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CANNON CONNECTORS
TYPES DPX AND DPX2

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL

Alice Whitmore.

Ministry of Defence

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EMER Aircraft A040 (ARMY)
AP 100B-01 Order 0504 (RAF)

AMENDMENT RECORD

Amdt	Incorporated by	Date
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TECHNICAL ENQUIRIES

R.A.F.

Technical enquiries concerning these connectors should be directed to the Delegated Engineering Authority for Electrical Connectors, ESS, EEW, CSDE, RAF Swanton Morley. Telephone RAF Swanton Morley (894), extension 290 for urgent enquiries only.

Technical enquiries concerning tooling for these connectors should be directed to the Delegated Engineering Authority for Electrical Hand Tools, OC, GSS, RAF Swanton Morley. Telephone RAF Swanton Morley (894), extension 286 for urgent enquiries only.

R.N.

Technical enquiries concerning these connectors or tooling for these connectors should be directed to O.C. NATEC, HMS DAEDALUS, Lee-on-the-Solent, Hants.

Chapter 1

DESCRIPTION

CONTENTS

Introduction

1 Cannon DPX series and DPX2 series connectors are a range of rectangular, single and double-gang, non-environmental and environmental, friction coupling connectors manufacturered by ITT Cannon Electric.

DESCRIPTION

Specifications

2 The environmental connectors meet the requirements of specification MIL-C-81659.

Intermountability and intermateability

3 The environmental connectors are intermountable and intermateable with in service proprietary connectors as follows:-

3.1 AMP RME series.

3.2 Panavia 6440 series.

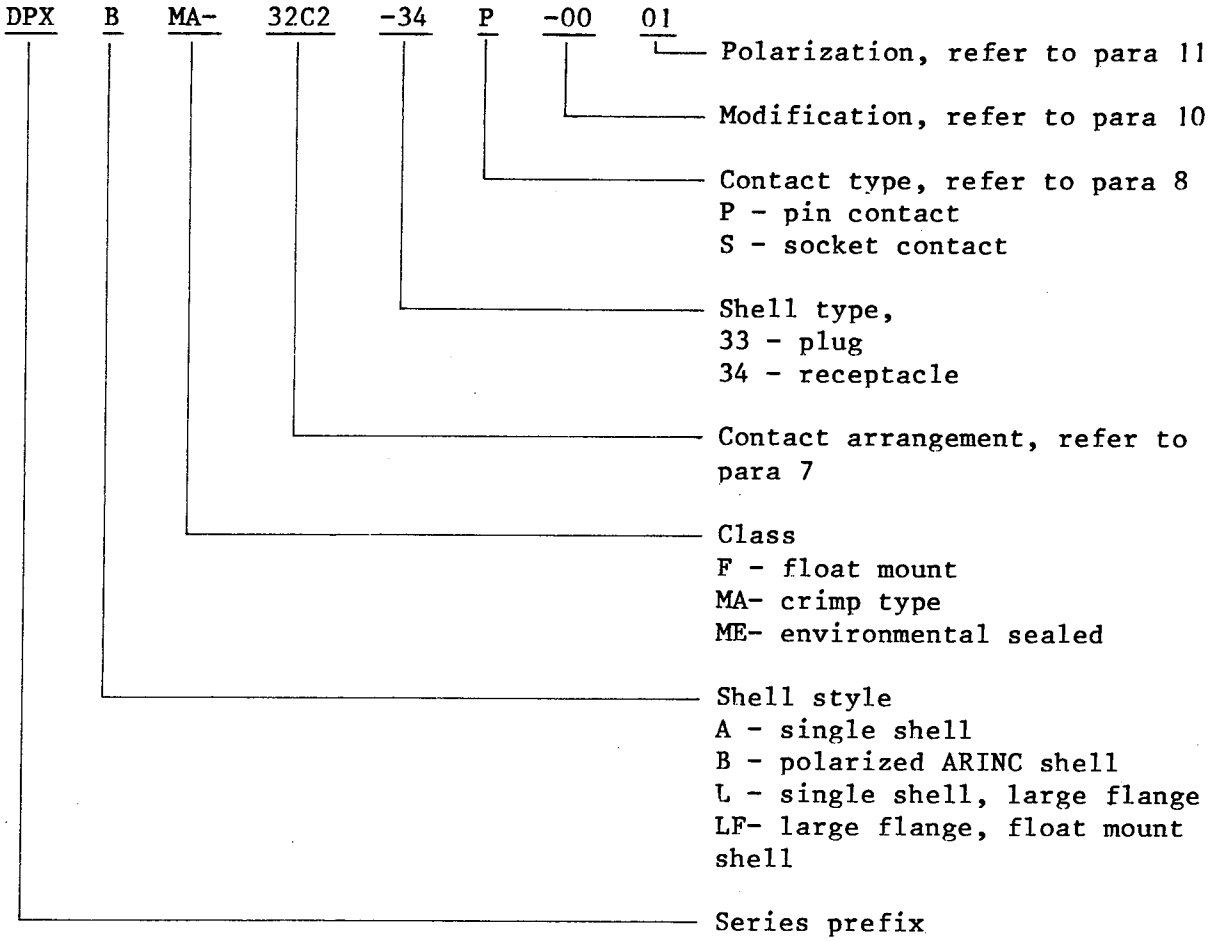
Note ...

When DPX2 connectors are fitted, they must not be substituted without reference to the relevant engineering authority for the equipment involved. To do so may degrade the design standard of the equipment.

Connector identification

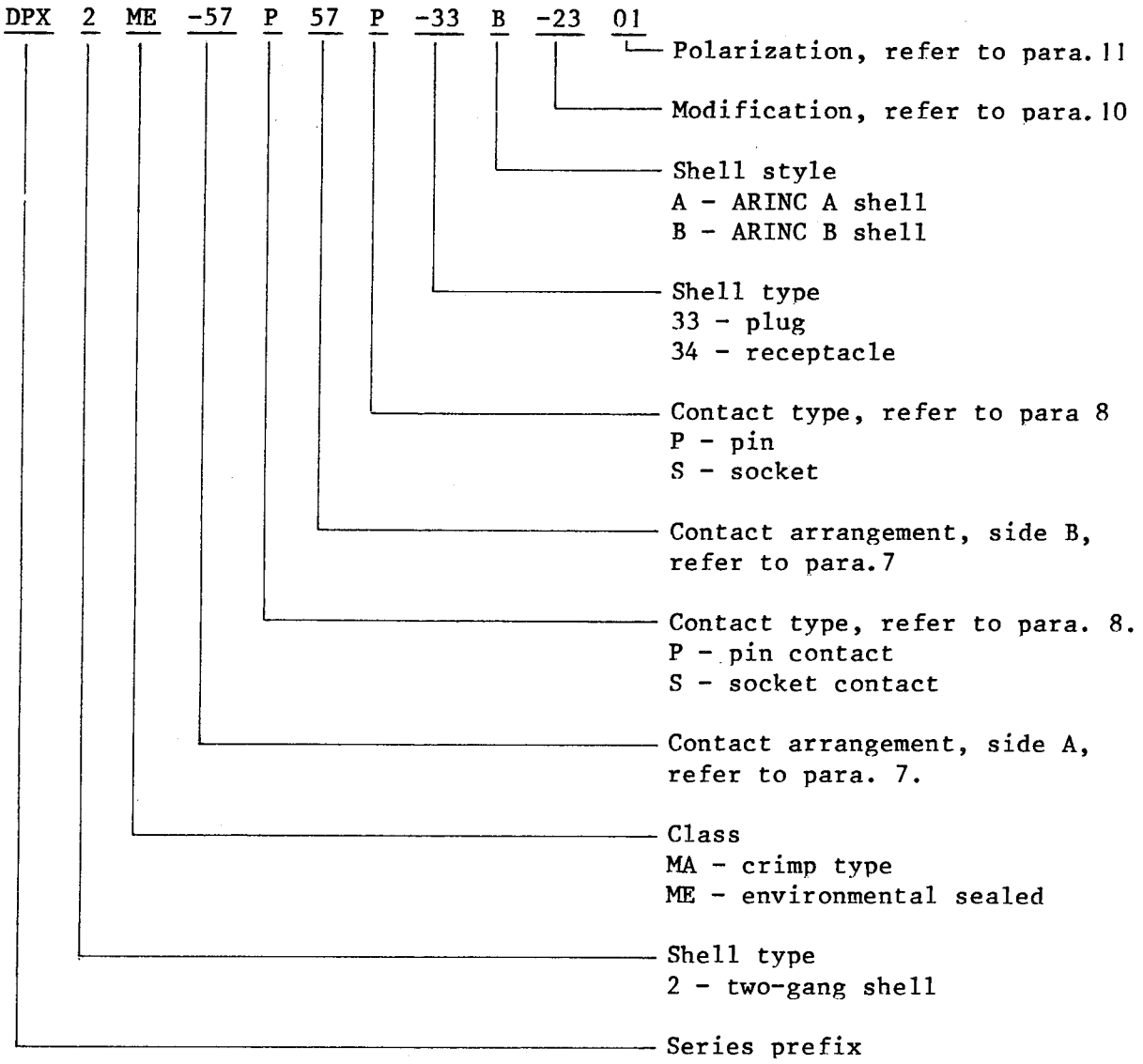
DPX series.

4 DPX series connectors are identified by the manufacturer's part number. A typical part number is as follows:-



DPX2 series

5 DPX2 series connectors are identified by the manufacturer's part number. A typical part number is as follows:-



Connector styles

6 The DPX single shell style is shown in fig 1 and the DPX2 two-gang shell style is shown in fig 2.

Shell size and insert arrangement

7 The insert arrangements are identical for both series of connector and are shown in fig. 3. The number and size of contacts are detailed in Table 1.

Contacts

Solder pot

8 Contact pins or contact sockets, and coaxial contacts can be specified for the DPX and DPX2 series connectors. Standard contacts are of the solder pot type, execpt for class MA and ME connectors, refer to para. 9.

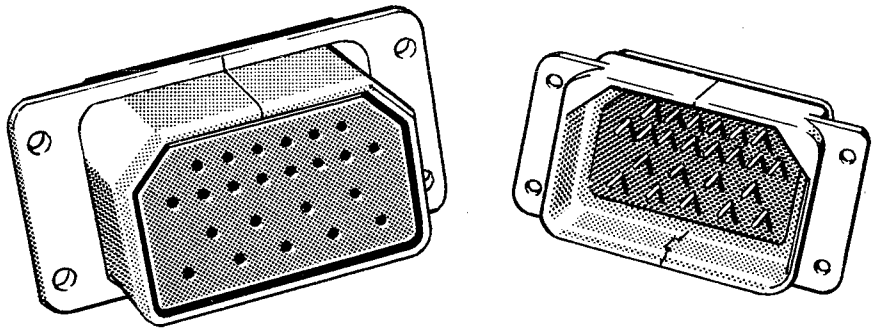


Fig. 1 Typical DPX shell style

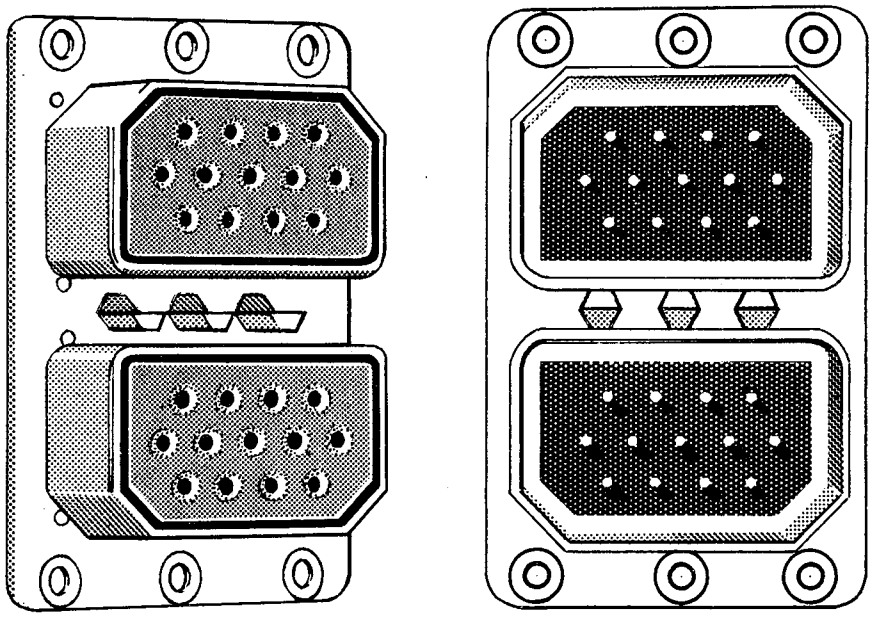


Fig. 2 Typical DPX2 shell style

TABLE 1 INSERT ARRANGEMENTS

Insert arrangement	No of contacts						
	Size 22	Size 20	Size 16	Size 12	Size 8	Size 4	Coaxial
C2	-	-	-	-	-	-	2
C7	-	-	-	-	-	-	7
*D8	-	-	4	4	-	-	-
*+W8	-	-	-	-	-	-	8
**+8	-	-	-	8	-	-	-
*+A10	-	-	8	-	-	2	-
*10	-	8	-	-	2	-	-
**+10C3	-	7	-	-	-	-	3
**B16C3	-	-	13	-	-	-	3
17	-	17	-	-	-	-	-
23	-	23	-	-	-	-	-
**25C3	-	22	-	-	-	-	3
**+26	-	-	26	-	-	-	-
30C4	-	15	11	-	-	-	4
32	-	29	3	-	-	-	-
**+32C2	-	30	-	-	-	-	2
*+32W4	-	24	4	-	-	-	4
**+40	-	40	-	-	-	-	-
**+40C1	-	39	-	-	-	-	1
**+45	-	45	-	-	-	-	-
**+57	-	57	-	-	-	-	-
**+67	-	64	3	-	-	-	-
*+106	106	-	-	-	-	-	-

Note ...

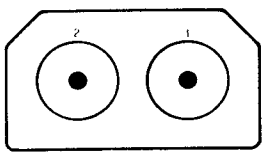
* Crimp contact series only

** Solder pot or crimp contact alternative

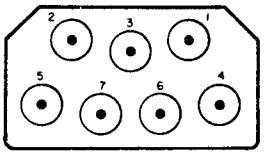
\+ Environmental available

Crimp pot

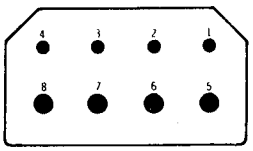
9 Contact pins or contact sockets, and coaxial contacts can be specified for the DPX and DPX2 series class MA and ME connectors. Standard contacts for class MA and ME connectors are of the crimp pot type. Tables 2 to 5 detail the contact data by contact size for class MA and ME connectors.



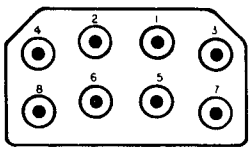
C2
2 coax (RG-9/U)
1000 (1, 2)
matched impedance



C7
7 coax
1000 (1-7)

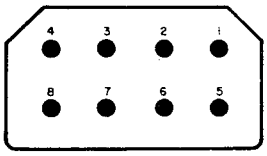


D8
4 #16, 4 #12
3000

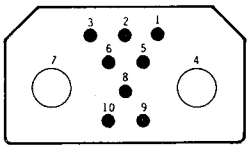


W8
8 coax
1000 (1-8)

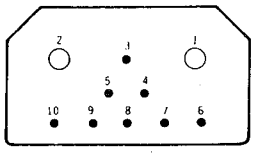
NO. OF CONTACTS & WIRE SIZE TEST VOLTAGE AC (RMS)



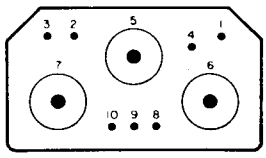
8
8 #12
3000



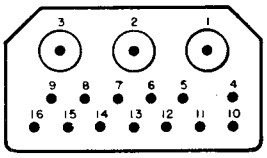
A10
8 #16, 2 #4
2000



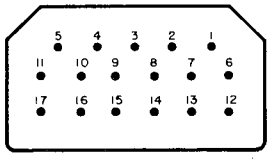
10
2 #8, 8 #20
2000



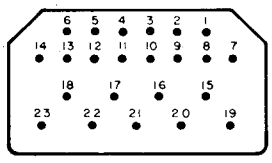
10C3
7 #20, 3 coax
1700 (1-4, 8-10)



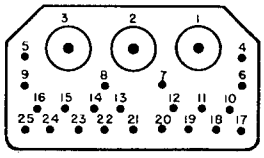
B16C3
13 #16, 3 coax
1700 (4-16),
1000 (1-3)



17
17 #20
3000

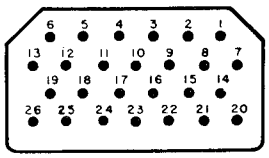


23
23 #20
3000 (15-23), 2050 (1-14)

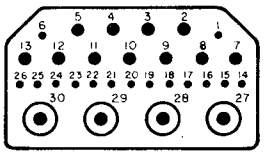


25C3
22 (#20), 3 coax
1900 (4-25),
1000 (1-3)

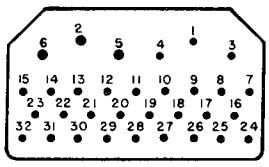
NO. OF CONTACTS & WIRE SIZE TEST VOLTAGE AC (RMS)



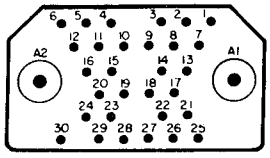
26
26 #16
1900



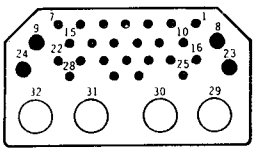
30C4
15 #20, 11 #16, 4 coax
1700 (2-5 & 7-13)
1000 (1, 6 & 14-26)



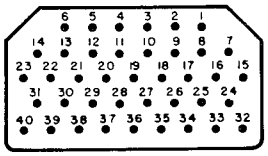
32
3 #16, 29 #20
2900 (1, 3, 4),
2350 (2, 5, 6),
1900 (7-32)



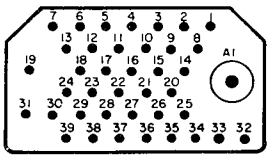
32C2
30 #20, 2 coax
2350 (30), 1600 (1-29),
1000 (A1, A2)



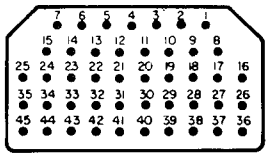
32W4
24 #20 H.D., 4 #16, 4 coax
1500 (1-7, 10-22, 25-28),
1800 (8,9, 23, 24), 1000 (29-32)



40
40 #20
2050

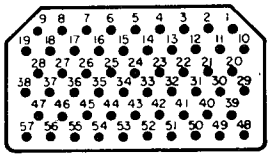


40C1
39 #20, 1 coax
3050 (19),
1600 (1-18, 20-39)
1000 (A1)

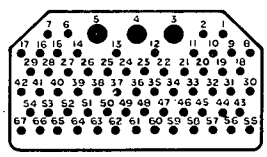


45
45 #20
1900

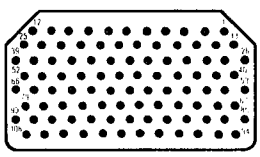
NO. OF CONTACTS & WIRE SIZE TEST VOLTAGE AC (RMS)



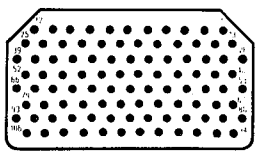
57
57 #20
1500



67
64 #20, 3 #16
1900 (3-5),
1100 (1, 2, 6-67)



106
106 # 22
1100



A106
106 # 22
1100
(metal clip)

Fig. 3 Insert arrangements

TABLE 2 CRIMP CONTACTS - CLASS MA

Size	Contact type	Current rating (max)	Contact accommodation (a.w.g.)	Contact ident	Service Ref.No./ NATO Stock No.	Part No.
2222	Pin	5A	26-22			030-1975-007
2222	Socket	5A	26-22			031-1113-007
2020	Pin	7.5A	24-20		5X/1999647	030-9081-000
2020	Socket	7.5A	24-20		5X/1999649	031-9134-001
2026	Pin	2A	30-26		5X/1160166	030-1951-000
2026	Socket	2A	30-26		5X/1163018	030-1099-000
2020HD	Pin	7.5A	24-20		5X/1993355	030-9081-003
2020HD	Socket	7.5A	24-20		5X/1999650	031-9134-004
2026HD	Pin	2A	30-26		5X/1999648	030-9081-017
2026HD	Socket	2A	30-26			031-9134-013
1616	Pin	20A	20-16		5X/1993354	030-9083-001
1616	Socket	20A	20-16		5X/1999651	031-9084-001
1620	Pin	7.5A	24-20			030-9123-000
1620	Socket	7.5A	24-20			031-9124-000
12	Pin	25A	14-12			030-1909-001
12	Socket	25A	14-12			031-1059-001
8	Pin	73A	8			030-1908-001
8	Socket	73A	8			031-1154-000
4	Pin					030-2049-000
4	Socket					031-1151-000

TABLE 3 CRIMP CONTACTS - CLASS ME

Size	Contact type	Current rating (max)	Contact accommodation (a.w.g.)	Contact ident	Service Ref.No./ NATO Stock No.	Part No.
22	Pin	5A	26-22			030-1975-002
22	Socket	5A	26-22			031-1113-002
20	Pin	7.5A	24-20		5X/1197974	030-2040-000
20	Socket	7.5A	24-20		5X/6262440	031-1046-002
20HD	Pin	7.5A	24-20			030-1892-002
20HD	Socket	7.5A	24-20			031-1047-002
16	Pin	20A	20-16			030-1893-002
16	Socket	20A	20-16			031-9206-021
12	Pin	25A	14-12			030-2045-000
12	Socket	25A	14-12			031-1059-002
8	Pin	73A	8			030-1908-001
8	Socket	73A	8			031-1154-000
0406	Pin	101A	6			030-2049-000
0406	Socket	101A	6			031-1151-000

TABLE 4 COAXIAL CONTACT - SOLDER TYPE

Code	Contact type	Cable accommodation	Service Ref No./ NATO Stock No.	Part No
A	Pin	RG187/U,RG188/U		249-0672-000
A	Socket	RG187/U,RG188/U		249-0671-000
B	Pin	RG180,RG195/U		249-0702-000
B	Socket	RG180,RG195/U		249-0703-000
C	Pin	RG55,58,223/U		249-0749-000
C	Socket	RG55,58,223/U		249-0750-000
D	Socket	RG59,62,71/U		249-0518-000
E	Pin	RG59,62,71/U		249-0843-000
F	Pin	UG692/U		249-0585-000
F	Socket	UG692/U		249-0587-000
G	Pin	UG692/U		249-0582-000
G	Socket	UG692/U		249-0588-000
H	Pin	UG692/U		249-0923-000
H	Socket	UG692/U		249-0737-000
I	Pin	RG115A/U		249-0365-000
I	Socket	RG115A/U		249-0353-000
J	Pin	RG55,58,223/U		249-0257-000
J	Socket	RG55,58,223/U		249-0268-000
K	Pin	Microdot 70 ohm		249-0583-000
K	Socket	Microdot 70 ohm		249-0591-000
K	Pin	Microdot 70 ohm		024-0015-000
K	Socket	Microdot 70 ohm		024-0015-000
K	Pin	Microdot 70 ohm		253-0120-000
K	Socket	Microdot 70 ohm		253-0120-000
L	Pin	5A,size 20 wire		330-0144-000
L	Socket	5A,size 20 wire		330-0145-000
M	Pin	10A,size 16 wire		030-0056-000
M	Socket	10A,size 16 wire		031-0016-000
N	Pin	41A,size 12 wire		030-0017-015
O	Socket	41A,size 12 wire		031-0059-008
P	Pin	5A HV,size 20 wire		143-0103-000
P	Socket	5A HV,size 20 wire		143-0102-000
Z	Pin	Captive contact RG55/58/223/U		249-1624-000
Z	Socket	Captive contact RG55,58,223/U		249-1598-000
AA	Pin	Captive contact RG196/U		249-1599-000
AA	Socket	Captive contact RG196/U		249-1622-000

TABLE 5 COAXIAL CONTACT - CRIMP TYPE

Code	Contact type	Cable accommodation	Service Ref.No./ NATO Stock No.	Part No
*A	Pin	RG59/U,RG62/U		249-1397-000
*A	Socket	RG59/U,RG62/U		249-1398-000
*B	Pin	RG58/U		249-1399-000
*B	Socket	RG58/U		249-1400-000
*C	Pin	RG180/U,RG195/U		249-1401-000
*C	Socket	RG180/U,RG195/U		249-1402-000

(continued)

TABLE 5 COAXIAL CONTACT - CRIMP TYPE (Continued)

Code	Contact type	Cable accommodation	Service Ref.No/ NATO Stock No	Part No
*D	Pin	RG174/U,RG187/U RG179/U,RG188/U		249-1403-000
*D	Socket	RG174/U,RG187/U		249-1404-000
		RG179/U,RG188/U		249-1404-000
*E	Pin	RG178/U,RG196/U	5X/1198963	249-1406-000
*E	Socket	RG178/U,RG196/U		249-1406-000
F	Pin	RG59/U,RG62/U		249-1474-000
F	Socket	RG59/U,RG62/U		249-1471-000
G	Pin	RG58/U		249-1631-000
G	Socket	RG58/U		249-1632-000
H	Pin	RG174/U,RG187/U RG179/U,RG188//U		249-1633-000
H	Socket	RG174/U,RG187/U RG179/U,RG188/U		249-1634-000
*J	Pin	RG58/U		249-1388-000
*J	Socket	RG58/U		249-1390-000
*K	Pin	RG178/U,RG196/U		249-1384-000
*K	Socket	RG178/U,RG196/U		249-1413-000
*L	Pin	RG178/U,RG196/U		249-1386-000
*L	Socket	RG178/U,RG196/U		249-1414-000
*P	Socket	RG58/U with nylon braid over jacket	5X/5315463	249-1608-000
R	Pin	RG178/U,RG196/U		249-1670-000
R	Socket	RG178/U,RG196/U		249-1671-000
S	Pin	RG55/U,RG142/U	5X/6225927	249-1958-000
S	Socket	RG55/U,RG142/U		249-1959-000
T	Pin	RG59/U,RG62/U	5X/6262199	249-1960-000
T	Socket	RG59/U,RG62/U		249-1961-000
U	Socket	RG174/U,RG187/U RG179/U,RG188/U		249-1883-000
AA	Pin	RG178/U,RG196/U		249-1968-000
AB	Pin	RG180/U,RG195/U		249-1982-000
AB	Socket	RG180/U,RG195/U		249-1983-000
AD	Pin	RG58/U		249-2017-001
AD	Socket	RG58/U		249-2018-001
AE	Pin	RG142/U		249-2019-001
AE	Socket	RG142/U		249-2020-001
AF	Pin	RG174/U,RG187/U RG179/U,RG188U	5X/6270035	249-1633-004
AF	Socket	RG174/U,RG187/U RG179/U,RG188/U		249-1634-003
AG	Pin	RG178/U,RG196/U		249-2061-000
AG	Socket	RG178/U,RG196/U		249-2062-001
V	Pin	RG115/U		249-1956-000
V	Socket	RG115/U		249-1957-000
AC	Socket	RG58/U		249-1977-000

Note ...

* Ring loc type
** Not available for class ME

Modifications

10 The modification codes detailed in Tables 6 and 7 list the variations in specification for DPX and DPX2 connectors.

TABLE 6 MODIFICATION CODE - DPX SERIES

Mod.No	Description of variation from standard
00	Standard design
02	With junction shell attaching tabs
03	Mounting holes 0.120 in dia, csk 100 deg to 0.230 in dia
04	With junction shell attaching tabs and mounting holes csk 100 deg to 0.230 in dia
14	With straight junction shell
23	With floating eyelets

TABLE 7 MODIFICATION CODE - DPX2 SERIES

Mod.No	Description of variation from standard
00	Standard design
01	With straight junction shells
02	With 90 deg junction shells
03	Mounting holes 0.120 in dia, csk 100 deg to 0.230 in dia
04	Mounting holes 0.120 in dia, csk 100 deg to 0.230 in dia and with tabs for attaching junction shells
13	With mounting slots 0.237 in wide
14	With straight junction shells
23	With floating eyelets

Polarization

11 Polarization of DPX series connectors, except DPXB, is achieved via keystone corners. Polarization of DPX2 series connectors and DPXB connectors is achieved by three keying posts on the plug shell and three corresponding keying inserts on the receptacle shell. Each post and insert can be set in six different positions. Fig.4 shows the six positions, the darkened portion indicating the extended part of the post in the plug and the light portion the key insert in the receptacle. Table 8 lists the polarization codes, using the six positions shown in fig.4.

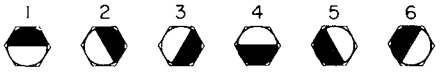


Fig.4 Polarization keys

TABLE 8 POLARIZATION CODES

Position	Plug post position			Receptacle insert position		
	Left	Centre	Right	Left	Centre	Right
01	1	1	1	4	4	4
02	2	1	1	4	4	3
03	3	1	1	4	4	2
04	4	1	1	4	4	1
05	5	1	1	4	4	6
06	6	1	1	4	4	5
07	1	1	6	5	4	4
08	2	1	6	5	4	3
09	3	1	6	5	4	2
10	4	1	6	5	4	1
11	5	1	6	5	4	6
12	6	1	6	5	4	5
13	1	1	5	6	4	4
14	2	1	5	6	4	3
15	3	1	5	6	4	2
16	4	1	5	6	4	1
17	5	1	5	6	4	6
18	6	1	5	6	4	5
19	1	1	4	1	4	4
20	2	1	4	1	4	3
21	3	1	4	1	4	2
22	4	1	4	1	4	1
23	5	1	4	1	4	6
24	6	1	4	1	4	5
25	1	1	3	2	4	4
26	2	1	3	2	4	3
27	3	1	3	2	4	2
28	4	1	3	2	4	1
29	5	1	3	2	4	6
30	6	1	3	2	4	5
31	1	1	2	3	4	4
32	2	1	2	3	4	3
33	3	1	2	3	4	2
34	4	1	2	3	4	1
35	5	1	2	3	4	6
36	6	1	2	3	4	5
37	1	2	1	4	3	4
38	2	2	1	4	3	3
39	3	2	1	4	3	2
40	4	2	1	4	3	1
41	5	2	1	4	3	6
42	6	2	1	4	3	5
43	1	2	6	5	3	4
44	2	2	6	5	3	3
45	3	2	6	5	3	2
46	4	2	6	5	3	1
47	5	2	6	5	3	6
48	6	2	6	5	3	5
49	1	2	5	6	3	4
50	2	2	5	6	3	3

(continued)

TABLE 8 POLARIZATION CODES (continued)

Position	Plug post position			Receptacle insert position		
	Left	Centre	Right	Left	Centre	Right
51	3	2	5	6	3	2
52	4	2	5	6	3	1
53	5	2	5	6	3	6
54	6	2	5	6	3	5
55	1	2	4	1	3	4
56	2	2	4	1	3	3
57	3	2	4	1	3	2
58	4	2	4	1	3	1
59	5	2	4	1	3	6
60	6	2	4	1	3	5
61	1	2	3	2	3	4
62	2	2	3	2	3	3
63	3	2	3	2	3	2
64	4	2	3	2	3	1
65	5	2	3	2	3	6
66	6	2	3	2	3	5
67	1	2	2	3	3	4
68	2	2	2	3	3	3
69	3	2	2	3	3	2
70	4	2	2	3	3	1
71	5	2	2	3	3	6
72	6	2	2	3	3	5
73	1	3	1	4	2	4
74	2	3	1	4	2	3
75	3	3	1	4	2	2
76	4	3	1	4	2	1
77	5	3	1	4	2	6
78	6	3	1	4	2	5
79	1	3	6	5	2	4
80	2	3	6	5	2	3
81	3	3	6	5	2	2
82	4	3	6	5	2	1
83	5	3	6	5	2	6
84	6	3	6	5	2	5
85	1	3	5	6	2	4
86	2	3	5	6	2	3
87	3	3	5	6	2	2
88	4	3	5	6	2	1
89	5	3	5	6	2	6
90	6	3	5	6	2	5
91	1	3	4	1	2	4
92	2	3	4	1	2	3
93	3	3	4	1	2	2
94	4	3	4	1	2	1
95	5	3	4	1	2	6
96	6	3	4	1	2	5
97	1	3	3	2	2	4
98	2	3	3	2	2	3
99	3	3	3	2	2	2

Environmental sealing

12 Environmental sealing in class ME connectors is achieved with interfacial, 'cork in bottle', method. Rear sealing is provided by a grommet. The grommet is designed to seal on wires having the maximum insulation o.d. detailed in Table 9.

TABLE 9 WIRE SEALING RANGE

Contact size	Insulation outside diameter (in) (max)
22	0.054
20	0.071
16	0.103
12	0.135
8	0.250
4	0.310

13 In cavities which are not wired, filler plugs must be fitted behind unwired contacts. Table 10 details the filler plugs available.

TABLE 10 FILLER PLUGS

Contact size	Colour code	NATO Stock No.	Part No.
22			225-1013-000
20		5X/1153913	225-0070-000
16		5X/2239208	225-0071-000
12			
8			
4			

Temperature range

14 The operating temperature range of the connectors is -55 deg C to +125 deg C. The upper limit quoted is the maximum internal hot spot temperature resulting from any combination of temperature and heating due to current.

Lubrication and cleaning

15 No lubrication is to be used on these connectors. Connectors can be cleaned using, sparingly, Arklone P (33D/2204018) or Safeclene aerosol (33D/511).

Tooling

16 Select the correct tooling, for crimp pot types, from the appropriate contact work sheet detailed in Chap.2 or connector assembly instructions detailed in Chap.3.

ACCESSORIES

Dust caps

17 Dust caps provide protection against damage during transit only and do not provide protection against the ingress of moisture, oil or dust. These caps are not provisioned by service supply sources as accessories.

Conductor size measurement

18 The contact work sheets in Chapter 2 detail each contact size and the standard a.w.g. wire size each contact size will accomodate.

Note ...

Where either it is suspected that the cable conductor (wire) is not standard a.w.g. or the integrity of the crimp is in doubt then either DEA 92, CSDE, RAF Swanton Morley, extension 290 (RAF) or OC NATEC, HMS Daedalus (RN) should be contacted for cable (wire) identification.

Chapter 2

CONTACT ASSEMBLY INSTRUCTIONS

CONTENTS

Introduction

1 This chapter comprises a number of work sheets detailing the procedure for crimping standard contacts, and soldering and crimping coaxial contacts, each size and type of contact, to the range of wire sizes they are designed to accommodate.

Procedure

2 Proceed as follows :-

2.1 Identify the size and type of contact to be crimped and/or soldered.

2.2 Select the appropriate contact work sheet.

2.3 Identify the size of cable conductor (wire size) being used.

2.4 Carry out the stripping, crimping and/or soldering procedures detailed in the contact work sheet.

Contact Work Sheet 1

STANDARD CONTACT SIZE 22

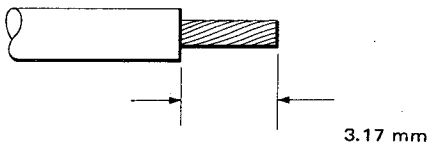


Fig. 1 Stripping dimensions

Wire insulation range	Wire conductor range
0.054 in max.	Wire size 26-22 a.w.g.

Procedure

1 Check that the wire, to which the contact is to be crimped, is within the insulation and conductor ranges given in this work sheet.

2 Strip the wire to the dimensions given in fig. 1. Ensure that the insulation is completely removed and that the conductor is undamaged.

Note ...

Information on wire stripping is detailed in AP 113D-1700-1 (RAF) and AP 120M-0600-1 (RN).

3 Select the appropriate crimping tool from Tables 1, 2 or 3.

TABLE 1 RAF CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
M22520/2-01	1M	M22520/2-23	1M	

Note ...

The tool and turret detailed in Table 1 are available as part of Crimping tool kit Ref No. 1M/1399989. Units are to demand the tool kit rather than individual tools and turrets.

TABLE 2 RAF ALTERNATIVE CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
MS 3191	1M/4658819			

TABLE 3 RN CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
M22520/2-01	0623-165-3910	K13-1	0274-017-3921	

4 Where the crimping tool detailed in Tables 1 and 3 is to be used, select the appropriate tool setting from Table 4.

TABLE 4 CRIMPING TOOL MS22520/1-01 TOOL SETTING

Wire size	Tool setting
26	1
24	2
24	3

5 Crimp the contact to the wire.

Note ...

Information on the use of crimping tools is detailed in AP 120M-0602-1 (RAF) and AP 120M-0600-1(RN).

6 Inspect the crimp joint for the following :-

6.1 All conductor strands enter the crimping barrel and the conductor is visible through the inspection hole.

6.2 The contact is not distorted and the crimp barrel is free from fractures.

Contact Work Sheet 2

STANDARD CONTACT SIZE 20

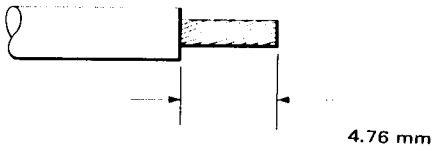


Fig. 1 Stripping dimensions

Wire insulation range	Wire conductor range
0.071 in max.	Wire size 24-20 a.w.g.

Procedure

1 Check that the wire, to which the contact is to be crimped, is within the insulation and conductor ranges given in this work sheet.

2 Strip the wire to the dimensions given in fig. 1. Ensure that the insulation is completely removed and that the conductor is undamaged.

Note ...

Information on wire stripping is detailed in AP 113D-1700-1 (RAF) and AP 120M-0600-1 (RN).

3 Select the appropriate crimping tool from Tables 1, 2 or 3.

TABLE 1 RAF CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
M22520/2-01	1M	M22520/2-08	1M/6277166	

Note ...

The tool and turret detailed in Table 1 are available as part of Crimping tool kit Ref No. 1M/1399989 Units are to demand the tool kit rather than individual tools and turrets.

TABLE 2 RAF ALTERNATIVE CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
MS 3191	1M/4658819	Part No 603604	1M/1275524	

TABLE 3 RN CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
M22520/2-01	0623-165-3910	K13-1	0274-017-3921	

4 Where the crimping tool detailed in Tables 1 and 3 is to be used, select the appropriate tool setting from Table 4.

TABLE 4 CRIMPING TOOL MS22520/1-01 TOOL SETTING

Wire size	Tool setting
24	2
22	3
20	4

5 Crimp the contact to the wire.

Note ...

Information on the use of crimping tools is detailed in AP 120M-0602-1 (RAF) and AP 120M-0600-1(RN).

6 Inspect the crimp joint for the following :-

6.1 All conductor strands enter the crimping barrel and the conductor is visible through the inspection hole.

6.2 The contact is not distorted and the crimp barrel is free from fractures.

Contact Work Sheet 3

STANDARD CONTACT SIZE 16

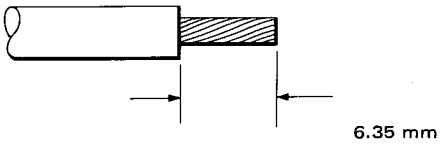


Fig. 1 Stripping dimensions

Wire insulation range

0.103 in max.

Wire conductor range

Wire size 20-16 a.w.g.

Procedure

1 Check that the wire, to which the contact is to be crimped, is within the insulation and conductor ranges given in this work sheet.

2 Strip the wire to the dimensions given in fig. 1. Ensure that the insulation is completely removed and that the conductor is undamaged.

Note ...

Information on wire stripping is detailed in AP 113D-1700-1 (RAF) and AP 120M-0600-1 (RN).

3 Select the appropriate crimping tool from Tables 1, 2 or 3.

TABLE 1 RAF CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
M22520/1-01	1M/1653912	M22520/1-02	1M/6278075	Blue

Note ...

The tool and turret detailed in Table 1 are available as part of Crimping tool kit Ref.No. 1M/949. Units are to demand the tool kit rather than individual tools and turrets.

TABLE 2 RAF ALTERNATIVE CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
MS 3191	1M/4658819	M3191-16A (Part No. 602520/3)	1M/1300294	Blue

TABLE 3 RN CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
M22520/1-01	0273-1380390	M22520/1-02	0273-1380391	Blue

4 Where the crimping tool detailed in Tables 1 and 3 is to be used, select the appropriate tool setting from Table 4.

TABLE 4 CRIMPING TOOL MS22520/1-01 TOOL SETTING

Wire size	Tool setting
20	4
18	5
16	6

5 Crimp the contact to the wire.

Note ...

Information on the use of crimping tools is detailed in AP 120M-0602-1 (RAF) and AP 120M-0600-1(RN).

6 Inspect the crimp joint for the following :-

6.1 All conductor strands enter the crimping barrel and the conductor is visible through the inspection hole.

6.2 The contact is not distorted and the crimp barrel is free from fractures.

Contact Work Sheet 4

STANDARD CONTACT SIZE 12

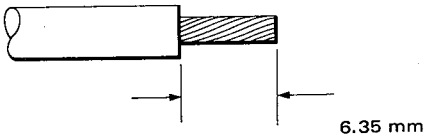


Fig. 1 Stripping dimensions

Wire insulation range	Wire conductor range
0.135 in max.	Wire size 14-12 a.w.g.

Procedure

1 Check that the wire, to which the contact is to be crimped, is within the insulation and conductor ranges given in this work sheet.

2 Strip the wire to the dimensions given in fig. 1. Ensure that the insulation is completely removed and that the conductor is undamaged.

Note ...

Information on wire stripping is detailed in AP 113D-1700-1 (RAF) and AP 120M-0600-1 (RN).

3 Select the appropriate crimping tool from Tables 1, 2 or 3.

TABLE 1 RAF CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
M22520/1-01	1M/1653912	M22520/1-02	1M/6278075	Yellow

Note ...

The tool and turret detailed in Table 1 are available as part of Crimping tool kit Ref.No. 1M/949. Units are to demand the tool kit rather than individual tools and turrets.

TABLE 2 RAF ALTERNATIVE CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
MS 3191	1M/4658819	M3191-16A (Part No. 602520/3)	1M/1300294	Yellow

TABLE 3 RN CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
M22520/1-01	0273-1380390	M22520/1-02	0273-1380391	Yellow

4 Where the crimping tool detailed in Tables 1 and 3 is to be used, select the appropriate tool setting from Table 4.

TABLE 4 CRIMPING TOOL MS22520/1-01 TOOL SETTING

Wire size	Tool setting
14	7
16	6

5 Crimp the contact to the wire.

Note ...

Information on the use of crimping tools is detailed in AP 120M-0602-1 (RAF) and AP 120M-0600-1(RN).

6 Inspect the crimp joint for the following :-

6.1 All conductor strands enter the crimping barrel and the conductor is visible through the inspection hole.

6.2 The contact is not distorted and the crimp barrel is free from fractures.

Contact Work Sheet 5

STANDARD CONTACT SIZE 8

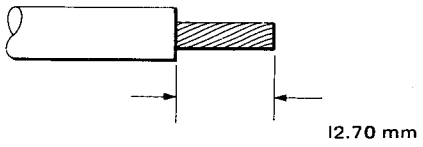


Fig. 1 Stripping dimensions

Wire insulation range	Wire conductor range
0.250 in max.	Wire size 8 a.w.g.

Procedure

1 Check that the wire, to which the contact is to be crimped, is within the insulation and conductor ranges given in this work sheet.

2 Strip the wire to the dimensions given in fig. 1. Ensure that the insulation is completely removed and that the conductor is undamaged.

Note ...

Information on wire stripping is detailed in AP 113D-1700-1 (RAF) and AP 120M-0600-1 (RN).

3 Select the appropriate crimping tool from Tables 1, 2 or 3.

TABLE 1 RAF CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
Consult DEA Electrical Hand Tools, refer to page (vi)				

TABLE 2 RAF ALTERNATIVE CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
Consult DEA Electrical Hand Tools, refer to page (vi)				

TABLE 3 RN CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
Consult OC NATEC, refer to page (vi)				

4 Crimp the contact to the wire.

Note ...

Information on the use of crimping tools is detailed in AP 120M-0602-1 (RAF) and AP 120M-0600-1 (RN).

5 Inspect the crimp joint for the following :-

5.1 All conductor strands enter the crimping barrel and the conductor is visible through the inspection hole.

5.2 The contact is not distorted and the crimp barrel is free from fractures.

Contact Work Sheet 6

STANDARD CONTACT SIZE 0406

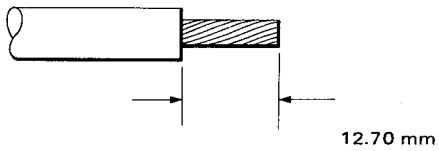


Fig. 1 Stripping dimensions

Wire insulation range	Wire conductor range
0.310 in max.	Wire size 6 a.w.g.

Procedure

1 Check that the wire, to which the contact is to be crimped, is within the insulation and conductor ranges given in this work sheet.

2 Strip the wire to the dimensions given in fig. 1. Ensure that the insulation is completely removed and that the conductor is undamaged.

Note ...

Information on wire stripping is detailed in AP 113D-1700-1 (RAF) and AP 120M-0600-1 (RN).

3 Select the appropriate crimping tool from Tables 1, 2 or 3.

TABLE 1 RAF CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
Consult DEA Electrical Hand Tools, refer to page (vi)				

TABLE 2 RAF ALTERNATIVE CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
Consult DEA Electrical Hand Tools, refer to page (vi)				

TABLE 3 RN CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect. Ref.	Specification	Sect. Ref.	Colour code
Consult OC NATEC, refer to page (vi)				

4 Crimp the contact to the wire.

Note ...

Information on the use of crimping tools is detailed in AP 120M-0602-1 (RAF) and AP 120M-0600-1 (RN).

5 Inspect the crimp joint for the following :-

5.1 All conductor strands enter the crimping barrel and the conductor is visible through the inspection hole.

5.2 The contact is not distorted and the crimp barrel is free from fractures.

Contact Work Sheet 7

COAXIAL CONTACT - SOLDER TYPE

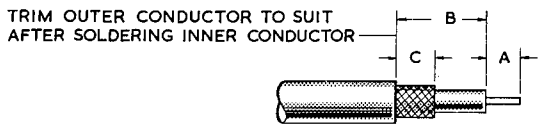


Fig 1 Stripping dimensions

Procedure

1 Check that the wire to which the contact is to be soldered, is within the range for the contact size.

2 Strip the wire to the dimensions given in fig 1 and Table 1. Ensure that the insulation is completely removed and that neither the conductor nor the dieletric is damaged.

Note ...

Information on wire stripping is detailed in AP 113D-1700-1 (RAF) and AP 120M-0600-1 (RN).

TABLE 1 WIRE STRIPPING DIMENSIONS

Wire code	Dimensions (in)					
	A		B		C	
	Min	Max	Min	Max	Min	Max
A		0.14	0.358	0.318	0.166	0.146
B		0.14	0.358	0.318	0.166	0.146
C		0.14	0.358	0.318	0.166	0.146
D		0.14	0.358	0.318	0.166	0.146
E		0.14	0.358	0.318	0.166	0.146
I	0.166	0.146		0.39	0.166	0.146
J	0.166	0.146		0.55	0.166	0.146
K		0.25	0.448	0.428	0.198	0.178
Z		0.23		0.41		0.08
AA	0.195	0.175		0.23		0.11

3 For wire codes A, B, C, D and E, proceed as follows :-

3.1 Remove the inner contact from the coaxial assembly and solder it to the cable inner conductor.

3.2 Push the inner contact into the coaxial assembly, pull the outer conductor over the coaxial shell, and solder the outer conductor to the shell.

4 For wire codes, I and J proceed as follows :-

4.1 Comb the braid, remove the solder pot cover, insert the cable inner conductor and solder the conductor to the contact, ensuring that the dielectric butts against the solder pot.

4.2 Fit the solder pot cover and solder the braid to the ferrule.

5 For wire code K, proceed as follows :-

5.1 Unscrew the cap and remove the spacer and inner contact from the coaxial assembly.

5.2 Push the cable through the centre of the cap and spacer, and solder the inner conductor to the inner contact.

5.3 Push the inner contact into the coaxial shell and attach the cap, separate the outer conductor into two pigtails 180 deg apart and solder one pigtail to each end of the cap strip.

6 For wire codes Z and ZA, proceed as follows :-

6.1 Solder the inner conductor to the coaxial contact through the side slot in the contact with the outer sleeve pushed back on the cable.

6.3 Pull the sleeve forward over the braid and solder through the holes in the sleeve.

6.4 Solder the sleeve to the coaxial body.

Contact Work Sheet 8

COAXIAL CONTACT - RING LOC TYPE

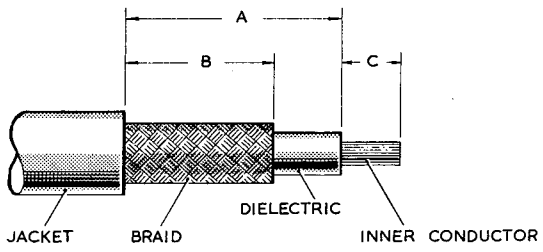


Fig. 1 Stripping dimensions

Procedure

1 Check that the wire to which the contact is to be installed, is within the range for the contact size.

2 Strip the wire to the dimensions given in fig 1 and Table 1. Ensure that the insulation is completely removed and that neither the conductor nor the dielectric is damaged.

Note ...

Information on wire stripping is detailed in AP 113D-1700-1 (RAF) and AP 120M-0600-1 (RN).

TABLE 1 WIRE STRIPPING DIMENSIONS

Wire code	Dimension (in)					
	A		B		C	
	Min	Max	Min	Max	Min	Max
A	0.400	0.420	0.415	0.435	0.310	0.330
B	0.400	0.420	0.440	0.460	0.310	0.330
C	0.400	0.420	0.440	0.460	0.310	0.330
D	0.400	0.420	0.440	0.460	0.310	0.330
E	0.400	0.420	0.460	0.480	0.310	0.330
J	0.306	0.326	0.230	0.250	0.068	0.088
K	0.390	0.410	0.270	0.290	0.068	0.088
L	0.365	0.385	0.224	0.244	0.064	0.074
P	0.400	0.420	0.440	0.460	0.310	0.330

3 Place the crimp ring over the cable jacket.

4 Place the rear insulator over the dielectric and solder the inner conductor to the centre conductor.

5 Insert the soldered cable firmly into the coaxial with the shielding over the shell and pull the crimp ring forward untie stopped.

6 Select the appropriate crimping tool from Tables 2, 3 or 4.

TABLE 2 RAF CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect.Ref.	Specification	Sect.Ref.	Colour code
Consult DEA Electrical Hand Tools, refer to page (vi)				

TABLE 3 RAF ALTERNATIVE CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect.Ref.	Specification	Sect.Ref.	Colour code
Consult DEA Electrical Hand Tools, refer to page (vi)				

TABLE 4 RN CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect.Ref.	Specification	Sect Ref.	Colour code
Consult OC NATEC, refer to page (vi)				

7 Crimp the ring

Note ...

Information on the use of crimping tools is detailed in AP 120M-0602-1 (RAF) and AP 120M-0600-1 (RN).

Contact Work Sheet 9

COAXIAL CONTACT - CRIMP TYPE

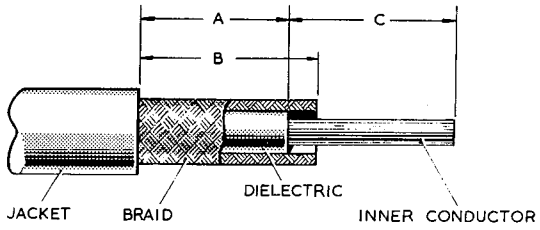


Fig 1 Stripping dimensions

Procedure

1 Check that the wire to which the contact is to be crimped, is within the range for the contact size.

2 Strip the wire to the dimensions given in fig 1 and Table 1. Ensure that the insulation is completely removed and that neither the conductor nor the dielectric is damaged.

Note ...

Information on wire stripping is detailed in AP113D-1700-1 (RAF) and AP 120M-0600-1 (RN).

TABLE 1 WIRE STRIPPING DIMENSIONS

Wire code	Dimensions (in)					
	A		B		C	
	Min	Max	Min	Max	Min	Max
F	0.745	0.765	0.255	0.275	0.208	0.228
G	0.470	0.490	0.255	0.275	0.136	0.156
H	0.561	0.581	0.325	0.345	0.136	0.156
R	0.561	0.581	0.325	0.345	0.136	0.156
S	0.658	0.678	0.255	0.275	0.136	0.156
T	0.578	0.598	0.280	0.300	0.208	0.228
U	0.920	0.940	0.740	0.760	0.060	0.080
V	0.540	0.550	0.405	0.415	0.240	0.250

3 For wire codes F, S and T, proceed as follows :-

3.1 Solder the inner conductor to the coaxial contact with the crimp ring over the braid and the rear insulator over the inner conductor.

3.2 Insert the cable into the coaxial shell, with the shell under the braid.

3.3 Select the appropriate crimping tool from Tables 2, 3 or 4.

TABLE 2 RAF CRIMPING TOOL

Crimping tool		Turret		
Specification	Sect.Ref.	Specification	Sect.Ref.	Colour code
Consult DEA Electrical Hand Tools, refer to page (vi)				

TABLE 3 RAF ALTERNATIVE CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect.Ref.	Specification	Sect.Ref.	Colour code
Consult DEA Electrical Hand Tools, refer to page (vi)				

TABLE 4 RN CRIMPING TOOL

Crimping tool		Locator		
Specification	Sect.Ref.	Specification	Sect Ref.	Colour code
Consult OC NATEC, refer to page (vi)				

3.4 Crimp the ring :

Note ...
Information on the use of crimping tools is detailed in AP 120M-0602-1 (RAF) and AP 120M-0600-1 (RN).

4 For wire Codes G, H and R, proceed as follows :-

4.1 Push the crimp ring back over the cable and solder the inner conductor to the coaxial contact.

4.2 Insert the cable into the coaxial and pull the crimp ring forward over the the braid.

4.3 Select the appropriate crimping tool from Tables 2, 3 or 4.

4.4 Crimp the ring.

5 For wire code U, proceed as follows :-

5.1 Slide the crimping ring over the braid and the cable jacket.

5.2 Unbraid the exposed portion of the braid and fold the braid wires backward over the outside of the crimp ring. Insert the inner conductor into the right angle fitting of the shell assembly and align the inner conductor in the centre contact slot.

5.3 Select the appropriate crimping tool from Tables 2, 3 or 4.

5.4 Crimp the ring, solder the inner conductor to the centre contact, insert the cap and solder the cap in place.

6 For wire code V, proceed as follows :-

6.1 Push the ferrule under the braid as far as it will go and press the braid down tightly around the ferrule.

6.2 Solder the ends of the braid to the ferrule, avoiding an excess of solder which will cause the braid to swell up. Remove any solder exceeding 0.349 in maximum diameter.

6.3 Check that 0.075 in maximum dieletric extends from the ferrule, trim as necessary.

6.4 Place the rear insulator over the dielectric and the inner conductor into the contact. Solder the contact to the conductor through the access hole. Remove any excess solder from the outside of the contact.

6.5 Place the front insulator over the contact and push the parts into the coaxial.

6.6 Select the appropriate crimping tool from Tables 2, 3 or 4.

6.7 Hold the parts firmly against the stop shoulder and crimp the back end of the shell.

Amendment No 1 to
AP 113D-18 06-1 2nd EDITION

MINISTRY OF DEFENCE

Remove and destroy Chap 3 (one leaf) and substitute new Chap 3 (one leaf)

Record the incorporation of this amendment in the Amendment Record.

Chapter 3

CONNECTOR ASSEMBLY INSTRUCTIONS

Contact insertion

Note ...

Contacts are to be inserted into the connector starting at the top and working down.

1 Proceed as follows :-

1.1 Select the correct insertion tool from Table 1.

1.2 Place the wire over the wire slot of the insertion tip and hold the wire in position with a thumb.

1.3 Apply light pressure on the wire and slide the thumb towards the tool tip. The tip will speed, allowing the wire to enter the tip.

1.4 Position the tool tip against the shoulder of the contact, see fig 1. Note that the bevelled tip is smaller than the outside diameter of the contact shoulder. This allows the locking lance in the cavity to grip the shoulder of the contact.

1.5 Press the wire against the tool handle to hold the contact in position.

1.6 Align the contact with the cavity and insert the contact straight into the cavity until the contact bottoms.

1.7 Remove the tool and pull back slightly on the wire to check that the contact is locked in the cavity.

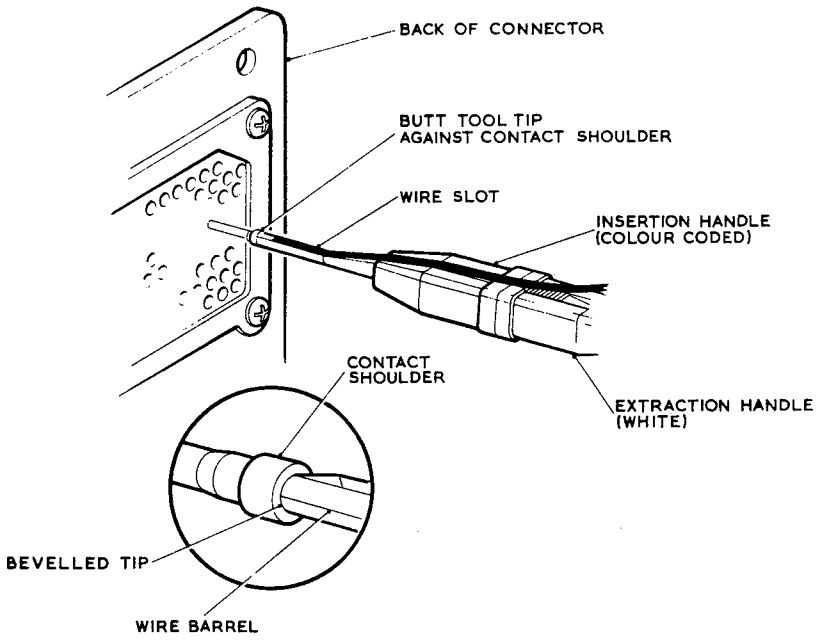


Fig.1 Contact insertion

Contact removal (fig.2)

2 To remove the contacts, proceed as follows :-

2.1 Place the wire over the wire slot of the extraction tip and hold the wire in this position with a thumb.

2.2 Apply light pressure on the wire and slide the thumb toward the tip of the tool. The tip will spread allowing the wire to enter the tip.

2.3 Insert the tool tip into the cavity until it bottoms.

2.4 Hold the wire against the tool handle, pull the tool and contact out of the rear of the cavity.

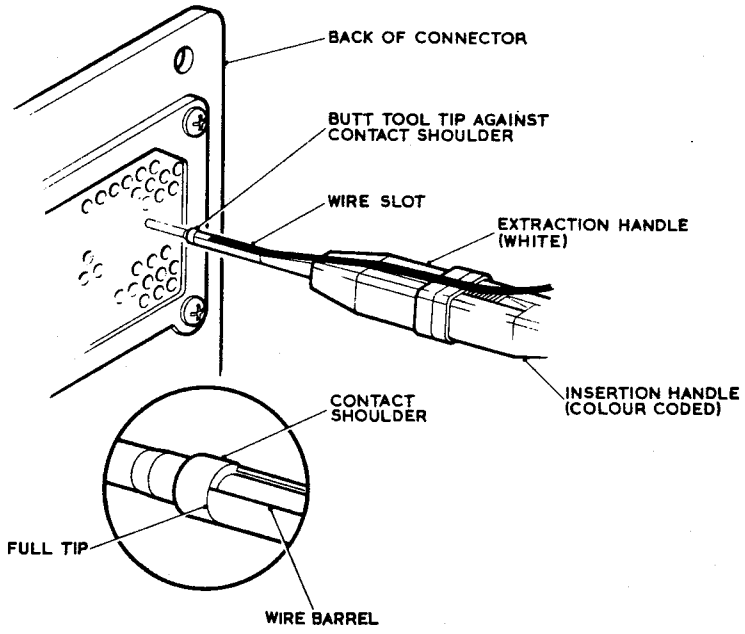


Fig.2 Contact removal

TABLE 6 CONTACT REMOVAL

Contact size	Tool	Handle colours		Ref.No.
		Insertion	Extraction	
22	MS3156-22	Black	White	1H/1001
20	MS3156-20	Red	White	1H/1002
16	MS3156-16	Blue	White	1H/1003
12		Yellow	White	1H/1017
8				
4