CD-80720-02
Issue 5-D
Appendix 5-D
Dwg. Issue 27-D

POWER SYSTEMS
100 TYPE PLANTS
DISCHARGE CIRCUIT
10-240 AMPERE 44-50 VOLT
110A PLANTS

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 ZG option applied to the connection of the VM & VR fuse on a special basis.

D.2 Fig. 7 rated A & M Only.

D.3 Note 116 changed.

D.4 Note 132 added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5152-PWG-JMD-SJ

CD-80720-02
Issue 5-D
Appendix 4-D
Dwg. Issue 26-D

POWER SYSTEMS
100 TYPE PLANTS
DISCHARGE CIRCUIT
10-240 AMPERE 44-50 NET
110A PLANTS

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Low contact setting of the (VR) relay for both (G) and (F) option changed, also the test clip data was changed.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 (ZE) and (ZF) options shown in Fig. 7.

D.2 Change in Note 108. Busy Hour Load shown as 51-100 amp. for the 233A Ret. Coil.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5152-PWC-JMD-AC

CD-80720-02
Issue 5-D
Appendix 3-D
Dwg. Issue 25-D

POWER SYSTEMS
100 TYPE PLANTS
DISCHARGE CIRCUIT
10-240 AMPERE 44-50 VOLT
110A PLANTS

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 BSP figure for the (H3) relay was 101/106 now 110/106.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 (ZE) and (ZF) Option added in Fig. 1.

D.2 (C1) lead added in Fig. 1.

D.3 (ZE) and (ZF) Option added in Note 116.

D.4 Notes 130 and 131 added.

D.5 701B and 711B PBXs shown in Fig. 9.

D.6 "In calculating the 'D' leads" added to Note 107.

All other headings under Changes, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5152-PWD-JMD-LM

POWER SYSTEMS
100 TYPE PLANTS
DISCHARGE CIRCUIT
10-240 AMPERE 44-50 VOLT
110A PLANTS

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "ZD" option in Fig. 2B replaces "ZC" option to add the "HLV1" lead to the Chg. Ckt.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5152-WJM-HHS-B6

POWER SYSTEMS
100 TYPE PLANTS
DISCHARGE CIRCUIT
10-240 AMPERE 44-50 VOLT
110A PLANTS

CHANGES

B. CHANGES IN APPARATUS

B.1 Resistor (R7) 1000 ohms KS-13490,L3 added as part of "ZB" option.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Fig. 1, Issue 22 changed the voltmeter range without options.

D.2 "ZA" and "ZB" options were incorrectly shown in Figs. 1 and 2.

D.3 Note 129 added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5232-WJM-HHS-B1

POWER SYSTEMS
100 TYPE PLANTS
DISCHARGE CIRCUIT
10-240 AMPERE 44-50 VOLT
110A PLANT

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 Information added for increasing capacity of Plant to 400 amperes by adding Auxiliary Charge and Discharge Circuits.

A.2 Added facilities for maintaining discharge voltage at nominal 50 or 52 volts with selections under control of key in Charge Circuit.

A.3 Added artificial load to be used when the minimum load causes unsatisfactory plant operation.

B. CHANGES IN APPARATUS

B.1 In Fig. 2, (R7) and (R8) added to permit discharge voltage to be maintained at nominal 52 volts without bringing in a HLV alarm.

B.2 In Fig. 2, 185A network added.

B.3 In Fig. 1, 48V BAT. and 24V DISCHG. keys rated M.D.

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 The Circuit Requirements for the (VR) relay has been changed to include 52 volt operation.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Fig. 2, "A" option added to permit discharge voltage to be maintained at nominal 50 or 52 volts.

D.2 References to Auxiliary Discharge Circuit added in order that capacity of Plant may be increased to 400 amps.

D.3 In Fig. 1, "ZB" option added to permit use of suppressed zero voltmeter. Method of measuring 24V DISCHG voltage will be provided on 24 V BAT SUPPLY CKT.

D.4 Fig. 7 rated "Mfr. Disc."

D.5 Fig. 11 added.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 To provide a 48 volt Discharge Circuit with a capacity of 10-120 and with provisions for adding an Auxiliary Discharge Circuit to increase the capacity of the Plant to 400 amperes.

2. WORKING LIMITS

2.1 44 to 50 or 44 to 52 volts.

3. FUNCTIONS

3.1 To provide a 48 volt battery supply.

3.2 To provide control for maintaining battery voltage within limits.

3.3 To provide alarms if battery voltage varies out of limits.

3.4 To provide meters for indicating the discharge voltage and the load current.

3.5 To provide fusing for distribution.

3.6 To provide means for increasing capacity of Plant to 400 amperes.

4. CONNECTING CIRCUITS

4.1 SD-80722-02 Charge Circuit

4.2 SD-81270-01 Auxiliary Charge Circuit

4.3 SD-81271-01 Auxiliary Discharge Circuit

5. DESCRIPTION OF OPERATION

5.1 Figure 1, Discharge Circuit, covers the discharge circuit arrangement for 44-50 or 44-52 volt Plants with a discharge circuit filter, if required. An ammeter is provided for indicating the load current

and, with "ZB" option, a voltmeter for indicating the discharge voltage of the Plant. With "ZA" option, keys are provided in order that the 48V BAT voltage and the discharge voltage of the 24 volt supply may be measured.

5.2 Figure 2, CEMF Cell Control Circuit, covers the control of the CEMF cells and orginates alarms for high or low voltage conditions.

With 50 volt operation "K" option provides three counter-cells two of which are manually inserted while overcharging. With "J" option the two manually controlled cells are omitted and the battery is overcharged at a slightly lower voltage. The third CEMF cell is normally in the circuit, with either option, being automatically removed during power failures or other causes of low battery voltage.

For 52 volt operation "J" option is always provided. The automatically controlled group of CEMF cells are in the circuit only during overcharging periods.

The operation of the nominal 50 volt plant is as follows: The coil of the (VR) relay is measuring the circuit discharge voltage. When "B" option is furnished, the (VR) relay is connected directly to the discharge leads. With "A" option the (VR) relay is connected thru the Charge Circuit, which connects "VRR1" and "VRR2" leads together shorting out (R7) and (R8), and then to the discharge leads. In both cases the (VR) relay measures voltage at the same point. When the circuit discharge voltage goes low, (VR) closes its low contact operating the (L1) relay which in turn operates the (L2) relay. (L2) operated removes lock-up ground to the (H3) relay which releases and removes battery from one side of the winding of the (CEMF GR1) contactor. This releases the (CEMF GR1) contactor which shorts out (CEMF GR1) and raises the discharge voltage. When the discharge voltage increases sufficiently to operate the high contact of the (VR) relay, battery is furnished the winding of the (H1) relay. Operation of (H1) furnishes ground to the (H2) relay which operates and furnishes ground to the (H3) relay. (H3) operates and locks up to ground through the released (L2) relay. The operation of the (H3) relay furnishes battery to one side of the winding of the (CEMF GR1) contactor. The other side of the winding is connected directly to ground, option "B", or to ground through the Charge Circuit, option "A". Operation of the (CEMF GR1) contactor removes the short around the (CEMF GR1) cell placing it in the circuit and lowering the discharge voltage.

The operation of the nominal 52 volt plant is as follows: Option "A" is required and where (R7) and (R8) were shorted out in the Charge Circuit for 50 volt operation the short around (R7) and (R8) is removed for 52 volt operation. This connects the coil of the (VR) relay through (R7) and (R8) and then to the discharge leads effectively raising the high contact closure value of the (VR) relay. Where ground was furnished from the Charge Circuit over the "GR1" lead to the winding of (CEMF GR1) contactor in the case of 50 volt operation, this ground is absent during normal 52 volt operation. This prevents the operation of the contactor insuring (CEMF GR1) cells being out of the circuit. When it is desired to overcharge the batteries, ground is supplied by the Charge Circuit over the "GR1" lead allowing (CEMF GR1) contactor to operate when (VR) operates its high contact. This operation is the same as described above under 50 volt operation.

5.3 Each time the voltage exceeds its limits the (VR) relay operates and in turn the (L2) or (H2) relays are operated. This is true regardless of plant voltage or whether the battery is being overcharged or floated. Operations of the (L2) or (H2) relays furnishes battery to the (AD) relay. Since the (AD) relay is of the delay type, it will not operate on false or momentary alarm signals. Operation of the (AD2) relay operates the (HLV) relay which brings in various alarms. An alarm from the 24 volt supply, with "H" option, operates in the same manner as an alarm from the 48 volt supply which is described above. If "H" option is not provided, the (AD) relay is by-passed and there is no delay.

If a fuse should fail, battery over the "DF" lead operates the (FA) relay operating the various alarms.

5.4 Figures 4, 5, 6, 8 and 9 show alarm battery supply connections for several applications.

5.5 Fig. 10 shows a switch and fuse unit for use when a battery distributing fuse board is provided.