TYPHOON
(FGR 4 / T Mk 3)

FLIGHT CREW CHECKLIST

Amendment Information

This electronic publication represents the latest/ current at time version of the publication and includes:

Issue

Issue 16

AL

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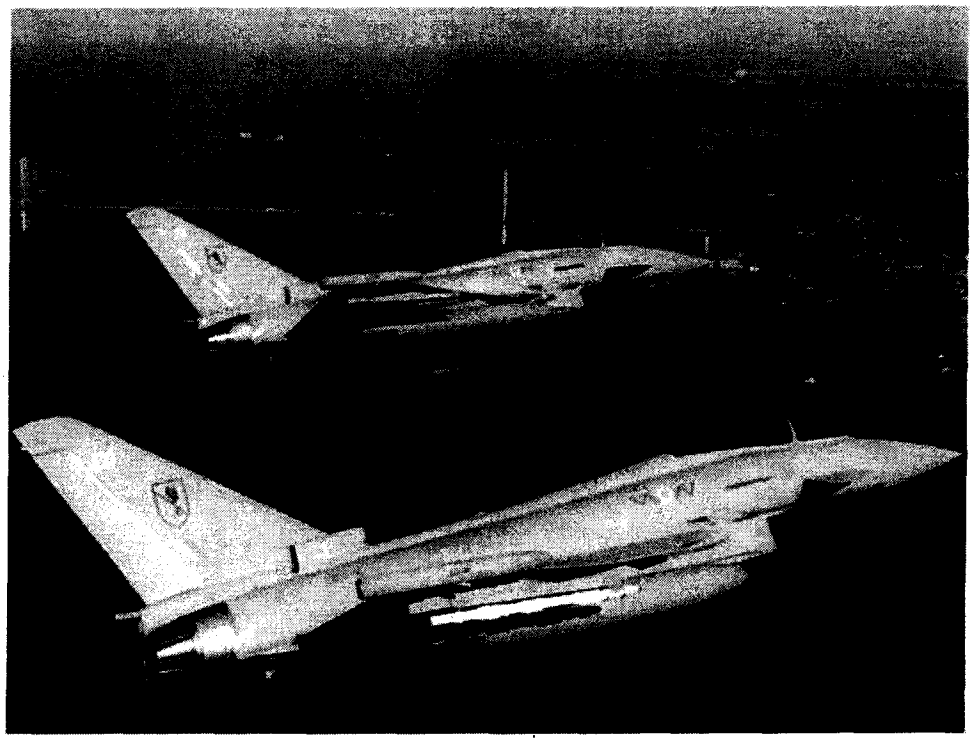
ANA

-

▸Issue 16
Jul 2014

AP101B-5400-14 ◂

TYPHOON
FGR 4 / T MK 3



FLIGHT CREW CHECKLIST

NORMAL AND EMERGENCY PROCEDURES

AIRCRAFT SAFE CONDITION

The aircraft is in the 'SAFE CONDITION' when:

- A/S/E handle is SAFE
- The Seat Firing Handle Pin(s) is inserted correctly through the handle and the housing
- The Canopy Jettison Unit Pin is inserted correctly

BY COMMAND OF THE DEFENCE COUNCIL

▸LIST OF CARDS AT ISSUE 16◂

Card	AL	Card	AL	Card	AL	Card	AL	Card	AL
N-1	-	N-43	-	E-34	-	E-60	-	E-95	-
N-2	-	N-44	-	E-35	-	E-61	-	E-96	-
N-3	-	N-45	-	E-35a	-	E-62	-	E-97	-
N-4	-	N-46	-	E-35b	-	E-63	-	E-98	-
N-5	-	N-47	-	E-35c	-	E-64	-	E-99	-
N-6	-	N-48	-	E-35d	-	E-65	-	E-100	-
N-7	-	N-49	-	E-36	-	E-66	-	E-101	-
N-8	-	N-50	-	E-37	-	E-67	-	E-102	-
N-9	-	E-1	-	E-38	-	E-68	-	E-103	-
N-10	-	E-2	-	E-39	-	E-69	-	E-104	-
N-11	-	E-3	-	E-40	-	E-70	-	E-105	-
N-12	-	E-4	-	E-41	-	E-71	-	E-106	-
N-13	-	E-5	-	E-42	-	E-72	-	E-107	-
N-14	-	E-6	-	E-43	-	E-73	-	E-108	-
N-15	-	E-7	-	E-44	-	E-74	-	E-109	-
N-16	-	E-8	-	E-45	-	E-75	-	E-110	-
N-17	-	E-9	-	E-46	-	E-76	-	E-111	-
N-18	-	E-10	-	E-46a	-	E-77	-	E-112	-
N-19	-	E-11	-	E-46b	-	E-78	-	E-113	-
N-20	-	E-11a	-	E-46c	-	E-79	-	E-114	-
N-21	-	E-12	-	E-46d	-	E-80	-	E-115	-
N-22	-	E-13	-	E-46e	-	E-81	-	E-116	-
N-23	-	E-14	-	E-47	-	E-82	-		
N-24	-	E-15	-	E-48	-	E-83	-		
N-25	-	E-16	-	E-49	-	E-84	-		
N-26	-	E-17	-	E-50	-	E-85	-		
N-27	-	E-18	-	E-51	-	E-86	-		
N-28	-	E-19	-	E-52	-	E-87	-		
N-29	-	E-20	-	E-53	-	E-88	-		
N-30	-	E-21	-	E-54	-	E-89	-		
N-31	-	E-22	-	E-55	-	E-89a	-		
N-32	-	E-23	-	E-56	-	E-89b	-		
N-33	-	E-24	-	E-57	-	E-89c	-		
N-34	-	E-25	-	E-57a	-	E-89d	-		
N-35	-	E-26	-	E-57b	-	E-89e	-		
N-36	-	E-27	-	E-57c	-	E-89f	-		
N-37	-	E-28	-	E-57d	-	E-89g	-		
N-38	-	E-29	-	E-57e	-	E-90	-		
N-39	-	E-30	-	E-57f	-	E-91	-		
N-40	-	E-31	-	E-57g	-	E-92	-		
N-41	-	E-32	-	E-58	-	E-93	-		
N-42	-	E-33	-	E-59	-	E-94	-		

ANA INCORPORATED

All ANA from previous issues incorporated

ANA No	1	2	3	4	5	6	7
Location							

NOTES TO USERS

1. This Flight Crew Checklist (FCC) is complementary to the Typhoon Integrated Data (DAP101B-5400-1A). Conventions and amendment procedures used differ as follows:

   - Typhoon Integrated Data
     To fly the aircraft safely and efficiently you must know the procedures, in amplified form as per Typhoon Integrated Data. The FCC contains only the abbreviated form.

   - Changes
     Urgent amendments are issued by Advanced Notification Amendment (ANA). The format of the ANA may be same as the FCC. Amendments are issued by new cards. An AL or ANA number on a card relates to any amendment symbols on that card. A convention of inward pointing arrows is used to identify the point where information has been changed or added. Outward pointing arrows are used to identify the point where information has been removed.

2. For current release limitations consult the appropriate Release to Service (RTS) document:

   - Typhoon FGR 4 and T Mk 3

3. Comments and suggestions regarding this Flight Crew Checklist should be progressed using form 765X, to the User Authenticator, (29(R) Sqn, RAF Coningsby) for onward transmission, to the Publication Authority:

   BAE SYSTEMS
   Change Management Team
   Technical Publications
   Warton Aerodrome W354D
   Warton, Preston
   Lancashire PR4 1AX
   England
   Tel [redacted]
   Fax

4. **Actions printed in bold face are those which should be completed from memory.**

continued >>>

Notes to Users - cont'd

5. Some information in this document is applicable to twin seat or single seat aircraft only, and can be identified by the presence of the following marks: (T) (S)

6. Some procedures in the FCC contain cross references to additional procedures. For reasons of convenience these additional procedures may be duplicated on extra cards located near to the original procedure. These extra cards bear a "chequered border" to aid their identification. Where the card containing the additional information is adjacent to the original card, an arrow symbol (← or →) is used to indicate the presence of the extra card and the direction of its location, i.e. the previous or next card. Where the card containing the additional information is more than one card away from the original card, the arrow symbol is accompanied by the relevant card reference number, e.g. (→) E-11a

7. To ensure that the correct procedure is followed, the aircrew must know the aircraft Production System Configuration (PSC). Where the undertaking of a procedure, step or a sequence of steps is dependent upon PSC state, then the PSC statement will be highlighted by use of coloured text as follows:

   - Red text relates to PSC PSC 3.3 x
   - Blue text relates to PSC 3.7 x
   - Magenta text relates to PSC10. x onwards

8. The following terms are used to give guidance but are not intended to be precise definitions nor preclude relevant airmanship actions:

   a. Land ASAP. Land at the nearest airfield with a runway suitable for a safe landing.

   b. Land as soon as practicable. Land at the nearest airfield where you can land safely and expect practical assistance for your aircraft type.

   c. **Recover**. Fly the aircraft into a safe flight regime consistent with the severity of the emergency or malfunction.

continued >>>

Notes to Users - cont'd

9. The normal and emergency procedures in this publication contain warnings, cautions and notes, the definitions of which are stated below:

WARNING	A warning is inserted when the consequence of not respecting a limitation or action might be death and / or injury to the person.
CAUTION	A caution is inserted when the consequence of not respecting a limitation or action might be damage to the aircraft or its equipment.
NOTE	A note is inserted to clarify the reason for a limitation or action.

Intentionally blank

EXTERNAL CHECKS

Check inlets and outlets are clear, doors secured, covers off and pins removed as required. Be alert for loose fasteners, cracks, dents, leaks and other general discrepancies. Systematically check all pylons, launchers and stores. Positively confirm (by hand) that all ERU breech caps are secure and that red bands are visible for jettisonable stores.

External Checks

Specifically accomplish the following:

Left centre fuselage:

1.	Engine air intake	Clear
2.	External canopy jettison handle	Secured and covered

Nose section:

3.	Foreplanes	Condition
4.	Radome	Secure (2 latches)
5.	ADT	Condition
6.	Nose wheel	Condition

Right wing:

7.	Slats	Condition
8.	Flaperons	Condition
9.	Main wheel	Condition, brake wear indicator
10.	RADAR switch	NML (guarded)
11.	AGTS switch	NORM

Rear fuselage / Fin:

12.	Arrester hook	Secured, pin removed
13.	Brake chute and door	Marker flag visible, door closed, pin removed
14.	Fin and rudder	Condition

Left wing:

15.	Flaperons	Condition
16.	Slats	Condition
17.	Main wheel	Condition, brake wear indicator
18.	APU GEN control switch	As required

REAR COCKPIT SAFETY CHECKS (SOLO) (T)

Before entering the front cockpit, the following procedure must be performed in the rear cockpit:

1.	LP COCKS	OPEN, guards down
2.	All other switches	Guarded, OFF or NORM
3.	MHDD	OFF
4.	HUD repeater	● OFF ● ON (PSC 3.7x / PSC 10.x onwards) ◄ ● Cover removed
5.	Radio channel selector knobs	In
6.	MHDD rotary controls	Detents
7.	Internal lighting	Toggle switch REV Rotary switch LOW
8.	Lap lights	OFF and stowed
9.	A/S/E handle	SAFE
10.	CMD EJECT	SOLO (locked)
11.	WEAPON RELEASE	ENABLE
12.	Restraint apron	Fitted

EJECTION SEAT CHECKS

1.	A/S/E handle	SAFE
2.	V strap	To front of negative g strap ◄
3.	Both top latch levers	Correctly engaged
4.	CJTDU (x2)	Connected and secure
5.	Shoulder strap buckles	Correctly routed
6.	PSP / strap connectors	Straps connected to harness, connector assembly in clip
7.	PSP lowering selector	As required
8.	ADU / ALIU static lines	Secure
9.	Anti-g valve	On (Fwd)
10.	Oxygen regulator selector	MAIN
11.	Auxiliary oxygen handle	Down
12.	Leg restraints	Correctly routed
13.	Canopy jettison unit pin	Remove and stow
14.	Seat firing handle pin	Remove and stow

INTERNAL CHECKS

Before electrical power on:

	1. PDS / VVR tape / DVVR RMM	Insert (doors close)	
(T)	2. PIC	As required	
	3. PARK BRK	ON	
	4. EXPD	OFF	
	5. Throttles	SHUT	
	6. LP COCKs	OPEN, guards down	**Internal Solo Seat**
▶	*PSC 3.7x / PSC 10.x onwards:*		
	7. LASER	SAFE	
	8. EWTF	LIVE	◀ **QRA-OS**
	9. SCAC	NORM	
	10. Landing gear handle	DOWN	
	11. Late arm	Safe	
	12. HUD	ON	
	13. ECS	ECS	
	14. DEMIST	OFF	
	15. Int / Ext lighting	As required	
	16. FUEL PROBE	To match probe position	
	17. AIR DRIVE	AUTO	
	18. Battery gangbar	OFF	
	19. MASS	SAFE	
	20. Systems gangbar	As required:	
		● L / R GEN - On	
		● W / S HTR - On	
		● RAD ALT - On	
		● XPDR - On	
	21. All other switches	As required	
(T)	22. CMD EJECT	As required	

QRA ONSTATE CHECKS

▶ *PSC 3.7x / PSC 10.x onwards:*

1. DVVR RMM	Insert, door close	
2. Seat firing handle pin	Removed and stowed	
3. Canopy jettison unit pin	Removed and stowed	◀

Before electrical power on:

4. PARK BRK	OFF	
5. EXPD	OFF	
▶ 6. EWTF	LIVE	

PSC 3.7x / PSC 10.x onwards ◀

7. LASER	SAFE

continued >>>

QRA Onstate Checks – cont'd

8.	SCAC	NORM
9.	LP COCKs	OPEN
10.	Throttles	SHUT
11.	Landing gear handle	DOWN
▶ 12.	SEL JETT	PROG/TANKS, as required ◀
13.	Late arm	Safe
14.	ECS	ECS
15.	DEMIST	OFF
16.	Int / Ext lighting	As required
17.	FUEL PROBE	As required
18.	AIR DRIVE	AUTO
19.	Battery gangbar	OFF
20.	PDS	In (door closed)
21.	MASS	STBY
22.	Systems gangbar	● L / R GEN - On ● W / S HTR - On ● RADALT - On ● XPDR - On

QRA COCKING

1.	Battery gangbar	Forward
2.	External AC power	On
3.	LINS	Select ALIGN NORM
4.	AIDS	Check PP, ENT
5.	ACUE format	Check for: ● PDS load errors ● STORES errors ● FCS NOGO ● LOAD MAC
6.	Landing gear indications	3 greens
7.	COMMS	● Ground crew - Cx, [redacted] ● Radios - Cx ● T/B - Cx
8.	NVG stowage	Secure
9.	STOR format	Check and ACCEPT/Check ● ASRAAMs select, check audio
10.	MASS	SAFE

continued >>>

QRA Cocking – cont'd

11. ACUE format	After 240 sec, confirm: ● LINS READY
12. NAV SEL	**DO NOT SELECT**
13. ECS	OFF

Wait for horn activation:

14. ECS	ECS
15. External AC power	OFF

After 40 sec:

16. BATT	OFF
17. MASS	STBY
18. VVR tape	Insert (door close)
19. Config	Ground crew - Confirm 'Stored for later transmission' on MDP

COCKPIT READY START-UP

1. Battery gangbar	Forward
2. PARK BRK	ON

Ground crew external AC power on

3. NVG (night only)	Batteries in, stow
4. AEA	Don
5. ACUE format	Check for: ● PDS load errors ● STORES errors ● FCS NOGO ● LOAD MAC
6. STOR format	Check or ACCEPT & Check

Ground crew comms confirm 2-way 'Cleared for APU start'

7. APU	START when cleared (confirm boxed)
8. Strap in	

Cx-in "cockpit ready" on T/B when APU started

SCRAMBLE START

Carry out Cockpit Ready Checks and then:

1. Throttles	IDLE
2. CANOPY	Closed
3. STOR format	Confirm accepted and valid
4. FCS RSET	Press (with both engines running)
5. Systems gangbar	● INT - On ● RADAR - On
6. Avionics	Confirm LGS as per LUC ● XPDR mode 2 (boxed) ● Radio 2 Guard VHF selected
7. GUH	Confirm valid heading
8. Altimeter	Check / set
9. LOW HT	Set
10. Weapons	Confirm: ● Selective jettison as required ● ASRAAM - Status and cooling
11. HYD format	Check
12. Taxy	When ground crew clear

Complete Pre Takeoff (N-16) and subsequent checks.

DRY CRANK

NOTE

Wait 60 seconds between shutdown and start / dry crank cycles

1. LP COCK affected side	SHUT
2. Relevant throttle	IDLE, monitor NH increasing

When approx. 27% NH is reached:

3. Throttle affected engine	SHUT

ENGINE START

	● = Normal start	● = Autonomous start
1.	Battery gangbar	Forward
2.	AC power source	Select option:
	● External AC	On
	● ECS	RAM AIR
	● APU(28XA ON).....	START (confirm boxed)
3.	Systems gangbar.....	As required: ● ECM - OFF ● MAW - OFF
4.	Landing gear	3 greens
5.	AIDS.....	Check PP, ENT
6.	ACUE format.....	Check
7.	Config.....	Sent, by ground crew
8.	MASS.....	STBY
9.	STOR format	Check ● Delay until post start if autonomous start ● STOR Format, check config ● ACUE Format, check WTF INTERLOCK not displayed
Training sorties only:		
10.	EWTF.....	Set TRAIN: ● Delay until post start if autonomous start ● ACUE Format, check WTF INTERLOCK is displayed
11.	Avionics.....	As required
12.	Areas.....	Check clear
13.	Start option.....	As required: ● APU START (confirm boxed) ● External Air On

Starting
Dry
Crank

continued >>>

Engine Start – cont'd

CAUTION

- If L VIBR or R VIBR warnings or audio are triggered shutdown immediately

PSC 3.2 x / 3.3 x:

- Two further start attempts are permitted if engine has been run within the previous six hours

PSC 3.7x / PSC 10.x onwards:

- No further re-start attempts are permitted

14. Either throttle ..... IDLE
15. Other throttle ..... IDLE

After engine start:

- 16. ECS..... ECS
17. External services..... Disconnect
18. APU RUN..... Not lit
19. Systems gangbar.....
    - INT - On
    - RADAR - On

START FAILURES / START CANCEL

CAUTION

In the event of a jet pipe fire exceeding 5 seconds carry out a Dry Crank (N-12) to dissipate heat and flames. Do not attempt another start

1. Throttle(s)..... SHUT
2. LP COCK(s)..... SHUT

NOTE

- Following a failed start attempt, the ground start procedure may be re-initiated 30 seconds after rotation of the HP spool has stopped
- If required to shutdown engine(s), throttle(s) must remain at IDLE for 5 min if IDLE RPM previously exceeded

CROSSBLEED ENGINE START

1.	APU	STOP
2.	Throttle live engine	80% NH minimum
3.	Other throttle	IDLE, check NH increasing

PRE TAXY CHECKS

1.	Areas	Check clear

> **NOTE**
>
> Upon AMC entry, check that the REV ENV warning is raised and maintained for 2 seconds, otherwise the aircraft is not cleared to fly

Start
Failures
Pre Taxy

2.	AMC	Perform if required
3.	ASP	Test
(1) 4.	ACUE format	Confirm correct PIC setting
5.	FCS RSET	Press
6.	Groundcrew	Panel up / leak check
7.	GUH	Confirm valid true heading
8.	Altimeter	Check / set
9.	LOW HT	Set
10.	FUEL format	Check
11.	HYD format	Check
12.	Weapons	Check status
13.	ACUE format	Confirm: ● LINS READY ● NAV SEL ● NAV mode confirm
14.	Canopy	Close

PRE TAKEOFF

1.	Brakes	Check
2.	Instruments	Check / set NAV mode confirm
3.	FUEL format	Confirm no failures
(S) 4.	Pins	2 stowed
(T) 5.	Pins	2 Front / 1 Rear stowed
6.	QRB	Centralised and secure
7.	Harness / visor / oxy / PSP / HEA lanyard	Check connections and flow
8.	Canopy	Closed and locked
9.	A/S/E handle	ARMED
10.	External lights	As required
11.	Takeoff emergency brief	Complete
12.	Radar	Set up (if required)
13.	PARK BRK	ON (for 5 seconds)

LINE UP

1.	Jettison	Set as required
2.	XPDR	As required
3.	VVR / DVVR	As required
4.	Radar	As required
5.	Weapons	De-select
6.	MASS	LIVE
7.	ACUE format	Check
8.	Landing lights	As required

AIR TO AIR REFUELLING

1.	XMIT	ALL SLNT
2.	External lights	As required
3.	Late arm	Safe
4.	Weapons	Deselect
5.	EXPD	OFF
6.	Envelope	Within limits

continued >>>

Air to air refuelling – cont'd

NOTE

- With the FUEL PROBE switch OUT, the FCS is in REV mode and ALSR is disabled
- **FCS REV** and **REV ENV** will be displayed if out of refuelling envelope

7. FUEL PROBE ..... OUT

When RDY is displayed on the FUEL format:

8. FUEL format.....
   - Confirm no failures
   - REFU options as required
   - If refuelling to full is prohibited, see (N-39) for disconnect total

NOTE

- If any amber indication present on the FUEL format, consider REFU STOP (15 second interval) REFU START, if amber indications remain consider AAR probe recycle
- If the **AIR DATA** warning is triggered during contact, continue refuelling, then refer to Air Data First Failure (E-68) if warning remains

Pre T/O Line Up AAR

After refuelling:

CAUTION

If ADT damage is suspected, refer to Recovery with Fuel Probe Out (E-34)

9. FUEL PROBE ..... IN
10. XMIT..... ALL NORM
11. External lights..... As required

RECOVERY CHECKS

1. FUEL format	Contents / balance
2. Instruments	Check / set
3. Radios	Check / set
4. Altimeter	Set
5. Late arm	Safe
6. EXPD	OFF
7. AIDS	Check / set
8. Landing lights	On

PRE LANDING

1. Landing gear	Below [redacted] KDAS, DOWN, 3 greens / DDD

Airspeed / AoA Check on Approach

AoA	26% CG	28% CG	30% CG
14°	[redacted]		
12°			
Aircraft mass [redacted] kg +/- 5 KDAS / 1000kg above / below			

AFTER LANDING

1. MASS	STBY
2. Brake chute	As required
3. A/S/E handle	SAFE
4. XMIT	ALL SLNT
5. External lights	As required
6. VVR / DVVR	OFF
7. Systems gangbar	● RADAR - OFF ● ECM - OFF ● MAW - OFF
8. ACUE format	Check brakes

ENGINE SHUTDOWN

	1. PARK BRK	As required
	2. FUEL PROBE	Check (if required)
▶	3. Seat firing handle pin(s).	Insert correctly
(T)	4. Canopy jettison unit pin .	Insert correctly
	5. A/S/E handle	EGRESS then SAFE ◀
	6. Unstrap	As required
	7. SUIT TEMP	OFF
	8. Throttles	IDLE (for 5 minutes)
	9. SECURE DATA	ERASE if required
	10. PDS / VVR tape	Remove
	11. Canopy	Open

If external AC power required:

▶	12. External AC power	Connect
	13. Throttles	SHUT (within 10 seconds of AC power connection) ◀
	14. LP COCKs	SHUT
	15. HYD format	Ensure pressure depleted, stir down checks complete
	16. MASS	SAFE
	17. All other switches	As required

If APU generator required:

	12. Either throttle	SHUT
	13. APU	START, confirm boxed
	14. Throttle (live engine)	SHUT
	15. LP COCKs	SHUT
	16. HYD format	Ensure pressure depleted, stir down checks complete
	17. MASS	SAFE
	18. All other switches	As required

Recovery Landing Shut-Down

If complete shutdown required:

	12. Throttles	SHUT
	13. LP COCKs	SHUT

Wait for warning horn activation, then:

	14. BATT	OFF
	15. MASS	SAFE
	16. All other switches	As required

When all shutdown items complete:

▶	1. Canopy jettison unit pin .	Insert correctly
	2. Aircraft	Ensure in SAFE CONDITION ◀

HOT REFUELLING

CAUTION

Do not carry out Hot Refuelling if:

- [redacted]

1. After landing checks..... Completed, (N-18) **(pins remain out)**
2. PARK BRK ..... ON (when requested)
3. FUEL format..... Select / Monitor
4. PARK BRK ..... OFF (when requested)

CAUTION

During hot refuel:

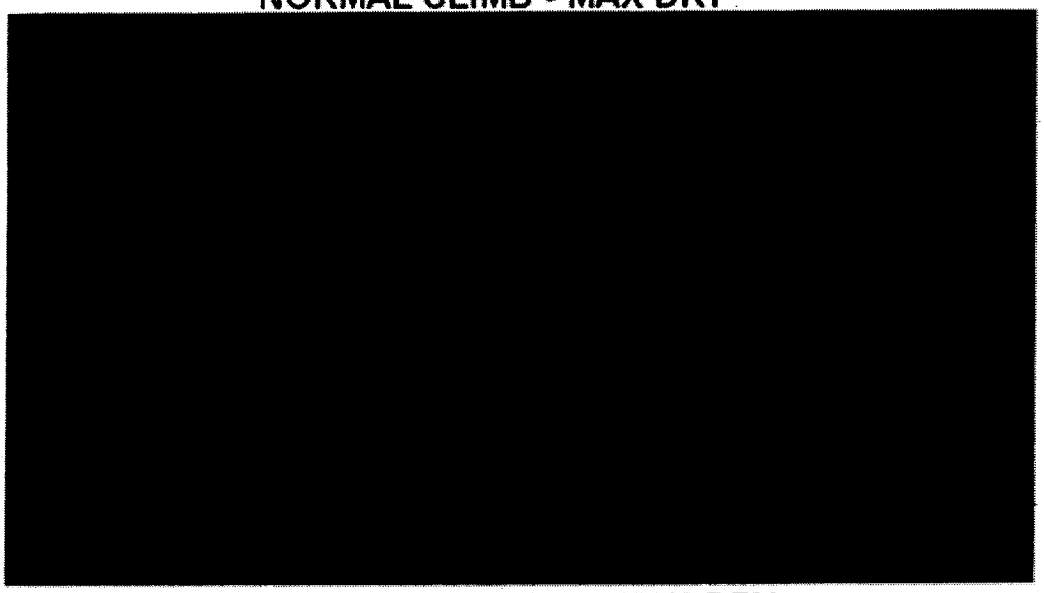
- Radio transmission in emergency only
- Stop refuelling if :
  - Fuel leakage occurs.
  - Fuel vents from the fin
- Transient CG 1 and CG 2 warnings can be ignored, however, continued operation is not permitted if:
  - Fuel system failures are suspected
  - CG warnings remain on completion
- Observe RTS taxy limitations

After refuelling:

5. Systems gangbar ..... As required
6. XMIT..... PROG / NORM
7. PARK BRK ..... ON (when requested)
8. Pre Taxy checks..... Carry out appropriate actions (N-15)

CLIMB DATA

NORMAL CLIMB - MAX DRY



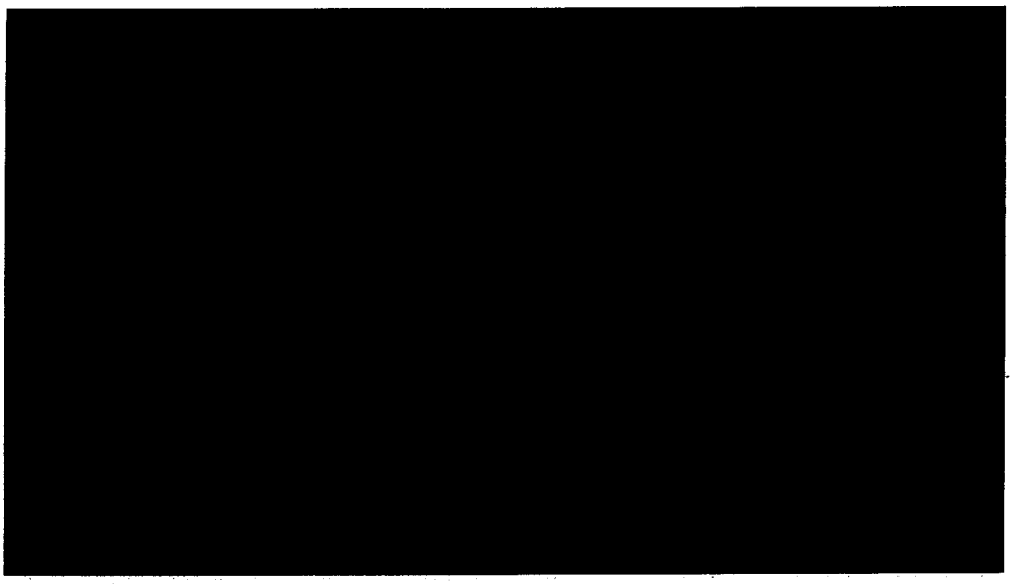
MINIMUM FUEL CLIMB - MAX DRY

MINIMUM TIME CLIMB - MAX REHEAT

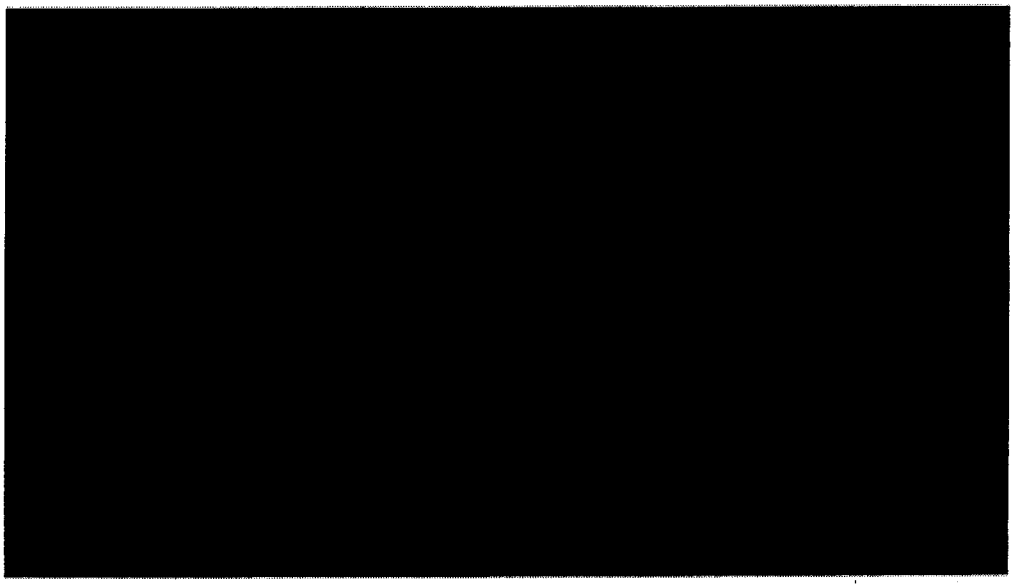
Climb
Recovery
Descent

continued >>>

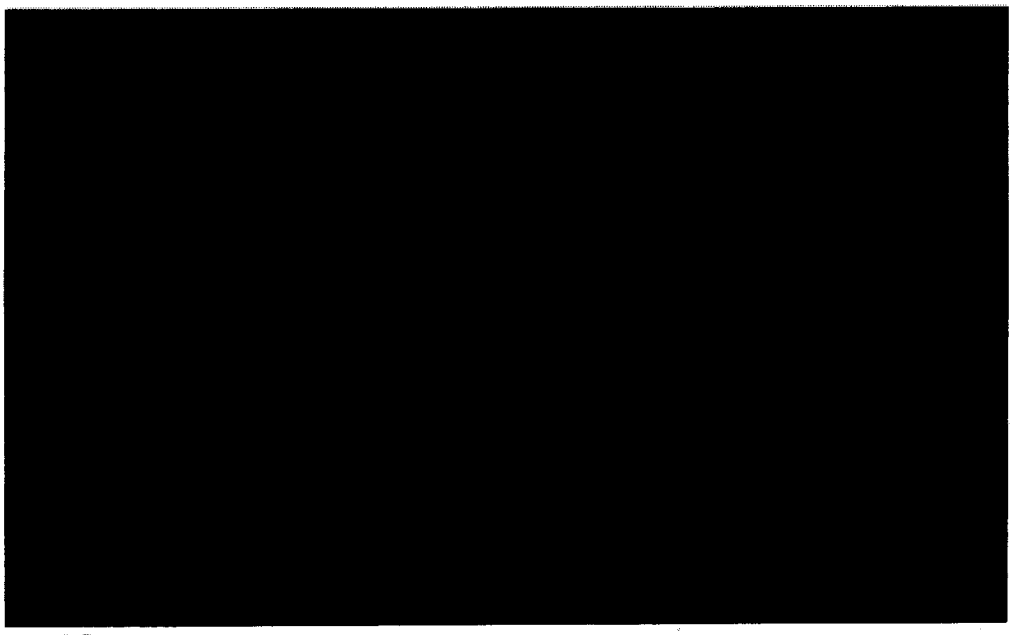
NORMAL CLIMB - MAX DRY



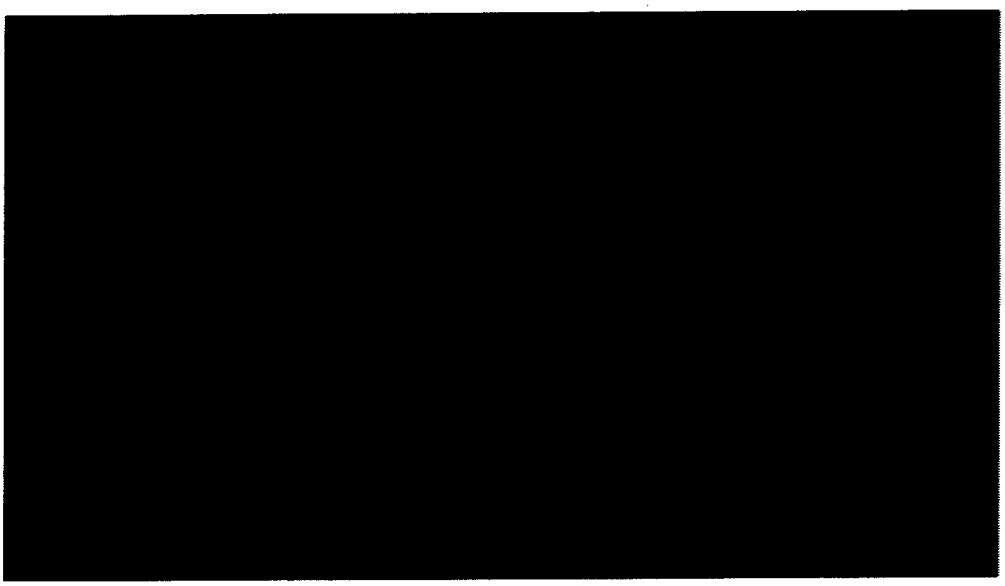
MINIMUM FUEL CLIMB - MAX DRY



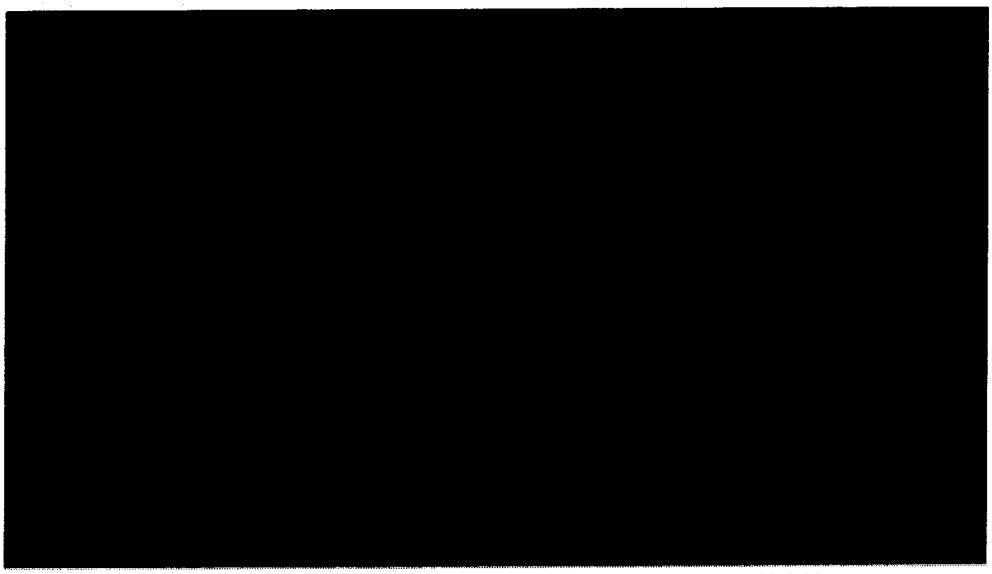
MINIMUM TIME CLIMB - MAX REHEAT



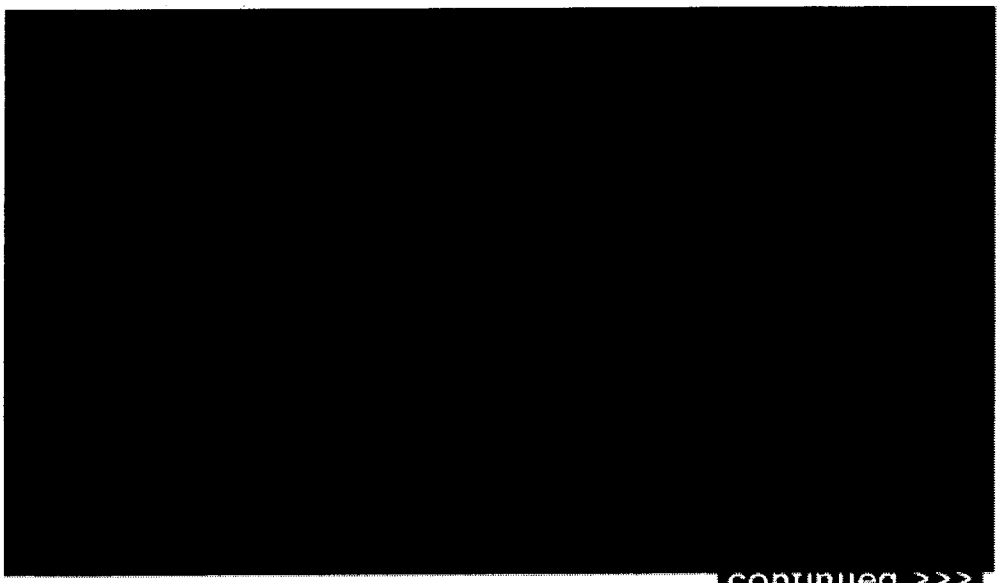
NORMAL CLIMB - MAX DRY



MINIMUM FUEL CLIMB - MAX DRY

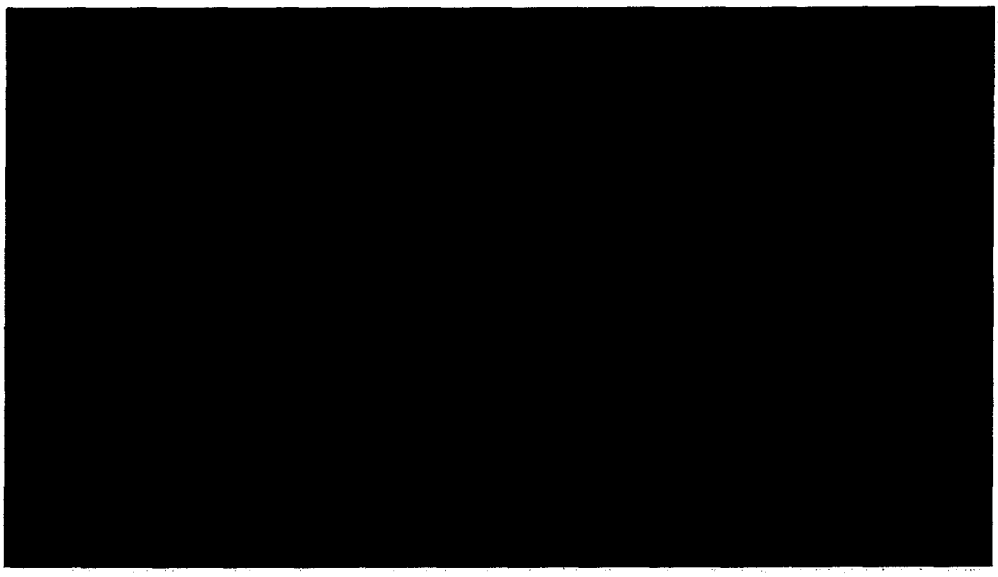


MINIMUM TIME CLIMB - MAX REHEAT

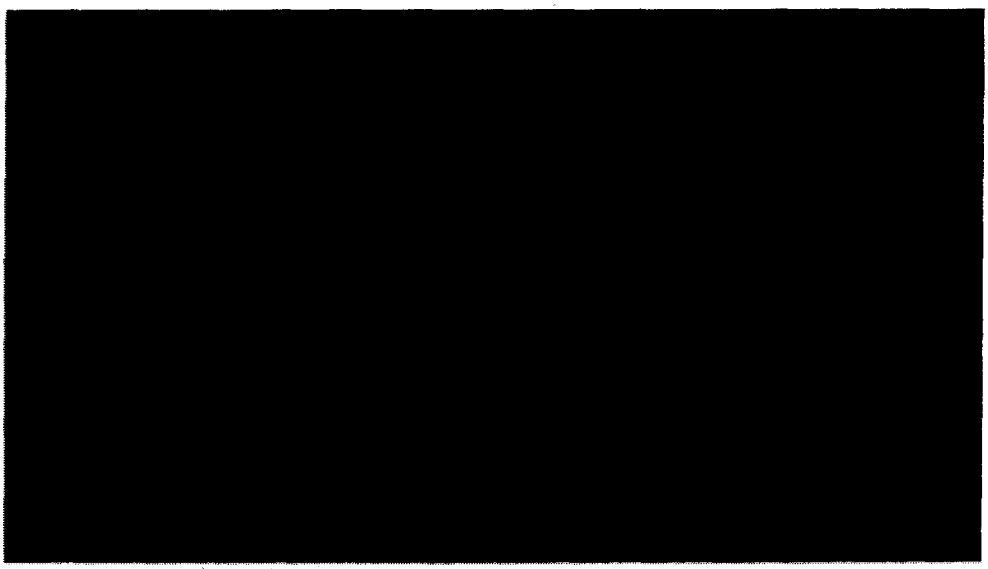


continued >>>

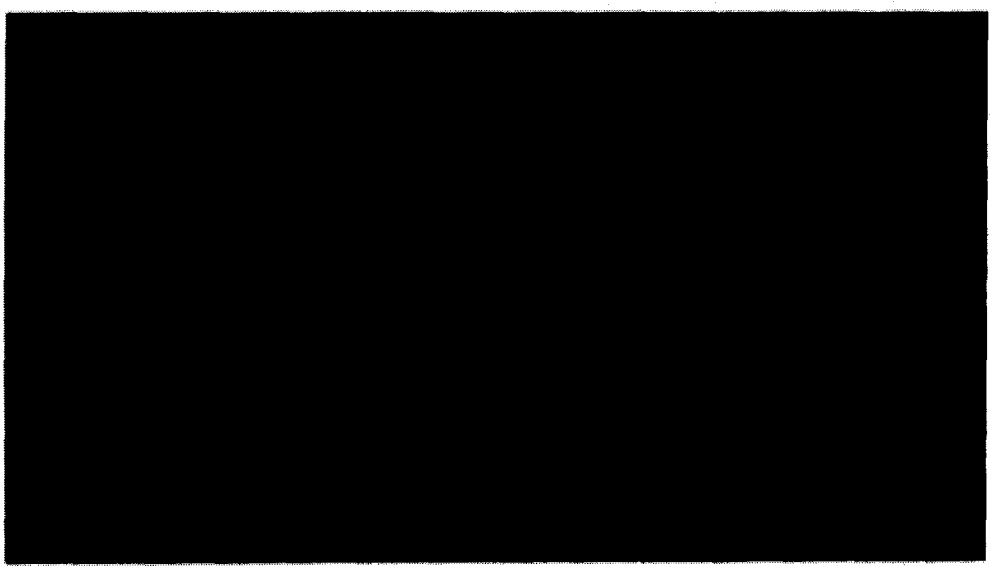
NORMAL CLIMB - MAX DRY



MINIMUM FUEL CLIMB - MAX DRY



MINIMUM TIME CLIMB - MAX REHEAT



RECOVERY DATA

NOTE

- Climb speed [redacted]
- Fuel used values do not include a landing allowance.
- Descend at [redacted] KDAS, IDLE power, airbrake in (range descent).

[redacted]

RECOVERY FROM SEA LEVEL - 2 ENGINES, DI 15

[redacted]

RANGE AND ENDURANCE - 2 ENGINES, DI 15

[redacted]

continued >>>

NOTE

- Climb speed [redacted]
- Fuel used values do not include a landing allowance.
- Descend at [redacted] KDAS, IDLE power, airbrake in (range descent).
- Applicable to windmilling/seized engine.

[redacted]

RECOVERY FROM SEA LEVEL - SINGLE ENGINE, DI 15

[redacted]

RANGE AND ENDURANCE - SINGLE ENGINE, DI 15

[redacted]

continued >>>

NOTE

- Climb speed [redacted]
- Fuel used values do not include a landing allowance.
- Descend at [redacted] KDAS, IDLE power, airbrake in (range descent).

[redacted]

RECOVERY FROM SEA LEVEL - 2 ENGINES, DI 60

[redacted]

RANGE AND ENDURANCE - 2 ENGINES, DI 60

[redacted]

continued >>>

NOTE

- Climb speed [redacted]
- Fuel used values do not include a landing allowance.
- Descend at [redacted] KDAS, IDLE power, airbrake in (range descent).
- Applicable to windmilling/seized engine.

[redacted]

RECOVERY FROM SEA LEVEL - SINGLE ENGINE, DI 60

[redacted]

RANGE AND ENDURANCE - SINGLE ENGINE, DI 60

[redacted]

continued >>>

NOTE

- Climb speed [redacted]
- Fuel used values do not include a landing allowance.
- Descend at [redacted] KDAS, IDLE power, airbrake in (range descent).

[redacted]

RECOVERY FROM SEA LEVEL - 2 ENGINES, DI 90

[redacted]

RANGE AND ENDURANCE - 2 ENGINES, DI 90

[redacted]

continued >>>

NOTE

- Climb speed [redacted]
- Fuel used values do not include a landing allowance.
- Descend at [redacted] KDAS, IDLE power, airbrake in (range descent).
- Applicable to windmilling/seized engine.

[redacted]

RECOVERY FROM SEA LEVEL - SINGLE ENGINE, DI 90

[redacted]

RANGE AND ENDURANCE - SINGLE ENGINE, DI 90

[redacted]

continued >>>

NOTE

- Climb speed [redacted]
- Fuel used values do not include a landing allowance.
- Descend at [redacted] KDAS, IDLE power, airbrake in (range descent).

[redacted]

RECOVERY FROM SEA LEVEL - 2 ENGINES, DI 130

[redacted]

RANGE AND ENDURANCE - 2 ENGINES, DI 130

[redacted]

continued >>>

NOTE

- Climb speed [redacted]
- Fuel used values do not include a landing allowance.
- Descend at [redacted] KDAS, IDLE power, airbrake in (range descent).
- Applicable to windmilling/seized engine.

[redacted]

RECOVERY FROM SEA LEVEL - SINGLE ENGINE, DI 130

[redacted]

RANGE AND ENDURANCE - SINGLE ENGINE, DI 130

[redacted]

DESCENT DATA

NOTE

For rapid descent, add / subtract [redacted] of the obtained value for each [redacted] kg above / below [redacted]

RAPID DESCENT - IDLE A/B OUT

[redacted]

RANGE DESCENT - IDLE A/B IN

[redacted]

INSTRUMENT DESCENT - IDLE A/B IN

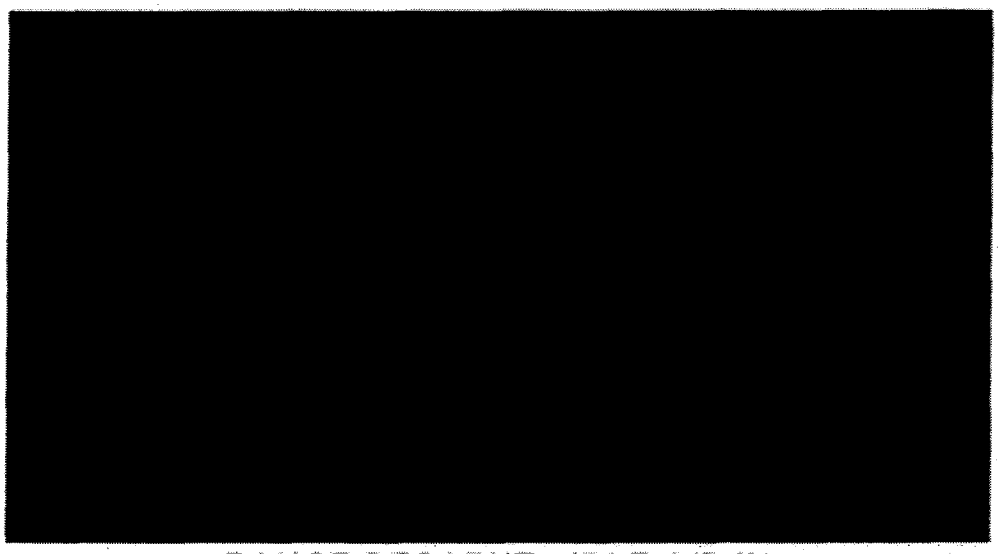
[redacted]

continued >>>

NOTE

For rapid descent, add / subtract [redacted] of the obtained value for each [redacted] kg above / below [redacted]

RAPID DESCENT - IDLE A/B OUT



RANGE DESCENT - IDLE A/B IN

INSTRUMENT DESCENT - IDLE A/B IN

continued >>>

NOTE

For rapid descent, add / subtract [redacted] of the obtained value for each [redacted] kg above / below [redacted]

RAPID DESCENT - IDLE A/B OUT

[redacted]

RANGE DESCENT - IDLE A/B IN

[redacted]

INSTRUMENT DESCENT - IDLE A/B IN

[redacted]

continued >>>

NOTE

For rapid descent, add / subtract [redacted] of the obtained value for each [redacted] above / below [redacted]

RAPID DESCENT - IDLE A/B OUT

[redacted]

RANGE DESCENT - IDLE A/B IN

[redacted]

INSTRUMENT DESCENT - IDLE A/B IN

[redacted]

LIMITATIONS

ENVIRONMENTAL RANGE	[redacted]

ICING
[redacted]

MASSES	
Max ground ops	[redacted]
Max takeoff	
Max landing (normal)	
Max landing (emergency)	

MAX TYRE SPEED TAKEOFF	
Max main gear tyre speed (GS)	[redacted]
Max nose gear tyre speed (GS)	

RTS
Limits

continued >>>

Limitations - cont'd

TAKEOFF / LANDING	A/A	A/S
Max crosswind	[redacted]	
Max crosswind for asymmetry exceeding single missile		
Max crosswind formation		
Max crosswind brake chute		
Max tailwind		
Max touchdown speed (GS)		
Max touchdown AoA		
Max touchdown AoA with U/F tank		
Max AoA during aerobraking: - crosswind < 20 kt - crosswind ≥ 20 kt		
Max normal brake chute speed		
Brake chute speed emergency landing		
Brake chute speed rejected takeoff		

LANDING GEAR	
Max alt	[redacted]
▶ Max speed / g cycling	
Max speed / g down	

FUEL PROBE / AAR						
Activity	Altx1000	Speed	Mach	AoA°	g	Remarks
▶ Cycling	[redacted]					
Extended						
◀ AAR VOYAGER						

Limitations - cont'd

Voyager, KC-135, KC-10, A310, C-135FR, CC-150T
Fuel Total Limits

Configuration	Fuel Quantity (kg)	
	Single Seat	Twin Seat
No SFT		
U/F SFT only		
U/W SFT only		
U/F and U/W SFT		

IN FLIGHT	
Negative g	
Normal FCS CONT Handover	

SALT CORRECTION	A/A	A/S

continued >>>

Maximum Cable Entry Speed (kts) (Hook Load [redacted]

Mass kg	RHAG Mk1	44B-2C	44B-2D GAF	44B-2E
[redacted]				

Mass kg	44B-2L	SUPER BAK 9	BAK 12 E32A	BAK 13 - AM1
[redacted]				

continued >>>

Maximum Cable Entry Speed (kts) (Hook Load [redacted]

Mass kg	RHAG Mk1	ADEC 500S8	PAAG	AERAZUR 4M6-C
[redacted]				

Mass kg	E-28	MAAS	MAAS	WT44-36
[redacted]				

continued >>>

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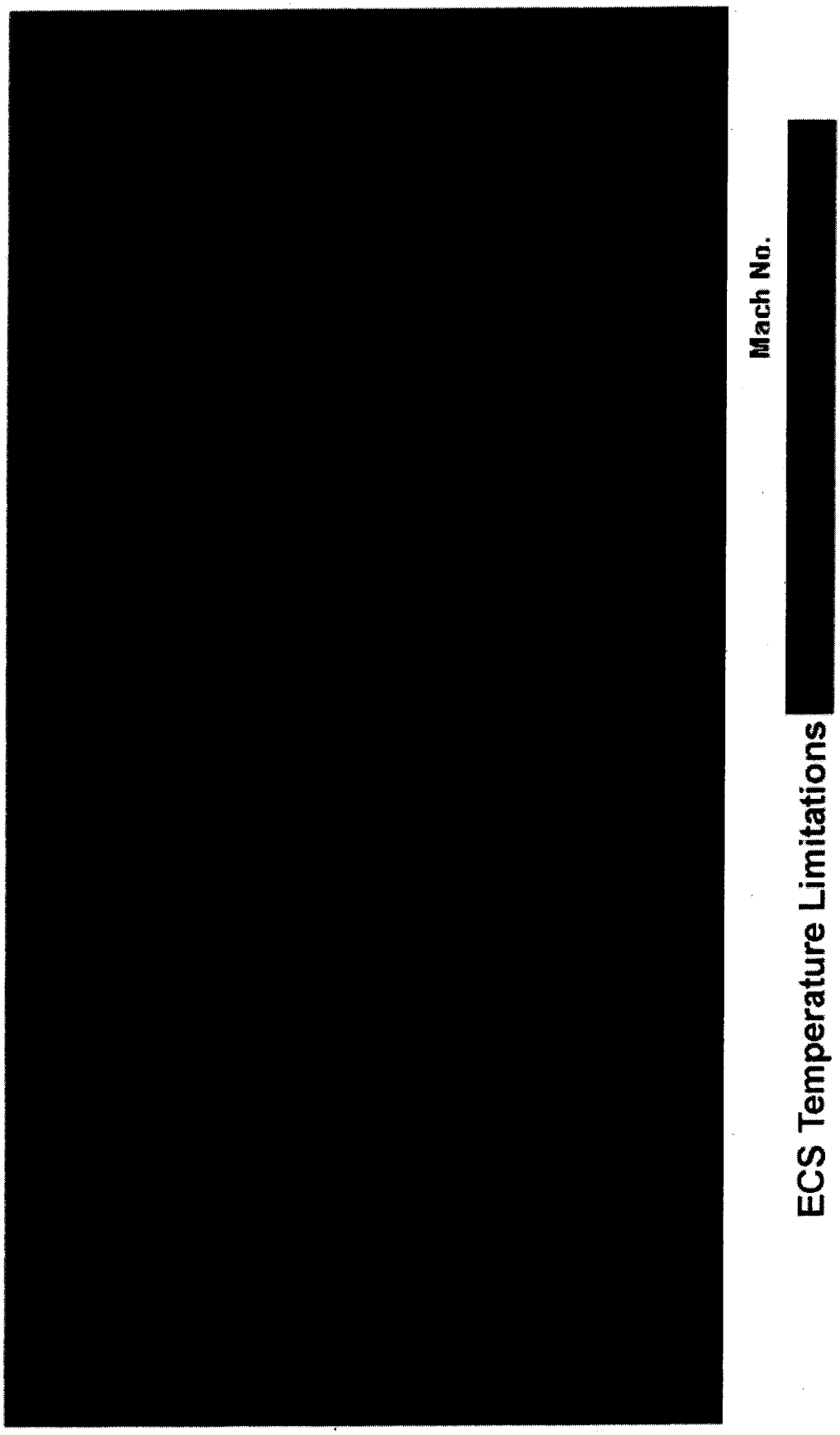

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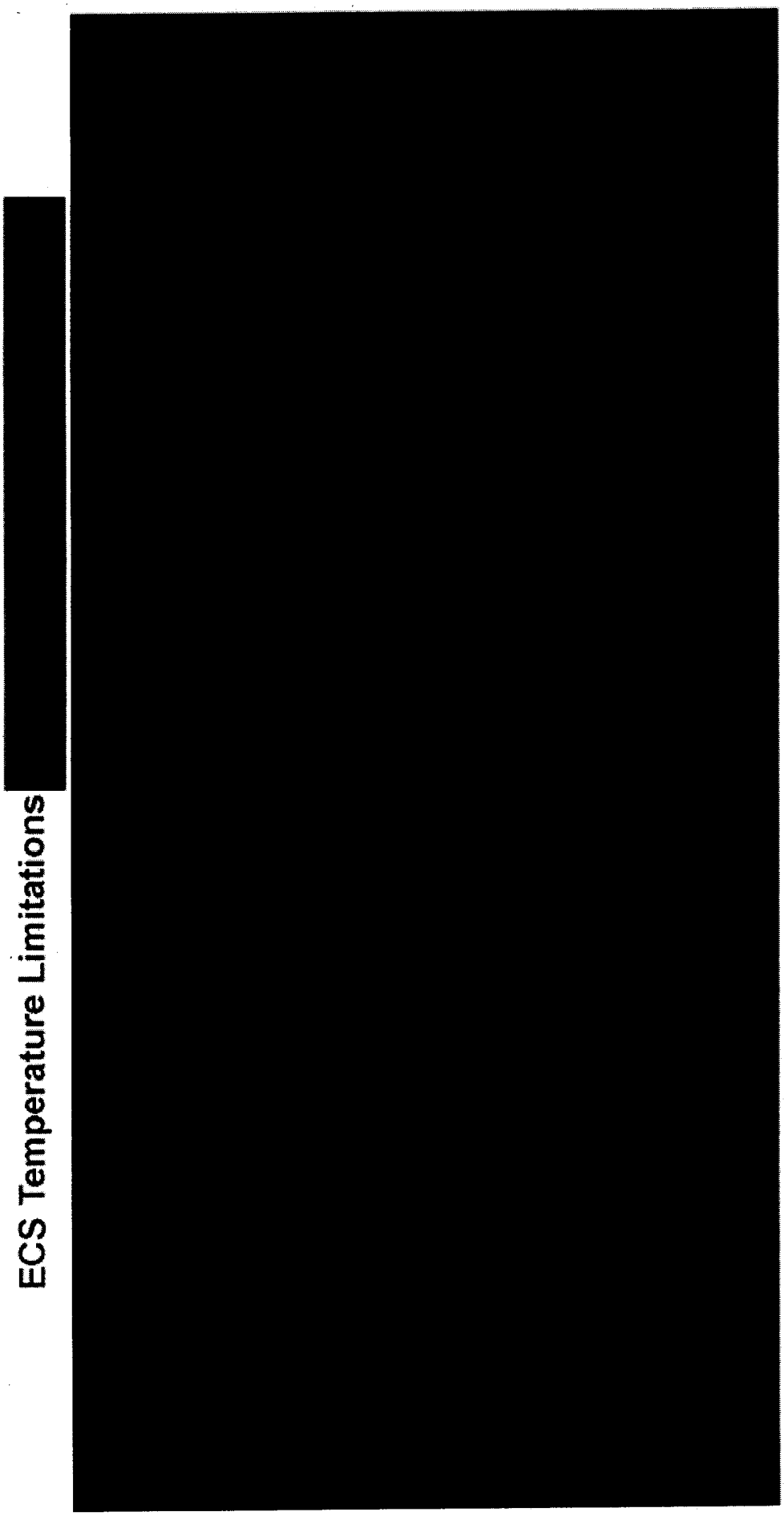
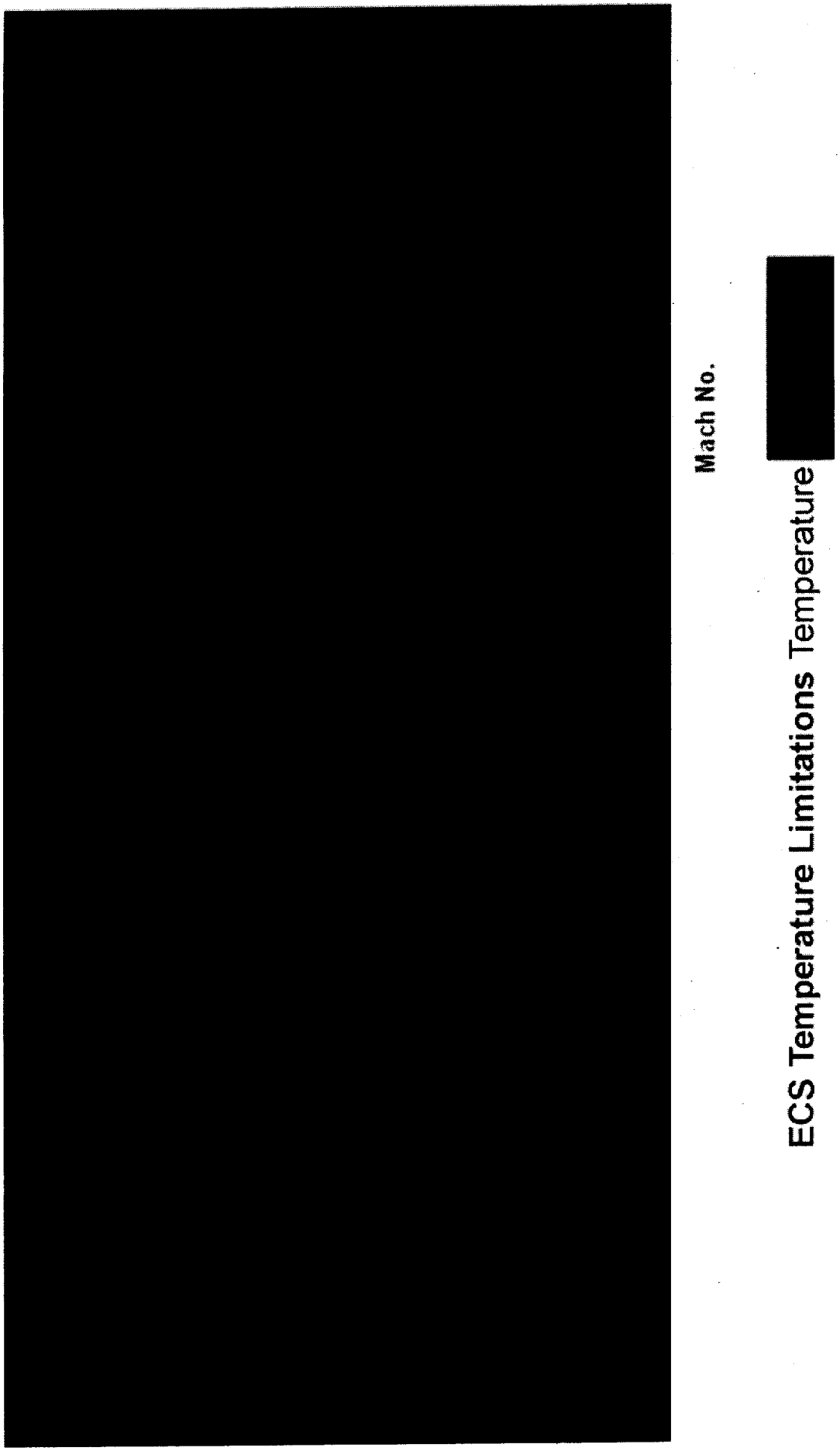


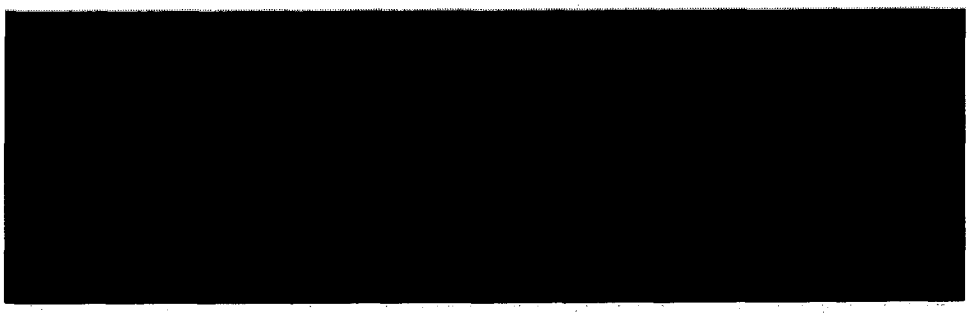
continued >>>


ECS Temperature Limitations Temperature
Mach No.

CLEARED ENVELOPES AND MANOEUVRES

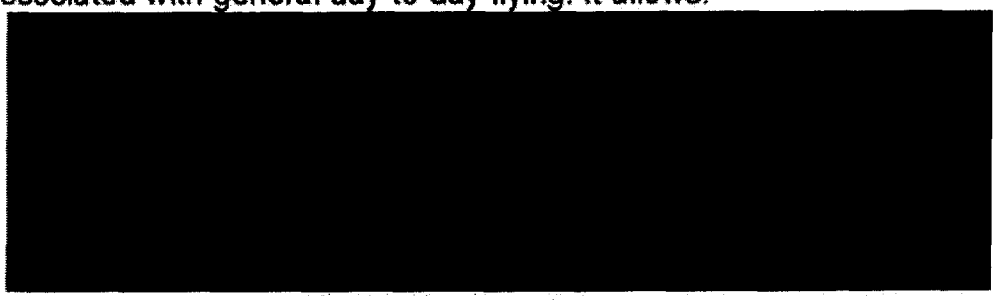
M1 (Carefree Handling Manoeuvres)

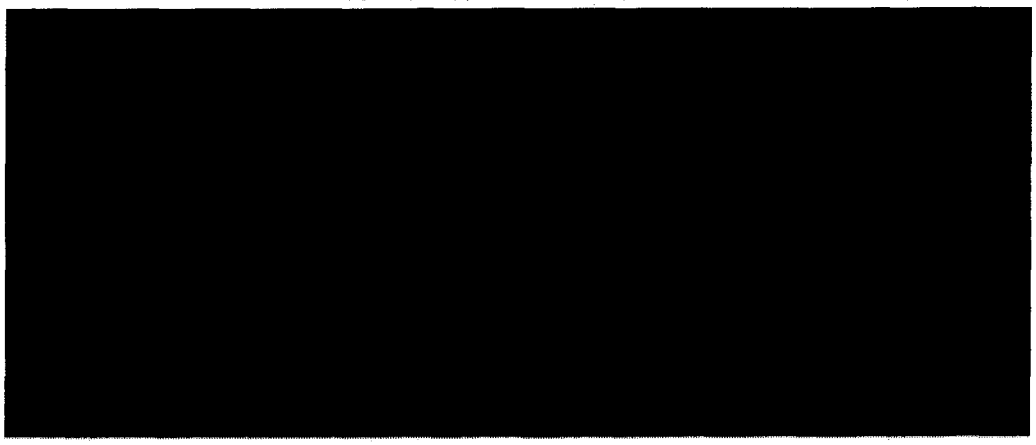
The M1 clearance allows unrestricted ('carefree') use of the stick and pedals insofar as necessary to achieve all manoeuvres that are appropriate to the A/A combat and A/S attack roles respectively. This includes:



M2 (General Flight Manoeuvres)

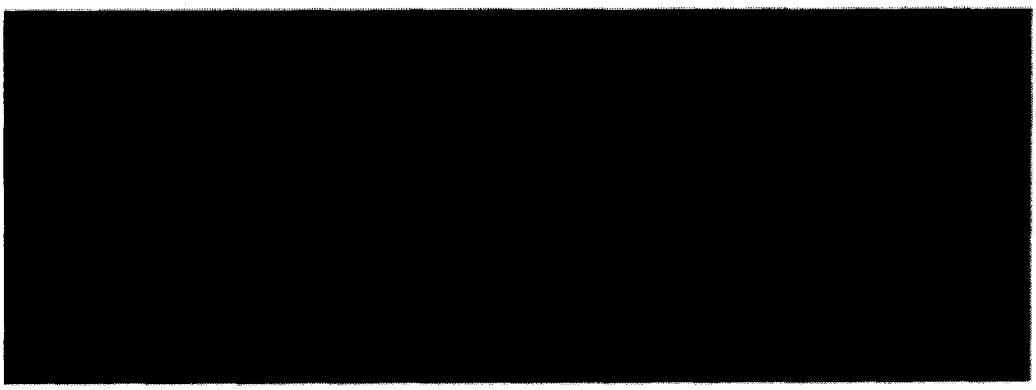
The M2 manoeuvre category covers nearly all flight manoeuvres associated with general day-to-day flying. It allows:





M3 (Gentle Manoeuvres)

The M3 manoeuvre category applies to flight with severe failures, and is thus intended to cover only the return to base task. It allows:



continued >>>

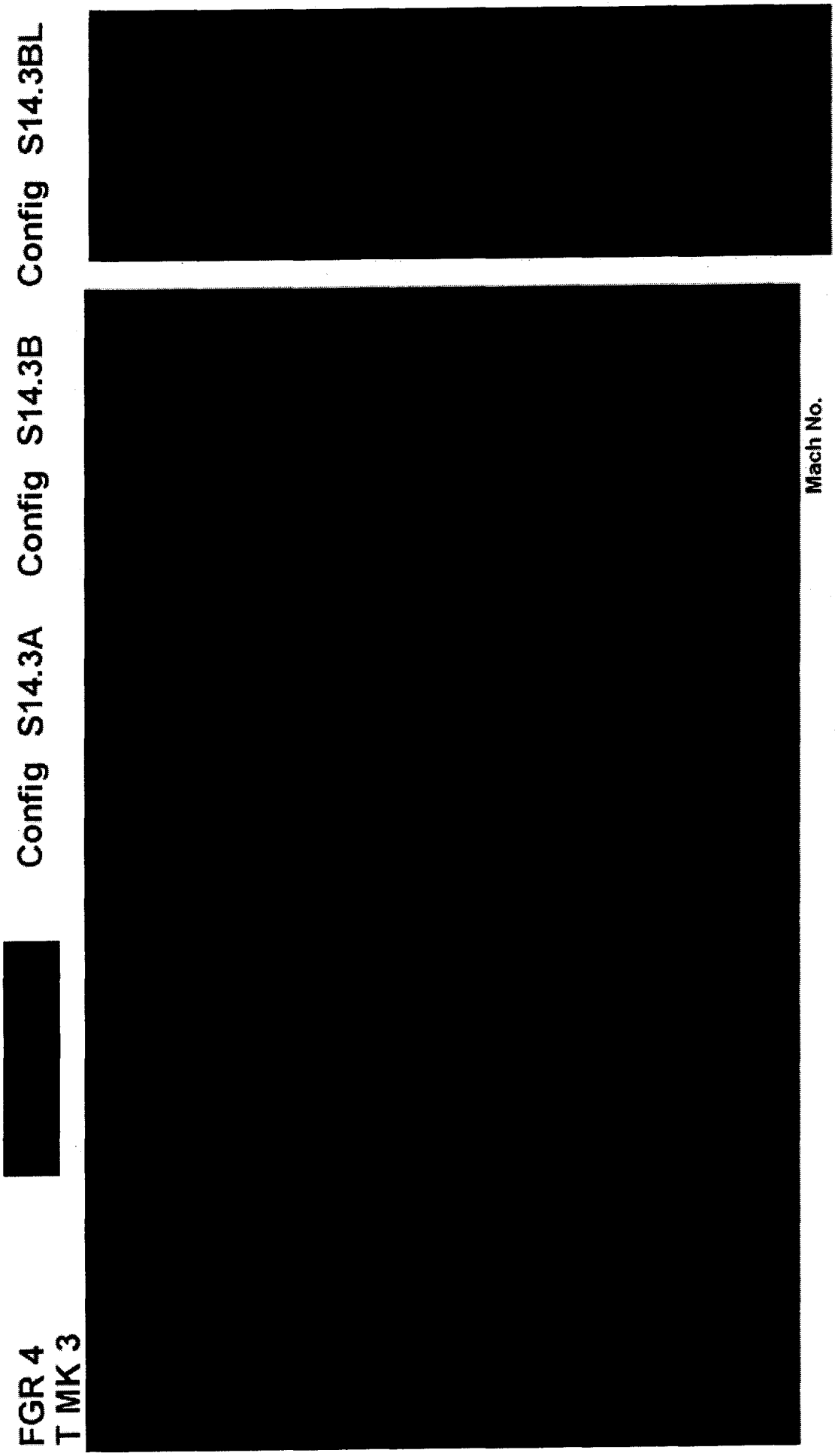
[redacted]

Mach No.

FGR4 / T Mk 3

Config A1.0A	Config A2.0A	Config A3.0A
Config A1.0B	Config A2.0B	Config A3.0B
Config A1.0C	Config A2.0C	Config A3.0C

continued >>>



continued >>>

[redacted]

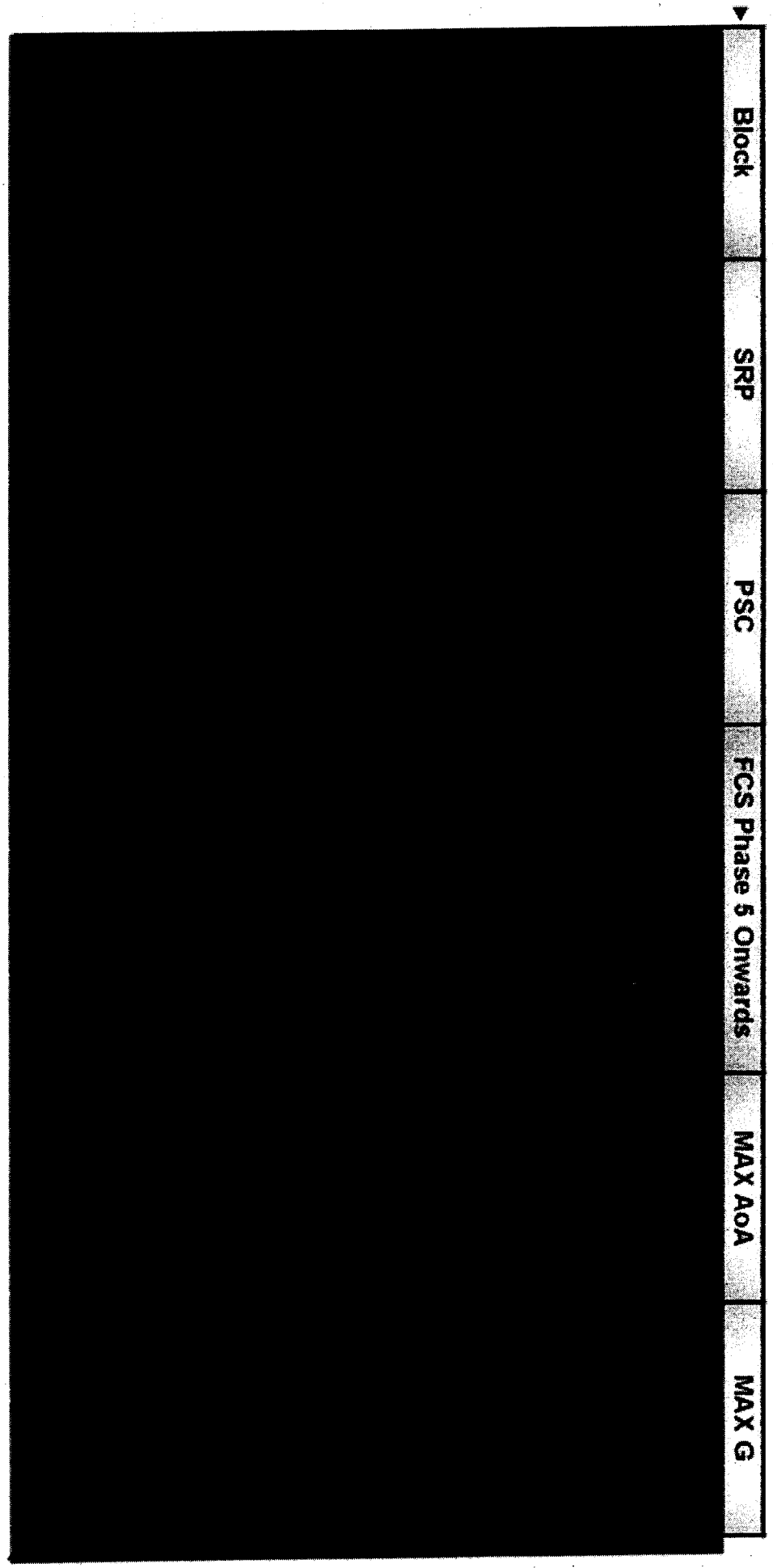
[redacted]

Mach No.

FGR 4
T MK 3

[redacted]

Config S4.1 Config S14.1 Config S16.1
Config S4.1C Config S14.1C Config S16.1C
Config S4.1P Config S14.1P Config S16.1P



* at Block 11 equivalence

EMERGENCY DRILLS

SINGLE ENGINE OPERATION

WARNING

Maintain 70% NL minimum if live engine CONT P or POT or GEN warnings are illuminated. Otherwise hydraulics and / or AC may be lost

1. Throttle ..... Maintain 70 % NL min, possible ECS failure below this setting

If irrecoverable ECS failure occurs:

2. ECS..... Within limits, RAM AIR (E-84)

In all cases:

NOTE

Expect unresettable AIR DATA warning after 3 minutes, which can be ignored

2. Positive g..... Maintain
3. Flight Envelope ..... REV ENV (E-116)
4. Fuel ..... Balance as appropriate, refer to:
   - Fuel Balancing (E-32)

WARNING

Do not select XFEED to OPEN in the case of a **FUEL LEAK** and/or FUEL T warning

5. XFEED ..... OPEN
6. Land ..... ASAP

SG 4: ● [redacted]

WARNING CAPTIONS AND MEANINGS

continued >>>

Warning Captions

continued >>>

continued >>>

ESCM		ESM / ECM failure
ESCM T		ESM / ECM overtemperature E-80
FCS 1		FCS first failure E-67
FCS RSET		FCS reset required E-67
FLARE		Flare dispenser failure E-79
FLIR		Forward looking infra-red failure
FLIR DEG		Forward looking infra-red degraded
FUEL LOW		Fuel low level E-25
L FUEL C	R FUEL C	Fuel computer failure . . . E-36/37
L FUEL T	R FUEL T	Fuel overtemperature E-30
FUEL VLV		Air-to-air refuelling failure E-35
▶ L GB OIL	R GB OIL	Gearbox oil temp (PSC10.x onwards) E-49 ◀
L GEN	R GEN	AC generator failure E-42
L GEN T	R GEN T	AC generator overtemp E-46
GPS		GPS failure E-73
GPWS		GPWS failure
GUN FAIL		Gun failure E-107
HANG-UP		Store hung up E-105
HOOK		Hook loss of function
HOOKDWN		Uncommanded hook down E-92
L HYD A	R HYD A	Air detected in hydraulics . . . E-54
L HYD T	R HYD T	Hydraulic overtemperature . . E-57
ICE		Ice detected E-24
IFF INT		IFF interrogator failure
LINS		Laser inertial navigation system failure . . E-72

continued >>>

continued >>>

REVERSIONARY WARNING CAPTIONS

DRILLS WITHOUT DEDICATED WARNINGS

Intentionally blank

EMERGENCY GROUND EGRESS

1.	**Throttles**	**SHUT**	
2.	**LP COCKs**	**SHUT**	
▶ 3.	**APU**	**STOP, if running** ◀	
4.	**PARK BRK**	**ON**	**Aband.**
5.	**BATT**	**OFF**	**Eject**
▶ 6.	**A/S/E handle**	**EGRESS**	
7.	**Canopy**	**Open / Jettison** ◀	
8.	**QRB**	**Release**	
9.	**ASP**	**Release**	
10.	**Ladder**	**Deploy**	

▶PREMEDITATED EJECTION ◀

If time and conditions permit:

1.	NVG	Remove and stow
2.	Conditions	Straight and level [redacted] KDAS
3.	Heading	Towards unpopulated area
4.	XPDR	EMGY
5.	QRB	Centralised and secure
6.	Harness / PSP / HEA lanyard	Locked / connected

WARNING

The mask hose must be connected prior to ejection over water

7.	Oxygen mask	Tight, toggle down, hose connected
8.	Visor	Down
9.	Radio	Call
10.	Throttles	IDLE
11.	Assume ejection position	
12.	Eject	

LANDING WITH A BLOWN TYRE

Before landing consider:

- Condition of runway, overrun, and side areas
- Crosswind
- Arrester gear limitations

1.	Aircraft mass	Reduce to min practicable

Fly a normal approach.

If nose tyre blown:

2.	Brake chute	Deploy at main wheel touchdown
3.	Nose wheel	Lower gently by 100 KDAS

If main tyre blown:

2.	Land	Cable Engagement Approach-End recommended, refer to (E-93)

▶*If approach-end-cable not available:*

3.	Land	On side of runway towards good tyre
4.	Nose wheel	Lower ASAP
5.	Wings	Maintain level
6.	Brake chute	Deploy ◀

ABORT

1.	**Throttles**	**IDLE**
2.	**Chute**	**Deploy (if required)**
3.	**Brakes**	**Apply**
4.	**Hook**	**Down (if required)** ● 1000 ft before cable ● Switch boxed

ENGINE FAILURE DURING TAKEOFF

If decision to stop is made:

1. ABORT

When aircraft stopped:

2.	Throttle affected engine	SHUT
3.	LP COCK affected side	SHUT

If takeoff is continued:

1.	**Throttles**	**MAX RHT**

When airborne:

2.	**Landing gear**	**Up**
3.	**External stores**	**Jettison, if required**
4.	Throttle affected engine	SHUT
5.	LP COCK affected side	SHUT
6.	Land	ASAP, refer to: ● Single Engine Operation (E-1)

TYRE FAILURE DURING TAKEOFF

If decision to stop is made:

1. ABORT

If takeoff is continued:

1.	**Landing Gear**	**Do not retract**
2.	Land	As soon as practicable, refer to: ● Landing with a Blown Tyre (←)

REHEAT FAILURE DURING TAKEOFF

L RHEAT or **R RHEAT**

If decision to stop is made:

1. **ABORT**

If takeoff is continued:

1. **Throttles** ..... **MAX RHT**

When airborne:

2. **Landing gear** ..... **Up**
3. **External stores** ..... **Jettison, if required**
4. Throttle affected engine .. Dry range

> **NOTE**
> Reheat reselection is permitted

If engine response and or AJ / NH behaviour is abnormal:

5. Refer to ..... Abnormal Engine Response (E-22)

ENGINE PERFORMANCE DURING TAKEOFF

L ENG P or **R ENG P**

On ground only

If decision to stop is made:

1. **ABORT**

If takeoff is continued:

1. **Throttles** ..... **MAX RHT**

When airborne:

2. **Landing gear** ..... **Up**
3. **External stores** ..... **Jettison, if required**
4. Throttle affected engine .. IDLE
5. Refer to ..... Abnormal Engine Response (E-22)

APU FIRE ON GROUND

APU FIRE

or CANOPY HORN MODULATED AUDIO WARNING

◄ **1. Emergency Ground Egress** ►

ENGINE FIRE ON GROUND

L FIRE **or** **R FIRE**

F button lit

◄ **1. Emergency Ground Egress** ►

ENGINE FIRE DURING TAKEOFF

L FIRE **or** **R FIRE**

F button lit

If decision to stop is made:

1. ABORT

When stopped:

► **2. Emergency Ground Egress** ◄

If takeoff is continued:

1. Throttles ..... **MAX RHT**

When airborne:

2. Landing gear ..... **Up**
3. External stores ..... **Jettison, if required**
4. Refer to ..... Engine Fire in Flight (➔)

ENGINE FIRE IN FLIGHT

L FIRE **or** **R FIRE**

F button lit

1. **Throttle affected engine.. SHUT**
2. **LP COCK affected side... SHUT**
3. **Check for further indications of fire**

If fire is confirmed:

4. **EJECT**

If fire is not confirmed:

4. Flight Envelope ..... **REV ENV** (E-116)
5. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)

DOUBLE ENGINE FLAMEOUT

L FLAME R FLAME

AC
ESS DC
CPT DISP

L CONT P R CONT P
HYD TOT REV ENV

Some or all of these warnings will illuminate.

Flameout Relight

If steady HYD TOT *lit or critical aircraft operation occurs:*

1. **EJECT**

If no auto relight and HYD TOT warning not lit:

1.	**Speed**	**≥** [redacted]
2.	**External Stores**	**EMGY JETT, if required**
3.	**Controls**	**Minimize / gentle movements**
4.	**Either Throttle**	**SHUT, then MAX DRY**
5.	**Other Throttle**	**SHUT, then MAX DRY**
6.	**Altitude**	**Reduce to below** [redacted]
7.	Land	ASAP

After relight and avionic system recovery:

8.	MASS	SAFE then LIVE, to reset FCS MASS and REV ENV
9.	CSG	REV then NORM, to restore aircraft PP on PA format
▶ 10.	XPDR MDE	XPDR reset, code re-entry may be required ◀

ATSM FAILURE

L ATSM or R ATSM

1.	Throttle affected engine	IDLE
2.	Altitude	Below [redacted]
3.	Land	ASAP

ENGINE FLAMEOUT

L FLAME or R FLAME

ECS possible

CAUTION
Do not attempt any relight if engine mechanical failure is suspected

If mechanical failure suspected:

1. Throttle affected engine .. SHUT
2. LP COCK affected side... SHUT
3. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)

If windmill relight to be attempted refer to Windmill Relight (below)

WINDMILL RELIGHT

NOTE
Best windmill relight envelope is [redacted] M, altitude below [redacted]

1. LP COCK affected side... OPEN, guard down
2. Throttle good engine..... Dry range
3. Affected engine ..... Check NH above 5% (optimum > 12 %)
4. Throttle affected engine .. SHUT, then IDLE or above

If TBT exceeds 750°C prior to reaching idle / decision for single engine landing is made:

5. Throttle affected engine .. SHUT
6. LP COCK affected side... SHUT
7. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)

If relight not successful:

5. Carry out further attempts at lower altitude / higher airspeed or consider an Assisted Relight, refer to (➔)

ASSISTED RELIGHT

WARNING

Do not attempt assisted relight if the live engine CONT P or POT or GEN warnings are present. Hydraulics could be lost depending on the windmilling speed of the relighting engine

NOTE

- Expect transient gearbox, electrical and hydraulic warnings on the affected side
- ECS recovery cannot be guaranteed after ECS automatic shutdown during crossbleed or engine relight operations exceeding 60 seconds

1.	LP COCK affected side	OPEN, guard down
2.	Throttle good engine	70% NL min
3.	Throttle affected engine	SHUT, then dry range
4.	AIR DRIVE	EMGY and release
5.	FCS RSET	Press, if required

If TBT exceeds 750°C prior to reaching idle:

6.	Throttle affected engine	SHUT
7.	LP COCK affected side	SHUT
8.	Land	ASAP, refer to: ● Single Engine Operation (E-1)

If L ATSM *or* R ATSM *is displayed after unsuccessful relight:*

6.	Throttle affected engine	SHUT
7.	LP COCK affected side	SHUT
8.	Land	ASAP, refer to: ● Single Engine Operation (E-1) ● Gearbox Failure (E-47) ◄

If L ATSM *or* R ATSM *is displayed after relight:*

6.	Throttle affected engine	IDLE
7.	Altitude	Below [redacted]
8.	Land	ASAP

ENGINE OIL PRESSURE LOW

L OIL P or **R OIL P**

1. **Recover**
2. **Throttle affected engine.** IDLE

If warning persists for more than 10 seconds:

3. **Throttle affected engine.** **SHUT**
4. **LP COCK affected side.** **SHUT**
5. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)

If warning goes out:

3. Land ..... As soon as practicable

ENGINE OIL OVERTEMPERATURE

L OIL T or **R OIL T**

CAUTION

If **L FUEL T** / **R FUEL T** warning also present and transferable fuel remains, Fuel Overtemperature (E-30) has priority

1. Recover
2. Throttle affected engine.... IDLE
3. Time ..... Note
4. Altitude ..... Below [redacted]

If warning goes out:

5. Land ..... As soon as practicable

If warning persists for more than 5 minutes:

5. Throttle affected engine .. SHUT
6. LP COCK affected side ... SHUT
7. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)

continued >>>

Engine Oil Overtemperature – cont'd

NOTE

Engine relight is permitted if required, provided that the L OIL T or R OIL T has gone out

ENGINE VIBRATION / MECHANICAL FAILURE

L VIBR **or** **R VIBR**

Engine

1. Throttle affected engine .. IDLE

If warning remains and / or mechanical failure is suspected:

2. Throttle affected engine .. SHUT
3. LP COCK affected side ... SHUT
4. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)

If warning goes out:

2. Throttle affected engine .. Maintain IDLE
3. Land ..... As soon as practicable

ENGINE VIBRATION / ICING

L VIBR **and / or** **R VIBR**

with **ICE**

1. Throttle affected engine.. Advance by at least 10% NL

If vibration warning does not go out within 10 seconds:

2. Refer to Engine Vibration / Mechanical Failure (above)

If vibration warning goes out within 10 seconds:

2. Continue normal operation

ENGINE SURGE

1. Recover

If both engines in surge:

2. Throttles ..... IDLE, if practicable

If both engines affected by locked in surge:

3. Throttle with higher TBT/ lower NH ..... SHUT then IDLE

After successful relight:

4. Other throttle ..... Repeat, if necessary

If single engine in surge:

2. Throttle affected engine. IDLE

If surge is locked in:

3. Altitude / airspeed ..... Descend and/or increase

If surge remains and/or TBT increasing:

4. Throttle affected engine .. SHUT
5. LP COCK affected side ... SHUT
6. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)

REHEAT FAILURE

L RHEAT **or** **R RHEAT**

1. Throttle affected engine .. Dry range

> **NOTE**
> Reheat reselection is permitted

2. Assess engine thrust response and AJ /NH behaviour

If engine response and or AJ / NH behaviour is abnormal:

3. Refer to ..... Abnormal Engine Response (➔)

ABNORMAL ENGINE RESPONSE

No system (primary failure) warning will be indicated. Some or all of the following characteristics will be seen:

- ENG P caption if the failure occurs while on the ground
- Inconsistent AJ / NH
- Dry modulation limited or lost
- Slow engine acceleration / deceleration
- Reheat inhibited or cancelled
- Locked-in surge/rotating stall
- DECU / DECMU lane change

NOTE

In dry range, smooth and progressive movements are permitted although the engine response can be degraded or lost

1. Throttle affected engine ..	IDLE, if practicable
2. Land	As soon as practicable

Before landing:

3. Affected engine	Assess engine thrust response

If IDLE thrust too high to allow a safe landing:

4. Affected engine	Consider shutdown prior to landing

If engine has been shutdown:

5. Refer to	Single Engine Operation (E-1)

DECU / DECMU FAILURE

L DECU or R DECU with AIR DATA

NOTE

- Other engine warnings may not be available on affected side
- When operating in the transonic region (between 0.85 and 1.25 M) the AIR DATA and REV ENV warnings are generated
- Outside the transonic region:
  - AIR DATA and REV ENV go out
  - AIR DATA is displayed

If engine is automatically stabilized near flight idle:

1. Land ..... As soon as practicable

If NL falls below 30%:

1. Throttle affected engine .. SHUT
2. LP COCK affected side... SHUT

NOTE

The shutdown engine cannot be relit

3. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)

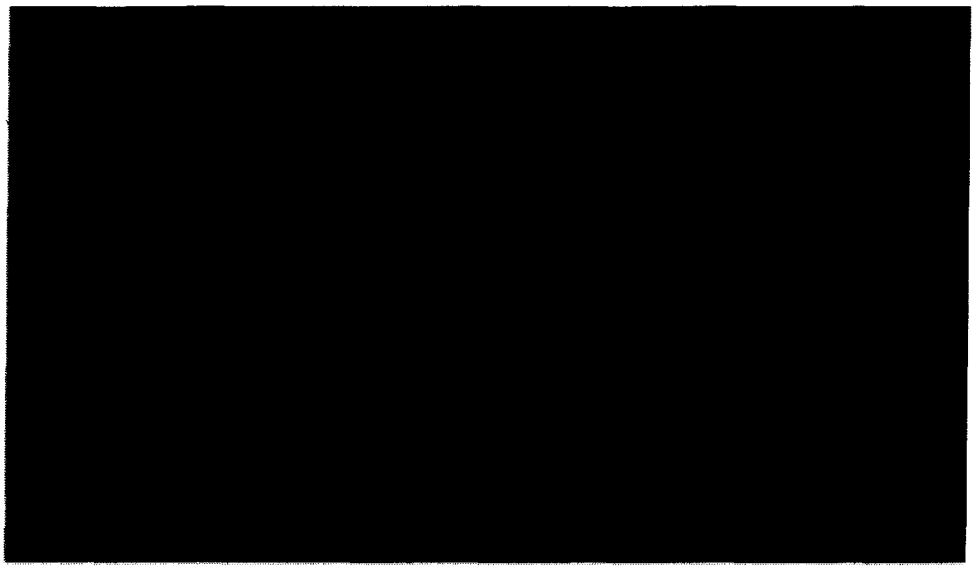
ICING

ICE or trace icing observed on windscreen or foreplanes

1. Icing conditions ..... Exit

If icing conditions continue:

2. Speed ..... Accelerate to ice free speed if practicable, and maintain for 2 minutes



Mach Number

Icing

FUEL SUPPLY LOW PRESSURE

L FUEL P or **R FUEL P**

If fuel leak suspected refer to Fuel Leak (➔)

1. Recover ..... Positive g
2. Throttles ..... Dry range
3. Altitude ..... Below [redacted] if practicable
4. FUEL format ..... Check BOOST PUMP status

If **L FUEL P** *and / or* **R FUEL P** *remains:*

WARNING

Do not select XFEED to OPEN if:

- Fuel leak is suspected
- **L FUEL T** or **R FUEL T** warnings are present
- TANK INTC valve cannot be opened

5. FUEL format ..... TANK INTC select
6. XFEED ..... OPEN
7. Land ..... ASAP

LOW FUEL

FUEL LOW

Maintain the following conditions until group(s) replenished or cause is established:

CAUTION

If **FUEL LOW** warning is triggered during ALSR manoeuvre, the following procedure must be completed ASAP following recovery from the ALSR manoeuvre

1. Recover ..... Positive g
2. Throttles ..... Minimum practicable
3. FUEL format ..... Confirm TANK INTC closed
4. XFEED ..... NORMAL

continued >>>

Low Fuel – cont'd

If fuel leak suspected:
5. Refer to Fuel Leak (below)

If fuel is hung-up:
5. Refer to Fuel Transfer Failure (E-28)

If fuel imbalance is apparent:
5. Refer to Fuel Balancing (E-32)

FUEL LEAK

1.	**Throttles**	**Dry range**
2.	Envelope	Within probe cycle limit: ● [redacted] ●
◄ 3.	FUEL PROBE	OUT, to stop fuel transfer and allow diagnosis of leaking group ►
4.	FUEL format	Confirm TANK INTC closed
5.	XFEED	NORMAL

Fuel

NOTE

Only in the case of a main group fuel leak is further action possible

WARNING

With a CG 1 warning, the FUEL format will prompt the pilot to transfer in the opposite direction to that required

continued >>>

Fuel Leak – cont'd

WARNING

Transient CG 2 warnings are also possible, during which:

- The required manual transfer option will be temporarily lost (will require reselection)
- Manual boost pump fuel balancing is prohibited
- Use of FUEL PROBE switch, to stop fuel transfer to leaking group, must only be considered where the CG 2 warning does not clear

6.	FUEL PROBE.....	Re-select IN before continuing

If location of leak has been determined from main group:

7.	FUEL Format.....	Transfer away from leak if XFER FWD / REAR fuel softkeys available
8.	Land	ASAP

If engine flameout occurs:

9.	Throttle affected engine ..	SHUT
10.	LP COCK affected side...	SHUT
11.	BOOST PUMP affected side	OFF

WARNING

Do not set AIR DRIVE to OFF if PA format / DWP:

- LXBLEED with R CONT P or R GEN or R POT
- RXBLEED with L CONT P or L GEN or L POT

12.	AIR DRIVE	OFF, until 2 minutes before touchdown
13.	Land	ASAP, refer to: ● Single Engine Operation (E-1) ● Gearbox Failure (E-47)

Two minutes before touchdown:

14.	AIR DRIVE	AUTO
15.	FCS RSET	Press, if required

When aircraft stopped:

16.	AIR DRIVE	OFF

FUEL TRANSFER FAILURE

XFER

1. Recover
2. FUEL format..... Check contents / balance

If fuel seen venting from fin, or fuel contents depleting rapidly:

3. Envelope ..... Within probe cycle limit:
   - [redacted]

4. FUEL PROBE..... Select OUT:
   - Allow affected main group to deplete to [redacted] then reselect IN
   - Expect a **FUEL VLV** warning which can be ignored

If warning does not reset when main group full:

5. FUEL PROBE..... Reselect OUT:
   - Assume un-resettable main group overfill
   - Refer to Recovery with Fuel Probe Out (E-34)

If warning resets when main group full:

5. FUEL format..... Monitor
6. Land ..... As soon as practicable
   - Expect further transient **XFER** warnings

If fuel hung-up or automatic sequence not advancing:

3. FUEL format..... XFER, select appropriate stage

If fuel flow to main groups is not restored:

4. Land ..... ASAP

continued >>>

Fuel Transfer Failure – cont'd

NOTE

If normal fuel flow to main groups is restored and XFER warning extinguishes continue flight

If warning remains illuminated and fuel flow to main groups is maintained:

4. Land ..... As soon as practicable, refer to Fuel Balancing (E-32)

FUEL VENT FAILURE

VENT

CAUTION

If XFER warning present, Fuel Transfer Failure has priority (←)

1. Speed .....
2. g .....
3. Throttles .....
4. Rate of descent .....
5. Rate of climb .....

[redacted]

If external transfer in progress and external fuel hung-up:

CAUTION

[redacted]

6. FUEL format ..... XFER select appropriate stage

If VENT *warning remains:*

7. Land ..... As soon as practicable

FUEL OVERTEMPERATURE

L FUEL T or R FUEL T

CAUTION

- Prolonged operation in the presence of a fuel overtemperature warning will eventually lead to:
  - L GB OIL or R GB OIL
  - *PSC10.x onwards*
    - L GB OIL or R GB OIL
    - L HYD T or R HYD T
    - L OIL T or R OIL T
    - L GEN T or R GEN T
- If warnings do occur, fuel over-temperature has priority

1. L and R BOOST PUMP... On
2. Throttle affected engine .. Increase if transferable fuel available (if practicable)
3. Altitude ..... Reduce, if possible
4. FUEL format ..... Monitor fuel temp

If L GB OIL *or* R GB OIL *triggered:*

5. Land ..... ASAP

If L FUEL T *or* R FUEL T *triggered, or if:*
L OIL T *or* R OIL T *triggered for > 5 min:*

5. Throttle affected engine .. SHUT
6. LP COCK affected side ... SHUT
7. XFEED ..... NORMAL
8. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)

If fuel available to good engine becomes critical:

9. FUEL format ..... TANK INTC select

continued >>>

Fuel Overtemperature – cont'd

If any of the following oil warnings occur:

L GB OIL	*or*	R GB OIL
PSC10.x onwards		
L GB OIL	*or*	R GB OIL
L HYD T	*or*	R HYD T
L GEN T	*or*	R GEN T

WARNING

Do not set AIR DRIVE to OFF if PA format / DWP:

- LXBLEED with R CONT P or R GEN or R POT
- RXBLEED with L CONT P or L GEN or L POT

10. AIR DRIVE ..... OFF, refer to:
    - Gearbox Failure (➔) E-35a

If oil warnings (listed above) go out, 2 minutes before touchdown:

11. AIR DRIVE ..... AUTO, consequential oil warnings can be ignored until aircraft stopped
12. FCS RSET ..... Press, if required

NOTE

If all warnings including the oil warnings (above) go out, the engine can be relit for the approach and landing

When aircraft stopped:

13. AIR DRIVE ..... OFF

FUEL BALANCING

MAIN GROUPS IMBALANCED

WARNING
If unexplained imbalance, then suspect fuel leak, refer to Fuel Leak (E-26)

1. Recover
2. Throttles ..... Dry range

If only main group fuel remaining:
3. FUEL format..... TANK INTC select

Otherwise:
3. FUEL format..... Selective XFER: FWD or REAR (until balance correct)

If soft keys unavailable / ineffective:

CAUTION
Do not select XFEED to OPEN in case of a FUEL T warning

3. XFEED ..... OPEN

If FWD heavy:
4. R BOOST PUMP..... OFF

If REAR heavy:
4. L BOOST PUMP ..... OFF

When balance correct:
5. L and R BOOST PUMP... On
6. XFEED ..... NORMAL

TRANSFER / EXTERNAL TANKS IMBALANCE

NOTE
Lateral / longitudinal transfer tank imbalances can only be corrected by allowing the affected stage to transfer

1. Refer to Fuel Transfer Failure (E-28)

FUEL PROBE UNLOCKED

IFR

NOTE

If **IFR** warning occults, continue as required

1. Contact..... Disconnect, do not attempt AAR
2. FUEL PROBE..... Attempt recycle

If **IFR** *warning still present:*

3. Refer to Recovery with Fuel Probe Out (➔)

FUEL PROBE PROBLEMS

Fuel probe switch selection does not result in correct or complete movement of the probe.

NOTE

If **IFR** warning illuminates, refer to Fuel Probe Unlocked (above)

1. FUEL PROBE..... Recycle (25 sec between switch selections)

If probe behaviour still abnormal:

2. FUEL PROBE..... Match probe position, refer to:
   - Recovery with Fuel Probe Out (➔)

If successful:

2. Continue as required

RECOVERY WITH FUEL PROBE OUT

1. Flight envelope..... [redacted]

   Altitude
   Speed (Probe unlocked)
   Speed (Probe locked)

2. FUEL PROBE switch ..... Confirm OUT

WARNING

[redacted]

CAUTION

- The ALSR function is disabled whenever the FUEL PROBE switch is set to OUT
- Attempts to transfer external fuel will result in poor transfer rates and CG may be adversely affected, unless external tanks are equipped with transfer pumps

If fuel transfer required:

3. FUEL format..... Reinstate fuel transfer via:
   - REFU STOP
   - XFER (appropriate stage)

If fuel has previously vented from fin (main group overfill):

4. Fuel format..... Control transfer as follows:
   - XFER AUTO
   - Use REFU STRT to stop transfer to prevent overfill
   - When affected group depleted by 200 kg reinstate transfer (Step 3)
   - Repeat cycle as required
   - PROBE IN selection will be required to transfer fuel from unpumped external tanks

continued >>>

Recovery with Fuel Probe Out – cont'd

5. Land ..... As soon as practicable

NOTE

The following captions will appear but can be ignored:

- FCS REV and REV ENV landing gear handle UP below [redacted] KDAS
- AIRDATA and REV ENV landing gear handle DOWN

FUEL TRANSFER VALVE FAILURE

FUEL VLV

CAUTION

If XFER warning present, Fuel Transfer Failure has priority (E-28)

1. Contact ..... Disconnect
2. FUEL format ..... REFU STOP press, then wait 15 seconds minimum

If warning and amber outlines (on FUEL format) reset:

3. FUEL format ..... REFU STRT press
4. Continue refuelling

If warning(s) / amber outlines persist:

3. Do not attempt AAR

GEARBOX FAILURE

L GBOX	or	R GBOX
L CONT P	or	R CONT P
L UTIL P	or	R UTIL P
L COWL	or	R COWL
L ATSM	possible	R ATSM

NWS left system

REV ENV

L POT	or	R POT
L GEN	possible	R GEN

ELEC 1 possible

A BRAKE right system

ECS possible

1. **Recover**
2. Throttle affected engine .... IDLE
3. AP..... Disengage
4. Airbrake..... In
5. Flight Envelope ..... REV ENV (E-116)

If POT is flailing and/or damage is suspected:

6. AIR DRIVE ..... OFF
7. Throttle affected engine .. SHUT
8. LP COCK affected side... SHUT
9. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)
   - Services Lost (➔)

In all cases:

6. INTAKE..... Remain below [redacted] KDAS, OPEN (42 sec) if engine operating

NOTE

At higher masses / approach speeds consider Jettison of External Stores (E-113)

continued >>>

Gearbox Failure – cont'd

7. Landing gear ..... DOWN as soon as practicable
8. Land ..... ASAP, refer to
   - Services Lost (Below)

SG 4: - [redacted] KDAS min

If **L CONT P** *and* **L UTIL P** *are displayed:*

9. EMGY GEAR ..... DOWN (gear handle down)
10. HOOK..... Down (if cable available)
11. HYD format ..... Monitor R UTIL parameters, and if necessary, refer to:
    - Double Utility Failure (E-53)
12. Land ..... ASAP, refer to:
    - Services Lost (Below)
    - Nose Wheel Steering (➔)

SG 4: - [redacted] KDAS min

If fuel probe OUT:

13. Land ..... ASAP refer to:
    - Recovery with Fuel Probe OUT (E-34)

SERVICES LOST	
LEFT UTILS	**RIGHT UTILS**
- Left cowl - NWS - Landing gear normal extension - Brakes/A-skid normal - Fuel probe extension - Park brake * - Canopy * - Ladder *	- Right cowl - Airbrake - Landing gear emergency extension - Brakes/A-skid emergency - Gun

* Limited operation is provided by the accumulators

NOSE WHEEL STEERING FAILURE

NWS

CAUTION

Suspected LGC / WOW (E-97) has priority if:

- FCS 1 present (gear up)

and / or

- FCS 2 present (gear down)

If approach-end cable available:

1. Land ..... Approach-end cable (→)

NOTE

If cable missed, bolt option available

If approach-end cable not available:

1. Jettison asymmetric O/B, asymmetric C/W bombs

NOTE

If lateral directional problems occur during x-wind landing, jettison brake chute

After main wheel touchdown:

2. Brake chute..... Deploy

After nose wheel touchdown:

3. Stick ..... Neutral
4. Directional control ..... Use rudder and differential braking

If approach end cable not available and landing in x-wind greater than 20 kt, or if x-wind greater or equal to 10 kt and lateral CG warning present:

1. Jettison asymmetric O/B, asymmetric C/W bombs

After main wheel touchdown:

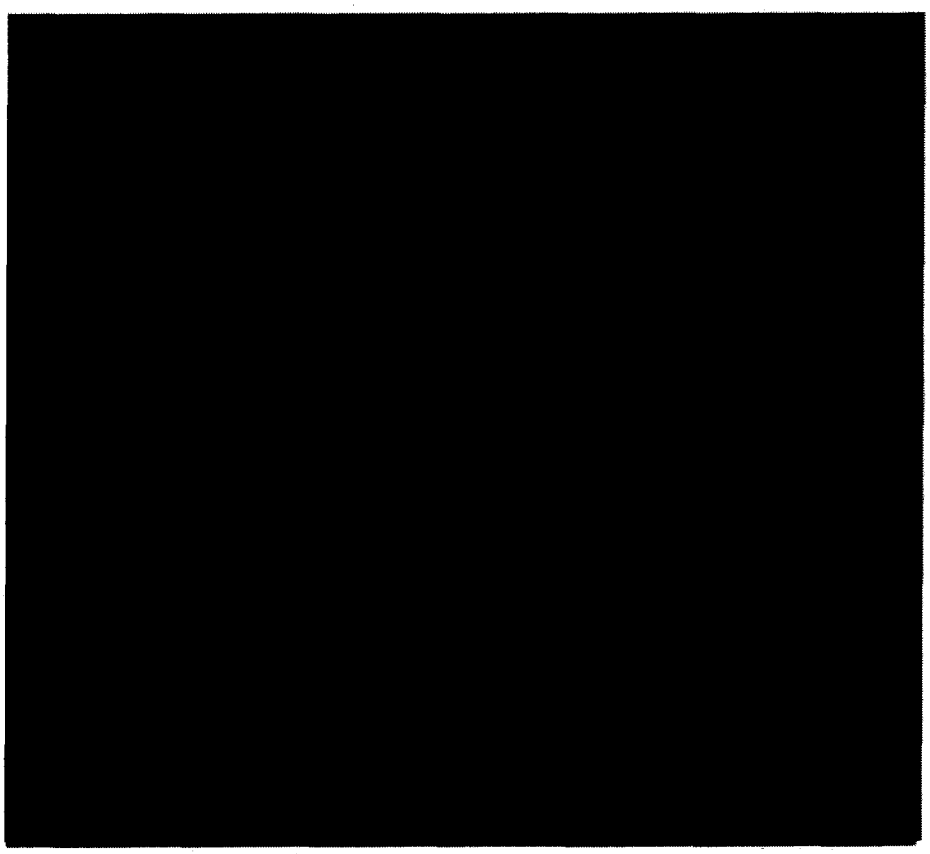
2. De-rotate..... As soon as practicable
3. Brake chute..... Deploy
4. Stick ..... Full forward and roll into wind until brakes applied
5. Directional control ..... Use rudder and differential braking

APPROACH-END CABLE ENGAGEMENT

CAUTION

- Cable engagement with nose wheel off the ground may result in aircraft damage
- Do not use brakes to control roll back

1.	Aircraft mass	Reduce to min practicable See table (below)
2.	Hook	Down, switch boxed
3.	Harness	Locked
4.	Glide path	2.5° to 3°
5.	Approach	14° AoA
6.	Touchdown	Minimum 500 ft before cable (if practicable)
7.	Throttles	IDLE
8.	Nose wheel	Lower in front of cable
9.	Brakes	Do not apply



For full cable listings refer to (N-40 / N-41)

FUEL COMPUTER FAILURE

L FUEL C or R FUEL C

FCS MASS

REV ENV

NOTE

PSC 3.3x / 3.7x / 10.x onwards:
If L SPS C | R SPS C | UCSCPTR are lit, treat as Double Fuel Computer Failure (➔)

1. **Recover**
2. Throttles ..... Dry range

CAUTION

- Fuel transfer rates and content displays are degraded
- L FUEL C results in U/FUS transfer failure. Hung U/FUS fuel is unusable and will not be displayed. U/WG tank contents may be grossly in error
- R FUEL C results in U/WG transfer failure. Hung U/WG fuel is unusable and will not be displayed. U/FUS tank contents may be grossly in error

3. FUEL format..... Contents / balance / stage

If external fuel hung up and affected stage not bypassed:
4. FUEL format..... Select next available stage

In all cases:
5. Land ..... As soon as practicable, refer to:
   - CG1 / CG2 / Lateral CG / Fuel Mass / Stores Data (E-60)

DOUBLE FUEL COMPUTER FAILURE

L FUEL C and R FUEL C

L SPS C and R SPS C

UCS CPTR

FCS MASS and REV ENV

Maintain bold face actions until system recovers or cause is established:

1. **Recover**
2. **Throttles ..... Dry range**
3. **AOB ..... Select**
4. Flight Envelope ..... REV ENV (E-116)

If amber captions remain and GUH attitude / heading present:

5. IMC ..... Exit
6. CSG ..... Assume undetected Single CSG failure:
   - Wait 60 seconds, then
   - Cycle REV / NORM
   - Re-select REV if fault re-occurs

If auto reset initiated (amber captions reset):

5. Initial conditions ..... Maintain, until the FCS MASS and REV ENV have reset (approx 30 sec)

If auto reset successful:

6. ECS ..... OFF / RSET then ECS (if necessary)
7. FUEL format ..... Select:
   - Confirm no failures
   - XFER, select appropriate stage (if necessary)
   - Confirm flow, then reselect XFER AUTO
8. HUP ..... Fuel GUH displays consistent with FUEL format

continued >>>

Double Fuel Computer Failure - cont'd

WARNING

Confirm sufficient AOB contents remain prior to AOB de-selection if resuming operation above [redacted]

9. AOB..... Deselect

If auto reset fails or not supported:

6. Altitude ..... Below [redacted]
7. ECS..... Within limits, RAM AIR (E-84)
8. IMC..... Exit ASAP

▶ **WARNING**

With the exception of warnings provided by DWP REV mode, warnings associated with the following systems / services are inhibited:

- Hydraulics
- Electrical
- ECS
- OXY / MSOC
- Fuel
- Brakes
- ICE warning
- SPS (other than L / R SPS C)
- Fire warning
  (F buttons remain available)
- Landing Gear
  (speed, limit, not lowered)

CAUTION

- Worst case failure can reduce usable fuel to main groups only, therefore assume only main groups available
- It will not be possible to monitor AOB contents on the PA format, however the OXY warning remains supported in DWP REV
- AAR is prohibited
- Crossbleed will be maintained if already in progress, but is otherwise inhibited ◀

If fuel computer reset switches available:

9. Consider Fuel Computer Reset Switch Procedure (E-40)

continued >>>

Double Fuel Computer Failure - cont'd

Otherwise recover as follows:

9.	DWP.....	Select REV periodically, to check for hidden warnings
10.	Recovery.....	Land ASAP, mandatory [redacted] altitude limit, refer to: ● CG1/ CG2 / Lateral CG / Loss of Fuel Mass or Stores Data (E-60)

NOTE

Expect nuisance GPWS warnings

11.	Approach / Landing.....	Plan for / expect: ● LGS baro-set readout frozen (switch, HUD and HD HUD indications available) ● Manual selection of LDG POF (for AoA display) ● Lift dump failure to cancel ● Loss of HUD / HD HUD gear indications ● Loss of NWS ±40° mode

If AOB contents depleted:

◄ 12.	Mask hose.....	Disconnect ►

FUEL COMPUTER RESET SWITCH PROCEDURE

WARNING

Complete initial actions from Double Fuel Computer Failure (E-37) before performing this procedure

1. L and R FUEL C (simultaneously) ..... RSET, for 3 seconds, then release

NOTE

- Positive confirmation of a successful reset attempt may take up to 30 seconds and results in complete recovery of both fuel computers and all related systems
- In the event of a single fuel computer reset, refer to Fuel Computer Failure (E-36)
- In the event that neither fuel computer resets, further reset attempts are permitted

If reset(s) not successful:

2. Land ..... ASAP, refer to recovery actions in Double Fuel Computer Failure (←)

If reset(s) successful:

2. ECS ..... OFF / RSET then ECS (if necessary)
3. FUEL format ..... Select:
   - Confirm no failures
   - XFER, select appropriate stage (if necessary)
   - Confirm flow, then reselect XFER AUTO
4. HUP ..... Fuel GUH displays consistent with FUEL format

WARNING

Confirm sufficient AOB contents remain prior to AOB de-selection if resuming operation above [redacted]

5. AOB ..... Deselect

DOUBLE AC GENERATOR FAILURE

AC **DWP REV mode**

CPT DISP

REV ENV

Cockpit displays blank.

NOTE

If **ESS DC** warning also present, complete this procedure before referral to Essential DC Failure (E-45)

1. L and R GEN (in turn) ..... OFF / RSET, for 3 seconds then ON

If **AC** *warning remains:*

2. Land ..... ASAP, refer to:
   - Services Lost (→)
   - Minimize longitudinal accelerations
   - Do not exceed [redacted] up or down for extended periods
   - **REV ENV** (E-116)

NOTE

GUH on RGS displays true heading

CAUTION

Only main group fuel available

3. XFEED ..... OPEN
4. Altitude ..... Below [redacted] to maximize fuel oil cooling
5. Icing conditions ..... Exit / avoid

continued >>>

Double AC Generator Failure - cont'd

DOUBLE AC FAILURE - SERVICES LOST	
-TRU 1 & 2	-NAV CPTR
-AC fuel boost pumps	-ATK CPTR
-Avionic cooling fans	-CIUs
-Fuel transfer pumps	-CSGs
-Ice detection	-HUD
-Probe heating	-MHDDs
-Windscreen heating	-LINS
-Nav lights (pre mod 600042)	-DWP (normal mode)
-Brake fans	-GPS
- V/UHF 2	-LGS mb setting

If **AC** *warning resets, and avionic system recovers:*

6. MASS ..... SAFE then LIVE, to reset **FCS MASS** and **REV ENV**
7. CSG ..... REV then NORM, to restore aircraft PP on PA format
8. XPDR MDE ..... XPDR reset, code re-entry may be required

AC GENERATOR FAILURE

L GEN or **R GEN**

ELEC 1

with or without **ELEC 2**

1. Affected GEN ..... OFF / RSET, for 3 seconds then ON

If **L GEN** *or* **R GEN** *warning remains:*

CAUTION

If cyclic blanking of the displays is observed, setting the affected generator to OFF/RSET may prevent further interruption

2. Land ..... As soon as practicable

If **ELEC 2** *warning remains:*

2. Refer to Electrical Level 2 Failure (→)

ELECTRICAL LEVEL 2 FAILURE

ELEC 2

ELEC 1

Accompanied by other captions according to loss of systems connected to the affected busbar(s)

Multiple LRI failure. Loss of generated supply to at least one busbar.

1. Throttles ..... Dry range
2. Flight Envelope ..... **REV ENV** (E-116)
3. Land ..... ASAP
4. DWP ..... Select REV periodically to check for hidden **ESS DC**

If **ESS DC** *is not revealed:*

5. DWP ..... Re-select NORM
6. Prioritize and action DWP captions

If **ESS DC** *is revealed, generated supply to PP3 is lost.*

PP3 is powered by the battery only:

> **WARNING**
>
> In the event that PP4 is subsequently lost, the aircaft will not be controllable after battery depletion

> **NOTE**
>
> There will be no symptoms until the battery is depleted

5. Time ..... Note
6. DWP ..... Re-select NORM

If time / range not critical:

7. Landing gear ..... DOWN

Within 5 minutes:

> **CAUTION**
>
> After battery depletion, ECS will fail without warning and it will not be possible to monitor AOB contents

8. AOB ..... Select, initiate descent below [redacted]
9. ECS ..... Below [redacted] RAM AIR
10. Icing conditions ..... Exit / avoid

continued >>>

Electrical Level 2 Failure - cont'd

11. L / R MHDD ..... Select:
    - HD HUD format
    - FREQ format
12. V / UHF 2 ..... Select suitable channel

NOTE

After battery depletion:

- The DWP will revert to REV with the ESS DC warning displayed
- Assume all DWP reversionary warnings except ESS DC and CPT DISP are lost
- Expect HUD, GUH instruments and V / UHF 1 failure
- U / FUS transfer will be lost

CAUTION

After battery depletion EMGY GEAR selection is lost

13. Landing gear ..... DOWN, when required
14. POF ..... Select LDG

NOTE

Expect nuisance GPWS warnings, even with gear down

If AOB contents depleted:

15. Mask hose ..... Disconnect
16. Land ..... ASAP, expect loss of :
    - IFF XPDR
    - Engine relight
    - X-BLEED operation
    - EMGY GEAR selection
    - HD HUD gear status indications
    - Pedestal panel illumination (buttons still active)
    - NORM brakes
    - LP COCKs
    - PARK BRK
    - Canopy opening
    - Ladder deployment

ESSENTIAL DC FAILURE

◄ **ESS DC** **DWP REV mode** ►

REV ENV

Multiple LRI failure. Confirmed loss of essential busbar PP4:

NOTE

If **AC** warning is also present, Double AC Generator Failure has priority (E-41)

1. Throttles ..... Dry range
2. Flight Envelope ..... **REV ENV** (E-116)

WARNING

In the event that generated supply to PP3 has also been lost, controlled flight cannot be guaranteed beyond 5 minutes

3. Land ..... ASAP, expect loss of:
   - X-BLEED to R GBOX
   - RAD ALT
   - Normal gear lowering
   - HD gear status indications
   - Landing gear not lowered warning
   - Pedestal panel illumination (buttons still active)
   - REV brakes
   - Brake chute
   - Hook legend
4. Gear handle ..... DOWN
5. EMGY GEAR..... DOWN
6. POF..... Select LDG

NOTE

- U / WG fuel transfer will be lost
- Expect nuisance GPWS warnings, even with gear down

AC GENERATOR OVERTEMPERATURE

L GEN T or R GEN T

1. Land ..... As soon as practicable

NOTE

Unresettable L GEN or R GEN and ELEC 1 warnings are possible

ELECTRICAL LEVEL 1 FAILURE

ELEC 1

◂Loss of LRI, but supply to all busbars is maintained. ▸

1. BATT ..... On
2. Land ..... As soon as practicable

CAUTION

ELEC 1 can be the first indication of an uncontained failure of a DC GEN, which may result in catastrophic casing breach due to an electrical arc

---

BATTERY OVERTEMPERATURE

BATT T

ELEC 1 **on ground only**

1. Land ..... As soon as practicable

ECS FAILURE

ECS

NOTE

If **MSOC** present refer to Controlled Hot Bleed Air Leak (E-87)

If no other warning:

1. DEMIST ..... AUTO / OFF (as desired)
2. Speed ..... Above [redacted] KDAS

NOTE

ECS reselection cannot be guaranteed after automatic shutdown longer than 60 seconds

3. ECS ..... OFF / RSET then ECS

If unsuccessful:

CAUTION

Cabin altitude will gradually increase until it equals aircraft altitude

NOTE

Services lost include:
- Supply to ECS lines (cabin residual pressure only)
- Anti-mist / demist
- RADAR / FLIR cooling

4. Altitude ..... Below [redacted] (if practicable)
5. ECS ..... Within limits, RAM AIR (→) E-46c (warning occults)
6. Land ..... As soon as practicable

RECOVERY WITH FUEL PROBE OUT

▶ 1.	Flight envelope.....	Within probe limits, unless overriding FCS limit:
	Altitude	Below [redacted]
	Speed (Probe unlocked)	[redacted]
	Speed (Probe locked)	
2.	FUEL PROBE switch	Confirm OUT ◀

WARNING

[redacted]

CAUTION

- The ALSR function is disabled whenever the FUEL PROBE switch is set to OUT
- Attempts to transfer external fuel will result in poor transfer rates and CG may be adversely affected, unless external tanks are equipped with transfer pumps

▶*If fuel transfer required:* ◀

3.	FUEL format.....	Reinstate fuel transfer via: - REFU STOP - XFER (appropriate stage)

▶*If fuel has previously vented from fin (main group overfill):* ◀

4.	Fuel format.....	Control transfer as follows: ● XFER AUTO ● Use REFU STRT to stop transfer to prevent overfill ● When affected group depleted by 200 kg reinstate transfer (Step 3) ● Repeat cycle as required ● PROBE IN selection will be required to transfer fuel from unpumped external tanks

continued >>>

Recovery with Fuel Probe Out – cont'd

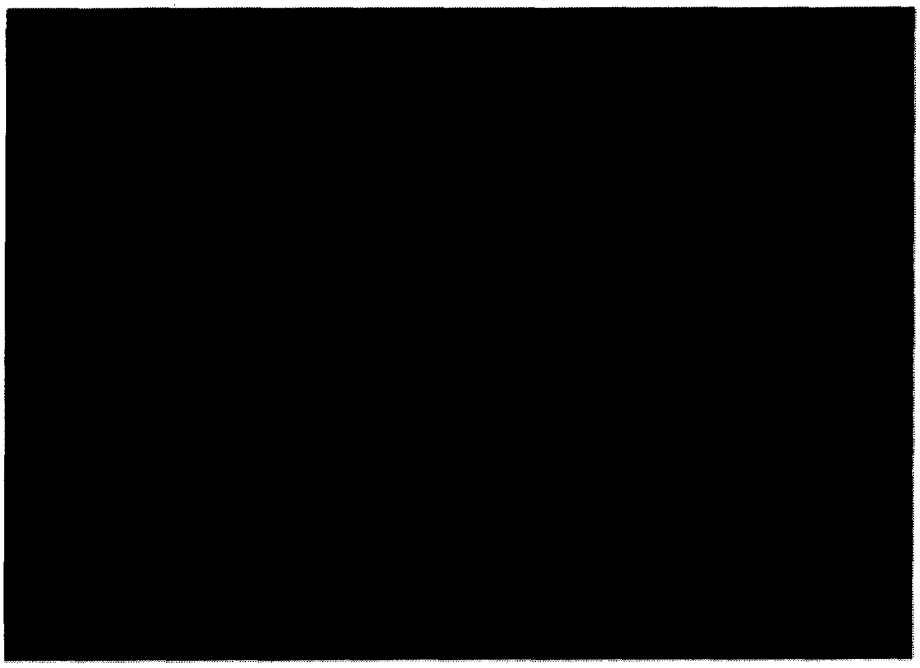
5. Land ..... As soon as practicable

NOTE

The following captions will appear but can be ignored:

- FCS REV and REV ENV landing gear handle UP below [redacted] KDAS
- AIRDATA and REV ENV landing gear handle DOWN

RAM AIR ENVELOPE



NOSE WHEEL STEERING FAILURE

NWS

CAUTION

Suspected LGC / WOW (E-97) has priority if:

- **FCS 1** present (gear up)

and / or

- **FCS 2** present (gear down)

If approach-end cable available:

1. Land ..... Approach-end cable (➔)

NOTE

If cable missed, bolt option available

If approach-end cable not available:

1. Jettison asymmetric O/B, asymmetric C/W bombs

NOTE

If lateral directional problems occur during x-wind landing, jettison brake chute

After main wheel touchdown:

2. Brake chute..... Deploy

After nose wheel touchdown:

3. Stick ..... Neutral
4. Directional control ..... Use rudder and differential braking

If approach end cable not available and landing in x-wind greater than 20 kt, or if x-wind greater or equal to 10 kt and lateral CG warning present:

1. Jettison asymmetric O/B, asymmetric C/W bombs

After main wheel touchdown:

2. De-rotate..... As soon as practicable
3. Brake chute..... Deploy
4. Stick ..... Full forward and roll into wind until brakes applied
5. Directional control ..... Use rudder and differential braking

APPROACH-END CABLE ENGAGEMENT

CAUTION

- Cable engagement with nose wheel off the ground may result in aircraft damage
- Do not use brakes to control roll back

1.	Aircraft mass	Reduce to min practicable See table (below)
2.	Hook.....	Down, switch boxed
3.	Harness.....	Locked
4.	Glide path.....	2.5° to 3°
5.	Approach.....	14° AoA
6.	Touchdown	Minimum 500 ft before cable (if practicable)
7.	Throttles	IDLE
8.	Nose wheel	Lower in front of cable
9.	Brakes	Do not apply

kg x1000	MAXIMUM CABLE ENTRY GROUND SPEED - KT										
	44B 2C	44B 2D GAF	44B 2E	44B 2L	SUPER BAK 9	BAK12 E32 A	BAK 13 Am.1	**RHAG MK-1**	ADEC 500 S8	PAAG	AERAZ 4M6-C
[redacted]											

For full cable listings refer to (N-40 / N-41)

GEARBOX FAILURE

L GBOX or R GBOX
L CONT P or R CONT P
L UTIL P or R UTIL P
L COWL or R COWL
L ATSM possible R ATSM
NWS left system
REV ENV
L POT or R POT
L GEN possible R GEN
ELEC 1 possible
A BRAKE right system
ECS possible

1. **Recover**
2. Throttle affected engine .... IDLE
3. AP ..... Disengage
4. Airbrake ..... In
5. Flight Envelope ..... REV ENV (E-116)

SPS / Gearbox

If POT is flailing and/or damage is suspected:

6. AIR DRIVE ..... OFF
7. Throttle affected engine .. SHUT
8. LP COCK affected side ... SHUT
9. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)
   - Services Lost (➔)

In all cases:

6. INTAKE ..... Remain below [redacted]KDAS, OPEN (42 sec) if engine operating

NOTE

At higher masses / approach speeds consider Jettison of External Stores (E-113)

continued >>>

Gearbox Failure – cont'd

7. Landing gear ..... DOWN as soon as practicable
8. Land ..... ASAP, refer to
   - Services Lost (Below)

   SG 4: - [redacted] KDAS min

If **L CONT P** *and* **L UTIL P** *are displayed:*

9. EMGY GEAR ..... DOWN (gear handle down)
10. HOOK ..... Down (if cable available)
11. HYD format ..... Monitor R UTIL parameters, and if necessary, refer to:
    - Double Utility Failure (E-53)
12. Land ..... ASAP, refer to:
    - Services Lost (Below)
    - Nose Wheel Steering (←) E-46d

    SG 4: - [redacted] KDAS min

If fuel probe OUT:

13. Land ..... ASAP refer to:
    - Recovery with Fuel Probe OUT (←) E-46b

SERVICES LOST	
LEFT UTILS	**RIGHT UTILS**
- Left cowl - NWS - Landing gear normal extension - Brakes/A-skid normal - Fuel probe extension - Park brake * - Canopy * - Ladder *	- Right cowl - Airbrake - Landing gear emergency extension - Brakes/A-skid emergency - Gun

* Limited operation is provided by the accumulators

GEARBOX OIL

L GB OIL or R GB OIL

PSC 10.x onwards

L GB OIL or R GB OIL

NOTE

If FUEL T warning is also displayed, it has priority, refer to Fuel Overtemperature (E-30)

1. Throttle affected engine .. IDLE

PSC 10.x onwards

If L GB OIL *or* R GB OIL *are displayed:*

2. Land ..... As soon as practicable

If L GB OIL *or* R GB OIL *are displayed:*

2. Land ..... ASAP

If the affected gearbox is being driven by crossbleed:

WARNING

Do not set AIR DRIVE to OFF if PA format / DWP:

- LXBLEED with R CONT P or R GEN or R POT
- RXBLEED with L CONT P or L GEN or L POT

3. AIR DRIVE ..... OFF, refer to:
   - Single Engine Operation (E-1)
   - Gearbox Failure (E-47)

If the warnings go out, 2 minutes before touchdown:

4. AIR DRIVE ..... AUTO
5. FCS RSET..... Press, if required

When aircraft stopped:

6. AIR DRIVE ..... OFF

GEARBOX UNDERSPEED

L POT or R POT

L GEN or R GEN

ELEC 1

L GBOX with or without R GBOX

1. Throttle affected engine .. IDLE
2. Land ..... As soon as practicable

POWER OFF-TAKE SHAFT FAILURE

L POT or R POT

1. Throttle affected engine .. IDLE
2. Land ..... As soon as practicable

WARNING

Do not set AIR DRIVE to OFF if PA format / DWP:

- LXBLEED with R CONT P or R GEN or R POT
- RXBLEED with L CONT P or L GEN or L POT

If POT is flailing and/or damage is suspected:

3. AIR DRIVE ..... OFF
4. Throttle affected engine .. SHUT
5. LP COCK affected side ... SHUT
6. Land ..... ASAP, refer to:
   - Single Engine (E-1)
   - Gearbox Failure (E-47)

SPS OVERPRESSURE

SPS P

NOTE

Assisted relight is inhibited

1. Land ..... As soon as practicable

SPS AIR LEAK

SPS LEAK

Crossbleed not in progress:

1. Throttles ..... Minimum practicable
2. Land ..... ASAP

Crossbleed in progress:

1. Throttle ..... Minimum practicable

WARNING

Do not set AIR DRIVE to OFF if PA format / DWP:

- LXBLEED with R CONT P or R GEN or R POT
- RXBLEED with L CONT P or L GEN or L POT

2. AIR DRIVE ..... OFF
3. Land ..... ASAP refer to:
   - Gearbox Failure (E-47)

SPS COMPUTER FAILURE

L SPS C or R SPS C

MSOC (if L SPS C)

1. Land ..... As soon as practicable
2. DWP ..... Select REV periodically to check for hidden warnings

If L SPS C *and* MSOC *present:*

3. AOB contents ..... Monitor
4. Altitude ..... Below [redacted]
5. [redacted]

If OXY *displayed:*

6. Altitude ..... Below [redacted]

If AOB contents depleted:

7. Mask hose ..... Disconnect

continued >>>

SPS Computer Failure – cont'd

SERVICES LOST	
MSOC (L SPS C failure only), AOB is selected automatically	
Assisted relight / engine start (affected side)	
Crossbleed (affected side)	
HYD format symbology and soft key functions (affected side)	
WARNINGS LOST	
Left Computer Failure	Right Computer Failure
L POT	R POT
L GBOX	R GBOX
L GB OIL	R GB OIL
L GB OIL PSC10.x onwards	PSC10.x onwards R GB OIL
L ATSM	R ATSM
L CONT P *	* R CONT P
L UTIL P	R UTIL P
L HYD T	R HYD T
L FIRE *	* R FIRE
APU FIRE *	
SPS LEAK	SPS LEAK
ICE	
SPS P	
NWS **	

* Warnings remain supported in DWP REV mode

** Warning will not be triggered in the case of subsequent loss of hydraulic utilities

DOUBLE HYDRAULIC FAILURE

HYD TOT

REV ENV

1. EJECT

DOUBLE UTILITY FAILURE

L UTIL P and R UTIL P

L COWL and R COWL

NWS

SLATS

A BRAKE

BRK FAIL

REV ENV

1. **Recover**
2. AP..... Disengage
3. Airbrake..... In
4. Flight Envelope ..... REV ENV (E-116)
5. INTAKE..... Remain below [redacted] KDAS, OPEN (42 sec)

Hyd

NOTE

- Retain empty U/WG SFT if gear up
- At higher masses / approach speeds consider Jettison of External Stores (E-113)

If landing gear is UP:

6. Landing gear..... Do not attempt to lower
7. FUEL PROBE..... OUT (ALSR disengaged)

NOTE

FUEL PROBE switch in OUT position disables ALSR

continued >>>

Double Utility Failure - cont'd

8. Land ..... ASAP, refer to:
   - Services Lost (below)
   - Recovery with Fuel Probe OUT (➔) E-57c
   - Landing with Gear Unsafe (➔) E-57a

If landing gear is DOWN:

6. HOOK..... Down (if cable available)
7. Land ..... ASAP, refer to:
   - Services Lost (below)
   - Nose Wheel Steering Failure (➔) E-57f

SG 4: - [redacted] KDAS min

SERVICES LOST	
LEFT UTILS	**RIGHT UTILS**
- Left cowl - NWS - Landing gear normal extension - Brakes/A-skid normal - Fuel probe extension - Park brake * - Canopy * - Ladder *	- Right cowl - Airbrake - Landing gear emergency extension - Brakes/A-skid emergency - Gun
LEFT and RIGHT UTILS Power Drive Unit for LH and RH LE-Slats	
* Limited operation is provided by the accumulators	

AIR IN HYDRAULICS

L HYD A **or** **R HYD A**

A complete power down is required.

After 3 minutes, power up and restart engines:

1. DWP ..... Confirm L HYD A and/or R HYD A not lit
2. HYD format ..... Check L and R reservoir levels are above [redacted]

If less than [redacted] in either system, cancel sortie.

HYDRAULIC FAILURE

L CONT P or R CONT P

L UTIL P or R UTIL P

L COWL or R COWL

NWS left system

A BRAKE right system

REV ENV

1. **Recover**
2. AP ..... Disengage
3. Airbrake ..... In
4. Flight Envelope ..... REV ENV (E-116)
5. INTAKE ..... Remain below [redacted] KDAS, OPEN (42 sec)

NOTE
At higher masses / approach speeds consider Jettison of External Stores (E-113)

6. Landing gear ..... DOWN as soon as practicable
7. Land ..... ASAP refer to:
   - Services Lost (→) E-57a

SG 4:
   - [redacted] KDAS min

If L CONT P *and* L UTIL P *are displayed:*

8. EMGY GEAR ..... DOWN (gear handle down)
9. HOOK ..... Down (if cable available)
10. HYD format ..... Monitor R UTIL parameters, and if necessary, refer to:
    - Double Utility Failure (E-53)
11. Land ..... ASAP refer to:
    - Services Lost (→) E-57a
    - Nose Wheel Steering Failure (→) E-57f
    - If FUEL PROBE OUT refer to (→) E-57c

SG 4:
    - [redacted] KDAS min

UTILITY FAILURE

L UTIL P or R UTIL P

L COWL or R COWL

NWS left system

A BRAKE right system

1. INTAKE	Remain below [redacted] KDAS / [redacted] M, OPEN (42 sec)
2. Landing gear	DOWN as soon as practicable
3. Land	As soon as practicable refer to: ● Services Lost (➔) E-57a

If L UTIL P *is displayed:*

4. EMGY GEAR	DOWN (gear handle down)
5. HOOK	Down (if cable available)
6. HYD format	Monitor R UTIL parameters, and if necessary, refer to: ● Double Utility Failure (E-53)
7. Land	As soon as practicable, refer to: ● Services Lost (➔) E-57a ● Nose Wheel Steering Failure (➔) E-57f ● If FUEL PROBE OUT refer to (➔) E-57c

HYDRAULIC OVERTEMPERATURE

L HYD T or **R HYD T**

1.	Throttle affected engine ..	IDLE
2.	Altitude	Decrease, if possible
3.	HYD format	Check/monitor HYD temp

If temperature not decreasing:

4.	AUTO/MAN (HYD format)	Affected side MAN
5.	OPEN/CLSD (HYD format)	Affected side CLSD, check: **L UTIL P** or **R UTIL P**; **L COWL** or **R COWL**; left system **NWS**; right system **A BRAKE**
6.	FUEL format.....	Select and monitor fuel temperature periodically: ● Consider performing the Fuel Overtemperature procedure (E-30)
7.	INTAKE.....	Remain below [redacted] KDAS / [redacted]
8.	Land	

Prior landing:

9.	AUTO/MAN (HYD format)	Affected side AUTO
10.	DWP.....	**L UTIL P** or **R UTIL P** not lit
11.	FCS RSET.....	Press, if required

If **L UTIL P** *or* **R UTIL P** *warning remains:*

12. Refer to Utility Failure (←)

SERVICES LOST

SERVICES LOST	
LEFT UTILS	**RIGHT UTILS**
- Left cowl - NWS - Landing gear normal extension - Brakes/A-skid normal - Fuel probe extension - Park brake * - Canopy * - Ladder *	- Right cowl - Airbrake - Landing gear emergency extension - Brakes/A-skid emergency - Gun

* Limited operation is provided by the accumulators

LANDING WITH GEAR UNSAFE

Before landing consider:

- Condition of runway, overrun, and side areas
- Crosswind
- Approach-end cable removal
- Availability of foam

NOTE

- With emergency gear selected down, a HUD or HD indication of DDD or 3 greens, can be relied upon
- Illumination of either taxy or landing light verifies that the right MLG is down and locked
- Expect nuisance GPWS warnings

1. Aircraft mass ..... Reduce to min. practicable

If landing gear handle DOWN:

2. Refer to: ..... ● Recommended Actions (➔).

continued >>>

Landing with Gear Unsafe – cont'd

If landing with gear handle UP:

2. Envelope ..... Within probe cycle limit:
   - [redacted]

3. FUEL PROBE switch ..... OUT (ALSR disengaged) refer to:
   - Recovery with Fuel Probe Out (➔)
   - Recommended Actions (Below)

CONFIGURATION	RECOMMENDED ACTIONS
[redacted]	

RECOVERY WITH FUEL PROBE OUT

1. Flight envelope..... Within probe limits, unless overriding FCS limit:

   Altitude
   Speed (Probe unlocked)
   Speed (Probe locked)
   [redacted]

2. FUEL PROBE switch ..... Confirm OUT

WARNING

[redacted]

CAUTION

- The ALSR function is disabled whenever the FUEL PROBE switch is set to OUT
- Attempts to transfer external fuel will result in poor transfer rates and CG may be adversely affected, unless external tanks are equipped with transfer pumps

If fuel transfer required:

3. FUEL format..... Reinstate fuel transfer via:
   - REFU STOP
   - XFER (appropriate stage)

If fuel has previously vented from fin (main group overfill):

4. Fuel format..... Control transfer as follows:
   - XFER AUTO
   - Use REFU STRT to stop transfer to prevent overfill
   - When affected group depleted by 200 kg reinstate transfer (Step 3)
   - Repeat cycle as required
   - PROBE IN selection will be required to transfer fuel from unpumped external tanks

continued >>>

Recovery with Fuel Probe Out – cont'd

5. Land ..... As soon as practicable

NOTE

The following captions will appear but can be ignored:

- FCS REV and REV ENV landing gear handle UP below [redacted] KDAS
- AIRDATA and REV ENV landing gear handle DOWN

APPROACH-END CABLE ENGAGEMENT

CAUTION

- Cable engagement with nose wheel off the ground may result in aircraft damage
- Do not use brakes to control roll back

1. Aircraft mass ..... Reduce to min practicable
   See table (below)
2. Hook ..... Down, switch boxed
3. Harness ..... Locked
4. Glide path ..... 2.5° to 3°
5. Approach ..... 14° AoA
6. Touchdown ..... Minimum 500 ft before cable (if practicable)
7. Throttles ..... IDLE
8. Nose wheel ..... Lower in front of cable
9. Brakes ..... Do not apply

kg x1000	MAXIMUM CABLE ENTRY GROUND SPEED - KT										
	44B 2C	44B 2D GAF	44B 2E	44B 2L	SUPER BAK 9	BAK12 E32 A	BAK 13 Am.1	**RHAG MK-1**	ADEC 500 S8	PAAG	AERAZ 4M6-C
[redacted]											

For full cable listings refer to (N-40 / N-41)

NOSE WHEEL STEERING FAILURE

NWS

CAUTION

Suspected LGC / WOW (E-97) has priority if:

- FCS 1 present (gear up)

and / or

- FCS 2 present (gear down)

If approach-end cable available:

1. Land ..... Approach-end cable (←)

NOTE

If cable missed, bolt option available

If approach-end cable not available:

1. Jettison asymmetric O/B, asymmetric C/W bombs

NOTE

If lateral directional problems occur during x-wind landing, jettison brake chute

After main wheel touchdown:

2. Brake chute..... Deploy

After nose wheel touchdown:

3. Stick ..... Neutral
4. Directional control ..... Use rudder and differential braking

If approach end cable not available and landing in x-wind greater than 20 kt, or if x-wind greater or equal to 10 kt and lateral CG warning present:

1. Jettison asymmetric O/B, asymmetric C/W bombs

After main wheel touchdown:

2. De-rotate..... As soon as practicable
3. Brake chute..... Deploy
4. Stick ..... Full forward and roll into wind until brakes applied
5. Directional control ..... Use rudder and differential braking

FUEL BALANCING

MAIN GROUPS IMBALANCED

WARNING
If unexplained imbalance, then suspect fuel leak, refer to Fuel Leak (E-26)

1. Recover
2. Throttles ..... Dry range

If only main group fuel remaining:
3. FUEL format..... TANK INTC select

Otherwise:
3. FUEL format..... Selective XFER: FWD or REAR (until balance correct)

If soft keys unavailable / ineffective:

CAUTION
Do not select XFEED to OPEN in case of a FUEL T warning

3. XFEED ..... OPEN

If FWD heavy:
4. R BOOST PUMP..... OFF

If REAR heavy:
4. L BOOST PUMP ..... OFF

When balance correct:
5. L and R BOOST PUMP... On
6. XFEED ..... NORMAL

TRANSFER / EXTERNAL TANKS IMBALANCE

NOTE
Lateral / longitudinal transfer tank imbalances can only be corrected by allowing the affected stage to transfer

1. Refer to Fuel Transfer Failure (E-28)

REV ENV ALONE WARNING

REV ENV

WARNING

A significant reduction in pitch authority is possible, assess aircraft handling before landing

CAUTION

- ALSR function may be disarmed or disabled
- If the warning is triggered during AAR, ensure the fuel probe is out. Follow the procedure below and refer to Recovery with Fuel Probe Out (←) E-57c

1. **Recover**
2. AP ..... Disengage
3. Airbrake ..... In
4. Throttles ..... Dry range only
5. Flight Envelope ..... REV ENV (E-116)
6. Sideslip ..... Nominal zero until final approach
7. CG position ..... Determine on FUEL format
8. Fuel ..... Balance, if required, refer to:
   - Fuel Balancing (←)

FCS RED

If fuel balance unsuccessful or REV ENV *still displayed:*

WARNING

[redacted]

9. Land ..... ASAP

continued >>>

REV ENV Alone Warning - cont'd

10. Approach / Landing..... ● Straight in, if possible
● AoA accuracy unreliable
● Approach / Landing Parameters (E-116)

NOTE

For high mass / approach speeds consider:
- Departure-end-cable engagement (E-93)
- Stores jettison (E-113)

After nose wheel touchdown:

NOTE

If FWD CG suspected and aircraft mass above [redacted] only max. half stick forward is permitted until brakes applied

11. Stick..... Full forward to avoid nose-up tendency

NOTE

The following are prohibited:
- Weapon firing
- AAR, unless under emergency fuel conditions
- Taxy with aft or unknown CG

CG 1 / CG 2 / LATERAL CG / LOSS OF FUEL MASS OR STORES DATA

CG 1 or
CG 2 or
FCS MASS and
REV ENV

NOTE
Avoid abrupt control inputs

1. **Recover**
2. AP ..... Disengage
3. Airbrake ..... In
4. Throttles ..... Dry range, only
5. Flight Envelope ..... REV ENV (E-116)
6. FUEL format ..... Determine CG position, if required refer to:
   - Fuel Leak (E-26)
   - Fuel Balancing (←) E-57g
7. STOR format ..... Check displayed correctly, if empty, refer to:
   - SCAC failure (E-106)

If fuel balance unsuccessful or CG position unknown:

NOTE
- When FCS MASS is displayed, selective jettison is prohibited, except for external tanks
- At higher masses / approach speeds consider:
  - Departure-end-cable engagement (E-93)
  - Stores jettison (E-113)

8. Land ..... As soon as practicable
9. Approach / Landing .....
   - Straight in, if possible
   - Approach / Landing Parameters (E-116)

continued >>>

CG1/CG2/Lateral CG/Loss of Fuel Mass or Stores Data
- cont'd

After nose wheel touchdown:

NOTE

With a FWD CG 1 / CG 2 and an aircraft mass above [redacted] only max. half stick forward is permitted until brakes applied

10. Stick..... Full forward until brakes applied

NOTE

The following are prohibited:

- Weapon firing
- AAR, unless under emergency fuel conditions
- Taxy with aft or unknown CG

FCS REVERSIONARY

FCS REV

REV ENV

WARNING

A significant reduction in pitch authority is possible, assess aircraft handling before landing

CAUTION

- ALSR function may be disarmed or disabled
- If the warning is triggered during AAR, ensure the fuel probe is out. Follow the procedure below and refer to Recovery with Fuel Probe Out (←) E-57c

1. **Recover**
2. AP ..... Disengage
3. Airbrake ..... In
4. Throttles ..... Dry range (if practicable)
5. Flight Envelope ..... **REV ENV** (E-116)
6. Sideslip ..... Nominal zero until final approach

WARNING

[redacted]

NOTE

At higher masses/approach speeds consider:

- Departure-end-cable engagement (E-93)
- Jettison of External Stores (E-113)

7. Land ..... As soon as practicable
8. Approach / Landing .....
   - Straight in, if possible
   - AoA accuracy unreliable
   - Approach / Landing Parameters (E-116)

After nose wheel touchdown:

9. Stick ..... Full forward to avoid nose-up tendency

continued >>>

FCS Reversionary - cont'd

NOTE

The following are prohibited:

- Weapon firing
- AAR, unless under emergency fuel conditions

SLATS FAILURE

SLATS

REV ENV

1. **Recover**
2. DWP..... If FCS REV also present refer to:
   - REV ENV Alone Warning (E-58)
3. AP..... Disengage
4. Throttles ..... Dry range (if practicable)
5. Flight Envelope ..... REV ENV (E-116)

CAUTION

[redacted]

6. Land ..... As soon as practicable:

SG 4: ● [redacted] KDAS min

AIR DATA FAILURE

AIR DATA

REV ENV

CAUTION

If the warning is triggered during AAR, ensure the fuel probe is out. Follow the procedure below and refer to Recovery with Fuel Probe Out (←) E-57c

1. **Recover**
2. AP ..... Disengage
3. Airbrake ..... In
4. Throttles ..... Dry range (if practicable)
5. Flight Envelope .....
   - REV ENV (E-116)
   - If AIR DATA + THROT LK, assume additional hidden Air Intake Cowl Failure (E-66), remain below [redacted] (even if warnings reset)
6. Sideslip ..... Nominal zero until final approach

WARNING

[redacted]

NOTE

At higher masses/approach speeds consider:
- Departure-end-cable engagement (E-93)
- Jettison of External Stores (E-113)

7. Land ..... As soon as practicable
   - nominal 1g
   - **SG 4:** [redacted] KDAS min

NOTE

The following are prohibited:
- Weapon firing
- AAR, unless under emergency fuel conditions

FCS 2ND FAILURE

FCS 2

with or without **NWS** **gear down**

REV ENV

NOTE

- **FCS 2** failure with loss of some or all of the following, is indicative of an FCS interface failure:
  - Multiple secondary flying controls
  - Throttle response (with uncommanded rundown to idle)
  - Engine parameters on ENG format
  - HUD or GUH flight reference data
- In the case of an FCS interface failure, FCS and propulsion warnings other than those present may be lost
- Do not perform roller landings

1. **Recover**
2. AP..... Disengage
3. Flight Envelope ..... **REV ENV** (E-116)

If **FCS 2** *and* **NWS** *present during or after gear lowering:*

4. Refer to Suspected LGC / WOW Failure (E-97)

In all cases:

NOTE

At higher masses/approach speeds consider:

- Departure-end-cable engagement (E-93)
- Jettison of External Stores (E-113)

5. Land ..... As soon as practicable

SG 4: ● [redacted]

AIR INTAKE COWL FAILURE

L COWL or R COWL

If FCS RSET *present:*

1. FCS RSET..... Press

If reset unsuccessful or not possible:

2. INTAKE..... Remain below [redacted] (42 sec)

AUTOPILOT FAILURE

A/PILOT

Autopilot engagement inhibited.

AUTOTHROTTLE FAILURE

A THROT

Autothrottle engagement inhibited.

ADT HEATER FAILURE

PROBE 2

1. Icing conditions ..... Exit / avoid
2. Land ..... As soon as practicable

Takeoff with PROBE 2 warning is prohibited.

FCS 1ST FAILURE

FCS 1

and

FCS RSET

If FCS 1 *and* FCS RSET *present:*

1. FCS RSET..... Press

If reset is unsuccessful or FCS RSET *not displayed:*

2. Land ..... As soon as practicable

If any combination of FCS 1 *and / or* FCS RSET *with* NWS *(LDG UP)* NWS *(LDG DOWN) present:*

1. Refer to Suspected LGC / WOW failure (E-97)

AIRBRAKE FAILURE

A BRAKE

If FCS RSET *present:*

1. FCS RSET..... Press

If reset unsuccessful or not possible:

2. Airbrake ..... Select in, check HUD

AIR DATA FIRST FAILURE

AIR DATA

with or without **FCS RSET**

If **FCS RSET** *present:*

1. FCS RSET..... Press
   - If **AIR DATA** + **THROT LK**, assume additional hidden Air Intake Cowl Failure (E-66) remain below [redacted] (even if warnings reset)

If FCS reset unsuccessful or not available:

2. **SG 1 / SG 2:**
   - [redacted]

▸ 2. **SG 4:** ◂
   - [redacted]

WARNING

[redacted]

3. Land ..... As soon as practicable

FCS AMBER

TRIM FAILURE

TRIM

Manual trim function lost. Pitch trim fades to neutral, yaw trim may fade to neutral.

THROTTLE FOLLOW UP / FRICTION FAILURE

THROT LK

WARNING

- Uncommanded throttle movements can occur
- Takeoff from rear cockpit with **THROT LK** is prohibited

(1) *Prior to transferring control to the other cockpit:*

1. Front and rear throttles ...	Attempt to synchronize throttle positions in both cockpits
2. Both cockpits	Keep hands clear of throttles when control is taken

---

BARO-SET FAILURE

BARO-SET

If Baro toggle switch in standard (1013 mb) position:

1. Baro toggle switch..... Move to centre position

If **BARO-SET** *present with the baro toggle switch in the centre position but extinguishes after 23 sec:*

2. Baro toggle switch..... Move up or down:
   - Observe LGS/HUD display

If **BARO-SET** *raised as soon as the baro toggle switch is moved up or down out of centre position, use REV Baro-set procedure below:*

> **NOTE**
> Adjustments are only possible within 20 seconds of yaw trim push. Pushing the yaw trim switch again provides another 20 second cycle

3. Yaw trim switch ..... Push momentarily either left or right
4. Baro toggle switch..... Attempt to adjust value, observe LGS / HUD display

If the LGS / HUD is not responding and **BARO-SET** *remains on:*

5. Yaw trim switch ..... Push momentarily opposite side
6. Baro toggle switch..... Attempt to adjust value:
   - Observe LGS / HUD display

If still no baro-set response and **BARO-SET** *does not extinguish:*

- Baro-set facility is lost for the remainder of the flight
- Previously manually selected value is retained / restored.

MONITOR TRIP

MON TRIP **with pitch / bank disparity**

Assume LINS / FCS angle monitor trip:

1. HUD / GUH ..... Cross-monitor pitch / bank

Selected Source	HUD	HDHUD
SPLT	LINS	Best navigation*
LINS	LINS	LINS
NAV	Best navigation*	Best navigation*

2. HD HUD ..... SRCE option, select as appropriate (see below)

* - best navigation solution from NAV CPTR
- degraded accuracy in vertical velocity

If neither HDHUD option is appropriate:

3. NAV MODE ..... Select an alternative mode or consider recovery using GUH instruments

MON TRIP **with increasing navigation drift**

Assume LINS / GPS velocity monitor trip:

1. NAV MODE ..... Check

If system has degraded to LINS GPS2 (Mode 4):

2. LINS ..... Consider in-flight alignment to restore lost NAV modes (➔)

MON TRIP **with LINS / GPS PP disparity (GND PoF)**

1. AIDS ..... Check PP, consider LINS re-alignment

INERTIAL NAVIGATION FAILURE

LINS

NO MONITOR displayed on HUD.

If no additional navigation failures, system will automatically degrade to FCS GPS (Mode 6) with the following consequences:

- HUD and GUH flight reference data use common source
- Slight inaccuracy in displayed pitch, bank heading

If GPS subsequently lost:

1. Land ..... As soon as practicable

NOTE

- NWS ±40° mode is lost, NWS reverts to medium speed mode (± 25°)
- Lift dump does not cancel
- System will degrade to FCS FIX
- Navigation information drift increases significantly
- System displays true heading (magnetic still available)

LINS IN-FLIGHT ALIGNMENT (IFA)

NOTE

- LINS IFA is only available when in NAV PoF and with valid GPS feed
- LINS based NAV modes are lost if the alignment fails or is interrupted

1. AIDS ..... Select
2. AIR ALGN ..... Select
3. HUD ..... Confirm "ALIGN" and "READY IN" countdown
4. Current GS and altitude .. Maintain
5. NAV WPT 172 to 174 ..... Follow route
6. HUD ..... After 180 sec, confirm "LINS READY"
7. AIR ALGN ..... De-select
8. AIDS / NAV MODE ..... Select required NAV mode

GPS FAILURE

GPS

NO MONITOR displayed on HUD.

If no additonal failures, system will automatically degrade to LINS FIX1 with the following consequences:

- Slight inaccuracy in displayed pitch
- Increased navigation drift

1. HUD / GUH ..... Cross-monitor pitch / bank

If disparity present in HUD / GUH data:

2. NAV MODE ..... Select an alternative mode or consider recovery using GUH instruments

If LINS not available:

3. Land ..... As soon as practicable, refer to Inertial Navigation failure (←)

NAVIGATION COMPUTER FAILURE

▶(PSC 10.x onwards)◀

NAV CPTR

Avionics bus control is assumed by the attack computer, all systems and services will remain functional with the exception of the following:

- Subsequent loss of attack computer will result in the loss of both avionics and attack data bus
- A-A lock symbology may fluctuate for 8 seconds, steering cues will also be erratic.

If **NAV CPTR** *warning self resets:*

- HSI TAC mode will require re-selection, system reverts to NAV with steering to DWP
- Pre existing attack computer data bus problems may cause HUD flight reference data and autopilot symbology to flicker every 3-4 seconds.

NAVIGATION COMPUTER FAILURE

▶(PSC 3.3x)
(PSC 3.7x) ◀

NAV CPTR

If no additonal failures, system will automatically degrade to LINS GPS 2.

1. HUD / GUH ..... Cross-monitor pitch / bank

If disparity present in HUD / GUH data

2. NAV MODE ..... Select an alternative mode or consider recovery using GUH instruments

Avionics bus control is assumed by the attack computer, resulting in the following consequences:

- NO MONITOR displayed on the HUD
- Climb / dive angle has reduced integrity
- The low height warning is lost
- LINS is the only available source for flight path displays
- Emergency airfield data is frozen to its last known state
- The following Nav modes remain available, all other navigation modes are lost:
  - LINS GPS2..... (Mode 4)
  - LINS FIX2..... (Mode 5)
- Manual route is lost, but auto route remains available
- Waypoints can be created using lat/long but cannot be deleted
- System uses last good wind data as constant
- Fuel management cues with the exception of Bingo are lost.

ATTACK COMPUTER FAILURE

[redacted]

ATTACK COMPUTER FAILURE

[redacted]

RADAR FAILURE

RADAR

1. XMIT..... RDR SBY, if possible
2. RADAR (gangbar)..... OFF
3. INT (gangbar)..... OFF

RADAR SHUTDOWN

RADAR SD

1. XMIT..... RDR SBY
2. RADAR (gangbar)..... OFF
3. INT (gangbar)..... OFF

IFF INTERROGATOR OVERTEMPERATURE

INT T

1. Deselect multiple mode selections and/or decrease interrogation volume.

The interrogator shuts down automatically when the overtemperature limit is reached.

The interrogator may be recycled when **INT T** goes out.

[redacted]

DOUBLE CIU FAILURE

CPT DISP **DWP REV mode**

If HUD and MHDD symbology is lost refer to Double CSG Failure (→)

1. CIU ..... Cycle REV / NORM
   - Allow up to 30 seconds for system recovery

If not recovered:

▶ 2. Land ..... As soon as practicable ◀

- DWP switches to reversionary (REV) mode, but all audio warnings remain active
- MHDD soft keys and HUD moding keys inoperative
- MHDD HSI setting, course setting and radar / DMG video theshold control will be lost
- LGS not lit (barometric pressure setting functions are maintained)
- ▶ RGS LOW HT control will be lost ◀
- Dedicated readout panel not lit
- CIU interface switches and controls inoperative.

DOUBLE REAR CIU FAILURE (T)

REAR CIU

CIU interface switches and controls inoperative.

DOUBLE CSG FAILURE

CPT DISP **DWP REV mode**

If HUD and MHDD symbology is present refer to Double CIU Failure (←)

NOTE
Autopilot hold modes only

1. CSG..... Cycle REV / NORM
   - Allow up to 60 seconds for system recovery

If not recovered:

2. Land ..... ASAP

- DWP switches to reversionary (REV) mode
- HUD and MHDD symbology is lost
- MHDD soft keys blank.

SINGLE CSG FAILURE

CSG

If the GUH instruments not present / frozen:

1. Land ..... ASAP

If the GUH instruments present:

2. CSG redundancy lost

LOSS OF GUH INSTRUMENTS

If GUH instruments not present / frozen:

1. Land ..... ASAP

FLARE DISPENSER FAILURE

FLARE

Prior to landing:

1. EXPD..... OFF

As soon as practicable after landing:

2. MASS..... SAFE

CHAFF DISPENSER FAILURE

CHAFF

Prior to landing:

1. EXPD..... OFF

DASS COMPUTER FAILURE

DAS CPTR

◄ ►

[redacted]

ESM / ECM OVERTEMPERATURE

ESCM T

If ESM / ECM not required:

1. Mission ..... Continue

> **NOTE**
> ESM/ECM equipment will automatically shut down after 1 minute if overheat condition persists

If ESM / ECM required:

> **CAUTION**
> The overheat override function is for use in operational conditions only. Use of this function will result in the eventual total failure of the ESM/ECM equipment

1. MDEF DAS..... HEAT OVRD press
   ECM OVRD press

When ESM / ECM no longer required:

2. ECM OVRD..... Press

MIDS OVERTEMPERATURE

MIDS T

If no action is taken, the MIDS and TACAN functions are lost.

If necessary (AA PoF):

1. THML OVRD MK..... Press, within 30 seconds of MIDS T appearance

When no longer required:

2. THML OVRD MK..... Press

VOICE WARNING FAILURE

VOICE

NOTE

- All voice warnings with the exception of HYD TOT and REV ENV are lost
- If CAMU is lost, the **VOICE** warning is the only indication of a total COMMS failure. This can be confirmed by absence of sidetone on both radios

RADIO FAILURE

(PSC 10.x onwards)

RADIO 1 **and / or** **RADIO 2**

The radio 1 / 2 warnings will be triggered on the first occurence of any single event (below), and will not be re-triggered for subsequent failure events:

- Radio transmitter failure
- Radio receiver failure
- Radio communication security failure
- Radio transmission security failure
- Radio time of day alarm
- Radio word of day alarm
- Radio key of day alarm

Intentionally blank

ECS FAILURE

ECS

NOTE

If **MSOC** present refer to Controlled Hot Bleed Air Leak (E-87)

If no other warning:

1.	DEMIST	AUTO / OFF (as desired)
2.	Speed	Above [redacted] KDAS
3.	ECS	Within 60 seconds, OFF / RSET, then ECS

If unsuccessful:

CAUTION

Cabin altitude will gradually increase until it equals aircraft altitude

NOTE

Services lost include:
- Supply to ECS lines (cabin residual pressure only)
- Anti-mist / demist
- RADAR / FLIR cooling

4.	Altitude	Below [redacted] (if practicable)
5.	ECS	Within limits, RAM AIR (→) (warning occults)
6.	Land	As soon as practicable

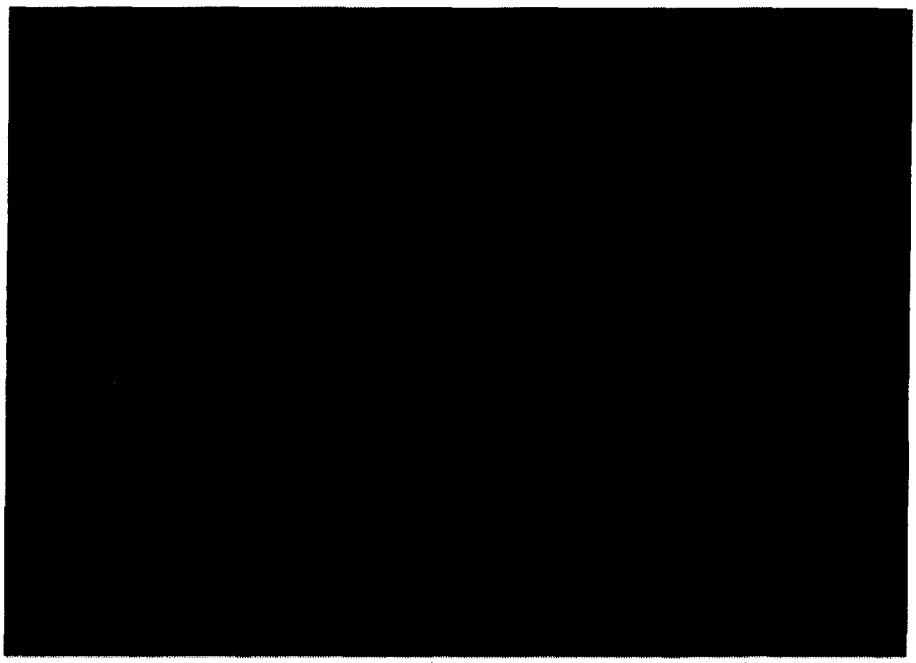
ECS FAN FAILURE

FAN

WARNING
FCS performance cannot be guaranteed beyond 20 minutes

1. Land ..... ASAP

RAM AIR ENVELOPE



ECS
OXY

OXYGEN FAILURE / SUSPECTED HYPOXIA

OXY

with or without MSOC

1.	**AOB**	**Select**
2.	**Altitude**	**Below 10 000 ft**
3.	AOB contents	Monitor

If AOB contents depleted:

4.	Mask hose	Disconnect
5.	Land	As soon as practicable

MSOC FAILURE

MSOC

1.	**AOB contents**	**Monitor**

NOTE

If ECS present refer to Controlled Hot Bleed Air Leak (E-87)

If AOB contents not displayed concurrently with MSOC *:*

2.	**AOB**	**Select,** assume an undetected UCS Front Computer fault (→)

In all other cases:

If MSOC *warning does not extinguish within 1 minute:*

2.	Altitude	Below [redacted]

If OXY *displayed:*

3.	Altitude	Below 10 000 ft

If AOB contents depleted:

4.	Mask hose	Disconnect
5.	Land	As soon as practicable

UCS FRONT COMPUTER FAILURE

UCS CPTR

with or without MSOC

and / or OXY

CAUTION

- The following are lost:
  - Cross bleed
  - MSOC
  - Anti-g
  - Supply to ECS lines (cabin residual pressure only)
  - Antimist / demist
  - RADAR / FLIR cooling
  - ECS control and monitoring
  - AOB contents monitoring and automatic control selection (caption displayed)
  - Cabin altitude read out
  - CABIN LP CABIN HP L ECS LK R ECS LK warnings
- Cabin altitude will gradually increase until it equals aircraft altitude

1. **AOB ..... Select**

NOTE

After AOB manual selection MSOC will be displayed on DWP, if not already present

2. Altitude ..... Below [redacted] if practicable
3. ECS ..... Within limits, RAM AIR (E-84)
4. Altitude ..... 10 000 ft or below

CAUTION

If UCS CPTR subsequently resets, confirm sufficient AOB contents remain before resuming operation above 10 000 ft

continued >>>

UCS Front Computer Failure - cont'd

If AOB contents depleted:

5. Mask hose	Disconnect
6. Land	As soon as practicable

CONTROLLED HOT BLEED AIR LEAK

ECS

MSOC

CAUTION

Cabin altitude will gradually increase until it equals aircraft altitude

NOTE

Services lost include:
- Cross-bleed
- MSOC
- Anti-g
- Supply to ECS lines (cabin residual pressure only)
- Anti-mist / demist
- RADAR / FLIR cooling

1. AOB contents	Monitor
2. Altitude	Below [redacted] if practicable
3. ECS	OFF / RSET, then ECS: ● If the **ECS** warning remains, within limits RAM AIR (E-84)
4. Altitude	Below 10 000 ft

If AOB contents depleted:

5. Mask hose	Disconnect
6. Land	As soon as practicable

UNCONTROLLED HOT BLEED AIR LEAK

L ECS LK or **R ECS LK**

ECS

MSOC

WARNING

If a **CONT P** or **POT** warning is lit on the unaffected side, shutting down the engine will induce double hydraulic failure

CAUTION

If **UTIL P** warning is lit on the unaffected side, shutting down the engine will induce a double utility failure. Consider lowering landing gear before engine shutdown

1. **Throttle affected engine . SHUT**
2. **LP COCK affected side..... SHUT**

CAUTION

Cabin altitude will gradually increase until it equals aircraft altitude

NOTE

Services lost include:
- Cross-bleed
- MSOC
- Anti-g
- Supply to ECS lines (cabin residual pressure only)
- Anti-mist / demist
- RADAR / FLIR cooling

3. AOB contents ..... Monitor
4. Altitude ..... Below [redacted] if practicable
5. ECS ..... Within limits, RAM AIR (E-84)
6. Altitude ..... Below 10 000 ft

continued >>>

Uncontrolled Hot Bleed Air Leak - cont'd

If AOB contents depleted:

7. Mask hose	Disconnect	
8. Land	ASAP, refer to: ● Single Engine Operation (E-1) ● Gearbox Failure (➔)	

CABIN LOW PRESSURE

CABIN LP
MSOC **temporarily**

1. Altitude	Below [redacted] (if practicable)	
2. AOB contents	Monitor, if necessary	

If after 1 minute **MSOC** *presists:*

3. Refer to MSOC failure (E-85)

CABIN HIGH PRESSURE

CABIN HP

1. Recover	
2. Altitude	Below [redacted] (if practicable)
3. ECS	OFF / RSET
4. ECS	Within limits, RAM AIR (E-84)

GEARBOX FAILURE

L GBOX or R GBOX

L CONT P or R CONT P

L UTIL P or R UTIL P

L COWL or R COWL

L ATSM possible R ATSM

NWS left system

REV ENV

L POT or R POT

L GEN possible R GEN

ELEC 1 possible

A BRAKE right system

ECS possible

1. **Recover**
2. Throttle affected engine .... IDLE
3. AP..... Disengage
4. Airbrake..... In
5. Flight Envelope ..... REV ENV (E-116)

If POT is flailing and/or damage is suspected:

6. AIR DRIVE ..... OFF
7. Throttle affected engine .. SHUT
8. LP COCK affected side ... SHUT
9. Land ..... ASAP, refer to:
   - Single Engine Operation (E-1)
   - Services Lost (→)

In all cases:

6. INTAKE..... Remain below [redacted] KDAS, OPEN (42 sec) if engine operating

NOTE

At higher masses / approach speeds consider Jettison of External Stores (E-113)

continued >>>

Gearbox Failure – cont'd

7. Landing gear ..... DOWN as soon as practicable
8. Land ..... ASAP, refer to
   - Services Lost (Below)

SG 4:
   - [redacted] KDAS min

If **L CONT P** *and* **L UTIL P** *are displayed:*

9. EMGY GEAR ..... DOWN (gear handle down)
10. HOOK..... Down (if cable available)
11. HYD format ..... Monitor R UTIL parameters, and if necessary, refer to:
    - Double Utility Failure (E-53)
12. Land ..... ASAP, refer to:
    - Services Lost (Below)
    - Nose Wheel Steering (➔)

SG 4:
    - [redacted] KDAS min

If fuel probe OUT:

13. Land ..... ASAP refer to:
    - Recovery with Fuel Probe OUT (➔) E-89e

SERVICES LOST	
LEFT UTILS	**RIGHT UTILS**
- Left cowl - NWS - Landing gear normal extension - Brakes/A-skid normal - Fuel probe extension - Park brake * - Canopy * - Ladder *	- Right cowl - Airbrake - Landing gear emergency extension - Brakes/A-skid emergency - Gun

* Limited operation is provided by the accumulators

NOSE WHEEL STEERING FAILURE

NWS

CAUTION

Suspected LGC / WOW (E-97) has priority if:

- FCS 1 present (gear up)

and / or

- FCS 2 present (gear down)

If approach-end cable available:

1. Land ..... Approach-end cable (➔)

NOTE

If cable missed, bolt option available

If approach-end cable not available:

1. Jettison asymmetric O/B, asymmetric C/W bombs

NOTE

If lateral directional problems occur during x-wind landing, jettison brake chute

After main wheel touchdown:

2. Brake chute..... Deploy

After nose wheel touchdown:

3. Stick ..... Neutral
4. Directional control ..... Use rudder and differential braking

If approach end cable not available and landing in x-wind greater than 20 kt, or if x-wind greater or equal to 10 kt and lateral CG warning present:

1. Jettison asymmetric O/B, asymmetric C/W bombs

After main wheel touchdown:

2. De-rotate..... As soon as practicable
3. Brake chute..... Deploy
4. Stick ..... Full forward and roll into wind until brakes applied
5. Directional control ..... Use rudder and differential braking

APPROACH-END CABLE ENGAGEMENT

CAUTION

- Cable engagement with nose wheel off the ground may result in aircraft damage
- Do not use brakes to control roll back

1. Aircraft mass ..... Reduce to min practicable See table (below)
2. Hook ..... Down, switch boxed
3. Harness ..... Locked
4. Glide path ..... 2.5° to 3°
5. Approach ..... 14° AoA
6. Touchdown ..... Minimum 500 ft before cable (if practicable)
7. Throttles ..... IDLE
8. Nose wheel ..... Lower in front of cable
9. Brakes ..... Do not apply

kg x1000	MAXIMUM CABLE ENTRY GROUND SPEED - KT										
	44B 2C	44B 2D GAF	44B 2E	44B 2L	SUPER BAK 9	BAK12 E32 A	BAK 13 Am.1	**RHAG MK-1**	ADEC 500 S8	PAAG	AERAZ 4M6-C
[redacted]											

For full cable listings refer to (N-40 / N-41)

RECOVERY WITH FUEL PROBE OUT

1. Flight envelope..... Within probe limits, unless overriding FCS limit:
   - Altitude: Below [redacted]
   - Speed (Probe unlocked): [redacted] KDAS, [redacted]
   - Speed (Probe locked): [redacted] KDAS, [redacted]
2. FUEL PROBE switch ..... Confirm OUT

WARNING

Add 200 ft to the DH / MDA

CAUTION

- The ALSR function is disabled whenever the FUEL PROBE switch is set to OUT
- Attempts to transfer external fuel will result in poor transfer rates and CG may be adversely affected, unless external tanks are equipped with transfer pumps

If fuel transfer required:

3. FUEL format..... Reinstate fuel transfer via:
   - REFU STOP
   - XFER (appropriate stage)

If fuel has previously vented from fin (main group overfill):

4. Fuel format..... Control transfer as follows:
   - XFER AUTO
   - Use REFU STRT to stop transfer to prevent overfill
   - When affected group depleted by 200 kg reinstate transfer (Step 3)
   - Repeat cycle as required
   - PROBE IN selection will be required to transfer fuel from unpumped external tanks

continued >>>

Recovery with Fuel Probe Out – cont'd

5. Land ..... As soon as practicable

NOTE

The following captions will appear but can be ignored:

- FCS REV and REV ENV landing gear handle UP below [redacted] KDAS
- AIRDATA and REV ENV landing gear handle DOWN

Intentionally blank

CANOPY NOT LOCKED / LOST OR JETTISONED

CANOPY

1. **Recover**
2. **Altitude** ..... **Below 10 000 ft (if practicable)**
3. **Speed** ..... **Min practical speed**
4. Land ..... ASAP

If canopy lost or jettisoned:

5. Land ..... Refer to:
   - CG1 / CG2 / Lateral CG / Fuel Mass / Stores Data (E-60)

LADDER NOT LOCKED

LADDER

If ladder detected not locked in flight:

1. Speed ..... Minimum practicable
2. Left throttle ..... IDLE (if practicable)
3. Land ..... As soon as practicable

WINDSCREEN HEATER

WINDSCRN

1. W/S HTR ..... OFF

If mist forms on the windscreen:

2. DEMIST ..... AUTO / REV

If REV selection induces ECS failure:

3. DEMIST ..... AUTO, refer immediately to ECS Failure (E-83)

SMOKE OR FUMES IN COCKPIT

1.	**AOB**	**Select**
2.	**Altitude**	**Below [redacted] if practicable**
3.	**ECS**	**Within limits, RAM AIR** (below)
◄ 4.	AOB contents	Monitor ►

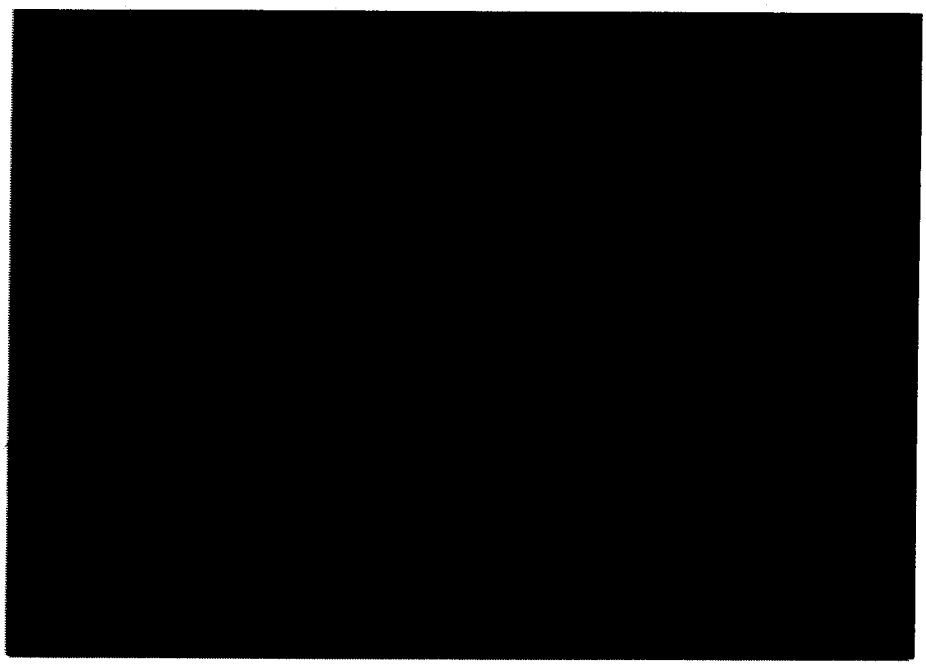
If unable to clear smoke:

5.	Suspect equipment	OFF, if possible

If canopy jettison necessary:

6.	Speed	Minimum practicable: refer to: ● CG1 / CG2 / Lateral CG / Fuel Mass / Stores Data (E-60)
7.	Altitude	Below 10 000 ft (if practicable)
(S) 8.	Airbrake	In
9.	Canopy	Jettison
10.	Land	ASAP

RAM AIR ENVELOPE



BRAKES FAILURE

BRK FAIL

with or without A/SKID

1. Land	Refer to: ● Cable Engagement, Approach-End (➔) or ● Departure-End (➔)

ANTI SKID FAILURE

A/SKID

Before / Upon landing, consider:
- Reduction of aircraft mass
- Use of aerobraking
- Use of brake chute.

1. Brakes	Use with caution

HOOK DOWN

HOOK DWN

1. Land	Consider removing approach-end cable or refer to: ● Cable Engagement, Approach-End (➔)

APPROACH-END CABLE ENGAGEMENT

CAUTION

- Cable engagement with nose wheel off the ground may result in aircraft damage
- Do not use brakes to control roll back

1.	Aircraft mass	Reduce to min practicable See table (➔)
2.	Hook	Down, switch boxed
3.	Harness	Locked
4.	Glide path	2.5° to 3°
5.	Approach	14° AoA
6.	Touchdown	Minimum 500 ft before cable (if practicable)
7.	Throttles	IDLE
8.	Nose wheel	Lower in front of cable
9.	Brakes	Do not apply

DEPARTURE-END CABLE ENGAGEMENT

CAUTION

- Cable engagement with nose wheel off the ground may result in aircraft damage
- Do not use brakes to control roll back

1.	Throttles	IDLE
2.	Brake chute	Deploy
3.	Hook	Down (1000 ft before cable), switch boxed
4.	Brakes	Release 2 to 3 seconds prior to cable

continued >>>

Cable Engagement – cont'd

kg x1000	MAXIMUM CABLE ENTRY GROUND SPEED - KT										
	44B 2C	44B 2D GAF	44B 2E	44B 2L	SUPER BAK 9	BAK12 E32 A	BAK 13 Am.1	**RHAG MK-1**	ADEC 500 S8	PAAG	AERAZ 4M6-C
[redacted]											

For full cable listings refer to (N-40 / N-41)

EMERGENCY MAX BRAKING SPEED - DRY RUNWAY

[redacted]

NOSE WHEEL STEERING FAILURE

NWS

CAUTION

Suspected LGC / WOW (E-97) has priority if:

- FCS 1 present (gear up)

and / or

- FCS 2 present (gear down)

If approach-end cable available:

1. Land ..... Approach-end cable (E-93)

NOTE

If cable missed, bolt option available

If approach-end cable not available:

1. Jettison asymmetric O/B, asymmetric C/W bombs

NOTE

If lateral directional problems occur during x-wind landing, jettison brake chute

After main wheel touchdown:

2. Brake chute..... Deploy

After nose wheel touchdown:

3. Stick ..... Neutral
4. Directional control ..... Use rudder and differential braking

If approach end cable not available and landing in x-wind greater than 20 kt, or if x-wind greater or equal to 10 kt and lateral CG warning present:

1. Jettison asymmetric O/B, asymmetric C/W bombs

After main wheel touchdown:

2. De-rotate..... As soon as practicable
3. Brake chute..... Deploy
4. Stick ..... Full forward and roll into wind until brakes applied
5. Directional control ..... Use rudder and differential braking

GEAR FAILS TO LOWER / INDICATION ANOMALY

Gear Handle assumed down. If gear handle stuck up refer to Landing with Gear Handle Stuck up (E-98)

NOTE

For gear indication anomalies consider:
- HUD indication missing CSG - REV
- HD indication missing internal lights REV - HIGH

1. Gear handle ..... Recycle (if possible):
   - Further attempts are permitted if required
   - Consider application of positive / negative g during down selection
   - Gear handle must be DOWN before continuing

If HUD and HD indicates DDD and 3 greens:

2. Proceed to normal landing instructions (Step 5)

If gear position still unsafe, including HUD and HD disparity:

WARNING

After emergency down selection, do not recycle the gear if the current configuration permits a landing to be attempted

3. EMGY GEAR ..... DOWN (gear handle down, if possible)

If either HUD or HD indicates DDD or 3 greens:

4. Proceed to normal landing instructions (Step 5)

If landing gear position on both displays remains unsafe:

4. Landing Gear ..... Consider:
   - Visual inspection
   - Applying positive / negative g
   - Landing with Gear Unsafe (E-99)

Prior to normal landing:

5. DWP ..... Check for FCS / NWS captions:
   - Where present, refer to LGC / WOW Failure (→)
6. Land ..... Normal:
   - Do not aerobrake

SUSPECTED LGC / WOW FAILURE

If gear fails to lower or gear indication anomaly occurs following gear handle down selection, refer to Gear Fails to Lower / Indication Anomaly (←)

1. PoF ..... Select LDG

If FCS 1 *and* FCS RSET *and* NWS *present:*

2. FCS RSET ..... Press, to recover NWS / lift dump

If NWS *resets a single failure is confirmed:*

3. Land ..... Normal, expect:
   - Loss of one brake system
   - Anti-skid failure possible
   - FCS2 can be triggered on derotation

If NWS *remains and* FCS 2 *present, a multiple failure is confirmed:*

NOTE
- If cable missed, bolt option available
- Expect increased pitch sensitivity

3. Land ..... Approach-end cable (E-93), expect loss of:
   - NWS / lift dump
   - Brake(s) / anti-skid (without warning)

If approach-end cable not available:

4. Jettison asymmetric O/B, asymmetric C/W bombs
5. Brake chute ..... Deploy

NOTE
If lateral directional problems occur during x-wind landing, jettison brake chute

6. Stick ..... Do not aerobrake, hold stick neutral in pitch
7. Directional control ..... Use rudder and differential braking
8. HOOK ..... DOWN (1000 ft before cable), if required

If lateral directional problems still present < 30 kt GS:

9. PARK BRK ..... ON (if necessary)

L GEAR

LANDING WITH GEAR HANDLE STUCK UP

NOTE

- NWS and LD are lost, NWS will be triggered on touchdown
- Approach-end cable engagement required if available
- At higher masses / approach speeds consider jettison of external stores (E-113)

1. EMGY GEAR ..... DOWN
2. Envelope ..... Within probe cycle limit: [redacted]
3. FUEL PROBE switch ..... OUT (ALSR disengaged)
   - Refer to Recovery with Fuel Probe Out (E-34)

NOTE

FUEL PROBE switch in OUT position disables ALSR

4. POF ..... Select LDG (for AoA display)

NOTE

- If cable missed, bolt option available
- Expect increased pitch sensitivity
- Expect nuisance GPWS warnings

5. Land ..... Approach-end cable (E-93)
   - NWS and lift dump are lost
   - Roller landing option available

If approach-end cable not available:

6. Jettison asymmetric O/B, asymmetric C/W bombs
7. Brake chute ..... Deploy

NOTE

If lateral directional problems occur during x-wind landing, jettison brake chute

continued >>>

Landing with Gear Handle Stuck up – cont'd

8.	Stick.....	Do not aerobrake, hold stick neutral in pitch
9.	Directional control	Use rudder and differential braking

If lateral directional problems still present < 30 kt GS:

10.	PARK BRK	ON (if necessary)

LANDING WITH GEAR UNSAFE

Before landing consider:

- Condition of runway, overrun, and side areas
- Crosswind
- Approach-end cable removal
- Availability of foam

NOTE

- With emergency gear selected down, a HUD or HD indication of DDD or 3 greens, can be relied upon
- Illumination of either taxy or landing light verifies that the right MLG is down and locked
- Expect nuisance GPWS warnings

1.	Aircraft mass	Reduce to min. practicable,

If landing gear handle DOWN:

2.	Refer to:	• Recommended Actions (E-100 / 101)

If landing with gear handle UP:

2.	Envelope	Within probe cycle limit: [redacted]
3.	FUEL PROBE switch	OUT (ALSR disengaged) refer to: • Recovery with Fuel Probe Out (E-34) • Recommended Actions (E-100 / 101)

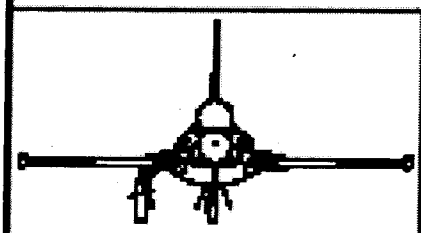
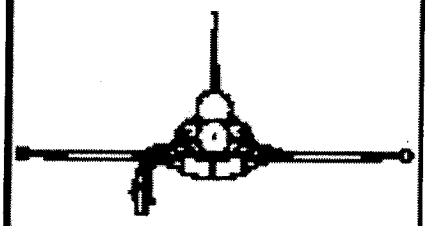
continued >>>

Landing with Gear Unsafe – cont'd

CONFIGURATION	RECOMMENDED ACTIONS
[redacted]	

continued >>>

Landing with Gear Unsafe – cont'd

CONFIGURATION	RECOMMENDED ACTIONS
[redacted]	
CAUTION Consecutive selections of EMGY DOWN leads to loss of right utility system	
 One main gear unsafe - Nose gear down	If left utility system available: - EMGY GEAR switch to RSET - LDG lever UP - Refer to Landing with All Gear Up - If unable to obtain other configurations: - EJECT
 One main gear unsafe - Nose gear up	If left utility system available: - EMGY GEAR switch to RSET - LDG lever UP - Refer to Landing with All Gear Up - If unable to obtain other configurations: - EJECT

LANDING GEAR RETRACTION FAILURE

1.	Gear handle stuck down .	Leave down
2.	Speed	Below [redacted] KDAS

If the gear handle is UP and HUD and / or HD gear indications are abnormal:

1.	Speed	Below [redacted] KDAS
▶ 2.	Landing gear handle	DOWN

If 3 greens and DDD:

3.	Landing gear handle	Don't recycle ◀

If gear not fully locked down (gear indications still abnormal), refer to Gear Fails to Lower / Indication Anomaly (E-96)

LANDING WITH A BLOWN TYRE

Before landing consider:

- Condition of runway, overrun, and side areas
- Crosswind
- Arrester gear limitations

1.	Aircraft mass	Reduce to min practicable

Fly a normal approach.

If nose tyre blown:

2.	Brake chute	Deploy at main wheel touchdown
3.	Nose wheel	Lower gently by 100 KDAS

If main tyre blown:

2.	Land	Cable Engagement Approach-End recommended, refer to (E-93)

▶ *If approach-end-cable not available:*

3.	Land	On side of runway towards good tyre
4.	Nose wheel	Lower ASAP
5.	Wings	Maintain level
6.	Brake chute	Deploy ◀

CONTROLLABILITY CHECK

1.	Altitude	5000 ft AGL minimum
2.	Fuel Probe.....	In
3.	Aircraft mass	Reduce to minimum practicable
4.	External stores	Jettison, if required refer to Stores Jettison (E-113)
5.	Speed/AoA/Roll.....	Determine to achieve acceptable approach and landing characteristic with landing gear down

If adequate control is available:

6. Maintain landing configuration
7. Do not decelerate below minimum controllable speed/AoA
8. Land ..... As soon as practicable

NOTE

For approach and landing consider:
- Cable engagement (E-93)
- Landing field conditions and crosswind

9. Fly straight-in approach

If adequate control is not available:

6. Refer to Controlled Ejection (E-11)

ACS FAILURE

ACS FAIL

with or without **SCAC**

with or without **GUN FAIL**

with or without **FCS MASS**

REV ENV

All ACS functions are lost except for Emergency Jettison.

1. Refer to ..... CG1 / CG2 / Lateral CG / Fuel Mass / Stores Data (E-60)

A-A FAILURE

A-A FAIL

- Loss of A-A firing capability
- EJ / SJ still available
- A-S operations still available
- Gun still available

1. MASS ..... Maintain LIVE

A-S FAILURE

A-S FAIL

- Loss of A-S release capability
- EJ / SJ still available
- A-A operations still available

1. MASS ..... Maintain LIVE

HUNG STORE

HANG-UP

NOTE

HANG-UP warning is not a permanent indication

1. Recover
2. Late arm ..... Safe
3. Inform range control
4. STOR format ..... Identify the hung store

If the store is hung in a safe and stable condition:

5. Maintain within range airspace
6. Continue with sortie
7. When RTB ..... Follow hung store recovery procedure (below)

If store is in an unstable condition:

5. Perform jettison when cleared by Range Control — Refer to FCC Store Jettison (E-113)

If unable to jettison the hung store:

6. RTB ..... Follow hung store recovery procedure (below)

HUNG STORE RECOVERY PROCEDURE

1. A-A / A-S Mode ..... De-select
2. Recover .....
   - Inform all appropriate agencies
   - Avoid built up areas
   - Conduct straight in approach
   - Follow local procedures
3. After landing .....
   - MASS SAFE
   - Park on a safe heading
   - Await ground crew assistance
   - Proceed IAW local procedures

SCAC FAILURE

SCAC PSC10.x onwards

SCAC

FCS MASS

REV ENV

WARNING

Selection of the SCAC NORM / REV switch to REV position is prohibited unless:

- Live A/A weapon firing essential
- SJ is required

NOTE

No stores displayed on STOR format

1. MASS ..... SAFE, then LIVE

If STOR format resumed and FCS MASS *and* REV ENV *warnings extinguished:*

2. Continue flight with SCAC NORM / REV switch to NORM position

If STOR format still empty:

If A-A weapon firing is not essential or SJ is not required:

2. Continue flight with SCAC NORM / REV switch to NORM position

NOTE

- ACS weapon / stores release functionality lost
- EJ still available

3. Refer to ..... CG1 / CG2 / Lateral CG/ Fuel Mass / Stores Data (E-60)

continued >>>

SCAC Failure – cont'd

If A-A weapon firing is essential or SJ is required:

2. SCAC NORM/REV..... REV

PSC 10.x onwards ● SCAC → SCAC category change confirms single channel operation

If STOR format resumed and FCS MASS *and* REV ENV *warnings extinguished:*

3. Continue flight with SCAC in reversionary mode

If STOR format still empty:

3. SCAC NORM/REV..... NORM then REV within 3 seconds

If STOR format resumed and FCS MASS *and* REV ENV *warnings extinguished:*

4. Continue flight with SCAC in reversionary mode

If STOR format still empty:

NOTE

- ACS weapon / stores release functionality lost
- EJ still available

5. Refer to ..... CG1 / CG2 / Lateral CG/ Fuel Mass / Stores Data (E-60)

GUN STOPPAGE PROCEDURE

with or without GUN FAIL

1. Recover
2. Late arm..... SAFE (only to be set to ARMED during other weapon attack)
3. A-A / A-S Gun..... De-select (A-A / A-S gun is not to be re-selected)
4. MASS..... LIVE (MASS not to be cycled to SAFE)

RUNAWAY GUN PROCEDURE

1. Recover
2. Maintain safe heading
3. Late arm ..... SAFE
4. A-S / A-A Gun ..... Deselect (A-A / A-S gun is not to be re-selected)
5. Allow gun to fire out (if still firing)

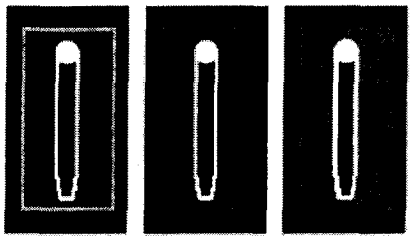
When gun ceases firing:

6. MASS ..... LIVE
7. RTB .....
   - Inform all appropriate agencies
   - Avoid built up areas
   - Conduct a straight in approach
   - Follow local safety procedures
8. After landing .....
   - MASS SAFE
   - Park on safe heading
   - Await ground crew assistance
   - Proceed IAW local procedures

▸LASER DESIGNATOR POD FAILURES PSC3.3x ◂

with or without **POD FAIL**

1. STOR format..... Check for :



NOTE

In all cases where LDP behaviour is abnormal or status cannot be confirmed, consider recovery with MASS in STBY

If red outline / infill present LDP is not available:

2. STOR format..... Confirm nature of failure, refer to table (below)

If amber outline present LDP is degraded:

2. POD format..... Confirm nature of failure before further use, see table (➔)

STOR FORMAT LDP FAILURE MESSAGES

MESSAGE	MEANING	CONSEQUENCE
TEMP	LDP temperature critical	
MCOMP	Main computer failure	LDP FORCED
SERVO	Servo system failure	STANDBY
PHASE	Incorrect AC phase rotation	

continued >>>

Laser Designator Pod Failures – cont'd

POD FORMAT LDP FAILURE MESSAGES

MESSAGE	MEANING
POD TEMP	LDP temperature near critical
PSS SAFE	LDP safety switch set to SAFE
MASK TABLES	No mask tables loaded
PRF CODES	No valid PRF codes loaded
LSR FAIL	Laser designator failed
LSR ENERGY	Laser designator low energy
LSR HOT	Laser overtemperature
LSR RNG FAIL	Laser range finder failure
ECU FAIL	Environmental control unit failure
CCD FAIL	Charge coupled device (camera) failure
IR FAIL	IR sensor overtemperature
EO FAIL	Electro-optical failure
IR TEMP	IR sensor overtemperature
INR FAIL	Inertial sensor failed
NAV ALGN	Navigation alignment error
AZ ALGN	Azimuth alignment error
DVR FAIL	Digital video recorder failure
DVR MEMORY	Digital video recorder memory unavailable
MNTNCE NOTE	Maintenance note failed
SSR FAIL	Solid state recorder failure
SSR MEMORY	Solid state recorder memory unavailable

▸LASER DESIGNATOR POD FAILURES

PSC10.x onwards

with or without	**POD FAIL**
and / or	**POD IMG**
and / or	**POD LSR**
and / or	**POD NAV**
and / or	**POD SD**
and / or	**POD TEMP**
and / or	**POD TRK**
and / or	**POD UTIL**

1. STOR fromat ..... Check nature of failure
   - See table below

DWP / STOR FORMAT INDICATIONS	FAILURE TYPE
RED infilled box around LDP store symbol	**CRITICAL** (LDP not available)
POD FAIL	ACS / LDP communication lost or phase rotation fault
POD SD	LDP critical overtemperature (pod auto shutdown)
AMBER infilled box	**DEGRADED**
POD IMG	CCD or IR sensor degraded / failed. IR sensor hot.
POD LSR	Laser fail, low energy, overheat, PRF code, mask table
POD NAV	Attitude or Inertial tracking sensor degraded / failed
POD TEMP	Approaching critical LDP temperature
POD TRK	Servo system or EO tracker degraded / failed
POD UTIL	Computer, ECU, video, recorder, memory failure

continued >>>

LDP Failure Procedure – cont'd

If LDP operation degraded or re-activation required for operational reasons following a critical failure:

2.	A/S MDE	POD PAGE, consider temporary: ● POD STBY selection, or ● POD OFF selection wait 10 seconds min, then POD ON ◄

JETTISON EXTERNAL STORES (SEL OR EMGY)

WARNING

- If tanks have to be jettisoned with landing gear DOWN, gear damage is possible and an approach-end cable engagement is recommended (E-93)
- Premeditated Jettison of LDP (via EJ) must only be considered after SJ of U/WG stores has been completed in the following order:
  - Bombs
  - Tanks

NOTE

Pre-jettison conditions:

Configuration	A/A	A/S
Speed Range	(→)	
Altitude (ft)	[redacted]	
Load Factor	Nominal 1g	
Sideslip	Rudder pedals central	
Bank	Wings level	
Attitude	Straight and level	
AoA	(→)	
Undercarriage	Retracted	

Post-jettison conditions:

- If configuration cannot be determined post jettison, respect FCS REV envelope
- Transient FCS MASS / REV ENV warnings may occur for ten seconds after jettison

continued >>>

Jettison External Stores – cont'd

QRA / A/A / TRG ROLE (SFT-F)

Jettison	KDAS		Mach No
	MIN	MAX	
EMGY or SEL			

TRG ROLE (SFT-N)

Jettison	KDAS		Mach No
	MIN	MAX	
EMGY or SEL			

NOTE

- SFT-N refers to SFT without fins
- Jettison limits for SFT-N are significantly lower than for SFT-F

LDP ONLY

Jettison	Altitude	KDAS		AoA	
	MAX	MIN	MAX	MIN	MAX
EMGY					

SWING ROLE (AMRAAM + IB PW II + UWG SFT-F)

Jettison	KDAS		Mach No
	MIN	MAX	
EMGY			
SEL PW II			
SEL SFT-F			

SWING ROLE (AMRAAM + 6 PW II + UFUS SFT-F)

Jettison	KDAS		Mach No
	MIN	MAX	
EMGY			
SEL PW II			
SEL SFT-F			

SELECTIVE JETTISON

NOTE

- SJ of UF stores (excluding tank) and I/B stores is inhibited when the main LDG doors are not closed and locked
- SJ of UFUS LDP is not possible
- SJ is allowed with the following exceptions:
  - do not jettison any centre wing bomb if at least one outboard bomb is present
  - do not jettison any inboard bomb if at least one centre wing or outboard bomb is present

1.	MASS	LIVE
2.	STOR format	Check: - Selected SJ package - SEL JETT NOT ACCEPTED occulted
3.	PROG / TANKS	As required
4.	JETT pushbutton	Press

If SJ successful:

5.	STOR format	Check ejected stores not lit

If SJ unsuccessful and/or stores hung-up:

6. Refer to Hung Store (E-105)

EMERGENCY JETTISON

1.	MASS	LIVE
2.	EMGY JETT push button	Press

If EJ successful:

3.	STOR format	Check ejected stores not lit

If EJ unsuccessful and/or stores hung-up:

3. Refer to Hung Store (E-105)
