POWER SYSTEMS
RINGING CIRCUIT
AC-DC RINGING
701B, 711B & 740E PBX
806G RINGING POWER PLANT
J86472

CHANGES

B. Changes in Apparatus

B.1 Superseded	Superseded By
LV Diode, 420B - FS 1 & APP Fig. 1, "X" Option	LV Diode, 446F - FS 1 & APP Fig. 1, "G" Option

D. Description of Changes

D.1 The LV diode has been changed to a higher voltage rating which will prove more reliable during "Start-Stop" operation of the plant.

D.2 Added J86472 to the title.

D.3 A modular fuse block is shown for fuses A thru E (For Record Only).

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POWER SYSTEMS
RINGING CIRCUIT
AC-DC RINGING
701B, 711B, & 740E PBX
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CHANGES

B. Changes in Apparatus

B.1 Superseded	Superseded By
APP FIG. 1, A & B Alarm Fuses, 70G, K Option	APP FIG. 1, A & B Alarm Fuses, 70F, J Option

D. Description of Changes

D.1 In FS 1, for the 1, 2, 3T transfer of the T2 relay the make and break are interchanged. (For Record Only.)

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POWER SYSTEMS
RINGING CIRCUIT
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806G RINGING POWER PLANT

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SECTION I - GENERAL FUNCTIONS

1. PURPOSE OF CIRCUIT

1.01 This circuit provides continuous ringing, machine ringing, continuous dial tone, interrupted busy tone, and 60 ipm and 120 ipm signals for the PBX.

1.02 When two ringing machines are provided, the loss of output on the first machine will cause an automatic transfer to the second machine and bring in an alarm. If only one machine is provided, loss of output will bring in an alarm.

1.03 An interrupter gear failure alarm is provided which will transfer the plant to the reserve machine in case of gear failure in the regular machine.

1.04 TOUCH-TONE dial tone is provided with a single generator for PBXs under 200 lines.

1.05 Duplicate TOUCH-TONE dial tone generators with automatic transfer are provided for PBXs over 200 lines.

2. GENERAL METHOD OF OPERATION

2.01 The first ringing machine is started by application of ground to the MS lead by the PBX switching circuits and stops when ground is removed from the MS lead.

2.02 If the first ringing machine output fails, while running or during the starting period, a "low voltage" relay releases and transfer relays operate to start the second machine and transfer the load to it. At the same time an alarm is brought in.

2.03 Keys are provided to make a manual transfer to the second machine if desired, to manually start the machine that is not carrying the load - for maintenance purposes - and to restore the circuit to normal after an automatic transfer to the second machine.

2.04 Either of the two machines may be used as the first or "regular" machine by inserting that particular machine plug in the RM1 jack on the equipment panel.

SECTION II - DETAILED DESCRIPTION

1. STARTING RINGING MACHINE

1.01 With the circuit in the normal operating condition, the application of ground to the MS lead by the PBX switching circuits operates the RM1 relay which starts the first or normal ringing machine by connecting battery to the motor.

1.02 The ringing machine comes up to speed in approximately 1/2 second, operating

the LV and LV1 relays which opens the path to the RF relay, the operation of which is delayed by thermistor A.

2. AUTOMATIC TRANSFER

2.01 If the output of the first machine fails while the machine is running the LV relay releases, releasing relay LV1 which in turn operates relay RF after a delay due to thermistor A. Relay RF, when operated locks up through the RST key and operates relays T1 and T2 which in turn transfer the MS ground to relay RM2 to start the second machine, and connect the output leads to the second machine. Relay RF operated, also brings in an alarm. As relay RF is locked up, possible failure of the second machine will not bring in any additional alarm.

2.02 If the first machine fails on starting, relay LV will not operate and the transfer takes place as described under 2.01.

3. MANUAL TRANSFER

3.01 The load may be manually transferred to the second machine by operating the MAN TRNS key to the TRNS position. This lights the GD lamp and operates relays T1 and T2 which transfer the load to the second machine as described under 2.01. With "V" option the alarm is cut off in the TRNS position.

4. RESTORING CIRCUIT TO NORMAL

4.01 After an automatic or a manual transfer the circuit is restored to normal by operating the RST key which opens the locking path of the RF relay. Before restoring the circuit to normal the first machine should be checked to be sure that it is operating properly.

4.02 After a manual transfer the circuit is restored to normal operating the MAN TRNS key to the NORMAL position. Before restoring the circuit to normal, the first machine should be checked to be sure it is operating properly.

5. MANUAL STARTING OF RINGING MACHINES

5.01 The machine that is not running and carrying the load, may be started manually for maintenance purposes by operating the RM1 ST or RM2 ST keys. This starts the idle machine, but does not transfer the load to it.

5.02 Operation of the RM1 ST or RM2 ST keys lights the GD lamp as a warning to restore the key to normal before leaving the premises.

6. ALARMS

6.01 Transfer Alarm

When an automatic transfer has taken place, the operation of relay RF connects ground to the F and CAP leads to the PBX alarm circuit to bring in the PBX alarm and also lights the RING TRNS lamp on the ringing panel. Relay RF remains operated until the circuit is restored to normal.

6.02 Fuse Alarms

The failure of any fuse connects battery to the FA relay which operates, lights the FA lamp on the ringing panel and connects ground to the F and CAP leads to the PBX alarm circuit to bring in the PBX alarm. The A and B fusetrons have 1/2 ampere alarm type fuses connected in parallel with them through 10 ohm resistances. The blowing of the fusetron will cause the associated alarm fuse to blow and bring the alarm.

7. TESTING RINGING MACHINE

7.01 If it is desired to test the idle machine it may be started by operating the corresponding RM-ST key to the start position. The operating machine may be made idle by operating the MAN TRNS key to the transfer position and then restarted by operating its RM-ST key to the start position.

7.02 When checking interrupter timing requirements remove the machine plug from its jack so that the machine cannot be started up by the automatic transfer feature. The machine may be readily removed from its mounting panel if desired.

8. INTERRUPTER GEAR FAILURE ALARM

8.01 During normal operations the IA capacitor and resistor are connected alternately to ground and to the winding of the IF relay. The periodic connection of the IA capacitor to the IF relay winding keeps the relay operated while the capacitor is charging, and its slow release characteristics when in parallel with the IF capacitor prevent it from releasing during the interval that the IA capacitor is being discharged.

8.02 If the interrupter shaft ceases to turn due to gear failure, the 120 IPM spring pileup may stop in one of two positions causing the IF relay to release. If it stops when the IA capacitor is connected to the winding of the IF relay, the relay will stay operated until the charging current falls below the relay holding current.

If the interrupter stops with the lead to the IF relay open, the relay will release after a short delay due to the parallel IF capacitor. Relay IF released connects ground through thermistor A to operate the RF relay and causes an automatic transfer as in 2.01.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 Voltage Limits

DC	44 to 52 Volts
AC	65 to 90 Volts, 20 Cycles
LT2	1 Volt Nominal
TB	3 Volts Nominal
BT	1/2 Volt Nominal
TT4	350 CPS - 1.58V 440 CPS - 1.58V Combined - 2.24V ± 12%

2. FUNCTIONS

2.01 This circuit is designed to perform the following functions:

(a) To provide continuous ringing, machine ringing, dial tone, 60 ipm line busy tone, 60 ipm trunks busy tone and 60 ipm and 120 ipm signals to the PBX.

(b) To start and automatically transfer the load to the second or reserve ringing machine in case of failure of the 20 cycle output of the first or regular ringing machine.

(c) To provide for manually transferring the load from the first to the second machine.

(d) To provide for using either machine as the regular or first machine.

(e) To provide for manually starting the idle machine without connecting the load to it.

(f) To provide for easy removal of a machine for test purposes or replacement.

(g) To provide alarms to indicate automatic transfer or fuse failure.

(h) To provide a guard lamp for the MAN TRNS, RM1 ST, and RM2 ST keys so that they will not be left in the operated position.

(i) To provide an interrupter gear failure alarm and transfer.

(j) To provide TOUCH-TONE dial tone with a single generator for PBXs under 200 lines.

(k) To provide TOUCH-TONE dial tone with duplicate generators with automatic transfer for PBXs over 200 lines.

3. FUNCTIONAL DESIGNATIONS

Desig.	Meaning	Main Function
RM1	Ringing Machine 1	Starts ringing machine 1.
RM2	Ringing Machine 2	Starts ringing machine 2.
LV	Low Voltage	Provides for automatic transfer due to low output voltage on ringing machine 1.
LV1	Low Voltage	Operates from relay LV.
RF	Ringing Failure	Actuates transfer relays and brings in alarms if LV releases while ringing machine 1 is running.
T1, T2	Transfer	Transfer load and start-circuit from one machine to the other.
FA	Fuse Alarm	Brings in alarm due to fuse failure.

4. CONNECTING CIRCUITS

4.01 Power Charge & Discharge Circuit or Rectifier Circuit.

4.02 PBX Switching Circuits

4.03 PBX Alarm Circuits

4.04 Attendant's Switchboard Circuits

4.05 SD-81700-01 Miscellaneous Power Supplies Circuit for 3A ACDS.

SECTION IV - REASON FOR REISSUE

CHANGES

A. Changed and Added Functions

A.1 To provide a single TOUCH-TONE dial tone generator for PBXs under 200 lines.

A.2 To provide duplicate TOUCH-TONE dial tone generators with automatic transfer for PBXs over 200 lines.

B. Changes in Apparatus

B.1 In FS3 and APP. FIG. 5 the 404D tone generator and the J1 Connector, KS-14528, L1, are added.

B.2 In FS4 and APP. FIG. 6 the 405B tone generator and the J1 connector, KS-14672, L1, are added.

D. Description of Changes

D.1 FS3 and FS4 are added.

D.2 APP. FIG. 5 and APP. FIG. 6 are added.

D.3 In FS1, CAD 1, 2 & 3 the LT2 lead is shown as "M" option.

D.4 CAD 4 & 5 are added.

D.5 Note 101 is expanded.

D.6 Note 102 is expanded.

F. Changes in CD

F.1 In Section I paragraphs 1.3, 1.4, & 1.5 are added.

F.2 In Section II paragraph 4.2 is added.

F.3 In Section II paragraphs 8.1 and 8.2 are added.

F.4 In Section III paragraph 1.1 is expanded.

D.5 In Section III paragraphs 2.09, 2.10 & 2.11 have been added.

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