A.P.101B-0407-1A
A.L.158, Apr.77

SECTION 1

# CONTROLS AND EXITS

LIST OF CHAPTERS OVERLEAF

## SECTION 1

# CONTROLS AND EXITS

## LIST OF CHAPTERS

Note:- *A list of contents appears at the beginning of each chapter*

# Chapter 1 PILOT'S CONTROLS AND EQUIPMENT

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## LIST OF ILLUSTRATIONS



**WARNING . . .**

**The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cabin or performing any operations on the aircraft.**

### Introduction

1. This chapter is intended to serve as a guide to the location of the controls, equipment, and instruments at the pilot's station, together with the method of operating the controls where this is not obvious. To simplify reference to any particular control according to its purpose, four separate illustrations of the station are given.

### Entry to cabin

2. The only normal means of entry to the cabin is through the door in the starboard side of the fuselage aft of the nose fairing; it is hinged at its upper edge. To open the door from either inside or out, press the red-painted knob adjacent to the latching handle and turn the handle in a counter-clockwise direction from the outside, clockwise from inside; it is supported in the open position by a hinged strut which is attached to the door and locates in a socket in the door aperture framing.

### Pilot's seat

3. A Martin Baker Type 2CA.1, Mk.2 ejection seat with single lever ejection facility is provided for the pilot. The seat is fully described in A.P.109B-0107-1. For leg reach, the rudder pedals can be adjusted by rotation of a starwheel located in the centre of the rudder bar.

### Instrument and control panels

4. The pilot's instrument panel is divided into four sections; thetake-off panel, the flight instrument panel, the engine instrument panel and

the miscellaneous instruments panel. The take-off panel is situated on the port wall of the cabin; the switches on it must be in the UP position before flight. A controls console is fitted at the port side below the take-off panel, and a sloping panel forward of the controls console, has fitted to it, controls for the flaps and alighting-gear mechanisms. A panel containing the engine-starting controls is located immedlately below the flight instrument panel. A control panel for the banner target towing facility is fitted to the port console panel.

**Electrical control panel**

5. The electrical control panel is located to starboard and slightly aft of the pilot's seat.

**Curtains**

6. A sun blind is located above the pilot's seat, and a curtain, fitted to the canopy coaming cross-tube, when lowered, divides the pilot's station from the crew station.

**Lighting**

7. Four dimmer switches on the coaming panel control the normal illumination of the coaming, engine, miscellaneous and flying panels. The illumination of the console, take-off and sloping panels, the frequency cards and the general area on the port side of the pilot's station are controlled by two dimmer switches located on the port wall above the console; a single-pole switch between these dimmers, enables the frequency card lamps to be switched off when not required. Emergency lighting of the flying panel is provided by two lamps which are controlled by a single-pole switch located on the coaming panel; this switch also controls the emergency lighting for the emergency compass. Two anti-dazzle lamps, located on the coaming tube, are controlled by a three position switch located on the coaming panel; these lamps can also be controlled by a two-position switch located at the navigator's rear station. The lighting system is fully described in Sect.5, Chap.1, Group L.

**Stowages**

8. The locking pins for the flaps and bomb bay door switches are stowed in a bag *(Sect.2, Chap.1)* located on the inner face of the entrance door; the aircraft entrance door key is also stowed in this bag. A divided container is located at the forward end of the console on the inboard side, providing stowage for the pilot's maps and notes. The detachable handle of the hydraulic system hand-pump has a stowage on the starboard wall of the cabin, aft of the entrance door. The stowage for the pilot's ejection seat safety pins is located above the aft end of the entrance door.

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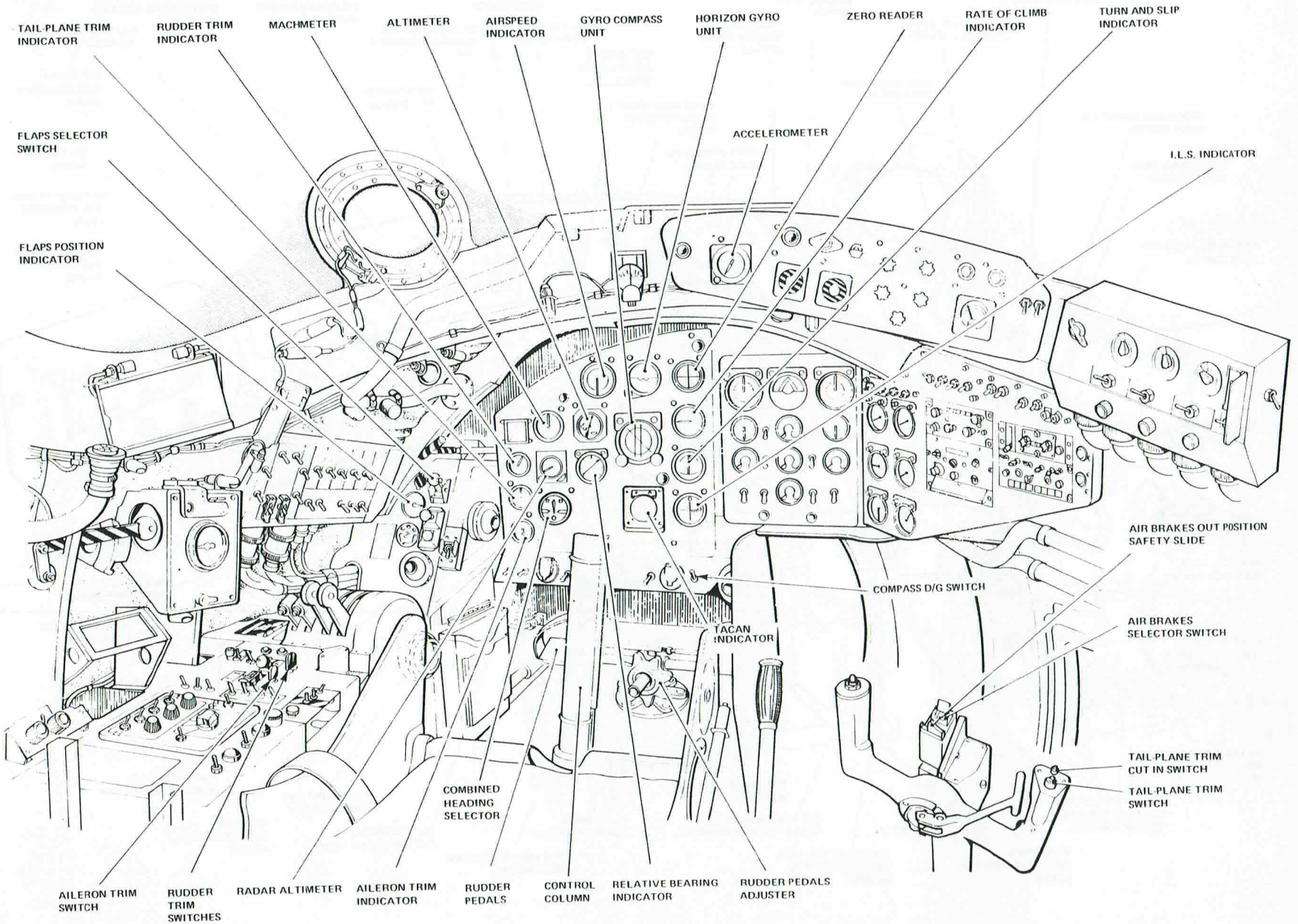


FIG.1. FLYING CONTROLS AND INSTRUMENTS

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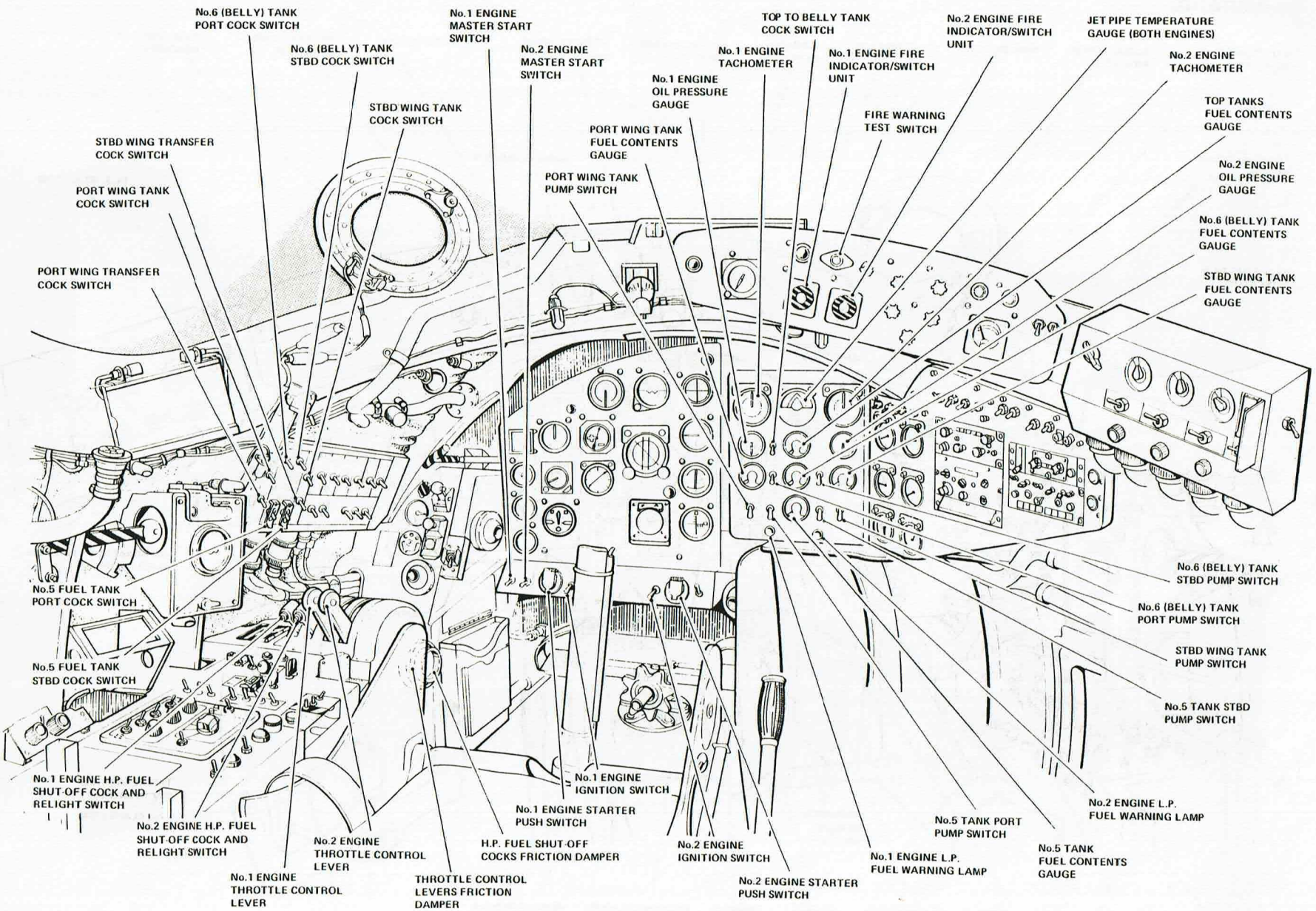


**FIG. 2. ENGINE CONTROLS AND INSTRUMENTS**

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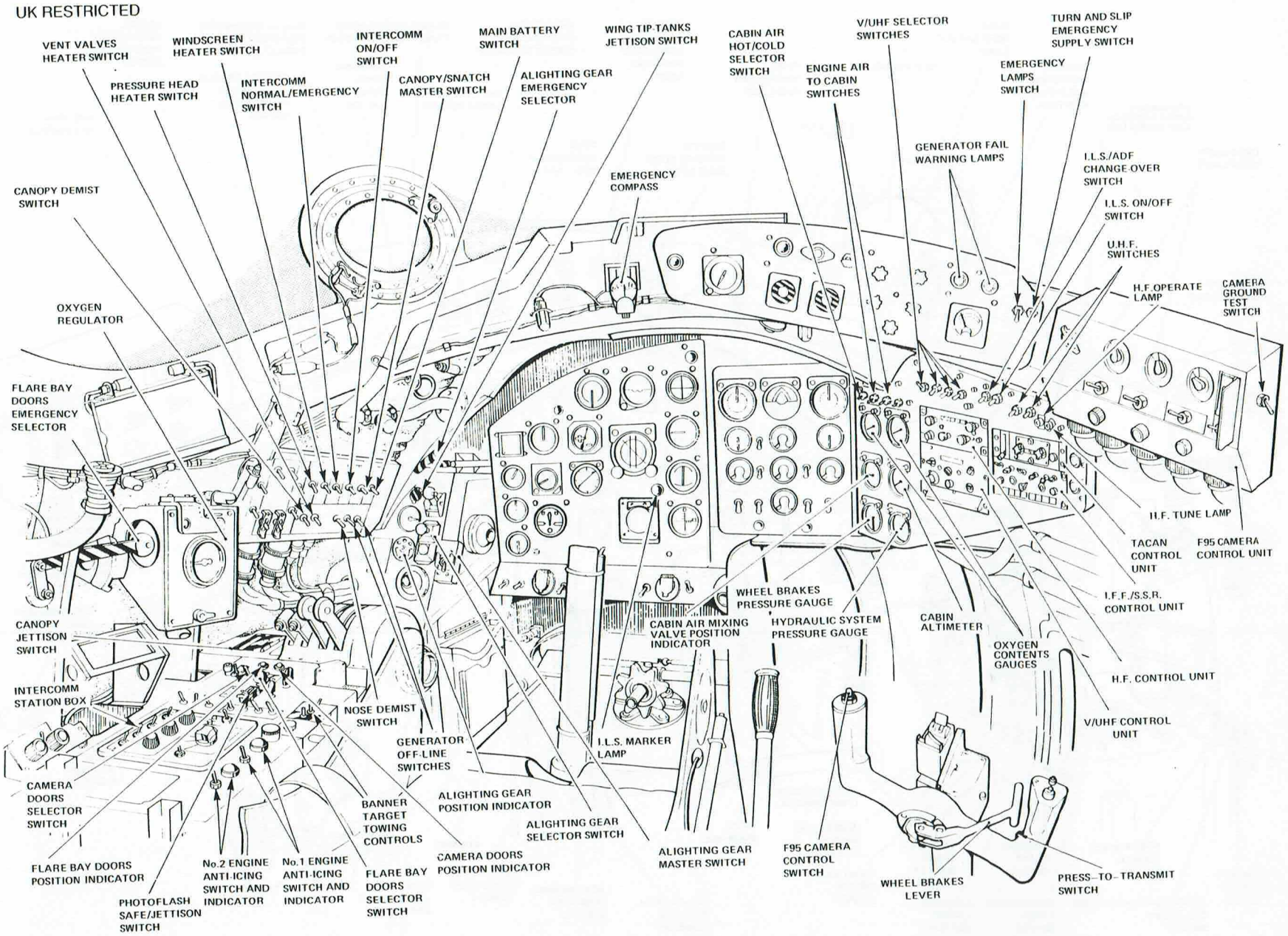


**FIG. 3. OPERATIONAL EQUIPMENT**

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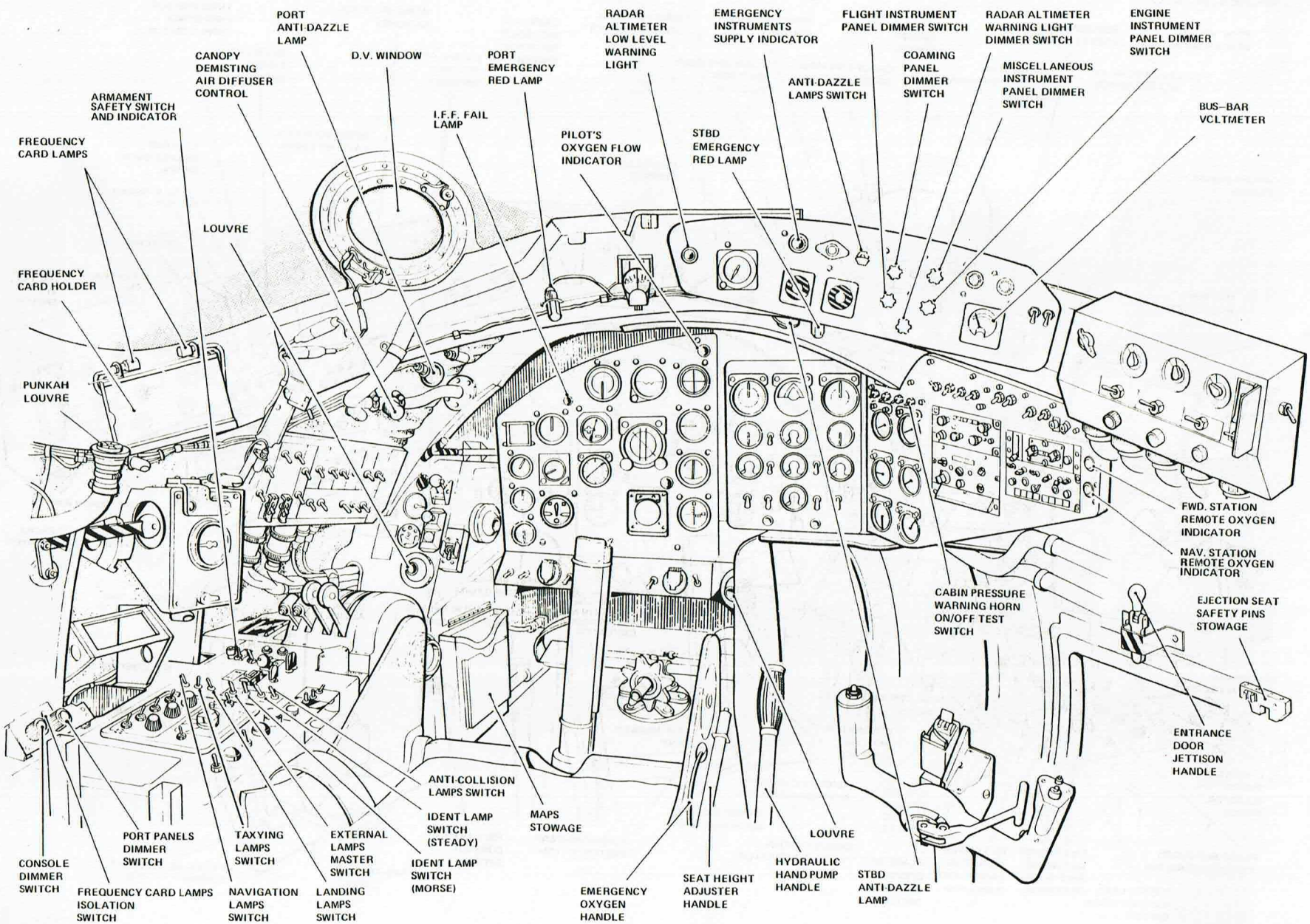


**FIG. 4. MISCELLANEOUS EQUIPMENT**

# Chapter 2 CONTROLS AND EQUIPMENT AT CREW STATIONS

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## LIST OF ILLUSTRATIONS

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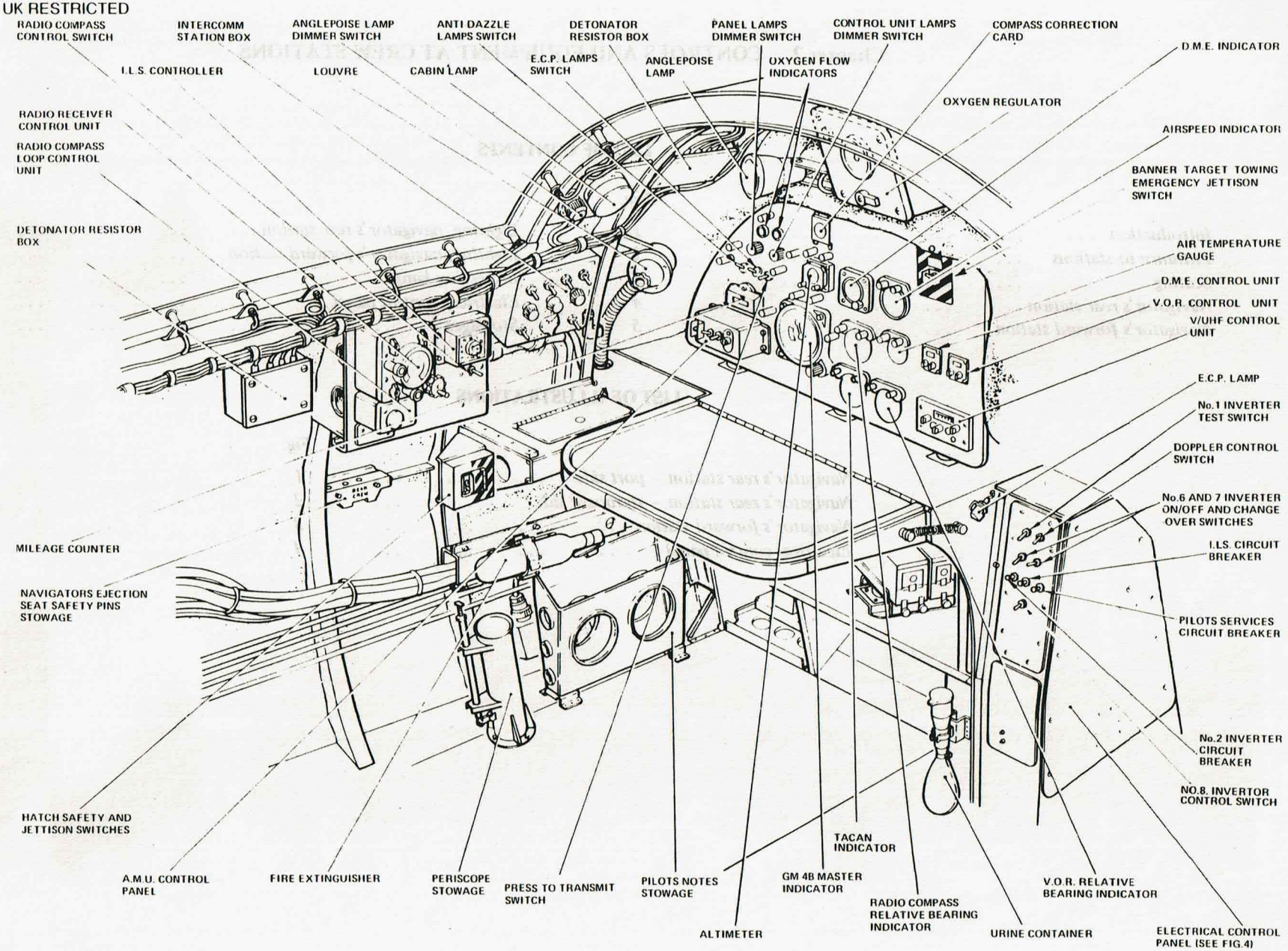


**FIG.1. NAVIGATORS REAR STATION PORT SIDE**

◀CHAFF CONTROLLER DELETED▶

**WARNING**

**The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cabin or performing any operations on the aircraft.**

**Introduction**

1. This chapter provides general information on the disposition and function of controls and equipment at the navigator's two stations. The controls and equipment are illustrated in fig.1 to 4.

**Entrance to stations**

2. Entrance to the stations is through the doorway in the starboard side of the fuselage, aft of the nose fairing *(Chap.1)*.

**Seating**

3. A Martin Baker Type 2CA.2, Mk.4 ejection seat with single-lever ejection facilities is provided for the navigator. The seat is described in detail in A.P.109B-0107-1. A folding seat for occasional use, hinged to the cabin wall just aft of the entrance door, can be folded upwards against the cabin wall when not in use.

**Navigator's rear station** *(Fig.1 and 2)*

◀ 4. The navigator's seat is at the rear of the cabin on the port side. A chart table is mounted forward of the seat. The table is hinged at the front side allowing it to be raised vertically, a clip enables it to be held in this position. Forward of the table is the instrument panel containing various flight, navigation and communications indicators and controls. Also located on it is the switch for the normal/emergency jettison of the towed-target banner. Above the instrument panel are the oxygen regulator and angle poise lamp. Various photographic, navigational and communication equipments are located on the port and starboard walls. The starboard wall also contains the chaff dispenser controller (Post Mod.5500). ▶

**Navigator's forward station** *(fig.3)*

5. The navigator's forward station is in the nose of the aircraft and located there are the GM4B compass repeater, camera controls, an oxygen regulator and photographic sighting equipment. An observation window is provided in the bottom skin of the fuselage aft of the transparent plastic nose.

**Lighting, navigator's rear station**

6. A Mk.1A dome lamp, incorporating a switch and two-pin socket in the lamp base, is mounted in the roof at the port side of the station to provide general lighting. Three anglepoise lamps, controlled by dimmer switches, are provided for the selective illuminating of equipment; two lamps are mounted in the roof, one on the port side and the other on the starboard side, between frames 6 and 7, while the third lamp is mounted on the pressure bulkhead. The navigator's instruments and controls are illuminated by pillar, bridge or integral lamps.

**Lighting, navigator's forward station**

7. A Mk.1A dome lamp, incorporating a switch and two-pin socket in the lamp base, is mounted centrally in the roof of the nose between frames 1 and A to provide general lighting. An anglepoise lamp controlled by a dimmer switch, and mounted at the port side in the nose, is provided for the selective illuminating of equipment. In addition two white lamps, controlled by a dimmer switch, one mounted on the camera control panel and the other above the compass repeater, provide limited illumination of the equipment in the nose.

**Inspection lamp**

8. In addition to the normal lighting at the navigator's forward and rear stations, an inspection lamp is carried in a stowage on the starboard wall at frame 7; the lamp may be plugged into the two-pin sockets in the bases of the Mk.1A dome lamps. An extension lead, stowed adjacent to the lamp stowage, is also provided for use with the lamp.

**Electrical control panel** *(fig.4)*

9. The electrical control panel, mounted to starboard and slightly aft of the pilot's seat, carries on its forward face the fuel pump and cock circuit breakers, and on its rear face the switches and circuit breakers for the main generators and a.c. supplies.

**Stowages**

10. A stowage for the navigator's valise is located adjacent to his ejection seat, and a stowage block for the ejection seat safety pins, is located on the port wall between frames 7 and 8.

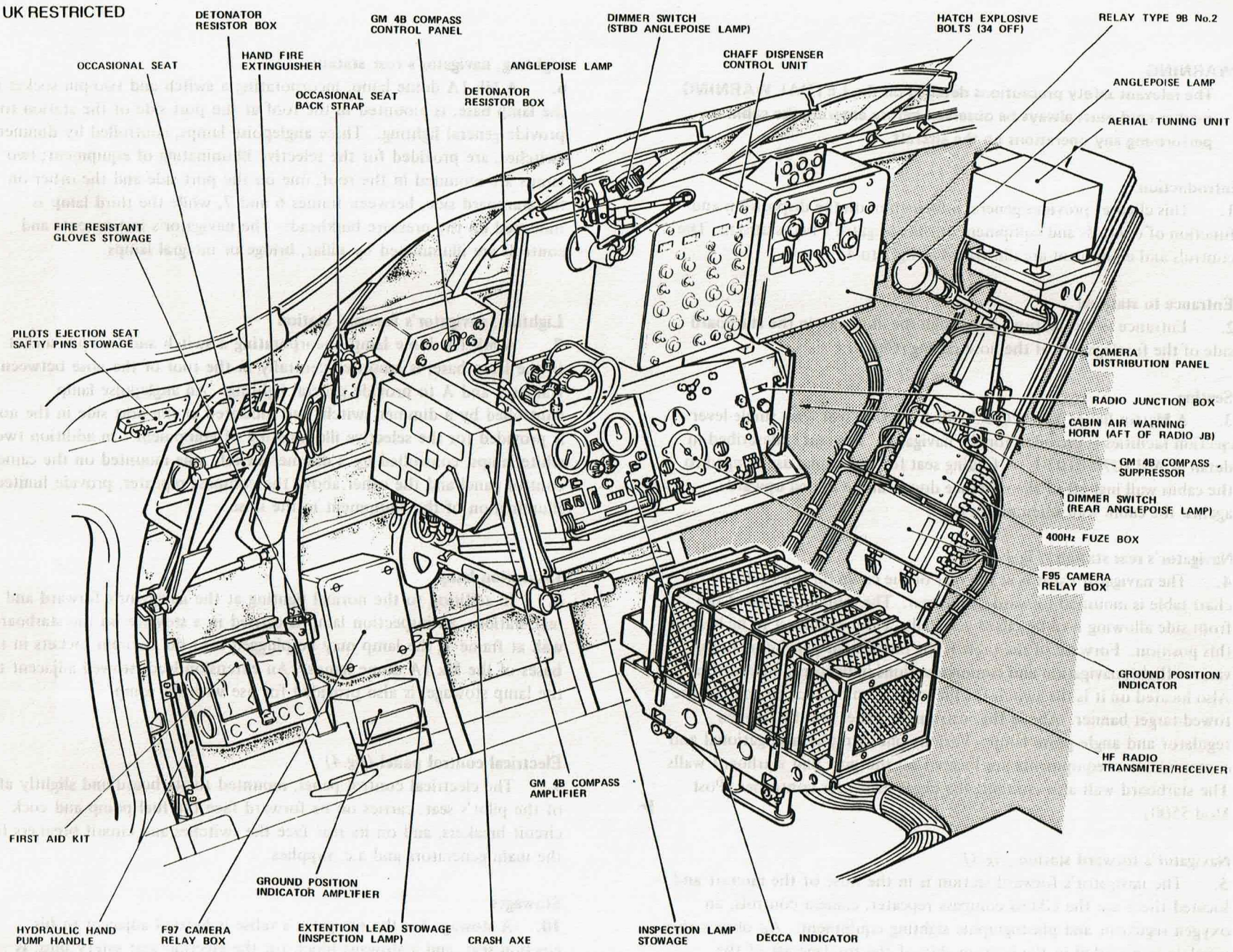


**FIG. 2 NAVIGATORS REAR STATION - STARBOARD SIDE**

◄ MOD 5500 EMBODIED ►

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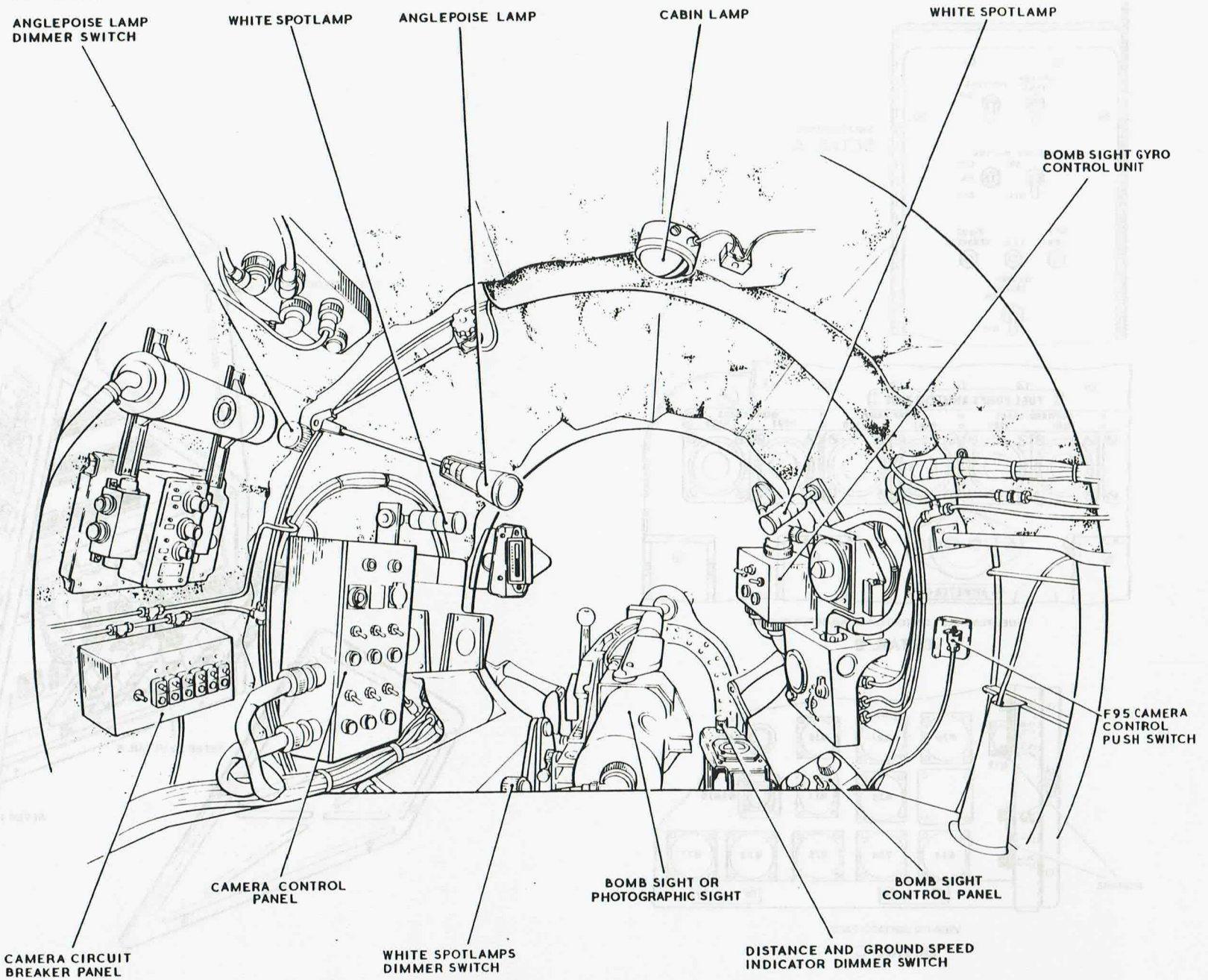


FIG. 3. NAVIGATOR'S FORWARD STATION

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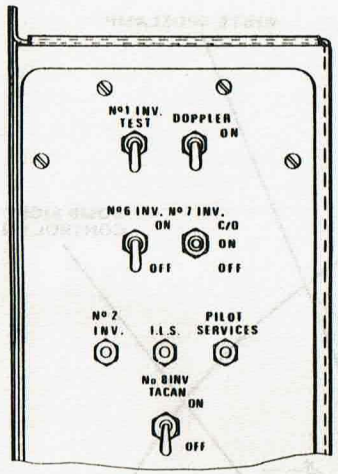
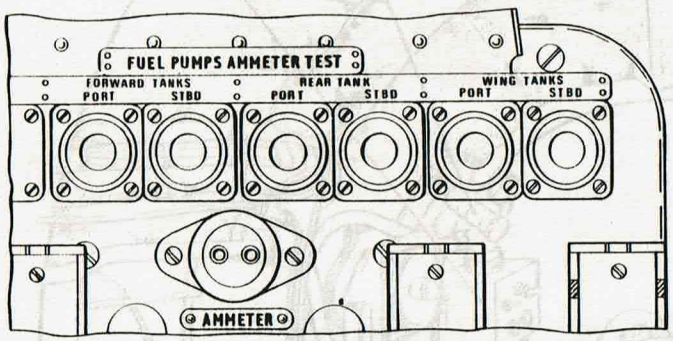
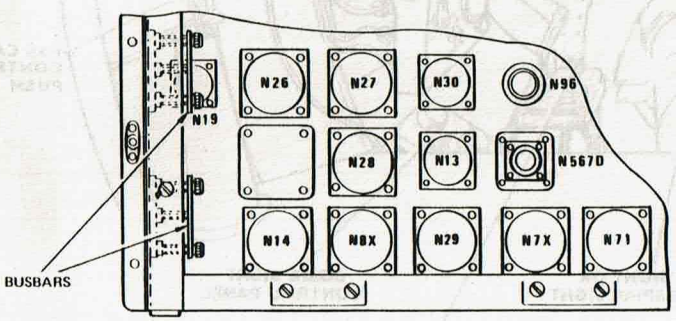



SWITCH PANEL
**DETAIL A**




FUEL PUMP TEST SWITCHES AND AMMETER SOCKET

**DETAIL B**




VIEW ON INBOARD FACE

**DETAIL C**

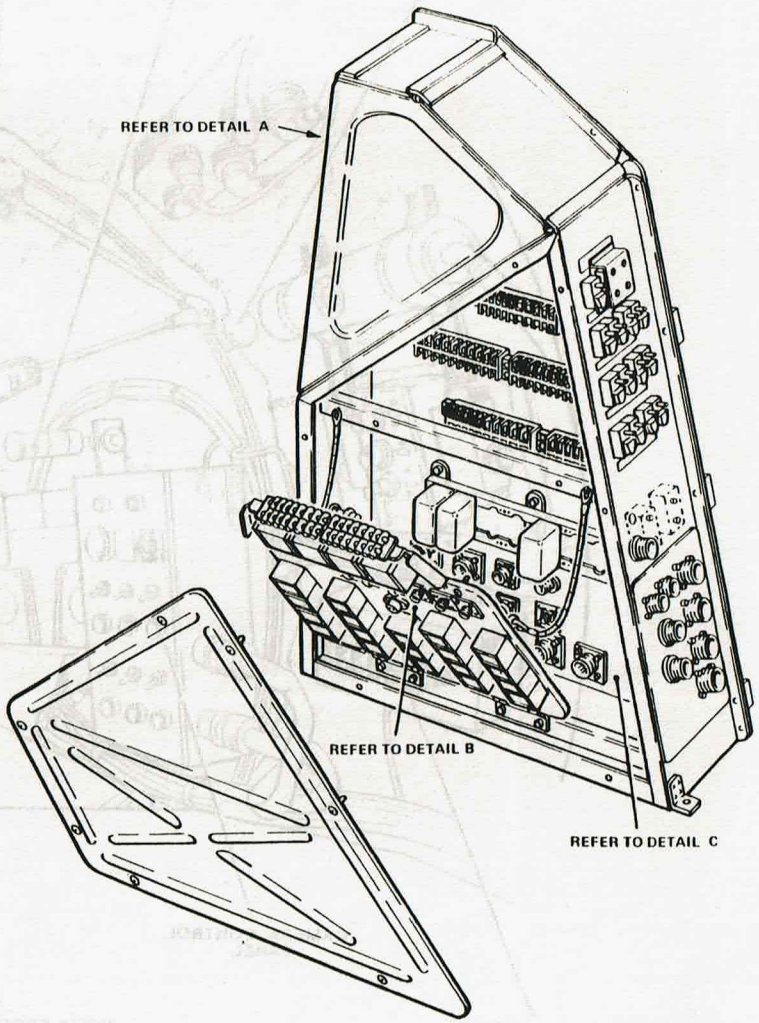



**FIG.4. ELECTRICAL CONTROL PANEL**

◂CHAFF CONTROLLER DELETED▸

# Chapter 3 EMERGENCY CONTROLS, EQUIPMENT AND EXITS – METHOD OF OPERATION

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## LIST OF ILLUSTRATIONS

**WARNING**

**The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cabin or performing any operations upon the aircraft.**

**Introduction**

1. The purpose of this chapter is to describe the location of the emergency controls, equipment and exits, and to indicate methods of operation where this is not obvious. A description of the emergency equipment and the servicing procedure, is given in Sect.3, Chap.11. The emergency controls and equipment are illustrated in Fig.1.

## EMERGENCY CONTROLS

**Alighting gear**

*Lowering*

2. A mechanical control for lowering the alighting gear in an emergency is situated above the alighting-gear control panel at the port side of the main instrument panel. It consists of a T-shaped handle painted black-and-yellow and marked U/C EMERGENCY. The handle is secured in the unoperated position by a sealed aluminium wire loop. To operate the emergency service the handle should be pulled to its full extent, where it is retained in that position by a spring-loaded lock incorporated in the handle. This control is used in the event of an electrical fault rendering the normal alighting gear control inoperative, and it functions irrespective of the position of the normal alighting-gear control.

*Raising*

3. The alighting gear may be raised in an emergency, if the normal method of retraction fails to operate owing to the wheels being on the ground, or to an electrical malfunction. Turn the knobbed ring encircling the UP push-button on the alighting gear position selector, mounted on the port sloping panel, clockwise through 60 deg (or 90 deg according to type of switch) and then depress the UP push-button in the normal manner. Once this emergency selection has been made, UP and DOWN operations may be carried out normally, but until the switch is reset there is no protection to prevent accidental retraction on the ground other than the U/C MASTER SWITCH. To reset, lightly depress the DOWN selector button and insert into the hole in the face of the UP selector button, a Dowty resetting tool Part No. ST1567 or 18 s.w.g. stiff wire. Exert sufficient pressure on the tool or wire to overcome internal spring tension until the knobbed ring rotates counter-clockwise to its normal position (the knobs horizontal to the switch body) under internal spring pressure.

**WARNING**

**Under no circumstances should the knobbed ring be turned past the 60 deg or 90 deg stop as such action will damage the switch and may result in inadvertent retraction of the alighting gear, similarly the switch must only be reset as detailed in main para.**

*Master safety switch*

4. A master safety switch, marked LIVE-SAFE, is situated on the alighting-gear panel. The switch prevents inadvertent retraction of the alighting gear on the ground by isolating the electrical supply. On the ground the switch must be at SAFE at all times except when retraction tests are being made with the aircraft jacked and trestled.

**Flare-bay doors emergency control**

5. A control for opening the flare-bay doors in an emergency is situated on the port wall at the pilot's station, and is held in the unoperated position by a sealed aluminium wire loop. The control lever, painted black-and-yellow and labelled FLARE DOOR EMERGENCY CONTROL, is moved down to open the doors, and is held in that position by a spring lock. This control is used in the event of an electrical fault rendering the normal control inoperative, and operates irrespective of the position selected on that control.

**Photoflash jettisoning**

6. Emergency jettisoning of the 8 in. photoflashes is controlled by a switch, identified by black and yellow stripes, and labelled PHOTOFLASH JETTISON SWITCH, located on the pilot's console. When the switch, which is guarded by a spring-loaded flap, is selected to JETTISON ON, the flare-bay doors open and the 8 in. photoflashes are released safe. To reclose the flare-bay doors select the jettison switch to OFF.

**Note . . .**

*Pending modification action it is not possible to jettison either the 252 x 1.75 in. photoflashes or the container which houses them as introduced by Mod.1257.*

**Wing-tip tank/pod jettisoning**

7. A push button switch, covered by a black-and-yellow painted hinged guard and labelled FUEL TANK JETTISON, is located on the alighting-gear control panel. When this switch is depressed the explosive bolts which secure the tanks/pods to the wing tips are detonated.

**Target towing – emergency jettison**

7A. An emergency jettison switch is fitted on the pilot's port console.

7B. An emergency jettison switch is also fitted on the 1st navigator's instrument panel, near the upper right hand corner.

**Emergency lighting**

8. Emergency lighting of the pilot's instrument panels is provided by two red lamps situated on the coaming tube and controlled by a single luminous toggle switch on the starboard end of the coaming panel. Selecting this switch, labelled COMP. and EMGY. LGTS., to STANDBY, will direct a supply from the emergency batteries to the lamps; selecting the switch to STANDBY will also direct a supply for the emergency lighting of the emergency compass.

## EMERGENCY EQUIPMENT

**Ejection seats**

9. Martin Baker ejection seats are installed at the pilot's and navigator's stations *(Chap.1 & 2)*, the Type and Mark numbers of which are related to the aircraft modification standard. The seats are described in detail in A.P.109B-0107-1. Servicing of the seats is detailed in A.P.109B-0107-5.

*Leg-restraining straps*

10. To prevent leg injury to crew members during ejection, leg-restraining straps are provided on each seat. These are anchored to brackets on the cabin floor, the straps then pass through snubbing units on the front of the seat pan and are connected to the safety harness straps. During ejection, the restraining straps are pulled down through the snubbing units to move the occupant's legs close to the seat pan. At a predetermined force the rivets anchoring the brackets secured to the cabin floor shear, freeing the straps from the brackets.

**Hydraulic system hand pump**

11. This pump is situated on the starboard side of the pilot's seat and its detachable handle is stowed on the starboard wall of the fuselage aft of the entrance door. In the event of a failure of the engine-driven pumps or of the associated supply circuit, the hand pump will operate the alighting-gear, flare-bay doors and wheel brakes circuits after the appropriate selection has been made. Before resorting to the use of the hand pump, operate the associated emergency control; if the fault is electrical this will operate the system and render recourse to the hand pump unnecessary.

**Fire warning and extinguishers**

*Engine fire warning lamps and extinguishers*

12. Warning of engine fire is given by two lamps, one for each engine, which are incorporated in the engine fire indicator switch units located on the coaming panel. Illumination of either warning lamp indicates a fire in the associated engine nacelle, and operating the integral push switch will initiate fire extinguishing action; before operating the push switch the pilot must ensure that the associated cabin air gate-valve switch is set to OFF. In the event of a crash landing the fire extinguishers are automatically discharged by the inertia crash switches *(para.20)*.

*Fuel bay fire extinguisher*

13. A fire extinguisher is mounted on frame 27A in the fuselage and will discharge its contents into the fuel bay when the inertia switches *(para.20)* have tripped; no indicator or manual control is provided for this extinguisher.

*Hand fire extinguisher*

◀ 14. Two BCF hand fire extinguishers are provided and are stowed one on each wall, at the navigator's station. ▶

**Crash axe**

15. This is stowed at frame 6 on the starboard side of the cabin.

**First-aid kit**

16. A first-aid kit is stowed in a fire-resistant stowage on the starboard side of the fuselage, aft of the entrance door.

**Emergency oxygen**

17. Each member of the crew has an emergency supply of oxygen, for use when abandoning the aircraft in flight by ejection seat. The cylinders are mounted on the starboard side of the seat and are connected to the main oxygen supply tubes by quick-release fittings and are operated, on ejection, by cables attached to the aircraft structure. The emergency supply may be made available to the crew member in the event of a failure of the main supply, by pulling up on the emergency control at the starboard side of the seat pan. An emergency oxygen bottle is also fitted at the navigator's forward station.

**Survival packs**

18. Survival packs, one for each crew member, are located in stowage crates secured to the roof in the rear fuselage. The position of the stowage is suitably marked on the outer surface of the rear fuselage.

**Fire resistant gloves**

19. These are stowed beneath the starboard hand fire extinguisher at frame 5.

**Inertia crash switches**

20. During a crash landing the inertia switches, situated one in the port equipment bay and the other in the starboard equipment bay, are automatically operated. This results in the automatic operation of the engine and fuel-bay extinguishers, and the isolation of the power supplies to all electrical services except the photoflash jettison, No.6 fuel tank explosion suppression, and the detonator circuits of the canopy, elevator control and navigator's hatch.

**Emergency batteries**

21. Two 12-volt batteries, connected in series, are situated in a tray below the pilot's console and provide emergency power for the detonator circuits, the turn-and-slip indicator and emergency lighting.

**Sonar locator beacon**

21A. The sonar locator beacon Type 17638 is specifically designed to withstand and operate after the impact of an aircraft crashing into the sea. When submerged the SLB is automatically switched on transmitting acoustic signals which can be received by shipborne and airborne search equipment for at least 240 hours. The SLB derives its power from a 2-cell lithium sulphur-dioxide battery pack. The beacon can be functionally tested by manually operating the switch via the raised area of the diaphragm on the end cap and listening for the clear audible pulses. The exterior of the SLB is covered with a tough epoxy paint which is signal red in colour.

**Turn-and-slip indicator – emergency**

22. A switch positioned at the starboard end of the coaming panel and labelled TURN-AND-SLIP will, when selected to STANDBY, direct a supply from the emergency batteries to the turn-and-slip indicator.

**Aircraft destructor**

23. Provision is made to carry an aircraft destructor unit on the inside face of the starboard equipment compartment entrance hatch.

**Emergency compass**

24. An emergency compass is fitted to the canopy coaming tube above the flight instrument panel.

**Urine container**

25. A urine container is located beneath the navigator's table adjacent to the electrical control panel.

## EMERGENCY EXITS

**WARNING**

**The relevant safety precautions detailed on the LETHAL WARNING marker card must be observed before attempting to carry out any operation or inspection on the control column release, canopy and hatch jettison controls.**

**Entrance door jettisoning**

26. The entrance door may be jettisoned by turning the cranked handle, situated on the coaming above the entrance door, in a clockwise direction as far as possible and striking the top of the door. The handle, which is marked DOOR EMERGENCY RELEASE, is normally secured against inadvertent operation by a strap. It is not necessary to operate the normal door-locking mechanism when preparing to jettison the door.

**Canopy jettisoning**

27. To abandon the aircraft when ditching or during a crash landing, the canopy is released by the fracturing of 32 attachment bolts which contain explosive detonators. The system is controlled by a CANOPY/SNATCH MASTER switch on the take-off panel, and a CANOPY JETTISON switch, located at the port side of the throttle box below a hinged flap: The flap is painted black-and-yellow.

28. The CANOPY/SNATCH MASTER switch is selected ON before the commencement of flight. This completes the electrical circuit to the elevator control rod severance unit and the CANOPY JETTISON switch.

**Pilot's single-lever ejection**

29. To abandon the aircraft during flight using single-lever ejection, the pilot ejects through the canopy by pulling the face-stream firing handle or, seat-pan firing handle, on his ejection seat. This results in gas from a time-release and breech unit operating a switch which fractures the elevator control tube by firing an explosive charge clamped to the tube, whereupon the control column is pulled forward and held against the instrument panel clear of the pilot's knees by a snatch unit mounted on the port side of the cabin *(Sect.3, Chap.11)*. Approximately one second later the main ejection gun is fired to eject the pilot in his seat through the canopy.

**Crew escape hatch**

30. The hatch is secured to the fuselage in a manner similar to that of the pilot's canopy. The hatch detonator circuit is controlled by a SAFETY switch, a JETTISON switch, and a hatch jettisoning mechanism *(Sect.3, Chap.11)*, which operates in conjunction with the ejection system. The hatch SAFETY and JETTISON switches are mounted on a panel on the port wall of the cabin at the navigator's station; the panel is identified by black-and-yellow stripes. To prevent accidental operation, the SAFETY switch is secured by a guard and the JETTISON switch is covered by a hinged flap. The hatch jettisoning SAFETY switch must be ON to render the JETTISON switch and the ejection system operative.

**Hatch jettisoning**

31. The hatch is automatically jettisoned when the rear crew member operates either the face-screen firing handle or, the seat-pan firing handle of his ejection seat. A safety-catch, positioned in the restrictor of the breech type time-delayed firing unit of the ejection gun, ensures that seat ejection is delayed until the hatch has been jettisoned *(Sect.3, Chap.11)*. The hatch jettisoning SAFETY switch must be ON to render the JETTISON switch operative for jettisoning the hatch without ejecting the seat, e.g. in ditching or in a crash landing.

**Cocking lever and safety pins stowage**

32. Situated on the centre-line on the front of the pressure bulkhead is a stowage for the cocking lever. This tool is used to cock the hatch jettisoning mechanism. A stowage is also provided in the cabin for the ejection seat safety pins together with their integral tallies *(Chap.1 and 2)*.

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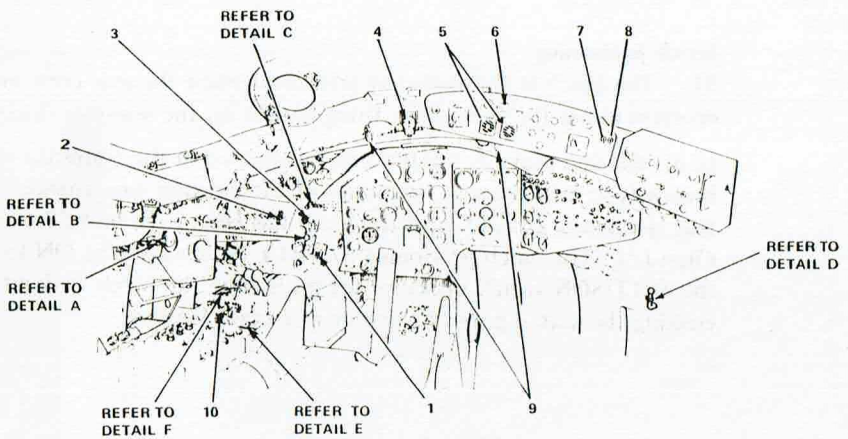
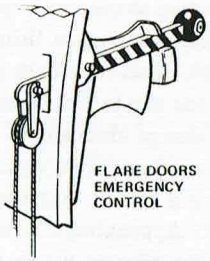
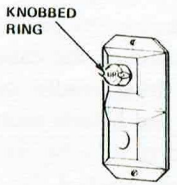


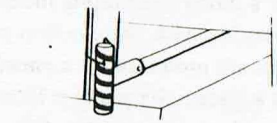

PILOT'S STATION



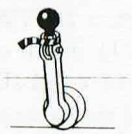

DETAIL A




DETAIL B

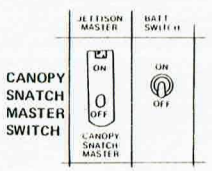



DETAIL C




DETAIL D


DETAIL E




DETAIL F


DETAIL G

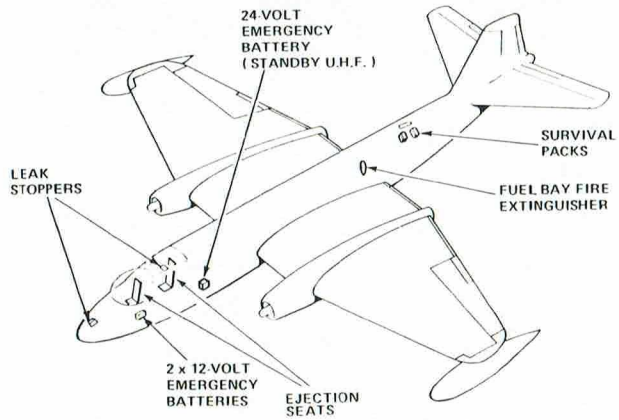
KEY

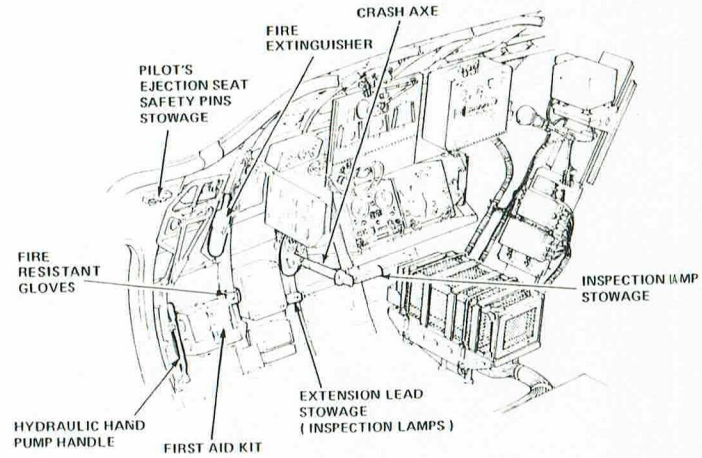
1. ALIGHTING GEAR SAFETY MASTER SWITCH
2. CANOPY/SNATCH MASTER SWITCH (DETAIL B)
3. WING TIP FUEL TANK JETTISON SWITCH
4. EMERGENCY COMPASS
5. ENGINE FIRE EXTINGUISHER INDICATOR/ SWITCH UNITS
6. ENGINE FIRE WARNING TEST SWITCH
7. EMERGENCY LAMPS SWITCH
8. TURN AND SLIP EMERGENCY SUPPLY SWITCH
9. EMERGENCY LAMPS
10. PHOTOFLASH JETTISON SWITCH

**FIG.1. EMERGENCY CONTROLS, EQUIPMENT AND EXITS (1)**

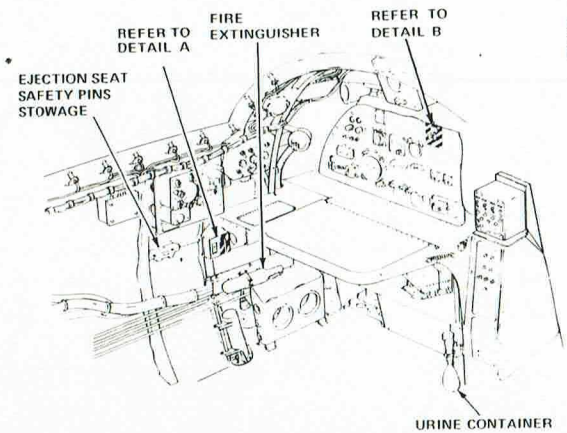
◄NEW FIGURE►

UK RESTRICTED

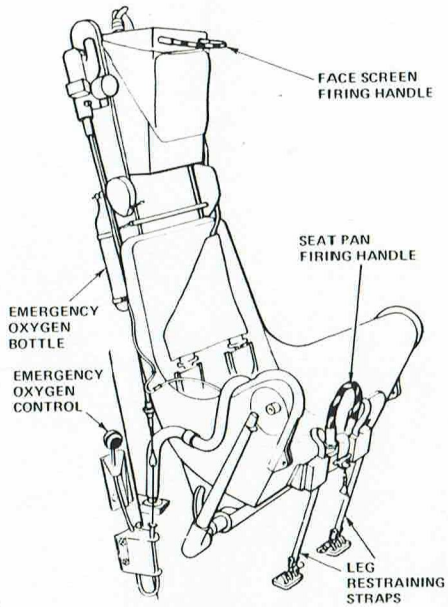



NAVIGATORS STATION
STARBOARD SIDE




NAVIGATORS STATION
PORT SIDE




EJECTION SEAT
TYPICAL


HATCH SAFETY AND
JETTISON SWITCH

DETAIL A


DETAIL B

FIG.1. EMERGENCY CONTROLS, EQUIPMENT AND EXITS (2)

◄NEW FIGURE►