# PART I

# *DESCRIPTIVE*

NOTE.—Throughout this publication the following conventions apply:—

(a) Words in capital letters indicate the actual markings on the controls concerned.

(b) The numbers quoted in brackets after items in the text refer to the illustrations in Part VI.

(c) Unless otherwise stated, all airspeeds and mach numbers quoted are "indicated".

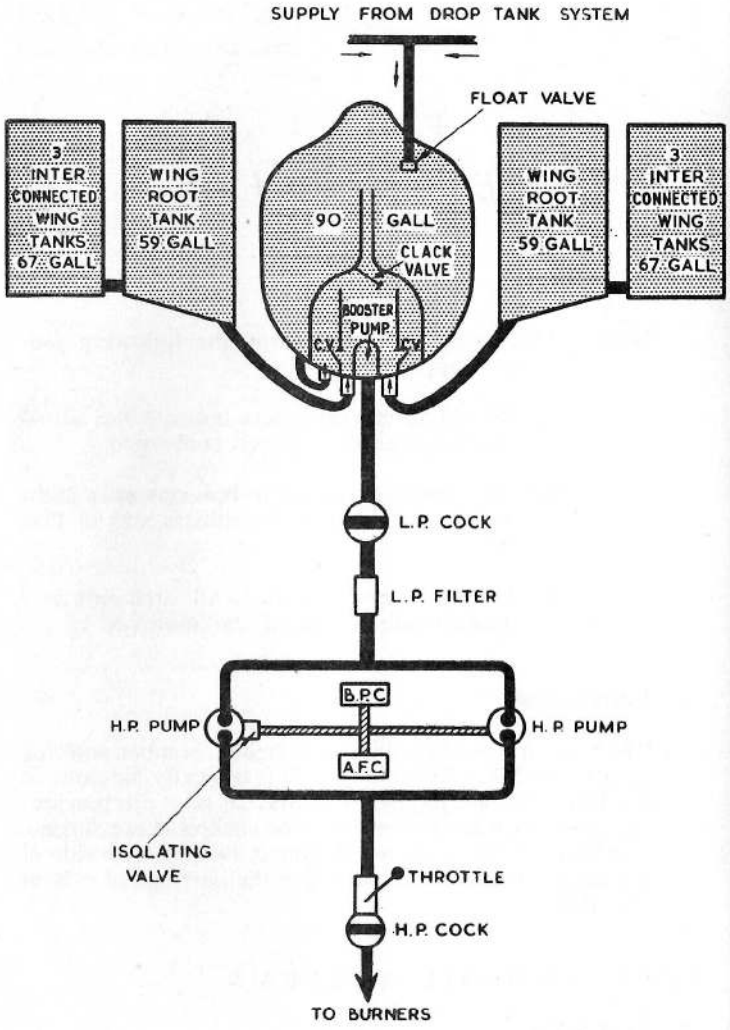
## 1. **Introduction**

The Venom F.B.4 is a single-seat fighter-bomber powered by a Ghost Mk. 103 turbo-jet. It is basically the same as the F.B.1, but is equipped with Mk. 2F pilot ejection seat and power-operated ailerons. The cockpit is pressurised, and four 20 mm. guns are mounted, two on each side of the nose. Provision is made for the carriage of bombs and R.P's.

## FUEL AND OIL SYSTEMS

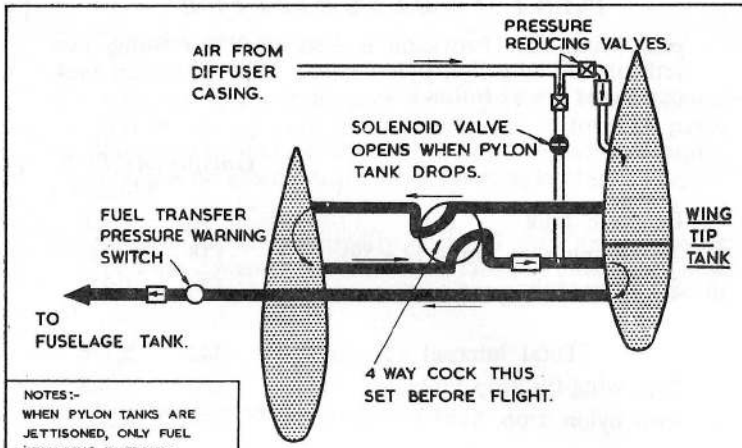
## 2. **Fuel tanks**

(i) Nine internal fuel tanks are fitted, one in the fuselage and four in each wing. A drop tank can be attached to



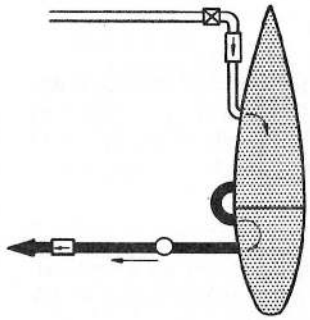

MAIN FUEL SYSTEM



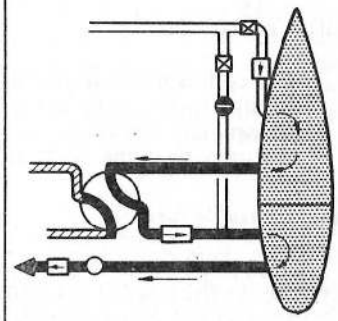



NOTES:-
WHEN PYLON TANKS ARE JETTISONED, ONLY FUEL REMAINING IN FRONT COMPARTMENT OF WING TIP TANKS IS TRANSFERABLE.

FUEL FLOW WITH PYLON TANKS FITTED.



WING TIP SYSTEM ON AIRCRAFT WITHOUT PROVISION FOR PYLON TANKS. (4 WAY COCK NOT FITTED)



SETTING OF 4 WAY COCK WHEN PYLON TANKS NOT CARRIED.

WING AND PYLON TANK FUEL SYSTEM.

each wing tip. Provision is also made for fitting two jettisonable 80-gallon pylon tanks. The estimated tank capacities are as follows:—

| | Gallons | lb. (AVTUR 8 lb./gall.) |
|---|---|---|
| Fuselage tank ... ... ... | 90 | 720 |
| Two wing root tanks (2 × 59) ... | 118 | 944 |
| Six wing tanks ... ... ... | 134 | 1,072 |
| Total internal capacity ... | 342 | 2,736 |
| Two wing-tip drop tanks (2 × 78) ... | 156 | 1,248 |
| Two pylon drop tanks (2 × 80) ... | 160 | 1,280 |
| Total | 658 | 5,264 |

All the internal tanks are pressure vented to atmosphere via a common outlet. The drop tanks are pressurised, to enable fuel to be transferred by air pressure.

(ii) *Collector box*

The collector box in the base of the fuselage tank contains enough fuel to keep the engine running up to the limit of 10 seconds under negative loading, or when flying in attitudes near the vertical.

(iii) *Unusable fuel*

Between 10 and 28 gallons of fuel are unusable, depending on the aircraft attitude, the amount increasing as the aircraft tail-down attitude is increased.

(iv) *Pylon and wing-tip tanks*

The pylon tanks cannot be used unless the wing-tip tanks are fitted as fuel transfer is via the tip tanks. Wing-tip tanks may be used irrespective of the fitting of pylon tanks. Four-way valves in the wings are set before flight for the carriage of either pylon and wing-tip tanks, or tip tanks only.





3. **Fuel contents gauge**

(i) A Pacitor (electrically operated) type fuel contents gauge (34) at the top right-hand side of the instrument panel gives the combined contents of all the internal tanks. There is no gauge for the wing-tip or pylon tanks.

(ii) All aircraft will eventually be fitted with gauges giving the total contents of the internal tanks in pounds. These gauges are more accurate than the gauges calibrated in volume.

4. **Fuel transfer system and indicators**

(i) The engine is fed with fuel from the collector box in the bottom of the fuselage tank, and the fuel from the internal wing tanks is fed by gravity to the collector box. The fuel from the wing-tip and pylon drop tanks is automatically transferred to the fuselage tank by air pressure from the engine. Transfer is via the tip tanks front compartments and takes place before fuel is used from the internal wing tanks. It commences when approximately 15 gallons (120 lb.) have been used from the fuselage tank, the rate of transfer being controlled by a float-valve near the top of the tank. During transfer the tip tanks rear compartments empty first then the pylon tanks (if fitted), and finally the tip tanks front compartments.

(ii) Two magnetic indicators (36) are fitted at the top of the right-hand instrument panel beside the fuel contents gauge. They show black when transfer from the wing-tip tanks is taking place or when no electrical supply is available, and white when transfer is not taking place. There is no positive indication that fuel is actually transferring to the tip tanks from the pylon tanks, but this can be judged by the time taken before fuel stops transferring from the tip tanks.

(iii) When the level in the fuselage tank has fallen sufficiently, 30-40 gallons remaining (240-320 lb.), transfer starts from the internal wing tanks, by gravity only.

5. **Fuel feed to the engine**

(i) A booster pump is fitted in the collector box and delivers fuel through the L.P. cock to two engine-driven H.P. pumps, which supply fuel to the engine. If the booster pump fails, fuel is delivered to the H.P. pumps by means of a gravity by-pass. A warning light (25) comes on if the fuel delivery pressure falls below a predetermined minimum. Normally when the pump is on, the warning light should go out. The light will be on at all times when the pump is off and electrical power is available.

(ii) From the H.P. pumps, fuel is delivered to an H.P. cock (7) and a throttle valve. When the H.P. cock is opened, fuel will flow at the rate determined by the B.P.C., through the throttle valve to a fuel flow distributor, and thence to each burner. The rate of flow set by the B.P.C. will be dependent upon the position of the throttle, the altitude and the ram pressure at the air intakes.

(iii) When the throttle is opened or closed, an acceleration control unit (A.C.U.) temporarily overrides the B.P.C. and ensures the correct delivery.

(iv) Both the B.P.C. and A.C.U. control the delivery of fuel to the engine by varying the output of the H.P. pumps, through a servo mechanism.

(v) The two engine-driven H.P. pumps have interconnected servo mechanisms and are thus capable of operating in harmony, and together satisfy the fuel requirements of the engine. Should one pump fail, the output of the other is sufficient to supply the fuel required by the engine under all conditions. The B.P.C. and the A.C.U. are linked to both pumps which differ from each other only in respect of a solenoid-operated isolating valve incorporated in the front pump. An overspeed governor is incorporated in each pump.

6. **Fuel controls**

(i) *H.P. pumlp isoating valve*

(a) The isolating valve is primarily intended as a means of restoring power in flight in the event of a sudden





drop in engine r.p.m. caused by failure of the servo system or either H.P. pump. It may also be used, if desired, as a safeguard against failure during take-off (see paras. 52 and 69).

(b) The valve is controlled by a switch (55) marked FUEL PUMP EMERGENCY on the electrical panel. On later aircraft the switch will be repositioned on the instrument panel. When it is ON, the valve isolates the front pump from the fuel pump servo system, the B.P.C. and the A.C.U., but the rear pump remains under the control of the B.P.C. and A.C.U. Under these circumstances, provided a failure has not occurred, the front pump will be operating at full stroke, controlled only by the pump overspeed governor, and the rear pump will be operating at reduced stroke.

(ii) *Booster pump switch (54)*

The booster pump is controlled by a switch, marked FUEL PUMP SWITCH, on the electrical panel.

(iii) *L.P. cock lever (13)*

The L.P. cock lever is on the underside of the engine control box and is marked FUEL OFF (down and aft) and FUEL ON (forward and up). The L.P. cock should be closed in the event of an engine fire, but must not be used to stop the engine, except in an emergency, as the H.P. pumps will be damaged, and the fuel system aerated.

(iv) *H.P. fuel cock lever (7)*

The H.P. fuel cock lever is mounted outboard of the throttle lever and is marked OPEN (forward) and SHUT (aft). When in the OPEN position it allows fuel to flow from the engine-driven pumps to the burners. It should normally be used to stop the engine. On later aircraft this lever is positioned inboard of the throttle lever and incorporates a pushbutton for relighting the engine in flight. On early aircraft relighting is carried out by a separate switch on the left-hand instrument panel.

(v) *Fuel tank jettisoning*

The wing-tip tanks may be jettisoned electrically by pressing the rear button (9) on the inboard face of the throttle box. They can also be jettisoned mechanically by pulling back the lever (65) on the right of the seat. The pylon tanks are jettisoned by the forward button (9) or by the lever (17) on the left of the seat.

### 7. Oil system

Oil is carried in the engine sump only, the capacity of which is 16 pints. An oil temperature gauge is on the left of the instrument panel.

## ENGINE CONTROLS

### 8. Throttle control (10)

The throttle lever which moves in a quadrant marked SHUT—THROTTLE—OPEN, is on the throttle box on the port side of the cockpit. The lever incorporates a V.H.F. press-to-transmit button. A friction damper is on the inboard side of the box, and is rotated clockwise to tighten.

### 9. Engine starting system

(i) The engine is started by a cartridge system. The engine starter master switch (50) on the electrical panel must be ON to energise the firing and the ignition circuit. The cartridge is fired by pressing in the button (37) on the right of the instrument panel; the button is then held in electromagnetically for 20 seconds, and during this time the high energy ignition system is in operation. The delay prevents a second cartridge being fired too soon after a misfire. During a normal start, the turbo-starter brings the engine up to approximately 1,500 r.p.m. by which time a light-up should have occurred and the engine should continue to accelerate to the normal idling speed of 3,000 r.p.m.





(ii) The starter system contains two cartridges; the second one is auto-selected as the starter button resets. Four spare cartridges may be stowed in the flap compartment.

### 10. Relighting control

(i) On early aircraft engine relighting in flight is carried out by use of a rotary ignition time switch (19) mounted on the left of the instrument panel. When switched to ON, current is supplied to the high energy condenser units which in turn supply the sparks for relighting. A clock-work mechanism in the switch returns the dial pointer from the fully ON position to the OFF position in 20 seconds and cuts off the supply of current to the condensers.

(ii) On later aircraft a relighting pushbutton is incorporated in the end of the H.P. cock lever. It should be pressed to energise the igniter plugs when relighting in flight, and may be used as an audible check that the H.E. ignition is functioning before starting up. The relight system will operate irrespective of the position of the engine starter master switch.

### 11. Engine fire warning light and extinguishers

(i) *Fire warning*

A fire warning light (31) is on the right of the G.G.S. The flame switches are all of the resetting type; if the fire has been put out the light will go out.

(ii) *Fire-extinguisher*

NOTE.—No inertia crash-operated switch is fitted.

Two fire-extinguisher bottles are stowed one in each flap shroud, and are operated by pressing the pushbutton (44) on the electrical panel provided that electrical power is available. The contents of the extinguishers are discharged from spray rings on the front and rear faces of the diffuser casing. The cockpit pressure control must be OFF before the extinguishers are operated. Below

generator cut-in speed electrical supply is available from the batteries provided the battery isolating switch is on. Above generator cut-in speed the extinguishers can be operated irrespective of the setting of the battery isolating switch.

### 12. Engine instruments

The following engine instruments are provided:—

R.P.M. indicator
J.P.T. gauge
Oil temperature gauge.

## MAIN SERVICES

### 13. Hydraulic system

(i) An engine-driven pump provides pressure for the operation of the:—

Undercarriage
Flaps
Airbrakes
Powered ailerons.

(ii) Two accumulators are fitted. No. 1 accumulator will serve any selected system, but in emergency provides sufficient pressure only for the *immediate* one-way operation of the flaps and undercarriage; otherwise the pressure will be fed to the powered ailerons. No. 2 accumulator serves the aileron power circuit only and should provide sufficient *immediate* reserve for three full aileron reversals if the hydraulic system fails. Due to normal hydraulic component seepage the accumulator pressure will dissipate in a short time, even if no call is made on the accumulators.

(iii) If either the engine or the engine-driven pump fails, a handpump (15) on the left of the pilot's seat, on the floor, will operate the undercarriage, or flaps, at a reduced rate. The handpump will not operate the airbrakes, or the ailerons, or charge either of the accumulators, except on





the ground, where a release valve accessible through a door on the port side underneath the fuselage can be opened.

(iv) There are two types of warning of hydraulic failure, one operated by lack of pressure and the other by lack of flow in the system. A pressure switch is incorporated in the *aileron power circuit* and when pressure falls or the ailerons are selected to manual, it causes a red light (11) to come on. A flow switch is incorporated downstream of the hydraulic pump and when lack of flow in the *main hydraulic system* occurs it causes an audio warning to sound over the headset and at the same time illuminates the red light previously mentioned. The warning may be silenced by the switch (45).

### 14. Pneumatic system

(i) An engine-driven compressor charges an air bottle to a pressure of 450 lb./sq. in. From the bottle the pneumatic supply passes through reducing valves to the wheel brakes relay valve, and the anti-G system.

(ii) The main supply pressure and the pressure at each wheel brake (150 lb./sq. in.) are shown on a triple-reading pressure gauge (39) on the right of the instrument panel.

### 15. Electrical system

(i) Two 1,500-watt (24 volts) generators supply the whole electrical system and charge the aircraft batteries. Two generator failure warning lights (47) on the electrical panel indicate whenever their respective generators are not supplying power.

(ii) A battery isolating switch (48) (with a guard) is fitted on the electrical panel. In the OFF position this switch isolates the aircraft batteries from all the electrical services, but the generators will still supply current to the electrical services when the engine r.p.m. are sufficiently high. When the aircraft is parked, the switch should be set OFF to switch off all the electrical equipment and indicators, including the generator failure warning lights.

(iii) Two generator isolating switches and two generator field circuit-breakers (61) are mounted on the electrical panel, and provision is made for ground testing each generator by means of ammeter and voltmeter sockets.

(iv) Ground testing of electrical services may be carried out with an external battery connected to the three-pin plug on the fuselage starboard side. The action of plugging in the external battery cuts out the aircraft batteries.

(v) Alternating current for the Mk. 4F compass and artificial horizon is supplied by an inverter, driven by the main D.C. supply.

## AIRCRAFT CONTROLS

### 16. **Flying controls**

(i) *Ailerons*

(a) The ailerons may be operated either hydraulically or manually. Hydraulic operation is selected by a valve (20) on the lower left of the instrument panel. The valve is pushed down for MANUAL operation and pulled out for POWER operation; it is turned clockwise to lock in either position. If hydraulic pressure fails, the aileron control reverts to manual automatically. A light (11) adjacent to the selector comes on when hydraulic pressure fails or MANUAL is selected.

(b) *Power operation*

Movement of the control column is transmitted by cables to servodynes at each aileron. Artificial feel is provided by a spring strut in the aileron circuit, giving a force proportional to aileron deflection but not to airspeed. The stick position can be altered by rotating the spring strut (66), which is on the right-hand side of the cockpit floor, in the natural sense.

(c) *Manual operation*

When hydraulic pressure falls, or is turned off by pushing down the selector valve, ports are opened connecting both sides of the servodyne pistons. Manual operation is then obtained.





(d) *Servo-tabs*

Each aileron has a servo-tab, which operates during power operation to relieve loads on the servodynes. When hydraulic pressure falls or is selected off, a pressure switch enables the ailerons to be trimmed by means of an actuator connected to the port servo-tab. The spring-loaded trim switch (8) on the inboard side of the throttle box enables selection of tab UP or DOWN and an indicator light (26) on the port instrument panel comes on when the port aileron tab is out of the neutral position. A circuit-breaker (4) on the port wall may be used to isolate the actuator.

(ii) *Elevator*

The elevator is manually operated and has a servo-tab to assist the pilot, and a trimming tab controlled by the handwheel (12) below the engine control box. The trim indicator (27) is above the instrument panel.

(iii) *Rudder*

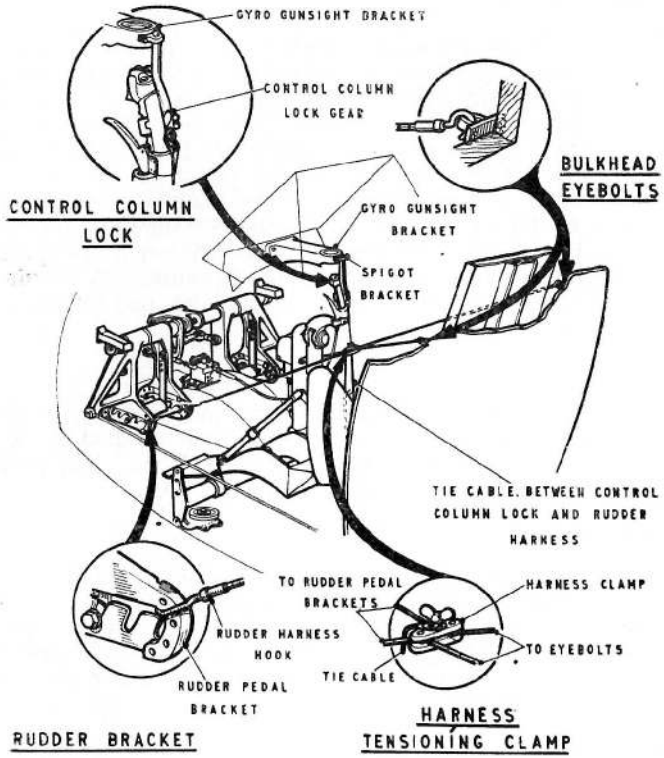
The rudder is not power operated. Each rudder has a ground-adjustable trim tab. A spring in the rudder circuit supplements the aerodynamic forces in centralising the rudder. The rudder pedals can be adjusted for reach by lifting them and then sliding them forward or aft into the required slot.

### 17. **Flying controls locking gear**

(i) *Internal*

The flying controls are locked with a cable harness. The spigot of the handle clamp is inserted into the bracket at the base of the gunsight bracket, and the clamp body is bolted round the handgrip.

The small hooks on the cable harness clip into eyebolts on the bulkhead situated about elbow height each side of the seat. The longer hooks clip on the rudder pedal brackets. Tension adjustment is made by sliding the locking clamp along the harness. The gear is stowed (2) behind the pilot's seat.




FLYING CONTROLS LOCKING GEAR

(ii) *External*

Clamping blocks are provided for the ailerons.

## 18. Undercarriage

(i) *Normal operation*

The undercarriage selector (18) is the longest of three levers extending from the rear face of the engine controls





box and has two positions, UP and DOWN. A safety catch on the lever must be held back before the lever can be raised. When the wheels are on the ground the lever is locked in the DOWN position by a solenoid-operated plunger.

(ii) *Position indicator*

A standard undercarriage position indicator (21) is on the bottom left-hand side of the instrument panel. Indications are:—

| | | |
|---|---|---|
| Undercarriage up | locked | No lights |
| Undercarriage unlocked | | Three red lights |
| Undercarriage down | locked | Three green lights |

A red light (29), above the instrument panel, comes on only if any of the three wheels are *locked up* and the throttle is less than a quarter open. The light is extinguished when *all* the wheels start to come down.

(iii) *Emergency operation*

If the engine-driven hydraulic pump fails and accumulator pressure is exhausted, the handpump to the left of the pilot's seat can be used to operate the undercarriage. Up to 115 strokes may be necessary to lower the undercarriage fully and lock it down.

(iv) *Undercarriage emergency override*

The undercarriage can be retracted in emergency when the aircraft is on the ground by first operating the guarded switch (5) on the port wall aft of the throttle box, and then using the normal undercarriage selector.

NOTE.—Safety locks, each with a red flag, may be inserted in the radius rods of the main undercarriage struts. Stowage for these locks is provided in the starboard gun-bay door.

19. **Flaps**

(i) *Normal operation*

The flaps selector lever (16) is on the rear face of the engine control box. There are three positions on the selector lever quadrant, UP—NEUTRAL—DOWN. Any degree of flap movement may be obtained by selecting and then returning to neutral after the required position is reached. The lever should be returned to neutral after the flaps are fully down if it is necessary in emergency to conserve accumulator pressure, but may be left in the up position when they are up.

(ii) *Position indicator*

A flaps position indicator (23) is fitted at the left-hand side of the instrument panel. It is connected to the right-hand flap only, and may give a false reading for intermediate flap settings on the ground. When the flaps are under air load, the indication is correct.

(iii) *Emergency operation*

The flaps may be operated by the handpump after normal selection, if the engine-driven pump fails and the accumulator is exhausted.

20. **Airbrakes**

(i) *Normal operation*

The airbrakes are operated by a lever (14) extending from the top of the engine control box. No intermediate settings are available.

(ii) *Emergency operation*

The airbrakes cannot be operated in flight by the handpump.





21. **Wheel brakes**

The wheel brakes are operated by a lever, incorporating a parking catch, on the control column, and differential braking by the rudder bar. The available pressure in the system and at each wheel brake is indicated on the triple-reading pressure gauge (39). The maximum pressure at each wheel brake is 150 lb./sq. in.

## COCKPIT EQUIPMENT

22. **Access to cockpit**

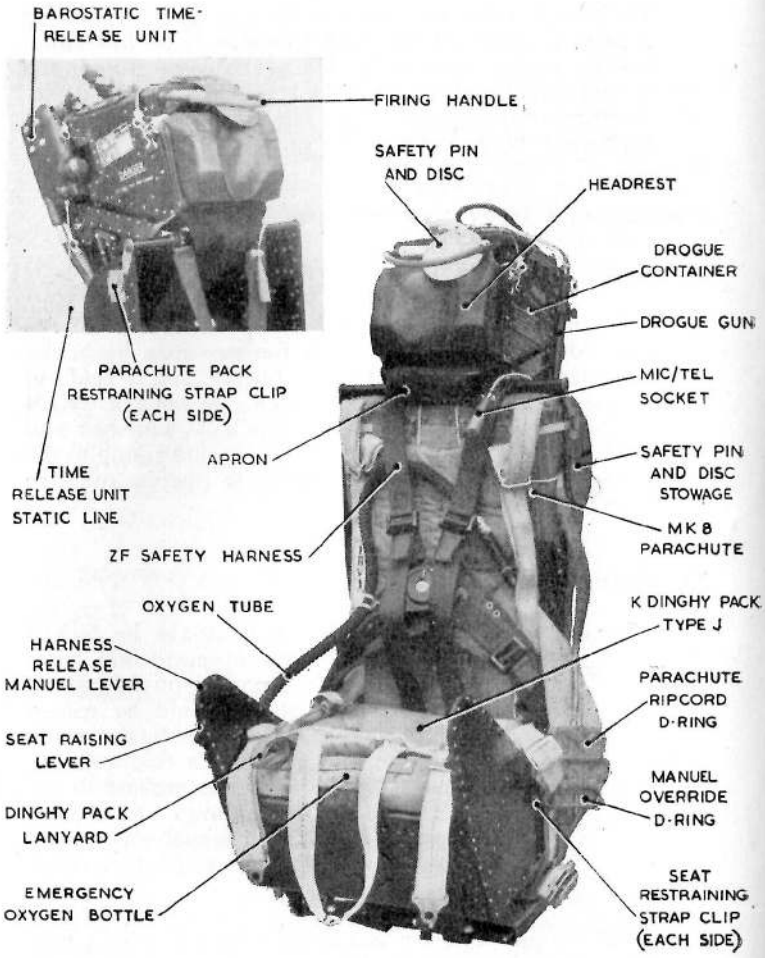
A spring-loaded retractable footstep is located on the port side of the fuselage. The footstep may be pulled out after first depressing the end fairing, and is held out by means of a spring-loaded catch. When the weight of the body is on the step, the catch is depressed and when the weight is removed the step should spring to the closed position. It is not possible to operate the step from inside the cockpit.

23. **Ejection seat Mk. 2F**

WARNING.—The firing handle must always be locked against the possibility of accidental withdrawal whenever the aircraft is on the ground. The fabric safety strap should be passed through the handle and secured by the spring safety pin. It is the pilot's responsibility to lock the handle after landing and to ensure that the pin is removed and stowed prior to take-off. All personnel must ensure that the firing handle is locked before entering the cockpit.

(i) A Mk. 2F pilot ejection seat is fitted incorporating a type ZF harness, headrest, footrests, parachute container and a seat well for the dinghy and emergency oxygen supply.

(ii) The height of the seat may be adjusted by a lever on the starboard side of the seat; the harness release is also on the starboard side.




EJECTION SEAT MK.2F





(iii) The ejection gun is fired by pulling the handle above the headrest.

(iv) All leads incorporate quick releases which are automatically broken on ejection.

(v) After ejection, at heights of 10,000 ft. and below, a barostat causes an automatic cycle to commence. After five seconds the safety harness is released, as are the face screen, firing handle and headrest pad. An apron attached to the seat drogue then pitches the pilot head first out of the seat, at the same time opening his parachute.

(vi) A manual override D-ring is fitted over the rip-cord D-ring and should be operated to isolate the automatic device if the system has failed.

## 24. Hood operation

(i) The sliding hood may be opened or closed by means of the winding handle (53) on the cockpit starboard wall: the handle must first be pulled out, then rotated in the natural sense. A plunger incorporated in the spring-loaded handle permits the hood to be locked in any desired position. When opening the hood from inside, the initial movement of the winding handle will partially turn off the hood seal cock (52) to remind the pilot that this lever must be turned off before opening the hood. A lanyard is provided beside the handle, and should be attached on take-off and during flight to prevent the hood inadvertently opening. When Mod. 447 is incorporated, the handle no longer has to be pulled out before turning. Instead, pressing a pushbutton in the end of the handle releases a locking plunger. No lanyard is fitted.

(ii) Operation from outside is effected by first pressing and holding in the button marked PRESS TO SLIDE CANOPY on the starboard side of the fuselage just below the hood rail. The hood is then free to slide in either direction. The hood cannot be operated externally if the seal cock is ON, or if the lanyard is attached to the handle.

(iii) The hood may be jettisoned by pulling inwards the lever (35) on the cockpit starboard wall. The pilot's head should be lowered below the level of the cockpit coaming before operating the lever.

(iv) The hood may be jettisoned from outside by opening the starboard ammunition door above the engine intake and pulling the red-painted jettison cable inside.

### 25. Cockpit lighting

(i) Three red floodlamps and four U/V lamps are fitted at various places in the cockpit. The master and dimmer switches are all on the port wall.

(ii) A single amber emergency lamp is fitted above the instrument panel and is controlled by a switch (6) on the port wall.

### 26. Oxygen system and pressure-breathing equipment

(i) Oxygen is carried in two cylinders stowed behind the pilot's seat. The high pressure supply is taken to a Mk. 16A regulator (41) on the starboard side of the instrument panel. The low pressure supply is taken from the regulator to a selector valve (64) marked P.B. and ECON. behind the pilot's seat on the starboard side, where it is directed either to the pressure-breathing waistcoat and the pilot's type J oxygen mask (when pressure-breathing equipment is in use) or to the economiser and then to the type H mask, via a flexible tube, depending on the position of the selector valve.

(ii) *With pressure-breathing equipment*

When the pressure-breathing waistcoat and type J mask are used, the selector valve must be wired in the P.B. position. The flow selector lever on the regulator should be used in the normal way to vary the flow according to the cockpit altitude.

(iii) *Without pressure-breathing equipment*

When the type H mask is used, the selector valve must be wired in the ECON. position.

NOTE 1. The economiser will be damaged if pressure-breathing equipment is used with the selector valve in the ECON. position. The ECON. position must always be used when wearing an H-type mask.





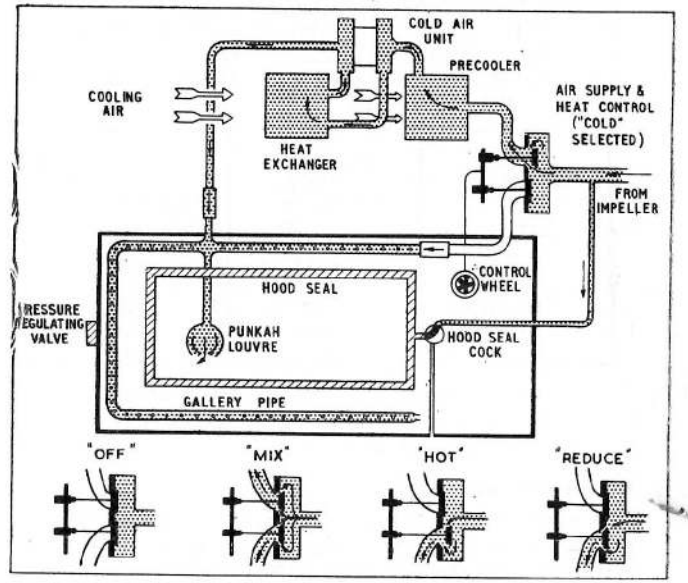
NOTE 2. The use of pressure-breathing equipment entails the replacement of the Mk. 1 quick-release socket in the pilot's supply tube by a Mk. 3 quick-release plug. The changeover from ECON. to P.B. cannot therefore be made in flight.

### 27. Emergency oxygen

An oxygen supply is incorporated in the dinghy pack. On ejection the main oxygen service is broken at the quick-release plug, and a cable anchor by the economiser operates the emergency oxygen supply to the pilot's mask.

### 28. Cockpit air conditioning

A hood seal control on the starboard wall must be on before attempting to pressurise the cockpit.




COCKPIT PRESSURIZATION AND HEATING

(i) Cockpit pressurising, heating, and cooling are controlled by movement of the wheel (3) on the port wall. The wheel rotates through 270°, and has five marked positions: OFF—COLD—MIX—HOT—REDUCE. If a reduction of cockpit temperature is desired at altitude, MIX is to be preferred to REDUCE otherwise the reduced volume of air entering the cockpit may adversely affect the pressure differential. COLD or MIX *must not* be selected on the ground otherwise overheating of the cold air unit may occur with subsequent damage.

(ii) *Pressure*

With the hood seal cock on, and the wheel set other than OFF, the cockpit pressure is automatically controlled by a valve which allows a steady build-up of differential cockpit pressure above approximately 12,000 ft., until at 35,000 ft. the full differential pressure is reached. The cockpit pressure is indicated on an altimeter (38) at the right-hand side of the instrument panel. A warning light (40) below the altimeter comes on when the cockpit altitude falls below the allowable minimum for a given altitude. The table below shows the cockpit altitudes corresponding to the minimum pressures. When the control is at REDUCE the cockpit pressure will be reduced.

| Actual altitude (ft.) | Equivalent altitude (cockpit) | Approx. cockpit altitude at which light comes on |
|---|---|---|
| 20,000 | 15,000 | 16,500 |
| 30,000 | 19,000 | 20,750 |
| 40,000 | 24,000 | 26,000 |
| 50,000 | 28,000 | 31,000 |

(iii) Air for pressurising enters the cockpit through a punkah louvre and also through holes in the gallery pipe for windscreen and hood de-misting.

29. **Windscreen de-icing**

The windscreen de-icing system is controlled by a hand-pump (43) on the right of the cockpit floor. The handle is turned anti-clockwise to unlock, and pumped in to raise pressure. The handle returns slowly to the out position while spraying the windscreen.





30. **Anti-G equipment**

Pressurised air for the G-suit is taken from points attached to the seat. The selector lever (42) below the oxygen regulator is pulled out and moved inboard for ON. The anti-G valve and test button (60) (pushed down to test) are at the aft end of the electrical panel. If pneumatic system failure occurs pressure in the anti-G system fails when the air bottle pressure falls to 250 lb./sq. in.

31. **Emergency equipment**

Stowage for a first-aid kit is provided on the decking behind the pilot's head. A crowbar (1) is on the left of the pilot's seat.

## FLIGHT AND NAVIGATION EQUIPMENT

32. **Flight and navigation instruments**

(i) *Mk. 4F compass and artificial horizon*

The Mk. 4F compass and artificial horizon will function whenever alternating current is made available, by switching ON the Mk. 4F compass switch (51) on the electrical panel providing the circuit-breaker (62) is in. No stand-by inverter is fitted. On later aircraft a warning lamp on the right of the instrument panel comes on to indicate inverter failure. A test panel (63) for the Mk. 4F compass is at the aft end of the starboard side of the cockpit.

(ii) *Turn and slip indicator*

The turn and slip indicator will function whenever D.C. electrical power is available.

(iii) *Pressure-operated instruments*

The pitot head heater switch (49) is on the electrical panel on the starboard wall.

(iv) *E.2A stand-by compass*

An E.2A stand-by compass (32) is mounted to the right of the G.G.S.

33. **External lighting**

| Lights | Switch position |
|---|---|
| Navigation lights | (49) on electrical panel |
| Identification lights | (49) on electrical panel |
| Landing lamp | Three-position selector switch (59) OFF—LOW—HIGH on electrical panel.<br>NOTE.—No lamp fitted at present. |

SIGNALS EQUIPMENT

34. **Wireless installation**

(i) *V.H.F—TR.1934 (ARI.5490) or TR.1998*

The V.H.F. controller (24) is on the left-hand instrument panel. The pilot's press-to-transmit switch is on the G.G.S. twist-grip.

(ii) *Stand-by V.H.F. (TR.2002)*

To be issued by amendment

(iii) *Telebriefing (ARI.18012)*

The pilot's warning lamp (22) which indicates the system is in use, and the press-to-talk push switch are on the lower side of the port instrument panel. The landline connector is in the end of the port tail boom.





(iv) *Rebecca Mk. 7 (ARI.5489)*

The controller is at the aft end of the port wall, the range and heading indicator (28) is at the left of the G.G.S. and a circuit-breaker (56) is above the electrical panel.

ARMAMENT EQUIPMENT

35. **Guns**

Four 20 mm. guns are mounted, two on each side of the nose, and are fired electrically by a trigger on the control column, after the safety catch has been released. To prevent the inadvertent firing of the guns when the aircraft is on the ground, the electrical firing circuit is broken when the undercarriage is locked down. No override switch is fitted.

36. **Gunsight**

(i) *Gyro-gunsight*

A gyro-gunsight Mk. 4E is fitted above the instrument panel, and is controlled by the master switch (57) on the electrical panel. The R.P./GUNS selector (58) is on the starboard wall.

(ii) *G.G.S. selector-dimmer control*

A G.G.S. selector-dimmer control (30) is at the top of the instrument panel to the right of the gunsight. Ranging is operated by a twist-grip on the throttle lever handle.

37. **Cameras**

(i) *G.G.S. recorder-camera*

A recorder camera may be fitted to the top of the gunsight. It will operate whenever the guns are fired or the camera button on the control column is pressed, provided the camera master switch (57) on the electrical panel is on. Stowage for the camera is provided on the cockpit floor beneath the throttle quadrant. A test switch on the

lower port instrument panel enables the camera circuit to be tested on the ground.

(ii) *G.45 camera*

A G.45 camera is pod-mounted beneath the port wing and will operate whenever the guns are fired or the camera switch is operated, provided the camera master switch is on. A sunny-cloudy switch (49) is on the electrical panel.

38. **R.P. and bombs**

The R.P's may be fired either in pairs or salvoes according to the position of the PAIRS—SALVO selector switch (57). The firing pushbutton is mounted on the control column handgrip. The button releases the R.P's or bombs according to the position of the R.P./BOMBS selector switch on the electrical panel. The nose and tail fusing switches, the single-salvo selector and the port and starboard selector switches (57) for the bombs are also located on the electrical panel.

39. **Light series bomb carrier**

Light series bomb carriers may be mounted on the bomb pylons to carry light practice bombs. Changeover switches in the wheel wells are set to PRACTICE BOMBS when the carriers are fitted.

40. **Bomb jettisoning**

No electrical jettison switch is fitted. Bombs may be jettisoned unfused through the normal electrical circuit or by the mechanical jettison lever (17) on the left-hand side of the seat.