Chapter 9

DE-ICING SYSTEM

(Completely revised)

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

DESCRIPTION AND OPERATION

Introduction

1. Two independent de-icing systems are fitted to the aircraft; one for the windscreen and the other for the engine air intakes, both using hot air supplied from the engines.

Windscreen de-icing (Fig. 1)

2. Hot air for the windscreen de-icing is supplied from the tapping at the 15th stage of each engine compressor, which also supplies the air conditioning system.

3. The supply is taken from the main pipeline just aft of the rear pressure bulkhead, and is routed along the port side of the air brake bay, below the cabin floor, to pass through frame 131.1 where an expansion joint is fitted.

4. The pipeline continues through the port fuselage rocket bay and is then routed up the front face of the front pressure bulkhead to the windscreen temperature controller, Pt. No. 520630 or 527610 (mod. 1395) with Normalair mod. 151TC (mod. 1517). The temperature controller is described in A.P.1275A, Vol. 1, Sec. 20, Chap. 23.

5. The controlled mixture of hot and cold air (72-75 deg. C. at 110 deg. C. inlet temperature) is ducted to the bottom of the windscreen where it passes between the sandwich space in the two centre panels and also through a duct over the centre beam of the windscreen frame. The warm air is exhausted to atmosphere through outlets at the top of the windscreen arch.

6. The pipelines are lagged with glass fibre casings, and the pipe joints with glass fibre muffs.

Engine air intake anti-icing

7. To prevent icing of the engine air intakes, they are supplied with hot air from a separate tapping of the 15th stage of each engine compressor. The port and starboard installations are similar and independent; each engine supplies its own intake.

8. The hot air is taken from a gate valve on the engine through a flow controller (Pt. No. 520640) fitted in a lagged duct between the gate valve and the front firewall.

9. The duct continues outboard to run forward above the centre section top skin and beneath a fairing panel to enter the air intake structure through the false spars just outboard of the leading edge rib No. 0.

10. The hot air flows through double skinning from the top leading edge to the bottom, and exhausts through holes in the struts and the air intake inner skin.

11. An internal duct directs hot air to the boundary layer bleed nose section.

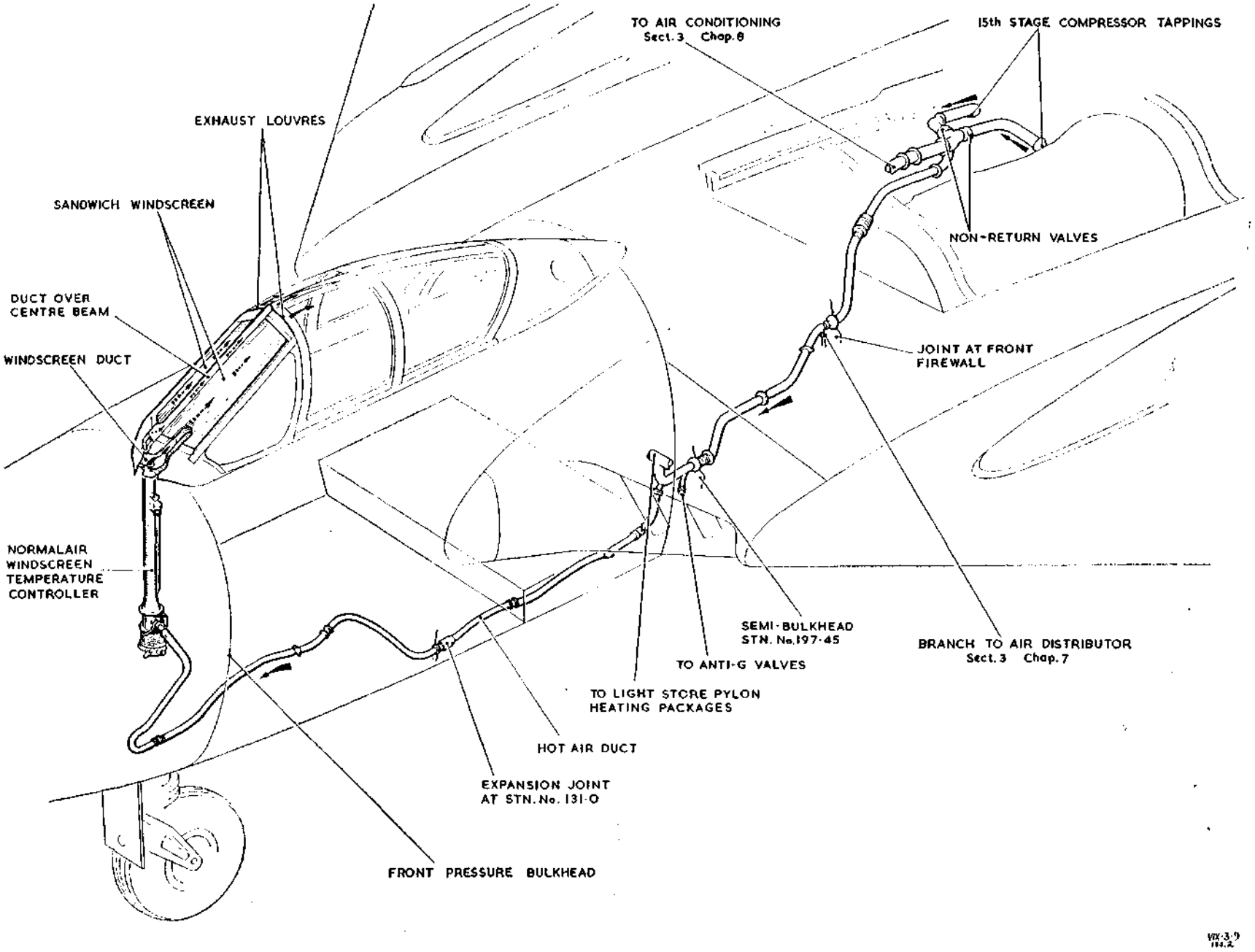

Fig. 1. Windscreen de-icing
◀Annotation added▶

12. One branch from the main duct feeds into a manifold on top of the air intake centre duct, directing hot air round the duct through double skinning to exhaust through holes at the bottom of the duct.

13. Another branch duct directs hot air to the accessory air intake below the engine air intake. This air exhausts through holes in the dividing lip and bottom leading edge of the intake.

14. A flamestat (Type FHO/A/596) is fitted in the main duct to close the gate valves if overheating occurs

15. The engine anti-icing, which operates in conjunction with the air intake anti-icing, is described in A.P. 4481 H, Vol. 1.

16. The flow controller is described in A.P.4340, Vol. 1, Book 2, Sect. 6, Chap. 21, and the electrical circuit in Book 2, Sect. 5, Chap. 1, Group C14.

Operation

17. The anti-icing system is controlled by an ice detector head on the port side of the fuselage, a relay unit forward in the pilot's cockpit, the two flamestats, and an AUTO/MANUAL switch on panel AU.

18. With switch at AUTO; when icing of the detector head occurs, the gate valve actuators open the gate valves to permit a flow of hot air to the engine leading edge and starter fairing, and also to the airframe air intakes. Simultaneously, an electrical supply heats the detector head for a limited period to disperse the ice. This cycle will be repeated until the aircraft clears the icing conditions.

19. Two magnetic indicators are fitted near the switch on panel AU. The valves closed indicator shows WHITE if one or more gate valves are open, and BLACK when all valves are closed. The de-icing detector shows WHITE when the detector head detects ice and BLACK when clear of ice.

20. The pilot can select MANUAL, thus by-passing the relay unit and giving direct control of the gate valves. The de-icing indicator is inoperative under these conditions

21. The flamestats protect the system by causing the gate valves to close if the system overheats.

22. The electrical operation is described in Book 2, Sect. 5, Chap. 1, Group C14.

SERVICING

Windscreen de-icing

23. Servicing of the windscreen will normally be confined to checking the controller and ducting for damage and security.

24. The filters of the temperature controller must be kept clear of fluff and dirt as described in the specialist A.P. (para. 4).

25. Mod. 1517 introduces a fusible cap with a higher melting point in the temperature controller. When the new cap is fitted, it must be identified by painting the closed end red as described in the specialist A.P. (para. 4).

Engine anti-icing

26. The servicing of the anti-icing system will normally be confined to examining the ducting and components for damage and security.

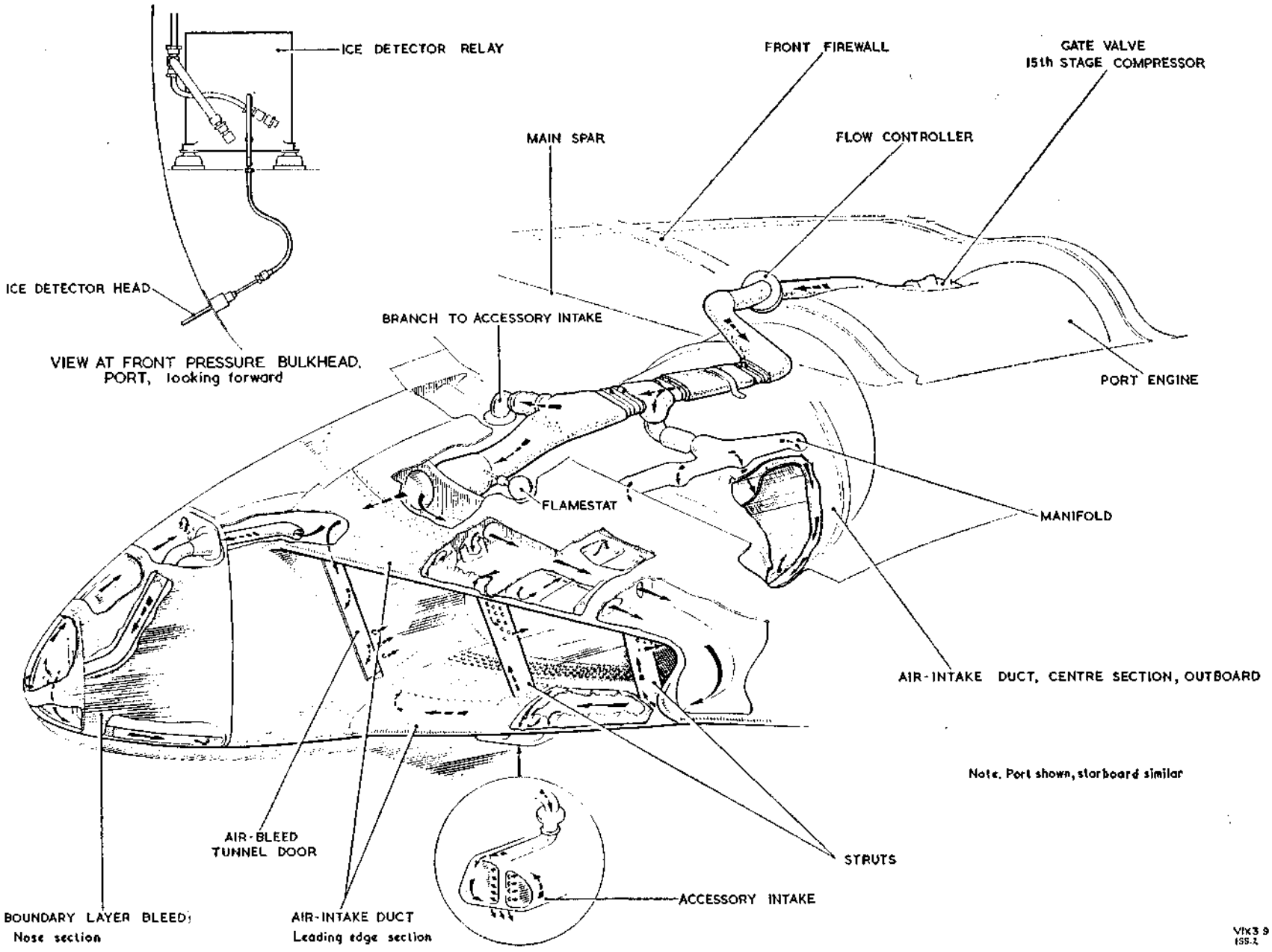

Fig. 2. Engine air-intake de-icing
◀Additional outlet holes—Mod. 846▶

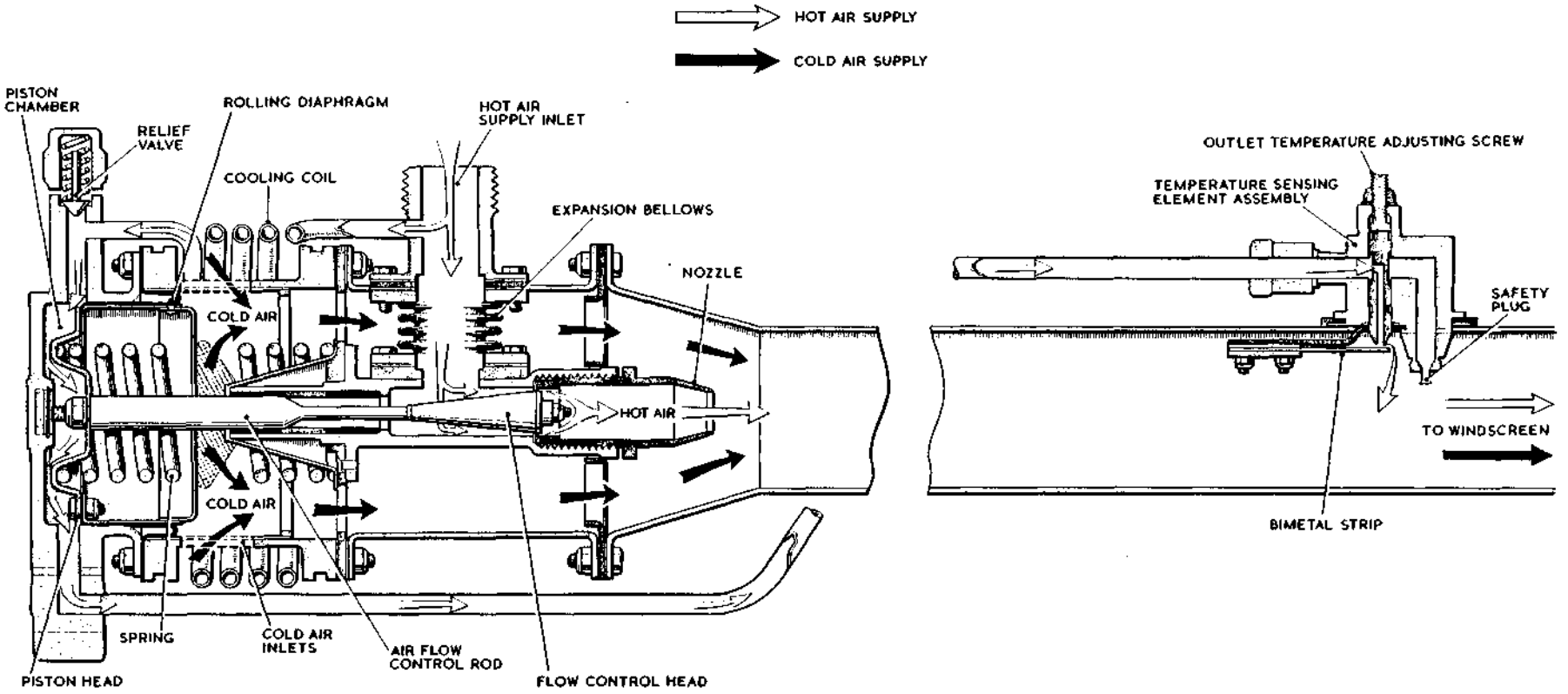

Fig. 3. Windscreen temperature control valve diagram

Printed for Her Majesty's Stationery Office by Hobbs the Printers Ltd, Southampton
(992) 462197 500 6/67