

STATION PROTECTION

STATIONS SERVED BY GROUNDED METAL SHEATH CABLE

1.00 INTRODUCTION

This section covers the identification, use, location, fasteners, installation, and maintenance of the 111A, 98AA, 106CA, 116A, and 117A fuseless protectors and associated mountings and brackets. It also includes information on the conversion of the 98A and 106C fused protectors to fuseless operation.

2.00 GENERAL

2.01 *Service orders or local instructions will specify when station protection is required.* However, when circuits not otherwise requiring protection are extended from a terminal into areas where the drop wire may possibly come in contact with power wiring in excess of 300 volts, protection (fuseless) is required at the station fed by the exposed drop wire. An example of this would be a drop wire fed from a terminal in an unexposed area to an **out of block** station on the opposite side of a street. In order to prevent exposing the entire cable, protection is also required at the cable terminal. Fuseless station protectors may also be used at the cable terminal. Use the 1305A protector for one or two installations and the 116A protector where more than two installations are expected.

2.02 The fuseless protectors described in this section are to be used when station protection is required in areas served by grounded metal sheath cable (lead, alpeth, stalpeth, etc). Fused protectors may be used as a substitute for fuseless protectors in all cases in which fuseless protection is specified.

2.03 Fuse shields are not required when fuseless protectors are installed in customer-provided protector cabinets.

2.04 Insulated building attachments and tubes are not required for electrical protection and should not be used on new drop or block wire installations where fuseless protectors (or fused when substituted) are installed. Insulated drop or block wire attachments that are in place should be re-used.

2.05 Fuseless protectors may be used on battery and ringing feeders of key telephone systems, wiring plans, etc. However, where required to run more than one drop or block wire to furnish battery for a system, it will be necessary to use the fused-type protector in place of the fuseless type. A maximum of three drop or block wires furnishing battery for a system may be terminated on one fused protector and should be bridged on the line side of the protector.

2.06 Sneak current fuses (60 type) are not required in connection with protectors associated with residence systems, wiring plans, or key equipment. They shall, however, be provided on special service and leased lines when specified on the service order or by other local instruction

2.07 PBX protection is covered in the B series of Bell System Practices governing such protection.

2.08 Special protection arrangements for station sets located in explosive atmospheres or auto-trailers is specified in the C sections of Bell System Practices governing such installations.

SECTION C23.033

3.00 IDENTIFICATION OF PROTECTORS, MOUNTINGS, AND BRACKETS

3.01 The 111A fuseless protector shown in Fig. 1 should be used with the 305A protector mounting (see Fig. 2) when installed outdoors. The protector, complete with mounting, is coded 1305A.

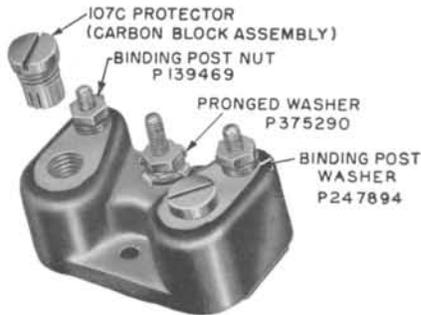


FIG. 1—111A PROTECTOR

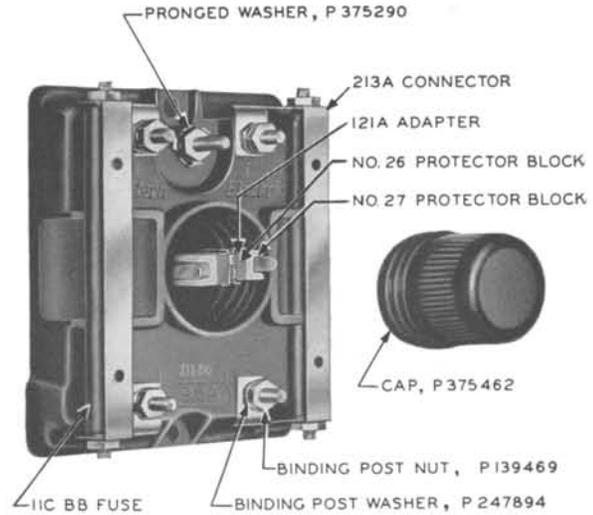


FIG. 3—98AA PROTECTOR

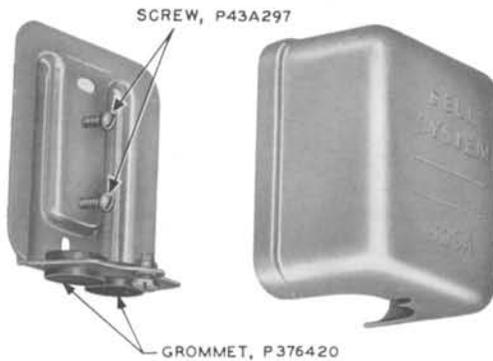


FIG. 2—305A PROTECTOR MOUNTING

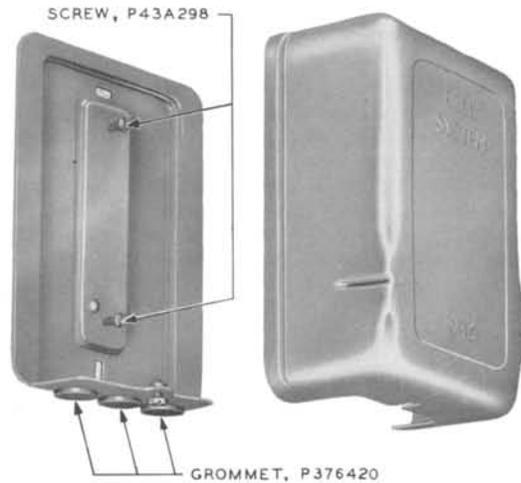


FIG. 4—93C PROTECTOR MOUNTING

3.03 The 106CA protector shown in Fig. 5 is a fuseless conversion of the 106C fused protector. It should be used with a 93C or 93A protector mounting when installed outdoors. The protector, complete with 93C mounting, is coded 1293CA.

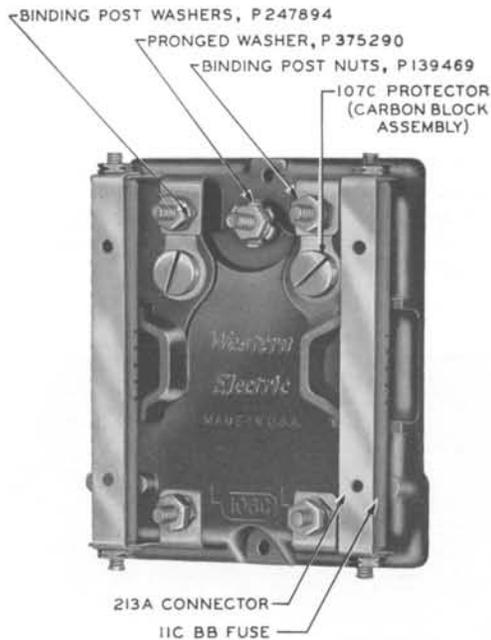


FIG. 5—106CA PROTECTOR

3.04 The 116A protector shown in Fig. 6 has a capacity of six lines and is designed for outdoor use at multiple dwellings. It may be used also where **out-of-block** cable protection is required for three or more lines. A 45A bracket is furnished with the 116A protector and is used to mount the protector.

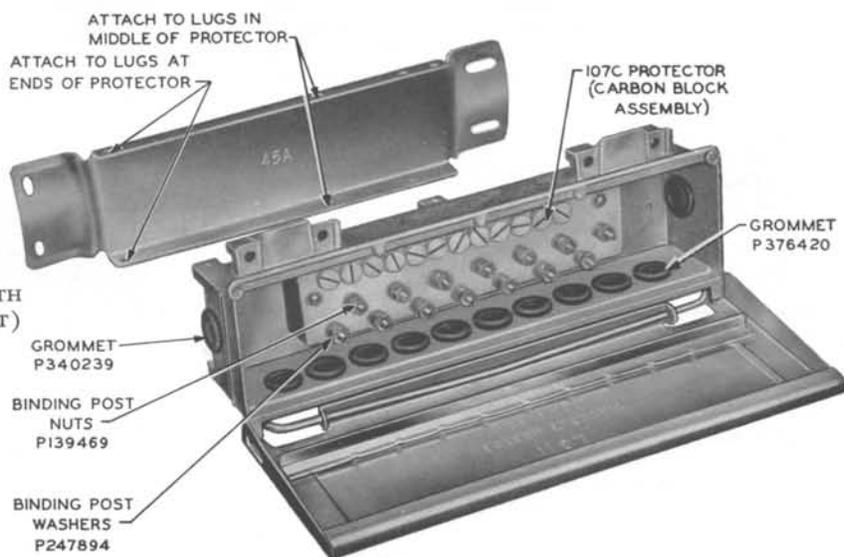


FIG. 6—116A PROTECTOR (WITH 45A MOUNTING BRACKET)

3.05 The 117A protector shown in Fig. 7 is designed for use at indoor locations where multiple protection is required. It may be mounted in customer-provided cabinets. A GB-11 terminal box may be used to enclose the protector when necessary for appearance or other reasons. Before installing the protector in a terminal box, it will be necessary to drill two mounting holes in the terminal box. Fasten protector with screws (No. 10 self-tapping screws, type Z, 1-1/2 inches long) furnished with it. Since the mounting screws used for the protector will extend slightly beyond the back of the terminal, it will be necessary to drill lead holes in the mounting surface.

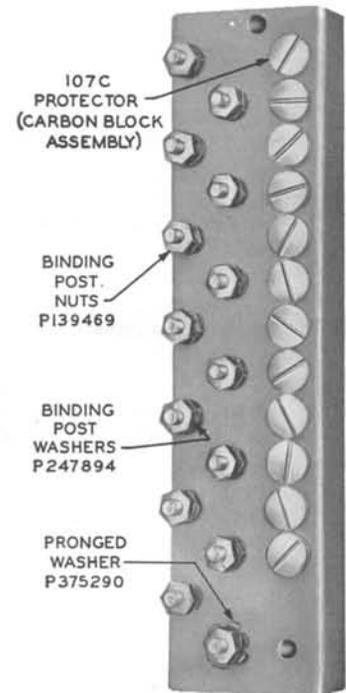


FIG. 7—117A PROTECTOR

4.00 LOCATING PROTECTORS

Consider the following when locating protectors:

- Accessibility (avoid placing where a ladder is necessary for installation or maintenance).
- Location of telephone, protector ground, and entrance for drop or block wire.
- Freedom from likelihood of mechanical damage.
- Appearance standpoint (avoid locations on front of buildings or in living quarters).
- Dry and well ventilated locations when mounted inside or underneath buildings.

5.00 FASTENING PROTECTORS, MOUNTINGS, AND BRACKETS

5.01 Protectors may be mounted in any position.

5.02 Fasteners are indicated in Table A. All screws and fasteners shall be of sufficient length to mount securely.

TABLE A

Apparatus	Fasteners
Protectors	No. 8 RH Blued Wood Screws or equivalent.
Protector Mountings	No. 8 RH Galvanized Wood Screws or equivalent.
Bracket (for 116A Protector)	No. 14 RH Galvanized Wood Screws or equivalent.

5.03 Backboards should be used only when required. Choose backboard as indicated in Table B or a suitable alternate type.

TABLE B

Type of Protector Installation	Backboard Type
111A — Single	171
111A — Multiple	79
98AA or 106CA (Three or Less)	79
98AA or 106CA (Four or More)	81

6.00 INSTALLING PROTECTORS

6.01 The number of fuseless protectors that may be connected to various sizes of ground wires is covered in the C section of Bell System Practices governing the selection of wire and cable.

6.02 Terminate line and inside wires on protectors so that the ring conductors (red or single tracer wires) shall be connected to the right-hand side of the protector (on ceilings the right-hand side as viewed from the inside wiring end of the protector). (See Figs. 8 through 10.)

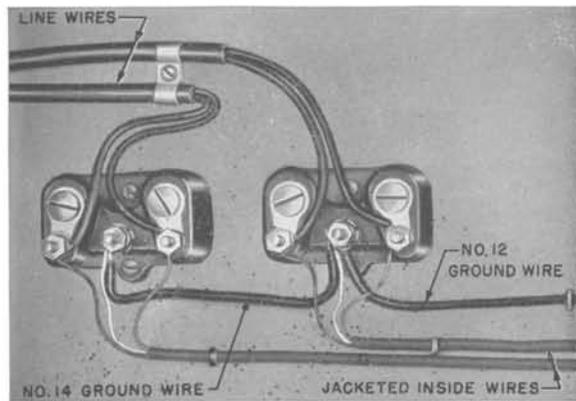


FIG. 8—INSTALLATION OF 111A PROTECTORS

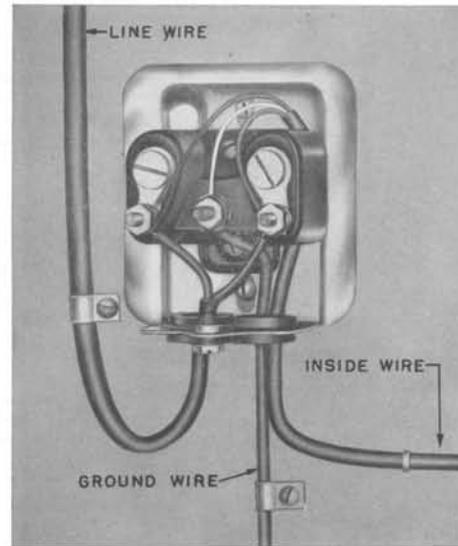


FIG. 9—INSTALLATION OF 1305A PROTECTOR

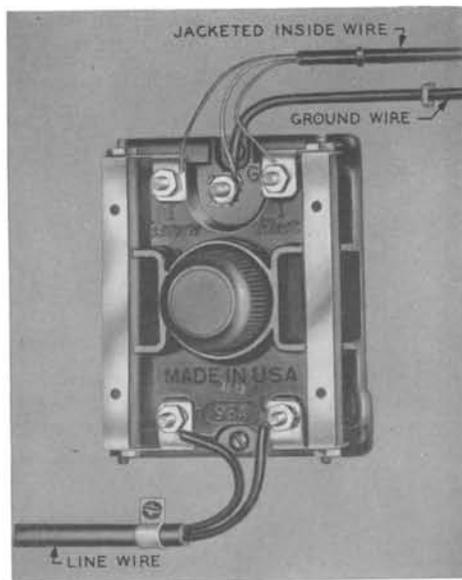


FIG. 10—INSTALLATION OF 98AA PROTECTOR

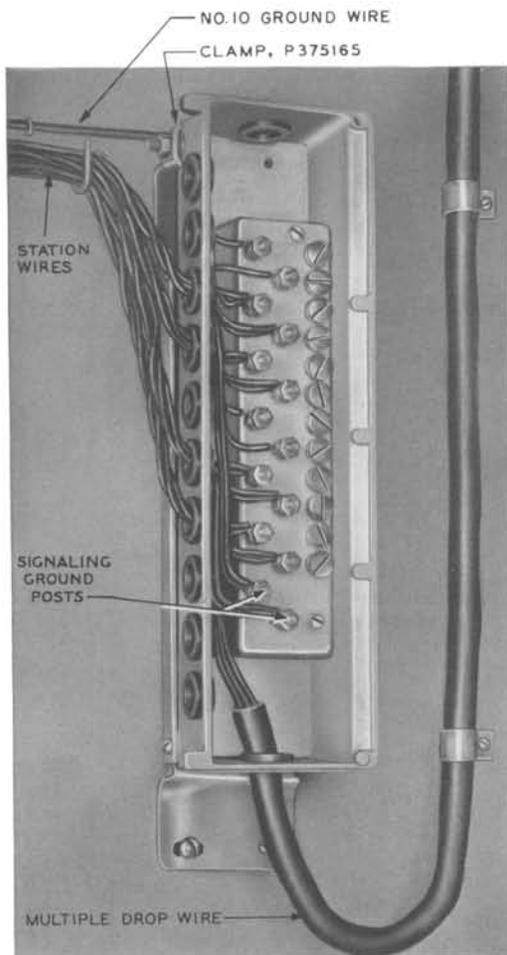
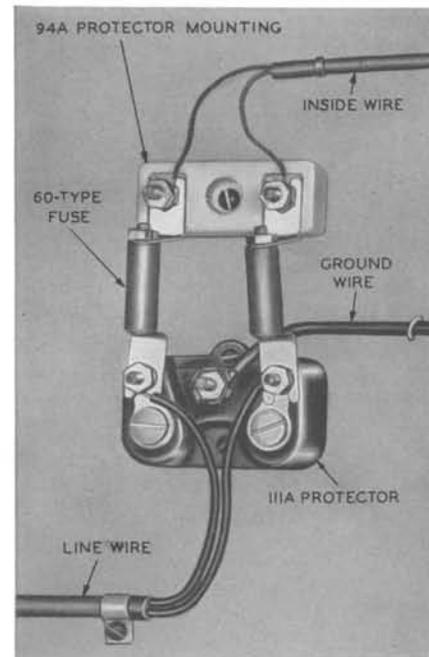


FIG. 11—INSTALLATION OF 116A PROTECTOR

6.03 The 116A protector shown in Fig. 11 is served by a multiple drop wire, but it is also permissible to use separate drop or block wires. The drop or block wire may be inserted from either end. Two end grommets are provided: one having an open center for the drop or block wire entrance, the other a solid grommet to seal the opposite end. All drop or block wire conductors **must** be terminated during the initial installation. Place the individual wires under the bottom nut of each binding post. Station wires should be terminated between the washers below the top nut. A ground terminal is provided on the rear of the 116A protector, and the signaling ground posts are internally bonded to it.

6.04 Sneak current fuses, when specified, may be arranged with the 111A fuseless protector or the 98AA and 106CA converted fuseless protectors. Two 60-type fuses are mounted between the protector and a 94A protector mounting. (See Fig. 12.)



Note: May be mounted outdoors. Fasten to 1094A protector mounting plate and install in 97A protector mounting.

FIG. 12—TYPICAL INSTALLATION OF 111A PROTECTOR WITH 60-TYPE FUSES

7.00 CONVERSION OF 98A AND 106C PROTECTORS TO FUSELESS OPERATION

7.01 Fused protectors on stations served by grounded metal sheath cable should be converted whenever the station is visited, except when it would be necessary to place a new ground wire. The number of converted fuseless protectors which may be connected to various sizes of ground wire is covered in the C section of Bell System Practices governing the selection of wire and cable.

7.02 The adapters and connectors (shown in Fig. 13) used in converting protectors are:

- The 121A adapter and 213A connector may be used to convert all 98A protectors.
- The 120A adapter and 211A connector are no longer manufactured but may be used if available from existing stocks. They may not be used to convert 98A protectors manufactured prior to 1939 because the 120A adapter will not fit over the larger ground electrode employed in the earlier type of 98A protectors.

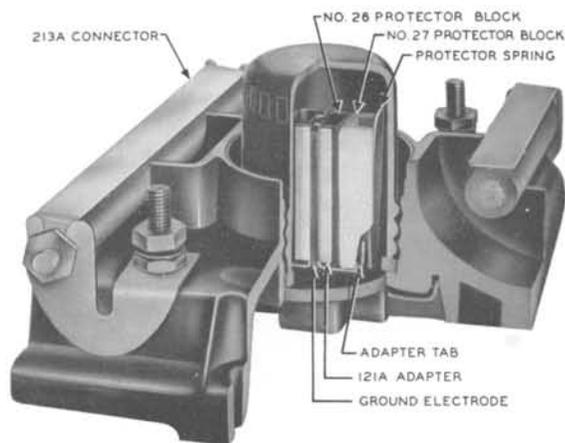


FIG. 14—CONVERTED 98A PROTECTOR USING 121A ADAPTERS AND 213A CONNECTORS

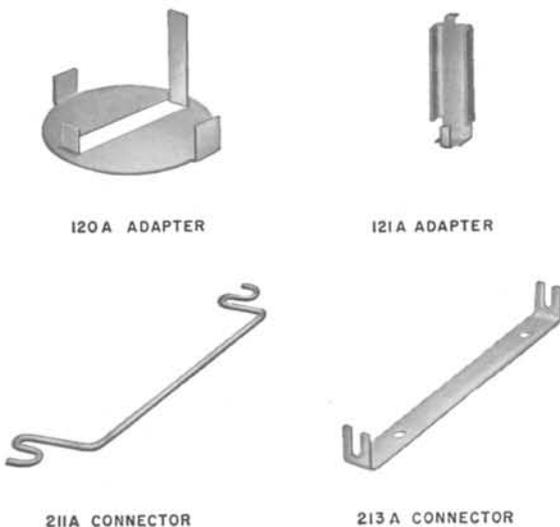


FIG. 13—ADAPTERS AND CONNECTORS

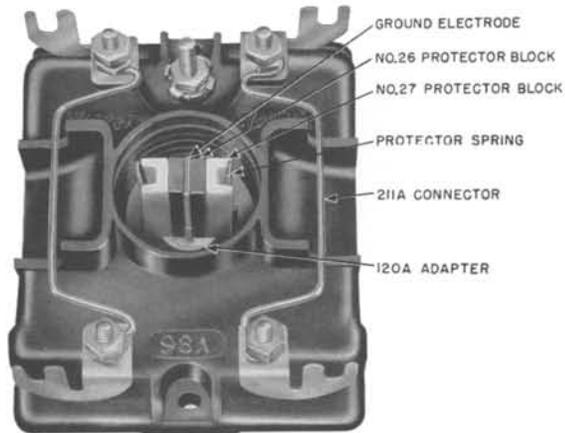


FIG. 15—CONVERTED 98A PROTECTOR USING 120A ADAPTERS AND 211A CONNECTORS

7.03 For conversion of 98A protectors that are in service, see Figs. 14 and 15 and use Table C. Connectors may be omitted as specified in 7.05.

7.04 To convert 106C protectors to fuseless operation, two connectors are required, except as covered in 7.05 where connectors may be omitted. When connectors are used to convert 106C protectors, they are installed in the same manner as that outlined in Table C for 98A protectors. No adapters are required. *The 106A protector cannot be converted to fuseless operation, due to insufficient current-carrying capacity.*

TABLE C

Conversion of 98A Protector*	
Using a 120A Adapter and Two 211A Connectors	Using Two 121A Adapters and Two 213A Connectors
1. Disconnect line and station wires.	1. Remove cap and Nos. 26 and 27 protector blocks.
2. Remove cap and Nos. 26 and 27 protector blocks.	2. Insert the 121A adapters all the way into the protector well with flat side against the ground electrode.
3. Insert 120A adapter over ground electrode. Press adapter all the way down.	3. Check for ground on all binding post terminals. (See note 1.)
4. Check for ground on all binding post terminals. (See note 1.)	4. Remove adapters.
5. Replace Nos. 26 and 27 protector blocks. Make certain that they are properly seated on the face of the adapter.	5. Assemble a No. 26 and a No. 27 protector block in each adapter.
6. Check for grounds. (See note 1.)	6. Install assemblies in protector well.
7. Remove 11C fuses.	7. Check for grounds. (See note 1.)
8. Place 211A connectors under the bottom binding post nuts. Tighten binding post nuts securely. (See note 2.)	8. Loosen both nuts on 11C fuses.
9. Reconnect line and station wires.	9. Insert 213A connector over each fuse with bent down ends inside fuse clips. (See note 3.)
	10. Tighten nuts on fuses.

Notes

1. If an adapter does not provide solid ground with the carbon blocks removed or if ground exists when the carbon blocks are in place, discard adapter and replace with one that will meet requirements. If the requirements cannot be met on the second attempt, do not try to convert the protector. **Do not attempt to bend or adjust adapter tabs or protector block springs.**
2. Terminal clips may be removed. A binding post washer (P-234967) should be placed under the bottom nut, and the 211A connector placed between the washer and the bottom binding post nut when clips are removed.
3. In cases where fuses have shrunk slightly, one or both connector ends may be placed outside fuse clips. Some bowing of the connector might be encountered with short fuses. This condition is not considered objectionable. If desired, a bow may be placed prior to installation. With 213A connectors, the fuses only provide a physical means for securing the connectors in place, and defective fuses may be used for this purpose.

* Where a protector cannot be converted because it will not meet the requirements in Table C, a linen tag shall be left at the protector. Indicate on the tag why protector could not be converted.

7.05 Alternate methods of converting to fuseless operation are:

- The 98A protector may be converted by connecting line wires directly to station side of protector if they are of sufficient length. The connectors may be omitted. *The 120A or 121A adapter(s) must still be used.*
- The 106C protector may be converted by connecting line wires directly to station side of protector if they are of sufficient length. The connectors may be omitted. No adapters are necessary. (See Fig. 16.)

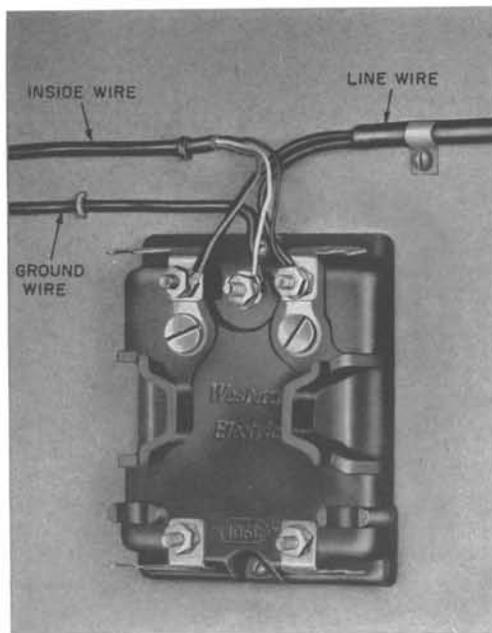


FIG. 16—ALTERNATE METHOD OF CONVERTING 106C PROTECTOR

8.00 MAINTENANCE

8.01 Station protectors need not be inspected on subsequent installation and maintenance visits unless a trouble condition is suspected within the protector, or local instructions specify otherwise.

8.02 When a protector is visited, the following work operations shall be performed:

- Replace protectors, mountings, and associated parts which are defective or are in poor condition.
- Replace broken or cracked carbon blocks on the 98-type protector. If No. 26 protector is excessively pitted, turn over and re-use opposite side if it is in good condition. If neither side is satisfactory, replace block.
- Replace all 107-type protectors (carbon block assemblies used in 111A, 106CA, 116A, and 117A protectors) in which the blocks have operated or are otherwise defective with a 107C protector.
- Converted 98A protectors shall be replaced when found to have operated due to a power cross (permanent contact between spring and adapter tab). (When the protector is subject to continuous current discharges, such as those resulting from power crosses, the protector springs become annealed and deformed near their point of contact with the No. 27 protector blocks, thus making solid contact with the adapter tabs and thereby providing a low-resistance path to ground.)
- Inspect wire terminations at protector.
- Inspect ground wire and ground clamp.