

DIAGRAM NOTES (ISSUE 1)

concerning

NZPO 25947, ISSUE J

titled

FIRE CALL-OUT SYSTEM "E"

An explanation of the above circuitry is covered under the following headings:

1. GENERAL.
2. FACILITY SCHEDULE.
3. OUTLINE CIRCUIT OPERATION.
4. OPERATIONAL DETAILS.
5. CIRCUIT DESIGN NOTES.

1. GENERAL.

1.1 This diagram shows the circuit of a relay set used for fire call-out system "E", which provides for fire-calls to be originated by a toll operator at the GC Fire Station officer's request, or by the operator if the Toll Exchange is acting as an Acceptance Point/Call-Out Point (ref. TR 1067 par. 9).

1.2 The diagram should be considered in conjunction with the following:

Technical Report No. 1067, Fire Call-Out Systems.

GBW 10782 Final Selector with Toll Facilities or equivalent,
or GBW 16660 Final Selector, UAX 13 or equivalent.

The remote Ring-Out Point is equipped with a standard red coloured telephone with dummy dial. Extension bells may be connected up to the normal Plan No. limits. A power control relay for sounding the siren is associated with the telephone (ref. Fig. 2) when required.

2. FACILITY SCHEDULE.

Provision is made for -

2.1 Seizure of the circuit from an orthodox Final Selector Bank by a Toll Operator.

2.2 Busy tone to be fed to the operator on completion of dialling the last digit.

2.3 A distinctive tone to be fed to the operator after her initial Trunk Offer.

2.4 Normal ringing to be fed to the Fire Call-out line after a second Trunk Offer.

2.5 Speech between the Ring-Out Point and operator or other person (via cord circuit).

2.6 The preventing of accidental second Trunk Offer, causing the operation of the siren.

3. OUTLINE CIRCUIT OPERATION.

3.1 Preliminary. With reference to TR 1067 page 7 par. 9.10, (Operation); assume that sub-paragraph (a)-(d) have been carried out (i.e., the GC Fire Station Officer has asked that the remote exchange non-listed number be called).

The operator will select any junction to the remote exchange required and will dial the number necessary to connect with the remote Fire Ring-Out Point equipment. Normal busy tone will be heard.

3.2 Seizure. The operator will then trunk offer.

3.3 Warning Signal. A special Fire Call-Out line warning signal will be heard. This comprises 900Hz tone for approx. 0.25sec followed by 400Hz tone for approx. 0.5sec and a silent period of 0.75sec.

3.4 Activating. The special warning signal confirms that the operator is on the correct number and may trunk offer again. This causes the final selector to revert to the automatic ringing condition which in turn causes the Fire Call-Out Circuit to disconnect the 900/400Hz tone and forward the ringing current to the remote Fire Ring-Out Point equipment (see Fig. 2).

The first automatic ring at the Ring-Out Point will operate the power control relay and will start the local siren which will then run continuously until it is manually released at the Fire Station. The automatic telephone (and any extension bells) will operate in the normal manner until the Ring-Out Point telephone is answered.

3.5 Release. When the Fire Ring-Out Point telephone handset is replaced, the usual clearing signal will be received in the toll exchange and the equipment and junction will be released by the operator.

4. OPERATIONAL DETAILS.

4.1 This describes the operation of Fig. 1 (25497) when used in conjunction with GBW 10782 Reg. Toll (final selector). It also describes the operation of Fig. 2 when used in conjunction with GBW 16660 (UAX final selector), bearing in mind changes in contact designations, etc.

The absence of relay contacts signifies that they have no useful function at that stage.

4.2 Preliminary. It is assumed that the GC Fire Station Officer has requested that the remote exchange number be called. The operator selects a junction to the remote exchange and dials the number necessary to connect with the remote Fire Ring-Out Point equipment. Normal busy tone will be heard.

4.3 Seizure. The operator will trunk offer by operating the cord circuit ring key momentarily. In the final selector this causes the OC relay contact to remove the S/C from relay F which operates relay D and extends the "-" and "+" wires into the fire call-out circuit. Earth from contact D6 of the final selector is applied to the "P" wire via Relay H (which does not operate at this stage). Relay K (slow operating) in the Fire Call-Out Circuit, being 10,000 ohms, will operate to the D6 earth.

Relay K operates,

K1 operates relay KA.

K2 operates relay KD.

Relay KD operates,

KD1 prevents 1300 ohm battery reaching the "P" wire at this stage.

Relay KA operates,

KA1 prepares relay TA operate circuit.

KA2 prepares relay KB holding circuit.

KA3 prepares 900 and 400 Hz tone circuit to retard Z (d-e coil).

KA4 prepares R1 1300 ohm battery-to-"P" wire circuit.

KA5 disconnects relay K (slow releasing).

Relay K releases,

K1 relay KA holds now via K1 and KA5 to the (D6) earth on the "P" wire.

K2 disconnects relay KD.

The capacitor C3/resistor R2 network delays relay KD's release to 5-7 secs. (This reduces the possibility of prolonged operation of the ring key causing the sequence outlined in par. 4.4, with a resultant false operation of the siren.)

4.4 Warning Signal. Following the operation of relay KA in par. 4.3, the first pulse of Interrupted Earth would operate relay TA (slow operating).

Relay TA operates,

TA1 connects 900 Hz tone to retard Z (d-e coil).

TA2 completes circuit for relay TB.

Relay TB operates,

TB1 places relay TB's release under the control of the Interrupted Earth.

TB2 disconnects relay TA (slow releasing).

TB3 prepares 400 Hz circuit.

Relay TA releases,

TA1 disconnects 900 Hz tone and connects 400 Hz tone to the retard Z (d-e coil).

The Interrupted Earth now ceases and relay TB releases slowly.

Relay TB releases,

TB2 prepares relay TA operate circuit for the next Interrupted Earth pulse.

TB3 disconnects the 400 Hz.

A silent period prevails until the next Interrupted Earth pulse.

The interaction of relays TA and TB transmits to the calling operator the special Fire Call-Out line warning signal of approx. 0.25 sec 900 Hz tone, approx. 0.5 sec 400 Hz tone and approx. 0.75 sec silent period, repeated. This special warning signal confirms that the operator is on the correct number.

Relay KD releases (after its delay as already described in par. 4.3).

KD1 completes R1 1300 ohm battery-to-"P" wire circuit, causing Relay H in the final selector to operate.

As a result of the operation of relay H in the final selector, the cord circuit supervisory lamp will glow, indicating that the operator may trunk offer again.

Relays operated at this stage: KA (TA and TB).

4.5 Activating. The operator will trunk offer again by operating the cord circuit ring key momentarily. This causes interrupted ringing to be fed to the Fire Call-Out Circuit from the final selector and operate relay L.

Relay L operates,

L1 completes the operate circuit of relay KB (slow operating).

Relay KB operates,

KB1 completes relay KB locking circuit.

KB2) extends "-" and "+" wires to the remote

KB4) Fire Ring-Out Point equipment (Fig. 2).

The ringing will operate the siren control relay, and will ring the automatic telephone (and extension bells) in the normal manner. When the telephone is answered, the call proceeds as for a normal call.

Relays operated while ringing and talking: KA and KB.

4.6 Release. When the Fire Ring-Out Point telephone handset is replaced Relay D in the final selector releases causing the cord circuit supervisory lamp to light. The operator withdraws the cord circuit plug. The final selector then disconnects the earth from the "P" wire and relay KA releases.

Relay KA releases,

KA1 disconnects the Interrupted Earth.

KA2 disconnects relay KB locking circuit.

KA5 restores the K relay to the "P" wire in preparation for the next call.

Relay KB releases,

KB2) prepares "-" and "+" wires for next call.
KB4)

The circuit is now normal.

5. CIRCUIT DESIGN NOTES.

5.1 Relay K. Slow operate (and release).

(a) Prevents the operation of relay K when the final selector first tests the "P" wire (par. 4.2).

(b) Ensures that -

(i) relay KA holds to the "P" wire, and

(ii) the capacitor C3 is fully discharged.

5.2 Relay PA. Slow operate (and release), and Relay PB (slow releasing). Are slugged to ensure adequate duration of pulses of 900 and 400 Hz tones.

5.3 Resistor R1. Allows operation of the H relay in the final selector.

5.4 Resistor R2 and Capacitor C3. Resistor R2 limits the discharge current of C3 to protect the K2 contacts.

Capacitor C3 is discharged by contact K2; contact K2 also operates relay KD. On the release of relay K, C3 re-charges via relay KD, prolonging its release until the charging current drops below its release value. This corresponds to a release lag of 5-7 secs (for relay KD).

5.5 Capacitors C1 and C2. Prevents premature ring trip following the second trunk offer (par. 4.5).

5.6 Rectifier MR1. Half-wave rectifier, rectifies the ringing current to provide unidirectional pulses of current to operate relay L.

5.7 Thermistor RY1. Prevents momentary operation of relay L during first trunk offer.

5.8 Design Line Limits. Dictated by the exit limits of the final selectors equipped at the associated exchange.

END