

SPLICING
INDIVIDUAL CONDUCTORS

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1. GENERAL

1.1 Scope of Section

1.11 This section covers requirements and methods for splicing individual conductors (except power wire, shielded wire, and coaxial cables) of switchboard cable, loose wire forms, and sewed cable forms of PVC, PVC-CBL, PVC-CL, CL or IPVC insulated wires of 16 gauge and smaller diameter.

1.111 Splicing of shielded cables and coaxial cables are covered in SEC. 750 and 751 of this handbook. Refer to Handbook 18 for the splicing of power wires.

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

1.13 Each figure in 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 or shown.

1.2 Precautions Against Personal Injury,
Equipment Damage and Service Interruptions

1.21 General precautions to be taken against personal injuries, equipment damage and service interruptions are covered in Handbook 0 and are to be observed at all times, as they apply to the operations being performed. Specific precautions, when applicable, are included in this section with the associated method.

1.3 Arrangement of Tools

1.31 Prior to starting operations covered by this section, the tools and other items required should be arranged at the work locations so as to minimize fatigue and inconvenience when handling.

2. INSTALLING EQUIPMENT

2.1 Tools and Supplies

2.11 Tools and supplies generally required for operations covered by this section are listed below:

TOOLS

R-4121-L2 - Soldering Station,
Temperature Controlled
R-2733 - Copper, Soldering
(110 Watt)
R-4444 - Gun, Heat
AT-8810 - Pliers, G Long Nose
R-4108 - Cutters, Diagonal, Midget

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2.11 (Cont'd)

SUPPLIES

RM-581514	- Sleeving, No. 14 Black, 2-3/4" Lg.
RM-628436	- Sleeving, No. 14 Black, 1-1/4" Lg.
R-3428	- Tape, Gray Plastic, 3/4" Wide
R-3359	- Tape, Gray Plastic, 1/2" Wide
RM-728225	- Solder, Rosin Core (.070" Dia.)
RM-728226	- Solder, Rosin Core (.040" Dia.)
KS-21256-L1-L3	- Sleeve, Solder
R-2916	- Twine
701-2AR	- Connector, Wire
702-2AR	- Conenctor, Wire

3. SPlicing3.1 When to Splice

3.11 In general, individual conductors shall not be spliced except where specified on job information papers, such as specification, drawings, Detail Change Sheets (DCS), Circuit Revision Information (CRI), etc.

3.111 Short or accidentally broken conductors in loose wire local cable forms shall not be spliced. These leads shall be replaced.

3.112 Short or accidentally broken conductors in switchboard cable forms and sewed local cable forms may be spliced. However, the number of splices shall be kept to a reasonable minimum (5% or less) consistent with careful workmanship (refer to Handbook 35, Section 54).

EXAMPLE: Consider that a 262A Cable Form has (7) seven leads accidentally broken or cut short. The 262A has 200 leads, therefore, 5% of 200 or (10) ten leads would be the maximum amount of leads allowed to splice.

3.113 Cables (including AM and BH Type Piece Part Wires) run on cable racks - (from the butt location at one end - to the butt location at the other end), shall be run in continuous lengths without splices, unless authorized in the Telephone Company or Western Electric Company specifications or by other instructions from the Equipment Engineering Organization. An exception to this is the splicing of FD and 20BH Wire run underneath the cable racks for the emergency alarm system (refer to SEC. 802).

3.2 Location of Splices

3.21 Sewed Forms: Splices in conductors of sewed forms shall be located in a readily accessible place at the outside of the form and protected with No. 14 Varnish Impregnated Sleeving, PVC Tape, or approved heat shrink sleeving. An exception to this would be in cases such as splicing skimmers to the magnet terminals of 263 Type Relays covered in PAR. 4.11.

3.22 Loose Wire Forms: When the conductors of switchboard cable forms are run loosely through cable brackets, fanning rings, adjustable wiring supports, etc., locate the splices in the loose wiring path as close to the cable butt as practicable. When the loose wire form is secured to cable brackets, or is banded with sewing twine or ties, the splice may be located in the loose wiring path between any two bands or ties, or as near the cable butt as practicable, insulate all splices in the loose wiring path per PAR. 3.411 or 3.412.

3.23 Fanned Forms: Since fanned forms may start directly from switchboard cables at the butting locations, or may start at a breakout from sewed or loose wire forms (such as bay or frame main vertical forms), the location of the splices may vary and shall be determined as follows:

3.231 When the fan starts at the butt location, the splices shall be located in the area between the rear of the fanning strip and the cable butt, and as close to the butt as practicable. Insulate the splices as covered in PAR. 3.411 or 3.412.

3.232 When the fan starts at the breakout of a sewed form, locate the splices in the area between the fanning strip and the form breakout. Make the splice as close as practicable to the form breakout. Where the length of wire will not permit a splice in the skinner portion of the wire as described above, then locate the splice in the sewed portion of the form as described in PAR. 3.21. Insulate splice in accordance with PAR. 3.411 or 3.412.

3.233 Where common cable leads, such as battery or ground leads, etc., are disconnected from apparatus that has been removed or modified for reassignment, the leads should be spliced in accordance with either FIG. 4, 5 or 6.

3.3 Types of Splices

3.31 Unless otherwise specified in job specification, on job drawings, or by Operating Company directive, individual conductor splices shall be made by one of the following approved methods:

3.311 A "Straight" Splice as shown in FIG. 1, 2 or 3 shall be used when conductors approach from opposite directions.

3.312 An "End" Splice as shown in FIG. 4, 5 or 10 shall be used when conductors are adjacent and approach from the same direction.

3.313 An "End" splice as shown in FIG. 6 shall be used for splicing either 28 or 30 gauge conductors approaching from either the same or opposite direction.

3.314 An "End" Splice as shown in FIG. 10A shall be used for splicing 19 to 26 gauge conductors approaching from the same direction using the 701-2AR wire connector.

3.315 A "Y" Splice as shown in FIG. 7, shall be used when due to economic reasons, piece part wire such as (S) singles, (P) pair, (T) triple and (Q) quad 20 thru 24 gauge wire requires splicing for the purpose of bridging or apparatus relocating.

3.316 An "In Service" Splice using the KS-21256-L3 Solder Sleeve, as shown in Fig. 9, can be used where slack of approximately 3" can be obtained in the splice area. This type of splice will result in a variation of the "end" splice.

3.317 An "In Service" Splice of common leads, as shown in FIG. 4, can be used where apparatus has been removed, or due to circuit modification, the leads are removed and require splicing to retain the continuity to other circuits.

3.318 The splicing of "Tight Twisted Pairs" shall be "End" spliced according to FIG. 8.

3.319 An "In Service" Y Splice using the 702-2AR connector as shown in FIG. 9A, can be used when splicing cable leads on a cable rack. This splice may be used to correct wiring errors or to splice less than fifteen conductors in a completed cable splice where 710 Connectors are used.

3.4 Methods of Splicing

3.41 There are three basic methods of splicing individual conductors. They are (1) the twist, solder and insulate method, as shown in FIG. 1, 4 and 7, (2) the heat shrink solder sleeve method where the wires may or may not require twisting prior to the shrinking of the sleeve. These methods are shown in FIG. 2, 3, 5, 6 and 8. (3) The 700 Type Connector method allows for joining wires without stripping the insulation, as shown in FIGS. 9A and 10A.

3.411 Method No. 1

A. Leads to be spliced should be twisted, together as shown in FIG. 1, 4, or 7.

B. Apply sufficient solder to the twisted bare wire area to properly fuse the spliced leads.

C. Tape "Straight" and "Y" splices with a single layer of gray PVC tape applied with a half-lap which extends approximately 1/4" beyond the bare wires at both ends.

D. Tape end splices with a single layer of gray PVC tape applied with a half-lap. Start tape by inserting it between the insulated portion of the wires and then wrapped around the splice area - refer to FIG. 4.

E. No. 14 Varnish Impregnated Sleeving may be used as an alternate method of insulating the splice area providing the sleeves cannot be easily displaced.

3.412 Method No. 2 - This method may be used to splice individual conductors (20 thru 30 gauge) by using the KS-21256-L1 thru L3 Heat Shrinkable Solder Sleeves. Refer to Table "A" for selection of the proper sleeve and to FIG. 2, 3, 5, 6, 8, 9, or 10A for the proper type of splice.

Wire Gauge	Type of Splice	KS-21256 Solder Sleeve		
		List 1	List 2	List 3
20 - 22	Straight		X	
24 - 26	Straight	X		
20 - 26	End			X
20 - 26	Twisted Pair			X (2 Req'd)
28 - 30	End	X		

NOTE: Sleeves may be used to splice tinned stranded wire providing the requirements of PAR. 3.413 (A thru H) are complied with Table A (PAR. 3.412, 3.413A).

3.413 When using the KS-21256-L1 thru L3 Solder Sleeves, the following requirements must be observed:

- A. The sleeves shall be used in accordance with the list number and wire gauge shown in Table A.
- B. The internal solder ring must not be broken prior to application of heat.
- C. The insulation of each wire being spliced must extend under the solder sleeve at least 1/8" (min.) after application of heat.
- D. The R-4444 Heat Gun, or an approved equivalent, shall be used to shrink the KS-21256 Solder Sleeves.
- E. The solder flow of the internal solder ring shall be confined within the splice sleeve. The solder fillet (soldered area where bare wires are bonded) shall be a minimum of 1/4".
- F. The solder sleeve shall not be excessively scorched (colored black) or burnt, however, a slight tinge of brown does not indicate the insulation is defective.

- G. The sleeving shall not be punctured or show signs of being punctured.
- H. The complete sleeve must be shrunk.
- I. When individual conductors of a cable require splicing on a cable rack, they may be spliced using the solder sleeve methods shown in FIG. 2, 3, 5 or 9, or the twist, solder and protect methods shown in FIG. 1 and 4.
- J. When individual conductors are being extended, use the same color coded lead. However, when a type of wire or color code of cable has been rated Manufacture Discontinued (MD), the replacing type of wire or cable code shall be used.

3.414 Method No. 3

The 701-2AR and 702AR Connectors are to be used for splicing individual leads in cable splices. When used, the following shall apply:

- A. No more than fifteen connectors shall be used in a completed splice on the cable rack.
- B. The above connectors are approved for the following cables:
 - 1. CL cable, 22 gauge containing C2 wire (all textile insulation).
 - 2. M cable, 22 or 24 gauge containing C3 wire (PVC-CL insulation).
 - 3. A cable, 22, 24 or 26 gauge containing PVC insulation.
 - 4. R cable, 20, 22 or 24 gauge containing IPVC insulation.
- C. The AT-8810 "G" Long Nose Pliers or approved equivalent tool shall be used to complete the splice.
- D. The connectors shall be used in conjunction with the 710 Connector as specified in Section 373 of this Handbook. These connectors shall not be reused.

E. These connectors shall be protected the same as the 710 Connectors, per Section 375 of this Handbook as specified under "Protection".

3.5 R-4444 Heat Gun

3.51 The R-4444 Heat Gun (FIG. 12) has an electrically driven motor which drives air through a nozzle which contains a heating element. This hot air then flows into a deflector which completely surrounds the KS-21256 Solder Sleeve with sufficient heat to shrink the sleeve and melt the internal solder ring.

3.511 The following precautions should be observed when using the R-4444 Heat Gun:

A. Always Use the Deflector: This reduces the shrinking interval and the possibility of causing damage to equipment located in the near vicinity.

B. Extreme caution and fiber protection should be used when shrinking in confined areas. The heat in the deflector is approximately 500°F.

C. When shrinking, the solder sleeve should be placed in the approximate center of the deflector. This will avoid the possibility of burning or excessively scorching the sleeve or wire insulation.

D. The sleeve should shrink first before the solder begins to flow. This should retain the solder within the confines of the sleeve, however, observe all splices to be sure solder has flowed correctly and has not crept outside the splice area.

E. PRECAUTION: DO NOT GRAB, TOUCH, OR PLACE THE NOZZLE OR DEFLECTOR AGAINST CABLES, WIRE, OR EQUIPMENT SUSCEPTIBLE TO HEAT DAMAGE.

F. PRECAUTION: "DO NOT" RESTRICT THE OPENING OF THE INTAKE GRILL OR DISCHARGE NOZZLE. THIS WILL CAUSE OVERHEATING AND TOOL FAILURE.

NOTE: An additional nozzle (silver colored) can be ordered from Stockkeeping to replace defective heating elements.

G. When heat gun is not being used continuously, or prior to discontinuing use, the tools should be switched to cool and run in this position for several minutes. This will not only cool the nozzle, but prolong the life of the heating element.

4. SPLICING AT SPECIFIED APPARATUS

4.1 Magnet Terminals of Multicontact Relays

4.11 When 263 type relays are to be added to existing equipment and the wiring initially provided was designed for 245 type relays, it will be necessary to splice and extend the skimmers to the magnet terminals. A straight splice shall be used as described in Method No. 1 (PAR. 3.411) or Method No. 2 (PAR. 3.412). When splice is insulated with a No. 14 Varnish Impregnated Sleeve, it shall extend from the end of the terminal to a point approximately 1/2" from the form.

4.12 When 287 or 288 type relays are to be added to existing equipment, and the wiring initially provided is designed for 263 or 245 type relays, it will be necessary to splice and extend the skimmers to the magnet terminals as follows:

A. Make straight splices to additional wire of the same type color and gauge as indicated in FIG. 1, 2 or 3.

B. Locate splices in the area between the original skinner breakouts and the new skinner breakouts as illustrated in FIG. 11.

C. After splices have been made and the insulation applied, superimpose the extended leads on the switchboard or local cable form serving the relay contacts to breakout points corresponding with the locations of the magnet terminals. The requirements for superimposing wires shall be met, although generally, a single strand of twine will be satisfactory. Additional leads to multiple the terminals of the lower magnet to the upper magnet, if required, should be superimposed at the same time. See FIG. 11 for the method of dressing these leads.

NOTE: The wire type, color, and gauge of the added leads required to multiple the lower to upper magnet wiring terminals should be determined from the T-wiring drawing for the associated circuit. In the event that the associated wiring drawing received does not show the wiring information for 287 type relays, use the type, gauge, and colors specified on the drawing for the spliced-out leads.

4.121 When 287 type relays are added to frames or units on which insulated strap wire is used to multiple the magnets of adjacent 263 type relays served by the same battery supply lead, it will be necessary to extend the strap with added local wiring between the positions of the last 263 type relay and the first of the added 287 type relays. Added local wiring will also be required between adjacent 287 type relays when they are served by the same battery supply lead. In this case proceed as follows:

A. Between the last 263 type relay and the first 287 type, superimpose a wire of the same type, color and gauge as the feeder supplying the strap. At the 263 type relay, the wire should break out of the form at the same point as other wires to the lower magnet. At the 287 type relay, the wire should break out at the lower magnet terminal of the lower magnet and should be included with other spliced-out and added leads superimposed on this leg.

B. Between adjacent 287 type relays served by the same battery feeder, superimpose leads of the same type, color, and gauge and form the leads in the same manner as in (A) above.

C. At the last 263 type relay, remove approximately 1/4" of the insulation from the common strap at a point approximately midway between the last two 263 type relays. Connect the added battery feeder lead to this strap by wrapping 1-1/2 turns of wire around the strap and soldering. It is not necessary to provide a loop in the strap wire as usually required for feeder connections at common straps.

D. At the added 287 type relays, connect the wires to the magnets as indicated on the associated T-wiring drawings and dress in accordance with FIG. 11.

4.2 Skinner and "D" Wiring Leads to Pigtail Apparatus

4.21 Where skinner and "D" wiring leads are to be connected to pigtail apparatus, make the connection as outlined in SEC. 333.

4.211 Protection is required for the leads of the pigtail apparatus when connected to skinner or "D" wire leads. It is permissible to use No. 14 Varnished Impregnated Sleeves providing the sleeves do not slide freely and expose bare wire, otherwise, use gray PVC tape.

4.3 Multiple-Bank Wire

4.31 When splicing type "AR" stranded multiple-bank wire or type "BT" solid wire, the Installer shall use the straight splice as indicated in PAR. 3.411 or 3.412. This applies to solid-to-solid wire splices, solid-to-stranded wire splices, and stranded-to-stranded wire splices. Refer to FIG. 1 or 3.

4.4 Switchboard Ringing Mains

4.41 When sections are added to switchboard lineups having ringing mains, and short stubs for the extension of the leads were left at the last section, extend the ringing mains to the added sections by splicing the respective leads to the short stubs. The Installer shall use the straight splice as indicated in PAR. 3.411 or 3.412. Splices shall be staggered.

4.42 Where short stubs were not left at the last section, disconnect the leads at the lamp sockets of the last section and extend the ringing mains to the added sections by splicing the respective leads at a point between the last two sections, reconnecting the last section with the extended leads. Splice as indicated in PAR. 3.411 or 3.412. Splices shall be staggered. If the operation cannot be performed when the last section is idle, temporarily bridge the ringing mains to the last section.

5. VERIFICATION ITEMS

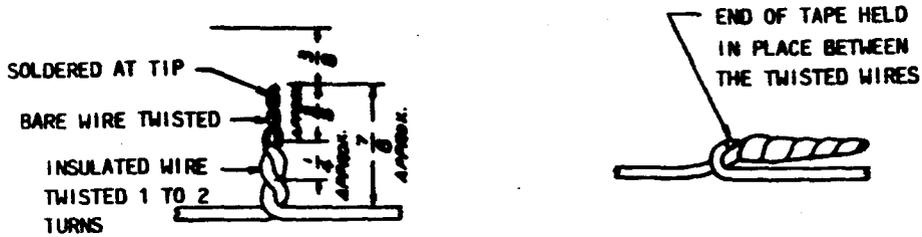
Verification Items and Brief Statement of Requirement	Reference	
	Paragraph Number	Figure Number
5.1 <u>When to Splice</u>	3.1	
5.11 Only when authorized in Job Information Papers	3.11	
5.12 Conductors in loose wire local cable forms not spliced - replace leads	3.111	
5.13 Switchboard cable forms and sewed local cable form splices kept to a minimum (5%)	3.112	
5.14 No splicing on cable rack unless authorized. (Exception is fire detection 20BH Wire.)	3.113	
5.2 <u>Location of Splices</u>	3.2	
5.21 Sewed Forms: Located at outside of form.	3.21	
5.22 Loose Wire Forms: <u>When run loosely through cable brackets, fanning rings, adjustable wiring supports, etc., splices located in loose wiring path as close to cable butt as practicable. All splices insulated.</u>	3.22	
5.23 <u>When secured to cable brackets or banded, splice located in loose wiring path near cable butt or between two adjacent bands. All splices insulated.</u>	3.22	
5.24 Fanned Forms: <u>When fan starts at butt location, splices located between rear of fanning strip and cable butt, and as close to butt as practicable. All splices insulated.</u>	3.23 3.231	
5.25 <u>When fan starts at sewed form breakout, splices located between fanning strap and breakout. Spliced as close to breakout as practicable. All splices insulated.</u>	3.232	
5.26 Common cable leads, such as battery or ground leads which have been disconnected from removed apparatus, or modified and require retermination, they may be spliced per FIG. 4,5, or 6.	3.233	4,5,6
5.3 <u>Types of splice</u>	3.3	
5.31 Individual conductors 16 gauge, or smaller than 16 gauge "Straight" spliced according to FIG. 1,2, or 3 (opposite directions).	3.311	1,2,3
5.32 Individual conductors 16 gauge and smaller "End" spliced according to FIG. 4,5, or 10 (same direction).	3.312	4,5,10
5.33 An "End" splice of 28 or 30 gauge conductors spliced according to FIG. 6 (either direction).	3.313	6
5.34 An "End" splice using 701-2AR Connector	3.314	10A ←
5.35 A "Y" splice conforms to FIG. 7.	3.315	7
5.36 AN "In Service" splice using 702-2AR connector	3.319	9A ←

5. VERIFICATION ITEMS

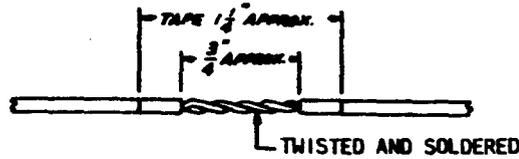
Verification Items and Brief Statement of Requirement		Reference	
		Paragraph Number	Figure Number
5.4	<u>Methods of Splicing</u>		
5.41	Method No. 1 twisted together, properly fused together and protected according to FIG. 1, 4, or 7.	3.411	1,4,7
5.42	Method No. 2 - KS-21256 Solder Sleeves for splicing 20 thru 30 gauge wire - requirements	3.412 3.413	2,3,5,6 8,9,10
	A. Sleeves and wire gauge used in accordance with Table A.	3.413A	
	B. Solder ring not broken before heat applied	3.413B	
	C. Insulation under sleeve 1/8" minimum	3.413C	
	D. Use R-4444 or approved equivalent to heat shrink sleeve	3.413D	
	E. Solder confined within sleeve - 1/4" minimum fillet (fusing area) required.	3.413E	
	F. Sleeve not scorched or burnt.	3.413F	
	G. Sleeve not punctured or signs of being punctured.	3.413G	
	H. Complete sleeve shrunk.	3.413H	2-5,9
	I. Individual cable conductors may be spliced on cable rack.	3.413I	
	J. Use same color coded lead or direct replacement when splicing.	3.413J	
5.43	Method No. 3 - 701-2AR and 702-2AR Connectors	3.414	9A,10A
5.43	A. No more than 15 connectors per cable splice <u>located on the cable rack.</u>	3.414A	
	B. 700 type connectors are approved for CL, M, A and R type cables.	3.414B	
	C. Use AT-8810 or approved equivalent to press connectors	3.414C	
	D. Connectors cannot be reused.	3.414D	
	E. Connectors shall be protected same as 710 Connectors.	3.414E	
5.5	<u>Splicing at Specific Apparatus</u>		
5.51	Skimmers to magnet terminals of 263 relays spliced with straight splice; splice protected with No. 14 sleeving extended from end of terminal to 1/2" from form. KS-21256-L1, L2 Solder Sleeves allowed.	4.11	

5. VERIFICATION ITEMS (Cont'd)

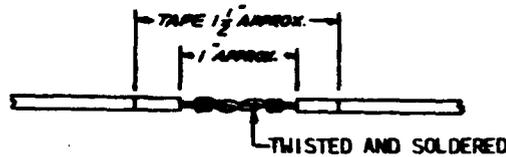
Verification Items and Brief Statement of Requirement	Reference	
	Paragraph Number	Figure Number
5.52 Skinners to magnet terminals of 287 or 288 type relays spliced with straight splice; splice insulated friction tape and shellacked, No. 14 Sleeving of Heat Shrink Solder Sleeve.	4.12A	1,2,3
5.521 Splice located in accordance with figure.	4.12C	11
5.522 Extended leads superimposed on switchboard or local cable form.	4.12C	11
5.523 Where insulated strap wire is used to multiple magnets of adjacent 263 type relays - extend strap with added local wire between positions of last 263 and first 287 then adjacent 287 relays.	4.121	
A. <u>Between last 263 and first 287:</u> Superimpose wire of same type, color and gauge as feeder supplying the strap - superimposed on leg.	4.121A	
B. <u>Between adjacent 287 relays:</u> Superimpose wire of same type, color and gauge as indicated in 5.523A.	4.121B	
C. <u>At last 263 relay:</u> Wrap feeder lead with 1-1/2 turns and solder at a midway point between last two relays.	4.121C	
D. Added 287 relays connected per "T" drawing and dressed according to figure.	4.121D	11
5.6 <u>Splicing Skinner and "D" Wiring to Pigtail Apparatus</u>	4.2	
5.61 Connection to pigtail apparatus - SEC. 333.	4.21	
5.611 Protect with friction tape and shellac, PVC tape, or No. 14 Sleeve - providing sleeve does not slide freely.	4.211	
5.7 <u>Splicing Multiple-Bank Wire</u>	4.3	
5.71 Use straight splice protected with friction tape and shellac, PVC tape, No. 14 Sleeve or Heat Shrink Sleeve.	4.31	1,3
5.8 <u>Splicing Ringing Mains</u>		
5.81 Ringing mains, when sections are added, spliced at end of form with straight splices. Splices staggered.	4.41, 4.42	



FOR INDIVIDUAL CONDUCTORS SMALLER THAN 16 GAUGE
 (PIGTAIL SPLICE - CABLES ONLY)



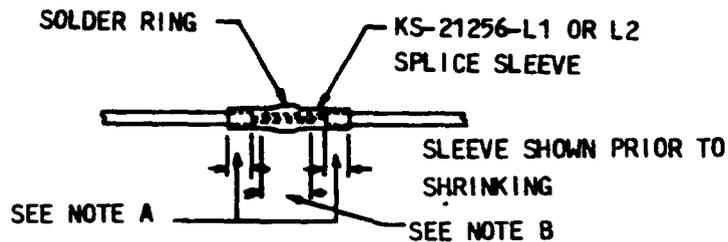
FOR INDIVIDUAL CONDUCTORS SMALLER THAN 16 GAUGE
 AND IN CABLES WHERE THE DIMENSIONS OF THE SPLICE
 ARE SUCH AS TO PREVENT THE USE OF THE PIGTAIL SPLICE



FOR INDIVIDUAL CONDUCTORS 16 GAUGE
 (WESTERN UNION SPLICE)

RP-09760

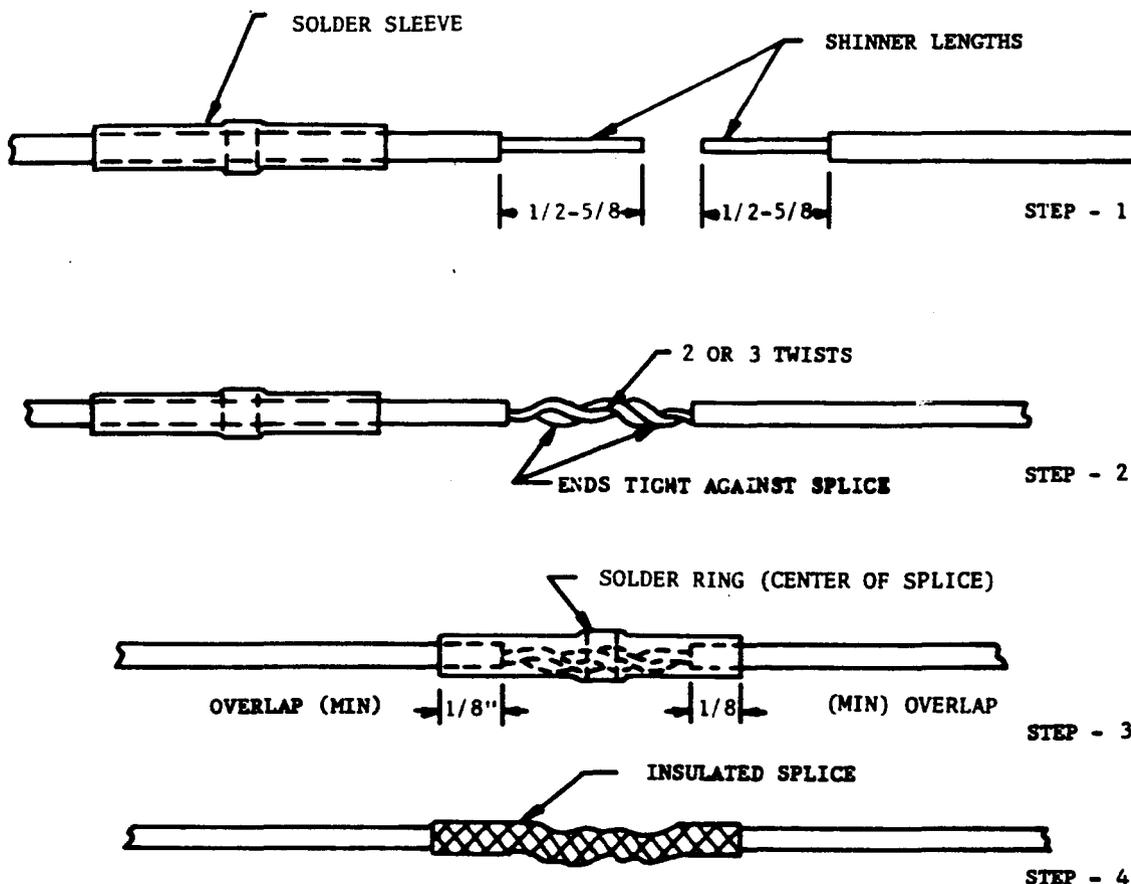
FIG. 1 STRAIGHT SPLICE FOR INDIVIDUAL CONDUCTORS
 (PAR. 3.311, 3.41, 3.411A, 3.4131, 4.12A, 4.31)



- NOTES: A. THE INSULATION OF EACH WIRE SHALL EXTEND INTO THE SLEEVE 1/8" MINIMUM.
 B. THE BARE WIRES WITHIN THE SLEEVE MAY BE LAID FLAT AGAINST EACH OTHER WITH A MINIMUM 3/8" OVERLAP. THE BARE PORTION OF THE WIRE SHALL NOT OVERLAP THE INSULATED PORTION OF THE WIRE. THE SOLDER RING SHOULD BE APPROXIMATELY AT THE CENTER.

RP-0976B

FIG. 2 (OPTION-A) STRAIGHT SPLICE
 (PAR. 3.311, 3.41, 3.412, 3.4131, 4.12A)

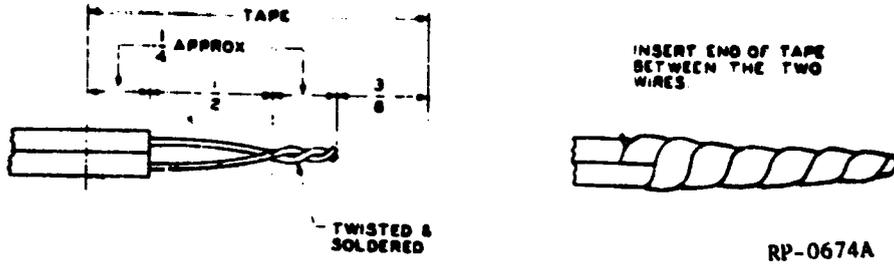


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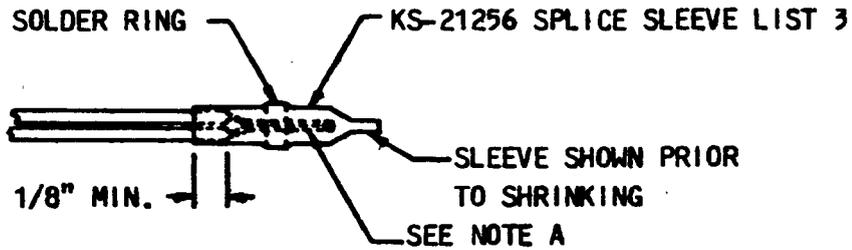
NOTES:

1. REMOVE APPROXIMATELY $1/2$ "- $5/8$ " OF INSULATION FROM THE ENDS OF THE TWO WIRES TO BE SPLICED; INSERT SOLDER SLEEVE OVER THE END OF ONE LEAD (STEP 1).
2. TWIST THE BARE WIRE ENDS TOGETHER, MAKE AT LEAST TWO FULL TWISTS AND KEEPING THE WIRE ENDS TIGHT AS POSSIBLE AGAINST THE SPLICE (STEP 2).
3. SLIDE THE KS-21256L1 OR L2 SOLDER SLEEVE OVER THE TWISTED BARE WIRE SO THE SOLDER RING IS CENTERED. SLEEVE MUST OVERLAP THE WIRE INSULATION (MINIMUM $1/8$ ") AT BOTH ENDS. NO BARE WIRE PROTRUDING OUT THE ENDS OF THE SLEEVE (STEP 3).
4. APPLY HEAT TO THE SOLDER SLEEVE USING A HEAT SHRINK GUN R-4444. THE HEAT WILL MELT THE SOLDER RING (SOLDERING THE CONNECTION) AND SHRINK THE HEAT SHRINKABLE INSULATION TIGHT AGAINST THE CONNECTION.

FIG. 3 (OPTION - B) - METHOD OF MAKING STRAIGHT SPLICE
(PAR. 3.311, 3.41, 3.412, 3.413I, 4.12A, 4.31)



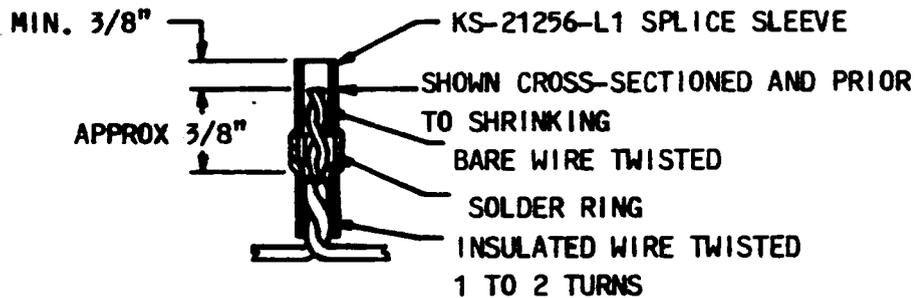
→ FIG. 4 END SPLICE FOR CONDUCTORS
 → (PAR. 3.233, 3.312, 3.316, 3.41, 3.411D, 3.413Y)



NOTE: A. BRING WIRES APPROXIMATELY TO THE BEND OF THE SPLICE SLEEVE

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FIG. 5 END SPLICE FOR CONDUCTORS
 (PAR. 3.233, 3.312, 3.41, 3.412, 3.413I)



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FIG. 6 28 AND 30 GAUGE CONDUCTOR SPLICE
 (PAR. 3.233, 3.313, 3.41, 3.412)

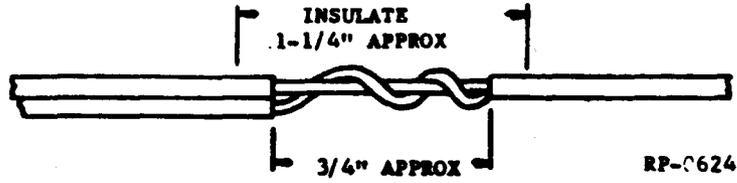
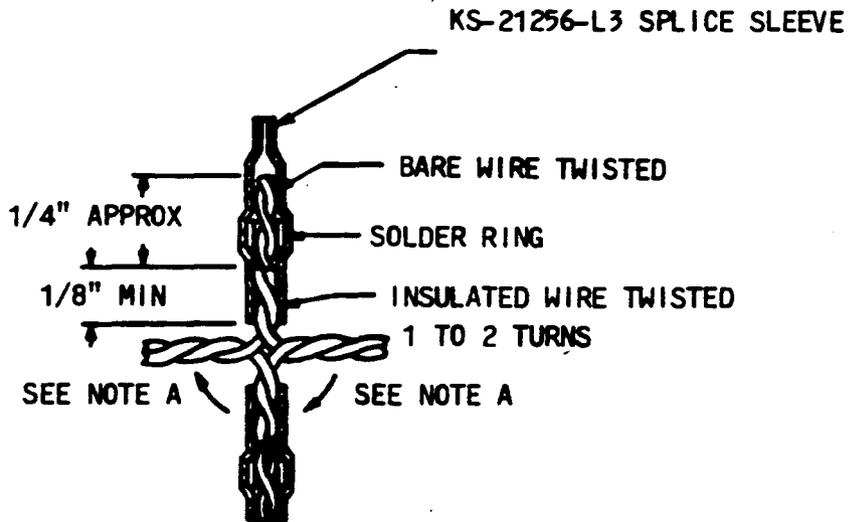


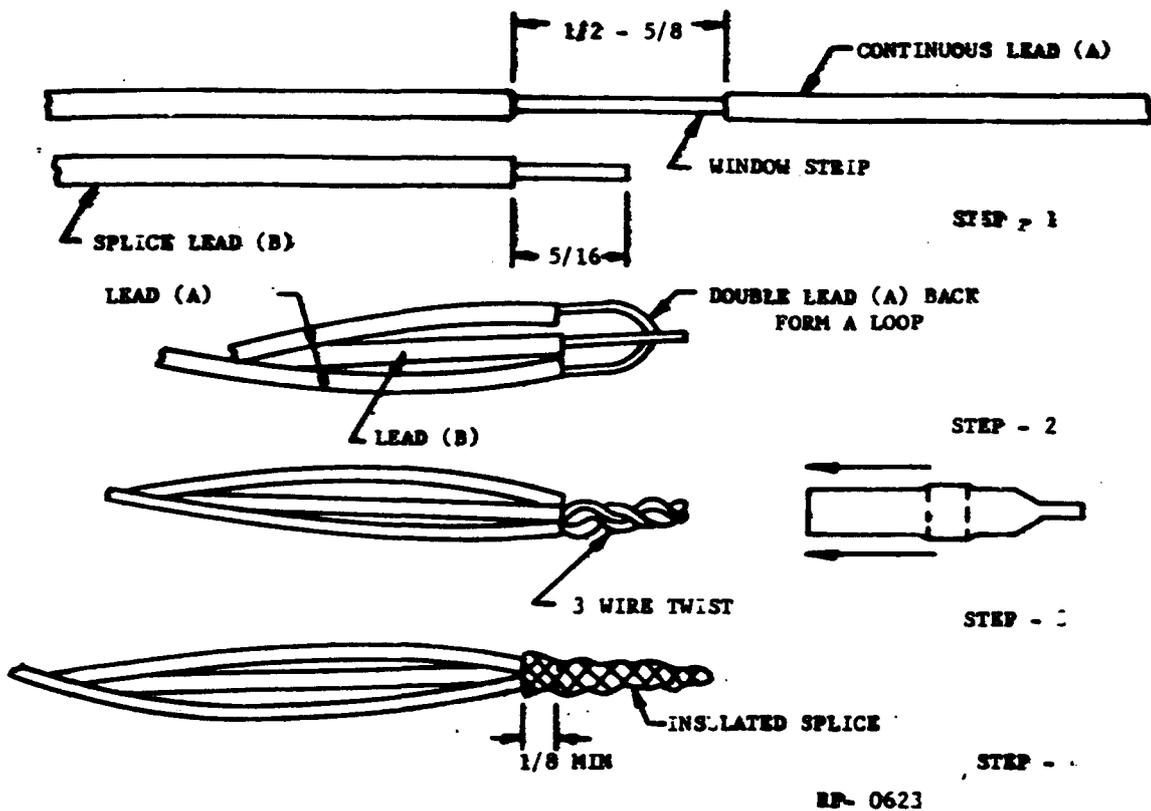
FIG. 7 "Y" SPLICE FOR CONDUCTORS
(PAR. 3.315, 3.41, 3.411A)



NOTE: A. AFTER THE SPLICES ARE MADE, THE SPLICES SHALL BE FOLDED IN OPOSITE DIRECTIONS PARALLEL TO THE TWISTED PAIR.

RP-0976B

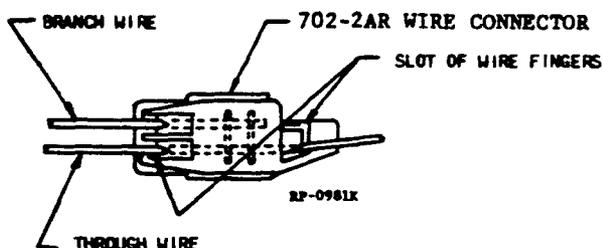
FIG. 8 SPLICING TWISTED PAIRS
(PAR. 3.317, 3.41, 3.412)



NOTES:

1. THIS TYPE OF SPLICE CAN BE MADE ONLY WHERE APPROXIMATELY 3 INCHES OF SLACK CAN BE OBTAINED FROM THE TERMINATED LEAD (A) (STEP 1).
2. "WINDOW STRIP" LEAD (A) EXPOSING $1/2 - 5/8$ " OF BARE CONDUCTOR AND REMOVE $5/16$ " OF INSULATION FROM LEAD (B) (STEP 1).
3. DOUBLE LEAD (A) BACK AND PLACE LEAD (B) AS SHOWN IN STEP 2, TWIST THE THREE LEADS TOGETHER MAKING 2-3 FULL TWISTS AND TRIM TO ABOUT $1/4$ " LONG (STEP 3).
4. SLIDE LARGE END OF THE KS-21256L3 SOLDER SLEEVE OVER THE TWISTED WIRES. BE SURE THAT (A) THE SOLDER RING IS IN THE APPROXIMATE CENTER OF THE BARE WIRE TWISTS AND (B) THE SLEEVE OVERLAPS ONTO THE INSULATED PORTION OF THE WIRES FOR AT LEAST $1/8$ " (MINIMUM).

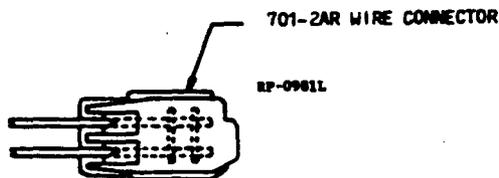
FIG. 9 METHOD OF MAKING IN SERVICE "Y" SPLICE
(PAR. 3.316, 3.412, 3.413I)



NOTES:

1. SELECT THE WIRES TO BE BRIDGED FROM THE THROUGH CABLE AND THE BRANCH CABLE.
2. POSITION THE WIRE FROM THE THROUGH CABLE IN THE SLOT OF THE CONNECTOR.
3. INSERT THE WIRE FROM THE BRANCH CABLE IN THE VACANT WIRE HOLE OF THE CONNECTOR. BE SURE THE WIRES ARE FULLY SEATED IN THE RESPECTIVE HOLES PRIOR TO PRESSING CONNECTOR.
4. WITH WIRES IN PLACE, SNAP CONNECTOR TOGETHER BY HAND TO HOLD WIRES.
5. HOLDING WIRES AND CONNECTOR IN PLACE, USE THE AT-8810 G LONG NOSE PLIERS TO PRESS THE CONNECTOR FIRMLY TOGETHER.
6. AFTER PRESSING, BUT BEFORE RELEASING THE TOOL, PUSH THE BRIDGED WIRE INTO THE SLOTS OF THE WIRE FINGERS.
7. BRIDGE WIRE REMOVAL
A WIRE MAY BE REMOVED FROM THE PRESSED JOINT BY CUTTING THE WIRE OFF CLOSE TO THE PLASTIC BODY AND TUCKING THE WIRE STUB DEEP INSIDE THE CAVITY IN THE CAP OF THE 702-2AR CONNECTOR. USE THE R-4108 MIDGET DIAGONAL CUTTERS FOR THIS OPERATION.

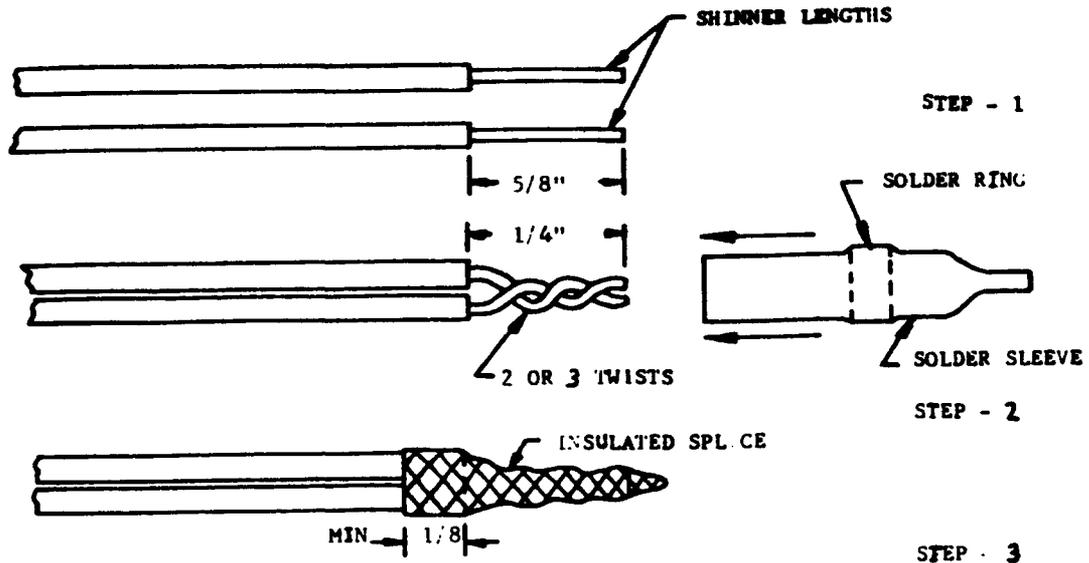
FIG. 9A METHOD OF MAKING IN SERVICE "Y" SPLICE WITH 702-2AR WIRE CONNECTOR
(PAR. 3.319, 3.414)



NOTES:

1. SELECT THE WIRES TO BE SPLICED.
2. CUT THE MATCHED WIRES EVENLY.
3. FULLY INSERT WIRES INTO THE HOLES OF THE CONNECTORS.
4. VISUALLY CHECK THE ENDS OF THE CONDUCTOR TO ASSURE THAT THE WIRE AND INSULATION ARE THE SAME LENGTH AND ASSURE THAT THE WIRES EXTEND ALL THE WAY INTO THE CONNECTOR.
5. HOLDING CONNECTOR IN PLACE WITH FOREFINGER, SNAP CONNECTOR TOGETHER BY HAND TO HOLD WIRES.
6. STILL HOLDING CONNECTOR IN PLACE WITH FOREFINGER, USE AT-8810 G LONG NOSE PLIERS TO PRESS THE CONNECTOR FIRMLY TOGETHER.

FIG. 10 METHOD OF MAKING A BUTT SPLICE WITH THE 701-2AR WIRE CONNECTOR
(PAR. 3.314, 3.414)



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NOTES:

1. REMOVE APPROXIMATELY $3/4$ " OF INSULATION FROM THE ENDS OF THE TWO WIRES TO BE SPLICED (STEP 1).
2. LAY THE TWO WIRES PARALLEL TO EACH OTHER WITH THE ENDS OF THE INSULATION APPROXIMATELY EVEN (STEP 2).
3. GRASP THE TWO INSULATED WIRES WITH THE THUMB AND FORE-FINGER JUST BELOW THE BARE PORTION OF WIRE, SEPARATE THE BARE WIRES SLIGHTLY AND PROCEED TO MAKE 3-4 TWISTS IN BARE WIRE. TRIM THE BARE TWISTED WIRE BACK TO ABOUT $1/4$ "- $5/16$ " LONG (STEP 2).
4. SLIDE THE LARGE END OF THE KS-21256L3 SOLDER SLEEVE OVER THE TWISTED WIRES BEING SURE THE SOLDER RING IS APPROXIMATELY IN THE CENTER OF THE BARE PORTION OF TWISTED WIRE AND THAT THE SLEEVE OVERLAPS ONTO THE INSULATION FOR AT LEAST $1/8$ " (MINIMUM), APPLY HEAT.

FIG. 10A METHOD OF MAKING AN END SPLICE
(PAR 3.312, 3.412)

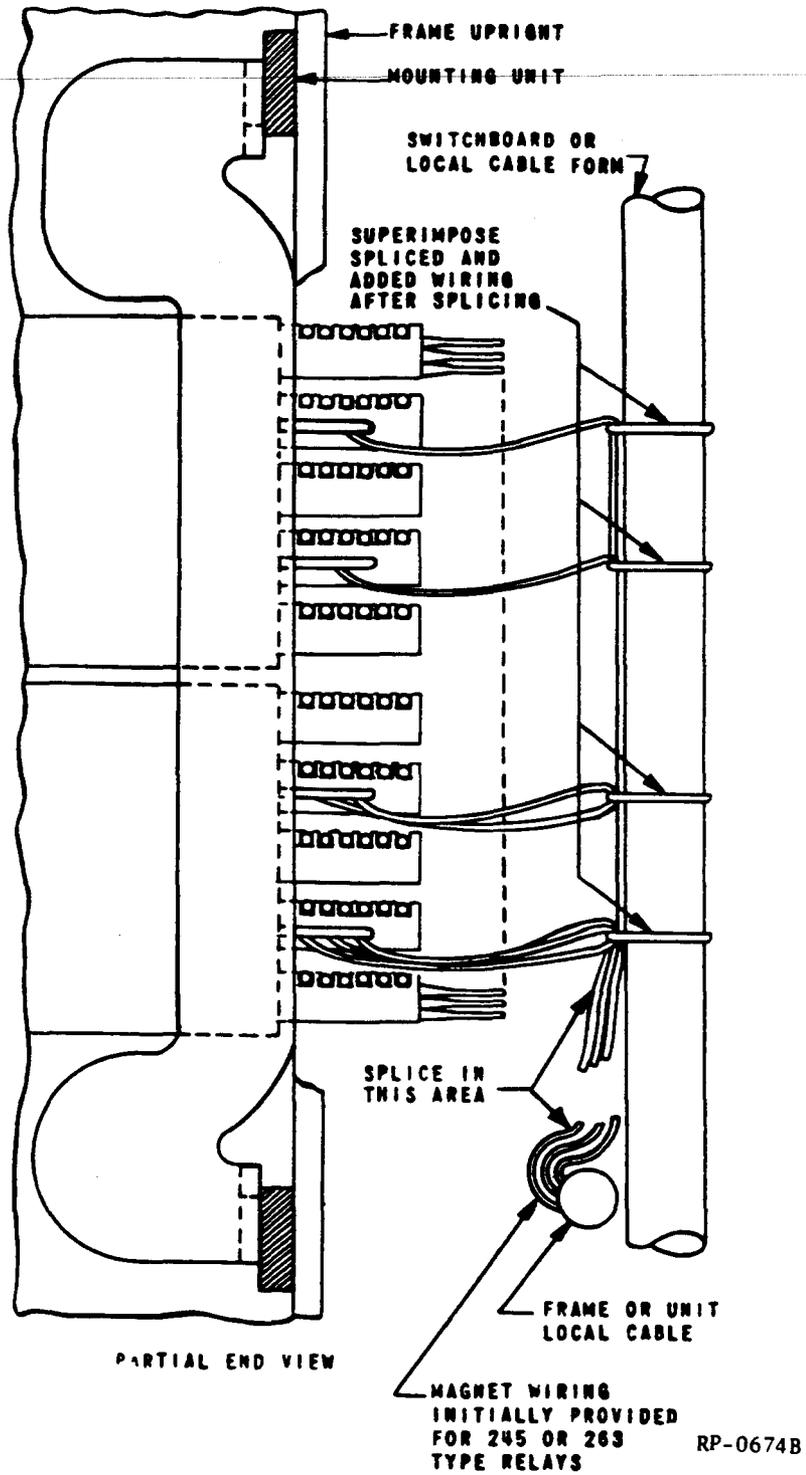


FIG. 11 RELAYS MULTICONTACT 287 AND SIMILAR TYPES METHOD OF EXTENDING MAGNET SKINNERS AND INTERMAGNET WIRING (PAR. 4.12B, 4.12C, 4.12D)

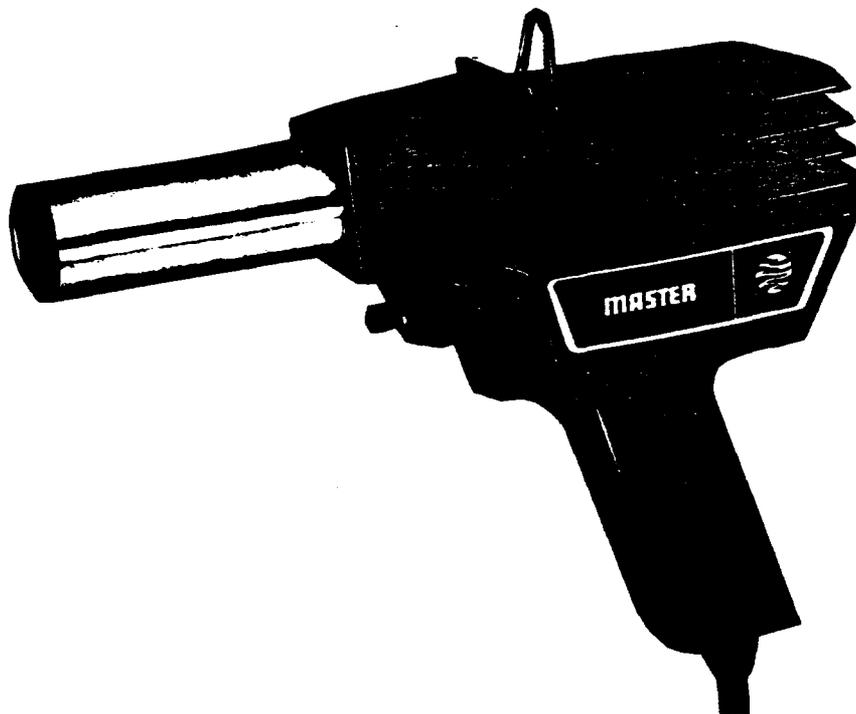


FIG. 12 R-4444 HEAT GUN
(PAR. 3.51)

[Vertical lines at side of paragraphs
indicate requirements

→ Indicates new or changed information

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Reason for Reissue:

1. To add information pertaining to 701 and 702-2AR Wire Connectors.
2. Revise Par. 2.11, 3.41 and 5.
3. Add Par. 3.314, 3.319 and 3.414.
4. Add Fig. 9A and 10A.