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.

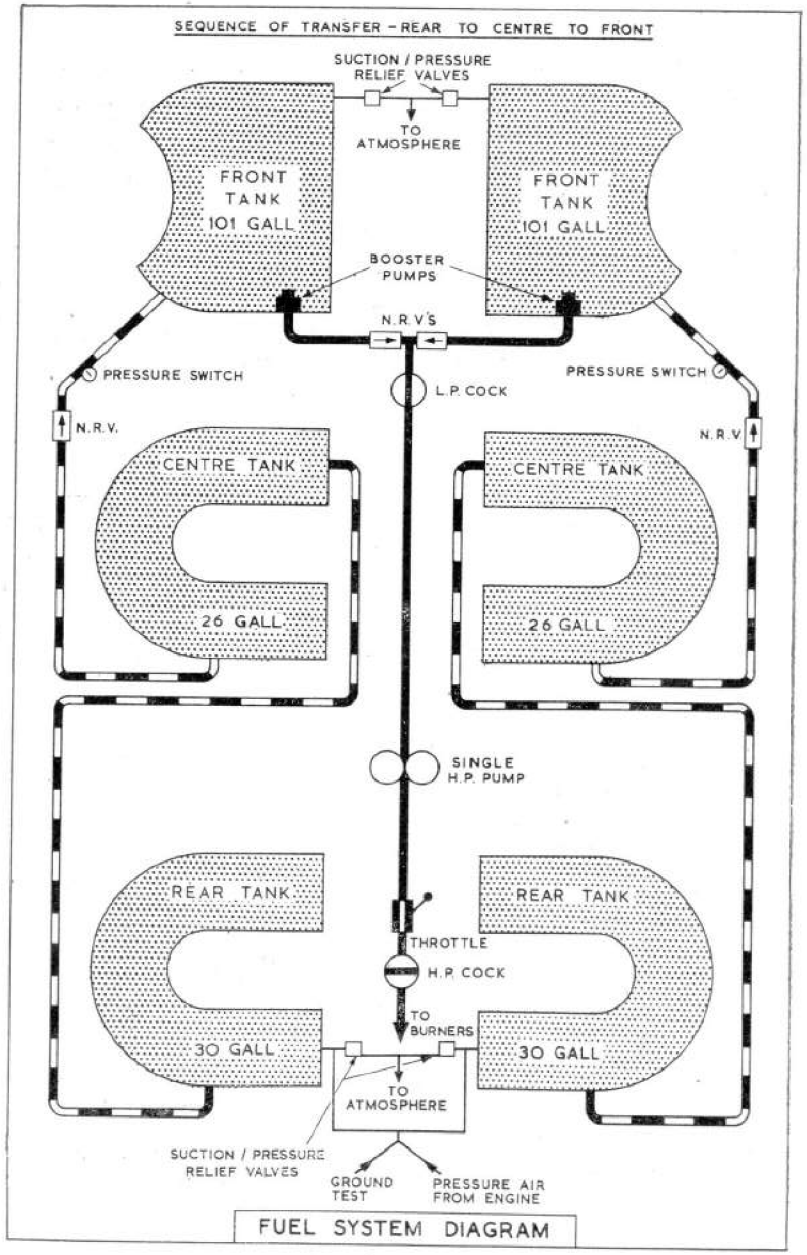
(c) Unless otherwise stated, all airspeeds and Mach numbers quoted are "Indicated".

1. Introduction

(i) The Hunter F.2 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; the cockpit is pressurized and equipped with a Mk. 2H ejection seat.

(ii) The power unit is a Sapphire Mk. 101 axial flow gas turbine developing 8,000 lb. static thrust at sea level.

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



FUEL SYSTEM DIAGRAM

2. Fuel tanks and gauges

(i) Fuel is carried in six flexible tanks, four mounted forward of the engine between and around the air intake ducts and two around the rear of the engine.

(ii) The tank capacities in gallons are:—

Front tank (2 × 101)	202
Centre tanks (2 × 26)	52
Rear tanks (2 × 30)	60
	314

(iii) Two electrical contents gauges (68) on the starboard shelf indicate the total fuel in the PORT TANKS (front, centre and rear) and in the STBD. TANKS (front, centre and rear). A CONTENTS CHECK switch (67) aft of the gauges has two positions ENGINE ON and ENGINE OFF. It is spring loaded to the ENGINE ON position. It should only be set to ENGINE OFF if it is required to know the total contents when the engine is not running (see also para. 3(ii)).

(iv) 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.

3. Fuel transfer system

(i) Fuel from the rear tanks is fed, by air pressure, to the centre tanks and then to the front tanks.

(ii) Should the transfer system fail completely, no fuel will transfer from the rear and centre tanks. This will be indicated by two indicators (66), one on each side of the contents gauges switch (67), both showing white. At the same time the contents gauge transmitters in the rear and 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. **Main fuel feed system**

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

5. **Booster pumps control**

(i) The electrically-driven booster pumps should feed from each front tank at an equal rate. Two ON/OFF switches (69), PORT and STBD. TANK PUMPS, on the starboard shelf, control the pumps together with two TANK PUMPS circuit-breakers (78) also on the starboard shelf.

(ii) Should one pump tend to deliver more fuel than the other, as indicated by variation of the readings of the contents gauges, the levels can be restored by switching off the pump which is feeding too fast until the levels are again equal.

(iii) A magnetic indicator (55) on the starboard side of the instrument panel comes on if the fuel delivery pressure drops below a satisfactory minimum.

(iv) A selector switch (80) and an ammeter socket (77) on the starboard shelf, are provided for ground test purposes. When testing the pumps the circuit-breakers should first be tripped.

6. **H.P. pump**

(i) A servo control system limits the pump output and a governor limits overspeeding of the engine.

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

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

(b) A barometric flow control (BFC), to vary the pump output in relation to intake pressure.

(c) An air/fuel ratio control (AFC) to prevent an excess supply of fuel to the engine during periods of engine acceleration.

Both BFC and AFC are connected to the servo control system.

7. **H.P. fuel cock**

The H.P. fuel cock control (24) 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 turned OFF unless it is first pressed downwards.

8. **L.P. fuel cock**

The L.P. fuel cock control (12) is adjacent to the H.P. cock control and also moves forward from OFF to ON.

9. **Oil system**

The engine employs a total loss oil system for the centre and rear bearings and a circulating system for the front bearing and accessory drives. Oil is carried in a 9-pint capacity tank on the engine stator casing.

ENGINE CONTROLS

10. **Engine starting system**

(i) Starting is by means of a twin-breech cartridge starter which accelerates the engine until it becomes self-sustaining.

(ii) Fuel for starting is delivered through a solenoid valve to six starting atomisers, where it is ignited by two high energy igniter plugs. Both the solenoid valve and the igniter plugs are energised when the starter button is pressed. During initial starting the throttle must be in the half-open position.

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

(a) The engine master switch (62), which completes the circuit to the starter button, ignition switch, relight button engine, instruments and main inverters. It should be ON for starting and at all times when the engine is running.

(b) The ignition switch (~~66~~ 59) which controls the current to the igniter plugs. It is locked in the ON position.

(c) The starter button (61) which fires the cartridge and energises the starting fuel solenoid and igniter plugs.

(iv) When the battery master, engine master and ignition switches are all ON and the starter button is pressed, a cartridge is fired. The cartridge fires over a period of 4 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 5 seconds a time switch de-energises the ignition relay, closing the starting fuel solenoid valve and cutting out the igniters. After 11 seconds the engine should have accelerated to 3,000 r.p.m. Twenty-nine seconds after pressing the starter button the automatic time switch de-energises the hold-in solenoid of the button allowing it to become operative once more, with the second cartridge indexed.

11. **Restarting in flight system**

A relight button is incorporated in the top of the H.P. cock control lever (24). It completes the circuit to the igniter plugs when relighting is required in flight.

12. **Throttle control**

The throttle control lever 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 push-button (19) and the airbrake control (20). A throttle damper (16) is aft of the lever.

13. **Engine instruments**

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

14. **Engine fire-extinguisher**

(i) 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:—

(a) A manually-operated pushbutton (47) in the cockpit, on the starboard coaming, or

(b) An automatically-operated inertia switch which operates if a crash landing occurs.

(ii) Twelve re-setting 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 (47) incorporated in the push-button, to come on, provided 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.

(iii) The inertia switch, in the nose of the aircraft, operates the extinguisher bottle when the aircraft is crash landed.

(iv) The warning light may be tested by pulling out the extinguisher pushbutton.

MAIN SERVICES

15. Hydraulic system

(i) An engine-driven hydraulic pump maintains a live-line pressure of 3,000 ± 150 lb./sq. in. for the normal operation of the:—

Undercarriage and doors

Flaps

Wheel brakes

Aileron and elevator hydroboosters

Airbrake.

The main pressure is indicated by the central needle of the triple pressure gauge (27) at the forward end of the port shelf.

(ii) 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 hydroboosters (one) respectively.

(iii) The pressure available in the wheel brakes accumulators is shown on a gauge (10) on the port shelf. The accumulators are charged with air to a pressure of 1,550 lb./sq. in. via a connection in the nosewheel bay. The aileron accumulators are charged to 1,550 lb./sq. in. via a connection in the starboard wheel bay and the elevator accumulator is charged to 1,575 lb./sq. in. via a panel in the port side of the fin. The pressure in the latter is indicated on a gauge readable through a transparent window in the panel.

(iv) Indication that failure of the live-line system has occurred is given by the illumination of a red warning light (36) on the port side of the instrument panel.

(v) 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 (8) (9) for the bottles are mounted on the port shelf.

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

16. Electrical system (24 volt)

(i) Two 6,000-watt engine-driven generators supply the whole of the electrical system and charge two 12-volt aircraft batteries connected in series. Two generator failure warning lights (58), 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 (64) 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.

(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 incorporating a magnetic indicator is shown by the indicator showing white.

Service	Indication	Function
Fire warning	1 red light (47)	Gives warning when temperature in engine bay exceeds 300±30°C.
Undercarriage position	3 red or green lights (32)	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 (31)	Indicates when throttle closed and U/C locked up
Fuel pressure warning	1 white magnetic indicator (55)	Indicates fuel pressure low at engine inlet
Fuel transfer warning	2 white magnetic indicators (66)	Indicate failure of transfer system
Generator failure warning	2 red lights (58)	Indicate generator failure due to (1) Cut-out not closed (2) Fault in circuit
Hydraulic failure warning	1 red light (36)	Indicates hydraulic pressure below 600 lb./sq. in.
Cockpit pressure warning	1 red light (51)	Indicates drop of ½ lb./sq. in. in cabin pressure differential
Radar ranging warning	1 white magnetic indicator (30)	Indicates radar ranging in use
Powered controls	2 white magnetic indicators (37)	Indicate separately disengagement of aileron or elevator hydroboosters, or fault in electrical circuit
Airbrake warning	1 white magnetic indicator (33)	Indicates airbrake not fully retracted
Telebriefing	1 red light (28)	Indicates telebriefing in use

AIRCRAFT CONTROLS

17. Flying controls

(i) *General*

(a) Hydroboosters are installed to provide fully powered ailerons with spring feel and power-assisted elevators with a 4.2 to 1 feed back ratio.

(b) An electrically-operated variable-incidence tailplane is incorporated.

(ii) *Aileron and elevator hydrobooster controls*

(a) The hydroboosters transmit the pilot's control movement to the appropriate control surfaces. The ram anchorages are automatically released if hydraulic pressure fails. They may also be released by individual selection of the appropriate switches (39). In either case the appropriate indicator (37) will show white and the controls may be operated manually. Some control backlash will be noticeable when in the manual condition.

(b) The functioning of the controls under emergency conditions is described at para. 79.

(iii) *Tailplane incidence control*

(a) The tailplane 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. Limit switches control the range of movement of the actuator which is operated by one of two electric motors, the main and the standby.

(b) The main motor is controlled by a switch (57) on the control column. A circuit-breaker (6) is fitted at the aft end of the port shelf. The standby motor, which is fitted to meet the case of failure of the main motor, or main motor electrical supply, is controlled by a switch (25) under a guarded cover on the port shelf. When the cover is raised to enable operation of the switch, the control column main motor circuit is isolated. The standby motor operates at about one-third the rate of the main motor.

(c) The setting of the tailplane is shown on an indicator (41) on the port side of the centre instrument panel.

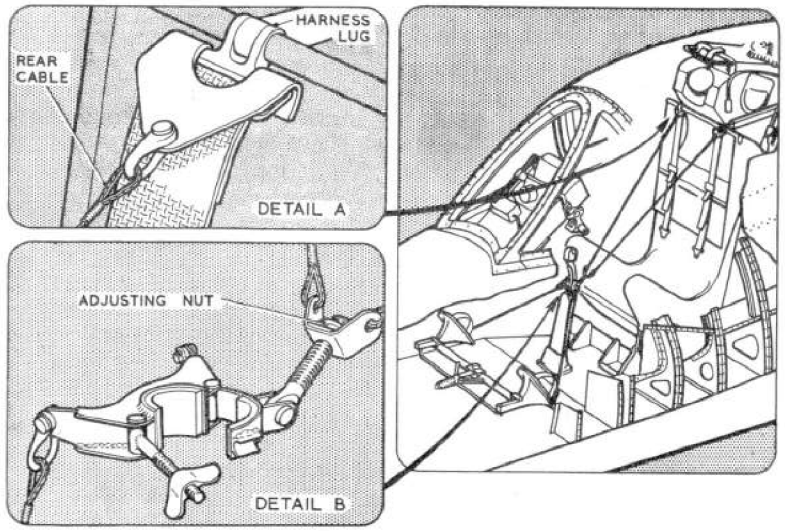
(iv) *Rudder bar adjustment*

The rudder bar is adjustable for leg reach by means of a control toggle (65) at the bottom 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 bar arms 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 bar in the desired position.

18. **Flying controls locking gear**

(i) *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.



FLYING CONTROLS LOCKING GEAR

(ii) *External locking*

Locking clamps are provided for all flying control surfaces.

19. **Trimming tab controls**

The rudder and port aileron incorporate electrically-operated trimming tabs. A combined aileron and rudder trim control (23) is situated on the port shelf with a combined tab position indicator (22) just forward of it. The aileron trim tab must be set to neutral before take-off power, and must remain so at all times when power is engaged. A locking guard is provided to hold the aileron trim inoperative. It must be engaged at all times when flying with aileron power engaged.

20. **Undercarriage control and position indicator**

(i) The tricycle undercarriage is operated hydraulically after electrical selection by either the UP or DOWN push-button (34), on the port side of the instrument panel.

(ii) A standard position indicator (32) is fitted to the left of the pushbuttons. A warning light (31) below the push-buttons comes on if, with the undercarriage locked up, the throttle is closed.

21. **Undercarriage emergency operation**

(i) Should electrical or hydraulic failure occur, the undercarriage may be lowered by pulling the U/C emergency release (29), on the port shelf, after first pushing in the central knob. This admits air from the emergency bottle to the wheel unit jacks, forcing them to lower and lock. The available air pressure is shown on a gauge (8) at the aft end of the port shelf.

(ii) If it is required to retract the undercarriage *on the ground only* the UP selector pushbutton should be twisted clockwise and then pressed.

22. **Flaps control and position indicator**

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

(ii) 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.

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

23. **Flaps emergency operation**

Should electrical or hydraulic failure occur, the flaps may be lowered fully down only by the emergency air system. When the FLAPS EMERGY LOWERING control (35) on the instrument panel, is pulled, after first pressing in the central knob, the air is directed to the lowering jacks. The available pressure is shown on a gauge (9) at the aft end of the port shelf.

24. **Airbrake control**

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

(ii) Control of the airbrake is by means of a three position switch (20), 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 (33) on the instrument panel shows black only when the airbrakes are fully in.

(iii) 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.*

(iv) A spring-loaded switch (13) 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 in operation.

25. **Wheel brakes control**

(i) 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 bar.

(ii) The live-line pressure (3,000 ± 150 lb./sq. in.) is shown on a triple pressure gauge (27) together with the pressure at each main wheel (1,500 - 1,650 lb./sq. in.).

(iii) Should the hydraulic system fail, the pressure in the wheel brakes accumulator will be sufficient for landing but will leave little in hand for subsequent taxying. The available accumulator pressure (10) is shown on a gauge at the aft end of the port shelf.

COCKPIT EQUIPMENT

26. **Entry to aircraft**

(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.

27. **Hood operation**

(i) The hood is opened or closed electrically after selection by a three position OPEN-OFF-SHUT switch (18) 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 (17) operation of which to FREE declutches

the actuator, locks the switch at OFF and enables the hood to be moved by hand. A circuit breaker (7) is fitted at the aft end of the port shelf.

(ii) 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.

(iii) Four pointers (14) are provided, one at each end of the hood rails. Alignment of the pointer with the associated spigot indicates that the hood rails are locked and are safe for flight.

28. Hood jettisoning

(i) The hood may be jettisoned mechanically by pulling the handle on the port shelf or (40) at the top port side of the instrument panel on early aircraft. This action also operates a micro-switch which, if electrical power is available, automatically lowers the gunsight.

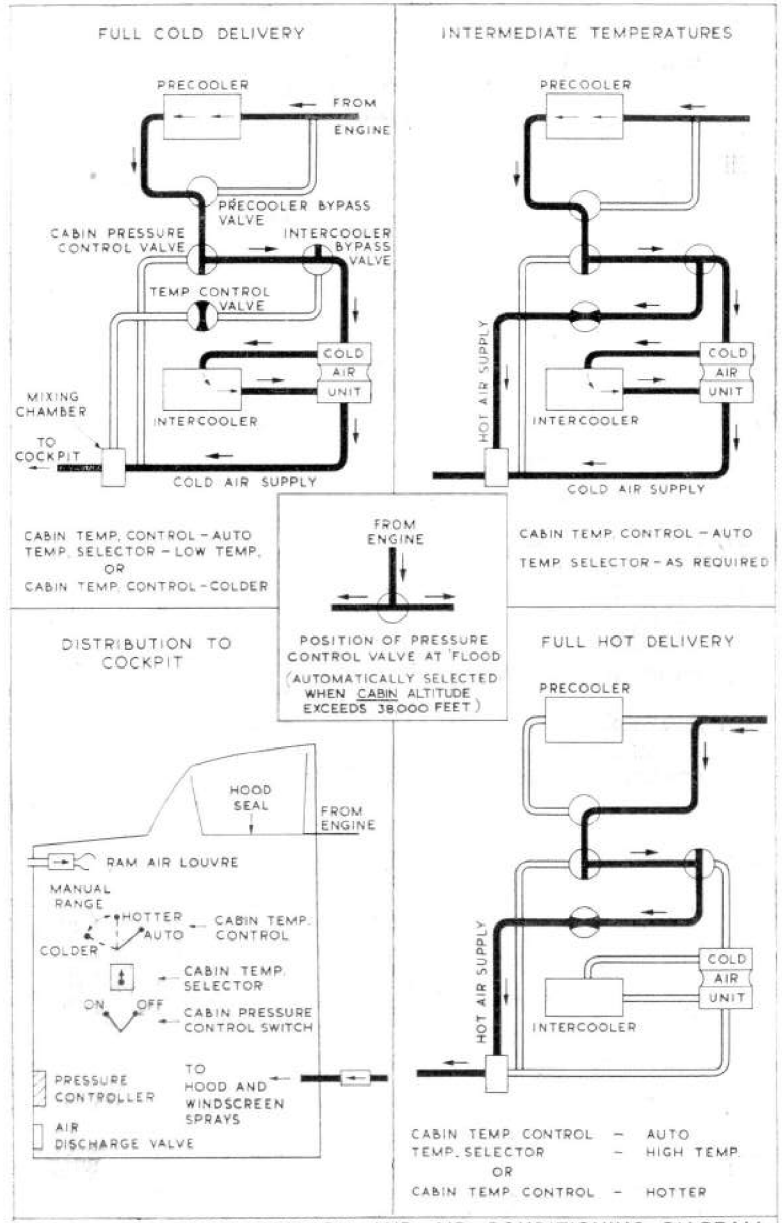
(ii) An external emergency release ring is inside a break panel on the port side of the fuselage below the cockpit. When the release ring is pulled, the hood may be lifted clear manually.

29. Cockpit pressurization, heating and de-misting

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

(i) 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.

(ii) 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 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



COCKPIT PRESSURISATION AND AIR CONDITIONING DIAGRAM

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.

(iii) The cockpit altimeter (50) should indicate in accordance with the following table. Should the cockpit pressure drop below a predetermined minimum, a red light (51) 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.

(iv) Should loss of pressure cause the cockpit altitude to exceed 38,000 ft. an altitude switch operates to supply extra "flood" air to the cockpit. In addition an aural warning is transmitted over the pilot's headset. The warning may be silenced by operation of the switch (54) on the instrument panel.

(v) A switch (4) for *ground* testing the aural and visual warning circuits and flood air supply is aft of the normal controls. It must not be used in flight.

30. 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 (46) on the starboard coaming. When the switch is ON the pump operates to force de-icing fluid to the spray unit.

31. Anti-G suit system

(i) 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.

(ii) Air under pressure is stored in an air bottle, the contents of which are indicated by a pressure gauge (75) on the starboard wall. When the cock (73) below the gauge is ON and G in excess of approximately $1\frac{1}{2}$ 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.

(iii) The system may be tested, with the cock ON, by pressing the ANTI-G-TEST button (74) adjacent to the on/off cock, as gently as possible to avoid severe discomfort due to too rapid inflation.

32. Ejection seat Mk. 2H

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.

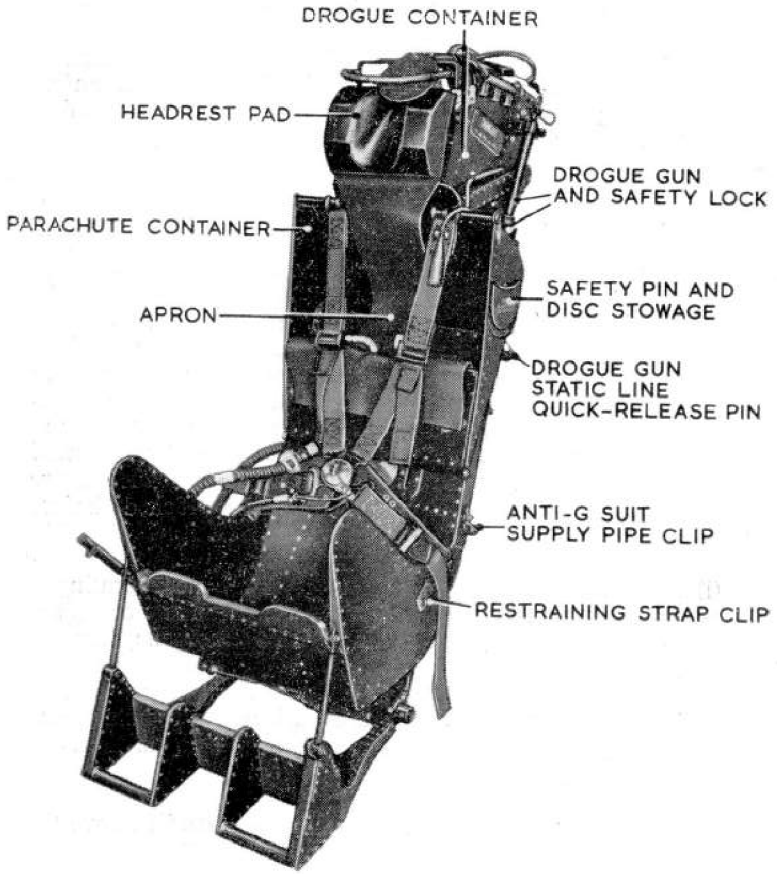
(i) A Mk. 2H pilot ejection seat is fitted incorporating a type ZF harness, headrest, footrests, parachute container and a seat well for the dinghy and emergency oxygen supply.

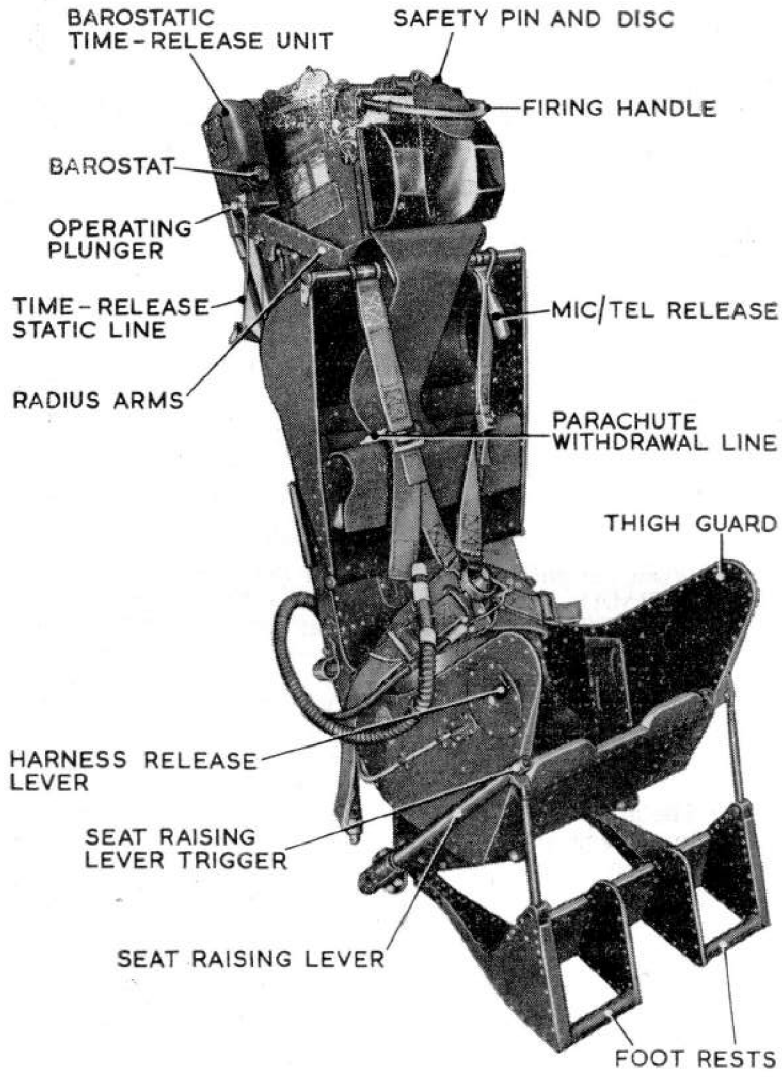
(ii) The height may be adjusted by a lever on the starboard side of the seat; the harness release is also on the starboard side.

(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 5


DROGUE CONTAINER
HEADREST PAD
DROGUE GUN AND SAFETY LOCK
PARACHUTE CONTAINER
SAFETY PIN AND DISC STOWAGE
APRON
DROGUE GUN STATIC LINE QUICK-RELEASE PIN
ANTI-G SUIT SUPPLY PIPE CLIP
RESTRAINING STRAP CLIP


BAROSTATIC TIME-RELEASE UNIT
SAFETY PIN AND DISC
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TIME-RELEASE STATIC LINE
MIC/TEL RELEASE
RADIUS ARMS
PARACHUTE WITHDRAWAL LINE
THIGH GUARD
HARNESS RELEASE LEVER
SEAT RAISING LEVER TRIGGER
SEAT RAISING LEVER
FOOT RESTS

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.

33. **Oxygen system**

(i) Oxygen is carried in two Mk. 5D cylinders. A Mk. 17 demand regulator controls the supply to the pilot.

(ii) A contents gauge (52) is mounted on the right of the instrument panel. The regulator (56) 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.

(iii) 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. When the inlet switch is at 100% OXYGEN, no air is added. This position should be selected if any symptoms of anoxia are present. The emergency switch when moved to either right or left admits oxygen under greater pressure. Normally it should be central, but should be offset if cabin pressure failure occurs.

(iv) 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.

(v) *Emergency system*

A manual control (87) inboard of the starboard shelf is pulled up to turn on the emergency bottle, provided the safety pin on the emergency bottle is withdrawn.

34. **Internal lighting**

Three ON/OFF dimmer switches (72) are provided on the starboard wall for the control of the internal lighting. An emergency lamp switch (71) is on the starboard wall above the oxygen regulator.

35. **External lighting**

The navigation and identification lights are controlled by two on/off switches (88) (89) on the starboard shelf.

36. **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 re-set.

37. **Pitot head heater**

The heater element in the pitot head is controlled by a switch (62) below the centre of the instrument panel.

38. **Emergency equipment**

(i) *Crowbar*

This (11) is clipped to the cockpit port wall.

(ii) *E.2 compass*

This (45) 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.

(iii) *Aircraft destructor*

Access to this is gained through a quick release panel on the fuselage port side, level with the cockpit.

39. **Electrical supply to flight instruments and radar ranging**

(i) 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 a window in the face of the instrument.

(ii) A.C. for the Mk. 4F compass, artificial horizon and GGS radar ranging is supplied by two inverters. No. 1 inverter normally supplies the flight instruments and No. 2 inverter normally supplies the radar ranging. The engine starter master switch 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.

(iii) If No. 1 inverter fails, automatic changeover occurs and No. 2 inverter then supplies the flight instruments, the load to the radar ranging equipment, if in use, being shed.

(iv) Located on top of the A.C. junction box, at the aft end of the starboard shelf, are two circuit breakers (82) (one for each inverter supply), a magnetic indicator (which gives indication of inverter changeover) and a TEST/NORMAL switch (83) (for servicing purposes). This latter switch should be set to NORMAL (inboard) for flight conditions. In flight none of these is visible or accessible.

(v) To test the standby inverter, first check that the engine master switch is OFF and then set the battery master switch ON, the inverter test switch to NORMAL (inboard) the inverter circuit breakers in and then move the RADAR TEST switch (5) to TEST. The inverter can then be heard to operate and the artificial horizon can be seen to erect. When the test is complete return the radar test switch to OFF. While the test is in operation the radar ranging magnetic indicator (30) shows white.

OPERATIONAL CONTROLS

40. **Gyro gunsight Mk. 6**

(i) The GGS 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 (43) on the right of the sight. An emergency lowering manual control (42) is on the left of the sight.

(ii) The sight automatically provides for both manual and radar ranging depending on the position of the throttle twist-grip. 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.

(iii) The selector-dimmer control (26) on the port shelf contains a dimmer switch and a 5-position selector switch. The five positions are:—

G (gyro)	Moving graticule only is visible
F and G (fixed and gyro)	Both graticules are visible
F (fixed)	Fixed graticule only is visible. The sight may only be used as a reflector sight. Radar ranging not possible
MRP (Medium RP) SRP (Steep RP)	The sight is set for use with RP's

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

(i) The installation is controlled by an ON/OFF switch (30) on the forward end of the port shelf. An adjacent magnetic indicator shows white when the system is in use.

(ii) Radar ranging automatically provides the GGS with target range information within the distance limits of 200 - 800 yards. The ranging unit strobe searches inwards from maximum range down to minimum range until a target signal is overlapped. If no such signal is received the strobe returns to maximum range and the search repeats. When a target signal is overlapped the strobes lock on to it as indicated by a blue light (44), on the right of the GGS.

(iii) A spring-loaded TARGET REJECT IN-OUT switch is fitted on the cockpit port wall. Its function is to unlock the strobes from an unwanted target or to check that the strobes are locked on the correct target. When IN is selected the strobes are moved inwards from the unwanted target irrespective of whether the switch is retained at IN or not. Then, if no fresh target is reached before minimum range is reached the normal search cycle recommences. When OUT is selected the strobes are moved outwards in range and continue to search outwards to maximum range. The strobes remain at maximum range if the switch is retained at OUT, but when it is released they resume the normal search cycle.

(iv) To check that the strobes are locked on the correct target, set the span knob on the GGS to that of the target type. If the correct target is being ranged, the GGS graticule should just encompass the span. If the span extends beyond the graticule (excess range) or falls short of the inner edges (short range) the wrong target is being ranged and REJECT IN or REJECT OUT respectively should be selected.

NOTE.—(a) At distances in excess of that for which the manual ranging twist grip is set, manual ranging only is possible. When radar range is less than manual range, the radar equipment takes over.

(b) When the manual control is set to minimum range, radar ranging is overridden. This is to enable the pilot partially to cage the GGS gyro during violent manoeuvres.

42. VHF - TR.1934/1935 with telebriefing (ARI.5490)

(i) The two 10-channel VHF controllers (84), with an adjacent changeover switch (85), are on the starboard shelf. On later aircraft they are repositioned on the port shelf. A press-to-transmit switch (19) is in the end of the throttle lever handle. The sets are stowed in the starboard equipment bay. The aerial is mounted beneath the port wing tip.

(ii) The telebriefing land-line plug is at the underside of the rear fuselage, forward of the tail bumper. When the plug is connected the VHF circuit is de-energised and a red warning light (28) on the port shelf indicates that telebriefing is in use. The pilot's press-to-speak switch is adjacent.

43. IFF Mk. 3 GR (ARI.5131)

(i) The G, G/D, F and D switches (86) are grouped on the starboard shelf.

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

44. DME - Rebecca Mk. 7 (ARI.5849)

(i) The control unit (15) is on the port shelf. On later aircraft it is on the starboard shelf. A range and heading meter (49), which indicates range and left/right heading from the homing beacon, is on the instrument panel.

(ii) Provision is made for two suppressed aerials in the engine starter and engine access doors. These are not at present fitted.

45. G45 and recorder cameras

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

(ii) The camera master switch (63) is on the switch panel below the instrument panel. The aperture switch (53), is on the starboard side of the instrument panel.

46. Guns/R.P. firing

(i) 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 (76) is mounted on the starboard shelf and provides an override of the automatic isolation of the gun firing circuit.

(ii) When the guns are fired, an electrically operated selector is energised 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.

(iii) The bombs/R.P. firing button is on top of the control column beneath a safety flap.