AP 108B-0117-1

AIRCREW EQUIPMENT ASSEMBLIES

EJECTION SEATS TYPE 3H
(MARTIN-BAKER)
AND
AIRCREW LIST (M.L. AVIATION)

HUNTER F MK 6, F(GA) MK 9, FR MK 10 AIRCRAFT

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence

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ROYAL AIR FORCE by D WSE (RAF)

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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.

CONTENTS

MODIFICATION RECORD

The following record confirms that this publication incorporates all technical changes necessitated by the modifications listed below. Information on modification titles, classification, categories and Mark applicabilities is given in Topic 2.

Mod No	Brief details	Class
NONE		

AIRCREW EQUIPMENT ASSEMBLIES

EJECTION SEAT TYPE 3H
(HUNTER F. Mk.6, F (GA) Mk.9, AND FR. Mk.10 AIRCRAFT)

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ILLUSTRATIONS

APPENDICES

INTRODUCTION

1. The Type 3H ejection seat (fig. 1 and 2) is fitted in Hunter F. Mk. 6, F (GA) Mk. 9 and FR. Mk. 10 aircraft.

2. 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 or those concerned with, the A.E.A. and its function is included.

COMPOSITION OF THE ASSEMBLY

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

Ejection seat Type 3H

Safety harness Type ZR No. 13, Mk. 2. Mod. E.S.3150.

Parachute assembly Back Type, Mk. 9

Personal survival pack Type R, Mk. 2 c/w cushion.

Emergency oxygen set, Mk. 7A (an upper tube assembly is required to complete the system)

Flying clothing (Appendix 1).

DESCRIPTION

4. These assemblies (para. 3) are fully described in the following publications:-

Ejection Seat	A.P.109B-0117-1
Parachute Assembly	A.P.108C-0110-1
Personal Survival Pack	A.P.108E-0510-1
Emergency oxygen	A.P.107D-1002-1

FIRING SYSTEM

5. Two firing handles are fitted to the seat. The face screen firing handle projects from the front of the drogue container and has an integral face screen which protects the face from air blast during ejection. The seat pan firing handle is fitted behind the centre of the front face of the seat pan.

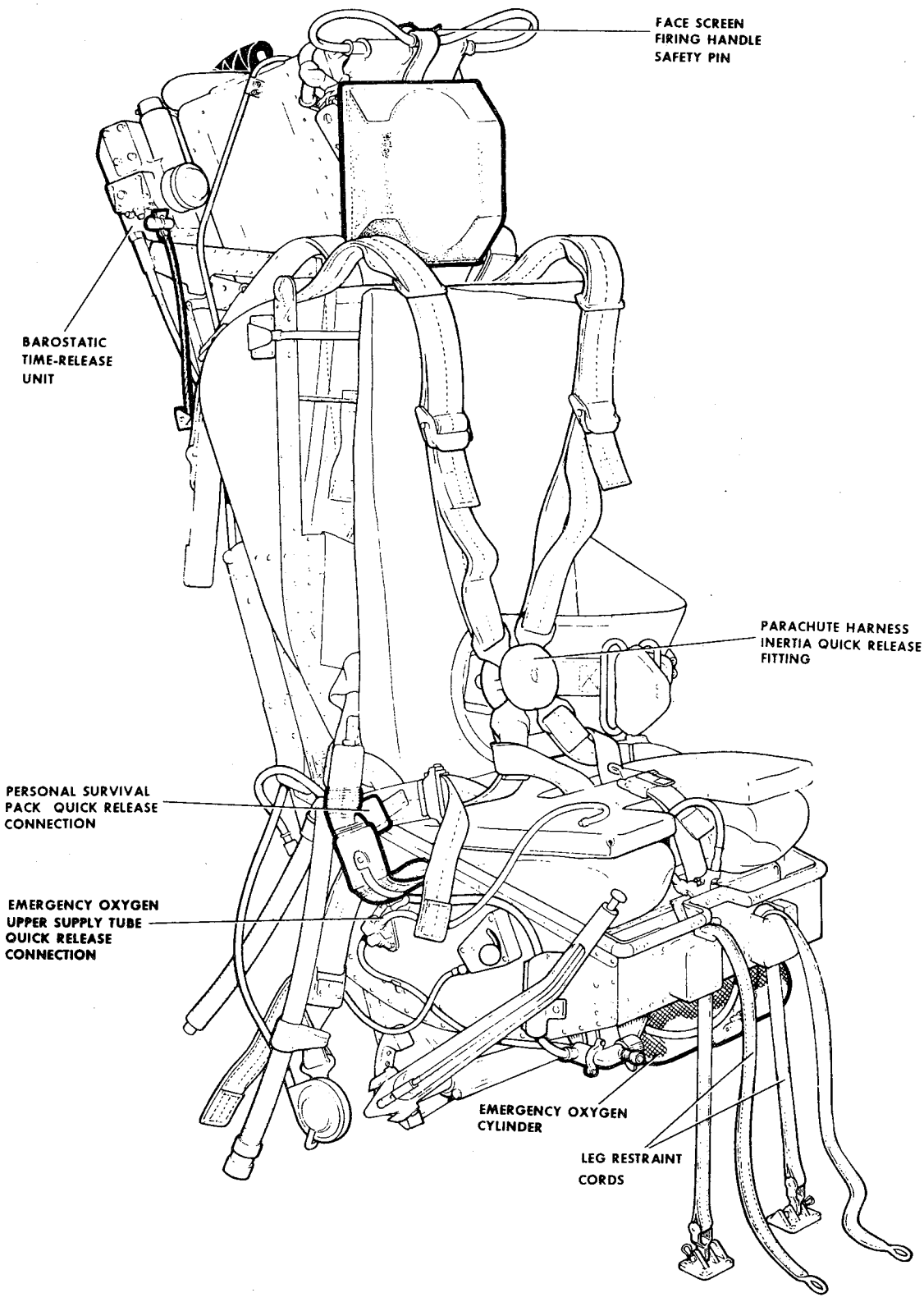

Fig.1 Seat equipped (1)

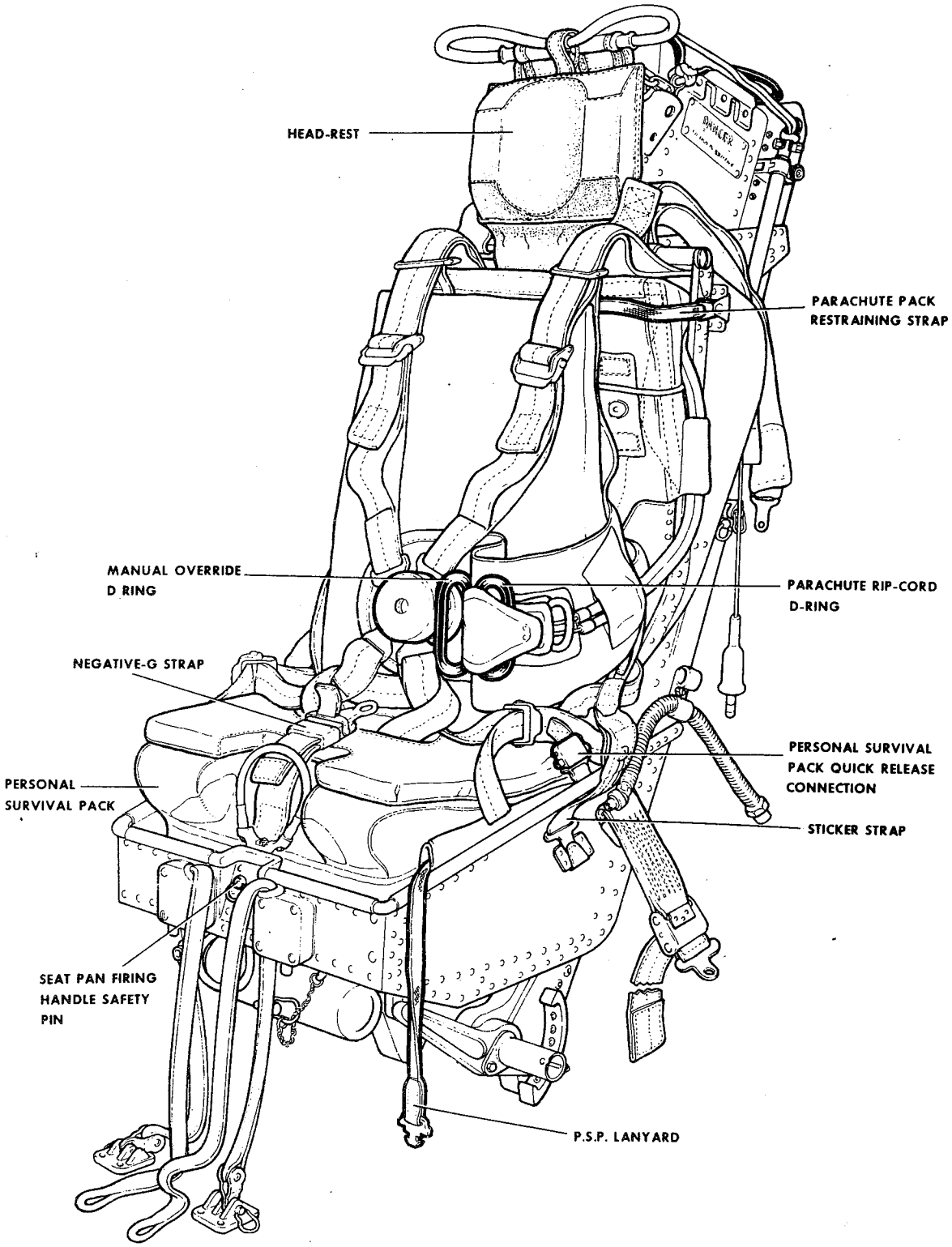

Fig. 2 Seat equipped (2)

6. Both firing handles are connected to the canopy jettison firing unit. When either handle is pulled the canopy is jettisoned immediately; after the appropriate delay the seat is ejected. A separate canopy jettison handle is fitted in the aircraft for use if it is necessary to jettison the canopy without initiating the ejection sequence.

HEADREST AND APRON ASSEMBLY

7. The headrest and apron assembly are secured to the front of the drogue container by the pins attached to the apron lifting line, two lugs on the lower end of the apron are secured to two spring clips on the parachute container. The apron is designed to pitch the seat occupant forward and then to open his parachute by means of an attached withdrawal line. After the occupant has left the seat and the apron has straightened, the weight of the seat frees the clips and the seat drops clear.

PARACHUTE ASSEMBLY

8. A back type Mk. 9 parachute assembly is fitted into the parachute container and is retained by two lugs attached to the parachute pack being secured by two spring clips situated on the outside of the parachute container. The parachute assembly is attached to the apron withdrawal line. The parachute harness is secured to the seat structure by two sticker strap lugs fitting into spring clips situated on the outside of the seat pan, also attached to the parachute harness are two quick-release connections for the attachment of the survival pack. Two D-rings are provided on the waist-belt, the first one disconnects the parachute from the apron, the second operates the parachute.

GO-FORWARD MECHANISM

9. The go-forward mechanism is controlled by a lever situated on the starboard side of the seat pan. The lever is connected to the radius arms of the parachute container and the cross-shaft by a cable. The radius arms are secured to the parachute container by the same bolt that secures the ZR No.13, Mk.2 seat harness to the parachute container, the radius arm bodies are secured to the seat structure by bolts. Operation of the go-forward lever releases the radius arms and allows the parachute container to hinge forward.

LEG RESTRAINING SYSTEM

10. Leg restraining 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 mounted on the seat pan front face. The lower ends of the cords are secured to rollers and brackets which, in their turn, are secured to the floor of the aircraft, the rollers are secured to the brackets by light alloy rivets which have a shear load of approximately 400 lb. The upper ends of the cords terminate in loops which are passed over the lugs of the safety harness shoulder straps before the straps are locked into the safety harness quick-release fitting.

NEGATIVE-G RESTRAINT STRAP (Mod. E.S.3292)

11. A negative-g restraint strap is fitted to provide restraint against vertical movement when the seat occupant is subjected to negative-g forces. The strap is secured to the inside front face of the seat pan, the upper end terminates in an angled metal loop which passes over the lug of the port lap strap before it is locked into the safety harness quick-release fitting. The strap is tightened by pulling down on the loose end of the strap.

PERSONAL SURVIVAL PACK, TYPE R, Mk.2

12. The personal survival pack (P.S.P.) Type R, Mk.2 complete with cushion is housed in the seat pan. It is connected to the parachute harness by two quick-release fittings, a further connection on the pack lanyard connects to a quick-release fitting on the occupants life-preserver. The P.S.P. lanyard being connected to the life-preserver enables the pack side connections to be released without loss of the pack.

EMERGENCY OXYGEN SYSTEM (Mod. E.S.421)

13. An emergency oxygen cylinder is mounted beneath the front of the seat pan and is secured to the mounting plate by a clamp and quick-release pin. The lower supply tube and the operating cable tube are routed along the starboard side of the seat pan. The supply tube goes to a clamp bracket situated just below the sticker strap clip, the operating cable bracket is situated on the back edge of the starboard side of the seat pan. An upper oxygen tube carries the supply from the clamp bracket to the seat occupants oxygen mask. A looped stirrup strap is fitted to the tube and to the parachute harness to disconnect the tube from the seat during man/seat separation. The emergency oxygen system is operated automatically by a cable attached to the floor of the aircraft.

MANUAL SEPARATION

14. Fully automatic facilities are provided to withdraw the parachute and separate the occupant from the seat after ejection. In the unlikely event of failure of these automatic facilities the seat occupant must pull the first D-ring on the waistbelt, pulling this D-ring operates a slide disconnect which disconnects the parachute withdrawal line from the withdrawal line on the apron. The seat occupant then manually releases the seat harness, drops forward out of the seat and pulls the second D-ring to operate the parachute.

SEQUENCE OF EVENTS DURING EJECTION

15. When either firing handle is pulled the aircraft canopy is jettisoned, and after an appropriate delay the ejection sequence is initiated. As the seat ascends the guide rails the following sequence takes place:-

(1) The leg restraining cords tighten drawing the legs back to the front of the seat pan, the rivets shear in the end fittings.

(2) The time-delay mechanism of the drogue gun is activated, the gun being fired after 0.5 seconds.

(3) The time-delay mechanism of the barostatic time-release unit is tripped. The functioning of the mechanism depends upon the aircraft height and speed at the time of ejection.

(4) The main oxygen supply hose, anti-g supply hose and the mic/tel lead are disconnected from the aircraft supplies.

(5) The emergency oxygen system is activated.

(6) After approximately 0.5 seconds delay the drogue gun fires and the two drogues stabilize and retard the seat. If the seat ejection occurs at high altitude the seat will eventually fall in a near vertical attitude with the occupant restrained from falling forward by the seat safety harness. At low altitude there may not be enough time for the seat to attain a near vertical attitude. During this phase the occupant will be breathing emergency oxygen from the emergency oxygen set installed on the seat.

(7) 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 emergency oxygen upper tube is disconnected as is the mic/tel lead, allowing ambient air to be inhaled. At low or moderate aircraft speeds and heights the delay is approximately 1.25 seconds after ejection. At high altitude the 1.25 second delay does not start until the seat has descended below 10,000 feet. At high speeds at 10,000 ft and below the delay does not start until the seat has decelerated to a safe speed for the parachute to deploy without damage.

CONNECTIONS TO THE AIRCRAFT

16. On an installed ejection seat the following items are connected to the airframe or the guide rail:-

(1) Port side of the seat:-
- (a) Mic/tel lead
- (b) Drogue gun static rod
- (c) Anti-g supply hose

(2) Starboard side of the seat:-
- (a) Main oxygen supply hose
- (b) Static line from barostatic time-release unit
- (c) Static line from emergency oxygen cylinder operating head

(3) Front of seat:-
(a) Leg restraint cords

(4) Top of seat:-
(a) Cable to canopy jettison firing unit
(b) Cable to canopy jettison trip lever
(c) Link from canopy jettison unit to ejection gun firing unit sear

EQUIPPING THE SEAT

17. The following procedure is to be used when installing the equipment in the seat; refer to fig. 1 to 4 for details as necessary.

(1) Ensure the seat has been placed in the Safe for Servicing condition in accordance with the relevant current instructions, (Lethal Warning Prelim Page 5/6).

CAUTION...
Ensure that all oxygen connections are kept free from oils and grease.

(2) Place the safety harness shoulder straps over the back of the parachute pack container and ensure that the lap straps, leg restraint cords and negative-g restraint strap are clear of the seat pan.

(3) Sit in the seat and raise it fully.

(4) Fit the emergency oxygen cylinder into its mounting bracket, ensuring that the operating head is to be the starboard side of the seat and that the supply tube faces aft.

(5) Clamp the cylinder into its bracket and fit the locking pin into the clamp.

(6) Secure the bayonet union plug of the supply tube in the clamp on the starboard side of the seat pan and, having arranged the tube as shown in fig. 4, fit it into the spring clip below the clamp.

(7) Fit the emergency oxygen cylinder operating cable housing into the two clips on the starboard side of the seat pan.

(8) Ensure that the cable housing passes outside the safety harness lap strap and UNDER the main oxygen supply hose (which should be outside all straps and cables) and does not loop over the safety harness automatic release cable; connect the operating cable to the anchor section of the static line and fit the housing ferrule into the anchor socket.

(9) Connect the anchor hook to the static line-cum-manual operating cable.

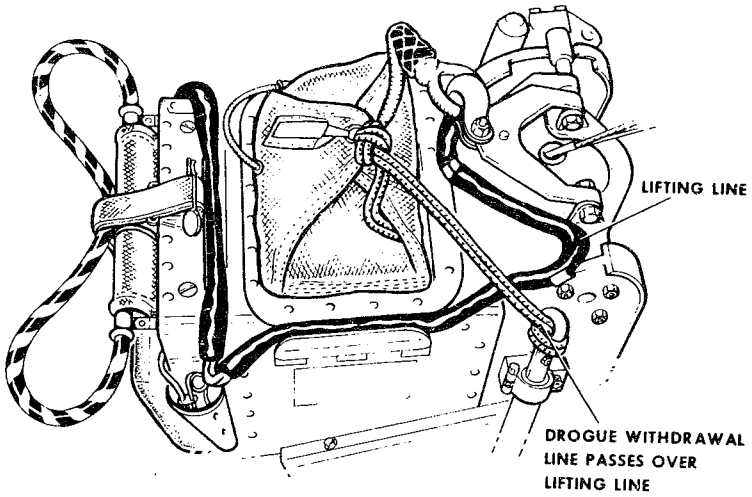

Fig. 3 Arrangement of drogue withdrawal and lifting lines

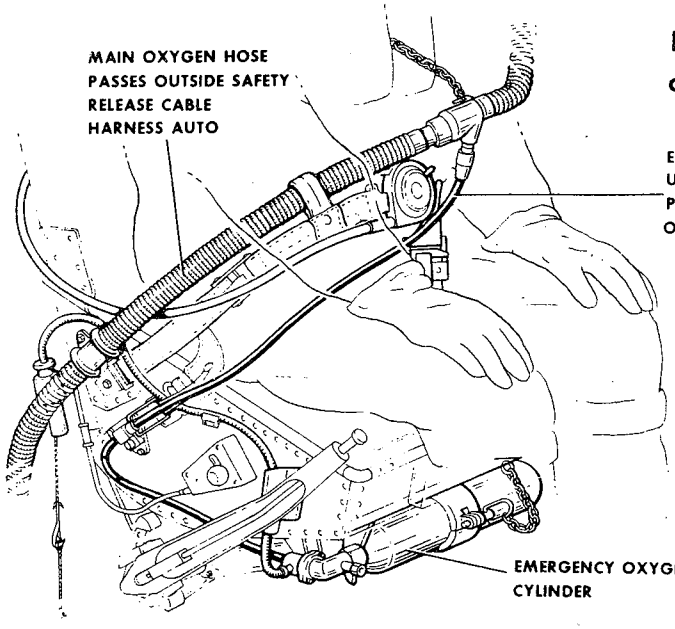

Fig. 4 Arrangement of oxygen supply on seat

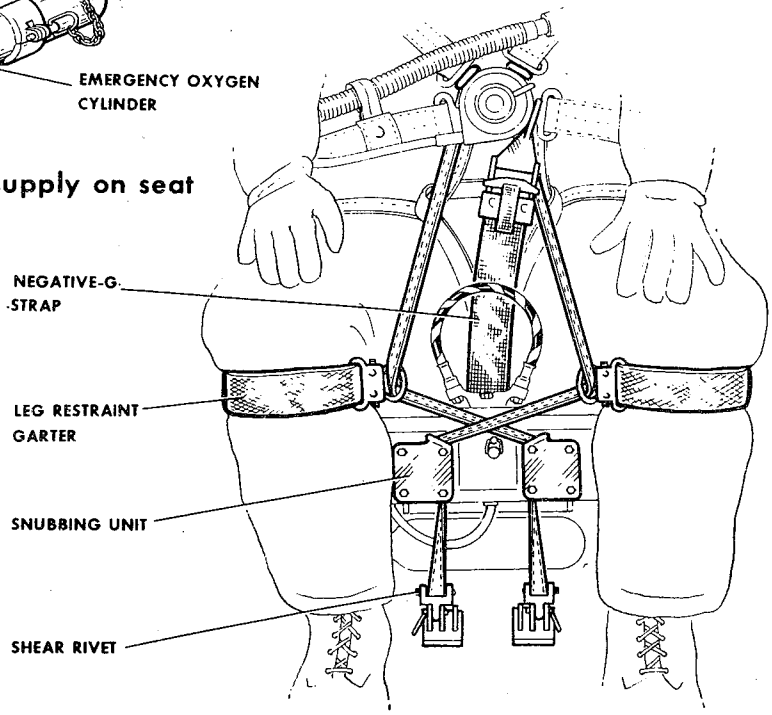

Fig. 5 Arrangement of negative-g strap and leg restraint cords

(10) Place the personal survival pack into the seat pan, ensuring that the lowering line satchel is on the left and that the line emerges from the port side of the seat pan.

(11) Check that the apron is clipped securely to the lower extension of the parachute pack container. Tension the apron against its clips and insert the parachute pack into its container; before pushing the pack fully home, connect the two halves of the parachute withdrawal line coupling.

(12) Push the pack fully home into its container and fit the pack restraining straps into the spring clips on the sides of the container.

(13) Insert the parachute harness sticker straps into the spring clips on the sides of the seat pan. Arrange the harness and cushion so that the front edge of the cushion does not overlap the front edge of the seat pan.

(14) Connect the personal survival pack side quick-release couplings to the fittings on the parachute harness; ensure that the couplings pass outside all other straps.

(15) Pass the bayonet union socket of the emergency oxygen upper tube assembly through the stirrup quick-release coupling and connect it to the bayonet union plug of the supply tube.

(16) Remove and retain the safety pin from the emergency oxygen cylinder operating head.

(17) Ensure that the drogue gun static rod is connected to the bracket.

(18) Remove the safety pins from the ejection gun sear, canopy jettison unit sear and trip lever and fit the appropriate pin through the face screen firing handle safety strap.

STRAPPING-IN PROCEDURE

18. The strapping-in procedure is as follows reference being made to figs. 4 to 7 as necessary.

(1) Check that all safety pins are correctly fitted in the pre-flight positions.

(2) Sit in the seat and adjust its height to position the head level with the centre of the head rest.

(3) Fasten the leg restraint garters just below each knee, ensuring that the D-rings and buckles are to the inside rear; tuck the surplus strap under each garter.

Note...
The leg restraint garters may already be fitted in the legs of the flying suit.

(4) Connect the personal survival pack lowering line to the life preserver, ensuring that the quick-release coupling is below the level of the parachute harness waist belt and that the line passes outside the left leg as shown in fig.7. Tuck the surplus line between the leg and the side of the seat pan.

(5) Connect the anti-g suit air supply hose to the suit. Route the hose outside the straps, (fig.7).

(6) Connect and tighten the parachute harness, ensuring that the shoulder straps pass under the folds of the life preserver stole and that the quick-release fitting is positioned as high as possible compatible with comfort.

Note...

When an inertia proof quick-release fitting is incorporated in the parachute harness, turn the disc-knob anti-clockwise as far as it will go (until the yellow line passes the dots on the body), hold the knob in this position and insert the first lug. Repeat the operation as each remaining lug is inserted.

(7) Bring the negative-g restraint strap up between the legs, ensuring that it is to the REAR of the seat pan firing handle and NOT PASSING THROUGH IT. Pass the lug of the port lap strap of the safety harness through the eye of the negative-g strap lug and insert the lap strap lug into the quick-release fitting of the safety harness. Do not tighten the straps. Ensure that the negative-g strap lug fits as close as possible to the quick-release fitting.

(8) Pass the left leg restraint cord through the right leg garter D-ring and under the right lap strap of the safety harness. Pass the lug of the right shoulder strap of the safety harness through the loop in the end of the leg restraint cord and insert the lug into the safety harness quick-release fitting.

(9) Pass the right leg restraint cord through the left garter D-ring and under the left lap strap of the safety harness. Pass the lug of the left shoulder strap of the safety harness through the loop in the end of the leg restraint cord and insert the lug into the safety harness quick-release fitting.

(10) Tighten the lap straps, tighten the negative-g restraint strap by pulling DOWNWARDS on the free end of the blue strap. These straps are to be as tight as possible as they provide the principal restraint under all conditions. The safety harness quick-release fitting must be as low as possible consistent with comfort and must lie below and not obstruct the parachute harness quick-release fitting. To loosen the negative-g restraint strap, pull down on the yellow tab attached to the snubber. Tighten the safety harness shoulder straps, ensuring that they pass under the life preserver stole.

(11) Don the appropriate helmet and fasten the chin strap.

Note...

If the chin strap is not fastened the helmet and oxygen mask may be wrenched off during ejection, at high altitude this would lead to the loss of vital oxygen supply.

(12) Connect the oxygen mask tube assembly to the main oxygen supply hose and adjust the hose in its loop on the safety harness lap strap to achieve unrestricted head movement. Connect the oxygen mask tube locating chain to the D-ring on the life preserver.

(13) Pass the emergency oxygen upper tube assembly over the right thigh and connect it to the oxygen mask tube bayonet fitting.

(14) Connect the mic/tel lead (this connection may be made if more convenient by the assisting ground crew member)..

FUNCTIONAL TESTS

19. After strapping-in proceed with the following functional tests:-

(1) Ensure that the face screen firing handle can be reached with both hands simultaneously.

(2) Ensure sufficient leg movement.

(3) Operate go-forward mechanism and test for correct functioning.

(4) Test mic/tel system.

20. With assistance remove the safety pins from the pre-flight position, stow the pins.

Note...
If assistance is not available the seat occupant must remove and stow all safety pins prior to strapping-in.

EMERGENCIES

21. Instructions for dealing with emergencies are contained in A.P.4347F, J or K P.N. as appropriate.

LEAVING THE AIRCRAFT

22. When leaving the aircraft after landing, the following sequence should be used:-

(1) Remove the safety pin for the seat pan firing handle from its stowage and fit it through the handle.

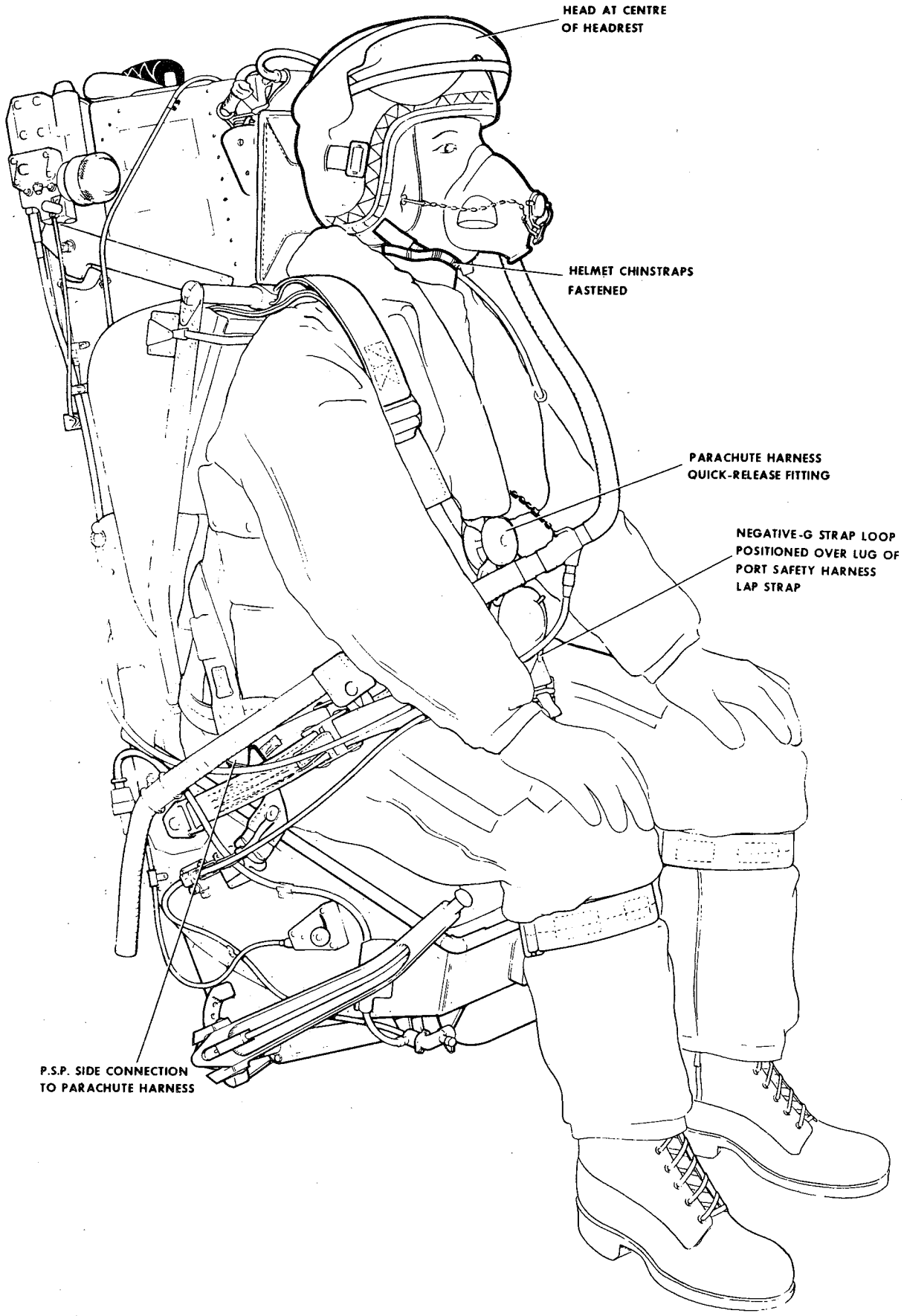

Fig. 6 Seat occupied (1)

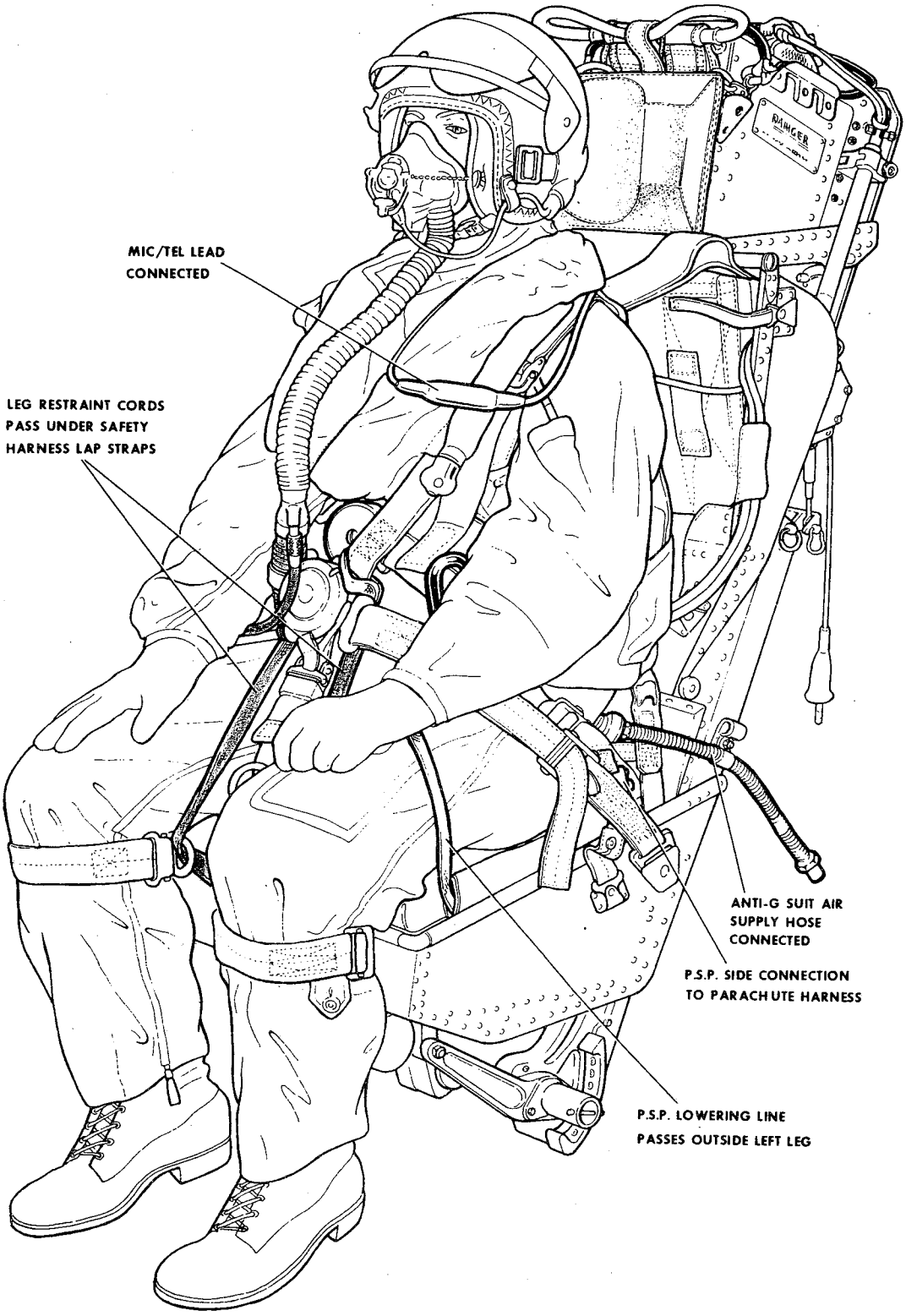

Fig. 7 Seat occupied (2)

(2) The ground crew member removes the safety pin for the face screen firing handle from its stowage and fits it through the handle safety strap.

Note...

If a ground crew member is not available the pilot MUST fit this safety pin before leaving the aircraft.

(3) Disconnect the main oxygen supply hose and the emergency oxygen upper tube assembly from the oxygen mask tube.

(4) Release the safety harness and return the quick-release fitting to the FASTEN position.

(5) Free the leg restraint cords and negative-g strap.

(6) Release the parachute harness and return the quick-release fitting to the locked position.

(7) Disconnect the anti-g suit air supply hose from the suit and fit the blanking plug.

(8) Disconnect the personal survival pack lowering line from the life preserver.

(9) Disconnect the mic/tel lead and vacate the aircraft.

Chapter 2

AIRCREW LIST

CONTENTS

INTRODUCTION

1 The following information lists items normally worn or carried by aircrew (AP 830 Vol 3 Pt C and AP 108F-0001-12) and details the order of donning. The items have full AEC approval unless indicated 'Lim' (Limited) or 'Dev' (Development), and are described and maintained in accordance with the appropriate 108F Air Publication.

Notes ...

(1) Items of clothing and equipment for aircrew of the Hunter F Mk 6, F (GA) Mk 9, FR Mk 10 aircraft are selected from the following lists which are extracted from the AP 108B-0001 Schedules.

(2) Pre Mod ES421: A Mk 4A EO Set is used.

TABLE 1. NORMAL WEAR

Item	Ref No	Nomenclature	Remarks
1a	22C 1229219 to 235	Boots Aircrew 1965 Pattern	
b	22C 1229236 to 251	Boots Aircrew Lightweight	
2	27VA 4585	Connector Anti-g (Dunlop)	Attach to Item 20
3	22C 1304077 to 086	Coverall Aircrew Mk 14A	
4	22C 1300224 to 233	Coverall Immersion Mk 10	
5a	22C 1388537 to 546	Coverall Inner Mk 3	
> b	22C TBA	Coverall Inner Knitted Mk 1	Lim <
6	22C 1301631 to 636	Drawers Long Cotton Ribbed	
7	22C 1374391	Garter Leg Restraint	
8a	22C 1303139 to 146	Gloves S/R Olive Drab Mk 2	
b	22C 1369699 to 705	Gloves W/R Olive Drab Mk 2	Wear with Item 4
9	22C 1303171 to 174	Helmet Protective Mk 3C	Double visor
10	22C 1301950 to 953	Jersey Heavy Olive Drab	
> 11	1680 99 7744677	Kneeboard Aircrew Mk 1	<
12	22C 1278106	Knife Emergency Mk 3	Attach to Items 3 or 4 & 20b
13	22C 1395921 & 023	Life Preserver Mk 27/27A	
14a	6D 2244087 & 2243465	Mask Oxygen Type P1B	
b	6D 2244058	Mask Oxygen Type Q1A	
15	22C 9770526 to 529	Shirt Aircrew Cotton Olive Drab Mk 2	
16	22C 1380510	Sleeve Sealing Angular Single	Attach to Item 4
17	22C 1303115 to 120	Socks Terryloop Olive Drab	
18	22C 1305029 to 037	Socks Immersion Mk 3	Attach to Item 4
> 19	5A 0356077	Torch Aircrew 'Crewlight' Type FA-11(M)	<

(continued)

TABLE 1 NORMAL WEAR (continued)

Item	Ref No	Nomenclature	Remarks
20a	22C 1300180 to 183	Trousers Anti-g Mk 6C	
b	22C 1304036 to 040	Trousers Anti-g External Mk 2A	
21	22C 1301626 to 630	Vest Sleeved Cotton Ribbed	
22	6BB 9243306	Watch Aircrew	

TABLE 2 NBC ROLE

There is at present no requirement for NBC protection in Hunter aircraft.

EMERGENCIES

2 Details of emergency procedures are contained in the Flight Reference Cards and the appropriate Aircrew Manual.

ORDER OF DONNING

3 Thermal comfort in flying clothing is designed on the layer principle and layers may be added or removed as desired. It is important to note that although the immersion coverall when worn will provide protection against water, survival time depends on protection against the cold. This can only be provided by adequate clothing beneath the immersion coverall. Lightweight aircrew boots are to be worn only in tropical or temperate summer environments.

4 A Survival Equipment Fitter or other suitably qualified tradesman should be available to render assistance when necessary. The following order of donning is recommended:

4.1 Vest, drawers and socks

4.2 Anti-g trousers

4.3 Shirt

4.4 Jersey

4.5 Inner coverall

4.6 Aircrew coverall
or
Immersion coverall

Note ...

Pass the hose of the anti-g trousers through the slit provided in the inner and aircrew coveralls, or through the sealing sleeve of the immersion coverall.

4.7 Boots

4.8 Leg restraint garters

4.9 Life preserver

4.10 Protective helmet with oxygen mask assembly

4.11 Gloves

FUNCTIONAL TESTS

5 Final pre-flight tests of the equipment must be made by the aircrew utilizing the aircraft systems in accordance with current Service Instructions.

6 Periodically, routine tests of the equipment must be made using the Flying Clothing Test Cabinet Mk 4 in accordance with current Service Instructions.

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