

DIAGRAM NOTES (ISSUE 2)

concerning

DIAGRAM GBW.14130

titled

50/1200 LINE P.A.B.X.

RING AND TONE CIRCUIT

1. GENERAL.

This diagram shows the circuit of the relay set used to provide ringing and tone supplies to the Automatic equipment. Closely associated with this circuit is the Pulse Circuit (GBW.14140) whose circuit description should be read in conjunction with this one.

2. FACILITY SCHEDULE.

Provision is made for:-

- (1) Operation of the circuit on receipt of the ringer start condition.
- (2) start condition to be extended to the Pulse Circuit.
- (3) continuous and interrupted ringing supply.
- (4) dial, busy and ring tone supplies.
- (5) alarms to be given under ring fail conditions.

3. CIRCUIT DESCRIPTION.

3.1 Outline.

The circuit is brought into use by the connection of a start condition to the ringer start lead. When this occurs a start condition is extended to the Pulse Circuit, which generates the interrupted earth supplies necessary for the operation of the ringing and busy relays in the Pulse Circuit.

The ringing supply is generated by a heavy duty vibrating relay, and the valve oscillator generates all 400 c.p.s. tones. Certain of these supplies are interrupted by the ringing and busy relays.

If the circuit fails to generate the ringing supply, alarm conditions are extended to the C.T.S. A rack alarm lamp is lighted, and a visual alarm is given on the relay set.

3.2 Detail.

Ringer Start Condition.

When ringing or tones are required for the operation of a circuit in the P.A.B.X., an earth is connected to the common ringer start lead to operate relay RS.

Relay RS operating

- RS1 connects an earth to operate the ringing vibrator relay VB.
- RS2 connects an earth to operate relay FA (slow operate).
- RS3 spare
- RS4 extends an earth to the Pulse Circuit for the supply of interruptions.

Ringling Supply.

Relay VB operating.

VB1 connects an earth to a primary half winding of transformer TR1, allows current to flow via choke L1, and disconnects the operating circuit of relay VB thereby releasing it.

Relay VB releasing

VB1 transfers the earth connection to the other half primary winding of transformer TR1, and allows VB to re-operate.

Relay VB is thus kept vibrating at a frequency of approximately 20 cycles per second. The reversals of current through the primary winding of TR1 cause an alternating EMF of approximately 70 volts at 20 c.p.s. to be induced into the secondary winding. The A.C. is superimposed on the D.C. supply and the resultant ringing is fed to the continuous ringing common.

Ringling is also fed via condenser C4 to operate relay RR.

Relay RR operating

RR1 prevents the operation of relay FB (see ringing failure).

Tones supply.

Dial tone has a frequency of approximately 400 cycles per second. The changes of current through the primary winding of TR2 caused by the oscillations of the valve V1 generate a tone of approximately 1 volt at 400 c.p.s.

Ring Tone is obtained from the centre point of transformer TR1 via the retard I.

All tones that require interrupting are extended to the pulse circuit, where the necessary interruptions are made.

Ringling Failure.

If for any reason, ringling current is not produced, relay RR either releases, or is not operated. Contact RS2 extends an earth to operate relay FA.

Relay FA operating

FA1 operates relay FB over RR contact.

Relay FB operating

FB1 releases relay FA and holds relay FB when FA releases.
FB2 locks relay FB on release of relay FA.
FB3 prepares to light supervisory lamp LP1 on release of relay FA.
FB4 prepares to light Ring Fail rack lamp on release of relay FA.
FB5 prepares to earth AL lead to sound audible alarm and light Auto Alarm lamp on C.T.S.

Relay FA releasing

FA1 holds FB relay locked to FB2 contact.
FA2 lights the supervisory lamp LP1.
FA3 lights the Ring fail rack lamp.
FA4 earths the AL lead thereby sounding audible alarm and lighting the Auto Alarm lamp on C.T.S. via the Manual Ring and Alarm Circuit AL relay.

Relay FB remains held until the fault is located, whereupon on the operation of relay RR, relay FB releases and restores the ring fail circuit to normal.