5ESS™ SWITCHING EQUIPMENT

+48V DC POWER DISTRIBUTION CIRCUIT

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit provides fusing and distribution of +48V for all equipment units that are located in 5ESS. This circuit provides an electrical alarm signal and a visual indicator whenever any fuse operates.

2. GENERAL DESCRIPTION OF OPERATION

2.01 The nominal power input to the circuit is -48 volts, with the return (RTN) isolated from frame ground in the equipment cabinet. Each circuit is fed from at least two 20-amp fuses in the power distribution cabinet; each fuse powers just one DC-DC converter as a part of the 662A plant, to derive +48V power from -48V. The outputs of all the converters are connected in parallel to form an output +48V bus. This bus then feeds a "0" distribution bus and a "1" distribution bus in the J5D003AJ-1 fuse panel. Each using circuit in the 5ESS switch receives its +48V power from both buses and separate fuses as required, to satisfy reliability constraints. Additional converters are added to the 662A plant as required, to supply the needed current. One extra converter is always provided, for reliability. Extra fuse panels are added as required.

SECTION II - DETAILED DESCRIPTION

1. CIRCUIT AND PHYSICAL ARRANGEMENT

1.01 FS 1 The basic power plant is the 662A plant. The minimum installation is one converter panel equipped with 1 load converter and 1 spare load converter. The input to each converter is fused independently, with the first converter on the "0" or "A" bus and the other on the "1" or "B" bus in the Power Distribution Cabinet. As output load currents require, additional converter panels are added, up to a total of 3, to reach the ultimate capacity of the 662A plant (11.5 amperes of +48V). Fuses for the growth panels should be fed from different panels in the Power Distribution Cabinet, or even different Power Distribution Cabinets, for added reliability.

1.02 FS 2 The outputs of all +48V converters are connected together in the 662A plant to form the master +48V bus. Individual Fuse Panels per J5D003AJ-1 obtain +48V power from this bus via two sets of connections. The "0" side of the fuse panel connects to this master bus, and the "1" side also connects to it independently. A total of 24 "0" fuses and 24 "1" fuses are available on each fuse panel. A typical unit requiring +48V power will be assigned to one fuse on each bus, or as required. Fuse panels are added as required to meet the total system requirements for +48V power; the probable maximum number is five panels, as limited by the total current drain available from the 662A plant.

2. ALARMS

2.01 FS 3 All fuse alarms within any given fuse panel are tied together and sent as the FA lead back to the FA lead of the 662A Plant. The Fuse Alarm (FA) relay in this plant is normally energized. When any fuse blows in any fuse panel, +48V is sent over the FA lead to the 662A plant. The FA relay then has the same +48V potential on either side of its coil, so it drops open. When the relay is open, it closes contacts to the major (PMJ), minor (PMN), major visual (PMJV) and minor visual (PMNV) alarms. These alarms are assigned to scan points on a job basis in each office, and provide the information to the MCC video terminal that a +48V fuse has blown.

3. ALARM TESTING

3.01 Alarms may be tested by inserting a blown fuse in any fuse panel position. The red 662A plant Fuse Alarm (FA) LED should light, and the appropriate information should be received at the MCC video terminal. The FA LED at the top (front and rear) of the Miscellaneous Cabinet also should light. Note that all +48V fuse panels are to be located in the same Miscellaneous Cabinet that mounts the 662A plant, to simplify craft maintenance procedures.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01

Battery Symbol	Voltage Range
-48V	-42.75 to -52.5V
+48V	+48.0 to +50.0V

2. FUNCTIONAL DESIGNATIONS

2.01

Designation	Voltage	Bus	Meaning
-48A	-48	A	-48V input, "A" bus

Designation	Voltage	Bus	Meaning
-48B	-48	B	-48V input, "B" bus
GRDA	-	-	Ground for -48V bus A
+48	+48	-	Either 0 or 1 bus in 662A Plant
GRD	RTN	-	Return for +48 in 662A Plant
+48V0	+48	0	+48 volt for 0 bus in fuse panel
RTN0	RTN	0	Return for 0 bus in fuse panel
+48V1	+48	1	+48 volt for 1 bus in fuse panel
RTN1	RTN	1	Return for 1 bus in fuse panel
FA	-	-	Fuse alarm in fuse panel or in 662A plant
PMNV	-	-	Power Minor Visual Alarm
PMN	-	-	Power Minor Alarm
PMJ	-	-	Power Major Alarm
PMJV	-	-	Power Major Visual Alarm
PMNR	-	-	Power Minor Alarm Return
PMNVR	-	-	Power Minor Visual Alarm Return
PMJR	-	-	Power Major Alarm Return
PMJVR	-	-	Power Major Visual Alarm Return

3. FUNCTIONS

3.01 Provides equipment load fusing for up to 24 circuit 0 loads and up to 24 circuit 1 loads per fuse panel.

3.02 Provides visual and electrical fuse alarm indications for each bus.

3.03 Provides alarm circuit testing capability.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a keysheet, the connecting information thereon is to be followed:

(a) Fuse/Filter Panel Unit J5D003AJ-1.

(b) Appropriate 5ESS Cabinet Schematic Drawing.

(c) Appropriate 5ESS Equipment Unit Schematic Drawings.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 None.

6. ALARM INFORMATION

6.01 Electrical alarm signal indications are sent to the 5ESS switch scanner (a job assignment). The alarm condition is indicated on the MCC video terminal.

7. TAKING EQUIPMENT OUT OF SERVICE (TEOS)

7.01 Any group of 24 load fuses can be taken out of service by first powering down all equipment units using those fuses (in accordance with system operational guidelines). Then the power feed for that half of the fuse panel may be disconnected. For some equipment units that are duplicated, only one side of the unit may need to be powered down; then fuse panel fuses may be removed as required.

7.02 To power up a circuit requiring +48 volt power, ensure that the side of that unit is powered down.

Insert the appropriate +48V fuse, and power up the unit using standard procedures.

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