Chapter 2

FUEL SYSTEM

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

KEY TO SYMBOLS

- THREE WAY COCK
- FUEL TANK SELECTOR COCK
- CROSS FEED COCK
- MASTER ENGINE FUEL COCK
- FUEL FILTER
- W/M. FILTER
- FUEL METERING PUMP
- FLOWMETER TRANSMITTER.
- PUMP
- PRESSURE REGULATING VALVE
- NITROGEN PRESSURE REDUCING VALVE
- NON-RETURN VALVE
- PRIMING VALVE
- ENGINE INDUCTION SYSTEM
- RESTRICTOR VALVE
- PRIMING PUMP AND MOTOR
- PRESSURE SWITCH
- OIL DILUTION VALVE

COLOUR IDENTIFICATION BANDING

FUEL:- ONE 1/2 INCH WIDE RED BAND

WATER METHANOL:- ONE 1/4 INCH WIDE RED BAND ONE 1/4 INCH WIDE BLUE BAND

ENGINE PRIMING:- ONE 1/2 INCH WIDE GREEN BAND

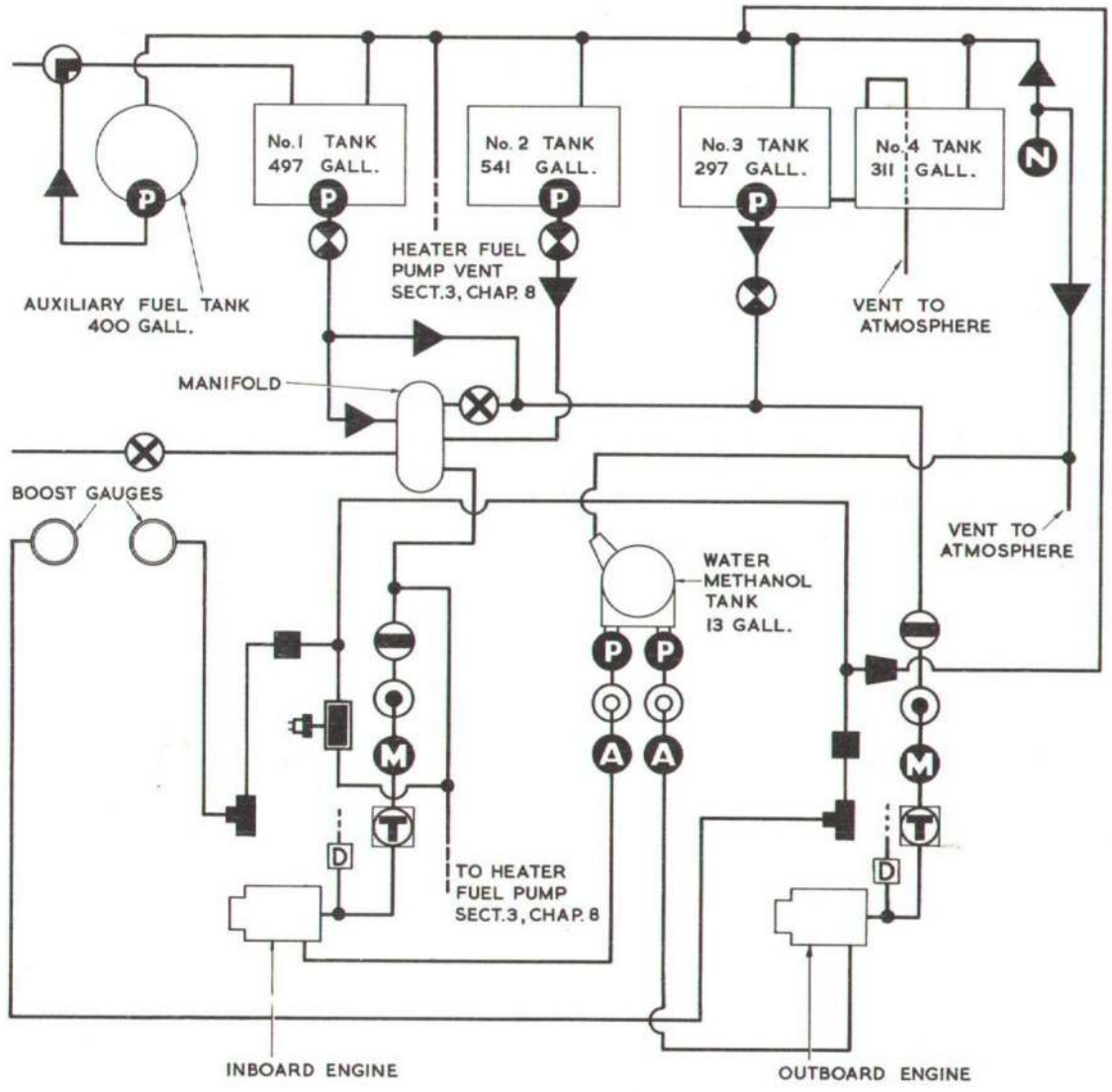

Fig. 1. Diagram of fuel system - starboard side

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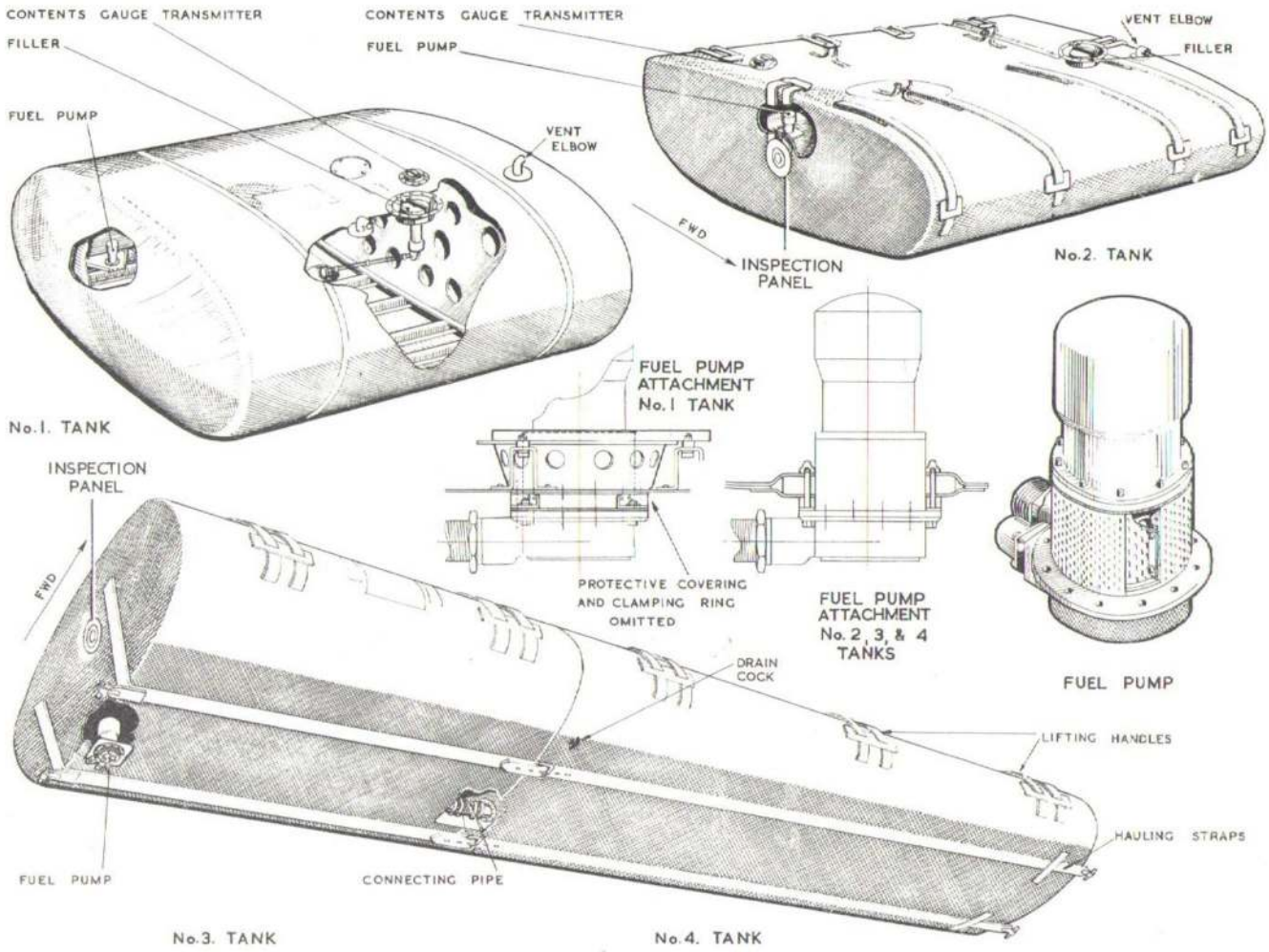

Fig. 2. Fuel tanks

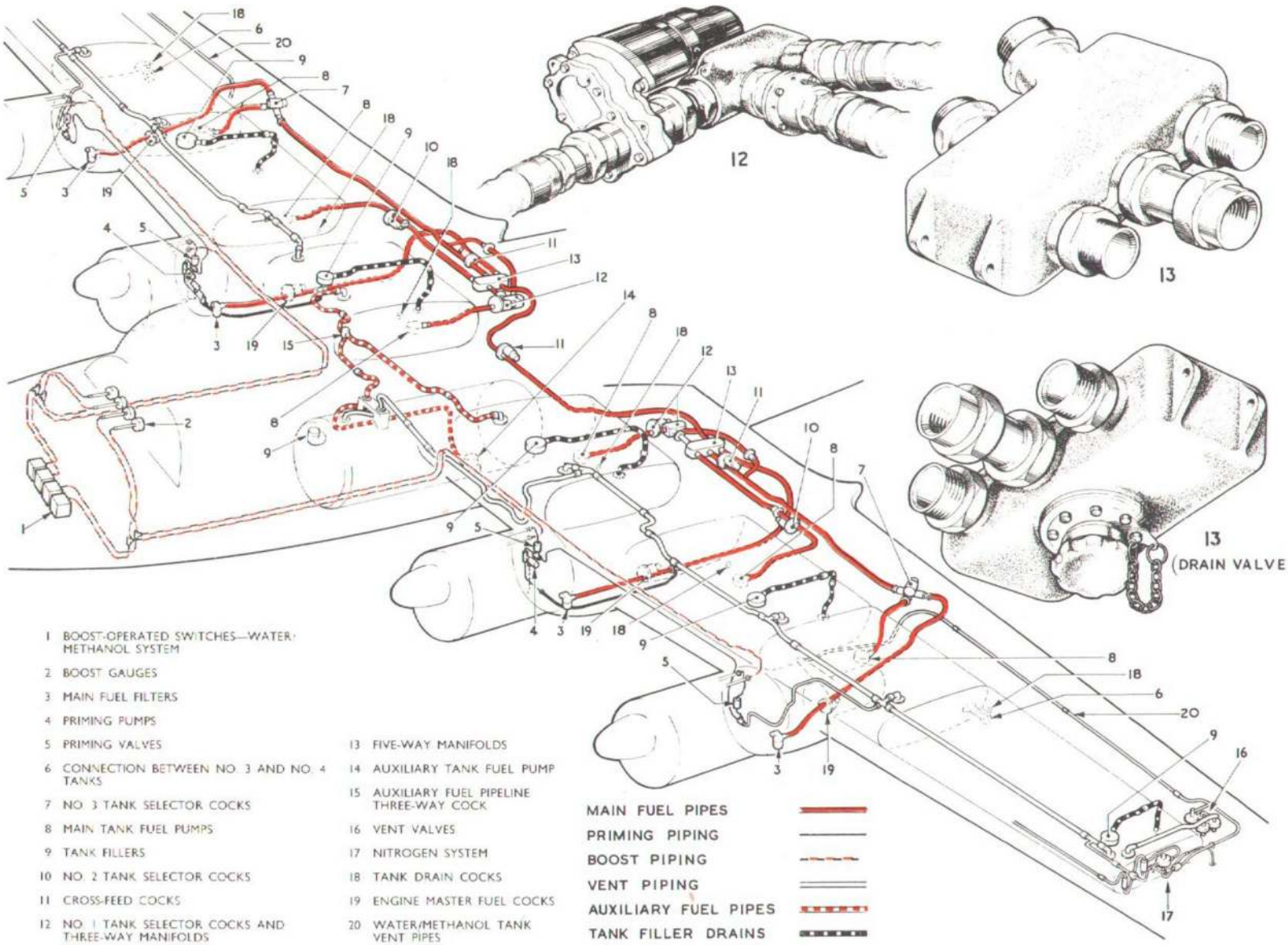

Fig. 3. Fuel system

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DESCRIPTION AND OPERATION

Introduction

1. Fuel for the power units is carried in eight tanks mounted between the main plane spars. There are four tanks in each wing numbered 1 to 4 from inboard to outboard. No.3 and 4 tanks on each side are, in effect, one tank, the contents of each No.4 tank being fed by gravity into its adjacent No.3 tank. In the delivery pipe from each No.1, 2 and 3 tanks is an electrically-operated tank-selector cock. Three cross-feed cocks are fitted, one between the port and starboard halves of the system and one on each side of the associated No.2 and 3 tanks. In the feed pipe to each engine is a master engine fuel cock. A manually operated three-way cock on the front spar controls the transfer of fuel from an auxiliary tank, which can be installed in the bomb bay, to either No.1 tank as required. A water/methanol system provides extra power, when required, for take-off.

MAIN FUEL SYSTEM

Main fuel tanks

2. Each No.1 tank is mounted between the fuselage wall and its associated inboard engine nacelle. Outboard of these nacelles are mounted the No.2 tanks which extend from the inner main plane joints to rib 7 on each side. The No.3 and 4 tanks are outboard of each No.2 tank. The positions of all panels which provide access to the tanks, their components and fittings are shown in the relevant illustration in Sect.2, Chap.4.

No.1 tanks (fig.2)

3. No.1 tank, on each side, is secured by four straps attached to the front and rear spars, between the inboard nacelle and the fuselage (Sect.3, Chap.2). These two tanks are constructed of light-alloy sheet with welded seams and with top-hat section stiffeners spot welded to the shell internally. Perforated baffles bolted to the stiffeners maintain the contours and rigidity. Crashproof protective covering, consisting of rubber and fabric covers cemented over the surface of the tanks and clamped at the edges of cut-outs for tank fittings by flanges, is provided. Access doors in the tanks are covered by doped-on patches, and a drain cock is provided at the bottom of each tank; these drain cocks are reached through access doors in the undersurface of the centre plane. A contents gauge transmitter is fitted to each tank.

No.2, 3 and 4 tanks (fig.2)

4. These tanks are of flexible construction and are housed in a single, smooth skinned compartment in each main plane intermediate section (Sect.3, Chap.2). A diaphragm separating No.2 from No.3 and 4 tanks is secured to the internal skinning of the tank housing by pieces of light-alloy angle strip and screws and the latter are accessible after removing No.2 tank. Drain cocks are fitted to No.2 and 4 tanks and these are reached through access doors in the undersurface of the main plane. A fuel contents gauge transmitter is fitted to No.2 tank and another to No.3 tank, the latter operating a gauge which reads the combined contents of the No.3 and 4 tanks. A bracket is provided to maintain each contents transmitter attachment flange level and at its proper height. These brackets also serve as support points for the tops of their associated tanks.

5. A large assembly panel outboard of the inboard engine nacelle can be removed for the installation or removal of the No.2, 3 and 4 tanks in each wing. No.2 and 3 tanks are provided with hauling straps incorporating end toggles to enable ropes to be attached for removal and installation. The straps are attached to the underside of the tanks and each has a buckle to enable the tanks to be parted. Provision is also made for lacing the tanks together at their upper adjacent edges. When the tanks are installed, the toggles are secured to the internal skin by screws. Tank lifting handles are fitted to all six flexible tanks, and support straps on the upper surfaces are fastened over bars set across holes, covered by circular access panels, in the upper surface of each wing. The filler cap assemblies of the No.2 and 4 tanks (each No.3 tank is filled from the adjacent No.4 tank) are bolted to the main plane upper surface, and also provide support for these tanks.

Fuel supply, vent and filler drain connections (fig.2)

6. Each No.1, 2 and 3 tanks has an integral fuel pump, Type F.B.6, Mk.3 (Ref.No.5UE/4986). Each No.4 tank is connected by a short pipe to its adjacent No.3 tank, and its contents transfer into the No.3 tank as the latter is emptied. All filler necks are fitted with drip trays which are drained by pipes led aft over the top of the tanks to the undersurface of the main plane just forward of the rear spar. A vent connection is fitted at the outboard end of the top of each tank. No.4 tank has an additional vent elbow (para.19).

Fuel pumps (fig.2)

7. These are the immersed type. The motor and filter are inside the tank and a flange at the pump itself is bolted to a similar flange integral with the tank. The pump motors are continuously rated and are normally in use for the whole period during which fuel is drawn from their tanks. Control of the pump motors is effected by switches on the flight engineer's main panel (fig.5).

AUXILIARY FUEL TANK (fig.4)

8. Provision is made for fitting this tank in the bomb compartment. The tank is of cylindrical shape and is constructed of light-alloy plate, reinforced by longitudinal top-hat section stiffeners and circular baffle plates. An electrical pump Type F.B.6, Mk.3 (Ref.No.5UE/4986), is located aft at the bottom of the tank and installed similarly to those in the main tanks. The positions of the tank fittings are shown in the illustration.

Fittings

9. At the top of the tank is a platform which carries two female half-couplings, and an electrical plug from which a cable is run to the pump motor through a suppressor unit mounted low down on the aft end of the tank. A filler neck is fitted at the forward end, and a fuel contents gauge towards the aft end of the top of the tank. A cable from this gauge is also connected to the electrical plug. At the top of the tank are two hoisting lugs and a central lug which is engaged with the heavy bomb slip when the tank is installed. The heavy bomb crutches are used to steady the tank.

10. When the tank is in position, the two female half-couplings fit over two male half-couplings in the roof of the bomb compartment and the electrical plug is inserted in a corresponding socket nearby. A dipstick assembly at the top of the tank is positioned forward of the central heavy lug so that the dipstick is accessible and withdrawable through the heavy bomb release unit housing in the fuselage floor when the housing cover is removed. This is the middle cover of the three positioned between formers 8 and 9.

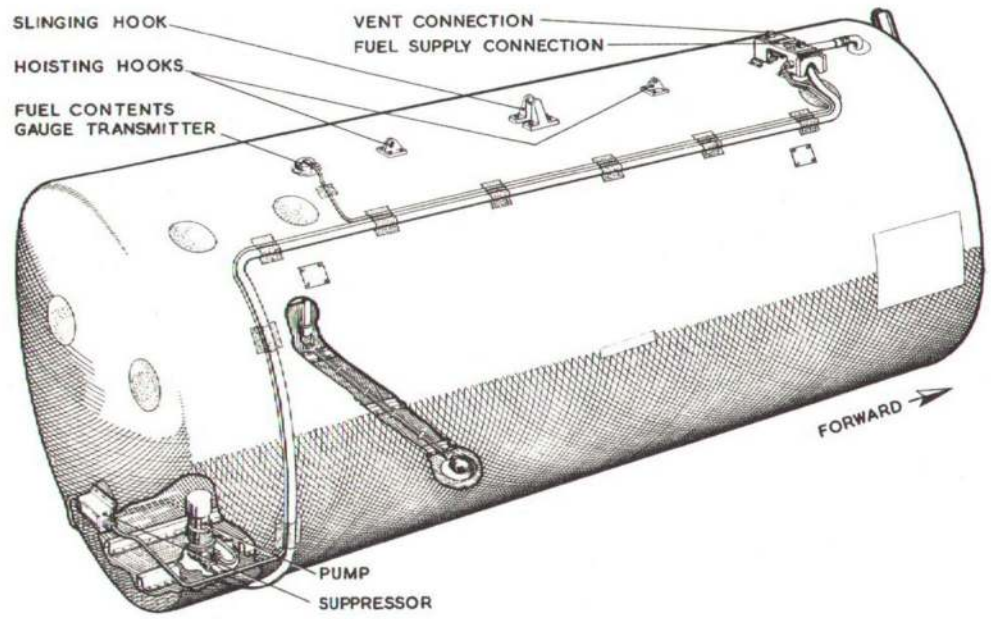

Fig.4. Auxiliary fuel tank

WARNING...

The centre bomb slip (No.15) in some aircraft is fitted with a built in manual jettison lever. Care must be taken when an auxiliary tank is being carried, that this lever is not inadvertently operated and the fuel tank consequently released from the bomb slip.

FUEL PIPING (fig.3)

11. The piping is shown in the illustration together with the positions of the system components. The components in the wing trailing edge are accessible through access panels in the underside of the trailing edge as follows:-

(1) Three-way manifold - between the centre-plane trailing edge ribs 29 and 30.

(2) Five-way manifold - between ribs 28 and 29 of the same member.

The positions of the fuel cocks are stated in the relevant paragraphs.

Tank selector cocks (fig.3 and 10)

12. Each No.1 tank selector cock, which is electrically operated, is fitted between ribs 29 and 30 in the centre-plane trailing edge section. The outlet of each cock is connected directly to the three-way manifold mentioned in the previous paragraph. In the fuel pipe from each No.2 tank, another identical cock is connected and positioned between ribs 1 and 2 of the intermediate trailing-edge section. The selector cock for each No.3 tank is connected directly to the T-union between ribs 7 and 8 of the intermediate trailing-edge section. All six cocks are

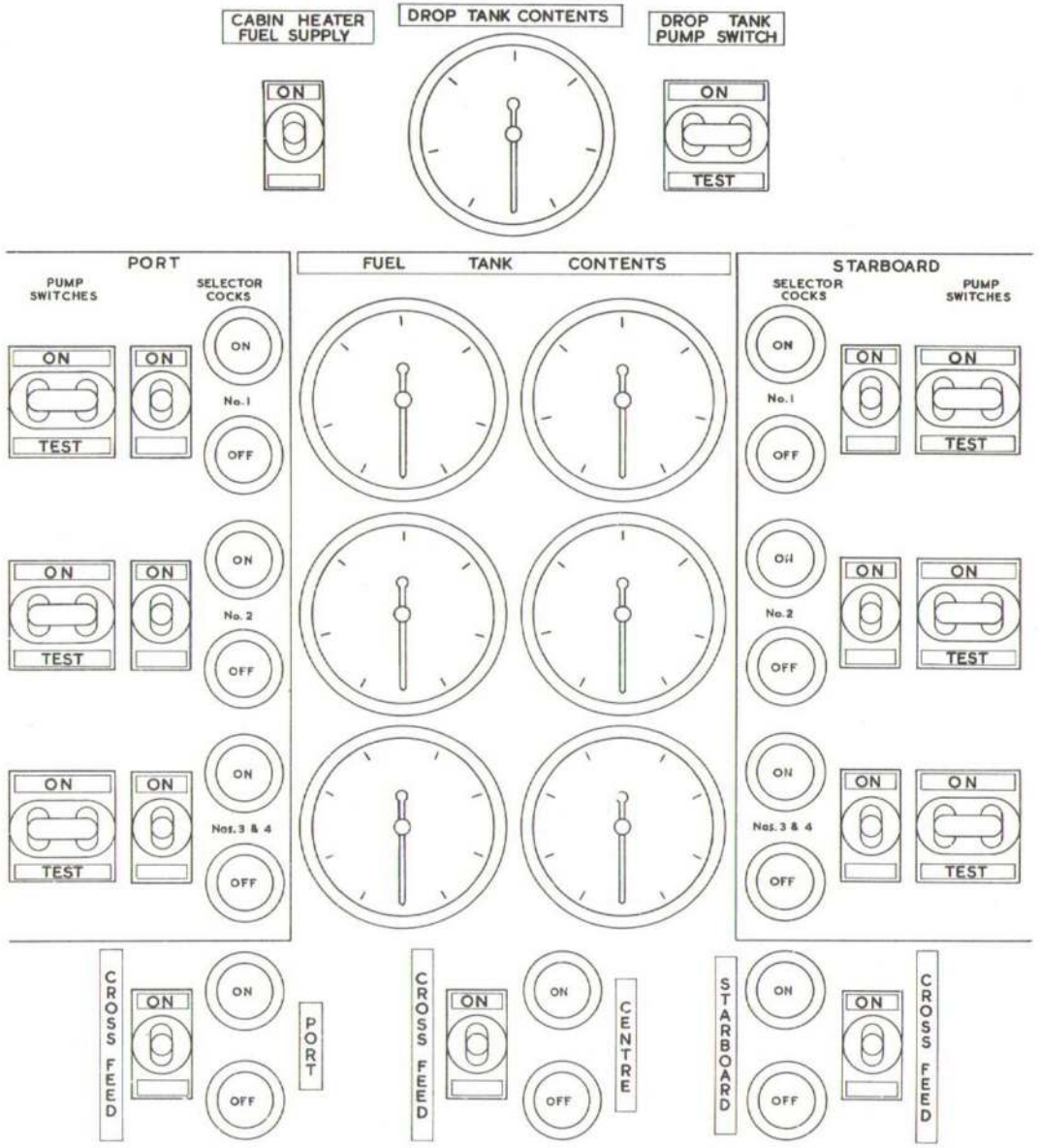

Fig. 5. Fuel system controls on flight engineer's main panel

controlled by separate switches on the flight engineer's main panel (fig.5). A manually-operated three-way cock, mounted on a bracket on the starboard side of the fuselage on the aft face of the front spar (fig.10), is used to direct fuel from the auxiliary tank, when fitted, to either of the No.1 tanks. The handle of this cock has three positions indicated by a label inscribed: PORT - OFF - STARBOARD. Fuel will only be fed through this cock when the auxiliary fuel tank pump is switched on (fig.5).

Cross-feed cocks

13. In the cross-feed pipe between the two five-way manifolds is an electrically-operated fuel cock. An identical cross-feed cock is fitted to a union on the five-way manifold on each side. This in turn is connected to the pipe from the No.3 tank. These cross-feed cocks are controlled by three switches on the flight engineer's main panel (fig.5).

Master engine fuel cocks (fig.3)

14. Each engine fuel pipe incorporates an electrically-operated fuel cock. The pipe is led forward along the port side of its relevant nacelle, and the fuel cock is attached to the sub-frame structure in the outboard nacelles and inside the port main-wheel valance of the inboard nacelles. The cocks are controlled by four switches at the top of the centre portion of the pilot's panel.

Non-return valves (fig.3)

15. Non-return valves are incorporated in the system as shown in fig.1. They are fitted to prevent reverse flow of fuel occurring when any combination of tanks is selected to feed the engine as laid down in Pilots Notes - A.P.4267B - P.N.

Using the fuel pumps (fig.5)

16. When each tank is selected, the relevant pump must be switched on to ensure maximum potential delivery of fuel

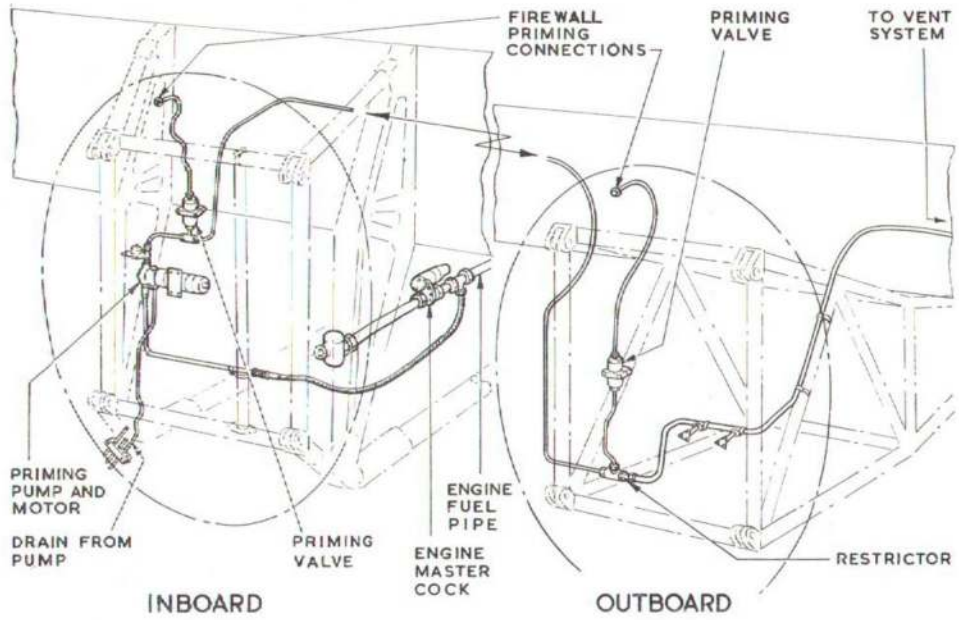

Fig. 6. Priming system - port side

to the engine or engines being fed. If the pump is not running, fuel is delivered by gravity action, but, in the case of a No.1 tank feeding both engines on the same side by gravity, the engines must not be operated at more than maximum continuous rated boost, i.e., +12 p.s.i. The complete fuel system drill is given in A.P.4267B-P.N. (Pilots Notes).

PRIMING SYSTEM (fig.6)

17. An injection priming system is provided for use when starting the power units. Immediately aft of the master engine fuel cock fitted in the pipe from each five-way manifold to its inboard engine is a T-union from which a small bore pipe is taken to the firewall and to an electric pump, Type F.P.3, Mk.7 (Ref.No.5U/5057), mounted on the aft face of the nacelle firewall. The outlet of the pump is fed through a fuel pressure switch, 157/1PG., which is set at 55 p.s.i., and then through a solenoid-operated valve to the inboard firewall. A branch pipe from a T-union immediately before the fuel pressure switch is led to the adjacent outboard nacelle and through another solenoid-operated valve to the outboard firewall. The four valves, one in each nacelle, are controlled by a five positioned switch mounted on the flight engineer's auxiliary panel. The handle of this switch is turned to the desired position and then depressed to operate the selected valve. Refer to Sect.2, Chap.2, when using this system during engine starting.

OIL DILUTION SYSTEM

18. In each power unit, an oil dilution valve is incorporated (A.P.4275, Vol.1). This valve admits fuel from the fuel injection unit into the inlet of the oil pump and is controlled by one of four switches on the flight engineer's auxiliary panel (Sect.1, Chap.2). The correct times for which these switches are to be used, according to the prevalent ambient temperature when the power units are being started is contained in Sect.2, Chap.4.

VENT SYSTEM (fig.3)

19. All four tanks on each side are vented by a common vent pipe connected to the vent elbow of each tank. This pipe extends from the outboard end of the No.1 tank to the outboard end of the No.4 tank. The vent connection from the auxiliary tank is led to the inboard end of the port vent pipe. At the outboard end of each vent pipe is the connection from the low-pressure feed from the nitrogen system (Chap.6.)

20. An outlet to atmosphere on each side is provided by a pipe connected to a second elbow at the outboard end of the No.4 tank (para.6). This pipe is led aft over the top of the tank and through the spar web, terminating in three outlets (refer to Chap.6).

WATER/METHANOL SYSTEM

21. Two tanks, one inside each outboard rear nacelle fairing, feed water/methanol fluid to the power units when a take-off boost exceeding 18 to 18·5 ± 0·25 p.s.i. is required. Fig.7 shows the system and fig. 8 illustrates the system installation.

Pumps (fig.9)

22. A sump at the aft end of the bottom of each tank provides a flat surface with mounting rings for two electric pumps, S.P.M.7 (Ref.No.5U/5272). The outlet of each pump is piped to a filter (Ref.No. 28J/12240) clipped to the sub-frame at each side of the forward end of the tank. Control of the pump motors is effected by a switch on the flight engineer's main panel.

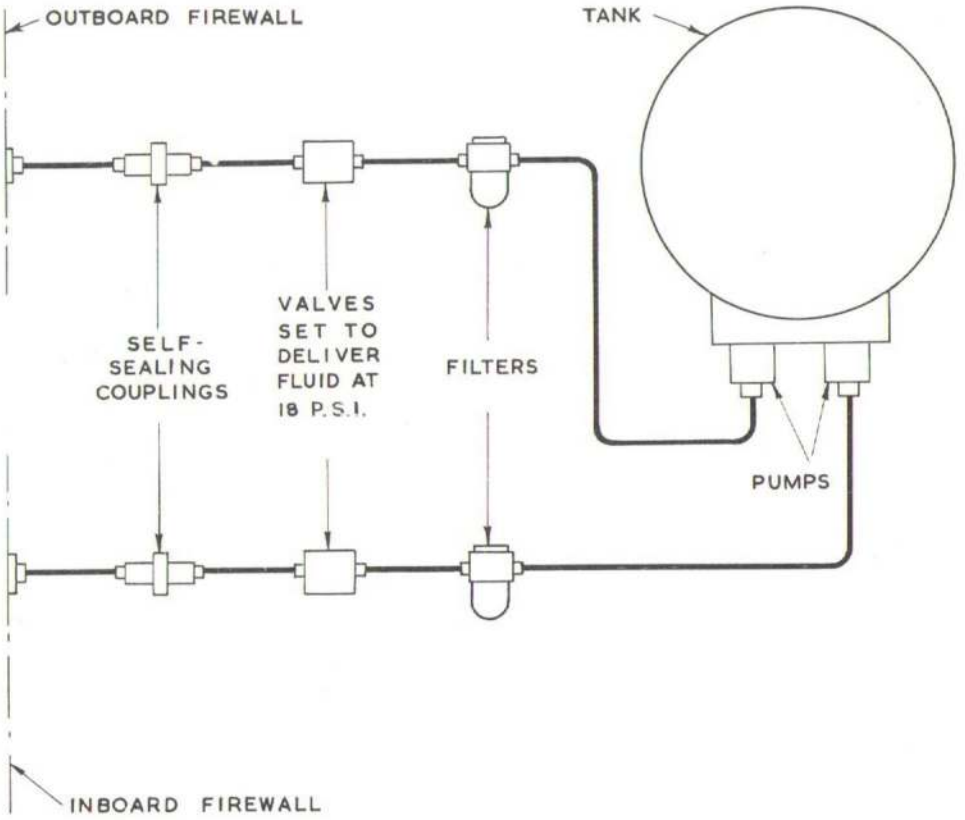

Fig.7. Diagram of water/methanol system

Piping to engines (fig.9)

23. From each outboard filter a pipe is led forward to a valve, Amal 301/3/025-1, and thence to the outboard firewall through a pipe which incorporates a self-sealing coupling, A.V.A.50F. A pipe from each inboard filter is led to the forward face of the front spar and then inboard to a valve, Amal 301/3/025-1, on the inboard firewall. The valve outlet is piped through a self-sealing coupling, A.V.A.50F, directly connected to the firewall connection.

Control system

24. Four boost-operated switches (Ref.No.5C/4261), mounted under the floor of the fuselage nose section on the forward face of former F, are connected by pipes to T-unions in the four boost gauge pipes. These switches are set to operate at a pressure of 18·5±0·75 p.s.i. The contacts of each switch are connected in series with one of the four water/methanol fluid pumps and the four pump circuits are controlled by the switch on the flight engineer's main panel. The switch is ganged with the supercharger switch to prevent any possibility of the system being operated in M.S. gear, or not operating when the boost in F.S. gear exceeds that already quoted.

Operation

25. When F.S. gear is selected, the water/methanol control switch is automatically switched on and one contact in each boost-operated switch is energised. If any of the engine throttle control levers are advanced beyond the normal take-off boost of 18 p.s.i. to 18·5±0·25 p.s.i. the associated pumps are energised by the closure of the boost-operated switch or switches. The pumps then deliver fluid under a pressure of approximately 18 p.s.i. regulated by each Amal valve to its associated engine boost control where it opens a boost pressure bleed valve. This causes a diaphragm, normally held static by equal pressure on each side, to move and the + 19 p.s.i. boost stop to withdraw, permitting the boost regulator valve to follow the variable datum cam up to a + 25 p.s.i. stop. The fluid is then injected into the supercharger intake and the flow rate is regulated by a boost-pressure-operated valve to the correct rate for all boost pressures between approximately 18·5 and 25 p.s.i., thereby keeping down the charge temperature and allowing a 15 to 20 per cent weaker fuel/air ratio to be used.

BOOST GAUGES

26. Each of the four boost gauges on the pilot's panel is connected by copper piping to the boost pressure connection on the engine through a union on the relevant firewall. These boost gauges are calibrated up to + 24 p.s.i. only. At a boost pressure of + 25 p.s.i. each gauge will read over this value without harm and the maximum boost is regulated to this figure by the boost control.

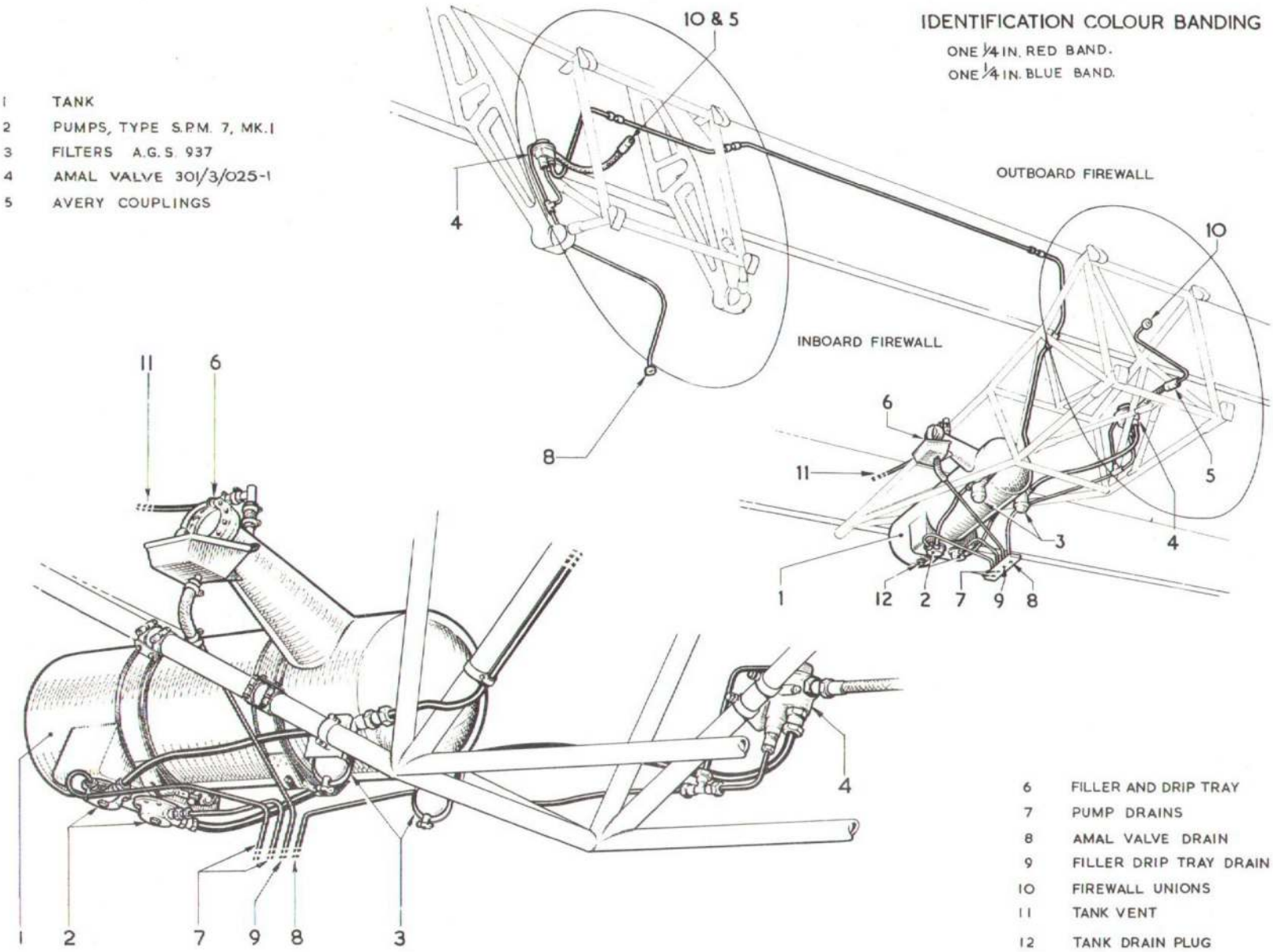

Fig. 8. Water/methanol system

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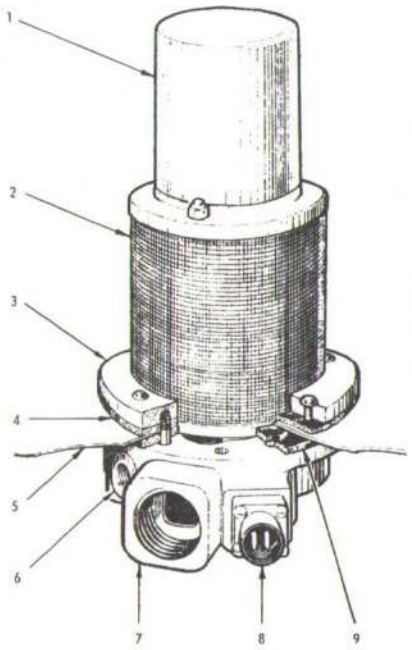


1 ENCLOSED PUMP MOTOR
2 PUMP INLET FILTER
3 PUMP ATTACHMENT RING (riveted to tank)
4 FIXED SEALING WASHER BETWEEN RING AND TANK
5 TANK SKINNING
6 PUMP ATTACHMENT FLANGE AND DRAIN CONNECTION
7 PUMP DELIVERY CONNECTIONS
8 ELECTRICAL CONNECTION SOCKET
9 SEALING WASHER BETWEEN PUMP FLANGE AND TANK

NOTE...
PUMP IS ATTACHED TO TANK BY 12 BOLTS WHICH PASS THROUGH THE TANK SKIN AND SCREW INTO HOLES IN (3) ABOVE.

Fig.9. Water/methanol fluid pump installation

TABLE 1
Fuel flow testing

Connect test rig to firewall union No.	Select tank No.	Fuel flow (gallons)	Time with fuel pump ON(secs)	Time with fuel pump OFF(secs)	Min.del. press. (p.s.i.)
1 and 2	1 port	3	50 max.	60 max.	10
	2 port	3	50 max.	50 max.	10
	3 & 4 port	3	50 max.	50 max.	10
	3 & 4 stbd. (all crossfeed cocks ON)	3	50 max.	50 max.	10
3 and 4	1 starboard	3	50 max.	60 max.	10
	2 starboard	3	50 max.	50 max.	10
	3 & 4 starboard	3	50 max.	50 max.	10
4	3 & 4 port (all crossfeed cocks ON)	3	50 max.	50 max.	10

NOTE...
Refer to fig.1 for diagram of fuel system, and check each fuel cock visual indicator during these tests. The positions of the cocks are shown in fig.1.

SERVICING

Introduction

27. Description of servicing operations are confined to the fuel tanks and to the water/methanol system. A.P.2241, Vol.1, contains servicing instructions for the fuel and water/methanol fluid pumps. The fuel cock actuators are dealt with in A.P.4343D. Other references are as follows:-

(1) Electrical components - refer to Book 2, Sect.5, Chap.1 of this volume.

(2) All other components and piping - A.P.1464D, Vol.1, Part 2.

FUEL TANKS

28. Each No.1, 2 and 4 tank is fitted with a drain cock, but normal draining can be effected without its use.

Draining the system and tanks

29. All or any of the tanks in each wing can be drained from the drain valve located at the bottom of the five-way manifold on the side as follows:-

(1) Open the access door on the underside of the centre section trailing edge under the manifold and remove the screw cap on the underside of the manifold.

(2) Attach a draining adapter, A.S.2584 (fig.10) to the screw spigot of the valve. Ensure that the opposite end of the hose is in a suitable container to take the quantity of fuel to be drained off.

(3) Open the selector cock of each tank to be drained on that side.

(4) Maximum rate of draining can be obtained by operating the tank

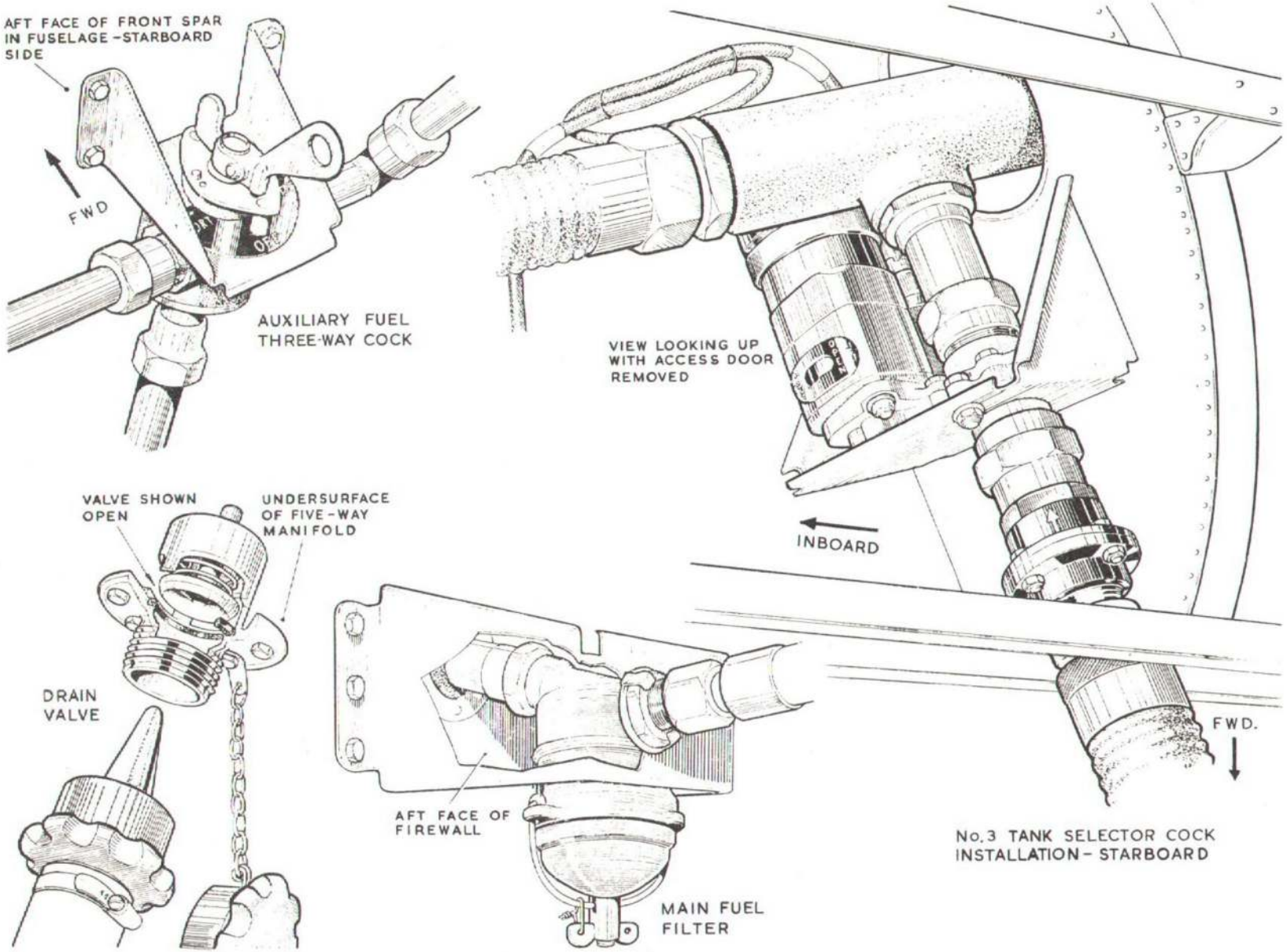


Fig. 10. Typical fuel system servicing points.

pumps, but this must only be done when there is plenty of fuel to be drained.

WARNING...
When there is less than 25 gallons of fuel in any tank, the pump must be switched off and final draining effected without its use. The pumps must never be operated 'dry' (refer to A.P.1095C).

(5) If required, complete draining of each No.1 tank can be effected by use of the drain cock situated above an access door at the aft edge of the assembly panel under each side of the centre plane. A similar procedure is applicable in the case of No.2 and 4 tanks. No.2, 3 and 4 tanks will however, drain almost completely from the manifold. No drain cocks are fitted to the No.3 tanks. Refer to Sect.2, Chap.4, for access instructions to all drain cocks. Ensure that all cocks are closed and wirelocked before the tanks are filled.

Cleaning the tanks
30. Drain the tanks as described in para.29 and remove them as described in the Removal and Assembly section of this chapter. Remove the access doors and fittings from each tank and proceed as instructed in A.P.4117A, Vol.1 and 6.

NOTE...
Do not refit the fuel contents transmitter to any flexible tank until after it has been completely installed in the aircraft wing.

Flow and pressure testing
31. Ensure that there is a minimum of 100 gallons of fuel in each of the No.1, 2 and 3 tanks, and proceed as follows:-

(1) Disconnect the engine fuel pipes at the union on the forward face of each firewall.

(2) Carry out fuel flow tests in accordance with A.P.1464D, Vol.2, leaflet D.22, and Table 1 of this chapter.

WATER/METHANOL SYSTEM

32. Detailed procedure for cleaning the tanks is contained in A.P.4117A, Vol.1 and 6. Notes on servicing the system are contained in A.P.1464C, Vol.1, Part 1, Sect.2, Chap.3.

Draining the tanks
33. Each tank is drained by removing the drain plug located in the tank sump. Access to this is gained by removing a panel on the undersurface of each outboard rear nacelle fairing. The sequence of operation is as follows:-

(1) Loosen the filler cap.

(2) Position a receptacle of at least 25 gallons capacity below the draining point.

(3) Remove the locking wire from the drain plug.

(4) Unscrew and remove the plug and its sealing washers.

(5) After draining is completed, reposition the washers on the plug and refit the plug. Finally relock with new locking wire.

(6) Finally tighten the filler cap, unless the tank is to be refilled immediately.

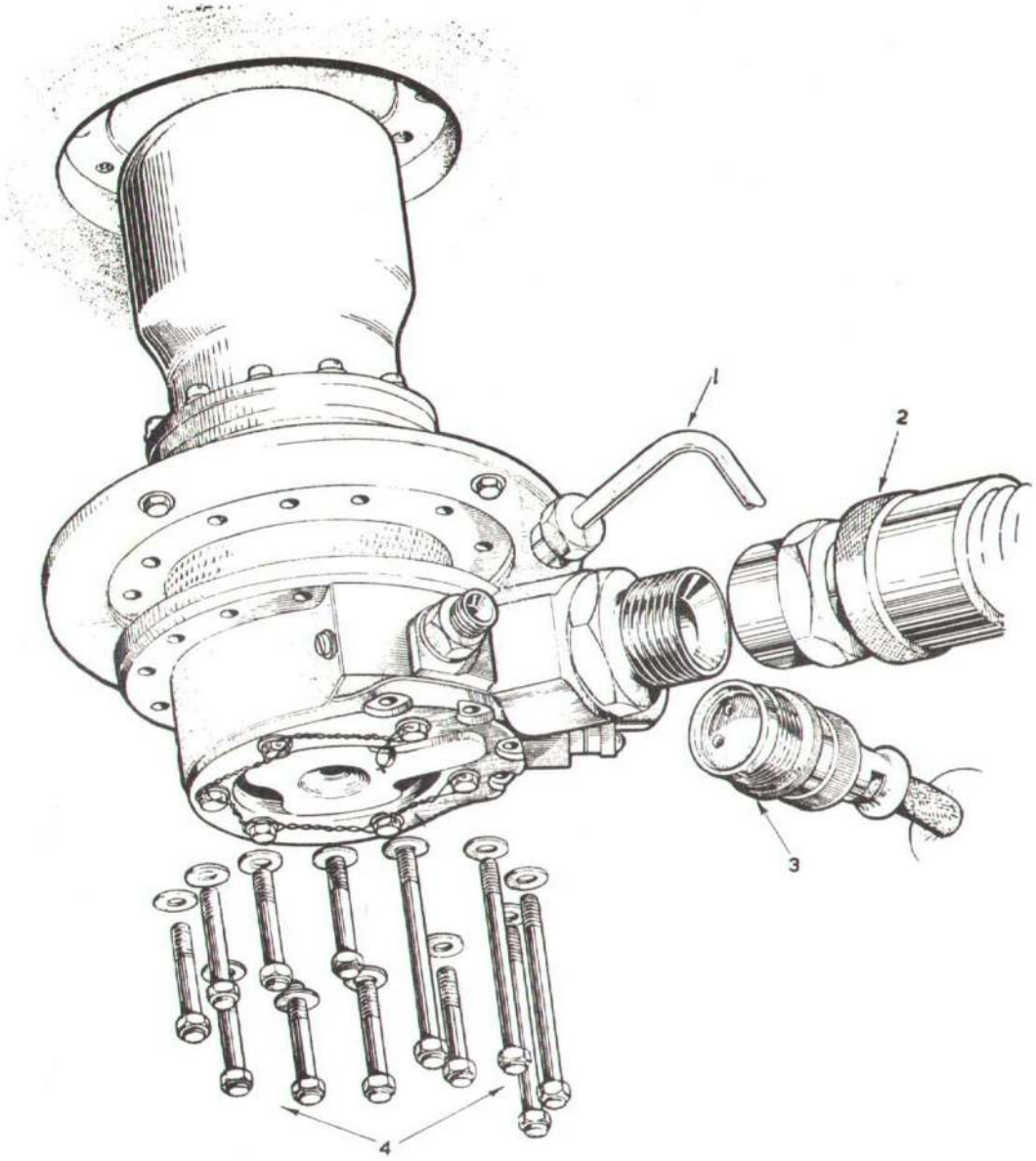
Cleaning the tanks
34. Owing to the narrow filler neck, it is necessary to remove the tanks (fig.14), in order to swill them out effectively. Inhibited water/methanol fluid (Leading Particulars) must be used.

Pressure test
35. Pressure testing of the system is carried out by switching 'on' the water/methanol electric pumps which are ganged with, and initially operated by, the supercharger F.S. switch, located on the flight engineer's main panel. The test will subject each individual engine system piping and components, to a pressure of 25 to 28 p.s.i., to be maintained for 20 minutes. As the water/methanol electric pump for each engine system is operated by action of its associated boost pressure switch (para.24), an air pump must be connected with the boost pressure line, at the connection on the forward face of the respective bulkhead, and a boost pressure of + 18 p.s.i. simulated. During the pressure test, ensure that the loading of the water/methanol electric pump does not exceed 12 amps. with 28 volts at the aircraft bus-bar.

Flow test equipment
36. The equipment required to carry out a water/methanol flow test consists of a test rig, two five gallon containers, one of which must be calibrated, an air pump and a stop watch. The test rig is made of a suitable length of pipe incorporating a side tapping to which is connected a pressure gauge (Ref.No.4G/4182). An off/on cock and an adapter to house a jet (size 0·154 in.,drill 3·90 mm.)are fitted to the outlet end of the pipe. A flexible hose, of sufficient length to reach the containers, must be connected to the outlet end of the pipe.

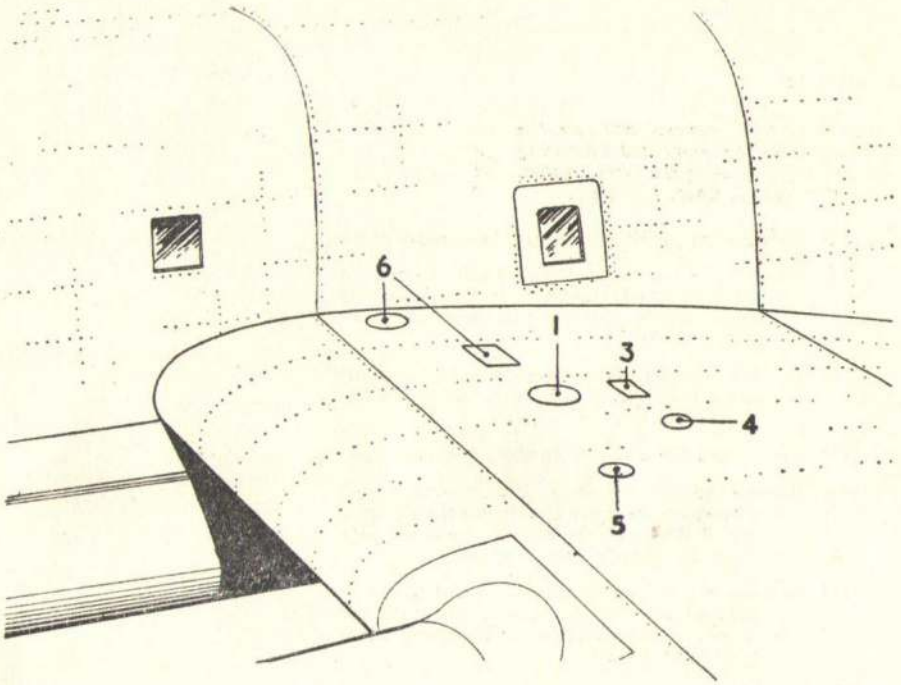
Functional and flow test
37. Before carrying out the functional and flow tests, ensure that the water/methanol tanks are filled to normal capacity and proceed as follows:-

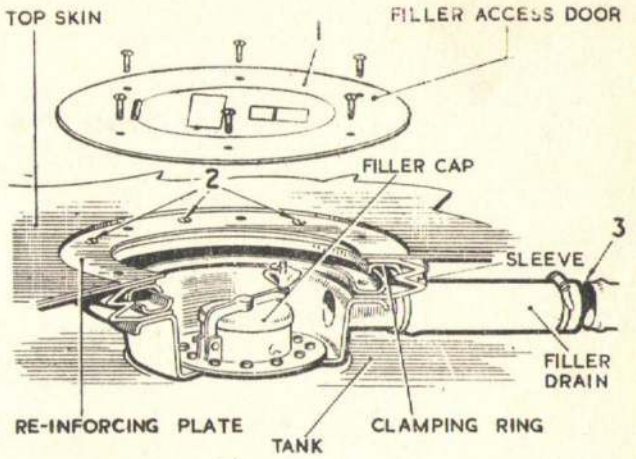
(1) Disconnect the water/methanol

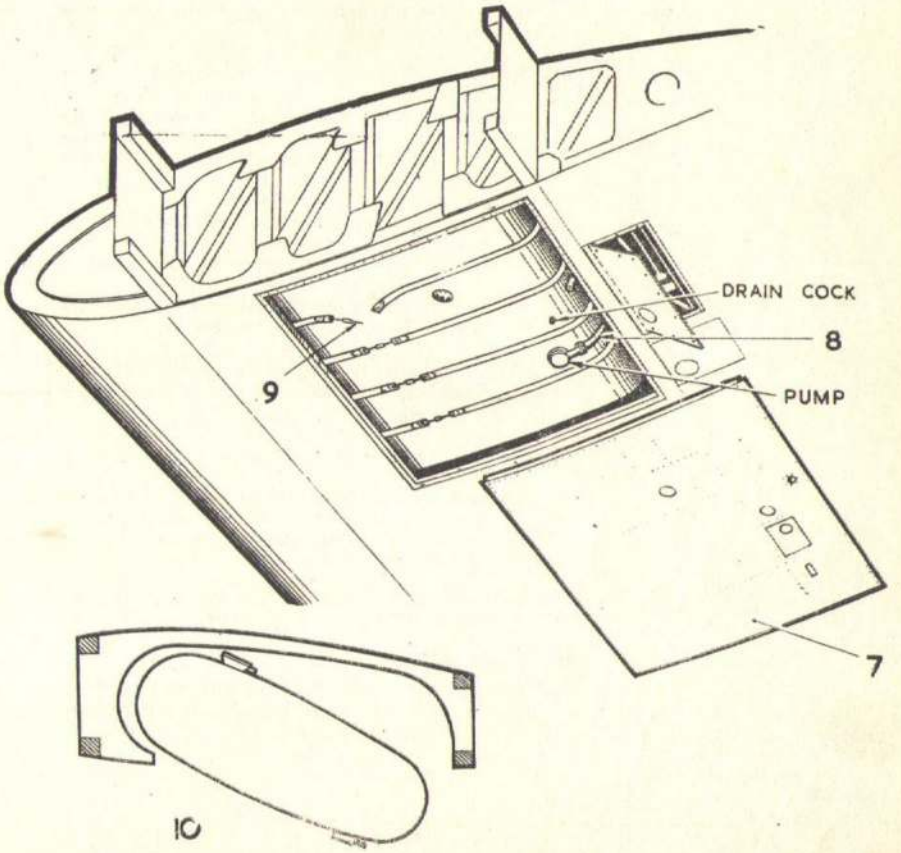


1 REMOVE DRAIN PIPE CONNECTION
2 REMOVE FUEL DELIVERY PIPE
3 RELEASE ELECTRICAL CONNECTION SOCKET
4 REMOVE TWELVE BOLTS
5 WITHDRAW PUMP COMPLETE WITH TANK COVERING CLAMPING RING

Fig. 11. Removal of fuel pumps







Note. *Drain the tank (refer to the text) before beginning removal and jack the aircraft in approximately the rigging position, trestling the wings and supporting the engines to relieve all stresses in the wing skinning by using the jacks, trestles, gantries, beams and power plant slings detailed in Sect. 2, Chap. 4, Table 1.*

(1) Remove the filler access door

(2) Remove the screws to release the filler splash tray assembly

(3) Disconnect the filler drain through the handhole in the skin

(4) Remove the access panel and disconnect the electrical leads to the fuel gauge transmitter

(5) Remove the access panel and disconnect the vent pipe

(6) Remove the access panels and disconnect the cross-feed pipe and the auxiliary fuel tank supply line

(7) Remove the tank access door (*Sect. 2, Chap. 4*)

(8) Open the access door and disconnect the pipe between pump and fuel cock

(9) Support the tank and release the turnbuckles in each strap

(10) Lower the tank carefully from the main plane

Fig. 12. Removal of No. 1 fuel tank

KEY TO FIG. 13

Note. *Drain the tank (refer to the text) before beginning removal and jack the aircraft in approximately the rigging position, trestling the wings and supporting the engines to relieve all stresses in the wing skinning by using the jacks, trestles, gantries, beams and power plant slings detailed in Sect. 2, Chap. 4, Table 1.*

No. 2 Tank

(1) Remove access panels

(2) Disconnect filler splash tray from assembly panel

(3) Remove access panel and disconnect the fuel delivery pipe and drain pipe from the pump on the underside of the tank

(4) Remove the fuel pump by releasing the 12 bolts securing the flange to the square, dished reinforcing plate riveted to the tank compartment skin

(5) Remove the four bolts and special washers attaching the pump mounting flange on the tank to the square reinforcing plate (these are outside the circle of pump attachment bolts and at the corners of the reinforcing plate)

(6) Remove the access panel and detach the bracket securing the attachment flange of the fuel gauge transmitter tank assembly panel

(7) Disconnect the electrical cables from the fuel gauge transmitter and remove it

(7A) Remove the bolts securing the clamping bracket locating the drain cock and remove the bracket.

(8) Release the tank support straps

(9) Remove the tank assembly panel and disconnect the vent elbow from the main vent pipe, and remove the filler drain pipe by releasing the connections

(10) Collapse the tank and lift clear of the wing, using the handling straps provided

No. 3 and 4 Tanks

(11) Remove the screws securing the diaphragm at the inboard end of No. 3 tank and remove the diaphragm

(12) Remove the panels and release the support straps

(13) Remove the access panel and detach the bracket securing the attachment flange of the fuel gauge transmitter to the wing structure (No. 3 tank)

(14) Remove the fuel gauge transmitter and the fuel pump from No. 3 tank (refer to operations (3), (4) and (5))

(15) Disconnect the elbow from the main vent pipe

(16) Release the filler drip tray; disconnect the vent elbows—two—from the main vent pipe and No. 4 tank vent pipe, and the drain pipe from the spigot on the drip tray

(17) Remove the screws from inboard and outboard ends of the haulage straps; the outboard screws are accessible after removing outer wing joint covers

(18) Haul No. 3 and No. 4 tanks together to bring No. 3 tank into No. 2 tank's position

(19) Remove the two access panels

(20) Release the tank interconnection pipe and the two buckles joining the haulage straps

(21) Unlace the joint between the No. 3 and No. 4 tanks (top surface), collapse No. 3 tank and lift clear using the lifting handles

(22) Haul No. 4 tank into the No. 2 tank position, collapse and lift clear using the lifting handles

Installation of No. 3 and No. 4 tanks

(23) Join the haulage straps at the buckles (operation (20)); lace the upper adjacent edges together (operation (21)) and make the interconnection pipe joint between the two tanks (operation (20)) and haul both tanks into position

(24) Reverse all operations (19) to (1) to complete installation of all three tanks

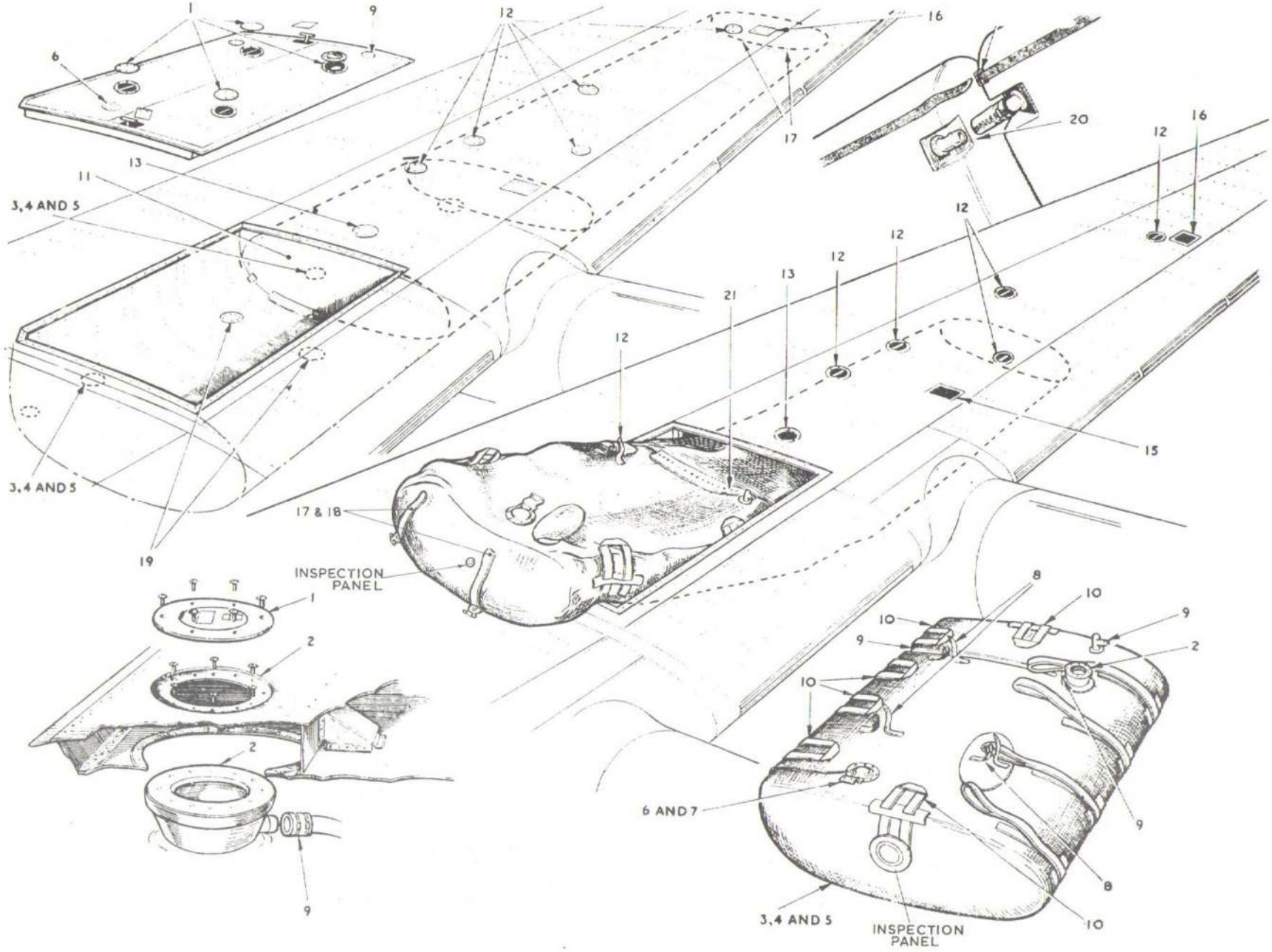
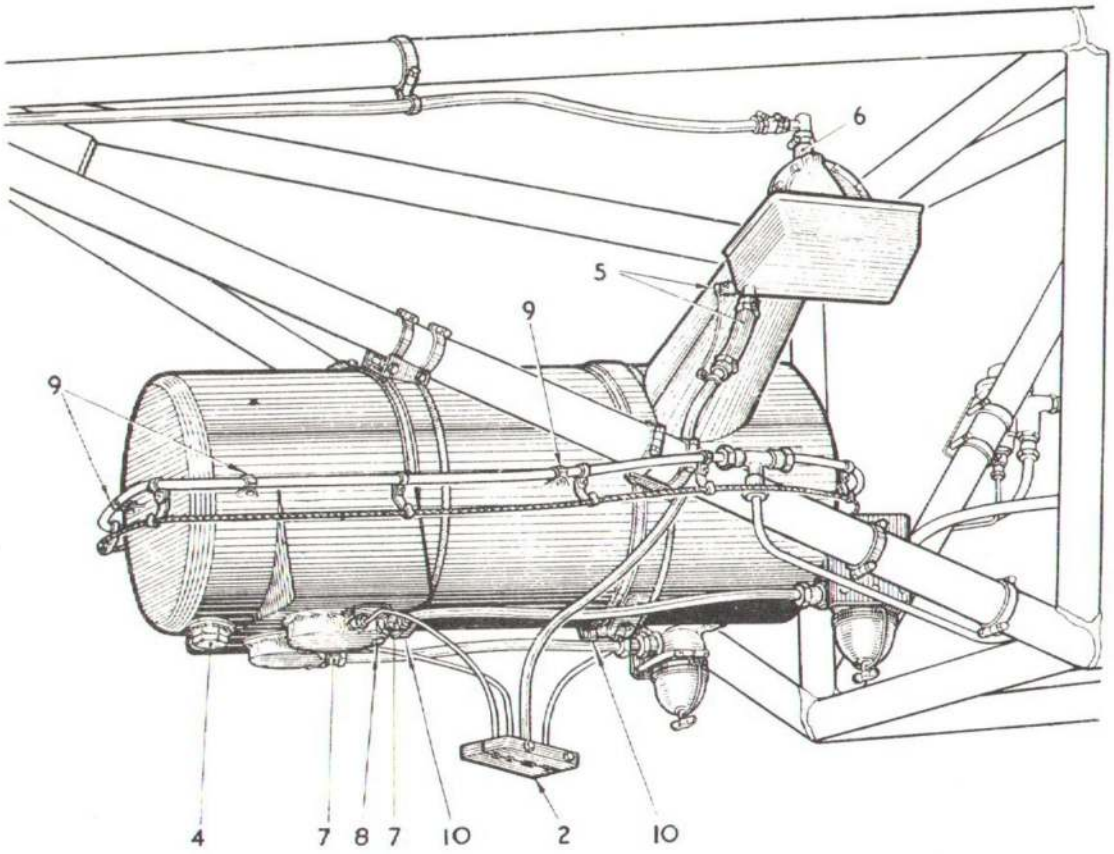
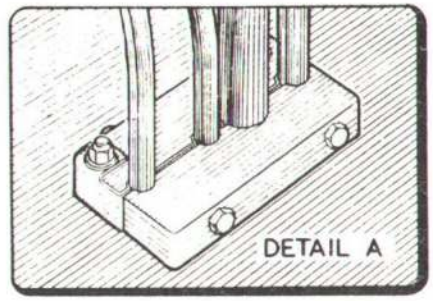
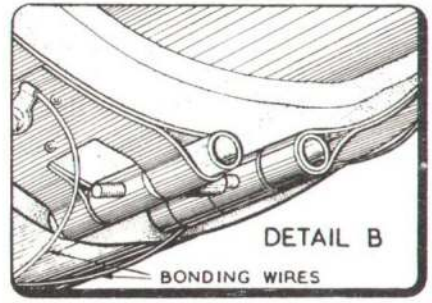


Fig. 13. Removal of No: 2, 3, and 4 fuel tanks





BLOCK SECURING DRAIN PIPES TO REAR NACELLE FAIRING



TANK STRAP FASTENER

Note . . . *Items not bracketed are not shown on the illustration*

1 Remove the access door in the underside of the nacelle fairing

(2) Disconnect the fairlead attaching the drain pipes to the nacelle fairing (shown in detail A)

3 Remove the nacelle fairing (Sect. 4, *Chap.* 1)

(4) Drain the tank

(5) Disconnect the drain pipe and bonding wire at the tray

(6) Disconnect the vent pipe at the filler neck

(7) Disconnect the outlet pipes at the pumps

(8) Disconnect the electrical leads at the pumps

(9) Disconnect the six clips attaching the spray pipe to the tank

(10) Disconnect the pump bonding wires at the aft tank strap and release both tanks straps (shown in detail B)

11 Remove the tank, tilting the filler neck inwards to clear the spray pipe and flame cord

Fig. 14. Removal of water/methanol tank

feed pipe at the connection on the forward face of the bulkhead (fig.8) and connect the test rig.

(2) Disconnect the boost pressure pipe at the top forward face of the engine rear bulkhead and connect the air pump to the adapter on the bulkhead.

(3) Connect an external electrical supply to the aircraft, set the test rig on/off cock to 'off' and select the water/methanol F.S. switches on the flight engineer's panel to ON.

(4) By using the air pump, slowly build up a pressure in the boost system and check that the water/methanol pump operates at a boost pressure of + 18·5 ± 0·75 p.s.i.

(5) Turn the test rig on/off cock to 'on' and direct the flow of water/methanol into the uncalibrated container until an air free flow of fluid is obtained. Turn the on/off cock to 'off' and select the water/methanol F.S. switches to OFF.

(6) Increase the pressure in the boost system to + 19 p.s.i. Select the water/methanol F.S. switches to ON and check the water/methanol pump pressure registered on the test rig pressure gauge, this pressure must be 27 p.s.i. with 28 volts on the aircraft bus-bar.

(7) Maintain boost system pressure at + 19 p.s.i. Direct the test rig outlet hose into the calibrated container, turn the test rig on/off cock to 'on' and time the flow of three gallons. The system flow requirement is 960 - 1,200 pints per hour at a pressure of 18 p.s.i. as registered on the test rig pressure gauge.

(8) Turn the on/off cock to 'off' and select the water/methanol F.S. switches to OFF.

(9) Remove the test rig and connect the water/methanol feed pipe and wire lock the union. With a pressure of + 18·5 ± 0·75 p.s.i. in the boost system, select the water/methanol F.S. switches to ON and check the pipe unions for leaks.

(10) Select the water/methanol F.S. switches to OFF, remove the air pump and connect the boost pressure pipe and wire lock the union.

Pumps, valves and filters

38. Servicing data and instructions regarding these items are contained in the following publications:-

(1) Pumps - A.P.1095C, Vol.1, Sect.4.

(2) Amal valves - A.P.1464C, Vol.1, Part 1, Sect.2, Chap.2.

(3) Filters and self-sealing couplings - A.P.1464D, Vol.1, Part 2. The filters should be cleaned with inhibited water/methanol fluid (Leading Particulars). Access is gained through the large bottom panel at the forward end of each outboard rear nacelle fairing. Care must be taken to ensure that the safety pin is secure after assembly of each filter.

REMOVAL AND ASSEMBLY

FUEL PUMPS AND TANKS
(fig.10, 11, 12 and 13)

39. In the keys to the illustrations, operation reference numbers which are not bracketed refer to operations which are not illustrated.

MISCELLANEOUS COMPONENTS

40. All pipes, filters, fuel cocks and manifolds are clipped to the adjacent structure or secured by bolts to brackets, and the method of removal and subsequent refitting or replacement follows normal procedure. Illustrations of removal procedure are contained in the pages which follow.