

Chapter 2-0

PRESSURE AND POSITION INDICATORS, TYPE S63 SERIES

INTRODUCTION (fig. 1)

1. The information in this chapter deals with the basic Type S63 pressure and position indicators. Each instrument has a manufacturer's code number which is made up of three parts. A typical code is S63.4.1222 where S63 is the model number, .4 is the "form" and .122 is the suffix number of the application to which the instrument is adapted.

2. Details of each application are given in the sub-chapter for the particular suffix number. Dial presentation, circuit diagram and test procedure are shown for each variant in the particular sub-chapter.

PRINCIPLE

3. This type of indicator operates as a ratiometer, which measures the ratio of currents flowing in each of the two moving coils. Magnetic circuits are so arranged that the field, in the gap between the core and the pole-piece in which the coils rotate, is not uniform. This non-uniformity is achieved by the shaping of the centre core. Two coils mounted on a common former are so connected that the torques produced in each coil are in opposition.

4. Due to the shaping of the centre core, the coil in which the greater current flows is in a weaker part of the field than that in which the lesser current flows. The assembly will therefore always rotate until the coils are equal and opposite; in this position a state of equilibrium is reached.

5. Theoretically, the instrument is substantially independent of the supply voltage, since any change in the voltage will not alter the ratio of the currents in the two coils on the former. Assuming that the ligaments, which conduct the current into and out of the coils, exert no controlling torque, then no change in pointer indication will occur. In practice, the ligaments exert a small torque, but this has little effect on the pointer at operating voltages.

6. At the rear of the movement, the current is transferred from the two cables to the moving coils by the two ligaments which exert a small torque on the pointer assembly. The common return circuit is conducted by a low torque hairspring at the front of the assembly which also functions as a pointer return spring.

DESCRIPTION

7. The indicator consists of the following units:-

- (1) Casing
- (2) Base
- (3) Rear cover
- (4) Magnet and movement assembly.

CASING

8. A moulded casing, complete with a mounting flange, houses the indicator mechanism. The cover glass is inserted from the rear of the casing and is secured by a bezel ring held in position by cement. The casing is secured to the base by three screws disposed around the periphery.

BASE

9. The base carries three supporting pillars, each pillar having a threaded portion to which the magnet and movement assembly is secured. Three leads extend from the front of the base and are connected to the magnet and movement assembly as shown in fig. 3. A combination of resistance spools, mounted on the base and connected in series or parallel with the moving coils of the movement, are used to calibrate the indicator according to its service function.

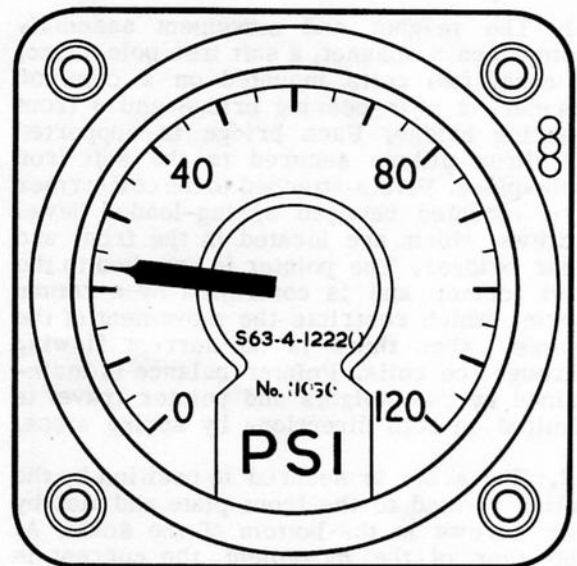


Fig. 1. A typical indicator

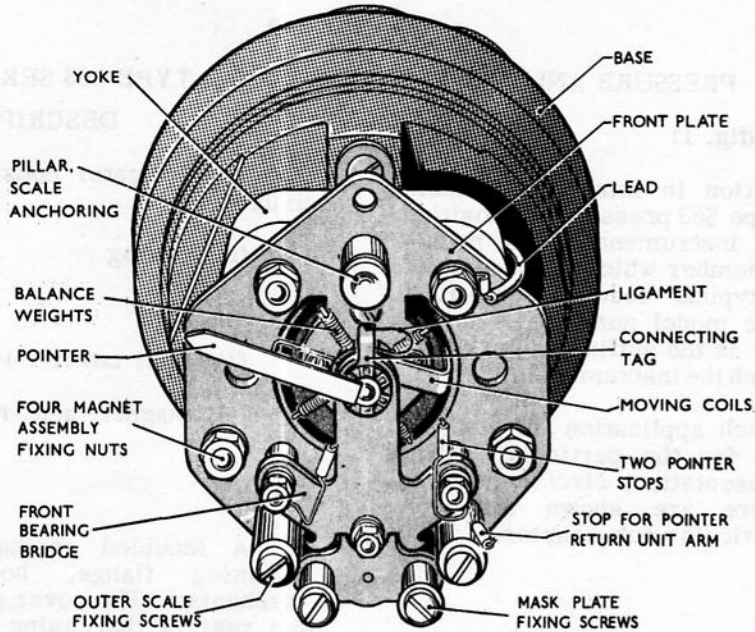


Fig. 2. Indicator movement (front view)

REAR COVER

10. The rear cover is secured to the base by a single centrally-disposed screw which passes through the rear cover and is located by a tapped insert in the base. A projection and slot register the base with the rear cover. Only three of the four terminal screws, number 1, 3 and 4 are used in this particular "form" of indicator.

MAGNET AND MOVEMENT ASSEMBLY

11. The magnet and movement assembly comprises a magnet, a soft iron pole-piece, a core, two coils mounted on a common former, a rear bearing bridge and a front bearing bridge. Each bridge is supported by three pillars secured to the soft iron pole-piece. Pivots attached to the coil former are mounted between spring-loaded jewel screws which are located in the front and rear bridges. The pointer is attached to the coil former and is controlled by a return spring which restricts the movement of the pointer when there is no current flowing through the coils. Pointer balance is maintained by two weights and pointer travel is limited in both directions by spring stops.

12. The scale is secured in position by the pillar riveted to the front plate and also by two screws at the bottom of the scale. At the rear of the movement, the current is

transferred from the two leads to the moving coils by two ligaments. These two ligaments also exert a small torque which moves the pointer off the scale when no current is flowing in the coils.

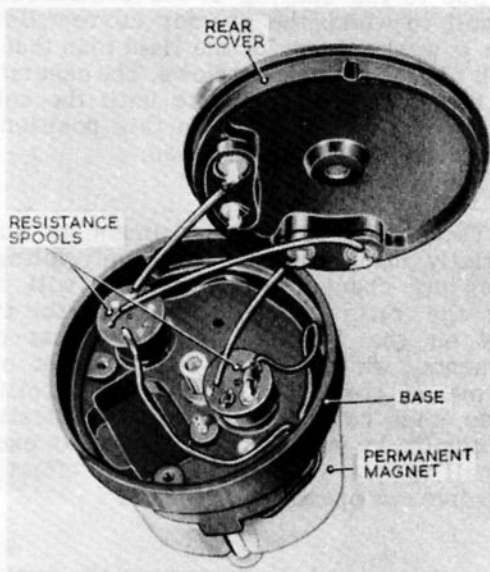


Fig. 3. Base assembly

SUFFIX

13. The suffix number represents the instrument application; each instrument will have a different suffix number if used for more than one purpose. The relevant information is contained in the sub-chapters. Where indicators have been provided by the aircraft contractor, a relevant spare indicator provided by Service Stores will bear a different suffix number.

SERVICING AND TESTING

14. Each sub-chapter contains the relevant information to be used to test that particular indicator. The resistance values given in the calibration table include an additional amount of resistance to simulate actual conditions under which the indicator will operate.

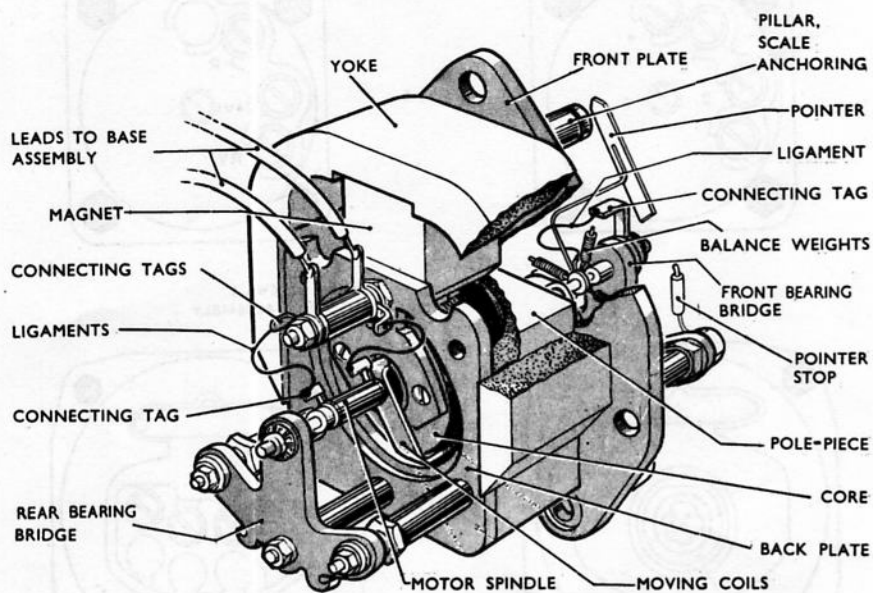
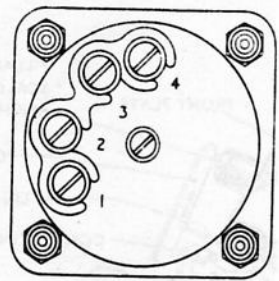


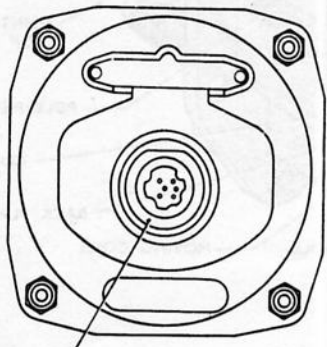
Fig. 4. Magnet and movement assembly

14. Each sub-character contains the relevant information to be used to test that particular character. The resistance values given in the character table include an additional margin of resistance to maintain correct conditions under which the indicator will operate.

15. The suffix number represents the test resistance application; each resistance will have a different suffix number if used for more than one purpose. The relevant information is contained in the sub-character. Where indicators have been provided by the manufacturer, a relevant spare indicator provided by Service Stores will bear a different suffix number.

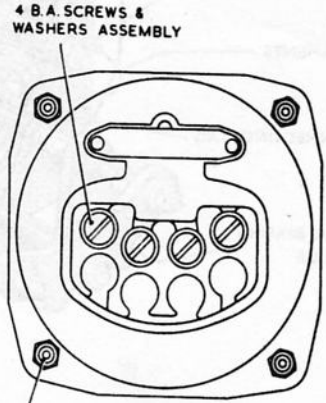


FORM 4

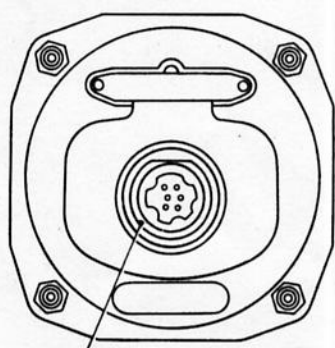


6-POLE PLUG

FORM 5



4 B.A. NYLOC NUTS



6-POLE PLUG

FORM 6



Fig. 5. Form details