# 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 VII.

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

(d) All fuel poundage figures are calculated at 7.7 lb./gall. (Normal AVTAG).

## 1. Introduction

(a) (i) The Hunter F.4 is a single-seat mid-wing fighter aircraft, with swept-back wings and a swept-back variable-incidence tailplane. Full-power ailerons and power-assisted elevators are fitted, both with manual reversion. When Mod. 365 is incorporated a full-power elevator replaces the power-assisted elevator. In such aircraft audio warning of hydraulic failure is provided by Mod. 327. The cockpit is pressurized and equipped with a Mk. 2H ejection seat.

(ii) An electric follow-up tail may be fitted; Mod. 533 introduces extended wing leading edges.

(b) (i) The power unit is an Avon Mk. 115 or Mk. 121 engine. The Mk. 115 develops 7,975 lb. and the Mk. 121, 7,575 lb. static thrust at sea level. The Avon 121 is a modified Avon 115 incorporating a system of fuel dipping and air bleeding to facilitate gun firing at altitude. The system works automatically whenever the gunfiring button is pressed. Automatic control of max. j.p.t. is also embodied.

(ii) These Notes are based on aircraft powered by the Avon 121 engine. Essential information for the Mk. 115 is given where applicable.





(c) Four Aden 30-mm. guns are installed in a detachable armament package in the fuselage undersurface.

(d) (i) Access to the cockpit is normally gained via a special ladder, supplied as ground equipment.

(ii) A single emergency footstep is located in the port side of the fuselage, below the cockpit.

## FUEL SYSTEM

### 2. Fuel tanks and gauges

(a) Fuel is carried in four flexible bag-type tanks, in the centre fuselage, and in four interconnected tanks in the forward edge of each wing. Provision is made for carrying four 100-gallon pylon drop tanks. On early aircraft only inboard drop tanks may be carried.

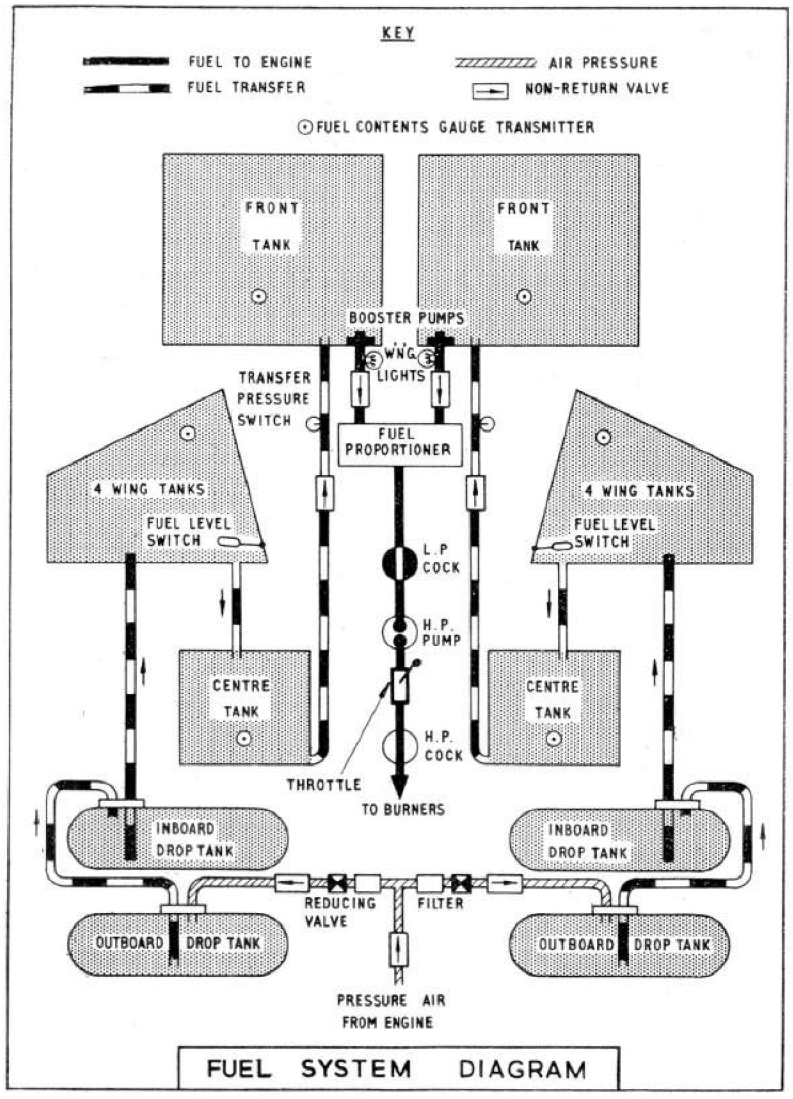
(b) Each front tank contains an electrically-driven booster-pump fitted in a negative G fuel trap, the total contents of both permitting at least 15 seconds inverted flight.

(c) The tank capacities are:—

| | Weight (lb.) at 7.7 lb./gall | Gallons |
|---|---|---|
| Front tanks .. .. .. | 1,555 | 202 |
| Centre tanks .. .. .. | 555 | 72 |
| Wing tanks .. .. .. .. | 1,078 | 140 |
| Total, internal .. .. | 3,188 | 414 |
| Pylon drop tanks (4) .. .. | 3,080 | 400 |
| Total, all tanks .. .. | 6,288 | 814 |

(d) Two electrical contents gauges (80) on the starboard shelf indicate, in pounds, the contents of the PORT TANKS and STBD. TANKS. On early aircraft these gauges indicate only the contents of the *fuselage* tanks (1,055 lb. per gauge) but on later aircraft they indicate the contents of both *wing and fuselage* tanks (1,598 lb. per gauge). In neither case is drop tank fuel gauged.

(e) A two position, ENGINE ON–ENGINE OFF, CONTENTS CHECK switch (103) is aft of the contents gauges. The switch is spring-loaded to the ENGINE ON position; when held to the other position the contents may be checked with the engine stopped.




FUEL SYSTEM DIAGRAM





3. **Fuel transfer system**

(a) Fuel from the drop and wing tanks is fed, by air pressure from the engine, to the centre tanks and then to the front tanks. The outboard drop tanks feed into the inboard drop tanks and thence to the wing tanks.

(b) The fuel transfer and the air pressure pipes are joined to each drop tank by means of a self-sealing connection, which automatically interconnects the air and fuel pipes when the drop tanks are jettisoned. When drop tanks are not carried, a bypass valve must be fitted to interconnect the two pipes.

(c) (i) On aircraft *without* gauged wing tank fuel, two WING TANK EMPTY magnetic indicators (81), one for each set of wing tanks, show white when transfer from the wing (and drop) tanks is complete. The gauge readings should then begin to show a steady drop.

(ii) On aircraft *with* gauged wing tank fuel, when Mod. 608 is embodied, these indicators show white when transfer from the *outboard* drop tanks is complete.

(d) Should the transfer system fail completely, no fuel will transfer from the wing and centre tanks. This is indicated by two TRANSFER FAILURE indicators (102), one on each side of the contents gauges switch, showing white. At the same time the contents gauge transmitters in the centre tanks will become inoperative and the gauges will then only indicate the contents of the front tanks, i.e. the amount of fuel available to the engine. If only one side of the transfer system fails, the appropriate TRANSFER FAILURE indicator will come on and the associated gauge will indicate the available contents.

4. **Fuel feed to engine**

The two booster-pumps deliver fuel from the front tank to a common pipe line, through the L.P. cock and thence to the engine-driven H.P. pumps. From the engine-driven H.P. pumps fuel is fed through the H.P. cock to the burners.

5. **Booster-pumps control**

(a) *Fuel balancing (early aircraft)*

NOTE.—Fuel balancing does not commence until the fuel gauge readings begin to fall from full indication,

i.e., on early aircraft when the wing and drop tanks are empty (1,055 lb.) or, on later aircraft, when the drop tanks are empty (1,598 lb.).

(i) The contents of the port and starboard tanks which are gauged (i.e. fuselage tanks early aircraft—wing and fuselage tanks later aircraft) are kept in balance by adjusting the rate of delivery from the front tanks booster-pumps. The pumps are electrically monitored by the fuel contents gauges so that should one side of the system tend to empty more quickly than the other, the delivery of the pump on that side is reduced until the levels are again approximately correct. (See para. 59 (c) (ii).)

(ii) The fuel booster-pumps are controlled by two AUTO-OFF-MANL switches (86). The conditions obtained with the switches in various positions and both fuel gauges indicating less than full contents are:—

| SWITCH SETTINGS | CONDITION |
|---|---|
| Both AUTO | Both pumps run under fuel balancing conditions |
| One OFF and one AUTO or MANL | Pump controlled by switch at AUTO or MANL runs at full speed. No fuel balancing |
| One MANL and one AUTO, or both MANL | Both pumps run at full speed. No fuel balancing |
| Both OFF | Gravity feed only |

Only when *both* switches are at AUTO and when the ungauged tanks are *empty* will balance control conditions obtain. AUTO should be selected at all times except when either abnormal conditions obtain, or when fuel from ungauged tanks is being transferred.

(iii) Two circuit-breakers (94), one for each booster-pump, an ammeter socket (93) and a test switch (97) are on the starboard shelf.

(iv) Should the contents gauges show more than 100 lb. difference in contents with both pumps at AUTO then either balance control or booster-pump failure has occurred.





(v) Failure of a pump in AUTO will leave balance control on the remaining pump and since the fuel from the side on which failure has occurred will be fed by gravity only the serviceable pump will go to minimum delivery. To check if a pump has failed, switch OFF the pump on the low contents side when the low pressure warning indicator (66) should show white. If no such indication occurs then balance failure as opposed to pump failure has occurred and balance can only be obtained by controlling the pumps between the MANL and OFF positions.

(vi) Later aircraft are fitted with two booster-pump failure red warning lights (87), one for each pump. In this case, the low pressure indicator will not show white if the test above is carried out.

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(b) *Fuel proportioner (later aircraft)*

(i) On later aircraft the fuel balancing equipment is replaced with a fuel proportioner. The booster-pumps are then controlled by two ON/OFF switches on the starboard shelf.

(ii) Fuel from each booster-pump is fed separately to the fuel proportioner (a pair of matched vane-type pumps on a common drive). Each proportioner pump delivers an equal amount of fuel to a single exit port; thence it is fed through the L.P. cock to the engine. Unequal feeding should only occur if one booster-pump delivery pressure differs from the other by more than 2 lb./sq. in. If the proportioner fails, fuel bypasses it via spring-loaded non-return valves.

(iii) Management of the fuel system is similar to that given in para. 59. For AUTO or MANL read ON.

6. **L.P. fuel cock**

The L.P. fuel cock control (16) is on the port shelf and is moved forward from OFF to ON. It controls the fuel flow to the engine.

## ENGINE CONTROLS

### 7. Variable swirl vanes and air-bleed valves

(a) The first row of stator blades in the engine compressor consists of variable swirl vanes which assist in imparting swirl to the incoming air. At. r.p.m. below 6,400 (6,200 Avon 115) the first stages of the compressor deliver more air than is acceptable to the later stages. To prevent surge, the surplus air is bled off through air-bleed valves and the swirl vanes are held in the maximum swirl position. When normal flight r.p.m. are reached the air-bleed valves are closed and the swirl vanes move progressively to the minimum swirl position which occurs at about 7,500 r.p.m. (7,200 r.p.m. Avon 115).

(b) No noticeable change in r.p.m. or thrust occurs when the air-bleed valves change over nor do the swirl vanes have any noticeable effect on engine operation. However, until the swirl vanes reach the minimum swirl position the compressor is not operating at maximum efficiency.

### 8. Engine starting system

(a) Starting is by means of a triple-breach cartridge starter which accelerates the engine until it becomes self sustaining. A high energy igniter system ignites the fuel injected into the combustion chambers by the main burners.

(b) The main control switches are all mounted centrally below the instrument panel and include:—

(i) The ENGINE MASTER switch (72) which completes the starter circuit through the starter button (71), the ignition switch (73) and the relight button (at 36) in its normal spring-loaded out position. It also closes circuits to the booster-pumps, the engine instruments and the No. 1 inverter and should be ON for starting and at all times when the engine is running. The starter circuit-breaker (95) is on the starboard shelf.

(ii) The IGNITION switch (73) which controls the current to the igniter plugs. It is locked in the ON position.

(iii) The STARTER button (71) which initiates the automatic starting sequence.





(c) When the battery master, engine master and ignition switches are all ON and the starter button is pressed, a cartridge is indexed and fired. The cartridge fires over a period of 2–3 seconds and causes the compressor to turn. At the same time full current is fed to the high energy igniter plugs which ignite the fuel spray. After approximately 30 seconds the engine becomes self sustaining and a time switch operates to cut out the igniter system and to release the starter button which has been held in during this time.

### 9. Restarting in flight system

A relight button is incorporated in the top of the H.P. cock control lever (36). It completes the circuit to the igniter plugs when relighting is required in flight.

### 10. Throttle control

The throttle control lever (20) moves in a quadrant on the port shelf, the handle of the lever incorporating a twist-grip for GGS manual ranging, a press-to-transmit switch (22) and the airbrake control (24). A throttle damper (18) is aft of the lever.

### 11. H.P. pumps

(a) The twin H.P. pumps share a common housing. A servo control system limits the total pump output and a governor limits over-speeding of the engine.

(b) Control of the fuel flow is effected by:—

(i) The throttle, to meter fuel to the burners.

(ii) A barometric pressure control (BPC), to vary the pump output in relation to intake pressure.

(iii) An acceleration control unit (ACU) to prevent an excess supply of fuel to the engine during periods of engine acceleration.

Both BPC and ACU are connected to the servo control system.

### 12. H.P. pump isolating valve and warning light (Avon Mod. 748)

(a) The isolating valve is intended as a means of restoring power in flight in the event of failure of the H.P. pumps servo system causing a sudden loss of power. (See para. 99 (b).)

(b) The valve is controlled by an ENGINE FUEL PUMPS NORMAL/ISOLATED switch (33) on the port shelf. When the switch is set to ISOLATED, one H.P. pump is cut off from the servo system which continues to control only the other H.P. pump. The isolated pump moves to full stroke and is controlled only by its over-speed governor.

(c) An adjacent warning light (35) indicates when the isolating switch is at ISOLATED.

13. **H.P. fuel cock**

The H.P. fuel cock control (36) is mounted in a quadrant on the cockpit port shelf, and is moved forward from OFF to ON. A safety gate is provided to ensure that the H.P. cock cannot be moved unless it is first pressed downwards.

14. **J.p.t. control**

This device prevents the j.p.t. from rising above 700° C. J.p.t. is measured by a number of thermocouples which supply current to a magnetic amplifier which in turn reduces fuel flow to the engine should the j.p.t. rise above the maximum permitted. The system, which is fully automatic, is brought into use by a micro switch operated by the nosewheel door in conjunction with a time delay and thus is operative only when the aircraft is airborne. An override switch (31), on the forward end of the port shelf and which is normally locked ON by a spring-loaded guard, may be used to isolate the system should it become unserviceable and reduce fuel flow too much.

15. **Engine instruments and anti-icing**

(a) The engine instruments comprise a jet pipe temperature gauge, an oil pressure gauge (78) and an r.p.m. indicator.

(b) An engine anti-icing OPEN/SHUT switch and indicator (at 84) are on the forward end of the starboard shelf. Hot air is tapped from the engine compressor and, with the switch OPEN, is ducted to the inlet guide vanes. The system is not intended for de-icing.

16. **Oil system**

Oil is carried in the engine sump, the capacity of which is approximately 17 pints. One pressure and two scavenge





pumps maintain a continuous circulation through a cooler and a filter to the engine bearings and gears.

17. **Engine fire-extinguishing equipment**

(a) A fire-extinguisher bottle, stowed between the air intakes just forward of the engine is connected to the engine extinguisher inlet connection. Operation of the system is either by:—

(i) A manually-operated pushbutton (at 58) in the cockpit, on the starboard coaming, or

(ii) An automatically-operated inertia switch which operates if a crash landing occurs. When the inertia switch operates, the batteries are automatically isolated irrespective of the position of the battery master switch.

(b) Twelve resetting flame detector switches are situated around the engine and forward part of the jet pipe. Operation of any of the switches causes the ENGINE FIRE warning light (at 58) incorporated in the pushbutton to come on, provided that electrical power is available. When the button is pressed the extinguisher discharges its contents through spray rings. If the fire is extinguished, the light goes out as the flame switches cool.

(c) The warning light may be tested by pulling out the extinguisher pushbutton. Modified aircraft are provided with a test switch on the starboard coaming. On such aircraft the light should be tested by use of the switch.

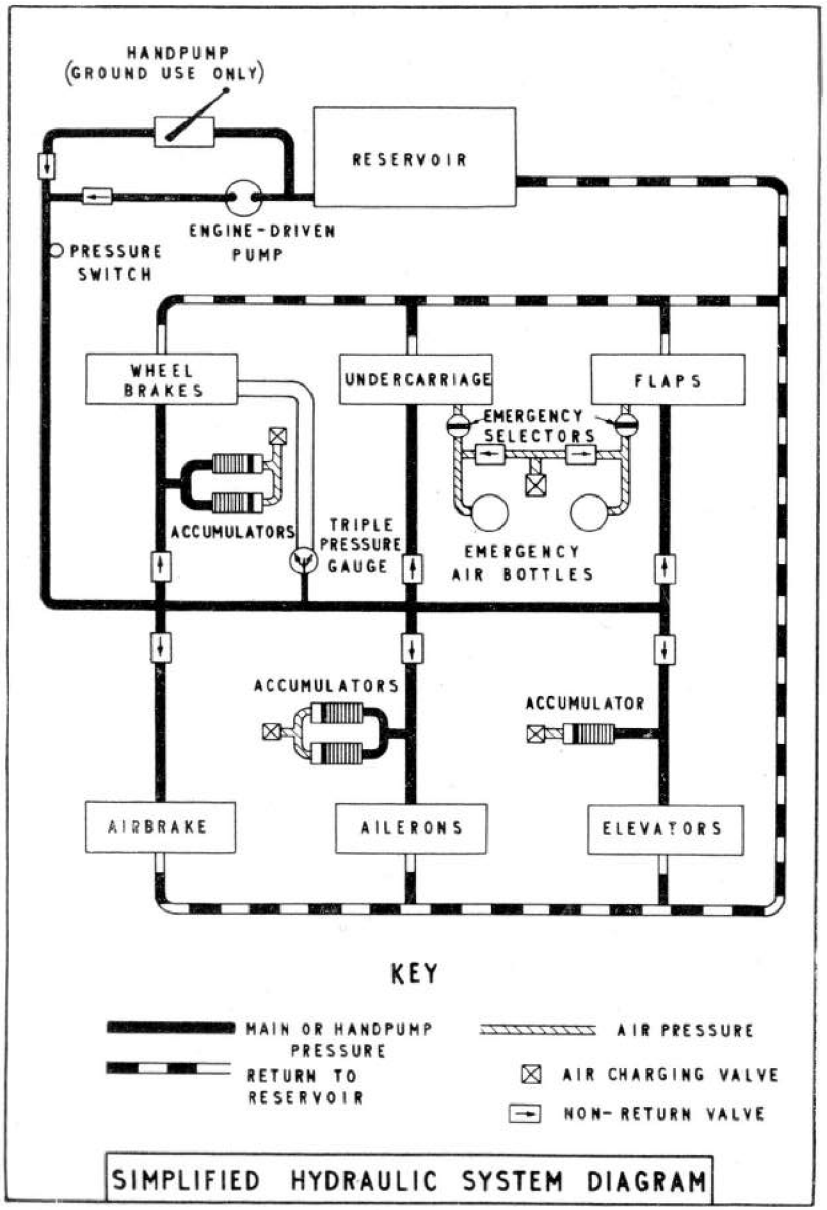
(d) When the battery master switch is OFF the fire-extinguishers can be operated only by the inertia switch. The battery master switch must be ON to test the warning light or to operate the system by pushbutton.

## MAIN SERVICES

18. **Hydraulic system**

(a) An engine-driven hydraulic pump maintains a live-line pressure of 2,850±150 lb./sq. in for the normal operation of the:—

Undercarriage and doors
Flaps
Wheel brakes
Aileron and elevator hydroboosters
Airbrake.




SIMPLIFIED HYDRAULIC SYSTEM DIAGRAM





The main pressure is indicated by the central needle of the triple pressure gauge (26) at the forward end of the port shelf.

(b) Five hydraulic accumulators are fitted in the circuit to provide a reserve of power in an emergency. The hydraulic side of the accumulators is connected to the wheel brakes (two), aileron hydroboosters (two), and elevator hydrobooster (one) respectively.

(c) The pressure available in the wheel brakes accumulators is shown on a gauge (11) on the port shelf. The accumulators are charged with air to a pressure of 750 lb./sq. in. via a connection in the nosewheel bay. The aileron accumulators are charged to 1,575 lb./sq. in. (900 lb./sq. in. when Mod. 690 embodied) via a connection in the starboard wheel bay; a pressure gauge is adjacent. The elevator accumulator is charged to 1,575 lb./sq. in. via a panel in the port side of the fin; the pressure is indicated on a gauge readable through a transparent window in the panel.

(d) Indication that failure of the live-line system has occurred is given by the main needle of the triple pressure gauge and, when pressure has fallen to 600 lb./sq. in. the illumination of a red warning light (at 45) on the port side of the instrument panel. When Mod. 327 is incorporated an audio warning also gives warning of hydraulic failure. This is the same audio warning, previously used for cockpit pressure failure. When the audio warning cut-off switch (65) is operated the warning is discontinued.

(e) Two high pressure air bottles, which are charged to 1,800–2,000 lb./sq. in., are provided for the emergency lowering of undercarriage and flaps respectively. Air pressure gauges (7) (8) for the bottles are mounted on the port shelf.

(f) A hydraulic handpump, for ground test purposes, is fitted in the engine bay.

19. **Electrical system (24 volt)**

(a) *D.C. supply*

(i) Two 6,000-watt d.c. engine-driven generators supply the whole of the electrical system and charge two 12-volt aircraft batteries connected in series. When

Mod. 386 is embodied, two 24-volt batteries are fitted and connected in parallel, thereby approximately doubling battery capacity. Two GENERATOR failure warning lights (70), situated below the centre of the instrument panel, come on only when their associated generator is not supplying power.

NOTE.—Minimum engine r.p.m. to keep the batteries fully charged are 3,700 (4,000 if one generator has failed). It must not be assumed that the generators are charging adequately if neither warning lamp is lit. The batteries can be taking an appreciable load with both lights out at low r.p.m.

(ii) Control of the batteries is effected by a BATTERY MASTER switch (77) below the centre of the instrument panel. When set to OFF the switch isolates all electrical services from the batteries except the engine fire-extinguisher inertia switch.

(iii) An external ground supply socket is accessible via the radio bay door and is for use when a ground battery is necessary for servicing purposes.

(iv) The following table lists the various electrical warning lights and indicators in the cockpit. Failure in any circuit (except radar ranging) incorporating a magnetic indicator is shown by the indicator showing white.

| Service | Indication | Function |
|---|---|---|
| Fire warning | 1 red light (58) | Gives warning when temperature in engine bay exceeds 300 ±30°C. |
| Fuel pressure warning | 1 white magnetic indicator (66) | Indicates fuel pressure low at engine inlet |
| Fuel transfer warning | 2 white magnetic indicators (102) | Indicate failure of transfer system |
| Wing tank transfer or, Outboard drop tank empty (Mod. 608) | 2 white magnetic indicators (81) | Indicate transfer from wing tanks complete, or when outboard drop tanks empty |





| Service | Indication | Function |
|---|---|---|
| Booster pump warning | 2 red lights (87) (when fitted) | Indicate failure of associated booster pumps |
| H.P pump isolation | 1 red light (35) | Indicates isolation in use (when fitted) |
| Generator failure warning | 2 red lights (70) | Indicate generator failure due to (1) Cut-out not closed (2) Fault in circuit |
| Radar ranging warning | 1 white magnetic indicator (37) | Indicates radar ranging in use |
| Hydraulic failure warning | 1 red light (at 45) | Indicates hydraulic pressure below 600 lb./sq. in. |
| Undercarriage position | 3 red or green lights (42) | Indicate position of each U/C unit separately No light—unit locked up Red light—unit between locks Green light—unit locked down |
| Undercarriage warning | 1 red light (40) | Indicates when throttle closed and U/C not locked down |
| Powered controls | 2 white magnetic indicators (45, 46) | Indicate separately disengagement of aileron or elevator hydroboosters, or fault in electrical circuit |
| Airbrake | 1 white magnetic indicator (38) | Indicates airbrake not fully retracted |
| Cockpit pressure warning | 1 red light (62) | Indicates drop of ½ lb./sq. in. in cabin pressure differential |
| Telebriefing | 1 amber light (25) | Indicates telebriefing in use |

(b) *Emergency battery*

An emergency battery is provided to supply the emergency lamps, the Manual emergency selector circuit (Mod. 502) and, when Mod. 488 is embodied, the turn and slip indicator. If fully charged the battery will provide between 7 and 20 hours' continuous use, depending on the load imposed on it.

(c) *A.C. supply*

(i) A.C. for the Mk. 4F compass, artificial horizon and oil pressure gauge is supplied by No. 1 Type 100A inverter, with No. 2 Type 100A inverter acting as a standby. The engine starter master switch normally controls the circuit to the inverters but No. 2 inverter does not come into circuit until micro-switches, attached to the undercarriage, are operated when the weight is taken from the undercarriage as the aircraft becomes airborne. If No. 1 inverter fails, automatic changeover to No. 2 inverter occurs, which causes a magnetic indicator on top of the A.C. junction box to show white.

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NOTE.—If auto-changeover does not occur, it is possible to activate No. 2 inverter by switching ON the radar ranging. Once No. 2 inverter is activated, the radar ranging may be switched OFF and the inverter will continue to supply the a.c. instruments.

(ii) When No. 2 inverter is in circuit it also acts as a feed to the radar ranging. When the latter is switched on, No. 2 inverter operates a torque switch to bring into operation a Type 200 inverter which supplies the radar ranging. If auto-changeover occurs, the torque switch trips and the radar ranging is inoperative.

(iii) A.C. for gun firing is supplied by a Type 300 inverter which is brought into operation when the gun firing safety flap is raised, provided that the gun firing circuit is in operation (see para. 53).

(iv) Located on top of the A.C. junction box at the aft end of of the starboard shelf, in addition to the changeover indicator, are two circuit breakers, for the Type 100A inverters, and a TEST/NORMAL switch, for servicing purposes. The latter should be set at NORMAL (inboard) for flight conditions. In flight none of these is visible or accessible.





## POWERED FLYING CONTROLS AND TRIMMERS

20. **Flying controls operation**

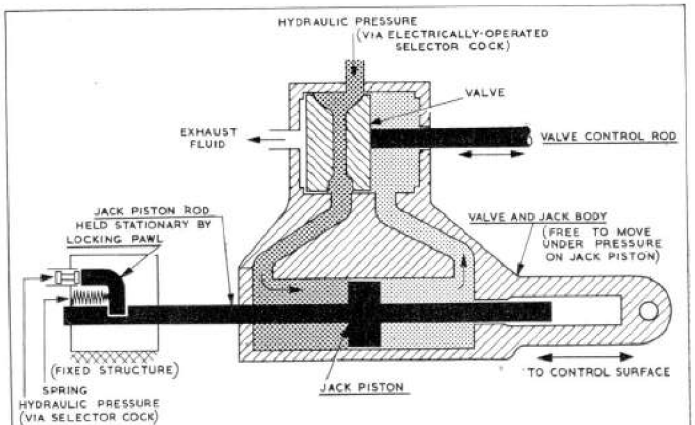
(a) *In Power*

The ailerons and elevator are power-operated, the power being supplied by hydraulic oil under pressure from the aircraft hydraulic system to the aileron and elevator hydro-boosters. The hydrobooster jack piston rods are each anchored to the aircraft structure by a spring-loaded hydraulically-operated pawl.

(b) *In Manual*

(i) Manual operation of the controls may be selected deliberately by operating a switch in the cockpit (see para. 21) to release the locking pawls provided that electrical power is available, or will happen automatically if hydraulic pressure drops below 200 lb./sq. in.

(ii) When operating in Manual, control surface movements are achieved through a mechanical linkage. The controls are heavy in Manual, especially the




DETAIL OF AILERON BOOSTER JACK
(ELEVATOR JACK SIMILAR)

ailerons, but to avoid excessively high stick forces the pawls automatically disengage and release the anchored jack piston rods, allowing them to slide freely with the movement of the jack bodies.

(c) *Hydraulic power reserve*

Accumulators are fitted in the powered control circuits to provide a reserve of power if the main hydraulic supply fails. This reserve may be sufficient for a maximum of 3 complete cycles of aileron and elevator operation before the controls revert automatically to Manual, but even if no control movement is made, accumulator pressure will not be maintained for a long period due to seepage through the hydraulic components. With some types of hydraulic failure immediate reversion to Manual will result.

21. **Controls and indicators**

(a) *Pre-Mod. 452*

Two ON/OFF switches are on the instrument panel and control electrically the hydraulic cocks, one for the aileron circuit and the other for the elevator circuit. When the engine is running and a switch is selected ON hydraulic pressure is fed to that circuit and to the pawl which engages in the jack piston rod.

(b) *Post-Mod. 452*

When Mod. 452 is embodied a revised wiring and switching arrangement is applied to the aileron and elevator pawl release units so that Manual is automatically selected if any pawl disengages, even though momentarily. The aircraft can therefore be flown only with Power correctly engaged or in Manual. The two ON/OFF switches of unmodified aircraft are replaced by two ganged POWER OFF–off–POWER ON selector switches (45, 46) which are spring-loaded to the central (off) position. Deflection upwards to POWER ON isolates the fail-safe circuit to allow initial engagement or re-engagement. Deflection downwards immediately selects Manual.

(c) Two magnetic indicators, one for the AILERON circuit and the other for the ELEVATOR, are mounted beside the switches and show black when the piston rod locking pawls are correctly engaged and white when the appropriate pawl is disengaged or incorrectly engaged, or alternatively when electric power to the indicator is not available.





(d) A hydraulic pressure gauge (26) and a red warning light (at 45) are fitted in the cockpit to warn the pilot if the pump is losing pressure.

(e) *Manual emergency selector buttons (Mod. 502)*

When Mod. 502 is embodied two yellow and black striped POWER OFF pushbuttons (53) are fitted at the bottom left-hand corner of the instrument panel to permit the emergency selection of Manual of either ailerons or elevators, or both, should the aircraft electrical system have failed. When either button is pressed an electrical supply from an independent dry battery is connected to the appropriate selector cock and the associated controls then revert immediately to Manual.

NOTE.—These buttons must not be pressed if normal electrical power is available as in this event it is likely that the control circuit fuse will be blown.

22. **Aileron feel and trim**

(a) On the ailerons, the piston rod is anchored to the aircraft structure, the air loads are resisted entirely by the hydraulic jack effort and no load is fed back to the control column. To provide control feel, a spring is fitted in the control circuit and gives an artificial stick force which is proportional only to aileron deflection but not to airspeed. When Mod. 188 is embodied a handwheel (76) is fitted on the left-hand side of the control column to provide spring feel adjustment and should be used to counteract any out-of-trim forces which may occur when flying in Power. A white line is inscribed on the handwheel. When the trimmer is neutral the line points forward and the trimmer engages in a spring-loaded detent. Movement from this position is through 300° either to the left or to the right thereby adjusting the zero force position of the stick. Its use when flying in Manual is not recommended because its assistance is almost negligible and unless reset to its original position when reverting to Power it reduces the likelihood of a successful re-engagement.

(b) A trim tab is fitted on the port aileron. It is only intended for use in Manual and a guard is placed round the trim control (34) to prevent its inadvertent use when in Power.

(c) *Aileron gear change*

(i) When Mod. 457 is incorporated, the control column/aileron gearing is automatically changed when Manual reversion occurs, so that for the same stick movement aileron travel in Manual is approximately two-thirds of that obtained in Power.

(ii) This automatic changeover is provided for by the insertion of a hydraulic jack in the aileron control linkage. When hydraulic pressure is fed to the jack (via the aileron power selector cock) the jack extends to alter the linkage effective arm. When hydraulic pressure is lacking, the jack retracts under spring pressure.

23. **Elevator feel and trim**

(a) (i) *Power-assisted elevator*

On the power-assisted elevator the piston rod is anchored to the control circuit itself, so that approximately $\frac{1}{4}$ of the air loads on the control surface are fed back to the stick, and changes of air load on the elevator will be felt by the pilot as changes of stick force, thus providing a feel similar to that obtained from a normal manual control.

(ii) *Full-power elevator (Mod. 365)*

In aircraft fitted with the full-power elevator the feed back previously built into the control circuit is eliminated by fixing the locking pawl to the aircraft structure and the air loads on the elevator are resisted entirely by hydraulic jack effort. To provide control feel, a spring is fitted in the control circuit between the control column and the variable-incidence tailplane. The spring gives an artificial feel to the elevator control circuit by imposing a force proportional to stick deflection but not to airspeed (i.e. air loads).

(b) (i) An electrically-operated variable incidence tailplane is provided to trim out the changes of stick force. It is hinged at the rear end, while a projection on the leading edge is connected to an electrically-operated actuator mounted in the dorsal fin below the tailplane. The actuator is operated by one of two electric motors, the main and the standby. The main motor is controlled by a thumb switch (69) on top of the stick





and the tailplane operates in the same way as a conventional trimming tab but is more powerful in effect. After selecting by feel the required tailplane angle to give zero stick force for a given flight condition, the elevator is trailing with no air load imposed on it. The tailplane main motor circuit is protected by a circuit breaker (5) on the port shelf.

(ii) The standby motor, which is fitted to meet the case of failure of the main motor, or its electrical supply, is controlled by a switch (30) under a cover on the port shelf. When the cover is raised to enable operation of the standby switch, the main motor circuit is isolated. The standby motor operates at about one-third the rate of the main motor.

(iii) The setting of the tailplane is shown on an indicator (47) on the port side of the instrument panel.

24. **Electric follow-up tail**

(a) *General*

An electrical interconnection enables the variable-incidence tailplane to follow-up elevator movement. A more powerful elevator booster and a faster rate tailplane actuator are fitted. Used together they give greater manœuvrability at high mach numbers and the booster increases available elevator angle (and hence tailplane angle) before jack stalling occurs.

(b) *Selectors and indicators*

(i) A TAILPLANE ON/OFF switch (29), by means of which the interconnection may be selected, is fitted on the port shelf. The tailplane indicator is so arranged to indicate when the tailplane is functioning as a flying control, i.e. the indicator moves when the control column is deflected as well as when the trim switch is actuated.

(ii) The circuit is so arranged that when the cover of the standby trim switch is raised, both the main actuator and the interconnection are isolated.

(c) *Function*

(i) Whenever the interconnection is switched ON, and electric power is available, it functions irrespective of whether the elevator is in Power or in Manual. It is

arranged in the form of a follow-up linkage, so that, for a given stick deflection and tailplane trim position a predetermined relationship exists between tailplane and elevator angles. A linkage attached to the elevator carries a switch arm, one end of which moves between two micro-switches. Movement of the elevator relative to the tailplane energizes one of these switches which operates the tailplane actuator to move the tailplane. When the tailplane reaches the required position the micro-switch is de-energized and tailplane movement stops, leaving the elevator deflected relative to the new position of the tailplane.

(ii) To prevent continual hunting of the tailplane actuator, the elevator has a small range of movement over which the micro-switches are not selected.

(iii) A spring-loaded telescopic strut is incorporated in the linkage so that full and unrestricted stick movement is always obtainable. The strut telescopes when either the elevator is moved faster than the rate at which the tailplane actuator can follow up or when the tailplane has reached the end of its travel.

(d) *Trimming*

Trimming is carried out by means of the thumb switch (69) on the control column. In addition to altering the tailplane incidence, operation of this switch also resets the datum position of the two micro-switches. During trimming the elevator is kept in line with the tailplane by the centring action of the spring feel strut, the switch arm thus following the resetting of the micro-switches datum position. The datum setting cannot be altered by means of the standby switch.

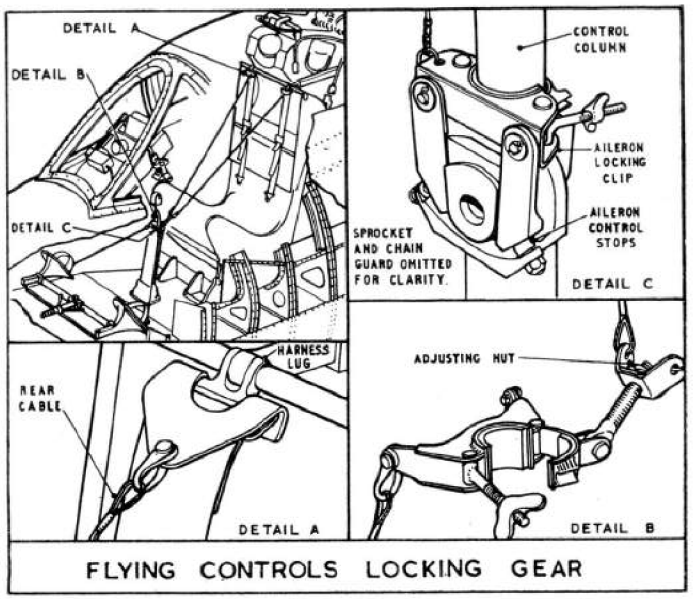
## OTHER AIRCRAFT CONTROLS

### 25. Rudder pedals adjustment

The rudder pedals are adjustable for leg reach by means of a control toggle (79) at the botton centre of the instrument panel. When the control is pulled out, a plunger is disengaged from a hole in the adjusting shaft, thus allowing the rudder pedals to be pushed forward against the pressure of a spring, or to swing aft by spring pressure. When adjustment is complete, releasing the control to allow the plunger to engage in the nearest hole will fix the rudder pedals in the desired position.








FLYING CONTROLS LOCKING GEAR

### 26. Flying controls locking gear

(a) *Internal locking*

The internal locking device consists of four cables which are joined to a clip, designed to attach to the control column. The other ends of the cables incorporate hooks which should be attached to the safety harness lugs on the ejector seat and to the outboard edges of the rudder pedals. When fitting the cables the rudder pedals should be in the central position and the cables tensioned by movement of the seat backrest pan.

(b) *External locking*

Locking clamps are provided for all flying control surfaces.

(c) No stowage is provided for internal or external locks.

### 27. Trimming tab controls

The rudder and port aileron incorporate electrically-operated trimming tabs. A combined aileron and rudder trim control (34) is situated on the port shelf with a

combined tab position indicator (32) just forward of it. The aileron trim tab must be set to neutral before take-off and must remain so at all times when Power is engaged. A locking guard is provided to prevent inadvertent operation of the aileron trim when in Power. It must be engaged at all times when flying with ailerons in Power.

28. **Undercarriage control and position indicator**

(a) The tricycle undercarriage is operated hydraulically after electrical selection by either the UP or DOWN push-button (43), on the port side of the instrument panel.

(b) A standard position indicator (42) is fitted to the left of the pushbuttons. A warning light (40) below the push-buttons comes on if, with the undercarriage not locked down, the throttle is closed.

29. **Undercarriage emergency operation**

(a) Should electrical or hydraulic failure occur, the undercarriage may be lowered irrespective of the setting of the normal selectors by pulling the U/C emergency release (39), on the port shelf, while holding in the central knob. This admits air from an emergency bottle direct to the lowering jacks, forcing them to lower and lock. The available air pressure is shown on a gauge (7) at the rear end of the port shelf. The release must be pulled fully out until several inches of wire show.

(b) If it is required to retract the undercarriage on the ground only, the UP selector pushbutton should be twisted clockwise and then pressed. This is inoperative if the undercarriage emergency system has been used.

30. **Flaps control and position indicator**

(a) The flaps are selected electrically and operated hydraulically. Selection is by means of a switch (41), on the port side of the instrument panel, which provides UP, DOWN (80°) and six intermediate positions (15°, 23°, 30°, 38°, 45°, 60°).

(b) The flaps may be selected to any position but the extent to which they will lower depends upon the air loads. If speed is increased with the flaps extended, the angle will be adjusted to suit the air loads. (But see para. 74 (f).)

(c) A flap position indicator is fitted adjacent to the selector switch.





31. **Flaps emergency operation**

Should electrical or hydraulic failure occur, the flaps may be lowered fully down only irrespective of the setting of the normal selector by pulling the emergency release (44), on the instrument panel, while holding in the central knob. This admits air from an emergency air bottle direct to the lowering jacks. The available air pressure is shown on a gauge (8) at the rear end of the port shelf. The release must be pulled fully out until several inches of wire show.

32. **Airbrake control**

(a) An under-fuselage airbrake is provided. It is electrically selected and hydraulically operated and will extend fully at any speed.

(b) Control of the airbrake is by means of a three-position switch (24), spring-loaded to the central off position, on the throttle lever. No position other than fully in or fully out can be selected. A magnetic indicator (38) on the instrument panel shows black only when the airbrake is fully in.

(c) The airbrake is automatically inoperative when the undercarriage is lowered. If the undercarriage is lowered when the airbrake is out, the airbrake will automatically retract. *Airbrake IN must not normally be obtained by selecting undercarriage DOWN.*

(d) A spring-loaded switch (15) on the port wall enables the airbrake to be tested on the ground. When the switch is held to TEST, the airbrake extends through 10° only and then retracts with a slight bump. The indicator shows white momentarily while the airbrake is out.

33. **Wheel brakes control**

(a) The wheel brakes are operated hydraulically by means of a lever attached to the forward face of the control column and a differential relay controlled by the rudder pedals.

(b) The main hydraulic pressure (2,850±150 lb./sq. in.) is shown on the triple pressure gauge (26) together with the pressure at each main wheel (1,500–1,650 lb./sq. in.).

(c) Should the hydraulic system fail, the pressure in the wheel brakes accumulators will be sufficient for landing but will leave little in hand for subsequent taxying. The available accumulator pressure is shown on a gauge (11) at the aft end of the port shelf.

(d) (i) Maxaret brake units are fitted and permit the use of full braking when essential without the danger of wheel locking and tyre damage. The units come into operation only if the wheels are rotating and in no circumstances should the brakes be applied before touchdown.

(ii) Should hydraulic pump failure occur, the brakes accumulators, if fully charged, should provide sufficient pressure for about 40 operations of the units. The brakes will remain effective until accumulator pressure drops to 750 lb./sq. in.

### 34. Electrically-operated flight instruments

(a) The turn and slip indicator is operated by D.C. whenever electrical supply is available. If electrical supply is lacking, the word OFF appears in the face of the instrument.

(b) The Mk. 3B or Mk. 4 artificial horizon is operated by A.C. (see para. 19 (c)). In the Mk. 4 artificial horizon is incorporated a power failure indicator that shows the word OFF when electrical supply is lacking. If the fast erection button is used before flight to erect the horizon it must not be kept depressed after satisfactory erection is achieved. In flight the button should only be used in unaccelerated level flight.

(c) The Mk. 4F compass is also operated by A.C. (see para. 19 (c)). A test panel (96) is fitted at the rear end of the starboard shelf.

## COCKPIT EQUIPMENT AND CONTROLS

### 35. Hood operation

(a) The hood is opened or closed electrically after selection by a three-position OPEN–OFF–SHUT switch (19) on the port wall The hood may be stopped at any position by selecting OFF but in flight the switch must be SHUT, otherwise partial depressurization may occur. There is a delay of about 5 seconds between selection and operation when the switch is set to OPEN. Above the switch is a clutch lever which when set to FREE declutches the actuator, locks the switch at OFF and enables the hood to be moved by hand. A circuit breaker (6) for the hood motor is at the rear end of the port shelf.





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(b) The hood seal is automatically inflated when the hood is fully closed, and deflated when either OPEN is selected or the clutch release is set to FREE.

(c) Four pointers (89) are provided, one at each end of the hood rails. Alignment of the pointers with their associated spigots indicates that the hood rails are locked and are safe for flight. When Mod. 604 is embodied the four pointers are replaced by two LOCKED plates at the aft end of which is a semi-circular indentation. Engagement of the red-painted lock sear pin within the recess indicates that the hood rails are locked and are safe for flight.

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### 36. Hood jettisoning

(a) *Pre-mod. 281*
The hood may be jettisoned mechanically by pulling the handle (27) on the port shelf. This action also operates a micro-switch which, if electrical power is available, automatically lowers the gunsight.

(b) *Post-mod. 281*
If mod. 281 is embodied, the hood is jettisoned by gas pressure from a jettison gun acting on two pistons which release the hood rails and then push the hood upwards. This action may be initiated by pulling the hood jettison handle or will occur when either ejection seat handle is pulled. In the former case the G.G.S. is automatically lowered if electrical power is available, but in the latter case it will be necessary first to lower the G.G.S. manually.

(c) *External emergency release*
An external emergency release ring is inside a break panel on the port side of the fuselage. When the release ring is pulled the hood rails are released; in the case of aircraft fitted with Mod. 281 the jettison gun is not fired. The hood may then be lifted clear manually.

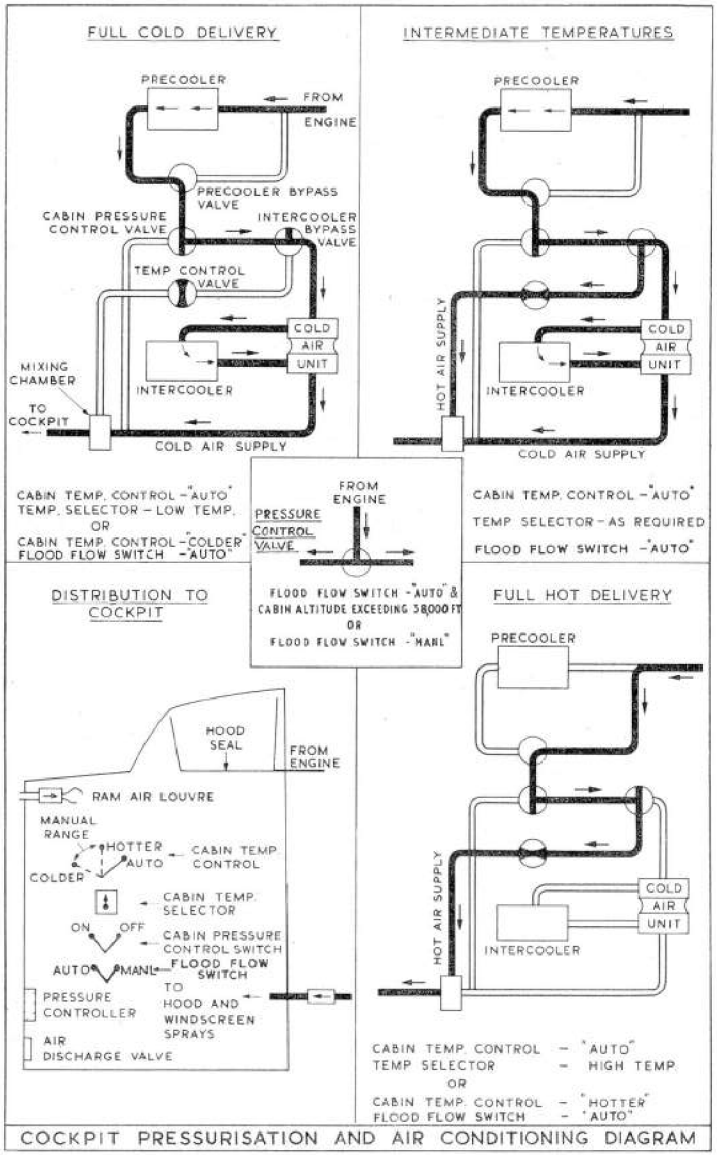
(d) Mod. 846 replaces previous locking indicators with triangular-shaped LOCKED plates, one on each side of the cockpit. Alignment of the black dot on the red painted lock sear pin below the line on the LOCKED plate indicates that the hood rails are safe for flight.

### 37. Cockpit pressurization, heating and demisting

NOTE.—The system is inoperative whenever the hood is open.

(a) Hot air under pressure is bled from the engine compressor to supply the heating, pressurization and demisting system. The air supply to the cockpit terminates in spray pipes which provide for windscreen side panels and hood demisting.

(b) The master ON/OFF switch (3) controls the flow to the cockpit. The temperature control lever (2) permits the selection of AUTO or manual HOTTER–COLDER. The




COCKPIT PRESSURISATION AND AIR CONDITIONING DIAGRAM





temperature selector (1) is for use in AUTO to pre-select the desired temperature, which is then maintained by a thermostat. In the manual range, temperature is controlled by first setting the lever to HOTTER or COLDER and then, when the desired temperature is reached, engaging the lever in the central gate.

(c) The cockpit altimeter (60) should indicate in accordance with the following table. Should the cockpit pressure drop below a pre-determined minimum, a red light (62) on the right of the instrument panel comes on.

| Actual altitude | Cockpit altitude | Cockpit altitude at which warning light comes on |
|---|---|---|
| 20,000 ft. | 13,000 ft. | 13,750 ft. |
| 30,000 ft. | 16,500 ft. | 18,000 ft. |
| 40,000 ft. | 22,500 ft. | 24,000 ft. |

(d) (i) A "flood flow" valve is incorporated in the system, which may be controlled in AUTO or MANL according to the setting of the FLOOD AIR FLOW control switch (4).

(ii) When the switch is set to MANL, "flood flow" is brought into operation and is used primarily for clearing any transparency misting.

(iii) When the switch is at AUTO, should loss of cockpit pressure cause the cockpit altitude to exceed 38,000 ft., an altitude switch operates to supply "flood" air to the cockpit. In addition, an audio warning is transmitted over the pilot's head set. This warning may be silenced by the operation of the switch (65) on the instrument panel. When Mod. 327 is incorporated, the audio warning is connected to the hydraulic system and its use here is discontinued.

(iv) For recommendations for the use of the system, see para. 61.

(v) A switch (10) for *ground testing* the aural and visual warning circuits and flood air supply is to the rear of the normal controls. It must not be used in flight.

38. **Windscreen de-icing system**

The system consists of a tank containing the fluid, an electrical pump, a spray unit forward of the windscreen and an ON/OFF control switch on the starboard coaming. When the switch is ON the pump operates to force de-icing fluid to the spray unit.

39. **Anti-G suit system**

(a) The purpose of the system is to provide air at low pressure for the pilot's anti-G suit, the connection for which is on the port side of the ejection seat.

(b) Air under pressure is stored in two air bottles, the contents of which are indicated by a pressure gauge (91) on the starboard wall. When the cock (88) below the gauge is ON and G in excess of approximately 1½ is applied, a spring-loaded valve operates and allows air to pass to and inflate the anti-G suit. The amount of inflation depends on the amount of G applied.

(c) The system may be tested, with the cock ON, by pressing the ANTI-G TEST button (90) adjacent to the on/off cock, as gently as possible to avoid severe discomfort due to too rapid inflation.

40. **Ejection seat—Mk. 2H**

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

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

(c) The ejection gun is fired by pulling the handle above the headrest. When Martin Baker Mod. 423 (which supersedes Mod. 273) or Martin Baker Mod. 488 (on aircraft embodying Hunter Mod. 281, see (h) below) is embodied a secondary firing handle is fitted to the forward edge of the seat pan. This handle is intended for use when ejecting under positive G conditions. When either handle is pulled the ejection gun is fired and ejection follows. A stowage for the secondary firing handle safety pin may be provided on the outer face of the starboard thigh guard.





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

(e) After ejection, at heights of 10,000 ft. and below, a barostat causes an automatic cycle to commence. After 3 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.

(f) 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.

(g) *Leg restraining cords*

(i) When Martin Baker Mod. 272 is embodied, leg restraining cords are fitted in lieu of footrests. The thigh guards are retained.

(ii) The leg restraining cords ensure that the occupant's legs are drawn back automatically and restrained close to the seat pan during ejection thus providing leg clearance and preventing the legs being blown apart after ejection.

(iii) The cords pass through snubbing units at the front of the seat pan. These units allow the cords to pass freely down through the unit, but prevent them passing upwards. A release button is provided under each snubbing unit to allow the occupant to adjust the cords to give comfortable leg movement in the aircraft.

(h) *Single lever ejection (Mod. 281)*

If Mod. 281 is embodied, when either ejection seat firing handle is pulled the hood is jettisoned immediately by gas pressure from a hood jettison cartridge; at the same time a delay unit at the back of the headrest is started. This unit withdraws the sear from the seat one second after the handle is pulled. The seat is then ejected.

(j) *G-stop*

Martin Baker Mod. 491 (in conjunction with mods. 293+387) introduces a G-stop to prevent the opening of the main parachute if the speed of the seat after ejection is too high for safe deployment. The switch prevents the operation of the barostatic time delay unit until the speed of the seat has fallen to a safe figure. Separation from the seat occurs within 1¼ seconds of reaching the safe speed. The seat has a ground level ejection capability provided that the aircraft's flight path is parallel to the ground and its speed is above 90 knots. Additionally an 80 f.p.s. ejection gun must be fitted. (Mod. 271.)

41. **Oxygen system**

(a) Oxygen is carried in two Mk. 5D cylinders. A Mk. 17D or 17E (Mod. 919) demand regulator (82) controls the supply to the pilot.

(b) A contents gauge (63) is on the right of the instrument panel. The regulator (82) is at the forward end of the starboard shelf. The regulator consists of an ON/OFF valve

which controls the flow of oxygen, an air inlet NORMAL–100% OXYGEN switch, an emergency three-position switch and a combined flow and blinker unit.

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(c) When the ON/OFF valve is on and the inlet switch is at NORMAL, an air/oxygen mixture is fed to the pilot's mask up to a height at which 100% oxygen is automatically delivered. When the inlet switch is at 100% OXYGEN, no air is added irrespective of the height. This position should normally be used on Mk. 17D regulators; the Mk. 17E regulator should be set to NORMAL. The emergency switch, when moved to either right or left, admits oxygen under greater pressure.

(d) The mask may be tested before flight by firmly pressing in the emergency switch, when in the central position. Oxygen is then supplied under pressure, the firmer the switch is pressed the greater the pressure (up to 5 times that obtained with the switch in either side position). The mask can then be adjusted until no leaks are present.

(e) *Emergency system*

A manual control (100) inboard of the starboard shelf is pulled up to turn on the emergency bottle, provided that the safety pin on the bottle is withdrawn. Operation of the emergency system is automatic on use of the ejection seat.

42. **Internal lighting**

Three ON/OFF dimmer switches (83) are provided on the starboard wall for the control of the internal lighting. An emergency lamps switch (85) is on the starboard wall above the oxygen regulator.

43. **External lighting**

The navigation lights are controlled by an on/off switch (101) on the starboard shelf.

44. **Accelerometer**

The accelerometer (48) indicates all normal accelerations imposed on the aircraft by means of three concentrically mounted pointers. One pointer indicates instantaneous G, the other two register the maximum positive and negative G readings respectively until reset.





45. **Pressure head heater**

The heater element in the pressure head is controlled by a switch (74) below the centre of the instrument panel.

46. **Emergency equipment**

(a) *Crowbar*

This is clipped to the cockpit port wall.

(b) *E.2 compass*

This (57) is mounted below and to the right of the GGS. Deviations of up to 12° must be expected when the GGS is in the combat position.

## RADIO AND RADAR CONTROLS

47. **VHF equipment**

(a) *ARI. 18064*

The two 10-channel VHF controllers (17), with an adjacent changeover switch, are on the port shelf. A press-to-transmit switch (22) is in the end of the throttle lever handle. The sets are stowed in the radio bay.

(b) *ARI. 18012*

The telebriefing land-line plug is on the underside of the rear fuselage, forward of the tail bumper. When the plug is connected the VHF circuit is de-energized and an amber warning light (25) on the port shelf indicates that telebriefing is in use. The pilot's press-to-speak button is adjacent.

(c) *ARI. 18044*

The control switches (21) are on the port wall. The indicator is positioned at (61).

48. **IFF Mk. 3 GR (ARI. 5131)**

(a) The G, G/D, F and D switches (99) are grouped on the starboard shelf.

(b) A suppressed aerial is mounted in the leading edge of the fin.

49. **DME—Rebecca Mk. 7 (ARI. 5849) or Mk. 8 (ARI. 23013)**

(a) The control unit (92) is on the starboard shelf. A range and heading meter (59), which indicates range and left/right heading from the homing beacon, is on the instrument panel.

(b) Two suppressed aerials are fitted, one in the engine starter door and one in the engine access door.

50. **Radar ranging (ARI. 5820)**

(a) The radar ranging ON/OFF switch (37) is on the forward end of the port shelf. An adjacent magnetic indicator shows white when radar ranging is in use and black when its use is discontinued. Electrical power for the system is obtained from a Type 200 inverter controlled by No. 2 Type 100A inverter.

(b) Radar ranging automatically provides the GGS with target range information within the limits of 200–800 yards. The radar searches from maximum range down to minimum range until a target is found. If no target is found within the search area the search is automatically repeated. When a target is found the radar locks on to it, and a blue light (56) on the right of the GGS lights up to indicate this.

(c) A spring-loaded TARGET REJECT IN–OUT switch (23) is on the port wall. Its function is to unlock the radar from an unwanted target or to check that it is locked on to the correct target. When IN is selected, the radar unlocks from the target and searches inwards to minimum range. If no fresh target is found the normal search cycle commences whether the switch is retained at IN or not. When OUT is selected the radar unlocks from the target and searches outwards to maximum range. It will remain at maximum range if the switch is retained at OUT, but when released the normal search cycle is commenced.

(d) A test switch (9) is on the port shelf.

## ARMAMENT CONTROLS

51. **Gyro gunsight Mk. 5**

(a) The GGS (54) is housed in a retractable mounting above the instrument panel. Retraction is controlled by an electric motor in circuit with the GGS on/off switch (55) on





the right of the sight. An emergency lowering manual control (52) is on the left of the sight.

(b) The sight automatically provides for both manual and radar ranging. Altitude and ballistics units automatically compensate for the time of flight and gravity drop of the particular ammunition in use. The altitude unit is fully automatic but the ballistics unit must be pre-set for the particular ammunition before flight.

(c) The selector-dimmer control (28) on the port shelf contains a dimmer switch and a 5-position selector switch.

52. **~~G45~~ G90 and recorder cameras**

(a) The cine and recorder cameras are operated automatically whenever the gun or camera firing switch (68) on the control column is energized, with the camera master switch ON.

(b) The CAMERA MASTER switch (75) is on the switch panel below the instrument panel. The aperture switch (64) is on the starboard side of the instrument panel.

53. **Gun firing**

(a) The gun firing switch is on the forward face of the control column handgrip. The circuit is automatically isolated when the undercarriage is locked down. A BUTT TEST switch (98) is mounted on the starboard shelf and provides an override of the automatic isolation of the gun firing circuit.

(b) The guns are operated by A.C. obtained from a Type 300 inverter, which is operative only when the gun switch safety flap (67) is raised and the gun firing circuit is "live".

(c) When the guns are fired, an electrically-operated selector is energized to open the gun bay scavenging flap. This causes air to clear the gases from the gun bay through the link and empty case chutes. When the trigger is released the scoop closes and the air flow is cut off.

54. **Bomb/RP release**

(a) *Bomb release and jettison*

(i) The armament control panel is on the port shelf. When the FUZING switch (13), is set to NOSE or TAIL (as required), the BOMBS/RP switch (12) set

to BOMBS the bombs are released by pressing the bomb/RP release pushbutton on top of the control column.

(ii) The bombs may be jettisoned in a safe condition by pressing the bomb/RP release pushbutton; in this case the FUSING switch must be OFF and the BOMBS/RP switch must be set to BOMBS before pressing the push-button.

(b) *RP firing*

With the BOMBS/RP switch set to RP and the RIPPLE/NORMAL and SELECTOR switches (on the left of the GGS) set as required, RP's are fired by pressing the bomb/RP release pushbutton. No jettison facilities are available.

**55. Drop tank jettisoning**

(a) *Inboard drop tank jettisoning*

The inboard drop tanks may be jettisoned by pressing the bombs/RP release pushbutton with the BOMBS/RP switch at BOMBS.

(b) *Outboard drop tank jettisoning*

When the OUTBD PYLON STORES pushbutton on the armament panel is pressed, both outboard tanks are jettisoned.

**56. "Clear aircraft" switch**

When the bomb fusing switch is OFF, all stores, drop tanks or bombs, carried on the pylons are simultaneously jettisoned by pressing the CLEAR A/C pushbutton on the left coaming panel.