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PROBE, (REF. No. 6A/12668)

GENERAL AND TECHNICAL INFORMATION

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Ministry of Defence

FOR USE IN THE
ROYAL AIR FORCE

(Prepared by the Ministry of Technology)

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

PROBE (Ref. No. 6A/12668)

DESCRIPTION

Leading particulars

Probe (total temperature sensor), Type 102BB2K	Ref. No. 6A/12668
Dimensions:				
Projection into airstream	...	...	...	3.25 in.
Length of housing	...	...	...	3.5 in.
Mating connector, Plessey UK-AN Type 14S-5S	...	...	...	Ref. No. 5X/8038
Temperature range	...	...	...	-100 to +350 degrees C
Weight	...	...	...	9-10 oz.

Description

1. The probe is used to provide a measurement of total air temperature. Air flows straight through a stainless-steel housing. Part of the airstream is caused to execute a sharp right-angled turn past a temperature sensitive platinum wire resistance thermometer element. The sharp right turn prevents particles of dust and droplets of water from coming into contact with the element.
2. In executing the right-angled turn the airflow

loses most of its forward velocity. The turn is aided by holes provided in the raised forward lip of the element chamber: air drawn through these holes prevents the formation of an eddy about the lip of the element chamber and causes a smooth airflow past the element. A cylindrical shield around the element minimises the effect on the element of heat radiation from the main body of the sensor. Small holes drilled in the housing reduce the heating effect of the boundary layer of the airstream flowing through the housing. No de-icing system is fitted.

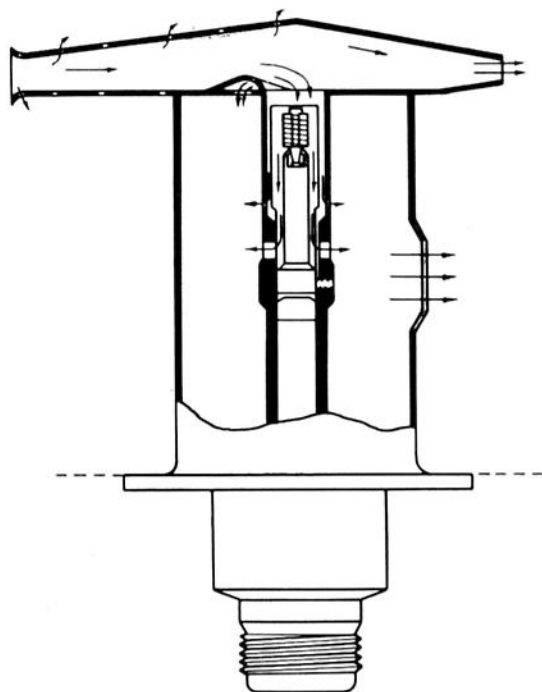


Fig. 1. Sectional view of probe

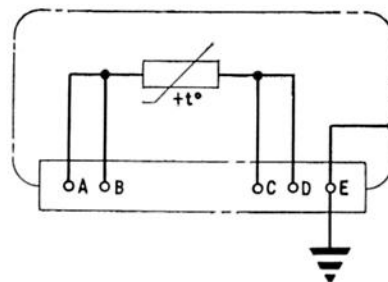


Fig. 2. Circuit diagram

Chapter 2

PROBE (Ref. No. 6A/12668) STANDARD SERVICEABILITY TEST

Introduction

1. This chapter describes the tests to be applied to the probe, Type 102BB2K (Ref. No. 6A/12668) immediately prior to installation in an aircraft and at any time the serviceability is suspect.

Test equipment

2. The following test equipment is required:—
- (1) Insulation resistance tester, Type C (Ref. No. 5G/152)
 - (2) Multimeter, Type 12889 (Ref. No. 5QP/6625-99-105-7049)
 - (3) Thermometer, precision (Ref. No. 6C/9432934)
 - (4) Boxes, Cambridge resistance (Ref. No. 10S/16237)—2 off
 - (5) Resistor, Type 321, variable 15 ohms (Ref. No. 10W/9846)
 - (6) Resistor, Type 10504, fixed 100 ohms $\pm 0.1\%$ (Ref. No. 10W/19365)
 - (7) Socket Plessey, Type UK-AN14S-5S (Ref. No. 5X/8038)

Power supplies

3. A 28V d.c. power supply is required.

Cleaning

4. Using dry rag (Ref. No. 32B/1257), clean the probe and examine for damage. Ensure that the orifices are clear of foreign matter.

TESTING

Insulation resistance

5. Using the insulation resistance tester, measure the resistance between pins A, B, C and D connected together, and pin E. The resistance is to be not less than 20 megohms.

Resistance element

6. Prepare the test circuit shown in fig. 1, ensuring that all leads used in the resistance bridge are of negligible resistance. Secure the precision thermometer so that the bulb is in close proximity to the probe. Shield probe and precision thermometer from moving air. Allow probe and precision thermometer time to attain the same temperature, then proceed as follows:—

- (1) Set S1 to the off position and adjust the variable resistance, Type 321 until the voltmeter indicates 5 volts.
- (2) Set the multimeter in the bridge circuit to the $250 \mu\text{A}$ d.c. range.
- (3) Set R1 to 1000 ohms.
- (4) Set S1 to the on position.
- (5) Adjust R2 until the multimeter indicates zero current.
- (6) Note the reading of the precision thermometer.
- (7) Check that the resistance indicated on R2 is within the limits indicated in the relevant column of Table 1 against the temperature indicated by the precision thermometer.
- (8) Set S2 to the off position.

Disconnect the probe from the test circuit.

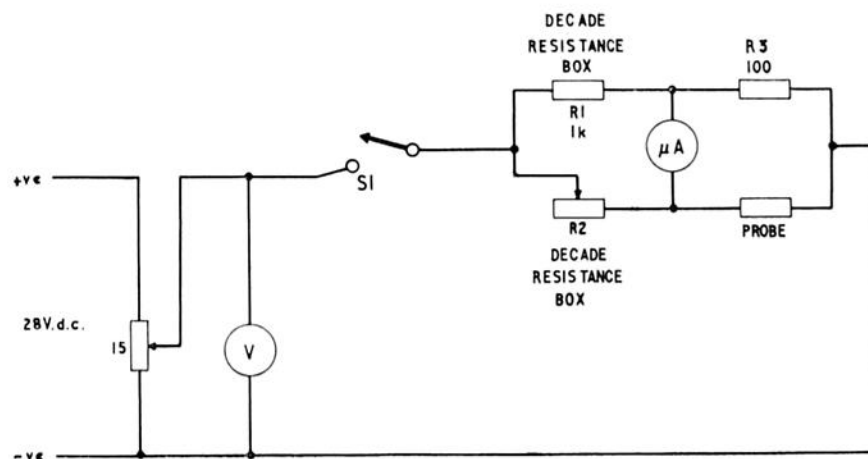


Fig. 1. Test circuit

TABLE 1
Calibration values

Precision thermometer (degrees C)	Resistance box R2 (ohms)
10	1351 to 1357
11	1356 to 1362
12	1361 to 1368
13	1367 to 1373
14	1372 to 1378
15	1377 to 1383
16	1382 to 1389
17	1387 to 1393
18	1392 to 1399
19	1398 to 1404
20	1403 to 1409
21	1408 to 1414
22	1413 to 1419
23	1418 to 1424
24	1423 to 1429
25	1428 to 1434
26	1433 to 1440
27	1439 to 1445
28	1444 to 1450
29	1449 to 1455
30	1454 to 1460