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TACHOMETER INDICATOR, Mk.10A

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL

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**FOR USE IN THE
ROYAL NAVY
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AMENDMENT RECORD SHEET

To record the incorporation of an Amendment List in this publication, sign against the appropriate A.L.No. and insert the date of incorporation

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Chapter 1

DESCRIPTION

Introduction

1. The tachometer indicator, Mk. 10A (Ref. No. 6A/2801) is fitted in aircraft to indicate the speed of rotation of either reciprocating or gas turbine engines, and is used in conjunction with a tacho-meter generator driven by the engine.

DESCRIPTION

2. The indicator (fig.1) has a mechanism similar to that of the Mk. 4B tachometer indicator described in A.P.112G-1243-1. The rotor of the synchronous motor runs in ball races and facilities are provided whereby the races may be lubricated without dismantling the instrument. Two small tubes convey the oil to the races, each tube being closed at its outer end by a small grub screw. A hole in the side of the case allows access to the grub screw at the end of the tube leading to the front race. The tube associated with the rear race projects through the moulded terminal block, and the grub screw at its end is accessible from the back of the instrument.



Fig.1 Tachometer indicator, Mk. 10A

3. The range of the instrument is 1,200-12,000 rev/min and the dial, which is fluorized, has an outer scale graduated in hundreds of rev/min and an inner scale graduated in thousands of rev/min. Thus, the larger of the two concentrically pivoted pointers, which are coupled to the drag cup by suitable gearing, makes 1 revolution for 1,000 rev/min while the smaller one completes approximately five-sixths of a revolution for 12,000 rev/min.

INSTALLATION

4. Any reasonable length of 3-core cable may be used to connect the tachometer indicator to its associated generator, but it is important to establish the direction of rotation of the generator driving shaft before effecting the interconnections.

5. Usually, the tachometer generator is driven clockwise (looking at the driving shaft) and when wiring the indicator to the generator, care must be taken to ensure that each lead from the numbered terminals on the tachometer indicator is connected to a terminal on the generator bearing a corresponding number. If the generator is driven counter-clockwise the terminals marked 1 should be connected together, terminal 2 on the generator should be connected to terminal 3 on the indicator, and terminal 3 on the generator to terminal 2 on the indicator.

Chapter 2

STANDARD SERVICEABILITY TEST

Introduction

1. The tests laid down in this Chapter are to be applied on receipt, when serviceability is suspect, and on completion of servicing or repair. Tolerances given must not be exceeded.

TEST EQUIPMENT

2. The following test equipment is required:-

- (1) Tester, insulation, resistance (Ref. No. 5G/9156675).
- (2) A serviceable, compatible generator
- (3) Dual tachometer tester (Ref. No. 6C/3000, 6C/2391 or 6C/2392).

Alternative to item in (3)

- (4) Tachometer tester, bench type (Ref. No. 6C/1879 or 6C/1880).

Alternative to item in (3)

- (5) Tachometer calibrator, Mk. 2 (Ref. No. 6C/869).

TEST PROCEDUREMethod of test

3. 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 of the indicator is permissible during the tests.

Insulation resistance - room temperature

4. Before the indicator undergoes its synchronization and ranging tests, measure the insulation resistance between each phase (terminals 1, 2 and 3) and the body, in turn. The resistance in each instance must not be less than 20 megohms.

Insulation resistance - hot

5. Immediately after the completion of the ranging tests, measure the insulation resistance between each phase (terminals 1, 2 and 3) and the body, in turn. The resistance in each instance must not be less than 5 megohms.

Ranging tests

6. Connect the generator to the tester or calibrator, then connect the indicator to the generator (see Chap. 1 para.5). Switch on the test equipment and exercise the generator and indicator by running at approximately 8000 rev/min. for 10 minutes. At the end of this period, reduce the speed to zero.

7. Slowly increase the generator speed from zero, and check the speed at which the generator and indicator synchronize. This must occur at or before 1200 rev/min.

8. Check the accuracy of the indicator at the test points quoted in Table 1. The error at any point must not exceed the given tolerance. Any lag, shown by the difference between readings taken at increasing and decreasing speeds, must not exceed 50 rev/min.

Note...

Unless an indicator has been lubricated immediately prior to the ranging tests, it must not be rejected for failing the synchronization or ranging tests until it has been lubricated and re-tested.

TABLE 1

Test points and tolerances

Test Bench speed (rev/min)	Indicator speed (rev/min)	Tolerance (rev/min)	Max. acceptable pointer fluctuation (rev/min)
500	2000	± 60	25
1000	4000	± 60	25
1500	6000	± 60	25
2000	8000	± 120	25
2500	10000	± 120	25
3000	12000	± 120	25

Chapter 3

SERVICING

1. The tachometer indicator must not be dismantled by units other than suitably equipped Repair Depots. Should the tachometer indicator give trouble, it must be returned to Stores and a new one fitted in its place.
2. At routine servicing periods, the ball races of the indicator should be lubricated as follows:-

Instruments manufactured by Messrs. Kelvin and Hughes

3. The equipment to be used is syringe, hypodermic, glass barrel, 1 cu. cm fitted with a No. 14 Summit needle (Ref. No. 1J/212).
4. The lubricant to be used is oil, OX-14.
5. The sequence of operations is as follows:-
 - (1) Remove the two screws, one located about half-way along the top of the case and the other in the centre of the terminal block of the indicator.
 - (2) Draw a quantity of anti-freeze oil into the syringe having previously ascertained that the syringe barrel is clean. Inspect the oil in the barrel and ensure that it is free from foreign matter.
 - (3) Insert two or three drops of oil in each oil channel in the instrument.
 - (4) Refit the screws removed in sub-para. (1).