

## RESTRICTED

### PART 2: SECTION 5

#### CHAPTER 1

## TURN AND SLIP INDICATORS

### Purpose

1. The purpose of an electrically-driven turn and slip indicator is identical with that of the air-driven version described in Section 1, Chapter 2 of this Part, but since air is not the driving medium the electrically-driven version is unaffected by low air density.

### Implementation

2. **Turn Indicators.** Electrically-driven turn indicators utilize the same fundamental principle of gyroscopic precession as the air-driven type.

3. **Slip Indicators.** The type of slip indicator used in these instruments is basically an inclinometer.

### CONSTRUCTION AND OPERATION

4. Constructional details are given in A.P. 1275A, but leading particulars of two representative types are given in broad outline below.

### Mk. 2

5. **Power Requirement.** This model (Fig. 1) is designed for 28-volt nominal (22 to 29-volt actual) D.C. operation.

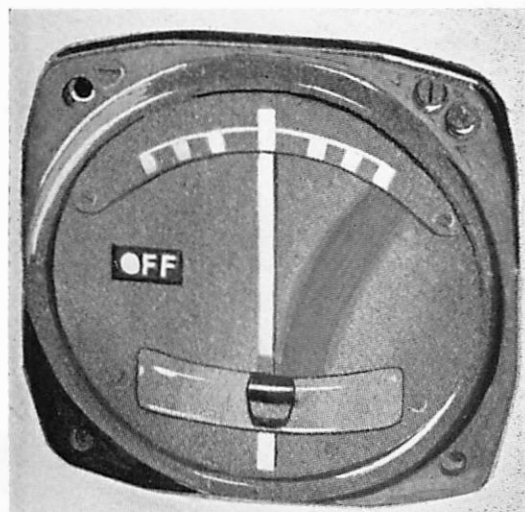


Fig. 1. Turn and Slip Indicator, Mk. 2.

6. **Power Failure Indicator.** A fluorized OFF-flag, which is out of sight during normal operation, appears whenever the rotor speed is insufficient to provide accurate indications.

7. **Turn Indicator Element.** The turn indicator markings represent Rates 1, 2, and 3 turns, port and starboard. The pointer and scale markings are fluorized. The electrically-driven rotor, the operating speed of which is 4,250 r.p.m., is mounted with its spinning axis athwartships in a gimbal ring pivoted fore and aft. Deflection of the gimbal system is restricted by a control spring which tends to retain the gimbal horizontal and which, at various rates of turn, balances the precessing torque and brings the system to rest in a state of equilibrium.

8. **Slip Indicator Element.** The slip indicator is a ball-in-tube inclinometer. The curved glass tube is liquid filled to dampen ball movements and has its forward surface (*i.e.* the background as seen by the pilot) fluorized in contrast with the black ball. A single fluorized zero line is marked at 6 o'clock on the dial. During straight and level flight the ball, by its own weight, rests in the centre position indicated by the zero line. In a turn, the ball positions itself in line with the *apparent* vertical, which only coincides with the centre zero position on the glass tube during a correctly banked turn.

9. **Operation.** During straight and level flight both the ball and turn pointer are centred. In straight but not laterally level flight the turn pointer remains centred but the ball rolls to the lower side. During a turn to port the turn pointer is off-centre to port to an extent appropriate to the rate of turn; correct bank is indicated by the ball being in the central (zero) position, displacement of the ball to port indicating slip, *i.e.* too much bank, and off-centring of the ball to starboard indicating skid, *i.e.* insufficient bank.

## RESTRICTED

A.P. 129, VOL. 1, PART 2, SECT. 5, CHAP. 1

### Mk. 2A

10. **Power Requirement.** This model (Fig. 2) is designed for 24-volt nominal (21 to 29-volt actual) D.C. operation.

11. **Power Failure Indicator.** A fluorized OFF-flag, which is out of sight during normal operation, appears whenever the rotor speed falls below 2,000 r.p.m.

12. **Turn Indicator Element.** Para. 7 may be taken as applicable to this instrument, except that the rotor speed in the Mk. 2A is 4,200 r.p.m.

13. **Slip Indicator Element.** Slip indication is provided by a pendulum inclinometer pivoted near the top of the instrument and having at its lower end a fluorescent pointer bob (false ball) which registers in relation to a single fluorescent zero line at 6 o'clock on the dial. Smooth pendulum movement is achieved by magnetic damping, and sensitivity is increased by the interconnection of a second, inverted pendulum to the main pendulum.

14. **Operation.** Para. 9 may be taken as applicable to this instrument.

### Mks. 2 and 2A Power Supply

15. Two separate D.C. circuits supply these instruments. If one supply circuit should fail,

the alternative circuit takes over automatically. On some aircraft which use an emergency battery for such functions as hood jettisoning, by operating a switch mounted near the turn and slip indicator this battery can also be used to drive the turn and slip indicator in the event of total electrical failure.

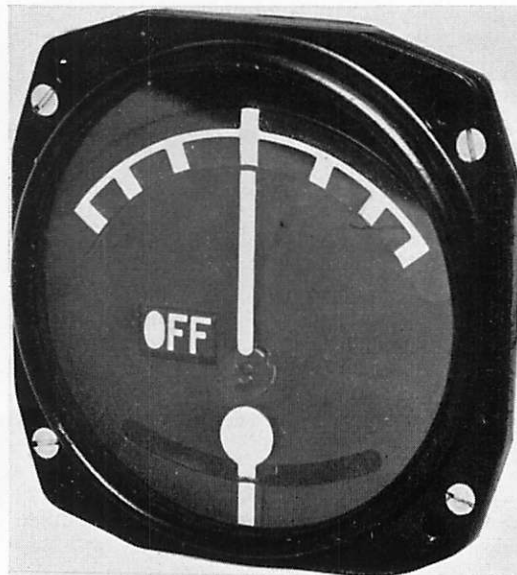


Fig. 2. Turn and Slip Indicator, Mk. 2A.

This file was downloaded  
from the RTFM Library.

Link: [www.scottbouch.com/rtfm](http://www.scottbouch.com/rtfm)

Please see site for usage terms,  
and more aircraft documents.

