CIRCUIT DESCRIPTION

CD-82447-01
ISSUE 1
APPENDIX 1B
DWG ISSUE 2B
DISTN CODE 1M01

POWER SYSTEMS
CHARGE AND DISCHARGE CIRCUIT
48 VOLTS, 600 AMPS
100 TYPE PLANTS
151C POWER PLANT

CHANGES

A. Changed and Added Functions

A.1 Added a new control circuit and backplane assembly.

B. Changes in Apparatus

B.1 Superseded	Superseded By
J85516B - App Fig 3	J85516C-1 - App Fig 7

D. Description of Changes

D.1 GRD lead added to FS 2.

D.2 FS 3, FS 9, and FS 10 rated Mfr Disc.

D.3 New control unit added to FS 11.

D.4 Circuit Notes 103 and 105 revised.

D.5 CAD 1, CAD 2, and CAD 3 rated Mfr Disc.

D.6 CAD 4 added to sheet G2.

D.7 CAD 5 and CAD 6 added to sheet G3.

D.8 FS 4 revised.

NOTICE

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BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 52423-FPH-RO

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TABLE OF CONTENTS

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit provides a 24-cell float and recharge power plant.

2. GENERAL DESCRIPTION OF OPERATION

2.01 Rectifiers normally float the battery and charge it as required. If the battery voltage exceeds the limit of 53.00 ±0.50 volts, an HLV indicator located on the control unit lights and a major alarm is sent. Also, a signal is sent to all rectifiers and the rectifier that failed is shut down. If any fuse operates or circuit breaker trips, a major alarm is sent and the DISCH FUSE indicator lamp on the control unit lights. Minor alarms are also sent when the battery voltage drops to 51.25 ±0.50 volts. If the voltage decreases to 48.25 ±0.50 volts, major alarms are sent.

2.02 If a rectifier is shut down because of transients, one attempt is made by the restart circuit in the control unit to get the rectifier restarted.

SECTION II - DETAILED DESCRIPTION

1. 100-AMPERE RECTIFIER

1.01 FS 1 illustrates the KS-20493, 100-ampere, 48-volt rectifier with its associated leads. This rectifier is furnished with a complete set of alarm and control leads.

2. 100-AMPERE RECTIFIER

2.01 FS 2 illustrates the J87437A 100-ampere, 48-volt rectifier with its associated leads. This rectifier is similar to the 100-ampere rectifier in FS 1.

3. CONTROL CIRCUIT

3.01 FS 3 illustrates the connections of the charge/discharge circuit to the control circuit. Additional leads, not covered in the previous paragraphs of this circuit description, connect to the control circuit as follows:

Designation	Meaning
Bat	Provides battery to rectifier. This 48-volt battery is needed for rectifier internal supply.
RB and RG	The rectifier senses the battery voltage over these leads. The RB- and RG- leads are converted to VR- and VR- leads in the control circuit.
HV and HVR	Whenever the battery exceeds the high-voltage limit, the voltage monitor in the control unit shuts down the rectifier causing the high voltage.

Designation	Meaning
RFA and RFAR	When a rectifier fails, it sends a ground over lead RFA to the control unit. RFAR sends a ground to the rectifier from the Control Unit. Upon rectifier failure, this ground is converted to an RFA ground by a loop closure in the rectifier.
RS and RSR	When the rectifier fails because of high voltage caused by transients, the control unit originates a signal and makes one attempt to start the failed rectifier over the RS and RSR leads.
GRD	Provides ground for relays and LEDs and for monitoring the battery voltage to the control unit.

4. NEGATIVE BATTERY

4.01 FS 4 illustrates the negative 24 cell battery with its associated wiring. Battery is connected to the CHG BAT BUS and CHG GRD BUS over the BC and GC leads respectively, and to the DISCHG BUS and DISCHG GRD BUS over the BD and GRD leads respectively. The VR+ and VR- leads connect to the REG BUS on the control circuit. The rectifier maintains the battery as sensed (over the VR+ and VR- leads) within closely regulated voltage limits.

5. DISCHARGE CIRCUIT

5.01 FS 5, 6, 7 and 8 illustrates the discharge circuit. The discharge circuit consists of a shunt, circuit breakers, cartridge type and 70-type LOAD fuses, and FAJ- resistors. In addition, bus bars DISCHG BAT and DISCHG GRD are shown. A meter connected to a shunt by leads K and L indicates the plant load current. The meter is in the control circuit.

5.02 The LOAD fuses and circuit breakers connect the plant to the load. If for any reason any load fuse operates or a circuit breaker trips, battery is connected over the FAJ resistor and FAJ lead to the FAJ relay in the control circuit. An operated FAJ relay sends alarms. (See control circuit CD-82454-01.)

5.03 FS 5 also illustrates leads DG, CF, and CBA. The DG lead connects the voltmeter to the discharge ground bus. The CF lead connects battery to the control buses located on the control unit. The CBA lead connects the circuit breaker to the capacitor charge circuit located in the control unit.

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6. BACKPLANE

6.01 FS 9 illustrates the backplane. The backplane serves as a special type of terminal strip where wiring connections between the charge and discharge circuit and control unit terminate. Printed wiring paths are used on both sides of the backplane. The printed wiring paths are part of this circuit continuity and must be included in tracing the circuit. Complete wiring of the backplane is shown on the control circuit.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 None.

2. FUNCTIONAL DESIGNATIONS

2.01

CB	Circuit breaker
FAJ	Fuse alarm major
HV	High voltage
HVR	High voltage return
LOA	Limited output alarm
LOAR	Limited output alarm return
PMN	Power minor
PMNR	Power minor return
PMNV	Power minor visible
PMNVR	Power minor visible return
RB	Reg battery
RG	Reg ground
RFA	Rectifier fail alarm
RFAR	Rectifier fail alarm return
RS	Restart
RSR	Restart return
VR	Voltage reg

3. FUNCTIONS

3.01 None.

4. CONNECTING CIRCUITS

4.01 SD-82454-01 Control Circuit

SD-82398-01 100 Ampere Rectifier, J87437A

SD-82401-02 100 Ampere Rectifier, KS-20493

5. MANUFACTURING TESTING REQUIREMENTS

5.01 None.