ENGINEERING NOTES

***** CONTINUED *******

57. APPLICABLE PRACTICES AND STANDARDS:

THE POWER DISTRIBUTION AND GROUNDING PRACTICES DOCUMENTED IN THIS DRAWING, WERE ENGINEERED TO COMPLY WITH THE STANDARDS LISTED BELOW:

AT&T 803-500-410	ISOLATED GROUND PLANES
AT&T 801-900-160	NETWORK EQUIPMENT DEVELOPMENT STANDARDS (NEDS)
TR-NWT-000295	BELLCORE, ISOLATED GROUND PLANES
TR-EOP-000063	NEBS GENERIC EQUIPMENT REQUIREMENTS
TA-NPL-000286	NEBS GENERIC ENGINEERING REQUIREMENTS FOR SYSTEM ASSEMBLY AND CABLING DISTRIBUTION
TA-NWT-001089	EMC AND ELECTRICAL SAFETY GENERIC CRITERIA FOR NETWORK TELECOMMUNICATION EQUIPMENT
TR-TSY-000513	LATA SWITCHING SYSTEM GENERIC REQUIREMENTS (LSSGR) SECTION 13
ANSI T1.311	DC POWER SYSTEMS TELECOMMUNICATIONS ENVIRONMENT PROTECTION
ANSI T1.313	ELECTRICAL PROTECTION FOR TELECOMMUNICATIONS CENTRAL OFFICE AND SIMILAR TYPE FACILITIES
NEC*	NATIONAL ELECTRICAL CODE
REA SECTION 810	RURAL ELECTRIFICATION ADMINISTRATION
PBS-068-180PT	PACIFIC BELL STANDARDS

THIS LIST IS NOT COMPLETE. ALL CUSTOMERS HAVE OR ARE IN THE PROCESS OF DEVELOPING SOME TYPE OF STANDARD. THIS LIST WILL BE REVISED AS STANDARDS BECOME AVAILABLE AND ARE REVIEWED.

*THE NEC DOES NOT APPLY TO INSTALLATION OF COMMUNICATION EQUIPMENT UNDER THE EXCLUSIVE CONTROL OF THE COMMUNICATION UTILITIES, (NEC ART. 90-2B4). HOWEVER, UNLESS OTHERWISE SPECIFIED IN THIS DRAWING, THE MINIMUM STANDARD OF SAFETY DICTATED BY THE NEC OR LOCAL CODES SHALL BE COMPLIED WITH WHEN INSTALLING POWER WIRES AND HARDWARE.

58. 5ESS INSTALLATION HANDBOOKS:

IEH555 5ESS-CLASSIC AND 5ESS-2000 PHASE I HARDWARE

SIG I WW 100 5ESS-2000 PHASE II HARDWARE

59. 5ESS POWER MAINTENANCE AND FAULT RECOVERY DOCUMENTS:

LUCENT 235-105-250 5ESS POWER FAULT RECOVERY PROCEDURE

60. 5ESS GROUNDING:

1. GROUNDING OVERVIEW:
FOR THE SINGLE POINT GROUND (ISOLATED GROUND PLANE) METHOD, THE ENTIRE 5ESS SYSTEM (CABINETS, LINEUP CABLE RACKS, CROSS AISLE TROUGHS, CONDUITS, WIRES, ETC.) IS INSULATED FROM THE HOST OFFICE GROUND SYSTEM EXCEPT AT ONE POINT, THE GW (GROUND WINDOW).

THE DC POWER PLANT RETURN BUS IS ALSO PART OF THE ISOLATED GROUND PLANE AND IT TOO CONNECTS TO THE HOST OFFICE GROUND SYSTEM ONLY VIA THE GROUND WINDOW.

ANY COMPONENT OF THE ISOLATED GROUND PLANE, EXCEPT THE POWER PLANT RETURN BUS BAR, SHOULD NOT BE INSTALLED MORE THAN ONE FLOOR AWAY, UP OR DOWN, FROM THE GROUND WINDOW. THIS IS NECESSARY TO REDUCE VOLTAGE DIFFERENCES BETWEEN COMPONENTS OF THE ISOLATED GROUND PLANE AND COMPONENTS OF THE BUILDING GROUND SYSTEM DURING THUNDERSTORM ACTIVITIES, ESPECIALLY DIRECT LIGHTNING HITS TO THE TOP OF THE BUILDING.

---------- CONTINUED ON NEXT SHEET ----------

ENGINEERING NOTES

51. PURPOSE OF DRAWING:

THIS DRAWING DOCUMENTS THE SPECIFICATIONS FOR SYSTEM LEVEL DC AND AC POWER DISTRIBUTION AND GROUNDING METHODS FOR THE 5ESS SYSTEM. THIS DRAWING SHALL BE USED BY THE REGIONAL ENGINEERS AS A GUIDE FOR THE PREPARATION OF DETAILED JOB DRAWINGS, AND TO OBTAIN HARDWARE ORDERING INFORMATION. THIS DRAWING MAY ALSO BE USED BY INSTALLATION AND QUALITY PERSONNEL AS A REFERENCE FOR METHOD OF INSTALLATION.

THE REQUIREMENTS AND PROCEDURES OUTLINED IN THIS DRAWING REFLECT RECOMMENDATIONS FOR MAXIMUM SYSTEM RELIABILITY AND PERSONNEL SAFETY. AT TIMES CUSTOMERS MAY ELECT TO DEVIATE FROM SOME OF THE RECOMMENDATIONS, AND THEY MAY DO SO AT THEIR OWN RISK.

52. DRAWING STRUCTURE:

ITEM	SHEET
ISSUE NOTES	A1
ENGINEERING NOTES	A1 - A3
LIST OF B- AND C- FIGURES	B1 - B3
LIST OF TABLES	B3
ACRONYMS	B4
B-FIGURES	B5 - B42
C-FIGURES	C1 - C28
TABLES	E1 - E5

53. BACKGROUND:

ED5D073-11, ED5D022-11 AND ED5D021-12 HAVE BEEN DISCONTINUED AND REPLACED BY THIS DRAWING. THIS NEW DRAWING CONTAINS NEW FIGURES AND NOTES AS WELL AS SEVERAL FIGURES AND CONCEPTS FROM THE OLD DRAWINGS. SOME FIGURES FROM THE OLD DRAWINGS WERE RE-DRAWN IN THIS NEW DRAWING FOR COMPLETENESS AND FOR DOCUMENTING METHODS THAT ARE EITHER STILL USED OR WERE USED IN OLDER SYSTEMS AND ARE IN EXISTENCE IN THE FIELD. THE OLD DRAWINGS WILL BE ARCHIVED FOR HISTORICAL REFERENCE.

54. HISTORICAL REFERENCES:

ED5D021-12	5ESS AC POWER DISTRIBUTION
ED5D022-11	5ESS GROUNDING
ED5D073-11	5ESS DC POWER DISTRIBUTION

55. ASSOCIATED SCHEMATIC DIAGRAMS:

SD5D002-01	5ESS CURRENT DRAINS
SD5D004-01	5ESS AC POWER CIRCUIT
SD5D005-01	5ESS DC POWER CIRCUIT
ED5D022-01	5ESS GROUNDING CIRCUIT

56. ASSOCIATED ORDERING AND METHOD OF INSTALLATION DRAWINGS:

ED4C471-30	COMMON ESS POWER FEEDERS TERMINATIONS BUS BARS
ED4C686-70	COMMON ESS GROUNDING HARDWARE AND KITS
ED5A079-70	POWER FEEDERS ORDERING DRAWING
ED5D511-31	EQUIPMENT CABINETS ANCHORING
ED5D753-70	5ESS LIGHTING
ED5D753-72	SPECIFICATIONS FOR 5ESS-2000 PHASE II GLOBAL CABLE RACK SUPPORTED LIGHTING
ED4C685-71	COMMON SYSTEMS LADDER TYPE CABLE RACKS AND GRADE 5 HARDWARE KITS

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ISSUE NOTES

ORIG ISS: 01/02/97 CHANGE CLASS:

DRAFT: RJS	ENGR: GM	SUPV: GJM	CERTIFIED: 01/02/97	ISSUE: 1

REVISED ENGINEERING NOTES 59, 61.3, 61.4.
DELETED "SHEET" COLUMN FROM THE LISTS IN B-SHEETS.
ADDED FIG. B45, B126, C45, C165 TO THE LISTS OF FIGURES.
ADDED KCMIL, PDU TO ACRONYM LIST.
ADDED THE N LEAD TO FIG. B20. ADDED WP93746 WIRE TO FIG. B40. AND UPDATED ITS SHT NOTE 6 WITH NEW HANDBOOK SECTION NO.
REVISED SHT NOTE 5 OF FIG. B80 & B100, SHT NOTE 7 OF FIG.B90 & B110, SHT NOTE 9 OF FIG B130 & B140.
ADDED FIG. C100(B) FOR 145P TAG AND REVISED ITS SHT NOTE 2.
ADDED FIG. B45, B126, B180(E)&(F), C45, C130(C), C165.
REVISED FIG. B180(A - D). REVISED B180 SHT NOTES AND ADDED NOTE 8 REGARDING ADDITIONAL BONDING WIRES REQUIED FOR SM2000.
REVISED FIG. B240, B250, B260. ADDED DETAIL-A TO B250 FOR MCC OPTICAL CABLE DETAIL.
ADDED PDU TO FIG. C180 AND NOTE 5.
CHANGED 750 KCMIL TO #4/0 MIN. IN FIG B220 TO BE CONSISTENT WITH FIG. B10.
UPDATED THE GROUND FAULT CURRENT MONITOR ORDERING DRAWING NO. IN SHT NOTE 4 OF FIG. C13.
REVISED FIG. B80 TO B110 AND B130 TO B140 FOR MCC WIRE GROUNDING TERMINATION.
CONVERTED ALL GRAPHIC DATA FROM UNIGRAPHICS TO PRO-E FORMAT.
REVISED ENGINEERING NOTES 59, 61.3, 61.4.
DELETED "SHEET" COLUMN FROM THE LISTS IN B-SHEETS.
ADDED FIG. B45, B126, C45, C165 TO THE LISTS OF FIGURES.
ADDED KCMIL, PDU TO ACRONYM LIST.
ADDED THE N LEAD TO FIG. B20. ADDED WP93746 WIRE TO FIG. B40. AND UPDATED ITS SHT NOTE 6 WITH NEW HANDBOOK SECTION NO.
REVISED SHT NOTE 5 OF FIG. B80 & B100, SHT NOTE 7 OF FIG.B90 & B110, SHT NOTE 9 OF FIG B130 & B140.
ADDED FIG. C100(B) FOR 145P TAG AND REVISED ITS SHT NOTE 2.
ADDED FIG. B45, B126, B180(E)&(F), C45, C130(C), C165.
REVISED FIG. B180(A - D). REVISED B180 SHT NOTES AND ADDED NOTE 8 REGARDING ADDITIONAL BONDING WIRES REQUIED FOR SM2000.
REVISED FIG. B240, B250, B260. ADDED DETAIL-A TO B250 FOR MCC OPTICAL CABLE DETAIL.
ADDED PDU TO FIG. C180 AND NOTE 5.
CHANGED 750 KCMIL TO #4/0 MIN. IN FIG B220 TO BE CONSISTENT WITH FIG. B10.
UPDATED THE GROUND FAULT CURRENT MONITOR ORDERING DRAWING NO. IN SHT NOTE 4 OF FIG. C13.
REVISED FIG. B80 TO B110 AND B130 TO B140 FOR MCC WIRE GROUNDING TERMINATION.
CONVERTED ALL GRAPHIC DATA FROM UNIGRAPHICS TO PRO-E FORMAT.

ORIG ISS: 01/02/97 CHANGE CLASS: ME

DRAFT: JB	ENGR: GM	SUPV: GJM	CERTIFIED: 08/25/99	ISSUE: 2

SHEET INDEX

SHT NBR / ISSUE											
SHT NBR / ISSUE	A1 THRU A3 ISSUE 2										
SHT NBR / ISSUE											
SHT NBR	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
ISSUE	2	2	2	2	2	2	2	2	2	2	2
SHT NBR	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22
ISSUE	2	2	2	2	2	2	2	2	2	2	2
SHT NBR	B23	B24	B25	B26	B27	B28	B29	B30	B31	B32	B33
ISSUE	2	2	2	2	2	2	2	2	2	2	2
SHT NBR	B34	B35	B36	B37	B38	B39	B40	B41	B42		
ISSUE	2	2	2	2	2	2	2	2	2		
SHT NBR	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
ISSUE	2	2	2	2	2	2	2	2	2	2	2
SHT NBR	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22
ISSUE	2	2	2	2	2	2	2	2	2	2	2
SHT NBR	C23	C24	C25	C26	C27	C28					
ISSUE	2	2	2	2	2	2					
SHT NBR	E1	E2	E3	E4	E5						
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SHT NBR											
ISSUE											
SHT NBR											
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SHT NBR											
ISSUE											
SHT NBR											
ISSUE											

TABLE OF CONTENTS

BT13

5ESS SWITCHING EQUIPMENT
SPECIFICATIONS FOR
POWER DISTRIBUTION
AND
GROUNDING METHODS

DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES INC | ED5D805-10 | SHEET A1 OF 78

BE IN SEPARATE BUNDLES AND OPPOSITE SIDES OF CABLE RACK. IF TWO SEPARATE RACKS ARE AVAILABLE PLACE A AND B BUS CABLES ON TWO SEPARATE RACKS, SEE FIG. C310.

ROUTE SECONDARY POWER FEEDERS IN POWER COMPARTMENT OF LINEUP CABLE RACK MOUNTED OVER EQUIPMENT CABINETS, SEE FIGS. C220 AND C230.

7. POWER FEEDERS INSTALLATION (UNDER RAISED FLOOR, NON - PLENUM):
WHEN THE EQUIPMENT CABINETS ARE INSTALLED ON A RAISED FLOOR, AND ALL CABLING MUST BE DONE IN THE SPACE BELOW THE RAISED FLOOR, FOLLOW THE FOLLOWING GUIDELINES:

A) INSTALL PRIMARY POWER FEEDERS (FROM POWER PLANT TO 5ESS PDF) ON LADDER TYPE CABLE RACKS OR EQUIVALENT. CABLE RACKS SHOULD BE SECURED TO STEEL CHANNELS ANCHORED TO THE CONCRETE SLAB. ROUTE A BUS AND B BUS FEEDERS ON SEPARATE CABLE RACKS OR ON OPPOSITE SIDES OF ONE CABLE RACK.

B) ROUTE SECONDARY POWER FEEDERS BELOW THE RAISED FLOOR ON THE CONCRETE SLAB IN NEAT BUNDLES AND KEEP THEM SEPARATED FROM SWITCHBOARD CABLES.

C) TO FACILITATE CHANGES SUCH AS GROWTH, DE-GROWTH AND INSPECTIONS, USE CABLE RACK BRIDGES WHEN SWITCHBOARD AND POWER CABLES CROSS OVER EACH OTHER. ALSO, RUN CABLES IN DEDICATED PATHS AND AVOID DIAGONAL RUNS AND INTERTWINING CABLES INTO A TANGLED MESS.

8. POWER FEEDERS INSTALLATION (UNDER RAISED FLOOR PLENUM):
CABLING RULES HAVE NOT BEEN ESTABLISHED FOR TELEPHONE EQUIPMENT INSTALLATIONS WHERE AIR IS CIRCULATED UNDER THE RAISED FLOOR CAVITY FOR THE PURPOSE OF COOLING THE SWITCH ROOM.

AS OF ISSUE 1 OF THIS DRAWING, WE ARE STILL USING THE FACT THAT IN A TELEPHONE OFFICE UNDER THE EXCLUSIVE CONTROL OF THE COMMUNICATIONS UTILITIES, THE INSTALLATION IS EXEMPT FROM THE NATIONAL ELECTRICAL CODE, SEE NEC ART. 90-2B4.

ON CUSTOMER PREMISES, HOWEVER, THE NEC AND LOCAL CODES MAY APPLY. UNTIL RULES ARE ESTABLISHED GOVERNING THE INSTALLATION OF TELEPHONE EQUIPMENT POWER AND SIGNAL CABLES IN A PLENUM RAISED FLOOR, THE CUSTOMER TAKES ON THE RESPONSIBILITY OF THE INSTALLATION. LUCENT TECHNOLOGIES DOES NOT RECOMMEND THE PRACTICE OF CIRCULATING CONDITIONED AIR UNDER THE RAISED FLOOR CAVITY AT THIS TIME.

9. 5ESS PDF LOCATION:
THE 5ESS PDF SHALL BE LOCATED TOWARD THE MIDDLE OF THE LINEUP AND EQUIPMENT THAT IT WILL ULTIMATELY SERVE. THIS IS NECESSARY TO EQUALIZE SECONDARY POWER FEEDER LENGTHS AND REDUCE THE NEED FOR CABLE SPLICING TO COMPLY WITH MAXIMUM VOLTAGE DROP.

62. AC POWER:

1. PROTECTED AC:
AC POWER IS USED IN THE 5ESS SWITCH FOR MODEMS, TAPE UNIT, PRINTERS AND TERMINALS.

FOR IMPROVED RELIABILITY, IT IS RECOMMENDED THAT THE AC BE DERIVED FROM AN INVERTER. THE INVERTER DERIVED AC IS KNOWN AS PROTECTED AC. THE RECOMMENDED METHOD OF PROVIDING PROTECTED AC TO THESE LOADS, IS WITH A 1KVA INVERTER MOUNTED IN THE 5ESS MISCELLANEOUS CABINET.

IF PROTECTED AC IS ALREADY AVAILABLE IN THE HOST BUILDING, IT MAY BE USED, PROVIDED ALL THE GROUNDING AND DISTRIBUTION REQUIREMENTS SPECIFIED IN THIS DRAWING ARE FOLLOWED,

SEE FIGS. B230, B240, B250, B260 FOR AC DISTRIBUTION OPTIONS.

2. TEST EQUIPMENT OUTLETS:
AC OUTLETS FOR TESTING AND TROUBLESHOOTING EQUIPMENT ARE SHOWN IN FIG. B190 AND B270.

3. AC DISTRIBUTION HARDWARE:
UNLESS OTHERWISE SPECIFIED IN THIS DRAWING, COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC) AND/OR ANY APPLICABLE LOCAL CODE. UNLESS OTHERWISE SPECIFIED BY CUSTOMER REQUIREMENTS OR LOCAL CODES, USE EMT CONDUIT FOR AC DISTRIBUTION.

4. AC DISTRIBUTION WIRES:
USE KS22641 THWN/THHN 600V OR EQUIVALENT WIRES.

5. AC GROUNDING:
ALL AC DISTRIBUTION RACEWAYS AND LOADS MUST BE EQUIPPED WITH AN ACEG (AC EQUIPMENT GROUND) WIRE. ANY AC CONDUIT AND ACEG WIRE ENTERING THE ISOLATED GROUND PLANE OF THE 5ESS SYSTEM,

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3. PRIMARY DC POWER FEEDER TYPE:
PRIMARY POWER FEEDERS, ARE FEEDERS FROM THE POWER SOURCE TO THE 5ESS PDF.
THE FOLLOWING WIRES ARE APPROVED FOR USE:

KS24194 (CLASS B) NON-HALOGEN INS. COPPER POWER WIRE
WP93862 (CLASS B) CROSS-LINKED POLYOLEFIN COPPER WIRE.

KS23814 (CLASS B)(DA'D) NON-HALOGEN INS. COPPER POWER WIRE.
KS5482-L28FR (CLASS B)(DA'D) HYPALON INS. COPPER POWER WIRE.

USE THE FOLLOWING WIRES AS DROP-IN LEADS ONLY IN CONGESTED AREAS WHERE A MORE FLEXIBLE WIRE WILL FACILIATE BENDING AND ROUTING.

KS24194 (CLASS I) NON-HALOGEN INS. COPPER WIRE.
WP93682 (CLASS I) CROSS-LINKED POLYOLEFINE COPPER WIRE.

KS23835 (FLEX) (DA'D) NON-HALOGEN INS. COPPER POWER WIRE
KS20921 (FLEX) (DA'D) HYPALON INS. COPPER POWER WIRE

4. SECONDARY DC POWER FEEDER TYPE:
SECONDARY FEEDERS, ARE FEEDERS FROM THE 5ESS PDF TO THE EQUIPMENT CABINETS. THE RECOMMENDED STANDARD CABLE TO BE USED FOR THIS PURPOSE IS:

WP93746-L1, FLAME-RETARDANT PVC COPPER WIRE
KS13385-L1, NO.10 AWG TWISTED PAIR, AVAILABLE FROM ED5A079-30.

5. POWER FEEDER SIZING:
THE SIZE OF A DC POWER FEEDER IS A FUNCTION OF THE FOLLOWING:
A) UPSTREAM OVERCURRENT PROTECTION DEVICE (OPD) SIZE
B) LOAD CURRENT (LIST 2 DRAIN)
C) MAXIMUM ALLOWED VOLTAGE DROP
D) FEEDER LENGTH

WHEN CALCULATING FEEDER SIZE, CHOOSE THE LARGEST FEEDER RESULTING FROM THE FOLLOWING:

A) USE # 1/0 MINIMUM.

B) FEEDER AMPACITY BASED ON NEC TABLE 310-16 SHALL BE EQUAL TO OR EXCEED FUSE OR CIRCUIT BREAKER SIZE (SEE NOTE 61.2)

$$C)\quad CM = \frac{(11.1)\ X\ (L2\ AMPS)\ X\ (LOOP\ FEET)}{(MAX\ LOOP\ VOLT\ DROP)}$$

CM = CIRCULAR MILS
L2 = LIST 2 CURRENT

EXAMPLE:

GIVEN THE FOLLOWING PARAMETERS:

* MAXIMUM EXPECTED L2 DRAIN = 85A
* FEEDER LENGTH = 180 FT. LOOP
* MAX LOOP VOLTAGE DROP ON FEEDER = 1.25

CALCULATE:

1. OVERCURRENT PROTECTION DEVICE (OPD), CB OR FUSE
2. FEEDER SIZE

OPD SIZE = (1.25) X (L2 DRAIN) = 106.25

NEXT OPD STANDARD SIZE = 110 AMPERES

TEST A - # 1/0 MINIMUM

TEST B - WIRE SIZE BASED ON NEC TABLE 310-16
75 DEGREE C COLUMN = # 2 AWG

TEST C - WIRE SIZE BASED ON FORMULA

$$CM = \frac{(11.1)\ X\ (85)\ X\ (180)}{1.25}$$

CM = 135864 = 3/0

IF 3/0 IS NOT A STANDARD SIZE, USE 4/0

6. POWER FEEDERS ROUTING (OVERHEAD DISTRIBUTION):
ROUTE PRIMARY FEEDERS ON OPEN CABLE TRAYS, USUALLY LADDER TYPE CABLE RACKS. KEEP THE -48V CONDUCTOR AND ITS ASSOCIATED RETURN CONDUCTOR PAIRED THROUGHOUT THE ENTIRE PATH. A BUS AND B BUS FEEDERS MAY GO ON THE SAME CABLE TRAY BUT SHOULD

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2. 5ESS EQUIPMENT CABINET FRAMEWORK GROUND:
THE FRAMEWORK OF THE EQUIPMENT CABINETS SHALL BE ISOLATED FROM ANY CONDUCTIVE SURFACES THAT ARE NOT PART OF THE 5ESS GROUND SYSTEM. INSULATING BUSHINGS SHALL BE USED WITH FLOOR ANCHORS AND LIGHT FIXTURE SUPPORT BRACKETS. SEE FIG. C10, C12 AND C13 FOR ISOLATION TEST.

3. 5ESS GROUND WINDOW AND MAIN GROUND BUS (GWMGB):
THE GROUND WINDOW IS AN IMAGINARY SPHERE OF 3 FEET RADIUS. THE MAIN GROUND BUS IS A COPPER BAR LOCATED WITHIN THE GROUND WINDOW AND IS USED FOR MAKING PHYSICAL CONNECTIONS OF GROUNDING AND GROUNDED CONDUCTORS. THE 5ESS ISOLATED GROUND PLANE SYSTEM IS CONNECTED TO THE HOST BUILDING GROUND SYSTEM AND EVENTUALLY TO EARTH ONLY VIA THE GROUND WINDOW MAIN GROUND BUS.

TO PREVENT, OR AT LEAST REDUCE THE MAGNITUDE OF FOREIGN CURRENTS FROM TRAVELING THROUGH THE SYSTEM, ANY FOREIGN GROUND BEING INTRODUCED INTO THE ISOLATED GROUND PLANE MUST PASS THROUGH THE GROUND WINDOW AND BE BONDED TO THE GROUND WINDOW MAIN GROUND BUS.

4. DC EQUIPMENT GROUNDING CONDUCTORS:
GROUNDING CONDUCTOR SIZES AND METHODS TO CALCULATE GROUNDING CONDUCTOR SIZES ARE GIVEN IN THIS DRAWING. GROUNDING CONDUCTOR INSULATION SHALL BE GREEN UNLESS OTHERWISE INDICATED BY THE CUSTOMER OR LOCAL CODES. A GROUNDING CONDUCTOR WITH AN INSULATION COLOR THAT IS DIFFERENT THAN ALL THE OTHER WIRES, FACILITATES INSPECTIONS AND SURVEYS.

5. DC GROUNDING CONDUCTORS ROUTING:
TO REDUCE GROUND PATH IMPEDANCE, GROUND CONDUCTORS SHALL BE RUN AS STRAIGHT AS POSSIBLE WITH LARGE RADIUS BENDS. AVOID RUNNING DC GROUNDING CONDUCTORS THROUGH A CONDUCTIVE CLOSED LOOP I.E. A FLOOR OR WALL CABLE HOLE WITH A STEEL SLEEVE OR FRAME, OR TOTALLY SURROUND THE CONDUCTOR WITH STEEL CLAMPS. IF A GROUNDING CONDUCTOR IS ROUTED INSIDE A METALLIC CONDUIT, THE CONDUCTOR MUST BE BONDED TO THE CONDUIT AT BOTH ENDS.

6. EQUIPOTENTIAL BONDING:
IF POSSIBLE, INSTALL ALL COMPONENTS (CABINETS, RACKS ETC.) OF THE ISOLATED GROUND PLANE GREATER THAN 7 FEET FROM ANY CONDUCTIVE SURFACES I.E. STORAGE CABINETS, EXPOSED BUILDING STEEL, AIR DUCTS, OTHER ELECTRONIC SYSTEMS. OTHERWISE BOND ANY CONDUCTIVE SURFACE THAT IS 7 FEET OR LESS FROM ANY COMPONENT OF THE 5ESS ISOLATED GROUND PLANE TO THE GWMGB.

7. GROUNDING HARDWARE:
GROUNDING HARDWARE AND KITS MAY BE ORDERED FROM ED4C686-70. WP91412 TINNED COPPER CRIMP TYPE LUGS OR EQUIVALENT ARE APPROVED FOR USE WITH 5ESS.

61. DC POWER:

1. DC POWER SOURCE:
THE 5ESS SWITCH REQUIRES A NOMINAL -48V DC POWER SUPPLY. THE DC POWER SOURCE MAY BE DEDICATED FOR 5ESS OR SHARED WITH OTHER SYSTEMS. A DEDICATED POWER PLANT IS PREFERRED SINCE IT OFFERS THE HIGHEST RELIABILITY.

IF THE POWER PLANT MUST BE SHARED WITH OTHER SYSTEMS, ONE OF THE FOLLOWING OPTIONS MUST BE USED TO ENSURE GROUNDING COMPATIBILITY.

A) USE THE POWER PLANT DISCHARGE BUS BAR AS THE GROUND WINDOW MAIN GROUND BUS (GWMGB).

B) IF A SEPARATE (STAND ALONE) GROUND WINDOW EXISTS OR WILL BE INSTALLED, THE RETURN FEEDERS OF ANY OTHER SYSTEM OF UNKNOWN GROUNDING METHODS OR MULTIGROUNDED SYSTEM SHALL BE ROUTED THROUGH THE GW AND BONDED TO THE GWMGB. SEE FIG. B90, B110, B280 AND C120.

2. OVERCURRENT PROTECTION DEVICE:
THE RECOMMENDED MAXIMUM SIZE FOR POWER PLANT FUSES OR CIRCUIT BREAKERS FEEDING EACH 5ESS PDF(S) FUSE PANEL IS 225 AMPERES. IF THE POWER PLANT IS EQUIPPED WITH A LARGER FUSE OR CIRCUIT BREAKER, THE POWER FEEDERS AND GROUNDING CONDUCTORS SHALL BE ENGINEERED ACCORDINGLY, SEE NOTE 61.5. THE MINIMUM CIRCUIT BREAKER SIZE SHALL BE 1.25 X L2 AMPERES.

------ CONTINUED TO THE LEFT ------

BT13

5ESS SWITCHING EQUIPMENT
SPECIFICATIONS FOR
POWER DISTRIBUTION
AND
GROUNDING METHODS

DWG SIZE C2 | ISSUE 2

ENGINEERING NOTES

***** CONTINUED *******

PLATED COPPER CONNECTOR TANG IS CONNECTED TO AN UNPLATED COPPER BAR, THIS CONNECTION REQUIRES ANTI-OXIDIZING INHIBITING COMPOUND.

THE ABOVE DOES NOT APPLY IF THE PRODUCT DOCUMENTATION SPECIFICALLY STATES ANTI-OXIDIZING COMPOUND APPLICATION REQUIREMENTS.

65. CURRENT DRAIN DEFINITIONS:

1. LIST 1:
   USED TO SIZE BATTERIES AND RECTIFIERS. THESE DRAINS REPRESENT THE AVERAGE BUSY-HOUR CURRENT AT NORMAL OPERATING VOLTAGES.

2. LIST 2:
   USED TO SIZE FEEDER CABLES AND FUSES. THESE DRAINS REPRESENT THE PEAK CURRENT FOR A CIRCUIT OR A GROUP OF CIRCUITS UNDER WORST CASE OPERATING CONDITIONS. FOR EXAMPLE, A CONSTANT POWER LOAD REQUIRES MAXIMUM CURRENT AT MINIMUM OPERATING VOLTAGE. LIST 2 CURRENT MAY ALSO BE GENERATED BY CIRCUIT OPERATING VARIABILITY (TRAFFIC, TEST CONDITION, ETC.) WHILE AT NORMAL FLOAT VOLTAGE.

3. LIST 3:
   USED TO SIZE CONVERTER PLANTS. LIKE LIST 2 DRAINS, THESE DRAINS REPRESENT PEAK CURRENT, BUT UNLIKE LIST 2 DRAINS, THEY ARE AT A REGULATED OPERATING VOLTAGE PROVIDED BY CONVERTER PLANTS. NOTE THAT LIST 3 DRAINS ARE ESSENTIALLY L1 DRAINS FOR THOSE LOADS WITH NO CIRCUIT OPERATING VARIABILITY.

ENGINEERING NOTES

***** CONTINUED *******

SHALL BE BONDED TO THE GROUND WINDOW AND THEREAFTER ISOLATED FROM BUILDING GROUND OR ANY OTHER CONDUCTIVE SURFACE THAT IS NOT PART OF THE 5ESS ISOLATED GROUND PLANE. THE NO. 6 AWG BONDING JUMPER BETWEEN THE AC JUNCTION BOX AND THE GW SHALL BE 3 FEET MAXIMUM.
SEE FIG. C130.

63. MCC GROUNDING:
ALL MCC (MASTER CONTROL CENTER) WORKSTATION FURNITURE COMPONENTS THAT HAVE CONDUCTIVE SURFACES MUST BE BONDED TOGETHER AND GROUNDED. SEE FIGS. C290, AND C300.
ALL MAINTENANCE TERMINALS AND PRINTERS EQUIPPED WITH AN ACEG WIRE SHALL BE CONSIDERED ADEQUATELY GROUNDED.

64. INSTALLATION NOTES:

1. CRIMPING TOOLS:
   ALL CRIMP TYPE CONNECTORS USED ON POWER AND GROUNDING CONDUCTORS SHALL BE CRIMPED WITH APPROVED PROFESSIONAL TOOLS, SUCH AS BURNDY Y35, Y39, Y46, Y750 OR THOMAS AND BETTS TOOLS USING COLOR CODED DIES, OR EQUIVALENT TOOLS.

   ANY TOOL USED MUST LEAVE A IDENTIFICATION MARK ON THE CONNECTOR.

2. ANTI-OXIDIZING COMPOUND:

   THE FOLLOWING GUIDELINES SHOULD BE USED IN DETERMINING WHEN AND IF ANTI-OXIDIZING COMPOUND SHOULD BE USED ON 5ESS SWITCH POWER AND GROUND CONNECTIONS:

   DEFINITIONS:

   UNPROTECTED METAL - DEFINED AS ANY OF THE FOLLOWING:

   - UNPLATED COPPER
   - UNPLATED COPPER ALLOY
   - UNPLATED STEEL
   - ALUMINUM
   - LEAD OR PLATED LEAD
   - ANY METAL WITH EXPOSED SURFACE OF COPPER/COPPER ALLOY PLATE.

   UNPROTECTED METAL COMBINATIONS - DEFINED AS ELECTRICAL CONTACT SURFACES THAT MAKE UP A SINGLE CONNECTION IN WHICH ONE OR MORE OF THE CONTACTING SURFACES IS AN UNPROTECTED METAL.

   PROTECTED METAL - DEFINED AS METAL CONSISTING OF OR PLATED WITH ONE OF THE FOLLOWING MATERIALS:

   TIN SOLDER NICKEL SILVER GOLD
   CHROMIUM ZINC CADMIUM PLATINUM

   I. UNPROTECTED METAL ELECTRICAL CONNECTIONS MADE BY CRIMPED OR MECHANICAL SCREW/NUT CONNECTIONS SHALL BE PROTECTED AGAINST OXIDATION BY APPLYING ANTI-OXIDIZING COMPOUND TO THE UNPROTECTED SURFACE.

      A. UNPROTECTED METAL IS CONNECTED OR FASTENED TO UNPROTECTED METAL.

      B. UNPROTECTED METAL IS CONNECTED OR FASTENED TO PROTECTED METAL.

   II. THE FOLLOWING ELECTRICAL CONNECTION COMBINATIONS SHALL NOT REQUIRE THE APPLICATION OF ANTI-OXIDIZING COMPOUND:

      A. PROTECTED METAL IS CONNECTED OR FASTENED TO PROTECTED METAL.

   III. IN ALL CASES, WHERE SOME DOUBT EXISTS, THE INHIBITING COMPOUND SHOULD BE USED.

      THE FOLLOWING IS AN EXAMPLE WHICH MAY HELP TO EXPLAIN THIS REQUIREMENT:

      EXAMPLE: A TIN PLATED COPPER CONNECTOR CRIMPED ON A TIN PLATED COPPER WIRE REQUIRES NO INHIBITING COMPOUND, BUT WHEN THE TIN

------ CONTINUED TO THE LEFT ------

BT13

5ESS SWITCHING EQUIPMENT
SPECIFICATIONS FOR
POWER DISTRIBUTION
AND
GROUNDING METHODS

DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES INC | ED5D805-10 | SHEET A3 OF 78

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LIST OF FIGURES IN B- AND C-SHEETS			
FIG.	STATUS	INTRODUCED IN DRAWING ISSUE	DESCRIPTION
B10	ACTIVE	1	ISOLATED GROUND PLANE OVERVIEW
B20	ACTIVE	1	POWER PLANT GROUNDING
B30	ACTIVE	1	VOLTAGE DROP ALLOCATION
B40	ACTIVE	1	DC POWER CABLING REQUIREMENTS
B45	ACTIVE	2	DC POWER FEEDER CONFIGURATIONS FOR 5ESS EQUIPMENT CABINETS
B50	ACTIVE	1	SINGLE POWER PLANT ARCHITECTURE
B60	DA	1	GROUND WINDOW, AT POWER PLANT WITH COMMERCIAL AC
B70	DA	1	GROUND WINDOW,STAND ALONE WITH COMMERCIAL AC
B80	ACTIVE	1	GROUND WINDOW AT POWER PLANT, NO COMMERCIAL AC
B90	ACTIVE	1	GROUND WINDOW, STAND ALONE, NO COMMERCIAL AC
B100	ACTIVE	1	GROUND WINDOW AT POWER PLANT, WITH COMMERCIAL AC
B110	ACTIVE	1	GROUND WINDOW, STAND ALONE WITH COMMERCIAL AC
B120	ACTIVE	1	DUAL POWER PLANT ARCHITECTURE
B125	ACTIVE	1	TWO 5ESS POWERED BY TWO POWER PLANTS
B126	ACTIVE	2	TWO ISOLATED SYSTEMS SHARING ONE POWER PLANT
B130	ACTIVE	1	5ESS WITH DUAL POWER PLANTS AND COMMERCIAL AC
B140	ACTIVE	1	5ESS WITH DUAL POWER PLANT, NO COMMERCIAL AC
B150	ACTIVE	1	RSM, ORM, VCDX WITH GW AT POWER PLANT
B160	ACTIVE	1	RSM, ORM, VCDX WITH STAND ALONE GW
B170	ACTIVE	1	STAND ALONE EQUIPMENT CABINET
B180	ACTIVE	1	FRAMEWORK GROUNDING LAYOUTS
B190	ACTIVE	1	SLAB INSTALLATION, HIGH LEVEL DIAGRAM
B200	DA	1	GROUND WINDOW CONNECTIONS, STAND ALONE GW
B210	ACTIVE	1	GROUND WINDOW CONNECTIONS, GW AT POWER PLANT
B220	ACTIVE	1	GROUND WINDOW CONNECTIONS, STAND ALONE GW
B230	ACTIVE	1	AC DISTRIBUTION, HIGH LEVEL DIAGRAM, PROTECTED AC METHOD 1
B240	ACTIVE	1	PROTECTED AC DISTRIBUTION, METHODS 2 AND 3
B250	ACTIVE	1	PROTECTED AC DISTRIBUTION METHOD 4
B260	ACTIVE	1	PROTECTED AC DISTRIBUTION METHOD 5
B270	ACTIVE	1	AC OUTLETS FOR TEST EQUIPMENT
B280	ACTIVE	1	SHARED POWER PLANT, STAND ALONE GW, MULTI STORY BUILDING
B290	ACTIVE	1	SHARED POWER PLANT, GW AT POWER PLANT, MULTI STORY BUILDING
B300	ACTIVE	1	SHARED POWER PLANT, STAND ALONE GW, MULTI STORY BUILDING
B310	ACTIVE	1	EXAMPLE OF 5ESS EQUIPMENT INSTALLED ON 3 FLOORS
B320	ACTIVE	1	EXAMPLE OF SHARED POWER PLANT, MULTY STORY BUILDING
B330	ACTIVE	1	SHARED POWER PLANT, STAND ALONE GW, MULTI STORY BUILDING

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B1

MODEL NAME

LIST OF FIGURES IN B- AND C-SHEETS (CONT.)			
FIG.	STATUS	INTRODUCED IN DRAWING ISSUE	DESCRIPTION
B340	ACTIVE	1	EXAMPLE OF INSTALLATION "NOT RECOMMENDED"
B350	ACTIVE	1	EXAMPLE OF INSTALLATION "NOT RECOMMENDED"
B360	ACTIVE	1	COMPARISON OF THREE GROUNDING SCHEMES
C10	ACTIVE	1	ISOLATED GROUND PLANE INTEGRITY TEST 1
C11	ACTIVE	1	ANCHORING DETAIL FOR SLAB INSTALLATION
C12	ACTIVE	1	ISOLATED GROUND PLANE INTEGRITY TEST 2
C13	ACTIVE	1	OPTIONAL ISOLATED GROUND PLANE MONITOR
C20	ACTIVE	1	FRAME GROUNDING LOCATION, SLAB INSTALLATION
C30	ACTIVE	1	FRAME GROUNDING LOCATION, RAISED FLOOR INSTALLATION
C40	ACTIVE	1	MISCELLANEOUS CABINET GROUNDING DETAIL
C45	ACTIVE	2	PIDB/PICB CABLE TROUGH GROUNDING
C50	ACTIVE	1	METHOD OF CONNECTING #6 AWG LUG TO A COPPER BAR
C60	ACTIVE	1	METHOD OF INSTALLING FRAME GROUND CABLE
C70	ACTIVE	1	METHOD OF INSTALLING C-TAP
C80	ACTIVE	1	METHOD OF INSTALLING PARALLEL TAPS, H-TAPS
C90	ACTIVE	1	GROUND WINDOW LABEL
C100	ACTIVE	1	TAGS, 145C/145P
C110	ACTIVE	1	METHOD OF BONDING SMALL WIRES TO GWMGB OR 5EFGB
C120	ACTIVE	1	METHOD OF BONDING RETURN CONDUCTORS TO GW
C130	ACTIVE	1	METHODS OF BONDING ACEG WIRE AND CONDUIT TO GW
C140	ACTIVE	1	METHOD OF BONDING COAX CABLE SHIELD TO GW
C150	ACTIVE	1	PDF (PCFD OR GPDF) INPUT FEEDERS, SINGLE POWER PLANT
C160	ACTIVE	1	GPDF INPUT FEEDERS, DUAL POWER PLANT
C165	ACTIVE	2	PDU WITH GPDF CABINET
C170	DA	1	PCDF (J86334D-1) FUSE PANELS LAYOUT
C180	ACTIVE	1	GPDF (J86334E-1) FUSE PANEL LAYOUT
C190	ACTIVE	1	FUSE ASSIGNMENT LABEL, GPDF
C200	ACTIVE	1	MFFU, DC POWER RECEPTICLES EQL
C210	ACTIVE	1	CABLING FROM THE BOTTOM
C220	ACTIVE	1	LINUP CABLE RACK COMPARTMENTS, CLASSIC AND 5ESS - 2000 PHASE 1
C230	ACTIVE	1	LINEUP CABLE RACK COMPARTMENTS, 5ESS-2000 PHASE 11 MODEL
C240	ACTIVE	1	METHOD OF CABLING 5E-2000 PHASE 11 EQT CAB
C250	ACTIVE	1	METHOD OF CABLING MISC CAB E/W 5E-2000 PHASE 11
C260	ACTIVE	1	METHOD OF CABLING GPDF E/W 5E-2000 PHASE 1 RACK
C270	DA	1	1KVA INVERTER (WP91652, L20)
C280	ACTIVE	1	1KVA INVERTER (WP-93388,L10)
C290	ACTIVE	1	MCC/TLWS CONSOLE ON ISOLATED GROUND PLANE

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS

THIRD ANGLE PROJN

DWG SIZE C2

ISSUE 2

LUCENT TECHNOLOGIES

ED5D805-10

SHEET NO. B2

MODEL NAME

D

LIST OF FIGURES IN B- AND C-SHEETS (CONT.)			
FIG.	STATUS	INTRODUCED IN DRAWING ISSUE	DESCRIPTION
C300	ACTIVE	1	MCC/TLWS CONSOLE ON INTEGRATED GROUND PLANE
C310	ACTIVE	1	ROUTING POWER AND GROUNDING WIRES ON LADDER TYPE CABLE RACKS
C320	ACTIVE	1	ROUTING GROUNDING WIRE ALONG WALLS

LIST OF TABLES			
TABLE	STATUS	INTRODUCED IN DRAWING ISSUE	DESCRIPTION
E10	ACTIVE	1	GROUND CONDUCTOR SIZE AND LENGTH FOR 0.010 OHM MAX. RESISTANCE.
E20	ACTIVE	1	AWG AND METRIC CONDUCTOR SIZES
E30	ACTIVE	1	RESISTANCE OF COPPER WIRE @ 25 DEGREES C
E40	ACTIVE	1	METHOD OF SIZING A DCEG CONDUCTOR
E50	ACTIVE	1	FUSE ALLOCATION FOR PCDF (J86334D-1) FUSE BLOCKS
E60	ACTIVE	1	-48V DC POWER DISTRIBUTION REQUIREMENTS

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)

THIRD ANGLE PROJN

DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES | ED5D805-10 | SHEET NO. B3

MODEL NAME

ACRONYMS	
AC	ALTERNATING CURRENT
ACEG	AC EQUIPMENT GROUND (ALSO KNOWN AS GREEN WIRE)
ANSI	AMERICAN NATIONAL STANDARD INSTITUTE
AWG	AMERICAN WIRE GAUGE
COG	CENTRAL OFFICE GROUND
COGB	CENTRAL OFFICE GROUND BAR
DA	DISCONTINUED AVAILABILITY
DC	DIRECT CURRENT
DCEG	DIRECT CURRENT EQUIPMENT GROUND (FRAME GROUND)
FG	FRAME GROUND
5EFGB	5ESS FRAME GROUND BAR
GPDF	GLOBAL POWER DISTRIBUTION FRAME
GW	GROUND WINDOW
GWMGB	GROUND WINDOW MAIN GROUND BUS
GWSGB	GROUND WINDOW SUPPLEMENTARY GROUND BUS
IGP	ISOLATED GROUND PLANE
JB	JUNCTION BOX
KCMIL	KILO CIRCULAR MILS
NEC	NATIONAL ELECTRICAL CODE
OPGP	OFFICE PRINCIPLE GROUND POINT
ORM	OPTICAL REMOTE SWITCHING MODULE
P	PAIRED
PCFD	POWER CONTROL FUSED DISTRIBUTION
PDF	POWER DISTRIBUTION FRAME
PDSC	POWER DISTRIBUTION SERVICE CABINET
PDU	POWER DISTRIBUTION UNIT
RSM	REMOTE SWITCHING MODULE
RTN	RETURN (+ SIDE OF -48V DC DISTRIBUTION)
SP	SPLICE PLATE
UL	UNDERWRITER LABORATORIES
VCDX	VERY COMPACT DIGITAL EXCHANGE

5ESS SWITCHING EQUIPMENT
SPECIFICATIONS FOR
POWER DISTRIBUTION
AND
GROUNDING METHODS (P)

THIRD ANGLE PROJN

DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES | ED5D805-10 | SHEET NO. B4

MODEL NAME

D

SHEET NOTES

1. IF A CABLE IS TERMINATED OUTSIDE THE 5E IGP, AND IS EQUIPPED WITH A SHIELD NOT USED FOR SIGNAL RETURN PATH, GROUND SHIELD AT ONE END ONLY.
2. THE POWER PLANT RETURN BUS IS PART OF THE ISOLATED GROUND PLANE. A SHARED POWER PLANT MAY AFFECT WIRE SIZES AND CABLE ROUTING.
3. POWER PLANT FRAME GROUNDING CONDUCTOR (A) IS REQUIRED IF THE POWER PLANT FRAMEWORK AND THE GWMGB ARE BONDED TO DIFFERENT COG BARS.
4. TIP AND RING CABLE SHIELDS MAY BE GROUNDED: (A) TO A LOCAL GROUND BAR OR (B) TO THE OPGP. FOR MORE DETAILS USE ANSI/T1.313 DOCUMENT.
5. SEE ED7C795-10 FOR PROTECTOR TYPE AND ORDERING INFORMATION.

VERTICAL GROUND RISER 750Kcmil TYPICAL OR CONTINOUS BUILDING STEEL
750 Kcmil TYPICAL
COG BAR
#1/0 MIN (0.010 OHM MAX) TABLE E10
SYSTEM EARTH REFERENCE
AC SOURCE
EARTH
CONDUIT
AC LIGHTING (NOT PART OF ISOLATED GROUND PLANE)
FLUORESCENT LIGHTS
#6
REQUIRED IF AC CONDUIT OR FIXTURES ARE 7 FT. OR LESS FROM ISOLATED GROUND EQUIPMENT
EQUALIZATION BONDING
#6
ENG. NOTE 60.6
CONDUCTIVE SURFACES 7 FT OR LESS FROM ANY ISOLATED GROUND EQUIPMENT
FLOATING OR INCIDENTALLY OR INTENTIONALLY GROUNDED
#6 3 FT MAX
SHIELD GROUNDING COPPER BAR (FIG. C130)
TRCU COAX CABLE
FEED-THRU CONNECTOR
GW = IMAGINARY SPHERE OF 3 FT. RADIUS
GWMGB
JB
DCEG (A)
TO GWMGB (NOTE 3)
SIZE PER TABLE E40
#4/0 MIN. 0.005 OHM MAXIMUM
POWER PLANT GW REFERENCE
#1/0 INS.
(B) SIZE PER POWER PLANT REQUIREMENTS
DCEG (B)
SHIELD GROUNDED TO CABINET CHASSIS VIA BACKPLANE
NOTE 1
ALSO BOND TO GWMGB IF ANY 5ESS EQUIPMENT IS 7 FT. OR LESS FROM MDF
#6
#1/0
(A)
USE SHORTEST FEASIBLE PATH A OR B
FG
GROUND BAR
PROTECTOR
(B)
FLOOR
CONCRETE SLAB
NON-METALLIC SLEAVE
#1/0 INS.
MDF OR PROTECTOR FRAME (TYPICAL) (SEE NOTE 5)
TIP AND RING CABLES
OPGP
EARTH
SHIELDS
(A)
TYPICAL CABLE VAULT (NOTE 4)
(+)
(-)
-48V DC POWER SOURCE
-48RTN
-48VDC
RETURN BUS
DC/DC CONVERTER
CKT PACKS
CKT PACKS
± 5V GRD ±12V GRD ETC
LINE UNITS
RETURN BUS
5ESS SWITCH
EQUIPMENT CABINET CHASSIS AND HOLD DOWN HARDWARE ARE INSULATED FROM FLOOR.
TRANSFORMER COUPLED
OPTOISOLATOR COUPLED
OPTICALLY COUPLED
METALLIC CONNECTION
RS232 CABLE
TWISTED PAIR CABLE
TO EQUIPMENT OUTSIDE 5ESS ISOLATED GROUND PLANE (IGP)
TO EQUIPMENT ON 5ESS ISOLATED GROUND PLANE

FIG. B10
5ESS ISOLATED GROUND PLANE OVERVIEW

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B5

MODEL NAME

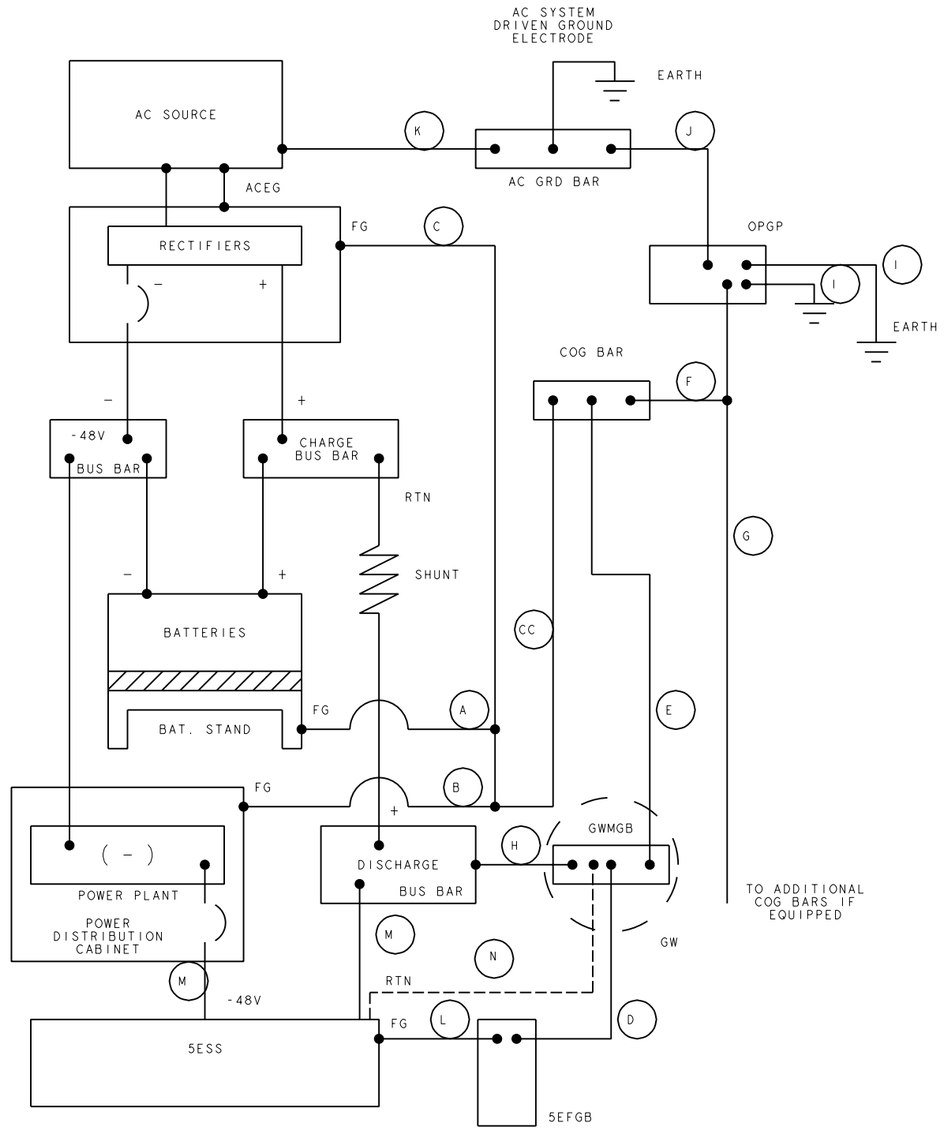

FIG. B20

EQUIPMENT GROUNDING FOR A TYPICAL
POWER PLANT LAYOUT SERVING 5ESS

SHEET NOTES:

1.

DC EQUIPMENT GROUNDING CONDUCTOR	SIZE ACCORDING TO:
A, B, C, CC	POWER PLANT VENDOR REQUIREMENTS
D	I/O MIN. (TABLE E10), 0.010 OHM MAX
E	I/O MIN. (TABLE E10), 0.010 OHM MAX
F	750 Kcmil (TYPICAL)
G	750 Kcmil (TYPICAL)
H	REQUIRED FOR STANDALONE GW - SEE FIG. B90, B110)
I	(2) #2 AWG SOLID (TYPICAL)
J	(2) #2 AWG (TYPICAL)
K	NEC ART-250-94
L	FIG. B80, B90, B100, B110, B130, B140
M	CALCULATED (ENG. NOTE 61-5)
N	REQUIRED FOR STAND-ALONE GW. (SEE FIG. B90, B110)

2. H IS NOT REQUIRED IF THE GW IS PART OF THE DISCHARGE BUS BAR.

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B6

MODEL NAME

ED5D805-10

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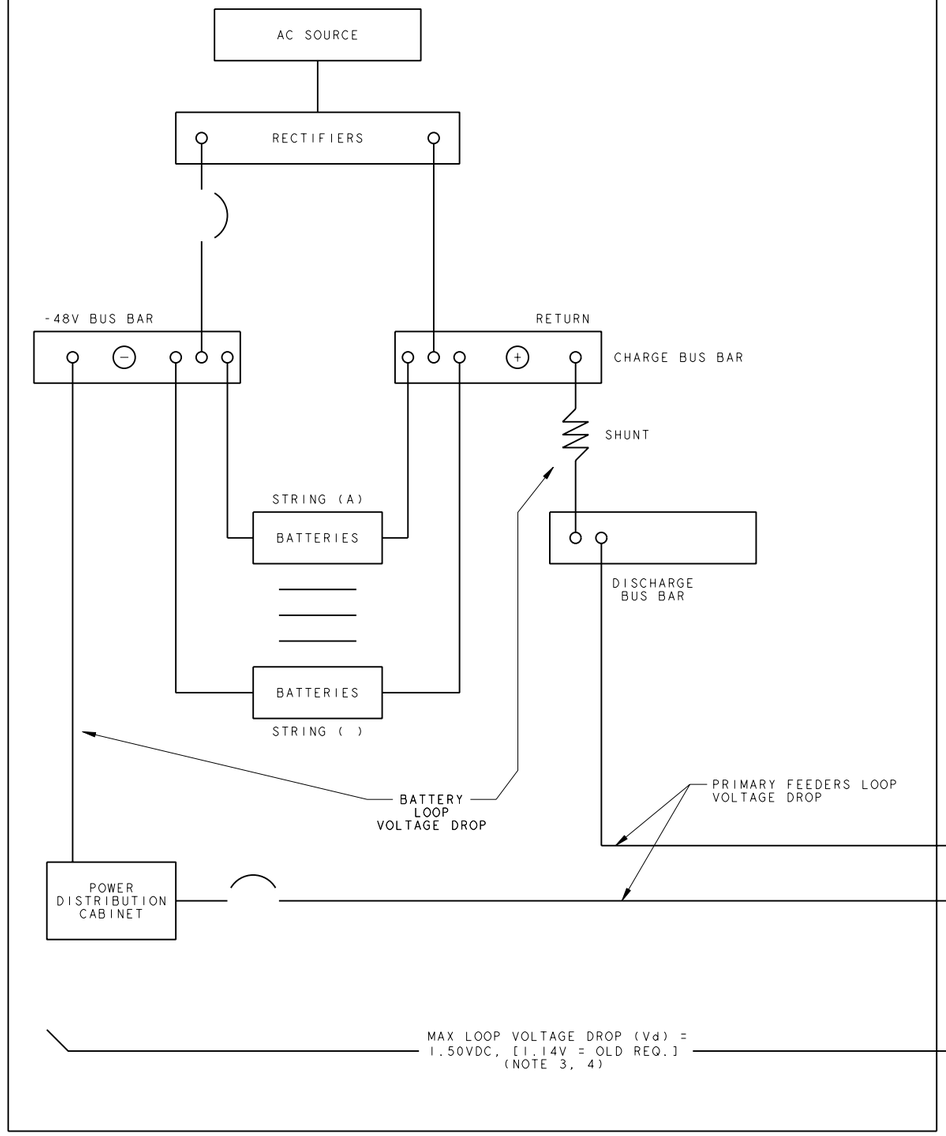
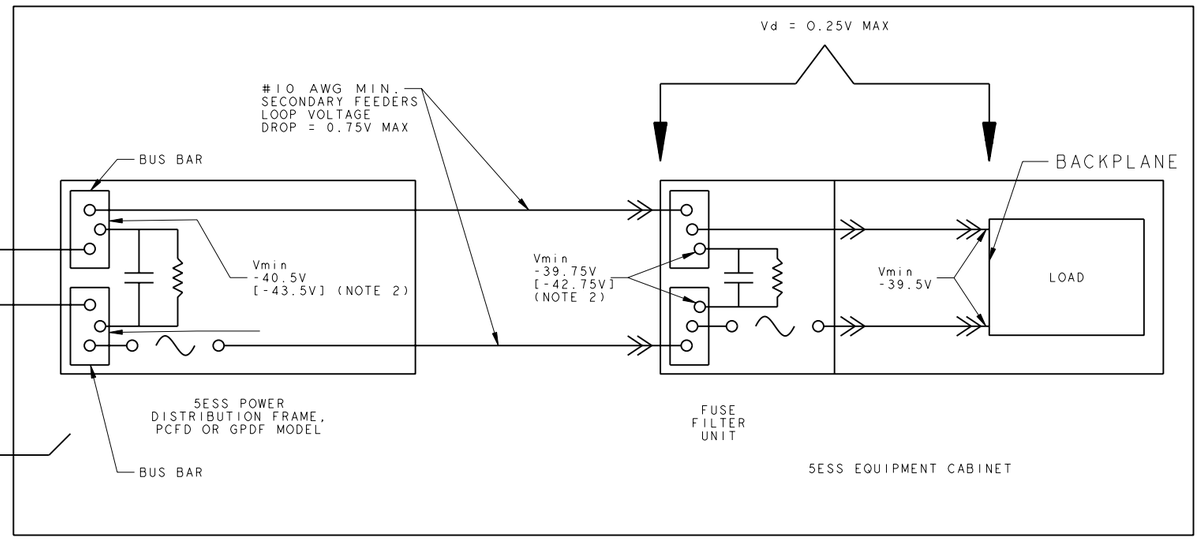


TYPICAL POWER SOURCE CONFIGURATION



5ESS SWITCH

SHEET NOTES

1. IF THE CURRENT DRAIN IS DOMINATED BY CONSTANT POWER LOADS, SUCH AS DC/DC CONVERTERS. THE MAXIMUM VOLTAGE DROP OCCURS DURING AC LOSS AND BATTERY OPERATION, WHEN THE BATTERY REACHES THE MINIMUM VOLT/CELL. THIS IS NORMALLY REFELECTED IN THE LIST 2 CURRENT DRAIN CALCULATIONS.

2. NUMBERS IN[ ] SQUARE BRACKETS WERE PREVIOUS REQUIREMENTS. THE NEW MAXIMUM VOLTAGE DROP CHANGE BECAME OFFICIAL WITH THE RELEASE OF EIM 1866 ON JUNE 8, 1994.

3. THE MINIMUM VOLTAGE AT THE BATTERY STRING(S) IS A FUNCTION OF BATTERY CELL TYPE, MINIMUM VOLT/CELL REQUIREMENTS AND BATTERY RESERVE TIME REQUESTED BY THE CUSTOMER. THEREFORE THE PRIMARY POWER FEEDER VOLTAGE DROP, BATTERY MINIMUM VOLT/CELL, BATTERY LOOP VOLTAGE DROP AND FEEDER SIZES SHALL BE CALCULATED ACCORDINGLY AND WITH CUSTOMER INPUT. WITH A MAXIMUM VOLTAGE DROP OF 1.5V AND 5ESS MINIMUM REQUIREMENTS OF -40.5V, THE WORST CASE BATTERY VOLTAGE IS -42.0V OR 1.75V/CELL. IT IS RECOMMENDED THAT THE 1.5V MAX VOLTAGE DROP BE USED EVEN FOR HIGHER VOLT/CELL LIMITS.

4. THE MAXIMUM RECOMMENDED POWER SOURCE VOLTAGE DROP CONSISTS OF TWO COMPONENTS; THE BATTERY LOOP DROP AND THE PRIMARY FEEDERS DROP. THE 1.5V TOTAL DROP SHALL BE DISTRIBUTED BETWEEN THE TWO COMPONENTS BY THE REGION ENGINEER WITH CUSTOMER INPUT. THIS VOLTAGE DROP WAS CHOSEN TO OPTIMIZE CABLE SIZE, HEAT RELEASE FROM CABLES, EFFICIENCY, BATTERY RESERVE TIME AND 5ESS MINIMUM VOLTAGE REQUIREMENT.

FIG. B30

VOLTAGE DROP ALLOCATION

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B7

MODEL NAME

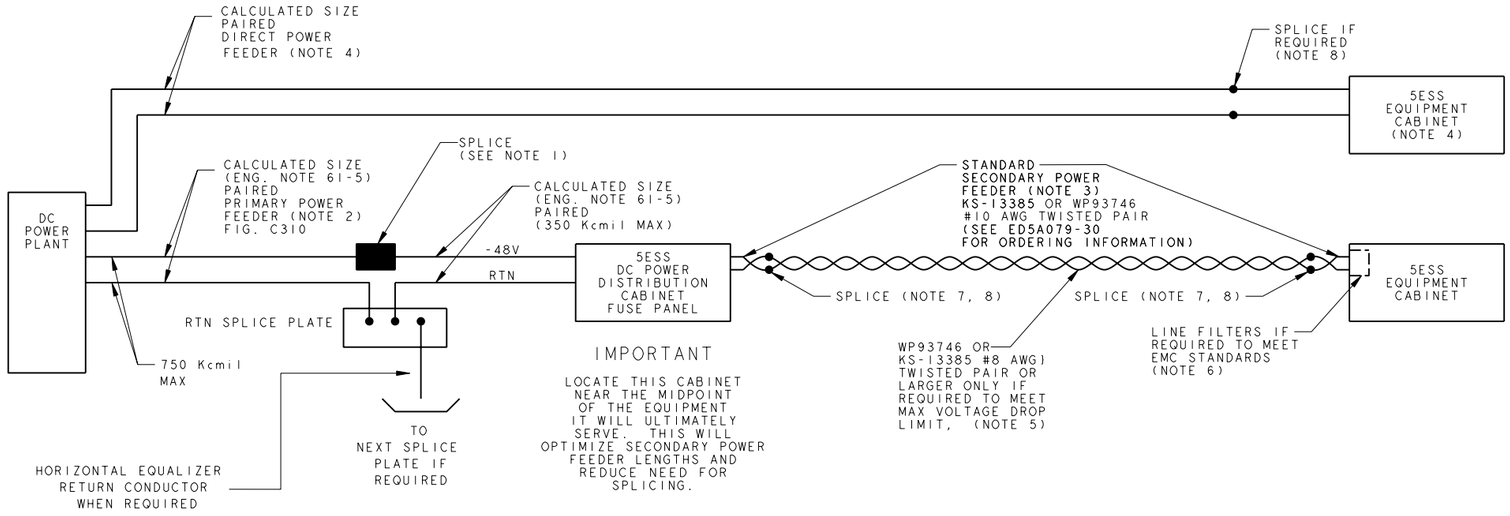


FIG. B40

DC POWER DISTRIBUTION
CABLING REQUIREMENTS
(SEE FIG. C240 FOR MORE DETAILS)

SHEET NOTES FOR FIG. B40

1. PRIMARY POWER FEEDER SPLICES IF REQUIRED SHALL BE OF PARALLEL TAP CRIMPING TYPE USING MANUFACTURER'S RECOMMENDED CRIMPING TOOL.

2. EVERY -48V AND ASSOCIATED RETURN PRIMARY POWER FEEDER CONDUCTOR MUST BE ROUTED ON CABLE RACKS AND ADJACENT TO EACH OTHER FOR THE ENTIRE LENGTH OF THE FEEDER PATH. THE UNPAIRED LENGTH OF FEEDERS AT THE POWER PLANT TERMINATION AND 5ESS PDF TERMINATION SHALL BE KEPT TO A MINIMUM.

3. SECONDARY POWER FEEDERS MUST BE ROUTED IN POWER COMPARTMENT OF LINEUP CABLE RACK OR UNDER RAISED FLOORS.

4. OCCASIONALLY A POWER FEEDER MAY RUN DIRECTLY FROM THE POWER PLANT TO THE EQUIPMENT CABINET. EXAMPLE: DC/AC INVERTER FEEDER AND FUSE PANEL FEEDER IN RSM AND ORM APPLICATIONS.

5. WP93746 AND KS-13385 IS AVAILABLE IN SIZES UP TO 8 AWG AS A FORMED TWISTED PAIR CABLE. IF A LARGER SIZE WIRE IS NEEDED TO COMPLY WITH THE MAX VOLTAGE DROP REQUIREMENT, THE -48V AND RETURN WIRES MUST BE RUN PAIRED FOR THE ENTIRE LENGTH OF THE PATH AND LACED TOGETHER EVERY TWO FEET.

6. SEE 5ESS-2000 INSTALLATION HANDBOOK SIG-1-WW-100 SECTION 4872 FOR LINE FILTERS INSTALLATION DETAILS. SEE ED5D832-70 FOR ORDERING INFORMATION.

7. IF A POWER CABLE LARGER THAN 10 AWG IS REQUIRED, IT WILL BE NECESSARY TO CUT THE STANDARD 10 AWG CABLE AND SPLICE THE LARGER CABLE ONTO IT, BECAUSE THE STANDARD CABLE MATE-N-LOK CONNECTOR CANNOT ACCEPT WIRES LARGER THAN 10 AWG. SAME IS REQUIRED AT THE POWER DISTRIBUTION CABINET END, EXCEPT FOR 8 AWG WIRE. AT THE PDF END, 8 AWG WIRES MAY BE CONNECTED DIRECTLY BY USING 8 AWG TERMINAL LUGS. SEE J86334E-1 FOR ORDERING INFORMATION.

8. SPLICES SHALL BE LOCATED IN CABLE RACKS TO ALLEVIATE CONGESTION IN THE CABINETS. SPLICES SHALL BE STAGGERED TO ALLEVIATE CONGESTION IN THE CABLE RACKS. ALL SPLICES SHOULD BE LOCATED WITHIN 6 FT OF THE CABINET CABLE ACCESS POINT.

SHEET NOTES FOR FIGS. B45

1. ROUTE POWER FEEDERS FROM POWER SOURCE TO EQUIPMENT CABINET USING A CABLE RUNNING LIST GENERATED BY VIRGOS OR EQUIVALENT DATABASE.

2. INFORMATION ON POWER FEEDER CONFIGURATIONS MAY BE OBTAINED FROM THE WEB SITE IN STEPS 1 & 2.

   STEP 1. GO TO
   http://ixstar.ih.lucent.com/mffu/
   THIS IS THE MFFU (MODULAR FUSE FILTER UNIT) HOME PAGE. THIS PAGE CONTAINS LINKS TO CHANGE HISTORY AND OTHER INFORMATION.

   STEP 2. CLICK ON "INPUT FEEDS FROM POWER BAY" LINK, THIS WILL BRING YOU TO URL:
   http://ixstar.ih.lucent.com/mffu/feeds.htm
   THIS WEB PAGE CONTAINS THE 5ESS EQUIPMENT CABINET POWER FEEDER CONFIGURATIONS.

3. EQUIPMENT CABINET POWER FEEDER CONFIGURATIONS WERE FORMERLY DOCUMENTED IN ED5D073-11. ED5D073-11 HAS BEEN DISCONTINUED AND REPLACED BY THIS DRAWING.

4. 5ESS EQUIPMENT CABINETS MAY OBTAIN POWER FROM A 5ESS POWER DISTRIBUTION PANEL OR DIRECTLY FROM A COMPATIBLE CUSTOMER POWER PLANT DISTRIBUTION PANEL.

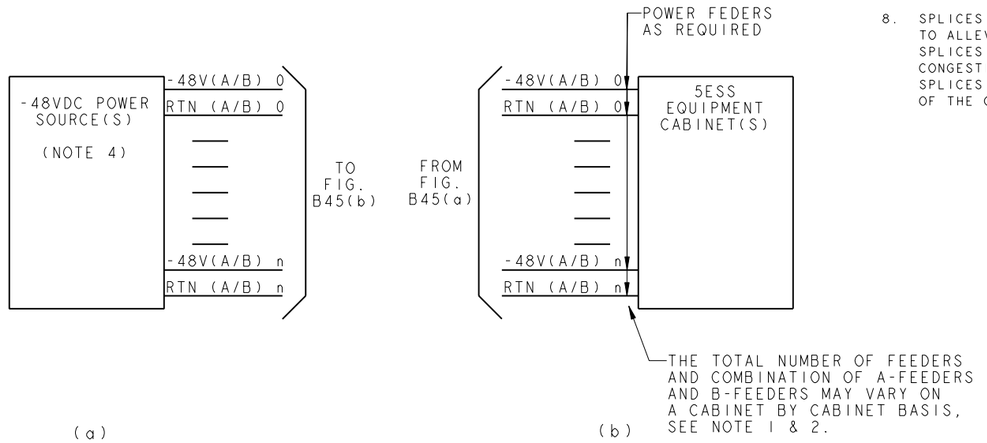


FIG. B45

POWER FEEDER CONFIGURATIONS FOR
5ESS EQUIPMENT CABINETS
USING THE MFFU (J5D003FJ-1)

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B8

MODEL NAME

SHEET NOTES.

1. GPDF (J86334E-1) MAY BE EQUIPPED WITH A MAX. OF 96 FUSES PER SIDE A/B.

   PCFD (J86334D-1) MAY BE EQUIPPED WITH A MAX. OF 88 FUSED PER SIDE A/B.

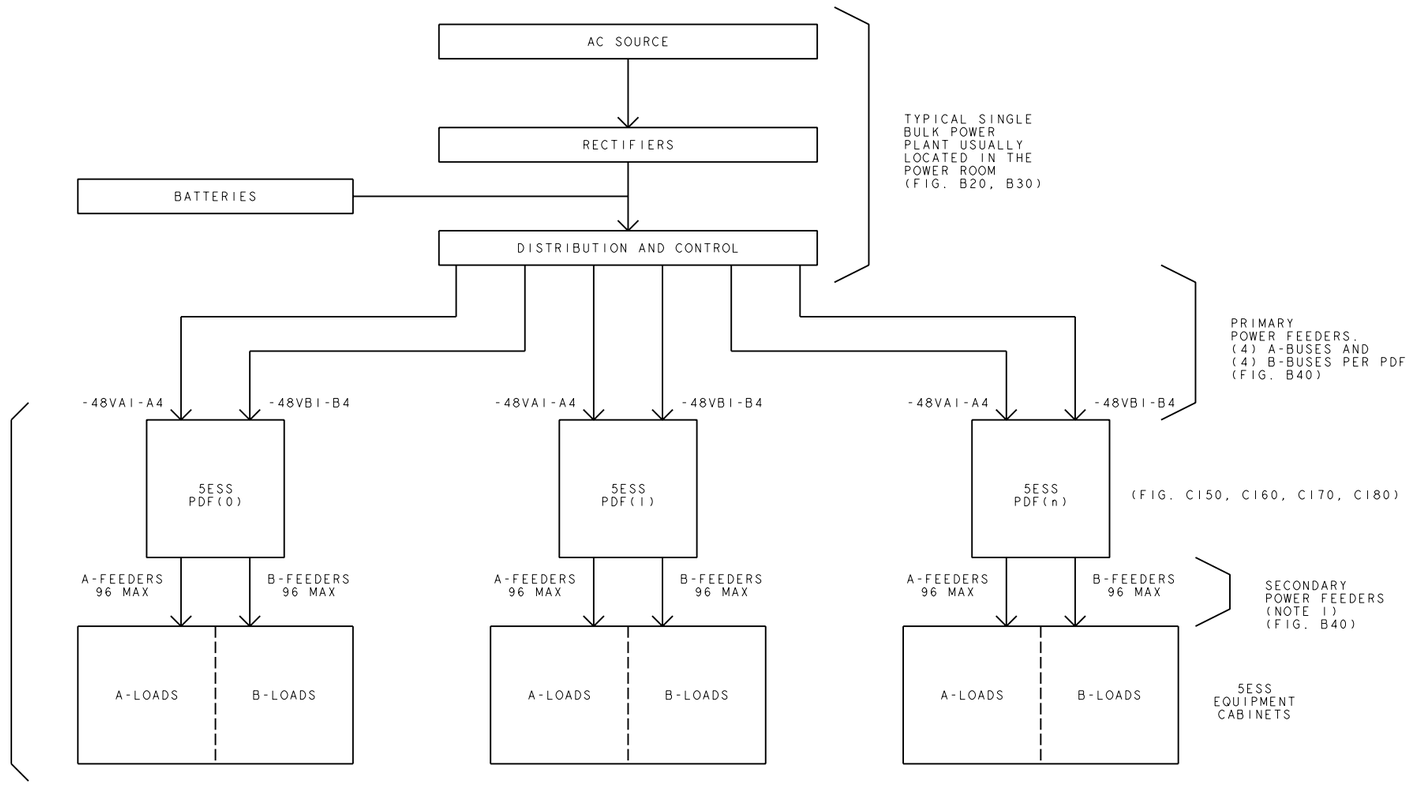


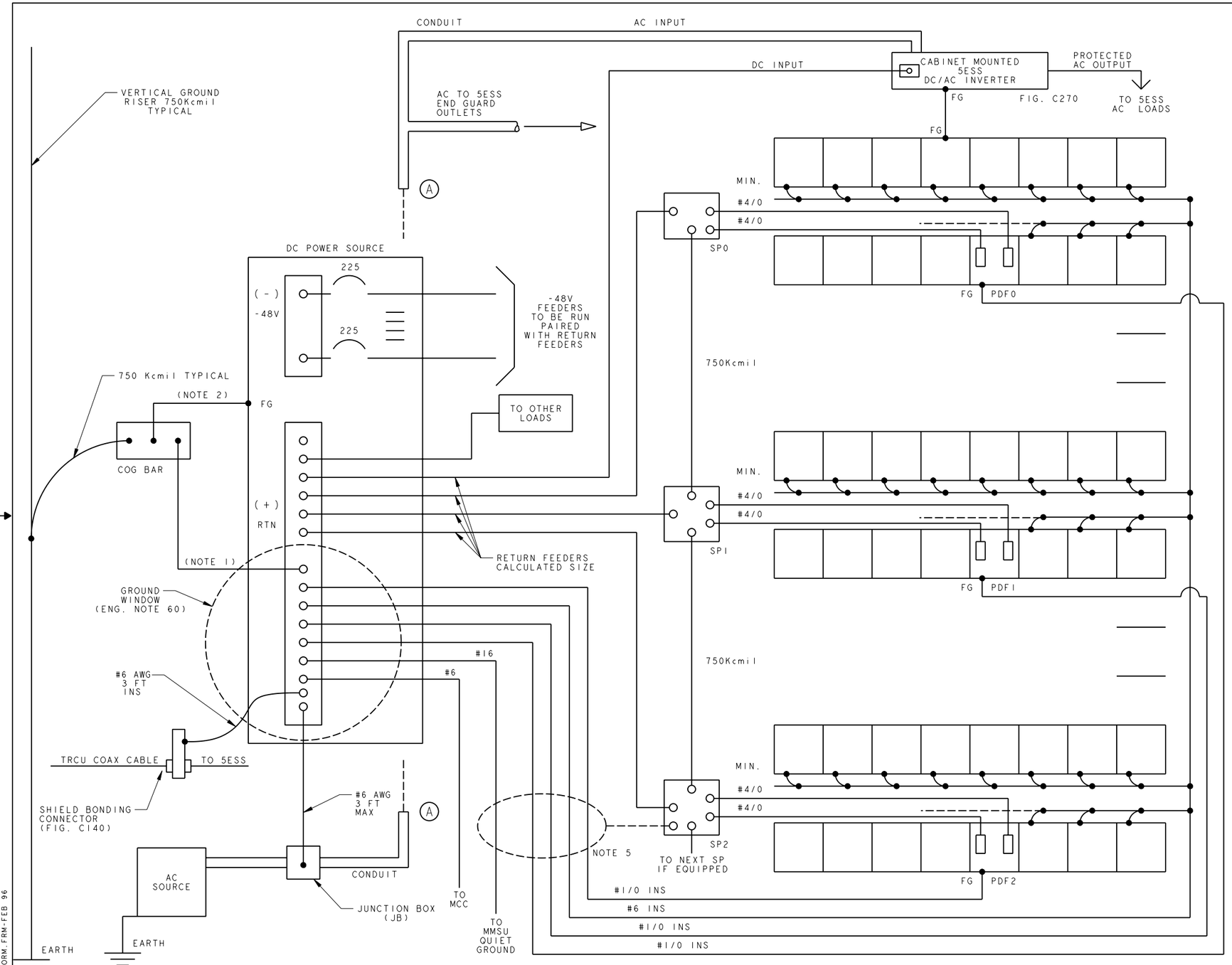
FIG. B50

HIGH LEVEL DC POWER DISTRIBUTION ARCHITECTURE
USING SINGLE BULK POWER PLANT
AND 5ESS PDF WITH SPLIT A/B BUSES

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B9

MODEL NAME



SHEET NOTES

1. SIZE POWER PLANT RETURN BUS EARTH REFERENCE CONDUCTOR PER POWER PLANT REQUIREMENTS. 5ESS REQUIRES #1/0 AWG MINIMUM.
2. SIZE PER POWER PLANT REQUIREMENTS.
3. SHOWN IS A 3 PDF SYSTEM. SAME CONCEPT APPLIES TO SWITCHES WITH MORE THAN 3 PDF'S.
4. THIS FIGURE REFLECTS INSTALLATIONS IN EXISTANCE AND MAY BE USED FOR HISTORICAL PURPOSE AND FOR ADDITIONS AND MAINTENANCE. THIS FIGURE HAS BEEN SUPERCEEDED BY FIG. B80 AND B100.
5. AN ACCEPTABLE PRACTICE DOCUMENTED IN ED5D022-11 NOTE 57.D.5 AND FIG. 28A WAS TO TERMINATE 5ESS FRAME GROUNDING CONDUCTORS TO THE SPLICE PLATE NEAREST THE GW, WHEN THE GW WAS LOCATED AT THE POWER PLANT OR REMOTED FROM THE 5ESS AREA.

FIG. B60

TYPICAL POWER AND GROUNDING DIAGRAM WITH GROUND WINDOW LOCATED AT POWER PLANT RETURN DISCHARGE BUS BAR

"DA" REPLACED BY FIG. B80, B100

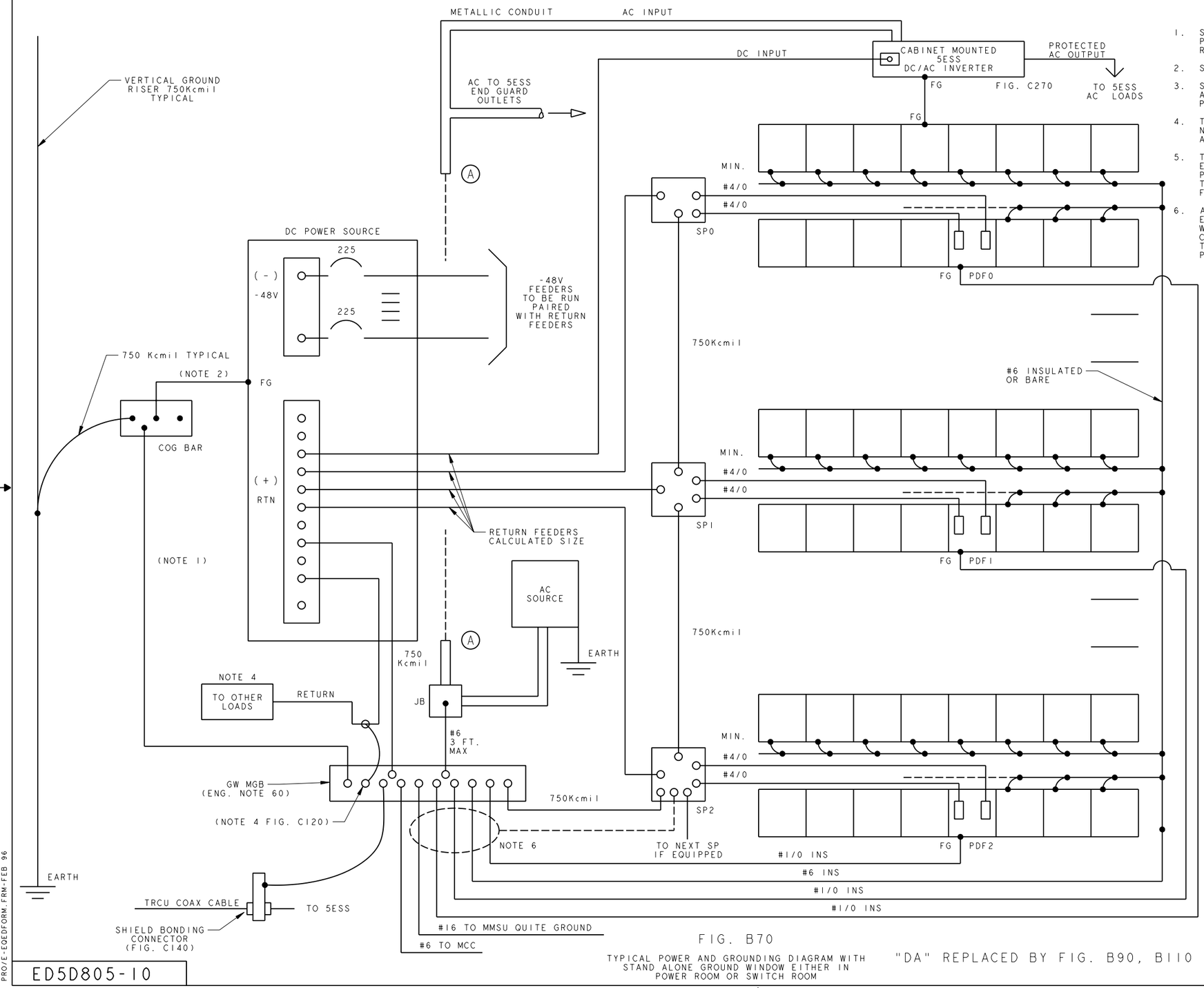
PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B10

MODEL NAME



SHEET NOTES

1. SIZE SYSTEM EARTH REFERENCE CONDUCTOR PER POWER PLANT REQUIREMENTS. 5ESS REQUIRES #0 AWG MINIMUM.
2. SIZE PER POWER PLANT REQUIREMENTS.
3. SHOWN IS A 3 PDF SYSTEM. SAME CONCEPT APPLIES TO SWITCHES WITH MORE THAN 3 PDF'S.
4. THE RETURN CONDUCTORS OF ANY OTHER SYSTEM NOT ON IGP MUST BE ROUTED THROUGH THE GW AND BONDED TO THE GW MGB.
5. THIS FIGURE REFLECTS INSTALLATIONS IN EXISTANCE AND MAY BE USED FOR HISTORICAL PURPOSE AND FOR ADDITIONS AND MAINTENANCE. THIS FIGURE HAS BEEN SUPERCEEDED BY FIG. B90 AND B110.
6. AN ACCEPTABLE PRACTICE DOCUMENTED IN ED5D022-11 NOTE 57.D.5 AND FIG. 28A WAS TO TERMINATE 5ESS FRAME GROUNDING CONDUCTORS TO THE SPLICE PLATE NEAREST THE GW WHEN THE GW WAS LOCATED AT THE POWER PLANT OR REMOTED FROM THE 5ESS AREA.

FIG. B70

TYPICAL POWER AND GROUNDING DIAGRAM WITH STAND ALONE GROUND WINDOW EITHER IN POWER ROOM OR SWITCH ROOM

"DA" REPLACED BY FIG. B90, B110

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)

THIRD ANGLE PROJN

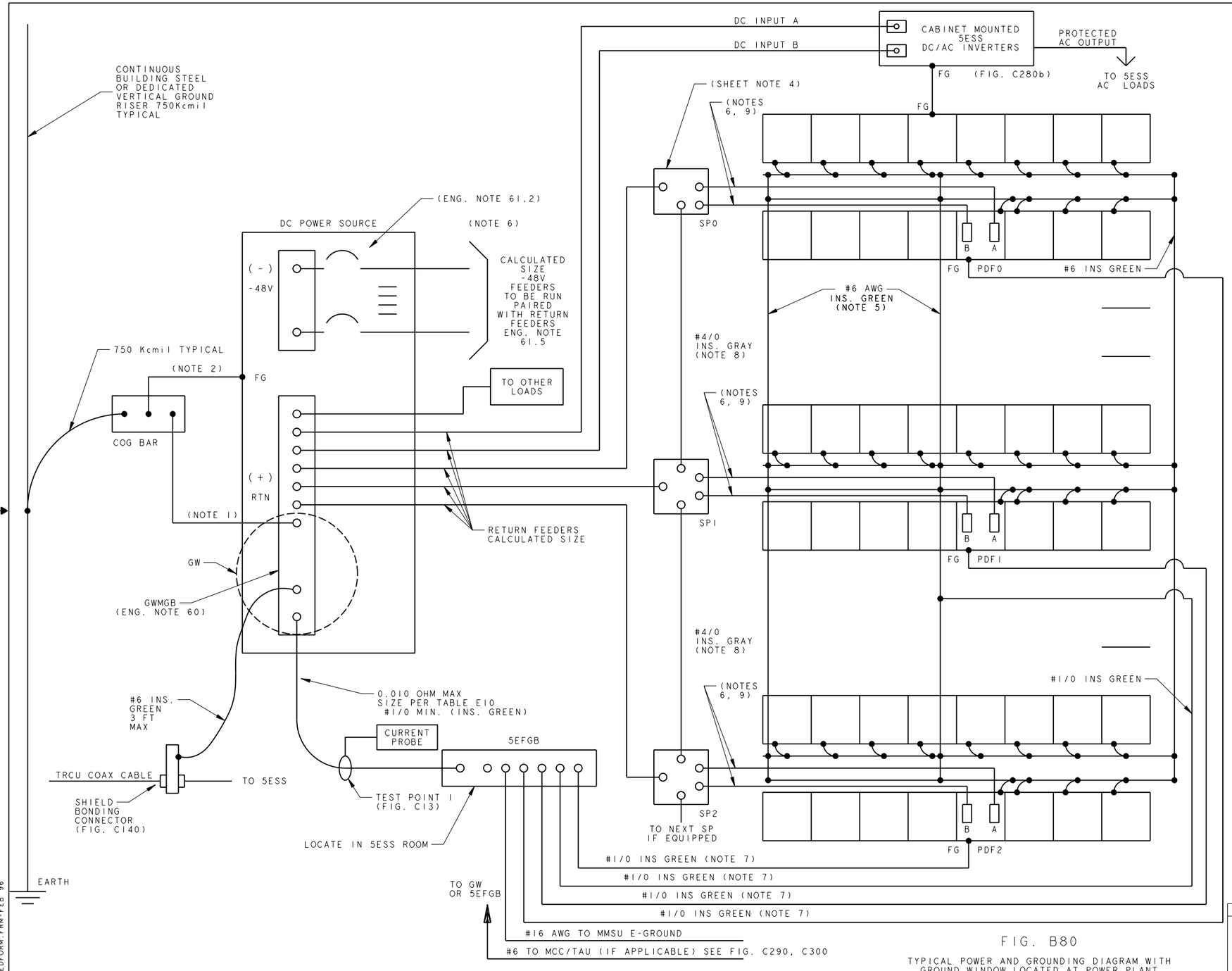
DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES | ED5D805-10 | SHEET NO. B11

MODEL NAME

ED5D805-10

PRO/E-EQEDFORM.FRM-FEB 96



SHEET NOTES

1. SIZE POWER PLANT RETURN BUS EARTH REFERENCE CONDUCTOR PER POWER PLANT REQUIREMENTS. 5ESS REQUIRES #1/0 AWG MINIMUM AND 0.010 OHM MAX. RESISTANCE.
2. SIZE PER POWER PLANT REQUIREMENTS.
3. SHOWN IS A 3 PDF SYSTEM. SAME CONCEPT APPLIES TO SWITCHES WITH ONE TO N PDF(S).
4. LOCATE SPLICE PLATE AS CLOSE AS POSSIBLE TO ITS ASSOCIATED PDF.
5. SM-2000 INSTALLATIONS REQUIRE UP TO 3 LINEUP BONDING CONDUCTORS. SEE FIG. B180 FOR DIFFERENT LINEUP CONFIGURATIONS AND ADDITIONAL APPLICATION NOTES.

SEE FIG. C20, C30 FOR ADDITIONAL FRAME GROUNDING DETAILS

6. ENGINEER POWER PLANT FUSES OR CIRCUIT BREAKERS AND PRIMARY POWER FEEDERS BASED ON ENG. NOTES 61.2 AND 61.5.
7. THESE GROUNDING WIRES MAY BE #6 AWG IF POWER PLANT CB IS 200 AMPERES OR LESS
8. USE #4/0 HORIZONTAL EQUALIZER IN ALL CASES.
9. THE MAXIMUM SIZE CONDUCTOR THAT CAN BE TERMINATED AT THE PDF FUSE PANEL IS 350Kcmil. SEE FIG. C150, C160.

FIG. B80

TYPICAL POWER AND GROUNDING DIAGRAM WITH GROUND WINDOW LOCATED AT POWER PLANT RETURN DISCHARGE BUS BAR AND (NO COMMERCIAL AC ENTERING THE 5ESS SWITCH)

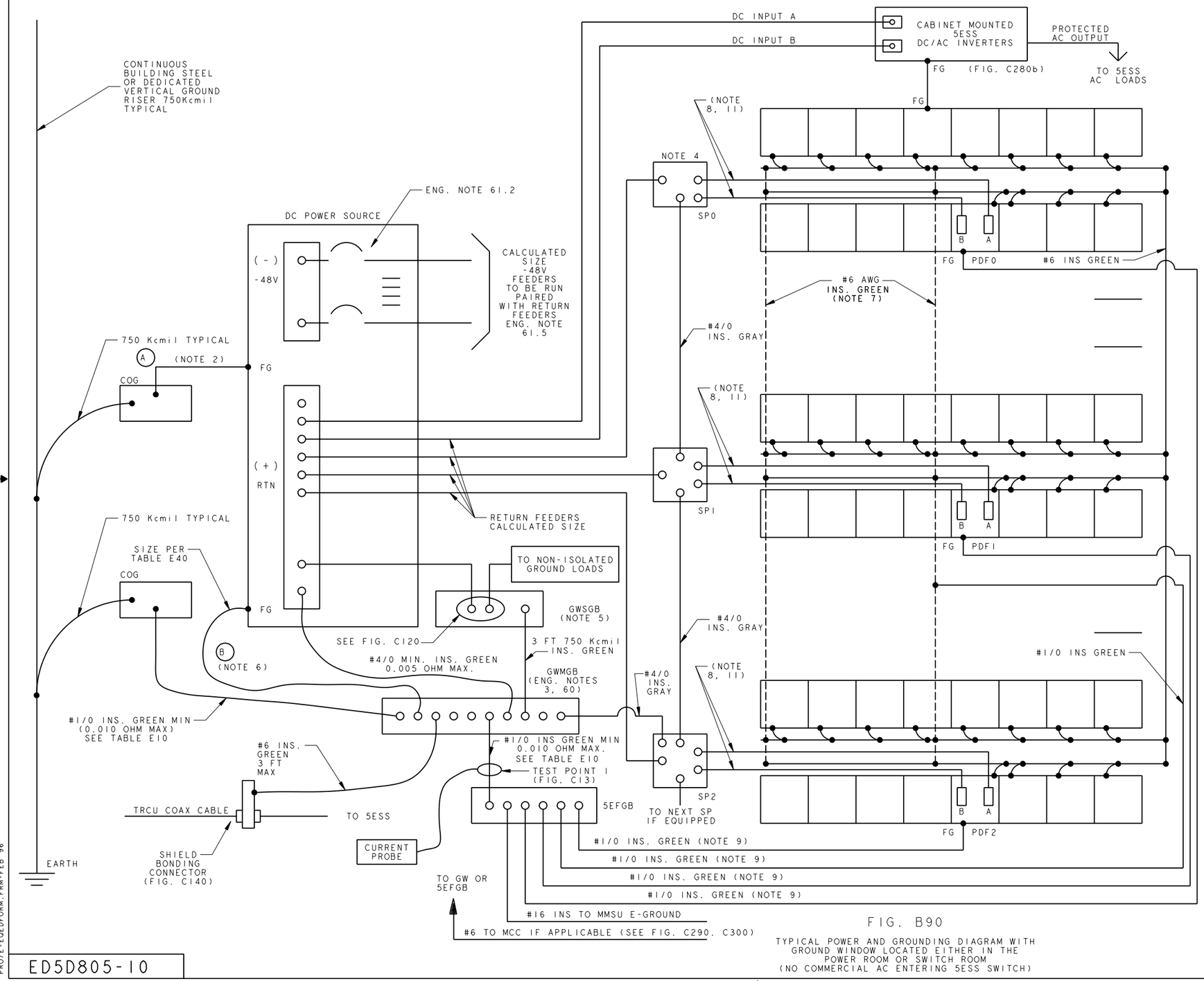
FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B12

MODEL NAME

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10



SHEET NOTES

1. SIZE POWER PLANT RETURN BUS EARTH REFERENCE CONDUCTOR PER POWER PLANT REQUIREMENTS. 5ESS REQUIRES #0 AWG MINIMUM AND 0.010 OHM MAX. RESISTANCE.
2. SIZE PER POWER PLANT REQUIREMENTS.
3. FOR A DEDICATED POWER PLANT, THE PREFERRED GW LOCATION IS THE SWITCH ROOM.
4. LOCATE SPLICE PLATE AS CLOSE AS POSSIBLE TO ITS ASSOCIATED PDF.
5. PROVIDE A GWSGB ONLY IF THE GWMGB CANNOT ACCOMODATE ALL CABLE TERMINATIONS.
6. FRAME GROUND CONDUCTOR B IS REQUIRED IF THE GWMGB IS GROUNDED ON A SEPARATE COG BAR THAN THE POWER PLANT.
7. SM-2000 INSTALLATIONS REQUIRE UP TO 3 LINEUP BONDING CONDUCTORS. SEE FIG. B180 FOR DIFFERENT LINEUP CONFIGURATIONS AND ADDITIONAL APPLICATION NOTES.

SEE FIG. C20, C30 FOR ADDITIONAL FRAME GROUNDING DETAILS

8. ENGINEER POWER PLANT FUSES OR CIRCUIT BREAKERS AND PRIMARY POWER FEEDERS BASED ON ENG. NOTES 61.2 AND 61.5.
9. THESE GROUNDING WIRES MAY BE #6 AWG IF POWER PLANT CB IS 200 AMPERES OR LESS
10. USE #4/0 HORIZONTAL EQUALIZER IN ALL CASES.
11. THE MAXIMUM SIZE CONDUCTOR THAT CAN BE TERMINATED AT THE PDF FUSE PANEL IS 350Kcmil. SEE FIG. C150, C160.

FIG. B90

TYPICAL POWER AND GROUNDING DIAGRAM WITH GROUND WINDOW LOCATED EITHER IN THE POWER ROOM OR SWITCH ROOM (NO COMMERCIAL AC ENTERING 5ESS SWITCH)

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

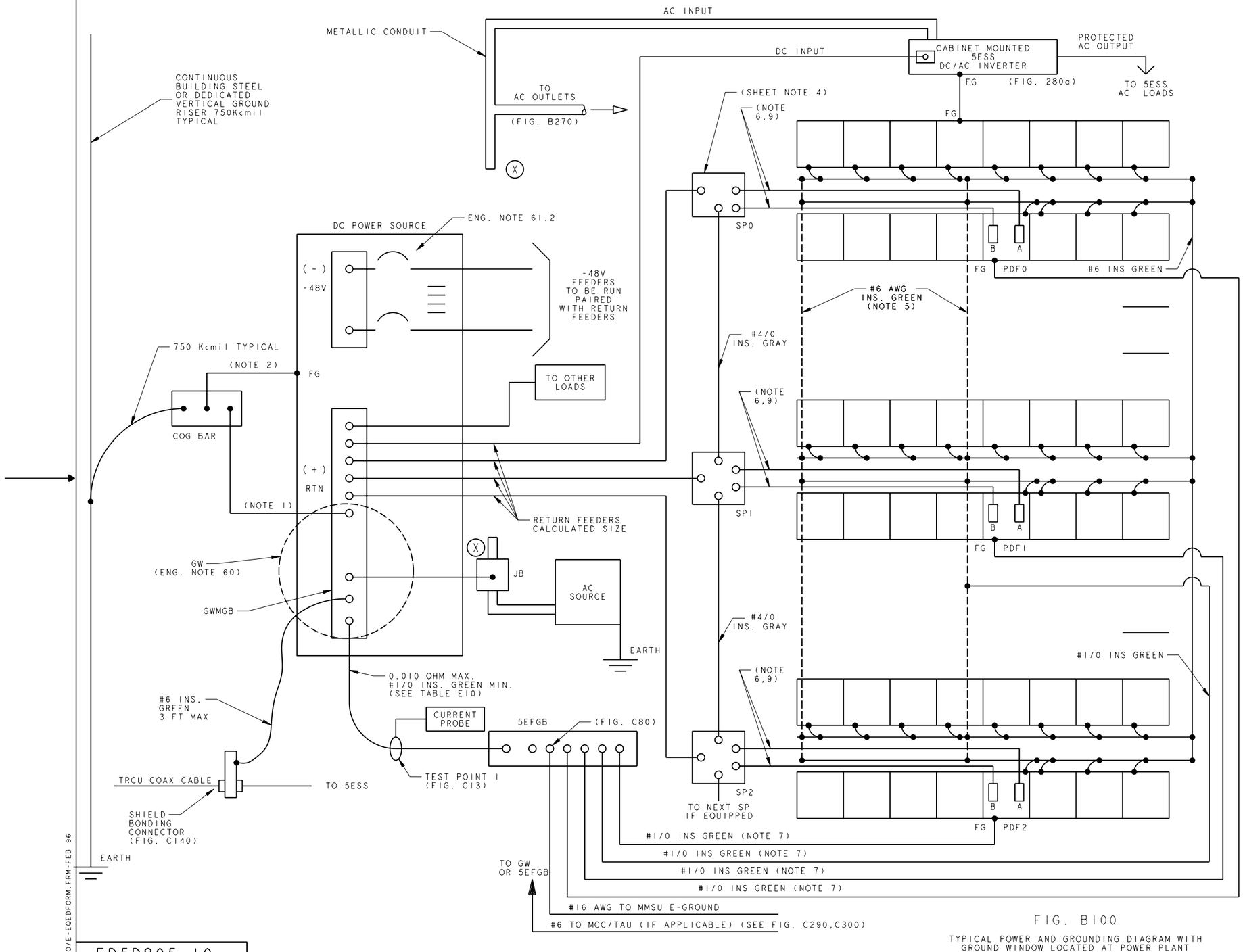
5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)

THIRD ANGLE PROJN

DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES | ED5D805-10 | SHEET NO. B13

MODEL NAME



SHEET NOTES

1. SIZE POWER PLANT RETURN BUS EARTH REFERENCE CONDUCTOR PER POWER PLANT REQUIREMENTS. 5ESS REQUIRES #1/0 AWG MINIMUM AND 0.010 OHM MAX. RESISTANCE.
2. SIZE PER POWER PLANT REQUIREMENTS.
3. SHOWN IS A 3 PDF SYSTEM. SAME CONCEPT APPLIES TO SWITCHES WITH MORE THAN 3 PDF'S.
4. LOCATE SPLICE PLATE AS CLOSE AS POSSIBLE TO ITS ASSOCIATED PDF.
5. SM-2000 INSTALLATIONS REQUIRE UP TO 3 LINEUP BONDING CONDUCTORS. SEE FIG. B180 FOR DIFFERENT LINEUP CONFIGURATIONS AND ADDITIONAL APPLICATION NOTES.

SEE FIG. C20, C30 FOR ADDITIONAL FRAME GROUNDING DETAILS

6. ENGINEER POWER PLANT FUSES OR CIRCUIT BREAKERS AND PRIMARY POWER FEEDERS BASED ON ENG. NOTES 61.2 AND 61.5.
7. THESE GROUNDING WIRES MAY BE #6 AWG IF POWER PLANT CB IS 200 AMPERES OR LESS
8. USE #4/0 HORIZONTAL EQUALIZER IN ALL CASES.
9. THE MAXIMUM SIZE CONDUCTOR THAT CAN BE TERMINATED AT THE PDF FUSE PANEL IS 350Kcmil. SEE FIG. C150, C160.

FIG. B100

TYPICAL POWER AND GROUNDING DIAGRAM WITH GROUND WINDOW LOCATED AT POWER PLANT RETURN DISCHARGE BUS BAR

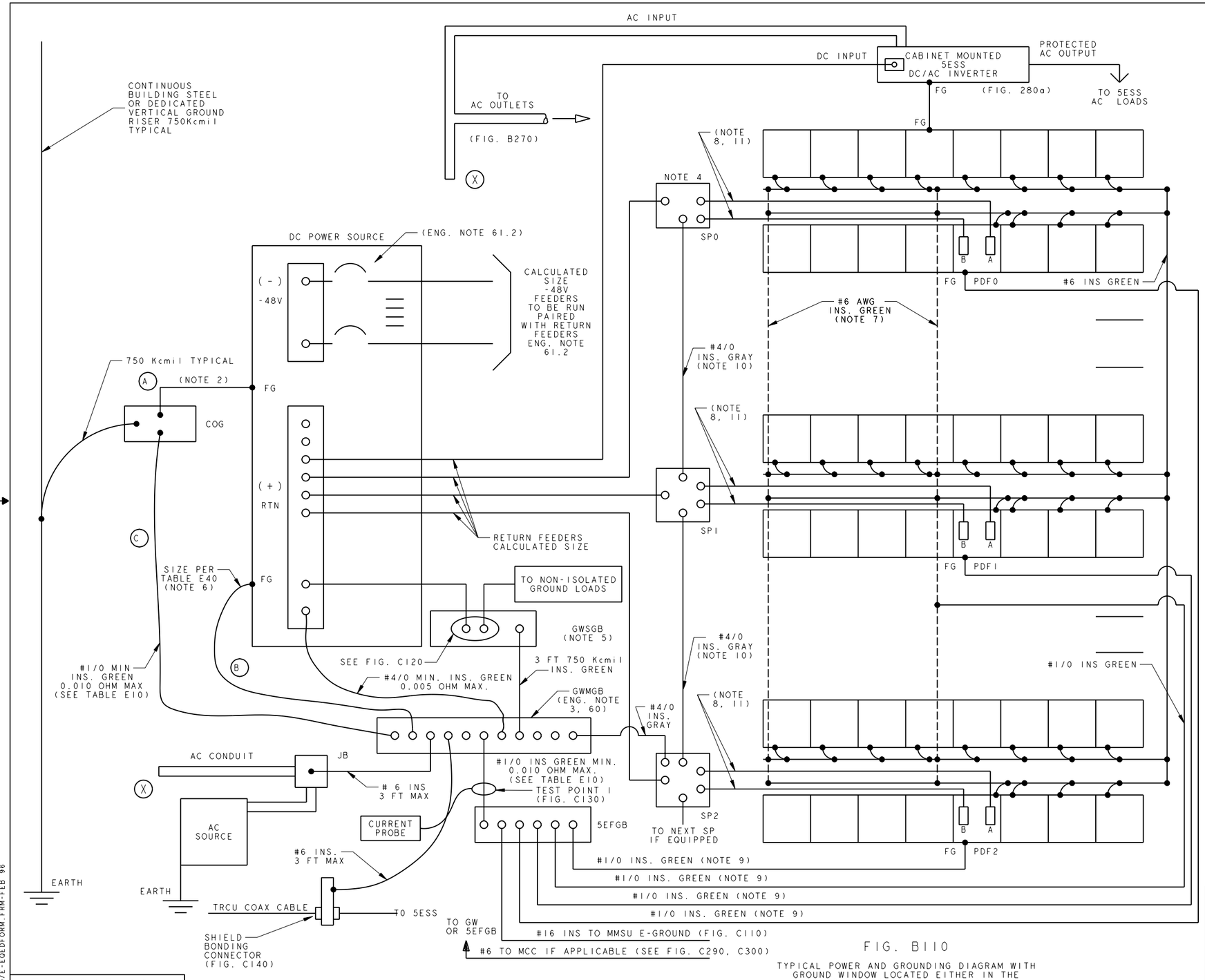


FIG. B110

TYPICAL POWER AND GROUNDING DIAGRAM WITH GROUND WINDOW LOCATED EITHER IN THE POWER ROOM OR SWITCH ROOM

SHEET NOTES

1. SIZE POWER PLANT RETURN BUS EARTH REFERENCE CONDUCTOR PER POWER PLANT REQUIREMENTS. 5ESS REQUIRES #0 AWG MINIMUM AND 0.010 OHM MAX. RESISTANCE.
2. SIZE PER POWER PLANT REQUIREMENTS.
3. FOR A DEDICATED POWER PLANT, THE PREFERRED GW LOCATION IS THE SWITCH ROOM.
4. LOCATE SPLICE PLATE AS CLOSE AS POSSIBLE TO ITS ASSOCIATED PDF.
5. PROVIDE A GWSGB ONLY IF THE GWMGB CANNOT ACCOMODATE ALL CABLE TERMINATIONS.
6. FRAME GROUND CONDUCTOR B IS REQUIRED IF GROUNDING CONDUCTORS A AND C ARE CONNECTED TO DIFFERENT COG BARS.
7. SM-2000 INSTALLATIONS REQUIRE UP TO 3 LINEUP BONDING CONDUCTORS. SEE FIG. B180 FOR DIFFERENT LINEUP CONFIGURATIONS AND ADDITIONAL APPLICATION NOTES.

SEE FIG. C20, C30 FOR ADDITIONAL FRAME GROUNDING DETAILS

8. ENGINEER POWER PLANT FUSES OR CIRCUIT BREAKERS AND PRIMARY POWER FEEDERS BASED ON ENG. NOTES 61.2 AND 61.5.
9. THESE GROUNDING WIRES MAY BE #6 AWG IF POWER PLANT CB IS 200 AMPERES OR LESS
10. USE #4/0 HORIZONTAL EQUALIZER IN ALL CASES.
11. THE MAXIMUM SIZE CONDUCTOR THAT CAN BE TERMINATED AT THE PDF FUSE PANEL IS 350Kcmil. SEE FIG. C150, C160.

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)

THIRD ANGLE PROJN

DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES | ED5D805-10 | SHEET NO. B15

MODEL NAME

ED5D805-10

PRO/E-EQEDFORM.FRM-FEB 96

SHEET NOTES:

1. THIS IS NOT AN ORED POWER SYSTEM. EACH POWER PLANT PROVIDES APPROX 50% OF THE POWER REQUIRED BY 5ESS.
2. SEE FIG. B130 AND B140 FOR GROUNDING REQUIREMENTS.

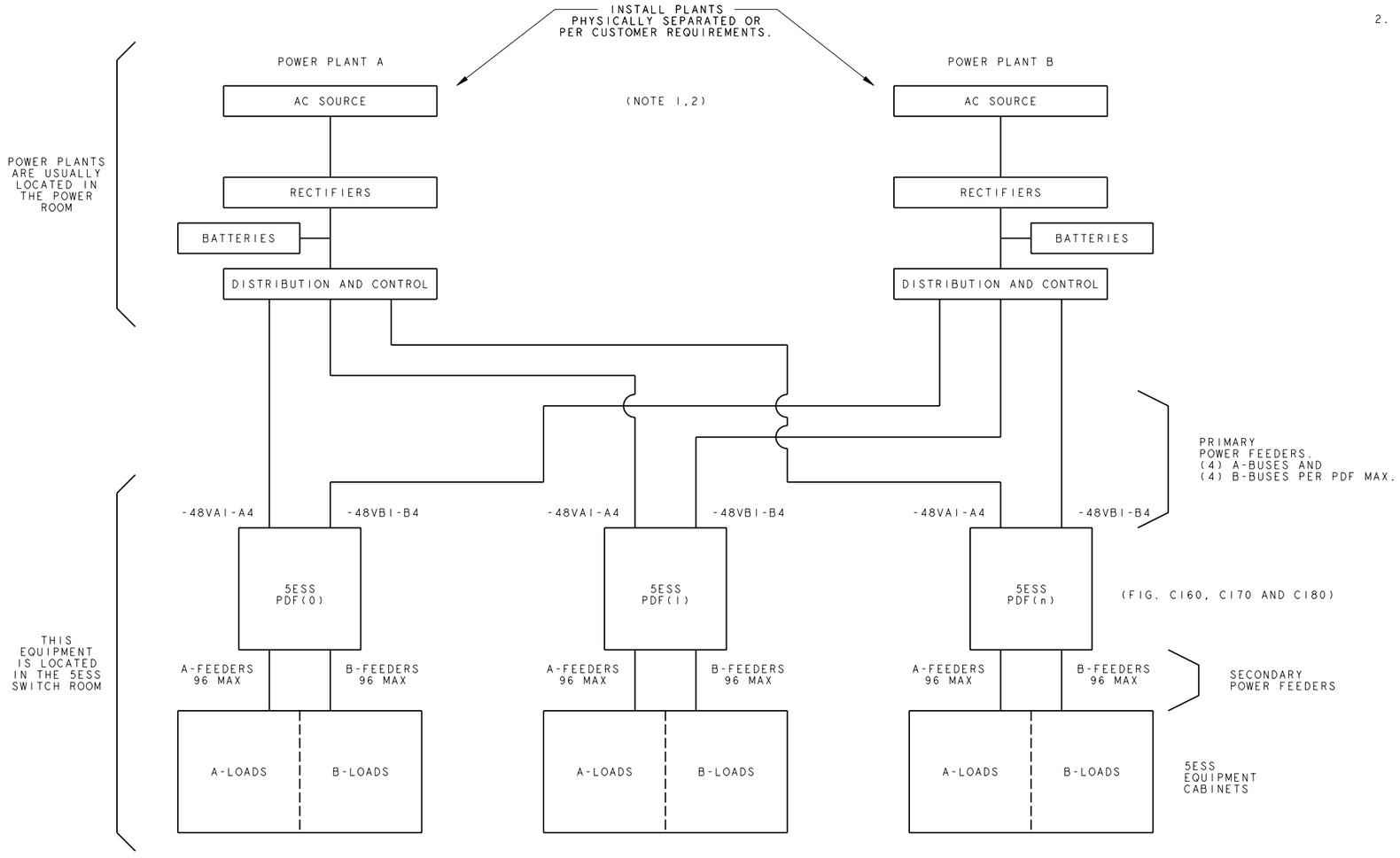


FIG. B120

DC POWER DISTRIBUTION ARCHITECTURE
USING DUAL BULK POWER PLANTS
AND 5ESS PDF WITH SPLIT A & B BUSES

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B16

MODEL NAME

D

SHEET NOTES

1. SEE FIG. B130 AND B140 FOR DETAILS OF EACH 5ESS CONFIGURATION.
2. BONDING ALL RETURNS TO THE GW, REDUCES THE RISK OF ONE SYSTEM AFFECTING ANOTHER. IF THIS INSTALLATION IS NOT POSSIBLE, INSTALL PER FIG. B110.

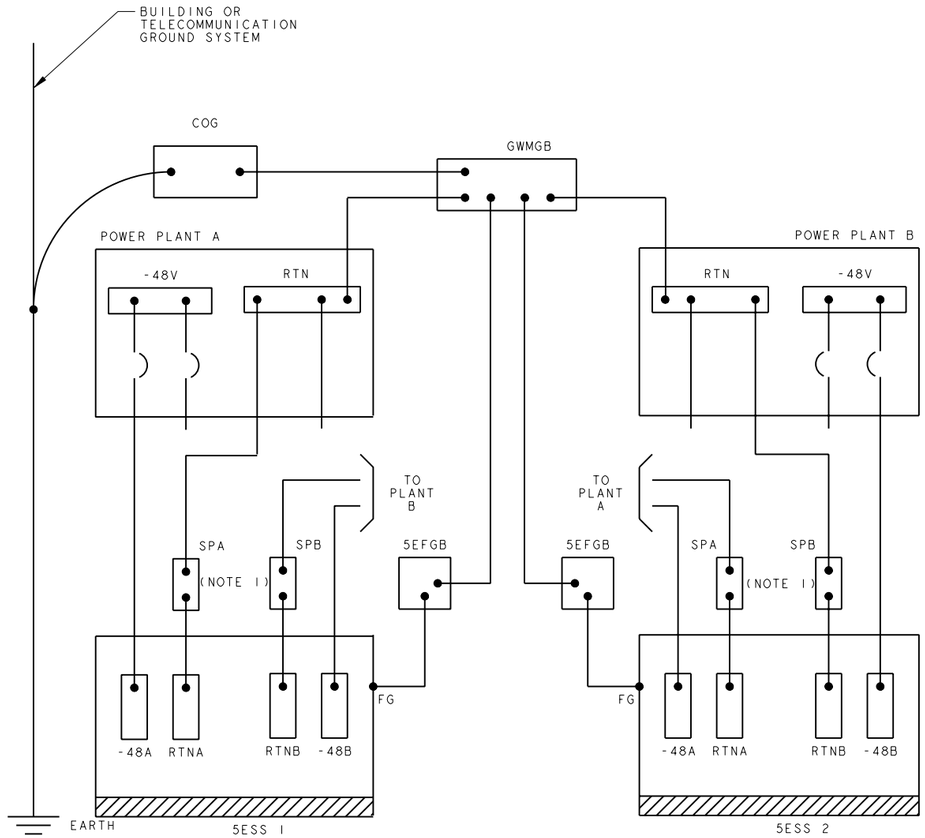
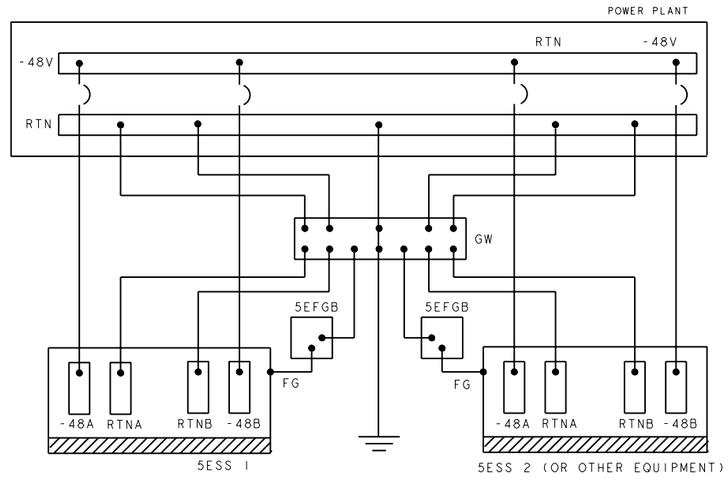


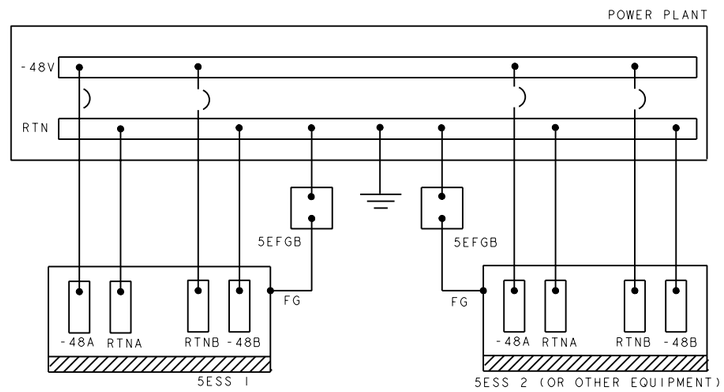
FIG. B125

TWO 5ESS SWITCHES, EACH POWERED BY TWO SEPARATE POWER PLANTS



(b)

TWO SINGLE POINT GROUND SWITCHES, WITH STAND-ALONE GW (PREFERRED INSTALLATION), SEE NOTE 2.



(a)

TWO SINGLE POINT GROUND SWITCHES, WITH GW ATRTN BUS BAR OF POWER PLANT

FIG. B126

TWO ISOLATED SYSTEMS SHARING ONE POWER PLANT

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B17

MODEL NAME

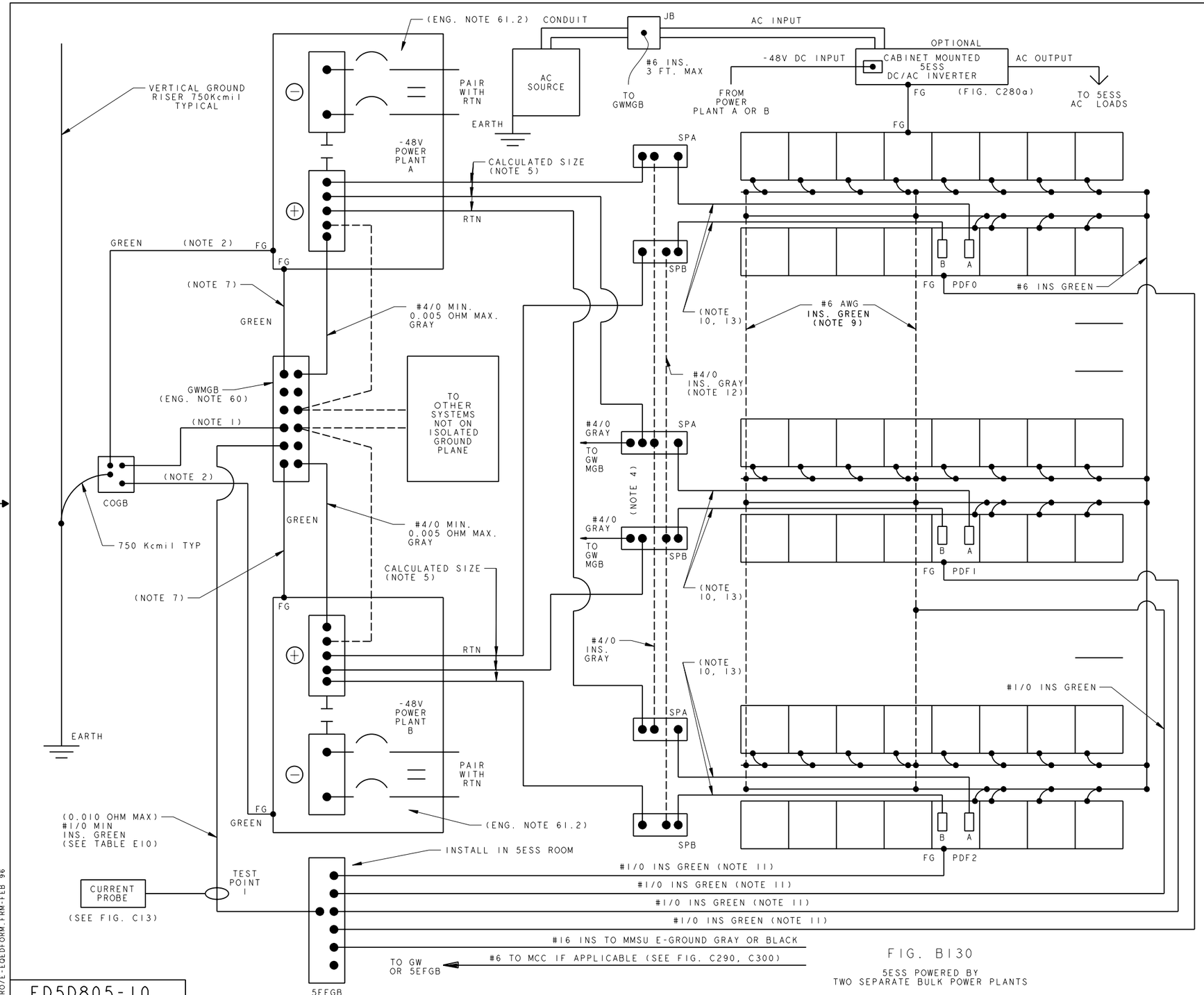


FIG. B130

5ESS POWERED BY TWO SEPARATE BULK POWER PLANTS

SHEET NOTES

1. SIZE POWER PLANT RETURN BUS EARTH REFERENCE CONDUCTOR PER POWER PLANT REQUIREMENTS. 5ESS REQUIRES #1/0 AWG MINIMUM AND 0.010 OHM MAX. RESISTANCE.
2. SIZE PER POWER PLANT REQUIREMENTS.
3. FOR A DEDICATED POWER PLANT, THE PREFERRED GW LOCATION IS THE SWITCH ROOM.
4. LOCATE SPLICE PLATE AS CLOSE AS POSSIBLE TO ITS ASSOCIATED PDF. DO NOT CONNECT A AND B SPLICE PLATES TOGETHER.
5. -48V AND RETURN FEEDERS ARE RUN PAIRED (FIG. C310) AND SIZE IS CALCULATED PER ENG. NOTE 61.5.
6. UNLESS OTHERWISE SPECIFIED BY CUSTOMER OR LOCAL CODES INSULATION COLOR SHALL BE:

RED	=	-48VA
RED/BLACK	=	RTN A
BLUE	=	-48VB
BLUE/BLACK	=	RTN B
GREEN	=	FRAME GROUNDING
GRAY	=	CONDUCTOR FROM POWER PLANT RETURN BUS TO GWMGB
GRAY	=	HORIZONTAL EQUALIZER CONDUCTORS

7. THIS ADDITIONAL FRAME GROUNDING WIRE IS REQUIRED IF THE GWMGB IS GROUNDED TO A DIFFERENT COG BAR THAN THE POWER PLANT FRAMEWORK. SEE TABLE E40.
8. GROUND WINDOW LOCATED EITHER IN THE POWER ROOM OR SWITCH ROOM.
9. SM-2000 INSTALLATIONS REQUIRE UP TO 3 LINEUP BONDING CONDUCTORS. SEE FIG. B180 FOR DIFFERENT LINEUP CONFIGURATIONS AND ADDITIONAL APPLICATION NOTES.
10. ENGINEER POWER PLANT FUSES OR CIRCUIT BREAKERS AND PRIMARY POWER FEEDERS BASED ON ENG. NOTES 61.2 AND 61.5.
11. THESE GROUNDING WIRES MAY BE #6 AWG IF POWER PLANT CB IS 200 AMPERES OR LESS
12. USE #4/0 HORIZONTAL EQUALIZER IN ALL CASES.
13. THE MAXIMUM SIZE CONDUCTOR THAT CAN BE TERMINATED AT THE PDF FUSE PANEL IS 350Kcmil. SEE FIG. C150, C160.

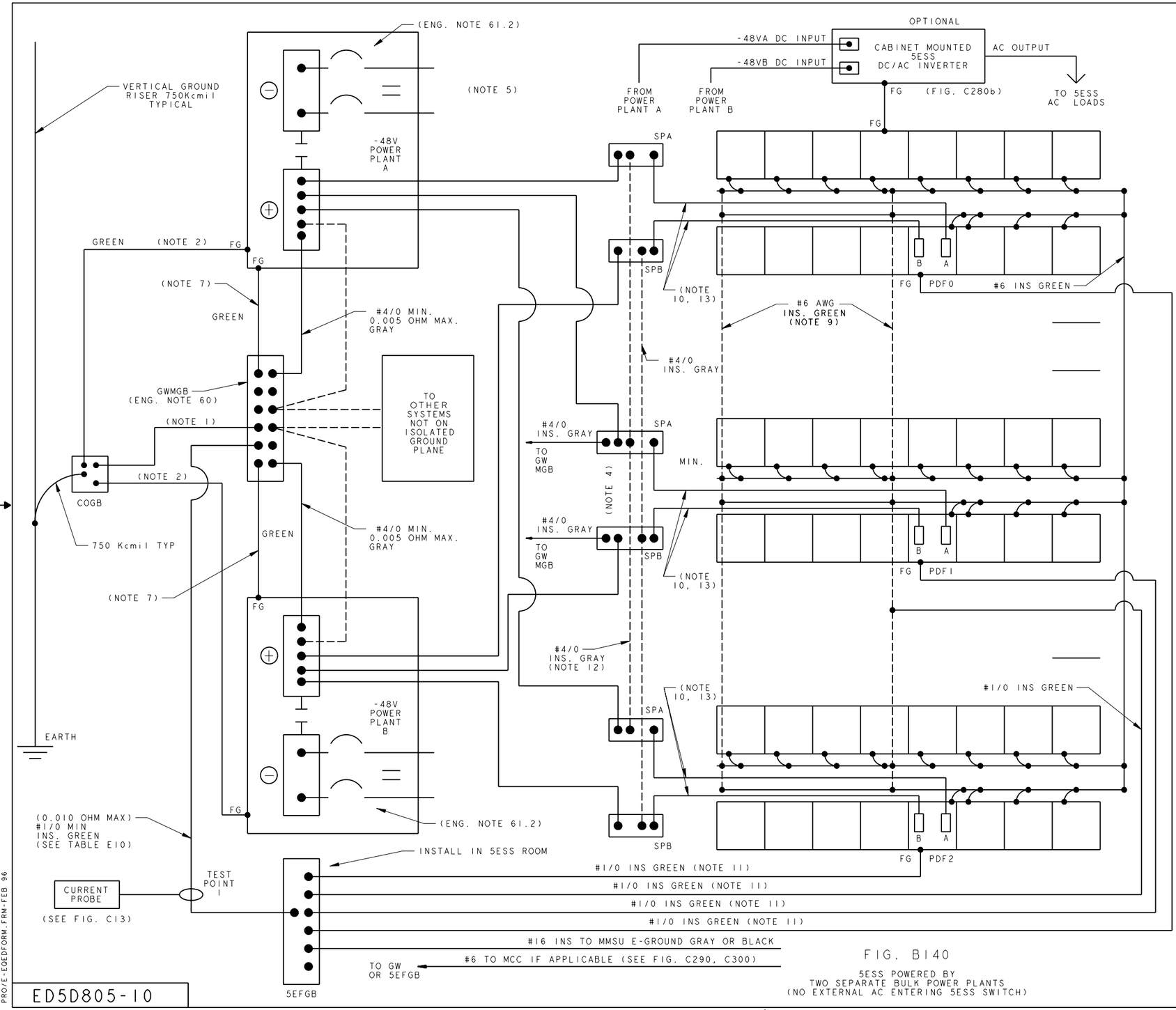


FIG. B140

5ESS POWERED BY
TWO SEPARATE BULK POWER PLANTS
(NO EXTERNAL AC ENTERING 5ESS SWITCH)

SHEET NOTES

1. SIZE POWER PLANT RETURN BUS EARTH REFERENCE CONDUCTOR PER POWER PLANT REQUIREMENTS. 5ESS REQUIRES #1/0 AWG MINIMUM AND 0.010 OHM MAX. RESISTANCE.
2. SIZE PER POWER PLANT REQUIREMENTS.
3. FOR A DEDICATED POWER PLANT, THE PREFERRED GW LOCATION IS THE SWITCH ROOM.
4. LOCATE SPLICE PLATE AS CLOSE AS POSSIBLE TO ITS ASSOCIATED PDF, AND DO NOT CONNECT SPLICE PLATES TOGETHER.
5. -48V AND RETURN FEEDERS ARE RUN PAIRED (FIG. C310) AND SIZE IS CALCULATED PER ENG. NOTE 61.5.
6. UNLESS OTHERWISE SPECIFIED BY CUSTOMER OR LOCAL CODES INSULATION COLOR SHALL BE:

RED	= -48VA
RED/BLACK	= RTN A
BLUE	= -48VB
BLUE/BLACK	= RTN B
GREEN	= FRAME GROUNDING
GRAY	= CONDUCTOR FROM POWER PLANT RETURN BUS TO GWMGB
GRAY	= HORIZONTAL EQUALIZER CONDUCTORS.

7. THIS ADDITIONAL FRAME GROUNDING WIRE IS REQUIRED IF THE GWMGB IS GROUNDED TO A DIFFERENT COG BAR THAN THE POWER PLANT FRAMEWORK. SEE TABLE E40.
8. GROUND WINDOW LOCATED EITHER IN THE POWER ROOM OR SWITCH ROOM.
9. SM-2000 INSTALLATIONS REQUIRE UP TO 3 LINEUP BONDING CONDUCTORS. SEE FIG. B180 FOR DIFFERENT LINEUP CONFIGURATIONS AND. ADDITIONAL APPLICATION NOTES.
10. ENGINEER POWER PLANT FUSES OR CIRCUIT BREAKERS AND PRIMARY POWER FEEDERS BASED ON ENG. NOTES 61.2 AND 61.5.
11. THESE GROUNDING WIRES MAY BE #6 AWG IF POWER PLANT CB IS 200 AMPERES OR LESS
12. USE #4/0 HORIZONTAL EQUALIZER IN ALL CASES.
13. THE MAXIMUM SIZE CONDUCTOR THAT CAN BE TERMINATED AT THE PDF FUSE PANEL IS 350Kcmil. SEE FIG. C150, C160.

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B19

MODEL NAME

ED5D805-10

PRO/E-EQEDFORM.FRM-FEB 96

D

SHEET NOTES

1. MINIMUM CB SIZE = (1.25) x (L2 AMPS). IF CALCULATIONS RESULT IN A NONSTANDARD FUSE OR CKT BREAKER SIZE, THE NEXT STANDARD SIZE MAY BE USED.
2. SIZE PRIMARY FEEDERS BASED ON THE LARGEST FEEDER RESULTING FROM THE FOLLOWING:
   a) USE #1/0 MINIMUM.
   b) FEEDER AMPACITY BASED ON NEC TABLE 310-16 SHALL BE EQUAL TO OR EXCEED CB SIZE.
   c) $CM = \frac{(11.1)(FT\ LOOP)(L2\ AMP)}{VDROP}$
3. IF THE LOAD IN THE FUSE PANEL IS EXPECTED TO GROW IN THE FUTURE, IT MAY BE ADVANTAGEOUS AND SAFER TO SIZE THE CB AND FEEDERS ACCORDINGLY DURING INITIAL INSTALLATION.
4. DO NOT USE SPLICE PLATES OR TIE RTN A AND RTN B TOGETHER IN ANY OTHER WAY.
5. #6 AWG MAY BE USED IF THE POWER PLANT CB IS 200 AMPERES OR LESS.

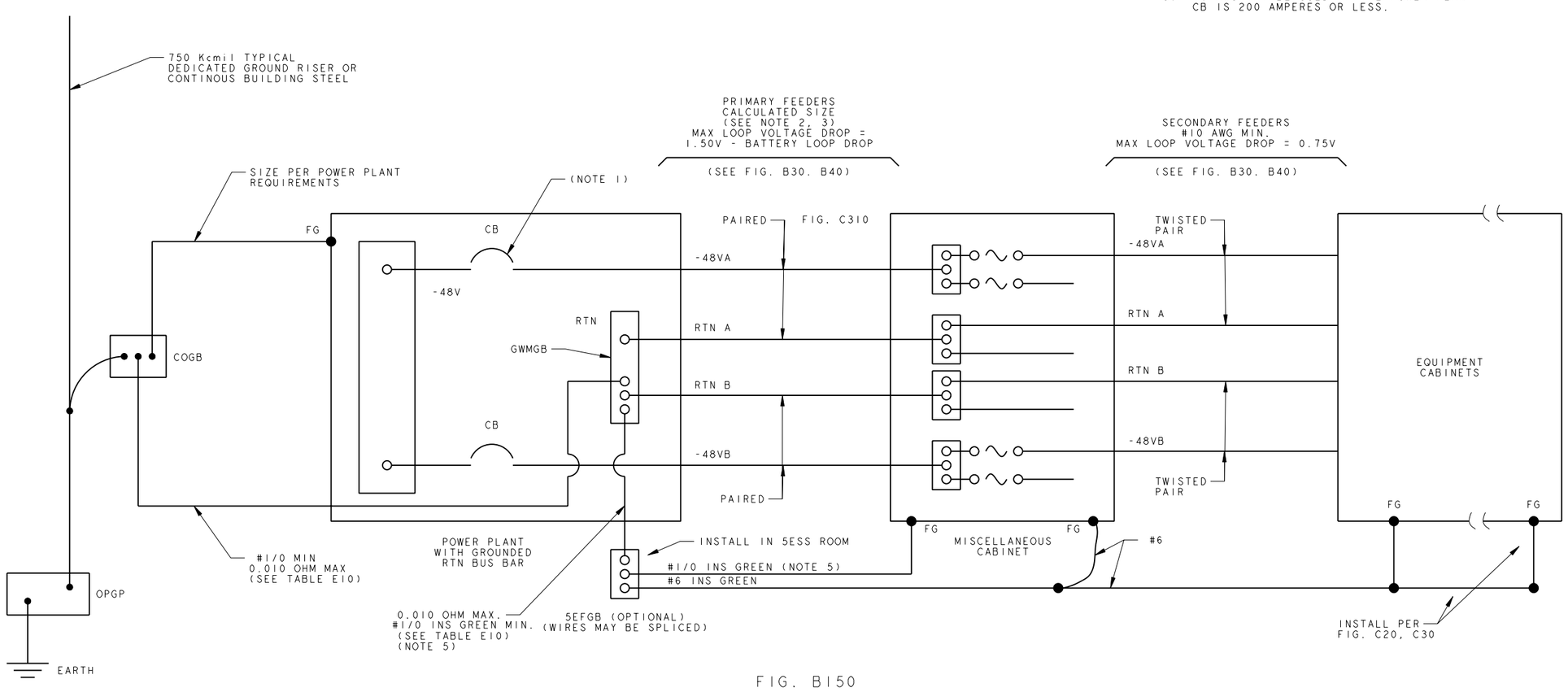


FIG. B150

TYPICAL DC DISTRIBUTION AND GROUNDING CONFIGURATION UTILIZING ONE FUSE PANEL FOR SMALL SYSTEMS (RSM, ORM, VCDX ETC. ...)

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B20

MODEL NAME

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

D

SHEET NOTES

1. MINIMUM CB SIZE = (1.25) x (L2 AMPS). IF CALCULATIONS RESULT IN A NONSTANDARD FUSE OR CKT BREAKER SIZE, THE NEXT STANDARD SIZE MAY BE USED.
2. SIZE PRIMARY FEEDERS BASED OF THE LARGEST FEEDER RESULATING FROM THE FOLLOWING:
   a) USE #1/0 MINIMUM.
   b) FEEDER AMPACITY BASED ON NEC TABLE 310-16 SHALL BE EQUAL TO OR EXCEEDS CB SIZE.
   c) $CM = \frac{(11.1)(FT\ LOOP)(L2\ AMP)}{VDROP}$
3. IF THE LOAD IN THE FUSE PANEL IS EXPECTED TO GROW IN THE FUTURE, IT MAY BE ADVANTAGEOUS AND SAFER TO SIZE THE CB AND FEEDERS ACCORDINGLY DURING INITIAL INSTALLATION.
4. DO NOT USE SPLICE PLATES OR TIE RTN A AND RTN B TOGETHER IN ANY OTHER WAY.
5. #6 AWG MAY BE USED IF THE POWER PLANT CB IS 200 AMPERES OR LESS.

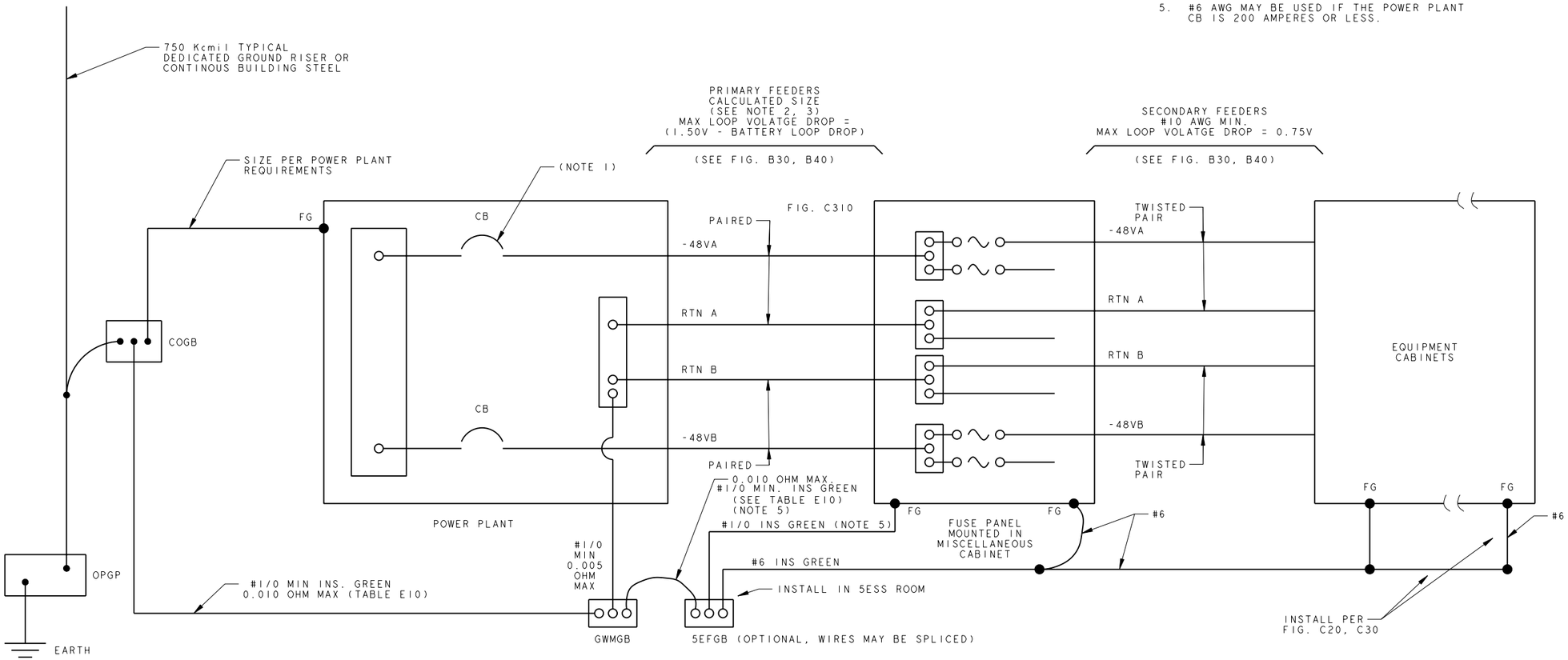


FIG. B160

TYPICAL DC DISTRIBUTION AND GROUNDING CONFIGURATION UTILIZING ONE FUSE PANEL FOR SMALL SYSTEMS (RSM, ORM, VCDX ETC. ...)

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN DWG SIZE C2 / ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B21

MODEL NAME

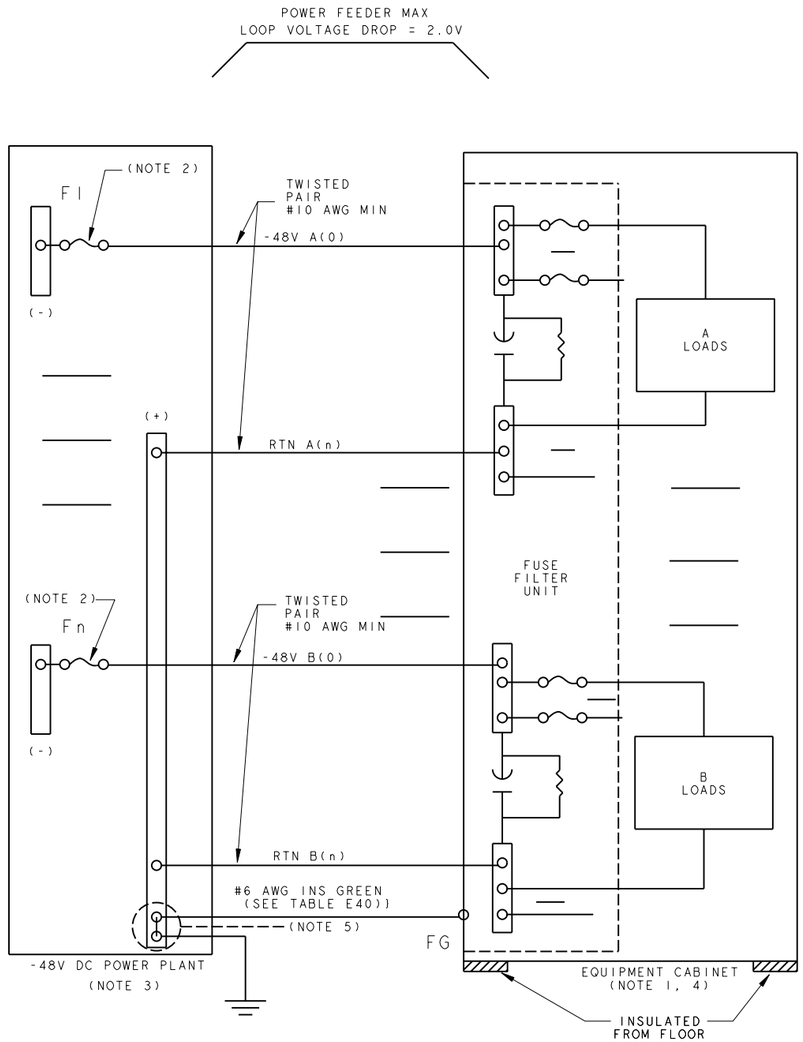


FIG. B170

TYPICAL POWER DISTRIBUTION AND GROUNDING FOR A STAND-ALONE 5ESS CABINET ON ISOLATED GROUND PLANE (NOTE 1)

SHEET NOTES:

1. THIS IS A NON-STANDARD CONFIGURATION. POWER TO THE EQUIPMENT CABINET(S) IS CABLED DIRECTLY FROM THE DISTRIBUTION CABINET OF THE POWER PLANT.
2. CIRCUIT BREAKER OR FUSE SIZE SHALL BE 20 AMP MINIMUM - 30 AMP MAXIMUM.
3. THE DC POWER SOURCE MUST BE EQUIPPED WITH A CHARGE CIRCUIT OR BE ABLE TO WITHSTAND THE INRUSH CURRENT GENERATED BY THE LOAD CAPACITANCE. INRUSH CURRENT INFORMATION IS DOCUMENTED IN SD-5D005-01.
4. ADDITIONAL GROUNDING REQUIREMENTS SHOWN IN FIG. B10 AND THROUGHOUT THIS DRAWING MAY APPLY DEPENDING ON THE SPECIFIC CABINET APPLICATION POWER SOURCE TYPE AND COMMUNICATION CABLE(S) INTERFACING WITH THE EQUIPMENT IN THE CABINET.
5. THE EQUIPMENT CABINET FRAME GROUND WIRE MAY BE CONNECTED TO A GROUND WINDOW IF ONE EXISTS.

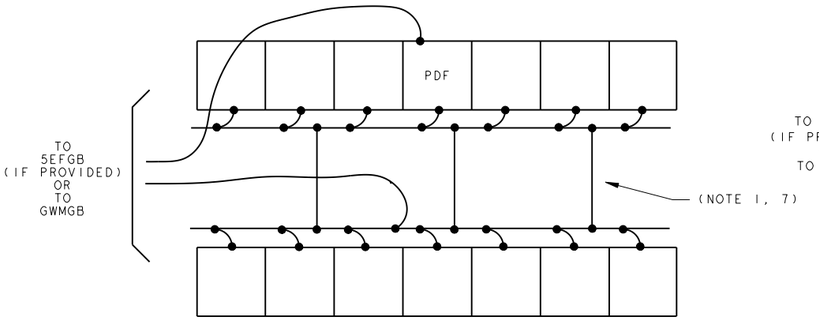
ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B22

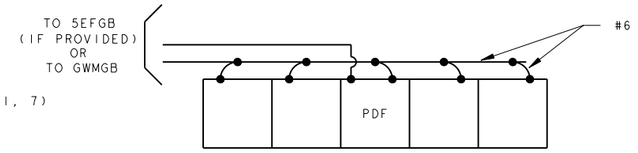
MODEL NAME

SHEET NOTES

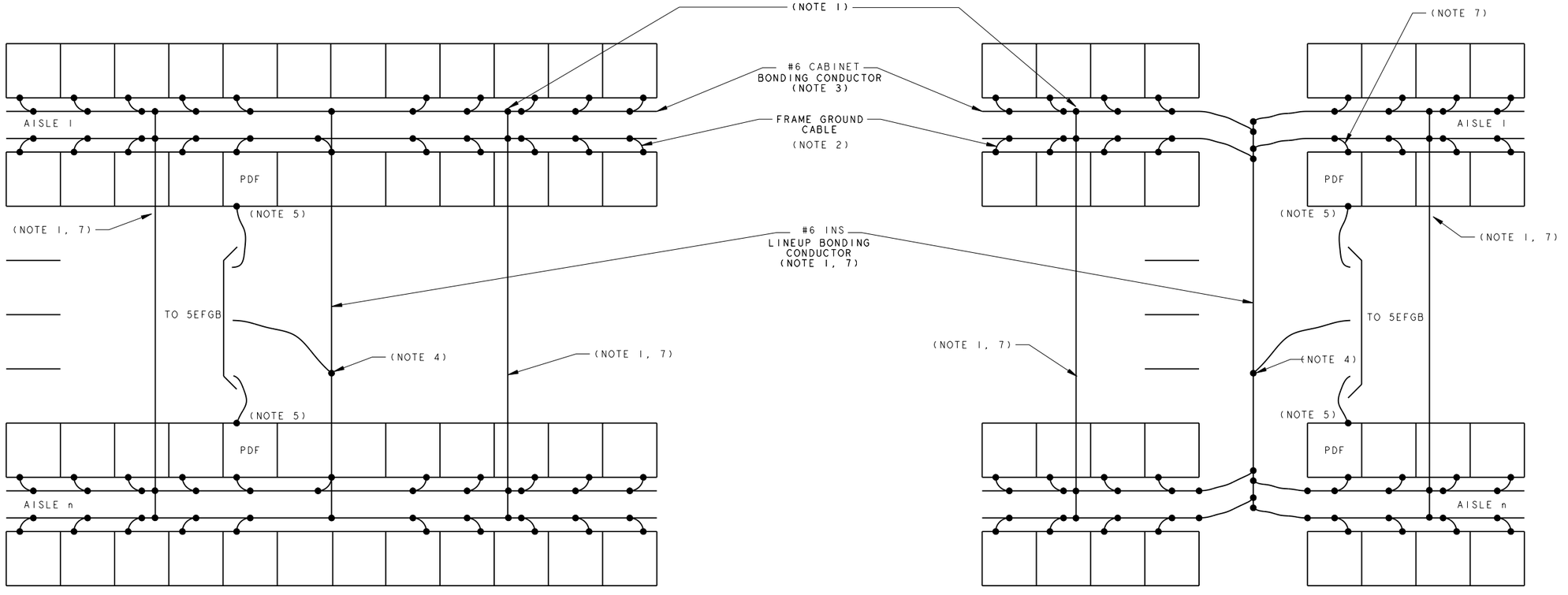
1. AS OF ISSUE ONE OF THIS DRAWING INSTALL TWO ADDITIONAL #6 AWG LINEUP BONDING CONDUCTORS (TOTAL OF 3) ON ALL NEW SM-2000 INSTALLATIONS. WHEN ADDING SM-2000 EQUIPMENT TO AN EXISTING SYSTEM WITH CLASSIC SM, THE ADDITIONAL LINEUP BONDING WIRES ARE REQUIRED ONLY IN LINEUPS CONTAINING SM-2000 CABINETS.
2. SEE FIG. C20 AND C30 FOR HARDWARE DETAILS.
3. THE CABINET BONDING CONDUCTOR IS BARE IF ROUTED IN LINEUP CABLE RACK OR UNSULATED IF ROUTED UNDER THE RAISED FLOOR.
4. WHENEVER POSSIBLE CONNECT TO MIDPOINT OF LINEUP BONDING CONDUCTOR.
5. PDF BONDING TO LINEUP BONDING CONDUCTOR WAS NOT REQUIRED PRIOR TO ISSUE 1 OF THIS DRAWING.
6. SEE FIG. B80 - B170 FOR FRAME GROUNDING WIRE SIZES.
7. ROUTE LINEUP BONDING CONDUCTORS IN CROSS AISLE TROUGHS. USE PIDB/PICB TROUGH FIRST POWER AND SWITCHBOARD TROUGHS. MAX ONE GROUNDING
8. THE GROUNDING KIT, ED4C686-70, G-30, SHALL BE BE INSTALLED WITH PIDB/PICB CABLE TROUGH. SEE FIG. C45.



(d)
TWO LINEUP SYSTEM
(NOTE 6, 7)



(c)
SINGLE LINEUP SYSTEM
(NOTE 6, 7)



(a)
CONTINUOUS LINEUPS
(NOTE 6, 7)

(b)
SPLIT LINEUPS
(NOTE 6, 7)

FIG. B180
EXAMPLES OF TYPICAL CABINET FRAMEWORK (CHASSIS) BONDING LAYOUTS

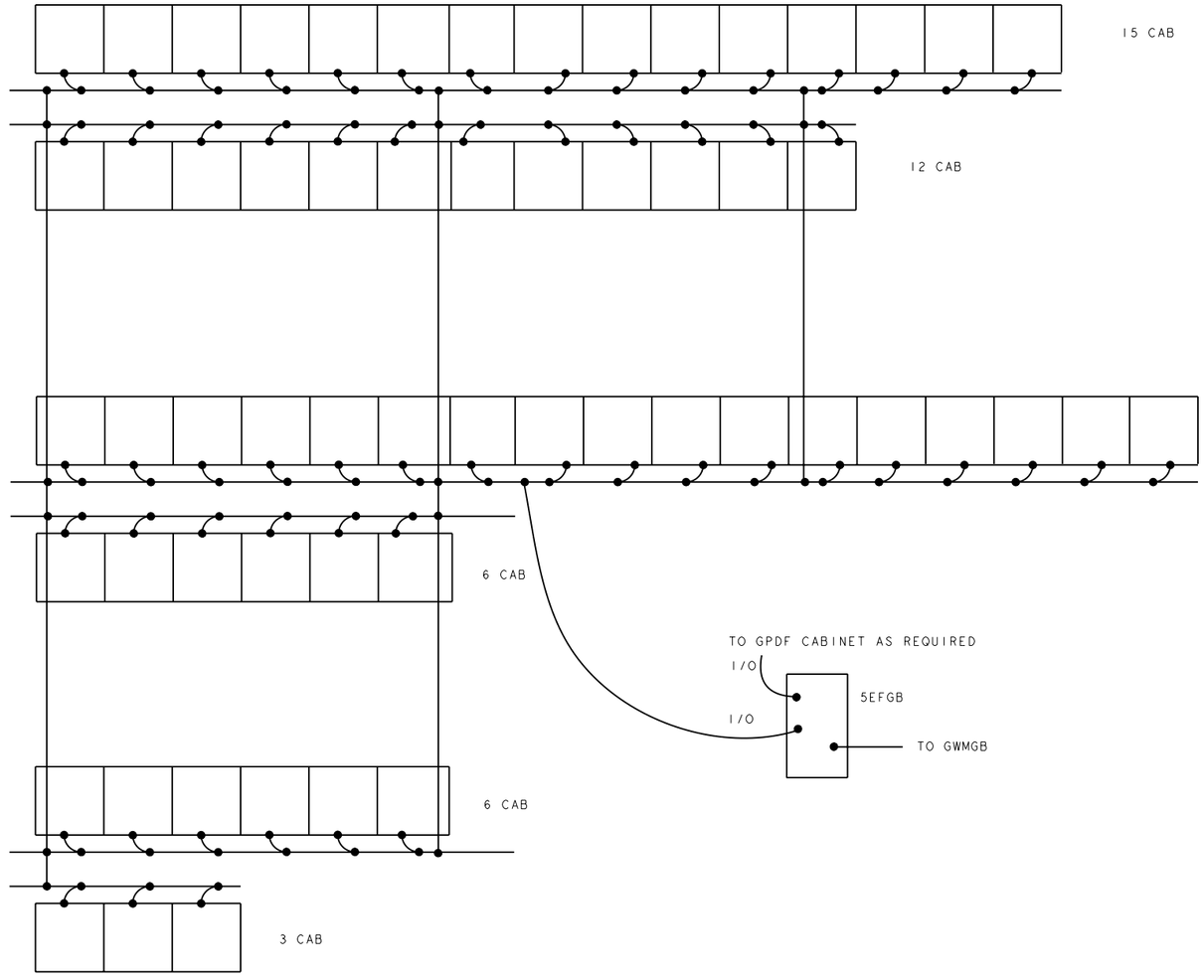
FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B23

MODEL NAME

PRO/E-EQEDFORM.FRM-FEB 96

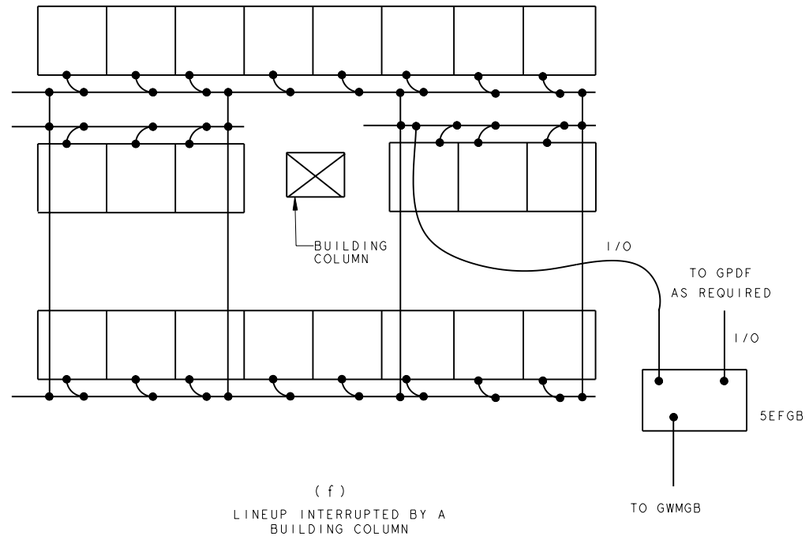
ED5D805-10



(e)

BONDING REQUIREMENTS FOR EQUIPMENT LINEUPS OF VARIOUS LENGTH.
(NOTE 1)

NO. OF CABINETS	MIN. NO. OF BONDING WIRES REQUIRED
1 TO 3	1
4 TO 6	2
7 TO 17	3



(f)

LINEUP INTERRUPTED BY A BUILDING COLUMN

FIG. B180 (CONT.)

EXAMPLES OF TYPICAL CABINET FRAMEWORK (CHASSIS) BONDING LAYOUTS

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)

THIRD ANGLE PROJN

DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES | ED5D805-10 | SHEET NO. B24

MODEL NAME

ED5D805-10

PRO/E-EQEDFORM.FRM-FEB 96

SHEET NOTES

1. THIS FIGURE DOES NOT REPRESENT ACTUAL FLOOR PLAN LAYOUT. PLACE PDF CLOSE TO MIDDLE OF LINEUP TO MINIMIZE POWER FEEDER LENGTH AND REDUCE NEED FOR SPLICING DUE TO VOLTAGE DROP REQUIREMENTS.
2. BEFORE ISSUE 1 OF THIS DWG, THE 5ESS PDF WAS NOT REQUIRED TO HAVE A CONNECTION TO THE LINEUP BONDING CONDUCTOR.
3. AC OUTLETS FOR TEST EQUIPMENT WILL NO LONGER BE INSTALLED ON END GUARDS AS OF ISSUE 1 OF THIS DRAWING.
4. SEE FIGS. B60-B160 FOR GROUNDING WIRE SIZES.

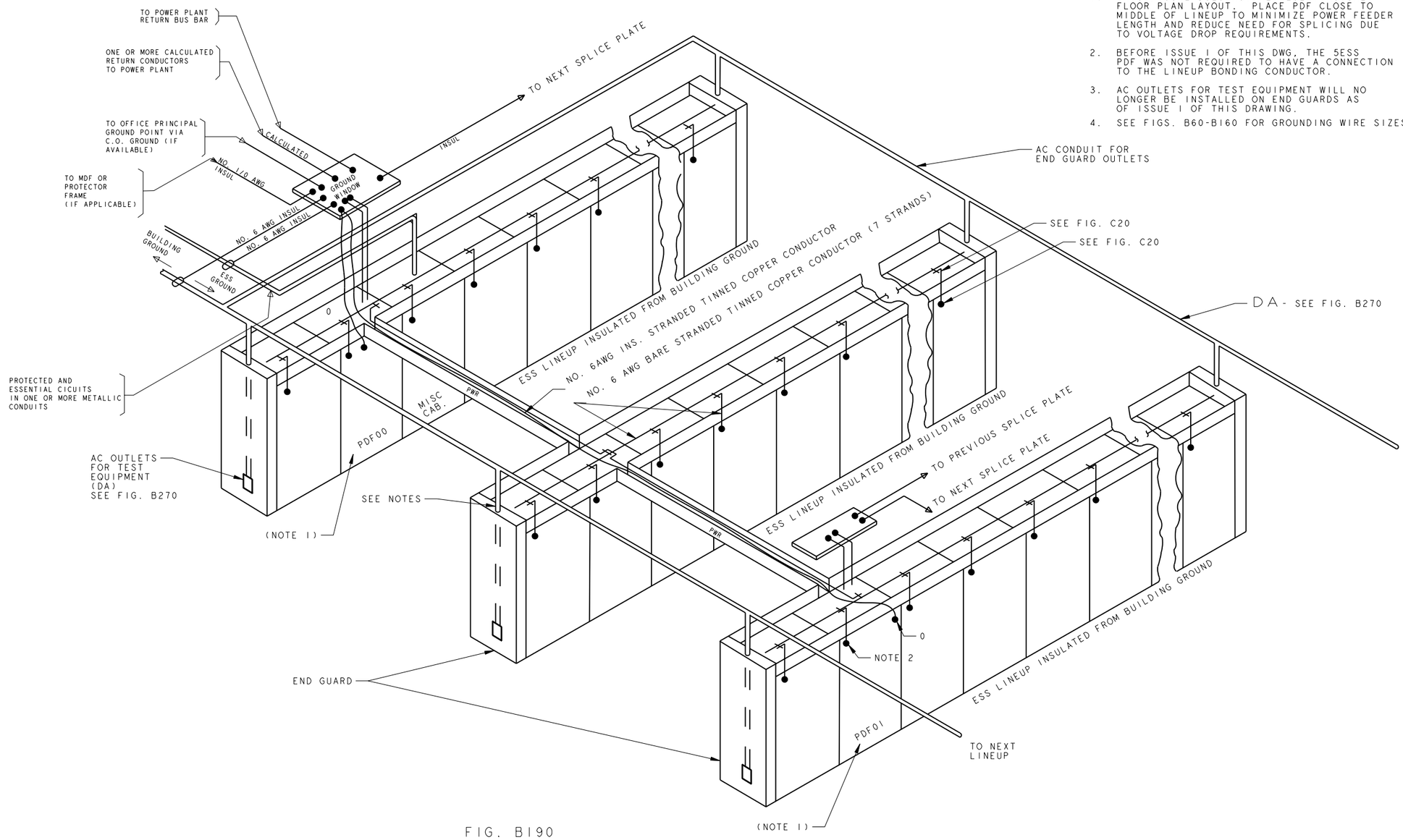


FIG. B190

TYPICAL GROUNDING ARRANGEMENT FOR SLAB INSTALLATIONS

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B25

MODEL NAME

D

SHEET NOTES

1. SHOWN ARE TWO METHODS (A AND B) OF BONDING THE RTN CONDUCTORS TO THE GROUND WINDOW FOR LOADS NOT ON ISOLATED GROUND.
2. A SUPPLEMENTARY GROUND WINDOW BUS BAR IS REQUIRED WHEN THE MAIN GROUND BUS BAR DOES NOT HAVE ADEQUATE SPACE TO TERMINATE ALL THE NECESSARY CABLES.
3. SAME SIZE AS LARGEST RETURN FEEDER UP TO #1/0 MAXIMUM.

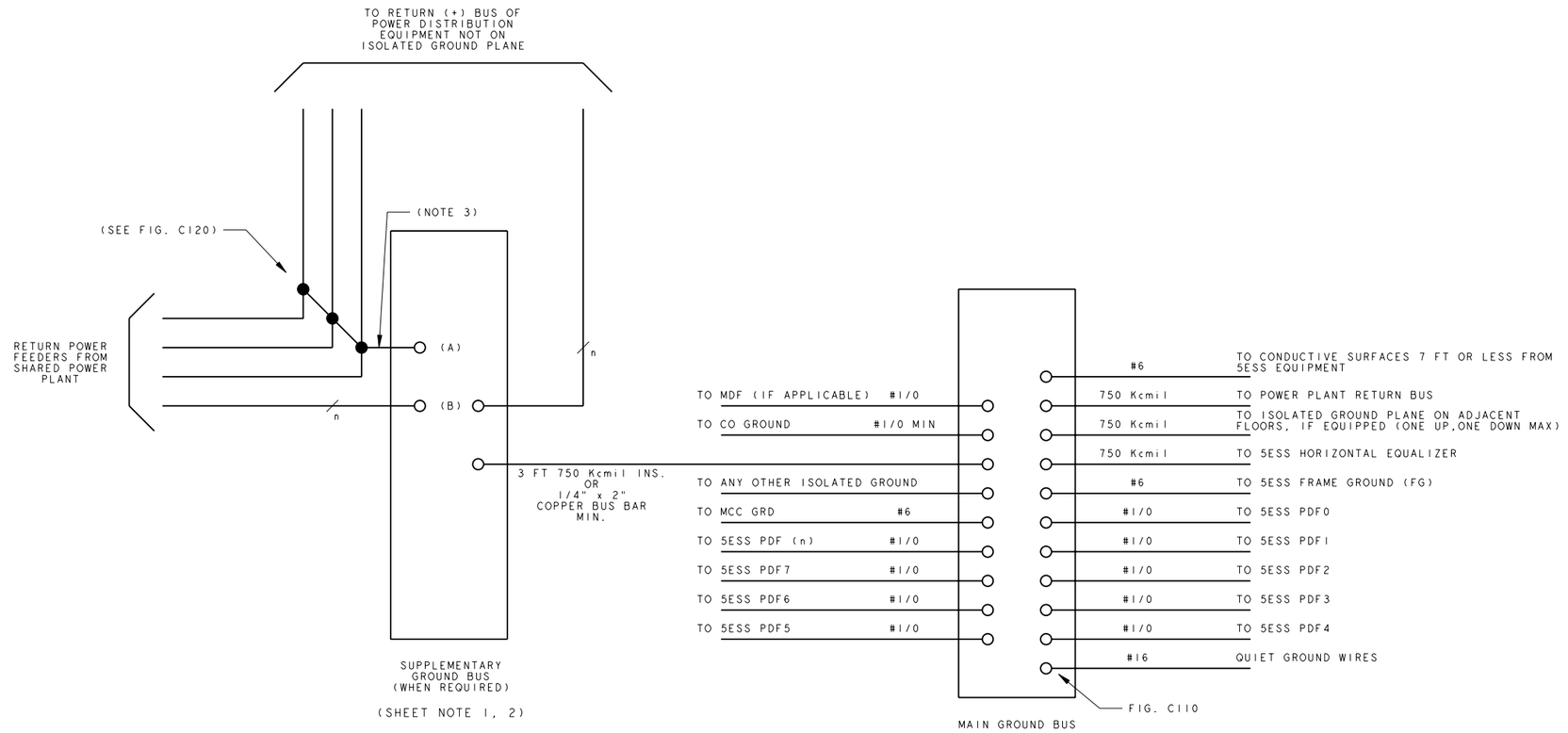


FIG. B200

TYPICAL STAND ALONE GROUND WINDOW CONNECTIONS

DA - REPLACED BY FIG. B210, B220

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B26

MODEL NAME

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

D

SHEET NOTES

1. #6 AWG MAY BE USED IF POWER PLANT CB IS 200 AMPERES OR LESS.

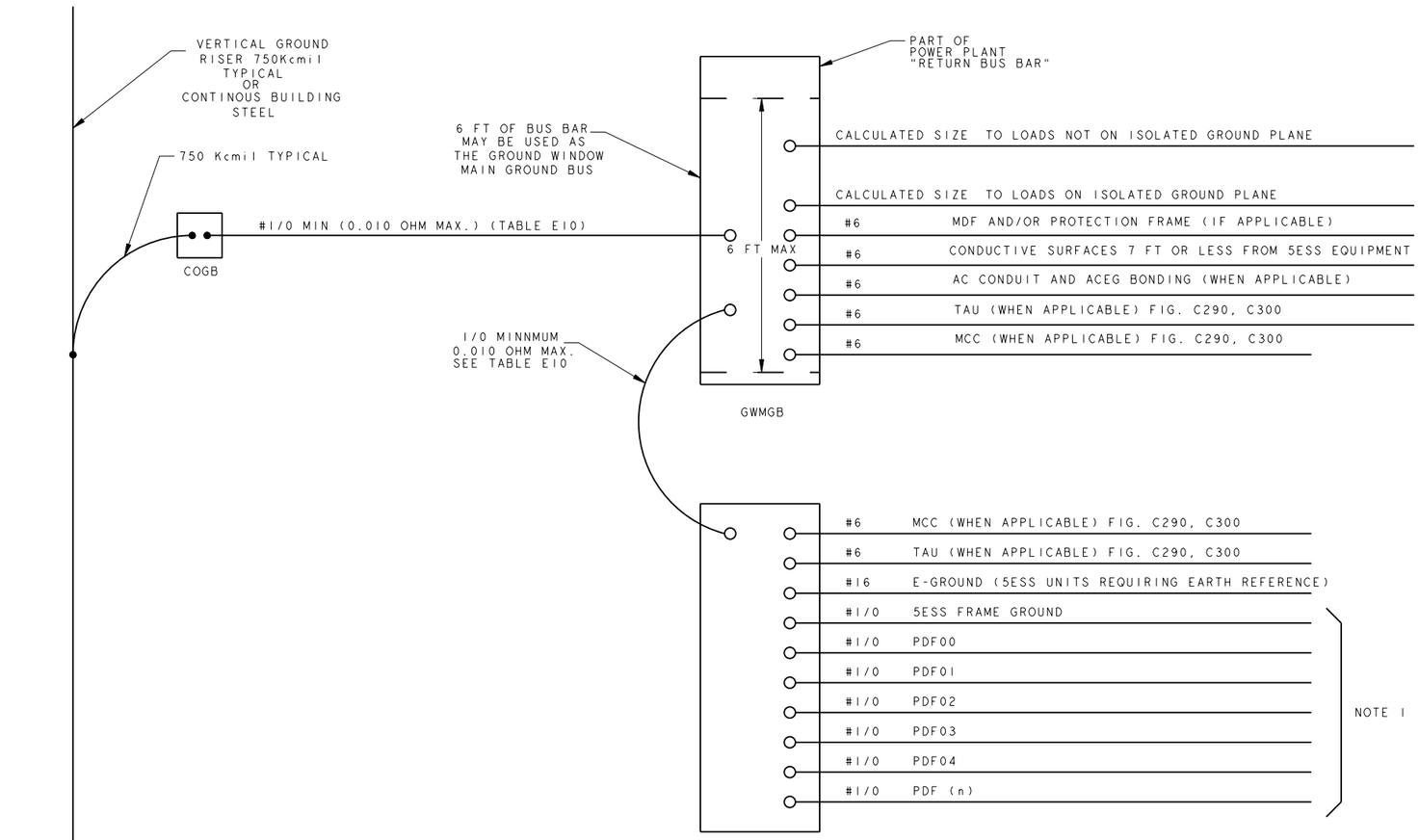


FIG. B210

TYPICAL GROUND WINDOW CONNECTIONS WHEN THE GROUND WINDOW IS PART OF A POWER PLANT RETURN BUS BAR

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B27

MODEL NAME

SHEET NOTES

1. A GWSGB MAY BE REQUIRED IF ADDITIONAL SPACE IS NEEDED TO BOND RETURN FEEDERS.
2. #6 AWG MAY BE USED IF POWER PLANT CB IS 200 AMPERES OR LESS.

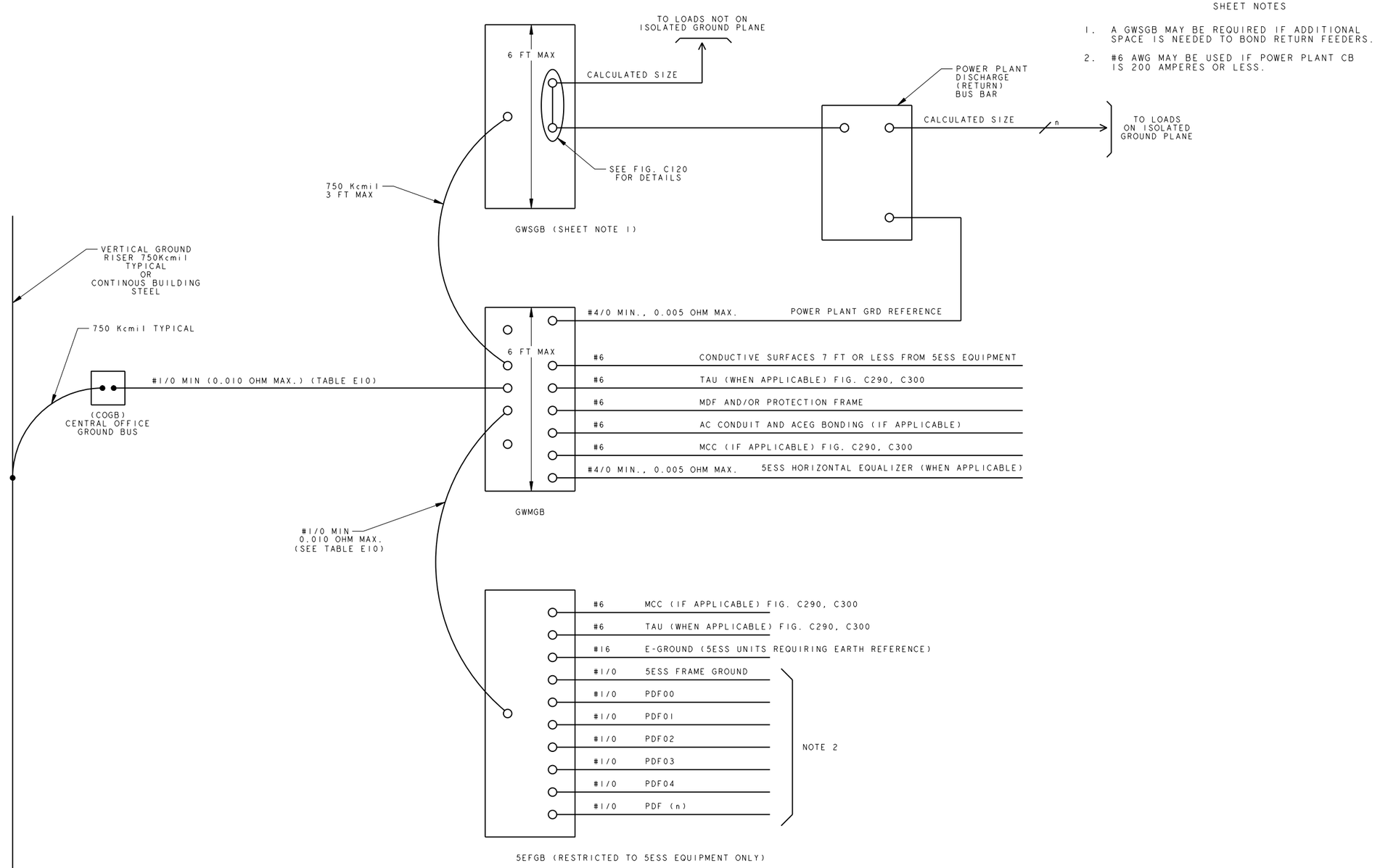


FIG. B220
TYPICAL "STAND ALONE GROUND WINDOW" AND 5ESS FRAME GROUND CONNECTIONS

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B28

THIRD ANGLE PROJN

MODEL NAME

D

SHEETS NOTES

1. LIGHTING SYSTEM IS NOT PART OF ISOLATED GROUND PLANE. MOUNTING HARDWARE MUST BE INSULATED FROM 5ESS EQUIPMENT.
2. #6 INS GREEN EQUALIZATION BONDING WIRE IS REQUIRED IF CONDUIT OR LIGHT FIXTURES ARE 7 FT. OR LESS FROM ANY ISOLATED GROUND EQUIPMENT.
3. THIS IS THE TRADITIONAL PROTECTED AC DISTRIBUTION METHOD THAT HAS BEEN USED AND MAY STILL BE USED. HOWEVER OTHER APPROVED METHODS ARE AVAILABLE (FIG. B240) TO ACCOMODATE INDIVIDUAL JOB AND CUSTOMER REQUIREMENTS.

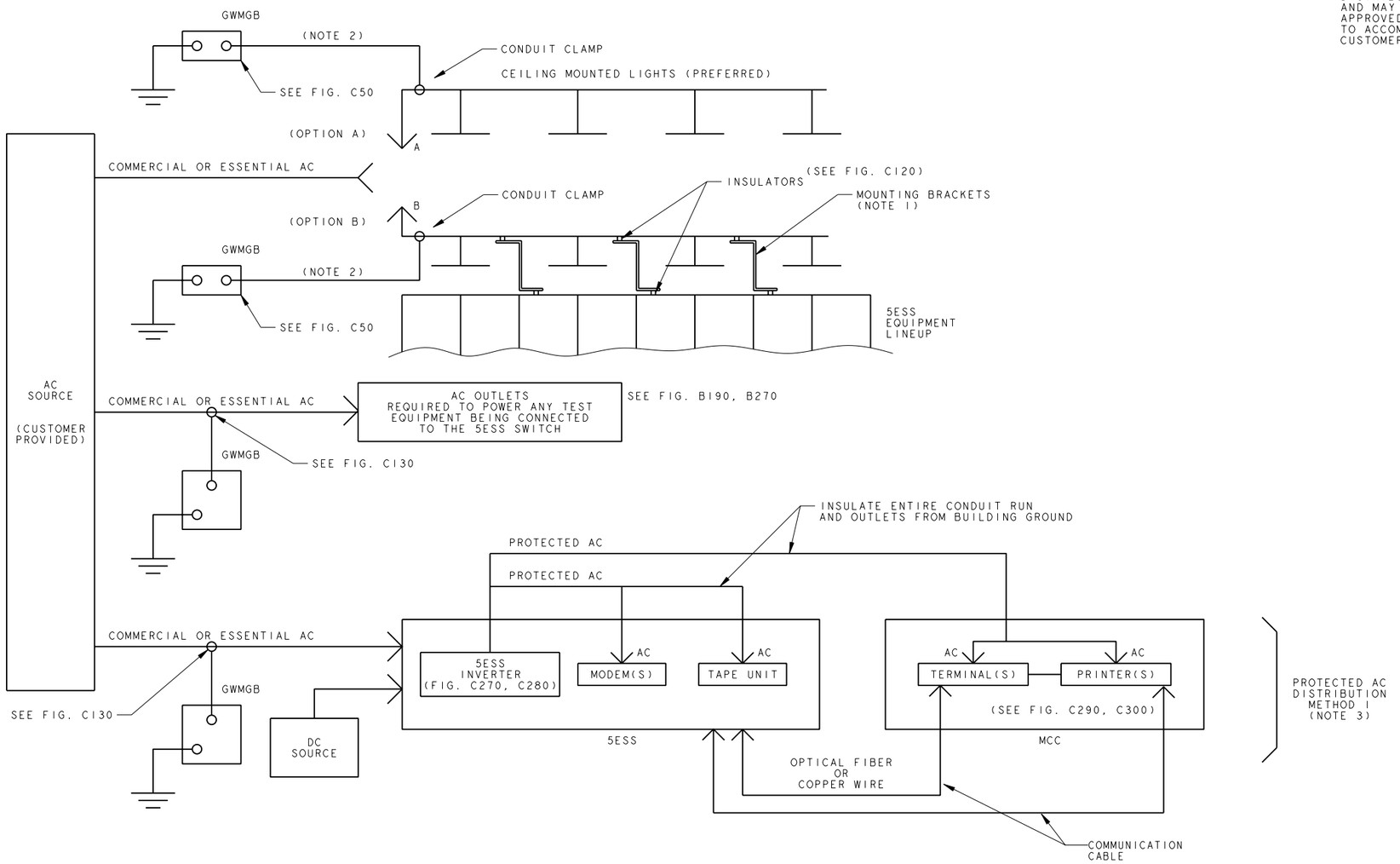


FIG. B230

HIGH LEVEL DIAGRAM OF
AC POWER DISTRIBUTION
SEE FIG. B240, B250 AND B260 FOR ADDITIONAL OPTIONS

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

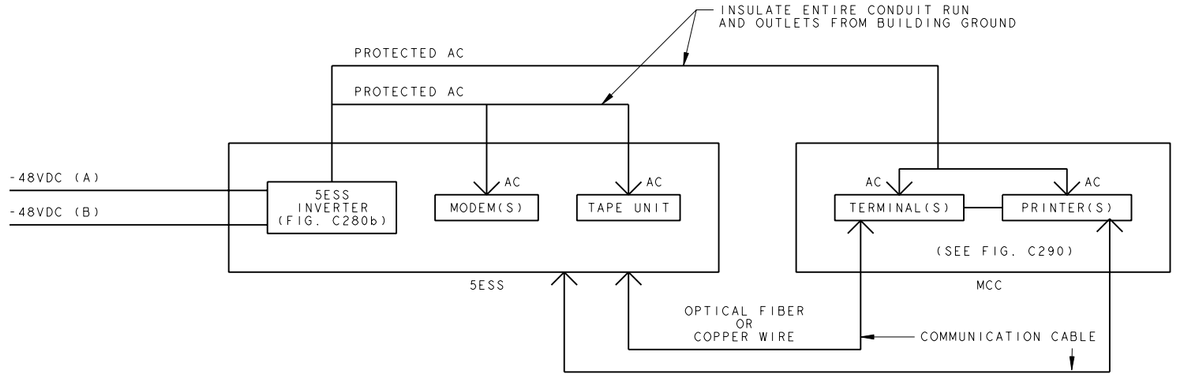
5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B29

MODEL NAME

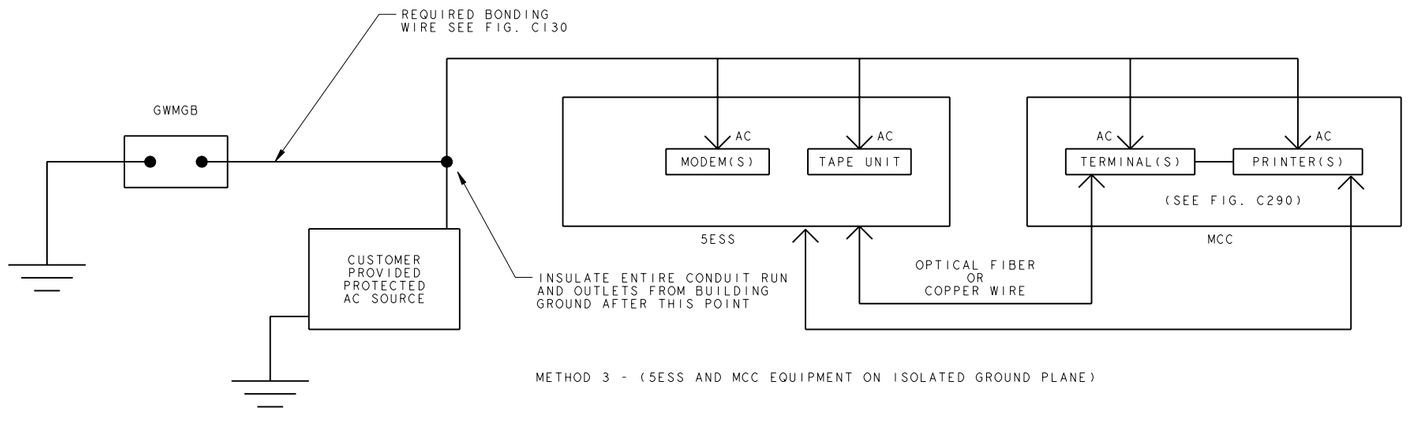
D

SHEET NOTES

1. IN METHOD (2), THE 5ESS INVERTER PROVIDES 100% OF REQUIRED AC POWER. IN METHOD (3), THE CUSTOMER SUPPLIES 100 OF REQUIRED AC POWER.



METHOD 2 - (5ESS AND MCC EQUIPMENT ON ISOLATED GROUND PLANE)



METHOD 3 - (5ESS AND MCC EQUIPMENT ON ISOLATED GROUND PLANE)

FIG. B240

PROTECTED AC DISTRIBUTION
(SEE FIG. B250, AND 260 FOR MORE OPTIONS)

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

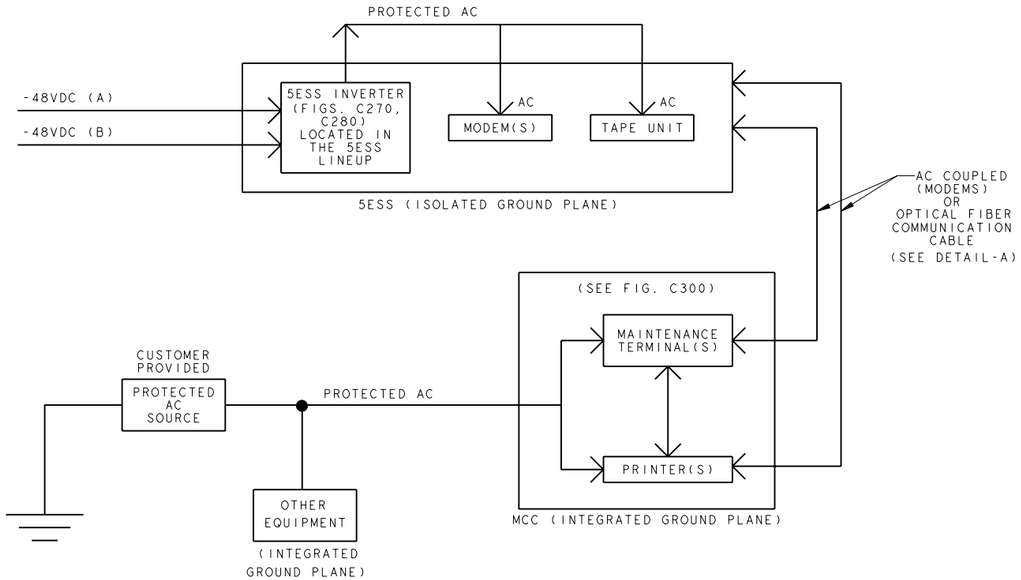
5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B30

MODEL NAME

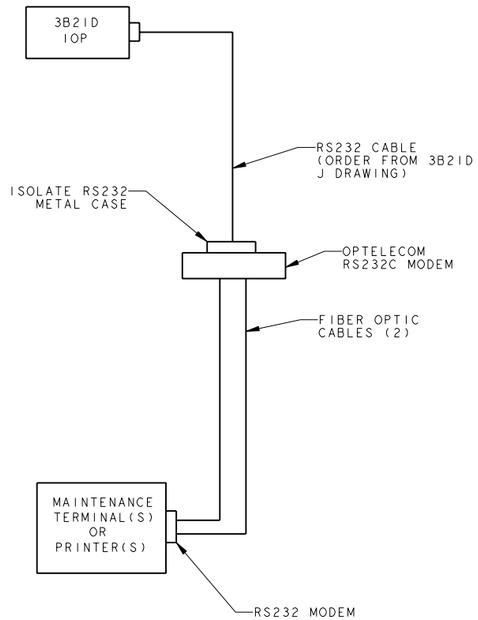
D

SHEET NOTES

1. THIS CONFIGURATION SIMPLIFIES SYSTEM GROUNDING SINCE NO ACEG AND CONDUIT BONDING TO GW IS NECESSARY. IT ALSO REDUCES RISK OF GROUNDING VIOLATIONS AFFECTING SYSTEM PERFORMANCE.
2. MCC EQUIPMENT AND FURNITURE MAY BE REFERENCED TO BUILDING GROUND (SEE FIG. C300)



METHOD 4
(NOTE 1, 2)



DETAIL-A

FIG. B250
PROTECTED AC DISTRIBUTION

PRO/E-EQEDFORM.FRM-FEB 96

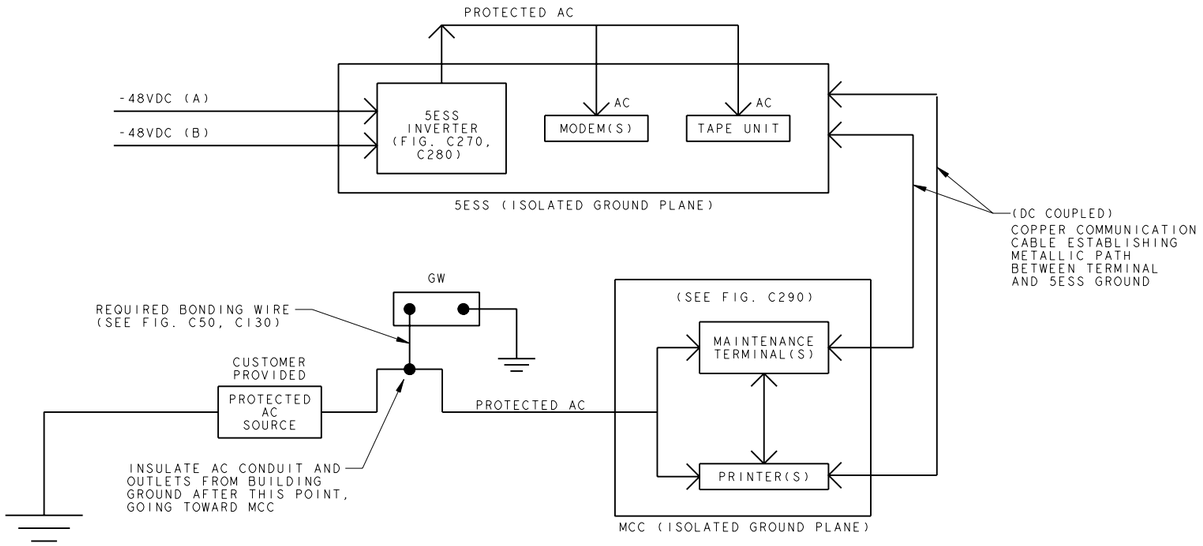
ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1		
5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B31

MODEL NAME

SHEET NOTES:

1. MCC EQUIPMENT AND FURNITURE MUST BE REFERENCED TO THE ISOLATED GROUND PLANE AND INSULATED FROM BUILDING GROUND. (SEE FIGS. C290)



METHOD 5
(NOTE 1)

FIG. B260
PROTECTED AC DISTRIBUTION

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B32

MODEL NAME

SHEET NOTES:

1. LOCATE AC OUTLET(S) IN SAME ROOM AS 5ESS EQUIPMENT AND AS CLOSE TO THE 5ESS EQUIPMENT AS POSSIBLE TO MINIMIZE EXTENTION CORD LENGTH BETWEEN OUTLETS AND TEST EQUIPMENT. INSTALL A MINIMUM OF ONE DUPLEX AC OUTLET PER SYSTEM, FOR UNUSUAL FLOOR PLAN LAYOUTS OR LARGE SYSTEM, MORE OUTLETS MAY BE NEEDED.

2. DO NOT INSTALL TEST EWUIPMENT AC OUTLETS ON 5ESS EQUIPMENT FRAMES OR END GUARDS AS OF ISSUE 1 OF THIS DRAWING. SEE FIG. B190 FROM PREVIOUS AC OUTLET LOCATIONS.

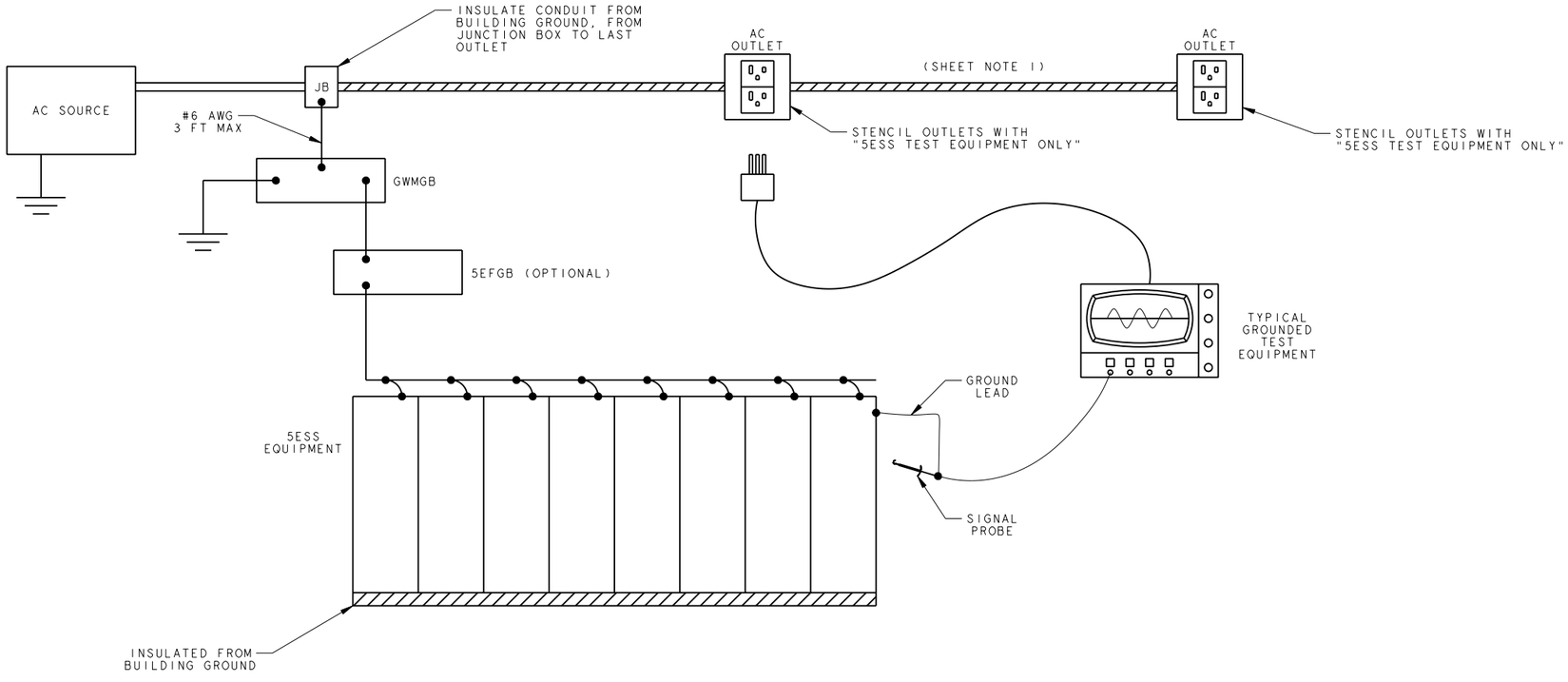


FIG. B270

METHOD OF PROVIDING AC POWER FOR TEST EQUIPMENT WITHOUT VIOLATING THE ISOLATED GROUND PLANE (NOTES 1, 2)

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B33

MODEL NAME

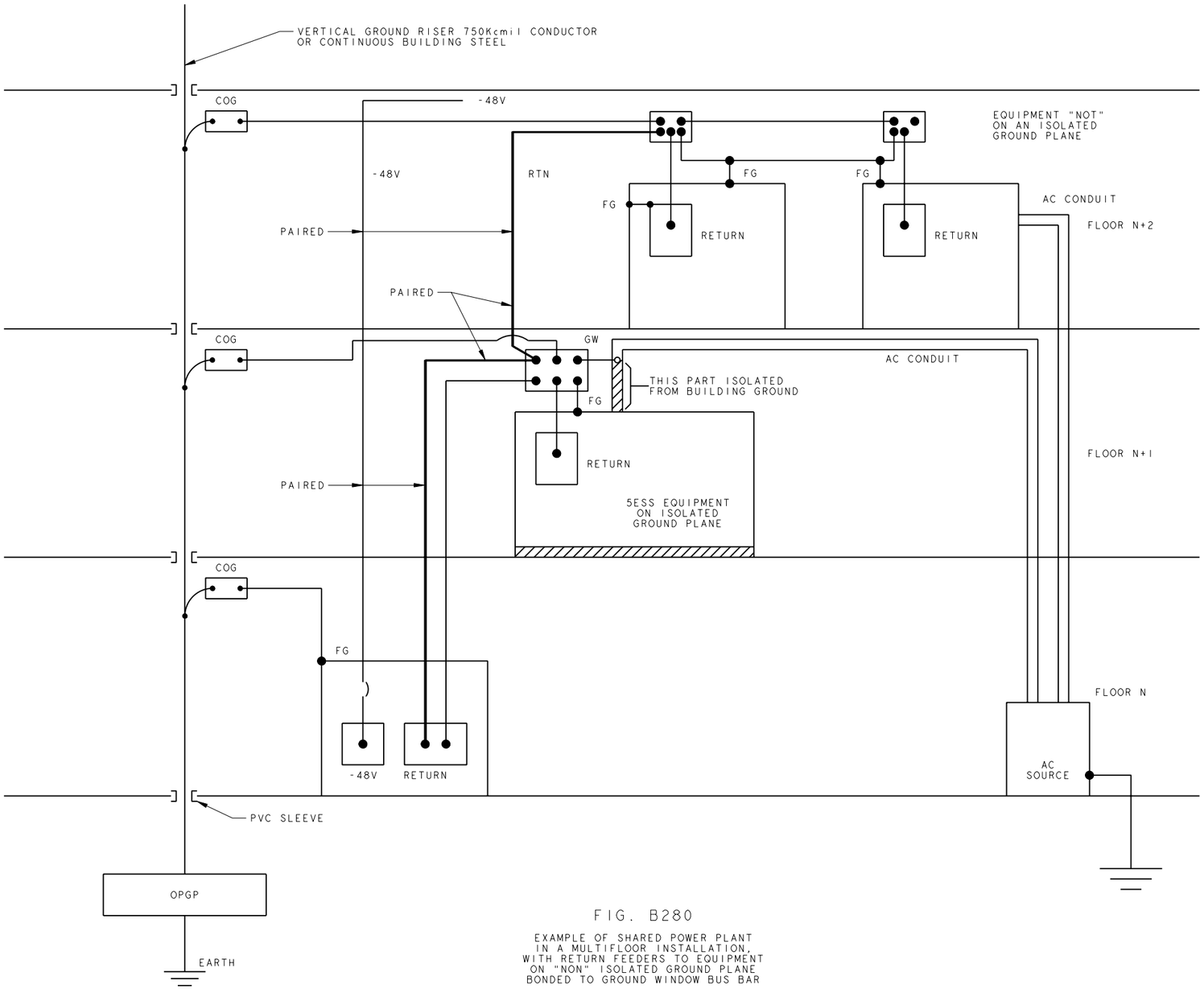


FIG. B280

EXAMPLE OF SHARED POWER PLANT
IN A MULTIFLOOR INSTALLATION,
WITH RETURN FEEDERS TO EQUIPMENT
ON "NON" ISOLATED GROUND PLANE
BONDED TO GROUND WINDOW BUS BAR

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B34

MODEL NAME

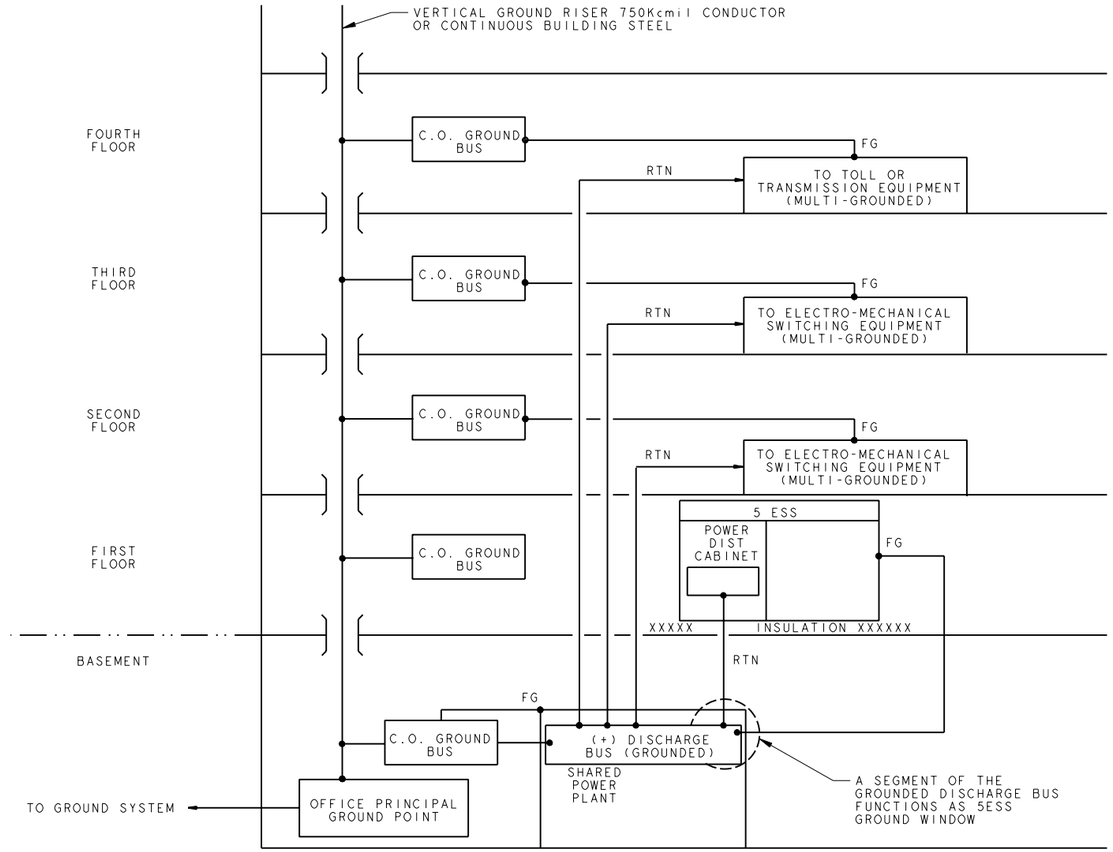


FIG. B290

EXAMPLE GROUNDING ARRANGEMENT
(ACCEPTABLE)

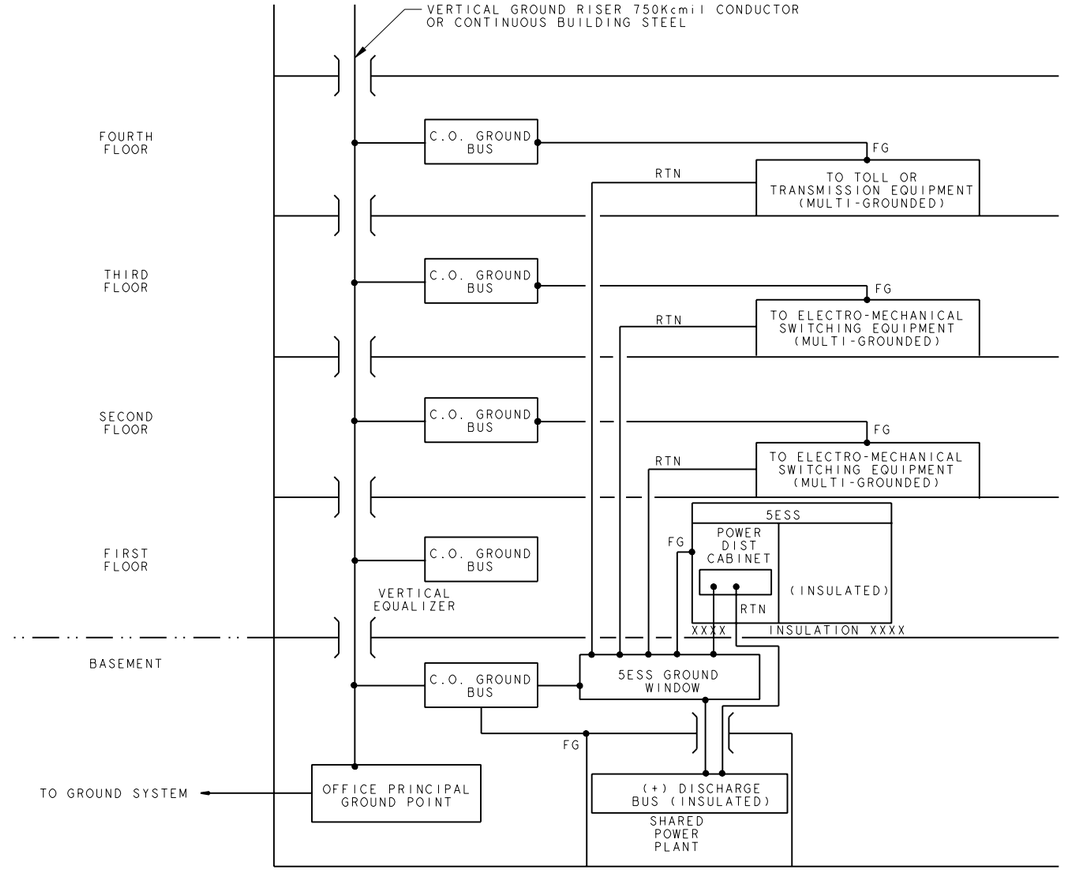


FIG. B300

EXAMPLE GROUNDING ARRANGEMENT
(ACCEPTABLE)

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B36

MODEL NAME

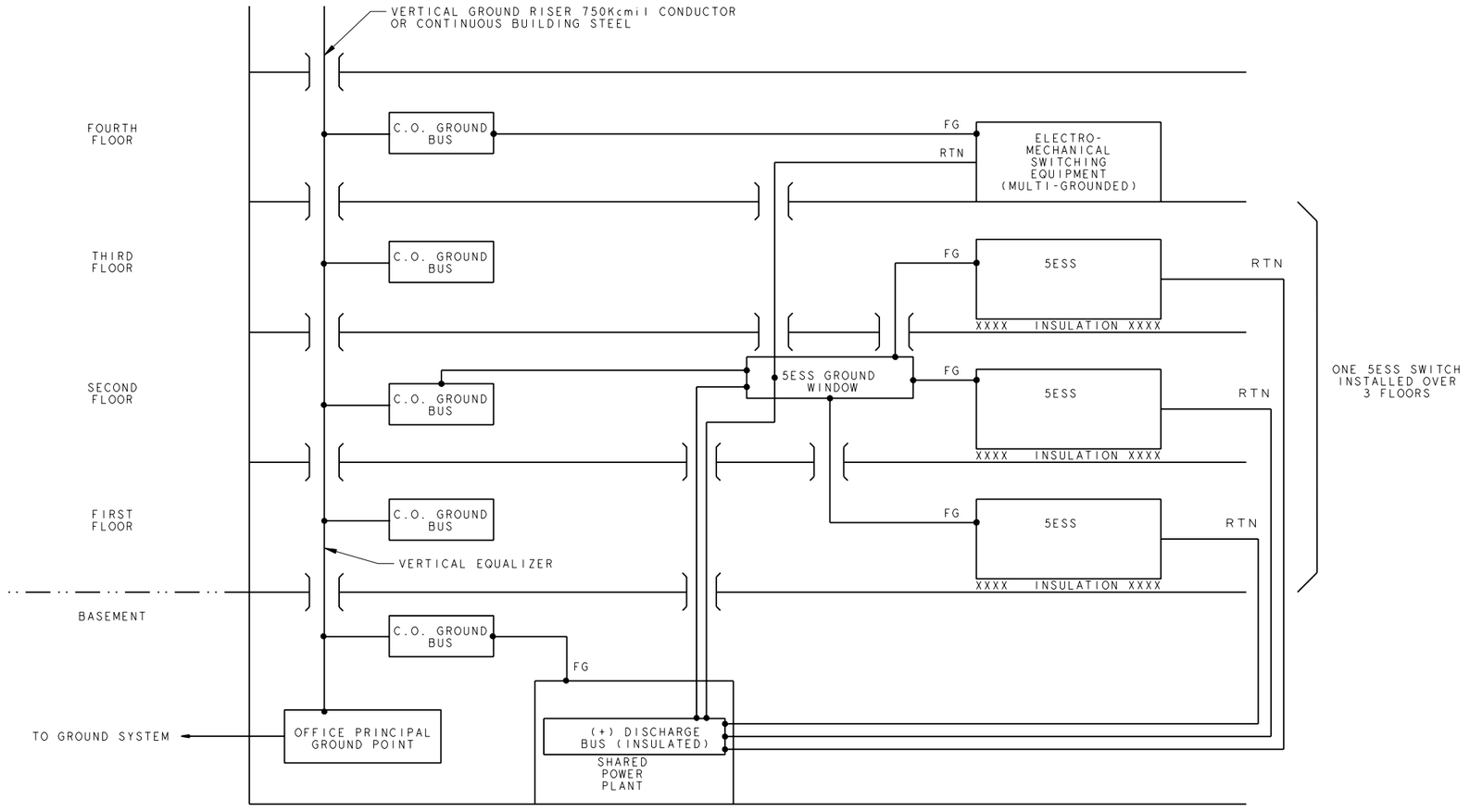


FIG. B310

EXAMPLE GROUNDING ARRANGEMENT
(ACCEPTABLE)

D

SHEET NOTES

1. THIS ARRANGEMENT IS ACCEPTABLE, SINCE THE 5ESS IS ONLY ONE FLOOR FROM THE EXISTING GROUND WINDOW. NOTE THAT ONLY ONE GROUND WINDOW PER POWER PLANT IS PERMITTED; ANY NUMBER OF 5ESS MAY SHARE THIS GROUND WINDOW AS LONG AS EACH IS ON THE SAME FLOOR OR WITHIN ONE FLOOR.

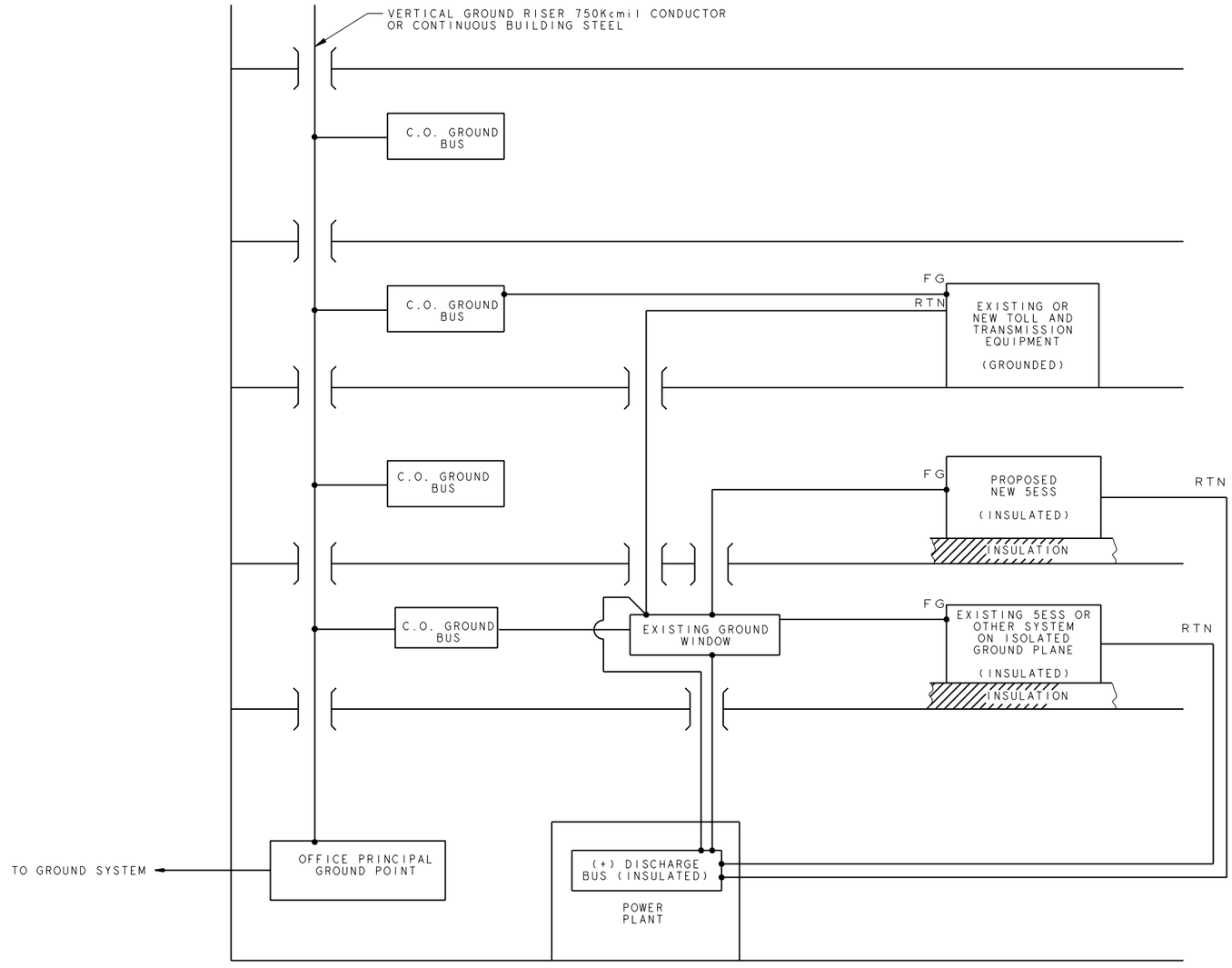


FIG. B320

EXAMPLE GROUNDING ARRANGEMENT (ACCEPTABLE)

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B38

MODEL NAME

ED5D805-10

PRO/E-EQEDFORM.FRM-FEB 96

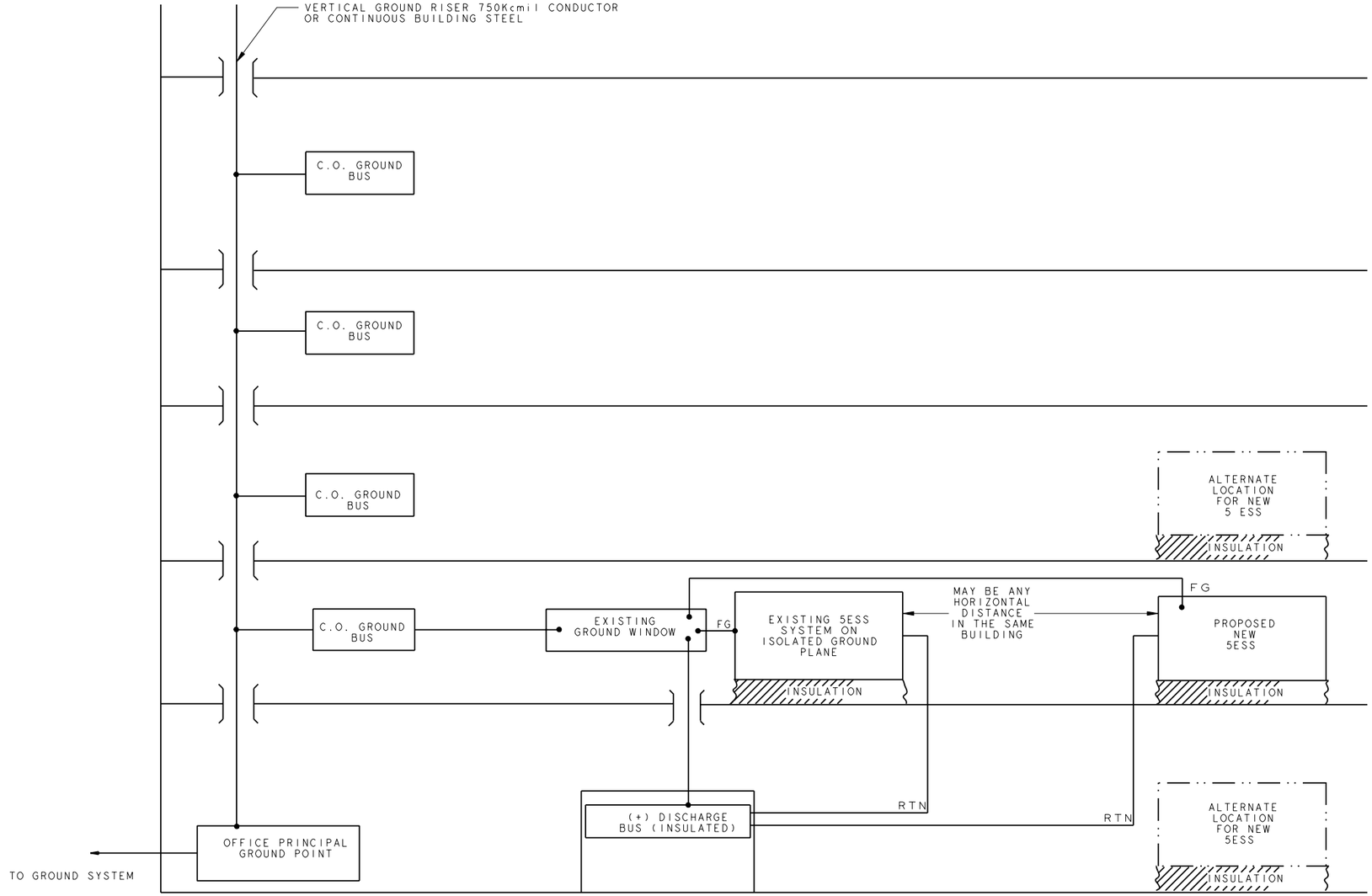


FIG. B330

EXAMPLE GROUNDING ARRANGEMENT
(ACCEPTABLE)

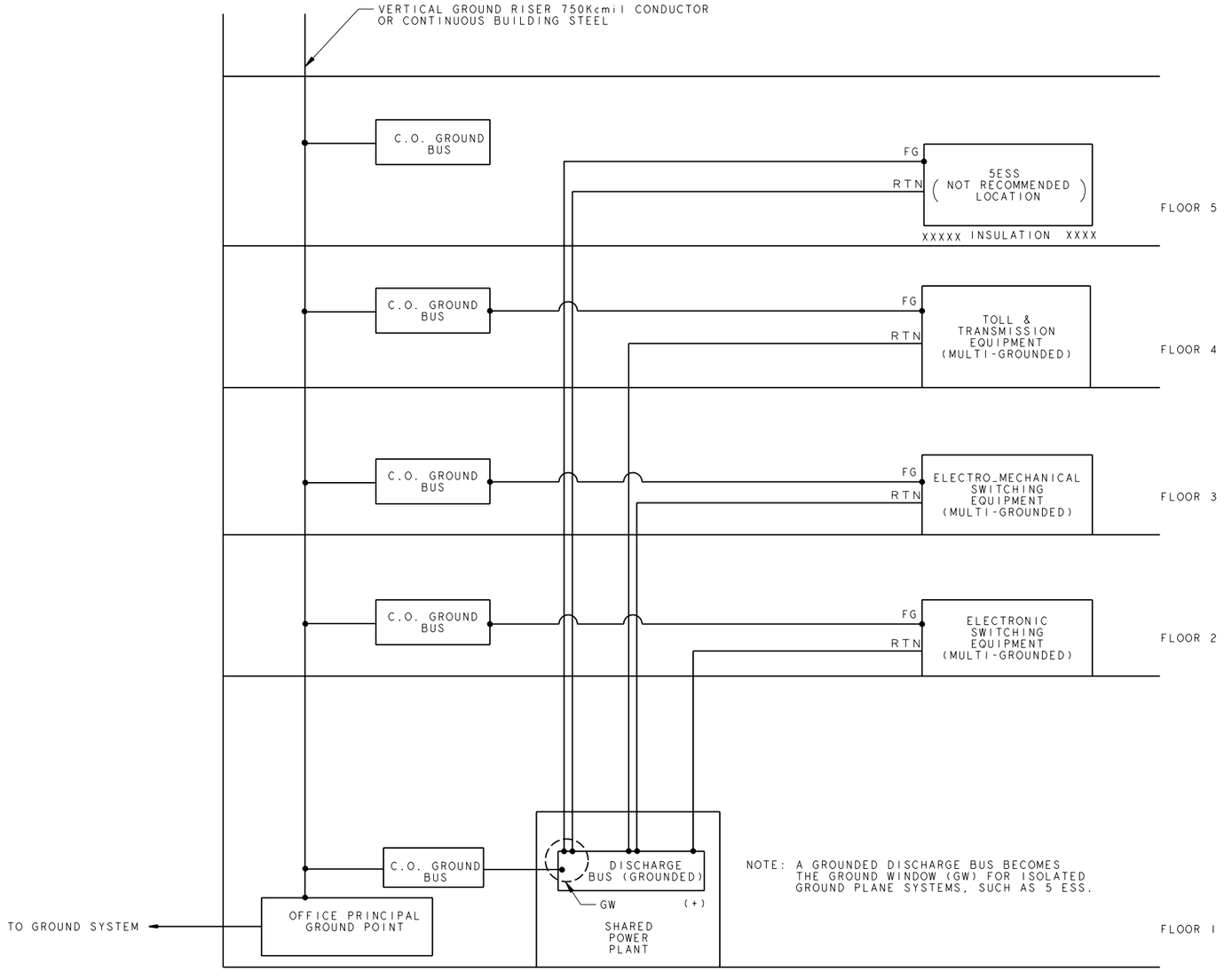


FIG. B340

EXAMPLE GROUNDING ARRANGEMENT
(NOT RECOMMENDED)

SHEET NOTES

1. NOT ACCEPTABLE:

   5ESS IS MORE THAN ONE FLOOR AWAY FROM THE (GW) GROUNDED DISCHARGE BUS.

2. IF THE GROUND WINDOW IS MOVED, ALL RTN FEEDERS FOR MULTI GROUNDED SYSTEMS WOULD HAVE TO BE BONDED TO THE NEW GROUND WINDOW BUS. THIS MAY PROVE TO BE MORE EXPENSIVE THAN PROVIDING A DEDICATED POWER PLANT FOR THE 5ESS SWITCH.

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN	
		DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10		SHEET NO. B40

MODEL NAME

D

SHEET NOTES

1. NOT ACCEPTABLE:

   5ESS IS MORE THAN ONE FLOOR AWAY FROM THE EXISTING GROUND WINDOW.

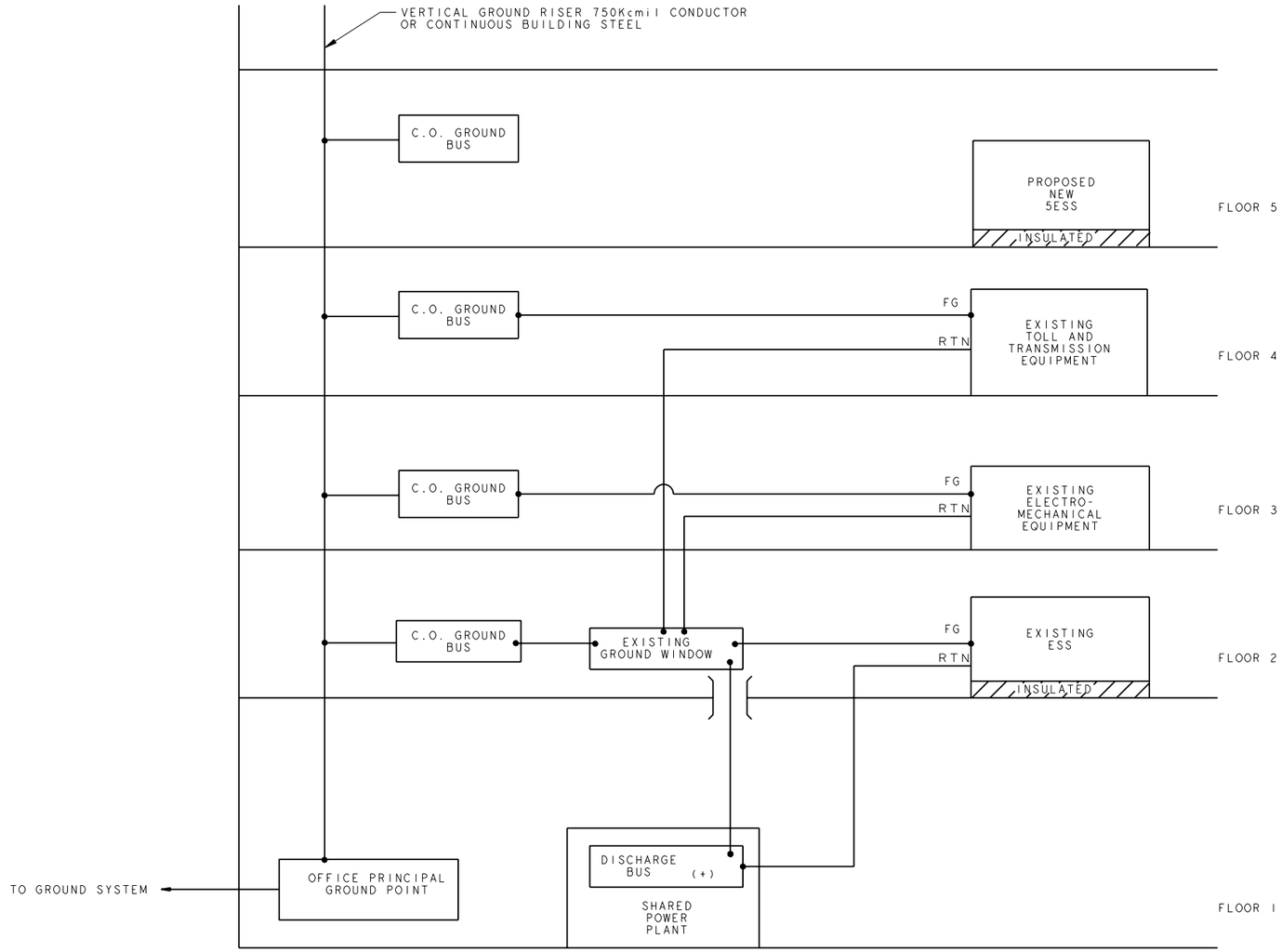


FIG. B350

EXAMPLE GROUNDING ARRANGEMENT
(NOT RECOMMENDED)

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B41

MODEL NAME

D

SHEET NOTES

1. THE PURPOSE OF THIS DIAGRAM IS TO ILLUSTRATE THE MAIN DIFFERENCES BETWEEN THREE COMMONLY USED GROUNDING SCHEMES. THIS FIGURE, HOWEVER, DOES NOT SHOW THE MANY DETAILS AND VARIATIONS UNIQUE TO DIFFERENT EQUIPMENT AND VENDORS.

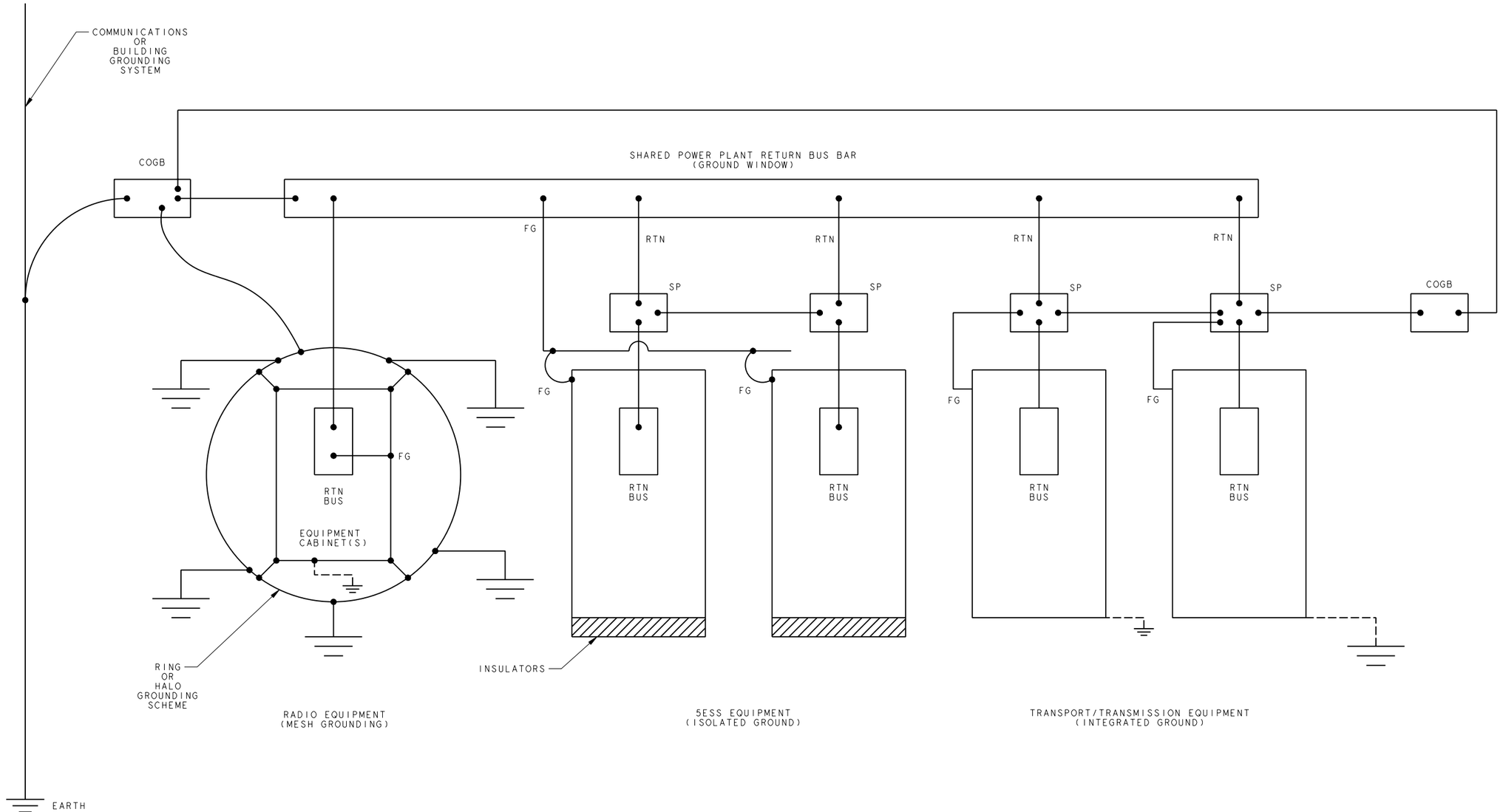


FIG. B360

HIGH LEVEL DIAGRAM OF
3 DIFFERENTLY GROUNDED SYSTEMS
SHARING A POWER PLANT
(FOR REFERENCE ONLY)

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. B42

MODEL NAME

SHEET NOTES:

1. DURING INITIAL OFFICE INSTALLATION OR GROWTH IN AN EXISISTING OFFICE THE FRAME GROUND INTEGRITY (TEST 1a) AND INSULATION RESISTANCE OF THE INSULATING SLEEVES IN THE HOLD DOWN FASTENING HARDWARE (TEST 1b) SHALL BE MADE AFTER THE CABINETS ARE FASTENED TO THE FLOOR BUT BEFORE THE CABINET GROUND WIRE IS CONNECTED TO THE CABINET AND BEFORE ANY METALLIC RACEWAY IS ATTACHED AND POWER FEEDERS CONNECTED.

2. TEST NO. 1a FRAME GROUND ISOLATION (LOW VOLTAGE TEST)

   THE TEST SET SHALL BE CONNECTED BETWEEN THE CABINET BEING TESTED AND C. O. GROUND OR BUILDING GROUND. MINIMUM ACCEPTABLE RESISTANCE IS 100K OHMS.

3. TEST NO. 1b INSULATION RESISTANCE (500 VOLT TEST)

   THE MINIMUM ACCEPTABLE INSULATION RESISTANCE IS 100K OHMS.

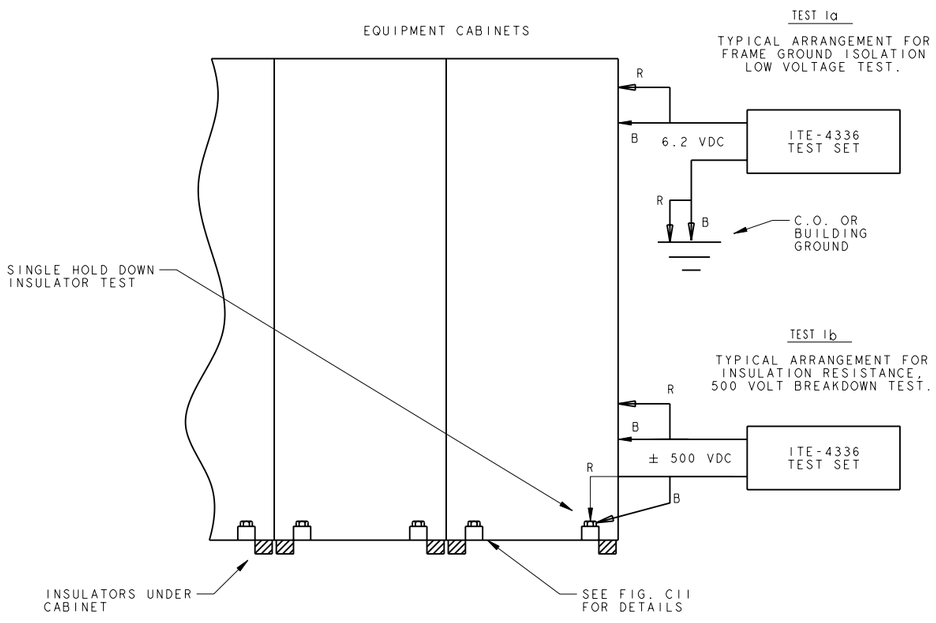


FIG. C10

ISOLATED GROUND PLANE INTEGRITY TEST 1.
ANCHOR BOLT BUSHING
ISOLATION AND INSULATION RESISTANCE TEST.

(SEE TEST PROCEDURE 1a AND 1b ON THE FOLLOWING PAGES)

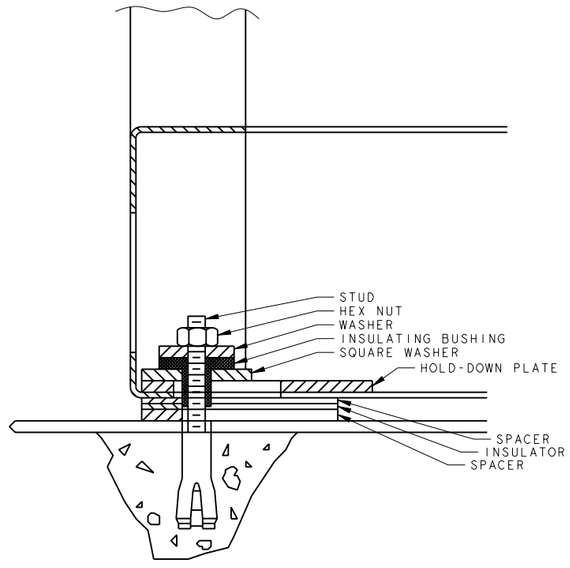


FIG. C11

TYPICAL ANCHORING METHOD FOR
EQUIPMENT CABINET INSTALLED
ON CONCRETE SLAB (SEISMIC ZONES 2, 3 & 4)
(SEE ED5D511-31 FOR MORE ANCHORING METHODS)

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C1

MODEL NAME

ED5D805-10

PRO/E-EQEDFORM.FRM-FEB 96

EQUIPMENT CABINET ISOLATION AND INSULATION TEST

1. GENERAL TEST INFORMATION

1.1 DURING INITIAL OFFICE OR EXISTING OFFICE GROWTH, ADDED ESS EQUIPMENT THAT WILL BE PART OF THE SYSTEM ISOLATED GROUND PLANE MUST BE INSULATED FROM BUILDING GROUND.

1.2 EQUIPMENT FRAMEWORK IS ISOLATED FROM THE FLOOR BY THE USE OF INSULATING LEVELING BLOCKS, INSULATION SPACERS AND ANCHOR BUSNINGS.

1.3 NEW INSTALLATIONS

TWO TESTS ARE MADE ON AN INDIVIDUAL FRAME BASIS, AFTER EACH FRAME IS LEVELED AND THE ASSOCIATED HOLD DOWN ANCHOR SECURED, BUT BEFORE FRAME GROUND CONDUCTORS, DC POWER FEEDERS OR AC CONDUITS ARE INSTALLED.

1.4 ADDITIONS TO EXISTING SYSTEM

AS EACH FRAME IS SECURED TO THE FLOOR, TEMPORARILY INSULATE FROM EXISTING EQUIPMENT AND OTHER PREVIOUSLY INSTALLED FRAME AND/OR CABLE RACKS BY MEANS OF PHENOL FIBER SHEETS OR OTHER EQUIVALENT INSULATING MATERIAL.

2. PRECAUTIONS

R-4285 OR EQUIVALENT LOW VOLTAGE RUBBER LINEMAN'S GLOVES SHOULD BE WORN AT ALL TIMES WHEN PERFORMING +/- 500 VOLTS D.C. BREAKDOWN TEST. INSPECT THE DATE STAMP ON THE GLOVES BEFORE USING THEM. REORDER GLOVES IF NECESSARY. DO NOT TOUCH TEST CLIPS OR EQUIPMENT UNDER TEST WHEN OPERATING THE +/- 500 VOLTS D.C. TEST BUTTON LOCATED ON ITE-4336 TEST SET. AN ELECTRICAL SHOCK WILL RESULT.

3. TEST SET GENERAL DESCRIPTION

THE ITE-4336 FRAME TO GROUND MONITOR TEST TEST SET WAS DEVELOPED TO VERIFY THE PRESET LEVELS OF RESISTANCE AT +/- 500 VOLTS D.C. WHILE MAKING AN EXACT MEASUREMENT OF THE RESISTANCE CONNECTED ACROSS ITS TEST LEADS. THE RANGE OF RESISTANCE MEASURED IS FROM 100K OHMS TO 10 MEGOHMS.

3.1 THE AUDIBLE DEVICES INDICATE WITH AN INTERRUPTED TONE FOR RESISTANCE LEVELS BELOW 100 KILO-OHMS BUT ABOVE 50 KILO-OHMS +/- 10, AND WITH A STEADY TONE FOR LEVELS BELOW 50 KILO-OHMS +/- 10.

3.2 THIS TEST SET CAN ALSO VERIFY PRESET RESISTANCE LEVELS AT 6.2 VOLTS DC. THIS IS A PORTABLE TEST SET WHICH IS APPROXIMATLY 7-1/4" x 10-1/16" x 4-3/16" IN DIMENSION AND WEIGHS APPROXIMATELY 9 lbs.

3.3 THE TEST SET HAS TWO TEST CORDS. THESE TEST CORDS ARE PERMANENTLY CONNECTED TO THE FRONT PANEL OF THE TEST SET. EACH TEST CORD HAS TWO LEADS PROPERLY TERMINATED AND SLEEVED WITH RED AND BLACK COVERS. TWO LEADS OF THE SAME CORD CONNECT TO THE SAME ELECTRICAL POINT OF THE FRAME.

3.4 THE REASON FOR THE REDUNDANCY IS TO CHECK THE VALIDITY OF THE LEAD CONNECTIONS IN THE CIRCUIT CHECK POSITION. AN 8', 3 PRONG, POWER CORD IS USED FOR CHARGING THE BATTERIES AND FOR OPERATING THE TEST SET FROM THE 120 VOLT A.C. LINE.

4. TEST SET POWER REQUIREMENTS

THE TEST SET MAY BE OPERATED FROM EITHER THE 120 VOLTS A.C. OR FROM THE SIX NICKLE CADMINUM RECHARGEABLE BATTERIES. THE BATTERIES ARE PHYSICALLY LOCATED WITHIN THE TEST SET.

4.1 THE BATTERY CHARGE LAMP WILL LIGHT, INDICATING THAT THE BATTERIES ARE RECEIVING A CHARGE, WHEN THE TEST SET IS OPERATING FROM THE 120 VOLT A.C. LINE. IF THE UNIT IS TO BE BATTERY OPERATED, MAKE SURE THAT THE BATTERIES ARE CHARGED FOR AT LEAST 10 HOURS BEFORE USING.

4.2 THE UNIT CAN BE A.C. LINE OPERATED IN ALL TESTS. HOWEVER, IN THE +/- 500 VOLTS TEST AND WHEN LESS THAN ONE MEGAOHM RESISTANCE IS CONNECTED ACROSS THE TEST LEADS, (TWO RED CLIPS) PART OF THE POWER NECESSARY TO OPERATE THE TEST SET IS SUPPLIED BY THE BATTERIES. THEREFORE, DURING THE OPERATION AT +/- 500 VOLTS, IT IS NECESSARY THAT THE BATTERIES HAVE BEEN CHARGED IN ORDER TO DELIVER THE ADDITIONAL POWER REQUIRED.

4.3 IF PRACTICAL, ALWAYS OPERATE THE UNIT FROM THE 120 VOLT A.C. LINE. THIS WILL ALLOW THE BATTERIES TO ALWAYS BE IN A CHARGED CONDITION. THE METER CHECKS THE CONDITION OF THE BATTERY CHARGE WHEN FUNCTION SWITCH IS IN CIRCUIT CHECK OR LOW VOLTAGE TEST POSITION.

5. TEST SET OPERATIONAL CHECK DESCRIPTION

5.1 OFF POSITION (BATT. CHARGE): IN THIS POSITION, THE POWER TO ALL CIRCUITS IS DISCONNECTED WITH THE EXCEPTION OF THE BATTERY CHARGING CIRCUIT. AN INDICATING LAMP IS ACTIVATED WHEN THE A.C. CORD IS PLUGGED INTO AN A.C. OUTLET AND THE BATTERIES ARE CHARGING.

5.2 CIRCUIT CHECK POSITION:

MOVING THE FUNCTION SWITCH TO THIS POSITION ALLOWS CHECKING OF:

A) BATTERY CHARGE:
THE METER IS SWITCHED ACROSS THE BATTERIES. IF A BATTERY CHARGE OF A SUFFICIENT MAGNITUDE IS PRESENT, THE METER WILL INDICATE IN THE GREEN REGION. IT IS NECESSARY TO CHARGE THE BATTERY IF THE METER INDICATES IN THE RED REGION.

B) AUDIBLE DEVICES:
WITH THE THRESHOLD POTENTIOMETER TURNED FULLY COUNTER-CLOCKWISE, THE TEST SET IS PROGRAMMED TO DETECT RESISTANCE OF LESS THAN 100K. BY OPERATING THE "PRESS TO CHECK" SWITCH, THE AUDIBLE DEVICES WILL GIVE AN INTERRUPTED TONE, WHICH WILL INDICATE THAT THE TEST SET IS IN GOOD OPERATING CONDITION.

C) TEST SET CONNECTION VALIDITY:

A VALID GOOD CONNECTION (LOW RESISTANCE) NECESSARY FOR RESISTANCE MEASUREMENT TO AVOID FALSE ALARM DURING THE OPERATION. THE TEST SET HAS TWO CORDS. EACH TEST CORD HAS TWO LEADS ON ONE END. RED AND BLACK INSULATING COVERS ARE PROVIDED ON THE LEADS. THE RED COVERED CLIP LEAD ON EACH CORD IS FOR LOW VOLTAGE TEST, +/- 500V D.C. TEST AND RESISTANCE TESTING. THE BLACK COVERED CLIP LEAD OF THE SAME CORD IS USED TO VERIFY THAT THE RED COVERED CLIP HAS MADE GOOD CONTACT WITH THE POINT TO WHICH IT IS CONNECTED. SHORT THE BLACK AND THE RED CLIP LEADS OF THE SAME CORD AND OBSERVE THAT ASSOCIATED LAMP IS TURNED OFF. REPEAT THIS TEST FOR THE SECOND CORD AND OBSERVE THAT THE ASSOCIATED LAMP IS TURNED OFF (SHORTING SIMULATED A CONNECTION). RETURN THE TEST SETS TO THE SERVICE CENTER FOR REPAIR IF THE AUDIBLE DEVICES WILL NOT OPERATE OR IF THE CONNECTION VALIDITY CHECK FAILS.

D) TEST SET CONNECTION VALIDITY TEST:

CONNECT THE RED CLIPS TO THE POINTS TO BE TESTED FOR THE LOW VOLTAGE TEST, +/- 500 VOLTAGE D.C. TEST, OR RESISTANCE MEASUREMENT TEST. CONNECT THE BLACK CLIPS OF THE SAME CORD TO A POINT ELECTRICALLY ADJACENT TO, BUT NOT TOUCHING, THEIR RESPECTIVE RED CLIPS. VALIDITY CONNECTION IS VERIFIED BY THE LEAD LAMP INDICATOR ON THE TEST SET. WHEN PROPER CONTACT OF EACH CORD IS MADE, THE ASSOCIATED LAMP GOES OUT. IF THE LAMP WILL NOT EXTINGUISH, THE CONTACT POINT WILL HAVE TO BE CLEANED. IF DUE TO SPACE LIMITATIONS IT IS IMPOSSIBLE TO ATTACH BOTH RED AND BLACK TEST CORD CLIPS TO THE TEST POINT, ATTACH THE BLACK CLIPS TO AN ADJACENT POINT (ELECTRICALLY CONTINUOUS) TO VERIFY THAT A GOOD CONTACT HAS BEEN MADE BY THE RED CLIP. DO NOT ALLOW THE CLIPS (RED AND BLACK) TO TOUCH.

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C2

MODEL NAME

6. TEST SET CALIBRATION AND FIELD MAINTENANCE

6.1 THE TEST SET IS NORMALLY CALIBRATED AT THE SERVICE CENTER. A SIMPLE CHECK WILL INDICATE IF IT REQUIRES CALIBRATION. WHEN NO ALARM IS ENCOUNTERED, CONNECT THE VOLT-OHM METER TO THE TEST LEADS AT THE TEST POINTS DURING THE LOW VOLTAGE TEST (6.2 VOLTS D.C.) AND (+/- 500 VOLTS D.C. TEST. MAKE SURE THAT THE METER IS SET AT PROPER RANGE AND POLARITY. MEASURE THE VOLTAGE ON THE METER. IF THE METER READS LESS THAN 6.2 VOLTS D.C. OR (+/- 500 VOLTS D.C. THE TEST SET REQUIRES CALIBRATION AND SHOULD BE RETURNED TO THE SERVICE CENTER. THE BATTERY SHOULD BE KEPT CHARGED IF METER INDICATES THE CHARGE IN THE RED REGION.

7. TEST NO. 1a (GENERAL) - FRAME GROUND ISOLATION (LOW VOLTAGE)

7.1 FOR THIS TEST, THE TEST SET IS CONNECTED BETWEEN THE FRAMEWORK EQUIPMENT UNDER TEST AND THE CLOSEST ACCESS TO BUILDING GROUND, (THE CENTRAL OFFICE GROUND BAR PREFERABLY). THE MINIMUM ACCEPTABLE RESISTANCE IS 100K OHMS.

8 TEST NO. 1a (PROCEDURE)

8.1 WITH VALID LEAD CONNECTION (SEE SECTION 5.2D) MADE BETWEEN THE FRAME AND BUILDING GROUND, PLACE THE FUNCTION SWITCH AT THE LOW VOLTAGE TEST POSITION. IN THIS POSITION, 6.2 VOLTS D.C. IS APPLIED ACROSS THE TEST LEADS (RED CLIPS).

8.2 A POTENTIOMETER LOCATED ON THE FRONT PANEL CAN CHANGE THE THRESHOLD OF DETECTION TO ANY VALUE FROM 100,000 OHMS TO 10 MEGAOHMS. WHEN A RESISTANCE OF LESS THAN THE PRESENT VALUE IS PLACED ACROSS THE LEADS, THE AUDIBLE DEVICES ARE ACTIVATED. IN THIS TEST THE METER IS CONSTANTLY MONITORING THE CONDITION OF THE BATTERIES.

8.3 ROTATE THE THRESHOLD POTENTIOMETER FULLY CLOCKWISE. IF THE AUDIBLE DEVICES ARE NOT ACTIVATED, IT INDICATES THAT THE RESISTANCE BETWEEN THE FRAME AND THE RETAINING BOLT IS IN EXCESS OF 10 MEGAOHMS. THE POTENTIOMETER SHOULD BE LEFT AT THIS POSITION. AS MORE FRAMES ARE INSTALLED THE EFFECTIVE RESISTANCE MEASURED BY THE TEST SET WILL GRADUALLY DECREASE.

8.4 WHEN THE RESISTANCE DROPS BELOW 10 MEGOHMS, THE AUDIBLE DEVICES WILL BE ACTIVATED. BACK-OFF THE THRESHOLD POTENTIOMETER UNTIL THE AUDIBLE DEVICES ARE TURNED OFF.

8.5 AS MORE FRAMES ARE INSTALLED THE THRESHOLD POTENTIOMETER IS CONTINUOUSLY ADJUSTED. THE CHANGE IN RESISTANCE FROM FRAME TO FRAME SHOULD BE UNIFORM. IF THE CHANGE IN RESISTANCE IS ABRUPT DURING THE INSTALLATION OF ANY ONE FRAME, THAT FRAME'S RETAINING BOLT INSULATION SHOULD BE CHECKED FOR FRACTURE OF DAMAGE.

8.6 BEFORE DISCONNECTING THE TEST LEADS FROM THE FRAMES, PLACE THE FUNCTION SWITCH IN THE "OFF" (BATTERY CHARGE) POSITION.

9. TEST NO. 1b (GENERAL) - INSULATION RESISTANCE TEST AT 500V

9.1 FOR THIS TEST, THE TEST SET IS CONNECTED BETWEEN THE EQUIPMENT ANCHOR BOLT AN TO THE EQUIPMENT FRAMEWORK. THE MINIMUM ACCEPTABLE RESISTANCE IS 100K OHMS. THIS TEST CHECKS THE INTEGRITY OF THE INSULATING BUSHING.

10. TEST NO. 1b (PROCEDURE)

10.1 FOR SAFETY REASONS, THE +/- 500 VOLTS POSITIONS ARE INTERLOCKED AND CONTROLLED BY A PUSH BUTTON SWITCH. NO VOLTAGE WILL BE APPLIED TO THE TEST LEADS UNTIL THE PUSH BUTTON IS OPERATED.

10.2 AN INDICATING LAMP ASSOCIATED WITH THIS TEST IS ACTIVATED TO INDICATE THE PRESENCE OF +/- 500 VOLTS D.C. ACROSS THE TEST LEADS. IN THIS TEST POSITION THE METER READS THE LOAD RESISTANCE IN MEGAOHMS. THE TEST SET IS PRESET AT THE FACTORY TO DETECT A RESISTANCE OF 100,000 OHMS OR LESS.

10.3 THE +500 VOLT TEST OR -500 VOLT TEST DETECTS PRESET LEVEL OF RESISTANCE WHILE GIVING AN EXACT MEASURMENT OF THE RESISTANCE CONNECTED ACROSS ITS TEST LEADS. THE RANGE OF THE RESISTANCE MEASURED IS FROM 100 KILO-OHMS TO 10 MEGA-OHMS +/- 10, (SEE 3.1).

10.4 THE +/- 500 VOLTS DC BREAKDOWN TEST IS TO CHECK THAT THE INSULATORS HAVE NO FRACTURES ALLOWING LEAKAGE RESISTANCE BELOW 100,000 OHMS AT +/- 500 VOLTS DC.

10.5 MAKE VALID CONNECTIONS WITH TEST LEADS (SEE SECTION 5.2D) AND CHECK PER LEAD CONNECTION VERIFICATION LAMPS AS IN THE LOW VOLTAGE TEST. PLACE THE FUNCTION SWITCH IN THE "+500 VOLT" POSITION AND PRESS THE "TEST" SWITCH. "+500 VOLTS DC" NOW APPEARS BETWEEN THE FRAME AND THE RETAINING BOLT.

10.6 OBSERVE AND RECORD THE READING OF THE METER AS FRAMES ARE INSTALLED. THE METER READING (IN MEGAOHMS) WILL PROGRESSIVELY GET SMALLER. IF THE BREAKDOWN OCCURS (LESS THAN 100,000 OHMS), THE PREVIOUSLY INSTALLED FRAMES WILL HAVE TO BE INSPECTED FOR ANY INSULATING BUSHING FAULTS.

10.7 MOVE THE FUNCTION SWITCH TO THE -500 VOLT POSITION. REPEAT THE TESTING. EACH TIME THE TEST SWITCH IS RELEASED, THE TEST SET DISCHARGES IN ONE SECOND ANY CHARGE WHICH THE FRAMES HAVE BUILT-UP.

10.8 BEFORE DISCONNECTING THE TEST LEADS FROM THE FRAMES, PLACE THE FUNCTION SWITCH IN THE "OFF" (BATTERY CHARGE) POSITION.

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C3

MODEL NAME

SHEET NOTES:

1. PERFORM THIS TEST AFTER ALL EQUIPMENT CABINETS HAVE BEEN INSTALLED AND BONDED TO THE LINEUP GROUND BONDING CONDUCTOR, AND OPTIONAL LIGHT FIXTURE INSTALLED, BUT BEFORE POWER FEEDERS ARE CONNECTED TO THE EQUIPMENT CABINETS.

2. PERFORM LOW VOLTAGE TEST FIRST, IF IT PASSES THEN APPLY THE HIGH VOLTAGE (+ AND - 500VDC) TEST. MINIMUM ACCEPTABLE RESISTANCE TO PASS THIS TEST IS 100,000 OHMS.

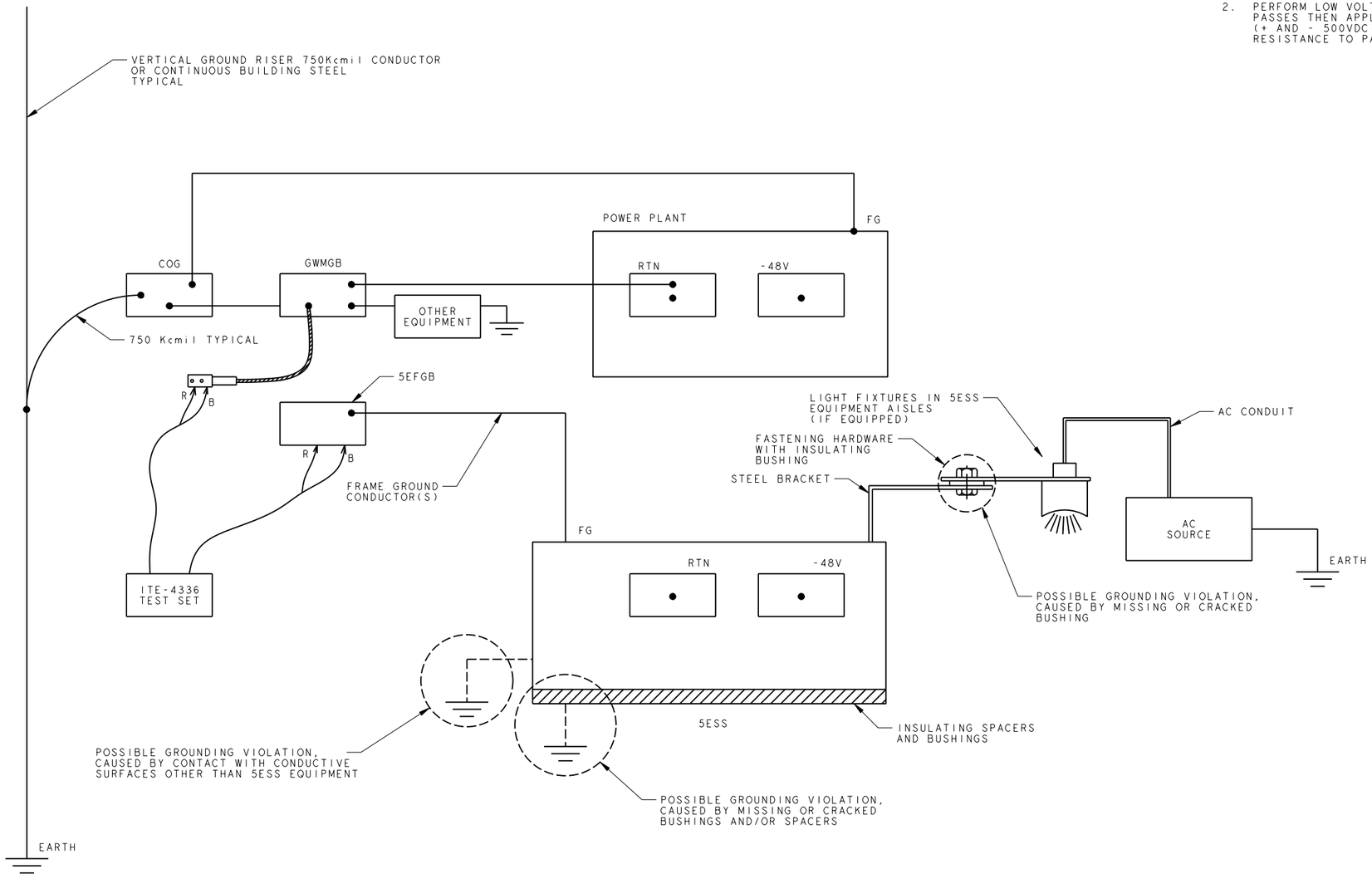
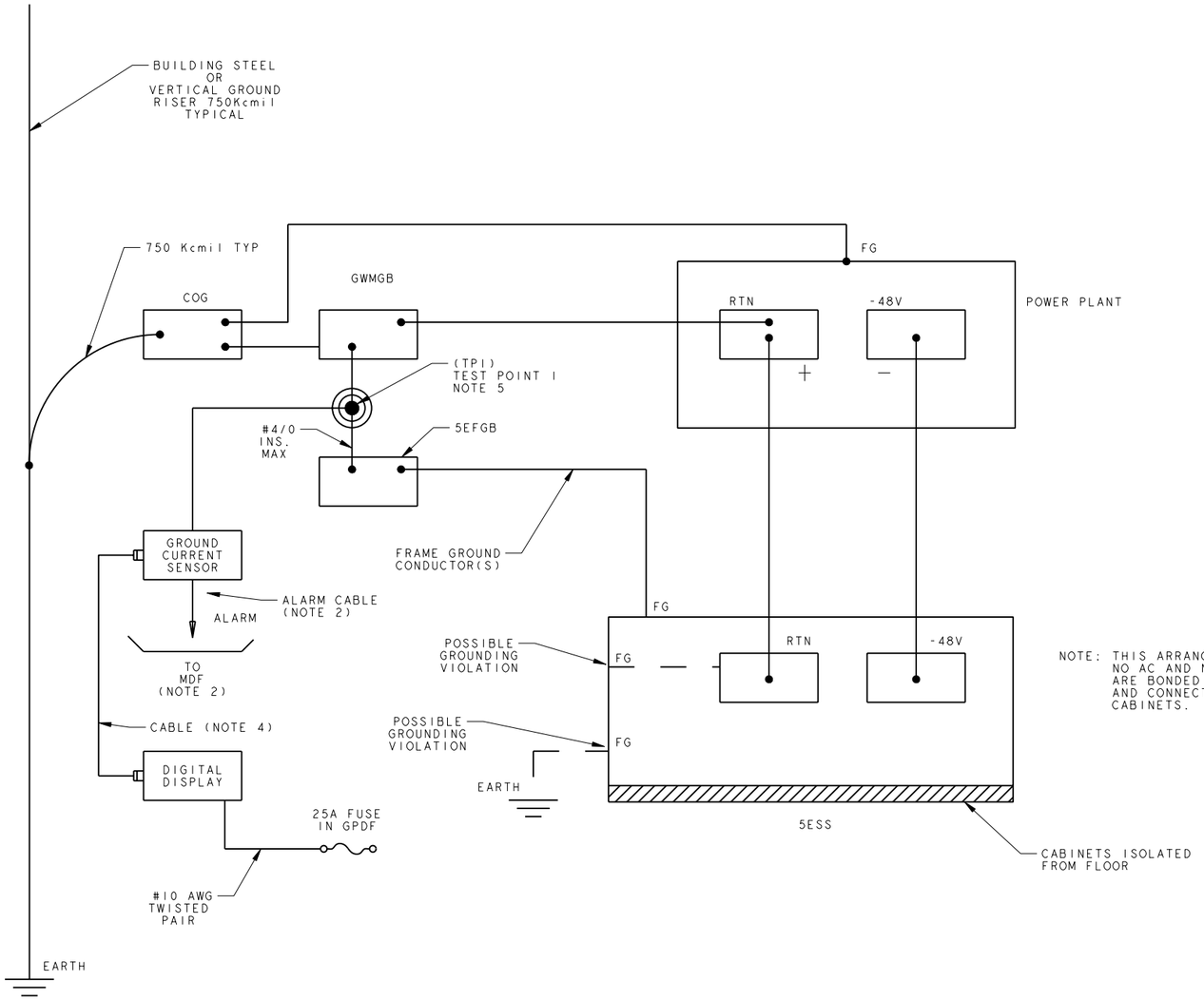


FIG. C12

ISOLATED GROUND PLANE INTEGRITY TEST 2
SYSTEM LEVEL TEST (SEE NOTE 1)



NOTE: THIS ARRANGEMENT ASSUMES; NO AC AND NO COAX CABLES ARE BONDED TO THE GWMGB AND CONNECTED TO 5ESS CABINETS.

FIG. C13

OPTIONAL ISOLATED GROUND PLANE MONITOR

SHEET NOTES

1. AN OPTIONAL ISOLATED GROUND PLANE MONITOR MAY BE USED TO DETECT AND MEASURE THE TOTAL AMOUNT OF DC CURRENT PRESENT ON THE 5ESS FRAME GROUND CONDUCTOR. THIS MONITOR IS A HALL EFFECT CURRENT SENSOR EQUIPPED WITH A DIGITAL DISPLAY AND ALARM OUTPUT. THE ALARM THRESHOLD SHOULD BE SET AT 0.250 AMPERE ABOVE THE NORMAL LEAKAGE CURRENT FOR A PARTICULAR SYSTEM. A GROUNDING VIOLATION WILL USUALLY CAUSE ADDITIONAL CURRENT TO FLOW THROUGH TP1, TRIGGERING AN ALARM.

   ONCE A VIOLATION IS DETECTED, A VISUAL INSPECTION AND TROUBLE SHOOTING WILL BE NECESSARY TO IDENTIFY AND REMOVE THE VIOLATION.

2. ALARM CABLE TO MDF CUSTOMER ASSIGNABLE SCAN POINTS CONSISTS OF A TWISTED PAIR #22 AWG WIRE TO BE PROVIDED BY REGIONAL ENGINEERING ON A PER JOB BASIS.

3. LOCATE DISPLAY ON A WALL OR COLUMN IN THE 5ESS ROOM AT A HEIGHT THAT ALLOWS GOOD VISIBILITY. RECOMMENDED HEIGHT IS 6'-0" (6 FT.- 0 IN.) FROM THE FLOOR.

4. THE ISOLATED GROUND PLANE MONITOR AND CABLE MAY BE ORDERED FROM NE00305-45.

5. A HAND HELD CLAMP-ON CURRENT PROBE MAY ALSO BE USED TO TAKE CURRENT MEASUREMENTS AT TEST POINT 1.

6. USE USER'S MANUAL FOR INSTALLATION AND ADJUSTMENT DETAILS.

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C5

MODEL NAME

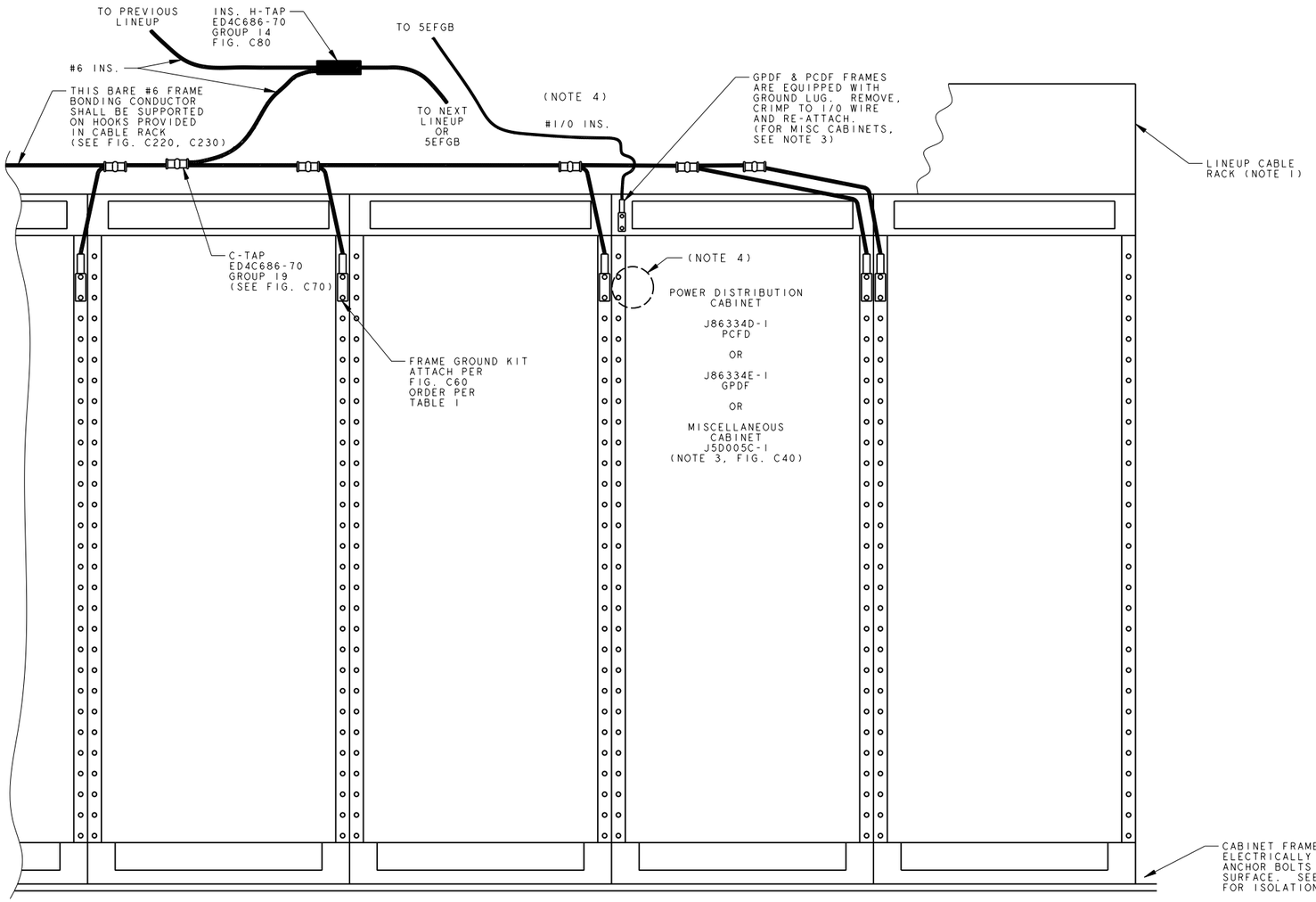


FIG. C20

TYPICAL LOCATION OF EQUIPMENT GROUNDING CONDUCTORS FOR OVERHEAD CABLING (REAR VIEW) (NOTE 2)

SHEET NOTES:

1. LINEUP CABLE RACK OVER CABINETS IS NOT SHOWN FOR CLARITY.
2. THIS FIGURE SHOWS TYPICAL CABLE LOCATIONS ONLY. IT DOES NOT REFLECT ACTUAL CABINET LAYOUT.
3. WHEN THE MISCELLANEOUS CABINET IS EQUIPPED WITH A POWER DISTRIBUTION FUSE PANEL AND SUPPLIED BY AND UPSTREAM CB LARGER THAN 200 AMPERES, ORDER A GROUNDING KIT FROM ED4C686-70, GROUP 22. 2 HOLES AT 1 INCH ON CENTER ARE PROVIDED AT THE FRAME BOTTOM REAR EXTENSION.
4. A #6 AWG GROUNDING WIRE MAY BE USED WHEN THE LARGEST CB SUPPLYING THE PDF OR MISC. CABINET IS 200 AMPERES OR LESS. ORDER GROUNDING LUG AND FASTENING HARDWARE FROM ED4C686-70, GROUP 20 AND 21. ATTACH LUG AT REAR FRAME UPRIGHT. ORDER WIRE LENGTH AS REQUIRED.

TABLE 1

CABINET MODEL	GROUNDING KIT
CLASSIC	ED4C686-70 GROUP 17A
5E-2000 PHASE 1	ED4C686-70 GROUP 17A
5E-2000 PHASE 11	ED4C686-70 GROUP 18A

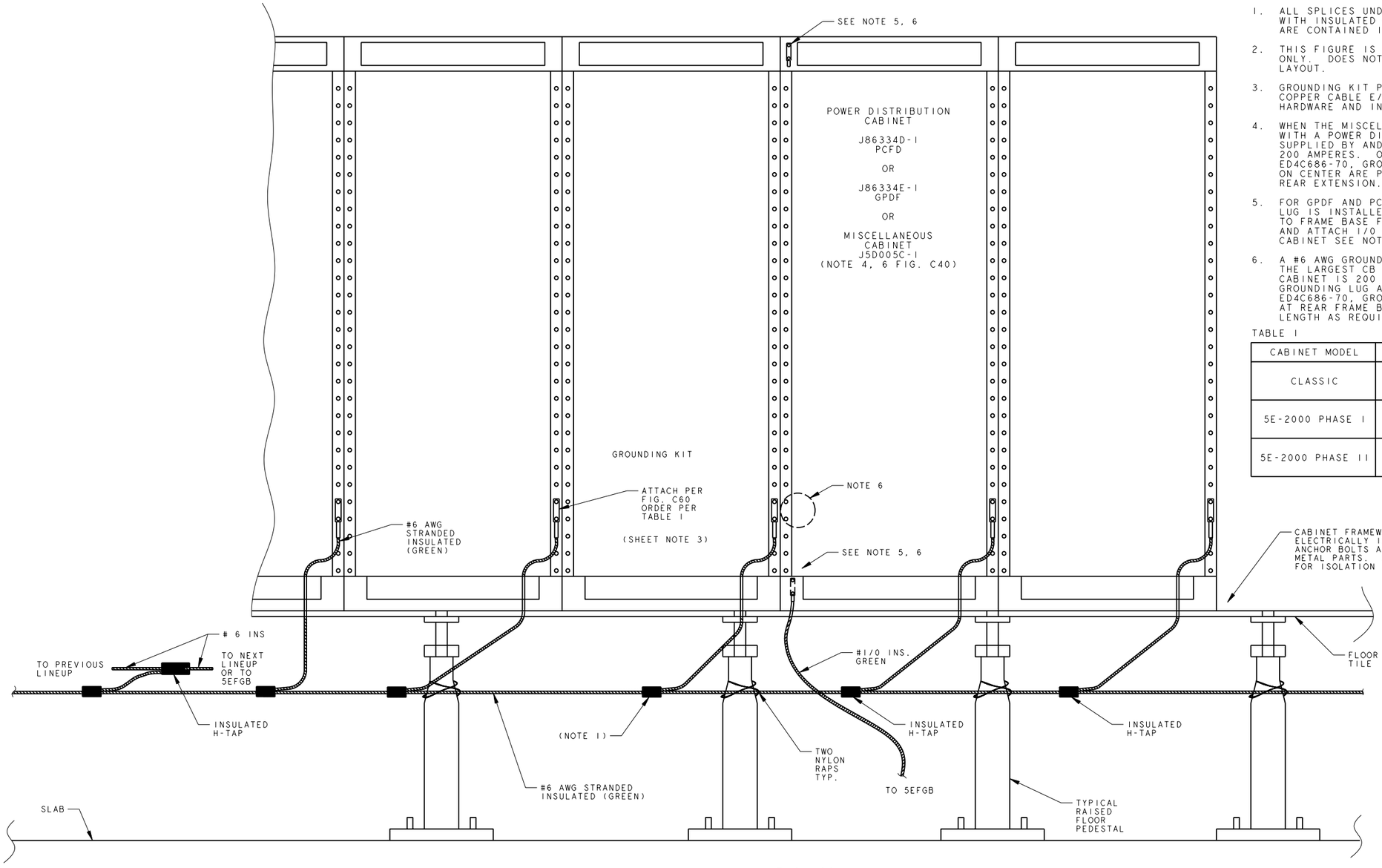


FIG. C30

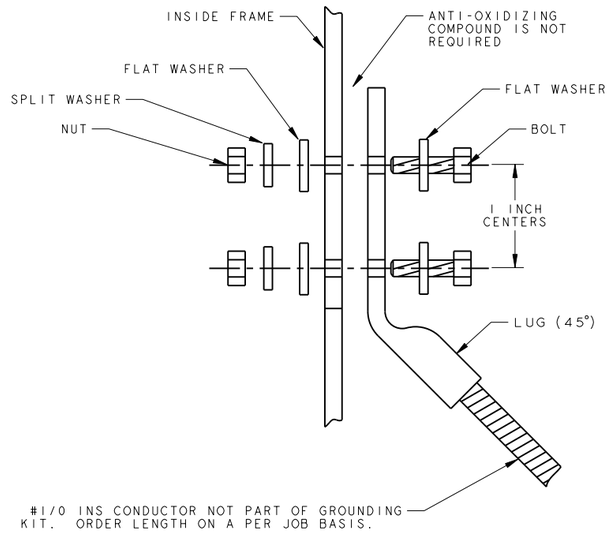
TYPICAL METHOD OF CONNECTING EQUIPMENT GROUNDING CONDUCTORS WHEN CABLING FROM BELOW REAR (WIRING SIDE) VIEW.

SHEET NOTES:

1. ALL SPLICES UNDER THE FLOOR ARE TO BE MADE WITH INSULATED CONNECTORS. THESE PARTS ARE CONTAINED IN ED4C686-70, GROUP 14.
2. THIS FIGURE IS FOR GROUNDING REFERENCE ONLY. DOES NOT REFLECT ACTUAL CABINET LAYOUT.
3. GROUNDING KIT PROVIDES A 6 FT INS. #6 COPPER CABLE E/W TWO HOLE LUG, FASTENING HARDWARE AND INS. H-TAP.
4. WHEN THE MISCELLANEOUS CABINET IS EQUIPPED WITH A POWER DISTRIBUTION FUSE PANEL AND SUPPLIED BY AND UPSTREAM CB LARGER THAN 200 AMPERES. ORDER A GROUNDING KIT FROM ED4C686-70, GROUP 22. 2 HOLES AT 1 INCH ON CENTER ARE PROVIDED AT THE FRAME BOTTOM REAR EXTENSION.
5. FOR GPDF AND PCFD CABINETS THE GROUNDING LUG IS INSTALLED AT FACTORY. RELOCATE TO FRAME BASE FOR RAISED FLOOR INSTALLATIONS AND ATTACH 1/0 GROUNDING WIRE. (FOR MISC CABINET SEE NOTE 4)
6. A #6 AWG GROUNDING WIRE MAY BE USED WHEN THE LARGEST CB SUPPLYING THE PDF OR MISC. CABINET IS 200 AMPERES OR LESS. ORDER GROUNDING LUG AND FASTENING HARDWARE FROM ED4C686-70, GROUP 20 AND 21. ATTACH LUG AT REAR FRAME BOTTOM RIGHT. ORDER WIRE LENGTH AS REQUIRED.

TABLE 1

CABINET MODEL	GROUNDING KIT
CLASSIC	ED4C686-70 GROUP 24
5E-2000 PHASE 1	ED4C686-70 GROUP 24
5E-2000 PHASE 11	ED4C686-70 GROUP 23



DETAIL C40

GROUNDING KIT
(ED4C686-70, GROUP 22)
BOLTING SEQUENCE.

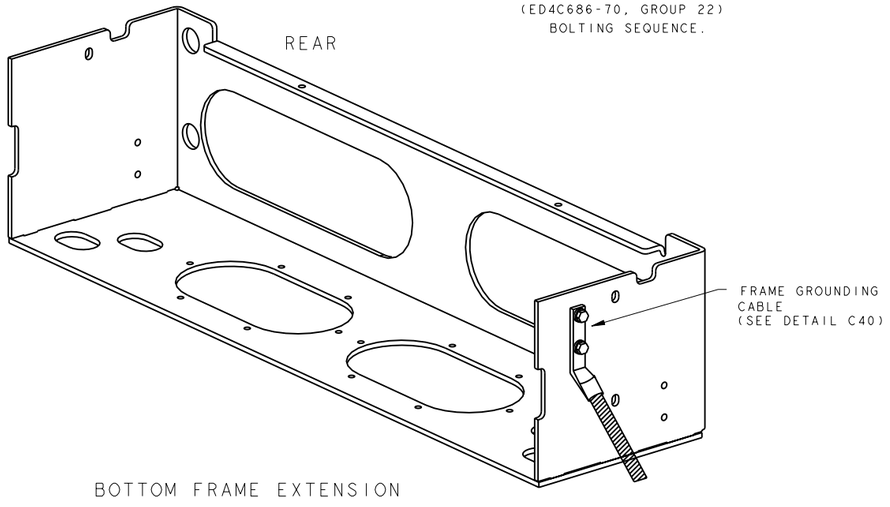


FIG. C40

LOCATION AND METHOD OF
INSTALLING THE #1/0 GROUNDING LUG
(WHEN REQUIRED)
FOR MISCELLANEOUS CABINET USING
5ESS-2000 GLOBAL FRAME (ED5D785-70, GRP 1A)

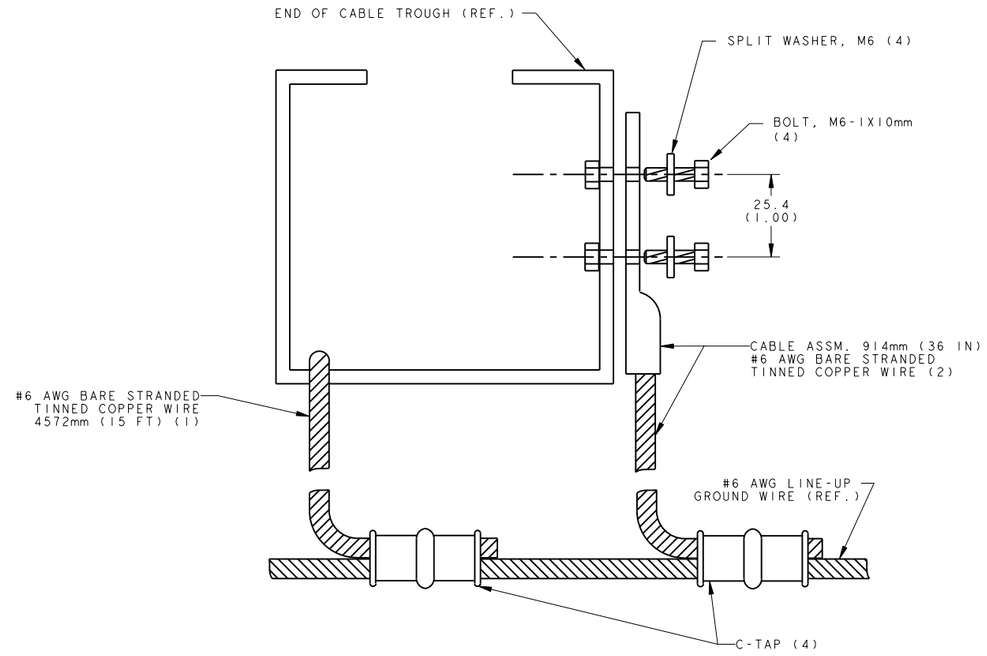


FIG. C45

PIDB/PICB CABLE TROUGH
GROUNDING KIT (METRIC)
(ED4C686-70, G-30)

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C8

MODEL NAME

D

SHEET NOTES:

1. THE MOUNTING HARDWARE MAY BE OBTAINED FROM ED4C686-70 GROUP 12. KIT NUMBER 407040914 (BURNDY TMH267). TORQUE TO 240 IN-LBS.

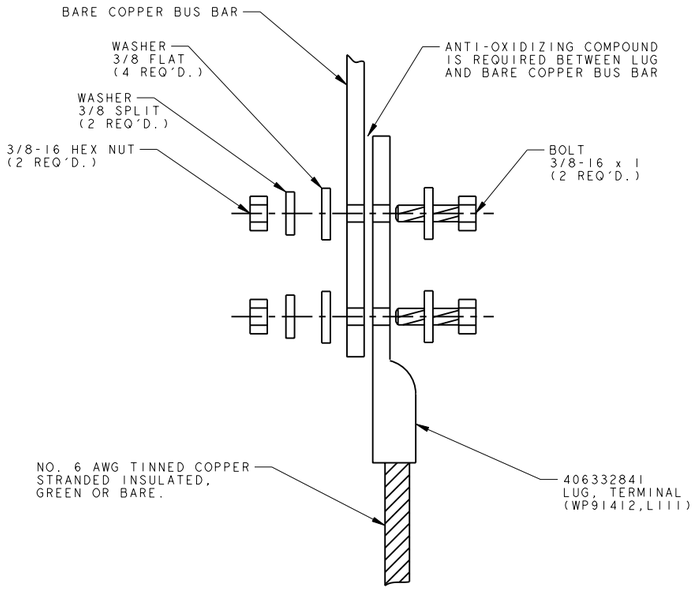


FIG. C50

TYPICAL METHOD OF CONNECTING NO. 6 AWG GROUNDING CONNECTOR TO A COPPER BUS BAR SEE NOTE 1

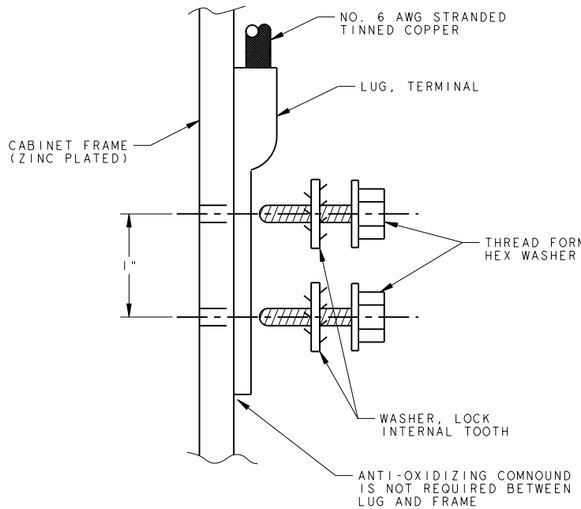


FIG. C60

METHOD OF INSTALLING NO. 6 AWG FRAME GROUND CABLE

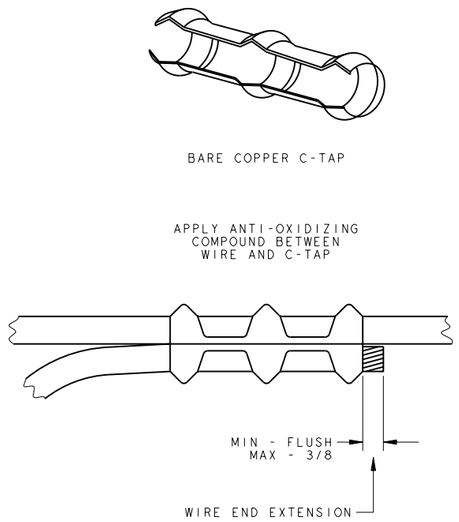


FIG. C70

METHOD OF INSTALLING C-TAP

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

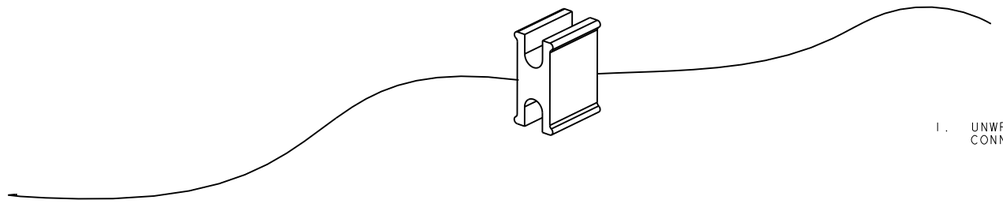
FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C9

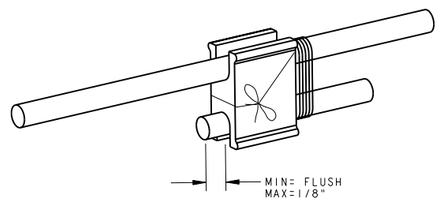
MODEL NAME

SHEET NOTES:

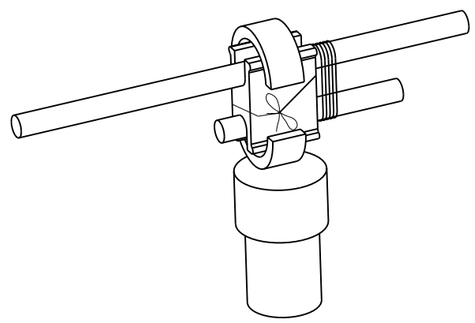
1. ANTI-OXIDIZING COMPOUND IS NOT REQUIRED WITH TIN PLATED COPPER AND TIN PLATED COPPER H-TAP. IT IS REQUIRED WITH BARE COPPER. SEE ENG. NOTE 64.2.



1. UNWRAP STRING FROM CONNECTOR.



2. WRAP STRING TIGHTLY AROUND CONDUCTOR, KEEPING THE STRING OUTSIDE OF THE CONDUCTOR AREA.



3. POSITION CONNECTOR IN TOOL, USING RECOMMENDED DIE, MAKE CRIMP(S).

4. STRING MAY BE REMOVED AFTER CRIMPING IS COMPLETE.

5. INSTALL THE INSULATING COVER.

FIG. C80

METHOD OF INSTALLING PARALLEL TAPS (NOTE 1)

D

SHEET NOTES:

1. THE ADHESIVE LABLE SHOWN CAN BE PROVIDED FOR ATTACHMENT TO ANY CONVENIENT SURFACE NEAR THE GROUND WINDOW, SUCH AS THE OUTSIDE SURFACE OF A LADDER RACK STRINGER. THE LABEL SHOULD BE READILY SEEN FROM THE EQUIPMENT FLOOR. QUANTITY TO BE ONE OR TWO PER GROUND WINDOW, DEPENDING ON JOB CONDITION.

   LABEL NOT REQUIRED IF GROUND WINDOW LOCATION MAY BE STENCILED WITH 3/8" SIZE CHARACTERS.

2. USE 145C TAG (E/W METALLIC RING) OR 145P TAG (WITHOUT RING) FOR ANY WIRE REQUIRED IDENTIFICATION, SUCH AS FRAME GROUNDING WIRES. PLACE ONE TAG AT EACH END OF CABLE AND IDENTIFY THE DESTINATION AT THE OTHER END.

3. DO NOT COIL-UP ANY EXCESS LENGTH OF GROUNDING WIRE. CUT OFF ANY EXTRA WIRE LENGTH PRIOR TO TERMINATING WIRE ONTO TERMINAL STRIP.

FIG. C90

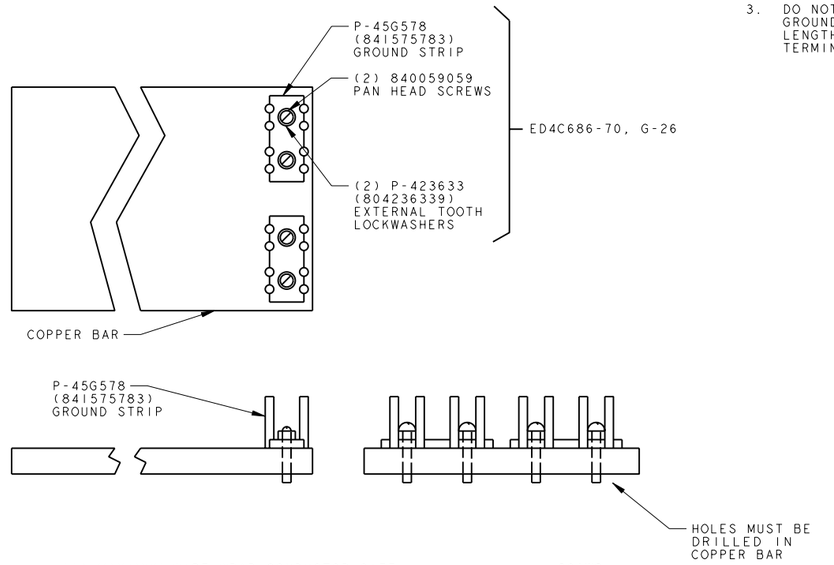
GROUND WINDOW LABEL
(SHEET NOTE 1)

145C
(ED4C686-70, G25)
(a)

145P
(ED4C686-70, G25A)
(b)

FIG. C100

TYPICAL STAMPING OF 145C OR 145P TAGS
BOTH SIDES MAY BE USED FOR STAMPING
(SHEET NOTE 2)



(A) MAXIMUM WIRE WRAP CONDUCTOR SIZE: 20AWG

(B) MAXIMUM NUMBER OF WIRE WRAPS PER TERMINAL: 2

(C) MAXIMUM ONE BUTT CONNECTOR PER TERMINAL (#16 AWG).

(D) ALL CONNECTIONS MUST BE SOLDERED, WHETHER DIRECT OR USING BUTT CONNECTOR.

FIG. C110

TYPICAL METHOD FOR BONDING SMALL GROUND CONDUCTORS

(SHEET NOTE 3)

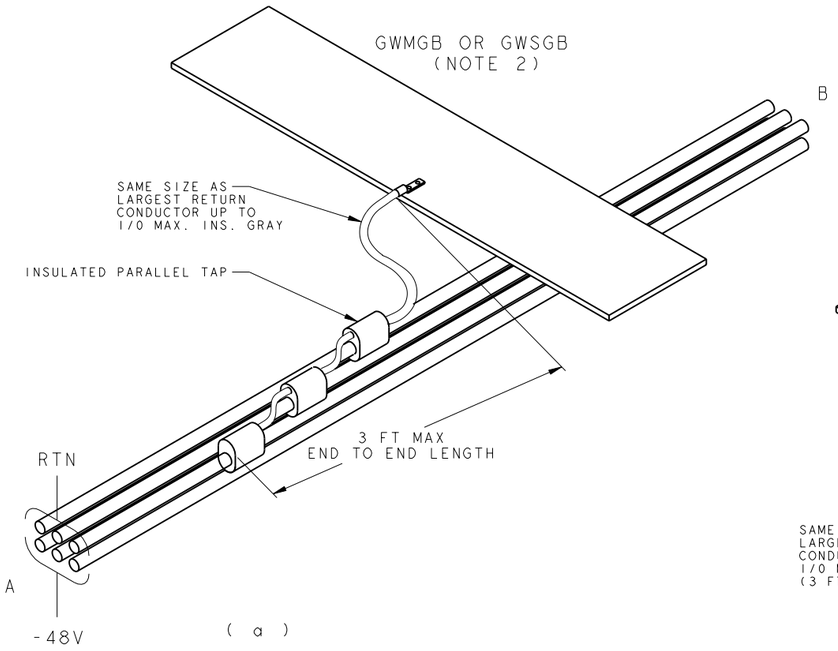
PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

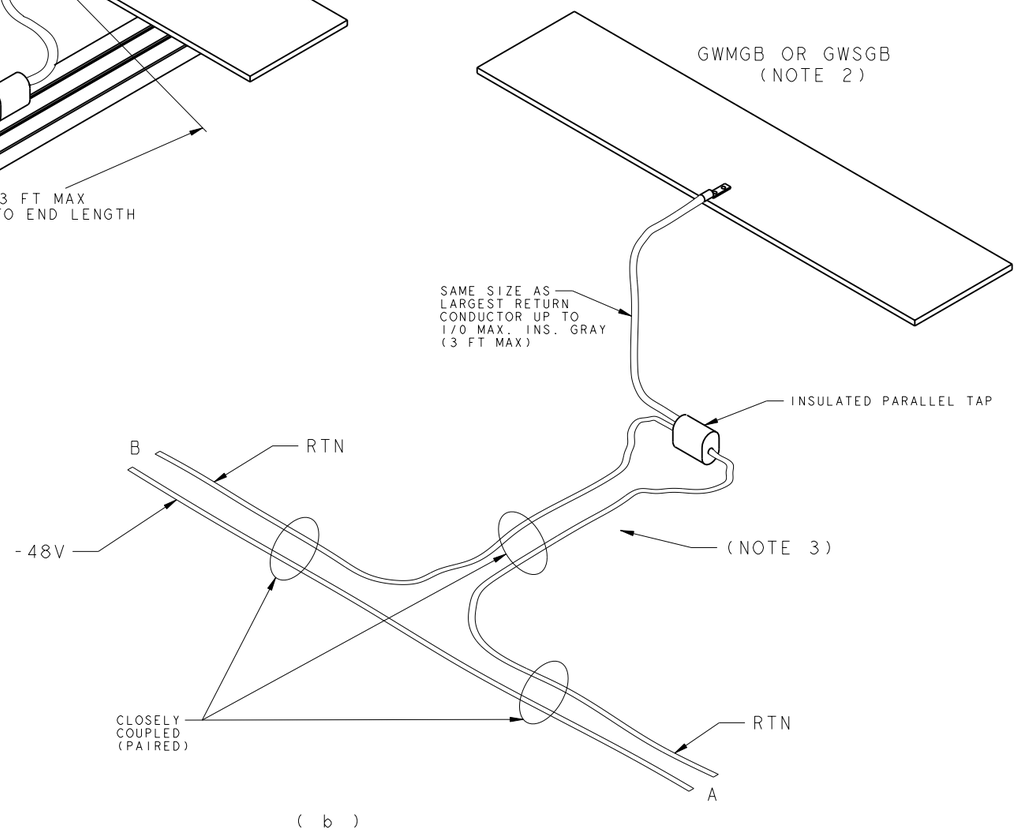
D

SHEET NOTES

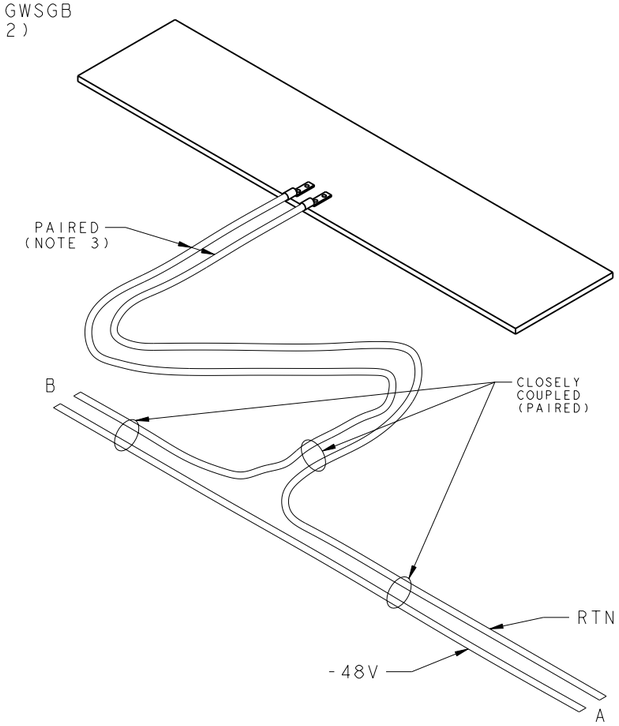
1. A - FROM POWER PLANT
   B - TO EQUIPMENT NOT ON ISOLATED GROUND PLANE
2. IF IT IS NECESSARY TO INSTALL A GWSGB, CONNECT IT TO THE GWMGB WITH A 750Kcmil OF 3 FEET MAX LENGTH.
3. THERE IS NO LIMIT ON THE MAXIMUM LENGTH OF UNPAIRED RETURN CONDUCTOR ALLOWED. EACH CONDUCTOR MUST BE PAIRED TO ITSELF.



(a)



(b)



(c)

FIG. C120

METHODS OF BONDING RETURN CONDUCTORS TO THE GROUND WINDOW FOR LOADS NOT ON ISOLATED GROUND PLANE

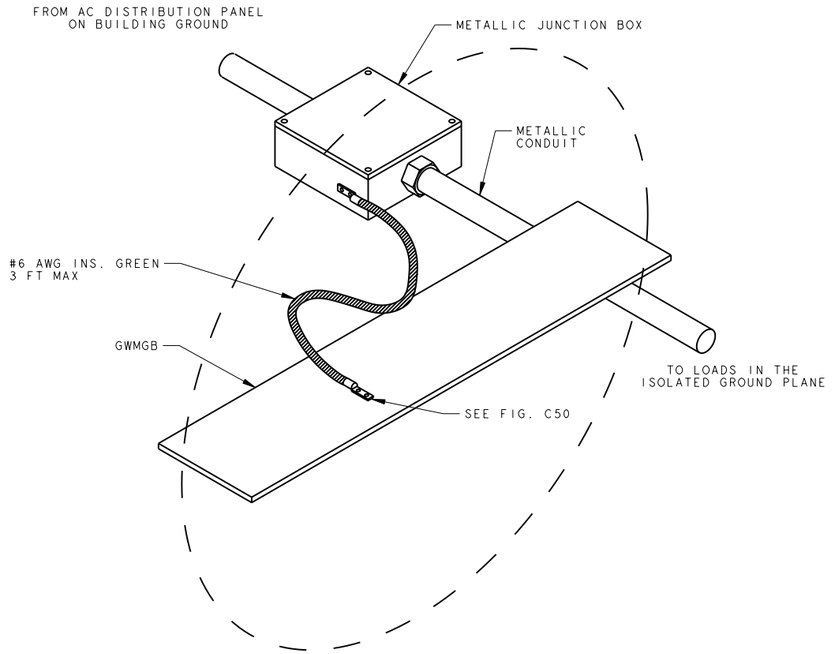
PRO/E-EQEDFORM.FRM-FEB 96

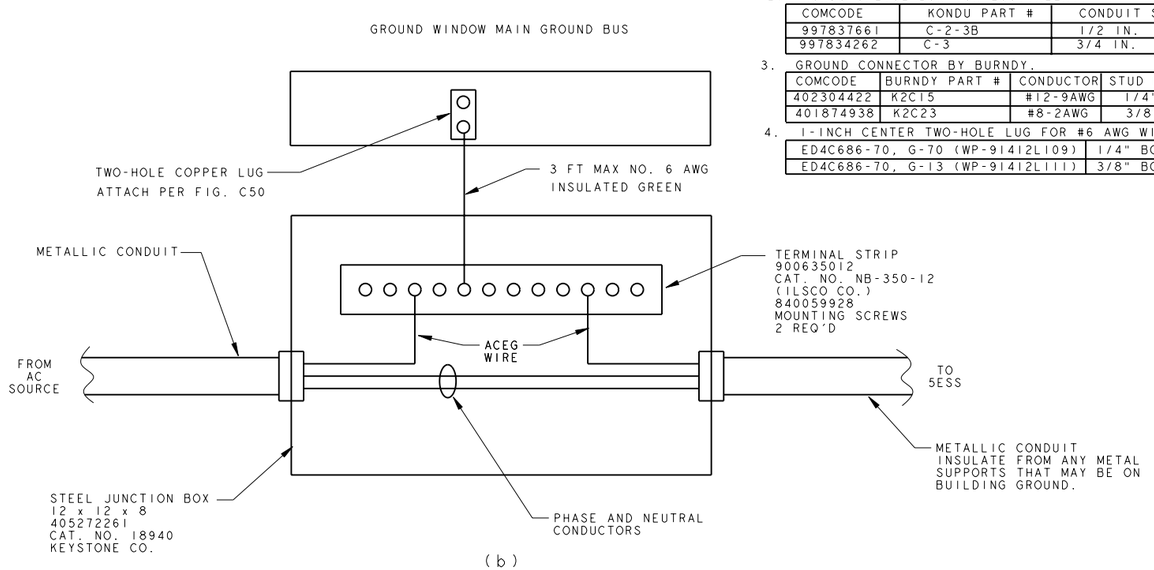
ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C12

MODEL NAME





(b)

METHOD OF BONDING ACEG WIRE
AND CONDUIT TO GROUND WINDOW MAIN GROUND BUS
(ALTERNATE)

SHEET NOTES:

1. BOX SHALL BE DRILLED AS REQUIRED TO MOUNT GROUND CABLE.

2. KONDU SPLICE BOX (OR EQUIVALENT)

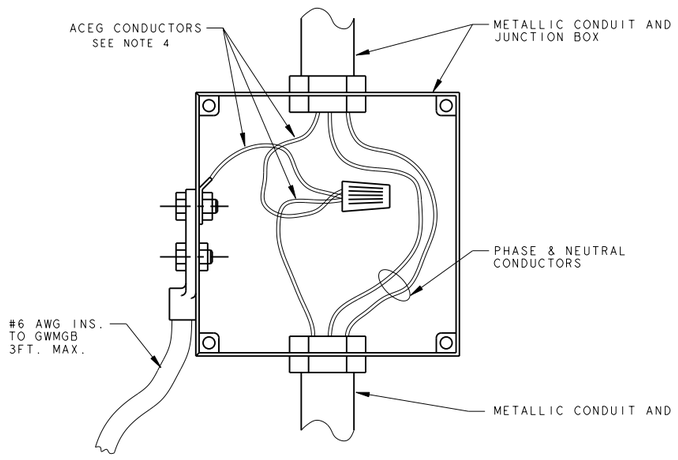
COMCODE	KONDU PART #	CONDUIT SIZE
997837661	C-2-3B	1/2 IN.
997834262	C-3	3/4 IN.

3. GROUND CONNECTOR BY BURNDY.

COMCODE	BURNDY PART #	CONDUCTOR	STUD DIA.
402304422	K2C15	#12-9AWG	1/4"
401874938	K2C23	#8-2AWG	3/8"

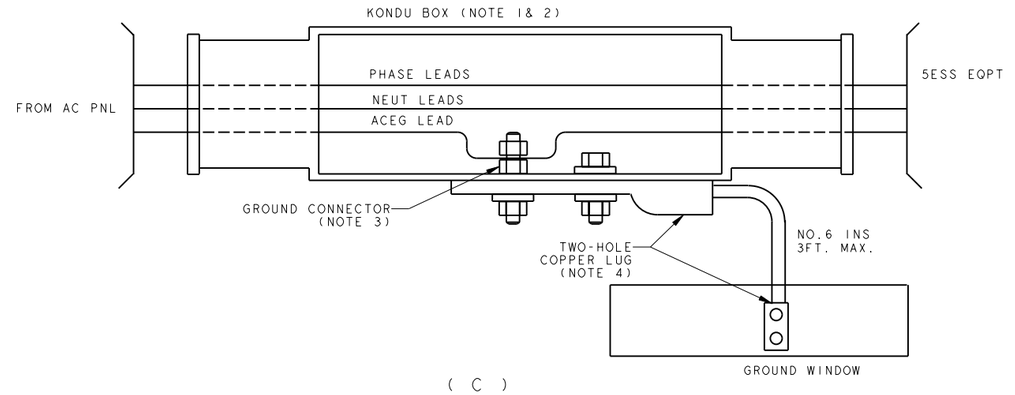
4. 1-INCH CENTER TWO-HOLE LUG FOR #6 AWG WIRE

ED4C686-70, G-70 (WP-91412L109)	1/4" BOLT
ED4C686-70, G-13 (WP-91412L111)	3/8" BOLT



(a)

METHOD OF BONDING AC CONDUIT
AND ACEG WIRE TO MAIN WINDOW
(ALTERNATE)



(C)

METHOD OF BONDING 5ESS AC CONDUIT
AND ACEG WIRE TO GROUND WINDOW
(PREFERRED)

FIG. C130

TYPICAL METHODS OF BONDING ACEG WIRE (GREEN WIRE)
AND CONDUIT TO GROUND WINDOW MAIN GROUND BUS

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C13

MODEL NAME

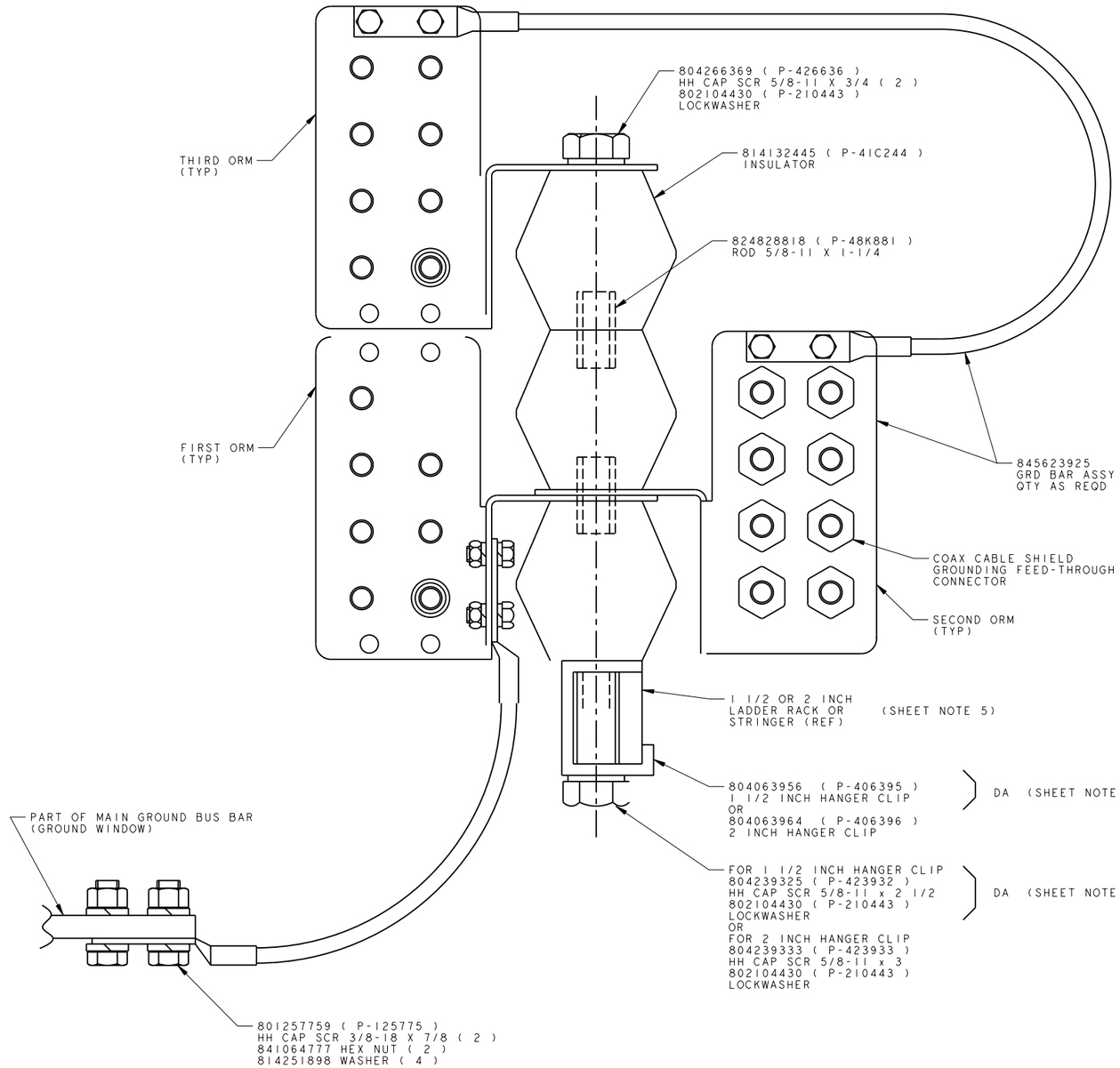


FIG. C140

TYPICAL MOTHOD OF MOUNTING
TRCU2 COAX CABLE GROUND BAR ASSEMBLY 845623925
(ED-5D500-21 GROUP 85A & 86)
TO LADDER RACK STRINGER

SHEET NOTES

1. INDIVIDUAL CONNECTOR PLATES MAY BE CONNECTED IN SERIES BY OVERLAPPING PLATES OR STRAPPING TOGETHER WITH ONE CONNECTION TO ESS GRD WINDOW. EACH PLATE MAY ALSO BE TIED INDIVIDUALLY TO THE GROUND WINDOW. GROUND CABLE MAY BE RELOCATED ON GROUND BAR AS NEEDED.
2. COAX CABLE SHOULD BE SUPPORTED WITHIN 2 FEET OF CONNECTOR PLATE.
3. ANTI-OXIDIZING COMPOUND MUST BE USED BETWEEN LUG AND CONNECTOR PLATE AND/OR BETWEEN CONNECTOR PLATES WHEN USED AS AN INTERCONNECTION.
4. CONNECTOR PLATES MAY BE STAMPED AS REQUIRED FOR JOB INFORMATION.
5. 1 1/2 INCH LADDER RACK MAY BE PRESENT IN THE FIELD, BUT HAS BEEN DISCONTINUED FOR NEW INSTALLATIONS.

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C14

MODEL NAME

D

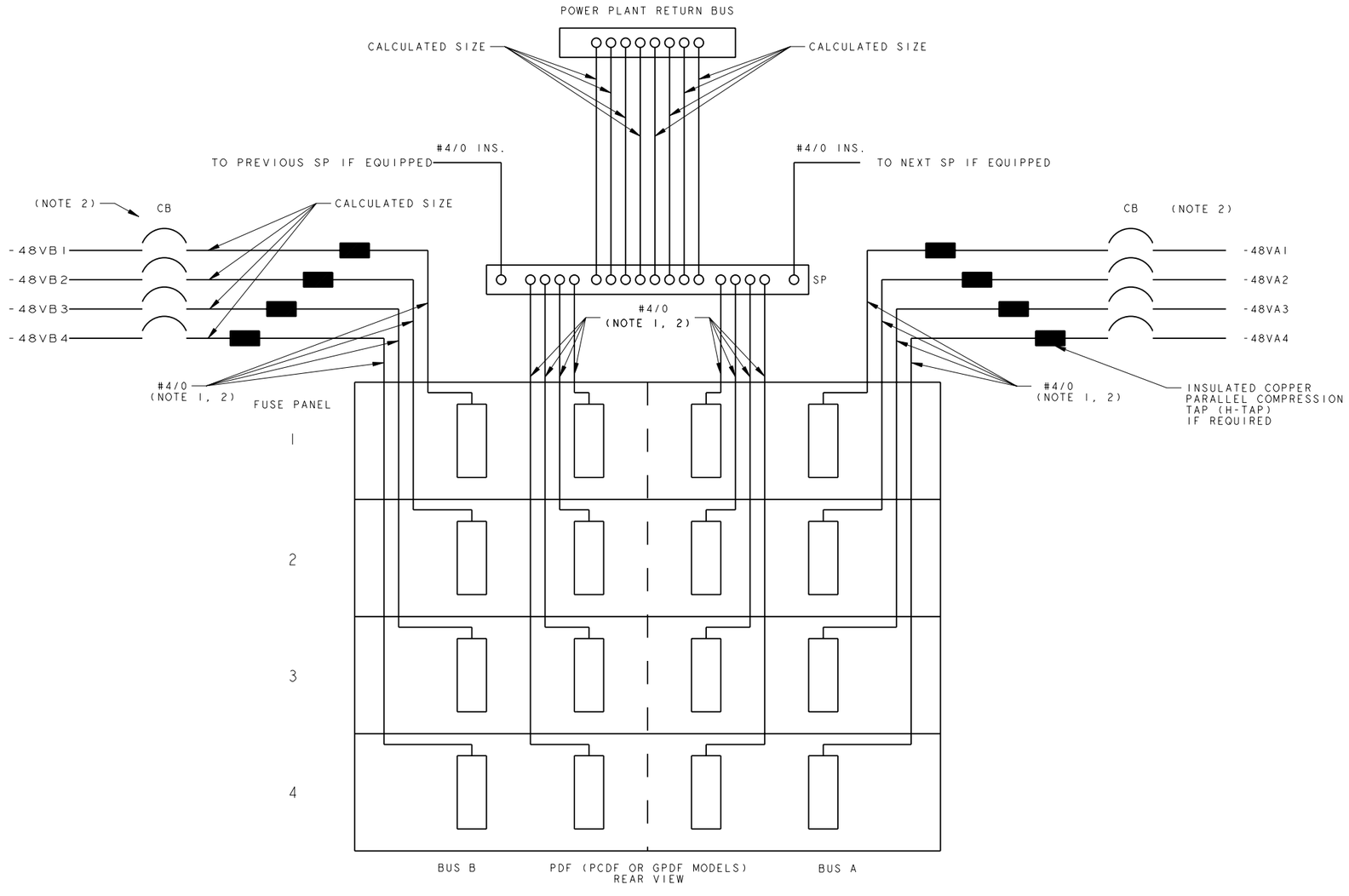


FIG. C150

INPUT POWER FEEDER TO 5ESS PDF WITH
SPLIT FUSE PANEL CONFIGURATION.
POWER IS SUPPLIED FROM
ONE BULK POWER PLANT.

SHEET NOTES

1. UP TO 350 Kcmil MAY TERMINATE ONTO THE FUSE PANEL BUS BARS. BUT TO AVOID CABLE CONGESTION WITHIN THE PDF AND OVERHEAD LINEUP CABLE RACK, USE OF #4/0 WIRE IS RECOMMENDED TO FACILITATE INSTALLATION. EXCEPTION 1 - POWER SOURCE IS LOCATED AT A DISTANCE THAT ALLOWS 350 Kcmil TO BE USED FOR THE ENTIRE RUN, ELIMINATING THE NEED FOR SPLICING.

2. THE WIRE SIZE SHOWN IS ENGINEERED FOR A 225 AMPERES CIRCUIT BREAKER OR FUSE. IF A DIFFERENT SIZE CIRCUIT BREAKER OR FUSE IS USED ADJUST WIRE SIZE ACCORDINGLY. SEE ENG. NOTE 61.5.

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C15

MODEL NAME

D

SHEET NOTES

1. UP TO 350 Kcmil MAY TERMINATE ONTO THE FUSE PANEL BUS BARS. BUT TO AVOID CABLE CONGESTION WITHIN THE PDF AND OVERHEAD LINEUP CABLE RACK, USE OF #4/0 WIRE IS RECOMMENDED TO FACILITATE INSTALLATION. EXCEPTION 1 - POWER SOURCE IS LOCATED AT A DISTANCE THAT ALLOWS 350 Kcmil TO BE USED FOR THE ENTIRE RUN, ELIMINATING THE NEED FOR SPLICING.

2. THE WIRE SIZE SHOWN IS ENGINEERED FOR A 225 AMPERES CIRCUIT BREAKER OR FUSE. IF A DIFFERENT SIZE CIRCUIT BREAKER OR FUSE IS USED ADJUST WIRE SIZE ACCORDINGLY. SEE ENG. NOTE 61.5.

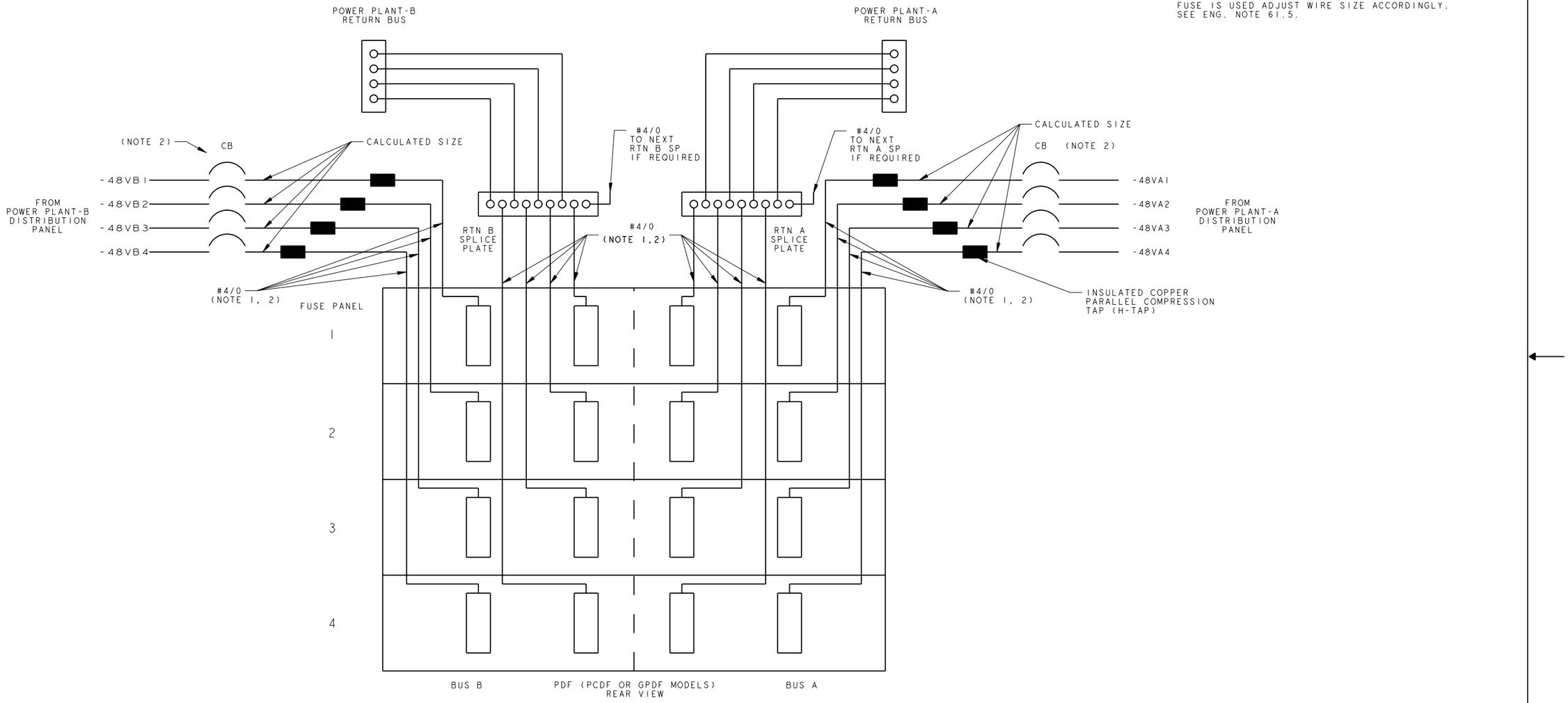


FIG. C160

INPUT POWER FEEDER TO 5ESS PDF WITH SPLIT FUSE PANEL CONFIGURATION. POWER SUPPLIED BY TWO SEPARATE POWER PLANTS

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C16

MODEL NAME

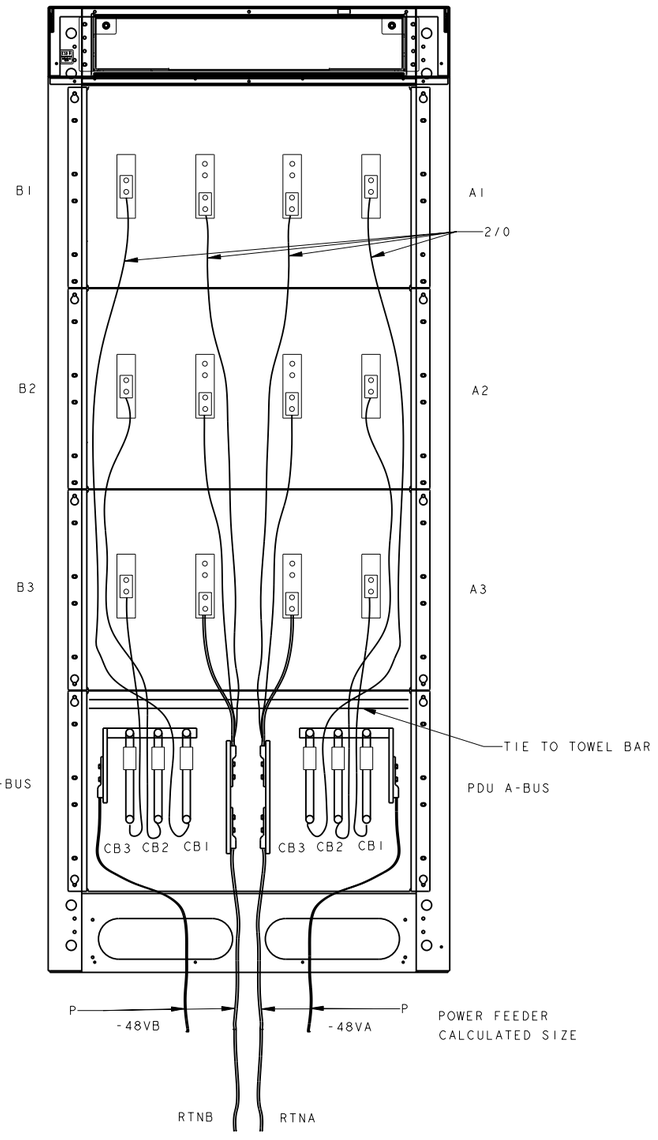


FIG. C165

PDU APPLICATION WITH GPDF CABINET.
(BOTTOM CABLING SHOWN.)
(NOTE 1, 2, 3)
REAR VIEW

SHEET NOTES:

1

PDU CB SIZE	MAX L2 LOAD @-39.5V	MAX L1 LOAD @51.0V	POWER PLANT CB OF FUSE SIZE FEEDING ONE PDU CIRCUIT (3 LOADS)
175A	140A	108A	450 MIN. 600 MAX.

2. SEE FIG. C180 FOR ADDITIONAL PDU INFORMATION.

3. THE PDU SHOULD BE USED ONLY WHEN THE CUSTOMER'S POWER PLANT IS NOT EQUIPPED WITH NUMBER OF FUSES OR CIRCUIT BREAKERS REQUIRED BY THE GPDF AND THE CUSTOMER REFUSES TO PROVIDE THEM, OR PER OTHER SPECIAL APPLICATIONS SPECIFIED IN THIS DOCUMENT.

5ESS SWITCHING EQUIPMENT
SPECIFICATIONS FOR
POWER DISTRIBUTION
AND
GROUNDING METHODS (P)

THIRD ANGLE PROJN

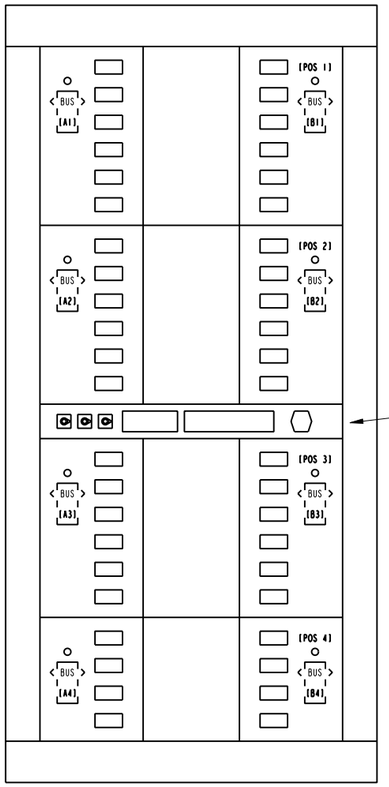
DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES | ED5D805-10 | SHEET NO. C17

MODEL NAME

ED5D805-10

PRO/E-EQEDFORM.FRM-FEB 96



CHARGE PROBE AND ALARM PANEL

(NOTE 2)

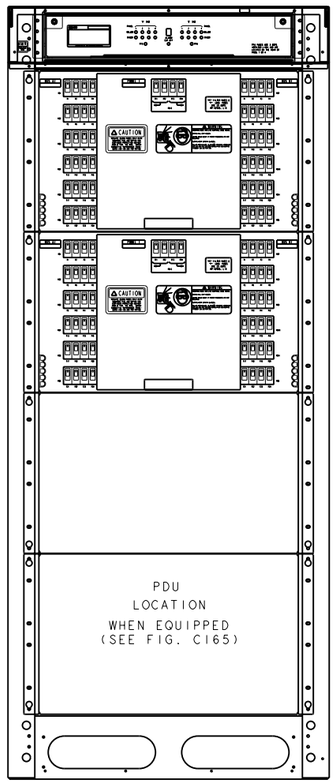
"DA" REPLACED BY FIG. C180

FIG. C170

J86334D-1 POWER DISTRIBUTION FRAME MODEL "PCFD"

(NOTE 1)

(NOTE 4)



POS 1

POS 2

POS 3

POS 4

FRONT VIEW

(BEZEL AND DOORS NOT SHOWN)

FIG. C180

J86334E-1 POWER DISTRIBUTION FRAME MODEL GPDF

(NOTE 3, 4, 5)

SHEET NOTES

1. A J86334-D PDF CAN BE EQUIPED WITH 4 FUSE PANELS. FUSE PANELS IN POSITIONS 1, 2 AND 3 MAY BE EITHER 48 OR 32 FUSE POSITION PANELS. POSITION 4 CAN ONLY ACCOMODATE THE 32 FUSE POSITION PANEL.
2. POSITION 4 MAY BE EQUIPPED WITH A HIGH ENERGY FUSE PANEL. THIS PANEL HAS 8 FUSE POSITIONS AND FUSE SIZE MAY BE UP TO 60 AMPERES.
3. THE GPDF IS NOT EQUIPPED WITH A CHARGE PROBE. FUSES MAY BE INSERTED "HOT".
4. TWO OF FOUR POSSIBLE FUSE PANELS SHOWN. EACH PANEL MAY BE EQUIPPED WITH 48 FUSES.
5. IF THE GPDF CABINET IS EQUIPPED WITH A PDU (POWER DISTRIBUTION UNIT ED-82947-31), IT SHALL BE LOCATED AT POSITION 4 (BOTTOM OF THE CABINET) FOR EITHER SLAB OR RAISED FLOOR INSTALLATIONS. THE PDU AND ASSOCIATED CABLES MAY BE ORDERED FROM. J86334E-1. SEE FIG. C165

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)

THIRD ANGLE PROJN

DWG SIZE C2

ISSUE 2

LUCENT TECHNOLOGIES

ED5D805-10

SHEET NO. C18

MODEL NAME

ED5D805-10

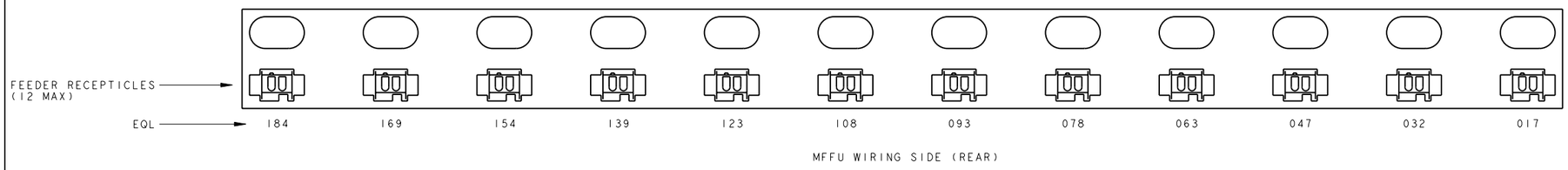
PRO/E-EQEDFORM.FRM-FEB 96

A-BUS FUSE ASSIGNMENTS		
NO.	AMP	EQUIPMENT
F1	25	CSPC A0 017
F2	25	CSPC A1 032
F3	25	
F4	25	
F5	25	
F6	25	
F7	25	
F8	25	
F9	25	SM01 LTP0 A0 017
F10	25	SM01 LTP0 A1 063
F11	25	
F12	25	
F13	25	
F14	25	
F15	25	
F16	25	
F17	25	CM2 B5 A0 017
F18	25	CM2 B5 A1 047
F19	25	
F20	25	
F21	25	
F22	25	
F23	25	
F24	25	

MFFU EQL IDENTIFICATION
-48V FEEDER IDENTIFICATION (A0, A1, A2, B0, B1 ...)
CABINET IDENTIFICATION
FUSE SIZE

FIG. C190

FUSE ASSIGNMENTS LABEL PROVIDED WITH FUSE PANEL ED83024-30 (GPDF)
EXAMPLE OF RECOMMENDED LOAD IDENTIFICATION



MFFU WIRING SIDE (REAR)

FIG. C200

EQL NUMBERS STAMPED ON THE MODULAR FUSE
FILTER UNIT (MFFU) J5D003FJ-1 LOCATED AT
THE TOP OF EQUIPMENT CABINETS

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C19

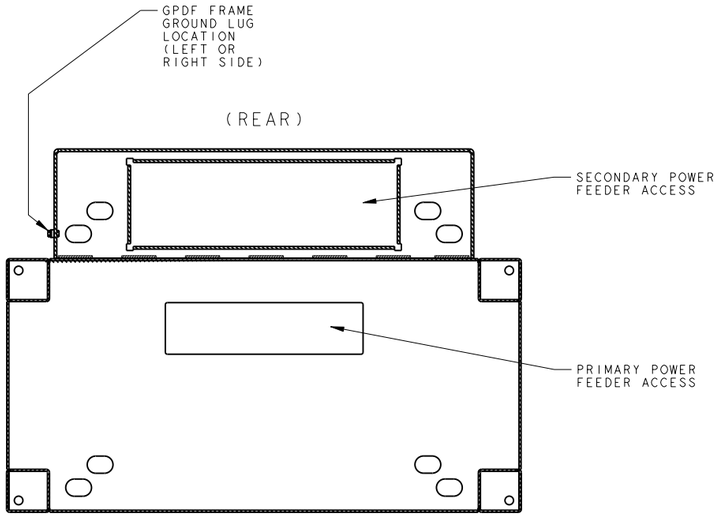
MODEL NAME

D

SHEET NOTES

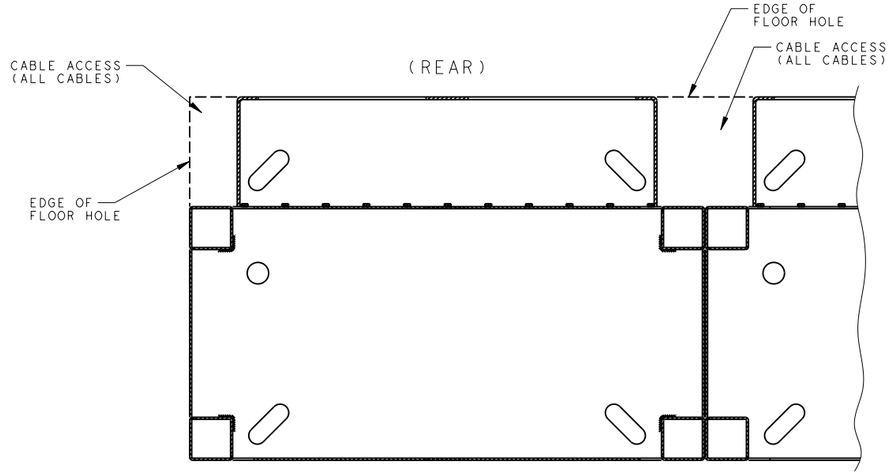
1. TEMPLATE FOR LOCATION OF ANCHORING HARDWARE AND CABLE HOLES MAY BE OBTAINED FROM:
   I.M.D.A.R.C. TOWN AND COUNTRY,
   MISSOURI, USA.
   TEMPLATE R5840A
   RAMAC #1146449.

2. SEE 5ESS-2000 INSTALLATION HANDBOOK SIG-I-WW-100 SECTION 6003 FOR ADDITIONAL INSTALLATION DETAILS.



VIEW OF GPDF (J86334E-1)
ED5D785-70, GROUP 1B
BASE SHOWING POWER
CABLE ACCESS

(a)



VIEW OF 5ESS-2000 EQUIPMENT CABINET
ED5D785-70, GROUP 1A
BASE SHOWING POWER
CABLE ACCESS

(b)

FIG. C210

CABLING FROM THE BOTTOM

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)		THIRD ANGLE PROJN
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C20

MODEL NAME

D

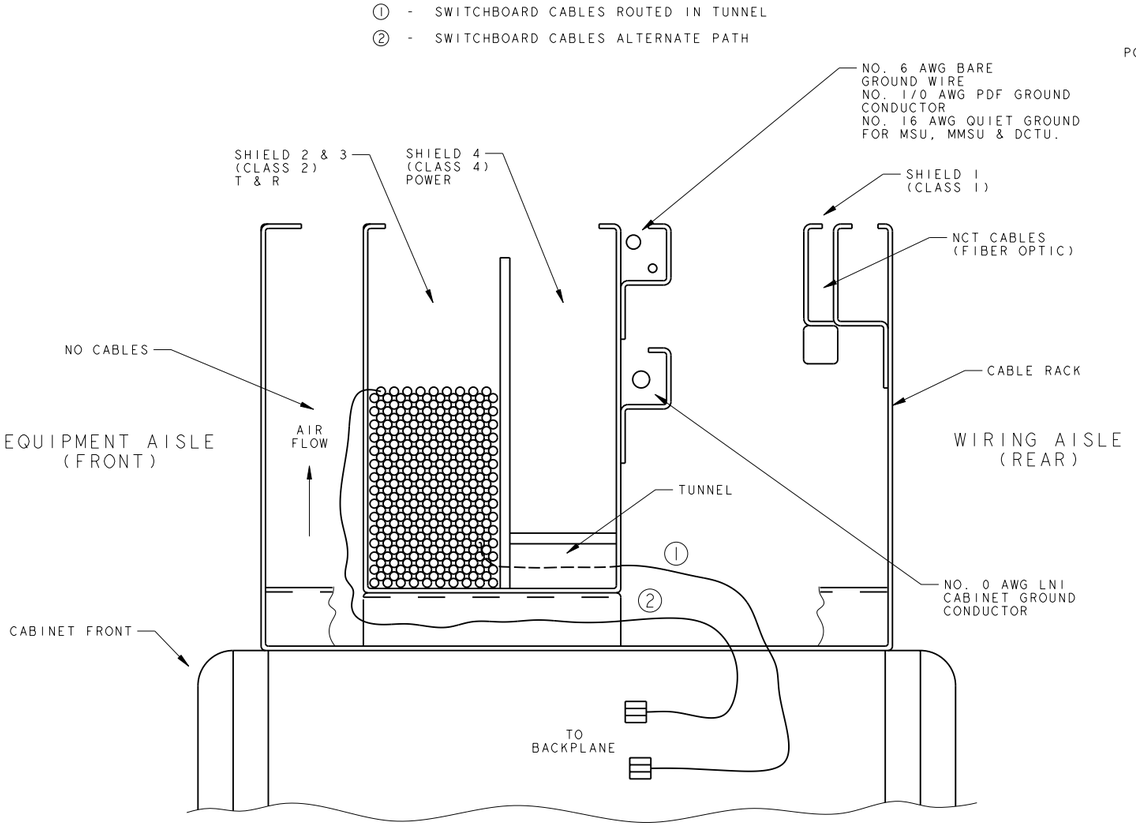


FIG. C220

END VIEW OF CLASSIC MODEL (ED5D509-71)
AND 5ESS-2000 PHASE I MODEL (ED5D742-70)
LINEUP CABLE RACK ILLUSTRATING DEDICATED CABLE COMPARTMENTS

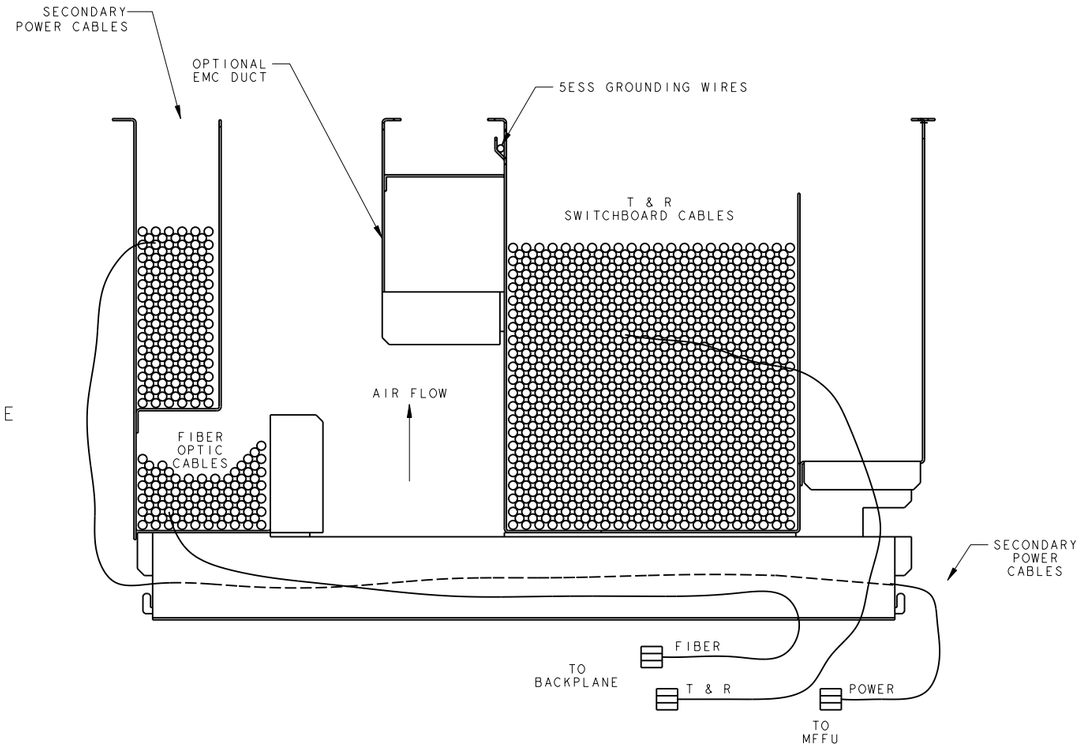


FIG. C230

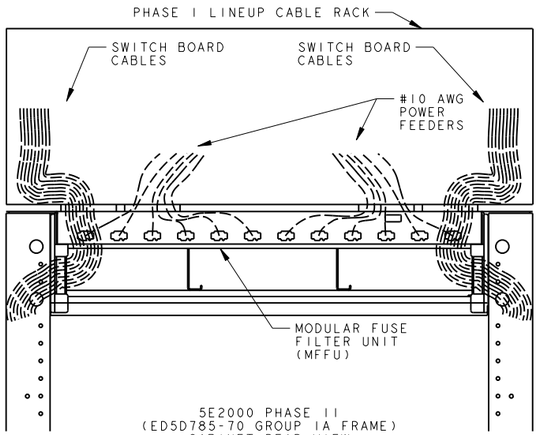
END VIEW OF 5E-2000 PHASE II (GLOBAL) CABLE RACK (ED5D779-70)
ILLUSTRATING DEDICATED CABLE COMPARTMENTS

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

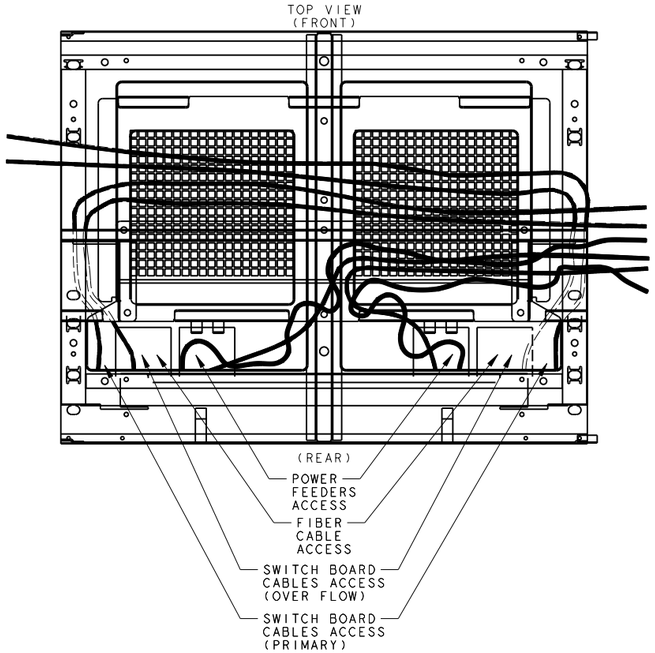
FOR PROPRIETARY NOTICE SEE SHEET A1		
5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ		THIRD ANGLE PROJN
		DWG SIZE C2 / ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C21

MODEL NAME



5E2000 PHASE II
(ED5D785-70 GROUP 1A FRAME)
CABINET REAR VIEW
(WIRING SIDE)

(a)



(b)

FIG. C240

METHOD OF CABLING (FROM ABOVE) POWER AND SWITCH BOARD CABLES TO A 5E2000 PHASE II CABINET EQUIPPED WITH A PHASE I (BLUE) CABLE RACK

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

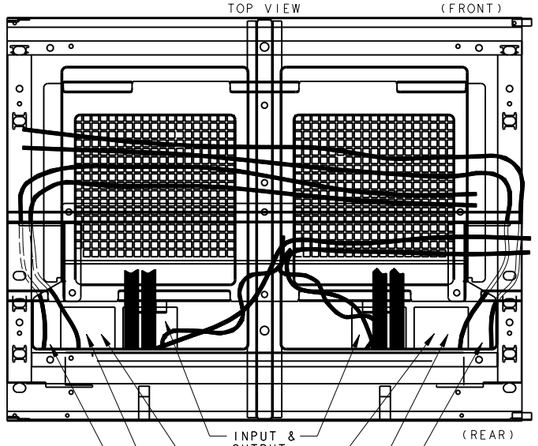
FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C22

MODEL NAME

D

CABLE ROUTING

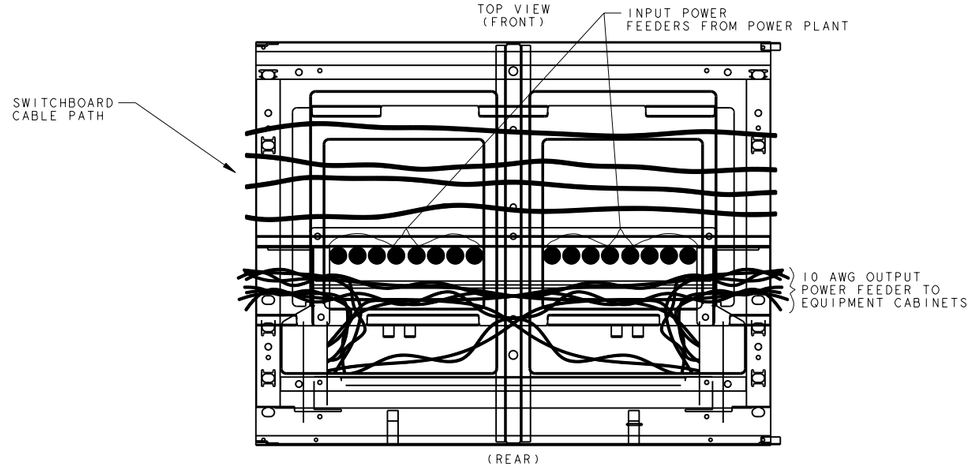


ED5D785-70, GROUP IA FRAME

FIG. C250

TOP VIEW OF PHASE I CABLE RACK (BLUE) OVER MISCELLANEOUS CABINET EQUIPPED WITH A DC DISTRIBUTION FUSE PANEL AND USED AS A POWER DISTRIBUTION CABINET.

CABLE ROUTING



ED5D785-70, GROUP IB FRAME

FIG. C260

TOP VIEW OF PHASE I CABLE RACK (BLUE) OVER GPDF.

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C23

MODEL NAME

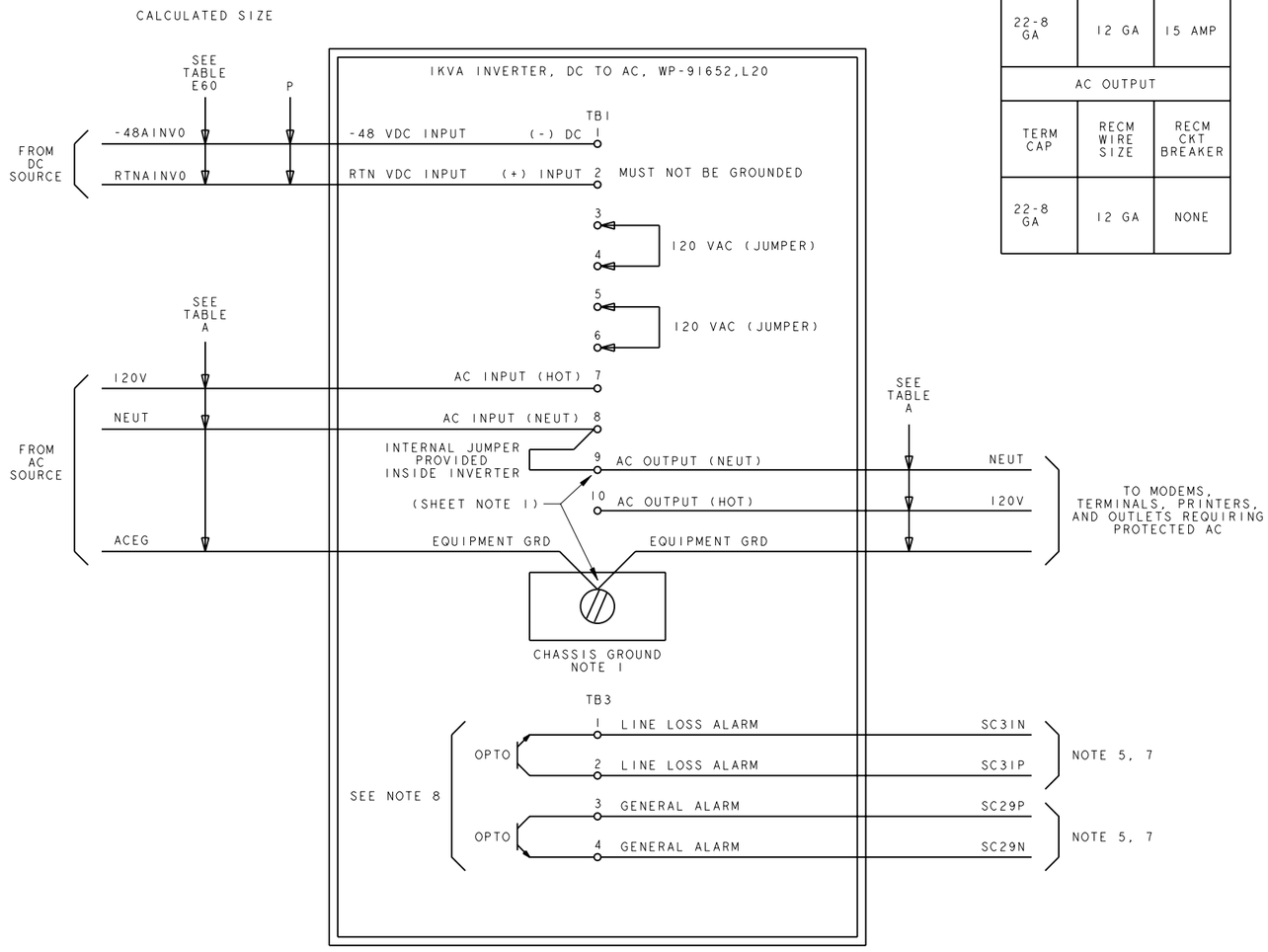


FIG. C270

1KVA INVERTER MOUNTED
IN THE 5ESS MISCELLANEOUS CABINET

DA - SEE FIG. C280

TABLE A

AC INPUT		
TERM CAP	RECM WIRE SIZE	RECM CKT BREAKER
22-8 GA	12 GA	15 AMP
AC OUTPUT		
TERM CAP	RECM WIRE SIZE	RECM CKT BREAKER
22-8 GA	12 GA	NONE

SHEET NOTES:

1. CHASSIS GROUND TERMINAL WILL BE USED AS EQUIPMENT GROUND (EG) FOR AC OUTPUT CIRCUIT IN ALL CASES WHERE AC INPUT WIRES TO INVERTER ARE ARE PROVIDED. THE NEUTRAL LEAD (NEUT) MUST NOT BE CONNECTED TO CHASSIS GROUND.

   FOR DC INPUT ONLY APPLICATION, THE INVERTER IS USED AS A SEPARATELY DERIVED SOURCE AND TERMINAL 9 (AC OUTPUT MEUTRAL) MUST BE CONNECTED TO THE CHASSIS GROUND TERMINAL.

2. THE SCREW-TYPE CONNECTIONS FURNISHED ON THE T.B. 1 ARE ACCEPTABLE FOR THIS APPLICATION IN LIEU OF STUDS AND COMPRESSION LUGS.

3. MAXIMUM TERMINAL CAPACITY IS 4 GAUGE. FOR LOOP LENGTH GREATER THAN 208 FEET SPLICE A LARGER GAUGE WIRE TO THE 4 GAUGE USING COMPRESSION PARALLEL TAPS.

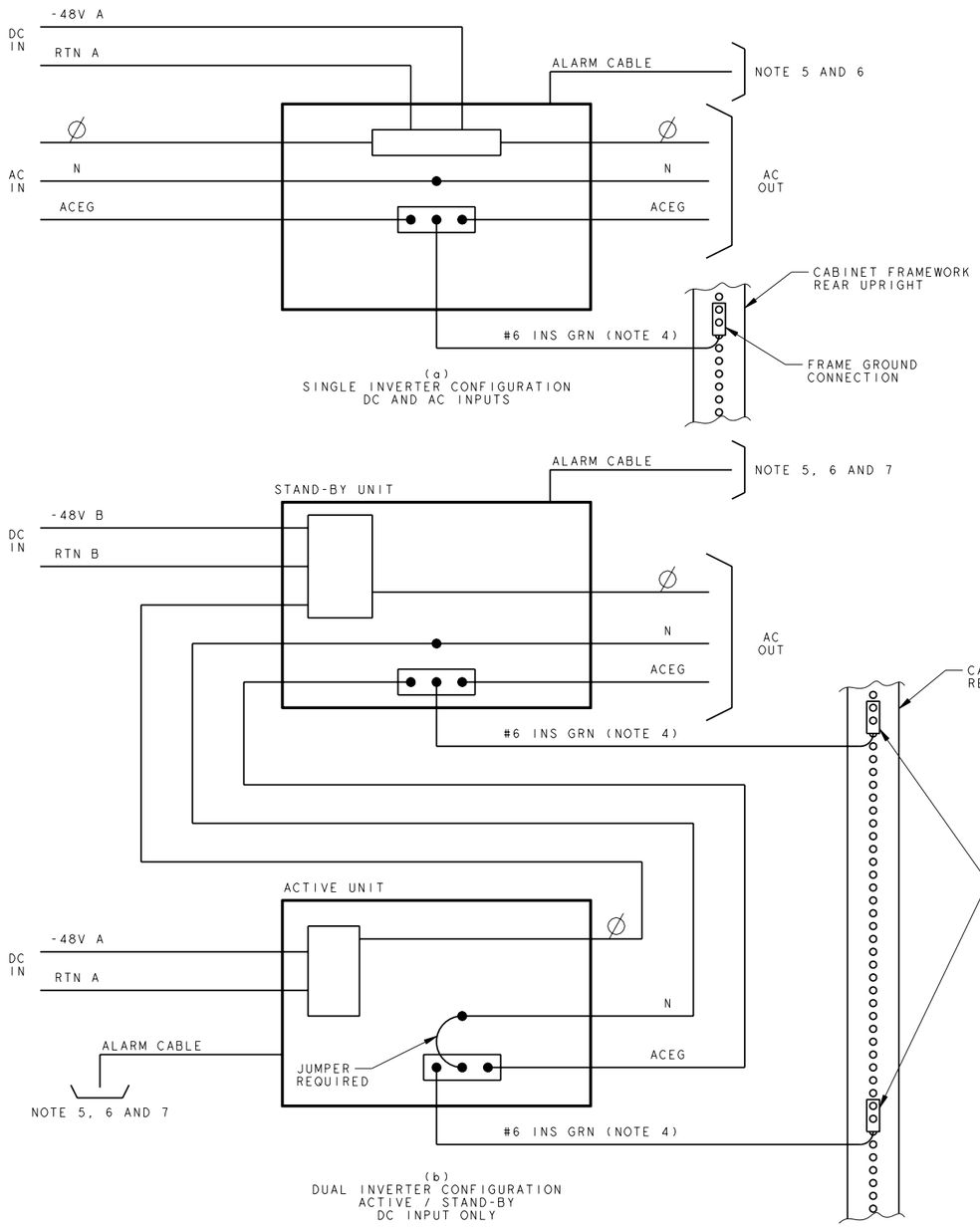
4. AC AND DC INPUT CIRCUIT BREAKERS ARE LOCATED AT THE POWER SOURCE.

5. THE "LINE LOSS ALARM" (AN OPTO- ISOLATOR CIRCUIT, NOT A RELAY CONTACT CLOSURE) IS CONNECTED AT THE OFFICE ALARM UNIT TI AN OUTPUT OF THE TN867 (USED AS A TIE POINT) AND THEN CONNECTED TO THE 3B20 IOP'S, PC01, TO PROVIDE THE SIGNAL INPUT TO SC31, INV XFER TO INDICATE INVERTER TRANSFER, DUE TO ITS LOSS OF COMMERCIAL POWER.

6. THE "GENERAL ALARM" (AN OPTO-ISOLATOR CIRCUIT, NOT A RELAY CONTACT CLOSURE) IS CONNECTED AT THE OFFICE ALARM UNIT TO AND OUTPUT OF THE TN867 (USED AS A TIE POINT AND THEN CONNECTED TO THE 3B20 IOP'S, PC01, TO PROVIDE THE SIGNAL INPUT TO SC29, INV FAIL, TO INDICATE A GENERAL FAILURE OF THE INVERTER.

7. SEE SD-5D008-01 FOR OFFICE ALARM INFORMATION AND SD-5D007-01 FOR ASSIGNMENT RULE INFORMATION ON SCAN POINTS.

8. OPTO-ISOLATORS ARE USED IN LIEW OF CONTACT CLOSURES TO PROVIDE ALARM INDICATOINS. THESE ARE RATED 60 VOLTS MINIMUM AND 16 MA MAXIMUM. POLARITY IS IMPORTANT.



(a)
SINGLE INVERTER CONFIGURATION
DC AND AC INPUTS

(b)
DUAL INVERTER CONFIGURATION
ACTIVE / STAND-BY
DC INPUT ONLY

FIG. C280

IKVA INVERTER (WP-93388)

MANUFACTURING NOTES

1. USE INVERTER INSTALLATION MANUAL FOR ADDITIONAL WIRING AND INSTALLATION INSTRUCTIONS.
2. UNLESS OTHER ARRANGMENTS ARE MADE, THE INVERTER(S) ARE MOUNTED IN THE 5ESS MISCELLANEOUS CABINET. SEE J5D005C-1 FOR ORDERING AND INSTALLATION INFORMATION.
3. WIRING INFORMATION:

	WIRE SIZE (AWG)	FUSE OR CB SIZE
AC INPUT	12	15 AMP
AC OUTPUT	12	NONE
DC INPUT	SEE TABLE E60	

4. ORDER FRAME GROUND KIT FROM ED4C686-70 GROUP 23.
5. 22 AWG TWISTED PAIR CABLE (2 WIRES) FOR ALARMS TO BE PROVIDED OF A JOB BASIS BY REGIONAL ENGINEER.
6. ALARM CABLE IS ROUTED TO THE OFFICE ALARM UNIT (OAU) VIA MDF. FOR RSM, ORM AND VCDX SYSTEMS. IN A 5ESS HOST OFFICE THE ALARM CABLE IS TERMINATED AT THE 3B21D IOP.
7. THE INVERTER ALARM INTERFACE IS AN ISOLATED CONTACT (FORM-C) TYPE.

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C25

MODEL NAME

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

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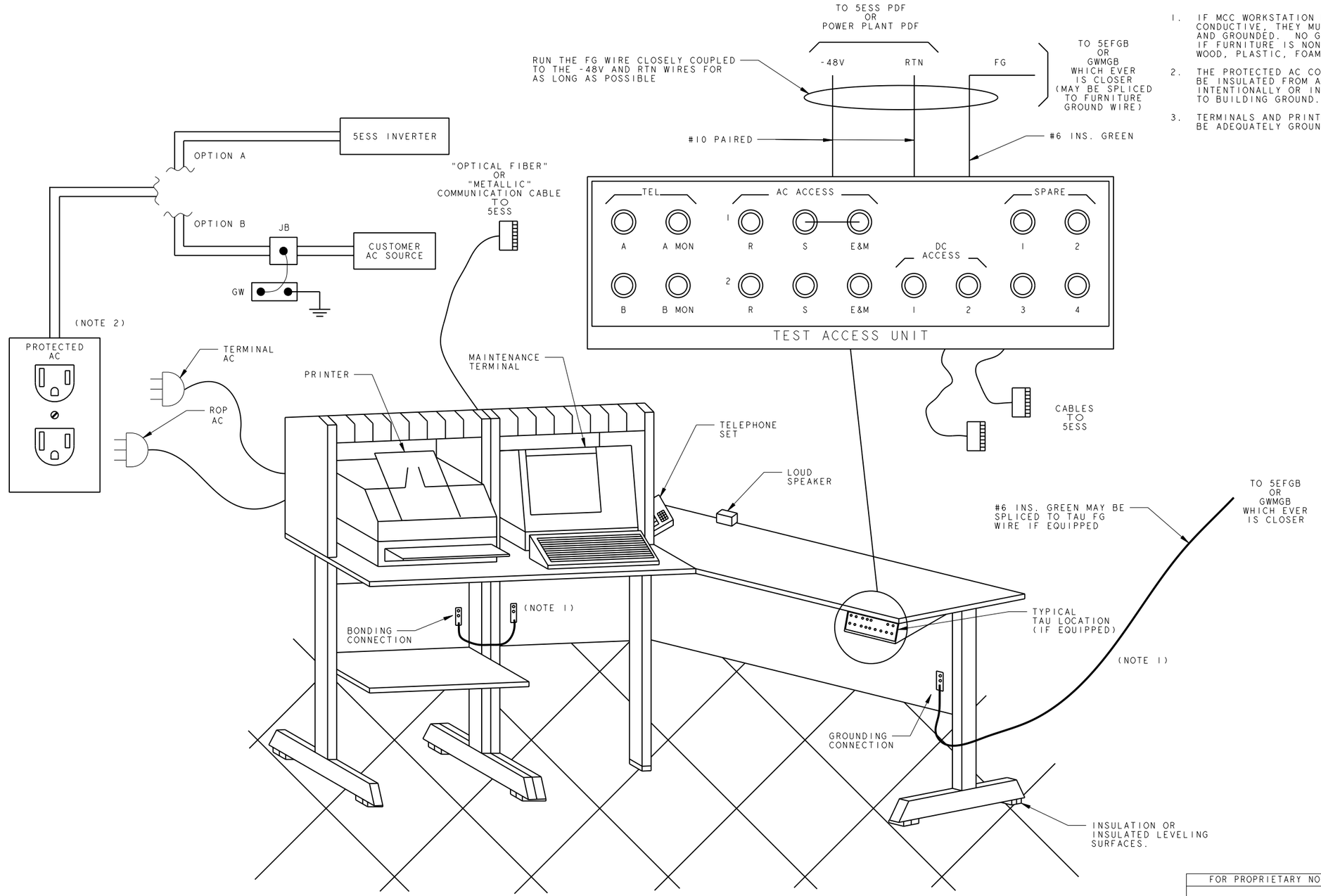


FIG. C290
TYPICAL MCC/TLWS CONSOLES ON ISOLATED GROUND PLANE
SEE FIGS. B150, B160 AND B170 FOR
AC DISTRIBUTION AND GROUNDING DIAGRAMS

SHEET NOTES

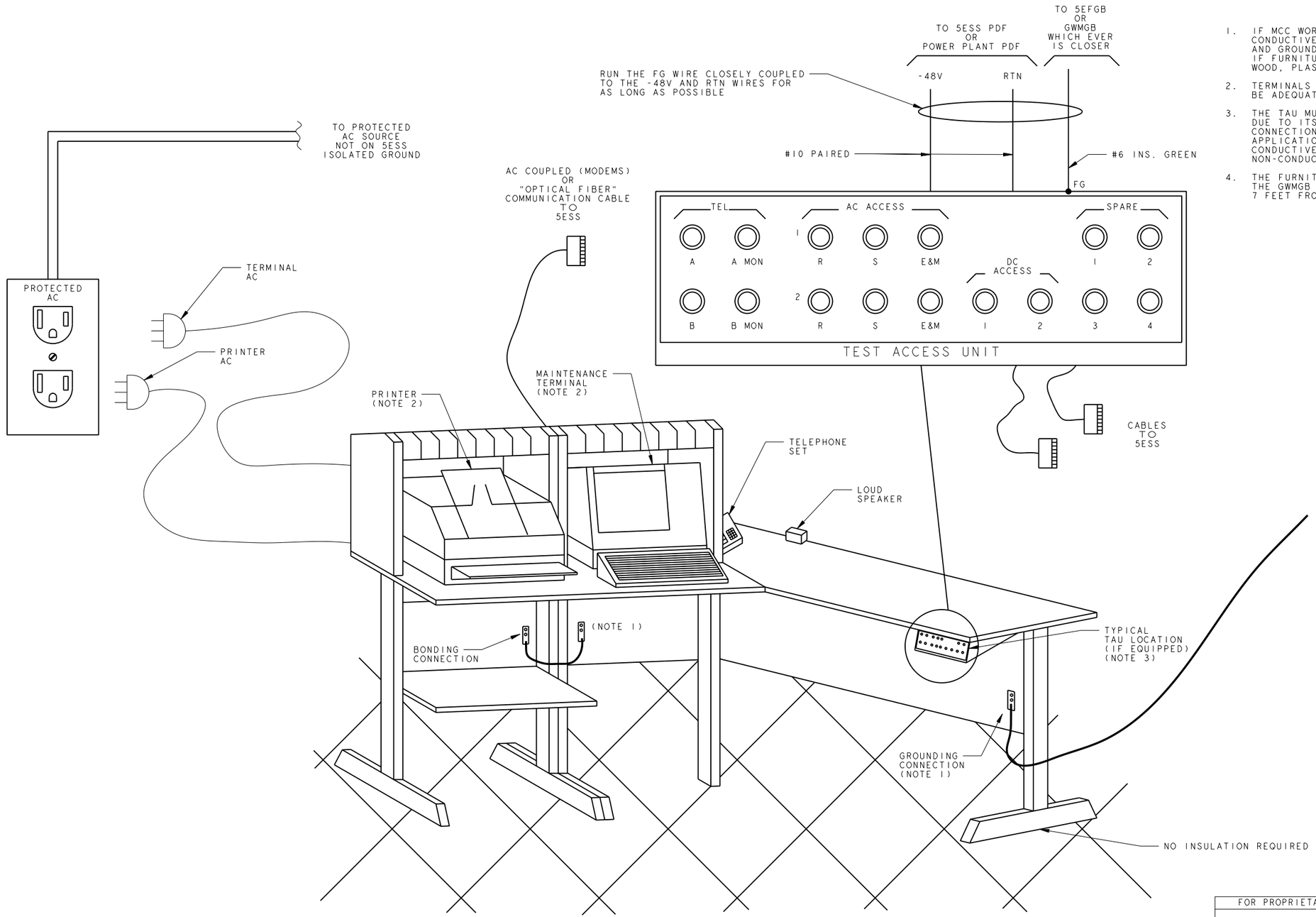
1. IF MCC WORKSTATION FURNITURE SURFACES ARE CONDUCTIVE, THEY MUST BE BONDED TOGETHER AND GROUNDED. NO GROUNDING IS NECESSARY IF FURNITURE IS NON-CONDUCTIVE, SUCH AS WOOD, PLASTIC, FOAM, CLOTH ETC...
2. THE PROTECTED AC CONDUIT AND OUTLETS MUST BE INSULATED FROM ANY CONDUCTIVE SURFACE INTENTIONALLY OR INCIDENTALLY CONNECTED TO BUILDING GROUND.
3. TERMINALS AND PRINTERS ARE ASSUMED TO BE ADEQUATELY GROUNDED BY THE ACEG WIRE.

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C26

MODEL NAME

ED5D805-10

PRO/E-EQEDFORM.FRM-FEB 96



SHEET NOTES

1. IF MCC WORKSTATION FURNITURE SURFACES ARE CONDUCTIVE, THEY MUST BE BONDED TOGETHER AND GROUNDED. NO GROUNDING IS NECESSARY IF FURNITURE IS NON-CONDUCTIVE, SUCH AS WOOD, PLASTIC, FOAM, CLOTH ETC...
2. TERMINALS AND PRINTERS ARE ASSUMED TO BE ADEQUATELY GROUNDED BY THE ACEG WIRE.
3. THE TAU MUST BE AT 5ESS GROUND POTENTIAL DUE TO ITS METALLIC COMMUNICATION CABLES CONNECTIONS WITH 5ESS EQUIPMENT. FOR THIS APPLICATION EITHER INSULATE THE UNIT FROM CONDUCTIVE FURNITURE OR MOUNT IT ON A NON-CONDUCTIVE SURFACE.
4. THE FURNITURE GROUNDING WIRE MUST GO TO THE GWMGB IF A TAU IS MOUNTED WITHIN 7 FEET FROM THE FURNITURE.

FIG. C300

TYPICAL MCC/TLWS CONSOLES ON INTEGRATED GROUND PLANE
SEE FIGS. B150, B160 AND B170 FOR
AC DISTRIBUTION AND GROUNDING DIAGRAMS

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C27

MODEL NAME

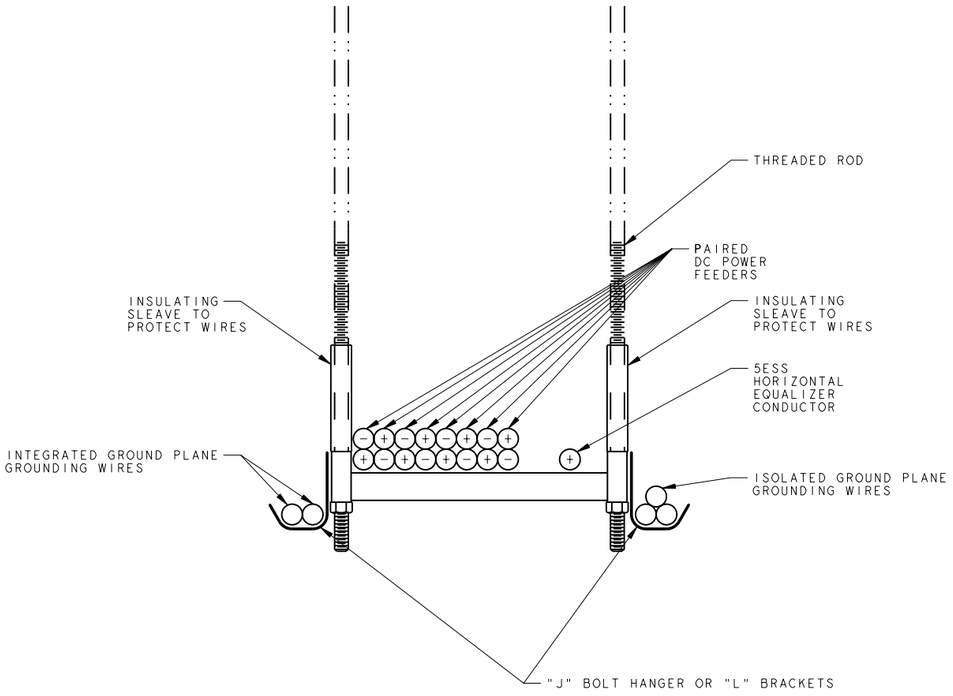


FIG. C310

METHOD OF ROUTING
POWER AND GROUNDING WIRES
IN LADDER TYPE CABLE RACK

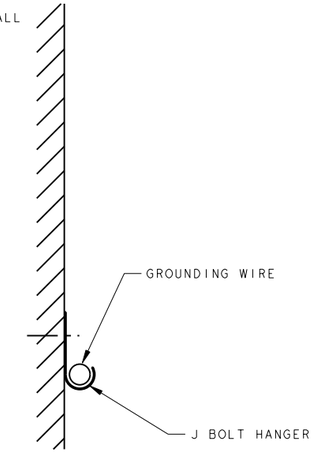


FIG. C320

METHOD OF ROUTING
GROUNDING WIRES
ALONG WALLS

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. C28

MODEL NAME

ED5D805-10

PRO/E-EQEDFORM.FRM-FEB 96

TABLE - E10

GROUNDING CONDUCTORS REQUIRING A 0.010 OHM MAX RESISTANCE	
GROUND CONDUCTOR LENGTH FEET (METERS)	GROUND CONDUCTOR SIZE AWG
0 - 25 (0 - 8)	6
26 - 100 (9 - 30)	1/0
101 - 120 (31 - 37)	2/0
121 - 160 (38 - 49)	3/0
161 - 200 (50 - 61)	4/0

TABLE - E20 AWG AND CORRESPONDING METRIC SIZE

	AREA AT 20 DEGREES C	
AWG	C MILS	MM SQUARE
16	2580	1.31
15	3260	1.65
14	4110	2.08
13	5180	2.63
12	6530	3.31
11	8230	4.17
10	10380	5.26
9	13090	6.63
8	16510	8.36
7	20820	10.55
6	26240	13.30
5	33090	16.77
4	41740	21.15
3	52620	26.67
2	66360	33.62
1	83690	42.41
1/0	105500	53.49
2/0	133100	67.43
3/0	167800	85.01
4/0	211600	107.26
	350000	177.39
	500000	253.35
	750000	380.13

THE FOLLOWING FORMULAS WERE TAKEN FROM THE 1996 NEC HANDBOOK (CHAPTER 9, PAGE 886), AND MAY BE USED TO APPROXIMATE THE CONVERSION BETWEEN CIRCULAR MIL AREA AND MM SQUARE:

1) C MILS = (MM SQ) x (1973.53)

2) $$\text{MM SQ} = \frac{(\text{C MIL})}{1973.53}$$

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TABLE - E30 RESISTANCE OF COPPER WIRE @ 25° C

AWG C mils	MILLIOHMS PER FOOT	
	TINNED	UNTINNED
10	1.08	1.04
8	0.678	0.652
6	0.427	0.411
4	0.269	0.258
3	0.213	0.205
2	0.169	0.162
1	0.134	0.129
1/0	0.106	0.102
2/0	0.084	0.081
3/0	0.0644	0.0642
4/0	0.052	0.051
250K	0.0432	0.0431
350K	0.032	0.031
500K	0.022	0.021
750K	0.0148	0.0144

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)

THIRD ANGLE PROJN

DWG SIZE C2

ISSUE 2

LUCENT TECHNOLOGIES

ED5D805-10

SHEET NO. E2

MODEL NAME

TABLE - E40 METHOD OF SIZING A DCEG CONDUCTOR

TO SELECT THE PROPER CONDUCTOR SIZE FOR A DCEG CONDUCTOR, APPLY THE FOLLOWING 3 TESTS AND CHOOSE THE RESULTING LARGEST SIZE CONDUCTOR:

1. #6 AWG MINIMUM

2. MATCH WIRE SIZE TO OPDR (OVERCURRENT PROTECTION DEVICE RATING) LISTED BELOW:

LARGEST OPDR UPSTREAM OF FRAME TO BE GROUNDED (AMPERES)	MINIMUM DCEG COPPER CONDUCTOR SIZE (AWG)
UP TO 200	6
300	4
400	3
500	2
600	1
800	1/0
1000	2/0
1200	3/0
1600	4/0

3. THE FOLLOWING FORMULA TAKES GROUNDING PATH LENGTH INTO CONSIDERATION AND ENSURES A LOW RESISTANCE PATH FOR FAULT CURRENT -

$$Rmax = \frac{(0.9) \times (Vnom)}{(10) \times (OPDR)}$$

WHERE: Rmax = MAXIMUM GROUND PATH RESISTANCE

Vnom = POWER SOURCE NOMINAL VOLTAGE e.g. 24, 48, 140 etc.

OPDR = RATING OF OVERCURRENT PROTECTION DEVICE UPSTREAM OF FRAMEWORK TO BE GROUNDED.

EXAMPLE:

GROUNDING WIRE LENGTH = 100 FT
OPDR = 200 AMP CIRCUIT BREAKER
Vnom = -48V

$$Rmax = \frac{(0.9) \times (Vnom)}{(10) \times (OPDR)} = \frac{-43.2V}{(10) \times (200A)} = \frac{-48v}{2000A}$$

$$= 0.022 \text{ OHMS}$$

THUS, THE MAX RESISTANCE FOR THE TOTAL LENGTH IS 0.022 OHMS, OR 22 MILLIOHMS.

$$\frac{0.022 \text{ OHM}}{100 \text{ FEET}} = 0.00022 \text{ OHM/FOOT}$$

$$= 0.22 \text{ MILLIOHM/FOOT}$$

FROM TABLE E30 SELECT A WIRE WITH A RESISTANCE OF 0.22 MILLIOHM PER FOOT OR LESS.

FROM TABLE E30 A 3 AWG WIRE IS SUFFICIENT FOR THIS APPLICATION. HOWEVER IT IS NOT A STANDARD SIZE, THEREFORE A 2 AWG MAY BE NECESSARY.

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)

THIRD ANGLE PROJN

DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES | ED5D805-10 | SHEET NO. E3

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TABLE E50

INFORMATION FOR PROPER FUSE ALLOCATION FOR THE PCFD (J86334D-1) POWER DISTRIBUTION FRAME (PDF) FUSE PANELS - USING MODIFIED 30B FUSE BLOCKS.

POWER DISSIPATION

74F FUSE	
LI BUSY HOUR AMPS	WATTAGE DISSIPATED IN 74F FUSE
1 AMP	.01 WATTS
2 AMP	.02 WATTS
3 AMP	.05 WATTS
4 AMP	.09 WATTS
5 AMP	.16 WATTS
6 AMP	.22 WATTS
7 AMP	.32 WATTS
8 AMP	.41 WATTS
9 AMP	.55 WATTS
10 AMP	.70 WATTS
11 AMP	.80 WATTS
12 AMP	1.05 WATTS
13 AMP	1.25 WATTS

30 B BLOCK BUS BAR	
LI BUSY HOUR AMPS	WATTAGE DISSIPATED IN 74F FUSE
5 AMP	.004 WATTS
10 AMP	.015 WATTS
15 AMP	.033 WATTS
20 AMP	.059 WATTS
25 AMP	.093 WATTS
30 AMP	.133 WATTS
35 AMP	.181 WATTS
40 AMP	.237 WATTS
45 AMP	.300 WATTS

FUSE ALLOCATION GUIDE

THE FOLLOWING COMBINATIONS OF FEEDER AMPS ARE ACCEPTABLE. BEING WITHIN THE 45 AMP AND 3.48 WATT LIMITS (3.78 WATTS MINUS .300 WATTS FOR BUS BAR LOSSES)

FEEDERS	LIST I AMPERES (BUSY HOURS)								
FIRST	13A	13A	13A	13A	13A	13A	13A	12A	12A
SECOND	13A	13A	13A	12A	12A	12A	11A	12A	11A
THIRD	11A	10A	9A	11A	10A	9A	10A	10A	11A
FOURTH	5A	6A	8A	7A	8A	9A	10A	10A	11A
TOTALS AMPS	42A	42A	43A	43A	43A	43A	44A	44A	45A
TOTAL WATTS	3.46W	3.42W	3.46W	3.42W	3.41W	3.40W	3.45W	3.50W	3.45W

EXAMPLES OF FUSE ALLOCATION

EXAMPLE NO. 1

FIRST FUSE	13 AMPS	1.25 WATTS	
SECOND FUSE	13 AMPS	1.25 WATTS	
THIRD FUSE	5 AMPS	.16 WATTS	
FUSE TOTAL	31 AMPS	2.66 WATTS	
PLUS BUS BAR WATTAGE		.13 WATTS	
TOTALS	31 AMPS	2.79 WATTS	ACCEPTABLE

EXAMPLE NO. 2

FIRST FUSE	13 AMPS	1.25 WATTS	
SECOND FUSE	13 AMPS	1.25 WATTS	
THIRD FUSE	11 AMPS	.80 WATTS	
FOURTH FUSE	8 AMPS	.41 WATTS	
FUSE TOTAL	45 AMPS	3.71 WATTS	
PLUS BUS BAR WATTAGE		.30 WATTS	
TOTALS	45 AMPS (OK)	4.01 WATTS (TOO HIGH)	ACCEPTABLE

EXAMPLE NO. 3

FIRST FUSE	12 AMPS	1.05 WATTS	
SECOND FUSE	12 AMPS	1.05 WATTS	
THIRD FUSE	11 AMPS	.80 WATTS	
FOURTH FUSE	11 AMPS	.80 WATTS	
FUSE TOTAL	46 AMPS	3.70 WATTS	
PLUS BUS BAR WATTAGE		.30 WATTS	
TOTALS	46 AMPS (OK)	4.00 WATTS (TOO HIGH)	ACCEPTABLE

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS (P)

THIRD ANGLE PROJN

DWG SIZE C2 | ISSUE 2

LUCENT TECHNOLOGIES | ED5D805-10 | SHEET NO. E4

MODEL NAME

SHEET NOTES: (CONT'D.)

4. THE -48VA AND -48VB FEEDER WILL NOT BE CARRING CURRENT SIMULTANEOUSLY. EITHER THE "A" FEEDER OR THE "B" FEEDER MAY BE ON AT ANY GIVEN TIME.
5. CURRENT DRAIN FOR WP-93388 INVERTER WAS MEASURED AT 100 LOAD (8.3A, 840W, 0.84 POWER FACTOR).

SHEET NOTES:

1. LIST 1 (L1) @ 51.0V, LIST 2 (L2) @ 39.5V MEASURED AT BACKPLANE OF LOAD CIRCUIT.
2. INVERTER CURRENT DRAIN WAS DERIVED FROM INVERTER SPECIFICATIONS AT MAX OUTPUT LOAD OF 90 PERCENT CAPACITY. 80 PERCENT EFFICIENCY IS ASSUMED.
3. MAXIMUM TERMINAL CAPACITY IS 4 GAUGE FOR ONE WAY LENGTH GREATER THAN 123 FT, SPLICE A LARGER GAUGE WIRE TO THE 4 GAUGE USING COMPRESSION PARALLEL TAPS.

TABLE - E60 -48V DC POWER DISTRIBUTION REQUIREMENTS (NOTE 1)

LOAD EQUIPMENT			FEEDER INFORMATION				CURRENT DRAIN		POWER DISTRIBUTION REQUIREMENTS		POWER CONSUMPTION PER CABINET				POWER SOURCE		ADDITIONAL INFORMATION	
ITEM			FEEDER DESIG	FEEDER DESTINATION IDENTIFIER OR EQL	MINIMUM FEEDER SIZE (AWG)	FEEDER LUG TERMINAL AT LOAD END	FEEDER AMPS		FEEDER VOLT DROP MAX (L2)	MAX ONE WAY FEEDER LENGTH (FT)	TOTAL CABINET AMPS		TOTAL (L1) POWER (WATTS)	TOTAL (L1) BTU/HRS	POWER SOURCE EQUIPMENT	CB OR FUSE SIZE (AMP)	FIG.	REMARKS
	DESIG	DESCRIPTION					L1	L2			L1	L2						
1	INV	WP91652,L20 1KVA INVERTER (DA)	-48VA	TB1	8 6 4	SCREW TYPE	23.5	30.6	2.0	49 78 123 (NOTE 3)	23.5	30.6	1198	4097	TYPICAL DC POWER PLANT DISTRIBUTION PANEL	50 MAX 35 MIN	C270	NOTES 2, 3
2	INV	WP-93388 1KVA INVERTER SINGLE CONFIG.	-48VA		8 6 4 2 1/0	SCREW TYPE	19.7	25.4	2.0	58 93 148 235 374	19.7	25.4	1004.7	3436		50 MAX 35 MIN	C280 (a)	NOTES 1, 4, 5
3	INV	WP-93388 1KVA INVERTER DUAL INV. CONFIG.	-48VA		8 6 4 2 1/0	SCREW TYPE	19.7	25.4	2.0	58 93 148 235 374	19.7	25.4	1004.7	3436		50 MAX 35 MIN	C280 (b)	NOTES 1, 4, 5
			-48VB		8 6 4 2 1/0		19.7	25.4	2.0	58 93 148 235 374								

PRO/E-EQEDFORM.FRM-FEB 96

ED5D805-10

FOR PROPRIETARY NOTICE SEE SHEET A1

5ESS SWITCHING EQUIPMENT SPECIFICATIONS FOR POWER DISTRIBUTION AND GROUNDING METHODS Ⓟ	THIRD ANGLE PROJN	
	DWG SIZE C2	ISSUE 2
LUCENT TECHNOLOGIES	ED5D805-10	SHEET NO. E5

MODEL NAME