

BURIED SERVICE WIRE TERMINATIONS

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E. D and E Buried Wire Terminals	11	1.01 This practice covers buried service wire ter- minations at junctions with aerial and buried plant and the exterior mounting of station protectors at customer locations.	
F. Exterior Mounting of Station Protectors at Customer Locations	11	1.02 This practice is reissued to:	
G. Junction With Aerial Cable	11	• Add new 9-type terminal blocks with water- proof stub cable	
H. Junction With Multiple Wire	14	• Add 101C1 wire terminal.	
I. Junction With C Rural Wire	17	Revision arrows are used to indicate significant changes.	
J. Junction With Open Wire	18	1.03 The recommended depths and methods for placing buried service wire are specified in Section 629-200-206.	
5. DROP AND BLOCK WIRING AT BURIED CABLE TERMINALS	20	1.04 Section 626-300-100 covers the description and selection of service wire and buried distribu- tion wire. Unless otherwise stated, the term service wire as used in this practice refers to BSW-2/22-C and BSW-5/22-C (C service wire), BSW-2/22-GRE (E armored service wire), BDW-1/19-GRE (E buried wire), and BDW-2/19-GRF.†	
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1.05 DANGER: The metallic shield or armor of service wires must always be connected to the ground terminal at the customer protector when the protector is fed from any type of aerial or buried plant. This grounding connection is required at customer locations to protect against damage by lightning and sustained power contact. The metallic shield or armor of service wires must always be connected to the bond bar of above and below ground closures at the junction with buried cable. For those stations served from buried distribution cable exposed to contact with power of over 300 volts, such as in random separation construction, the service order should specify the appropriate protection in the circuit between the exposed cable and the station to minimize fire or shock hazards at the subscriber premises.

1.06 Service wires should be identified at stored cut ends by one of several methods. Two common methods, depending on the length of time required to retain wire identity, are as follows:

(a) **Less Than Three Months:** One method of identifying service wires is the use of self-laminating label (obtain from T&B Company, W.H. Brady Company, or other companies with equivalent labels (Fig. 1). Mark the label with a pen or felt marker. Remove the label from the pad and place on the service wire by wrapping it on itself so that the transparent adhesive covers the written identity.

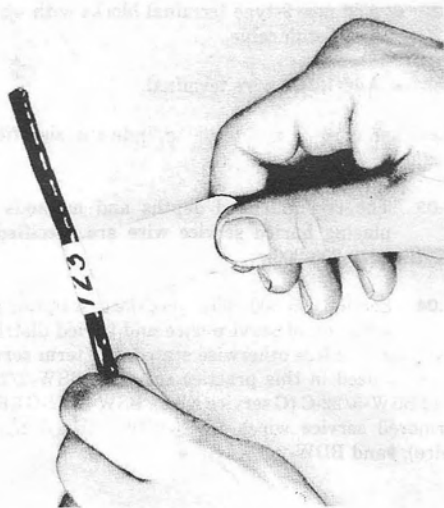


Fig. 1—Placing Self-Laminating Label

(b) **More Than Three Months:** Use TY-RAP* tie and marker (obtained from T&B Company or equivalent obtained from W.H. Brady Company or other companies with equivalent labels (Fig. 2) to identify service wires. Twist off and retain the locking head from the nylon tie. Wrap the tie around the service wire and slip the tail of the tie through the eye of the grommet end and pull taut. Slide the desired preprinted tubular marker on the tail of the tie; then, slide the locking head on the tie and push snug against the marker.

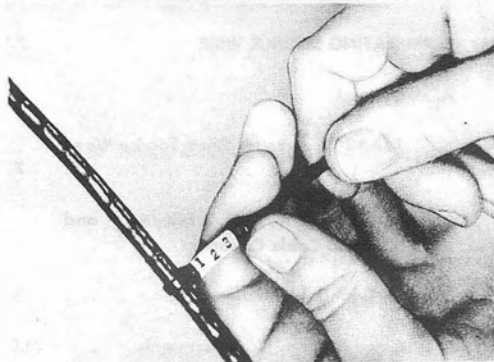


Fig. 2—Placing Tie and Marker

1.07 The 700-type connectors are used to join conductors in most combinations of gauges without stripping the insulation (see note) as follows:

- **701-2B or 701-2BT connectors**, 19 through 26 gauge, used to splice two wires
- **702-2B or 702-2BT connectors**, 19 through 26 gauge, used to bridge one wire to one through wire
- **700-3B or 700-3BT connectors**, 17 through 26 gauge, used to splice two or three wires and bridge up to two wires to one through wire.

* Registered trademark of Thomas & Betts Company.

Section 632-205-215 covers the complete description and use of the 700-type connectors.

Note: Where 700-type connectors are used to splice BDW-1/19-GRE (E buried wire) or D underground wire, the insulation must be removed.

1.08 The E, F, and H connector pressers and the G long-nose pliers are the only approved tools for pressing the 700-type connectors. Use of other tools may result in improperly made connections.

1.09 **Warning:** *The 700-type connectors shall not be exposed to solvent or solvent fumes, such as B cleaning fluid, Acetone, etc. Such solvents can damage or destroy the plastic connector parts.* When joining BDW-1/19-GRE (E buried wire) to a cable pair with 700-type connectors, split the conductors apart for approximately 2 inches. Where the service wire insulation joins the 700-type connector, place vinyl tape over the joint.

1.10 The C service wire clamp (Fig. 3) and the H connector (Fig. 4) are used to terminate the shields of buried wire. The H connector is available in two sizes. The smaller, size 1 connector, is intended for copper conductor sizes No. 4, 6, 8, 10, and 12 in any combination. The size 2 connector is intended for attaching copper conductor sizes No. 12 through No. 4 to copper conductors No. 8 through 1/0 or to armored bare grounding conductors No. 8 through No. 4.

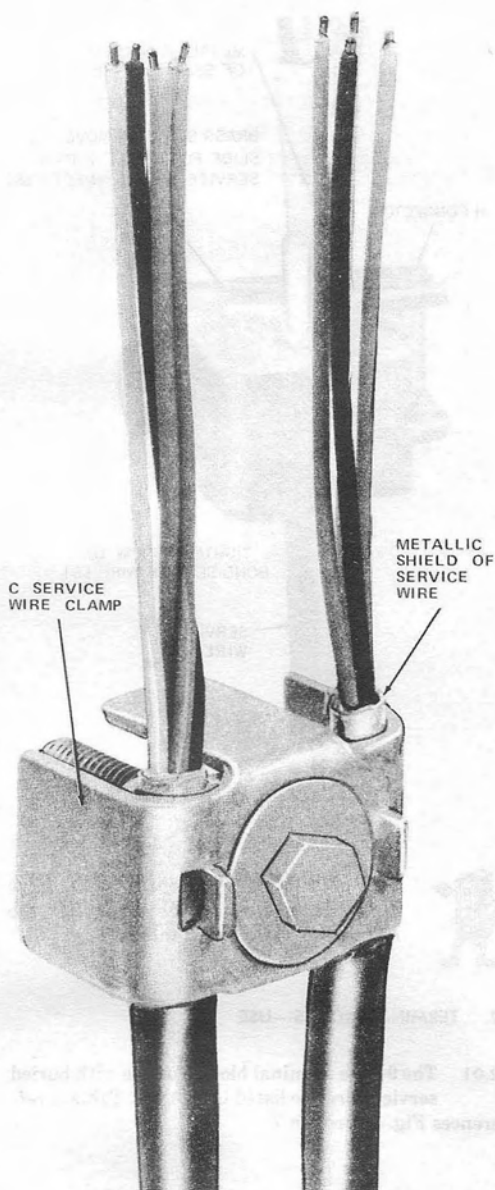


Fig. 3—C Service Wire Clamp

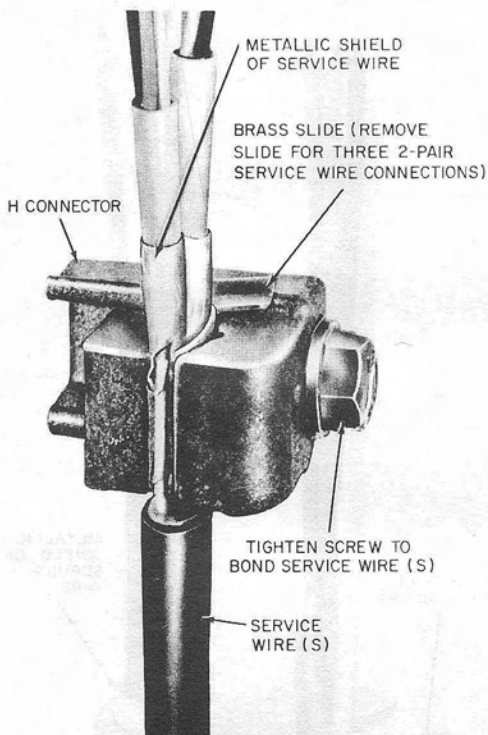


Fig. 4—H2 Connector AT-8980



Use 700-type connectors for new terminations and reconnections. Do not use B wire connectors.

2. TERMINAL BLOCKS—USE

2.01 The 9-type terminal blocks for use with buried service wire are listed in Table A. Table A references Fig. 5 through 7.

DISPOSITION OF UNTERMINATED WIRE

3.01 Buried wire not in use may include new installations when some time may elapse before the buried wire is placed in service or where existing service is being disconnected. To avoid differences in potential between conductors and the metallic shield or armor, buried wire not in use should be protected as listed below.

(a) **New installations** where the wire is not being terminated on a station protector at time of placing:

- (1) At the station end, twist the bare conductors and metallic shield together and wrap with vinyl tape.
- (2) At the end toward the central office, bridge the metallic shield or armor to a common ground post. The conductor must be bonded to the same ground post or to the metallic shield.

(b) **Service disconnections** where the wire has been terminated and existing service is being disconnected:

- (1) At the station end, leave all terminations as they are; but, where the station protector is being removed, twist the metallic shield or armor and bare conductors together and wrap with vinyl tape.
- (2) At the end toward the central office, when the wire terminates on a protector, leave the terminations as they are. Under serving area interface (SAI) conditions, leave the terminations as they are. Under all other conditions, follow the instructions in (a)(2).

◆ TABLE A ◆
9-TYPE TERMINAL BLOCKS

TERMINAL BLOCK CODE	VOLTAGE PROTECTION NOMINAL	NO. PAIRS	TYPE PROTECTION	PROTECTION UNITS	TERMINAL STUB CABLE (24 GAUGE)
9A1-5**	-	5	Fusing*	-	4 ft length
9A1-10**		10	Fusing*	-	
9A1-25**		25	Fusing*	-	
9A1-5U		5	Fusing	-	4 or 12 ft lengths
9A1-10U		10	Fusing	-	
9A1-25U		25	Fusing	-	
9A1A-5**	500	5	Station	2A1A	4 ft length
9A1A-10		10	Station		4 ft length
9A1A-25		25	Station		4 ft length
9A1A-5U		5	Station		4 ft length
9A1A-10U		10	Station		
9A1A-25U		25	Station		
9A1B-5**	800	5	Cable	2A1B	4 ft length
9A1B-10		10	Cable		
9A1B-25		25	Cable		
9A1B-5U		5	Cable		4 ft length
9A1B-10U		10	Cable		
9A1B-25U		25	Cable		
9E1A-5	500	5	Station	11A1A	4 ft length
9E1A-10		10	Station		
9E1A-25		25	Station		
9E1A-5U		5	Station		4 ft length
9E1A-10U		10	Station		
9E1A-25U		25	Station		
9A1-10W	-	10	Fusing*	-	12 or 25 ft lengths
9A1-25W	-	25	Fusing*	-	
9A1A-10W	500	10	Station	2A1A	4 or 12 ft lengths
9A1A-25W		25	Station		
9A1B-10W	800	10	Station	2A1B	12 ft length
9E1A-10W	500	10	Station	11A1A	4 or 12 ft lengths
9E1A-25W		25	Station		

* Fusing protection is accomplished through 24 AWG conductors of terminal leads or stub cable.

** A & M only

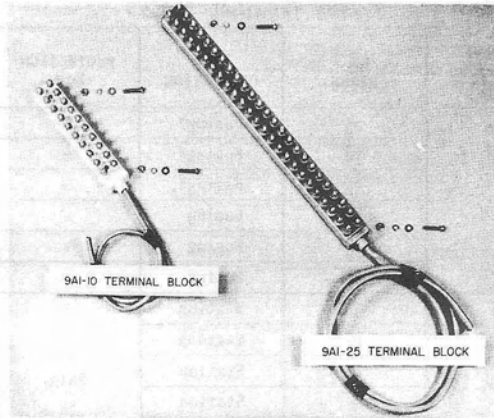


Fig. 5—9-Type Terminal Blocks (Unprotected)◄

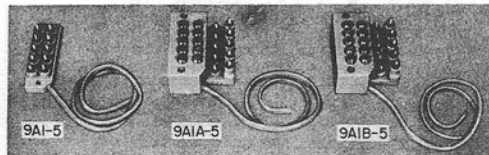


Fig. 6—9-Type Terminal Blocks (Protected)◄

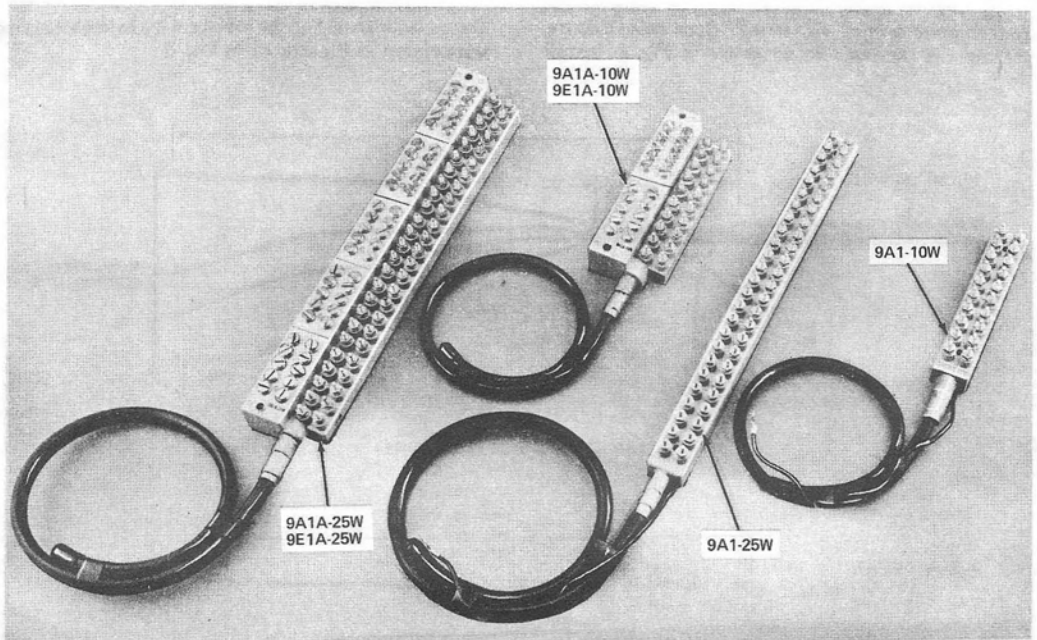


Fig. 7—9-Type Terminal Blocks (Waterproof Stubs)¶

4. TERMINATING SERVICE WIRE

A. General

4.01 The methods for terminating service wires are referred to as:

(a) **Fixed count access (FCA):** A predetermined cable pair count appears at each terminal for service connections. The assigned cable pairs are permanently connected and appear on 9A-type terminal blocks.

(b) **Permanent connections:** Connections are made in buried and/or encapsulated closures. Sufficient connections must be made initially to provide service without reentering the closure.

4.02 All buried wires contain slitting cords to assist in the removal of the outer jacket.

4.03 The filled 700-type connectors must be used to terminate buried wires for **all** connections.

4.04 The H connector will accommodate a maximum of three 2-pair or two 5-pair service wires. For three 2-pair service wire connections, remove the brass slide for a more reliable connection.

4.05 The spare service wire conductors must be attached to a common ground post and dressed toward the base of the closure.

B. 16AA2 Closures for Filled Service Wire

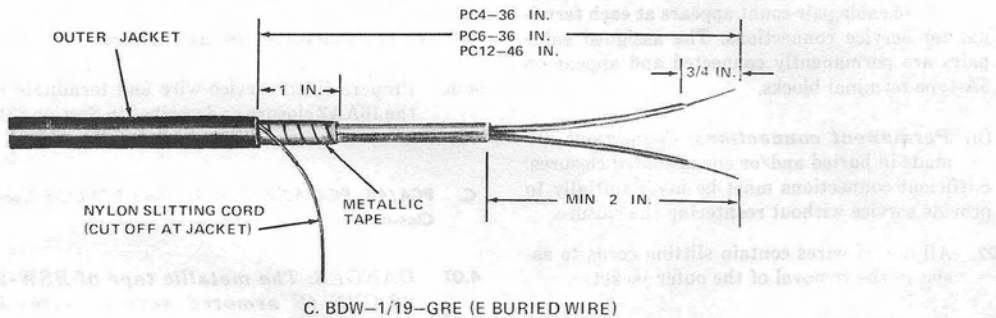
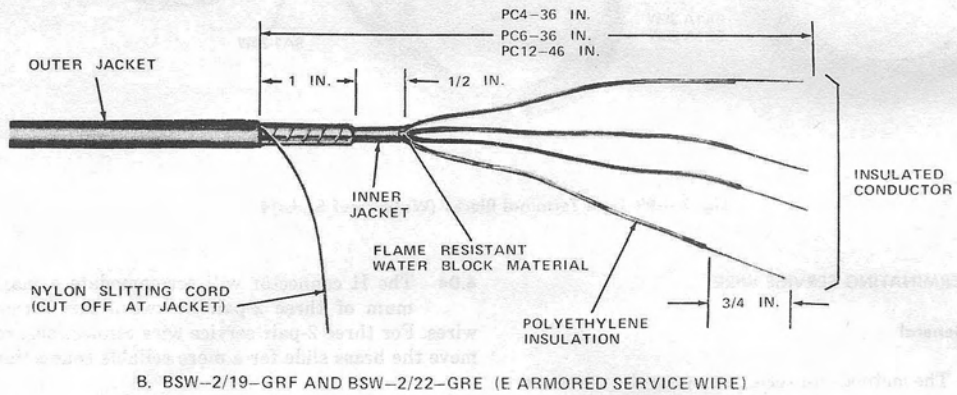
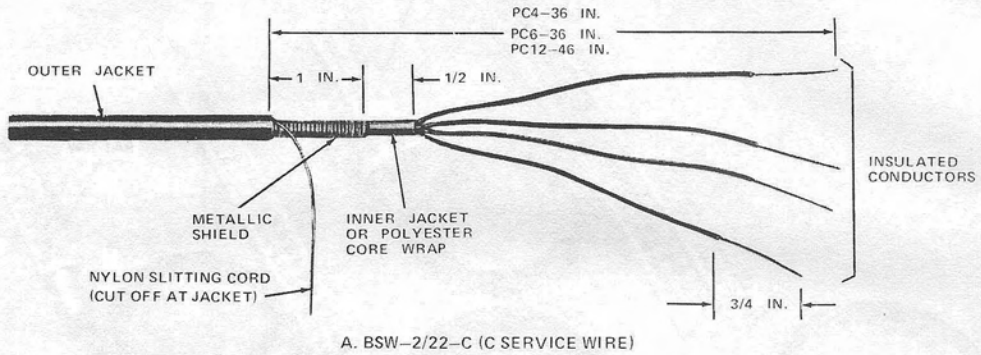
4.06 Prepare filled service wire and terminate in the 16AA2 closure as described in Section 631-600-214.

C. PC4/48, PC4/48M, PC6/48, and PC12/55 Cable Closures

4.07 **DANGER:** The metallic tape of BSW-2/22-GRE (E armored service wire) is stainless steel. After the excess tape has been removed, round the edges to prevent injury.

To terminate service wire in a PC-type cable closure, prepare the service wire as shown in Fig. 8. Install

the metallic shield of the service wire in the C service wire clamp as illustrated in Fig. 3.



◆ Fig. 8—Prepared Service Wire for PC-Type Cable Closure ◆

4.08 An example of terminating the conductors of the service wire to a terminal block in a PC12/55 closure is shown in Fig. 9. Terminating the service wire is similar in other PC-type closures.

D. 85-Type Cable Terminal

4.09 **DANGER:** *The metallic tape of BSW-2/22-GRE (E amored service wire) is stainless steel. After the excess tape has been removed, round the edges to prevent injury.* To terminate service wire in an 85-type cable terminal, prepare the service wire as shown in Fig. 8. Install the metallic shield of the service wire in the C service wire clamp as illustrated in Fig. 3.

SERVICE
WIRE

9A1-25
TERMINAL
BLOCK

STUB OF
TERMINAL
BLOCK
SPliced
TO ASSIGNED
FIXED COUNT

C SERVICE
WIRE CLAMP
OR AT-8980 H
CONNECTOR

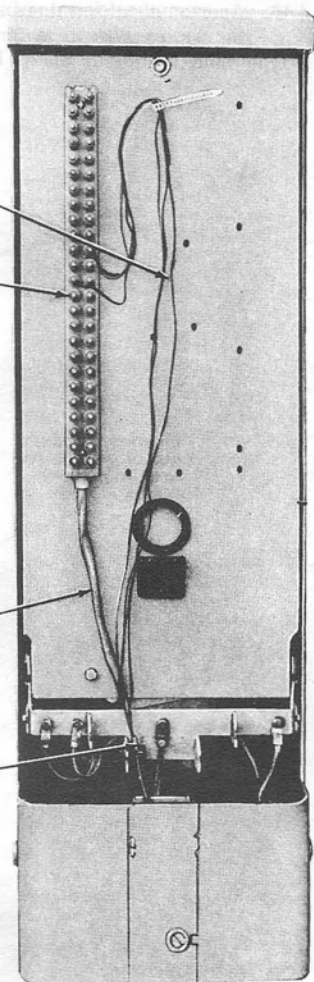


Fig. 9—Service Wire Terminated in PC12/55 Cable Closure

4.10 An example of terminating the conductors of the service wire to a terminal block in an 85-type cable terminal is shown in Fig. 10.

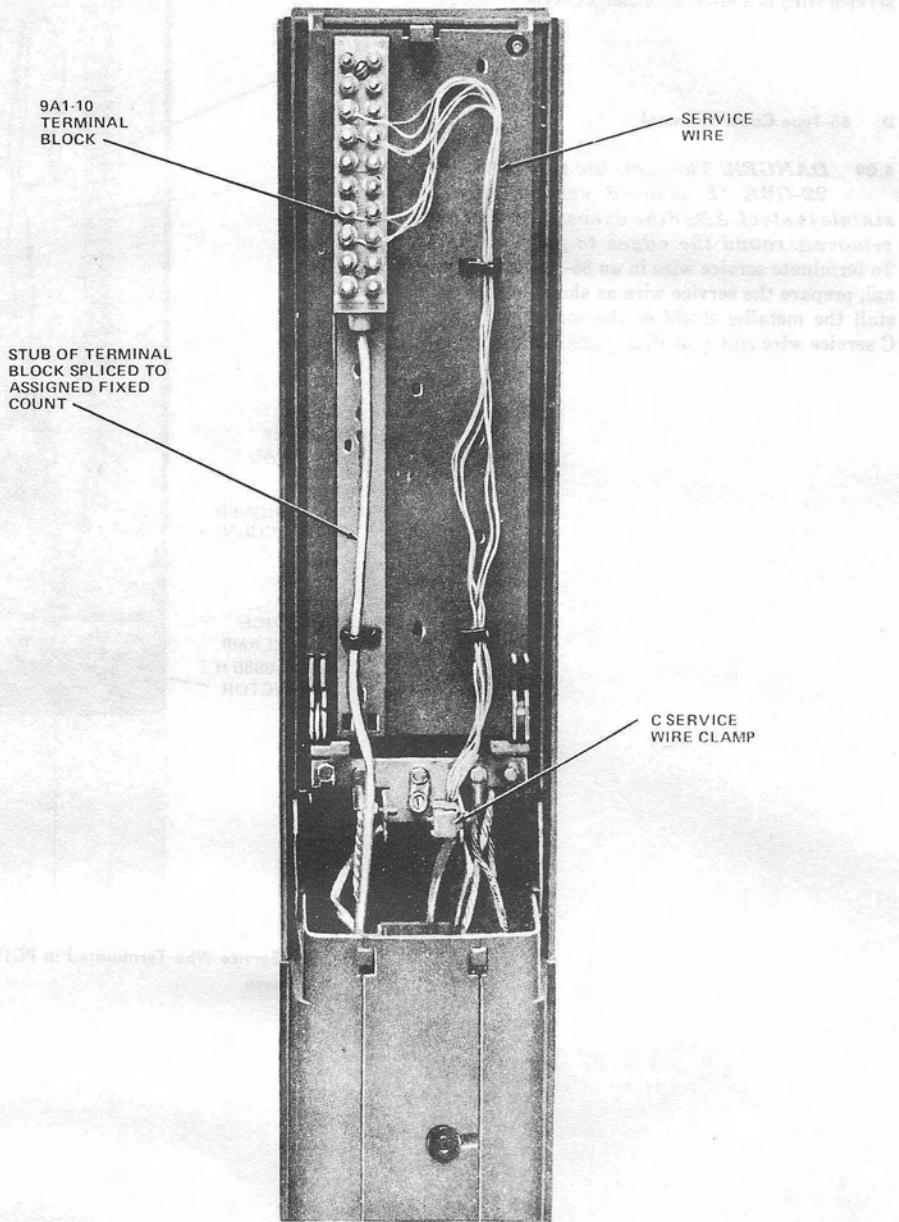


Fig. 10—Service Wires Terminated in 85-Type Cable Terminal

E. D and E Buried Wire Terminals

4.11 The connecting block furnished with the D and E wire terminals provides air gap lightning protection. The large washers on each binding post are spaced to provide an air gap between themselves and between the heads of the screws mounting the block to the terminal plate. This equalizes any discharge between the conductors and the armor wire or terminal housing at the connecting block. If the large washers, the binding post, or the connecting block is damaged, replace the connecting block.

4.12 The termination of service wire in either the D or E buried wire terminal is identical. Prepare the service wire as shown in Fig. 11 and terminate as shown in Fig. 12.

F. Exterior Mounting of Station Protectors at Customer Locations

4.13 Locate station protectors on exterior building walls following the guidelines listed below (Fig. 13):

- Locate in *close proximity* to power entrance to facilitate common grounding.
- Locate in an accessible location where it is not likely to be subjected to damage or immersion.
- Avoid locations on fronts of buildings.
- Locate to allow the shortest straight line burial path for the service wire.

(e) Use the B, C, or D customer service closures to mount the protectors. See Section 462-242-101 for information covering the customer service closures.

4.14 See Section 462-005-100 for information on the selection and installation of station protectors.

G. Junction With Aerial Cable

4.15 At the cable terminal where buried service wire feeds from aerial cable and where the length of the buried service wire is:

(a) **700 feet or less, do not bond** the metallic shield of service wire to the strand or terminal housing. This will **protect the subscriber location from possible fire** caused by excessive power fault should the circuit come in sustained contact with power lines of any voltage.

(b) **More than 700 feet**, use BDW-1/19-GRE (E buried wire) and bond the metallic shield to the strand or metallic terminal housing. When the length of buried wire is greater than 700 feet, the resistance of BDW-1/19-GRE (E buried wire), because of its length, will limit the fault current to safe values. **BSW-2/22-C or BSW-5/22-C (C service wire) and BSW-2/22-GRE (E armored service wire) are not to be used for distances of more than 700 feet.**

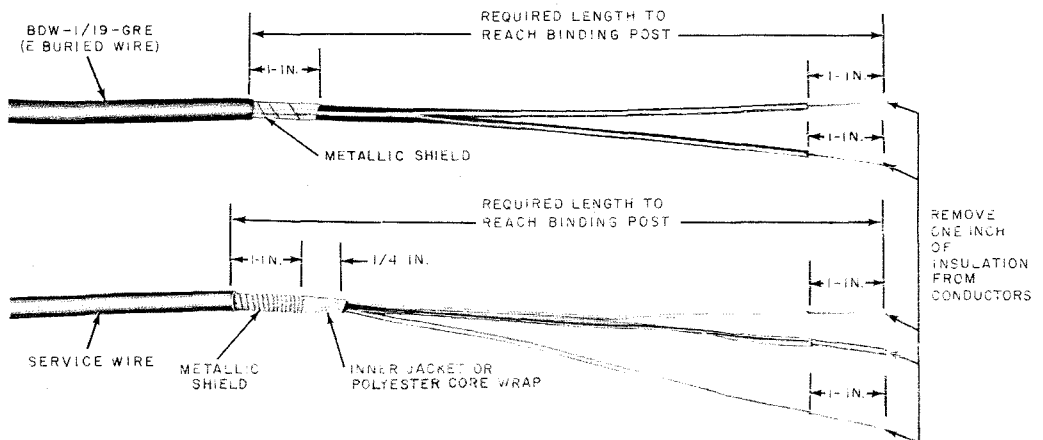


Fig. 11—Prepared Service Wire, D or E Buried Wire Terminal

SPARE PAIR OF SERVICE WIRE TERMINATED ON SPARE BINDING POST OF CONNECTING BLOCK

BURIED WIRE AND SERVICE WIRES TERMINATED ON TIP AND RING BINDING POST

EXPOSED METALLIC SHIELD OF SERVICE WIRE PLACED IN CONNECTOR

EXPOSED METALLIC SHIELDS OF BURIED DISTRIBUTION WIRES PLACED IN SPLIT-BOLT

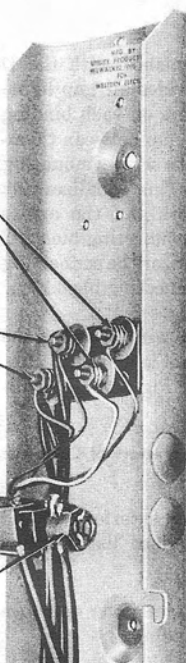


Fig. 12—Service Wire Terminated, D or E Buried Wire Terminal

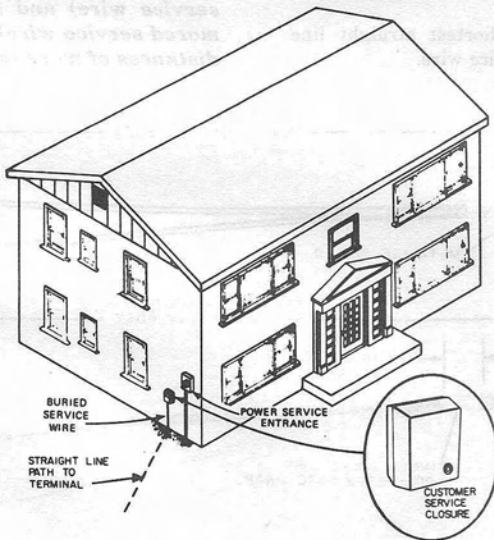


Fig. 13—Recommended Location of Station Protector

4.16 No carbon block cable protection is required between the cable conductors and the buried service wire conductors unless lightning exposure exists. (See paragraph 4.22.)

4.17 Caution: Buried service wires should not be clamped directly against creosote poles. Constant contact with creosote may cause deterioration of the outer PVC jacket. Where the service wire is attached to a creosote pole with cable clamps, apply two or three wraps of vinyl tape to the wire under

the clamps. Buried service wire can be brought up a pole and terminated directly in a pole- or strand-mounted cable terminal or cable closure if the cable conductor is 24 or 26 gauge. Where fuseless protectors are used at the station and the cable conductor is 22 or 19 gauge and exposed to power contact, a fusible link is required between the cable pair and the service wire. The 24-gauge conductors in a cable stub or the terminal block of a 105- or N-type cable terminal are satisfactory fusible links. At the ground line, the wire should be protected with an 8-foot length of No. 0 U cable guard. A typical installation terminating in a 105-type cable terminal is shown in Fig. 14.

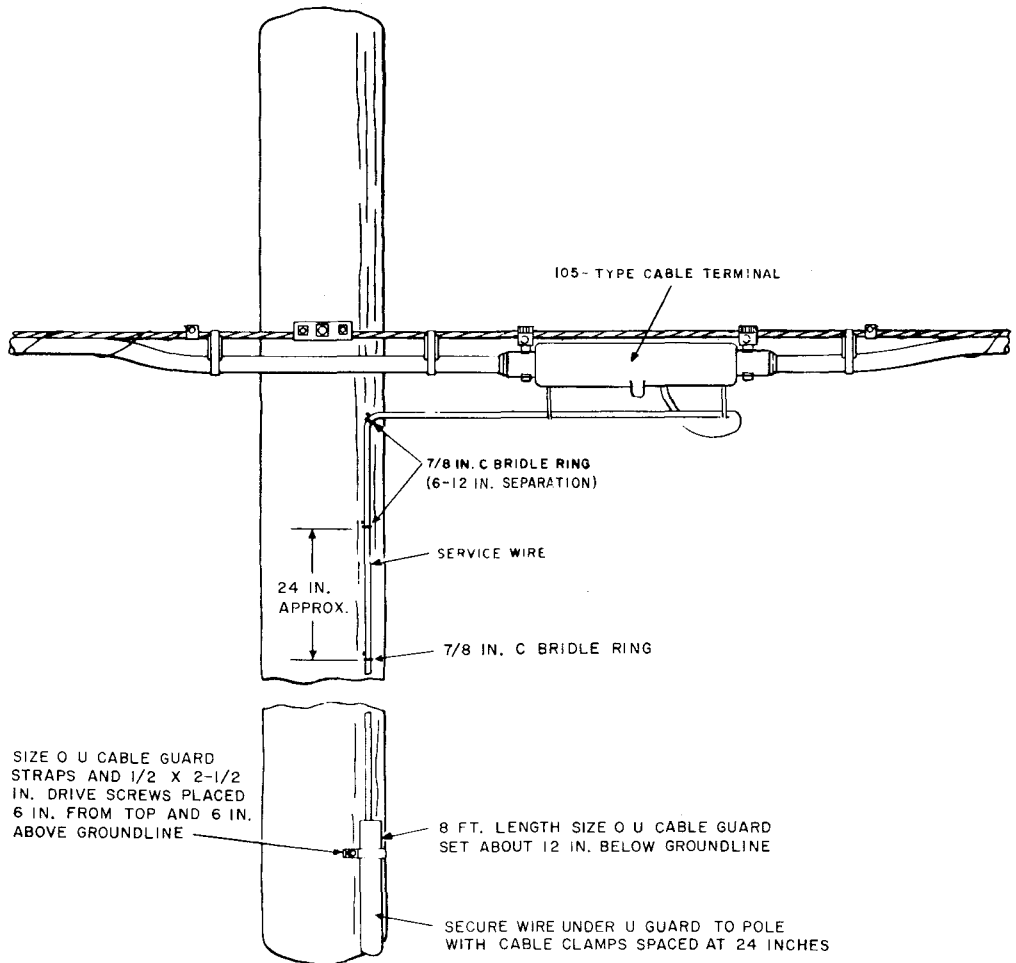


Fig. 14—Buried Plant Terminating in 105-Type Cable Terminal

Inside a Cable Terminal

4.18 Where the buried wire is 700 feet or less in length, grounding of the metallic shield at the aerial cable terminal is omitted. Cut off the metallic shield at the terminal location, and wrap with two turns of vinyl tape (Fig. 15).

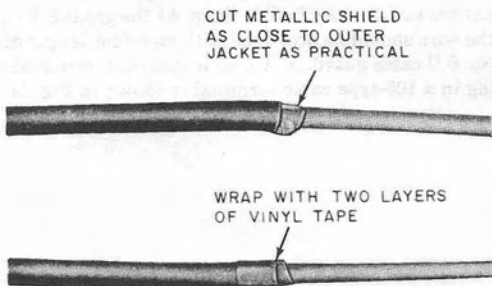


Fig. 15—Removal of Metallic Shield

4.19 Where the buried wire is over 700 feet in length, the metallic shield of the BDW-1/19-GRE (E buried wire) must be bonded to the aerial cable terminal. A B bond clip and B appliance wire may be installed on the metallic shield in a solderless connector as shown in Fig. 16.

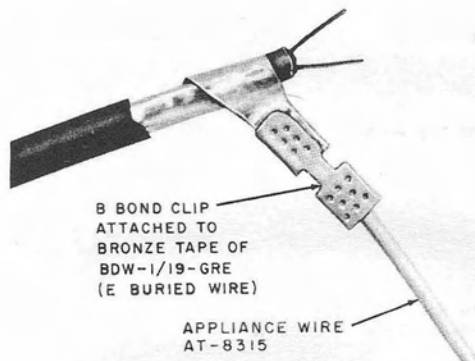


Fig. 16—Bonded Shield of BDW-1/19-GRE (E Buried Wire)

4.20 Inside a cable terminal, the conductors of service wires are terminated on the binding post in the usual manner. The stub cable conductors of the terminal provides the fusible link.

4.21 Where the length of buried wire is over 700 feet, bond the metallic shield to the aerial terminal housing with a B bond clip and B appliance wire. Fasten the appliance wire under a terminal block mounting screw in the N-type cable terminal and under the existing ground screw in a 53-type cable terminal.

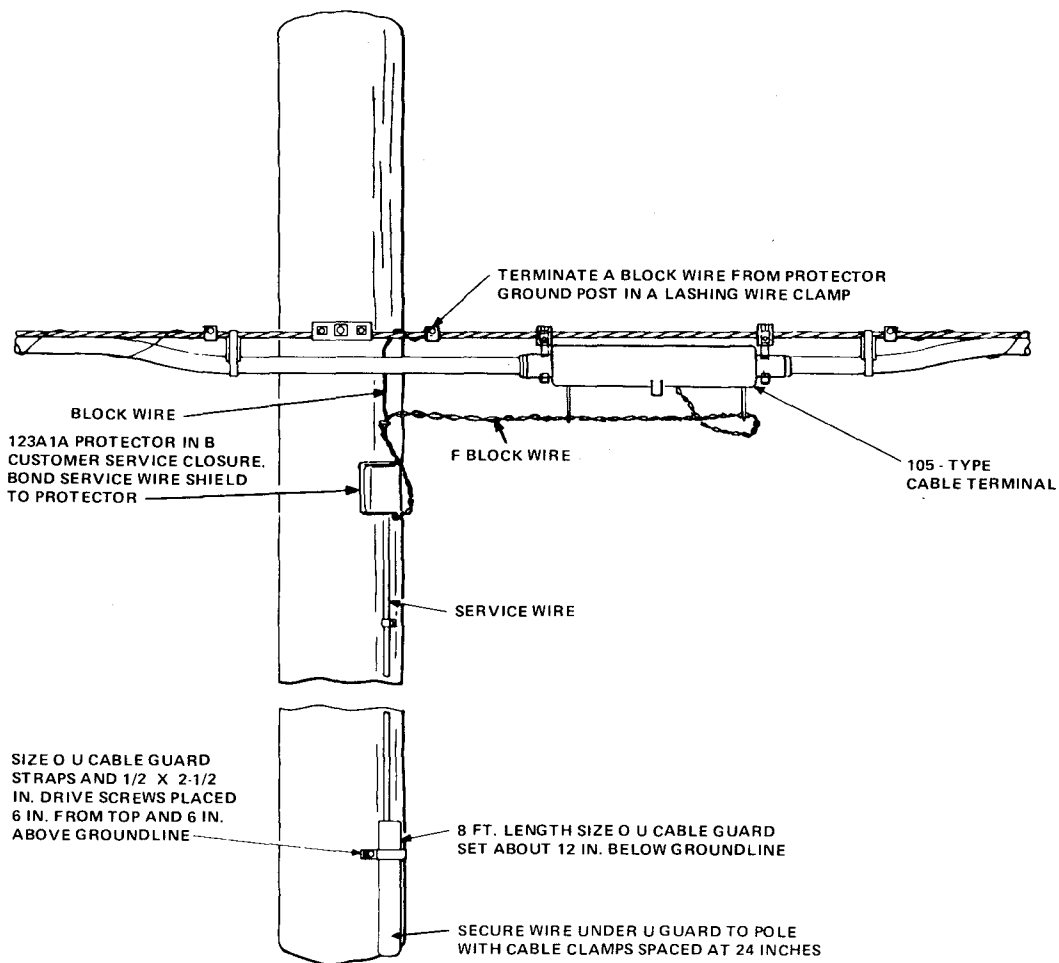
Special Lightning Protection

4.22 In lightning areas, where the subscriber station is exposed to lightning, it may be desirable to furnish additional lightning protection to buried service wires which are 700 feet or less in length. Under these conditions, detailed plans or other special instructions will authorize bonding the metallic shield at the aerial cable terminal. Such installations require the use of a 123- or 128-type protector (equipped with 2B2E protector units) and bonding the metallic shield to the ground post of the protector. A bond is also required between the protector ground post and the cable strand. For the latter purpose, block wire is required to prevent the metallic shield from overheating. A typical installation is shown in Fig. 17.

H. Junction With Multiple Wire

4.23 Where multiple wire is exposed to power contact and a fuseless protector is used at the station, BSW-2/22-C or BSW-5/22-C (C service wire) or BSW-2/22-GRE (E armored service wire) **must not** be used with or fed from multiple wire of present manufacture because of the relatively small size and low fusing level of the conductors of the service wires. A satisfactory fusible link is not available for use between the multiple wire conductors and the service wire conductors.

Note: Multiple wire with 24-gauge conductors may be satisfactorily used with BSW-2/22-C or BSW-5/22-C (C service wire) or BSW-2/22-GRE (E armored service wire).



◆Fig. 17—Termination for Special Lightning Protection◆

4.24 The BDW-1/19-GRE (E buried wire) can be used with or fed from multiple wire where the multiple wire is exposed to power contact and fuseless station protection is used. The BDW-1/19-GRE (E buried wire) should be brought up a pole and terminated in a 101B2 or 101C wire terminal. The

metallic shield should be cut back and taped as shown in Fig. 15. Connect the conductors of BDW-1/19-GRE (E buried wire) to the conductors of the multiple wire with block wire. At the ground line, the wire should be covered with an 8-foot length of No. 0 U cable

guard. Figure 18 shows a typical example of BDW-1/19-GRE (E buried wire) being connected to a 105A wire terminal.

4.25 The block wire serving as a fusible link between the BDW-1/19-GRE (E buried wire) conductors and the multiple wire conductors can be

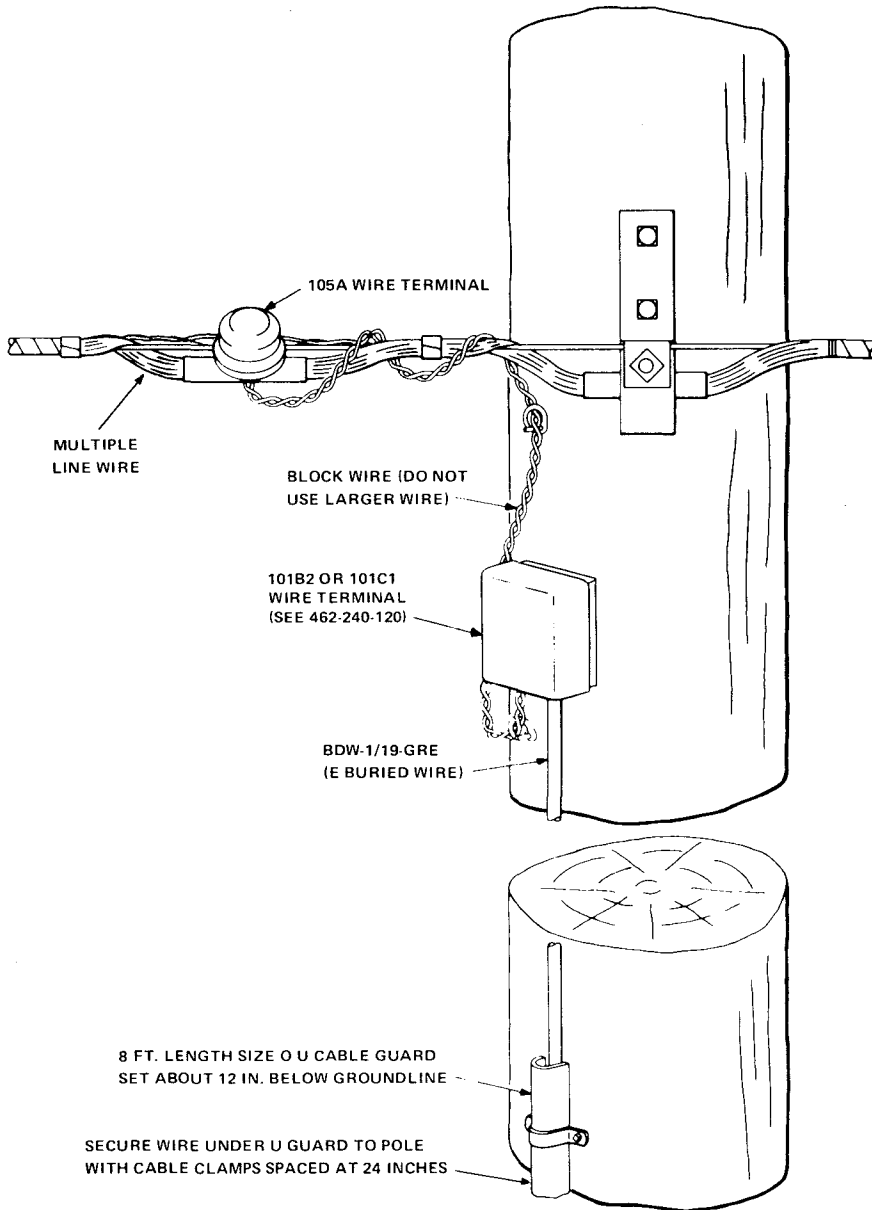


Fig. 18—BDW-1/19-GRE (E Buried Wire) Terminated at Multiple Line Wire

terminated in a 105A wire terminal, a 116-type protector, a 108-type wire terminal, or in similar wire terminals used with multiple wire.

I. Junction With C Rural Wire

4.26 Where fuseless protectors are used, do not connect BSW-2/22-C or BSW-5/22-C (C service wire) or BSW-2/22-GRE (E armored service wire) to C rural wire because of the small size of the conductors of the service wire and no satisfactory fuse link is available.

4.27 At the junction with C rural wire, BDW-1/19-GRE (E buried wire) can be brought up a pole and terminated in a 101B2 or 101C1 wire terminal. The metallic shield should be cut off and taped as shown in Fig. 15. Block wire should be used to bridle between the 101B2 wire terminal and the 107-type wire terminal on the C rural wire. At the ground line, the BDW-1/19-GRE (E buried wire) should be covered with an 8-foot length of No. 0 U cable guard. A typical installation is shown in Fig. 19.

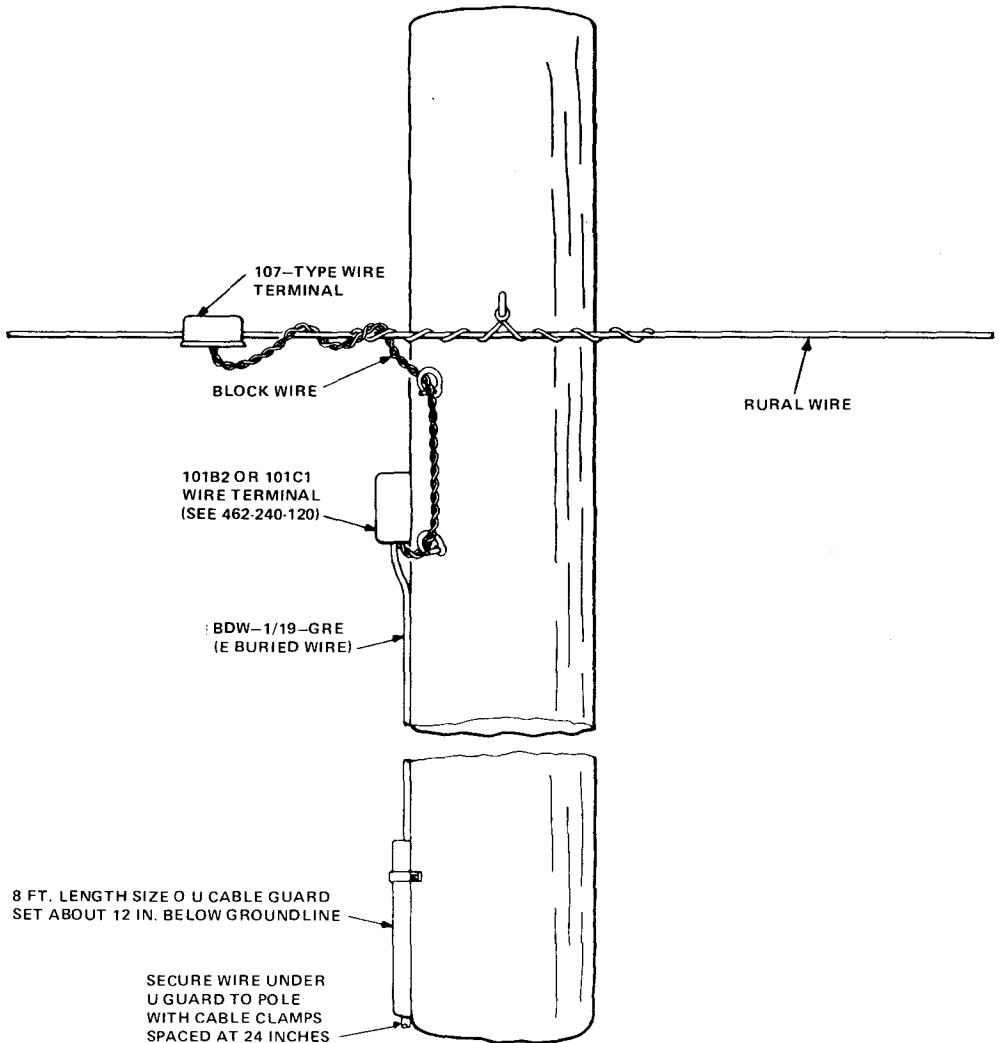


Fig. 19—Termination of BDW-1/19-GRE (E Buried Wire) and Rural Wire

J. Junction With Open Wire

4.28 Where fuseless protectors are used, BSW-2/22-C or BSW-5/22-C (C service wire) and BSW-2/22-GRE (E armored service wire) should not be used with or fed from open wire due to the relatively small size and low fusing level of the conductors of the service wire and no satisfactory fuse link is available.

4.29 At the junction with open wire, BDW-1/19-GRE (E buried wire) can be brought up a pole and terminated in a 101B2 or 101C wire terminal. The metallic shield should be cut off and taped as shown in Fig. 15. Block wire must be used between the protector and the open wire. At the ground line, the wire should be covered with an 8-foot length of No. 0 U cable guard. A typical installation is shown in Fig. 20.

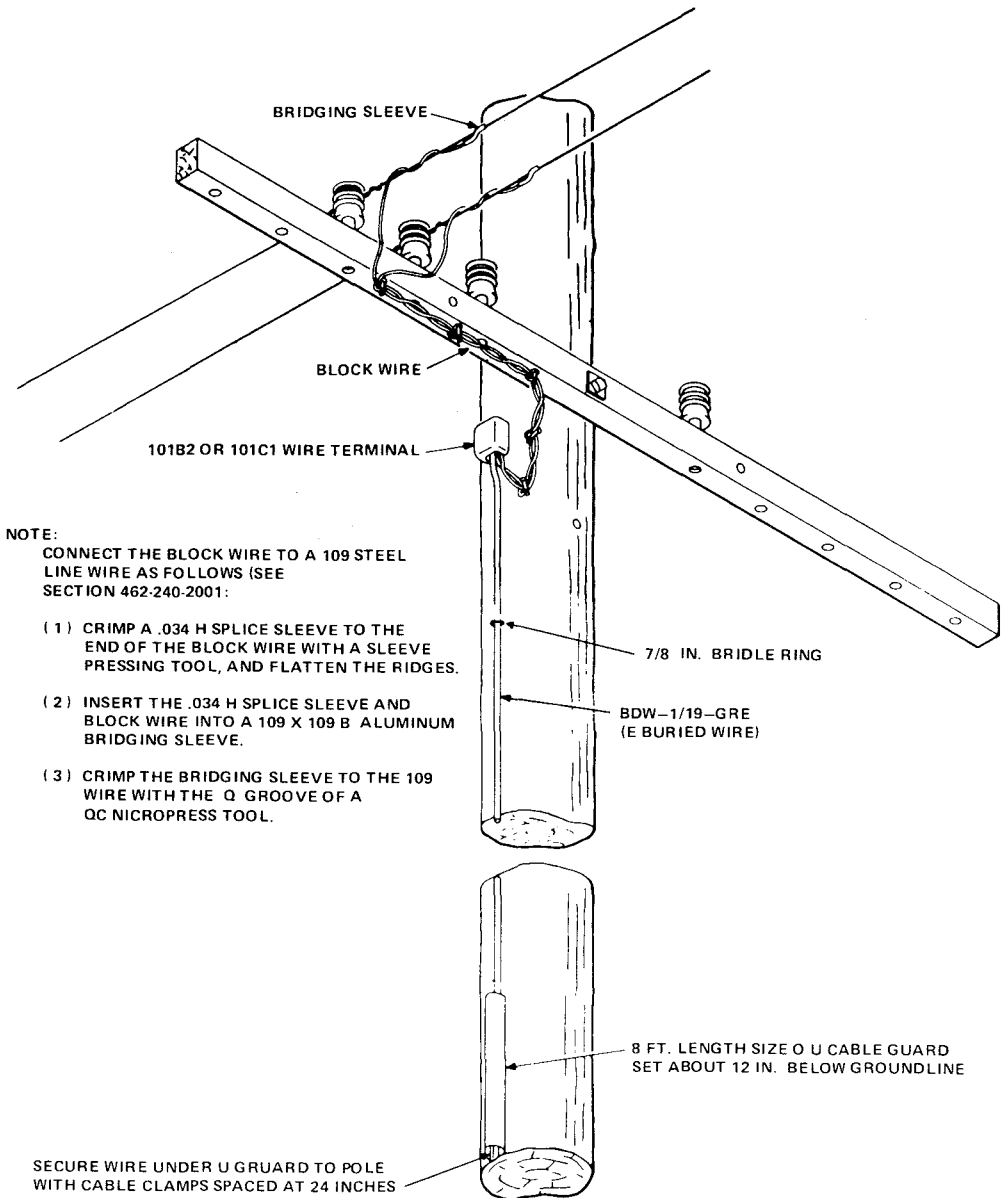


Fig. 20—Termination of BDW-1/19-GRE (E Buried Wire) and Open Wire

5. DROP AND BLOCK WIRING AT BURIED CABLE TERMINALS

5.01 Typical installations of buried cable block service are illustrated in Fig. 21, 22, and 23.

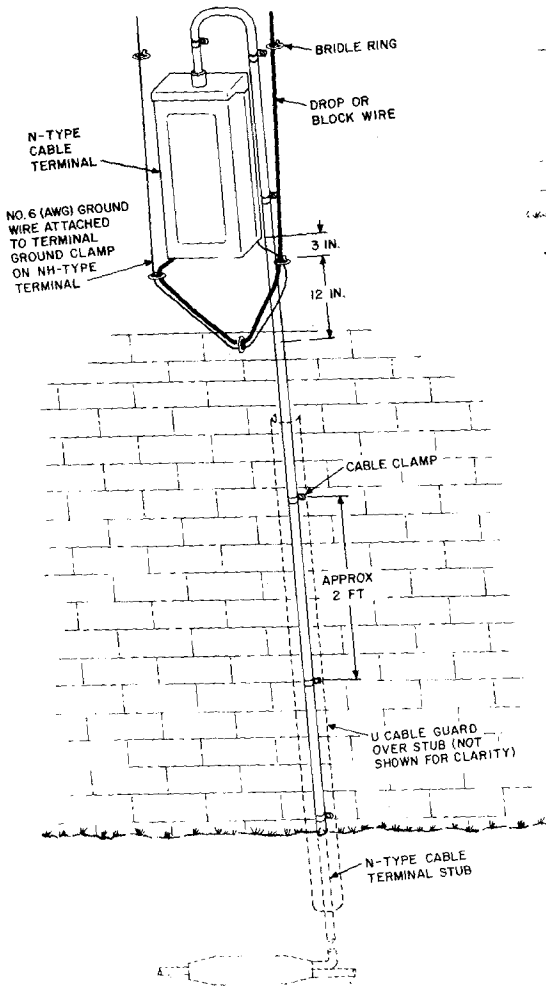


Fig. 21—N-Type Cable Terminal—Building Mounted

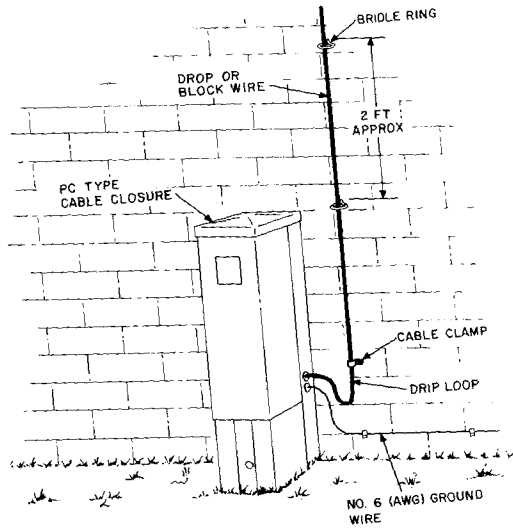


Fig. 22—PC- or 85-Type Cable Closure—Building Mounted

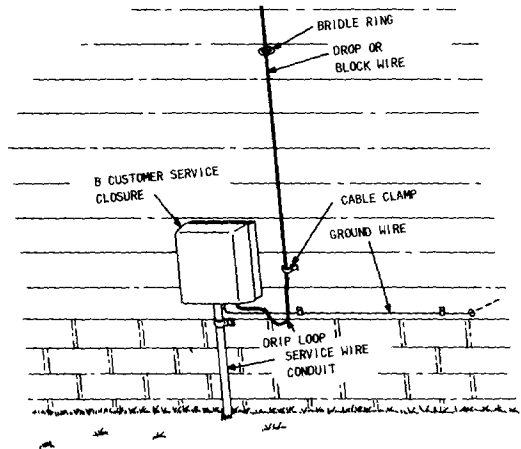


Fig. 23—B Customer Service Closure—Building Mounted

5.02 Typical illustrations of buried cable distribution from poles are illustrated in Fig. 24 through 27.

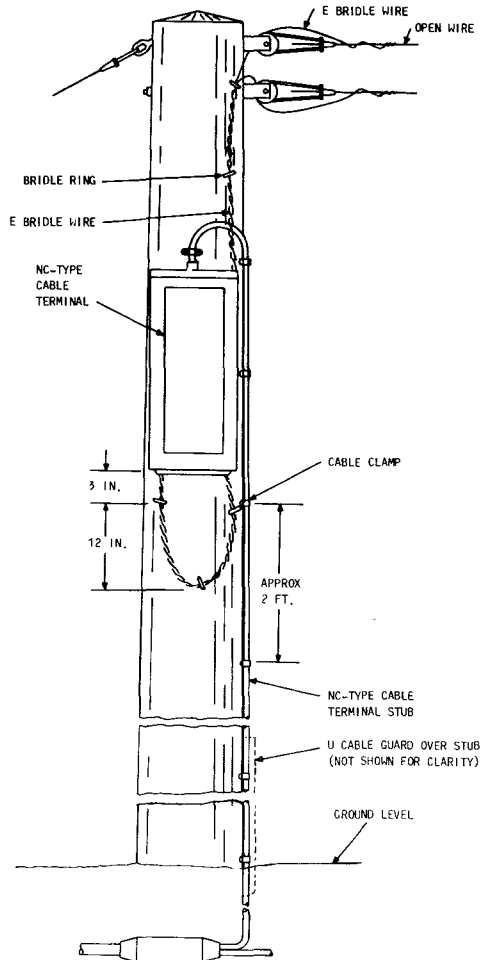
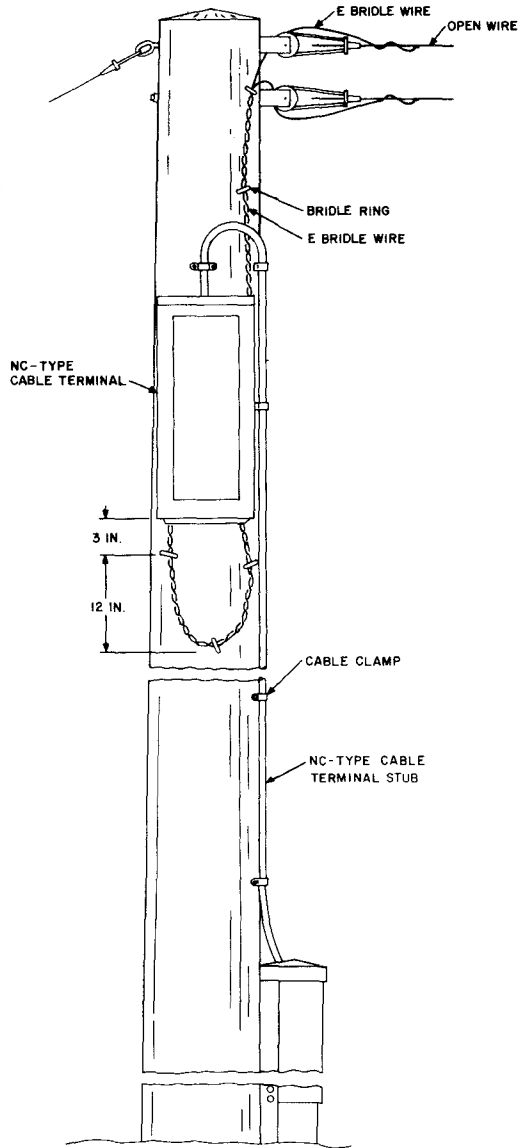


Fig. 24—Open Wire Feed From Buried Cable—Using Buried Splice Closure and Pole-Mounted NC-Type Cable Terminal



♦Fig. 25—Open Wire Feed From Buried Cable—Using Pole-Mounted PC- or 85-Type Cable Closure and NC-Type Cable Terminals♦

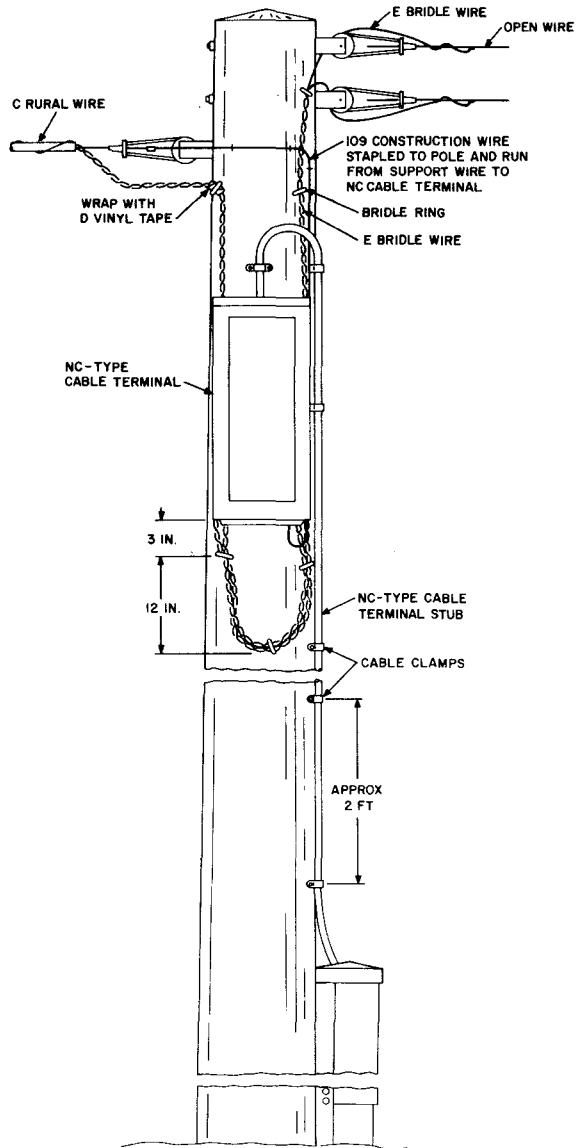


Fig. 26—Open Wire and Rural Wire Feed From Buried Cable

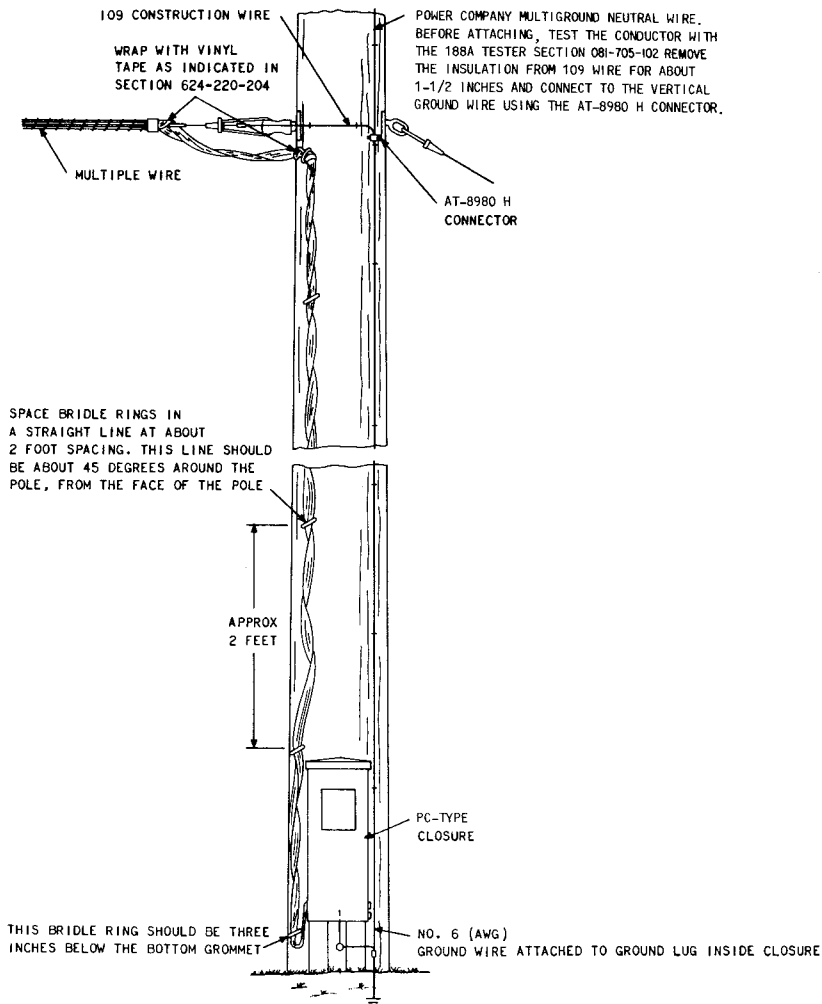


Fig. 27—Multiple Wire Feed From Buried Cable

6. SUPERSEDED TYPE CABLE CLOSURES (TERMINATING SERVICE WIRE)

6.01 The B, C, D, E, G, H, J, K, LD-6, LD-10, RC4/72, UP-200, and UP-200S cable closures have been rated manufacture discontinued. Where these closures have been damaged and must be replaced,

use the PC4/48, PC4/48M, PC6/48, or PC12/55 cable closure as outlined in Section 644-200-032 or the D and E wire terminals as outlined in Section 629-720-215.

Note: Use 700-type connectors for all connections.

A. B Cable Closure

6.02 Prepare the service wire for B cable closure as illustrated in Fig. 28.

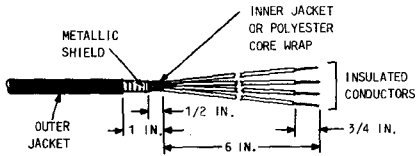


Fig. 28—Prepared Service Wire—B Cable Closure

B. D Cable Closure

6.03 Prepare service wire for D cable closure as illustrated in Fig. 29.

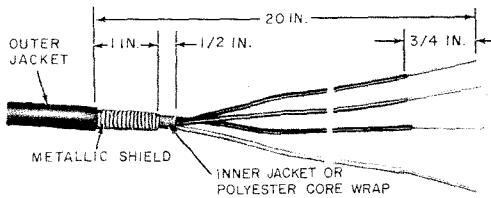


Fig. 29—Prepared Service Wire—D Cable Closure

C. E Cable Closure

6.04 Prepare service wire for E cable closure as illustrated in Fig. 30.

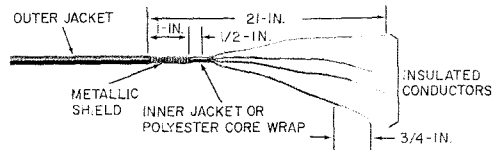


Fig. 30—Prepared Service Wire—E Cable Closure

D. G and H Cable Closures

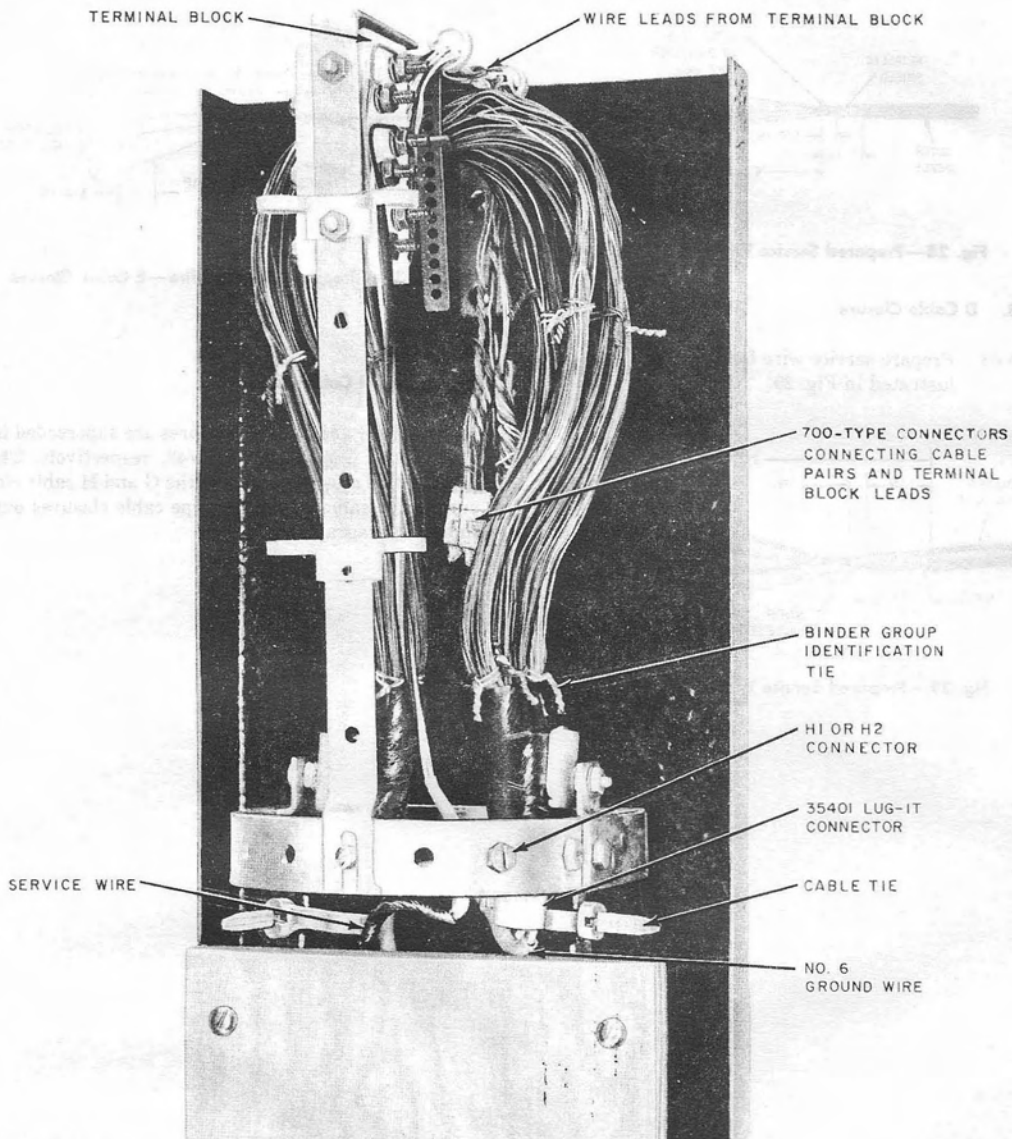
6.05 The G and H cable closures are superseded by the LD6/42 and LD10/42, respectively. The termination of service wire in the G and H cable closure is the same as the LD-type cable closures outlined in paragraph 6.10.

E. J Cable Closure

6.06 Terminate service wire in the J cable closure as shown in Fig. 31.

F. K Cable Closure

6.07 Prepare the service wire for termination in the K cable closure as shown in Fig. 32.



◆Fig. 31—Service Wire Installed—J Cable Closure (Protected)◆

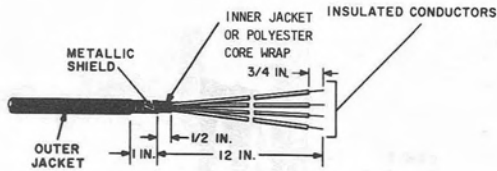
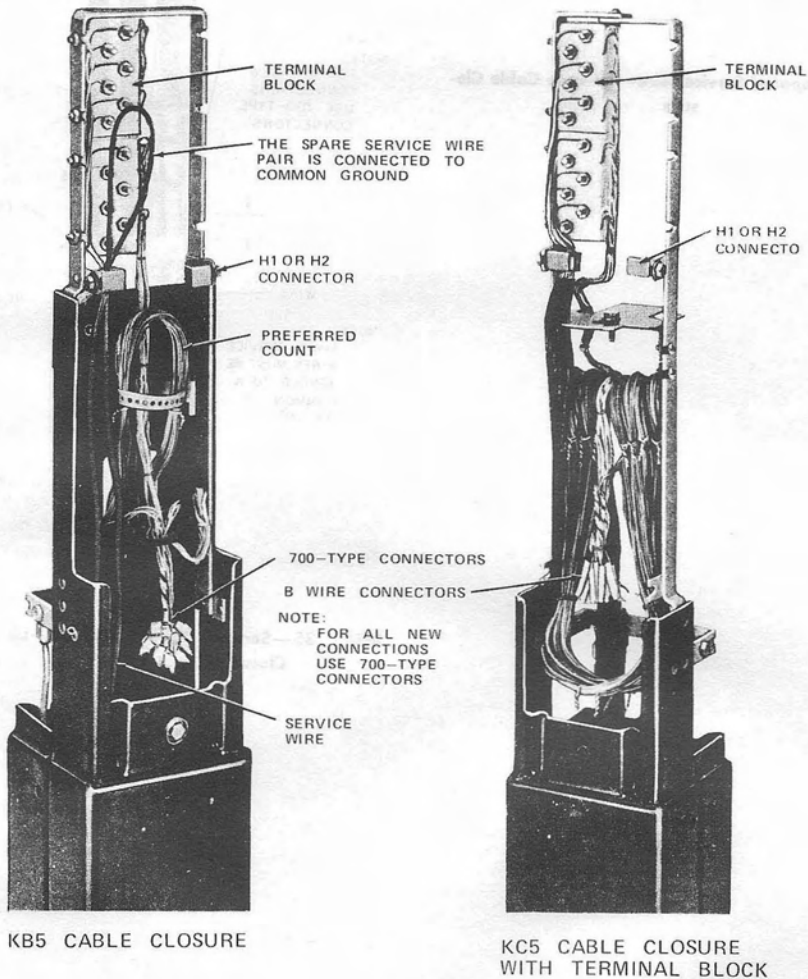


Fig. 32—Prepared Service Wire—K-Type Cable Closure

6.08 Terminate the service wire as shown in Fig. 33.

G. LD Cable Closures

6.09 The termination of service wire is identical in both the LD6/42 and LD10/42 cable closures.



◆ Fig. 33—Service Wire Installed—K-Type Cable Closure (Protected) ◆

6.10 Prepare the service wire as shown in Fig. 34 and terminate as illustrated in Fig. 35.

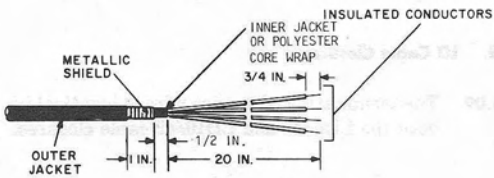


Fig. 34—Prepared Service Wire—LD-Type Cable Closure

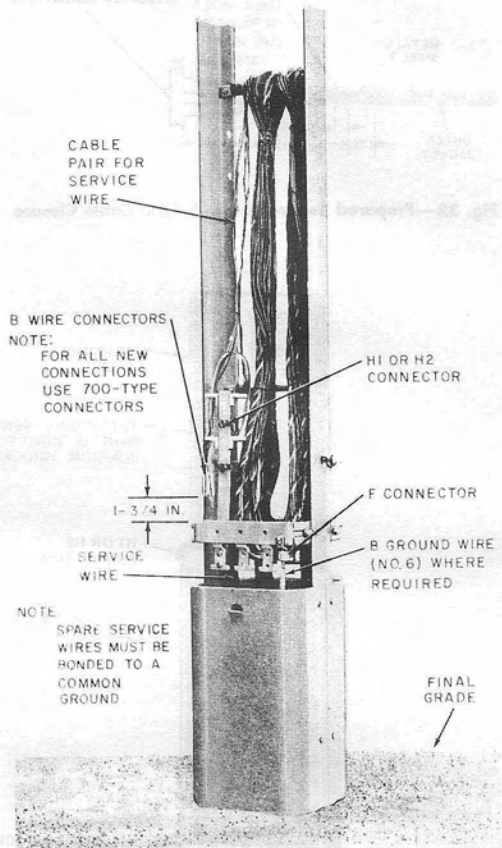


Fig. 35—Service Wire Installed—LD-Type Cable Closure

H. RC4/72 Cable Closure

6.11 To terminate service wire in the RC4/72 closure, prepare the service wire as shown in Fig. 36.

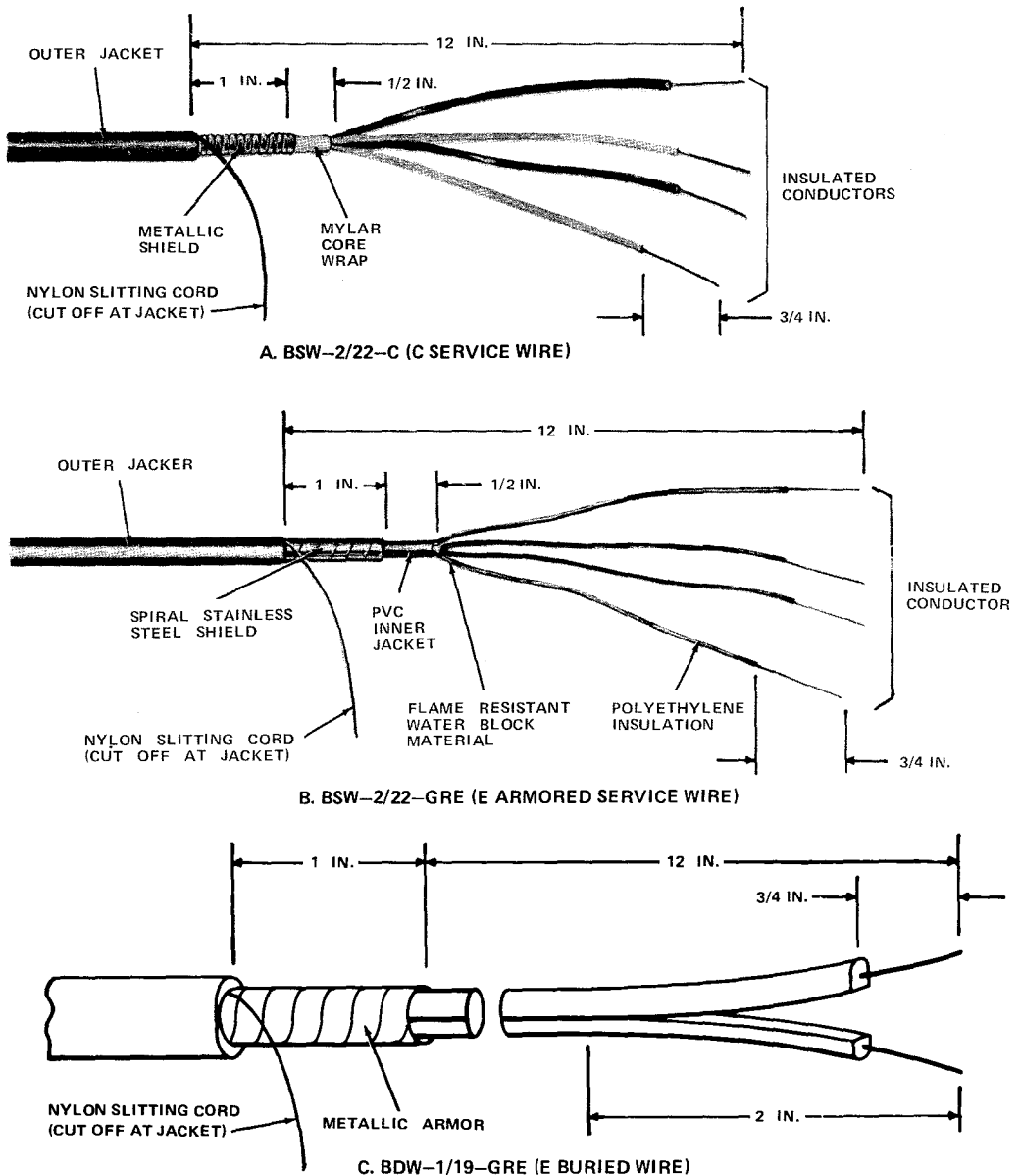


Fig. 36—Prepared Service Wire for RC4/72

6.12 Install the metallic shield of the service in the C service wire clamp as illustrated in Fig. 3.

6.13 Terminate the service wire to the assigned binding post of the terminal block as shown in Fig. 37.

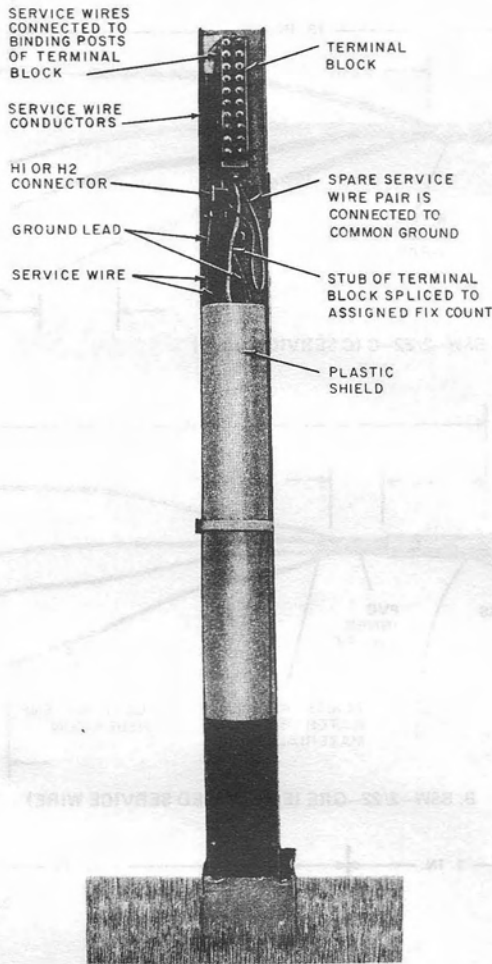


Fig. 37—Service Wire Terminated in RC4/72 Cable Closure

I. UP-200 CABLE CLOSURES

Note: There are no facilities for installing terminal blocks in the UP-200 cable closure.

6.14 Prepare the service wire as shown in Fig. 38.

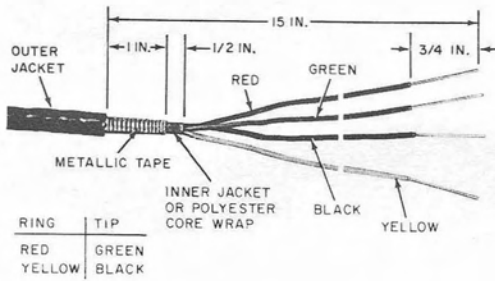


Fig. 38—Prepared Service Wire—UP-200 Cable Closure

6.15 Terminate the service wire as shown in Fig. 39.

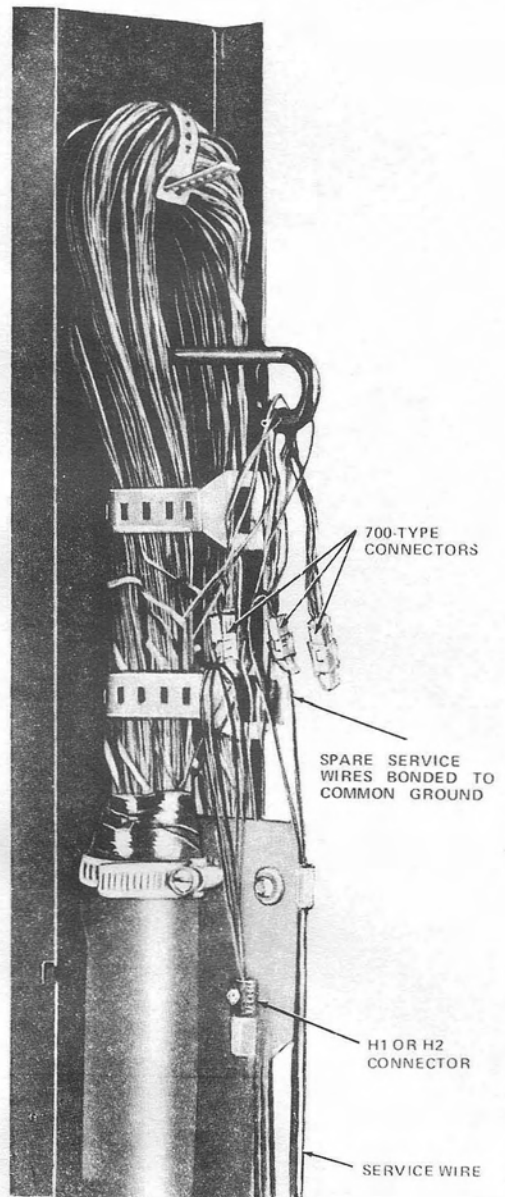


Fig. 39—Service Wire Installed—UP-200 Cable Closure