

SHIELDED CABLES AND WIRES
SOLDERLESS SHIELD CONNECTIONS

CONTENTS

- | | |
|-------------------------|--|
| 1. GENERAL | 3. DESCRIPTION OF CRIMPING PARTS |
| 2. INSTALLING EQUIPMENT | 4. DESCRIPTION AND USE OF CRIMPING TOOLS |
| | 5. REQUIREMENTS AND METHODS |

1. GENERAL

1.1 Scope of Section

1.11 This section describes a solderless crimped shield connection, outlines when crimped connection are required, and covers the general requirements and methods for making crimped connections.

1.12 Each figure of this section illustrates only conditions to which reference is made in the text and is not to be considered as covering the requirements for other conditions that may be involved.

1.13 The requirements covered in this section shall be followed except as modified by applicable specifications and drawings.

1.2 Arrangement of Tools, Precautions, and Verification

1.21 Refer to Section 700 of Handbook 9 for information pertaining to these items.

1.3 Description of Solderless Crimped Shield Connections

1.31 A solderless crimped shield connection provides a reliable means of grounding or otherwise terminating the shield of shielded cables and wires. It is made by placing a hard long inner sleeve under the shield and a soft short outer sleeve over the shield. The soft outer sleeve is then compressed, by means of a crimping tool, from a round to a hexagonal cross section, thus exerting a great pressure across the flats of the hexagonal which in turn compresses the shield between the outer sleeve and the firm support of the inner sleeve. The hard inner sleeve does not distort during the crimping process and thus provides protection for the conductor dielectric. A properly made crimped connection provides at least six reliable mechanical and electrical connections between the shield and inner and outer sleeves. Various types of crimped connections are shown in Figures 5, 6 & 7.

2. INSTALLING EQUIPMENT

2.1 In addition to the tools and supplies ordinarily required for connecting operations the following are required for the operations covered by this section.

The crimping tools specified in Fig. 1 and Table A R-2783 Fixture, Holding Coaxial Cable R-2165 Stripper, Power Wire R-3851 B Pressing Pliers

3. DESCRIPTION OF CRIMPING PARTS

3.1 The B Bond Clip is to be used for attaching the ground wire to the aluminum sheath of ABAM cable. The open end is pressed to the shield with the R-3851 B pressing pliers so that the shield is sandwiched between the clip. The ground wire is pressed into the other end of the clip & soldered. See drawing ED-97270-10 for detailed method.

3.11 Figure 2 lists numerically the various inner and outer sleeves, and flag-type shield ground connectors that may be used for a crimped connection. This figure associates the KS and list number with the manufacturer's code number, the color, and dimensions for each part.

3.12 For ordering purposes, these parts are specified by KS and list numbers and/or the manufacturer's (Thomas & Betts) code number.

NOTE: The manufacturer's code number indicates the inside diameter of the part.

3.13 For identification purposes these parts are colored.

NOTE: There are duplications of colors between the inner and outer sleeves. An inner sleeve may be distinguished from a similar colored outer sleeve by observing that the inner sleeve is longer than the outer sleeve, 5/16 inch as against 1/4 inch.

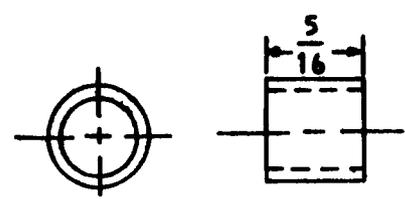


FIG A

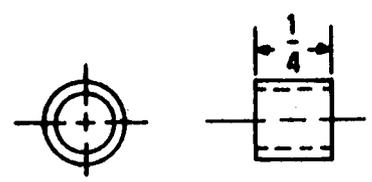


FIG B

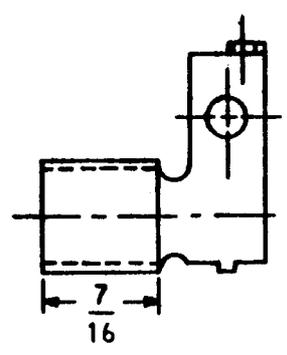


FIG C

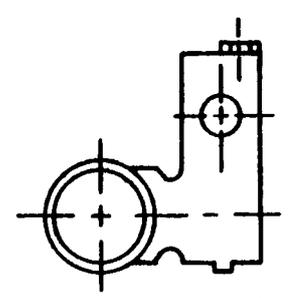


FIG D

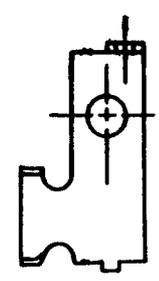


FIG E

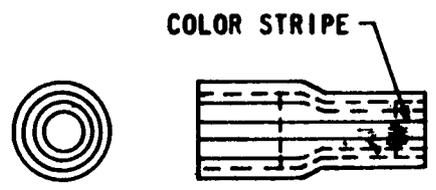


FIG F

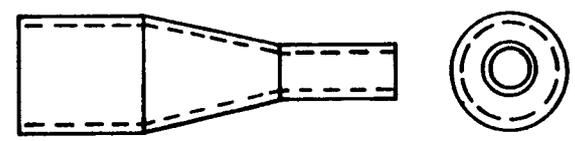


FIG G

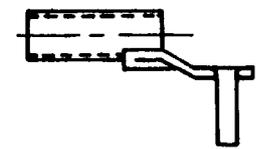
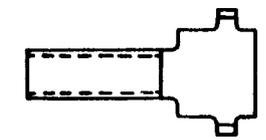


FIG H



(MVI-1427A)

TABLE A									
PARTS FOR CONNECTING SHIELD GROUND LEADS									
CABLE & WIRE	INNER SLEEVE		OUTER SLEEVE		CRIMPING TOOL				
	KS-15711- & T&B EQUIVALENT	COLOR	KS-15712- & T&B EQUIVALENT	COLOR	DIE CODE	DIE COLOR	KS15710 LIST	R-4081 EQUI DIE	
720, 754E KS13730 (RG63/U)	L-10 GSC- 297	RED	L-37 GSC- 415	RED	X	RED	3	Det. 2 -18	
724, 726 727A, 728A 729A, 760A KS8086	L-8 GSB- 219	TIN	L-22 GSC- 327	TIN	V	TIN	3 or 2	Det. 3 -16	
SDC-75-2S (RG-59/U) RG-59B/U	L-20 GSB- 156	RED	L-19 GSC- 261	YELLOW	-	YELLOW	6	Det. 6 -11	
SDC-75-2S (RG-59/U) RG-59B/U	L-6 GSB- 194*	BLUE	L-51 GSC- 287	BLUE	T	BLUE	2	Det. 4 -14	
16 GA BK	SINGLE	L-23 GSB-124	GREEN	L-27 GSC-199	TIN	L	RED	1	Det. 5 -06
	PAIR	L-9 GSB-232	RED	L-22 GSC-327	TIN	V	TIN	2 or 3	Det. 3 -16
20 GA BK	SINGLE	L-2 GSB-096	PURPLE	L-1 GSC-175	BLUE	K	BLUE	1	Det. 7 -0
	PAIR RG-58/U	L-5 GSB-165	TIN	L-19 GSC-261	YELLOW		YELLOW	6	Det. 1 -11
	TRIPLE	L-5 GSB-165	TIN	L-19 GSC-261	YELLOW		YELLOW	6	Det. 6 -11
22 GA BF	SINGLE	L-2 GSB-096	PURPLE	L-1 GSC-175	BLUE	K	BLUE	1	Det. 7 -03
	PAIR & PAIRS IN 750 CA	L-4 GSB-149	BLUE	L-3 GSC-232	ORANGE	P	ORANGE	1	Det. 3 -10
750A cable = 2 pairs of 22 ga. wire 751A cable = 3 pairs of 22 ga. wire 752A cable = 6 pairs of 22 ga. wire 753A cable = 12 pairs of 22 ga. wire 758A cable = 4 pairs of 22 ga. wire 759A cable = 8 pairs of 22 ga. wire									
22 GA P	SINGLE	L-2 GSB-096	PURPLE	L-1 GSC-175	BLUE	K	BLUE	1	Det. 3 -03
	PAIR	L-3 GSB-109	RED	L-2 GSC-194	RED	L	RED	1	Det. 5 -06
AK	(16GA)	L-3 GSB-109	RED	L-2 GSC-194	RED	L	RED	1	Det. 5 -06
730A 731A 732A*****	L-20 GSB-156	RED	L-24 GSC-275	TIN	-	TIN	-	Det. 1 -1	
761A, 762A** 764A*****	L-11 GSB-134	ORANGE	L-52 GSC-225	PURPLE	P	PURPLE	6	Det. 6 -09	
BS (22GA) Shield Fold- ed over Inner	L-1 GSB-090	ORANGE	L-1 GSC-175	BLUE	K	BLUE	1	Det. -0	
BG, 479M 1 PAIR	L-23 GSB-124	GREEN	L-27 GSC-199	TIN	L	RED	1	Det. 5 -06	
KS19224-L1	L-16 GSB-071	GREEN	L-15 GSR-149	PURPLE	K	BLUE	1	Det. 7 -03	

TABLE A (Cont'd)								
PARTS FOR CONNECTING SHIELD GROUND LEADS								
CABLE & WIRE	INNER SLEEVE		OUTER SLEEVE		CRIMPING TOOL			
	KS-15711- & T&B EQUIVALENT	COLOR	KS-15712- & T&B EQUIVALENT	COLOR	DIE CODE	DIE COLOR	KS15710 LIST	R-4081 EQUIV. DIES
KS19224-L1	L-16 GSB-071	GREEN	L-23 GSC-149	PURPLE	-	PURPLE	4 or 5	Det. 7 -01
KS19224-L2	L-16 GSB-071	GREEN	L-26 GSR-156	YELLOW	L	✓ RED	1	Det. 5 -06
KS19414-L1	L-19 GSB-101	YELLOW	L-16 GSR-175	BLUE	-	✓ YELLOW	4	Det. 8 -08
KS19414-L1	L-19 GSB-101	YELLOW	L-1 GSC-175	BLUE	K	BLUE	1	Det. 7 -03
KS19195-L2 SINGLE (24GA)	L-22 GSB-058	YELLOW	L-14 GSR-128	BLUE	-	✓ PURPLE	4 or 5	Det. 7 -01
KS19195-L2 PAIR (24GA)	L-23 GSB-124	GREEN	L-29 GSC-219	GREEN		YELLOW	4	Det. 8 -08
KS19906-L1	L-19 GSB-101	YELLOW	L-2 GSC-194	RED	L	RED	1	Det. 5 -06
763A	L-24 GSB-128	TIN	L-32 GSR-205	YELLOW		✓ YELLOW	6	Det. 6 -11
***								Det. 5 -22
A25K TERMINATE GROUND PER ED-92524-15, Fig. 53								
***							5	Det. 7 -00
761A, 762A** 764A****	GSB-134 L-11	ORANGE	KS-15712 L33	TIN		✓ PURPLE	6	Det. 6 -11
			EQUIVALENT T&B GSR-225	PURPLE		✓ YELLOW	6	
<p>* Shield folded over Inner (Per ED-92524-11 Fig. 3A & ED-92524-10 Note 34.)</p> <p>** Consists of ten, 761A type cable under a common jacket.</p> <p>*** The use of these dies appear on ED-92774-11</p> <p>**** Consists of eight, 761A cables under a common jacket.</p> <p>✓ Color of stripe on outer sleeve insulation.</p> <p>GSR Insulated outer sleeve.</p> <p>***** Consists of ten, 730A cables under a common jacket.</p>								

TABLE B

PARTS FOR CONNECTING FLAG-TYPE SHIELD GROUND CONNECTORS

CABLE & WIRE	INNER SLEEVE		OUTER SLEEVE		CRIMPING TOOL			
	KS-15711- & T&B EQUIVALENT	COLOR	KS-15712- & T&B EQUIVALENT	COLOR	DIE CODE	DIE COLOR	KS15710 LIST	R-4081 EQUIV. DIES
754, 720 KS13730 (RG-63/U)	L-10 GSB-297	RED	R-8 GSF-415 L-11 93-50557	TIN	X	RED	3	Det. 2 -18
SDC-75-2S (RG-59/U) RG-59B/U	L-9 GSB-232	RED	L-7 GSF-327 L-10 93-50179	TIN	V	TIN	3 or 2	Det. 2 -16
724, 726 727A, 728A 729B KS-8086 & 760A	L-8 GSB-219	TIN	L-7 GSF-327 L-10 93-50179	TIN	V	TIN	3 or 2	Det. 3 -16
761A 762A** 764A****	L-4 GSB-149	BLUE	L-12 GSF-232	TIN	P	ORANGE	1	Det. 3 -10
730A & 731A 732A*****	L-20 GSB-156	RED	L-28 GSF-261			YELLOW	6	Det. 6 -11

4.12 The B pressing pliers are approximately 5 1/8" long and are used to crimp the B Bond Clip to the Aluminum shield of ABAM or ABMM cable. The shield end of the clip shall be squeezed to a thickness of ".070" or less. This tolerance will be met using these pliers.

4.2 Use of Crimping Tool R-4081

4.21 The R-4081 Det. 1 crimping tool and interchangeable dies, Det. 2 thru 8, are available for making crimp connections. The particular detailed die to be used will depend on the outer sleeve or other outer connecting part. The terminating drawings referred to in Handbook 9, Section 700 and Table A & B of this section indicate the proper die to use with the various size outer sleeves.

4.22 Maintenance on this tool will consist of keeping the dies clean of dirt and other foreign material. The dies should close tight enough when the crimping tool is closed that a piece of paper cannot be removed from between the dies without ripping. Inspect the tool for wear on the dies or track the dies ride on in the handle. At any signs of wear replace the worn detail. If the dies fail to close properly return the tool to stockkeeping for repair with a note indicating what is wrong with the tool.

4.23 Use crimping tools as follows:

4.231 Crimp only one cable end at a time.

4.232 Prior to inserting the cable end into the die opening, squeeze the handles together until the dies are completely closed and the ratchet feature releases. This procedure opens the dies completely and facilitates inserting the assembly into the die opening.

4.233 Place the assembly to be crimped into the proper die opening. Using both hands apply a steady even pressure and squeeze the handles of the tool together until the dies are completely closed and the ratchet feature releases. Then remove the tool from the crimped connection.

4.2331 If for some unusual reason the dies on the R-4081 Det. 1 cannot be completely closed, the ratchet feature may be released by placing a KS-6320 orange stick into the slot which houses the movable handle and pressing down on that portion of the pawl which is slightly visible from the side of the ratchet of the movable handle. At the same time apply a slight downward pressure to the movable handle. This may have to be repeated several times until the pawl slips from the ratchet allowing the movable handle to open.

4.3 Use of Crimping Tools Other Than R-4081

4.31 Either the R-3075, R-3142, or R-3408 crimping tool is available for making crimp connections. The type of tool to be used will depend on the outer sleeve or other outer connecting part. The terminating drawings referred to in Section 700 of Handbook 9 and Table A of this section indicate the proper tool to be used.

4.32 Periodically, before using the shield sleeve crimpers (R-3075, R-3142, or R-3408) check with a feeler gauge that there is not more than .003" space at the open end of the dies when the dies are closed. Appropriately tag and return tools failing to meet this requirement to Installation Stockkeeping for adjustment. Make no attempt to correct any defect in die closure on the job.

4.33 Use crimping tools as follows:

4.331 Crimp only one cable end at a time.

4.332 Prior to inserting the cable end into the die opening, squeeze the handles together until dies are completely closed and the ratchet feature releases. This procedure opens the dies completely and facilitates inserting the assembly into the die opening.

4.333 After placing the assembly to be crimped into the proper die opening, use both hands, apply a steady even pressure, and squeeze the handles of the tool together until the dies are completely closed, and the ratchet feature releases. Then remove the tool from the crimped connection.

NOTE: If for some unusual reason the dies cannot be completely closed, the ratchet feature may be released by placing the tip of a screwdriver under the tip of the pawl and lifting it up or by pushing on the heel of the pawl at the point where the spring is attached.

5. REQUIREMENTS AND METHODS

5.1 When Crimped Connections are Required

5.11 When the wiring diagram indicates that the shield of a shielded cable is to be connected to a terminal another shield or coaxial type jack, plug etc., or when other equipment drawings or the job specification indicates that cables are to be spliced, make all shield connections by means of the solderless crimped connection unless otherwise specified by the terminating drawings referred to in Section 700 of Handbook 9.



FIG.3 SHIELDED SLEEVE CRIMPER
PARA. (4.11,4.233)

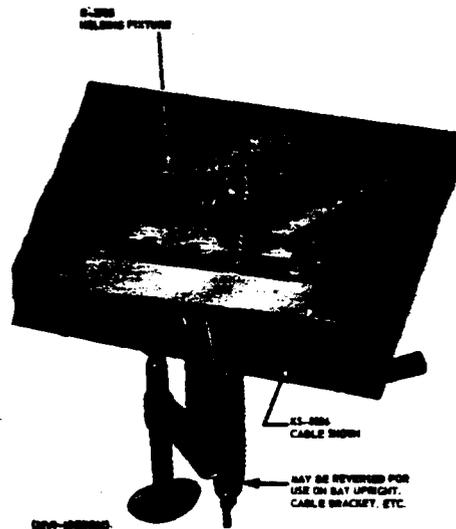


FIG.4 HOLDING FIXTURE FOR
COAXIAL OR TWIN-CONDUCTOR
OFFICE CABLES. PARA. 5.212

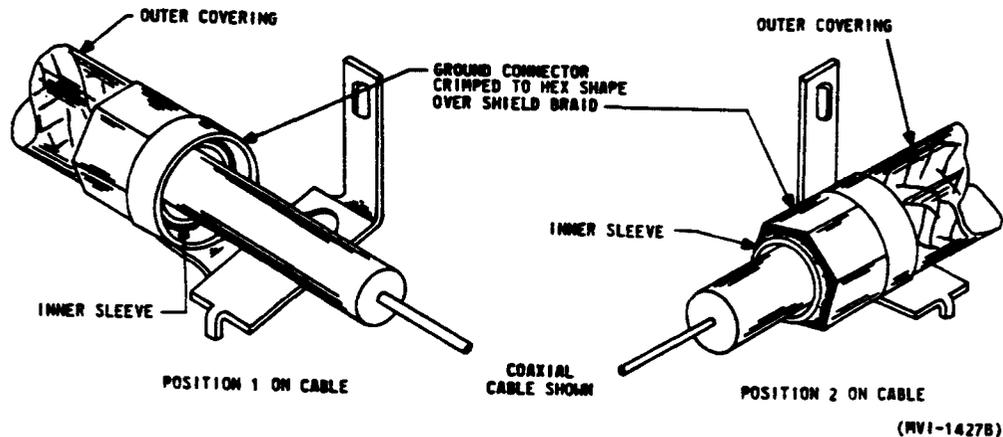


FIG. 5 FLAG-TYPE SHIELD GROUND CONNECTOR

5.2 Method of Making Crimped Connection

5.21 Preparation

5.211 Prior to making a crimp connection, refer to the terminating drawings referred to in Section 700 of Handbook 9 and make all crimped connections in accordance with these drawings. These drawings indicate the proper inner and outer sleeves or other outer part, tool and die that shall be used for a particular cable.

5.212 Use the holding fixture (R-2783) as shown in Figure 4 to hold the cable during crimping operations. The fixture can be adjusted to any position, and can be clamped on the bay upright or other framework detail. When used on a bench, the C clamp assembly should be reversed so that the screw handle will not interfere with the closing of the cam hasp.

NOTE: Fill out split halves of hole in clamping head, as required, with friction or acetate fiber tape when cable is too small to be otherwise adequately held in fixture.

5.213 Remove flag-type connectors that are mounted on the equipment panel. In general, the mounting location of the connector prohibits making a satisfactory crimp connection when the connector is mounted on the panel.

5.22 Sequence of Operations

NOTE: The following paragraphs outline the general sequence for making crimped connections. When a crimped connection is to be made at coaxial type jack, etc., refer to Handbook 9 Section 770 for the sequence to be followed.

5.221 Make crimped connection in the following sequenc:

5.2211 Slip the proper outer sleeve, flag-type connector or other outer part over the exposed shield and back onto the outer cable jacket. When a flag-type connector is provided, place the connector onto the cable so that it properly oriented with respect to its mounting and tab locking holes in the equipment panel. Figure 5 shows two crimped positions for a flag-type connector. The position to be used is controlled by the connector's mounting and tab locking holes in the panel and the direction that the cable approaches the connector.

5.2212 When the terminating drawings indicate that the inner sleeve is to be under the shield, perform the following:

- a) To facilitate inserting the inner sleeve, fan the shield by rotating the exposed inner conductor (s) around with a circular motion.

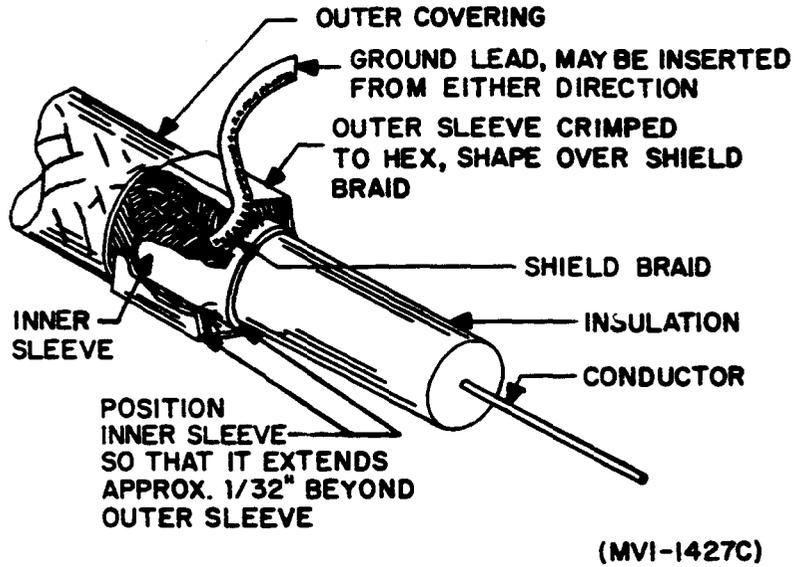


FIG. 6 SOLDERLESS CONNECTION TO SHIELD GROUND LEAD. PARA. (1.31, 5.2215)

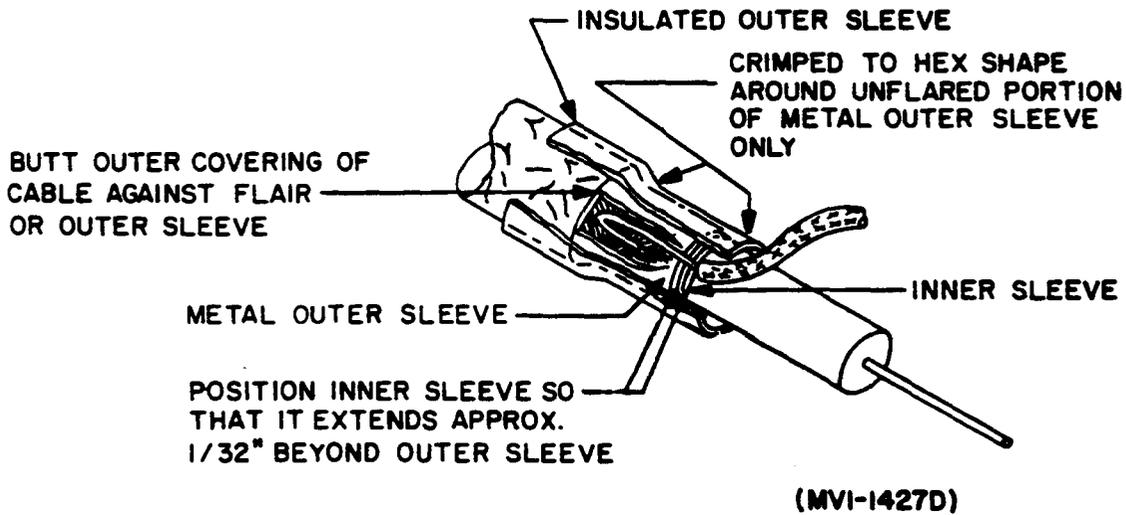
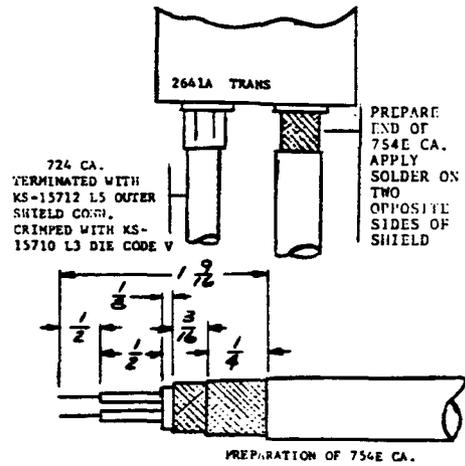


FIG. 7 SOLDERLESS CONNECTION TO SHIELDED GROUND LEAD USING INSULATED OUTER. PARA. (5.2216)

- b) Slide the proper inner sleeve under the shield braid and position it so that the end of the inner sleeve will extend approximately 1/32" beyond the end of the metal outer sleeve. While no loose strands of the shield braid are permitted to extend beyond the end of the inner sleeve, the shield braid shall be at least flush with the end of the metal outer sleeve. Figures 6 & 7 show the proper orientation.



5.2213 When the terminating drawings indicate that the inner sleeve is to be inserted over the shield slide the inner sleeve over the exposed shield back to the outer covering. Double back the remaining portion of the shield over the inner sleeve.

5.2214 Slide the outer sleeve, flag-type connector or other outer part over the exposed shield and position it over the inner sleeve as indicated by the terminating drawings.

5.2215 When an external lead is to be connected to the shield, insert the folded skinned end of the wire between the outer sleeve and the shield as shown in Figure 6. When 16AA wire (16 gauge stranded) is specified for such a connection, skin this wire with the power wire stripper (R-2165).

5.2216 When an external lead is to be connected to a shield, insert the folded skinned end of the wire under or over the shield braid depending on the type of wire or cable used. Figure 7 shows the proper orientation of the insulated sleeve and instructions for crimping. Refer to Table A for proper inner and outer sleeves to be used.

5.2217 Insert the assembly to be crimped into the proper die opening of the proper crimping tool and make the crimped connection. When crimping a flag-type connector, use care to make sure that the brazed tab is not enclosed within the confines of the die as this will prevent a clean crimping job.

CAUTION: Before crimping make sure that the inner sleeve and outer sleeve, flag-type connector, or other outer part is positioned correctly and the assembly is in the proper die opening because it is very difficult to remove a crimped part from the cable, once the connection has been made or partially made.

5.23 Crimped connections should not be taped unless it is necessary to protect them from apparatus terminals, foreign ground, etc.

5.3 Opening Crimped Connections

5.31 When it is necessary to open up a solderless shield connection, file through one of the hexagonal corners of the compressed outer sleeve or tubular part, and peel it off with a pair of short nose pliers.

5.4 Connecting 754E Cable to A-2641A Transformer

5.41 Crimping Tool R-4081 detail 2 should be used to connect 754E cable to Transformer A-2641A. Crimping Tool R-3075 cannot be used to make this connection because of its design.

5.42 When Crimping Tool R-4081 is not available the following alternate method of connecting to the transformer may be used.

5.421 Remove the transformer and can from the panel mounting for ease of connecting the 754E to the transformer. Prepare the 754E cable for soldering the shield to the inner connector and the two center conductors to the transformer as shown above.

5.422 After the cable is prepared, feed the two center conductors through the inner connector for wiring to the transformer terminals; at the same time feed the double shield over the inner connector. Using a well tinned, 60 watt iron, solder the shield to the connector. (Do not leave the soldering iron too long on the connector while soldering the shield to the connector as too much heat will melt the polyethylene). Solder the two center conductors to the transformer terminals. Replace the transformer and can on the panel.

Arrowed lines indicate new or changed information.
REASON FOR REISSUE:
 To change list numbers of outer sleeves to longer 1/2 inch size.

Manager, Engineering Transmission Products