

CLOCKS, BPO No. 36 AND No. 46
ADJUSTMENTS AND REQUIREMENTS

(NOTE: As this Instruction has been revised, paragraphs have not been starred.)

1. CANCELLATIONS. Nil.

2. GENERAL.

2.1 This Instruction describes the adjustments and requirements of BPO No. 36 and No. 46 clocks.

2.1.1 BPO No. 36 clocks are used as master clocks in exchanges and BPO No. 46 clocks are used as time pulse control clocks in UAXs.

2.2 Both clocks use an electro-magnet to maintain the swing of the pendulum which, for the No. 36 clock has a 1-second beat and for the No. 46 clock, a $\frac{1}{2}$ -second beat.

2.3 The mechanisms have a very low fault incidence and provided they have been mounted and installed correctly, very little trouble should be experienced.

3. INSTALLATION.

3.1 For accurate and regular time-keeping the clocks must be firmly fixed to a rigid wall free from vibrations. The pointed lower end of the pendulum rod, when at rest, must be directly over the plumb-register at the bottom of the case.

4. REGULATION.

4.1 The swing of the pendulum is regulated by raising or lowering the brass encased lead bob by means of the rating nut. The clock will gain if the bob is raised and lose if it is lowered. In the case of the No. 36 clock, it should be possible to adjust to an accuracy of eight seconds variation per week.

5. TOGGLE.

5.1 The "Hipp" toggle must swing freely about its pivot. Failure to swing freely could indicate the need to clean and lubricate the pivot.

6. LUBRICATION.

6.1 Lubricate the mechanisms as specified in B 5051.

7. No. 36 CLOCKS.

7.1 The No. 36 clock provides 1-second, 6-second and $\frac{1}{2}$ -minute pulses.

7.2 Identification.

7.2.1 The Mark 4 clock differs from earlier Marks in that the terminals are located at the top of the clock immediately above the casting, instead of being mounted in several smaller groups on the casting. In addition, "make" springsets are used instead of "make-before-break" springsets. Synchronising equipment is associated with the six second pulse count wheel, but this equipment is not used.

7.2.2 The Mark 5 clock is similar to the Mark 4 clock, but the synchronising equipment is not provided.

7.2.3 The Mark 6 clock is similar to the Mark 5 clock, but three separate wiring colours are used and a wiring diagram is pasted inside the clock. There are also special fittings to hold the pendulum during transport.

7.3 Springsets.

7.3.1 Contact springs must be straight against their buffer springs and the contacts are to be accurately aligned.

7.3.2 With the springs normal the contact gaps are to be 10 mils minimum.

7.3.3 Spring tensions, measured at the tip of the springs, are to be:

- (a) Lever springs, 5-8 grammes
- (b) Contact springs, 15-18 grammes

7.3.4 Contact springs are to lift from their buffer springs 40 mils minimum to 60 mils maximum, with the normal operating swing of the pendulum.

7.3.5 With the clock stopped, the one-second operating cams are to rest 40 to 50 mils distant from their lever springs.

7.3.6 The drive magnet contacts and the associated toggle are mounted on an adjustable bracket which allows the toggle to be moved in relation to the agate. The toggle is positioned so that, whilst the arc of oscillation of the pendulum lies outside a predetermined minimum, the toggle trails over the notched agate; but when the arc has narrowed to the predetermined minimum, the toggle engages with the notch and on the return swing of the pendulum, the toggle is raised to close the contacts and energise the pendulum drive magnet.

7.3.7 Adjustment of the toggle springs must be such that the contacts make for a period sufficient to ensure a drive magnet pulse of adequate length, but must break sufficiently early to prevent the swing of the pendulum from being retarded.

7.4 Drive.

7.4.1 The pendulum drive magnet current should be between 400 and 450 mA.

7.4.2 The drive pulses should occur regularly and the adjustments applied must allow the swing of the pendulum to take up the 40 to 50 mils gap between the 1-second operating cams and their lever springs, then lift the contact springs from their buffers to the extent of the 40 to 60 mils specified. Failure to achieve the minimum lift will result in pulses of shortened duration, with the possibility of faulty operation of the slave equipment.

7.4.3 The following factors should be taken into account when the extent of the pendulum swing is being considered:

- (a) the contact spring tensions and gaps;
- (b) the "Hipp" toggle adjustment and the drive magnet contact adjustment;
- (c) the drive magnet current; and
- (d) the gap between the magnet and the armature.

8. NO. 46 CLOCKS.

8.1 The No. 46 clock provides 1-second and 6-second pulses, also three pulses at 1-second intervals during each successive 6-seconds period.

8.2 Two toggle operated contacts are used, one for the pendulum drive and the other to provide the 1-second pulses. The duration of the 1-second pulses can be reduced or increased by moving the agate to the right or left respectively.

8.3 As applicable, the spring adjustments follow those for the No. 36 clock.

8.4 A resistor is connected across the drive magnet to help reduce sparking at the contacts. The drive circuit current is nominally 650 mA.

9. REFERENCES. B 5051.

END