

Chapter 3

(Completely Revised)

INSTRUMENT INSTALLATION

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Introduction

1. The circuits for electrically operated instruments are shown in Chapters 1 and 2 of this section.

AIR SPEED INDICATOR SYSTEM

Description

2. The A.S.I. system is shown in fig.1. A pressure head is fitted beneath the port wing, and the pressure and static lines connect, through T-pieces, to instruments in both instrument panels. A moisture trap (A.G.S.838/6) with drain plug is fitted in each line, beneath the port wing walkway; these traps are accessible through the rear detachable panel in the wing under-surface skin. The pressure head is electrically heated. Instruments coupled to the A.S.I. system pipelines are listed in Table 1 and described in A.P.1275A, Vol.1 or A.P.1275B, Vol.1.

TABLE 1

Flying Instruments : A.S.I. system

Instrument	Ref.No.
Altimeter, Mk.5B (P) : 0-45,000 ft.	6A/1512
Air speed indicator :-	
Pre. Mod.H.161-159AS : 20-210 knots	6A/2674
Post Mod.H.161-167AS : 30-210 knots	6A/3348
Rate-of-climb indicator, 21RC/PC	6A/2675
Pressure head, Mk.8D	6A/731

Servicing

3. General servicing consists primarily of draining any accumulation of moisture at the traps, checking the instruments for damage and security, and ensuring that

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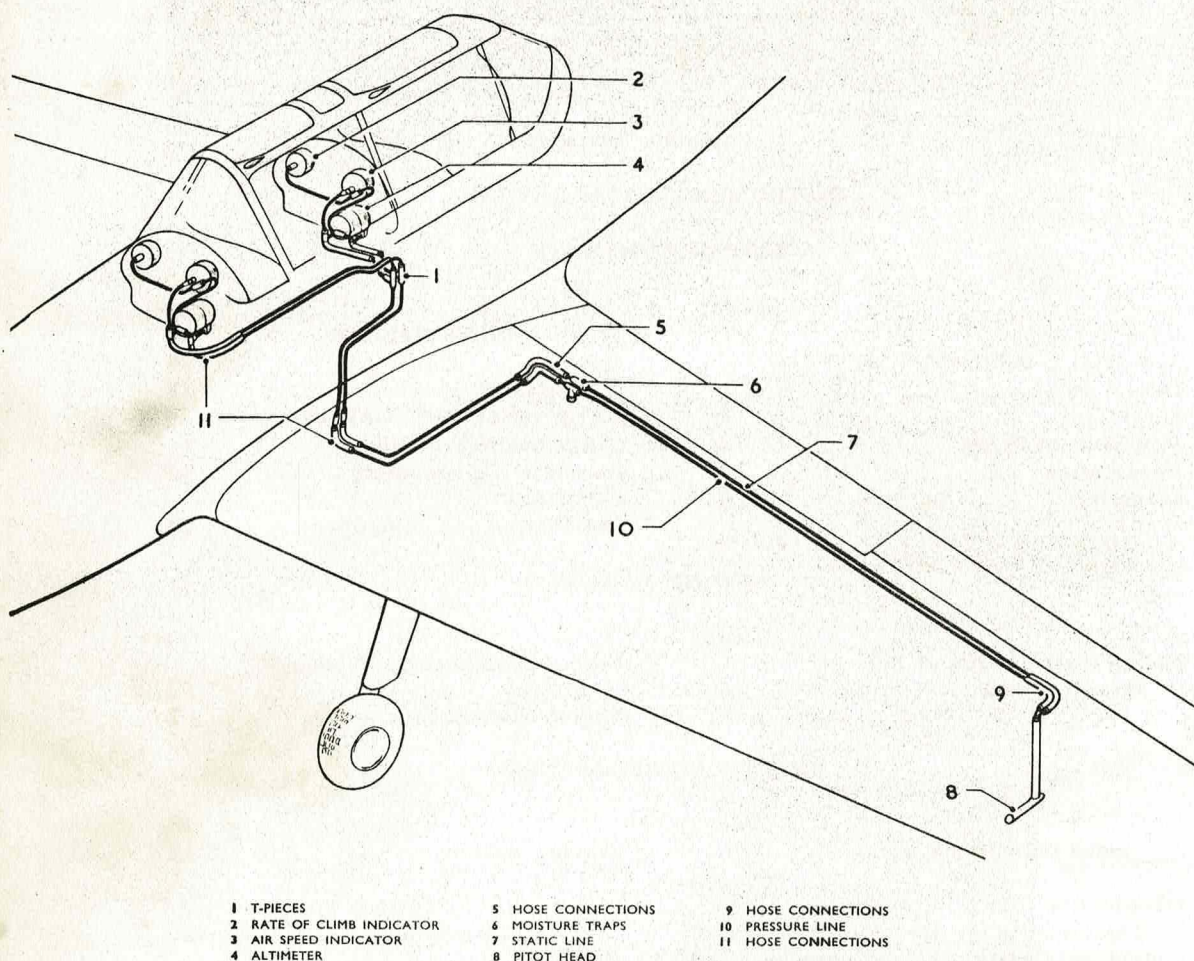


Fig.1. Air speed indicator system

the drain and static holes in the pressure head are unobstructed. If the moisture accumulation is considerable, or frozen, disconnect both pipelines from the instruments and the pressure head, and blow warm air through the pipelines. After reconnecting the pipelines a leak test in accordance with A.P.1275B, Vol. 2, Part 1, Leaflets No. A8 and A33 must be carried out. Rubber bushes are employed at pipeline union nut locations, and there is a rubber seal in the moisture traps; these must be renewed if their condition deteriorates to an extent likely to cause leaks.

VACUUM SYSTEM

Description

4. The arrangement of the vacuum system is illustrated in fig.2. A Plessey B3X, Mk.1 vacuum pump(Ref.No.37J/4) provides suction to operate the relevant instruments, the discharge side of the pump being connected to the engine breather drain pipe. When Mod.H.148 is embodied a wire-mesh screen with retaining unions is fitted in the suction line, at the fire-wall, to prevent any foreign matter reaching the pump. Each suction manifold is provided with a system test-point (Mod.H.80).

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Instruments connected to the vacuum system are listed in Table 2, and described in A.P.1275A, Vol. 1.

TABLE 2

Flying instruments: Vacuum system

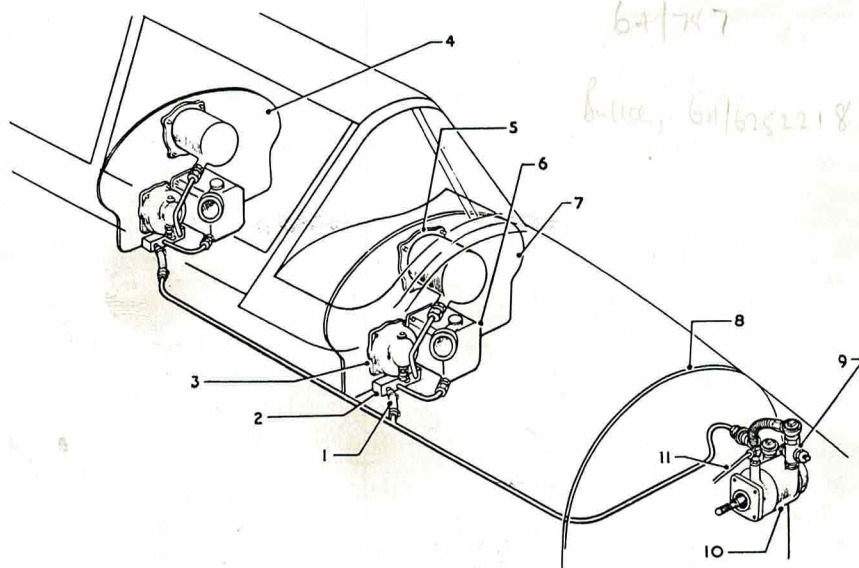
Instrument	Ref. No.
Artificial horizon:	
Pre-Mod. 235-Mk. 1B	6A/1519
Post-Mod. 235	6A/1498
	6A/3290
	6A/3827
Direction indicator, Mk. 1A	6A/1298
Turn and slip indicator:	
Pre-Mod. H.184—TN. 300	6A/2676
Post-Mod. H.184—Mk. 1B	6A/3371

Servicing

5. Details of vacuum pump and suction

relief valve servicing are given in A.P.4303Z, Vol. 1, Sect. 9, Chapter 2. Correct functioning of the vacuum pump may be established by observing the relevant instruments when the aircraft engine is being run. Do not make any adjustments until the filters in the suction relief valve and the gyro instruments have been examined and a check has been made to ensure that the relief valve is not sticking; the wire-mesh screen at the firewall should also be examined.

6. To test the system remove the union nut, with nipple plug, from the test-point on the rear suction manifold and fit a suction gauge, Mk. 1 (Ref. No. 6A/757) or 257PG (Ref. No. 6A/2092). With the aircraft engine running at 1,600 r.p.m. a reading of 4.5 in. Hg. should be obtained. Any necessary adjustment must be effected at the suction relief valve (A.P.4303Z, Vol. 1, Sect. 9, Chap. 2).



- 1 HOSE CONNECTIONS
- 2 SUCTION MANIFOLD, EMBODYING SYSTEM TEST
- 3 TURN AND SLIP INDICATOR

- 4 REAR INSTRUMENT PANEL (SIMILAR TO FRONT PANEL)
- 5 ARTIFICIAL HORIZON
- 6 DIRECTION INDICATOR
- 7 FRONT INSTRUMENT PANEL

- 8 FIREWALL
- 9 RELIEF VALVE
- 10 VACUUM PUMP
- 11 OIL DRAIN

Fig. 2. Vacuum system

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A suction check for the front instrument panel may be carried out by fitting a suction gauge to the test point on the front suction manifold. After testing, ensure that the suction gauges are removed, and that the union nuts are refitted and locked with 20 swg. locking wire.

ENGINE INSTRUMENTS

General

7. Instruments associated with the engine are listed in Table 3. The tachometer is described in A.P.1275A, Vol. 1, Sect. 26, Chap. 4. The oil thermometer indicator is similar to the Mk. 2 type covered in A.P.112G-0625-1, where details of the oil thermometer bulb are given.

TABLE 3

Engine instruments

Instrument	Ref. No.	Description
Oil pressure gauge, 155 P.G.	6A/2677	10 ft. capillary
Tachometer, Mk. 4B	6A/1299	0-5000 r.p.m.
Oil thermometer (electrical): —		
Indicator, 55 M.V.	6A/2126	0 deg. C-120 deg. C.
Bulb, Mk. 3	6A/1566	
Fuel contents gauge 1335 F.G.	6A/2670	Mechanical

Oil pressure gauge

8. The Smiths 155 P.G. oil pressure gauge is generally similar to the Mk. 11 series described in A.P.1275A, Vol. 1, Sect. 3, Chap. 19, and the same precautions must be observed during installation. Principal data for the 155 P.G. gauge are as follows:—

Working range	0 - 100 lb. p.s.i.
Overload pressure	200 lb. p.s.i.
Permissible error	1.5 to +3 lb. p.s.i.

FUEL CONTENTS GAUGE

9. A fuel contents gauge is fitted flush with

the leading edge skin, adjacent to the filler cap for each wing tank.

10. The gauge is of the direct reading type, the operation of the float arm causing a spindle, which carries a permanent magnet to rotate. The pointer movement in the indicator is also connected to a magnetic system, which follows up any rotation of the spindle through the magnetic link, thus giving a reading of the fuel contents.

11. The dial is calibrated with white figures to indicate the contents when the aircraft is in the flying attitude, and smaller red figures to show the contents when in the ground attitude. The white figures are visible from the pilot's seat; there are no gauges in the cockpits. The fuel system is described and illustrated in Part 2, Sect. 3, Chap. 3 of this book.

12. The gauge is a self-contained unit which must be renewed as a whole. To remove the unit from the tank it is necessary to take out the casting which also holds the filler neck, and then remove the unit from the casting. When fitting a unit, care must be taken to ensure that it is correctly positioned radially. When viewed from the cockpit, the empty and full marks should be at the opposite corners of the tank; this condition is obtained when installing the gauge by pointing the float arm diagonally to the rear inboard corner of the tank.

INSTRUMENT PANELS

Removal and assembly

13. Both instrument panels are similar in arrangement and attachment. The removal procedure is as follows:—

(1) Unbolt the oil pressure gauge and carefully lodge it locally within the cockpit. Exercise care to ensure that the capillary remains undamaged.

(2) Disconnect the leads from the oil thermometer indicator, tachometer and, on the front panel only, the power failure warning lamp.

(3) Unscrew the knob from the cold air inlet control (front panel only).

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A.P.101B-5510-1, Part 2, Sect.4, Chap.3
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(4) Disconnect the hose from the suction manifold.

(5) Disconnect the A.S.I. pressure and static hoses, at the bottom of the panel.

(6) Disconnect the bonding leads from the port side of the panel, near the bottom.

(7) Support the panel, unscrew the four attachment knobs on the face, and carefully withdraw the panel aft.

(8) Blank off all open-ended connections to prevent ingress of foreign matter.

14. For re-assembly, the sequence listed in para. 13 should be reversed. Finally, check the vacuum and A.S.I. systems for satisfactory operation, and then functionally check the oil pressure gauge, oil thermometer indicator, tachometer and power failure warning lamp. The cold air inlet control (front panel only) should not require resetting unless the operating rod was disturbed during the removal of the panel.

COMPASS

Calibration and adjustment

15. Aircraft fitted with a voltage regulator, Type FO406 must have the regulator mounted upside down, i.e., with the cable entries uppermost, since it has been found to give minimum deviation of the compass when fitted in this position.

16. The compass in the front cockpit must be calibrated with the wireless set switched on, as it is located inside the safe distance, with the brake and flap levers in the flying position, i.e., forward and the canopy in the closed position. A label stating this requirement is fixed adjacent to the compass card on the starboard side of the front cockpit. A second label is secured to the platform supporting the set; this label draws attention to the necessity for the front cockpit compass to be re-calibrated if the wireless set is renewed, because the interference characteristics vary with different sets. General information on compass calibration and adjustment is given in the Air Navigation Manual (A.P.1234), and A.P.1275B, Vol. 1, Sect. 10, Chap. 2. The compasses fitted are Type 11 (Ref. No. 6B/1672).

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