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Card 1
(AL9)

Issue 8
(AL9, March 1978)

AP 101B-1801-14

FLIGHT REFERENCE CARDS

GNAT T Mk 1

NORMAL DRILLS

AIRCRAFT 'SAFE FOR PARKING'

The aircraft is safe for parking when the safety breech lock levers on both ejection seats are pointing forwards.

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

BY COMMAND OF THE DEFENCE COUNCIL

NOTES TO USERS

1. These Flight Reference Cards are complementary to the Gnat T Mk 1 Pilot's Notes (AP 101B-1801-15). The same conventions are used and amendment procedure is similar.

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 AT AL9

<i>Card No</i>	<i>Issued by</i>	<i>Card No</i>	<i>Issued by</i>
1	AL9	12	AL9
2	AL9	13	AL6
3	AL8	14	AL6
4	AL9	15	AL7
5	AL9	16	AL8
6	AL9	17	AL7
7	AL9	18	AL7
8	Initial issue	19	AL8
9	AL5	20	AL7
9A	AL6	21	AL9
10	AL6	22	AL7
11	AL7		

Initial/
External/
Internal

INITIAL CHECKS

Before starting the external checks ensure that:

Chocks are in position.

A fire extinguisher is available.

The aircraft is in a suitable position for starting and taxiing.

There is no accumulation of fuel under the aircraft likely to cause a fire risk.

EXTERNAL CHECKS

External surface free of damage: panels, nose locks, filler caps secure. Oleo extensions equal and normal. Tyres free from cuts and creep. Brake leads secure; no sign of hydraulic leaks. Hydraulic handpump secure in port wheel fairing. Jet pipe free from wrinkling and distortion: blanking plate removed. Brake parachute correctly fitted. Canopy and windscreen clean and undamaged.

Pressure-head cover removed.

Fire extinguisher bottle, pin flush.

Tailplane accumulator 1350 to 1500 PSI.

Static vent plug removed; no signs of hydraulic fluid in vent.

Undercarriage ground locks removed.

Blanks removed from engine air intakes and boundary layer bleed entrances.

External power disconnected.

Claw of locking device on cockpit starboard coaming engaged on the hood locking pin.

INTERNAL CHECKS

If the aircraft is to be flown solo, check the rear cockpit:

- ◀ 1. Seat harness and equipment secure, anti-g stopper in. ▶
2. FIS front displays switch on.
3. Standby trim switches central, guard fully down, changeover switches NORMAL.
4. Intercom OFF.
5. Cabin altimeter changeover cock CABIN.
6. SWS mute button in.
7. Oxygen selected NORMAL and emergency OFF.
8. Seat height adjustment locked (handle tongue out).

continued overleaf

Internal Checks — continued

Ejection Seat Checks

Before entering the cockpit check seat as follows:

5 Reds

1. Breech lock lever pointing forwards.
2. Face screen firing handle locked.
3. Seat pan firing handle fully home.
4. Drogue container flap safety tie intact.
5. Manual separation lever gated down. Red thread intact.

5 Greens

1. } Gas lock indicators green.
2. }
3. Green pin protruding below headrest.
4. }
5. } PSP attached to lap straps.

5 Blacks

Tug all five harness attachment points to test for security.

2 Extra

1. Check static line attached to seat.
2. Check emergency oxygen tell-tale wire is unbroken

Front Cockpit and Pre-Start Checks

Where applicable, the checks should be repeated in the rear cockpit. (Maximum time with battery master switch ON before starting engine is 5 minutes).

Strap-in and adjust seat, checking handle tongue out.

Parking brake	...	...	On
Ejection seat	...	...	Ensure that breech lock lever is turned to firing position (starboard through 90°)
ACC MASTER switch			ON
Standard warning system			Cancel. Leave hydraulic warning unmuted
Canopy	...	...	Closed (caption goes out), or on the vent catch
UHF main/standby switch			Main
UHF power switch	...		Normal
UHF standby	...	...	Guard

continued below

Internal Checks — continued

Port Side: Check around the cockpit from left to right:

Canopy jettison handle	Secure
Undercarriage selector	Undercarriage down, flat to rear
Throttle	Full and free movement
	Check fuel contents, F.T.R and gauge operation
	Throttle closed to HP OFF
Brake parachute ...	SET (forward)
Booster pump ...	Off
Pressure-head heater ...	OFF
Landing lamp ...	OFF
Alternator reset button	Out
Air vent	As required
Windscreen demist control	As required
Elevator unlock handle	Fully forward (locked)
Emergency depressurise knob	Secure
E2B compass	Serviceable. Note heading

Internal

Instrument Panel

Hydraulic pressure gauge	Air pressure 1500 PSI (approx)
Aileron position indicator	Test by operating ailerons
Flight director park switch	PARK or OFF
ASI	Condition
Machmeter	Needle vertical
Secondary warning panel	All lights off except AC DC FUEL, F.T.R and OIL
Oxygen flow MI ...	Functioning correctly
Engine anti-ice switch	Gated OFF
Accelerometer ...	Reset
FIS power failure flag	Orange
RCDI	Indicating zero
Undercarriage indicator	Three green lights, equal intensity
Standby instrument switch	NORMAL BATT

Continued overleaf

Internal Checks — *continued*

Cabin altimeter ...	...	Set zero, note millibars
Cabin altimeter change-over ...	...	CABIN
Oxygen contents gauge		Sufficient for flight
Front compass control ...		FRONT (up)
Standard warning system		Test. Check captions and warning lights and audio warning. Cancel. (If solo, select standby radio on, SWS test, standby radio off) ▶
External tanks MI (two)		White (empty), black (fuelled)
Fuel low level warning ...		Test
Ram air control ...		In

Starboard Console

Main oxygen control ...		Wired ON
Cockpit air control ...		OFF
Cockpit lighting controls		As required
Offset computer ...		As required
Zero Reader control panel ...	...	Main selector switch FLT INST. Altitude switch OFF. Pitch switch 0°
Navigation lights switch		As required
Flashing light switch ...		ON
Emergency light switch		OFF
ILS ON/OFF switch ...		OFF
SSR lighting switch ...		As required
Tacan control unit ...		OFF. Select DIST BRG and required channel
SSR controller ...	...	S/B
Emergency oxygen knob		Not operated
Hydraulic selector ...		ALL ON
LP cock ...	...	Gated ON
ILS frequency ...	...	As required

Centre Pedestal

Emergency flow toggle		Test by deflecting left or right Leave central
◀ Normal / 100% oxygen selector ...	...	Test 100% flow, set NORMAL ▶
UHF ...	...	T/R or T/R + G. Channel as required

STARTING THE ENGINE

Palouste Start

1. Check with ground crew that the air starter is ready for starting.
2. Booster pump ... ON } Bar
Pressure-head heater ON } forward
3. Throttle to THROTTLE CLOSED.
4. Press relight button and release when JPT reaches 300°C.

Starting/
Failure
to Start

Engine should light up at 7% to 8% in 2½ seconds and accelerate to idling RPM in 17 seconds. Check OIL caption out before idling RPM. If JPT rises rapidly towards 700°C., close throttle to HP OFF.

Air Bottle Start

1. Booster pump ... ON } Bar
Pressure-head heater ON } forward
2. Press relight button.
3. At 10% RPM throttle to THROTTLE CLOSED.
4. Release relight button when JPT reaches 300°C.
5. If JPT rises rapidly towards 700°C, select HP OFF immediately.

FAILURE TO START

1. Throttle to HP OFF and release relight button.
2. Check for cause and whether fuel dumped.
3. If fuel is present, carry out dry run:
Advise ground crew.
Check throttle at HP OFF.
Check booster pump ON.
Thumbs-up to ground crew, hands on cockpit coaming (visible to ground crew)
4. Dry run carried out by ground crew.
5. On completion confirm jet pipe clear of fuel and that none has spilled on ground to cause fire risk. Then attempt a further start.
6. If unsuccessful do not make another attempt.

AFTER STARTING CHECKS

Air starter	...	...	Disconnected
Idling RPM	...	...	35 to 38% minimum
JPT	...	...	Normal, 450°C approx
			Max idling, (585°C)

All standard and secondary warning captions out.
If DC caption remains on, operate a DC service.

Standby Trim. Test as follows:

1. Check T/P setting with TRIM caption out (2° to 6° nose-up).
2. Using standby trim switches, trim nose-up; TRIM caption comes on; TPI shows movement in correct sense. While checking, test separately each half of double pole switch; no TPI movement.
3. Trim nose-down until TRIM caption out; indicator returns to original setting.
4. Switches central, replace guard.

Feel Trim. With TRIM caption out, stick free:

Action (n-u=nose-up n-d=nose-down)	Tailplane setting (° n-u)		Feel trim indicator
	Mk 4 unit	Other Marks	
*Trim fully n-u Stick fully back Trim n-d	Approx 12° 18° 5° ± 3/4°	9 3/4° min 18° approx 5° ± 3/4°	Nose-up No movement Exactly at SAFE/IDEAL position
*Trim fully n-d Stick fully fwd	Approx 2 1/2° Approx 2°	2 3/4° max 1 1/2° approx	Nose-down No movement

*When checking these tailplane settings, use the following method:

- ◀ Feel trim fully nose-down, push stick forward, slowly release forward pressure until stick ceases to move. Check TPI reading. Use similar procedure for nose-up check, pulling stick back. ▶

While trimming nose-up, independently select each trim changeover switch to STANDBY. Outboard switch cuts out feel trim, inboard switch does not; set both switches to STANDBY and operate feel trim switch nose-up TRIM caption comes on and TPI moves in correct sense. TRIM nose-down until TRIM caption out; select changeover switches to NORMAL. Separate feel trim switches; test each half separately; no T/P movement. Set 6° nose-up for take-off.

continued below

After Starting Checks — *continued*

Instruments Yaw MI (two) black. Test (white).
 Altimeter OFF flag retracted. Zero set,
 compare MB with cabin altimeter.
 FIS power failure indicator black.
 Attitude indicator erect.
 Standby A/H erect, OFF flag retracted.
 Compass system:
 Press fast-erection button
 Mode switch to COMP
 Check annunciator and ratchet,
 synchronise
 DI erect and synchronised with gyro
 compass and cross-checked with E2
 compass
 Compass to rear if required

After Start/
Taxi

Cockpit air control levers As required
 Tacan ... ON
 SSR ... Test
 Anti-g system Test
 ◀ Flaps .. Test operation over full range starting
 from UP. Check indicator. Set UP.
 Hydraulic pressure 2900 PSI minimum ▶
 Hydraulics ... Cycling between approx 2470 and 3050
 PSI (min top pressure 2900 PSI at idle
 RPM; if less than 2900 PSI, set 55% and
 recheck. If still below 2900 PSI, aircraft
 unserviceable)
 FIS Check as required (Card 8).

TAXYING CHECKS

Before Taxying

Test main and standby radios as required
 Set altimeters

During Taxying

Test brakes for effectiveness. While turning:

- a. Depress and hold the alternator reset button and confirm that the standby direction indicator continues to rotate.
- b. Check the remaining flight instruments.

CHECKS BEFORE TAKE-OFF

Trim	...	Tailplane incidence 6° nose-up
Anti-icing	...	As required
Fuel	...	Contents sufficient for flight. Low level warning out. Slipper tank indication correct.
Flaps	...	UP or 20°, as required. Indicating
Instruments		Pressure-head heater ON. Altimeter set, OFF flag retracted. Power failure indicator black. Attitude indicator erect. Standby A/H erect. Nav display erect and annunciating. All compasses synchronised.
Oxygen	...	As required. Emergency lever central. Contents sufficient for flight. Magnetic flow indicators functioning.
Hood	...	Closed and locked. Vent catch stowed
Harness	...	Tight and locked. Seat live, seat pan locked, leg-restraint garters and dinghy lanyard connected.
Hydraulics	...	Hydraulic selector lever fully ALL ON. Pressure fluctuating between approx 2470 and 3050 PSI (min top pressure 2900 PSI).
Controls	...	Full and free movement. TPI and API respond correctly.
Captions	...	All out.
On take-off		RPM, JPT within limits. All warning captions out.

CHECKS AFTER TAKE-OFF

Brakes on momentarily.
Undercarriage UP above 145 knots.
Flaps UP before 200 knots. Indicating up.
Undercarriage indicator lights out.
Pressurisation ON. Temperature as required.

CHECKS BEFORE AEROBATICS AND STALLING

Height	...	Sufficient
Airframe	...	Flaps UP, indicating up
		Airbrakes in
		TPI, aileron position and yaw indicators all functioning
		Canopy clear of ice
Security	...	Harness tight and locked
		Check for loose articles
Locality and look-out	...	Check position. Check clear of controlled airspace, populated areas, cloud and other aircraft

MANUAL CONTROL PROCEDURES

Standard Manual Selection Drill

Maximum speed for unlocking elevators and flight with ELEV caption on: 400 knots below and 0.85M above 20,000 feet.

Practice Manual Selection Drills

Inexperienced, 5000 feet Minimum Height

- S — Speed below 400 knots/0.85M.
- T — Trim to ideal sector, while regaining level flight.
- U — Unlock elevators, checking two clicks, white band, ELEV caption on.
- ◀ P — Power (HYDRAULIC SELECTOR) cock off. ▶
- R — Raise guard on standby trim.
- E — Exhaust T/P and then aileron accumulators (ideally T/P 1° to 2° nose-up UC up, 5° to 6° UC down)
- C — Check operation of elevators, ailerons and standby trim switches.
- C — Changeover switches to standby, if required.

When manoeuvring, use standby trim to maintain stick load free. Use elevators only for fine control in pitch.

When Experienced, 2000 feet Minimum Height

1. Turn off hydraulic selector.
2. When SWS operates, carry out **Hydraulic System Failures** drill.

To Reselect Power

1. Whenever possible ensure UC in same position as when manual control selected to avoid effect of datum shift change as power is restored.
2. Trim load free.
3. At 1000 feet minimum select ALL ON.
4. Check T/P responds to stick movement.
5. Check HYD warning out, pressure cycling normally.
6. At minimum height of 2000 feet, re-lock elevators, ELEV caption out.
7. If TRIM caption on, retrim until out.
8. Lower trim guard or changeover switches NORMAL. Check restoration of feel trim.

WARNING 1: If selecting ALL ON fails to restore T/P response, select TAIL & AILN OFF and remain in manual.

WARNING 2: If ELEV caption remains on, move stick fore and aft while pushing unlock lever. If caption still on, pull unlock lever fully aft and remain in follow-up.

APPROACH

Controlled descent (minimum fuel 700 lb for CDTC and GCA).

75% RPM.

Speed 0.80M or 300 knots.

Airbrakes out.

INSTRUMENT APPROACH (normal fuel state)

<i>Position</i>	<i>Airspeed (knots)</i>	<i>Flaps</i>	<i>Power (approx)</i>
Downwind	Allow to fall to 165 to 170	10°	75%
Base leg	165 to 170	10°	75%
Glide path	150 to 155	50°	75%

CIRCUIT (minimum fuel for joining — 400 lb)

<i>Position</i>	<i>Airspeed (knots)</i>	<i>Flaps</i>	<i>Power (approx)</i>
End of downwind leg	160 to 170	10°	65%
Finals turn	170 to 150	30° or as reqd	65% or as reqd
Lined up	150 to 140 150 with slippers off	50° or as reqd	55% minimum
Threshold (fuel)	(if in manual or flapless, add 5 knots)		
Above 1850 lb	145	50°	—
1850 to 1501 lb	140	50°	—
1500 to 1001 lb	135	50°	—
Below 1001 lb	130	50°	—
Without slipper tanks	140	50°	—

PRE-JOINING/DESCENT CHECKS

Fuel	...	...	Contents
Instruments	...	...	Functioning, erect and synchronised
Radio	...	...	Unmuted, as required
Altimeters	...	...	Set as required, cross-checked
Demist	...	...	As required

PRE-LANDING CHECKS

Undercarriage	...	...	Down below 250 knots
Fuel	...	...	Sufficient for overshoot (calculate threshold speed)
Flaps	...	...	10° or as required
Harness	...	...	Tight and locked
UC indicator	...	...	Three green lights
Tailplane	Datum shift operated (6° nose-up) stick in the middle

On Round-Out

Brakes	Toes off
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AFTER LANDING CHECKS

Parking brake	On
Brake parachute	Jettison (if used)
Pressure-head heater	OFF
Flaps	...	...	UP
FIS	...	...	COMP mode
FFFD	...	...	Test
Engine anti-icing	...	...	OFF (if used)
Pressurisation	...	...	OFF
Hood	...	...	As required for taxiing
Non-essential electrics	...	...	OFF
Feel trim	...	...	Fully nose-down

Approach/
Landing

STOPPING THE ENGINE

Throttle	...	...	CLOSED
Parking brake	...	...	On
RPM and JPT	...	...	Stabilised
Flaps	...	...	Confirm underside clear then DOWN
Throttle	...	...	HP OFF
Booster pump	...	...	Off
ACC MASTER switch	...	...	OFF
Intercom and UHF	...	...	OFF
Hood	...	...	Open
Ejection seat	...	...	Breech lock lever to safe
Chocks	...	...	In position
Parking brake	...	...	Off

Intentionally Blank

FLIGHT INSTRUMENT SYSTEM CHECKS***Essential checks**

Item	Action or check	Indication
*Power failure	Power failure indicator	Black (AC or DC failure indicated by two arrows on orange disc)
*Attitude indicator	Horizon (if bank over 40° operate fast-erection button)	Indicates aircraft ground attitude
Flight director index (attitude indicator)	1. Flight director park switch NORMAL	
	2. Depress and turn HDG knob. Align selected heading pointer (SHP) on navigation display with datum	Flight director indicator (FDI) horizontally central
	3. Move SHP clockwise then anti-clockwise, check for free movement	FDI moves right then left
	4. Turn pitch pointer clockwise then anti-clockwise	FDI moves down then up
	5. Turn pitch pointer until FDI vertically central	Pitch pointer indicates aircraft's attitude
	6. Turn main selector to TEST. Press TEST button and release	FDI moves left and up, then returns to original position
	7. Flight director park switch PARK	(continued overleaf)

Flight Instrument System Checks — continued

Item	Action or check	Indication
ILS presentation (navigation display)	1. ILS receiver OFF, mode selector ILS	Localiser and glide path pointers bisect central index
	2. Note beam and glide path signal	OFF
	3. Pull HDG knob and turn	Localiser heading setting alters
TACAN presentation (navigation display)	1. TACAN switch OFF. Mode selector to DL. Note bearing and range	Range counter shutter raised
	2. Set offset computer to zero miles. Mode selector TAC	Range and bearing approximates to DL range and bearing
	3. Mode selector as required for take-off	

continued below

Flight instrument system checks — *continued*

Item	Action or check	Indication
Compass system (navigation display)	*1. Press fast-erection button to check fuse	Light remains on if gyro not within 12° of erection
	*2. Mode switch to COMP	Black background
	3. Press COMP/DG button for serviceability and leave on DG	DG in window
	4. Turn SYN knob	Compass card follows smoothly
	*5. Press COMP/DG button for COMP and turn SYN knob. Check synchronised ratchet operation	Annunciator oscillates, window black. Compass card turns only to synchronised heading (15°—20° opposite movement permissible)
	*6. Check synchronised heading against E2B compass	
	*7. Rear cockpit compass	Within 1° of front compass
NOTE: To check rear cockpit compass, set compass control switch to REAR. Front compass does not annunciate.		

CLIMB DATA

1 Clean wing

Fuel contents ... 2120 (Avtur)

Start up and taxi allowance 70 lb.

Time and fuel from "Brakes-off".

From	To (ft.)	Fuel (lb.)	Time (mins.)	Distance (NM)
SL	10,000	170	2½	12
	20,000	245	3½	22
	30,000	320	5½	32
	40,000	410	7½	52
	45,000	465	10½	74

2 Take-off with slipper tanks fitted but empty

Fuel contents ... 2120

Start up and taxi allowance 70 lb.

Time and fuel from "Brakes-off".

From	To (ft.)	Fuel (lb.)	Time (mins.)	Distance (NM)
SL	10,000	185	2½	12
	20,000	275	4	25
	30,000	350	5½	37
	40,000	445	9	62
	45,000	535	13½	93

3 Take-off with slipper tanks full

Fuel contents ... 3064

Start up and taxi allowance 70 lb.

Time and fuel from "Brakes-off".

From	To (ft.)	Fuel (lb.)	Time (mins.)	Distance (NM)
SL	10,000	205	2½	12
	20,000	295	4½	25
	30,000	390	6¼	40
	40,000	515	10½	70
	45,000	670	20	130

33000 430 7:32 49

35000 455 8:22 55

DESCENT DATA

1 Cruise descent

<i>From</i> (ft.)	<i>To</i> (ft.)	<i>Fuel</i> (lb.)	<i>Time</i> (mins.)	<i>Distance</i> (NM)
50,000	2,000	150	14½	98
45,000	2,000	130	11½	80
40,000	2,000	115	10	66
30,000	2,000	90	7½	46
20,000	2,000	65	5	28
10,000	2,000	35	2	12

Speed 0.80M/300 knots

Throttle CLOSED

Airbrakes in

Flaps UP

2 Instrument descent

<i>From</i> (ft.)	<i>To</i> (ft.)	<i>Fuel</i> (lb.)	<i>Time</i> (mins.)	<i>Distance</i> (NM)
35,000	2,000	129	6½	38
30,000	2,000	122	5¾	33
20,000	2,000	100	4¼	23
10,000	2,000	61	2¼	11

Speed 0.8M/300 knots

Throttle 75% RPM

Airbrakes extended

Flaps UP

3 Rapid descent

<i>From</i> (ft.)	<i>To</i> (ft.)	<i>Fuel</i> (lb.)	<i>Time</i> (mins.)	<i>Distance</i> (NM)
50,000	2,000	30	2¾	24
45,000	2,000	26	2¼	20
40,000	2,000	22	2	16
30,000	2,000	16	1½	12
20,000	2,000	11	1	7
10,000	2,000	5	½	3

Climb/
Descent/
Recovery
Data

Speed 0.9M/400 knots

Throttle closed

Airbrakes extended

Flaps UP

Recovery data — overleaf

RECOVERY DATA — CLEAN WING

◀ Distance in NMs to overhead base at cruise altitude.
 Fuel allowance for cruise descent to 2,000 ft.
 Reserve of 400 lb. fuel for circuit and landing. ▶

At sea level

Speed Kts	Fuel (lb.)	1955	1500	1000	500
360	Range at SL	238	166	90	15
	◀(15.3 NM/100 lb., 39.2 lb./min.)▶				
	Best: —				
	Height × 1,000 ft.	45	40	40	SL
	Speed M	.82	.81	.81	360K
	Range NM	620	390	139	15
190	Endurance (mins.)	53	37	19	—
	◀at SL (29.5 lb./min., 3.4 min./100 lb.)▶				

At 10,000 ft.

Speed Kts	Fuel (lb.)	1880	1500	1000	500
320	Range at 10,000 ft.	280	210	115	15
	◀(19.5 NM/100 lb., 31.4 lb./min.)▶				
	Best: —				
	Height × 1,000 ft.	40	40	40	10
	Speed M	.81	.81	.81	320K
	Range NM	606	415	164	13
190	Endurance (mins.)	63	37	19	—
	◀at 10,000 ft. (22.5 lb./min., 4.4 min./100 lb.)▶				

At 20,000 ft.

Speed Kts	Fuel (lb.)	1805	1500	1000	500
310	Range at 20,000 ft.	362	279	144	9
	◀(27.0 NM/100 lb., 25.4 lb./min.)▶				
	Best: —				
	Height × 1,000 ft.	40	40	40	20
	Speed M	.81	.81	.81	310K
	Range NM	600	443	192	9
200	Endurance (mins.)	76	59	31	—
	◀at 20,000 ft. (17.5 lb./min., 5.7 min./100 lb.)▶				

(contd. below)

Recovery data clean wing — *continued*

At 30,000 ft.

Speed	Fuel (lb.)	1730	1500	1000	500
·77M	Range at 30,000 ft.	450	370	187	4
	◀(36·3 NM/100 lb., 20·8 lb./min.)▶				
	Best:—				
	Height × 1,000 ft.	40	40	40	30
	Speed M	·81	·81	·81	·77
	Range NM	586	472	220	4
210K	Endurance (mins.)	77	64	33	—
	◀at 30,000 ft. (16·0 lb./min., 6·3 min./100 lb.)▶				

At 40,000 ft.

Speed	Fuel (lb.)	1640	1500	1000	500
·81M	Range at 40,000 ft.	566	478	240	—
	◀(50·2 NM/100 lb., 15·5 lb./min.)▶				
	Best:—				
	Height × 1,000 ft.	40	40	40	40
	Speed M	·81	·81	·81	·81
	Range NM	566	478	240	—
210K	Endurance (mins.)	81	71	36	—
	◀at 40,000 ft. (14·0 lb./min., 7·2 min./100 lb.)▶				

At 45,000 ft.

Speed	Fuel (lb.)	1585	1500	1000	500
·82M	Range at 45,000 ft.	540	477	241	—
	◀(51·2 NM/100 lb., 15·2 lb./min.)▶				
	Best:—				
	Height × 1,000 ft.		Maintain		
	Speed M	—	—	—	—
	Range NM	—	—	—	—
210K	Endurance (mins.)	79	71	36	—
	◀at 45,000 ft. (13·5 lb./min., 7·4 min./100 lb.)▶				

Recovery
Data

(contd)

*continued over*Recovery data — Tanks fitted — *overleaf*

RECOVERY DATA — TANKS FITTED

◀ Distance in NMS to overhead base at cruise altitude.
 Fuel allowance for cruise descent to 2,000 ft.
 Reserve of 400 lb. fuel for circuit and landing. ▶

At sea level

Speed Kts	Fuel (lb.)	2869	2120	1500	1000	500
370	Range at SL	353	246	160	87	14 ▶
	◀ (14.3 NM/100 lb., 43.2 lb./min.)					
	Best: —					
	Height × 1,000 ft.	45	40	40	40	SL
	Speed M	.83	.77	.77	.77	370K
	Range NM	922	593	343	124	14
190	Endurance (mins.)	83	56	35	18	—
	◀ at SL (31.0 lb./min., 3.2 min./100 lb.) ▶					

At 10,000 ft.

Speed Kts	Fuel (lb.)	2774	2120	1500	1000	500
310	Range at 10 000 ft.	440	317	199	106	12 ▶
	◀ (18.8 NM/100 lb., 31.6 lb./min.)					
	Best: —					
	Height × 1,000 ft.	45	40	40	40	10
	Speed M	.83	.77	.77	.77	310K
	Range NM	910	623	379	159	12
190	Endurance (mins.)	97	70	45	23	—
	◀ at 10,000 ft. (24.0 lb./min., 4.2 min./100 lb.) ▶					

At 20,000 ft.

Speed Kts	Fuel (lb.)	2684	2120	1500	1000	500
280	Range at 20,000 ft.	546	407	260	134	8 ▶
	◀ (24.6 NM/100 lb., 25.4 lb./min.)					
	Best: —					
	Height × 1,000 ft.	45	40	40	40	20
	Speed M	.83	.77	.77	.77	280K
	Range NM	897	649	397	177	9
200	Endurance (mins.)	116	87	55	30	—
	◀ at 20,000 ft. (19.0 lb./min., 5.3 min./100 lb.) ▶					

continued below

Recovery Data Tanks Fitted — *continued*

At 30,000 feet

Speed Kts	Fuel (lb)	2589	2120	1500	1000	500
260	Range at 30,000 ft (33.0 NM/100 lb, 20.6 lb/min)	693	538	343	172	3
	Best: —					
	Height x 1000 ft	45	40	40	40	30
	Speed M	.83	.77	.77	.77	260K
	Range NM	882	675	418	198	3
210	Endurance (mins) at 30,000 ft (17.0 lb/min, 5.9 min/100 lb)	122	97	62	32	—

At 40,000 feet

Speed	Fuel (lb)	2464	2120	1500	1000	500
.77M	Range at 40,000 ft (43.5 NM/100 lb, 17.0 lb/min)	849	699	435	216	—
	Best: —					
	Height x 1000 ft	45	40	40	40	—
	Speed M	.83	.77	.77	.77	—
	Range NM	852	699	435	216	—
210K	Endurance (mins) at 40,000 ft (15.5 lb/min, 6.4 min/100 lb)	124	103	65	34	—

At 45,000 feet

Speed	Fuel (lb)	2309	2120	1500	1000	500
.83M	Range at 45,000 ft (44.5 NM/100 lb, 17.8 lb/min)	792	707	438	212	—
	Best: —					
	Height x 1000 ft		Maintain			
	Speed M	—	—	—	—	—
	Range NM	—	—	—	—	—
210K	Endurance (mins) at 45,000 ft (15.5 lb/min, 6.5 min/100 lb)	116	103	65	34	—

FLYING LIMITATIONS

(a) Maximum Height 48,000 feet

(b) Maximum Speeds

(i) *Without Slipper Tanks*

SL to 9500 feet: 0-92M. Above 9500 feet: 525 knots.

(ii) *With Slipper Tanks*

SL to 11,000 feet: 0-90M. Above 11,000 feet: 500 knots.

(iii) *Operation of Services*

Flaps 0° to 20° ... 300 knots/0-7M

More than 20° ... 200 knots

Undercarriage down ... 250 knots

(No restriction on air brakes)

Streaming parachute 160 knots

(iv) *Flight Without Hydraulic Power (or Elevators Unlocked)*

Below 20,000 feet: 400 knots. Above 20,000 feet: 0-85M.

◀ (c) AAL

The aircraft approach limitations (true heights) for a 3° glide path are as follows:

	<i>Runway Aids without Glide- path Guidance</i>	<i>Raw ILS</i>	<i>Rate ILS</i>	<i>PAR</i>
In-line Localiser (ft)	250	250	200	200
Off-set Localiser (ft)	270	270	250	—

For indicated height, figures should be reduced by 20 feet. When using standby instruments, 400 feet should be used in all cases. ▶

(d) Maximum Crosswinds

For take-off and landing, dry runway ... 20 knots

wet runway ... 10 knots

For streaming brake parachute, dry runway ... 15 knots

wet runway ... 10 knots

flooded runway ... 5 knots

Wet runway with friction course ... 15 knots

(e) G Limits

	<i>Maximum g</i>	
	<i>Positive</i>	<i>Negative (400 lb min fuel, 15 secs max)</i>
Up to 0-90M	+7	minus 2½
Above 0-90M	+4	minus 2½
Rapid rolling up to 180°	+5	minus 1
Rapid rolling more than 180°	+2	0

continued below

Flying Limitations — continued

Weight and CG

- Max weight for take-off 9520 lb
 ◀ Normal max for landing 8100 lb ▶
 CG range UC down, 197.0 to 200.5 inches AOD (with forward movement to 195.5 inches as fuel used).
 Forward limit 197.8 inches with slippers empty or off.

Stalling, Spinning, Aerobatics

- Stalling* for experienced, qualified pilots only.
Spinning only to incipient condition, for experienced, qualified pilots only.
Aerobatics. Minimum fuel 500 lb.
 All fishtail and flick manoeuvres are prohibited.

Escape

- Minimum height/speed for ejection. Ground level/90 knots (level or climbing).
 ◀ If time is vital, eject through canopy using seat-pan handle. ▶
 If in a spin, jettison canopy manually before ejection.
 If making manual bale-out, invert aircraft first.
 Best speeds for canopy jettison, 130 to 350 knots.

ENGINE LIMITATIONS

- Fuel** F34 or F40 contain AL38 (FSII and Hitec).
 ◀ F35 or F44 may, or may not contain FSII and Hitec. ▶
Oil OX-38 (O-149).

RPM and JPT

Condition	Time Limit per Flight		RPM %	JPT °C
Max power	2 minutes	30 mins combined	102	670
	Up to 30 minutes		102	650
Inter-mediate	30 minutes		99	605
Max continuous	Unlimited		97.5	585
Ground idling	Unlimited*		36 (ISA, min)	585
Overspeed	20 seconds		105	—
Starting	—		—	700

Limitations

- *Increase to 65% every 10 minutes.
 Slam throttle movement prohibited below 170 knots above 30,000 feet

Intentionally Blank

R/T FAILURE

- VMC
1. Select S/B Radio. If unsuccessful, return to main radio, Std 2
 2. Select ILS, Std A, turn up vol.
 3. Transmit Blind
 4. Rejoin visually, waggling wings

IMC - Tacan + ILS Serviceable

1. As above 1 → 3 Select A 7600
2. Home on TACAN to O/H VY at $\frac{1}{4}$ miles above FL185
3. Let down on 260° M radial turning rt at 10 miles
4. ILS Aff on R/W 14 to DH followed if necessary by visual cut on R/W in use.

IMC - Tacan Serviceable and ILS u/s

As 1) above

1. Home on TACAN to O/H VY above FL185
2. Let down 280° Radial turning left at 9000
3. Maintain 265° M radial inbound descending to MDH (DOA 180')

IMC Tacan u/s

As 1) above

IFF A 7700

Fly triangles at endurance speed.

Electrical Failures — *continued*

Considerations

AC/DC Caption:

1. Intercom may be switched off. Standby UHF intercom adequate.
2. Standby trim transfer switches inoperative if STBY BATT selected.
3. SWS inoperative when main battery discharged.
4. Endurance of main battery approx 20 minutes *with non-essential electrics switched off.*

DC Caption:

1. Land within 20 minutes. If this is not done, FIS and DC services will fail and UHF channel change become impossible.

AC Caption:

1. Main UHF continues to operate on 200 volt AC and DC.

Table of DC Loads Controlled by Pilot

Service	Amps	Service	Amps
◀ Standby trim	12.50	Cockpit lighting	
Landing lamp	10.00	(each cockpit)	2.80
ILS	9.00	Relighting	2.50
Booster pump	8.00	Feel trim	2.34
Channel changing	7.50	Navigation lights	2.10
Pressure-head		SSR	1.75
heater	6.30	Intercom	1.40
Standby UHF (re-		UHF controller	1.10
ception and		TACAN (also	
transmission)	3.60	requires AC)	1.00
Standby UHF (re-		Emergency lighting	
ception)	3.00	(each cockpit)	0.60
Anti-collision		Anti-icing	0.50
lights	3.00	Lighting dimmers	0.25 ▶

ELECTRICAL FAILURES

Summary of Actions after Electrical Failure

Alternator Failure (AC/DC caption on)

1. Refer to standby A/H for attitude.
2. Press and release ALTR RESET button.

If caption remains on:

- C Cabin and altimeter to static (check sub-scale).
 - U UHF to standby.
 - B Booster pump off.
 - S Speed below 400 knots/0.85M.
 - T Trim to ideal sector.
 - U Unlock elevators, checking two clicks, white band, ELEV caption on.
 - N Non-essential electrics off.
3. Transmit R/T call. RTB or divert.
 4. Select UHF power switch to BATT when reception fades.
 5. Select STBY INST switch to STBY BATT before speed falls to 140 knots or when UHF fades.
 6. Land within 20 minutes.

Transformer Failure (AC caption on)

1. Refer to standby A/H for attitude.
2. Cabin altimeter to STATIC.
3. Switch off TACAN and ILS.
4. Transmit R/T call. RTB or divert.

TRU Failure (DC caption on)

1. Refer to standby A/H for attitude.
2. Booster pump OFF.
3. Speed below 400 knots/0.85M, feel trim and unlock.
4. Non-essential electrics off.
5. Transmit R/T call. RTB or divert.
6. Land within 20 minutes.

continued below

TRIMMING SYSTEM FAILURES

Feel Trim Failure

Actions

Adjust to trimmed speed if below 400 knots and unlock elevators. If trimmed speed above 400 knots, reduce to below 400 knots and trim aircraft using standby system before unlocking elevators. After unlocking, trim out the TRIM caption to restore the normal stick-to-tail relationship. Recovery and landing should be made without the use of standby trim. ▶

Feel Trim Position Indicator Failure

Indication

FTPI — Needle not moving or moving abnormally.

Action — Land as soon as possible:

Considerations:

If a subsequent hydraulic failure occurs:

1. Adjust speed to 210 to 330 knots (175 knots UC down).
2. Speed below 400 knots/0.85 M, feel trim and unlock.
3. Complete Manual Selection drill (Card 19 reverse).

WARNING: Manual control without the use of *standby* trim is severely limited. Configuration or speed changes in this situation can result in uncontrollable trim changes. A landing is likely to be extremely hazardous and should not be attempted unless a trial circuit and 'landing' can be made at a safe height.

Automatic Datum Shift Failure

Actions: (when lowering undercarriage):

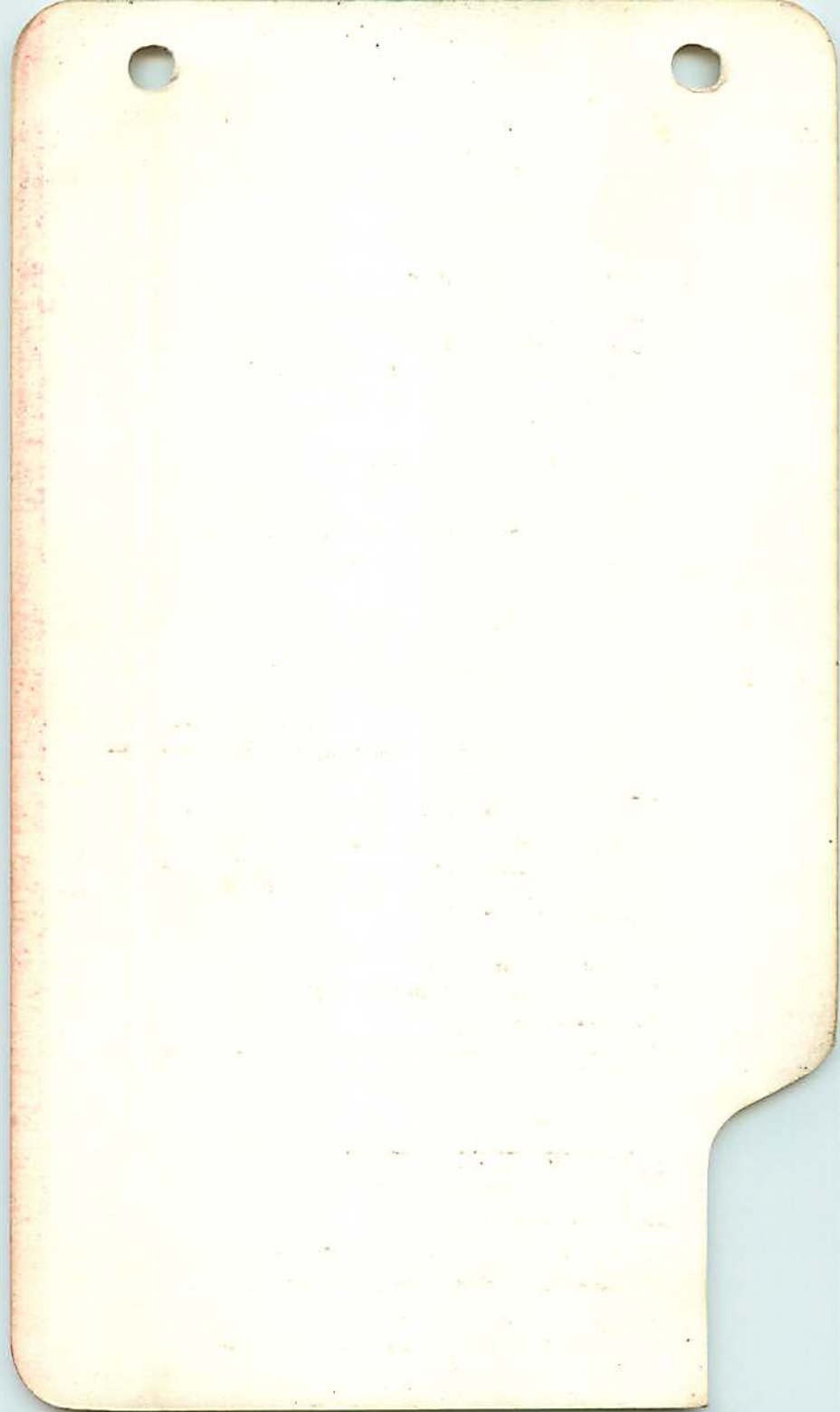
Hold nose-down trim.
Operate standby trim switches to provide datum shift.
Feel trim and unlock the elevators.
Carry out the landing using 'follow-up' tailplane.

Actions: (when raising undercarriage):

Lower undercarriage immediately.
Make a normal approach and landing.

Q-Gearing Failures

1. *Effect:* Lighter stick force per g above 200 knots.
Action: Reduce to below 200 knots.
2. *Effect:* Heavier stick force per g below 200 knots.
Action: Trim and unlock the elevators.



Hydraulic System Failures — *continued*

◀ *Considerations:*

1. Airbrakes and flaps are not available. However, if failure is only partial, flaps may be available.
2. If undercarriage is already down when system fails, leave down and exhaust accumulator at 5° to 6° nose-up. If flaps are also down, exhaust accumulator at 6° to 7° plus 1° for each 10° flap (eg 11° to 12° with full flap).
3. If flaps are already down when the system fails, leave down. They can be selected up if essential by holding the selector in the UP position. They may also creep up depending on the nature of the hydraulic failure.
4. If committed to landing when SWS operates, feel trim to the ideal sector, unlock elevators and keep control movements to a minimum. ▶

No Air Pressure in Aileron Accumulator

Indication:

Hydraulic pressure cycling over reduced range, or not cycling and pressure falling.
No SWS warning.

Actions:

Lower undercarriage and return to base. (Hydraulic failure in addition would render undercarriage lowering system inoperative).

Fuel/
STUP-
RECC/
Hydraulics

Seizure of Hydraulic Tail Motor

Indication:

Failure of tailplane to respond (hydraulic system remains normal).

Actions:

Carry out Manual Selection drill.
Do not raise undercarriage if down.

Considerations:

UC and flaps available on normal system.
Datum shift inoperative.

Low Level Fuel Warning (except under negative g)

Effect: If low level light comes on, assume only 410 lb fuel available, unless light subsequently goes out.

Action: Carry out a flame-out pattern at the nearest suitable airfield.

Transient warnings may be given under negative g, in a nose-down attitude, or when decelerating.

HYDRAULIC SYSTEM FAILURES

Hydraulic Failure

Indication

HYD warning. Pressure not cycling.

Immediate Actions: Manual Selection drill

- S Speed below 400 knots/0.85M.
- T Trim to ideal sector while regaining level flight.
- U Unlock elevators checking two clicks, white band, ELEV caption on.
- P Power cock off.
- R Raise guard on standby trim.
- E Exhaust T/P and then aileron accumulators (ideally T/P 1° to 2° nose-up UC up, 5° to 6° nose-up UC down, 6° to 7° nose-up UC and flaps down).
- C Check operation of elevators, ailerons and standby trim switches.
- C Changeover switches to standby if required.

Subsequent Actions:



1. Select, UC DOWN using 'Undercarriage Fails to Lower' (hydraulic system failure) Drill (Card 16).
2. If barrier entry is required or likely, use 'Engagement of Arrestor Barrier' Drill (Card 17).

continued below

Fuel System Failures — *continued*

Transfer Pressure Failure

Indication: FTR caption on when throttle *not* closed.

Effects:

1. If more than 1600 lb fuel, gauge reverts to 1600 lb and continues to indicate usable fuel only.
2. Only fuel in internal tanks (less 50% internal wing tank capacity) available.
3. Max RPM may be restricted when less than 500 lb fuel remaining.

WARNING: The low level warning light may also come on. See drill below.

Action:

1. If possible, increase RPM to restore pressure.
2. With slipper tanks fitted, to avoid tank collapse, if possible restrict rate of descent to 4000 ft/min, or 2000 ft/min above or below 10,000 feet.

Note: A spurious warning may be given during a rapid descent but will cancel after levelling off.

Fuel Supply Restriction/Booster Pump Failure

Indication: FUEL caption on.

Effects: If there is a restriction in the fuel supply, max RPM may be reduced. There is a slight risk of flame-out, preceded by fluctuating RPM and rough running.

Actions:

1. Throttle back.
2. If light goes out, maintain power (if possible) at a setting below that at which the light comes on.
3. If the light does not go out, keep power to the minimum possible, avoiding negative g.
4. *In either case*, land as soon as possible.

Note: If the engine runs normally, treat as booster pump failure and return to base. If the DC caption comes on, momentarily switch on ILS to check for DC failure.

continued overleaf

Oxygen System Failures — continued

4. Continuous White MI

Check mask fit, tube for leaks, EMERGENCY flow not selected. If not cured, descend below 10,000 feet (cabin) before LOX contents exhausted.

5. Persistent Difficulty Exhaling

Loosen mask sufficiently to exhale. Descend below 10,000 feet (cabin) before LOX contents exhausted.

6. Low Pressure Warning

Carry out Emergency Oxygen Drill.

EMERGENCY OXYGEN DRILL

1. Pull emergency oxygen knob.
2. Select NORMAL oxygen.
3. Descend below 10,000 feet (cabin) within 10 minutes.
4. Return to base.

OIL PRESSURE WARNING

Indication: OIL caption on (with positive g applied).

Actions: 1. If OIL caption on above 95% RPM, throttle back. Land as soon as possible, using minimum practicable constant power.

2. If OIL caption on at steady RPM below 95%, increase RPM to 95%. If caption goes out, return to base, using sufficient RPM to keep caption out.

FUEL SYSTEM FAILURES

Asymmetric Fuel Transfer

Indication: One external tank indicator white, the other black, indicated fuel below 1800 lb, possible one wing heaviness.

Actions: 1. Land as soon as possible, keeping fuel consumption to a minimum.

2. When low level warning light comes on, a maximum of 410 lb fuel is available.

3. Allow for ungauged fuel when calculating landing speeds.

continued below

COCKPIT PRESSURE OR CANOPY FAILURE

Indication:

CPR warning may be given. Cockpit altimeter indicates over or under-pressurisation.

Actions (over-pressurisation):

1. Depressurise cockpit.
2. Close ram airscoop.

Actions (under-pressurisation or canopy failure):

1. Depress tab on mask.
2. Select 100% oxygen.
3. Check pressurisation fully on.
4. Descend immediately below 35,000 feet and subsequently below 25,000 feet. Speed not above 200 knots if canopy has failed.
5. If canopy or windscreen cracked, reduce to 200 knots/40,000 feet or below.

Noxious Fumes

Actions:

Depress tab on mask.
Select 100% and emergency flow.
Depressurise.
Open ram air scoop.
Descend below 25,000 feet.

Abandon-
ing/
Pressure/
Canopy/
Oxygen

OXYGEN SYSTEM FAILURES

1. *If Hypoxia Suspected* Carry out Emergency Oxygen Drill

2. *Inhalation Difficult*

Check tube for kinks. If restriction not cleared, carry out Emergency Oxygen Drill.

3. *Continuous Black MI, Breathing Unrestricted*

Select 100% oxygen ...	{ If breathing still unrestricted, MI faulty. Remain on 100% oxygen. If breathing becomes restricted carry out Emergency Oxygen Drill.
------------------------	---

continued overleaf

ABANDONING

Ejection

Convert speed above 250 knots to height. Minimum conditions: ground level/90 knots provided straight and level or climbing.

Note: At speeds above 280 knots, it may not be possible to reach the face screen firing handle after the canopy has been jettisoned.

To avoid the severe hazards of slipstream and buffeting, the rear seat occupant ejects first, using the face screen firing handle. The front seat occupant ejects immediately he hears the rear seat fire.

Action (face screen firing handle)

Head back, elbows in, feet on rudder pedals.

Grip handle, pull blind over face to fullest extent.

Action (seat pan handle)

Jettison canopy.

Head back, elbows in, feet on rudder pedals.

Pull handle up to fullest extent.

Before reaching ground or water

Release PSP from parachute harness.

Undo oxy-mic/tel connection.

Lower mask from face if entering water.

Manual Operation of Parachute

If parachute does not open automatically below 10,000 feet, pull D-ring across body.

Manual Separation from Seat

If automatic separation does not take place within 1½ seconds;

Release firing handle, place left hand on manual separation lever and pull outwards and upwards.

Manual Bale-Out

WARNING: When manual separation lever is operated, drogue sock deploys after pilot moves 30 inches from normal position and, if below 10,000 feet, main parachute starts to deploy ½ second later.

- Actions:*
1. Reduce speed as low as possible.
 2. Pull emergency oxygen knob if above 10,000 feet.
 3. Undo oxygen and anti-g aircraft connections.
 4. Jettison canopy.
 5. Trim nose-down, hold pull-force and invert aircraft.
 6. Operate manual separation lever and release stick-force simultaneously.

Engagement of Arrestor Barrier

1. Call 'Barrier', stream parachute, start steady braking and aim for centre panel.
2. Close throttle to HP OFF.
3. Keep canopy closed.
4. Ensure nosewheel is on ground before engagement, duck head and release brakes just before engaging.
5. During the arrest, use steady braking and apply the parking brake immediately before coming to rest.
6. Vacate aircraft and put breech lock levers to safe.

Landing
Emergys/
Ditching/
Canopy
Jettison

DITCHING

Ditching is not recommended.
The aircraft should be abandoned.

CANOPY JETTISON

Jettison between 130 and 350 knots if possible.
Lower visor and duck head forward.
Pull jettison handle to fullest extent.
If canopy fails to jettison, use normal unlocking lever as last resort before abandoning.
Canopy must be jettisoned manually first if ejecting from a spinning aircraft.
Max comfortable speed for 1 pilot 350 knots.
for 2 pilots 200 knots.

Undercarriage/Landing Emergencies — *continued*

3. If gear appears fully down, keep the engine running until the landing is complete, unless the gear collapses on or after touchdown.
4. If the gear is obviously not fully down, close the HP cock on touchdown.
5. Do not taxi until after the ground locks have been inserted.

WARNING: If the starboard leg is swinging free, random trim changes may be caused by datum shift operation.

One Mainleg Unlocked or Up

1. Land close to runway edge on side of locked leg.
2. Land gently at normal speed, lower nosewheel, stream brake chute and select HP OFF if necessary (General — paras 3 and 4).
3. Stick fully forward. Keep wings level with ailerons.
4. When wing drops use brake to keep straight.

Nose Leg Unlocked or Up

1. After touchdown at normal speed stream brake chute.
2. Select HP OFF if necessary (General — paras 3 and 4).
3. Lower nose gently to runway before control is lost, then stick fully aft.

Belly Landing

1. Make a normal approach aiming to land gently on the runway at normal touchdown speed.
2. On touchdown stream brake chute and select HP OFF.

Wheelbrakes Emergency

If hydraulic system fails, the brakes accumulator provides sufficient pressure for landing.

On landing:

HP OFF

Stream parachute

Apply continuous brake pressure

Avoid maxaretting

continued below

UC/
Landing
Emergen-
cies

Undercarriage Fails to Lower

Actions: (hydraulic system normal)

1. Repeat selection, applying positive and negative g.
2. Select UP. Increase speed to 350 knots, then apply up to maximum g simultaneously selecting AIR-BRAKE.
3. If the airbrakes extend, reduce speed to lowest practicable below 250 knots and select UC DOWN.
4. If the gear does not extend, leave selector in DOWN position and continue as for '**Landing With Undercarriage in Abnormal Positions**' below.

(i) Consideration should be given to the possibility that a partial inadvertent standby selection has been made. If this is possible, carry out the appropriate drill above.

(ii) If the hydraulic system pressure is normal and the undercarriage appears fully down, the aircraft may be landed without selecting standby UC. The hydraulic pressure should support the weight of the aircraft. The engine should not be shut down until ground locks have been inserted.

Actions: (hydraulic system failure)

1. Unlock elevators and reduce speed to 170 knots.
2. Select normal UC DOWN.
3. Wait at least 30 seconds.
4. If gear has not locked down, raise lever (if rear cockpit lever is used rotate catch first), turn 90° to left and select STANDBY UC. (No further selection is then possible, nor can the undercarriage be raised on the ground).

Landing with the Undercarriage in Abnormal Positions

General

1. Tighten harness, disconnect leg-restraint garters, dinghy lanyard and anti-g connections. Make a normal approach.
2. Unless it may be necessary to raise the undercarriage during landing, unlock the elevators, reduce speed to below 170 knots and after 30 seconds select STANDBY UC.

continued overleaf

◀ UNDERCARRIAGE LANDING EMERGENCIES

To Raise Undercarriage on Ground

Action:

Press plate marked OVERRIDE PRESS and simultaneously select undercarriage UP (Note: Not possible if undercarriage has been selected down using the standby system).

Inadvertent Standby Undercarriage Selection

1. If inadvertent standby selection has been made or suspected with hydraulic pressure normal, carry out STUPRECC Drill (Card 19R).
2. When three greens are obtained, revert to normal powered controls.

WARNING: Automatic datum shift operation will produce a nose-up trim change as hydraulic power is re-selected. This should be anticipated.

Failure to Obtain Three Greens

1. *Amber Light.* If the external amber light comes on as the gear is seen to complete its extension, the gear is locked down.
2. *No Lights.* If no lights (red, green or amber) are obtained and the gear appears down, the power fuse has probably failed. If the gear is felt to extend normally and appears fully down, it may be assumed locked down. Land normally.
3. *No Lights for One Leg.* If no lights (red or green) are obtained on one leg and the gear appears fully down, an electrical failure is probable in the circuit from the power fuse. If the gear is felt to extend normally and appears fully down, it may be assumed locked down. Land normally.
4. *No Green Light, Red Light Out.* If one (or more) green does not illuminate and the gear appears fully down, select UP. Subsequently reselect DOWN. If the gear is felt to extend normally and the appropriate red light illuminates and then goes out, there is probably an electrical failure in the green light circuit, and the gear may be assumed locked down. Land normally.
5. *Red Light Remains On.* If one (or more) red light remains on and the gear appears fully down: the downlock may not have engaged, or the downlock microswitch may have failed or be out of adjustment. Continue as for 'Undercarriage Fails to Lower' — (hydraulic system normal) below. ▶

continued below

Flame-out Landing Procedure — continued

WARNING: If a safe landing is doubtful, both crew must eject before the minimum height/speed for safe ejection, allowing at least 300 feet to regain level flight prior to ejection.

Relight/
Flame-Out
Landing

Flame-Out Circuit ^{Unlock} (follow-up)

1. Keeping control movements to a minimum, lower UC on normal system as soon as circumstances permit.
2. Aim to be overhead at 5000 to 6000 ft. Tighten harness.
3. Aim to be downwind abeam threshold at 2500 to 3000 feet, 170 knots minimum until round-out.
4. Do not lower or raise flaps more than 10° at any time. Monitor pressure.
5. Aim to touch-down at 150 to 160 knots (not above 160 knots).
6. Stream brake parachute on touchdown.
7. Avoid unnecessary maxaretting.

If in Manual Control

1. Use standby system to lower UC. Allow 3000 feet to lock down.
2. Flaps not available. Achieve touchdown point by adjusting pattern size and speed (170 to 200 knots).
3. Minimum TPI setting for landing 8° nose-up. Do not trim nose-down if increasing speed.

WARNING 1: If hydraulic pressure fails during round-out, leave selector on and land using minimum control movements.

WARNING 2: If hydraulic pressure fails at any other time and it is not restored, complete Manual Selection drill, using following minimum TPI settings:

UC up, 180 knots	...	...	...	2° to 3° nose-up
UC down	...	...	...	6° nose-up
UC down, finals	...	...	...	8° nose-up

WARNING 3: If forced to fly outside speed range 170 to 200 knots on a manual approach, a safe landing is unlikely.

WARNING 4: If the threshold is crossed at 200 knots flapless, up to 1500 yards of runway will be used before speed reduces to 160 knots.

RELIGHTING

1. *At or below 25,000 ft. check:*

Airspeed ...	...	...	180 knots
Throttle ...	...	...	HP OFF
Booster pump ...	...	...	ON
Battery master switch ...	...	...	ON
LP cock ...	...	...	ON

2. *To relight:*

(a) Press relight button for 2-3 secs., then move throttle to idling position (keeping relight button pressed). At altitude, move throttle forward one inch if necessary.

(b) Release button at 40% RPM and 300°C JPT. Increase power when RPM stable.

(c) Select main UHF.

(d) If no relight after 15 seconds, release relight button, select HP OFF and booster pump OFF. Descend and try again.

3. *Failure to relight:*

Set throttle to HP OFF.

Set booster pump OFF.

Carry out a flame-out landing or abandon.

FLAME-OUT LANDING PROCEDURE

En-route

Glide at 180 knots.

Plan for range of 2 NM per 1,000 ft.

Rate of descent approx. 2,500 ft./min. (3,500 ft./min. U/C down).

CPR failure above 26,000 ft.

Prepare for possible manual reversion.

Actions

Fuel	...	...	...	HP cock off
				Booster pump off
				LP cock off
Hydraulics	...	...	...	Monitor gauge. Use services sparingly
◀Electrics	...	...	...	Complete CUBSTUN drill (Card 21R) ▶
Instruments	...	...	...	Set <i>destination</i> QFE on cabin altimeter
Radio	...	...	...	Standby UHF selected

continued below

Fire/Engine
Failure/
Flame-out

ENGINE FAILURE

If seizure or mechanical cause, do not attempt relight.

- Actions* STUBL STUPRECC CNT
- Speed Reduce to 180 knots and trim
for glide
- Throttle HP OFF
- UHF Standby set on
- Booster pump OFF
- LP cock OFF
- Carry out STUPRECC drill (Card 19R)
- Cabin altimeter STATIC
- Non-essential electrics ... Off
- Transmit distress call. SSR to emergency.
- Carry out a forced landing or abandon.

WARNING: Do not use the airbrakes to reduce speed.

FLAME-OUT

Immediate actions

If above 25000 feet

Close the throttle to HP OFF.

UHF standby set on.

Immediate actions

If below 25000 feet

Press relight button (10 secs. max.) and close throttle.

If unsuccessful, or if JPT exceeds 670°, set HP OFF.

UHF standby set on.

Subsequent actions

Glide at 180 kts.

Carry out CUBSTUN drill (Card 21R).

Transmit distress call. SSR to emergency.

Attempt normal relight drill below 25,000 ft.

The following table gives the relight envelope but, to cater for variations in aircraft, the recommended max. altitude is 25,000 ft.

Alt. ft. x 1000	|	30	29	28	27	26	25	24	23	22	21	20
Max. IAS kts.	|	180	210	230	250	270	290	310	330	350	370	390

FIRE

Indication SWS ... FIRE 1 (compressor and accessories)
FIRE 2 (combustion and jet pipe zone)

Immediate actions

Throttle ... Closed (if impracticable, eject)
◀ UHF ... Standby set on ▶
SWS ... Cancel audio
Fire warning ... Re-check
Check for confirmatory signs of fire.
Circumstances permitting, turn to check jet wake for smoke.

Subsequent actions

FIRE 2 only. If caption goes out within 5 secs., and no other signs of fire (hot gas leak):

Land as soon as possible at nearest suitable airfield using minimum necessary power. If warning recurs, cancel audio and throttle back at frequent intervals to check that caption goes out.

If either warning persists longer than 5 secs. but there are no other signs of fire:

A decision must be made on evidence available whether to treat the warning as real or spurious.

◀ *If spurious* ... Land as soon as possible, ▶
using minimum power. Be prepared to resume drill or eject if further signs of fire.

◀ *If there are real or definite signs of fire:* ▶

Throttle ... HP OFF
Booster pump ... OFF
LP cock ... OFF
Extinguisher ... Only operate for FIRE 1
Speed as low as practicable
If warning remains on ... Abandon aircraft
◀ If fire goes out, continue with CUBSTUN drill (Card 21R). Do not relight engine. ▶
Oxygen ... 100% and emergency flow
Mask tab depressed
Pressurisation ... OFF (if below 40,000 ft).
◀ Distress call, SSR to emergency, glide at 180 knots, see ▶
Flame-out Landing procedure

Card 13
AL6)

GNAT I. Mk. 1 EMERGENCIES

At 1801B-1801-14

FIRE/ENGINE FAILURE/FLAME-OUT

RELIGHT/FLAME-OUT LANDING

UNDERCARRIAGE/LANDING EMERGENCIES

DITCHING/CANOPY JETTISON/ABANDONING

PRESSURE/CANOPY/OXYGEN

OIL/FUEL

HYDRAULICS

TRIMMING

ELECTRICAL