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POSITION TRANSMITTER (PENNY & GILES, TYPE D2357/1)

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL

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Chapter 1

POSITION TRANSMITTER (PENNY & GILES, TYPE D2357/1)

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Introduction

1. The position transmitter D2357/1 (Ref. No. 6A/12378) is a modified Dessyn transmitter designed to provide dual information to indicators of remote mechanism or control surface movement. It requires a 28V supply and uses the d.c. potentiometer principle to supply current to the indicators. The operating lever arm of the transmitter has a range of 60° angular movement.

DESCRIPTION

2. The mechanism of the transmitter comprises the following main parts :—

(1) Body
(2) Adjustable operating lever arm
(3) Gear assembly
(4) Insulated crank and pin
(5) Spiral spring
(6) Upper and lower toroidal coil resistances
(7) Upper and lower wiper brush assemblies
(8) Housing

3. The body of the transmitter is a light alloy casting and as shown in fig. 1 is flanged for mounting purposes. The operating lever arm is serrated on its upper surface and secured on the driving spindle by a serrated plate, a plain plate and a stiffnut.

Gear assembly (fig. 2)

4. A sector gear is locked to the driving spindle and engages with a pinion on a shaft concentric with the body. An insulated crank at the upper end of the pinion shaft carries a pin which engages a slot in an upper wiper arm assembly. The underside of the crank disc carries a lower wiper arm which has a leaf contact. To take up any backlash in the gearing, a spiral spring is fitted to the pinion shaft.

5. The sector and pinion gear provide a gear ratio of 6 to 1, hence a 30° movement of the operating lever arm will cause both wiper arms to move through 180°.

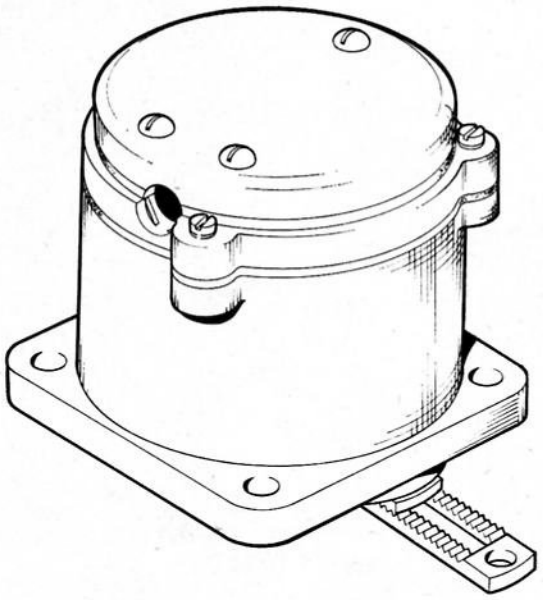


Fig. 1. Position transmitter D2357/1

Upper resistance and wiper brush assembly (fig. 2)

6. The upper resistance is a toroidal wound coil cemented into a recess in the housing and tapped at points 120° apart. A cover on top of the housing encloses eight shrouded terminals (fig. 3) which screw into moulded inserts in the housing. The inserts extend through the housing and are connected to the resistance and upper wiper (brush) assembly.

7. Mounted on the centre pin, which is an extension of the central insert, and free to rotate, are two wiper arms insulated from each other and which wipe the upper resistance coil at points diametrically opposite. One wiper is in electrical contact with the central pin and is thereby connected to one pole of the electrical supply via the central terminal. The other wiper is in contact with a metal collar through which it is connected to the other pole of the supply. The metal collar rides on a three fingered spring ring which is connected to a negative marked terminal on the housing. The circuit and terminal connections are shown in fig. 3.

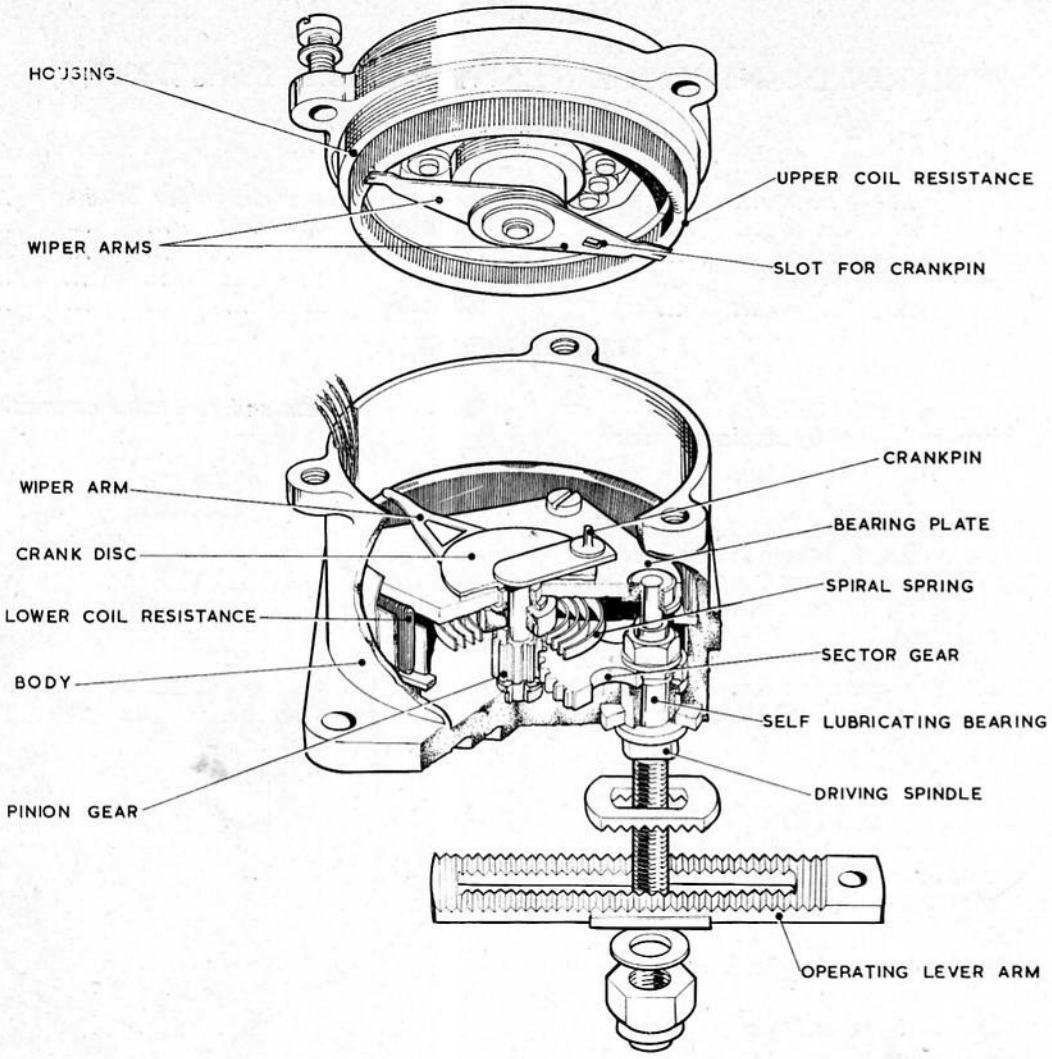


Fig. 2. Cut-away and partially exploded view

Lower resistance and wiper brush (fig. 2 and 3)

8. The lower resistance is a toroidal wound coil cemented inside the lower portion of the body. Supplies to the resistance and leaf contact wiper arm are fed through a slot in the housing and down through the body (fig. 2). Continuous supply is made to the wiper arm via a slipring type spring contact loaded against the underside of the wiper arm.

PRINCIPLE OF OPERATION

9. Movement of the operating lever arm will cause the upper and lower wiper arms to rotate around their associated coil resistances. When a d.c. voltage is applied, the position of the wiper arms will determine the voltages at the equally spaced tappings. These voltages may then be applied via a multi-cored cable to indicator units. The indicators convert the voltages applied to pointer movement, which will indicate the movement of the mechanism to which the transmitter is connected.

INSTALLATION

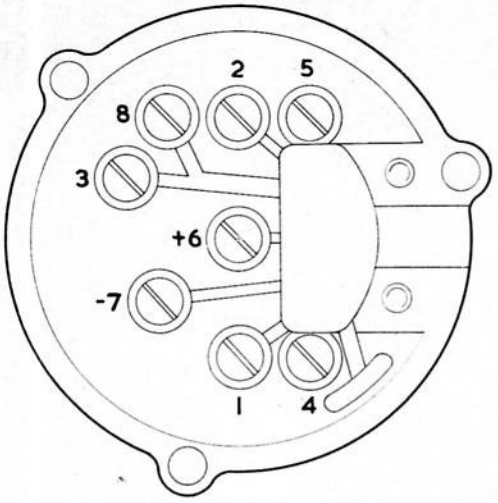
General

10. The transmitter is connected to the aircraft control either by a standard adjustable link or by a coupling provided by the aircraft manufacturers. Should the operating lever arm require adjustment to its length, this may be obtained by slackening the stiffnut (fig. 2) and moving the lever along the serrations on the serrated plate.

11. The instrument should be handled carefully before and during fitting as the electrical setting may be altered if the wiper arms are allowed to spring back against their stops. A violent impact of the wipers against their stops, under the influence of the spiral spring (fig. 2), would probably necessitate resetting and recalibration of the transmitter. The transmitter terminals are connected to the indicators and supply as shown in fig. 3.

12. The transmitter may be checked in the aircraft in conjunction with the indicators as follows :—

(1) Set the aircraft control to one extreme position and adjust the link or coupling



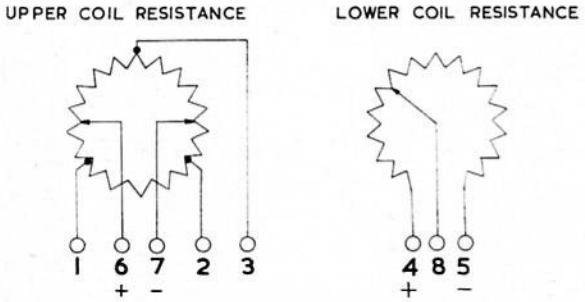


Fig. 3. Terminals and resistance connections

until the indicator pointers register correctly, then set the control in the other extreme position.

(2) If the indicators overshoot the correct marks on the dials, lengthen the lever arm; if they fail to reach it, shorten the lever arm. If the transmitters are to be used on a control where the mid-position is the most important (i.e. trimming tabs) this position should be adjusted first. When the indicators register the control movement correctly, lock all adjustments, then re-check for correct control movements.

SERVICING

13. Servicing should normally be confined to an examination for damage. The transmitter may be electrically tested for accuracy *in situ* using the Dessyn test set (Ref. No. 6C/470). Should the serviceability of the transmitter be suspect, it should be removed and tested as detailed in the standard serviceability tests in Chap. 2.