Chapter 8

PITOT-STATIC SYSTEM

Completely revised

LIST OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

Introduction

1. This chapter contains descriptive and servicing information on the two pitot static systems, one on each side of the aircraft. Both systems are independent of each other so that in the event of failure of the port system and consequently of the first pilot's instruments, the second pilot's instruments will continue to function from the starboard system. The installations are illustrated in fig.1 and 2.

DESCRIPTION AND OPERATION

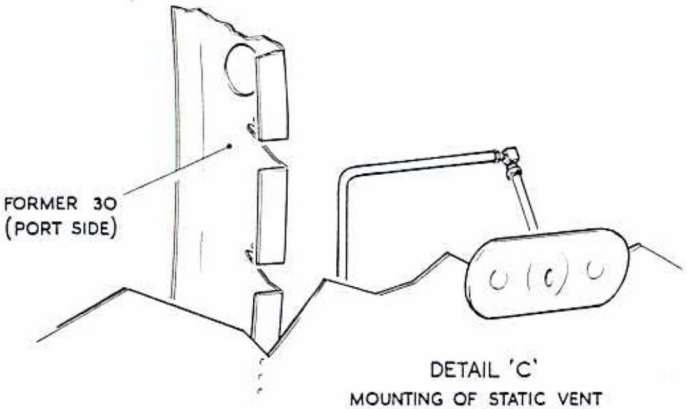
Pipe runs

2. Pressure pipe lines pass from the pitot heads along the front spar of each wing of the aircraft until they meet the fuselage. Inside the fuselage they run forward and pass through the pilot's floor to the instrument panels. During the course of their run 'T' connections are fitted in the lines to supply the instruments.

KEY

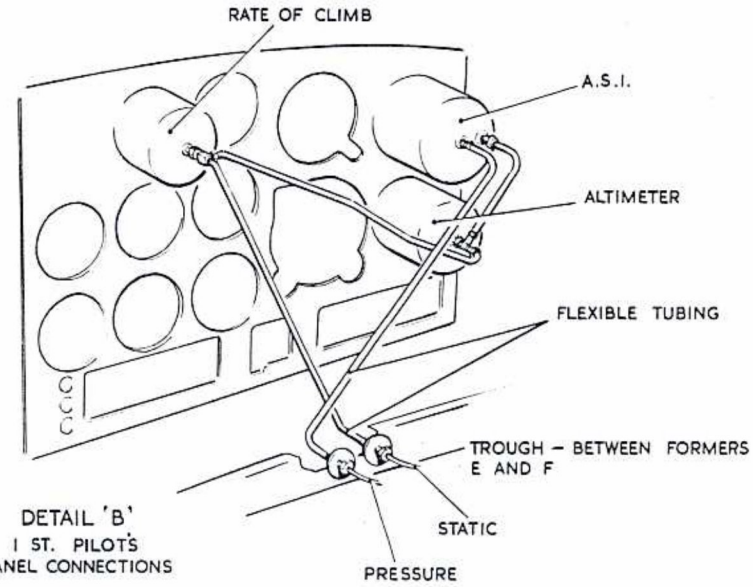
PRESSURE — STATIC — DRAINS

1 RATE-OF-CLIMB INDICATOR (1 ST. PILOT)
2 ALTIMETER (1 ST. PILOT)
3 AIR SPEED INDICATOR (1 ST. PILOT)
4 ZERO READER FLIGHT COMPUTOR
5 AIR SPEED INDICATOR (2 ND. PILOT)
6 ALTIMETER (2 ND. PILOT)
7 RATE-OF-CLIMB INDICATOR (2 ND. PILOT)
8 AIR PRESSURE SWITCH (LANDING GEAR)
9 ALTIMETER (NAVIGATOR'S)
10 AIR SPEED INDICATOR (NAVIGATOR'S)
11 PRESSURE HEAD (STARBOARD)
12 STATIC VENTS
13 AUTO. PILOT COUPLING UNIT
14 AIR MILEAGE UNIT
15 AIR PRESSURE SWITCH (FATIGUE METER)
16 PRESSURE SWITCHES A.D.D. (POST MOD. 1474)



DETAIL 'C'
MOUNTING OF STATIC VENT AT FORMER 30

DETAIL 'A'
PRESSURE HEAD MOUNTING



DETAIL 'B'
1 ST. PILOT'S PANEL CONNECTIONS

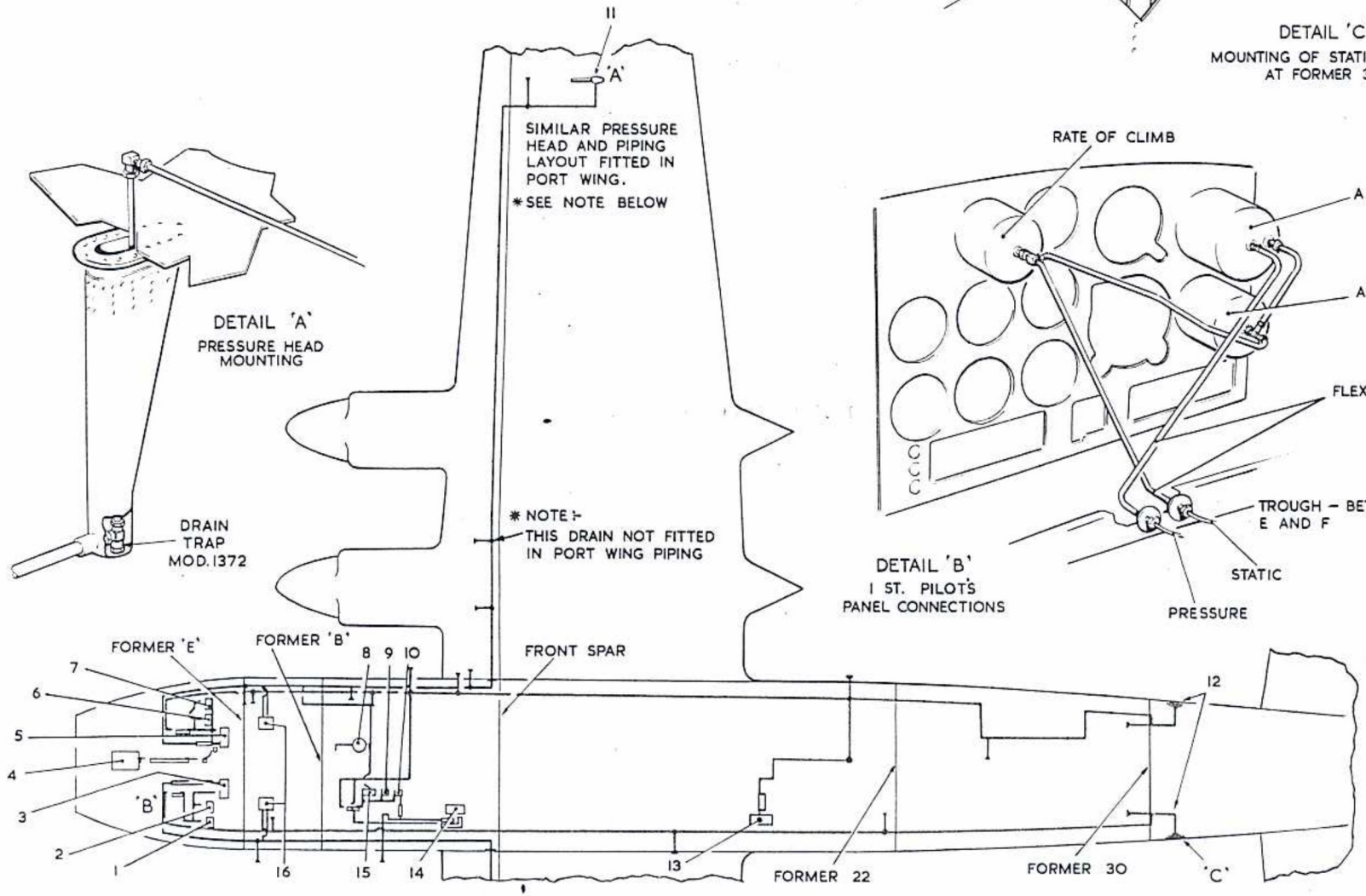


Fig 1. Pitot – static system

◂Mod. 1474 embodied▸

Static vents

3. Two static vents, Type F, are fitted on each side of the fuselage at former 30. From these the static pipe lines pass forward along each fuselage wall until they reach the forward spar where they join up with their respective pressure pipe lines and continue to the instruments.

4. Light alloy piping is used throughout the installation with short lengths of flexible rubber tubing connecting to the instruments. Fig.1 shows the pipe runs and location of connected instruments.

Drain traps

5. A total of twenty drain traps (twenty two, Post Mod.1372) are fitted in the installation. They are located at various points in the pressure and static lines as shown in fig.1 and 2. The drain traps can easily be removed to release moisture trapped in the system.

Pressure heads

6. A Mk.8W electrically-heated pressure head is attached to the undersurface of each wing between ribs 20 and 21. Access to the pipe unions, drain traps and electrical connections is provided by a detachable panel at the rear of the pitot head support bracket.

Heating elements

7. The heating elements of the pressure heads are controlled by two 3-position switches on the extreme starboard bottom corner of the second pilot's panel. The switches labelled PORT-ON-TEST and STARBOARD-ON-TEST are spring loaded from the TEST position to the centre 'off' position.

Pilot's instruments

8. The instruments installed on the first pilot's panel are supplied from the port system as follows:-

Pressure and static	-	airspeed indicator
Static only	-	altimeter and rate of climb indicator

The second pilot's panel contains identical instruments and is supplied from the starboard system.

Navigator's instruments

9. Mounted on the instrument panel at the routine attack navigators station is an altimeter and an airspeed indicator. The airspeed indicator receives its static supply from the starboard system and pressure supply from the port system. The altimeter receives a static supply only, from the starboard system.

Landing gear

Air pressure switch

10. An air pressure switch, Type FGW/A/12, Pre Mod.1451, (Type FGW/A/2, Post Mod.1451) is mounted on the starboard side of the aircraft at bulkhead D. The switch is operated by the starboard pressure system and is part of the landing gear circuit which is described in Sect.6, Chap. 3D of this publication.

Fatigue meter

Air pressure switch

11. An air pressure switch, Type E 12A/10A/281, is mounted in the roof of the bomb bay and connected to the starboard pitot static line. The switch controls the electrical circuit of the fatigue meter described in Chap.6 of this section. Descriptive details of the switch will be found in A.P.1275A, Vol.1, Sect.21.

Air mileage unit

12. An air mileage unit, Mk.2 (A.M.U.) is fitted below the navigators table on the port side of the aircraft (adjacent to former 12). Pressure is provided at the unit from the port system and static from the starboard system. The A.M.U. is described in Chap.3 of this section.

Automatic pilot

13. A static supply is provided for the automatuc pilot equipment from the starboard line. The automatic pilot is described in Chap.7 of this section.

Zero reader

14. The zero reader static supply is from the starboard system. A description of the zero reader installation will be found in Chap.2 of this section.

A.D.D. and stall warning

14A. Post mod.1474 two pressure switches for the A.D.D. and stall warning systems are fitted into the port and starboard pitot and static lines. Details will be found in Chap.3J.

SERVICING

Pitot-static tests

15. Whenever any part of the system is distributed or when an instrument panel or instrument is removed the instructions laid down in A.P.3158, Leaflet B42 and A.P.1275A, Vol.2, Part 2, Leaflet A9 should be carried out.

16. It may be necessary, during adverse weather conditions, to remove excess moisture by drying out the system in accordance with A.P.1275A, Vol.2, Part 2, Leaflet A10.

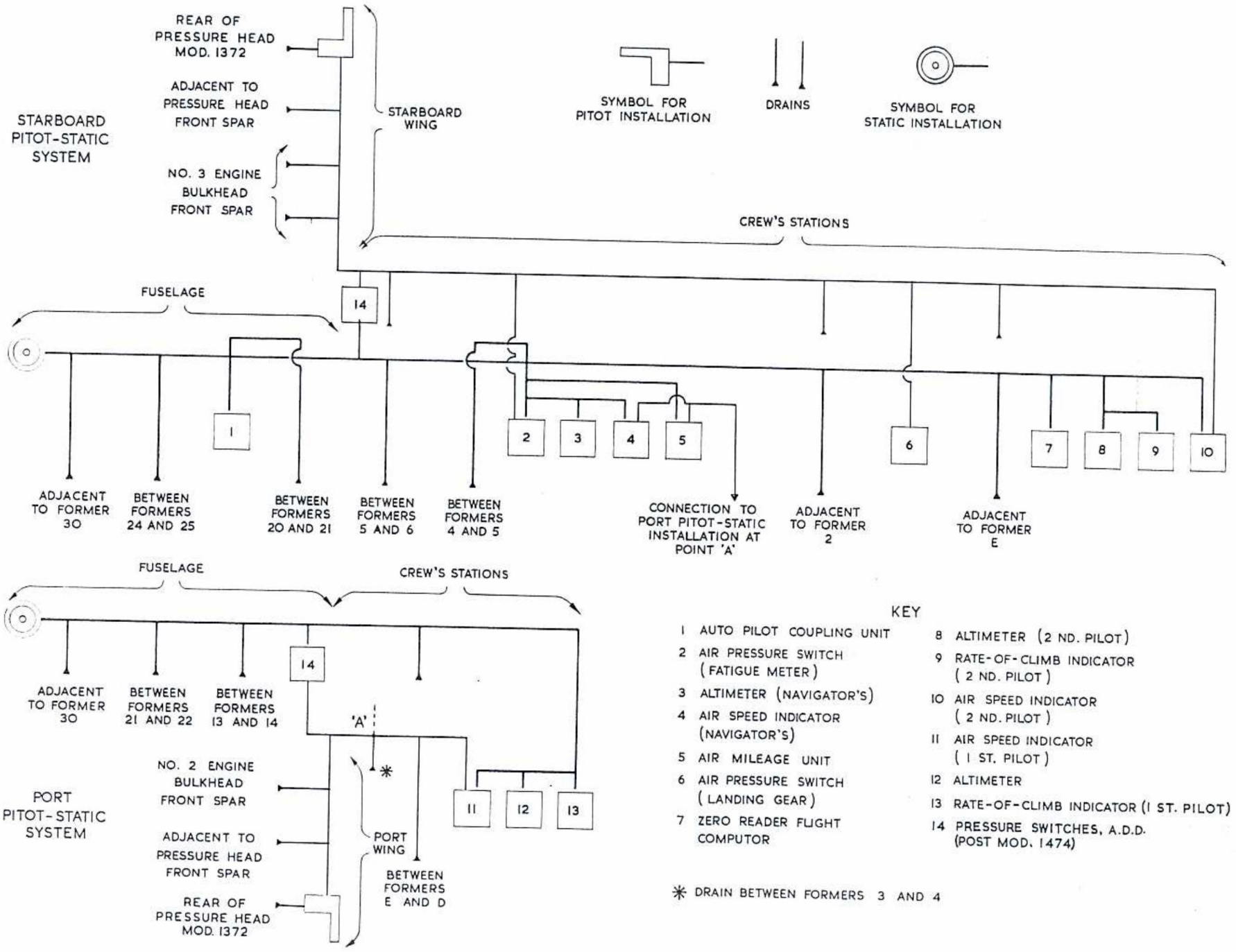


Fig. 2. Location of drains

Mod. 1474 embodied

Drain traps

17. The system should also be drained by means of the drain traps at the intervals laid down in A.P.101B-1703-5B and whenever it is suspected that water has accumulated in the system.

Pressure heads

18. The pressure heads should be examined visually to ensure that the pitot orifices are free from obstruction. If it is necessary to clean orifices, no sharp metal tools should be used, since enlargement or burring of the orifice, will render the pressure head unserviceable.

19. A functional check of the heating elements can be carried out by placing the appropriate control switch to ON and making a physical check with the hand to detect warming up. The head must be switched off immediately it becomes too hot to hold with the naked hand, otherwise the element may be damaged by overheating. Current consumption of the heads can be checked by using a test meter, Type D, in conjunction with the test sockets adjacent to the pitot head control switches.

20. Whilst the aircraft is on the ground protective covers should be fitted over the pitot heads. Servicing instructions for the pitot heads Mk.8M will be found in A.P.1275A, Vol.1, Sect.27.

Static vents

21. The vent apertures should be examined visually for freedom from obstruction and general cleanliness of the aperture plate. To prevent ingress of dirt and moisture into the system, tapered rubber blanking-off plugs are available for insertion into the vent apertures when the aircraft is on the ground. The plugs are attached to a red warning flag to ensure that they are removed before flight.

Air pressure switch, Type FGW/A/12 and FGW/A/2

22. Apart from a general inspection of the switch, particular attention being paid to locking and signs of leakage, nothing in the way of minor servicing can be done. The switch is described in A.P.1275A, Vol.1, Sect.24. Defective switches are to be returned to a Repair Depot.

Air pressure switch, Type E/12A/10A/281

23. Servicing of this switch is similar to that detailed in para.22. The switch is described in A.P.1275A, Vol.1, Sect.21.

REMOVAL AND INSTALLATION

General

24. Whenever it becomes necessary to remove any of the instruments connected to the pitot-static system extreme care should be exercised and every precaution taken to avoid damage to the instruments.

25. When instruments are removed, the supply pipes should be blanked off to prevent ingress of dirt or moisture.

26. Removal of the instruments is straightforward and detailed instructions are not considered necessary.

Pressure heads

27. Before removing a pressure head, it will first be necessary to disconnect the electrical and pressure line connections to the head. The recommended procedure is as follows:-

(1) Unscrew and remove the access cover at the head of the support bracket.

(2) Uncouple the pitot union and disconnect the electrical leads.

(3) Remove the eight fixing screws.

(4) Withdraw the pressure head from the support bracket.

The foregoing procedure is reversed when fitting a pressure head.

Static vents

28. Two fixed screws attached to the vent plate pass through the aircraft skin and a stiffener plate is secured by two knurled nuts on the inside of the aircraft. Care should be taken not to distort the plate by excessive tightening of the nuts but, at the same time ensure that they are sufficiently tight and locked with 20 s.w.g. locking wire.

Pressure switches

29. If the pressure switches for the landing gear, the fatigue meter and the A.D.D. stall warning are removed for any purpose ensure that the coupling pipes are blanked off.

TABLE 1

Major items of equipment

Item	Type	Ref.No.	A.P. reference
Pressure heads	Mk.8M	6A/2176	A.P.1275A, Vol.1, Sect.27
Altimeter	Mk.20A	6A/3155	A.P.1275A, Vol.1, Sect.21
Air speed indicator	Mk.9E*	6A/1294	A.P.1275A, Vol.1, Sect.21
	or Mk.9K	6A/4729	
Air pressure switch	FGW/A/12	5CW/4855	A.P.1275A, Vol.1, Sect.24
Air pressure switch	E/12A/10A/281	6A/5415	A.P.1275A, Vol.1, Sect.21
Air pressure switch (Post Mod.1474)	M.2359/A/A	-	-

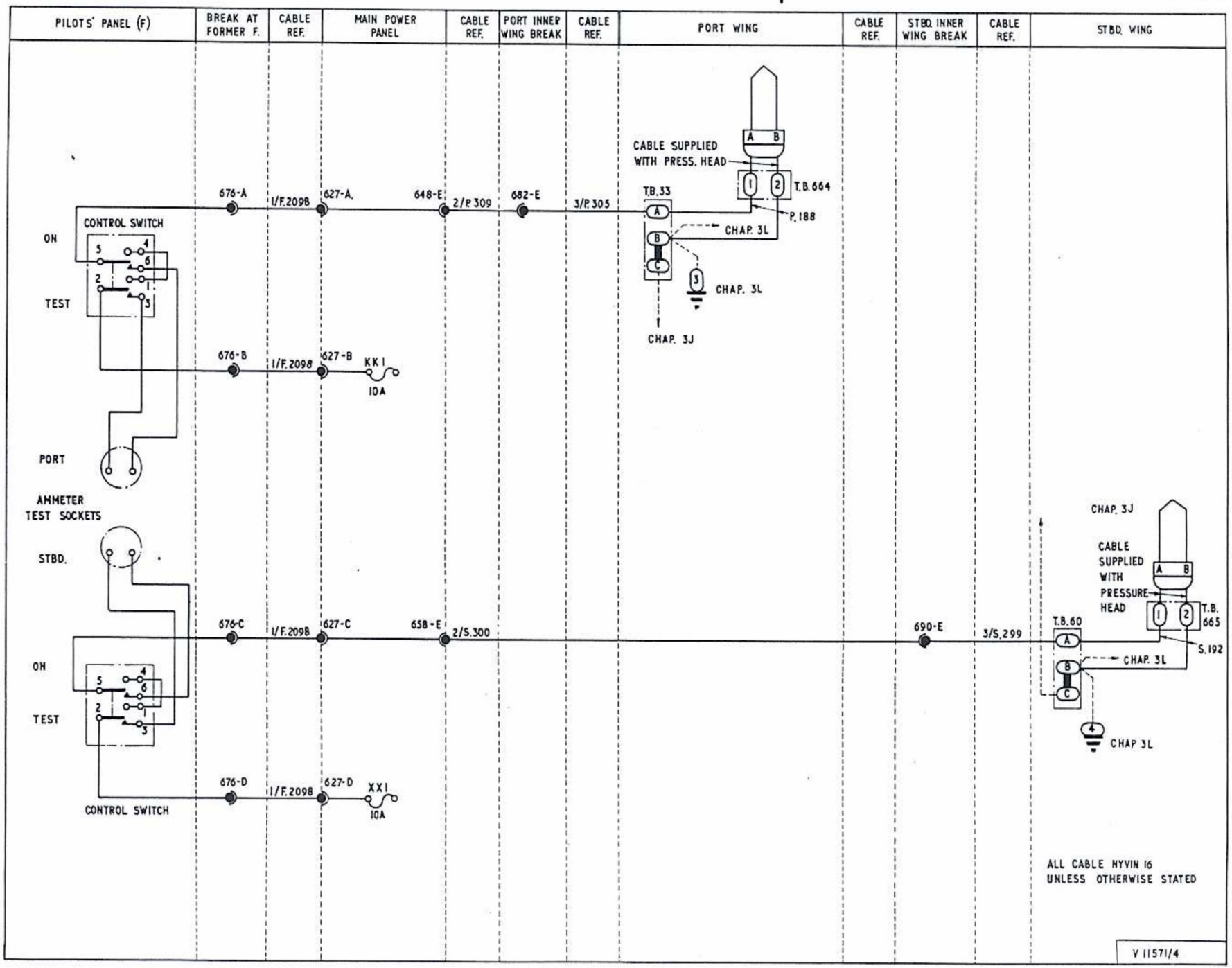


Fig.3 Heated pressure heads