

OPEN WIRE

HIGHER VOLTAGE JOINT USE

99A PROTECTOR - GENERAL

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1. GENERAL

1.01 This series of practices covers instructions for installing 99A protectors on exchange open wire telephone circuits on jointly used poles carrying higher voltage power circuits (power circuits having voltages of more than 2900 volts to ground or more than 5000 volts between wires.) These protectors are designed to divert power fault current to ground in the event of an accidental contact between higher voltage power wires and telephone wires.

1.02 This section provides instructions for selecting the location of the 99A protectors as well as special construction measures to be employed in these leads to insure maximum effectiveness of the protectors.

1.03 In this area there are two types of higher voltage power systems.

(a) Power Systems With Multigrounded Neutral.

This type power system is used by the Imperial Irrigation District and the Mountain Empire Electric Cooperative who operate higher voltage power circuits in Imperial Valley and the southeast corner of San Diego County.

(b) Power Systems With No Multigrounded Neutral.

This type power system is used by all Power Companies in this area, except as indicated above.

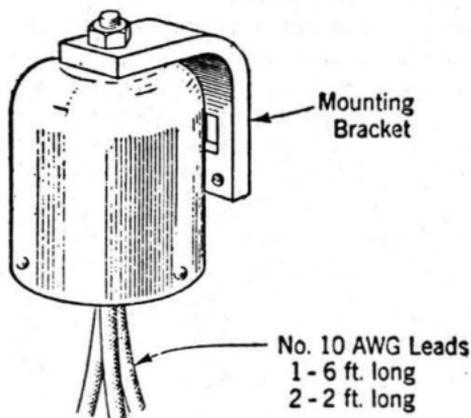
1.04 All reference to ground wires in this series of practices shall be on the following basis.

(a) "Vertical grounding conductor" shall mean a power system grounding conductor which is connected to a multigrounded neutral.

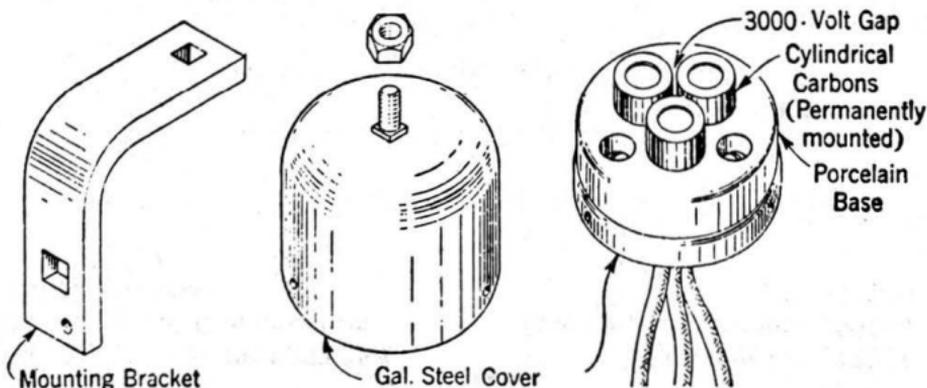
(b) "99A ground wire" shall mean a 99A protector ground wire which is not connected to a power multigrounded neutral.

2. DESCRIPTION OF 99A PROTECTOR

2.01 The 99A protector is shown in the following illustration:



DISASSEMBLED FOR ILLUSTRATION



2.02 The three insulated wires which are provided for connecting the protector to the two sides of the telephone circuit and to the vertical grounding conductor may be used interchangeably, to suit the location of the protector. The 99A protector is self-clearing and generally should require no maintenance as a result of normal operation.

3. USE OF 99A PROTECTORS

3.01 In various sections of the Southern California Area, the Southern California Edison Company is at this time operating some substations and associated 11,500 volt and 16,500 volt power lines which are equipped with sensitive ground relays and ground fault current limiting impedances. Because of these protection features, 99A protectors will not be required in joint use sections with these power circuits. The following list, intended for information only, shows the power substations which are now equipped as described above and the corresponding telephone area. In each specific joint use case in these areas the Plant Engineer will determine from the Protection Engineer that the power circuit involved is protected as described above and if so, will note on the detail plans that the 99A protectors may be omitted.

<u>Telephone Exchange Area</u>	<u>S. C. E. Co. Substation Area</u>
Canoga Park	Malibu, Crater
Reseda	Malibu, Crater
Palmdale	Saugus, Anaverde, Little Rock (Special circuits only)
Newhall	Saugus, Agua Dulce
Crescenta	La Canada
Pasadena (Foothill, Lake)	La Canada, Arroyo, Eaton (Special circuits only)
Los Angeles (Lafayette, Adams, Angelus)	City of Vernon
Orange County Exchanges	Atwood, Crown, Fullerton, Fairview, Irvine, Katella, La Palma, Sullivan, Villa Park

3.02 In general, the 99A protectors shall be installed at approximately $1/2$ mile intervals (from $1/4$ mile to $3/4$ mile) depending upon the characteristics of the power system, the size of the telephone wire in the joint use section, and the locations of suitable ground connections. The locations of the 99A protectors shall be specified on the detail plans by the Plant Engineer so as to meet the following requirements.

(a) In short higher voltage joint use sections of 2 spans or less, 99A protectors will not be required unless specified by the Plant Engineer, as in cases where future extension is likely.

(b) In higher voltage joint use sections not over $1/4$ mile in length, 99A protectors should be installed on all circuits on or within two spans of the last pole (far end away from the central office) in the higher voltage joint use section.

(c) In long higher voltage joint use sections, 99A protectors should be installed on all circuits on or within 2 spans of the far end pole (away from the central office); on or within 2 spans of the first joint use pole (near end); and at sufficient intermediate points so that the intervals between the 99A protectors are about equal and are about $1/2$ mile in length. If the cable terminal which feeds the open wire lead on joint use poles is at or within several spans of the start of the joint use section, the 99A protector at the near end should be omitted. However in this case, all bridling connections or drop wire slack spans between the cable terminal and the start of the joint use section should be AL wire or HD wire.

3.03 In the case of a long main lead and several branch leads in higher voltage joint use, the 99A protector locations should be determined as required by Paragraph 3.02 in the main lead first, disregarding the branch leads. Then each branch lead should be considered separately, and the 99A protector locations determined as required by Paragraph 3.02 except that the near end 99A protector on the branch lead should be located so that its distance from the nearest 99A protector in the main lead is approximately $1/2$ mile.

3.04 The 99A protector locations should be selected within the provisions of Paragraphs 3.02 and 3.03 but their location should finally be determined by available grounding structures or by suitable locations for driving ground rods.

3.05 If an open wire lead has two or more higher voltage joint use sections, separated by non-joint sections, the 99A protector requirements may be determined separately for each higher voltage joint use section in accordance with the above paragraphs. As an alternative, all the higher voltage joint use sections and the intermediate non-joint use sections may be considered as one continuous higher voltage joint use section, if such treatment will reduce the number of 99A protectors required. However, in this latter case, all drop wire slack spans in the lead, all buckarm jumpers and bridling connections in the intermediate non-joint use sections must be made with AL wire or HD wire.

3.06 Where covered wire is used to connect two open wire portions of a circuit in a higher voltage joint use section, or where the higher voltage joint use section of a circuit starts as covered wire and is extended by open wire, the 99A protector locations shall be determined as if the entire higher voltage joint use section were open wire. (Subscriber's drops connected to such covered wire runs will be equipped with 99A protectors if required by Section G32.132.1-S.) However, all such covered wire shall be HD wire or wire of equivalent conductivity.

4. SPECIAL CONSTRUCTION MEASURES

4.01 All bridling connections in open wire circuits which are equipped with 99A protectors, such as connections to cable terminals, bridling at buckarm corners, drop wire slack spans etc., shall be made with AL wire or HD wire.

4.02 In an open wire lead equipped with 99A protectors, all wire circuit diminishing points should be located at 99A locations: i. e. open wire circuits should not dead end at points between 99A locations but should be extended to the next 99A location.

4.03 Do not install 99A protectors at cable terminal poles.

4.04 In new open wire construction, do not make drop wire service connections, and do not connect the open wire to the cable terminal before the 99A protectors have been installed and connected to the telephone circuit and to suitable grounds.

4.05 When placing new open wire in an existing joint use lead, place 99A protectors on all new circuits at all points where existing circuits are equipped with 99A protectors and connect

the new protectors to the existing ground wire, except that in the areas where the Imperial Irrigation District and the Mountain Empire Electric Cooperative operate the power lines, notify the Plant Engineer who will arrange for the Power Company to connect the protectors to the existing vertical grounding conductor. When adding new wire to an existing lead in high voltage joint use, use the type and gauge of wire specified on the service order.

4.06 Do not remove 99A protectors from dead open wire circuits on higher voltage joint use poles.

4.07 If there is a vertical grounding conductor or a 99A ground wire on a higher voltage joint use pole where buried wire or buried cable is fed from open wire, the sheath of the buried cable or the shield of the buried wire shall be connected to the grounding conductor or the ground wire.