

BURIED PLANT
DESCRIPTION, SPLICING AND TERMINATION
OF BRAND REX BURIED DISTRIBUTION WIRE

CONTENTS	PAGE
1. GENERAL	1
2. DESCRIPTION	1
3. ELECTRICAL CHARACTERISTICS	4
4. PLACING	4
5. SPLICING PROCEDURES	4
6. TERMINATION PROCEDURES - AERIAL JUNCTIONS	7
7. TERMINATION PROCEDURES - AT THE STATION	11
8. TROUBLE LOCATION AND REPAIR	18
9. TAGGING BURIED DISTRIBUTION WIRES	19

1. GENERAL

1.01 This section covers the description, splicing and termination of Brand Rex 2, 3 and 6 pair Buried Distribution Wire (BDW).

1.02 The 2 pair BDW is meant as a replacement for the 2 pair B Service Wire; the 3 pair BDW is meant as a replacement where the engineer feels the dwelling unit will require a third line and would have previously specified 2-2 pair B Service Wire. The 6 pair Buried Distribution Wire is intended for use primarily at multiple dwelling units such as condominiums or at single dwelling units where the engineer feels there will be a requirement for more than a third line.

1.03 Termination procedures at locations where fused (7 Amp) station protection is required is not covered in this section. Where this requirement occurs, 2, 3, or 6 1293-C Protectors will have to be placed at the station as there is no approved multiple 7 Amp fused protector available. For detailed termination procedures when using the 1293-C protector, see Sections 460-100-101 and 460-100-200.

2. DESCRIPTION

2.01 The conductors of all the wires are solid annealed bare 22 AWG copper covered with a high density polyethylene insulation. The pairs are twisted color coded conductors with the color code following the standard PIC cable sequence.

2.02 The conductors are covered with a high-dielectric applied with overlap which provides additional dielectric protection between conductors and shield.

SECTION 629-030-900SN

2.03 The inner jacket is a black high density polyethylene which provides additional mechanical protection and resistance to moisture penetration. A slitting cord is provided to facilitate the removal of the inner jacket but the jacket may be removed, using a knife, if care is taken so as to not damage the underlying conductors.

2.04 The shield is a .004 longitudinally applied corrugated bi-metal tape with overlap. This shield provides full electrical shielding, mechanical protection against termites and rodents, and resistance to tensile stresses encountered in plowing operations.

2.05 The outer jacket is a compounded black high density polyethylene sheath resistant to moisture, weathering, abrasion and corrosion. Sequential footage markings are printed on this jacket at two foot intervals. A slitting cord is provided to facilitate the removal of the outer jacket but the jacket may be removed with a knife if care is taken so as not to damage the underlying shield.

2.06 Figures 1, 2 and 3 are of the two, three and six pair Buried Distribution Wires respectively.

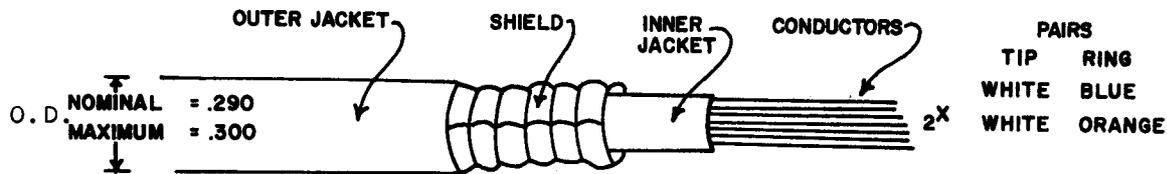


FIGURE 1
2 PAIR BURIED DISTRIBUTION WIRE

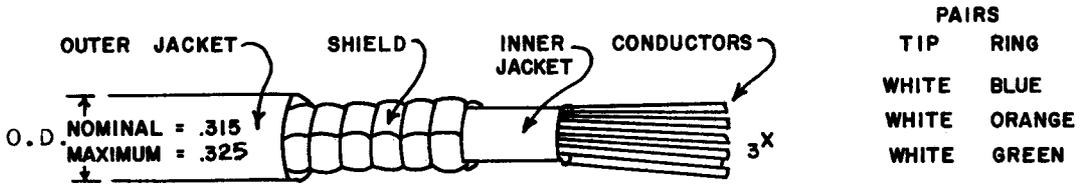


FIGURE 2
3 PAIR BURIED DISTRIBUTION WIRE

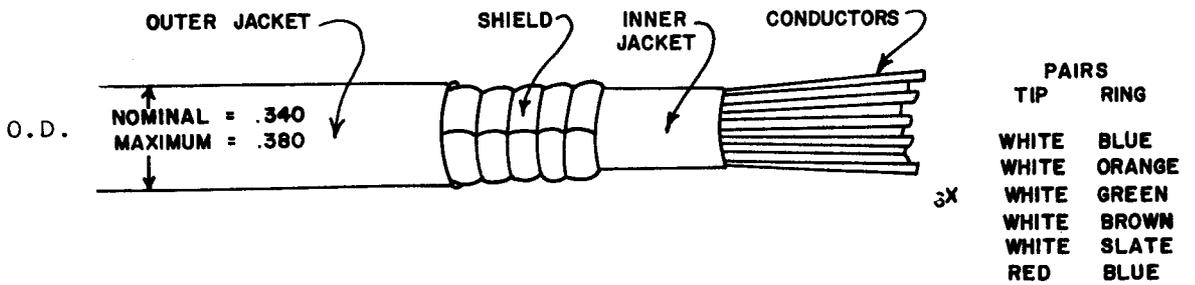


FIGURE 3
6 PAIR BURIED DISTRIBUTION WIRE

3. ELECTRICAL CHARACTERISTICS

3.01 TABLE A outlines some of the electrical characteristics of the 22 AWG 2, 3 and 6 pair Buried Distribution Wires.

TABLE A

AVERAGE MUTUAL CAPACITANCE @ 1 kHz, mf/mile	.083
MAXIMUM CONDUCTOR RESISTANCE @ 68°F, ohms/1000 ft.	17.4
APPROXIMATE FOOTAGE PER ohm	57.5

4. PLACING

4.01 The procedures to be followed when placing this wire are no different than those associated with previously standard service wire. The wire may be trenched in or plowed in using the plows presently standard with this Company and the appropriate size reel. Standard reel lengths are as follows:

TABLE B

2 PAIR BURIED DISTRIBUTION WIRE	1000 FOOT & 5000 FOOT REELS
3 " " " "	5000 FOOT REELS
6 " " " "	5000 FOOT REELS

5. SPLICING

9-TYPE CLOSURES

5.01 Splicing of the buried distribution wire will normally be done in a 9-Type Closure and the splice encapsulated. The following TABLE C indicates the combinations of wires that may be joined using B Wire Connectors. All other copper wire combinations must be twisted and soldered.

TABLE C

COPPER-COPPER

MAIN CABLE (S)	BDW
22-	22
22-22	22
24-	22
24-24	22
26-	22
26-26	22
22-24	22
22-26	22
26-24	22

NOTE: STRIPPING OF THE INSULATION FROM ALL 22 AWG CONDUCTORS IS REQUIRED IN THE COMBINATIONS OUTLINED ABOVE.

5.02 See Section 632-205-201 for aluminum conductor-copper conductor combinations.

PREPARATION OF WIRES FOR SPLICING

5.03 Figure 4 shows the dimensions of the 2, 3 and 6 pair BDW required for splicing in the 9-Type Closure.

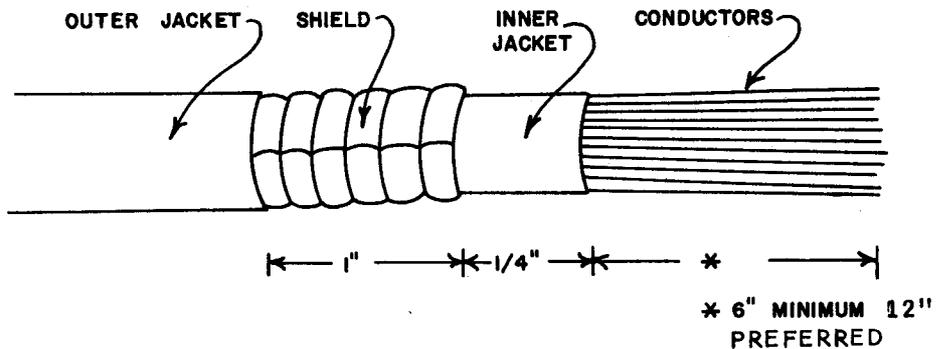


FIGURE 4
PREPARATION OF 2, 3 AND 6 PAIR BDW FOR SPLICING
IN 9-TYPE CLOSURE

SECTION 629-030-900SN

5.04 The shield of BDW shall be terminated in the AT-7796X (Fargo) Connector #6, that is mounted on the Tie Bar(s) furnished with the 9-Type Closure. The maximum number of wires that may be terminated in a particular 9-Type Closure is outlined in TABLE D.

TABLE D

CLOSURE	MAXIMUM NUMBER OF AT-7796X (FARGO) CONNECTORS #6	MAXIMUM NUMBER OR WIRES PER (FARGO)			MAXIMUM NUMBER OF WIRES PER CLOSURE		
		2XBDW	3XBDW	6XBDW	2XBDW	3XBDW	6XBDW
9A2	4	2	2	1	8	8	4
9B2	4	2	2	1	8	8	4
9C1 (M)	4	2	2	1	8	8	4
9D1 (M)	4	2	2	1	8	8	4

NOTE: NO BONDING OPERATIONS SHALL BE PERFORMED IN 9-TYPE CLOSURES THAT ARE USED TO SPLICE SERVICE WIRES.

5.05 Complete the splicing operations.

5.06 Wrap the splice with 4" Diaper Tape.

5.07 Encapsulate the splice using standard plugging compound.

PEDESTAL LOCATIONS

5.08 The termination of the BDW in a pedestal may sometimes be required and the termination operations will be identical to those required with the previously standard B Service Wire. The number of 2 and 3 pair BDW that may be terminated in any pedestal will be identical to the number of B Service Wires that could be terminated within them. However, the number of 6 pair BDW that may be terminated will be 1/2 of what the capacity was for the B Service Wire because of the limitations of the AT-7796X (Fargo) #6 Connectors, i.e., 1-6x per connector.

NOTE: Where it is necessary to terminate additional 6xBDW the AT-7796X #6 connectors may be removed from the pedestal and the AT-7796X, size 4 connector may be substituted. The size 4 connector will accept 2 - 6xBDW WIRES.

5.09 The preparation of the wire for termination in a pedestal will be the same as that for termination in a 9-Type Closure with the exception that the conductor length will be increased dependent on the pedestal and the desired splice configuration.

6. TERMINATION PROCEDURES - AERIAL JUNCTIONS

- 6.01 The 104B3-6 Wire Terminal shall be the standard housing utilized at the pole when the Buried Distribution Wires will be fed from aerial plant. See Figure 5.
- 6.02 The shield of any of the Buried Distribution Wires shall always be grounded within the 104B3-6 Wire Terminal, as well as at the subscribers protector when it will be fed from any type of aerial plant.
- 6.03 Shield continuity of the BDW shall be carried thru to the cable strand using #12 AWG Ground Wire. One end of the #12 AWG wire shall be terminated on the top ground terminal lug of the block within the 104B3-6 Wire Terminal. See Figure 5. The other end of the #12 AWG Ground Wire is run up the pole and terminated to the strand using the appropriate device. See Table E.

TABLE E

STRAND SIZE	ATTACHMENT
6M, 10M, 16M	D CABLE LASHING WIRE CLAMP
25M	B STRAND CONNECTOR
SELF-SUPPORTING	D CONNECTOR

- 6.04 As the 104B3-6 Wire Terminal comes equipped without protection, where cable protection is required it shall be provided in the cable terminal (sealed head or ready access). Station protection shall be provided at the dwelling unit as outlined later in this practice.
- 6.05 The conductors of the 2, 3 and 6 pair Buried Distribution Wires are terminated in the 104B3-6 Wire Terminal as shown in Figures 6B (2XBWD), 6C (3XBWD) and 6D (6XBWD).
- 6.06 Cross connections between the cable terminal and the 104B3-6 are accomplished using Block Wire.
- 6.07 In no case shall the 2, 3 or 6 pair Buried Distribution Wire be used at multiple wire, C Rural or open wire junctions. In these cases E Buried Wire (replaces D Underground Wire) shall be placed. See Section 629-720-200 for procedures outlining these applications.
- 6.08 Prior to climbing the pole, prepare the 104B3-6 for the mounting on the pole and the termination of the shield as follows:
- Drill the mounting holes out at the top and the bottom of the 104B3-6 using a Yankee Drill.

SECTION 629-030-900SN

Using the Yankee Drill, drill a 1/8" hole in the bottom right hand corner of the 104B3-6 a distance of 1-1/2" up from the bottom and 3/4" in from the right side of the terminal. (See Figure 6A) Slit the bottom grommet.

Note: The recommended location of the drilled hole outlined above assures that the aerial terminal is located on the right side field side of the pole and, for convenience when running the block wire, the grommets of the 104B3-6 will be on the right side of the 104B3-6 facing the terminal side of the pole.

- 6.09 Run the wire up the pole and secure it using the appropriate size clamps or straps. Do not place the top most clamp at this time.
- 6.10 Place the #0 U Guard over the wire at the bottom of the pole as shown in Figure 5.
- 6.11 Determine the desired location of the 104B3-6 on the pole and mark the pole at the point where the bottom of the 104B3-6 will rest on the pole. Do not secure the terminal to the pole at this time.
- 6.12 Push the wire up thru the slit grommet of the 104B3-6 and slide the terminal down far enough to facilitate the preparation of the wire.
- 6.13 Prepare the wire as shown in Figure 7.
- 6.14 Twist the wire so that the side that was facing the pole is now facing you. Slip the T&B Lug It Connector down onto the shield of the wire and secure the bolt with a screw driver. See Figure 8.
- 6.15 Twist the wire back to its original position so that the bolt on the T&B is facing the pole. Slide the 104B3-6 up the wire until the hole in the tongue of the T&B connectors lines up with the hole drilled in the rear wall.
Note: The bolt of the T&B lug it should rest in the recessed portion of the rear wall of the 104B3-6.
- 6.16 Secure the tongue of the T&B Connector to the rear wall of the 104B3-6 terminal using a #7-1/2" screw.
- 6.17 Secure the 104B3-6 to the pole using 2-#8 1-1/2" screws. Place any additional clamps or straps on the wires that are necessary.
- 6.18 Terminate the pairs of the wires.
- 6.19 Place and terminate the #12 AWG ground wire.
- 6.20 Cross connect between the 104B3-6 and the cable terminal using block wire. See Figure 5 for the completed installation.

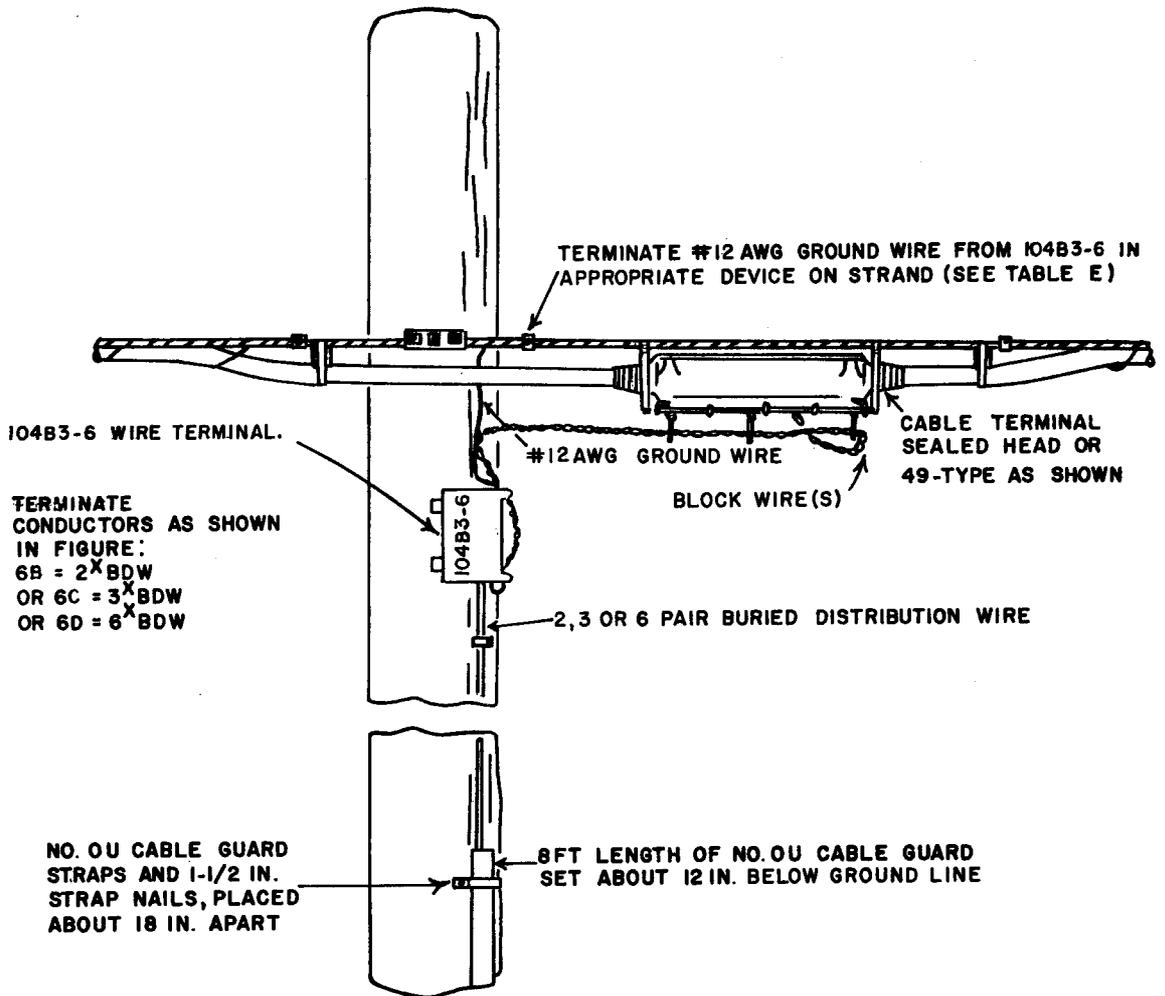


FIG.5 TERMINATION AT JUNCTION WITH AERIAL CABLE

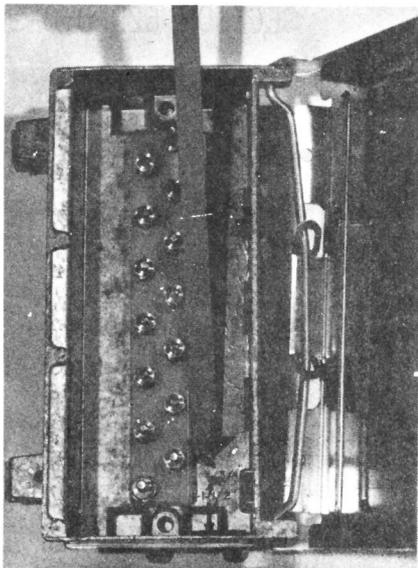


FIGURE 6A

DRILLED HOLE FOR TONGUE
OF T&B CONNECTOR

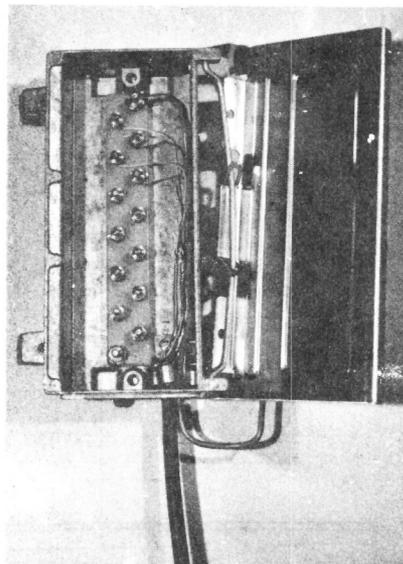


FIGURE 6B

TERMINATION OF 2X BDW

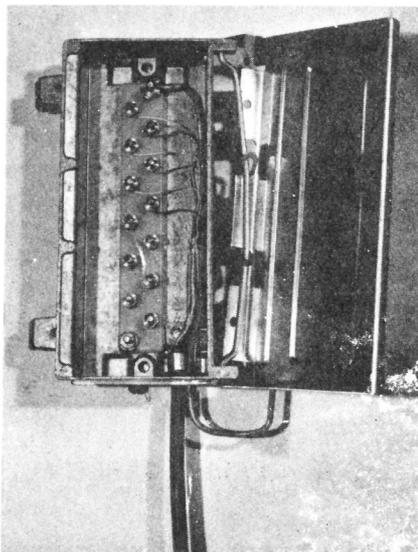


FIGURE 6C

TERMINATION OF 3X BDW

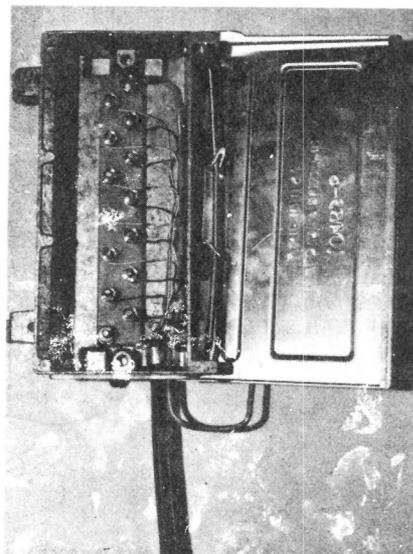


FIGURE 6D

TERMINATION OF 6X BDW

7. TERMINATION PROCEDURES - AT THE STATION

2X BURIED DISTRIBUTION WIRE

7.01 The 2x BDW will be terminated on a 128A1A-2 Protector mounted within a 305A2 Protector Mounting. This protector is equipped with fuseless station protection.

7.02 Mount the 305A2 Protector Mounting on the exterior wall of the unit at the desired location. Secure the 128A1A-2 Protector within the 305A2 Protector Mounting. See Figure 9.

7.03 Slip the hole in the tongue of the T & B Lug It Connector temporarily onto the ground terminal lug of the 128A1A-2 Protector.

7.04 Line the wire up with the T & B Lug It and mark the wire at the point where it lines up with the bottom of the tongue. Cut the wire off a minimum of 12 inches above this mark.

7.05 Prepare the wire as shown in Figure 7.

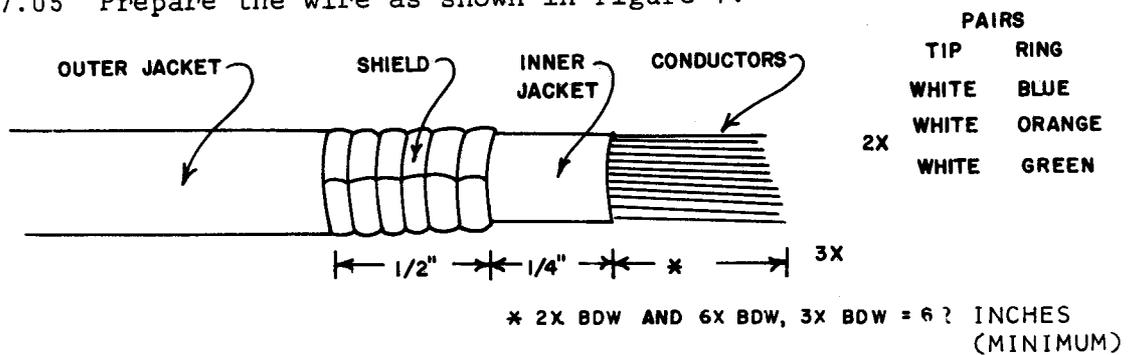


FIGURE 7
PREPARATION OF 2 AND 3 PAIR BDW FOR
TERMINATION ON THE PROTECTOR WITHIN THE
305A2 PROTECTOR MOUNTING

7.06 Remove the T & B Lug It from the terminal lug and position it on the shield as shown in Figure 8 and tighten the screw securely.

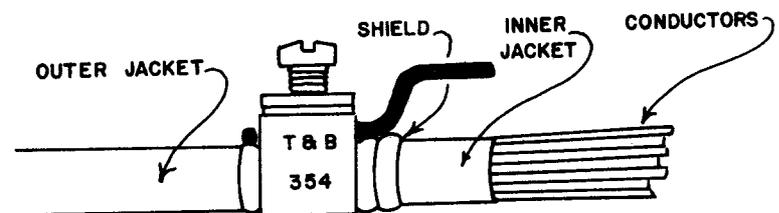


FIGURE 8
T & B LUG IT CONNECTOR POSITIONED ON SHIELD

- 7.07 Remove the nut, brass washers, and pronged washer from the ground terminal lug.
- 7.08 Slip the hole in the tongue of the T & B Connector onto the ground terminal post followed by the pronged washer, a brass washer, the ground wire, the other brass washer and the nut. Tighten the nut securely.
- 7.09 Terminate the conductors under the bottom nut of the binding posts on the protector as shown in Figure 9. The top binding posts will be for the White-Blue pair. The bottom binding posts for the White-Orange pair.

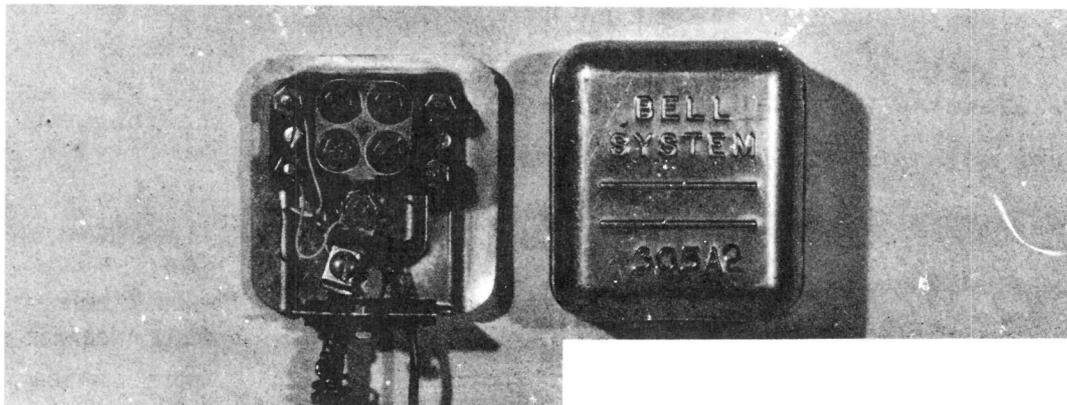


FIGURE 9

2XBDW TERMINATED ON 128A1A-2 PROTECTOR

3X BURIED DISTRIBUTION WIRE

- 7.10 All three pair of the 3x BDW will be terminated initially regardless of whether they will be utilized initially or not.
- 7.11 The 3x BDW will be terminated on 1-128A1A-2 Protector and 1-123A1A Protector both mounted within a 97A Protector Mounting. Both of these protectors are equipped with fuseless station protection.
- 7.12 Mount the 97A Protector Mounting on the exterior wall of the unit at the desired location. Use the oval shaped holes in the 97A for the mounting screws.
- 7.13 Using the top (circular) hole in the 97A, secure the 128A1A-2 Protector to the 97A by inserting one of the self-tapping screws supplied with the protector mounting into the hole in the 128A1A-2 Protector to the left of the ground terminal lug. Tighten the screw securely. See Figure 10.

- 7.14 Using the bottom (circular) hole in the 97A, secure the 123A1A Protector to the 97A by inserting the other self-tapping screw supplied with the protector mounting into the hole in the 123A1A directly below the ground terminal lug. Tighten the screw securely. See Figure 10.
- 7.15 Prepare a piece of #10 AWG ground wire of sufficient length to reach between the ground terminal lugs of the 128A1A-2 and the 123A1A Protectors. Skin each end of this wire (approximately 1 inch) and terminate one end under the pronged washer of the ground terminal lug of the 128A1A-2 Protector. Tighten the nut securely. Remove the nut, brass washers and the pronged washer from the ground terminal lug of the 123A1A Protector. Secure the other end of this length of ground wire onto the threaded stud of the ground terminal lug on the 123A1A Protector.
- 7.16 Skin the end (approximately 1 inch) of the ground wire that has (or will be) been terminated on the appropriate ground, i.e. cold water pipe, ground wire, and secure the skinned end onto the threaded stud of the ground terminal lug of the 123A1A Protector on top of the previously placed length of ground wire.
- 7.17 Slip the hole in the tongue of a T & B Lug It Connector onto the threaded stud of the ground terminal lug of the 123A1A Protector.
- 7.18 Line the wire up with the T & B Lug It Connector and mark the wire on the sheath where it lines up with the bottom of the tongue. Cut the wire off a minimum of 6 inches above this mark.
- 7.19 Prepare the wire as shown in Figure 7.
- 7.20 Remove the T & B Lug It Connector from the ground terminal stud and position it on the wire as shown in Figure 8. Tighten the screw securely.
- 7.21 Slip the pronged washer, a brass washer, and the hole in the tongue of the T & B Lug It Connector onto the threaded stud of the ground terminal lug, followed by the other brass washer and the nut. Tighten the nut securely.
- 7.22 Terminate the conductors under the bottom nut of the binding posts on the protectors as shown in Figure 10. The top binding posts of the 128A1A-2 Protector will be for the White-Blue pair, the bottom binding posts of the 128A1A-2 Protector will be for the White-Orange pair. The White-Green pair shall be terminated on the binding posts of the 123A1A Protector.

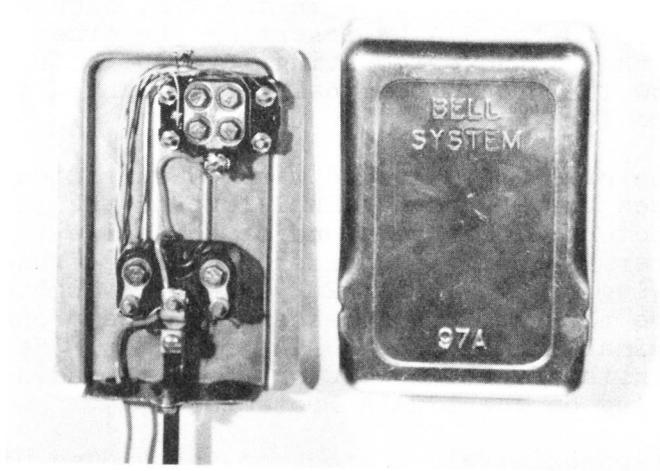


FIGURE 10

3XBDW TERMINATED ON 1-123A1A AND 1-128A1A-2 PROTECTOR

6X PAIR BURIED DISTRIBUTION WIRE

7.23 The primary closure for termination of the 6x BDW will be the 116C Protector. This protector comes equipped with fuseless station protection, terminal lugs for termination of the conductors, and ground terminals for termination of the appropriate size ground wire where required.

7.24 To facilitate the termination of the 6x BDW, remove the Ground Terminal Assembly and the cover from the 116C Protector. Retain all the parts.

7.25 Punch the mounting holes in the rear wall of the protector.

7.26 Place the 116C Protector at the desired location on the building so that the hole vacated when the ground terminal was removed is at the bottom right when facing the protector. Secure the protector to the wall.

7.27 Line the 6x BDW up with the 116C Protector and allowing for 1/4 inch of the outer jacket to extend above the grommet within the protector, mark the outer jacket at this location. Cut the wire off a minimum of 12 inches above this mark.

7.28 Remove a minimum of 12 inches of the outer jacket.

- 7.29 From the butt of the outer jacket measure 1 inch along the shield. Mark the shield at this point, score and remove the remainder of the shield.
- 7.30 From the butt of the shield, measure 1/4 inch along the inner jacket. Mark the inner jacket at this point, score and remove the remainder of the inner jacket.
- 7.31 Twist the conductor pairs together to avoid their separation.
- 7.32 Slit the grommet in the bottom of the 116C Protector and slip the wire up thru the grommet until the 1 inch section of exposed shield is centered opposite the hole created when the Ground Terminal was removed.
- 7.33 Slip the T & B Lug It 354 Connector over the conductors and down onto the shield insuring that the connector is positioned as shown in Figure 11. If no ground wire is to be terminated on the Ground Terminal, slip the washer on the bolt (removed from the Ground Terminal originally), insert the bolt thru the Ground Terminal hole and screw the bolt into the hole in the T & B Lug It on the shield of the BDW. See Figure 11.

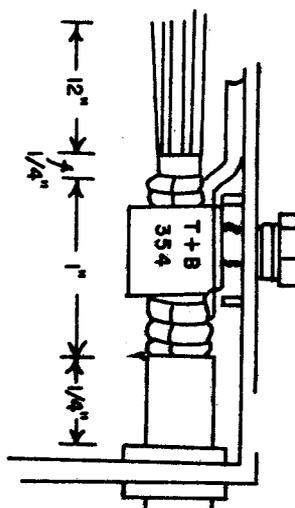


FIGURE 11
PREPARATION OF 6^X BDW AND TERMINATION OF T & B LUG IT
CONNECTOR

7.34 The ground wire may be run from one of the ground terminal lugs within the terminal or the ground terminal assembly on the side of the 116C. If the desired location that it is to be terminated on is the Ground Terminal Assembly, the following is the recommended method of termination.

Place a previously prepared ground wire under the Ground Terminal and washer and insert the bolt thru the hole in the Ground Terminal, the washer and the hole in the side of the 116C Protector and then into the hole in the T & B Lug It. Tighten the bolt using the 216B Tool. See Figure 12.

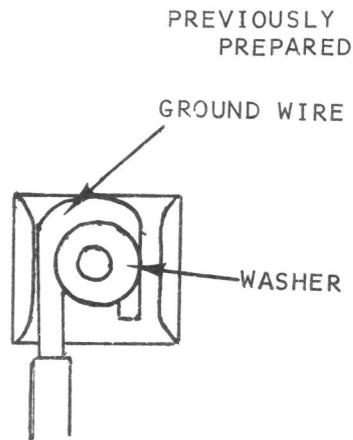
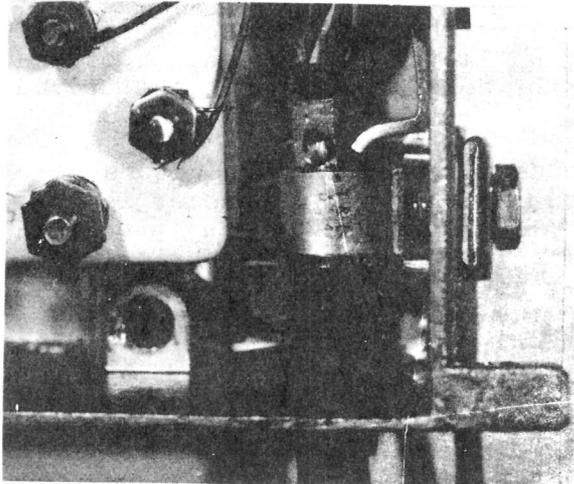


FIGURE 12

7.35 Terminate the conductors as shown in Figure 13 from top to bottom beginning with the White-Blue pair on the top lugs and ending with the Red-Blue pair on the bottom lugs. See Figure 13.

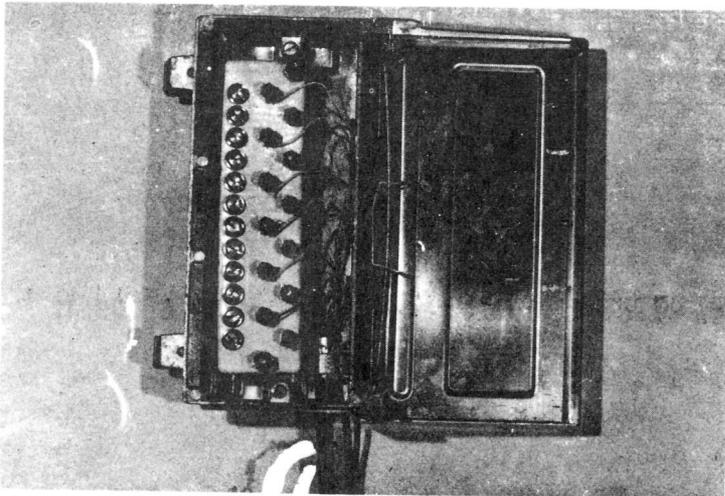


FIGURE 13

8. TROUBLE LOCATION AND REPAIR

- 8.01 Trouble location procedures are outlined in 629-760-211SN.
- 8.02 The repair of the 2, 3 or 6 pair wires can be accomplished using the Hyseal Capping Kit, CK200, and the #2 Fargo Connector.
- 8.03 Prepare the wires as shown in Figure 4. Twist the conductors together to avoid their separating. The conductor length may be reduced to 3 inches for splicing, however, the 6 inch minimum length is recommended in order to identify pairs.
- 8.04 Scuff the jacket of the wires to be joined in a circular motion using an old Carding Brush or emory paper.
- 8.05 Insert the shields of the wires into the appropriate size Fargo Connector. Tighten the Fargo securely.
- 8.06 Skin approximately 3/4 inch of insulation off each wire.
- 8.07 Join the conductors using B Wire Connectors.
- 8.08 Using the Hyseal Capping Kit, CK200, proceed as follows:

CAUTION: AVOID SKIN CONTACT OR PROLONGED BREATHING OF FUMES AND VAPORS. IF SKIN CONTACT OCCURS, WASH THOROUGHLY WITH SOAP AND WATER.

- (a) Hold the tube horizontally (heat sealed end away from you).
- (b) With the thumb, flip the barrier between the two components and work the barrier to the heat sealed end and hold there.
- (c) Holding the tube upright (heat sealed end up) cut the sealed end off and remove the barrier with the paddle and discard it.
- (d) Vigorously stir the components with the paddle in a circular as well as a scooping motion for one minute. The compound will change to a dark color. The tube will become warm.
- (e) Insert the foam centering spacer (open end up) into the open end of the tube. This spacer will center the splice in the tube.

- (f) Insert the prepared splice into foam spacer and push the spacer to bottom of tube. Hold for 1 1/2 minutes until compound gels.

NOTE: THIS COMPOUND WILL SET UP IN 3 MINUTES.

- (g) Place the completed splice in the ground and cover as required.

9. TAGGING BURIED DISTRIBUTION WIRES

9.01 The BD Wires will be tagged using the marker, wire, brady, SCD36-(Number or Letter) at the Hand Hole end and the station end with the house number or lot number (if the house number is not available).

9.02 A tagging alternative to the "Clip-On" labels could be a lead tag with the house or lot number (or unit number in the case of multi-unit dwellings) and the cable number and count.