

COMMON SYSTEMS
RINGING INTERRUPTER AND ALARM CIRCUIT
FOR TEN PARTY TERMINAL PER STATION
CODE RINGING
AND FOUR PARTY SEMI-SELECTIVE RINGING

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

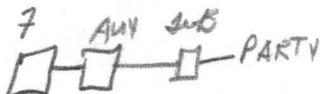
- D.1 Circuit note 108 (A) for manual offices was formerly numbered 108.
- D.2 Circuit note 108 (B) for panel offices is added.
- D.3 In diagram of cross connection, rating, "Mfr. Disc." is added to Figs. 1K and 2K.
- D.4 Fig. 51 is added to cross connections.

All other headings, No change.

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COMMON SYSTEM
RINGING INTERRUPTER AND ALARM CIRCUIT
FOR 10 PARTY TERMINAL PER STATION
CODE RINGING
AND 4 PARTY SEMI-SELECTIVE RINGING

CHANGES

B. CHANGES IN APPARATUS

Added

R208 Relay (optional)

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

- C.1 Page 3 of circuit requirements table is added. Requirements for relay (S) per Figures D and E are added and test notes and references thereto have been rearranged to conform to the changes incidental to moving the requirements of some relays from page 2 to page 3.

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Figure D is added to provide code ringing interruptions where the 120 IPM signal supply furnishes interrupted ground to 24V circuits.
- D.2 Figure E is added to provide code ringing interruptions where the 120 IPM signal supply furnishes interrupted 24V battery.
- D.3 Fusing requirements for figure D are added to note 1, and a record of changes are listed in table of note 107.
- D.4 Circuit note 108 and the 24V battery convention are added.
- D.5 "Or To Misc. Alarms" is added to connecting information in Fig. 2.

All other headings, No change.

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DEPT. 332

ACP) ET
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COMMON SYSTEMS
RINGING INTERRUPTER AND ALARM CIRCUIT
FOR 10 PARTY TERMINAL PER STATION
CODE RINGING
AND 4 PARTY SEMI-SELECTIVE RINGING

CHANGES

A. CHANGED AND ADDED FUNCTIONS

- A.1 The circuit is changed to provide standard one-ring and two-ring codes with the same intervals used in semi-selective type offices.

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Optional wiring has been provided to permit using this circuit for 4 party semi-selective ringing as well as for 10 party terminal per station code ringing. "Y" wiring is used on a standard basis and "X" wiring is to be applied on a special basis to permit modifying existing circuits.
- D.2 "Y" wiring was formerly part of Figure 1 and "X" wiring was not shown.
- D.3 Notes 106 and 107 have been added.
- D.4 When "Y" wiring is used the ringing codes are provided in the standard manner for 10 party terminal per station code ringing and when "X" wiring is used for 10 party terminal per station code ringing and semi-selective ringing the various codes are set up as follows from Figure 1:-

Relay (A) is operated from brush No. 4 and provides a "2-ring" code for lead C2.

Relay (B) is operated from brush 2 and provides a "3-ring" code for lead C3.

Relay (E) is operated from brush 2 and provides a "4-ring" code for lead C4.

Relay (C) is operated from brush 1 and provides "1 long ring" for lead C1.

Relay (D) is operated from brush 1 and provides a "1 long and 1 short ring" code for leads C5. The C leads in Figure 1 are to be connected as outlined in Note 106 and the associated table.

- D.5 The circuit title has been changed to add the last line which reads as follows: "And 4 Party Semi-Selective Ringing."

All other headings, No Change.

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CHB)
WLF) VY

CIRCUIT DESCRIPTION
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COMMON SYSTEM
RINGING INTERRUPTER AND ALARM CIRCUIT
FOR 10 PARTY TERMINAL PER STATION
CODE RINGING

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Cross-connection figures 2-L and 3-K are removed.

All other headings, No Change.

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COMMON SYSTEM
RINGING INTERRUPTER AND ALARM CIRCUIT
FOR 10 PARTY TERMINAL PER STATION
CODE RINGING

1. PURPOSE OF CIRCUIT

- 1.1 This circuit is arranged to provide interruptions for code ringing to ten party terminal per station auxiliary line circuits in panel offices, or ten party jack per station auxiliary line circuits in manual offices.

2. WORKING LIMITS

- 2.1 None.

3. FUNCTIONS

- 3.1 To provide an interrupter lead for a "2 short ring" code.
- 3.2 To provide an interrupter lead for a "3 short ring" code.
- 3.3 To provide an interrupter lead for a "4 short ring" code.
- 3.4 To provide an interrupter lead for a "1 long and 1 short ring" code.
- 3.5 To provide an interrupter lead for a "1 long and 2 short ring" code.
- 3.6 To provide a pick-up ground preceding each ringing code cycle.
- 3.7 To automatically return to a normal position when not in use.
- 3.8 To provide means for transferring to a duplicate interrupter equipment.
- 3.9 To provide an alarm when any of the common leads become grounded or when the auxiliary line circuits fail to receive code pulses.

4. CONNECTING CIRCUITS

- 4.1 Auxiliary line circuit.

- 4.2 Relay Interrupter Circuit (Manual office).
- 4.3 Signal Supply for 120 I.P.M. (Manual office).
- 4.4 Annunciator Circuit (Manual office).
- 4.5 Miscellaneous circuit for miscellaneous interrupter frame, (Panel office).
- 4.6 Floor alarm board miscellaneous and auxiliary alarm circuit, (Panel office).

DESCRIPTION OF OPERATION

5. START

When an auxiliary line circuit requires code ringing pulses, it connects ground to leads "ST" and "TA" and also connects a "pick-up" relay, which has battery on its winding, to lead "PU". Ground on lead "ST" operates relay (ST) while ground on lead "TA" operates relay (T) which functions, as will be later described, to operate an alarm after a delay if lead "TA" is grounded for excessively long interval. Battery on lead "PU" operates relay (TA) which connects a supplementary ground to lead "TA" that serves no useful function unless the "ST" and "TA" leads to the auxiliary line circuit are open. The operation of relay (ST) connects interrupter (CT) to relay (S) and also connects ground to lead "TA" which serves no useful function unless a trouble condition occurs which prevents relay (SR) from operating and relay (TA) fails to operate.

6. STEPPING OF SELECTOR SWITCH (M)

Relay (S) operates and releases under control of an interrupter (approx. 0.3 second closed and 0.2 second open) and causes the stepper magnet (M) to advance at the rate of one step per half second over all terminals except terminals 10 and 21. In panel offices "N" wiring is used and the interrupter ground is furnished by the (CT) interrupter. In manual offices "M" wiring is used and the interruptions are obtained from the office 120 I.P.M. signal supply. When the selector is in positions 10 or 21, relay (G) operates from ground on arc 5. When relay (G) operates, it transfers the interrupter circuit from the magnet (M) to the contacts of relay (N). When relay (S) operates at this time, it operates relay (R) thus closing its locking circuit under control of relay (G) and also preparing the operating circuit for relay (N). When relay (S) releases at the completion of the interrupter closure, relay (N) operates and holds in series with relay (R) under control of relay (G). The operation of relay (N) transfers the (S) relay contacts back to the stepper magnet (M). On the next pulse from the contacts of relay (S), the brushes for all arcs of the selector are advanced off terminals 10 or 21. Relay (G)

then releases, thus releasing relays (R) and (N). A complete rotation of the brushes over the arc thus requires 12 seconds which is divided into two ringing code cycles of 6 seconds each. Relay (K) is operated while the selector brushes are in positions 3 to 11 and 14 to 22 thus removing ground from the "PU" lead so that the "pick-up" relays, of the associated auxiliary line circuits which may require code ringing pulses, will not operate except at the start of a ringing cycle in order to avoid the sending of partial code ringing signals. Relay (K) operated also operates relay (SR) and connects ground to lead "TA". Relay (SR) is slow to release in order to allow time for relays (T) and (T1) to reset each time that relay (K) releases.

7. RESTORE TO NORMAL OF SELECTOR SWITCH (M)

When all auxiliary line circuits are satisfied, ground is removed by these circuits from leads "TA" and "ST". This causes relay (ST) to release and automatically restore the selector to normal where relay (K) releases to stop the selector and remove ground from lead "TA". This causes relays (T) and (T1) to release if they were operated.

8. RINGING CODE INTERRUPTIONS

Relay (A) is operated from brush No. 4 and the connection to the bank terminals are such that it is operated one second, released one second, operated one second and released three seconds during each cycle. This provides a "two ring" code for lead "C1".

Relay (B) is operated from brush No. 2 and the connections to the bank terminals are such that it is operated $\frac{1}{2}$ second, released $\frac{1}{2}$ second, operated $\frac{1}{2}$ second, released $\frac{1}{2}$ second, operated $\frac{1}{2}$ second and released $3\frac{1}{3}$ seconds during each ringing cycle. This provides a "3 ring" code for lead "C2".

Relay (E) is operated from brush No. 2 and is operated $\frac{1}{2}$ second, released $\frac{1}{2}$ second, operated $\frac{1}{2}$ second, released $\frac{1}{2}$ second, operated $\frac{1}{2}$ second, released $\frac{1}{2}$ second, operated $\frac{1}{2}$ second and released $2\frac{1}{2}$ seconds during each ringing cycle. This provides a "4 ring" code for lead "C3".

Relay (C) is operated from brush No. 1 and is operated for 2 seconds, released $\frac{1}{2}$ second, operated $\frac{1}{2}$ second and released 3 seconds during each ringing cycle. This provides a "1 long and 1 short" ring code for lead "C4".

Relay (D) is operated both from brush No. 1 and brush No. 2 and is operated 2 seconds, released $\frac{1}{2}$ second, operated $\frac{1}{2}$ second, released $\frac{1}{2}$ second, operated $\frac{1}{2}$ second and released 2 seconds, during each ringing cycle. This provides a "1 long and 2 short" ring code for lead "C5".

Ten auxiliary line circuits may be connected to each interrupter lead from figure 2. When more than 10 lines are to be served, figure 3 is provided.

9. INTERRUPTER RELAYS - FIG. 3

When more than 50 auxiliary line circuits are to be served, leads "C1" to "C5" of figure 2 are connected to corresponding relays (C1) to (C5) of figure 3. A maximum of two figures 3 can be connected to figure 2 thereby providing means for accommodating any number of auxiliary line circuits up to 200. This limitation is necessary since not more than two figures 3 can be connected to a figure 2 for contact metal reasons.

10. ALARM CIRCUIT ARRANGEMENT

10.1 Panel Offices - Figure A and "N" Wiring

A trouble ground on the "PU" lead will cause relay (PU) to operate when relay (K) operates. Relay (PU) operates relay (P) and also connects ground to lead "ST". Relay (P) operated (1) locks to lead "PU", (2) connects ground to lead "ST" and (3) lights lamp (PU) in series with relay (AL) which operates. Relay (AL) lights a lamp at the floor alarm board and also sounds the audible alarm. Relay (PU) is slow to operate to avoid unnecessary alarms due to possible bunching of the bottom contacts of relay (K) as it operates or releases. Lead "TA" is a general time alarm lead which causes an alarm to be operated after a delay of approximately 28 to 56 seconds if the "TA" lead is continuously grounded for any reason. This is accomplished by relays (T), (T1) and (T2) and interrupter (TA). Thus, ground on lead "TA" operates relay (T). When contact "F" of interrupter (TA) closes, relay (T1) operates and locks under control of relay (T). After an interval of 28 seconds, contact "B" of interrupter (TA) closes and operates relay (T2) which locks under control of relay (T1) and lights lamp (TA) in series with relay (AL). Thus relay (AL) operates and causes the audible alarm to operate. A trouble ground on any of the code leads operates relay (AL) in series with the associated lamp which lights to identify the grounded code lead "C1" to "C5". The 700 ohm resistances which are bridged across all of the 2Y lamps assure operating current for the series (AL) relay when the lamp circuit is open.

10.2 Manual Offices - Figure B and "M" Wiring

A trouble ground on the "PU" lead will cause relay (PU) to operate when relay (K) operates. Relay (PU) operates relay (P) and also connects ground to lead "ST". Relay (P) operated, (1) locks to lead "PU", (2) connects ground to lead "ST", and (3) lights lamp (PU) in series with relay (AL) which operates. Relay (AL) connects ground to the "A" and

"DC" leads of the manual systems annunciator circuit. Relay (PU) is slow to operate to avoid unnecessary alarms due to possible bunching of the bottom contacts of relay (K) as it operates or releases. Lead "TA" is a general time alarm lead which causes an alarm to be operated after a delay of approximately 30 seconds if the "TA" lead is continuously grounded for any reason. This is accomplished by the (T), (T1) and (T2) relays operating in connection with a relay interrupter circuit. A ground on the "TA" lead operates relay (T) which in turn operates relay (T1). Relay (T1) connects ground to the "TS" lead of the relay interrupter circuit and connects the winding of the (T2) relay to the "B" lead of the interrupter circuit. After the elapse of approximately 30 seconds time, the relay interrupter circuit connects ground to the "B" lead operating the (T2) relay. Relay (T2) locks under control of the (T1) relay, connects ground to the (TA) lamp and (AL) relay winding in series, operating the relay and lighting the lamp. The (AL) relay connects ground to the "A" and "DC" leads of manual systems annunciator circuit starting an alarm. A trouble ground on any code lead operates relay (AL) in series with the associated lamp which lights to identify the grounded "C1" to "C5" lead. The 700 ohm resistances which are bridged across all of the 2Y lamps assure operating current for the series (AL) relay in case the lamp circuit opens.

When the trouble condition is cleared the (T) relay releases releasing the (T1) and (T2) relays restoring the associated relay interrupter circuit to normal.

11. TRANSFER KEYS - FIG. 2

Two keys (A) and (B) of figure 2 are provided to transfer to a duplicate interrupter circuit per figure 1. If the keys are not both operated or both normal, lamp (K) will light in series with relay (AL) which will operate to sound an audible alarm. This will indicate that both keys are not connecting to the common leads of the same figure 1.

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