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CONNECTORS, TRANSRADIO VMP AND SM SERIES

GENERAL AND TECHNICAL INFORMATION

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CONNECTORS, TRANSRADIO VMP SERIES

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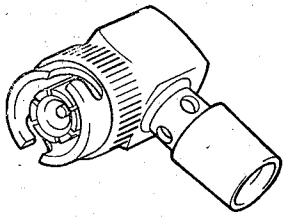
ILLUSTRATIONS

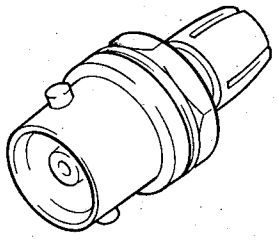
LEADING PARTICULARS

VMP Series, Transradio Connectors

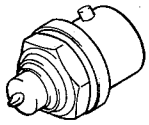
Voltage (maximum)	1 *kV to* 1·5 *kV*
Frequency (maximum)	2000 *Mc/s*
Impedance	50 *ohm*
Insulation resistance	100 *Megohms at* 500*V d.c.*
Flash voltage (maximum)	2 *kV*
Temperature range	−40 *to* +150 *deg. C*
Humidity	*Class H2*
Altitude	70000 *ft*
Cable types	*Uniradio, RG Minicables and Heat proof p.t.f.e. as indicated for the relevant connectors*
Lubricant	*Kingsnorth* 1026



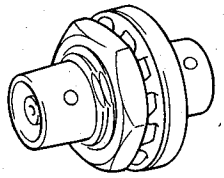
VMP 6 A
RIGHT ANGLE PLUG



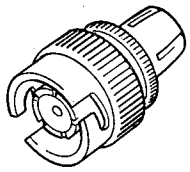
VMP 2/3
PANEL MOUNTED JACK



VMP 5/5
PANEL MOUNTED
RECEPTACLE



VMP 3 A
PANEL MOUNTED
STRAIGHT ADAPTERS



VMP 1/3
STRAIGHT PLUG

Fig. 1. VMP Connectors

Introduction

1. The Transradio VMP series of connectors are miniature, 50 ohm impedance, bayonet lock, coaxial type connectors for use in radio frequency applications up to 2000 Mc/s. These connectors are weatherproof and may be used outdoors under wide extremes of climatic conditions.

2. This range of connectors comprises cable mounted (free), plugs and adapters, panel mounted (fixed) receptacles and jacks as shown in fig. 1. When the plugs are mated to the panel mounted components, the assemblies are hermetically sealed to withstand moisture and pressures up to 30 lb/in^2. Overlapping of the insulation of the mated components enables high voltages to be applied without causing breakdowns.

DESCRIPTION

3. These connectors may not be dismantled, as the internal insulation and contacts are integral with the shells to ensure accurate contact alignment and an impedance of 50 ohms. The shells are of machined brass, heavily silver plated and coated to prevent oxidization. The insulation between the shell and contact pin is of Teflon and the contacts are made of brass, silver plated and coated. The overall dimensions and arrangements of the connectors in this range are shown in fig. 2. Table 1 details the connector types and reference numbers.

4. Mated connectors are secured togther by a bayonet-lock arrangement, the pins being located on the fixed (panel mounted) components and the slots in the free (cable mounted) components. Panel mounted components are secured through the panels by a nut and lockwasher on to an external screw thread. Cable mounted components are secured to the cables either by an internal screw thread, into which is screwed the outer insulation of the cable, or by shrinking a plastic sleeve over the end of the connector and the cable. Only cables of the correct external dimensions should be fitted to the plugs and panel jack.

Connector Type VMP 1/3

5. The Type VMP 1/3 connectors are straight plugs with a P.V.C. sheath type cable securing arrangement. The cable entry diameter is 0·118 in. ±0·006 in. suitable for the following cable types:—

(1) UR — 95

(2) RG — 174/U

(3) Minicables GO1232, GO1232H, and GO1239/45H.

(4) Heat-proof p.t.f.e. cable KO1292a (MHP/50).

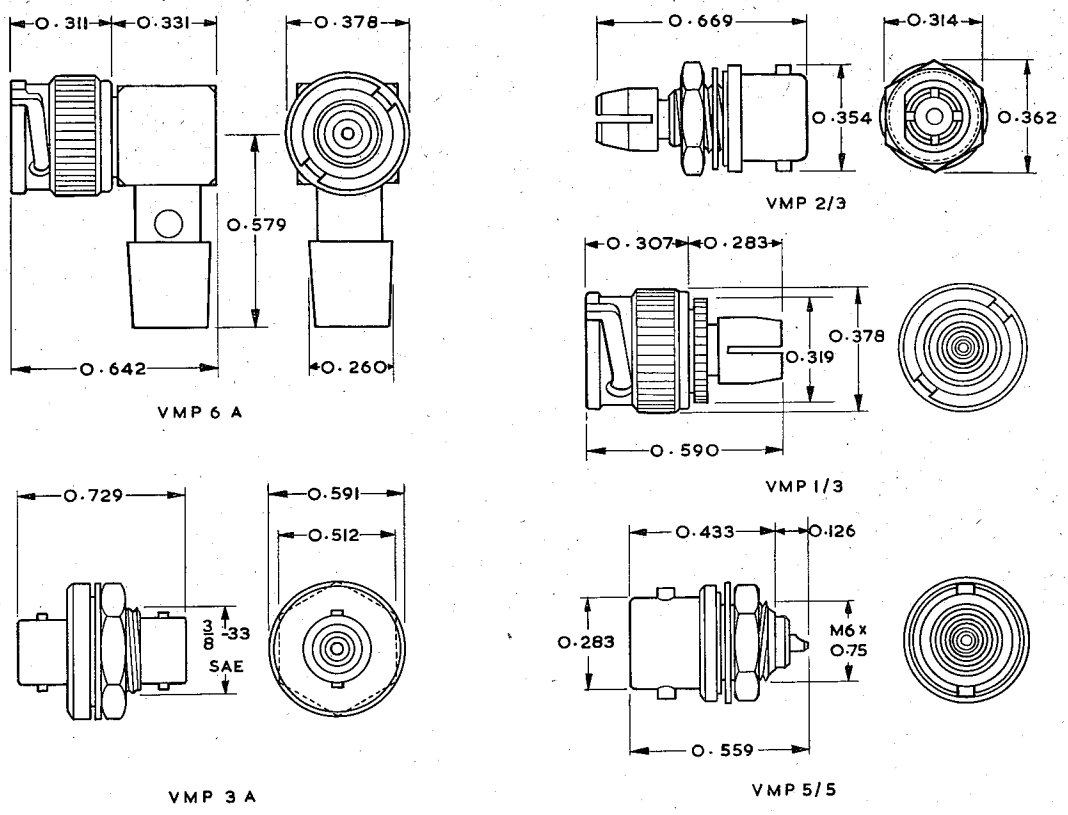


Fig. 2. Arrangement and dimensions

Connector Type VMP 5/5

6. The Type VMP 5/5 connectors are panel mounted chassis receptacles, secured to the panel from the rear by a nut and lock-washer. Cable connection is by the inner conductor only, to the solder tag at the rear of the connector.

Connector Type VMP 6A

7. The Type VMP 6A connectors are right angled plugs with a screw-in type cable fitting. The cable inner conductor is pressure fitted to the contact and the outer conductor (braid) is soldered to the shell via soldering holes, drilled radially through the waisted portion at the cable end of the connector.

8. The cable entry diameter is 0·196 in. ±0·006 in. suitable for the following cable types:—

(1) Minicables GO3232

(2) Heat-proof p.t.f.e. cable KO3292.

Connector Type VMP 3A

9. The Type VMP 3A connectors are panel mounted, straight adapters, fitted with two female contacts one at each end. The adapters are designed to accept cable mounted plugs on each end, to enable cables to be passed through the panel, without the necessity of a permanent soldered connection being made. The adapters are secured through the panel by a nut and lock-washer on the external screw thread.

Connector Type VMP 2/3

10. The Type VMP 2/3 connectors are panel mounted jacks, similar to the Type VMP 1/3 straight plugs (para. 5). These jacks are fitted with an external screw thread on the rear of the shell, enabling them to be mounted through a panel and secured by a nut and lockwasher. These jacks enable both conductors of a cable to be connected behind the panel. The cable entry diameter and cable types are the same as for the VMP 1/3 connectors.

INSTRUCTIONS FOR USE

11. Before fitting or preparing cables for assembly to the plug connectors or to the panel jack types, it must be ensured that the cables are of a suitable type as detailed.

12. During cable preparation and assembly to the connectors care should be taken that the cable sheath, outer conductor (braid), dielectric and inner conductor of the cable and the connector insulation are not damaged or overheated. When making soldered joints, resin cored solder (Ref. No. 30B/1606) should be used, and the resulting joint must be free of any lumps, spikes or protrusions. All soldered joints should be as neat and as small as possible, consistent with a good electrical contact and holding power.

VMP 1/3 and 2/3 assembly

13. The appropriatte types of cables should be prepared and assembled to the connectors, in accordance with fig. 3 and the following procedure:—

(1) Slide the scarlet sleeve on to the cable over the sheath and clear of the cable end.

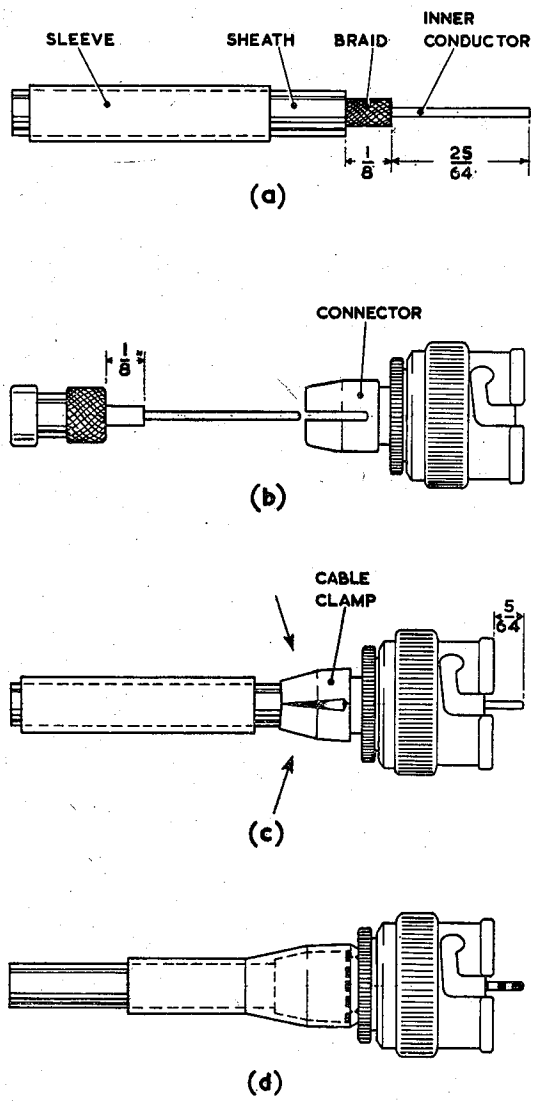


Fig. 3. VMP 1/3 and 2/3 assembly details

(2) Carefully cut through the cable sheath, completely around the cable, at a point approximately $\frac{33}{64}$ in. for Type 1/3 or $\frac{17}{64}$ in. for Type 2/3, from the end of the cable. Take care not to cut into or mark the braid under the sheath.

(3) Slit the sheath, longitudinally from the circular cut to the end of the cable, and peel off the cut piece of sheath. Again, take care when cutting through the sheath that the braid is not damaged.

(4) Carefully cut through the braid and the dielectric, completely around the cable at a point approximately $\frac{25}{64}$ in. for type 1/3 or $\frac{1}{8}$ in. for type 2/3 from the end of the cable. Take care not to cut into or mark the inner conductor (fig. 3 (a)).

(5) Slide the cut portion of the braid and dielectric off the inner conductor.

(6) Carefully splay or loosen the braid and turn the braid backwards over the sheath (fig. 3 (b)).

(7) Lightly tin the surface of the inner conductor.

(8) Insert the end to the inner conductor into the rear of the contact pin, through the rear of the connector, until the inner conductor protrudes from the front of the contact pin and the cut surface of the dielectric is seated against the rear of the contact.

(9) Pinch the cable clamp jaws, at the rear of the connector together in the direction of the arrows (fig. 3 (c)).

(10) If required, solder the braid to the cable clamp.

(11) Carefully solder the inner conductor to the front end of the contact pin and cut off the protruding portion flush with the front end of the pin.

(12) Slide the sleeve, previously placed on the cable, down the cable and over the cable entry up to the knurled ring at the rear of the connector.

(13) Warm the sleeve, using hot air, weak flame, or an infra red lamp, until it tightens around the rear of the connector and the cable.

Note . . .

If the assembly is to be used with an operating voltage of 1·5 kV, a drop of viscous polystyrene solution should be applied to the cut face of the dielectric in sub-para. (6).

VMP 5/5 assembly

14. The cable should be prepared and assembled to the connector as follows:—

(1) Carefully cut through the sheath, braid and dielectric, completely around the cable, at a point approximately $\frac{1}{4}$ in. from the end of the cable.

(2) Slide the cut portions of the sheath, braid and dielectric off the inner conductor.

(3) Lightly tin the surface of the inner conductor.

(4) Form the end of the inner conductor into a hook.

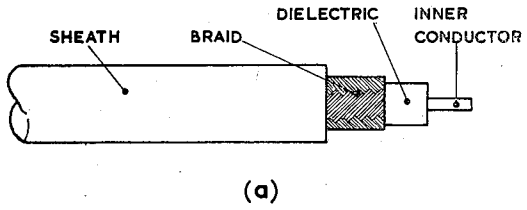
(5) Insert the hooked end of the inner conductor through the solder tag at the rear of the connector and carefully pinch the inner conductor around the solder tag.

(6) Solder the inner conductor to the solder tag.

VMP 6A assembly

15. The appropriate type of cable should be prepared and assembled, in accordance with fig. 4, and the following procedure:—

(1) Carefully cut through the sheath, completely around the cable, at a point approximately $\frac{3}{8}$ in. from the end of the cable. Taking care not to cut into or mark the braid.



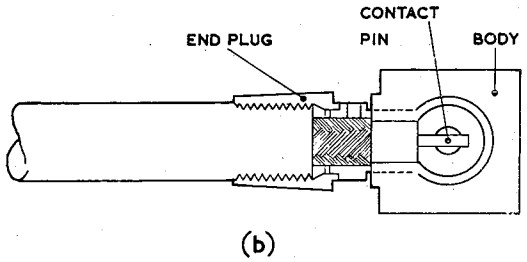


Fig. 4. VMP 6A assembly details

(2) Slit the sheath longitudinally from the circular cut to the end of the cable and peel off the cut pieces of sheath (fig. 4 (a)). Again care should be taken that the braid is not damaged.

(3) Carefully cut through the braid, completely around the cable, at a point approximately $\frac{3}{16}$ in. from the end of of the cable. Take care not to damage the dielectric.

(4) Pull the cut piece of braid off the end of the cable.

(5) Carefully cut through the dielectric, completely around the cable, at a point approximately $\frac{5}{32}$ in. from the end of the cable. Take care not to damage the inner conductor.

(6) Pull the cut piece of dielectric off the end of the cable.

(7) Lightly tin the exposed braid for a distance of approximately $\frac{1}{8}$ in. from the end of the braid. Take care not to overheat or damage the dielectric.

(8) Tin the inner conductor and offer it up to the front end of the connector contact pin. Ensure that the inner conductor slides freely into the contact pin.

(9) Remove the end plug from the connector and screw on to the cable.

(10) Insert the inner conductor in to the slot at the rear of the contact pin, through the rear of the connector body, fig. 4 (b).

(11) Insert the cable fully in to the body, by screwing the end plug into the connector body until the cable dielectric is seated on to the connector insulation, as seen by the soldered braid being visible through the two diametrically opposite holes in the neck of the connector body, and the end plug being screwed fully home.

(12) Solder the braid to the connector body, via the holes in the neck, using a sharp pointed soldering iron. Take care that the dielectric is not damaged by overheating.

(13) Allow the cable and connector to cool down, without disturbance.

(14) Solder the contact pin to the inner conductor by applying heat to the front end of the contact pin. Take care that the cable

dielectric and the connector insulation are not damaged by overheating.

(15) Heat the cable entry end of the connector body to about 160 deg. C, for sufficient time to melt the sheath. Take care that the dielectric is not overheated.

(16) Allow the assembly to cool without disturbance.

TABLE 1

VMP series connectors

Type	Description	N.A.T.O. Ref. No. 5935–99–	R.A.F. Ref. No. 10H/
VMP 1/3	Straight plug	945–7089	23681
VMP 5/5	Chassis receptacle	945–8225	23683
VMP 6A	Right angle plug	580–9714	
VMP 3A	Straight adapter		23062
VMP 2/3	Panel jack	580–9715	

Chapter 2

CONNECTORS, TRANSRADIO SM SERIES

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TABLE

ILLUSTRATIONS

LEADING PARTICULARS

SM Series Transradio Connectors

Voltage (maximum)	500*V*
Frequency (maximum)	3600 *Mc/s*
Impedance	50 *and* 75 *ohm*
Insulation resistance	100 *Megohms at* 500*V d.c.*
Flash voltage (maximum)	750*V*
Temperature range	−40 *to* +200 *deg. C*
Humidity	*Class M2*
Cable types	*Uniradio, RG, mini and heat proof p.t.f.e. as indicated.*

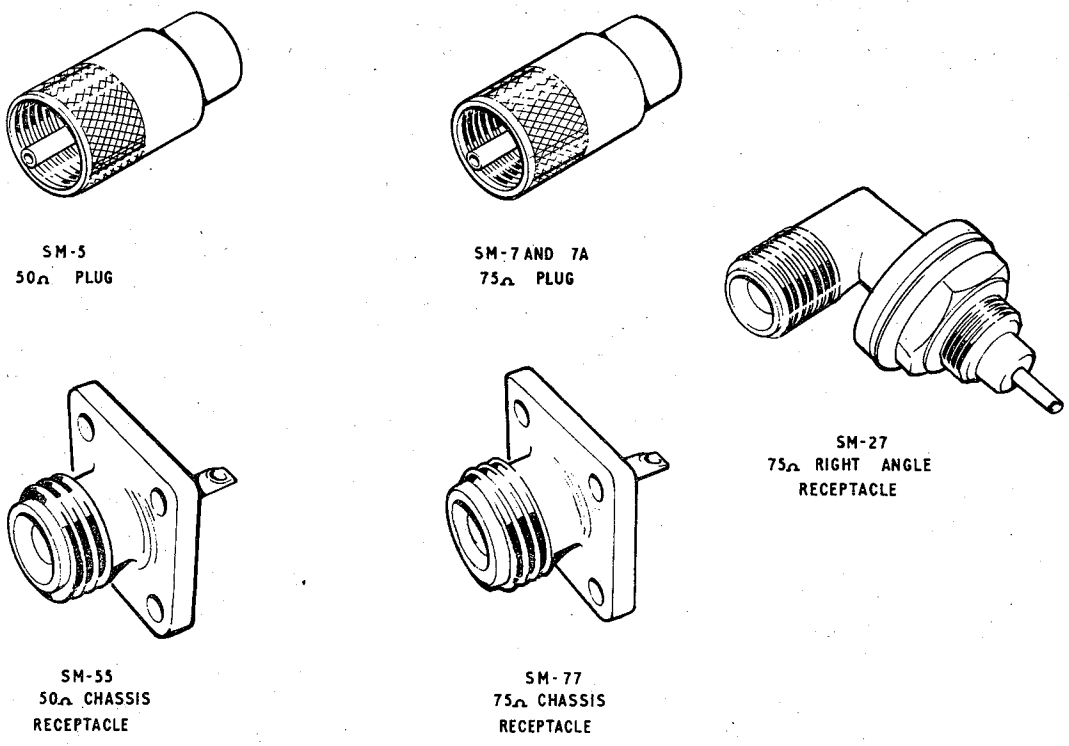

Fig. 1. SM Connectors

Introduction

1. The Transradio SM series of connectors are miniature 50 and 75 ohm impedance, screw-lock, coaxial type connectors for use in high frequency application up to 3600 Mc/s.

2. The range of connectors comprise cable mounted (free) plugs and panel mounted (fixed) receptacles as shown in fig. 1. When mated the connectors are hermetically sealed with the insulation overlapping to enable high voltages to be applied to the assembly.

DESCRIPTION

3. Apart from the coupling ring of the plug type connectors, these connectors may not be dismantled at the internal insulation and contact pins are integral with the shells, to ensure accurate contact alignment and impedances. The shells are of machined brass, silver plated and coated to prevent oxidization. The insulation beween the shell and the contact pin is of Teflon, and the contacts are made of brass, silver plated. The overall dimensions and general arrangement of the connectors in this series are shown in fig. 2. Table 1 details the types and reference numbers.

4. Mated connectors are secured together by a screw-lock arrangement, the male thread being cut on the receptacles, and the female thread in the coupling ring of the plugs. The coupling ring on the plugs also serves to secure the body of the plug to the cable. Straight receptacles are secured to the panels by means of a flange plate with four clearance holes. The right angle receptacle is secured through the panel by its external thread, a lockwasher and a nut.

5. Cable connection to the receptacles is by the inner conductor of the cable only, being soldered to the tag at the rear of the receptacle. Connections to the plugs may be made either by clamping or by soldering as indicated in the relevant paragraphs under Instructions for Use. Only cables of the correct external dimensions and types should be connected to the plug connections, as indicated in the appropriate paragraph for the particular type in the series.

Connector Type SM5

6. The Type SM5 connectors are 50 ohm impedance, straight plugs comprising a body and a coupling nut. The body is externally threaded and contains the insulation and contact pin. The coupling nut is externally knurled and internally threaded to afford a firm grip and to secure the body to its mating receptacle respectively.

7. The diameter of the cable entry hole in the rear of the coupling nut and body is 0·196 in. +0·010 in. −0·006 in. The connector is suitable for use with the following types of cables:—

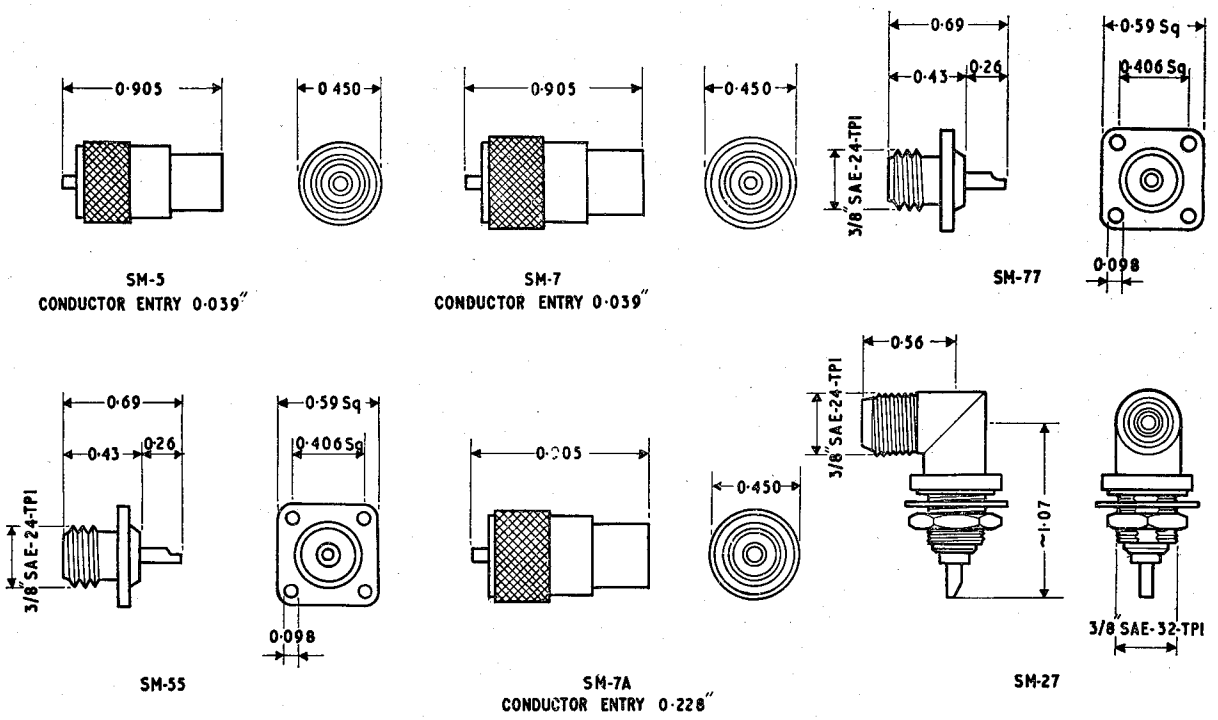

Fig. 2. Arrangements and dimensions

(1) UR-43 and UR-76

(2) RG-58/U, RG-58 C/U, RG-141 A/U and RG-142A/U

(3) Minicable G 03232

(4) Heat-proof p.t.f.e. cable K 03292

Connector Type SM55

8. The Type SM55 connectors are 50 ohm impedance, panel mounted receptacles, secured to the panel via four 0·098 in. clearance holes in the flange plate. Cable connection is by the inner conductor only to the solder tag at the rear of the connector.

Connector Type SM7

9. The Type SM7 connectors are 75 ohm impedance, straight plugs, similar in construction to the Type SM5 para. 6. The diameter of the cable entry hole is 0·196 in. +0·010 in. −0·006 in. The connector is suitable for use with the following types of cables:—

(1) UR-104

(2) Minicables G 03233 and G 03233 H

(3) Heat-proof p.t.f.e. cable K 03293

Connector Type SM7A

10. The Type SM7A connectors are 75 ohm impedance, straight plugs, similar in construction to the Type SM7 para. 9. The diameter of the cable entry hole is 0·228 in. +0·010 in. −0·006 in. The connector is suitable for use with the following types of cables:—

(1) Uniradio 70

(2) RG-140/U

Connector Type SM77

11. The Type SM77 connectors are 75 ohm impedance, panel mounted receptacles, similar in construction to the Type SM55 para. 8.

Connector Type SM27

12. The Type SM27 connectors are 75 ohm impedance, through panel mounted, right angle receptacles. They are designed for use on pressurized bulkhead application and are located by a thread on the rear of the connector, passing through the panel and then being secured by a nut and a lockwasher. Cable connection is by the inner conductor only to the solder cup projecting from the rear of the connector.

INSTRUCTIONS FOR USE

13. Before fitting or preparing any cables for assembly to the plug connectors, it must be ensured that the cables are of a suitable type, as indicated.

14. During cable preparation and subsequent assembly to the connectors, care should be taken that the sheath, braid, dielectric and inner conductor of the cable, and the connector insulation are not damaged or overheated. Resin cored solder (Ref. No. 30B/1606) should be used when making soldered joints, and the resulting joint must be free of any lumps, spikes or protrusions. All soldered joints should be as neat and as small as possible, consistent with a good electrical contact and holding power.

Straight plug (SM5, SM7 and SM7A) assembly

15. The straight plugs may be connected to the appropriate cables using one of three possible methods. The method selected will depend upon the application; conditions and frequency of operation of the equipment with which the connector is to be used. When the connector and attached cable are to be used on equipment with frequencies greater than 1000 Mc/s, the fitting must be checked for quality before usage.

16. The three possible methods are as follows:—

(1) Clamped fitting for use at up to 300 Mc/s.

(2) Soldered fitting for use at up to 3600 Mc/s.

(3) Clamped fitting for use at high frequencies, as an alternative to the method of sub-para. (2). This method can give results not far short of the reflectionless termination that is obtainable with the soldered method sub-para. (2).

Clamped fitting suitable for frequencies up to 300 Mc/s

17. The type of cable appropriate to the relevant connector should be selected, prepared and assembled, in accordance with fig. 3 and the following procedure:—

(1) Carefully cut through the sheath, completely around the cable, at a point approximately $\frac{7}{8}$ in. from the end of the cable, taking care not to cut into or mark the braid under the sheath.

(2) Slit the sheath, longitudinally, from the circular cut to the end of the cable, and peel off the cut piece of sheath from the cable, fig. 3 (a). Again, care should be taken that the braid under the sheath is not cut or marked in any way.

(3) Carefully cut through the braid, completely around the cable, at a point approximately $\frac{11}{16}$ in. from the end of the cable, taking care not to damage the dielectric under the braid.

(4) Work the cut piece of braid loose from the dielectric and slide it off the end of the cable, fig. 3 (b).

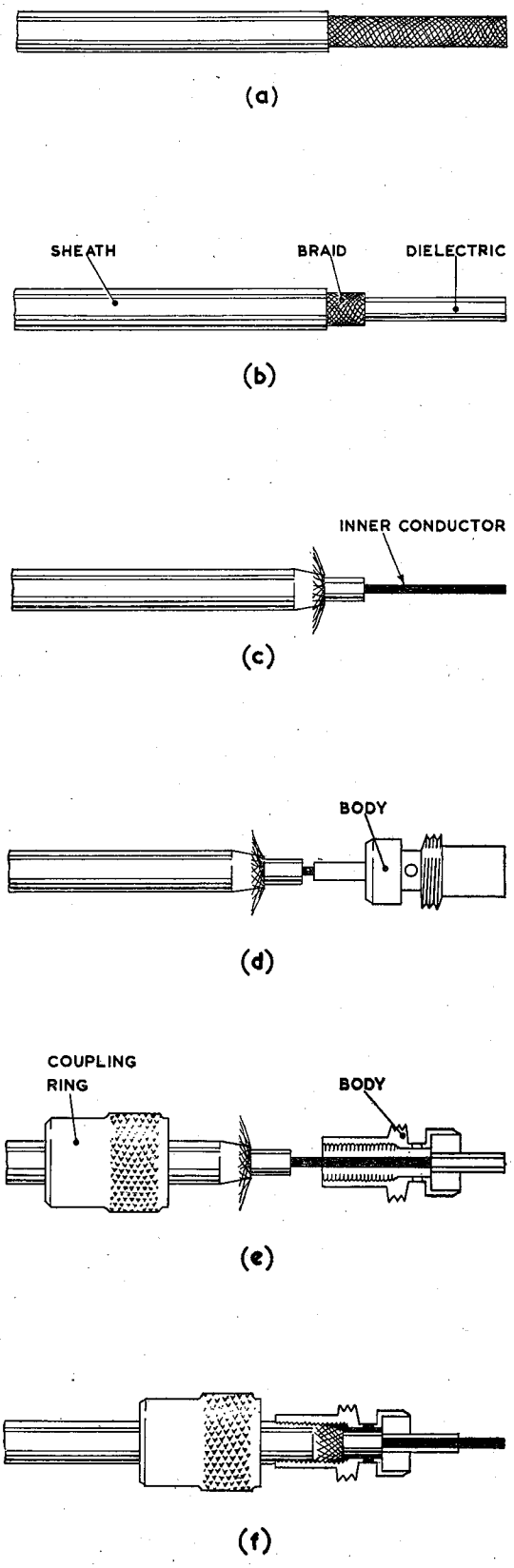

Fig. 3. Straight plug assembly for frequencies to 300 Mc/s

(5) Carefully cut through the dielectric, completely around the cable, at a point approximately $\frac{9}{16}$ in. from the end of the cable, taking care not to cut into or damage the inner conductor. Do not remove the dielectric from the inner conductor.

(6) Repeat sub-para. (5) at $\frac{1}{8}$ in. intervals working from the original cut to the end of the cable.

(7) Slide off each piece of dielectric from the inner conductor.

(8) Carefully taper the sheath down to the braid, from a point approximately $\frac{1}{4}$ in. from the cut end of the sheath, taking care that the braid is not damaged.

(9) Unpick and splay out the braid evenly around the cable.

(10) Fold the braid back over the tapered portion of the dielectric and evenly around the cable, fig. 3 (c).

(11) Tin the end of the inner conductor, taking care that the dielectric is not damaged by overheating.

(12) Remove the coupling ring from the body of the connector and slide it on to the cable and clear of the prepared end.

(13) Offer up the front end of the contact pin in the connector body, to the tinned end of the inner conductor, and ensure that the inner conductor slides easily into the contact pin, fig. 3 (d).

(14) Insert the inner conductor in to the rear of the contact pin, through the rear of the connector body, fig. 3 (e).

(15) Insert the cable fully in to the connector body, by screwing the body on to the cable sheath, until the cable dielectric is seated on to the connector insulation, as viewed through the two diametrically opposite holes in the neck of the connector body, fig. 3 (f).

(16) Heat the cable entry end of the body to about 160°C, using a weak gas flame, maintaining this heat just long enough to melt the outer sheath of the cable. Care must be taken that the dielectric is not overheated during the process.

(17) Allow the connector body and cable to cool down. Do not move the assembly whilst the cooling period is in progress.

(18) Solder the contact pin to the inner conductor by applying heat to the front end of the contact pin, taking care that the connector insulation and the cable dielectric are not damaged by overheating.

(19) Slide the coupling ring down the cable and screw it on to the connector body.

Soldered fitting suitable for frequencies up to 3600 Mc/s

18. After selecting the type of cable appropriate to the relevant connector, prepare the cable and assemble to the connector in accordance with fig. 4 and the following procedure:—

(1) Initially, prepare the cable as instructed in para. 17, sub-para. (1) to (7) inclusive.

(2) Lightly tin the exposed braid for a length of approximately $\frac{1}{8}$ in. from the end of the braid, taking care not to overheat or damage the dielectric (fig. 4 (a)).

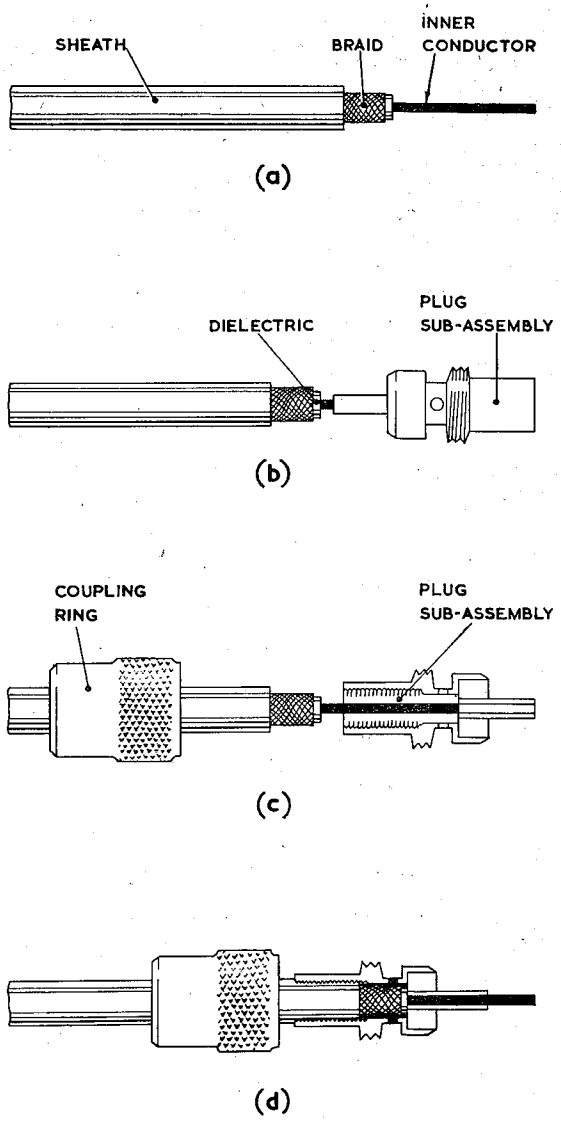

Fig. 4. Straight plug assembly for frequencies to 3600 Mc/s

(3) Remove the coupling ring from the body of the connector and slide it on to the cable and clear of the prepared end.

(4) Tin the inner conductor and offer the tinned end to the front end of the connector contact pin. Ensure that the inner conductor slides freely in to the contact pin (fig. 4 (b)).

(5) Insert the inner conductor in to the rear of the contact pin, through the rear of the connector body (fig. 4 (c)).

(6) Insert the cable fully in to the connector body, by screwing the body on to the cable sheath, until the cable dielectric is seated on to the connector insulation, as viewed through the two diametrically opposite holes in the neck of the connector body (fig. 4 (d)).

(7) Solder the braid to the connector body via the two holes in the neck of the connector, using a sharp pointed soldering iron. Take care that the dielectric is not damaged by overheating.

(8) Allow the cable and connector to cool down, without disturbance.

(9) Solder the contact pin to the inner conductor by applying heat to the front end of the contact pin. Take care that the connector innsulation and the cable dielectric are not damaged by overheating.

(10) Slide the coupling plug down the cable and screw in on to the connector body.

Clamped fitting suitable for high frequencies

19. After selecting the type of cable appropriate to the relevant connector, prepare the cable and assemble it to the connector in accordance with fig. 4 and the following procedure:—

(1) Prepare the cable as instructed in para. 18 sub-para. (1) to (3) inclusive.

(2) Using a length of fine copper wire, wind a layer carefully over the braid to bring the diameter at this point to 3·9 mm +0·08 mm, −0 mm. The layer should extend over approximately $\frac{1}{8}$ in.

(3) Run solder over the layer to secure it to the braid, taking care that the dielectric is not damaged or overheated (fig. 5).

(4) Follow the instructions given in para. 18, sub-para. (4) to (6) inclusive.

(5) Follow the instruction given in para. 18 sub-para. (9) and (10).

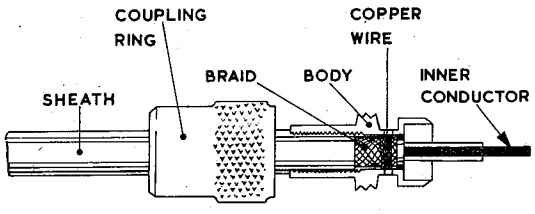

Fig. 5. Straight plug assembly for high frequencies

Chassis receptacle (SM55 and SM77) assembly

20. The cable should be prepared and assembled to the connectors as follows:—

(1) Carefully cut through the sheath, braid and dielectric, completely around the cable, at a point approximately $\frac{1}{4}$ in. from the end of the cable, taking care not to damage the inner conductor.

(2) Slide the cut portion of the sheath, braid and dielectric off the end of the inner conductor.

(3) Lightly tin the surface of the inner conductor.

(4) Form the tinned end of the inner conductor into a hook.

(5) Insert the hooked end of the inner conductor through the eye of the solder tag at the rear of the connector, and carefully pinch the inner conductor around the solder tag.

(6) Solder the inner conductor to the solder tag, taking care that the dielectric is not damaged by being overheated.

Right-angle receptacle (SM27) assembly

21. The cable should be prepared and assembled to the connector as follows:—

(1) Carefully cut through the sheath, braid and dielectric, completely around the cable, at a point $\frac{3}{16}$ in. from the end of the cable, taking care not to damage the inner conductor.

(2) Pull the cut portions of the sheath, braid and dielectric off the inner conductor.

(3) Tin the end of the inner conductor.

(4) Insert the tinned end of the inner conductor in to the solder cup at the rear of the connector contact pin.

(5) Solder the inner conductor to the contact pin, taking care not to overheat the dielectric.

TABLE 1

SM series connectors

Type	Description	N.A.T.O. Ref. No. 5935–99–	R.A.F. Ref. No. 10H/
SM5	Straight plug	999–5347	
SM55	Chassis receptacle		24144
SM7	Straight plug	911–6882	
SM7A	Straight plug	580–3573	
SM77	Chassis receptacle	911–6607	
SM27	Right angle receptacle	920–9260	

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