

DIMENSION® 2000 AND CUSTOM PBX
SYSTEM GROUND ARRAYS

CONTENTS

-
- | | | | |
|----|---------------------|----|-----------|
| 1. | GENERAL | 3. | DRAWINGS |
| 2. | TOOLS AND MATERIALS | 4. | PROCEDURE |
-

1. GENERAL

1.1 This section describes the 201L Grounding System and how it is to be installed. It is extremely important that these instructions be followed in their entirety. Failure to do so may result in erratic system operation with unexplainable troubles that do not respond to the usual trouble shooting techniques.

1.2 Where local electrical codes are more stringent than the requirements in this section, the local electrical codes shall be followed.

1.3 There are 7 separate ground arrays in this machine, all of which must be properly run and terminated. Not all grounds are used in all systems - the minimum number is 5. The 7 ground arrays and when they are used are listed below:

<u>Array #</u>	<u>Ground</u>	<u>When Used</u>
1	System	Always required
2	Protector	Always required
3	111A	Only on battery reserve systems
4	AC Power	Always required
5	Circuit Common	Always required
6	Ductwork	Always required
7	Equalizing	As required

Each of the above listed grounds will be described in PAR. 4 of this section.

PRIVATE

Printed in U.S.A.

THE INFORMATION CONTAINED HEREIN SHOULD NOT BE DISCLOSED TO UNAUTHORIZED PERSONS. IT IS MEANT SOLELY FOR USE BY AUTHORIZED BELL SYSTEM EMPLOYEES.

- 1.4 The protector cabinet is the common termination point for all the ground runs. None of the grounds should be connected to any other point. This will give maximum protection for the machine from the destructive effects of lightning and other hazardous voltages.
- 1.5 Figure 1 shows the ground arrays that may be installed in a non-reserve system. Figure 2 shows the ground arrays for a battery reserve system.
- 1.6 Wherever wire gauges are specified, it is assumed that copper is being used. If the system is being wired in aluminum, larger gauges must be used to provide an equivalent current carrying capacity and impedance.
- 1.7 All ground wires and their associated connectors are to be provided or arranged for by the Telco Engineer.

2. TOOL AND MATERIALS

- 2.1 In addition to the usual common installation tools (wrenches, screw-drivers, etc.), a supply of R-3266 NO-OX-ID "A" Compound and sandpaper will be required. All ground connections must be sanded clean and NO-OXed before tightening the clamping bolts to assure that a reliable low impedance ground will exist for the life of the system. The importance of these ground connections cannot be over emphasized.

3. DRAWINGS

- 3.1 The following drawings should be on site when work is ready to start:

ED-1E368-01 Equipment Notes for DIMENSION 2000 Power Distribution

SD-1E481-01 System AC & DC Power Distribution

Telco Floor Plan and AC Wiring Drawing

- 3.2 The circuit and information notes of SD-1E481-01 should be read and thoroughly understood before starting work. Carefully note which FS's will be used on the particular system being installed. All non-reserve systems will utilize FS1, FS2 and FS5. Battery reserve systems will use FS3 through FS9.

4. PROCEDURE

- 4.1 System Ground - Array #1

- 4.11 This is the ground wire normally connected to a metallic water pipe or other approved building ground. It is usually stranded and must be run in a single piece (no splices). It is #6 AWG connected to the protector cabinet ground bar at one end and to the building ground at the other.
- 4.12 At the protector cabinet end, be sure the wire and clamping fixture are clean and a thin coat of NO-OX-ID "A" Compound is applied to the wire. If necessary, sandpaper the wire and clamp "copper bright" to assure a reliable low impedance connection.
- 4.13 Similarly, prepare the other end of the wire by cleaning and coating it with NO-OX-ID "A" Compound. A proper ground clamp fixture must be provided locally. Make every effort to connect the ground lead to the street side of a water meter (if a water pipe is used). Water pipe fittings (particularly threaded ones) are a potential source of electrical resistance which will increase the impedance, and thus the noise susceptibility, of the ground system.
- 4.14 See BSP Addendum 800-614-154 (attachment to this section) for method of connecting ground and for use of NO-OX-ID "A" Compound.
- 4.2 Protector Ground - Array #2
- 4.21 It is a requirement of DIMENSION systems that the underground cable from the serving Central Office must be protected by carbon blocks at the PBX end as well as at the Central Office end. The carbon blocks will protect the PBX from lightning and other hazardous voltages which may otherwise enter the system on the underground cable.
- 4.22 Carbon block protectors are mounted against a grounded metal strip which forms half of its circuit. The ground strips of all the protectors must be electrically bonded together and the entire array connected, via a #6 AWG solid or stranded copper wire, to the protector cabinet ground strip. Clean the connections and the wire with fine sandpaper and apply a thin coat of R-3266 NO-OX-ID "A" Compound before clamping the wire into its fitting.
- 4.23 The ground wire should be run parallel to, and should be laced to the cable running from the protector to the cross-connecting field (if possible).

- 4.24 In some cases, it may be necessary or advantageous to run the T/R protector ground in rigid conduit. If conduit is used, no other leads may be carried and the conduit may make a metallic connection only at the protector cabinet end. Use fiber between the conduit and supporting devices to prevent contact with any foreign metallic surfaces.
- 4.3 111A Power Plant Ground - Array #3
- 4.31 When a system must be operational even in the event of a commercial power outage, a 111A rectifier and the battery plant should be specified. The installation of this plant for this purpose is conventional with certain specific exceptions. These exceptions are described below (and in Figure 2).
- 4.32 From the 3-phase power panel, a ground wire will be run in the same conduit with the 3-phase leads. The size of this conductor will depend upon the gauge and current through the phase conductors. Consult the Telco specification or the National Electrical Code for sizing.
- 4.33 Within the 111A plant, the -48V ground return conductors must be insulated. Reference is made to notes 111 and 118 of SD-81613-01 to accomplish this work. The -48 volt ground return conductors will be grounded instead inside the protector cabinet to the protector cabinet ground bar. Bond all the -48 volt ground return leads together at the varistors and connect the group to the protector cabinet ground bar with a #6 wire. Part of SD-81613-01 is attached for reference.
- 4.34 Treat these ground connections as carefully as all the others - clean the wires and connectors thoroughly, apply NO-OX-ID "A" Compound to the mating electrical surfaces and clamp them securely.
- 4.4 AC Power Ground System - Array #4
- 4.41 The AC power ground system is quite extensive and may be controlled by local electrical codes. In every case, the local codes should be compared with the AC ground system specified in this section and the most stringent requirements applied. Requirements specified in this section are equal to or exceed requirements of the National Electrical Code.
- 4.42 Even though the electrical feeders will normally be run in rigid conduit, the conduit cannot be trusted for use in the AC ground system. It should be utilized as mechanical protection only. Green ground wires must be run in the conduit along with the power feeders.

- 4.43 The Telco specification will normally specify how to run the AC power system. If a Telco spec has been provided for this purpose, the descriptions below should be used as a guide only to be sure nothing has been inadvertently overlooked. Figures 1 and 2 should be referred to while wiring the AC power ground system. Array #4 on these figures is the AC power ground system.
- 4.44 The following ground lead runs make up the AC power ground system:
1. A #2 AWG from the customer's service panel to the protector cabinet ground bar.
 2. A #4 AWG from the protector cabinet ground bar to the AC module boxes. This lead is multiplied to all module boxes. It is neither necessary nor desirable to "home run" each module box to the protector cabinet.
 3. A #12 AWG from the protector cabinet ground bar to the utility outlets. Again it is only necessary to multiple this lead to all the utility outlets.
 4. On battery reserve systems, a #6 AWG lead is run from the customer's service panel to each inverter and another #6 from each inverter to the protector cabinet ground bar. Note that each inverter requires 2 leads - 1 to the customer service panel and 1 to the protector cabinet. These leads are not to be multiplied between inverters.
- 4.45 Clamp the wires securely in approved fittings after cleaning and applying NO-OX-ID "A" Compound to the mating electrical surfaces.
- 4.5 Circuit Common - Array #5
- 4.51 Technically, the Circuit Common is not a ground array, but since it connects to the system ground at the protector cabinet, it will be discussed as if it were. The Circuit Common is actually an equalizing lead to which all the cabinet power supplies are referenced.
- 4.52 The Circuit Common System consists of a grid of #4 wires originating at the protector cabinet and laid into the ductwork parallel to the system cables. Insofar as possible, the routing of these wires should follow the cabling when it leaves the ductwork (to the cross-connect field, for example). Lay the #4 wires into the ducts and tape their ends so they cannot make electrical contact with the metal ductwork at any point. The circuit common ground is laid into the lowest (bottom) duct.

- 4.53 Each cabinet in the system is equipped with a length of #8 AWG wire terminated inside the cabinet on the copper ground bar. Tap the outer end of the #8 AWG wire onto the #4 grid. Use NO-OX-ID "A" Compound on these terminations to assure the best possible permanent contact.
- 4.54 The Circuit Common runs are shown on FS2 and FS5 of SD-1E481-01. Also, read Note 116 of this same drawing.
- 4.55 If the circuit common is run in conduit (for appearance or physical protection), 2 conditions must be met:
1. The conduit may make metallic contact only at the protector cabinet end. All conduit supporting devices must be equipped with fiber inserts to prevent metallic contact. Carefully inspect the entire conduit run and insulate with fiber where necessary to prevent inadvertant metallic contact with structural steel, water pipes, other conduit, etc.
 2. No other wires may be run in the conduit carrying the circuit common lead.
- 4.56 It is a requirement that there be no more than 2 taps in the circuit from any cabinet to the protector cabinet ground bar. One of these taps will always be the #8 cabinet lead to the #4 grid wire. One more, if required, would be necessary if 2 or more #4 wires must be tapped onto a #4 backbone wire. This will be necessary in multi-lineup systems which will have a single #4 wire from the protector cabinet laid into the overhead cross aisle cable duct. Individual #4 leads will then be tapped onto this backbone lead dropping down into the bottom duct of the horizontal ductwork. Two such leads are required in each lineup containing a centrally located vertical duct (one to each side).
- 4.6 Ductwork Ground - Array #6
- 4.61 This is the most extensive and installation time consuming ground array in the system. This ground array ties all the ductwork and frames of the equipment cabinets into a single low impedance electrical unit which is then connected, at a single point, to the protector cabinet ground bar. The protector cabinet to ductwork single contact point is run in #6 AWG wire. At the duct point of contact, scrape or sandpaper the terminal and ductwork clean, apply NO-OX-ID "A" Compound and clamp securely under a .312-18 hex bolt with an external tooth lock washer.

- 4.62 In each equipment lineup, all the ductwork is bonded together by use of .312-18 bolts through the 842154361 tie plates and, where a vertical duct is encountered, through the 842143323 divider assembly. Every hex bolt must have a lock washer.
- 4.63 Each section of horizontal ductwork must be bonded to its neighbor(s) by at least two electrical bonds. Scrape or sandpaper the mating surfaces of the ductwork, tie plates and divider assemblies, apply NO-OX-ID "A" Compound to the cleaned surfaces and immediately clamp securely with lock washers.
- 4.64 Multi-lineup systems present a special problem in installation of the ductwork ground system. It is not practical to try to scrape and NO-OX every point of contact between lineups especially when bonding to the overhead cross aisle cable rack since the overhead rack sections are heavily painted. Several #6 wire leads are necessary in such a ductwork ground array. Follow the procedure detailed below for multi-lineup systems.
- A. Run the #6 AWG wire from the protector cabinet ground bar to the 1st lineup. The ductwork #6 ground routes through any overhead duct (but not AC power duct from the ground bar of the AC protector cabinet and down through the first module upright to a convenient floor duct bond point.
 - B. Connect the first lineup to the second by running a second #6 lead from a contact point on the ductwork of line 1, back up the vertical duct, across the aisle and then down the vertical duct to a point of contact on the horizontal duct of the second lineup. Be sure contact terminals are clean, NO-OXed and clamped securely.
 - C. Similarly connect the 2nd to the 3rd line, 3rd to 4th, etc., until all horizontal duct lines are bonded with #6 wire runs. The runs are similar in all cases (up the vertical ducts and overhead cable rack).
- 4.7 Equalizing Ground - Array #7
- 4.71 If miscellaneous equipment units with large metal contact surfaces are located in the telephone room, an Equalizing Ground System will be required. This is another #6 AWG wire originating at the protector cabinet ground bar, and soledly connected to the equipment framework. Select a solid frame bolt, use a suitable terminal device, scrape or sandpaper the connecting point down to the bare metal, apply NO-OX-ID "A" Compound to the mating electrical surfaces, and clamp the terminal securely.

- 4.72 The purpose of the Equalizing Ground System is to prevent any static electricity or lightning induced voltages from affecting normal machine operation.
- 4.73 Miscellaneous equipment as used here could be auxiliary equipment cabinets not on floor rails, a sump pump, a copy machine, or a filing cabinet or metal locker, if in contact with any surface that could be hit by lightning. This includes plastered or brick walls and concrete and metal floors. If in doubt as to whether or not an equalizing ground is required, play it safe - install the ground array.
- 4.74 The equalizing ground wires may be looped from unit to unit - multiplied. It is not necessary to "home run" a #6 wire from each miscellaneous unit to the protector cabinet ground bar.
- 4.8 Recheck
- 4.81 When all required ground arrays are completed, recheck them all very carefully. Look for loose bolts, wiring dressed in such a manner that it can be easily broken, lack of insulation such that bare ground wires may touch electrical circuits or the building walls or floor, etc. At this point in the job, this recheck is easy to do and may be highly rewarding (in the interest of preventing trouble after the machine is up and running).
- 4.82 When satisfied with the ground arrays, the job can now enter the circuit cabling phase. Return to Section 100, PAR. 6 for description of this work.

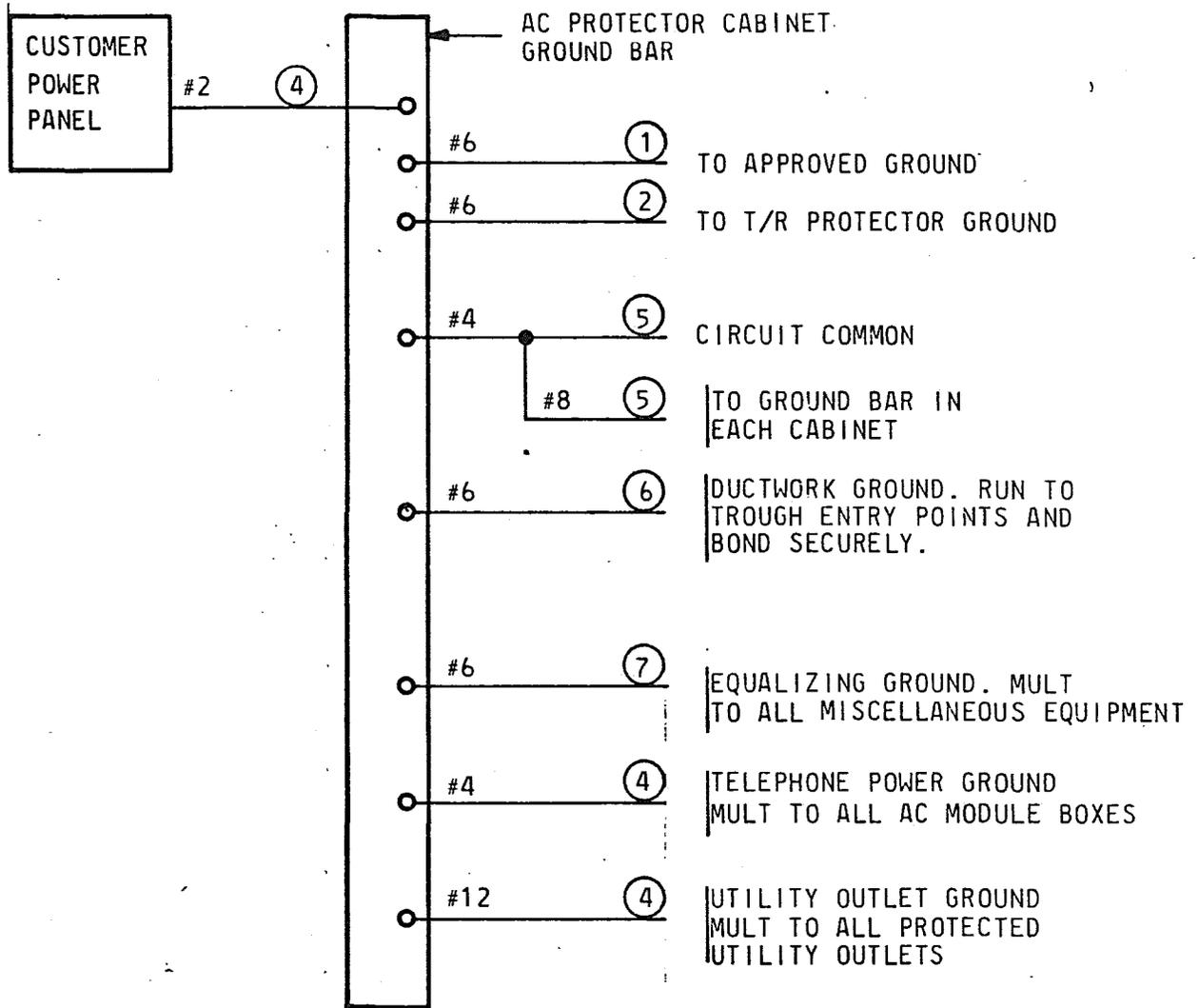
Arrows indicate new or changed information.

Reason for Issue:
Update Section

ATTACHMENT:
BSP Addendum 800-614-154
Figure 1 and 2
Part of SD-81613-01-2

Manager, Denver PBX PECC

FIGURE 1
GROUND WIRING ARRAYS
(NON-RESERVE SYSTEM)

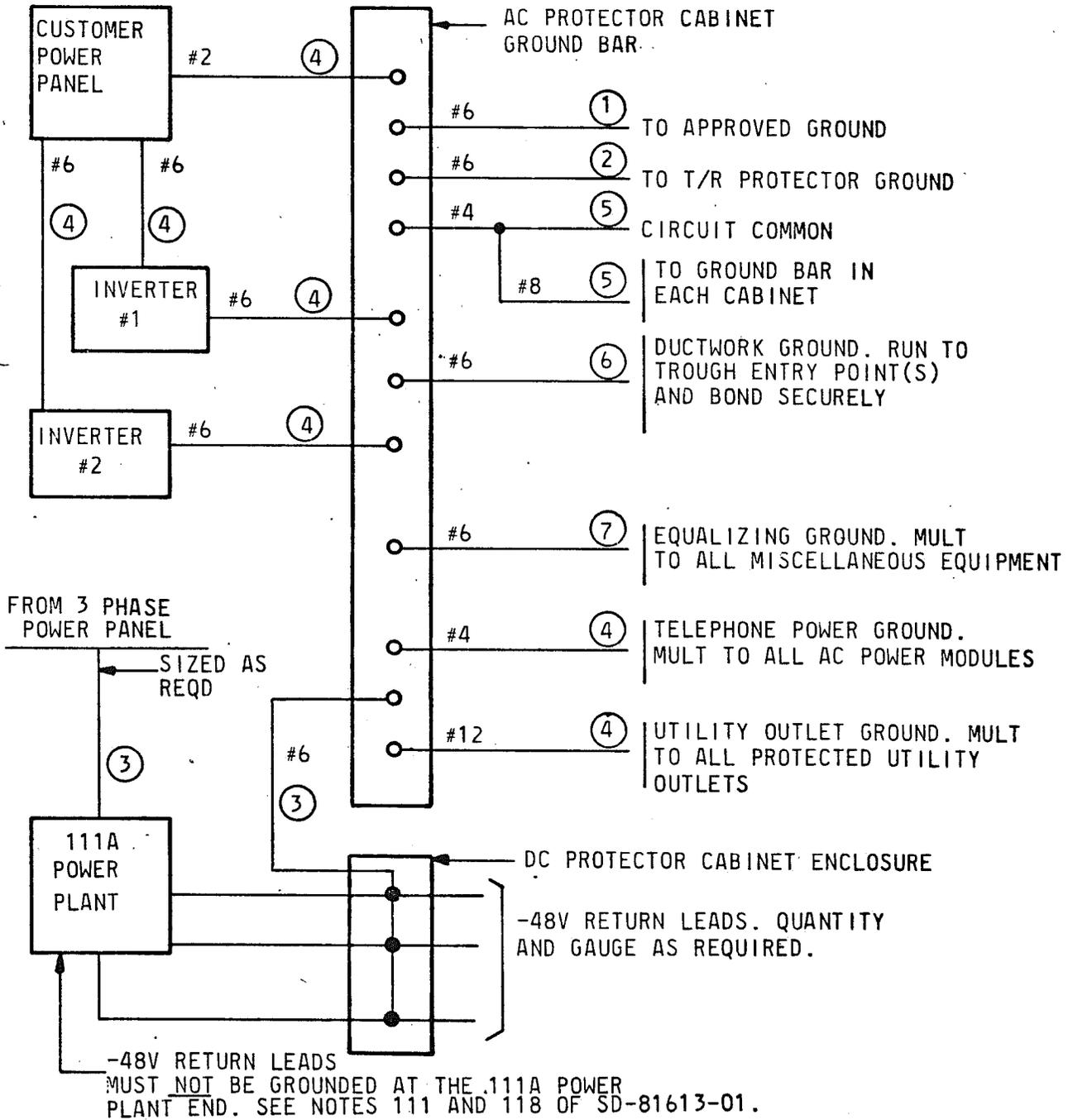


NOTES:

#2, #6, ETC., REFERS TO GAUGE OF AWG STRANDED COPPER WIRE.

(1), (7), (5), ETC., REFERS TO GROUND ARRAY NUMBER. REFER TO PARAGRAPH 1.3.

FIGURE 2
GROUND WIRING ARRAYS
(RESERVE BATTERY SYSTEM)



NOTES:

#4, #6, ETC., DENOTES GAUGE OF AWG STRANDED COPPER WIRE.

(4), (3), (7), ETC., REFERS TO GROUND ARRAY NUMBER. REFER P 1.3 AND TEXT.

CIRCUIT NOTES (CONT):

- 107. U OPTION APPLIES WHEN THIS CIRCUIT IS THE ORIGINATING DISCHARGE CIRCUIT. WHEN THIS CIRCUIT IS USED AS AN AUXILIARY DISCHARGE CIRCUIT, USE T OPTION. SEE NOTE 102.
- 108. d LEAD SHALL HAVE AMPACITY FOR AVERAGE AMPERES PER BATTERY STRING OR 1/4 OF THE 8-HOUR AMPERE HOUR RATING OF THE CELL SIZE USED.

$$\text{AVERAGE AMP} = \frac{\text{AMP LOAD (ULTIMATE)}}{\text{NO. OF STRINGS OF CELLS (ULTIMATE)}}$$

THE FOLLOWING TABLE LISTS COPPER WIRE SIZES WITH THEIR AMPACITIES WHEN USED FOR d LEADS.

SIZE	CAPACITY	SIZE	CAPACITY
8	55 AMP	750,000	630 AMP
4	105 AMP		
2	140 AMP		
00	220 AMP		
4/0	295 AMP		
350,000	405 AMP		
500,000	500 AMP		

IN THIS TABLE, AMPACITY OF KS-5482-01 WIRE ON CABLE RACK IS BASED ON THE AVERAGE OF THE OPEN AND ENCLOSED NEC RATINGS.

- 109. RECTIFIER POLARITY OPTIONS SHALL BE FURNISHED TO MATCH PLANT POLARITY OPTIONS.
- 110. LEADS FROM DISCHARGE BUS IN INITIAL BAY TO SUPPLEMENTARY FUSE PANELS IN OTHER BAYS SHALL HAVE AT LEAST THE CURRENT CARRYING CAPACITY SHOWN IN NOTE 108 FOR THE CONNECTED PEAK LOADS. IN ADDITION, THE VOLTAGE DROP BETWEEN INITIAL BAY AND SUPPLEMENTARY FUSE PANELS SHALL BE SUBTRACTED FROM THE ALLOWED VOLTAGE DROP TO THE EQUIPMENT FUSE PANELS.
- 111. FOR ESS APPLICATIONS, THE DISCHARGE GROUND BAR IS INSULATED FROM THE FRAMEWORK AND THE CO GROUND LEAD SHALL NOT BE CONNECTED TO THE DISCHARGE GROUND BUS AT THE POWER PLANT. A TEMPORARY CONNECTION BETWEEN THE DISCHARGE GROUND BAR AND THE FRAMEWORK IS FURNISHED WITH ESS PLANTS. IT SHALL BE REMOVED WHEN CONNECTION TO CO GROUND VIA DISCHARGE GROUND LEADS AND ESS PDF IS VERIFIED. (SEE NOTE 118).
- 112. SEE BSP AA367.120 (J86470) FOR CALCULATING DISCHARGE LEAD VOLTAGE DROPS FOR ESS APPLICATIONS.
- 113. IN CABINET VERSION, S OPTION, CONNECT RFR1 LEAD TO THE LOWEST NUMBERED RFA LEAD FROM 1ST SUPL BAY AND REMOVE STRAP TO PRECEDING RFA TERMINAL. CONNECT RFR2 LEAD TO THE LOWEST NUMBERED RFA LEAD FROM THE 2ND SUPL BAY AND REMOVE STRAP TO PRECEDING RFA TERMINAL. (SEE CAD. 1).
- 114. WHEN THIS CIRCUIT IS USED FOR NO. 1 ESS:
 - (A) THE (ABS ALH) FUSE SHALL BE 70A AND A DUMMY FUSE INSERTED INTO THE (ABS) FUSE HOLDER.
 - (B) NO CONNECTION SHALL BE MADE TO ALARM CIRCUITS OTHER THAN THE ESS NO. 1 OFFICE ALARM CIRCUIT.
- 115. WHERE A POSITIVE 24 VOLT PLANT IS USED WITH A NEGATIVE 48 VOLT PLANT IN ESS, THE GROUND BUS BARS OF THE TWO PLANTS SHALL BE CONNECTED BY TWO 350,000 SIZE CABLES. IF THE TWO PLANTS ARE NOT LOCATED NEXT TO ONE ANOTHER USE LEAD SIZES IN TABLE BELOW. FOR LEAD LENGTHS EXCEEDING TABLE VALUES, THE L LEAD SHALL BE CALCULATED FOR 1/8 VOLT LOOP DROP AT 800 AMPERES.

L LEAD	
MIN SIZE	LOOP LENGTH IN FEET
750,000	10
2 - 750,000	21
3 - 750,000	31

- 116. SEE TYPICAL BATTERY DISTRIBUTING CIRCUIT FOR NO. 1 ESS (SD-81923-01) FOR CALCULATING CHARGING EQUIPMENT, CHARGE AND DISCHARGE LEADS WHEN THIS CIRCUIT IS USED AS PART OF A NO. 1 ESS POWER PLANT. INFORMATION INCLUDED IN SD-81923-01 SUPERSEDES NOTES 112 AND 115.
- 117. USE H OPTION WHERE ABSF LEAD IS NOT REQUIRED BY THE OFFICE ALARM CIRCUIT.
- 118. SMALL ELECTRONIC SWITCHING SYSTEMS MAY USE THIS PLANT IF GROUND BARS ARE INSULATED IN ACCORDANCE WITH ELECTRONIC SYSTEM GROUNDING PRACTICES (SEE NOTE 111).
- 119. (A) WHEN USED WITH CABLE JUNCTION STAND, SEE SD-81923-01 FOR POINT OF TERMINATION.
(B) WHERE SO DICTATED BY ECONOMICAL OR MECHANICAL CONDITIONS THE CHG BAT AND CHG GRD BUSES IN FS4 MAY BE OMITTED AND THE CHARGE LEADS RUN DIRECTLY FROM RECTIFIERS TO CABLE JUNCTION STAND.

CIRCUIT NOTES (CONT):

- 120. THE CAPACITY OF THE LARGEST RECTIFIER IN THE PLANT CAN NOT EXCEED TWO THIRDS OF THE MINIMUM PLANT LOAD IN AMPERES FOR ELECTRONIC SWITCHING OFFICES.
- 121. THE USE OF OPTION ZC, DESIRABLE IN ALL CASES, IS MANDATORY IN ELECTRONIC SWITCHING SYSTEMS APPLICATIONS. WITH RECTIFIER PER FS12, THE TWELFTH FUSE AND GROUND POSITIONS ARE REASSIGNED FOR CONNECTION OF HVB AND HVG WHEN APPLYING ZC OPTION.
- 122. MAXIMUM TOTAL RECTIFIER CAPACITY CONNECTED TO THE CHG. BUS BAR SHALL NOT EXCEED 1700 AMPERES.
- 123. PRIOR TO ISSUE 11B, 7G, 2K AND 7H OPTIONS WERE PART OF ZH OPTION.
- 124. WHEN B OPTION (LOOP CLOSURE) IS FURNISHED, ZH OPTION MUST ALSO BE FURNISHED.
- 125. PRIOR TO ISSUE 13B PART OF ZH OPTION WAS SHOWN AS PART OF ZB OPTION.
- 126. IF THESE RECTIFIERS ARE APPLIED IN A THREE-PHASE SYSTEM WITH THREE PHASE RECTIFIERS THE FULL LOAD KVA DRAWN BY SINGLE-PHASE RECTIFIERS SHOULD NOT EXCEED 20 PER CENT OF THE STANDBY RESERVE ENGINE KVA RATING.

EQUIPMENT NOTES:

- 201. UNLESS OTHERWISE SPECIFIED WIRE SHALL BE 22 GAUGE BH. WHEN STRANDED WIRE IS SPECIFIED USE KS-13385 WIRE.
- 202. BUS BARS SHOWN IN FS 3 AND FS 6 ARE PART OF BATTERY STAND EQUIPMENT AS COVERED IN J87122.
- 203. FOR COMPUTED LEADS USE COPPER WIRE PER KS-5482-01 OR ALUMINUM WIRE PER KS-20189 PROVIDING EXISTING TERMINATION FACILITIES PERMIT.
- 204. WHEN RECTIFIERS ARE MOUNTED IN "FOUR-PACK" CHARGE BAYS, THE HV-AND RFA-LEADS SHALL RELATE TO THE LOWEST NUMBERED CHARGE UNIT IN THE BAY SINCE ONLY ONE EACH OF THE HV-AND RFA-LEADS ARE REQUIRED FOR EACH "FOUR PACK" CHARGE BAY. USE 456M CABLE FOR CONNECTIONS TO INDIVIDUAL RELAY RACK MOUNTED RECTIFIERS AND 458M CABLES FOR CONNECTIONS TO "FOUR PACK" CHARGE BAYS.
- 205. MOUNT RESISTOR FAL AS CLOSE TO BUS BAR AS POSSIBLE.

INFORMATION NOTES:

- 301. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, VALUES PRECEDED BY THE SYMBOL +(PLUS) OR -(MINUS) ARE IN VOLTS.
- 302. INFORMATION SHOWN IN BRACKETS [] IS FOR REFERENCE ONLY.
- 303. LOW CONTACT SETTING OF HV RELAY MAY BE RAISED FOR LOWERED TO MEET LOCAL VOLTAGE ALARM REQUIREMENTS. IF NEW SETTING IS MORE THAN +3 PERCENT OF VALUE SHOWN IN CIRCUIT REQUIREMENTS TABLE, ERRATIC ACTION OF THE METER MAY BE INCURRED.
- 304. ALARM INDICATIONS:

LEAD DESIG	CAUSE	TYPE OF ALARM
F/PMN	RECTIFIER FAIL OR RC FUSE FAIL	MINOR AUDIBLE
A/PMNV	RECTIFIER FAIL OR RC FUSE FAIL	MINOR VISUAL
DF/PMJ	HIGH-LOW VOLTAGE AND FUSE ALM	MAJOR AUDIBLE
D/PMJV	HIGH-LOW VOLTAGE AND FUSE ALM	MAJOR VISUAL
ATA/SI(A)	HIGH-LOW VOLTAGE	MAJOR ALM
ATD/SI(D)	DISCH FUSE FAIL, CONTROL FUSE FAIL	MAJOR ALM
ATF/SI(F)	DISCH FUSE FAIL, CONTROL FUSE FAIL	MAJOR ALM
ATC/SI(C)	RECTIFIER FAIL OR RC FUSE FAIL	MINOR ALM

(X)
(Y)

100 TYPE PLANTS CHARGE & DISCHARGE CIRCUIT	SD-81613-01-2
BELL TELEPHONE LABORATORIES INCORPORATED	65

17A

LOCATION, ERECTION, AND ASSEMBLY OF EQUIPMENT INSTALLATION

GENERAL EQUIPMENT REQUIREMENTS

1. GENERAL

1.001 This addendum supplements Section 800-614-154, Issue 8-D.

1.002 This addendum is issued:

- (a) To revise 4.08 to specify NO-OX-ID "A", NO-OX-ID "A" Special, or Alcoa No. 2 in place of petrolatum and to clarify its application.
- (b) To revise 4.09 (a) and (b) to specify NO-OX-ID or Alcoa No. 2 in place of petrolatum.
- (c) To omit 4.09 (c).
- (d) To revise 4.10 to specify zinc- or cadmium-plated parts plus a chromate treatment in place of copper-plated and zinc-coated steel.

4. ASSEMBLY OF EQUIPMENT

The following changes apply to Part 4 of the section:

- (a) 4.08 and 4.09 (a) and (b)—revised
- (b) 4.09 (c)—omitted
- (c) 4.10—revised

4.08 All contact surfaces of current-carrying connections shall be clean so that metal-to-metal contact is maintained. A coating of NO-OX-ID "A", NO-OX-ID "A" Special (Dearborn Chemical), or Alcoa No. 2 inhibitor compound shall be applied immediately after cleaning contact surfaces. See 4.08 (f) for aluminum. If required, use petroleum spirits to remove dirt and grease from contact area prior to treatment noted in the following:

- (a) When copper or copper-alloy contact surfaces require cleaning, sandpaper, abrasive cloth, or KS-16736 compound may be used. Remove dust or residue of compound.

(b) Threads of studs or nuts need not be cleaned unless corroded or excessively dirty.

(c) Parts having an added metallic coating shall be cleaned to remove dust or residue, but coating should not be scratched. Coat with NO-OX-ID or Alcoa No. 2.

(d) Nuts, which form a part of the electrical circuit (for example, nuts on studs), are current-carrying parts.

(e) Terminal punchings for wires smaller than No. 8 do not require the application of NO-OX-ID or Alcoa No. 2 to the punchings, bolts, screws, or nuts after cleaning since such punchings are sufficiently pliable to permit them to be drawn into close contact with the surface to which they are connected. Also, NO-OX-ID or Alcoa No. 2 may be omitted in the case of other thin pliable terminals such as the ground terminal strip on the ground bar of fuse panels.

(f) Aluminum contact surfaces shall be cleaned (dry) with sandpaper or abrasive cloth to remove the hard oxide insulating coating. Then, immediately apply a coat of NO-OX-ID or Alcoa No. 2 and use a wire brush to break up any new oxide that has reformed and reapply a coating of inhibitor compound. Clamp the connections together, within 5 minutes, if possible, without removing the inhibitor.

4.09

(a) Surfaces between bus bars and the iron framework shall be clean but need not be scraped, regardless of whether metallic or nonmetallic finish is used on the framework. The use of NO-OX-ID or Alcoa No. 2 is unnecessary.

(b) Where a lead is furnished especially for grounding purposes, as in the case of an isolated frame, the iron surface under the bus

bar or lug shall be scraped and cleaned so that a metal-to-metal connection is certain. Requirements for the use of NO-OX-ID or Alcoa No. 2 are the same as those covered in 4.08 for current-carrying connections.

to aluminum, copper to copper, or combinations of metals shall be zinc- or cadmium-plated plus a chromate treatment, except where lead-coated or lead-encased details are used. Zinc- or cadmium-finished parts are standard; however, copper-finished parts may be used when furnished.

4.10 Ferrous bolts, screws, nuts, washers, bus bar supports, and clips in fastening aluminum