Prepared by
The Pacific Telephone and Telegraph Company
Southern California Area
BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance
SECTION G32.132.1-S
Issue A, January, 1949

DROP AND BLOCK WIRING POLE-TO-POLE RUNS ON HIGHER VOLTAGE JOINT USE 99A PROTECTOR

Contents

1. GENERAL

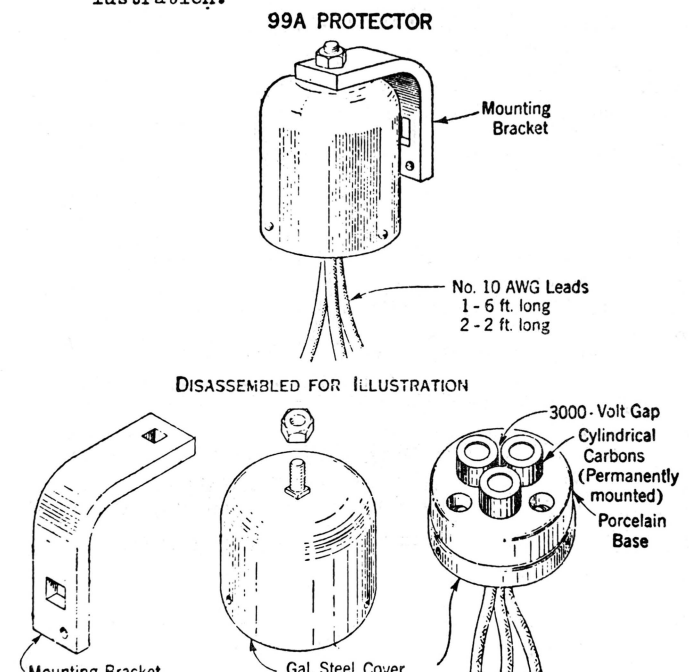
1.01 The section provides instructions for installing 99A protectors on pole-to-pole drop wire runs on jointly used poles carrying higher voltage power distribution circuits (power circuits having voltages of more than 2900 volts to ground or more than 5000 volts between wires). Parts 3 to 5 inclusive apply specifically to power lines where the higher voltage power circuit includes a multigrounded neutral wire. In the Southern California Area, the only higher voltage power lines containing a multigrounded neutral wire are the circuits (7200 volts to ground - 12000 volts between wires) of the Imperial Irrigation District in the Imperial Valley. In the cases of all other higher voltage power circuits which do not include a multigrounded neutral wire, refer to Parts 6 to 8 inclusive.

1.02 All references in this section to "vertical grounding conductor" shall mean a power system grounding conductor as described in Part 4.

1.03 This section, together with Section G31.180.1S, Issue A, replaces Section G32.132, Issue 1, which is hereby cancelled.

2. DESCRIPTION OF 99A PROTECTOR

2.01 The 99A Protector is shown in the following 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 PROTECTOR (POWER SYSTEM WITH MULTI-GROUNDED NEUTRAL)

3.01 The 99A protector is designed to protect telephone circuits in the event of an accidental contact between higher voltage power wires and telephone wires.

3.02 Install 99A protectors on drop wire circuits (except guarded drops described in Paragraph 3.04) under the conditions indicated in the following instructions: If a drop wire circuit, together with its bridged branches, is carried on higher voltage joint use poles for a distance of more than 5 spans equip the circuit with a 99A protector at or within 5 spans of each point where

(a) A subscriber's drop, service cable, or buried wire is connected to the circuit.

(b) The drop wire, or any of its bridged branches leaves the higher voltage joint use pole line.

One protector will serve several such points on the same circuit, provided that none of them is more than 5 spans away from the protector.

3.03 If a drop wire, together with its bridged branches, is carried on higher voltage joint use poles for a distance of not more than 5 spans, 99A protectors are not required. This applies to power lines with or without a multi-grounded neutral wire.

3.04 Drop wire runs which are attached directly below an aerial metallic sheath cable run on joint use poles are considered to be "guarded" sufficiently by the cable against power contact and, therefore, such drop wire runs do not require 99A protectors. This applies to power lines with or without a multi-grounded neutral wire.

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

3.06 Do not make drop wire service connections, nor connect the pole to pole drop wire run to cable pairs or open wires until the 99A protectors have been installed and connected to the telephone circuit and to suitable grounds as described in Part 4. The power company workmen shall connect the 99A protector to the vertical grounding conductor unless otherwise specified on the detail plans.

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

3.08 When placing additional drop wire circuits in an existing drop wire joint use lead, refer to the Plant Engineer for 99A protector locations. The 99A protectors shall be located on the new drop wire in accordance with paragraph 3.02 and wherever practicable at the same locations as the protectors on the existing drop wire.

4. GROUNDING CONDUCTOR (POWER SYSTEM WITH MULTIGROUNDED NEUTRAL)

4.01 The ground wire from the 99A protector should preferably be connected to a power system vertical grounding conductor that is connected both to the power system multigrounded neutral wire and to a ground electrode. Grounding conductors on transformer poles which meet the above requirements are satisfactory. Grounding conductors from power system lightning arrestors shall not be used unless they are connected to the neutral wire. The connection between the ground wire of the 99A protector and the vertical grounding conductor shall be made by the power company workman unless otherwise specified in the detail plans.

4.02 If a 99A protector is to be installed at a location where there is no power system vertical grounding conductor, install a ground rod at the base of the pole. Run a No. 6 bare copper wire or a No. 6 BRC Solid R wire from the ground rod to the top of the telephone space and leave coiled at this point an additional length (usually about 6 feet) sufficient to reach the power neutral wire. The connection to the neutral wire shall be made by a power company workman. Report all such cases to your supervisor immediately in order that arrangements may be made to have the grounding conductor connected to the power neutral as soon as possible.

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

4.03 The work to be performed by telephone workmen in placing a ground rod and grounding conductor is outlined in the following:

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

(b) Splice the grounding conductor to the tail of the ground rod with a 165 x 104 S copper sleeve or with a twisted sleeve.

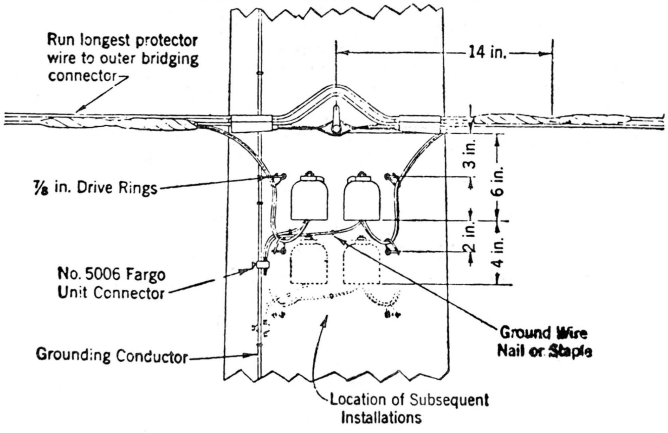
(c) Fasten the grounding conductor to the pole at 18-inch intervals with galvanized guy staples or with No. 6 cable clamps and 1-1/2-inch strap nails.

(d) Where required by Section G10.301-S, the grounding conductor shall be protected with ground wire molding fastened with No. 16 Cable Straps and 1-1/2 inch strap nails at 4-foot intervals.

5. INSTALLATION (POWER SYSTEM WITH MULTIGROUNDED NEUTRAL)

5.01 The manner of installing 99A protectors on a pole carrying drop wire runs is shown in the following illustration. Use 2A Bridging Connectors for connecting the protector leads to the drop wire. Two of the leads from the protector are bridged to the two sides of the drop wire circuit, and the third lead is connected to the vertical grounding conductor.

INSTALLATION OF 99A PROTECTORS IN POLE-TO-POLE DROP WIRE RUN



DROP AND BLOCK WIRING
POLE-TO-POLE RUNS ON HIGHER VOLTAGE JOINT USE 99A PROTECTOR

6. USE OF 99A PROTECTORS (POWER SYSTEM WITH NO MULTI-GROUNDED NEUTRAL)

6.01 In the cases of pole to pole drop wire runs in joint use with higher voltage power circuits which do not include a multigrounded neutral, the following instructions shall apply.

6.02 If a drop wire circuit, together with its bridged branches, is carried on higher voltage joint use poles for a distance of more than 5 spans, equip the circuit with a 99A protector at or within 5 spans at each point where

(a) A subscriber's drop, service cable, or buried wire is connected to the circuit,

(b) The drop wire, or any of its bridged branches leaves the higher voltage joint use pole line.

One protector will serve several such points on the same circuit, provided that none of them is more than 5 spans away from the protector. The locations of the 99A protectors shall be specified on the detail plans by the Plant Engineer.

6.03 If a drop wire, together with its bridged branches, is carried on higher voltage joint use poles for a distance of not more than 5 spans, 99A protectors are not required.

6.04 Drop wire runs which are attached directly below an aerial metallic sheath cable run on joint use poles are considered to be "guarded" by the cable against power contacts and therefore 99A protectors are not required on such drop wire runs.

6.05 When placing additional drop wire circuits in an existing drop wire joint use lead, refer to the Plant Engineer for 99A protector locations. The 99A protectors shall be located on the new drop wire in accordance with paragraph 6.02 and wherever practicable at the same locations as the protectors on the existing drop wire.

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

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

6.08 Do not make drop wire service connections, nor connect the pole to pole drop wire run to cable pairs or to open wires until the 99A protectors have been installed and connected to the telephone circuit and to suitable grounds as described in Part 7.

7. GROUND CONNECTIONS (POWER SYSTEM WITH NO MULTI-GROUNDED NEUTRAL)

7.01 The 99A protector should be connected to one of the following ground structures in accordance with detailed plans issued by the Plant Engineer. These ground structures are listed in the order of preference.

(a) A public water system consisting of buried metallic pipe.

(b) A local water system which consists of 100 feet or more of buried metallic pipe.

(c) Two eight foot driven ground rods.

(d) Special ground structures.

7.02 Connect the ground lead of the 99A protector to one of the above ground structures by means of a No. 6 BRC Solid R Wire fastened to the pole at 18 inch intervals with galvanized guy staples or with No. 6 cable clamps and 1-1/2 inch strap nails.

(a) Attach the ground leads of the 99A protectors to the ground wire with No. 5004 or No. 5006 Fargo unit connectors.

(b) Where required by G10.301S, the ground wire shall be protected by wooden ground wire molding fastened to the pole with No. 16 cable straps and 1-1/2 inch strap nails at four foot intervals.

7.03 When connecting the ground wire to a water pipe, place in trench not less than two feet deep, selecting a route as short as practicable to the pipe. No conduit is necessary, but a creosoted plank shall be placed over the wire when specified in the detail plans. In placing the ground wire in sodded parkways, care should be taken to replace sod properly.

(a) Where a water service pipe from a public water system is used, the point of attachment of the ground wire shall be on the street side of the

water meter and shut-off valve. When a connection is to be made to a fire hydrant, it may be made between the shut-off valve and the fire hydrant plug. When connecting to a local water system, select, wherever possible, a pipe that appears to be permanent, such as a main service pipe from a well or tank. Avoid connecting to pipes serving isolated faucets in the yards, as these pipes may be removed.

(b) Clean the water pipe at the point of attachment using abrasive cloth or a file to obtain a clean contact surface. Place an L ground clamp around the pipe, inserting the ground wire in the proper loop. If the pipe is larger than three inches, use two or more L ground clamps. Care must be taken when placing ground clamps on copper or brass service pipes as they are easily dented or flattened.

(c) In order to prevent corrosion, paint the connection with No. 2 asphalt paint. Apply two layers of friction tape and paint again with asphalt paint. The tape and paint shall completely cover all bare parts of the clamp and ground wire, extending along the water pipe at least one inch beyond the clamp in both directions.

7.04 Where water pipes are not available, the vertical ground wire shall be made to two No. 9428 (1/2 inch by 8 foot) Copperweld ground rods driven full length, vertically, into the ground to such a depth below the surface of the ground that the top of the rods and their connections are not likely to be disturbed. Separate the ground rods by approximately 8 feet, with the nearest rod at least 2 feet from the base of the pole. Connect the No. 6 ground wire directly to the most distant rod using a No. 9591 Square Head Bolt Type Ground Wire Clamp, threading the wire, unbroken, through a similar clamp on the nearer ground rod.

8. INSTALLATION (POWER SYSTEM WITH NO MULTIGROUNDED NEUTRAL)

8.01 The manner of mounting and connecting 99A protectors to drop wire circuits which are in joint use with higher voltage power circuits not equipped with a multiground neutral is the same as described in part 5, except that the vertical grounding wire on the pole will not extend above the level of the highest 99A protector connection.