RESTRICTED

CANBERRA B Mk 2

AP 101B-0402-14

FLIGHT REFERENCE CARDS

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Issue No 7
November 1972
(AL 8 September 1982)

CANBERRA B Mk 2

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FLIGHT REFERENCE CARDS

NORMAL DRILLS

AIRCRAFT SAFE FOR PARKING

The aircraft is safe for parking when:

Safety pins are inserted in face screen and seat pan firing handles on each ejection seat

CANOPY JETTISON switch .	Off, flap flush
CANOPY/SNATCH MASTER switch	Guarded off
Navigators' HATCH SAFETY switches (2)	Off, flap flush

Prepared by Procurement Executive, Ministry of Defence in collaboration with RAF Handling Squadron

BY COMMAND OF THE DEFENCE COUNCIL

NOTES TO USERS

1. These cards are complementary to Pilot's Notes for the Canberra B Mk 2 (AP 101B-0402-15). The same conventions are used and amendment procedure is similar

2. Where the response 'As required' is listed, the pilot should respond by stating the condition or setting of the system/equipment

IMPORTANT

Comments and suggestions regarding these Flight Reference Cards should be forwarded to the Officer Commanding, RAF Handling Squadron, Boscombe Down, Salisbury SP4 0JF

LIST OF CARDS

With AL 8 Incorporated

Card No	*Issued by*	*Card No*	*Issued by*
1	AL 8	13	AL 5
2	AL 8	14	AL 6
3	AL 6	15	AL 8
4	AL 6	16	AL 5
5	AL 6	17	AL 6
6	AL 7	18	AL 4
7	AL 5	19	AL 7
8	AL 5	20	AL 7
9	AL 5	21	AL 5
10	AL 4	22	AL 8
11	AL 7	23	AL 8
12	AL 7		

ANA INCORPORATED

ANA No									

ANA No 1 is already incorporated

2924035 512 9/82 EGE 1447

INITIAL CHECKS

UC master switch	SAFE
UC selector	DOWN button fully in, override horizontal
Hydraulic pressure	Exhausted

EXTERNAL CHECKS

Check the exterior of the aircraft for signs of damage and security of panels, filler caps, doors and hatches, including the following specific items:

Engine blanks	Removed
UC locks	Removed
Hydraulic accumulators (two)	1350 $^{+50}_{-0}$ PSI at 15°C
Aileron and elevator locks	Removed (see Note)
Rudder lock	Secure, retaining pin in
Hyd ground/flight cock	Wired at FLIGHT
Pressure head cover	Removed
Static vent plugs	Removed
Port equipment hatch	Key locked
External power	As required
Starboard equipment hatch	Key locked (if external power not required)

◀ For target towing sorties, check the following in conjunction with the navigator:

External power	Off
Battery switch	ON
Banner master switch	ON
Release unit	Cock (light on)
Pilot's normal jett switch	ON (light out)
Release unit	Confirm released. Recock
Battery switch	OFF
Pilot's emerg jett switch	ON
Release unit	Confirm released. Recock
Navigator's emerg jett switch	ON
Release unit	Confirm released
External power	As required ▶

Note: If control locks are left in for taxying:

The rudder lock must be fitted the correct way up

The flap selector must be locked UP

The flap selector, rudder and aileron trims must not be operated while locks are in

EJECTION SEAT CHECKS

Pilot's Seat (Type 2CA1 Mk 2)

Leg-restraint lines and negative-g strap	Secure
Emergency oxygen	Static line connected. Tube connected at seat
Emergency oxygen cylinder	Safety pin removed (tell-tale wire unbroken)
Barostatic time-release unit	Trip rod connected, securing pin in place
Snatch firing unit safety pin*	Removed and stowed
Time-delay safety pin*	Removed and stowed
Drogue withdrawal line	Above all other lines
Drogue gun	Trip rod connected, safety pin removed
Mic/tel lead	Connected
Manual handles	Disconnect handle exposed Ripcord handle covered, flap secured

* Although these pins bear the words 'canopy jettison', they are not associated with the canopy jettison system on this aircraft

Navigators' Seats (Type 2CA2 Mk 4)

Leg-restraint lines and negative-g strap	Secure
Emergency oxygen	Static line connected. Tube connected at seat
Emergency oxygen cylinder	Safety pin removed (tell-tale wire unbroken)
Barostatic time-release unit	Trip rod connected, securing pin in place
Cocking lever	Stowed
Cocking link	Correctly aligned
Hatch cable	Attached to restrictor safety pin
Drogue withdrawal line	Above all other lines
Drogue gun	Trip rod connected, safety pin removed
Mic/tel lead	Connected
Manual handles	Disconnect handle exposed Ripcord handle covered, flap secured

INTERNAL CHECKS

Navigator

Pilot's Notes, fire extinguishers, crash axe, first-aid kit, asbestos gloves, essential publications	Stowed and secure
Nose station oxygen regulator	Checked, 100% (NORMAL if 4th crew member carried)
Oxygen wander lead	In clip
LP cock and pump c/b	Made
Generator switches	ON
Pilot's services and generator field c/b	Made
Nav's equip and inverters	Off
Inverter c/b	Made
Nav's flight instruments	Undamaged

After Strapping-In Checks

Set all day/night screens open during these checks

External power or battery switch	ON, 23 volts (min)
Intercom master switch	NORM
Station box (crew check)	NORMAL and I/C Volume controls as reqd
* Rudder lock	Removed and stowed
* Flap safety pin	Removed

* Except when control locks fitted for taxying

UC safety clip	Removed
Bomb door safety pin	Removed
Canopy and hatch jettison lights	Tested
DV panel heater	OFF
Pressure head heater	OFF
Air drier (canopy demist)	Tested and off
Bomb doors selector	OPEN, light on
Oxygen (crew check)	Checks complete
Standby UHF switches	OFF and GUARD
Camera switch (if fitted)	Central
External lights	As required, master switch ON
HP pump isolation switches	NORMAL (down)

(continued)

After Strapping-In Checks (*continued*)

Throttles and HP cocks	Full and free movement, friction adjusted
Demister	Off (clockwise)
UC emergency handle	In (wired)
UC selector and indicator	DOWN button fully in, six green lights
Flaps	Selected UP
Master starting and ignition switches	OFF
Compass/DG switch	COMPass
Flight instruments	Undamaged VOR 1 "ON"
Marker lights (SRIM 3479)	Tested VOR 1 "OFF"
Turn-and-slip emergency supply	Tested and OFF
Emergency lamps	Tested and off
Accelerometer	Reset
Generator warning lights	On (front and rear)
Engine instruments	Undamaged
Fuel contents	.....lb
Fuel pressure warning lights	On
LP pumps	Tested (aurally and against FPWL) and OFF
Cabin heat control	Tested and HOT (COLD if no engine air switches) pre mod 5.
Engine air switches (if fitted)	OFF
Cabin pressure warning switch	TEST and ON
Fire warning lights	Tested
V/UHF	TR+G, frequency selected
Pilot/Nav CU switch	PILOT
Aerial switch	As required
Entrance door	Open, jettison handle strapped up
Airbrakes	IN
Flying controls (except when locks fitted)	Full and free movement
Station box (crew check)	V/UHF

STARTING CHECKS

Start clearance	Obtained
Anti-collision lights	ON
Parking brake	On, pump to 1350 PSI min
Throttles	Closed
Port engine clear	Checked
No 1 master starting switch	ON
Emergency inst supply MI	White
Turn-and-slip and A/H flags	Black
Starboard engine clear	Checked
No 2 master starting switch	ON
Emergency inst supply MI	Black
Ignition switches	ON
HP cocks	ON
Relights	Tested
HP cocks	OFF
No 3 tank LP pumps	ON
Fuel pressure warning lights	Out

Start Port Engine

HP cock	ON
Starter button	Press
*RPM	Above 1000
* Fire warning light	Out
* Oil pressure	Above 3 PSI
*JPT	Below 500°C
Hydraulic pressure	Rising
Bomb doors	SHUT
*Idling RPM	2750 ± 100
*Generator warning light (post-mod 714)	Out
*RPM (pre-mod 714)	5000
*Generator warning light (pre-mod 714)	Out at about 3500 RPM
*DC voltage	28 (if external power off)
Hydraulic pressures	2400 to 2500 PSI

(continued)

Starting Checks (*continued*)

If Using External Power

External power	Disconnected
Battery switch	ON
DC voltage	28
Starboard equipment hatch . .	Confirmed closed and key locked

Start Starboard Engine

HP cock	ON
Starter button	Press

*Check starred items on front of this card

Pre-mod 714:

Port throttle	Closed
Port generator warning light .	On
DC voltage	28

Failure to Start

Engine Fails to Accelerate or Cartridge Fails to Fire:

1. HP cock . . . . OFF immediately
2. Master starting and ignition switches . . . . OFF
3. Wait 1 minute before having starter breech cap removed
4. If second cartridge fails to fire, have the electrical system checked

Black smoke.

Engine Fails to Accelerate Above 1000 *RPM or Pressure Relief Valve Blows*: OR 2ND CARTRIDGE FAILS TO FIRE

1. Carry out the **Shutdown Checks**
2. Make no more attempts to start with that starter

Engine 'Blow Through' Drill:

1.	Master starting switch . .	ON
2.	Ignition switch . . .	OFF
3.	HP cock	OFF
4.	LP pumps	OFF
5.	Starter button . . .	Press

Note 1: After a failure to start, if the HP cock is closed without delay it should not be necessary to 'Blow Through' the engine

Note 2: Having fired two cartridges a delay of 10 minutes must elapse before loading a third cartridge. If the engine still fails to light up 45 minutes must elapse before loading each subsequent cartridge

AFTER START CHECKS

If external locks left in for taxying, delay checks against the four starred items until **Pre-Take-Off Checks**

* Flying control locks	Confirm removed
* Flaps	Tested and UP
* Trims	Tested and neutral
Airbrakes	Tested and IN
Hydraulic pressures	2400 to 2500 PSI
Pressure head heater	ON and checked
Compasses	G4B annunciating on .....° Standby.....°
Artificial horizon	Erect, button out and free
Entrance door	Closed
* Engine air switches (if fitted)	Tested individually; leave as required
Standby UHF	Tested
Pilot/Nav V/UHF CU	Both tested
No 5 and 6 inverters	ON
Taxy clearance	Obtained
Altimeters	Nav—flags clear QFE .....mb, compare on Reset and STBY

TAXY CHECKS

Taxy lamps	As required
Brakes (on moving)	Tested (2000 PSI min)
Flight instruments	All checked

PRE-TAKE-OFF CHECKS

Parking brake	On (2000 PSI min)

If external locks used, have them removed and stowed; then remove the flap safety pin and check operation of flaps and trims

RPM (pre-mod 714)	5000 on both engines
Generators	Lights out, 28 volts
◀No 4 inverter▶	ON
ILS, ILS/VOR, Tacan	On and checked
IFF/SSR	SBY
DV panel heater	ON
Pressure head heater	ON
◀Air drier (canopy demist)▶	As required
Bomb doors	SHUT, light out
Oxygen (crew check)	Contents, three connections, flow
Trims	All neutral
Taxy lamps	ON
HP pump isolation switches	NORMAL (down)
HP cocks	Fully ON
Demister	Off (clockwise)
Flaps	UP and indicating UP
Artificial horizon	Erect, button free, flag black
Emergency inst supply MI	Black
Altimeters	Pilot—STBY Nav—flags clear QFE set, checked within limits
Compasses	G4B annunciating on .....° Standby.....°
Turn-and-slip flag	Black
Engine instruments	Readings normal
Fuel contents	.....lb
LP pumps	All ON (except bomb bay)
LP cock and pump c/b	Made
Engine air switches (if fitted)	ON
Cabin heat control	Set
Entrance door	Closed
Airbrakes	IN
DV panel	Closed
UC master switch	LIVE
Canopy/snatch master switch	ON
Hatch safety switches (2)	Flap flush, ON
Pins (crew check)	Stowed: Pilot 4, Navs 2 (each)
Harness (crew check)	Tight and locked, PSP, leg restraints, visor
Flying controls	Full and free movement
IFF/SSR	NORM (test), then as required

(continued)

Pre-Take-Off Checks (*continued*)

Navigator's table	Folded forward
EMBS	.....knots
Stop speed	.....knots
Unstick speed	.....knots
Safety speed	140 knots
Take-off emergencies	Brief complete

AFTER TAKE-OFF CHECKS

†These items need not be read out but they should be monitored

†Wheelbrakes	On—off
†Undercarriage	UP (button fully in)
140 knots (safety speed)	Climbing power set (7600 RPM) UC lights out below 170 knots
†Landing lamp	OFF

Transition Altitude/Airfield Departure

Altimeters (crew check)	RPS/1013 mb set Pilot's to Reset, flag clear (transition altitude only)
LP pumps	As required
ILS	OFF
Taxy lamps	As required

Climbing Checks (every 10,000 feet)

Oxygen (crew check)	Contents, 3 connections, flow
Electrics	28 volts. MI black
Engines	Within limits
Fuel distribution	Checked
Cabin pressure	Checked .....feet

PRE-DESCENT/RECOVERY CHECKS

Weather and airfield state	Checked
Fuel distribution	Checked
Instruments	G4B synchronised (magnetic for recovery). AH erect
Radio and ILS or ILS/VOR	Frequencies selected
Altimeters	Set as required, pilot's to STBY
Demister and air drier	As required
Safety altitude	Checked
Taxy lamps	As required
Navigator's table	Folded forward

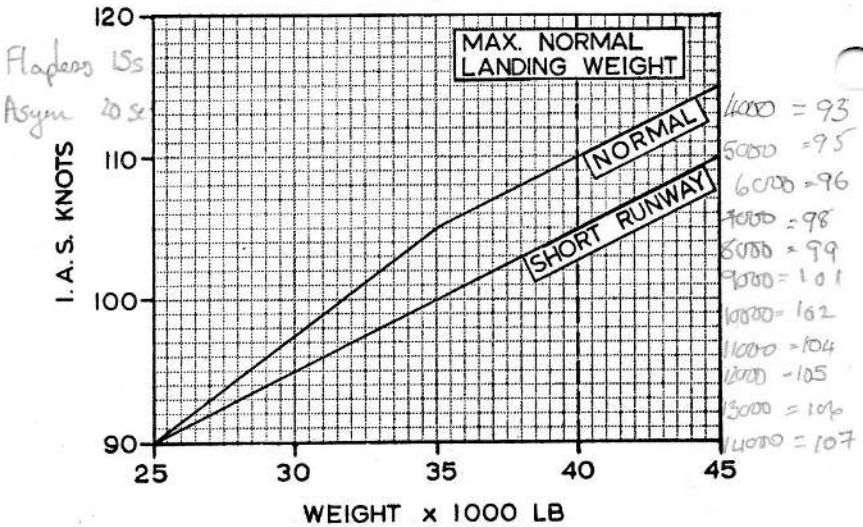
Descent	*Normal*	*Rapid*
Throttles	Closed	Closed
Airbrakes	OUT (2-position) MID (3-position)	OUT OUT
Speed	0·75M/250 knots	0·79M to 40,000 feet then 0·75M/350 knots

PRE-LANDING CHECKS

Airbrakes	As required
Undercarriage (below 190 knots) .	DOWN (button fully in), three greens
Fuel contents	.....lb
LP pumps	Min two ON per engine
Harness (crew check) . . .	Tight and locked
Brakes	Checked and off (2000 PSI min)
*Normal threshold speed .....knots	.....knots threshold .....knots min approach .....knots initial approach

*On asymmetric approach, navigator gives asymmetric approach speeds instead of threshold speed. Pilot acknowledges

Threshold Speeds



Normal Approach Speeds

Initial approach speed . . .	Threshold + 30 knots
Minimum approach speed . .	Threshold + 10 knots

Flapless Landing

Initial approach speed . . .	Normal threshold + 30 knots
Minimum approach speed . .	Normal threshold + 20 knots
Threshold speed	Normal threshold + 10 knots

Asymmetric Approach Speeds (knots)

	Below 36,000 *lb AUW*	*Above* 36,000 *lb AUW*
Min to 600 feet AGL (VCH) .	140	150
Min from 600 feet AGL (VCH) until certain of landing . .	125	135

WARNING: Flaps must not be lowered above 100 feet AGL

INSTRUMENT APPROACHES

TWO ENGINES

Power — 6200 RPM (approximately) at 30,000 lb AUW
6600 RPM (approximately) at 40,000 lb AUW

Speed — Pattern and initial approach . . Threshold + 40 knots (minimum)
Glidepath . . Initially threshold + 30 knots, reducing to minimum of threshold + 10 knots until committed to a landing

UC — DOWN

Flaps — Select DOWN to initiate glidepath descent

ONE ENGINE

Power — 6300 RPM (approximately) at 30,000 lb AUW
6800 RPM (approximately) at 40,000 lb AUW

Speed — Pattern and initial approach . . *Below* 36,000 *lb* 150 minimum; *Above* 36,000 *lb* 160 minimum
Glidepath:

Minimum to 600 feet AGL (VCH)	140	150
Minimum from 600 feet AGL (VCH) until certain of landing . . .	125	135

UC — Select DOWN to initiate glidepath descent

Flaps — UP. Flaps may be used to reduce the landing run but must not be lowered above 100 feet AGL

ICING CONDITIONS (TWO ENGINES)

If Possible Divert to an Airfield Free of Icing

Power — 6000 RPM (5800 RPM pre-mod Avon 5278) Set and maintain this RPM until certain of reaching the runway

Speed — Pattern and initial approach . . 170 knots (approximately)
Glidepath . . 160 knots (maximum) reducing to threshold speed

UC — Select DOWN to initiate glidepath descent

Flaps — UP. Flaps may be selected DOWN only when certain of reaching the runway without increasing power. If below 500 feet when flaps are selected DOWN, a higher than normal speed at the threshold, may be unavoidable

Airbrakes — As required. (Bomb doors may be used for short periods in the pattern to help control the speed)

Aircraft Approach Limitations, EOA and VCH (*overleaf*)

Aircraft Approach Limitations (True Heights (feet))

	ILS	*PAR*
In-line localiser	250	200
Off-set localiser	270	

Engine Out Allowance
The EOA is 450 feet

Visual Committal Height
The VCH is 600 feet

AFTER LANDING CHECKS

Parking brake	On (2000 PSI min)
RPM (pre-mod 714)	5000 on one engine
UC master switch	SAFE
Canopy/snatch master switch	Off
Hatch safety switches (2)	Off, flap flush
Ejection seat (crew check) after final landing	Seat pan pin refitted
Flaps	UP
Airbrakes	IN
DV panel heater and air drier	OFF
Pressure head heater	As required
Demister	Off
Trims	As required
Taxy lamps	As required
Landing lamp	OFF
LP pumps	As required
Cabin heat control	HOT (COLD if no engine air switches)
Engine air switches (if fitted)	OFF
DV panel	Open (leave as required)
ILS/VOR or ILS, Tacan, IFF/SSR	OFF
No 4 (if fitted), 5 and 6 inverters	OFF
Hydraulic pressures	2400 to 2500 PSI

If external control locks are to be fitted for taxying, insert the flap lever locking pin before having the locks fitted. Thereafter, do not operate the rudder or aileron trims, or the flaps

After parking for an 'Engines-Running' crew change, the aircraft must be made **Safe for Parking**

CREW CHANGEOVER CHECKS

The following checks must be completed by the relief crew:

Aircraft	**Safe for Parking**
RPM (pre-mod 714)	5000 on port engine
Pressure head heater	As required
Generator(s)	Light(s) out, 28 volts
Oxygen (crew check)	Checks complete

Fuel contents	.....lb
Hydraulic pressures	2000 PSI (min)
Entrance door	Closed
Nav's equipment and inverters	As required
Radios	As required
Taxy clearance	Obtained
Altimeters	QFE set, compare on Reset and STBY

After Landing/ Changeover/ Shutdown

Shutdown Checks (*overleaf*)

SHUTDOWN CHECKS

Parking brake	On
Port HP cock	OFF
Bomb doors	OPEN
DV panel	Open
Heaters and air drier	OFF
Tailplane	Full nose-down, one 'blip' up
Hydraulic pressures	2400 to 2500 PSI
Starboard HP cock	OFF
Master starting and ignition switches	OFF
LP pumps	OFF
Station box (crew check)	I/C
All radios	Off
DV panel	Closed
Flap and bomb door pins	In
UC safety clip	In
External lights	Off
Ejection seats (crew check)	Safe (pins refitted)
Internal lamps	Off
Parking brake	Off when chocks in position
Station box (crew check)	OFF
Intercom master switch	OFF
Battery switch	OFF

Before Leaving the Aircraft

Confirm the aircraft is **Safe for Parking** (see drill on Card 1)

FIRE

Engine Fire in the Air

Immediate Actions

1. Warn crew
2. HP cock . . . . OFF
3. LP cocks and pumps . . CLOSED—OFF
4. Fire extinguisher pushbutton . Press

Subsequent Actions

Recheck items 2 to 4

5. Generator switch . . . OFF
6. Electrical load . . . Reduce (see **Load Shedding**, Card 13)
7. IFF/SSR . . . . EMGY
8. Engine air switch (if fitted) . OFF
9. If necessary carry out **Smoke or Fumes** drill (Card 12 reverse)
10. Monitor DC voltage
11. Do not relight
12. If warning light remains on and there are other signs of fire, abandon the aircraft. If the fire is not confirmed, land as soon as possible, but be prepared to abandon at any time

CHECKS COMPLETE!

Cabin Fire in the Air

1. Warn crew
2. Oxygen regulator to EMERGENCY and 100% OXYGEN
3. All non-essential electrical loads off
4. Use hand fire extinguishers if fire is located and is persistent
5. Maintain cabin pressure
6. Land as soon as possible
7. If the fumes become dangerous, jettison the hatch and, if necessary, the canopy
8. If the fire spreads abandon aircraft

(continued)

Fire (*continued*)

Fires on the Ground

1. Warn crew
2. HP cocks . . . . OFF
3. LP cocks and pumps . . CLOSED—OFF
4. Operate fire extinguishers, if necessary
5. Inform ATC if possible
6. Battery switch . . . OFF
7. Vacate the aircraft (see below)

Wheelbrake Fire

1. Warn crew
2. Do not shutdown engines until fire appliances are available. If fire appliances not readily available, shutdown by switching LP cocks and pumps to CLOSED—OFF, leaving HP cocks ON. (Report this method of shutdown)
3. Battery switch . . . OFF

Emergency Evacuation on the Ground

Pilot

1. Order crew to evacuate the aircraft*
2. Close HP cocks if applicable
3. Switch OFF battery switch (if time permits)
4. Vacate the aircraft
5. Warn fire crew/technical personnel if ejection seats unsafe

* Depending on the nature of the emergency and the number and position of crew, the pilot must detail the methods of exit as follows:

a. Cabin door—Open normally or operate door jettison handle

b. Jettison the hatch

c. Jettison the canopy (weight approx 110 lb, may require two persons to push clear)

JETTISON PROCEDURES

Wing-Tip Tanks

1. Speed below 365 knots. Maximum IMN 0·79M below 25,000 feet, 0·80M above
2. Press the FUEL TANK JETTISON button

Hatch

1. Speed 150 knots minimum (90 knots in emergency)
2. Confirm navigator's HATCH SAFETY switch ON (either navigator)
3. Lower vizors
4. Switch ON, HATCH JETTISON switch (either navigator, whoever has HATCH SAFETY switch ON)

▶◀

Canopy

1. Speed 150 knots minimum (90 knots in emergency)
2. Lower vizor
3. Confirm CANOPY/SNATCH MASTER switch ON
4. CANOPY JETTISON switch ON

Entrance Door

Turn the crank above the door clockwise approximately $4\frac{1}{2}$ turns

Strike top of door

Intentionally Blank

ENGINE FAILURE AND RELIGHTING

Mechanical Failure

Immediate Actions

1. Warn crew
2. HP cock . . . . OFF
3. LP cocks and pumps . . CLOSED—OFF
4. Monitor fire warning light

Subsequent Actions

Recheck items 2 and 3

5. Generator switch . . . OFF
6. Electrical load . . . Reduce (see **Load Shedding,** Card 13)
7. Engine air switch (if fitted) . OFF
8. Monitor DC voltage
9. IFF/SSR . . . . EMGY (if necessary)
10. Do not relight. Watch for indication of fire

Flame Out (No Indication of Mechanical Failure)

Immediate Actions

1. Attempt an *Immediate Relight*. Press relight button for 5 seconds with throttle and HP cock at set positions, then keep JPT within limits by throttling back if necessary

If this fails:

2. HP cock . . . . OFF
3. Throttle . . . . Close
4. LP pumps . . . . OFF

Subsequent Actions

Recheck items 2 to 4

5. Generator switch . . . OFF
6. Electrical load . . . Reduce (see **Load Shedding,** Card 13)
7. Engine air switch (if fitted) . OFF
8. Monitor DC voltage
9. Attempt a **Normal Relight** (see overleaf)

(continued)

Double Flame Out

1. If below the maximum recommended altitude for **Normal Relight** (below), first switch ON another LP pump
2. Attempt *Immediate Relight* on one engine
3. If this fails, reduce electrical load to the minimum and carry out **Flame Out** drill on both engines and then **Normal Relight** drill on each engine in turn

Altitude/RPM Recommended Maxima for Relighting

Pre-Avon Mod 857

1. 20,000 feet, 1200 RPM
2. Relighting is practicable up to 25,000 feet

Post-Avon Mod 857

1. 25,000 feet, no RPM restriction
2. Above 25,000 feet, 1200 RPM
3. Relighting is practicable up to 30,000 feet

Normal Relight (After Completion of Flame Out Drill)

1.	Altitude and RPM	.....feet .....RPM
2.	Throttle	Closed
3.	HP cock	OFF
4.	HP pump isolation switch	As required
5.	LP pump	ON, FPWL out
6.	Master starting and ignition switches	ON
7.	Press and hold relight button while opening HP cock	

When RPM Starts to Rise:

8.	Relight button	Released
9.	Fire warning light	Out
10.	JPT and oil pressure	Normal

When RPM Has Stabilised:

11.	Throttle	Set as required
12.	Generator field c/b	Made
13.	Generator switch	ON, warning light out
14.	DC voltage	28
15.	Engine air switch (if fitted)	ON
16.	Resume electrical services	

Failure to Relight

If no relight within 30 seconds, close HP cock, wait 2 minutes and make another attempt at lower altitude. If necessary, check master and igniter fuses: 41 and 43 (Port) or 45 and 47 (Stbd) in the ECP

OXYGEN SYSTEM FAILURES

1. Suspected Hypoxia or Contaminated Supply

Check connections, contents and flow

Pull emergency oxygen knob (disconnect from main supply)

Descend to 10,000 feet cabin altitude or below

If oxygen contamination is suspected . . . Main supply OFF

---

2. *Difficulty in breathing IN*

↓

Inadvertent disconnection (inlet warning connector)

↓

or

↓ Exhaustion of supply	↓ Regulator failure
↓ HP contents in RED	↓ HP contents normal
↓ Pull emergency oxygen knob and descend to 10,000 feet cabin altitude or below (disconnect from main supply)	↓ Change regulator if spare available
←	↓ If not available

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3. *Difficulty in breathing OUT*

↓

Dirt under mask inlet valve

↓

Lift mask off face and press regulator toggle

↓

Release toggle and replace mask

---

4. *Black magnetic indicator*

Select 100% oxygen and check connections

↓

↓ CAN breathe	↓ CANNOT breathe
↓ Electrical failure	↓ Para 2 (above)

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5. *White magnetic indicator*

↓

Leak

↓

Check mask and connections to stop leak

↓

If magnetic indicator remains white, pull emergency oxygen knob and descend to 10,000 feet cabin altitude or below (disconnect from main supply)

Oxygen/ Pressn./ Fuel

SMOKE OR FUMES

1. Switch regulator EMERGENCY switch to either side
2. Select 100% OXYGEN

CABIN PRESSURISATION FAILURE

1. If above 40,000 feet pilot warns crew "Immediate Descent", crew acknowledge
2. Oxygen mask toggle down (only after emergency overpressure is felt)
3. Throttles fully closed
4. Airbrakes OUT
5. Bomb doors OPEN (if practicable)
6. Descend at 0·79M above 40,000 feet, 0·75M/350 knots below
7. Engine air switches (if fitted)—OFF below 40,000 feet
8. Altitude—reduce to lowest practicable (25,000 feet max)

Note: If cabin or canopy is damaged keep speed below 0·70M or 300 knots after initial descent

LP PUMP FAILURES

Single LP Pump Failure

1. Close appropriate throttle
2. When RPM and JPT stabilise, switch ON another LP pump on the same side, then switch OFF the failed pump
3. If JPT and RPM are erratic, shutdown and relight
4. Check all LP cock and pump c/b made

Note: Fuel from tank with the failed pump may be used for the other engine.

Gravity/Suction Feed

If no LP pumps are serviceable in a tank and it becomes necessary to gravity/suction feed from that tank proceed as follows:

1. Reduce altitude to 35,000 feet (Avtur or Avcat) or 25,000 feet (Avtag) or, if range permits, to 15,000 feet or below
2. Close throttle of engine to be gravity/suction fed
3. Select 'failed tank' cock and pump switch to OPEN—OFF and the other two cock and pump switches (same side) to CLOSED—OFF
4. Accelerate engine carefully. Cruising RPM should be obtainable below 15,000 feet but at higher altitudes 7200 RPM should not be exceeded
5. Use tanks with serviceable pumps for landing and for climbing

Note 1: Erratic running must be avoided.

Note 2: Report use of gravity/suction feed

ELECTRICAL SYSTEM FAILURES

Load Shedding

1. If a generator fails or is switched OFF, the average load on the remaining generator must be reduced to not more than 175 amps for continuous operation
2. Check Green Satin off-line if not, switch OFF No 4 inverter (SRIM 3479)
3. Switch OFF No 5 or No 6 inverter (if separate switches fitted)
4. In the landing condition use two LP pumps per side
5. Use tailplane trim and radios economically

Single Generator Failure

1. Carry out **Load Shedding**
2. Check DC voltage
   a. *If 27 to 28 volts, carry out Reset Action viz*:
      (1) Switch generator OFF
      (2) Check generator field c/b made
      (3) After 30 seconds switch generator ON
   b. *If above 30 volts*:
      (1) Switch OFF apparently serviceable generator
      (2) Failed generator should automatically reset itself
   c. *If below 26 volts and reducing*:
      (1) Switch OFF apparently serviceable generator
      (2) Carry out *Reset Action* on generator which gave first failure indication
3. If *Reset Action* results in one generator still off-line:
   a. Switch that generator OFF
   b. Trip its field c/b

① RCCB tripped
② TYPE D c/B tripped
③ TYPE A CUT OUT tripped
④ ON-OFF SWITCH
⑤ SHEARED DRIVE - No RPM
⑥ LOW RPM - below cut-in

(continued)

Double Generator Failure

1. Switch both generators OFF
2. Switch off all electrical equipment not essential to aircraft safety
3. Carry out *Reset Action* for each generator in turn
4. If both generators remain off-line, the battery may last 20 minutes. Use the tailplane trim as little as possible. Proceed as at 5 and 6 following, so that fuel may be obtained by gravity/ suction feed if LP pump supply fails
5. Reduce altitude to 15,000 feet (max) or if this is not practicable restrict RPM to 7200 (max) and maximum altitude to 35,000 ft (Avtur or Avcat) or 25,000 feet (Avtag)
6. Land as soon as practicable. If battery voltage is low, consider making a flapless landing to avoid the necessity of using tailplane trim

Note: There is a risk of double flame out when the battery is exhausted if the LP cocks of an empty fuel tank are OPEN; consequently consideration should be given to conserving sufficient battery power to switch to CLOSED the LP cocks of tanks at very low fuel states

Overvolting

After Starting

1. 29 to 30 volts. Keep engine running, have fault checked
2. Over 30 volts. Shut down and report defect

In Flight

1. 28 to 29 volts. Continue the sortie, monitor DC voltage closely
2. 29 to 30 volts. land as soon as practicable
3. Over 30 volts:
   a. Reduce electrical load
   b. Switch OFF each generator in turn, checking voltage. If one generator is serviceable, switch the other OFF and return to base using minimum electrical load
   c. If voltage is still 30 to 34, put both generators ON, switch the battery OFF and land at nearest suitable airfield. Battery ON for landing
   d. If voltage is over 34, switch OFF both generators and proceed as for **Double Generator Failure**

Note: A reduction in engine RPM may reduce the voltage

(*continued*)

Electrical System Failures (*continued*)

No 2 Inverter Failure

1. No 3 inverter automatically takes over and the emergency instrument supply indicator shows white
2. To regain No 2 inverter, reset its circuit breaker if necessary and, once only, switch off the starboard master starting switch for 1 second then on again

No 3 Inverter Failure

If after a No 2 inverter failure, No 3 inverter fails (indicated by warning flags in AC-operated flight instruments) an attempt to restart may be made by re-setting its circuit breaker if this has tripped

No 4 Inverter Failure (Green Satin only) (*SRIM* 3479)

1. Switch off the Green Satin
2. Switch off the inverter

Note: There is no standby for Green Satin

No 5 Inverter Failure

If No 5 inverter fails, Tacan can be operated by selecting the inverters to CO (changeover) and switching on the Tacan. The equipment normally supplied by No 6 is then inoperable

No 6 Inverter Failure

If No 6 inverter fails, IFF/SSR, AHE and ILS/VOR (if fitted) can be operated by selecting the inverters to CO (changeover) and switching on the equipment. The Tacan normally supplied by No 5 is then inoperable

SELECTS PM INVERTER SET
2 all main instruments 1 S/A
4 Green Satin
5 Tacan 6 ILS ALTIMETER IFF/SSR

(*continued*)

Intercom System Failures

Station Box Amplifier Failure

Select DIRECT (now only the service selected by the SPEAK—LISTEN switch can be monitored)

Intercom Amplifier Failure

Select EMERG on pilot's OFF/NORM/EMERG switch

V/UHF Amplifier Failure

Select NORM on pilot's STANDBY UHF switch

Intercom using Standby UHF Emergency Battery

Select STANDBY UHF to BATT and station boxes to DIRECT and V/UHF

Electrical Loads

Service	*Load (amps)*
No 4 inverter (Green Satin) (if fitted)	90
No 5 inverter	24
No 6 inverter	24
Tailplane trim motor	50
No 3 inverter	19
V/UHF (Transmit)	15
V/UHF (Receive)	10
LP pumps (each)	15
No 2 inverter	12
ILS (military)	11
Landing lamp	9
Pressure head heater	6
DV window heater	6
Battery charging	6

Service	*Load (amps)*
Rudder trim	5
Internal lighting (all on)	5
GPI (if fitted)	4
Navigation lights	4
Aileron trim	3
Airbrakes	3
Engine air gate valve	3
Mixer valve	3
Anti-collision lights	3
Radio compass	2
Intercom	2
Tacan	2
ILS/VOR	1
IFF/SSR	1

UNDERCARRIAGE AND HYDRAULIC FAILURES

MAIN SYSTEM FAILURE

1. Main Hydraulic Pressure Gauge Below 2000 PSI

a. If associated with failure of a service or low *brake* pressure, see appropriate drill first, before continuing with **Main System Failure Procedure** below

b. If *not* associated with failure of a service, operate the handpump (few strokes only):

(1) If strong resistance to handpump:
Suspect gauge fault (normally only at high altitude). Monitor hydraulics carefully for remainder of flight. Gauge may register normally after descent

(2) If no resistance to handpump

Carry out following procedure:

Main System Failure Procedure

a. See Note 1. As soon as practicable, select UC DOWN

b. Use handpump to obtain 'three greens' (see Note 2)

c. Application of positive-g may assist UC lowering

d. As last resort, pull UC emergency lowering handle out to its locked position

e. Leave airbrakes in

f. Leave bomb doors closed

g. Carry out a flapless landing

h. Do not operate the wheelbrakes before landing

i. Use handpump to raise brake pressure prior to landing, if necessary

j. Use continuous progressive braking on landing run

k. Do not attempt to taxy

Note 1: Before lowering the UC, consideration should be given to the other conditions prevailing such as the distance from a suitable airfield, icing conditions, fuel remaining or the ability to maintain height

Note 2: Normally the UC can be hand-pumped down in about 5 minutes, (about 130 strokes); exceptionally up to 30 minutes and considerable physical effort may be required

2. Main Pressure 'Cycling' Between 2000 and 2500 PSI

Pressure 'cycling', except during operation of services, may indicate an internal or external leak. If cycling occurs at intervals of less than 15 minutes, the possibility of loss of fluid and consequent hydraulic services failure must be considered and the UC should be lowered as soon as practicable

WHEELBRAKES

3. Brake Pressure Gauge Below 2000 PSI

Check *main* pressure:

a. If *main* pressure normal:

Suspect *brake* gauge fault (normally only at high altitude)

Monitor hydraulics carefully for remainder of flight

Gauge may register normally after descent

b. If *main* pressure low:

Assume *brake* and *main* systems failure

Carry out **Main System Failure Procedure** (Card 15 reverse) with the following additional considerations:

Reduce fuel load to practical minimum

Land at airfield with long runway into wind and/or suitable barrier—see **Barrier Engagement** (Card 19)

Close HP cocks after touchdown. (If barrier available, the engines may be left running to assist directional control)

Use aerodynamic braking on landing run

4. Brake Failure While Taxying

If a leak occurs in the wheelbrake system while taxying (indicated by a loss of pressure on the *brake* and *main* pressure gauges), it may be necessary to raise the undercarriage to stop the aircraft

To raise the undercarriage:

a. Release wheelbrake lever

b. UC master switch to LIVE

c. Rotate collar of UC UP button clockwise to its stop (60° or 90°) and select UP

d. Operate handpump if necessary

UC and Hydraulic Failures *(continued)*

UNDERCARRIAGE—FAILURE TO RETRACT

5. UP Button Will Not Depress

Check UC master switch:

a. If SAFE, select LIVE, reselect UC UP

b. If LIVE, ensure fully down selected, do not reselect, land as soon as practicable (if it is imperative to raise the UC, rotate the collar of the UC UP button clockwise to its stop (60° or 90°) and reselect UP)

6. Three Green Lights Remain On After UP Selection

a. Select DOWN

b. Check *main* hydraulic pressure:

(1) If *main* pressure normal:
Make no further UC selections
Land as soon as practicable

(2) If *main* pressure low:
Carry out **Main System Failure Procedure** (Card 15 reverse)

7. Mainwheel Red Light(s) or Any Green Light Remains On After UP Selection

See Note to para 8. As soon as practicable, select UC DOWN:

a. If three greens obtained, confirm *main* and *brake* pressures normal
Land as soon as practicable

b. If three greens not obtained, see **Failure to Obtain Three Green Lights** (Card 17)

8. Nosewheel Red Light Remains On After UP Selection

Check *main* hydraulic pressure:

a. If *main* pressure normal:
Reduce to 150 to 160 knots, sharply apply small amount of negative-g
If red light remains on, maintain speed below 190 knots and obtain visual check:
If doors appear closed, continue sortie subject to max speed of 300 knots and only one lowering of UC at end of sortie
If doors do not appear closed, maintain speed below 190 knots. See Note below and then select UC DOWN and land as soon as practicable

b. If *main* pressure low:
Carry out **Main System Failure Procedure** (Card 15 reverse)

Note: Before lowering the UC, consideration should be given to the other conditions prevailing such as the distance from a suitable airfield, icing conditions, fuel remaining or the ability to maintain height

UNDERCARRIAGE—FAILURE TO LOWER

9. Failure to Obtain Three Green Lights

Check *main* hydraulic pressure:

a. If *Main* Pressure Low:
Carry out **Main System Failure Procedure** (Card 15 reverse)

b. If *Main* Pressure Normal:

(1) *Undercarriage Not Felt or Heard to Lower*

If *no* lights, try to reselect UC UP; if UP button *will not* depress:

Select UC master switch to SAFE

Change UC selector fuse 67

Reselect UC master switch to LIVE

If *no* lights and UC UP button *does* depress *or* if UC still remains up after changing fuse 67 *or* if there are any light(s):

Reselect or check UC DOWN button in

Pull UC emergency lowering handle out to its locked position (see Notes 1 and 2)

(2) *Undercarriage Felt or Heard to Lower*

Check changeover and day/night screen on UC position indicator

If *no* lights, change indicator fuse 68

Close either throttle:

If the nosewheel red light remains out, the undercarriage can be assumed to be locked down

If the nosewheel red light comes on or if any red light remains on:

Operate handpump vigorously (additional pressure (3100 PSI) may overcome mechanical or sequencing fault)

Apply positive-g and yaw at 150 to 160 knots

Select UC UP and DOWN several times

Obtain visual check

▶◀ See **Hazardous Landings** (Card 18)

Note 1: The UC emergency lowering handle operates with the normal UC selector in either position

Note 2: Once the UC emergency lowering handle has been operated, the undercarriage cannot be retracted

UC and Hydraulic Failures *(continued)*

FLAPS

10. Malfunction of Flaps—Not Felt to Operate

a. Reverse flaps selection

b. Check *main* hydraulic pressure:

(1) If *main* pressure low:
Carry out **Main System Failure Procedure** (Card 15 reverse)

(2) If *main* pressure normal:
Change flaps selector fuse 27

11. Malfunction of Flaps—Felt to Operate, No Indication

Change flaps indicator fuse 28

AIRBRAKES

12. Malfunction of Airbrakes

a. Reverse airbrakes selection

b. Check *main* hydraulic pressure:

(1) If *main* pressure low:
Carry out **Main System Failure Procedure** (Card 15 reverse)

(2) If *main* pressure normal:
Change airbrakes selector fuse 31

BOMB DOORS

13. Malfunction of Bomb Doors—Not Heard or Felt to Operate

a. Reverse bomb doors selection immediately

b. Check *main* hydraulic pressure:

(1) If *main* pressure low:
Carry out **Main System Failure Procedure** (Card 15 reverse)
With the following additional considerations:
Unless imperative, make no further bomb doors selection (to conserve emergency supply of hydraulic fluid)
If necessary land with bomb doors open

(2) If *main* pressure normal:
Change bomb doors selector fuse 24
If unsuccessful and it is imperative to open the bomb doors, operate the bomb doors emergency control lever —they cannot then be closed in flight

14. Malfunction of Bomb Doors—Heard or Felt to Operate, No Indication

Change bomb doors indicator fuse 22

HAZARDOUS LANDINGS

Preparation and Escape

Before Landing

1. Release lifepreserver from survival pack
2. Disconnect emergency oxygen
3. Tighten harness and helmet straps
4. Navigator—if ordered to jettison hatch, see **Jettison Procedures**
5. All non-essential electrical loads off before touchdown

After Landing

1. Battery master switch OFF
2. Disconnect oxygen, mic/tel leads, harnesses and leg restraint. If practicable, make aircraft **Safe for Parking**
3. Exit through entrance door or hatchway
4. If necessary, return to aircraft when safe to do so and make it **Safe for Parking**

Both Main Wheels Only Locked Down

1. Reduce weight (normal fuel drill)
2. Carry out **Before Landing** drill above. Navigator's hatch may be retained at pilot's discretion
3. Approach and landing normal. Close HP cocks just before touchdown
4. Hold nose up, using tail trim, until elevator effectiveness just sufficient to lower nose smoothly on to runway. Use brakes gently
5. Carry out **After Landing** drill above

One Main Wheel Not Locked Down

1. If a landing must be made while there is fuel remaining in the tip tanks, jettison them
2. Reduce weight (normal fuel drill)
3. Carry out **Before Landing** drill above
4. Jettison navigator's hatch
5. Check that area parallel to runway and up to 100 yards out from touchdown point is clear, to allow for swing after landing. If the area is not clear, it may be preferable to land with all wheels up (see overleaf)
6. Make a normal landing on one side of runway centre line, same side as locked down main wheel

(continued)

Hazardous Landings (*continued*)

7. Close HP cocks just before touchdown. Use aerodynamic braking, hold wings level to 60 knots (approximately) and lower the nose and wing gently before the elevator and aileron control are lost. Use wheelbrakes to delay groundloop
8. Carry out **After Landing** drill (this card over)

All Wheels Up

1. If a landing must be made while there is fuel remaining in the wing-tip tanks, jettison them
2. Reduce weight (normal fuel drill)
3. Carry out **Before Landing** drill (this card over)
4. Jettison navigator's hatch
5. HP cocks closed just before touchdown
6. Carry out **After Landing** drill (this card over)

Forced Landing

Note 1: It may be advantageous to have the undercarriage down to absorb impact load

Note 2: If necessary, select EMGY on IFF/SSR

With Engine Power Available

1. Jettison wing-tip tanks if they contain fuel
2. Reduce weight (normal fuel drill)
3. Carry out **Before Landing** drill (this card over)
4. Jettison navigator's hatch
5. Approach—normal; HP cocks closed before touchdown
6. Carry out **After Landing** drill (this card over)

With No Engine Power Available

1. Glide at 165 knots
2. Jettison wing-tip tanks if they contain fuel
3. Close HP cocks, switch off LP pumps and cocks
4. If time permits, carry out **Before Landing** drill (this card over); in any case jettison the navigator's hatch
5. Lower flaps if possible
6. Approach 130 knots; threshold speed normal plus 10 knots
7. Carry out **After Landing** drill (this card over)

Asymmetric Wing-Tip Fuel Load

1. Determine, at a safe height, the lowest speed for adequate lateral control with undercarriage and flaps down. Keep threshold speed 5 knots above this speed
2. Jettison the wing-tip tanks if their retention jeopardises the safety of the aircraft

BARRIER ENGAGEMENT

(Mk 5, Mk 6, Type A and at their 'Light Aircraft' settings Mk 12, Mk 12A and Type B Barriers)

If take-off is aborted:

1. Close throttles, lower flaps, make RT call "Barrier"
2. When flaps have travelled, close HP cocks
3. Decide whether to jettison wing-tip tanks
4. Retain canopy and hatch
5. Aim to engage barrier between verticals and in the centre of the net if possible
6. Duck head forward and release brakes just before entry
7. After entry use steady wheel braking
8. Apply parking brake when aircraft stops
9. **If possible, switch off all electrical services including LP cocks and battery switch and make Safe for Parking** before leaving aircraft
10. Jettison hatch after aircraft stops if speedy exit is essential

Recommended Max Entry Groundspeeds (knots)

AUW (lb)	*Mk 5*	*Mk 6/Type A*	*Mk 12/12A/Type B At 'Light Aircraft' Setting*
25,000	89	102	99
30,000	81	93	91
35,000	76	86	83
40,000	70	81	79
45,000	66	75	73

Note: If engaged above 120 knots, regardless of AUW, the aircraft may break through the net

Limitations

The seats have a ground-level capability at speeds above 90 knots in straight and level flight

The navigator's hatch is jettisoned automatically when either firing handle on either rear crewman's seat is operated

The snatch unit is operated automatically when either firing handle on the pilot's seat is operated

To avoid possible seat collisions, simultaneous or near simultaneous ejections by crew members should not be made

Ejection

Complete as much of the following drill as time and conditions permit

Consider and plan for:

Area of parachute landing
Area of aircraft impact

1. Warn crew
2. Height . . . . . Ideally between 2000 and 9000 feet AGL
3. Airspeed . . . . . Ideally 200 knots
4. IFF/SSR . . . . . EMGY
5. Canopy/snatch master switch Confirm ON
6. Hatch safety switches . . Confirm ON

WARNING: Whichever rear crewman ejects first must ensure that *his* HATCH SAFETY switch is ON

7. Harness . . . . . Locked and tight, leg restraints and PSP lanyard connected
8. Oxygen mask . . . . Tight
9. Visors . . . . . Down
10. Aircraft . . . . . Trim as required, consider the use of aileron trim, head towards impact area
11. Navigator's table . . . **Folded forward**
12. Radio . . . . . **Call as required**
13. Throttles . . . . . **Closed**
14. Eject, 1st then 2nd rear crewman then pilot

If the Hatch Fails to Jettison

15. Check HATCH SAFETY switch. If it is ON, switch ON the HATCH JETTISON switch. If it is off, switch it ON. Re-pull the firing handle to withdraw the BTDU sear; the seat should then fire 0·5 second later
16. If necessary repeat item 15 using the 2nd rear crewman's switches

(continued)

Abandoning Drills (*continued*)

Any Ejection Seat Fails to Fire or Hatch Fails to Jettison

1. If possible, descend to below 10,000 feet and reduce speed to 160 knots
2. Disconnect main and emergency oxygen
3. Pull manual disconnect handle
4. Operate seat harness quick release fitting
5. Remove hydraulic handpump handle
6. Jettison entrance door and abandon aircraft
7. Pull ripcord handle when clear of aircraft and at safe height. (No emergency oxygen available)

Automatic System Fails After Ejection

1. Pull manual disconnect handle
2. Operate safety harness quick-release fitting and kick or push seat away. Note that no emergency oxygen is available after leaving seat
3. Pull ripcord handle when clear of seat, at safe height

Abandoning via Entrance Door

Ensure aircraft 'clean' if possible. Speed below 160 knots if possible
Roll out forward in crouched attitude

Passenger's Abandoning Drill

Note: The following drill assumes that the passenger is equipped with a chest-type parachute and a personal survival pack (para harness on, PSP attached, para pack stowed but immediately accessible)

1. Release seat harness
2. Remove hydraulic handpump handle
3. Raise seat to stowed position on starboard wall, engaging retaining clip or strap. If possible the pilot should assist in these actions so that the passenger does not need to turn round
4. Operate emergency oxygen (if carried) and disconnect main oxygen supply. If no emergency oxygen equipment carried, lower oxygen mask
5. Attach chest parachute
6. Jettison door by rotating jettison handle clockwise as far as possible (approximately 4½ turns) and striking top of door
7. Crouch or kneel facing forwards by door aperture
8. Half roll forwards and sideways through aperture, retain the crouched attitude and keep the head down
9. When clear of the aircraft, pull the parachute ripcord handle or override knob, if at low level

Ditching (*overleaf*)

DITCHING

Do not ditch if the aircraft can be abandoned in flight. If forced to ditch:

1. Transmit distress call. Navigator selects EMGY on IFF/SSR
2. Bomb doors and entrance door closed
3. Disconnect parachute harnesses and AVS
4. Lower vizors
5. Tighten harnesses and helmet straps
6. Jettison the navigator's hatch
7. Final approach flaps down. Touchdown at lowest practicable speed and rate of descent
8. After touchdown release harnesses, mic/tel leads and oxygen connections
9. Leave aircraft through hatch aperture taking PSP
10. Inflate lifepreservers

FUEL MANAGEMENT DRILL

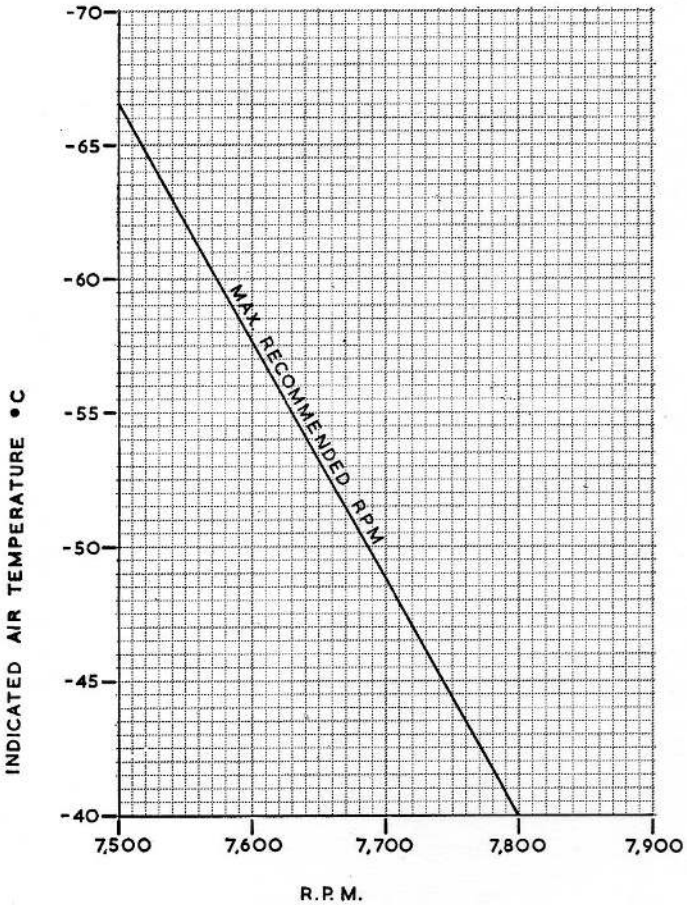
	Condition	*Tank*			
		No 1 Pumps	*No 2 Pumps*	*No 3 Pumps*	*Bomb bay Pumps*
1	Start up and taxy . .	OFF	OFF	ON	OFF
2	Take-off to 2000 ft . .	ON	ON	ON	OFF
3	Cruise. It is important that the fuel in the bomb bay tank is used soon after the wing-tip tanks are empty .	OFF	OFF	ON	OFF
	When No 3 tank contents gauge reads 2500 lb .	OFF	OFF	ON	ON
	When No 3 tank contents gauge reads 3500 lb .	OFF	OFF	ON	OFF
	Repeat the above procedure until the bomb bay tank is empty				
3A	Cruise. Bomb bay tank empty or not fitted . .	Maintain balance amounts in No 1 and No 3 tanks			
		As reqd	OFF	As reqd	OFF
4	When No 1 and No 3 tanks read 500 lb each . .	ON	ON	ON	OFF
5	Landing (see Note) . .	ON	ON	ON	OFF

Note: When carrying out circuit practice, item 5 above may be modified to read 'Minimum of two pumps per engine ON as long as No 1 and 3 tanks read above 500 lb each'

Engine Surge Graph (*overleaf*)

LOW TEMPERATURE ENGINE SURGE

Maximum recommended RPM (Pilot's Notes Part 3, Chapter 2, para 5(b) refers



ENGINE LIMITATIONS—AVON Mk 1

Power Rating	*Time Limit per Flight*	*Max RPM*	*Max JPT °C*
Take-off and operational necessity	30 minutes (combined total)	7800 ±50	600
Max continuous	Unrestricted	7600	565
Idling on ground	Unrestricted	2750 ±100	500

Oil Pressure

Minimum pressure at idling RPM ... ... 3 PSI
Minimum pressure at 7400 RPM and above ... ... 15 PSI
Normal at 7400 RPM ... ... 20 PSI

AIRFRAME LIMITATIONS

Speed and Mach Number Limitations

Condition	*Max IAS (knots)*	*Max IMN*
Clean aircraft	450	0·75 below 15,000 feet 0·79 15,000 to 25,000 feet Above 25,000 feet limited by compressibility effects The speed at which a strong nose-up change of trim occurs, ie about 0·84, must not be exceeded
With wing-tip tanks	365	0·79 below 25,000 feet 0·8 above 25,000 feet
Bomb doors	350	0·75 up to 40,000 feet 0·8 above 40,000 feet
Airbrakes (2-position) Airbrakes (3-position) MID	As for clean aircraft	As for clean aircraft
Airbrakes (3-position) OUT	400	0·75 12,500 to 25,000 feet 0·79 above 25,000 feet
Undercarriage	190	
Flaps	160	

Note 1: The speed for the operation of a service also applies for flight with the service in the extended position

Note 2: There is no role requirement to open the bomb doors in flight. They are to remain closed except during emergencies, icing let-downs and as required by the flight test schedule

Maximum Altitude

The maximum permitted altitude is 45,000 feet

(continued)

Airframe Limitations (*continued*)

Maximum Weights

For take-off and all permitted forms of flying—46,000 lb

Max normal for landing 40,000 lb

Note: In emergency the aircraft may be landed at higher weights but great care will be required, particularly when braking

Manoeuvre Limitations

Combined application of coarse aileron and g loading should be avoided

The acceleration limitations are:

Condition	*With Negligible Aileron*	*With Aileron*
Up to 37,600 lb without wing-tip tanks	4·0g	2·0g
Above 37,600 lb or with wing-tip tanks	3·0g	1·5g

Note: The application of negative-g loading is to be avoided (Engine fuel supply consideration)

Jettisoning of Wing-Tip Tanks (Any Fuel State)

Max speed 365 knots or 0·79M below 25,000 feet, 0·8M above

Arresting Barrier Engagement

The aircraft is cleared for engagement with the Mk 5, Mk 6, Type A and at their Light Aircraft setting the Mk 12, 12A and Type B arresting barriers. (See Card 19 for max engaging speed/weight combinations)

Aircraft Arresting Gear Trampling

The aircraft is cleared to trample the supported and tensioned centre spans of the following types of arresting gear at speeds up to unstick speed: SPRAG; CHAG; RHAG; PUAG; BAK 9; BAK 12; Bliss 500S

Maximum Crosswind Component

Take-off . . . . . 25 knots max recommended

Landing . . . . . 25 knots max permitted

Tyre Limiting Speed

The tyre limiting speed on the ground is 161 knots groundspeed

(continued)

Limitations—(*continued*)

BANNER TARGET TOWING LIMITATIONS

Take-Off

Minimum runway length . . 6000 feet

Maximum crosswind component . 20 knots for runways over 150 feet wide

15 knots for runways up to 150 feet wide

Maximum tailwind component . 5 knots

In Flight

Condition	*Max IAS*	*Altitude*	*Max Bank Angle*
Transit overland	250 knots	2000 feet AGL (min)	45° at 300 knots and below
Over range	300 knots	20,000 feet (max)	

Target Release

Approach descent . . . 3°

Release . . . . . 150 knots and 350 feet aircraft AGL

Intentionally Blank

B2T ADDITIONAL FUSES

ECP

SERVICE	NO	RATING AMPS
VOR/ILS SUPPLY.	48	10
VOR/ILS SUPPLY	49	10
GREEN SATIN CONTROL	65	5

LOCATED BEHIND SMALL PANEL ABOVE ECP

SERVICE	NO	RATING AMPS
PILOTS RMI	F1	5
VOR 2 AC	F2	5
VOR 2 RX	F3	5
VOR 2 ANAL	F4	5
VOR 2 ON/OFF	F5	5
NAV RMI	F6	5
VOR 1 AC	F7	5
VOR 1 RX	F8	5
VOR 1 MIC ANAL	F9	5
GLIDESCOPE RX	F10	5
VOR 1 ON/OFF	F11	5
SPARE	F12	5

MEP

SERVICE	NO	RATING AMPS
No 4 INV HOLD IN	139	5

Service	Fuse No	Rating (Amps)
MEP		
Battery isolation	1	5
Fire extinguisher	2	20
Target towing emergency jettison	3	5
Fatigue meter	4	2.5
Ammeter test socket	5	5
Ammeter test socket	6	5
Ammeter test socket	7	5
Ammeter test socket	8	5
Voltmeter	9	5
Stand-by UHF - normal	10	10
Stand-by UHF - emergency	11	10
Equipment bay lamp	12	5
Stand-by UHF battery test	13	5
No 1 generator failure warning lamp	14	5
No 2 generator failure warning lamp	15	5
Stand-by UHF control	16	5
Canopy jettison	17	50
Hatch jettison	18	50
UHF system	19	40
Tail-plane control	138	60
ECP		
Tail-plane control	21	5
Bomb bay door indicator	22	5
Bombbay door control	24	10
Tail-plane control	25	5
Tail-plane indicator	26	5
Flaps control	27	10
Flaps indicator	28	5
Rudder-trim control	29	10
Rudder-trim indicator	30	5
Air brakes	31	10
Aileron-trim control	32	10
Aileron-trim indicator	33	5
Oxygen warning	34	2.5
External air thermometer	35	5
AMU and API	36	5
Cabin air control	37	5
Cabin air indicator	38	5

Service ECP	Fuse No	Rating (Amps)
Cabin air warning	39	5
Cabin air control (post Mod 5)	40	5
No 1 engine starting	41	10
No 1 engine pump isolating solenoid	42	5
No 1 engine ignition	43	20
AHE 28V test supply	44	5
No 2 engine starting	45	10
No 2 engine pump isolating solenoid	46	5
No 2 engine ignition	47	20
Target towing	48	5
Cabin air control (post Mod 5)	50	5
Overload tank fuel cock starboard (post Mod 1490)	51	5
Overload tank fuel cock port (post Mod 1490)	51	5
Oxygen warning	52	2.5
Pilots insrrument panel lighting	53	5
Pilots panel lighting (U/V)	54	5
Console and forward ststion lighting	55	5
Navigators cockpit and chartboard lanps	56	5
Canopy de-misting	57	5
Fuel pump, overload tank forward (post Mod 1490)	58	20
Fuel pump ov rload tank aft (post Mod 1490)	59	20
Exhaust gas thermometers	61	5
Fuel contents gauges	62	7.5
Intercomm supply	63	5
Intercomm junction box	64	5
Intercomm isolation panel	66	5
Alighting-gear control	67	10
Alighting-gear indicator	68	5
Fuel pressure warning (No 1 engine)	69	5
Fuel pressure warning (No 2 engine)	70	5
No 1 engine fire warning	71	5
No 2 engine fire warning	72	5
No 1 engine fire extinguisher push switch	74	5

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Service	Fuse No	Rating (Amps)
ECP		
No 2 engine fire extinguisher push switch	75	5
Wing tip fuel tank jettison	76	10
Tacan DC supply	77	5
Radio compass	78	10
Instrument DC supplies	80	5
Instrument DC supplies	81	10
Turn and slip indicator	82	2.5
Turn and slip indicator	83	2.5
UHF aerial change-over	84	5
No 1 port fuel cock	149	5
No 2 port fuel cock	150	5
No 3 port fuel cock	151	5
No 1 starboard fuel cock	152	5
No 2 starboard fuel cock	153	5
No 3 starboard fuel cock	154	5
AHE	155	5
AHE 28 volt DC test supply	156	5
IFF aerial switch unit	157	5
IFF transponder	158	5
IFF control	159	5
IFF fail	160	5
Tacan/IFF inverter control	161	5
DC test socket	162	10
Navigators instrument panel lamps	163	5
V/UHF control unit	164	5
Pilots console		
Turn and slip indicator (emergency)	89	2.5
Pressure head heater	93	10
Vent valve heater (if fitted)	94	10
DV window heater	95	10
Landing lamp control	96	5
Navigation lamps	97	5
Identification lamps	98	5
Taxying lamps.	99	10
Landing lamp filaments	100	20
Anti-collision lamps	165	5
No 1 distribution box		
Oil pressure gauge (No 1 engine)	101	2.5
Oil pressure gauge (No 2 engine)	103	2.5
Radio Compass	102	5
Radio Compass	104	5

Service	Fuse No	Rating (Amps)
No 1 distribution box		
Tacan	105	5
Tacan	106	5
Tacan	108	5
No 2 distribution box		
AHE	131	5
AHE 115V AC test supply	132	5
IFF/SSR	136	5
400 Hz fuse box		
GM4B compass	109	2.5
Artificial horizon	111	2.5
DV window heater	112	5
GM4B compass	113	2.5
Artificial horizon	115	2.5
GM4B compass	120	2.5
Port undercarriage bay		
HE ignition unit (inboard)	166	10
HE ignition unit (outboard)	167	10
Starboard undercarriage bay		
HE ignition unit (inboard)	168	10
HE ignition unit (outboard)	169	10
Navigators heated clothing		
*1st navigators heated clothing	171	5
2nd navigators heated clothing	172	5
Pilots heated clothing		
Pilots heated clothing	170	5