MS-E Series Electrical Connectors

Installation Instructions

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Form L-410-4

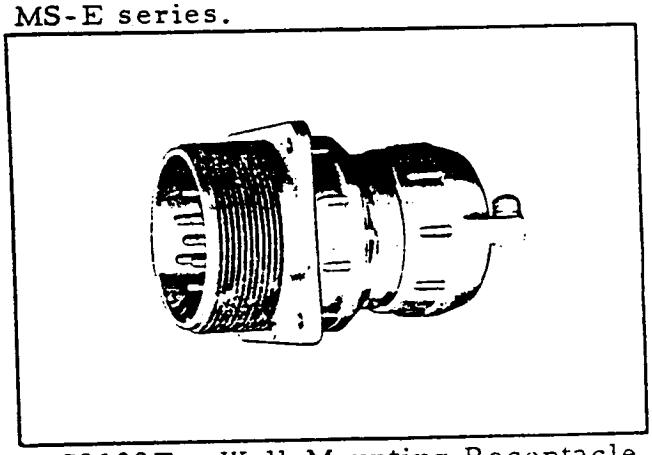
Bendix Electrical Components Division

Sidney, N. Y. 13838

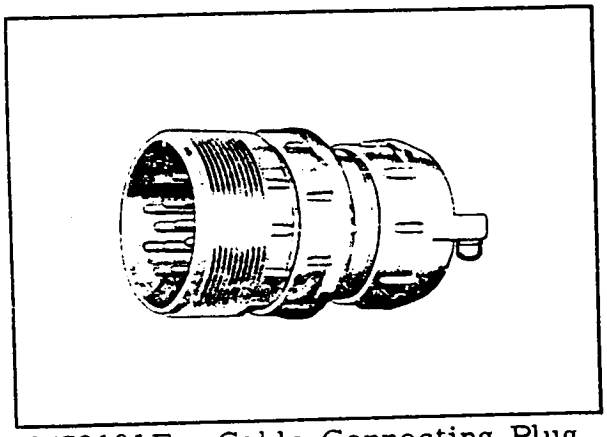
INTRODUCTION

This publication contains instructions for installing, disassembling, inspecting and reassembling the Bendix MS-E Environmental Resisting Electrical Connectors manufactured by Electrical Components Division of The Bendix Corporation, Sidney, New York 13838.

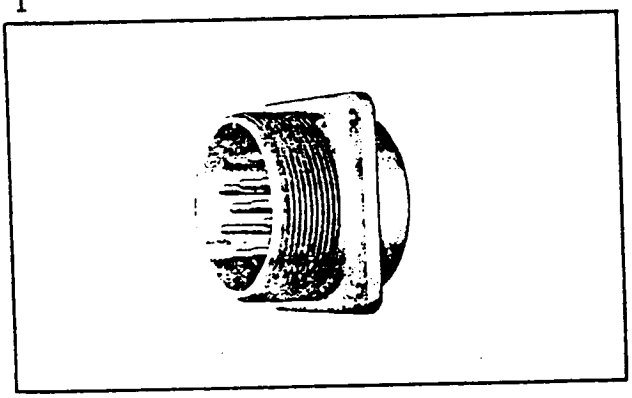
Figures 1 through 5 illustrate the five shell styles available in the Bendix MS-E series.



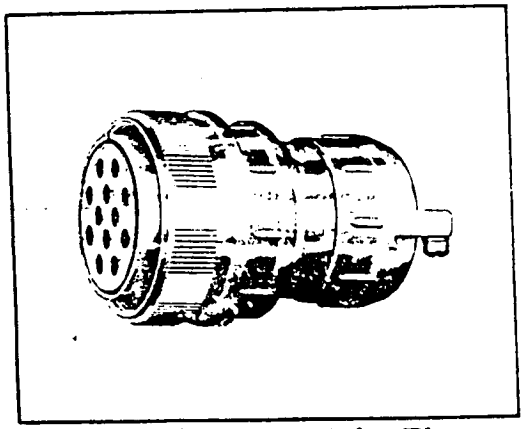
MS3100E - Wall Mounting Receptacle
Figure 1



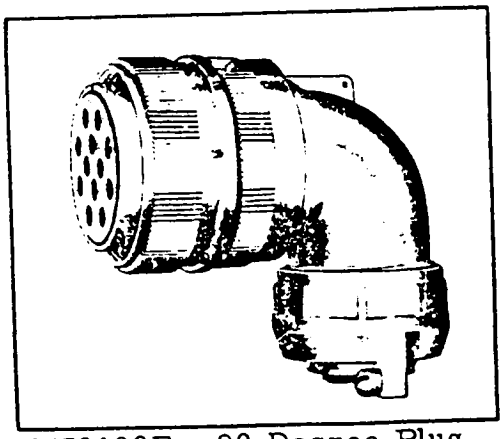
MS3101E - Cable Connecting Plug
Figure 2



MS3102E - Box Mounting Receptacle
Figure 3



MS3106E - Straight Plug
Figure 4



MS3108E - 90 Degree Plug
Figure 5

SECTION I

DESCRIPTION

1-1. The Bendix MS-E environmental resisting series is designed to meet the requirements specified in the latest issue of MIL-C-5015. This series is suitable for applications where heavy condensation, changes in temperature, and heavy vibratory conditions must be met.

1-2. Shell components are fabricated from high grade aluminum alloys, and are cadmium plated with an olive drab chromate after treatment. This finish offers maximum corrosion resistance and is electrically conductive.

1-3. Contacts are fabricated from high grade copper alloy and are silver plated. Closed entry socket design is utilized in size 12 and 16 contacts. Maximum vibration resistance is assured by using Bendix resilient inserts. Either pin or socket contacts can be pressurized. The clamp assembly provides a positive mechanical moisture seal, complete field serviceability, and relieves tension strain at the solder well connection.

SECTION II

INSTALLATION

CAUTION

Removal of inserts from MS-E connectors is not recommended. To do so would break the pressure and moisture proofing seal incorporated at the time of factory assembly. Contacts and inserts are not removable from MS3100E and MS3102E receptacles.

2-1. PREPARING FOR INSTALLATION

a. Remove the clamping nut and back shell by unscrewing to the LEFT. See Section IV for information on removing accessories when a connector is to be replaced or removed from a wire bundle.

b. Visually check the connector to be sure contacts and other components have not become accidentally damaged in any way. All solder wells should extend the same distance from the insert, except size "O", when installed with smaller contacts.

2-2. CLEANING

Inserts, contacts, and inside surfaces of shells must be kept free of oil, grease and dirt throughout the installation procedure. Use a clean cloth moistened with Neosol* or proprietary denatured ethyl alcohol, (Federal Specification O-E-760 Grade IV) for any necessary cleaning.

2-3. INSTALLING ACCESSORIES

Before any soldering operations, the back shell, grommet, tapered sleeve and clamping nut must be slipped on the wire bundle. The order of components is illustrated in Figure 6 for the MS3100E, MS3101E, and MS3106E. Figure 7 illustrates the order of components for the MS3108E. The MS3102E has no accessory or rear thread.

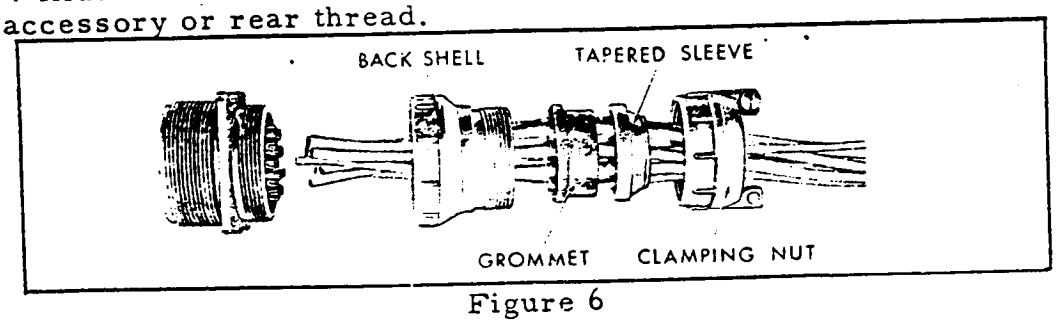


Figure 6

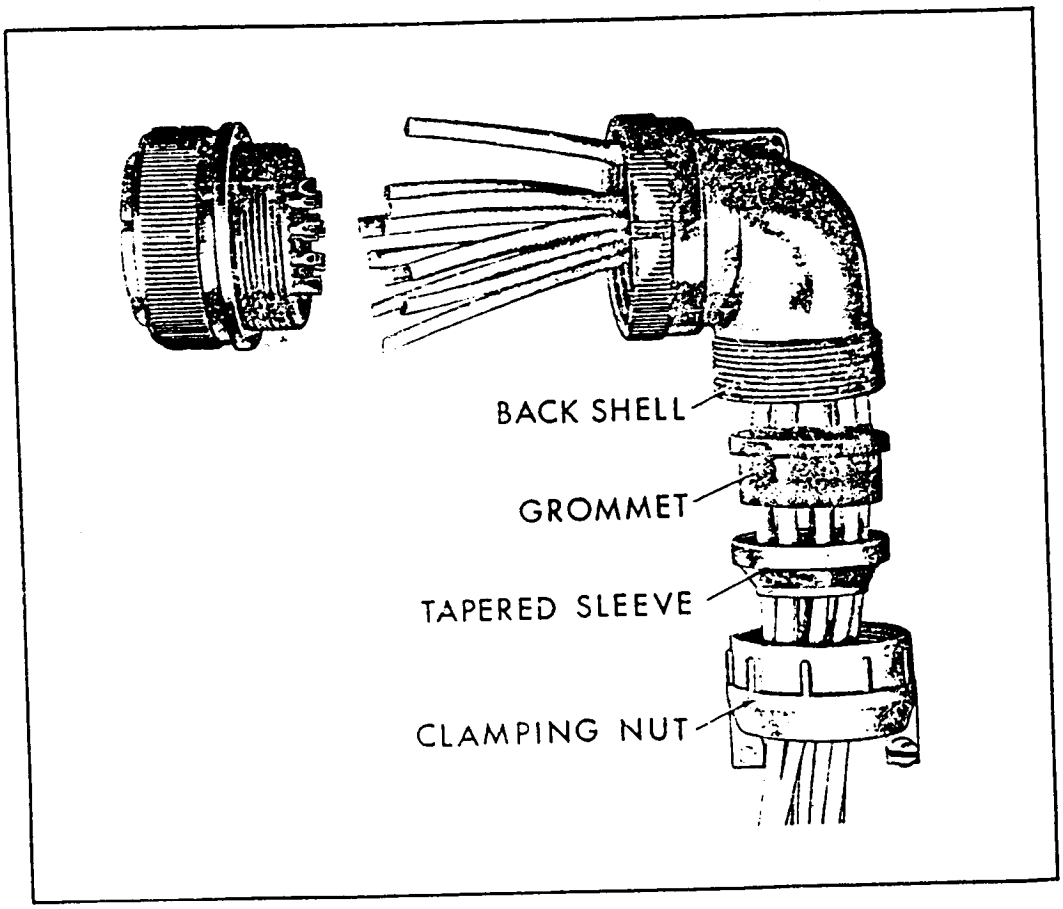


Figure 7

*Available from Shell Chemical Co., 380 Madison Ave., New York 17, N. Y.

NOTE

Identifying letters on the rear face of the grommets are to be used as a guide in threading wires. The letter or letters of the grommet should align with the same letter or letters on the rear face of the insert, figure 8.

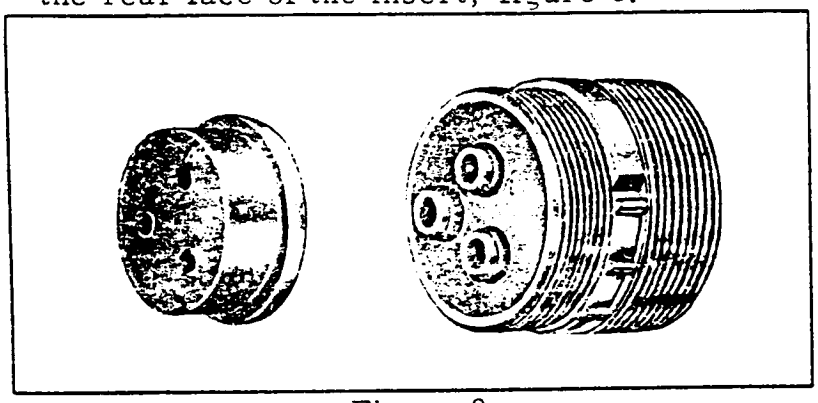


Figure 8

NOTE

The adapter "O" ring and accessory threads should be coated with a thin film of Uni-Temp Grease (MIL-C-3278) or equivalent. The "O" ring and accessory threads are properly lubricated at the time of factory assembly, but may have been wiped dry during preparation for installation.

24. CABLE AND WIRE PREPARATION

a. Provide sufficient wire slack to permit easy installation of the connector.

NOTE

Stripping is done after placing the grommet on the wires. In some cases, where it is difficult to get the wires through the grommet, the wire may be cut at a 45° angle, as shown in Figure 9.

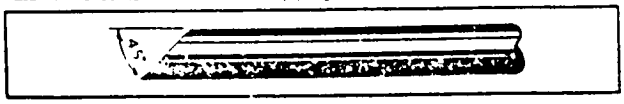


Figure 9

b. Strip the wire ends according to size of contacts. Refer to Table I for correct stripping dimensions.

TABLE I

Contact Size	Strip Cable Insulation to B
0	3/4"
4	5/8"
8	5/8"
12	5/16"
16	1/4"

c. Make sure the stripped conductors are clean, straight, and the strands are tight together.

d. Apply a good grade of roxin alcohol flux to the stripped ends. This can be done by dipping the bare ends in flux about half way to the insulation. Shake off excess flux.

e. Immediately after fluxing, pre-tin approximately 50% of each exposed conductor end. Use of a solder pot and a good grade of 60/40 tin-lead solder is recommended, figure 10. The temperature should be 500° to 550° F. Dip the bare conductor ends into the solder about halfway to the insulation. Hold in the bath long enough for the conductors to heat through and tinning of all strands to take place. Avoid melting, burning, or scorching the insulation. Shake off the excess solder when conductors are removed from the bath.

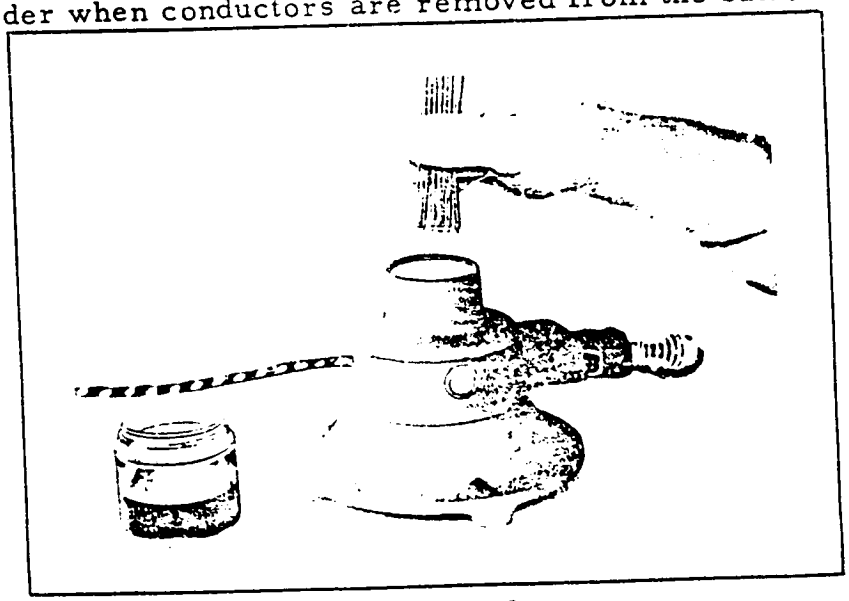


Figure 10

NOTE

Wire wells of size 12 and 16 contacts are pre-filled with solder at the factory; larger sizes are pre-tinned.

2-5. SOLDERING CONTACTS

Either probe type resistance soldering equipment or a soldering iron is suitable for soldering conductors to contacts. When using an iron, it may be necessary to re-shape the tip to provide access to dense contact arrangements. The tip should be left as large as practicable in order to obtain the greatest amount of heat transfer in the shortest length of time. Recommended iron sizes are: 500 watt for size 0 and 4 contacts, 300 watt for size 8, and 100 watt for size 12 and 16. The tip should be kept clean, free of pits, and well tinned. Support the connectors for soldering in a convenient manner which will leave both hands free for the soldering operation. Jaws of any clamping device should be well covered with a soft material which will prevent damage to the connector shell.

a. Position the connector as shown in Figure 11. Cutaway sides of solderwells should be up. If necessary, the wire being attached should be supported to avoid putting side strain on the connector shell and insert.

b. Select the first conductor to be soldered and dip in the rosin-alcohol flux. It is recommended that soldering start with the bottom row. working across and up.

c. Start the conductor into the proper wire well and position the soldering tip at the side or opposite the cutaway. To avoid a "cold joint", maintain heat until solder both in the solder well and on the conductor is completely liquid. Be sure the conductor is pushed to the bottom of the well. Add more solder if needed. Be sure any additional solder melts completely.

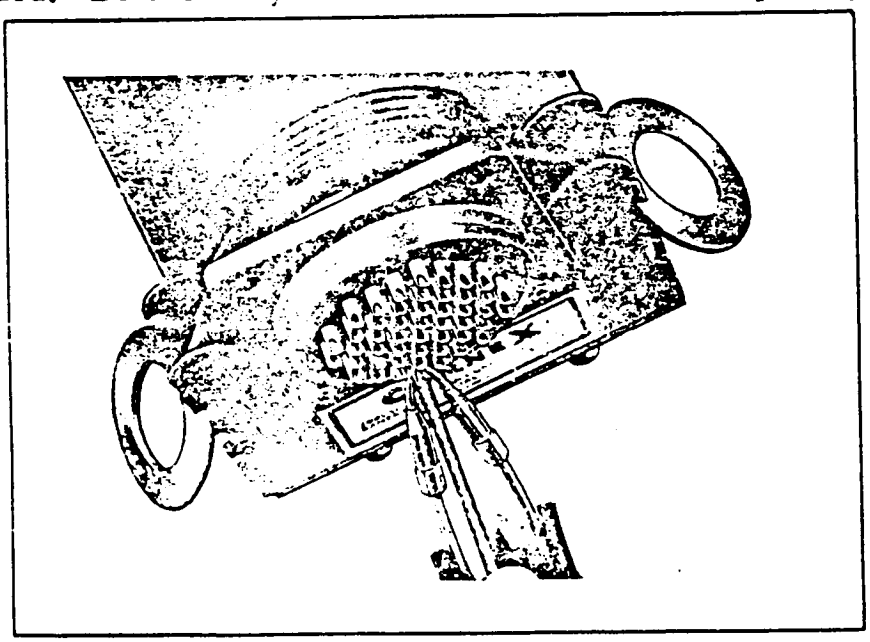


Figure 11

CAUTION

Soldering of bonded-in contacts must be done carefully to avoid overheating. Do not hold contacts at elevated temperatures any longer than necessary. Do not apply temperatures higher than those normally generated by the recommended sizes of soldering irons.

d. While holding the wire steady and properly aligned, remove the heat source and allow the solder to cool until completely solid. Permitting the wire to move while the solder is in a plastic state results in crystallization and a weak joint.

e. Check to assure that excess solder has not collected outside of the solder well. By working quickly, excess may be wiped from the contacts before it solidifies. If heat is needed to remove excess, hold the wire in correct alignment until the solder in the well is completely solid.

f. Proceed in like manner for the remainder of the wires and contacts.

2-6. ASSEMBLING ACCESSORIES

After the conductors have been soldered in place the component parts, which have been previously slipped on the wire bundle, are installed in the following sequence: .

a. Slide back shell or elbow forward, couple, and tighten using the 11-6147-1 pliers or suitable padded wrench.

b. Seat the grommet into the back shell or elbow. It may be necessary to seat the grommet with the tip of a 3/8" phenolic rod, as shown in figure 12. Insert this tool between the wires at numerous points around the grommet. Keep wires taut, to prevent buckling of the wires between insert and grommet.

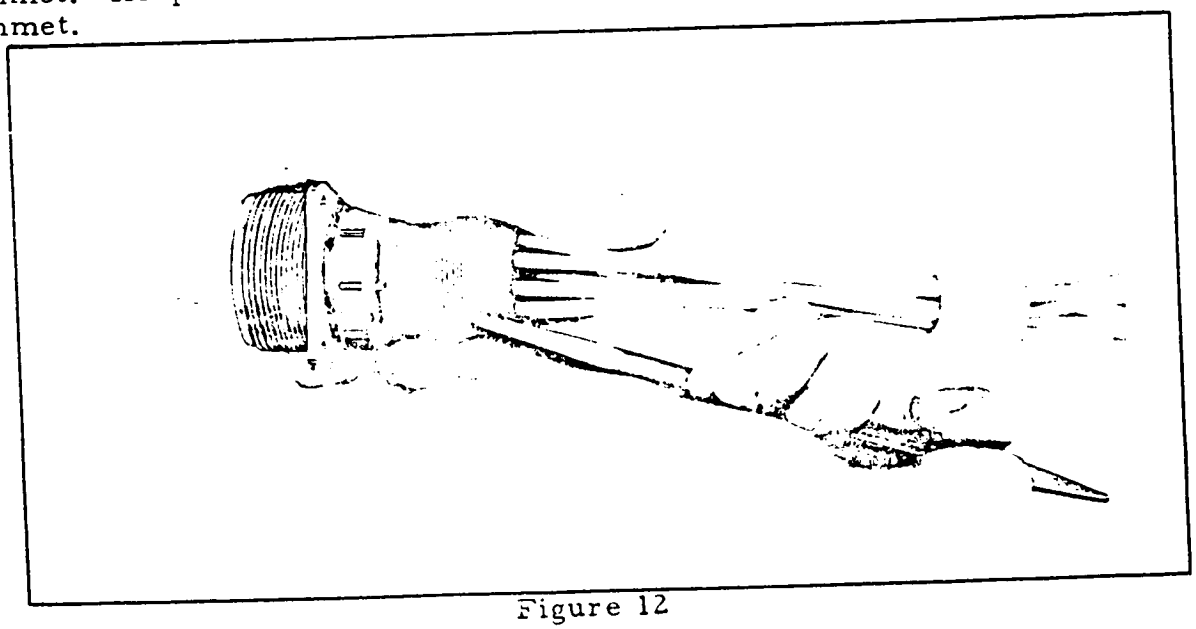


Figure 12

c. Fill all unused grommet holes with the nylon sealing plug specified in Table II.

TABLE II

Contact Size	Wire Size	Use Plug No.	Color Code
16	22-16	10-101033-12	Blue
12	14-12	10-101033-13	Yellow
8	10-8	10-101033-14	White
4	6-4	10-36750-4	Green
0	2-0	10-36750-5	Black

d. Apply a thin film of petrolatum to outside diameter of the grommet and sleeve as shown in figure 13.

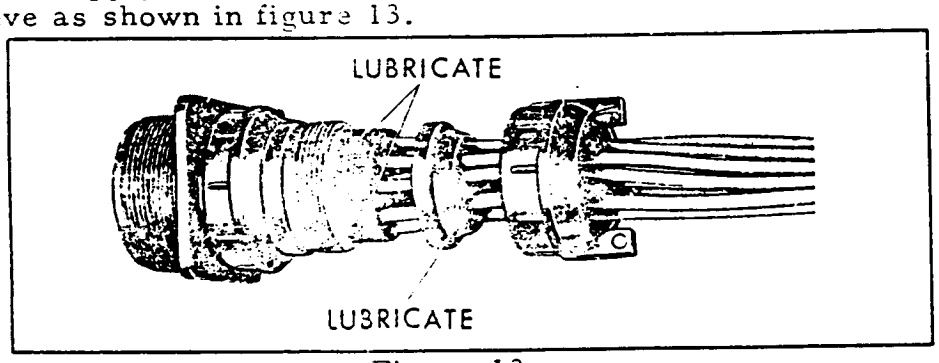


Figure 13

e. Place the tapered sleeve in position, over the grommet.

f. Thread and tighten the clamping nut using the 11-6147-1 pliers or equivalent. The screws provided on the clamping nut may be used for grounding circuits through the connector.

2-7. SHIELDED WIRE PREPARATION

a. Form an opening in the shielded braid by slipping the braid on the cable to loosen the mesh.

b. Push the strands apart with a scribe until the wires can be pulled through, figure 14. Avoid breaking the strands of braid or fracturing the insulation.

c. Stretch the loose braid to the approximate size of the wire.

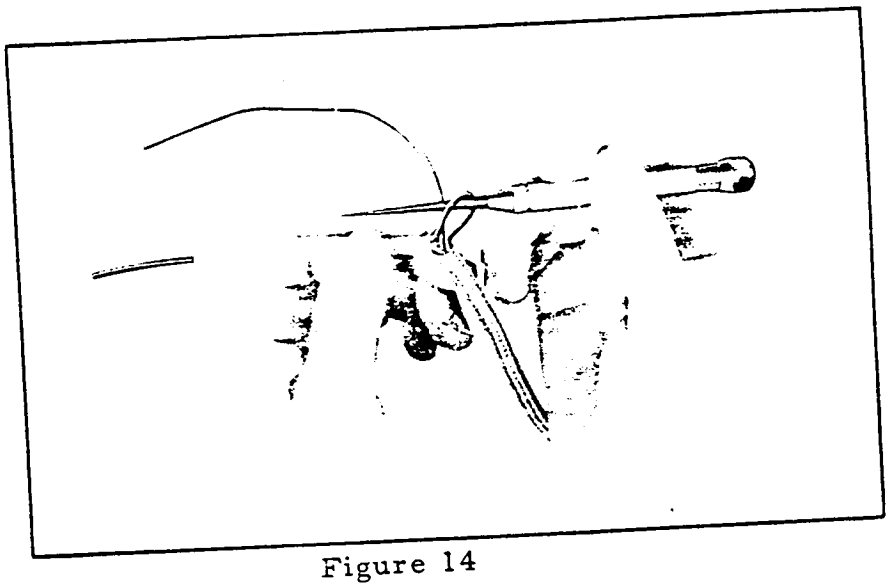


Figure 14

INSTALLING COMPONENTS

a. Gather the wires and slide the clamping nut and tapered sleeve on the wire bundle.

b. Align the letters of both insert and grommet as shown in figure 8, and proceed to thread the wires through the grommet.

c. Position the back shell and solder the wires as previously described.

ASSEMBLY

After soldering operations:

a. Thread and tighten the back shell using the 11-6147-1 tool or equivalent.

b. Seat the grommet and fill all unused holes with nylon sealing plugs.

c. Bring out the braided wire as shown in figures 15 and 16. Seat sleeve, and tighten the clamping.

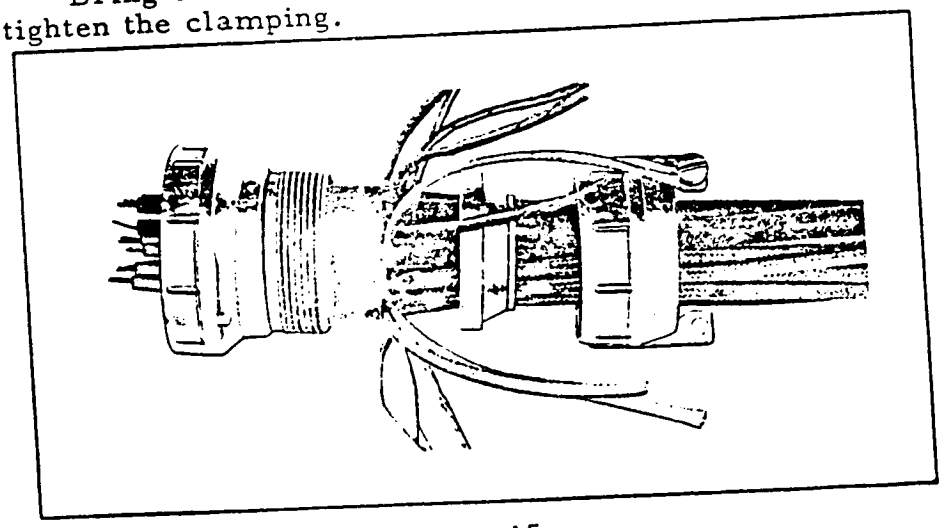


Figure 15

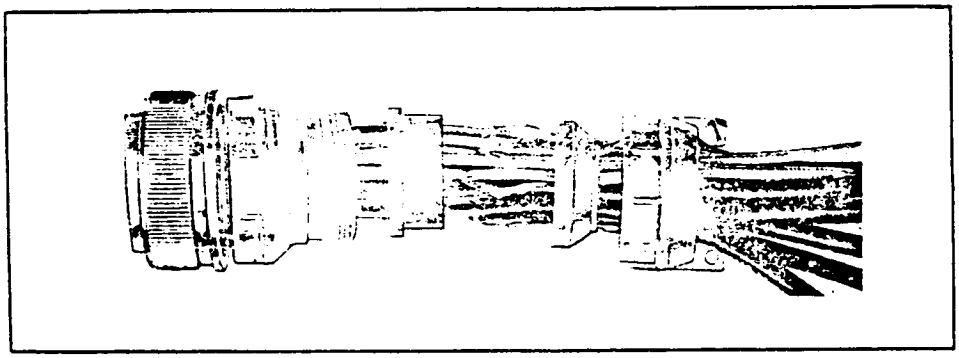


Figure 16

ALTERNATE METHOD

a. Prepare wires as outlined in previous paragraphs, separating wire from the shielding for a distance equal to the length of the back shell grommet, plus the length of the stripped conductor.

b. Install the clamping nut, sleeve, back shell, and grommet as shown in figure 17.

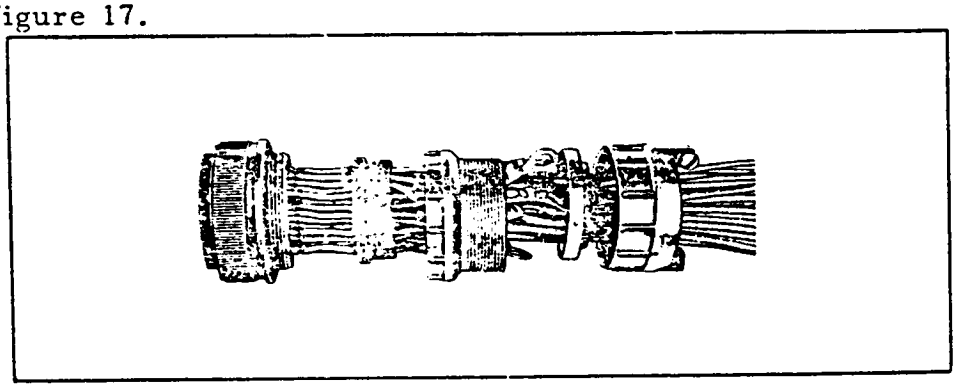


Figure 17

c. Strip, pretin and solder the wires.

d. Position a length of safety wire (stainless steel #30) between approximately 1/3 of the wires, around the outer edge of the grommet, and through the back shell.

e. Grasp the safety wire with pliers and push the back shell down over the grommet while pulling on the safety wire, figure 18.

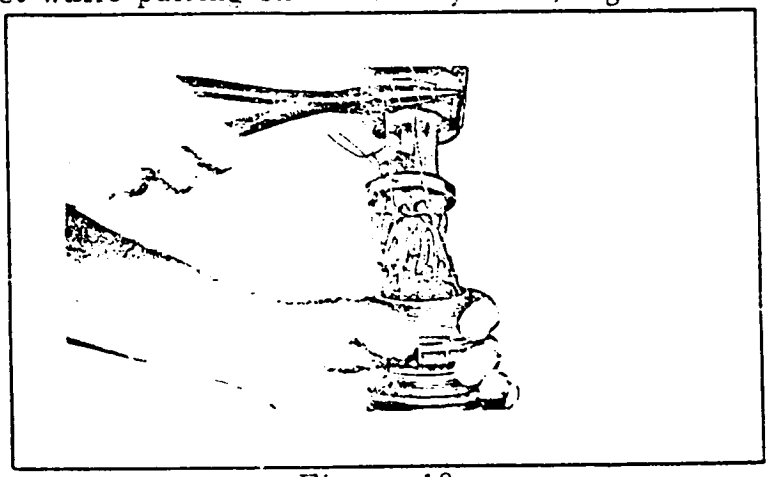


Figure 18

f. Tighten the back shell - seat the grommet - fill unused grommet holes - lubricate as previously described - and bring the braided wire back under the clamping nut, figure 19

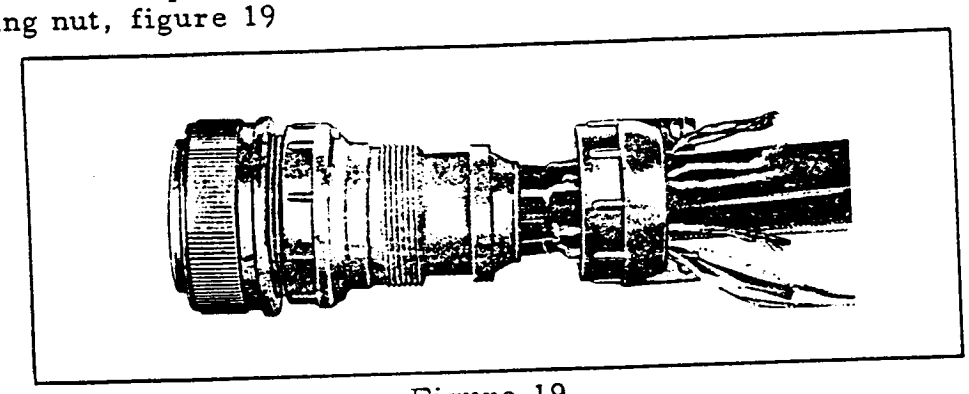


Figure 19

Stretch the shielding tight on the cables and trim the shielding to make a neat connection at the grounding screws on the connector clamping nut. Place the vinylite sleeving over the pigtail and crimp on the terminal. When several cables are used, cover as many as will go into one terminal with the vinylite sleeve and crimp the pigtails into the terminal. Secure the terminal(s) by use of the grounding screws on the connector clamping nut, figure 20.

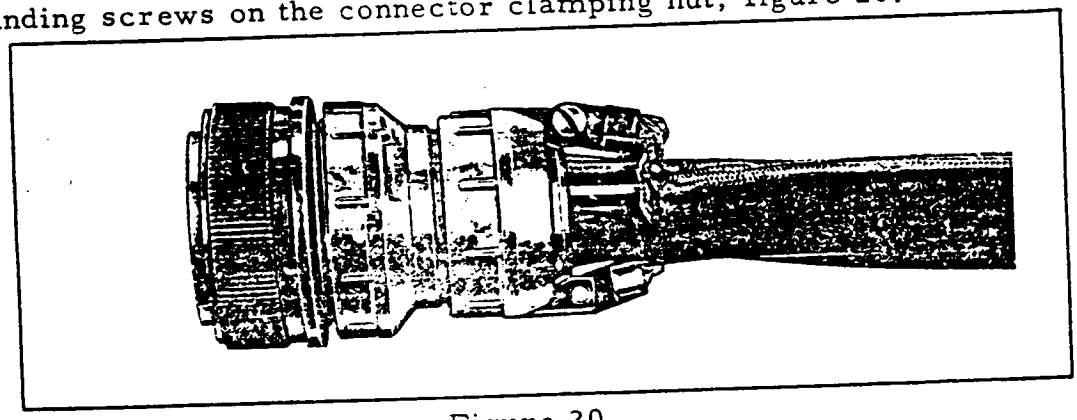


Figure 20

SECTION III

TESTING

3-1. After installation is complete, continuity should be checked according to standard practice. For checking lead assemblies with size 12 or 16 contacts, it is recommended that a test set be made up as follows:

a. Solder a size 16 pin contact to each of the test leads.

b. Solder a size 16 socket to a size 12 pin.

c. Solder a size 16 socket to a size 12 socket.

d. Solder a size 16 socket to a size 16 socket.

Figure 21 shows the suggested adapters. While making a continuity check, the proper pins and sockets are matched. This enables an excellent check on the mating surfaces of the contacts. USE TEST PROBES CAREFULLY TO PREVENT DAMAGE TO THE CONTACTS. Insertion should be made in a straigh. line and not at an angle.

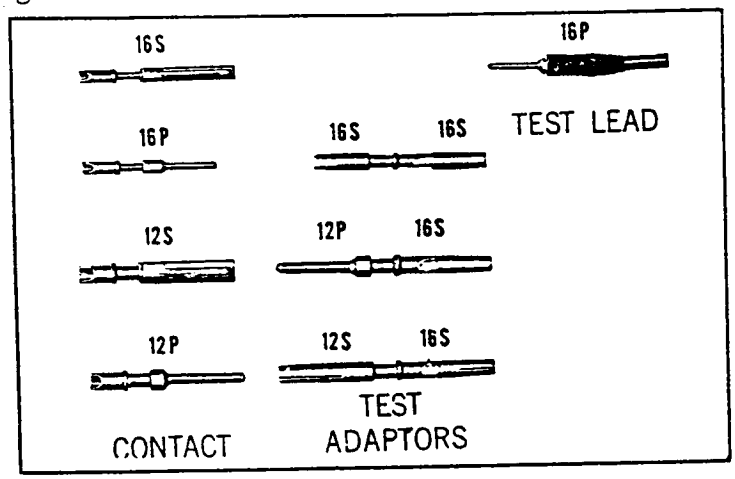


Figure 21

SECTION IV

REPAIR OR REPLACEMENT

4-1. To remove and/or replace one or more conductors, or the entire connector assembly from the wire bundle, access to the wire well is necessary.

a. Unfasten the grounding wires from the clamping nut.

b. Loosen and slide the clamping nut up the wire bundle.

c. Slide the tapered sleeve up the wire bundle.

d. If necessary, a 3/8" phenolic rod may be used to pry the grommet out of the seat in the back shell. When sufficiently loosened - slide grommet up the wire bundle.

e. Loosen the back shell from the connector and move it away from the solder well area.

f. Unsolder the conductors from the contacts. Use caution when applying heat, to prevent damaging the insert or the insert and contact seal.

g. Refer to Section II for recommended preparation and soldering instructions.