

**5ESS® SWITCHING EQUIPMENT
DC POWER DISTRIBUTION
CIRCUIT**

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1. GENERAL DESCRIPTION

1.1 PURPOSE OF CIRCUIT

This circuit provides specifications and other information for the distribution of -48 volt DC power in a 5ESS® switch. Areas covered include distribution between the six -48 volt power plants and the power distribution (PD) frame, between the PD frame and the various equipment frames, and within the equipment frames themselves (including frame filters and frame fuse panels).

1.2 GENERAL DESCRIPTION OF OPERATION

The basic power required by the 5ESS® switch is -48 volts DC. This power is obtained from the power plants, which generate the -48 volt DC by rectifying and filtering commercial AC power. The power plants not only provide the power for the 5ESS® switch, but also maintain a full charge on the office reserve batteries. The -48V DC from the power plant is distributed, through large feeders, to power distribution frames, where many fuse positions are furnished to power the smaller feeders at each equipment frame. At this point, a dual (redundant) bus system to the equipment frames is established to provide system reliability. Each equipment frame receives the required quantity and type (A or B bus) of frame feeders from the PD frame. These frame feeders are fed through frame filters in the base of the frame to the frame fuse panel, which supplies many relatively low-current fuse positions to power the various equipment units in each frame.

2. DETAILED DESCRIPTION

2.1 CIRCUIT AND PHYSICAL ARRANGEMENT

A 131A power plant, rated at 70 amperes output (functional schematic [FS1]) and a 133A plant, rated at 140 amperes output (FS2), are used by the 5ESS® switch that does not include a 3B processor. Typically, this application is a 5ESS® switch configured as a remote switching module (RSM), which does not require a power distribution frame. A 151C plant, rated at 600 amperes output (FS3), a 153A plant, rated at 1200 amperes (FS4), a 155A plant, rated at 2400 amperes (FS5), and a Lineage 2000 MCS plant rated at 3200 amperes output (FS51) are shown for a 5ESS® switch installation that includes a 3B processor. Application specifications for all of these power plants are shown on the schematic drawing (SD).

The lineage power plant (400 amperes) is depicted in FS69.

The power plant (ECS 2000) used with the auxiliary work station (AWS) is shown in FS111.

Power distribution frame J86334B, used with 150 series power plants, is shown on FS6, together with specifications for use of the frame in the 5ESS® switch. Power distribution cabinet J86334D is also used with the 150 series and Lineage 2000 power plants. It is shown in FS33, together with the specification for use of the cabinet in a 5ESS® switch.

FS48, FS49, and FS50 depict cell switching mechanisms used to keep load bus voltage within specified limits as batteries discharge and the terminal voltage decreases.

When powering up the feeder to an equipment frame, first insert the charging probe assembly in to the fuse block position for that feeder. This probe applies a constant current into the feeder circuit to charge up the equipment frame filter capacitor for that feeder. Then, quickly replace the probe with a 20 ampere 74F fuse, before the frame filter discharges appreciably.

Grounding specifications and arrangements for the single point ground function bar system are provided in FS7 and FS8. This data is applicable to all 5ESS® switch installations.

Power arrangements for specific equipment frames are given in the various FSs, including:

FS9	Time Multiplex Switch Cabinet,7ft	J5D001B
FS10	Line Trunk Frame	J5D003A
FS11	Supplementary Line Trunk Frame	J5D003B
FS12	Interface Module Control Cabinet,7ft	J5D003C
FS13	Line Trunk Peripheral Cabinet,7ft.	J5D003D
FS14	Miscellaneous Frame	J5D005A
FS15	Miscellaneous Cabinet,7ft.	J5D005B
FS16	Message Switch Frame	J5D003C
FS17	Message Switch Cabinet,7ft.	J5D006B
FS18	Maintenance Control Center Control	ED-5D039-35
FS19	Main Distributing Frame	
FS20	Protected AC Inverter	KS-20816-L1A
FS33	Power Distribution Cabinet,6ft.	J86334D
FS34,35	Time Multiplex Switch Cabinet,6ft.	J5D001C
FS36	Maintenance Control Center Cabinet,6ft.	J5D002A
FS37	Line Trunk Peripheral Cabinet,6ft.	J5D003F
FS38	Interface Module Control Cabinet,6ft.	J5D003E
FS39,40	Message Switch Cabinet,6ft.	J5D006C
FS45	Message Switch Cabinet,7ft.	J5D006B
FS46,47	Miscellaneous Cabinet,6ft.	J5D005C
FS54	Supplementary Trunk Line Work Station	J5D002B
FS55	MCC TLWS	J5D002C-1
FS56	Supplementary Trunk Line Work Station	J5D002D-1
FS57,58	CM2, Bay 5 and 6	J5D002A-1
FS59,60	CM2, Bays 0-4 and Bays 7-11	J5D020B-1
FS61	Miscellaneous Cabinet,6ft. for RSMs	J5D005C
FS62	SMC,6ft.	J5D003E
FS63,64	LTP Cabinet	J5D003F
FS65,66,67		J5D003F
FS68	Transmission Facility Cabinet	J1C251A
FS70	Peripheral Interface Cabinet	J1C215-1
FS71	Ring Node Cabinet	J3F011C-1
FS72	Digital Facility Access Cabinet	J3F010B
FS73	Analog Facility Access Frame	J3F009A-1
FS74,75	SMC Cabinet	J5D003L
FS76,77,78		J5D003L
FS81	DATAKIT II Virtual Circuit Switched (VCS) Highgate circuit six-foot six inch cabinet	J1P1868-1
FS82,83	3B20D Model 3 Small Computer systems interface Disk Cabinet (SDC) equipped with 5-1/4 inch Small Computer Systems Interface (SCSI) Disk Drives	J3T027A-1
FS85	Line Trunk Peripheral (LTP)	J5D003F-2

FS86	Cabinet equipped with J5D003FJ-1 MFFU, 2A and 2B feeders LTP Cabinet equipped with J5D003FJ-1 MFFU, 5A and 1B feeders	J5D003F-2
FS87	LTP Cabinet equipped with J5D003FJ-1 MFFU, 1A and 4B feeders	J5D003F-2
FS88	LTP Cabinet equipped with J5D003FJ-1 MFFU, 4A and 5B feeders	J5D003F-2
FS89	LTP Cabinet equipped with J5D003FJ-1 MFFU, 7A and 2B feeders	J5D003F-2
FS90	LTP Cabinet equipped with J5D003FJ-1 MFFU, 2A and 7B feeders	J5D003F-2
FS91	LTP Cabinet equipped with J5D003FJ-1 MFFU, 5A and 5B feeders	J5D003F-2
FS92	LTP Cabinet equipped with J5D003FJ-1 MFFU, 9A and 1B feeders	J5D003F-2
FS93	LTP Cabinet equipped with J5D003FJ-1 MFFU, 1A and 9B feeders	J5D003F-2
FS94	Switching Module Control (SMC) cabinet equipped with J5D003FJ-1 MFFU, 2A and 2B feeders	J5D003L-1
FS95	SMC cabinet equipped with J5D003FJ-1 MFFU, 2A and 4B feeders	J5D003L-1
FS96	SMC cabinet equipped with J5D003FJ-1 MFFU, 2A, 2B, 1A, and 1B feeders	J5D003L-1
FS97	SMC cabinet equipped with J5D003FJ-1 MFFU, 2A, 2B, and 2A feeders	J5D003L-1
FS98	SMC cabinet equipped with J5D003FJ-1 MFFU, 2A, 2B, 2A, and 2B feeders	J5D003L-1
FS99	SMC cabinet equipped with J5D003FJ-1 MFFU, 2A, 2B, and 4A feeders	J5D003L-1
FS100	SMC cabinet equipped with J5D003FJ-1 MFFU, 2A and 6B feeders	J5D003L-1
FS101	Miscellaneous Cabinet equipped with J5D003FJ-1 MFFU, 2A and 2B feeders	J5D005C-1
FS102	Modem Pooling Cabinet equipped with J5D003FJ-1 MFFU, 1A and 1B feeders	J5D007B-1
FS103	Communication Module 2 (CM2) single fabric cabinet equipped with J5D003FJ-1 MFFU, 6A feeders	J5D020A,B
FS104	CM2 single fabric cabinet equipped with J5D003FJ-1 MFFU, 6B feeders	J5D020A,B
FS105	Export Data set cabinet equipped with J5D003FJ-1 MFFU, 1A and 1B	J5X099A-1

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FS106	feeders Digital Conferencing and Switching System (DCSS) cabinet equipped with J5D003FJ-1 MFFU, 2A and 2B feeders	J5X101A-1
FS107	3B21D basic cabinet equipped with J5D003FJ-1 MFFU, 6A and 6B feeders	J3T060A-1
FS108		J5D003N-0
FS109	SMC2000 Cabinet equipped with J5D003FJ-1 MFFU	
FS110	Enhanced 911 power diagram	

Information regarding the protected AC inverter is included on FS20, FS79, and FS84. FS80 represents a job condition arrangement to eliminate the requirement for 177V power from power service cabinet 19 or the 23 relay rack.

FSs pertaining to power distribution of the 3B processor frames include:

FS21,22	3B Processor frame.
FS23,24	3B Processor Peripheral Control frame.
FS25,26,27	3B Processor Peripheral Control frame.
FS28,29	3B Processor Control cabinet.
FS30,31	3B Processor Moving Head Disk, 7ft.
FS32	Tape Unit frame cabinet, 7ft.
FS41,42	3B Processor Control Cabinet 6ft.
FS43	Disk Power Control Cabinet 6ft.
FS44	Tape Unit Frame with cabinet assembly, 6ft.
FS52,53	Model 3 Tape/Disk cabinet, 6ft.
FS82,83	3B20D Model 3 SCSI Disk cabinet SDC equipped with 5 1/4 inch SCSI Disk drives.

Power specifications for the test talk facilities on the main distributing frame are supplied on FS19.

To facilitate maintenance of the various power feeders, see the lead designation mnemonics in information notes 304 and 305. These notes also standardize the naming of the feeders, indicate which bus (A or B) sequential order, and indicate the feeder outage. Typical powering diagrams are included in information notes 306 and 307.

Information note 308 furnishes power distribution feeder data for each equipment frame and cabinet, including the using circuit (SD) numbers, current drains (List 1 for busy hour and List 2 for peak), feeder sizes and loop lengths, and total frame drains for fully equipped frames. As a reference, similar information is included for 3B processor frames, although standard documentation applying specifically to the frames is in control in the event of a conflict.

Information note 309 provides voltage specifications and allowable voltage drop specifications in feeders.

Information note 310 provides fuse assignment table worksheets for use as required for 131 and 133 type power plants.

Information note 311 covers power feeder assignments for the power distribution frame, as well as work sheets for engineering an installation of a 5ESS® switch.

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- Information note 312 covers power feeder assignments for the 5ESS® in six foot cabinets.
- Information note 313 covers power feeder assignments for the 3B processor in six foot cabinets.
- Information note 314 covers power feeder assignments for the 3B processor, power distribution cabinets, and 5ESS® switch, all in seven foot cabinets.
- Information note 315 covers power feeder assignments for the 3B processor, power distribution cabinets, and 5ESS® switch, all in six foot cabinets.
- Information note 316 covers typical six foot cabinet powering except for the miscellaneous cabinet J5D005C.
- Information note 317 covers typical six foot cabinet powering for the miscellaneous cabinet J5D005C, bay 0.
- Information note 318 covers typical six foot cabinet powering for the miscellaneous cabinet J5D005C, bay 1.
- Information note 319 covers typical six foot cabinet powering for interface module control cabinets.
- Information note 320 covers typical seven foot frame powering for the message switch frame, J5D006AS.
- Information note 321 covers calculation of feeder sizes.
- Information note 322 covers feeder requirements for unusual floor plan arrangements.
- Information note 323 covers wattage limitations in power distribution cabinets.
- Information note 324 cover power feeder input into power distribution cabinet.
- Information note 325 covers unusual installations where the ESS™ ground window is remotely located.
- Information note 326 covers typical feeder assignments for the 3B20D model 3 processor.
- Information note 327 covers the power distribution frame/cabinet fuse assignment log book page.
- Information notes 328-331 show typical assignments for communication module (CM2).
- Information note 332 illustrates the bonding of PD frames.
- Information note 333 illustrates labels required for R.N. fuse filter panels.

2.2 ALARMS AND ALARM TESTING

Alarms for power plants are covered in the power plant documentation and in the office alarm circuit, SD-5D008-01. Alarms from the power distribution frame are connected to the 3B processor through the main distributing frame. Alarms from each equipment frame fuse panel are covered in the schematic drawings (SDs) applicable to the particular frame.

3. REFERENCE DATA**3.1 WORKING LIMITS**

Working limits for supply voltages and voltage drops are provided in the circuit, equipment, and information notes of the SD.

3.2 FUNCTIONAL DESIGNATIONS

Function designations are specified in the equipment notes.

CIRCUIT DESCRIPTION

CD-5D005-01

RISLU	Remote Integrated Service Line Unit
RN	?
RSM	Remote Switching Module
SCSI	Small Computer Systems Interface
SD	Schematic Drawing
SDC	Small Computer Systems Interface Disk Cabinet
SMC	Switching Module Control
SMC2000	Switching Module Control Module 2000
TLWS	Trunk Line Work Station
VCS	Virtual Switched Circuit

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