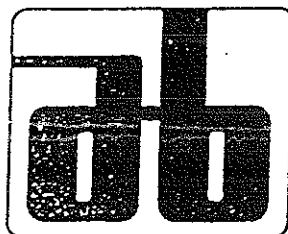


AB CONNECTORS LIMITED

MK18 (PATT 608) CONNECTORS

WIRING & ASSEMBLY INSTRUCTIONS



FOREWORD

This document is intended merely as a guide to wiring and assembly of the PLESSEY CONNECTORS LTD MK.18 (PATTERN 608) connector range.

It does not list connector planforms, sizes, accessories, tooling etc as this information is already contained in the MK.18 catalogue.

Similarly, connector dimensions, panel mounting cutout dimensions and maximum densities etc are also already contained in the MK.18 catalogue.

No detail of cable specifications, cable types, cable lays or cable identification is included in this document.

SAFETY WARNING

Where connectors carry voltages in excess of 350V AC or 50V DC the system design must be arranged so that when a connector is uncoupled these voltages appear on one fitting only and this fitting must have socket contacts.

As a general rule connectors should not be uncoupled when voltages are live across contacts: The system should be switched off first.

SECTION A

FREE CONNECTORS WITH SEALED BACK END FITTINGS

This section describes the wiring and assembly of MK18 (Pattern 608) Free Connectors. CRIMP TYPE ONLY.

The Free Connector with solder contacts is not designed as a sealed assembly and therefore its use is not applicable with sealed Back end fittings. For solder type wiring instructions refer to SECTION B - FIXED CONNECTORS, 1 through 4.

- A. FREE CONNECTORS
 - 1. CABLE PREPARATION
 - 1.1. WIRE SIZES
 - 1.2. INDIVIDUAL WIRE CORE INSULATION DETAILS
 - 1.3. CABLE STRIPPING DETAILS
 - 1.3.1. CABLE OUTER JACKET STRIPPING DIMENSIONS
 - 1.3.2. INDIVIDUAL WIRE PREPARATION
 - 1.3.3. INDIVIDUALLY SCREENED CABLE CORES
 - 2. CRIMPING PROCEDURE
 - 2.1. CRIMPING TOOLS AND RECOMMENDED SELECTOR POSITIONS
 - 2.2. CRIMP TOOL SETTINGS
 - 2.3. IN-LINE GAUGING PROCEDURE
 - 2.4. CONTACT CRIMPING
 - 3. CONTACT INSERTION AND REMOVAL
 - 3.1. FILLER PLUGS
 - 3.2. CONTACT INSERTION
 - 3.3. CONTACT REMOVAL
 - 4. ASSEMBLY OF SEALED BACK END FITTINGS ONTO CONNECTOR
 - 4.1. FRONT SECTION
 - 4.2. TERMINATION OF SCREEN
 - 4.3. REAR SECTION

1. CABLE PREPARATION

Multicore cables conforming to M.O.D. specifications DGS 211, 212, and 213, and DEF STAN 61-12 (Part 5), have been selected for use with this connector range. Non-preferred cables can be used effectively with MK18 connectors providing that they fit within the range of seal sizes and wire conductor sizes listed in the Pattern 608 specification (See MK18 catalogue for details).

1.1. Wire Sizes

Crimp Contact barrels are designed to accept the following wire conductor diameters:-

Contact Size	MAX	MIN
20	1.09mm (.043")	0.61mm (.024")
16	1.58mm (.062")	0.97mm (.038")
12	2.29mm (.090")	1.85mm (.073")

1.2. Individual wire core insulation details

Mk18 connector moisture sealing grommets are designed to accept the following core insulation diameters:

Contact Size	Wire insulation dia's	
	MAX	MIN
20	2.16mm (.085")	1.19mm (.047")
16	2.77mm (.109")	1.68mm (.066")
12	3.61mm (.142")	2.46mm (.097")

NOTE If the wire core insulation diameters used are smaller than the minimum dimension in the above table, a moisture-tight seal may not be effected.

1.3. Cable Stripping Details

The cable core lay must first be established to identify normal (clockwise) lay for connections to pin contacts and reversed (anti-clockwise) lay for connections to socket contacts. All outlet fittings should be positioned onto the cable before stripping begins.

1.3.1. Cable Outer Jacket Stripping Dimensions

An easy guide to Cable Outer Jacket stripping length is to assemble together the connector and the front section of the outlet assembly. The union nut should be finger-tight. Insert the unstripped cable into the back of the outlet until the cable touches the moisture sealing grommet at the back of the connector. Mark off on the cable where it emerges from the cone on the back of the front outlet section. This is an approximate cable jacket stripping dimension (see Fig.1)

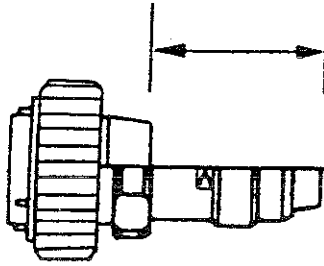


FIG. 1 CABLE OUTER JACKET STRIPPING DIMENSION

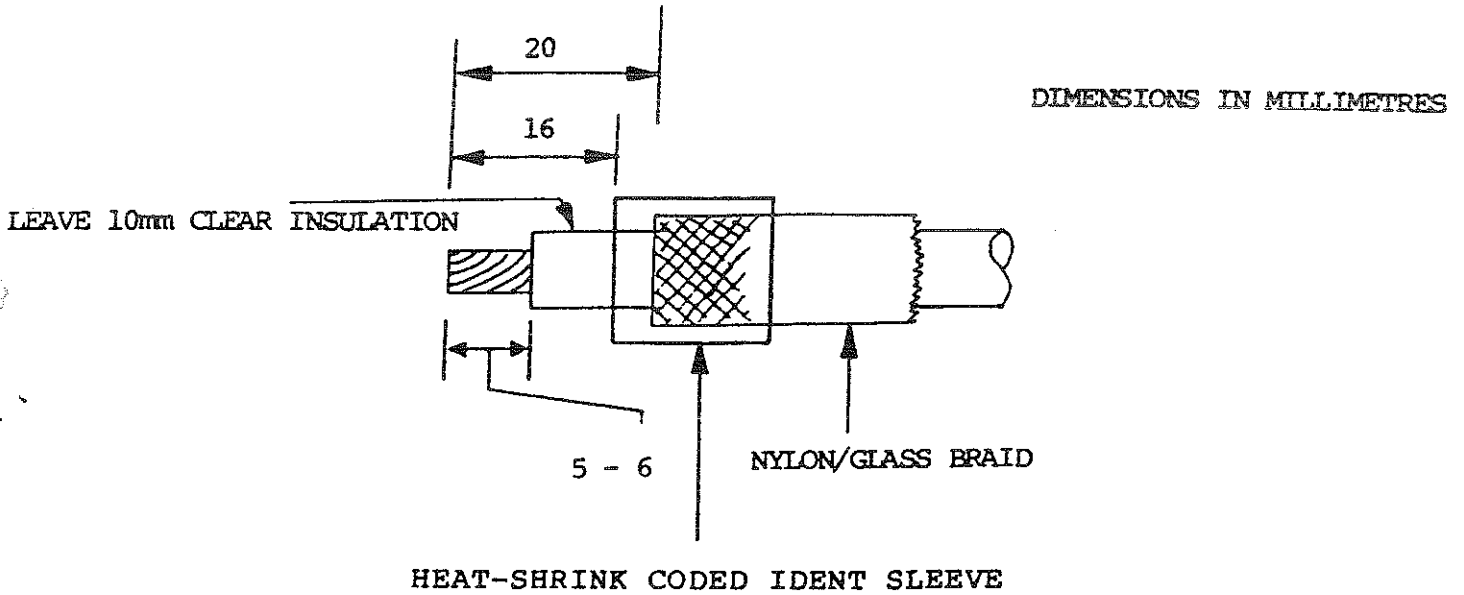


FIG. 2 INDIVIDUAL WIRE STRIPPING DETAILS

1.3.2. Individual Wire preparation

The cable outer jacket has now been stripped to the required length. In the case of cable types incorporating a collective screen, the screening braid should be teased back over the cable outer jacket and taped down.

Each individual cable core must now be identified using a heat-shrink coded indent. sleeve to correspond with the cavity identity of the connector being used.

Note 1: When Silicone insulated cores with glass braid insulation are used, or when a nylon braid sheath covers the core, the heat-shrink ident. sleeve should be positioned to trap the braid and prevent fraying.

Note 2: In the case of large planform connectors such as the 22-55 or 24-61, the heat-shrink sleeves should be staggered throughout the cable cores to prevent 'bunching'.
SEE FIG.2

The outer lay of the cable should be identified first, prepared and stripped, contacts crimped (see section 2. CONTACT CRIMPING) and then taped back over the outer jacket. The same procedure should be followed with the inner lays in sequence and finally with the centre cores. This method ensures that the cable lay remains intact, layer upon layer, until the complete lay is identified. It also minimises the possibility of identification errors.

1.3.3. Individually screened cable cores

This method applies to single screened cores, screened twisted pairs, and screened twisted triples.

NOTE: This complete procedure should be applied to each individual core in turn i.e. the first core should be completely identified, prepared, and stripped, then contacts crimped, before the next core is started.

After removing the cable outer jacket to the required dimension, and teasing back and taping the screen where applicable, proceed with the identification of each individual core using heat-shrink coded indent. sleeves. The sleeve should be slid up over the Melinex screen insulation and partially shrunk down so that approx 50% length of the sleeve remains in its original unshrunk condition inwards, towards the cable sheath. SEE FIG.3.

The Melinex screen insulation is then removed up to the leading edge of the shrunk end of the indent.sleeve. The individual screen is then trimmed back to the dimensions shown in FIG.4 and a solder sleeve and tap wire placed in the position shown. Having ensured that the solder will shrink down onto the exposed braid and that the braid will be entirely covered by the sleeve, the assembly can be shrunk onto the braid, core, and heat shrink sleeve already in place. In the process the remainder of the indent.sleeve should be shrunk down onto the Melinex insulation.

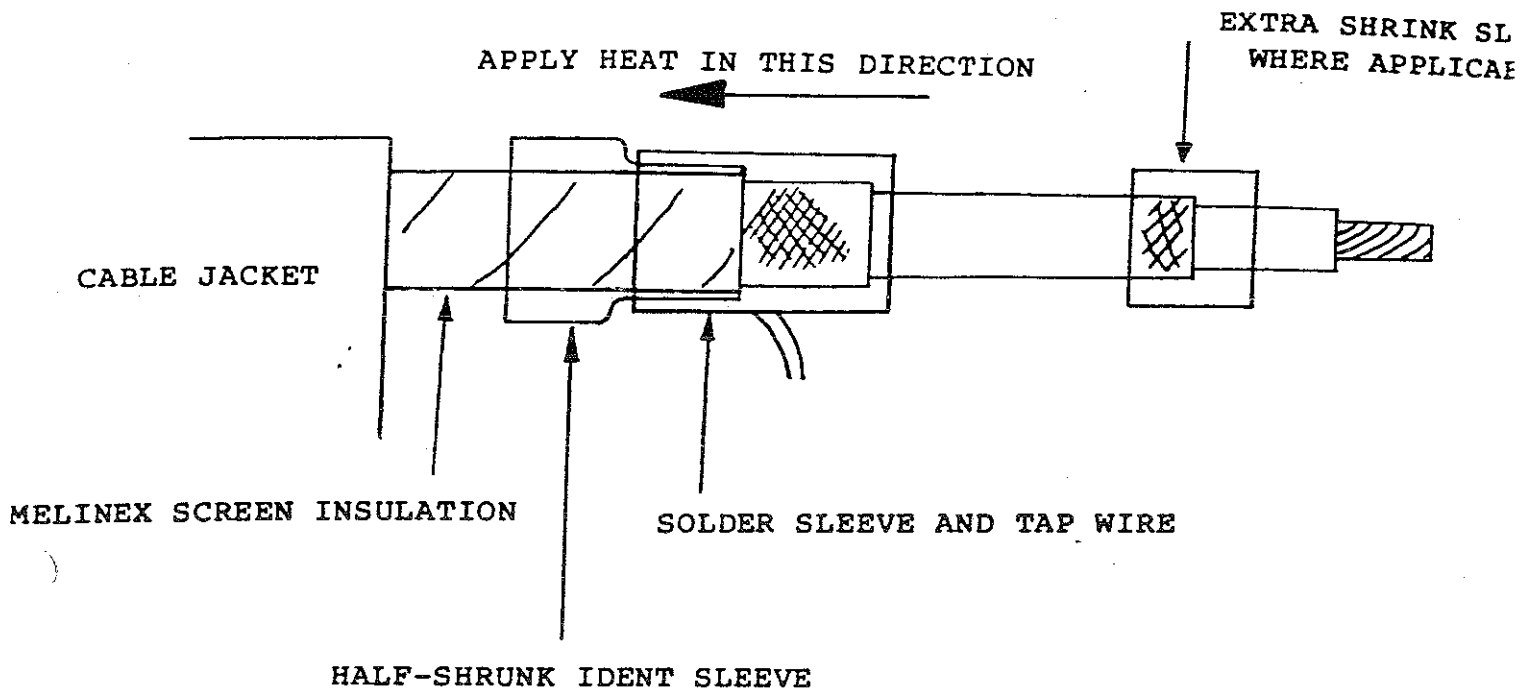


FIG. 3 POSITIONING OF SOLDER SLEEVE AND TAP WIRE

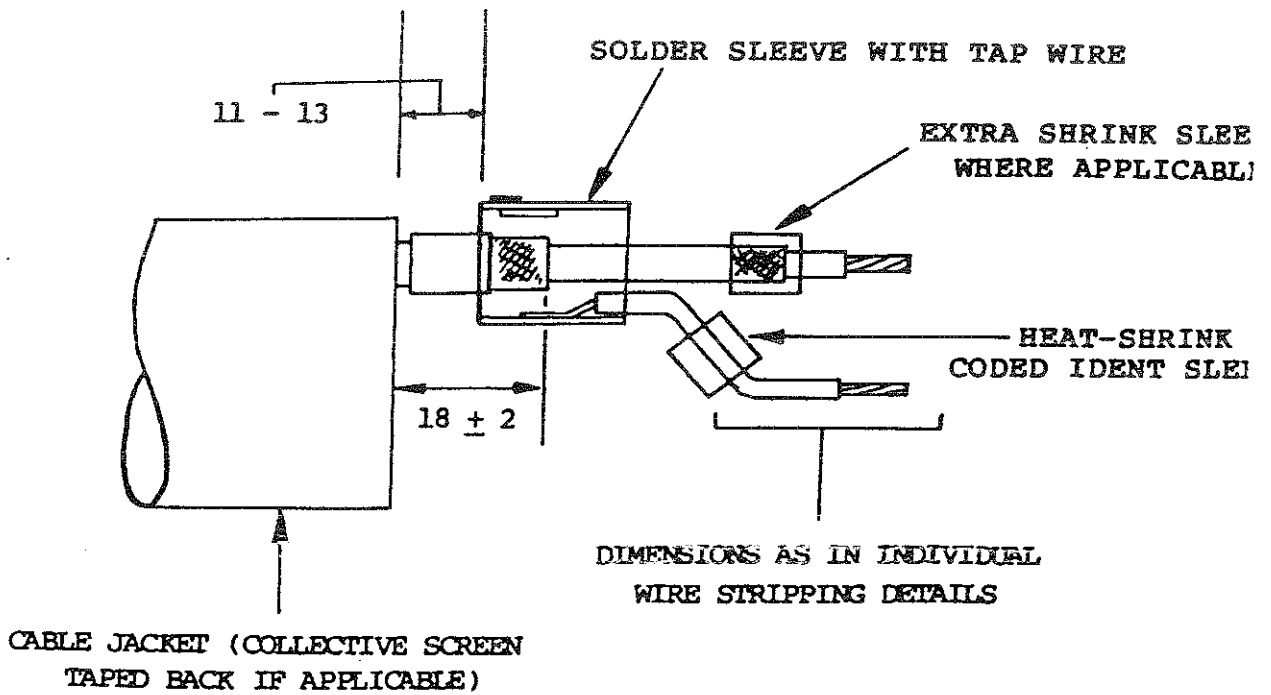


FIG. 4 INDIVIDUALLY SCREENED WIRES - STRIPPING DETAILS

NOTE: When shrinking the solder sleeve over the core braid, heat should always be applied from the 'free' end of the cable towards the Jacket to avoid melting the melinex screen insulation and to eliminate short circuits between screens.

Where applicable an additional heat-shrink ident. sleeve should now be shrunk onto the core, trapping the glass or nylon braid sheath to prevent fraying. The Tap Wire should also be identified by a heat-shrink coded ident. sleeve to correspond with the relevant cavity.

Contacts can now be crimped to each wire and once each complete layer is finished it is taped back over the cable outer jacket and the next layer identified.

2. CRIMPING PROCEDURE

2.1. Crimping tools and recommended selector positions

Crimp style contacts supplied with MK18 connectors conform to both American and British specifications relative to design and performance. The following crimp tools are recommended for use with these contacts.

CRIMP TOOL DANIELS AF8 N.S.N.5120-99-136-1082	558/4/02431/000
TURRET HEAD GB101 " 5120.99.136-1083	558/4/02432/000

This tool will crimp contact sizes 20, 16 and 12.
Crimp Tool MS No. M22520/1-01.

2.2. Crimp Tool Settings

For cables of known AWG the tool setting can be read off on the scale on the tool turret head. Alternatively, the following table can be used:

Stranding	(mm)	AWG	Contact size	Tool setting			
7/0.10		26	20	Selector position	(Red)		1
25/0.10		26	20	"	"	"	1
19/0.15		24	20	"	"	"	2
16/0.20		22	20	"	"	"	3
24/0.20		20	16	"	"	(Blue)	4
7/0.40		20	16	"	"	"	4
32/0.20		18	16	"	"	"	5
7/0.50		16	12	"	"	(Yellow)	6
50/0.25		16	12	"	"	"	6
7/0.67		14	12	"	"	"	6
37/0.315		12	12	"	"	"	7

NOTE It is important that the crimp tool and turret are regularly gauged with the 'In service' GO-NOGO gauge supplied with the tool.

2.3. In-line gauging procedure

1. Set the selection positioner on the tool to setting No.4 and rotate the turret to size 20 (red).
2. Fully close the crimp tool and hold fully closed during the following operations.

3. With the tool fully closed insert the 0.039" 'GO' gauge (coloured green) into the centre of the crimp tool 'indentors', so that it passes freely between the tips of the indenter jaws.
4. Remove the 'GO' gauge and insert the 0.044" 'NO-GO' gauge (coloured red). This gauge should not pass between the tips of the indenter jaws.

CAUTION Do not crimp down onto the 'NO-GO' gauge.

2.4. Contact Crimping

Ensure that the crimp tool is adjusted to the correct setting for the wire size, and that the turret is correctly set for the contact size. Insert the wire into the contact barrel and then insert the pin or socket contact into the crimping tool (engaging end foremost) making sure that the stripped wire is fully inserted into the barrel of the contact and that the wire insulation butts up to the rear of the contact barrel. The stranding should be visible through the small hole in the contact barrel.

Squeeze the crimp tool handles together until they will go no further and release in a single smooth action. (Remove the now crimped contact).
SEE FIG.5.

3. CONTACT INSERTION AND REMOVAL

Crimp style contacts can be inserted and removed from MK18 crimp connectors without damage to the connector moulding only if the correct insertion and removal tools are used - as specified in the MK18 catalogue.

3.1. Filler Plugs

To ensure even compression of the connector insulator all contact cavities must be fully loaded. In the case where connector contact cavities are in excess of the number of cable cores being wired, the unused cavities MUST be loaded with unwired contacts and filler plugs.

After inserting the unwired contact into its cavity, the filler plug should be placed, long thin end first, into the relevant contact size extraction tool, and pressed home, bulbous end first, into the rear of the connector. This method avoids damage to both filler plug and connector moulding and ensures that the plug is correctly seated in the back of the contact barrel.

Filler plug colours and sizes are detailed in the MK18 (Pattern 608) Catalogue.

3.2. Contact Insertion

All outlet fittings must be positioned onto the cable in the correct order (and taped down to keep them out of the way) before inserting the contacts into the connector. SEE FIG.6.

Contacts are now ready for insertion into the connector. As the cable lay has previously been identified, and each layer taped back to the cable jacket in sequence, it is recommended that the centre core contacts are inserted first, followed (where applicable) by the inner lays, working outwards from the centre of the connector, finishing with the outer lay. This method ensures the minimum of difficulty in inserting individual contacts, produces a well-ordered 'cats cradle' of wires at the back of the connector which occupies the minimum of space, and also alleviates the problem of wire crossovers.

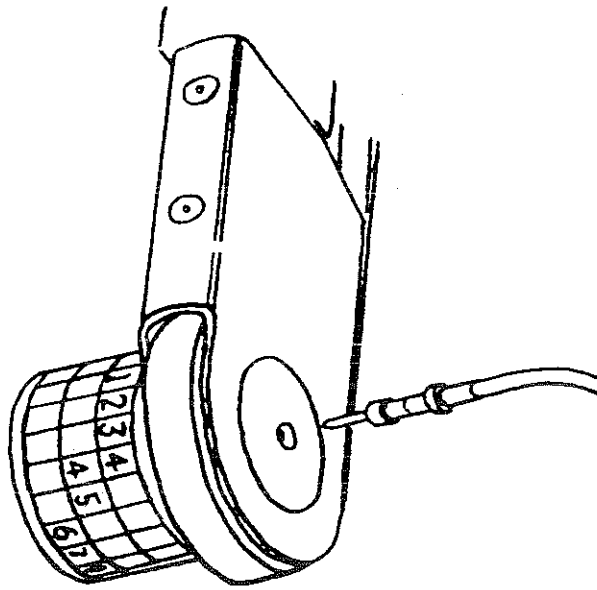


FIG. 5 CONTACT CRIMPING

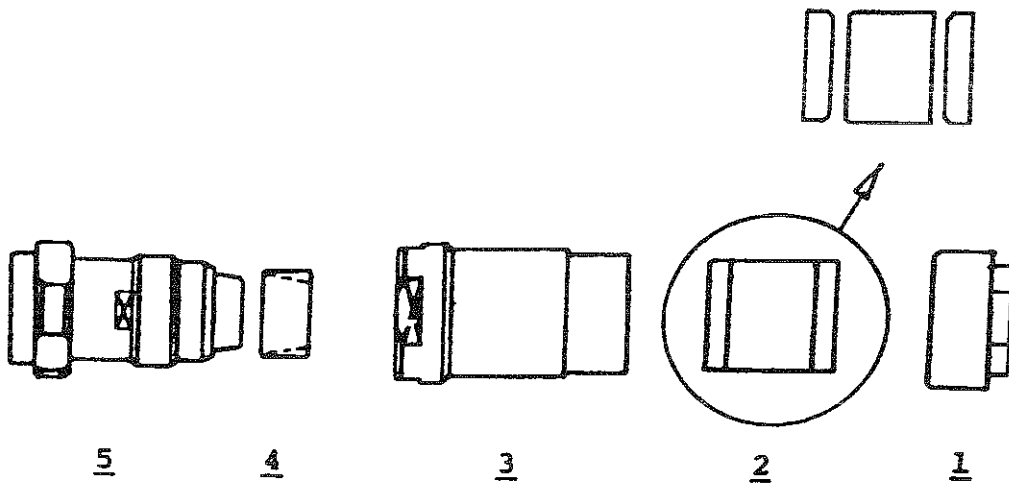


FIG. 6 POSITION BACK END FITTINGS ONTO CABLE IN THIS ORDER

Using the appropriate size insertion tool present the contact to the correct hole in the REAR OF THE CONNECTOR and ensuring that the contact is in line with the connector axis, apply a gentle forward pressure until the contact is felt to snap home against a positive stop. A smear of Hellerine grade M on the tool tip will ease the insertion of the tool into the rubber moulding. SEE FIG.7.

If difficulty is encountered after partially inserting the contact, remove the contact and repeat the procedure. UNDER NO CIRCUMSTANCES should a contact be forced home if it offers any resistance.

Once the contact is felt to have snapped home, remove the tool from the back of the connector. A light tug on the wire will ensure that the contact retention mechanism is fully engaged.

3.3. Contact Removal

All rear outlet fittings (where applicable) must be removed from the back of the connector and positioned well back onto the cable.

The tool used to remove contacts from the connector has a spring-loaded plunger to eject the contacts.

Select the appropriate size tool and insert over the pin or socket contact from the connector FRONT face, keeping the tool in the same axial plane as the connector. SEE FIG.8.

Carefully push the tool inward, with a slight rotational action, to engage and release the contact retention clip. This will be felt by a slight snap action.

If no snap action is detected, DO NOT PUSH INWARD ON THE PLUNGER COLLAR.

Hold the tool steady and push the plunger collar inward with a steady action to eject the contact from the rear of the connector.

4. ASSEMBLY OF SEALED BACK END FITTINGS ONTO CONNECTOR

Once all contacts have been inserted into their relevant positions in the connector moulding, and any unused cavities have been fitted with unwired contacts and filler plugs, the sealed back end assembly may be fitted onto the connector.

The parts are assembled in order according to the diagram. SEE FIG.9.

4.1. Front Section

Fit the front section over the moisture sealing grommet and screw down tightly onto the back of the connector. A holding spanner should be positioned on the front of the connector and the union nut tightened as far as possible.

NOTE. A smear of Hellerine grade M on the outside of the sealing grommet is essential to allow easy assembly of the front section onto the connector.

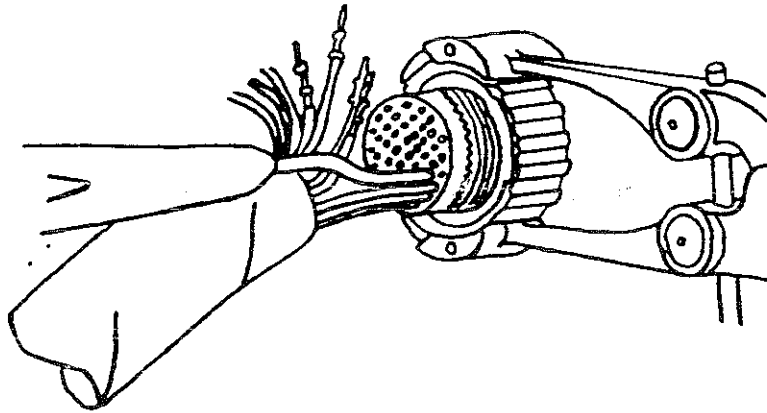


FIG. 7 CONTACT INSERTION

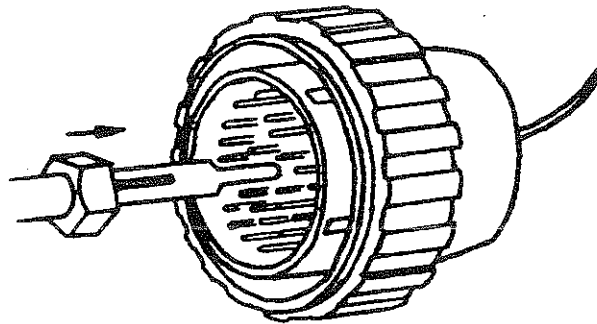


FIG. 8 CONTACT REMOVAL

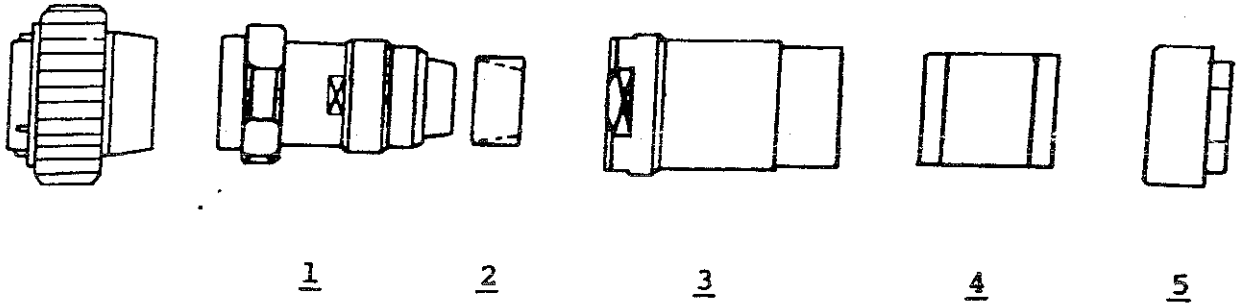


FIG. 9 CONNECTOR ASSEMBLY

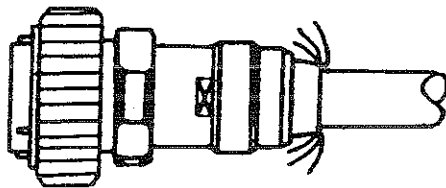


FIG. 10 COMB BRAID OVER INNER CONE

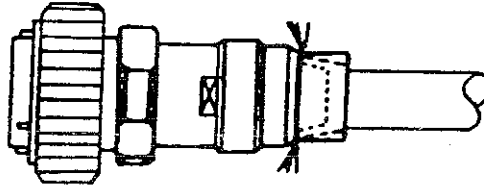


FIG. 11 TRAP THE BRAID BETWEEN THE TWO CONES AND TRIM TO SIZE

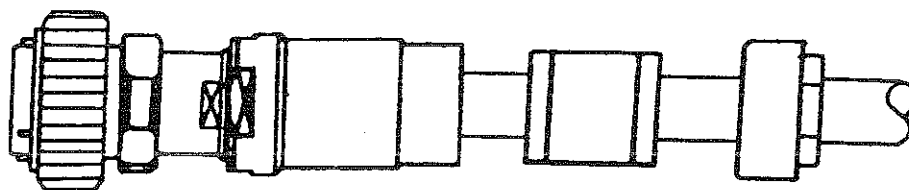


FIG. 12 ASSEMBLE REAR SECTION TO FRONT SECTION

4.2. Termination of screen

In the case of cables with an overall screen, the following procedure should be adopted.

The screen, which has previously been taped back over the cable outer jacket, should be untaped and spread out to cover the inner cone on the front section outlet. SEE FIG.10.

The outer cone is then brought forward and pushed over the inner cone to trap the screening braid between the two cones. SEE FIG.11.

The outer cone should then be pushed hard against the inner cone, and rotated against the screen braid trapped between the two cones. This will leave a round mark on the screen braid at the join between the outer cone and the front section. The outer cone is then withdrawn and the screen braid is trimmed, with a pair of small wire cutters, or scissors, down to the mark left by the outer cone. When the outer cone is now brought back over the inner cone it will be seen that only a small surplus of screening braid overlaps between the two.

4.3. Rear Section

The sealed rear section of the outlet assembly, with the thrust washer located inside, can now be brought forward and screwed tightly down onto the front section, trapping the cone between the two sections. SEE FIG.12.

To complete the back end assembly, the rubber seal gland with its two associated thrust rings are located, one at a time, into the back of the rear sealed unit, and finally the gland nut is screwed down as tightly as possible onto the rear outlet. SEE FIG.13.

NOTE. After 24 hours the rear gland nut should be retightened to allow for any relaxation in the rubber seal gland.

NOTE. When assembling the back end fittings on MK18 connectors, it is important that each section is sequentially tightened i.e. the rear gland nut should be tightened using spanners a) on the nut itself and b) on the rear sealed outlet (and not on the front section or the connector body). The outlet assembly is tightened starting from the front of the connector and working back.

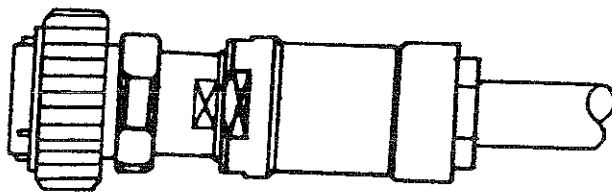


FIG. 13 ASSEMBLE GLAND NUT AND SEAL

SECTION B

FIXED CONNECTORS

B. FIXED CONNECTORS

1. CONNECTOR STYLES
 - 1.1. SQUARE FLANGE MOUNTING
 - 1.2. SINGLE HOLE MOUNTING
 - 1.3. SINGLE HOLE MOUNTING
2. CRIMP STYLES
3. SOLDER STYLES
 - 3.1. WIRE SIZES
 - 3.2. SOLDERING IRON BIT SIZES
 - 3.3. SOLDERING METHOD
 - 3.3.1. WIRE INSULATION STRIPPING
 - 3.3.2. TINNING
 - 3.3.3. MOISTURE SEAL GROMMET AND REAR FITTINGS
 - 3.3.4. SOLDERING CORES TO CONTACTS
4. FINAL ASSEMBLY

1. CONNECTOR STYLES

MK18 (Pattern 608) fixed connectors are available in three separate styles:

- a) Fixed Square Flange with external accessory thread (crimp or solder contacts)
- b) Single Hole Mount with internal accessory thread (crimp or solder contacts)
- c) Single Hole Mount with no accessory thread (solder contacts ONLY)

1.1. Square Flange Mounting

This style has four holes for panel fixing and is supplied complete with gasket, nuts and bolts, and earthing tag. It can be front or rear mounted. For EMI or RFI environments a conductive gasket is available (see catalogue): this must be fitted between the connector flange and the equipment.

Either a strain relief clamp or a nut and ferrule assembly must be fitted to the rear of this connector to ensure correct contact alignment and sealing. For the solder style a moisture sealing grommet is always required.

Alternatively, if watertight sealing is required, a cable outlet and accessories may be fitted to the crimp type ONLY.

1.2. Single Hole Mounting (with internal accessory thread)

This style is mounted from the rear of the panel through a single 'D' shaped Hole. When correctly mounted, the connector provides a pressure proof seal. For EMI or RFI environments a conductive 'O' ring is available.

Either a strain relief clamp or a Nut and ferrule assembly must always be fitted, and for the solder style a moisture sealing grommet is required.

Sealed outlets can not be used with this style.

1.3. Single Hole Mounting (with NO accessory thread)

This style is mounted in the same way as 1.2. but no rear fittings or accessories can be used.

No moisture grommet seal is required but normal wiring practice involves fitting a silicone rubber sleeve or equivalent (to withstand 125°C) over each soldered joint to insulate the joint and provide wire/conductor support.

2. CRIMP STYLES

For fixed connectors incorporating crimp contacts the following procedures in SECTION 'A' apply:

- 1.1
- 1.2
- 1.3.2.
- 2.1.
- 2.2.
- 2.3.
- 2.4.
- 3.1.
- 3.2.
- 3.3.

NOTE: A Strain relief clamp or Nut and ferrule assembly must be fitted - to ensure correct contact alignment and sealing. A smear of Hellenine grade M on the outside of the rubber grommet is essential to ease assembly.

When tightening strain relief clamp ensure that outer wires have a slight form to prevent overstressing of wires which could cause contact splay.

3. SOLDER STYLES

The fixed square flange and single hole mount styles with accessory threads both require a moisture sealing grommet to ensure an environmental seal. In the case of the single hole mount style with no accessory thread the moisture sealing grommet cannot be fitted and a sleeve should be used to insulate the solder joint.

3.1. Wire sizes

For wire insulation max. and min. dimensions see SECTION 'A' 1.2. contact size conductor diameters

	<u>Max.</u>	<u>Min.</u>
20	1.22mm(0.048")	-
16	1.75mm(0.068")	-
12	2.84mm(0.112")	-

3.2. Soldering iron bit sizes

The soldering iron bit should be no larger than the sizes shown in the following table:

<u>contact size</u>	<u>bit size (mm)</u>
20, 16	3
12	4.75

Note: The Bit may be shaped to aid heat transfer. Approximate temperature should be 230/240°C.

3.3. Soldering Method

The following method also applies to MK.18 Free solder style connectors.

3.3.1. Wire Insulation stripping

Each individual wire should be stripped to expose a core length of 6 ± 1 mm.

3.3.2. Tinning

All wire conductors and contact barrels should be Pre-Tinned with a NON-ACTIVATED RESIN CORED SOLDER.

3.3.3. Moisture seal grommet and rear fittings

NOTE. This procedure does not apply to Single Hole Mounting connectors with NO accessory thread.
For this style only an insulating/supporting sleeve is placed over the wire.

NOTE. If required, identify each wire with a heat-shrink ident sleeve.

After stripping and tinning, dip the prepared wire into Hellerine grade 'M' to a depth of approx. 5mm. Feed each wire in turn first through the strain relief or Nut and Ferrule assembly, then through the correct hole in the moisture seal grommet. The Hellerine will aid final assembly.

3.3.4. Soldering cores to contacts

- (a) Insert the tinned conductor fully into the correct contact barrel.
- (b) Apply soldering iron to barrel and apply solder as required.
- (c) Remove heat source as soon as solder flows.

NOTE. Solder each row of contacts in turn starting at the TOP of the connector.

NOTE. NO LUMPS OR SPIKES of solder must remain on the outside of the contact barrel. Any accidental spillage of solder must be removed.

4. FINAL ASSEMBLY

Once all wires have been soldered to contacts, the moisture sealing grommet can be slid down the wires and inserted into the back of the connector. A smear of Hellenine grade 'M', around the bottom edge of the seal will aid assembly. Once the moisture seal is located in its correct position another thin smear of Hellenine M is placed all around the grommet and the Strain Relief or Nut and Ferrule assembly screwed down onto the back of the connector.

NOTE. This procedure does not apply to Single Hole mounting connector styles with NO accessory thread. The wires from this style of connector are insulated and supported by silicone rubber sleeves (or equivalent) over the solder joint.

IMPORTANT NOTE. SOLDER CONTACTS are barrier sealed into connectors and are NOT REMOVEABLE.