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TACHOMETER INDICATORS
TYPE KTD 1200 SERIES

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL

L.T. Durrett

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TACHOMETER INDICATORS
TYPE KTD 1200 SERIES

LIST OF CHAPTERS

Chapter 1

GENERAL DESCRIPTION

INTRODUCTION

1. The tachometer indicators in the Type KTD 1200 series are fitted in aircraft to indicate engine speed in revolutions per minute (rev/min) and operate in conjunction with a tachometer generator.

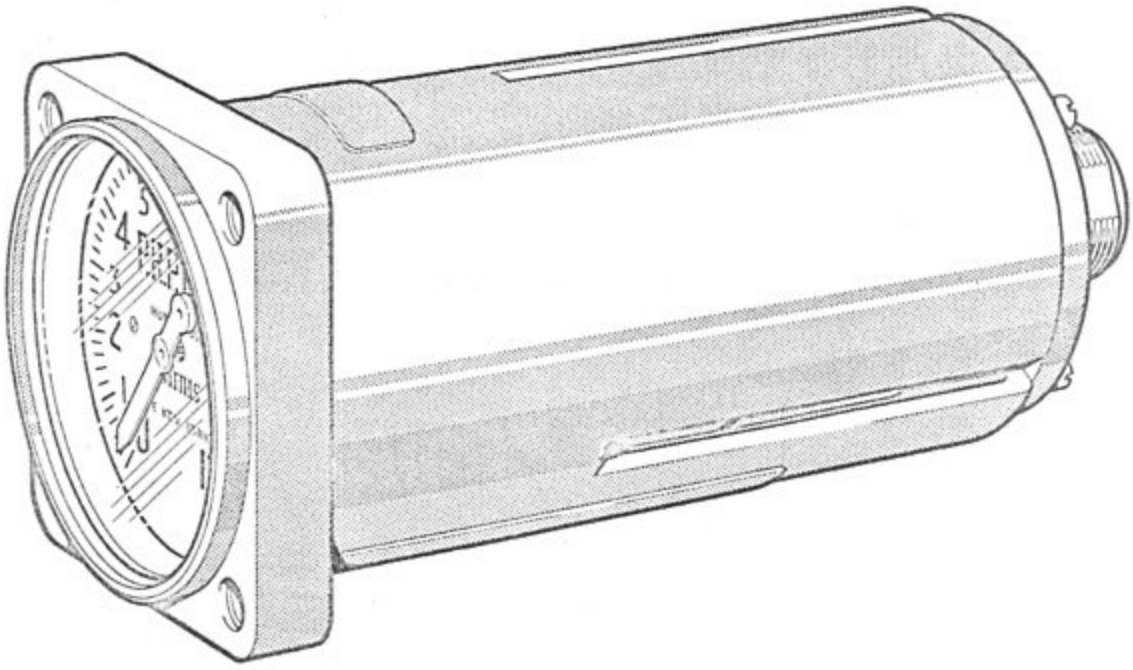

Fig. 1 General view, Type KTD 1200 series indicator

DESCRIPTION

GENERAL

2. Each indicator consists, essentially, of a three-phase, self-starting synchronous motor, which operates a co-axial magnetic drag element to move a pointer over a dial calibrated in R.P.M.

MOTOR

3. The synchronous motor has a three-phase, star-connected stator and a laminated rotor, which is mounted in pre-greased journal bearings. Pre-modification B.064 indicators are fitted with Swiss bearings and are provided with oilways which enable the bearings to be lubricated without dismantling the indicator.

MAGNETIC DRAG ASSEMBLY

4. A magnetic drag assembly, comprising a 4-pole, circular, permanent magnet and a keeper, is secured to the front of the rotor shaft. A copper magnetic drag cup is mounted on the rear end of a

handstaff and is located between the magnet and the keeper, such that the air gap is reduced to a minimum. The pointer is mounted on the front end of the handstaff, which is supported at its centre by a bearing.

OPERATION

5. A three-phase voltage, produced by an associated tachometer generator, is applied to the stator coil of the indicator and induces a rotating magnetic field, which causes the rotor to revolve in synchronism with the frequency of the applied voltage (i.e. at a speed directly proportional to the engine speed).

6. When the indicators rotor revolves, the permanent magnet, mounted on the rotor shaft, rotates within the drag cup. The rotating field of the permanent magnet induces eddy currents in the drag cup which, in turn, create their own magnetic fields. Interaction between the magnetic fields produced by the permanent magnet and the eddy currents, results in a magnetic torque within the drag cup, which causes the drag cup to rotate.

7. The rotary movement of the drag cup is transmitted, through the handstaff and gears, to the two pointers. This action is opposed by the hair spring and, when the hair spring torque equals the eddy current torque, the drag cup ceases to rotate, and the indicator reading stabilizes at a value corresponding to the engine speed.

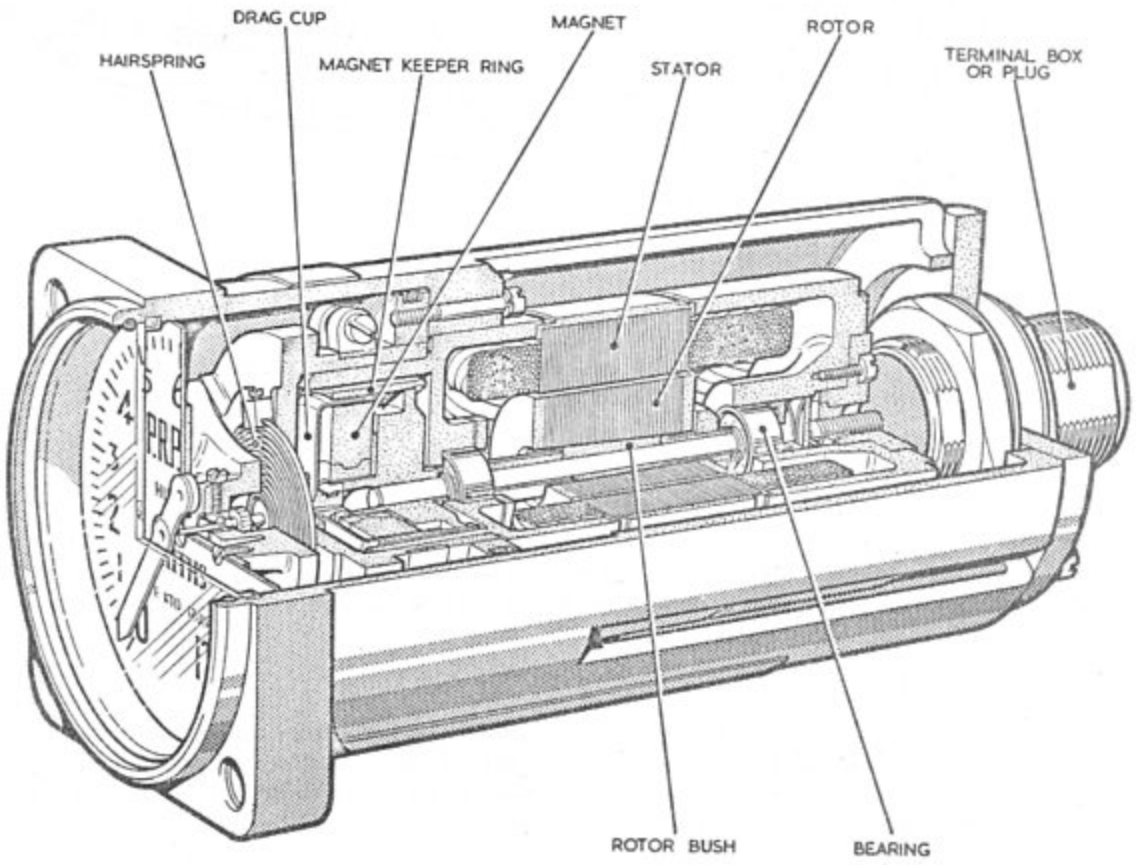

Fig. 2 Cutaway view, Type KTD 1200 series indicator

MOUNTING

8. The indicator can be secured to its mounting either by four 4BA screws, or by four 6-32 UNC screws, which pass through the front of the case, into attachment nuts at the rear of the case. Three small yellow circles to the bottom right of the unit mounting flange indicate the attachment nuts have a unified screwthread.

SERVICING

GENERAL

9. The only routine servicing required is an examination for damage and corrosion. Prior to installation, or at any time when the serviceability of the indicator is suspect, it should be subjected to the tests specified in Chap.2.

LUBRICATION

10. Modification number B.064 introduced pre-greased shielded type journal bearings on the rotor shaft. Pre-mod indicators are fitted with Swiss bearings and lubricating instructions for these bearings are contained in the relevant chapters.

Chapter 1-1

TACHOMETER INDICATORS
TYPE KTD 1201W
(Incorporating modifications up to B.064)

LEADING PARTICULARS

Case dia.	2·25in
Weight	1 lb 8 ozs
Range	0 to 1200 rev/min
Ref.No.	6A/8778

DESCRIPTION

1. The tachometer indicator, Type KTD 1201W is used on turbo-prop aircraft in conjunction with a tachometer generator, Type KGA 0400 series. The dial finish is matt black with the dial markings and pointer painted white.

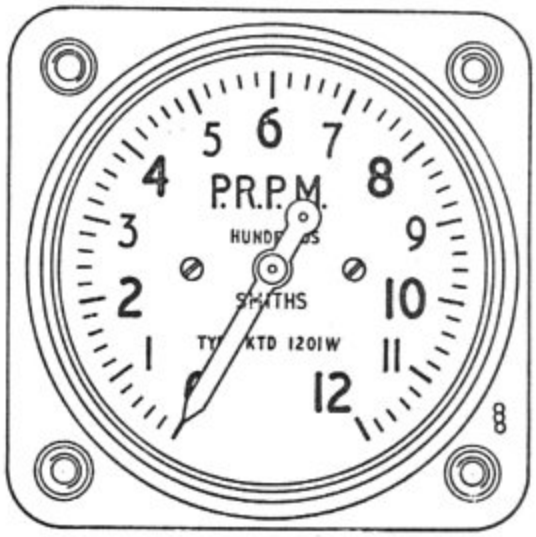

Fig. 1 Dial presentation

SERVICING

2. Routine servicing is laid down in Chap.1, no lubrication is required on post mod B.064 indicators; for pre-mod indicators, refer to para.3 of this chapter.

LUBRICATION (Pre-Mod B.064)

3. Pre-mod indicators have two oilways to permit lubrication of the rotor bearings without dismantling the indicator. The oilway for the front bearing is located approximately halfway along the indicator body, while that for the rear bearing is positioned at the centre of the rear bearing retainer. The outer end of both oilways is closed with a screw and sealing washer, to prevent the ingress of dirt and moisture.

4. The equipment to be used when lubricating the bearings is as follows:-

(1) Syringe, disposable, glass barrel, 1.c.c. (Ref.No.6515-99-210-5756)

(2) Needle, Summit, No.14. (Ref.No.1J/214)

(3) Oil, OX-14. (Ref.No.34B/9100590)

5. The procedure is as follows:-

(1) Check that the syringe barrel is clean, then draw a quantity of oil into the syringe.

(2) Remove the screw and sealing washer from the case, inject two or three drops of oil into the oilway and replace the sealing washer and screw.

(3) Remove the Breeze connector and backplate from the indicator and remove the screw and sealing washer from the centre of the bearing retainer.

(4) Inject two or three drops of oil into the rear bearing, then refit the sealing washer, screw, backplate and Breeze connector.

MODIFICATIONS

6. Modifications applicable to the type KTD 1201W indicator are listed in Table 2.

TABLE 1

Test points and tolerances

Indicator speed (rev/min)	Tolerances (rev/min)
200	± 5
400	± 5
600	± 10
800	± 15
1000	± 15
1200	± 20

TABLE 2

List of Modifications

Manufacturers Mod.No.	Mod.Inst. No.	Brief details
01	B.064	Deletion of lubricating facility, fitting of pre-greased shielded type journal bearings to rotor.

Chapter 2

STANDARD SERVICEABILITY TESTS for TACHOMETER INDICATOR TYPE KTD 1201W

INTRODUCTION

1. The tests detailed in this chapter are to be applied to the tachometer indicator, Type KTD 1201W immediately prior to installation in aircraft, or at any time the serviceability is suspect. The tests are also to be applied at re-inspection periods at Equipment Depots. The tolerances specified are not to be exceeded.

TEST EQUIPMENT

2. The following test equipment is required:-

(1) Tester, insulation resistance, Type C (Ref.No.5G/152)

(2) A serviceable compatible tachometer generator.

(3) Dual tachometer tester (Ref.No.6C/3000, 6C/2391 or 6C/2392).

INSULATION RESISTANCE TESTS

3. Two tests for insulation resistances are made, one before commencing the ranging tests when the indicator is at room temperature, the other immediately after completion of the ranging tests when the indicator is hot.

INSULATION RESISTANCE-ROOM TEMPERATURE

4. Using the Type C tester, measure the insulation resistance between pins A, B and C of the plug and the body in turn. The resistance in each instance must not be less than 20 megohms.

INSULATION RESISTANCE-HOT

5. Immediately after the ranging tests have been completed, measure the insulation resistance between pins A,B and C and the plug body, in turn. The resistance in each instance must not be less than 5 megohms.

RANGING TESTS

6. During the ranging tests, the indicator is to be mounted in the normal position, that is, with the dial upright and in the vertical plane. Light tapping is permissible during the tests.

7. Switch on the tester and run the generator and indicator at approximately 800 rev/min for 10 minutes. At the end of this period, switch off the tester and check that the indicator pointer returns smoothly to zero.

8. Test the indicator at the test points listed in Table 1, Chap.1-1 at both increasing and decreasing speeds. Synchronization of the generator and indicator must occur at or below 200 rev/min, and the error at any test point must not exceed the tolerance stated.

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