SPECIAL STATION AND HIGHER VOLTAGE PROTECTION ON MILITARY LINES AND AT JUNCTIONS WITH TELEPHONE COMPANY PLANT

1. GENERAL

1.01 This section covers special protection procedures to be followed where Telephone Company and military communication circuits are interconnected. For convenience, wire of any of our armed forces will be referred to, below, as "field wire."

1.02 In those cases where station or P.B.X. protection is absent in the plant of the armed forces, and connecting telephone plant is exposed, station protection or its equivalent shall be placed at the junction of the two plants to protect the terminal equipment against foreign electrical disturbances which might occur in the Telephone Company plant.

1.03 Where it is known or can readily be ascertained that station protection is installed at the station end of field wire, station protectors may be omitted at the junction except

(a) In those cases involving unexposed telephone plant, the equivalent of station protection will be required at the junction as covered in paragraph 3.01.

(b) In those cases where field wire is attached to poles supporting higher voltage circuits in which case the situation shall be handled as covered in paragraph 4.01.

1.04 Where station protection is omitted at the junction of telephone plant and field wire, a 101A wire terminal shall be installed not less than one foot below telephone plant and connection to telephone plant shall be made by means of bridle wire.

1.05 Where protector mountings, bridle or drop wire vertical runs or attachments, or ground wire with its protective covering are attached to poles, the required separations or clearances from other plant must be obtained, and care should be exercised to avoid obstructing the climbing space or use of pole steps, or creating any hazards to safe work.

1.06 Where protector ground wire is installed on any pole, protect with ground wire molding throughout its length except at extreme upper portion of wire where solderless connectors are used for bridging wires to separate protectors. This upper extremity of wire may be left unprotected provided that in no case is it within 6 feet of power line conductors.

1.07 In any case where ground rods are used for protector grounds, if any reasonable choice of location is possible, select spots for driving rods where moisture or other surface evidence indicates probable low resistance ground. In the case of grounds associated with 99-A protectors, it may be desirable to select another pole even three or four spans distant from junction station protectors, if by so doing a much better ground will be assured and, at the same time, no additional higher voltage exposure of field wire between the protector and the junction is introduced.

1.08 Where driven ground rods are used, cover top of rods and all portions of ground wire between pole and rods as provided in Section C33.004. Provide greater cover where local conditions make additional mechanical protection desirable.

1.09 If supply difficulties are encountered in connection with the application of these instructions, use approved equivalents or consult your supervisor.

1.10 Connections between field wire and telephone plant should be made, whenever practicable, by or under the supervision of a telephone employee for the general assistance of the military personnel and to avoid unnecessary troubles which may otherwise be caused by the handling of wires and protectors by untrained personnel.

2. JUNCTION PROTECTOR INSTALLATION - TELEPHONE COMPANY PLANT EXPOSED

2.01 Where one circuit of field wire connects to telephone wire, place standard station protection at the junction. Connect telephone wire to "line"

terminals of protector, leaving "instrument" lugs for connection of field wire, except in any case where 99-A protector is required by reason of exposure of field wire to higher voltage power lines, in which case these connections shall be reversed. Install protector mounting on face of pole approximately one foot below lowest telephone crossarm brace on pole but in no case less than 6 feet below any power circuits on the pole. Provide protector ground as covered in Station Protector Installation practices, except that no smaller wire than No. 14 shall be used for ground wire.

2.02 Where more than one circuit is connected to telephone wire, place one D-96845 protector (See Section G32.180), which will accommodate as many as four circuits. Install this protector on face of pole approximately one foot below lowest crossarm brace on poles which support communication circuits only. On poles which support power circuits, the protector shall be not less than 6 feet below the lowest power circuits. Connect telephone wire to "exposed wire" terminals of protector, leaving the "unexposed wire" terminals for connection to field wire, except in any case where 99A protectors are required by reason of exposure of field wire to higher voltage power lines, in which case these connections shall be reversed. Place No. 12 ground wire from uppermost protector mounting to water pipe ground if one is readily accessible, otherwise to one No. 9428 Copperweld ground rod (⅝-inch by 8-foot) driven into ground at least 2 feet distant from pole. Connect ground wire to rod by means of a No. 9591 Square Head Bolt Type Ground Wire Clamp.

NOTE: If supply difficulties prevent the use of D-96845 protector, it will be permissible to use individual station protectors as required. This, however, is undesirable because of the possible shortage of outdoor station protector mountings and the greater pole space required for mounting. Where more than one protector is installed, all should be located with due regard to convenience in wiring and avoidance of obstruction of climbing space, access to pole steps, etc. The uppermost protector mounting of any such group shall be not less than 6 feet below any power circuits supported by the pole. Use bridging connectors to connect No. 14 ground wires from the individual protectors to the No. 12 ground wire.

2.03 Where field wire connects to telephone cable terminals, install protectors on junction pole, number and type of protectors being determined and connected as covered in paragraphs 2.01 and 2.02. Locate protector mounting (or uppermost of group of protectors if more than one is placed) approximately one foot below bridle wire run to terminal, preferably on same side of pole.

3. JUNCTION PROTECTOR INSTALLATION - TELEPHONE COMPANY PLANT UNEXPOSED

3.01 Where Telephone Company plant is unexposed and field wire is now, or may be later, exposed, install protection at the junction point as covered under Part 2 except that, in all cases, field wire connections shall be made to the "line" terminals of protectors. Protector ground connections shall be made as covered under Part 2.

4. SPECIAL PROTECTOR INSTALLATION - FIELD WIRE EXPOSED TO HIGHER VOLTAGE

4.01 Where field wire, connecting to either exposed or unexposed Telephone Company wire or cable, is at any place throughout its length attached to poles supporting power circuits of voltage in excess of 5,000 volts, and said exposure extends for distances in excess of approximately 300 feet, a 99-A protector should be installed on each such circuit on the field wire one or two spans ahead of the junction with Telephone Company plant. This requirement is in addition to the station protection which will be required in all such cases at the junction of field wire and telephone plant. Field wire shall be connected to the "exposed" or "line" terminals of all junction protectors used in this connection. In the event that any pole selected for installation of the 99-A protectors does not support any Telephone Company plant, the matter shall be referred to the Plant Engineering Department. The engineer shall initiate any necessary plans before granting authority for installing telephone equipment on such poles.

4.02 Install 99-A protectors and undertake any work on field wire only in the presence of military personnel or on direct permission from proper military authority. Should it appear desirable that Telephone Company confine its work, in this connection, to placing protector, ground and ground wire, it will be satisfactory to permit military personnel to perform all actual work on its own wire and make connections under direction of Telephone Company. Installation

may be made, as nearly as practicable, in accordance with instructions contained in Section G32.132, except that:

(a) Ground wire shall not be carried higher on pole than the uppermost protector.

(b) Ground wire shall be connected to cold water pipe if one is readily accessible.

(c) In the absence of water pipe, ground connection shall be made to two No. 9428 ($\frac{1}{2}$-inch by 8-foot) Copperweld ground rods driven full length, vertically, into the ground and separated by approximately 8 feet, the nearest rod not closer than 2 feet from base of pole. Connect wire directly to 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.

(d) In the event that the 8-foot rods cannot be obtained, three standard station ground rods, spaced approximately 6 feet apart, may be substituted, upon approval of your supervisor. If this substitution is necessary, ground rod tail wires may be soldered to No. 6 ground wire which shall extend, unbroken, to the most distant rod. In lieu of soldering, type 165B or 165V Reliable Solderless Connectors may be used. No. 6 stranded ground wire may be made to fit this connector by untwisting wire slightly after removing insulation at desired junction point.

4.03 If more than one circuit is equipped with 99-A protector at any point, a single ground wire installation may be used for all protectors.

4.04 Connect ground wire from each 99-A protector to No. 6 ground wire on pole with a 165 x 104 Copper Sleeve, or if this is impracticable, the 104 wire may be twisted around the No. 6 wire and soldered. In lieu of soldering, type 165B or 165V Reliable Solderless Connectors may be used.

4.05 Where the terminating equipment connected at the remote end of such a section of field wire (exposed to higher voltages) is installed by or is the responsibility of the Telephone Company, it will be equipped with station protection, and a 99-A protector should be installed on each such circuit one or two spans ahead of the station protector location in accordance with Paragraphs 4.01, 4.02, 4.03 and 4.04.

4.06 Tag all 99-A protectors installed on field wire. The tag should be appropriately marked so as to direct attention of military personnel to ownership of protectors by Telephone Company and necessity of advising latter at such time as circuits so equipped are rerun, relocated or removed.

5. SUMMARY - TABLE

5.01 The following table lists the usual conditions encountered and indicates when protection is to be provided. For conditions not covered in this table, refer to your supervisor. For details of wire connections, refer to above instructions.

Item	Field Conditions				Protection Requirements			
					Station Prot'n.		Spcl. Higher Voltage Prot'n.	
	Tel. Co. Plant Exposure	Field Wire Exposure	Sta.Eqpt. Owned By	At Station: Sta.Prot'n. (In Place Or To Be Installed By)	At Junction Point: Tel. Co. Sta.(Or D-96845) Protector	Junction Protector Fuses Pointed Toward	Near Junction Pt.: Tel. Co. 99-A Prot.	Near Station End: Tel. Co. 99-A Prot.
1	Unexposed	(1)	Tel. Co.	Tel. Co.	Yes	Military	No	No
2	Unexposed	(1)	Military	None	Yes	Military	No	No
3	Exposed	(1)	Tel. Co.	Tel. Co.	No	-	No	No
4	Exposed	(1)	Military	None	Yes	Tel. Co.	No	No
5	Exposed	(1)	Military	Military (3)	No	-	No	No
6	Exposed or Unexposed	(2)	Tel. Co.	Tel. Co.	Yes	Military	Yes	Yes
7	Exposed or Unexposed	(2)	Military	None	Yes	Military	Yes	No

NOTES:

(1) Field wire considered to be exposed in all cases (0-5000 volts, and/or incidental crossings below higher voltage circuits).

(2) Field wire supported on pole lines carrying higher voltage power circuits (over 5000 volts; see paragraph 4.01).

(3) If unable to determine from military personnel that protection is provided at station, treat as in Item 4.