

## GROUNDING AND WIRING REQUIREMENTS PUBLIC TELEPHONE ENCLOSURES

### 1. GENERAL

1.01 This section contains information concerning grounding and wiring requirements for public telephone enclosures.

1.02 This section is reissued to:

- Revise paragraphs 3.02, 3.03, 4.01, and 5.01 for clarity
- Update callouts, Fig. 10, 12, and 15.

1.03 Commercial power of 110- to 125-volt, 15-ampere ac is necessary for operation of blower and illumination of lamps.

1.04 Wiring shall be installed to meet requirements of the National Electrical Code, local governmental regulations, and approved practices and standards of the local Telephone Company.

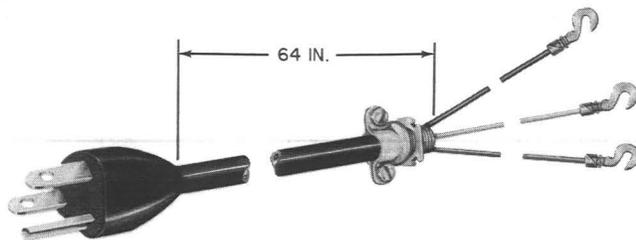


Fig. 1—KS-19425, List 22 Cable Assembly

### 2. ELECTRIC WIRING—BRANCH CIRCUIT SERVICE

2.01 Branch circuit service constitutes the connection of a Public Telephone Enclosure to Commercial power supplied from a service box (equipped with a circuit breaker) located outside of the telephone enclosure, on a service pole, or

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outside or inside of a building. Cord-connected enclosures are also considered as branch circuit service. Only in the special case described in paragraph 4.03(b), will a service box and circuit breaker be connected in the telephone enclosure wired for branch circuit service.

2.02 Branch circuit electric wiring to metal booths, enclosures, and mountings is terminated in a standard 3-wire grounded receptacle mounted within the unit and designed to accept a standard plug with grounding pin. All lamp and blower cords plug into the receptacle. All exposed wiring except aerial service or plug-ended cords should be enclosed in conduit.

2.03 The green or grounding terminal of the power receptacle is connected internally to mounting lugs. When the receptacle is installed in the enclosure, the grounding circuit is completed between metal enclosure grounding terminal of receptacle and the green wire of the power conductor. See paragraphs 3.04 and 4.01.



***Rigid grounding requirements are necessary to ensure deenergizing of electrical circuit if a defect or fault occurs. This is accomplished by connecting all metal parts of the telephone enclosure electrically to the power system ground.***

2.04 All permanent wiring up to and within the telephone enclosure, shall be as follows:

- 15 ampere circuit, No. 14 AWG conductor or larger
- 20 ampere circuit, No. 12 AWG conductors or larger.

The National Electric Code does not permit the connection of a single 15 ampere receptacle on a branch circuit from a 20 ampere main circuit.

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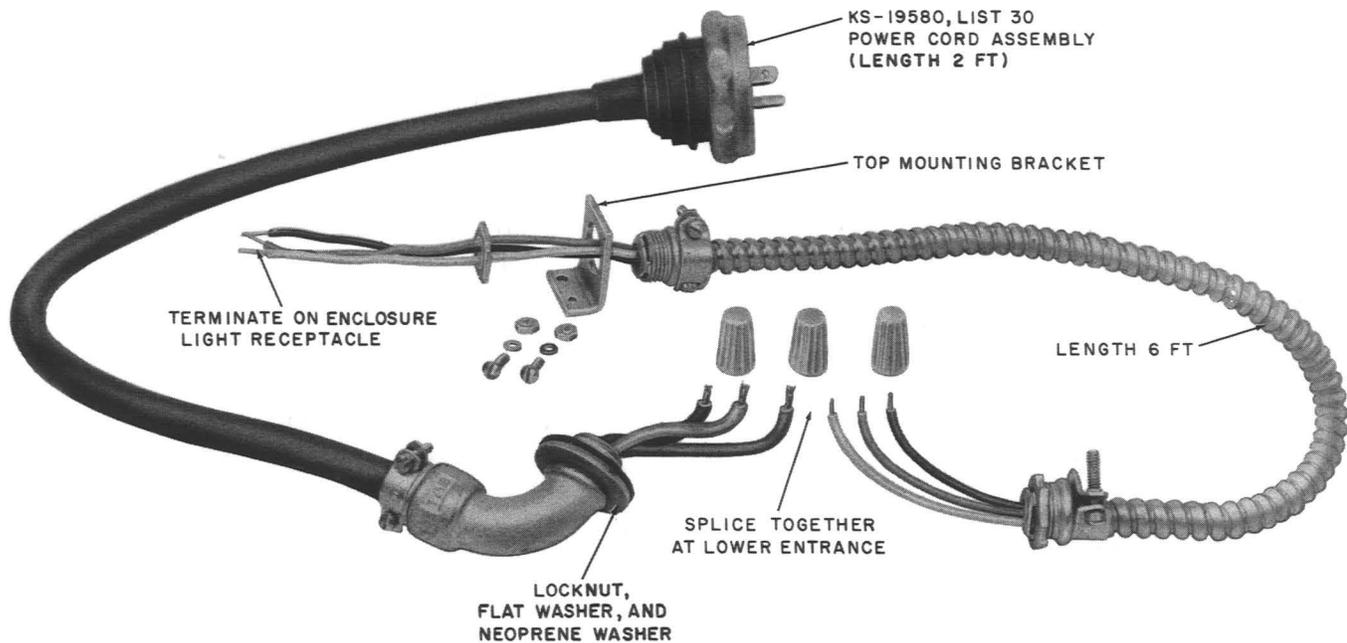


Fig. 2—KS-19580, List 31 Power Cord Group

Therefore, only enclosures with duplex receptacles may be connected to a 20 ampere circuit.

**2.05** All cord connected wiring shall be made with No. 14 or larger AWG conductors to either a 15 or 20 ampere receptacle. The power cord assemblies in Table A are to be used with the listed enclosure. Any other cord assemblies used must be Underwriters Laboratories (UL) listed for outdoor service, if applicable.

**2.06** A weatherproof power receptacle (Crouse/Hinds Co. Catalog No. DS96-M2 or equivalent) supplied by the electrical contractor or obtained locally, should be used on all outdoor installations. Typical outdoor enclosure plug-in installations are shown in Fig. 4 and 5, and Fig. 3 shows a typical outdoor post and wall installation.

### 3. ELECTRIC WIRING—DIRECT SERVICE

**3.01** Direct service constitutes the connection of a Public Telephone Enclosure to commercial power secondary from a pole or underground supply. There must be no service box or receptacle outside the enclosure.

**3.02** The commercial power secondary is terminated in a UL listed service box inside the telephone

enclosure. The service box must contain a circuit breaker (120 volt, 15 ampere time delay curve No. 3 or equivalent) and an insulated neutral bar with provisions for grounding. Typical direct service installations are shown in Fig. 6. The neutral bar connection must be made to the service box with the bonding screw provided to insure proper connection of the power neutral to the power ground. ***This connection is completed by bonding the service box to the enclosure upon installation of the service box; if necessary a No. 12 AWG ground wire should be added between the box and the ground lug in the enclosure.***

**3.03** A No. 12 AWG conductor or larger must be used for incoming wiring to the service box and also between the service box and the receptacle box, (refer to paragraph 3.04). A power ground rod must always be supplied at the enclosure site for direct service. The connection to the commercial power ground rod shall be made with No. 6 ground wire or larger and connected to the neutral bar in the service box.

**3.04** A 120-volt 15 ampere parallel blade duplex grounding type receptacle for the light and other accessory cords, shall be installed in a separate UL listed receptacle box with provisions for ground

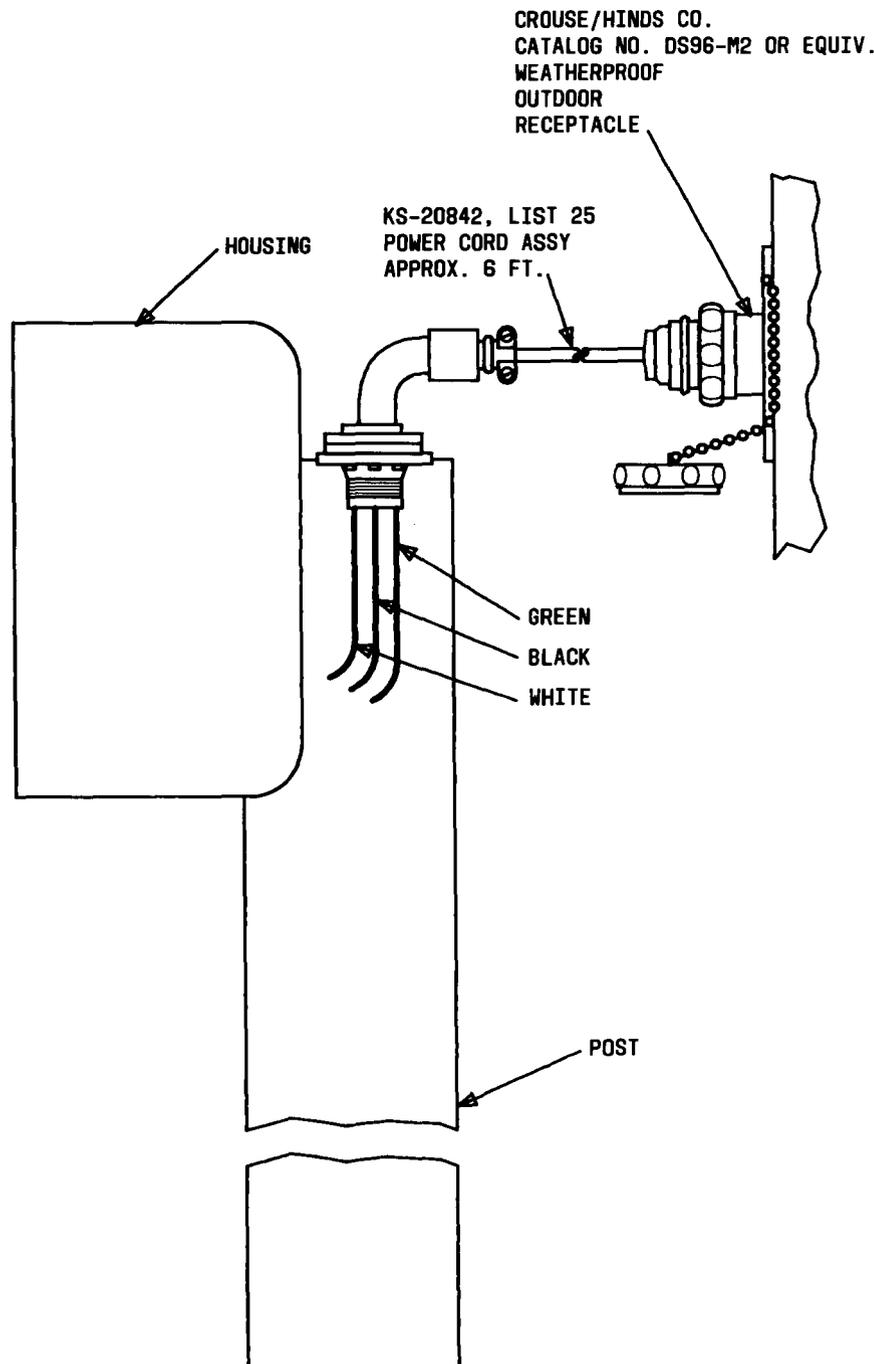


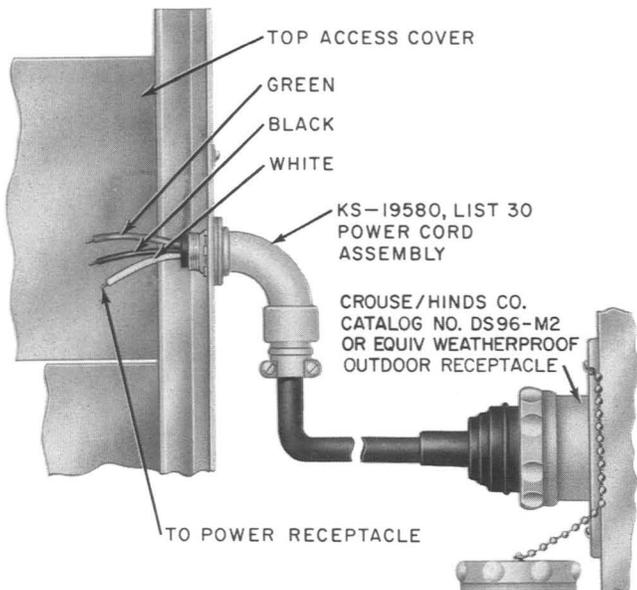
Fig. 3—Power Cord Entrance at Top of Post

termination. This receptacle box must be properly bonded to the telephone enclosure to insure ground continuity.

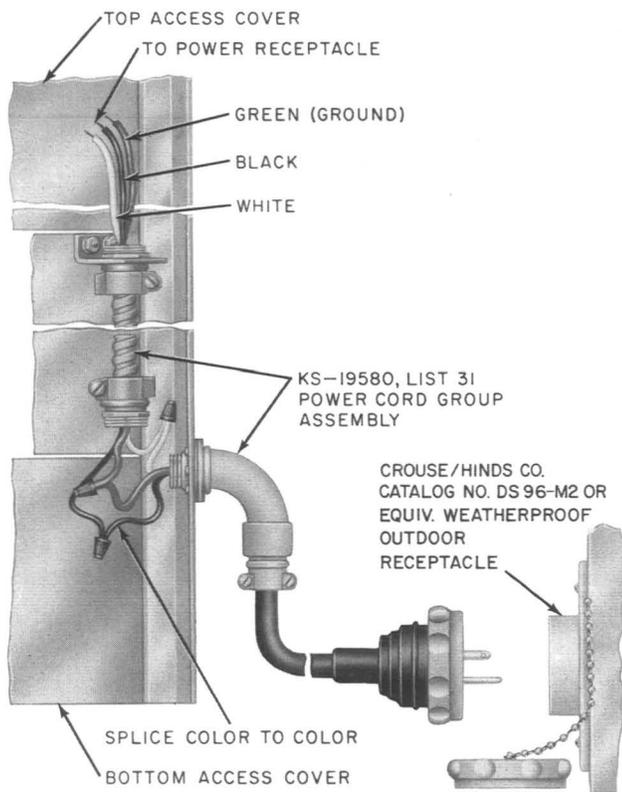
#### 4. COMMERCIAL POWER GROUNDING—BRANCH CIRCUIT SERVICE

4.01 The telephone enclosure must be grounded by connection to an equipment grounding

conductor run with the branch circuit supplying the enclosure. If power is supplied by means of metallic conduit, electrical metallic tubing or armored cable, the metal enclosure for the circuit conductors is not a satisfactory equipment grounding conductor. ***Always supplement the conduit or armor path by an additional bare or green insulated conductor sized the same gauge as the circuit conductors and run within***



**Fig. 4—Power Entrance at Top of Booth**



**Fig. 5—Ground-Level Power Entrance**

*the conduit or armor. This avoids poor ground continuity caused by broken armor, loosened conduit connections, or corrosion. An equipment grounding conductor may also be contained within a nonmetallic sheathed or (UF) cable. A continuous metallic ground must be provided between the electrical box in the enclosure and the service box serving the branch circuit. See Tables B and C for hardware used to terminate station ground wire.*

**4.02** If an equipment grounding conductor is not provided in the branch circuit and if the enclosure is located indoors, or outdoors against the building serving the power, the circuit must be rewired by an electrician to provide the grounding conductor.

**4.03** If an equipment grounding conductor is not provided and if the enclosure is located outdoors as a separate structure apart from the building serving the power, ground the enclosure in the following manner.

- (a) Having the branch circuit to the telephone enclosure rewired to include a grounding conductor (bare or green-insulated) sized the same gauge as the circuit conductors or wire.
- (b) If the manner described in paragraph 4.03(a) is unacceptable, then include a service box in the telephone enclosure and wire as described in Part 3, Electric Wiring—Direct Service and provide ground as described in paragraph 5.01.

## **5. COMMERCIAL POWER GROUNDING—DIRECT SERVICE**

**5.01** Enclosures served directly from the commercial power secondary shall be grounded by one of the following means. See Tables B and C for hardware used to terminate ground wire.

- (a) An 8-foot ground rod is the recommended choice connected to the neutral bar in the service box with No. 6 AWG wire.
- (b) If the enclosure is installed against a building with an accessible metallic water pipe, the water pipe may be connected to the neutral bar in the service box with No. 6 AWG wire. See Section 506-100-100 for definition of acceptable metallic waterpipe.

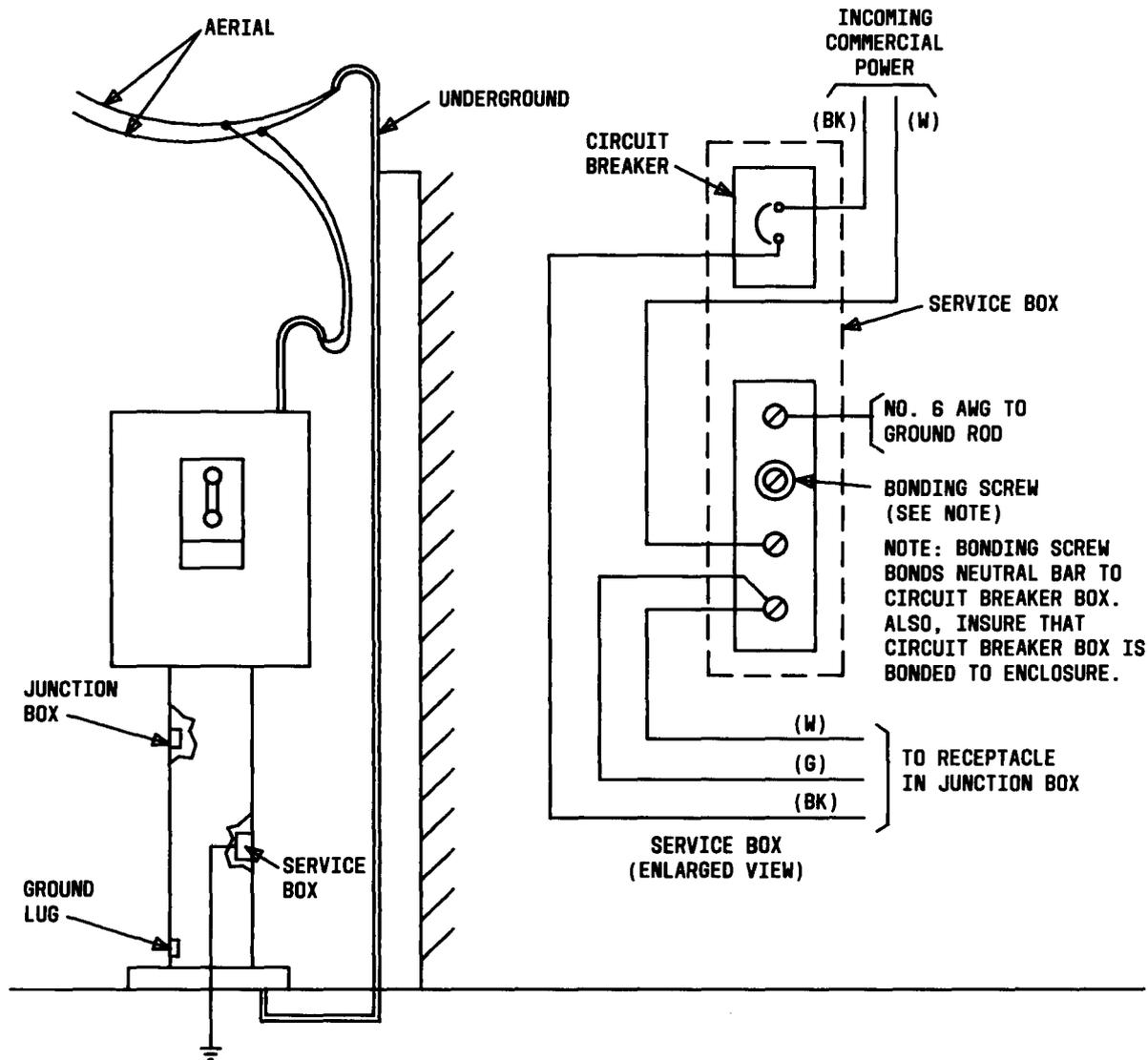


Fig. 6—Direct Service Wiring Entrance

5.02 Enclosure ground lugs are located in outdoor KS-type enclosures as follows.

- (a) **KS-19580 Outdoor or KS-21716 Handicapped Booth:** This booth is equipped with a ground lug near the bottom of the booth, behind the corner panel in the right rear corner (Fig. 7).
- (b) **KS-19425 Indoor-Outdoor Booth:** This booth is equipped with a ground lug near the bottom of the booth in the right rear corner column. It is the same type as the one in the KS-19580 booth.

(c) **KS-14611 Outdoor Booth:** This booth is equipped with a 5/16—18 by 1-1/4 FHM screw with two 3/8-inch steel washers and one 5/16—18 hex nut (Fig. 8), located in the right rear corner on the mounting bracket. Wrap the ground wire around the screw, between the two washers as shown.

**Note:** Future reconditioned KS-14611 booths will have a ground lug similar to the KS-19580 booth (Fig. 7).

(d) **KS-16797 Universal Booth:** This booth will require the use of the mounting bolt in

TABLE A  
ENCLOSURE POWER CORDS

PUBLIC TEL ENCLOSURE	POWER CORD ASSEMBLY	DESCRIPTION
KS-19425	KS-19425, List 22 (Fig. 1)	Used to bring power into the top of an indoor enclosure (No. 14 AWG)
KS-19425, KS-19580, KS-21716	KS-19580, List 30 (Fig. 2)	Used to bring power into the top of an outdoor enclosure (No. 14 AWG)
KS-19580, KS-21716	KS-19580, List 31 (Fig. 2)	Used to bring power into the bottom of an indoor or outdoor enclosure (No. 14 AWG)
KS-20842	KS-20842, List 25 (Fig. 3)	Used to bring power into the top of post indoor or outdoor enclosure (No. 14 AWG)
KS-21571	KS-19425, List 22 (Fig. 1)	Used to bring power into bottom of enclosure (No. 14 AWG)

the right rear corner for connecting the ground wire (Fig. 9) unless a KS-16797, List 21 junction box is used. When the junction box is used, the ground terminal in the junction box may be used for connecting ground wire.

**Note:** Future reconditioned KS-16797 booths will have a ground lug similar to the KS-19425 booth.

(e) **KS-19426 Walk-Up, Drive-Up Mounting:**  
For post mountings, use ground terminal in junction box behind post cover. For wall mountings, use the ground lug located in housing adjacent to electrical receptacle.

(f) **KS-16705 Walk-Up, Drive-Up Mounting:**  
Use threaded hole in post for ground screw.

(g) **KS-19206 Curved Door Booth and KS-19442 Glass Deluxe Booth:** These booths are for indoor installation only. Each is equipped with a 3-conductor cord for plugging into a grounded, 3-terminal electrical receptacle.

TABLE B  
GROUND CLAMPS

GROUND CLAMP		WIRE SIZE	GROUND ELECTRODE (SIZE IN INCHES)	USE
B Station Grd Clamp	6-3/4 in.	No. 14	3/8 - 1-3/4	Connect protector ground to water pipe or power service entrance conduit, or mount 72A, 90A, or 114A bracket (Note 2)
	12-1/2 in.	No. 12 or No. 10	1-7/8 - 3	
L Ground Clamp		No. 6	1 - 3	Connect protector ground or bond to water pipe or power service entrance conduit (Note 2)
B Ground Clamp (Note 1)		No. 6	1/2 - 1	Connect protector ground or bond to ground rod or water pipe

**Note 1.** Use caution when attaching the B ground clamp to copper pipes. The pipes can be damaged by the wire loop in the clamp if the clamp is tightened excessively.

**Note 2.** Do not connect to aluminum conduit.

TABLE C

## WIRE CONNECTORS

CONNECTOR	CONDUCTOR SIZE	USE
E Connector Size 1	No. 14 thru 4	Connect or bond ground wire to bare power ground wire.
E Connector Size 2	No. 14 thru 1/0 and 8 thru 4 armored ground wire	Connect or bond ground wire to armored power ground wire.
AT 7796X Size 6 Size 4 Size 2	No. 14 thru 6 No. 8 thru 4 No. 6 thru 2	Ground shield of cable or buried service wire at terminals or cable closures. No. 6 used for connecting ground rod to No. 12 ground wire.
Blackburn PAC 3	No. 6 thru 8 copper to	Connect No. 6 ground wire to aluminum power ground wire for bonding.
FARGO GA610C	No. 2 thru 4 aluminum	
F Connector	No. 6	(A) Connect service wire shield to protector ground terminal. (B) Connect No. 6 ground wire to ground bracket of cable closure housing.

(h) **KS-20842 SENTRY Mounting:** For post mountings—Lists 40 (A&M Only), 41 (A&M Only), 43 (A&M Only), 141, and 143 lug in the electrical compartment immediately below the duplex receptacle. For wall mounted brackets—Lists 42 and 45 use grounding screw large enough for No. 6 AWG wire in the electrical receptacle.

## 6. MULTIPLE BOOTH ENCLOSURE AND MOUNTING INSTALLATIONS

**6.01** When units are installed in multiples, they should be bonded together for grounding purposes.

**6.02** Electrical power should be connected to the end unit and extended to the remaining units by running 3-conductor cables through knockouts provided in the roof and side assemblies.

## 7. STATION PROTECTOR GROUNDING

**Note:** The station protector ground terminal must be bonded to the telephone enclosure metal structure through the bonding lug provided.



Fig. 7—Grounding Screw in KS-19580 or KS-21716 Booth

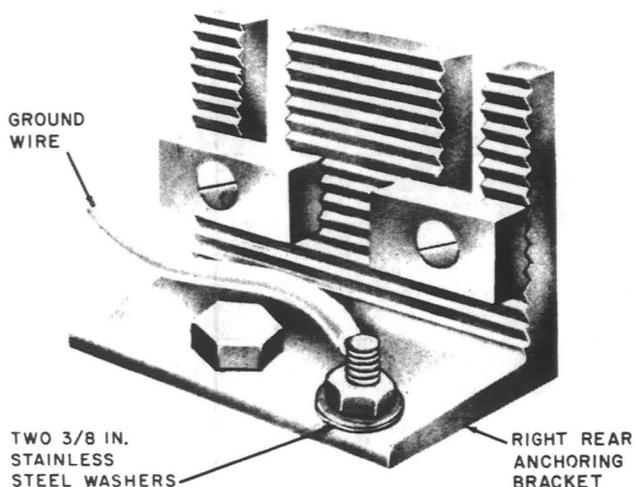


Fig. 8—Grounding Screw in KS-14611 Booth

*The ground lead must be no smaller than No. 12 AWG wire except as covered in paragraph 7.03.*

*Note: The grounding conductor (3rd wire of an electrical wiring system) must never be used as the protector ground.*

**7.01** When an enclosure is located outdoors and a power ground rod is installed and connected as described in paragraphs 3.02 and 5.01(a), this rod may serve as the telephone protector ground.

**7.02** When a telephone enclosure is located outdoors and adjacent power ground rod is not installed, install the protector ground as described in Sections 460-100-400 and 506-100-100.

**7.03** When a protector is used as a connecting block only (functioning protector is mounted in a building or some secure location other than the telephone enclosure in this case), there must not be a connection made between the ground terminal of the protector and the telephone enclosure if the enclosure is located within or attached to the outside of the building structure. Always bond the protector ground to the enclosure metal structure on remote enclosure installation.

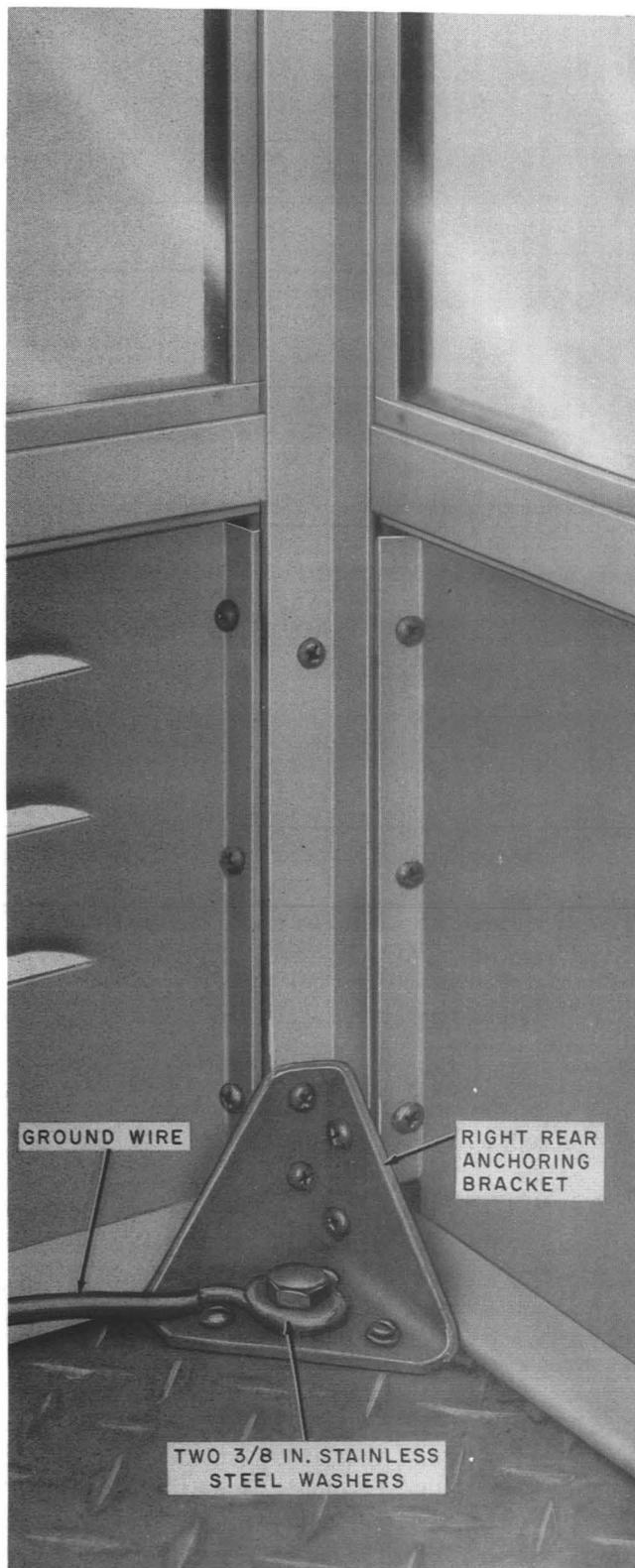


Fig. 9—Grounding Screw in KS-16797 Booth

**8. INSPECTION**

**8.01** Inspect the telephone and commercial power wiring on an installed public telephone enclosure for recommended layout. For additional information refer to Section 460-100-400 entitled Station Protection and Grounds.

**8.02** The protector must be out of reach of the public telephone customer and the cover securely fastened. It is recommended that the protector be mounted inside the enclosure structure (access protected by security screws) or inside building if drop wire or underground service does not terminate at the telephone enclosure.

**8.03** The telephone drop wire or underground service must be terminated and fastened in agreement with standard installation practices. Refer to Division 460 for additional information.

Insure that conduit is used to protect the wire for at least 6 feet from the station set. Wall mounted conduit should conceal the entire wire run.

**8.04** Conduit should also be used to enclose the wire runs of the commercial power conductors in wall mounted enclosures. On plug-in installations, the plug must be a **dead-front** type (no access to conductor wiring at the blade end of the plug) at all new installations. The cord and receptacle should be UL listed for outdoor service and mounted to avoid damage from doors, pedestrian traffic, etc.

**9. ELECTRICAL CONNECTIONS AND GROUND REQUIREMENTS**

**9.01** Refer to Fig. 10 through 17 for typical electrical connections and ground requirements.

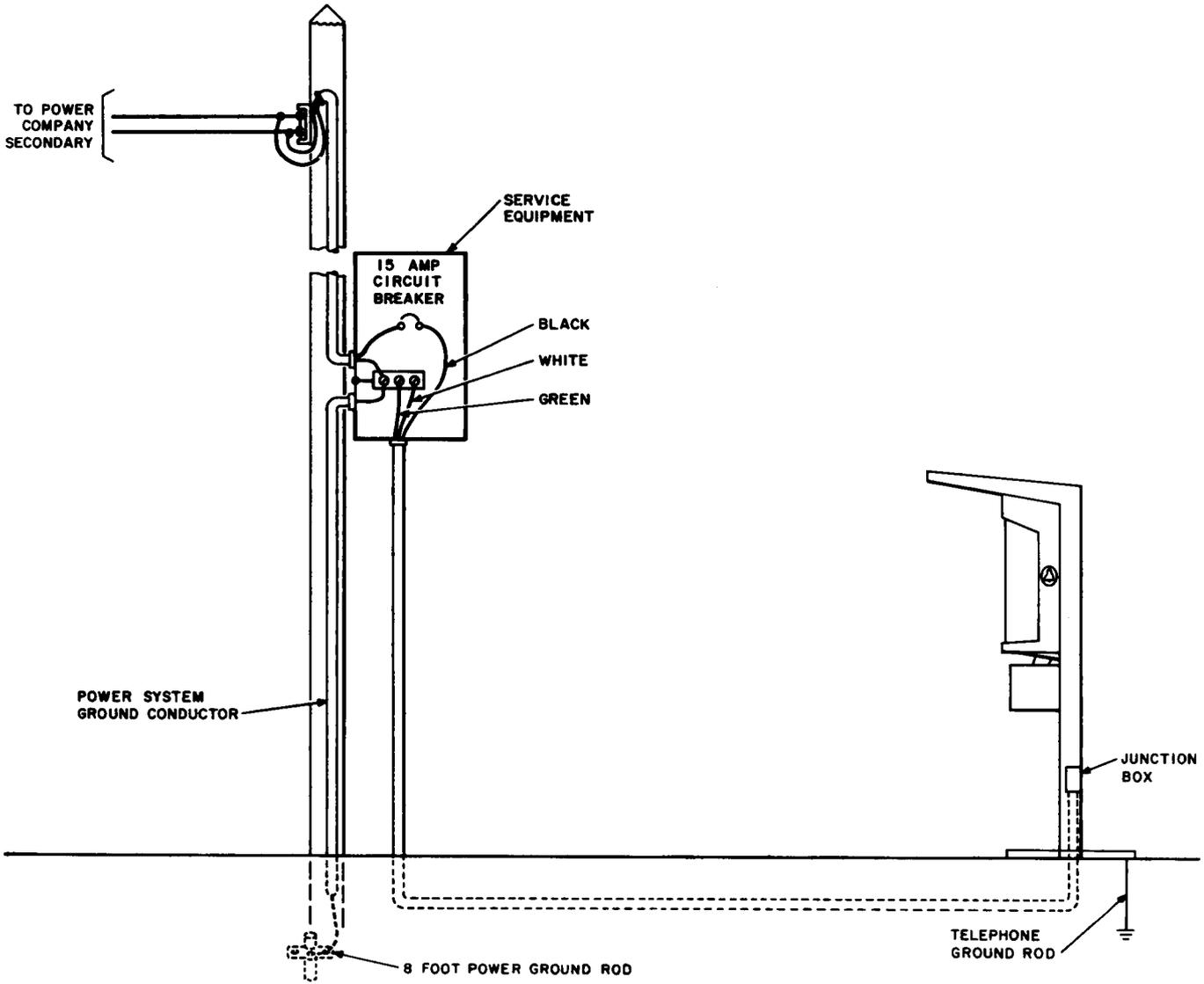


Fig. 10—Branch Circuit Connection for Pole Service

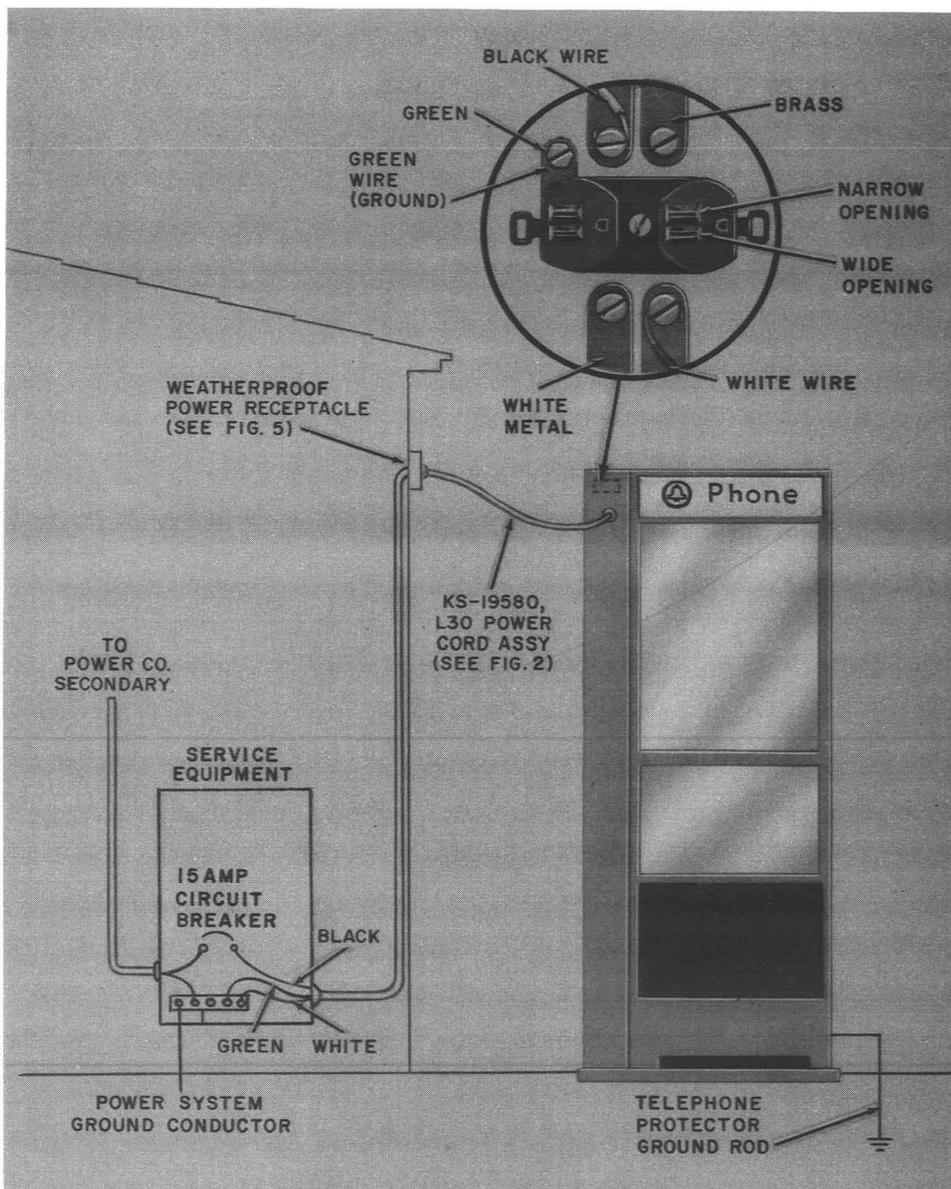


Fig. 11—3-Wire Extension of Branch Circuit to Booth By Means of Power Cord

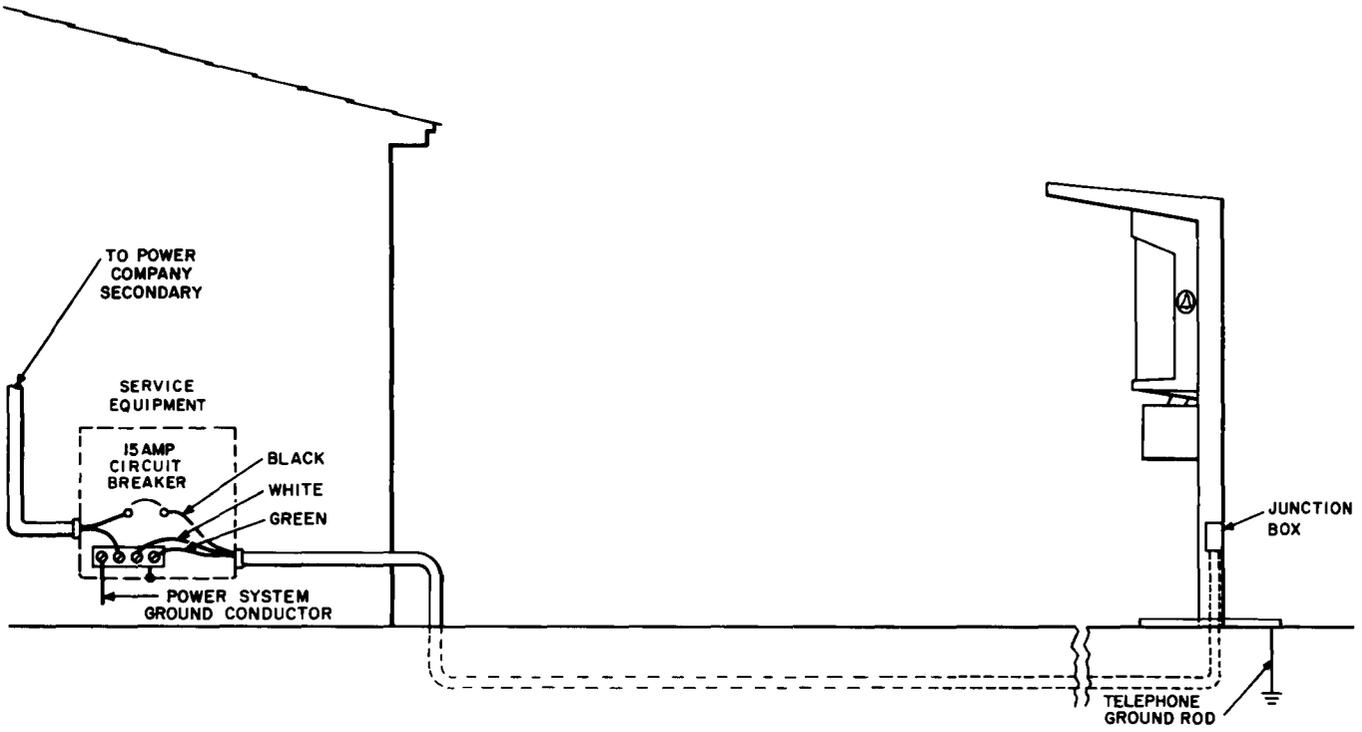


Fig. 12—3-Wire Extension of Branch Circuit to Mounting By Means of Metal Conduit

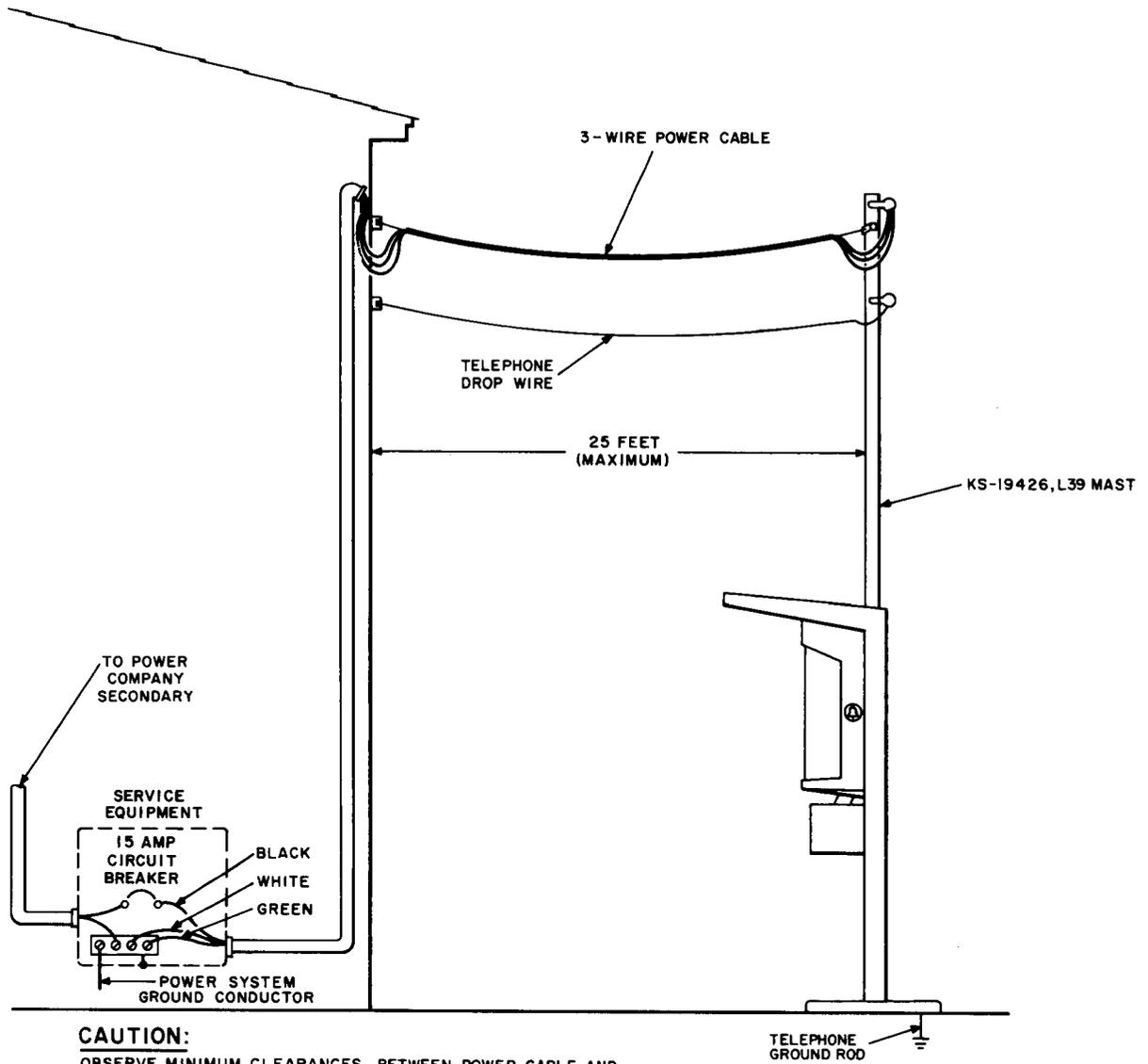


Fig. 13—3-Wire Extension of Branch Circuit to Mounting By Means of 3-Wire Cable



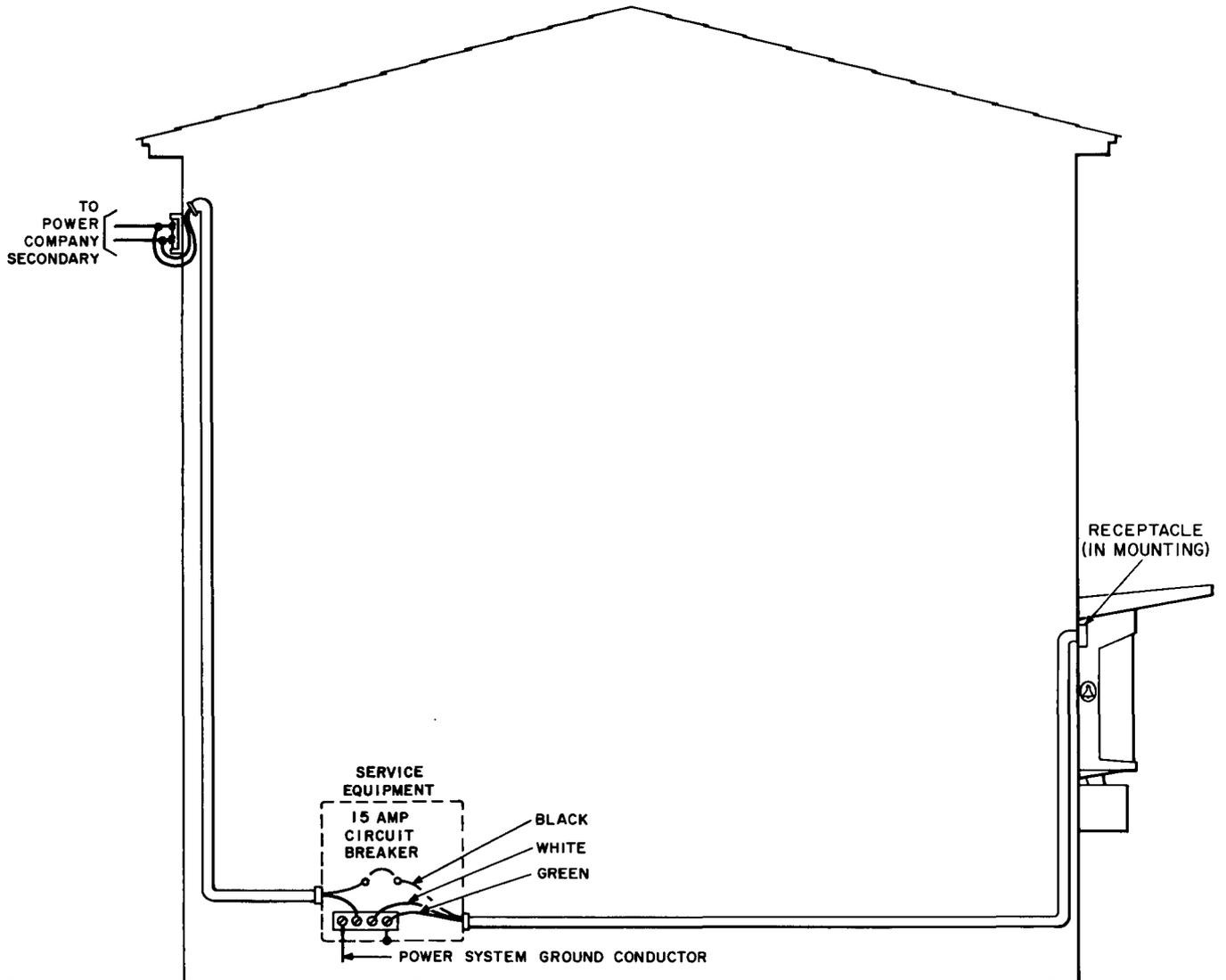
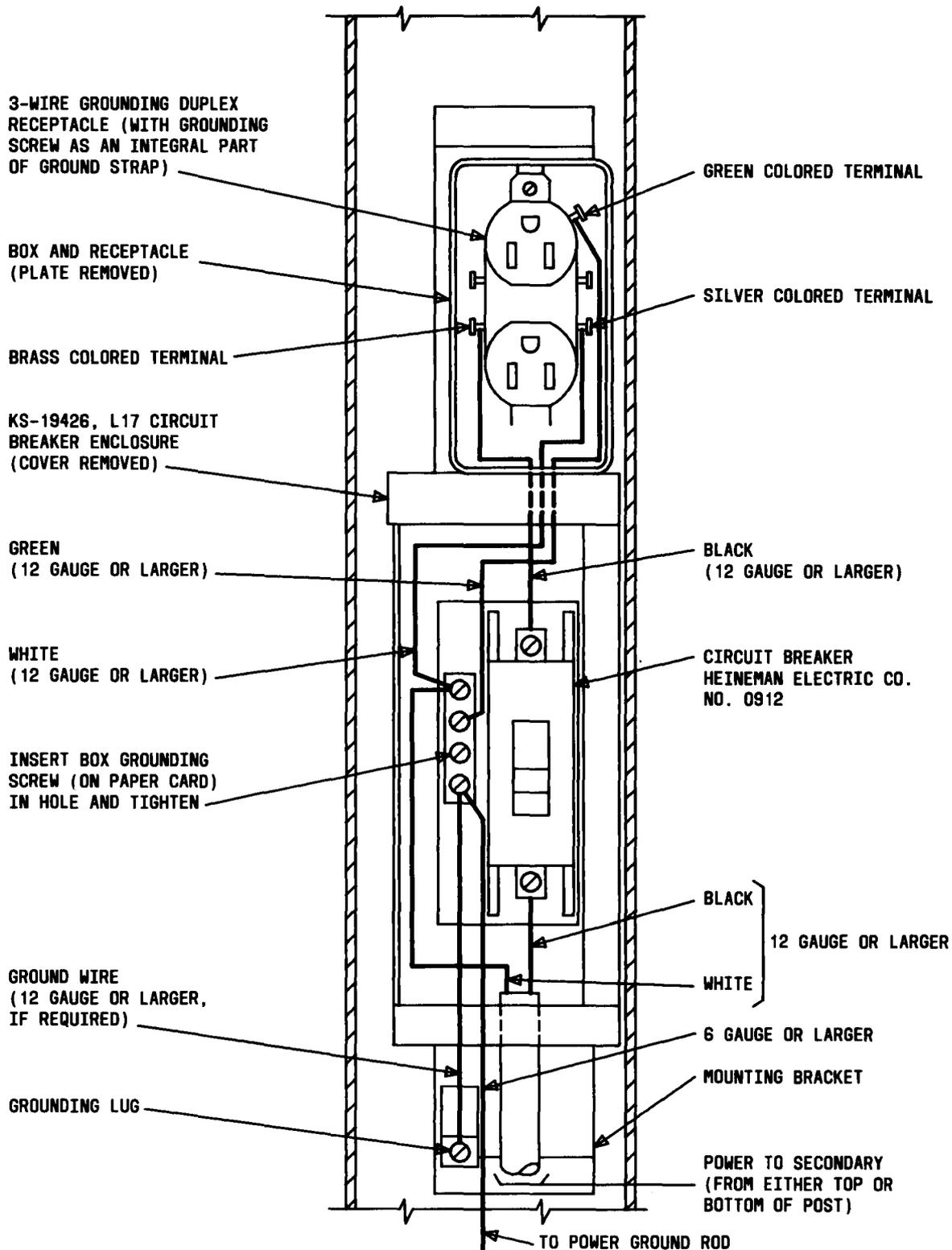
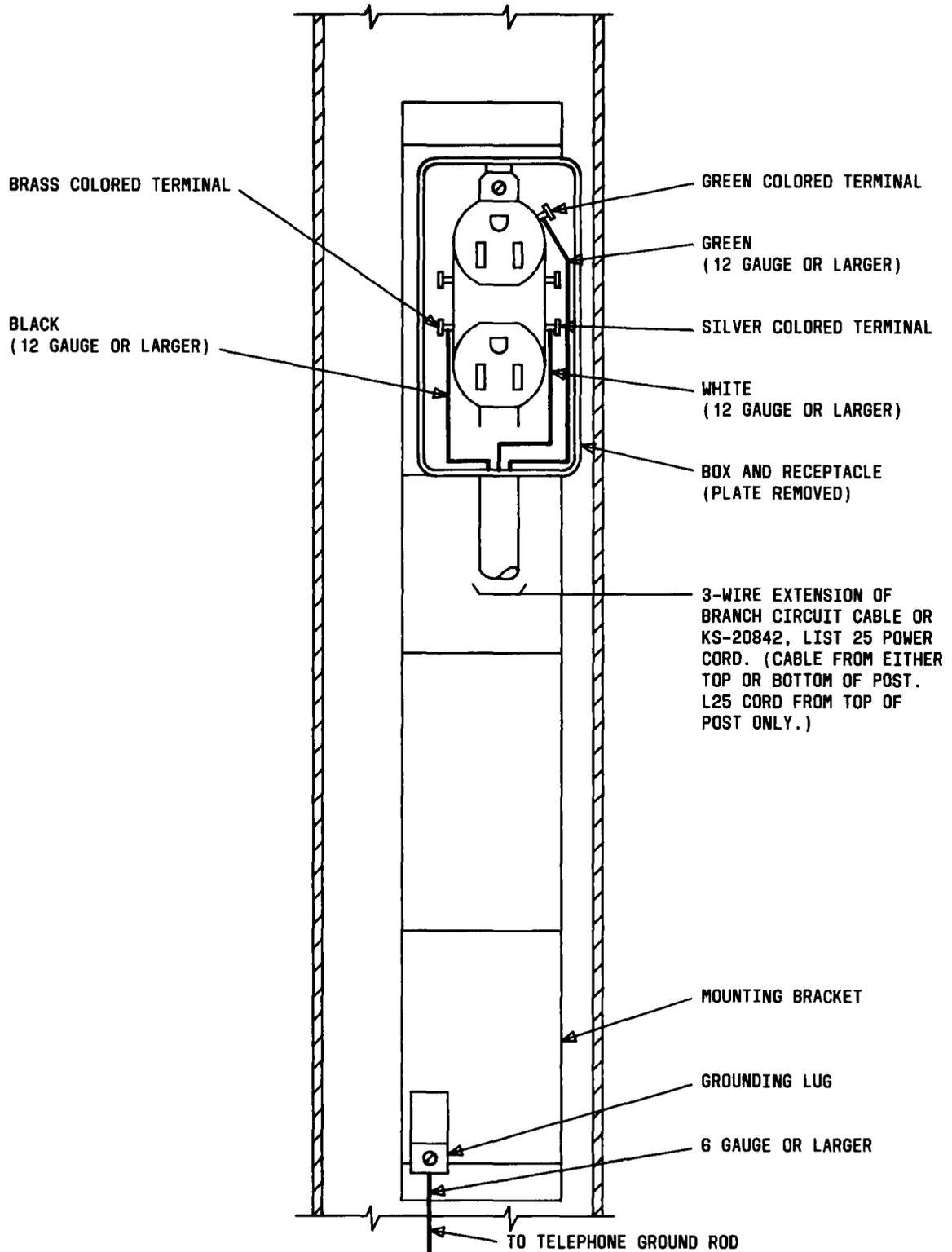


Fig. 14—Enclosure Located On or Within Same Building as Branch Circuit



A. POWER SOURCE DIRECTLY FROM POWER CO. SECONDARY

Fig. 15—KS-20842, List 40 (A&M Only), 41 (A&M Only), 43 (A&M Only), 141, or 143 Post, Electrical Wiring and Grounding Requirements (Sheet 1 of 2)



B. BRANCH CIRCUIT (INCLUDING LIST 25 POWER CORD)

Fig. 15—KS-20842, List 40 (A&M Only), 41 (A&M Only), 43 (A&M Only), 141, or 143 Post, Electrical Wiring and Grounding Requirements (Sheet 2 of 2)

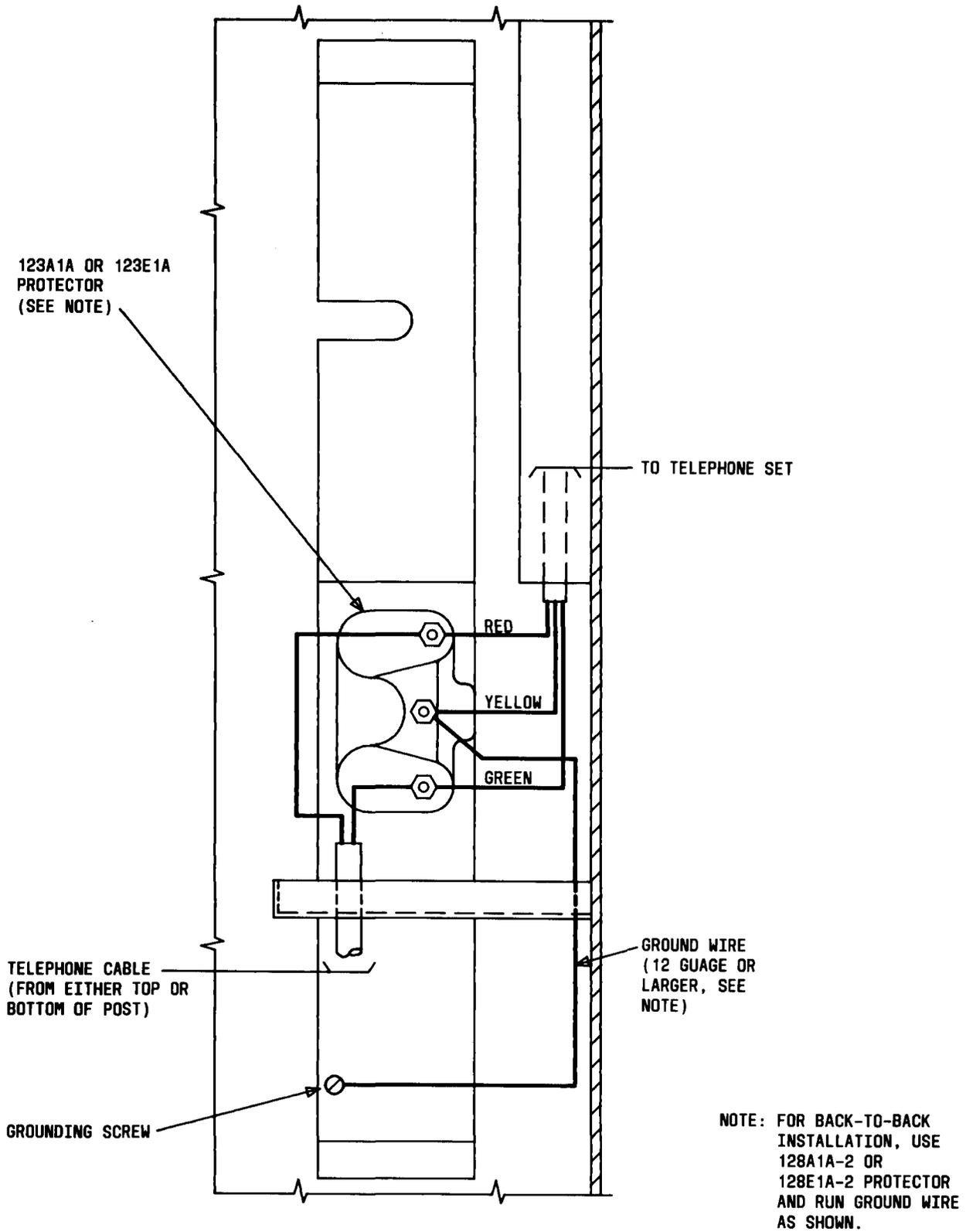


Fig. 16—♦KS-20842, List 40 (A&M Only), 41 (A&M Only), 42 (A&M Only), 43 (A&M Only), 141, or 143 Post Telephone Wiring and Grounding Requirements♦

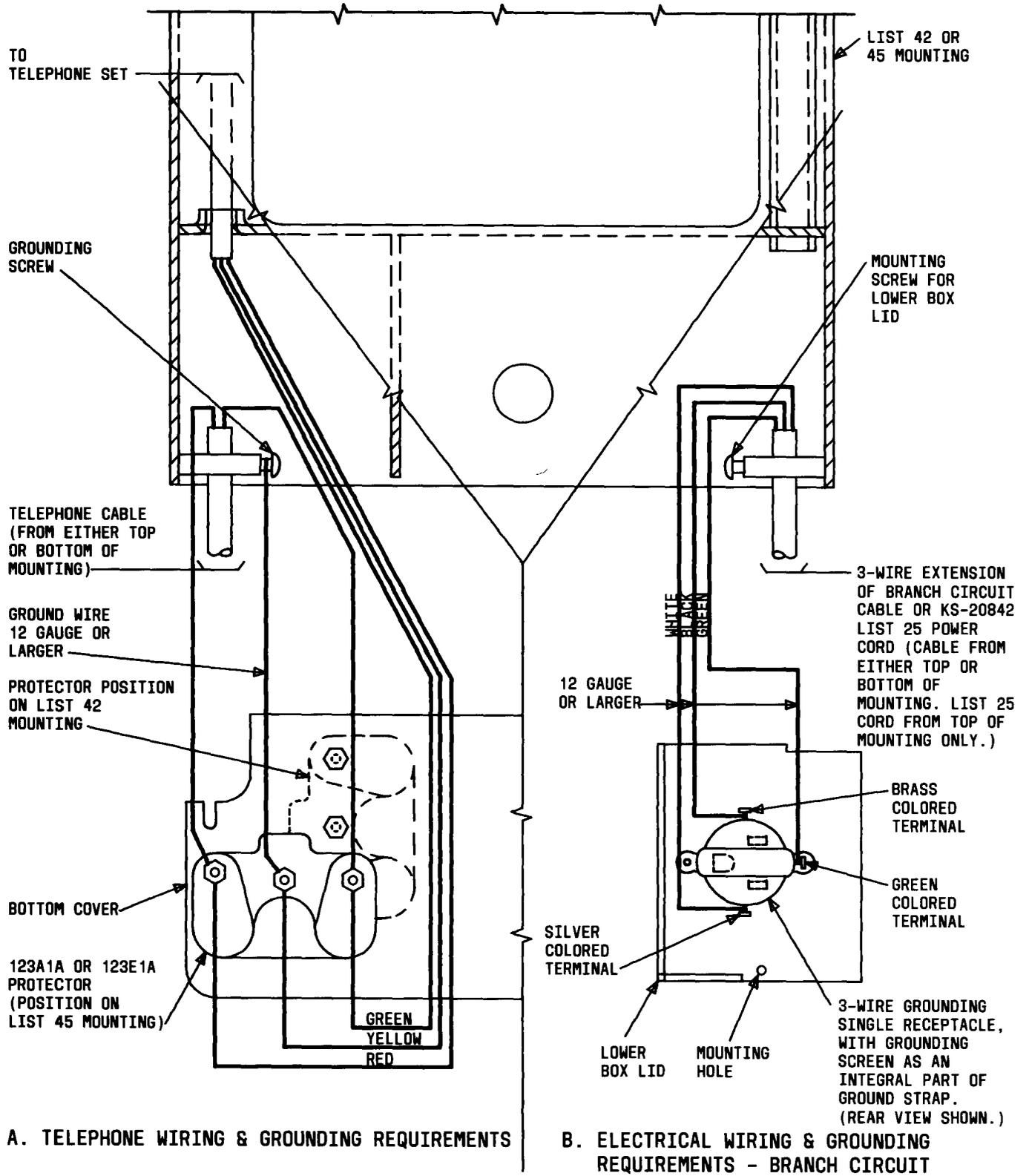


Fig. 17—KS-20842, List 42 or 45 Mounting Wiring and Grounding Requirements