

## OPEN WIRE 104-TYPE PROTECTOR

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### 2. DESCRIPTION OF 104B PROTECTOR

#### 1. GENERAL

**1.01** This section describes 104-type protectors and provides instructions for their installation. They are intended for providing protection on open-wire circuits which are subject to induced voltages from adjacent power circuits. This section replaces Section 638-425-200 which is cancelled.

**1.02** Install 104-type protectors only when directed by detail plans or other specific instructions.

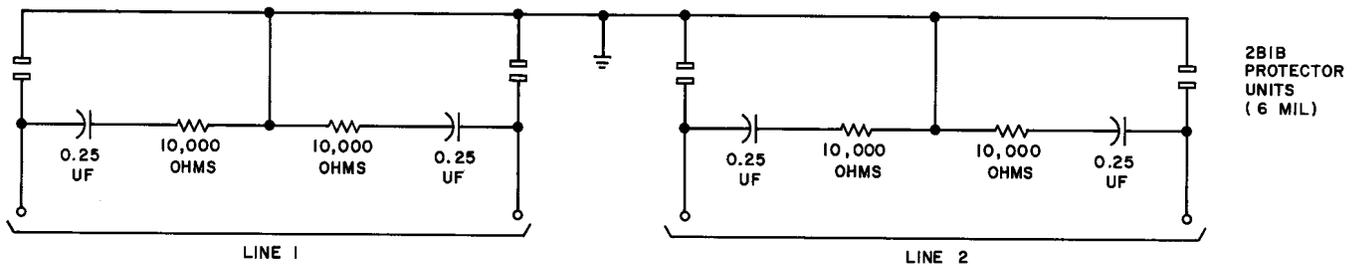
**1.03** The schematic diagram for the 104B Protector is shown in Fig. 1. The values for the resistors and capacitors are the same in the 104A Protector, but the type of carbon block protection is different.

**2.01** The 104B Protector is designed to limit the voltages that may be induced in open wire telephone circuits as a result of exposure to nearby power circuits. By providing balanced drainage paths from the two sides of the telephone circuit to ground, it reduces the induced voltages to safe values, without interfering with the normal operation of the circuit. The voltage induced in the telephone circuit depends principally on the voltage of the power circuit to ground, the distance between the telephone wires and the power wires, and certain characteristics of the telephone circuit. Each protector will serve two telephone circuits.

**2.02** The 104B Protector consists of a galvanized steel housing, about 8-3/16 inches high, 5-1/4 inches wide, and 2-7/8 inches deep, equipped for crossarm or pole mounting. It contains four resistors, four capacitors, and four 2B1B Protector Units (6 mil) in a 128A1A-2 Protector. There are grommets in the bottom of the housing for the entrance of bridle wires and ground wires.

**2.03** The inside of a 104B Protector as shown in Fig. 2, indicates the ground binding post and the binding posts for the two telephone lines.

**2.04** The housing cover is opened by grasping the sides near the bottom, and pulling the cover out, away from the back of the housing. This releases the cover and permits it to be swung



**Fig. 1—Schematic of 104B Protector**

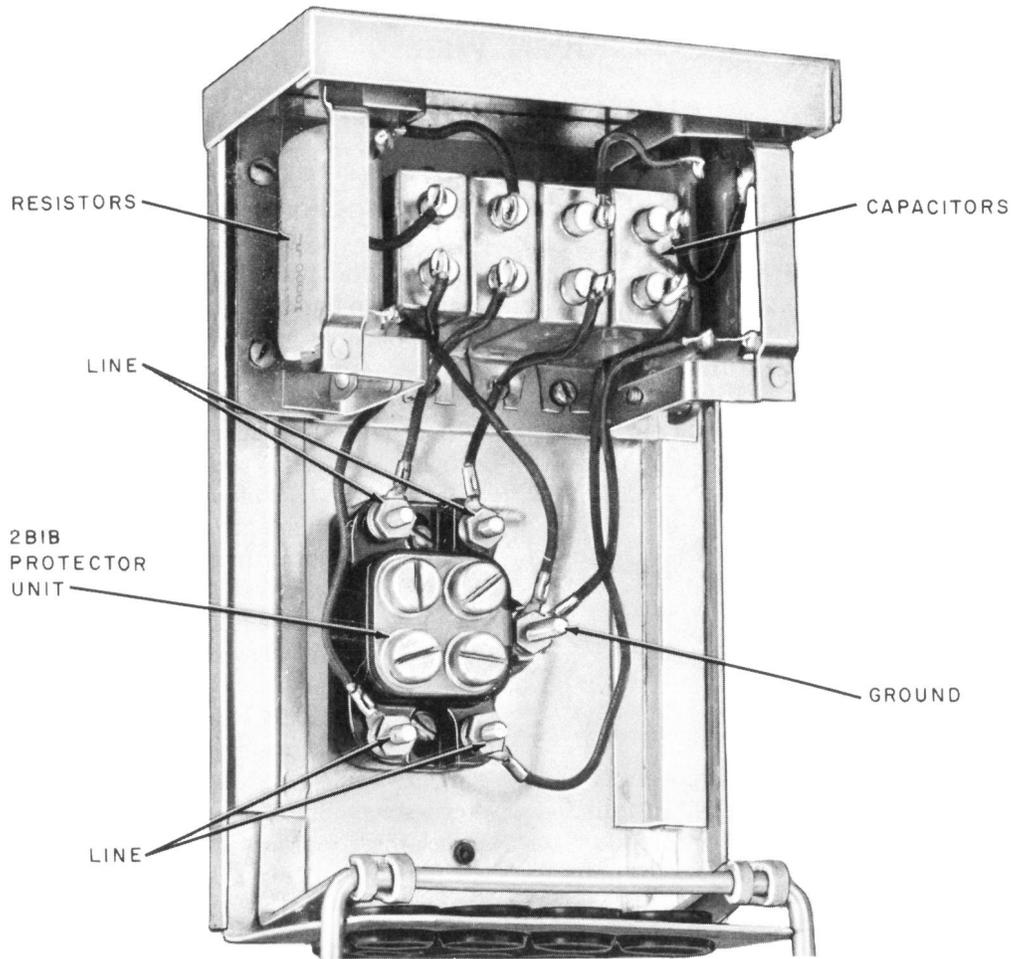


Fig. 2—104B Protector

down, thus giving access to the equipment. To close the housing, swing the cover up, and insert the top end of the cover under the hood at the upper end of the housing, then force the lower end of the cover toward the back of the housing until it snaps into place.

### 3. DESCRIPTION OF 104A PROTECTOR

**3.01** The 104A Protector has been superseded by the 104B Protector. The 104A Protector has four sets of No. 26 and No. 30 Protector Blocks mounted in a 79B Protector Mounting instead of the enclosed protector unit in the 104B Protector. The operation and appearance of the 104A Protector is otherwise the same as the 104B Protector.

**3.02** Fig. 3 shows the inside of a 104A Protector, and indicates the ground binding post and the binding posts for the two telephone lines.

### 4. GROUNDING CONDUCTORS

**4.01** If 104-type protectors are installed on telephone circuits that are carried on joint use poles with a power circuit which includes a multigrounded neutral wire, the ground wire from each protector should, wherever possible, be connected to the power system vertical grounding conductor that is connected to the neutral wire and to a ground rod. Grounding conductors on transformer poles or lightning arrester poles in multigrounded neutral power systems are satisfactory for grounding 104-type protectors. These vertical power ground wires must be connected to the multigrounded

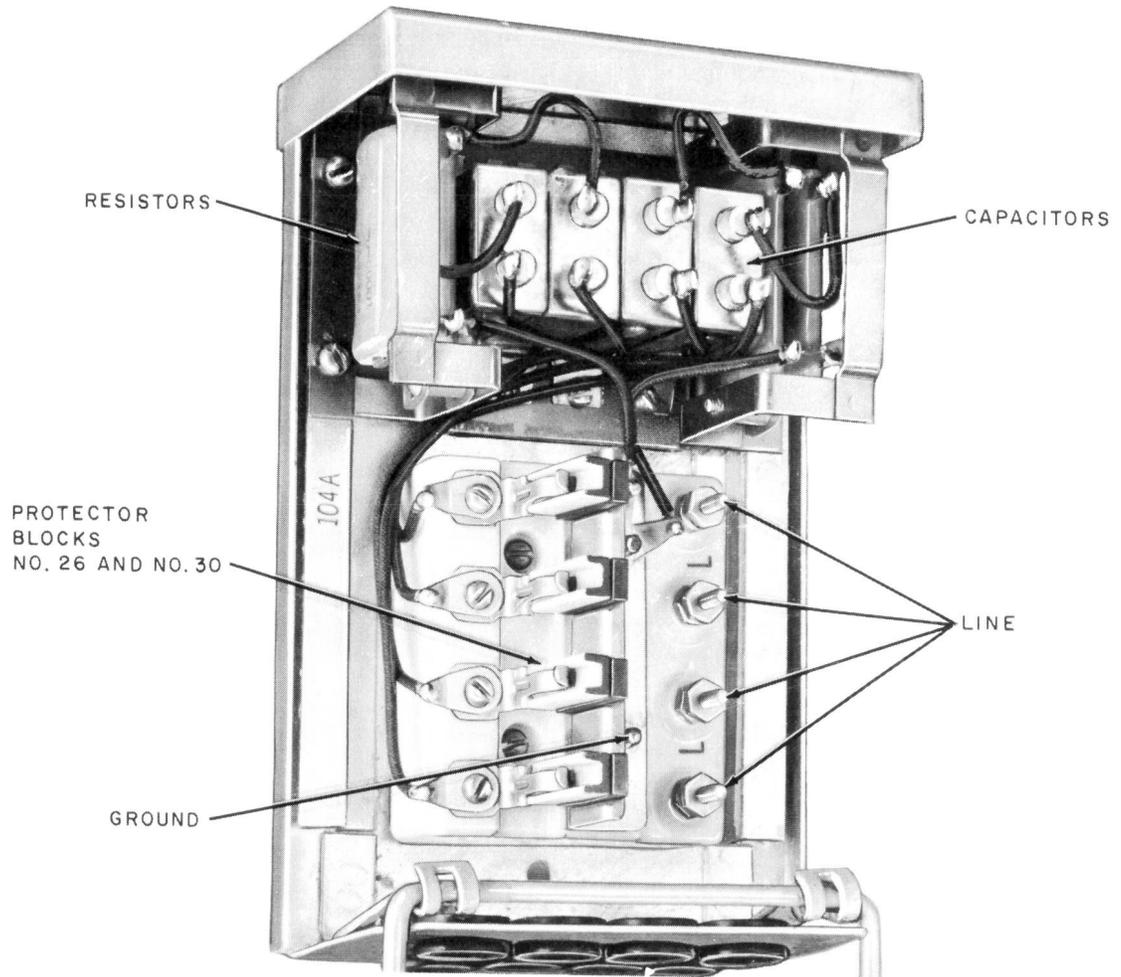


Fig. 3—104A Protector

neutral power wire. Be sure to **test** the power system vertical grounding conductor with a **B Voltage Tester** as instructed in Section 620-105-010 before attaching the protector ground wire to it.

**4.02** If 104-type protectors are to be installed at a pole that is not equipped with a grounding conductor that meets the requirements of 4.01, it will be necessary to install a B Ground Wire and connect it to a D Ground Rod driven in the earth near the base of the pole. Connect the grounding conductor directly to the ground rod with a B Ground Clamp. The ground wire should be fastened to the pole at 18-inch intervals with galvanized staples and where required by local regulation, should be covered with wood molding. Fasten the molding with No. 16 cable straps and 1-1/2 inch strap nails at 4-foot intervals.

**4.03** *Do not perform any work in the power company space on the pole.*

## 5. INSTALLATION

**5.01** To remove the protector housing from the mounting bracket, proceed as follows:

- (a) Open the cover.
- (b) Remove the round-head machine screw located below the protector equipment inside the housing.
- (c) Move the housing up a short distance, thus releasing the knob in the back of the housing from the keyhole slot in the mounting bracket.

## SECTION 623-190-200

**5.02** Mounting a 104-type protector and wiring it to open wire lines are shown in Fig. 4 and

5. Use C Bridle Wire to connect the protector to the open wire. The bridle wire should be connected to the open wire with bridging sleeves. Use bridle wire to connect the ground binding post to the appropriate ground.

**5.03** The C Bridle Wire from the ground binding post of the protector is connected to the vertical grounding conductor with an AT-7796X Connector. Remove about 1-1/2 inches of insulation from the bridle wire and where two or more bridle wire conductors are connected to a grounding

conductor, twist the conductors together before inserting them in the AT-7796X Connector. Three bridle wire conductors can be connected to a B Ground Wire or a No. 6 copper conductor with a No. 6 AT-7796X Connector and to a No. 4 copper conductor with a No. 4 AT-7796X Connector.

**5.04** Where the power company has installed an aluminum vertical grounding conductor, do not use an AT-7796X Connector because of the corrosive chemical reaction between copper and aluminum. Make the grounding connection to the aluminum vertical grounding conductor with a Blackburn PAC 3 or a Fargo GA610AC Connector.

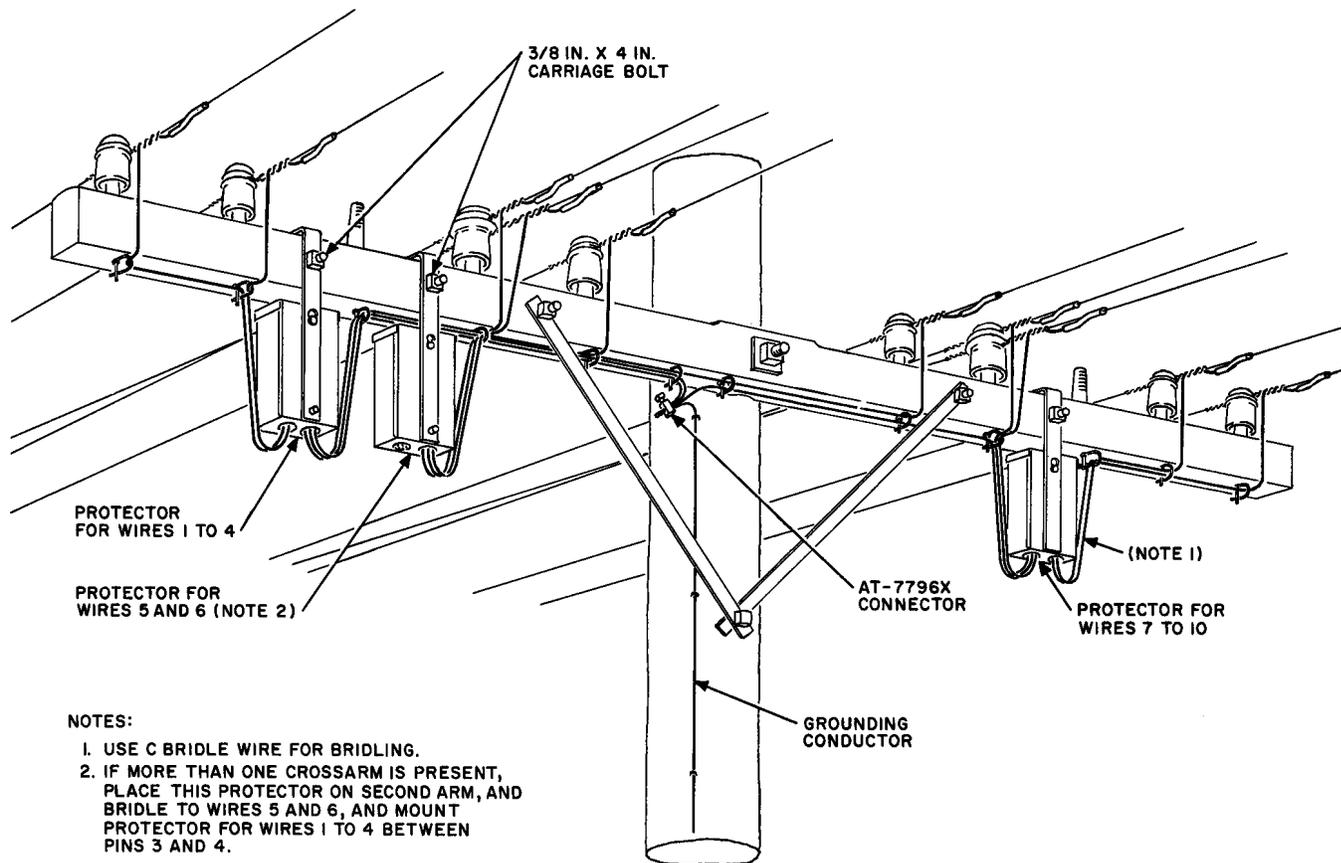


Fig. 4—Mounted on Crossarm

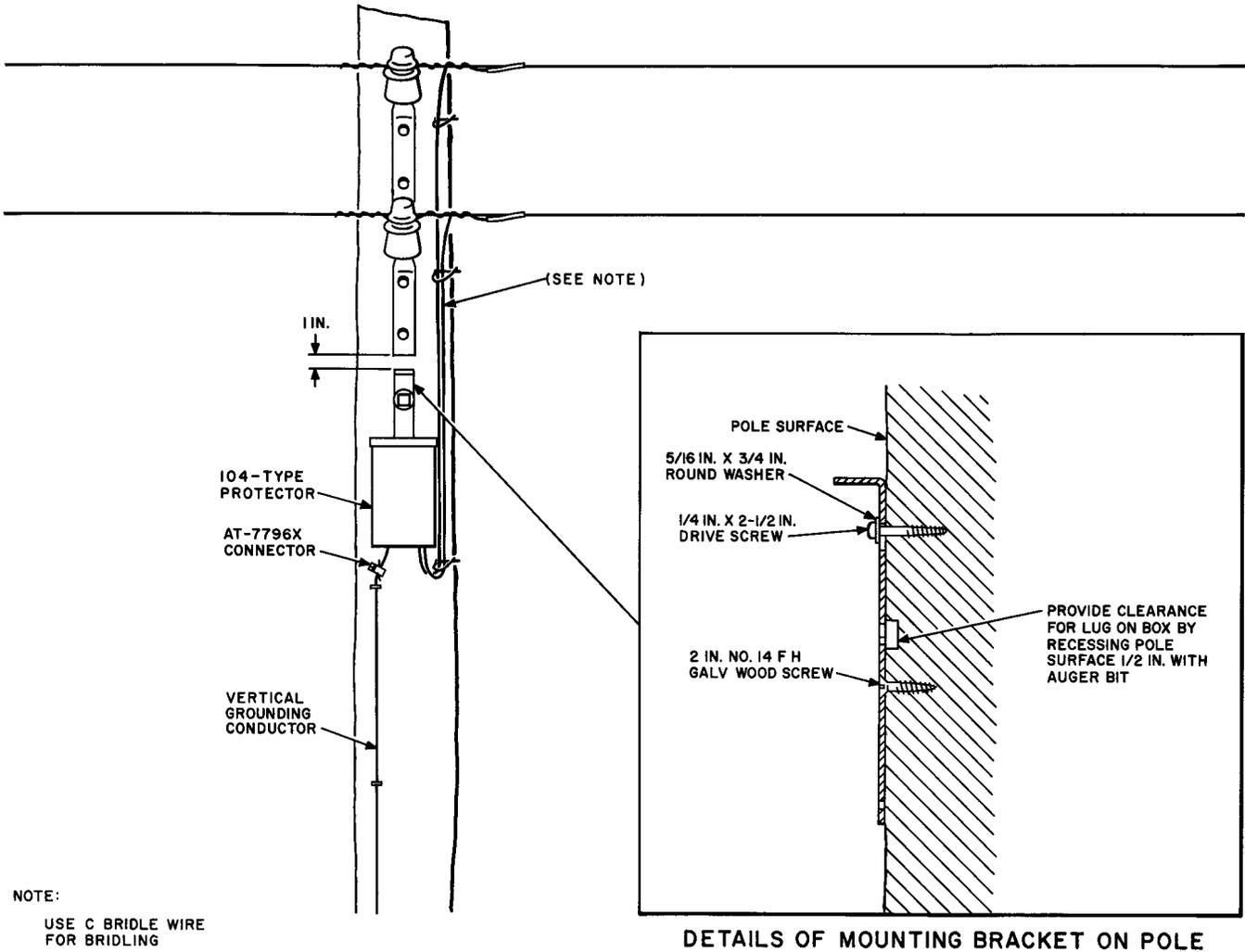


Fig. 5—Mounted on a Pole