5-1. GENERAL. - Transmission lines are electrical circuits whose prime function is to transmit radio frequency energy from one point to another in an electronic equipment or system. Other functions of transmission lines are to act as circuit elements, as impedance matching devices, as delay lines, etc. Regardless of function, the transmission line must be correctly designed and properly installed to accomplish its particular purpose. It must be equipped with suitable connectors and fittings, assembled with particular care, and installed in accordance with approved practices. The least deviation from accepted methods or carelessness in installation places the entire electronic system in jeopardy.

a. SCOPE. - This section discusses the various types of radio frequency transmission lines; multiwire lines, coaxial lines and waveguides. It establishes and lists the major components of these three types, the connectors and fittings which are used with each, and gives complete instructions for their assembly. The proper installation methods and procedures are stated, as well as approved manners of finishing and protecting.

b. MULTIWIRE LINE. - A transmission line made of two or more parallel wires is known as multiwire line. The most common is the two wire line which has impedances in the general range of 50 to 1,000 ohms. It may have air or a solid but flexible insulating material between the conductors. A basic design is the simple "twin-lead" used to connect a television antenna to the receiver. Multiwire lines may be open wire lines, twin lead or shielded twin lead cables.

(1) Open Wire Lines. - The open wire line was the earliest, and remains the simplest, form of balanced transmission line. It is made of two or more parallel open wires. The open wire conductors are kept at a fixed distance from each other by insulating material, such as spacers or spreaders, placed at suitable intervals. For a given conductor size the center-to-center spacing determines the line impedance. They are most efficient at high impedances (300 to 600 ohms) and for low frequencies, particularly with rombic and doublet antennas. The attenuation and power handling capacity are quite good but are highly dependent on atmospheric conditions and snow or ice loading on the conductors. While the installation is simple, it is permanent in nature and requires considerable clearance space around the conductors. Open lines are quite susceptible to interference from external signals and will begin to radiate energy to an appreciable degree when the conductor spacing approaches 1/20 wave length.

(2) Twin Lead. - Flexible unshielded twin conductor or twin lead cables are fabricated with a continuous dielectric of solid or semisolid material in a variety of cross-section configurations. Low in cost, they are popular for television and FM receivers. The dielectric increases the attenuation by reducing the impedance range but makes the cable much less sensitive to weather conditions. Pigmented polyethylene when used resists cracking caused by continued exposure to the ultra-violet rays of the sun. Twin lead is generally fabricated as a flat cable and it is necessary to handle them with care to avoid kinking, twisting or causing uneven tension in or between the conductors.

(3) Shielded Twin Lead. - Shielded twin lead consists of individually insulated conductors, usually twisted pair, encased in a dielectric of the desired diameter, enclosed in an overall shield of one or two braids, and then covered by a protecting jacket. Greater electrical stability and mechanical ruggedness are thus obtained. They are used primarily for receiver applications at frequencies below several hundred megacycles. They are also used extensively in fixed and portable direction-finding antenna systems in which balance is of paramount importance.

c. COAXIAL LINE. - The coaxial type of transmission line has a center or inner, conductor which is separated from and completely surrounded by an outer conductor. The conductors are separated by a solid or semisolid dielectric, or by air and small insulating spacers called beads. Coaxial lines are small, light and will conduct a relatively wide band of frequencies. They have impedances of the general value of 20 to 100 ohms. Energy which would be radiated by an open wire line is contained within the coaxial configuration, and the overall efficiency is increased. The relative dimensions of the conductors of a coaxial line may be chosen to obtain minimum attenuation, maximum power capacity, or the maximum voltage rating for either a fixed outer diameter or a fixed mean diameter. The finished product may be flexible coaxial cable, or semirigid or rigid coaxial lines.

(1) Flexible Coaxial Cables. - Flexible coaxial cables are a simple and popular means for the transmission of radio frequency energy. Their extensive use has encouraged the development of dielectric materials and production techniques which have resulted in improved temperature range, attenuation stability, operating voltage and other features. They are made in a wide range of sizes and electrical characteristics.

(2) Semirigid Coaxial Lines. - There are many constructional variations between the flexible coaxial cables and the rigid coaxial lines which fall in the broad category of semirigid, or semiflexible, lines. These lines can be fabricated and shipped in continuous lengths to 2,000 feet. The outer conductor is a smooth-drawn or corrugated tubing of ductile metal which may be covered for abrasion protection or for corrosion resistance. They have been separated into two main classes; the airspaced lines and the solid dielectric lines. The dielectric material of the airspaced lines may be a continuous ribbon, rod or tube which is placed between the inner and outer conductor. The solid dielectirc type is fabricated with a solid or continuous insulating material between the inner and outer conductor.

(3) Rigid Coaxial Lines. - The conductors of rigid coaxial lines are different diameter tubes, one being inserted within the other. They are usually precision made tubing of high conductivity hard drawn copper, although

extruded aluminum or copper coated steel have been used. The inner conductor is rigidly supported by some type of dielectric material in the form of a bead or pin which is mechanically crimped or press fitted between the conductors. They are designated by the overall diameter of the outer conductor and are fabricated in 20 foot sections with couplings at each end.

d. WAVEGUIDE. - The waveguide is a single conductive pipe or tube through which radio frequency energy can be transmitted. Electric and magnetic fields are present within the guide during propagation of the radio frequency energy. The two fields are at right angles to each other and, in general, they are transverse also to the direction of propagation of the energy. Many patterns, called modes, are formed by the two fields within the guide. The variations of the modes are caused largely by the physical dimensions of the guide and by the wave length of the radio frequency energy which has been introduced into it. Guides are generally rectangular or circular in shape, although other configurations are also available and in use. These latter include the single or double ridged guide, flat guide, H guide and the G line.

(1) Rectangular Waveguides. - Standard rectangular waveguides are available over the frequency range from 470 megacycles to 326 gigacycles with inside dimensions extending from 15.00 by 7.50 inch to 0.0340 by 0.0170 inch. Although earlier guides used outside dimensions, all new guides utilize an aspect ratio of 2:1 for the inside dimensions which simplifies scaling of designs from one guide to another. The AN nomenclature for waveguides is UG-number/U, where the number designates the material and size, although there is no correlation between the number and the dimensions of the guide; whereas the EIA designation consists of the letters WR (waveguide rigid) followed by a number equal to the broad wall dimension in hundredths of an inch. A variety of construction techniques and materials are required to encompass this broad range of sizes and frequencies. Materials used are copper, aluminum, magnesium and silver. Silver laminated on brass is preferable to the solid coin silver types.

(2) Circular Waveguides. - Circular waveguides have not received the wide usage of rectangular waveguides in the past except as part of rotary joints which required circular symmetry. The use of circular waveguides is steadily increasing, particularly in view of the interest in higher frequencies. The circular waveguide has the disadvantage of greater bulk and weight than the rectangular waveguide as the cutoff wave length of the circular guide is determined by its diameter, which must be greater than the wide dimension of a rectangular guide having the same cutoff frequency. However, the circular guide has the advantages of greater power capacity and lower attenuation because of its greater size. In the circular guide minor irregularities of the wall surface might cause the field pattern to turn within the guide, thus disturbing the operation of the terminating device.

Although available in larger and smaller sizes, the acceptable dimensional requirements are from 8.470 inch nominal I.D. to 0.219 inch nominal I.D. These have EIA designations of WC 847 to WC 22. The materials used are aluminum, brass, copper, and silver laminated on brass.

e. GENERAL CONSIDERATIONS. - Lines used for the transfer of radio frequency energy should possess certain desirable characteristics. It is advantageous that the attenuation, dielectric constant and insulation power factor should be held at low values, while the insulation resistance and dielectric strength values should be high. Other factors being equal, the tendency is to construct the transmission line with the materials most easily handled, having sufficient inherent strength, being flexible instead of rigid, being fire resistant or not fire sustaining, and being able to withstand extremes of temperature. The perfect material for the transmission line for radio frequency energy has not been developed, hence, a compromise obtained by weighting all the known factors must be accepted. Contained herein is much data and information on what is available. In the installation of radio frequency transmission lines one usually produces results proportionately with the effort expended.

5-2. FLEXIBLE COAXIAL CABLES AND CONNECTORS. - Flexible coaxial cables have been discussed generally in sub-section 5-1. Considerable information about them can be found in texts, handbooks and service manuals. Details pertinent to specific flexible coaxial cables and their associated connectors will be found here. Care and attention to detail will assure an installation with maximum reliability.

a. SCOPE. - This sub-section provides information which will aid the planner in the selection of cables for specific applications and the installer during actual installation of those cables. The data compiled and given here includes the cables listed in MIL-STD-242D, Part 1, Section 200, and those for submarine use listed in MIL-C-23020. The connectors and fittings which are used with these cables are also listed and arranged here, with instructions for assembling connectors to cables.

b. PROCUREMENT. - The majority of cables listed herein are procured in accordance with specification MIL-C-17C, "Cables, Radio Frequency; Coaxial, Dual Coaxial, Twin Conductor, and Twin Lead", or by interim drawings or supplements which refer to it. Cables intended for submarine use are procured in accordance with specification MIL-C-23020, "Cables, Coaxial (for Submarine Use)", as amended.

c. CABLE ELEMENTS. - Flexible coaxial cables are fabricated with an inner conductor of solid or stranded wire, a low loss solid or semi-solid dielectric material, an outer conductor of braided wire or solid material, and a protecting jacket which may be covered with an armor. Functionally, they are designed to provide a specific impedance and capacitance, or to have a high operating voltage or high temperature ability, and to have flexibility with resistance to light pressure deformation and with low dielectric flow at normal temperatures.

(1) Inner Conductor. - The inner conductor, or conductors, may be solid, tubular, stranded or helical.

(a) Solid conductors may be of bare, tinned or silver plated copper wire, copper covered steel wire, or other similar materials; or a high resistance wire such as Nichrome V, Chrome A, Tophet A, Karma, or the like. Solid copper is used for diameters above approximately 0.100 inch. Coated steel conductors provide greater mechanical strength. Copper covered steel inner conductors with diameters of 0.025 inch are used.

(b) Stranded conductors are generally of the concentric stranding type. The strands are of the same materials as the solid conductors. Stranded conductors are used below 0.100 inch diameters for greater flexibility, except for some miniature cables where sufficient flexibility can be obtained with solid wire. Two purposes for the use of stranded center conductor are flexibility of cable and nick resistance during trimming.

(c) Helical conductors are usually for specific applications such as delay lines and are designed accordingly. Special resistance alloys, such as Formex F and similar, may be used.

(d) Comments. Some general observations about the inner conductor include these. Silver coatings are necessary on the inner conductor of high temperature cables to prevent rapid oxidation of the copper during processing and use. Another advantage of silver coating is to reduce attenuation. Nickel coatings are also used for this purpose. Tin coatings are used to facilitate soldering of cables to fittings, and at times as identification markers. Tin and nickel plated conductors should be limited to low-frequency applications where the thickness of the coating will not increase the conductor attenuation significantly.

(2) Dielectric. - The dielectric core, for the cables listed in this sub-section, is predominently of the solid type, a few are of the semi-solid type, and a very few are of the composite type.

The solid type dielectric makes continuous intimate contact with the inner conductor, such that there are no air films, air bubbles, or air voids present. The existence of air bubbles in the dielectric will permit corona effect to occur at an unacceptable voltage level. The inner conductor must not be off center more than 10 percent of the core radius to maintain the design characteristic impedance and reduce variations in the VSWR.

The semi-solid type consists of air spaced dielectrics. A dielectric thread, or a braid of threads, is wrapped around the inner conductor and then a dielectric material is taped or extruded over the threads. Alternate layers of braid and wraps of tape dielectric or foam dielectric can be used. The process is repeated until the desired thickness is obtained.

The dielectric materials, which are of varied chemical compositions, include:

(a) Polyethylene. It is by far the most poplar, being used almost exclusively where the maximum temperature will not exceed 85° C. (185° F.). In appearance it is a translucent, colorless ageing to gray or amber resin. It will remain flexible until temperatures drop to approximately -40° C. (-40° F.). Although it is generally a tough material it will cold flow when subjected to heavy pressure for a prolonged time. Hence, when installing cables having a polyethylene dielectric effort should be made to avoid any point pressures, especially in making bends or tightening stuffing tube glands. It is normally fabricated tightly around the inner conductor, as this increases the conductor's ability to carry higher radio frequency voltages without a breakdown of the air between the conductor and the polyethylene, into corona.

(b) Polytetrafluoroethylene. It is a white, slightly translucent, thermoplastic material. It is known more commonly by the name of TEFLON. It is tough, non-flammable, and chemically inert; it does not react to oil, acid, alkali or solvent, nor will other materials adhere to it without pretreatment. It will retain its dielectric properties and flexibility from approximately -70°C. (-94°F.) to 250°C. (482°F.) Although its capability is over a wide temperature range it is normally used only in high temperature situations. A detrimental characteristic is that most

other materials will not stick to it. The tapes and varnishes used with other dielectric materials therefore should not be used with it. Installations should follow, as closely as possible, the recommended methods, materials and varnishes, in order to obtain the results which are desired. When polytetrafluoroethylene dielectric is used in areas where the temperature is normally high, of the order of 85°C. (185°F.), it is good installation practice to use silicone rubber gaskets with polytetrafluoroethylene inserts.

(c) Synthetic rubber. The types used are usually either dimethylchlorosilane or polychloroprene and should not be used in installations where the frequency is above 50 mc.

Dimethylchlorosilane is a rubber-like material which is commonly known as SILICONE RUBBER, or simply SILICONE. It exhibits elastic properties over the temperature range from approximately -55°C. (-67°F.) to over 200°C. (392°F). It is easily installed at normal working temperatures. It is good as electrical insulation and as a moisture resistant material. It retains these capabilities over its wide temperature range. With exposure to light it gradually dries, but does not become brittle with age or normal high temperatures.

Polychloprene is a synthetic rubber and is commonly known as NEOPRENE. It is black and is quite flexible. It retains its insulating and dielectric characteristics in temperatures as high as 125°C. (257°F.). Its power loss is considerable at the higher frequencies and therefore it should not be used in cables carrying radio frequency energy. However, it is used in the transmission of high voltage DC pulses. Because of its flexibility and its attribute of adhering to metals, it can be formed very tightly around a conductor. When the coaxial cable is so fabricated the possibility of corona is reduced.

(3) Outer Conductor. – The outer conductor is generally braided copper. It may be tinned, silverplated, or bare, and is chosen to give the best electrical qualities consistent with maximum flexibility. It may consist of one, two, or three separate braids. The angles of the outer conductor braid, with respect to the axis of the cable, are held to close tolerances as a means of lowering high frequency losses. It is desirable, therefore, in assembling connectors to cable, not to push the braid back too far. Normally, flexible coaxial lines used in flexing work will break the inner conductor, while those used in twisting work will break the outer conductor.

(4) Jacket. - The outer conductor is usually covered with a tough, flexible, nonhygroscopic jacket which has been tightly applied to the braid. It may be a noncontaminating synthetic resin such as polyvinyl chloride, a thin continuous sheath of polyethylene, extruded or taped polytetrafluoroethylene, or fluorinated ethylene propylene. Neoprene and polyurethane are also used for flexibility. Of the six jacket materials mentioned, only polytetrafluoroethylene and fluorinated ethylene propylene do not burn. All six materials are flexible at -40°C. although polyvinyl chloride may be considered a border case and while some neoprene is not flexible at that temperature, the neoprene used on coaxial cables is flexible.

(5) Armor. - The cable may or may not have an armor sheath over the jacket material. It is a further protection against mechanical injury and is used primarily for protection during installation. Coaxial cables should have the armor tinted a light green for identification. The armor is usually a single or double thickness of aluminum braiding. Special purpose armor is occasionally used.

d. ELECTRICAL CHARACTERISTICS. - Coaxial cables are selected on the basis of their characteristic impedance, voltage rating, power rating for the frequency at which they will be used, and their weight. These and other electrical characteristics of coaxial cables are discussed here.

(1) Characteristic Impedance. - The characteristic impedance, also known as the iterative impedance or surge impedance, of a coaxial cable with low series resistance and shunt leakage is solely a function of its inductance and capacitance. Practically, this means the impedance is determined by the ratio of the diameter of the inner surface of the outer conductor to the diameter of the outer surface of the inner conductor, and to the electrical characteristics (dielectric constant) of the material chosen as the dielectric. Three impedance levels of coaxial cables have been established in the interest of simplicity and standardization of associated devices.

50±2 ohms - Preferred for all microwave applications; test equipment; and transitions to waveguides.

75±3 ohms - For video, and low r-f use (below 30 mc); data transmission; very long runs.

95±5 ohms - Balanced or dual cables, low capacitance, special uses.

In general the uniformity or constancy of the impedance has a greater effect on circuit performance than the absolute value of the impedance level. For example, the larger stronger center conductor of a 50 ohm, compared to 75 or 95 ohm, coaxial cable results in a more stable mechanical structure and therefore a more uniform impedance level.

(2) Capacitance. - The capacitance of a solid dielectric flexible coaxial cable varies inversely with its impedance. Considering general purpose cables, the majority of 50 ohm impedance cables have a capacitance of 29.5 picofarads per foot, while those of 75 ohm impedance have a capacitance of 20.5 picofarads per foot. A lower capacitance is often desirable, particularly in high impedance circuits where the cable shunts the input to the device. Data on four cables in Table 2-1 illustrates the relationship between their capacitance and impedance.

TABLE 2-1. Low Capacitance Cables

Type RG-	Maximum Capacitance pf/ft	Nominal Impedance ohms	Inner Conductor Diameter in.	Dielectric Material	DOD in.	OD in.	Armored
62A/U	14.5	93	0.0253	PE	0.146	0.242	No
195A/U	14.5	95	0.012	PTFE	0.102	0.155	No
63B/U	11.0	125	0.0253	PE	0.285	0.405	No
79B/U	11.0	125	0.0253	PE	0.285	0.475	Yes

All inner conductors are copper covered steel wire except, RG-195A/U which is silver covered, annealed copper covered steel wire.

PE is Polyethylene

PTFE is Polytetrafluoroethylene

DOD is Diameter over dielectric

(3) Attenuation. - No practical line is free of losses. Some attenuation of the input power will occur as it travels along the line, so that not all arrives at the load. These losses limit the efficiency of any system of which the line is a part. An example is the RG-59B/U cable which has losses in the order of:

2.0 db per 100 ft. at 30 mc
9.0 db per 100 ft. at 400 mc
300 db per 100 ft. at 3,000 mc

Such losses in power result even if the line is properly terminated.

If the line is not properly terminated, that is, if there are standing waves on the line, there will be additional losses of power, the magnitude depending upon the degree of mismatch. Thus the VSWR is useful in determining the efficiency of the line and load as a whole. In the microwave region, the VSWR looking into a flexible coaxial cable may vary between 1.1 and 1.3 and occasionally reach 1.8. These variations are due to additive reflections from changes in characteristic impedance caused by fluctuations in the diameter over the dielectric, ellipticity of the core, or the centering of the inner conductor. Such small continuous variations are inherent in the nature of the mechanical extrusion process and are more prevalent in polytetrafluoroethylene than in polyethylene. If cable irregularities are uniformly spaced it may be possible to measure a VSWR of 5 to 1. Hence, critical installations should have the individual cable measured by frequency-scanning techniques over the specified band of interest. An increase in attenuation may occur above 3,000 mc due to the braid construction of certain cables. At these frequencies, the intimacy of contact between the individual braid wires has a marked effect on the apparent resistance of the cable. A loose or open braid or any form of surface contamination, can cause erratic attenuation when the cable is flexed.

(4) Voltage Rating. - The maximum voltage that should be applied to a coaxial transmission line is a voltage some value less than that which causes corona. Solid dielectric materials will stand higher voltage than gases, before corona occurs. The maximum peak voltage which exists at any point on the line will generally differ from the input voltage when the line is not properly terminated. Its value will depend on the degree of mismatch, the electrical length, and the attenuation of the line.

(5) Corona. - Air, when under voltage stress, ionizes. Increasing the voltage increases the ionization of the air until finally corona occurs. Operation above the corona level will affect the life of the cable. The voltage at which corona occurs in an air dielectric line is determined by local stress concentrations such as those caused by a metallic burr on the conductor, the introduction of a sharp corner at a connector, or a marked surface irregularity on the bead or spacer. In solid dielectric cables, minute air voids are present within the dielectric and in the neighborhood of the conductors. The interstices around the outer conductor braid are the predominating factor for corona initiation. Other factors are the voids around the inner conductor, and bubbles in the dielectric. Electrical discharges occur within these gaseous voids when the peak voltage reaches a critical value. The critical value, or corona level, does not vary significantly in a gas from the very low power frequencies to several hundred megacycles. The electrical discharges cause energy losses in addition to normal attenuation, and will eventually lead to complete molecular breakdown of the insulating material. It is generally necessary to resort to a direct measurement of the corona initiation or extinction level at power frequencies to establish a practical voltage rating.

(6) Power Rating. - The maximum radio frequency power a coaxial line may safely transmit can be limited either by the voltage introduced due to the peak power, or the thermal heating due to the average power. Which of these is the predominating factor will vary according to operating conditions and the design of the transmission line. The peak power rating is determined directly by the voltage rating, and is affected by any of the design features, mechanical imperfections, or external factors which tend to lower the corona level. During CW transmission, di-

electric losses may limit the power rating to a value lower than that determined by the voltage rating because of the heating.

(7) Average Power. – The average power rating for any particular installation will depend on the permissible temperature rise above a stated ambient. This may be determined by the attenuation of the line, or by the maximum temperature which the dielectric or conductor can withstand continuously. The limiting factor in the power handling capability of a coaxial cable usually is controlled by the melting point of the dielectric. Heat is generated internally at the inner conductor, within the dielectric, and at the outer conductor in direct proportion to their individual attenuation. The rate of heat dissipation from the line depends on the diameter, materials, color of the outer covering, and the ambient temperature. Excessive temperature can result in conductor shifting due to softening of the dielectric, mechanical damage due to different rates of expansion, or shortened life due to chemical deterioration. Longitudinal variations in voltage and current, as a result of a mismatched load, will reduce the average permissible power.

(8) Shielding. - Interference or crosstalk can occur between a coaxial line and the surrounding media as the result of radial propagation of energy through the outer conductor. This energy is diminished by attenuation, due to penetration and dissipation in the material of the shield; and by reflection of the wave, due to impedance discontinuities at the interfaces of the materials used in the shield structure. When shielding is a major problem, consideration should be given to the use of double shielded coaxial cables and to triaxial cables which provide the best shielding in the flexible coaxial cable form. Leakage occurs with a tightly woven braid at frequencies below approximately 50 mc. Leakage which occurs above this frequency is due to the finite openings present at the braid crossovers.

e. INSTALLATION NOTES. – Flexible coaxial cables, although quite rugged and able to withstand the normal shock and vibration of ship action and gunfire, require precautionary measures during installation to obtain maximum reliability. Forces should not be applied which change the dimensions, or in any way damage the cable. Shipboard installations, external to equipment, shall be of armored cable. Shipboard installations, internal to equipment, may be of non-armored cable. High temperature cables, polytetrafluoroethylene, are for zones where the still air ambient temperature exceeds 105°F. with average current flowing in all cables.

(1) Cable Supports. – Long cable runs should be supported at intervals to remove the full stress from the couplings, particularly for cable connectors with spring loaded couplings. Static compression will cause a semi-permanent deformation, cold flow, of the thermoplastic dielectric and jacket materials. Constriction of the cross section causes a loss of sealing and introduces an additional VSWR at the connector junction.

(2) Bends. – When installing flexible coaxial cable the radii of curvature should be as large as possible. The inside bend radius shall not be less than 10 times the cable diameter. If the cable is to be subjected to repeated flexure, the inside bend radius shall not be less than 20 times the cable diameter. Sharp bends introduce mechanical stress on the cable jacket, and to a lesser degree, on the dielectric. These stresses greatly accelerate the cracking of the jacket in the presence of ultra-violet rays in sunlight, and of atmospheric ozone which is greatly increased when corona is present. The inner conductor tends to move outward at the bend and may make contact with the braid of the outer conductor under extremes of temperature cycling. Polyethylene dielectric may also rupture in contact with certain common soaps, greases, alcohols, and solvents when subjected to bend stresses. All of these chemical reactions increase rapidly with temperature. Consideration should be given to the use of right-angle fittings, wherever possible, to eliminate sharp bends.

(3) Flexibility. - Coaxial cables have not been designed primarily for continous flexure or twisting. If a limited degree of flexure is necessary, the cable should be installed so that the radius of bend changes in one direction only, rather than undergoing a reversal. All cables stiffen at low temperatures; the plastic materials much more rapidly than the elastomeric materials. If possible cables stored at sub-zero temperatures should be warmed prior to bending, as the forces involved can cause cracking of the jacket. In any event, cold cable should not be unreeled rapidly. Under continuous flexure or twisting, the braid will loosen and reduce the corona level, and also cause erratic attenuation at the higher frequencies. In moderate twisting, the braids will usually fail first after about 10,000 cycles due to the high degree of abrasion they receive in the comparatively stiffer plastic cables. Under predominant flexure, the center conductor will break first. Where extreme flexibility is desired, special constructions of the inner conductor and outer conductor braid should be used as well as very elastic dielectrics.

(4) Tightness. – Every mechanical joint in the line assembly should be well made and tight to provide protection against leakage of the radio frequency energy out, or of foreign matter in. This will also aid in the elimination of discontinuities which produce high VSWR, and which outherwise interfere with proper functioning of the line. When it is necessary to disassemble the connector from the cable, all rubber gaskets should be replaced.

(5) Cleanliness. – Every job of the complete installation should be done in a clean and workmanlike manner. Every effort should be made to avoid the accumulation of dirt, copper particles, solder, solder flux, or other foreign matter in any parts of the installation. Foreign matter causes all manner of electrical troubles, including lowering the insulation resistance of the line, causing leakage across the line, potential sources of arcing, etc.

f. CONNECTORS. - The connectors in MIL-STD-242D, Part 1, Section 300; those for miniature cables in MIL-C-22557; and others to give complete coverage for the coaxial cables are included in this subsection. The ones which

ORIGINAL

TABLE 2-2 CONNECTORS

Series	Spec. MIL-C-	Coupling Type	Imp. Ohms	Frequency mc	Voltage RMS Opr.	Voltage RMS Peak	Weather-proofing	Cables RG- /U	Cables O. D. Range in.	Assembly Instruction Number	Comments
Miniature	22557	Push-on & Screw-on	50			500		188 196	0.80-0.110	8 8A 8B	
TPS		Push-on	50						0.160-0.242		For use with cables within O. D. range.
BNC	3608A	Bayonet	50	to 10,000		500	Yes	58 59 62 140 141	0.190-0.242	1	Non-armored cables only.
C	3989A	Bayonet	50	to 10,000		1,500	Yes	11 12 58 65 165 166 211 213 214 215 216 217 218 222 293 295	0.195-0.895	2 Non-armored cables 2A Armored cables	Preferable for new installation.
N	71A	Screw	50	to 10,000		500	Yes	11 12 58 62 63 165 166 211 213 79 214 215 216 217 218 219 222 224 293 295	0.195-0.945	3 Non-armored cables. 3A Armored cables	Series C is preferable for new installations.
HN	3643A	Screw	50	to 10,000	1,500	5,000	Yes	11 12 144 149 150 211 213 214 215 216 217 218 219 224 227 228 293 295	0.405-0.945	4) 4A) Non-armored cables 4B Armored cables	For replacement only. Series C or QDL is preferable for new installations.
QDL		Spring (5 ball)	50	to 1,000		9,000	Yes	11 12 35 85 213 214 215 216 217 218 219 224 293 295	0.405-1.565	5) Armored and 5A) Non-armored cables 5B) 5C Receptacle FL	
QDS	18867A	Spring (3 ball)	50	to 10,000	1,500		Yes	11 12 85 213 214 215 216 217 224 293	0.405-1.565	6 Non-armored cables 6A Armored cables 6B Receptacle FL	Use Series QDL where space allows.
LC	3650A	Screw	50	to 1,000		5,000	Yes	85	1.565	7 Armored cable	Plug, Male (UG-1179/U) for use with RG-85A/U cable.
TWIN	3655A	Screw	XX	200 practical 500 maximum		500	No	294	0.630	9 Non-armored cable	Plug, Male (UG-1060 A/U) for use with RG-294/U cable.
PULSE	3607A	Screw				13,000 6,000	Yes	27 28 64 88 156 157 158 190 191	0.540-0.750	10A Ceramic armored 10B Ceramic non-armored 10 Rubber non-armored	Data to be provided when available. Plug assembly molded on definite cable length.

are to be used with a particular cable are listed on the reverse side of its Cable Data Sheet. When the connectors do not electrically match the cable, in the case of 50 ohm impedance connectors with a 75 ohm impedance cable, a note so stating has been placed on the sheet.

The connectors have been tabulated, in Table 2-2, by their various series: BNC, C, etc. Other information is also in the table, including the Assembly Instruction numbers for each connector series, the RG-/U Cable numbers applicable to each series of connectors, the O.D. range of the cables listed, comments pertinent to the use of each series of connectors, etc. It will be noted that series HN has been included for replacement only, new installations being expected to use series BNC, C, QDL or QDS, or N.

g. **CABLE DATA TABLES.** - Data about the cables has been placed in various tabular arrangements for convenience.

All of the cables have been divided into five groups, according to their predominant purpose.

General Purpose Cables	Table 2-3
High Temperature Cables	Table 2-4
Pulse Cables	Table 2-5
Submarine Cables	Table 2-6
Special Characteristic Cables	Table 2-7

These tables also include the nominal impedance and the maximum operating voltage of each cable.

TABLE 2-3. General Purpose Cables

Mil Type	NATO Type	Impedance Ohms	Maximum Operating Voltage
RG-11A/U	NWR-3S	75	5,000
RG-12A/U	NWR-18	75	5,000
RG-35B/U	NWR-20	75	10,000
RG-58C/U	NWR-2S	50	1,900
RG-59B/U	NWR-11	75	2,300
RG-85A/U		75	10,000
RG-213/U	NWR-1S	50	5,000
RG-214/U		50	5,000
RG-215/U	NWR-17	50	5,000
RG-216/U		75	5,000
RG-217/U		50	7,000
RG-218/U	NWR-5	50	11,000
RG-219/U	NWR-19	50	11,000
RG-224/U		50	7,000

TABLE 2-4. High Temperature Cables

Mil Type	NATO Type	Impedance Ohms	Maximum Operating Voltage
RG-140/U	NWR-14	75	2,300
RG-141A/U	NWR-9	50	1,900
RG-144/U	NWR-16	75	5,000
RG-165/U	NWR-10S	50	5,000
RG-166/U			5,000
RG-178B/U		50	1,000
RG-179B/U		75	1,200
RG-180B/U		95	1,500
RG-187A/U	NWR-22	75	1,200
RG-188A/U	NWR-21	50	1,200
RG-195A/U		95	1,500
RG-196A/U	NWR-23	50	1,000
RG-211A/U		50	7,000

Continued Table 2-4

Mil Type	NATO Type	Impedance Ohms	Maximum Operating Voltage
RG-227/U		50	5,000
RG-228A/U		50	7,000
RG-302/U		75	2,300
RG-303/U		50	1,900
RG-316/U		50	1,200

TABLE 2-5. Pulse Cables

RG-27A/U		48	15,000
RG-28B/U		48	15,000
RG-64A/U		48	10,000
RG-88/U		48	10,000
RG-156/U		50	10,000
RG-157/U		50	15,000
RG-158/U		25	15,000
RG-190/U		50	15,000
RG-191/U		25	25,000

TABLE 2-6. Submarine Cables

Mil Type	NATO Type	Impedance Ohms	Operating Maximum Voltage
RG-264A/U (Quad-Coax)		40	2,000
RG-293/U		50	5,500
RG-294/U		95	3,000
RG-295/U		50	11,000

*Each

TABLE 2-7. Special Characteristic Cables

Mil Type	NATO Type	Impedance Ohms	Maximum Operating Voltage
Low Capacitance Cables			
RG-62A/U	NWR-12	93	750
RG-63B/U	NWR-4	125	1,000
RG-79B/U		125	1,000
Delay Lines			
RG-65A/U	NWR-8	950	1,000
RG-176/U		2,240	2,000
Low Noise, Low Power Cables			
RG-149/U		75	4,000
RG-150/U		75	4,000
High Attenuation Cables			
RG-222/U		50	2,700

A useful grouping of cables is in terms of their diameter over dielectric (D.O.D.). Table 2-8 is a summation of D.O.D. 's. The cables, divided into five size groups, have been listed according to their impedance (50 or 75 ohms), and their dielectric material (general purpose polyethylene or high temperature polytetrafluoroethylene). Cables which have a different impedance or dielectric are not included in the table.

Table 2-8. Summation of D.O.D

Size Designation	D.O.D.* Inches	Armored or Non-Armored	Dielectric: 50 Ohm Impedance PE**	50 Ohm Impedance PTFE***	75 Ohm Impedance PE**	75 Ohm Impedance PTFE***
Sub-Miniature	0.034	NA		RG-196A/U		
Miniature	0.060	NA		RG-188A/U		RG-187A/U
	0.116	NA	RG-58C/U	RG-141A/U		
	0.146	NA			RG-59B/U	
Small	0.146	A				RG-140/U
	0.185	NA	RG-222/U			
	0.285	NA	RG-156/U		RG-11A/U	
			213/U	RG-165/U	149/U	RG-144/U
			214/U		150/U	
					216/U	
Medium	0.285	A	RG-215/U	RG-166/U	RG-12A/U	
				227/U		
	0.370	NA	RG-217/U	RG-293/U		
	0.370	A	RG-224/U			
	0.455	NA	RG-157/U			
	0.620	NA		RG-211/U		
	0.620	A		RG-228A/U		
Large	0.680	NA	RG-218/U	RG-295/U		
	0.680	A	RG-219/U		RG-35B/U	
					85A/U	

* Diameter Over Dielectric
** Polyethylene
*** Polytetrafluoroethylene

h. CABLE DATA SHEETS. – A cable data sheet has been compiled for each of the cables listed in tables 2-3 through 2-7. The sheets are arranged in alpha-numerical sequence by the cable designation number. Each sheet states the cable type, shows a full illustration of the cable construction, and lists some of its electrical and mechanical characteristics. Installation data, pertinent to the cable, is at the bottom of the sheet. The page adjacent to each of the cable sheets lists the connectors and fittings which may be used with the cable. These pages are headed, "Connectors for MIL type Cable RG-/U". The connectors are identified by description and series. In the description, ML indicates male and FL indicates female. The UG or MX number is given, and also the applicable Bureau of Ships drawing number. The last column gives the assembly instruction number for the connector or fitting. The Cable Data Sheets and their associated connector lists follow after paragraph i.

i. CONNECTOR ASSEMBLY INSTRUCTIONS. – The termination of coaxial cable requires the use of precisely manufactured connector parts and their correct assembly. An assembly instruction sheet has been included for every connector and end seal listed on the "Connectors for MIL Type Cable RE-/U" sheets. The assembly instructions include illustrations of all the parts that make-up the connector, the step-by-step assembly and a cross section illustrating the correct assembly onto the cable. Pertinent comments are included to emphasize critical stages of assembly. The comments which are a part of the Assembly Instructions have been kept brief and positive. They state, as succinctly as possible commensurate with clarity, what should be done and have not been interspersed with cautions or what should not be done. Warning comments, applicable to all the Assembly Instructions, include the following.

(1) Cutting Coaxial Cable. – Cuts of the cable, or layers of its elements, should be made cleanly and at a right angle to the cable length. Because of their greater thickness this should be carefully heeded when cutting the jacket or dielectric material, but it is applicable to all the cable elements. Uneven and ragged surfaces are to be avoided.

(2) Wire Braid Strands. – It is essential that the wire strands of the outer or inner conductor are not nicked or cut or in any way scored or mutilated during cutting or any phase of assembly. The outer conductor braid must be combed or wire brushed outward in a radial direction until all of the strands are separated. There should not be any wire cross-overs when the strands are folded over the clamp. The strands are folded over the clamp correctly when each individual wire extends radially and all are evenly distributed around the clamp.

(3) Soldering and Tinning. – Tinning and soldering operations require a delicate touch with a properly dressed iron. These operations, in the assembly of connectors to coaxial cables, are not jobs for a plumber with a blow-torch. The jacket and dielectric materials are quite susceptible to heat and, unless handled carefully, become easily deformed. Tinning means a thin even coat of solder, with all excess solder removed.

(4) Contact Positioning. – A contact, either male or female, properly positioned on the inner conductor will butt solidly against the dielectric material. The contact should neither dig into the dielectric nor be loose enough to leave an axial space between it and the dielectric, and it should be in a straight line with the inner conductor. Deposits of flux or solder, as well as any foreign substance, should be carefully removed.

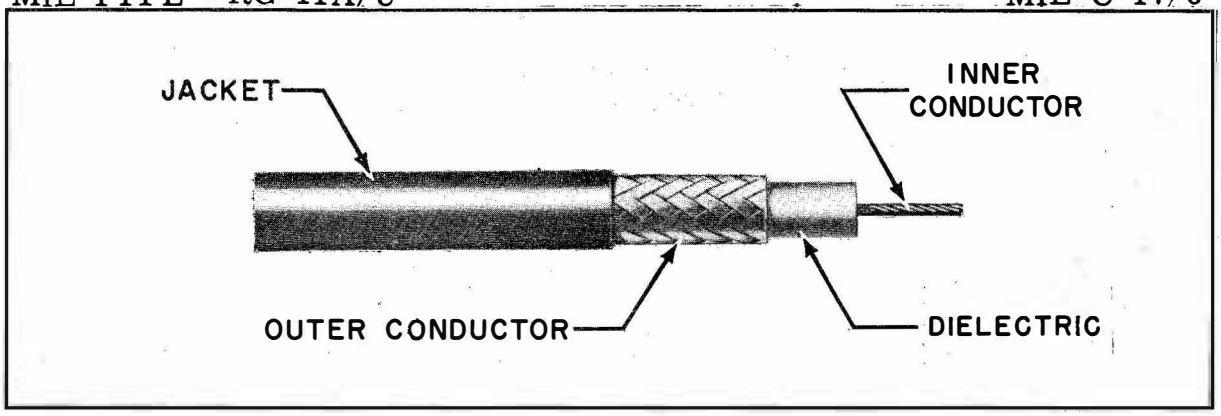
(5) Exposed Dielectric Length. - Before adding the connector body to the assembly, the distance from where the outer conductor braid is folded over the clamp to the end of the dielectric should be measured to make sure the proper length has been obtained. In most of the Assembly Instructions this is given as dimension C.

(6) Concentricity. – A final check of the completed assembly should include the concentricity of cable and connector. The cable, connector body and contact should be in line.

The Assembly Instruction sheets follow the Cable Data Sheets.

GENERAL PURPOSE CABLES

MIL TYPE - RG-11A/U — MIL-C-17/6



Class	General Purpose
Inner Conductor	7/26 AWG Tinned Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Copper, Single Braid
Protective Covering Jacket	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.405 Inch
Weight	0.093 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	20.5 $\mu\mu$f/ft
Maximum Operating Voltage	5000 Volts (RMS)
Attenuation	5.2 db/100 ft Maximum At 400 MC 18.5 db/100 ft Maximum At 3,000 MC
Flow	18 Pounds
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Remarks	Medium Size, Flexible Video Cable

INSTALLATION DATA

Minimum Bend Radius	5 Inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	1/2 inch

CONNECTORS FOR MIL TYPE CABLE RG-11A/U

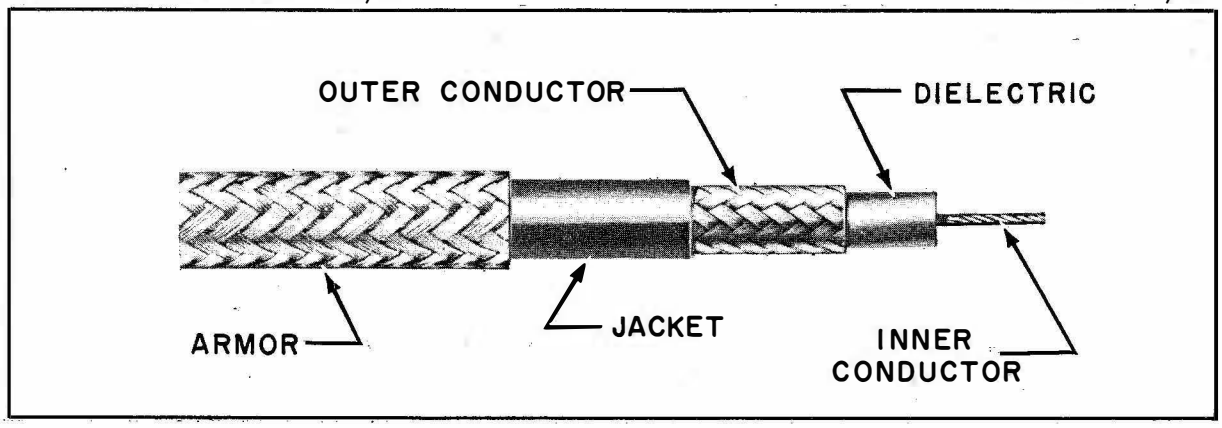
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	573B/U	NUG-201	MS 35315	2
Plug, FL	No	C	572A/U	NUG-202	MS 35318	2
Receptacle, FL	No	C	570A/U	NUG-203	MS 35317	2
Plug, ML	Yes	C	943B/U		RE B 49195	2
Plug, FL	Yes	C	944A/U		RE B 49193	2
Receptacle, FL	Yes	C	937A/U		RE B 49191	2
Plug, ML	No	N	1185A/U		RE B 49035	3
Plug, FL	No	N	1186A/U		RE B 49036	3
Receptacle, FL	No	N	160D/U		RE B 49082	3
Plug, ML	Yes	N	941B/U		MS 90293	3
Plug, FL	Yes	N	940B/U		MS 90292	3
Receptacle, FL	Yes	N	936B/U		RE B 49092	3
Plug, ML	No	HN	59E/U		RE B 49227	4
Plug, FL	No	HN	60E/U		RE B 49224	4
Receptacle, FL	No	HN	427C/U		RE B 49223	4
Plug, ML	Yes	HN	925B/U		RE B 49226	4
Plug, FL	Yes	HN	927B/U		RE B 49230	4
Receptacle, FL	Yes	HN	930B/U		RE B 49229	4
*Plug, ML	No	HN	1213/U		RE B 49364	4A
*Plug, FL	No	HN	1214/U		RE B 49363	4A
Plug, FL	Yes	QDL	1075C/U		RE B 49166	5
Receptacle, FL	Yes	QDL	1076C/U		RE B 49167	5
Plug, ML	Yes	QDS	968B/U		RE B 49123	6A
Plug, FL	Yes	QDS	967B/U		RE B 49122	6A
Receptacle, FL	Yes	QDS	1132A/U		RE B 49305	6A
End Seal	Yes		MX-1461/U		RE B 49139	22
End Seal	No		MX-1465/U		RE B 49140	23
End Seal	No		MX-1554A/U		RE B 49144	25

* Captivated contact.

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-11A/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

GENERAL PURPOSE CABLES

MIL TYPE - RG-12A/U — MIL-C-17/7



Class	General Purpose
Inner Conductor	7/26 AWG Tinned Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Copper, Single Braid
Protective Covering	Noncontaminating Synthetic Resin With Armor
Nominal Over-All Diameter	0.475 Inch
Weight	0.117 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	20.5 $\mu\mu$f/ft
Maximum Operating Voltage	5000 Volts (RMS)
Attentuation	5.2 db/100 ft Maximum At 400 MC 18.5 db/100 ft Maximum At 3,000 MC
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Remarks	Similar to RG-11A/U But With Armor

INSTALLATION DATA

Minimum Bend Radius	5 inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	1/2 inch

CONNECTORS FOR MIL TYPE CABLE RG-12A/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	C	943B/U		RE B 49195	2A
Plug, FL	Yes	C	944A/U		RE B 49193	2A
Receptacle, FL	Yes	C	937A/U		RE B 49191	2A
Plug, ML	Yes	N	941B/U		MS 90293	3A
Plug, FL	Yes	N	940B/U		MS 90292	3A
Receptacle, FL	Yes	N	936B/U		RE B 49092	3A

Cont'd Table - CONNECTORS FOR MIL TYPE CABLE RG-12A/U

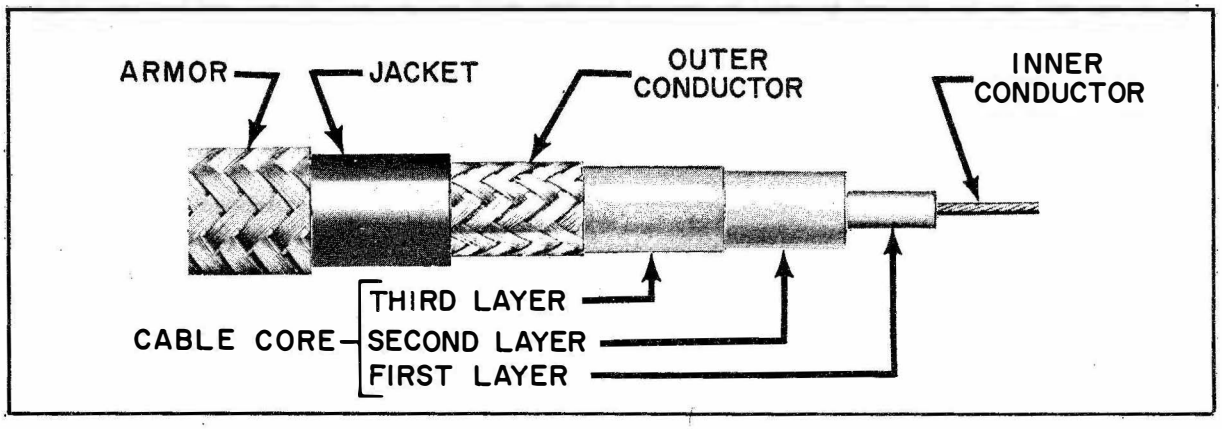
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	HN	925B/U		RE B 49226	4B
Plug, FL	Yes	HN	927B/U		RE B 49230	4B
Receptacle, FL	Yes	HN	930B/U		RE B 49229	4B
Plug, FL	Yes	QDL	1075C/U		RE B 49166	5
Receptacle, FL	Yes	QDL	1076C/U		RE B 49167	5
Plug, ML	Yes	QDS	968B/U		RE B 49123	6A
Plug, FL	Yes	QDS	967B/U		RE B 49122	6A
Receptacle, FL	Yes	QDS	1132A/U		RE B 49305	6A
End Seal	Yes		MX-1461/U		RE B 49139	22
End Seal	Yes		MX-1465/U		RE B 49140	23

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-12A/U cable.

PULSE CABLE

MIL TYPE - RG-27A/U

MIL-C-17/22A



Class	Pulse
Inner Conductor	19/0.0185 Inch Tinned Copper
Dielectric Material (Cable Core)	Layer of Synthetic Insulating Compound Between Two Layers of Conducting Compound
Nominal Diameter of Dielectric	0.455 Inch
Outer Conductor	Tinned Copper Single Braid
Protective Covering	Chloroprene Jacket and Armor
Nominal Over-All Diameter	0.670 Inch
Weight	0.304 lb/ft
Approximate Impedance	48±4 Ohms
Nominal Capacitance	50 $\mu\mu$f/ft
Maximum Operating Voltage	15,000 (PEAK) Volts (RMS)
Attenuation	0.7 db/100 ft Maximum At 1 MC
Dielectric Strength	18.000 Volts RMS, Minimum
Corona	15,000 Volts RMS, Minimum
Remarks	Large Size Cable

INSTALLATION DATA

Minimum Bend Radius	10 inches
Metal Tube Size	D
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	3/4 inch

CONNECTORS FOR MIL TYPE CABLE RG-27A/U

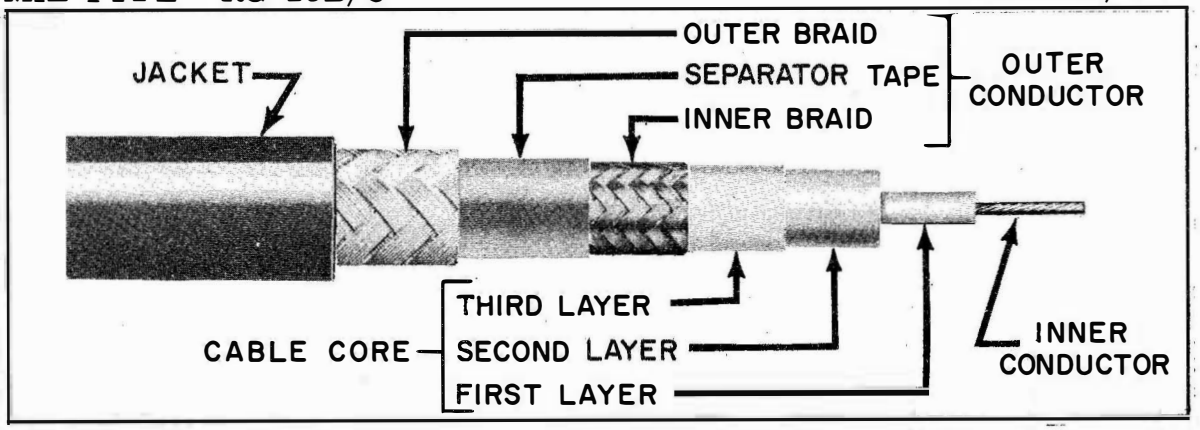
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	PULSE	36/U		RE B 49207	10A

1. When selecting connectors, NATO types are preferred.

PULSE CABLES

MIL TYPE - RG-28B/U

MIL-C-17/23B



Class	Pulse
Inner Conductor	19/0.0185 Inch Tinned Copper
Dielectric Material (Cable Core)	Layer of Insulating Compound Between two Layers of Conducting Compound
Nominal Diameter of Dielectric	0.455 Inch
Outer Conductor	Inner-Tinned Copper Outer-Galvanized steel
Protective Covering	Chloroprene Jacket
Nominal Over-All Diameter	0.750 Inch
Weight	0.370 lb/ft
Approximate Impedance	48±4 Ohms
Nominal Capacitance	50 $\mu\mu$f/ft
Maximum Operating Voltage	15,000 (PEAKS) Volts (RMS)
Attenuation	7 db/100 ft Maximum At 1 MC
Dielectric Strength	18,000 Volts RMS, Minimum
Corona	15,000 Volts RMS, Minimum
Remarks	Large Size Cable

INSTALLATION DATA

Minimum Bend Radius	8 inches
Metal Tube Size	E
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-9
Synthetic Rubber Grommet	3/4 inch
Kickpipe Size	1 inch

CONNECTORS FOR MIL TYPE CABLE RG-28B/U

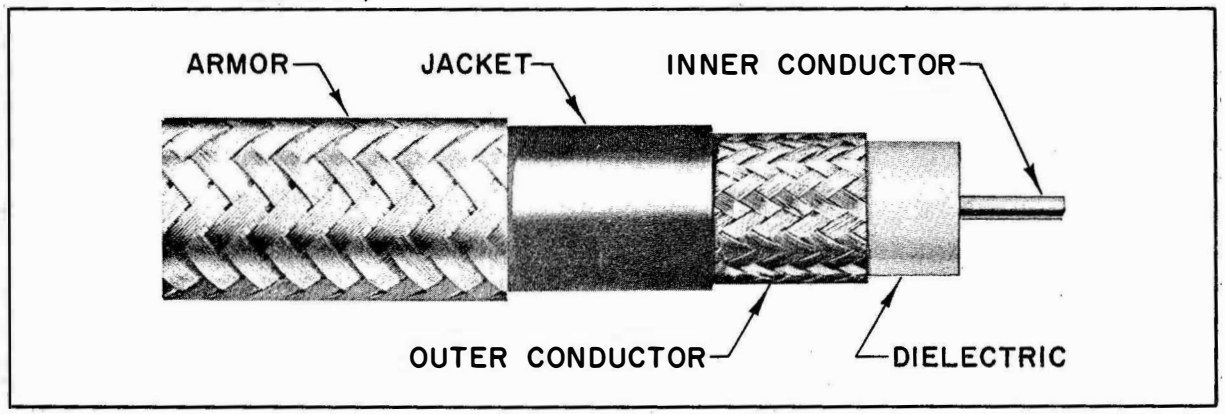
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	PULSE	174/U		RE B 49298	10B

1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

GENERAL PURPOSE CABLES

MIL TYPE - RG-35B/U

MIL-C-17/25A



Class	General Purpose
Inner Conductor	0.1045 Inch Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.680 Inch
Outer Conductor	Copper, Single Braid
Protective Covering	Noncontaminating Synthetic Resin with Armor
Nominal Over-All Diameter	0.945 Inch (Max.)
Weight	0.480 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	20.5 $\mu\mu$ f/ft
Maximum Operating Voltage	10,000 Volts (RMS)
Attenuation	2.8 db/100 ft Maximum At 400 MC
Dielectric Strength	22,000 Volts RMS, Minimum
Corona	10,000 Volts RMS, Minimum
Remarks	Armored, solid center conductor, large size, high power, low attenuation, video and communication cable

INSTALLATION DATA

Minimum Bend Radius	10 inches
Metal Tube Size	G
Nylon Tube Size	5
Nylon Tube Packing Assembly	MS16189-3
Synthetic Rubber Grommet	1 inch
Kickpipe Size	1 inch

CONNECTORS FOR MIL TYPE CABLE RG-35B/U

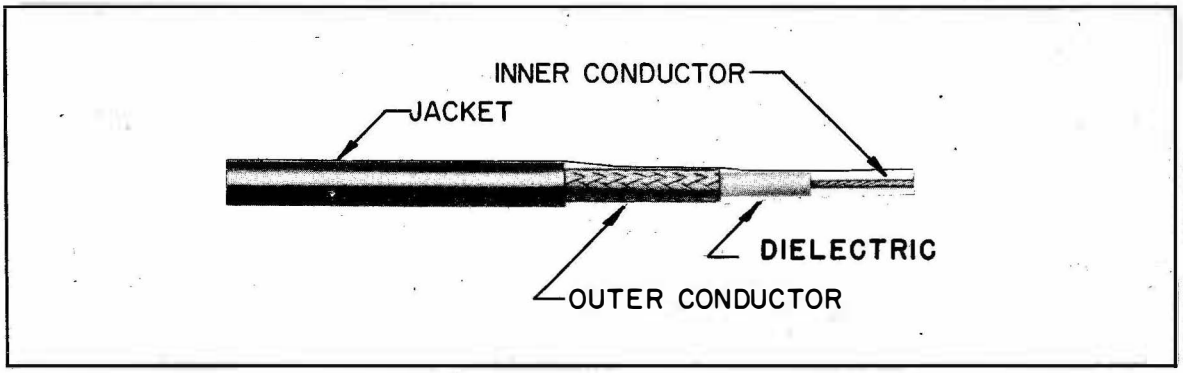
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	QDL	1020A/U		RE B49130	5A

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-35B/U cable.

GENERAL PURPOSE CABLES

MIL TYPE - RG-58C/U

MIL-C-17/28



Class	General Purpose
Inner Conductor	19/.0071 Inch Tinned Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.116 Inch
Outer Conductor	Tinned Copper, Single Braid
Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.195 Inch
Weight	0.029 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	28.5 $\mu\mu$f/ft
Maximum Operating Voltage	1,900 Volts (RMS)
Attenuation	14 db 100 ft Maximum At 400 MC 50 db/100 ft Maximum At 3,000 MC
Flow	6 Pounds
Dielectric Strength	5,000 Volts RMS, Minimum
Corona	1,900 Volts RMS, Minimum
Remarks	Small Size, Flexible Cable

INSTALLATION DATA

Minimum Bend Radius	2 inches
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-1
Synthetic Ruber Grommet	
Kickpipe Size	3/8 inch

CONNECTORS FOR MIL TYPE CABLE RG-58C/U

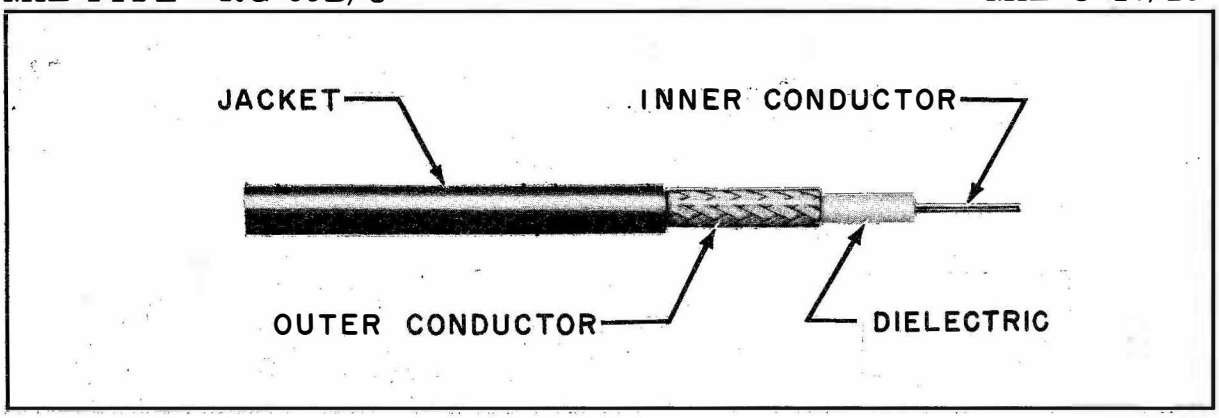
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	BNC	88E/U	NUG-101	MS 35168	1
Plug, FL	No	BNC	89C/U	NUG-102	MS 35169	1
Receptacle, FL	No	BNC	909B/U		MS 35180	1
*Receptacle, FL	No	BNC	253B/U		RE B 49097	1
Plug, ML	Yes	C	709B/U		MS 90214	2
Plug, ML	No	N	536B/U		RE B 49090	3
Receptacle, FL	No	N	556B/U		RE B 49378	3
End Seal	No	MX-	1684A/U		REA 49313	25
End Seal	No		MX-1744A/U		REB 49325	26
End Seal	No		MX-1884/U		REB 49327	26

1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

* Pressurized.

GENERAL PURPOSE CABLES

MIL TYPE - RG-59B/U — MIL-C-17/29



Class	General Purpose
Inner Conductor	0.023 Inch Copper Cover Steel
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.146 Inch
Outer Conductor	Copper, Single Braid
Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.242 Inch
Weight	0.035 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	21 $\mu\mu$f/ft
Maximum Operating Voltage	2,300 Volts (RMS)
Attenuation	9.0 db/100 ft Maximum At 400 MC 30 db/100 ft Maximum At 3000 MC
Flow	6 Pounds
Dielectric Strength	7,000 Volts RMS, Minimum
Corona	2,300 Volts RMS, Minimum
Remarks	General Purpose, Small Size, Video Cable

INSTALLATION DATA

Minimum Bend Radius	3 inches
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	3/8 inch

CONNECTORS FOR MIL TYPE CABLE RG-59B/U

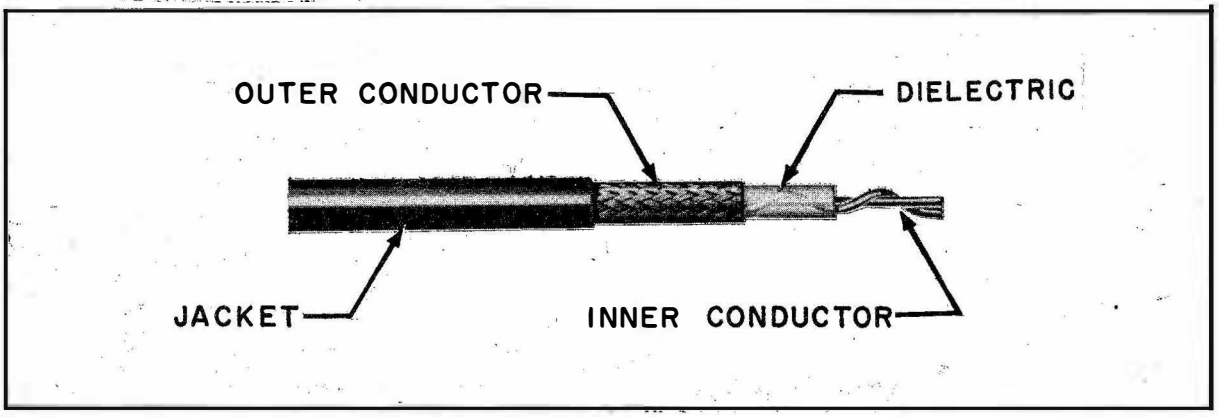
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	BNC	260D/U	NUG-104	MS 35170	1
Plug, FL	No	BNC	261C/U	NUG-105	MS 35171	1
Receptacle, FL,	No	BNC	910B/U	NUG-106	MS 35181	1
End Seal	No		MX-1530A/U		RE B 49142	25
End Seal	No		MX-1801A/U		RE B 49342	26
End Seal	No		MX-1802A/U		RE B 49343	26

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-59B/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

SPECIAL CHARACTERISTIC CABLES

MIL TYPE - RG-62A/U

MIL-C-17/30



Class	Special Characteristic
Inner Conductor	Copper Covered Steel Wire
Dielectric Material	Polyethylene (Semi-Solid)
Nominal Diameter of Dielectric	0.146 Inch
Outer Conductor	Copper; Single Braid
Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.242 Inch
Weight	0.382 lb/ft
Approximate Impedance	93±5 Ohms
Nominal Capacitance	14.5$\mu\mu$f/ft
Maximum Operating Voltage	750 Volts (RMS)
Attenuation	8.0 db/100 ft Maximum At 400 MC
Flow	2 Pounds
Dielectric Strength	3,000 Volts (RMS), Minimum
Capacitance Stability	Less Than 1.5%

INSTALLATION DATA

Minimum Bend Radius	3 inches
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	3/8 inch

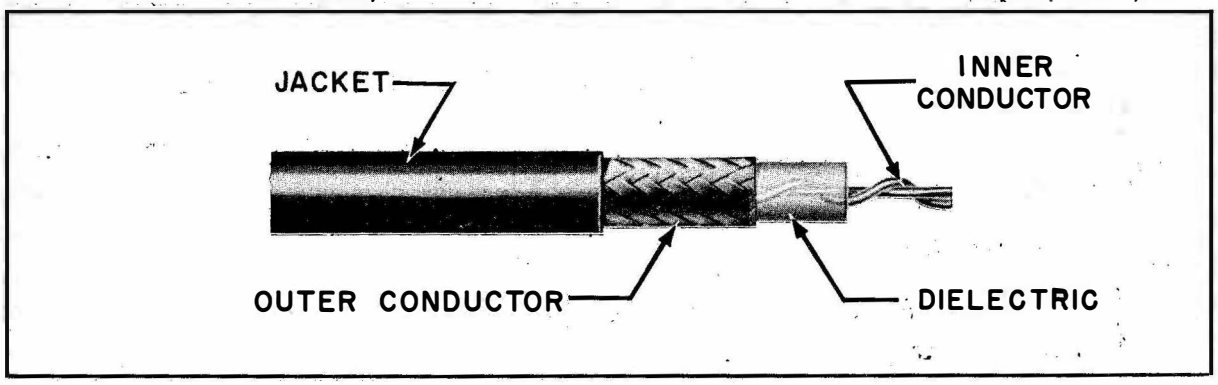
CONNECTORS FOR MIL TYPE CABLE RG-62A/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	BNC	260D/U		MS 35170	1
Plug, FL	No	BNC	261C/U		MS 35171	1
Receptacle, FL	No	BNC	910B/U		MS 35181	1
Plug, ML	No	N	603A/U		RE B49211	3
End Seal	No		MX-1530A/U		RE B49142	25
End Seal	No		MX-1801A/U		RE B49342	26
End Seal	No	MX-1802A/U			RE B49343	26

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-62A/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

SPECIAL CHARACTERISTIC CABLES

MIL TYPE - RG-63B/U — MIL-C-17/31



Class	Special Characteristic
Inner Conductor	0.0253 Inch Copper Covered Steel Wire
Dielectric Material	Polyethylene (Semi-Solid)
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Copper; Single Braid
Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.405 Inch
Weight	0.082 lb/ft
Approximate Impedance	125±6 Ohms
Nominal Capacitance	11 $\mu\mu$ f/ft
Maximum Operating Voltage	1000 Volts (RMS)
Attenuation	5.5 db/100 ft Maximum At 400 MC
Flow	2 Pounds
Dielectric Strength	3,000 Volts (RMS), Minimum
Capacitance Stability	Less Than 1.5%
Remarks	Medium Size, Low Capacitance Air-Space Cable

INSTALLATION DATA

Minimum Bend Radius	5 Inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 Inch
Kickpipe Size	1/2 Inch

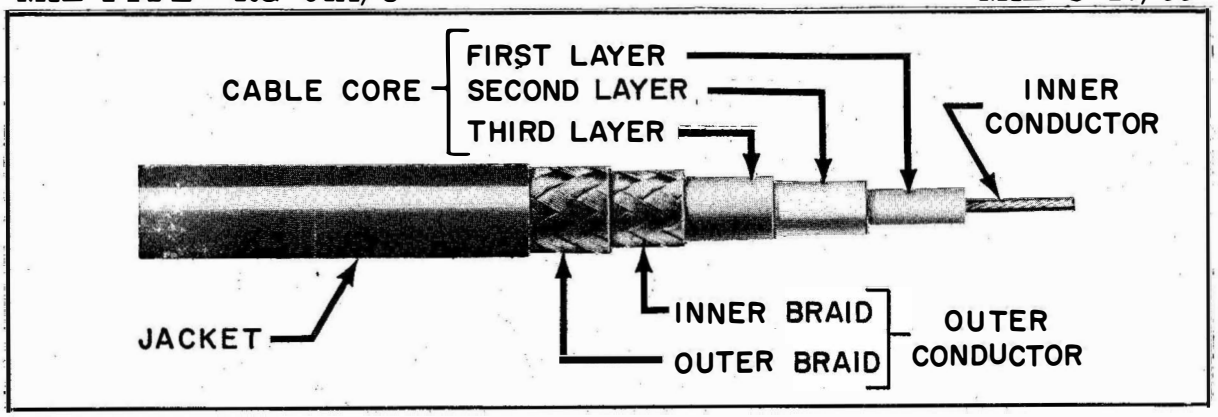
CONNECTORS FOR MIL TYPE CABLE RG-63B/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML		N	1003/U			3
End Seal	Yes		MX-1465/U		RE B49140	23

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-63B/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

PULSE CABLES

MIL TYPE - RG-64A/U — MIL-C-17/33



Class	Pulse
Inner Conductor	19/0.0117 Inch Tinned Copper
Dielectric Material	Layer of Conducting Synthetic Rubber Plus Two Layers of Nonconducting Synthetic Rubber
Nominal Diameter of Dielectric	0.288 Inch
Outer Conductor	Tinned Copper Double Braid
Protective Covering	Chloroprene Jacket
Nominal Over-All Diameter	0.475 Inch (Max)
Weight	0.205 lb/ft
Approximate Impedance	48±4 Ohms
Nominal Capacitance	50 $\mu\mu$f/ft
Maximum Operating Voltage	10,000 Volts (RMS)
Attenuation	0.7 db/100 ft Maximum At 1 MC
Dielectric Strength	12,000 Volts RMS, Minimum
Corona	10,000 Volts RMS, Minimum for Qualification And Acceptance Testing, And 3,500 Volts RMS at 3.4 Inches of Mercury And -55°C (-67°F) For Qualification Testing
Remarks	Medium Size Cable

INSTALLATION DATA

Minimum Bend Radius	5 inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-5
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	1/2 inch

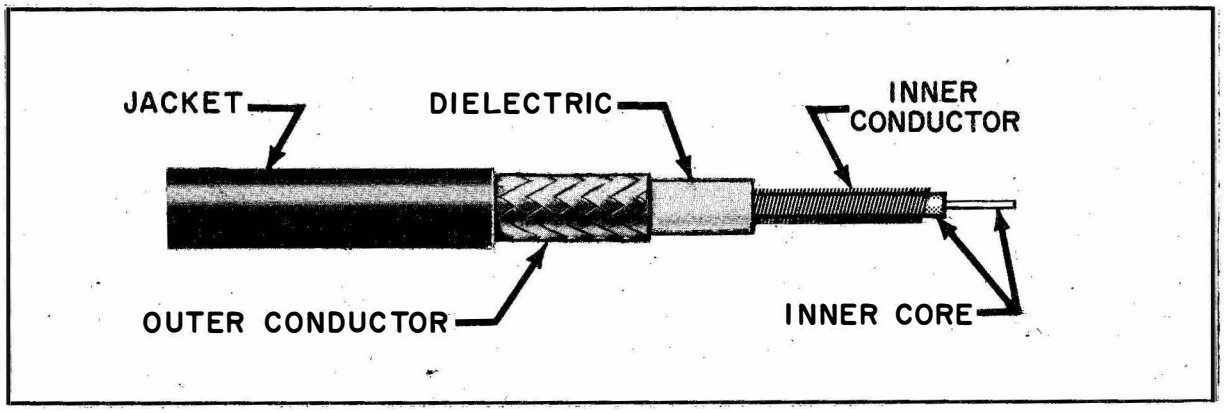
CONNECTORS FOR MIL TYPE CABLE RG-64A/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	PULSE	180A/U		RE B49184	10
Receptacle, FL	No	PULSE	181A/U		RE B49209	10

1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

SPECIAL CHARACTERISTIC CABLES

MIL TYPE - RG-65A/U — MIL-C-17/34



Class	Special Characteristic
Inner Conductor	No. 32 AWG Formex F; 0.128 Inch Dia. Helix
Dielectric Material	Polyethylene
Nominal Diameter of Delectric	0.285 Inch
Outer Conductor	Copper, Single Braid
Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.405 Inch
Weight	0.096 lb/ft
Approximate Impedance	950±50 Ohms
Nominal Capacitance	44 $\mu\mu$ f/ft
Maximum Operating Voltage	1000 Volts (RMS)
Attenuation	16.0 db/100 ft Maximum At 5 MC
Dielectric Strength	3000 Volts (RMS), Minimum
Time Delay	0.042 μ sec/ft Nominal at 5 MC
Remarks	High Impedance Video Cable, High Delay Line

INSTALLATION DATA

Minimum Bend Radius	5 Inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 Inch
Kickpipe Size	1/2 Inch

CONNECTORS FOR MIL TYPE CABLE RG-65A/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	1032/U		*MS 35315	2

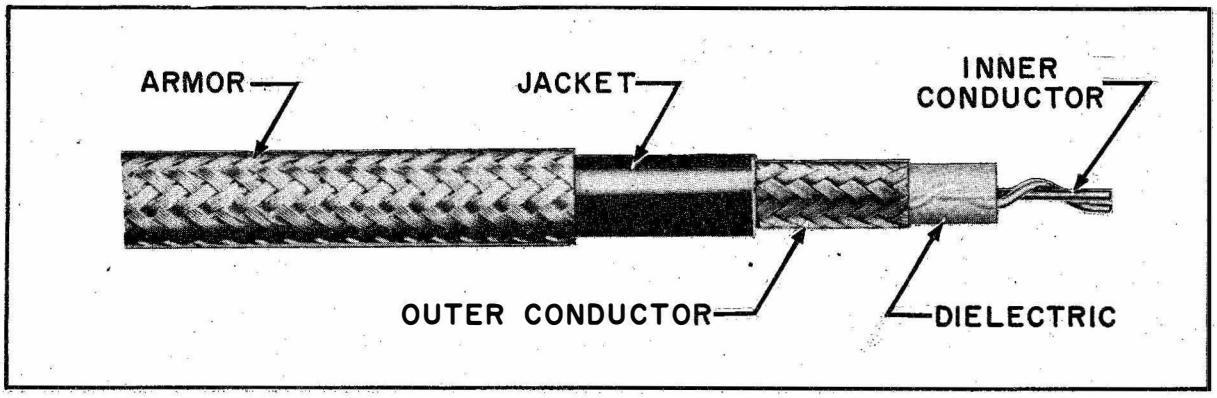
1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-65A/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

*UG-1032/U is similiar to UG-573B/U, except designed for RG-65A/U cable.

SPECIAL CHARACTERISTIC CABLES

MIL TYPE - RG-79B/U

MIL-C-17/36



Class	Special Characteristic
Inner Conductor	0.0253 Inch Copper Covered Steel Wire
Dielectric Material	Polyethylene (Semi-Solid)
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Copper; Single Braid
Protective Covering	Noncontaminating Synthetic Resin With Armor
Nominal Over-All Diameter	0.475 Inch (MAX)
Weight	0.138 lb/ft
Approximate Impedance	125±6 Ohms
Nominal Capacitance	11$\mu\mu$ f/ft
Maximum Operating Voltage	1000 Volts (RMS)
Attenuation	5.5 db/100 ft Maximum At 400 MC
Flow	2 Pounds
Dielectric Strength	3,000 Volts (RMS), Minimum
Capacitance Stability	Less Than 1.5%
Remarks	Low Capacitance; Same As RG-63B/U, but With Armor

INSTALLATION DATA

Minimum Bend Radius	5 Inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 Inch
Kickpipe Size	1/2 Inch

CONNECTORS FOR MIL TYPE CABLE RG-79B/U

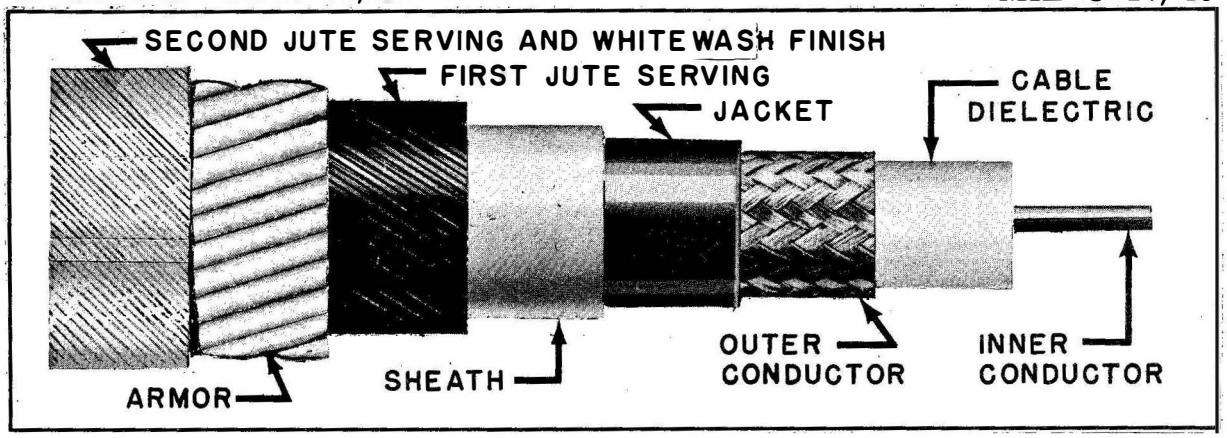
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	N	941B/U		MS 90293	3A
Plug, FL	Yes	N	940B/U		MS 90292	3A
Receptacle, FL	Yes	N	936B/U		RE B 49092	3A

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-79B/U cable.

GENERAL PURPOSE CABLES

MIL TYPE - RG-85A/U

MIL-C-17/40



Class	General Purpose
Inner Conductor	0.1045 Inch Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.680 Inch
Outer Conductor	Copper, Single Braid
Protective Covering	Noncontaminating Synthetic Resin With Lead Sheath And Special Armor
Nonominal Over-All Diameter	1.565 Inch (Max)
Weight	2.910 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	21.5$\mu\mu$ f/ft
Maximum Operating Voltage	10,000 Volts (RMS)
Attenuation	2.8 db/100 ft Maximum At 400 MC
Dielectric Strength	22,000 Volts RMS, Minimum
Corona	10,000 Volts RMS, Minimum
Remarks	Special Armor For Subterranean Installations

INSTALLATION DATA

Minimum Bend Radius	16 Inches
Metal Tube Size	P
Nylon Tube Size	7
Nylon Tube Packing Assembly	MS16191-1
Synthetic Rubber Grommet	
Kickpipe Size	2 Inches

CONNECTORS FOR MIL TYPE CABLE RG-85A/U

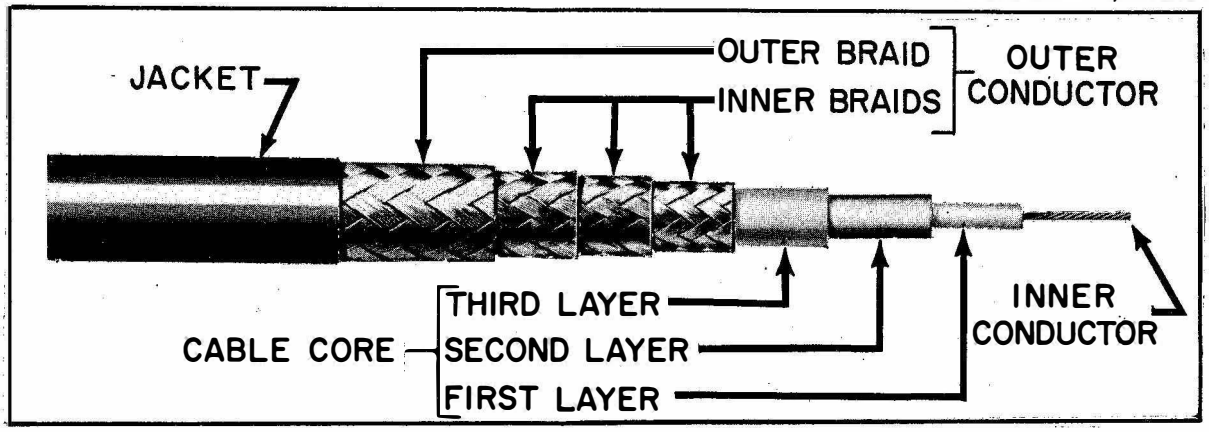
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
*Receptacle, FL	Yes	QDL	1165/U		RE C49347	5C
*Receptacle, FL	Yes	QDS	1210/U		RE C49355	6B
*Plug, ML	Yes	LC	1179/U		SC DL24455	7
End Seal	Yes		1170/U		RW47F 196	28
End Seal	Yes	C	MX-1901/U		RE49D 720	29

1. When Selecting connectors, NATO types are preferred.
*These connectors do NOT electrically match RG-85A/U cable.

PULSE CABLES

MIL TYPE - RG-88/U

MIL-C-17/43B



Class	Pulse
Inner Conductor	19/0.0117 Inch Tinned Copper
Dielectric Material	One Layer of Conducting Synthetic Rubber plus Two Layers of Nonconducting Synthetic Rubber
Nominal Diameter of Dielectric	0.288 Inch
Outer Conductor	Tinned Copper Four Braids
Protective Covering	Synthetic Resin
Nominal Over-All Diameter	0.515 Inch
Approximate Impedance	48±4 Ohms
Nominal Capacitance	50 $\mu\mu$ f/ft
Maximum Operating Voltage	10,000 Volts (RMS)
Attenuation	0.7 db/100 ft Macimum At 1 MC
Dielectric Strength	12,000 Volts RMS, Minimum
Corona	10,000 Volts RMS for Qualification Inspection And Acceptance Inspection, And 3,500 Volts RMS at 3.4 Inches of Mercury And At -55°C For Qualification Inspection
Remarks	Four Braid, Medium Size; Multi-Shielded High Voltage Cable

INSTALLATION DATA

Minimum Bend Radius	6 Inches
Metal Tube Size	C
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-5
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	3/4 inch

ORIGINAL

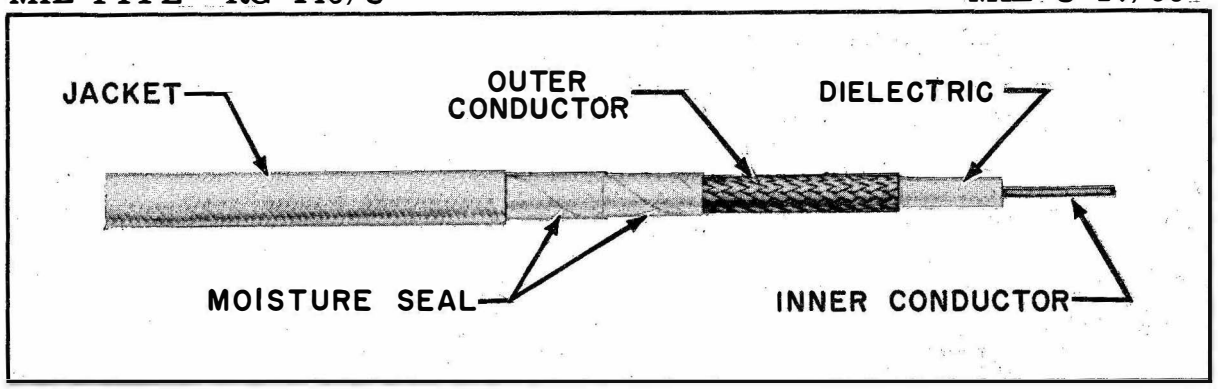
CONNECTORS FOR MIL TYPE CABLE RG-88/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	PULSE	180A/U		RE B 49184	10
Receptacle, FL	No	PULSE	181A/U		RE B 49209	10

1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-140/U — MIL-C-17/58



Class	High Temperature
Inner Conductor	0.025 Inch Silver Coated Copper Covered Steel
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.146 Inch
Outer Conductor	Silver Covered Copper, Single Braid
Protective Covering	Polytetrafluoroethylene Tape Moisture Seal With Single Braid Fibreglass Jacket
Nominal Over-All Diameter	0.233 Inch
Weight	0.045 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	21.0$\mu\mu$ f/ft
Maximum Operating Voltage	2300 Volts (RMS)
Attenuation	8.0 db/100 ft Maximum At 400 MC
Dielectric Strength	7,000 Volts RMS, Minimum
Corona	2,300 Volts RMS, Minimum
Remarks	Similar to RG-59/U, Except Cable Core is Polytetraflouroethylene

INSTALLATION DATA

Minimum Bend Radius	3 inches
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	3/8 inch

CONNECTORS FOR MIL TYPE CABLE RG-150/U

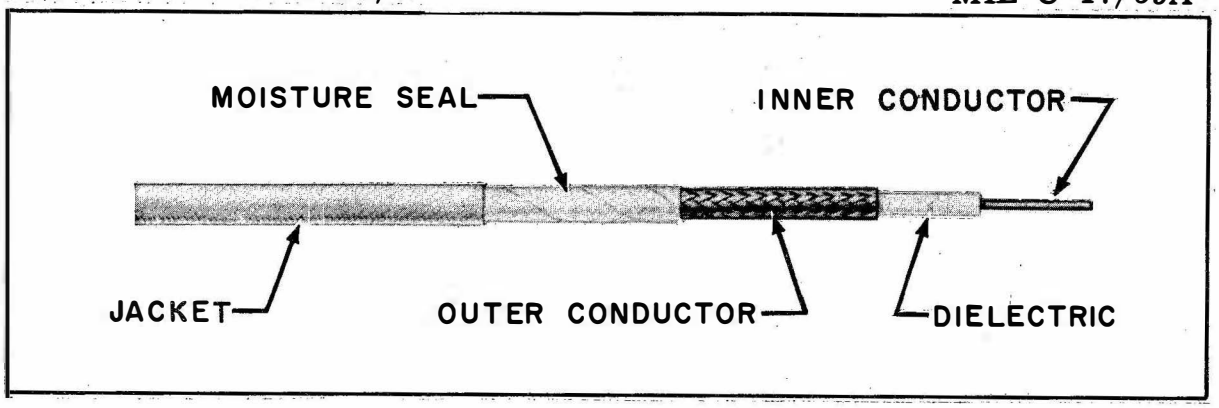
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	BNC	260D/U	NUG-104	MS 35170	1
Plug, FL	No	BNC	261C/U	NUG-105	MS 35171	1
Receptacle, FL	No	BNC	910B/U	NUG-106	MS 35181	1

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-140/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-141A/U

MIL-C-17/59A



Class	High Temperature
Inner Conductor	0.039 Inch Silver Coated Copper Covered Steel
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.116 Inch
Outer Conductor	Silver Covered Copper, Single Braid
Protective Covering	Polyetrafluoroethylene Tape Moisture Seal With Single Braid Fibreglass Jacket
Nominal Over-All Diameter	0.190 Inch
Weight	0.030 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	28.5$\mu\mu$f/ft
Maximum Operating Voltage	1900 Volts (RMS)
Attenuation	9.0 db/100 ft Maximum at 400 MC
Dielectric Strength	5,000 Volts RMS, Minimum
Corona	1,900 Volts RMS, Minimum
Remarks	Small Size Flexible Cable

INSTALLATION DATA

Minimum Bend Radius	2 inches
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-3
Synthetic Rubber Grommet	
Kickpipe Size	3/8 inch

ORIGINAL

CONNECTORS FOR MIL TYPE CABLE RG-141A/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	BNC	88E/U	NUG-101	MS 35168	1
Plug, FL	No	BNC	89C/U	NUG-102	MS 35169	1
Receptacle, FL	No	BNC	909B/U		MS 35180	1
*Receptacle, FL	No	BNC	253B/U		RE B49097	1

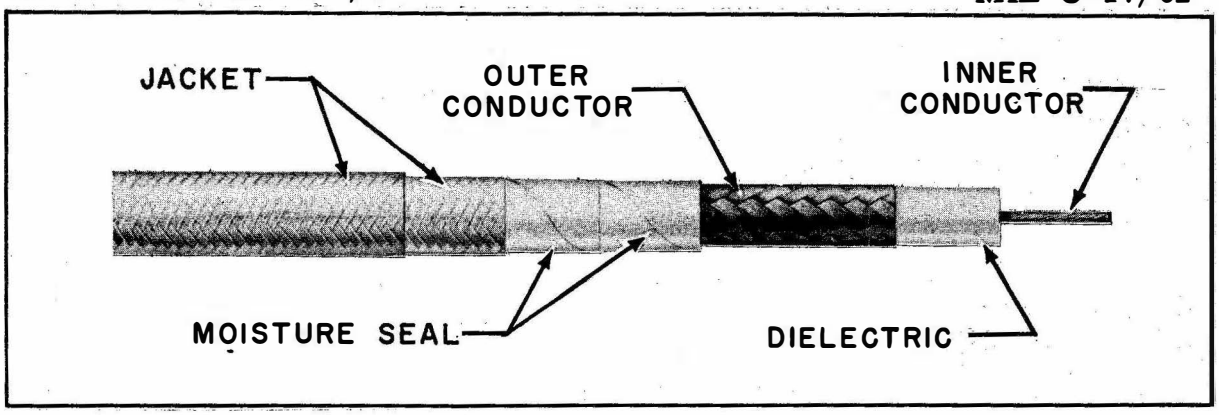
1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

*Pressurized

HIGH TEMPERATURE CABLES

MIL TYPE - RG-144/U

MIL-C-17/62



Class	High Temperature
Inner Conductor	7/0.179 Inch Silver Coated Copper Covered Steel
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Silver Covered Copper, Single Braid
Protective Covering	Polytetrafluoroethylene Tape Moisture Seal With Double Braid Fibreglass Jacket
Nominal Over-All Diameter	0.410 Inch
Weight	0.120 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	20.5$\mu\mu$f/ft
Maximum Operating Voltage	5000 Volts (RMS)
Attenuation	4.5 db/100 ft Maximum At 400 MC
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Remarks	Similar to RG-11A/U Except Cable Dielectric is Polytetrafluoroethylene

INSTALLATION DATA

Minimum Bend Radius	5 inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	1/2 inch

CONNECTORS FOR MIL TYPE CABLE RG-144/U

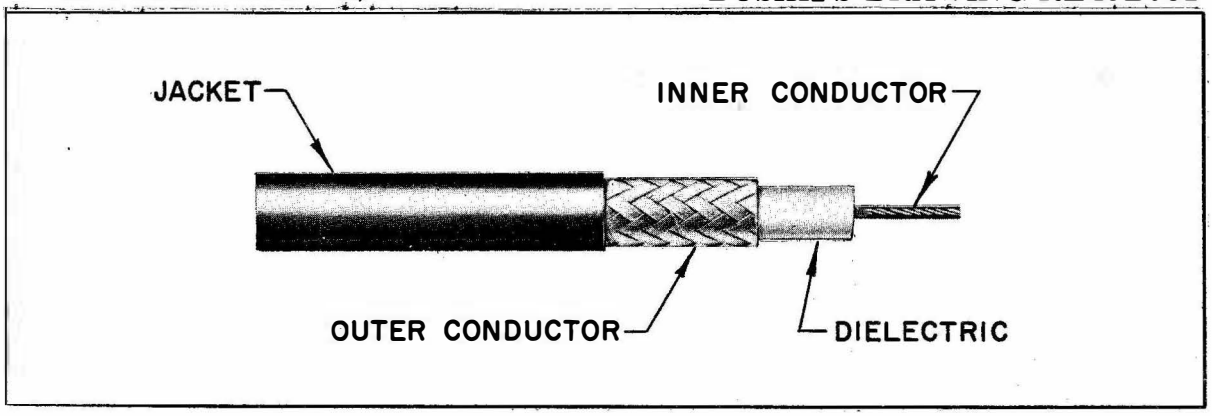
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	HN	59E/U		RE B 49227	4
Plug, FL	No	HN	60E/U		RE B 49224	4
Receptacle, Fl	No	HN	427C/U		RE B 49223	4
Plug, ML	Yes	HN	925B/U		RE B 49226	4
Plug, FL	Yes	HN	927B/U		RE B 49230	4
Receptacle, FL	Yes	HN	930B/U		RE B 49229	4
*Plug, ML	No	HN	1212/U		RE B 49364	4A
*Plug, FL	No	HN	1214/U		RE B 49363	4A

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-144/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

*Captivated contact.

SPECIAL CHARACTERISTIC CABLES

MIL TYPE - RG-149/U — BUSHIPS DRAWING RE49B681



Class	Special Characteristic
Inner Conductor	7/26 AWG Tinned Copper
Dielectric Material	Polyethylene, Solid
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Copper; Single Braid
Protective Covering	Vinyl Jacket
Nominal Over-All Diameter	0.405 Inch
Weight	0.093 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	20.5$\mu\mu$ f/ft
Maximum Operating Voltage	4,000 Volts (RMS)
Attenuation	10.0 db/100 ft Maximum At 400 MC
Remarks	Low Noise, Low Power Cable

INSTALLATION DATA

Minimum Bend Radius	5 Inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4

Synthetic Rubber Grommet	1/2 Inch
Kickpipe Size	1/2 Inch

CONNECTORS FOR MIL TYPE CABLE RG149/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	HN	59E/U		RE B 49227	4
Plug, FL	No	HN	60E/U		RE B 49224	4
Receptacle, FL	No	HN	427C/U		RE B 49223	4
Plug, ML	Yes	HN	925B/U		RE B 49226	4
Plug, FL	Yes	HN	927B/U		RE B 49230	4
Receptacle, FL	Yes	HN	930B/U		RE B 49229	4
*Plug, ML	No	HN	1213/U		RE B 49364	4A
*Plug, FL	No	HN	1214/U		RE B 49363	4A

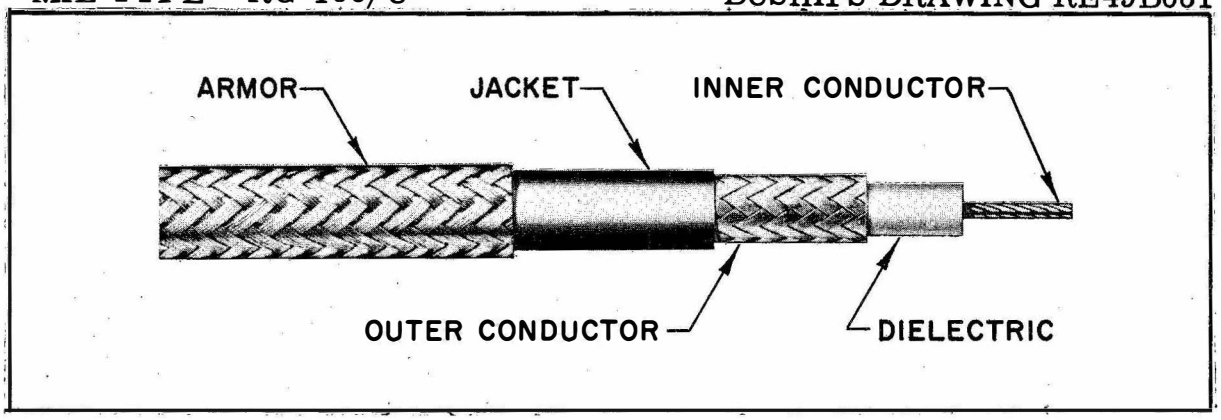
1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-149/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

* Captivated contact.

SPECIAL CHARACTERISTIC CABLES

MIL TYPE - RG-150/U

BUSHIPS DRAWING RE49B681



Class	Special Characteristic
Inner Conductor	7/26 AWG Tinned Copper
Dielectric Material	Polyethylene, Solid
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Copper; Single Braid
Protective Covering	Vinyl Jacket
Nominal Over-All Diameter	0.475 Inch Maximum
Weight	0.117 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	20.5$\mu\mu$ f/ft
Maximum Operating Voltage	4,000 Volts (RMS)
Attenuation	10.0 db/100 ft Maximum At 400 MC
Remarks	Low Noise, same as RG-149/U but with Armor

INSTALLATION DATA

Minimum Bend Radius	5 Inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 Inch
Kickpipe Size	1/2 Inch

CONNECTORS FOR MIL TYPE CABLE RG-150/U

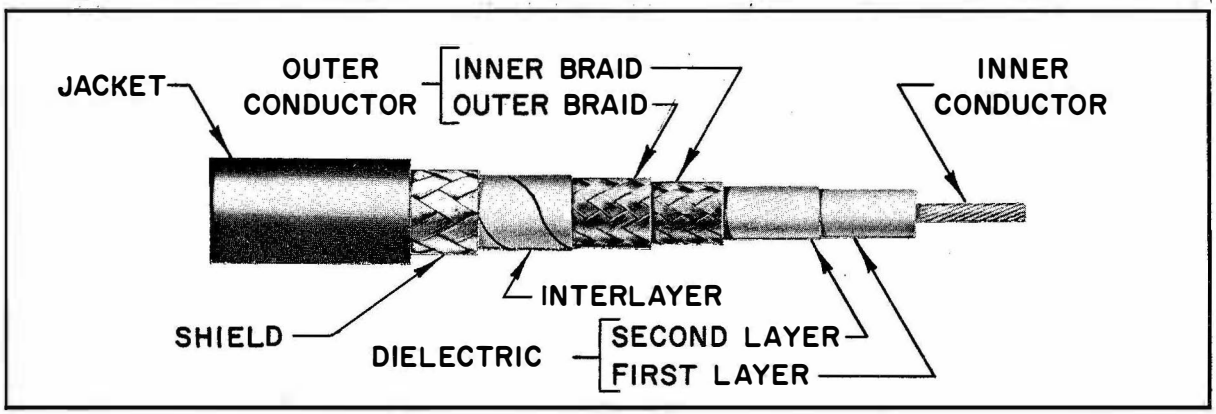
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	HN	925B/U		RE B 49226	4B
Plug, FL	Yes	HN	927B/U		RE B 49230	4B
Receptacle, FL	Yes	HN	930B/U		RE B 49229	4B

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-150/U cable.

PULSE CABLES

MIL TYPE - RG-156/U

MIL-C-17/101



Class	Pulse
Inner Conductor	7 Strands AWG #21 Tinned Copper Wire
Dielectric Material	First Layer: Polyethylene, Solid Second Layer: Conducting Synthetic Rubber
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Inner Braid: Tinned Copper Wire Outer Braid: Galvanized Steel Wire
Interlayer	First Layer (optional): Synthetic Resin Tape Second Layer: Polyethylene, Pigmented Red
Protective Covering	Shield: Tinned Copper Wire Jacket: Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.540 Inch
Approximate Impedance	50±4 Ohms
Nominal Capacitance	30 $\mu\mu$f/ft
Maximum Operating Voltage	10,000 Volts (RMS)
Attenuation	0.21 db/100 ft Maximum at 1 MC
Dielectric Strength	Interlayer: 1,000 Volts (RMS), Minimum Dielectric: 20,000 Volts (RMS), Minimum
Corona	10,000 Volts (RMS), Minimum

INSTALLATION DATA

Minimum Bend Radius	6 inches
Metal Tube Size	C
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-5
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	3/4 inch

CONNECTORS FOR MIL TYPE CABLE RG-156/U

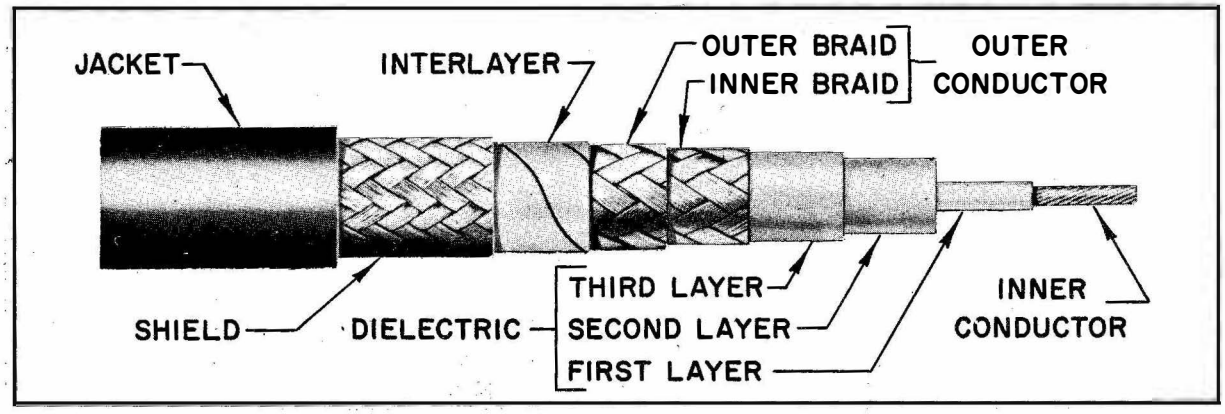
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst

Connector information will be provided when available.

PULSE CABLE

MIL TYPE - RG-157/U

MIL-C-17/102



Class	Pulse
Inner Conductor	19 Strands AWG #24 Tinned Copper Wire
Dielectric Material	First Layer: Conducting Synthetic Rubber Second Layer: Polyethylene, Solid Third Layer: Conducting Synthetic Rubber
Nominal Diameter of Dielectric	Third Layer: 0.455 Inch
Outer Conductor	Inner Braid: Tinned Copper Wire Outer Braid: Galvanized Steel Wire
Interlayer	First Layer (optional): Synthetic Resin Tape Second Layer: Polyethylene, Pigmented Red
Protective Covering	Shield: Tinned Copper Wire Jacket: Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.725 Inch
Approximate Impedance	50±4 Ohms
Nominal Capacitance	38$\mu\mu$ f/ft
Maximum Operating Voltage	15,000 Volts (RMS)
Attenuation	0.19 db/100 ft Maximum at 1 MC
Dielectric Strength	Interlayer; 1,000 Volts (RMS), Minimum Dielectric; 30,000 Volts (RMS), Minimum
Corona	15,000 Volts (RMS), Minimum

INSTALLATION DATA

Minimum Bend Radius	8 inches
Metal Tube Size	D
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-7
Synthetic Rubber Grommet	3/4 inch
Kickpipe Size	3/4 inch

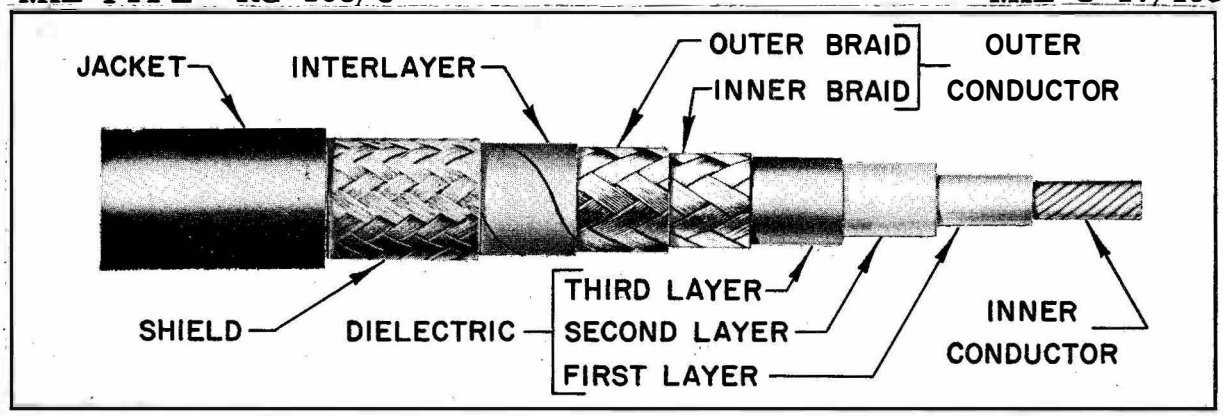
CONNECTORS FOR MIL TYPE CABLE RG-157/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst

Connector information will be provided when available.

PULSE CABLES

MIL TYPE - RG-158/U — MIL-C-17/103



Class	Pulse
Inner Conductor	37 Strands AWG #21 Tinned Copper Wire
Dielectric Material	First Layer: Conducting Synthetic Rubber Second Layer; Polyethylene, Solid Third Layer; Conducting Synthetic Rubber
Nominal Diameter of Dielectric	Third Layer: 0.455 Inch
Outer Conductor	Inner Braid: Tinned Copper Wire Outer Braid: Galvanized Steel Wire
Interlayer	First Layer (optional): Synthetic Resin Tape Second Layer: Polyethylene, Pigmented Red
Protective Covering	Shield: Tinned Copper Wire Jacket: Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.725 Inch
Approximate Impedance	25±2.5 Ohms
Nominal Capacitance	78$\mu\mu$ f/ft
Maximum Operating Voltage	15,000 Volts (RMS)
Attenuation	0.20 db/100 ft Maximum at 1 MC
Dielectric Strength	Interlayer: 1,000 Volts (RMS), Minimum Dielectric: 25,000 Volts (RMS), Minimum
Corona	15,000 Volts (RMS), Minimum
Remarks	Same as RG-157/U But Inner Conductor Larger

INSTALLATION DATA

Minimum Bend Radius	8 inches
Metal Tube Size	D
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-7
Synthetic Rubber Grommet	3/4 inch
Kickpipe Size	3/4 inch

CONNECTORS FOR MIL TYPE CABLE RG-158/U

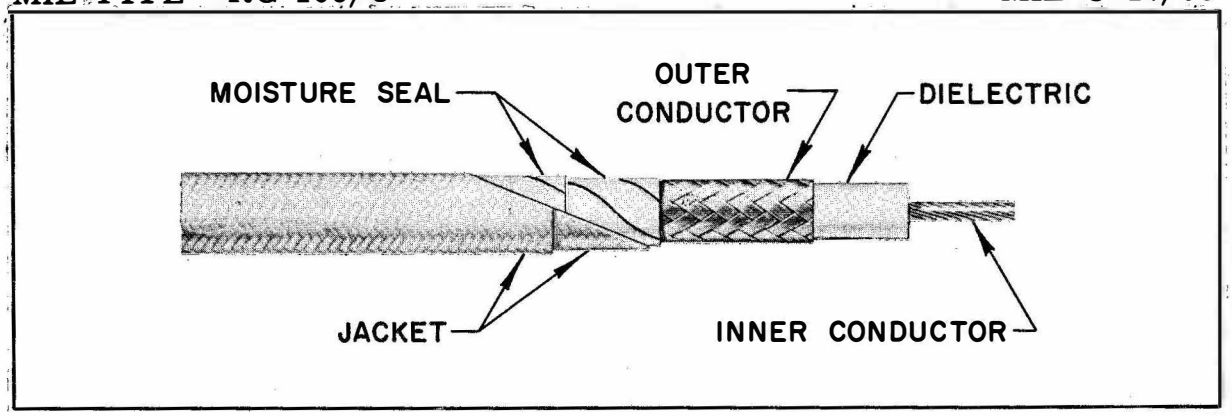
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst

Connector information will be provided when available.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-165/U

MIL-C-17/65



Class	High Temperature
Inner Conductor	7/0.032 Inch Silver Covered Copper
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Silver Covered Copper, Single Braid
Protective Covering	Polytetrafluoroethyline Tape Moisture Seal, with Fiberglass Double Braid Jacket
Nominal Over-All Diameter	0.410 Inch
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29.5 $\mu\mu$f/ft
Maximum Operating Voltage	5,000 Volts (RMS)
Attenuation	5 db/100 ft Maximum at 400 MC
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Remarks	

INSTALLATION DATA

Minimum Bend Radius	5 Inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 Inch
Kickpipe Size	1/2 Inch

CONNECTORS FOR MIL TYPE CABLE RG-165/U

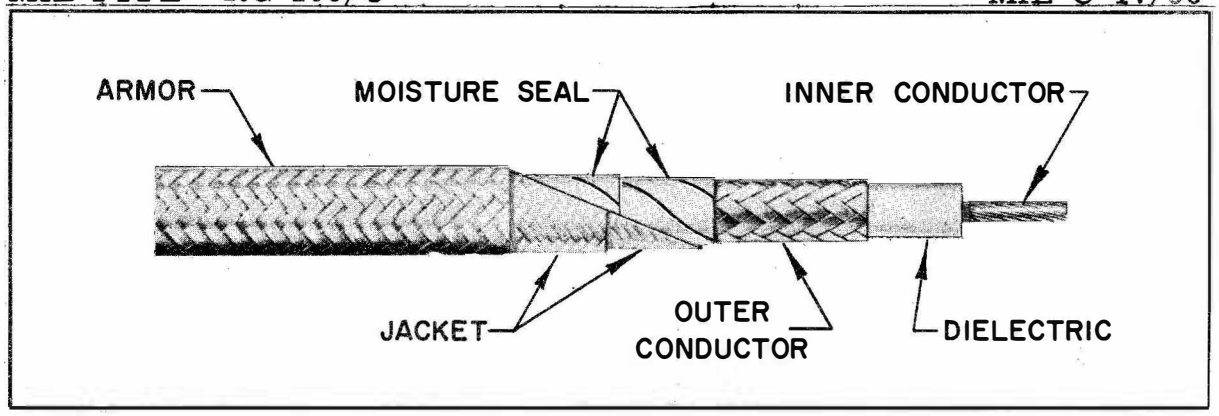
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Inst Assy
Plug, ML	No	C	573B/U	NUG-201	MS 35315	2
Plug, FL	No	C	572A/U	NUG-202	MS 35318	2
Recepatcle, FL	No	C	570A/U	NUG-203	MS 35317	2
*Plug, ML	No	N	1185A/U		RE B 49035	3
*Plug, FL	No	N	1186A/U		RE B 49036	3
Receptacle, FL	No	N	160D/U		RE B 49082	3

1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

* Captivated contact.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-166/U — MIL-C-17/66



Class	High Temperature
Inner Conductor	7/0.032 Inch Silver Covered Copper
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Silver Covered Copper, Single Braid
Protective Covering	Polytetrafluoroethylene Tape Moisture Seal, with Fiberglass Double Braid Jacket
Nominal Over-All Diameter	0.460 Inch
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29.5 $\mu\mu$ f/ft
Maximum Operating Voltage	5,000 Volts (RMS)
Attenuation	5 db/100 ft Maximum at 400 MC
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Remarks	Same as RG-165/U but with Armor

INSTALLATION DATA

Minimum Bend Radius	5 Inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4

ORIGINAL

5-2-33

Synthetic Rubber Grommet ..... 1/2 Inch
Kickpipe Size..... 1/2 Inch

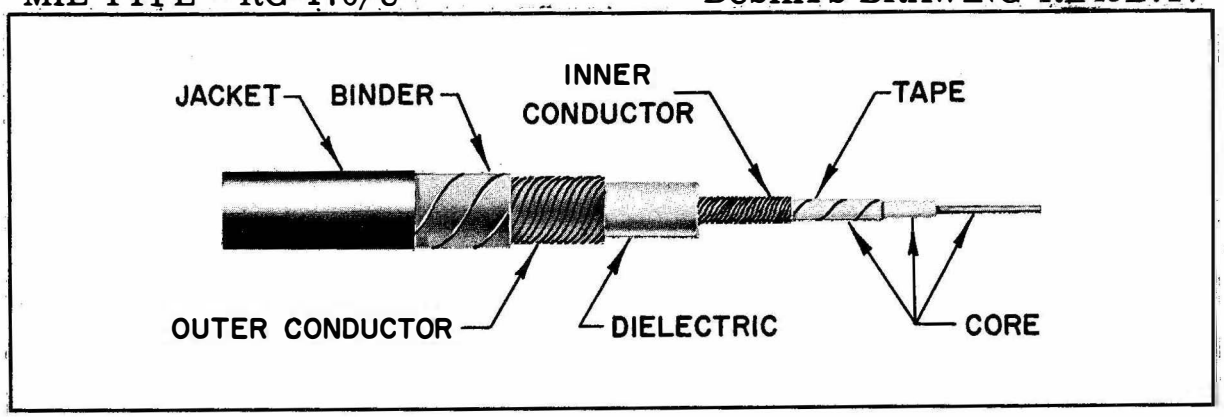
CONNECTORS FOR MIL TYPE CABLE RG-166/U

Description	Armor Clamp	Series	UG/MX Number	Type NATO	Applicable Drawing	Inst Assy
Plug, ML	Yes	C	943B/U		RE B 49195	2A
Plug, FL	Yes	C	944A/U		RE B 49193	2A
Receptacle, FL	Yes	C	937A/U		RE B 49191	2A
Plug, ML	Yes	N	941B/U		MS 90293	3A
Plug, FL	Yes	N	940B/U		MS 90292	3A
Receptacle, FL	Yes	N	936B/U		RE B 49092	3A

1. When selecting connectors, NATO types are preferred.

SPECIAL CHARACTERISTIC CABLES

MIL TYPE - RG-176/U — BUSHIPS DRAWING RE49B717



Class.....	Special Characteristic
Core.....	Low Loss Magnetic Material Nominal Overall Diameter 0.118 Inch
Inner Conductor.....	Close Wound Helix of #32 AWG Copper Wire
Nominal Over-All Diameter	0.135 Inch
Dielectric.....	Polyethylene Nominal Overall Diameter 0.285 Inch
Outer Conductor.....	Spiral Wound 0.117 Inch Diameter Insulated Wire
Protective Coating	Binder over Outer Conductor: Plastic Tape Jacket: Synthetic Resin
Nominal Over-All Diameter	0.405 Inch
Approximate Impedance	2,240±70 Ohms
Nominal Capacitance	49.0$\mu\mu$ f/ft
Maximum Operating Voltage.....	2,000 Volts (RMS)
Remarks	High Impedance Delay Line: 0.11 micro sec/ft delay at 5 mc/sec

INSTALLATION DATA

Minimum Bend Radius.....	5 Inches
Metal Tube Size.....	B
Nylon Tube Size	2

Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 Inch
Kickpipe Size	1/2 Inch

CONNECTORS FOR MIL TYPE CABLE RG-176/U

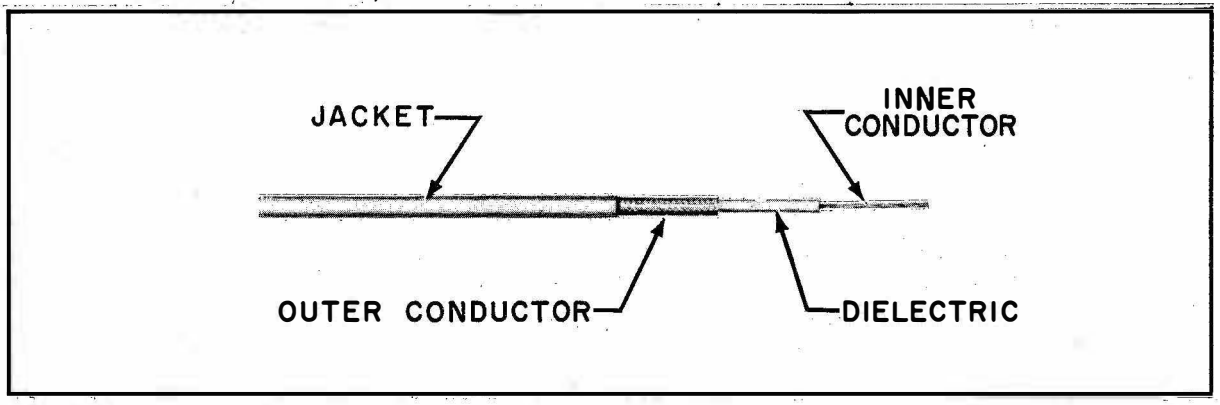
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst

High delay cable is usually part of a circuit design. Connector information will be provided when available.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-187A/U

MIL-C-17-68B



Class	High Temperature
Inner Conductor	7/0.004 Inch Silver Covered Copper Covered Steel Wire
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.060 Inch
Outer Conductor	Silvered Copper; Single Braid
Protective Covering	Polytetrafluoroethylene
Nominal Over-All Diameter	0.110 Inch
Approximate Impedance	75±3 Ohms
Nominal Capacitance	19.3 $\mu\mu$f/ft
Maximum Operating Voltage	1200 Volts (RMS)
Attenuation	21 db/100 ft Maximum At 400 MC
Dielectric Strength	2,000 Volts RMS, Minimum
Corona	1,200 Volts RMS, Minimum
Remarks	High Temperature Minature Cable

INSTALLATION DATA

Minimum Bend Radius	2 inches
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-2
Synthetic Rubber Grommet	
Kickpipe Size	3/8 inch

CONNECTORS FOR MIL TYPE CABLE RG-187A/U

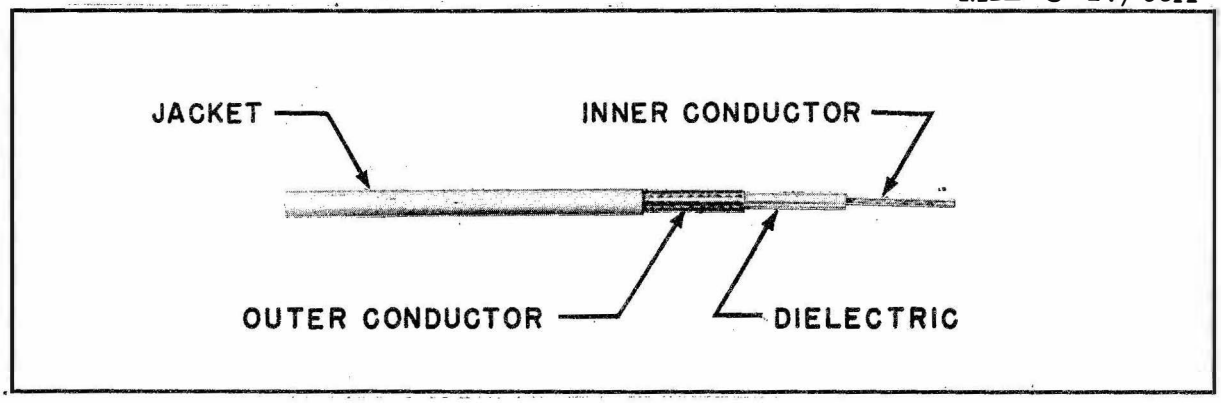
Description	Type	Number Manufacturer's	NATO Type	Applicable Specification	Inst. Assembly
Plug, ML	Push-on	3131%			8B
*Plug, ML	Push-on	3101%			8B
*Plug, ML	Push-on	1101$			8A
Plug, ML&	Push-on	3133%			8B
*Plug, ML&	Push-on	3103%			8B
*Plug, ML&	Push-on	1105$			8A
Plug, FL	Push-on	3130%			8B
*Plug, FL	Push-on	3100%			8B
*Plug, FL	Push-on	1102$			8A
Plug, ML	Screw-on	3031%			8B
*Plug, ML	Screw-on	3001%			8B
*Plug, ML	Screw-on	1001$			8A
Plug, ML&	Screw-on	3033%			8B
*Plug, ML&	Screw-on	3003%			8B
*Plug, ML&	Screw-on	1005$			8A
Plug, FL	Screw-on	3030%			8B
*Plug, FL	Screw-on	3000%			8B
*Plug, FL	Screw-on	1002$			8A

1. When selecting connectors, NATO types are preferred.
* These connectors do NOT electrically match RG-187A/U cable.
& Bulkhead mounted.
$ Micon Electronics, Inc., Garden City, L.I., N.Y., series 1000.
% Sealectro Corp., Mamaroneck, N.Y., type ConheX.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-188A/U

MIL-C-17/69A



Class	High Temperature
Inner Conductor	7/0.0067 Inch Silver Covered Copper Covered Steel Wire
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.060 Inch
Outer Conductor	Silver Covered Copper; Single Braid
Protective Covering	Polytetrafluoroethylene
Nominal Over-All Diameter	0.110 Inch
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29$\mu\mu$ f/ft
Maximum Operating Voltage	1200 Volts (RMS)
Attenuation	20 db/100 ft Maximum At 400 MC
Dielectric Strength	2,000 Volts RMS, Minimum
Corona	1,200 Volts RMS, Minimum
Remarks	High Temperature Miniaturized Cable

INSTALLATION DATA

Minimum Bend Radius	2 inches
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-2
Synthetic Rubber Grommet	
Kickpipe Size	3/8 inch

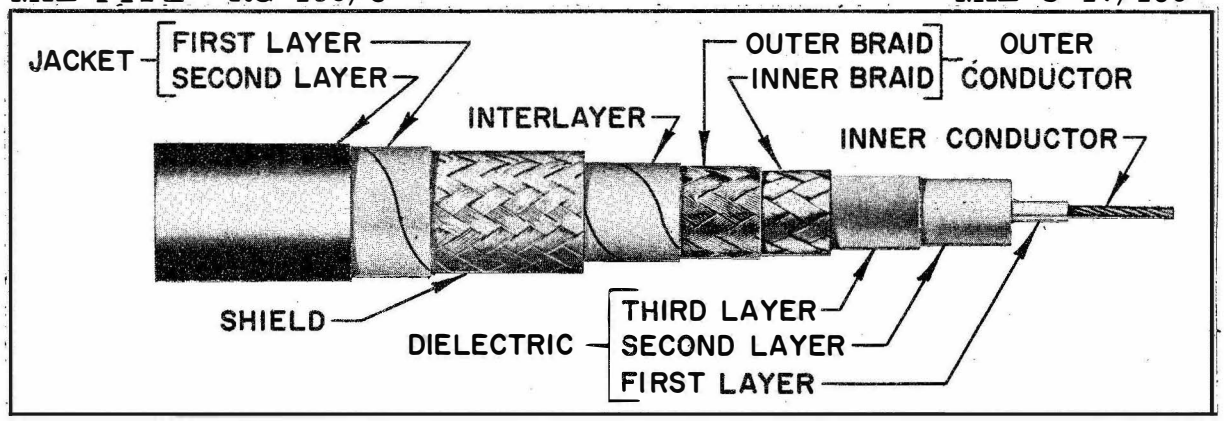
CONNECTORS FOR MIL TYPE CABLE RG-188A/U

Description	Type	Manufacturer's Number	UGor MX Number	NATO Type	Applicable Specification	
Plug, ML	Push-on	1101**	1458		MIL-C-22557/8	8A
Plug, ML	Push-on	3101***	1458		"	8B
*Plug, ML	Push-on	1105**	1459		MIL-C-22557/9	8A
*Plug, ML	Push-on	3103***	1459		"	8B
Plug, FL	Push-on	1102**	1456		MIL-C-22557/6	8A
Plug, FL	Push-on	3100***	1456		"	8B
Plug, ML	Screw-on	1001**	1467		MIL-C-22557/17	8A
Plug, ML	Screw-on	3001***	1467		"	8B
*Plug, ML	Screw-on	1005**	1468		MIL-C-22557/18	8A
*Plug, ML	Screw-on	3003***	1468		"	8B
Plug, FL	Screw-on	1002**	1465		MIL-C-22557/15	8A
Plug, FL	Screw-on	3000***	1465		"	8B

1. When selecting connectors, NATO types are preferred.
* Bulkhead mounted.
** Micon Electronics, Inc., Garden City, L.I., N.Y., series 1000.
*** Sealectro Corp., Mamaroneck, N.Y., type ConheX.

PULSE CABLES

MIL TYPE - RG-190/U — MIL-C-17/105



Class	Pulse
Inner Conductor	19 Strands 0.0117 inch Tinned Copper Wire
Dielectric Material	First Layer: Conducting Synthetic Rubber Second Layer: Insulating Butyl-Rubber Compound Third Layer: Conducting Synthetic Rubber
Nominal Diameter of Dielectric	Third Layer: 0.380 Inch
Outer Conductor	Inner Braid: Tinned Copper Wire Outer Braid: Galvanized Steel Wire
Interlayer	First Layer (one wrap); Synthetic Resin Tape Second Layer (one wrap): Synthetic Resin Tape Third Layer (two wraps): Silicone-Rubber-Treated Glass Tape

Protective Covering	Shield: Tinned Copper Wire Jacket: First Layer: Synthetic Resin Tape Second Layer: Polychloroprene Compound
Nominal Over-All Diameter	0.700 Inch
Approximate Impedance	50±4 Ohms
Nominal Capacitance	50.0$\mu\mu$f/ft
Maximum Operating Voltage	15,000 Volts (RMS)
Attenuation	0.40 db/100 ft Maximum at 1 MC
Dielectric Strength	Interlayer: 1,000 Volts (RMS) Minimum Dielectric: 30,000 Volts (RMS) Minimum
Corona	15,000 Volts (RMS) Minimum
Remarks	Low Noise

INSTALLATION DATA

Minimum Bend Radius	7 inches
Metal Tube Size	D
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-5
Synthetic Rubber Grommet	3/4 inch
Kickpipe Size	3/4 inch

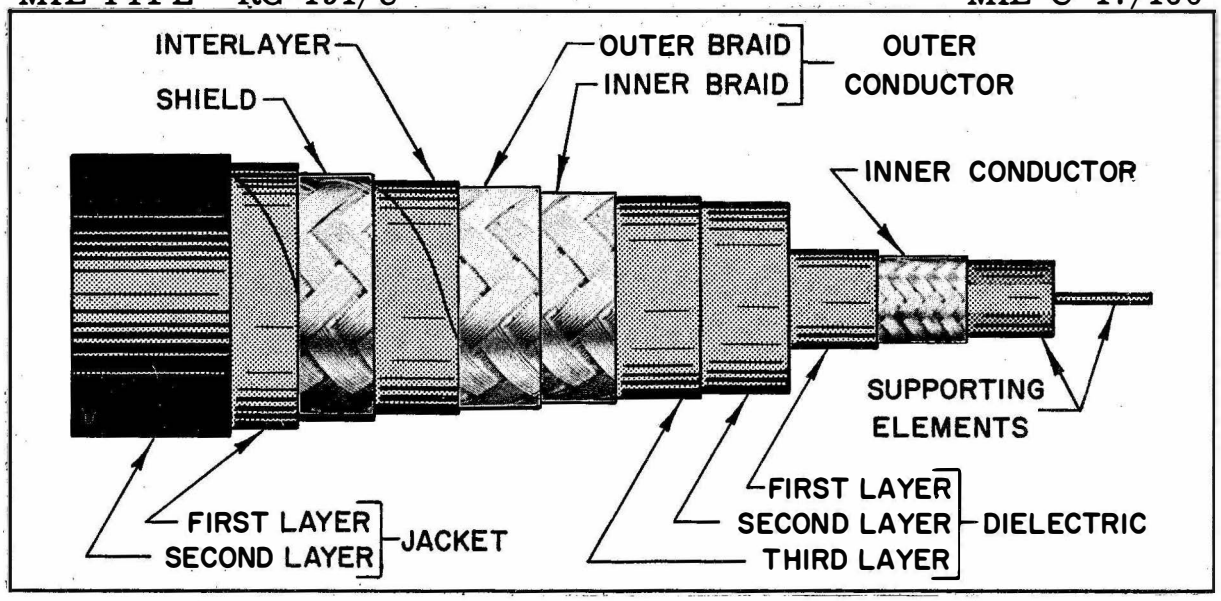
CONNECTORS FOR MIL TYPE CABLE RG-190U

Description	Type	UG/MX Number	NATO Type	Applicable Specification	Assembly Instructions

Connector information will be provided when available.

PULSE CABLES

MIL TYPE - RG-191/U MIL-C-17/106



Class	Pulse
Supporting Elements	Center Element: Cordage Second Element: Insulating Butyl-Rubber Compound
Inner Conductor	Single Braid, AWG size 30 Tinned Copper Wire
Inner Conductor, Maximum Over-All Diameter	0.485 Inch
Dielectric Material	First Layer: Conducting Synthetic Rubber Second Layer: Insulating Butyl-Rubber Compound Third Layer: Conducting Synthetic Rubber
Nominal Diameter of Dielectric	Third Layer: 1.065 Inch
Outer Conductor	Inner Braid: Tinned Copper Wire Outer Braid: Galvanized Steel Wire
Interlayer	First Layer (one wrap): Synthetic Resin Tape Second Layer (one wrap): Synthetic Resin Tape Third Layer (two wraps): Silicone-Rubber-treated Glass Tape
Protective Covering	Shield: Tinned Copper Wire Jacket: First Layer: Synthetic Resin Tape Second Layer: Polychloroprene Compound
Nominal Over-All Diameter	1.460 Inch
Approximate Impedance	25±2.5 Ohms
Nominal Capacitance	85.0$\mu\mu$f/ft
Maximum Operating Voltage	25,000 Volts (RMS)
Attenuation	0.50 db/100 ft Maximum at 1 MC
Dielectric Strength	Interlayer: 1,000 Volts (RMS), Minimum Dielectric: 50,000 Volts (RMS), Minimum
Corona	25,000 Volts (RMS), Minimum

INSTALLATION DATA

Minimum Bend Radius	15 Inches
Metal Tube Size	N
Nylon Tube Size	6
Nylon Tube Packing Assembly	MS16190-4
Synthetic Rubber Grommet	1/4 Inch
Kickpipe Size	1 1/2 Inch

CONNECTORS FOR MIL TYPE CABLE RG-191/U

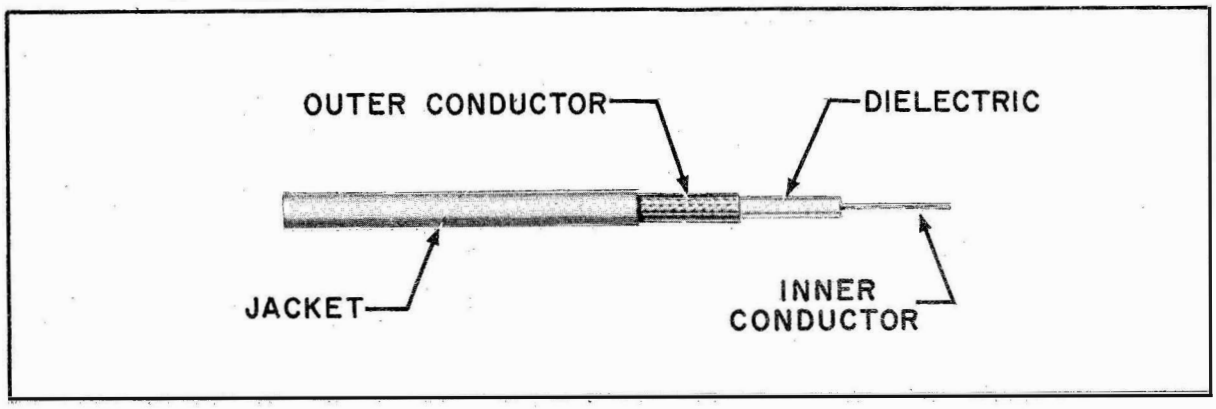
Description	Type	UG/MX Number	NATO Type	Applicable Specification	Assembly Instructions
Plug, ML	1303/U				*
Receptacle, FL		1304/U			*
Plug, ML		1417/U			**
Receptacle, FL		1418/U			**

*Plug assembly molded on definite length cable, part of cable assembly CG-1718/U (-ft. -in.), for use with receptacle UG-1304/U.

**Plug assembly molded on definite length cable, part of cable assembly CG-2218/U (-ft. -in.), for use with receptacle UG-1418/U.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-195A/U MIL-C-17/70A



Class	High Temperature
Inner Conductor	7/0.004 Inch Silver Covered Copper Covered Steel Wire
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.102 Inch
Outer Conductor	Silver Covered Copper; Single Braid
Protective Covering	Polytetrafluoroethylene
Nominal Over-All Diameter	0.155 Inch
Approximate Impedance	95±3 Ohms
Nominal Capacitance	15.2$\mu\mu$f/ft
Maximum Operating Voltage	1500 Volts (RMS)
Attenuation	17 db/100 ft Maximum At 400 MC
Dielectric Strength	2,000 Volts RMS, Minimum
Corona	1,500 Volts RMS, Minimum
Remarks	High Temperature Miniaturized Cable

INSTALLATION DATA

Minimum Bend Radius	2 inches
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-2
Synthetic Rubber Grommet	
Kickpipe Size	3/8 inch

CONNECTORS FOR MIL TYPE CABLE RG-195A/U

Description	Type	Manufacturer's Number	NATO Type	Applicable Specification	Assembly Inst.
Plug, ML	Push-on	3131%			8B
*Plug, ML	Push-on	3133%			8B
Plug, FL	Push-on	3130%			8B
Plug, ML	Screw-on	3031%			8B
*Plug, ML	Screw-on	3033%			8B
Plug, FL	Screw-on	3030%			8B

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-195A/U cable.

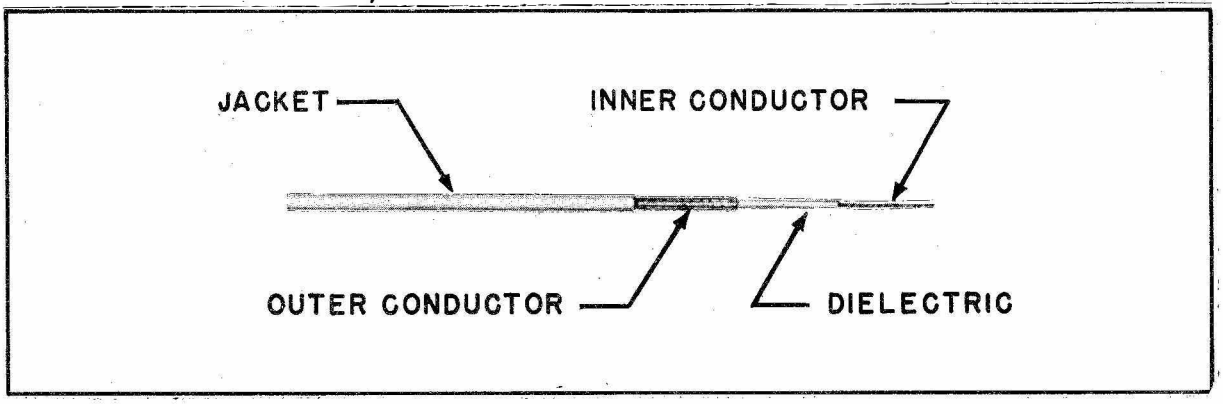
* Bulkhead mounted.

% Sealectro Corp., Mamaroneck, N. Y., type ConheX.

ORIGINAL

HIGH TEMPERATURE CABLES

MIL TYPE - RG-196A/U — MIL-C-17/71A



Class	High Temperature
Inner Conductor	7/0.004 Inch Silver Covered Copper Covered Steel Wire
Dielectric Material	Polytetrafluoroethylene
Nominal Diameter of Dielectric	0.034 Inch
Outer Conductor	Silver Covered Copper; Single Braid
Protective Covering	Polytetrafluoroethylene
Nominal Over-All Diameter	0.080 Inch
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29 $\mu\mu$ f/ft
Maximum Operating Voltage	1000 Volts (RMS)
Attenuation	29 db/100 ft Maximum At 400 MC
Dielectric Strength	2,000 Volts RMS, Minimum
Corona	1,000 Volts RMS, Minimum
Remarks	High Temperature Miniaturized Cable

INSTALLATION DATA

Minimum Bend Radius	1 inch
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-2
Synthetic Rubber Grommet	
Kickpipe Size	3/8 inch

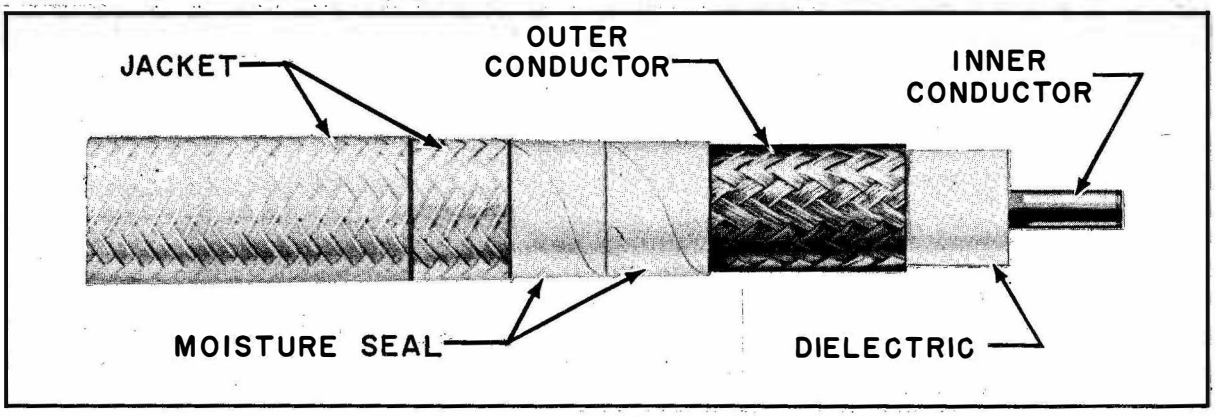
CONNECTORS FOR MIL TYPE CABLE RG-196A/U

Description	Type	Manufacturer's Number	UG or MX Number	NATO Type	Applicable Specification	Assy Inst
Plug, ML	Push-on	27-31**	1453		MIL-C-22557/3	8
Plug, ML	Push-on	1101/196***	1453		"	8A
Plug, ML	Push-on	3111****	1453		"	8B
*Plug, ML	Push-on	27-32**	1454		MIL-C-22557/4	8
*Plug, ML	Push-on	1105/196***	1454		"	8A
*Plug, ML	Push-on	3113****	1454		"	8B
Plug, FL	Push-on	27-30**	1451		MIL-C-22557/1	8
Plug, FL	Push-on	1102/196***	1451		"	8A
Plug, FL	Push-on	3110****	1451		"	8B
Plug, ML	Screw-on	27-35**	1462		MIL-C-22557/12	8
Plug, ML	Screw-on	1001/196***	1462		"	8A
Plug, ML	Screw-on	3011****	1462		"	8B
*Plug, ML	Screw-on	27-36**		1463	MIL-C-22557/13	8
*Plug, ML	Screw-on	1005/196***		1463	"	8A
*Plug, ML	Screw-on	3013****		1463	"	8B
Plug, FL	Screw-on	27-34**		1460	MIL-C-22557/10	8
Plug, FL	Screw-on	1002/196***		1460	"	8A
Plug, FL	Screw-on	3010****		1460	"	8B

1. When selecting connectors, NATO types are preferred.
* Bulkhead mounted.
** Industrial Products Co., Danbury, Conn., SubMinax series 27.
*** Micon Electronics, Inc., Garden City, L.I., N.Y., series 1000.
****Sealectro Corp., Mamaroneck, N.Y., type ConheX.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-211 A/U — MIL-C-17/72



Class	High Temperature
Inner Conductor	0.190 Inch Copper
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.620 Inch
Outer Conductor	Copper, Single Braid
Protective Covering	Polytetrafluoroethylene Tape Moisture Seal With Double Braid Fibreglass Jacket

Nominal Over-All Diameter	0.745 Inch
Weight	0.450 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29$\mu\mu$f/ft
Maximum Operating Voltage	7000 Volts (RMS)
Attenuation	2.3 db/100 ft Maximum At 400 MC 10 db/100 ft Maximum At 3,000 MC
Dielectric Strength	10 K Volts RMS, Minimum
Corona	7 K Volts RMS, Minimum
Remarks	Semi-Flexible Cable Operating At Temperatures-55°C to 200°C (131°F to 392°F). Similar to RG-177/U

INSTALLATION DATA

Minimum Bend Radius	8 inches
Metal Tube Size	D
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-7
Synthetic Rubber Grommet	3/4 inch
Kickpipe Size	3/4 inch

CONNECTORS FOR MIL TYPE CABLE RG-211A/U

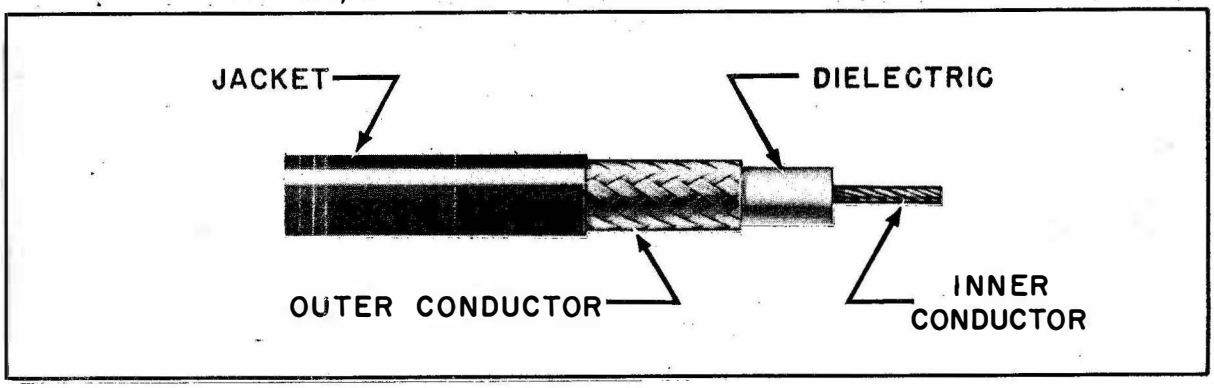
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	771B/U		MS 90244	2
Plug, ML	No	N	557A/U		RE B 49249	3
Plug, ML	Yes	HN	926B/U		RE B 49220	4

1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

GENERAL PURPOSE CABLES

MIL TYPE - RG-213/U

MIL-C-17/74



Class	General Purpose
Inner Conductor	7/.0296 Inch Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.285 Inch

ORIGINAL

5-2-43

Protective Covering	Noncontaminating Synthetic Resin
Outer Conductor	Copper; Single Braid
Nominal Over-All Diameter	0.405 Inch
Weight	0.120 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29.5$\mu\mu$ f/ft
Maximum Operating Voltage	5000 Volts (RMS)
Attenuation	5.5 db/100 ft Maximum At 400 MC 19 db/100 ft Maximum At 3,000 MC
Flow	24 Pounds
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Remarks	Medium Size, Flexible Cable, Formerly RG-8A/U

INSTALLATION DATA

Minimum Bend Radius	5 inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	1/2 inch

CONNECTORS FOR MIL TYPE CABLE RG-213/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	573B/U	NUG-201	MS 35315	2
Plug, FL	No	C	572A/U	NUG-202	MS 35318	2
Receptacle, FL	No	C	570A/U	NUG-203	MS 35317	2
Plug, ML	Yes	C	943B/U		RE B 49195	2
Plug, FL	Yes	C	944A/U		RE B 49193	2
Receptacle, FL	Yes	C	937A/U		RE B 49191	2
*Plug, ML	No	N	1185A/U		RE B 49035	3
*Plug, FL	No	N	1186A/U		RE B 49036	3
Receptacle, FL	No	N	1601/U		RE B 49082	3
Plug, ML	Yes	N	941B/U		MS 90293	3
Plug, FL	Yes	N	940B/U		MS 90292	3
Receptacle, FL	Yes	N	936B/U		RE B 49092	3
Plug, ML	No	HN	59E/U		RE B 49227	4
Plug, FL	No	HN	60E/U		RE B 49224	4
Receptacle, FL	No	HN	427C/U		RE B 49223	4
Plug, ML	Yes	HN	925B/U		RE B 49226	4
Plug, FL	Yes	HN	927B/U		RE B 49230	4
Receptacle, FL	Yes	HN	930B/U		RE B 49229	4
*Plug, ML	No	HN	1213/U		RE B 49364	4A
*Plug, FL	No	HN	1214/U		RE B 49363	4A
Plug, FL	Yes	QDL	1075C/U		RE B 49166	5
Receptacle, FL	Yes	QDL	1076C/U		RE B 49167	5
Plug, ML	Yes	QDS	968B/U		RE B 49123	6
Plug, FL	Yes	QDS	967B/U		RE B 49122	6
Receptacle, FL	Yes	QDS	1132A/U		RE B 49305	6
End Seal	Yes	MX	1461/U		RE B 49139	22
End Seal	Yes	MX	1465/U		RE B 49140	23
End Seal	No	MX	1554A/U		RE B 49144	25

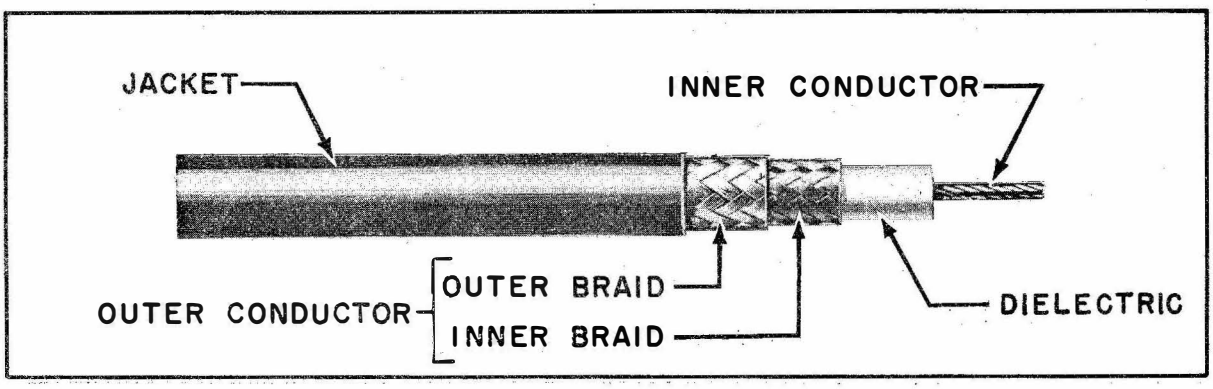
1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

* Captivated contact.

GENERAL PURPOSE CABLES

MIL TYPE - RG-214/U

MIL-C-17/75



Class	General Purpose
Inner Conductor	7/.0296 Inch Silvered Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Silver-Coated Copper; Double Braid
Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.425 Inch
Weight	0.158 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	30 $\mu\mu$ f/ft
Maximum Operating Voltage	5000 Volts (RMS)
Attenuation	5.5 db/100 ft Maximum At 400 MC 19 db/100 ft Maximum At 3,000 MC
Flow	24 Pounds
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Attenuation and Corona Stability	4.8 db/100 ft Maximum Change At 10,000 MC
Remarks	Special, Medium Size, Flexible Cable. Formerly RG-9B/U

INSTALLATION DATA

Minimum Bend Radius	5 inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	1/2 inch

CONNECTORS FOR MIL TYPE CABLE RG-214/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	573B/U	NUG-201	MS 35315	2
Plug, FL	No	C	572A/U	NUG-202	MS 35318	2
Receptacle, FL	No	C	570A/U	NUG-203	MS 35317	2
Plug, ML	Yes	C	943/BU		RE B 49195	2
Plug, FL	Yes	C	944A/U		RE B 49193	2

Cont'd Table For RG-214/U

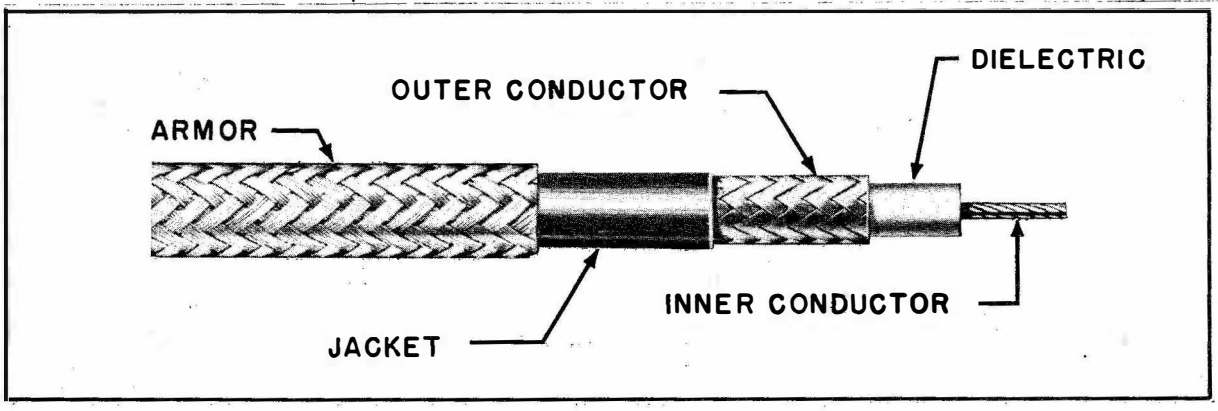
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Receptacle, FL	Yes	C	937A/U		RE B 49191	2
*Plug, ML	No	N	1185A/U		RE B 49035	3
*Plug, FL	No	N	1186A/U		RE B 49036	3
Receptacle, FL	No	N	160D/U		RE B 49082	3
Plug, ML	Yes	N	941B/U		MS 90293	3
Plug, FL	Yes	N	940B/U		MS 90292	3
Receptacle, FL	Yes	N	936B/U		RE B 49092	3
Plug, ML	No	HN	59E/U		RE B 49227	4
Plug, FL	No	HN	60E/U		RE B 49224	4
Receptacle, FL	No	HN	427C/U		RE B 49223	4
Plug, ML	Yes	HN	925B/U		Re B 49226	4
Plug, FL	Yes	HN	927B/U		RE B 49230	4
Receptacle, FL	Yes	HN	930B/U		RE B 49229	4
*Plug, ML	No	HN	1213/U		RE B 49364	4A
*Plug, FL	No	HN	1214/U		RE B 49363	4A
Plug, FL	Yes	QDL	1075C/U		RE B 49166	5
Receptacle, FL	Yes	QDL	1076C/U		RE B 49167	5
Plug, ML	Yes	QDS	968B/U		RE B 49123	6
Plug, FL	Yes	QDS	967B/U		RE B 49122	6
Receptacle, FL	Yes	QDS	1132A/U		RE B 49305	6
End Seal	Yes		MX-1461/U		RE B 49139	22
End Seal	Yes	MX-	1465/U		RE B 49140	23
End Seal	No		MX-1554A/U		RE B 49144	25

1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

* Captivated contact.

GENERAL PURPOSE CABLES

MIL TYPE - RG-215/U — MIL-C-17/76



Class	General Purpose
Inner Conductor	7/.0296 Inch Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Copper, Single Braid

Protective Covering	Noncontaminating Synthetic Resin With Armor
Nominal Over-All Diameter	0.475 Inch (MAX)
Weight	0.160 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29.5 $\mu\mu$f/ft
Maximum Operating Voltage	5000 Volts (RMS)
Attenuation	5.5 db/100 ft Maximum At 400 MC 19 db/100 ft Maximum At 3,000 MC
Flow	24 Pounds
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Remarks	Same As RG-213/U But With Armor. Formerly RG-10A/U

INSTALLATION DATA

Minimum Bend Radius	5 inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	1/2 inch

CONNECTORS FOR MIL TYPE CABLE RG-215/U

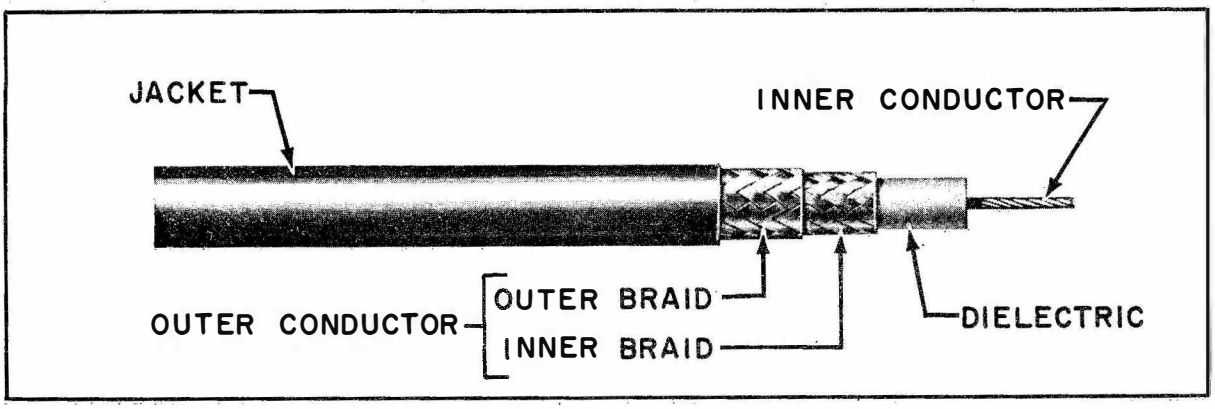
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	C	943B/U		RE B 49195	2A
Plug, FL	Yes	C	944A/U		RE B 49193	2A
Receptacle, FL	Yes	C	937A/U		RE B 49191	2A
Plug, ML	Yes	N	941B/U		MS 90293	3A
Plug, FL	Yes	N	940B/U		MS 90292	3A
Receptacle, FL	Yes	N	936B/U		RE B 49092	3A
Plug, ML	Yes	HN	925B/U		RE B 49226	4B
Plug, FL	Yes	HN	927B/U		RE B 49230	4B
Receptacle, FL	Yes	HN	930B/U		RE B 49229	4B
Plug, FL	Yes	QDL	1075C/U		RE B 49166	5
Receptacle, FL	Yes	QDL	1076C/U		RE B 49167	5
Plug, ML	Yes	QDS	968B/U		RE B 49123	6A
Plug, FL	Yes	QDS	967B/U		RE B 49122	6A
Receptacle, FL	Yes	QDS	1132A/U		RE B 49305	6A
End Seal	Yes		MX-1461/U		RE B 49139	22
End Seal	Yes		MX-1465/U		RE B 49140	23

1. When selecting connectors, NATO types are preferred.

GENERAL PURPOSE CABLES

MIL TYPE - RG-216/U

MIL-C-17/77



Class	General Purpose
Inner Conductor	7/.0159 Inch Tinned Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Copper, Double Braid
Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.425 Inch
Weight	0.121 lb/ft
Approximate Impedance	75±3 Ohms
Nominal Capacitance	20.5$\mu\mu$ f/ft
Maximum Operating Voltage	5000 Volts (RMS)
Attenuation	5.2 db/100 ft Maximum At 400 MC 18.5 db/100 ft Maximum At 3,000 MC
Flow	18 Pounds
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Remarks	Medium Size, Flexible Video And Communication Cable. Formerly RG-13A/U

INSTALLATION DATA

Minimum Bend Radius	5 inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	1/2 Inch

CONNECTORS FOR MIL TYPE CABLE RG-216/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	573B/U	NUG-201	MS 35315	2
Plug, FL	No	C	572A/U	NUG-202	MS 35318	2
Receptacle, FL	No	C	570A/U	NUG-203	MS 35317	2
Plug, ML	Yes	C	943B/U		RE B 49195	2
Plug, FL	Yes	C	944A/U		RE B 49193	2
Receptacle, FL	Yes	C	937A/U		RE B 49191	2

Cont'd Table for RG-216/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
*Plug, ML	No	N	1185A/U		RE B 49035	3
*Plug, FL	No	N	1186A/U		RE B 49036	3
Receptacle, FL	No	N	160D/U		RE B 49082	3
Plug, ML	Yes	N	941B/U		MS 90293	3
Plug, FL	Yes	N	940B/U		MS 90292	3
Receptacle, FL	Yes	N	936B/U		RE B 49092	3
Plug, ML	No	HN	59E/U		RE B 49227	4
Plug, FL	No	HN	60E/U		RE B 49224	4
Receptacle, FL	No	HN	427C/U		RE B 49223	4
Plug, ML	Yes	HN	925B/U		RE B 49226	4
Plug, FL	Yes	HN	927B/U		RE B 49230	4
Receptacle, FL	Yes	HN	930B/U		RE B 49229	4
*Plug, ML	No	HN	1213/U		RE B 49364	4A
*Plug, FL	No	HN	1214/U		RE B 49363	4A
Plug, FL	Yes	QDL	1075C/U		RE B 49166	5
Receptacle, FL	Yes	QDL	1076C/U		RE B 49167	5
Plug, ML	Yes	QDS	968B/U		RE B 49123	6
Plug, FL	Yes	QDS	967B/U		RE B 49122	6
Receptacle, FL	Yes	QDS	1132A/U		RE B 49305	6
End Seal	Yes		MX-1461/U		RE B 49139	22
End Seal	Yes		MX-1465/U		RE B 49140	23
End Seal	No		MX-1554A/U		RE B 49144	25

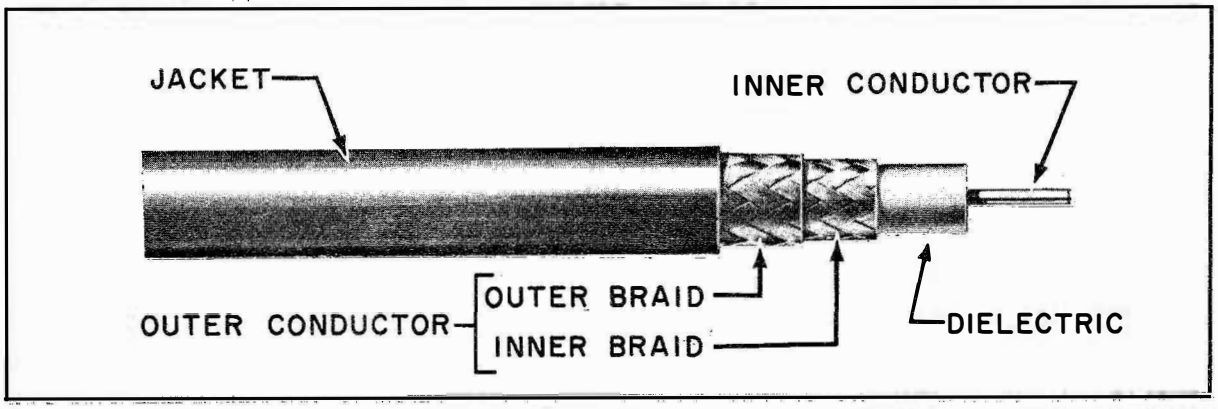
1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-216/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

* Captivated contact.

GENERAL PURPOSE CABLES

MIL TYPE - RG-217/U

MIL-C-17/78



Class	General Purpose
Inner Conductor	0.106 Inch Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.370 Inch
Outer Conductor	Copper, Double Braid

ORIGINAL

Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.545 Inch
Weight	0.236 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29.5$\mu\mu$ f/ft
Maximum Operating Voltage	7000 Volts (RMS)
Attenuation	4.3 db/100 ft Maximum At 400 MC 14.0 db/100 ft Maximum At 3,000 MC
Flow	39 Pounds
Dielectric Strength	12,000 Volts RMS, Minimum
Corona	7,000 Volts, RMS, Minimum
Remarks	Medium Size, Power Transmission Line. Formerly RG-14A/U

INSTALLATION DATA

Minimum Bend Radius	6 inches
Metal Tube Size	C
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-2
Synthetic Rubber Grommet	1/2 Inch
Kickpipe Size	3/4 inch

Connectors For Mil Type Cable RG-217/U

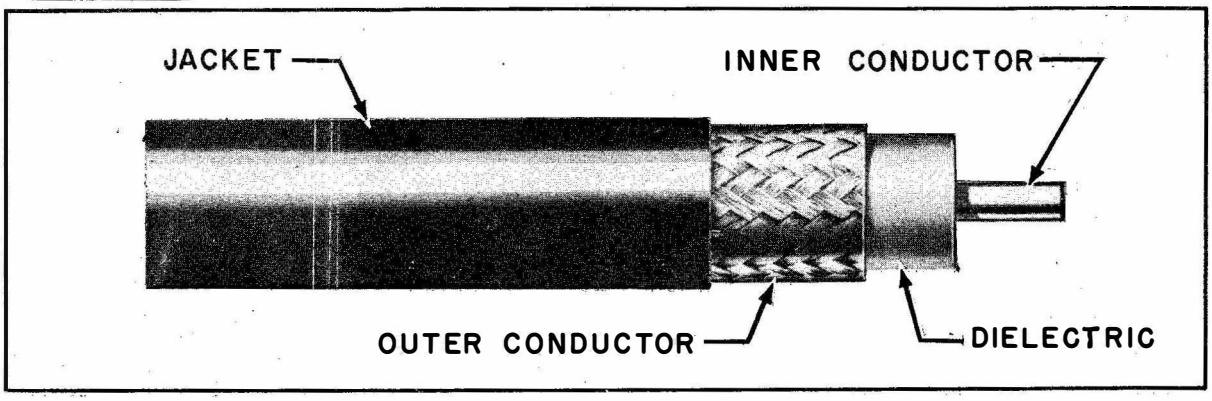
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	707A/U		MS 35315	2
Plug, ML	No	N	204D/U		MS 91238	3
Plug, ML	Yes	N	1006A/U		RE B 49096	3
Plug, ML	Yes	HN	1021A/U		RE B 49218	4
Plug, ML	Yes	QDL	1133/U		RE B 49316	5
Plug, ML	Yes	QDS	1134/U		RE B 49307	6
Plug, FL	Yes	QDS	1135/U		RE B 49308	6
End Seal	No		MX-2632/U		RE B 49396	27

1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

GENERAL PURPOSE CABLES

MIL TYPE - RG-218/U

MIL-C-17/79



Class	General Purpose
Inner Conductor	0.195 Inch Copper
Dielectric Material	Polyethylene
Nominal Diameter Of Dielectric	0.680 Inch
Outer Conductor	Copper, Single Braid
Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.870 Inch
Weight	0.491 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29.5 $\mu\mu$ f/ft
Maximum Operating Voltage	11,000 Volts (RMS)
Attenuation	2.5 db/100 ft Maximum At 400 MC 11.0 db/100 ft Maximum At 3,000 MC
Dielectric Strength	22,000 Volts RMS, Minimum
Corona	11,000 Volts RMS, Minimum
Remarks	Large Size, Low Attenuation, High Power Transmission Line. Formerly RG-17A/U

INSTALLATION DATA

Minimum Bend Radius	9 inches
Metal Tube Size	G
Nylon Tube Size	5
Nylon Tube Packing Assembly	MS16189-3
Synthetic Rubber Grommet	3/4 inch
Kickpipe Size	1 inch

Connectors For Mil Type Cable RG-218/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	708B/U		MS 90247	2
Plug, ML	Yes	N	982/U		RE B 49095	3
Plug, ML	Yes	HN	1041A/U		RE B 49289	4
Plug, FL	Yes	HN	1102/U		RE B 49232	4
Receptacle, FL	Yes	HN	1103/U		RE B 49233	4
Plug, ML	No	QDL	946/U		RE B 49120	5A
Plug, ML	Yes	QDL	1020A/U		RE B 49130	5A

Cont'd Table for RG-218/U

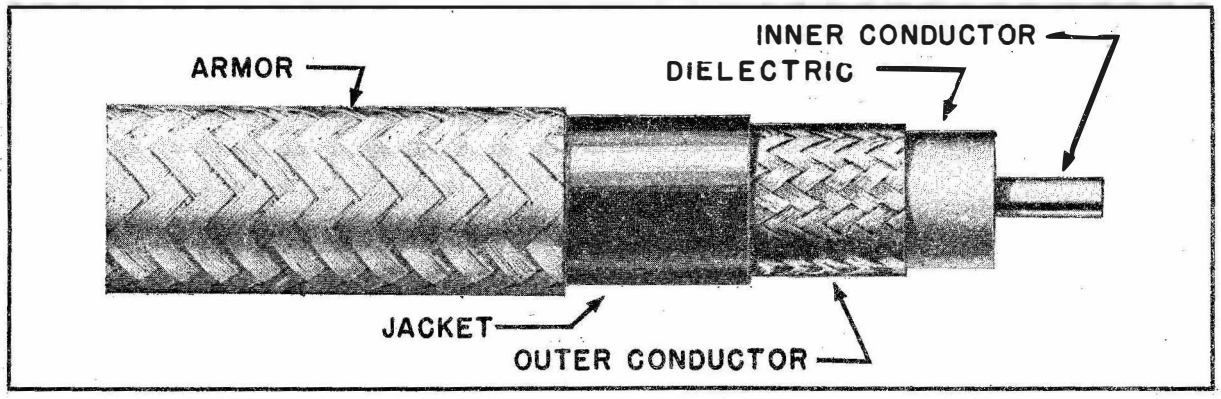
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, FL	Yes	QDL	1073A/U		RE B 49215	5B
Receptacle, FL	Yes	QDL	1074A/U		RE B 49216	5B
Stuffing Tube		Hull	MX-2326/U		RE B 49336	*
End Seal	Yes		MX-407B/U		RE B 49168	20
End Seal	Yes		MX-1057A/U		RE B 49259	21
End Seal	No		MX-1203F/U		RE C 49137	27
End Seal	Yes		MX-1490B/U		RE B 49141	24

1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

* Assembly Instructions will be found in sub-section 5-5 PRESSUREPROOF FITTINGS.

GENERAL PURPOSE CABLES

MIL TYPE - RG-219/U — MIL-C-17/80



Class	General Purpose
Inner Conductor	0.195 Inch Copper
Dielectric Material	Polyethylene
Nominal Diameter Of Dielectric	0.680 Inch
Outer Conductor	Copper, Single Braid
Protective Covering	Noncontaminating Synthetic Resin With Armor
Nominal Over-All Diameter	0.945 Inch (MAX)
Weight	0.603 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29.5$\mu\mu$ f/ft
Maximum Operating Voltage	11,000 Volts (RMS)
Attenuation	2.5 db/100 ft Maximum At 400 MC 11.0 db/100 ft Maximum At 3,000 MC
Dielectric Strength	22,000 Volts RMS, Minimum
Corona	11,000 Volts RMS, Minimum
Remarks	Same As RG-218/U But With Armor Formerly RG-18A/U

ORIGINAL

INSTALLATION DATA

Minimum Bend Radius	10 inches
Metal Tube Size	G
Nylon Tube Size	5
Nylon Tube Packing Assembly	MS16189-3
Synthetic Rubber Grommet	1 inch
Kickpipe Size	1 inch

Connectors For Mil Type Cable RG-219/U

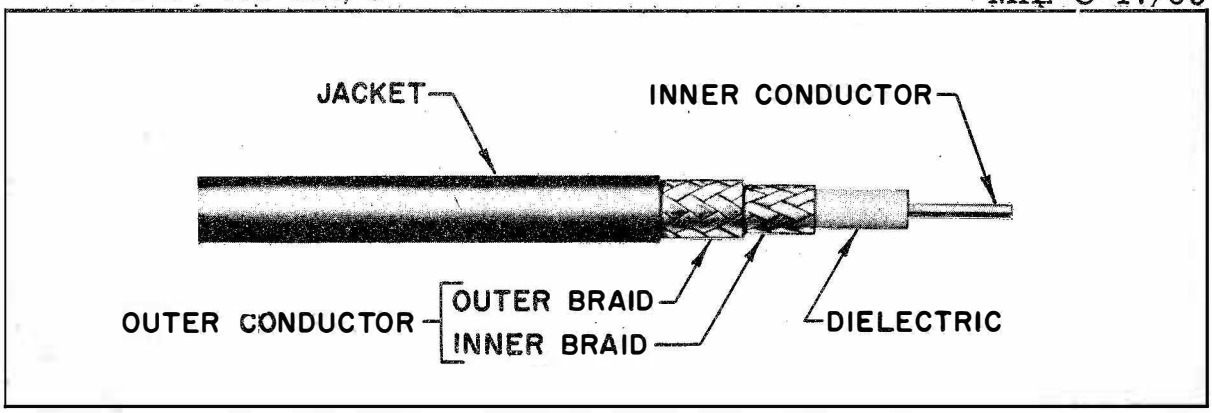
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	N	982/U		RE B 49095	3A
Plug, ML	Yes	HN	1041A/U		RE B 49289	4B
Plug, FL	Yes	HN	1102/U		RE B 49232	4B
Receptacle, FL	Yes	HN	1103/U		RE B 49233	4B
Plug, ML	Yes	QDL	1020A/U		RE B 49130	5A
Plug, FL	Yes	QDL	1073A/U		RE B 49215	5B
Receptacle, FL	Yes	QDL	1074A/U		RE B 49216	5B
End Seal	Yes		MX-407B/U		RE B 49168	20
End Seal	Yes		MX-1057 A/U		RE B 49259	21
End Seal	Yes		MX-1490B/U		RE B 49141	24

1. When selecting connectors, NATO types are preferred.

SPECIAL CHARACTERISTIC CABLES

MIL TYPE - RG-222/U

MIL-C-17/83



Class	Special Characteristics
Inner Conductor	0.0556 Inch High Resistance Wire
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.185 Inch
Outer Conductor	Silver Covered Copper; Double Braid
Protective Covering	Noncontaminating Synthetic Resin
Nominal Over-All Diameter	0.332 Inch
Approximate Impedance	50±2 Ohms
Maximum Operating Voltage	7,000 Volts (RMS)
Attenuation	33. db/100 ft Maximum at 400 MC 90. db/100 ft Maximum at 3,000 MC
Flow	12 Pounds
Dielectric Strength	7,000 Volts RMS, Minimum
Remarks	Formerly RG-21A/U

ORIGINAL

INSTALLATION DATA

Minimum Bend Radius	4 Inches
Metal Tube Size	A
Nylon Tube Size	1
Nylon Tube Packing Assembly	MS16177-6
Synthetic Rubber Grommet	1/2 Inch
Kickpipe Size	3/8 Inch

CONNECTORS FOR MIL TYPE CABLE RG222/U

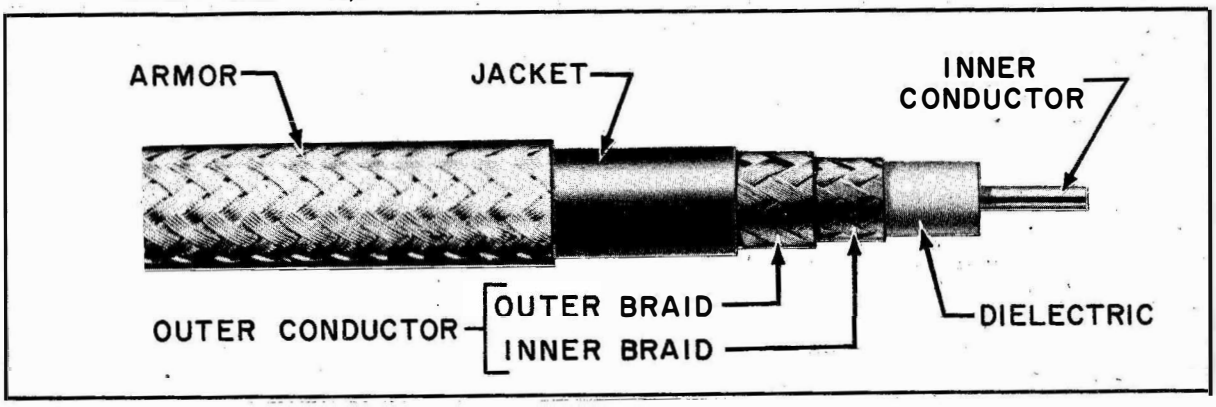
Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	626B/U		MS 35280	2
Plug, FL	No	C	633A/U		MS 35328	2
Receptacle, FL	No	C	629A/U		MS 35330	2
Receptacle, FL	No	C	630A/U		MS 35284	2
Plug, ML	No	N	18D/U		MS 91231	3
Plug, FL	No	N	20D/U		MS 91233	3
Receptacle, FL	No	N	19D/U		MS 91233	3
Receptacle, FL	No	N	159C/U		RE B 49081	3

1. When selecting connectors, NATO types are preferred.
2. If an annor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

GENERAL PURPOSE CABLES

MIL TYPE - RG-224/U

MIL-C-17/85



Class	General Purpose
Inner Conductor	0.106 Inch Copper
Dielectric Material	Polyethylene
Nominal Diameter of Dielectric	0.370 Inch
Outer Conductor	Copper, Double Braid
Protective Covering	Noncontaminating Synthetic Resin with Armor
Nominal Over-All Diameter	0.615 Inch (MAX)
Weight	0.282 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29.5 $\mu\mu$ f/ft
Maximum Operating Voltage	7000 Volts (RMS)
Attenuation	4.3 db/100 ft Maximum At 400 MC 14.0 db/100 ft Maximum At 3,000 MC

Flow	39 Pounds
Dielectric Strength	12,000 Volts RMS, Minimum
Corona	7,000 Volts RMS, Minimum
Remarks	Same as RG-217/U But With Armor. Formerly RG-74A/U

INSTALLATION DATA

Minimum Bend Radius	7 inches
Metal Tube Size	C
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-2
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	3/4 inch

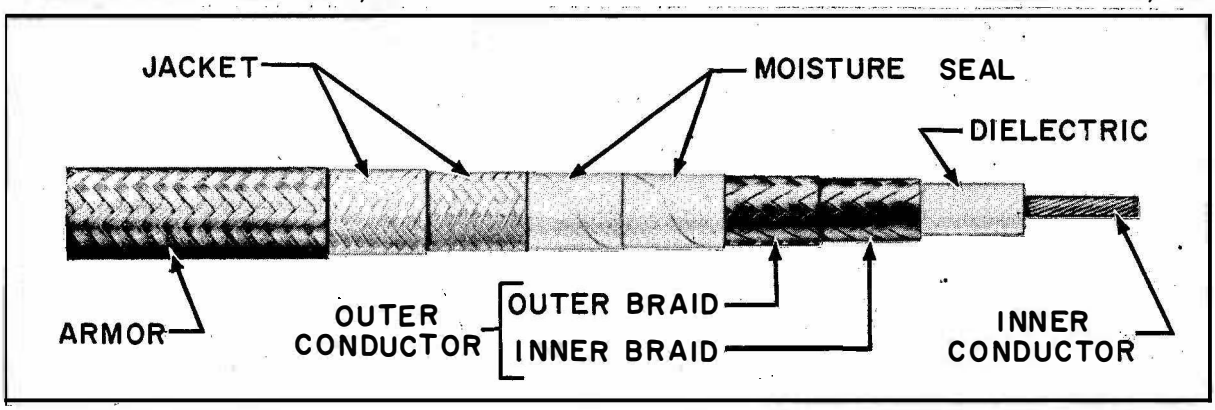
CONNECTORS FOR MIL TYPE CABLE RG-224/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	N	1006A/U		RE B 49096	3A
Plug, ML	Yes	HN	1021A/U		RE B 49218	4B
Plug, ML	Yes	QDL	1133/U		RE B 49316	3
Plug, ML	Yes	QDS	1134/U		RE B 49307	6A
Plug, FL	Yes	QDS	1135/U		RE B 49308	6A

1. When selecting connectors, NATO types are preferred.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-227/U — MIL-C-17/88



Class	High Temperature
Inner Conductor	7/0.0312 Inch Silvered Copper
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.285 Inch
Outer Conductor	Silver Covered Copper; Double Braid
Protective Covering	Polytetrafluoroethylene Tape Moisture Seal With Double Braid Fibreglass Jacket With Armor
Nominal Over-All Diameter	0.490 Inch
Weight	0.224 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29.5 $\mu\mu$ f/ft
Maximum Operating Voltage	5000 Volts (RMS)
Attenuation	5.0 db/100 ft Maximum At 400 MC

Dielectric Strength	10,000 Volts RMS, Minimum
Corona	5,000 Volts RMS, Minimum
Remarks	Formerly RG-116/U

INSTALLATION DATA

Minimum Bend Radius	5 inches
Metal Tube Size	B
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	1/2 inch

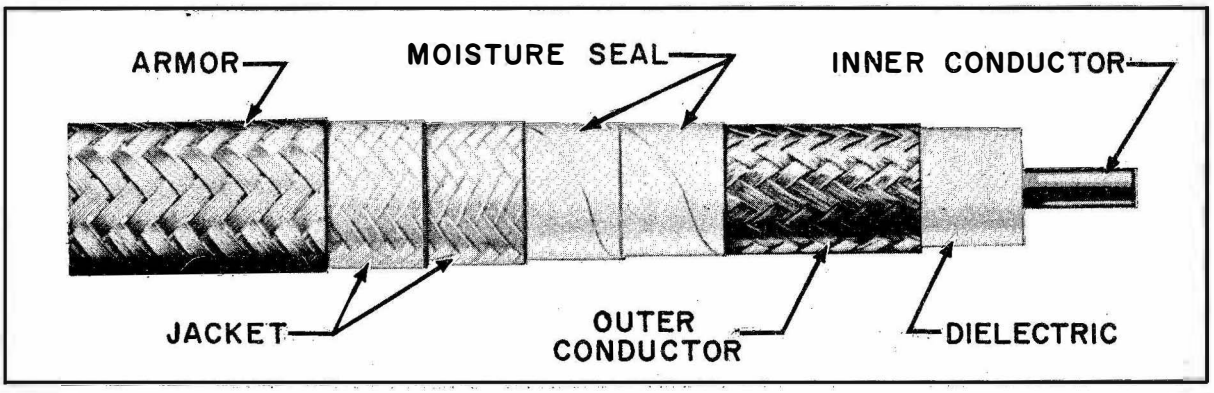
CONNECTORS FOR MIL TYPE CABLE RG-227/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	HN	925B/U		RE B 49226	4B

1. When selecting connectors, NATO types are preferred.

HIGH TEMPERATURE CABLES

MIL TYPE - RG-228A/U — MIL-C-17/89A



Class	High Temperature
Inner Conductor	0.190 Inch Copper
Dielectric Material	Polytetrafluoroethylene (Solid)
Nominal Diameter of Dielectric	0.620 Inch
Outer Conductor	Copper; Single Braid
Protective Covering	Polytetrafluoroethylene Tape Moisture Seal With Double Braid Fibreglass Jacket With Armor
Nominal Over-All Diameter	0.795 Inch
Weight	0.600 lb/ft
Approximate Impedance	50±2 Ohms
Nominal Capacitance	29 $\mu\mu$ f/ft
Maximum Operating Voltage	7000 Volts (RMS)
Attenuation	2.3 db/100 ft Maximum At 400 MC 10.0 db/100 ft Maximum At 3,000 MC
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	7,000 Volts RMS, Minimum
Remarks	Same as RG-211A/U But With Armor. Formerly RG-118A/U

INSTALLATION DATA

Minimum Bend Radius	8 inches
Metal Tube Size	E
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-7
Synthetic Rubber Grommet	3/4 inch
Kickpipe Size	1 inch

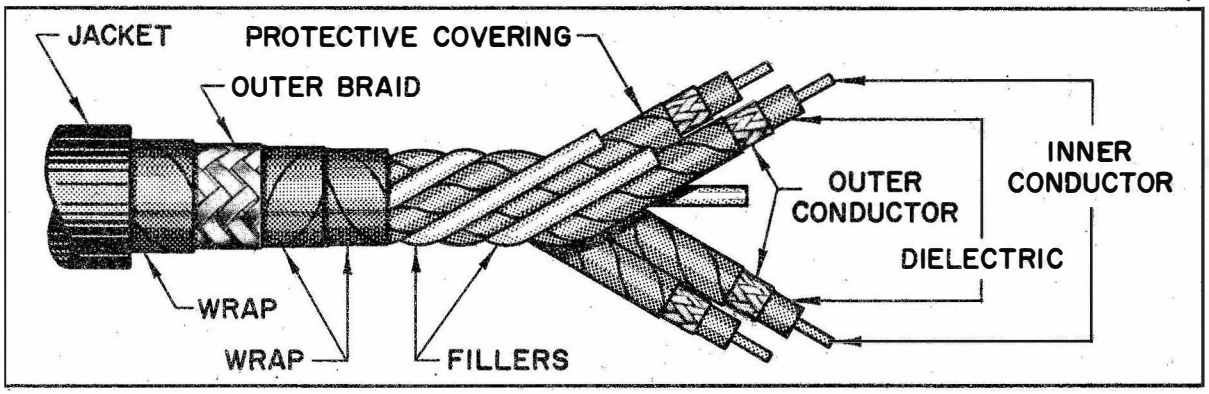
CONNECTORS FOR MIL TYPE CABLE RG-228A/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	Yes	HN	926B/U		RE B 49220	4B

1. When selecting connectors, NATO types are preferred.

SUBMARINE CABLES

MIL TYPE - RG-264A/U — MIL-C-23020



Class		Submarine
Coaxial Conductors		
Inner (Center) Conductor		19/27 Bare Copper Wire
Dielectric Material		Polyethylene
Outer Conductor		One pair: 16 Carriers #36 AWG Tinned Copper Wire One pair: 16 Carriers #36 AWG Bare Copper Wire
Protective Covering Jacket		2 Wraps 1/2 Inch Mylar
Cable		Four Coaxial Conductors Twisted about a Nonconducting Core
Fillers		Polyethylene
Outer Wrap		2 Wraps of Mylar Tape
Outer Braid		24 Carriers #33 AWG Bare Copper Wire
Protective Covering	Wrap:	Mylar Tape
	Jacket:	Polyurethane
Nominal Over-All Diameter		0.750 Inch
Approximate Impedance	Each Coaxial	40±2 Ohms
Nominal Capacitance	Each Coaxial	42 $\mu\mu$ f/ft
Maximum Operating Voltage		2,000 Volts (RMS)
Attenuation	Each Coaxial	12.0 db/100 ft Maximum at 400 MC
Dielectric Strength	Each Coaxial	5,000 Volts RMS, Minimum Each Braid to other Braids-1,000 Volts (RMS)
Corona		2,000 Volts RMS, Minimum
Remarks		Low Frequency Loop Antenna use; Low Temperature Polyurethane Jacket

INSTALLATION DATA

Minimum Bend Radius	8 Inches
Metal Tube Size	E
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-7
Synthetic Rubber Grommet	3/4 Inch
Kickpipe Size	1 Inch

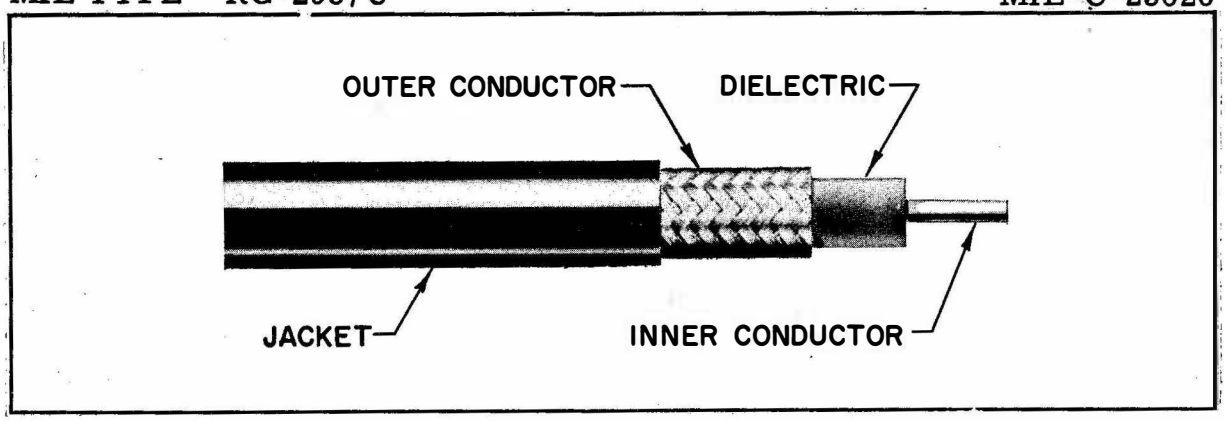
CONNECTORS FOR MIL TYPE CABLE RG-264A/U

Description	Type	UG-MX Number	NATO Type	Applicable Specification	Assy Inst

BuShips Dwg. No. 815-1197003 Rev. E.

SUBMARINE CABLES

MIL TYPE - RG-293/U — MIL-C-23020



Class	Submarine
Inner Conductor	0.106 Inch Diameter Bare Copper Wire
Dielectric Material	Polyethylene, Solid
Nominal Diameter of Dielectric	0.370 Inch
Outer Conductor	Single Braid, #33 AWG Silver Covered Copper Wire
Protective Covering Jacket	Polychloroprene Synthetic Rubber Compound
Nominal Over-All Diameter	0.545 Inch
Approximate Impedance	50±2 Ohms
Nominal Capacitance	30.5 $\mu\mu$ f/ft
Maximum Operating Voltage	5,500 Volts (RMS)
Attenuation	5.0 db/100 ft Maximum at 400 MC 16.0 db/100 ft Maximum at 3,000 MC
Dielectric Strength	12,000 Volts RMS, Minimum
Corona	5,500 Volts RMS, Minimum
Remarks	Low Temperature, -54°C, (-65°F) Flexibility; Watertight

INSTALLATION DATA

Minimum Bend Radius	6 inches
Metal Tube Size	C
Nylon Tube Size	2
Nylon Tube Packing Assembly	MS16178-5
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	3/4 inch

CONNECTORS FOR MIL TYPE CABLE RG-293/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	707A/U		MS 90233	2
Plug, Ml	No	N	204D/U		MS 91238	3
Plug, ML	Yes	N	1006A/U		RE B 49096	3
Plug, ML	Yes	HN	1021A/U		RE B 42918	4
Plug, ML	Yes	QDL	1133/U		RE B 49316	5
Plug, ML	Yes	QDS	1134/U		RE B 49307	6
Plug, FL	Yes	QDS	1135/U		RE B 49308	6
Stuffing Tube		Hull	MX-2327/U		RE B 49366	*
End Seal			MX-2632/U		RE B 49396	27

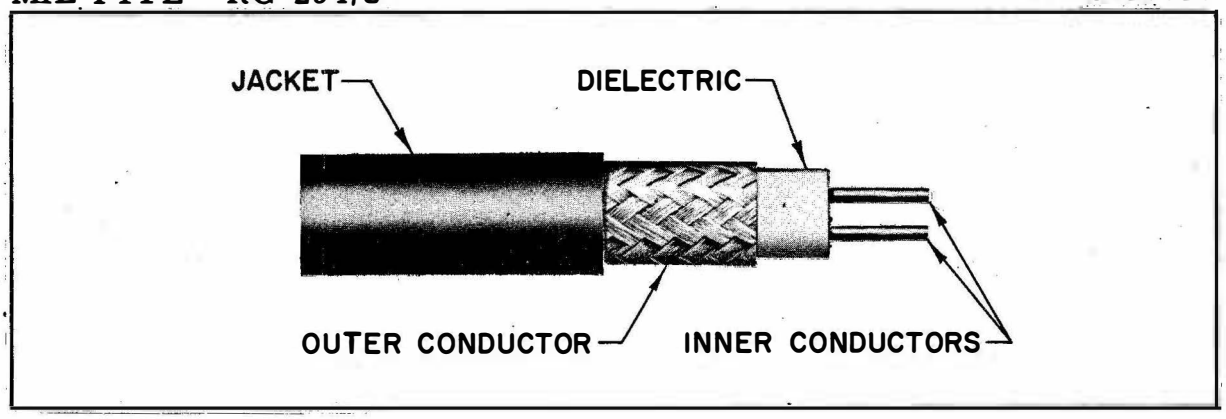
1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

*Assembly Instructions will be found in sub-section 5-5 PRESSUREPROOF FITTINGS.

SUBMARINE CABLES

MIL TYPE - RG-294/U

MIL-C-23020



Class	Submarine
Inner Conductor	Two Bare Copper Wire Conductors Nominal Diameter each 0.0808 Inch One Conductor Tinned for Circuit Identification
Dielectric Material	Polyethylene, Solid
Nominal Diameter of Dielectric	0.472 Inch
Outer Conductor	Single Braid, #30 AWG Tinned Copper Wire
Protective Covering Jacket	Polychloroprene Synthetic Rubber Compound
Nominal Over-All Diameter	0.630 Inch
Approximate Impedance	95±5 Ohms
Nominal Capacitance	16.5$\mu\mu$ f/ft
Maximum Operating Voltage	3,000 Volts (RMS)
Attenuation	10.0 db/100 ft Maximum at 400 MC
Dielectric Strength	10,000 Volts RMS, Minimum
Corona	3,000 Volts RMS, Minimum
Remarks	Low Temperature, -54°C, (-65°F) Flexibility; Watertight

INSTALLATION DATA

Minimum Bend Radius	7 Inches
Metal Tube Size	C
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-4
Synthetic Rubber Grommet	1/2 inch
Kickpipe Size	3/4 inch

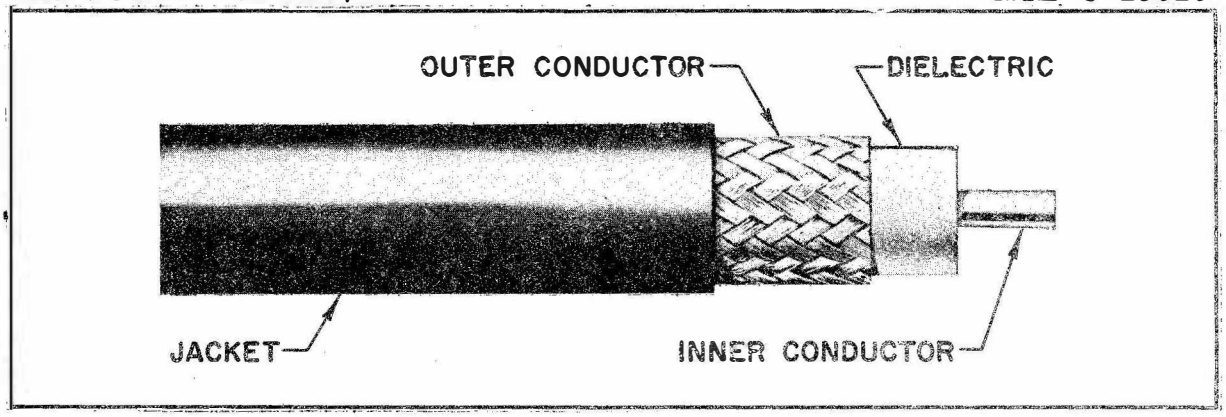
CONNECTORS FOR MIL TYPE CABLE RG-294/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	Twin	1060A/U		RE B 49170	9

1. When selecting connectors, NATO types are preferred.
2. These connectors do NOT electrically match RG-294/U cable.
3. If an armor clamp cap is provided, it may be installed. See the applicable connector series assembly instructions for armored cable.

SUBMARINE CABLES

MIL TYPE - RG-295/U — MIL-C-23020



Class	Submarine
Inner Conductor	0.195 Inch Diameter Bare Copper Wire
Dielectric Material	Polyethylene, Solid
Nominal Diameter of Dielectric	0.680 Inch
Outer Conductor	Single Braid, #30 AWG Bare Copper Wire
Protective Covering Jacket	Polychloroprene Synthetic Rubber Compound
Nominal Over-All Diameter	0.895 Inch
Approximate Impedance	50±2 Ohms
Nominal Capacitance	30.5 $\mu\mu$f/ft
Maximum Operating Voltage	11,000 Volts (RMS)
Attenuation	3.0 db/100 ft Maximum at 400 MC 12.5 db/100 ft Maximum at 3,000 MC
Dielectric Strength	22,000 Volts (RMS)
Corona	11,000 Volts (RMS)
Remarks	Low Temperature, -54°C, (-65°F) Flexibility, Watertight

INSTALLATION DATA

Minimum Bend Radius	10 Inches
Metal Tube Size	G

ORIGINAL

Nylon Tube Size	5
Nylon Tube Packing Assembly	MS16189-2
Synthetic Rubber Grommet	3/4 Inch
Kickpipe Size	1 inch

CONNECTORS FOR MIL TYPE CABLE RG-295/U

Description	Armor Clamp	Series	UG/MX Number	NATO Type	Applicable Drawing	Assy Inst
Plug, ML	No	C	708B/U		MS 90247	2
Plug, ML	Yes	N	982/U		RE B 49095	3
Plug, ML	Yes	HN	1041A/U		RE B 49289	4
Plug, FL	Yes	HN	1102/U		RE B 49232	4
Receptacle, FL	Yes	HN	1103/U		RE B 49233	4
Plug, ML	No	QDL	946/U		RE B 49120	5A
Plug, ML	Yes	QDL	1020A/U		RE B 49130	5A
Plug, FL	Yes	QDL	1073A/U		RE B 49215	5B
Receptacle, FL	Yes	QDL	1074A/U		RE B 49216	5B
Stuffing Tube		Hull	MX-2326/U		RE B 49336	**
End Seal	Yes		MX-407B/U		RE B 49168	20
End Seal	Yes		MX-1057A/U		RE B 49259	21
*End Seal	No		MX-1203F/U		RE C 49137	27
End Seal	Yes		MX-1490B/U		RE B 49141	24

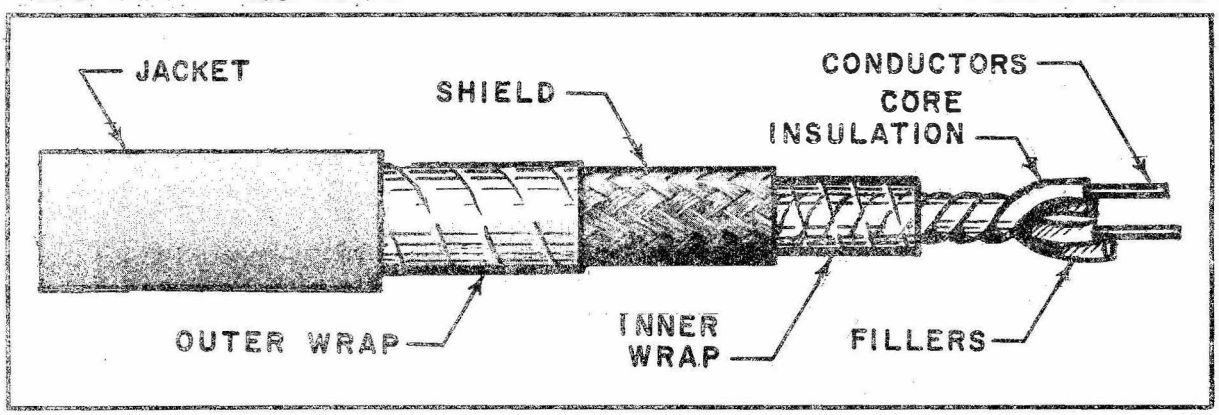
1. When selecting connectors, NATO types are preferred.
2. If an armor clamp cap is provided, it may be installed. See the appicable connector series assembly instructions for armored cable.

*Submersionproof.

**Assembly Instructions will be found in sub-section 5-5 PRESSUREPROOF FITTINGS.

SUBMARINE CABLES

MIL TYPE - RG-317/U — MIL-C-23020A



Class	Submarine
Conductors	Two bare copper wires, 7 strands each 0.029 inch dia, nominal O.D. 0.093 inch The center strand of one conductor shall be tinned for indentification purposes
Core Insulation	Polytetrafluoroethylene, type FEP, O.D. 0.224
Fillers	Polytetrafluoroethylene, O.D. 0.145
Inner Wrap	Mylar tape, nominal O.D. 0.446

Shield	Single braid, #30 AWG tinned copper wire
Outer Wrap	Mylar tape, O.D. 0.528
Jacket	Artic neoprene 0.080 inch thick
Nominal Over-All Diameter	0.710 inch
Characteristic Impedance	95+5 ohms
Capacitance Unbalance	5 percent
Velocity of Propagation	68.3 percent min. at 100 mc
Attenuation	8 db/100 feet at 400 mc
Dielectric Strength	10,000 volts rms min
Hydrostatic Leakage	"0" cubic inches
Abrasion	1000 revolutions

INSTALLATION DATA

Minimum Bend Radius	8 inches
Metal Tube Size	E
Nylon Tube Size	4
Nylon Tube Packing Assembly	MS16179-7
Synthetic Rubber Grommet	3/4 inch
Kickpipe Size	1 inch

CONNECTORS FOR MIL TYPE CABLE RG-317/U

Description	Type	UG/MX Number	NATO Type	Applicable Spec	Assy Inst

Connector information will be provided when available.

LIST OF ASSEMBLY INSTRUCTIONS

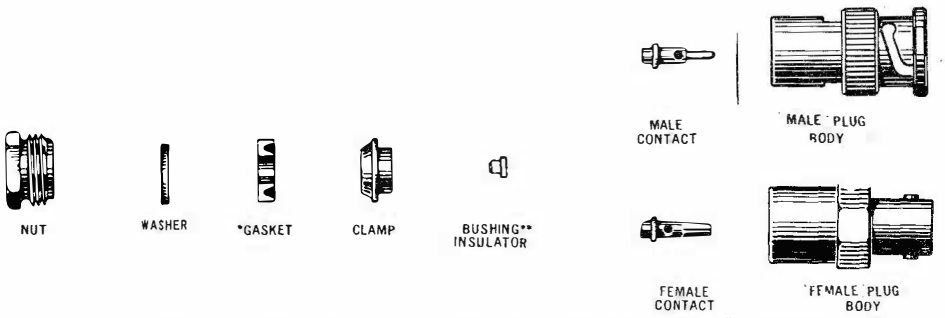
Assembly Instruction Number	Connector Series	Description
1	BNC	Non-armored cable.
2	C	Non-armored cable.
2A	C	Armored cable.
3	N	Non-armored cable.
3A	N	Armored cable.
4	HN	Non-armored cable.
4A	HN	Non-armored cable, V-gasket butting clamp.
4B	HN	Armored cable.
5	QDL	Armored and Non-armored cables.
5A	QDL	Armored and Non-armored cables, Plugs, Male, requiring a tapered dielectric.
5B	QDL	Armored and Non-armored cables, Plugs, Female, requiring a tapered dielectric.
5C	QDL	Receptacle, Female (UG-1165/U) for use with RG-85A/U cable.
6	QDS	Non-armored cable.
6A	QDS	Armored cable.
6B	QDS	Receptacle, Female (UG-1210/U) for use with RG-85A/U cable.
7	LC	Plug, Male (UG-1179/U) for use with RG-85A/U cable.
8	Miniature	Non-armored cable, Industrial Products Co., Sub Minax series 27.
8A	Miniature	Non-armored cable, Micon Electronics, Inc., series 1000
8B	Miniature	Non-armored cable, Sealectro Corp., type ConheX.
9	TWIN	Non-armored cable, Plug, Male (UG-1060A/U) for use with RG-294/U cable.
10	PULSE	Non-armored cable, Rubber Insert.
10A	PULSE	Armored cable, Ceramic Insert.
10B	PULSE	Non-armored cable, Ceramic Insert.

LIST OF ASSEMBLY INSTRUCTIONS (Con't)

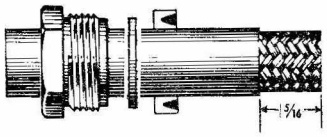
Assembly Instruction Number	Connector Series	Description
20	End Seal	MX-407B/U
21	End Seal	MX-1057A/U
22	End Seal	MX-1461/U
23	End Seal	MX-1465/U
24	End Seal	MX-1490B/U
25	End Seal	Non-armored cables. MX-1530A/U, MX-1554A/U, MX-1684A/U.
26	End Seal	Non-armored cables. End seal with mounting plate.
27	End Seal	Non-armored cables. Pressureproof MX-1203F/U and MX-2632/U.
28	End Seal	Watertight. UG-1170/U for use with RG-85A/U Cable.
29	End Seal	Panel Mounted. MX-1901/U for use with RG-85A/U cable.

ASSEMBLY INSTRUCTION NUMBER 1, Sheet 1 of 1

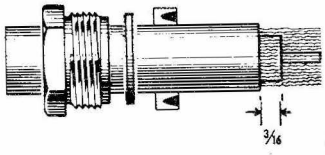
BNC SERIES



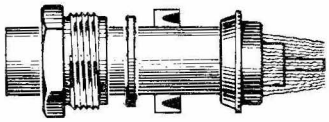
*Cross Section Views **This part is only used when RG-62 /U cables are employed



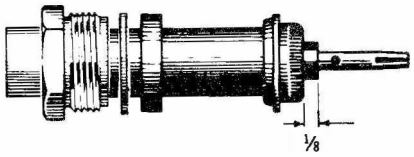
Slide nut, washer and gasket over jacket. V-groove of gasket faces cable end. Cut jacket to dimension shown.



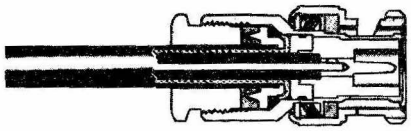
Comb braid and bend out of way. Cut dielectric to dimension shown.

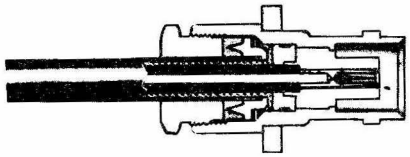


Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



Form braid wires over clamp and trim to proper length. Slide bushing over dielectric if cable is RG-62/U. Solder contact to center conductor.





Slide plug (or receptacle) body into position over the assembly. Move gasket into contact with sharp edge of clamp. Tighten nut while holding body stationary.

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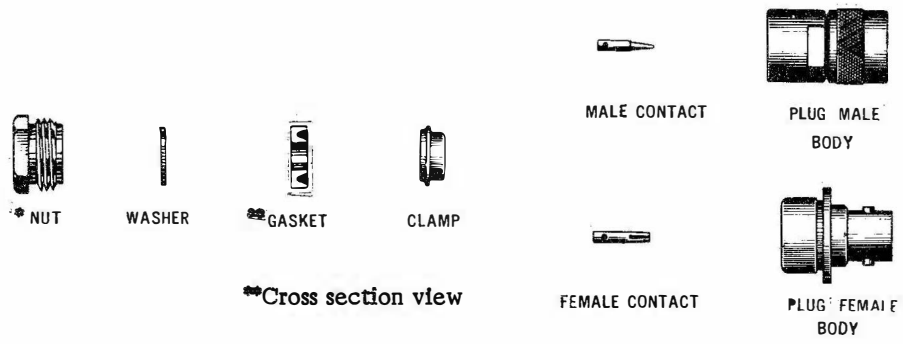
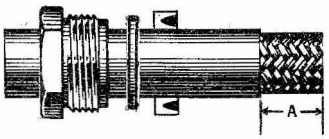
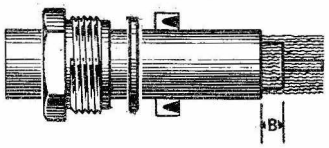
ASSEMBLY INSTRUCTION NUMBER 2, Sheet 1 of 1
C SERIES (Non-armored Cable)



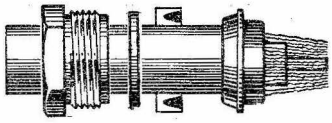
**Cross section view



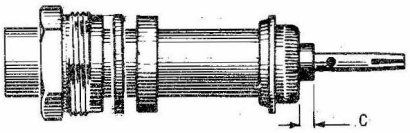
Slide nut, washer and gasket over jacket. V-groove of gasket faces cable end. Cut jacket to dimension A.



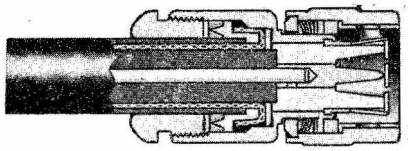
Comb braid and bend out of way. Cut dielectric to dimension B.

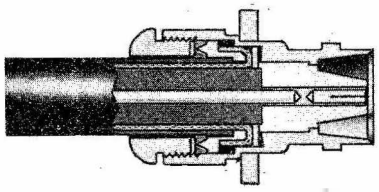


Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



Form braid wires over clamp and trim to proper length. Solder contact to center conductor. Exposed dielectric should equal dimension C.





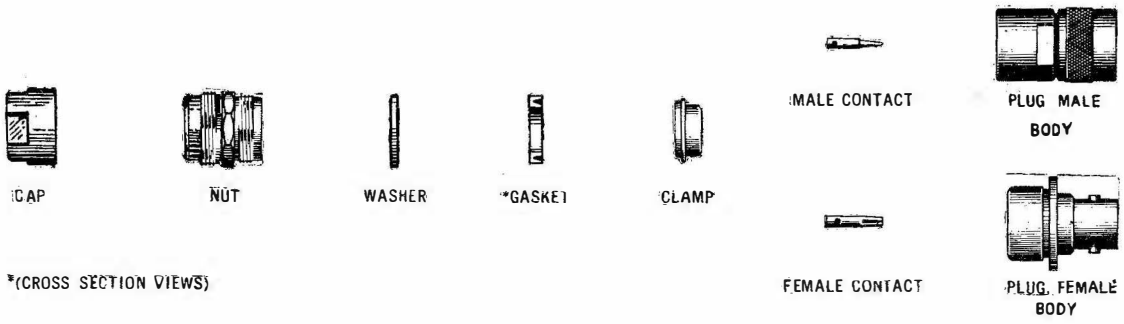
Slide plug (or receptacle) body into position over the assembly. Move gasket into contact with sharp edge of clamp. Tighten nut while holding body stationary.

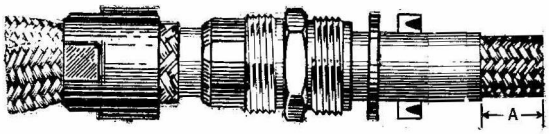
DIMENSIONS (inches)

UG-Number	A	B	C
570A/U 573B/U 626B/U 629A/U 630A/U 633A/U *937A/U *943B/U	5/16	1/8	1/16
572A/U *944A/U	5/16	5/32	3/32
707A/U 1032/U	11/32	1/8	1/16
708B/U 711B/U	13/32	1/8	1/16
709B/U	11/32	3/16	1/8

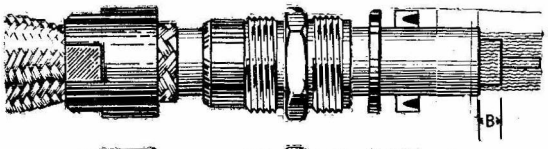
*When armor clamp nut and cap are provided instead of *Nut, they may be used on unarmored cable. See Assembly Instruction 2A.

ASSEMBLY INSTRUCTION NUMBER 2A, Sheet 1 of 1
C SERIES (Armored Cable)

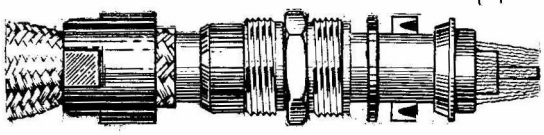




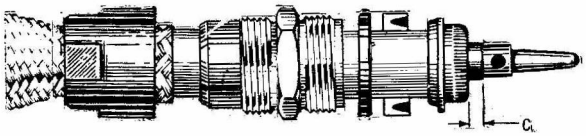
Slide cap over armor and push both away from cable end, exposing jacket. Slide nut, washer and gasket over jacket, V-groove of gasket as shown. Cut jacket to dimension A.



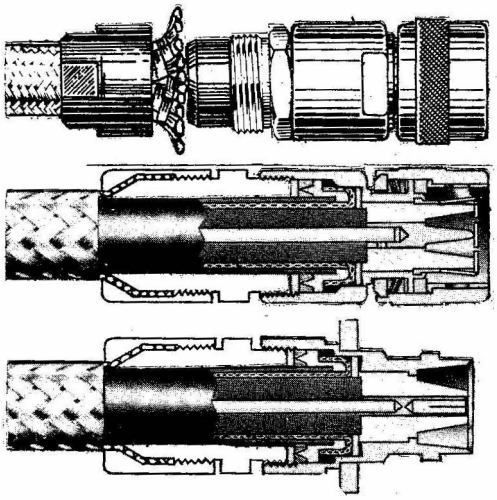
Comb braid and bend out of way. Cut dielectric to dimension B.



Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



Form braid wires over clamp and trim to proper length. Solder contact to center conductor. Exposed dielectric should equal dimension C.



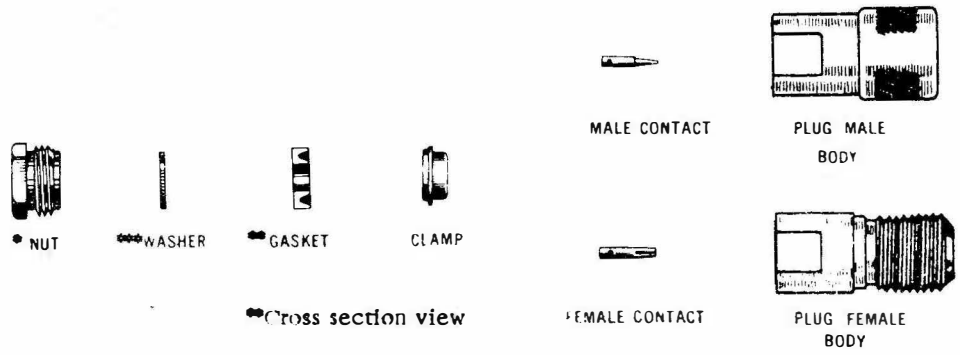
Slide plug (or receptacle) body into position over the assembly. Move gasket into contact with sharp edge of clamp. Tighten nut while holding body stationary. Form armor over nut and trim to proper length. Tighten cap while holding nut stationary.

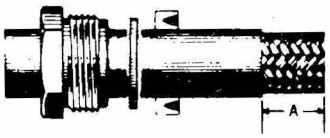
DIMENSIONS (inches)

UG-Number	A	B	C
937A/U 943B/U	5/16	1/8	1/16
944A/U	5/16	5/32	3/32

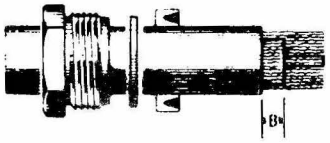
ORIGINAL

ASSEMBLY INSTRUCTION NUMBER 3, Sheet 1 of 1
N SERIES (Non-armored Cable)

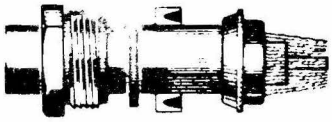




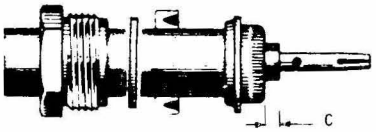
Slide nut, washer and gasket over jacket, V-groove of gasket faces cable end. Cut jacket to dimension A.



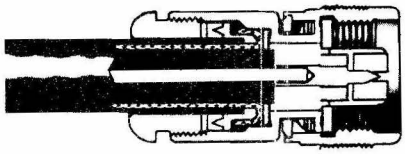
Comb braid and bend out of way. Cut dielectric to dimension B.

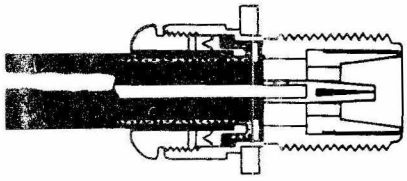


Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



Form braid wires over clamp and trim to proper length. Solder contact to center conductor. Exposed dielectric should equal dimension C.





Slide plug (or receptacle) body into position over the assembly. Move gasket into contact with sharp edge of clamp. Tighten nut while holding body stationary.

DIMENSIONS (inches)

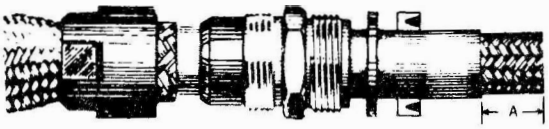
UG - Number	A	B	C
18D/U 19D/U 20D/U 159C/U 160D/U 557A/U *936B/U *940B/U *941B/U *982/U 1003/U *1006A/U 1185A/U 1186A/U	5/16	1/8	1/16
204D/U	11/32	1/8	1/16
536B/U 556B/U	11/32	3/16	1/8
603A/U	11/32	11/64	7/64

*Where armor clamp nut and cap are provided instead of *Nut, they may be used on unarmored cable. See Assembly Instruction Number 3A.

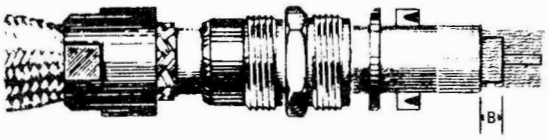
**Washer is not provided with all N-Series connectors.

ASSEMBLY INSTRUCTION NUMBER 3A, Sheet 1 of 1
N SERIES (Armored Cable)

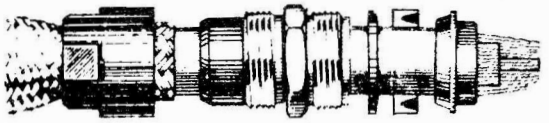
* CROSS SECTION VIEWS



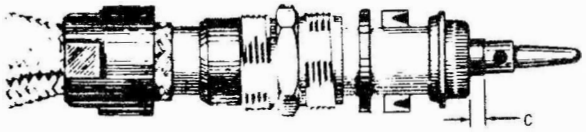
Slide cap over armor and push both away from cable end, exposing jacket. Slide nut, washer and gasket over jacket, V-groove of gasket as shown. Cut jacket to dimension A.



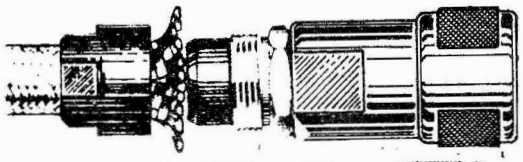
Comb braid and bend out of way. Cut dielectric to dimension B.



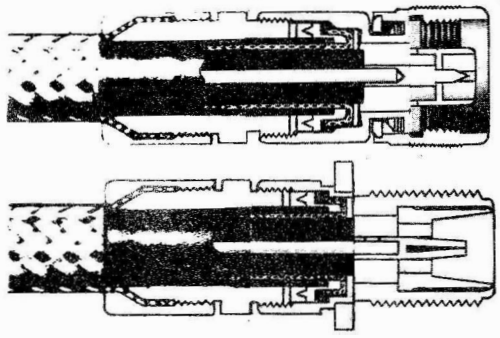
Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



Form braid wires over clamp and trim to proper length. Solder contact to center conductor. Exposed dielectric should equal dimension C.



Slide plug (or receptacle) body into position over the assembly. Move gasket into contact with sharp edge of clamp. Tighten nut while holding body stationary. Form armor over nut and trim to proper length. Tighten cap while holding nut stationary.



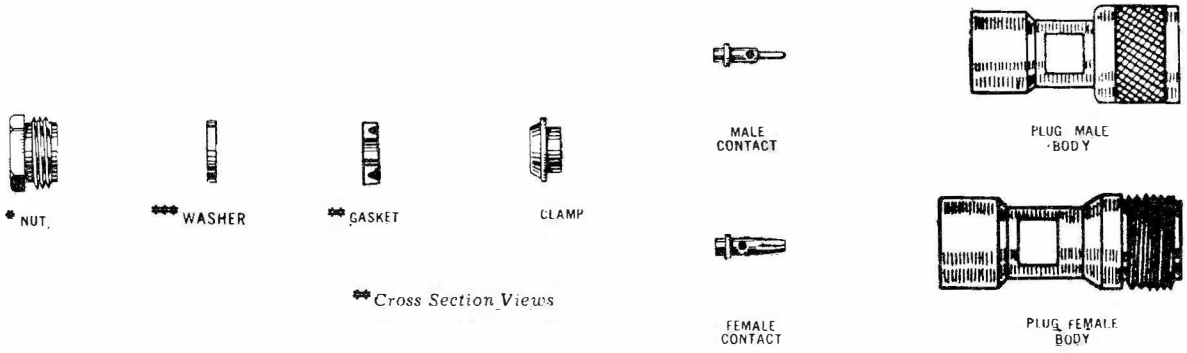
DIMENSIONS (inches)

UG-Number	A	B	C
936B/U 940B/U 941B/U 982/U 1006A/U	5/16	1/8	1/16

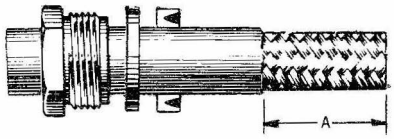
**Washer is not provided with all N-Series connectors.

ORIGINAL

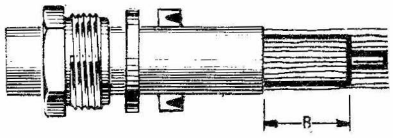
ASSEMBLY INSTRUCTION NUMBER 4, Sheet 1 of 1
HN SERIES (Non-armored Cable)



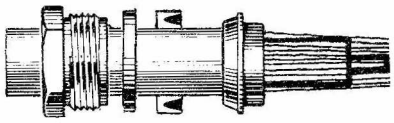
** *Cross Section Views*



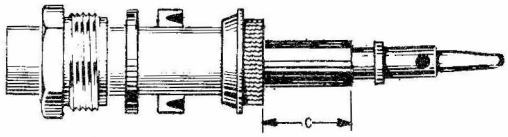
Slide nut, washer and gasket over jacket, V-groove of gasket as shown. Cut jacket to dimension A.



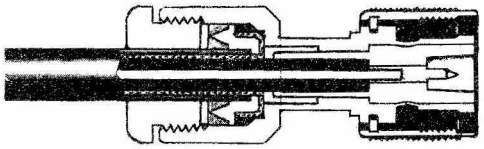
Comb braid and bend out of way. Cut dielectric to dimension B.



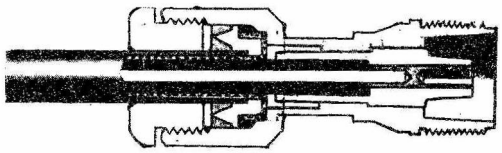
Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



Form braid wires over clamp and trim to proper length. Exposed dielectric should equal dimension C. Slide contact onto center conductor and solder.



Slide body into position over the assembly. Holding body firmly against the clamp, move gasket, washer and nut into position. Tighten nut, holding body stationary.



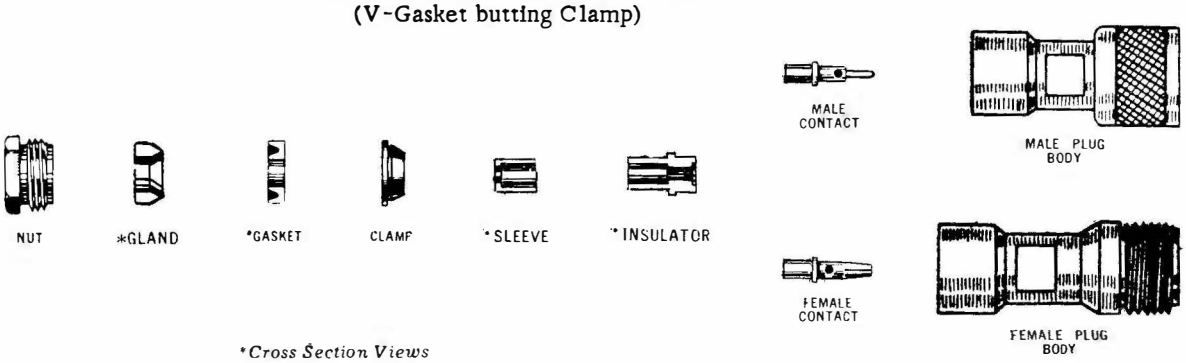
DIMENSIONS (inches)

UG NUMBER	A	B	C
59E/U 60E/U 427C/U *925B/U *927B/U *930B/U *1041A/U *1102/U *1103/U	5/8	3/8	9/32
*926B/U	7/16	3/16	1/16
*1021A/U	11/16	7/16	9/32

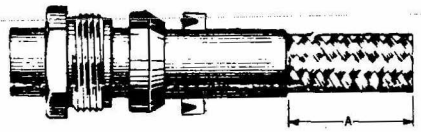
*When armor clamp nut and cap are provided instead of *Nut, they may be used on unarnored cable. See Assembly Instruction Number 4B.

***Washer is not provided with all HN Series connectors.

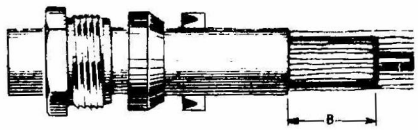
ASSEMBLY INSTRUCTION NUMBER 4A, Sheet 1 of 1
HN SERIES (Non-armored Cable)
(V-Gasket butting Clamp)



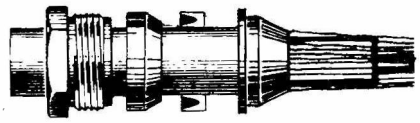
*Cross Section Views



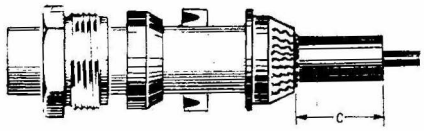
Slide nut, gland and gasket over jacket, V-groove of gasket faces away from cable end. Cut jacket to dimension A.



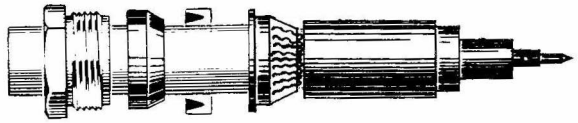
Comb braid and bend out of way. Cut dielectric to dimension B.



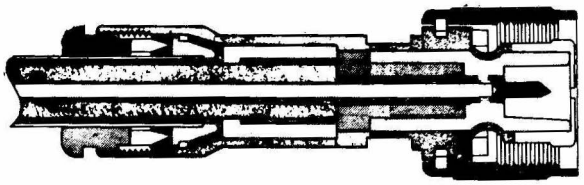
Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



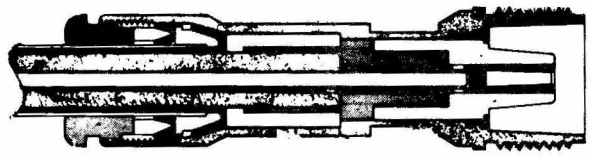
Form braid wires over clamp and trim to proper length. Exposed dielectric should equal dimension C.



Slide sleeve and insulator over dielectric. Slide contact onto center conductor and solder.



Slide body into position over the assembly. Holding body stationary against the clamp, move gasket and gland into position and tighten the nut.



DIMENSIONS (inches)

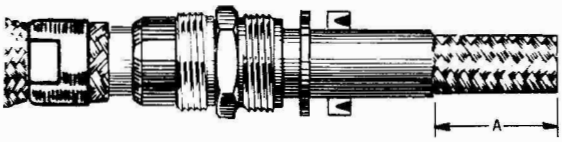
UG - Number	A	B	C
1213/U 1214/U	1 5/8	7/8	3/4

ORIGINAL

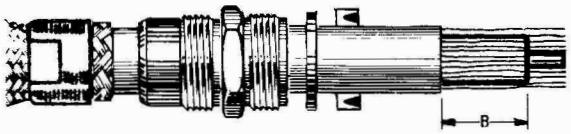
ASSEMBLY INSTRUCTION NUMBER 4B, Sheet 1 of 1

HN SERIES (Armored Cable)

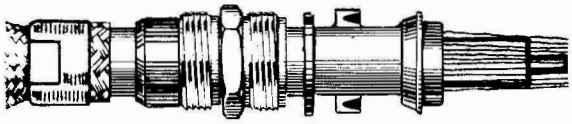
*(CROSS SECTION VIEWS)



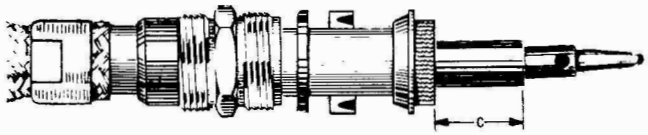
Slide cap over armor and push both away from cable end, exposing jacket. Slide nut, washer and gasket over jacket, V-groove of gasket as shown. Cut jacket to dimension A.



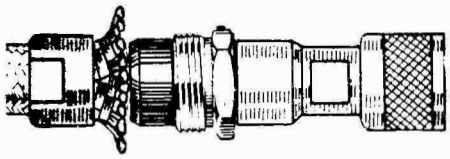
Comb braid and bend out of way. Cut dielectric to dimension B.



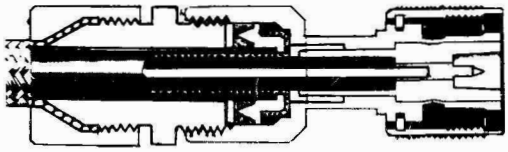
Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.

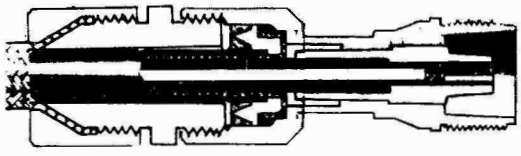


Form braid wires over clamp and trim to proper length. Solder contact to center conductor. Exposed dielectric should equal dimension C.



Slide plug (or receptacle) body into position over the assembly. Move gasket into contact with sharp edge of clamp. Tighten nut while holding body stationary. Form armor over nut and trim to proper length. Tighten cap while holding nut stationary.





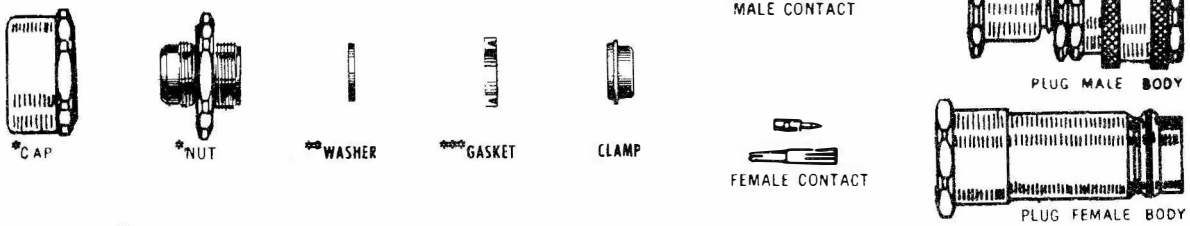
DIMENSIONS (inches)

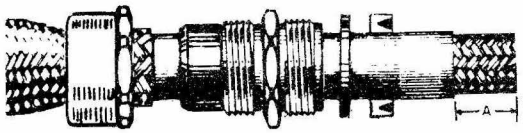
UG - Number	A	B	C
925B/U 927B/U 930B/U 1041A/U 1102/U 1103/U	5/8	3/8	9/32
926B/U	7/16	3/16	1/16
1021A/U	11/16	7/16	9/32

**Washer is not provided with all HN series connectors.

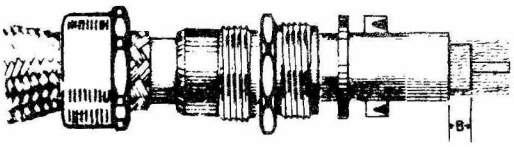
ASSEMBLY INSTRUCTION NUMBER 5, Sheet 1 of 1

QDL SERIES (Armored and Non-armored Cables)

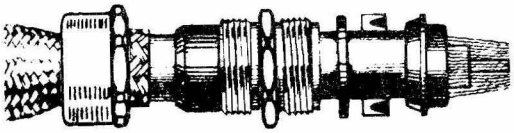




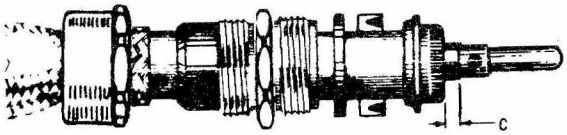
Slide cap over armor and push both away from cable end, exposing jacket. Slide nut, washer and gasket over jacket, V-groove of gasket as shown. Cut jacket to dimension A.



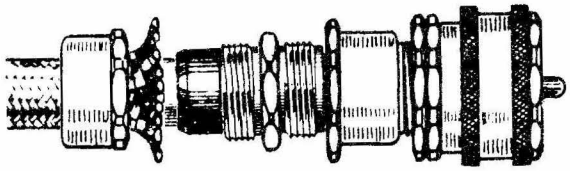
Comb braid and bend out of way. Cut dielectric to dimension B.



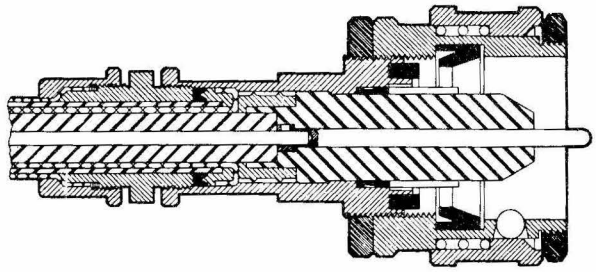
Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.

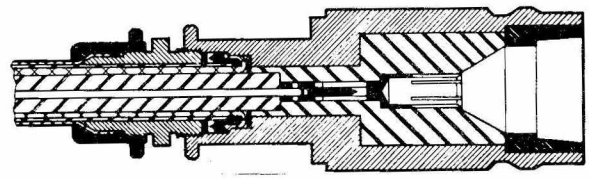


Form and trim braid wires over clamp. Place contact, male or male portion of female, on center conductor, and solder. (Female portion of female contact is part of plug female body). Exposed dielectric should equal dimension C.



Slide body assembly into position over the clamp and contact configuration. Move gasket into contact with mating edge of clamp. Tighten nut while holding body stationary. Form armor over nut and trim to proper length. Tighten cap while holding nut stationary.





DIMENSIONS (inches)

UG-Number	A	B	C
1075C/U 1076C/U	9/16	5/16	1/4
1133/U	9/16	3/8	1/4

*These assembly instructions are for armored cable. When the cable is not armored the connector packet may not have a *cap and the nut will be threaded at only one end. However, if the armor clamp *nut and *cap are provided, they may be installed.

**Some QDL connectors do not have washer.

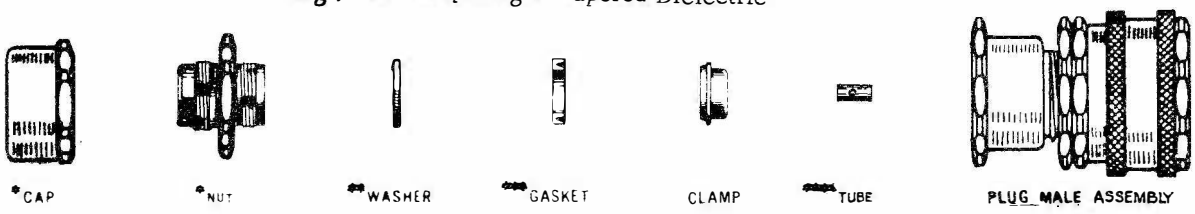
*** Gasket views are cross section.

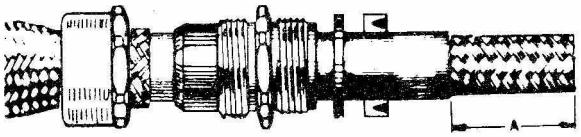
ORIGINAL

ASSEMBLY INSTRUCTION NUMBER 5A, Sheet 1 of 2

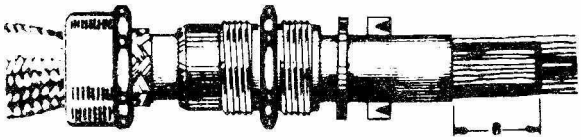
QDL SERIES (Armored and Non-armored Cables)

Plugs, Male Requiring a Tapered Dielectric

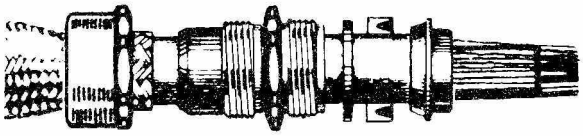




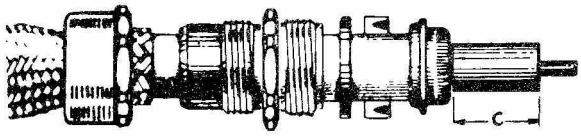
Slide cap over armor and push both away from cable end, exposing jacket. Slide nut, washer and gasket over jacket, V-groove of gasket as shown. Cut jacket to dimension A.



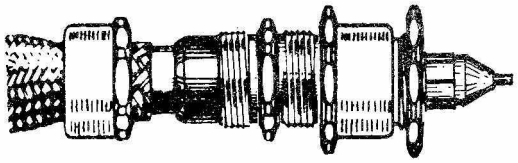
Comb braid and bend out of way. Cut dielectric to dimension B.



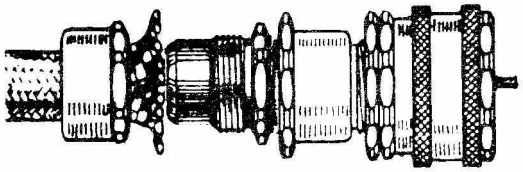
Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



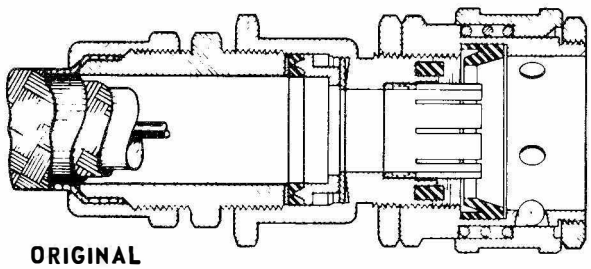
Form braid wires over clamp and trim to shoulder length. Exposed dielectric should equal dimension C.



Separate plug male assembly. Slide body portion into position over clamp. Move gasket into contact with meshing edge of clamp. Tighten nut while holding body stationary. Taper dielectric with tool; see sheet 2 for details. For RG-35B/U cable, put ****tube over center conductor snugly against dielectric, and solder.



Holding body stationary, fit and screw remaining portion of plug male assembly (lock ring assembly) into place. Tighten lock nut, on body, to hold lock ring assembly in place. Form armor over nut and trim to proper length. Tighten cap while holding nut stationary.



ORIGINAL

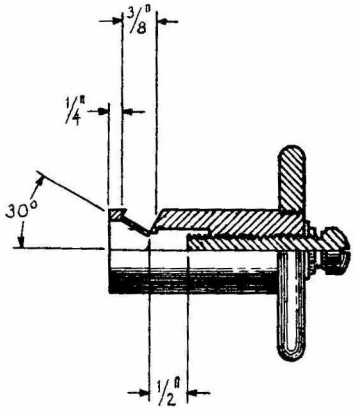
DIMENSIONS (inches)

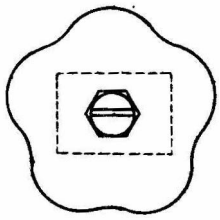
UG - number	A	B	C
946/U 1020A/U	2 1/2	2	1 7/8

See Sheet 2 for Notes.

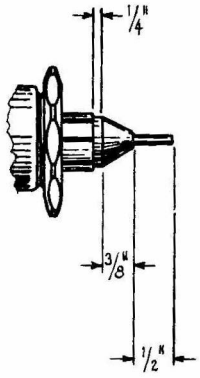
ASSEMBLY INSTRUCTION NUMBER 5A, Sheet 2 of 2
QDL SERIES (Armored and Non-armored Cables)
Plugs, Male Requiring a Tapered Dielectric

Tapering Tool





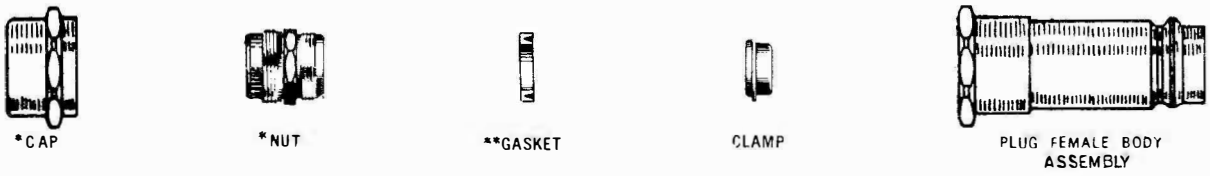
Adjust machine screw to obtain desired length of center conductor.

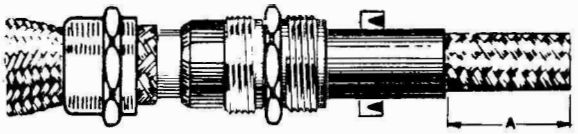


Refer to fifth figure, sheet 1. Tapering tool will butt against contact fingers at finish of tapering operation.

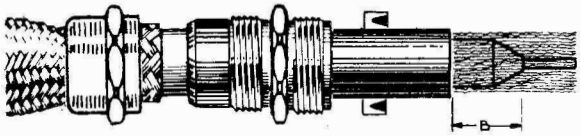
*When the cable is not armored and connector packet includes armor *nut and *cap, they may be installed.
**Washer is not provided with all QDL series connectors.
*** Gasket views are cross section.

ASSEMBLY INSTRUCTION NUMBER 5B, Sheet 1 of 1
QDL SERIES (Armored and Non-armored Cables)
Plugs, Female Requiring a Tapered Dielectric

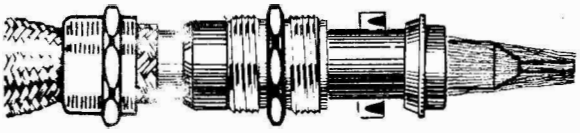




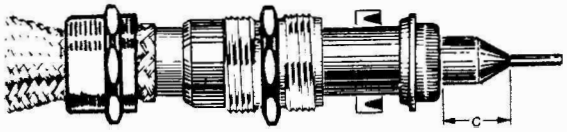
Slide cap over armor and push both away from cable end, exposing jacket. Place nut and gasket over jacket, V-groove of gasket as shown. Cut jacket to dimension A.



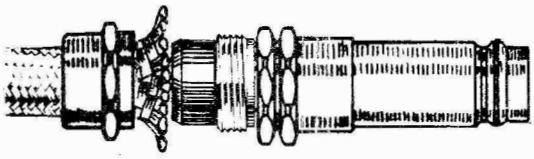
Comb braid and bend out of way. Cut and taper dielectric. See sheet 2 of Assembly Instruction Number 5A for tapering tool details. Adjust machine screw of tool to obtain dimension B.



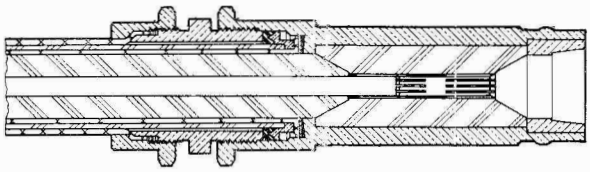
Taper braid wires toward center conductor. Slide clamp over braid wires and push tightly against cable jacket.



Form braid wires over clamp and trim to shoulder length. Slightly round edge of center conductor. Exposed dielectric should equal dimension C.



Place body into position over the assembly. Move gasket into contact with meshing edge of clamp. Tighten nut while holding body stationary. Form armor over nut and trim to length. Tighten cap while holding nut stationary.



DIMENSIONS (Inches)

UG - Number	A	B	C
1073A/U 1074A/U	1	9/16	7/16

*When the cable is not armored and the connector packet includes an armor clamp *nut and *cap, they may be installed.
**Gasket views are cross section.

ORIGINAL

5-2-75

ASSEMBLY INSTRUCTION NUMBER 5C, Sheet 1 of 3
QDL SERIES Receptacle, Female (UG-1165/U)
for use with RG-85A/U Cable

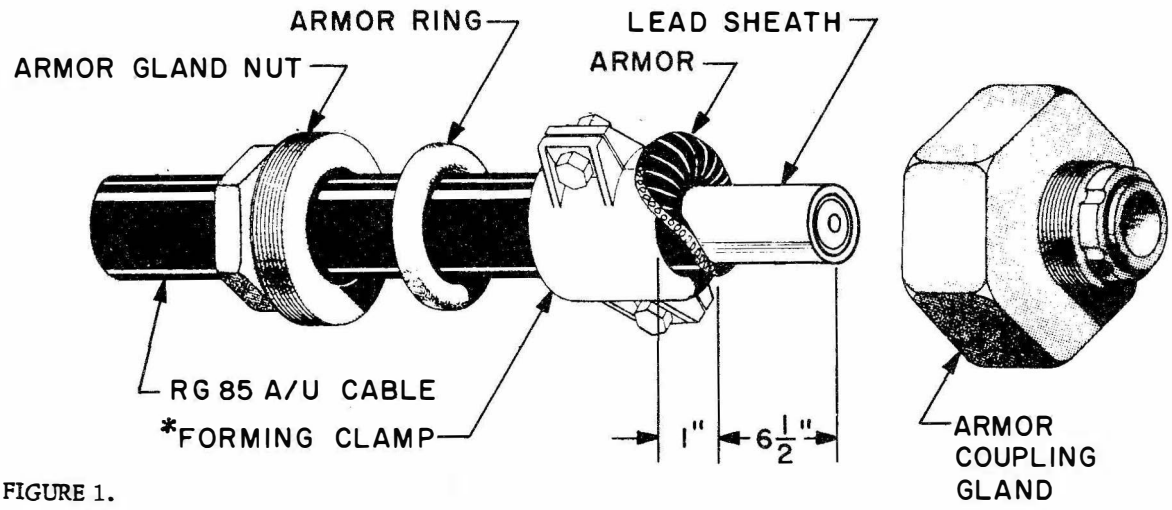


FIGURE 1.

Slide the armor gland nut and armor ring onto cable. Secure* forming clamp firmly 7 1/2 inches from the end of the cable. Six and one half inches from the cable end cut outer jute serving, galvanized steel wire armor and inner jute serving, and flare them outward as shown.

*See Assembly Instruction Number 28, Sheet 4.

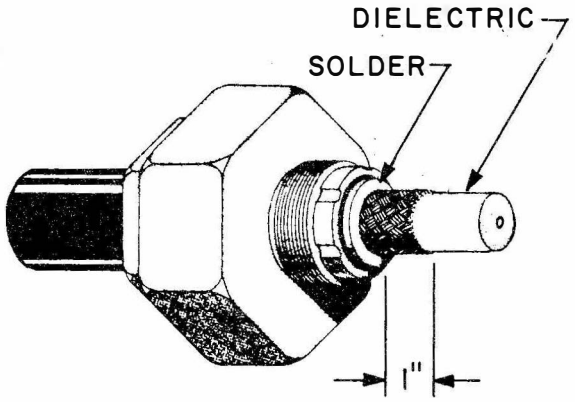


FIGURE 2.

Remove forming clamp. Place armor coupling gland over lead sheath. Fit armor and armor ring in place in gland. Holding armor coupling gland stationary, tighten armor gland nut. Cut lead sheath approximately 1/16 inch from end of armor coupling gland, and solder lead sheath to shoulder of armor coupling gland, as shown. Cut cable jacket flush with the soldered edge. Cut the copper braid outer conductor, leaving 1 inch.

ASSEMBLY INSTRUCTION NUMBER 5C, Sheet 2 of 3
QDL SERIES Receptacle, Female (UG-1165/U)
for use with RG-85A/U Cable

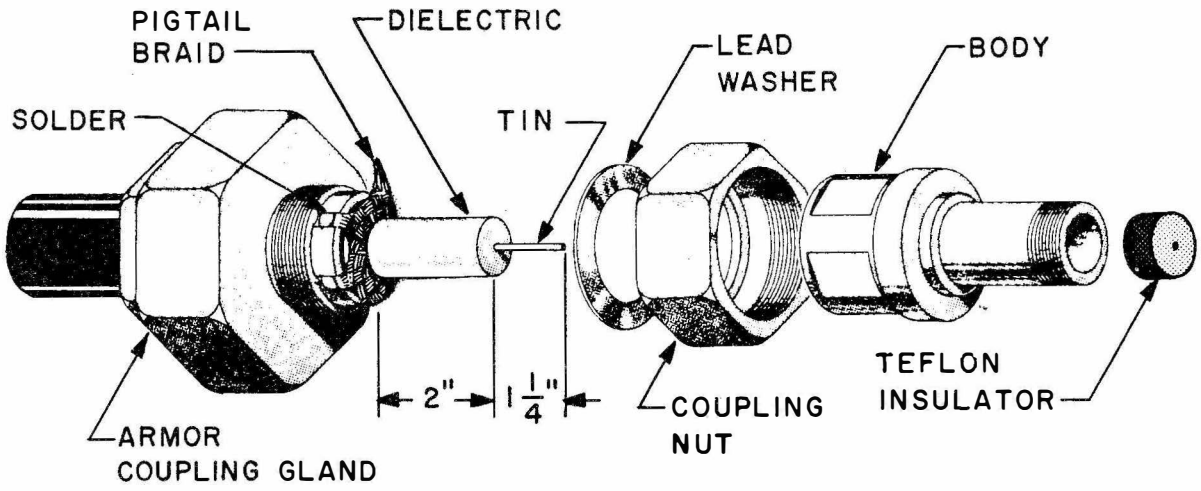


FIGURE 3.

Comb braid of outer conductor. Seperate into six pigtails, trim to fit length of groove, and solder in gland grooves. Cut dielectric 2 inches from outer conductor braid. Cut inner conductor 1 1/4 inches from end of dielectric. Round end of inner conductor and tin outer 1/2 inch.

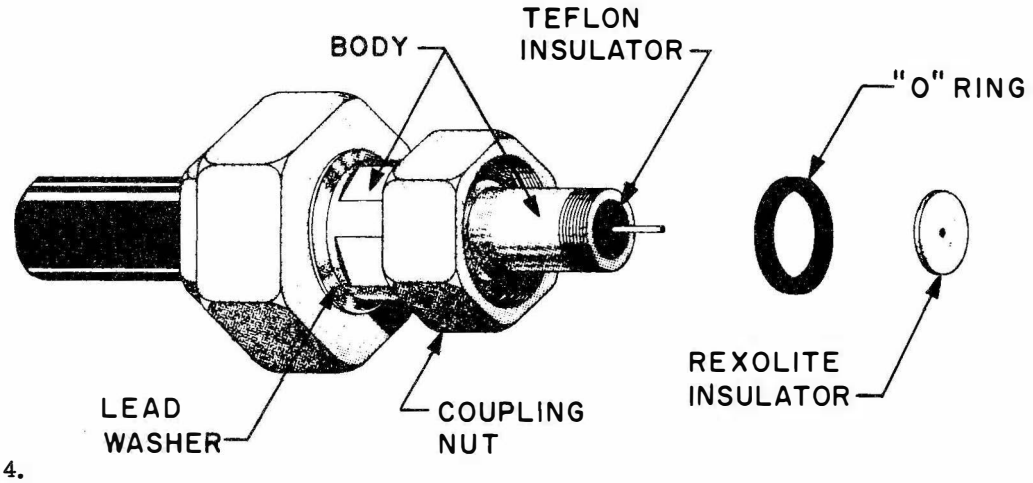


FIGURE 4.

Place lead washer over dielectric and against the armor coupling gland. Push body through coupling nut and over dielectric. Holding armor coupling gland stationary, tighten body securely against lead washer. Fit teflon insulator over inner conductor and tightly against dielectric. Lubricate O-ring with Insulating Compound, Electrical, Silicone, stock number G-5970-159-1598, and place it in position around body. Fit rexolite insulator over inner conductor, against teflon insulator.

ASSEMBLY INSTRUCTION NUMBER 5C, Sheet 3 of 3
QDL SERIES Receptacle, Female (UG-1165/U)
for use with RG-85A/U Cable

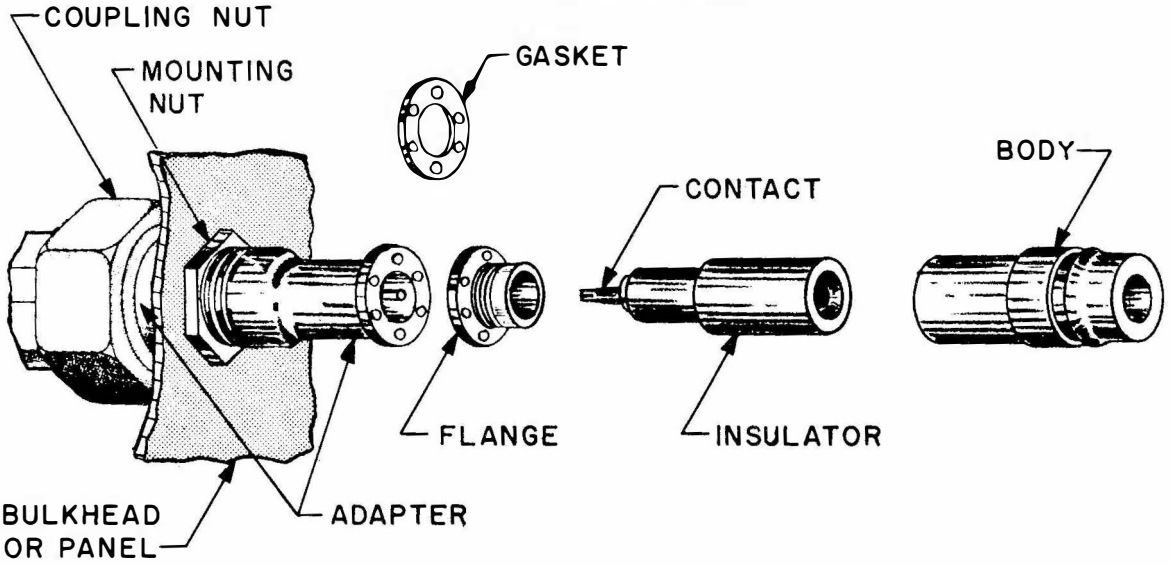


FIGURE 5.

Insert adapter through bulkhead, or panel, circular opening 1 9/16 inch diameter. Fit mounting nut to threads of adapter, on opposite side of bulkhead, and tighten. Place the cable-connector assembly in the adapter. Holding the cable-connector assembly stationary, tighten into place turning the coupling nut.

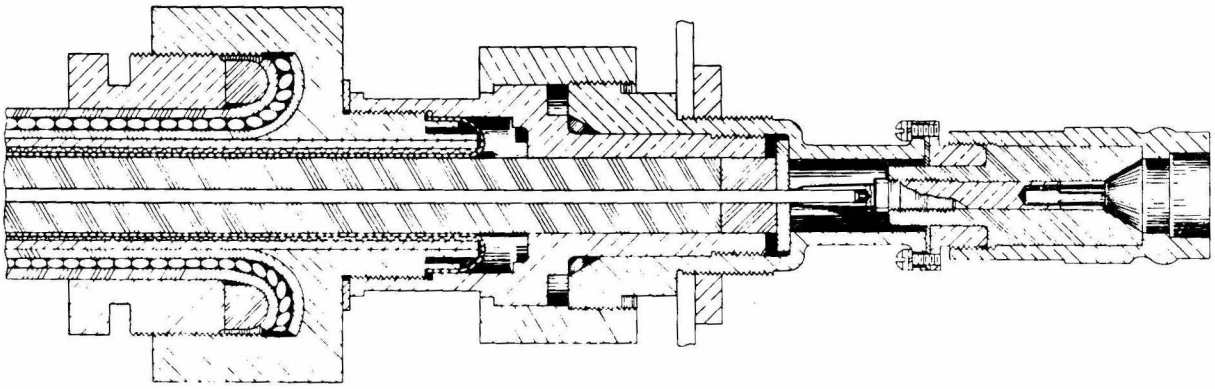
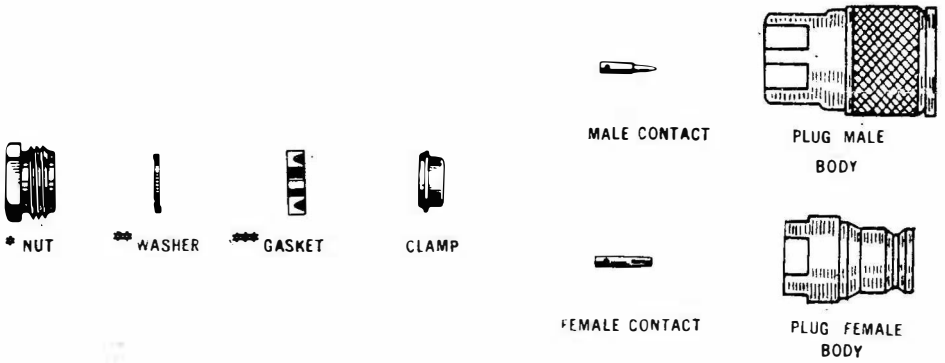
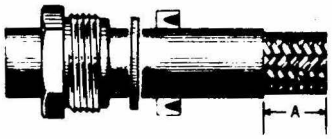


FIGURE 6.

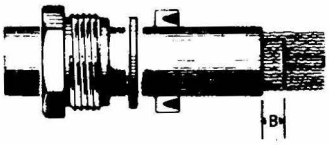
Place gasket and flange in position against outer end of adapter. Bolt in place with 6 machine screws, each secured with a lock washer. Screw contact into plug insulator. Push insulator into flange, inner end of contact sliding over end of center conductor. Move plug body over insulator and screw on until insulator is tightly against flange.

ASSEMBLY INSTRUCTION NUMBER 6, Sheet 1 of 1
QDS SERIES (Non-armored Cable)

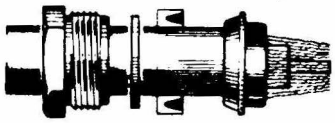




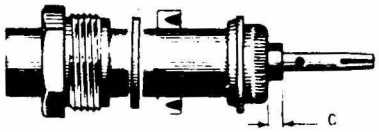
Slide nut, washer and gasket over jacket, V-groove of gasket as shown. Cut jacket to dimension A.



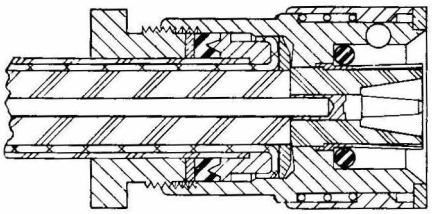
Comb braid and bend out of way. Cut dielectric to dimension B.



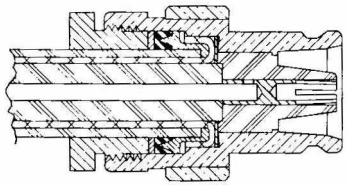
Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



Form braid wires over clamp and trim to clamp shoulder. Solder contact to center conductor. Exposed dielectric should equal dimension C.



Place plug (or receptacle) body into position over the assembly. Move gasket into contact with mating edge of clamp. Tighten nut while holding body stationary.



DIMENSIONS (inches)

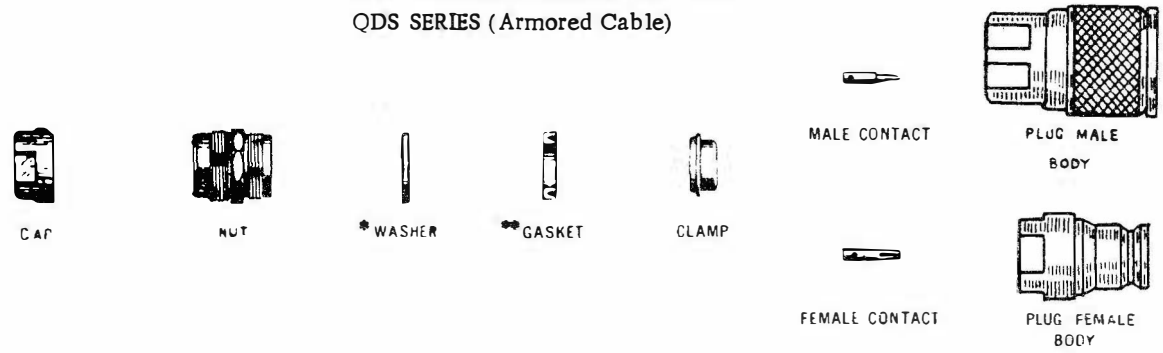
UG - Number	A	B	C
967B/U 968B/U 1132A/U	1/4	3/32	1/32
1134/U 1135/U	3/8	7/32	3/32

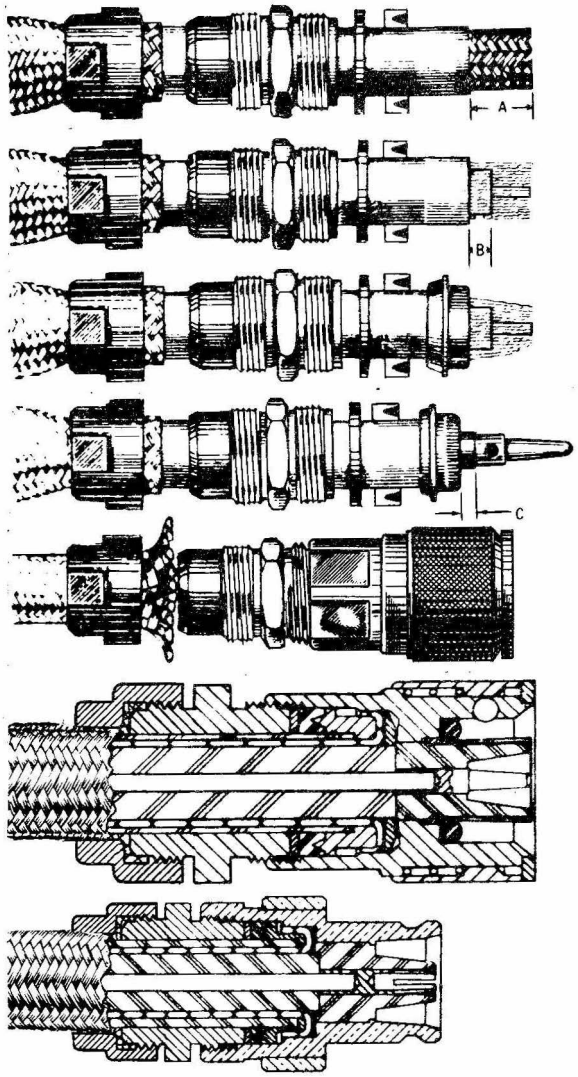
* When armor clamp nut and cap are provided instead of *nut, they may be installed. See Assembly Instruction Number 6A.

** Some QDS connectors do not have washer.

*** Gasket views are cross section.

ASSEMBLY INSTRUCTION NUMBER 6A, Sheet 1 of 1
QDS SERIES (Armored Cable)





Slide cap over armor and push both away from cable end, exposing jacket. Place nut, washer and gasket over jacket, V-groove of gasket as shown. Cut jacket to dimension A.

Comb braid and bend out of way. Cut dielectric to dimension B.

Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.

Form braid wires over clamp and trim to clamp shoulder. Solder contact to center conductor. Exposed dielectric should equal dimension C.

Place plug (or receptacle) body into position over the assembly. Move gasket into contact with mating edge of clamp. Tighten nut while holding body stationary. Form armor over nut and trim at threads. Tighten cap while holding nut stationary.

DIMENSIONS (inches)

UG - Number	A	B	C
967B/U 968B/U 1132A/U	1/4	3/32	1/32
1134/U 1135/U	3/8	7/32	3/32

*Some QDS Series connectors do not have washer.
**Gasket views are cross section.

ASSEMBLY INSTRUCTION NUMBER 6B, Sheet 1 of 3
QDS SERIES Receptacle, Female (UG-1210/U)
for use with RG-85A/U Cable

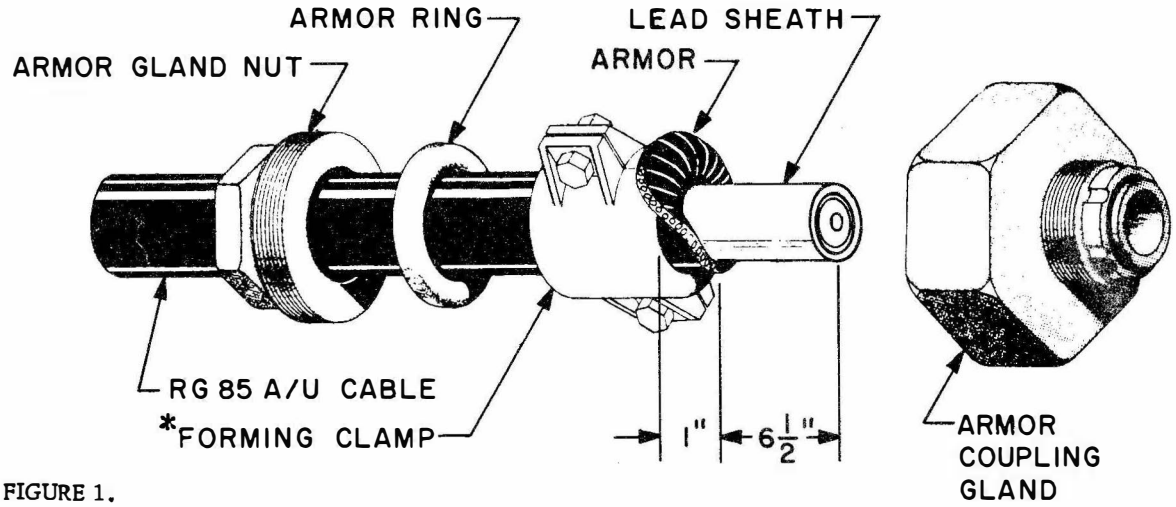


FIGURE 1.

Slide the armor gland nut and armor ring onto cable. Secure *forming clamp firmly 7 1/2 inches from the end of the cable. Six and one half inches from the cable end cut outer jute serving, galvanized steel wire armor and inner jute serving, and flare them outward as shown.

*See Assembly Instruction Number 28, Sheet 4.

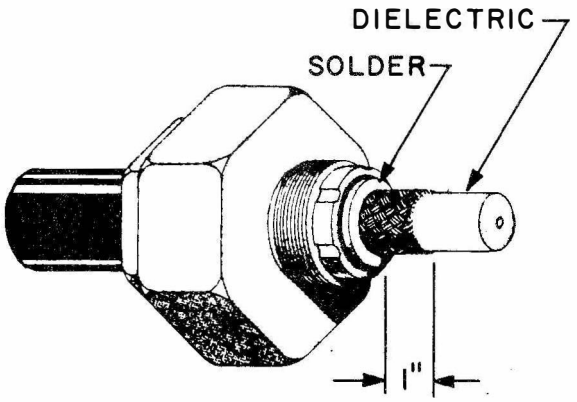


FIGURE 2.

Remove forming clamp. Place armor coupling gland over lead sheath. Fit armor and armor ring in place in gland. Holding armor coupling gland sationary, tighten armor gland nut. Cut lead sheath approximately 1/16 inch from end of armor coupling gland, and solder lead sheath to shoulder of armor coupling gland, as shown. Cut cable jacket flush with the soldered edge. Cut the copper braid outer conductor, leaving 1 inch.

ASSEMBLY INSTRUCTION NUMBER 6B, Sheet 2 of 3
QDS SERIES Receptacle, Female (UG-1210/U)
for use with RG-85A/U Cable

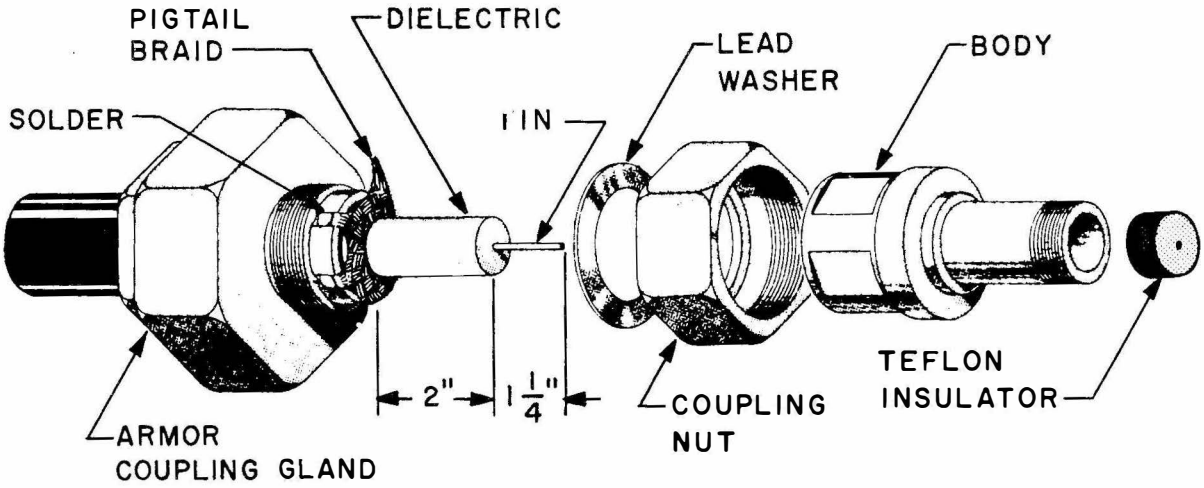


FIGURE 3.

Comb braid of outer conductor. Seperate into six pigtails, trim to fit length of groove, and solder in gland grooves. Cut dielectric 2 inches from outer conductor braid. Cut inner conductor 1 1/4 inches from end of dielectric. Round end of inner conductor and tin outer 1/2 inch.

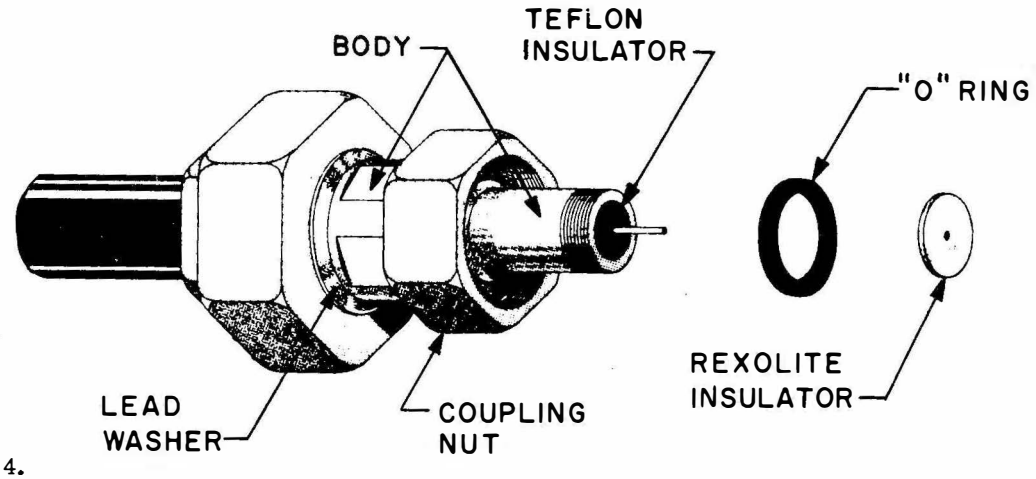


FIGURE 4.

Place lead washer over dielectric and against the armor coupling gland. Push body through coupling nut and over dielectric. Holding armor coupling gland stationary, tighten body securely against lead washer. Fit teflon insulator over inner conductor and tightly against dielectric. Lubricate O-ring with Insulating Compound, Electrical, Silicone, stock number G-5970-159-1598, and place it in position around body. Fit rexolite insulator over inner conductor, against teflon insulator.

ASSEMBLY INSTRUCTION NUMBER 6B, Sheet 3 of 3
QDS SERIES Receptacle, Female (UG-1210/U)
for use with RG-85A/U Cable

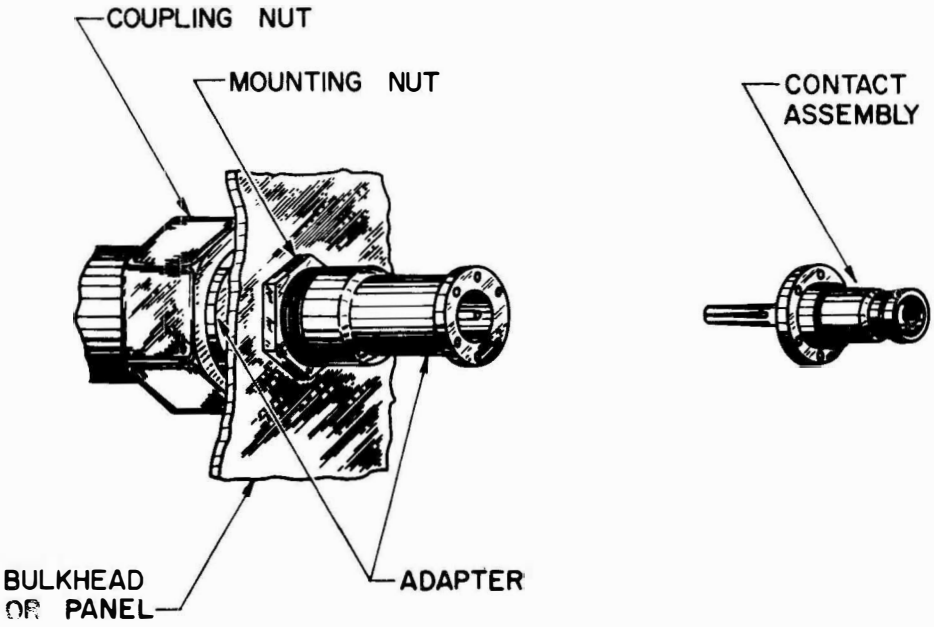


FIGURE 5

Insert adapter through bulkhead, or panel, circular opening 1 9/16 inch diameter. Fit mounting nut to threads of adapter, on opposite side of bulkhead, and tighten. Place the cable-connector assembly in the adapter. Holding the cable-connector assembly stationary, tighten into place turning the coupling nut.

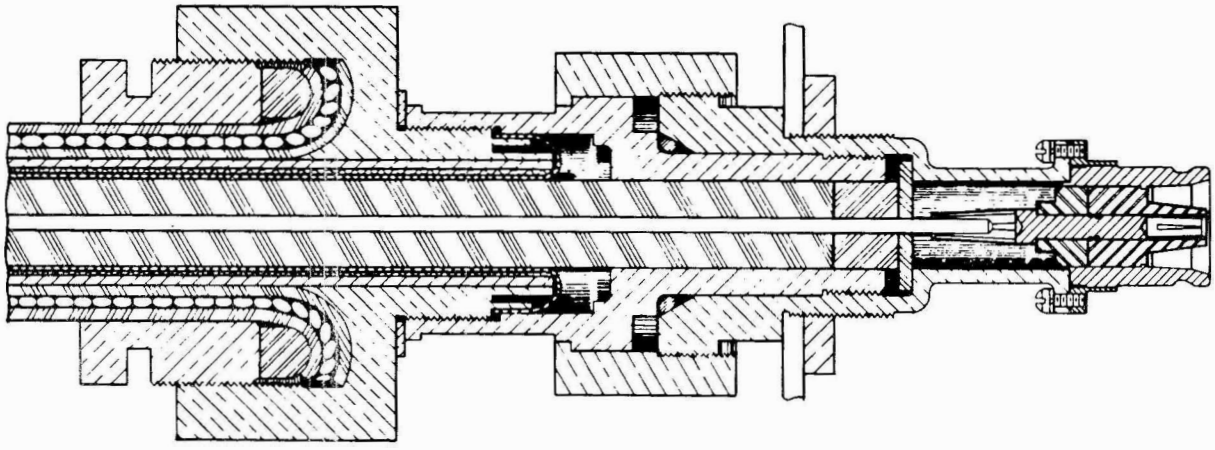
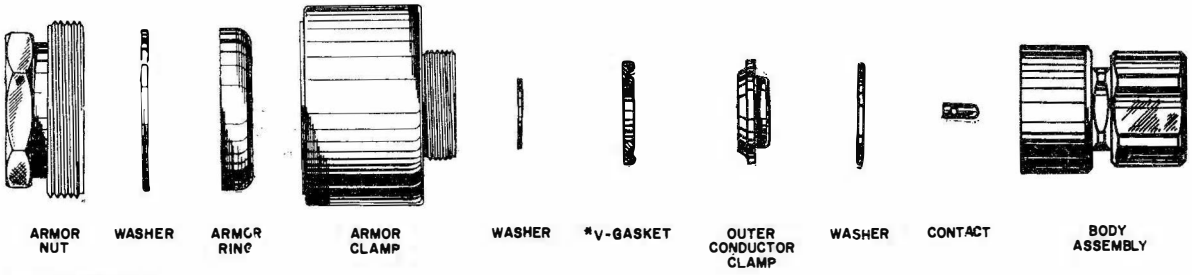


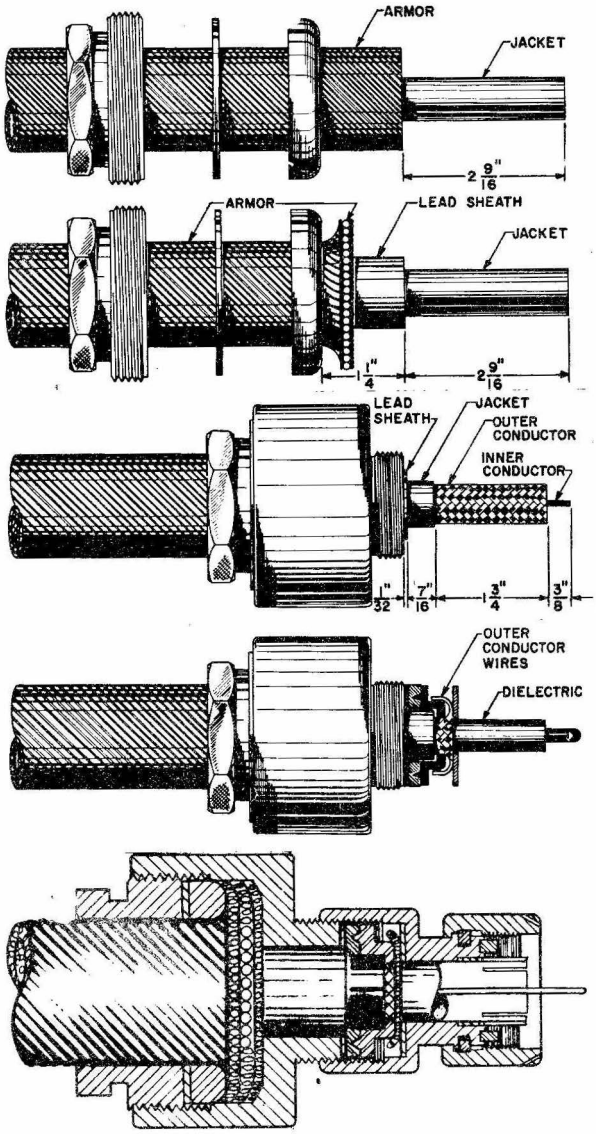
FIGURE 6.

Place contact assembly in position against outer end of adapter, inner end of contact sliding over end of center conductor. Bolt in place with 6 machine screws, each secured with a lock washer.

ASSEMBLY INSTRUCTION NUMBER 7, Sheet 1 of 1
LC SERIES Plug, Male (UG-1179/U)
for use with RG-85A/U Cable



*CROSS-SECTION VIEW



Place armor nut, washer and armor ring over cable. Cut outer jute, steel wire armor, inner jute and lead sheath 2 9/16" from end of cable.

Flare armor and both jute servings around armor ring, exposing 1 1/4" of lead sheath. Trim armor and jute to outer diameter of armor ring.

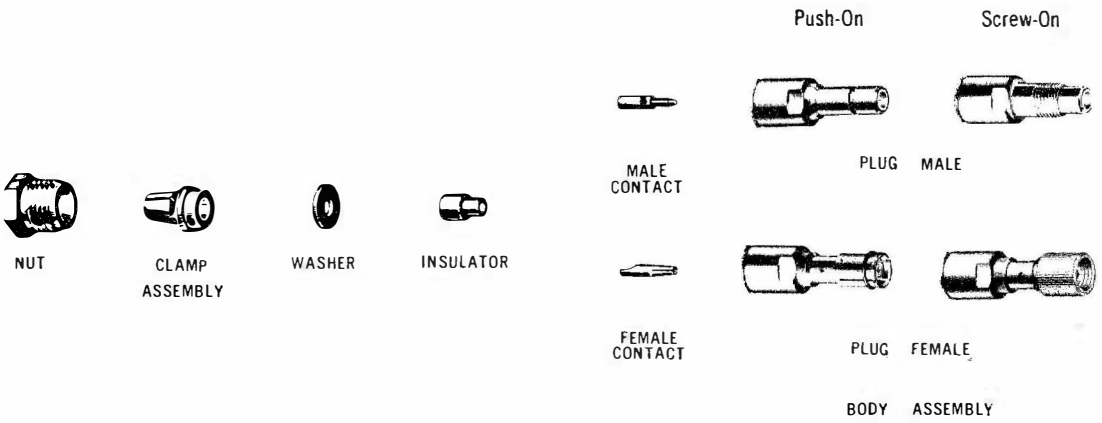
Slide armor clamp over lead sheath, leaving 1/32" of lead sheath exposed. Holding armor clamp, tighten armor nut. Cut jacket 7/16" from lead sheath, and dielectric 3/8" from cable end.

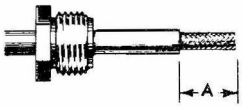
Place washer over lead sheath against armor clamp, and V-gasket over jacket, against lead sheath and washer. Slide outer conductor clamp over outer conductor braid until its inner collar is firmly against jacket. Form braid wires over clamp and trim to length of clamp shoulder. Place washer over dielectric, against braid. Fit contact over center conductor against dielectric, and solder.

Place body assembly over contact and dielectric. Holding armor clamp stationary, tighten body.

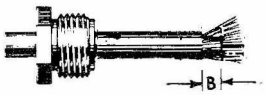
ORIGINAL

ASSEMBLY INSTRUCTION NUMBER 8, Sheet 1 of 1
MINIATURE (Non-armored Cable)





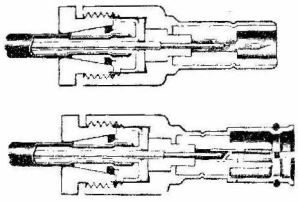
Slide nut over jacket. Cut jacket to dimension A.



Comb braid and bend out of way. Cut dielectric to dimension B.

Taper braid wires toward center conductor. Slide clamp assembly over braid wires and push snugly against cable jacket.

Form braid wires over clamp and trim to length of clamp shoulder. Place washer over dielectric. Slide insulator snugly against washer and cable dielectric. Fit contact onto center conductor against insulator. Solder contact.



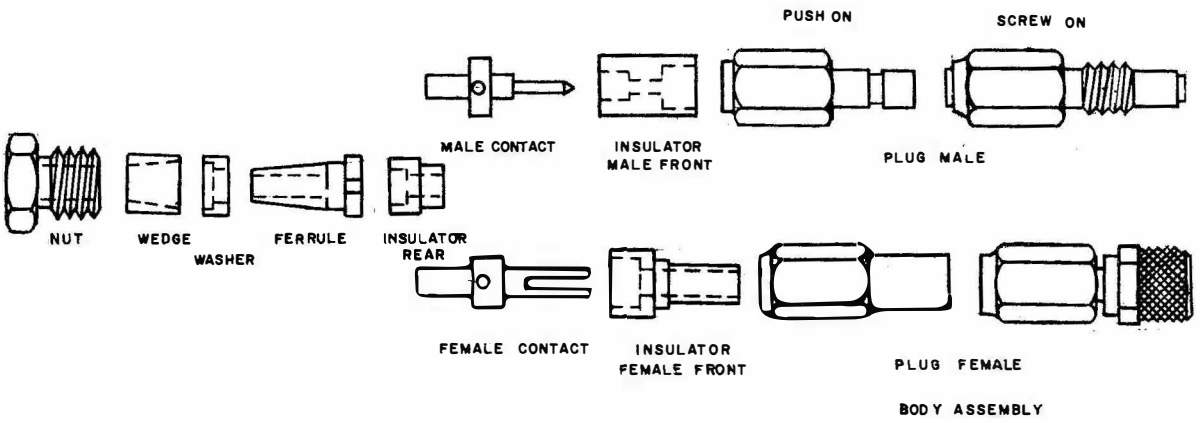
Slide body assembly into position over contact, snugly against insulator and washer. Holding nut stationary, tighten body with wrench.

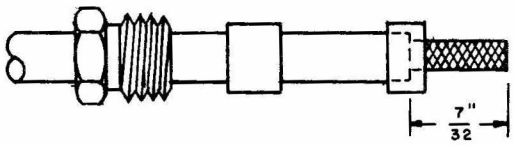
Push-on type shown in cross-cut views.
Screw-on type differs only in body design.

DIMENSIONS (inches)

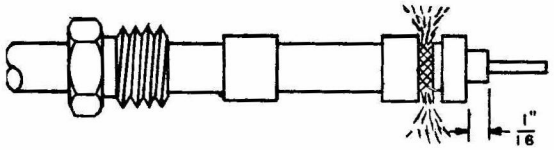
UG Number			A	B
1451/U	1453/U	1454/U	5/16	5/32
1460/U	1462/U	1463/U	5/16	5/32

ASSEMBLY INSTRUCTION NUMBER 8A, Sheet 1 of 1
MINIATURE (Non-armored Cable)

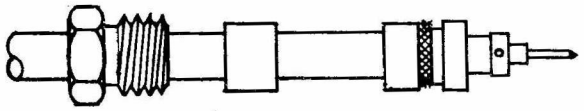




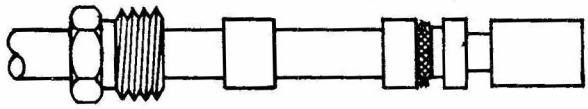
Slide nut and wedge over jacket. Cut jacket to dimension shown. Place washer over and against dielectric.



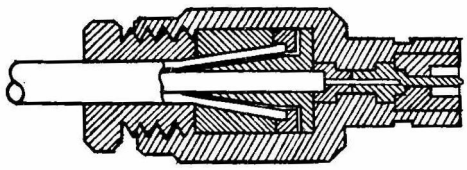
Comb braid and bend out of way. Insert ferrule between braid and dielectric, closely against braid ends. Trim braid to diameter of ferrule flange. Cut dielectric to dimension shown.



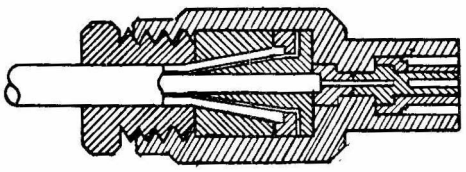
Place rear insulator over center conductor and dielectric, tightly against ferrule flange. Place contact over center conductor, and solder.



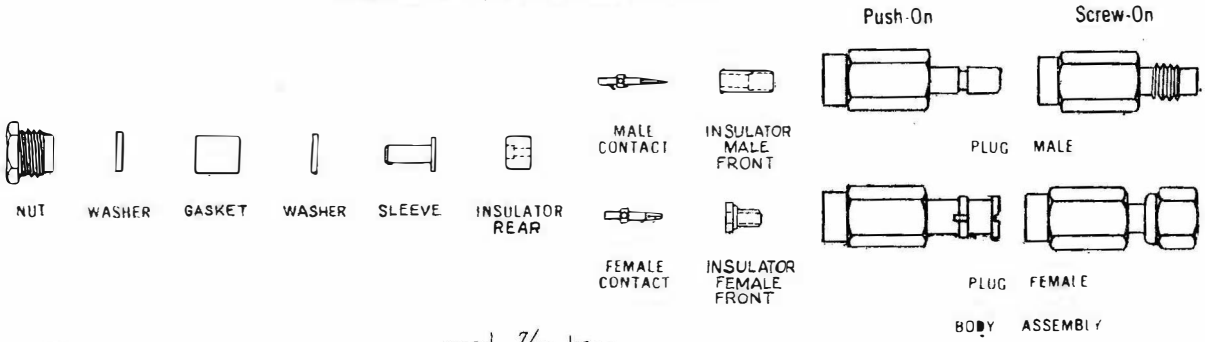
Place front insulator over contact.

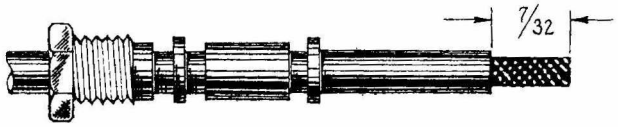


Slide body over contact assembly and tighten nut.

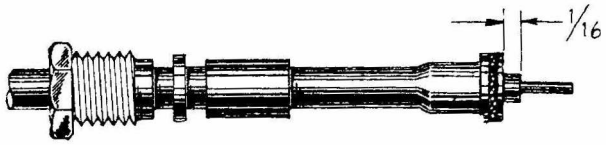


ASSEMBLY INSTRUCTION NUMBER 8B, Sheet 1 of 1
MINIATURE (Non-armored Cable)

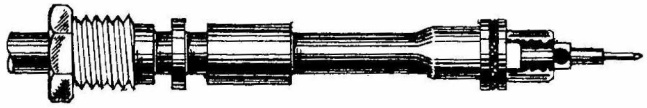




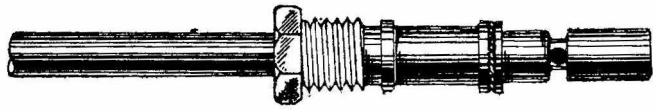
Slide nut, washer, gasket, and washer over jacket. Washers are interchangeable. Cut jacket to 7/32".



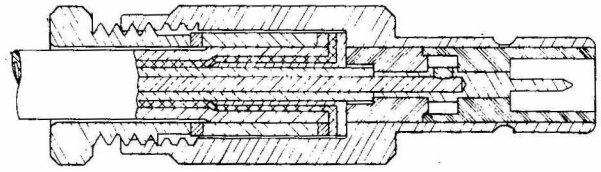
Comb braid and bend out of way. Move washer close to braid. Insert sleeve between braid and dielectric, closely against braid ends. Trim braid to diameter of sleeve flange. Cut dielectric to 1/16", as shown.



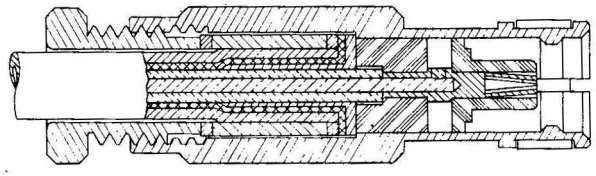
Place rear insulator over inner conductor and dielectric, tightly against sleeve flange. Place contact over inner conductor, and solder.



Place front insulator over contact.

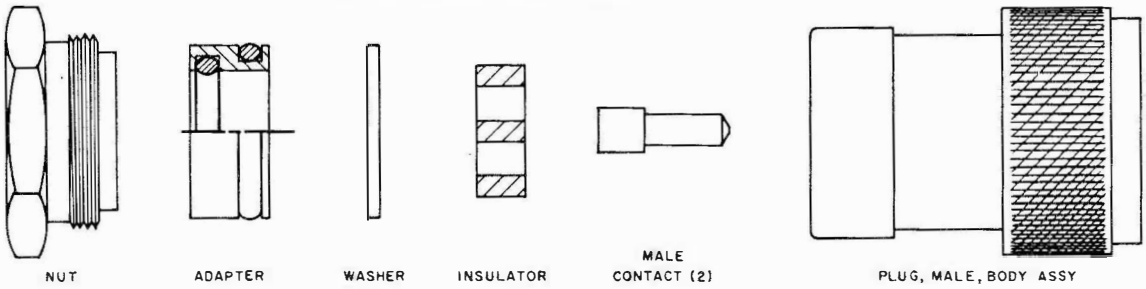


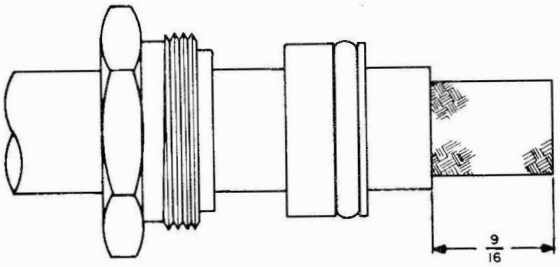
Slide body over contact assembly and tighten nut. Push-on type are shown in cross section views. Screw-on type differs only in body design.



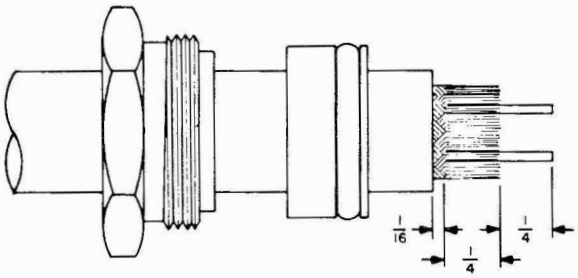
ORIGINAL

ASSEMBLY INSTRUCTION NUMBER 9, Sheet 1 of 1
TWIN SERIES (Non-armored Cable)
Plug, Male (UG-1060A/U)
for use with RG-294/U Cable

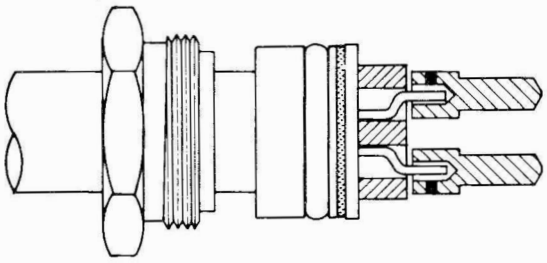




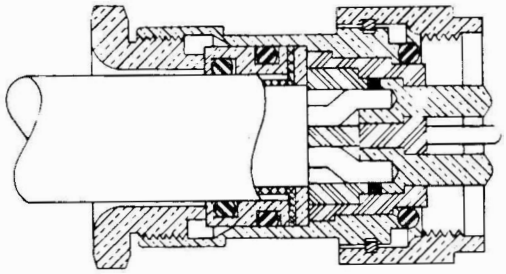
Slide nut over jacket. Lubricate inner O-ring of adapter with Insulating Compound, Electrical, Silicone, stock number G-5970-159-1598. Slide adapter, positioned as shown, over jacket. Cut jacket 9/16" from cable end.



Comb braid, cut 1/4" from cable end and bend out of way. Cut dielectric 1/2" from cable end.



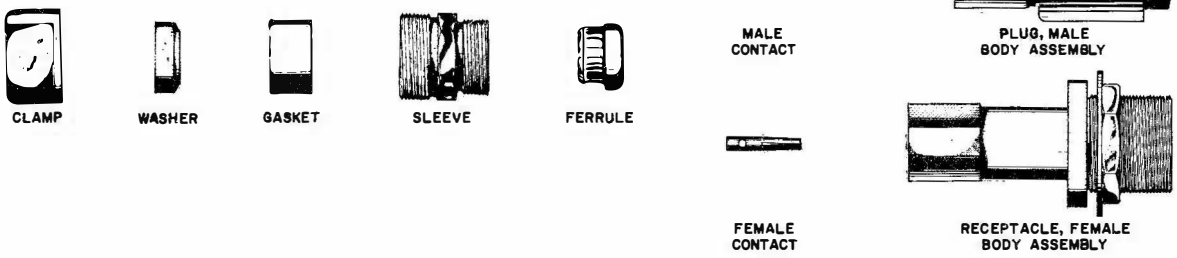
Bend inner conductors as shown. Pass washer over them and over dielectric until it rests firmly against the fanned-out conductor braid. Move adapter into contact with other side of fanned-out braid. Slide insulator over inner conductors to rest tightly against washer and dielectric. Insert contacts onto inner conductors and solder.

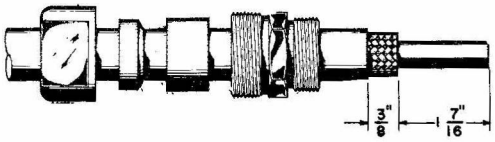


Lubricate outer O-ring of adapter with insulating compound, same as inner O-ring. Place body assembly over the cable assembly, fitting the assemblies carefully together. Holding body and cable assembly stationary, tighten nut.

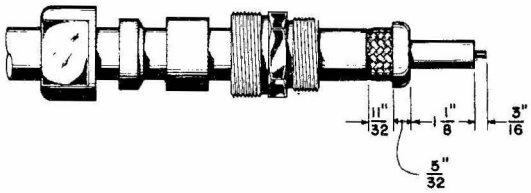
ORIGINAL

ASSEMBLY INSTRUCTION NUMBER 10, Sheet 1 of 1
PULSE SERIES (Non-armored Cable)
Rubber Insert



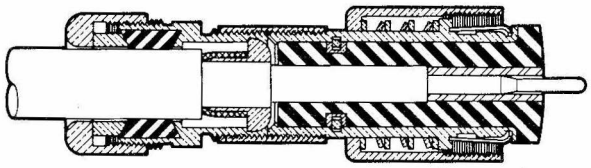


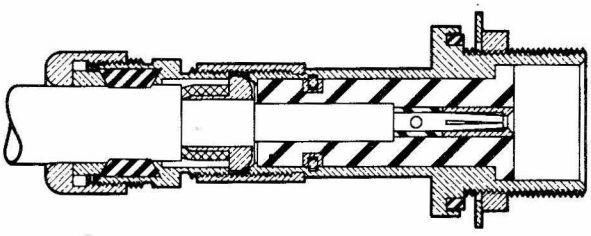
Slide clamp, washer, gasket and sleeve over jacket. Cut jacket and outer conductor braids to dimensions shown.



Push ferrule over dielectric and between it and the inner braid of the outer conductor. Solder all strands of outer conductor braid wires to ferrule. Cut dielectric to expose 3/16" of center conductor.

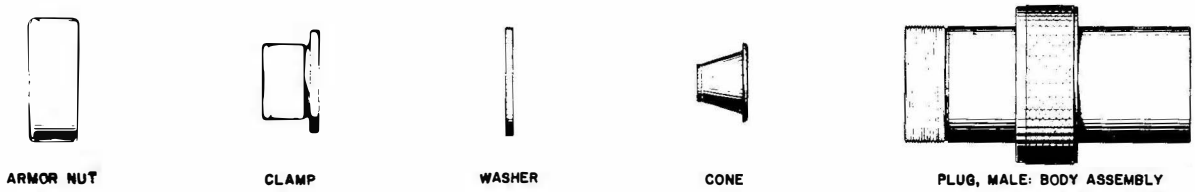
Place contact over center conductor, firmly against dielectric, and solder.

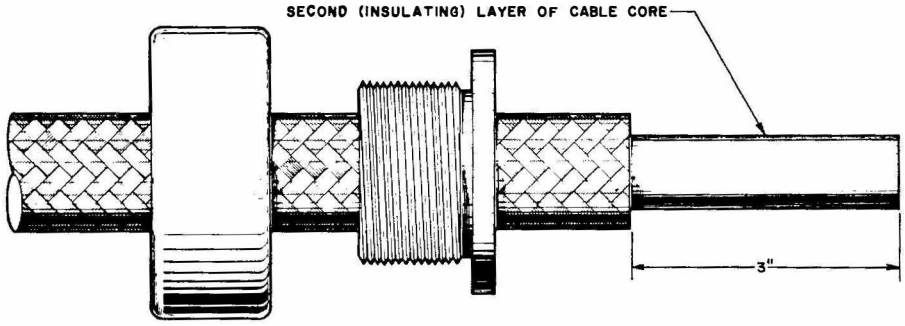




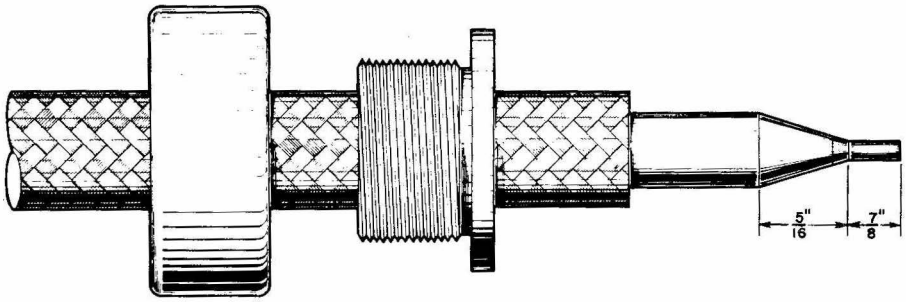
Push body assembly over dielectric until its shell butts against the ferrule. Holding body assembly stationary, insert the sleeve and tighten. Insert the gasket and washer under the sleeve. Engage the clamp and, holding the body assembly stationary, tighten it.

ASSEMBLY INSTRUCTION NUMBER 10A, Sheet 1 of 3
PULSE SERIES (Armored Cable)
Plug, Male (UG-36/U) for use with
RG-27A/U Cable





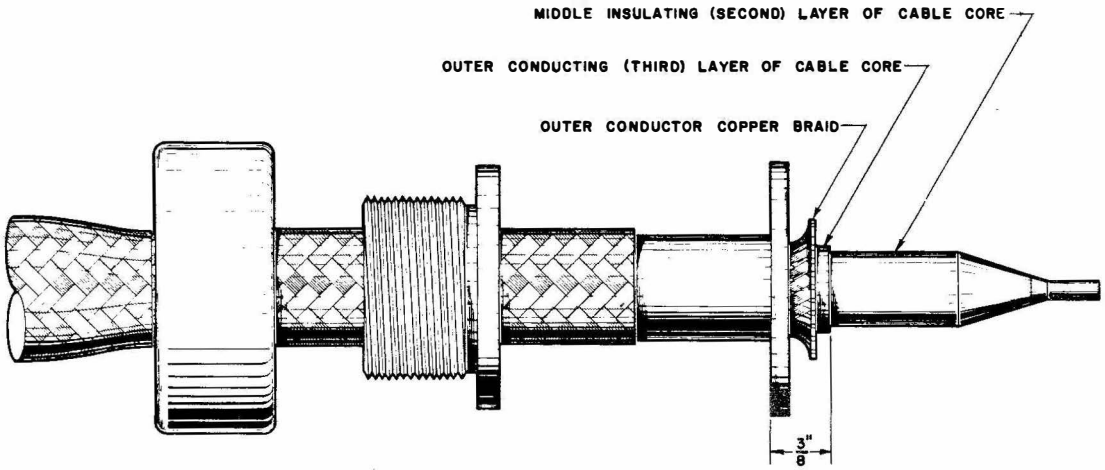
Slide armor nut and clamp over armor. Cut armor, jacket, outer conductor braid, and outer (third and conducting) layer of cable core 3" from cable end, as shown, exposing insulating second layer of cable core.



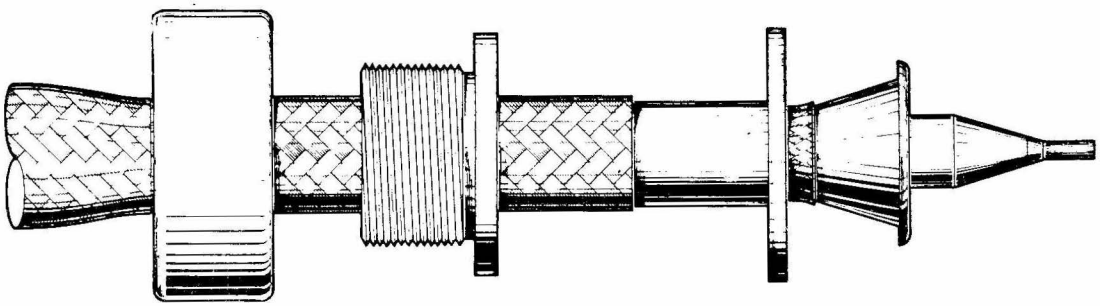
Cut dielectric (second and first layer of cable core) 7/8" from cable end, exposing inner conductor. Taper dielectric with tapering tool (see Assembly Instruction Number 5A, sheet 2) adjusted for 7/8" inner conductor length.

ORIGINAL

ASSEMBLY INSTRUCTION NUMBER 10A, Sheet 2 of 3
PULSE SERIES (Armored Cable)
Plug, Male (UG-36/U) for use with
RG-27A/U Cable

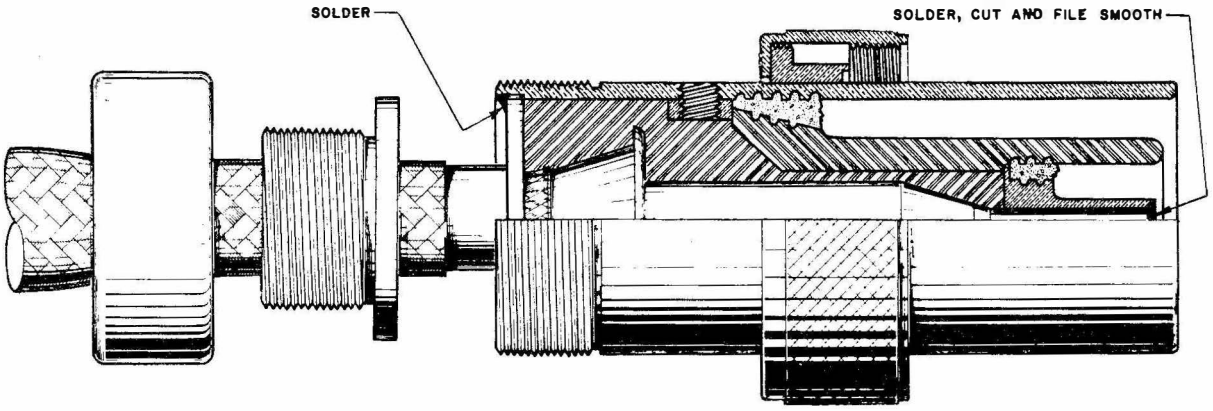


Push armor away from cable end, exposing jacket. Cut jacket 3/8" from its previous end, exposing outer conductor braid. Place washer over braid and tightly against jacket. Comb braid and bend it out from cable core exposing the third layer (outer conducting layer) of the cable core.

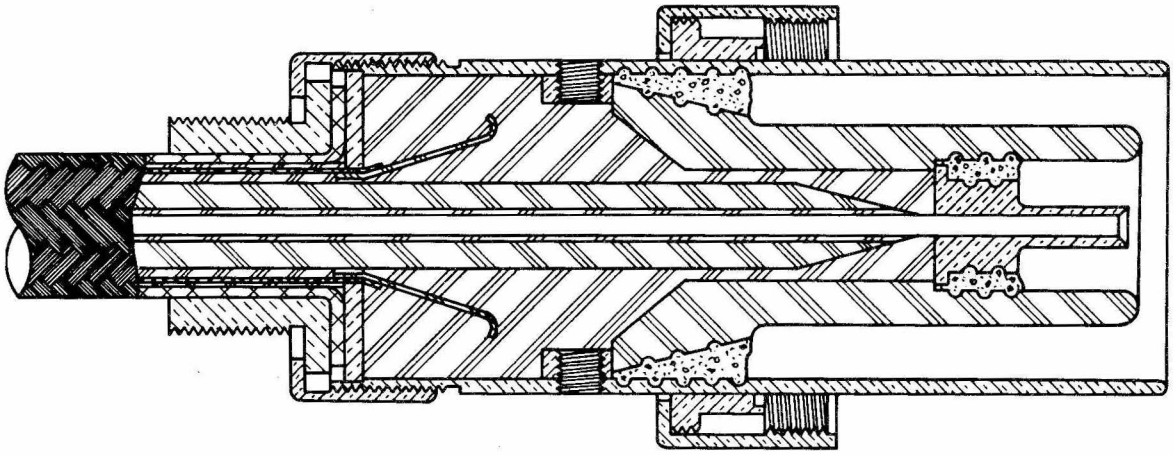


Force cone end between third (outer conducting) layer of cable core and outer conductor braid. Trim braid to 1/16" from face of washer and push ends against washer. Solder braid strands, washer and cone together.

ASSEMBLY INSTRUCTION NUMBER 10A, Sheet 3 of 3
PULSE SERIES (Armored Cable)
Plug, Male (UG-36/U) for use with
RG-27A/U Cable

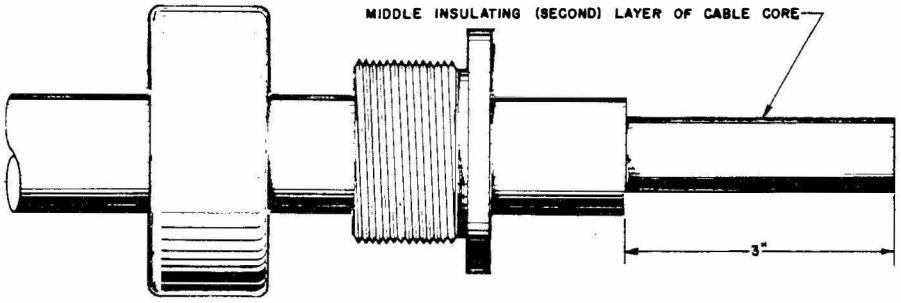


Examine body assembly to assure that ceramic insulator and contact are securely cemented. Move body assembly over cable until washer is firmly in place. Slide armor toward washer until strands are tight. Spread armor strands and push against washer. Solder armor strands to washer and washer to body, scraping nickel plating from body as necessary. Solder inner conductor to contact, remove excess wire and smooth end.

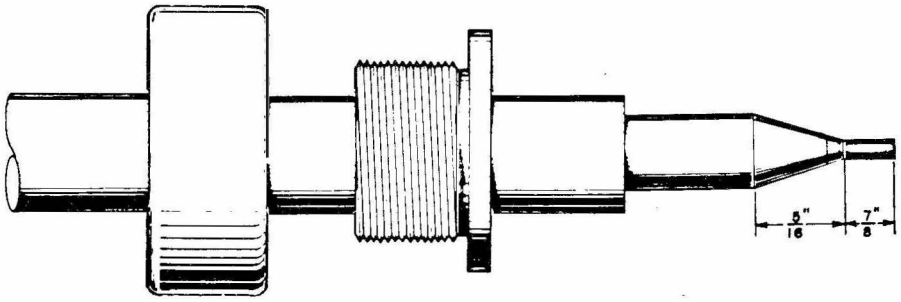


Move clamp and armor nut into place. Holding body stationary, tighten armor nut. Remove set screws, fill connector with Insulating and Sealing Compound, MIL-I-8660A, and replace set screws.

ASSEMBLY INSTRUCTION NUMBER 10B, Sheet 1 of 3
PULSE SERIES (Non-armored Cable)
Plug, Male (UG-174/U) for use with
RG-28B/U Cable

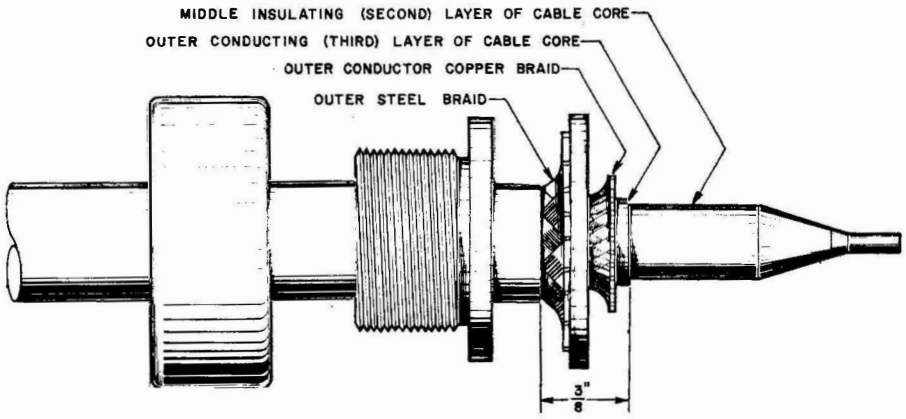


Slide armor nut and clamp over jacket. Cut jacket, outer conductor braids and their separating tape, and outer (third and conducting) layer of cable core 3" from cable end, as shown, exposing insulating second layer of cable core.

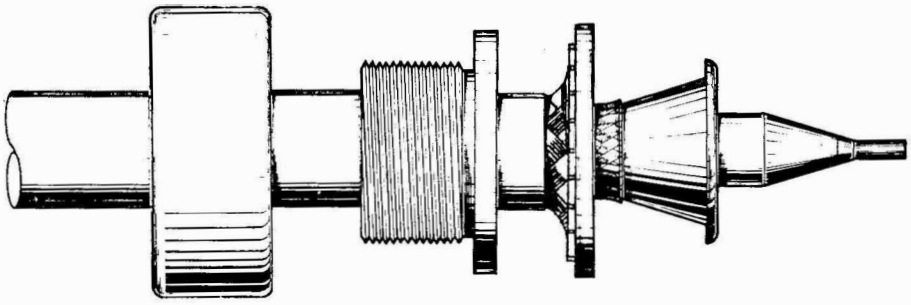


Cut dielectric (second and first layer of cable core) 7/8" from cable end, exposing inner conductor. Taper dielectric with tapering tool (see Assembly Instruction Number 5A, sheet 2) adjusted for 7/8" inner conductor length.

ASSEMBLY INSTRUCTION NUMBER 10B, Sheet 2 of 3
PULSE SERIES (Non-armored Cable)
Plug, Male (UG-174/U) for use with
RG-28B/U Cable

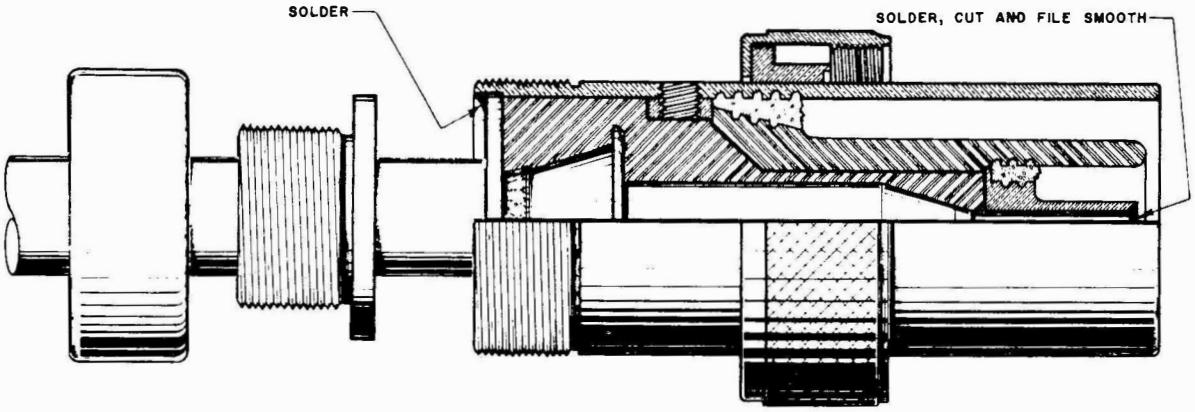


Cut jacket 3/8" from its previous end, exposing outer (steel) braid of outer conductor. Bend the steel strands and the separator tape away, exposing the inner (copper) braid of the outer conductor. Place washer over tinned copper braid and tightly against galvanized steel braid. Comb copper braid and bend it out from cable core, exposing the third layer (outer conducting layer) of the cable core.

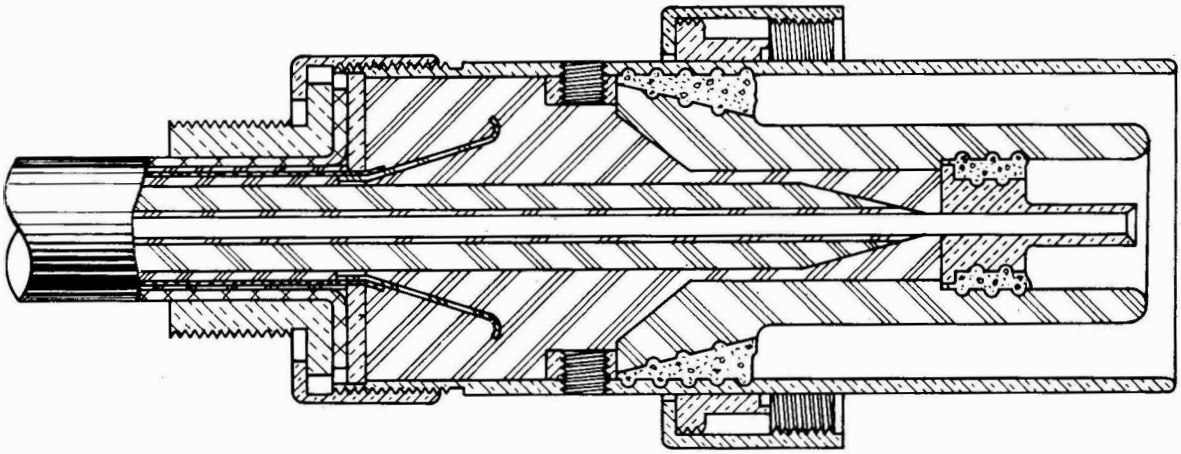


Force cone end between third (outer conducting) layer of cable core and the inner (copper) braid of the outer conductor. Trim the copper braid to 1/16" from face of washer and push ends against washer. Solder copper strands, washer and cone together.

ASSEMBLY INSTRUCTION NUMBER 10B, Sheet 3 of 3
PULSE SERIES (Non-armored Cable)
Plug, Male (UG-174/U) for use with
RG-28B/U Cable

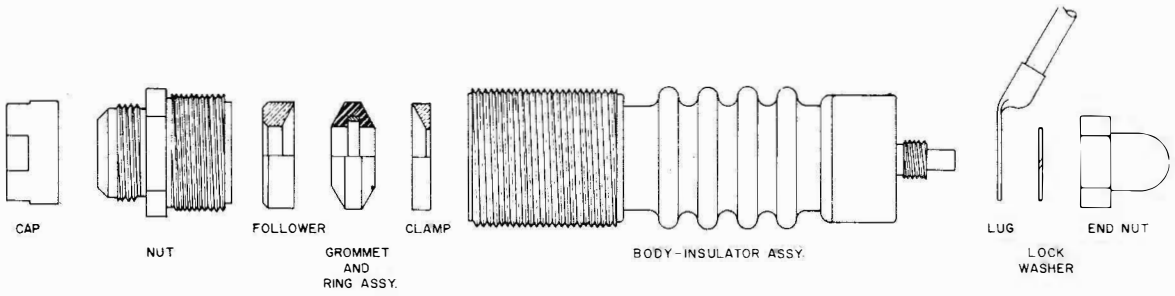


Examine body assembly to assure that ceramic insulator and contact are securely cemented. Move body assembly over cable until washer is firmly in place. Push steel strands of outer braid of outer conductor against washer. Solder steel strands to washer and washer to body, scraping nickel plating from body as necessary. Solder inner conductor to contact, remove excess wire and smooth end.



Move clamp and armor nut into place. Holding body stationary, tighten armor nut. Remove set screws, fill connector with Insulating and Sealing Compound, MIL-I-8660A, and replace set screws.

ASSEMBLY INSTRUCTION NUMBER 20, Sheet 1 of 3
END SEAL (MX-407B/U)



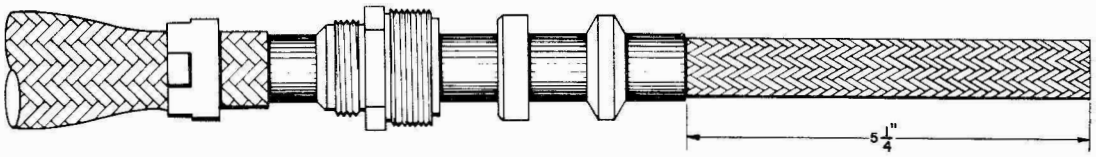


FIGURE 1.

Slide cap over armor and push both away from cable end, exposing jacket. Place nut, follower, and grommet and ring assembly over jacket. Remove jacket 5-1/4" from end, exposing outer conductor.

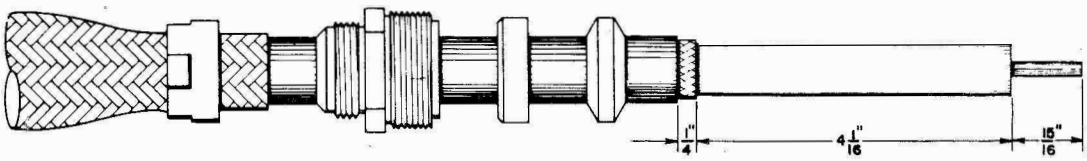


FIGURE 2.

Cut and remove outer conductor braid and dielectric to dimensions shown.

ASSEMBLY INSTRUCTION NUMBER 20, Sheet 2 of 3
END SEAL (MX-407B/U)

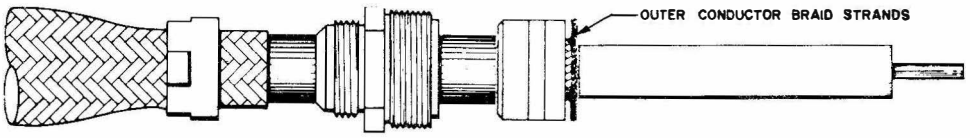


FIGURE 3.

Push clamp over outer conductor braid, tightly against jacket. Comb braid strands, form against clamp, and trim length to outer clamp edge. Move grommet and ring assembly, follower, and nut into meshing position against clamp.

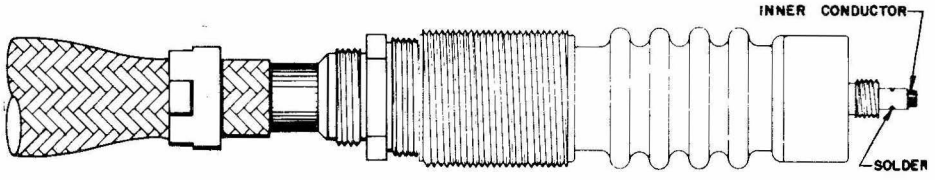


FIGURE 4.

Slide body-insulator assembly over the dielectric until the body inner shoulder is against the braid strands. Holding body-insulator assembly stationary, engage and tighten nut. The inner conductor should protrude 1/16" beyond end of insulator cap. Solder insulator cap and inner conductor.

ASSEMBLY INSTRUCTION NUMBER 20, Sheet 3 of 3
END SEAL (MX-407B/U)

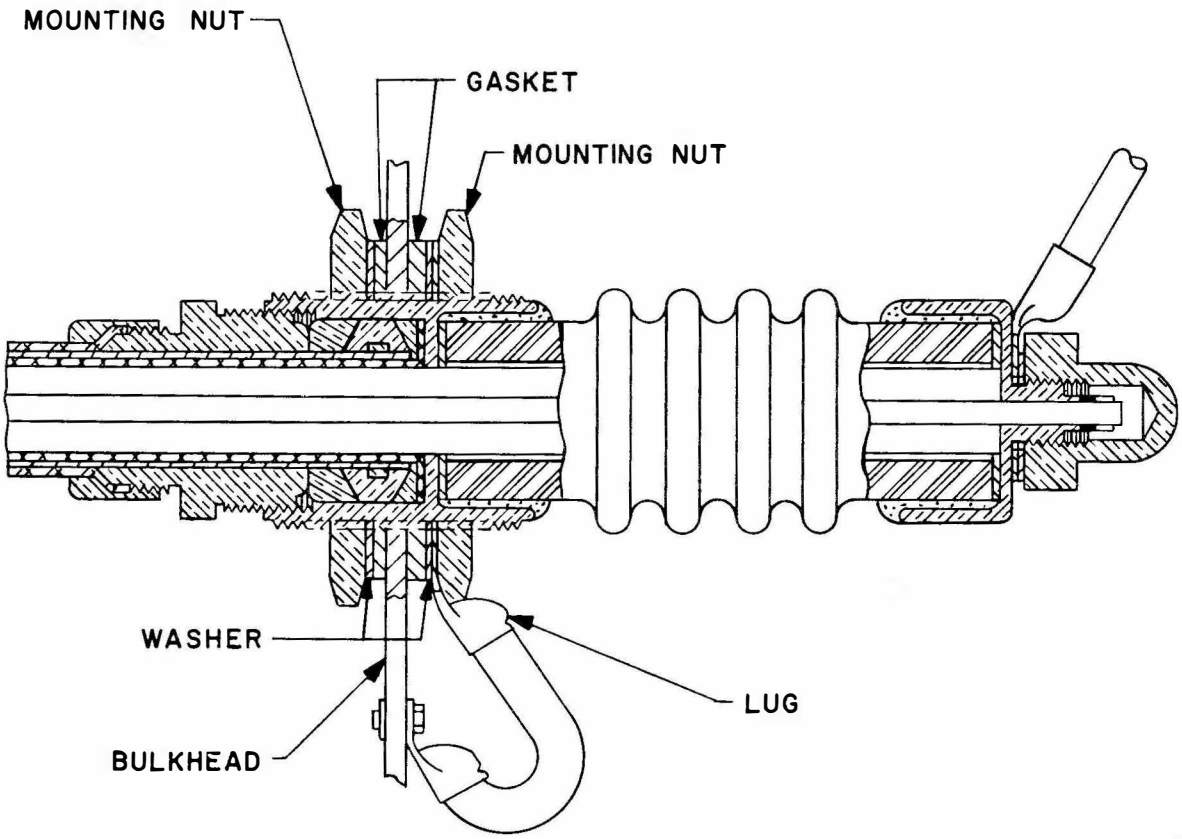


FIGURE 5.

Form armor over nut and trim to first thread of nut. Tighten armor cap while holding nut and body-insulator assembly stationary. Place mounting nut, washer and gasket in position on body. Insert insulator-cable assembly through 1-13/16" hole in bulkhead. Place gasket, washer, lug with ground strip attached, and mounting nut on opposite side of bulkhead. Holding cable assembly stationary, tighten mounting nuts. Attach ground strip to bulkhead. Place lug with conductor attached, lockwasher, and end nut . Keeping mounted installation stationary, tighten end nut.

*When the cable is not armored and connector packet includes armor nut and cap, they may be installed.

ASSEMBLY INSTRUCTION NUMBER 21, Sheet 1 of 2
END SEAL (MX-1057A/U)

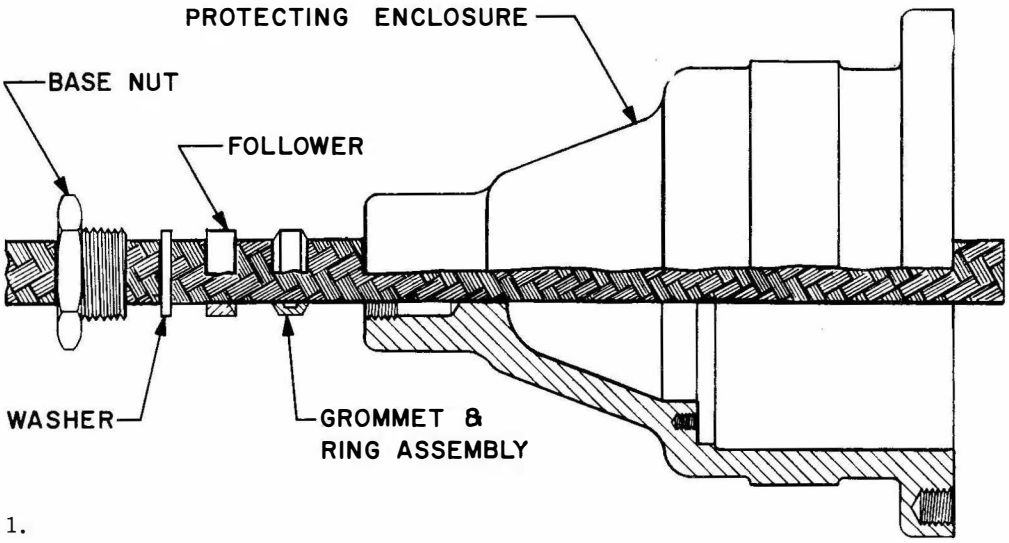


FIGURE 1.

Slide base nut, washer, follower, and grommet and ring assembly over armor. Insert cable into base of protecting enclosure.

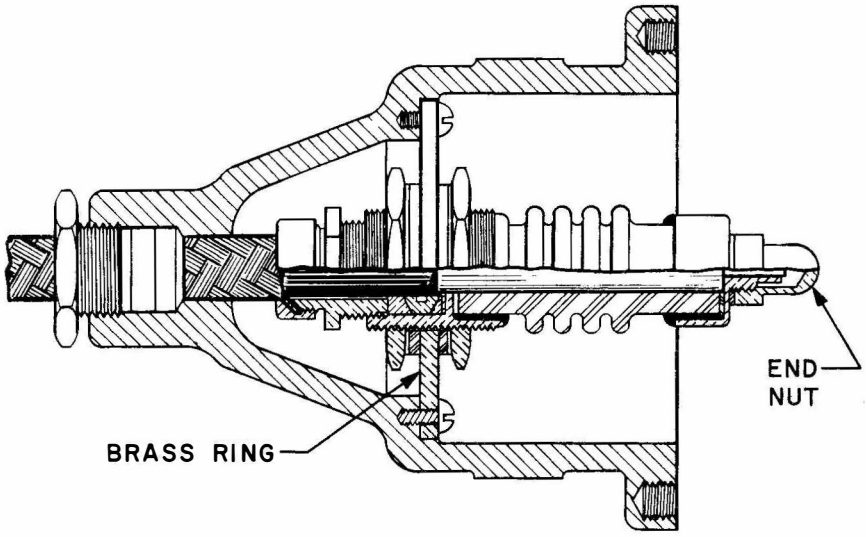
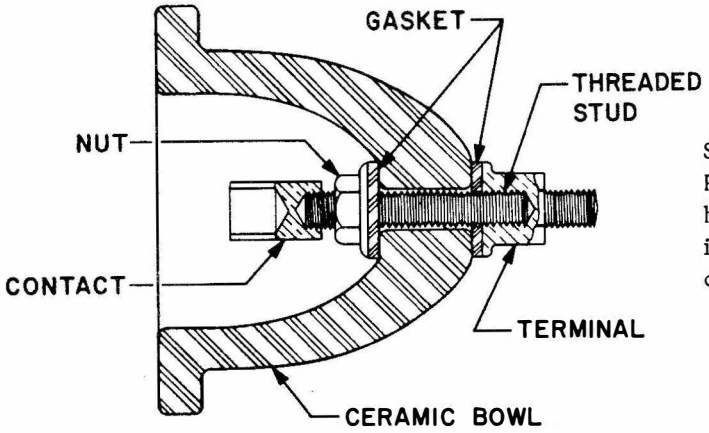


FIGURE 2.

Assemble end seal on cable in accordance with Assembly Instruction Number 20, except that brass ring replaces bulkhead. Move assembly into protecting enclosure, seating brass ring. Secure brass ring with 8 round head machine screws. Push grommet and ring assembly, follower, and washer into base of enclosure. Engage and tighten base nut holding protective enclosure stationary.

ASSEMBLY INSTRUCTION NUMBER 21, Sheet 2 of 2
END SEAL (MX-1057A/U)



Screw 3-1/2" long threaded stud into terminal. Place gasket over stud and insert stud through hole in ceramic bowl. Place gasket over stud inside bowl. Engage and tighten nut. Screw contact in place on stud.

FIGURE 3.

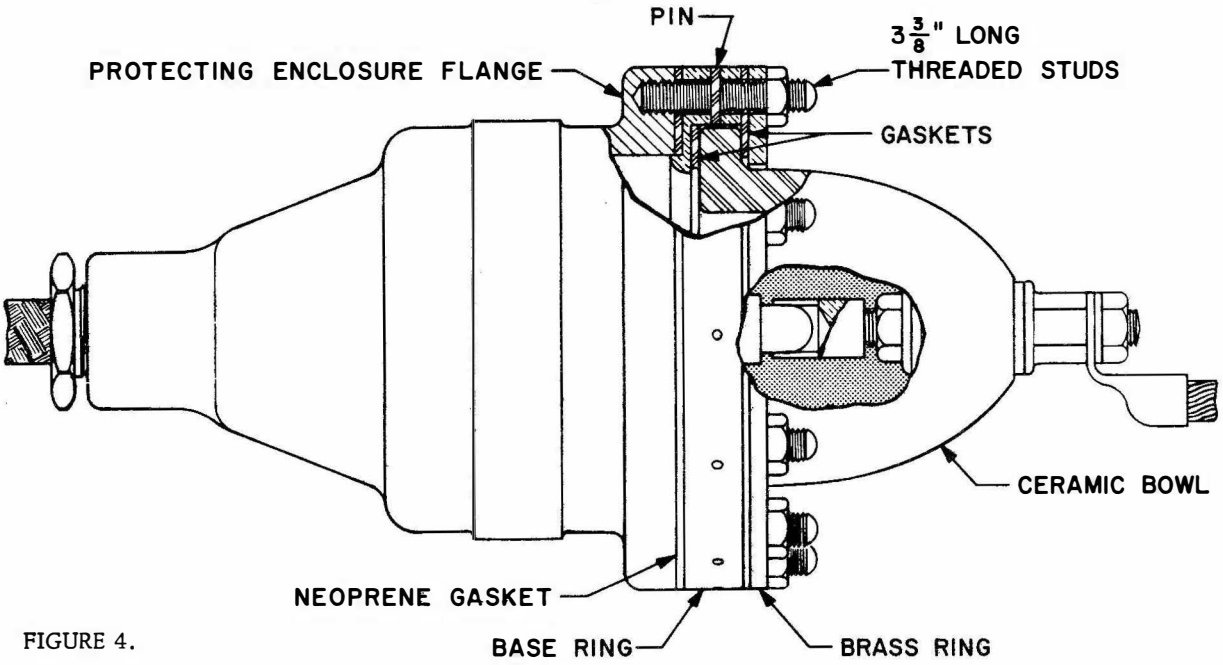
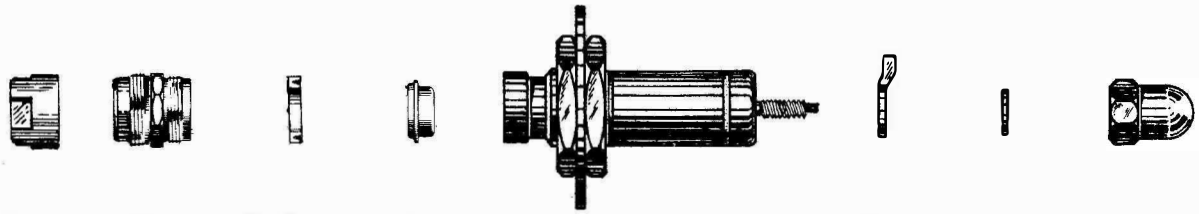


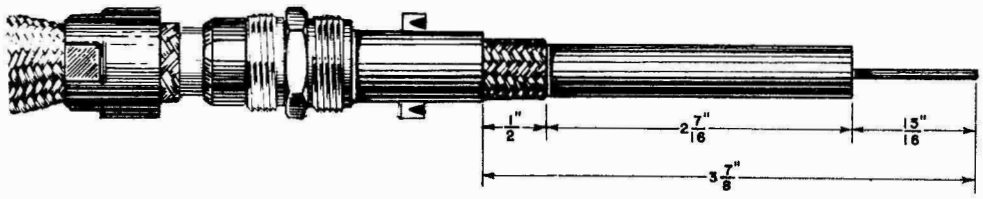
FIGURE 4.

Screw 12, 3-3/8" long, threaded studs into flange of protecting enclosure until they are tightly engaged. Place neoprene gasket (5-3/16" ID) over the studs. Put brass base ring over studs, flat surface resting against the neoprene gasket. Using the 12 holes in the side of the base ring as pilot holes, with a No. 31 drill continue the hole through the threaded stud and the inner wall of the base ring. Into each hole insert a 1/8" dia., 13/16" long, pin. Remove all drill shavings and dust. Lay neoprene gasket (4-7/8" ID) against base ring. Fit ceramic bowl to rest against the neoprene gasket, its contact sliding over the rounded end nut of the cable-insulator assembly but not resting against the end nut flange. Place 4-13/16" ID neoprene gasket over studs to rest against flange of ceramic bowl. Lay brass ring (5" ID) over studs to rest on neoprene gasket. Place and tighten nuts. Put lug, with stranded cable attached, and lock-washer over stud of terminal. Engage nut, and holding terminal stationary, tighten.

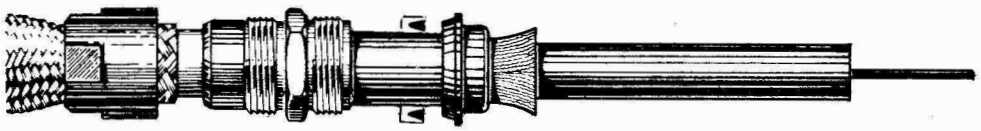
ORIGINAL

ASSEMBLY INSTRUCTION NUMBER 22, Sheet 1 of 2
END SEAL (MX-1461/U)



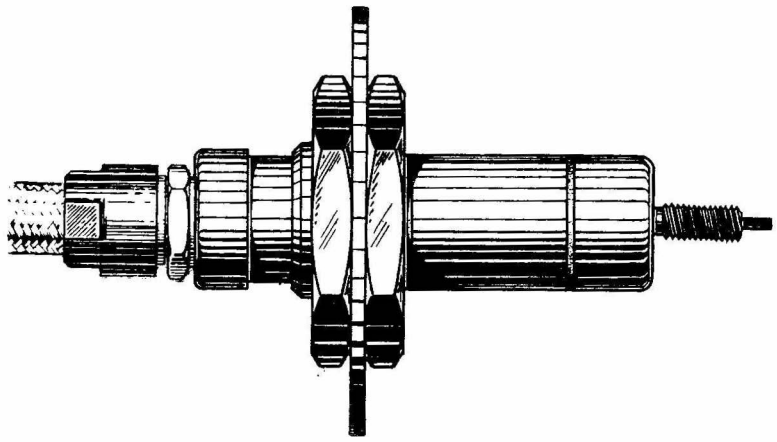


Slide cap over armor and push both away from cable end. Place nut and gasket over jacket, V-groove of gasket as shown, Cut jacket, outer conductor braid, and dielectric to dimensions shown.

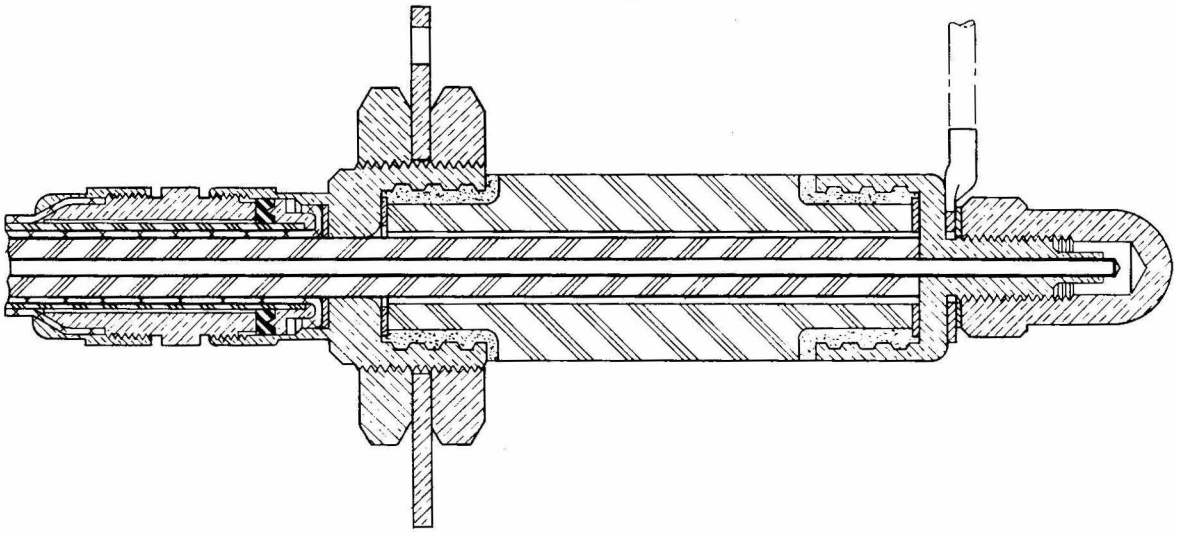


Slide clamp over braid wires and push snugly against cable jacket. Form braid wires over clamp and trim to shoulder length.

ASSEMBLY INSTRUCTION NUMBER 22, Sheet 2 of 2
END SEAL (MX-1461/U)



Insert cable into body end of body-insulator-cap assembly. Move V-gasket into contact with mating edge of clamp. Engage and tighten nut, holding body stationary. Form armor over nut and trim to length of first thread. Tighten cap while holding nut stationary.

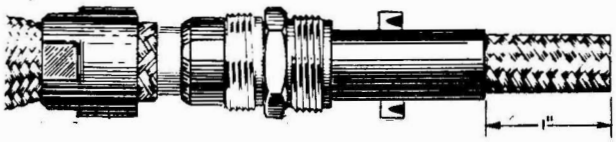


Place lug and lockwasher over insulator cap. Engage and tighten end nut, holding insulator cap stationary and lug in desired position.

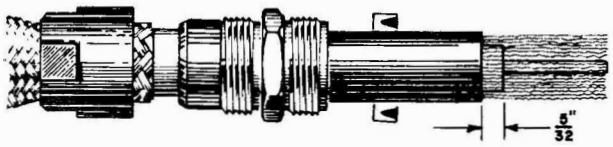
* These assembly instructions are for armored cable. When the cable is not armored the end seal packet may not have a *cap and the nut will be threaded at only one end. However, if the armor clamp *nut and *cap are provided, they may be installed.

** Cross section views.

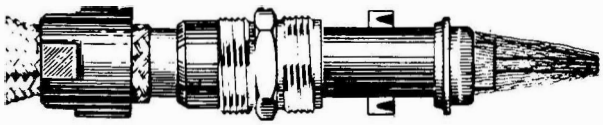
ASSEMBLY INSTRUCTION NUMBER 23, Sheet 1 of 1
END SEAL (MX-1465/U)



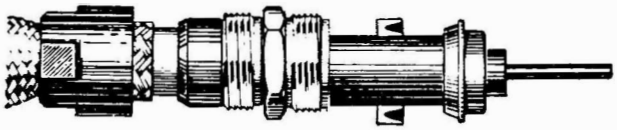
Slide cap over armor and push both away from cable end, exposing jacket. Place nut and gasket over jacket, V-groove of gasket as shown. Cut jacket 1", as shown.



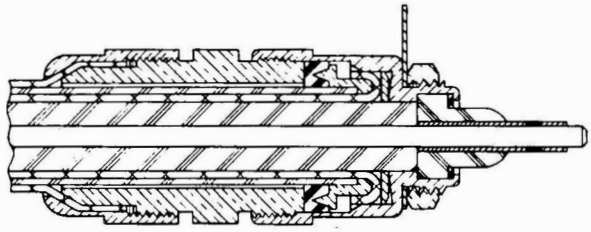
Comb braid and bend out of way. Cut dielectric 5/32" from jacket, as shown, exposing inner conductor.



Taper braid wires toward center conductor. Slide clamp over braid wires and push snugly against cable jacket.



Form braid wires over clamp, trimmed to shoulder length.

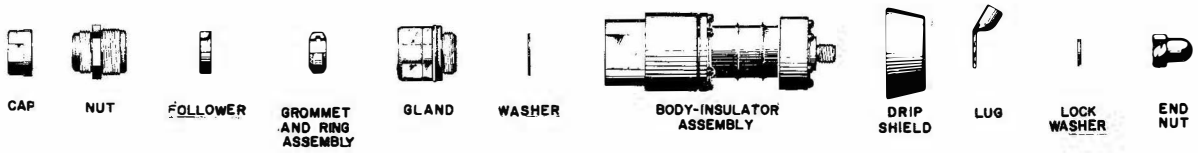


Slide end seal body into position over the assembly. Move gasket into position with the sharp edge of clamp. Engage and tighten nut while holding body stationary. Form armor over nut and trim to thread length. Engage and tighten cap, while holding nut stationary. Solder contact to center conductor.

* These assembly instructions are for armored cable. When the cable is not armored the end seal packet may not have a *cap and the nut will be threaded at only one end. However, if the armor clamp *nut and *cap are provided, they may be installed.

ASSEMBLY INSTRUCTION NUMBER 24, Sheet 1 of 2

END SEAL (MX-1490B/U)



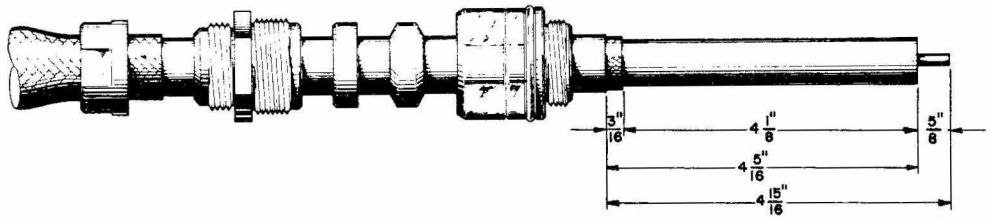


FIGURE 1.

Slide cap over armor and push both away from cable end, exposing jacket. Place nut, follower, grommet and ring assembly, and gland over jacket. Cut jacket, outer conductor and dielectric to dimensions shown.

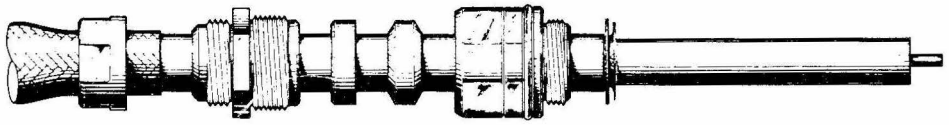


FIGURE 2.

Comb braid and straighten along dielectric. Slide washer over braid strands until it is snugly against cable jacket. Form braid wires over washer and trim to outer edge.

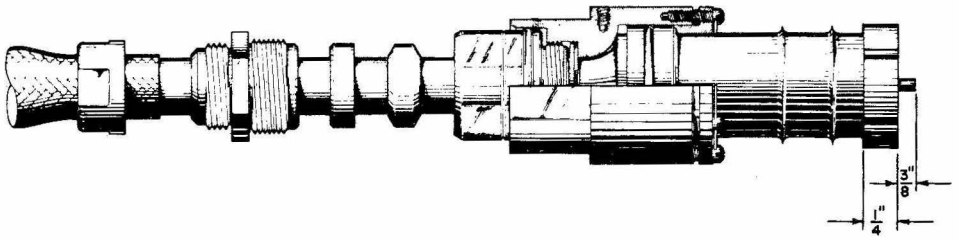


FIGURE 3.

Slide dielectric into body-insulator assembly. Dielectric should be 1/4" inside insulator, with inner conductor extending 3/8" beyond end of insulator. Lubricate O-ring with Insulating Compound, Electrical, Silicone, stock number G-5970-159-1598, and place in gland. Move gland, with O-ring in place, into body. Holding body stationary, tighten gland.

ASSEMBLY INSTRUCTION NUMBER 24, Sheet 2 of 2
END SEAL (MX-1490B/U)

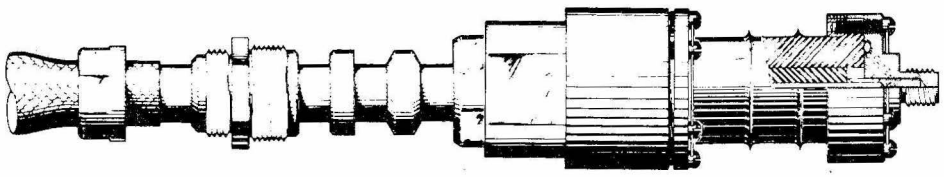


FIGURE 4.

Slide grommet and ring assembly, and follower under gland. Engage and, holding gland and body stationary, tighten nut. Form armor over nut and trim to thread length. Tighten cap while holding nut stationary. Place ring and female contact assembly over inner conductor. Push halves of brass securing ring into position. Insert and tighten filister head machine screws, securing them with #18, B & S, copper wire.

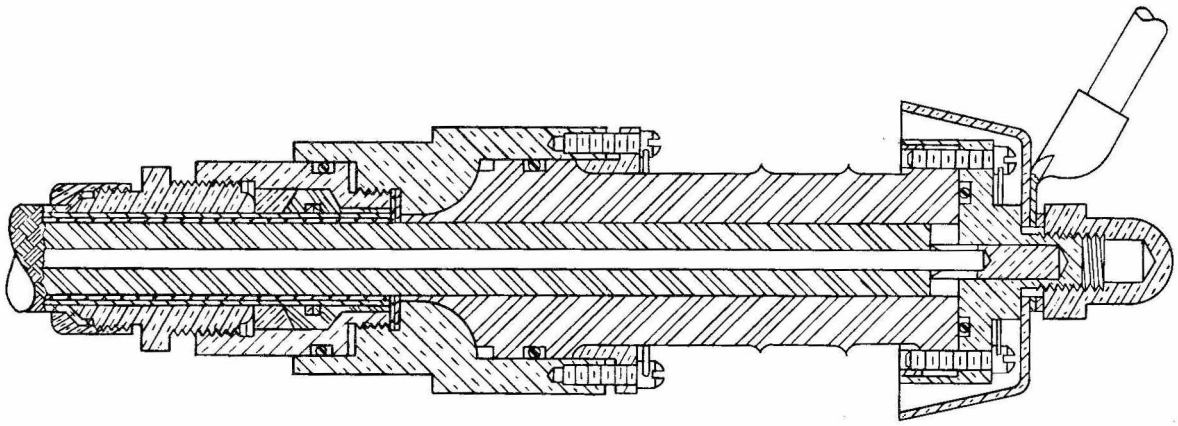


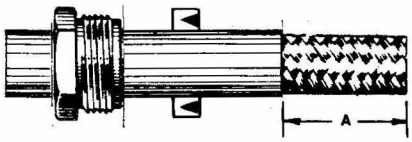
FIGURE 5.

Place drip shield, lug, lockwasher and end nut over threaded end of ring and female contact assembly, and tighten end nut.

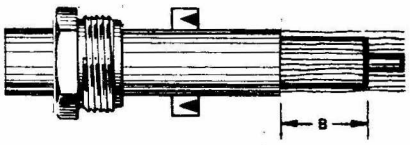
ASSEMBLY INSTRUCTION NUMBER 25, Sheet 1 of 1
END SEAL (Non-armored Cable)

NUT * GASKET CLAMP BODY

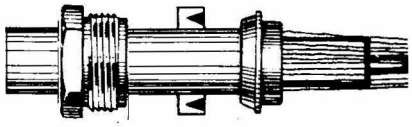
* *Cross Section View*



Slide nut and gasket over jacket, V-groove of gasket faces cable end. Cut jacket to dimension A.

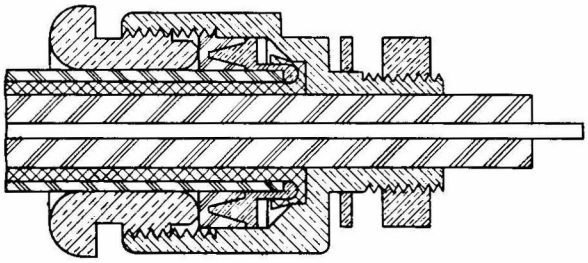


Comb braid and bend out of way. Cut dielectric to dimension B.



Taper braid wires toward center conductor. Place clamp over braid wires and push snugly against cable jacket.

Form braid wires over clamp and trim to shoulder length.



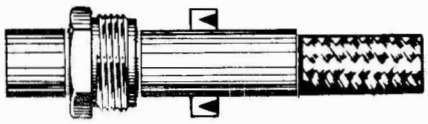
Slide body into position over the assembly. Move gasket into contact with meshing edge of clamp. Tighten nut while holding body stationary.

DIMENSIONS (inches)

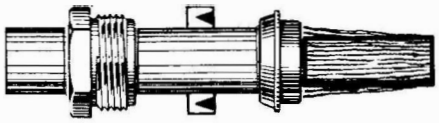
MX-NUMBER	A	B
1530A/U 1554A/U 1684A/U	2-1/4	1-3/4

ASSEMBLY INSTRUCTION NUMBER 26, Sheet 1 of 1
END SEAL with Mounting Plate
(Non-armored Cable)

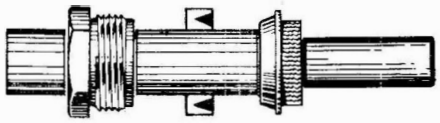
**Cross Section View*



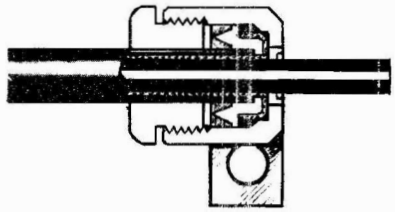
Slide nut and gasket over jacket, V-groove of gasket as shown. Cut jacket, allowing sufficient length of dielectric and inner conductor.



Comb braid and taper strands toward dielectric. Slide clamp over braid wires and push snugly against cable jacket.



Form braid wires over clamp and trim to shoulder length.



Slide body into position over the clamp. Holding body firmly against the clamp, move gasket and nut into position. Tighten nut, holding body stationary.

ASSEMBLY INSTRUCTION NUMBER 28, Sheet 1 of 4
END SEAL Watertight
UG-1170/U for use with RG-85A/U Cable

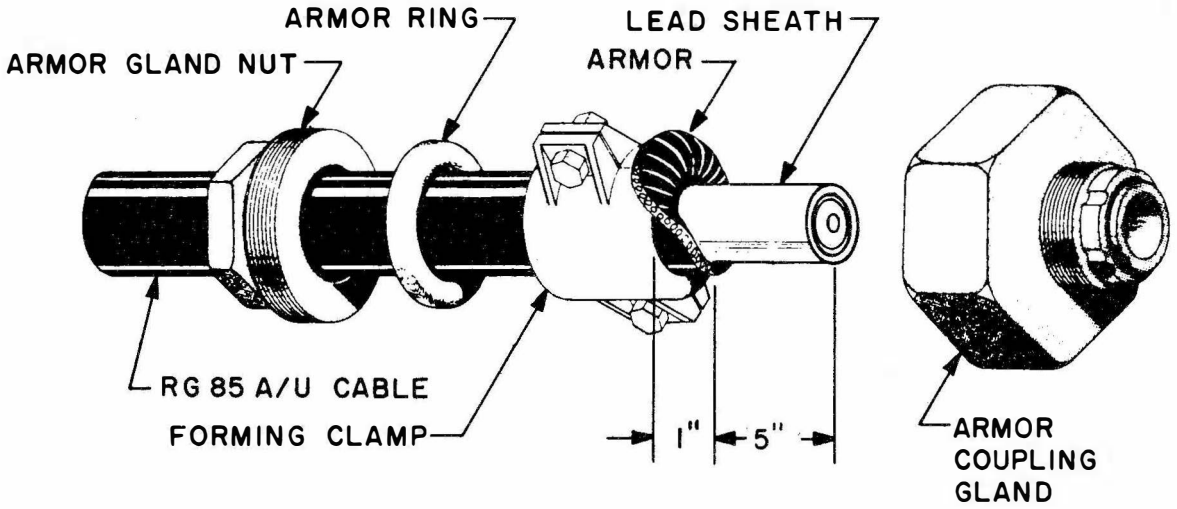


FIGURE 1.

Slide the armor gland nut and armor ring onto cable. Secure forming clamp 6 inches from the end of the cable. Five inches from the cable end cut outer jute serving, galvanized steel wire armor and inner jute serving, and flare them outward as shown.

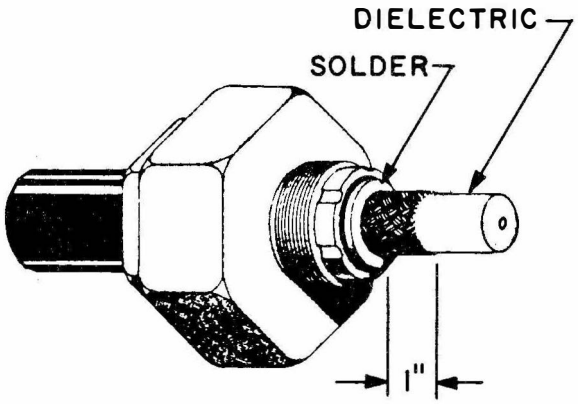


FIGURE 2.

Remove forming clamp. Move armor ring against flared armor. Trim armor to outer edge of armor ring; note cross section view, Figure 6. Place armor coupling gland over lead sheath, armor and armor ring. Holding armor coupling gland stationary, tighten armor gland nut. Cut lead sheath at end of armor coupling gland, and solder lead sheath to shoulder of armor coupling gland, as shown. Cut cable jacket flush with the soldered edge. Cut the copper braid outer conductor, leaving 1 inch.

ASSEMBLY INSTRUCTION NUMBER 28, Sheet 2 of 4
END SEAL Watertight
UG-1170/U for use with RG-85A/U Cable

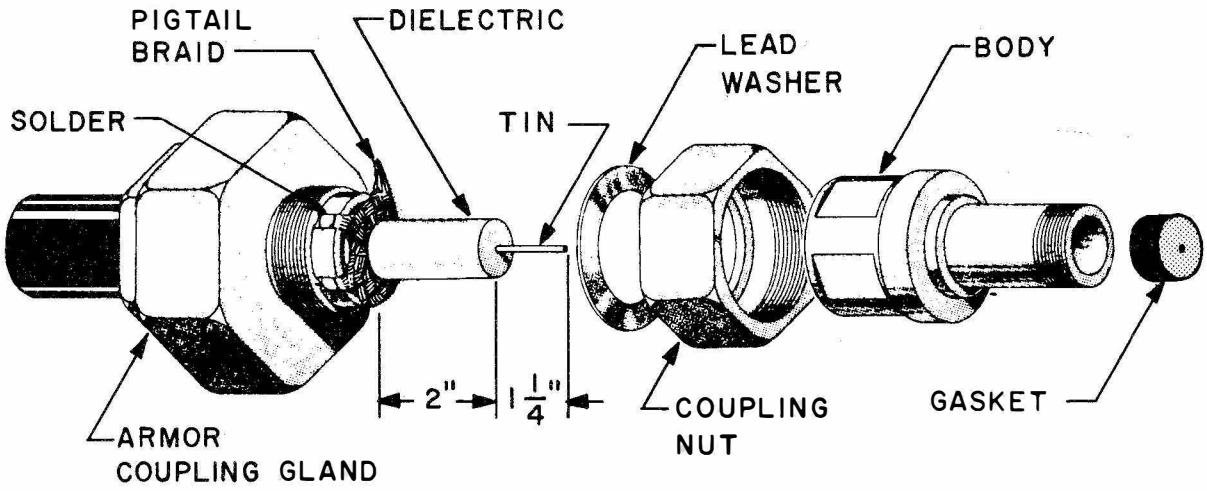


FIGURE 3.

Comb braid of outer conductor. Seperate into six pigtails, trim to fit length of groove, and solder in gland grooves. Cut dielectric 2 inches from outer conductor braid. Cut inner conductor 1 1/4 inches from end of dielectric. Round end of inner conductor and tin outer 1/2 inch.

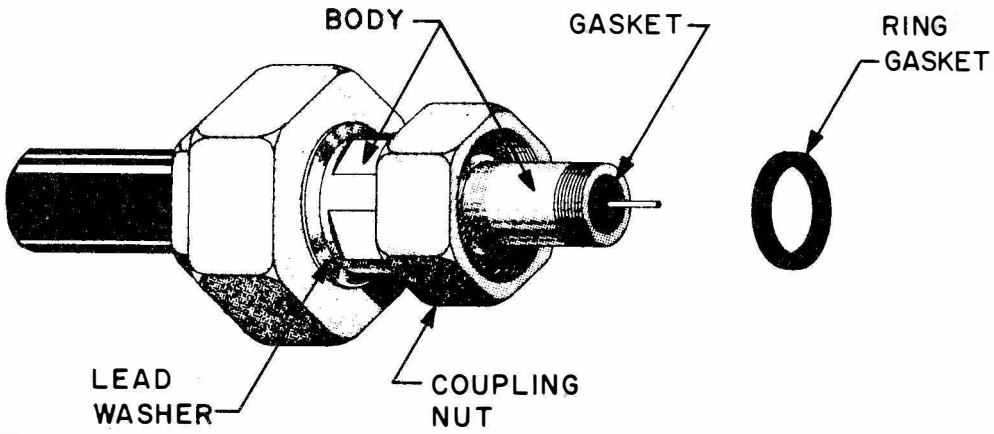


FIGURE 4.

Place lead washer over dielectric and against the armor coupling gland. Push body through coupling nut and over dielectric. Holding armor coupling gland stationary, tighten body securely against lead washer. Fit gasket over inner conductor and tightly against dielectric. Lubricate ring gasket with Insulating Compound, Electrical, Silicone, stock number G-5970-159-1598, and place it in position against body, within coupling nut.

ASSEMBLY INSTRUCTION NUMBER 28, Sheet 3 of 4
END SEAL Watertight
UG-1170/U for use with RG-85A/U Cable

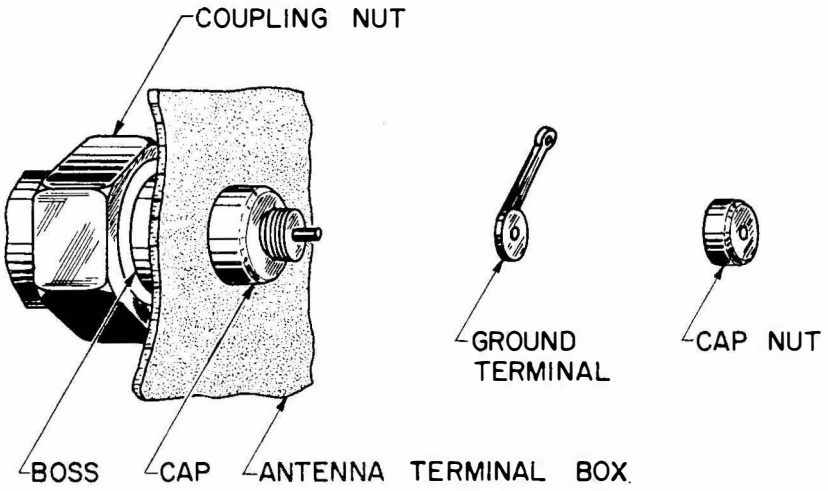


FIGURE 5.

Slide boss over body, engage with coupling nut threads, and tighten. Insert body through 1-1/8" opening in terminal box. Fit cap to body end inside box and, holding cable and end seal assembly in position, tighten.

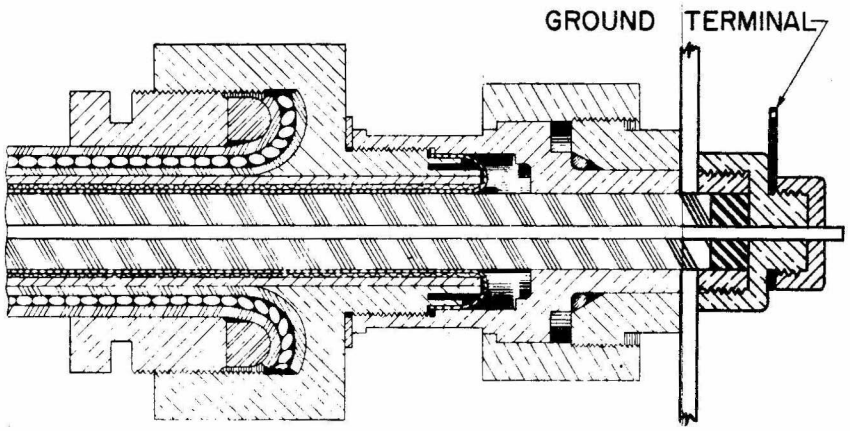
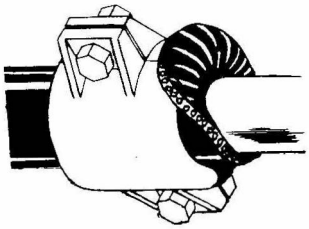
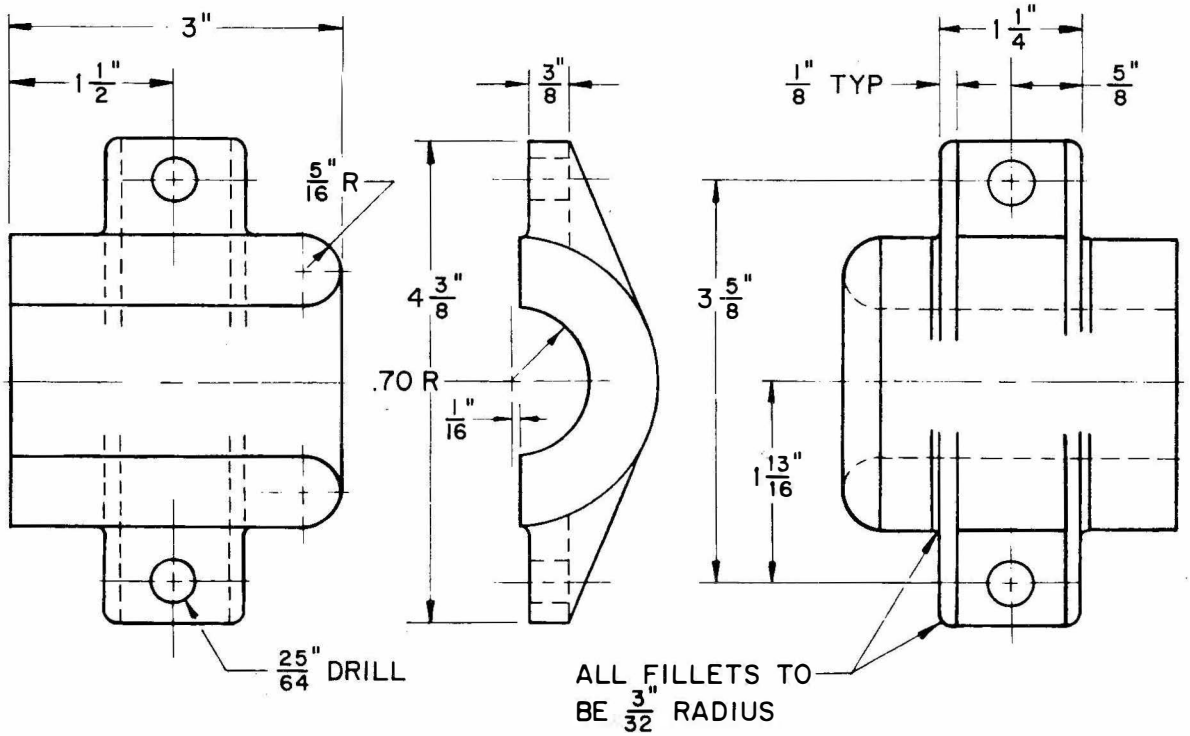


FIGURE 6.

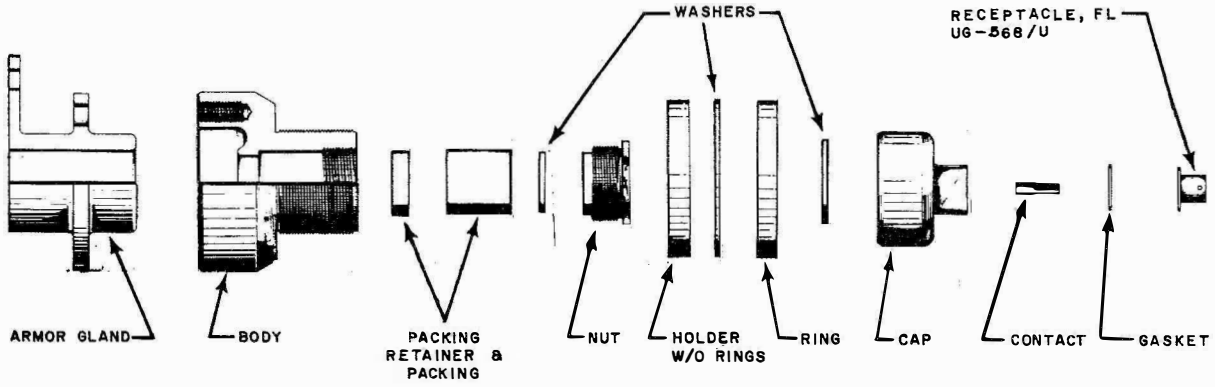
Place ground terminal and cap nut. Tighten nut holding ground terminal in position.

ASSEMBLY INSTRUCTION NUMBER 28, Sheet 4 of 4
FORMING CLAMP
for use with RG-85A/U Cable





ASSEMBLY INSTRUCTION NUMBER 29, Sheet 1 of 3
END SEAL Panel Mounted
MX-1901/U for use with RG-85A/U Cable



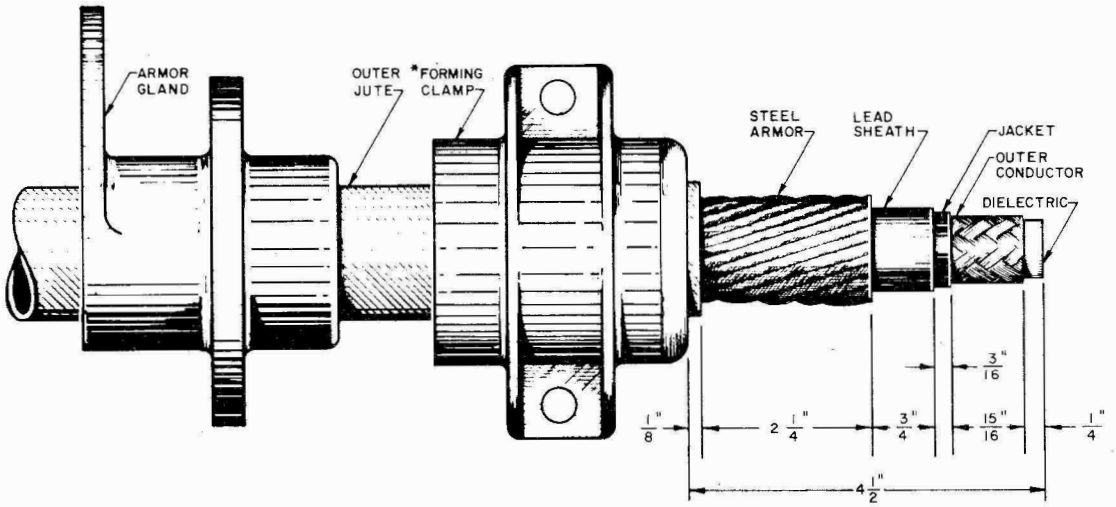


FIGURE 1.

Slide armor gland onto cable. Secure *forming clamp 4-1/2" from end of cable. Cut outer jute serving 4-3/8" from cable end. Cut steel armor and inner jute serving 2-1/8" from cable end, exposing the lead sheath. Cut lead sheath, jacket, outer conductor and dielectric to dimensions shown.

ORIGINAL

ASSEMBLY INSTRUCTION NUMBER 29, Sheet 2 of 3
END SEAL Panel Mounted
MX-1901/U for use with RG-85A/U Cable

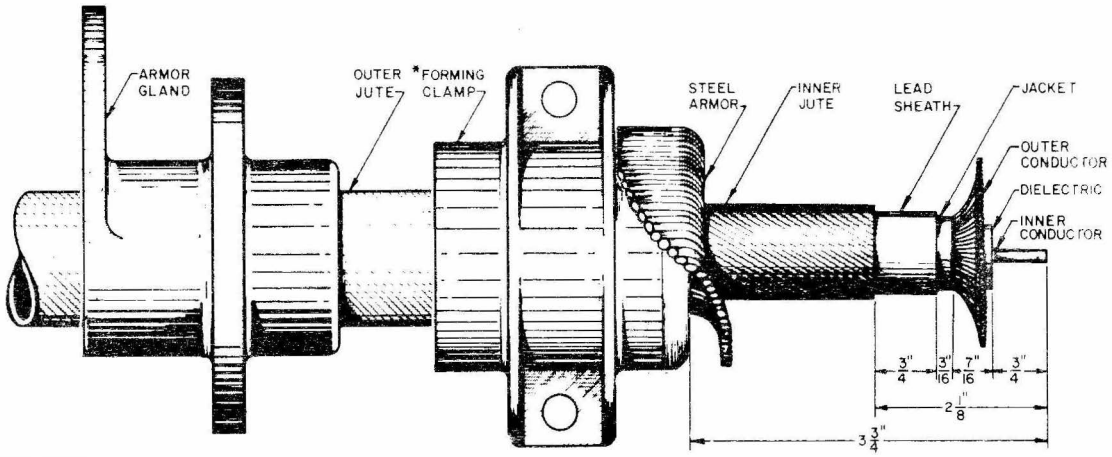


FIGURE 2.

Move edge of forming clamp to 3-3/4" from cable end. Form steel armor around end of armor clamp. Comb outer conductor braid and bend away from dielectric. Cut dielectric 3/4" from cable end.

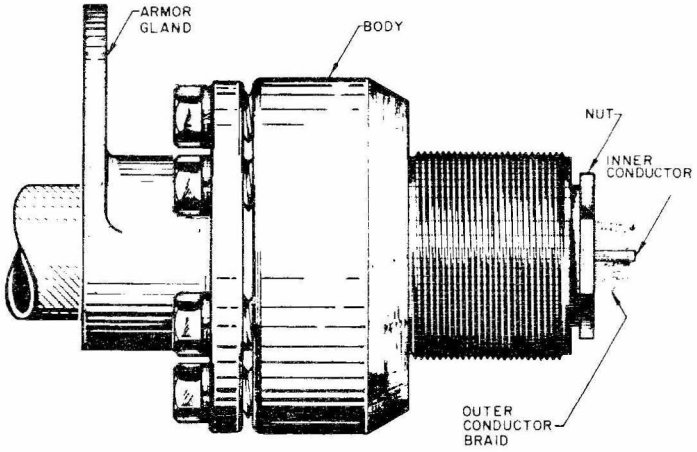


FIGURE 3.

Remove forming clamp. Slide armor gland into contact with the formed armor. Bend outer conductor braid toward inner conductor. Place body over lead sheath and push it against the rounded side of the formed armor trimming inner jute. Insert the 6 hex cap screws, with lockwashers, and turn finger tight. Slide the packing retainer ring and neoprene packing sleeve over the lead sheath, under the body. Place brass washer over lead sheath, against the neoprene packing. Place the nut over the outer conductor braid and engage with body, turning nut finger tight. Wrench tighten the 6 hex head cap screws securing armor gland and body. Holding cable assembly stationary, wrench tighten nut.

ASSEMBLY INSTRUCTION NUMBER 29, Sheet 3 of 3
END SEAL Panel Mounted
MX-1901/U for use with RG-85A/U Cable

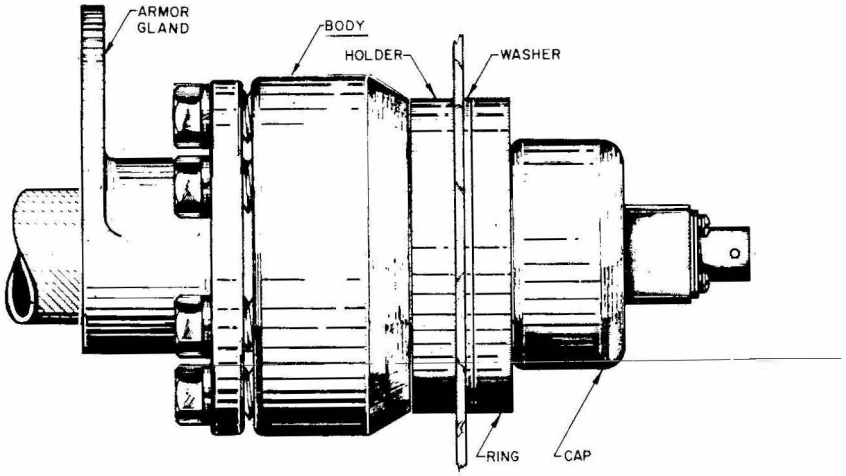


FIGURE 4.

Lubricate O-rings of holder with Insulating Compound, Electrical, Silicone, stock number G-5970-159-1598. Slide holder over body. Insert body in enclosure, or panel, opening. Place washer over body on other side of panel. Add threaded ring and, holding cable and end seal assembly stationary and in position, tighten. Form outer conductor braid against nut, trimming excess. Place washer against braid. Place cap over washer, and tighten.

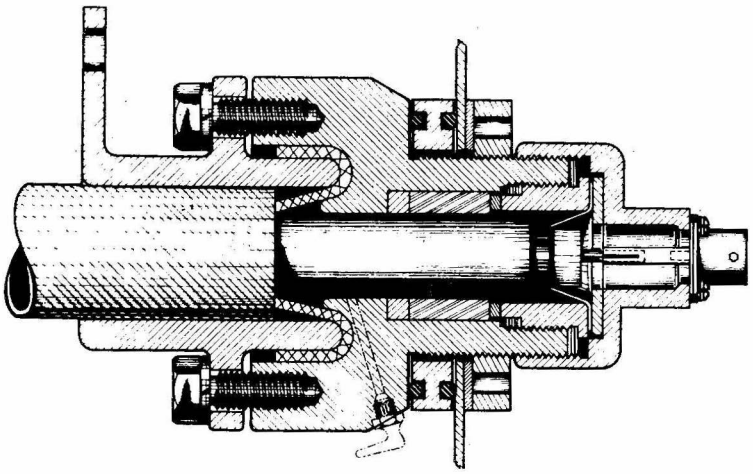


Figure 5.

Insert pin of receptacle UG-568/U into 1/8" diameter hole of contact and solder. Round end of inner conductor. Fit square neoprene gasket, and receptacle UG-568/U onto end of cap, female end of contact sliding over inner conductor of cable. Place 4 lock washers and binder head machine screws and tighten. Install hydraulic lubrication fittings into tapped openings in body and fill body inner space with Insulating Compound, Electrical, Silicone, stock number G-5970-159-1598.

* See Assembly Instruction Number 28. Sheet 4.

5-3. COAXIAL CABLE INSPECTION AND TESTING. - In many cases, coaxial cables are kept in stock for long periods of time. Although these cables are subjected to all acceptance tests, they may change characteristics due to improper storing or being left exposed in the weather for long periods of time. For this reason, it is standard practice to inspect and to check insulation resistance, attenuation (if possible) and dielectric strength of all cables before and after installation. The oily plasticizer in old cables may have dried out, causing the cable to be less flexible with the possibility of cracking. This also includes previously installed cables which may be used for new or altered installations.

a. **CABLES WITHOUT CONNECTORS INSTALLED.** - Before installation of the fittings each cable must be inspected and tested. This must be done in order to assure that the cable has not lost any of its characteristics because of damage by handling or prolonged storage.

(1) Jacket Inspection. - Inspect the armor and the jacket to make sure that it is not cut or damaged. This is especially true of cables exposed to the weather, such as antenna mast runs, etc. Any small cut in the jacket will allow water into the cable and short the cable at the connector after installation.

(2) Insulation Tests. - The insulation resistance test shall be conducted by use of a constant voltage megger with an output of 500 or 1000 volts. The dielectric strength test shall be conducted with specially designed high voltage equipment.

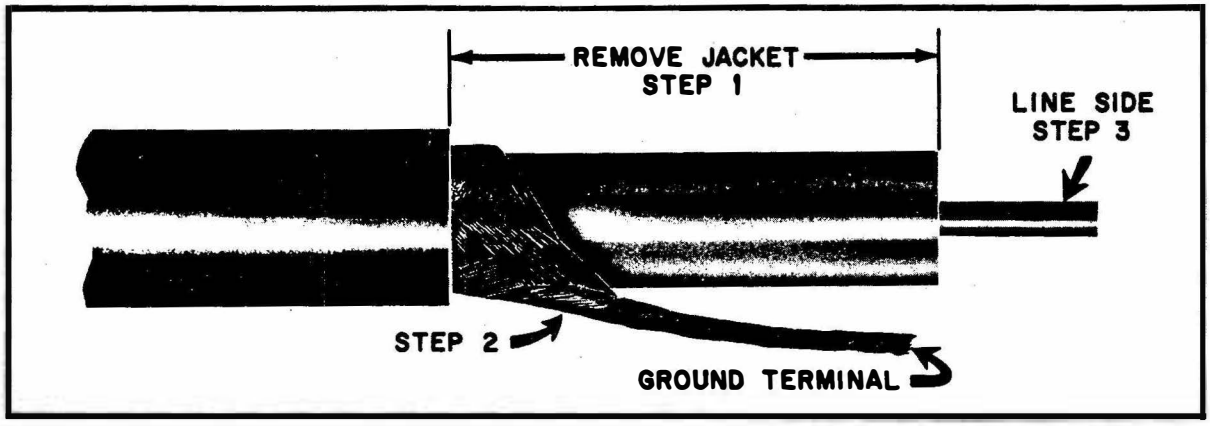
WARNING

Voltages generated by equipment used in these tests are dangerous. All safety precautions must be observed to protect personnel and equipment.

(a) Insulation Resistance Test. - Low insulation resistances, by permitting the flow of large leakage currents, can disturb the operation of circuits intended to be isolated. Excessive leakage currents can eventually lead to deterioration of the insulation by heating or by direct-current electrolysis. Insulation resistance measurements should not be considered the equivalent of dielectric strength tests. A clean, dry insulation may have a high insulation resistance and yet possess a mechanical fault that would cause failure in the dielectric strength test. Conversely, a dirty, deteriorated insulation with a low insulation resistance might not break down under high potential. This test is helpful in determining the extent to which the insulation has been affected by deteriorative influences such as heat, moisture, dirt, oxidation or loss of volatile materials. Tables 3-1 and 3-2 show acceptable insulation resistance values for polyethylene, polytetrafluoroethylene (teflon), and synthetic rubber insulated cables. While values below these will probably do for low frequency applications, the values given are necessary for proper cable operation at radar frequencies. The test procedure should be performed as follows:

Step 1. - Cut back the jacket at least two inches.

Step 2. - Comb out the braid, form a pigtail, and connect to the ground terminal of the megger.



~~Figure 3-1.~~ ~~Insulation Resistance Test.~~

Step 3. - Connect the center conductor to the line side of the megger.

Step 4. - Apply the 500 or 1000 volts for a period of one minute and check the resistance reading with that of table 3-1 or 3-2.

TABLE 3-1. Polyethylene and Teflon Insulation Resistance

Length (Ft.)	Insulation Resistance (Megohms)
100	40,000
200	20,000
500	8,000
1,000	4,000

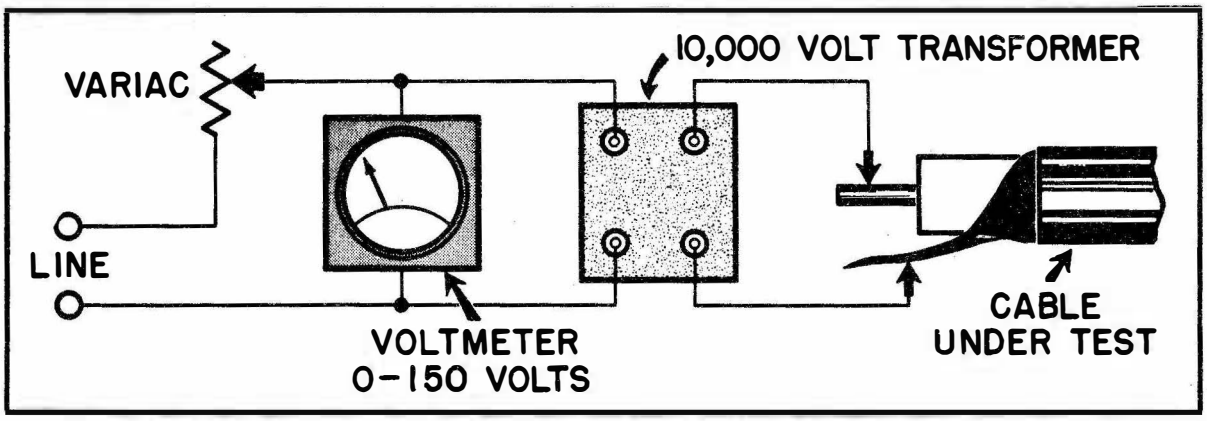
TABLE 3-2. Synthetic Rubber Insulation Resistance

Length	Insulation Resistance (megohms)	
	60 F (15C)	68 F (20C)
10	50,000	35,000
100	5,000	3,500
1000	500	350

(b) Dielectric Strength Tests. - For dielectric strength measurements, the working values should not be greater than those listed for each cable in section 5-2. The equipment used for this test is a standard 10,000 volt, 60 cycles transformer with a voltmeter (calibrated for the range) inserted in the primary circuit of the transformer. Observe all the precautions required when working with high voltages. Apply only that voltage listed for the particular cable. Once the cable is broken down, the insulation resistance goes down to a low value and the cable is useless. Proceed with the test as follows:

Step 1. – Cut back the jacket a distance of 1/2 inch per 1000 volts expected to be applied.

Step 2. – Arrange the test equipment as shown in figure 3-2.



Step 3. – Comb out the braid, form pigtail, and connect to the ground terminal of the transformer.

Step 4. – Connect the high voltage lead to the center conductor. Make sure that there is sufficient clearance between the two terminals, and that no other metal or other conducting surfaces are in the vicinity.

Step 5. – Adjust the variac to the desired voltage on the voltmeter. This reading may be determined by the following equation:

$$V_1 = \frac{N_1 V_2}{N_2}$$

Where: N_1 = turns in primary,
N_2 = turns in secondary,
and V_2 = dielectric test voltage.

NOTE

Apply this voltage at the rate of 200-300 volts per second for voltages up to 2,000 volts, and 500 volts per second for cables taking higher voltages. When the cable dielectric is faulty, ap-

plication of the test voltage will result in either disruptive discharge or deterioration. Disruptive discharge is evidenced by flashover (surface discharge), sparkover (air discharge), or breakdown (puncture discharge).

Step 6. – When the maximum voltage for the cable (as listed in section 5-2) is reached and breakdown has not occured, the cable may be considered acceptable.

WARNING

The test equipment provides dangerous high voltage. If the other end of the cable should be remote, it should be clearly marked "HIGH VOLTAGE". All safety precautions must be observed in order to protect both the worker and equipment.

(3) Attenuation Measurement. - Attenuation per unit length is defined as the logarithmic decrement in transmitted power. The attenuation, expressed in db per 100 feet, shall be measured at a sufficiently low power level that the resulting temperature rise will be negligible. An acceptable method for measuring attenuation is illustrated in the block diagram. Figure 3-1.

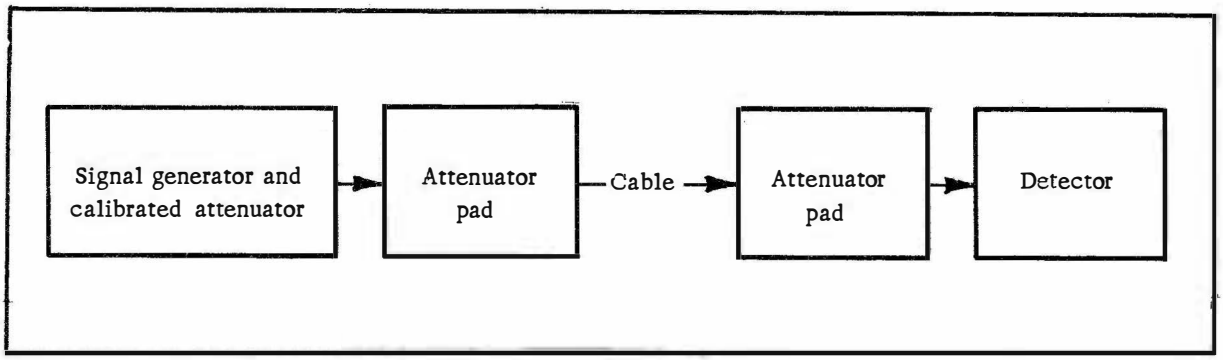


Figure 3-3. Attenuation Measurement.

In the block diagram, a suitable length of cable with an attenuation of at least 3 db is inserted between the connectors. The signal generator and calibrated attenuator are adjusted to produce a reasonable indication at the detector. The detector reading is noted, and the calibrated attenuator output level is recorded. The cable under test is then withdrawn and the circuit completed with the connectors (or a very short length of cable). The calibrated attenuator is readjusted to reproduce the original reading at the detector, and the attenuator output level is again recorded. Attenuation is then computed as follows:

$$A = D \frac{100}{L}$$

where:
A = attenuation in db per 100 feet.
D = difference in calibrated attenuator readings in db.
L = length of cable under test in feet.

The attenuation shall not exceed that shown on the Cable Data Sheets, Sub-section 5-2, FLEXIBLE COAXIAL CABLES AND CONNECTORS. For measurements at frequencies of 400 mc or less, the characteristic impedance of the attenuator pads and connectors shall preferably be the same as that of the cable under test. For measurements at frequencies of 1,000 mc or above, the attenuator pads, connectors, and test cable shall be matched to the same characteristic impedance. Both pads shall be high enough in attenuation value to minimize the error caused by any mismatch of the signal generator and detector. For the majority of measurements, it is recommended that the attenuation of each pad be approximately 10 db. Tuning stubs may be used in the circuit for impedance matching purposes. Any other approved method may be used in lieu of that described above.

b. Connector Testing. - Before a connector is installed on a cable, it should be given an insulation resistance test to make certain that it is not defective. Small coaxial fittings, in which the center conductor is not readily accessible, may be tested by use of a mating fitting converted to a test jig as shown in figure 3-3.

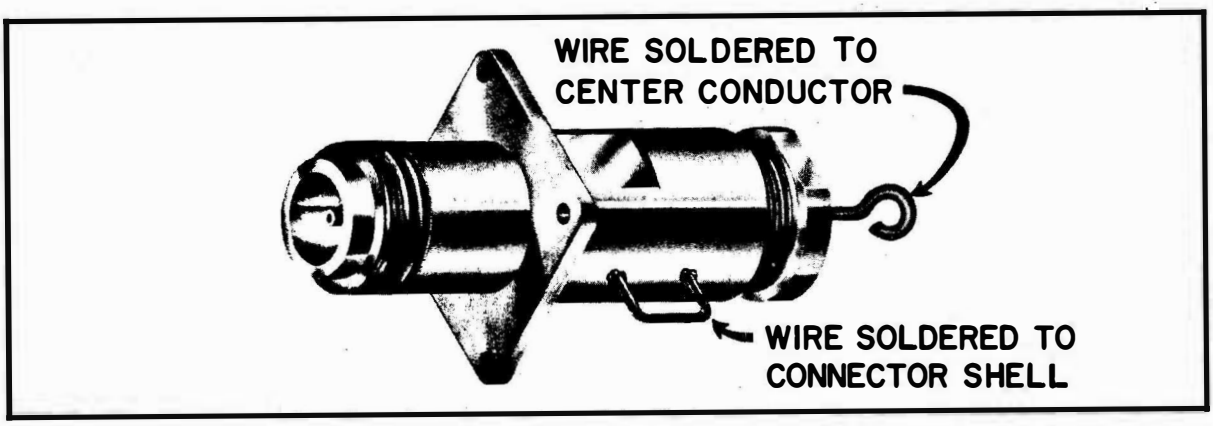


Figure 3-4. Connector Test Jig.

NOTE

If corona is present, it may be due to a faulty connector, a bad assembly, a small air space in the connector, a loose connection, a loose tape wrapping, etc. The ceramic type plugs usually operate with some corona between the inner and outer contacts along the ceramic inserts. This corona does not produce any bad effects except potential noise (if the assembly is not tight) because the ceramic materials are not damaged by corona. Rubber, however, soon breaks down under corona. Therefore, it is important that great care be taken and that proper installation practices are observed when installing pulse cables and connectors.

c. Cable Testing-Connectors Installed. - When the cable installation is complete and the connectors have been installed, check insulation resistance of the cable to determine whether the connectors have been properly installed and then test for conductor continuity. Connect the outer conductor to the inner conductor at one end of the cable and check across the conductors at the other end with a suitable continuity checker.

5-5. PRESSUREPROOF FITTINGS.

Pressureproof fittings are designed to maintain a watertight seal around RF cables without adversely affecting electrical characteristics of the transmission lines. To accomplish the purposes for which they are designed, assembly techniques must be closely adhered to.

a. **O-Ring Watertight Seals.** - Seals employed in pressureproof fittings are precision made O-rings. The O-ring is installed in an O-ring groove and the cross section of the O-ring is given an initial diametral squeeze of 10 to 25 percent by the mating flanges or other parts of a pressureproof fitting. At low pressure the diametral squeeze and material resilience of the O-ring furnishes the necessary seal. At higher pressures, force is applied to the O-ring and the resulting distortion augments the seal. See figures 5-1 through 5-4.

Additional information may be found in NAVSHIPS 93793 and Bureau of Ships Instruction 9670.103.

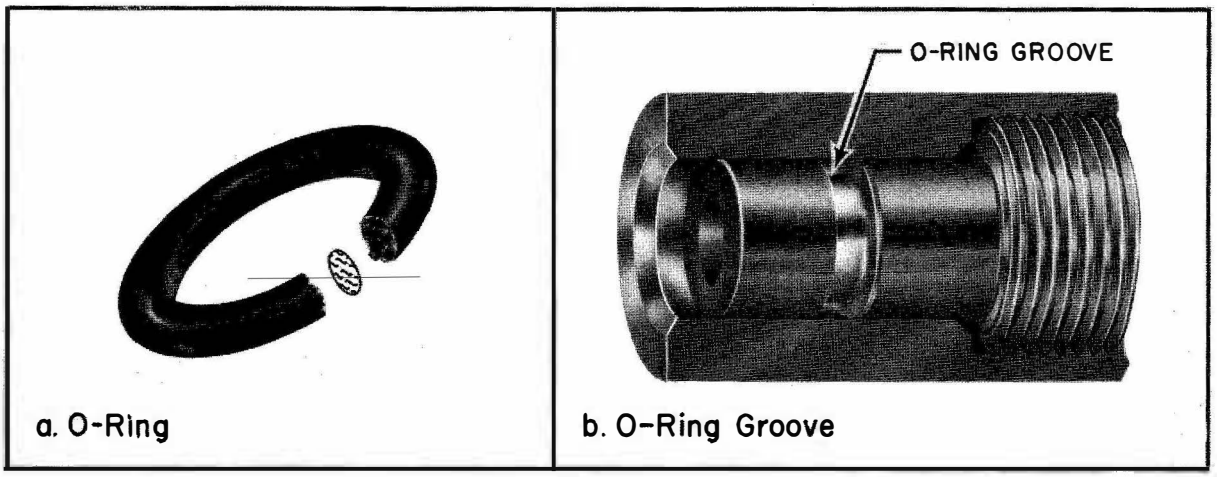


Figure 5-1. O-Ring and O-Ring Groove

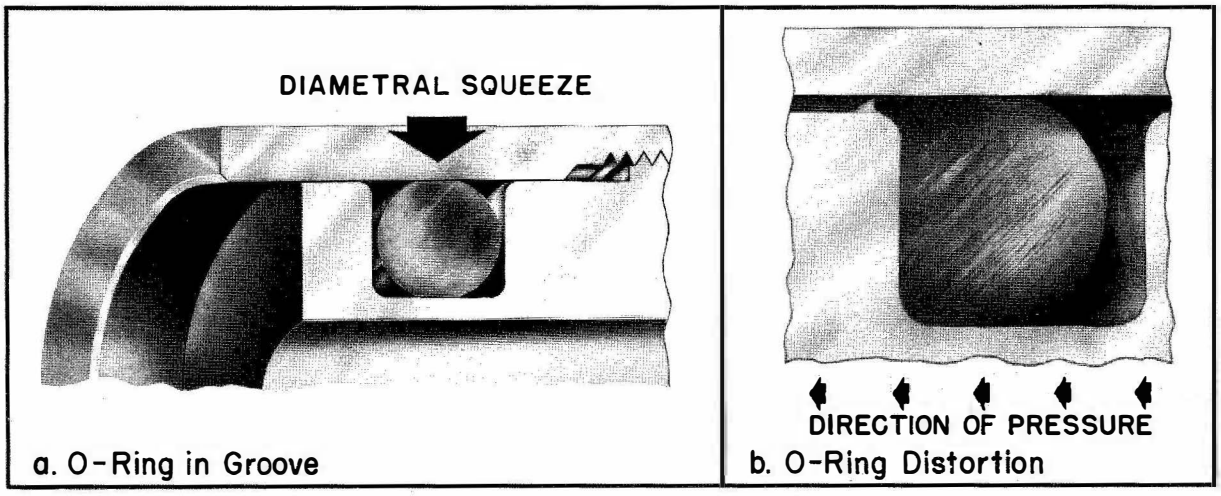


Figure 5-2. O-Ring Seal

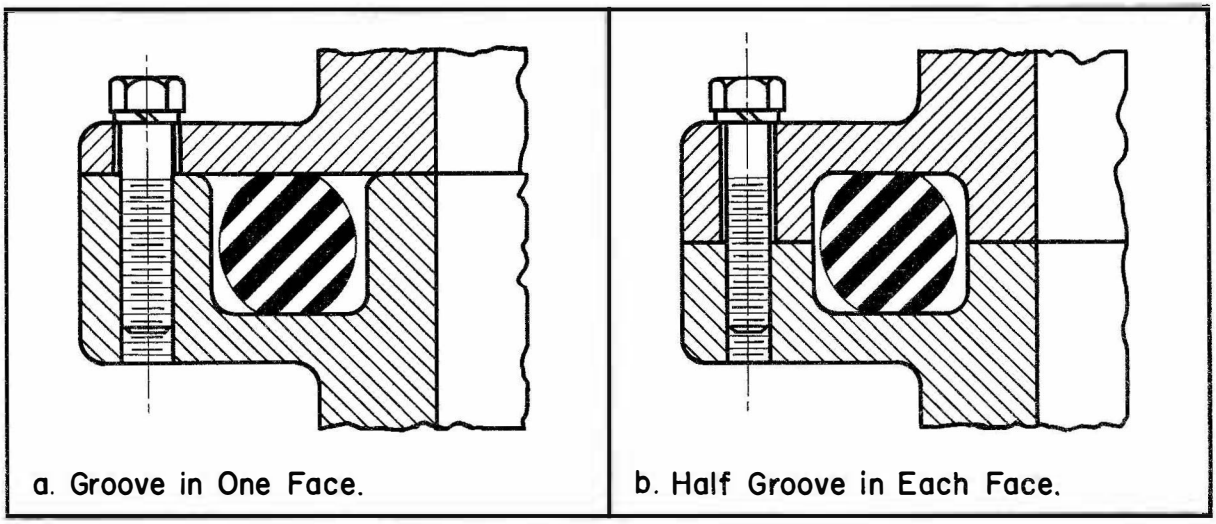


Figure 5-3. Static Flange Or Face Seal

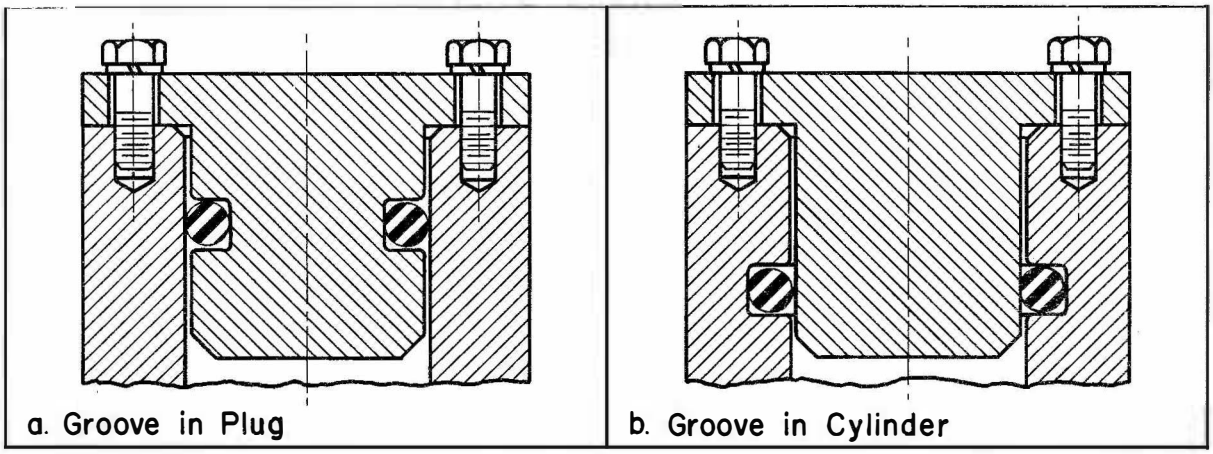


Figure 5-4. Static Radial Seal

(1) O-Ring Material. - O-rings are made from a variety of materials, depending upon usage. O-rings used in pressureproof fittings are made from material conforming to MIL-P-5516B, Class B. This material is a Buna "N" (Nitrile) synthetic rubber and is resistant to most oils, greases, and fuels. It has a low compression set and a hardness of approximately 70 on the Shore "A" durometer scale. The Shore "A" durometer scale is a standard measure of the hardness of rubber. A reading of 70 on this scale is a medium hardness for rubber. These O-rings are suitable for use throughout a temperature range of -65° F. to 160° F.

CAUTION

O-rings made of Buna "N" (Nitrile) should not be exposed to sunlight or ozone for prolonged periods of time. They should not be stored closer than six feet from an operating electric motor. When they have been exposed to the above for prolonged periods of time, they should be discarded. When replacing an RF cable in a pressureproof fitting, use a new O-ring.

(2) O-Ring Identification and Sizes. - O-rings conforming to MIL-P-5516B and drawings AN 6227 and AN 6230 are identified by a color code which indicates their designed usage and the manufacturer. Coding is accomplished by a series of colored dots, arranged in a clockwise order around the O-ring. The first dot, reading in a clockwise direction, will be blue to indicate usage as hydraulic and pneumatic seals. Subsequent dots used in combination with the first blue dot identify the manufacturer. The manufacturer's colors are listed in QPL-5516.

Most O-rings used in pressureproof fittings are taken from the sizes listed on drawings AN 6227 and AN 6230. The dash number following the AN numbers refer to the size of the O-rings. All sizes of O-rings listed on AN 6227 and AN 6230 are listed in Group 53, Part 9, Section A of the Navy Stock List of General Stores.

CAUTION

In RF pressureproof fittings, do not use O-rings other than those designed for the particular fitting.

(3) Visual Inspection of O-Rings. - O-rings should be visually inspected for dents, gouges, protrusions, peeling, and foreign matter before installation. Failure to detect these defects will reduce the effectiveness of the seal.

CAUTION

The O-ring is a precision part and should be handled with care.

(4) Lubrication of O-rings. - O-rings should be lubricated prior to being installed to facilitate assembly of the fitting. For this purpose Insulating Compound, Electrical, Silicone, stock number N-5970-159-1598 is used.

CAUTION

Grease should not be used as an O-ring lubricant because of the deteriorating effects some greases have on O-ring materials.

b. O-Ring Grooves. - The O-ring groove in a pressureproof fitting is rectangular in shape with a groove area approximately 15 percent greater than the cross-section area of the O-ring. The depth of the groove is such that when the surfaces that contain the O-ring are assembled the O-ring is given the required diametral squeeze to effect a watertight seal at low pressure. The outer and inner corners of the groove are rounded to prevent possible cutting of the O-ring and to minimize mechanical stress concentrations (see figure 5-5). The hull fitting hole is chamfered to prevent pinching off some of the O-ring material during assembly (see figures 5-6 and 5-7).

CAUTION

The surface finish on all sides of the groove and other sealing surfaces should be checked before installation to assure a maximum roughness of 32 microinches or less (see figure 5-7).

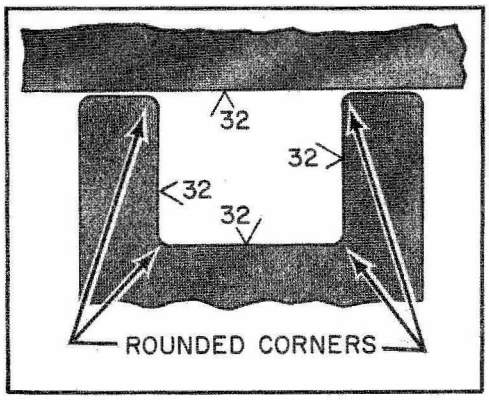


Figure 5-5 Groove Design

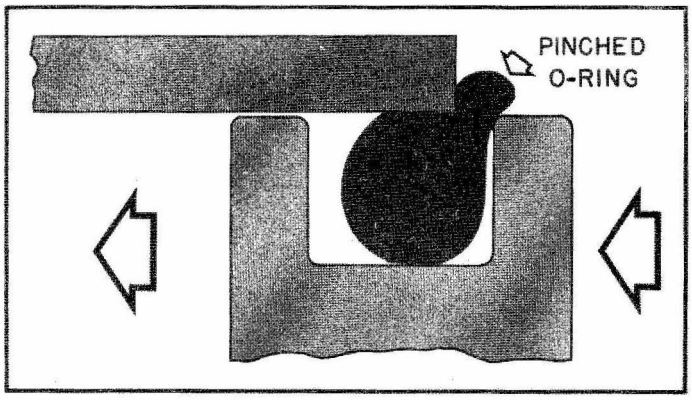


Figure 5-6 Pinched O-Ring

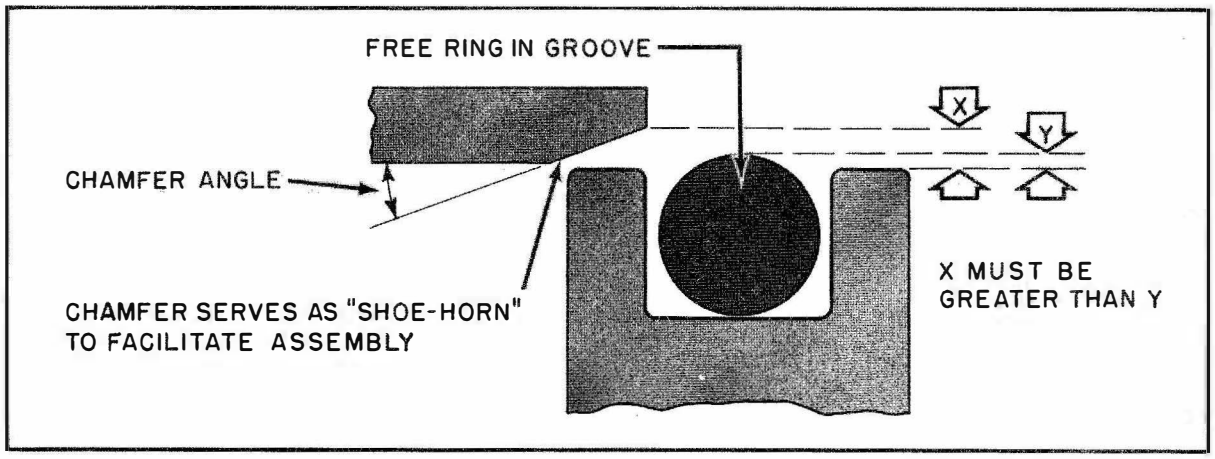


Figure 5-7. Hull Fitting Chamfer

c. ASSEMBLY TOOLS. – Tools Recommended for use in assembly of pressureproof cable fittings are listed in table 5-1. Other useful tools not available in Navy stock but obtainable commercially include a pistol-grip keyhole hacksaw (for cutting cable in confined spaces), straight toe nail scissors (such as Wiss Number 603-1/2 for trimming braid), and a microfinish comparator equivalent to Fairfield Development Laboratories, Inc., model S-22, 190 Henry Street, Stanford, Conn.

Table 5-1. PRESSUREPROOF FITTING ASSEMBLY TOOLS

Item	Federal Stock No
Scissors, Electrician's	CX5110-255-0420
Frame, Hand Hacksaw	CX5110-289-9657
Blade, Hand Hacksaw 10", 24T	CX5110-237-8107
Blade, Hand Hacksaw 10", 32T	CX5110-142-4928
File, Hand, Flat 6" Smooth Cut	CX5110-234-6532
Pliers, Diagonal Cutting 5-1/2"	CX5110-542-1350
Wrench, Basin	CX5120-203-4832
Key Set, Socket Head Screw	CX5120-288-8732
Pliers, Lineman's 8"	CX5120-239-8251
Knife, Pocket, General Purpose	CX7340-162-2205
Knife, Pocket, Electrician's	CX7340-223-7129
Soldering Iron, Electric, Thermostatic	Y3439-372-0664
Tip, Electric Soldering Iron	Y3439-369-4886
Tip, Electric Soldering Iron	Y3439-369-4887
TL-323/U Wrench for UG-154/U	CX5120-699-3335
Dresser, Lead Pipe	HH5120-293-2945
Pliers, Retaining Ring, Internal - Flat Jaw	CX5120-293-0048
Wrench Set, Crowfoot, Ratcheting, Set #5	CX5120-293-0009
Socket, Crowfoot Wrench 1-1/4"	CX5120-277-6627
Socket, Crowfoot Wrench Head 1-5/8"	CX5120-248-6651
Wrench, Open End, 1-1/2	CX5120-203-4804
Wrench, Open End, 1-5/8	CX5120-203-4802
Wrench, Open End, 5/8	CX5120-277-1258

d. ASSEMBLY OF FITTINGS. - The assembly instructions of cables in pressureproof fittings that follow should be carried out in every detail. The omission of any step during assembly will result in failure of the installation. The following CAUTIONS are applicable to the assembly of all pressureproof fittings.

CAUTION

Do not solder the outer conductor or shield braid of flexible RF cables to clamps, washers, or any other part when assembling the connector or pressureproof fittings. Such soldering invariably results in melting a portion of the cable dielectric which may cause a mismatch in the cable. However, the more serious damage from melting the dielectric will be the loss of watertight seal.

CAUTION

When cutting around the jacket, the utmost care should be exercised to ensure that the outer conductor braid is not cut. A slight cut in a strand creates the possibility that the strand will break off when, in later steps, the strands are fanned out and folded back. A single broken strand may reduce the operational efficiency a negligible amount; however, it is possible that several broken strands can reduce this to an intolerable amount and change the characteristic impedance of the cable.

(1) MX-2326/U DETAILED ASSEMBLY. – This fitting will accommodate any coaxial cables having a jacket OD of 0.855 inch minimum -0.910 inch maximum and a dielectric OD of 0.665 inch minimum -0.695 inch maximum. A pressure hull entry hole, 1.5 inches in diameter, is required for installation of the fitting.

Assembled and expolded views are shown in figures 5-8a and 5-8b. In these views the various parts are assigned piece numbers which are used for reference in the assembly instructions. Table 5-2 lists the stock numbers for the required parts and material.

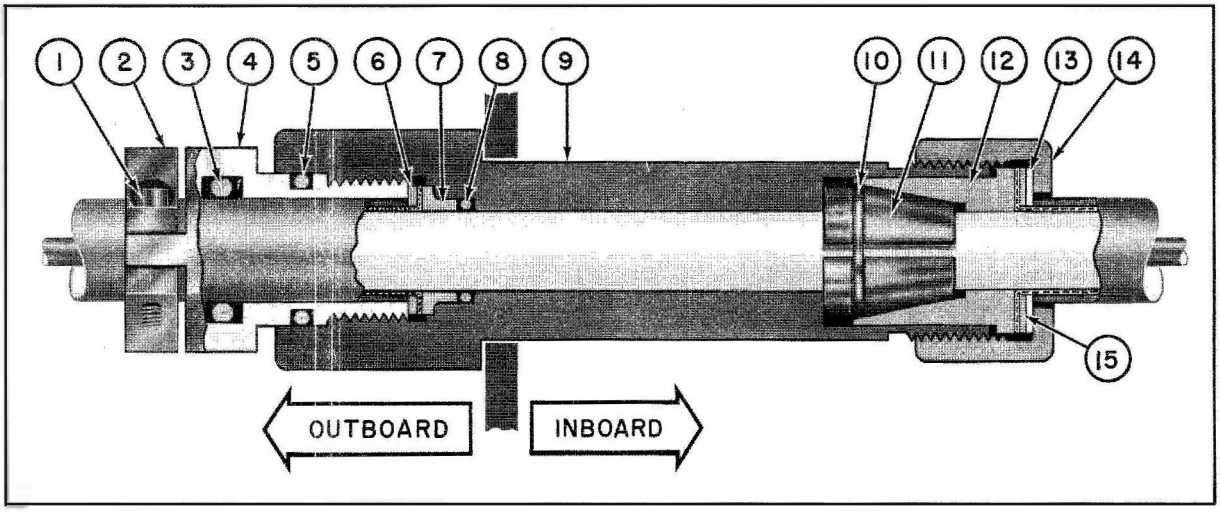


Figure 5-8a. MX-2326U Assembled

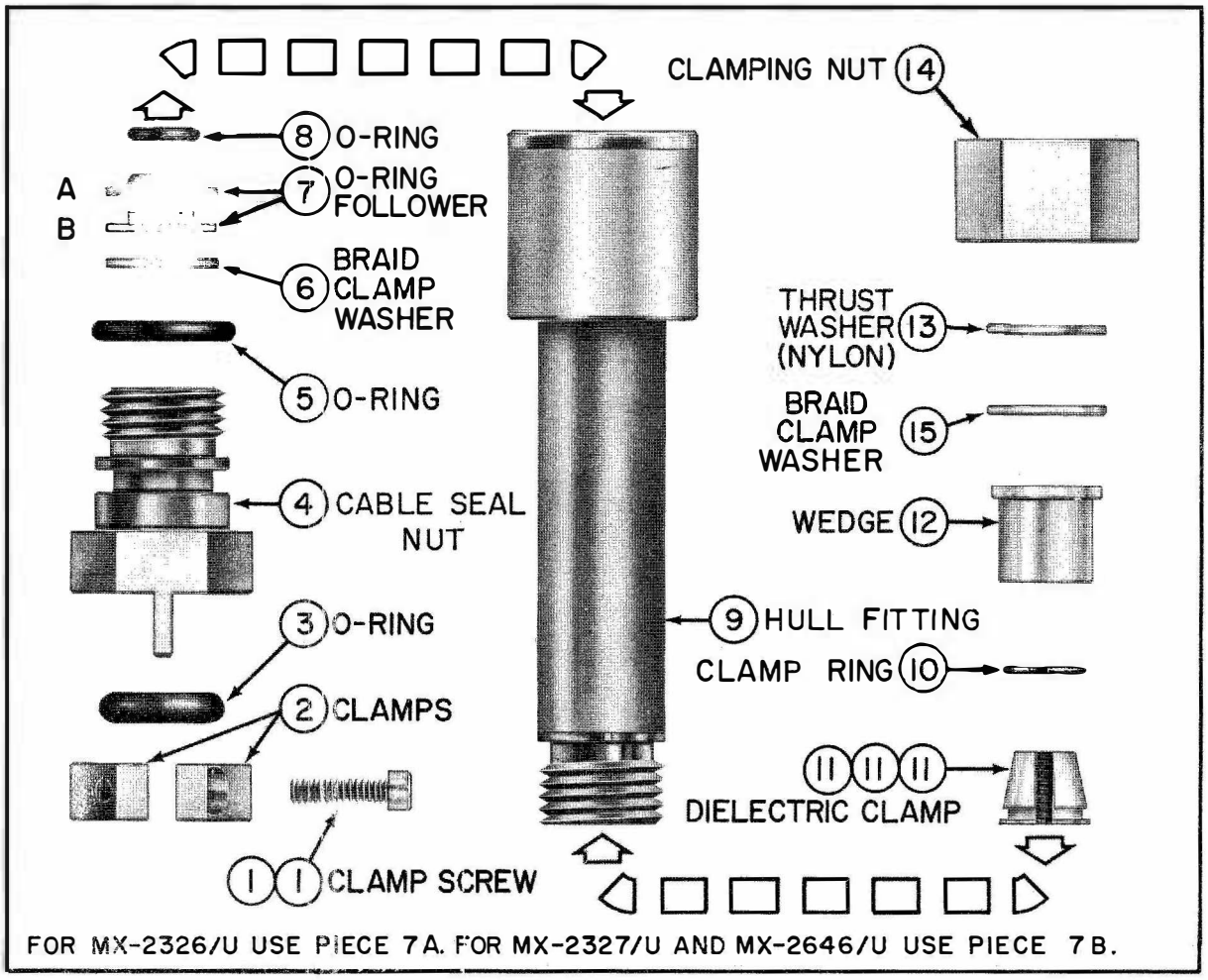


Figure 5-8b. MX-2326/U, MX-2327/U & MX-2646/U Exploded

TABLE 5-2. MX-2326/U ASSEMBLY STOCK NUMBERS

PC. NO.	ITEM	FEDERAL STOCK NO.
9	MX-2326/U Hull Fitting (includes pieces 1 through 15)	N5975-581-4598
8	AN 6227-13, Packing, Preformed, O-Ring	KZ5330-641-0642
5	AN 6227-20, Packing, Preformed, O-Ring	KZ5330-198-6176
3	REA10083-15 Packing, Preformed, O-Ring	KZ5330-878-4226
	Cable Seal Nut consisting of pieces	N5985-893-0859
	1, 2, 4, 6 and 7 Assembly consisting of pieces 10&11	N5340-616-6611

(a) Cable and Fitting Installation. - Install the cable run in accordance with section 5-4, from the outboard termination down to the area where the pressure hull is to be penetrated. Determine the length of cable which will be required inboard between the pressureproof fitting and the cable termination. Allow for slack and loss during assembly. Weld the hull fitting of the pressureproof fitting, piece 9, in the pressure hull in accordance with section 8-5, then complete the following steps.

Step 1. - Visually inspect all parts that make up the complete assembly for damage, replacing any part found to be defective. Use new O-rings, pieces 3, 5, and 8, when replacing a cable in a pressureproof fitting.

Step 2. - Cut around the jacket at the point where the jacket will terminate inside the outboard end of the hull fitting and at a point two inches toward the inboard end of the cable. Make a cut the length of the 2 inch section and remove the jacket. Figure 5-8c illustrates this step.

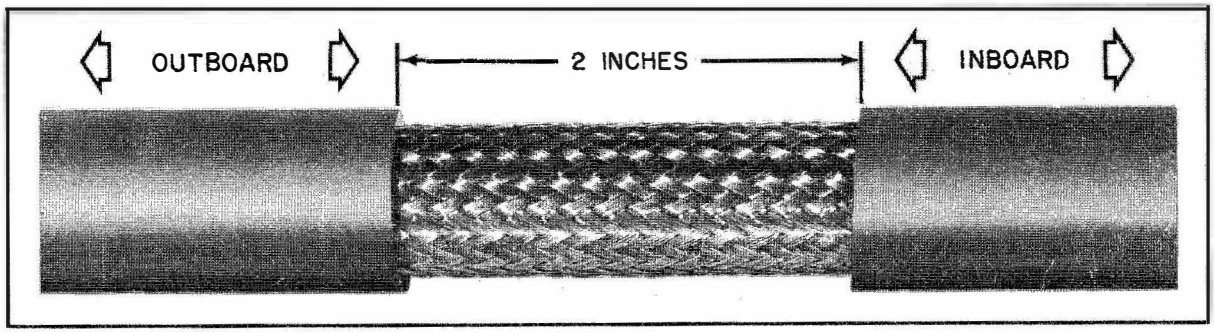


Figure 5-8c. Cable Section, Jacket Removed

Step 3. - Cut around the jacket at a point 4 inches from the terminating end of the cable on the inboard side. Make a cut the length of the 4.0 inch section and remove the jacket. Cut around the outer conductor braid at a point 3.0 inches from the terminating end and remove this section. Fold the remaining outer conductor braid back onto the jacket and tape tightly to the jacket. Figure 5-8d illustrates this step.

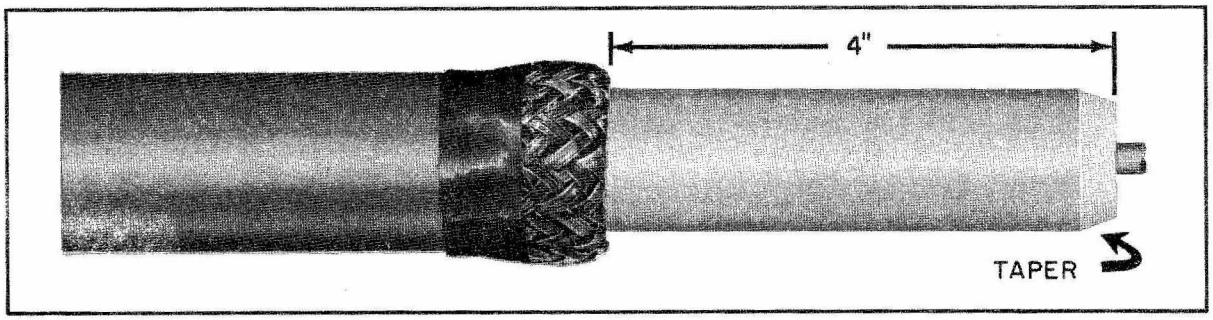


Figure 5-8d. Inboard End of Cable

Step 4. - Make a bulge in the outer conductor braid where the cable is to pass through the hull fitting sliding the inboard section of jacket and braid toward the outboard section of cable (see figure 5-8e). Cut the bulged braid

at midpoint with sharp scissors and fold the braid back onto the jacket of the inboard section and tape down (see figure 5-8f). Slide the inboard section of the outer braid and jacket off the cable dielectric. Save this for replacement on the dielectric when completing the assembly of the pressureproof fitting on the inboard side (step 10). In the case of cables having two outer conductor braids, remove the inner braid and discard it.

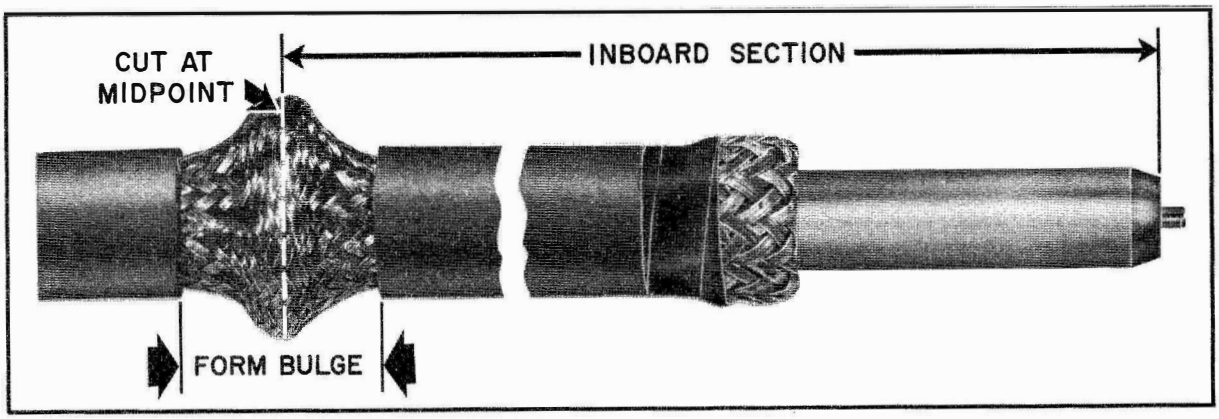


Figure 5-8e Bulge in Braid

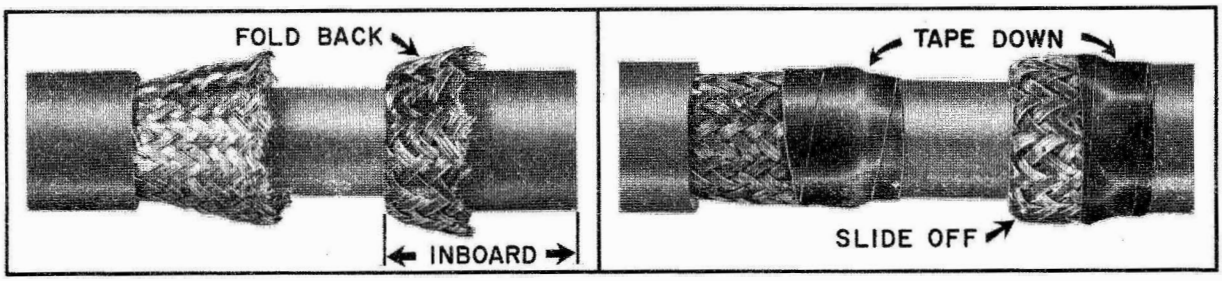


Figure 5-8f. Removing Braid and Jacket

Step 5. - Smooth down the braid remaining on the outboard cable and tape tightly against the dielectric using a minimum of tape (see figure 5-8f).

Step 6. - Referring to figures 5-8a and 5-8b for piece number identification, loosen the screws, piece 1, in the cable clamps, piece 2, on the cable seal nut. Coat each O-ring with insulating compound N5970 159-1598 and install the O-ring, piece 3, in the internal groove and O-ring, piece 5, in the external groove of the cable seal nut, piece 4, exercising care to prevent damage of the O-ring by threads. Bevel jacket as shown in figure 5-10d. Slide the cable seal nut, piece 4, clamp end first, over the cable dielectric and onto the jacket, trim the end of the jacket square using the end of the cable seal nut as a guide (see figure 5-8g). Slide the cable seal nut up the cable out of the way as shown in figure 5-8h.

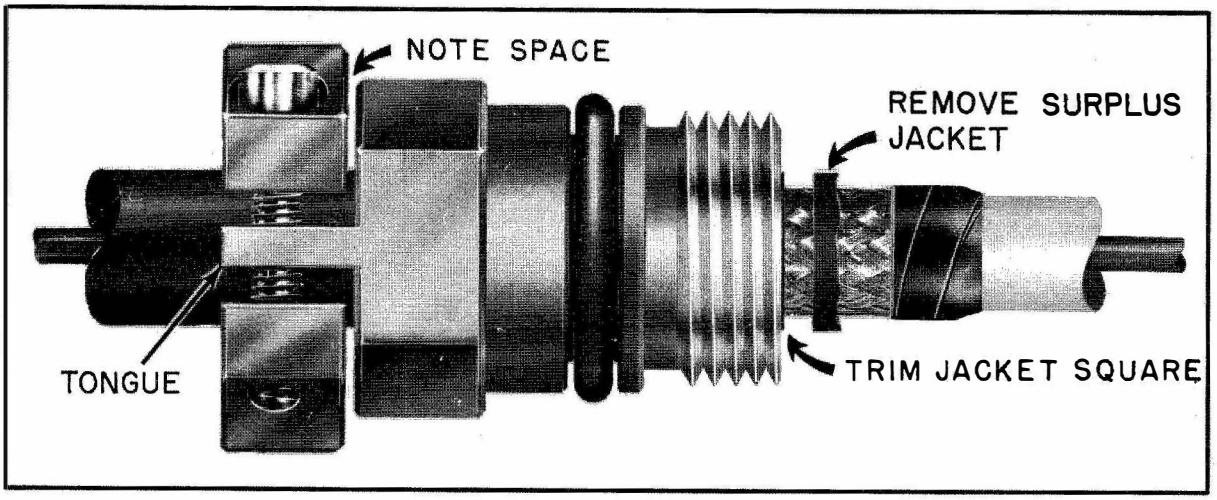


Figure 5-8g. Trimming Jacket

Step 7. - Slide the braid clamp washer, piece 6, onto the cable dielectric over the taped down braid and up to the jacket. Remove the tape from the braid and fan out the strands being careful not to damage the dielectric. Bend the fanned out braid over the washer and trim the braid even with the outer diameter of the washer with sharp scissors. Remove any pieces of braid that may have stuck to the cable, and check dielectric again for gouges or grooves. Slide the O-ring follower, piece 7, over the cable dielectric and up against the braid. Lubricate the O-ring, piece 8, with insulating compound and then slide it over the cable dielectric up against the follower. The assembly up to this point is illustrated in figure 5-8h.

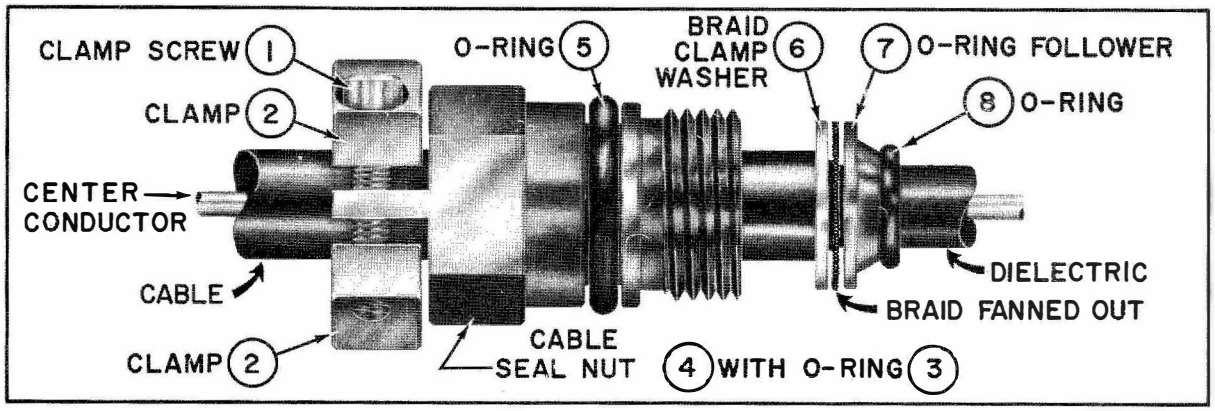


Figure 5-8h. MX-2326/U Partial Assembly, Outboard

Step 8. - Clean the cable dielectric and remove all bits of wire, dirt and other foreign matter. Insert the cable into the hull fitting to the point where the O-ring, O-ring follower, braid, and braid clamp washer are properly seated as illustrated in figure 5-8i. Exert hand-pressure on the cable to maintain seating of the above pieces and tighten the cable seal nut assembly into the hull fitting. Improper seating could result in hull fitting leak and decreased efficiency of the transmission line. Tighten the two clamp screws, piece 1, with an Allen wrench. If the cable jacket is ruptured or cut and the O-ring seals leak, water will be admitted to the ship. Ensure that the clamp halves are in complete contact with the cable seal nut tongues. The screw holes in some cable seal nuts have been drilled off center to allow a space between the clamp and cable seal nut (see figure 5-8g). This has been done to prevent the clamp from "riding on the cable seal nut and becoming cocked and allow jacket expansion (due to extrusion effect) when clamp is tightened.

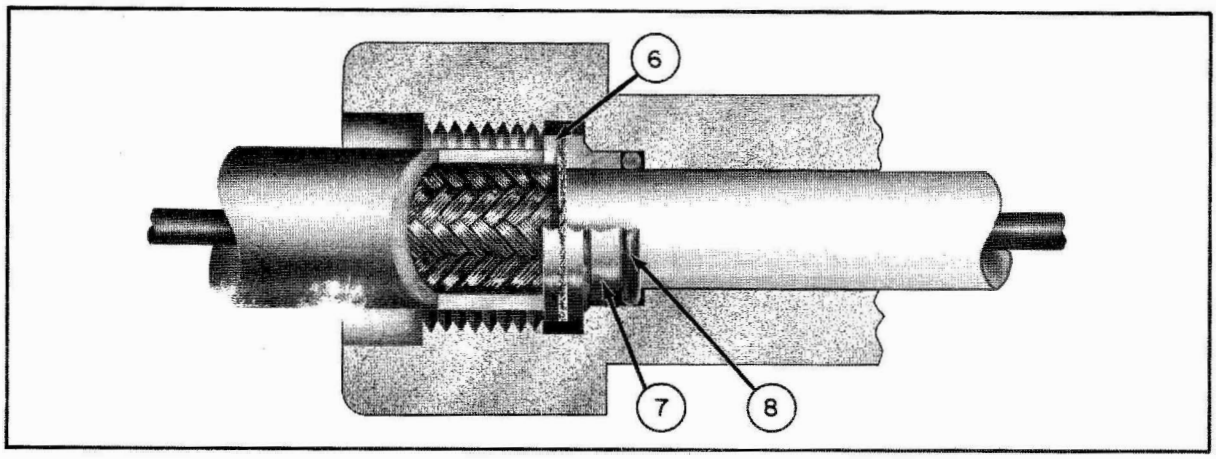


Figure 5-8i. Proper Seating of Cable In Pressureproof Fitting

Step 9. - Clip the three sections of the cable dielectric clamp, piece 11, around the cable dielectric (at the inboard end of the hull fitting) by installing the clamp ring, piece 10, into the clamp groove. The shoulder ends of the clamp sections should face the hull fitting. Push the clamp assembly into the hull fitting until it is properly seated. This should be done with a wood or plastic implement in order to avoid damage to the cable dielectric. Slide the wedge, piece 12, braid clamp washer, piece 15, thrust washer, piece 13, and clamping nut, piece 14, up over the cable (in the order named) to the fitting body. Seat the wedge in place by tightening the clamping nut onto the hull fitting (see figure 5-8j). Unscrew the clamping nut from the fitting. Remove the braid clamp washer and thrust washer from the inside of the clamping nut and secure them temporarily to the cable dielectric near the fitting body. Slide the clamping nut completely off the inboard cable end.

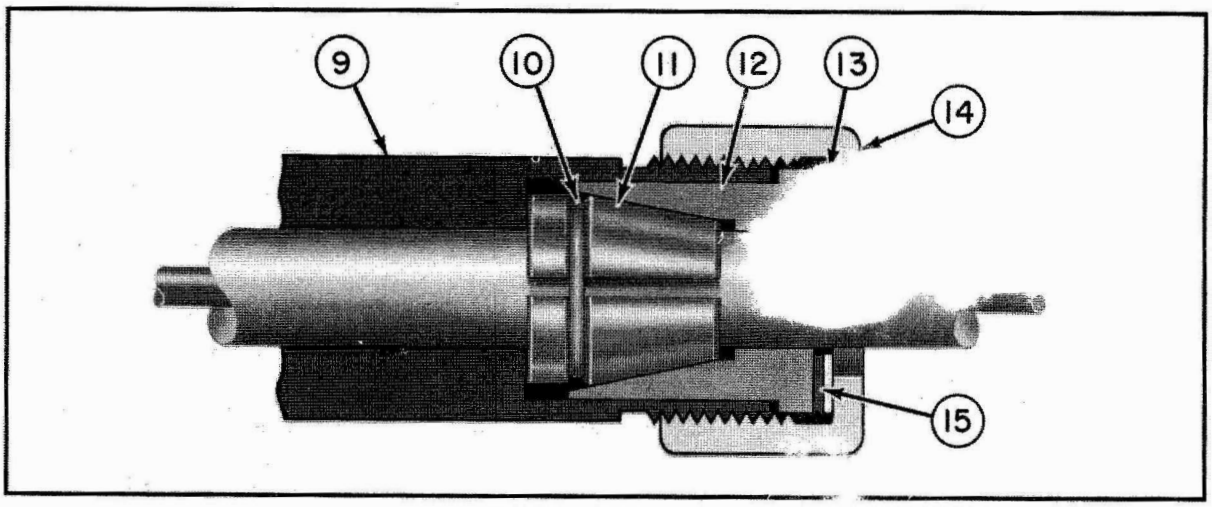


Figure 5-8j. MX-2326/U Partial Assembly, Inboard

Step 10. - Replace the jacket and braid that was removed from the cable in step 4. Replacement may be made easier by using insulating compound and a fish tape. Solder a lug to the inner conductor of the cable to act as a connection for the fish tape. Slide the fish tape through the jacket and braid and connect to the lug (see figure 5-8k). Lubricate the dielectric with a small amount of insulating compound. The jacket and braid can now be easily replaced keeping the cable inner conductor and dielectric straight and taut while sliding the jacket and braid back over the cable dielectric.

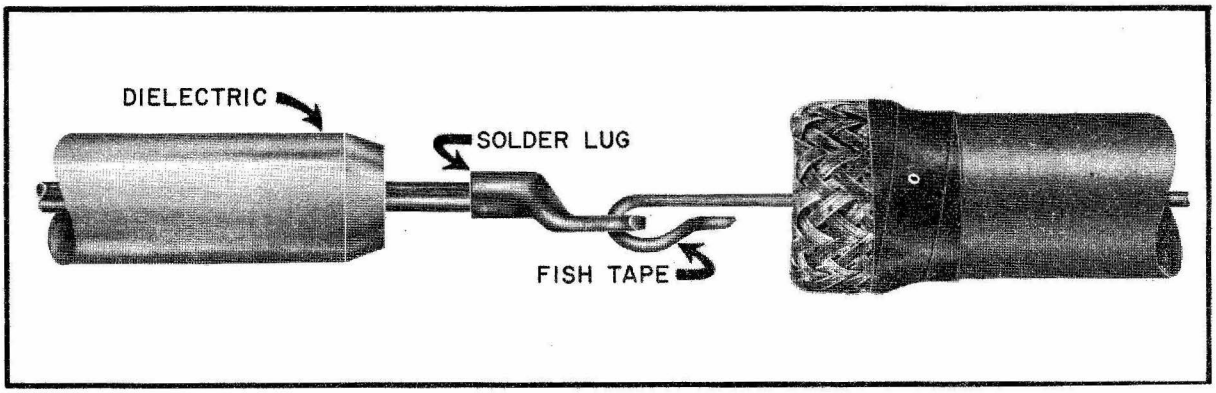


Figure 5-8k. Reinstalling Jacket and Braid Using Fish Tape

Step 11. - Remove the tape and smooth the braid around the cable dielectric at the hull fitting. Slide the thrust and braid clamp washers over the braid and up against the cable jacket as illustrated in figure 5-8l. Fan out the braid and bend the braid over the braid clamp washer. Force the jacket and braid up the cable until the braid is clamped between the wedge and braid clamp washer. Trim the braid even with the outer edge of the braid clamp washer and wedge as illustrated in figure 5-8m.

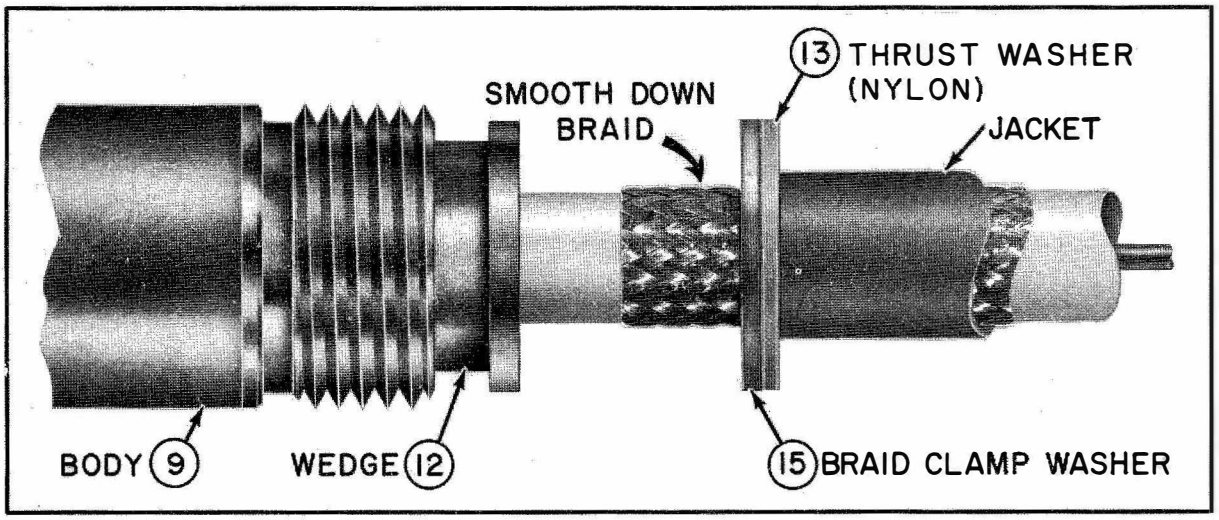


Figure 5-8l. Reinstalling Jacket and Braid

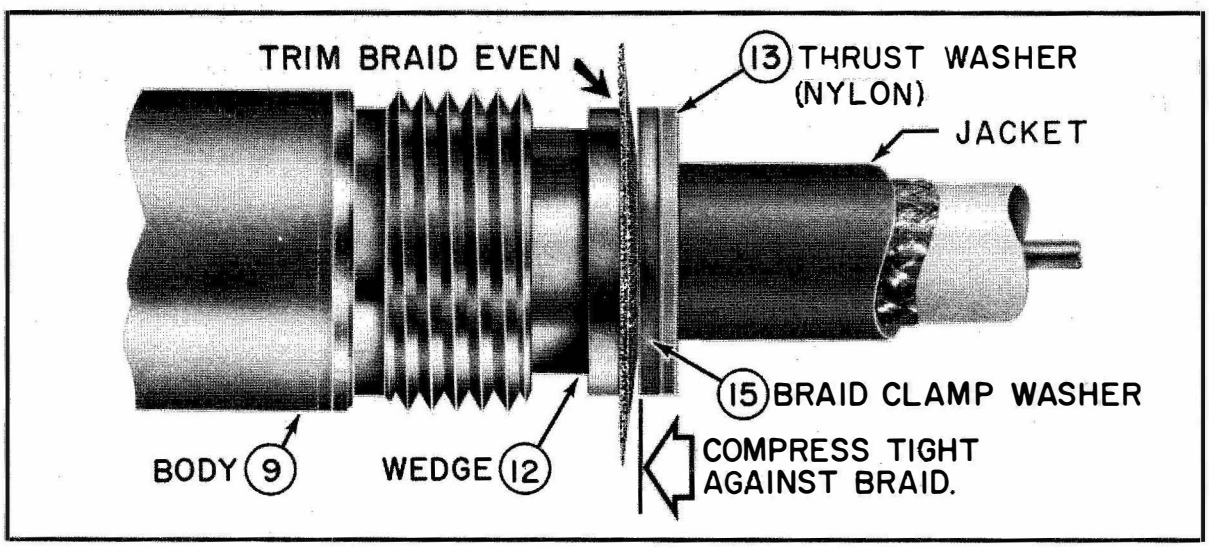


Figure 5-8m. Trimming Braid

Step 12. - Remove the fish tape (if used) from the cable, remove the tape from the folded braid on the inboard end of the cable and smooth the braid down over the cable dielectric. Slide the clamping nut over the cable jacket and tighten in place on the fitting assembly. Figure 5-8a shows the completed installation.

(2) MX-2327/U Detailed Assembly. - This fitting will accomodate any coaxial cable having a jacket OD of 0.532 inch minimum - 0.558 inch maximum and a dielectric OD of 0.357 inch minimum - 0.383 inch maximum. A pressure hull entry hole, 1 inch in diameter, is required for installation of the fitting. Assembled and exploded views are shown in figures 5-8a and 5-8b. In these views, the various parts are assigned piece numbers which are used for reference in the assembly instructions. Table 5-3 lists the stock numbers for the required parts.

TABLE 5-3. MX-2327/U Assembly Stock Numbers

Piece No.	Item	Federal Stock No.
All	MX-2327/U Hull Fitting (includes pieces 1 thru 15)	N5975-601-9770
8	AN 6227-8 Packing, Preformed, O-Ring	KZ5330-187-3633
5	AN-6227-16 Packing, Preformed, O-Ring	KZ5330-530-1997
3	REA10083-16 Packing, Preformed, O-Ring	KZ5330-808-4547
	Cable Seal Nut (c/o pieces 1, 2, 4, 6, 7)	N5935-893-0860
	Assembly consisting of pieces 10 & 11	N5340-616-6331

(a) **Cable and Fitting Installation.** - The MX-2327/U fitting is identical to the MX-2326/U as far as mechanical construction is concerned; the only difference is the size of the parts. The only difference in installation is the treatment of the inner braid when using the fitting with RG-14A/U. When using RG-14A/U cable install the cable run from the outboard termination down to the area where the pressure hull is to be penetrated. Determine the length of cable which will be required inboard between the fitting and the cable termination. Allow for slack and loss during assembly. Weld the pressureproof hull fitting in the pressure hull in accordance with instructions given in section 8-5.

Step 1. - Complete step 1 and step 2 as described under MX-2326/U installation. Use piece number 7B instead of 7A. (See Figure 8b).

Step 2. - Remove 4.0 inches of jacket from the inboard end of the cable. Remove 3.0 inches of the outer braid, fold back and tape the remaining outer braid to the jacket. Smooth the inner braid down against the cable dielectric.

Step 3. - Complete step 4 as described under MX-2326/U installation. Remove the inner braid, it will not be reinstalled and may be discarded.

Step 4. - Complete step 5 through step 12 as described under MX-2326/U installation.

(3) MX-2646/U Detailed Assembly. - This fitting is used with RF cable type RG-57A/U or with other types having a jacket OD of 0.610 inch minimum - 0.640 inch maximum and a dielectric OD of 0.457 inch minimum - 0.487 inch maximum. A pressure hull entry hole, 1.0 inch in diameter, is required for installation of the fitting. Assembled and exploded views are shwon in figures 5-8a and 5-8b. In these views, the various parts are assigned piece numbers which are used for reference in the assembly instructions. Table 5-4 lists the stock numbers for the required parts.

TABLE 5-4. MX-2646/U Assembly Stock Numbers

Piece No.	Item	Federal Stock No.
All	MX-2646/U Hull Fitting	N5975-710-4554
8	AN 6227-9 Packing, Preformed, O-Ring	KZ5330-227-9483
5	AN 6227-16 Packing, Preformed O-Ring	KZ5330-530-1997
3	REA10083-17 Packing, Preformed O-Ring	KZ5330-585-1363

(a) Cable and Fitting Installation. - The MX-2646/U is identical to the MX-2326/U as far as mechanical constructions is concerned, the only difference is the size of the parts. Installation procedures are the same as described under MX-2326/U Cable and Fitting Installation.

(4) UG-988D/U Detailed Assembly. - This fitting is used with RF coaxial cable types RG-17/U, RG-17A/U, RG177/U, or with other types having a jacket OD of 0.855 inch minimum - 0.910 inch maximum, a dielectric OD of 0.665 inch minimum -0.695 inch maximum, and an inner conductor diameter of 0.187 inch maximum. The cable is terminated in the fitting, inside the pressure hull, by an especially designed QDL fitting. A pressure hull entry hole, 1.5 inches in diameter, is required for installation of the fitting. An assembled view is shown in figure 5-9a. In this view, the various parts are assigned piece numbers which are used for reference in the following assembly instructions. Table 5-5 lists the stock numbers for the required parts.

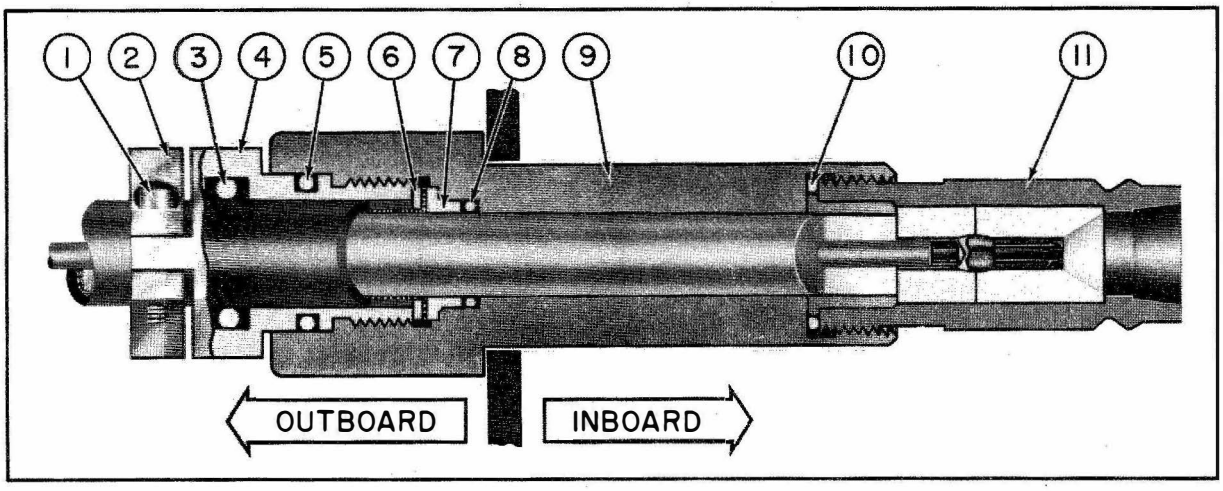


Figure 5-9a. UG-988D/U Assembled

TABLE 5-5. UG-988D/U Assembly Stock Numbers

Piece No.	Item	Federal Stock No.
All	UG-988D/U Hull Fitting	N5935-506-4966
8	AN 6227-13 Packing, Preformed, O-Ring	KZ5330-641-0642
5	AN 6227-20 Packing, Preformed, O-Ring	KZ5330-198-6176
3	REA10083-15 Packing, Preformed, O-Ring	KZ5330-878-4226
1, 2, 4, 6, 7	Cable Seal Nut	N5985-893-0859

(a) Cable and Fitting Installation. - Install the cable run, in accordance with Sub-section 5-4. Allow enough cable to make the termination at the inboard end of the pressureproof fitting. Weld the hull fitting in the pressure hull in accordance with section 8-5, then complete the following steps:

Step 1. - Visually inspect all parts that make up the assembly, replacing any part found to be damaged. Use new O-rings, pieces 3, 5, 8, and 10, each time a cable is installed.

Step 2. - Loosen the clamps, piece 2, on the cable seal nut, piece 4. Lubricate O-ring, piece 3, with insulating compound and install in the inside groove of the cable seal nut. Bevel the cable jacket at the end and slide the cable seal nut (clamp end first) over the cable until 6.0 inches of the cable protrudes through the cable seal nut as illustrated in figure 5-9b.

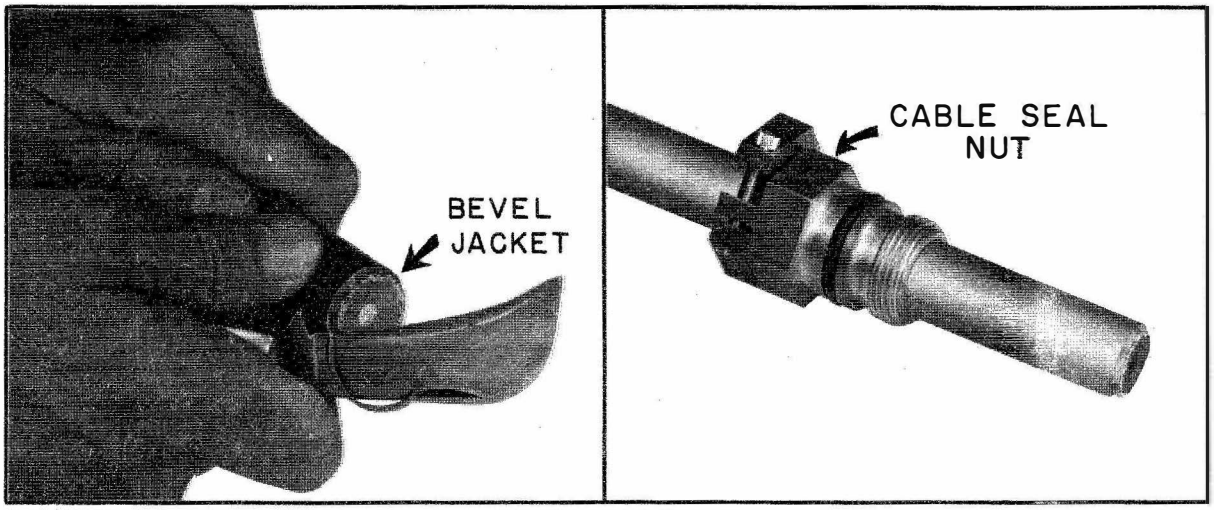


Figure 5-9b. Cable Seal Nut on Cable

Step 3. - Using the end of the cable seal nut as a guide, make a circular cut around the cable jacket 6.0 inches from the cable end. Make a cut the length of the 6 inch section and remove the jacket as illustrated in figure 5-9c.

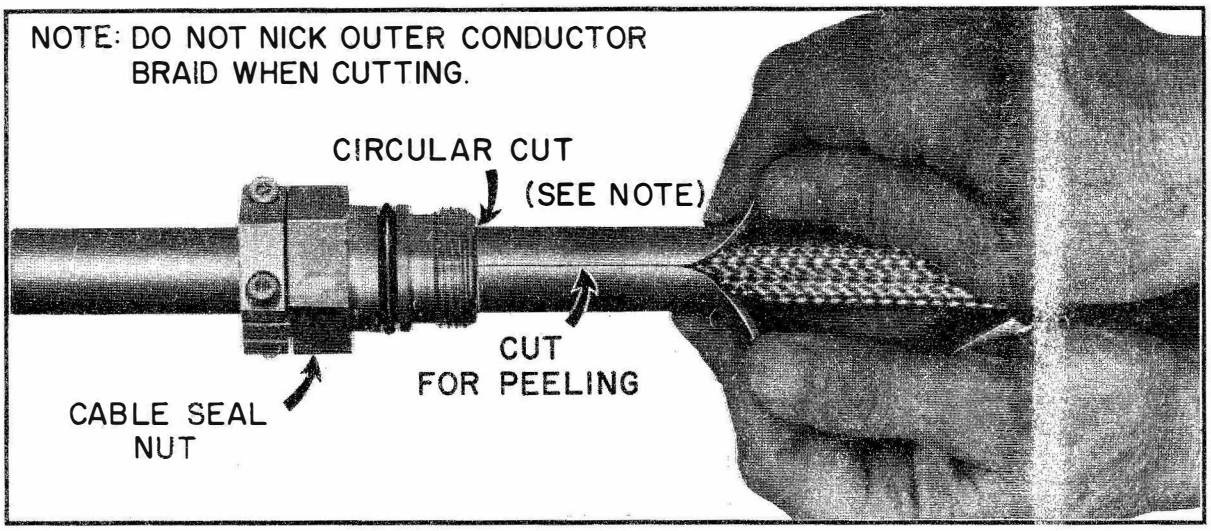


Figure 5-9c. Removing Cable Jacket

Step 4. - Slide the braid clamp washer, piece 6, over the outer conductor braid, against the cable jacket and the cable seal nut. Bulge the braid and, using scissors, cut the braid approximately 0.5 inch from the braid clamp washer as illustrated in figure 5-9d.

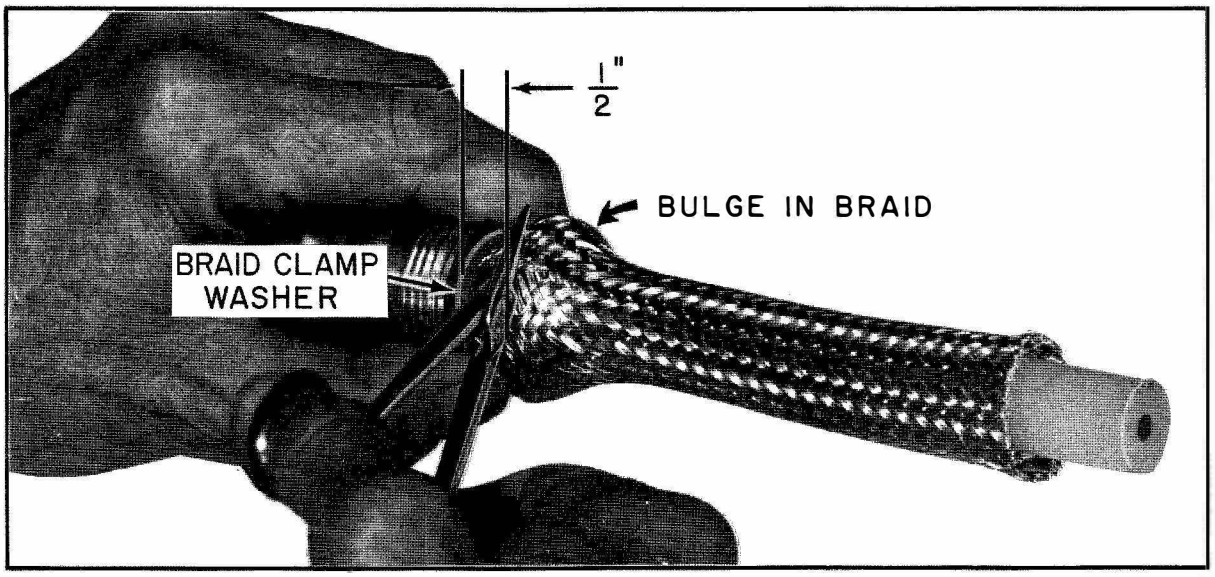


Figure 5-9d. Cutting Braid

Step 5. - Fan out the braid strands and bend them up against the braid clamp washer. Trim the braid strands even with the outside edge of the braid clamp washer. Remove any pieces of loose braid strands that may have lodged on the dielectric or cable seal nut assembly. Slide the O-ring follower, piece 7, over the cable dielectric and up against the fanned out braid. Lubricate O-ring, piece 5, with insulating compound and install in the cable seal nut outer groove. Lubricate O-ring, piece 8, with insulating compound and slide over the cable dielectric and up against the O-ring follower as illustrated in figure 5-9e.

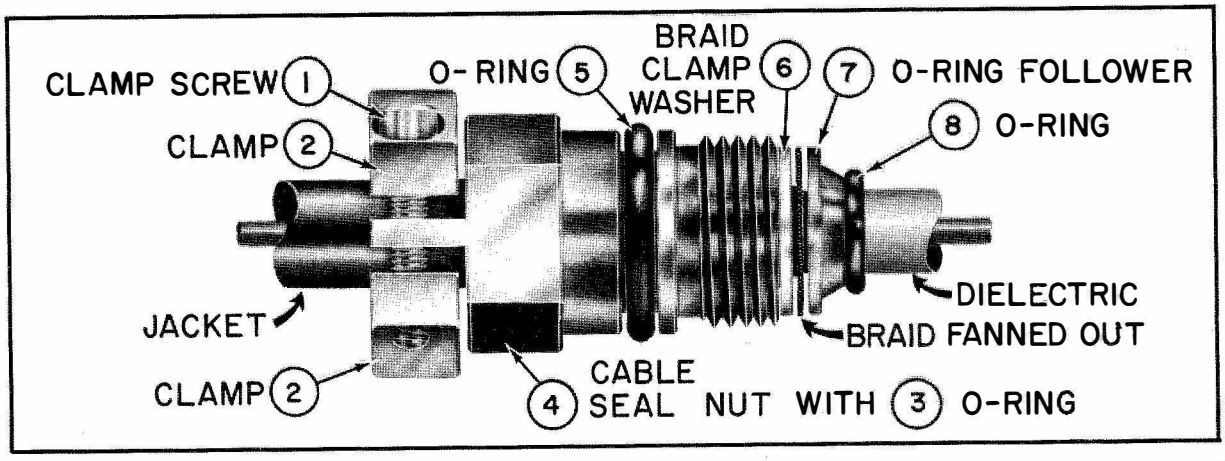


Figure 5-9e. Cable Seal Nut Assembly

Step 6. - Clean the cable dielectric of insulation compound. Insert the cable into the hull fitting to the point where the O-ring, O-ring followers, braid, and braid clamp washer are properly seated as illustrated in figure 5-9a. Exert hand-pressure on the cable to maintain seating of the above pieces and tighten the cable seal nut assembly into the hull fitting. Improper seating could result in decreased efficiency of the transmission line.

Step 7. - Tighten the cable clamps until complete contact is made with the cable seal nut tongue. This completes the outboard assembly.

Step 8. - Cut and remove the cable dielectric flush with the inboard end of the hull fitting. Cut the inner conductor to leave a 0.375 inch length of conductor protruding from the dielectric. Round the end of the conductor slightly and remove all filings as illustrated in figure 5-9f.

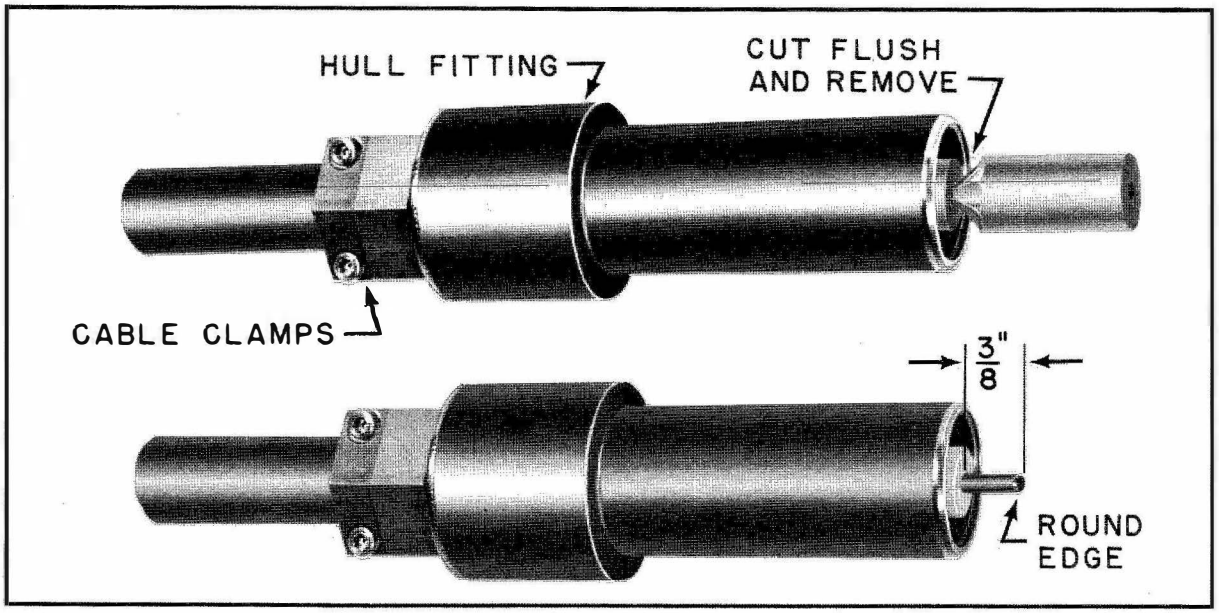


Figure 5-9f. Cable End Preparation

Step 9. - Lubricate O-ring, piece 10, with insulating compound and slip into the hull fitting around the cable dielectric. Screw the QDL adapter, piece 11, tightly into the hull fitting as illustrated in figure 5-9g.

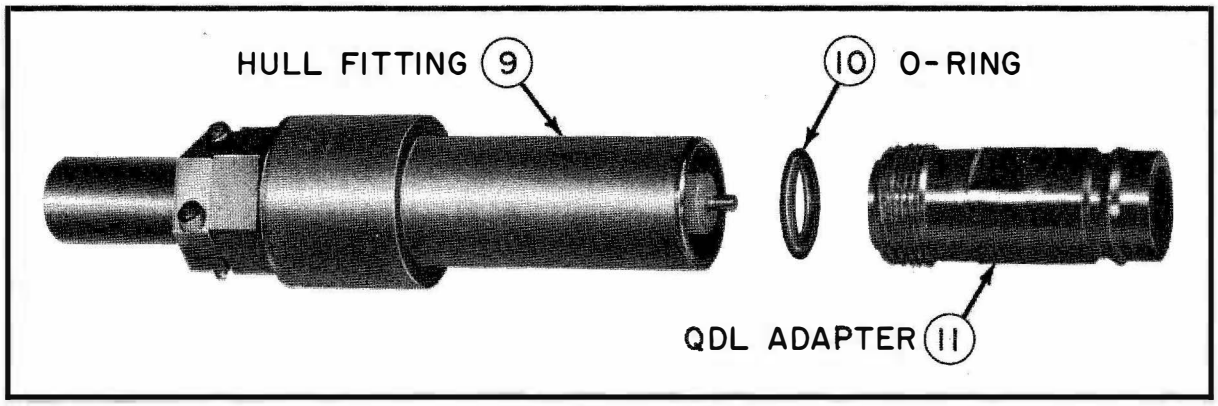


Figure 5-9g. Installing O-Ring and Adapter

(5) MX-1203F/U Detailed Assembly.- This fitting will accommodate any coaxial cable having a jacket OD of 0.855 inch minimum - 0.910 inch maximum, dielectric OD of 0.665 inch minimum - 0.695 inch maximum, and an inner conductor OD of 0.188 inch minimum - 0.196 inch maximum. The cable is terminated in the fitting. Assembled and exploded views are shown in figures 5-10a and 5-10b. In these views the parts are assigned piece numbers which are used for reference in the assembly instructions. Table 5-6 lists the stock numbers for the required parts.

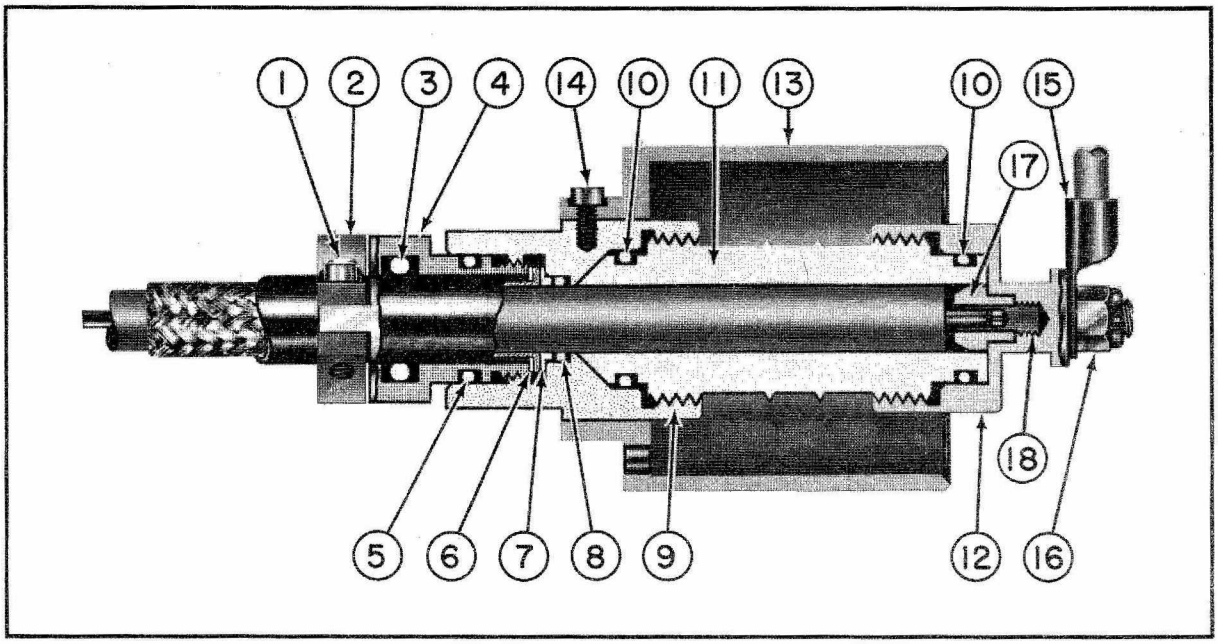


Figure 5-10a. MX-1203F/U Assembled

TABLE 5-6. MX-1203F/U Assembly Stock Numbers

Piece No.	Item	Federal Stock No.
All	MX-1203F/U End Seal	N5985-606-7886
8	AN 6227-13 Packing, Preformed, O-Ring	KZ5330-641-0642
5	AN 6227-20 Packing, Preformed, O-Ring	KZ5330-198-6176
3	REA10083-15 Packing, Preformed, O-Ring	KZ5330-878-4226
11	REB101376-1 Insulator	N5970-670-3809
12, 16, 17, 18	REB49391-Terminal	N5935-683-1518
1, 2, 4, 6, 7	Cable Seal Nut Assembly	N5985-893-0859

(a) Cable and Fitting Installation. – Install the cable run in accordance with section 5-4. Allow enough cable to make termination at both ends. Figure 5-10c illustrates one method of mounting this fitting in the superstructure. However, in most cases the method of mounting the fitting will depend on the individual installation. If the antenna to which this fitting is mast mounted, the cable entry into the cable loop guard should be one foot above vertical center of mast travel.

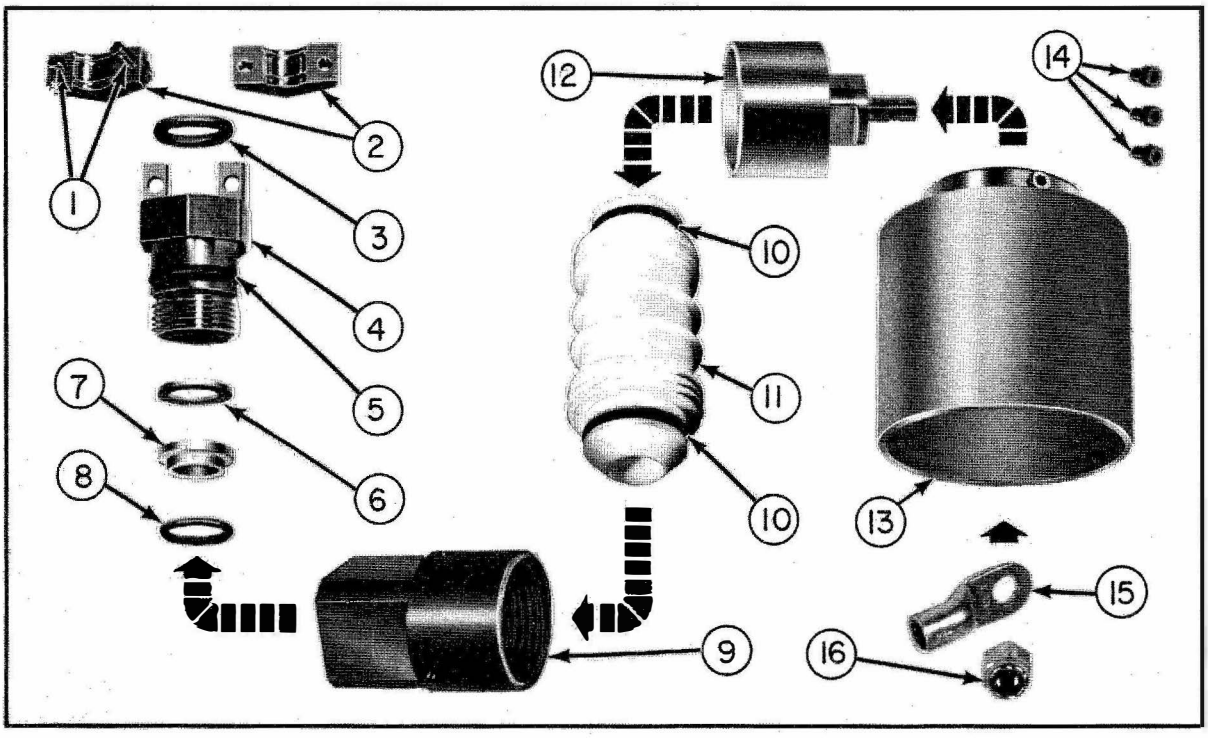


Figure 5-10b. MX-1203F/U Exploded

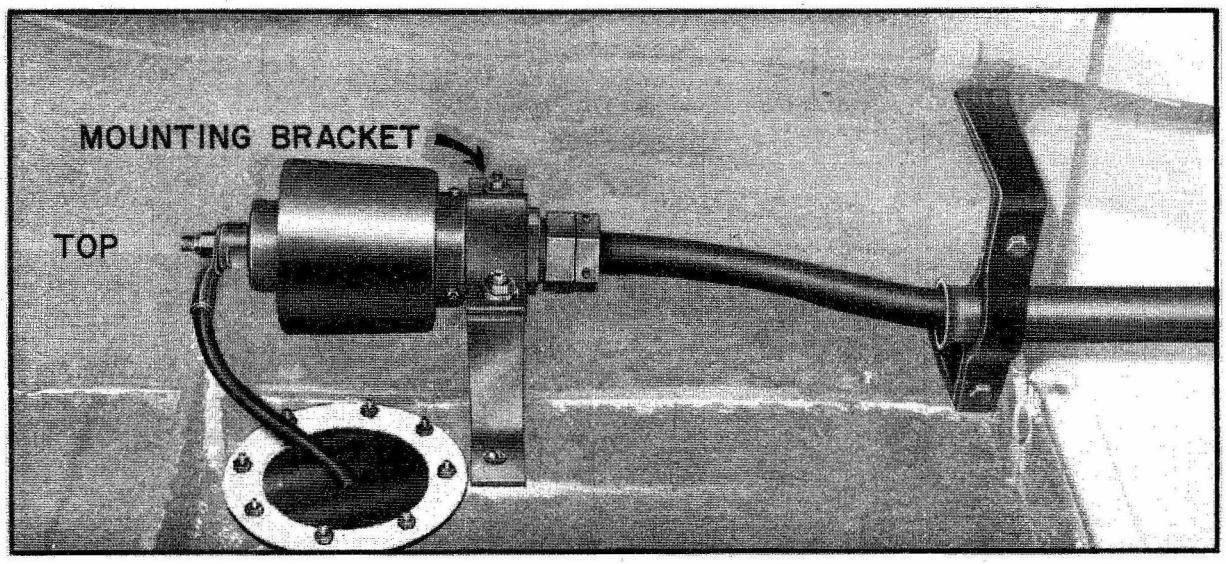


Figure 5-10c. MX-1203F/U Typical Installation

Step 1. – Visually inspect all parts that make up the assembly replacing any parts found to be damaged. Use new "O" rings, pieces 3, 5, 8, and 10, each time a new cable is installed. Particular care should be exercised to ensure that grooves have a 32 micro inch finish or better.

Step 2. – Remove socket head screws, piece 1, and cable clamps, piece 2, from cable seal nut, piece 4. Lubricate the O-ring, piece 3, with insulating compound and install in the internal groove at the tongue end of the cable seal nut. Lubricate O-ring, piece 5, with insulating compound and slip over the threaded end of the cable seal nut and into the groove as illustrated in figure 5-10b. Exercise extreme care that the O-ring is not cut on the sharp threads.

Step 3. – Bevel the end of the cable jacket with a knife as illustrated in figure 5-10d. Slide the cable seal nut assembly, clamp end first, onto the cable jacket. Replace the cable clamp halves with screws but do not tighten the screws.

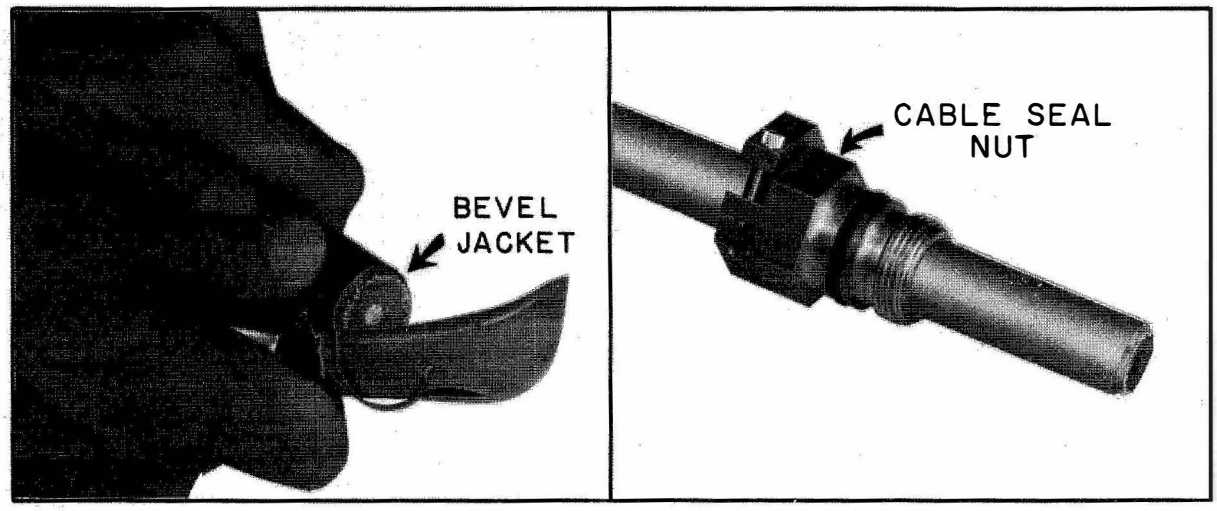


Figure 5-10d. Cable Seal Nut on Cable

Step 4. – Slide the cable seal nut assembly back on the cable jacket so that 6 inches of the cable protrudes through the threaded end of the nut.

Step 5. - Using the end of the cable seal nut as a guide make a circular cut around the cable jacket. Make a cut the length of the section and remove the jacket as illustrated in figure 5-10e. Do not nick outer conductor braid. Form the outer conductor braid down over the dielectric and inner conductor and slide braid clamp washer, piece 6, against the cable seal nut.

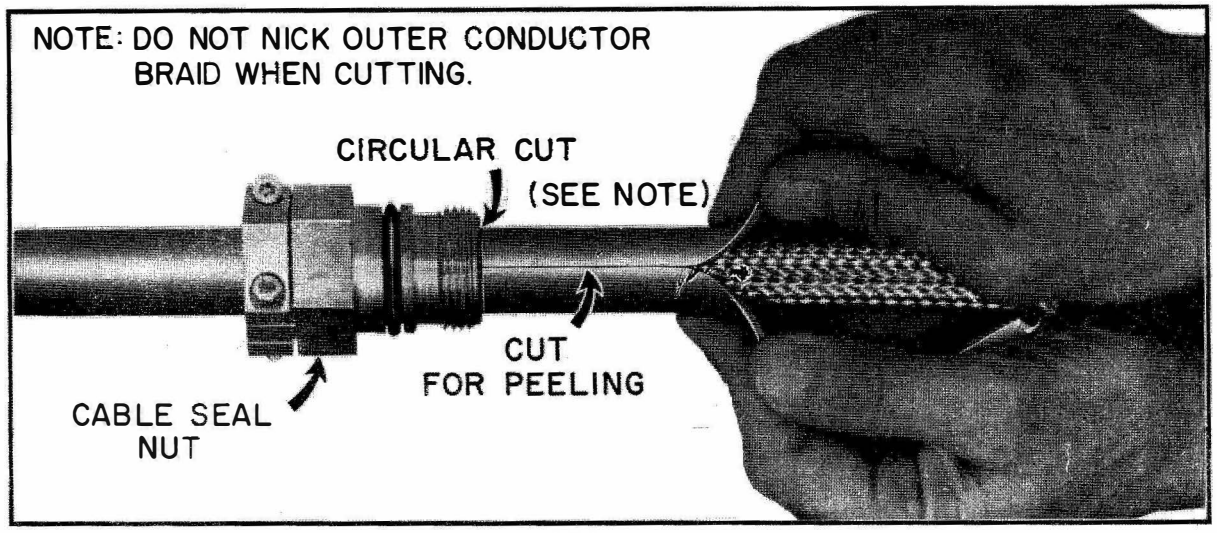


Figure 5-10e. Removing Cable Jacket

Step 6. – Slide braid clamp washer, piece 6; over the outer conductor braid and up against the end of the jacket. Make a bulge in the outer conductor braid and cut it off 0.5 inch from the braid clamp washer as illustrated in figure 5-10f. Fan out the braid and fold back against the braid clamp washer. Slide O-ring follower, piece 7, flat side first, over the dielectric and against the fanned out braid. Cut the braid even with the braid clamp washer and O-ring follower. Remove any pieces of braid on the cable seal nut or cable dielectric. Lubricate O-ring, piece 8, with insulating compound and slide over the dielectric and against the O-ring follower. Figure 5-10g shows the cable seal nut assembled on the RF cable.

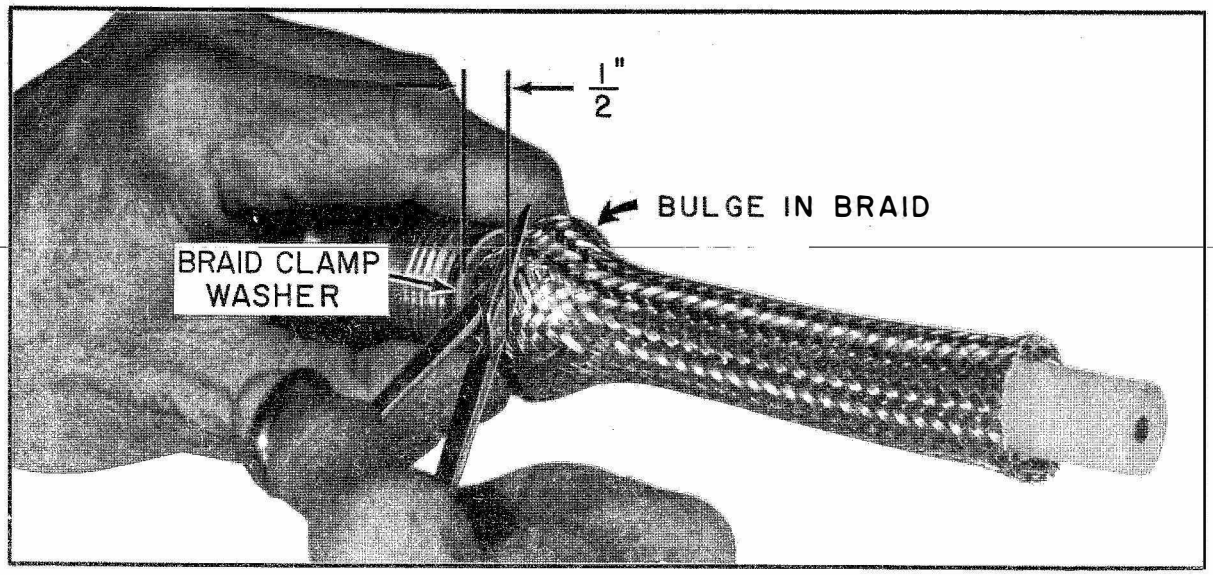


Figure 5-10f. Cutting Braid

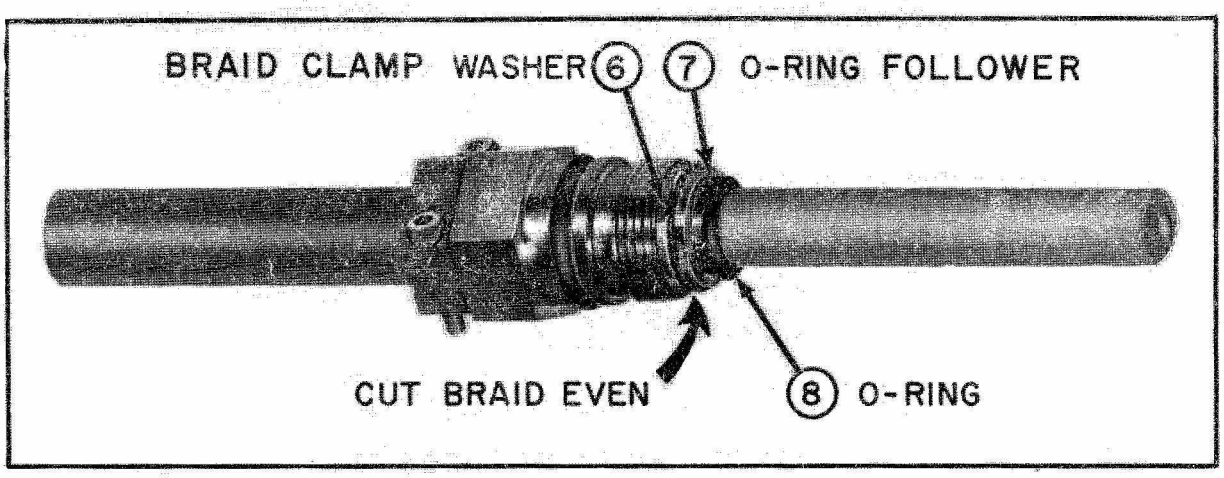


Figure 5-10g. Cable Seal Nut Assembled

Step 7. – Screw fitting body, piece 9, onto the cable seal nut and tighten with a wrench. Tighten the cable clamp screws to hold the cable seal nut in this position. The cable clamps should be tightened so that they make metal-to-metal contact with the tongue of the cable seal nut. Slip the teflon insulator, tapered end first, over the dielectric and hand tighten. Mark the cable dielectric flush with the end of the insulator. Remove the insulator and saw off the dielectric and inner conductor at the mark. Remove 0.5 inch of the dielectric exposing the inner conductor. Round the end of the inner conductor with a file (see figure 5-10h.)

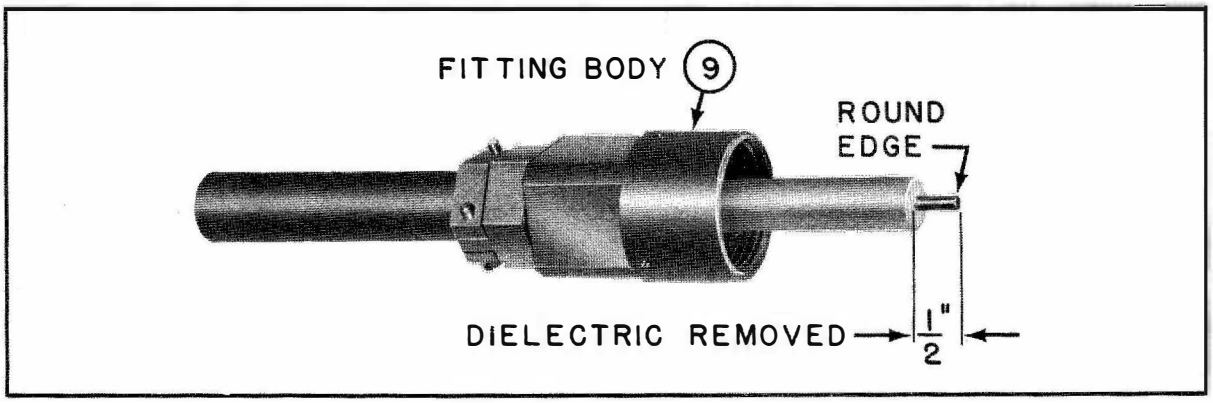


Figure 5–10h. Body Installed and Dielectric Trimmed

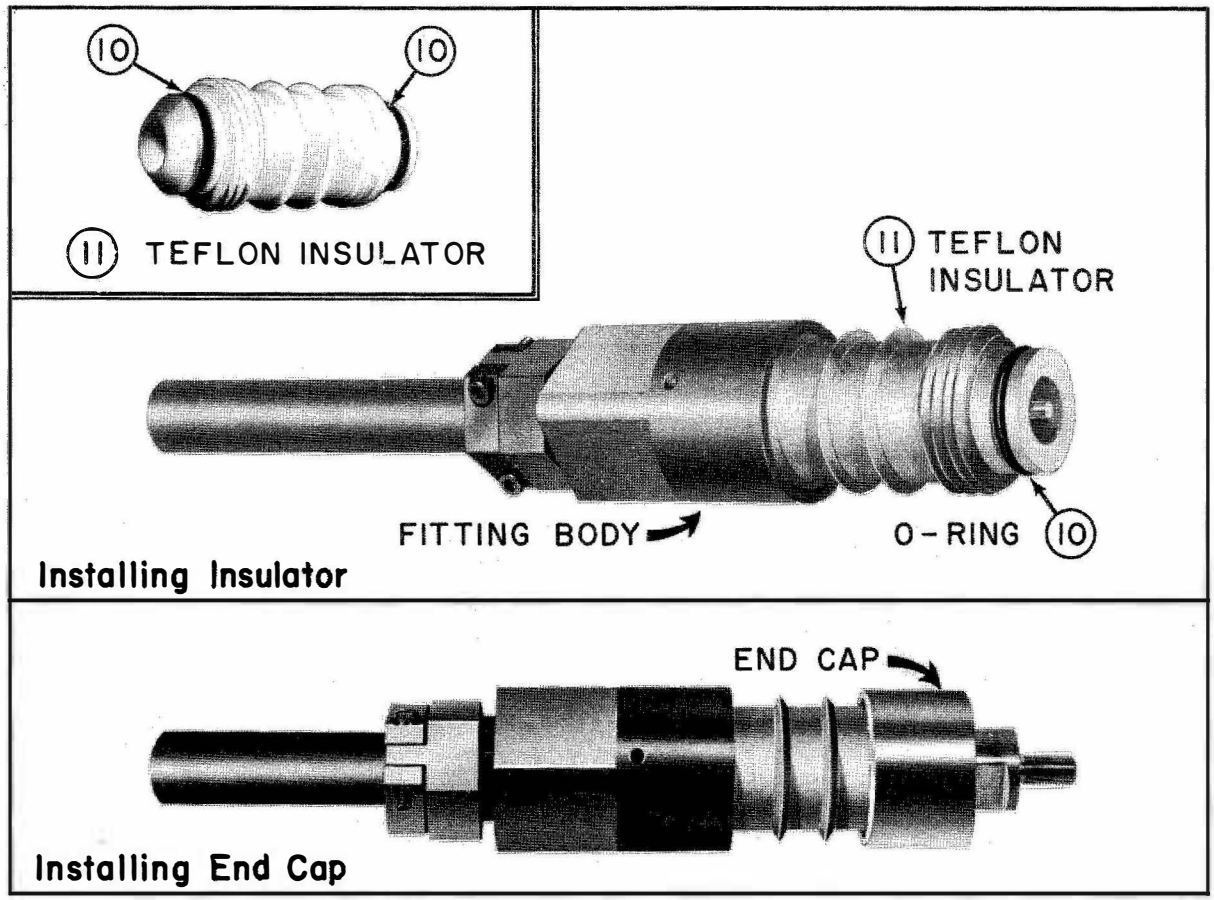


Figure 5–10i. Teflon Insulator and Cap Installed

Step 8. – Lubricate both O-rings, piece 10, with insulating compound and install in the grooves on each end of the teflon insulator. Slip the insulator over the dielectric and tighten it to the fitting body. Ensure that the center conductor is centered with the end of the insulator. Tighten the end cap to the insulator. Remove any foreign matter from the insulator (see figure 5-10i).

Step 9. – Slip the splash shield, small hole first, over the end cap and onto the body. Install the three 10-32 x 5/16 inch socket head screws and tighten with proper Allen wrench. Solder the lug to the antenna lead. Soldering of the lug is covered in section 8-2. Place the lug on the end cap stud and, while holding the cap with one wrench on the flats provided use a second wrench to screw the elastic stop nut on tightly (see figure 5-10j).

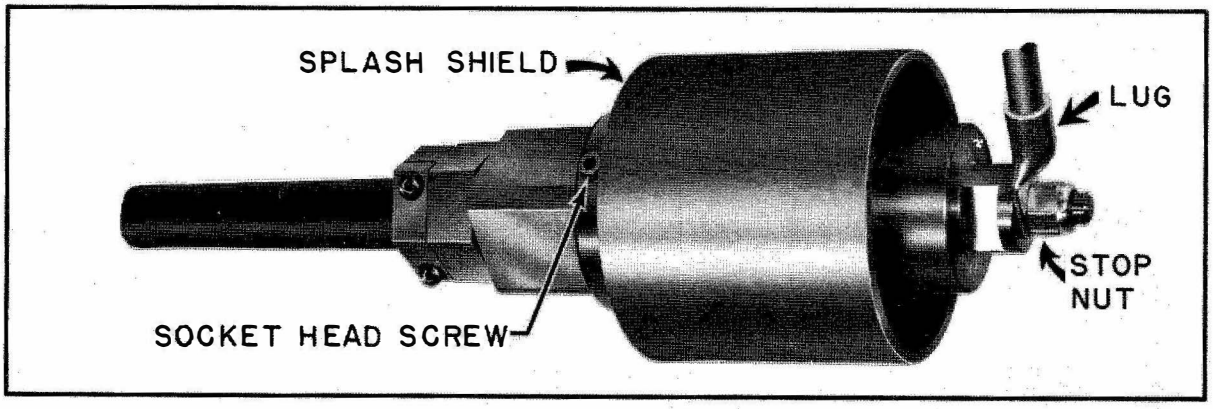


Figure 5-10j. End Seal Assembly

(6) MX-1203E/U Detailed Assembly. – This fitting is the same as MX-1203F/U, except that it does not use pieces 8 and 7 which are an O-ring and O-ring follower. In the MX-1203F/U these two pieces provide a water-tight seal between the cable dielectric and the fitting body. For this reason the MX-1203E/U is obsolete and should be used only in emergencies. When it is used, it should be assembled in accordance with the instructions for MX-1203F/U, except for the two above pieces.

(7) MX-2632/U Detailed Assembly. – This fitting is the same as MX-1203F/U, except its physical size. It is used with RF cable types RG-14A/U and RG-217/U. This fitting is assembled the same as MX-1203F/U.

(8) UG-1363/U Detailed Assembly. – This fitting is used with RF twinax cable type RG-57A/U having a jacket OD of 0.610 inch minimum - 0.640 inch maximum, a dielectric OD of 0.457 inch minimum - 0.487 inch maximum and twin inner conductors of seven strands each. The cable is terminated in the fitting which is then installed in the AT-317/BRR or AT-317A/BRR type antennas. Assembled and exploded views are shown in figures 5-11a and 5-11b. In these views the parts are assigned piece numbers which are used for reference in the assembly instructions. Table 5-7 lists the stock numbers for the required parts.

TABLE 5-7. UG-1363/U Assembly Stock Numbers

Piece No.	Item	Federal Stock Number
ALL	UG-1363/U Connector Plug	N5935-710-1923
8	AN 6227-9 Packing, Preformed, O-Ring	KZ5330-227-9483
5, 13	AN 6227-16 Packing, Preformed, O-Ring	KZ5330-530-1997
16	AN 6227-22 Packing, Preformed, O-Ring	KZ5330-198-6179
3	REA10083-17, Packing, Preformed, O-Ring	KZ5330-585-1363

(a) Cable and Fitting Installation. - Install the cable run in accordance with section 5-4. Allow enough cable to make the termination at both ends of the cable. If the antenna with which this fitting is used, is mast mounted, the mast should be raised to its full height before measuring the cable length required, then complete the following steps:

Step 1. - Complete step 1 through step 3 for assembly of MX-1203F/U. The physical dimensions of the cable seal nut are different, however, the parts are numbered the same and the assembly is the same.

Step 2. - Complete step 4 for MX-1203F/U except the cable seal nut should be positioned on the cable so that 2.5 inches protrude through the cable seal nut.

Step 3. - Complete step 5 and step 6 for MX-1203F/U.

Step 4. - Insert the cable seal nut assembly into the male body, piece 9, and tighten. Using the smaller end of the male body as a guide cut the dielectric away from the two inner conductors. Cut the inner conductors 0.5 inch in length (see figure 5-11c.).

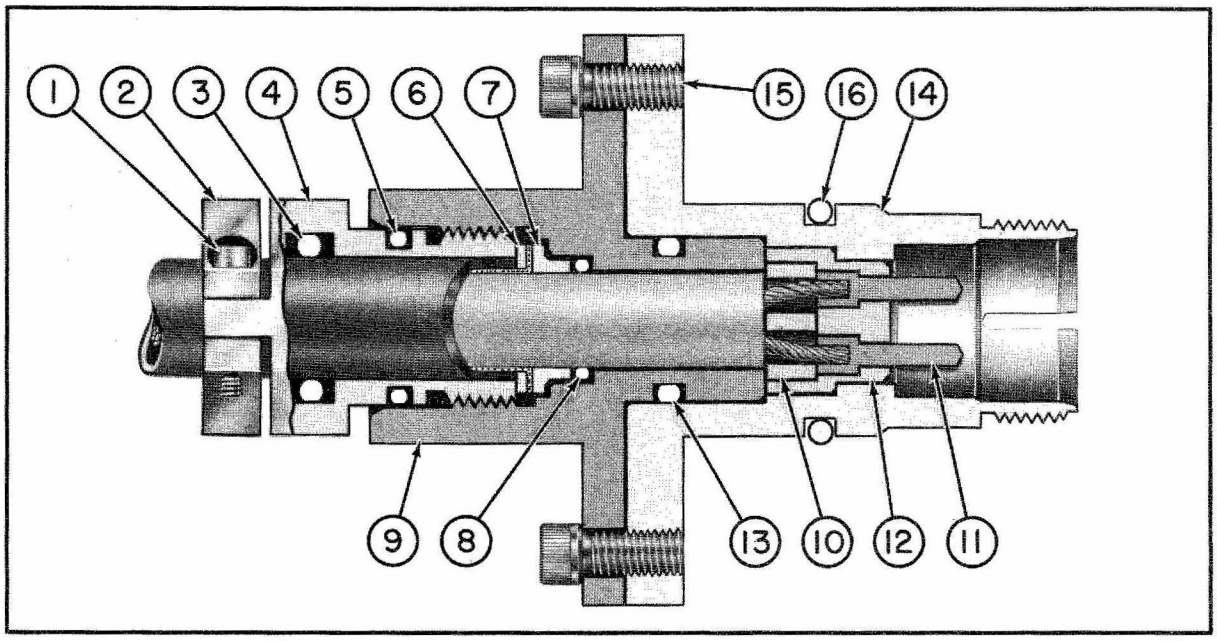


Figure 5-11a. UG-1363/U Assembled

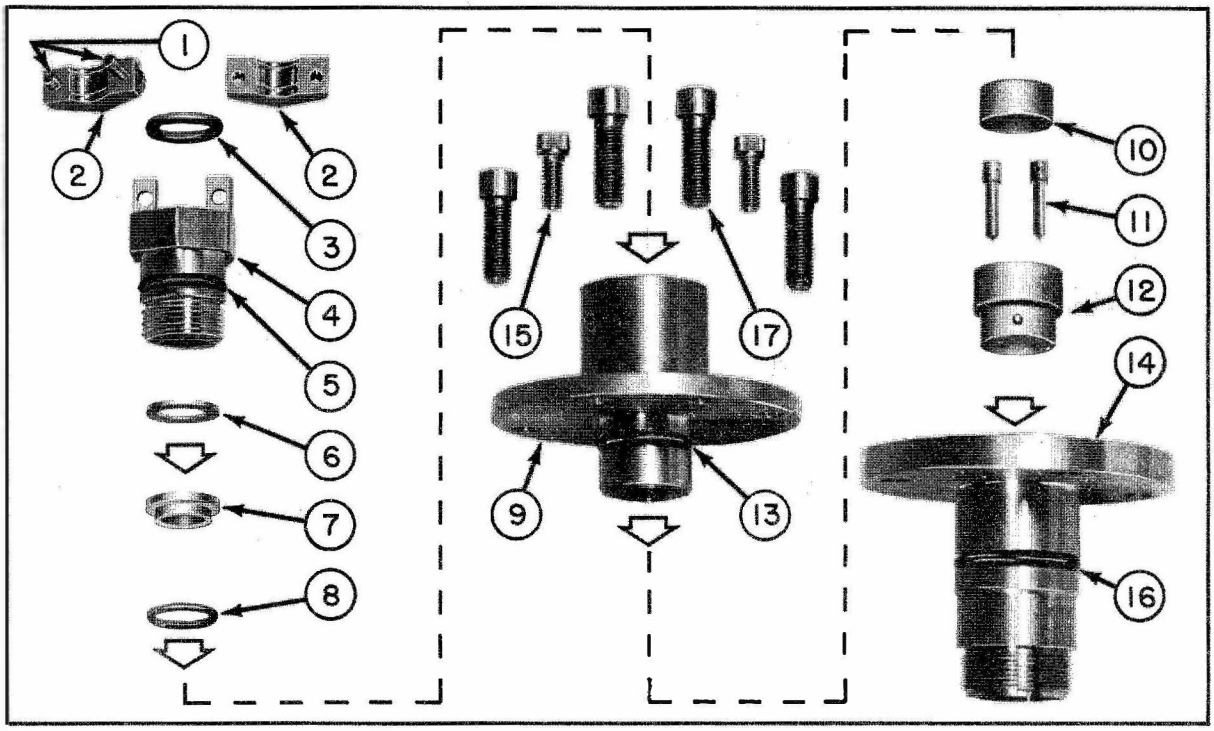


Figure 5-11b. UG-1363/U Exploded

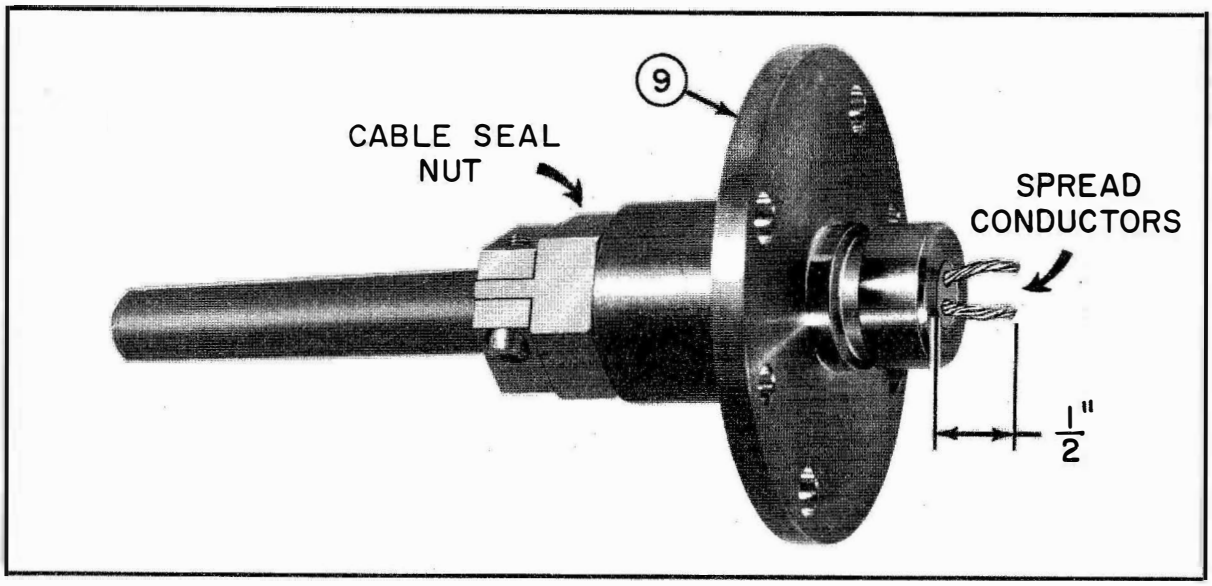


Figure 5-11c. Male Body Assembled and Dielectric Removed

Step 5. - Slide insulating spreader, piece 10, over the bare inner conductors, one conductor through each hole. Clean and tin approximately 0.187 inch of each conductor. Place male contact, piece 11, on the conductors so that there is a space of approximately 0.031 inch between the contacts and the insulation spreader. Solder the contact pins to the conductors, filling each hole in the contact pins completely (see figure 5-11d). Exercise particular care during the soldering operation to avoid dielectric flow from excessive heat and accumulation of flux or foreign matter.

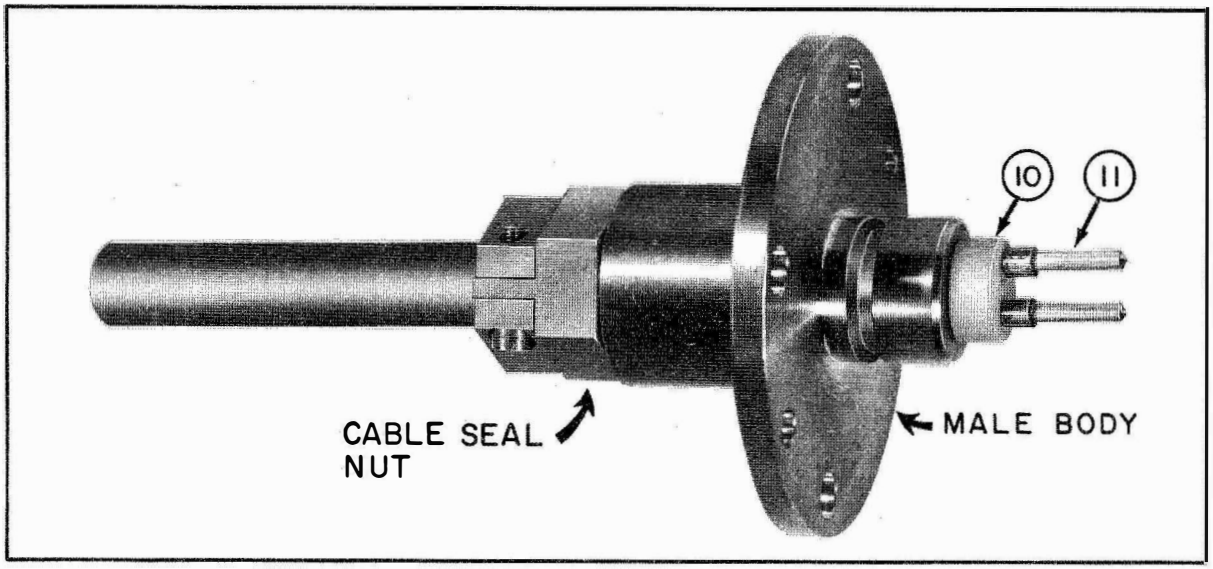


Figure 5-11d. Male Contact Pins Installed

Step 6. - Place male contact insulator, piece 12, over the contact pins. When the contact insulator is installed correctly, it should be flat against the male body. Lubricate O-ring, piece 13, with insulating compound and install in outside groove on male body (see figure 5-11e).

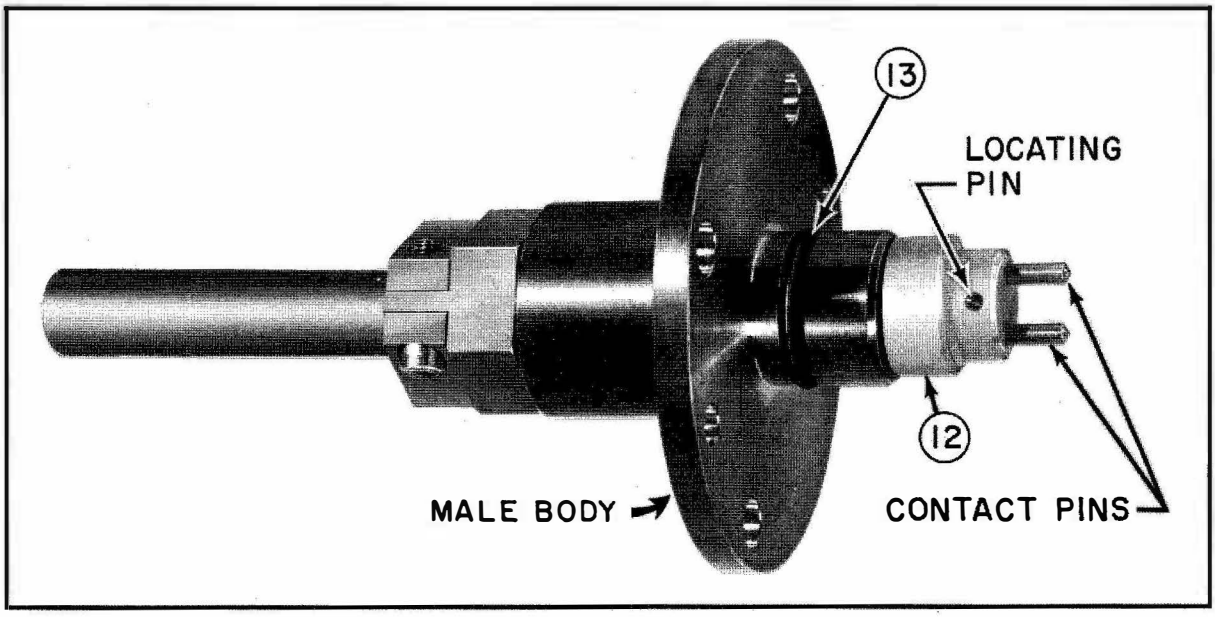


Figure 5-11e. Male Contact Insulator Installed

Step 7. - Align the locating pin on male contact insulator in the male body assembly with the slot in female body, piece 14, and push them until the two flanges come together. Install the two 1/4-20 x 5/8 inch socket head screws, piece 15, and tighten with an Allen wrench. Lubricate O-ring, piece 16, with insulating compound and install it in the outside groove on the female body. The four socket head screws, piece 17, are used to secure the connector in the case of the AT-317/BRR or AT-317A/BRR type antennas (see figure 5-11f.)

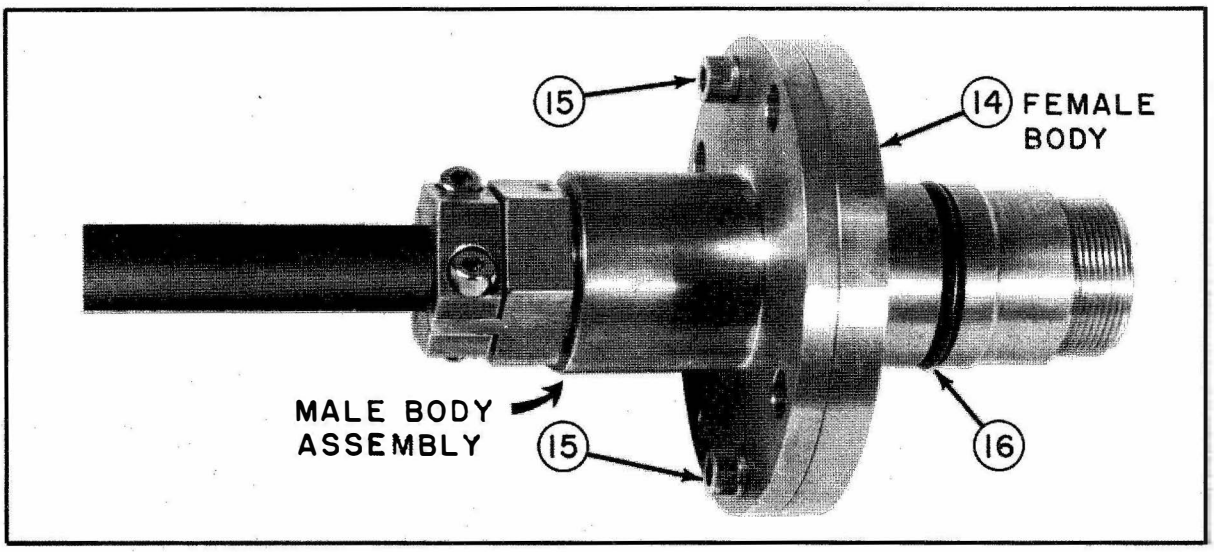


Figure 5-11f. UG-1363/U. Completed Assembly

(9) AB-562 (XN-1)/U Detailed Assembly. - This pressure fitting is a combination end seal and antenna support base for the AT-497/U antenna, using RF coaxial cables having a jacket OD of 0.855 inch minimum - 0.910 inch maximum. The dielectric has an OD of 0.655 inch minimum - 0.695 inch maximum. The cable is terminated in the fitting. Assembled and exploded views are shown in figures 5-12a and 5-12b. In these views the parts are assigned piece numbers which are used for reference in the assembly instructions. Table 5-8 lists the stock numbers for the parts.

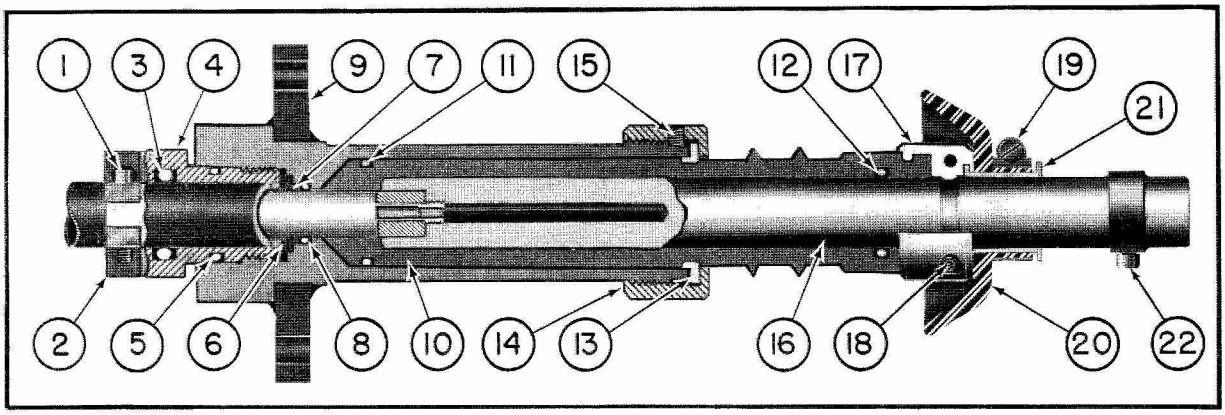


Figure 5-12a. AB-562(XN-1)/U Assembled

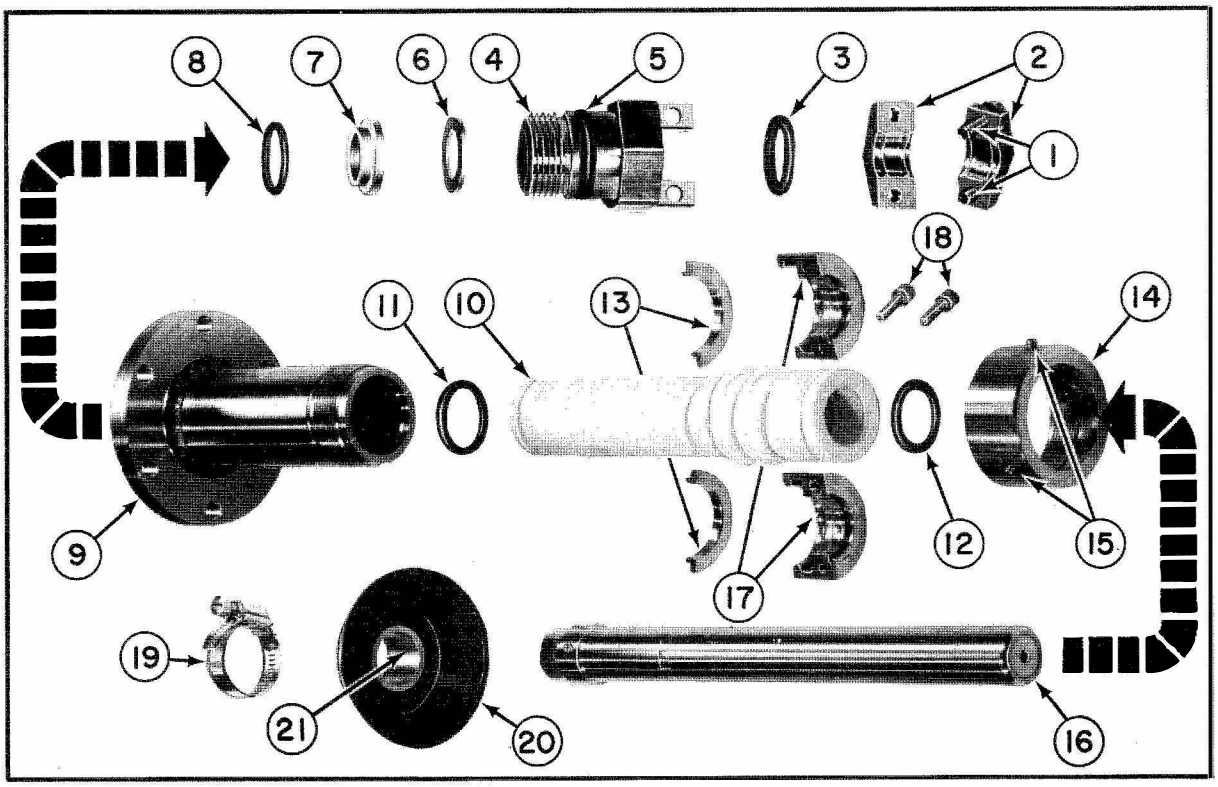


Figure 5-12b. AB-562(XN-1)/U Exploded

TABLE 5-8. AB-562(XN-1)/U Assembly Stock Numbers

Piece No.	Item	Federal Stock Number
12	AN 6227-19 Packing, Preformed, O-Ring	KZ5330-196-5382
5	AN 6227-20 Packing, Preformed, O-Ring	KZ5330-198-6176
11	AN 6227-23 Packing, Preformed O-Ring	KZ5330-196-5385
8	PD5330 -212-6 Packing, Preformed, O-Ring	KZ5330-198-6160
3	REA10083-15 Packing, Preformed, O-Ring	KZ5330-878-4226
1, 2, 4, 6, 7	Cable Seal Nut	N5985-893-0859

(a) Cable and Fitting Installation.- Install the cable run in accordance with Section 5-4. Allow enough cable to make terminations at both ends. If the base of this fitting is to be mounted on a mast, the mast should be raised to its full height before measuring the cable. Figure 5-12c illustrates a typical installation of this fitting. However, the method of mounting will usually depend on the individual installation.

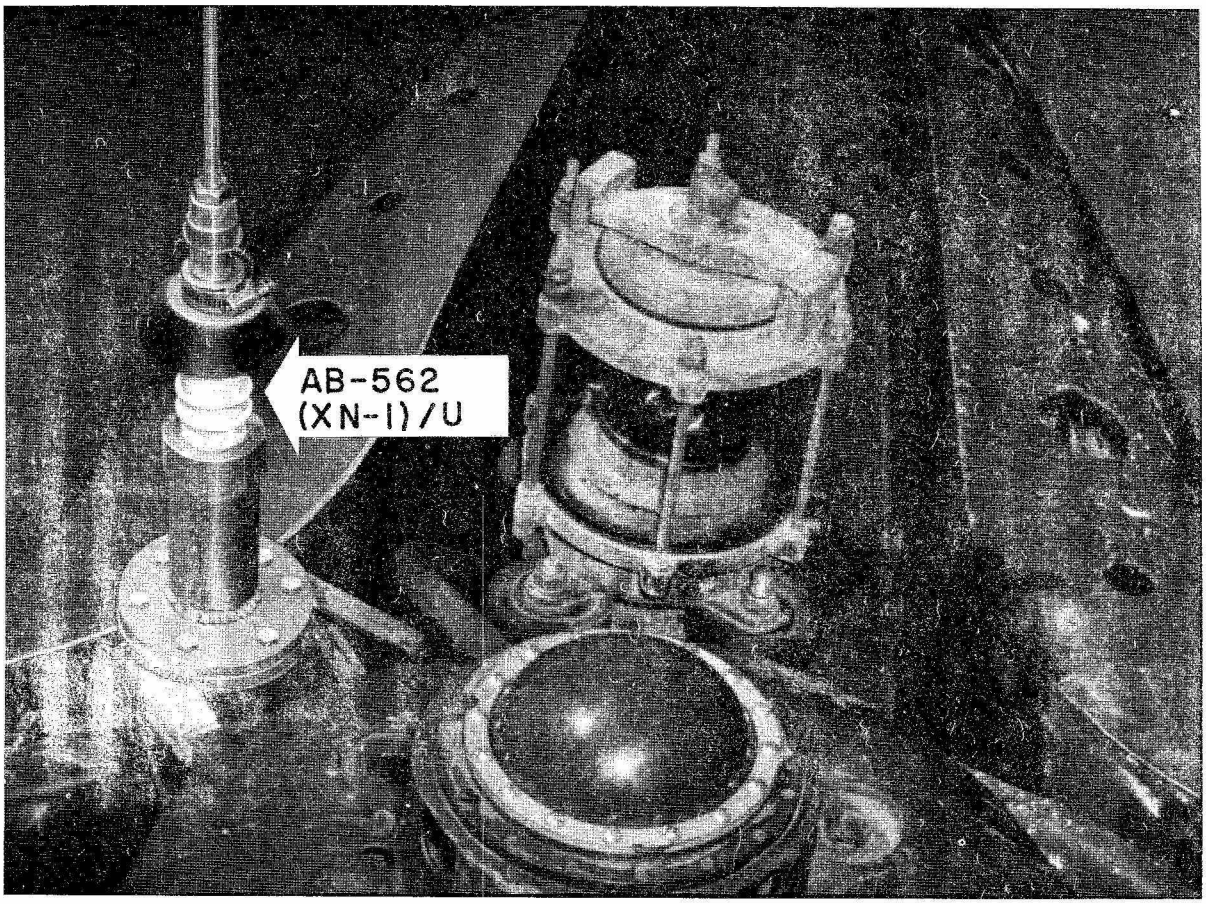


Figure 5-12c. AB-(X-1)/U Typical Installation.

Step 1. - Assemble the cable seal nut, pieces 1 through 8, in accordance with the assembly instruction for MX-1203F/U cable seal nut, step 1 through step 6. Except in step 4 the cable seal nut should be slid back so that only 1.938 inches of cable protrudes through it.

Step 2. - Measure 0.66525 inch from the end of the dielectric and cut it off square to expose the center conductor. Avoid cutting, nicking or otherwise damaging the center conductor. Round off the end of the center conductor with a fine file. Remove all filings that may be on the center conductor or dielectric (see figure 5-12d).

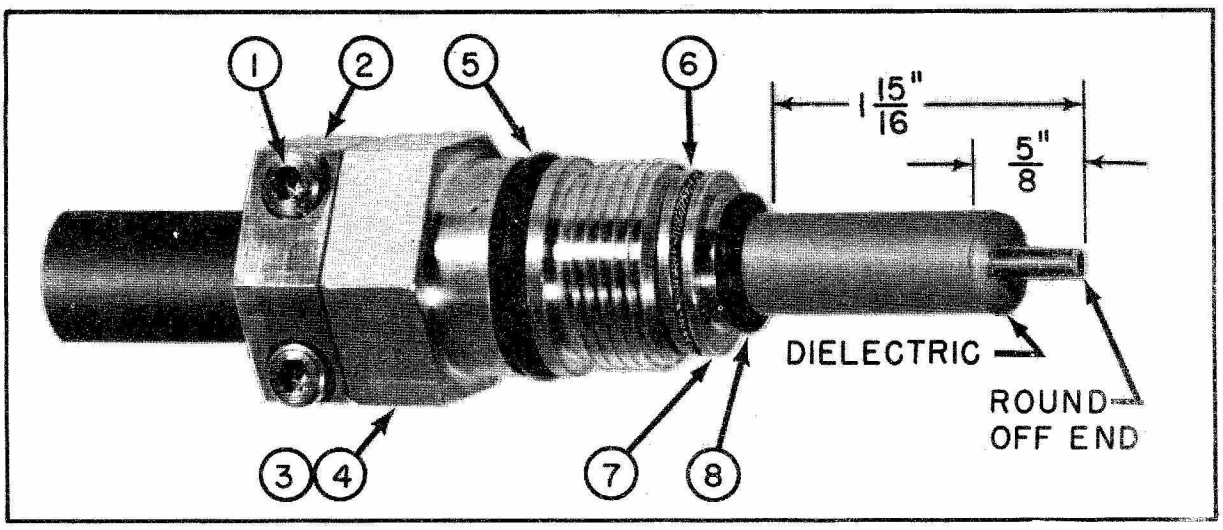


Figure 5-12d. Dielectric Removed from Center Conductor

Step 3. - Clean the teflon insulator, piece 10, and lubricate O-ring, 11, with insulating compound and install in an external groove of the teflon insulator. Lubricate O-ring, piece 12, with insulating compound and install in the internal groove in the insulator. Place the two retainer half rings, piece 13, into the groove located at approximately the center of the insulator. Push the insulator down into the base, tapered end first, as far as it will go. The lower part of the retainer half rings should go into the base.

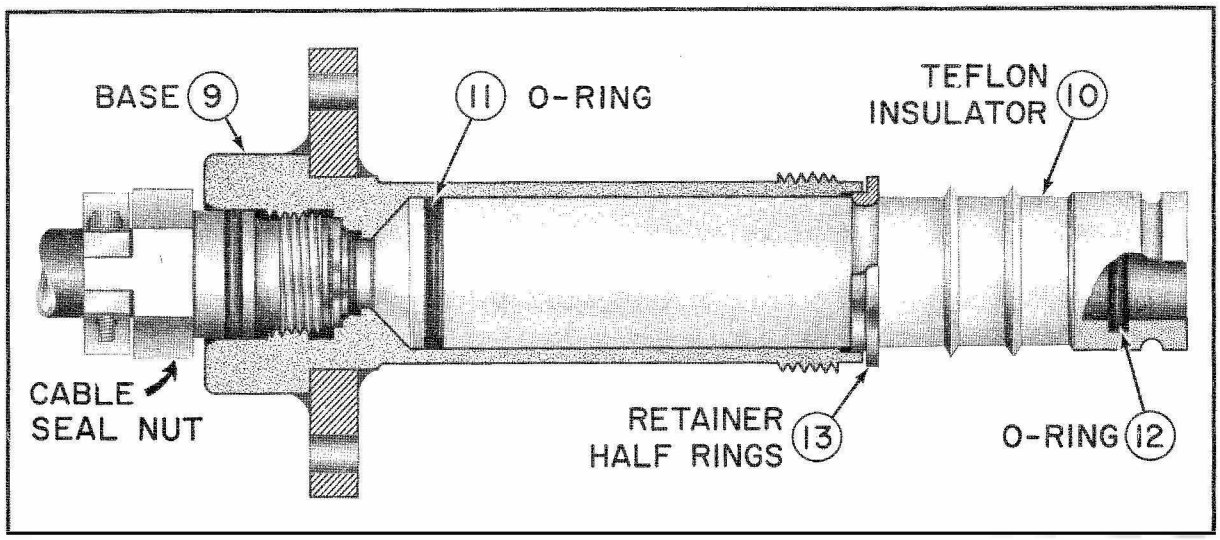


Figure 5-12e. Insulator Installed in Base

Step 4. - Screw lower collar, piece 14, onto the base, but do not tighten. Expand drip shield clamp, piece 19, by loosening the screw and place it over drip shield, piece 20. Place the drip shield on the locking collar, piece 21, and tighten the drip shield clamp screw. Slide this assembly on the center conductor rod, piece 16. Insert the center conductor rod into the insulator. Hold the cable seal nut assembly with a wrench and screw on the base, piece 9. A cut-away view of the assembly, figure 5-12e illustrates the retainer halves and insulator properly seated in the base. Do not permit the cable and cable seal nut to rotate. Place one of the insulator collar halves, piece 17, on the insulator and center conductor rod. The lower rounded lip on the collar should fit into the groove on the end of the teflon insulator. This is shown in figure 5-12f with the drip shield bent back. Now install the remaining half of the collar. Install the two collar screws, piece 18, and tighten with an Allen wrench. Tighten the lower collar on the base.

Tighten the two lower collar set screws, piece 15, and stake them with a center punch at two points 180 degrees apart. Figure 5-12g shows the completed assembly.

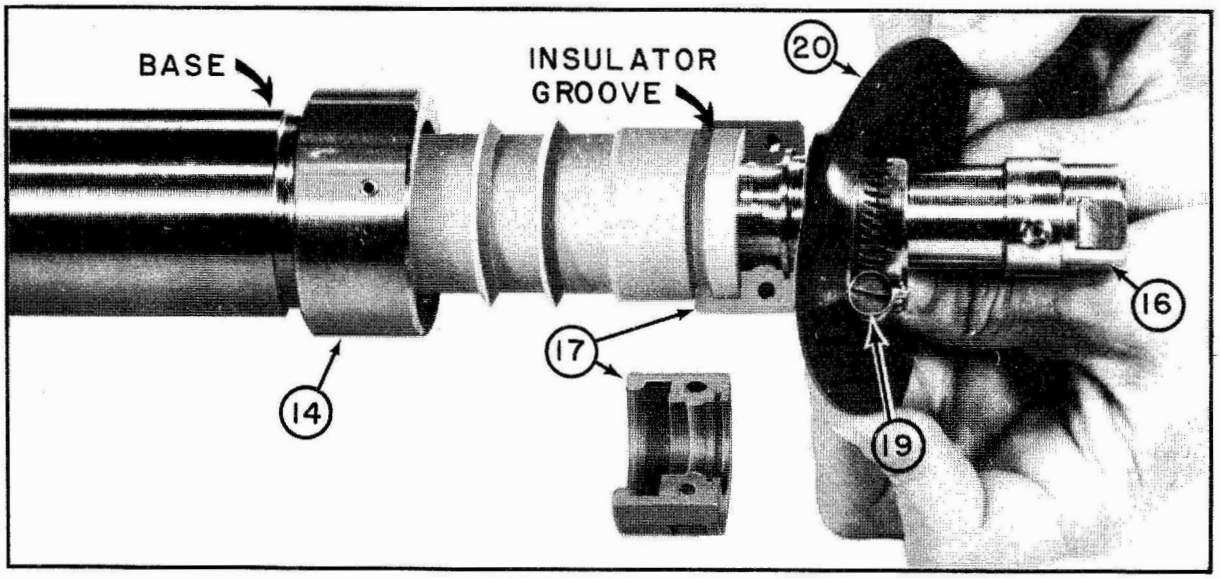


Figure 5-12f. Drip Shield and Center Conductor Installed

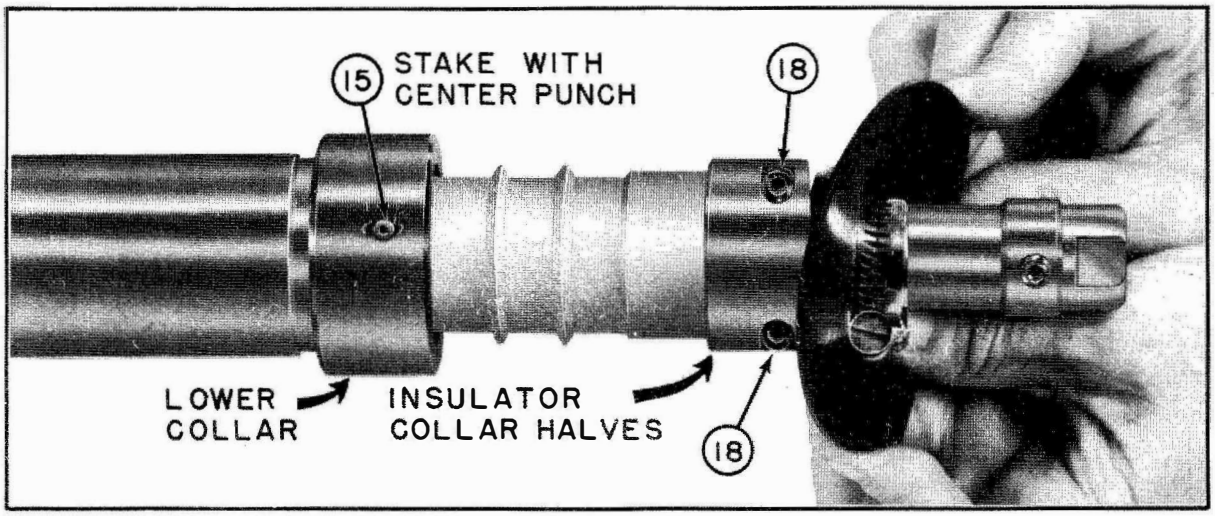


Figure 5-12g. AB-562(XN-1)/U Assembly Completed

(10) AB-234B/B Detailed Assembly. - The parts required for assembly of the RF cable fitting UG-1439/U in the antenna support base are shown in a cut-away view for the completed assembly (figure 5-13a) and an exploded view (figure5-13b). The parts in these illustrations are given part number for identification and are referred to in the Assembly instructions. RG-217/U or RG-14A/U cable is used in these fittings. Table 5-9 lists stock numbers for the parts.

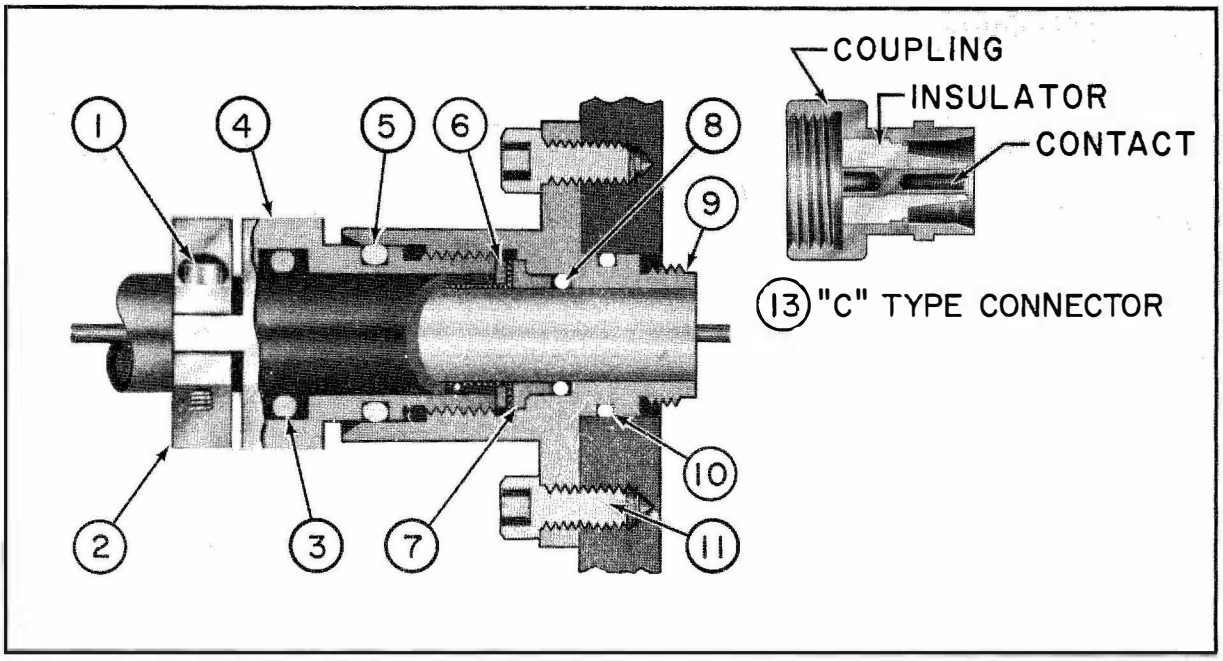


Figure 5-13a. UG-1439/U Assembled

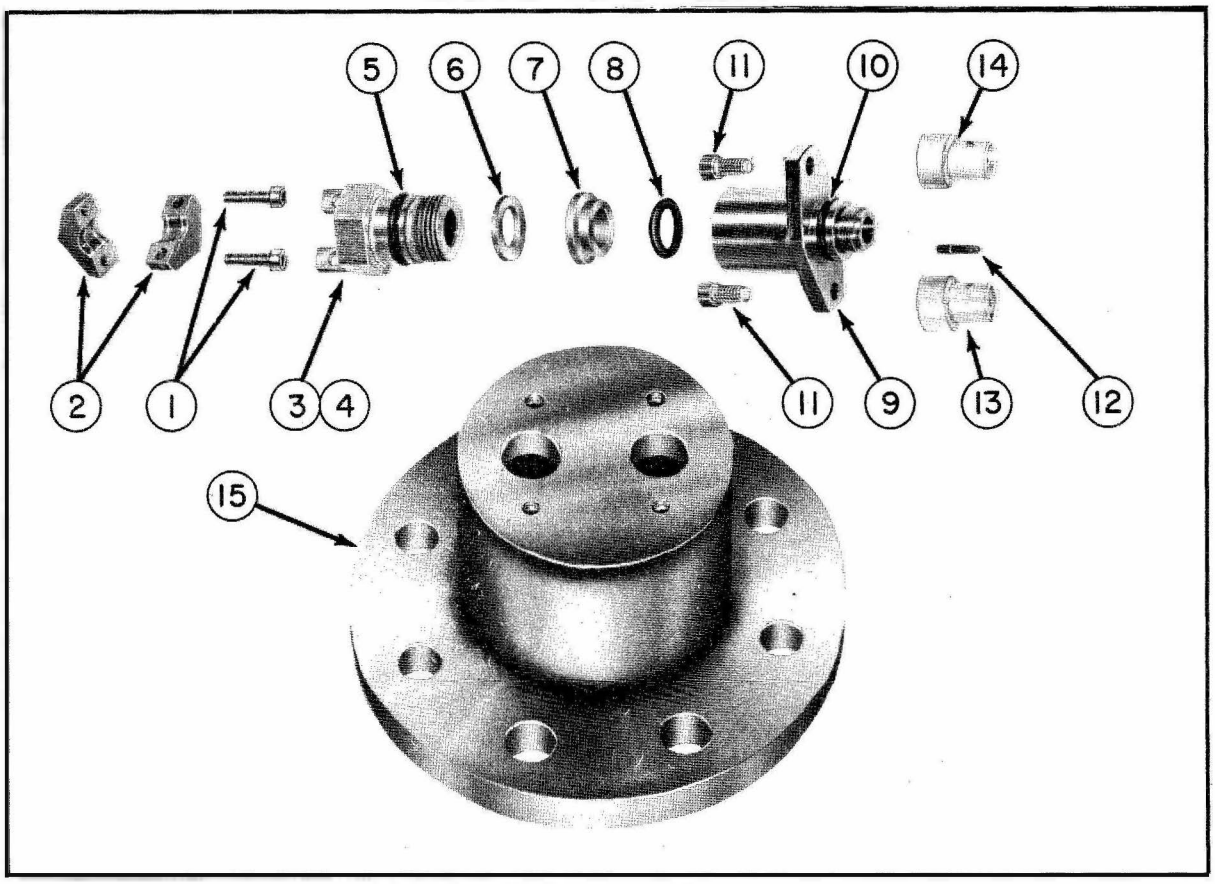


Figure 5-13b. AB-234 B/B Exploded

TABLE 5-9. AB-234 B/B Assembly Stock Numbers

Piece No.	Item	Federal Stock Number
All	AB-234B/B Antenna Base Support	F5985-893-4914
8	AN 6227-8 Packing, Preformed O-Ring	KZG5330-187-3633
10	AN 6227-13 Packing, Preformed, O-Ring	KZG5330-641-0642
3	REA10083-16 Packing, Preformed, O-Ring	KZG5330-808-4547
5	AN 6227-16 Pacing, Preformed, O-Ring	KZ5330-530-1997
1,2,4,6,7	Cable Seal Nut Assembly	N5935-893-0860

(a) CABLE AND FITTING INSTALLATION. - Install the cable run in accordance with section 5-4. New O-rings, pieces 3, 5, 8, and 10 must be used each time a new cable is installed. Complete the following steps for installation of the cable and assembly of the antenna support base and fittings.

STEP 1. - Visually inspect all parts of the fitting and replace any parts found to be damaged. Pay particular attention to the finish of O-ring grooves.

STEP2. - For assembly of the cable seal nut pieces 1 through 8, on the RF cable, complete step 1 through step 6 for the assembly of MX-2326/U, except that in step 4 slide 2 inches of the cable through the nut. The parts are identical except for their size.

STEP 3. - Hold the fitting body, piece 9, with a wrench and screw the cable seal nut into the fitting body. There should be approximately 0.76 inch of the cable dielectric protruding through the fitting body.

STEP 4. - Remove the dielectric from the center conductor by cutting it flush with the end of the fitting body (see figure 5-13c).

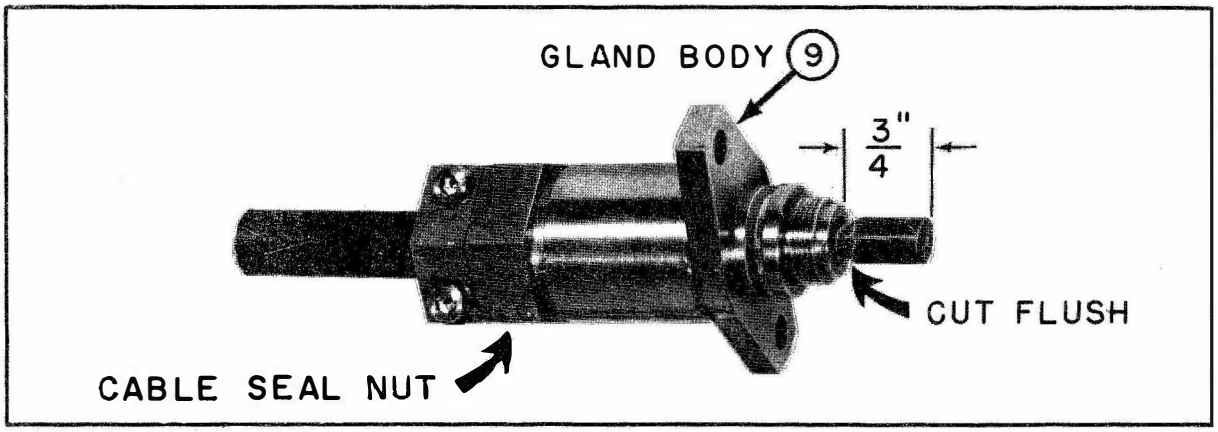


Figure 5-13c. Removing Dielectric

Step 5. - Lubricate O-ring, piece 10, with insulating compound and install it in the groove of the fitting body. Cut the exposed center conductor to a length of 0.219 inch. Using a fine file, round off the end of the center conductor (see figure 5-13d). Solder the contact pin, piece 12, onto the center conductor of the cable. Remove any excess solder from the contact pin and screw the connector, piece 13, into the fitting body (see figure 5-15e).

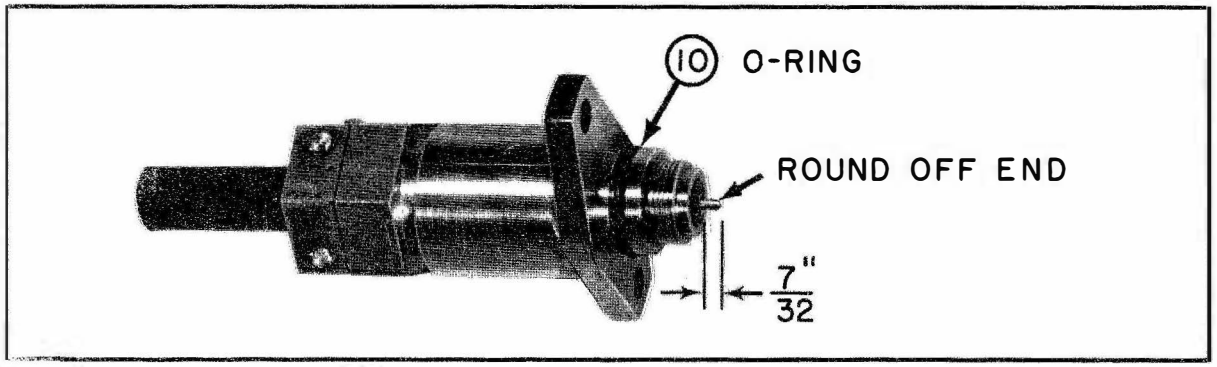


Figure 5-13d. Installing O-Ring

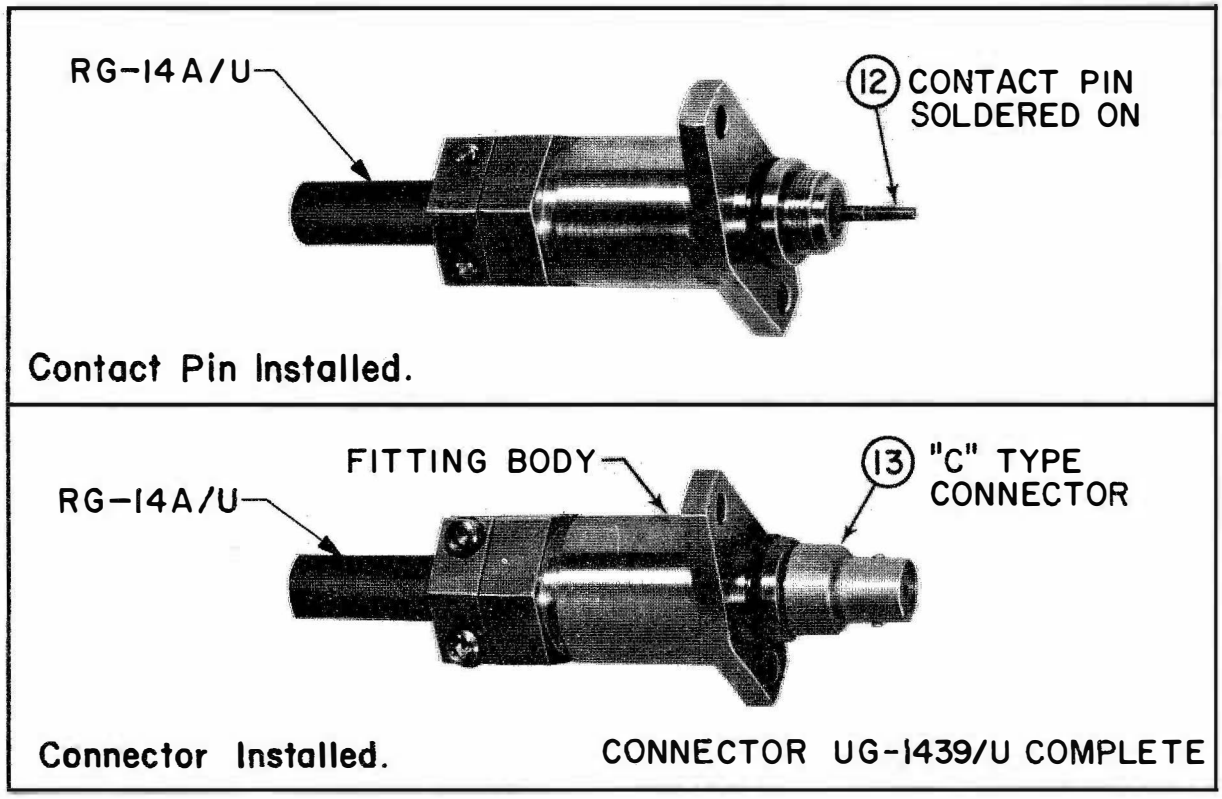


Figure 5-13e. "C" Type Connector Installed

Step 6. - Install the assembled pressureproof fitting in the Antenna Support Base AB-234B/B (see figure 5-13f) and secure in place with the two socket head screws, piece 11.

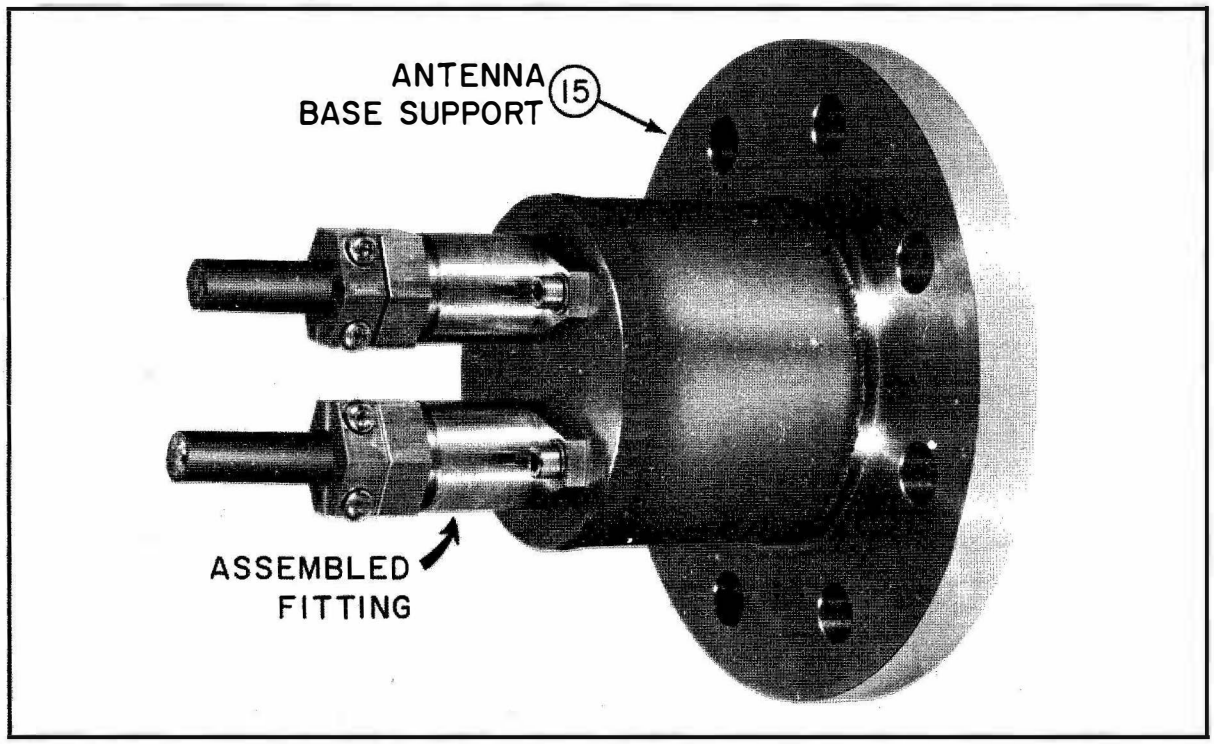


Figure 5-13f. Fitting Installed in Antenna Support Base

5-16. ANTENNA TRUNKS.—Unless otherwise specified antenna trunks are used as feeders from shipboard radio transmitters to antennas. An antenna trunk consists of a thin-walled shell of rectangular or circular cross section that contains a relatively small inner conductor (antenna bus), centered as nearly as practicable within the shell. A typical shipboard antenna trunk installation is shown in figure 16-1. The antenna bus is supported within the shell by standoff insulators. The antenna end of a trunk is ended with an entrance insulator. If a bulkhead is to be passed through, a feed-through insulator is utilized. Insulators are explained in detail later in this section. Within the antenna trunk is also an antenna switch. This switch is mounted between the transmitter and antenna, being as near as practicable to the antenna. Antenna switches are explained in detail later in this section.

The shell of the antenna trunk is for shielding purposes, mechanical protection, and also to prevent accidental contact with the bus by personnel. In exposed locations the antenna trunk shall be installed so as not to be a hazard to personnel. (Figure 16-2 illustrates these clearances.)

a. ANTENNA TRUNK SIZES.—Antenna trunks are constructed in various sizes to accomodate radio transmitters having different frequency ranges and power outputs. A list of trunk sizes and fittings used with some shipboard installations is given in table 16-1. The following trunks are also commonly used in shipboard installations:

(1) Six by eight inches for transmitters having a frequency range of two to 30 MC and an output of less than 100 watts.

(2) Nine by eleven inches for transmitters having a frequency range of 0.175 to 30 MC and an output of 100 to 500 watts.

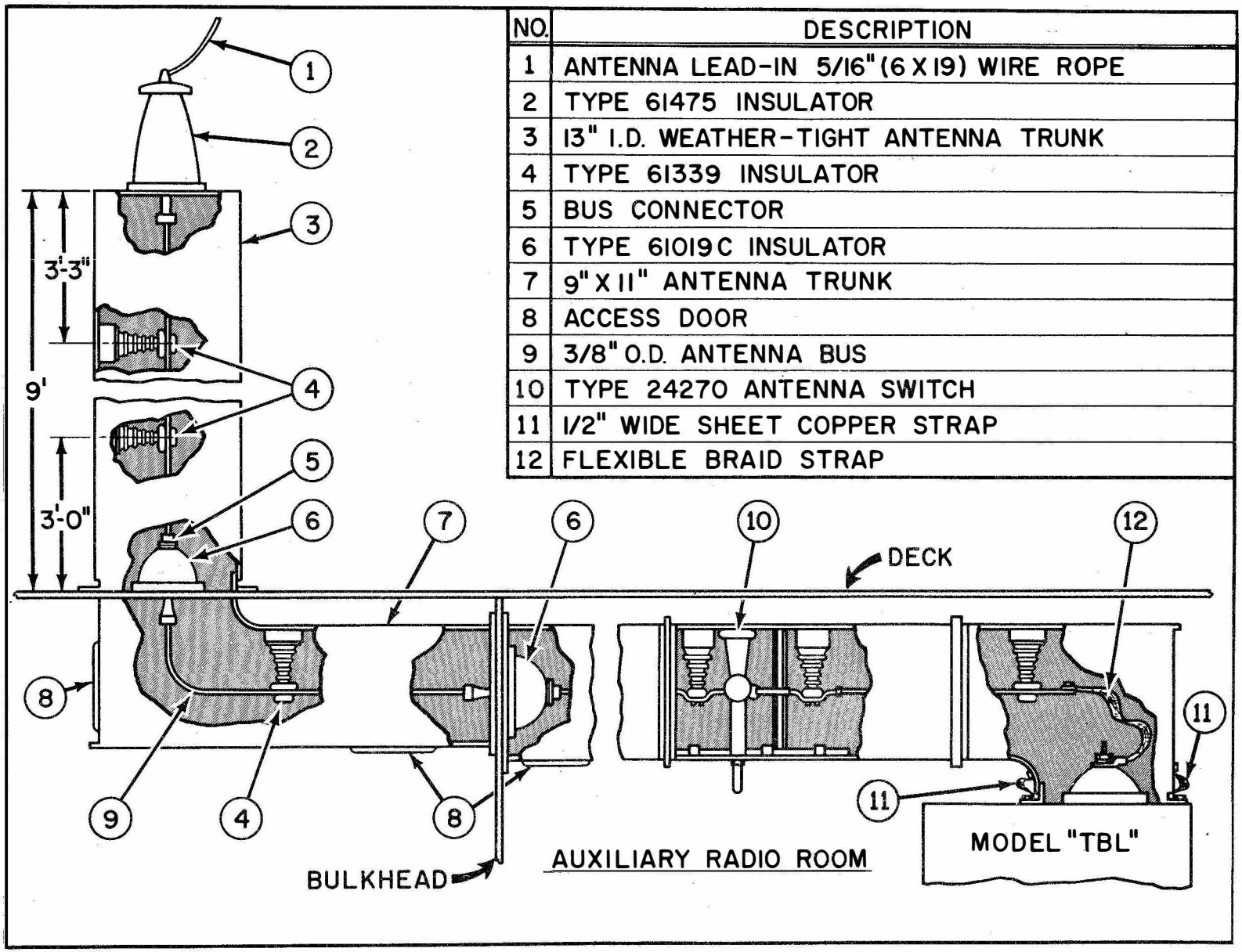
(3) Eighteen by twenty inches for transmitters having a frequency range of 175 to 600 KC and an output of no greater than 500 watts.

b. MATERIAL SPECIFICATIONS.—The shell of antenna trunks shall be fabricated of sheet steel conforming with Military Specification MIL-S-16113, Grade M, Type I, of a minimum thickness of 0.094 inch with a copper cladding of not less than 0.008 inch on the inside of the finished shell.

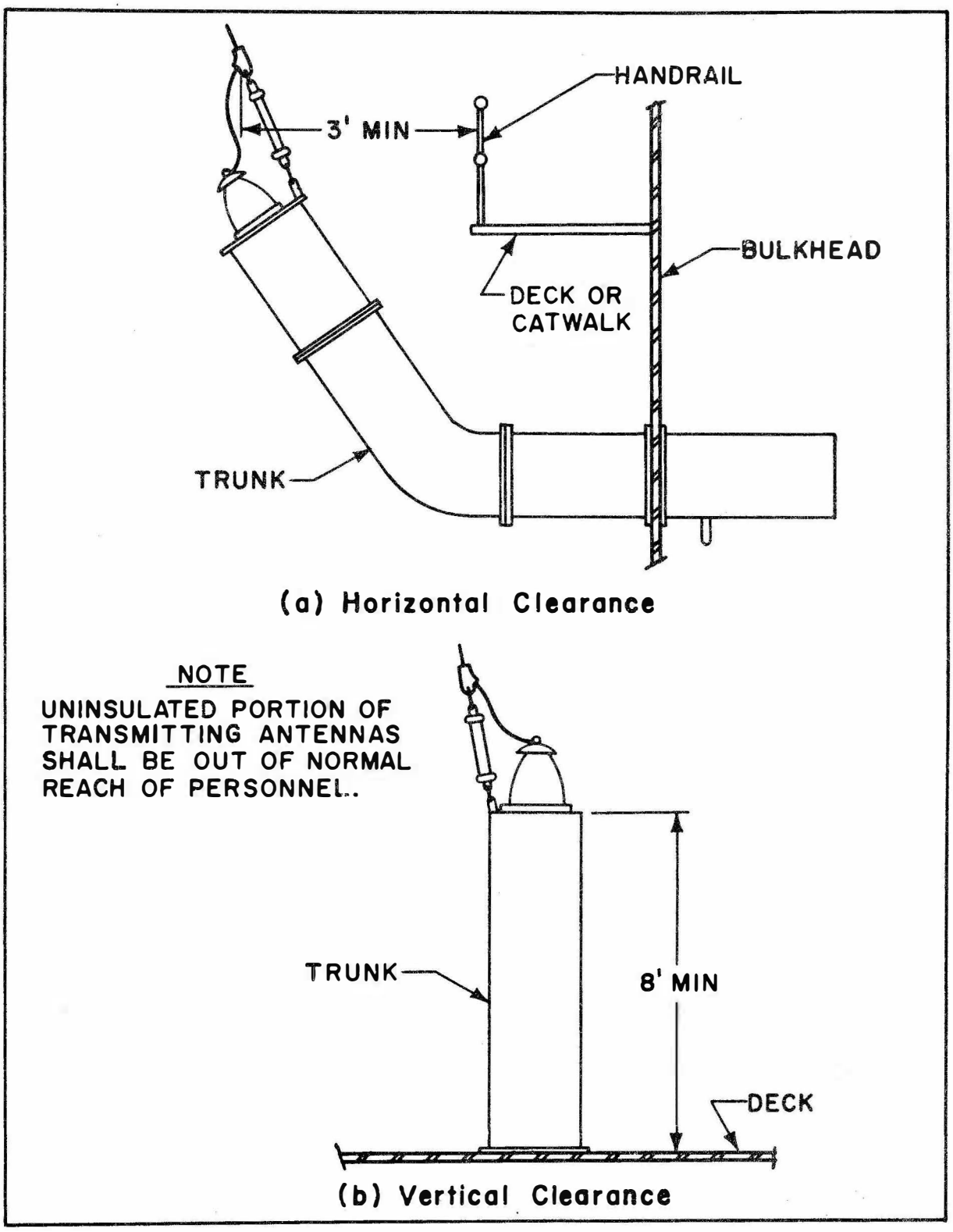
For applications requiring aluminum shells for antenna trunks, such as in mine sweepers where the magnetic signature must be kept low, the aluminum should be 61-ST-6, in accordance with Federal Specification QQ-A-327, with a minimum thickness of 0.125 inch. After fabrication, and before installation, the aluminum shell shall be anodized by an electrolytic chromic acid process, Military Specification MIL-A-8625, or a chemical process MIL-C-5541.

TABLE 16-1. TYPICAL SHIPBOARD RADIO TRANSMITTING ANTENNA TRUNKS.

XMTR (MOD)	ANT BUS (OD)	STANDOFF INS		TRUNK DIM. (IN.)	DISC. DEVICE	BHD/DK INS (INSIDE)	ENT INS (OUTSIDE)
		TYPE	APPROX SP				
TAD	3/8"	61339	36"	9 x 11	24270	61019C	61475
TAJ	3/8"	61339	48"	9 x 11	24270	61019C	61475
TAQ	3/4"	61338	60"	18 x 20	RE66F 312	61475	61475
TBA	3/8"	61339	36"	9 x 11	24270	61019C	61475
TBK	3/8"	61339	36"	9 x 11	24270	61019C	61475
TBL	3/8"	61339	48"	9 x 11	24270	61019C	61475
TBM	3/8"	61339	36"	9 x 11	24270	61019C	61475
TBN	3/8"	61339	36"	9 x 11	24270	61019C	61475
TBU	3/4"	61338	60"	18 x 20	RE66F 312	61475	61475
TCE	3/8"	61175A	48"	6 x 8	24206	61019C	61475
TCH	3/8"	61175A	48"	6 x 8	24206	61471	61019C
TCJ	3/8"	61339	48"	9 x 11	24270	61019C	61475
TCK	3/8"	61339	36"	9 x 11	24270	61019C	61475
TCO	3/8"	61175A	48"	6 x 8	24206	61471	61471
TCP	3/8"	61175A	48"	6 x 8	24206	61471	61019C
TCQ	3/8"	61175A	48"	6 x 8	24206	61471	61471
TCS	3/8"	61175A	48"	6 x 8	24206	61471	61471
TCU	3/8"	61175A	48"	6 x 8	24206	61019C	61019C
TCX	3/8"	61175A	48"	6 x 8	24206	61471	61471
TCZ	3/8"	61175A	48"	6 x 8	24206	61019C	61019C
TDA	3/8"	61339	48"	9 x 11	24270	61019C	61019C
TDB	3/8"	61339	36"	9 x 11	24270	61019C	61019C
TDE	3/8"	61775A	48"	6 x 8	24206	61019C	61019C
TDJ	3/8"	61339	36"	9 x 11	24270	61019C	61019C



NO.	DESCRIPTION
1	ANTENNA LEAD-IN 5/16" (6 X 19) WIRE ROPE
2	TYPE 61475 INSULATOR
3	13" I.D. WEATHER-TIGHT ANTENNA TRUNK
4	TYPE 61339 INSULATOR
5	BUS CONNECTOR
6	TYPE 61019C INSULATOR
7	9" X 11" ANTENNA TRUNK
8	ACCESS DOOR
9	3/8" O.D. ANTENNA BUS
10	TYPE 24270 ANTENNA SWITCH
11	1/2" WIDE SHEET COPPER STRAP
12	FLEXIBLE BRAID STRAP


HANDRAIL
3' MIN
BULKHEAD
DECK OR
CATWALK
TRUNK
(a) Horizontal Clearance
NOTE
UNINSULATED PORTION OF
TRANSMITTING ANTENNAS
SHALL BE OUT OF NORMAL
REACH OF PERSONNEL.
TRUNK
8' MIN
DECK
(b) Vertical Clearance

The antenna bus shall be copper tubing in accordance with Federal Specification, WW-T-799. Refer to table 16-1 for outside diameter of copper tubing to be used.

c. INSULATORS. – The types of insulators used with the various sizes of antenna trunks are shown in table 16-1. All insulators shall be mounted with bolts, studs, or screws: brazing or welding is not acceptable.

(1) STANDOFF INSULATORS.–The Standoff or pedestal type insulators are used to support antennas or open-wire transmission lines away from the ship's structure. These insulators have found general application as an antenna bus insulator in trunk lines between the transmitter and the antenna. These insulators are mounted on soft rubber pads, 1/4 inch thick and of the same diameter as the insulator base. Pads are fabricated of rubber conforming to Military Specifications MIL-R-880 or MIL-R-900. The different types of standoff insulators are illustrated in figures 16-3, 16-4, and 16-5. Descriptions and specifications are included in the applicable figures.

(2) ENTRANCE INSULATORS.–This type insulator is mounted on the terminating (antenna) end of an antenna trunk. An insulator of this type consists of various parts. These parts are listed in table 16-2 with materials and specifications. Installation of this type insulator shall include a corona shield, and an approved type of water proof gaskets. Refer to figures 16-6, 16-7 and 16-8 for illustrations of this type insulator. Description and specifications are included in applicable figures.

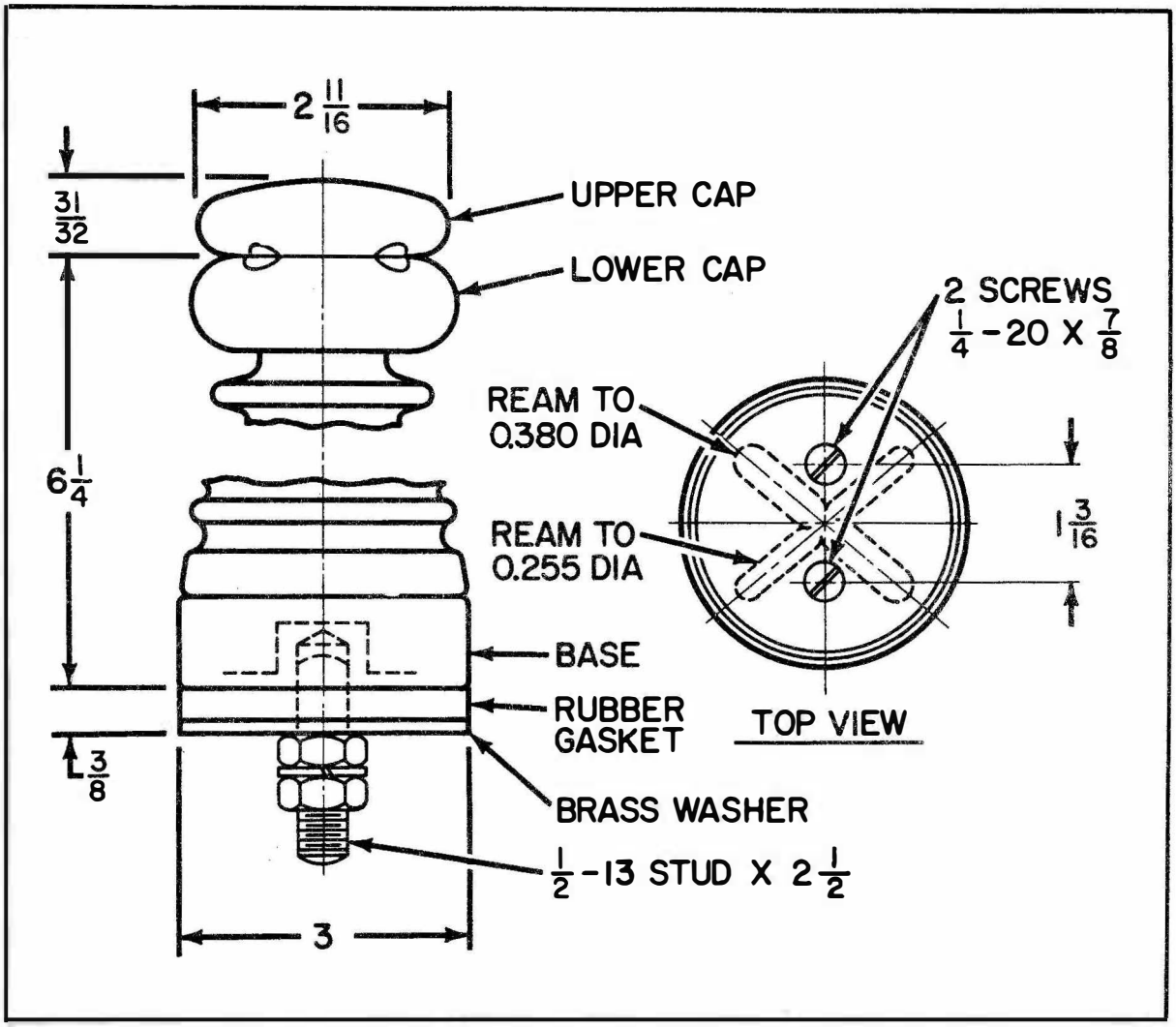
(3) FEED THROUGH OR (BULKHEAD) INSULATORS.–This type insulator is identical to the entrance insulator. When this insulator is installed in an antenna trunk it need not be provided with the corona shield. This insulator finds general application in isolating the antenna feed line as it passes through a structural part of the ship.

d. ANTENNA SWITCHES.–Antenna switches are used in shipboard installations to provide a means of either disconnecting the antenna from the radio transmitter or grounding the antenna. Antenna switches shall be of the type specified, or fabricated in accordance with the BuShips plans. The types of switches used in shipboard trunk installations are as follows:

(1) NAVY TYPE 24270.–Antenna Disconnect switch Navy Type 24270 is shown in figure 16-9. This disconnect switch is essentially a section of the antenna trunk containing a single-pole, three-position knife switch. The three positions are marked on the cover: "GROUND, "CLOSED", and "OPEN". This switch has a shield or blanking off plate, which is inserted into the trunk section of the switch between the switch mechanism and the bus leading to the transmitter. An interlock prevents the shield from being inserted into the slide except when the switch is in the grounded position. After the shield has been inserted into the slide, it locks the operating handle in the grounded position. This prevents closing the switch again before the shield has been removed. The trunk section of the switch is fabricated of copper-clad steel (copper cladding 0.008 inch thick inside only). See table 16-3 for specifications.

TABLE 16-2. INSULATOR PARTS.

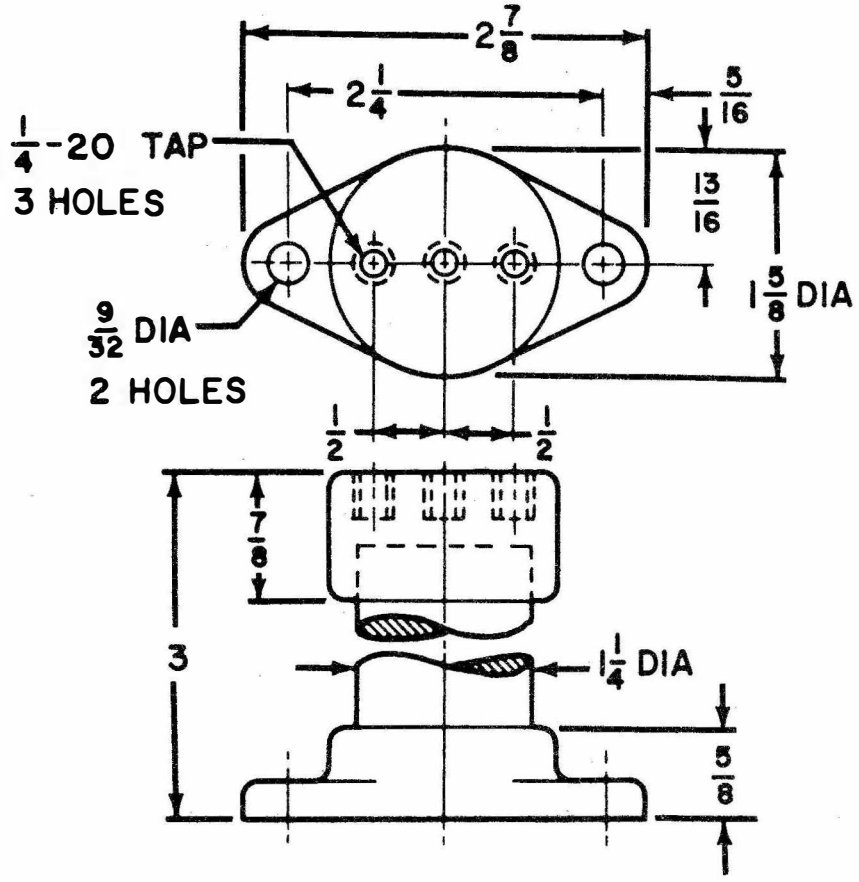
NO. REQ'D	DESCRIPTION	MATERIAL	SPECIFICATION
4	Gasket	Neoprene	N. D. Spec. 33R1 Class 1 or 2
1	Insulator Bowl	Ceramic	JAN-1-10 Grade L-2
6	Pin 1/8" DIA x 13/16" long	Stainless Steel	
1	Shield	Brass	N. D. Spec. 46B6
6	1/2" 13 N. C. HEX. NUT	Brass or Bronze	N. D. Spec. 46B6 if machined 46B8 or 46B23 if cast.
7	Lockwasher 1/2" x 13/16" x 1/8"	Phospor Bronze	
6	1/2" - 13 N. C. STUD	Brass	N. D. Spec. 46B6
1	Flange Ring	Brass or Bronze	N. D. Spec. 46B6 if machined 46B8 or 46B23 if cast.
1	Clamping Ring	Brass or Bronze	N. D. Spec. 46B6 if machined 46B8 or 46B23 if cast.
7	1/2" - 13 N. C. Acorn Nut	Brass or Bronze	N. D. Spec. 46B6 if machined 46B8 or 46B23 if cast.
1	Terminal	Brass or Bronze	N. D. Spec. 46B6 or 46B23
1	Spacer	Brass	N. D. Spec. 46B6 (Type 61019C only)
1	Special HEX. Nut	Brass or Bronze	N. D. Spec. 46B6 if machined 46B8 or 46B23 if cast.
1	Conductor Rod	Bronze	N. D. Spec. 49B3 (Type 6019C)
1	Conductor Rod	Bronze	N. D. Spec. 46B6 (Type 61475)



DESCRIPTION. - Standoff Insulator, Navy Type 61339, may be used to support a 1/4 inch or a 3/8 inch conductor.

MATERIAL:	
BODY	Brown Glazed Porcelain, Grade L2
BASE AND CAPS	Brass or Bronze
DRY VOLTAGE BREAKDOWN	40 KV
ULTIMATE TENSILE STRENGTH	1800 LB
ULTIMATE COMPRESSION LOAD	12,500 LB
CANTILEVER STRENGTH:	
MINIMUM	200 LB
ULTIMATE	400 LB
CONTINUOUS WORKING	120 LB
APPROXIMATE WEIGHT	7-3/4 LB
FEDERAL STOCK NUMBER	N5970-117-4944
REFERENCE	BUSHIPS DWG RE-61F-262

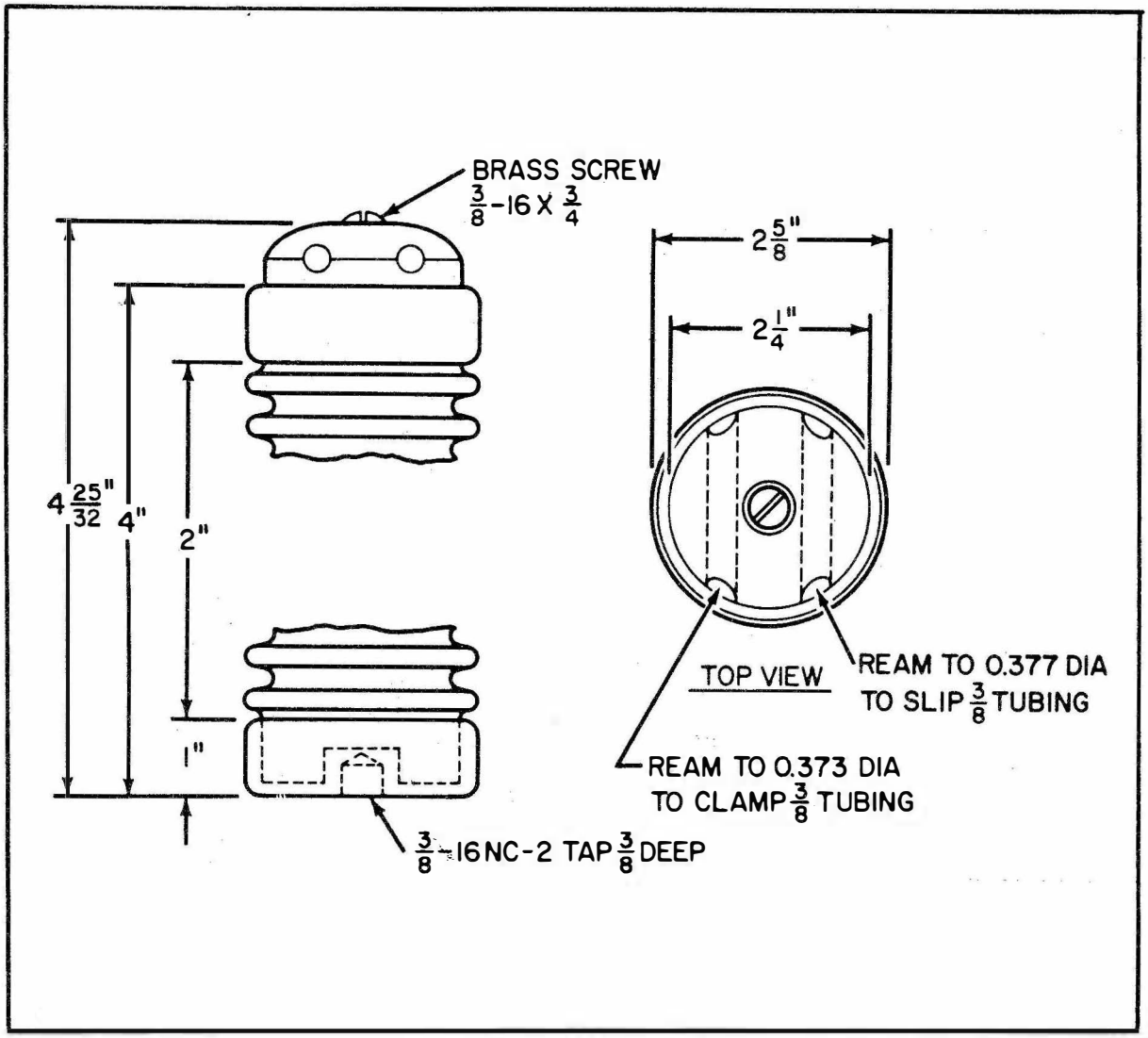
Figure 16-3. Standoff Insulator Type 61339



DESCRIPTION. - Standoff Insulator, Navy Type 61174B, consists of a cylindrical ceramic body with a metal base and cap.

MATERIAL:	
BODY	Ceramic, Brown, Glazed
BASE AND CAP	Brass
TENSILE STRENGTH:	
MINIMUM	650 LB
ULTIMATE	900 LB
CANTILEVER STRENGTH:	
MINIMUM	170 LB
ULTIMATE	240 LB
CONTINUOUS WORKING	120 LB
APPROXIMATE WEIGHT	1-1/2 LB
FEDERAL STOCK NUMBER	N5970-175-2870
REFERENCE	BUSHIPS DWG RE-61A-247

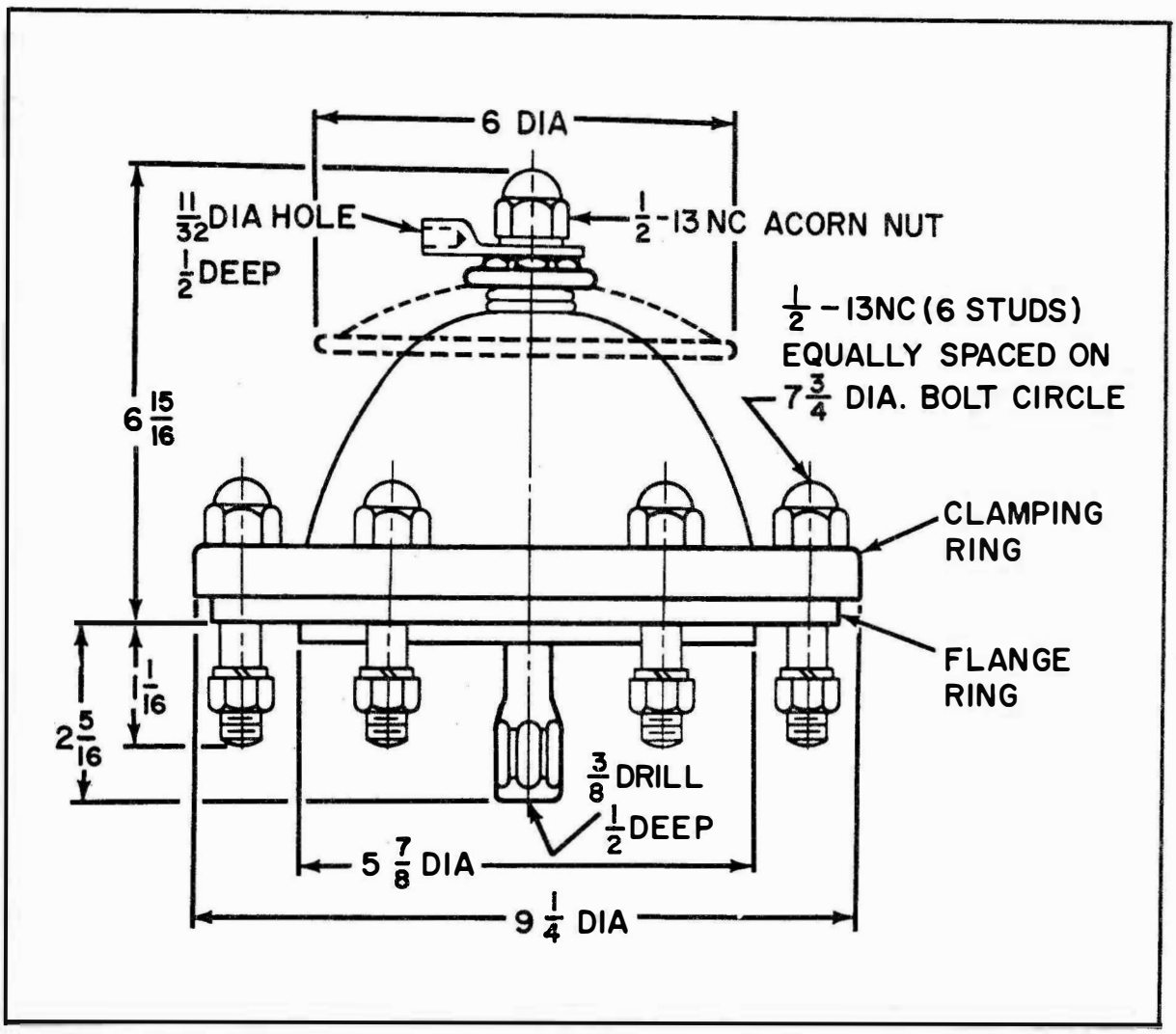
Figure 16-4. Standoff Insulator Type 61174B



DESCRIPTION. - Standoff Insulator, Navy Type 61175A, may be used to support a 3/8 inch conductor.

MATERIAL:	
BODY	Porcelain Grade L2
BASE AND CAP	Brass
COLOR	Brown Glazed
TENSILE STRENGTH:	
MINIMUM	1,000 LB
ULTIMATE	2,000 LB
CANTILEVER STRENGTH:	
MINIMUM	525 LB
ULTIMATE	750 LB
APPROXIMATE WEIGHT	3-3/4 LB
FEDERAL STOCK NUMBER	N5970-284-4296
REFERENCE	BUSHIPS DWG RE-61AA-249

Figure 16-5. Standoff Insulator Type 61175A



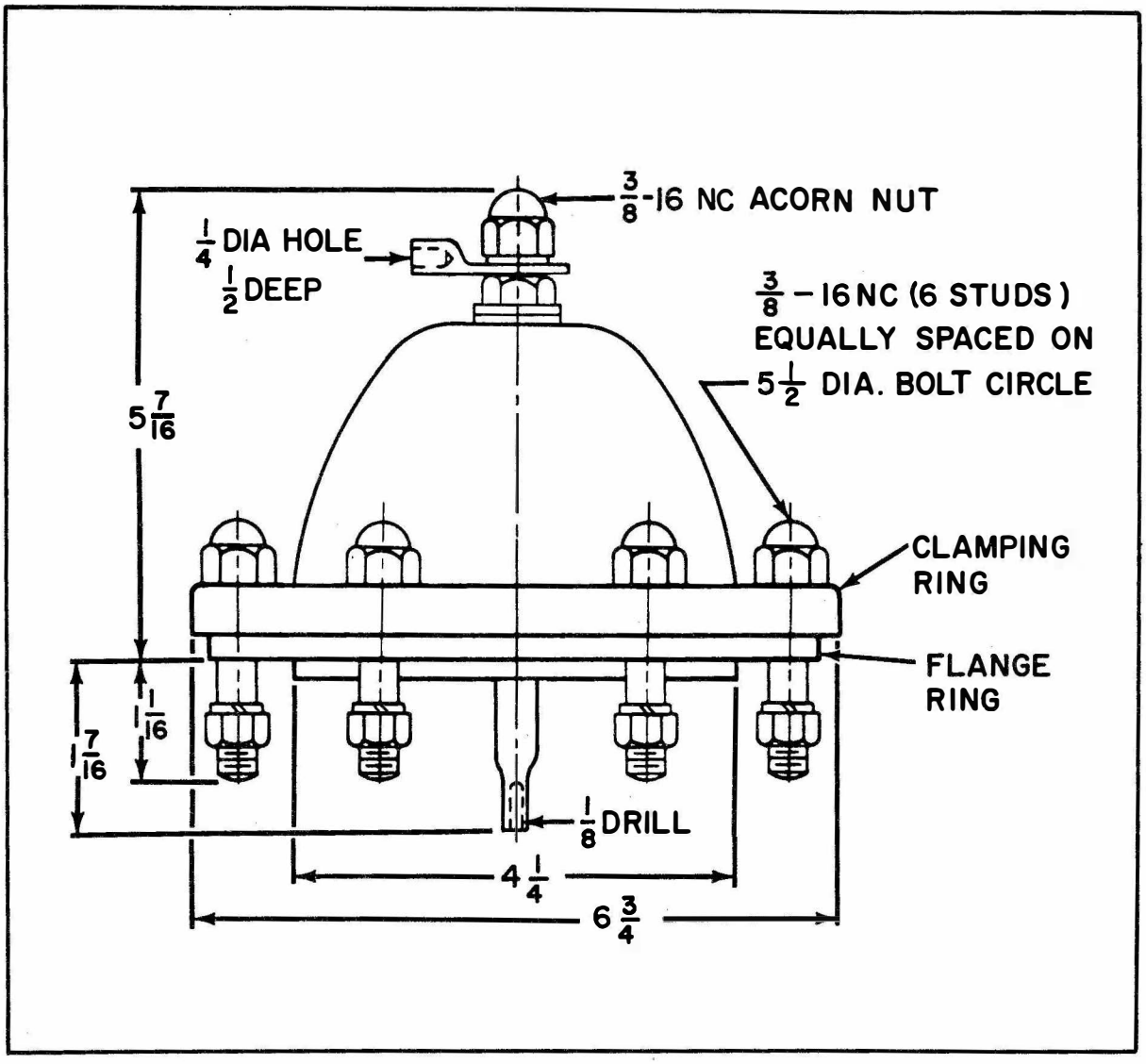
DESCRIPTION. - Entrance Insulator, Navy Type 61019C, consists of a bell shaped bowl (JAN Type NP2B4701), conductor rod, flange ring, clamping ring, corona shield, and necessary gaskets, washers, spacers, studs, nuts, pins, and a lug terminal. When the bowl is shipped separately, four neoprene gaskets are shipped with it.

MATERIAL:

BOWL	Brown Glazed Ceramic, Grade L2
CONDUCTOR ROD	Bronze
FLANGE RING	Brass or Bronze
CLAMPING RING	Brass or Bronze
CORONA SHIELD	Bronze

DRY FLASHOVER TEST	50 KV Peak
APPROXIMATE WEIGHT	16-1/2 LB
FEDERAL STOCK NUMBER	N5970-665-0490
REFERENCE	BUSHIPS DWG RE-61F-203

Figure 16-6. Entrance Insulator Type 61019C



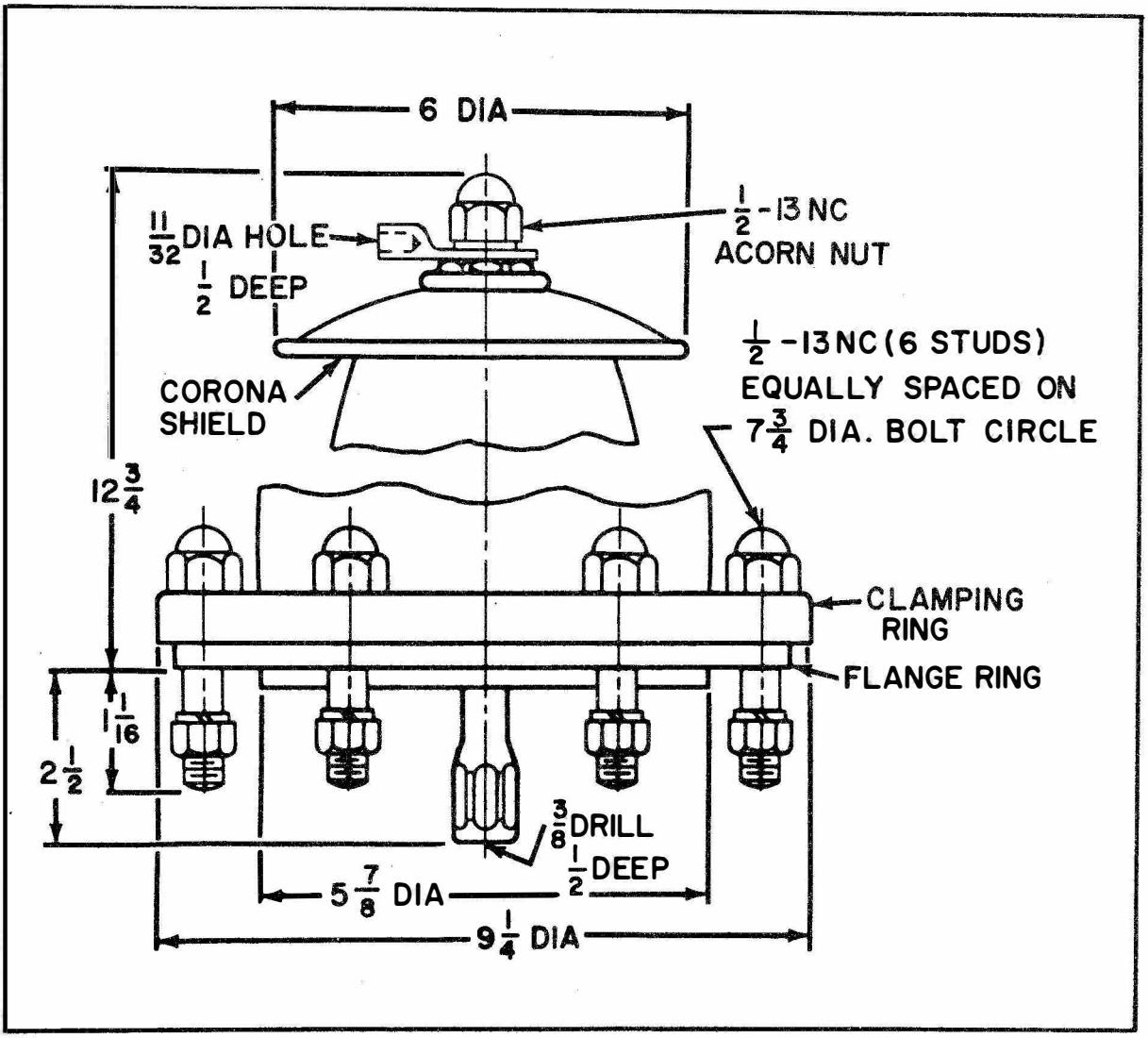
DESCRIPTION. - Entrance Insulator, Navy Type 61471, consists of a bowl (Navy Type 61470), conductor rod, flange ring, clamping ring, and necessary gaskets, washers, studs, nuts, and lug terminal. When the bowl is shipped separately, four neoprene gaskets are shipped with it.

MATERIAL:

BOWL	Brown Glazed Ceramic, Grade L2
CONDUCTOR ROD	Bronze
FLANGE RING	Brass or Bronze
CLAMPING RING	Brass

DRY FLASHOVER TEST	20 KV Peak
APPROXIMATE WEIGHT	6-1/2 LB
FEDERAL STOCK NUMBER	N5970-117-4973
REFERENCE	BUSHIPS DWG RE-61F-293

Figure 16-7. Entrance Insulator Type 61471



DESCRIPTION. - Entrance Insulator, Navy Type 61475, consists of a dome shaped bowl (Navy Type 61476), conductor rod, clamping ring, flange ring, corona shield, and necessary washers, gaskets, bolts, nuts, and lug terminal.

MATERIAL:

BOWL	Brown Glazed Porcelain, Grade L2
CONDUCTOR ROD	Bronze
FLANGE RING	Brass or Bronze
CLAMPING RING	Brass or Bronze
CORONA SHIELD	Brass

DRY FLASHOVER TEST	50 KV Peak
APPROXIMATE WEIGHT	24 LB
FEDERAL STOCK NUMBER	N5970-280-9948
REFERENCE	BUSHIPS DWG RE-61F-298

Figure 16-8. Entrance Insulator Type 61475

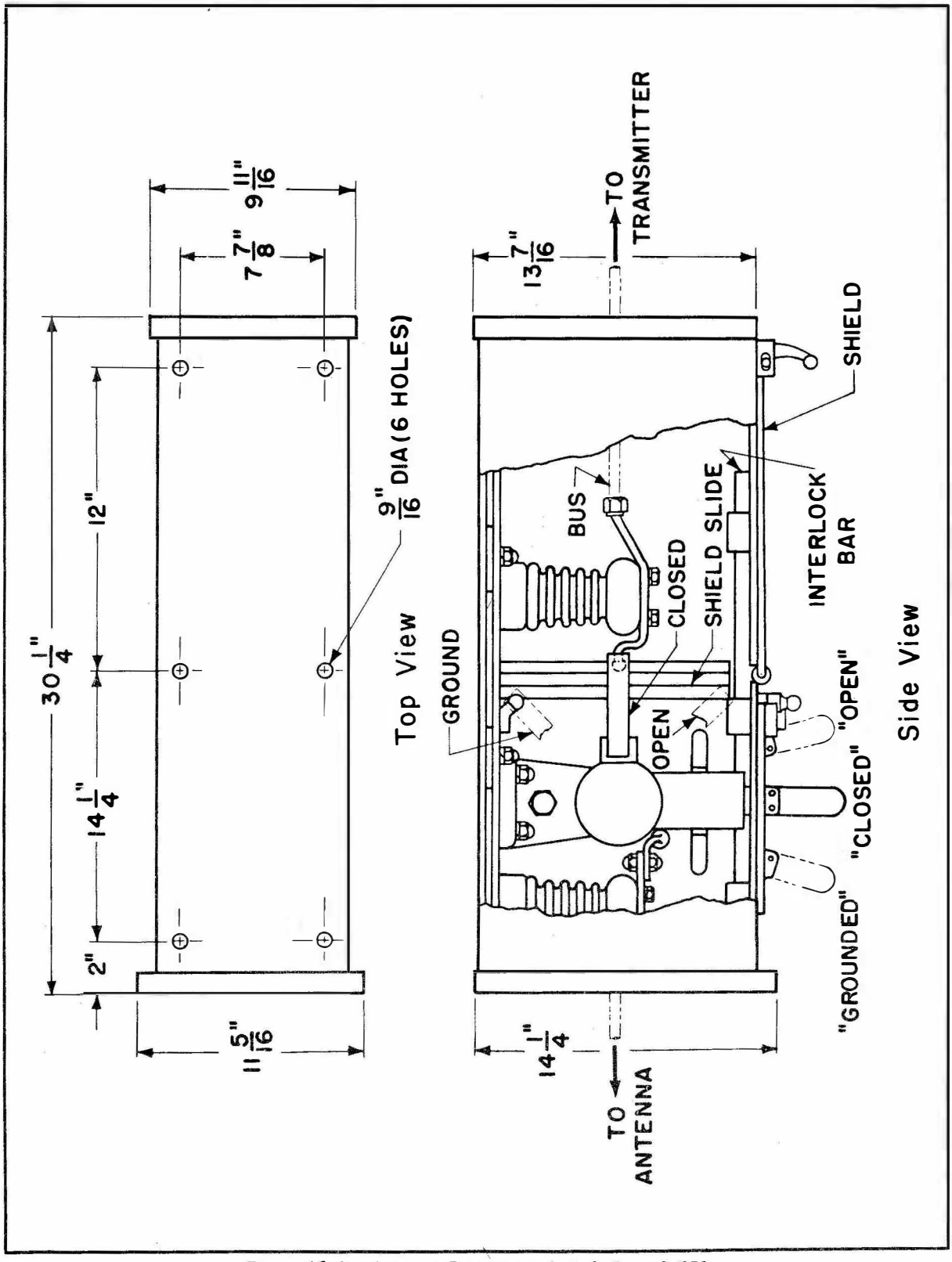


Figure 16-9. Antenna Disconnect Switch Type 24270

(2) NAVY TYPE 24206.—Antenna disconnect switch Navy Type 24206 is shown in figure 16-10. This disconnect switch is a single-pole, double-throw knife switch. It has two positions: "CLOSED" and "GROUNDED". In the "CLOSED" position the radio transmitter is connected to the antenna. In the "GROUNDED" position the antenna is grounded and the transmitter is disconnected from the antenna. The switch contains two Navy Type 61175A insulators as supports. It has two compression type terminals for clamping on a 3/8 inch OD copper antenna bus (see table 16-3 for specifications).

(3) NAVY TYPE 24223.—Antenna disconnect switch Navy Type 24223 is shown in figure 16-11. This disconnect switch is a single-pole, double-throw knife switch. It has two positions: "CLOSED" and "GROUNDED". In the "CLOSED" position the radio transmitter is connected to the antenna. In the "GROUNDED" position the antenna is grounded and the transmitter is disconnected from the antenna. It has a bus bar clamp type terminal in the ends for clamping on a 3/8 inch OD copper antenna bus. The switch is supported by two Navy Type 61174B insulators (see table 16-3 for specifications).

TABLE 16-3. ANTENNA DISCONNECT SWITCHES

TYPE	AMPERAGE	VOLTAGE	FIIN	RG DWG NO.
24270	200	15000	N5930-412-1056	24J161A
24206	200	7500	N5930-472-1631	24F146
24233	100	2500	N5930-412-1058	24F147

e. INSTALLATION.—Antenna trunks shall be continuous both mechanically and electrically from the transmitter to the antenna end of the trunk.

(1) LENGTH.—They shall be as short and as free from bends as practicable. The inside corner of all trunk bends shall have a minimum radius of three inches.

(2) ACCESS.—Access doors or removable sections shall be provided to permit inspection and maintenance of all pedestal and feed through insulators enclosed in the trunk.

(3) SEAMS.—Each seam and joint in which continuity of shielding or electrical conductivity must be maintained shall be welded.

(4) INTERIOR.—The inside of the trunk shall be free of dirt, scale, oil, water, or oxidation. All plane surfaces shall be smooth; screws, bolts, burrs or sharp edges shall not protrude from the inside surface of trunks. All joints shall be free of rough or jagged edges or slag resulting from welding.

(5) INNER CONDUCTOR.—The inner conductor shall be free of kinks, dents, rough spots, or other deformations. When necessary to join inner conductors to form a continuous length, a copper sleeve shall be fitted over the ends of the inner conductor and soldered. The inner conductors are supported by means of standoff insulators of the type described in paragraph 16-1c.(1) of this section.

CAUTION

Paint, varnish, shellac, grease or any form of coating shall not be applied to the inner conductor, to any metallic portion of any insulator in contact with the inner conductor, nor to any portion of ceramic or phenolic insulating materials forming a part of the antenna system.

(6) BONDING.—The transmitter end of the trunk shall be bonded to the transmitter by at least two straps in accordance with BUSHIPS drawing RE-66-D-2071. The straps shall be sheet copper or brass not less than 0.020 inch thick by 1/2 inch wide.

(7) PAINTING.—The inside and outside of trunk shells shall be painted in accordance with section S19-1 of the BUSHIPS Manual.

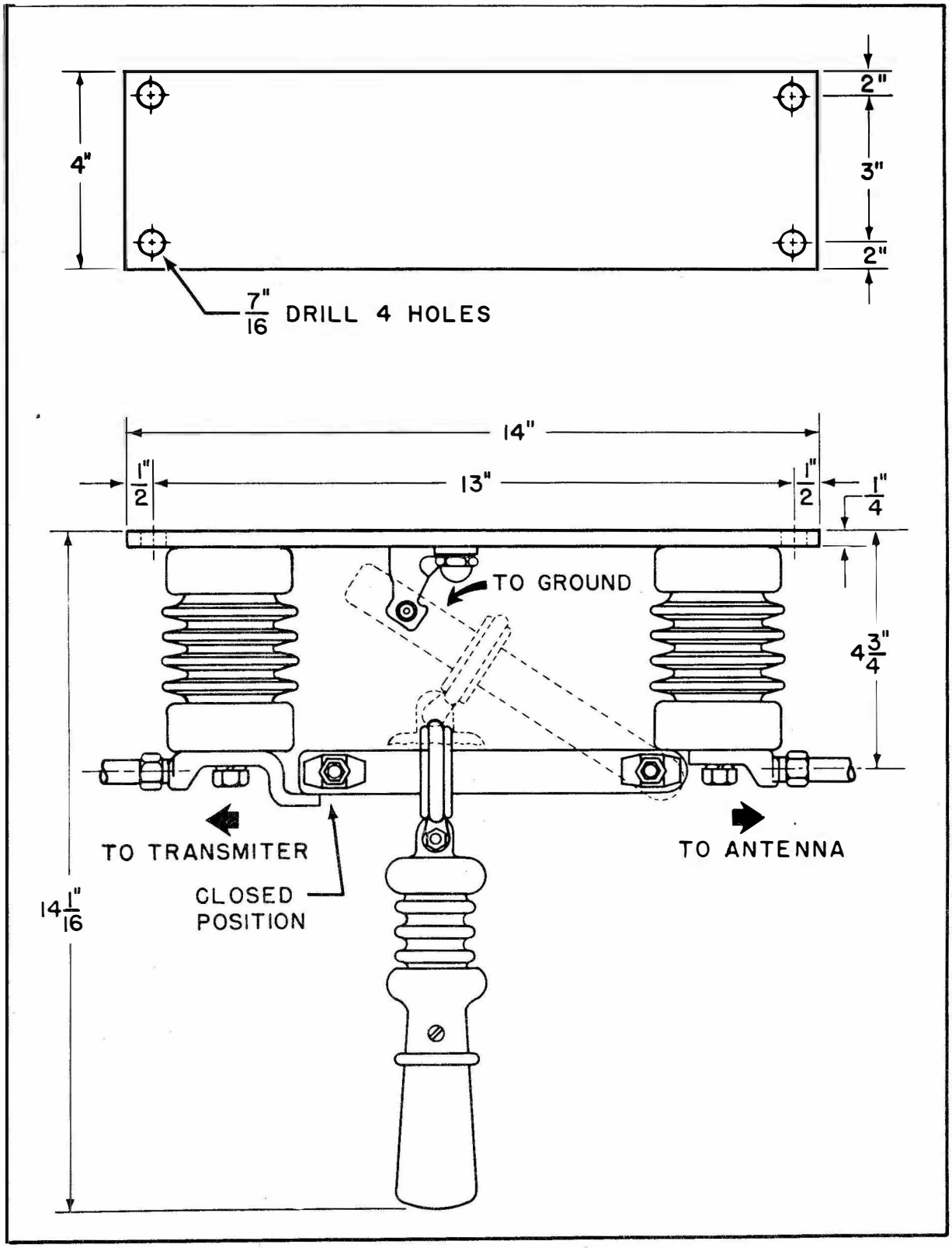


Figure 16-10. Antenna Disconnect Switch Type 24206

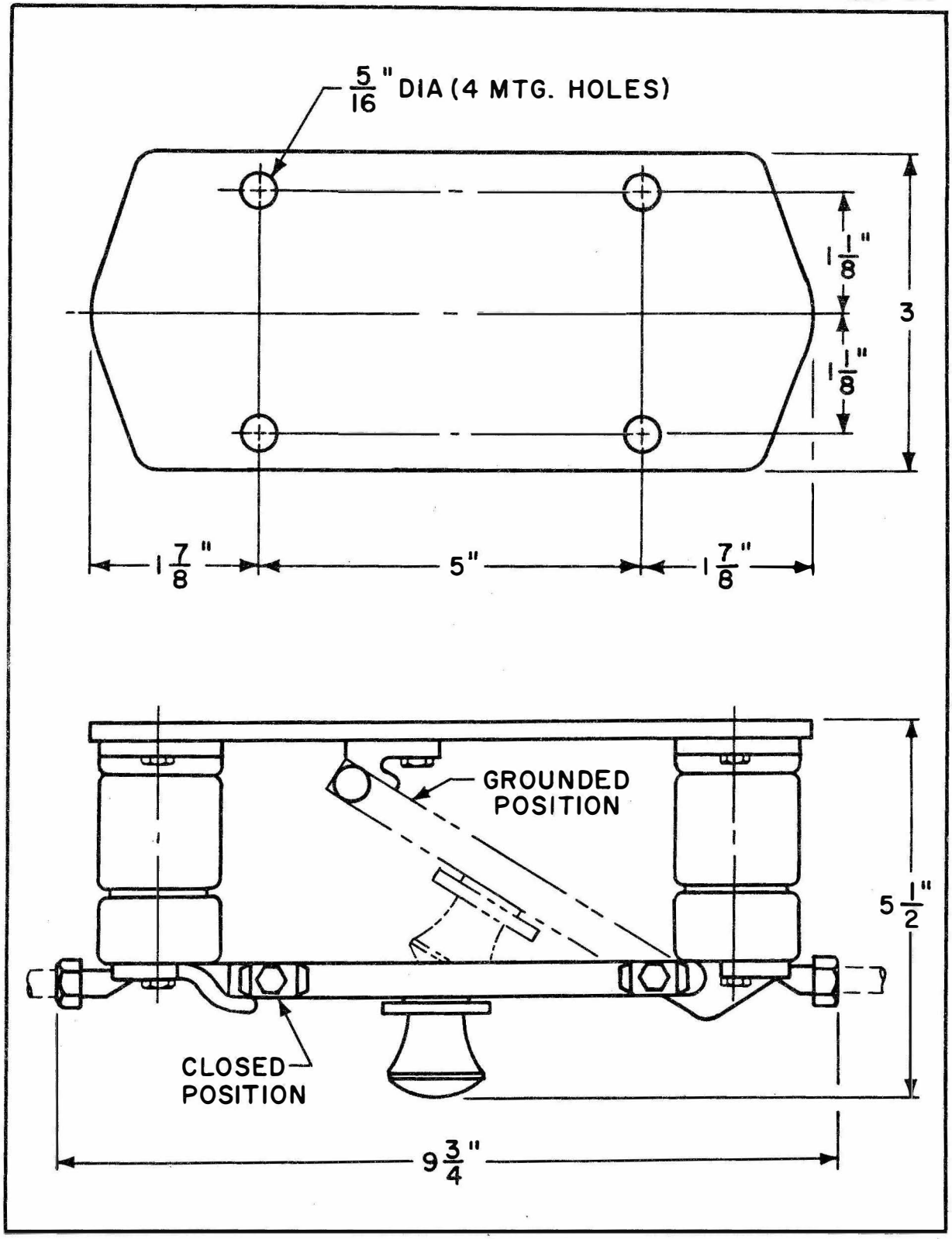


Figure 16-11. Antenna Disconnect Switch Type 24223