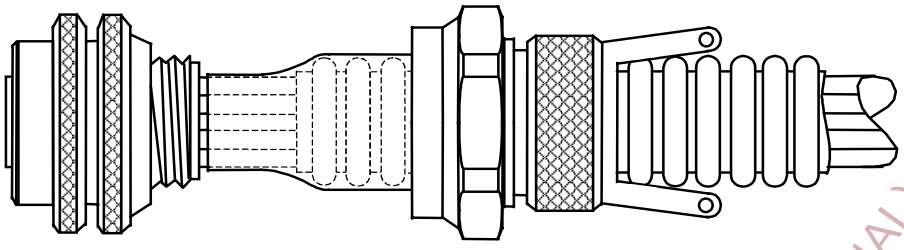

Figure 15

4.1.6 Slide the cable clamp assembly forward and tighten onto the rear of the connector (hand tight plus a quarter turn).

4.1.7 Place the two clamp bars over the bobbin, and refit the screws with J93.201 thread locking compound as shown in Figure 16.

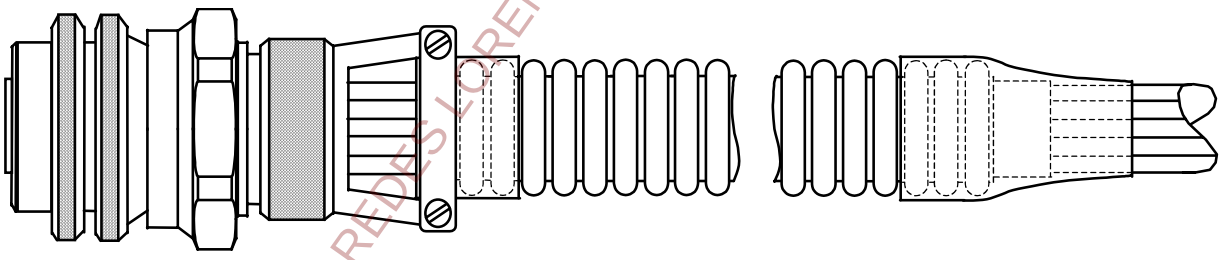

Figure 16

4.1.8 Do not over-tighten to prevent damage to the fibre optic cables.

NOTE:
A JN1096R bush is not required when Conduit is used for protection.

4.2 Method 2 – Using JN1130R Bobbin For Protection

4.2.1 Unscrew the two mounting screws and remove the two clamp bars from the JN1130H cable clamp.

4.2.2 Slide the JN1096E bobbin, cable clamp assembly (consisting of JN1130H cable clamp and JN1130L backshell adapter) over the fibre optic bundle as shown in Figure 17.

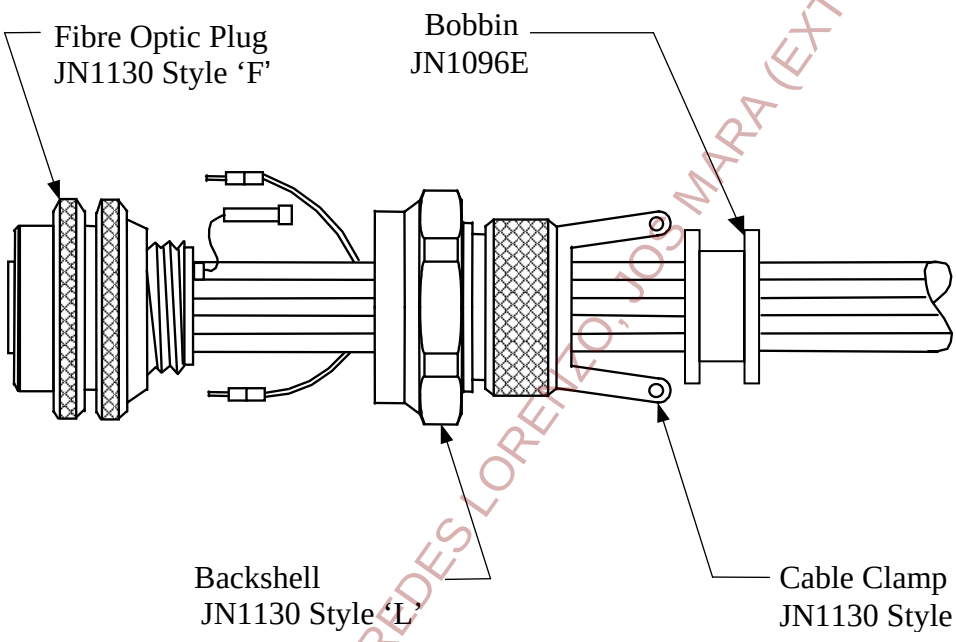

Figure 17

4.2.3 Insert the contacts into the connector starting from the centre and working to the outside. All unused cavities shall be fitted with JN1130J dummy contacts. The tools used for insertion and extraction are as detailed in Table I.

4.2.4 Slide the cable clamp assembly forward and tighten onto the rear of the connector (hand tight plus a quarter turn).

4.2.5 Place the two clamp bars over the bobbin, and refit the screws with J93.201 thread locking compound as shown in Figure 18.

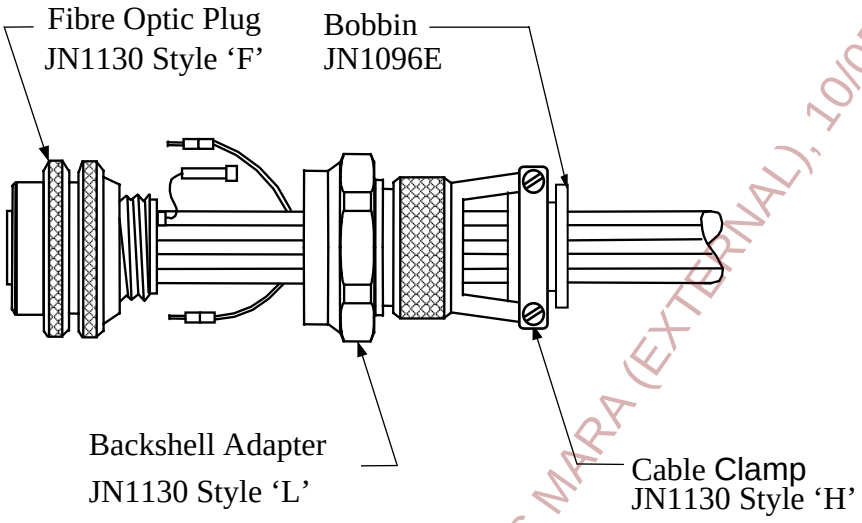

Figure 18

4.3 Method 3 - Termination using PAN6480L For Protection

4.3.1 Slide an appropriate size and length of PAN6480L heatshrink tubing over the fibre optic bundle. Note it may be necessary to build the heatshrink sleeving to the appropriate diameter to match the cable bundle using different diameters of heatshrink.

4.3.2 Unscrew the two mounting screws and remove the two clamp bars from the JN1130H cable clamp.

4.3.3 Slide the cable clamp assembly (consisting of JN1130H cable clamp and JN1130L backshell adapter) over the fibre optic bundle as shown in Figure 19. Insert the contacts into the connector starting from the centre and working to the
Outside.

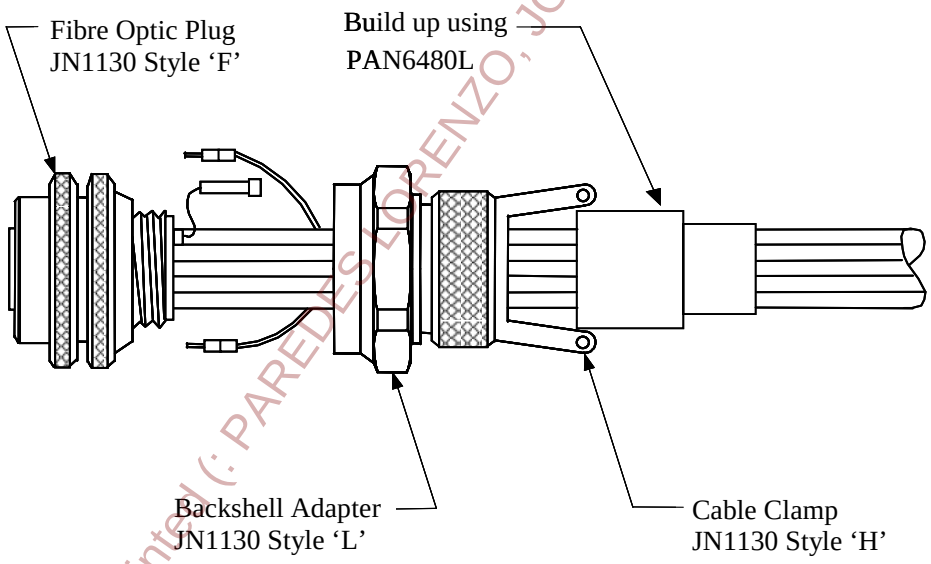

Figure 19

4.3.4 All unused cavities shall be fitted with JN1130J dummy contacts.
The tools used for insertion and extraction are as detailed in Table I.

4.3.5 Slide the PAN6480K heatshrink tubing conduit towards the rear of the connector ensuring that the final position will be under the area of the clamp saddle bars.

4.3.6 Recover the heathsrink in accordance with INS501. See figure 20.

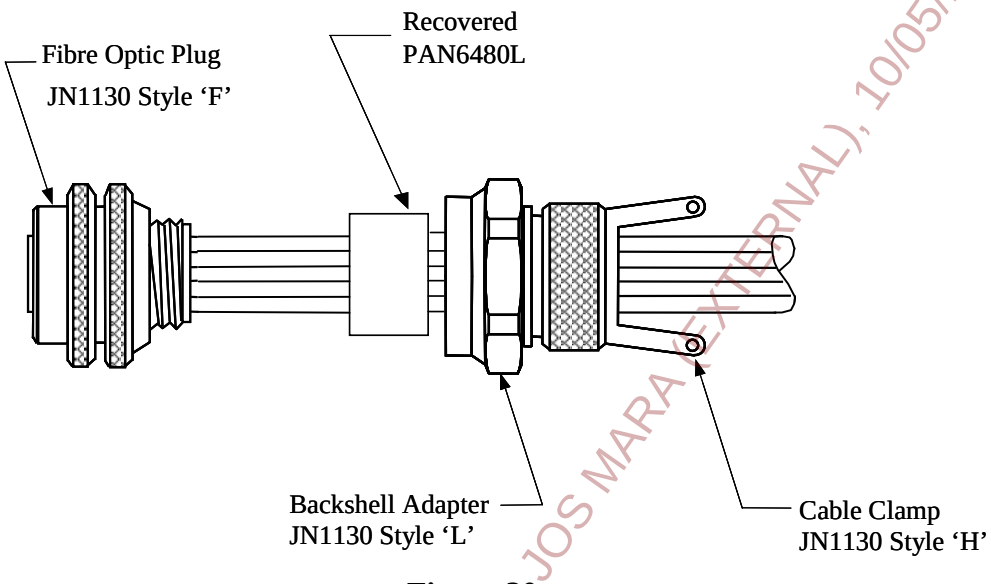

Figure 20

4.3.7 Slide the cable clamp assembly forward and tighten onto the rear of the connector (hand tight plus a quarter turn). See figure 21.

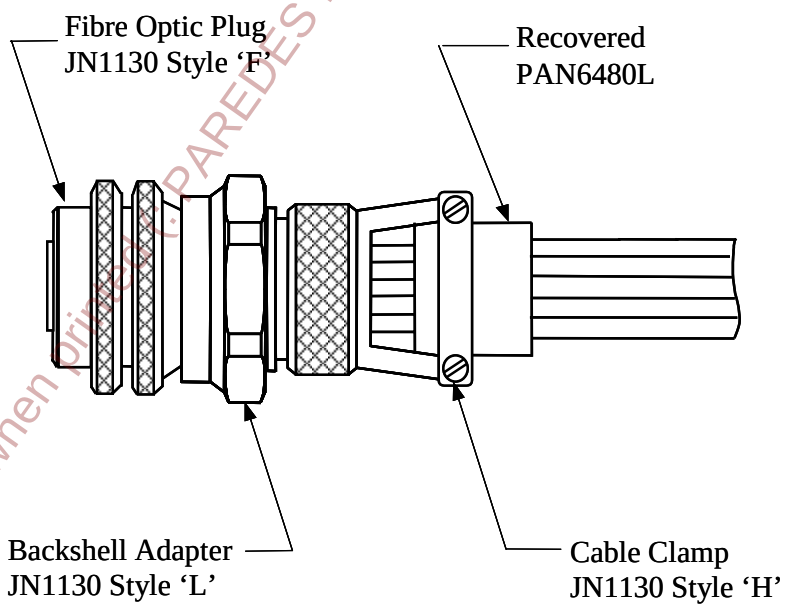

Figure 21

4.4 Method 4 – Termination Using PAN6480M Tape for Protection

4.4.1 Unscrew the two mounting screws and remove the two clamp bars from the JN1130H cable clamp.

4.4.2 Slide the cable clamp assembly (consisting of JN1130H cable clamp and JN1130L backshell adapter) over the fibre optic bundle as shown in Figure 22.

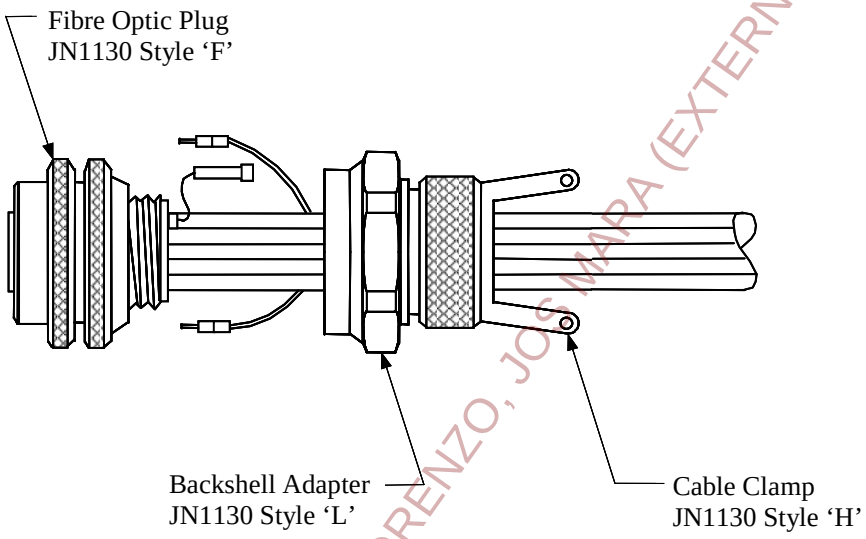

Figure 22

4.4.3 Insert the contacts into the connector starting from the centre and working to the outside.

4.4.4 All unused cavities shall be fitted with JN1130J dummy contacts. The tools used for insertion and extraction are as detailed in Table I.

4.4.5 Bind the fibre optic loom with PAN6480M Silicon tape, ensuring sufficient tape is applied to the loom to provide adequate protection for the cables under the saddle clamp bars. Position the tape along the length of the loom to ensure the tape rests under the saddle bars with the backshell is fitted to the connector. See figure 23.

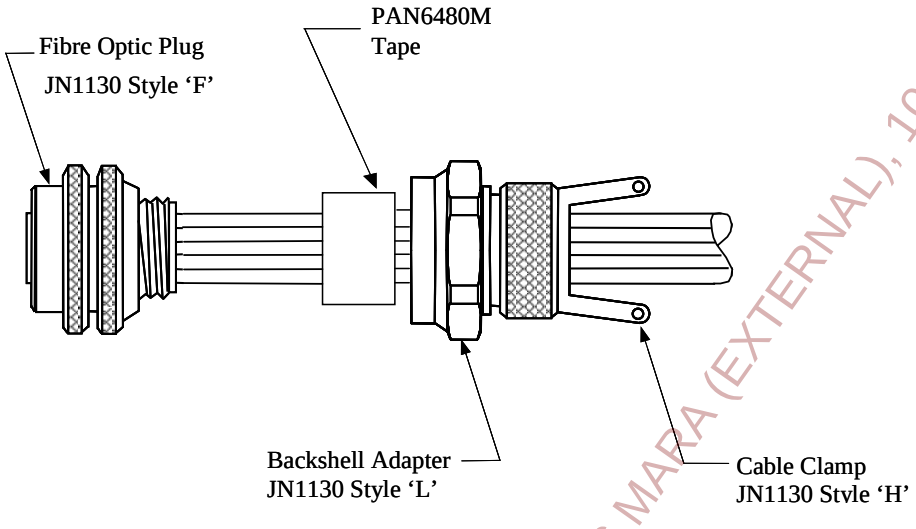

Figure 23

4.4.6 Slide the cable clamp assembly forward and tighten onto the rear of the connector (hand tight plus a quarter turn). See figure 24.

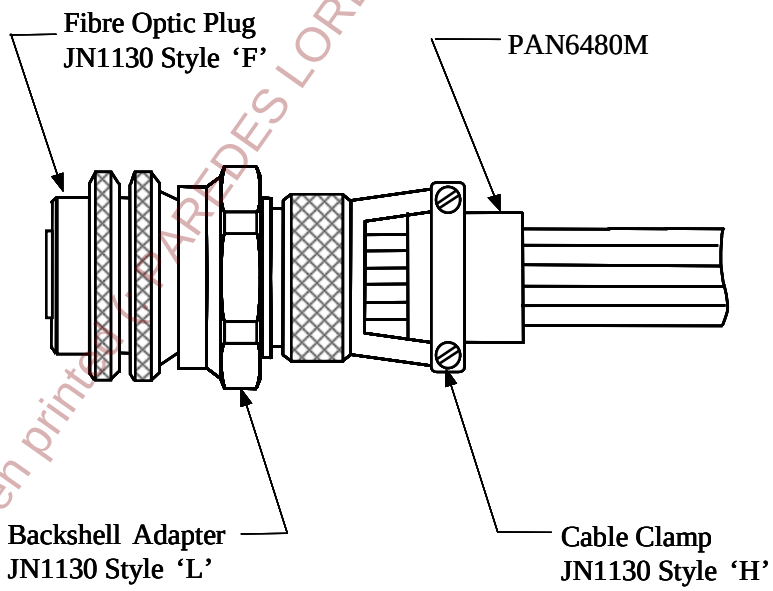

Figure 24

TABLE 1		
CONTACT SIZE	**INSERTION TOOL PART NUMBER AND COLOUR**	**EXTRACTION TOOL PART NUMBER AND COLOUR**
16	M15570-16 BLUE	M15570-16 WHITE

5. INSTRUCTION SHEETS

Contact Insertion	**INS 300**
Contact Extraction	**INS 301**
Heat shrink sleeving	**INS 501**
Torque Tightening of Jam Nuts	**INS700**

6. TOOL DATA

6.1 The tooling and consumables described in tables I, II and IV are recommended DEUTSCH LTD. part numbers.
Equivalent tooling and consumables may be used providing approval from the Eurofighter partner companies' fibre optic specialist and quality control personnel. Examples of alternative consumables are shown in table III.

TABLE II – General Tooling

Part Number	Description
453228	Fibre cleaving tool.
453936	Multi-cure heater. 9461/2 code 105-56E.(150°C)
454154	Solvent dispenser (Chempump 6oz PT No CP60).
454167	Omnifit 230L contact adhesive.
454297	Syringe and needle kit used for Omnifit and epoxy.
454299	Scalpel and blades to cut fibre cable and trim Kevlar.
452964	Priorspec portable microscope x 200.
454802	Epotek 353 ND epoxy. 4 gm sachet.
457301	Stripping Tool (Buffer Dia)
457419	Stripping Tool for stripping outer jacket. (RS539-924)
455820-2	Curing bushes, M/heater 24 off
455574	30µm and µ9m aluminium oxide
451716	Crimp tool body
457440	Crimp tool die set
457278	Priorscope adaptor for JN1130
454483	DM diamond disc (Medium Grade with DM in centre of disc)
455170	AF5D final fibre polishing disc - yellow (10 discs of 454484).
455801	2 x Rubber polishing pads (packing pads used under polishing discs)
455367	Polishing dolly.

TABLE III – Alternatives to General Tooling

Part Number	Manufacturer	Description
3M261X	**3M**	30 micron Aluminium oxide lapping film (green) to rough grind epoxy
3M661X**	**3M**	9 micron Aluminium oxide lapping film (pink) to rough grind epoxy
3M661X**	**3M**	0,5 micron Aluminium oxide lapping film (grey) for use with polishing dolly and rubber pad

**** Part number to include suffix of "micron" size of lapping film / foil.**

TABLE IV - Tooling Flat Polishing of Flat Faced Ferrules	
Part Number	**Description**
454724	Polishing Jig Insert
454089	Polishing Jig Base
453900	Al Oxide Lapping Film Set Comprising: 16 x 50mm wide strips of 30 micron film Light Green 16 x 50mm wide strips of 9 micron film Blue 16 x 50mm wide strips of 3 micron film Pink 16 x 50mm wide strips of 0.3 micron film White