

AIR PUBLICATION
108B-0135-1

AIRCREW EQUIPMENT ASSEMBLIES

**EJECTION SEATS
TYPE 5A/1 AND 2, Mk.1
(PHANTOM AIRCRAFT)**

GENERAL AND TECHNICAL INFORMATION

S.E. SEAT BAY

BY COMMAND OF THE DEFENCE COUNCIL

J. Dunnett

Ministry of Defence

FOR USE IN THE
ROYAL NAVY
ROYAL AIR FORCE

EXPERIMENTAL AIRCRAFT
SERVICES DEPT.
17 FEB 1958

(Prepared by the Ministry of Technology)

A111/74

AMENDMENT RECORD SHEET

To record the incorporation of an Amendment List in this publication, sign against the appropriate A.L. No. and insert the date of incorporation.

A.L. No.	AMENDED BY	DATE
1	<i>M. J. Jones</i>	20.3.74
2	<i>R. Taylor</i>	12.5.74
3	<i>R. Taylor</i>	26.6.74
4	<i>P. Hardy</i>	14.7.74
5	<i>R. Taylor</i>	12.11.74
6	<i>M. J. Jones</i>	10.4.75
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ROYAL NAVY
LETHAL WARNING

1. Modern aircraft have many equipments, e.g. assisted escape systems, explosive release units, high energy igniter units, etc. which, if operated inadvertently or worked on without due care, can cause loss of life and/or damage to the aircraft. Before anyone enters a cockpit or starts work on an aircraft, the individual himself is responsible for ensuring that:-

(1) All safety devices are correctly fitted.

(2) No units or switches, with which the individual is not fully conversant, are touched.

2. Detailed safety precautions for each type of aircraft will be found in the relevant aircraft servicing schedules.

N.B. (Royal Air Force Lethal Warning overleaf)

ROYAL AIR FORCE

LETHAL WARNING

1. The assisted escape system and associated explosive operated jettison mechanisms fitted to aircraft are a potential source of lethal injury to personnel and damage to Government property if inadvertently operated.
2. Safety devices in the form of safety pins, levers and switches are provided for use when the aircraft is on the ground to safeguard against this danger.
3. On entering the cockpit/cabin of an aircraft, it is the responsibility of the individual to be able to recognise the assisted escape system safety devices in that aircraft and to ensure that they are correctly applied at all times in accordance with para. 4 below.
4. Instructions for the correct positioning of the assisted escape system safety devices in each aircraft type and mark are detailed in the Servicing Schedules and Pilot's Notes related to that aircraft.

AIRCREW EQUIPMENT ASSEMBLY

EJECTION SEAT TYPE 5A/1 AND 2, Mk. 1 (PHANTOM AIRCRAFT)

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Introduction

1. The Type 5A/1 and 2 Mk. 1 ejection seats are fitted to Phantom aircraft of both the R.A.F. and Royal Navy. These seats are almost identical, their minor variations being detailed in the ejection seat publication. This publication is primarily concerned with the installation of the aircrew equipment assembly (A.E.A.) in the seat, the strapping-in procedure and the drill to be used when leaving the seat after landing. A brief description of the various components of the A.E.A. and their functions is included.

Composition of the assembly

2. The aircrew equipment assembly consists of the following items:-

Ejection seat	Type 5A/1 and 2 Mk. 1
Parachute assembly	Back Type Mk. 52
Personal survival pack	Type ZD
Emergency oxygen set	Demand emergency oxygen cylinder/operating head Mk. 4A (Ref. 6D/3606) used in conjunction with a miniaturised oxygen regulator assembly, high or low altitude.
Flying clothing	Refer to Appendix 1

DESCRIPTION

3. These assemblies are fully described in the following publications or their coded equivalent.

Ejection seat	A.P.109B-0135-1
Parachute assembly	A.P.108C-0128-1H
Personal survival pack	A.P.108E-0529-1A A.P.108-0529-1B(R) A.P.108-0529-1B(N)
Emergency oxygen set	◀ A.P.107D-1001-1 ▶

Parachute assembly

4. The horseshoe shaped parachute seats upon the support arch of the seat and is held in the parachute container by two restraining straps. The lift webs emerging from the top of the parachute pack terminate in Koch fittings which are attached to the male lugs on the shoulders of the skeletal torso harness during strapping-in. Two short straps attached to the lift webs and Koch fittings each terminate in half of a split yoke fitting, the two parts being mated together when installing the parachute in the seat. The 40G webbing strap is passed down through the assembled split yoke and the lug of the strap is locked into the top harness lock during the

equipping procedure to attach the parachute to the seat. The two short straps restrain the occupant's shoulders when strapped in. The parachute rip-cord handle is attached to the left lift web at shoulder height, a downward pull being required to deploy the parachute in the manual separation case. Rubbing strips are attached to the front face of the parachute pack to protect the pack from wear. A back pad, fitted for comfort and to give support to the lumbar regions, is attached by two straps to buckles at the bottom of the parachute pack and to the lift web by two press studded beackets.

Go-forward mechanism

5. A go-forward mechanism is linked to the 40G beam permitting the occupant to lean forward when required. The mechanism is controlled by a three-position spring loaded lever situated on the port side of the seat pan. If the lever is pushed fully rearwards and then released to the centre position, the occupant can lean forward and backward at will. Movement of the lever to the forward position brings the snubbing unit in the 40G beam into action preventing further forward movement and automatically locking the harness in the rearward position as the occupant leans back. In the event of a crash landing or ejection occurring whilst the lever is in the central position, an automatic inertia device brings the snubbing unit into action to prevent the occupant being thrown forward.

Seat straps

6. Two adjustable lap straps one port and one starboard, are provided to restrain the occupant in the seat. Each lap strap terminates in a lug which is locked into the appropriate lower harness lock. The other end of each lap strap terminates in another lug which is locked into the quick-release fitting of the skeletal torso harness during strapping-in. Attached to each lap strap are two short straps, the upper one called the sticker strap terminates in a lug which is inserted into the sticker clip on the seat pan side, the lower one is attached to a quick-release fitting to which is connected an arrow-head connector of the survival pack.

Negative-g restraint strap

7. A negative-g restraint strap is fitted to restrain the occupant against vertical movement when subjected to negative-g forces. The strap passes through brackets in the floor of the seat pan, the rear ends being attached to the lap

strap lugs before insertion into the lower harness locks, and the forward end terminates in a lug which is locked into the quick-release fitting of the skeletal torso harness during strapping-in. Means are provided for tensioning the strap during the strapping-in procedure.

Leg restraint system

8. Leg restraint cords are provided to ensure that the legs are drawn back and held close to the seat pan during and after ejection. The cords pass through snubbing units below the front of the seat pan, then through roller brackets incorporating a shear rivet and attached to the cockpit floor, before being finally anchored under the seat pan. The snubbing units allow the cords to pass freely rearwards but prevent the cords passing forward except when released by the spring-loaded toggle at the front of the unit. The free end of the cords terminating in taper plugs are passed through the rings on the leg garters before being inserted into the taper plug assemblies on the front of the seat pan. The taper plug assemblies are connected to the harness release mechanism and an independent leg line release lever is provided on the forward end of the port side of the seat pan.

9. The leg restraint garters are strapped one to each leg below the knee. Attached to one end of the garter is a quick-release fitting and a little way along is a triangular shaped ring through which the leg restraint cords are passed. The other end of the garter is passed through a self locking buckle incorporating an arrow head connector which mates with the quick-release fitting. The leg garters can be adjusted to suit, the loose ends fastened back by the Velcro strip, and the leg garters can then be removed and refitted by means of the quick-release fitting and arrowhead connector.

Manual separation

10. In the event of failure of the automatic facilities, a manual release handle is provided on the starboard side of the seat pan. When operated it releases the occupant from the seat and fires the guillotine firing unit to sever the parachute withdrawal line separating the parachute from the seat structure. The parachute can then be deployed by pulling down the handle attached to the left lift web.

Personal survival pack Type ZD

11. The Type ZD personal survival pack is a rigid cased pack complete with cushion and is housed in the seat pan where it forms a comfortable seat for the occupant. It is attached to the lap straps by two quick-release couplings, one on each strap, and to the lifejacket by the lowering line stowed in a rolled satchel in the port side of the cushion. The lap strap attachments are connected when the seat is equipped and the lowering line by the occupant when strapping-in. The lowering line, being attached to the clothing, enables the harness quick-release fitting to be released during a parachute descent so that the pack and lap straps fall and hang 15 feet below the body.

Emergency oxygen

12. The emergency oxygen consists of an emergency oxygen cylinder and operating head assembly, with in-situ cocking, mounted in the port rear corner of the seat pan and connected to a personal equipment connector (P.E.C.) on the port side of the seat pan. From the P.E.C. the oxygen is fed through a high pressure hose to a miniaturised man-mounted regulator of either low or high altitude type which is mounted on the lifejacket closure plate. The low pressure supply tube from the oxygen mask is connected to the regulator. The supply from the cylinder is turned on automatically during ejection as the aircraft portion of the P.E.C. is disconnected. Provision is made for the manual operation of the system, in the event of failure of the main oxygen supply, by means of a yellow/black striped knob situated on the front end of the port side of the seat pan. The emergency oxygen system is capable of meeting both pressure suit inflation and the breathing requirements of the occupant in the event of failure of the main supply or when abandoning the aircraft.

Personal equipment connector

13. The personal equipment connector (P.E.C.) is fitted to the port side of the seat pan. It enables the emergency oxygen, main oxygen, air ventilated suit (A.V.S.), anti-g suit and mic/tel leads to be connected or disconnected in one action. The P.E.C. comprises three components:-

- (1) *Aircraft portion.* Connected to the cockpit floor by a static line and to the personal supply system in the aircraft. The

handle trips the emergency oxygen operating linkage when the aircraft portion is separated from the seat portion.

(2) *Seat portion.* Bolted to the seat pan and connected to the emergency oxygen cylinder.

(3) *Man portion.* Attached to the flying clothing by supply pipes. A lanyard is attached between the handle and the flying clothing so that the man portion is pulled free from the seat portion as the occupant separates from the seat.

SEQUENCE OF EVENTS DURING EJECTION

14. When either firing handle is pulled the emergency ejection sequencing system is activated and the jettisoned canopy withdraws the interlock block from the firing mechanism permitting the continued pull on the firing handle to fire the ejection gun and eject the seat. As the seat ascends the guide rails the following sequence occurs :-

- (1) The leg restraint cords tighten until the rivets shear.
- (2) The time-delay mechanism of the drogue gun is activated, the gun being fired after one second.
- (3) The time-delay mechanism for the barostatic time-release unit is tripped. The functioning of the mechanism is dependent upon aircraft height and speed at the time of ejection.
- (4) The electric supply leads to the seat raising actuator are disconnected.
- (5) The OFF switch is tripped.
- (6) The aircraft portion of the personal equipment connector is separated from the seat portion, disconnecting the main oxygen, anti-g switch, A.V.S. and mic/tel supplies between the aircraft and the seat. The handle trips the operating link and turns on the emergency oxygen supplies.
- (7) After one second the drogue gun fires and the two drogues stabilize and retard the seat. If the ejection occurs at high altitude the seat will eventually fall nearly vertical with the occupant restrained from falling forward by the lap straps and shoulder straps. At low altitudes there may not be time for the seat to attain the near vertical position. During this phase the occupant will be breathing emergency oxygen from the

emergency oxygen system fitted on the seat.

(8) After an appropriate delay the occupant is released from the seat and his parachute canopy opens automatically. Deployment of the parachute pulls the occupant from the seat separating the sticker strap lugs from the clips on the seat pan. At the same time the man portion of the P.E.C. is pulled from the seat portion, detaching the personal services from the seat and enabling ambient air to be inhaled. At low or moderate aircraft speeds and height the delay is 1.75 seconds after ejection. At high altitude the 1.75 seconds delay does not start until the seat has descended below 10,000 ft. At high speeds, at 10,000 feet or below, the delay does not start until the seat has decelerated to a safe speed for the parachute to deploy.

Connections to the aircraft

15. On an installed ejection seat the following items are connected to the airframe or fixed portion of the seat :-

- (1) *Port side of seat :-*
 - (a) Static rod from the drogue gun to the cross beam.
 - (b) Static line from the aircraft portion of the P.E.C.
 - (c) All P.E.C. services.
- (2) *Starboard side of the seat :-*
 - (a) Static rod from the barostatic time-release unit to the cross beam.
 - (b) Electric supply lead to the seat adjusting actuator
- (3) *Underside of the seat :-*
 - (a) Leg restraint cord roller brackets to the floor.
- (4) *Top of the seat :-*
 - (a) Static cable from the canopy to the interlock block.
 - (b) Firing linkage to the primary initiator of the ejection sequencing system.

EQUIPPING THE SEAT

16. The following procedure is to be used when installing the equipment in the seat, refer to figures 1 to 10 for detail as necessary :-

- (1) Ensure the seat has been made safe for servicing in accordance with current instructions.

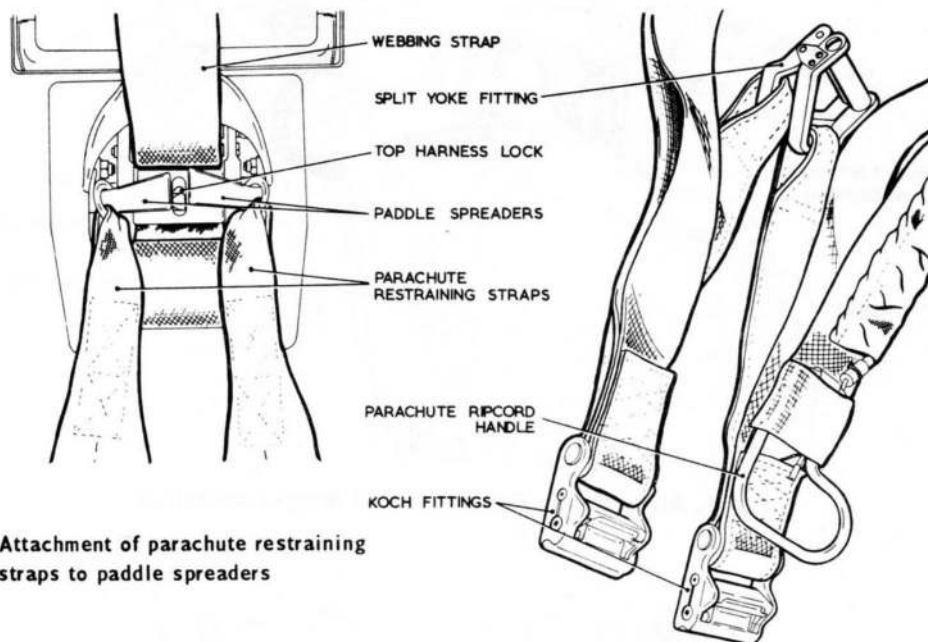


Fig. 1. Attachment of parachute restraining straps to paddle spreaders

Fig. 2. Arrangement of lift webs and split yoke

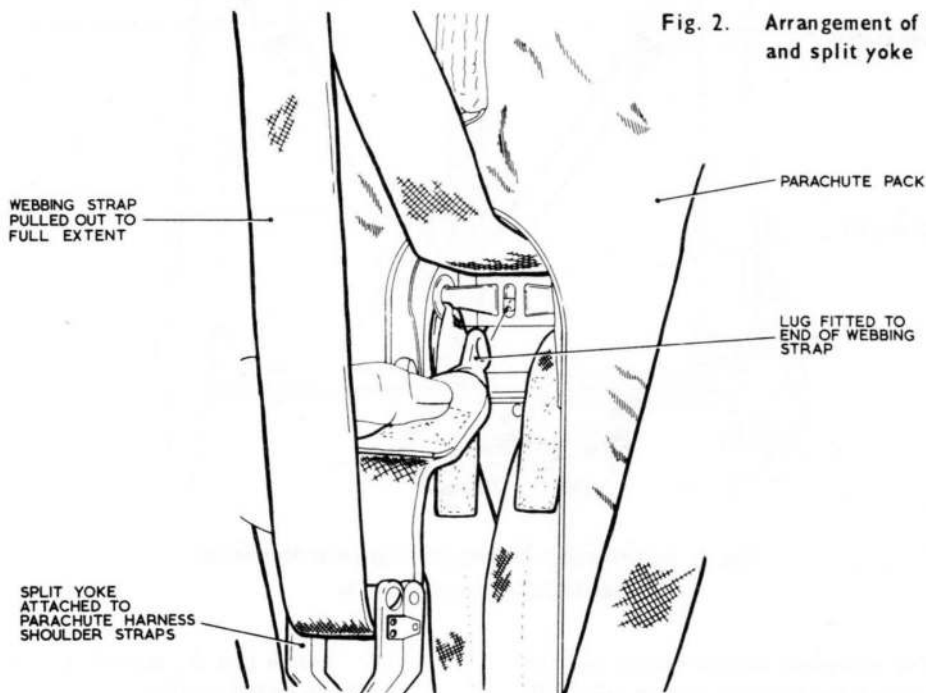


Fig. 3. Insertion of lug into upper harness lock

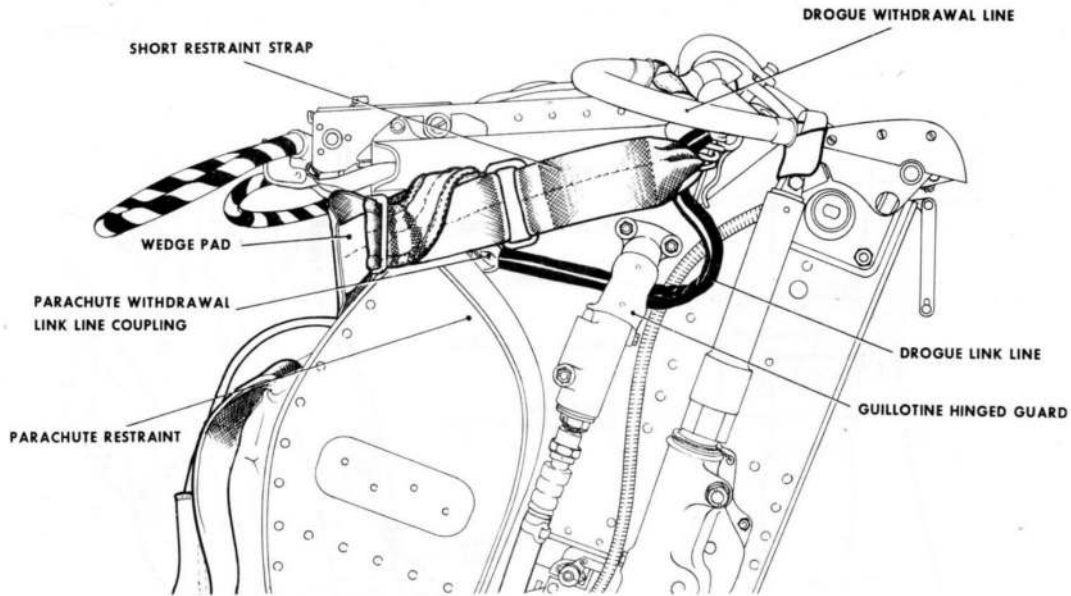


Fig. 4. Arrangement on port side of drogue container

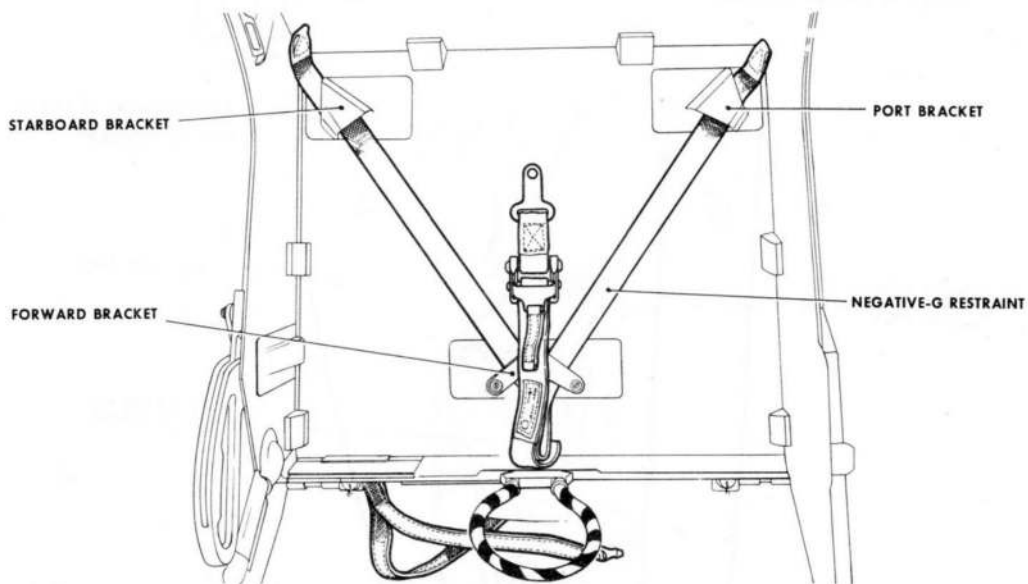


Fig. 5. Installation of negative-g restraint strap

◀(Mod. ES 3404 deleted)▶

(2) The emergency oxygen system must be fitted before the ejection seat is equipped.

(3) Ensure the seat pan is clean and that the leg restraint cords are clear of the seat pan.

(4) Ensure that the manual release handle is in the locked position.

(5) Open the paddle spreaders situated in front of the top harness lock and pass the O-rings of the two parachute restraining

straps over the paddle spreaders, one over each spreader. Push each O-ring well back towards the pivot end of its paddle spreader and close the paddle spreaders inwards towards each other as far as they will go (*fig. 1*).

(6) Place the parachute assembly in the seat pan. Carefully open the outer and intermediate flaps of the parachute pack and check that the rip cord cable pins are correctly positioned through the cones and that the scarlet cotton tie securing the starboard pin is unbroken. Replace the intermediate flap, re-route the withdrawal line on top of the intermediate flap and close the outer flap.

(7) Place the parachute in the container pushing it well back so that it is supported on the support bracket.

(8) Ensure that the split yoke is correctly assembled and that the lift webs are not twisted (*fig. 2*).

(9) Move the go-forward lever to the rearward position, release it to the central position, restrain the paddle spreaders, pull out the webbing strap from under the parachute support bracket and hold it against the spring tension.

(10) Pick up the assembled split yoke ensuring that the straps are not twisted. Pass the webbing strap **DOWNWARDS** through the yoke and insert the lug fitted to the end of the webbing strap between the inner extremities of the paddle spreaders and into the top harness lock; push the lug in until it locks into position (*fig. 3*). It may be necessary to partially depress the harness release lever situated below the barostatic time-release unit to facilitate the insertion of the lug. Check that the lug has locked in correctly by pulling on the webbing strap. Allow the webbing strap to wind back and return the go-forward lever to the forward position.

(11) Draw the free ends of the parachute restraining straps forward through the arch of the parachute pack, over the pack and

towards the rear of the seat on either side of the drogue container.

(12) Pass the port restraining strap over the parachute withdrawal line and through the buckle of the short restraining strap on the port side of the drogue container, from the outside inwards. Route the drogue link line **UNDER** the short restraining strap.

(13) Pass the starboard restraining strap through the buckle of the short restraining strap on the starboard side of the drogue container, from the outside inwards.

(14) Position the wedge pad on top of the parachute pack between the pack and the drogue container. The wedge pad is stencilled with the word **TOP** to ensure correct installation. Pass the ends of the parachute restraining straps through the buckles on each side of the wedge pad so that the ends emerge on the outside of the buckles (*fig. 4*).

(15) Tighten the straps evenly until the parachute pack and wedge pad are strapped tightly to the seat. Pass the ends back through the buckles on the short straps so that they are stowed neatly between the drogue container and the straps.

(16) Check that the drogue withdrawal line has been routed **OVER ALL OTHER LINES**.

(17) Connect the two halves of the parachute withdrawal line/link line coupling. Open the yellow gate on the top of the guillotine and route the drogue link line through the aperture in the guillotine. Close the yellow gate and ensure that it correctly retains the drogue link line. The drogue link line is routed under the short restraining strap (*fig. 4*).

(18) Fit the negative-g restraint strap as follows:-

(a) Thread the white straps through the front bracket on the floor of the seat pan from front to rear. The white straps are marked **PORT** and **STARBOARD** and it is essential that they are so positioned to ensure correct installation (*fig. 5*).

(b) Pass the straps rearwards and thread each strap through its respective rear bracket on the floor of the seat pan.

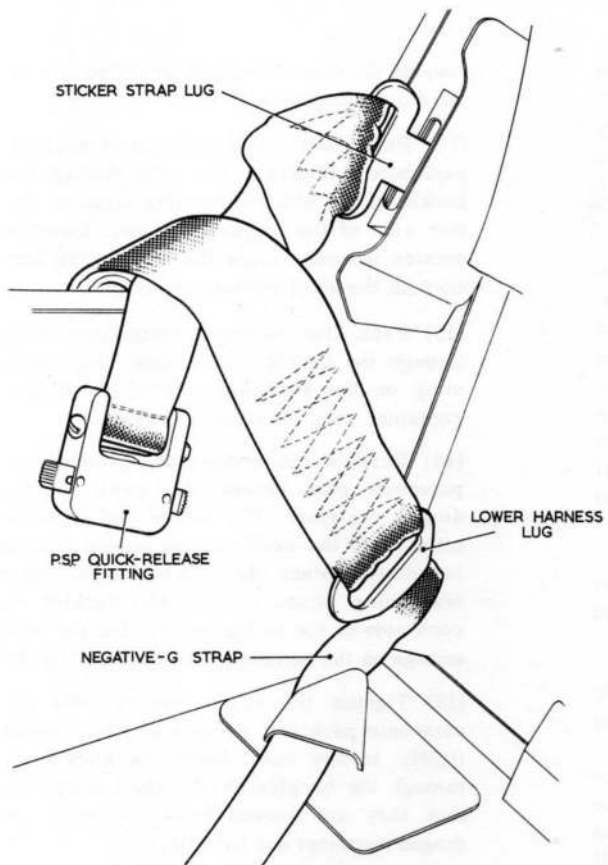


Fig. 6. Fitting the starboard lap strap (port similar)

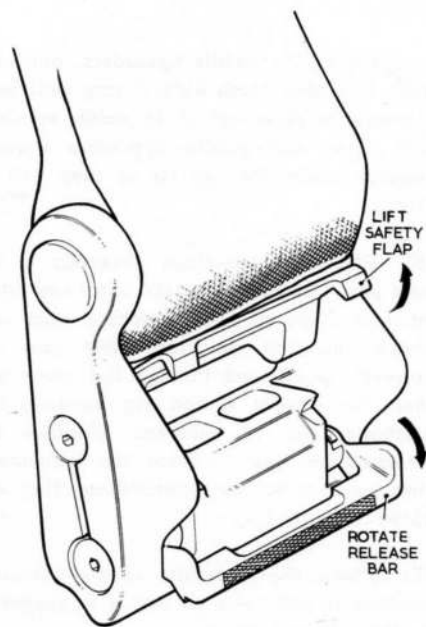


Fig. 7. Operation of Koch fitting

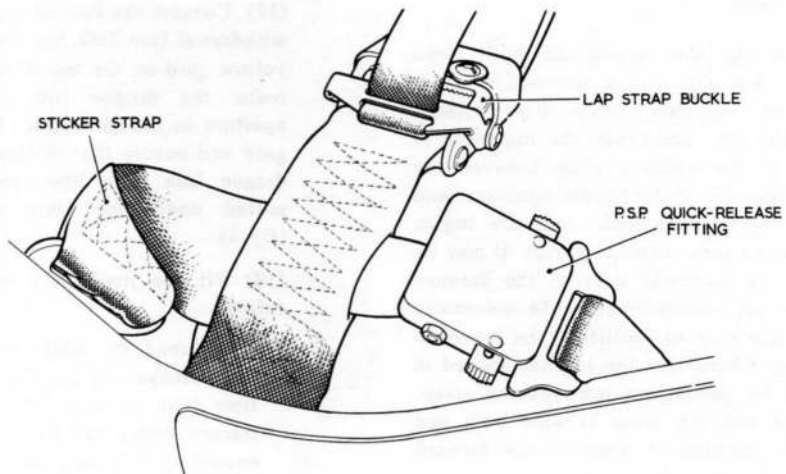


Fig. 8. Attachment of personal survival pack to lap strap (starboard)

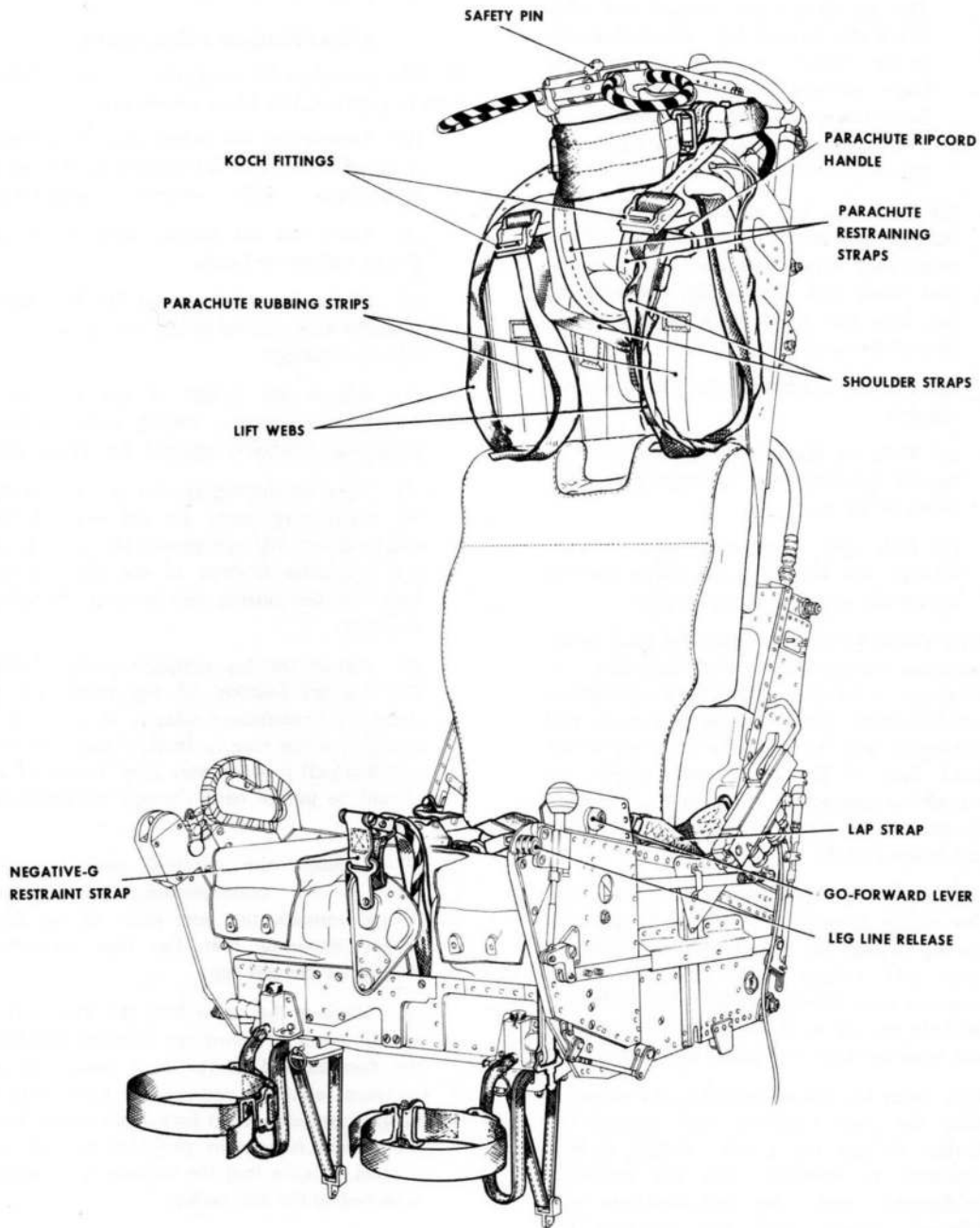


Fig. 9 The seat equipped (port)
◀(Mod. ES 3404 deleted)▶

(19) Position the lap straps ready for fitting and proceed as follows referring to fig. 6 as necessary :-

Note . . .

The lap straps are handed and when fitted the largest lug, attached to the single strap, is inserted into the lower harness lock, the survival pack quick-release fitting hangs below the strap, the sticker strap lies above the lap strap, and the buckle faces forward.

(a) Pass the lug of the port lap strap through the loop of the port leg of the negative-g strap and insert it into the port lower lock. Insert the sticker strap lug into the spring clip on the inside face of the seat pan.

(b) Fit the starboard strap in a similar manner.

(c) Pull on each strap to ensure it is locked and drape the lap straps over the sides of the seat pan.

(d) Pull the negative-g strap forward through the brackets and drape the lug OVER the seat pan firing handle.

(20) Place the personal survival pack in the seat pan taking care that the lowering line stowage in the port side of the cushion is not disturbed. The lowering line arrowhead connector will lay over the port end of the front face of the seat pan. Connect the arrowhead connectors of the side attachment straps to the quick-release fittings on the lap straps (fig. 8).

(21) Place the back pad in position. Pass the straps attached to the rear of the back pad up through the buckles on the parachute case and secure them with the Velcro fastener tape. Route the lift webs under the beackets on top of the back pad and secure the beackets with the press studs provided.

(22) Pass the leg restraining cord emerging from the port snubbing unit through the D-ring of one leg garter, routing it from outboard to inboard when the garter is positioned with the quick-release end inboard. Repeat with the starboard leg restraining cord and the other leg garter.

(23) Extend all the straps to their full extent and ensure that the Koch fittings on the parachute lift webs are set with the

safety flap over the release bar. Lay the lap straps in the seat pan. Lift the shoulder straps and secure them in the stowage position with the straps provided on the top face of the parachute pack.

STRAPPING-IN PROCEDURE

17. The procedure for strapping-in is as follows: refer to figures 11 to 13 as necessary.

(1) Ensure that the safety pins are correctly fitted in the safe for parking condition, in accordance with current instructions.

(2) Carry out all checks detailed on the Flight Reference Cards.

(3) Sit in the seat, remove the dust cover from the seat portion of the P.E.C. and fit it into its stowage.

(4) Adjust the height of the seat to a satisfactory position, ideally with the head positioned centrally against the wedge pad.

(5) Take up the leg garters and ensure the leg restraining cords are not twisted, the quick-release fittings should lie inboard and the triangular D-rings to the back of the legs. Fit the garters one to each leg below the knee.

(6) Adjust the leg restraint cords to give the desired freedom of leg movement. If there is insufficient length of cord, pull forward on the ring in front of the snubbing unit and pull forward more cord. Excess cord should be pulled back through the snubbing units.

(7) Connect the survival pack lowering line to the corresponding quick-release fitting beneath the port stole of the life-jacket ensuring that the line is routed outside of the left leg.

(8) Remove the cover from the man portion of the P.E.C., insert the forward end into the forward end of the seat portion in an inclined attitude and seat down with a hinging motion until it locks into place. Test for correct fitment by checking the mic/tel system. Ensure that the lanyard is correctly attached to the life jacket.

(9) Bring across the lap straps and insert the lugs into the quick-release fitting of the skeletal torso harness. The left lap strap should pass over the survival pack lowering line.

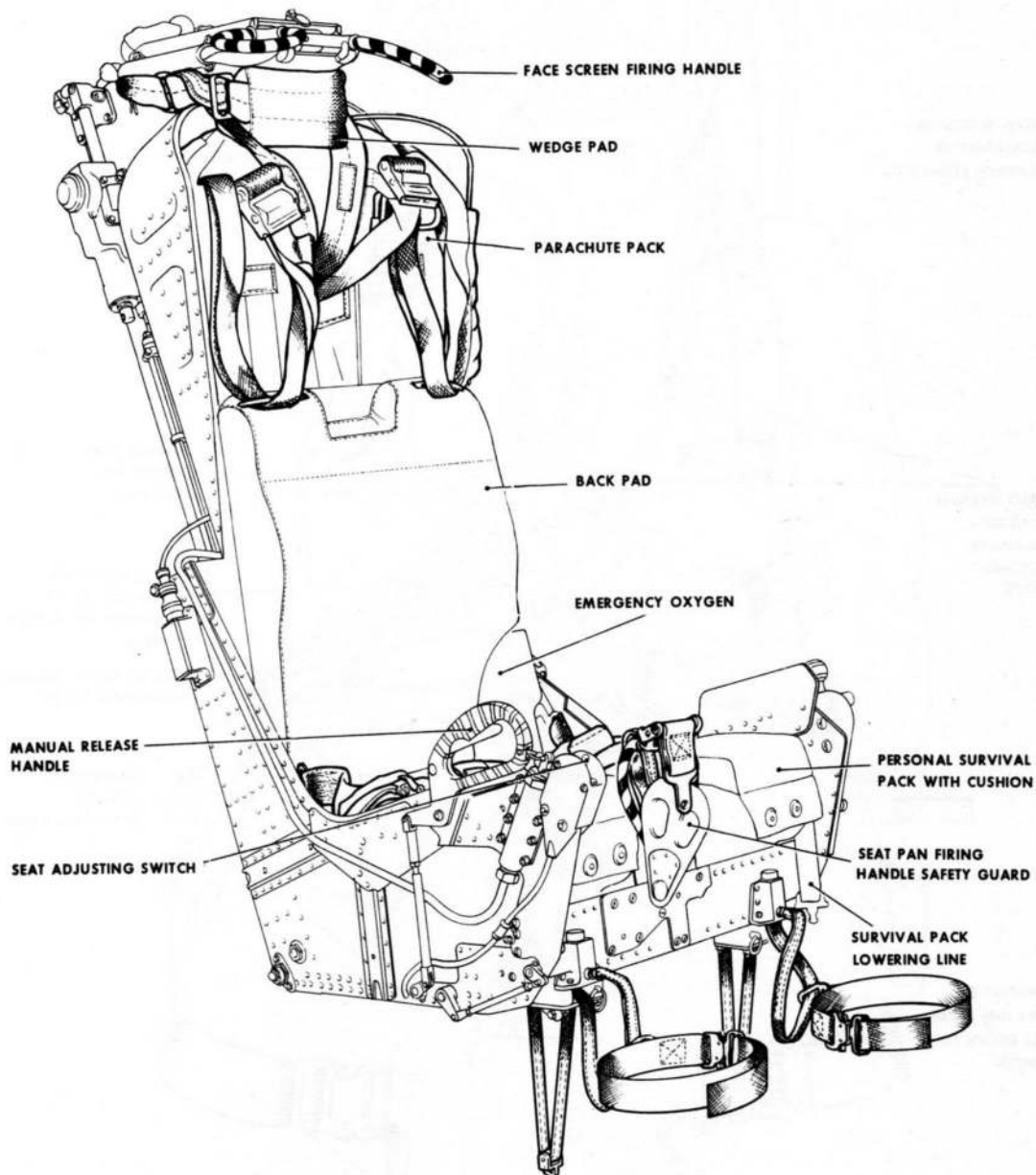


Fig. 10 The seat equipped (starboard)

(10) Bring the negative-g strap up between the legs ensuring that it is to the rear of the seat pan firing handle and NOT PASSED

THROUGH it and that the buckle is facing forward. Insert the lug into the quick-release fitting of the torso suit.

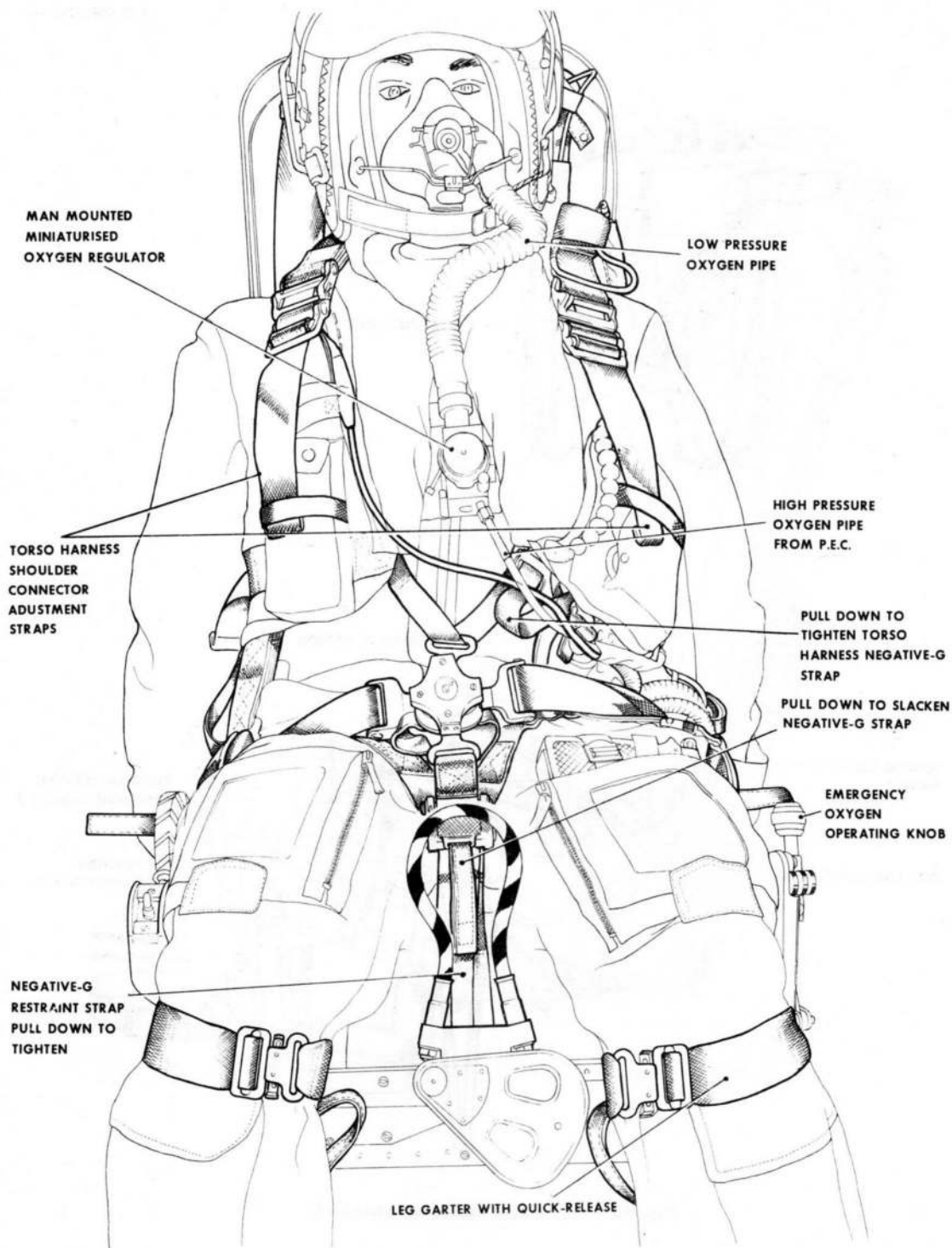


Fig. 11 Arrangement of leg restraint cords and harness straps
◀(STI/FC/109)▶

- ◀(11) Operate the go-forward control, pull on the parachute lift webs and connect the Koch fittings to the lugs on each shoulder of the skeletal torso harness. To fit, it is necessary to raise the safety flap of the Koch fittings and push the lug into the fitting until it locks into place. An audible 'click' will be heard on correct engagement and full return of the safety flap will indicate positive locking.▶

Note . . .

To release a Koch fitting lift the safety flap and rotate the release bar downward (fig. 7). The bar is knurled on the top to improve the grip.

- (12) Tighten the lap straps evenly ensuring that the quick-release fitting is positioned centrally in the lap. Roll up the ends of the straps and secure with the Velcro fasteners.
- (13) Tighten the negative-g restraint strap by pulling down on the free end of the blue strap locating the quick-release box over the pubis.

Notes . . .

- (1) *It is important that the lap straps and negative-g restraint strap are as tight as possible as they provide the principal restraint under all stress conditions.*
- (2) *The lap straps and negative-g restraint strap can be loosened by pulling on the tabs attached to the snubber bars of the adjusting buckles.*
- (14) Return the go-forward lever to the locked position and lean hard back in the seat.
- (15) Tighten the torso harness shoulder connector adjustment straps. Tuck the ends down under the parachute harness torso adjustment straps.
- (16) Tighten the torso harness negative-g strap.
- (17) Put on the flying helmet and fasten the chin straps. Connect the oxygen mask hose to the regulator. Connect the mic/tel lead locating the connector outside or beneath the right stole of the life-saving jacket.

Note . . .

If the chin straps are not fastened the helmet and oxygen mask may be

wrenched off during ejection with the consequent loss of vital oxygen at high altitude.

18. After strapping-in carry out the following functional checks:-

- (1) Check that the face screen firing handle can be reached with both hands simultaneously. DO NOT PULL.
- (2) Check that the man portion of the P.E.C. is correctly fitted by testing the mic/tel system.
- (3) Check that the leg restraint cords are locked in their sockets.
- (4) Raise and lower the seat to its full extent and check that the aircraft portion of the P.E.C. remains locked to the seat portion. Reposition to the desired height.
- (5) Operate the go-forward mechanism and check for correct functioning. Lean forward to permit a ground crew member to check that the split yoke has not separated.
- (6) Conduct pre-flight oxygen checks.

19. With assistance remove the safety pins from the safe for parking positions. Stow the pins.

Note . . .

If assistance is not available the occupant must remove and stow all safety pins.

EMERGENCIES

20. Instructions for dealing with emergencies are contained in Pilots/Aircrew notes.

LEAVING THE AIRCRAFT AFTER LANDING

21. The following procedure is to be followed when leaving the aircraft after landing:-

- (1) Release the oxygen mask and turn off the oxygen supply.
- (2) Remove the safety pins from the stowages and with assistance place them in the safe for parking positions.

Note . . .

If assistance is not available the occupant must position all safety pins himself.

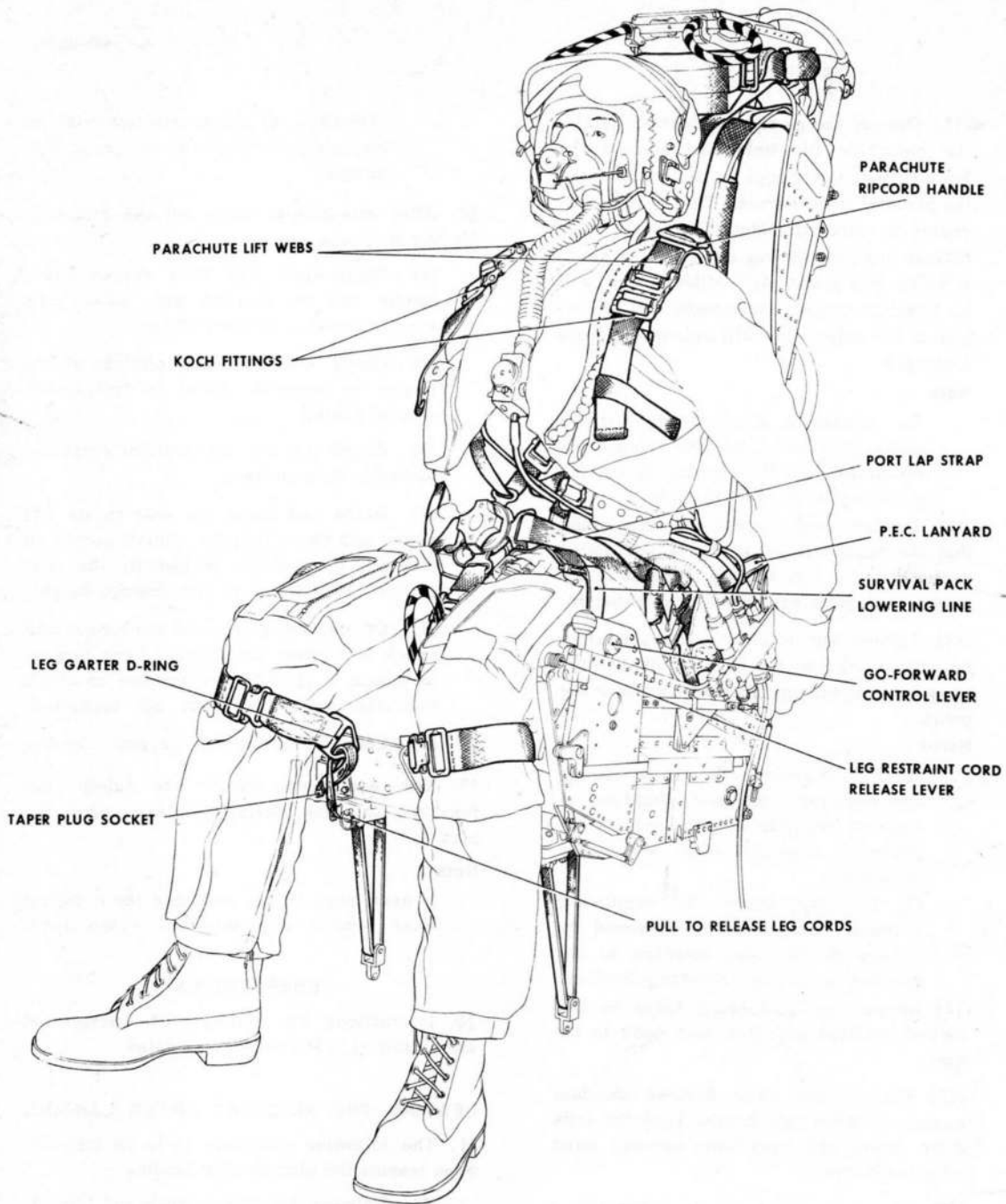


Fig. 12 The seat occupied (port)

◀(ST1/FC/109)▶

(3) Free the shoulder straps by operating the Koch fittings. To operate lift the safety flap and rotate forward the release bar.

Note . . .

After operating the Koch fitting ensure

that the release bar returns and that the safety flap, when released, is over the release bar.

(4) Loosen the lap straps and negative-restraint strap by pulling on the tabs attached to the snubbers in the buckles.

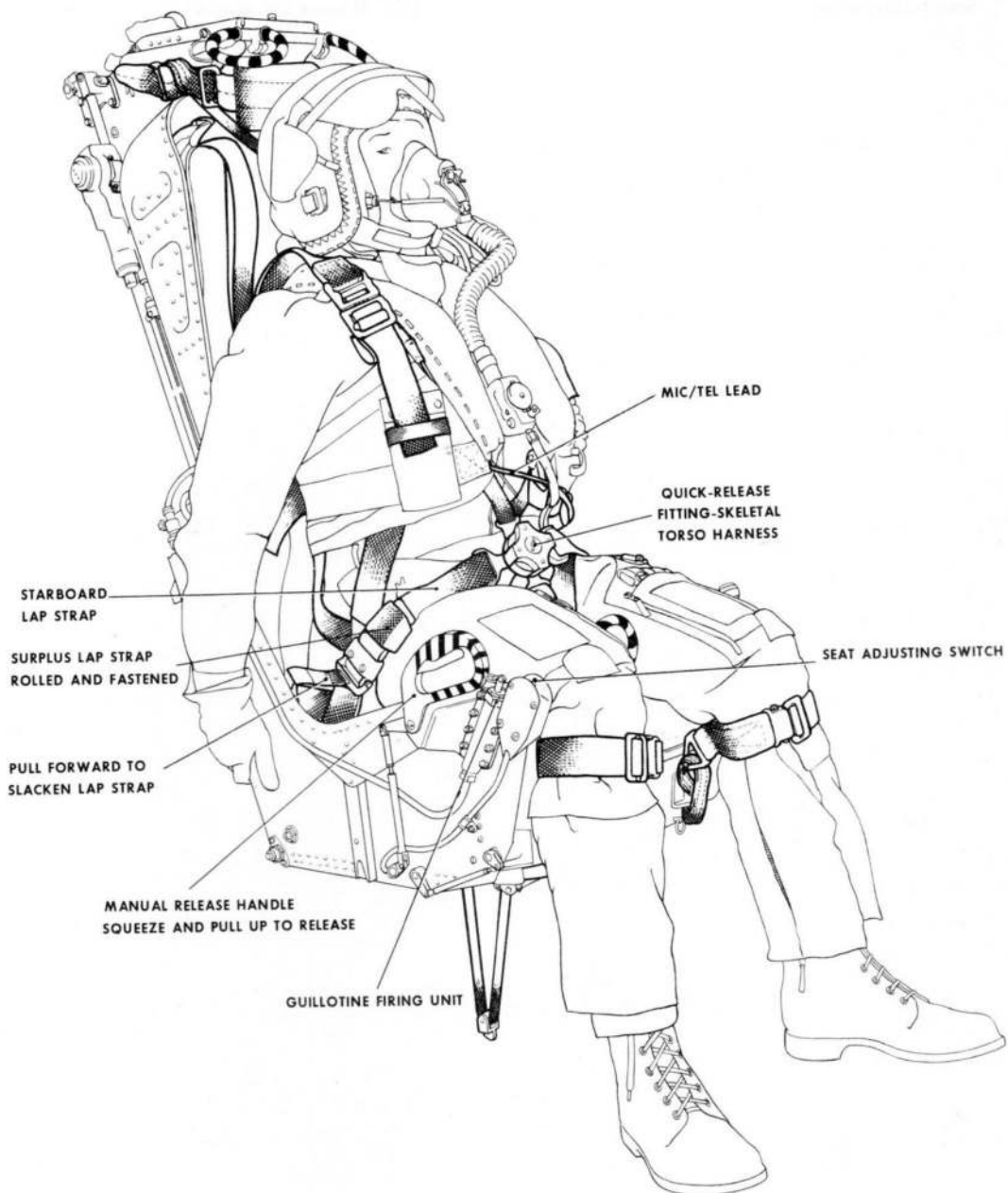


Fig. 13 The seat occupied (starboard)

◀(Mod. ES 3404 deleted)▶

Operate the harness quick-release fitting by rotating it 90 deg. to the left or right to release the lap straps and seat negative-g restraint strap.

(5) Pull up on the handle to remove the man portion of the P.E.C. from the seat portion. Fit dust covers to the seat portion and man portion.

(6) Release the leg garters from the legs by operating the quick-release attachments leaving the garters attached to the leg restraining cords.

(7) Disconnect the personal survival pack lowering line from the lifejacket.

(8) Vacate the aircraft.

Appendix 1
FLYING CLOTHING

Introduction

1. The following information includes lists of available items, the recommended combinations of these items for high and low altitude flying in both summer and winter conditions, and their limitations of use. Dressing and functional tests which are to be conducted before leaving the crewroom or cloakroom are also included. Description and servicing will be found in A.P.108E (Naval) and A.P.1182E or the appropriate publication in the A.P.108F-series; reference is to be made to this information as necessary.
2. The anti-g trousers Mk. 6C when worn, counter the effect of high G loading on the wearer.
3. The air ventilated suit Mk. 2A worn in warm weather, provides against heat exhaustion in the aircraft, and by connection to an air supply on the ground, immediately the suit is fitted.
4. The coverall, partial pressure/anti-g/air ventilated Mk. 2 performs both the functions described in para. 2 and 3, and also it is used as a pressure garment to protect the body following loss of cabin pressure at high altitude.
5. The anti-g garments in para. 2 and 4 are functioned by a 'g' valve installed in the aircraft. The pressure bladder of the combined garment in para. 4 is functioned by the man-mounted, high altitude, oxygen regulator; this inflates the pressure bladder when a cabin pressure failure occurs above 38000 ft.

Flying clothing assemblies

6. For convenience, the combination of items of flying clothing required for high and low altitude flying, in either summer or winter conditions, are listed separately. Since items such as underclothing are common in all assemblies and do not affect the limitations placed on the use of an assembly, e.g. the maximum height at which full protection is retained; only the functional items are listed under the appropriate assemblies. All functional items of the assemblies are issued and fitted initially to all crew members by the Aero Medical Training Centre, R.A.F. North Luffenham.

List of clothing items

7. (1) Common items

<u>RN</u> <u>Vocab Ref</u>	<u>RAF</u> <u>Ref No</u>	<u>Description</u>
47220-3	22C/2467 to 2469 2770	Helmet, integral protective Mk. 2A
-	22C/1300238	Life preserver aircrew Mk. 10 (RAF only)
	22C/1301515	Life preserver Mk. 10A (RAF only)
47487	22C/1300240	Life preserver aircrew Mk. 11 (RN only)
47488		Life preserver Mk. 11A (RN only)
47250-55	22C/2827 to 2832	Gloves, cape leather, sweat resistant
47214-19	22C/1253255-260	Gloves, cape leather, water resistant

<u>RN</u> <u>Vocab Ref</u>	<u>RAF</u> <u>Ref No</u>	<u>Description</u>
47380-83	22C/1301932-935	Tee shirt, aircrew
47990-97	22C/2693 to 2700	Socks, terryloop
47952-59	22C/9421244-250	Socks, woollen, knitted, plain
47924-27	22C/1301906-909	Vest, aircrew, wool/Courtelle
47458-61	22C/132664-671	Vest, aircrew, fine, cotton ribbed
47462-66	22C/1321672-679	Drawers, aircrew, fine cotton ribbed long
47918-22	22C/1301911-916	Drawers, aircrew, wool/Courtelle
47541-4	22C/1300275-278	Harness, skeletal Mk. 1
47409	22C/1864	Knife, emergency, aircrew Mk. 3
-	6D/3563	Hose assembly, high pressure, Mk. 1
-	6D/3560	Mask, oxygen, P7
-	6D/3561	Mask, oxygen, P7 (Medical)
-	6D/3558	Mask, oxygen, Q7
-	6D/3559	Mask, oxygen, Q7 (Medical)
		or
-	6D/3570	Mask, oxygen, V1, large
-	6D/3571	Mask, oxygen, V1, large (Medical)
-	6D/3572	Mask, oxygen, V1, small
-	6D/3573	Mask, oxygen, V1, small (Medical)
-	6D/8475-99-220-2955	Connector, air ventilated suit
-	6D/8475-99-220-2956	Connector, anti-g suit
-	27L/148-1767	Garters, leg restraint

(2) Items for high altitude

<u>RN</u> <u>Vocab Ref</u>	<u>RAF</u> <u>Ref No</u>	<u>Description</u>
	Summer	
-	22C/1301248-255	Coverall Aircrew Mk. 9 ▶
47561-9	22C/1300184-193	Coverall, flying, lightweight Mk. 12 (RN only)
-	22C/1300194-203	Coverall, flying, lightweight Mk. 11 (RAF only)
47531-9	22C/1300204-213	Coverall, partial pressure/anti-g/air ventilated Mk. 2
-	22C/1229236-251	Boots, flying, lightweight
-	6D/3705	Miniaturised oxygen regulator, man-mounted, high altitude (Pt. No. 532/WOOO) Stage 2
		or
-	6D/3579	Miniaturised oxygen regulator, man-mounted, high altitude Mk. 1 Type 324 (Pt. No. 153/WOOO) Stage 4
	Winter	
	22C/1300224 to 1300233	Coverall, immersion Mk. 10
47071-86	22C/1229220-235	Boots, flying, 1965 pattern
	22C/1278396-405	Socks, butyl Mk. 2 (for coverall, immersion Mk. 10)
47531-9	22C/1300204-213	Coverall, partial pressure/anti-g/air ventilated Mk. 2
◀ -	22C/1302403-412	Coverall, Inner, Aircrew Mk. 2 ▶

<u>RN</u> <u>Vocab Ref</u>	<u>RAF</u> <u>Ref No</u>	<u>Description</u>
	Winter	
	22C/1301203-212	Coverall, inner aircrew
71250-59	22C/1300950-953	Pullover, jersey wool, heavy (RN only)
	6D/3705	Miniaturised oxygen regulator, man-mounted, high altitude (Pt. No. 532/WOOO) Stage 2
		or
		Miniaturised oxygen regulator, man-mounted, high altitude, Mk. 1 Type 324 (Pt. No. 1563/WOOO) Stage 4

(3) Items for low altitude

<u>RN</u> <u>Vocab Ref</u>	<u>RAF</u> <u>Ref No</u>	<u>Description</u>
	Summer	
47561-9	22C/1300184-193	Coverall, flying, lightweight Mk. 12 (RN only)
-	22C/1300194-203	Coverall, flying, lightweight Mk. 11 (RAF only)
-	22C/1058603-608	Coverall, air ventilated Mk. 2A
47690-3	22C/1300180-183	Trousers, anti-g Mk. 6C
-	22C/1229236-251	Boots, flying, lightweight
	6D/2205824	Miniaturised oxygen regulator, man-mounted, low altitude Mk. 2 (Pt. No. 1551/WOOO) Stage 3
	Winter	
47771-9	22C/1300224-233	Coverall, immersion Mk. 10
	22C/129220-235	Boots, flying, 1965 pattern
	22C/1278396-405	Socks, butyl Mk. 2 (for coverall, immersion Mk. 10)
	22C/1058603-608	Coverall, air ventilated Mk. 2A
	22C/1301203-212	Coverall, inner, aircrew
47690-3	22C/1300180-183	Trousers, anti-g Mk. 6C
71250-59	22C/1301950-953	Pullover, jersey, wool, heavy (RN only)
	6D/2205824	Miniaturised oxygen regulator, man-mounted, low altitude, Mk. 2 (Pt. No. 1551/WOOO) Stage 3

LIMITATIONS

High altitude assembly

8. The following limitations are placed on the use of this assembly:-

- (1) It affords full protection up to CABIN altitude of 60 000 ft taking into consideration the aerodynamic "suck" due to loss of canopy.
- (2) If cabin pressure is lost for any reason, the aircraft must be brought down to a CABIN altitude of 40 000 ft at maximum descent rate in a total time of 3½ min, followed by a

gradual descent to below 30 000 ft. It is essential that descent is commenced within 30 sec of the emergency. A.P.101B-0901-15 or 0902-15, Pilots Notes refer.

(3) If sorties are carried out over large water areas, immersion protection is given by using the Immersion Coverall Mk. 10.

Low altitude assembly

9. The following limitations are placed on the use of this assembly:-

(1) It provides protection up to a CABIN altitude of 50 000 ft taking into consideration the aerodynamic suck due to loss of canopy.

(2) If cabin pressure is lost for any reason, the aircraft must be brought down to a CABIN altitude of 40 000 ft at maximum descent rate (Pilots Notes, refer para. 8) in a total time of 2 min followed by a gradual descent below 30 000 ft. It is essential that descent is commenced within 30 sec of the emergency.

(3) If sorties are carried out over large water areas, immersion protection is given by using the coverall, immersion Mk. 10.

DRESSING

Royal Air Force

10. A flying clothing worker or other suitably qualified tradesman should be in attendance during dressing to render assistance where necessary.

High altitude (RN/RAF)

11. Subject to the conditions in para. 6 and prevailing summer or winter requirements, the following order of dressing is recommended for the high altitude assembly:-

(1) Vest and drawers.

(2) Coverall, partial pressure/anti-g/air ventilated Mk. 2.

Note . . .

In warm weather an air supply should be connected immediately the suit has been fitted and maintained in action until take-off (an adapter will be required between the suit and the air supply); this is important, since the risk of heat exhaustion is greater during this period than after the aircraft is airborne.

(3) Coverall, flying, lightweight. If winter clothing is required to be worn the coverall, immersion is to be donned in lieu of the coverall, lightweight. In extreme cold weather conditions the coverall, inner aircrew will also be worn, donned before the immersion suit.

Note . . .

Pass the hoses of the coverall combined pressure/anti-g/air ventilated through the slit provided on the left side of the coverall, flying or through the coverall, immersion udder seals as applicable.

- (4) Don flying boots.
- (5) Don skeletal torso harness and life-preserver.

Note . . .

The oxygen regulator/hose assembly is already attached to the life-preserver closure plate. Ensure that the ring on the P.E.C. handle is attached to the snap hook at the rear of the life-preserver.

- (6) Connect the coverall, partial pressure/anti-g connections to the P.E.C., leaving the coverall, air-ventilated suit hose connected to the air supply.
- (7) Don the helmet and oxygen mask and connect the mask tube to the regulator assembly.
- (8) Connect the mic/tel lead to the socket on the regulator hose assembly.
- (9) Conduct a functional test of the assembly in accordance with the instructions on the test rig cabinet.
- (10) Put on the gloves and proceed to the aircraft. Just before entering the aircraft disconnect the coverall, air ventilated from the air supply and connect the hose to the man-portion of the P.E.C.

Low altitude (RN/RAF)

12. The order of dressing for low altitude is similar to that for high altitude described in para. 6, except that the coverall, partial pressure/anti-g/air ventilated Mk. 2 is substituted for the separate anti-g trousers and air ventilated coverall.

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