

OPEN WIRE
116-TYPE PROTECTORS

	CONTENTS	PAGE
1. GENERAL	1
2. DESCRIPTION	1
3. LOCATING	3
4. INSTALLING	3
5. GROUNDING	3
6. TERMINATING WIRE AT PROTECTORS	7
7. PLANT REQUIRING PROTECTION	7
8. MAINTENANCE	8

1. GENERAL

1.01 This section replaces Sections 638-435-100 and 638-435-200. This section covers the description, installation, and grounding of the 116-type protector when used with open wire.

1.02 The 116-type protector supersedes the 83A Protector Mounting. Sections 638-410-011 and 638-410-200, which include the description, installation, and grounding of the 83A Protector Mounting, are cancelled.

1.03 In general, 116-type protectors are used when protection against lightning or high voltage is required at locations such as junctions between open wire and buried wire, multiple wire, drop wire, or cable plant. When 116-type protectors are installed at junctions of open wire and drop

wire to subscribers with fuseless station protection, D or E Block Wire must be used between the 116-type protector and the open wire. Otherwise, fused station protection must be used at the subscriber location.

1.04 The 116D3B-6 Protector supersedes the 116D2B-6 Protector and the pole mounted 116D Protector and is arranged so it can be mounted on the support wire of multiple wire. Knockouts are provided in the housing for pole or crossarm mounting.

1.05 The superseded 116D2B-6, 116B, and 116D Protectors now in plant may be reused if they are in satisfactory condition.

1.06 See Part 8 for maintenance and replacement of obsolete 83A Protector mountings.

2. DESCRIPTION

2.01 At junctions of open wire and multiple wire or cable plant, the 116D3B-6 Protector can be mounted directly on the support wire of multiple wire or knockouts are provided in the housing for mounting on poles and crossarms.

2.02 The 116D3B-6 Protector shown in Fig. 1 consists of an aluminum housing containing a 57A2B-6 Connecting Block, equipped with six pairs of binding posts, two terminals for ground connections, and twelve 2A1B Protector Units. A ground terminal is also located on the outside of the box. The 116D2B-6 Protector is similar to the 116D3B-6 except for the strand mounting lugs (Fig. 2).

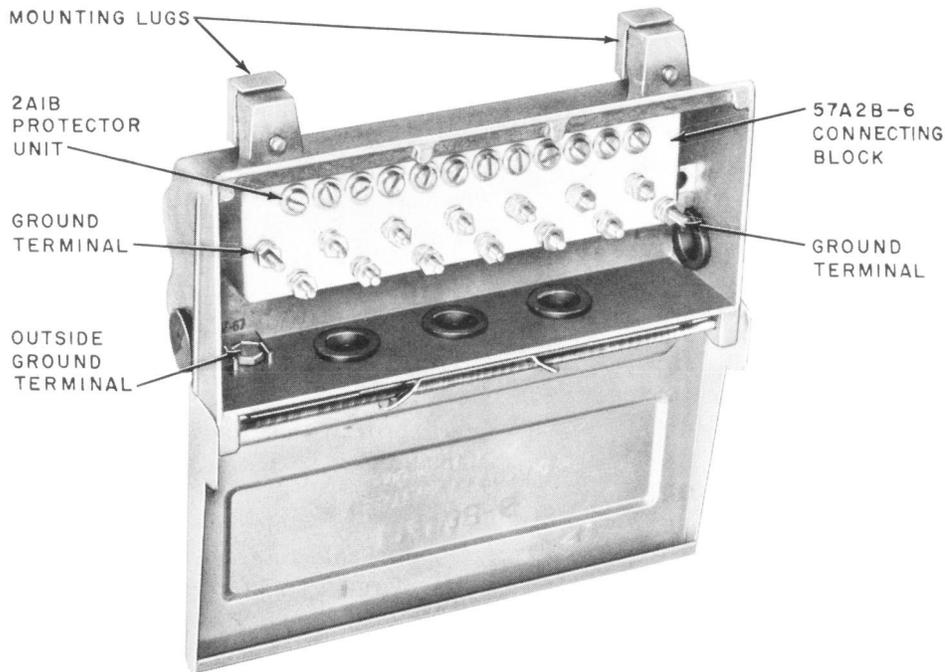


Fig. 1—116D3B-6 Protector

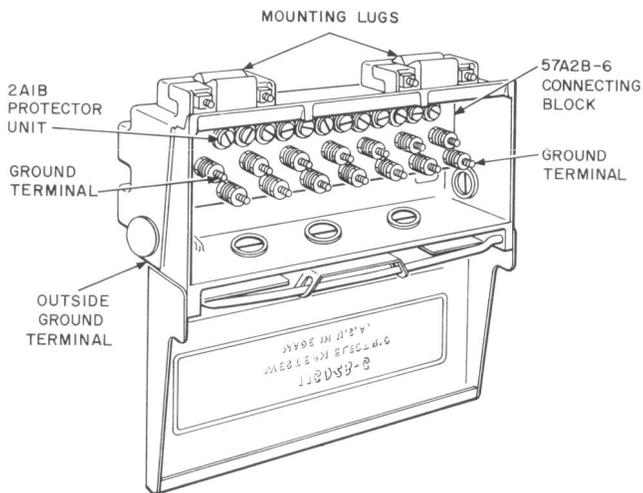


Fig. 2—116D2B-6 Protector

2.03 The 116D Protector shown in Fig. 3 consists of an aluminum housing containing a 57A2B-6 Connecting Block equipped with six pairs of binding posts, two terminals for ground connections, and twelve 2A1B Protector Units. A ground terminal is also located on the outside of the box. The 116D is arranged for pole and crossarm mounting using wood screws.

2.04 The 116B Protector shown in Fig. 4 consists of an aluminum housing containing a connecting block equipped with six pairs of binding posts, two terminals for ground connections, and twelve 2A1B Protector Units. The housing is similar to that of an NC-10 Cable Terminal. A ground terminal is also located on the outside of the box. A 45A Bracket is furnished to mount the terminal on a pole or crossarm.

2.05 The superseded 83A Protector Mounting is illustrated in Fig. 5. See Part 8 for information on replacement and maintenance.

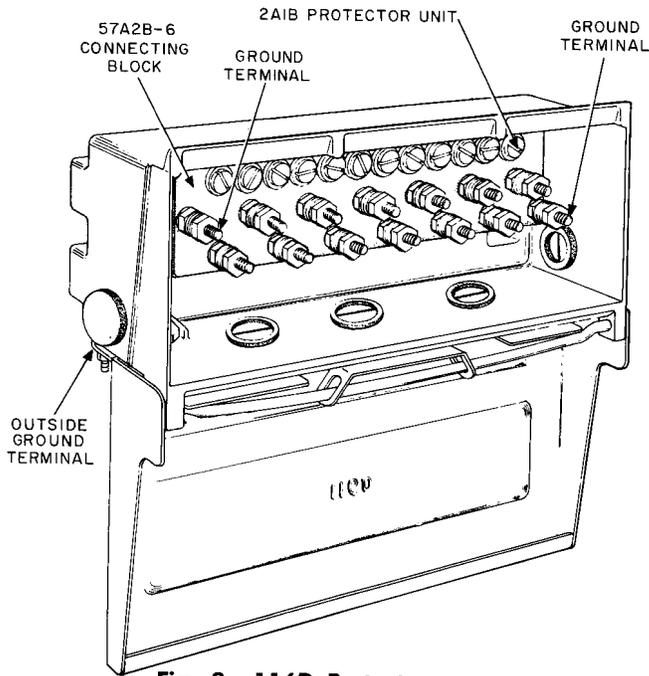


Fig. 3—116D Protector

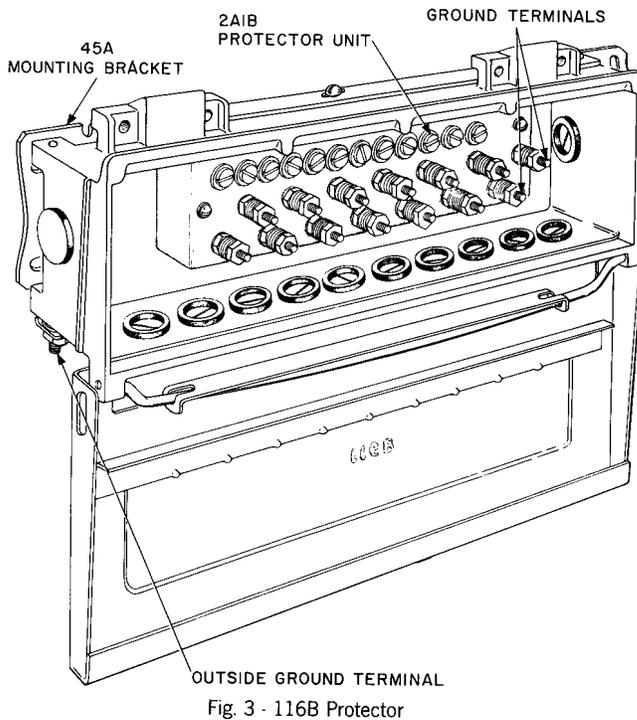


Fig. 4—116B Protector

3. LOCATING

3.01 Locate these protectors so the length of the ground wire to the suspension strand or other ground is as short as practical.

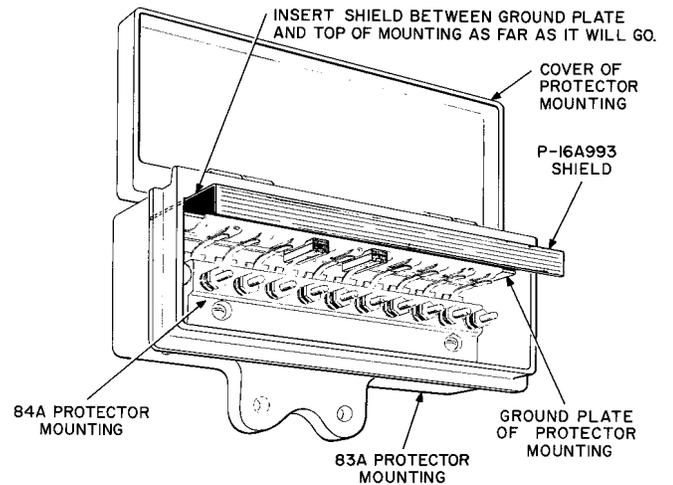


Fig. 5—83A Protector Mounting

3.02 Locate 116-type protectors when required at pole-mounted, nonprotected terminals as illustrated in Fig. 6. If open wire is to be protected, bridle the top protector to the top crossarm.

3.03 Locate 116-type protectors, when required at strand-mounted and ready access terminals directly below the strand as shown in Fig. 7.

3.04 Locate 116-type protectors, when required at cross-connecting terminals, at the most convenient point. See Fig. 8 for a suggested location.

3.05 Locate 116-type protectors on the crossarm when the protector is specified along the open wire route for additional lightning protection. See Fig. 9.

4. INSTALLING

4.01 Mount 116-type protectors on crossarms or poles with two 2-inch No. 14 RH galvanized wood screws.

5. GROUNDING

5.01 Ground 116-type protectors to the type grounds listed in the order of preference as follows:

- (a) Grounded suspension strand

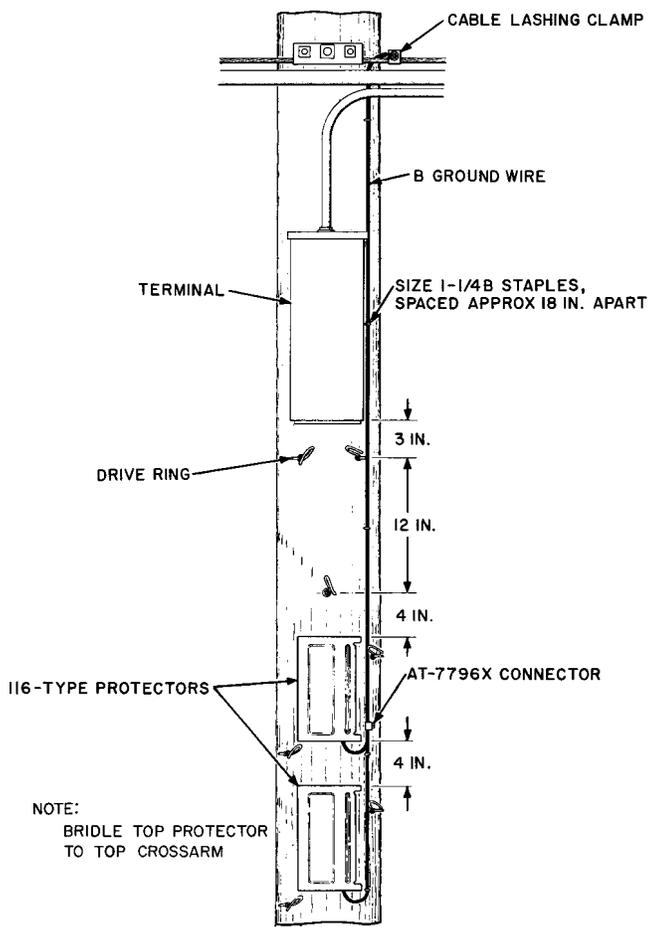


Fig. 6—Mounting 116-Type Protectors at Pole Mounted Terminal

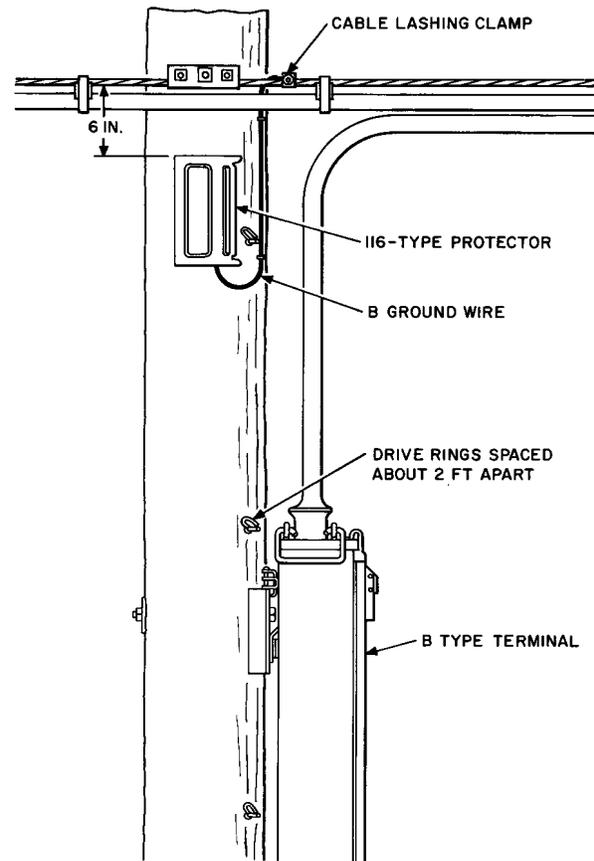


Fig. 8—Mounting 116-Type Protector at Cross Connect Terminal

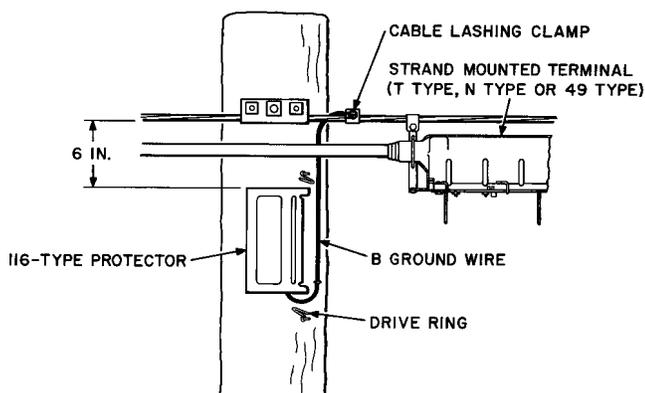


Fig. 7—Mounting 116-Type Protector at Ready Access Terminal

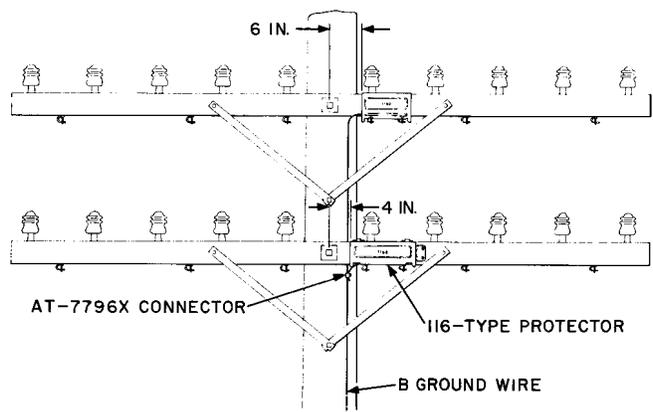


Fig. 9—Mounting 116-Type Protector on Crossarm Terminal

- (b) Vertical grounding conductor of a power system multigrounded neutral wire
- (c) Ground rods.

Grounding conductors from power system lightning arresters shall not be used unless they are connected to the power neutral wire.

5.02 When the ground is a strand, connect the ground wire from 116-type protectors as follows:

- (a) Use one piece of B Ground Wire without joints and run as directly as practical from the protector to the ground (suspension strand).
- (b) Secure the ground wire to the pole with 1-1/4 inch B Staples spaced 18 inches apart.
- (c) Clean the ends of the ground wire to remove all traces of dirt, grease, or other foreign matter.
- (d) Attach the ground wire to the ground terminal located on the outside of the 116-type protector.
- (e) Attach the ground wire to suspension strand by means of a strand ground clamp located as close to the pole as practical, and in such a position that it will not interfere with drop wire runs. Bend the wire back on itself for a length of about 2 inches, insert the loop of wire between the strand and bolt, and tighten the bolt. See Fig. 10.
- (f) Where the strand is dead ended in an eye bolt, place the strand ground clamp on the neck of the suspension strand deadend; otherwise, place it on the strand at the opposite end of the 3-bolt guy clamp.
- (g) When a Strandvise is used for terminating strand, **never make a connection to the bail of the Strandvise; connect directly to the strand itself.**
- (h) Where the strand is dead ended by other means, place the strand ground clamp on the strand as close to the pole as practical.

5.03 When the ground is the vertical grounding conductor of a power system multigrounded

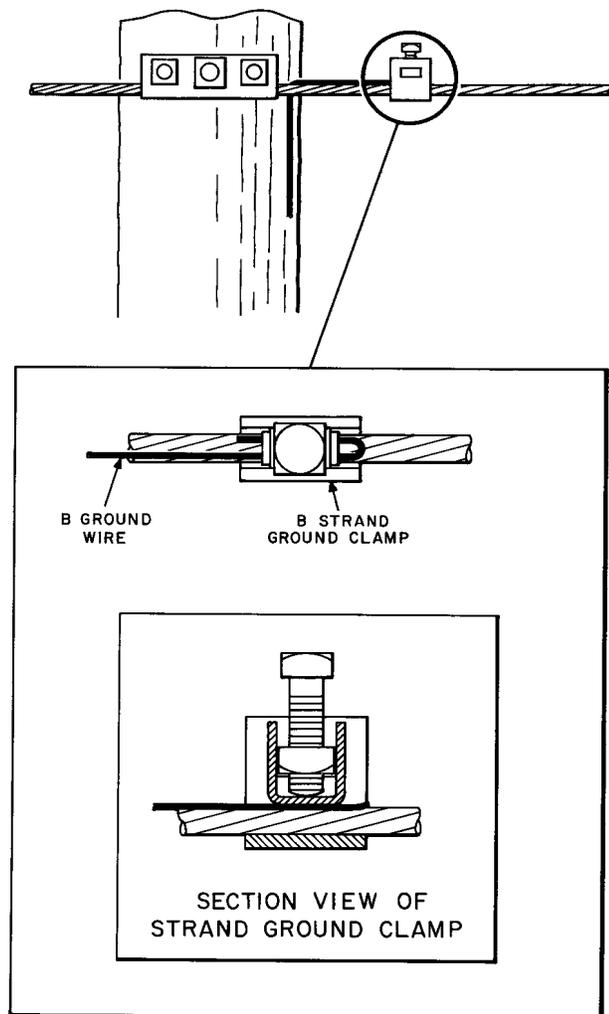


Fig. 10—Method of Attaching Ground Wire to Strand

neutral wire, connect the ground wire from 116-type protectors as follows:

- (a) **Test the vertical grounding conductor with the B Voltage Tester as instructed in Section 620-105-010.**
- (b) Place B Ground Wire as indicated in 5.02 (a) through (d).
- (c) The connection between the ground wire and the vertical grounding conductor may be made by a telephone workman if this procedure meets with the approval of the power company and if the connection is made within telephone company space.

SECTION 623-195-205

(d) Attach the ground wire to the vertical grounding conductor with an AT-7796X Connector.

(e) Where the power company has installed an **aluminum** vertical grounding conductor, do not use an AT-7796X Connector because of the reaction between copper and aluminum. Make the connection with a Blackburn PAC3 or a Fargo GA610C Connector.

5.04 If there is no power system vertical grounding conductor on the joint-use pole at the location of the 116-type protector, but there is a multigrounded neutral wire, connect the ground wire from 116-type protectors as follows:

(a) Drive a ground rod about 2 feet from the base of the pole, so the top of the rod will be about 3 inches below the level of the ground. The ground rod should be located so the grounding conductor may be run on the side of the pole reserved for power company attachments.

(b) Connect the B Ground Wire directly to the ground rod with a B Ground Clamp. Clean all wires thoroughly before making connection.

(c) Fasten the B Ground Wire to the pole at 18-inch intervals with 1-1/4 inch B Staples. Carry out any additional instructions involving local regulations on the vertical grounding conductor.

(d) When the top of the telephone space is reached, leave sufficient ground wire to reach the power neutral wire (usually about 6 feet) coiled at this point. **The connection to the neutral wire shall be made by a power company workman.** Report all such installations to the supervisor immediately so arrangements may be made to have the vertical grounding conductor connected to the power neutral as soon as practical.

(e) Connect the ground wire from the protector to the vertical grounding conductor as instructed in 5.03.

Caution: Do not under any circumstances perform work in the power space on the pole.

5.05 Where neither suspension strand nor power multigrounded neutral wires are available,

and where additional lightning protection is specified along an open wire route, ground 116-type protectors as follows:

(a) The plant engineer will specify on the construction drawing the number of ground rods required for each location. He will also specify the spacing of the rods and the depth of trench.

(b) Locate the ground rods in the line of the pole lead with the first rod about 2 feet from the base of the pole (Fig. 11).

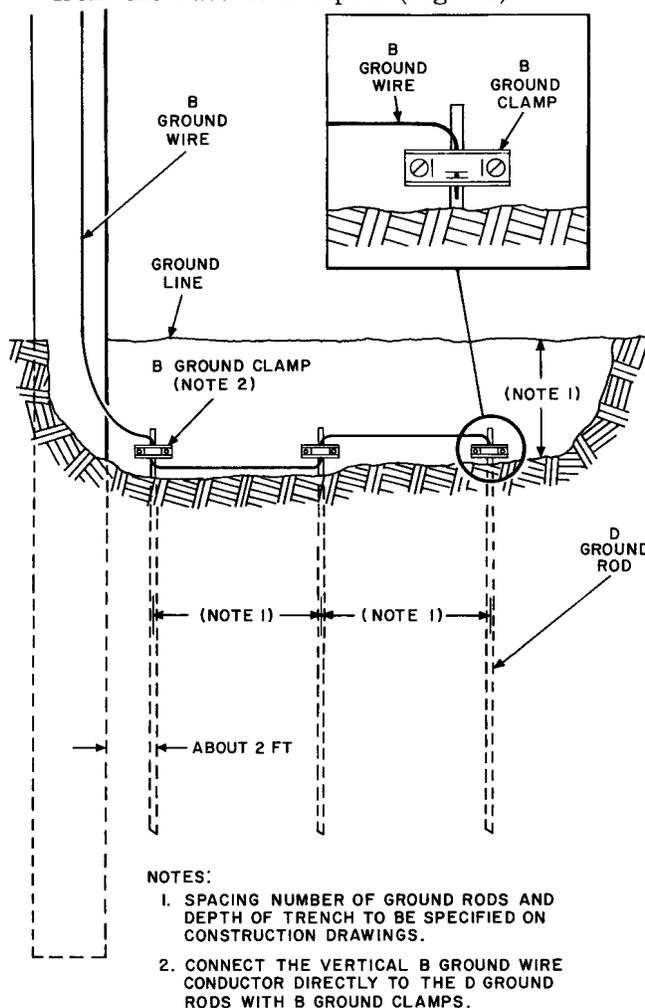


Fig. 11—Locating Ground Rods

(c) Connect the B Ground Wire directly to the ground rod with a B Ground Clamp.

(d) Fasten the B Ground Wire to the pole with 1-1/4 inch B Staples at 18-inch intervals. Carry out any additional instructions involving

local regulations on the vertical grounding conductor.

(e) Clean the end of the wire to remove all traces of dirt, grease, or other foreign matter and attach it to the ground terminal located on the outside of the 116-type protector.

5.06 Where additional protectors are installed, bridge to the original ground wire as follows:

- (a) Place B Ground Wire as indicated in 5.02 (a) through (d). (See Fig. 6 and 9.)
- (b) Clean both wires thoroughly.
- (c) Bridge the new wire to the original wire with an AT-7796X Connector.

6. TERMINATING WIRES AT PROTECTORS

6.01 Bridling from cable terminals is terminated at 116-type protectors as follows:

- (a) The position of the bridling in the protector corresponds to the pin position in the crossarms.
- (b) Place bridle wire as outlined in Section 623-300-201 from the open wire through the appropriate entrance holes in the bottom of the protector.
- (c) Place the block wire to the cable terminal through the hole in the end, or through the appropriate entrance holes in the bottom of the 116-type protectors. (See Fig. 12.)
- (d) Cut the wire to the proper length for terminating. Skin and clean the ends of the conductors.
- (e) Place the bridle wire from the open wire under the bottom washer, the tracer conductor on the right-hand binding post, and the plain conductor on the left-hand binding post and tighten the nut to obtain firm contact.

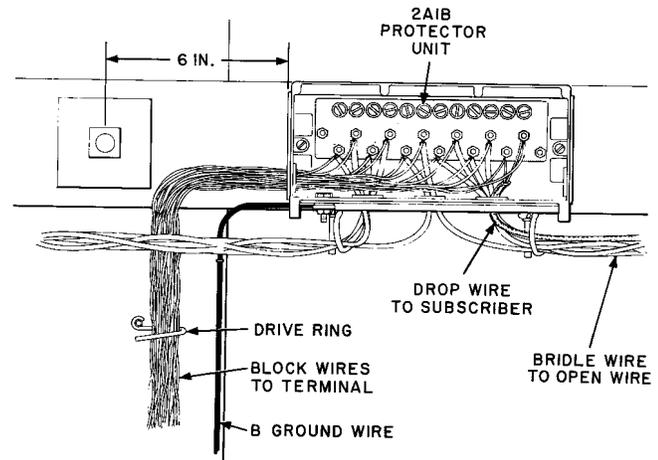


Fig. 12—Method of Terminating Wires at 116-Type Protector (Cover Omitted for Clarity)

(f) Place the conductors of the block wire between the bottom nut and the next washer, with the tracer and plain conductor the same as in (e), and tighten the top nut to obtain a firm contact.

(g) When a new open wire circuit is dead ended at a terminal pole and it is not immediately connected for service, it should be grounded as outlined in Section 623-104-010.

7. PLANT REQUIRING PROTECTION

7.01 The plant engineer shall specify on the construction drawings when 116-type protectors are required, and shall specify the pole at which they should be placed together with special grounding information when required.

7.02 The plant engineer shall specify on the construction drawings any additional 116-type protectors which may be placed along open wire lines as special lightning protection. The 2A1B

SECTION 623-195-205

Protectors in these 116-type protectors should be replaced with 2A1E Protectors to provide a 10 mil air gap. They are in addition to the normal protection provided at the cable terminal feeding the open wire.

7.03 When a new open wire circuit is dead ended at a terminal pole, and it is not immediately connected for service, the nonworking open wire should be grounded as outlined in Section 623-104-010.

7.04 The use of 116-type protectors as protected terminals for multiple wires is covered in Division 624 on multiple wires.

8. MAINTENANCE

8.01 Whenever a protector location is visited for any reason, clean any cobwebs, nests, dirt, etc, from the inside of the box. Replace the 2A1B Protectors when they become grounded.

8.02 Replace the 57A2B-6 Protector Assembly in the 116D Protector if the original assembly is damaged enough to prevent replacement of grounded protectors or is otherwise damaged so as to impair protection or telephone service. Service is temporarily disconnected while the replacement is being made. This may be done as follows:

- (a) Disconnect and bend back out of the way all conductors, ground wires, and drop wires. While the replacement is being made, temporarily ground the conductors on lines where induced

voltages are encountered due to joint use or power line parallels.

- (b) Remove the nuts and washers from each of the ground terminals located at each end of the protector assembly with a 216B Tool.

- (c) The protector assembly may now be pulled out of the box and the new one put in its place using the screws now in place.

- (d) Replace the nuts and washers on the ground terminals and reconnect all conductors, ground wires, and drop wires. Be sure to disconnect the temporary ground.

8.03 If the 116B Protector requires replacement, the whole unit including the housing must be replaced.

8.04 The 83A Protector Mounting has been superseded by the 116-type protectors for open wire protection. On maintenance visits to open wire locations served by 83A Protector Mountings, replace grounded or defective No. 26 (carbons) and No. 30 (blue) Protector Blocks in the 83A Protector Mountings only. For all other mechanical failures, replace the 83A Protector Mounting with a 116D3B-6 Protector.

8.05 116B and 116D Protectors in reusable condition may also be used to replace defective 83A Protector Mountings.