Part 1—Description and Management of Systems

Chapter 15—General Equipment and Controls

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Entrance Door and Canopy

1 Entrance door and ladders

(a) General

The entrance door under the fuselage nose below the crew compartment opens downwards, entry being made by a folding ladder secured to the inside of the door. The ladder can be jettisoned from the door by pulling up on the top rung. Another ladder, which may be stowed by lifting and sliding to port, provides access to the cockpit floor. Mechanically and pneumatically-operated door mechanisms are fitted ; the latter is normally utilised to close the door from the outside, and open it in flight against the airstream to provide an emergency exit. The entrance door may be opened or closed from inside or outside the aircraft.

(b) Door-closing operation

Closing from inside the aircraft is by means of a handle and cable attachment, which is normally stowed under a hinged panel on the floor below the centre seat. When pulled, air passes from one of the air-storage cylinders at 400 PSI to operate the door-closing jacks. Pressing an external button, adjacent to the door handle, causes a supply of air to operate the door-closing jacks in a similar manner. In both cases the door seals are automatically inflated.

(c) Door-opening operation

(i) Opening, from inside the aircraft, is by means of a lever, which is spring-loaded to the closed position in the gated quadrant at the forward end of door-frame on the port side, or externally, by means of a handle. To open the door from inside the aircraft, when on the ground, the lever should normally be moved to the gate position only, when the door will open under gravity.

(ii) In an emergency, when on the ground, the movement of the lever beyond the gate to the EMERGENCY position will supply the door jacks with pressurised air from the pneumatic system at a restricted rate, thus opening the door gently.

(iii) In flight, however, movement of the lever beyond the gate to the EMERGENCY position will supply the door jacks with unrestricted pressurised air from the pneumatic system, thus providing sufficient pressure to open the door against the force of the airstream.

(iv) The door may also be opened in flight by operation of an EMERGENCY DOOR OPEN switch, adjacent to the ABANDON AIRCRAFT sign, at the nav/plotter's station, once the aircraft has been depressurised. (See also Chap. 17, para. 2(*a*) of the Part).

(*d*) *Door indicators*

Two indicator lights adjacent to the door-opening lever, marked DOOR SAFE (green) and DOOR NOT SAFE (red) are illuminated when the door is closed and locked, or open or unlocked, respectively. An ENTRANCE DOOR UNLOCKED magnetic indicator (A38) on the engine instruments panel shows white when the entrance door is not fully closed. A physical check should also be made to ensure that the door-opening lever is to the rear.

2 Canopy

(*a*) The canopy, which is jettisonable by means of a cartridge-operated jettison gun, is of double-skin construction and has two windows, fitted with sliding sun visors and black-out screens at the front port and starboard sides, and hinged sun visors at the forward edge. It is fitted to the fuselage nose by six attachment units and has an inflatable seal fitted to provide an airtight fit. A stowage for a dinghy is provided under the rear of the canopy, which is outside the pressure cabin.

(*b*) *Controls and indicators*

(i) The canopy jettison levers (C13) and (E6) on the port and starboard cockpit rails are normally wire-locked in the forward position. In this position, the canopy attachment units (front four only) are locked. The two rear attachment units are designed to open when the canopy leading edge is raised 20 degrees. Two pip-pins (C12), (E7), stowed under the oockpit rails, are provided to fit in holes in the bracket in which the canopy jettison levers operate, to prevent inadvertent operation when servicing the canopy. These pins must be removed and stowed before flight, otherwise the canopy cannot be jettisoned and the ejection seats will not operate.

(ii) Two pointers (C7) and (E14) on the canopy rails on either side show LOCKED (pointers forward) when the canopy attachment units are locked and UNLOCKED (pointers vertical) when a jettison lever has been moved or the attachment units are unlocked. The LOCKED position is indicated by a small white segment marked SAFE ; the UNLOCKED range is indicated by a larger, red segment. A CANOPY UNLOCKED magnetic indicator (A1) on the engine instruments panel, shows black when the canopy is locked, and white when the four forward attachment units are not correctly closed.

(*c*) *Canopy jettison gun safety-pin*

A safety-pin (to which is attached a pip-pin) is provided and must be inserted in the jettison gun sear, located at the rear of the canopy in the cabin, after landing. Before flight the safety-pin must be removed from the jettison gun sear and the attached pip-pin must be inserted in the canopy jettison lever mechanism adjacent, thus linking up the canopy manual jettison mechanism with the jettison gun.

NOTE: Instructions on the method of inserting the pip-pin in the canopy jettison lever mechanism, or the safety-pin in the jettison gun sear are given on two tablets which are attached to a perspex cover which surrounds the jettison gun and associated mechanism. Two holes in the perspex cover line up with the two items concerned, and a diagrammatic arrangement of the safety devices is included on one of the instruction tablets.

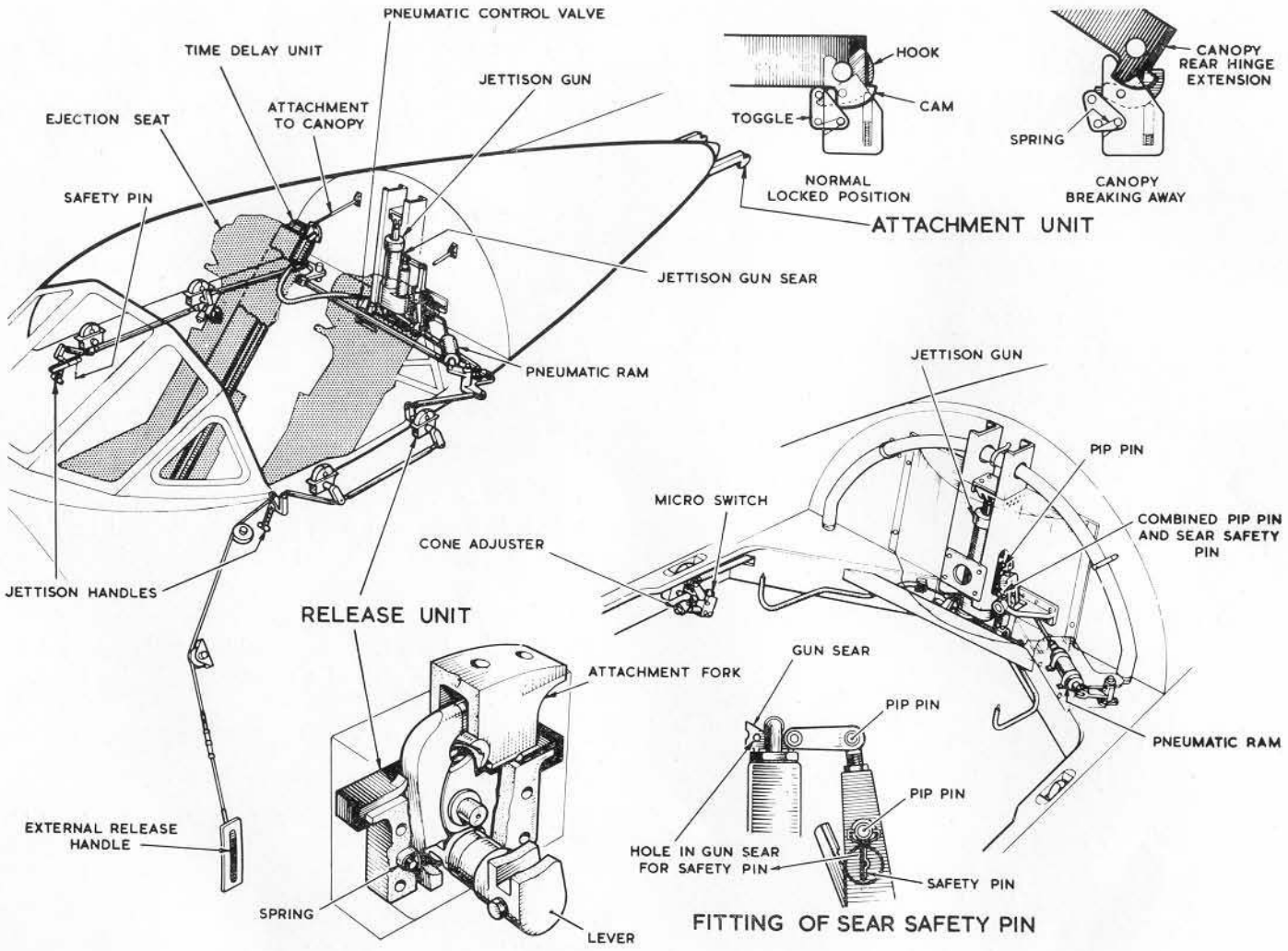

Fig 1 Canopy Jettison Mechanism

3 Canopy jettison controls

(*a*) *The canopy can be jettisoned by*:

(i) Pulling the seat-firing blind handle on either the 1st or 2nd pilot's ejection seat, or, when Mod MB.881 is embodied, pulling either firing handle on either seat.

(ii) Operation of either CANOPY RELEASE—PULL lever.

(iii) Operation of an external red-painted handle on the port side of the fuselage nose.

(*b*) Operation of an ejection seat-firing handle opens the canopy control valve to admit air from the pneumatic system to a jack, the function of which is to open the jaws of the canopy attachment units and operate the jettison gun.

(*c*) When either a canopy release handle or the external handle, (*a*)(ii) and (*a*)(iii) above, is operated, mechanical linkages open the canopy attachment units and operate the jettison gun.

4 Internal lighting

(*a*) *Cabin and general lighting*

(i) *Nose compartment*

Two cockpit lamps fitted to the roof of the nose compartment are controlled by the LIGHT ON - OFF switch on the floor support structure below the pilot's floor. The built-in control switches on these two lamps are wire-locked in the ON position.

(ii) *Nav/bomb-aimer's prone station*

One cockpit lamp fitted to the under-surface of the pilots' floor structure, providing general illumination for the nav/bomb-aimer's prone station, is controlled either from the LIGHT ON-OFF switch on a panel at the bomb-aimer's prone station or from a similar switch at the nav/plotter's station.

(iii) *Crew's floor lamps*

Two cockpit lamps fitted on the under-surface of the floor structure at the crew's station illuminate the equipment below. The forward lamp is controlled by the ON - OFF switch on the nav/plotter's panel ; the rear lamp is controlled by a built-in switch.

(iv) *Cabin lamp*

A cabin lamp in the fuselage roof above the entrance door is controlled either from the ON - OFF switch on the nav/plotter's panel or from a switch at the entrance door.

(v) *Sextant lamps*

Two cockpit lamps installed, one adjacent to each sextant stowage, are controlled by adjacent ON - OFF switches.

(vi) *Power compartment*

A cockpit lamp, with built-in switch, is fitted in the roof and provides general illumination for the power compartment.

(vii) *Inspection lamp sockets*

Each cockpit lamp is equipped with a 2-pin socket designed to accommodate the plug of a standard inspection lamp.

(*b*) *Lighting at the pilots' stations*

(i) *General*

The lighting at the 1st and 2nd pilot's station is divided into four groups :

Ultra-violet lighting.

Red floodlighting.

White fluorescent lighting.

Emergency lighting.

(ii) *Ultra-violet lighting*

Oxygen regulators

Two U/V cockpit lamps, one on each cockpit rail, controlled by a dimmer switch (C/20), fitted at the front of the port console provide illumination for each pilot's oxygen regulator.

Instrument flying panel and fuel control panel

Six adjustable tubular-type U/V lamps are fitted, five under the coaming around the pilot's panels, and one behing the throttle quadrant. Two dimmer switches (C/21) and (E/38), on the port and starboard consoles respectively, each control three lamps. Electrical supply for these six lamps is obtained from the No. 3 inverter.

(iii) *Red floodlighting*

Pilot's and engine instruments panels

Four red lamp assemblies fitted to the under-surface of the panel coaming provide illumination for the pilot's instrument panels and the engine instruments panel. The two port lamps are controlled by the front dimmer switch (C/18) on the forward portion of the cockpit port rail ; a corresponding switch (E/2) on the starboard rail controls the two starboard lamps. Two of the lamps are of the double-flood type and each contain one emergency lighting filament (see sub-para. (f) below).

Console lighting

The port and starboard consoles each have three red flood lamps. The port lamps are controlled by the centre dimmer switch (C/17) on the cockpit port rail, and the starboard lamps by a corresponding switch (E/3) on the starboard rail.

Fuel control panel

One red flood lamp fitted in the undersurface of the throttle quadrant provides illumination for the fuel control panel ; it is controlled by the same switch (E/3) as the starboard console red lights. The lamp contains two filaments, one being for emergency lighting.

PFC start panel

A red strip light on the rear starboard side of the fuel control panel illuminates the PFC and auto-trimmer controls. It is controlled by the same switch (C/7) as the port console red lamps. A similar lamp on the rear port side of the fuel panel provides emergency lighting for the same area.

Wander lamp

A red flood wander lamp installed on the canopy, having a bungee-loaded extension lead and fitted with a focussing lamp, a built-in ON—OFF switch and a red filter with a dimming iris, is provided with a clip so that it may be secured in any desired position.

(iv) *White fluorescent lighting*

Two tubular-pattern fluorescent lamps fitted on each cockpit rail and controlled by the ON—OFF switches (A/6) and (A/35) marked WHITE FLOOD on the 1st and 2nd pilot's instrument panels respectively, provide illumination for the port and starboard consoles. Electrical supply for these four lamps is obtained from the No. 3 inverter.

(v) *Anti-dazzle lighting*

Two anti-dazzle lamps are fitted on the pilots' coaming, one above each instrument panel. They are controlled by a BRIGHT—OFF—DIM switch (B/4) to the left of the fuel contents panel, or by an OFF—BRIGHT switch on the left of the abandon aircraft sign at the nav/plotter's station.

(vi) *2nd pilot's knee pad light*

A single lamp controlled by the dimmer (E/1) on the cockpit starboard rail provides illumination of the 2nd pilot's knee pad.

(vii) *E2B compass lighting*

Illumination of the E2B compasses is controlled by means of the dimmer switches (C/16) and (E/4) on the cockpit port and starboard rails. A NORM—OFF—EMERGENCY switch (C/15) and (E/5), adjacent to each dimmer switch permits selection of the normal 28-volt DC supply or the emergency batteries.

(*c*) *Lighting at the crew's station*

(i) *General*

The lighting at the crew's station is divided into three groups:

Red fluorescent lighting supplied from the No. 3 inverter

Anglepoise chart lamps

Concealed lighting for instrument lighting on the nav/plotter's panel

(ii) *Red fluorescent lighting*

Crew's station

Four tubular red fluorescent lamps are fitted at the crew's station to give even illumination, each lamp being fitted to a metal reflector by spring clips. Two ON—OFF switches on the nav/plotter's panel, each control a pair of lamps.

Bomb bay temperature gauge lamp

An instrument lamp is fitted above the bomb bay temperature gauge. A dimmer switch is adjacent.

Bombing panel

A cockpit-type lamp, controlled by a dimmer switch adjacent, is fitted above the bombing panel on the starboard side of the aircraft at the nav/bomb-aimer's station.

(iii) *Anglepoise lamps*

Three anglepoise lamps, each fitted with a shade and amber filter glass, are fitted on the panel at the crew's station for general instrument illumination. The lamps are supplied from the 28-volt DC supply, and controlled by three dimmer switches on the nav/plotter's panel.

(iv) *Nav/plotter's panel*

Concealed lighting to illuminate the various instruments on the nav/ plotter's panel is provided by seven lamps which are controlled by the dimmer switch on the panel.

(*d*) *Ground service lighting*

A number of cabin lamps with built-in ON—OFF switches are fitted to provide illumination of the bomb bay and wheel bays, etc. The lamps are numbered and installed:

Bomb bay forward . .	Lamp No. 4, 5, 10 and 11
Bomb bay aft . . .	Lamp No. 6, 7, 8 and 9
Nose-wheel bay . . .	Lamp No. 13 and 14
Starboard main wheel bay .	Lamp No. 17 and 18
Port main wheel bay . .	Lamp No. 15 and 16
Aft power compartment .	Lamp No. 1 and 2
Rear fuselage . . .	Lamp No. 3 and 19

Electrical supply is available only when the aircraft is on the ground and an external 28-volt battery is plugged in. A master switch aft of the power compartment, adjacent to the external supply connections controls the supply to the lamps.

(*e*) *Inspection sockets*

Two sockets, one on the front spar bulkhead and the other on the rear spar bulkhead, are fitted for use with inspection lamps.

(*f*) *Emergency lighting*

Emergency lighting is provided by three red flood-lamps which form part of the red floodlighting equipment, and provide illumination for the engine instruments panel and the fuel control panel. Two 24-volt alkaline batteries connected in parallel and mounted in a container fitted on the port side of the pilots' floor

provide electrical power, which is controlled by an EMER, LIGHT ON—OFF switch (B/17) at the bottom of the engine instruments panel. Switches (C/15) and (E/5) control the emergency lighting of the E2B compasses (see para. 4(*b*)(*iii*).

5 External lighting

(*a*) *External lights master switch*

The EXTERNAL LIGHTS ON—OFF master switch (E/31) is on the starboard console.

(*b*) *Landing and taxying lamps*

(i) Two landing lamps are fitted, one on the underside of each mainplane. They have a dual function, i.e. to provide illumination for landing, and for taxying. For taxying, the lamps are extended beyond the landing setting.

(ii) The lamps are operated independently by means of two switches (E/28), (E/26) on the starboard console. A LAND—TAXY—IN POSITION CONTROL switch (E/27) is between these switches.

(*c*) *Navigation lights*

The navigation lights and flashing white lights, on the top and bottom of the fuselage, are controlled by a switch on the starboard console marked NAV (steady navigation lights only).—OFF—FLASH (steady navigation lights and white flashing lights).

(*d*) *Downward identification light*

A single downward amber identification light in the rear fuselage is controlled by a three-way STEADY—off—MORSE switch (E/30) on the starboard console. This switch, being spring-loaded to off from MORSE, may be used for signalling.

(*e*) *Probe illumination*

Two high intensity lights fitted behind perspex windows in the top skin of the nose are provided to illuminate the probe. Control is by means of two dimmer switches (E/35) on the CABIN HEAT AND PRESSURE CONTROLS panel on the starboard console.

Windscreens

6 Windscreen wipers

An electro-hydraulically operated windscreen wiper, operating from a self-contained fluid supply is fitted to the windscreen in front of the 1st and co-pilots. Both wipers are controlled by a three-position OFF—FAST—SLOW switch (A/34) on the co-pilot's instrument flying panel. The wiper blades are of the parallel motion type and are self-parking.

A windscreen wiper operating from the port wiper supply, is fitted to the centre panel of the windscreen. All three wipers are controlled by the same switch.

NOTE: The wipers must not be used when the windscreens are dry, and when used must be started on FAST, and then adjusted to the speed required.

7 Direct-vision windows

At either side of the windscreen is a triangular window, hinged on the lower edge, which may be removed by depressing the handle (A/33) after first pressing in a catch on the handle, pulling inwards and sliding back. No stowages are provided. Care must be taken in replacing the panels to ensure that the balls are fitted correctly in their sockets, otherwise a serious cabin pressure leak can occur.

Miscellaneous Equipment

8 Ration heaters

(*a*) A ration heater (C/1), (E/21) is fitted at each crew station.

(*b*) The ration heaters are controlled by three switches on the DC control panel, one switch controlling both the 1st pilot's and

AEO's ration heaters, the second switch controlling the nav/plotter's and the third switch controlling both the co-pilot's and nav/bomb-aimer's ration heaters.

(*c*) When using the ration heaters it is imperative that a hole is made in each food tin before it is placed in a heater, and that no tin is heated continuously for a period of more than two hours.

9 Periscope installation

Provision is made at the crew's station to accommodate an upper and lower rearward-facing periscope, controlled from a handle under the crew's table in front of the AEO ; the control switch for heating of the sighting head is on the AEO's panel. When the handle is raised upwards the view from the upper periscope is selected, and conversely lowering the handle selects the lower periscope. Movement of the handle right or left will rotate the selected periscope to give a view of the aircraft. The eye-piece of the sighting head is at the edge of the table, the table being hinged so that the edge can be raised when the periscope is in use.

10 Anti-flash screens

(*a*) *Windscreen and cabin windows*

Silicon-proofed glass cloth screens are provided at the windscreens and cabin windows, secured in position by zip-fasteners.

(*b*) *Canopy windows and bomb-aimer's window*

Metal screens are provided at these positions. The canopy window screens are fitted in slide rails ; the bomb-aimer's window screen consists of two plates hinged together, with a rubber seal around the periphery which bears against the window frame to retain the screen in position.

11 Black-out curtains

In addition to the canopy black-out curtains referred to in para 2 above, black-out curtains are provided at all cabin windows, secured by press-studs and straps.