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**CANNON CONNECTORS,
TYPE PV**



GENERAL AND TECHNICAL INFORMATION (-1)

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AMENDMENT RECORD SHEET

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Chapter 1

CANNON CONNECTORS, TYPE PV

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LEADING PARTICULARS

Cannon connectors, Type PV

Current ratings:—

Size 20 contacts ... 7.5A

Size 16 contacts ... 20A

Contact, cable accommodation sizes

Size 20 contact accommodates ... 20-24 A.W.G.

Size 16 contact accommodates ... 16-20 A.W.G.

Insertion and extraction forces

Insertion force ... Less than 15 lb

Extraction force ... Less than 10 lb

Insulation resistance ... Not less than 500 megohms

Durability ... NAS1599

Humidity ... NAS1599

Temperature ... NAS1599

Introduction

1. The Cannon PV series of circular, bayonet lock connectors (fig. 1) are designed to conform with the American specification NAS1599. By

selection of appropriate arrangements from three to 61 crimped terminations of A.W.G. (#) wire gauges 16 to 24 may be accommodated in a single connector.

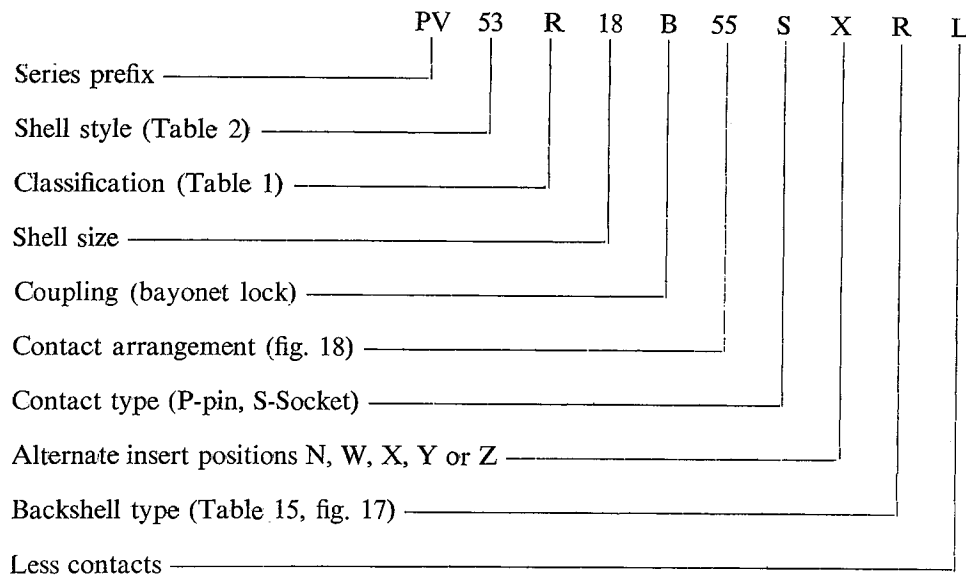


Fig. 1. Typical plug, receptacles and backshells

DESCRIPTION

Significance of part numbers

2. Each connector is defined by a manufacturer's part number, stamped on the shell, as follows:—



Construction

3. The construction of a PV series wall-mounting receptacle is shown in (fig. 2). It comprises an aluminium alloy shell which contains a moulded thermo-setting plastic insert. The mating face of the plug insert is provided with raised tapered barriers around each contact, which locate into lead-in chamfers on the socket inserts, to ensure individual contact sealing. The contacts are held in the insert by moulded-in shoulders.

Classification

4. The classifications available are given in Table 1, this is dependent upon the shell finish.

TABLE 1

Classification

Classification	Description
R	Environment-resistant anodized finish
C	Environment-resistant, chromium conductive finish
G	Environment-resistant, nickel conductive finish

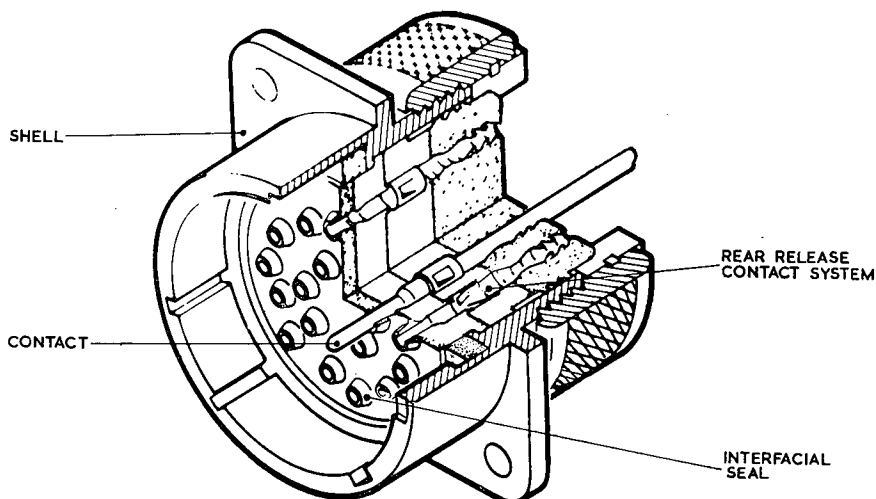


Fig. 2. Cut-away of connector

Shell style

5. Four shell styles are available as given in Table 2. The shell dimensions are given in (fig. 12 to 17) inclusive which should be used in conjunction with the respective Tables 10 to 16 inclusive.

TABLE 2

Shell styles

NAS designation	Cannon NAS equivalent	Cannon standard	Description
1650	50	0	Narrow flange receptacle
1651	51	4	Wide flange receptacle
1652	52	7	Jam nut receptacle
1653	53	6	Straight plug
—	—	1	Cable mounting receptacle

Insert positions and polarization

6. Fig 3 shows the position of the insert for the available insert orientation. Connectors cannot be re-orientated after manufacture.

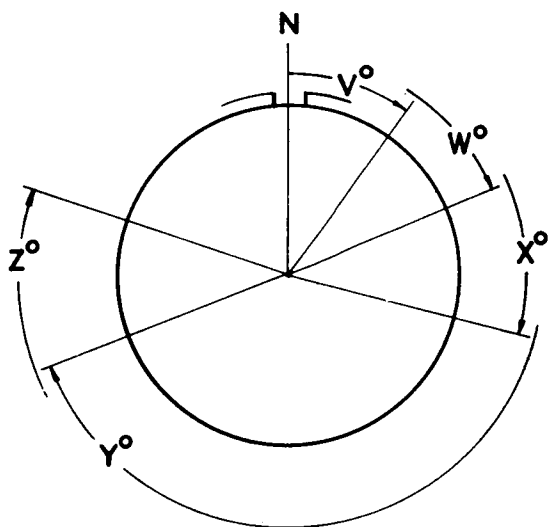


Fig. 3. Insert positions

Contacts and contact arrangements

7. The contacts are made of copper alloy with gold over silver plating. The contacts are retained in the insert by an integral metal retaining clip which locates onto the shoulders moulded in the

holes. The contacts are shown in (fig. 4) and wire hole fillers, for positions where no contacts are wired, are shown in (fig. 5). Tables 4 and 5 give details of the contacts and wire hole fillers respectively. The contact arrangement and relative shell sizes are shown in (fig. 18). Unwired contacts should be inserted prior to fitting the filler plugs.

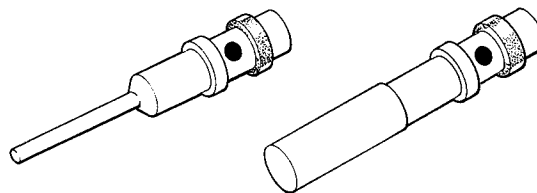


Fig. 4. Contacts

TABLE 3 (fig. 4)

Contacts

Contact Size	Type	NAS	Cannon Part. No.
20	Socket	1663-20	S2020SC-D71
20	Pin	1662-20	S2020PC-G71
16	Socket	1663-16	S1616SC-B71
16	Pin	1662-16	S1616PC-G72

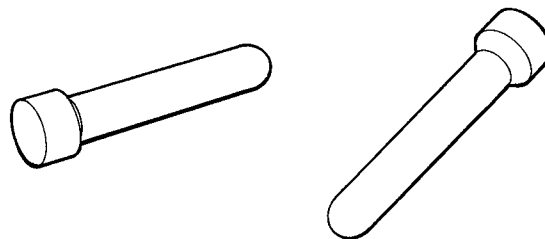


Fig. 5. Wire hole fillers

TABLE 4 (fig. 5)

Wire hole fillers

Contact size	Colour code	NAS	Cannon Part No.
20	Red	1668-1	225-0070-000
16	Blue	1668-2	225-0071-000

Panel thicknesses and cut-outs

8. For mounting purposes details of the relevant panel thicknesses and cut-outs for the connector types are given in Tables 5 to 8 inclusive and fig. 6 and 7.

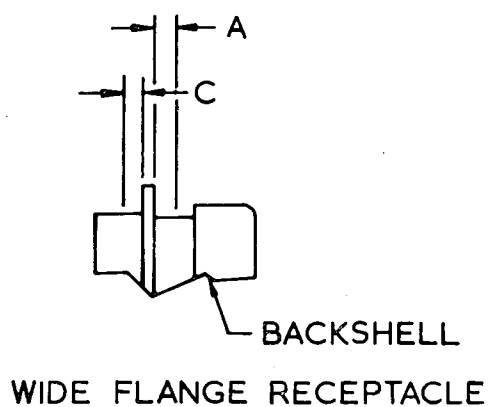
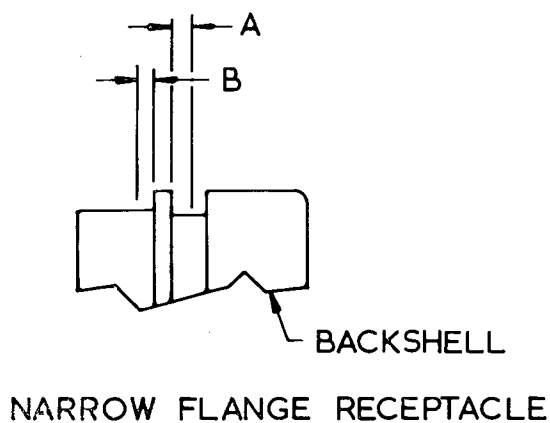


Fig. 6. Panel thickness (Table 5)

TABLE 5 (fig. 6)

Panel thickness for flange mounting connectors

Shell size	A Max.	B	C
10	0.125	0.087	0.118
12	0.125	0.087	0.118
14	0.125	0.087	0.118
16	0.125	0.087	0.118
18	0.125	0.087	0.118
20	0.125	0.212	0.212
22	0.125	0.212	0.212
24	0.125	0.212	0.212

TABLE 6 (fig. 7)

Panel cut-out dimensions for flange mounting receptacle

Shell size	PV			
	Narrow A	R	Wide A	R
8	—	—	—	—
10	0.734	0.719	0.734	0.812
12	0.858	0.812	0.858	0.938
14	0.984	0.906	0.984	1.031
16	1.110	0.969	1.110	1.125
18	1.234	1.062	1.234	1.203
20	1.360	1.156	1.156	1.297
22	1.484	1.250	1.484	1.375
24	1.610	1.375	1.610	1.500

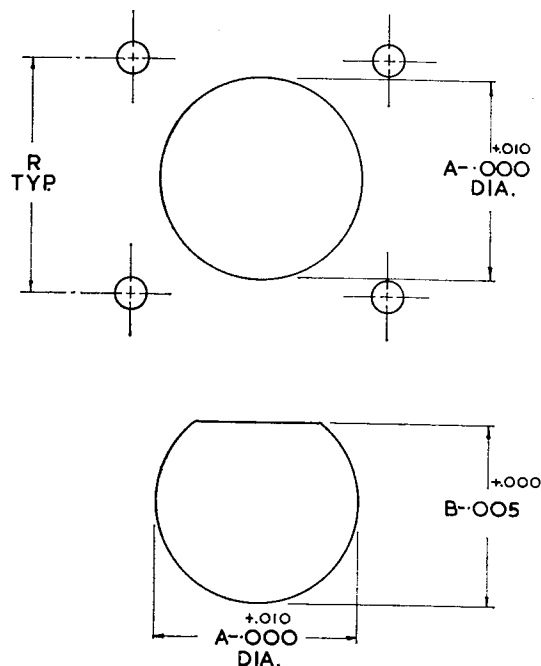


Fig. 7. Panel cut-outs (Table 6)

TABLE 7 (fig. 7)**Panel cut-out dimensions for jam nut receptacles**

Shell size	A	B
8	—	—
10	0.661	0.697
12	0.824	0.895
14	0.948	1.010
16	1.072	1.135
18	1.197	1.260
20	1.322	1.385
22	1.447	1.510
24	1.572	1.635

TABLE 8 (fig. 7)**Mounting hole diameters**

Shell size	KPT/KPTM KPSE/PV ± 0.005	Screw A.W.G.
8	0.125	4
10	0.125	4
12	0.125	4
14	0.125	4
16	0.125	4
18	0.125	4
20	0.125	4
22	0.125	4
24	0.155	6

INSTRUCTIONS FOR USE**Tools**

9. The tools listed in Table 9 are required for use with the PV connectors.

Selection of connectors and terminations

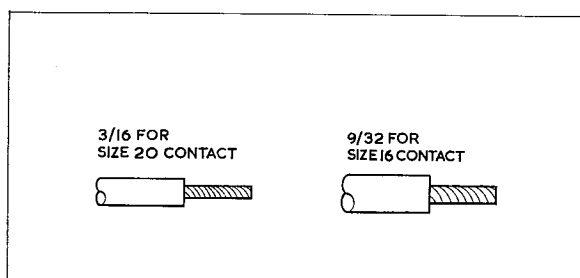
10. The appropriate connector and termination should be selected to suit the cable or cable-form conductors and the required application.

TABLE 9**Tools**

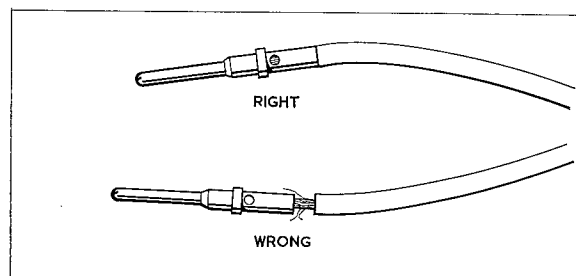
Description	Cannon Pt. No.	MS/NAS Ref. No.	Ref. No.
Crimping tool			1H/279
Locator (size 20)			1H/414
Locator (size 16)			1H/415
Locator (size 12)			1H/416
Uniwired Contact removal tool			
Contact size 20	CET-20-24		
Contact size 16	CET-16-21		
Insertion/extraction tool (size 20)	CIET-20	NAS 1664-20	
Insertion/extraction tool (size 16)	CIET-16	NAS 1664-16	

Note . . .

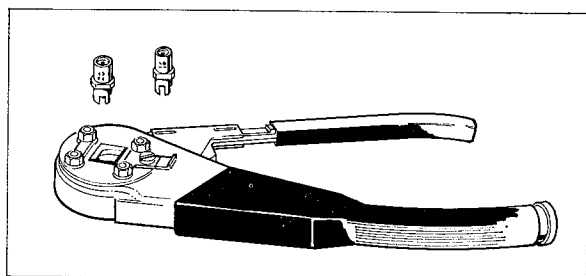
Insertion/extraction tools are supplied with the connector.



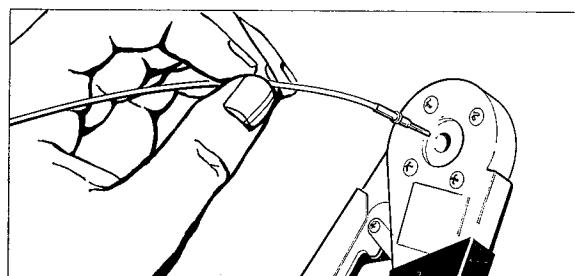
1. Strip wires according to contact size: 3/16 in. for size 20 and 9/32 in. for size 16. Size 20 contacts accommodate A.W.G. wire sizes 20, 22 or 24; size 16 contacts accommodate A.W.G. 16, 18 or 20.



2. Insert wire into rear of contact. Wire insulation must butt against rear of contact. Wire must be visible through the inspection hole.

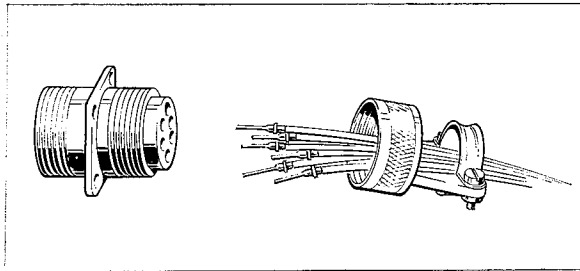


3. Use MS3191-1 crimp tool with correct crimp locator. The colour code band on the contact (red for size 20, blue for size 16) MUST match the colour code of the locator and the insertion tool throughout the crimping and assembly operations.

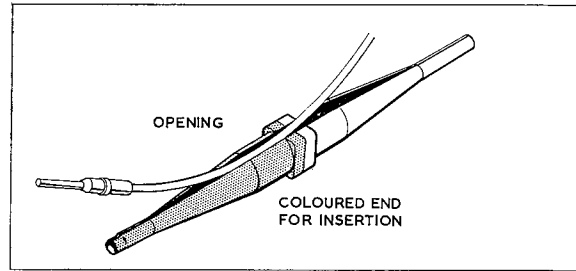


4. Insert the contact and the wire into the tool jaws. To crimp, squeeze the handles together until the ratchet releases and allows the handles to separate. Maintain a slight insertion pressure on the wire during crimping.

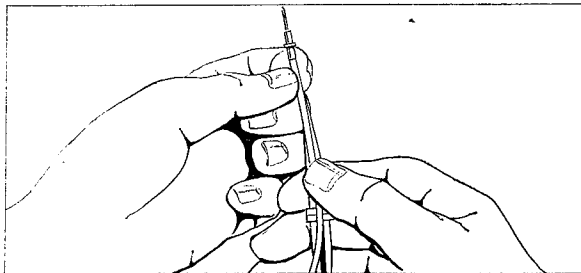
Fig. 8. Stripping and crimping



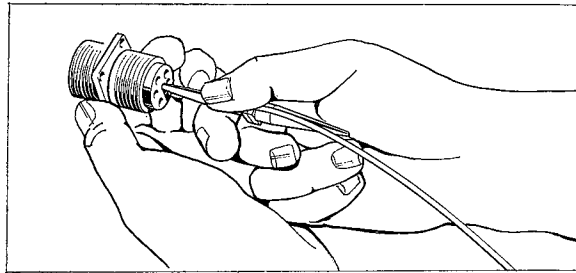
1. Remove the backshell and put the wired contacts through the cable clamp opening.



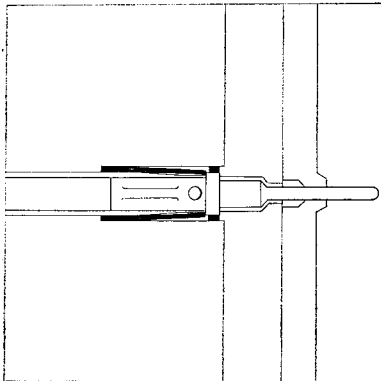
2. Use the coloured end of the CIET tool for insertion. Place the wire into the tool at large opening. To facilitate contact insertion, a minimum length of 6 in. of free wire is recommended.



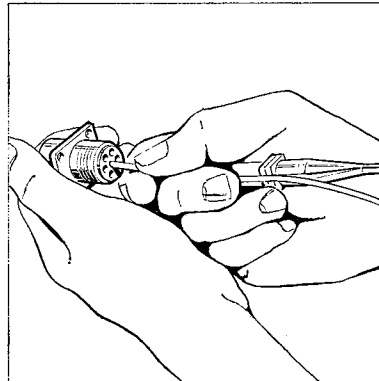
3. Slide back the tool on the wire whilst holding the thumb against the wire at the opening. The wire will then slip into the tool.
NOTE... The socket contacts should be inserted partially into the grommet by hand before using the insertion tool.



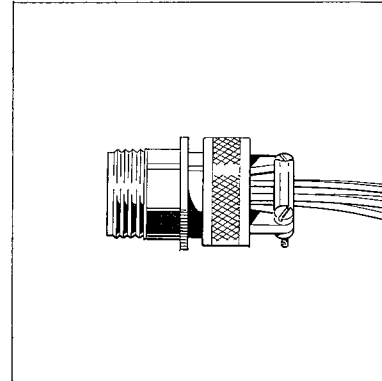
4. With the tool pressed against the shoulder of the contact; start at the centre cavity and insert the wired contact and tool into the properly identified cavity at the rear of the plug, with firm, even pressure. Do not use excessive pressure.



5. When the contact bottoms (seats), a slight click will be heard as the tines of the metal retaining clip snaps into place behind the contact shoulder.

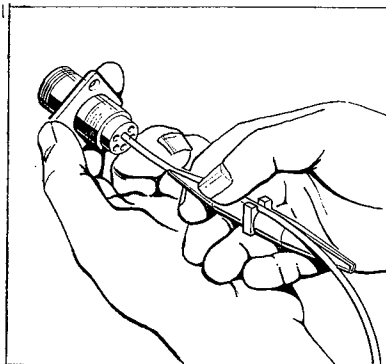


6. Withdraw the tool from the rear of the plug. To be certain that the contact is locked, pull back lightly on the wire. Then remove the tool from the wire and proceed with the other contacts.

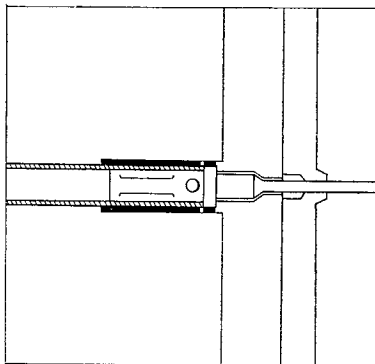


7. After all the contacts are inserted, assemble the backshell on to the rear of the plug.

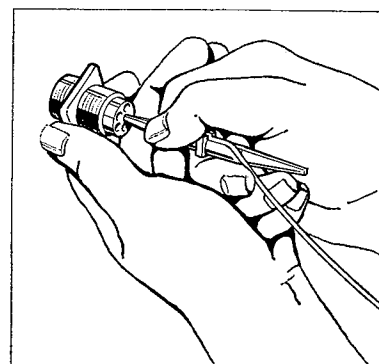
Fig. 9. Contact insertion



1. Remove the backshell and slide back along the wires to allow access. To extract a contact use the white end of the CIET tool. Place the wire into the tool at the large opening. Slide back the tool on the wire, whilst holding the thumbs against the wire at the opening. The wire should slip into the tool.

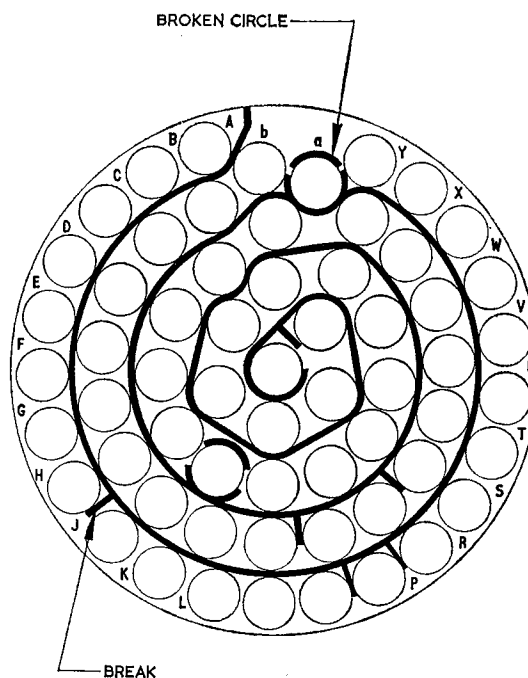


2. Push the tool into the rear of the plug until it bottoms (seats). At this point, the tool releases the line on the retaining clip so that the contact can be extracted.



3. Whilst maintaining a slight insertion force on the tool, firmly hold the wire against the serrated shoulder at the centre of the tool and extract both the wired contact and the tool from the plug.

Fig. 10. Contact extraction



1. Check the face of the plug or the receptacle for correct contact installation. In socket inserts with a large number of contacts, cavities are identified in a spiral pattern. In PV inserts a projecting line from the spiral indicates omission of a letter; a broken circle around a cavity indicates the transition between capitals and lower case and double letters.

Fig. 11. Completion

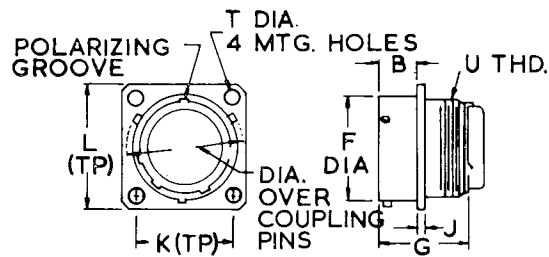


Fig. 12. Wall mounting receptacle (Table 10)

TABLE 10 (fig. 12)

Wall-mounting receptacle dimensions

Shell size	B Max	F Max	G Max	J Max	K	L	N Max	T ± 0.005	U Thread Class 2A
10	0.462	0.591	1.215	0.078	0.719	0.954	0.680	0.120	$\frac{5}{8}$ 24UNEF
12	0.462	0.751	1.215	0.078	0.812	1.047	0.859	0.120	$\frac{3}{4}$ 20UNEF
14	0.462	0.876	1.215	0.078	0.906	1.141	0.984	0.120	$\frac{7}{8}$ 20UNEF
16	0.462	1.001	1.215	0.078	0.969	1.234	1.108	0.120	1 20UNEF
18	0.462	1.126	1.215	0.078	1.062	1.328	1.223	0.120	$1\frac{1}{16}$ 18UNEF
20	0.587	1.251	1.275	0.110	1.156	1.453	1.358	0.120	$1\frac{3}{16}$ 18UNEF
22	0.587	1.376	1.275	0.110	1.250	1.578	1.483	0.120	$1\frac{5}{16}$ 18UNEF
24	0.620	1.501	1.275	0.110	1.375	1.703	1.610	0.147	$1\frac{7}{16}$ 18UNEF

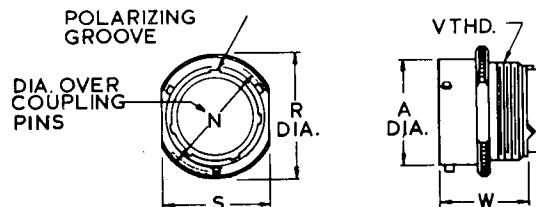


Fig. 13. Cable connecting receptacle (Table 11)

TABLE 11 (fig. 13)

Cable connecting receptacle dimensions

Shell size	A Max	N Max	R Max	S Max	V Thread Class 2A	W Max
10	0.591	0.680	0.869	0.748	$\frac{5}{8}$ 24UNEF	1.215
12	0.751	0.859	1.012	0.872	$\frac{3}{4}$ 20UNEF	1.215
14	0.876	0.984	1.158	0.998	$\frac{7}{8}$ 20UNEF	1.215
16	1.001	1.108	1.307	1.124	1 20UNEF	1.215
18	1.126	1.233	1.427	1.230	$1\frac{1}{16}$ 18UNEF	1.215
20	1.251	1.358	1.571	1.355	$1\frac{3}{16}$ 18UNEF	1.275
22	1.375	1.483	1.717	1.480	$1\frac{5}{16}$ 18UNEF	1.275
24	1.501	1.610	1.859	1.605	$1\frac{7}{16}$ 18UNEF	1.275

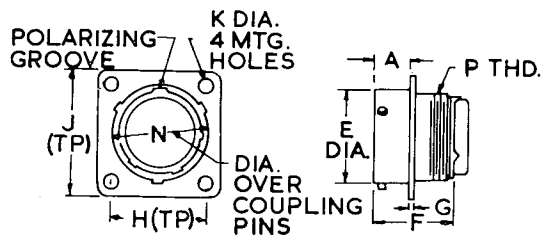


Fig. 14. Wide flange receptacle (Table 12)

TABLE 12 (fig. 14)

Wide flange receptacle dimensions

Shell size	A Max	E Max	F Max	G Max	H	J Max	K ± 0.005	N Max	P Thread Class 2A
10	0.493	0.591	1.215	0.078	0.812	1.141	0.150	0.680	$\frac{5}{8}$ 24UNEF
12	0.493	0.751	1.215	0.078	0.938	1.266	0.150	0.859	$\frac{3}{4}$ 20UNEF
14	0.493	0.876	1.215	0.078	1.031	1.360	0.150	0.984	$\frac{7}{8}$ 20UNEF
16	0.493	1.001	1.215	0.078	1.125	1.453	0.150	1.108	1 20UNEF
18	0.493	1.126	1.215	0.078	1.203	1.532	0.150	1.233	$1\frac{1}{8}$ 18UNEF
20	0.587	1.251	1.275	0.110	1.297	1.688	0.150	1.358	$1\frac{3}{8}$ 18UNEF
22	0.587	1.376	1.275	0.110	1.375	1.766	0.150	1.483	$1\frac{5}{8}$ 18UNEF
24	0.620	1.501	1.275	0.110	1.500	1.891	0.150	1.610	$1\frac{7}{8}$ 18UNEF

TABLE 13 (fig. 15)

Straight plug dimensions

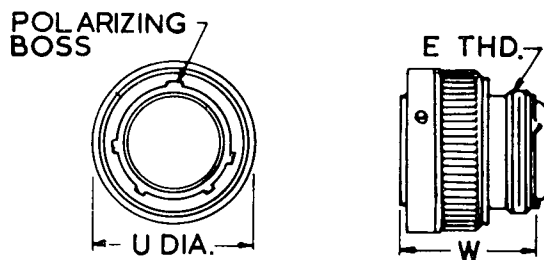


Fig. 15. Straight plug (Table 13)

Shell size	E Thread Class 2A	U Max	W Max
10	$\frac{5}{8}$ 24UNEF	0.855	1.230
12	$\frac{3}{4}$ 20UNEF	1.040	1.230
14	$\frac{7}{8}$ 20UNEF	1.180	1.230
16	1 20UNEF	1.305	1.230
18	$1\frac{1}{8}$ 18UNEF	1.391	1.230
20	$1\frac{3}{8}$ 18UNEF	1.531	1.230
22	$1\frac{5}{8}$ 18UNEF	1.656	1.230
24	$1\frac{7}{8}$ 18UNEF	1.777	1.230

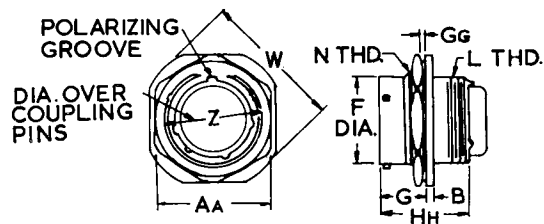


Fig. 16. Jam nut receptacle (Table 14)

TABLE 14 (fig.16)

Jam nut receptacle dimensions

Shell size	AA Max	B Max	F Max	G	GG Panel Thick.	HH Max	L Thread Class 2A	N Thread Class 2A	W Max.	Z Max.
10	0.892	0.113	0.591	0.707	0.187	1.215	$\frac{5}{8}$ 24UNEF	$\frac{11}{16}$ 24UNEF	1.203	0.680
12	1.079	0.113	0.751	0.707	0.187	1.215	$\frac{3}{4}$ 20UNEF	$\frac{7}{8}$ 20UNEF	1.391	0.859
14	1.205	0.113	0.876	0.707	0.187	1.215	$\frac{7}{8}$ 20UNEF	1 20UNEF	1.516	0.984
16	1.329	0.113	1.001	0.707	0.187	1.215	1 20UNEF	$1\frac{1}{8}$ 18UNEF	1.641	1.108
18	1.455	0.113	1.126	0.707	0.187	1.215	$1\frac{1}{16}$ 18UNEF	$1\frac{1}{4}$ 18UNEF	1.766	1.233
20	1.579	0.148	1.251	0.772	0.250	1.275	$1\frac{3}{16}$ 18UNEF	$1\frac{3}{8}$ 18UNEF	1.954	1.358
22	1.705	0.148	1.376	0.772	0.250	1.275	$1\frac{5}{16}$ 18UNEF	$1\frac{1}{2}$ 18UNEF	2.078	1.483
24	1.829	0.148	1.501	0.722	0.219	1.275	$1\frac{7}{16}$ 18UNEF	$1\frac{5}{8}$ 18UNEF	2.203	1.610

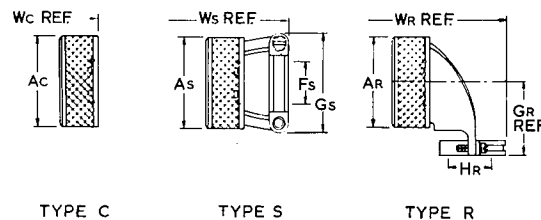


Fig. 17. Backshell assemblies (Table 15)

TABLE 15 (fig. 17)

Backshell dimensions

Shell size	Type C		Type S				Type R			
	Ac Max	Wc Max	As Max	Fs Max	Gs Max	Ws Max	Ar Max	Gr Max	Hr Max	Wr Max
10	0.734	1.492	0.734	0.286	0.809	1.842	0.734	0.880	0.286	2.115
12	0.858	1.492	0.858	0.416	0.937	1.842	0.858	0.950	0.416	2.250
14	0.984	1.492	0.984	0.476	1.008	2.077	0.984	1.010	0.476	2.340
16	1.112	1.492	1.112	0.626	1.183	2.077	1.112	1.070	0.626	2.475
18	1.218	1.492	1.218	0.706	1.299	2.077	1.218	1.130	0.706	2.574
20	1.345	1.552	1.345	0.831	1.431	2.137	1.345	1.190	0.831	2.767
22	1.468	1.552	1.468	0.956	1.558	2.137	1.468	1.260	0.956	2.890
24	1.593	1.552	1.593	1.081	1.700	2.137	1.593	1.320	1.081	2.012

TABLE 16 (fig. 17)**Backshell part numbers**

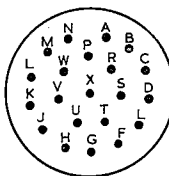
Shell size	Type C (Short)		Type S (Straight)		Type R (90 deg.)	
	NAS	Cannon Part No.	NAS	Cannon Part No.	NAS	Cannon Part No.
10	1665-10	057-0716-000	1666-10	057-0683-000	1667-10	057-0704-000
12	1665-12	057-0717-000	1666-12	057-0684-000	1667-12	057-0705-000
14	1665-14	057-0718-000	1666-14	057-0685-000	1667-14	057-0706-000
16	1665-16	057-0719-000	1666-16	057-0686-000	1667-16	057-0707-000
18	1665-18	057-0720-000	1666-18	057-0687-000	1667-18	057-0708-000
20	1665-20	057-0721-000	1666-20	057-0688-000	1667-20	057-0709-000
22	1665-22	057-0722-000	1666-22	057-0689-000	1667-22	057-0710-000
24	1665-24	057-0723-000	1666-24	057-0713-000	1667-24	057-0711-000



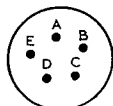
12-3
3-#16



14-12
8-#20
4-#16



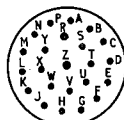
22-21
21-#16



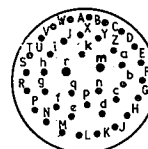
14-5
5-#16



14-15
14-#20
1-#16



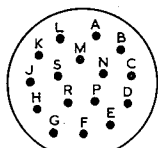
16-23
22-#20
1-#16



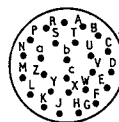
20-39
37-#20
2-#16



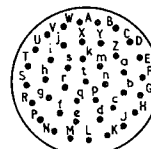
10-6
6-#20



20-16
16-#16



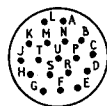
20-24
24-#20



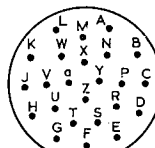
20-41
41-#20



12-8
8-#20



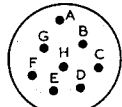
14-18
18-#20



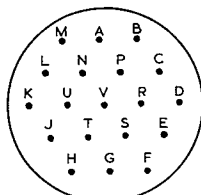
16-26
26-#20



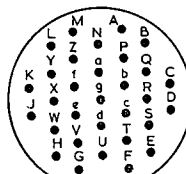
22-41
27-#20
14-#16



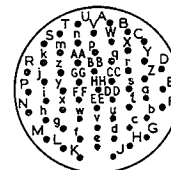
16-8
8-#16



24-19
19-#12



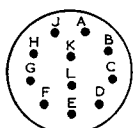
24-31
31-#16



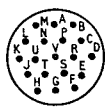
22-55
55-#20



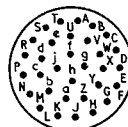
12-10
10-#20



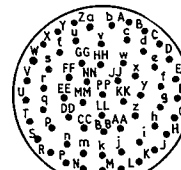
18-11
11-#16



14-19
19-#20



18-32
32-#20



24-61
61-#20

Fig. 18. Contact arrangements

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