Chapter 8B AIR SYSTEMS - AIR CONDITIONING AND PRESSURIZATION

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DESCRIPTION

General information

1. Conditioned air for regulating cockpit temperature and pressure, for radar head pressurization, and for the pilot's air-ventilated suit and anti-g trousers, is tapped from the main air-system *(Chap. 8A)*, the flow being controlled by an electrically-operated shut-off valve. When the valve is open, the main flow of hot air in the air conditioning duct is admitted to a refrigeration system where a considerable reduction in temperature is effected. Cockpit temperature is regulated by mixing metered hot air, by-passed from downstream of the shut-off valve, with refrigerated air. Before entering the cockpit, the mixed air is passed through a water extractor to reduce the moisture content. The cockpit is completely sealed when the canopy is closed, and conditioned air is employed for cockpit pressurization. For stand-by or emergency use, a manually operated ram-air valve is provided in the fuselage skin. External connections for ground servicing are provided.

Air shut-off valve

2. This butterfly-type valve is operated to either of two positions – open or closed – by a rotary electric actuator controlled by the CABIN AIR switch on the starboard leg panel *(Sect. 1, Chap. 1)*. The valve is mounted on the aft face of frame 25 at the starboard side and is accessible when No.1 engine is removed.

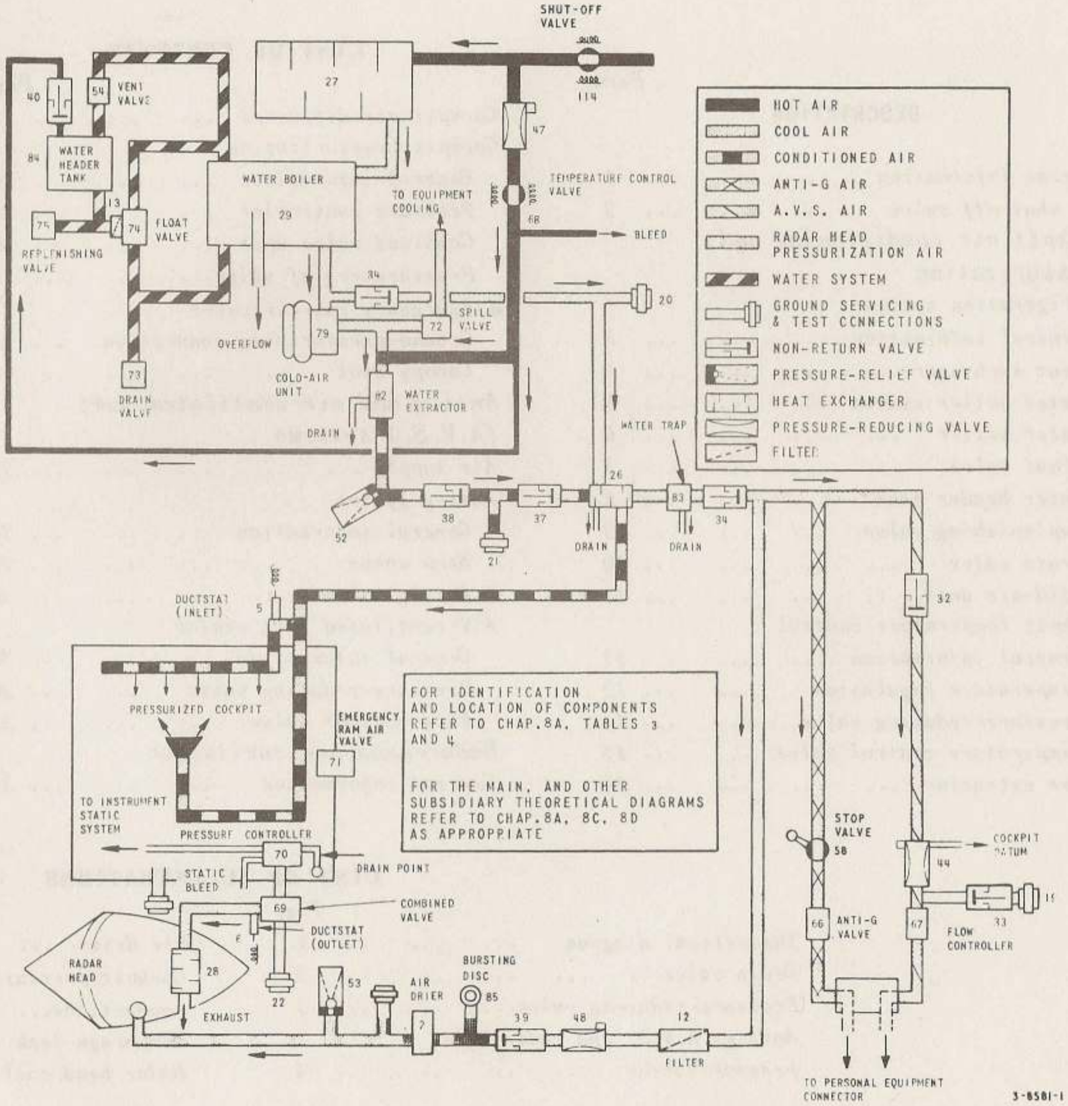

Fig. 1. Theoretical diagram

COCKPIT AIR CONDITIONING AND PRESSURIZATION

Refrigeration system

General information

3. Air flowing through the shut-off valve, except that which is by-passed for temperature control, is cooled in three stages; the first stage takes place in a heat-exchanger, the second stage in a water boiler, and the third stage in a cold-air unit.

Heat exchanger

4. An air-to-air heat exchanger is mounted in the engine air intake dividing structure. Two flanged pipe stubs at the aft end are the connecting points to the air system; the port stub is the air inlet and the starboard stub is the outlet. The heat exchanger is accessible through screwed panels in the upper surface of the dividing structure.

Water boiler system

5. The system comprises a water boiler, a water header tank, a float valve, a replenishing valve, and a drain valve all interconnected by pipes. The cooling medium is a solution of 90-per cent softened or distilled water and 10-per-cent anti-freeze mixture (D.T.D.779). First-stage-cooled air from the heat-exchanger is passed through the water boiler where it gives up heat to the coolant; evaporation losses from the coolant are compensated by flow from the header tank through the float valve. (As evaporation losses affect only the water content of the coolant solution in the boiler, there is a tendency towards saturation with anti-freeze mixture. To keep boiler corrosion and coolant boiling point as low as possible, the boiler must be drained after every flight, and the system replenished *(Sect.2, Chap.2)*. If the aircraft is to be laid up for a lengthy period the system must be drained and flushed *(para.45)*).

Water boiler

6. The water boiler is mounted between frames 22 and 23 on the starboard side and is accessible through panel 26S. Air from the heat-exchanger enters through the lower of two flanged couplings in the aft end and passes through a wafer-type matrix to exit through the upper coupling. The space between the wafers contains coiled wire and coolant to which heat is transferred from the circulating air, causing the coolant to boil. A stack pipe fitted to the base of the boiler is connected by an external pipe to a hole in the fuselage skin and acts as an overflow. Steam is exhausted to atmosphere through a second hole in the fuselage skin via a system of internal ducting in the boiler. The ducting is so designed that the coolant will not empty through the steam vent during inverted flight. Coolant is admitted to, and drained from, the boiler through a connection at the bottom; a pipe from the top is connected to the float valve to balance pressure between the two components.

Float valve

7. The valve comprises a cylindrical float chamber, a cantilever float assembly, and an adjustable filter housing. The filter housing is screwed into the float chamber to form the inlet port. The lower of two ports in the float chamber is the valve outlet; the other is the pressure balancing connection from the water boiler. When the coolant in the water boiler reaches the predetermined level, a projection on the float arm closes the valve inlet port, and stops the flow from the header tank to the boiler.

Water header tank

8. The tank is a pressure container with a maximum safe pressure of 11 lb/in^2; it is provided with three elbow pipes by which connections are made to the air system and the water cooling system. A small-diameter elbow at the top includes an irreversible type non-return valve through which compressed air from the temperature control by-pass line is introduced. A larger diameter elbow, at the top, incorporates an 8 lb/in^2 pressure-relief valve which determines the working pressure of the tank. The remaining elbow of the three is fitted in the bottom of the tank and is connected, via the float valve, to the water boiler, providing the feed line for replenishing the latter during flight. Two flanged brackets welded to the aft face of the tank support the water extractor and the complete assembly of tank and extractor is fixed, by tension straps, to frame 24.

Replenishing valve

9. This valve is a self-sealing coupling and is mounted on a bracket below the lower edge of panel 26S.

Drain valve (fig. 2)

10. The drain valve comprises an inlet sleeve, a valve body containing a valve cone, a circular valve plate and a coiled compression spring. Ground faces on the plate and cone are held in contact by the spring, which bears against the screwed inlet sleeve. The valve plate is prevented from rotating by three projections on its periphery which engage grooves in the valve body; also it has a hole drilled mid-way along its radius. The cone is drilled throughout its length, the drilling emerging at the inner face at the same radius as the hole in the plate. Limited axial and rotary movement of the cone is permitted by two U-shaped slots in the valve body, which are engaged by a transverse pin passing through the cone; slots cut in the outer end of the cone are for the application of a screwdriver to operate the valve. When the valve is closed, the hole in the cone is blanked off by the undrilled sector of the valve plate, and when it is open the holes are aligned, permitting flow through the valve. The valve is opened with a screwdriver, by pushing the cone inwards against spring pressure, turning it clockwise through 120 deg, and releasing the pressure. To close the valve the procedure is reversed.

Cold-air unit

11. The cold-air unit (access panel 26S) is mounted on the top surface of the water boiler and consists of a directly coupled radial-flow fan and axial-flow turbine enclosed within a three-piece casing; the fan section faces forward and the turbine section aft. The centre section incorporates a self-contained lubricating system. Second-stage cooled air from the water boiler enters the turbine inlet port and emerges at a reduced temperature from the outlet port. From the outlet port, third-stage cooled air is directed to the conditioning system. Ram air from No. 1 engine air-intake enters the fan inlet port and emerges from the outlet port whence it is exhausted upwards into No. 2 engine air intake.

Cockpit temperature control

General information

12. The temperature of the cockpit is regulated by mixing hot air, tapped upstream of the refrigeration system, with cold air leaving the cold-air unit. The hot air passes through a pressure-reducing valve and a temperature-control valve before entering the cold-air duct upstream of the water extractor. Temperature regulation is effected by varying the degree of opening of the latter valve, which is electrically actuated. A small diameter tapping, from the by-pass pipe downstream of the control valve and communicating with a hole in the starboard side of the fuselage, directs to atmosphere any hot air which may leak past the valve into the by-pass pipe when the valve is closed.

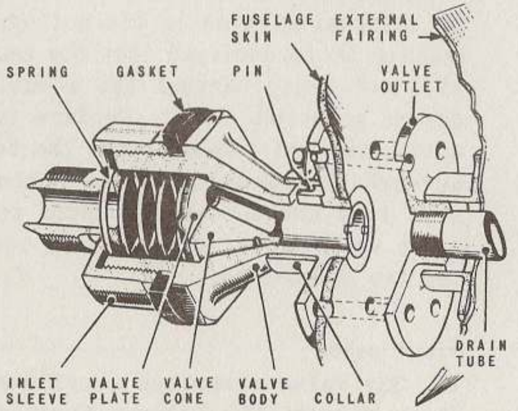

Fig. 2. Drain valve B2141-2

Temperature regulation

13. A rotary switch on the starboard console panel has two sectors, isolated by a spring-loaded plunger, the forward sector providing manual control and the aft sector automatic control. In the manual sector the switch is in direct circuit with the temperature-control valve actuator and has three positions, marked WARM, FIXED and COOL; the switch is spring-loaded towards fixed. Any degree of opening of the valve may be selected by deflecting the switch towards WARM or COOL and releasing it, when the actuator will come to rest in the position selected. When the switch is rotated to the AUTO sector, an electrical temperature control system is brought into operation; this maintains the temperature selected by the operator. For further details of the temperature control system refer to Sect. 6, Chap. 6.

Pressure-reducing valve (fig. 3)

14. The valve comprises a cylindrical body containing a spring-loaded piston, a damper rod, and a damper piston sliding in an adjustable damper cylinder. Four rectangular ports in the hollow piston are aligned with similar ports in the valve body when the spring is extended. A banjo body surrounds the ports and is held against an external flange on the

body by a screwed outlet sleeve; the pipe connections on the banjo and the sleeve embody Conoseal flanges. During operation, air from the engine compressors enters the valve through the banjo body and leaves through the sleeve. When the air pressure in the temperature-control by-pass pipe exceeds the pressure exerted by the spring plus that of the ambient air behind the piston, the latter is displaced to close the ports, stopping the air supply; reduction in air pressure allows the spring to return the valve to the open position. Air pressure in the pipe is determined by a combination of compressor delivery pressure at the valve inlet, and downstream demand as governed by the degree of opening of the temperature control valve *(para.15)*. Variations in either of these conditions can cause fluctuations in the pressure, with consequent oscillation of the valve piston to regulate the air flow and thus maintain pressure in the pipe at the value set by the spring. The spring is adjusted and locked during manufacture to give a reduced pressure of 15^{+6}_{-0} lb/in^2 and further adjustment is not required. The valve is mounted forward of frame 25 at the starboard side.

Temperature control valve

15. This valve is a carbon-plug type of unit, operated by a rotary electric actuator. It is connected in the hot-air by-pass pipe downstream of the pressure-reducing valve, and is mounted adjacent to frame 25.

Water extractor

16. The water extractor is mounted on the water tank, and is interposed in the pipeline between the cold-air unit and the cockpit. Excess moisture drains into a small diameter pipe venting through the fuselage skin at frame 23 on the port side.

Cockpit air diffusers

17. Conditioned air enters the cockpit through a non-return valve and a heat exchanger located between frames 16 and 18 on the port side. The pipes are divided aft of the rear pressure bulkhead into two branches, both of which pass through flanged pressure connections into the cockpit. One pipe carries air to an elbow-shaped perforated spray pipe on the forward face of the bulkhead, and the other passes beneath the cockpit floor to an open outlet forward of the centre pedestal *(Sect.1, Chap.1)*. A ductstat for detecting the cockpit air-inlet temperature is fitted in the pipe aft of the bulkhead.

Cockpit pressurization

General information

18. The cockpit is completely sealed when the canopy is closed. Pressurization is effected by the conditioned air, which is controlled at its point of discharge from the cockpit in order to build up a differential between cockpit and static pressures; at its maximum this differential is 4 lb/in^2. Pressure control is entirely automatic and is effected by the combined functioning of a pressure controller and a combined valve unit. A spill valve at the cold-air unit outlet prevents excessive flow of air to the cockpit by venting air pressure in excess of 5.5 lb/in^2, into the front

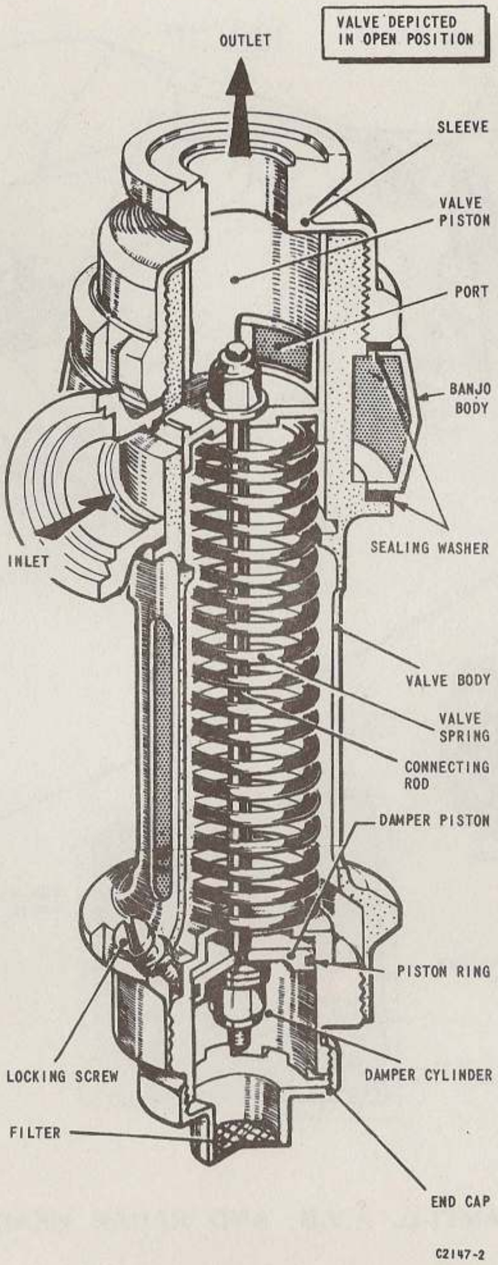

Fig. 3. Pressure-reducing valve

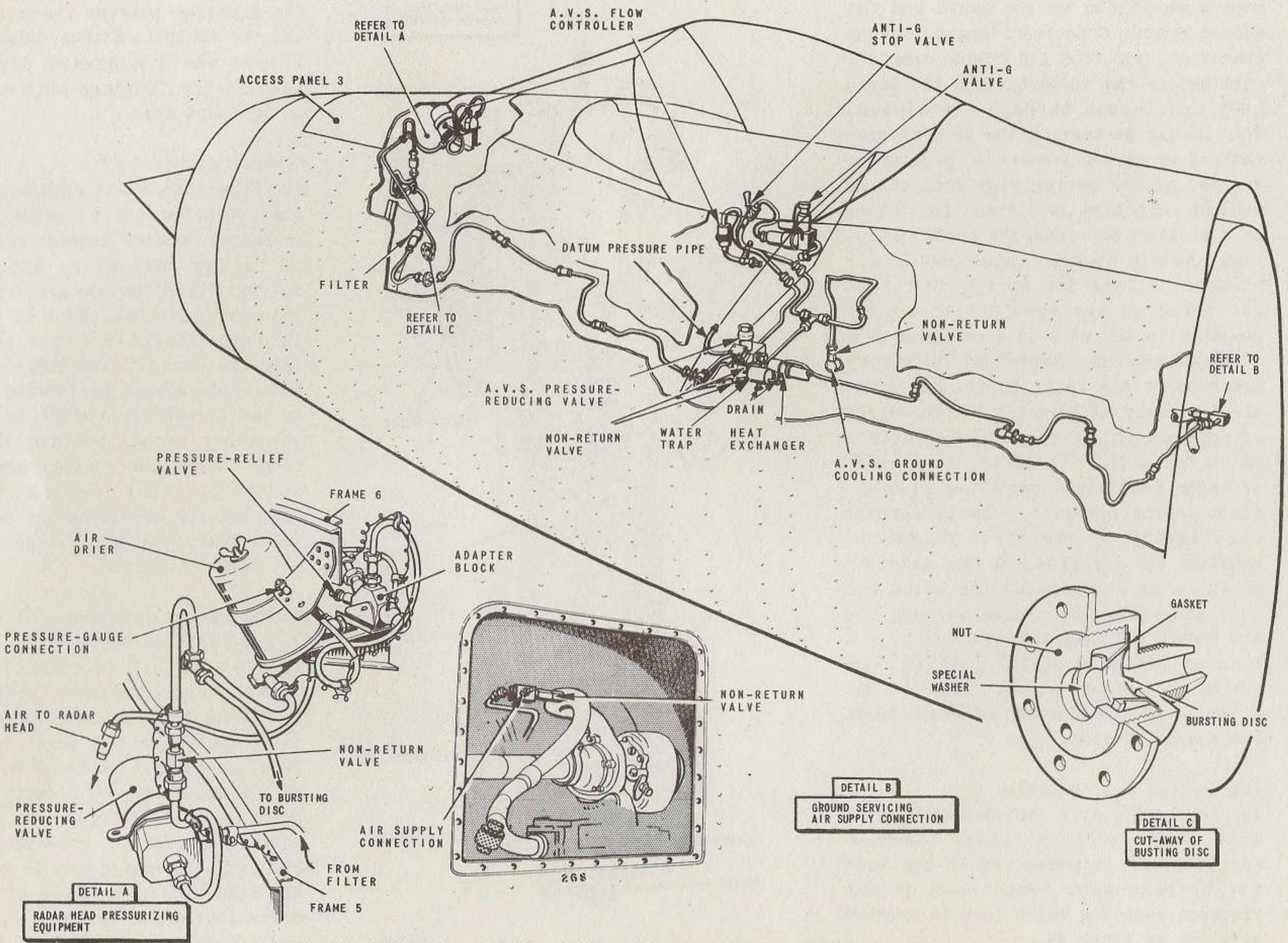

FIG. 4. ANTI-G, A.V.S. AND RADAR HEAD PRESSURIZATION

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fuselage equipment cooling system *(Chap.8D)*. Should this valve fail in the closed position, a relief valve, downstream of the water extractor, prevents cockpit pressure exceeding 5 lb/in^2. The relief valve does not blow off before the spill valve because of the pressure drop across the water extractor. In a loss of cockpit pressure the operation of an automatic switch, incorporated on the pressure controller, illuminates an indicator marked CPR on the standard warning panel *(Sect.1, Chap.3)*.

Pressure controller

19. This unit is bolted to the side face of the port console immediately aft of the forward pressure bulkhead. Three connections at the bottom of the unit provide for the connection of the true static, static bleed, and combined valve interconnection pipes respectively. The true static is connected to the static system *(Sect.7, Chap.5)* and the static bleed is connected to an open ended adapter on frame 5. A fourth connection accommodates a filter assembly through which cockpit pressure is admitted. A tapping from the true static connection communicates with a drain point mounted on the cockpit floor, immediately below the unit. It is essential that the two-way cock (at the bottom of the unit, facing inboard) is set to position 2.

Combined valve unit

20. The valve unit is secured, by a clamp ring, to an adapter bolted on the front face of the forward pressure bulkhead and surrounding a large hole through which cockpit air pressure can act on the valve. A collector shroud, forming an annular chamber around the discharge grille of the valve unit, passes exhaust air, via a flanged coupling, through a pipe leading to the radar head where it is employed as the cooling medium for the AI 23 heat exchanger. A second pipe extension is connected, by rubber hose, to a pipe leading to the radar ground cooling connection. A ductstat for detecting the cabin air outlet temperature is fitted in the shroud adjacent to the flanged coupling.

Pressure-relief valve

21. The valve is located in the cockpit air pipe between frames 24 and 25; it is of simple construction, consisting of a spring-loaded poppet valve in an open body. The body is screwed into the air pipe so that air pressure acts on the valve head.

Emergency ram-air valve

22. In failure of the cockpit air conditioning system, manual operation of the emergency ram-air valve *(Sect.1, Chap.3)* allows atmospheric air into the cockpit.

Ground-pressurizing connection

23. An attachment point for the hose of the ground pressurizing trolley is provided behind access panel 26P.

Canopy seal

24. The canopy seal and inflation systems are described in Chap.8C.

ANTI-G AND AIR-VENTILATED SUIT (A.V.S.) SYSTEMS (fig.4)

Air supply

25. Both anti-g and A.V.S. systems employ compressed air drawn from a tapping in the air pipe between the water boiler and the cold-air unit. A pipe conducts the flow across frame 23, through a heat exchanger inserted in the cockpit air pipe immediately behind the aft pressure bulkhead, and through a water trap and a non-return valve to a T-junction, where the flow is divided to supply the anti-g and A.V.S. systems respectively.

Anti-g system

General information

26. A pipe from the T-junction *(para. 25)* is connected to a bulkhead union from which a further pipe carries the air supply through a stop valve and the anti-g valve, both mounted on the starboard console, to a flanged pipe attached to the outlet of the latter valve. A kink-proof pipe is connected between this point and the aircraft portion of the personal equipment connector.

Stop valve

27. The stop valve is an on/off cock which is closed with the control handle in the forward position. Before the handle can be moved from either position it must be pulled up to release the spring-loaded catch.

Anti-g valve

28. The anti-g valve controls the supply of air for inflating the pilot's anti-g trousers, and incorporates a manually-

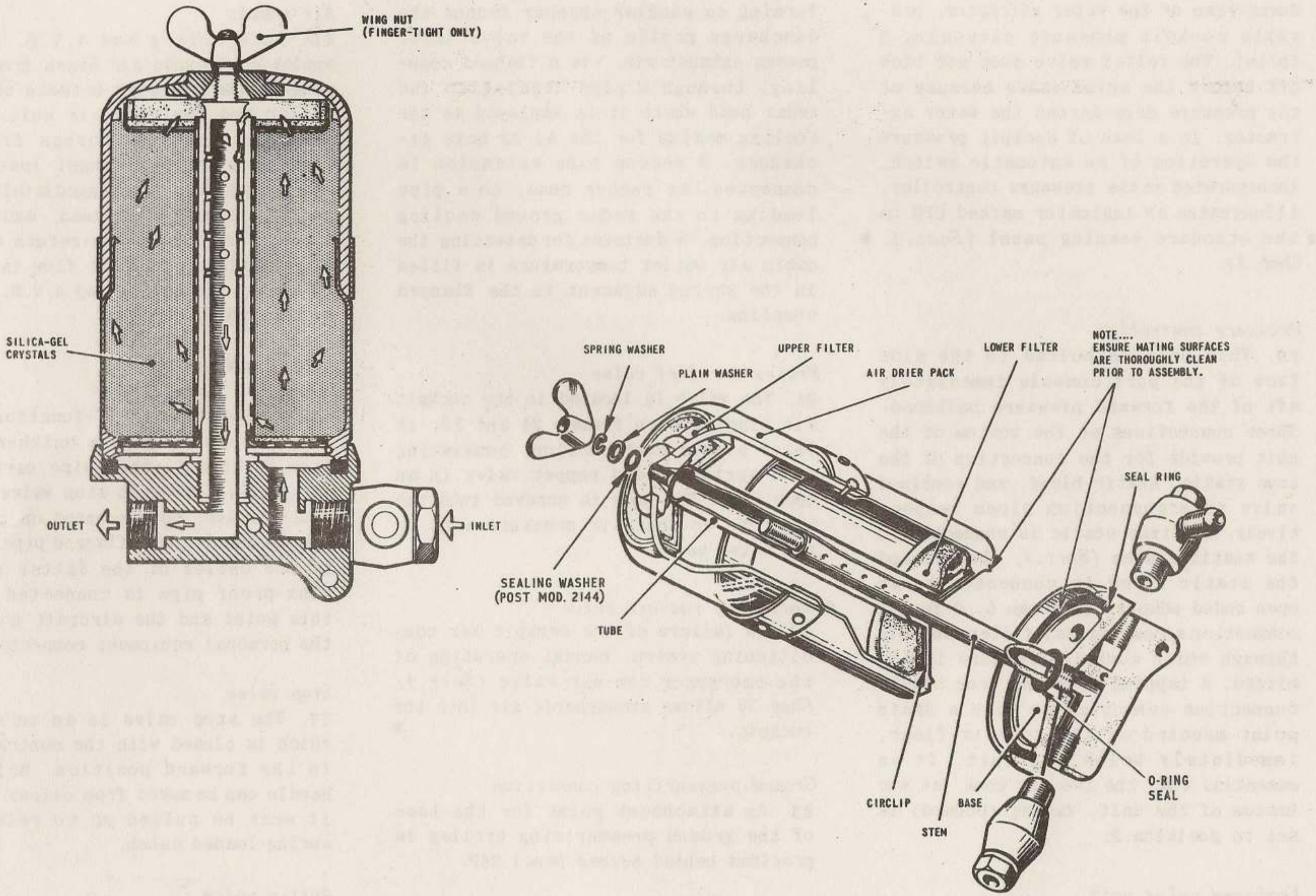

FIG.5. AIR DRIER

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operated low/high gradient selector and a test button.

Air-ventilated suit system

General information

29. The system comprises a single pipeline extending from the T-connection *(para. 25)* through a pressure-reducing valve and the pressure bulkhead to a flow controller on the starboard console. A pipe from the controller terminates in a threaded union, from which a flexible pipe is led to the aircraft portion of the personal equipment connector. A branch pipe, downstream of the reducing valve, communicates with a breakaway connection in the fuselage skin below access panel 18S.

Pressure-reducing valve

30. The valve is located in the main equipment compartment. Its function is to maintain pressure to the A.V.S. controller at 4½ lb/in^2 to 6½ lb/in^2 above the prevailing cockpit pressure at any altitude. A pressure datum pipe connected to the valve communicates with an open-ended adapter mounted on the forward face of the rear pressure bulkhead. A relief valve, incorporated in the valve outlet, prevents outlet pressure rising more than 11½ lb/in^2 above the static pressure.

Flow-control valve

31. The flow-control valve permits manual regulation of the rate of flow of air through the ventilated suit. A ribbed control sleeve on the valve is rotated counter clockwise, as viewed from the ejection seat, to turn on and increase the supply.

RADAR-HEAD PRESSURIZATION (fig.4)

General information

32. The radar head is pressurized to prevent electrical breakdown in the AI equipment. Pressurizing air is drawn from the anti-g/A.V.S. supply pipe, downstream of the heat exchanger, through a pipe which passes forward through the cockpit into the forward equipment bay (access panel 3). Within the bay, the air is passed through a filter, a pressure reducing valve, a non-return valve and a chemical air-drier before entering the head. An adapter block, at the air-drier outlet, incorporates three outlet unions, two of which communicate with the radar head structure and a test point respectively; the remaining outlet embodies a pressure-relief valve. Should both the relief and reducing valves fail and cause over-pressurization of the radar head a frangible disc *(detail C)*, located in the fuselage skin between frames 5 and 6 port, will burst and relieve the pressure. The reducing valve is set to deliver air at 23 ± ½ lb/in^2 absolute and the relief valve opens at 24 lb/in^2 gauge. An inward vent valve, housed on the port side of the radar head, safeguards the head in a rapid descent from altitude.

Note...

Absolute pressure is defined as gauge pressure plus ambient air pressure, e.g. 10 lb/in^2 gauge at sea level (14.7 lb/in^2) = 24.7 lb/in^2 abs.

Air drier *(fig.5)*

33. The air drier is mounted in brackets on frame 6. It has a circular light-alloy base, drilled to accept inlet and outlet unions. The inlet drilling, which is centrally disposed in the base, carries a hollow stem having drilled holes extending half-way down its length. The air-drier assembly is completed by a cylindrical pack comprising a transparent casing containing a chemical drying agent, and upper and lower filters. The pack assembly fits over the stem in the air drier and is retained by a wingnut.

SERVICING

WARNING

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cockpit or performing any operations upon the aircraft.

Cockpit safety valve and leakage tests

Preparation

34. Before commencing the tests ensure that:-

(1) All the cockpit fixed fittings are installed and secure.

(2) All instrument pitot and static pipelines are connected and the drain-point *(para. 19)* blanking cap is fitted.

(3) All inspection panels in the pressurized area are fitted, sealed where necessary, and secured.

(4) The ram-air lever is CLOSED.

(5) The de-misting lever is OFF.

(6) The BATTERY switch is off.

Method of testing

35.

(1) Connect a ground d.c. electrical supply.

(2) Close and lock the canopy *(Sect.3, Chap.1A)* and check that the warning light on the auxiliary warnings panel is extinguished.

(3) Blank off the static bleed on frame 5 *(fig.6)* using an outer sleeve Ref.No.28F/5722 and a nipple plug Ref. No.28F/9439950.

(4) Connect a 0-10 lb/in^2 pressure gauge Ref.No.4G/5809 to the cabin test connection on frame 5 *(fig.6)* using adapters Ref.No.4F/2459 and Ref.No.26DK/95401. The connecting tube must be as short as possible.

(5) Connect a Mk.1C ground pressurizing trolley Ref.No.4F/1714 to the ground pressurizing connection (access panel 26P) using adapter Ref.No.4F/1808.

(6) Inflate the canopy seal *(Chap.8C)* but do not open the ram-air valve.

(7) Set the trolley relief valve to 5 lb/in^2 and pressurize the cockpit at a rate not exceeding 2 lb/in^2 per minute.

(8) Check the pressure at which the safety valve in the combined unit relieves. The correct pressure is 4.4 to 4.5 lb/in^2.

(9) Shut off the air supply and allow the pressure to fall. Measure the time taken to fall from 4 to 2 lb/in^2. This should be not less than 30 seconds.

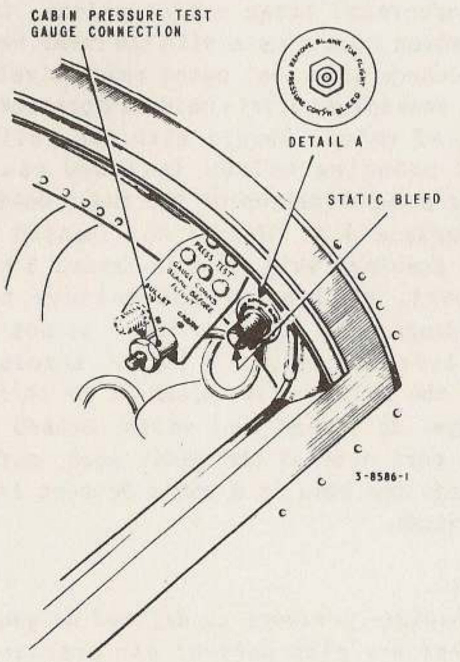
(10) Disconnect the trolley hose and the pressure gauge, and blank off the connections.

(11) Remove the blank from the static bleed.

(12) Remove the canopy seal inflation equipment and blank off the connection.

Note...

Do not open the canopy until cockpit pressure has fully dispersed.



VIEW ON FRAME 5 BEHIND ACCESS PANEL 3

Fig.6. Cockpit pressurization test connections

Combined valve unit (Type 7/20) diaphragm leak test

General information

36. If the cabin pressure controlling equipment is suspect, a leakage test of the combined valve unit diaphragm should be made to avoid unnecessary removal of the combined valve unit or pressure controller.

Method of testing

37. To leak test the diaphragm:-

(1) Remove access panel 5P *(Sect.2, Chap.4)*. Identify the pipe assembly, Part No.EB3.75.643, and disconnect it from the combined valve unit.

(2) Refer to fig.7 and connect the test pipe assembly with the unconnected union on the valve unit.

(3) Apply 11.4 in. of mercury or equivalent pressure. Check the time taken for the pressure to fall to 10.6 in. of mercury; if less than 70 sec., a leak in the valve unit diaphragm is indicated.

(4) On satisfactory completion of the test, remove the test equipment and refit and lock the system pipe assembly.

(5) Refit the access panel.

Radar head pressurization, A.V.S. and anti-g systems tests

General information

38. It is recommended that the complete group of tests be made in the sequence described. If the A.V.S. or anti-g systems are to be tested without the radar head pressurization, however, two

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alternatives are given. In all cases the air supply is applied at the point described in para.39. If the radar head is fitted, the pressure gauge must be fitted at the test point *(para.40 (4))* and referred to during the tests to guard against excessive pressure due to reducing valve failure. If the radar head is removed or incomplete the radar head supply pipe must be blanked off at some convenient point between the forward pressure bulkhead and the pressure-reducing valve.

Preparation

39. In preparation for the tests connect an air supply which will supply 150 lb/in^2 to the test connection (access panel 26S) and carry out the tests in para.40, 41 and 42 as appropriate.

Radar head pressurization test

40.

(1) Check that the radar head and radome are secure and that the bursting disc is intact.

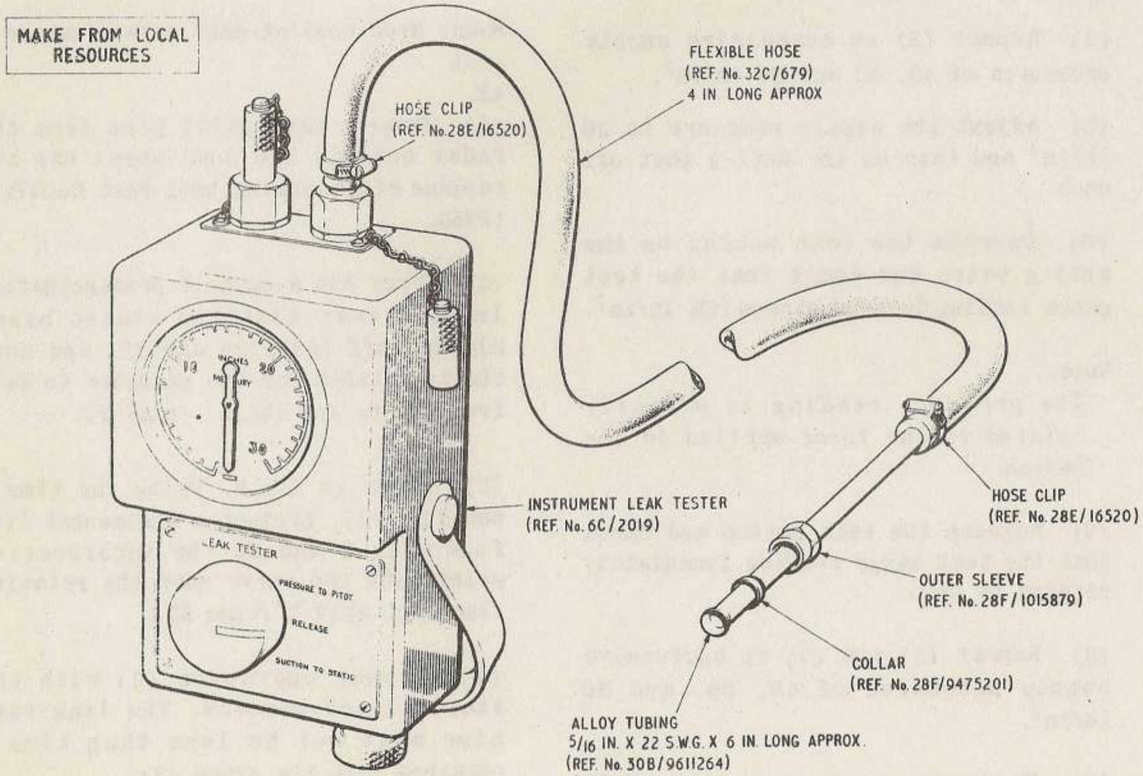

Fig.7. Diaphragm leak test equipment C2232-1

(2) Using adapter Ref.No.26DK/95228, connect a T-junction Ref.No.28F/10782 to the radar head test point *(fig.4)*. Using locally-manufactured adapters, connect a 0-40 lb/in^2 pressure gauge Ref.No.4G/3845 and a cock-controlled low-pressure air supply to the T-junction.

(3) Turn on the low-pressure air supply and slowly increase the pressure until the gauge registers 18 lb/in^2 (do not exceed 20 lb/in^2). Shut off the air supply and measure the time taken for the pressure to fall from 18 to 12 lb/in^2. This should be not less than 6 minutes.

(4) Disconnect the low-pressure air supply and blank off the opening in the T-junction. Substitute a 0-10 lb/in^2 pressure gauge Ref.No.4G/5809 for the 0-40 lb/in^2 gauge.

(5) Close the anti-g stop valve and the A.V.S. flow controller.

(6) Turn on the air supply *(para.39)* and slowly increase the pressure to 25 lb/in^2. Allow three minutes for pressure stabilization after which the test gauge should register between 6.3 and 9.3 lb/in^2.

(7) Slowly increase the air supply pressure to 50 and 80 lb/in^2 in turn. At each of these pressures the test gauge should register 6.3 to 9.3 lb/in^2.

A.V.S. system test

41.

(1) Turn on the air supply and increase the pressure to 30 lb/in^2.

(2) Operate the control sleeve of the A.V.S. controller and ensure that air-flow from the A.V.S. outlet increases and decreases according to the selection made.

(3) Turn off the air supply and connect a 0-15 lb/in^2 pressure gauge Ref.No.4F/2191 to the A.V.S. outlet. Fully open the flow controller.

(4) Turn on the air supply and adjust the delivery pressure to 20 lb/in^2. The pressure reading on the test gauge must be between 5 and 7 lb/in^2.

(5) Repeat operation (4) at delivery pressures at 40, 60 and 80 lb/in^2 and ensure that the test gauge reading does not vary.

(6) Blank off the reducing-valve datum-pipe outlet located on the pressure bulkhead.

(7) Turn on the air supply and adjust the delivery pressure to 20 lb/in^2. The pressure reading on the test gauge should not exceed 13 lb/in^2.

(8) Repeat operation (7) at delivery pressures of 40, 60 and 80 lb/in^2 and ensure that the test gauge reading does not vary.

(9) Remove the blank from the datum-pipe outlet.

(10) With air still flowing, check that air is issuing from the water trap and heat exchanger drains. These are located in the upper skin of No.2 engine intake duct between frames 15 and 16.

(11) Turn off the air supply and close the flow controller.

Anti-g system tests

42.
(1) Close the anti-g shut-off cock.

(2) Connect 0-15 lb/in^2 pressure gauge Ref.No.4F/2191 to the anti-g valve outlet.

(3) Turn on the air supply and adjust the delivery pressure to 20 lb/in^2. The pressure registered on the test gauge should be 0 lb/in^2.

(4) Repeat (3) at successive supply pressures of 40, 60 and 80 lb/in^2.

(5) Adjust the supply pressure to 20 lb/in^2 and turn on the anti-g shut-off cock.

(6) Depress the test button on the anti-g valve and check that the test gauge reading does not exceed 10½ lb/in^2.

Note...
The pressure reading is directly related to the force applied to the button.

(7) Release the test button and check that the test gauge reading immediately returns to zero.

(8) Repeat (6) and (7) at successive supply pressures of 40, 60, and 80 lb/in^2.

(9) With the supply pressure at 80 lb/in^2 depress the test button sufficiently hard to open the relief valve at the anti-g valve outlet. The test gauge reading should not exceed 10½ lb/in^2.

(10) Release the test button and check that the test gauge reading immediately returns to zero.

(11) Turn off the air supply.

(12) Disconnect and remove all ground equipment, blank off the test connection (access panel 26S) and the radar head test point *(para.40 (2))*.

Radar head cooling-duct joint leakage test

43.
(1) Remove the outlet pipe from the radar head in the nose-wheel bay and replace with blanking tool Part No.ST11/18250.

(2) Carry out a cockpit pressurization leakage test with the static bleed blanked off *(para.34 and 35)* and note the time taken for the pressure to fall from 4.0 to 2.0 lb/in^2 (time Y).

(3) Refer to fig.8. Using the time Y noted in (2), project a horizontal line from axis Y and at the intersection point with the curve note the relative figure on axis X (time X).

(4) Repeat operation (2) with the static blank removed. The leak-rate time must not be less than time X obtained from the graph (3).

(5) Remove the blanking tool and refit the outlet pipe.

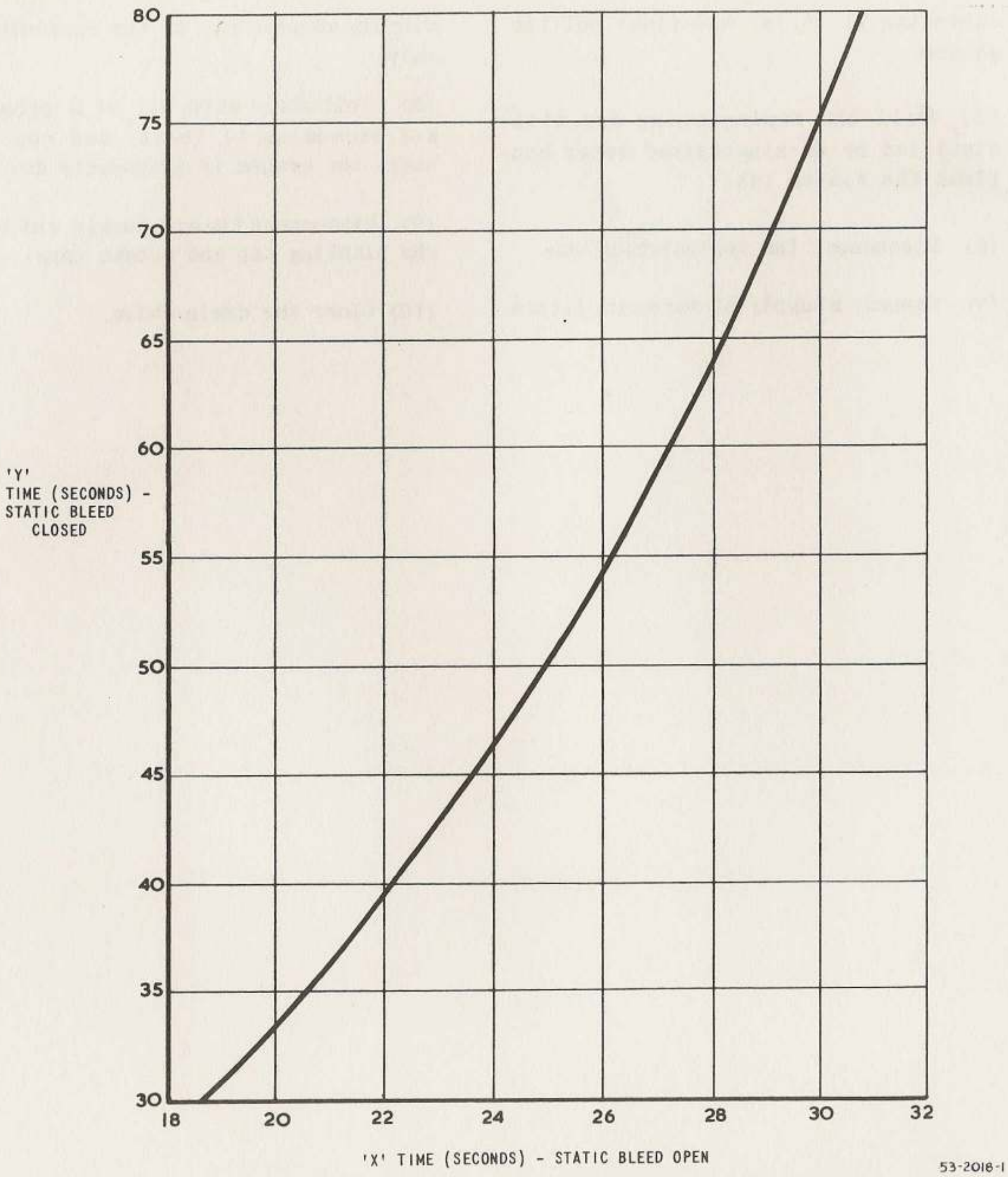

Fig.8. **Radar head cooling-duct leakage diagram**

(6) Refer to para.35 and carry out operations (10), (11) and (12).

Changing the air-drier desiccant *(fig.5)*

44. When the desiccant in the air drier changes in colour from blue to pink it is an indication that the desiccant crystals are saturated and require changing. To change the crystals:-

(1) Remove the air-drier pack from the air-drier body by unscrewing the wing nut.

(2) Remove the circlip retaining the bottom filter of the pack, and remove the filter.

(3) Retaining the top filter by finger pressure on its centre tube, empty out the saturated crystals.

(4) Check that the pack is free of moisture.

(5) Fill the pack with silica-gel crystals Ref.No.33C/2202650 (large grain).

Note...

1. *Be careful not to shatter the crystals.*

◀ 2. *Silica-gel crystals, Ref.No.33C/790, may be used as an alternative.* ▶

(6) Refit the bottom filter and circlip.

(7) Reassemble the pack to the air-drier body.

Flushing the water system

45.

(1) Open the drain valve *(para.10)* and drain the glycol/water mixture from the system.

(2) Remove access panel 27S and remove the blanking cap from the replenishing valve.

(3) Connect a Mk.3 fluid replenishing can Ref.No.4G/5378, containing clean water and fitted with adapter Ref.No. 26DK/95327, to the replenishing valve.

(4) Introduce water at a pressure not exceeding 11 lb/in^2 and flush out the system.

(5) Fill the replenishing can with distilled or de-mineralised water and flush the system (4).

(6) Disconnect the replenishing can.

(7) Connect a supply of warm air, fitted with the adapter (3), to the replenishing valve.

(8) Introduce warm air at a pressure not exceeding 11 lb/in^2 and continue until the system is thoroughly dry.

(9) Disconnect the air supply and refit the blanking cap and access panel.

(10) Close the drain valve.

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