STATION AND PBX PROTECTION

REQUIRED FOR VARIOUS CONDITIONS OF PLANT

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1. GENERAL

1.01 In general, this section covers the requirements for protection of subscriber stations including coin telephones at indoor or outdoor locations and general requirements for protecting PBX circuits.

1.02 This section replaces Section 638-210-011, Issue 1, and 465-310-201, Issue 2, which are canceled.

1.03 The service order should indicate the type of fuseless or fused protector required. If it does not, consult your supervisor.

1.04 Station protectors ensure safety to subscribers and telephone personnel and prevent damage to station equipment from abnormally high voltage and current.

1.05 Isolated sections of aerial cable are considered as open wire for the purpose of determining the type of protector required unless the cable is effectively grounded to a multigrounded neutral or to an extensive water (metallic pipe) system.

1.06 Cable, wire, strand, etc, that is subject to disturbances by lightning or possible contact or induction from electric circuits in excess of 300 volts are called exposed cable, wire, or circuits.

1.07 Cable, wire, strand, etc, that are not subject to disturbances by lightning or electric circuits in excess of 300 volts are called unexposed cable, wire, or circuits.

1.08 In nonlightning areas the exposure status of cable or wire is based only on power exposure. The protection outlined in the station protection practices is primarily for protection against the effects of power contacts. In lightning areas protection is required regardless of power exposure except when the plant is effectively shielded by buildings or other structures.

1.09 Ground rods encountered on reinstalls and reconnects shall not be used if a better grounding electrode is available.

1.10 Section 460-100-101 describes the various types of station protectors, Section 460-100-200 outlines the methods of installing protectors, Section 460-100-201 outlines the methods for installing protector and signaling grounds, Section 462-460-200 covers the installation of station sets installed in autotrailers, and Section 502-415-100 covers the special requirements for station sets installed in explosive atmospheres.

2. FUSELESS STATION PROTECTION AND REQUIREMENTS (AERIAL OR BLOCK CABLE)

2.01 Fuseless station protectors should be used at all stations served by a cable with a grounded metal sheath or shield, such as lead, alpeth, stalpeth, etc (1.05). When drop wire is to be joined to a cable pair, a fusible link is required as outlined in 4.01, (b).

2.02 The fuseless protectors should be installed when single pair drop wire is used at stations served by open or multiple wire when the protector can be grounded as follows:

(a) A metallic cold water pipe having at least 10 feet buried.

(b) A metallic cold water pipe bonded to a multigrounded neutral system.

(c) Service ground of a multigrounded neutral power system.

(d) Metallic service entrance conduit (except duminum) bonded to the service entrance box of a multigrounded neutral system.

Note: If one of these grounds is not available a fused-type protector must be used.

2.03 Subject to the grounding restrictions outlined in 2.02, the fuseless protector may be used as follows:

(a) At any station served by open wire where bridling to C Drop Wire is through D or E Block Wire fusible link (bridling wire).

(b) At stations where C Drop Wire is directly connected to urban wire.

(c) Where C Drop Wire is connected through D or E Block Wire fusible link to rural wire.

Note: The bridling between drop wire and open wire or rural wire must consist of at least two feet of D or E Block Wire. Bridling requirements are outlined in Section 462-240-200.

2.04 A fuseless protector must not be used with multiple drop wire when the stations are served by open or multiple wire.

Note: A fuseless protector can be used only with multiple drop wire when the stations are served by a grounded metal sheath or shielded cable.

2.05 Drop wire from an unexposed cable terminal into an exposed area exposes both the suscriber station and the distribution cable. Fuseless protectors are required at both ends of the drop. When drop is to be joined to a cable pair a fusible link is required as outlined in 4.01, (b).

Note: Section 638-200-200 covers unexposed cable at exposed wire connections.

3. FUSED STATION PROTECTION AND REQUIREMENTS

3.01 When the grounding requirements or bridling requirements outlined in 2.02 or 2.03 cannot be followed, a fused-type protector must be used.

4. STATION PROTECTION AND REQUIREMENTS (BURIED AND UNDERGROUND)

4.01 Fuseless station protectors may be used with buried distribution cable connected to exposed cable as follows:

(a) When 24- or 26-gauge cable is so located that it will serve as a fusible link. Section 638-205-015 covers the requirements for placing fuse cables.

(b) When the buried distribution cable is 19- or 22-gauge and no fuse cable has been placed, a minimum of 8 inches of either 24- or 26-gauge wire must be placed at the junction point as a fusible link between the service wire and buried cable.

Note: B Wire Connectors should be used to join the fine gauge wire (24- or 26-gauge conductors) used as a fusible link to the service wire and buried distribution cable.

4.02 When the requirements outlined in 4.01 cannot be met, a fused-type protector must be used.

4.03 For any length of buried wire, bond the aluminum shield or armored wire to the ground terminal of the protector by means of the solderless connector. The aluminum shield or armor wire is bonded to the terminal housing by means of an AT-7796X Connector.

4.04 Service drops joined to exposed underground cable pairs will require the same type protectors as drop wire joined to exposed aerial cable pairs.

5. PBX STATION PROTECTION (CENTRAL OFFICE TRUNKS, TIE TRUNKS, OFF-PREMISES EXTENSIONS, RINGING FEEDERS, AND BATTERY FEEDER CIRCUITS)

5.01 When PBX's are served by exposed metal sheath cables, the following protection is required:

(a) The sheath of the cable must be grounded.

(b) A fuse cable spliced between the entrance cable and the terminating facilities.

(c) The terminating facilities shall be equipped with heat coils and carbon blocks.

5.02 When drop or multiple drop wire is extended from exposed metal sheath cables, fuseless protectors should be used. When drop wire is to be joined to a cable pair a fusible link is required as outlined in 4.01, (b).

5.03 Fuseless protectors may be used with open or multiple wire when the requirements of 2.02 are observed. Otherwise fused protectors must be used.

5.04 All exposed PBX lines require 60-type fuses except as follows:

(a) As outlined in 5.01.

(b) Battery feeder circuits.

5.05 Battery feeder circuits extended from exposed metal sheath cables require the following protection:

(a) As outlined in 5.01.

(b) Where a single battery feeder pair is extended from a metal sheath cable, the fuseless-type protector or protected terminal is all the protection required.

(c) Where two or more cable pairs are used in multiple and these pairs are extended by a single drop wire, the arrangement may be considered as a single pair and protection provided as in (b).

(d) When multiple drop wire is extended from a cable terminal and terminates on 116- or 117-type protectors, no other protection for a single pair battery feeder circuit is required.

(e) When two or more battery feeder pairs are extended from NH-type terminals (without metal housing) or 1A4A-type terminals, no other protection is required.

(f) When two or more cable pairs are used in multiple and these pairs are extended by two or more drop wires, fused-type protectors must be used.

5.06 Battery feeder circuits extended from open or multiple wire require the following protection:

(a) A fuseless protector may be used with a single battery feeder pair when the protector can be grounded as outlined in 2.02. Otherwise a fused protector must be used.

(b) A fused protector must be used with two or more pairs.

5.07 Exposed PBX lines (central office trunks, tie trunks, off-premises extensions, and ringing feeder circuits) extended from metal sheath cables must be provided with sneak current protection. The 60A or 60D Fuses are generally used with these types of circuits. The 60-type fuses are not required when pairs are extended from a protector frame equipped with heat coils and carbon blocks.

5.08 Exposed PBX lines (central office trunks, tie trunks, off-premises extensions, and ringing feeder circuits) extended from open or multiple wire must be provided with sneak current protection. The 60A or 60D Fuses are generally used with these types of circuits. Protection can be provided as follows:

(a) Fuseless protectors equipped with 60-type fuses may be used with a single drop when the grounding requirements of 2.02 can be observed. Otherwise a fused protector equipped with 60-type fuses must be used.

(b) When two or more drops are terminated at the same location, fused protectors equipped with 60-type fuses must be provided for each drop.

6. STATIONS REQUIRING SPECIAL PROTECTIVE MEASURES

6.01 Special protective measures are usually required for stations located in the following areas:

(a) At power substations or generating stations.

(b) In atmosphere containing explosive gas, vapor, or dust.

(c) Where privately owned circuits are in conflict or joint use with power circuits not suitable for general joint use.

(d) When facilities are leased for the operation of FOREIGN signaling circuits which might impress excessive voltage or current on the system's facilities.

Note: The protection required for the circuits listed in (a) through (d) will be on the service order. If it is not, consult your supervisor.

6.02 Outdoor stations served by exposed conductors usually require only fuseless or fused protectors.

6.03 There are some stations where protectors and special grounding arrangements are necessary, as follows:

(a) ***Coin Telephones:*** If the drop or line wire is exposed between the cable terminal and telephone, protectors are required (2.05).

(b) ***Stations on Wood Poles:*** If possible install the stations on a pole having a vertical ground wire connected to a multigrounded neutral. When a multigrounded neutral is not available and the station is served from a metal sheath cable, the protector is grounded to a ground rod. If the station is served from open or multiple wire, ground the protector to a ground ring following local instruction.

Caution: Do not install a station on a pole having a power vertical ground wire for lightning protection unless the ground wire is connected to a multigrounded neutral.

(c) ***Stations on Metal Poles:***

Caution: Do not install stations on metal poles that support power circuits (open wire or in conduit) of 300 volts or more unless the pole is grounded to a multigrounded neutral or a metallic cold water pipe.

(1) Fuseless protectors are required on metal poles supporting power circuits of 300 volts or more.

(2) When the conductors are exposed and the power circuits on the metal pole are 300 volts or less and the pole is bonded to a multigrounded neutral or low impedance ground, such as a metallic cold water pipe, a fuseless protector is required.

(3) When the conductors are exposed and the power circuits on the metal pole are 300 volts or less, a fused protector is required.

(4) When the conductors are unexposed and the power circuits on the metal pole are 300 volts or less, no protection is required.