

Chapter 1

GENERAL DESCRIPTION

Introduction

1. The tachometer indicators, percentage r.p.m., Mk. 11 and Types KTD 07 and KTD 19 series, indicate engine speed expressed as a percentage of the nominal maximum. They are used in conjunction with a tachometer generator and give 100 per cent indication at a generator speed of 4200 rev/min, corresponding to nominal maximum engine speed.

2. The main dial is calibrated in 10 per cent graduations and the sub dial has ten numbered divisions. One revolution of the small hand is completed for each division indicated by the main hand. Fig. 1 shows the dial presentation, and the dial markings which may vary between individual types.

DESCRIPTION

3. The mechanism consists of a 3-phase synchronous motor driving a pointer assembly through a magnetic drag transmission. A cut-away view of the indicator mechanism is given in fig. 2.

4. The motor comprises a 3-phase stator and a rotor consisting of a starter magnet on a ball race located between two hysteresis discs secured to a rotor shaft. The starter magnet is a two-pole permanent magnet which is free to rotate on the shaft except for a peg drive between the two components.



Fig. 1. Dial presentation

5. A four-pole permanent magnet is mounted on the front end of the rotor shaft and is encircled by a keeper ring. In the air gap between the magnet and the keeper ring a drag cup is free to rotate against the restraining force of two hairsprings. The main hand is mounted on the main handstaff from which the small hand is driven, via a gear train.

6. The complete mechanism is housed in a 2 in. diameter sealed metal case filled with an inert gas to ensure long bearing life. The stator leadwires are connected to a 3-pole plug fitted to the back plate.

OPERATION

7. The 3-phase voltage produced by the associated engine-driven generator energizes the stator of the tachometer indicator producing a rotating field, whose frequency is controlled by the generator speed. The rotating stator field links with the starter magnet and causes it to revolve on the rotor shaft until the peg on the magnet engages the peg on the rotor shaft. The impetus thus given to the rotor overcomes its inertia and starts it revolving. As the speed increases, the magnet has little effect and operation is as a synchronous motor.

8. Rotation of the permanent magnet on the end of the rotor shaft induces eddy currents in the drag cup and produces a torque which causes the handstaff to rotate until the torque is balanced by the hairsprings. The deflection of the hand is then proportioned to the rotor speed, and therefore to the speed of the tachometer generator and the aircraft engine.

INSTALLATION

9. The indicator may be mounted using a bezel and a clamping ring as shown in fig. 3; it is then secured to the instrument panel by four screws and the insert nuts incorporated in the bezel.

10. An alternative method of fixing is shown in fig. 4. A securing clamp (Ref. No. 6A/3823) is secured to the indicator case by tightening the 2B.A. Phillips screw, and the assembly is then secured to the instrument panel by the 4B.A. Phillips screw at the top of the clamp.

SERVICING

11. The only routine servicing required is in examination of the indicator for damage and corrosion. Also examine the glass for signs of moisture on the interior surface; this indicates defective sealing. If serviceability of the indicator is suspect, it is to be tested as detailed in Chapter 2.

Chapter 1-1

**TACHOMETER INDICATOR, PERCENTAGE R.P.M.
TYPE KTD 0701 K****Description**

1. The tachometer indicator, Type KTD 0701 K (Ref. No. 6A/3251), is used in conjunction with a tachometer generator, Mk. 11 to indicate engine speed as a percentage of nominal maximum. The construction and operation is as described in Chapter 1.

2. The dial presentation (fig. 1) is calibrated from 0 to 100 per cent and both the dial markings and the hands are fluorized.

Installation

3. The methods of mounting the indicator on the instrument panel are as described in Chapter 1.

Servicing

4. Prior to installation, or at any time when the serviceability of the tachometer indicator is suspect, it should be subjected to the standard serviceability test detailed in Chapter 2.



Fig. 1. Dial presentation

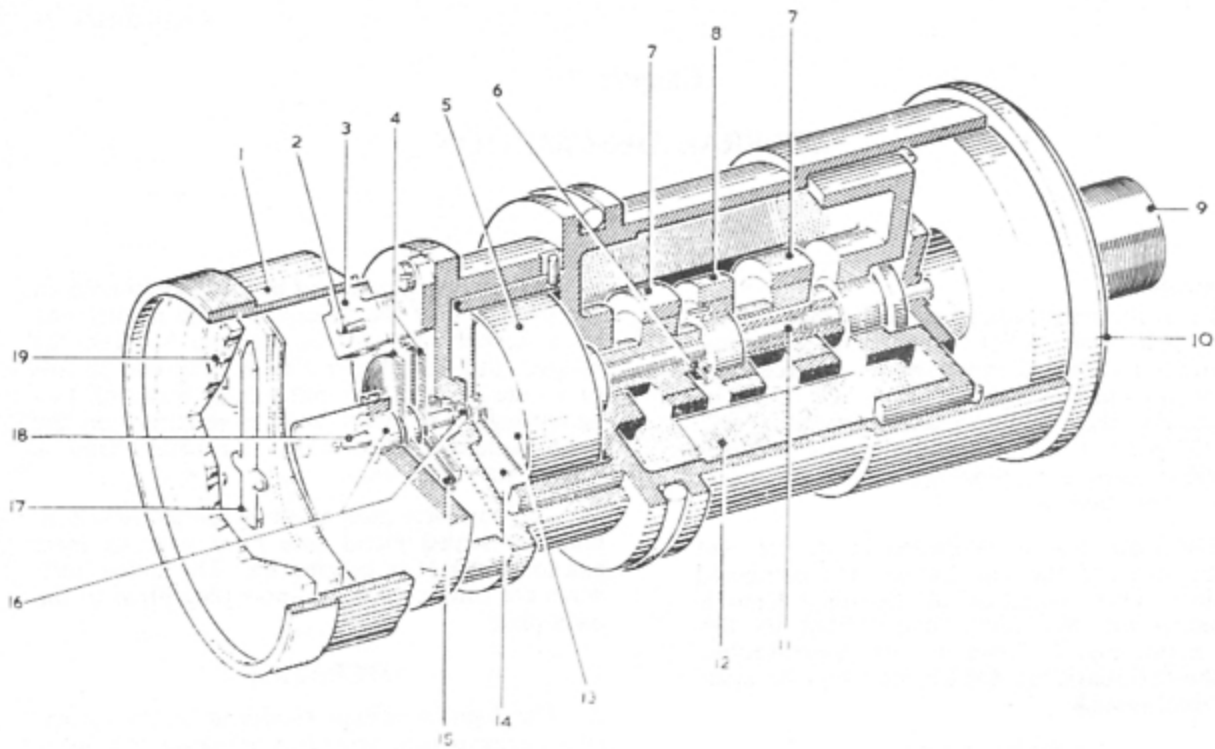


Fig. 2. Sectional view of indicator

- | | |
|-------------------|---------------------------|
| 1 CASE | 11 ROTOR SHAFT |
| 2 SMALL HANDSTAFF | 12 STATOR |
| 3 GEARBOX | 13 ROTOR PERMANENT MAGNET |
| 4 HAIRSPRINGS | 14 DRAG CUP |
| 5 KEEPER RING | 15 GEARWHEEL |
| 6 PEG DRIVE | 16 JEWELLED BEARINGS |
| 7 HYSTERESIS DISC | 17 MAIN POINTER |
| 8 STARTER MAGNET | 18 MAIN HANDSTAFF |
| 9 3-POLE PLUG | 19 SMALL POINTER |
| 10 BACK PLATE | |

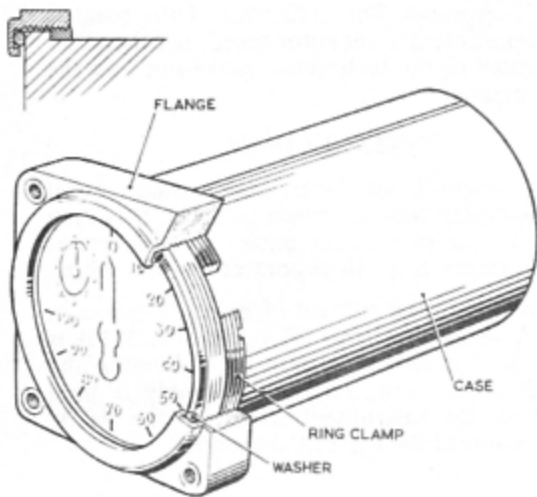


Fig. 3. Bezel mounting

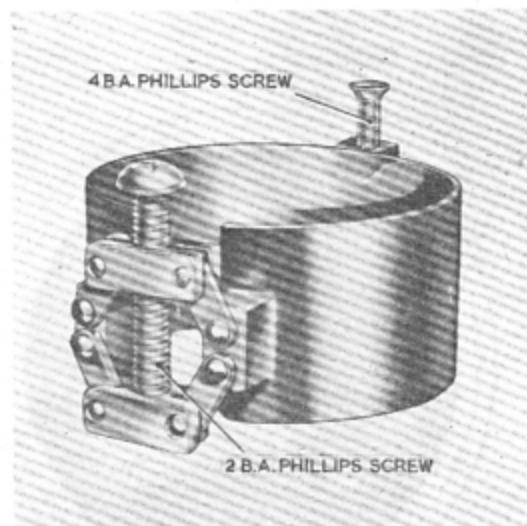


Fig. 4. Securing clamp

RESTRICTED