NOTE: DOD-STD-2003-5 has been redesignated as a standard practice. The cover page has been changed for Administrative reasons. There are no other changes to this Document.

INCH - POUND

DOD-STD-2003-5(SH)
24 June 1987
SUPERSEDING
NAVSEA S9300-AW-EDG-010/EPISM
(INCLUDING NAVSEA DWG. NO.
803-5001027) AND NAVSEC NO.
9000-S6202-73980

DEPARTMENT OF DEFENSE
STANDARD PRACTICE

# ELECTRIC PLANT INSTALLATION STANDARD METHODS FOR SURFACE SHIPS AND SUBMARINES (CONNECTORS)

SECTION 5 OF 5 SECTIONS

AMSC N/A

AREA GDRQ

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SECTION 5

CONNECTORS

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND

Washington, DC 20362-5101

Electric Plant Installation Standard Methods For Surface Ships and Submarines

1. This Military Standard is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

# FOREWORD

1. The criteria contained herein for the installation of the electrical plant on ships of the United States Navy supersede the data contained in Sections 1 through 5 of NAVSHIPS Drawing 9000-S6202-73980, NAVSEA Drawing No. 803-5001027 and NAVSEA PUBLICATION S9300-AW-EDG-010/EPISM.

2. This standard disseminates up-to-date information detailing Requirements for Standard Installation Methods Employed for Submarine and Surface Ship Electrical Distribution Systems.

3. These criteria apply to work on a specific ship or ships only when invoked by the Ship Specifications or similar contractual documents.

4. Although these criteria are primarily for application to new construction, their use may be considered in the conversion or alteration of existing ships. In such cases the degree of applicability of these criteria will be specified by the activity preparing the instructions for the work.

5. Considering the magnitude of this standard, along with the changing requirements imposed on the Electric Plant, it is inevitable that changes will be required to up-date these criteria. Therefore, as comments arise they should be forwarded to Naval Sea Systems Command (NAVSEA) 55Z3 to keep this standard as current as possible through subsequent revisions. Revisions will be accomplished by the issuance of additional or revised figures to be inserted in the basic standard sections. Document Improvement Proposal Form DD 1426 attached. Superseded pages may be retained for reference if so desired.

6. This standard is available in a 8-1/2 X 11 hard copy, in microfilm aperture cards, or in microfiche. It is available in 8-1/2 X 11 hard copy from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. Microfilm aperture card or microfiche are available from Commanding Officer, Portsmouth Naval Shipyard, Code 202.2, Portsmouth, NH 03801. All revisions on microfilm aperture cards, or on microfiche are automatically distributed to a previously approved distribution list. (Tel: (207) 439-1000, Ext. 1718, Autovon 684-1718). Activities having a requirement to be placed on the distribution or for additional copies should forward these requests to Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101. Aperture cards have been distributed to those activities presently on the distribution for NAVSEA Standard and Type Drawing microfilm aperture card sets. Microfiche has been distributed to all active ships.

CONTENTS

CONTENTS - Continued

Group A - Cable Lead Preparation (Continued)



Group B - MIL-C-81511 Connectors



Group C - MIL-C-5015 Connectors

CONTENTS - Continued

Group D - MIL-C-26482 Connectors

1. SCOPE

1.1 Purpose. The purpose of DOD-STD-2003-5 is to disseminate up-to-date information for connector fabrication on surface ships and submarines.

1.1.1 Application. These installation standards shall be used by all installing activities. These standards do not identify ship or type, but do establish minimum standards of acceptance for NAVSEA ships. It is the responsibility of the user activity to determine which standard satisfies their requirements. It does not authorize relaxation of any requirement specifically invoked by new construction, conversion, overhaul, or refurbishment contracts. In instances where deviated design requirements (for example, ship type, ship class, and so forth) conflict with the requirements of this standard, the requirements of this standard shall govern. Any deviation for electric plant installation identified in this standard shall be submitted to NAVSEA 56Z2 for resolution.

2. REFERENCED DOCUMENTS

Not applicable.

3. DEFINITIONS

3.1 Glossary of terms. Refer to figures 5A29 and 5A30.

4. GENERAL REQUIREMENTS

4.1 Instruction for use of DOD-STD-2003-5. This standard is designed to be utilized by a connector assembly technician and is formatted to be utilized as follows:

(a) Determine the governing Military specification for the connector being assembled.
(b) Proceed to the applicable Connector Assembly Procedure (figure 5B1, 5C1, and so forth) and review to determine tools and materials required. Each group is designed to assemble a connector starting with the basic components and proceeding in a step-by-step manner to the completed assembly.
(c) Instruction shown on figures 5A1 through 5A35 identify a sequence of processes common to any connector assembly (that is, lead stripping, crimping, soldering, and so forth). The conduct of these procedures will be sequenced by the Connector Assembly Procedures. The technician should review these procedures to familiarize himself with their content.
(d) Terminate the connector/backshell to the cable utilizing the appropriate Connector Assembly Procedure.

These procedures are designed for use with Military specification connectors and backshells. Commercial substitutions may result in deviations from these procedures. Manufacturer assembly instructions should be consulted in these cases. Equivalent tooling and materials may be substituted provided the intent of the required specification is achieved.

5. DETAILED REQUIREMENTS

See figures.

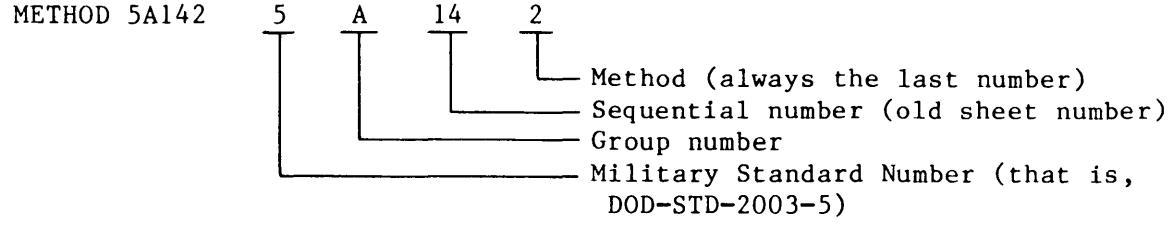
6. NOTES

6.1 Intended use. This standard specifies the requirements for Standard Methods to be employed both on surface ships and submarines. Standard Methods identified for electric plant installation are intended for new construction only.

6.2 Designation of Electric Plant Installation Standard Methods drawings (figures). The Electric Plant Installation Standard Methods (DOD-STD-2003-5) contains drawings that depict Standard Methods that are applicable for general electric plant installation on both surface ships and submarines. Each drawing has been assigned a figure number. The methods shown on the figures are grouped together providing similar functions. These groups are:

DOD-STD-2003-5 (Connectors) Group
- A. Cable Lead Preparation
- B. MIL-C-81511 Connectors
- C. MIL-C-5015 Connectors
- D. MIL-C-26482 Connectors
- E. MIL-C-28840 Connectors
- F. MIL-C-17599 Connectors
- G. MIL-C-22992 Connectors
- H. MIL-C-38999 Connectors

The methods shown on the figures are identified by the following alphanumeric designation system:




Thus, method 5A142 identifies method 2, sequential number 14 in group A of DOD-STD-2003-5.

6.3 Subject term (key word) listing.

Cable lead preparation
Connectors

Preparing activity:
Navy - SH
(Project GDRQ-N066-5)

1 ENSURE THE CABLE IS THE CORRECT TYPE AS SPECIFIED ON THE APPLICABLE CABLING DIAGRAM

1.1 ENSURE THAT THE MINIMUM ACCEPTANCE REQUIREMENTS OF THE APPLICABLE MIL-C-915 OR MIL-C-17 SPECIFICATION SHEET HAVE BEEN SATISFIED BY CHECKING THE ATTACHED PAPERWORK FOR AN INSPECTION ACCEPTANCE STAMP. IF NO STAMP EXISTS OR PAPERWORK IS MISSING, DO NOT USE THE CABLE.

2 MEASURE THE CABLE TO THE REQUIRED LENGTH

2.1 WHEN THE CONNECTOR IS PREFABRICATED IN THE SHOP, ADD 5 FEET OR 5%, WHICHEVER IS GREATER.

2.2 WHEN MEASURING THE CABLE TO TERMINATE AT EQUIPMENT ON BOARD, ENSURE THAT SUFFICIENT LENGTH EXISTS TO ALLOW FOR AT LEAST ONE, BUT WHERE PRACTICAL THREE RETERMINATIONS OF THE CONNECTOR CONTACTS. ENSURE THAT THE REQUIRED CABLE BEND RADIUS IS MAINTAINED.

3 VISUALLY INSPECT THE CABLE JACKET FOR DEFORMITIES, CUTS, OR PUNCTURES.

4 WIPE THE CABLE JACKET OR ARMOR WITH AN APPROVED SOLVENT FROM TABLE 1 IN ORDER TO REMOVE GREASE, OIL, DIRT, AND OTHER DEBRIS IN THE AREA WHERE THE CONNECTOR AND BACKSHELL WILL BE INSTALLED.

TABLE 1

| | |
|---|---|
| 1, 1, 1-TRICHLOROETHANE | O-T-620 |
| TRICHLOROTRIFLUORETHANE | MIL-C-81302 |
| ISOPROPYL ALCOHOL | TT-I-735 |
| PERCHLOROETHYLENE | O-T-236 |
| 1, 1, 1-TRICHLOROETHANE (VAPOR DEGREASING) | MIL-T-81533 |
| REAGENT WATER (TYPE II) | ASTM D-1193 |
| DETERGENT CLEANERS | AS APPROVED BY THE GOVERNMENT PROCURING ACTIVITY |

5 CUT THE CABLE PERPENDICULAR TO THE CABLE AXIS UTILIZING CABLE SHEARS (H.K. PORTER CO. 6990FS OR EQUIVALENT) (FIGURE 1). ENSURE A CLEAN SHARP CUT, ALL CONDUCTORS THE SAME LENGTH, AND NO DAMAGE TO THE CABLE.

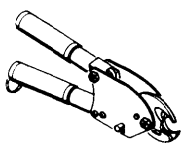


FIGURE 1
CABLE SHEARS

6 VERIFY CABLE DIAMETER IS COMPATIBLE WITH CABLE CLAMP SIZE.

6.1 PLACE THE CLAMP ASSEMBLY OVER THE OUTERMOST CABLE COVERING AND TIGHTEN THE CLAMP SCREWS TO THE VALUE SPECIFIED IN TABLE 2. TO CHECK THAT THE CLAMP SECURELY HOLDS THE ARMOR OR PVC, MAINTAINING A MINIMUM GAP OF 1/16-INCH BETWEEN CLAMP SADDLES AND SUPPORT (SEE FIGURE 3). IF SATISFACTORY CLAMPING CANNOT BE OBTAINED, BUILD-UP CABLE DIAMETER PER FIGURE 5A3.

TABLE 2 CLAMP SCREW TORQUE VALUES

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.50 IN | 25 ±2 IN /OZS |
| 0.50 IN TO 1.0 IN | 40 ±2 IN /OZS |
| 1.0 IN TO 2.0 IN | 50 ±2 IN /OZS |

NOTE: THESE TORQUE SPECIFICATIONS MUST BE MAINTAINED, ENSURING THAT A MINIMUM GAP OF NOT LESS THAN 1/16 IN. EXISTS BETWEEN THE CLAMP SUPPORT AND THE CLAMP SADDLES.

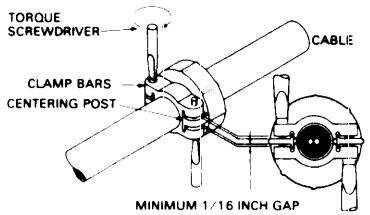



FIGURE 3

NOTE: FOR ARMORED CABLE, PREPARE THE CABLE USING STEPS 7 THROUGH 15. FOR UNARMORED CABLE, PREPARE THE CABLE USING STEPS 8 THROUGH 15.

7 ARMOR PREPARATION.

CAUTION: DO NOT DAMAGE THE CABLE JACKET BENEATH THE ARMOR.

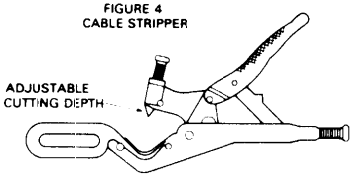
7.1 BACKSHELL WITHOUT ARMOR CINCHING RFI FERRULES (PCS. 6 AND 7).

7.1.1 MEASURE THE LENGTH OF THE ASSEMBLED BACKSHELL (PCS. 2 THROUGH 9) FROM THE CONNECTOR END TO THE FRONT END OF THE CLAMP SADDLE (PC 9). (SEE FIGURE 2).

NOTE: ON ANGLED BACKSHELLS MEASURE THE CENTER RADIUS DIMENSION.

7.1.2 ADD 2-INCHES AND MARK THIS DIMENSION ON THE ARMOR. CUT AND REMOVE THE CABLE ARMOR AT THIS MARK USING A CABLE STRIPPER (TYPE 1) WHICH MEETS THE REQUIREMENTS OF FED. SPEC. GGG-S-665 (SEE FIGURE 4). DIAGONAL CUTTING PLIERS MAY ALSO BE USED TO REMOVE THE ARMOR.

FIGURE 4
CABLE STRIPPER




NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A1 OF DWG. 803-5001027.




**FIGURE 2**
**TYPICAL CONNECTOR ASSEMBLY**







FIGURE 5A1. Cable preparation.

7.1.3 CENTER A 3- 4 TO 1 INCH LENGTH OF APPROPRIATELY SIZED HEAT SHRINK TUBING MEETING THE REQUIREMENTS OF MIL-I-23053/5 OVER THE ARMOR TERMINATION POINT AND SHRINK IN PLACE USING A HEAT GUN, PRIOR TO TIGHTENING THE SADDLE CLAMPS.

7.2 BACKSHELL WITH ARMOR CINCHING FERRULES.

7.2.1 MEASURE THE LENGTH OF THE ASSEMBLED BACKSHELL (PCS 2 THROUGH 6) FROM THE CONNECTOR END TO THE INNER ARMOR CLINCHING RFI FERRULE (PC 6) (SEE FIGURE 2).

NOTE: ON ANGLED BACKSHELLS MEASURE THE CENTER RADIUS DIMENSION.

7.2.2 ADD 2-INCHES AND MARK THIS DIMENSION ON THE ARMOR. CUT AND REMOVE THE CABLE ARMOR AT THIS MARK USING A CABLE STRIPPER (TYPE 1) WHICH MEETS THE REQUIREMENTS OF GGG-S-665.

CAUTION: DO NOT DAMAGE THE CABLE JACKET BENEATH THE ARMOR.

8. VERIFY CABLE DIAMETER IS COMPATIBLE WITH GROMMET SIZE FOR ENVIRONMENTAL SEAL.

8.1 WIPE THE CABLE JACKET WITH AN APPROVED SOLVENT FROM TABLE 1 IN ORDER TO REMOVE GREASE, OIL, DIRT, AND OTHER DEBRIS.

8.2 ASSEMBLE IN CORRECT ORDER AND ORIENTATION THE REQUIRED BACKSHELL HARDWARE TO COMPRESS THE GROMMET TO THE CABLE JACKET.

NOTE: TORQUE SPECIFICATIONS MUST BE OBTAINED WITHOUT BOTTOMING OF ADJOINING ASSEMBLIES.

8.3 ATTEMPT TO PUSH BACKSHELL STRAIGHT ALONG CABLE. APPLYING MODERATE PRESSURE (DO NOT TWIST). BACKSHELL SHALL NOT MOVE IF SATISFACTORY SEALING CANNOT BE OBTAINED, BUILD-UP THE CABLE DIAMETER PER FIGURE 5A4.

8.4 REMOVE ALL BACKSHELL COMPONENTS FROM THE CABLE.

9. JACKET PREPARATION FOR ENVIRONMENTAL SEALING.

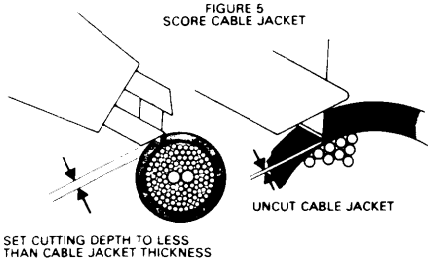
9.1 MEASURE THE LENGTH OF THE ASSEMBLED BACKSHELL FROM THE CONNECTOR END TO THE NEAREST GROMMET END (PC 3, FIGURE 2).

9.2 ADD 2-INCHES AND MARK THIS DIMENSION ON THE JACKET.

9.3 DISASSEMBLE AND RELOCATE THE BACKSHELL AND CLAMP COMPONENTS ON THE CABLE. VERIFY THAT ALL PARTS ARE INCLUDED AND ARE IN CORRECT ORDER AND ORIENTATION. ASSEMBLE THE BACKSHELL AND LOCATE IT ON THE CABLE SO THAT IT WILL NOT INTERFERE WITH CONNECTOR WIRING.

9.4 REMOVE THE CABLE JACKET TO THE PREDETERMINED LENGTH AS FOLLOWS.

FIGURE 5
SCORE CABLE JACKET

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NOTE: ENSURE THE CUT DOES NOT PENETRATE THE JACKET COMPLETELY (FIGURE 5).

9.4.1 SCORE THE CIRCUMFERENCE OF THE JACKET WITH A MULTI-PURPOSE CUTTER (OLFA 300 OR EQUIVALENT) AT THE MARK MADE IN STEP 9.3.

9.4.2 SCORE THE JACKET PIECE TO BE REMOVED ALONG ITS LENGTH WITH A MULTI-PURPOSE CUTTER.

9.4.3 REMOVE THE JACKET PIECE UTILIZING NEEDLE NOSE PLIERS.

10. PREPARE GROSS SHIELD IN ACCORDANCE WITH FIGURE 5A22 IF APPLICABLE.

11. CUT BACK AS CLOSE TO THE JACKET AS POSSIBLE AND REMOVE ANY GLASS OR ASBESTOS BELT, TAPE, FILLERS, OR CORE USED IN THE CABLE CONSTRUCTION.

12. PREPARE INDIVIDUAL CONDUCTOR SHIELDS IN ACCORDANCE WITH FIGURE 5A19 IF APPLICABLE.

13. INSPECT THE INDIVIDUAL CONDUCTORS TO ENSURE THE INSULATION IS NOT CUT, NICKED, OR SCRATCHED AND THAT NONE OF THE CONDUCTORS ARE CRUSHED.

14. PREPARE TWISTED PAIRS OR TRIADS AS FOLLOWS (IF APPLICABLE).

14.1 FOR CABLES IDENTIFIED WITH MIL-C-915 STANDARD IDENTIFICATION CODE, EACH TRIAD OR TWISTED PAIR SHOULD BE IDENTIFIED BY PLACING A 1/4 INCH LENGTH OF PRE-MARKED SHRINK TUBING OVER EACH TRIAD OR PAIR AND SHRINKING IN PLACE.

14.2 FOR CABLES IDENTIFIED WITH THE MIL-C-915 TELEPHONE IDENTIFICATION CODE, EACH TWISTED PAIR SHOULD BE IDENTIFIED BY PLACING A 1/8 INCH PIECE OF INSULATING SLEEVING OVER EACH TWISTED PAIR.

NOTE: DO NOT USE ADHESIVE BACKED MARKERS.

14.3 THE TUBING SHOULD BE LOCATED CLOSE TO THE CABLE JACKET END AND STAGGERED SO AS TO PREVENT FORMATION OF A BULKY LUMP.

15. IDENTIFY THE INDIVIDUAL LEADS AS FOLLOWS (NOT REQUIRED IF CONDUCTOR SIZE AND BACKSHELL SIZE PREVENTS INSTALLATION).

15.1 SLIDE PREMARKED, ELECTRICAL INSULATING SLEEVING WHICH MEETS THE REQUIREMENTS OR MIL-I-23053/5, LENGTH AND SIZE TO SUIT OVER EACH CONDUCTOR.

15.1.1 THE SLEEVES SHALL BE MARKED WITH THE CONTACT LETTER OR NUMBER OF THE CONTACT POSITION TO WHICH THEY ARE CONNECTED IN ACCORDANCE WITH MIL-M-81531.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A2 OF DWG. 803-5001027.

FIGURE 5A2. Cable preparation.

CABLE DIAMETER BUILD-UP PROCEDURES

1. THESE PROCEDURES SHALL BE USED WHEN THE CABLE ENTRANCE DIMENSION OF THE BACKSHELL IS TOO LARGE FOR THE CABLE DIAMETER TO WHICH THE CONNECTOR BACKSHELL ASSEMBLY IS BEING ATTACHED.

2. THE MATERIAL USED FOR CABLE BUILD-UP MUST EXTEND COMPLETELY THROUGH THE SEALING GROMMET WITHOUT INTERRUPTION AT COMPLETION OF CONNECTOR ASSEMBLY.

3. THE FIRST METHOD DEPICTS THE USE OF HEAT SHRINK SLEEVING AS THE MEANS TO INCREASE THE CABLE DIAMETER. THE SECOND METHOD DEPICTS THE USE OF TELESCOPING BUSHINGS AS THE MEANS OF CABLE DIAMETER BUILD-UP. EACH METHOD IS DESIGNED SUCH THAT IT CAN BE USED INDIVIDUALLY OR IN COMBINATION WITH THE OTHER AS THE METHOD FOR CABLE BUILD-UP.

4. THE FOLLOWING METHOD SHALL BE USED IN CONJUNCTION WITH HEAT SHRINK SLEEVING.

4.1 BUILD UP THE CABLE JACKET IN THE VICINITY OF THE ENVIRONMENTAL SEAL AND/OR CABLE CLAMP AS FOLLOWS.

4.1.1 MEASURE THE INSTALLED LENGTH OF THE GROMMET, GROMMET FOLLOWER, AND CABLE CLAMP.

4.1.2 CUT A CORRECTLY SIZED PIECE OF HEAT SHRINKABLE TUBING MEETING THE REQUIREMENTS OF MIL-I-23053/5 CLASS 1 OR MIL-I-23053/10 TO A LENGTH EQUAL TO THAT MEASURED IN STEP 4.1.1.

4.1.2.1 THE SIZE OF THE HEAT SHRINK TUBING SHALL BE SELECTED FROM TABLE 1 SUCH THAT THE INNER DIAMETER AFTER SHRINKAGE SHALL BE LESS THAN THE CABLE DIAMETER.

4.1.3 INSTALL THE HEAT SHRINK TUBING ON THE CABLE IN THE AREA WHERE THE ENVIRONMENTAL SEAL AND CABLE CLAMP WILL BE AND SHRINK IN PLACE USING A HEAT GUN.

4.1.4 VERIFY THAT SATISFACTORY ENVIRONMENTAL SEALING CAN BE OBTAINED WITHIN TORQUE SPECIFICATION, WITHOUT BOTTOMING OF ADJOINING BACKSHELL ASSEMBLIES.

4.1.5 VERIFY THAT THE CLAMP SECURELY HOLDS OVER THE SLEEVING AND CABLE, MAINTAINING A MINIMUM GAP OF 1/16-INCH BETWEEN CLAMP SADDLES AND SUPPORT (FIGURE 1).

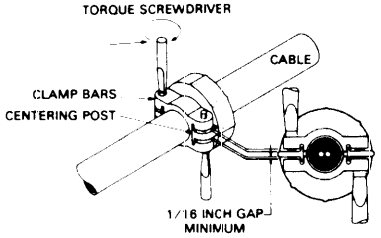


FIGURE 1
CABLE CLAMP GRIPPING

4.1.6 CONTINUE APPLYING HEAT SHRINK TUBING UNTIL THE CABLE OUTSIDE DIAMETER IS COMPATIBLE WITH THE CABLE SEALING RANGE OF THE ENVIRONMENTAL GROMMET AND/OR CABLE CLAMP.

5. THE FOLLOWING METHOD SHALL BE USED IN CONJUNCTION WITH A MS3420A TELESCOPING BUSHING (FIGURE 2).

NOTE: THE MS3420 WILL NOT BE INSTALLED UNDER THE GROMMET. THE MS3420 ARE ONLY USED TO BUILD-UP CABLE DIAMETER UNDER THE CABLE CLAMP.

5.1 MEASURE THE INSTALLED LENGTH OF THE GROMMET, GROMMET FOLLOWER, AND CABLE CLAMP. IF MEASURED LENGTH IS LONGER THAN AVAILABLE BUSHING USE HEAT SHRINK TUBING TO BUILD-UP CABLE DIAMETER.

TABLE 2

| DASH NO | A DIA | B DIA | C DIA | D LENGTH |
|---|---|---|---|---|
| -3 | 130 | 210 | 379 | 2 875 |
| -4 | 220 | 302 | 505 | 2 750 |
| -6 | 312 | 427 | 619 | 2 625 |
| -8 | 437 | 552 | 744 | 2 500 |
| -10 | 562 | 615 | 889 | 2 375 |
| -12 | 625 | 740 | 1 084 | 2 250 |
| -16 | 750 | 927 | 1 314 | 2 125 |
| -20 | 937 | 1 240 | 1 598 | 2 000 |
| -24 | 1 250 | 1 365 | 1 847 | 1 875 |
| -28 | 1 375 | 1 614 | 2 085 | 1 750 |
| -32 | 1 624 | 1 864 | 2 335 | 1 625 |
| -40 | 1 874 | 2 364 | 2 835 | 1 500 |

| MILITARY PART NO | AS SUPPLIED | | AFTER UNRESTRICTED SHRINKAGE WALL THICKNESS |
|---|---|---|---|
| | I D MIN | I D MAX | |
| CLASS 1 | | | |
| M23053 5/101-C | 046 | 023 | 016 ± 003 |
| -102-C | 063 | 031 | 017 ± 003 |
| -103-C | 093 | 046 | 020 ± 003 |
| -104-C | 125 | 062 | 020 ± 003 |
| -105-C | 187 | 093 | 020 ± 003 |
| -106-C | 250 | 125 | 025 ± 003 |
| -107-C | 375 | 187 | 025 ± 003 |
| -108-C | 500 | 250 | 025 ± 003 |
| -109-C | 750 | 375 | 030 ± 003 |
| -110-C | 1 000 | 500 | 035 ± 005 |
| -111-C | 1 500 | 750 | 040 ± 006 |
| -112-C | 2 000 | 1 000 | 045 ± 007 |
| -113-C | 3 000 | 1 500 | 050 ± 008 |
| -114-C | 4 000 | 2 000 | 055 ± 009 |
| CLASS 1 OVEREXPANDED | | | |
| -115-C | 1 000 | 275 | 045 ± 005 |
| -116-C | 2 000 | 550 | 045 ± 005 |
| -117-C | 3 000 | 810 | 045 ± 005 |
| -118-C | 4 000 | 1 050 | 045 ± 005 |
| -119-C | 1 000 | 462 | 045 ± 005 |
| -120-C | 2 375 | 680 | 045 ± 005 |
| -121-C | 3 000 | 840 | 045 ± 005 |
| -122-C | 3 750 | 930 | 045 ± 005 |
| -123-C | 4 500 | 1 450 | 045 ± 005 |
| M23053 10/001-C | 125 | 071 | 020 ± 006 |
| -002-C | 250 | 143 | 035 ± 010 |
| -003-C | 375 | 214 | 040 ± 010 |
| -004-C | 500 | 500 | 048 ± 015 |
| -005-C | 625 | 357 | 052 ± 015 |
| -006-C | 750 | 428 | 057 ± 015 |
| -007-C | 875 | 500 | 065 ± 015 |
| -008-C | 1 000 | 570 | 070 ± 020 |
| -009-C | 1 250 | 714 | 087 ± 020 |
| -010-C | 1 500 | 857 | 095 ± 020 |
| -011-C | 1 750 | 1 000 | 107 ± 020 |
| -012-C | 2 000 | 1 140 | 110 ± 020 |
| -013-C | 3 000 | 3 000 | 110 ± 025 |
| -014-C | 4 000 | 2 280 | 110 ± 025 |

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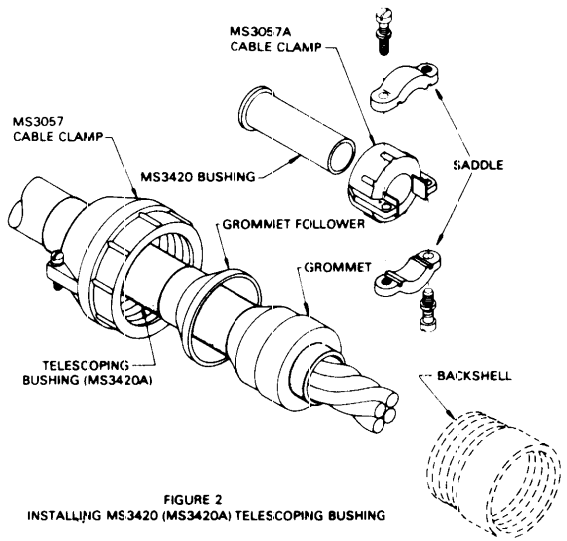
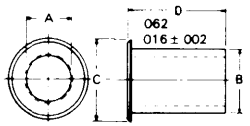



FIGURE 2
INSTALLING MS3420 (MS3420A) TELESCOPING BUSHING

FIGURE 5A3. Cable diameter build-up procedures.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A3 OF DWG. 803-5001027.

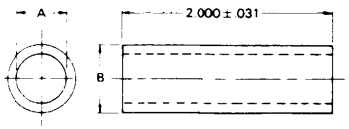



5.2 SLIDE A CORRECTLY SIZED MS3420A TELESCOPING BUSHING ON THE CONDUCTOR BUNDLE

5.2.1 TABLE 3 PROVIDES INFORMATION ON THE MS 3420A TELESCOPING BUSHING IN ORDER TO SELECT THE PROPER SIZE BASED ON THE CABLE DIAMETER

TABLE 3

| DASH NO | A DIA | B DIA |
|---|---|---|
| -3 | .125 | .210 |
| -4 | .219 | .302 |
| -6 | .312 | .427 |
| -8 | .438 | .531 |
| -10 | .438 | .615 |
| -12 | .541 | .740 |
| -16 | .750 | .927 |
| -18 | .938 | 1.115 |
| -20 | .938 | 1.240 |
| -24 | 1.125 | 1.365 |
| -28 | 1.250 | 1.614 |
| -32 | 1.625 | 1.865 |
| -40 | 1.875 | 2.365 |




5.2.2 VERIFY THAT SATISFACTORY ENVIRONMENTAL SEALING CAN BE OBTAINED WITHIN TORQUE SPECIFICATION, WITHOUT BOTTOMING OF ADJOINING BACKSHELL ASSEMBLIES.

5.2.3 VERIFY THAT THE CABLE CLAMP SECURELY HOLDS OVER THE BUSHING AND CABLE MAINTAINING A MINIMUM GAP OF 1/16 INCH BETWEEN CLAMP SADDLES AND SUPPORT (FIGURE 1).

NOTE: MORE THAN ONE BUSHING MAY BE USED TO ACHIEVE THE DESIRED CABLE DIAMETER. (SEE FIGURE 3).

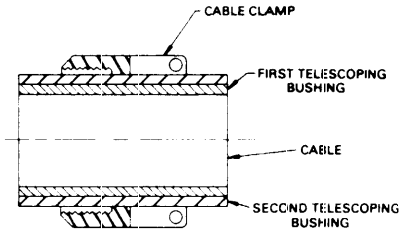



FIGURE 3
USING MORE THAN ONE TELESCOPING BUSHING

NOTE:

1. THIS FIGURE SUPERSEDES SHEET 5A4 OF DWG. 803-5001027.







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FIGURE 5A4. Cable diameter build-up procedure.

INDIVIDUAL LEAD STRIPPING TECHNIQUES

1 THERMAL STRIPPING IS THE PREFERRED METHOD WHEN COMPATIBLE WITH THE INSULATION TYPE.

2 OBSERVE THE FOLLOWING PRECAUTIONS WHEN STRIPPING WIRE WITH EITHER THERMAL OR MECHANICAL STRIPPERS.

2.1 ENSURE THE BLADES OR HEATED STRIPPING ELEMENTS OF THERMAL STRIPPERS ARE KEPT CLEAN AT ALL TIMES.

2.2 ENSURE ALL STRIPPING BLADES ARE SHARP AND FREE FROM NICKS, DENTS, AND ANY OTHER MECHANICAL DEFORMITIES THAT MAY PREVENT PROPER OPERATION.

2.3 ENSURE THE CORRECT STRIPPING HOLE IS USED FOR THE CORRESPONDING WIRE SIZE. FIGURE 8 IS PROVIDED TO SHOW CONSTRUCTION OF A COMMON CONDUCTOR.

CAUTION: THERE ARE SIGNIFICANT DIFFERENCES BETWEEN NAVY AND COMMERCIAL (AWG) WIRE GAGES. ENSURE ALL COMPARISONS ARE TAKEN USING THE SAME CONVENTION.

2.4 WHEN STRIPPING THE LEAD, HOLD THE WIRE PERPENDICULAR TO THE CUTTING OR THERMAL BLADE. (SEE FIGURES 2 AND 7 FOR EXAMPLE)

2.5 AVOID NICKING, CUTTING, OR OTHERWISE DAMAGING THE WIRE STRANDS.

2.6 ENSURE THERE ARE NO FRAYED OR RAGGED EDGES AFTER THE INSULATION HAS BEEN REMOVED.

2.7 ENSURE ALL INSULATION HAS BEEN REMOVED FROM THE STRIPPED AREA.

2.8 CONDUCTOR STRANDS MAY BE RETWISTED IF REQUIRED TO RESTORE THE NATURAL LAY AND TIGHTNESS OF THE STRANDS. AVOID BARE FINGER CONTACT WITH THE WIRE STRANDS.

3 GLASS BRAID OR TAPE AND SYNTHETIC RUBBER SHALL BE REMOVED UTILIZING PRECISION MECHANICAL STRIPPERS IN ACCORDANCE WITH STEP 6.

4 STRIP INDIVIDUAL LEAD.

4.1 STRIP LEAD USING THERMAL OR MECHANICAL STRIPPING METHOD (STEP 5 OR 6). TABLE 1 CONTAINS CONDUCTOR INFORMATION FOR COMMON NAVY CABLES AND RECOMMENDED STRIPPING METHOD.

4.1.1 STRIPPERS WILL BE TESTED AND ADJUSTED ON A TEST CONDUCTOR PRIOR TO STRIPPING ACTUAL CABLE CONDUCTOR.

4.1.2 AVOID NICKING, CUTTING, OR DAMAGING WIRE STRANDS DURING STRIPPING.

4.1.3 TAKE CARE TO PREVENT SMALL PARTICLES, ESPECIALLY THOSE WHICH ARE CONDUCTIVE, FROM ENTERING INTO CONNECTOR CONTACT CAVITIES. PARTICLES MAY HAMPER PROPER SEATING OF CONTACTS AND CAUSE SHORT CIRCUITS.

5 THERMAL STRIPPER (FIGURE 1)

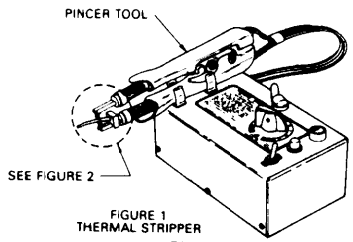


FIGURE 1
THERMAL STRIPPER

5.1 WHEN REQUIRED FOR PERSONNEL SAFETY, AN EXHAUST HOOD AND FAN VENTILATION SYSTEM SHALL BE USED TO EXHAUST TOXIC FUMES FROM POLYTETRAFLUOROETHYLENE OR POLYVINYL CHLORIDE.

5.2 OBSERVE THE FOLLOWING WHEN USING THERMAL WIRE STRIPPERS:

5.2.1 DETERMINE THE INSULATION MATERIAL USING TABLE 1 AS GUIDANCE.

5.2.2 EMPLOY THE LOWEST TEMPERATURE SETTING THAT WILL GIVE SATISFACTORY RESULTS.

5.2.3 MINIMIZE THE TIME HEAT IS APPLIED FOR STRIPPING IN ORDER TO MINIMIZE INSULATION DAMAGE AND SAFETY HAZARDS DUE TO MELTING. AT NO TIME SHOULD THE INSULATION DECOMPOSITION TEMPERATURE BE UTILIZED.

5.2.4 ASSURE THE ADEQUACY OF EXHAUST VENTILATION.

5.3 ENSURE THE STRIPPER IS SIMILAR TO IDEAL INDUSTRIES THERMO-STRIP OR HOT BLADE THERMAL STRIPPER. (IDEAL PART NO. 45-130) ADJUST THE WIRE STRIPPER FOR THE DEPTH OF THE CONTACT WIRE BARREL SPECIFIED FOR THE TYPE OF CONNECTOR BEING ASSEMBLED PLUS THE ALLOWABLE INSULATION CLEARANCE SPECIFIED IN STEP 7. (SEE FIGURE 2)

5.4 ADJUST THE TEMPERATURE TO THE INSULATION MELTING TEMPERATURE LISTED IN TABLE 1 FOR THE SPECIFIC CABLE TYPE BEING STRIPPED. IF A TEMPERATURE IS NOT LISTED, USE A PRECISION MECHANICAL STRIPPER IN ACCORDANCE WITH STEP 6.

5.5 CHECK STRIP LENGTH ON SEVERAL TEST PIECES.

5.5.1 STRIP LENGTH SHOULD MEET CRITERIA OF INSULATION CLEARANCE (SEE STEP 7). ADJUST STRIP LENGTH AS NECESSARY.

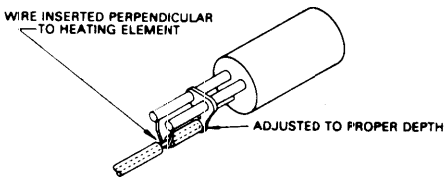


FIGURE 2
THERMAL STRIPPER DEPTH ADJUSTMENT

5.6 INSERT THE CONDUCTOR TO BE STRIPPED BETWEEN THE HEATING ELEMENTS OR STRIPPER BLADES.

5.7 TWIST THE TOOL SLIGHTLY OR ROTATE THE WIRE TO RING THE INSULATION WHILE APPLYING HEAT. (SEE FIGURE 1)

5.8 DRAW THE WIRE FROM THE TOOL. THE INSULATION SLUG WILL BE REMOVED WITH THE HEATING ELEMENTS.

6 PRECISION MECHANICAL STRIPPER (FIGURE 3)

6.1 ENSURE STRIPPER IS A PRECISION FIXED DIE CUTTING TYPE WHICH MEETS THE REQUIREMENTS OF FED. SPEC. GGG-S-665. STRIPPERS WHICH PERMIT OPERATOR ADJUSTMENT SHALL NOT BE USED. (SEE FIGURE 4)

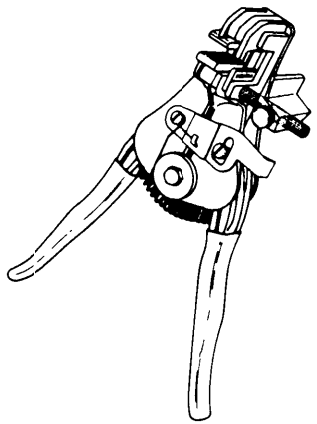

FIGURE 3
PRECISION MECHANICAL STRIPPER

6.1.1 SELECT THE CORRECT STRIPPER BLADE FOR THE SIZE CONDUCTOR BEING STRIPPED UTILIZING DATA SUPPLIED BY THE MANUFACTURER (TABLE 3 IS PROVIDED AS AN EXAMPLE OF TYPICAL IDEAL STRIPPER MODELS).

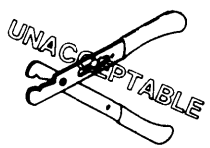


FIGURE 4
UNACCEPTABLE WIRE STRIPPER

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A8 OF DWG. 803-5001027.

FIGURE 5A5. Individual lead stripping techniques.

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6.2 EXAMINE THE STRIPPER TO ENSURE THE BLADES LINE UP FOR PROPER OPERATION (SEE FIGURE 5)

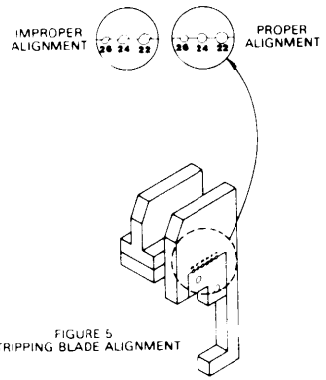


FIGURE 5.
STRIPPING BLADE ALIGNMENT

6.3 SET THE WIRE STOP FOR THE DEPTH OF THE CONTACT WIRE BARREL AS SPECIFIED IN THE CONNECTOR ASSEMBLY PROCEDURE FOR THE CONNECTOR TYPE BEING ASSEMBLED PLUS THE ALLOWABLE INSULATION CLEARANCE SPECIFIED IN STEP 7 (SEE FIGURE 6)

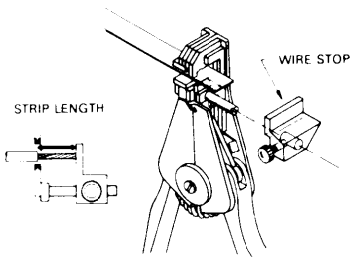


FIGURE 6.
MECHANICAL STRIPPER DEPTH ADJUSTMENT

6.4 CHECK STRIP LENGTH ON SEVERAL TEST PIECES

6.4.1 STRIP LENGTH SHOULD MEET CRITERIA OF INSULATION CLEARANCE (SEE STEP 7) ADJUST STRIP LENGTH AS NECESSARY

6.4.2 ENSURE CORRECT STRIPPING HOLE IS USED FOR CORRESPONDING CONDUCTOR GAGE SEE TABLE 1 FOR CONDUCTOR SIZE

6.5 POSITION THE CONDUCTOR IN THE STRIPPER JAWS (SEE FIGURE 7)

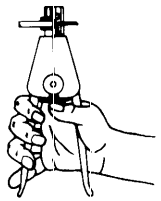

FIGURE 7.
CONDUCTOR POSITIONED IN STRIPPER

6.6 SQUEEZE THE HANDLES

7. EXAMINE THE STRIPPED WIRE FOR INSULATION DAMAGE AND PROPER INSULATION CLEARANCE. WIRES WITH DAMAGED INSULATION SHALL NOT BE USED.

7.1 CRIMP CONTACT INSULATION CLEARANCE SPECIFICATION.

7.1.1 CONDUCTOR MUST BE BOTTOMED IN CONTACT WIRE BARREL.

7.1.2 CONDUCTOR MUST BE VISIBLE IN INSPECTION HOLE.

7.1.3 CONDUCTOR SHOULD ONLY BE VISIBLE TO A MAXIMUM OF 1/32-INCH (20 GAGE AND SMALLER) 1/16-INCH (18 GAGE AND LARGER) AT REAR OF CONTACT.

7.1.4 CONTOUR OF THE CONDUCTOR SHALL BE VISIBLE AT THE INSULATION GAP.

7.2 SOLDER CONTACT INSULATION CLEARANCE SPECIFICATION.

7.2.1 CONDUCTOR MUST BE BOTTOMED IN CONTACT WIRE BARREL.

7.2.2 MINIMUM CLEARANCE. INSULATION MUST NOT BE EMBEDDED IN THE SOLDER JOINT.

7.2.3 CONTOUR OF THE CONDUCTOR SHALL BE VISIBLE AT THE INSULATION GAP.

7.2.4 MAXIMUM CLEARANCE. LESS THAN TWO WIRE DIAMETERS INCLUDING INSULATION OR 1/16 INCH, WHICHEVER IS LARGER), BUT SHALL NOT PERMIT SHORTING BETWEEN ADJACENT CONDUCTORS.

8. EXAMINE THE WIRE WITH A MAGNIFYING GLASS (6X TO 10X POWER) TO ENSURE THE STRANDS HAVE NOT BEEN SCRATCHED, NICKED, CUT, SCRAPED, BROKEN OR OTHERWISE DAMAGED.

8.1 SEE TABLE 2 FOR REJECTION CRITERIA FOR SOLDER CONTACTS.

TABLE 2

| NUMBER OF STRANDS | MAXIMUM ALLOWABLE NICKED OR BROKEN STRANDS |
|---|---|
| LESS THAN 7 | 0 |
| 7-15 | 1 |
| 16-18 | 2 |
| 19-25 | 3 |
| 26-36 | 4 |
| 37-40 | 5 |
| 41 OR MORE | 6 |

8.2 FOR CRIMPED CONTACTS, NO CONDUCTOR STRAND DAMAGE IS ACCEPTABLE.

9. REWORK REJECTED CONDUCTORS AS FOLLOWS.

9.1 CUT THE CONDUCTOR SQUARE WHERE THE DAMAGE ENDS.

9.2 RESTRIP THE CONDUCTOR IN ACCORDANCE WITH STEP 4.

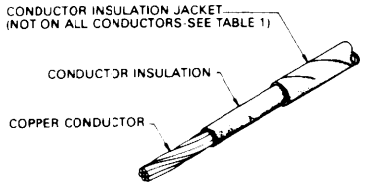


FIGURE 8.
TYPICAL CONDUCTOR CONSTRUCTION

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A6 OF DWG. 803-5001027.

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FIGURE 5A6. Individual lead stripping techniques.

| CABLE TYPE | CONDUCTOR WIRE MATERIAL | SIZE OF WIRE CONDUCTOR | NO OF STRANDS PER CONDUCTOR | MAX WIRE DIAMETER | MAX CONDUCTOR DIAMETER | CONDUCTOR PRIMARY INSULATION MATERIAL | INSULATION MELTING TEMPERATURE | INSULATION DECOMPOSITION TEMP | CONDUCTOR INSULATION JACKET MATERIAL | INSULATION JACKET MELTING TEMPERATURE | INSULATION JACKET DECOMPOSITION TEMP | RECOMMENDED STRIPPING METHOD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DHOF-3 | COPPER, UNCOATED | 2 1/2(26) (NAVY STANDARD) | 26 | 0.061 | 0.123 | SEPARATOR NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | SYNTHETIC RUBBER | 248°F NOTE 7 | 248°F | MECHANICAL |
| DHOF-4 | COPPER, UNCOATED | 4(41) | 41 | 0.077 | 0.139 | SEPARATOR NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | SYNTHETIC RUBBER | 248°F NOTE 7 | 248°F | MECHANICAL |
| DHOF-6 | COPPER, UNCOATED | 6(65) (NAVY STANDARD) | 65 | 0.097 | 0.159 | SEPARATOR NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | SYNTHETIC RUBBER | 248°F NOTE 7 | 248°F | MECHANICAL |
| DSGU-3 NOTE 1 | COPPER, UNCOATED | 3(7) (NAVY STANDARD) | 7 | 0.060 | 0.130 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | — | MECHANICAL |
| DSGU-4 NOTE 1 | COPPER, UNCOATED | 4(7) (NAVY STANDARD) | 7 | 0.076 | 0.143 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | — | MECHANICAL |
| DSGU-50 NOTE 1 | COPPER, UNCOATED | 50(19) (NAVY STANDARD) | 19 | 0.254 | 0.334 | SILICONE RUBBER | 482°F | 530°F | GLASS TAPE | 1300°F | — | MECHANICAL |
| FHOF-4 | COPPER, UNCOATED | 4(41) (NAVY STANDARD) | 41 | 0.077 | 0.139 | SEPARATOR NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | TEMPERATURE UNDETERMINED | SYNTHETIC RUBBER | 248°F NOTE 7 | 248°F | MECHANICAL |
| FHOF-9 | COPPER, UNCOATED | 9(90) (NAVY STANDARD) | 90 | 0.120 | 0.182 | SEPARATOR NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | SYNTHETIC RUBBER | 248°F NOTE 7 | 248°F | MECHANICAL |
| FSGU-3 NOTE 1 | COPPER, UNCOATED | 3(7) (NAVY STANDARD) | 7 | 0.060 | 0.096 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | — | MECHANICAL |
| FSGU-4 NOTE 1 | COPPER, UNCOATED | 4(7) (NAVY STANDARD) | 7 | 0.076 | 0.112 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | — | MECHANICAL |
| FSGU-9 NOTE 1 | COPPER, UNCOATED | 9(7) (NAVY STANDARD) | 7 | 0.108 | 0.154 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | — | MECHANICAL |
| FSGU-23 NOTE 1 | COPPER, UNCOATED | 23(7) (NAVY STANDARD) | 7 | 0.171 | 0.316 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | — | MECHANICAL |
| FSGU-50 NOTE 1 | COPPER, UNCOATED | 50(19) (NAVY STANDARD) | 19 | 0.254 | 0.334 | SILICONE RUBBER | 482°F | 530°F | GLASS TAPE | 1300°F | — | MECHANICAL |
| MCOS-2 | COPPER, UNCOATED | 11/2(16) (NAVY STANDARD) | 16 | 0.049 | 0.072 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | BRAIDED SHIELD AWG 34 OR 36 COPPER | EXTREMELY HIGH; BRAID MUST BE MECHANICALLY STRIPPED | — | MECHANICAL |
| MCOS-6 | COPPER, UNCOATED | 1(10) (NAVY STANDARD) | 10 | 0.038 | 0.064 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | BRAIDED SHIELD AWG 34 OR 36 COPPER | EXTREMELY HIGH; BRAID MUST BE MECHANICALLY STRIPPED | — | MECHANICAL |
| TTHFWA | COPPER, UNCOATED | 3/5(7) (NAVY STANDARD) | 7 | 0.030 | 0.062 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | NONE | — | — | THERMAL |
| TTOP XX | COPPER, UNCOATED | 1(10) (NAVY STANDARD) | 10 | 0.038 | 0.078 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | NONE | — | — | THERMAL |
| TTRS-XX NOTE 6 | COPPER, UNCOATED | 1(7) (NAVY STANDARD) | 7 | 0.038 | 0.078 | POLYETHYLENE | 275°-400°F | 440°F | POLYAMIDE | 325°-450°F | 700°F | THERMAL |

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A7 OF DWG. 803-5001027.

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FIGURE 5A7. Individual lead stripping techniques.

| CABLE TYPE | CONDUCTOR WIRE MATERIAL | SIZE OF WIRE CONDUCTOR | NO. OF STRANDS PER CONDUCTOR | MAX WIRE DIAMETER | MAX CONDUCTOR DIAMETER | CONDUCTOR PRIMARY INSULATION MATERIAL | INSULATION MELTING TEMPERATURE | INSULATION DECOMPO-SITION TEMP | CONDUCTOR INSULATION JACKET MATERIAL | INSULATION JACKET MELTING TEMPERATURE | INSULATION JACKET DECOMPO-SITION TEMP | RECOM-MENDED STRIP-PING METHOD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TTSU-XX NOTE 1 | COPPER, UNCOATED | 3 5(7) (NAVY STANDARD) | 7 | 0.030 | 0.047 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | POLYAMIDE | 325° 450°F | 700°F | THERMAL |
| 1SMWU-70 | COPPER, TIN COATED | 22-7 (ASTM B-286) | 7 | 0.033 | 0.093 | POLYETHYLENE | 275°-400°F | 440°F | POLYAMIDE | 325°-450°F | 700°F | THERMAL |
| 1S50MU-70 | COPPER, TIN COATED | 22-7 (ASTM B-286) | 7 | 0.033 | 0.093 | POLYETHYLENE | 275°-400°F | 440°F | POLYAMIDE | 325°-450°F | 700°F | THERMAL |
| 2A-40 NOTE 5 | COPPER, TIN COATED | 22-7 (ASTM B-286) | 7 | 0.033 | 0.081 | POLYETHYLENE | 275°-400°F | 440°F | POLYAMIDE | 325°-450°F | 700°F | THERMAL |
| 2SJ-16 | COPPER, TIN COATED | 16-19 (ASTM B-286) | 19 | 0.062 | 0.091 | POLYVINYL CHLORIDE | 300°F 375°F | 412°F | BRAIDED SHIELD TIN COATED COPPER AWG 30 | EXTREMELY HIGH; BRAID MUST BE MECHANI-CALLY STRIPPED | – | MECHANICAL |
| 2SJ-20 | COPPER, TIN COATED | 20-19 (ASTM B-286) | 19 | 0.038 | 0.073 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | BRAIDED SHIELD TIN COATED COPPER AWG 30 | EXTREMELY HIGH; BRAID MUST BE MECHANI-CALLY STRIPPED | – | MECHANICAL |
| 2SU-XX NOTE 1 | COPPER, UNCOATED | 22-7 (ASTM B-286) | 7 | 0.033 | 0.059 | POLYETHYLENE | 275°-400°°F | 440°F | POLYAMIDE | 325°-450°F | 700°F | THERMAL |
| 2SWA-XX NOTE 5 | COPPER, UNCOATED | 22-7 (ASTM B-286) | 7 | 0.033 | 0.059 | POLYETHYLENE | 275°F 400°F | 440°F | POLYAMIDE | 325°-450°F | 700°F | THERMAL |
| 2U-XX | COPPER, TIN COATED | 26-7 (ASTM B-286) | 7 | 0.020 | 0.051 | POLYETHYLENE | 275°F 400°F | 440°F | POLYAMIDE | 325°F 450°F | 700°F | THERMAL |
| 2UW-XX | COPPER, TIN COATED | 26-7 (ASTM B-286) | 7 | 0.020 | 0.044 | POLYETHYLENE | 275°F 400°F | 440°F | NONE | – | – | THERMAL |
| 3SJ-12 | COPPER, UNCOATED | 6(7) (NAVY STANDARD) | 7 | 0.092 | 0.145 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | BRAIDED SHIELD TIN COATED COPPER AWG 30 OR SMALLER | EXTREMELY HIGH; BRAID MUST BE MECHANI-CALLY STRIPPED | – | MECHANICAL |
| 3SJ-14 | COPPER, TIN COATED | 14-19 (ASTM B-286) | 19 | 0.072 | 0.105 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | BRAIDED SHIELD TIN COATED COPPER AWG 30 OR SMALLER | EXTREMELY HIGH; BRAID MUST BE MECHANI-CALLY STRIPPED | – | MECHANICAL |
| 3SJ-16 | COPPER, TIN COATED | 16-19 (ASTM B-286) | 19 | 0.062 | 0.091 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | BRAIDED SHIELD TIN COATED COPPER AWG 30 OR SMALLER | EXTREMELY HIGH; BRAID MUST BE MECHANI-CALLY STRIPPED | – | MECHANICAL |
| 3SJ-18 | COPPER, TIN COATED | 18-19 (ASTM B-286) | 19 | 0.051 | 0.084 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | BRAIDED SHIELD TIN COATED COPPER AWG 30 OR SMALLER | EXTREMELY HIGH MUST BE MECHANI-CALLY STRIPPED | – | MECHANICAL |
| 3SU-XX NOTE 1 | COPPER, UNCOATED | 18(AWG) | 7 | 0.050 | 0.096 | POLYETHYLENE | 275°-400°F | 440°F | POLYAMIDE | 325°-450°F | 700°F | THERMAL |
| 7SGU-3 NOTE 1 | COPPER, UNCOATED | 3(7) (NAVY STANDARD) | 7 | 0.060 | 0.130 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | – | MECHANICAL |
| 7SGU-4 NOTE 1 | COPPER, UNCOATED | 4(7) (NAVY STANDARD) | 7 | 0.076 | 0.143 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | – | MECHANICAL |
| MHOF-XX | COPPER, UNCOATED | 2 1 2(19) (NAVY STANDARD) | 19 | 0.057 | 0.097 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | NONE | – | – | THERMAL |

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A8 OF DWG. 803-5001027.

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FIGURE 5A8. Individual lead stripping techniques.

| CABLE TYPE | CONDUCTOR WIRE MATERIAL | SIZE OF WIRE CONDUCTOR | NO. OF STRANDS PER CONDUCTOR | MAX WIRE DIAMETER | MAX CONDUCTOR DIAMETER | CONDUCTOR PRIMARY INSULATION MATERIAL | INSULATION MELTING TEMPERATURE | INSULATION DECOMPOSITION TEMP | CONDUCTOR INSULATION JACKET MATERIAL | INSULATION JACKET MELTING TEMPERATURE | INSULATION JACKET DECOMPOSITION TEMP | RECOMMENDED STRIPPING METHOD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHFF | COPPER, UNCOATED | 2 1/2(26) (NAVY STANDARD) | 26 | 0.061 | 0.092 | SYNTHETIC RESIN | 475°-600°F | 482°-662°F | FELTED ASBESTOS OR GLASS FIBER TO A MAX DIA OF 0.125 | EXTREMELY HIGH, BRAID MUST BE MECHANICALLY STRIPPED NOTE 8 | EXTREMELY HIGH, BRAID MUST BE MECHANICALLY STRIPPED NOTE 8 | MECHANICAL |
| MSCU-XX NOTE 1 | COPPER, UNCOATED | 2(7) (NAVY STANDARD) | 7 | 0.048 | 0.084 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | — | MECHANICAL |
| MSP NOTE 4 | COPPER, TIN COATED | 22-7 (ASTM B-286) | 7 | 0.031 | 0.119 | FLUORO-CARBON RESIN | 475°F-600°F | 800°F-900°F | BRAIDED SHIELD, AWG 34 OR 36 COPPER | EXTREMELY HIGH, MUST BE MECHANICALLY STRIPPED | EXTREMELY HIGH | MECHANICAL |
| | COPPER, TIN COATED | 20-7 (ASTM B-286) | 7 | 0.038 | 0.088 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | POLYAMIDE | 325°-450°F | 700°F | THERMAL |
| | COPPER, TIN COATED | 3(7) (NAVY STANDARD) | 7 | 0.060 | 0.094 | POLYVINYL CHLORIDE | 300°-375°F | 412°F | POLYAMIDE | 325°-450°F | 700°F | THERMAL |
| MSTCP-65 NOTE 3 | COPPER, TIN COATED | 22 A.W.G | 7 | 0.033 | 0.064 (DIAMETER OF CONDUCTOR WITH NATURAL RUBBER INSULATION ONLY) | NATURAL RUBBER OR NATURAL RUBBER WITH POLY-CHLOROPRENE LAYER | NOTE 9 | NOTE 9 | 3 LAYERS OF BRAID RAYON, TINNED COPPER, RAYON | MECHANICALLY STRIP JACKET | — | MECHANICAL |
| | COPPER, TIN COATED | 22 A.W.G | 7 | 0.033 | 0.064 | SAME AS ABOVE | NOTE 9 | NOTE 9 | SAME AS ABOVE | MECHANICALLY STRIP JACKET | — | MECHANICAL |
| | COPPER, TIN COATED | 22 A.W.G | 7 | 0.033 | 0.072 | SAME AS ABOVE | NOTE 9 | NOTE 9 | SAME AS ABOVE | MECHANICALLY STRIP JACKET | — | MECHANICAL |
| | COPPER, TIN COATED | 18 A.W.G | 7 | 0.052 | 0.082 | SAME AS ABOVE | NOTE 9 | NOTE 9 | SAME AS ABOVE | MECHANICALLY STRIP JACKET | — | MECHANICAL |
| | COPPER, TIN COATED | 16 A.W.G | 7 | 0.062 | 0.092 | SAME AS ABOVE | NOTE 9 | NOTE 9 | SAME AS ABOVE | MECHANICALLY STRIP JACKET | — | MECHANICAL |
| | COPPER, TIN COATED | 19 A.W.G | 7 | 0.045 | 0.077 | SAME AS ABOVE | NOTE 9 | NOTE 9 | SAME AS ABOVE | MECHANICALLY STRIP JACKET | — | MECHANICAL |
| RG-108A/U | COPPER, TIN COATED | 20 A.W.G | 7 | 0.038 | 0.079 | POLYETHYLENE | 275°-400°F | 440°F | NONE | — | — | THERMAL |
| SHOF-3 | COPPER, UNCOATED | 2 1/2 (65) (NAVY STANDARD) | 65 | 0.061 | 0.123 | SEPARATOR NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | SYNTHETIC RUBBER | 248°F NOTE 7 | 248°F | MECHANICAL |
| SSGU-50 NOTE 1 | COPPER, UNCOATED | 50(19) (NAVY STANDARD) | 19 | 0.254 | 0.334 | SILICONE RUBBER | 482°F | 530°F | GLASS TAPE | 1300°F | — | MECHANICAL |
| THOF-3 | COPPER, UNCOATED | 2 1/2(26) (NAVY STANDARD) | 26 | 0.061 | 0.123 | SEPARATOR NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | SYNTHETIC RUBBER | 243°F NOTE 7 | 248°F | MECHANICAL |
| THOF-9 | COPPER, UNCOATED | 9(90) (NAVY STANDARD) | 90 | 0.120 | 0.182 | SEPARATOR NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | SYNTHETIC RUBBER | 243°F NOTE 7 | 248°F | MECHANICAL |
| THOF-14 | COPPER UNCOATED | 14(140) (NAVY STANDARD) | 140 | 0.145 | 0.225 | SEPARATOR NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | TEMPERATURE UNDETERMINED SEE NOTE 2 | SYNTHETIC RUBBER | 248°F NOTE 7 | 248°F | MECHANICAL |
| TSGU-3 NOTE 1 | COPPER, UNCOATED | 3(7) (NAVY STANDARD) | 7 | 0.060 | 0.130 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | — | MECHANICAL |

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NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A9 OF DWG. 803-5001027

FIGURE 5A9. Individual lead stripping techniques.

| CABLE TYPE | CONDUCTOR WIRE MATERIAL | SIZE OF WIRE CONDUCTOR | NO OF STRANDS PER CONDUCTOR | MAX WIRE DIAMETER | MAX CONDUCTOR DIAMETER | CONDUCTOR PRIMARY INSULATION MATERIAL | INSULATION MELTING TEMPERATURE | INSULATION DECOMPOSITION TEMP | CONDUCTOR INSULATION JACKET MATERIAL | INSULATION JACKET MELTING TEMPERATURE | INSULATION JACKET DECOMPOSITION TEMP | RECOMMENDED STRIPPING METHOD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TSGU-4 NOTE 1 | COPPER, UNCOATED | 4(7) (NAVY STANDARD) | 7 | | 0.143 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | – | MECHANICAL |
| TSGU-9 NOTE 1 | COPPER, UNCOATED | 9(7) (NAVY STANDARD) | 7 | 0.108 | 0.187 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | – | MECHANICAL |
| TSGU-14 NOTE 1 | COPPER, UNCOATED | 14(7) (NAVY STANDARD) | 7 | 0.136 | 0.230 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | – | MECHANICAL |
| TSGU-23 NOTE 1 | COPPER, UNCOATED | 23(7) (NAVY STANDARD) | 7 | 0.171 | 0.284 | EXTRUDED SILICONE RUBBER | 482°F | 530°F | GLASS BRAID | 1300°F | – | MECHANICAL |
| TSGU-150 NOTE 1 | COPPER, UNCOATED | 150(61) (NAVY STANDARD) | 61 | 0.457 | 0.557 | SILICONE RUBBER | 482°F | 530°F | GLASS TAPE | 1300°F | – | MECHANICAL |

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A10 OF DWG. 803-5001027.

NOTE 1 WHEN THIS CABLE IS MANUFACTURED WITH ARMOR, THE LAST LETTER OF THE CABLE DESIGNATION CHANGES FROM U TO A.

NOTE 2 SEVERAL TYPES OF WIRES ARE MANUFACTURED WITH A LAYER BETWEEN THE CONDUCTOR AND THE INSULATION JACKET CALLED THE SEPARATOR. THE SEPARATOR MAY CONSIST OF ANY ONE OF THE FOLLOWING MATERIALS

A GLASS FIBERS

B SYNTHETIC FIBERS

C COTTON

D COTTON TAPE

E SYNTHETIC FIBER TAPE

F PAPER TAPE

G POLYESTER TAPE

ENSURE THE SEPARATOR IS REMOVED ALONG WITH THE INSULATION

NOTE 3 REFER TO MIL-C-19787

NOTE 4 WHEN MANUFACTURED IN THE WATERTIGHT VERSION, THE LETTER W IS ADDED TO THE CABLE DESIGNATION

NOTE 5 IN THE UNARMORED VERSION, THE LETTER U IS ADDED TO THE CABLE DESIGNATION

NOTE 6 WHEN THIS CABLE IS MANUFACTURED WITH ARMOR, THE TYPE DESIGNATION SHALL CHANGE TO TTRSA

NOTE 7 SYNTHETIC RUBBER DECOMPOSES AND FUMES HEAVILY AT THE TEMPERATURE OF MATERIAL PLANCY

NOTE 8 TAKE PRECAUTIONS FOR ASBESTOS DUST

NOTE 9 NATURAL RUBBER DOES NOT MELT WITHOUT FUMING AND CHARRING

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**TABLE 3**

| IDEAL CAT NO | BLADE ONLY | BLADE HOLE SIZE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
| 45-169 | L-9300 CUTTER DIA<br>COUNTERBORE DIA | | | | | | | | 024<br>033 | 018<br>025 | 014<br>023 | 012<br>019 |
| 45-170<br>45-180 | L-5210 CUTTER DIA<br>COUNTERBORE DIA | 116<br>154 | 0937<br>136 | 076<br>113 | | | | | | | | |
| 45-171<br>45-181 | L-5211 CUTTER DIA<br>COUNTERBORE DIA | | | | 062<br>096 | 052<br>086 | 042<br>073 | 035<br>0635 | 0292<br>0595 | 022<br>052 | | |
| 45-172<br>45-182 | L-5436 CUTTER DIA<br>COUNTERBORE DIA | | | | | | | | | 024<br>043 | 020<br>040 | 016<br>037 |
| 45-173<br>45-183 | L-5562 CUTTER DIA<br>COUNTERBORE DIA | 119<br>144 | 096<br>125 | 076<br>104 | | | | | | | | |
| 45-174<br>45-184 | L-5563 CUTTER DIA<br>COUNTERBORE DIA | | | | 061<br>089 | 052<br>0785 | 042<br>067 | 034<br>0595 | 028<br>055 | 023<br>0465 | | |
| 45-175<br>45-185 | L-5564 CUTTER DIA<br>COUNTERBORE DIA | | | | | | | | | 023<br>0465 | 019<br>043 | 016<br>042 |
| 45-176<br>45-186 | L-5559 CUTTER DIA<br>COUNTERBORE DIA | 119<br>136 | 096<br>113 | 076<br>0935 | | | | | | | | |
| 45-177<br>45-187 | L-5560 CUTTER DIA<br>COUNTERBORE DIA | | | | 061<br>081 | 052<br>070 | 042<br>0595 | 034<br>052 | 028<br>043 | 023<br>039 | | |
| 45-178<br>45-188 | L-5561 CUTTER DIA<br>COUNTERBORE DIA | | | | | | | | | 023<br>039 | 019<br>035 | 016<br>032 |
| 45-179 | L-7625 CUTTER DIA<br>COUNTERBORE DIA | | | | | | | | | | | 012<br>020 |

FIGURE 5A10. Individual lead stripping techniques.

1. OBSERVE THE FOLLOWING WHEN CRIMPING CONTACTS.

1.1 ENSURE THE CRIMPING TOOL IS CALIBRATED IN ACCORDANCE WITH MIL-C-22520.

1.2 THE CRIMPING TOOL AND POSITIONER SHALL CONFORM TO MIL-C-22520.

2. SELECT THE CRIMPING TOOL (SEE FIGURE 1) AND POSITIONER IN ACCORDANCE WITH THOSE SPECIFIED FOR THE CONNECTOR BEING ASSEMBLED.

3. CHECK THE CRIMPING TOOL FOR PROPER OPERATION AS FOLLOWS.

3.1 CHECK PROPER ACTION OF TOOL.

3.1.1 SQUEEZE HANDLES TOGETHER.

3.1.2 CHECK LOCKING MECHANISM (RATCHET) RELEASES WHEN HANDLES ARE FULLY CLOSED.

3.1.3 RELEASE THE HANDLES.

3.2 CHECK PROPER ACTION OF CRIMPERS.

3.2.1 SELECT CORRECT INSPECTION GAGE (GO-NO GO GAGE) FOR CRIMPING TOOL PER MIL-C-22520 OR INSTRUCTION SHEET PROVIDED WITH CRIMPING TOOL.

3.2.2 ROTATE SELECTOR KNOB TO CORRECT POSITION FOR TESTING PER MIL-C-22520 OR CRIMPER INSTRUCTION SHEET.

3.2.3 ACTIVATE THE TOOL TO THE FULLY CLOSED POSITION AND HOLD. THE "GO" GAGE SHALL BE FREELY INSERTED IN THE SPACE BETWEEN OPPOSING CLOSED INDENTERS. RELEASE PRESSURE ON THE HANDLES AND ALLOW THE TOOL TO OPEN AUTOMATICALLY.

3.2.4 ACTIVATE THE TOOL TO THE FULLY CLOSED POSITION AND HOLD. THE "NO-GO" GAGE SHALL NOT BE INSERTABLE BETWEEN OPPOSING INDENTERS.

NOTE: DO NOT CRIMP THE GAGE, IT WILL DAMAGE THE INDENTERS.

3.3 CONDUCT A PULL TEST ON A TEST CONDUCTOR AS FOLLOWS.

3.3.1 SELECT A SAMPLE WIRE WHICH MATCHES THE CABLE CONDUCTORS BEING CRIMPED IN COMPOSITION AND SIZE.

3.3.2 STRIP THE SAMPLE CONDUCTOR TO THE SAME DISTANCE AS DETERMINED FOR THE CABLE CONDUCTORS BEING PREPARED IN ACCORDANCE WITH SHEET 5A5.

3.3.3 CRIMP A CONTACT (IDENTICAL TO CONTACTS BEING UTILIZED IN APPLICABLE CONNECTOR ASSEMBLY PROCEDURE) TO THE SAMPLE WIRE FOLLOWING STEPS 4 THROUGH 11.

3.3.4 CONDUCT A PULL TEST IN ACCORDANCE WITH STEP 12 OF THIS PROCEDURE.

3.3.5 IF THE SAMPLE WIRE BREAKS OR PULLS OUT OF THE CONTACT, RECHECK PROPER OPERATION OF THE TOOL (STEP 3), OR OBTAIN A NEW CRIMPING TOOL, AND REPERFORM STEPS 1 THROUGH 3.3.4.

4. MOUNT THE POSITIONER ON THE CRIMPING TOOL IN ACCORDANCE WITH THE APPROPRIATE INSTRUCTIONS FOR THE TOOL BEING USED.

NOTE: THE TOOL HANDLES MUST BE FULLY OPEN WHEN INSERTING THE POSITIONER OR CHANGING THE SELECTOR SETTING.

5. SET THE WIRE SIZE SELECTOR KNOB FOR THE WIRE SIZE BEING CRIMPED. THE CORRECT WIRE SIZE SELECTOR NUMBER IS DETERMINED FROM THE CHART ON THE SIDE OF THE TURRET HEAD.

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6. INSERT THE STRIPPED WIRE INTO THE CONTACT. THE STRIPPED WIRE MUST BE VISIBLE IN THE INSPECTION HOLE AND AT THE REAR OF THE CONTACT WIRE BARREL (MAXIMUM GAP BETWEEN CONTACT AND INSULATION DEPENDS ON CONTACT SIZE). (SEE FIGURE 2)

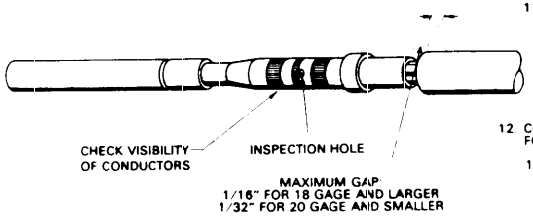



FIGURE 2
TYPICAL CRIMP CONTACT

6.1 ENSURE ALL WIRE STRANDS ARE INSERTED INTO THE CONTACT WIRE BARREL.

7. TURN THE CRIMPING TOOL SO THE FRONT IS FACING THE OPERATOR.

8. INSERT THE WIRE AND CONTACT THROUGH THE INDENTORS UNTIL IT BOTTOMS IN THE POSITIONER. (SEE FIGURE 3)

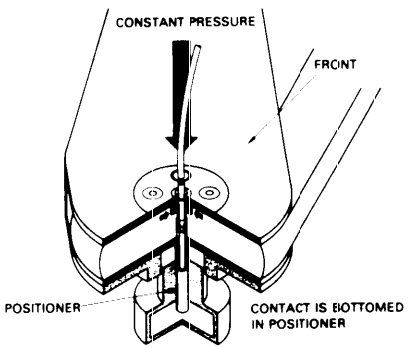



FIGURE 3
CONTACT INSERTED IN CRIMPING TOOL

9. HOLD THE WIRE IN PLACE AND SQUEEZE THE HANDLES UNTIL THE RATCHET RELEASES AND THE TOOL OPENS. THE CRIMPING CYCLE IS CONTROLLED BY MEANS OF A RATCHET WHICH WILL NOT RELEASE UNTIL THE CRIMPING CYCLE HAS BEEN COMPLETED.

10. REMOVE THE CRIMPED CONTACT AFTER RELEASING THE HANDLES.

11. INSPECT THE CRIMPED CONTACT FOR THE FOLLOWING.

11.1 EVEN CRIMP.

11.2 NO CRACKS UNDER A MAGNIFYING GLASS (3X POWER).

11.3 WIRE VISIBLE IN INSPECTION HOLE.

11.4 1/32 INCH MAXIMUM GAP BETWEEN CONTACT AND INSULATION FOR 20 GAGE AND SMALLER. 1/16 INCH MAXIMUM GAP BETWEEN CONTACT AND INSULATION FOR 18 GAGE AND LARGER (SEE FIGURE 2).

12. CONDUCT A PULL TEST ON ALL CRIMPED CONDUCTORS AS FOLLOWS.

12.1 INSTALL THE PULL TEST ADAPTER (NAVSEA DWG NO. 54999694 OR EQUIVALENT) ON THE TENSION END OF THE TENSION/ COMPRESSION GAGE (CHATILLON DPP SERIES OR EQUIVALENT). (SEE FIGURE 4)

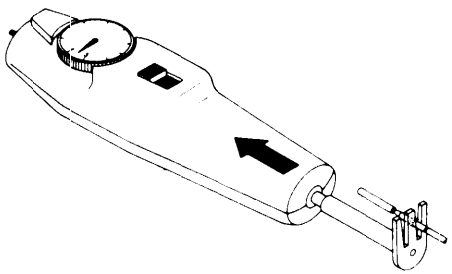


FIGURE 4
PULL TEST ADAPTER, TENSION/COMPRESSION GAGE

12.2 INSERT THE CRIMPED CONTACT INTO THE PULL TEST ADAPTER.

12.3 PULLING AGAINST THE CONTACT SHOULDER, PULL TEST THE CRIMPED CONTACT TO THE VALUE SPECIFIED IN TABLE I.

12.4 THE LEAD SHOULD NOT PULL OUT OF OR BREAK WITHIN THE CONTACT BARREL.

12.5 RELEASE THE CONTACT.

13. REWORK ANY FAILED CRIMPED CONTACT.

13.1 FAILED CRIMPED CONTACTS SHOULD BE REMOVED BY CUTTING THE CONTACT JUST ABOVE THE CRIMPED AREA.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A11 OF DWG. 803-5001027.







FIGURE 5A11. Connector contact crimping techniques

TABLE 1

| WIRE BARREL SIZE | WIRE SIZE RANGE | AXIAL LOAD (POUNDS) | | |
|---|---|---|---|---|
| | | SILVER- OR TIN-PLATED COPPER WIRE | NICKEL-PLATED COPPER WIRE | COPPER ALLOY WIRE |
| 0000 | 0000 | 25 | 25 | |
| | 00[1] | 25 | 25 | |
| 0 | 0 | 25 | 25 | |
| | 2[1] | 25 | 25 | |
| 2 | 2 | 25 | 25 | |
| | 4[1] | 25 | 25 | |
| 4 | 4 | 25 | 25 | |
| | 6[1] | 25 | 25 | |
| 6 | 6 | 25 | 25 | |
| | 8[1] | 25 | 25 | |
| 8 | 8 | 25 | 25 | |
| | 10[1] | 25 | 25 | |
| 10 | 10 | 25 | 25 | |
| | 12[1] | 25 | 25 | |
| 12 | 12 | 25 | 25 | |
| | 14 | 25 | 25 | |
| 16 | 16 | 25 | 18.5 | |
| | 20 | 10 | 9.5 | |
| 20 | 20 | 10 | 6.5 | 25 |
| | 24 | 4 | 3 | 9 |
| 22 | 22 | 6 | 4 | 15 |
| | 26 | 2.5 | 1.5 | 6 |
| 24 | 24 | 4 | 2.5 | 9 |
| | 28 | 1.5 | 1.0 | 3.5 |
| 26 | 26 | 2.2 | 1.4 | 5.5 |
| | 30 | 0.7 | 0.7 | 2 |
| 28 | 28 | 1.3 | 0.9 | 3.2 |
| | 32 | 0.5 | 0.5 | 1.2 |

[1]WITH ELECTRICALLY CONDUCTIVE BUSHING

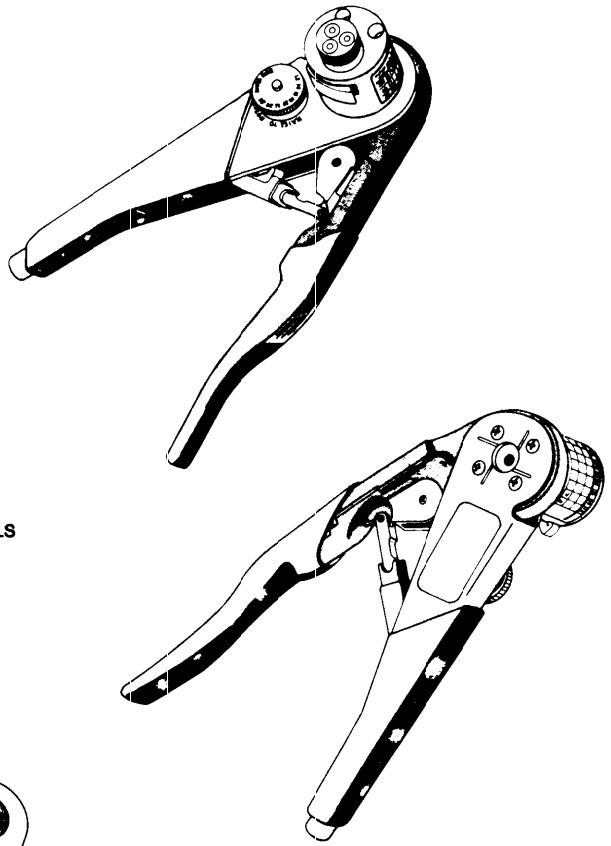
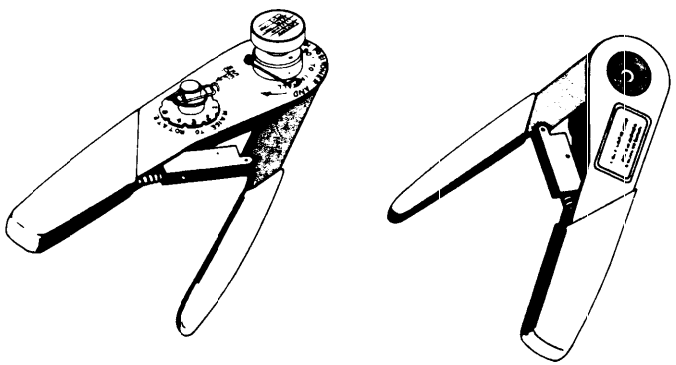


FIGURE 1
MIL-C-22520
CRIMPING TOOLS



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NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A12 OF DWG. 803-5001027.

FIGURE 5A12. Connector contact crimping techniques.

TINNING TECHNIQUES

1 OBSERVE THE FOLLOWING PRIOR TO COMMENCING WORK.

1.1 SOLDER SN 60 OR SN 63 TIN LEAD FORM W OR B, TYPE R, RMA OR S CONFORMING TO QQ-S-571 SHALL BE USED FOR PRETINNING.

1.2 ONLY ROSIN FLUX SHALL BE USED IN ALL SOLDERING OPERATIONS. LIQUID ROSIN FLUX SHALL CONFORM TO MIL-F-14256, TYPE RMA, EXCEPT THAT THE COPPER MIRROR TEST (SEE PARAGRAPH 3.5 OF MIL-F-14256) IS NOT REQUIRED AND THE RESISTIVITY OF THE WATER EXTRACT SHALL BE AT LEAST 45,000 OHM-CENTIMETERS.

1.3 SOLDERING GUNS WILL NOT BE USED AND THE USE OF A SOLDER POT IS NOT RECOMMENDED. WHEN CONDUCTORS ARE TINNED WITH A SOLDERING IRON, ONLY IRON CLAD TIPS SHALL BE USED. THE FOLLOWING NOTES APPLY TO SOLDERING IRON MAINTENANCE.

1.3.1 THE SOLDERING IRON TIP SHALL ALWAYS BE CHECKED FOR FULL INSERTION INTO THE HEATING ELEMENT AND TIGHT ATTACHMENT TO THE IRON. OXIDATION SCALE SHALL NOT BE ALLOWED TO ACCUMULATE BETWEEN THE HEATING ELEMENT AND THE TIP. THE BARREL OF THE COLD IRON SHALL BE CLEANED WITH A SOFT PIPE CLEANER OR SIMILAR OBJECT WHEN TIP IS REMOVED, OR ONCE A WEEK. A BRIGHT THIN, BUT CONTINUOUS, TINNED SURFACE SHALL BE MAINTAINED ON THE TIP WORKING SURFACE TO ENSURE PROPER HEAT TRANSFER AND TO AVOID TRANSFER OF IMPURITIES TO THE SOLDER CONNECTION.

1.3.2 PLATED TIPS SHALL BE CLEANED BY SCRUBBING ACTION ON AN ALUMINA SUBSTRATE (CERAMIC) WHILE THE IRON IS HOT. TIN THE TIP BY IMMERSION IN A BALL OF SOLDER AND FLUX UNTIL A BRIGHT SHINY SOLDER COATED SURFACE IS VISIBLE. FINE EMERY CLOTH MAY BE SUBSTITUTED FOR CERAMIC SUBSTRATE.

1.3.3 NEVER FILE AN IRON CLAD SOLDERING TIP.

1.3.4 DURING USE AND JUST BEFORE EACH APPLICATION THE HEATED AND TINNED SOLDERING TIP SHOULD BE MAINTAINED BY PASSING THE TIP (WITH A ROTARY MOTION) THROUGH THE FOLDS OF A DAMP CLEANING SPONGE. THIS REMOVES THE SURFACE DROSS AND EXCESS SOLDER FROM THE WORKING SURFACE. NEVER SHAKE OR "WHIP" THE IRON TO REMOVE EXCESS SOLDER.

2 TINNING WITH SOLDERING IRON (SEE FIGURE 1)

2.1 CHECK THE WIRE FOR ADEQUATE STRIP LENGTH (AS REQUIRED BY SHEET 5A5) AND FOR NICKS, CUT STRANDS, OR OTHER DAMAGE. IF REJECTABLE DEFECTS ARE EVIDENT, REPLACE THE WIRE OR IF WIRE LENGTH IS ADEQUATE, RESTRIP IT IN ACCORDANCE WITH SHEET 5A5.

2.2 THE SIZE OF THE SOLDERING IRON TO BE USED SHOULD BE DETERMINED FROM TABLE 1 BASED ON THE SIZE OF THE WIRE BEING TINNED.

TABLE 1

| WIRE SIZE | SOLDERING ELEMENT SIZE MAXIMUM WATTAGE CAPACITY | MAXIMUM TIP TEMPERATURE |
|---|---|---|
| 0 | 150 W | 1000°F |
| 4 | 150 W | 1000°F |
| 8 | 150 W | 1000°F |
| 10 | 75 W | 800°F |
| 12 | 60 W | 800°F |
| 16 | 50 W | 800°F |
| 20 | 35 W | 800°F |
| 22 | 35 W | 800°F |
| 24 26 | 24 W | 800°F |

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2.3 SELECT A SOLDERING IRON TIP WHICH WILL GIVE THE MAXIMUM "CONTACT" TO THE CONNECTION. FIGURE 1 SHOWS REPRESENTATIVE TIPS AND IS NOT INTENDED AS A SELECTION GUIDE.

2.4 PREPARE THE SOLDERING IRON WITH A SOLDER HEAT BRIDGE (POOL OF SOLDER) (FIGURE 2A).

2.5 PLACE THE STRIPPED END OF THE CONDUCTOR TO BE TINNED ON THE IRON TIP IN THE POOL OF SOLDER (FIGURE 2B).

2.6 APPLY ROSIN CORE SOLDER TO THE WIRE. (FIGURE 2C)

2.7 SEPARATE THE WIRE FROM THE IRON WITH A WIPING MOTION. (FIGURE 2D)

NOTE: DO NOT PERMIT SOLDER TO WICK UP UNDER THE INSULATION. AN ANTI-WICKING TOOL IS RECOMMENDED TO PREVENT EXCESSIVE WICKING.

2.8 ALLOW WIRE TO COOL.

2.9 INSPECT THE TINNED WIRE IN ACCORDANCE WITH STEP 3.

FIGURE 1

SOLDERING IRON TIPS

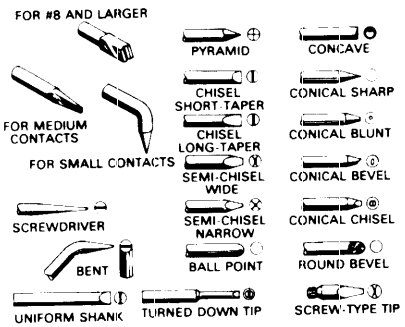
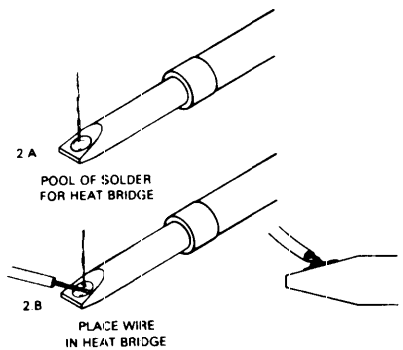
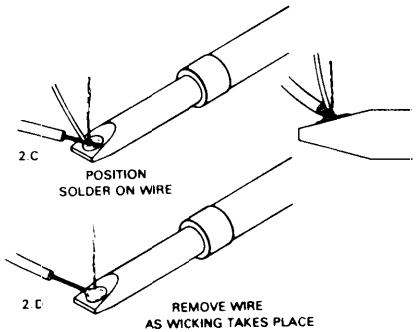



FIGURE 2
TINNING LEADS



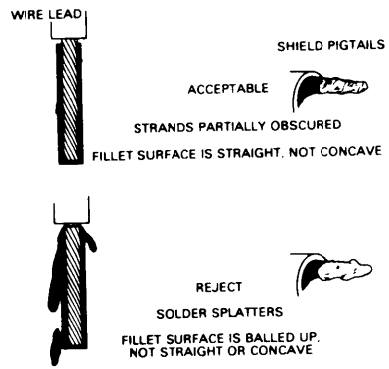




3 INSPECT THE TINNED WIRE AS FOLLOWS.

3.1 VISUALLY CHECK THE TINNED WIRE FOR COMPLETE WICKING BETWEEN STRANDS, COMPLETE WETTING AND VISIBILITY OF WIRE STRANDS IN THE TINNED AREA.

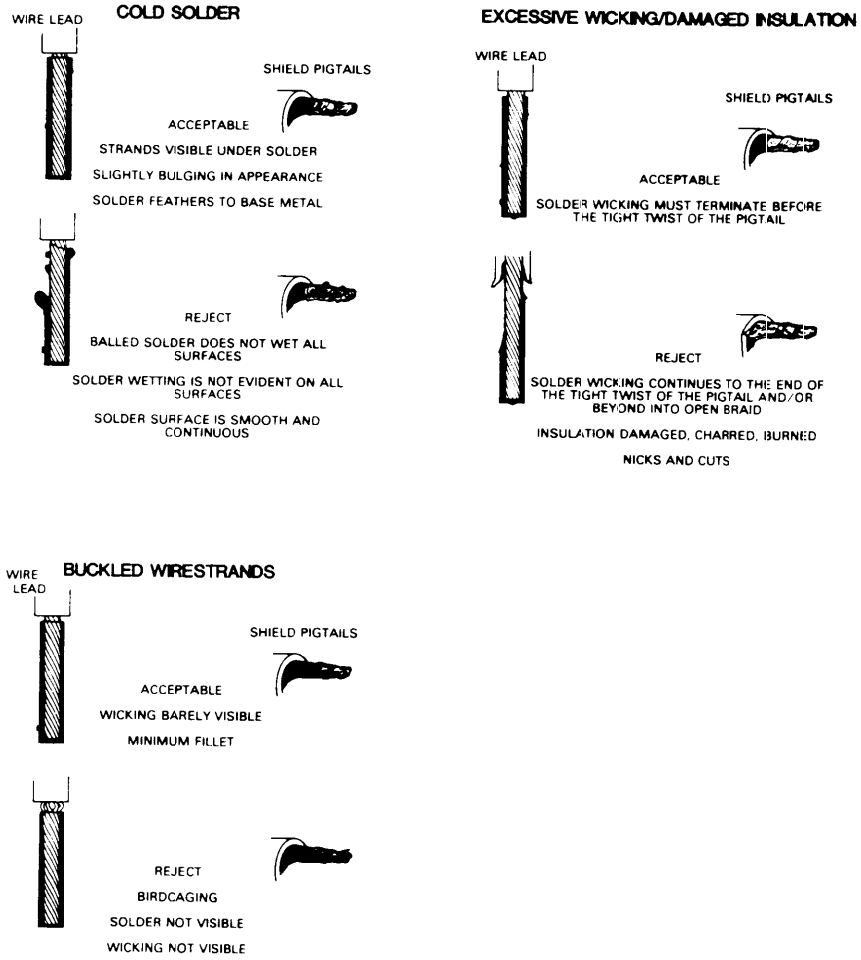
3.2 EXAMINE THE TINNED WIRE FOR EVIDENCE OF REJECTABLE DEFECTS.

3.2.1 REJECTABLE DEFECTS INCLUDE INSUFFICIENT OR EXCESS SOLDER, BALLED SOLDER, FRACTURED SOLDER, PITS, HOLES, VOIDS, INCLUSIONS, GRANULAR APPEARANCE, CHARRED INSULATION, OR BUCKLED WIRE STRANDS.




NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A13 OF DWG. 803-5001027.

FIGURE 5A13. Tinning techniques.

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NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A14 OF DWG. 803-5001027.

FIGURE 5A14. Tinning techniques.

CONNECTOR CONTACT SOLDERING TECHNIQUES

1. SOLDER SN 60 OR SN 63 TIN LEAD FORM W, TYPE R, OR RMA CONFORMING TO QQ-S-571 SHALL BE USED FOR CONNECTOR SOLDERING.

2. ONLY ROSIN FLUX SHALL BE USED IN ALL SOLDERING OPERATIONS. LIQUID ROSIN FLUX SHALL CONFORM TO MIL-F-14256, TYPE RMA, EXCEPT THAT THE COPPER MIRROR TEST (SEE PARAGRAPH 3.5 OF MIL-F-14256) IS NOT REQUIRED AND THE RESISTIVITY OF THE WATER EXTRACT SHALL BE AT LEAST 45,000 OHM-CENTIMETERS.

3. SOLDERING IRON TIPS TO BE USED FOR CONNECTOR ASSEMBLY SHALL BE IRON CLAD. THE SOLDERING IRON TIP STYLE SHOULD PROVIDE A LARGE CONTACT AREA WITH THE SOLDER CUP FOR MAXIMUM HEAT TRANSFER. THE FOLLOWING NOTES APPLY TO SOLDERING IRON TIP MAINTENANCE.

3.1 THE SOLDERING IRON TIP SHALL ALWAYS BE CHECKED FOR FULL INSERTION INTO THE HEATING ELEMENT AND TIGHT ATTACHMENT TO THE IRON. OXIDATION SCALE SHALL NOT BE ALLOWED TO ACCUMULATE BETWEEN THE HEATING ELEMENT AND THE TIP. THE BARREL OF THE COLD IRON SHALL BE CLEANED WITH A SOFT PIPE CLEANER OR SIMILAR OBJECT WHEN THE TIP IS REMOVED, OR ONCE A WEEK. A BRIGHT, THIN, BUT CONTINUOUS, TINNED SURFACE SHALL BE MAINTAINED ON THE TIP WORKING SURFACE TO ENSURE PROPER HEAT TRANSFER AND TO AVOID TRANSFER OF IMPURITIES TO THE SOLDER CONNECTION. (SEE FIGURE 1)

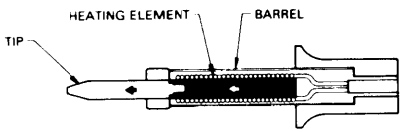


FIGURE 1

SOLDERING IRON COMPONENTS

3.2 PLATED TIPS SHALL BE CLEANED BY SCRUBBING ACTION ON AN ALUMINA SUBSTRATE (CERAMIC) WHILE THE IRON IS HOT. TIN THE TIP BY IMMERSION IN A BALL OF SOLDER AND FLUX UNTIL A BRIGHT SHINY SOLDER COATED SURFACE IS VISIBLE. FINE EMERY CLOTH MAY BE SUBSTITUTED FOR CERAMIC SUBSTRATE.

3.3 NEVER FILE AN IRON CLAD SOLDERING TIP.

3.4 DURING USE AND JUST PRIOR TO EACH APPLICATION, THE HEATED AND TINNED SOLDERING TIP SHOULD BE MAINTAINED BY PASSING THE TIP (WITH A ROTARY MOTION) THROUGH THE FOLDS OF A DAMP CLEANING SPONGE. THIS REMOVES THE SURFACE DROSS AND EXCESS SOLDER FROM THE WORKING SURFACE. NEVER SHAKE OR "WHIP" THE IRON TO REMOVE EXCESS SOLDER.

4. CLEANING SOLVENTS – SOLVENTS LISTED IN TABLE 1 SHOULD BE USED FOR THE REMOVAL OF GREASE, OIL, AND OTHER DIRT FROM THE PARTS PRIOR TO SOLDERING, AS WELL AS FLUX RESIDUES FROM THE JOINT AREA.

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TABLE 1

| | |
|---|---|
| 1,1,1-TRICHLOROETHANE | O-T-620 |
| TRICHLOROTRIFLUOROETHANE | MIL-C-81302 |
| ISOPROPYL ALCOHOL | TT-I-735 |
| PERCHLOROETHYLENE | O-T-236 |
| 1,1,1-TRICHLOROETHANE (VAPOR DEGREASING) | MIL-T-81533 |
| REAGENT WATER (TYPE II) | ASTM D 1193 |
| DETERGENT CLEANERS | AS APPROVED BY THE GOVERNMENT PROCURING ACTIVITY |

5. METHOD

5.1 IF REQUIRED, PLACE LENGTHS OF INSULATING SLEEVE ON EACH PRETINNED LEAD TO BE SOLDERED AND POSITION OUT OF THE WAY FOR SOLDERING.

5.1.1 INSULATION SLEEVING SHALL MEET THE REQUIREMENTS OF MIL-I-7444, TYPE 1.

5.1.2 INSULATING SLEEVES ARE NOT REQUIRED IN MINIATURE MS CONNECTORS OR IN MS TYPE CLASS E OR R CONNECTORS, BECAUSE THE SEALING GROMMETS COVER THE SOLDERED CONNECTION. CLASS E CONNECTORS MADE BY BENDIX REQUIRE INSULATING SLEEVES BECAUSE THE GROMMETS DO NOT COVER THE SOLDERED CONNECTION. THE INSULATING SLEEVE SHALL NOT EXTEND INTO THE GROMMET.

5.1.3 POLYVINYL CHLORIDE PLASTICS SHALL NOT BE USED.

5.1.4 THE SLEEVE LENGTH SHALL COVER THE ENTIRE SOLDER TERMINAL AND OVERLAP CONDUCTOR INSULATION BY TWO WIRE DIAMETERS (PLUS INSULATION). FIGURE 2.

5.1.4.1 TUBING SHALL BE TIGHT ON TERMINAL INITIALLY, AND WHEN REPOSITIONED AFTER CONNECTOR INSPECTION.

5.1.5 HEAT SHRINK TUBING IS NOT RECOMMENDED. IF USED, IT SHOULD NOT BE SHRUNK.

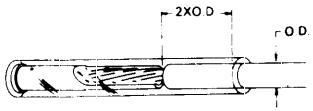


FIGURE 2

TUBING LENGTH

5.2 PRE-TIN SOLDER TERMINAL CUPS AS FOLLOWS: (FIGURE 2)

5.2.1 SUPPORT SOLDER TERMINAL CUP AT AN ANGLE AS SHOWN. (FIGURE 3 A)

5.2.2 APPLY SOLDERING IRON TIP TO THE SIDE OF THE SOLDER CUP TO HEAT THE SOLDER CUP. SOLDERING IRON SIZE SHOULD BE SELECTED FROM TABLE 2 BASED ON WRONG SIZE.

TABLE 2

| WIRE SIZE | SOLDERING ELEMENT SIZE MAXIMUM WATTAGE CAPACITY | MAXIMUM TIP TEMPERATURE |
|---|---|---|
| 0 | 150 W | 1000°F |
| 4 | 150 W | 1000°F |
| 8 | 150 W | 1000°F |
| 10 | 75 W | 800°F |
| 12 | 60 W | 800°F |
| 16 | 50 W | 800°F |
| 20 | 35 W | 800°F |
| 22 | 35 W | 800°F |
| 24-26 | 24 W | 800°F |

5.2.3 APPLY SOLDER TO THE INSIDE OF THE CUP CAVITY AS THE SOLDER MELTS AND BEGINS TO FLOW INTO THE CUP, SLOWLY ADD SOLDER UNTIL THE CUP IS FILLED TO THE PROPER LEVEL (THE PRE-FILL LEVEL SHOULD BE DETERMINED SUCH THAT THE CUP WILL BE PROPERLY FILLED WHEN THE TINNED WIRE IS PLACED IN THE PRE-FILLED TERMINAL CUP). (FIGURE 3.B)

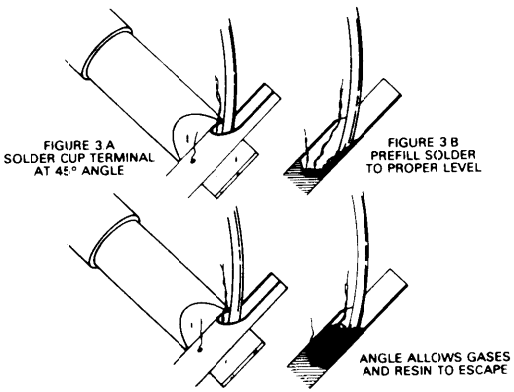


FIGURE 3 PRE-TINNING THE SOLDER TERMINAL CUPS

5.3 WHILE THE SOLDER CUP IS STILL HEATED, INSERT THE TINNED WIRE INTO THE CUP CAVITY SLOWLY AND AT AN ANGLE. THEN TIP THE WIRE INTO PLACE TO ALLOW THE SOLDER TO FLOW. ENSURE THAT THE WIRE IS BOTTOMED IN THE SOLDER CUP BEFORE REMOVING THE SOLDERING IRON. (FIGURE 4)

NOTE: THE USE OF AN ANTIWICKING TOOL IS RECOMMENDED.

CAUTION: STEP 5.3 MUST BE ACCOMPLISHED QUICKLY TO PREVENT EXCESS WICKING UNDER THE WIRE INSULATION.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A15 OF DWG. 803-5001027.

FIGURE 5A15. Connector contact soldering techniques.

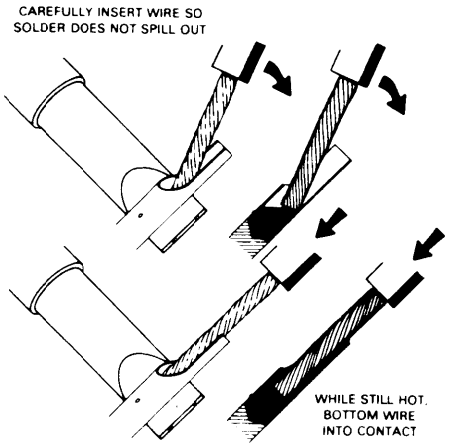


FIGURE 4
WIRE INSERTION IN CONTACT

5.4 REMOVE THE SOLDERING IRON FROM THE SOLDER TERMINAL CUP.

5.5 SUPPORT THE WIRE WITHOUT MOVEMENT WHILE THE SOLDER COOLS AND SOLIDIFIES.

5.6 CLEAN THE SOLDERED CONNECTION WITH A NON-METAL FIBER BRUSH DAMPENED IN SOLVENT (PARAGRAPH 4). REMOVE ALL TRACES OF FLUX AND SOLVENT RESIDUES BY BLOTTING THE AREA DRY WITH AN ABSORBENT LINT-FREE MATERIAL.

5.7 ALTERNATE METHOD. PRE-FILL ALL SOLDER CUPS (STEP 5.2) THEN PROCEED WITH INSTALLING WIRES (STEP 5.3 THROUGH 5.6).

5.8 VISUALLY INSPECT SOLDER CONNECTION FOR COMPLIANCE WITH THE FOLLOWING CRITERIA.

5.8.1 CLEAN SMOOTH BRIGHT UNDISTURBED SURFACE WITH A CONCAVE FILLET BETWEEN ALL STRANDS AND FROM CONDUCTOR TO CUP.

5.8.2 SOLDER SHALL NOT WICK UNDER CONDUCTOR INSULATION.

5.8.3 INSULATION SHALL NOT BE DAMAGED OR DEFORMED.

5.8.4 WIRE INSULATION SHALL NOT BE IMBEDDED IN THE SOLDER JOINT. MAXIMUM INSULATION CLEARANCE SHALL BE TWO WIRE DIAMETERS INCLUDING INSULATION OR 1.16 INCH WHICHEVER IS LARGER.

5.8.5 EXAMPLES OF REJECTABLE DEFECTS ARE SHOWN IN FIGURE 5.

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**FIGURE 5.A**
**POOR WETTING/DEWETTING**

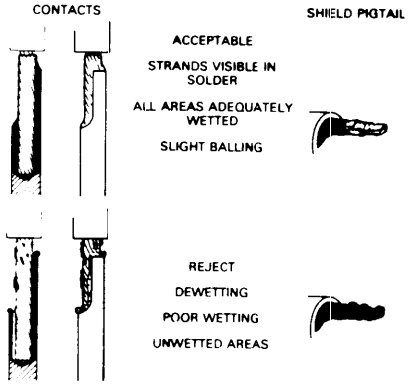



**FIGURE 5.B**
**EXCESSIVE SOLDER**

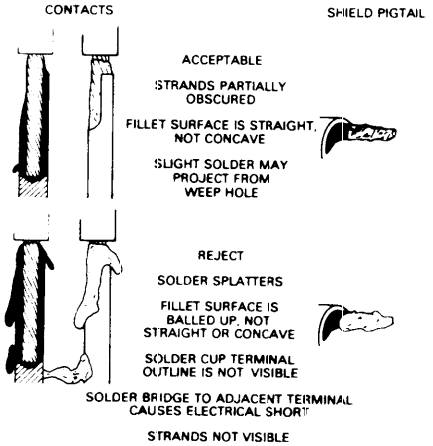



**FIGURE 5.C**
**INSUFFICIENT SOLDER**

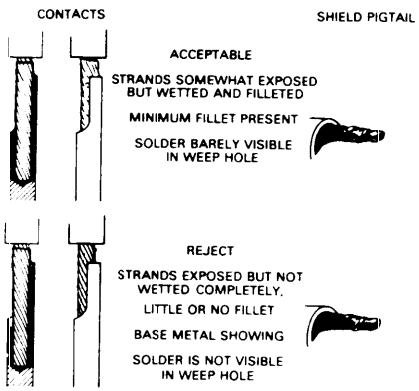
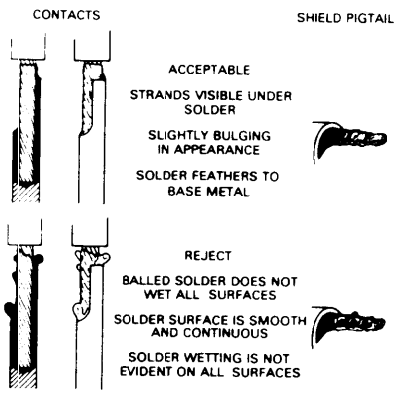



**FIGURE 5.D**
**COLD SOLDERED JOINT**




NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A16 OF DWG. 803-5001027.

FIGURE 5A16. Connector contact soldering techniques.

**FIGURE 5.E**

**FRACTURED/DISTURBED JOINT**

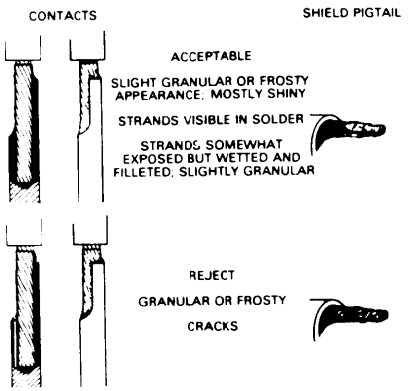



**FIGURE 5.G**

**EXCESSIVE WICKING**

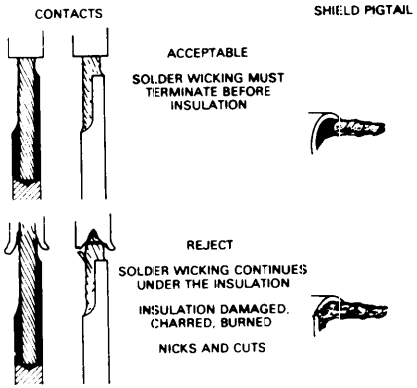
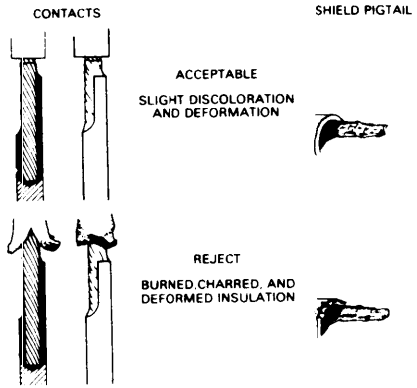



**FIGURE 5.I**

**DAMAGED INSULATION**




NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A17 OF DWG. 803-5001027.

**FIGURE 5.F**

**OVERHEATED JOINT**

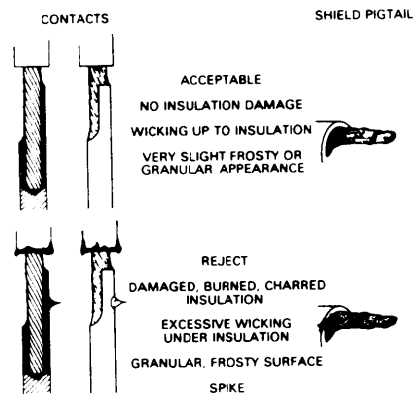



**FIGURE 5.H**

**INSUFFICIENT WICKING**

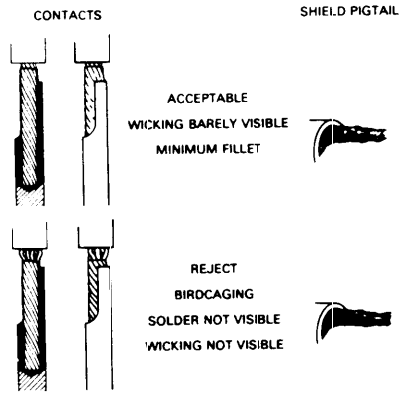



**FIGURE 5.J**

**INSULATION GAP**

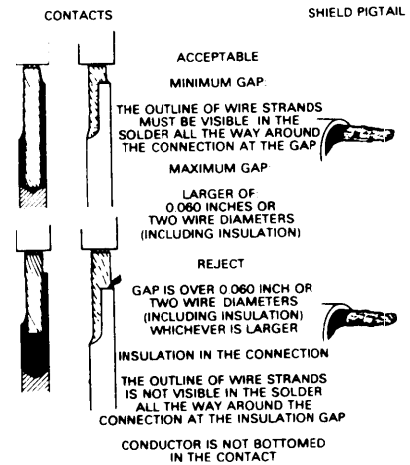



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FIGURE 5A17. Connector contact soldering techniques.

5.9 INSTALL INSULATING SLEEVING AS FOLLOWS

6 THE FOLLOWING DESOLDERING METHODS SHALL BE USED WHEN THE SOLDERED CONNECTION REQUIRES REPAIR, REWORK, OR REPLACEMENT

6.1 VACUUM METHOD

6.1.1 INSTALL AN ANTI-WICKING TOOL IN ORDER TO PREVENT MIGRATION OF EXCESS HEAT AND SOLDER (FIGURE 6.A)

6.1.2 APPLY A VERY LIGHT COAT OF FLUX TO THE SOLDER CONNECTION (FIGURE 6.B)

6.1.3 HEAT SOLDER CUP UNTIL MOLTEN AND REMOVE WIRE

6.1.4 SELECT A VACUUM TOOL TIP TO PROPERLY FIT THE SOLDER CONNECTION

6.1.5 LOAD OR COCK THE VACUUM TOOL

6.1.6 PLACE THE VACUUM TOOL TIP ADJACENT TO THE SOLDERED CONNECTION. (FIGURE 6.A)

6.1.7 HEAT THE SOLDER JOINT UNTIL MOLTEN WITH A SOLDERING IRON THEN RELEASE THE VACUUM TOOL TRIGGER DEVICE (FIGURE 6.C)

6.1.8 REMOVE THE SOLDERING IRON AND VACUUM TOOL

6.1.9 EXAMINE THE CONNECTION FOR ADEQUATE SOLDER REMOVAL

6.1.10 REPEAT STEPS 6.1.6 THROUGH 6.1.9 UNTIL ONLY A THIN FILM OF SOLDER REMAINS

6.1.11 CLEAN THE CONNECTION WITH AN APPROVED SOLVENT FROM TABLE 1

6.2 WICKING BRAID METHOD

6.2.1 INSTALL AN ANTI-WICKING TOOL IN ORDER TO PREVENT MIGRATION OF EXCESS HEAT OR SOLDER.

6.2.2 APPLY A LIGHT COAT OF LIQUID FLUX TO SOLDER CONNECTION.

6.2.3 HEAT SOLDER CUP UNTIL MOLTEN AND REMOVE WIRE.

6.2.4 APPLY A LIGHT COAT OF LIQUID FLUX TO THE WICKING WIRE.

6.2.5 PLACE WICKING BRAID OVER SOLDER TO BE REMOVED.

6.2.6 PLACE HEAT ON WICKING BRAID. REMOVE HEAT AND WICKING BRAID SIMULTANEOUSLY WHEN THE SOLDER HAS SATURATED THE WICKING BRAID. FIGURE 7.

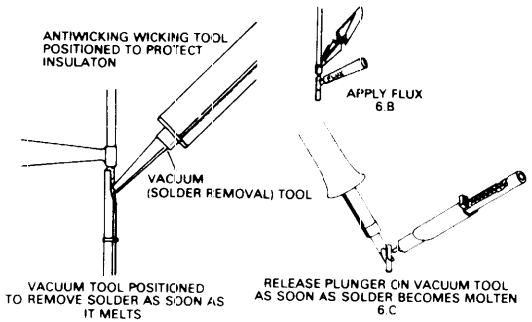


FIGURE 6

DESOLDERING (VACUUM METHOD)

6.2.7 REPEAT STEPS 6.2.1 THROUGH 6.2.4 UNTIL DESOLDERING IS COMPLETE, LEAVING ONLY A THIN FILM OF SOLDER ON THE CONNECTION.

6.2.8 CLEAN CONNECTION WITH APPROVED SOLVENT FROM TABLE 1.

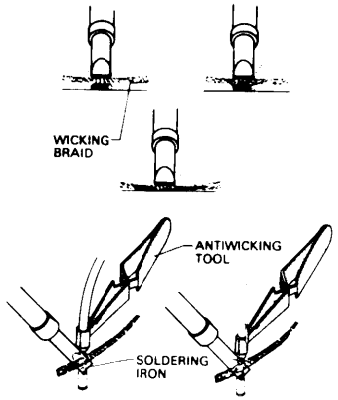


FIGURE 7

BRAIDED WICKING WIRE SOLDER REMOVAL

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A18 OF DWG. 803-5001027.





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FIGURE 5A18. Connector contact soldering techniques.

CONDUCTOR SHIELD TERMINATION PROCEDURES

1. VERIFY THAT THE SHIELD BRAIDING IS NOT CUT, NICKED, OR DAMAGED.

2. INSPECT ALL TERMINATION HARDWARE (I.E., RINGS, FERRULES, SOLDER SLEEVES, ETC.) TO ENSURE THEY ARE THE CORRECT TYPE AND SIZE FOR THE CONNECTOR BEING ASSEMBLED, AND ARE FREE OF TARNISH, CORROSION, OR DAMAGE.

3. SHIELD TERMINATION SHALL BE IN ACCORDANCE WITH APPLICABLE SYSTEM WIRING TABLES AND DESIGN DATA. IN ADDITION, THE FOLLOWING APPLIES.

   3.1 SHIELD TERMINATIONS SHALL BE STAGGERED IN ORDER TO LIMIT BUILDUP OF THE ASSEMBLY DIAMETER.

   3.2 SHIELD TERMINATIONS SHALL NOT BE POSITIONED AS TO OCCUR UNDER CABLE CLAMPS OR WITHIN THE POTTED AREAS OF CONNECTORS.

   3.3 THE USE OF A HEAT BARRIER WHEN SHRINKING SOLDER SLEEVES IS PREFERRED TO MINIMIZE DAMAGE TO CONDUCTOR INSULATION.

4. SHIELD TERMINATION TO A CONNECTOR USING THE SOLDER FERRULE METHOD.

NOTE: IF A SOLDER FERRULE OF THE CORRECT SIZE CAN NOT BE UTILIZED, TERMINATE THE SHIELD USING STEP 5.

   4.1 STRIP OUTER JACKET FROM CONDUCTORS STAGGERING THE DISTANCES BETWEEN EACH. (SEE FIGURE 1).

      4.1.1 ENSURE CONDUCTORS ARE IDENTIFIED BEFORE REMOVING INSULATION.

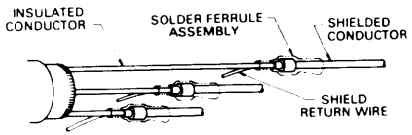


FIGURE 1
STAGGERED SHIELD TERMINATIONS

   4.2 TRIM THE SHIELDS TO 3/8 INCH LENGTH. (FIGURE 3)

   4.3 STRIP 3/8 INCH OF INSULATION FROM THE SHIELD RETURN WIRE IN ACCORDANCE WITH SHEET 5A5 (FIGURE 3).

      4.3.1 THE SHIELD RETURN WIRE SHALL BE FABRICATED FROM INSULATED, FLEXIBLE STRANDED WIRE WITH THE SAME PHYSICAL CHARACTERISTICS AS THE CONDUCTOR.

      4.3.2 WHEN TERMINATED TO A CONNECTOR CONTACT, THE WIRE SIZE SHALL BE GOVERNED BY THE CONTACT TO WHICH IT IS BEING ATTACHED.

      4.3.3 THE LENGTH SHALL ALLOW THE SHIELD RETURN WIRE TO EXTEND BEYOND THE SHIELDED CONDUCTOR AFTER ATTACHMENT TO THE SHIELD.

   4.4 TIN THE STRIPPED SHIELD RETURN WIRE USING A SOLDER WITH THE SAME MELTING TEMPERATURE AS THE PREFORMED SOLDER IN THE FERRULE. (SEE FIGURE 5A13.)

   4.5 WHEN A HEAT BARRIER IS USED (PREFERRED METHOD) SPREAD THE BRAIDED SHIELD SLIGHTLY OPEN, AND SLIDE THE HEAT BARRIER UNDER THE BRAID UNTIL IT BOTTOMS.

   4.6 POSITION THE STRIPPED END OF THE CONDUCTOR AGAINST AND PARALLEL TO THE EXPOSED SHIELDING.

NOTE: THE SHIELD RETURN WIRE MAY EXTEND FROM THE FRONT (WHEN TERMINATING TO A CONTACT) OR REAR (WHEN TERMINATED TO ANOTHER SHIELD) OF THE SOLDER FERRULE AS REQUIRED).

      4.6.1 ENSURE THE SHIELD RETURN WIRE STRANDS AND SHIELD BRAID STRANDS ARE FLAT AND SMOOTH.

   4.7 SELECT A SOLDER FERRULE MEETING THE REQUIREMENTS OF MIL-K-81786 OR MIL-S-83519 THAT WILL FIT FREELY BUT WILL NOT BE EXCESSIVELY LOOSE ON THE SHIELD AND SHIELD RETURN LEAD CONNECTION. (TABLE 1 IS PROVIDED AS AN EXAMPLE OF SOLDER FERRULE SIZES AVAILABLE.)

      4.7.1 SOLDER FERRULES CONSIST OF A HEAT-SHRINKABLE SLEEVE CONTAINING A PREFORM OF FLUXED SOLDER AT THE CENTER AND A THERMOPLASTIC SEALING RING IN EACH END. (SEE FIGURE 2)

TABLE 1

| PART NO | DIMENSIONS (INCH) AS SUPPLIED A MIN | B MIN | C MIN | AFT SHRINKING OUTSIDE DIAMETER MAX |
|---|---|---|---|---|
| M81786/7-1 | 62 ± .06 | 110 | .125 | 120 |
| M81786/7-2 | 62 ± .06 | 180 | .200 | 150 |
| M81786/7-3 | 75 ± .06 | 280 | .300 | 210 |

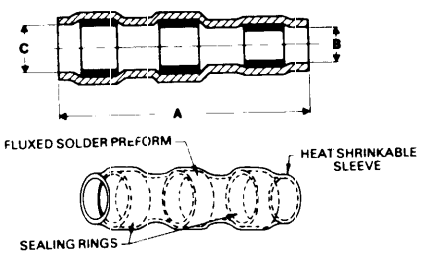


FIGURE 2
TYPICAL SOLDER FERRULE

   4.8 POSITION THE SOLDER FERRULE OVER THE ASSEMBLY SO THAT THE SOLDER RING IS CENTERED OVER THE SHIELDING AND SHIELD RETURN WIRE CONDUCTOR. (SEE FIGURE 3).

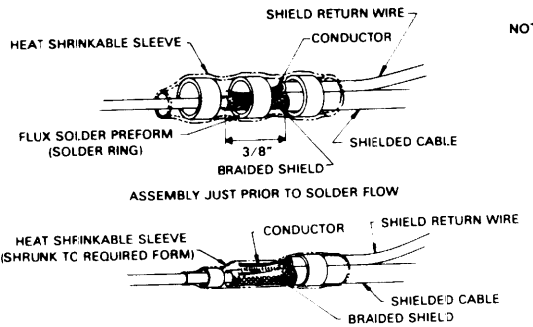


FIGURE 3
SOLDER HAS FLOWED

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A19 OF DWG. 803-5001027.

   4.9 USING A HEAT GUN AND THERMAL REFLECTOR AS SPECIFIED IN MIL-K-81786, HEAT THE ASSEMBLY WHILE ROTATING TO ACHIEVE PROPER SOLDER PENETRATION AND UNIFORM SLEEVE SHRINKAGE. (FIGURE 4).

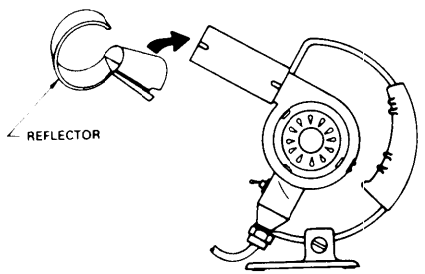


FIGURE 4
TYPICAL HEAT GUN

      4.9.1 APPLY HEAT UNTIL THE SOLDER BRIGHTENS AND STARTS TO FLOW TOWARD THE THERMOPLASTIC INSERTS.

CAUTION: USE EXTREME CARE WHILE APPLYING HEAT IN ORDER TO AVOID DAMAGING THE CONDUCTOR INSULATION DUE TO MELTING.

   4.10 HOLD THE ASSEMBLY FIRMLY UNTIL THE SOLDER JOINT IS SET.

   4.11 INSPECT THE SOLDER FERRULE.

      4.11.1 THE EXPOSED SHIELD WIRE MUST BE VISIBLE ON BOTH SIDES OF THE SOLDER RING BUT NOT EXTEND BEYOND THE HEAT SHRINKABLE INSERTS.

      4.11.2 THE FERRULE SOLDER SHOULD APPEAR CONTINUOUS AND SMOOTH WITH CONCAVE FILLET BETWEEN SHIELD AND RETURN WIRE LEAD.

      4.11.3 THE INSULATION OF THE SHIELD RETURN MUST BE ENCLOSED UNDER THE HEAT SHRINKABLE INSERT.

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FIGURE 5A19. Conductor shield termination procedures.

4.11.4 THE THERMOPLASTIC INSERT SHOULD COLLAPSE OVER THE SHIELD RETURN WIRE AND CONDUCTOR SHIELDING

4.11.5 THE FERRULE SLEEVE MUST NOT BE CUT, SPLIT OR HAVE STRANDS PROTRUDING

4.12 TERMINATE SHIELD RETURN WIRE WITH OTHER CONDUCTORS IN ACCORDANCE WITH THE APPLICABLE SYSTEM CONNECTOR ASSEMBLY PROCEDURE

5. SHIELD TERMINATION TO A CONNECTOR USING THE TWO-PIECE CRIMP FERRULE METHOD

5.1 STRIP OUTER JACKET FROM CONDUCTORS STAGGERING THE DISTANCES BETWEEN EACH (SEE FIGURE 1)

5.2 TRIM THE SHIELDS 1/2 TO 3/4 INCH LENGTH (FIGURE 5.A)

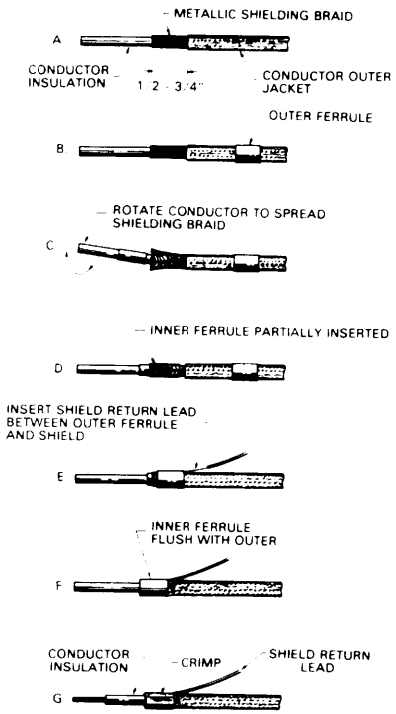


FIGURE 5
TWO PIECE GROUNDING
CONNECTION FOR TERMINATING SHIELDED WIRE

5.3 DETERMINE THE MAXIMUM CONDUCTOR DIAMETER (SEE INDIVIDUAL LEAD STRIPPING TECHNIQUES, TABLE 1, FIGURE 5A5) AND ADD 0.005 INCH.

5.4 SELECT THE INNER FERRULE FROM TABLE 2 HAVING THE INNER DIAMETER NEAREST BUT LARGER THAN THE DIMENSION CALCULATED IN STEP 5.3. ENSURE THE INNER FERRULE MEETS THE REQUIREMENTS OF MIL-F-21608 AND MS21981

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TABLE 2. SHIELDED WIRE TERMINATIONS INNER FERRULE SIZES

| PART NO | COLOR CODE | INNER FERRULE (NOMINAL) ID | OD |
|---|---|---|---|
| MS 21981-046 | TIN | 0.046 | 0.070 |
| -058 | YELLOW | 0.058 | 0.083 |
| -063 | RED | 0.063 | 0.088 |
| -071 | GREEN | 0.071 | 0.096 |
| -080 | BLUE | 0.080 | 0.104 |
| -090 | ORANGE | 0.090 | 0.114 |
| -096 | PURPLE | 0.096 | 0.119 |
| -101 | YELLOW | 0.101 | 0.124 |
| -109 | RED | 0.109 | 0.131 |
| -115 | TIN | 0.115 | 0.146 |
| -124 | GREEN | 0.124 | 0.145 |
| -128 | TIN | 0.128 | 0.152 |
| -134 | ORANGE | 0.134 | 0.156 |
| -149 | BLUE | 0.149 | 0.179 |
| -156 | RED | 0.156 | 0.192 |
| -165 | TIN | 0.165 | 0.194 |
| -175 | GREEN | 0.175 | 0.215 |
| -187 | YELLOW | 0.187 | 0.227 |
| -194 | BLUE | 0.194 | 0.225 |
| -205 | ORANGE | 0.205 | 0.245 |
| -219 | TIN | 0.219 | 0.248 |
| -225 | YELLOW | 0.225 | 0.256 |
| -232 | RED | 0.232 | 0.263 |
| -250 | GREEN | 0.250 | 0.281 |
| -261 | BLUE | 0.261 | 0.297 |
| -266 | TIN | 0.266 | 0.297 |
| -275 | ORANGE | 0.275 | 0.306 |
| -281 | YELLOW | 0.281 | 0.331 |
| -287 | TIN | 0.287 | 0.327 |
| -297 | RED | 0.297 | 0.335 |
| -312 | PURPLE | 0.312 | 0.362 |
| -375 | BLUE | 0.375 | 0.406 |

5.5 ADD 1/16 INCH TO THE OUTER DIAMETER OF THE INNER FERRULE SELECTED IN STEP 5.4. SELECT AN INSULATED OUTER FERRULE FROM TABLE 3 WHICH MEETS THE REQUIREMENTS OF MIL-F-21608 AND MS18121 WITH THE ABOVE DIMENSION AS THE MINIMUM INNER DIAMETER.

TABLE 3. SHIELDED WIRE TERMINATIONS. INSULATED OUTER FERRULE SIZES

| PART NO | COLOR CODE | INNER FERRULE (NOMINAL) ± .005 |
|---|---|---|
| MS 18121-101 | TIN | 0.101 |
| -128 | BLUE | 0.128 |
| -149 | PURPLE | 0.149 |
| -156 | YELLOW | 0.156 |
| -175 | BLUE | 0.175 |
| 187 | ORANGE | 0.187 |
| -194 | RED | 0.194 |
| -199 | TIN | 0.199 |
| -205 | YELLOW | 0.205 |
| -219 | GREEN | 0.219 |
| 225 | PURPLE | 0.225 |
| -232 | ORANGE | 0.232 |
| -261 | YELLOW | 0.261 |
| -275 | TIN | 0.275 |
| -281 | PURPLE | 0.281 |
| -287 | BLUE | 0.287 |
| -297 | GREEN | 0.297 |
| -312 | YELLOW | 0.312 |
| -327 | TIN | 0.327 |
| -348 | ORANGE | 0.348 |
| -359 | PURPLE | 0.359 |
| -375 | YELLOW | 0.375 |
| -405 | RED | 0.405 |
| -415 | BLUE | 0.415 |
| -460 | TIN | 0.460 |
| -500 | GREEN | 0.500 |

5.6 STRIP INSULATION TO MATCH THE LENGTH OF THE SHIELD PREPARED FROM THE SHIELD RETURN WIRE IN ACCORDANCE WITH FIGURE 5A6

5.6.1 THE SHIELD RETURN SHALL BE FABRICATED FROM INSULATED, FLEXIBLE STRANDED WIRE WITH THE SAME PHYSICAL CHARACTERISTICS AS THE CONDUCTOR.

5.6.2 WHEN TERMINATED TO A CONNECTOR CONTACT THE WIRE SIZE SHALL BE GOVERNED BY THE CONTACT TO WHICH IT IS BEING ATTACHED.

5.6.3 THE LENGTH SHALL ALLOW THE SHIELD RETURN WIRE TO EXTEND BEYOND THE CONNECTOR AFTER ATTACHMENT TO THE SHIELD.

5.7 SLIDE THE OUTER FERRULE BACK OVER THE CONDUCTOR OUTER JACKET (IF PRESENT) AND BRAIDED SHIELD (FIGURE 5.B).

5.8 ROTATE THE CONDUCTOR WITH A CIRCULAR MOTION TO FLARE OUT THE BRAID (FIGURE 5.C)

5.9 PLACE THE INNER FERRULE UNDER THE SHIELD BRAID SO THAT 1/16 INCH OF SLEEVE STICKS OUT BEYOND THE BRAID (FIGURE 5.D)

5.9.1 ENSURE THE SHIELD RETURN WIRE STRANDS AND SHIELD BRAID STRANDS ARE FLAT AND SMOOTH

5.10 INSERT THE STRIPPED END OF THE SHIELD RETURN WIRE UNDER THE OUTER FERRULE AND SLIDE BOTH FORWARD OVER THE SHIELD BRAID AND INNER FERRULE UNTIL FLUSH WITH THE BRAID AND INNER FERRULE

NOTE: THE SHIELD RETURN WIRE MAY EXTEND FROM THE FRONT (WHEN TERMINATING TO A CONTACT) OR REAR (WHEN TERMINATED TO ANOTHER SHIELD) OF THE OUTER FERRULE AS REQUIRED.

5.11 SELECT A CRIMPING TOOL AND DIES MEETING THE REQUIREMENTS OF MIL-C-22520/5 OR MIL-C-22520/10

5.11.1 TEST THE CRIMPING TOOL USING AN INSPECTION GAUGE MEETING THE REQUIREMENTS OF MIL-C-22520/6.

5.12 PLACE THE FERRULE ASSEMBLY INTO THE CRIMPING TOOL AND CRIMP UNTIL THE HANDLE RELEASES

5.13 VISUALLY INSPECT THE CRIMPED FERRULE ASSEMBLY FOR FRACTURES OR SPALLING. ENSURE THE INTEGRITY OF THE CONNECTION BY GIVING THE SHIELD RETURN WIRE A LIGHT FINGER TUG. REJECT ANY FERRULES THAT DO NOT MEET THE ABOVE CRITERIA.

5.14 TERMINATE THE SHIELD RETURN WIRE WITH OTHER CONDUCTORS IN ACCORDANCE WITH THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE.

6. TIEING BACK AND INSULATION OF SHIELDS

6.1 WHEN SYSTEM DESIGN DOES NOT REQUIRE CONTINUITY OF THE CONDUCTOR SHIELD THROUGH A CONNECTOR OR TO GROUND THE SHIELD SHALL BE TERMINATED AS FOLLOWS

6.1.1 STRIP THE CONDUCTOR INSULATION TO THE LENGTH REQUIRED BY THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE IN ACCORDANCE WITH FIGURE 5A5

6.1.2 TRIM THE SHIELD TO A LENGTH OF 3/8 INCH

6.1.3 COMB OUT THE SHIELD BRAID USING A SPUDGER (OR EQUIVALENT)

6.1.4 FOLD THE SHIELD BACK OVER THE CONDUCTOR JACKET. ENSURE THAT THE SHIELD STRANDS ARE FLAT AND SMOOTH.

6.1.5 CENTER A LENGTH OF INSULATION SLEEVE OVER THE FOLDED BACK SHIELD AND SHRINK IN PLACE.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A20 OF DWG. 803-5001027.

FIGURE 5A20. Connector shield termination procedures.

6.1.5.1 INSULATION SLEEVING SHALL MEET THE REQUIREMENTS OF MIL-I-23053, CLASS 1.

6.1.5.2 THE LENGTH SHALL BE SUFFICIENT TO COMPLETELY COVER THE SHIELD AFTER SHRINKING.

7. COMBINING INDIVIDUAL SHIELDS TO COMMON GROUND (DAISY CHAIN) (SEE FIGURE 6).

7.1 THIS PROCEDURE MAY BE UTILIZED WHEN SYSTEM WIRING TABLES REQUIRE MORE THAN ONE CONDUCTOR SHIELD TO BE ATTACHED TO A COMMON GROUND.

7.2 TRIM THE SHIELD OF ONE CONDUCTOR TO 3/8 INCH LENGTH (FIGURE 7).

7.3 STRIP APPROXIMATELY 3/8 INCH OF INSULATION FROM BOTH ENDS OF A FLEXIBLE, STRANDED WIRE COMPATIBLE WITH THE CONNECTOR CONTACTS (FIGURE 7).

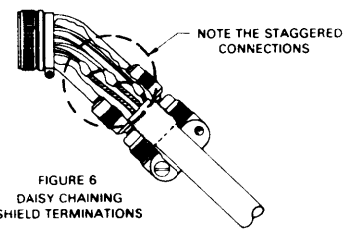



FIGURE 6
DAISY CHAINING
SHIELD TERMINATIONS

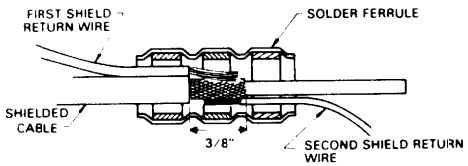



FIGURE 7
DAISY CHAIN SOLDER FERRULE JUNCTION

7.3.1 LENGTH TO SUIT THE DISTANCES BETWEEN THE LOCATION OF THE TWO SHIELDED CONDUCTORS.

7.4 TIN BOTH STRIPPED ENDS OF THE WIRE IN ACCORDANCE WITH FIGURE 5A13.

7.5 ATTACH THE WIRE TO THE SHIELD USING STEPS 4.5 THROUGH 4.11.

7.6 TRIM THE SHIELD OF A SECOND CONDUCTOR TO 3/8 INCH LENGTH.

7.6.1 ENSURE THE TRIMMED SHIELDS ARE STAGGERED IN LENGTH IN ORDER TO AVOID A BUILDUP IN ONE AREA.

7.7 POSITION THE OTHER STRIPPED END OF THE FIRST CONDUCTOR AGAINST AND PARALLEL TO THE SECOND EXPOSED SHIELDING.

NOTE: IF MORE THAN TWO SHIELDS ARE TO BE CONNECTED TOGETHER ENSURE A SECOND GROUND RETURN WIRE IS POSITIONED NEXT TO THE SECOND SHIELD AND FIRST GROUND RETURN WIRE. (SEE FIGURE 7).

7.8 ATTACH THE WIRE TO THE SHIELD USING STEPS 4.5 THROUGH 4.11.

7.9 CONTINUE IN THIS MANNER UNTIL ALL SHIELDS HAVE BEEN CONNECTED TOGETHER AND ONE SHIELD RETURN WIRE REMAINS.

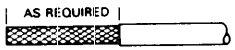
7.10 TERMINATE THE SHIELD RETURN WIRE WITH OTHER CONDUCTORS IN ACCORDANCE WITH THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE.

8. INDIVIDUAL SHIELD TERMINATION TO BACKSHELL.

NOTE: ENSURE LEADS/PAIRS ARE IDENTIFIED.

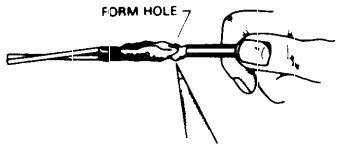
8.1 CUT AND REMOVE CONDUCTOR OUTER INSULATION AS CLOSE TO CABLE JACKET AS POSSIBLE (FIGURE 8.A) STAGGER AS NECESSARY TO PRECLUDE EXCESSIVE BULK.

A. SCORE AND REMOVE THE JACKET AS SHOWN.

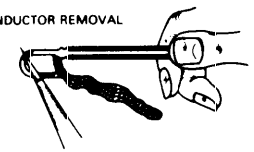



B. BUNCH THE BRAID

C. FORMATION OF HOLE




D. CONDUCTOR REMOVAL



E. STRETCH BRAID

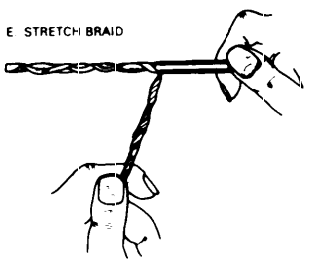


FIGURE 8

8.2 PUSH CONDUCTOR SHIELD BACK UNTIL A BUBBLE FORMS AT JACKET TERMINATION (FIGURE 8.B).

8.3 INSERT A SOFT INSTRUMENT (SPUDGER OR EQUIVALENT) INTO THE SHIELD BUBBLE AS CLOSE TO THE INSULATION TERMINATION AS PRACTICABLE (FIGURE 8.C).

NOTE: DO NOT DAMAGE UNDERLYING CONDUCTOR INSULATION.

8.4 MOVE TOOL WITH A CIRCULAR MOTION UNTIL A HOLE IS FORMED LARGE ENOUGH TO PASS THE CONDUCTOR THROUGH.

NOTE: CARE MUST BE TAKEN NOT TO BREAK ANY SHIELD STRANDS.

8.5 CAREFULLY BEND THE CONDUCTOR AND SHIELD AT THE HOLE WHILE INSERTING THE SOFT INSTRUMENT BETWEEN THE SHIELD AND CONDUCTOR (FIGURE 8.D) PULL THE CONDUCTORS COMPLETELY THROUGH THE FORMED HOLE.

8.6 STRETCH THE EMPTY SECTION OF SHIELD AND PROTECT UNTIL CLOSING. (FIGURE 8.E).

8.7 PROCEED TO STEP 5.9 ON SHEET 5A23 OF THE GROSS SHIELD TERMINATION PROCEDURE.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A21 OF DWG. 803-5001027.

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FIGURE 5A21. Conductor shield termination procedures.

GROSS SHIELD TERMINATION PROCEDURES

1. OBSERVE THE FOLLOWING BEFORE TERMINATING THE GROSS SHIELD.

   1.1 VERIFY THAT THE SHIELD BRAIDING IS NOT CUT, NICKED, OR SCRATCHED.

   1.2 INSPECT ALL SHIELD TERMINATION HARDWARE (RFI RINGS, FERRULES, ETC.) TO ENSURE THEY ARE THE CORRECT TYPE, SIZE AND ARE FREE OF TARNISH, CORROSION, OR DAMAGE.

2. GROSS SHIELD TERMINATION SHALL BE IN ACCORDANCE WITH APPLICABLE SYSTEM WIRING TABLES AND DIAGRAMS UTILIZING ONE OF THE METHODS OUTLINED IN THIS APPENDIX.

3. METHOD 1 — FLOATING SHIELD METHOD.

   3.1 THIS METHOD IS USED WHEN THE SYSTEM DESIGN DOES NOT REQUIRE CONTINUITY OF THE SHIELD THROUGH THE CONNECTOR OR GROUNDING OF THE SHIELD.

   3.2 CAREFULLY COMB OUT THE SHIELD USING A SPUDGER (OR EQUIVALENT). (FIGURE 1)

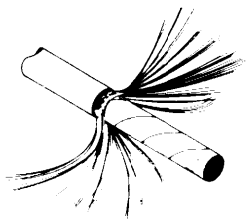

FIGURE 1.
COMBED OUT GROSS SHIELD

   3.3 SEPARATE THE UNBRAIDED SHIELD WIRES INTO THREE EQUAL GROUPS.

   3.4 TWIST EACH GROUP INTO A TIGHT SELF-CONTAINED BUNDLE (PIGTAIL). (FIGURE 2)

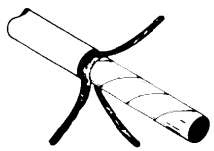

FIGURE 2
GROSS SHIELD PIGTAILS

   3.5 CUT THE PIGTAILS 3/4 OF AN INCH FROM THE CABLE JACKET. (FIGURE 3)

NOTE: DO NOT TIN THE PIGTAILS. LEAVE FOR POSSIBLE RFI HOOKUP AT A LATER DATE.

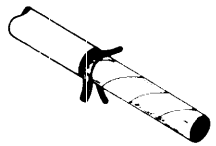

FIGURE 3
TRIMMED PIGTAILS

   3.6 COVER EACH PIGTAIL WITH A 1 INCH LENGTH OF APPROPRIATELY SIZED SHRINK SLEEVING CONFORMING TO MIL-I-23053, CLASS 1. (FIGURE 4)

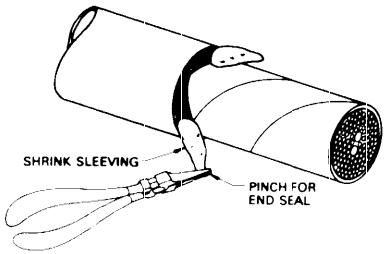


FIGURE 4
COVERING THE PIGTAILS

   3.7 APPLY HEAT TO SHRINK THE SLEEVING. PINCH THE ENDS OF THE SHRINK TUBING SHUT AS HEAT IS APPLIED TO CREATE AN END SEAL. (FIGURE 4)

NOTE: WHEN HEATING THE SHRINK TUBING, KEEP HEAT AWAY FROM THE CABLE AS MUCH AS POSSIBLE TO PREVENT MELTING THE CABLE JACKET AND INSULATION.

   3.8 TRIM THE UNDERLYING MYLAR WRAP, LEAVING 1/2 INCH TO PROTECT THE INDIVIDUAL CONDUCTOR INSULATION.

   3.9 PLACE A 3/4 INCH LENGTH OF SHRINK SLEEVING (DIAMETER TO EXCEED CABLE DIAMETER) OVER THE CABLE JACKET AND PIGTAILS.

   3.10 APPLY HEAT AND SHRINK THE SLEEVING PRIOR TO BACKSHELL ASSEMBLY IN THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE. (FIGURE 5). DO NOT SHRINK AT THIS TIME.

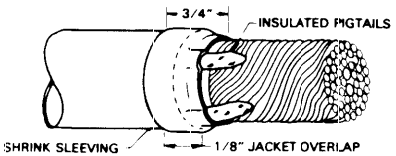


FIGURE 5

4. METHOD 2 — GROSS SHIELD ATTACHED TO CONNECTOR CONTACT.

   4.1 PREPARE THE GROSS SHIELD IN ACCORDANCE WITH STEPS 3.2 THROUGH 3.8 ENSURING ONE PIGTAIL IS LEFT EXPOSED FOR CONNECTION TO THE SHIELD RETURN WIRE.

   4.2 CUT A LENGTH OF SHIELD RETURN WIRE 2 INCHES LONGER THAN THE EXPOSED CONDUCTORS.

      4.2.1 SHIELD RETURN WIRES SHALL BE FABRICATED FROM INSULATED, FLEXIBLE STRANDED TYPE WIRE WITH THE SAME PHYSICAL CHARACTERISTICS AS THE SHIELDED CABLE.

      4.2.2 THE WIRE SIZE SHALL BE DICTATED BY THE CONTACT TO WHICH IT WILL BE CONNECTED (SEE APPLICABLE WIRING TABLE AND CONNECTOR ASSEMBLY PROCEDURE).

   4.3 STRIP 3/4 OF AN INCH OF INSULATION FROM THE SHIELD RETURN WIRE IN ACCORDANCE WITH FIGURE 5A5.

   4.4 TERMINATE THE SHIELD RETURN WIRE AS FOLLOWS.

      4.4.1 BUTT THE INSULATION TO WITHIN 1/16-INCH OF THE CUT END OF THE PIGTAIL. WRAP THE WIRE STRANDS INTO THE LAY OF THE PIGTAIL WIRE STRANDS. (SEE FIGURE 7).

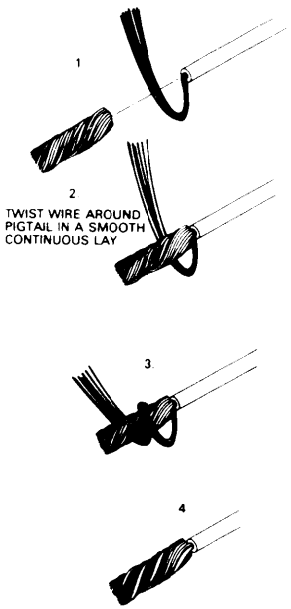


FIGURE 6

COMBINING SHIELD RETURN WIRE AND GROSS SHIELD PIGTAIL

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A22 OF DWG. 803-5001027.



FIGURE 5A22. Gross shield termination procedures.

4.4.2 SOLDER THE SHIELD RETURN WIRE TO THE PIGTAIL. THE SOLDER SHOULD APPEAR CONTINUOUS, SMOOTH AND SHINY WITH A CONCAVE FILLET BETWEEN STRANDS. SEE SHEET 5A10 FOR ACCEPTANCE CRITERIA.

4.4.3 CLEAN THE SOLDERED CONNECTION WITH APPROVED SOLVENT.

4.4.4 COVER THE SOLDERED CONNECTION WITH APPROPRIATELY SIZED SHRINK TUBING CONFORMING TO MIL-I-23053, CLASS 1 OF SUFFICIENT LENGTH TO COVER THE EXPOSED SHIELD AND SOLDER CONNECTION. SHRINK THE TUBING DIRECTING HEAT AWAY FROM CONDUCTORS TO PREVENT DAMAGE.

4.5 STRAIN RELIEF

4.5.1 PLACE A 1/2 INCH LENGTH OF APPROPRIATELY SIZED SHRINK TUBING OVER THE TUBING APPLIED IN STEP 4.4.4. LOOP THE SHIELD RETURN WIRE UP THROUGH THE SHRINK TUBING TO PROVIDE A STRAIN RELIEF FOR THE SHIELD RETURN WIRE (FIGURE 7).

4.5.2 (ALTERNATE METHOD) FOLD BACK THE RETURN WIRE AND TIE FORMING A STRAIN RELIEF USING LACING.

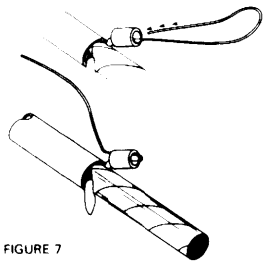

FIGURE 7
FORMING THE STRAIN RELIEF

4.6 PLACE A 3/4 INCH LENGTH OF SHRINK SLEEVING (DIAMETER TO EXCEED CABLE DIAMETER) OVER THE CABLE JACKET AND PIGTAILS.

4.7 APPLY HEAT AND SHRINK THE SLEEVING PRIOR TO BACKSHELL ASSEMBLY IN THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE.

4.8 TERMINATE THE SHIELD RETURN WIRE WITH OTHER CONDUCTORS IN ACCORDANCE WITH THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE.

5 METHOD 3 — GROSS SHIELD GROUNDED TO BACKSHELL (SEE FIGURE 8)

NOTE: THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 8. VARIATIONS MAY OCCUR AND CAUSE MINOR DEVIATION FROM THIS PROCEDURE.

5.1 CAREFULLY COMB OUT THE GROSS SHIELD USING A SOFT INSTRUMENT (SPUDGER OR EQUIVALENT).

5.2 ASSEMBLE SLEEVE ASSEMBLY (PC. 2) TO THE CONNECTOR PLUG (PC. 1) AND TIGHTEN.

5.3 MEASURE THE DISTANCE FROM THE CONNECTOR END TO THE AFT END OF THE SLEEVE ASSEMBLY.

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5.4 REMOVE THE SLEEVE ASSEMBLY AND REPOSITION ON THE CABLE IN A LOCATION WHICH WILL NOT INTERFERE WITH SUBSEQUENT CONNECTOR ASSEMBLY.

5.5 TRIM THE SHIELD TO THE DISTANCE MEASURED IN STEP 5.3.

5.6 COMPLETE ALL STEPS IN THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE UP TO THE BACKSHELL ASSEMBLY SECTION.

5.7 MEASURE THE DISTANCE FROM THE CONNECTOR AFT END TO THE CABLE JACKET.

5.8 MEASURE THE DISTANCE FROM THE FORWARD END OF THE SLEEVE ASSEMBLY TO A POINT MIDWAY ON THE TAPER OF THE INNER FERRULE (RFI BELL). THE INNER FERRULE MUST BE BOTTOMED AGAINST THE SLEEVE SHOULDER.

5.9 DETERMINE THE DESIRED LENGTH OF THE GROSS SHIELD BY SUBTRACTING THE MEASUREMENT OF STEP 5.8 FROM THE MEASUREMENT OF STEP 5.7.

NOTE: ENSURE GROSS SHIELD PIECES DO NOT FALL INTO THE CONNECTOR DURING TRIMMING.

5.10 TRIM THE GROSS SHIELD TO THE DESIRED LENGTH.

5.11 ASSEMBLE SLEEVE ASSEMBLY (PC. 2) TO THE CONNECTOR PLUG (PC. 1) AND TIGHTEN. TORQUE TO A VALUE ESTABLISHED FOR THE CONNECTOR BEING ASSEMBLED USING A TORQUE WRENCH AND STRAP WRENCH. (SEE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE).

5.12 SLIDE INNER FERRULE (RFI BELL) (PC. 3) INTO SLEEVE ASSEMBLY AND SEAT ON INNER SHOULDER.

5.13 IF THE APPLICABLE WIRING TABLES CALL FOR INDIVIDUAL CONDUCTOR SHIELDS TO BE GROUNDED TO THE BACKSHELL, PUSH THE SHIELDS THROUGH THE GROSS SHIELD CLOSE TO THE END OF THE CABLE JACKET AND COMBINE INDIVIDUAL SHIELD STRANDS WITH THE GROSS SHIELD.

5.14 FLARE THE GROSS SHIELD OVER THE TAPERED END OF THE INNER FERRULE.

5.15 GENTLY FORCE THE CABLE TOWARD THE CONNECTOR PLUG UNTIL THE SHIELD COVERS THE TAPERED SURFACE ON THE INNER FERRULE.

5.16 INSERT THE OUTER FERRULE (RFI RING) (PC. 4) INTO THE SLEEVE ASSEMBLY WHILE APPLYING FORWARD PRESSURE ON THE CABLE.

5.17 ASSEMBLE THE REMAINING BACKSHELL COMPONENTS IN ACCORDANCE WITH THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE.

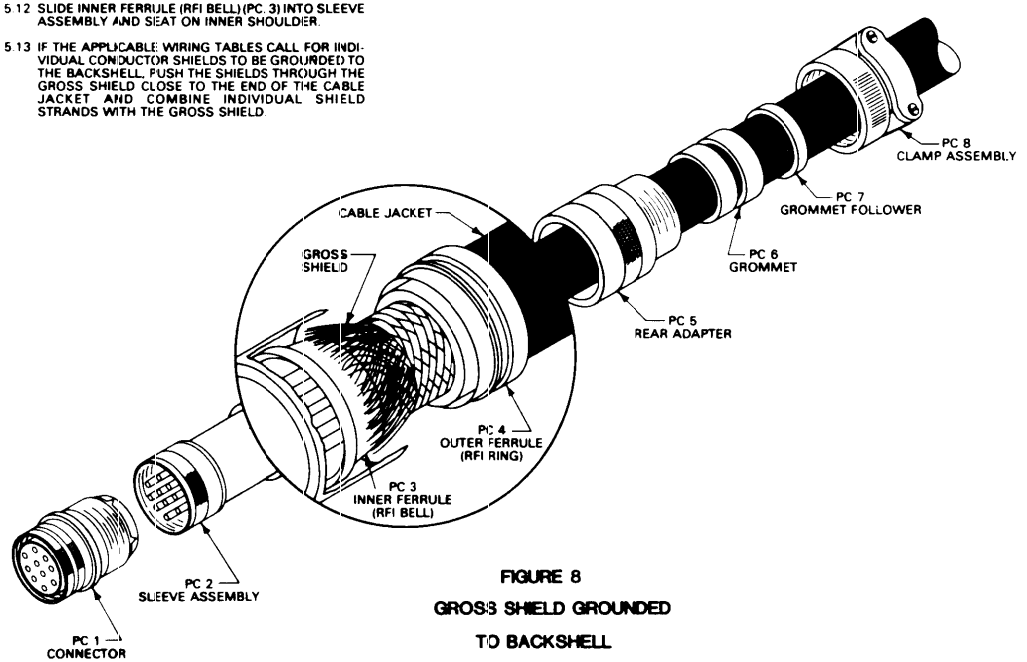


FIGURE 8
GROSS SHIELD GROUNDED
TO BACKSHELL

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A23 OF DWG. 803-5001027.

FIGURE 5A23. Gross shield termination procedures.

CONNECTOR LOCKWIRING TECHNIQUES

1. THE FOLLOWING PRACTICES SHALL BE OBSERVED WHEN LOCKWIRING CONNECTORS
   - 1.1 CONNECTORS SHALL BE LOCKWIRED WITH 0.020 INCH DIAMETER WIRE CONFORMING TO MS20995-NC20.
   - 1.2 CONNECTORS SHALL BE LOCKWIRED INDIVIDUALLY.
   - 1.3 LOCKWIRE SHALL NOT BE REUSED.
   - 1.4 DAMAGED LOCKWIRE SHALL NOT BE USED.
   - 1.5 BACKSHELLS WITH HOLES IN THE COUPLING RING SHALL BE LOCKWIRED.
2. CONNECTORS MUST BE LOCKWIRED WHEN USING 45° OR 90° ADAPTER ASSEMBLIES (BACKSHELLS) TO PREVENT THE LOOSENING OF THE ADAPTER COUPLING RING (SEE FIGURE 1)

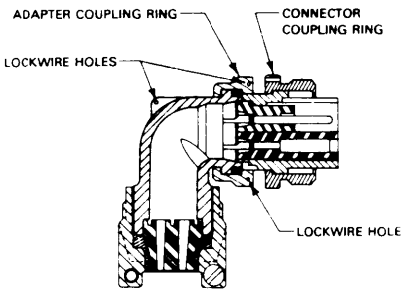


FIGURE 1
LOCATION OF LOCKWIRE

3. LOCKWIRE IS NOT REQUIRED IF THE COUPLING NUT HAS SET SCREWS.

4. THE FOLLOWING PROCEDURE SHALL BE USED TO LOCKWIRE CONNECTORS (SEE FIGURE 2)
   - 4.1 THE PARTS SHALL BE LOCKWIRED USING A DOUBLE TWIST IN SUCH A MANNER THAT WHEN THE COUPLING COLLAR LOOSENS THE LOCKWIRE SHALL BE PUT IN TENSION

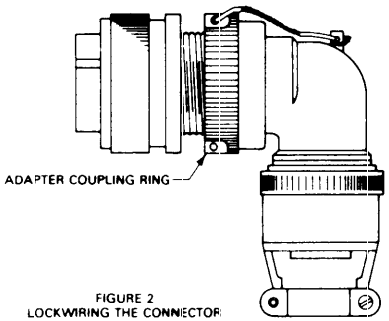


FIGURE 2
LOCKWIRING THE CONNECTOR

   - 4.2 WHEN THE BACKSHELL DOES NOT HAVE A HOLE PROVIDED AND THERE IS NO OTHER PROVISION FOR MAINTAINING BACKSHELL/CONNECTOR ORIENTATON, A CRES HOSE CLAMP (FED. SPEC. WW-C-440 TYPE F OR EQUIVALENT) SHOULD BE INSTALLED TO SECURE THE LOCKWIRE AS DEPICTED IN FIGURE (3).

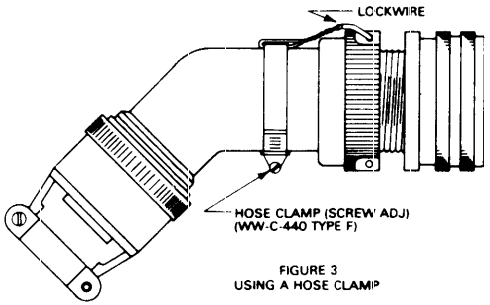


FIGURE 3
USING A HOSE CLAMP

   - 4.3 MEASURE THE DISTANCE FROM THE ADAPTER COUPLING RING SAFETY HOLE TO BACKSHELL TAB (OR HOSE CLAMP) AND ADD 2-INCHES.
   - 4.4 CUT THE LOCKWIRE TWICE THE TOTAL DIMENSION MEASURED IN STEP 4.3.
   - 4.5 THREAD THE LOCKWIRE THROUGH THE SELECTED ADAPTER COUPLING RING HOLE. PULL ENDS TOGETHER TO EVEN OUT THE LEGS OF LOCKWIRE.
   - 4.6 USING WIRE TWISTER PLIERS CONFORMING TO FED SPEC. GGG-W-3408, TWIST LOCKWIRE FROM ADAPTER COUPLING RING HOLE TO BACKSHELL SAFETY TAB (OR HOSE CLAMP) FORMING 6 TO 8 TURNS PER INCH.
   - 4.7 THREAD ONE LOCKWIRE THROUGH THE BACKSHELL LOCKWIRE TAB (OR HOSE CLAMP) AND PULL TIGHT.
   - 4.8 TWIST THE REMAINING LOCKWIRE. CUT OFF THE EXTRA LOCKWIRE LEAVING A PIGTAIL OF 1/4 TO 1/2 INCH (3 TO 6 TWISTS) AND BEND BACK OR UNDER TO PREVENT IT FROM BECOMING A SNAG.
     - 4.8.1 ENSURE THE LOCKWIRE IS INSTALLED AND TWISTED SO THAT THE LOOP AT THE SAFETY HOLES STAY DOWN AND DOES NOT TEND TO COME UP OVER THE HOLE AND LEAVE A SLACK LOOP. (FIGURE 3).
   - 4.9 WHEN OPTIONAL EXTENSIONS ARE USED, THE COUPLING NUT ON THE OPTIONAL EXTENSION MUST ALSO BE SECURED BY LOCKWIRE.
   - 4.10 IF THE CLAMP ASSEMBLY HAS A SAFETY WIRE HOLE INSTALLED, INSTALL LOCKWIRE BETWEEN IT AND THE ADAPTER ASSEMBLY. (SEE FIGURE 4).
   - 4.11 ENSURE THE HOSE CLAMP (IF PRESENT) IS SECURELY TIGHTENED.

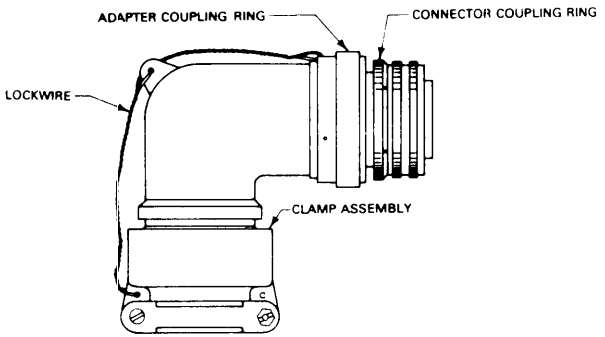


FIGURE 4
LOCKWIRING THE CLAMP ASSEMBLY

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A24 OF DWG. 803-5001027.

SH. 13231799

FIGURE 5A24. Connector lockwiring.

CABLE TRANSFLEXING PROCEDURE

1. CABLE TRANSFLEXING SHOULD BE ACCOMPLISHED ONLY AFTER PROPER APPROVAL HAS BEEN GRANTED.

2. THE PURPOSE OF TRANSFLEXING A CABLE IS TO ALLOW THE CABLE TO EXCEED THE MINIMUM BEND RADIUS REQUIREMENT AND STILL PROVIDE A MEASURE OF MECHANICAL AND ENVIRONMENTAL PROTECTION TO THE INDIVIDUAL CONDUCTORS.

3. CABLES SHALL BE TRANSFLEXED IN ACCORDANCE WITH THE FOLLOWING PROCEDURE. (SEE FIGURE 1)

3.1 PERFORM STEPS 1 AND 2 OF THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE. DO NOT PROCEED BEYOND STEP 5 OF CABLE PREPARATION (SHEET 5A1).

3.2 DETERMINE THE LENGTH OF CABLE TO BE TRANSFLEXED. THE LENGTH SHALL NOT EXCEED THE DISTANCE AS MEASURED FROM THE CABLE END TO THE POINT WHERE THE CABLE BREAKS OUT OF ITS LAST HANGER. (18 INCHES MAXIMUM).

3.3 IF THE CABLE IS ARMORED REMOVE THE ARMOR 1.1 2 INCHES BEYOND THE LENGTH DETERMINED IN STEP 3.2 USING A CABLE STRIPPER MEETING THE REQUIREMENTS OF FED. SPEC. GGG-S-665. THIS ENSURES THE ARMOR WILL NOT INTERFERE WITH THE ENVIRONMENTAL SEAL BETWEEN THE CABLE JACKET AND TRANSFLEX SLEEVING.

3.3.1 INSTALL A 1/2 INCH PIECE OF HEAT SHRINK SLEEVING CENTERED OVER THE ARMOR-JACKET JUNCTION AND SHRINK IN PLACE.

3.3.1.1 HEAT SHRINK SLEEVING SHALL MEET THE REQUIREMENTS OF MIL-I-23053/5 CLASS 1.

3.4 REMOVE THE CABLE JACKET TO THE PREDETERMINED LENGTH AS FOLLOWS.

NOTE: ENSURE THE CUT DOES NOT COMPLETELY PENETRATE THE JACKET.

3.4.1 SCORE THE CIRCUMFERENCE OF THE JACKET WITH A MULTI-PURPOSE CUTTER (OLFA 300 OR EQUIVALENT).

3.4.2 SCORE THE JACKET PIECE TO BE REMOVED ALONG ITS LENGTH WITH A MULTI-PURPOSE CUTTER.

3.4.3 REMOVE THE JACKET PIECE WITH NEEDLE NOSE PLIERS.

3.5 DO NOT DAMAGE GROSS SHIELD (IF APPLICABLE) OR CONDUCTOR INSULATION.

3.6 PROVIDE A LENGTH OF HEAT SHRINKABLE SLEEVING CONFORMING TO THE REQUIREMENTS OF MIL-I-23053/5 CLASS 1 OR MIL-I-23053/10 OF THE PROPER DIAMETER, (TABLE 1), THAT WILL COVER THE CABLE CONDUCTORS, ENSURING THE FOLLOWING:

3.6.1 A MINIMUM OF ONE INCH OF OVERLAP AT THE CABLE JACKET.

3.6.2 SLEEVING EXTENDS PAST THE SEALING GLAND IN THE BACKSHELL WHEN THE BACKSHELL IS MATED TO THE CONNECTOR.

NOTE: ENSURE LONGITUDINAL SHRINKAGE IS TAKEN INTO CONSIDERATION WHEN MAKING THE ABOVE DETERMINATION.

3.7 CUT AND REMOVE ANY FILLER OR CORE USED TO MAKE UP THE CABLE CONSTRUCTION.

NOTE: IF THE GROSS SHIELD INTERFERES WITH THIS STEP, PUSH THE BRAIDED SHIELD BACK ON THE CABLE AS DEPICTED IN FIGURE 2, WHILE REMOVING CABLE FILLERS.

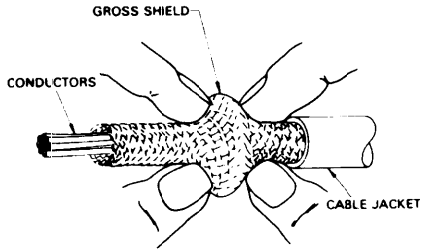


FIGURE 2
GROSS SHIELD INTERFERENCE REMOVAL

3.8 SHRINK A TEST PIECE OF TUBING OVER EXPOSED CONDUCTORS TO CHECK CLAMPING AND ENVIRONMENTAL SEALING PER FIGURE 5A1 STEPS 6 & 8.

3.8.1 BUILD UP THE CABLE DIAMETER PER SHEET 5A3 IF NECESSARY.

3.9 REMOVE THE TEST PIECE OF TUBING. ASSEMBLE BACKSHELL AND CLAMP COMPONENTS ON THE CABLE SO AS NOT TO INTERFERE WITH SUBSEQUENT STEPS.

3.10 SLIDE THE TUBING SELECTED IN STEP 3.6 OVER THE EXPOSED CONDUCTORS ONTO THE CABLE OUT OF THE WORK AREA.

3.11 HOLD EXPOSED CONDUCTORS AND GROSS SHIELD TOGETHER WITH TEMPORARY TIES.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A25 OF DWG. 803-5001027.

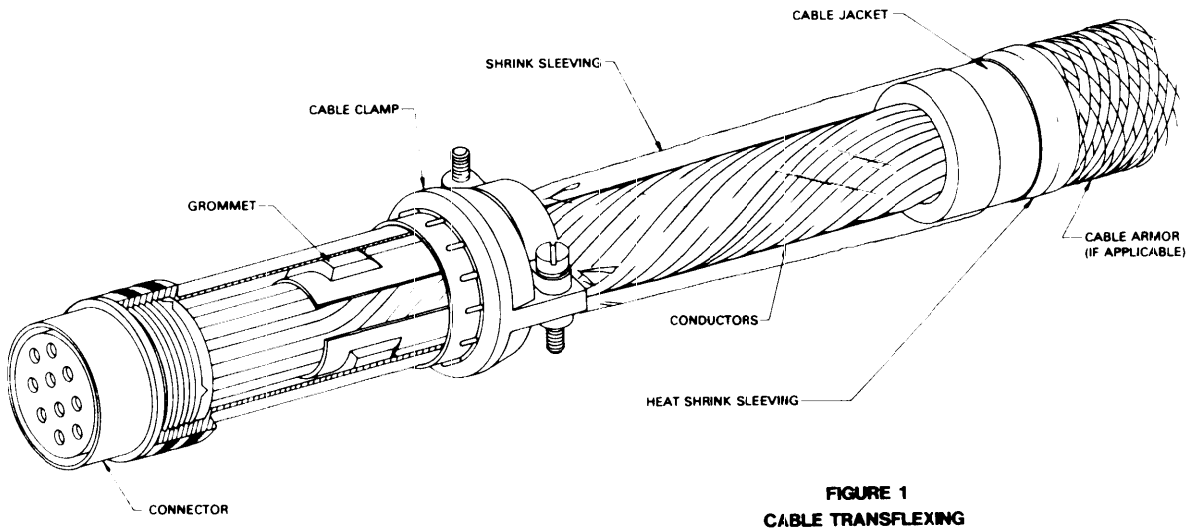


**FIGURE 1**
**CABLE TRANSFLEXING**

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FIGURE 5A25. Cable transflexing procedure.

3.12 DISASSEMBLE AND RELOCATE THE BACKSHELL AND CLAMP COMPONENTS ON THE CABLE. VERIFY THAT ALL PARTS ARE INCLUDED AND ARE IN CORRECT ORDER AND ORIENTATION. ASSEMBLE THE BACKSHELL AND LOCATE IT ON THE CABLE SO THAT IT WILL NOT INTERFERE WITH CONNECTOR WIRING.

3.13 CONTINUE ASSEMBLING THE CONNECTOR IN ACCORDANCE WITH THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE COMMENCING WITH STEP 12 OF FIGURE 5A1.

NOTE: TERMINATE THE GROSS SHIELD (IF APPLICABLE) INSIDE OF THE BACKSHELL FORWARD OF AND NOT TO INTERFERE WITH THE ENVIRONMENTAL SEAL.

NOTE: DO NOT ASSEMBLE THE BACKSHELL TO THE CONNECTOR UNTIL SEQUENCED IN THIS PROCEDURE.


FIGURE 3

TERMINATION OF SPARE CONDUCTORS

3.14 FOLD SPARE CONDUCTORS BACK AND INSULATE EXPOSED ENDS WITH A 1/2-INCH LENGTH OF HEAT SHRINK TUBING. (FIGURE 3).

3.14.1 POSITION GROMMET FOLLOWER IF APPLICABLE.

3.15 IF CONNECTOR HAS INDIVIDUAL LEAD SEALING GROMMET, SLIDE DOWN OVER CONDUCTORS AND SEAT.

3.15.1 CLEAN THE AREA WITH AN APPROVED SOLVENT FROM TABLE 2.

TABLE 2

APPROVED SOLVENT

| | |
|---|---|
| 1, 1, 1 TRICHLOROETHANE | O-T-620 |
| TRICHLOROTRIFLOURETHANE | MIL-C-81302 |
| ISOPROPYL ALCOHOL | TT-I-735 |
| PERCHLOROETHYLENE | O-T-236 |
| 1, 1, 1-TRICHLOROETHANE (VAPOR DEGREASING) | MIL-T-81533 |
| REAGENT WATER (TYPE II) | ASTM D-1193 |
| DETERGENT CLEANERS | AS APPROVED BY THE GOVERNMENT PROCURING ACTIVITY |

3.16 ABRADE BONDING SURFACE OF CABLE JACKET WITH NO. 320 EMERY CLOTH OR EQUIVALENT. (FIGURE 4).

3.16.1 ADHESIVE MATERIAL MUST BE OF A TYPE WHICH WILL EFFECTIVELY SEAL THE ENCLOSED AREA AGAINST MOISTURE. (GENERAL PURPOSE ADHESIVE MMM-A-189 OR EQUIVALENT).

3.17 APPLY ADHESIVE TO THE ABRADED AREA OF THE CABLE JACKET.

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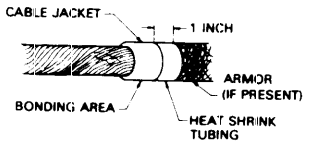


FIGURE 4

CABLE JACKET PREPARATION

3.18 REMOVE THE TEMPORARY TIES APPLIED IN STEP 3.11 AND POSITION THE HEAT SHRINKABLE TUBING OVER THE CABLE CONDUCTORS ENSURING THAT THE TUBING OVERLAPS THE CABLE JACKET BY ONE INCH AND COMPLETELY COVERS THE ENVIRONMENTAL SEAL AREA. IT WILL BE NECESSARY TO USE A HEAT GUN TO SHRINK THE TUBING SUFFICIENTLY TO PASS THE SHRINKABLE TUBING UNDER THE BACKSHELL COMPONENTS DURING POSITIONING.

3.19 POSITION THE BACKSHELL COMPONENTS AWAY FROM THE CONNECTOR END AND, USING A HEAT GUN, SHRINK THE TUBING STARTING AT THE CONNECTOR END. WHEN CLEAR OF THE AREA THAT WILL BE OCCUPIED BY THE BACKSHELL, SLIDE THE BACKSHELL COMPONENTS TO THE CONNECTOR END.

TABLE 1

| MILITARY PART NO | AS SUPPLIED I.D. MIN | AFTER UNRESTRICTED SHRINKAGE I.D. MAX | AFTER UNRESTRICTED SHRINKAGE WALL THICKNESS |
|---|---|---|---|
| CLASS 1 | | | |
| M23053/5-101 | .046 | .023 | .016 ± .003 |
| -102 | .063 | .031 | .017 ± .003 |
| -103 | .093 | .046 | .020 ± .003 |
| -104 | .125 | .062 | .020 ± .003 |
| -105 | .187 | .093 | .020 ± .003 |
| -106 | .250 | .125 | .025 ± .003 |
| -107 | .375 | .187 | .025 ± .003 |
| -108 | .500 | .250 | .025 ± .003 |
| -109 | .750 | .375 | .030 ± .003 |
| -110 | 1.000 | .500 | .035 ± .005 |
| -111 | 1.500 | .750 | .040 ± .006 |
| -112 | 2.000 | 1.000 | .045 ± .007 |
| -113 | 3.000 | 1.500 | .050 ± .008 |
| -114 | 4.000 | 2.000 | .055 ± .009 |
| CLASS 1 OVEREXPANDED | | | |
| -115 | 1.000 | .275 | .045 ± .005 |
| -116 | 2.000 | .550 | .045 ± .005 |
| -117 | 3.000 | .810 | .045 ± .005 |
| -118 | 4.000 | 1.050 | .045 ± .005 |
| -119 | 1.000 | .462 | .045 ± .005 |
| -120 | 2.375 | .680 | .045 ± .005 |
| -121 | 3.000 | .840 | .045 ± .005 |
| -122 | 3.750 | .930 | .045 ± .005 |
| -123 | 4.500 | 1.450 | .045 ± .005 |
| M23053/10-001 | .125 | .071 | .200 ± .006 |
| -002 | .250 | .143 | .035 ± .010 |
| -003 | .375 | .214 | .040 ± .010 |
| -004 | .500 | .286 | .048 ± .015 |
| -005 | .625 | .357 | .052 ± .015 |
| -006 | .750 | .428 | .057 ± .015 |
| -007 | .875 | .500 | .065 ± .015 |
| -008 | 1.000 | .570 | .070 ± .020 |
| -009 | 1.250 | .714 | .087 ± .020 |
| -010 | 1.500 | .857 | .095 ± .020 |
| -011 | 1.750 | 1.000 | .107 ± .020 |
| -012 | 2.000 | 1.140 | .110 ± .020 |
| -013 | 3.000 | 1.710 | .110 ± .020 |
| -014 | 4.000 | 2.280 | .110 ± .025 |

3.20 CONTINUE APPLYING HEAT IN THE DIRECTION OF THE CABLE JACKET REMOVING HEAT AS THE SLEEVING ASSUMES THE CONFIGURATION OF THE CABLE CONDUCTORS.

3.21 WHEN THE SLEEVING HAS RECOVERED SUFFICIENTLY TO SEAL WITH THE CABLE JACKET AND EXCESS ADHESIVE APPEARS AT THE END, DISCONTINUE THE HEATING PROCESS.

CAUTION: DO NOT USE SOLVENT FOR CLEANING OFF EXCESS ADHESIVE. DOING SO COULD CAUSE MIGRATION OF THE SOLVENT INTO THE BOND LINE AREA AND RESULT IN A POTENTIAL BOND FAILURE.

3.22 WIPE OFF EXCESS ADHESIVE WITH A CLEAN CLOTH.

3.23 ASSEMBLE THE BACKSHELL COMPONENTS TO THE CONNECTOR IN ACCORDANCE WITH THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A26 OF DWG. 803-5001027.

FIGURE 5A26. Cable transflexing procedure.

CABLE BIFURCATION PROCEDURE

1. CABLE BIFURCATION IN THIS PROCEDURE IS THE MATING OF TWO CABLES WITH A SINGLE CONNECTOR. THIS PROCEDURE SHALL ENSURE THAT AN ENVIRONMENTAL SEAL EXISTS AND THAT ADEQUATE STRAIN RELIEF IS PROVIDED. (FIGURE 1)

2. THE PROCEDURE FOR MATING TWO CABLES WILL BE AS FOLLOWS.

2.1 DETERMINE THE LENGTH FROM THE CONNECTOR WHERE THE MATING OF THE TWO CABLES WILL OCCUR.

2.1.1 THIS DISTANCE SHALL NOT EXCEED THE DISTANCE TO THE BREAKOUT OF THE TWO CABLES FROM THEIR LAST WIREWAY HANGER (18 INCHES MAXIMUM).

2.2 PREPARE EACH CABLE IN ACCORDANCE WITH SHEET 5A1 STEPS 1 THROUGH 5.

2.3 REMOVE THE CABLE JACKET OF EACH CABLE IN ACCORDANCE WITH FIGURE 5A1 STEP 9.5 TO THE POINT OF JUNCTURE OF THE TWO CABLES.

2.3.1 IF ONE OR BOTH OF THE CABLES IS ARMORED, REMOVE THE ARMOR FROM THE CABLE(S) AT A POINT 2 INCHES BEYOND THE POINT OF JUNCTURE USING A CABLE STRIPPER (FED. SPEC. GGG-S-665).

2.3.2 SHRINK A 1 INCH PIECE OF HEAT SHRINKABLE TUBING MEETING THE REQUIREMENTS OF MIL-I-23053/5, CLASS 1 CENTERED AT THE END OF THE ARMOR TO TERMINATE THE ARMOR ON THE CABLE JACKET.

2.3.3 DO NOT DAMAGE GROSS SHIELD OR CONDUCTOR INSULATION.

2.4 CUT AND REMOVE ANY FILLER OR CORE USED TO MAKE UP THE CABLE CONSTRUCTION.

NOTE: IF THE GROSS SHIELD INTERFERES WITH THIS STEP, PUSH THE BRAIDED SHIELD BACK ON THE CABLE AS DEPICTED IN FIGURE 2 WHILE REMOVING CABLE FILLERS.

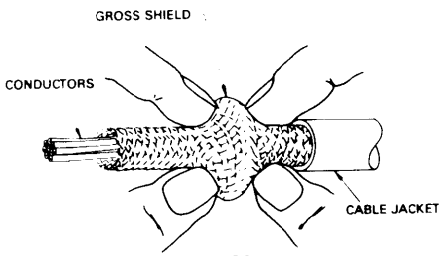


FIGURE 2
GROSS SHIELD INTERFERENCE REMOVAL

2.5 DETERMINE THE DIAMETERS OF THE TWO CABLES TO BE BIFURCATED AND THE RESULTANT WIRE BUNDLE AND SELECT THE APPROPRIATELY SIZED "Y" TRANSITION SLEEVE (BOOT).

2.5.1 MATERIAL FOR THE BOOT SHALL BE POLYOLEFIN, SEMIRIGID, NON-BURNING AND SHALL CONFORM TO THE REQUIREMENTS OF MIL-I-81765/1. THE BOOT SHALL HAVE AN INTERNAL COATING OF ADHESIVE.

2.5.2 IF ONE BOOT WILL NOT FIT THE CABLES AT ALL LEGS, SELECT A SIZE WHICH FITS AS MANY LEGS AS POSSIBLE AND IS TOO LARGE FOR THE REMAINING LEGS. THE CABLE(S) SHOULD THEN BE BUILT UP TO THE PROPER DIAMETER WITH ADHESIVE COATED HEAT SHRINKABLE TUBING CONFORMING TO MIL-I-23053/15 CLASS 1.

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2.6 SLIDE THE LEGS OF THE BOOT OVER THE CABLES AND POSITION AWAY FROM OF THE WORK AREA.

2.7 CAREFULLY COMB OUT THE GROSS SHIELD USING A SOFT INSTRUMENT (SPUDGER OR EQUIVALENT) TO JUNCTION OF THE TWO CABLES.

2.8 MARK ALL CONDUCTORS.

2.9 INTERWEAVE THE LEADS FROM BOTH CABLES TO FORM A SINGLE CABLE. THE CONDUCTORS OF THE COMBINED CABLE MUST EXHIBIT THE SAME LAY (CLOCKWISE OR COUNTERCLOCKWISE ROTATION) AND RELATIVE POSITION AS THE ORIGINAL SINGLE CABLE CONDUCTORS.

2.10 PROVIDE A LENGTH OF HEAT SHRINK SLEEVING, MEETING THE REQUIREMENTS OF MIL-I-23053/5, CLASS 1 OR MIL-I-23053/10 OF PROPER DIAMETER TO COVER THE COMBINED BUNDLE.

2.10.1 SLEEVING MUST EXTEND FROM A MINIMUM OF ONE INCH UNDER THE BOOT TO COMPLETELY THROUGH CONNECTOR SEALING GROMMET. FIGURES 1 AND 3.

NOTE: ENSURE LONGITUDINAL SHRINKAGE IS TAKEN INTO CONSIDERATION WHEN MAKING THE ABOVE DETERMINATION.

2.10.2 SHRINK A TEST PIECE OF SLEEVING OVER CONDUCTOR BUNDLE TO CHECK CLAMPING AND ENVIRONMENTAL SEALING PER FIGURE 5A1 STEPS 6 AND 8.

2.10.3 BUILD-UP THE CABLE DIAMETER PER SHEET 5A3 IF NECESSARY, AFTER REMOVAL OF THE TEST PIECE OF SLEEVING.

2.11 POSITION THE TUBING OVER THE CABLES AWAY FROM THE WORKING AREA. ASSEMBLE THE BACKSHELL AND CLAMP COMPONENTS ON THE CABLE SO AS NOT TO INTERFERE WITH SUBSEQUENT STEPS.

2.12 CONTINUE ASSEMBLING THE CONNECTOR IN ACCORDANCE WITH THE APPLICABLE CONNECTOR ASSEMBLY PROCEDURE COMMENCING WITH STEP 12 OF FIGURE 5A1.

NOTE: DO NOT ASSEMBLE THE BACKSHELL UNTIL SEQUENCED IN THIS PROCEDURE.

2.13 TERMINATE GROSS SHIELD INTERNAL TO THE BACKSHELL FORWARD OF (NOT TO INTERFERE WITH) ENVIRONMENTAL SEAL, IN ACCORDANCE WITH APPLICABLE METHOD OF FIGURE 5A22.

2.14 ABRADE THE BONDING SURFACE OF EACH CABLE JACKET WITH #320 EMERY CLOTH OR EQUIVALENT.

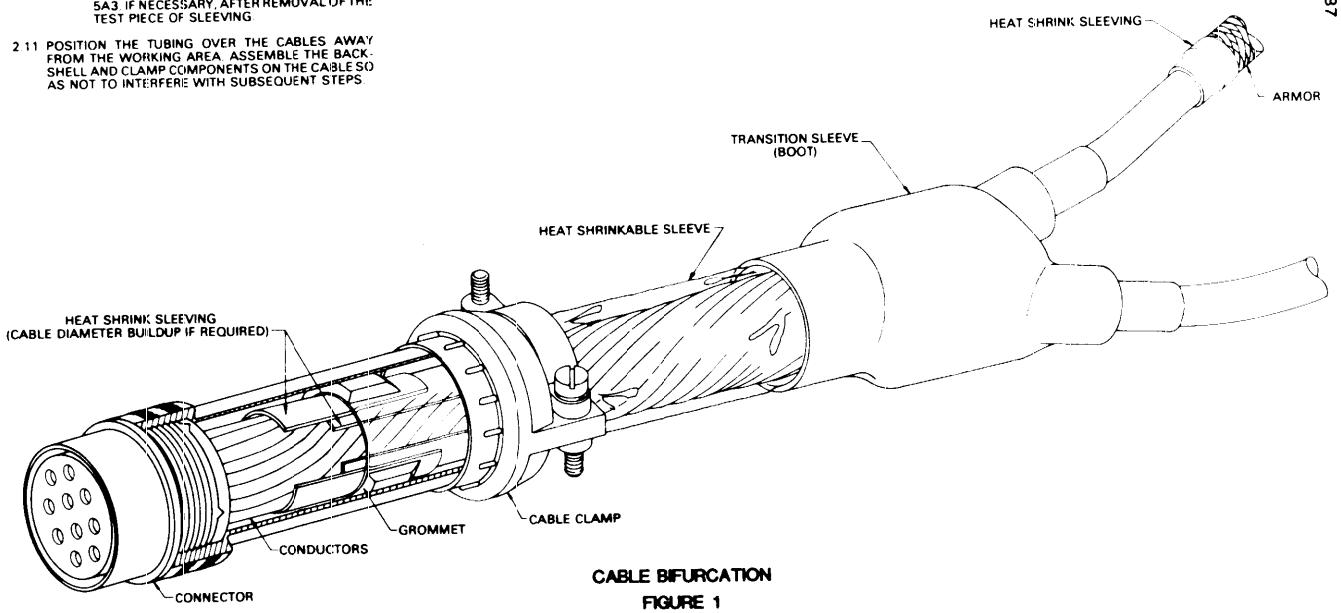
2.15 WIPE THE ABRADED SURFACE WITH A SOLVENT FROM TABLE 1.

TABLE 1

| | |
|---|---|
| 1, 1, 1-TRICHLOROETHANE | O-T-620 |
| TRICHLOROTRIFLUOROETHANE | MIL-C-81302 |
| ISOPROPYL ALCOHOL | TT-I-735 |
| PERCHLOROETHYLENE | O-T-236 |
| 1, 1, 1-TRICHLOROETHANE (VAPOR DEGREASING) | MIL-T-81533 |
| REAGENT WATER (TYPE II) | ASTM D-1193 |
| DETERGENT CLEANERS | AS APPROVED BY THE GOVERNMENT |

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A27 OF DWG. 803-5001027.




CABLE BIFURCATION
FIGURE 1

FIGURE 5A27. Cable bifurcation procedure.

2.16 ASSEMBLE THE SLEEVE ASSEMBLY AND TORQUE TO CONNECTOR SPEC.

2.17 USING A HEAT GUN, SHRINK THE SLEEVING BY APPLYING HEAT, STARTING AT THE CONNECTOR END, AS THE TUBING SHRINKS, SLIDE THE TUBING UNDER THE CLAMP AND INTO THE BACKSHELL FORWARD OF THE ENVIRONMENTAL SEALING AREA.

2.18 CONTINUE APPLYING HEAT IN THE DIRECTION OF THE CABLE JACKET, REMOVING HEAT AS THE SLEEVING ASSUMES THE CONFIGURATION OF THE CABLE.

2.19 PROCEED WITH CONNECTOR/BACKSHELL ASSEMBLY IN ACCORDANCE WITH THE APPLICABLE ASSEMBLY PROCEDURE.

2.20 SLIDE THE BOOT OVER THE CABLE JUNCTION.

2.20.1 ENSURE THE BOOT CROTCH IS POSITIONED SO THAT THE BOOT WILL OVERLAP EACH CABLE JACKET ONE INCH.

2.21 SHRINK THE BOOT WITH A HEAT GUN BY APPLYING HEAT FROM THE CENTER TO THE ENDS TO AVOID TRAPPING AIR.

2.21.1 WHEN THE BOOT IS RECOVERED SUFFICIENTLY TO ASSUME THE CONFIGURATION COVERED, REMOVE THE HEAT.

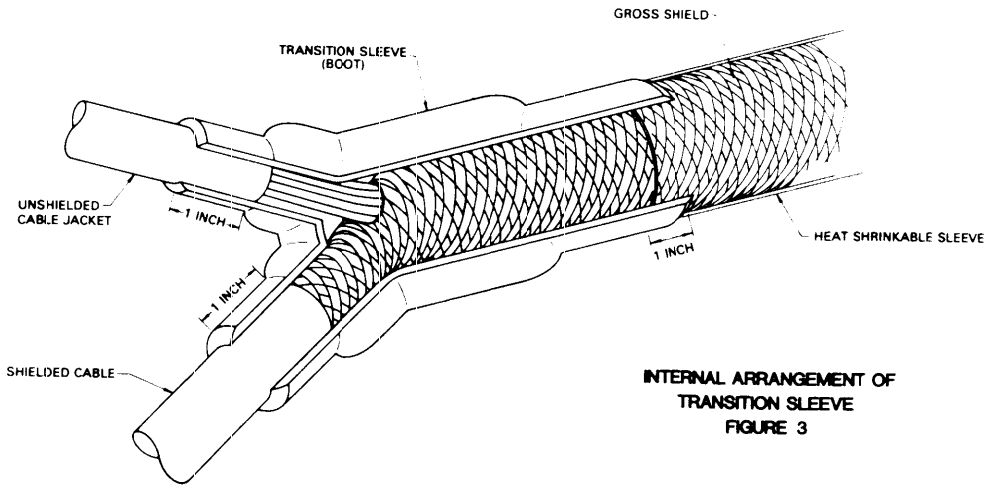
2.21.2 WIRE OFF EXCESSIVE ADHESIVE WITH A CLEAN CLOTH.

CAUTION: DO NOT USE SOLVENT FOR CLEANING OFF EXCESS ADHESIVE. DOING SO COULD RESULT IN MIGRATION OF THE SOLVENT IN THE BOND LINE AREA AND RESULT IN A POTENTIAL BOND FAILURE.

2.22 DO NOT DISTURB JUNCTION UNTIL COOL.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A28 OF DWG. 803-5001027.




INTERNAL ARRANGEMENT OF TRANSITION SLEEVE
FIGURE 3

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FIGURE 5A28. Cable bifurcation procedure.

GLOSSARY OF TERMS

1. A LIST OF TERMS USED IN THIS PROCEDURE WHICH ARE COMMONLY USED IN ELECTRICAL CONNECTOR ENGINEERING PRACTICE FOLLOWS.

1.1 CONNECTOR RELATED TERMINOLOGY.

1.1.1 ADAPTER. AN INTERMEDIATE DEVICE TO PROVIDE FOR ATTACHING SPECIAL ACCESSORIES OR TO PROVIDE SPECIAL MOUNTING MEANS.

1.1.2 BACKSHELL ASSEMBLIES. A DEVICE ADDED BETWEEN THE REAR OF THE CONNECTOR AND THE CABLE CLAMP. THE BACKSHELL IS USED TO PROVIDE ENVIRONMENTAL SEALING, RFI SHIELDING AND CONDUCTOR CONTACT STRAIN RELIEF. BACKSHELLS ARE NORMALLY EITHER STRAIGHT (0°) OR ANGLED (45° OR 90°).

1.1.3 BAYONET COUPLING RING. A POSITIONING DEVICE FOR MATING CONNECTORS UTILIZING KEYS ON A CONNECTOR AND SLOTS ON THE MATING RECEPTACLE. MATING AND UNMATING IS ACCOMPLISHED BY ROTATING THE COUPLING RING.

1.1.4 BIN (BASIC IDENTIFICATION NUMBER) CODE. A DISTINCTIVE NUMBER ASSIGNED TO IDENTIFY THE CONTACT. THE BIN CODE IS INDICATED ON THE CONTACT BY THREE COLOR CODED MARKING BANDS. THE COLOR CODED BANDS ARE NORMALLY LOCATED ON THE WIRE BARREL END OF THE CONTACT. THE WIDER BAND, NORMALLY NEAREST THE WIRE BARREL END, INDICATES THE FIRST DIGIT. THE MIDDLE BAND THE SECOND DIGIT AND THE LAST BAND, THE THIRD DIGIT OF THE BIN CODE. THE COLOR CODE IS.

| | | |
|---|---|---|
| 0 - BLACK | 4 - YELLOW | 7 - VIOLET |
| 1 - BROWN | 5 - GREEN | 8 - GRAY |
| 2 - RED | 6 - BLUE | 9 - WHITE |
| 3 - ORANGE | | |

1.1.5 BRAID. FLEXIBLE CONDUCTOR MADE OF A WOVEN OR BRAIDED ASSEMBLY OF FINE WIRES.

1.1.6 CABLE CLAMP. THE CABLE CLAMP, WHEN SCREWED ONTO THE BACKSHELL, PROVIDES THE COMPRESSION FORCE TO SEAL THE CABLE JACKET TO THE BACKSHELL VIA THE COMPRESSION RING AND GLAND. WHEN TIGHTENED, THE SCREWS ON THE CLAMPING BAR PROVIDE MECHANICAL HOLDING OF THE CABLE TO THE BACKSHELL SO THE SEAL IS NOT FRACTURED BY MOVEMENT OF THE CABLE.

1.1.7 CLOCKING. THE ORIENTATION OF CABLES HAVING ANGLED BACKSHELLS TO THE MASTER KEY OF THE MATING RECEPTACLE.

1.1.8 CONDUCTOR BARREL (WIRE BARREL). THE SECTION OF THE TERMINAL, SPLICE OR CONTACT THAT ACCOMMODATES THE STRIPPED CONDUCTOR.

1.1.9 CONNECTOR, ELECTRICAL. A DEVICE, EITHER A PLUG OR A RECEPTACLE, USED TO TERMINATE OR CONNECT THE CONDUCTORS IN CABLES AND WHICH PROVIDES A MEANS TO CONTINUE THE CONDUCTORS TO A MATING CONNECTOR OR PRINTED CIRCUIT BOARD.

1.1.10 CONTACT. THE CONDUCTIVE ELEMENT IN A CONNECTOR WHICH MAKES ACTUAL CONTACT FOR THE PURPOSE OF TRANSFERRING ELECTRICAL ENERGY.

1.1.11 CONTACT ARRANGEMENT. THE NUMBER, SPACING AND ARRANGEMENT OF CONTACTS IN A CONNECTOR.

1.1.12 CONTACT ENGAGING AND SEPARATING FORCE. FORCE NEEDED TO EITHER ENGAGE OR SEPARATE CONTACTS TO MATING CONTACTS OR GAGE PINS.

1.1.13 CONTACT RETAINER. A DEVICE EITHER ON THE CONTACT OR IN THE INSERT TO RETAIN THE CONTACT IN AN INSERT OR BODY.

1.1.14 CONTACT RETENTION. THE AXIAL LOAD IN EITHER DIRECTION WHICH A CONTACT CAN WITHSTAND WITHOUT BEING DISLODGED FROM ITS NORMAL POSITION WITHIN AN INSERT OR BODY.

1.1.15 CONTACT SIZE. AN ASSIGNED NUMBER DENOTING THE SIZE OF THE CONTACT ENGAGING END.

1.1.16 COVER, ELECTRICAL CONNECTOR. (DUST CAP) AN ITEM WHICH IS SPECIFICALLY DESIGNED TO COVER THE MATING END OF A CONNECTOR FOR MECHANICAL AND/OR ENVIRONMENTAL PROTECTION.

1.1.17 DUMMY CONNECTOR, RECEPTACLE. A SPECIALLY DESIGNED CONNECTOR RECEPTACLE WHICH DOES NOT HAVE PROVISIONS FOR ATTACHING CONDUCTORS. IT IS GENERALLY USED FOR ASSEMBLY OF A COUNTERPART CONNECTOR PLUG.

1.1.18 EXTRACTION TOOL. A DEVICE USED FOR REMOVING REMOVABLE CONTACTS FROM A CONNECTOR.

1.1.19 GUIDE PIN. A SPECIFICALLY DESIGNED PIN INSERTED THROUGH A CONNECTOR TO GUIDE SOCKET CONTACTS INTO PROPER INSERT CAVITY.

1.1.20 INSERT, ELECTRICAL CONNECTOR. AN INSULATING ELEMENT (DIALECTRIC) DESIGNED TO POSITION AND SUPPORT CONTACTS IN A CONNECTOR.

1.1.21 INSERTION TOOL. A DEVICE USED TO INSERT CONTACTS INTO A CONNECTOR. A DEVICE USED TO INSERT TAPER PINS INTO TAPER PIN RECEPTACLES.

1.1.22 KEYING. (POLARIZATION) A MECHANICAL ARRANGEMENT OF INSERTS AND SHELL CONFIGURATION WHICH PROHIBITS THE MATING OF MISMATCHED PLUGS AND RECEPTACLES. ALTERNATE KEY ARRANGEMENTS ARE AVAILABLE TO PREVENT MISMATING OF SIMILAR CONNECTORS.

1.1.23 PLUG CONNECTOR. SEE ELECTRICAL CONNECTOR.

1.1.24 PULL-OUT FORCE. FORCE NECESSARY TO SEPARATE A CONDUCTOR FROM A CONTACT OR TERMINAL, OR A CONTACT FROM A CONNECTOR, BY EXERTING A TENSILE PULL.

1.1.25 RFI PIECES. THE RFI PIECES ALLOW CONNECTION OF THE CABLE GROSS SHIELD TO THE CONNECTOR SHELL TO PROVIDE A CONTINUOUS RADIO FREQUENCY INTERFERENCE SHIELD.

1.1.26 SHELL, ELECTRICAL CONNECTOR. THE OUTSIDE CASE OF A CONNECTOR INTO WHICH THE DIELECTRIC MATERIAL AND CONTACTS ARE ASSEMBLED.

1.1.27 SLEEVE. THE SLEEVE IS THE OUTER HOUSING OF THE BACKSHELL ASSEMBLY. THE SLEEVE NORMALLY CONTAINS THE ENVIRONMENTAL SEALING AND RFI SHIELDING COMPONENTS OF THE BACKSHELL. ON ANGLED BACKSHELLS, THE SLEEVE IS FORMED AT 45° OR 90° ANGLE.

1.1.28 SOLDER CUP. THE END OF A TERMINAL OR CONTACT IN WHICH THE CONDUCTOR IS INSERTED PRIOR TO BEING SOLDERED.

1.1.29 THREADED COUPLING RING. A THREADED RING FITTING OVER THE CONNECTOR SHELL THAT THREADS ONTO THE PLUG. THE THREADED COUPLING RING AIDS IN MATING THE CONNECTOR TO THE PLUG AND HOLDS THE CONNECTOR AND PLUG IN A MATED CONDITION.

1.1.30 WIRE SEALING PLUG. WIRE SEALING PLUGS ARE INSERTED BEHIND CONTACTS IN UNUSED CONNECTOR HOLES TO PROVIDE AN ENVIRONMENTAL SEAL.

1.2 CRIMPING RELATED TERMINOLOGY.

1.2.1 CRIMP. THE PHYSICAL COMPRESSION (DEFORMATION) OF A CONTACT BARREL AROUND A CONDUCTOR IN ORDER TO MAKE AN ELECTRICAL CONNECTION.

1.2.2 CRIMPING. A PRESSURE METHOD OF MECHANICALLY SECURING A TERMINAL, SPLICE OR CONTACT TO A CONDUCTOR.

1.2.3 CRIMPING DIES. PORTION OF THE CRIMPING TOOL THAT SHAPES THE CRIMP.

1.2.4 CRIMPING TOOL. MECHANISM USED FOR CRIMPING.

1.2.5 DEPTH OF CRIMP. THE DISTANCE THE INDENTOR PENETRATES INTO THE BARREL.

1.2.6 INDENTOR. THAT PART OF A CRIMPING TOOL, USUALLY THE MOVING PART, THAT COMPRESSES INDENTATIONS IN THE CONTACT CONDUCTOR BARREL.

1.2.7 LOCATOR. THE PART OF THE CRIMPING DIE, POSITIONER OR TURRET HEAD THAT PLACES THE TERMINAL, SPLICE OR CONTACT IN THE CORRECT CRIMPING AREA OF THE CRIMPING TOOL OR DIE.

1.2.8 POSITIONER. SEE LOCATOR.

1.2.9 RATCHET CONTROL. A DEVICE TO ENSURE THE FULL CRIMPING CYCLE OF A CRIMPING TOOL.

1.2.10 TURRET HEAD. A DEVICE THAT IS ATTACHED TO A CRIMPING TOOL WHICH CONTAINS MORE THAN ONE LOCATOR AND ALLOWS THE LOCATORS TO BE ROTATED TO HOLD A CONTACT IN THE CORRECT POSITION FOR CRIMPING. IT IS USUALLY INTERCHANGEABLE WITH OTHER TURRET HEADS.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A29 OF DWG. 803-5001027.







FIGURE 5A29. Glossary of terms.

1.3 SOLDERING RELATED TERMINOLOGY

1.3.1 ALLOY REGION. THE AREA WITHIN THE SOLDER CONNECTION WHERE THE MIXING OF METALS OCCURS DURING THE SOLDERING PROCESS.

1.3.2 BIRDCAGING. SEPARATION OF INDIVIDUAL STRANDS.

1.3.3 COLD SOLDER CONNECTION. UNSATISFACTORY CONNECTION RESULTING FROM INSUFFICIENT HEAT AND EXHIBITING AN ABRUPT RISE OF THE SOLDER FROM THE SURFACE BEING SOLDERED. (SEE ALSO DISTURBED SOLDER CONNECTION, WHICH IS OFTEN REFERRED TO AS A "COLD JOINT.")

1.3.4 DISTURBED SOLDER JOINT: A DISTURBED SOLDER JOINT IS AN UNSATISFACTORY CONNECTION RESULTING FROM RELATIVE MOTION BETWEEN LEAD/WIRE AND THE TERMINAL AREA DURING SOLIDIFICATION OF THE SOLDER.

1.3.5 EXCESSIVE SOLDER. EXCESSIVE SOLDER IS A CONDITION RESULTING IN AN UNSATISFACTORY CONNECTION BECAUSE THE CONTOUR OF THE ELEMENTS OF THE CONNECTION IS COMPLETELY OBSCURED OR THE SOLDER HAS OVERFLOWED BEYOND THE CONFINES OF THE CONNECTION AREA.

1.3.6 FILLET. SOLDER THAT FILLS THE SPACE BETWEEN CONDUCTORS IN AN ELECTRICAL CONNECTION.

1.3.7 FLUX. FLUX IS A CHEMICALLY ACTIVE COMPOUND THAT IS CAPABLE OF PROMOTING THE WETTING OF METALS WITH SOLDER.

1.3.7.1 FLUX HAS A LOWER MELTING POINT THAN SOLDER. AS HEAT IS APPLIED, FLUX DISSOLVES, REACHING THE METAL FIRST IT CLEANS THE OXIDE AS THE SOLDER MELTS; IT DISPLACES THE FLUX ON THE CLEANED SURFACE. FLUX ALSO HELPS SOLDER FLOW AS IT SHOULD. THEN, RISES TO THE TOP AND IS PUSHED TO THE OUTER EDGES CARRYING WITH IT THE OXIDES IT HAS REMOVED. WHEN THIS HAPPENS, THE SURFACE IS CALLED "WETTED."

1.3.7.2 ROSIN FLUX. A NONCORROSIVE, NONCONDUCTIVE, CHEMICALLY ACTIVE COMPOUND CAPABLE OF PROMOTING THE WETTING OF METALS WITH SOLDER BY A CHEMICAL CLEANING ACTION.

1.3.8 OXIDATION. OXYGEN MIXING WITH THE SURFACE METAL FORMING A COATING THAT IS RESISTANT TO SOLDERING.

1.3.9 PRE TINNED. SOLDER APPLIED TO EITHER OR BOTH THE CONTACT AND CONDUCTOR PRIOR TO SOLDERING.

1.3.10 SOLDER. SOLDER IS A METALLIC ALLOY, USUALLY OF LEAD AND TIN, USED TO MECHANICALLY AND ELECTRICALLY JOIN METALLIC SURFACES BY SOLIDIFICATION FOLLOWING THE WETTING ACTION OF THE MELTED ALLOY.

1.3.11 SOLDERED CONNECTION. A SOLDERED CONNECTION IS AN ELECTRICAL CONNECTON WHICH EMPLOYS SOLDER FOR BONDING TWO OR MORE METALS WITH AN ALLOY (SOLDER).

1.3.12 SOLDERING. SOLDERING IS A PROCESS IN WHICH METALLIC SURFACES IN CLOSE PHYSICAL PROXIMITY ARE JOINED BY THE WETTING AND SUBSEQUENT COALESCENCE OF LIQUID SOLDER HAVING A MUCH LOWER MELTING POINT (GENERALLY BELOW 204°C) THAN ANY OF THE METALS BEING JOINED.

1.3.12.1 SOLDERING IS ACCOMPLISHED BY HEATING THE TWO METALS AND THE SOLDER TO THE MELTING POINT OF THE SOLDER. AT THIS TIME THE METAL AND THE LIQUID (MOLTEN) SOLDER MERGE AT THEIR INTERFACES AND MUTUALLY DIFFUSE INTO EACH OTHER.

1.3.13 SOLDER HEAT BRIDGE. HEAT TRANSFER IN SOLDERING CAN BE IMPROVED BY PLACING A SMALL AMOUNT OF SOLDER BETWEEN THE HEAT SOURCE AND THE CONNECTION. THIS IS CALLED A SOLDER HEAT BRIDGE. A SOLDER HEAT BRIDGE DOES JUST WHAT IT SAYS—IT PROVIDES A BRIDGE THROUGH WHICH HEAT CAN TRANSFER.

1.3.14 SOLDER PROJECTION. A SOLDER PROJECTION IS AN UNDESIRABLE PROTRUSION FROM A SOLIDIFIED SOLDER JOINT OR COATING.

1.3.15 TINNING. THE COATING OF A SURFACE WITH A UNIFORM LAYER OF SOLDER.

1.3.16 WET SOLDERING IRON TIP. HEATED SOLDERING IRON TIP COVERED WITH A SMALL QUANTITY OF MOLTEN SOLDER TO ACCELERATE TRANSFER OF HEAT CONNECTION.

1.3.17 WETTING. THE PROCESS OF REDUCING SURFACE RESISTANCE AND TENSION SO A LIQUID CAN SPREAD EVENLY OVER THE SURFACE.

1.3.18 WICKING. WICKING IS THE CAPILLARY ACTION OF A LIQUID BETWEEN STRANDS OR FIBERS. IN SOLDERING, WICKING OCCURS BETWEEN WIRES OR STRANDS OF WIRE THAT MAKE UP A CONDUCTOR WHEN HOT SOLDER COMES INTO CONTACT WITH HEATED STRANDED WIRE, THE SOLDER WICKS UP THE CONDUCTOR BETWEEN STRANDS OF WIRE BY CAPILLARY ACTION UNTIL IT REACHES WIRE THAT IS NOT HOT ENOUGH TO SUPPORT THE WETTING. THE WICKING EFFECT IS VERY USEFUL IN THE APPLICATION OF SOLDER TO A CONNECTION POINT. WICKING, VIA CAPILLARY ACTION, DISTRIBUTES SOLDER TO ALL AREAS OF THE CONDUCTORS BEING JOINED. THE HARMFUL EFFECTS OF WICKING OCCUR WHEN SOLDER IS ALLOWED TO WICK TOO FAR UP A CONDUCTOR, CAUSING THE CONDUCTOR TO BECOME INFLEXIBLE OR DAMAGING THE INSULATION.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A30 OF DWG. 803-5001027.

FIGURE 5A30. Glossary of terms.

TOOLING AND MATERIALS LIST

1 THE FOLLOWING TOOLS ARE UTILIZED IN THE ASSEMBLY OF TYPICAL CONNECTORS

1 1 SOLVENT BRUSH IS USED FOR CLEANING DIRT AND OTHER FOREIGN MATERIAL FROM CONNECTOR AND BACKSHELL PARTS

1 2 ARTISTS BRUSH IS USED FOR APPLYING PETROLATUM AND OTHER APPROVED LUBRICANTS TO CONNECTOR AND BACKSHELL PARTS

1 3 PRECISION MECHANICAL STRIPPER IS USED TO REMOVE INSULATION FROM CONDUCTORS USING BLADES IT CONSISTS OF AN ADJUSTABLE STOP TO CONTROL THE LENGTH OF INSULATION REMOVED

1 4 SOLDERING IRON IS USED TO HEAT CONDUCTORS AND SOLDER TO PROVIDE A SECURE ELECTRICAL CONNECTION

1 5 HEAT GUN IS USED TO HEAT SHRINK SOLDER SLEEVES AND SHRINKABLE TUBING

1 6 DIAGONAL CUTTER IS USED TO CUT CONDUCTORS TO LENGTH, CUT OFF A REJECTED CRIMPED CONTACT, AND TRIM STRIPPED CONDUCTOR WIRES TO LENGTH

1 7 CABLE SHEARS ARE USED TO CUT MULTICONDUCTOR CABLE SQUARELY

1 8 ADJUSTABLE CUTTER IS USED TO CUT CABLE JACKETS AND INSULATION BECAUSE IT IS TOTALLY ADJUSTABLE TO PREVENT PENETRATION TO THE UNDERLYING JACKET, CONDUCTORS, BRAIDED SHIELD AND HAS A BREAK-AWAY RENEWABLE BLADE

1 9 SOFT INSTRUMENT (SPUDGER) IS A POINTED INSTRUMENT USED TO COMB OUT THE SHIELD PRIOR TO PIGTAILING IT IS ALSO USED TO FIND AND ROUTE CONDUCTORS DURING CONNECTOR INSERTION

1 10 TAILOR SHEARS ARE USED TO CUT MYLAR, TAPE, AND LACING TAPE

1 11 NEEDLE NOSE PLIERS ARE USED TO PEEL OFF THE SCORED CABLE JACKET

1 12 CROWS FOOT WRENCH IS USED TO TIGHTEN THE ADAPTER ONTO THE CONNECTOR

1 13 STRAP WRENCH IS USED TO TIGHTEN VARIOUS BACKSHELL COMPONENTS (I E SLEEVE TO ADAPTER AND CABLE CLAMP TO SLEEVE)

1 14 TWEEZERS ARE AN ALTERNATIVE TO FINGERS IN TIGHT REWORK SITUATIONS

1 15 TORQUE WRENCH IS USED TO TIGHTEN VARIOUS BACKSHELL COMPONENTS TO SPECIFIED TORQUE VALUES

1 16 CABLE STRIPPER IS USED TO REMOVE ARMOR FROM CABLES BECAUSE IT IS ADJUSTABLE TO PREVENT PENETRATION TO THE UNDERLYING CABLE JACKET

1 17 CRIMPING TOOL IS USED TO FASTEN WIRE CONDUCTORS INTO CRIMP CONTACTS

1 18 POSITIONER IS USED TO POSITION THE CONTACT IN THE CRIMPING TOOL INDENTORS CLOSE TO THE PROPER DEPTH

1 19 CRIMPING TOOL GAGE PROVIDES A GO/NO GO TEST TO MAKE SURE THE CRIMP TOOL INDENTORS CLOSE TO THE PROPER DEPTH

1 20 PIN CONTACT GAGE IS USED TO TEST SOCKET CONTACT RETENTION

1 21 PIN VISE IS USED TO HOLD THE PIN CONTACT GAGE

1 22 DUMMY RECEPTACLE HOLDS AND TRANSFERS GUIDE PINS USED FOR INSERTION OF SOCKET CONTACTS AND PROVIDES A HOLDING BASE FOR THE CONNECTOR DURING INSERTION OF CONTACTS

1 23 GUIDE PINS PROVIDE A DEFINITE, UNOBSTRUCTED PATH FOR CONTACTS TO FOLLOW, PREVENT FOREIGN MATERIAL FROM ACCUMULATING INSIDE THE SOCKET CONTACT, AND PREVENT MISALIGNMENT CAUSED BY BUNCHING OF THE CONNECTOR INSERT

1 24 CONNECTOR ASSEMBLY FIXTURE HOLDS THE CABLE AND CONNECTOR IN RELATION TO EACH OTHER AND PREVENTS MOVEMENT OF THE CONDUCTORS AFTER THEY HAVE BEEN INSERTED ANY ASSEMBLY FIXTURE THAT PROVIDES THE ATTRIBUTES LISTED IN THE ASSEMBLY PORTIONS OF THIS PROCEDURE WILL BE ADEQUATE

1 25 INSERTION TOOL IS USED TO INSTALL CONTACTS INTO THE CONNECTOR CONTACT HOLES

1 26 EXTRACTION TOOL IS USED TO REMOVE CONTACTS FROM THE CONNECTOR

1 27 LOCKWIRE PLIERS ARE USED TO TWIST THE LOCKWIRE AND TO CUT THE LOCKWIRE

1 28 TENSION COMPRESSION GAGE IS USED WITH TWO ADAPTERS TO TEST CONTACT CRIMPING AND CONTACT RETENTION

1 28 1 WIRE PULL ADAPTER IS USED TO PERFORM A PULL TEST ON CRIMPED CONTACTS (MOUNTED ON THE TENSION END OF THE GAGE).

1 28 2 CONTACT PUSH ADAPTER IS USED TO PERFORM A PUSH TEST OF LOCKED CONTACTS IN THE CONNECTOR (MOUNTED ON THE COMPRESSION END OF THE GAGE)

1 29 TORQUE SCREWDRIVER IS USED TO TIGHTEN THE CABLE CLAMPING BAR SCREWS.

2 THE FOLLOWING MATERIALS ARE UTILIZED IN CONNECTOR ASSEMBLY PROCEDURES

2 1 PETROLATUM IS THE PHARMACEUTICAL NAME FOR PETROLEUM JELLY OR VASELINE AND IS USED TO LUBRICATE CONNECTOR AND BACKSHELL COMPONENTS

2 2 SHRINK TUBING CONFORMS TO MIL-I-23053 AND IS USED TO INSULATE SHIELD PIGTAILS, IDENTIFICATION OF TWISTED PAIRS OR TRIADS, AND TO PROVIDE ENVIRONMENTAL PROTECTION

2 3 LACING TAPE IS USED TO FORM A STRAIN RELIEF FOR THE SHIELD RETURN WIRE

2 4 TRANSITION SLEEVE (BOOT) IS USED AT THE JUNCTURE WHEN BIFURCATING TWO CABLES

2 5 SOLDER SLEEVE CONSISTS OF A HEAT SHRINKABLE SLEEVE CONTAINING A PREFORM OF FLUXED SOLDER AT THE CENTER AND A THERMOPLASTIC SEALING RING AT EACH END.

2 6 TRANSPARENT SLEEVING IS USED TO PROVIDE ENVIRONMENTAL PROTECTION TO EXPOSED CONDUCTORS AND CONFORMS TO MIL-I-631

2 7 SOLVENTS ARE USED TO REMOVE GREASE, OIL, DIRT, FLUX, AND OTHER DEBRIS FROM THE CONNECTOR AND BACKSHELL COMPONENTS AND THE CABLE JACKET

2 8 LOCKWIRE CONFORMING TO MS20995 NC20 IS USED ON CONNECTORS TO PREVENT THREADED PARTS FROM BACKING OFF

NOTES:

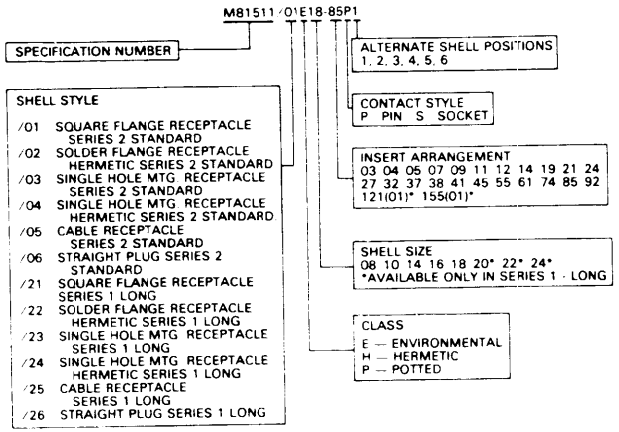
1. THIS FIGURE SUPERSEDES SHEET 5A31 OF DWG. 803-5001027.

SH 132317338

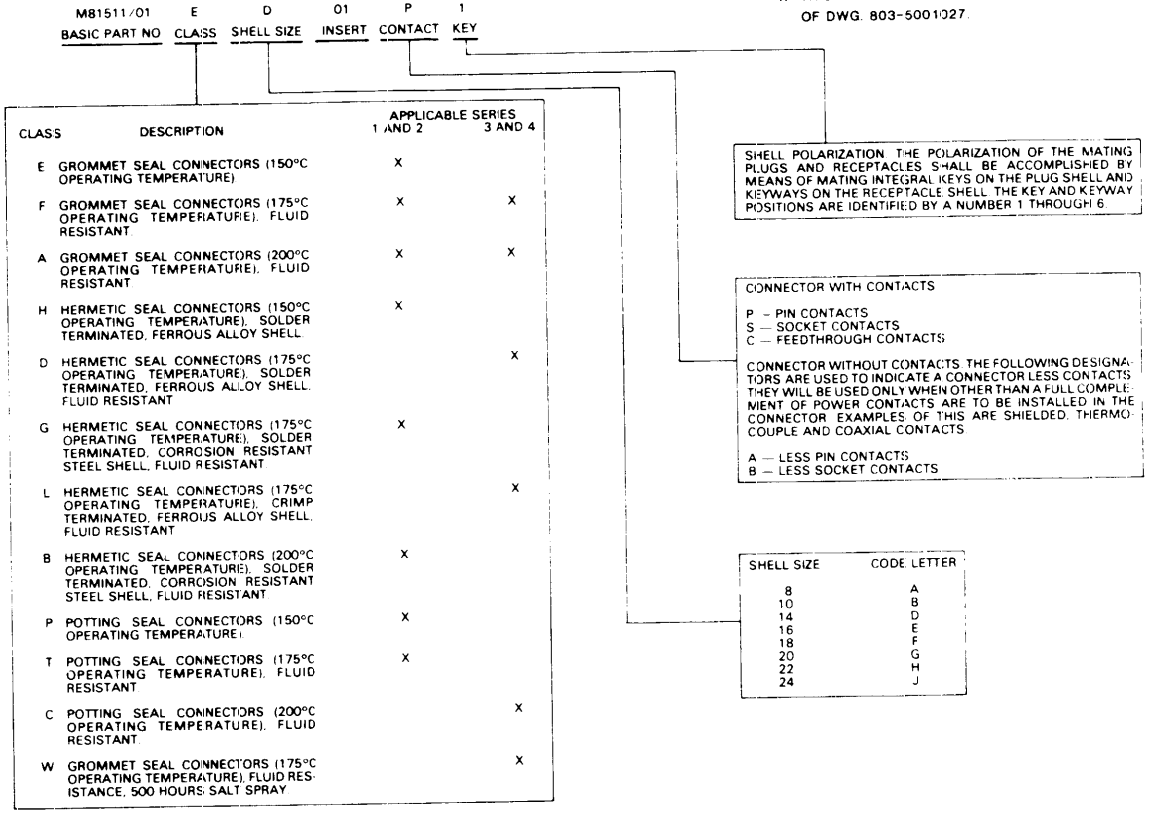
FIGURE 5A31. Tooling and materials list.

THIS PROCEDURE ENABLES THE ASSEMBLER TO BREAKDOWN A CONNECTOR PART NUMBER INTO ITS COMPONENTS AND DETERMINE THE PHYSICAL CHARACTERISTICS OF THE CONNECTOR.

1. M81511 REV. B CONNECTORS




2. M81511 REV. C AND LATER CONNECTORS




NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A32 OF DWG. 803-5001027.

SH 132317339

FIGURE 5A32. Connector part number nomenclature.

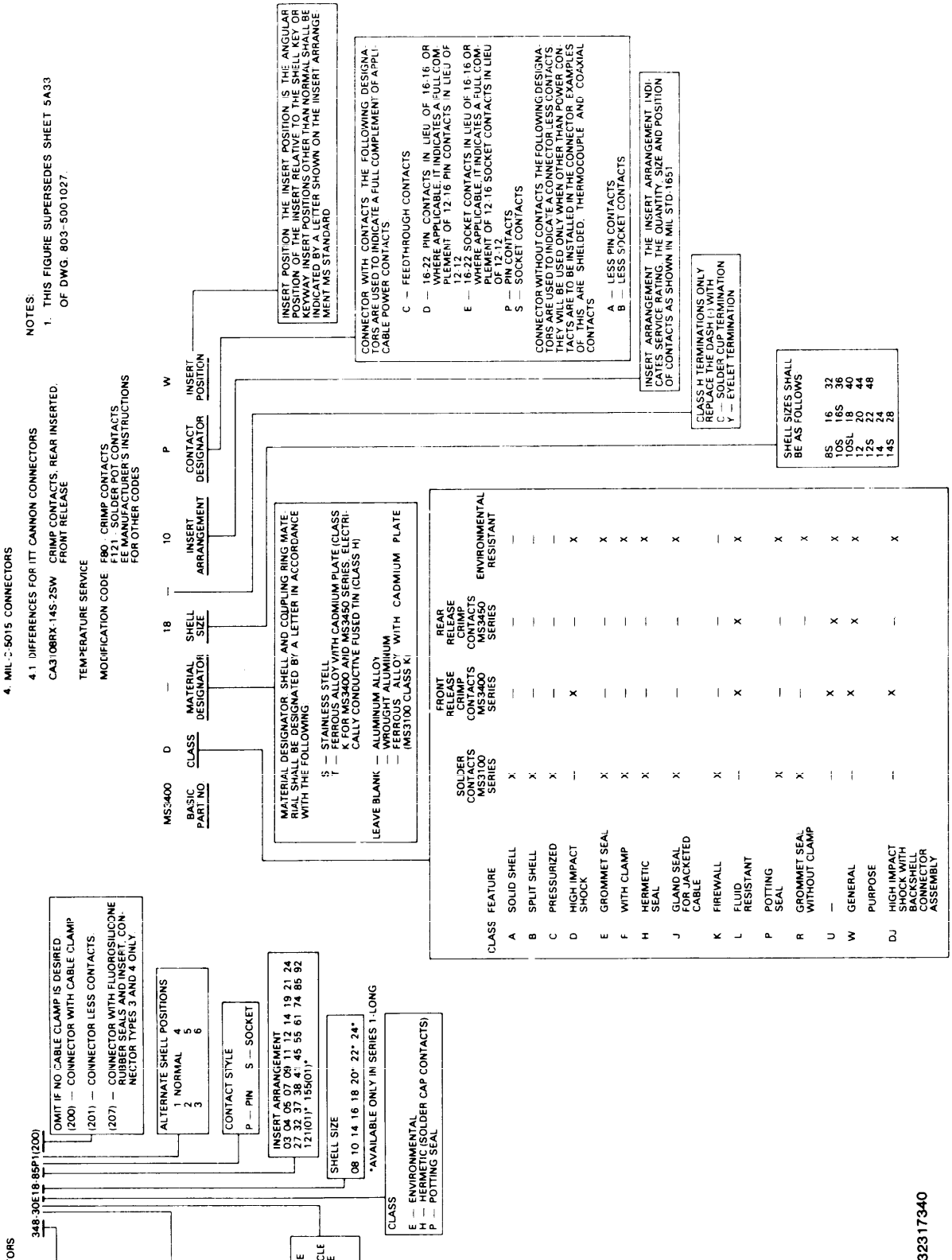
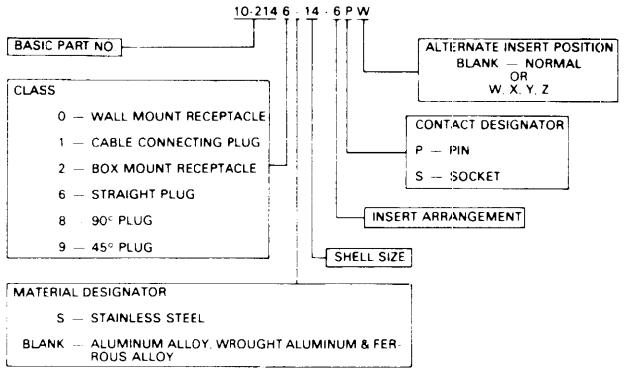
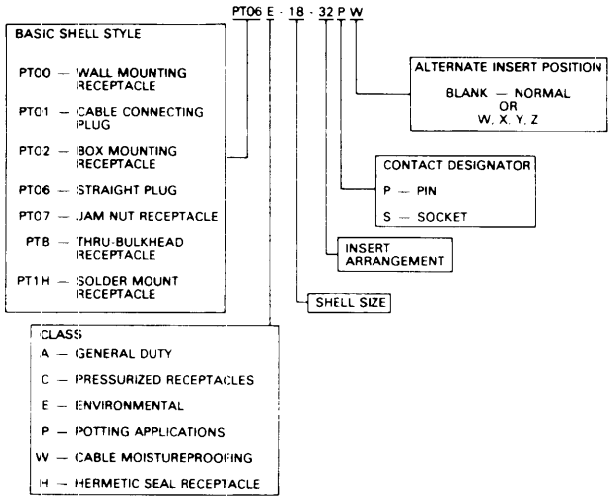



FIGURE 5A33. Connector part number nomenclature.

4.2 BENDIX 10-214 SERIES CONNECTOR

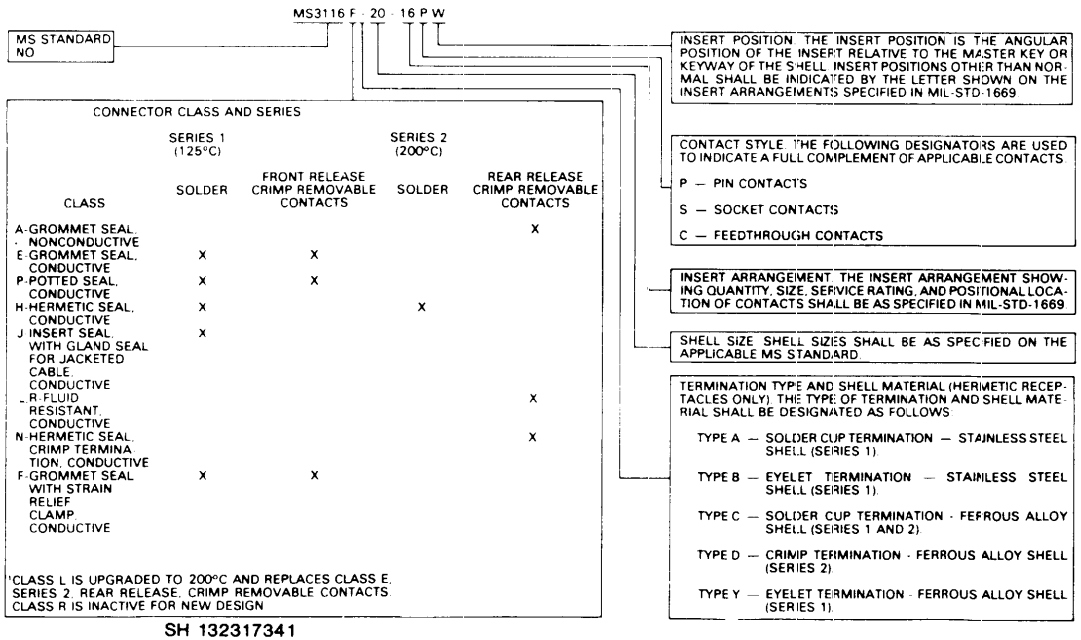



5.1 BENDIX "PT" CONNECTORS




NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5A34 OF DWG. 803-5001027.

5 MIL-C-26482 CONNECTORS




SH 132317341

FIGURE 5A34. Connector part number nomenclature.

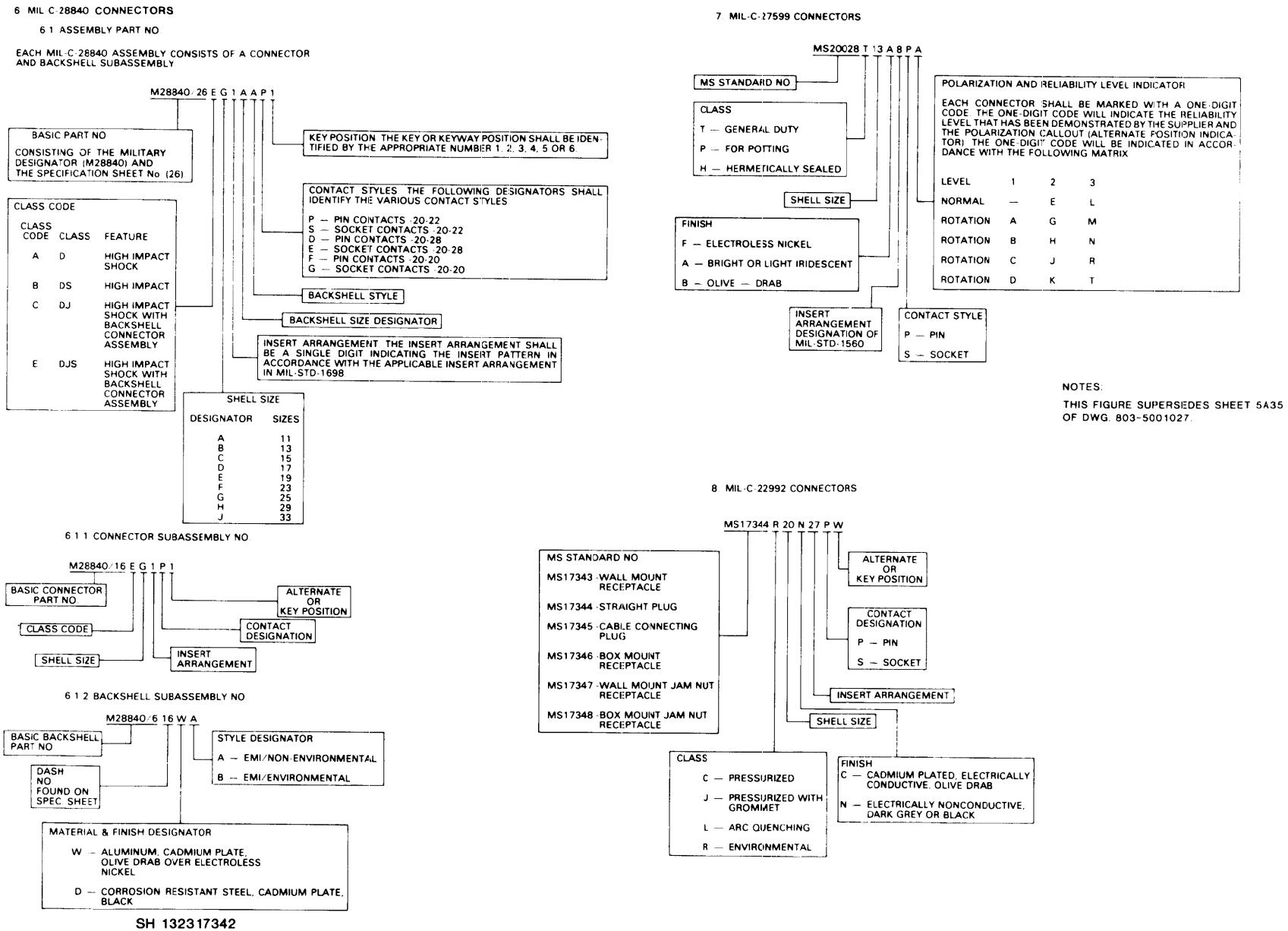
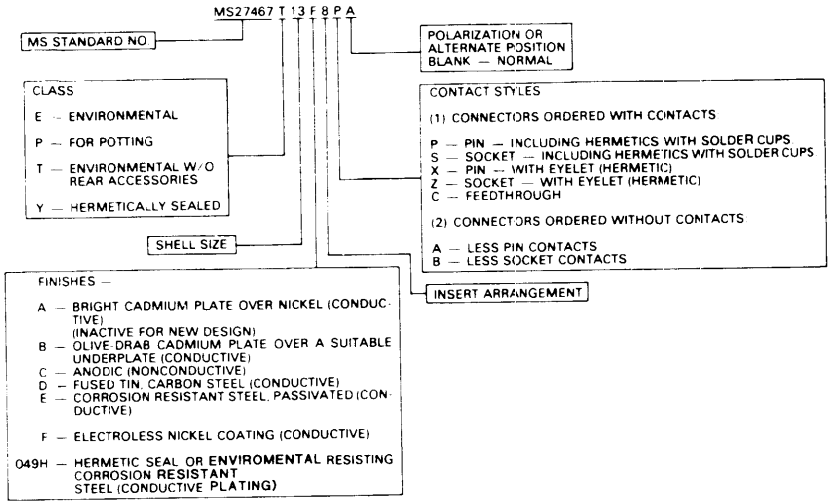


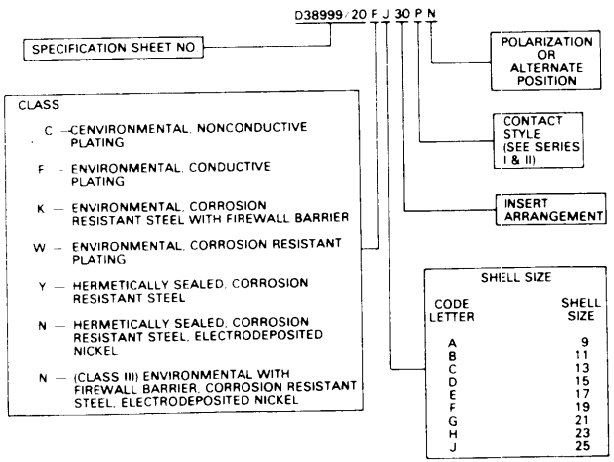

FIGURE 5A35. Connector part number nomenclature.

9. MIL-C-38999 CONNECTORS

9.1 SERIES I AND II




9.2 SERIES III AND IV




SH 132317343

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5A36 OF DWG. 803-5001027.

FIGURE 5A36. Connector part number nomenclature.

1 VISUAL INSPECTION AND VERIFICATION

1 1 DISASSEMBLE THE CONNECTOR/BACKSHELL ASSEMBLY

1 2 VERIFY THAT THE CONNECTOR IS OF THE CORRECT TYPE AND CONFIGURATION FOR THE CABLE BEING TERMINATED IN ACCORDANCE WITH THE SYSTEM CABLING DIAGRAM

1 3 VERIFY THAT THE BACKSHELL CONFIGURATION IS OF THE CORRECT TYPE AS SPECIFIED ON THE SYSTEM CABLING DIAGRAM

1 4 VERIFY THAT ALL COMPONENT PARTS OF THE CONNECTOR AND BACKSHELL HARDWARE ARE PRESENT (SEE FIGURE 1 FOR A TYPICAL CONNECTOR BACKSHELL CONFIGURATION) REFERENCE MIL SPECS MIL-C-81511 FOR CONNECTOR, MIL-C-85049 FOR BACKSHELL, OR VENDOR DATA FOR SPECIFIC CONFIGURATIONS

1 5 VISUALLY INSPECT THE COMPONENTS FOR DAMAGE SUCH AS DEFORMED PARTS, GOUGES, DAMAGED THREADS, CUT O-RINGS, BURRS, OR SURFACE DAMAGE

1 6 VERIFY THAT THE CONTACTS MEET THE REQUIREMENTS OF MIL-C-39029/47 FOR SERIES 1 AND 2 PIN, MIL-C-39029/33 FOR SERIES 1 SOCKET, OR MIL-C-39029/46 FOR SERIES 2 SOCKET CONTACTS AND ARE THE CORRECT SIZE AND TYPE FOR THE CONNECTOR BEING ASSEMBLED

1 7 IF THE CONDUCTORS ARE RETWISTED DURING LEAD PREPARATION, ENSURE THEY ARE TWISTED AS TIGHT AS ORIGINALLY CONSTRUCTED, THE NATURAL LAY OF THE CONDUCTOR IS MAINTAINED, AND THE CONDUCTORS WILL FIT INSIDE THE CONTACT BARREL

2 PREPARE THE CABLE IN ACCORDANCE WITH FIGURE 5A-1

3 INSERTION SETUP. OWING TO THE MANY POSSIBLE VARIATIONS OF ACCEPTABLE DESIGNS FOR AN ASSEMBLY FIXTURE, NO SPECIFICATION IS MADE AS TO A PARTICULAR TYPE. THE CRITERIA WHICH ARE DESIRABLE FOR AN ACCEPTABLE ASSEMBLY FIXTURE ARE AS FOLLOWS

A A DUMMY RECEPTACLE, WITHOUT CONNECTOR INSERT, TO HOLD THE CONNECTOR BEING WORKED ON SECURELY

B A CABLE CLAMPING FIXTURE TO HOLD THE CABLE IN A SECURE, FIXED RELATIONSHIP TO THE CONNECTOR WHILE PERMITTING ACCESS TO THE REAR FACE OF THE CONNECTOR FOR THE CONTACT INSERTION TOOL

C A DEVICE FOR HOLDING THE WIRE BUNDLE OUT OF THE WORK AREA

D CONTACT INSERTION GUIDES FOR SOCKET CONTACTS TO PREVENT THE COLLAPSE OF ADJACENT INSERT HOLES AS THE CONNECTOR IS GRADUALLY FILLED WITH CONTACTS. (THIS FACET BECOMES INCREASINGLY IMPORTANT AS THE CONTACT DENSITY INCREASES)

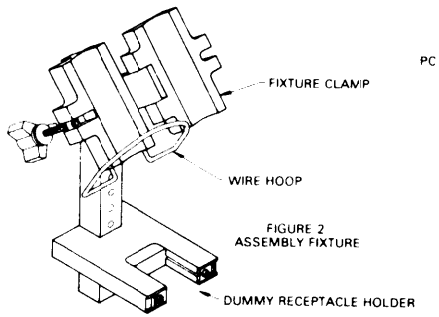



FIGURE 2
ASSEMBLY FIXTURE

SH 132317344

THE ASSEMBLY FIXTURE REFERRED TO IN THIS PROCEDURE IS THAT DEVELOPED BY SPERRY CORP AND IDENTIFIED BY NAVSEA DWG NO 53711-5499688 (FIGURE 2)

NOTE EQUIVALENT TOOLING FROM ALTERNATE SOURCES IS ACCEPTABLE, HOWEVER THE USE OF OTHER TOOLS MAY AFFECT THE PROCEDURAL STEPS OUTLINED BELOW

3 1 SECURE THE ASSEMBLY FIXTURE TO A VISE OR SIMILAR HOLDING DEVICE IN ORDER TO PROVIDE A STABLE WORK AREA

3 2 CHECK THE DUMMY RECEPTACLE (FIGURE 3) (DUMMY RECEPTACLE NAVSEA DWG NO 53711-5499689 USED IN THIS PROCEDURE)

3 2 1 O-RING IN PLACE AND LIGHTLY LUBRICATED WITH PETROLATUM (VV-P-236) OR EQUIVALENT (FIGURE 3 A)

3 2 2 RETAINER BARREL THREADS LIGHTLY LUBRICATED WITH PETROLATUM OR EQUIVALENT (FOR USE WITH SOCKET CONTACTS ONLY)

3 2 3 ALL GUIDE PINS PRESENT AND STRAIGHT (FOR USE WITH SOCKET CONTACTS ONLY)

3 2 4 GUIDE PINS PRESSED BACK INTO THE DUMMY RECEPTACLE SO THAT NO MORE THAN 1/8 INCH PROJECTS (FOR USE WITH SOCKET CONTACTS ONLY)

3 3 MATE THE CONNECTOR TO THE DUMMY RECEPTACLE RETAINER BARREL (IF REQUIRED) ASSEMBLY AND LOCK THE COUPLING RING (FIGURE 3 B)

3 4 TURN THE CONTACT RETENTION RING CLOCKWISE TO THE LOCKED POSITION (FIGURE 3 C)

3 5 PERFORM THIS STEP FOR SOCKET CONTACTS ONLY USING A WOODEN DOWEL, SLOWLY PRESS THE GUIDE PIN PLUNGER UP IN A SERIES OF SHORT STROKES. RELEASE THE UPWARD PRESSURE BETWEEN STROKES TO ALLOW THE GUIDE PINS TO REALIGN THEMSELVES AND RELIEVE STRESS WITHIN THE INSERT. CONTINUE UNTIL THE GUIDE PINS PROTRUDE ABOUT 1/8 INCH FROM THE REAR OF THE CONNECTOR (FIGURE 3 D)

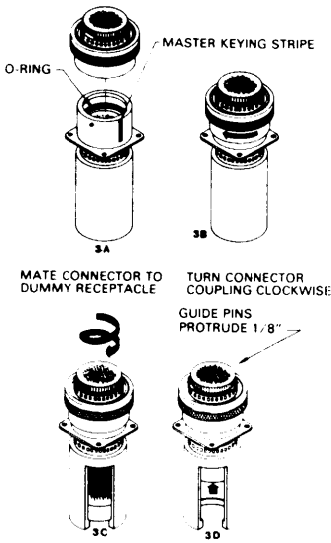
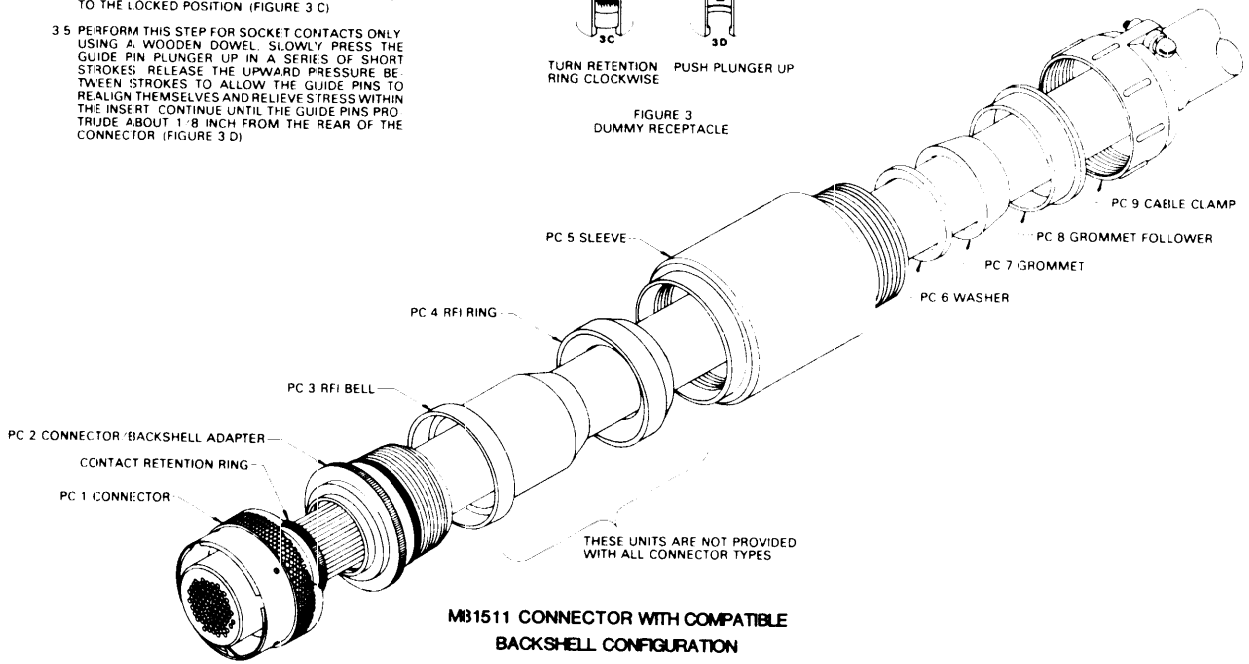



FIGURE 3
DUMMY RECEPTACLE

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5B1 OF DWG. 803-5001027.




MIL-C-81511 CONNECTOR WITH COMPATIBLE BACKSHELL CONFIGURATION

FIGURE 1

FIGURE 5B1. MIL-C-81511 series 1 and 2 gang contact release connector assembly procedure.

3.6 INSERT THE DUMMY RECEPTACLE/RETAINER BARREL (IF REQUIRED) ASSEMBLY WITH ATTACHED CONNECTOR INTO THE ASSEMBLY FIXTURE. SECURE THE CONNECTOR IN THE ASSEMBLY FIXTURE.

3.7 UNLOCK THE CONNECTOR CONTACT RETENTION RING BY TURNING CCW 2.1-2 TURNS (MINIMUM 2.1-/4 TURNS) TURN THE RETENTION RING CW A MAXIMUM OF 1.4 TURN TO PREVENT SEIZING.

3.8 PLACE THE PREPARED CABLE IN THE FIXTURE CLAMP SO THAT THE FIRST CONTACTS TO BE INSERTED WILL BE AT THE BACK OF THE CONNECTOR AS IT IS HELD IN THE DUMMY RECEPTACLE.

3.9 POSITION THE CABLE AT AN ANGLE SIMILAR TO THE BACKSHELL DESIGN (I.E. 45°, 90°, OR STRAIGHT). SECURE THE CABLE IN THE FIXTURE CLAMP (FIGURE 4A).

3.10 POSITION THE CONNECTOR SO THAT THE CONNECTOR TO CABLE JACKET DISTANCE IS THAT MEASURED IN STEP 9.2 OF FIGURE 5A1. ROTATE THE CONNECTOR TO ALIGN THE KEYWAY POSITION IN PROPER RELATIONSHIP TO THE BACKSHELL (FIGURE 4B).

3.11 ROUTE THE INDIVIDUAL CONDUCTORS PER THE APPLICABLE WIRING TABLE. ENSURE THAT THE LONGEST ROUTED CONDUCTOR HAS SUFFICIENT LENGTH AT THE REQUIRED POSITION TERMINATION PRIOR TO CUTTING ANY CONDUCTOR (FIGURE 4C).

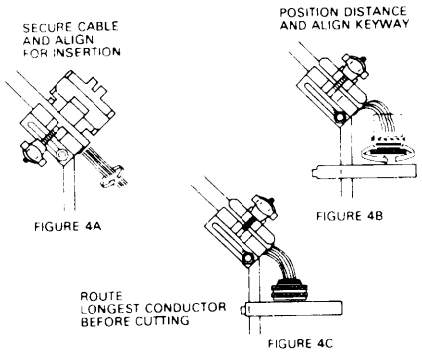



FIGURE 4A

FIGURE 4B

FIGURE 4C

FIGURE 4
DETERMINING CONDUCTOR LENGTH

3.12 CUT THE CONDUCTORS AS REQUIRED TO PROVIDE EVEN CONDUCTOR LENGTHS AT THE CONNECTOR INSERT.

NOTE: LEAVE THE SPARES FULL LENGTH.

4. STRIP THE INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH FIGURE 5A5 (FOR CONTACT WIRE BARREL DEPTHS SEE TABLE 1).

TABLE 1

| CONTACT SIZE | WIRE BARREL DEPTH (IN.) | | | | MIN SEPARATION FORCE (OZ) |
|---|---|---|---|---|---|
| | SERIES 1 | | SERIES 2 | | SERIES 1 & 2 |
| | PIN | SOCKET | PIN | SOCKET | SOCKET |
| 12-12 | .276 - .296 | .276 - .296 | .276 - .296 | .276 - .296 | 2.5 |
| 16-16 | .266 - .286 | .266 - .286 | .266 - .286 | .266 - .286 | 1.5 |
| 20-20 | .256 - .276 | .256 - .276 | .256 - .276 | .256 - .276 | 0.6 |
| 23-22 | .215 - .235 | .215 - .235 | .215 - .235 | .215 - .235 | 0.4 |
| 23-28 | .215 - .235 | .215 - .235 | .215 - .235 | .215 - .235 | 0.4 |

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5. PRIOR TO CRIMPING, A CONTACT SIZING TEST SHOULD BE ACCOMPLISHED FOR ALL SOCKET CONTACTS. (PIN CONTACTS PREVIOUSLY VERIFIED IN STEP 1.6 DO NOT NEED FURTHER TESTING.)

5.1 SOCKET CONTACTS SHOULD BE INSPECTED FOR PROPER SIZE USING A PIN CONTACT GAGE CONFORMING TO MS3197. WHEN TESTED, THE MINIMUM SEPARATION FORCE, MEASURED WITH A TENSION/COMPRESSION GAGE (CHATILLON DPP-16 OR EQUIVALENT) SHOULD BE AS SPECIFIED IN TABLE 1.

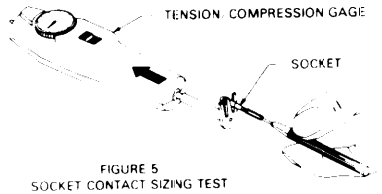



FIGURE 5
SOCKET CONTACT SIZING TEST

6. TERMINATE INDIVIDUAL CONDUCTORS WITH CRIMP CONTACTS IN ACCORDANCE WITH FIGURE 5A11 (SEE TABLE 2 FOR PROPER CRIMPING TOOL). IF CONTACT REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1.4 INCH THE JACKET MUST BE CUT BACK AGAIN AND ALL CONDUCTORS RETRIMMED TO PRECLUDE STRESS.

TABLE 2. CRIMP TOOLING INFORMATION

| CONTACT SIZE | SERIES 1 & 2 PIN & SERIES 2 SOCKET | | SERIES 1 SOCKET | |
|---|---|---|---|---|
| | CRIMPING TOOL | POSITIONER | CRIMPING TOOL | POSITIONER |
| 12-12 | M22520/1-01 | M22520/1-08 YELLOW | M22520/1-01 | M22520/1-08 YELLOW |
| 16-16 | M22520/7-01 M22520/1-01 | M22520/7-10 M22520/1-08 BLUE | M22520/1-01 | M22520/1-08 BLUE |
| 20-20 | M22520/7-01 M22520/1-01 | M22520/7-09 M22520/1-08 RED | M22520/1-01 | M22520/1-08 RED |
| 23-22 | M22520/2-01 | M22520/2-03 | M22520/2-01 | M22520/2-03 |
| 23-28 | M22520/2-01 | M22520/2-03 | M22520/2-01 | M22520/2-03 |

6.1 SECURE THE WIRE BUNDLE IN THE WIRE HOOP SO THAT THE WORK AREA AT THE CONNECTOR FACE IS CLEAR.

7. INSERTING CONTACTS

7.1 USING THE PROPER WIRING TABLE, PROPER INSERTING TOOL BASED ON CONTACT TYPE (SEE TABLE 3), AND WORKING FROM THE REAR TO THE FRONT OF THE INSERTION FIXTURE, INSERT THE CONTACTS INTO THEIR DESIGNATED LOCATIONS IN THE CONNECTOR AS FOLLOWS.

TABLE 3

| CONTACT SIZE | SERIES 1 & 2 SOCKET | | SERIES 1 & 2 PIN | |
|---|---|---|---|---|
| | INSTALLING TOOL | REMOVAL TOOL | INSTALLING TOOL | REMOVAL TOOL |
| 12-12 | M81969/2-03 | M81969/3-08 | M81969/2-04 | M81969/3-04 |
| 16-16 | M81969/2-03 | M81969/3-07 | M81969/2-03 | M81969/3-03 |
| 20-20 | M81969/2-02 | M81969/3-06 | M81969/2-02 | M81969/3-02 |
| 23-22 | M81969/3-01 | M81969/3-05 | M81969/2-01 | M81969/3-01 |
| 23-28 | M81969/2-01 | M81969/3-05 | M81969/2-01 | M81969/3-01 |

7.1.1 PUSH THE CONTACT STRAIGHT INTO ITS DESIGNATED LOCATION UNTIL THE CRIMPED PORTION OF THE CONTACT BARREL TOUCHES THE RUBBER INSERT.

7.1.1.1 FOR SOCKET CONTACTS, PLACE THE CONTACT ONTO THE PROTRUDING GUIDE PIN AND THEN INSERT INTO ITS DESIGNATED LOCATION.

7.1.2 POSITION THE INSERTION TOOL AROUND THE REAR OF THE CONTACT SHOULDER WITH A SLIGHT ANGLE TOWARD THE CONTACT AND USING FIRM, STEADY PRESSURE PUSH THE CONTACT STRAIGHT INTO THE CONNECTOR.

7.1.2.1 WHEN THE CONTACT IS PROPERLY SEATED, ITS SHOULDER WILL PROVIDE A POSITIVE STOP.

7.1.3 REMOVE THE INSERTION TOOL BY BACKING AWAY FROM THE CONTACT AND SLIDING STRAIGHT UP ALONG THE WIRE INSULATION UNTIL IT CLEARS THE RUBBER INSERT.

7.1.4 UPON INSERTION OF EACH TWO ROWS OF SOCKET CONTACTS, VISUALLY INSPECT THE BOTTOM OF THE DUMMY RECEPTACLE TO ENSURE THAT THE CONTACTS ARE PROPERLY INSERTED.

7.1.5 UPON INSERTION OF EACH TWO ROWS OF PIN CONTACTS, VISUALLY INSPECT THE CONNECTOR FACE TO ENSURE THAT THE CONTACTS ARE PROPERLY INSERTED AND DO NOT "CROSS-OVER" INTO ADJACENT HOLES. ANY IMPROPERLY INSERTED CONTACTS WILL APPEAR ANGLED WHEN COMPARED TO THE PROPERLY INSERTED CONTACTS.

7.1.6 ADJUST THE FIXTURE CLAMP AS REQUIRED DURING THE INSERTION PROCESS TO EASE STRESS ON THE CONDUCTORS.

7.1.7 ENSURE THAT THE SHIELD GROUND WIRE (IF TERMINATED TO A CONTACT) IS INSERTED IN ITS PROPER LOCATION.

7.2 INSERT UNWIRED CONTACTS, BACKED UP BY SEALING PLUGS IN ALL UNUSED CONNECTOR LOCATIONS (SEALING PLUGS CONFORMING TO MIL-C-81511/15).

7.3 CONDUCT A FINAL VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5B2 OF DWG. 803-5001027.

FIGURE 5B2. MIL-C-81511 series 1 and 2 gang contact release connector assembly procedure.

8 SEATING CHECKS (TO BE CONDUCTED AFTER INSERTION OF ALL CONTACTS)

8 1 RELEASE THE FIXTURE CLAMP AND, GRASPING THE CABLE JACKET, PUSH THE ENTIRE WIRE BUNDLE GENTLY TOWARD THE CONNECTOR WHILE CONTINUING TO EXERT PRESSURE. ROTATE THE CONTACT RETENTION RING TO ITS LOCKED POSITION

CAUTION DO NOT FORCE THE RETENTION RING. FAILURE OF THE RETENTION RING TO CLOSE INDICATES ONE OR MORE UNSEATED CONTACTS. USE OF EXCESSIVE FORCE WILL DAMAGE THE CONTACT RETENTION DISC.

THE RETENTION RING IS FULLY LOCKED WHEN NO COLOR SHOWS BELOW THE EDGE OF THE RING. THE RETENTION RING WILL NOT LOCK IF ONE OR MORE CONTACTS ARE NOT FULLY SEATED. FIGURE 6 ILLUSTRATES THE EFFECT OF AN UNSEATED CONTACT ON THE RETENTION DISC.

8 2 IDENTIFY UNSEATED CONTACTS BY A VISUAL INSPECTION OF THE CONNECTOR FACE OR BY EXAMINATION OF THE GUIDE PINS TO DETECT ANY THAT ARE NOT FULLY PUSHED OUT BY THE CORRESPONDING SOCKET CONTACT

8 3 IF REQUIRED REMOVE UNSEATED CONTACTS FROM THE CONNECTOR. REMOVE THE DUMMY RECEPTACLE AND UNLOCK THE RETENTION RING. INSERT THE EXTRACTION TOOL INTO THE CONNECTOR FACE AND PUSH THE UNSEATED CONTACTS BACK THROUGH THE INSERT UNTIL THE TOOL BOTTOMS OUT. NO FURTHER EXTRACTION IS NECESSARY

8 4 REINSERT ALL EXTRACTED CONTACTS AND REPEAT THE SEATING CHECKS

8 5 IF THE RETENTION RING CANNOT BE LOCKED AFTER THREE INSERTION ATTEMPTS, REPLACE THE OFFENDING CONTACTS. IF THE SAME CONTACT LOCATION CONTINUES TO GIVE DIFFICULTY, THE RETENTION DISC IS PROBABLY DAMAGED OR FAULTY AND THE ENTIRE CONNECTOR MUST BE REPLACED

8 6 REMOVE THE CONNECTOR FROM THE DUMMY RECEPTACLE UPON COMPLETION OF FINAL SEATING CHECKS

9 CONTACT PUSH TEST

9 1 USING THE COMBINATION TENSION/COMPRESSION GAGE (CHATILLON DPP 50 OR EQUIVALENT) PUSH TEST ALL CONTACTS TO EVALUATE CONTACT RETENTION (FIGURE 8)

9 1 1 ENSURE THE PROPER CONTACT RETENTION PROBE IS UTILIZED (FIGURE 9) SO THE RETENTION FINGERS WON'T BE DAMAGED

9 1 2 SEE TABLE 4 FOR PUSH TEST VALUES

9 1 3 THE FORCE SHALL BE APPLIED TO THE MATING END OF THE CONTACT IN A FIRM, SLOW MANNER. DO NOT INSTANTANEOUSLY APPLY THE FORCES LISTED IN TABLE 4

TABLE 4

| CONTACT SIZE | PUSH TEST VALUE (LBS) |
|---|---|
| 12·12 | 25 |
| 16·16 | 25 |
| 20·20 | 15 |
| 23·22 | 10 |
| 23·28 | 10 |

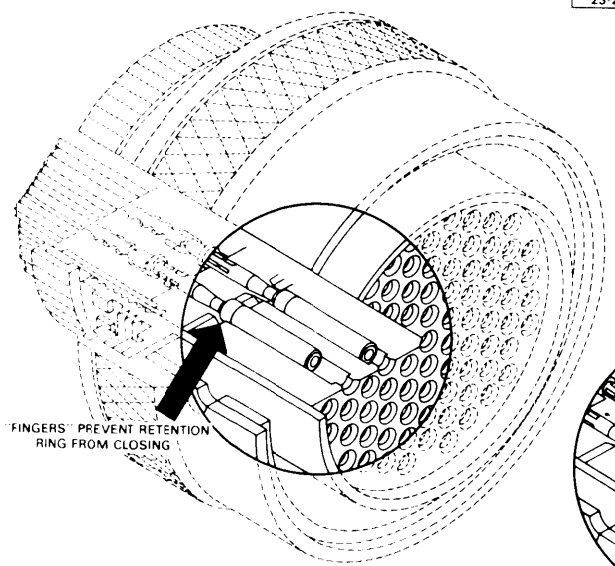



FIGURE 6
UNSEATED CONTACTS

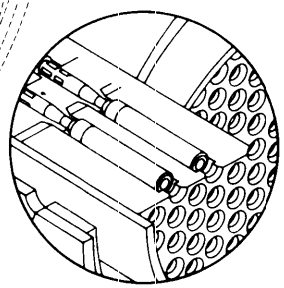
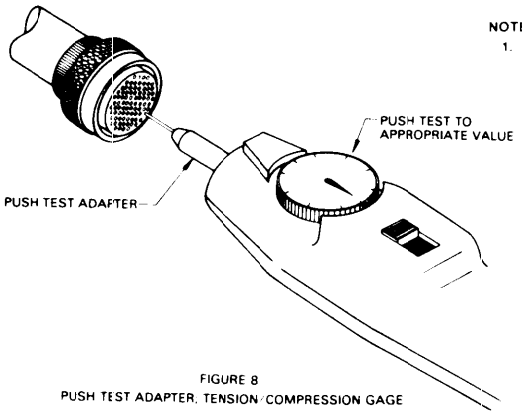


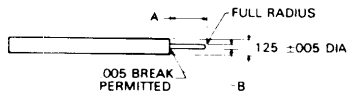
FIGURE 7
PROPERLY SEATED CONTACTS

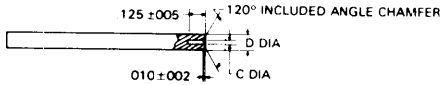



NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5B3 OF DWG. 803-5001027.

FIGURE 8
PUSH TEST ADAPTER, TENSION-COMPRESSION GAGE

SOCKET CONTACT RETENTION PROBE




PIN CONTACT RETENTION PROBE

| CONTACT SIZE | A ± 010 | B ± 001 | C ± 001 | D ± 005 |
|---|---|---|---|---|
| 23 | 300 | 026 | 029 | 125 |
| 20 | 410 | 039 | 043 | 125 |
| 16 | 410 | 061 | 065 | 125 |
| 12 | 410 | 093 | 097 | 156 |

FIGURE 9
CONTACT RETENTION PROBES

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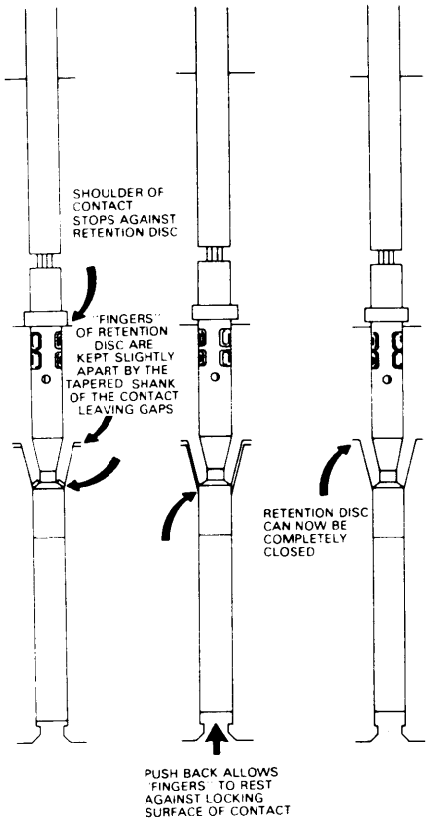
FIGURE 5B3. MIL-C-81511 series 1 and 2 gang contact release connector assembly procedure.

NOTE: DURING THE PERFORMANCE OF THIS TEST A SMALL AMOUNT OF CONTACT "PUSH BACK" OCCURS WHICH AFFECTS THE FINAL SEATING OF THE CONTACT RETENTION DISC. FIGURE 10 ILLUSTRATES THIS EFFECT AND THE NECESSITY FOR A FINAL TIGHTENING OF THE CONTACT RETENTION RING FOLLOWING THE PUSH TEST.

9.2 REPLACE THE CONNECTOR IN THE DUMMY RECEPTACLE AND RETIGHTEN THE RETENTION RING WHILE GENTLY PUSHING THE WIRE BUNDLE TOWARD THE CONNECTOR. IF ALL THE CONTACTS HAVE BEEN PROPERLY PUSH TESTED THE RETENTION RING WILL TURN AN ADDITIONAL 1/8 TO 1/4 TURN.




**CONTACT "PUSH BACK"**

**FIGURE 10**

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10. BACKSHELL ASSEMBLY

NOTE: THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 1. VARIATIONS MAY OCCUR AND CAUSE MINOR DEVIATIONS FROM THIS PROCEDURE. IF THIS SITUATION OCCURS THE MANUFACTURER'S ASSEMBLY INSTRUCTIONS SHOULD BE FOLLOWED.

10.1 FOLD SPARE WIRES BACK ONE-HALF THE DISTANCE BETWEEN THE CONNECTOR AND THE JACKET END.

10.2 SLIDE A 1 INCH LONG PIECE OF 1/4 INCH SHRINK TUBING OVER EACH FOLDED PAIR AND SHRINK IN PLACE.

10.3 LIGHTLY COAT THE THREADS OF EACH BACKSHELL PART WITH PETROLATUM (VV-P-236) JUST PRIOR TO USING.

10.4 POSITION AND LUBRICATE ALL O-RINGS.

10.5 REMOVE THE WIRE HOOP AND LOOSEN THE FIXTURE CLAMP FROM THE ASSEMBLY FIXTURE.

10.6 SLIDE THE BACKSHELL ADAPTER DOWN THE CABLE AND SCREW IT ONTO THE CONNECTOR (FIGURE 11). TIGHTEN THE ADAPTER TO THE TORQUE VALUE PROVIDED IN TABLE 5 FOR THE APPROPRIATE SHELL SIZE.

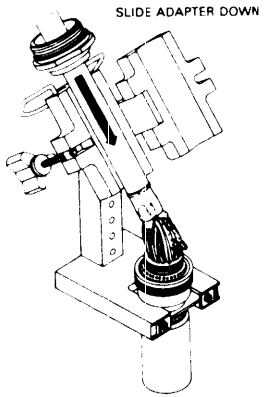


FIGURE 11

TABLE 5

| SHELL SIZE | CONNECTOR BACKSHELL & CABLE CLAMP TORQUE VALUE IN IN./LBS (± 5 IN./LBS) |
|---|---|
| 8 | 45 |
| 9 | 45 |
| 10 | 45 |
| 11 | 45 |
| 13 | 50 |
| 14 | 50 |
| 15 | 50 |
| 16 | 60 |
| 17 | 60 |
| 18 | 60 |
| 19 | 60 |
| 20 | 70 |
| 21 | 70 |
| 22 | 70 |
| 23 | 70 |
| 24 | 70 |
| 25 | 70 |

10.7 IF THE GROSS SHIELD IS TO BE FLOATED OR TERMINATED TO A CONNECTOR CONTACT, PROCEED TO STEP 10.8. IF THE SHIELD IS TO BE TERMINATED TO THE BACKSHELL RFI HARDWARE PROCEED AS FOLLOWS:

10.7.1 SLIDE THE RFI BELL (PC. 3) AGAINST THE BACKSHELL ADAPTOR.

10.7.2 FLARE THE GROSS SHIELD UNIFORMLY OVER THE TAPERED END OF THE RFI BELL. SHIELD SHALL NOT EXTEND BEYOND THE TAPERED END.

10.7.3 GENTLY FORCE THE CABLE TOWARD THE CONNECTOR PLUG UNTIL THE SHIELD COVERS THE TAPERED SURFACE ON THE RFI BELL.

10.7.4 SLIDE THE RFI RING (PC. 4) ONTO THE RFI BELL WHILE APPLYING FORWARD PRESSURE ON THE CABLE.

10.7.5 COMPRESS THE SHIELD BETWEEN THE RFI BELL AND RFI RING WITH A FORWARD MOTION ON THE RFI RING (SEE FIGURE 12).

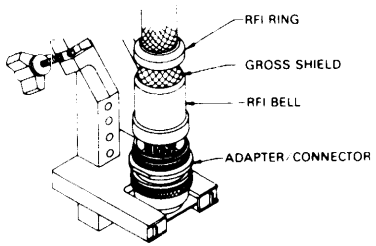


FIGURE 12
RFI COMPONENTS

10.8 IF THE GROSS SHIELD IS FLOATED OR TERMINATED TO A CONNECTOR CONTACT SLIDE THE RFI BACKSHELL COMPONENTS (PC. 3, 4) OVER THE PIGTAILS, LOOPED GROUND WIRE AND SPARE CONDUCTORS.

10.9 SLIDE THE BACKSHELL SLEEVE (PC. 5) OVER THE RFI ASSEMBLY AND SCREW THE SLEEVE ONTO THE ADAPTER.

10.10 TORQUE THE SLEEVE TO THE VALUE PROVIDED IN TABLE 5 FOR THE APPROPRIATE SHELL SIZE.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5B4 OF DWG. 803-5001027.







FIGURE 5B4. MIL-C-81511 series 1 and 2 gang contact release connector assembly procedure.

10.11 MARK A LINE ON THE CABLE 1/4-1/2 INCH ABOVE THE BACKSHELL SLEEVE (SEE FIGURE 13). CAREFULLY PUSH THE CABLE INTO THE BACKSHELL 1/4-1/2 INCH TO PROVIDE STRAIN RELIEF FOR THE CONDUCTORS AND MAINTAIN CONTINUOUS PRESSURE TO HOLD AT THIS POSITION FOR THE NEXT FOUR STEPS. (LINE MARKED ON JACKET IS PARALLEL WITH SLEEVE END)

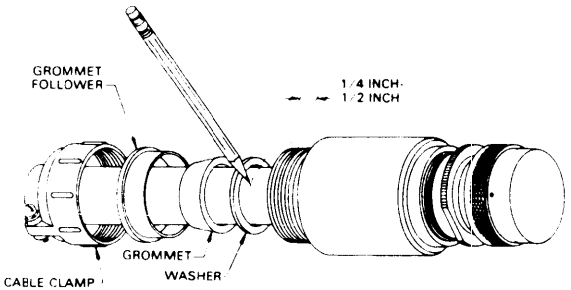


FIGURE 13
MARKING THE CABLE

10.12 SLIDE THE SEALING HARDWARE WASHER (PC 6), GROMMET (PC 7), AND GROMMET FOLLOWER (PC 8) INTO POSITION BEHIND THE SLEEVE.

10.13 VERIFY THE CABLE JACKET IS POSITIONED COMPLETELY THROUGH THE GROMMET.

10.14 SCREW THE CABLE CLAMP (PC 9) ONTO THE SLEEVE AND TORQUE TO THE VALUE SPECIFIED IN TABLE 5.

10.15 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 6 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT) (FIGURE 14)

NOTE: IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

10.16 REMOVE THE CONNECTOR FROM THE ASSEMBLY FIXTURE AND REMOVE THE DUMMY RECEPTACLE.

TABLE 6

CLAMP SCREWS

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.5 IN | .25 ±2 IN /OZ |
| 0.5 TO 1.0 IN | 40 ±2 IN /OZ |
| 1.0 TO 2.0 IN | 50 ±2 IN /OZ |

NOTE: THESE TORQUE VALUES MUST BE MAINTAINED SO THAT A MINIMUM GAP OF NOT LESS THAN 1/16 IN. EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES.

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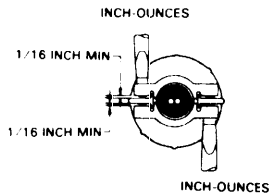


FIGURE 14

11. FINAL TEST AND DOCUMENTATION

11.1 USING ESTABLISHED SHIPYARD PROCEDURES PERFORM ELECTRICAL/ELECTRONIC CHECKS ON THE ASSEMBLED CONNECTOR.

11.2 INSTALL A PROTECTIVE DUST CAP ON THE CONNECTOR.

11.3 COMPLETE THE ASSEMBLY INSPECTION AND DOCUMENTATION AS REQUIRED BY LOCAL PROCEDURES.

12. IF NECESSARY, LOCKWIRE THE CONNECTOR IN ACCORDANCE WITH FIGURE 5A24.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5B5 OF DWG. 803-5001027.







FIGURE 5B5. MIL-C-81511 series 1 and 2 gang contact release connector assembly procedure.

| APPLICABLE CONNECTORS |
|---|
| MIL-C-81511/45 |
| MIL-C-81511/46 |
| MIL-C-81511/55 |
| MIL-C-81511/56 |

1. VISUAL INSPECTION AND VERIFICATION

1.1 DISASSEMBLE THE CONNECTOR/BACKSHELL ASSEMBLY.

1.2 VERIFY THAT THE CONNECTOR IS OF THE CORRECT TYPE AND CONFIGURATION FOR THE CABLE BEING TERMINATED IN ACCORDANCE WITH THE SYSTEM CABLING DIAGRAM.

1.3 VERIFY THAT THE BACKSHELL CONFIGURATION IS OF THE CORRECT TYPE AS SPECIFIED ON THE SYSTEM CABLING DIAGRAM.

1.4 VERIFY THAT ALL COMPONENT PARTS OF THE CONNECTOR AND BACKSHELL HARDWARE ARE PRESENT (SEE FIGURE 1 FOR A TYPICAL CONNECTOR/BACKSHELL CONFIGURATION). REFERENCE MIL SPECS MIL-C-81511 FOR CONNECTOR, MIL-C-85049 FOR BACKSHELL, OR VENDOR DATA FOR SPECIFIC CONFIGURATION.

1.5 VISUALLY INSPECT THE COMPONENTS FOR DAMAGE SUCH AS DEFORMED PARTS, GOUGES, DAMAGED THREADS, CUT O-RINGS, BURRS, OR SURFACE DAMAGE.

1.6 VERIFY THAT THE CONTACTS MEET THE REQUIREMENTS OF MIL-C-39029/18 FOR SERIES 3 AND 4 PIN, MIL-C-39029/17 FOR SERIES 3 SOCKET, MIL-C-39029/16 FOR SERIES 4 SOCKET, OR MIL C39029/15 FOR SERIES 3 AND 4 CLASS L SOCKET CONTACTS AND ARE THE CORRECT SIZE AND TYPE FOR THE CONNECTOR BEING ASSEMBLED.

1.7 IF THE CONDUCTORS ARE RETWISTED DURING LEAD PREPARATION, ENSURE THEY ARE TWISTED AS TIGHT AS ORIGINALLY CONSTRUCTED, THE NATURAL LAY OF THE CONDUCTOR IS MAINTAINED, AND THE CONDUCTORS WILL FIT INSIDE THE CONTACT BARREL.

2. PREPARE THE CABLE IN ACCORDANCE WITH FIGURE 5A1.

3. INSERTION SETUP. OWING TO THE MANY POSSIBLE VARIATIONS OF ACCEPTABLE DESIGNS FOR AN ASSEMBLY FIXTURE, NO SPECIFICATION IS MADE AS TO A PARTICULAR TYPE. THE CRITERIA WHICH ARE DESIRABLE FOR AN ACCEPTABLE ASSEMBLY FIXTURE ARE AS FOLLOWS:

A. A DUMMY RECEPTACLE, WITHOUT CONNECTOR INSERT, TO HOLD THE CONNECTOR BEING WORKED ON SECURELY.

B. A CABLE CLAMPING FIXTURE TO HOLD THE CABLE IN A SECURE, FIXED RELATIONSHIP TO THE CONNECTOR WHILE PERMITTING ACCESS TO THE REAR FACE OF THE CONNECTOR FOR THE CONTACT INSERTION TOOL.

C. A DEVICE FOR HOLDING THE WIRE BUNDLE OUT OF THE WORK AREA.

THE ASSEMBLY FIXTURE REFERRED TO IN THIS PROCEDURE IS THAT DEVELOPED BY SPERRY CORP. AND IDENTIFIED BY NAVSEA DWG. NO. 53711-5499688 (FIGURE 2).

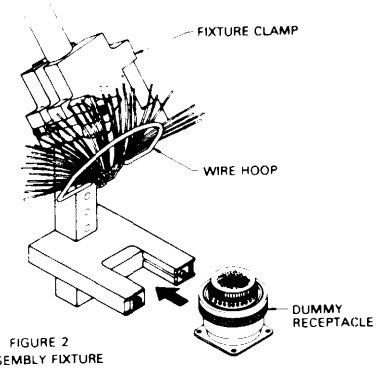


FIGURE 2
ASSEMBLY FIXTURE

NOTE: EQUIVALENT TOOLING FROM ALTERNATE SOURCES IS ACCEPTABLE. HOWEVER THE USE OF OTHER TOOLS MAY AFFECT THE PROCEDURAL STEPS OUTLINED BELOW.

3.1 SECURE THE ASSEMBLY FIXTURE TO A VISE OR SIMILAR HOLDING DEVICE IN ORDER TO PROVIDE A STABLE WORK AREA.

3.2 CHECK THE DUMMY RECEPTACLE (FIGURE 3) (DUMMY RECEPTACLE NAVSEA DWG. NO. 53711-5499689 USED IN THIS PROCEDURE WITHOUT RETAINER BARREL).

3.2.1 O-RING IN PLACE AND LIGHTLY LUBRICATED WITH PETROLATUM (VV-P-236) OR EQUIVALENT (FIGURE 3.A).

3.3 MATE THE CONNECTOR TO THE DUMMY RECEPTACLE AND LOCK THE COUPLING RING (FIGURE 3.B).

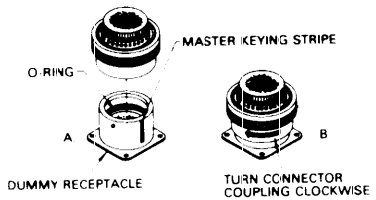


FIGURE 3
MATE CONNECTOR TO DUMMY RECEPTACLE

3.4 INSERT THE DUMMY RECEPTACLE WITH ATTACHED CONNECTOR INTO THE ASSEMBLY FIXTURE. SECURE THE CONNECTOR IN THE ASSEMBLY FIXTURE.

3.5 PLACE THE PREPARED CABLE IN THE FIXTURE CLAMP SO THAT THE FIRST CONTACTS TO BE INSERTED WILL BE AT THE BACK OF THE CONNECTOR AS IT IS HELD IN THE DUMMY RECEPTACLE.

3.6 POSITION THE CABLE AT AN ANGLE SIMILAR TO THE BACKSHELL DESIGN (I.E. 45°, 90°, OR STRAIGHT) SECURE THE CABLE IN THE FIXTURE CLAMP (FIGURE 4A).

3.7 POSITION THE CONNECTOR SO THAT THE CONNECTOR TO CABLE JACKET DISTANCE IS THAT MEASURED IN STEP 9.2 OF FIGURE 5A1. ROTATE THE CONNECTOR TO ALIGN THE KEYWAY POSITION IN PROPER RELATIONSHIP TO THE BACKSHELL (FIGURE 4B).

3.8 ROUTE THE INDIVIDUAL CONDUCTORS PER THE APPLICABLE WIRING TABLE. ENSURE THAT THE LONGEST ROUTED CONDUCTOR HAS SUFFICIENT LENGTH AT THE REQUIRED POSITION TERMINATION PRIOR TO CUTTING ANY CONDUCTOR. (FIGURE 4C).

3.9 CUT THE CONDUCTORS AS REQUIRED TO PROVIDE EVEN CONDUCTOR LENGTHS AT THE CONNECTOR INSERT.

NOTE: LEAVE THE SPARES FULL LENGTH.

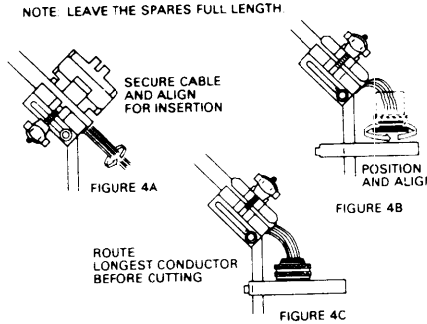


FIGURE 4
DETERMINING CONDUCTOR LENGTH

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5B6 OF DWG. 803-5001027.

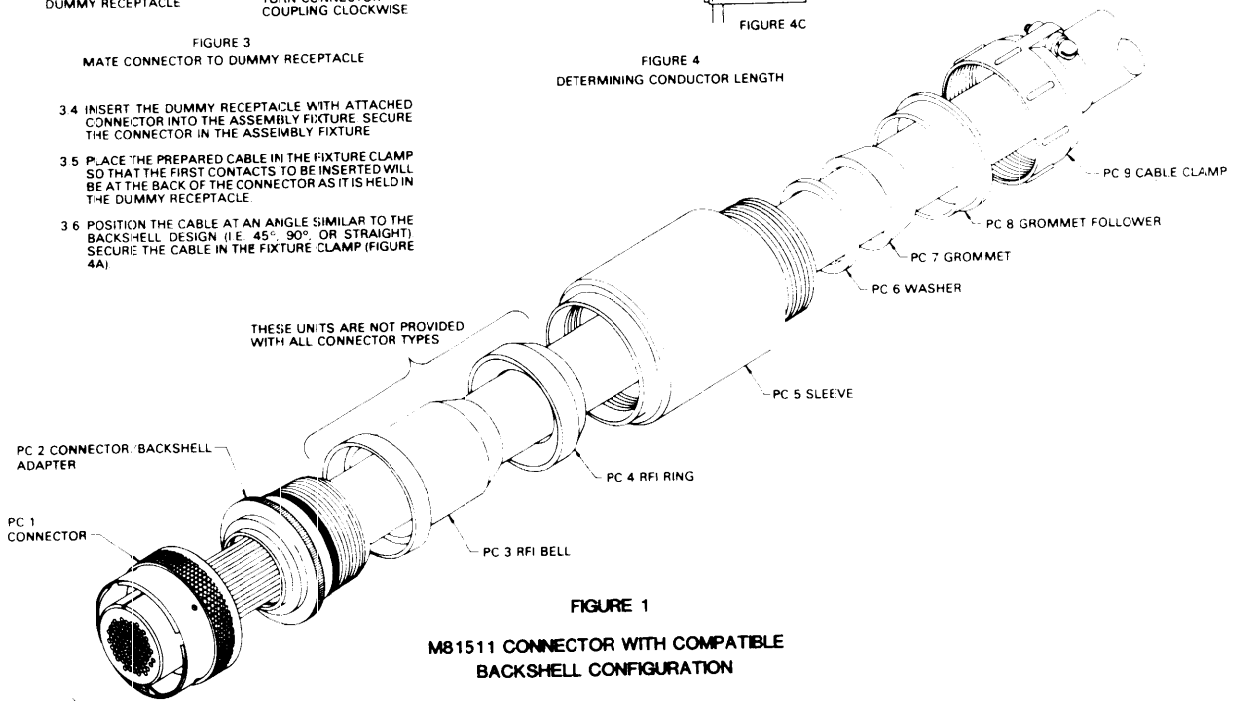


FIGURE 1
M81511 CONNECTOR WITH COMPATIBLE BACKSHELL CONFIGURATION

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FIGURE 5B6. MIL-C-81511 series 3 and 4 individual contact release connector assembly procedure.

4 STRIP THE INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH SHEET 5A5 (FOR CONTACT WIRE BARREL DEPTHS SEE TABLE 1).

TABLE 1

WIRE BARREL DEPTH (IN.)

| CONTACT SIZE | SERIES 3 | | SERIES 4 | |
|---|---|---|---|---|
| | PIN | SOCKET | PIN | SOCKET |
| 12-12<br>16-16<br>20-20<br>22-22<br>22-28 | .216 - .232<br>.185 - .195<br>.185 - .195<br>.145 - .155<br>.145 - .155 | .216 - .232<br>.185 - .195<br>.185 - .195<br>.145 - .155<br>.145 - .155 | .216 - .232<br>.185 - .195<br>.185 - .195<br>.145 - .155<br>.145 - .155 | .216 - .232<br>.185 - .195<br>.185 - .195<br>.145 - .155<br>.145 - .155 |

| CONTACT SIZE | MIN SEPARATION FORCE (OZ) SERIES 3 & 4 SOCKET |
|---|---|
| 12-12 | 2.5 |
| 16-16 | 1.5 |
| 20-20 | 0.6 |
| 22-22 | 0.4 |
| 23-28 | 0.4 |

NOTE: FOR CLASS L SOCKET CONTACTS THE BARREL DEPTH IS .160-.170 INCHES.

5 PRIOR TO CRIMPING, A CONTACT SIZING TEST SHOULD BE ACCOMPLISHED FOR ALL SOCKET CONTACTS (PIN CONTACTS PREVIOUSLY VERIFIED IN STEP 1.6 DO NOT NEED FURTHER TESTING).

5.1 SOCKET CONTACTS SHOULD BE INSPECTED FOR PROPER SIZE USING A PIN CONTACT GAGE CONFORMING TO MS3197. WHEN TESTED, THE MINIMUM SEPARATION FORCE, MEASURED WITH A TENSION COMPRESSION GAGE (CHATILLON DPP-16 OR EQUIVALENT) SHOULD BE AS SPECIFIED IN TABLE 1.

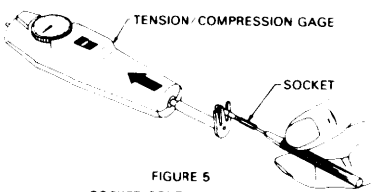



FIGURE 5

SOCKET CONTACT SIZING TEST

6 TERMINATE INDIVIDUAL CONDUCTORS WITH CRIMP CONTACTS IN ACCORDANCE WITH FIGURE 5A10, SEE TABLE 2 FOR PROPER CRIMPING TOOL). IF CONTACT REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1/4 INCH THE JACKET MUST BE CUT BACK AGAIN AND ALL CONDUCTORS RETRIMMED TO PRECLUDE STRESS.

TABLE 2 — CRIMP TOOLING INFORMATION

| CONTACT SIZE | SERIES 3 & 4 CLASS L SOCKET | |
|---|---|---|
| | CRIMPING TOOL | POSITIONER |
| 16-16 | M22520/2-01 | M22520/2-21 |
| 20-20 | M22520/2-01 | M22520/2-20 |
| 22-22 | M22520/2-01 | M22520/2-19 |
| 22-28 | M22520/2-01 | M22520/2-19 |

| CONTACT SIZE | SERIES 3 & 4 PIN & SERIES 4 SOCKET | | SERIES 3 SOCKET | |
|---|---|---|---|---|
| | CRIMPING TOOL | POSITIONER | CRIMPING TOOL | POSITIONER |
| 12-12 | M22520/1-01 | M22520/1-09 | M22520/1-01 | M22520/1-10 |
| 16-16 | M22520/7-01<br>M22520/2-01 | M22520/7-03<br>M22520/2-15 | M22520/2-01<br>M22520/7-01 | M22520/2-18<br>M22520/7-03 |
| 20-20 | M22520/7-01<br>M22520/2-01 | M22520/7-02<br>M22520/2-14 | M22520/2-01<br>M22520/7-01 | M22520/2-17<br>M22520/7-02 |
| 23-22 | M22520/2-01 | M22520/2-13 | M22520/2-01 | M22520/2-16 |
| 23-28 | M22520/2-01 | M22520/2-13 | M22520/2-01 | M22520/2-16 |

6.1 SECURE THE WIRE BUNDLE IN THE WIRE HOOP SO THAT THE WORK AREA AT THE CONNECTOR FACE IS CLEAR.

7 INSERTING CONTACTS

7.1 USING THE PROPER WIRING TABLE, PROPER INSERTING TOOL BASED ON CONTACT TYPE (SEE TABLE 3), AND WORKING FROM THE REAR TO THE FRONT OF THE INSERTION FIXTURE, INSERT THE CONTACTS INTO THEIR DESIGNATED LOCATIONS IN THE CONNECTOR AS FOLLOWS.

TABLE 3

| CONTACT SIZE | SERIES 3 & 4 PIN & SOCKET | | |
|---|---|---|---|
| | INSTALLING TOOL | REMOVAL TOOL | |
| | | WIRE CONTACT | UNWIRED CONTACT |
| 12-12 | M81969/16-03 | M81969/16-03 | M81969/30-04 |
| 16-16 | M81969/16-02 | M81969/16-02 | M81969/30-03 |
| 20-20 | M81969/16-01 | M81969/16-01 | M81969/30-02 |
| 22-22 | M81969/16-04 | M81969/16-04 | M81969/30-01 |
| 23-28 | M81969/16-04 | M81969/16-04 | M81969/30-01 |

| CONTACT SIZE | SERIES 3 & 4 CLASS L SOCKET CONTACT | | |
|---|---|---|---|
| | INSTALLING TOOL | REMOVAL TOOL | |
| | | WIRED CONTACT | UNWIRED CONTACT |
| 16-16 | M81969/16-02 BLUE | M81969/16-02 WHITE | M81969/30-03 BLUE |
| 20-20 | M81969/16-01 RED | M81969/16-01 WHITE | M81969/30-02 RED |
| 22-22 | M81969/16-04 GREEN | M81969/16-04 WHITE | M81969/30-01 YELLOW |
| 22-28 | M81969/16-04 GREEN | M81969/16-04 WHITE | M81969/30-01 YELLOW |

7.1.1 HOLD THE INSERTION TOOL BETWEEN THE THUMB AND FOREFINGER AND LAY THE WIRE AGAINST THE SLOT OF THE TOOL.

7.1.2 SNAP THE WIRE INTO THE SLOT.

7.1.3 SEAT THE RETENTION SHOULDER OF THE CONTACT AGAINST THE TIP OF THE TOOL.

7.1.4 SLOWLY PUSH THE WIRED CONTACT STRAIGHT INTO THE OPENING AT THE REAR OF THE INSERT.

7.1.5 APPLY STRAIGHT, STEADY FORWARD PRESSURE ON THE TOOL UNTIL THE CONTACT BOTTOMS.

7.1.6 REMOVE THE TOOL BY SLIDING IT STRAIGHT BACK ALONG THE WIRE.

7.1.7 UNSNAP THE TOOL FROM THE WIRE WHEN IT IS CLEAR OF THE INSERT.

7.1.7.1 LIGHTLY PULL ON INSERTED LEAD TO ENSURE CONTACT HAS LOCKED IN CONNECTOR.

7.1.8 ADJUST THE FIXTURE CLAMP AS REQUIRED DURING THE INSERTION PROCESS TO EASE STRESS ON THE CONDUCTORS.

7.1.9 ENSURE THAT THE SHIELD GROUND WIRE (IF TERMINATED TO A CONTACT) IS INSERTED IN ITS PROPER LOCATION.

7.1.10 UPON INSERTION OF EACH TWO ROWS OF CONTACTS, VISUALLY INSPECT THE CONNECTOR FACE TO ENSURE THAT THE CONTACTS ARE PROPERLY INSERTED AND DO NOT "CROSS OVER" INTO ADJACENT HOLES. ANY IMPROPERLY INSERTED CONTACTS WILL APPEAR ANGLED WHEN COMPARED TO THE PROPERLY INSERTED CONTACTS.

7.2 INSERT UNWIRED CONTACTS, BACKED UP BY SEALING PLUGS IN ALL UNUSED CONTACT LOCATIONS (SEALING PLUGS CONFORMING TO MS27488).

7.3 CONDUCT A VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.

8 CONTACT REMOVAL PROCEDURE (AS REQUIRED)

8.1 REMOVE THE CONNECTOR FROM THE DUMMY RECEPTACLE.

8.2 USING THE EXTRACTION TOOL, REMOVE ANY UNSEATED CONTACTS AS FOLLOWS.

8.2.1 LAY THE WIRE OF THE CONTACT TO BE REMOVED ALONG THE SLOT OF THE TOOL LEAVING 1/2 INCH FROM THE END OF THE TOOL TO THE REAR OF THE CONNECTOR.

8.2.2 SQUEEZE THE WIRE FIRMLY INTO THE TOOL BETWEEN THE THUMB AND FOREFINGER ABOUT 1/2 INCH FROM THE TIP.

8.2.3 SLIDE THE TOOL DOWN ALONG THE WIRE AND INTO THE REAR CAVITY AND SLOWLY AROUND THE CONTACT UNTIL A POSITIVE RESISTANCE IS FELT. CONTINUE UNTIL THE TOOL IS BOTTOMED, UNLOCKING THE CONNECTOR CONTACT RETENTION FINGERS.

8.2.4 PULL BOTH THE TOOL AND CONTACT WIRE ASSEMBLY OUT OF THE CONNECTOR SIMULTANEOUSLY.

NOTE: DO NOT ROTATE THE TOOL AS THIS MAY DAMAGE THE INSERT.

8.3 REINSERT ALL EXTRACTED CONTACTS.

9. CONTACT PUSH TEST

9.1 USING THE COMBINATION TENSION/COMPRESSION GAGE (CHATILLON DPP 50 OR EQUIVALENT) PUSH TEST ALL CONTACTS TO EVALUATE CONTACT RETENTION. (FIGURE 6)

9.1.1 ENSURE THE PROPER CONTACT RETENTION PROBE IS UTILIZED (FIGURE 7) SO THE RETENTION FINGERS WON'T BE DAMAGED.

9.1.2 SEE TABLE 4 FOR PUSH TEST VALUES.

9.1.3 THE FORCE SHALL BE APPLIED TO THE MATING END OF THE CONTACT IN A FIRM, SLOW MANNER. DO NOT INSTANTANEOUSLY APPLY THE FORCES LISTED IN TABLE 4.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5B7 OF DWG. 803-5001027.









FIGURE 5B7. MIL-C-81511 series 3 and 4 individual contact release connector assembly procedure.

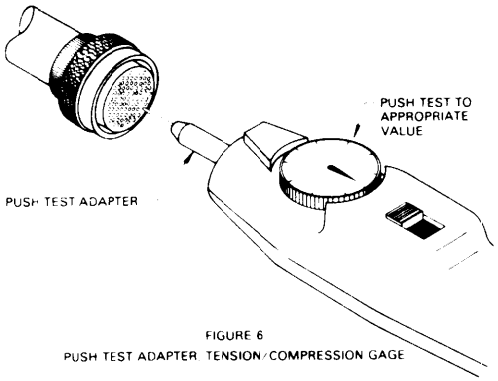
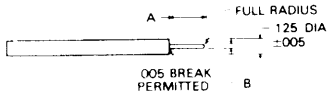



FIGURE 6
PUSH TEST ADAPTER TENSION/COMPRESSION GAGE

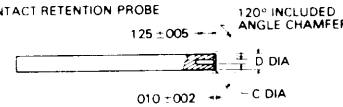
TABLE 4

| CONTACT SIZE | PUSH TEST (POUNDS) |
|---|---|
| 12 12 | 25 |
| 16-16 | 25 |
| 20-20 | 15 |
| 23-22 | 12 |
| 23 28 | 12 |

SOCKET CONTACT RETENTION PROBE




PIN CONTACT RETENTION PROBE




| CONTACT SIZE | A ± 010 | B ± 001 | C ± 001 | D · 005 |
|---|---|---|---|---|
| 23 | 300 | 026 | 029 | 125 |
| 20 | 410 | 039 | 043 | 125 |
| 16 | 410 | 061 | 065 | 125 |
| 12 | 410 | 093 | 097 | 156 |

FIGURE 7
CONTACT RETENTION PROBES

9.2 REPLACE THE CONNECTOR IN THE DUMMY RECEPTACLE

10. BACKSHELL ASSEMBLY

NOTE: THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 1. VARIATIONS MAY OCCUR AND CAUSE MINOR DEVIATIONS FROM THIS PROCEDURE. IF THIS SITUATION OCCURS THE MANUFACTURER'S ASSEMBLY INSTRUCTIONS SHOULD BE FOLLOWED.

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10.1 FOLD SPARE WIRES BACK ONE-HALF THE DISTANCE BETWEEN THE CONNECTOR AND THE JACKET END.

10.2 SLIDE A 1 INCH LONG PIECE OF 1/4 INCH SHRINK TUBING OVER EACH FOLDED PAIR AND SHRINK IN PLACE.

10.3 LIGHTLY COAT THE THREADS OF EACH BACKSHELL PART WITH PETROLATUM (VV-P-236) JUST PRIOR TO USING.

10.4 POSITION AND LUBRICATE ALL O-RINGS.

10.5 REMOVE THE WIRE HOOP AND LOOSEN THE FIXTURE CLAMP FROM THE ASSEMBLY FIXTURE.

10.6 SLIDE THE BACKSHELL ADAPTER DOWN THE CABLE AND SCREW IT ONTO THE CONNECTOR (FIGURE 8). TIGHTEN THE ADAPTER TO THE TORQUE VALUE PROVIDED IN TABLE 5 FOR THE APPROPRIATE SHELL SIZE.

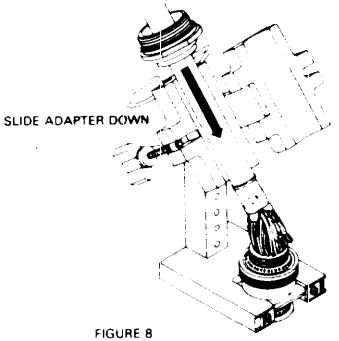


FIGURE 8

TABLE 5

| SHELL SIZE | CONNECTOR BACKSHELL & CABLE CLAMP TORQUE VALUE IN IN./LBS (±5 IN./LBS) |
|---|---|
| 8 | 45 |
| 9 | 45 |
| 10 | 45 |
| 11 | 45 |
| 13 | 50 |
| 14 | 50 |
| 15 | 50 |
| 16 | 60 |
| 17 | 60 |
| 18 | 60 |
| 19 | 60 |
| 20 | 70 |
| 21 | 70 |
| 22 | 70 |
| 23 | 70 |
| 24 | 70 |
| 25 | 70 |

10.7 IF THE GROSS SHIELD IS TO BE FLOATED OR TERMINATED TO A CONNECTOR CONTACT, PROCEED TO STEP 10.8. IF THE SHIELD IS TO BE TERMINATED TO THE BACKSHELL RFI HARDWARE, PROCEED AS FOLLOWS:

10.7.1 SLIDE THE RFI BELL (PC 3) AGAINST THE BACKSHELL ADAPTOR.

10.7.2 FLARE THE GROSS SHIELD OVER THE TAPERED END OF THE RFI BELL. SHIELD SHALL NOT EXTEND BEYOND THE TAPERED END.

10.7.3 GENTLY FORCE THE CABLE TOWARD THE CONNECTOR PLUG UNTIL THE SHIELD COVERS THE TAPERED SURFACE ON THE RFI BELL.

10.7.4 SLIDE THE RFI RING (PC 4) ONTO THE RFI BELL WHILE APPLYING FORWARD PRESSURE ON THE CABLE.

10.7.5 COMPRESS THE SHIELD BETWEEN THE RFI BELL AND RFI RING WITH A BACK AND FORTH TWISTING, FORWARD MOTION ON THE RFI RING. (SEE FIGURE 9).

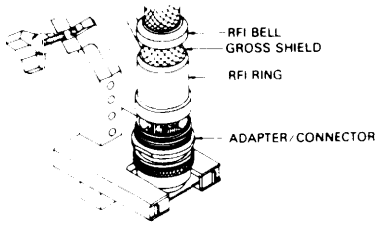


FIGURE 9
RFI COMPONENTS

10.8 IF THE GROSS SHIELD IS FLOATED OR TERMINATED TO A CONNECTOR CONTACT, SLIDE THE RFI BACKSHELL COMPONENTS (PC. 3, 4) OVER THE PIGTAILS, LOOPED GROUND WIRE AND SPARE CONDUCTORS.

10.9 SLIDE THE BACKSHELL SLEEVE (PC. 5) OVER THE RFI ASSEMBLY AND SCREW THE SLEEVE ONTO THE ADAPTER.

10.10 TORQUE THE SLEEVE TO THE VALUE PROVIDED IN TABLE 5 FOR THE APPROPRIATE SHELL SIZE.

10.11 MARK A LINE ON THE CABLE 1/4-1/2 INCH ABOVE THE BACKSHELL SLEEVE (SEE FIGURE 10). CAREFULLY PUSH THE CABLE INTO THE BACKSHELL 1/4-1/2 INCH TO PROVIDE STRAIN RELIEF FOR THE CONDUCTORS AND MAINTAIN CONTINUOUS PRESSURE TO HOLD AT THIS POSITION FOR THE NEXT FOUR STEPS. (LINE MARKED ON JACKET IS PARALLEL WITH SLEEVE END).

10.12 VERIFY THE CABLE JACKET IS POSITIONED COMPLETELY THROUGH THE GROMMET.

10.13 SLIDE THE SEALING HARDWARE WASHER, (PC. 6), GROMMET (PC. 7), AND GROMMET FOLLOWER (PC. 8) INTO POSITION BEHIND THE SLEEVE.

10.14 SCREW THE CABLE CLAMP (PC. 9) ONTO THE SLEEVE AND TORQUE TO THE VALUE SPECIFIED IN TABLE 5.

10.15 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 6 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT). (FIGURE 11).

NOTE: IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

10.16 REMOVE THE CONNECTOR FROM THE ASSEMBLY FIXTURE AND REMOVE THE DUMMY RECEPTACLE.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5B8 OF DWG. 803-5001027.



FIGURE 5B8. MIL-C-81511 series 3 and 4 individual contact release connector assembly procedure.

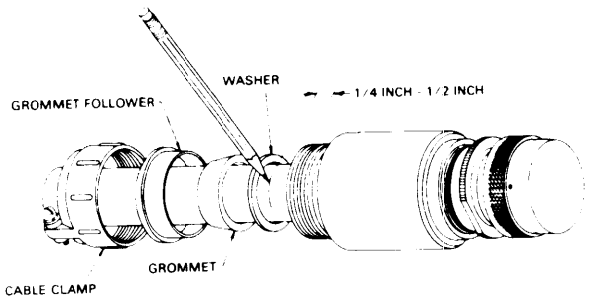


FIGURE 10
MARKING THE CABLE

TABLE 6
CLAMP SCREWS

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.5 IN | 25 ±IN /OZ |
| 0.5 TO 1.0 IN | 40 ±IN /OZ |
| 1.0 TO 2.0 IN | 50 ±IN /OZ |

NOTE THESE TORQUE VALUES MUST BE MAINTAINED SO THAT A MINIMUM GAP OF NOT LESS THAN 1/16 IN EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES

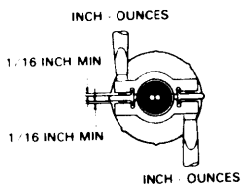


FIGURE 11

11 FINAL TEST AND DOCUMENTATION

11.1 USING ESTABLISHED SHIPYARD PROCEDURES PERFORM ELECTRICAL/ELECTRONIC CHECKS ON THE ASSEMBLED CONNECTOR

11.2 INSTALL A PROTECTIVE DUST CAP ON THE CONNECTOR

11.3 COMPLETE THE ASSEMBLY INSPECTION AND DOCUMENTATION AS REQUIRED BY LOCAL PROCEDURES

12 IF NECESSARY LOCKWIRE THE CONNECTOR IN ACCORDANCE WITH FIGURE 5A24.

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NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5B9 OF DWG 803-5001027.







FIGURE 5B9. MIL-C-81511 series 3 and 4 individual contact release connector assembly procedure.

1 VISUAL INSPECTION AND VERIFICATION

1 1 DISASSEMBLE THE CONNECTOR/BACKSHELL ASSEMBLY

1 2 VERIFY THAT THE CONNECTOR IS OF THE CORRECT TYPE AND CONFIGURATION FOR THE CABLE BEING TERMINATED IN ACCORDANCE WITH THE SYSTEM CABLING DIAGRAM

1 3 VERIFY THAT THE BACKSHELL CONFIGURATION IS OF THE CORRECT TYPE AS SPECIFIED ON THE SYSTEM CABLING DIAGRAM

1 4 VERIFY THAT ALL COMPONENT PARTS OF THE CONNECTOR AND BACKSHELL HARDWARE ARE PRESENT (SEE FIGURE 1 FOR TYPICAL CONNECTOR/BACKSHELL CONFIGURATIONS ) REFERENCE MIL SPECS MIL-C-5015 FOR CONNECTOR, MIL-C-85049 FOR BACKSHELL, OR VENDOR DATA FOR SPECIFIC CONFIGURATIONS

1 5 VISUALLY INSPECT THE COMPONENTS FOR DAMAGE SUCH AS DEFORMED PARTS, GOUGES, DAMAGED THREADS, CUT O-RINGS, BURRS, OR SURFACE DAMAGE

1 6 IF THE CONDUCTORS ARE RETWISTED DURING LEAD PREPARATION, ENSURE THEY ARE TWISTED AS TIGHT AS ORIGINALLY CONSTRUCTED, THE NATURAL LAY OF THE CONDUCTOR IS MAINTAINED, AND THE CONDUCTORS WILL FIT INSIDE THE CONTACT BARREL

2 PREPARE THE CABLE IN ACCORDANCE WITH FIGURE 5A1

2 1 THE GROMMET (PC 2) IS DESIGNED TO FIT AROUND INDIVIDUAL CONDUCTORS AND THEREFORE CANNOT BE PLACED ON THE CABLE UNTIL INDIVIDUAL CONDUCTORS HAVE BEEN EXPOSED IN THE CABLE

3 INSERTION SETUP OWING TO THE MANY POSSIBLE VARIATIONS OF ACCEPTABLE DESIGNS FOR AN ASSEMBLY FIXTURE, NO SPECIFICATION IS MADE AS TO A PARTICULAR TYPE. THE CRITERIA WHICH ARE DESIRABLE FOR AN ACCEPTABLE ASSEMBLY FIXTURE ARE AS FOLLOWS

A A DUMMY RECEPTACLE, WITHOUT CONNECTOR INSERT, TO HOLD THE CONNECTOR BEING WORKED ON SECURELY OR A CLAMPING DEVICE THAT WILL NOT DAMAGE THE CONNECTOR

B A CABLE CLAMPING FIXTURE TO HOLD THE CABLE IN A SECURE, FIXED RELATIONSHIP TO THE CONNECTOR WHILE PERMITTING ACCESS TO THE REAR FACE OF THE CONNECTOR FOR THE SOLDERING IRON

C A DEVICE FOR HOLDING THE WIRE BUNDLE OUT OF THE WORK AREA

THE ASSEMBLY FIXTURE REFERRED TO IN THIS PROCEDURE IS THAT DEVELOPED BY CHARLESTON NAVAL SHIPYARD. USE OF THIS FIXTURE CAN NEGATE THE NEED FOR A DUMMY RECEPTACLE, WHICH MAY AFFECT THE FOLLOWING STEPS.

NOTE: EQUIVALENT TOOLING FROM ALTERNATE SOURCES IS ACCEPTABLE. HOWEVER THE USE OF OTHER TOOLS MAY AFFECT THE PROCEDURAL STEPS OUTLINED BELOW.

ANGLE ADJUSTED TO BACKSHELL CONFIGURATION (I E STRAIGHT, 45°, OR 90°)

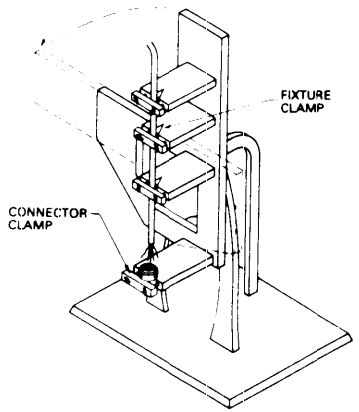



FIGURE 2
ASSEMBLY FIXTURE

3 1 SECURE THE ASSEMBLY FIXTURE TO A VISE OR SIMILAR HOLDING DEVICE IN ORDER TO PROVIDE A STABLE WORK AREA

3 2 ENSURE THE DUMMY RECEPTACLE (FIGURE 3) MEETS THE REQUIREMENTS OF MILITARY STANDARD MS3106 AND IS THE CORRECT SIZE FOR THE CONNECTOR BEING ASSEMBLED

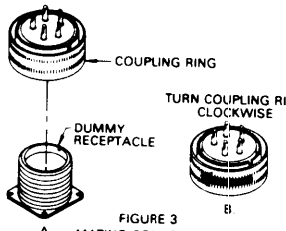



FIGURE 3
MATING CONNECTOR TO DUMMY RECEPTACLE

3 3 MATE THE CONNECTOR TO THE DUMMY RECEPTACLE AND TIGHTEN THE COUPLING RING (FIGURE 3 B)

4 PREPARE THE CONNECTOR AND CABLE FOR SOLDERING AS FOLLOWS

4 1 INSERT THE DUMMY RECEPTACLE WITH ATTACHED CONNECTOR INTO THE ASSEMBLY FIXTURE SECURE THE CONNECTOR IN THE ASSEMBLY FIXTURE

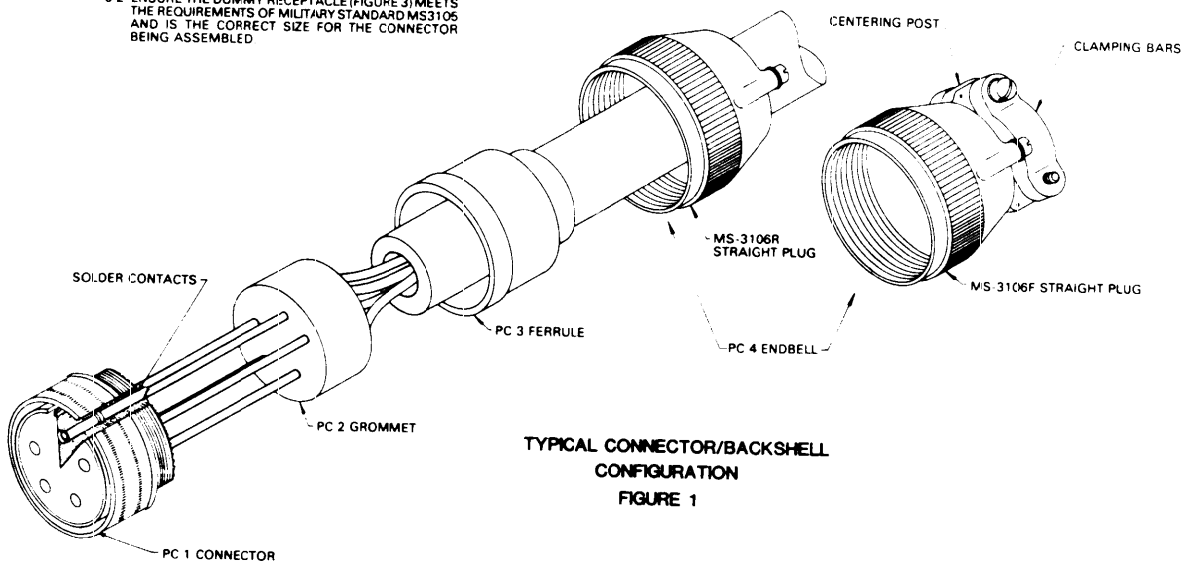
4 2 PLACE THE PREPARED CABLE IN THE FIXTURE CLAMP SO THAT THE FIRST CONTACTS TO BE SOLDERED WILL BE AT THE BACK OF THE CONNECTOR AS IT IS HELD IN THE DUMMY RECEPTACLE

4 3 POSITION THE CABLE AT AN ANGLE SIMILAR TO THE BACKSHELL DESIGN (I E 45°, 90°, OR STRAIGHT) SECURE THE CABLE IN THE FIXTURE CLAMP (FIGURE 4A)

4 4 POSITION THE CONNECTOR SO THAT THE CONNECTOR TO CABLE JACKET DISTANCE IS THAT MEASURED IN STEP 9 2 OF FIGURE 5A1 ROTATE THE CONNECTOR TO ALIGN THE KEYWAY POSITION IN PROPER RELATIONSHIP TO THE BACKSHELL (FIGURE 4B)

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5C1 OF DWG. 803-5001027.




TYPICAL CONNECTOR/BACKSHELL CONFIGURATION
FIGURE 1

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FIGURE 5C1. MIL-C-5015 solder connector assembly procedure.

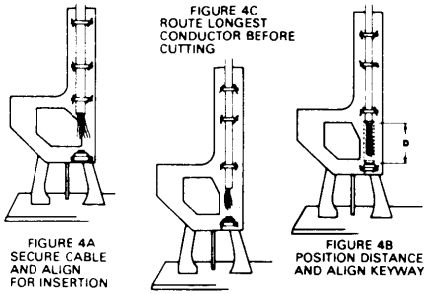


FIGURE 4
DETERMINING CONDUCTOR LENGTH

4.5 ROUTE THE INDIVIDUAL CONDUCTORS PER THE APPLICABLE WIRING TABLE. ENSURE THAT THE LONGEST ROUTED CONDUCTOR HAS SUFFICIENT LENGTH AT THE REQUIRED POSITION TERMINATION PRIOR TO CUTTING ANY CONDUCTOR (FIGURE 4C).

4.6 CUT THE CONDUCTORS AS REQUIRED TO PROVIDE EVEN CONDUCTOR LENGTHS AT THE CONNECTOR INSERT.

NOTE: LEAVE THE SPARES FULL LENGTH.

5. INSERT CONDUCTORS INTO PROPER HOLES OF GROMMET (PC 2). POSITION THE GROMMET NEXT TO THE CABLE JACKET.

TABLE 1

| CONTACT SIZE | WIRE BARREL DEPTH +0.063 -0.000 |
|---|---|
| 0 | 0.625 |
| 4 | 0.625 |
| 8 | 0.500 |
| 12 | 0.375 |
| 16 | 0.250 |

6. STRIP THE INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH SHEET 5A5 (FOR CONTACT WIRE BARREL DEPTHS SEE TABLE 1).

7. TIN THE CONDUCTORS IN ACCORDANCE WITH FIGURE 5A13.

7.1 ENSURE CONDUCTOR STRANDS ARE TWISTED TIGHT PRIOR TO TINNING.

7.2 IF REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1/4 INCH THE JACKET MUST BE CUT BACK AGAIN AND ALL LEADS RETRIMMED AND TINNED TO PRECLUDE STRESS.

8. SOLDER THE CONDUCTORS TO THE CONTACTS IN ACCORDANCE WITH FIGURE 5A15. SOLDERING SHOULD START WITH THE CONTACT ROW(S) FURTHEST AWAY FROM THE OPERATOR.

WARNING: DO NOT MOVE THE CONDUCTOR AFTER THE SOLDERING IRON HAS BEEN REMOVED OR A COLD SOLDER JOINT COULD RESULT.

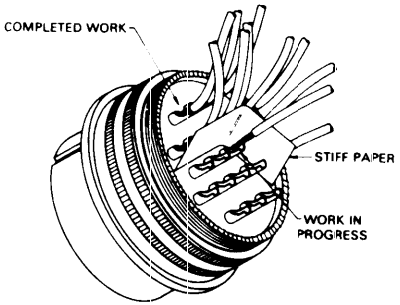


FIGURE 5
PROTECTING SOLDERED CONTACTS

9. A PIECE OF STIFF FIRE RETARDANT PAPER SHOULD BE INSERTED BETWEEN THE ROWS AS THEY ARE COMPLETED TO AID IN PROTECTING THE WORK ALREADY ACCOMPLISHED (SEE FIGURE 5 FOR EXAMPLE).

10. REMOVE THE CABLE AND CONNECTOR FROM THE ASSEMBLY FIXTURE AND DUMMY RECEPTACLE.

11. CONDUCT A FINAL VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.

12. BACKSHELL ASSEMBLY.

NOTE: THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 1. VARIATIONS MAY OCCUR AND CAUSE MINOR DEVIATIONS FROM THIS PROCEDURE. IF THIS SITUATION OCCURS THE MANUFACTURER'S ASSEMBLY INSTRUCTIONS SHOULD BE FOLLOWED.

12.1 SLIDE THE GROMMET (PC 2) OVER THE CONTACTS SO THAT IT IS FLUSH WITH THE CONNECTOR INSERT.

12.2 FILL ALL EMPTY GROMMET HOLES OF CLASS E, F, AND R CONNECTORS WITH SEALING PLUGS CORRESPONDING TO MS3187 OR MS27488.

12.3 FOLD SPARE WIRES BACK ONE-HALF THE DISTANCE BETWEEN THE CONNECTOR AND THE JACKET END.

12.4 SLIDE A 1 INCH LONG PIECE OF 1/4 INCH SHRINK TUBING OVER EACH FOLDED PAIR AND SHRINK IN PLACE.

12.5 LIGHTLY COAT THE THREADS OF THE ENDBELL (PC 4) WITH PETROLATUM (VV-P-236) JUST PRIOR TO ASSEMBLY.

12.6 PLACE THE FERRULE (PC 3) AND ENDBELL (PC 4) OVER THE GROMMET. TIGHTEN USING A STRAP WRENCH AND TORQUE WRENCH TO THE VALUE SPECIFIED IN TABLE 2.

NOTE: CONNECTORS MANUFACTURED BY THE BENDIX CORPORATION DO NOT REQUIRE THE BACKSHELL TO BE TORQUED. THE ENDBELL COMPRESSES THE WIRE SEALING GROMMET BY ENSURING A METAL-TO-METAL SEAT BETWEEN THE ENDBELL AND THE CONNECTOR BODY.

TABLE 2

| SHELL SIZE | CONNECTOR REAR THREAD AND CABLE CLAMP TORQUE IN IN./LBS. (± 5 IN./LBS.) |
|---|---|
| 8 | 45 |
| 8S | 45 |
| 10 | 45 |
| 10S | 45 |
| 10SL | 45 |
| 12 | 50 |
| 12S | 50 |
| 14 | 50 |
| 14S | 50 |
| 16 | 60 |
| 16S | 60 |
| 18 | 60 |
| 20 | 70 |
| 22 | 70 |
| 24 | 70 |
| 28 | 80 |
| 32 | 100 |
| 36 | 120 |
| 40 | 140 |
| 44 | 140 |
| 48 | 140 |

12.7 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 3 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT). (FIGURE 6).

NOTE: IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

TABLE 3
CLAMP SCREWS

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.5 IN. | 25 ± 2 IN./OZ |
| 0.5 TO 1.0 IN. | 40 ± 2 IN./OZ |
| 1.0 TO 2.0 IN. | 50 ± 2 IN./OZ |

NOTE: THESE TORQUE VALUES MUST BE MAINTAINED SO THAT A MINIMUM GAP OF NOT LESS THAN 1/16 IN. EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES.

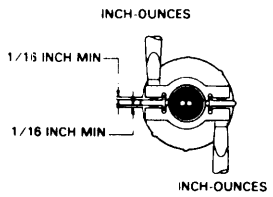


FIGURE 6

13. FINAL TEST AND DOCUMENTATION.

13.1 USING ESTABLISHED SHIPYARD PROCEDURES PERFORM ELECTRICAL/ELECTRONIC CHECKS ON THE ASSEMBLED CONNECTOR.

13.2 INSTALL A PROTECTIVE DUST CAP ON THE CONNECTOR.

13.3 COMPLETE THE ASSEMBLY INSPECTION AND DOCUMENTATION AS REQUIRED BY LOCAL PROCEDURES.

14. IF NECESSARY LOCKWIRE THE CONNECTOR IN ACCORDANCE WITH FIGURE 5A24.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5C2 OF DWG. 803-5001027.



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FIGURE 5C2. MIL-C-5015 solder connector assembly procedure.

NOTE: THIS PROCEDURE COVERS THE MS3400 SERIES (FRONT RELEASE CRIMP CONTACT), MS3450 SERIES CONNECTOR (REAR RELEASE CRIMP CONTACT), AND THE MIL-C-5015 (MODIFIED) CONNECTORS (BENDIX 10-214 SERIES FRONT RELEASE CONTACTS).

1. VISUAL INSPECTION AND VERIFICATION

1.1 DISASSEMBLE THE CONNECTOR/BACKSHELL ASSEMBLY.

1.2 VERIFY THAT THE CONNECTOR IS OF THE CORRECT TYPE AND CONFIGURATION FOR THE CABLE BEING TERMINATED IN ACCORDANCE WITH THE SYSTEM CABLING DIAGRAM.

1.3 VERIFY THAT THE BACKSHELL CONFIGURATION IS OF THE CORRECT TYPE AS SPECIFIED ON THE SYSTEM CABLING DIAGRAM.

1.4 VERIFY THAT ALL COMPONENTS PARTS OF THE CONNECTOR AND BACKSHELL HARDWARE ARE PRESENT (SEE FIGURE 1 FOR A TYPICAL CONNECTOR BACKSHELL CONFIGURATION). REFERENCE MIL-C-5015 FOR CONNECTOR, MIL-C-85049 FOR BACKSHELL OR VENDOR DATA FOR SPECIFIC CONFIGURATIONS.

1.5 VISUALLY INSPECT THE COMPONENTS FOR DAMAGE SUCH AS DEFORMED PARTS, GOUGES, DAMAGES THREADS, CUT O-RINGS, BURRS, OR SURFACE DAMAGE.

1.6 VERIFY THAT FRONT RELEASE CONTACTS MEET THE REQUIREMENTS OF MIL-C-39029/44 FOR PIN AND MIL-C-39029/45 FOR SOCKET CONTACTS.

1.7 VERIFY THAT REAR RELEASE CONTACTS MEET THE REQUIREMENTS OF MIL-C-39029/29 FOR PIN AND MIL-C-39029/30 FOR SOCKET CONTACTS.

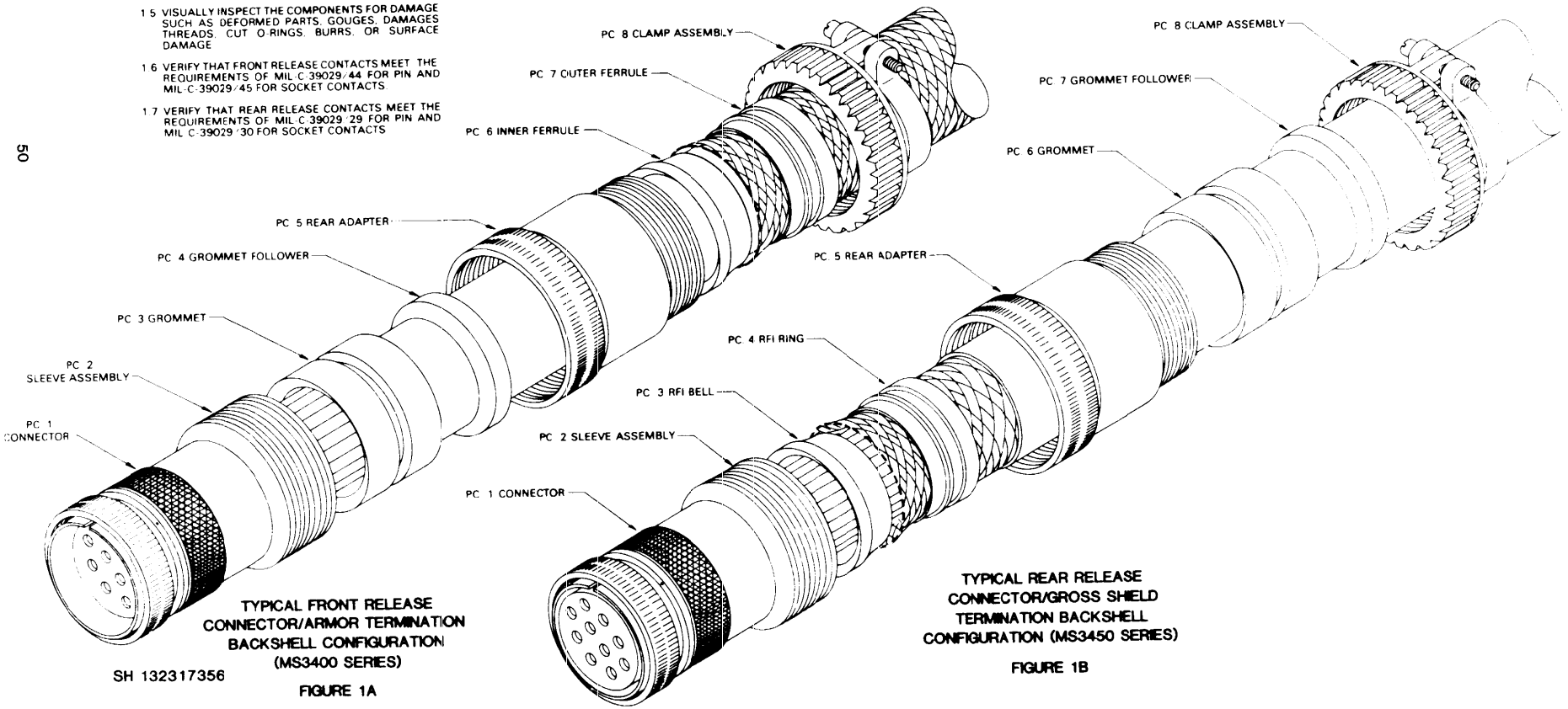
1.8 VERIFY THAT THE CONTACTS FOR MIL-C-5015 MODIFIED CONNECTORS ARE 10-113239 SERIES FOR SHELL SIZE 8S-40 AND 10-313672 (10-313673 SERIES FOR SOCKETS) SERIES FOR SHELL SIZE 44-48 OR ARE THE EQUIVALENT CURRENT BENDIX CORPORATION PART NUMBERS.

2. PREPARE THE CABLE IN ACCORDANCE WITH FIGURE 5A1.

NOTE: THE BACKSHELL CONFIGURATIONS DEPICTED IN FIGURES 1A, 1B, AND 1C ARE INTERCHANGEABLE BETWEEN CONNECTOR TYPES (SERIES).

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5C3 OF DWG. 803-5001027.




TYPICAL FRONT RELEASE CONNECTOR/ARMOR TERMINATION BACKSHELL CONFIGURATION (MS3400 SERIES)

SH 132317356

FIGURE 1A

TYPICAL REAR RELEASE CONNECTOR/GROSS SHIELD TERMINATION BACKSHELL CONFIGURATION (MS3450 SERIES)

FIGURE 1B

FIGURE 5C3. MIL-C-5015 (crimp) connector assembly procedure.

3 INSERTION SETUP. OWING TO THE MANY POSSIBLE VARIATIONS OF ACCEPTABLE DESIGNS FOR AN ASSEMBLY FIXTURE, NO SPECIFICATION IS MADE AS TO A PARTICULAR TYPE. THE CRITERIA WHICH ARE DESIRABLE FOR AN ACCEPTABLE ASSEMBLY FIXTURE ARE AS FOLLOWS:

A. A DUMMY RECEPTACLE, WITHOUT CONNECTOR INSERT, TO HOLD THE CONNECTOR BEING WORKED ON SECURELY, OR A CLAMPING DEVICE THAT WILL NOT DAMAGE THE CONNECTOR.

B. A CABLE CLAMPING FIXTURE TO HOLD THE CABLE IN A SECURE, FIXED RELATIONSHIP TO THE CONNECTOR WHILE PERMITTING ACCESS TO THE REAR FACE OF THE CONNECTOR FOR THE CONTACT INSERTION TOOL.

THE ASSEMBLY FIXTURE REFERRED TO IN THIS PROCEDURE IS THAT DEVELOPED BY CHARLESTON NAVAL SHIPYARD (FIGURE 2).

ANGLE ADJUSTED TO BACKSHELL CONFIGURATION (I.E. STRAIGHT, 45°, 90°)

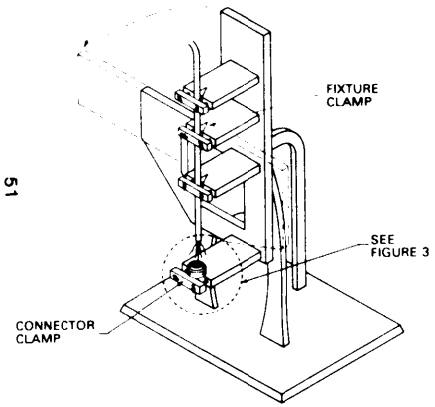



FIGURE 2
ASSEMBLY FIXTURE

C. A DEVICE FOR HOLDING THE WIRE BUNDLE OUT OF THE WORK AREA.

NOTE: EQUIVALENT TOOLING FROM ALTERNATE SOURCES IS ACCEPTABLE. HOWEVER, THE USE OF OTHER TOOLS MAY AFFECT THE PROCEDURAL STEPS OUTLINED BELOW.

3.1 SECURE THE ASSEMBLY FIXTURE TO A VISE OR SIMILAR HOLDING DEVICE IN ORDER TO PROVIDE A STABLE WORK AREA.

3.2 USE OF THIS ASSEMBLY FIXTURE NEGATES THE NEED FOR A DUMMY RECEPTACLE. FIGURE 3 ILLUSTRATES HOW THE CONNECTOR IS FIRMLY SEATED IN THE CONNECTOR CLAMP.

3.3 SEAT THE CONNECTOR IN THE CONNECTOR CLAMP AND ADJUST THE WING NUTS TO SECURE IT IN PLACE.

3.4 PLACE THE PREPARED CABLE IN THE FIXTURE CLAMP SO THAT THE FIRST CONTACTS TO BE INSERTED WILL BE AT THE BACK OF THE CONNECTOR AS IT IS HELD IN THE CONNECTOR CLAMP.

3.5 POSITION THE CABLE AT THE ANGLE SIMILAR TO THE BACKSHELL DESIGN (I.E. 45°, 90°, OR STRAIGHT). SECURE THE CABLE IN THE FIXTURE CLAMP (FIGURE 4A).

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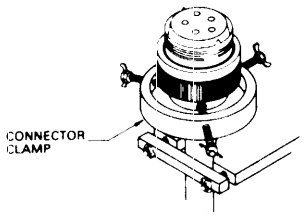



FIGURE 3
CONNECTOR SEATED IN ASSEMBLY FIXTURE

3.6 POSITION THE CONNECTOR SO THAT THE CONNECTOR CABLE JACKET DISTANCE IS THAT MEASURED IN STEP 9.2 OF FIGURE 5A1. ROTATE THE CONNECTOR TO ALIGN THE KEYWAY POSITION IN PROPER RELATIONSHIP TO THE BACKSHELL (FIGURE 4B).

3.7 ROUTE THE INDIVIDUAL CONDUCTORS PER THE APPLICABLE WIRING TABLE. ENSURE THAT THE LONGEST ROUTED CONDUCTOR HAS SUFFICIENT LENGTH AT THE REQUIRED POSITION TERMINATION PRIOR TO CUTTING ANY CONDUCTOR (FIGURE 4C).

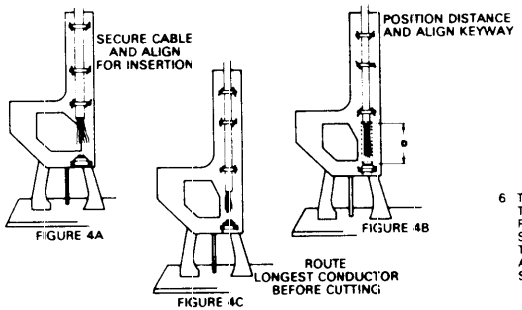



FIGURE 4
DETERMINING CONDUCTOR LENGTH

3.8 CUT THE CONDUCTORS AS REQUIRED TO PROVIDE EVEN CONDUCTOR LENGTHS AT THE CONNECTOR INSERT.

NOTE: LEAVE THE SPARES FULL LENGTH.

4. STRIP THE INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH FIGURE 5A5 (FOR CONTACT WIRE BARREL DEPTHS SEE TABLE 1).

TABLE 1*

| CONTACT BARREL SIZE | WIRE BARREL DEPTH (IN.) | | MINIMUM SEPARATION FORCE (OZ) |
|---|---|---|---|
| | FRONT RELEASE | REAR RELEASE | |
| 0 | 0.636-0.690 | 0.610-0.630 | 12 |
| 4 | 0.484-0.534 | 0.485-0.516 | 8 |
| 8 | 0.484-0.534 | 0.485-0.516 | 4 |
| 12 | 0.250-0.261 | 0.250-0.266 | 2.5 |
| 16 | 0.250-0.261 | 0.250-0.266 | 1.5 |
| 20 | 0.250-0.270 | N/A | 0.6 |

*SEE TABLE 4 FOR MIL-C-5015 MODIFIED CONNECTORS

5. PRIOR TO CRIMPING, A CONTACT SIZING TEST SHOULD BE ACCOMPLISHED FOR ALL SOCKET CONTACTS (PIN CONTACTS PREVIOUSLY VERIFIED IN STEPS 1.6, 1.7, AND 1.8 DO NOT NEED FURTHER TESTING.)

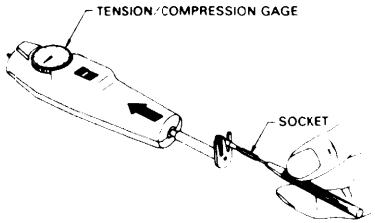



FIGURE 5
SOCKET CONTACT SIZING TEST

5.1 SOCKET CONTACTS SHOULD BE INSPECTED FOR PROPER SIZE USING A PIN CONTACT GAGE CONFORMING TO MS3197. WHEN TESTED, THE MINIMUM SEPARATION FORCE, MEASURED WITH A TENSION/COMPRESSION GAGE (CHATILLON DPP-16 OR EQUIVALENT) SHOULD BE AS SPECIFIED IN TABLE 1.

6. TERMINATE INDIVIDUAL CONDUCTORS WITH CRIMP CONTACTS IN ACCORDANCE WITH SHEET 5A11 (SEE TABLE 2 FOR PROPER CRIMPING TOOL). IF CONTACT REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1/4 INCH, THE JACKET MUST BE CUT BACK AGAIN AND ALL CONDUCTORS RETRIMMED TO PRECLUDE STRESS.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5C4 OF DWG. 803-5001027.

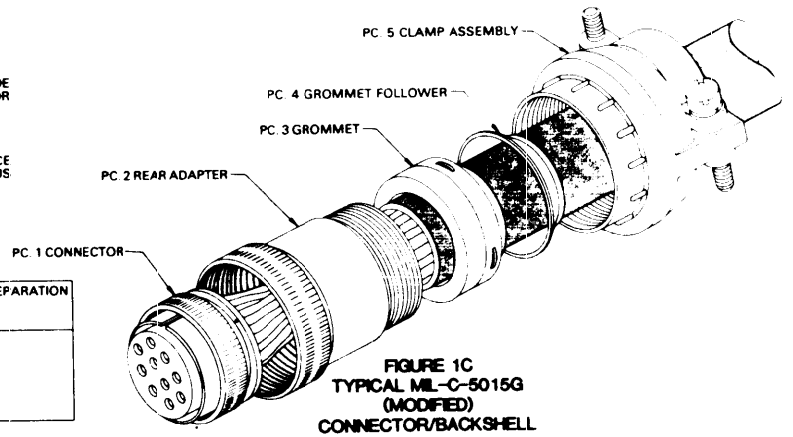



FIGURE 1C
TYPICAL MIL-C-5015G (MODIFIED) CONNECTOR/BACKSHELL CONFIGURATION

FIGURE 5C4. MIL-C-5015 (crimp) connector assembly procedure.

TABLE 2*

FRONT RELEASE

| CONTACT SIZE | BASIC CRIMPING TOOL | POSITIONER | DIE SET | LOCATOR |
|---|---|---|---|---|
| 0-0 | M22520/23-01 | — | M22520/23-05 | M22520/23-13 |
| 4-4 | M22520/23-01 | — | M22520/23-04 | M22520/23-11 |
| 8-8 | M22520/23-01 | — | M22520/23-02 | M22520/23-09 |
| 12-12 | M22520/1-01 | M22520/1-02 YELLOW | — | — |
| 12-16 | M22520/1-01 | M22520/1-02 YELLOW | — | — |
| 16-16 | M22520/1-01 | M22520/1-02 BLUE | — | — |
| 16-20 | M22520/1-01 | M22520/1-02 BLUE | — | — |

REAR RELEASE

| CONTACT SIZE | BASIC CRIMPING TOOL | POSITIONER | DIE SET | LOCATOR |
|---|---|---|---|---|
| 0-0 | M22520/23-01 | — | M22520/23-05 | M22520/23-13 |
| 4-4 | M22520/23-01 | — | M22520/23-04 | M22520/23-11 |
| 8-8 | M22520/23-01 | — | M22520/23-02 | M22520/23-09 |
| 12-12 | M22520/1-01 | M22520/1-02 YELLOW | — | — |
| 12-16 | — | — | — | — |
| 16-16 | M22520/7-01 M22520/1-01 | M22520/17-03 M22520/1-02 BLUE | — | — |
| 16-22 | — | — | — | — |

*SEE TABLE 4 FOR MIL-C-5015 MODIFIED CONNECTOR

7. INSERTING CONTACTS.

7.1 USING THE PROPER WIRING TABLE, PROPER INSERTING TOOL BASED ON CONTACT TYPE (SEE TABLE 3), AND WORKING FROM THE REAR TO THE FRONT OF THE ASSEMBLY FIXTURE, INSERT THE CONTACTS INTO THEIR DESIGNATED LOCATIONS IN THE CONNECTOR AS FOLLOWS.

TABLE 3*

| | FRONT RELEASE | | REAR RELEASE | |
|---|---|---|---|---|
| CONTACT SIZE | INSERTION TOOL | REMOVAL TOOL | INSERTION TOOL | REMOVAL TOOL |
| 0-0 | M81969/17-08 | M81969/19-05 | — | M81969/29-04 |
| 4-4 | M81969/17-07 | M81969/19-04 | — | M81969/29-03 |
| 8-8 | M81969/17-06 | M81969/19-03 | — | M81969/29-02 |
| 12-12 | M81969/17-02 | M81969/19-02 | M81969/14-04 | M81969/14-04 |
| 12-16 | M81969/17-01 | M81969/19-01 | — | — |
| 16-16 | M81969/17-01 | M81969/19-01 | M81969/14-03 | M81969/14-03 |
| 16-22 | M81969/17-01 | M81969/19-01 | — | — |

*SEE TABLE 4 FOR MIL-C-5015 MODIFIED CONNECTORS

NOTE: FOR MIL-C-5015 MODIFIED CONNECTORS WITH SOCKET CONTACTS, INSTALL SOCKET CONTACT PILOT PINS IN THE CONNECTOR. (TABLE 4) PROCEED TO STEP 7.1.4 FOR CONTACT INSERTION PROCEDURE.

7.1.1 INSERT A WIRED CONTACT INTO THE REAR OF THE INSERT.

7.1.2 SEAT THE CONTACT BY POSITIONING THE INSERTION TOOL AROUND THE REAR OF THE CONTACT SHOULDER WITH A SLIGHT ANGLE TOWARD THE CONTACT TO ASSURE A FIRM GRIP. (FIGURE 6)

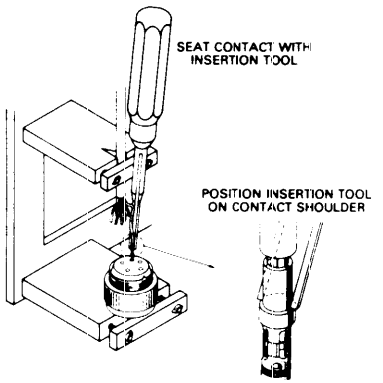



FIGURE 6
CONTACT INSERTION

7.1.2.1 PUSH THE CONTACT STRAIGHT INTO THE CONNECTOR WITH A FIRM, STEADY PRESSURE UNTIL THE CONTACT BOTTOMS.

7.1.2.2 THE CONTACT SHOULDER PROVIDES A POSITIVE STOP.

7.1.3 MOVE THE INSERTION TOOL BACK AWAY FROM THE CONTACT BEFORE SLIDING IT STRAIGHT UP ALONG THE WIRE INSULATION UNTIL IT CLEARS THE INSERT.

7.1.3.1 LIGHTLY PULL ON INSERTED CONDUCTOR TO ENSURE CONTACT HAS LOCKED IN CONNECTOR.

7.1.4 INSERT CONTACTS INTO THE MIL-C-5015 MODIFIED CONNECTOR AS FOLLOWS.

WARNING: CONTACTS (SIZE 16) ARE FRAGILE COMPARED TO THE CONTACT INSERTION FORCE. CARE MUST BE EXERCISED TO AVOID BENDING THE CONTACTS. BENT CONTACTS MUST BE REPLACED.

7.1.4.1 GRIP THE CONTACT WITH THE INSERTION TOOL LOCATED CLOSE TO THE CONTACT ENGAGING END. (FIGURE 7).

7.1.4.2 USING STRAIGHT FORWARD MOTION, PUSH THE WIRED CONTACT INTO THE APPROPRIATE CAVITY OF THE INSERT UNTIL THE TOOL TIP IS IN CONTACT WITH THE INSERT.

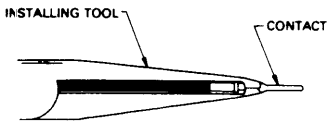



FIGURE 7
CONTACT INSERTION

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5C5 OF DWG. 803-5001027.

7.1.4.3 REPOSITION THE INSERTION TOOL BEHIND THE REAR SHOULDER OF THE CONTACT. (FIGURE 8).

7.1.4.4 PUSH THE CONTACT INTO THE INSERT UNTIL SEATED.

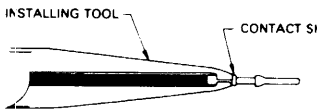



FIGURE 8
CONTACT INSERTION

7.1.4.5 REMOVE THE INSERTION TOOL BY MOVING IT BACK AWAY FROM THE CONTACT BEFORE SLIDING IT STRAIGHT UP ALONG THE WIRE INSULATION UNTIL IT CLEARS THE INSERT.

7.1.4.6 LIGHTLY PULL ON INSERTED LEAD TO ENSURE CONTACT HAS LOCKED IN CONNECTOR.

7.1.5 ADJUST THE FIXTURE CLAMP AS REQUIRED DURING THE INSERTION PROCESS TO EASE STRESS ON THE CONDUCTORS.

7.1.6 ENSURE THAT THE SHIELD GROUND WIRE (IF TERMINATED TO A CONTACT) IS INSERTED IN ITS PROPER LOCATION.

7.1.7 UPON INSERTION OF EACH TWO ROWS OF CONTACTS, VISUALLY INSPECT THE CONNECTOR FACE TO ENSURE THAT THE CONTACTS ARE PROPERLY INSERTED.

7.1.8 INSERT UNWIRED CONTACTS INTO ALL EMPTY HOLES IN THE CONNECTOR INSERT UTILIZING STEP 7.

7.1.9 INSERT SEALING PLUGS MEETING THE REQUIREMENTS OF MILITARY STANDARD MS3187 OR MS27488 INTO ALL UNWIRED CONTACT HOLES.

7.2 CONDUCT A VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.









FIGURE 5C5. MIL-C-5015 (crimp) connector assembly procedure.

TABLE 4 (BENDIX P/N's)

| CONTACT SIZE | CRIMPING TOOL | POSITIONER | INSERTION TOOL | EXTRACTION* TOOL TIP | | SOCKET CONTACT PILOT PIN | WIRE STRIP LENGTH (IN) |
|---|---|---|---|---|---|---|---|
| | | | | PIN | SOCKET | | |
| 16 | 11-7295 | 11-7771 | 11-7345 | 11-3697 | 11-3698 | 10-242758-16 | 5/16 |
| 12 | 11-7295 | 11-7771 | 11-7082 | 11-3676 | 11-3698 | 10-242758-12 | 5/16 |
| 8 | 11-7838-1 | 11-7740-5 (LOCATOR) | 11-8220 | 11-8252 | 11-8251 | 10-242758-8 | 9/16 |

*EXTRACTION TOOL TIPS ARE USED IN CONJUNCTION WITH THE 11-6911 HANDLE ASSEMBLY

8. CONTACT REMOVAL PROCEDURE (AS REQUIRED)

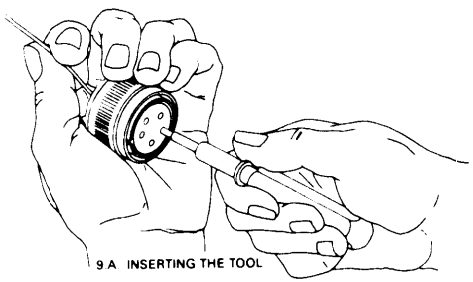
8.1 CONDUCT A VISUAL INSPECTION OF THE CONNECTOR FACE TO IDENTIFY ANY UNSEATED CONTACTS.

8.2 REMOVE THE CONNECTOR FROM THE CONNECTOR CLAMP AND USING THE EXTRACTION TOOL, REMOVE ANY UNSEATED CONTACTS AS FOLLOWS

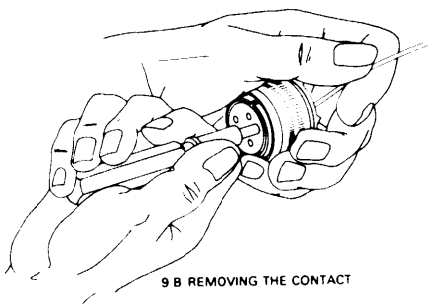
8.2.1 FRONT RELEASE (MS3400 SERIES)

8.2.1.1 SELECT THE CORRECT REMOVAL TOOL FROM TABLE 3.

8.2.1.2 ENCLOSE THE FRONT OF THE CONTACT WITH THE EXTRACTION TOOL (FIGURE 9.A).



9.A. INSERTING THE TOOL



9.B. REMOVING THE CONTACT

FIGURE 9
CONTACT REMOVAL (FRONT RELEASE)

8.2.1.3 PUSH WITH THE REAR OF THE TOOL AND FULLY BOTTOM THE TOOL TIP BY SLIGHTLY ROTATING THE REAR OF THE TOOL IN A CLOCKWISE DIRECTION.

8.2.1.4 WITH THE TOOL TIP BOTTOMED, PUSH THE THRUST SLEEVE FORWARD MOVING THE CONTACT BACK THROUGH THE SEALING BARRIERS. (FIGURE 9.B)

NOTE: FOR SIZE 8 WIRE AND LARGER, ASSIST THE TOOL BY PULLING BACK ON THE WIRE WHILE USING THE THRUST SLEEVE.

8.2.2 REAR RELEASE (MS3450 SERIES)

8.2.2.1 SELECT THE CORRECT REMOVAL TOOL FROM TABLE 3.

8.2.2.2 LAY THE WIRE OF THE CONTACT TO BE REMOVED ALONG THE SLOT OF THE TOOL LEAVING 1/2 INCH FROM THE END OF THE TOOL TO THE REAR OF THE CONNECTOR. (FIGURE 10.A)

8.2.2.3 SQUEEZE THE WIRE FIRMLY INTO THE TOOL BETWEEN THE THUMB AND FOREFINGER ABOUT 1/2 INCH FROM THE TIP. (FIGURE 10.A)

8.2.2.4 SLIDE THE TOOL DOWN ALONG THE WIRE AND INTO THE REAR CAVITY AND SLOWLY AROUND THE CONTACT UNTIL A POSITIVE RESISTANCE IS FELT. (FIGURE 10.B) CONTINUE UNTIL THE TOOL IS BOTTOMED, UNLOCKING CONNECTOR CONTACT RETENTION FINGERS.

NOTE: DO NOT ROTATE THE TOOL AS THIS MAY DAMAGE THE INSERT.

8.2.2.5 PULL BOTH THE TOOL AND CONTACT WIRE ASSEMBLY OUT OF THE CONNECTOR.

8.2.3 MIL-C-5015 MODIFIED (10-214 SERIES)

8.2.3.1 SELECT THE CORRECT REMOVAL TOOL FROM TABLE 4.

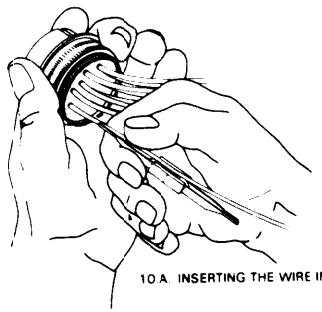
8.2.3.2 POSITION THE TOOL TIP IN (SOCKET) OR (PIN) OVER THE MATING (FRONT) END OF THE CONTACT TO BE REMOVED.

8.2.3.3 PUSH THE CONTACT THROUGH THE INSERT.

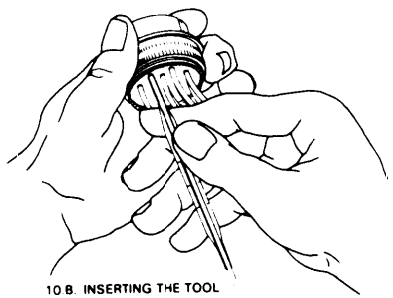
8.2.3.4 REMOVE THE REMOVAL TOOL AND INSPECT THE CONNECTOR INSERT FOR DAMAGE.

8.3 REINSERT ALL EXTRACTED CONTACTS.

FIGURE 10
CONTACT REMOVAL (REAR RELEASE)



10.A. INSERTING THE WIRE IN TOOL



10.B. INSERTING THE TOOL

8.4 IF A CONTACT FAILS TO RESEAT AFTER THREE INSERTION ATTEMPTS, REPLACE THE OFFENDING CONTACT. IF THE SAME CONTACT LOCATION CONTINUES TO GIVE DIFFICULTY, THE CONNECTOR IS PROBABLY DAMAGED OR FAULTY AND MUST BE REPLACED.

8.5 REMOVE THE CONNECTOR FROM THE CONNECTOR CLAMP IF NOT PREVIOUSLY ACCOMPLISHED.

9. CONTACT PUSH TEST.

9.1 USING THE COMBINATION TENSION/COMPRESSION GAGE (CHATILLON DPP 160 OR EQUIVALENT) PUSH TEST ALL CONTACTS TO EVALUATE CONTACT RETENTION (FIGURE 11).

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5C6 OF DRAWING NO. 803-5001027.









FIGURE 5C6. MIL-C-5015 (crimp) connector assembly procedure.

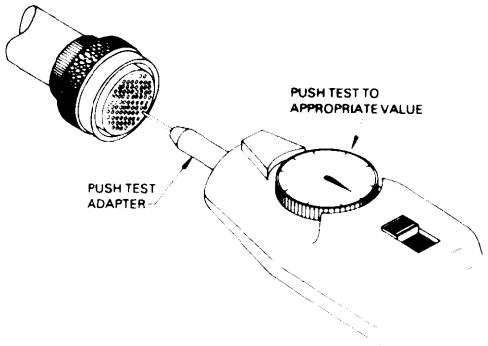



FIGURE 11
PUSH TEST ADAPTER, TENSION/COMPRESSION GAGE

9.1.1 SEE TABLE 5 FOR PUSH TEST VALUES.

9.1.2 THE FORCE SHALL BE APPLIED TO THE MATING END OF THE CONTACT IN A FIRM, SLOW MANNER. DO NOT INSTANTANEOUSLY APPLY THE FORCES LISTED IN TABLE 5.

9.1.3 ENSURE THE CORRECT PUSH TEST ADAPTER/PROBE IS UTILIZED FOR THE CONTACT SIZE BEING TESTED.

TABLE 5

| CONTACT SIZE | PUSH TEST VALUE (LBS) REMOVABLE CRIMP TYPE CONTACT* | CLASS D |
|---|---|---|
| 0-0 | 75 | 100 |
| 4-4 | 60 | 100 |
| 8-8 | 50 | 80 |
| 12-12 | 30 | 50 |
| 12-16 | 30 | 50 |
| 16-16 | 25 | 50 |
| 16-22 | 25 | 50 |

*EXCEPT CLASS D

10. BACKSHELL ASSEMBLY.

NOTE: THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 1. VARIATIONS MAY OCCUR AND CAUSE MINOR DEVIATIONS FROM THIS PROCEDURE. IF THIS SITUATION OCCURS THE MANUFACTURER'S ASSEMBLY INSTRUCTIONS SHOULD BE FOLLOWED.

10.1 FOLD SPARE WIRES BACK ONE-HALF THE DISTANCE BETWEEN THE CONNECTOR AND THE JACKET END.

10.2 SLIDE A 1 INCH LONG PIECE OF APPROPRIATELY SIZED SHRINK TUBING OVER EACH FOLDED PAIR AND SHRINK IN PLACE.

10.3 LIGHTLY COAT THE THREAD OF EACH BACKSHELL PART WITH PETROLATUM (VV-P-236) JUST PRIOR TO USING.

10.4 POSITION AND LUBRICATE ALL O-RINGS.

10.5 LOOSEN THE FIXTURE CLAMP ON THE ASSEMBLY FIXTURE.

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10.6 ARMOR TERMINATION BACKSHELL CONFIGURATION (FIGURE 1.A).

NOTE: IF THE CABLE IS UNARMORED, EXCHANGE THE GROMMET AND GROMMET FOLLOWER (PCS. 3 & 4 OF FIGURE 1.A) WITH THE INNER AND OUTER FERRULES (PCS. 6 & 7 OF FIGURE 1.A) IN THE ASSEMBLY SEQUENCE.

10.6.1 SLIDE THE SLEEVE ASSEMBLY (PC. 2) DOWN THE CABLE AND SCREW IT ON THE CONNECTOR PLUG (PC. 1). TIGHTEN THE SLEEVE ASSEMBLY TO THE TORQUE VALUE PROVIDED IN TABLE 6 FOR THE APPROPRIATE SHELL SIZE.

10.6.2 SLIDE THE GROMMET (PC. 3) AND GROMMET FOLLOWER (PC. 4) INTO THE SLEEVE ASSEMBLY.

10.6.2.1 THE CABLE JACKET MUST EXTEND BEYOND THE GROMMET SEAT IN THE SLEEVE TO ASSURE A PROPER CABLE-TO-GROMMET SEAL.

10.6.3 ENGAGE THE REAR ADAPTER (PC. 5) WITH THE SLEEVE ASSEMBLY AND TIGHTEN TO A TORQUE VALUE PROVIDED IN TABLE 6 FOR THE APPROPRIATE SHELL SIZE.

10.6.4 SLIDE THE INNER FERRULE (PC. 6) INTO THE REAR ADAPTER (PC. 5) AND SEAT ON THE INNER SHOULDER.

10.6.5 FLARE THE ARMOR OVER THE INNER SHOULDER.

10.6.6 GENTLY FORCE THE ARMOR TOWARD THE CONNECTOR, UNTIL THE ARMOR COVERS THE TAPERED SURFACE OF THE INNER FERRULE.

10.6.7 INSERT THE OUTER FERRULE (PC. 7) INTO THE REAR ADAPTER. COMPRESS THE ARMOR BETWEEN THE INNER AND OUTER FERRULES WITH A TWISTING MOTION.

10.6.8 SCREW THE CABLE CLAMP ASSEMBLY (PC. 8) ONTO THE REAR ADAPTER AND HAND TIGHTEN.

10.6.9 USING A STRAP WRENCH AND TORQUE WRENCH TIGHTEN THE CABLE CLAMP TO THE VALUE PROVIDED IN TABLE 6 FOR THE APPROPRIATE SHELL SIZE.

TABLE 6

| SHELL SIZE | CONNECTOR REAR THREAD AND CABLE CLAMP TORQUE IN IN./LBS (±5 IN./LBS) |
|---|---|
| 8 | 45 |
| 8S | 45 |
| 10 | 45 |
| 10S | 45 |
| 10SL | 45 |
| 12 | 50 |
| 12S | 50 |
| 14 | 50 |
| 14S | 50 |
| 16 | 60 |
| 16S | 60 |
| 18 | 60 |
| 20 | 70 |
| 22 | 70 |
| 24 | 70 |
| 28 | 80 |
| 32 | 100 |
| 36 | 120 |
| 40 | 140 |
| 44 | 140 |
| 48 | 140 |

10.6.10 PROCEED TO STEP 10.7.11.

10.7 GROSS SHIELD TERMINATION BACKSHELL CONFIGURATION (FIGURE 1.B).

10.7.1 SLIDE THE SLEEVE ASSEMBLY (PC. 2) DOWN THE CABLE AND SCREW IT ON THE CONNECTOR PLUG (PC. 1).

10.7.2 TORQUE THE SLEEVE ASSEMBLY TO THE VALUE PROVIDED IN TABLE 6 FOR THE APPROPRIATE SHELL SIZE.

10.7.3 IF THE GROSS SHIELD IS TO BE FLOATED OR TERMINATED TO A CONNECTOR CONTACT, PROCEED TO STEP 10.7.4. IF THE SHIELD IS TO BE TERMINATED TO THE BACKSHELL RFI HARDWARE PROCEED AS FOLLOWS.

10.7.3.1 SLIDE THE RFI BELL (PC. 3) AGAINST THE SLEEVE ASSEMBLY.

10.7.3.2 FLARE THE GROSS SHIELD OVER THE TAPERED END OF THE RFI BELL.

10.7.3.3 GENTLY FORCE THE CABLE TOWARD THE CONNECTOR PLUG UNTIL THE SHIELD COVERS THE TAPERED SURFACE ON THE RFI BELL.

10.7.3.4 SLIDE THE RFI RING (PC. 4) ONTO THE RFI BELL WHILE APPLYING FORWARD PRESSURE ON THE CABLE.

10.7.3.5 COMPRESS THE SHIELD BETWEEN THE RFI BELL AND RFI RING WITH A BACK AND FORTH TWISTING FORWARD MOTION ON THE RFI RING.

10.7.4 SLIDE THE RFI BACKSHELL COMPONENTS (PC. 3, 4) OVER THE PIGTAILS, LOOPED GROUND WIRE AND SPARE CONDUCTORS.

10.7.5 SLIDE THE REAR ADAPTER (PC. 5) OVER THE RFI ASSEMBLY AND SCREW IT ONTO THE SLEEVE ASSEMBLY.

10.7.6 TORQUE THE REAR ADAPTER TO THE VALUE PROVIDED IN TABLE 6 FOR THE APPROPRIATE SHELL SIZE.

10.7.7 MARK A LINE ON THE CABLE 1/4-1/2 INCH ABOVE THE BACKSHELL REAR ADAPTER (SEE FIGURE 12). CAREFULLY PUSH THE CABLE INTO THE BACKSHELL 1/4-1/2 INCH AND MAINTAIN CONTINUOUS PRESSURE TO HOLD AT THIS POSITION FOR THE NEXT FOUR STEPS. (LINE MARKED ON JACKET IS PARALLEL WITH END OF REAR ADAPTER)

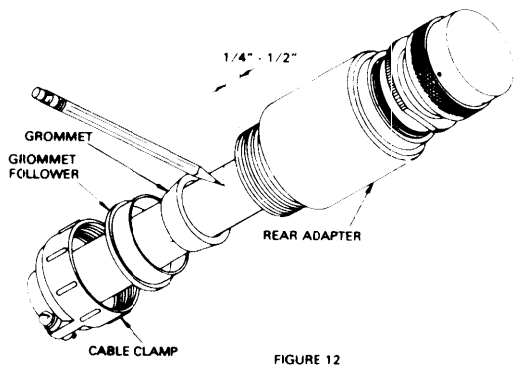


FIGURE 12
MARKING THE CABLE

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5C7 OF DRAWING NO. 803-5001027.





FIGURE 5C7. MIL-C-5015 (crimp) connector assembly procedure.

10.7.8 VERIFY THE CABLE JACKET IS POSITIONED COMPLETELY THROUGH THE GROMMET.

10.7.9 SLIDE THE GROMMET (PC. 6) AND GROMMET FOLLOWER (PC. 7) INTO POSITION BEHIND THE REAR ADAPTER.

10.7.10 SCREW THE CABLE CLAMP (PC. 8) ONTO THE REAR ADAPTER AND TORQUE TO THE VALUE SPECIFIED IN TABLE 6.

10.7.11 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 7 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT). (FIGURE 13).

NOTE: IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

10.7.12 REMOVE THE CONNNECTOR FROM THE ASSEMBLY FIXTURE.

TABLE 7

CLAMP SCREWS

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.5 IN. | 25 ± 2 IN./OZ |
| 0.5 TO 1.0 IN. | 40 ± 2 IN./OZ |
| 1.0 TO 2.0 IN. | 50 ± 2 IN./OZ |

NOTE: THESE TORQUE VALUES MUST BE MAINTAINED SO THAT A MINIMUM GAP OF NOT LESS THAN 1/16 IN. EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES.

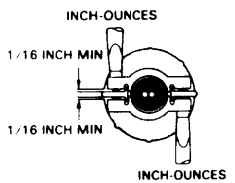


FIGURE 13

10.7.13 PROCEED TO STEP 11.

10.8 MIL-C-5015 MODIFIED CONNECTOR (10-214 SERIES) (FIGURE 1.C)

10.8.1 SLIDE THE REAR ADAPTER (PC. 2) DOWN THE CABLE AND SCREW IT ON THE CONNECTOR PLUG (PC. 1).

10.8.2 TORQUE THE REAR ADAPTER TO THE VALUE PROVIDED IN TABLE 6 FOR THE APPROPRIATE SHELL SIZE.

10.8.3 MARK A LINE ON THE CABLE 1/4-1/2 INCH ABOVE THE REAR ADAPTER. (FIGURE 12) CAREFULLY PUSH THE CABLE INTO THE REAR ADAPTER 1/4-1/2 INCH AND MAINTAIN CONTINUOUS PRESSURE TO HOLD AT THIS POSITION FOR THE NEXT FOUR STEPS. (LINE MARKED ON JACKET IS PARALLEL WITH END OF REAR ADAPTER)

10.8.4 VERIFY THE CABLE JACKET IS POSITIONED COMPLETELY THROUGH THE GROMMET.

10.8.5 SLIDE THE GROMMET (PC. 3) AND GROMMET FOLLOWER (PC. 4) INTO POSITION BEHIND THE REAR ADAPTER.

10.8.6 SCREW THE CABLE CLAMP (PC. 5) ONTO THE REAR ADAPTER AND TORQUE TO THE VALUE SPECIFIED IN TABLE 6.

10.8.7 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 7 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT). (FIGURE 13). ENSURE A MINIMUM GAP OF 1/16 INCH EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES.

NOTE: IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

10.8.8 REMOVE THE CONNECTOR FROM THE ASSEMBLY FIXTURE.

11. FINAL TEST AND DOCUMENTATION.

11.1 USING ESTABLISHED SHIPYARD PROCEDURES PERFORM ELECTRICAL/ELECTRONIC CHECKS ON THE ASSEMBLED CONNECTOR.

11.2 INSTALL A PROTECTIVE DUST CAP ON THE CONNECTOR.

11.3 COMPLETE THE ASSEMBLY INSPECTION AND DOCUMENTATION AS REQUIRED BY LOCAL PROCEDURES.

12. IF NECESSARY LOCKWIRE THE CONNECTOR IN ACCORDANCE WITH FIGURE 5A24.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5C8 OF DWG. 803-5001027.









FIGURE 5C8. MIL-C-5015 (crimp) connector assembly procedure.

NOTE: THIS PROCEDURE COVERS SERIES 1 CONNECTORS WHICH HAVE SOLDER OR FRONT RELEASE CRIMP CONTACTS AND SERIES 2 CONNECTORS WHICH HAVE REAR RELEASE CRIMP CONTACTS.

1. VISUAL INSPECTION AND VERIFICATION

1.1 DISASSEMBLE THE CONNECTOR/BACKSHELL ASSEMBLY.

1.2 VERIFY THAT THE CONNECTOR IS OF THE CORRECT TYPE AND CONFIGURATION FOR THE CABLE BEING TERMINATED IN ACCORDANCE WITH THE SYSTEM CABLING DIAGRAM.

1.3 VERIFY THAT THE BACKSHELL CONFIGURATION IS OF THE CORRECT TYPE AS SPECIFIED ON THE SYSTEM CABLING DIAGRAM.

1.4 VERIFY THAT ALL COMPONENTS PARTS OF THE CONNECTOR AND BACKSHELL HARDWARE ARE PRESENT (SEE FIGURE 1 FOR A TYPICAL CONNECTOR/BACKSHELL CONFIGURATION). REFERENCE MIL SPEC MIL-C-26482 FOR CONNECTOR AND BACKSHELL CONFIGURATIONS.

1.5 VISUALLY INSPECT THE COMPONENTS FOR DAMAGE SUCH AS DEFORMED PARTS, GOUGES, DAMAGED THREADS, CUT O-RINGS, BURRS, OR SURFACE DAMAGE.

1.6 VERIFY THAT THE SERIES 1 CRIMP PIN CONTACTS CONFORM TO MIL-C-39029/31, SERIES 1 CRIMP SOCKET CONTACTS CONFORM TO MIL-C-39029/32, SERIES 2 CRIMP PIN CONTACTS CONFORM TO MIL-C-39029/4, OR SERIES 2 CRIMP SOCKET CONTACTS CONFORM TO MIL-C-39029/5 AND ARE THE CORRECT SIZE AND TYPE FOR THE CONNECTOR BEING ASSEMBLED.

1.7 IF THE CONDUCTORS ARE RETWISTED DURING LEAD PREPARATION, ENSURE THEY ARE TWISTED AS TIGHT AS ORIGINALLY CONSTRUCTED, THE NATURAL LAY OF THE CONDUCTOR IS MAINTAINED, AND THE CONDUCTORS WILL FIT INSIDE THE CONTACT BARREL.

2. PREPARE THE CABLE IN ACCORDANCE WITH FIGURE 5A-1.

2.1 THE GROMMET (PC. 2) IS DESIGNED TO FIT AROUND INDIVIDUAL CONDUCTORS ON CLASSES E AND F AND THEREFORE CANNOT BE PLACED ON THE CABLE UNTIL INDIVIDUAL CONDUCTORS HAVE BEEN EXPOSED IN THE CABLE.

3. INSERTION SETUP. OWING TO THE MANY POSSIBLE VARIATIONS FOR ACCEPTABLE TOOLING FOR CONTACT INSERTION AND SOLDERING NO SPECIFICATION IS MADE AS TO A PARTICULAR TYPE. THE CRITERIA WHICH ARE DESIRABLE FOR AN ACCEPTABLE ASSEMBLY FIXTURE ARE AS FOLLOWS.

A. A DUMMY RECEPTACLE, WITHOUT CONNECTOR INSERT, TO HOLD THE CONNECTOR BEING WORKED ON SECURELY, OR A CLAMPING DEVICE THAT WILL NOT DAMAGE THE CONNECTOR.

B. A CABLE CLAMPING FIXTURE TO HOLD THE CABLE IN A SECURE, FIXED RELATIONSHIP TO THE CONNECTOR WHILE PERMITTING ACCESS TO THE REAR FACE OF THE CONNECTOR FOR THE CONTACT INSERTION TOOL OR SOLDERING IRON.

C. A DEVICE FOR HOLDING THE WIRE BUNDLE OUT OF THE WORK AREA.

THE ASSEMBLY FIXTURE REFERRED TO IN THIS PROCEDURE IS THAT DEVELOPED BY CHARLESTON NAVAL SHIPYARD (FIGURE 2).

NOTE: EQUIVALENT TOOLING FROM ALTERNATE SOURCES IS ACCEPTABLE, HOWEVER THE USE OF OTHER TOOLS MAY AFFECT THE PROCEDURAL STEPS OUTLINED BELOW.

3.1 SECURE THE ASSEMBLY FIXTURE TO A VISE OR SIMILAR HOLDING DEVICE IN ORDER TO PROVIDE A STABLE WORK AREA.

3.2 USE OF THIS ASSEMBLY FIXTURE NEGATES THE NEED FOR A DUMMY RECEPTACLE. FIGURE 3 ILLUSTRATES HOW THE CONNECTOR IS FIRMLY SEATED IN THE CONNECTOR CLAMP.

3.3 SEAT THE CONNECTOR IN THE CONNECTOR CLAMP AND ADJUST THE WING NUTS TO SECURE IT IN PLACE.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5D1 OF DWG. 803-5001027.

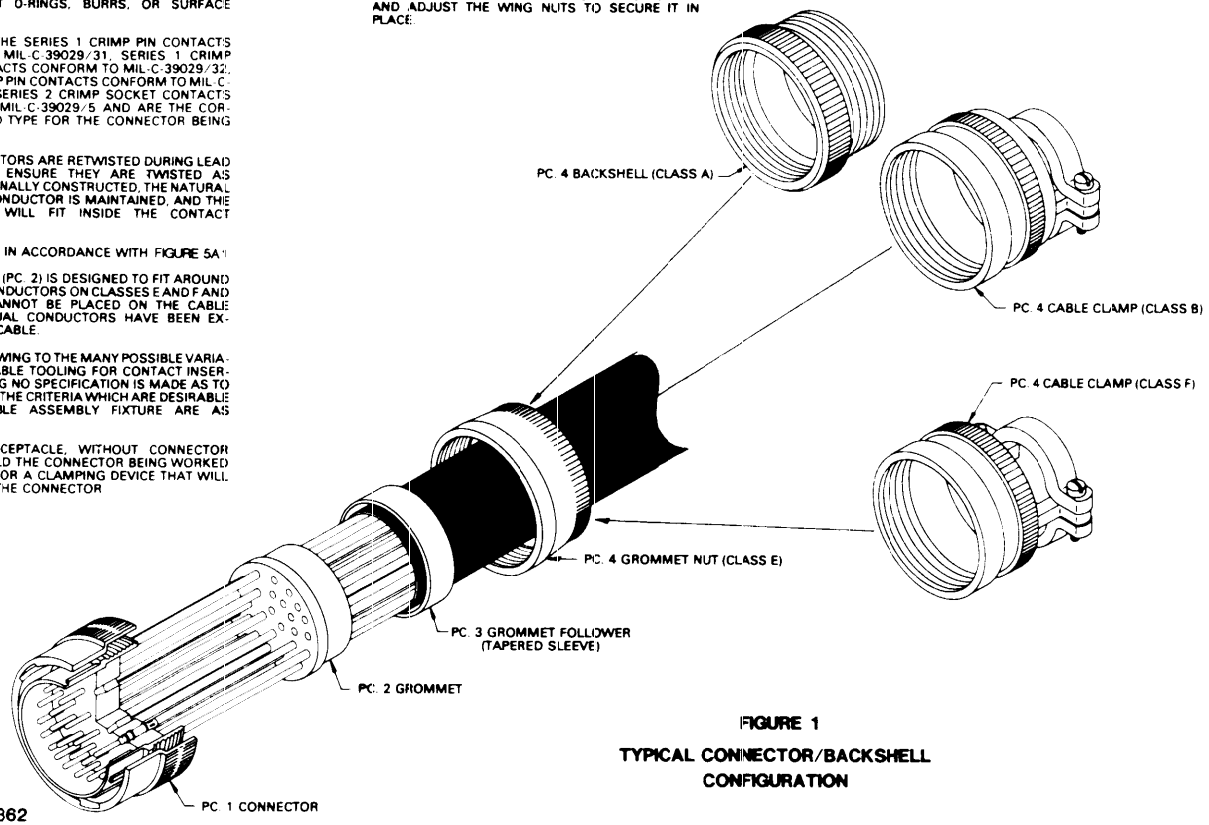


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**FIGURE 1**
**TYPICAL CONNECTOR/BACKSHELL CONFIGURATION**

FIGURE 5D1. MIL-C-26482 connector assembly procedure.

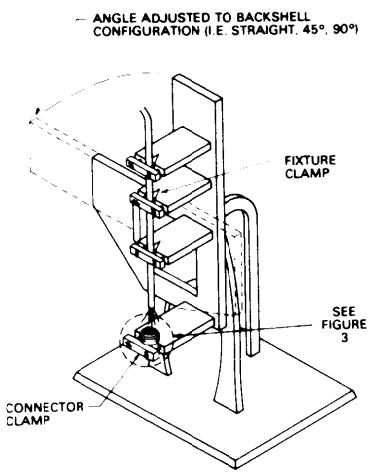


FIGURE 2
ASSEMBLY FIXTURE

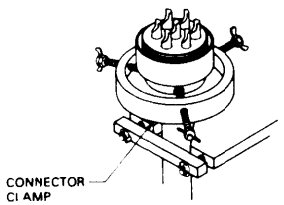


FIGURE 3
CONNECTOR SEATED IN ASSEMBLY FIXTURE

3.4 PLACE THE PREPARED CABLE IN THE FIXTURE CLAMP SO THAT THE FIRST CONTACTS TO BE INSERTED/SOLDERED WILL BE AT THE BACK OF THE CONNECTOR AS IT IS HELD IN THE CONNECTOR CLAMP.

3.5 POSITION THE CABLE AT THE ANGLE SIMILAR TO THE BACKSHELL DESIGN (I.E. 45°, 90°, OR STRAIGHT). SECURE THE CABLE IN THE FIXTURE CLAMP (FIGURE 4A).

3.6 POSITION THE CONNECTOR SO THAT THE CONNECTOR TO CABLE JACKET DISTANCE IS THAT MEASURED IN STEP 9.2 OF FIGURE 5A1. ROTATE THE CONNECTOR TO ALIGN THE KEYWAY POSITION IN PROPER RELATIONSHIP TO THE BACKSHELL (FIGURE 4B).

3.7 ROUTE THE INDIVIDUAL CONDUCTORS PER THE APPLICABLE WIRING TABLE. ENSURE THAT THE LONGEST ROUTED CONDUCTOR HAS SUFFICIENT LENGTH AT THE REQUIRED POSITION TERMINATION PRIOR TO CUTTING ANY CONDUCTOR. (FIGURE 4C).

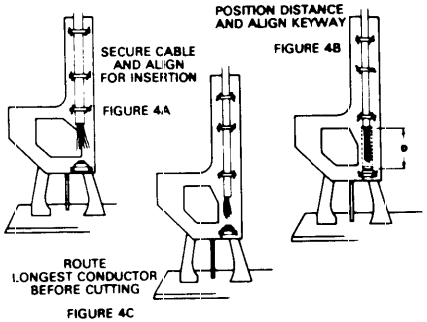


FIGURE 4
DETERMINING CONDUCTOR LENGTH

3.8 CUT THE CONDUCTORS AS REQUIRED TO PROVIDE EVEN CONDUCTOR LENGTHS AT THE CONNECTOR INSERT.

NOTE: LEAVE THE SPARES FULL LENGTH.

4 STRIP THE INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH SHEET 5A5 (FOR CONTACT WIRE BARREL DEPTHS SEE TABLE 1).

TABLE 1

WIRE BARREL DEPTH

| CONTACT SIZE | SERIES 1 (IN.) SOLDER +.063 -.016 | SERIES 1 (IN.) CRIMP SOCKET | SERIES 1 (IN.) CRIMP PIN | SERIES 2 (IN.) CRIMP SOCKET | SERIES 2 (IN.) CRIMP PIN | MINIMUM SEPARATION FORCE (OZ) SERIES 1 & 2 |
|---|---|---|---|---|---|---|
| 20 | .125 | .250-.270 | .250-.270 | .157-.186 | .157-.186 | 0.6 |
| 16 | .188 | .236-.281 | .236-.281 | .250-.284 | .250-.284 | 1.5 |
| 12 | .188 | .236-.281 | .236-.281 | .250-.284 | .250-.284 | 2.5 |

5. TERMINATE THE CONDUCTORS FOR SERIES 1 CONNECTORS AS FOLLOWS:

5.1 INSERT CONDUCTORS INTO THE PROPER HOLES OF THE WIRE SEALING GROMMET (PC 2). POSITION THE GROMMET NEXT TO THE CABLE JACKET.

5.2 COMPLETE THE FOLLOWING STEPS FOR SOLDER CONTACTS.

5.2.1 TIN THE CONDUCTORS IN ACCORDANCE WITH FIGURE 5A13.

5.2.1.1 ENSURE CONDUCTOR STRANDS ARE TWISTED TIGHT.

5.3 COMPLETE THE FOLLOWING STEPS FOR CRIMP CONTACTS.

5.3.1 SELECT THE CORRECT CRIMPING TOOL FROM TABLE 2 FOR SERIES 1 CONNECTORS AND TABLE 3 FOR SERIES 2 CONNECTORS.

TABLE 2

| CONTACT SIZE | PIN CONTACT BASIC CRIMPING TOOL | PIN CONTACT POSITIONER | SOCKET CONTACT BASIC CRIMPING TOOL | SOCKET CONTACT POSITIONER |
|---|---|---|---|---|
| 20 | M22520/7-01<br>M22520/1-01 | M22520/7-02<br>M22520/1-02<br>RED | M22520/7-01<br>M22520/1-01 | M22520/7-02<br>M22520/1-02 |
| | M22520/2-01 | M22520/2-02 | M22520/2-01 | M22520/2-02 |
| 16 | M22520/1-01 | M22520/1-02<br>BLUE | M22520/1-01 | M22520/1-02<br>BLUE |
| | M22520/7-01 | M22520/7-03 | M22520/7-01 | M22520/7-03 |
| 12 | M22520/1-01 | M22520/1-02<br>YELLOW | M22520/1-01 | M22520/1-02<br>YELLOW |

5.4 PRIOR TO CRIMPING, A CONTACT SIZING TEST SHOULD BE ACCOMPLISHED FOR ALL SOCKET CONTACTS. (PIN CONTACTS PREVIOUSLY VERIFIED IN STEP 1.6 DO NOT NEED FURTHER TESTING).

5.4.1 SOCKET CONTACTS SHOULD BE INSPECTED FOR PROPER SIZE USING A PIN CONTACT GAGE CONFORMING TO MS3197. WHEN TESTED, THE MINIMUM SEPARATION FORCE, MEASURED WITH A TENSION/COMPRESSION GAGE (CHATILLON DPP-16 OR EQUIVALENT) SHOULD BE AS SPECIFIED IN TABLE 1.

5.4.2 TERMINATE INDIVIDUAL CONDUCTORS WITH CRIMP CONTACTS IN ACCORDANCE WITH SHEET 5A11. IF CONTACT REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1/4 INCH THE JACKET MUST BE CUT BACK AGAIN AND ALL CONDUCTORS RETRIMMED TO PRECLUDE STRESS.

TABLE 3

| CONTACT SIZE | PIN CONTACT BASIC CRIMPING TOOL | PIN CONTACT POSITIONER | SOCKET CONTACT BASIC CRIMPING TOOL | SOCKET CONTACT POSITIONER |
|---|---|---|---|---|
| 20 | M22520/1-01 | M22520/1-02<br>RED | M22520/2-01 | M22520/2-02 |
| | M22520/2-01 | M22520/2-02 | M22520/1-01 | M22520/1-02<br>RED |
| 16 | M22520/1-01 | M22520/1-02<br>BLUE | M22520/1-01 | M22520/1-02<br>BLUE |
| | M22520/7-01 | M22520/7-03 | M22520/7-01 | M22520/7-03 |
| 12 | M22520/1-01 | M22520/1-02<br>YELLOW | M22520/1-01 | M22520/1-02<br>YELLOW |

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5D2 OF DWG. 803-5001027.

SH 132317363

FIGURE 5D2. MIL-C-26482 connector assembly procedure.

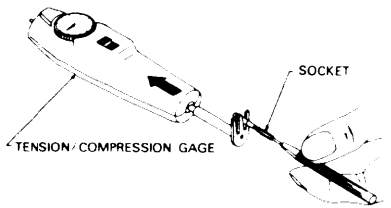


FIGURE 5
SOCKET CONTACT SIZING TEST

6 CONDUCTOR/CONTACT INSERTION INTO CONNECTOR

NOTE: UPON INSERTION OF EACH TWO ROWS OF PIN CONTACTS VISUALLY INSPECT THE CONNECTOR FACE TO ENSURE THAT THE CONTACTS ARE PROPERLY INSERTED.

6.1 INSERT SERIES 1 CONNECTORS AS FOLLOWS.

6.1.1 ACCOMPLISH THE FOLLOWING STEPS FOR SOLDER CONTACTS.

6.1.1.1 SOLDER THE CONDUCTORS TO THE CONTACTS IN ACCORDANCE WITH FIGURE 5A15. SOLDERING SHOULD COMMENCE WITH THE CONTACT ROW(S) FURTHEST AWAY FROM THE OPERATOR. A PIECE OF STIFF FIRE RETARDANT PAPER SHOULD BE INSERTED BETWEEN THE ROWS AS THE ROWS ARE COMPLETED TO AID IN PROTECTING COMPLETED WORK. (FIGURE 6)

WARNING: DO NOT MOVE THE CONDUCTOR AFTER THE SOLDERING IRON HAS BEEN REMOVED OR A COLD SOLDERED JOINT COULD RESULT.

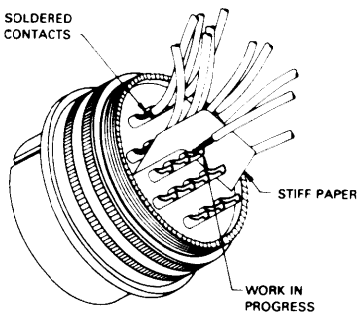


FIGURE 6
PROTECTING SOLDERED CONTACTS

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6.1.2 ACCOMPLISH THE FOLLOWING STEPS FOR CRIMP CONTACTS.

NOTE: ADJUST THE ASSEMBLY FIXTURE AS REQUIRED DURING THE INSERTION PROCESS TO EASE STRESS ON THE CONDUCTORS.

6.1.2.1 SELECT THE PROPER INSERTION TOOL FROM TABLE 4.

TABLE 4

| CONTACT SIZE | PIN CONTACT | | SOCKET CONTACT | |
|---|---|---|---|---|
| | INSERTION TOOL | REMOVAL TOOL | INSERTION TOOL | REMOVAL TOOL |
| 20 | M81969/17-03<br>M81969/14-02 | M81969/19-07 | M81969/17-03<br>M81969/14-02 | M81969/19-07 |
| 16 | M81969/17-04<br>M81969/14-03 | M81969/19-08 | M81969/14-03<br>M81969/17-04 | M81969/19-08 |
| 12 | M81969/17-05<br>M81969/14-04 | M81969/19-09 | M81969/14-04<br>M81969/17-05 | M81969/19-09 |

6.1.2.2 INSERT A WIRED CONTACT INTO THE REAR OF THE INSERT.

6.1.2.3 SEAT THE CONTACT BY POSITIONING THE INSERTION TOOL AROUND THE REAR OF THE CONTACT SHOULDER WITH A SLIGHT ANGLE TOWARD THE CONTACT TO ASSURE A FIRM GRIP. (SEE FIGURE 7)

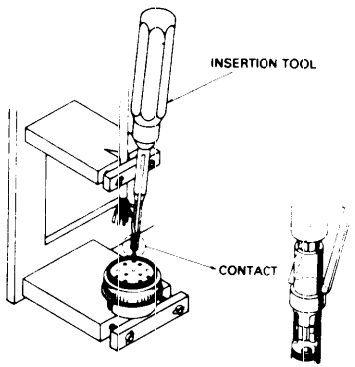



FIGURE 7
CONTACT INSERTION (SERIES 1)

6.1.2.3.1 PUSH THE CONTACT STRAIGHT INTO THE CONNECTOR WITH A FIRM, STEADY PRESSURE UNTIL THE CONTACT BOTTOMS.

6.1.2.3.2 THE CONTACT SHOULDER PROVIDES A POSITIVE STOP.

6.1.2.4 MOVE THE INSERTION TOOL BACK AWAY FROM THE CONTACT BEFORE SLIDING IT STRAIGHT UP ALONG THE WIRE INSULATION UNTIL IT CLEARS THE INSERT.

6.1.2.4.1 SLIGHTLY PULL ON INSERTED LEAD TO ENSURE CONTACT HAS LOCKED IN CONNECTOR.

6.2 ACCOMPLISH THE FOLLOWING STEPS, FOR SERIES 2 CONNECTORS.

NOTE: ADJUST THE ASSEMBLY FIXTURE AS REQUIRED DURING THE INSERTION PROCESS TO EASE STRESS ON THE CONDUCTORS.

TABLE 5

SOCKET CONTACT

| CONTACT SIZE | INSERTION TOOL | REMOVAL TOOL | |
|---|---|---|---|
| | | WIRED CONTACT | UNWIRED CONTACT |
| 20 | M81969/8-05<br>M81969/14-02 | M81969/8-06<br>M81969/14-02 | M81969/30-05 |
| 16 | M81969/8-07<br>M81969/14-03 | M81969/8-08<br>M81969/14-03 | M81969/30-06 |
| 12 | M81969/8-09<br>M81969/14-04 | M81969/8-10<br>M81969/14-04 | M81969/30-07 |

PIN CONTACT

| CONTACT SIZE | INSERTION TOOL | REMOVAL TOOL | |
|---|---|---|---|
| | | WIRED CONTACT | UNWIRED CONTACT |
| 20 | M81969/14-02 | M81969/14-02 | M81969/30-05 |
| 16 | M81969/14-03 | M81969/14-03 | M81969/30-06 |
| 12 | M81969/14-04 | M81969/14-04 | M81969/30-07 |

6.2.1 SELECT THE PROPER INSERTION TOOL FROM TABLE 5.

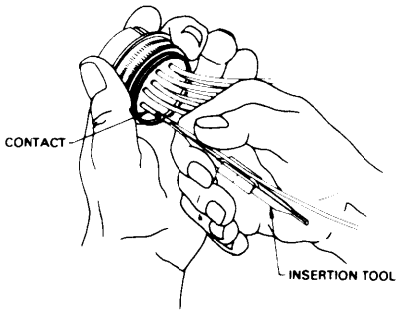
6.2.2 LAY THE WIRE, WITH CONTACT ATTACHED AGAINST THE SLOT OF THE CORRECT INSERTION TOOL AND SNAP INTO THE TOOL. (SEE FIGURE 8)

6.2.3 SEAT THE CONTACT SHOULDER AGAINST THE TIP OF THE TOOL.

6.2.4 PUSH THE CONTACT INTO THE PROPER OPENING AT THE REAR OF THE INSERT BY APPLYING STRAIGHT, STEADY FORWARD PRESSURE UNTIL THE CONTACT BOTTOMS.

NOTE: DO NOT TWIST THE TOOL.

6.2.5 REMOVE THE TOOL BY SLIDING IT STRAIGHT BACK ALONG THE WIRE. UNSNAP THE TOOL FROM THE WIRE WHEN CLEAR OF THE INSERT.




NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5D3 OF DWG. 803-5001027.





FIGURE 5D3. MIL-C-26482 connector assembly procedure.

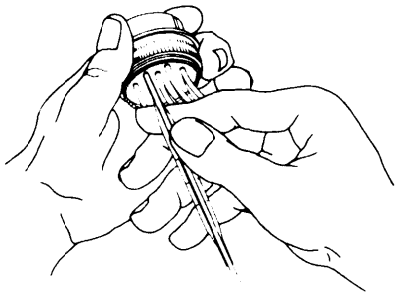


FIGURE 8
CONTACT INSERTION (SERIES 2)

6.2.5.1 SLIGHTLY PULL ON INSERTED CONDUCTOR TO ENSURE CONTACT HAS LOCKED IN CONNECTOR.

6.3 ENSURE THAT THE SHIELD GROUND WIRE (IF TERMINATED TO A CONTACT) IS INSERTED IN ITS PROPER LOCATION.

6.4 INSERT UNWIRED CONTACTS INTO ALL EMPTY HOLES IN THE CONNECTOR INSERT.

6.5 INSERT SEALING PLUGS MEETING THE REQUIREMENTS OF MILITARY STANDARD MS27488 INTO ALL UNWIRED CONTACT HOLES FOR SERIES 1 CLASSES E AND F AND SERIES 2 CLASSES L, R, AND A CONNECTORS.

6.6 REMOVE THE CONNECTOR FROM THE CONNECTOR CLAMP.

6.7 CONDUCT A VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.

7. CONTACT REMOVAL PROCEDURES (AS REQUIRED).

7.1 CONDUCT A VISUAL INSPECTION OF THE CONNECTOR FACE TO IDENTIFY ANY UNSEATED CONTACTS.

7.2 IF REQUIRED TO REMOVE UNSEATED CONTACTS PROCEED AS FOLLOWS.

7.2.1 REMOVE UNSEATED SERIES 1 CRIMP CONTACTS AS FOLLOWS.

7.2.1.1 SELECT THE PROPER REMOVAL TOOL FROM TABLE 4.

7.2.1.2 INSERT THE REMOVAL TOOL INTO THE CONNECTOR FACE, PLACING THE SLEEVE OF THE TOOL OVER THE CONTACT TO BE REMOVED.

7.2.1.3 USING STRAIGHT, FORWARD MOTION PUSH AND SLIGHTLY ROTATE THE TOOL UNTIL THE SLEEVE BOTTOMS IN THE INSERT.

7.2.1.4 PUSH THE REMOVAL TOOL THRUST COLLAR FORWARD WHICH MOVES THE CONTACT BACK THROUGH THE INSERT, EXPOSING IT FOR EASY HAND REMOVAL.

7.2.1.5 REMOVE THE REMOVAL TOOL FROM THE CONNECTOR.

7.2.2 REMOVE UNSEATED SERIES 2 CONTACTS AS FOLLOWS.

7.2.2.1 SELECT THE CORRECT REMOVAL TOOL FROM TABLE 5.

7.2.2.2 LAY THE SLOT OF THE TOOL AGAINST THE WIRE OF THE CONTACT TO BE REMOVED LEAVING 1/2 INCH FROM THE TOOL END TO THE REAR OF THE CONNECTOR.

7.2.2.3 SQUEEZE THE WIRE FIRMLY INTO THE TOOL BETWEEN THE THUMB AND FOREFINGER ABOUT 1/2 INCH FROM THE TOOL TIP.

7.2.2.4 SLIDE THE TOOL DOWN ALONG THE WIRE AND SLOWLY INTO THE INSERT UNTIL POSITIVE RESISTANCE IS FELT.

WARNING: DO NOT TWIST OR TURN THE TOOL.

7.2.2.5 PULL BOTH THE TOOL AND WIRED CONTACT OUT OF THE CONNECTOR.

7.3 REINSERT ALL EXTRACTED CONTACTS.

7.4 IF A CONTACT FAILS TO RESEAT AFTER THREE INSERTION ATTEMPTS REPLACE THE OFFENDING CONTACT. IF THE SAME CONTACT LOCATION CONTINUES TO GIVE DIFFICULTY, THE CONNECTOR IS PROBABLY DAMAGED OR FAULTY AND MUST BE REPLACED.

8. CONTACT PUSH TEST.

8.1 USING THE COMBINATION TENSION/COMPRESSION GAGE (CHATILLON DPP 50 OR EQUIVALENT) PUSH TEST ALL CRIMP CONTACTS TO EVALUATE CONTACT RETENTION (FIGURE 9).

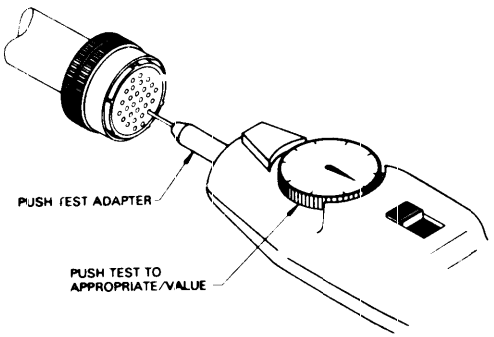



FIGURE 9
PUSH TEST ADAPTER, TENSION/COMPRESSION GAGE

8.1.1 SEE TABLE 6 FOR PUSH TEST VALUES.

8.1.2 THE FORCE SHALL BE APPLIED TO THE MATING END OF THE CONTACT IN A FIRM, SLOW MANNER (NOT TO EXCEED 1 LB/SEC). DO NOT INSTANTANEOUSLY APPLY THE FORCES LISTED IN TABLE 6.

8.1.3 ENSURE THE CORRECT PUSH TEST ADAPTER/PROBE IS UTILIZED FOR THE CONTACT SIZE BEING TESTED.

TABLE 6

| CONTACT SIZE | PUSH TEST VALUE (LBS.) | |
|---|---|---|
| | SERIES 1 | SERIES 2 |
| 20 | 15 | 20 |
| 16 | 25 | 25 |
| 12 | 25 | 30 |

8.2 REPLACE THE CONNECTOR IN THE CONNECTOR CLAMP.

9. BACKSHELL ASSEMBLY.

NOTE: THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 1. VARIATIONS MAY OCCUR AND CAUSE MINOR DEVIATIONS FROM THIS PROCEDURE. IF THIS SITUATION OCCURS THE MANUFACTURER'S ASSEMBLY INSTRUCTIONS SHOULD BE FOLLOWED.

9.1 FOLD THE SPARE WIRES BACK ONE-HALF THE DISTANCE BETWEEN THE CONNECTOR AND THE JACKET END.

9.2 SLIDE A 1 INCH LONG PIECE OF 1/4 INCH SHRINK TUBING OVER EACH FOLDED PAIR AND SHRINK IN PLACE.

9.3 LIGHTLY COAT THE THREADS OF EACH BACKSHELL PART WITH PETROLATUM (VV-P-236) JUST PRIOR TO USING.

9.4 LOOSEN THE FIXTURE CLAMP FROM THE ASSEMBLY FIXTURE.

9.5 FOR CLASS "A" CONNECTORS.

9.5.1 SLIDE THE BACKSHELL OVER THE CONDUCTORS AND TIGHTEN USING A STRAP WRENCH AND A TORQUE WRENCH. TORQUE THE ASSEMBLY TO THE VALUE PROVIDED IN TABLE 7.

9.6 FOR CLASS "E" AND "F" CONNECTORS.

9.6.1 SLIDE THE GROMMET (PC. 2) OVER THE WIRE BUNDLE.

9.6.2 SLIDE THE TAPERED SLEEVE (PC. 3) AND GROMMET NUT (PC. 4) OVER THE GROMMET AND TIGHTEN THE GROMMET NUT.

9.6.2.1 ENSURE THE TAPERED SLEEVE IS NOT COCKED IN THE NUT.

9.7 IF A CABLE CLAMP IS ATTACHED (CLASS "B" OR "F") ATTACH THE CLAMP TO THE CONNECTOR ASSEMBLY AND TORQUE TO THE VALUE SPECIFIED IN TABLE 7.

TABLE 7

| SHELL SIZE | CONNECTOR BACKSHELL & CABLE CLAMP TORQUE VALUE IN IN./LBS (± 5 IN./LBS) |
|---|---|
| 8 | 45 |
| 9 | 45 |
| 10 | 45 |
| 11 | 45 |
| 13 | 50 |
| 14 | 50 |
| 15 | 50 |
| 16 | 60 |
| 17 | 60 |
| 18 | 60 |
| 19 | 60 |
| 20 | 70 |
| 21 | 70 |
| 22 | 70 |
| 23 | 70 |
| 24 | 70 |
| 25 | 70 |

1. THIS FIGURE SUPERSEDES SHEET 5D4 OF DWG. 803-5001027.









FIGURE 5D4. MIL-C-26482 connector assembly procedure.

9.8 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 8 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT). (FIGURE 10). ENSURE A MINIMUM GAP OF 1/16 INCH EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES.

NOTE: IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

TABLE 8

CLAMP SCREWS

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.5 IN. | 25 ± 2 IN./OZ |
| 0.5 TO 1.0 IN. | 40 ± 2 IN./OZ |
| 1.0 TO 2.0 IN. | 50 ± 2 IN./OZ |

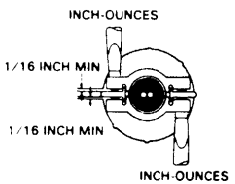



FIGURE 10

9.9 REMOVE THE CONNECTOR FROM THE ASSEMBLY FIXTURE.

10 FINAL TEST AND DOCUMENTATION.

10.1 USING ESTABLISHED SHIPYARD PROCEDURES PERFORM ELECTRICAL/ELECTRONIC CHECKS ON THE ASSEMBLED CONNECTOR.

10.2 INSTALL A PROTECTIVE DUST CAP ON THE CONNECTOR.

10.3 COMPLETE THE ASSEMBLY INSPECTION AND DOCUMENTATION AS REQUIRED BY LOCAL PROCEDURES.

11 IF NECESSARY, LOCKWIRE THE CONNECTOR IN ACCORDANCE WITH FIGURE 5A24.

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NOTES:
1. THIS SHEET SUPERSEDES SHEET 5D5 OF DWG. 803-5001027.







FIGURE 5D5. MIL-C-26482 connector assembly procedure.

1. VISUAL INSPECTION AND VERIFICATION

1.1 DISASSEMBLE THE CONNECTOR/BACKSHELL ASSEMBLY

1.2 VERIFY THAT THE CONNECTOR IS OF THE CORRECT TYPE AND CONFIGURATION FOR THE CABLE BEING TERMINATED IN ACCORDANCE WITH THE SYSTEM CABLING DIAGRAM.

1.3 VERIFY THAT THE BACKSHELL CONFIGURATION IS OF THE CORRECT TYPE AS SPECIFIED ON THE SYSTEM CABLING DIAGRAM.

1.4 VERIFY THAT ALL COMPONENTS PARTS OF THE CONNECTOR AND BACKSHELL HARDWARE ARE PRESENT. (SEE FIGURE 1 FOR A TYPICAL CONNECTOR/BACKSHELL CONFIGURATION) REFERENCE MIL SPEC MIL-C-28840 FOR SPECIFIC CONFIGURATIONS.

1.5 VISUALLY INSPECT THE COMPONENTS FOR DAMAGE SUCH AS DEFORMED PARTS, GOUGES, DAMAGED THREADS, CUT O-RINGS, BURRS, OR SURFACE DAMAGE.

1.6 VERIFY THAT THE CONTACTS MEET THE REQUIREMENTS OF MIL-C-39029/83 FOR PIN AND MIL-C-39029/84 FOR SOCKET CONTACTS.

1.7 IF THE CONDUCTORS ARE RETWISTED DURING LEAD PREPARATION, ENSURE THEY ARE TWISTED AS TIGHT AS ORIGINALLY CONSTRUCTED, THE NATURAL LAY OF THE CONDUCTOR IS MAINTAINED, AND THE CONDUCTORS WILL FIT INSIDE THE CONTACT BARREL.

2. PREPARE THE CABLE IN ACCORDANCE WITH FIGURE 5A1

3. INSERTION SETUP. OWING TO THE MANY POSSIBLE VARIATIONS FOR ACCEPTABLE DESIGNS FOR AN ASSEMBLY FIXTURE, NO SPECIFICATION IS MADE AS TO A PARTICULAR TYPE. THE CRITERIA WHICH ARE DESIRABLE FOR AN ACCEPTABLE ASSEMBLY FIXTURE ARE AS FOLLOWS:

A. A DUMMY RECEPTACLE, WITHOUT CONNECTOR INSERT, TO HOLD THE CONNECTOR BEING WORKED ON SECURELY, OR A CLAMPING DEVICE THAT WILL NOT DAMAGE THE CONNECTOR.

B. A CABLE CLAMPING FIXTURE TO HOLD THE CABLE IN A SECURE, FIXED RELATIONSHIP TO THE CONNECTOR WHILE PERMITTING ACCESS TO THE REAR FACE OF THE CONNECTOR FOR THE CONTACT INSERTION TOOL.

C. A DEVICE FOR HOLDING THE WIRE BUNDLE OUT OF THE WORK AREA.

THE ASSEMBLY FIXTURE REFERRED TO IN THIS PROCEDURE IS THAT DEVELOPED BY CHARLESTON NAVAL SHIPYARD (FIGURE 2).

NOTE: EQUIVALENT TOOLING FROM ALTERNATE SOURCES IS ACCEPTABLE, HOWEVER THE USE OF OTHER TOOLS MAY AFFECT THE PROCEDURAL STEPS OUTLINED BELOW.

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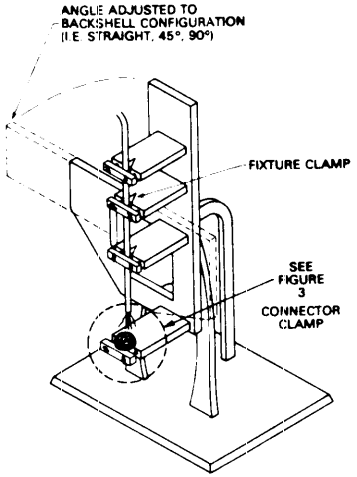



FIGURE 2
ASSEMBLY FIXTURE

3.1 SECURE THE ASSEMBLY FIXTURE TO A VISE OR SIMILAR HOLDING DEVICE IN ORDER TO PROVIDE A STABLE WORK AREA.

3.2 USE OF THIS ASSEMBLY FIXTURE NEGATES THE NEED FOR A DUMMY RECEPTACLE. FIGURE 3 ILLUSTRATES HOW THE CONNECTOR IS FIRMLY SEATED IN THE CONNECTOR CLAMP.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5E1 OF DWG. 803-5001027

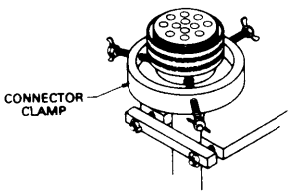
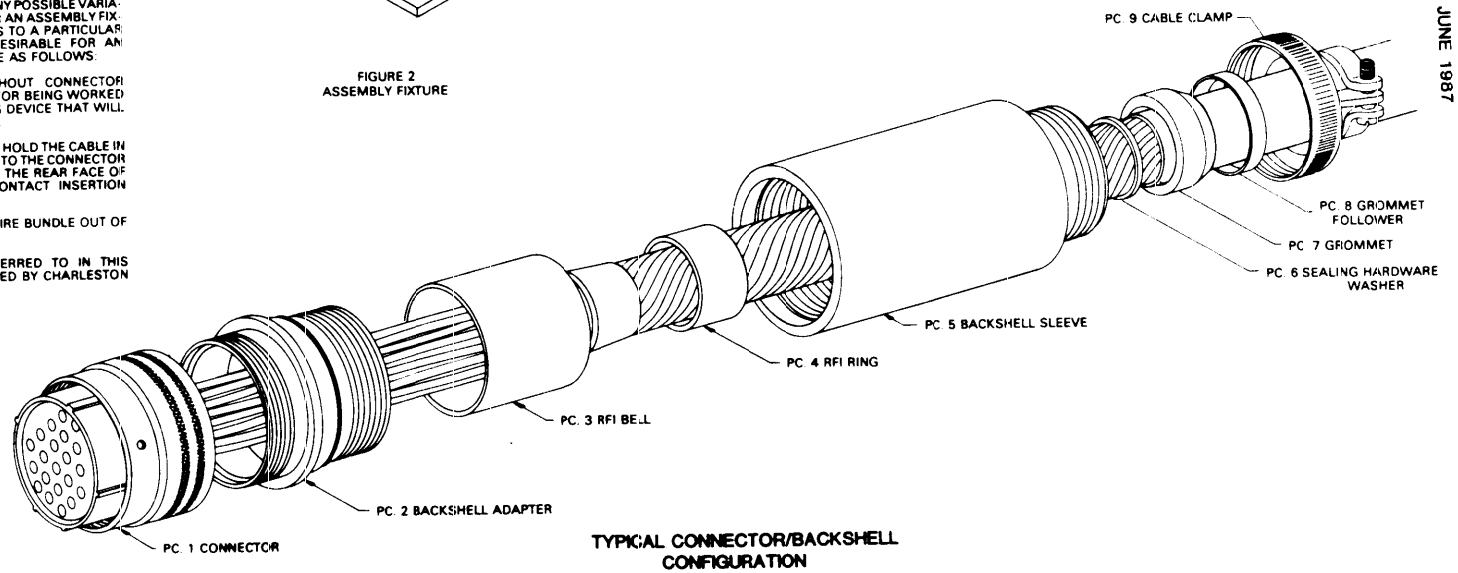



FIGURE 3
CONNECTOR SEATED IN ASSEMBLY FIXTURE




TYPICAL CONNECTOR/BACKSHELL CONFIGURATION

FIGURE 1





FIGURE 5E1. MIL-C-28840 connector assembly procedure.

3.3 SEAT THE CONNECTOR IN THE CONNECTOR CLAMP AND ADJUST THE WING NUTS TO SECURE IT IN PLACE

3.4 PLACE THE PREPARED CABLE IN THE FIXTURE CLAMP SO THAT THE FIRST CONTACTS TO BE INSERTED WILL BE AT THE BACK OF THE CONNECTOR AS IT IS HELD IN THE CONNECTOR CLAMP

3.5 POSITION THE CABLE AT THE ANGLE SIMILAR TO THE BACKSHELL DESIGN (I.E. 45°, 90°, OR STRAIGHT). SECURE THE CABLE IN THE FIXTURE CLAMP (FIGURE 4A)

3.6 POSITION THE CONNECTOR SO THAT THE CONNECTOR TO CABLE JACKET DISTANCE IS THAT MEASURED IN STEP 9.2 OF FIGURE 5A1. ROTATE THE CONNECTOR TO ALIGN THE KEYWAY POSITION IN PROPER RELATIONSHIP TO THE BACKSHELL (FIGURE 4B)

3.7 ROUTE THE INDIVIDUAL CONDUCTORS PER THE APPLICABLE WIRING TABLE. ENSURE THAT THE LONGEST ROUTED CONDUCTOR HAS SUFFICIENT LENGTH AT THE REQUIRED POSITION TERMINATION PRIOR TO CUTTING ANY CONDUCTOR. (FIGURE 4C)

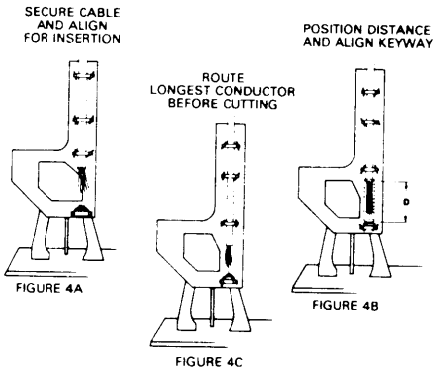



FIGURE 4A

FIGURE 4B

FIGURE 4C

FIGURE 4
DETERMINING CONDUCTOR LENGTH

3.8 CUT THE CONDUCTORS AS REQUIRED TO PROVIDE EVEN CONDUCTOR LENGTHS AT THE CONNECTOR INSERT

NOTE: LEAVE THE SPARES FULL LENGTH

4. STRIP THE INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH FIGURE 5A5 (CONTACT WIRE BARREL DEPTH IS .160-.208 INCHES)

5. PRIOR TO CRIMPING, A CONTACT SIZING TEST SHOULD BE ACCOMPLISHED FOR ALL SOCKET CONTACTS (PIN CONTACTS PREVIOUSLY VERIFIED IN STEP 1.6 DO NOT NEED FURTHER TESTING)

5.1 SOCKET CONTACTS SHOULD BE INSPECTED FOR PROPER SIZE USING A PIN CONTACT GAGE CONFORMING TO MS3197. WHEN TESTED, THE MINIMUM SEPARATION FORCE, MEASURED WITH A TENSION/COMPRESSION GAGE (CHATILLON DPP-16 OR EQUIVALENT) SHOULD BE 0.6 OZ.

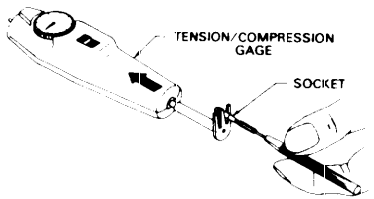



FIGURE 5
SOCKET CONTACT SIZING TEST

6. TERMINATE INDIVIDUAL CONDUCTORS WITH CRIMP CONTACTS IN ACCORDANCE WITH SHEET 5A11 (ENSURE THE CRIMPING TOOL CONFORMS TO M22520/34-01 WITH POSITIONER M22520/34-02)

6.1 IF CONTACT REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1/4 INCH THE JACKET MUST BE CUT BACK AGAIN.

7. USING THE PROPER WIRING TABLE, AND WORKING FROM THE REAR TO THE FRONT OF THE ASSEMBLY FIXTURE, INSERT THE CONTACTS INTO THEIR DESIGNATED LOCATIONS AS FOLLOWS (FIGURE 6)

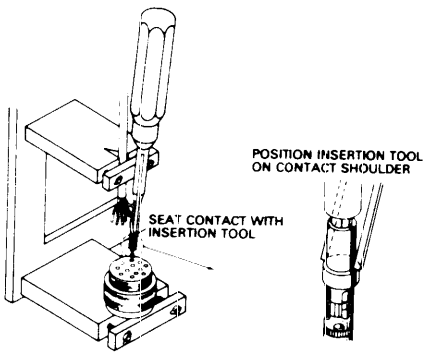



FIGURE 6
CONTACT INSERTION

NOTE: ADJUST THE FIXTURE CLAMP AS REQUIRED DURING THE INSERTION PROCESS TO EASE STRESS ON THE CONDUCTORS

7.1 ENSURE THE INSERTION TOOL CONFORMS TO MIL. SPEC. M81969/33-01

7.2 INSERT A WIRED CONTACT INTO THE REAR OF THE INSERT.

7.3 PUSH THE CONTACT FORWARD UNTIL THE SHOULDER OF THE CONTACT IS SLIGHTLY EXPOSED BEHIND THE INSERT.

7.4 SEAT THE CONTACT BY POSITIONING THE INSERTION TOOL AROUND THE REAR OF THE CONTACT SHOULDER WITH A SLIGHT ANGLE TOWARD THE CONTACT TO ASSURE A FIRM GRIP.

7.4.1 PUSH THE CONTACT STRAIGHT INTO THE CONNECTOR WITH A FIRM, STEADY PRESSURE UNTIL THE CONTACT BOTTOMS.

7.4.2 THE CONTACT SHOULDER PROVIDES A POSITIVE STOP.

NOTE: UPON INSERTION OF EACH TWO ROWS OF CONTACTS, VISUALLY INSPECT THE CONNECTOR FACE TO ENSURE THAT THE CONTACTS ARE PROPERLY INSERTED AND DO NOT "CROSS OVER" INTO ADJACENT HOLES. ANY IMPROPERLY INSERTED CONTACTS WILL APPEAR ANGLED WHEN COMPARED TO THE PROPERLY INSERTED CONTACTS.

7.4.3 MOVE THE INSERTION TOOL BACK AWAY FROM THE CONTACT BEFORE SLIDING IT STRAIGHT UP ALONG THE WIRE INSULATION UNTIL IT CLEARS THE INSERT.

7.4.3.1 LIGHTLY PULL ON THE INSERTED LEAD TO ENSURE THE CONTACT HAS LOCKED IN THE CONNECTOR.

7.5 ENSURE THAT THE SHIELD GROUND WIRE (IF TERMINATED TO A CONTACT) IS INSERTED IN ITS PROPER.

8. INSERT UNWIRED CONTACTS INTO ALL EMPTY HOLES IN THE CONNECTOR INSERT.

9. INSERT SEALING PLUGS WHICH MEET THE REQUIREMENTS OF MS27488 INTO ALL UNWIRED CONTACT HOLES.

10. CONDUCT A FINAL VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE BY MEANS OF A CONTINUITY TEST. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.

11. CONTACT REMOVAL PROCEDURE (AS REQUIRED)

11.1 CONDUCT A VISUAL INSPECTION OF THE CONNECTOR FACE TO IDENTIFY ANY UNSEATED CONTACTS.

11.2 IF REQUIRED REMOVE THE CONNECTOR FROM THE CONNECTOR CLAMP AND USING THE PROPER EXTRACTION TOOL (M81969/34-01), REMOVE THE UNSEATED CONTACT AS FOLLOWS. (FIGURE 7)

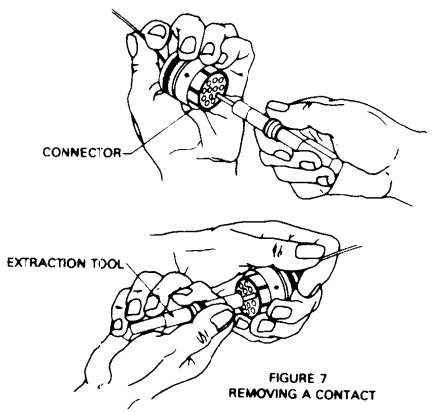



FIGURE 7
REMOVING A CONTACT

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5E2 OF DWG. 803-5001027.









FIGURE 5E2. MIL-C-28840 connector assembly procedure.

11.2.1 INSERT THE EXTRACTION TOOL INTO THE CONNECTOR FACE AND ENCLOSE THE FRONT OF THE CONTACT WITH THE TOOL.

11.2.2 PUSHING WITH THE REAR OF THE TOOL TO FULLY BOTTOM THE TOOL TIP, ROTATE THE TOOL REAR SLIGHTLY IN THE CLOCKWISE DIRECTION.

11.2.3 PUSH THE TOOL THRUST SLEEVE FORWARD MOVING THE CONTACT BACK THROUGH THE INSERT.

11.2.4 REMOVE THE CONTACT FROM THE REAR OF THE CONNECTOR AND SLOWLY REMOVE THE EXTRACTION TOOL FROM THE FACE OF THE CONTACT.

11.3 REINSERT ALL EXTRACTED CONTACTS IN ACCORDANCE WITH STEP 7 AND REINSPECT THE CONNECTOR FACE.

11.4 IF A CONTACT FAILS TO RESEAT AFTER THREE INSERTION ATTEMPTS REPLACE THE OFFENDING CONTACT. IF THE SAME CONTACT LOCATION CONTINUES TO GIVE DIFFICULTY, THE CONNECTOR IS PROBABLY DAMAGED OR FAULTY AND MUST BE REPLACED.

11.5 REMOVE THE CONNECTOR FROM THE CONNECTOR CLAMP IF NOT PREVIOUSLY ACCOMPLISHED.

12. CONTACT PUSH TEST.

12.1 USING THE COMBINATION TENSION/COMPRESSION GAGE (CHATILLON DPP 25 OR EQUIVALENT) PUSH TEST ALL CONTACTS TO EVALUATE CONTACT RETENTION. (FIGURE 8)

12.1.1 ENSURE THE CORRECT PUSH TEST ADAPTER/PROBE IS UTILIZED FOR THE CONTACT SIZE BEING TESTED.

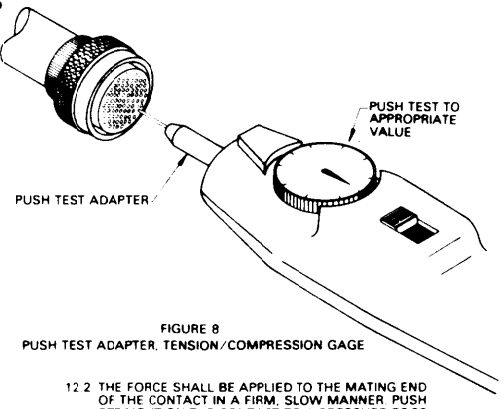



FIGURE 8
PUSH TEST ADAPTER, TENSION/COMPRESSION GAGE

12.2 THE FORCE SHALL BE APPLIED TO THE MATING END OF THE CONTACT IN A FIRM, SLOW MANNER. PUSH STRAIGHT ON THE CONTACT TO A PRESSURE OF 20 POUNDS. DO NOT INSTANTANEOUSLY APPLY THE PRESSURE.

12.3 REPLACE THE CONNECTOR IN THE CONNECTOR CLAMP.

13. BACKSHELL ASSEMBLY.

NOTE: THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 1. VARIATIONS MAY OCCUR AND CAUSE MINOR DEVIATIONS FROM THIS PROCEDURE. IF THIS SITUATION OCCURS THE MANUFACTURER'S ASSEMBLY INSTRUCTIONS SHOULD BE FOLLOWED.

13.1 FOLD SPARE WIRES BACK ONE-HALF THE DISTANCE BETWEEN THE CONNECTOR AND THE JACKET END.

13.2 SLIDE A 1 INCH LONG PIECE OF APPROPRIATELY SIZED SHRINK TUBING OVER EACH FOLDED PAIR AND SHRINK IN PLACE.

13.3 LIGHTLY COAT THE THREAD OF EACH BACKSHELL PART WITH PETROLATUM (VV-P-236) JUST PRIOR TO USING.

13.4 POSITION AND LUBRICATE ALL O-RINGS.

13.5 LOOSEN THE CABLE CLAMP ON THE ASSEMBLY FIXTURE.

13.6 SLIDE THE BACKSHELL ADAPTER (PC. 2) DOWN THE CABLE AND SCREW IT ON THE CONNECTOR. TIGHTEN THE ADAPTER USING A STRAP WRENCH AND TORQUE WRENCH TO THE VALUE PROVIDED IN TABLE 1 FOR THE APPROPRIATE SHELL SIZE.

TABLE 1

| SHELL SIZE | CONNECTOR REAR THREAD AND CABLE CLAMP TORQUE IN IN./LBS (± 5 IN./LBS) |
|---|---|
| 8 | 45 |
| 8S | 45 |
| 10 | 45 |
| 10S | 45 |
| 10SL | 45 |
| 12 | 50 |
| 12S | 50 |
| 14 | 50 |
| 14S | 50 |
| 16 | 60 |
| 16S | 60 |
| 18 | 60 |
| 20 | 70 |
| 22 | 70 |
| 24 | 70 |
| 28 | 80 |
| 32 | 100 |
| 36 | 120 |

13.7 IF THE GROSS SHIELD IS TO BE FLOATED OR TERMINATED TO A CONNECTOR CONTACT, PROCEED TO STEP 13.8. IF THE SHIELD IS TO BE TERMINATED TO THE BACKSHELL RFI HARDWARE PROCEED AS FOLLOWS.

13.7.1 SLIDE THE RFI BELL (PC. 3) AGAINST THE BACKSHELL ADAPTOR.

13.7.2 FLARE THE GROSS SHIELD OVER THE TAPERED END OF THE RFI BELL.

13.7.3 GENTLY FORCE THE CABLE TOWARD THE CONNECTOR PLUG UNTIL THE SHIELD COVERS THE TAPERED SURFACE ON THE RFI BELL.

13.7.4 SLIDE THE RFI RING (PC. 4) ONTO THE RFI BELL WHILE APPLYING FORWARD PRESSURE ON THE CABLE.

13.7.5 COMPRESS THE SHIELD BETWEEN THE RFI BELL AND RFI RING WITH A BACK AND FORTH TWISTING FORWARD MOTION ON THE RFI RING.

13.8 SLIDE THE RFI BACKSHELL COMPONENTS (PC. 3, 4) OVER THE PIGTAILS, LOOPED GROUND WIRE AND SPARE CONDUCTORS.

13.9 SLIDE THE BACKSHELL SLEEVE (PC. 5) OVER THE RFI ASSEMBLY AND SCREW THE SLEEVE ONTO THE ADAPTER.

13.10 TORQUE THE SLEEVE TO THE VALUE PROVIDED IN TABLE 1 FOR THE APPROPRIATE SHELL SIZE.

13.11 MARK A LINE ON THE CABLE 1/4-1/2 INCH ABOVE THE BACKSHELL SLEEVE (SEE FIGURE 9). CAREFULLY PUSH THE CABLE INTO THE BACKSHELL 1/4-1/2 INCH AND MAINTAIN CONTINUOUS PRESSURE TO HOLD AT THIS POSITION FOR THE NEXT FOUR STEPS. (LINE MARKED ON JACKET IS PARALLEL WITH END OF BACKSHELL SLEEVE)

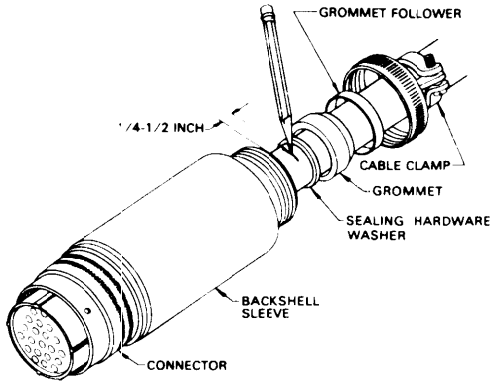



FIGURE 9
MARKING THE CABLE

13.12 VERIFY THE CABLE JACKET IS POSITIONED COMPLETELY THROUGH THE GROMMET.

13.13 SLIDE THE SEALING HARDWARE WASHER, (PC. 6), GROMMET (PC. 7), AND GROMMET FOLLOWER (PC. 8) INTO POSITION BEHIND THE SLEEVE.

13.14 SCREW THE CABLE CLAMP (PC. 9) ONTO THE SLEEVE AND TORQUE TO THE VALUE SPECIFIED IN TABLE 1.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5E3 OF DRAWING NO. 803-5001027.







FIGURE 5E3. MIL-C-28840 connector assembly procedure.

13.15 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 2 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT). (FIGURE 10).

NOTE IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

13.16 REMOVE THE CONNECTOR FROM THE ASSEMBLY FIXTURE.

TABLE 2

CLAMP SCREWS

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.5 IN | 25 ± 2 IN /OZ |
| 0.0 TO 1.0 IN | 40 ± 2 IN /OZ |
| 1.0 TO 2.0 IN | 50 ± 2 IN /OZ |

NOTE THESE TORQUE VALUES MUST BE MAINTAINED SO THAT A MINIMUM GAP OF NOT LESS THAN 1/16 IN. EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES.

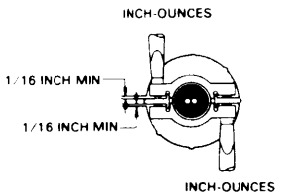



FIGURE 10

14. FINAL TEST AND DOCUMENTATION.

14.1 USING ESTABLISHED SHIPYARD PROCEDURES PERFORM ELECTRICAL/ELECTRONIC CHECKS ON THE ASSEMBLED CONNECTOR.

14.2 INSTALL A PROTECTIVE DUST CAP ON THE CONNECTOR.

14.3 COMPLETE THE ASSEMBLY INSPECTION AND DOCUMENTATION AS REQUIRED BY LOCAL PROCEDURES.

15. IF NECESSARY, LOCKWIRE THE CONNECTOR IN ACCORDANCE WITH FIGURE 5A24.



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NOTES:

1. THIS PROCEDURE SUPERSEDES SHEET 5E4 OF DRAWING NO. 803-5001027.



FIGURE 5E4. MIL-C-28840 connector assembly procedure.

1 VISUAL INSPECTION AND VERIFICATION

1.1 DISASSEMBLE THE CONNECTOR/BACKSHELL ASSEMBLY.

1.2 VERIFY THAT THE CONNECTOR IS OF THE CORRECT TYPE AND CONFIGURATION FOR THE CABLE BEING TERMINATED IN ACCORDANCE WITH THE SYSTEM CABLING DIAGRAM.

1.3 VERIFY THAT THE BACKSHELL CONFIGURATION IS OF THE CORRECT TYPE AS SPECIFIED ON THE SYSTEM CABLING DIAGRAM.

1.4 VERIFY THAT ALL COMPONENTS PARTS OF THE CONNECTOR AND BACKSHELL HARDWARE ARE PRESENT (SEE FIGURE 1 FOR A TYPICAL CONNECTOR/BACKSHELL CONFIGURATION). REFERENCE MIL SPECS, MIL-C-27599 FOR CONNECTOR, MIL-C-85049 FOR BACKSHELL, OR VENDOR DATA FOR SPECIFIC CONFIGURATIONS.

1.5 VISUALLY INSPECT THE COMPONENTS FOR DAMAGE SUCH AS DEFORMED PARTS, GOUGES, DAMAGED THREADS, CUT O-RINGS, BURRS, OR SURFACE DAMAGE.

1.6 VERIFY THAT THE CONTACTS MEET THE REQUIREMENTS OF MIL-C-27599 AND MATE PROPERLY WITH THEIR COUNTERPART CONTACTS.

1.7 IF THE CONDUCTORS ARE RETWISTED DURING LEAD PREPARATION, ENSURE THEY ARE TWISTED AS TIGHT AS ORIGINALLY CONSTRUCTED, THE NATURAL LAY OF THE CONDUCTOR IS MAINTAINED, AND THE CONDUCTORS WILL FIT INSIDE THE CONTACT BARREL.

2 PREPARE THE CABLE IN ACCORDANCE WITH FIGURE 5A1.

3 WHILE SOLDERING THE CONDUCTORS TO THE CONTACT, AN ASSEMBLY FIXTURE SHOULD BE UTILIZED IN ORDER TO IMMOBILIZE THE CABLE, CONDUCTORS, AND CONNECTOR. (FIGURE 2) THE CRITERIA FOR AN ACCEPTABLE ASSEMBLY FIXTURE ARE AS FOLLOWS:

A. A DUMMY RECEPTACLE, WITHOUT CONNECTOR INSERT, TO HOLD THE CONNECTOR BEING WORKED ON SECURELY, OR A CLAMPING DEVICE THAT WILL NOT DAMAGE THE CONNECTOR.

B. A CABLE CLAMPING FIXTURE TO HOLD THE CABLE IN A SECURE, FIXED RELATIONSHIP TO THE CONNECTOR WHILE PERMITTING ACCESS TO THE REAR FACE OF THE CONNECTOR FOR THE SOLDERING IRON.

- ANGLE ADJUSTED TO BACKSHELL CONFIGURATION (I.E. STRAIGHT, 45°, 90°)

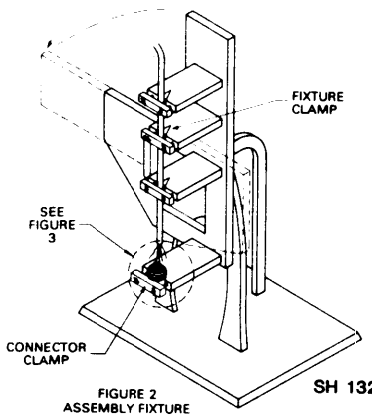


FIGURE 2
ASSEMBLY FIXTURE

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C. A DEVICE FOR HOLDING THE WIRE BUNDLE OUT OF THE WORK AREA.

THE ASSEMBLY FIXTURE REFERRED TO IN THIS PROCEDURE IS THAT DEVELOPED BY CHARLESTON NAVAL SHIPYARD (FIGURE 2).

NOTE: EQUIVALENT TOOLING FROM ALTERNATE SOURCES IS ACCEPTABLE. HOWEVER THE USE OF OTHER TOOLS MAY AFFECT THE PROCEDURAL STEPS OUTLINED BELOW.

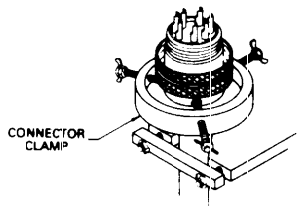



FIGURE 3
CONNECTOR SEATED IN ASSEMBLY FIXTURE

3.1 SECURE THE ASSEMBLY FIXTURE TO A VISE OR SIMILAR HOLDING DEVICE IN ORDER TO PROVIDE A STABLE WORK AREA.

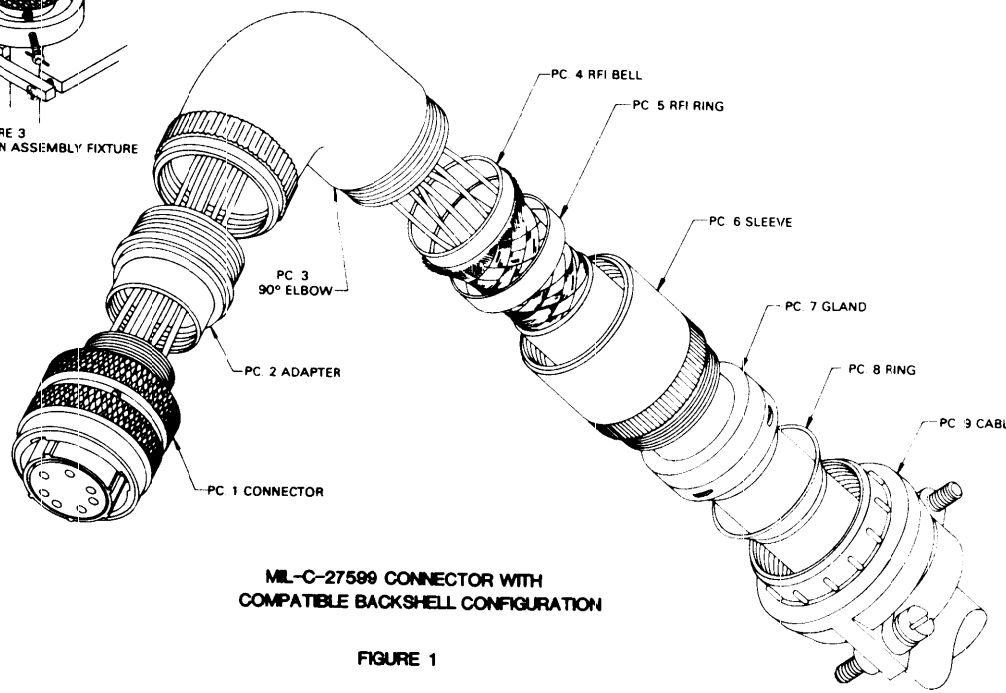
3.2 USE OF THIS ASSEMBLY FIXTURE NEGATES THE NEED FOR A DUMMY RECEPTACLE. FIGURE 3 ILLUSTRATES HOW THE CONNECTOR IS FIRMLY SEATED IN THE CONNECTOR CLAMP.

3.3 SEAT THE CONNECTOR IN THE CONNECTOR CLAMP AND ADJUST THE WING NUTS TO SECURE IT IN PLACE.

3.4 PLACE THE PREPARED CABLE IN THE FIXTURE CLAMP SO THAT THE FIRST CONTACTS TO BE SOLDERED WILL BE AT THE BACK OF THE CONNECTOR AS IT IS HELD IN THE CONNECTOR CLAMP.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5F1 OF DWG. 803-5001027.




MIL-C-27599 CONNECTOR WITH COMPATIBLE BACKSHELL CONFIGURATION

FIGURE 1

FIGURE 5F1. MIL-C-27599 connector assembly procedure.

3.5 POSITION THE CABLE AT THE ANGLE SIMILAR TO THE BACKSHELL DESIGN (I.E. 45°, 90°, OR STRAIGHT) SECURE THE CABLE IN THE FIXTURE CLAMP (FIGURE 4A)

3.6 POSITION THE CONNECTOR SO THAT THE CONNECTOR TO CABLE JACKET DISTANCE IS THAT MEASURED IN STEP 9.2 OF SHEET 5A1. ROTATE THE CONNECTOR TO ALIGN THE KEYWAY POSITION IN PROPER RELATIONSHIP TO THE BACKSHELL (FIGURE 4B)

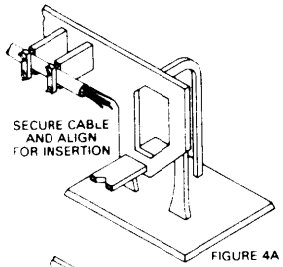



FIGURE 4A

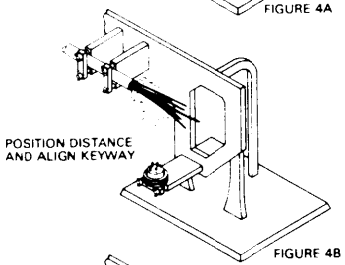



FIGURE 4B

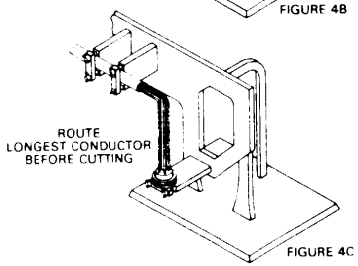



FIGURE 4C

FIGURE 4
DETERMINING CONDUCTOR LENGTH

3.7 ROUTE THE INDIVIDUAL CONDUCTORS PER THE APPLICABLE WIRING TABLE. ENSURE THAT THE LONGEST ROUTED CONDUCTOR HAS SUFFICIENT LENGTH AT THE REQUIRED POSITION TERMINATION PRIOR TO CUTTING ANY CONDUCTOR (FIGURE 4C).

3.8 CUT THE CONDUCTORS AS REQUIRED TO PROVIDE EVEN CONDUCTOR LENGTHS AT THE CONNECTOR INSERT.

NOTE: LEAVE THE SPARES FULL LENGTH.

4. STRIP THE INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH FIGURE 5A5 (FOR CONTACT WIRE BARREL DEPTHS SEE TABLE 1).

4.1 IF REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1/4 INCH THE JACKET MUST BE CUT BACK AGAIN AND ALL CONDUCTORS RETRIMMED TO PREVENT STRESS.

TABLE 1

| CONTACT SIZE | WIRE BARREL DEPTH |
|---|---|
| 22 | 094-.125 |
| 20 | 125-.156 |
| 16 | 141-.172 |

5. TIN INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH SHEET 5A13.

5.1 ENSURE CONDUCTOR STRANDS ARE TWISTED TIGHT PRIOR TO TINNING.

6. SOLDER THE CONDUCTORS TO THE CONTACTS IN ACCORDANCE WITH FIGURE 5A15. SOLDERING SHOULD START WITH THE CONTACT ROW(S) FURTHEST AWAY FROM THE OPERATOR. A PIECE OF STIFF FIRE-RETARDANT PAPER SHOULD BE INSERTED BETWEEN THE ROWS AS THEY ARE COMPLETED TO AID IN PROTECTING THE WORK ALREADY COMPLETED (SEE FIGURE 5 FOR EXAMPLE).

WARNING: DO NOT MOVE THE CONDUCTOR AFTER THE SOLDERING IRON HAS BEEN REMOVED OR A COLD SOLDERED JOINT COULD RESULT.

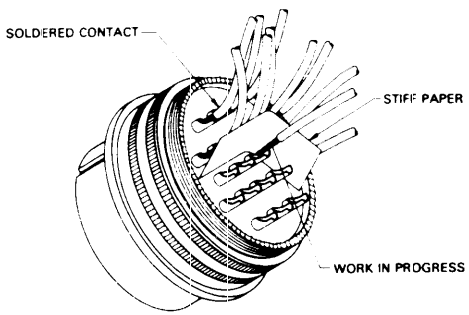



FIGURE 5
PROTECTING SOLDERED CONTACTS

7. REMOVE THE CABLE AND CONNECTOR FROM THE ASSEMBLY FIXTURE.

8. CONDUCT A VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.

9. BACKSHELL ASSEMBLY.

NOTE: THIS CONNECTOR SPECIFICATION DOES NOT PROVIDE FOR UNIQUE CONNECTOR ACCESSORY HARDWARE TO BE UTILIZED WITH THE CONNECTORS. THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 1. VARIATIONS IN HARDWARE DESIGN BASED ON MANUFACTURER MAY OCCUR AND CAUSE MINOR DEVIATIONS FROM THIS PROCEDURE. ASSEMBLY PROCEDURES SUPPLIED BY THE BACKSHELL MANUFACTURERS SHOULD BE UTILIZED WHEN CONFLICTS EXIST.

9.1 FOLD SPARE WIRES BACK ONE-HALF THE DISTANCE BETWEEN THE CONNECTOR AND THE JACKET END.

9.2 SLIDE A 1 INCH LONG PIECE OF APPROPRIATELY SIZED SHRINK TUBING OVER EACH FOLDED PAIR AND SHRINK IN PLACE.

9.3 LIGHTLY COAT THE THREADS OF EACH BACKSHELL PART WITH PETROLATUM (VV-P-236) JUST PRIOR TO ASSEMBLY.

9.4 POSITION AND LUBRICATE (PETROLATUM, VV-P-236) ALL O-RINGS.

9.5 SLIDE THE BACKSHELL ADAPTER (PC 2) DOWN THE CABLE AND SCREW IT ONTO THE CONNECTOR. TIGHTEN THE ADAPTER TO THE TORQUE VALUE PROVIDED IN TABLE 2 FOR THE APPROPRIATE SHELL SIZE USING A TORQUE WRENCH AND STRAP WRENCH.

9.6 SLIDE THE 90° ELBOW (PC 3) DOWN AND SCREW IT ONTO THE ADAPTER. TIGHTEN THE ELBOW TO THE TORQUE VALUE PROVIDED IN TABLE 2 FOR THE APPROPRIATE SHELL SIZE.

TABLE 2

| SHELL SIZE | CONNECTOR BACKSHELL & CABLE CLAMP TORQUE VALUE IN IN./LBS (± 5 IN./LBS) |
|---|---|
| 8 | 45 |
| 9 | 45 |
| 10 | 45 |
| 11 | 45 |
| 13 | 50 |
| 14 | 50 |
| 15 | 50 |
| 16 | 60 |
| 17 | 60 |
| 18 | 60 |
| 19 | 60 |
| 20 | 70 |
| 21 | 70 |
| 22 | 70 |
| 23 | 70 |
| 24 | 70 |
| 25 | 70 |

9.7 IF THE GROSS SHIELD IS TO BE FLOATED OR TERMINATED TO A CONNECTOR CONTACT, PROCEED TO STEP 9.8. IF THE SHIELD IS TO BE TERMINATED TO THE BACKSHELL RFI HARDWARE PROCEED AS FOLLOWS:

9.7.1 SLIDE THE RFI BELL (PC 4) AGAINST THE ELBOW.

9.7.2 FLARE THE GROSS SHIELD OVER THE TAPERED END OF THE RFI BELL.

9.7.3 GENTLY FORCE THE CABLE TOWARD THE CONNECTOR PLUG UNTIL THE SHIELD COVERS THE TAPERED SURFACE ON THE RFI BELL.

9.7.4 SLIDE THE RFI RING (PC 5) ONTO THE RFI BELL WHILE APPLYING FORWARD PRESSURE ON THE CABLE.

9.7.5 COMPRESS THE SHIELD BETWEEN THE RFI BELL AND RFI RING WITH A BACK AND FORTH TWISTING FORWARD MOTION ON THE RFI RING.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5F2 OF DWG. 803-5001027.



FIGURE 5F2. MIL-C-27599 connector assembly procedure.

9.8 SLIDE THE RFI BACKSHELL COMPONENTS (PC 4, 5) OVER ANY PIGTAILS, LOOPED GROUND WIRE OR SPARE CONDUCTORS.

9.9 SLIDE THE SLEEVE (PC 6) OVER THE RFI ASSEMBLY AND SCREW IT ONTO THE ELBOW.

9.10 TORQUE THE SLEEVE TO THE VALUE PROVIDED IN TABLE 2 FOR THE APPROPRIATE SHELL SIZE USING A TORQUE WRENCH AND STRAP WRENCH.

9.11 MARK A LINE ON THE CABLE 1/4-1/2 INCH ABOVE THE BACKSHELL SLEEVE (SEE FIGURE 6). CAREFULLY PUSH THE CABLE INTO THE BACKSHELL 1/4-1/2 INCH AND MAINTAIN CONTINUOUS PRESSURE TO HOLD AT THIS POSITION FOR THE NEXT FOUR STEPS. (LINE MARKED ON JACKET IS PARALLEL WITH BACKSHELL SLEEVE END.

9.12 VERIFY THE CABLE JACKET IS POSITIONED COMPLETELY THROUGH THE GLAND.

9.13 SLIDE THE GLAND (PC 7) AND RING (PC 8) INTO POSITION BEHIND THE SLEEVE.

9.14 SCREW THE CABLE CLAMP (PC 9) ONTO THE SLEEVE AND TORQUE TO THE VALUE SPECIFIED IN TABLE 2 USING A TORQUE WRENCH AND STRAP WRENCH.

9.15 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 3 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT) (FIGURE 7). ENSURE A MINIMUM GAP OF 1/16 INCH EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES.

TABLE 3

CLAMP SCREWS

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.5 IN | 25 ± 2 IN-OZ |
| 0.0 TO 1.0 IN | 40 ± 2 IN-OZ |
| 1.0 TO 2.0 IN | 50 ± 2 IN-OZ |

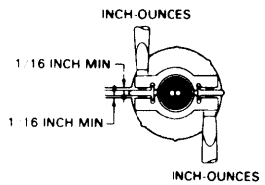



FIGURE 7

NOTE: IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

10. FINAL TEST AND DOCUMENTATION.

10.1 USING ESTABLISHED SHIPYARD PROCEDURES PERFORM ELECTRICAL/ELECTRONIC CHECKS ON THE ASSEMBLED CONNECTOR.

10.2 INSTALL A PROTECTIVE DUST CAP ON THE CONNECTOR.

10.3 COMPLETE THE ASSEMBLY INSPECTION AND DOCUMENTATION AS REQUIRED BY LOCAL PROCEDURES.

11. IF NECESSARY, LOCKWIRE THE CONNECTOR IN ACCORDANCE WITH FIGURE 5A24.

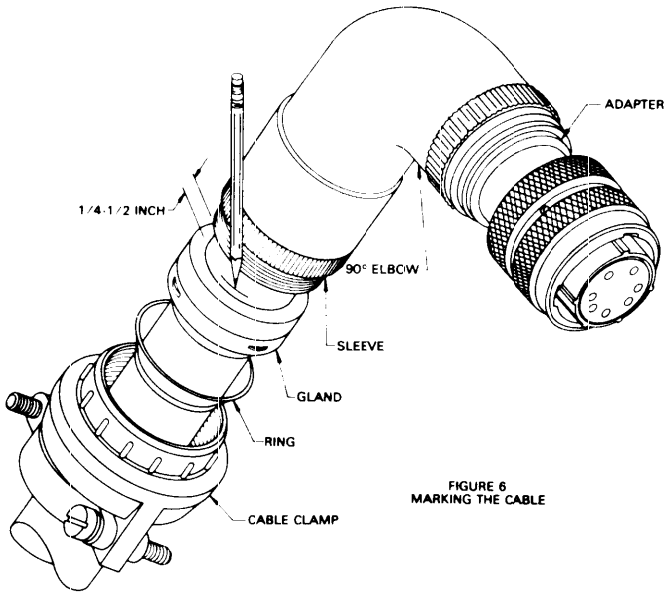



FIGURE 6
MARKING THE CABLE

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5F3 OF DWG 803-5001027.







FIGURE 5F3. MIL-C-27599 connector assembly procedure.

1. VISUAL INSPECTION AND VERIFICATION

1.1 DISASSEMBLE THE CONNECTOR/BACKSHELL ASSEMBLY.

1.2 VERIFY THAT THE CONNECTOR IS OF THE CORRECT TYPE AND CONFIGURATION FOR THE CABLE BEING TERMINATED IN ACCORDANCE WITH THE SYSTEM CABLING DIAGRAM.

1.3 VERIFY THAT THE BACKSHELL CONFIGURATION IS OF THE CORRECT TYPE AS SPECIFIED ON THE SYSTEM CABLING DIAGRAM.

1.4 VERIFY THAT ALL COMPONENTS PARTS OF THE CONNECTOR AND BACKSHELL HARDWARE ARE PRESENT. (SEE FIGURE 1 FOR A TYPICAL CONNECTOR/BACKSHELL CONFIGURATION). REFERENCE MIL SPECS, MIL-C-22992 FOR CONNECTOR, MIL-C-85049 M.S. DWGS FOR BACKSHELL OR VENDOR DATA FOR SPECIFIC CONFIGURATIONS.

1.5 VISUALLY INSPECT THE COMPONENTS FOR DAMAGE SUCH AS DEFORMED PARTS, GOUGES, DAMAGES THREADS, CUT O-RINGS, BURRS, OR SURFACE DAMAGE.

1.6 VERIFY THAT CONTACTS MEET THE REQUIREMENTS OF MIL-C-22992.

1.7 IF THE CONDUCTORS ARE RETWISTED DURING LEAD PREPARATION, ENSURE THEY ARE TWISTED AS TIGHT AS ORIGINALLY CONSTRUCTED, THE NATURAL LAY OF THE CONDUCTOR IS MAINTAINED, AND THE CONDUCTORS WILL FIT INSIDE THE CONTACT BARREL.

2. PREPARE THE CABLE IN ACCORDANCE WITH FIGURE 5A1.

3. WHILE SOLDERING THE CONDUCTORS TO THE CONTACT, AN ASSEMBLY FIXTURE SHOULD BE UTILIZED IN ORDER TO IMMOBILIZE THE CABLE, CONDUCTORS, AND CONNECTOR. (FIGURE 2) THE CRITERIA FOR AN ACCEPTABLE ASSEMBLY FIXTURE ARE AS FOLLOWS.

A. A DUMMY RECEPTACLE, WITHOUT CONNECTOR INSERT, TO HOLD THE CONNECTOR BEING WORKED ON SECURELY OR A CLAMPING DEVICE THAT WILL NOT DAMAGE THE CONNECTOR.

B. A CABLE CLAMPING FIXTURE TO HOLD THE CABLE IN A SECURE, FIXED RELATIONSHIP TO THE CONNECTOR WHILE PERMITTING ACCESS TO THE REAR FACE OF THE CONNECTOR FOR THE SOLDERING IRON.

C. A DEVICE FOR HOLDING THE WIRE BUNDLE OUT OF THE WORK AREA.

THE ASSEMBLY FIXTURE REFERRED TO IN THIS PROCEDURE IS THAT DEVELOPED BY CHARLESTON NAVAL SHIPYARD (FIGURE 2).

NOTE: EQUIVALENT TOOLING FROM ALTERNATE SOURCES IS ACCEPTABLE. HOWEVER THE USE OF OTHER TOOLS MAY AFFECT THE PROCEDURAL STEPS OUTLINED BELOW.

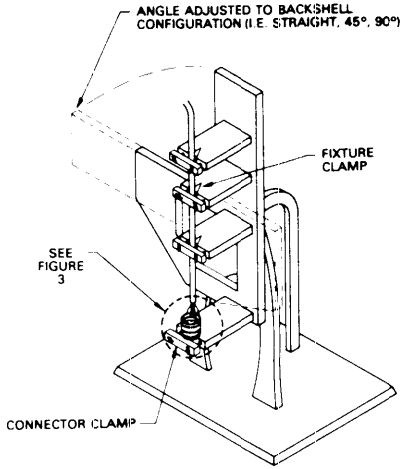



FIGURE 2
ASSEMBLY FIXTURE

3.1 PREPARE THE CONNECTOR AND CABLE FOR SOLDERING AS FOLLOWS.

3.1.1 SECURE THE ASSEMBLY FIXTURE TO A VISE OR SIMILAR HOLDING DEVICE.

3.1.2 USE OF THIS ASSEMBLY FIXTURE NEGATES THE NEED FOR A DUMMY RECEPTACLE. FIGURE 3 ILLUSTRATES HOW THE CONNECTOR IS FIRMLY SEATED IN THE CONNECTOR CLAMP.

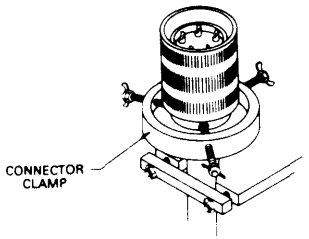
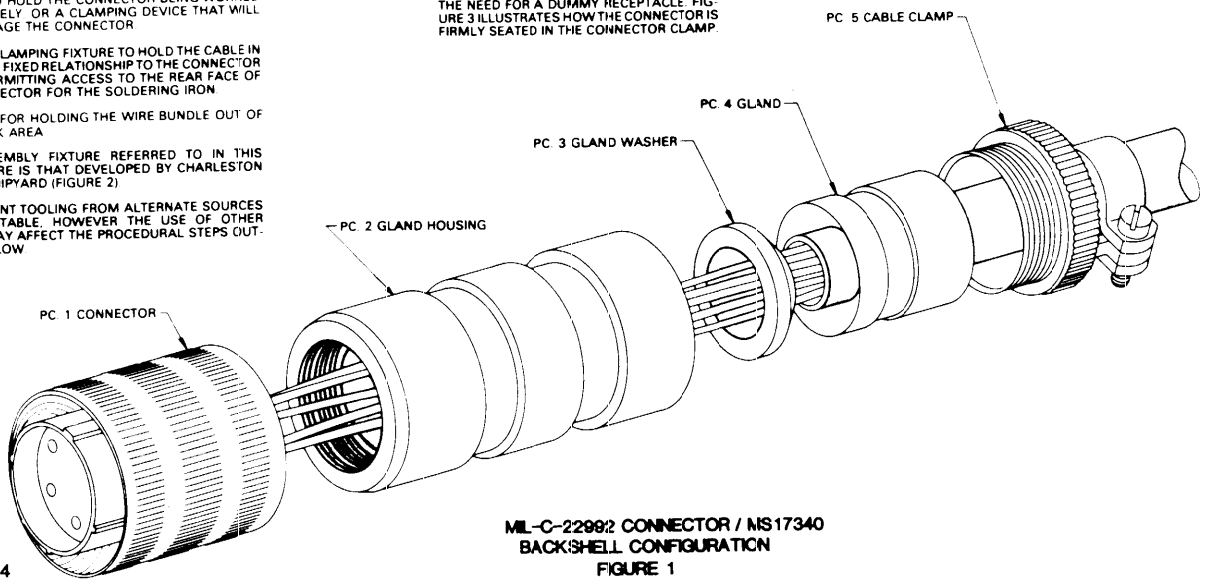



FIGURE 3
CONNECTOR SEATED IN ASSEMBLY FIXTURE

3.1.3 SEAT THE CONNECTOR IN THE CONNECTOR CLAMP AND ADJUST THE WING NUTS TO SECURE IT IN PLACE.

3.1.4 PLACE THE PREPARED CABLE IN THE FIXTURE CLAMP SO THAT THE FIRST CONTACTS TO BE SOLDERED WILL BE AT THE BACK OF THE CONNECTOR AS IT IS HELD IN THE CONNECTOR CLAMP.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5G1 OF DWG. 803-5001027.




MIL-C-22992 CONNECTOR / MS17340
BACKSHELL CONFIGURATION
FIGURE 1

SH 132317374

FIGURE 5G1. MIL-C-22992 connector assembly procedure (excluding class L).

3.1.5 POSITION THE CABLE AT THE ANGLE SIMILAR TO THE BACKSHELL DESIGN (I.E. 45°, 90°, OR STRAIGHT). SECURE THE CABLE IN THE FIXTURE CLAMP (FIGURE 4A).

3.1.6 POSITION THE CONNECTOR SO THAT THE CONNECTOR TO CABLE JACKET DISTANCE IS THAT MEASURED IN STEP 9.2 OF FIGURE 5A1. ROTATE THE CONNECTOR TO ALIGN THE KEYWAY POSITION IN PROPER RELATIONSHIP TO THE BACKSHELL (FIGURE 4B).

3.1.7 ROUTE THE INDIVIDUAL CONDUCTORS PER THE APPLICABLE WIRING TABLE. ENSURE THAT THE LONGEST ROUTED CONDUCTOR HAS SUFFICIENT LENGTH AT THE REQUIRED POSITION TERMINATION PRIOR TO CUTTING ANY CONDUCTOR (FIGURE 4C).

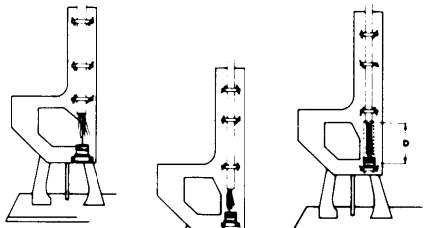


FIGURE 4A
SECURE CABLE AND ALIGN FOR INSERTION

FIGURE 4B
POSITION AT DISTANCE AND ALIGN KEYWAY

FIGURE 4C
ROUTE LONGEST CONDUCTOR BEFORE CUTTING

FIGURE 4
DETERMINING CONDUCTOR LENGTH

3.2 CUT THE CONDUCTORS AS REQUIRED TO PROVIDE EVEN CONDUCTOR LENGTHS AT THE CONNECTOR INSERT.

NOTE: LEAVE THE SPARES FULL LENGTH.

4 STRIP THE INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH FIGURE 5A5 (FOR CONTACT WIRE BARREL DEPTHS SEE TABLE 1).

TABLE 1

| CONTACT SIZE | WIRE BARREL DEPTH (IN.) |
|---|---|
| 16 | .250-.313 |
| 12 | .375-.438 |
| 8 | .500-.563 |
| 4 | .625-.688 |
| 0 | .625-.688 |

5 TIN THE CONDUCTORS IN ACCORDANCE WITH FIGURE 5A13.

5.1 ENSURE CONDUCTOR STRANDS ARE TWISTED TIGHT PRIOR TO TINNING.

5.2 IF REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1/4 INCH THE JACKET MUST BE CUT BACK AGAIN AND ALL LEADS RETRIMMED TO PRECLUDE STRESS.

SH 132317375

6 SOLDER THE CONDUCTORS TO THE CONTACTS IN ACCORDANCE WITH SHEET 5A15. SOLDERING SHOULD START WITH THE CONTACT ROW(S) FURTHEST AWAY FROM THE OPERATOR. A PIECE OF STIFF FIRE RETARDANT PAPER SHOULD BE INSERTED BETWEEN THE ROWS AS THEY ARE COMPLETED TO AID IN PROTECTING THE WORK ALREADY ACCOMPLISHED (SEE FIGURE 5 FOR EXAMPLE).

WARNING: DO NOT MOVE THE CONDUCTOR AFTER THE SOLDERING IRON HAS BEEN REMOVED OR A COLD SOLDER JOINT COULD RESULT.

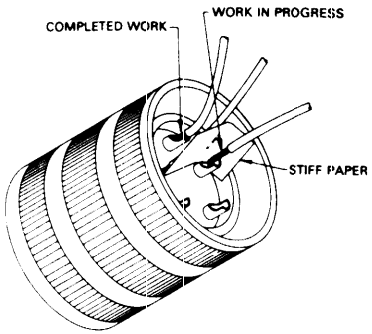



FIGURE 5
PROTECTING SOLDERED CONTACTS

7 REMOVE THE CABLE AND CONNECTOR FROM THE ASSEMBLY FIXTURE.

8 CONDUCT A VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.

9 BACKSHELL ASSEMBLY.

NOTE: THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 1. VARIATIONS MAY OCCUR AND CAUSE MINOR DEVIATIONS FROM THIS PROCEDURE. THE APPLICABLE MANUFACTURER'S INSTRUCTIONS SHOULD BE UTILIZED TO RESOLVE ASSEMBLY PROCEDURES FOR CONFIGURATIONS NOT COVERED IN THIS PROCEDURE.

9.1 LUBRICATE THE THREADS OF ALL BACKSHELL COMPONENTS WITH PETROLATUM (VV-P-236) PRIOR TO ASSEMBLY.

9.2 FOLD SPARE WIRES BACK ONE-HALF THE DISTANCE BETWEEN THE CONNECTOR AND THE JACKET END.

9.3 SLIDE A 1 INCH LONG PIECE OF APPROPRIATELY SIZED SHRINK TUBING OVER EACH FOLDED PAIR AND SHRINK IN PLACE.

9.4 POSITION AND LUBRICATE ALL O-RINGS.

9.5 SLIDE THE GLAND HOUSING (PC 2) DOWN THE CABLE AND SCREW IT ONTO THE CONNECTOR. TIGHTEN THE GLAND HOUSING TO THE TORQUE VALUE PROVIDED IN TABLE 2 FOR THE APPROPRIATE SHELL SIZE.

TABLE 2

| SHELL SIZE | CONNECTOR REAR THREAD AND CABLE CLAMP TORQUE IN IN./LBS (± 5 IN./LBS) |
|---|---|
| 8 | 45 |
| 8S | 45 |
| 10 | 45 |
| 10S | 45 |
| 10SL | 45 |
| 12 | 50 |
| 12S | 50 |
| 14 | 50 |
| 14S | 50 |
| 16 | 60 |
| 16S | 60 |
| 18 | 60 |
| 20 | 70 |
| 22 | 70 |
| 24 | 70 |
| 28 | 80 |
| 32 | 100 |
| 36 | 120 |
| 40 | 140 |
| 44 | 140 |
| 48 | 140 |

9.6 SLIDE THE GLAND WASHER (PC 3) AND GLAND (PC 4) INTO THE GLAND HOUSING. ENSURE THE CABLE JACKET EXTENDS THROUGH THE AREA UNDER THE GLAND.

9.7 SCREW THE CABLE CLAMP (PC 5) INTO THE GLAND HOUSING AND TORQUE TO A VALUE SPECIFIED IN TABLE 2.

9.8 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 3 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT) (FIGURE 6). ENSURE A MINIMUM GAP OF 1/16 INCH EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES.

NOTE: IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

TABLE 3

CLAMP SCREWS

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.5 IN. | 25 ± 2 IN./OZ |
| 0.5 TO 1.0 IN. | 40 ± 2 IN./OZ |
| 1.0 TO 2.0 IN. | 50 ± 2 IN./OZ |

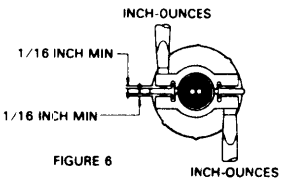



FIGURE 6

10 FINAL TEST AND DOCUMENTATION.

10.1 USING ESTABLISHED SHIPYARD PROCEDURES PERFORM ELECTRICAL/ELECTRONIC CHECKS ON THE ASSEMBLED CONNECTOR.

10.2 INSTALL A PROTECTIVE DUST CAP ON THE CONNECTOR.

10.3 COMPLETE THE ASSEMBLY INSPECTION AND DOCUMENTATION AS REQUIRED BY LOCAL PROCEDURES.

11 IF NECESSARY LOCKWIRE THE CONNECTOR IN ACCORDANCE WITH FIGURE 5A24.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5G2 OF DWG. 803-5001027.







FIGURE 5G2. MIL-C-22992 connector assembly procedure (excluding class L).

APPLICABLE CONNECTORS

MS27467
MS27468
MS27653
MS27661
MS27473
MS27484
MS27500
D38999/26
D38999/28
D38999/29
D38999/30
D38999/46
D38999/47

1. VISUAL INSPECTION AND VERIFICATION

1.1 DISASSEMBLE THE CONNECTOR/BACKSHELL ASSEMBLY.

1.2 VERIFY THAT THE CONNECTOR IS OF THE CORRECT TYPE AND CONFIGURATION FOR THE CABLE BEING TERMINATED IN ACCORDANCE WITH THE SYSTEM CABLING DIAGRAM.

1.3 VERIFY THAT THE BACKSHELL CONFIGURATION IS OF THE CORRECT TYPE AS SPECIFIED ON THE SYSTEM CABLING DIAGRAM.

1.4 VERIFY THAT ALL COMPONENTS PARTS OF THE CONNECTOR AND BACKSHELL HARDWARE ARE PRESENT (SEE FIGURE 1 FOR A TYPICAL CONNECTOR BACKSHELL CONFIGURATION). REFERENCE MIL SPECS MIL-C-38999 FOR CONNECTOR, MIL-C-85049 FOR BACKSHELL, OR VENDOR DATA FOR SPECIFIC CONFIGURATIONS.

1.5 VISUALLY INSPECT THE COMPONENTS FOR DAMAGE SUCH AS DEFORMED PARTS, GOUGES, DAMAGES THREADS, CUT O-RINGS, BURRS, OR SURFACE DAMAGE.

1.6 VERIFY THAT THE CRIMP CONTACTS MEET THE REQUIREMENTS OF MIL-C-39029/58 FOR SERIES 1, 2, 3 AND 4 PIN, MIL-C-39029/56 FOR SERIES 1, 3, AND 4 SOCKET, AND MIL-C-39029/57 FOR SERIES 2 SOCKET CONTACTS AND ARE THE CORRECT SIZE AND TYPE FOR THE CONNECTOR BEING ASSEMBLED.

1.7 VERIFY THAT THE SOLDER CONTACTS MEET THE REQUIREMENTS OF MIL-C-38999 AND MATE PROPERLY WITH THEIR COUNTERPART CONTACTS.

1.8 IF THE CONDUCTORS ARE RETWISTED DURING LEAD PREPARATION, ENSURE THEY ARE TWISTED AS TIGHT AS ORIGINALLY CONSTRUCTED. THE NATURAL LAY OF THE CONDUCTOR IS MAINTAINED, AND THE CONDUCTORS WILL FIT INSIDE THE CONTACT BARREL 2.

2. PREPARE THE CABLE IN ACCORDANCE WITH FIGURE 5A1.

3. INSERTION SETUP. OWING TO THE MANY POSSIBLE VARIATIONS FOR ACCEPTABLE TOOLING FOR CONTACT INSERTION AND SOLDERING, NO SPECIFICATION IS MADE AS TO A PARTICULAR TYPE. THE CRITERIA WHICH ARE DESIRABLE FOR AN ACCEPTABLE ASSEMBLY FIXTURE ARE AS FOLLOWS:

A. A DUMMY RECEPTACLE, WITHOUT CONNECTOR INSERT, TO HOLD THE CONNECTOR BEING WORKED ON SECURELY OR A CLAMPING DEVICE THAT WILL NOT DAMAGE THE CONNECTOR.

B. A CABLE CLAMPING FIXTURE TO HOLD THE CABLE IN A SECURE, FIXED RELATIONSHIP TO THE CONNECTOR WHILE PERMITTING ACCESS TO THE REAR FACE OF THE CONNECTOR FOR THE CONTACT INSERTION TOOL OR SOLDERING IRON.

C. A DEVICE FOR HOLDING THE WIRE BUNDLE OUT OF THE WORK AREA.

THE ASSEMBLY FIXTURE REFERRED TO IN THIS PROCEDURE IS THAT DEVELOPED BY CHARLESTON NAVAL SHIPYARD (FIGURE 2).

NOTE: EQUIVALENT TOOLING FROM ALTERNATE SOURCES IS ACCEPTABLE. HOWEVER THE USE OF OTHER TOOLS MAY AFFECT THE PROCEDURAL STEPS OUTLINED BELOW.

3.1 SECURE THE ASSEMBLY FIXTURE TO A VISE OR SIMILAR HOLDING DEVICE IN ORDER TO PROVIDE A STABLE WORK AREA.

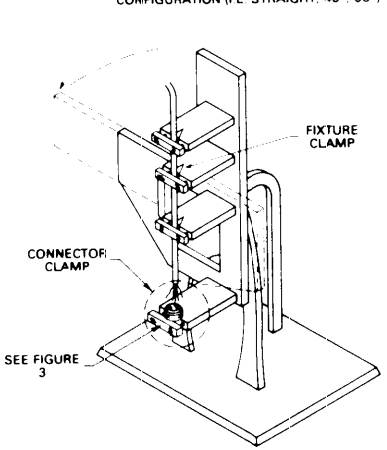



FIGURE 2.
ASSEMBLY FIXTURE

3.2 USE OF THIS ASSEMBLY FIXTURE NEGATES THE NEED FOR A DUMMY RECEPTACLE. FIGURE 3 ILLUSTRATES HOW THE CONNECTOR IS FIRMLY SEATED IN THE CONNECTOR CLAMP.

3.3 SEAT THE CONNECTOR IN THE CONNECTOR CLAMP AND ADJUST THE WING NUTS TO SECURE IT IN PLACE.

3.4 PLACE THE PREPARED CABLE IN THE FIXTURE CLAMP SO THAT THE FIRST CONTACTS TO BE INSERTED WILL BE AT THE BACK OF THE CONNECTOR AS IT IS HELD IN THE CONNECTOR CLAMP.

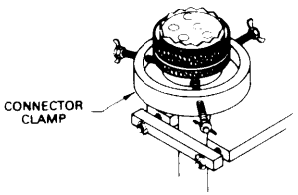
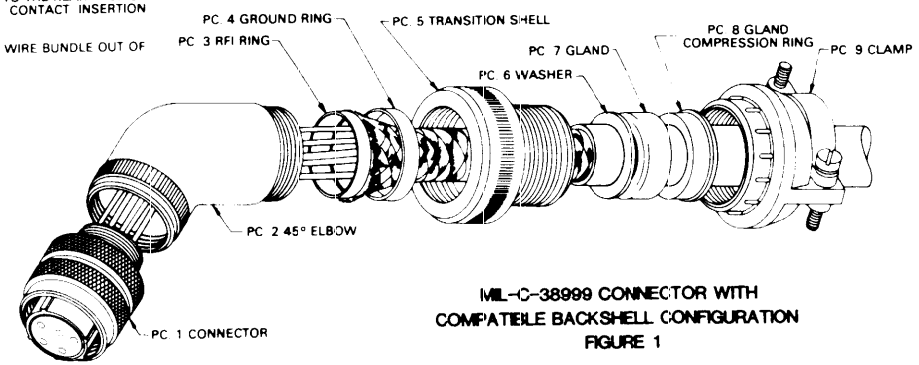



FIGURE 3
CONNECTOR SEATED IN ASSEMBLY FIXTURE

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5H1 OF DWG 803-5001027.




MIL-C-38999 CONNECTOR WITH COMPATIBLE BACKSHELL CONFIGURATION
FIGURE 1

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FIGURE 5H1. MIL-C-38999 connector assembly procedure.

3.5 POSITION THE CABLE AT THE ANGLE SIMILAR TO THE BACKSHELL DESIGN (I.E. 45°, 90° OR STRAIGHT). SECURE THE CABLE IN THE FIXTURE CLAMP (FIGURE 4A).

3.6 POSITION THE CONNECTOR SO THAT THE CONNECTOR TO CABLE JACKET DISTANCE IS THAT MEASURED IN STEP 9.2 OF FIGURE 5A1. ROTATE THE CONNECTOR TO ALIGN THE KEYWAY POSITION IN PROPER RELATIONSHIP TO THE BACKSHELL (FIGURE 4B).

3.7 ROUTE THE INDIVIDUAL CONDUCTORS PER THE APPLICABLE WIRING TABLE. ENSURE THAT THE LONGEST ROUTED CONDUCTOR HAS SUFFICIENT LENGTH AT THE REQUIRED POSITION TERMINATION PRIOR TO CUTTING ANY CONDUCTOR. (FIGURE 4C)

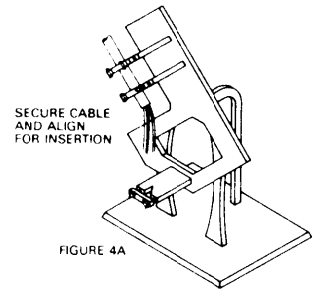

FIGURE 4A

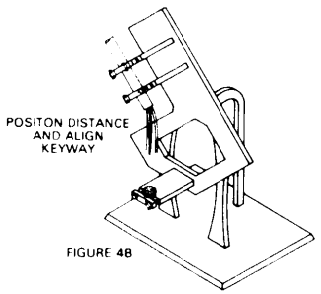

FIGURE 4B

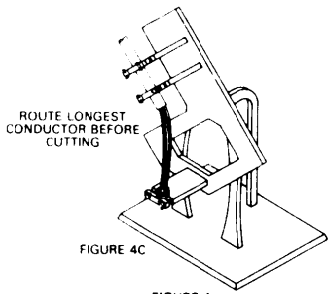

FIGURE 4C

FIGURE 4
DETERMINING CONDUCTOR LENGTH

3.8 CUT THE CONDUCTORS AS REQUIRED TO PROVIDE EVEN CONDUCTOR LENGTHS AT THE CONNECTOR INSERT.

NOTE: LEAVE THE SPARES FULL LENGTH.

4 STRIP THE INDIVIDUAL CONDUCTORS IN ACCORDANCE WITH FIGURE 5A5 (FOR CONTACT WIRE BARREL DEPTHS SEE TABLE 1).

TABLE 1

| CONTACT BARREL SIZE | WIRE BARREL DEPTH (IN.) | |
|---|---|---|
| | FRONT RELEASE | REAR RELEASE |
| 12-12 | 209-229 | 141-172 |
| 16-16 | 209-229 | 141-172 |
| 20-20 | 209-229 | 125-156 |
| 22-22 | 141-157 | 094-125 |
| 22-22M | 141-157 | 094-125 |
| 22-22D | 141-157 | 094-125 |

NOTE: FOR SOLDER CONNTACTS PROCEED TO STEP 6.

5 CRIMP CONTACT TERMINATION TO CONNECTOR.

5.1 PRIOR TO CRIMPING, A CONTACT SIZING TEST SHOULD BE ACCOMPLISHED FOR ALL SOCKET CONTACTS (PIN CONTACTS PREVIOUSLY VERIFIED IN STEP 1.6 DO NOT NEED FURTHER TESTING).

5.1.1 SOCKET CONTACTS SHOULD BE INSPECTED FOR PROPER SIZE USING A PIN CONTACT GAGE CONFORMING TO MS3197. WHEN TESTED, THE MINIMUM SEPARATION FORCE, MEASURED WITH A TENSION-COMPRESSION GAGE (CHATILLON DPP-16 OR EQUIVALENT) SHOULD BE AS SPECIFIED IN TABLE 1.

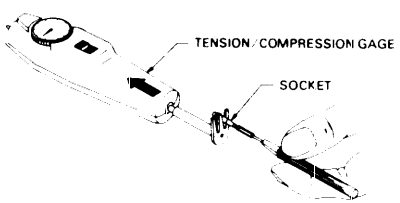

FIGURE 5
SOCKET CONTACT SIZING TEST

5.2 TERMINATE INDIVIDUAL CONDUCTORS WITH CRIMP CONTACTS IN ACCORDANCE WITH SHEET 5A11 (SEE TABLE 2 FOR PROPER CRIMPING TOOL). IF CONTACT REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1/4 INCH THE JACKET MUST BE CUT BACK AGAIN AND ALL CONDUCTORS RETRIMMED TO PRECLUDE STRESS.

TABLE 2

| CONTACT SIZE | SERIES 1, 2, 3, 4 PIN CONTACT | | SERIES 1, 2, 3, 4 SOCKET CONTACT | | MINIMUM SEPARATION FORCE (OZ) |
|---|---|---|---|---|---|
| | BASIC CRIMPING TOOL | POSITIONER | BASIC CRIMPING TOOL | POSITIONER | |
| 12-12 | M22520/1-01 | M22520/1-04 YELLOW | M22520/1-01 | M22520/1-04 YELLOW | 2.5 |
| 16-16 | M22520/1-01 | M22520/1-04 BLUE | M22520/1-01 | M22520/1-04 BLUE | 1.5 |
| | M22520/7-01 | M22520/7-04 | M22520/7-01 | M22520/7-04 | |
| 20-20 | M22520/1-01 | M22520/1-04 RED | M22520/1-01 | M22520/1-04 RED | 0.6 |
| | M22520/2-01 | M22520/2-10 | M22520/2-01 | M22520/2-10 | |
| | M22520/7-01 | M22520/7-08 | M22520/7-01 | M22520/7-08 | |
| 22-22, 22-22M, 22-22D | M22520/2-01 | M22520/2-09 | M22520/2-01 | M22520/2-07 | 0.6 |
| | M22520/7-01 | M22520/7-07 | M22520/7-01 | M22520/7-05 | |
| | | | | M22520/2-06* | 0.6 |
| | | | | M22520/7-06* | |

*SERIES 2 SOCKET CONTACTS ONLY

5.3 INSERTING CONTACTS (FIGURE 6)

5.3.1 USING THE PROPER WIRING TABLE, PROPER INSERTION TOOL BASED ON CONTACT TYPE (SEE TABLE 3), AND WORKING FROM THE REAR TO THE FRONT OF THE ASSEMBLY FIXTURE, INSERT THE CONTACTS INTO THEIR DESIGNATED LOCATIONS IN THE CONNECTOR AS FOLLOWS:

TABLE 3

| CONTACT SIZE | INSTALLING TOOL | REMOVAL TOOL |
|---|---|---|
| 12-12 | M81969/8-09<br>M81969/14-04 | M81969/8-10<br>M81969/14-04 |
| 16-16 | M81969/8-07<br>M81969/14-03 | M81969/8-08<br>M81969/14-03 |
| 20-20 | M81969/8-05<br>M81969/14-02 | M81969/8-06<br>M81969/14-02 |
| 22-22 | M81969/8-03 | M81969/8-04 |
| 22-22M | M81969/8-01<br>M81969/14-01 | M81969/8-02<br>M81969/14-01 |
| 22-22D | M81969/8-01<br>M81969/14-01 | M81969/8-02<br>M81969/14-01 |

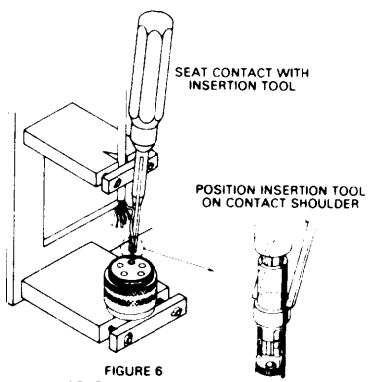

FIGURE 6
CONTACT INSERTION

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5H2 OF DWG. 803-5001027.







FIGURE 5H2. MIL-C-38999 connector assembly procedure.

5.3.1.1 POSITION THE CONTACT IN THE TOOL. THE TOOL TIP SHOULD BE AGAINST THE CONTACT SHOULDER JUST FORWARD OF THE WIRE BARREL.

5.3.1.2 INSERT THE CONTACT AND TOOL TIP INTO THE CONTACT CAVITY WITH A FIRM STEADY PRESSURE.

5.3.1.3 SLIDE THE INSERTION TOOL BACK ALONG THE WIRE UNTIL IT CLEARS THE CONNECTOR INSERT.

5.3.1.3.1 LIGHTLY PULL ON THE INSERTED LEAD TO ENSURE THE CONTACT IS LOCKED IN THE CONNECTOR.

5.3.1.4 ADJUST THE FIXTURE CLAMP AS REQUIRED DURING THE INSERTION PROCESS TO EASE STRESS ON THE CONDUCTORS.

5.3.1.5 ENSURE THAT THE SHIELD GROUND WIRE (IF TERMINATED TO A CONTACT) IS INSERTED IN ITS PROPER LOCATION.

5.3.1.6 UPON INSERTION OF EACH TWO ROWS OF PIN CONTACTS, VISUALLY INSPECT THE CONNECTOR FACE TO ENSURE THAT THE CONTACTS ARE PROPERLY INSERTED AND DO NOT "CROSS OVER" INTO ADJACENT PIN HOLES. ANY IMPROPERLY INSERTED CONTACTS WILL APPEAR ANGLED WHEN COMPARED TO THE PROPERLY INSERTED CONTACTS.

5.3.1.7 INSERT SEALING PLUGS MEETING THE REQUIREMENTS OF MILITARY STANDARD MS27488 INTO ALL UNWIRED CONTACT HOLES.

5.4 REMOVE THE CONNECTOR AND CABLE FROM THE ASSEMBLY FIXTURE.

5.5 CONDUCT A VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.

5.6 CONTACT REMOVAL PROCEDURE (AS REQUIRED)

5.6.1 CONDUCT A VISUAL INSPECTION OF THE CONNECTOR FACE TO IDENTIFY ANY UNSEATED CONTACTS.

5.6.2 IF REQUIRED TO REMOVE CONTACTS PROCEED AS FOLLOWS (FIGURE 7)

5.6.2.1 SELECT THE CORRECT REMOVAL TOOL FROM TABLE 3.

5.6.2.2 STRADDLE THE WIRE OF THE CONTACT TO BE REMOVED WITH THE REMOVAL TOOL.

5.6.2.3 SLIDE THE TOOL INTO THE INSERT UNTIL BOTTOMED AROUND THE CONTACT.

CAUTION: DO NOT TWIST THE EXTRACTION TOOL.

5.6.2.4 REMOVE THE CONTACT AND TOOL SLOWLY FROM THE CONNECTOR.

5.6.2.5 EXAMINE THE CONNECTOR AND CONTACT FOR DAMAGE.

5.6.2.6 REINSERT ALL EXTRACTED CONTACTS AND REPEAT THE SEATING CHECKS.

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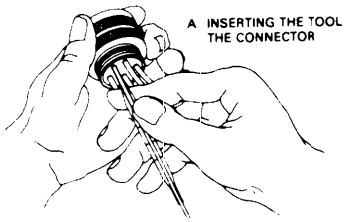
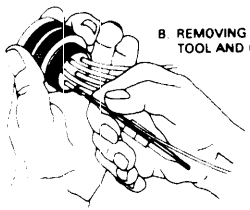


A. INSERTING THE TOOL INTO THE CONNECTOR



B. REMOVING THE TOOL AND CONTACT

FIGURE 7
CONTACT REMOVAL (REAR RELEASE)

5.6.3 IF A CONTACT FAILS TO RESEAT AFTER THREE INSERTION ATTEMPTS REPLACE THE OFFENDING CONTACT. IF THE SAME CONTACT LOCATION CONTINUES TO GIVE DIFFICULTY, THE CONNECTOR IS PROBABLY DAMAGED OR FAULTY AND MUST BE REPLACED.

5.7 CONTACT PUSH TEST

5.7.1 USING THE COMBINATION TENSION/COMPRESSION GAGE (CHATILLON DPP 50 OR EQUIVALENT) PUSH TEST ALL CRIMP CONTACTS TO EVALUATE CONTACT RETENTION. (FIGURE 8).

5.7.1.1 SEE TABLE 4 FOR PUSH TEST VALUES.

TABLE 4

| CONTACT SIZE | PUSH TEST VALUE (LBS.) |
|---|---|
| 12-12 | 25 |
| 16-16 | 25 |
| 20-20 | 15 |
| 22-22 | 10 |
| 22-22M | 10 |
| 22-22D | 10 |

5.7.1.2 ENSURE THE CORRECT PUSH TEST ADAPTER/PROBE IS UTILIZED FOR THE CONTACT SIZE BEING TESTED.

5.7.1.3 THE FORCE SHALL BE APPLIED TO THE MATING END OF THE CONTACT IN A FIRM, SLOW MANNER. DO NOT INSTANTANEOUSLY APPLY THE FORCES LISTED IN TABLE 4.

5.8 PROCEED TO STEP 7.

6. SOLDER TERMINATION TO CONNECTOR.

6.1 TIN THE CONDUCTORS IN ACCORDANCE WITH SHEET 5A13.

6.1.1 ENSURE CONDUCTOR STRANDS ARE TWISTED TIGHT PRIOR TO TINNING.

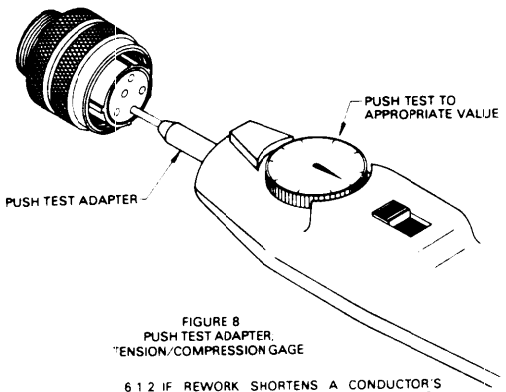



FIGURE 8
PUSH TEST ADAPTER, TENSION/COMPRESSION GAGE

6.1.2 IF REWORK SHORTENS A CONDUCTOR'S INITIAL LENGTH BY GREATER THAN 1/4 INCH THE JACKET MUST BE CUT BACK AGAIN AND ALL LEADS RETRIMMED TO PRECLUDE STRESS.

6.2 SOLDER THE CONDUCTORS TO THE CONTACTS IN ACCORDANCE WITH FIGURE 5A15. SOLDERING SHOULD START WITH THE CONTACT ROW(S) FURTHEST AWAY FROM THE OPERATOR. A PIECE OF STIFF FIRE RETARDANT PAPER SHOULD BE INSERTED BETWEEN THE ROWS AS THEY ARE COMPLETED TO AID IN PROTECTING THE WORK ALREADY ACCOMPLISHED (SEE FIGURE 9 FOR EXAMPLE).

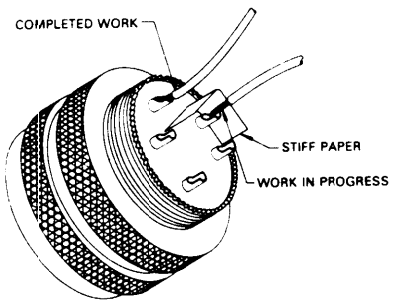



FIGURE 9
PROTECTING SOLDERING CONTACTS

WARNING: DO NOT MOVE THE CONDUCTOR AFTER THE SOLDERING IRON HAS BEEN REMOVED OR A COLD SOLDER JOINT COULD RESULT.

6.3 REMOVE THE CABLE AND CONNECTOR FROM THE ASSEMBLY FIXTURE.

6.4 CONDUCT A VISUAL CHECK OF THE CONNECTOR AND VERIFY WIRE LOCATION AGAINST THE WIRING TABLE. ENSURE NO DEBRIS IS INSIDE SOCKET CONTACTS.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 5H3 OF DWG 803-500127.



FIGURE 5H3. MIL-C-38999 connector assembly procedure.

7. BACKSHELL ASSEMBLY

NOTE: THIS CONNECTOR SPECIFICATION DOES NOT PROVIDE FOR UNIQUE CONNECTOR ACCESSORY HARDWARE TO BE UTILIZED WITH THE CONNECTORS. THE FOLLOWING ASSEMBLY PROCEDURE IS BASED ON THE NOMENCLATURE AND HARDWARE CONFIGURATION DEPICTED IN FIGURE 1. VARIATIONS IN HARDWARE DESIGN BASED ON MANUFACTURER MAY OCCUR AND CAUSE MINOR DEVIATIONS FROM THIS PROCEDURE. ASSEMBLY PROCEDURES SUPPLIED BY THE BACKSHELL MANUFACTURERS SHOULD BE UTILIZED WHEN CONFLICTS EXIST.

7.1 FOLD SPARE WIRES BACK ONE-HALF THE DISTANCE BETWEEN THE CONNECTOR AND THE JACKET END.

7.2 SLIDE A 1 INCH LONG PIECE OF APPROPRIATELY SIZED SHRINK TUBING OVER EACH FOLDED PAIR AND SHRINK IN PLACE.

7.3 LIGHTLY COAT THE THREADS OF EACH BACKSHELL PART WITH PETROLATUM (VV-P-236) JUST PRIOR TO ASSEMBLY.

7.4 POSITION AND LUBRICATE (PETROLATUM, VV-P-236) ALL O-RINGS.

7.5 SLIDE THE 45° ELBOW (PC. 2) DOWN THE CABLE AND SCREW IT ONTO THE CONNECTOR. TIGHTEN THE 45° ELBOW USING A STRAP WRENCH AND TORQUE WRENCH TO THE TORQUE VALUE PROVIDED IN TABLE 5 FOR THE APPROPRIATE SHELL SIZE.

TABLE 5

| SHELL SIZE | CONNECTOR REAR THREAD AND CABLE CLAMP TORQUE IN IN./LBS (± 5 IN./LBS) |
|---|---|
| 8 | 45 |
| 8S | 45 |
| 10 | 45 |
| 10S | 45 |
| 10SL | 45 |
| 12 | 50 |
| 12S | 50 |
| 14 | 50 |
| 14S | 50 |
| 16 | 60 |
| 16S | 60 |
| 18 | 60 |
| 20 | 70 |
| 22 | 70 |
| 24 | 70 |
| 28 | 80 |
| 32 | 100 |
| 36 | 120 |
| 40 | 140 |
| 44 | 140 |
| 48 | 140 |

7.6 IF THE GROSS SHIELD IS TO BE FLOATED OR TERMINATED TO A CONNECTOR CONTACT, PROCEED TO STEP 7.7. IF THE SHIELD IS TO BE TERMINATED TO THE BACKSHELL RFI HARDWARE PROCEED AS FOLLOWS:

7.6.1 SLIDE THE RFI RING (PC. 3) AGAINST THE ELBOW.

7.6.2 FLARE THE GROSS SHIELD OVER THE TAPERED END OF THE RFI RING.

7.6.3 GENTLY FORCE THE CABLE TOWARD THE CONNECTOR PLUG UNTIL THE SHIELD COVERS THE TAPERED SURFACE ON THE RFI RING.

7.6.4 SLIDE THE GROUND RING (PC. 4) ONTO THE RFI RING WHILE APPLYING FORWARD PRESSURE ON THE CABLE.

7.6.5 COMPRESS THE SHIELD BETWEEN THE RFI RING AND GROUND RING WITH A BACK AND FORTH TWISTING FORWARD MOTION ON THE GROUND RING.

7.7 IF THE GROSS SHIELD IS FLOATED OR TERMINATED TO A CONNECTOR CONTACT, SLIDE THE RFI BACKSHELL COMPONENTS (PC. 3, 4) OVER THE PIGTAILS, LOOPED GROUND WIRE AND SPARE CONDUCTORS.

7.8 SLIDE THE TRANSITION SHELL (PC. 5) OVER THE RFI ASSEMBLY AND SCREW IT ONTO THE ELBOW.

7.9 TORQUE THE TRANSITION SHELL TO THE VALUE PROVIDED IN TABLE 5 FOR THE APPROPRIATE SHELL SIZE.

7.10 MARK A LINE ON THE CABLE 1/4 INCH TO 1/2 INCH ABOVE THE BACKSHELL TRANSITION SHELL (SEE FIGURE 10). CAREFULLY PUSH THE CABLE INTO THE BACKSHELL 1/4-1/2 INCH AND MAINTAIN CONTINUOUS PRESSURE TO HOLD AT THIS POSITION FOR THE NEXT FOUR STEPS. (LINE MARKED ON JACKET IS EVEN WITH TRANSITION SHELL REAR EDGE)

7.11 VERIFY THE CABLE JACKET IS POSITIONED COMPLETELY THROUGH THE GLAND.

7.12 SLIDE THE WASHER (PC. 6), GLAND (PC. 7), AND GLAND COMPRESSION RING (PC. 8) INTO POSITION BEHIND THE TRANSITION SHELL.

7.13 SCREW THE CABLE CLAMP (PC. 9) ONTO THE TRANSITION SHELL AND TORQUE TO THE VALUE SPECIFIED IN TABLE 5.

7.14 ALTERNATELY TIGHTEN THE CLAMPING BAR SCREWS UNTIL REACHING THE TORQUE VALUE SPECIFIED IN TABLE 6 USING A TORQUE SCREWDRIVER (TORQUE CONTROL OR EQUIVALENT) (FIGURE 11). ENSURE A MINIMUM GAP OF 1/16 INCH EXISTS BETWEEN THE CLAMP SUPPORT AND CLAMP SADDLES.

NOTE: IF REQUIRED, INSTALL PERSONNEL SAFETY GROUND UNDER CLAMPING BAR SCREW.

TABLE 6

CLAMP SCREWS

| CABLE DIAMETER | TORQUE VALUE |
|---|---|
| 0.0 TO 0.5 IN. | 25 ± 2 IN./OZ |
| 0.0 TO 1.0 IN. | 40 ± 2 IN./OZ |
| 1.0 TO 2.0 IN. | 50 ± 2 IN./OZ |

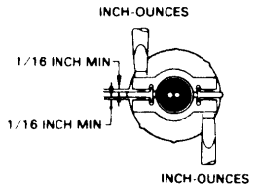



FIGURE 11

8. FINAL TEST AND DOCUMENTATION.

8.1 USING ESTABLISHED SHIPYARD PROCEDURES PERFORM ELECTRICAL/ELECTRONIC CHECKS ON THE ASSEMBLED CONNECTOR.

8.2 INSTALL A PROTECTIVE DUST CAP ON THE CONNECTOR.

8.3 COMPLETE THE ASSEMBLY INSPECTION AND DOCUMENTATION AS REQUIRED BY LOCAL PROCEDURES.

9. IF NECESSARY LOCKWIRE THE CONNECTOR IN ACCORDANCE WITH SHEET 5A24.

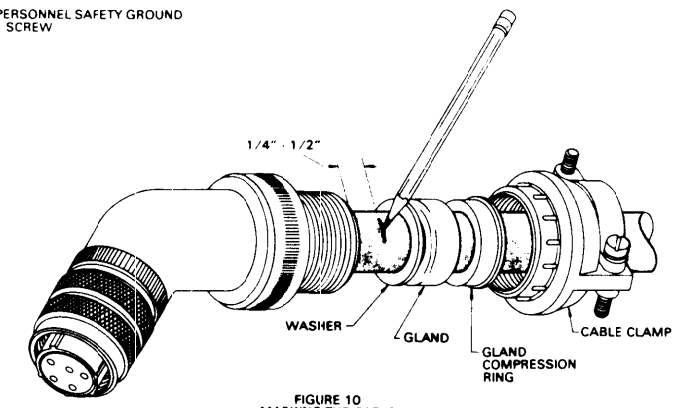



FIGURE 10
MARKING THE CABLE

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 5H4 OF DWG. 803-5001027.









FIGURE 5H4. MIL-C-38999 connector assembly procedure.

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| 1. DOCUMENT NUMBER | 2. DOCUMENT TITLE |
|---|---|
| DOD-STD-2003-5(NAVY) | ELECTRIC PLANT INSTALLATION STANDARD METHODS FOR SURFACE SHIPS AND SUBMARINES (CONNECTORS) SECTION 5 OF 5 |

**3a. NAME OF SUBMITTING ORGANIZATION**

**b. ADDRESS** *(Street, City, State, ZIP Code)*

**4. TYPE OF ORGANIZATION** *(Mark one)*

- ☐ VENDOR
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