

## Chapter 2

## PREPARATION FOR FLIGHT

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**WARNING****AN AIRCREW EJECTION SEAT IS FITTED TO THIS AIRCRAFT.**

Before attempting to enter the cabin ensure that the instructions detailed on the LETHAL WARNING marker card at the front of the handbook have been complied with.

**THIS IS VERY IMPORTANT**

**ENGINE**

When the aircraft is being manoeuvred on the ground with the engine running, or when the engine is being run for any purpose it is essential that all personnel keep well clear of the air intakes and jet exhausts. **To remain in proximity (fig. 1) is hazardous to safety.**

The air intake safety guards must be fitted at all times when the engine is being ground run.



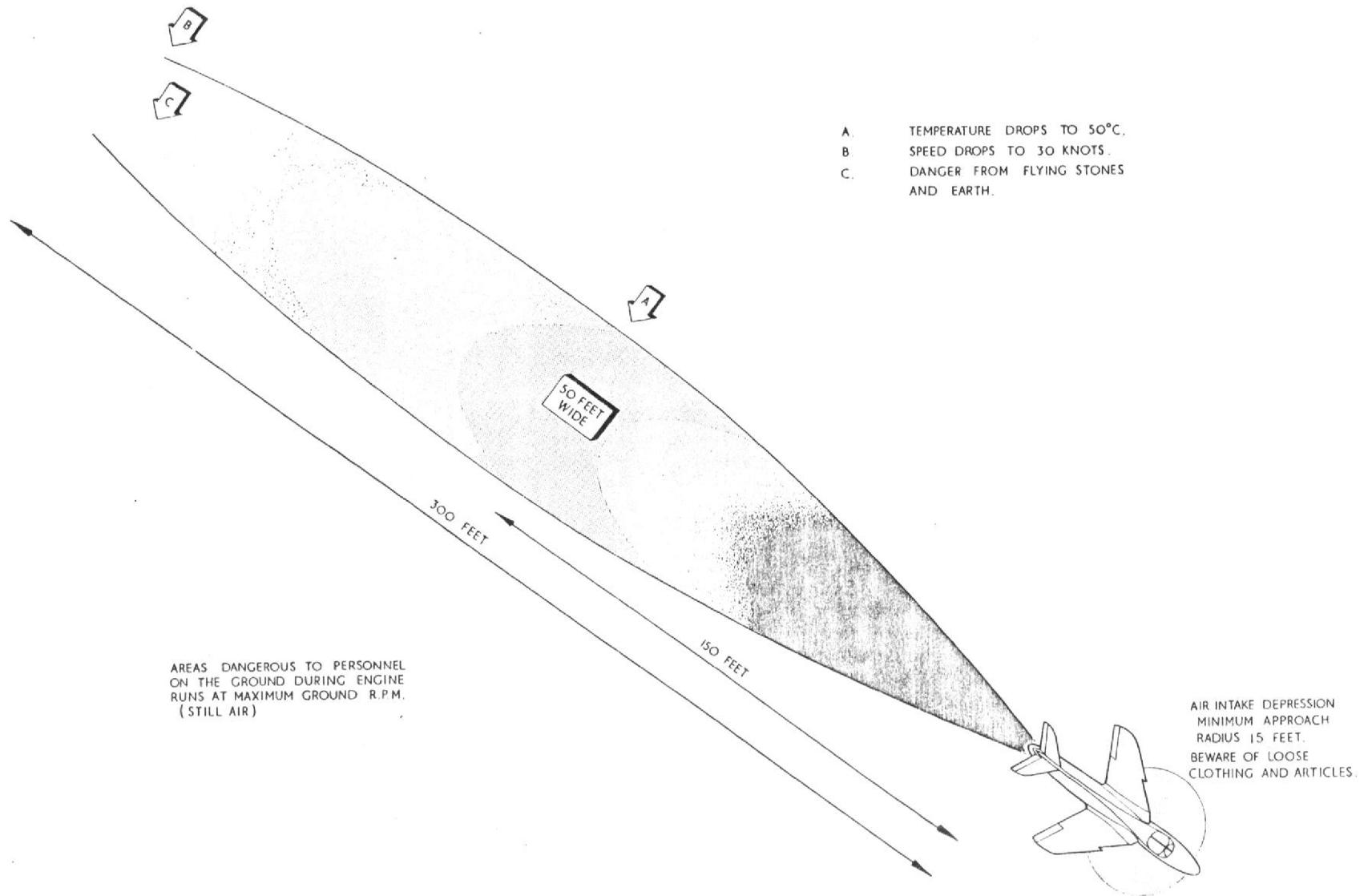


Fig. 1 Jet efflux danger areas

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## Introduction

1. This chapter describes the replenishing of the various systems and certain servicing operations which may be found necessary during the preparation of the aircraft for flight, the location of the various servicing points being given in fig. 2. When the necessary operations are completed a check must always be made to ensure that all tools have been removed and that all panels and access doors lie flush with the surrounding surfaces and are securely fastened. The position of the access doors and the removable panels is shown in Sect. 2, Chap. 4. The operations described in the following paragraphs are grouped for convenience under their various systems and do not, therefore, constitute the order in which the operations are to be carried out.

## Refuelling

2. The aircraft is refuelled under pressure through a  $1\frac{1}{2}$  in. standard coupling in the port wheel bay (fig. 2, item 11). High pressure refuellers, capable of refuelling at a rate of 150 gallons per minute at a pressure of 45-50 lb. per sq. in., should be used, but if these are not available, existing refuellers may be used with an adaptor hose.

3. The disposition of the tanks, their inter-connections and diagrams of the fuel system are given in Sect. 4, Chap. 2. The procedure for refuelling the system is as follows:—

- (1) Ensure that the defuelling cock (fig. 2, item 15) accessible via the engine starter access door, in the bottom of the fuselage, is turned OFF and locked (para. 4(8)).

## Note . . .

*The defuelling cock is normally locked in the OFF (flight) position. It is only turned to ON during defuelling.*

- (2) Ensure that the L.P. fuel cock in the cabin is OFF. *This is important.*

- (3) Ensure that the refueller is earthed and connect the bonding of the hose to the aircraft structure. Remove the sealing cap from the refuelling coupling in the port wheel bay and connect up the refueller hose in its place.

## Note . . .

*Ensure that the refuelling pressure relief valves in the underside of the stub wings are free to operate. This is particularly important when icy conditions prevail or when the aircraft has not been used for an appreciable time. To test a valve screw a  $\frac{1}{4}$  in. B.S.F. bolt into the threaded hole in the valve and then pull the valve down.*

- (4) Start the refueller pump and set the refueller control to RE-FUEL.

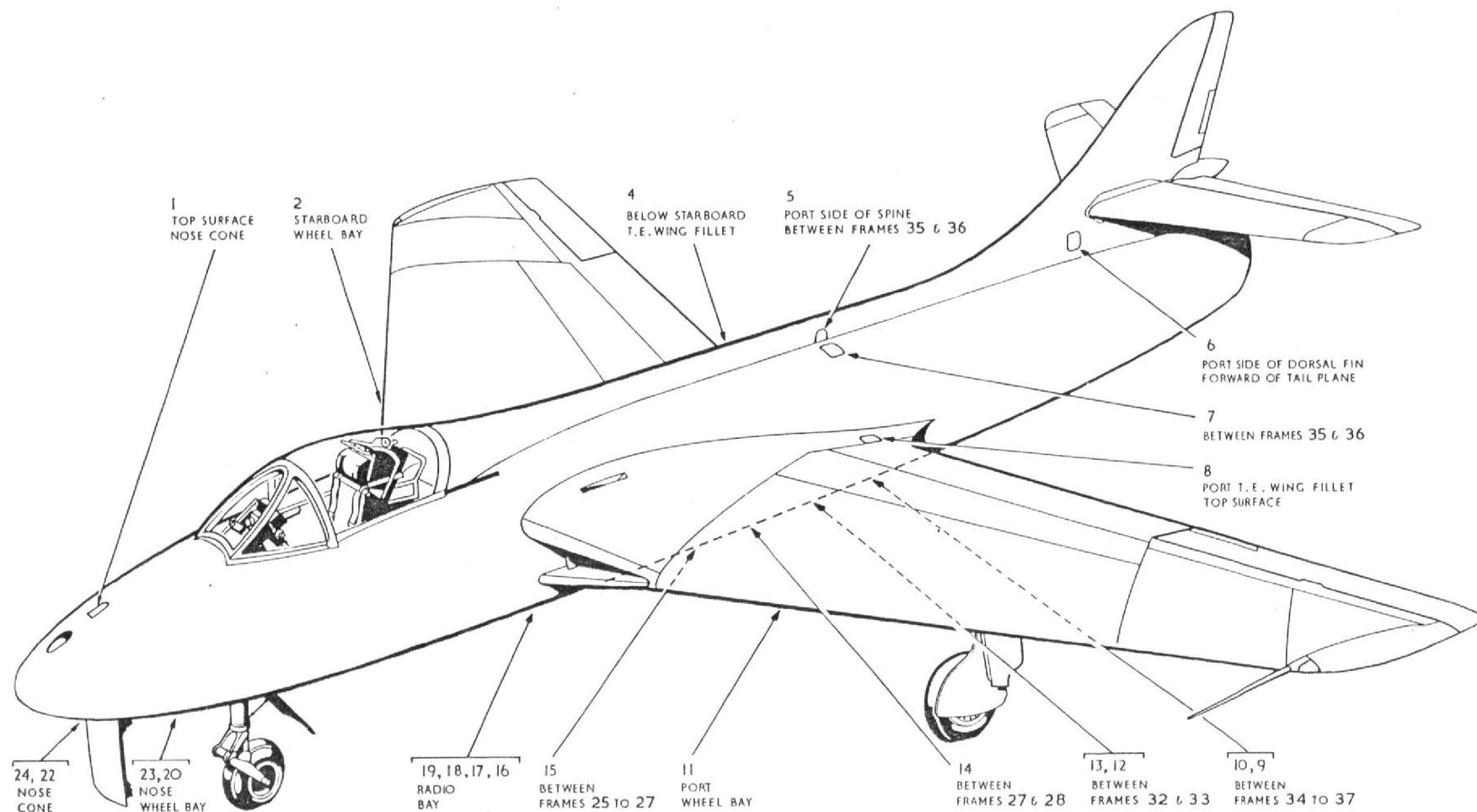
- (5) If using the internal power supply, set the battery master switch on the leg panel in the cabin to ON, if using external power supply ensure that the switch is set to OFF. Set the time switch in the port wheel bay to ON. If a low-pressure refueller is being employed, refuelling may take longer than 8 minutes and *this will necessitate switching on the time switch for a second cycle.* The servo valves in the aircraft fuel system will automatically close when the tanks are full and the refuelling circuit will cease to operate.

## Note . . .

*During refuelling, after 50-100 gallons of fuel have passed into the aircraft, ensure that air is passing out of the refuelling pressure relief valves. This is particularly important when icy conditions prevail or when the aircraft has not been used for an appreciable time.*

- (6) When refuelling is completed, check the contents of the fuel tanks by means of the fuel gauges in the cabin.

- (7) Remove the refuelling equipment and replace the sealing cap on the refuelling coupling in the port wheel bay. Switch off the time switch if it has not completed its full cycle and the battery master switch if using the internal power supply.



- 1 CAMERA GUN
- 2 CHARGING CONNECTOR — AILERON ACCUMULATOR
- 4 ENGINE OIL SUMP FILLER
- 5 EXTERNAL AIR CONNECTION — FUEL SYSTEM
- 6 CHARGING CONNECTION — ELEVATOR ACCUMULATOR
- 7 COLD AIR UNIT DIPSTICK
- 8 HYDRAULIC RESERVOIR FILLER

- 9 ENGINE FUEL FILTER
- 10 HYDRAULIC HANDPUMP
- 11 RE-FUELLING & DE-FUELLING COUPLING
- 12 ACCESSORIES GEARBOX FILLER
- 13 HYDRAULIC EXTERNAL SUPPLY VALVES
- 14 FUEL SYSTEM DRAIN VALVES (2)
- 15 FUEL SYSTEM DE-FUELLING COCK
- 16 FUEL SYSTEM DRAIN VALVES (2)

- 17 EXTERNAL ELECTRICAL SUPPLY SOCKET
- 18 BATTERIES
- 19 CHARGING CONNECTION — EMERGENCY AIR BOTTLES
- 20 CHARGING CONNECTION — OXYGEN CYLINDERS
- 21 NOT USED
- 22 EXTERNAL HOOD SWITCH
- 23 CHARGING CONNECTION — WHEEL BRAKES
- 24 GROUND PRESSURIZING CONNECTION

FIG. 2 SERVICING POINTS  
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#### Defuelling

4. The aircraft is defuelled through the refuelling coupling in the port wheelbay, being either sucked out by a refueller or pumped out by the tank booster pumps. An air pressure supply is required to transfer the fuel from the centre, wing and drop tanks to the front tanks during this operation. The air pressure, which must not exceed 120 lb. per sq. in. is fed into the system through an external supply connection in the spine of the centre fuselage (fig. 2, item 5). The procedure for defuelling the aircraft is as follows:—

- (1) Ensure that the refueller is earthed and connect the bonding of the hose to the aircraft structure. Remove the sealing cap from the refuelling coupling in the port wheel bay and connect the refueller hose.
- ◀ (2) Connect a pneumatic servicing trolley (Ref. No. 4F/1805) to the external air pressurization connection in the spine of the centre fuselage and apply pressure. ▶
- (3) Set the refueller control to DEFUEL.
- (4) Turn the L.P. cock to OFF.
- (5) On aircraft Pre mod. 1031 remove the locking wire and turn the defuelling cock (fig. 2, item 15) to ON. On aircraft Post mod. 1031 remove the locking pin from the lever of the defuelling cock., disengage the locking latch from the lever and turn the cock (fig. 2, item 15) to ON.
- (6) Start the refueller pump to draw out fuel.
- (7) As soon as the refueller commences to suck air, switch on the booster pumps to ensure that all fuel in the system is drained off. Switch off the booster pumps as soon as the refueller commences to suck air again and stop the refueller pump.

- (8) When the tanks are empty, turn the defuelling cock to OFF immediately. The stops on the cock are internal, it is therefore essential on aircraft Pre mod. 1031 that the cock be turned to its full extent to ensure that it is fully closed; relock with stainless steel wire to ensure that it remains fully closed. On aircraft Post mod. 1031 move the locking latch to engage with the lever of the cock and lock in position with the locking pin.

#### Note . . .

*During initial assembly of the locking latch to the defuelling cock, the latch attachment bolt, Part No. F.250214 must be adjusted so that the slot of the latch engages with the lever of the cock allowing no movement of the lever in the fully closed position (Sect. 4, Chap. 2). The stops on the cock are internal, it is therefore essential that the cock be turned to its full extent to ensure that it is fully closed.*

- (9) Disconnect and remove the defuelling equipment, re-fit the sealing cap on the refuelling coupling and the cap and access panel of the air pressurization connection.

#### Draining water from fuel system

5. Drainage of water and sediment that may have accumulated in the fuel system is facilitated by the provision of small drain valves located at the lowest points in the fuel system, together with a small plug in the engine filter casing. The position of these valves is indicated in fig. 2, items 14 and 16. These valves and drain plug must be used periodically to draw off a few pints of fuel and any water and sediment that may have accumulated. To use the valves, remove the sealing caps and insert a suitable length and diameter of hose into each valve in turn. Inserting the hose pushes open the spring loaded valve, which closes again automatically when the hose is removed. A suitable container should be made available for the reception of the drained fluid. This fluid must afterwards be discarded. When the drainage of water is completed, replace the sealing caps, replace and secure the access panels.

#### Refilling hydraulic reservoir

#### Note . . .

*Every care must be taken to ensure that only clean hydraulic fluid is introduced into the system. Fluid drained from the system during bleeding must NOT be put back into the reservoir. Hydraulic fluid has a detrimental effect on paint, electrical cables, rubber, etc., and although a drip tray is provided at the filler neck of the reservoir, great care must be taken to ensure that no fluid is spilled on such parts. The specification of the fluid to be used is given in the Leading Particulars.*

6. Access to the filler cap of the hydraulic reservoir is obtained by removing an access panel from the top surface of port wing fillet (fig. 2, item 8). The filler cap is provided with a sight glass to facilitate the checking of the fluid level in the reservoir.

#### Aircraft Pre-Mod. 344

If, with the aircraft standing on its alighting gear with the hydraulic accumulators inflated and fully charged, and with the landing flaps and air brake up, the fluid level no longer overlaps the white background below the sight glass, the reservoir must be topped up. To top up, remove the filler cap slowly, to release any built-up pressure that may exist in the reservoir, and pour in fluid until it reaches the white background below the sight glass.

#### Aircraft Post-Mod. 344

If, with the aircraft standing on its alighting gear with the hydraulic accumulators inflated with air but not charged with oil, and with the landing flaps and air brake up, the fluid level is no longer visible through the sight glass, the reservoir must be topped up. To top up, remove the filler cap slowly, to release any built-up pressure that may exist in the reservoir, and pour in fluid until it reaches the top of the filler neck.

In both instances, a container fitted with a flexible nozzle should be used to facilitate the operation. When topping up is completed, replace the filler cap securely and mop up any spilled fluid.

**Charging hydraulic emergency and anti-'G' air bottles**

7. The high pressure air bottles for the emergency operation of the alighting gear and landing flaps and the anti-'G' air bottles are mounted at the rear of the cabin. It is essential to ensure that these bottles are fully charged before each flight. Pressure gauges are installed in the cabin to register the pressure in the bottles, should the indicated pressure be below that given in the Leading Particulars, the bottles must be recharged to the correct pressure through the *in situ* charging valve (fig. 2, item 19).

**Note . . .**

*If either the alighting gear or flaps emergency system has been used, it will be necessary to reset the air release valves, after which the hydraulic system must be primed and bled. The air bottles must then be recharged.*

**Charging wheel brake accumulators**

8. Access to the hydraulic accumulators for the wheel brakes, together with their charging connection is from within the nose wheel bay. The pressure is indicated on the brake accumulator pressure gauge in the cabin. *If after dissipating the hydraulic pressure, by operating the brake lever a number of times, the pressure shown on the gauge is below that stipulated in the Leading Particulars, the accumulators must be recharged through the charging connection (fig. 2, item 23).*

**Charging aileron boosters accumulator**

9. The hydraulic accumulator for the aileron boosters, together with its charging connection and associated pressure gauge, is accessible from within the starboard wheel bay. *The hydraulic pressure should be dissipated by operating the aileron controls until the hydro-booster jacks cease to operate. The air pressure should then be checked and if the pressure shown on the gauge is below that stipulated in the Leading Particulars, the accumulator must be recharged through the adjacent charging connection (fig. 2, item 2).*

**Note . . .**

*When hydraulic pressure is dissipated, the power control for the ailerons is automatically disengaged and, therefore, it is important to ensure that the pawls of the hydro-booster jacks are re-engaged before flight by holding the aileron and moving the control column laterally while the hydraulic hand-pump is being operated*

**Charging elevator booster accumulator**

10. Access to the hydraulic accumulator for the elevator booster, together with its charging connection, may be obtained by removing an access panel (fig. 2, item 6) in the port side of the dorsal fin, just forward of the tail plane. The access panel is provided with a window to enable the accumulator pressure to be checked by reference to a pressure gauge located adjacent to the accumulator. On completion of recharging operations the valve cap must be replaced, tightened and the outer sleeve of the cap wire-locked to the hexagon of the valve body.

*If, after dissipating the hydraulic pressure by operating the elevator control until the hydro-booster jack ceases to operate, the pressure indicated on the gauge is below that stipulated in the Leading Particulars, the accumulator must be recharged.*

**Note . . .**

*When hydraulic pressure is dissipated, the elevator power control will be automatically disengaged and therefore it is important to ensure that the pawls of the hydro-booster jack are re-engaged correctly before flight by holding the elevator and moving the control column fore and aft while the hand pump is being operated.*

**Hood jettison control**

11. Before every flight ensure that the hood jettison control has not been wholly or partially operated. This can be checked by examining the release unit to ensure that the red painted lines on the lever and body of the release unit correspond. If they do not, the release unit must be set to the loaded position as described in Sect. 3, Chap. 1.

**Charging oxygen cylinders**

12. The two oxygen cylinders are mounted in the nose of the aircraft between frames 4, 5 and 6 on the starboard side of the aircraft, the in-situ charging valve being mounted below them on the forward face of frame 6 (fig. 2, item 20). Access to both cylinders and charging valve can be obtained from within the nose wheel bay. The cylinders may be re-charged in-situ to the pressure quoted in the Leading Particulars, through the charging valve, or the cylinders may be replaced by fully charged cylinders as described in Sect. 3, Chap. 10. The procedure for in-situ charging is described in A.P.1275G, Vol. 1, Sect. 1, Chap. 2.

**WARNING**

*It is essential in the interests of safety that oxygen installations are kept free from oil, grease or moisture.*

**Batteries**

13. The main and standby batteries are carried in the radio bay in the front fuselage, access being obtained via the radio access doors (fig. 2, item 18). These batteries must be checked periodically for state of charge as described in Section 5, Chapter 1, which also contains instructions for the changing of the batteries.

**Note . . .**

*Before attempting to connect the batteries, ensure that the Cannon plugs are not shorting against the aircraft structure.*

**Topping-up cold air unit**

14. An access door in the top port side of the centre fuselage (fig. 2, item 7), between frames 35 and 36 gives access to the cold air unit dipstick and filler orifice. The oil level in the unit should be examined daily and topped-up as necessary with oil as specified in the Leading Particulars until it reaches the full mark on the dipstick. The oil should be poured through the dipstick orifice in small quantities, otherwise a false level will be indicated on the dipstick.

#### Refilling engine oil sump

15. The filler cap for the engine oil sump is accessible through an access panel situated in the starboard side of the fuselage, just below the wing trailing edge fillet (fig. 2, item 4). The sump has a capacity of 16 pints and the oil level should be checked with the aircraft on level ground and with the engine cold. The level is indicated by a graduated sight glass window in the sump wall. Only oil as specified in the Leading Particulars must be used. Before replacing the filler cap ensure that the sealing washer in the filler neck is clean and undamaged and when replacing the cap, ensure that the self-locking wing nut is tightened down securely.

#### Note . . .

*It is not necessary to prime the oil system, although it is advisable to turn the engine over to ensure oil circulation and pressure indication before running the engine. After the initial ground run, the level should be re-checked and the sump replenished if necessary.*

#### Refilling accessories gearbox

16. The accessories gearbox is mounted in the bottom of the engine bay just aft of the rear spar on the port side of the aircraft and an access panel (fig. 2, item 12) in the underside of the centre fuselage is used to gain access to the filler neck and dipstick. Before checking the level of the oil ensure that the dipstick is pressed fully home before removing. If the oil level, as indicated on the dipstick, is low, the gearbox must be replenished. The specification of the oil to be used, when filling, is given in the Leading Particulars

#### Priming the fuel system

17. Priming consists of bleeding the fuel pumps and the system generally to remove all air, or oil if the engine has been inhibited. Bleeding must always be carried out if the engine is newly installed, whenever it has been inhibited or when there has been any disconnection in the system at any point, or the fuel tanks have been drained. The system should be bled at each point, working upwards from the lowest bleed point. The procedure is described in the Engine Volume I.

#### Note . . .

*The high-pressure fuel pumps are fuel lubricated, consequently they will suffer damage if the engine is turned over when the pumps are dry. It is essential, therefore, to ensure that the engine is not turned before the system is primed. To obviate the risk of fire when starting the engine, mop up any fuel that may have been spilled. It may be necessary to bleed the system again if fluctuations of rev/min are experienced during the initial ground run after bleeding, as such fluctuations may be due to trapped air having moved round into the pumps under running conditions.*

#### Armament safety break

18. An armament safety plug, located in the port stub wing, *must* be removed from its socket during the loading of stores and servicing of the equipment, except when carrying out functional checks. The plug, which is fitted with a red warning pennant, is accessible through a small hinged door which is fitted in a panel under the wing just forward of the main spar pin joint. The door is provided with a toggle fastener to facilitate access.

#### WARNING

*Before attempting to start the engine, ensure that all personnel are at a safe distance from the air intakes and jet exhaust and take the necessary action to prevent any person walking into these danger zones (fig. 1).*

#### Precautions prior to running the engine

19. Before running an engine which has been newly installed, or which has been inhibited or an engine in which there has been any disturbance of the components of the fuel system, such as disconnected pipes, draining, etc., the fuel system must be primed (described in para. 17). Remove the air intake and jet pipe sealing covers and the centre fuselage covers and examine the engine to ensure that the air intake ducts and engine are free from accumulations of fuel or oil and that no cleaning cloths or tools have been left around the engine. The air intake safety guards must be fitted prior to ground running the engine.

**Starting preliminaries**

20. Before starting the engine, the aircraft should be headed into wind with the tail pointing away from other aircraft. Main wheels should be effectively chocked in accordance with A.P.1464G, Vol. 1, Part 2, Sect. 5, Chap. 11. For full power engine run and especially when slam acceleration and deceleration checks are being made, double chained checks must be used.

**Engine starting**

21. The engine is started through the medium of a triple-breech turbo starter unit. The unit is described in A.P.1181D, Vol. 1. A stowage for starter cartridges is provided on the inside of the engine starter access door.

**WARNING**

*Personnel handling aircraft fitted with turbo starter units should be fully conversant with the relevant information, precautions and warnings contained in A.P.1181D, Vol. 1 and A.P.1161F, Vol. 1.*

**Running up engine with batteries removed**

22. While it is not recommended that the engine be run with the aircraft's batteries removed, this can be done, provided the Cannon plugs on the ends of the battery leads are insulated or placed in such a position that there is no possibility of them shorting against the aircraft structure.

**Undercarriage deflection check**

23. The main and nose undercarriage legs must be checked in accordance with the instructions given in A.P.1803E, Vol. 1, and recharged as necessary.

**Checking tyre pressures**

24. Due to the heavy loads imposed on the tyres of this aircraft, it is most important to ensure that the correct inflation pressures are maintained. When checking the pressures, as called for in the Servicing Schedule, a tyre pressure gauge must always be used.

**Air drier**

25. The air drier for the dry-air sandwich of the windscreen is located on the front face of frame 8 just forward of the cabin starboard shelf and is connected to the valve on the windscreen by a rubber tube. The system must be examined as follows:—

- (1) Examine the windscreen for signs of internal misting and moisture deposits. The presence of moisture indicates leaking connections, a cracked transparent panel, saturated silica gel or a blanked off air drier.
- (2) Examine the system for damage and security and check the colour of the silica gel crystals in the air drier tube. The crystals, which are normally blue in colour, should be changed when they become saturated and turn red. Use silica gel (Ref. 33C/790) when replenishing the air drier tube.
- (3) On replacement of an air drier ensure that it is not taped or otherwise blanked off.

**Note . . .**

*Pre S.T.N./Hunter/54*

*Before attempting to remove the air drier tube, the windscreen dry-air sandwich must be sealed against the ingress of moisture by unscrewing and removing the banjo bolt and rubber tube from the windscreen valve connection. The valve is spring loaded and will close thus sealing the wind-*

*screen. The instructions for the re-assembly of the banjo and banjo bolt are given in fig. 3*

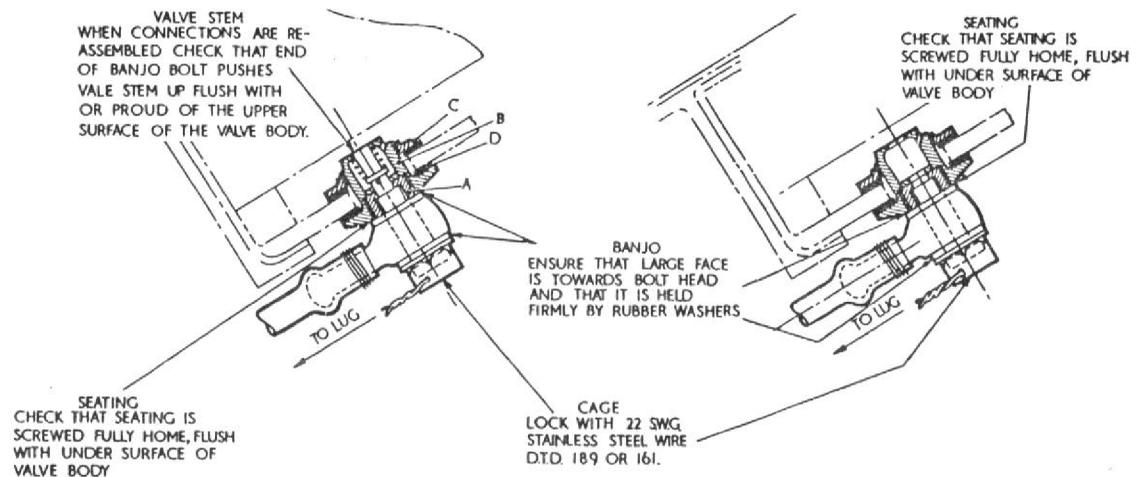
*Post S.T.N./Hunter/54*

*Before attempting to remove an air drier, the windscreen dry air sandwich must be sealed against the ingress of moisture by blanking off that end of the rubber tube disconnected from the air drier. See fig. 3 for assembly of banjo.*

**Removal of locking devices and covers**

26. Before flight, remove the following locking devices, as well as any weather covers that may be fitted:—

- (1) Control surface locking clamps (*always before flying controls locking gear*).
- (2) Flying controls locking gear.
- (3) Air intake sealing covers, or safety guards if they have been fitted. Jet pipe and pitot head sealing covers. Any other covers.
- (4) Any picketing equipment and attachments.
- (5) Undercarriage safety stops.
- (6) Pilot's ladder.

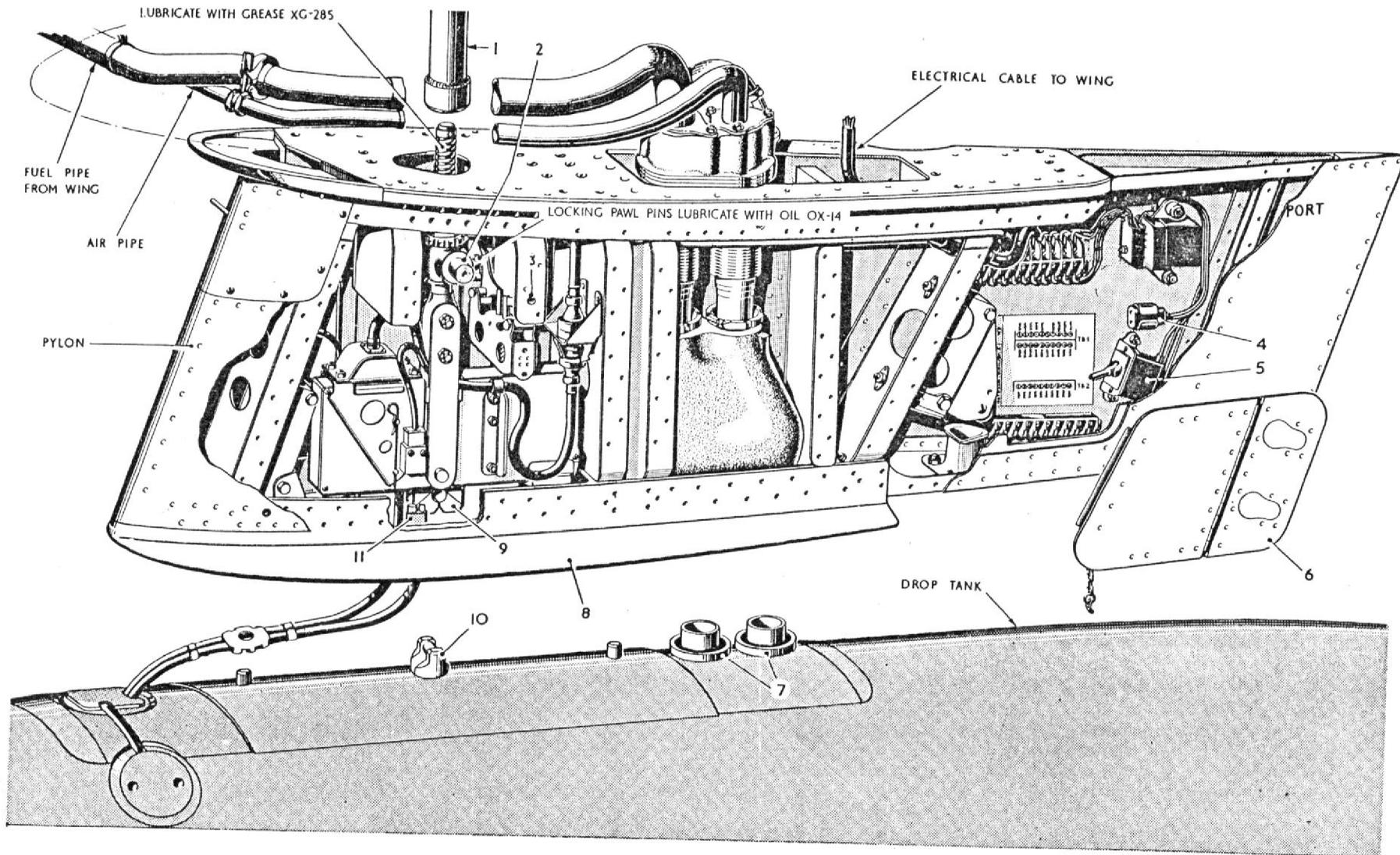


PRE STN./HUNTER/54

POST STN./HUNTER/54

Fig. 3 Windscreen air drier banjo

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ELECTRICAL CONNECTIONS (ii)	
STORE	PYLON
100 GAL DROP TANK	
L.L. CONNECTOR	STOWAGE
H.L. CONNECTOR	H.L. CONNECTOR
PRACTICE CARRIER	
BUTT CONNECTOR	BUTT CONNECTOR

TORQUE WRENCH LOADING (i)	
DROP TANKS	} $80^{+2}_{-0}$ LB. FT.
1,000 LB. STORE	
500 LB. STORE	} $40^{+2}_{-0}$ LB. FT.
PRACTICE CARRIER	
TRANSPORT SECURITY BAR	} HAND TIGHT USING SPANNER B224080
(NO STORES CARRIED)	

NORMAL/PRACTICE SWITCH(S)	
DROP TANKS	} NORMAL (DOWN) POSITION
1,000 LB. STORE	
500 LB. STORE	
PRACTICE CARRIER	PRACTICE (UP) POSITION

Fig.4 Loading of stores on inboard pylon

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## Fitting and removal of inboard drop tanks (Fig. 4)

27. The procedure for the fitting of the drop fuel tanks to the inboard pylons is described in the following sub-para.:

- (1) Disconnect the armament safety break in the port wing.
- (2) Remove Chekaleke plugs (3 fig. 5) from the sighting holes on the port and starboard sides of the pylon and check that the gap between the top of release housing (2 fig. 5) and the bottom of plungers (1 fig. 5) does not exceed 0.10 in.

## Note . . .

To avoid damage to the jettison and reset mechanism it is essential that only a tool similar to that illustrated in fig. 6 is used to operate the jettison and reset buttons. After operation, an inspection must be made to ensure that the buttons have returned to their normal position, which is 0.10 in. below the skin level of the pylon.

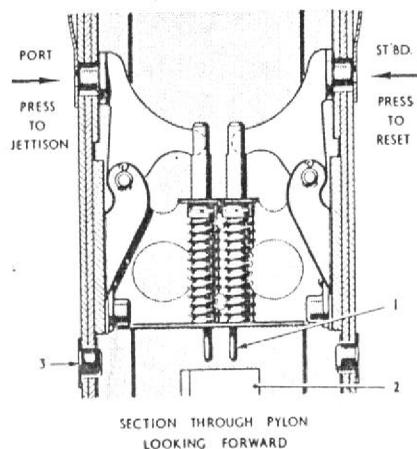


Fig. 5 Jettison and reset mechanism

- (3) If the electro-mechanical release unit (9) is not open, press the jettison button (3) (shown also on fig. 5), on the port side of the pylon, using a tool similar to that shown in fig. 6, and then reset by pressing the reset button on the starboard side of the pylon. (Should the electro-mechanical release be already open, only the reset button on the starboard side should be used.)

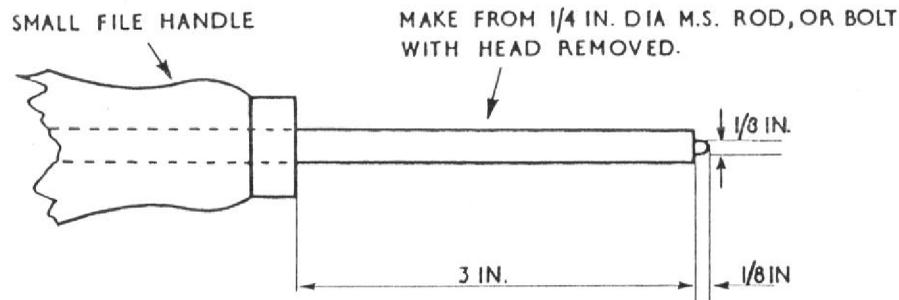


Fig. 6 Tool for operating jettison and reset button

- (4) Open the access door (6) on the outboard side of the pylon and check that the changeover switch (5) is in the DOWN position.
- (5) Remove the access panel in the wing top skin and place a crutching spanner (1) (Ref. 26FX/95645) over the hanger bolt of the release housing support (2) and, ensuring that the appropriate annular groove on the spanner is flush with the wing skin, lower the release housing.
- (6) Position the drop tank under the pylon and lubricate the front and rear spigots with anti-seize compound ZX-28. Inspect the sealing rings for serviceability and smear the outer surface of the rings with ZX-36 (Ref. 34B/1459).
- (7) Raise the tank sufficiently to allow the polythene connector without sleeve (11) to be plugged into the sleeved connector on the port side of the pylon and the polythene connector with sleeve to be plugged into the stowage on the starboard side of the pylon.
- (8) Raise the tank until the tank lug (10) is engaged by the electro-mechanical release unit (9) and check that the release is fully cocked by means of the cocking test socket (4).
- (9) By means of the crutching spanner (1) raise the tank until the fore and aft spigots are engaged in the sole

plate (8) and the tank adapters (7) are making contact with the fuel and air valves in the valve body. Check that the electrical cables from the tank to the connectors are not trapped between the tank and the sole plate.

- (10) Apply the final crutching load by using a torque spanner (Ref. 1L/171 set to  $80 \pm \frac{2}{0}$  lb. ft.) attached to the adapter on the crutching spanner. Check again, through the sighting holes that the gap between the top of the release housing (2 fig. 5) and the bottom of the plungers (1 fig. 5) does not exceed 0.10 in. and replace Chekaleke plugs (3 fig. 5).
- (11) Re-check that the release unit is fully cocked by means of the cocking test socket and test set and close the rear door.
- (12) Remove the torque wrench and crutching spanner and replace the access panel in the wing.
- (13) Immediately before flight, replace the Armament Safety break.

28. The removal of the inboard drop fuel tanks is a reversal of the above procedure.

## Note . . .

When stores are not being carried on the pylons, a security bar, 0.50 in. dia., and 2.75 in. long (Part No. F.224996) must be clamped between the closed jaws of the release unit and drawn up (hand tight) to the sole plate.

**Fuel flow check with drop tanks fitted**

29. After the fitment of previously unused drop tanks, tanks which have been broken down for servicing or whenever pylons or pylon fuel valves have been replaced, it is recommended that the following flow checks are made. These checks are to ensure that the wing fuel system and drop tank flow is satisfactory and are applicable to both inboard and outboard tanks:—

*Fuel flow check using aircraft booster pumps.*

- (1) Refuel the aircraft. Leave the refueller connected with the engine running but with the pump clutch disconnected.
- (2) Connect an external power supply of not less than 26 volts D.C. to the external supply plug.
- (3) Connect an air trolley delivering between 10 and 100 lb/in<sup>2</sup> pressure to the air pressurization connection.
- (4) Turn the defuelling cock to 'ON' and L.P. cock to 'OFF' and turn 'ON' the air pressure from the trolley.
- (5) Turn the refueller defuelling valve to 'ON' leaving the pump clutch disconnected.

**Note . . .**

*The refueller pump is not to be operated during this test.*

- (6) Switch the aircraft booster pumps to MANUAL and check the rate of flow by timing the gallons gone meter on the refueller. The rate of flow will probably not stabilize until after the first 10 gallons have passed, therefore the timing should commence at 10 gallons gone.
- (7) From timing the gallons gone meter the rate of flow should be controlled to 48 gallons per minute maximum by throttling the flow at the defuelling cock. The acceptable flow rate is between 31 and 48 gallons per minute.
- (8) Transfer pressure switches may operate and is acceptable at high rates of flow provided the out of balance condition at the end of the test is within the limits (sub-para. 10).
- (9) If the transfer switches operate below a flow rate of 33 gallons per minute the cause must be investigated.
- (10) Defuelling is to be continued until one of the aircraft fuel gauges is reading approximately 960 lb. At this point, switch OFF the booster pumps, shut off the air supply and the refueller valve. Check that the port and starboard fuel gauges read within 120 lb. of each other. If outside this limit the cause must be investigated.
- (11) When this test is satisfactorily concluded, remove the air supply from the spine connection and replace the blanking cap. Close and lock the defuelling cock. Refuel the aircraft.

**Note . . .**

*If the refueller is fitted with a serviceable and accurate flowmeter the rate of flow may be read directly from the flowmeter and timing is unnecessary.*

*Ground running check (alternative to fuel flow check operations 1 to 11).*

If more convenient the engine may be ground run as follows as an alternative to the fuel flow check:—

- (12) With the pylons and drop tanks fitted, the system is to be emptied by defuelling.
- (13) Pressure refuel the system keeping an accurate check on the quantity of fuel required to fill the system.
- (14) Start the engine and run up to maximum rev/min as quickly as possible.
- (15) Reduce rev/min to 7 500 and with both booster pump controls at MANUAL continue to run engine for 10½ minutes.
- (16) After 10½ minutes increase rev/min to maximum, switch OFF the port booster pump and continue for a further 2½ minutes. During this time the fuel transfer failure warning must not operate.
- (17) At the end of this 2½ minute period, switch ON the port booster pump and switch OFF the starboard pump and continue for a further 2½ minutes. During this time the fuel transfer failure warning must not operate. (Total time at max. rev/min 5 minutes).
- (18) Stop engine in the normal manner. Refuel the aircraft.

**Note . . .**

*If the fuel transfer failure warning operates the cause must be investigated.*

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