E M E R G	LIST OF WARNING MESSAGES	WARNING MSGs
	ELECTRICAL	ELEC
	ENGINE & DRIVE SHAFT FAILURE EMERGENCY SHUT DOWN	ENG FAIL SHT DWN
	FIRE & SMOKE	FIRE
	LANDING GEAR STATIC PORT OBSTRUCTION	LDG GR STC PRT
	ROTOR, TRANSMISSION, CONTROLS	RTR XMSN CTRLS
M A L F U N C T I O N	LIST OF CAUTION MESSAGES	CAUTION MSGs
	AUTOMATIC FLIGHT CONTROL SYSTEM	AFCS
	AVIONIC SYSTEMS	AVIONIC
	ELECTRICAL	ELEC
	ENGINE	ENG
	ENGINE IN FLIGHT RESTART	ENG FLT RESTART
	FUEL SYSTEM	FUEL
	HYDRAULIC SYSTEM LANDING GEAR	HYD LDG GR
	MISCELLANEOUS SYSTEMS (IPS, LIPS if applicable)	MISC
	PFD/MFD MESSAGES	PFD/MFD MSGs
	ROTOR & TRANSMISSION	ROTOR XMSN
	CAT A/B AND IN FLIGHT PROCEDURES FOR ENGINE FAILURE	CAT A/B PROCS
		NOTES

GENERAL

This section contains the procedures that should be performed in the event of an emergency or malfunction. The procedures used for each actual emergency or malfunction must result from consideration of the overall situation. Multiple emergencies or malfunctions may require a departure from normal corrective procedures detailed in this section and is at the discretion of the pilot.

The emergencies and malfunctions procedures are presented either as a procedural list of actions or in the form of flow charts.

The flow charts are based on cockpit indications that would be available to the pilot, a brief description of the emergency / malfunction, and the subsequent actions required by the pilot.

For some types of emergency / malfunction the flow charts give the pilot differing procedures depending on certain criteria. The correct procedure to follow can be defined by the flight condition, such as 'On ground' or 'In flight', by a Yes/No answer to certain questions, such as 'Does smoke clear?', or by '**If**' statements to identify more precisely the exact condition encountered which will dictate the correct procedure to follow on the flow chart.

The necessary pilot actions in the procedures commence with a dash '**-**' and are typed in **bold text** to make them more conspicuous.

USE OF WARNINGS, CAUTIONS AND NOTES

Warnings, Cautions and Notes are used to emphasize important and critical instructions and are used as follows:

WARNING

An operating procedure, practice, etc., which, if not correctly followed, could result in personal injury or loss of life.

CAUTION

An operating procedure, practice, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment.

Note

An operating procedure, condition, etc., which is essential to highlight.

DEFINITIONS

The level of alertness required by the pilots is a function of the flight regime. The following definitions are used in the manual;

Fly Attentive - Pilot to maintain close control of flight path using hands on when required.

Fly Manually - Pilot to control directly the flight path using hands on.

EMERGENCY PROCEDURES

MALFUNCTION PROCEDURES

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EMERGENCY PROCEDURES

CAS WARNING SYSTEM

VOICE WARNING MESSAGES AND PRIORITIES LOGIC

1. **“ROTOR LOW”**
2. **“ENGINE OUT”**
3. **“ENGINE FIRE”**
4. **“ROTOR HIGH”**
5. **“ENGINE IDLE”**
6. **“WARNING”**
7. **“AUTOPILOT”**
8. **“AIRSPEED”**
9. **“LOW SPEED”**
10. **“ALTITUDE”**
11. **“CHECK HEIGHT”**
12. “**LANDING GEAR**”
13. **“150 FEET”**

TABLE OF CAS WARNING MESSAGES

CAS caption	Voice Warning	Audio	Failure/System State
ROTOR LOW page 29	ROTOR LOW	Tone	Power ON: NR below 98% (AEO), or below 90% (OEI), Power OFF: NR below 95%.
1(2) ENG OUT page 15	ENGINE 1(2) OUT	Tone	Engine NG below 34.3% or NG rate of change outside limits.
1(2) ENG FIRE page 21	ENGINE 1(2) FIRE	Tone	Engine bay high temperature, fire or hot gas leak.
ROTOR HIGH page 29	ROTOR HIGH	Tone	Power ON: NR above 104%. Power OFF: NR above 110%.
1(2) ENG IDLE page 16	ENGINE 1(2) IDLE	Tone	Engine in IDLE and collective being raised. (Triggered on ground).
1(2) EEC FAIL page 18E	WARNING	None	Automatic reversion of associated engine to manual mode.
MGB OIL PRESS page 30	WARNING	None	Low pressure in MGB lubricating systems (less than 3.1 bar)
MGB OIL TEMP page 30A	WARNING	None	Overheating of MGB lubricating system (greater than 109 °C).
1(2) ENG OIL PRESS page 18E	WARNING	None	Low oil pressure in associated engine (less than 4.2 bar).
1-2 DC GEN page 11	WARNING	None	Failure of both generators.
MAIN BATT HOT page 14	WARNING	None	Main battery overheating.
AUX BATT HOT page 14	WARNING	None	Auxiliary battery overheating.
BAG FIRE page 23	WARNING	None	Smoke detected in baggage bay.

VOICE MESSAGES

1. **“AIRSPEED“** — Vne speed exceeded.
2. **“150 FEET”** — Aircraft at less than 150ft RAD ALT height.
3. **“AUTOPILOT”** — Associated with any AP caution message.
4. “**ALTITUDE**” — Altitude deviation in ALT or RHT mode exceeded.
5. **“CHECK HEIGHT”** — Aircraft at or below selected RAD ALT DH height (EPIC Software Phase 5, or later).
6. **“LOW SPEED”** — Aircraft below 55 KIAS and FD has automatically disengaged (EPIC Software Phase 5, or later).
7. **“RNP, RNP”** — Lateral Deviation exceeds RNP limit.

SAFE OEI FLIGHT

In general safe OEI flight is defined to mean (1) a sustainable airspeed of not less than 50 KIAS, (2) the ability to obtain a positive rate of climb at acceptable power levels and (3) an altitude which provides sufficient clearance from the ground/obstacles so that required manoeuvring can be reasonably achieved. At crew discretion, other procedural checks/actions may be carried out while these conditions are being established.

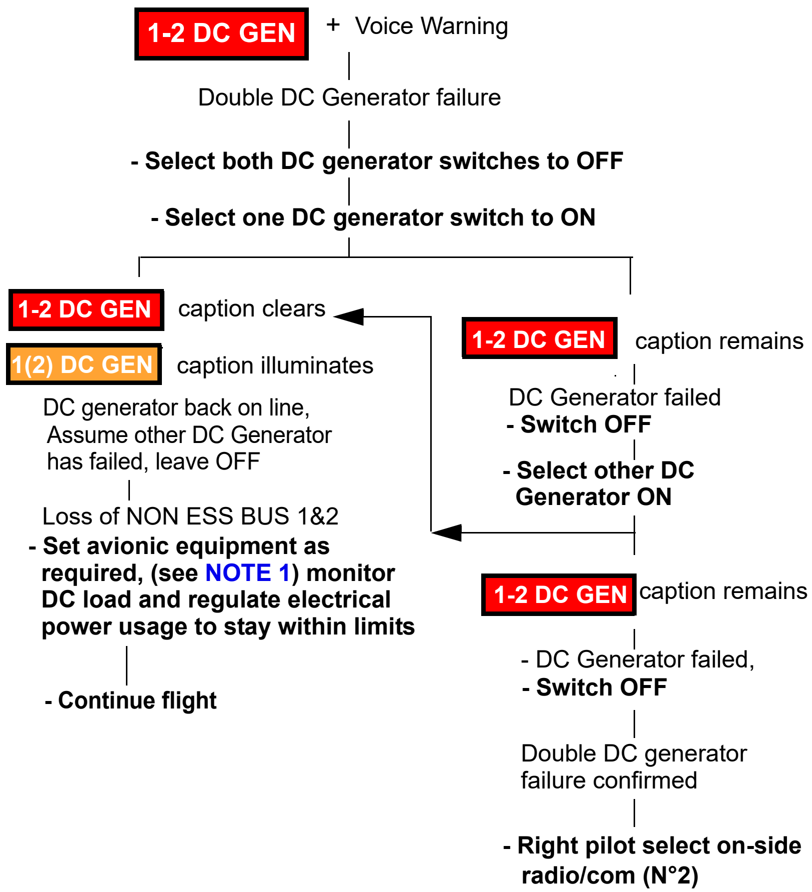
EMERGENCY LANDING GUIDANCE

Throughout this Section, three terms are used to indicate the degree of urgency with which a landing must be effected. In cases where extremely hazardous landing conditions exist such as dense bush, heavy seas or mountainous terrain, the final decision as to the urgency of landing must be made by the pilot.

1. **Land immediately:** — Land at once, even if for example this means ditching or landing in trees. The consequences of continued flight are likely to be more hazardous than those of landing at a site normally considered unsuitable.
2. **Land as soon as possible:** — Do not continue flight for longer than is necessary to achieve a safe and unhurried landing at the nearest site.
3. **Land as soon as practicable:** — Land at the nearest aviation location or, if there is none reasonably close, at a safe landing site selected for subsequent convenience.

ELECTRICAL SYSTEM

DOUBLE DC GENERATOR FAILURE



1-2 DC GEN + Voice Warning

Double DC Generator failure

- Select both DC generator switches to OFF

- Select one DC generator switch to ON

1-2 DC GEN caption clears

1(2) DC GEN caption illuminates

DC generator back on line,
Assume other DC Generator
has failed, leave OFF

Loss of NON ESS BUS 1&2

- Set avionic equipment as required, (see NOTE 1) monitor DC load and regulate electrical power usage to stay within limits

- Continue flight

1-2 DC GEN caption remains

DC Generator failed
- Switch OFF

- Select other DC Generator ON

1-2 DC GEN caption remains

- DC Generator failed,
- Switch OFF

Double DC generator
failure confirmed

- Right pilot select on-side radio/com (N°2)

CAUTION

MAIN BUS 2 and NON ESS BUS 1 & 2 lost. The following action will cause loss of MAIN BUS 1.
See **NOTE 1.**

- BATTERY MAIN , switch OFF to conserve battery power (See NOTE 2 & 3)

- Land as soon as possible (within 30 minutes) or refer to Extended Flight Endurance page 12

NOTE 1

See page 13 for services lost when BUS not available.

NOTE 2

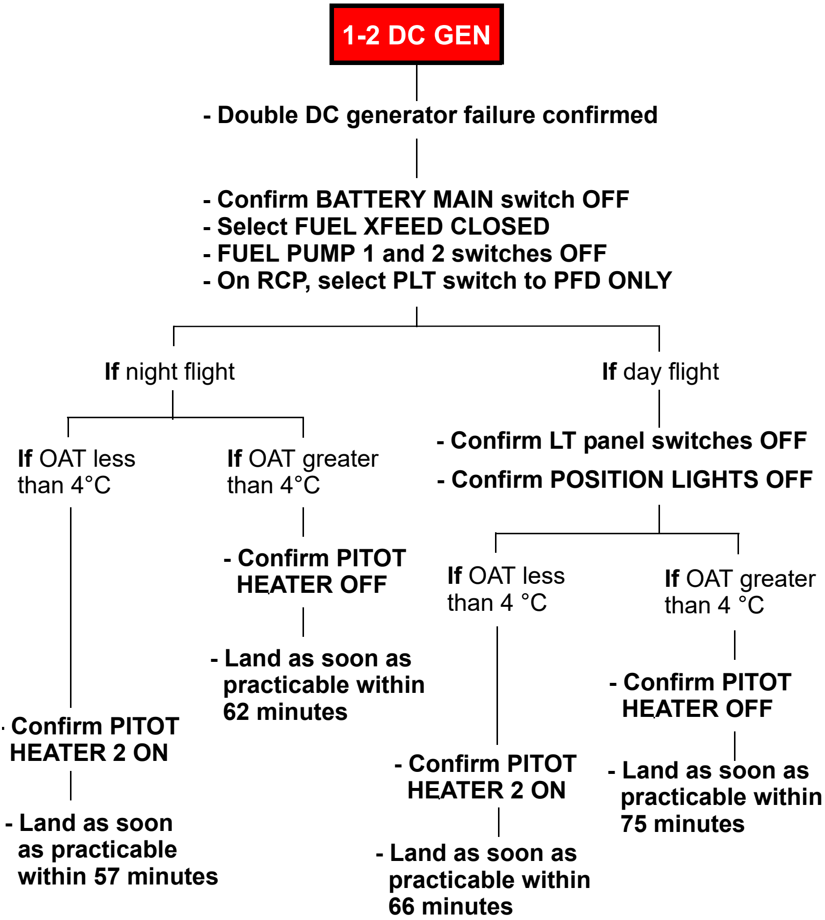
If MAIN BUS 1 required, the BATTERY MAIN switch may be switched ON to supply battery power to MAIN BUS 1 reducing the battery endurance to a maximum of **17 minutes**.
If the BUS TIE is switched ON the BATTERY power is also supplied to MAIN BUS 2, with a further reduction in battery endurance.

NOTE 3

After double DC GEN failure and with BATTERY MAIN OFF do not use ELEC and HYD synoptic pages.

EXTENDED FLIGHT ENDURANCE AFTER DOUBLE DC GENERATOR FAILURE

The following assumes the double DC Generator Failure procedure has been followed and a double DC generator failure is confirmed.



1-2 DC GEN

- **Double DC generator failure confirmed**

- **Confirm BATTERY MAIN switch OFF**
- **Select FUEL XFEED CLOSED**
- **FUEL PUMP 1 and 2 switches OFF**
- **On RCP, select PLT switch to PFD ONLY**

If night flight

- **If** OAT less than 4°C
  - **Confirm PITOT HEATER 2 ON**
  - **Land as soon as practicable within 57 minutes**
- **If** OAT greater than 4°C
  - **Confirm PITOT HEATER OFF**
  - **Land as soon as practicable within 62 minutes**

If day flight

- **Confirm LT panel switches OFF**
- **Confirm POSITION LIGHTS OFF**
- **If** OAT less than 4 °C
  - **Confirm PITOT HEATER 2 ON**
  - **Land as soon as practicable within 66 minutes**
- **If** OAT greater than 4 °C
  - **Confirm PITOT HEATER OFF**
  - **Land as soon as practicable within 75 minutes**

Note

The battery endurance reported above assumes the pilot operates the VHF2 radio system in transmission for a maximum of 1 minute every 15 minutes.

Note

The LDG LT can be turned on for 3 minutes before landing.

SERVICES LOST DURING BUS FAILURES

DC MAIN BUS 1

- ADM 1
- ANTI-COLL LIGHT
- CARGO HOOK RELEASE
- CLOCK CPLT
- COCKPIT CPLT LIGHT
- CPLT ICS
  - (CPLT ICS in back up mode)
- CPLT PFD
- CSL ILLUM
- FD1
- HOIST POWER
- HOIST CUTTER 1
- HOIST CONTROL
- HUMS
- HYD ELEC PUMP
- LINEAR ACTUATOR 1
- MAU1 (PRI POWER)
- MCDU PLT
- MRC 1 (NIM 1, NAV 1)
- OVHD PANEL ILLUM
- PA
- PFD CPLT CONTROL
- PITOT 1 FAIL INDICATION
- PITOT HEAT 1
- RAD ALT 1
- UTIL POWER
- W/RADAR
- XMSN OIL LEVEL SENSOR

DC MAIN BUS 2

- AUTO TRIM
- BAGGAGE COMPT LIGHT
- CABIN LIGHT
- COCKPIT/CABIN HEATER
- COCKPIT VENT (PLT)
- CPLT MFD
- DOME LIGHT
- FD2
- HOIST LIGHT
- MAU 1 (AUX POWER)
- MCDU CPLT
- MRC 2 (ADF & DME)
- PLT W/WIPER
- PSU
- RAD ALT 2
- SEARCH LIGHT CONTROL
- SEARCH LIGHT POWER
- STORM LIGHT
- SUN LIGHT CONTROL
- VENT CONTROL 2
- V/UHF

DC NON ESS BUS 1

- CABIN VENT
- COCKPIT VENT (CPLT)
- CPLT W/WIPE
- ECS (COCKPIT)
- FUEL DRAIN VALVE
- STEP LIGHT
- NOSE BAY FAN 1*

DC NON ESS BUS 2

- ECS (CABIN)
- EXT/SPKR POWER
- NOSE BAY FAN 2*

* NOSE BAY FANS for Long Nose Variant only (function on ground only)

Services available on ESSENTIAL BUS 1 AND 2

DC ESS BUS 1

BAGGAGE FIRE DETECT
BUS CONTROL 1
EAPS 1
EEC 1
EEC 1 FAIL INDICATION
EMERG LIGHT
EMERG FLOAT CONTROL (MANUAL)
EMERG FLOAT POWER
ENG 1 FIRE DETECTION
ENG 1 FIRE EXTINGUISHER
ENG 1 IGNITER & START
FCU 1
FDR/CVR
FUEL PUMP 1
FUEL SHUT OFF VALVE 1
FORCE TRIM
GCU 2
ENG GOV CONTROL
HYD SYS 1 & SOV 1&2
ICS PLT (PLT ICS IN BKUP MODE)
LANDING LIGHT CONTROL
LANDING LIGHT POWER
LDG GEAR CONTROL
LDG GEAR INDICATION
MAIN BATT CHARGE
MAU 2 (PRI POWER)
MRC 1 (VHF 1)
MRC 2 (XPDR)
NLG STEERING LOCK
PLT MFD
STBY 1 ATT
TAIL POS LIGHT
TRANS CHIP BURNER

DC ESS BUS 2

ADM 2
AUTO FLOAT CONTROL
AUX BATT CHARGE
BUS CONTROL 2
CARGO HOOK EMERG RELEASE
CLOCK PLT
COCKPIT PLT LIGHT
EAPS 2
EEC2
EEC 2 FAIL INDICATION
ELT
ENG 2 FIRE DETECTION
ENG 2 FIRE EXTINGUISHER
ENG 2 IGNITER & START
EXT SPKR CONTROL
FADEC GSE
FCU 2
FUEL PUMP 2
FUEL SHUT OFF VALVE 2
FUEL X FEED
GCU 1
HOIST CUTTER 2
HOIST ICS OPERATOR
HYD SYS 2
INSTRUMENT PANEL ILLUM.
LDG GEAR EMERG DOWN
LINEAR ACTUATOR 2
MAU 2 (AUX POWER)
MRC 2 (NIM2, VHF2, NAV2)
PFD PLT CONTROL
PITOT 2 FAIL INDICATION
PITOT 2 HEAT
PLT PFD
RTR BRK

MAIN AND AUXILIARY BATTERY HOT

MAIN BATT HOT + Voice Warning

Main battery temperature exceeding limits

- Switch BATTERY MAIN OFF
- Continue Flight

AUX BATT HOT + Voice Warning

Auxiliary battery temperature exceeding limits

- Switch BATTERY AUX OFF
- Continue flight

AUX-MAIN BATT HOT + Voice Warning

Auxiliary and Main battery temperature exceeding limits

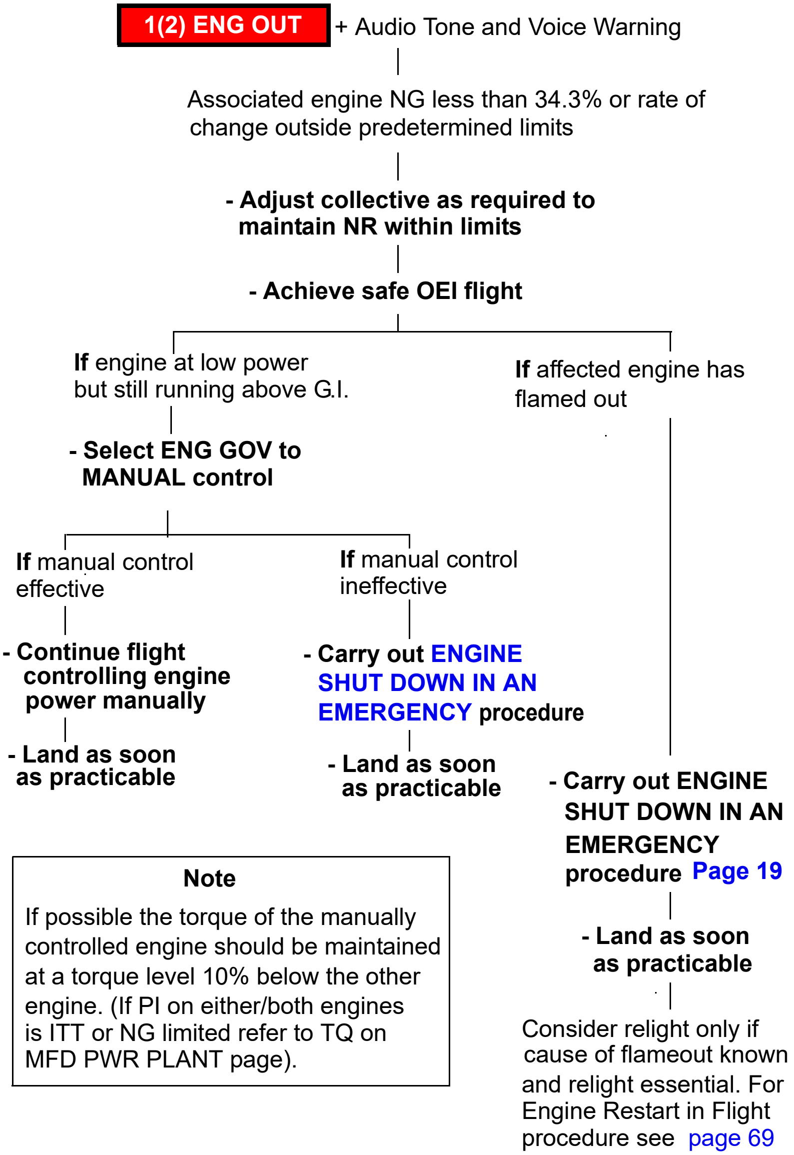
- Switch BATTERY AUX OFF, Switch BATTERY MAIN OFF
- Continue flight

ENGINE FAILURE

For any engine failure or loss of power the following must be carried out if the COND/HEATER system is fitted:

1. HEATER SOV 1 & 2 — CLOSE.
2. COND/HEATER — OFF, (HEATER ON or AIR COND ON advisory message not displayed).

ENGINE OUT



1(2) ENG OUT + Audio Tone and Voice Warning

Associated engine NG less than 34.3% or rate of change outside predetermined limits

- Adjust collective as required to maintain NR within limits

- Achieve safe OEI flight

If engine at low power but still running above G.I.

- Select ENG GOV to MANUAL control

If manual control effective

- Continue flight controlling engine power manually

- Land as soon as practicable

If manual control ineffective

- Carry out ENGINE SHUT DOWN IN AN EMERGENCY procedure

- Land as soon as practicable

If affected engine has flamed out

- Carry out ENGINE SHUT DOWN IN AN EMERGENCY procedure Page 19

- Land as soon as practicable

Consider relight only if cause of flameout known and relight essential. For Engine Restart in Flight procedure see page 69

Note

If possible the torque of the manually controlled engine should be maintained at a torque level 10% below the other engine. (If PI on either/both engines is ITT or NG limited refer to TQ on MFD PWR PLANT page).

ENGINE DRIVE SHAFT FAILURE

Rapid decrease in engine 1(2) TQ to 0 with NF1(2) above NR and/or possible **1(2) OVSPD**

NF approx 110% and/or PI 0%, drive shaft failure on affected engine

- Achieve safe OEI flight

- Carry out ENGINE SHUTDOWN IN EMERGENCY procedure Page 19

- Land as soon as practicable

Note

Following engine drive shaft failure, NF may overspeed and reach the NF overspeed trip point (111%).

ENGINE IDLE

1(2) ENG IDLE + Voice Warning

Associated engine MODE switch at IDLE and collective not fully down

- Select engine MODE switch to FLT before TAKE-OFF

DOUBLE ENGINE FAILURE

A sequential or simultaneous failure of both engines will require entry into autorotation. If sufficient additional time is available to make an engine restart feasible, use the **ENGINE RESTART IN FLIGHT** page 69 procedure. If ENG 2 is to be started first the BUS TIE switch must be selected ON.

AUTOROTATION ENTRY AND LANDING PROCEDURE

The procedure which follows outlines the steps required to execute a successful entry and autorotation landing (ditching), time permitting, consult the appropriate Emergency Procedure for the additional steps required to deal with a specific type failure.

1. Collective pitch — Smoothly and rapidly reduce to enter autorotation.
2. Cyclic — Adjust to obtain autorotation at between 80 KIAS (minimum rate of descent speed) and 100 KIAS (Best range speed).
3. Collective pitch — Adjust to obtain up to110% NR.
4. Landing gear — Extend. (UP for ditching).
5. Landing site — Select and manoeuvre into wind.
6. Brief — Cabin crew and occupants.
7. Radar altimeter — Verify working.
8. Windscreen wipers — As required (FAST for ditching).
9. Distress procedure — Broadcast Mayday (time permitting).
10. Shutdown — If appropriate and time available carry out **EMERGENCY/POST CRASH SHUTDOWN** procedure page 20 (steps 1 to 5 only).
11. Cyclic — At approximately 200 feet AGL, initiate a cyclic flare to a maximum 30° nose-up angle.
12. Collective pitch — Adjust, as required, to maintain NR at 110% maximum during the flare.
13. Cyclic / Collective pitch — At approximately 35 feet AGL, reduce pitch attitude to 10° nose-up and apply collective pitch, as required, to achieve touchdown at approximately 300 feet per minute or less.
14. Touchdown speed — As required by surface characteristics. Maximum touchdown speed 60 kts on paved surface and 40 kts on grass surface. (For ditching approach into oncoming waves, if possible, not exceeding 30 kts)
15. Collective pitch — Following touchdown, lower promptly to conserve the remaining rotor speed.
16. Wheel brakes — Apply as required (land only).
17. Shutdown — If not carried out previously, execute the **EMERGENCY/POST CRASH SHUTDOWN** procedure page 20.
18. Evacuate — Evacuate the aircraft as soon as possible.

SINGLE ENGINE FAILURE IN HOVER

GENERAL

The height loss during a single engine failure flyaway from hover for combinations of weight, altitude and temperature conditions is shown in Perf page 86 for weights up to 6400 kg. (for aircraft configured for operation between 6400 kg and 6800 kg see Supplement 50). The chart does not include any ground clearance height. If the hover height is greater than the height loss plus the ground clearance height required (15 ft minimum) then a flyaway capability exists and the Flyaway Procedure should be followed. The height loss is valid provided the flyaway manoeuvre is initiated within 1 second from engine failure recognition.

If a flyaway capability does not exist the landing/ditching procedure should be followed.

Note

If the helicopter weight, at the time of engine failure, is less or equal to the Hover OGE 2.5 min OEI weight, an engine failure in the hover will result in no height loss provided that the pilot does not intervene on the flight controls.

FLYAWAY PROCEDURE

1. Collective/ Cyclic control — Rotate nose down in 1 second to an attitude of -20° Recover pitch attitude to 5° nose up in approximately 5 seconds. Maintain this attitude while using the collective to droop the NR to a minimum of 90% NR, if necessary, to arrest the descent.
2. Acceleration — Maintain pitch attitude at 5° nose up and accelerate to V_{TOSS} (40 KIAS).
3. At V_{TOSS} — When the aircraft has achieved V_{TOSS} (40 KIAS) and a positive rate of climb lower collective to recover initial hover NR to continue climb.
4. Climb — Continue climb and accelerate to Vy or as required.

Note

Following the flyaway procedure the height loss indicated on the chart, for give ambient conditions and aircraft weight, guarantees that VTOSS (40 KIAS) will be achieved and , after accelerating to Vy, a subsequent minimum Rate of Climb of 150 fpm is assured.

LANDING/DITCHING PROCEDURE

1. Collective/ Cyclic control — Rotate nose down in 1 second to an attitude of no more than -20° while decreasing collective to maintain NR at 100%.

Note

The nose down rotation should be commensurate with hover height. An engine failure at low height will not allow a large pitch attitude change prior to water/ground impact. Engine failures at higher hover heights will permit greater pitch attitude change to gain aispeed energy that is subsequently used during the flare.

2. Cyclic — At 50 ft AGL rotate nose up as necessary (maximum 20°) to decelerate.
3. Approach/ Touchdown — Continue deceleration to attain landing attitude (level or 5° nose up) prior to touchdown or ditching at the slowest forward speed possible. Use collective to cushion touchdown.
4. Landing/Ditching — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.
   Apply brakes as required for ground landing or initiate the Ditching Procedure described in Supplement 9.

CAUTION

If the undercarriage is not extended the Rotor Brake will not function. In this case use the collective to slow the rotor, being aware the aircraft may yaw left.

DITCHING PROCEDURE (WHEN FLOTATON AND LIFERAFTS INSTALLED)

— Approach and landing should be into wind.

— When landing into waves, land head-on to oncoming waves avoiding, if possible, ditching into the fave of the wave.

— Rotor Brake will not function (with landing gear retracted).

WARNING

As considerable error can result from estimation of height over water, the radar altimeter should be used for height cues during descent.

WARNING

Do not deploy flotation bags in flight. Bags will automatically deploy on water touchdown.

DITCHING PROCEDURES

1. Pre-ditching checks — Warn crew and passengers to prepare for ditching.
2. OFF/ARMED switch (FLOATS EMER panel) — Confirm ARMED. FLOAT ARM caution displayed on CAS
3. Landing Gear — Confirm UP.

CAUTION

If the landing gear cannot be retracted, ditching with minimum forward speed is recommended.

4. Lights — At night, switch ON emergency lights and landing light.
5. Landing direction — If possible orientate the aircraft for an approach into the prevailing wind.
6. Brief — Cabin crew and occupants.
7. Radar altimeter — Verify working.
8. Windscreen wipers — Select FAST.
9. Distress procedure — Broadcast Mayday.

1) POWER ON DITCHING APPROACH AND TOUCHDOWN

1.	Initial point	— During the approach, reduce airspeed gradually to arrive at a position 200 ft (60 m) above touchdown point with a rate of descent of no more than 500 fpm. Initiate a deceleration to achieve 30 kts at 50 ft (15 m). At 50 ft (15 m) rotate nose up to approximately 20° to decelerate.
2.	Approach	— If power available continue the deceleration and descent to hover. Or continue deceleration to attain landing attitude prior to ditching at the slowest speed possible (not exceeding 30 kts).
3.	Touchdown	— Enter water cushioning touchdown with collective in a level or slightly nose up attitude (5°).

2) AUTOROTATION DITCHING APPROACH AND TOUCHDOWN

1.	Shutdown	— If appropriate and time available carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
2.	Flare	— At approximately 200 feet (60 m) AGL, initiate a cyclic flare to a maximum 30° nose-up angle.
3.	Collective pitch	— Adjust, as required, to maintain NR at 110% maximum during the flare.
4.	Cyclic/Collective pitch	— At approximately 35 feet (10 m) AGL, reduce pitch attitude to 10° nose-up and apply collective pitch, as required, to achieve touchdown at approximately 300 feet per minute or less.
5.	Waves	— Approach into oncoming waves, if possible.
6.	Touchdown speed	— Not exceeding 30 kts.
7.	Collective pitch	— Following touchdown, lower promptly.

AFTER TOUCHDOWN PROCEDURE

1.	Flotation equipment	— Check inflated, if not lift guard and press FLOAT override button on either Pilot or Copilot collective grip.
2.	Collective	— Lower collective.
3.	Emergency exits	— As soon as possible inform crew and passengers to jettison the emergency exits in cockpit and cabin.
4.	Engines	— Shut down as required using **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
5.	Collective	— If required gently raise collective to slow rotor.

CAUTION

Collective application will cause the helicopter to yaw left.

When rotors stationary

6.	GEN 1 & 2 and BATT MASTER switches	— OFF (using gang-bar).
7.	Life Rafts (if fitted)	— Deploy.
8.	Evacuation	— Evacuate the aircraft, with life preservers.

ENGINE OIL PRESSURE LOW

1(2) ENG OIL PRESS + Voice Warning

Associated engine oil pressure below limit (less than 4.2 bar)

- On affected engine check oil pressure and temperature on MFD

If engine oil pressure and temperature normal.

- Land as soon as practicable

If engine oil pressure below limit or invalid

- Achieve safe OEI flight

On affected engine

- Carry out ENGINE SHUT DOWN IN EMERGENCY procedure page 19

- Land as soon as practicable

ENGINE EEC FAIL

1(2) EEC FAIL + Voice Warning

Automatic reversion to engine manual mode

- On affected engine check engine parameters on MFD PWR PLANT

- ENG GOV switch to MANUAL control ECL using beep switch

- Land as soon as practicable

Note

If possible the torque of the manually controlled engine should be set at a torque level 10% below the other engine. (If PI on either/both engines is ITT or NG limited refer to TQ on MFD PWR PLANT page).

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ENGINE SHUTDOWN IN EMERGENCY

CAUTION

Care should be taken in confirming the failed engine prior to commencing this shutdown procedure.

CAUTION

If there is evidence of combustion after engine shutdown in flight, carry out a dry motoring procedure as required to extinguish any possible fire.

Following an engine failure/malfunction, establish a safe OEI flight condition. On the failed engine, carry out the following shut down procedures:

1. ENG Mode switch — OFF.
   If engine does not shut down then:
   ECL — OFF
2. FUEL PUMP switch — OFF, unless required for crossfeed.
3. ENG FUEL switch — OFF, fuel valve indicator horizontal.
4. HEATER SOV 1 & 2 (if fitted) — CLOSE.
5. COND/HEATER (if fitted) — OFF, (HEATER ON or AIR COND ON advisory message not displayed).
6. Fuel contents — Monitor, use crossfeed as required.

EMERGENCY/POST CRASH SHUTDOWN

In the event of an emergency or crash landing, priority must be given to ensuring that personnel are evacuated safely at the most appropriate time. Every effort should be made to carry out the following shutdown procedures immediately:

1. ENG MODE 1 & 2 switches — OFF.

   If engine does not shut down then:
   ECL 1 & 2 — OFF

2. FUEL PUMP 1 & 2 switches — OFF.
3. ENG FUEL 1 & 2 switches — OFF.
4. ENG 1 & 2 FIRE ARM pushbuttons — Lift guard and press appropriate pushbutton, if required.
5. ENG EXTING switch — Select BTL 1 and/or 2, if required.
6. Rotor brake (if fitted) — Select BRAKE (Braking from 90% NR permitted in an Emergency).

Note

If the undercarriage is not extended the Rotor Brake will not function. In this case use the collective to slow the rotor, being aware the aircraft may yaw left.

When rotor stopped.

7. GEN 1 & 2 and BATT MASTER switches — OFF (using gang-bar).

FIRE

In the event of smoke or fire, prepare to land the aircraft without delay while completing the applicable emergency procedures.

ENGINE BAY FIRE (GROUND)

1(2) ENG FIRE + Audio Tone and Voice Warning

- Confirm on ECL engine FIRE light ON

On affected engine
- ENG MODE switch to IDLE
- Confirm engine FIRE
- ECL to OFF
- HEATER SOV switches CLOSE and COND/HTR switch OFF (if fitted)
- Lift FIRE/ARM guard and press illuminated pushbutton
- Set FIRE EXTING switch to BTL1
- ENG MODE switch to OFF
- Fuel PUMP OFF
- FUEL switch OFF
- XFEED CLOSED

If fire warning clears

If fire warning persists

- Set FIRE EXTING switch to BTL2

- Carry out EMERGENCY/POST CRASH SHUTDOWN procedure page 20

CAUTION

In case of a subsequent fire in the other engine bay the initial ARM 1(2) pushbutton must be deselected to allow operation of the ARM 2(1) pushbutton.

ENGINE BAY FIRE (FLIGHT)

1(2) ENG FIRE + Audio Tone and Voice Warning

- Confirm on ECL engine FIRE light ON

- Achieve safe OEI Flight

- HEATER SOV switches CLOSE and COND/HTR switch OFF (if fitted)

On affected engine

- ENG MODE switch to IDLE

- Confirm engine FIRE

- ECL to OFF

- Lift FIRE/ARM guard and press illuminated pushbutton

- Set FIRE EXTING switch to BTL1

When conditions permit:

- ENG MODE switch to OFF

- Fuel PUMP OFF

- FUEL switch OFF

- XFEED CLOSED

If fire warning clears

- Deselect FIRE/ARM pushbutton

- Land as soon as possible

If fire warning persists

- Set FIRE EXTING switch to BTL2

If fire warning clears

- Land as soon as possible

If fire warning persists

- LAND IMMEDIATELY

- Carry out EMERGENCY/ POST CRASH SHUTDOWN procedure page 20

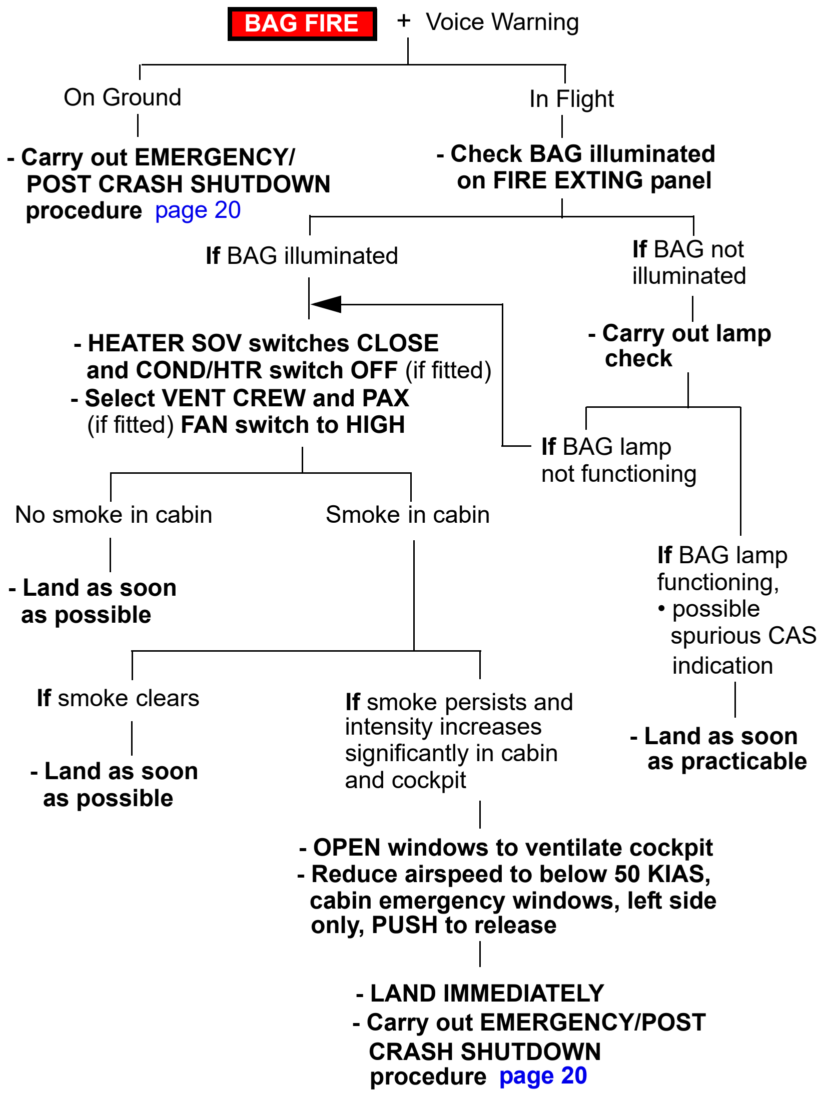
CAUTION

In case of a subsequent fire in the other engine bay the initial ARM 1(2) pushbutton must be deselected to allow operation of the ARM 2(1) pushbutton.

Note

When XFEED is CLOSED the affected engine fuel tank will have a maximum of 228 kg of unusable fuel. If essential, and the pilot is sure the engine fire has been contained, the unusable fuel can be made available by XFEED to OPEN and fuel PUMP ON.

BAGGAGE BAY FIRE



BAG FIRE + Voice Warning

On Ground

- **Carry out EMERGENCY/ POST CRASH SHUTDOWN procedure** page 20

In Flight

- **Check BAG illuminated on FIRE EXTING panel**

If BAG illuminated

- **HEATER SOV switches CLOSE and COND/HTR switch OFF** (if fitted)
- **Select VENT CREW and PAX** (if fitted) **FAN switch to HIGH**

No smoke in cabin

- **Land as soon as possible**

Smoke in cabin

If smoke clears

- **Land as soon as possible**

If smoke persists and intensity increases significantly in cabin and cockpit

- **OPEN windows to ventilate cockpit**
- **Reduce airspeed to below 50 KIAS, cabin emergency windows, left side only, PUSH to release**

- **LAND IMMEDIATELY**
- **Carry out EMERGENCY/POST CRASH SHUTDOWN procedure** **page 20**

If BAG not illuminated

- **Carry out lamp check**

If BAG lamp not functioning

If BAG lamp functioning,
• possible spurious CAS indication

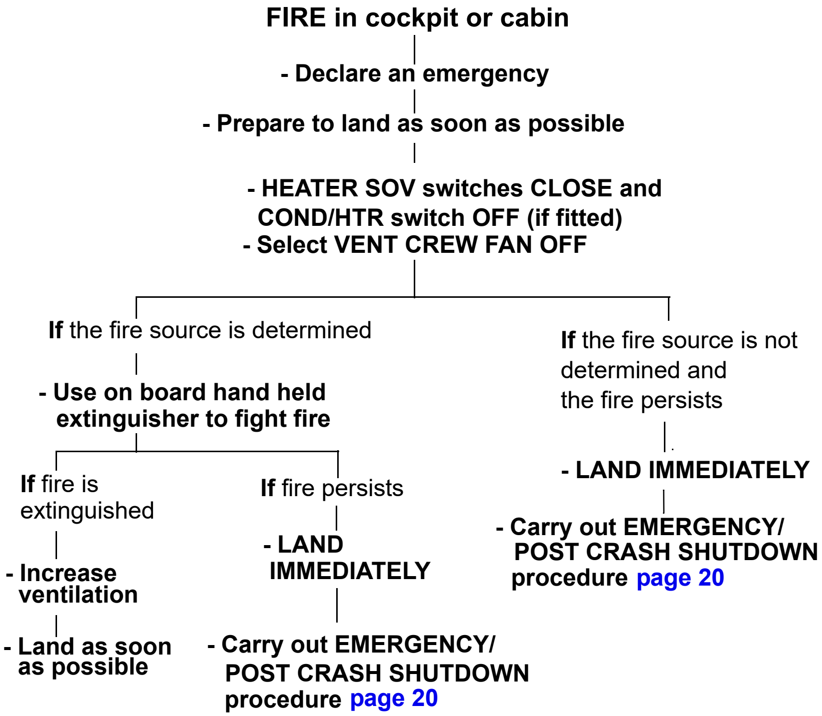
- **Land as soon as practicable**

COCKPIT / CABIN FIRE (GROUND)

FIRE in cockpit or cabin

- **Declare an emergency**
- **Carry out EMERGENCY/POST CRASH SHUTDOWN procedure** **page 20**
- **Evacuate aircraft at the earliest opportunity**

COCKPIT / CABIN FIRE (FLIGHT).



FIRE in cockpit or cabin

- **Declare an emergency**
- **Prepare to land as soon as possible**
- **HEATER SOV switches CLOSE and COND/HTR switch OFF (if fitted)**
- **Select VENT CREW FAN OFF**

If the fire source is determined

- **Use on board hand held extinguisher to fight fire**

If fire is extinguished

- **Increase ventilation**
- **Land as soon as possible**

If fire persists

- **LAND IMMEDIATELY**
- **Carry out EMERGENCY/ POST CRASH SHUTDOWN procedure page 20**

If the fire source is not determined and the fire persists

- **LAND IMMEDIATELY**
- **Carry out EMERGENCY/ POST CRASH SHUTDOWN procedure page 20**

CAUTION

If the fire is not completely extinguished, increased ventilation may aggravate the problem.

ELECTRICAL FIRE/SMOKE (GROUND)

An electrical fire is indicated by a smell of burning insulation and/or acrid smoke. If fire occurs:

Carry out **EMERGENCY/POST CRASH SHUTDOWN** procedure page 20.

ELECTRICAL FIRE/SMOKE (FLIGHT)

Electrical fires are often indicated by a smell of burning insulation and/or acrid smoke. The most important consideration is to maintain safe flight conditions while investigating the cause. Unnecessary electrical equipment must be switched off while detecting the source of an electrical fire. Unless the source of the smoke or fire can be positively identified (CAS display or C/B panel) and the equipment electrically isolated, carry out procedure detailed on next page.

Procedure contunues on next page

Continues from previous page:
ELECTRICAL FIRE/SMOKE PROCEDURE (FLIGHT)

- Reduce speed, recommended Vy
- Open windows to ventilate cockpit
If operational conditions permit
- Land as soon as possible

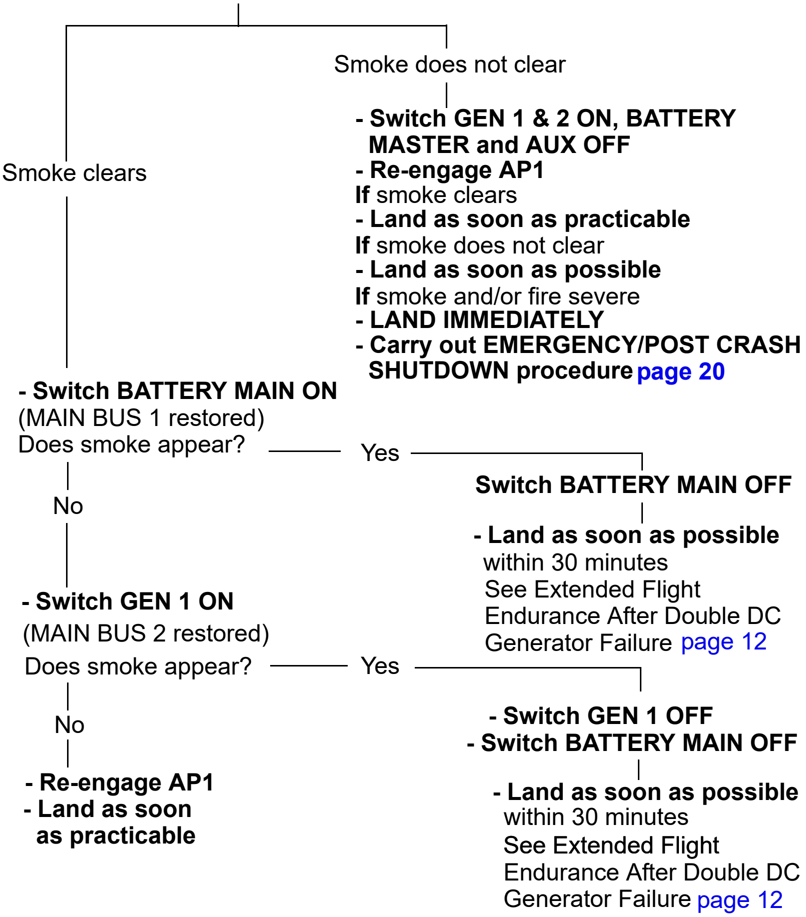
- Right pilot select on-side radio/com (N°2)
- Switch pilot UTILITY light ON (for night operation)
- Set MFD to PWR PLANT page to monitor continuously ESS BUS 2 voltage during the complete procedure
- Switch GEN 1 & GEN 2 OFF
- Switch BATTERY MAIN OFF(Loss of NON-ESS BUS 1 & 2, MAIN 1 & 2)

Note

AP2 and ATT will remain engaged, but relevant green lights on autopilot control panel will be OFF.

WARNING

Actions on the right hand column should be carried out immediately (if smoke clears or not) whenever ESS BUS 2 voltage drops below 22V (yellow range) or fluctuates.



Smoke clears

- Switch BATTERY MAIN ON
(MAIN BUS 1 restored)
Does smoke appear?

Yes

Switch BATTERY MAIN OFF

- Land as soon as possible
within 30 minutes
See Extended Flight Endurance After Double DC Generator Failure page 12

No

- Switch GEN 1 ON
(MAIN BUS 2 restored)
Does smoke appear?

Yes

- Switch GEN 1 OFF
- Switch BATTERY MAIN OFF

- Land as soon as possible
within 30 minutes
See Extended Flight Endurance After Double DC Generator Failure page 12

No

- Re-engage AP1
- Land as soon as practicable

Smoke does not clear

- Switch GEN 1 & 2 ON, BATTERY MASTER and AUX OFF
- Re-engage AP1
If smoke clears
- Land as soon as practicable
If smoke does not clear
- Land as soon as possible
If smoke and/or fire severe
- LAND IMMEDIATELY
- Carry out EMERGENCY/POST CRASH SHUTDOWN procedure page 20

WHEEL BRAKE FIRE

ON GROUND

When aircraft is stationary:

1. Shutdown — Carry out **EMERGENCY/POST CRASH SHUTDOWN** procedure page 20.

IN FLIGHT

1. Landing gear — Extend.
2. Aircraft — Land as soon as possible.

When aircraft is stationary on the ground:

3. Shutdown — Carry out **EMERGENCY/POST CRASH SHUTDOWN** procedure page 20.

CAUTION

Use of pedal brakes or parking brake may aggravate the fire.

Note

Consider using one of the cabin hand fire extinguishers or other available extinguishers to extinguish the fire.

ENGINE EXHAUST FIRE AFTER SHUTDOWN

If there are visible signs of fire in the engine exhaust, possibly accompanied by a rising ITT after shutdown, personnel should not be allowed to exit until the following actions have been carried out:

1. Fire warnings — Confirm not illuminated.
2. ENG GOV switch — Set MAN.
3. ENGINE IGN circuit breaker — Out. (Ringed in WHITE on CB panel)
4. BUS TIE switch — Select ON (for ENG 2 only)
5. ECL — OFF
6. ECL starter pushbutton — Push
7. Gas generator (NG) — Note increasing.
8. ECL starter pushbutton — Push to stop when ITT decrease noted (not more than 45 seconds. Starter Duty Cycle must be respected).
9. Rotors stopped — Evacuate aircraft.

LANDING GEAR

LANDING GEAR FAILS TO LOCK DOWN

If, after selecting the landing gear DOWN any indicators remain blank or amber, carry out the following:

- **Press LAMP TEST, confirm indicator lights functioning**
- **Reduce airspeed to less than 120 KIAS**
- **Check LDG GEAR NORM pressure (MFD Hydraulic synoptic page)**

If pressure low (amber box)

- **EMER DOWN pushbutton lift guard and press**

If pressure normal (green box)

- **Carry out the following actions, confirming landing gear indicatons, after each action:**
  - **Check LDG GEAR circuit breakers IN (2)**
  - **Cycle LDG GEAR lever, (maximum three times)**
  - **EMER DOWN pushbutton lift guard and press**

If all indicators illuminate green (down and locked)

- **Continue to land**

If any indicators remain blank or amber

- **Attempt to confirm if landing gear is down**

If all indicators illuminate green (down and locked)

- **Continue to land**

WARNING

If any indicators remain blank or amber (undercarriage not locked down) then the hydraulic pressure in EMER DOWN is sufficient to keep undercarriage extended when rotor speed is above 20% NR. Below 20% NR the landing gear not locked down may collapse.

- **Continue to land**
- **Land vertically on flat hard surface**
- **Do not taxi**

- **Consider evacuating aircraft, supporting aircraft or landing on suitable soft surface prior to shutting down rotor.**

Note

When the undercarriage has been extended using the EMER DOWN then subsequent retraction is not possible.

Procedure continues on next page

Procedure continues from previous page

Note

When the undercarriage has been extended using the EMERG DOWN then, after landing, if taxiing is required the EMERG DOWN pushbutton must be de-selected to permit the NOSE WHEEL steering to be unlocked

Note

For OAT of -30°C and below the undercarriage extension time may double.

STATIC PORT OBSTRUCTION

If erratic readings from the airspeed indicator and altimeter occur, with the STATIC source switch in NORMAL position, proceed as follows:

1. Storm window and vents — Closed.
2. COND/HEATER (if installed) — OFF.
3. STATIC source switch — Remove guard and select ALTERNATE.
4. Proceed with flight.

This procedure selects an alternate static source utilizing cabin air.

CAUTION

When utilizing the alternate static source, decrease the altimeter reading by 200 ft.

ROTOR UNDER-SPEED

ROTOR LOW + Audio Tone and Voice Warning

Rotor RPM below limit

- Check NR on PFD

Tone and ROTOR LOW
Power ON: below 98% (AEO), or 90% (OEI)
Power OFF: below 95%

If rotor speed low

- Lower collective to increase rotor speed

- Refer to Engine Emergency and Malfunction drills if relevant

ROTOR-OVERSPEED

ROTOR HIGH + Audio Tone and Voice Warning

Rotor RPM above limit

- Check NR on PFD

Tone and “ROTOR HIGH”
Power ON: above 104% (AEO and OEI)
Power OFF: above 110%

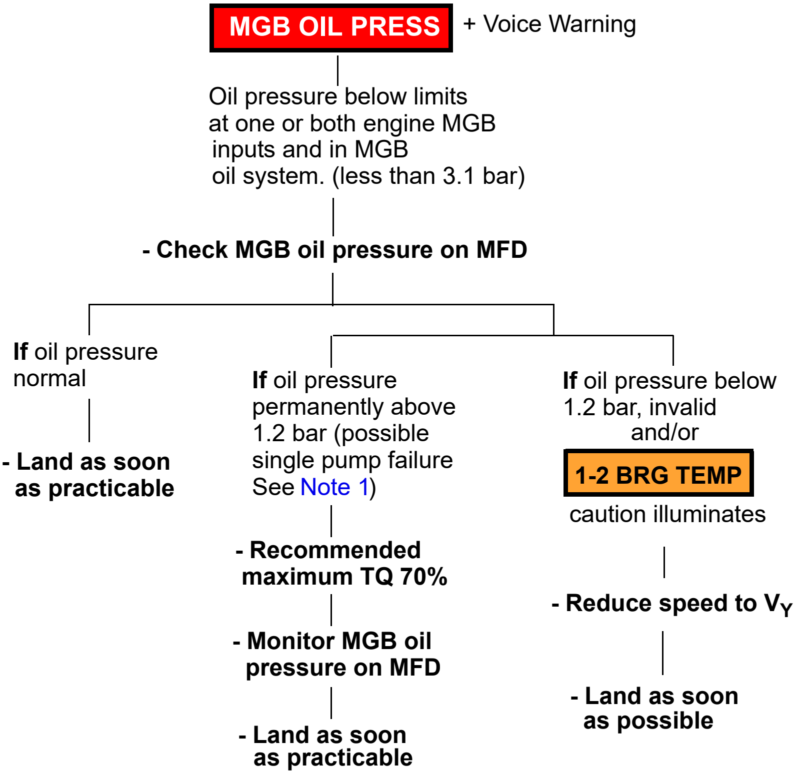
If rotor speed high

- Raise collective to decrease rotor speed

- Refer to engine Emergency and Malfunction drills if relevant

RTR XMSN
CTRLS

MAIN GEARBOX OIL PRESSURE LOW



MGB OIL PRESS + Voice Warning

Oil pressure below limits at one or both engine MGB inputs and in MGB oil system. (less than 3.1 bar)

- Check MGB oil pressure on MFD

If oil pressure normal

- Land as soon as practicable

If oil pressure permanently above 1.2 bar (possible single pump failure See Note 1)

- Recommended maximum TQ 70%

- Monitor MGB oil pressure on MFD

- Land as soon as practicable

If oil pressure below 1.2 bar, invalid and/or **1-2 BRG TEMP** caution illuminates

- Reduce speed to V_Y

- Land as soon as possible

Note 1

The most likely cause of oil pressure low but remaining above 1.2 bar permanently is a failure of one of the two MGB pumps. Lubrication is provided by the remaining pump to allow continued flight.

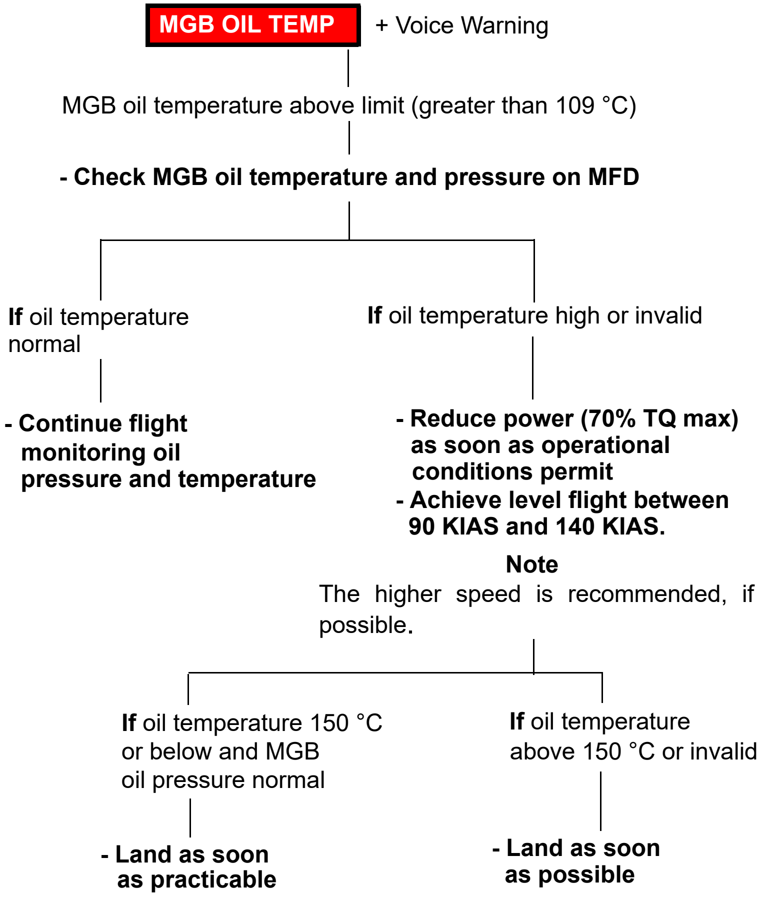
Note

If MGB CHIP MAST or MGB CHIP SUMP cautions illuminate when MGB OIL PRESS warning is illuminated the CHIP BURNER must not be activated.

Note

- It is acceptable for the MGB OIL PRESS warning to illuminate at GI providing the indicated pressure is above 2 BAR and, at FLT (100%NR), the warning is not illuminated.
- It is acceptable for the MGB OIL PRESS warning to illuminate transiently when accelerating from GI to FLT providing the warning is not illuminated at 100%NR.

MAIN GEARBOX OIL TEMPERATURE HIGH



MGB OIL TEMP + Voice Warning

MGB oil temperature above limit (greater than 109 °C)

- Check MGB oil temperature and pressure on MFD

If oil temperature normal

- Continue flight monitoring oil pressure and temperature

If oil temperature high or invalid

- Reduce power (70% TQ max) as soon as operational conditions permit

- Achieve level flight between 90 KIAS and 140 KIAS.

Note

The higher speed is recommended, if possible.

If oil temperature 150 °C or below and MGB oil pressure normal

- Land as soon as practicable

If oil temperature above 150 °C or invalid

- Land as soon as possible

Note

The most probable cause of MGB oil temperature high is a failure of the cooler fan, which is likely to be associated with an abnormal noise from the upper deck.

Note

Once oil temperature exceeds 150 °C the indication changes to '--' .

Note

Oil pressure typically decreases as the oil temperature increases.

MAIN ROTOR CONTROLS BINDING

WARNING

If a binding occurs in the aircraft main rotor control circuit, depending on the severity of the binding, greater forces will be required to operate the controls. A reduction in the available control ranges may result and, in this situation, the low speed flight envelope may be restricted.

If the airspeed is more than 25 KIAS, the aircraft should be landed into the wind as soon as possible using a running landing procedure and a touchdown speed of 25 KIAS.

If the airspeed is less than 25 KIAS, carry out a running landing at the speed at which the binding occurs. If the aircraft is in a hover, land vertically.

TAIL ROTOR SYSTEM FAILURES

YAW CONTROL DIAGNOSTICS

PEDAL CHARACTERISTICS	POSSIBLE CAUSE	AIRCRAFT MOTION
Free But Ineffective	**TAIL ROTOR DRIVE FAILURE** **TAIL ROTOR CONTROL CIRCUIT FAILURE** Disconnect between pedals and tail rotor servo	Rapid yaw to the right Direction of Yaw depends on airspeed / torque
Partially Effective (Perhaps effective in one direction only or with considerable backlash)	**TAIL ROTOR CONTROL CIRCUIT FAILURE** Disconnect between tail rotor servo output and tail rotor or mechanical disconnect of AFCS Yaw Series Actuator	Direction of Yaw depends on airspeed / torque
Seized (Excessive force required to move pedals)	**TAIL ROTOR CONTROL BINDING**	Aircraft yaws right when raising collective. Aircraft yaws left when lowering collective

TAIL ROTOR DRIVE FAILURE

The following cues will be present:

- Aircraft yaws rapidly to the right
- Loss of yaw control, pedals free but ineffective
- Possible noise and vibration from the aft fuselage area.

Severe yaw rates will result in large yaw angles within a very short period of time and, depending on the flight conditions at the time of failure, it is possible that yaw angles in excess of 30° will be experienced.

Additionally, very high yaw rates will produce aircraft pitching and rolling making retention of control difficult without the use of large cyclic inputs, which are structurally undesirable. Finally, very high yaw rates will produce disorienting effects on the pilots. Therefore, it is vital that corrective action, as outlined in the following procedures, be taken quickly to prevent post-failure yaw rates from reaching unacceptably high levels.

Failure Cues:

In Hover

- Lower collective to LAND IMMEDIATELY while maintaining attitude and minimizing lateral translation with the cyclic control.
- Retard ENG MODE switch (or ECL’s) to OFF if time available.

In Forward Flight

- Lower collective immediately to minimize yaw right.
- Establish an airspeed/power/roll angle sufficient to reach a suitable landing site.
- At landing site assess running landing capability.
- If a running landing cannot be carried out with a suitable power and speed, shutdown engines.
- Carry Out Engine Off Landing.

Note

- Land into wind
- Raising or Lowering the collective while maintaining NR within limits may be effective in helping control sideslip. (Increasing collective, nose left).

RTR XMSN
CTRLS

TAIL ROTOR CONTROL SYSTEM FAILURE

Failure Cues:

- **Aircraft Yaws Left or Right**
- **Loss of Yaw Control, pedals free but ineffective or free and partially effective.**

In Low Hover

- **Lower collective to LAND IMMEDIATELY while maintaining attitude and minimizing lateral translation with the cyclic control.**

If rapid yaw right develops

- **Retard ENG MODE switches (or ECL's) to OFF if time available.**

In Forward Flight / High Hover

- **Attempt to determine a combination of speed and power to minimize the yaw**
- **Carry out the following to diagnose the failure:**
  - **Gently and progressively apply left pedal to assess whether the aircraft responds in that direction. Pedal needs to be pushed until a positive response is obtained (it may be necessary to reach full displacement if no response is obtained)**
  - **If aircraft does not respond to the left, consideration should be given before assessing controllability to the right as this may worsen the situation. Gently and progressively apply right pedal to assess whether the aircraft responds in that direction. Pedal needs to be pushed until a positive response is obtained (it may be necessary to reach full displacement if no response is obtained).**

If the aircraft does not respond OR responds to right pedal but not to left pedal	If the aircraft does respond to both pedal inputs but is slow to respond, with noticeable backlash
Tail Rotor Pitch set to *zero* thrust **- Set up a rate of descent to align the aircraft nose to the flight path.** **- Reduce speed approaching the touchdown point; a yaw to the right may start to develop. In this case a low speed rotating landing will be required.** **- When the aircraft is rotating at low level, retard ENG MODE switched (or ECL's) to OFF and cushion the final touch down.**	Mechanical disconnect of the AFCS yaw series actuators. The remaining tail rotor pitch available is such that an IGE hover could be possible. However, depending upon the weight, altitude and wind, a power on running landing may be carried out.
Note Wind from the front **Left** quadrant of the a/c may be beneficial.	

TAIL ROTOR CONTROL BINDING

Failure Cues:

- **— Pedals seized or require excessive force (DO NOT ATTEMPT TO APPLY MAXIMUM EFFORT)**
- **— Aircraft yaws Left or Right in response to collective changes.**

In Low Hover

- **— Lower collective to LAND IMMEDIATELY while maintaining attitude and minimizing lateral translation with the cyclic control.**

Note

- Do not retard ECLs unless a severe right yaw occurs. If tail rotor control binds while hovering, landing can be accomplished with greater safety under controlled, powered flight rather than by shutting down engines and entering autorotation.

In Forward Flight / High Hover

- **— Attempt to determine a combination of speed and power to minimize the yaw.**

If binding occurred in high power climb or high hover (High Tail Rotor Thrust)	If binding occurred in high power cruise (Moderate Tail Rotor Thrust)	If binding occurred in descent or low power cruise. (Low Tail Rotor Thrust)
- Carry out a high power, low speed approach, keeping the nose to the left. **- Carry out a power-on landing using a speed / power combination which will keep the aircraft nose aligned.** **- On touch down, reduce collective and select ENG MODE switches (or ECLs) to OFF.**	**- During approach keep the nose to the left.** **- Carry out running landing at an airspeed of approximately 20 knots, raising the collective to straighten the nose.** **- As aircraft touches down, ENG MODE switches (or ECLs) to OFF while slowly lowering the collective.**	**- Set up a ROD to align the aircraft nose to flight path.** **- Reduce speed approaching the touchdown point; a yaw to the right may start to develop. In this case a low speed yawing landing will be required.** **- When the aircraft is yawing at low level, select ENG MODE switches (or ECLs) to OFF and cushion the touch down.**
Note Wind from the front **Right** quadrant of the a/c will be beneficial.		**Note** Wind from the front **Left** quadrant of the a/c will be beneficial.

CAUTION

Premature reduction of airspeed to low values may result in loss of directional control when increasing collective.

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MALFUNCTION PROCEDURES

CAS CAUTION SYSTEM

CAUTIONS WITH VOICE MESSAGES

- ‘LANDING GEAR’ voice message, associated with **LANDING GEAR** amber caution, is active when the radio altimeter height is less than 150 feet and undercarriage is retracted.
- ‘AUTOPILOT’ voice message, associated with any AP amber caution.

TABLE OF CAS CAUTION MESSAGES

CAS Caption	Page	Failure/System State
1(2) ADS FAIL	46	Associated ADS failed
AFCS DEGRADED	41	AFCS functioning degraded
1(2) AHRS FAIL	47	Associated AHRS failed
1(2) AP FAIL	37	Associated autopilot failed
1(2) AP OFF	38	Associated autopilot switched OFF
1(2) AP TEST ABORT	41	AFCS Test procedure aborted (only active on ground)
ATT OFF	39	AFCS attitude mode OFF
1(2)-(8) AUDIO FAIL	52F	Associated audio system failed
AUX BATT OFF	54	Auxiliary battery off line
AVIONIC FAULT	48	Avionic fault
AWG FAIL	47	Aural warning generator failed
BAG DOOR	85	Baggage door open
BATT OFF LINE	55	MAIN battery and/or AUX battery not connected to ESS BUS
1(2) BRG TEMP	105	Associated ENG-MGB input bearing over heating
BUS TIE OPEN	55	DC MAIN bus tie open
CABIN DOOR	85	Cabin door open
CHIP DET TEST	107	Drive system chip detect testing system failed
CHIP DET UNIT	107	Drive system chip detect unit failed
CHIP MAST FAIL	107	Chip detector on main gearbox mast failed
CHIP SUMP FAIL	107	Chip detector on main gearbox sump failed
COCKPIT DOOR	84	Cockpit door open
1(2) COLL FAIL	43	Collective Autopilot Failure
CVR FAIL	51	Cockpit voice recorder failed
DC BUS FAIL	56	DC bus failed
1(2) DC GEN	53	Associated generator failed
1(2) DC GEN HOT	53	Associated generator overheating

CAS Caption	Page	Failure/System State
1(2) DCU	65	Associated engine control functions degraded
1(2)(3)(4) DU DB DGRD	52E	Display unit database degraded (Phase 8 and later)
1(2)(3)(4) DU OVHT	46	Associated display unit overheating
1(2)(3)(4) DU DEGRADED	46	Associated display unit degraded
1(2) ECL FAIL	63	Associated engine control lever beep trim failed
1(2) ECL POS	63	Associated engine control lever out of flight position
1(2) EEC DATA	64	Associated engine data degraded
EMER LDG PRESS	78	Emergency landing gear deployment system pressure low
ENG ANALOG FAILURE	68	Engine analogue monitoring systems failed
1(2) ENG CHIP	61	Associated engine chip detected
1(2) ENG LIM EXPIRE	60	Associated engine exceeded 2.5 min OEI rating
1(2) ENG MODE SEL	63	Associated engine MODE switch failed
1(2) ENG OIL TEMP	60	Associated engine oil overtemp (> 140 °C)
EXT PWR DOOR	85	External Power door open
1(2) FCU FAIL	74	Associated fuel contents gauging unit failed
1(2) FCU TEST FAIL	76	Associated fuel contents gauging unit self test failed (only active on ground)
FDR FAIL	50	Flight data recorder failed
1(2) FIRE DET	62	Associated fire detect system failed
1(2) FMS FAIL	51	Associated FMS failed
1(2) FMS/GPS MSCP	52B	Miscompare between associated FMS and GPS position data
FMS/GPS MSCP UNAVL	52 52A 52C	FMS/GPS position comparison function not available
FPA MISCOMPARE	52D	Flight path angle miscompare (Phase 8 and later)
1(2) FUEL FILTER	66	Associated fuel filter impending bypass
1(2) FUEL HEATER	67	Fuel heater system failed
1(2) FUEL ICING	67	Associated fuel temperature less than 5 °C
1(2) FUEL LOW	73	Associated fuel level less that 92 kg
1(2) FUEL LOW FAIL	75	Associated fuel low sensor failed
1(2) FUEL PROBE	75	Associated fuel contents probe failed
1(2) FUEL PUMP	73	Associated fuel pump failed (< 0.6 bar)
1-2 FUEL PUMP	74	Double fuel pumps failure (< 0.6 bar)

CAS Caption	Page	Failure/System State
FWD(AFT) COND FAIL	87	Crew(PAX) conditoner failure
1(2) GEN OVLD	54	Associated DC Generator Overload (EPIC Phase 5, or later)
GPS FAIL	52 52A 52E	Single GPS failed Double GPS Failure Double GPS Failure (during Custom Approach Phase 8 and later)
HEATER FAIL	87	Heater system failed
1(2) HOT START	65	Associated engine ITT limits exceeded on engine starting
1(2) HYD MIN	79	Associated hydraulic system fluid level low
1(2) HYD OIL PRESS	77	Associated hydraulic system pressure low (less than 163 bar)
1(2) HYD OIL TEMP	78	Associated hydraulic system overtemp (greater than 134 °C)
1(2)(4) HYD PUMP	79	Associated hydraulic pump failed
HYD UTIL PRESS	77	Utility hydraulic pressure low
IGB CHIP	106	Intermediate gearbox chip detected
IGB CHIP FAIL	107	Chip detector on intermediate gearbox failed
IGB OIL LOW	106	Intermediate gearbox oil level low (only active on ground)
IGB OIL TEMP	106	Intermediate gearbox oil overtemp (greater than 109 °C)
1(2) ITT LIMITER	66	Associated ITT limiter not functioning
1(2) ITT MISCOMPARE	68	Discrepancy between EEC and analog value of ITT
LANDING GEAR	81	Landing gear retracted and aircraft below 150 ft AGL
LPV UNAVAIL	52C 52D	LPV not available or loss of redundancy (EPIC Phase 7 and later)
MAIN BATT OFF	54	Main battery off line
1(2) MAU OVHT	48	Associated MAU overtemp
1(2) MCDU OVHT	50	Associated MCDU overtemp
MGB CHIP MAST	104	Main gearbox mast chip detected
MGB CHIP SUMP	104	Main gearbox sump chip detected
MGB OIL FILTER	104	Main gearbox oil filter in bypass
MGB OIL LOW	104	Main gearbox oil level low (only active on ground)
1(2) MGB OIL PRESS	105	Associated MGB engine input oil pressure low (less than 3.1 bar)
MISTRIM	40	Linear actuators not re-centered by trim
1(2) MRC OVHT	52F	Modular Radio/NAV unit overheat

CAS Caption	Page	Failure/System State
1(2) NF MISCOMPARE	68	Discrepancy between EEC and analogue value of NF
1(2) NG MISCOMPARE	68	Discrepancy between EEC and analog value of NG
NOSE WHL UNLK	80	Nose wheel unlocked
NR MISCOMPARE	68	Discrepancy between EEC and analogue value of NR
1(2) OVSPD	64	Associated engine NF overspeed triggered
1(2) OVSPD DET	66	Associated engine overspeed detection system failed
PARK BRK ON	81	Park brake on
PARK BRK PRESS	81	Park brake system low pressure
1(2) PITOT FAIL	83	Associated pitot heating failed
1(2) PITOT HEAT OFF	83	Associated pitot heating system switched off and OAT less than 4 °C
1(2) P(R)(Y) AP FAIL	39	Associated AP Pitch, Roll or Yaw axis failed
1(2) P(R)(Y) AP OFF	39	Associated AP Pitch, Roll or Yaw axis OFF
P(R)(Y) TRIM 1(2) FAIL	40	Pitch, Roll or Yaw trim system failure
ROTOR BRK FAIL	86	Rotor brake system in failure a failure condition
RPM SELECT	103	RPM selector switch failed
1(2) SAS DEGRADED	41	Associated SAS system degraded
1(2) SERVO	80	Associated hydraulic servo actuator in bypass
SYS CONFIG FAIL	50	Software or hardware system configuration error (only active on ground)
TGB CHIP	106	Tail gearbox chip detected
TGB CHIP FAIL	107	Tail gearbox chip detect system failed
TGB OIL LOW	106	Tail gearbox oil low (only active on ground)
TGB OIL TEMP	107	Tail gearbox oil overtemp (> 109 °C)
1(2) TQ LIMITER	65	Associated engine torque limiter failed
1(2) TQ MISCOMPARE	68	Discrepancy between EEC and analogue value of TQ
1(2) TRIM FAIL	40	Trim system failed
VALIDATE CONFIG	50	Software or hardware configuration needs validation.
VENT FAIL	86	Cockpit ventilation fan failed or nose avionic fans failure
VNE MISCOMPARE	83	Miscompare between ADS 1 and 2 value of VNE
1(2) VHF COM OVHT	52F	Associated VHF radio overheat

CAS Caption	Page	Failure/System State
1(2) WOW FAIL	84	Associated Weight On Wheels (WOW) switch failed
XMSN OVTQ	103	Main gearbox overtorque

TABLE OF PFD AND MFD MESSAGES

Message	Page	Failure/System State
RED Messages		
‘ATT FAIL’	89	Failure of attitude information (on associated side)
‘1(2)CASMSCP’ on PFD	91	MAU 1 (MAU 2) CAS WARNING message list discrepancy
‘HDG FAIL’	89	Failure of heading information (on associated side)
‘RAD’ on display	99 100	Double RAD ALT failure Double RAD ALT failure during Custom Approach with level segment
‘VEL FAIL’ on compas display	100B	Double AHRS groundspeed failure
AMBER Messages		
‘(1)(2)(3)(4) DU’ on attitude indicator	95	Display unit graphics symbology malfunction
‘2.5m’ on side of PI and between NG and ITT indications	96	Associated side engine in 2.5 minute rating, message will flash 10”sec before 2.5 min limit expires.
‘ADS1(2)’ on attitude indicator	90	Pilot and Copilot ADS information from the same source. (1-Copilot side 2-Pilot side)
‘AHRS1(2)’ on attitude indicator	89	Pilot and Copilot attitude information from the same source. (1-Copilot side 2-Pilot side)
‘ALT’ on altitude display tape	97	Miscompare between ADS 1 & 2 for altitude information (±150 ft)
‘ATT’ on attitude indicator	97	Miscompare between AHRS 1 & 2 for Pitch and Roll information (±5° in pitch and ±6° in roll)
‘1(2)CASMSCP’ on PFD	91	MAU 1 (MAU 2) CAS CAUTION message list discrepancy.
DG1(2)	89	Pilot and Copilot heading information from the same source. (1-Copilot side 2-Pilot side) and selection of AHRS 1(2)
‘FD FAIL’ on PFD	98	Dual Flight Director failure
‘HDG’ on attitude indicator	97	Miscompare between AHRS 1 & 2 for Heading information (±10° heading)

Message	Page	Failure/System State
‘HTML’ on attitude indicator	101	Aircraft passed Safety Height and/or Ultimate Fly Up Limit (EPIC Software Phase 5, or later)
‘IAS’ on airspeed tape	97	Miscompare between ADS 1 & 2 airspeed information.(±20 kts)
‘LOC’ on HSI	97	Miscompare between LOC Lateral and/or Vertical deviation
MAG 1(2)	89	Pilot and Copilot heading information from the same source. (1-Copilot side 2-Pilot side) and selection of AHRS 1(2)
1(2) MAU	92	Associated MAU degraded
‘MIN’ on attitude indicator	96	Altitude equal or less than decision height (DH)
‘LOC/GS’ on HSI	97	Miscompare between navigation LOC/GS information from NAV 1 and NAV 2
‘OAT ##°C’ amber on PFD	101	Miscompare between the two OAT probes is 6°C or greater (EPIC Software Phase 5, or later)
‘PITCH’ on attitude indicator	97	Miscompare between AHRS 1 & 2 for Pitch information (±5° in pitch)
RAD 1(2) on RAD ALT display	98	RAD ALT failure, on double RAD ALT system, reconfiguration to functioning system
RAD on RAD ALT display	99	Miscompare between MAU 1 & 2 Radio Altimeter altitude information (10 ft+0.0625x(rad alt 1+ rad alt 2)
‘ROLL’ on attitude indicator	97	Miscompare between AHRS 1 & 2 for Roll information (±6° in roll)
‘VEL’ on compass display	101	Miscompare between AHRS 1 & 2 GS data when groundspeed below 20 kts (EPIC Software Phase 5, or later)
‘VTA’ on attitude indicator	100A	During VGP approach when RAD ALT height between MAP and MAP+100 ft

AUTOMATIC FLIGHT CONTROL SYSTEM

AUTOPILOT FAIL

1(2) AP FAIL + Aural Message

+

AFCS DEGRADED

Associated autopilot failure

If during SAR mission

- **Continue flight with FD modes coupled as required**
- **Fly attentive do not exceed Vne-27 KIAS in level flight, or 100 KIAS and 1000 fpm in climb.**

If during Non SAR mission

- **Continue flight attentive do not exceed Vne-27 KIAS in level flight, or 100 KIAS and 1000 fpm in climb.**
- **Decouple FD (below 500 ft (152 m) AGL fly manually) unless in approach, missed approach, approach and departure to/from hover and hover**

- **If** subsequent caution illuminates **1-2 AP FAIL** + Aural Message

- **Continue flight manually not exceeding 140 KIAS (100 KIAS in turbulence, IMC or approach)**

AUTOPILOT OFF

1(2) AP OFF + Aural Message

+

AFCS DEGRADED

Associate AP not switched on

On affected AP

- Confirm selected ON.

If fault remains

During SAR Mission

- Continue flight with FD modes coupled as required

- Fly attentive do not exceed Vne-27 KIAS in level flight, or 100 KIAS and 1000 fpm in climb.

During non SAR mission

- Continue flight attentive do not exceed Vne-27 KIAS in level flight, or 100 KIAS and 1000fpm in climb.

- Decouple FD (below 500 ft (152 m) AGL fly manually) unless in approach, missed approach, approach and departure to/from hover and hover

- If subsequent **1-2 AP OFF** + Aural Message caution illuminates

- Continue flight manually not exceeding 140 KIAS (100 KIAS in turbulence, IMC or approach)

AUTOPILOT AXIS OFF

1(2) P(R)(Y) AP OFF + Aural Message

Pitch (Roll) (Yaw) axis of AP1(2) not engaged

On affected AP

- Disengage and re-engage AP

If fault remains

- **Continue flight attentive**
- **If PITCH axis failed reduce speed to Vne-27 KIAS, level flight, or 100 KIAS and 1000 fpm in climb**
- **Below 500 ft (152 m) AGL fly manually**

AUTOPILOT AXIS DISENGAGE

1(2) P(R)(Y) AP FAIL + Aural Message

Pitch (Roll)(Yaw) axis of AP1(2) uncommanded disengagement

- **Continue flight attentive**
- **If PITCH axis failed reduce speed to Vne-27 KIAS, level flight, or 100 KIAS and 1000fpm in climb**
- **Below 500 ft (152 m) AGL fly manually**

ATTITUDE SYSTEM OFF

ATT OFF

+

SAS message displayed on both PFD’s

Attitude hold system not engaged

- Engage ATT on autopilot controller

If associated with cyclic freedom motion in longitudinal and/or lateral direction with loss of function of FTR switch and cyclic beep trim

Cyclic force trim failure
Collective FD modes automatically change to uncoupled (with chime)
Cyclic FD modes do not function, cyclic steering bars remain centred

- Fly manually

Note

With ATT system not engaged the aircraft flies in SAS mode only (SAS message on PFD).

AFCS TRIM FAILURE

1(2) TRIM FAIL

Trim system failure on all axes while AP 1(2) has priority

- Disengage and re-engage affected AP

If fault clears

- Continue Flight

If **2(1) TRIM FAIL** or **1-2 TRIM FAIL** appears

- Continue flight being aware that trim is unavailable

If MISTRIM caution appears manually trim controls

PITCH, ROLL, YAW TRIM FAIL

1(2) P(R)(Y) TRIM FAIL

Failure of Pitch (Roll) (Yaw) trim while AP1(2) has priority

- Disengage and re-engage affected AP

If fault clears

- Continue Flight

If **2(1) P(R)(Y) TRIM FAIL** or **1-2 P(R)(Y) TRIM FAIL** appears

- Continue flight, being aware that P(R)(Y) trim is unavailable

If MISTRIM caution appears manually trim controls

MISTRIM

MISTRIM

Linear actuators(s) not centered

- Continue flight using FTR button to obtain desired flight condition, and centre linear actuators, being attentive to autopilot functioning.

AFCS DEGRADED

AFCS DEGRADED

AFCS functions degraded

- Continue flight attentive reducing speed to Vne-27 KIAS, level flight, or 100 KIAS and 1000fpm in climb
- Below 500 ft (152 m) AGL fly manually

SAS DEGRADED

1(2) SAS DEGRADED

Associated SAS degraded operation

- Continue flight attentive. Expect reduced cyclic sensitivity

AP TEST ABORT

1(2) AP TEST ABORT

AP TEST aborted by pilot action or
aircraft lifted off before test completion

- To clear caution re-engage AP TEST with aircraft on ground and wait for test to complete

CYCLIC FORCE TRIM OFF OR FAIL

Cyclic force trim switched OFF (FORCE TRIM switch on MISC control panel) or cyclic force trim failure causes a disconnect of the longitudinal and/ or lateral clutches and is indicated by the cyclic being free to move in pitch and/or roll axis with loss of functioning of the cyclic trim release (FTR switch) and cyclic beep trim system. The **ATT OFF** caution (SAS message on PFD) may also illuminate.
The cyclic must be used hands-on to prevent it moving from its selected position.

CYCLIC FORCE TRIM RELEASE FAILURE

Cyclic force trim release failure, due to a fault which removes electric power to the clutches of the longitudinal and lateral trim will result in cyclic longitudinal and lateral clutches becoming permanently engaged. This will require the pilot to fly the aircraft against the cyclic force spring feel to manoeuvre the aircraft, or use the cyclic beep trim, as cyclic FTR button does not function.
In this case it is suggested that a FD mode (ie IAS) is engaged and the cyclic beep trim used to maintain the required flight condition. Coupled SAR mode operations are not affected.

COLLECTIVE FORCE TRIM OFF OR FAIL

Collective force trim switched OFF (CLTV/YAW switch on MISC control panel) or collective force trim failure causes a disconnect of the collective clutch and is indicated by the collective being free to move with loss of functioning of the collective trim release (FTR switch).
The collective must be used hands-on to prevent it moving from its selected position or the collective manual friction could be applied as required.

When a FD mode is engaged, and coupled, and the collective trim is switched OFF (MISC control panel) or fails, a chime sound is generated, , the collective may not maintain its selected position, the CLTV annuciation will illuminate on the top left of the ADI display, and the CLTV/YAW OFF green advisory will illuminate on the CAS. Collective modes are available uncoupled only.

COLLECTIVE FORCE TRIM RELEASE FAILURE

Collective force trim release failure, due to a fault which removes electric power to the clutch of the collective trim, will result in the collective clutch becoming permanently engaged. This will require the pilot to fly the aircraft against the collective force spring feel to manoeuvre the aircraft, as the collective FTR button does not function.
In this case when large collective movements are not required, it is suggested that a FD mode (ie ALT) is engaged and the collective beep trim used to maintain the required flight condition. Coupled SAR mode operations are unaffected.

AFCS QUICK DISCONNECT PROCEDURE

For situations where faults are suspected in the AFCS, but with no CAS cautions illuminated, and the AP functions need to be disengaged, all AP/AFCS functions can be disconnected by pressing the SAS REL button on the cyclic grip.

GUIDANCE CONTROL PANEL FAILURE

In case of Guidance Control Panel failure, recognised as non functionality of panel pushbuttons (modes cannot be changed or disengaged using panel), the FD may be disengaged using the cyclic FD STBY button.

Continue flight, using the FD modes already engaged as required. However, use the cyclic FD STBY button to disengage modes when required. When disengaged FD is no longer available.

SINGLE COLLECTIVE AUTOPILOT FAILURE

1(2) COLL FAIL

+ Aural Message
+ Collective FD mode annunciator amber (if a coupled collective mode active)

Collective axis of AP1(2) failed, collective reverts to uncoupled

- Manually control collective

- Deselect and reselect associated 1(2) AP pushbutton on Autopilot Controller

If fault clears

- Continue flight
Loss of redundancy of collective modes

If **2(1) COLL FAIL** appears

Collective modes available uncoupled only
Collective Safety Fly Up Function not available

- Continue flight

DUAL COLLECTIVE AUTOPILOT FAILURE

1-2 COLL FAIL

+ Aural Message
+ Collective FD mode annunciator amber (if a coupled collective mode active)

Collective axis failure of both AP1 and AP2

- Manually control collective

Collective modes available uncoupled only.
Collective Safety Fly Up Function not available

- Continue flight

MAU FAILURE WITH FD ENGAGED

For on-side MAU failure on the selected PFD the FD modes ALT, VS and IAS will disengage, (with a chime for an MAU 1 failure but not for an MAU 2 failure). Follow procedure below for FD action and refer to page 48 for complete MAU failure procedure.

1(2) MAU
+
1(2) ADS FAIL
+
1(2) AP FAIL

PFD message combined with CAS Cautions and disengagement of FD modes ALT, ALTA, IAS, VS + Audio Chime (MAU 1 failure o and loss of:

- Airspeed
- Altitude
- Vertical Speed

Data on Left (Right) PFD indicators

Multiple CAS cautions illuminate, but those which affect FD functioning are:
1(2) AP FAIL page 37
1(2) ADS FAIL page 46
AFCS DEGRADED page 41

- Continue flight attentive
- On RCP move ADS switch to non failed ADS
- Do not exceed Vne-27 KIAS in level flight, or 100 KIAS and 1000 fpm in climb
- Below 500 ft (152 m) AGL fly manually

ADS1(2) illuminates on both attitude indicator to highlight PFD's are using the same air data source

- Re-engage FD modes as required

- Compare frequently PFD data with STANDBY indicator.

CAUTION

In case of MAU 1(2) failure, do not use electrical and hydraulic synoptic page information.

AVIONIC SYSTEMS

PRIMARY OR/AND MULTIFUNCTIONAL FLIGHT DISPLAY UNIT FAILURE

Loss of either PFD or MFD will automatically configure remaining display to Composite mode. FD, if engaged and selected PFD fails, remains engaged on the same reference as PFD

- **Confirm no chime sound and FD mode green captions are present in Composite mode, if FD engaged**
- **Continue flight using composite mode**

- **If** failed screen becomes intermittent it can be powered down by switching associated RCP switch to functioning display.

Note

If failed screen returns valid, it can be restored by switching associated RCP switch to functioning display and back to NORM.

Note

MFD menu bar not functional if PFD in composite mode and MFD returns valid.

If subsequent loss of display in Composite mode FD, if engaged, disengages with chime

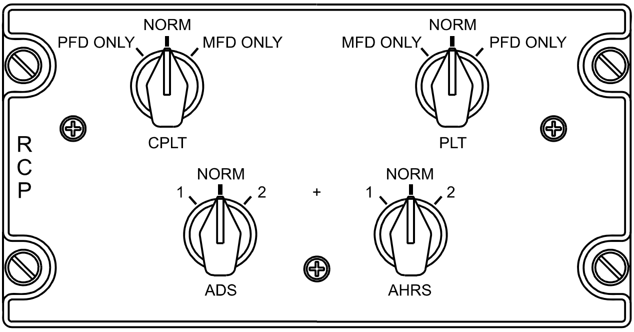
- **If** Copilot displays failed and Left pilot flying
- **Right pilot take control of aircraft**
- FD can be re-engaged (on right pilot side)

Note

When using Standby instrument the correct Vne must be determined from the Vne placard.

- **If** Pilot displays failed and Right pilot flying
  - **If** during SAR mission
    - **Left Pilot take control of aircraft**
    - FD can be re-engaged (on left pilot side)
  - **If** single pilot
    - **Revert to Standby instrument**
    - **Land as soon as practicable**

Reversion Control Panel



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DISPLAY UNIT OVERHEATING

1(2)(3)(4) DU OVHT

Associated display overheat

Expect format to be distorted or disappear

- Increase cockpit ventilation if possible

If DU fails, the remaining associated display automatically reverts to Composite mode

---

DISPLAY UNIT DEGRADED

1(2)(3)(4) DU DEGRADED

+

Possible **1(2)(3)(4) DU** on associated display unit

On associated display unit possible misleading/loss graphics data.

On Ground

- Shut down aircraft for maintenance action

In flight

- Revert unaffected DU to Composite Mode by switching associated RCP switch to functioning DU

ADS FAILURE

1(2) ADS FAIL

+

Disengagement of some FD modes (ALT, ALTA, IAS, VS) + Audio Chime (if FD engaged and on side ADS failure on selected PFD)

✗ and loss of:

- Airspeed
- Altitude
- Vertical Speed

Data on Left (Right) PFD indicators

Associated ADS system failure

- On RCP move ADS switch to non failed ADS

ADS1(2) illuminates on both attitude indicators to highlight PFD’s are using the same data source

- Re-engage FD modes as required

- Compare frequently PFD IAS data with STANDBY indicator.

AHRS FAILURE

1(2) AHRS FAIL
AVIONIC FAULT
1(2) AP FAIL

\+ **ATT FAIL** **HDG FAIL**

AFCS DEGRADED

+ Aural message

and loss of attitude, heading and slip skid data on Left (Right) PFD

Associated AHRS failure (and subsequent 1(2) AP failure)

If FD remain engaged

On-side AHRS failure on non selected PFD

- Uncouple FD unless in approach, missed approach, approach and departure to/from hover, hover and SAR mission

If FD not engaged

- On RCP move AHRS switch to non failed AHRS

AHRS 2(1)

illuminates on attitude indicator to highlight both attitude indicators are using the same AHRS data

If FD modes HDG, NAV, APP, BC, HOV, SAR disengage + Audio Chime and loss of Nav and approach command bars

On-side AHRS failure on selected PFD

- On RCP move AHRS switch to non failed AHRS

AHRS 2(1)

illuminates on attitude indicator to highlight both attitude indicators are using the same AHRS data

- FD may be re-engaged if in approach, missed approach, approach and departure to/ from hover and hover and SAR mission

- Continue Flight

- Compare frequently PFD attitude and heading with STANDBY

AURAL WARNING SYSTEM FAILURE

AWG FAIL

Aural warning system failure. Loss of aural warning

- Continue flight monitoring CAS system as aural warning does not function

AVIONIC FAULT

AVIONIC FAULT

Loss of redundancy in avionic system

On ground

- **Shut down aircraft for maintenance action**

In flight

- **Land as soon as practicable** being aware avionic system has lost redundancy

---

MODULAR AVIONICS UNIT OVERHEAT/FAIL

1(2) MAU OVHT

Associated MAU overheat

If MAU fails be aware of the following:

(For MAU failure with FD engaged see also Page 44)

If **1(2) MAU** message displayed on PFD combined with multiple CAS cautions being generated then MAU1(2) has failed, carry out the following essential actions before continuing to the list of cautions:

- **Continue flight attentive**
- **On RCP move ADS switch to non failed ADS**
- **Do not exceed Vne-27 KIAS in level flight, or 100 KIAS and 1000 fpm in climb**
- **Below 500 ft (152 m) AGL fly manually**
- **Compare frequently PFD data with STANDBY indicator.**

If MAU 1 fails:

1 MAU message displayed on PFD

CAS Messages displayed

AVIONIC FAULT page 48
1 AP FAIL page 37
AFCS DEGRADED page 41
1 ADS FAIL page 46
1 FMS FAIL page 51
1 PITOT FAIL (if 1 PITOT HEATER switch OFF) page 83
FDR FAIL page 50

Procedure continues on next page

MODULAR AVIONICS UNIT OVERHEAT/FAIL (CONT)

System parameters not valid (amber dashed):
MGB OIL TEMP, MGB OIL PRESS
1 HYD OIL TEMP, 1 HYD OIL PRESS
1 ENG OIL TEMP, 1 ENG OIL PRESS
1 FUEL PUMP, MAIN BUS 2 VOLT
ESS BUS 1 VOLT, DC GEN 1 AMP,
NON ESS BUS 1, AUX BATTERY AMP
Loss of redundancy in backup engine parameters N°1 engine
Loss of redundancy in monitor warning functions N°1
Loss of redundancy of MCDU 1 Primary Radio Control

CAS Cautions NOT Available

- 1 ENG OIL TEMP
- EMERG LDG PRESS
- MAIN BATT OFF
- EXT PWR DOOR
- 1 PITOT HEAT OFF
- 1 WOW FAIL
- 1 MCDU OVHT
- 1 MAU OVHT
- 1 ECL FAIL
- 1 ECL POS
- 1 FUEL HEATER
- 1 FUEL ICING

CAS Advisories NOT Available

- LANDING LT ON
- EXT PWR READY
- FWD VENT

CAUTION

In case of MAU 1 failure, do not use electrical and hydraulic synoptic page information.

If MAU 2 fails

2 MAU message displayed on PFD

CAS Messages displayed:

AVIONIC FAULT page 48
2 AP FAIL page 37
AFCS DEGRADED page 41
2 ADS FAIL page 46
2 FMS FAIL page 51
AWG FAIL page 47
GPS FAIL page 52
2 PITOT FAIL (if 2 PITOT HEATER switch OFF) page 83

System parameters not valid (amber dashed):
IGB OIL TEMP, TGB OIL TEMP
2 HYD OIL TEMP, 2 HYD OIL PRESS
2 ENG OIL TEMP, 2 ENG OIL PRESS
2 FUEL PUMP, MAIN BUS 1 VOLT
ESS BUS 2 VOLT, DC GEN 2 AMP,
NON ESS BUS 2, MAIN BATTERY AMP
Loss of redundancy in backup engine parameters N°2 engine
Loss of redundancy in monitor warning functions N°2
Loss of redundancy of MCDU 2 Primary Radio Control

CAS Cautions NOT Available

- 2 ENG OIL TEMP
- TGB OIL TEMP
- IGB OIL TEMP
- AUX BATT OFF
- 2 PITOT HEAT OFF
- 2 WOW FAIL
- 2 MCDU OVHT
- 2 MAU OVHT
- 2 ECL FAIL
- 2 ECL POS
- 2 FUEL HEATER
- 2 FUEL ICING

CAS Advisories NOT Available

- LDG EMER DOWN
- EXT PWR ON
- PARK BRK ON
- SEARCH LT ON

CAUTION

In case of MAU 2 failure, do not use electrical and hydraulic synoptic page information.

MULTIFUNCTION CONTROL DISPLAY UNIT OVERHEATING

1(2) MCDU OVHT

Associated MCDU overheat

Expect keyboard non functioning and/or display to be distorted or disappear

- Increase cockpit ventilation if possible

If MCDU fails

- Use radio tuning function with CCD on PFD

SYSTEM CONFIGURATION FAILURE

SYS CONFIG FAIL

Hardware or sofware configuration problem (displayed on ground only)

- Maintenance action

VALIDATE CONFIGURATION

VALIDATE CONFIG

Hardware or software changed, configuratiion validation operation required (displayed on ground only)

- Select SYSTEM on MFD, from drop down menu select SYS CONFIG to display system configuration pages. To validate configuration press ENTER on CCD.

If caution remains

- Maintenance Action

FLIGHT DATA RECORDER FAILURE

FDR FAIL

Flight Data Recorder failed

On ground

- Refer to minimum equipment list

In flight

- Continue flight

COCKPIT VOICE RECORDER FAILURE

CVR FAIL

Cockpit Flight Recorder failed

On ground

- **Refer to minimum equipment list**

In flight

- **Continue flight**

FMS FAILURE

1(2) FMS FAIL

Failure of Flight Management System 1(2)

If FMS 1(2) not used as Navigation source

- **Continue flight**
  Loss of redundancy for FMS Navigation

If FMS 1(2) used as Navigation source
LNAV, VGP, DCL and MOT modes, if engaged, disengage (with chime)

- **Select FMS 2(1) as Navigation Source (press LNAV on Display Controller) or revert to Radio Navigation as required**

If in Approach

- **Discontinue Approach**

GPS FAILURE (SINGLE GPS INSTALLATION)

GPS FAIL + **FMS/GPS MSCP UNAVL**

HOV, MOT, TDH, TU and WTR modes, if engaged, disengages (with chime) after 30 seconds.
Loss or RNP capability (If applicable)

GPS system failure
Groundspeed references not available
FMS reverts to alternative navigation sensors

If FMS 1 or 2 not selected as navigation source

- **Continue flight**
  HOV, MOT, TDH, TU and WTR modes not available

If FMS 1 or 2 selected as navigation source

- **Check FMS Navigation mode**
  (MCDU PROGRESS 1/3 page).
- Ensure approved FMS sensors for specific phase of flight are in use, or revert to Radio Navigation, as required

If not in Approach

- **Continue flight**
  HOV, MOT, TDH, TU and WTR modes not available
  If DGR illuminates on selected PFD, revert to Radio Navigation

If in Approach

- **Discontinue Approach**

DOUBLE GPS FAILURE (DOUBLE GPS INSTALLATION)

1-2 GPS FAIL + **FMS/GPS MSCP UNAVL**

HOV, MOT, TDH, TU and WTR modes, if engaged, disengages (with chime) after 30 seconds
Loss or RNP capability (if applicable)
Loss of SVS (if installed)

GPS system failure
Groundspeed references not available
FMS reverts to alternative navigation sensors

If FMS 1 or 2 not selected as navigation source

- **Continue flight**
  HOV, MOT, TDH, TU and WTR mode not available

If FMS 1 or 2 selected as navigation source

- **Check FMS Navigation mode**
  (MCDU PROGRESS 1/3 page).
- Ensure approved FMS sensors for specific phase of flight are in use, or revert to Radio Navigation, as required

If not in Approach

- **Continue flight**

HOV, MOT, TDH, TU and WTR modes not available
If DGR illuminates on selected PFD, revert to Radio Navigation

If in Approach

- **Discontinue Approach**

GPS FAILURE (DOUBLE GPS INSTALLATION)

1(2) GPS FAIL

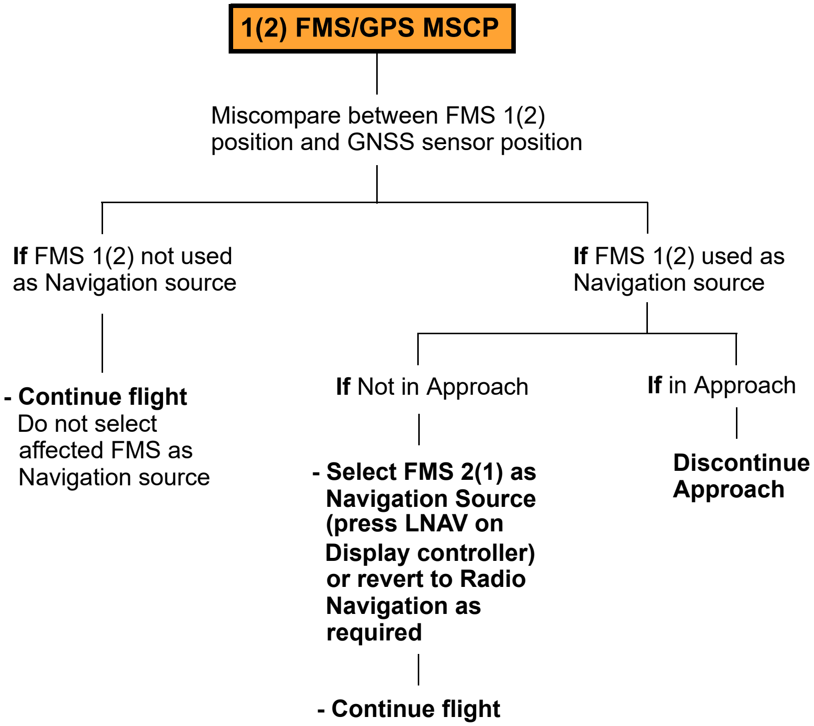
1(2) GPS system failure

Loss of GPS redundancy

- **Continue flight**

Note
Phase 4 only, PRAIM not available following GPS 2 failure.

SINGLE FMS/GPS MISCOMPARE



1(2) FMS/GPS MSCP

Miscompare between FMS 1(2) position and GNSS sensor position

If FMS 1(2) not used as Navigation source

- Continue flight
Do not select affected FMS as Navigation source

If FMS 1(2) used as Navigation source

If Not in Approach

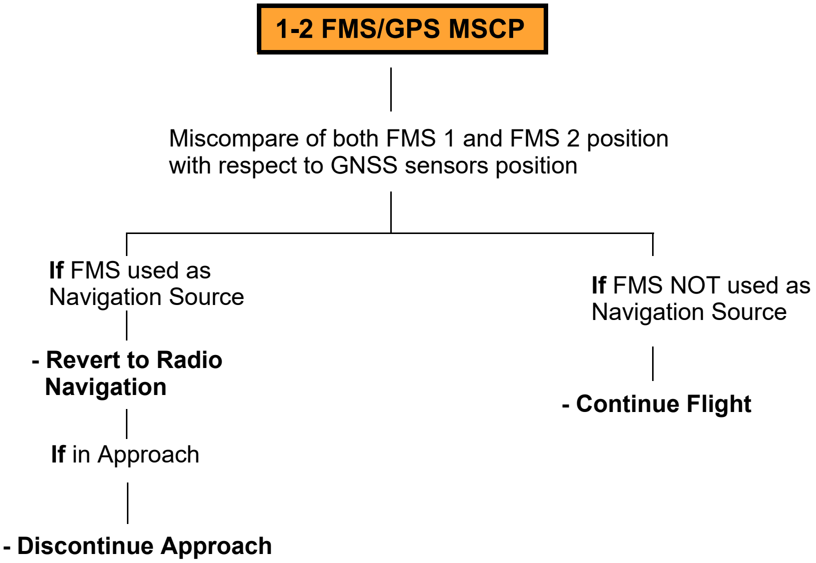
- Select FMS 2(1) as Navigation Source (press LNAV on Display controller) or revert to Radio Navigation as required

- Continue flight

If in Approach

Discontinue Approach

DUAL FMS/GPS MISCP



1-2 FMS/GPS MSCP

Miscompare of both FMS 1 and FMS 2 position with respect to GNSS sensors position

If FMS used as Navigation Source

- Revert to Radio Navigation

If in Approach

- Discontinue Approach

If FMS NOT used as Navigation Source

- Continue Flight

FMS/GPS MISCOMPARE UNAVAILABLE

FMS/GPS MSCP UNAVL

FMS/GPS position comparison function not available.

If FMS 1 or 2 not selected as navigation source

- Continue flight

If FMS 1 or 2 selected as navigation source

- Revert to Radio Navigation

If not in Approach

- Continue flight

If in Approach

- Discontinue Approach

DOUBLE LPV UNAVAILABLE CAUTION

1-2 LPV UNAVAIL **+** **LPV** **on both PFD's**

LPV approach unavailable

If before FAF

- Continue approach using LNAV/VNAV minima or alternative approved means

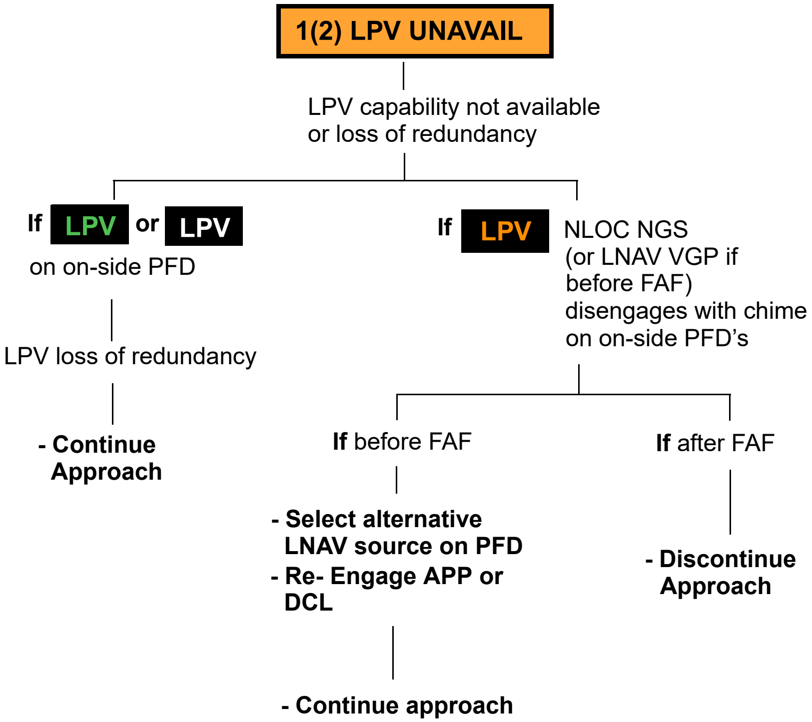
If LNAV/VNAV minima not available

- Discontinue Approach

If after FAF

- Discontinue Approach

SINGLE LPV UNAVAILABLE CAUTION

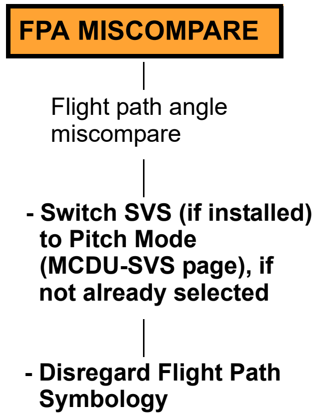


1(2) LPV UNAVAIL

LPV capability not available or loss of redundancy

- **If** LPV **or** LPV on on-side PFD
  - LPV loss of redundancy
    - **- Continue Approach**
- **If** LPV NLOC NGS (or LNAV VGP if before FAF) disengages with chime on on-side PFD's
  - **If** before FAF
    - **- Select alternative LNAV source on PFD**
    - **- Re- Engage APP or DCL**
      - **- Continue approach**
  - **If** after FAF
    - **- Discontinue Approach**

FLIGHT PATH MISCOMPARE (PHASE 8 AND LATER)



FPA MISCOMPARE

Flight path angle miscompare

- Switch SVS (if installed) to Pitch Mode (MCDU-SVS page), if not already selected

- Disregard Flight Path Symbology

DISPLAY UNIT DATABASE DEGRADED (PHASE 8 AND LATER)

1(2)(3)(4) DU DB DGRD

One or more databases
loaded on affected display
degraded

If a PFD is affected or an
MFD in composite mode
- Select SVS OFF (if installed)
- Select 2D Terrain in HSI OFF
(TERR/HSI button on display controller)
If a MFD is affected
- Select Terrain, aeronautical, Geopolitical
and Flight Plans OFF on affected MFD

DOUBLE GPS FAILURE DURING CUSTOM APPROACH (PHASE 8 AND LATER)

1-2 GPS FAIL + **FMS/GPS MSCP UNAVL**

GPS system failure
FMS reverts to alternative
navigation sensors

Loss or RNP capability
Loss of SVS (if installed)

- **If** during Approach without level segment
  - **- Discontinue Approach**
- **If** during Approach with level segment
  - **If** during descent as soon as DGR is displayed VRT and optional DCL modes disengage with chime
    - **- Discontinue Approach**
  - **If** during level segment RHT and optional DCL remain engaged
    - **If** required visual references NOT achieved
      - **- Discontinue Approach**

COMMUNICATION SYSTEM

VHF OVERHEAT

1(2) VHF COM OVHT

Associated radio transmitter overheat

On affected radio

- Minimise operation if possible

AUDIO PANEL FAILURE

1(2)(3)(4)(5)(6)(7)(8) AUDIO FAIL

Associated audio panel system failed

- Revert to back up ICS on audio panel to communicate with crew and transmit on failed side VHF only.

CAUTION

When Audio Panel 1/2 has been reverted to back-up mode audio tones and voice warnings cannot be heard by on side crew.

Note

Audio panel identification:1-Copilot, 2-Pilot, 3-Hoist Operator, 4-Cabin Operator (if installed), 5-2nd Cabin Operator (if installed), 6-3rd Cabin Operator (if installed) 7-8 Reserved .

MRC OVERHEAT

1(2) MRC OVHT

Associated Radio/Nav modular system overheat

- Continue flight
being aware that Radio
or Nav system may malfunction.

ELECTRICAL

SINGLE DC GENERATOR FAILURE

1(2) DC GEN

Associated DC generator failure

- If **BUS TIE OPEN** caution illuminated
  1(2) GEN load
  less than 3%
  - **Reset BUS TIE and set ON or increase electrical load on associated MAIN BUS**
  - **Continue flight**

On failed generator
- **OFF then ON**

If caution remains
- **Switch OFF associated generator.**
- **Continue flight**
  power is supplied by
  remaining generator.
  NON ESS BUS 1 & 2 lost
  (See Note below)
- **Monitor GEN load on MFD. Reduce electrical load if limit exceeded**

DC GENERATOR OVERHEAT

1(2) DC GEN HOT

Associated DC generator overheat

On affected DC generator
- **Switch OFF generator**
- **Continue flight**
  Power is supplied by remaining generator.
  NON ESS BUS 1 & 2 lost (See Note below)

NOTE

Services lost for DC NON ESS BUS 1 & 2 failure.

DC NON ESS BUS 1	**DC NON ESS BUS 2**
CABIN VENT	ECS (CABIN)
COCKPIT VENT (CPLT)	EXT/SPKR POWER
CPLT W/WIPE	NOSE BAY FAN 2*
ECS (COCKPIT)	
FUEL DRAIN VALVE	
STEP LIGHT	
NOSE BAY FAN 1*	

* NOSE BAY FANs for Long Nose Variant only (function on ground only)

DC GENERATOR OVERLOAD (EPIC Phase 5 or later)

1(2) GEN OVLD

Associated 1(2) DC generator in overload condition (in red band for more than 45 seconds)

- **Reduce electrical load on associated generator to within green range**
- **Continue flight**

MAIN BATTERY OFF

MAIN BATT OFF

Failure of MAIN battery to MAIN BUS 1

- **Confirm BATTERY MAIN switch ON**
- **Continue flight** being aware MAIN BATTERY not being charged by MAIN BUS 1

Note

When external power is connected the batteries are automatically disconnected and the MAIN BATT OFF and AUX BATT OFF cautions illuminate.

AUXILIARY BATTERY OFF

AUX BATT OFF

Failure of AUX battery to MAIN BUS 2

- **Confirm BATTERY AUX switch ON**
- **Continue flight** being aware AUX BATTERY not being charged by MAIN BUS 2

Note

When external power is connected the batteries are automatically disconnected and the MAIN BATT OFF and AUX BATT OFF cautions illuminate.

LOSS OF MAIN AND/OR AUXILIARY BATTERY SUPPLY

BATT OFF LINE

Failure of MAIN and/or AUX battery connection to ESS BUS

- Confirm BATTERY MASTER switch ON

- Continue flight being aware MAIN and/or AUX battery not connected to ESS BUS

BUS TIE OPEN

BUS TIE OPEN

BUS TIE has been requested to close (either manually by pilot selecting BUS TIE switch to ON, or automatically due to a DC GEN failure) but BUS TIE remains OPEN

- Reset BUS TIE and set to ON

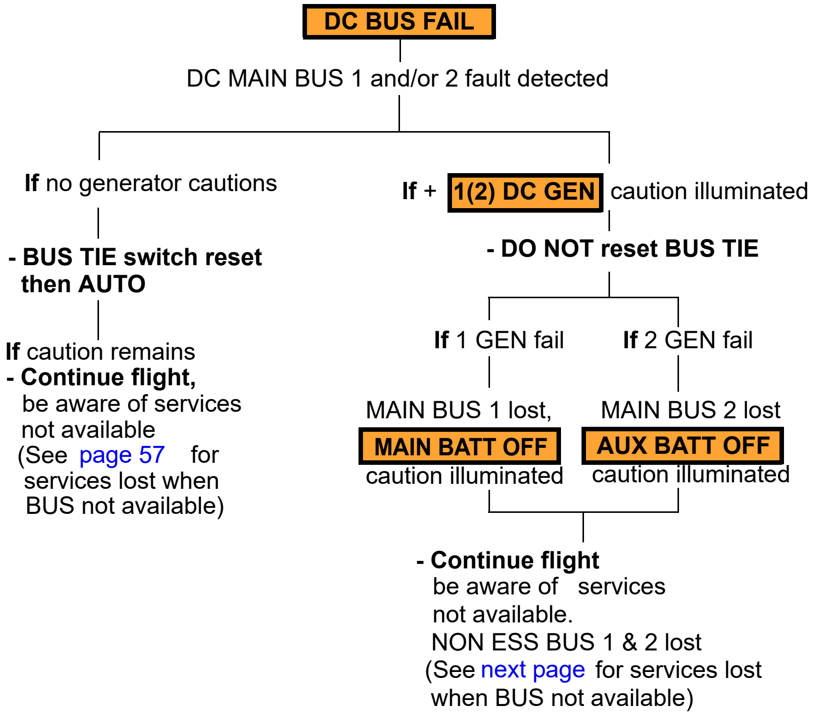
If caution remains connection of the MAIN BUS 1 and 2 not functioning.

- Continue flight

CAUTION

A subsequent DC Generator failure will cause loss of associated MAIN BUS as the BUS TIE will remain open.

DC MAIN BUS FAILURE



DC BUS FAIL

DC MAIN BUS 1 and/or 2 fault detected

If no generator cautions

- BUS TIE switch reset then AUTO

If caution remains

- Continue flight, be aware of services not available (See page 57 for services lost when BUS not available)

If + **1(2) DC GEN** caution illuminated

- DO NOT reset BUS TIE

If 1 GEN fail

MAIN BUS 1 lost, **MAIN BATT OFF** caution illuminated

If 2 GEN fail

MAIN BUS 2 lost **AUX BATT OFF** caution illuminated

- Continue flight be aware of services not available. NON ESS BUS 1 & 2 lost (See next page for services lost when BUS not available)

NOTE

Services lost:

DC MAIN BUS 1

ADM 1
ANTI-COLL LIGHT
CARGO HOOK RELEASE
CLOCK CPLT
COCKPIT CPLT LIGHT
CPLT ICS
(CPLT ICS in back up mode)
CPLT PFD
CSL ILLUM
FD1
HOIST POWER
HOIST CUTTER 1
HOIST CONTROL
HUMS
HYD ELEC PUMP
LINEAR ACTUATOR 1
MAU1 (PRI POWER)
MCDU PLT
MRC 1 (NIM 1, NAV 1)
OVHD PANEL ILLUM
PA
PFD CPLT CONTROL
PITOT 1 FAIL INDICATION
PITOT HEAT 1
RAD ALT 1
UTIL POWER
W/RADAR
XMSN OIL LEVEL SENSOR

Services lost:

DC MAIN BUS 2

AUTO TRIM
BAGGAGE COMPT LIGHT
CABIN LIGHT
COCKPIT/CABIN HEATER
COCKPIT VENT (PLT)
CPLT MFD
DOME LIGHT
FD2
HOIST LIGHT
MAU 1 (AUX POWER)
MCDU CPLT
MRC 2 (ADF & DME)
PLT W/WIPER
PSU
RAD ALT 2
SEARCH LIGHT CONTROL
SEARCH LIGHT POWER
STORM LIGHT
SUN LIGHT CONTROL
VENT CONTROL 2
V/UHF

DC NON ESS BUS 1

CABIN VENT
COCKPIT VENT (CPLT)
CPLT W/WIPE
ECS (COCKPIT)
FUEL DRAIN VALVE
STEP LIGHT
NOSE BAY FAN 1*

DC NON ESS BUS 2

ECS (CABIN)
EXT/SPKR POWER
NOSE BAY FAN 2*

* NOSE BAY FANS for Long Nose Variant only (function on ground only)

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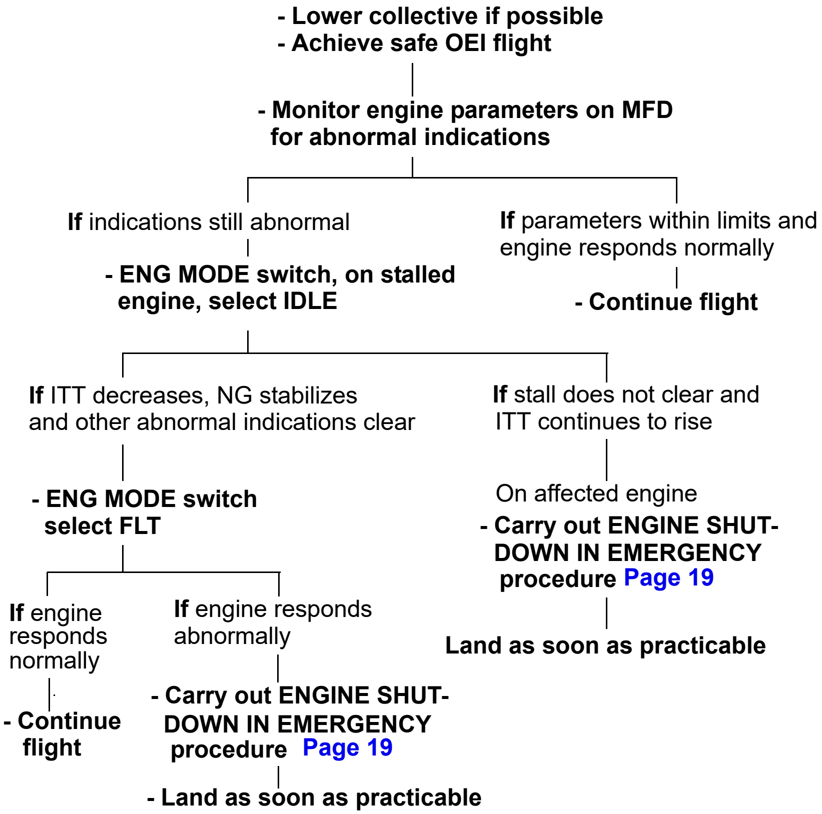
ENGINE MALFUNCTIONS

COMPRESSOR STALL

If compressor stall occurs, carry out the following procedure



- Lower collective if possible
- Achieve safe OEI flight

- Monitor engine parameters on MFD for abnormal indications

If indications still abnormal

- ENG MODE switch, on stalled engine, select IDLE

If ITT decreases, NG stabilizes and other abnormal indications clear

- ENG MODE switch select FLT

If engine responds normally

- Continue flight

If engine responds abnormally

- Carry out ENGINE SHUTDOWN IN EMERGENCY procedure Page 19

- Land as soon as practicable

If stall does not clear and ITT continues to rise

On affected engine

- Carry out ENGINE SHUTDOWN IN EMERGENCY procedure Page 19

Land as soon as practicable

If parameters within limits and engine responds normally

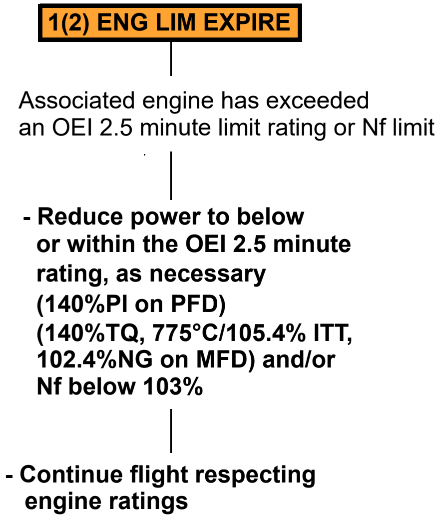
- Continue flight

UNUSUAL ENGINE NOISE

If an unusual noise is detected and FOD damage suspected:

1. Attempt to establish which engine has problems by monitoring ITT, NG, Engine Oil Pressure, Engine Oil Temperature.
2. Switch affected ENG MODE to IDLE or select sequentially to determine the affected engine.
3. On affected engine carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure, page 19.
4. Land as soon as practicable.

ENGINE LIMIT EXCEEDANCE



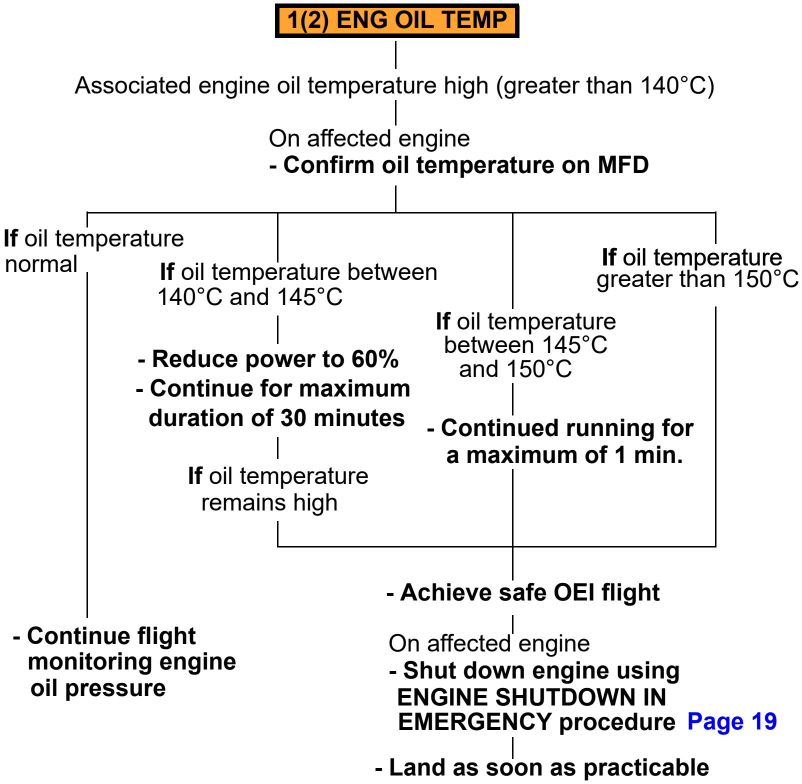
1(2) ENG LIM EXPIRE

Associated engine has exceeded an OEI 2.5 minute limit rating or Nf limit

- Reduce power to below or within the OEI 2.5 minute rating, as necessary (140%PI on PFD) (140%TQ, 775°C/105.4% ITT, 102.4%NG on MFD) and/or Nf below 103%

- Continue flight respecting engine ratings

ENGINE OIL TEMPERATURE



1(2) ENG OIL TEMP

Associated engine oil temperature high (greater than 140°C)

On affected engine

- Confirm oil temperature on MFD

If oil temperature normal

- Continue flight monitoring engine oil pressure

If oil temperature between 140°C and 145°C

- Reduce power to 60%

- Continue for maximum duration of 30 minutes

If oil temperature remains high

If oil temperature between 145°C and 150°C

- Continued running for a maximum of 1 min.

If oil temperature greater than 150°C

- Achieve safe OEI flight

On affected engine

- Shut down engine using ENGINE SHUTDOWN IN EMERGENCY procedure Page 19

- Land as soon as practicable

ENGINE OIL PRESSURE HIGH

If engine oil pressure operates continuously above oil pressure limit carry out the following:

- Continue flight

On affected engine
- Monitor engine parameters on MFD

If oil pressure remains in red or engine parameters erratic

- Achieve safe OEI flight

On affected engine
- Shut down engine using ENGINE SHUT DOWN IN EMERGENCY procedure **Page 19**

- Land as soon as practicable

If oil pressure remains in amber

- Continue flight

ENGINE CHIP DETECTOR

1(2) ENG CHIP

- Achieve safe OEI flight

- BUS TIE switch ON

On affected engine
- ENG MODE switch to IDLE

If engine indication stable

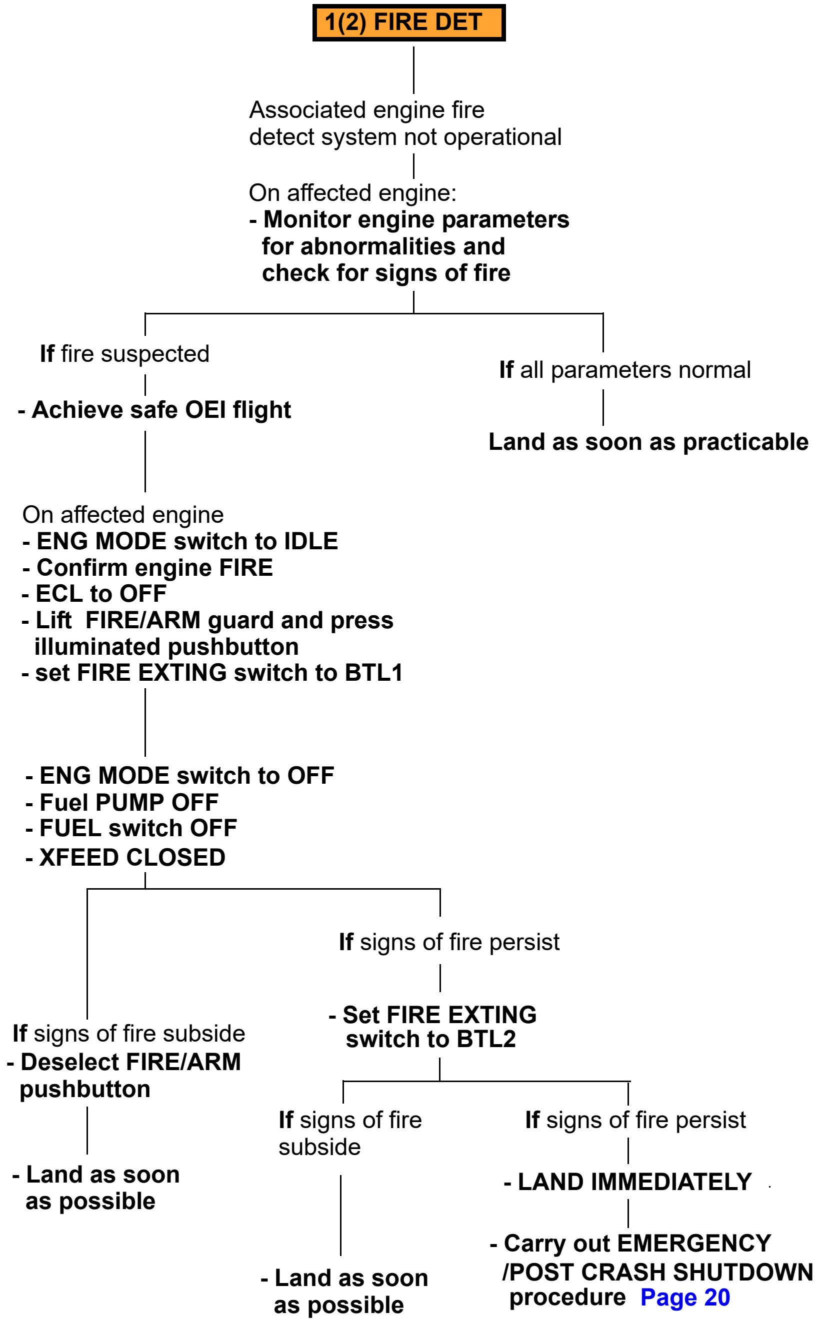
- Land as soon as practicable
If required, and ENG oil pressures and temperatures normal ENG MODE may be selected to FLT for landing

If any of the following occur:
- engine speed starts to decrease
- engine vibration increases
- engine oil pressure/temperature changes significantly

On affected engine
- Carry out ENGINE SHUTDOWN IN EMERGENCY procedure
Page 19

- Land as soon as practicable

ENGINE FIRE DETECTOR SYSTEM



1(2) FIRE DET

Associated engine fire
detect system not operational

On affected engine:
**- Monitor engine parameters
for abnormalities and
check for signs of fire**

If fire suspected

- Achieve safe OEI flight

On affected engine
- ENG MODE switch to IDLE
- Confirm engine FIRE
- ECL to OFF
**- Lift FIRE/ARM guard and press
illuminated pushbutton**
- set FIRE EXTING switch to BTL1

- ENG MODE switch to OFF
- Fuel PUMP OFF
- FUEL switch OFF
- XFEED CLOSED

If signs of fire subside
**- Deselect FIRE/ARM
pushbutton**

**- Land as soon
as possible**

If signs of fire persist

**- Set FIRE EXTING
switch to BTL2**

If signs of fire
subside

**- Land as soon
as possible**

If signs of fire persist

- LAND IMMEDIATELY

**- Carry out EMERGENCY
/POST CRASH SHUTDOWN
procedure Page 20**

If all parameters normal

Land as soon as practicable

ENGINE CONTROL LEVER

1(2) ECL FAIL

Associated engine ECL remote control beep not functioning

- Continue flight

If engine manual control required use manual lever

Note

If possible the torque of the manually controlled engine should be set at a torque level 10% below the other engine.

ENGINE CONTROL LEVER POSITION

1(2) ECL POS

Associated engine ECL out of flight position detent
(only active when engine control in AUTO mode)

- Confirm ECL position and correct.

If caution remains

- Continue flight

On affected engine
- Monitor engine parameters,
Be aware of a possible reduction
in engine response characteristics
and power available

ENGINE MODE SELECT SWITCH

1(2) ENG MODE SEL

Associated engine MODE SELECT switch failure

- Continue flight

On affected engine
- On collective grip cycle ENG GOV switch MANUAL then AUTO

If caution remains
- Monitor engine parameters being aware that engine may need to be shut down using ECL

ENGINE POWER TURBINE OVERSPEED

1(2) OVSPD

Associated engine in overspeed condition

- Check PI and NF

If PI on both engines fluctuating and NF approx 110% on affected engine probable 'run up' has occured

- Confirm engine in overspeed condition (CAS caution message)

On affected engine
- ENG GOV switch to MANUAL
- Control ECL using beep switch

- Land as soon as practicable

If engine cannot be controlled manually

Note
If possible the torque of the manually controlled engine should be set at a torque level 10% below the other engine. (If PI on either/both engines is ITT or NG limited refer to TQ on MFD PWR PLANT page).

If NF approx 110% and/or TQ 0% the drive shaft has failed on affected engine

- Achieve safe OEI flight

- Carry out ENGINE SHUTDOWN IN EMERGENCY procedure
Page 19

- Land as soon as practicable

Note
Following engine drive shaft failure, NF may overspeed and reach the NF overspeed trip point (111%).

ENGINE ELECTRONIC CONTROL DATA

1(2) EEC DATA

Associated engine EEC system non critical fault

- Continue flight

On affected engine:
- On collective grip cycle ENG GOV switch from AUTO to MANUAL and back to AUTO

If caution remains

- Confirm engine parameter readings with analogue sensors, avoid operation near engine limits if possible

DEGRADATION OF ENGINE CONTROL FUNCTIONS

1(2) DCU

Associated engine control function degraded

- Continue flight

On affected engine:

- Monitor engine parameters and compare with analogue values

- Avoid operating at engine limits if possible

ENGINE HOT START

1(2) HOT START

Associated engine ITT limits exceeded during start

On ground

On affected engine

- ENG Mode switch select OFF
ECL move to OFF
ENG FUEL switch select OFF

- Carry out Dry Motoring Proc. Normal Proc. Page 44

- Shut down aircraft

In flight

- Maintain safe OEI flight

On affected engine

- ENG Mode switch select OFF
ECL move to OFF

- FUEL PUMP switch select OFF
ENG FUEL switch select OFF

- Carry out Dry Motoring Proc. Normal Proc. Page 44

- Land as soon as practicable

TORQUE LIMITER

1(2) TQ LIMITER

Associated engine torque limiter system not functioning

- Continue flight

On affected engine:

- For inconsistent TQ indication or invalid TQ select analogue reading on MFD

If TQ LIMiter not enabled

- Do not select TQ LIMiter

- Respect engine limits manually.

If TQ LIMiter enabled

- De-select TQ LIMiter
(TQ Limiter ON advisory message not illuminated)

- Respect engine limits manually.

Note

The analogue sensors are selected from MFD PWR PLANT page, select ANALOG using Cursor Control Device.

INTER TURBINE TEMPERATURE LIMITER

1(2) ITT LIMITER

Associated engine ITT limiter not functioning

- Continue flight

- Set LD-SH switch to TORQUE

On affected engine:

- Select analogue ITT reading on MFD

- Avoid operating near engine limits

ENGINE POWER TURBINE OVERSPEED DETECT FAILURE

1(2) OVSPD DET

Associated engine NF overspeed detection system not operational

- Continue flight

On affected engine:

- Be aware than NF overspeed protection system will not function at the correct NF speed in the event of an NF overspeed.

FUEL FILTER BY-PASS

1(2) FUEL FILTER

Fuel filter blockage, impending bypass condition

On affected engine

- Monitor engine for possible reduction in power available

- Land as soon as practicable

FUEL ICING

1(2) FUEL ICING

Associated fuel temperature less than 5°C,
possible fuel heater malfunction and fuel icing

On ground

- Do not take off if caution does not extinguish as engine oil temperature increases and 1(2) FUEL HEATER caution illuminates

In flight

On affected engine

- Monitor engine for possible reduction in power available

If 1(2) FUEL FILTER caution illuminates, possible filter blockage due to ice

- Land as soon as practicable

FUEL HEATER

1(2) FUEL HEATER

Associated fuel temperature greater than 74°C **or** fuel temperature less than 5°C with associated engine oil temperature greater than 82°C. Possible fuel heater malfunction.
(Caution only active with associated engine running)

- Continue flight

On affected engine

- Monitor engine for possible reduction in power available or 1(2) FUEL ICING caution.

ENGINE AND ROTOR PARAMETERS MISCOMPARE

1(2) NF MISCOMPARE

or

1(2) NG MISCOMPARE

or

1(2) ITT MISCOMPARE

or

1(2) TQ MISCOMPARE

or

NR MISCOMPARE

Associated parameter EEC and analogue backup data comparison discrepancy

- Continue flight

On affected parameter

- Confirm correct value with analogue back up parameter

The MISCOMPARE caution is generated when comparison with backup parameter exceeds the following values:

NF	3%
NG	3%
ITT	50°C
TQ	15% (5%)*
NR	3%

Note

The analogue sensors are selected from MFD PWR PLANT page, menu selection using Cursor Control Device.

Note*

For Primus EPIC S/W EB7030191-00112 and all previous versions the TQ MISCOMPARE caution may illuminate spuriously due to low comparison threshold value (5%). Check occasionally to confirm that the ECC and analogue parameters are matched when the caution is illuminated.

ENGINE ANALOGUE SENSOR FAILURE

ENG ANALOG FAILURE

Failure of an analogue parameter

- Continue flight

- Select analogue sensor from MFD PWR PLANT page menu, select ANALOG using Cursor Control Device.

- Note which analogue parameters have failed.

- Deselect ANALOG sensors to return display to digital values

Be aware that the MISCOMPARE caution for the failed parameters will be inoperative

ENGINE IN FLIGHT RESTART PROCEDURE

If an engine flames out/or is shutdown during flight and if there is no indication of a mechanical malfunction or engine fire, the engine may be restarted.

Note

If, after a double engine failure, ENG 2 is to be started first set BUS TIE to ON.

STARTING MALFUNCTIONS AND ASSOCIATED ABORT ACTIONS

CAUTION

Failure to follow the appropriate Abort Procedure may cause damage to the engine.

Monitor engine start and if any of the following occur:

— light up is not within 10 seconds of ENG MODE switch to IDLE

— abnormal noise heard

— ITT increases beyond engine limits (HOT START caution illuminated)

— engine hangs (stagnation in NG below 54%)

— engine starter fails to disengage by 49% NG.

Shut down engine by:

1. ENG MODE switch — OFF.
2. ECL — OFF.
3. FUEL PUMP — OFF.
4. ENG FUEL switch — OFF.

Note

Observe the starter generator duty cycle limitations.

RESTARTING PROCEDURE

CAUTION

During starter activation AP1 may disengage

1. Airspeed — Less than 120 KIAS.
2. ECL — Confirm FLIGHT.
3. ENG Fuel switch — ON - Fuel valve indicator vertical.
4. FUEL PUMP — ON - FUEL PUMP caution not illuminated, check pressure.
5. MFD display — Confirm PWR PLANT page.
6. ENG MODE switch — Below 15000 ft Hp select IDLE
   — Above 15000 ft Hp select IDLE when NG at 0%

Procedure continues on next page

Note

It is recommended to start the engine to IDLE, if necessary, it is possible to start to FLIGHT by setting the ENG MODE switch directly to FLT.

7. Gas Producer (NG) — Note increasing and START legend displayed.
8. Engine temperature (ITT) — Note increasing and IGN legend displayed.
9. Engine oil pressure — Confirm rising.
10. Engine starter — Disengaged by 49% NG.
11. Engine power turbine speed (NF) — Confirm stabilized to IDLE speed below 100%.

Note

If the engine was started directly to FLT the NF will stabiles at 100% with rotor speed.

12. ENG MODE switch — FLT.
13. Engine parameters — Confirm within limits and matched with other engine.

ENGINE MANUAL STARTING

It is recommended that engine start be carried out in AUTO mode when possible. If a MANUAL start is necessary carry out the following procedures.

MANUAL STARTING MALFUNCTIONS AND ASSOCIATED ABORT ACTIONS

CAUTION

Failure to follow the appropriate Abort Procedure may cause damage to the engine.

Monitor engine start and, if any of the following occur:

— light-up is not within 10 seconds of ECL starter pushbutton engagement

— abnormal noise heard

— ITT increases beyond engine limits (HOT START caution illuminated)

— engine hangs (stagnation in NG below 54%) and NG cannot be accelerated with movemet of ECL

— engine starter fails to disengage by 49% NG.

Shut down engine by:

1. ECL — OFF position.
2. ENG MODE switch — OFF.
3. FUEL PUMP — OFF.
4. ENG FUEL switch — OFF.

Note

Observe the igniter and starter generator duty cycle limitations.

ENGINE MANUAL STARTING ON GROUND PROCEDURE

Engine manual starting, on the ground, should only be carried out if it is essential to move the aircraft, for example from a helideck to allow access to other aircraft.
It is necessary, however, to have the other engine running in AUTO mode to help control rotor speed.

Following an aborted start shutdown, perform a Dry Motoring Procedure before restarting. See Lims-Norm-Perf page 44.

MANUAL START PROCEDURE

The servicable engine must be started first and MPOG established.

1. MFD display — Confirm PWR PLANT page
2. ECL — OFF on required engine
3. ENG GOV — MANUAL on required engine (Confirm MAN legend on PI and TQ indicators)
4. ENG Fuel switch — ON - Fuel valve indicator vertical
5. FUEL PUMP — ON - FUEL PUMP caution not illuminated, check pressure
6. ENG MODE switch — Select IDLE
7. ECL starter pushbutton — Push and release, START and IGN legends displayed
8. Gas Producer (NG) — Note increasing
9. ECL — Advance to FLIGHT, and beyond if required, when NG greater than 15% and ITT below 200°C (26%)
10. Engine temperature (ITT) — Confirm increasing
11. Engine oil pressure — Confirm rising.
12. Engine starter — Verify disengaged when NG above 49% band START and IGN legends extinguished
13. Gas producer (NG) — Confirm stabilized at 68% or above.

Note

If NG hangs below 68%, advance ECL beyond FLIGHT to accelerate to 68% NG then return to FLIGHT.

14. Engine parameters — Confirm within limits.

CAUTION

In manual mode the ECL must be advanced to adjust engine power. This should be carried out using the ECL beep switch. It is recommended that the manual engine be set to a torque 10% lower than the other engine.

ENGINE MANUAL IN FLIGHT RESTART PROCEDURE

CAUTION

During starter activation AP1 may disengage.

1. MFD display — Confirm PWR PLANT page.
2. ECL — OFF on required engine.
3. ENG GOV — MANUAL on required engine (Confirm MAN legend on PI and TQ indicators).
4. ENG Fuel switch — ON - Fuel valve indicator vertical.
5. FUEL PUMP — ON - FUEL PUMP caution not illuminated, check pressure.
6. ENG MODE switch — Below 15000 ft Hp select IDLE when NG below 20%.
   — Above 15000 ft Hp select IDLE when NG at 0%.
7. ECL starter pushbutton — Push and release, START and IGN legends displayed.
8. Gas Producer (NG) — Note increasing.
9. ENG ECL — Advance to FLIGHT, and beyond if required, when NG greater than 15% and ITT below 200°C (26%).
10. Engine temperature (ITT) — Confirm increasing.
11. Engine oil pressure — Confirm rising.
12. Engine starter — Verify disengaged when NG above 49% band START and IGN legends extinguished.
13. Gas producer (NG) — Confirm stabilized at 68% or above.

Note

If NG hangs below 68%, advance ECL beyond FLIGHT to accelerate to 68% NG then return to FLIGHT.

14. Engine parameters — Confirm within limits.

CAUTION

In manual mode the ECL must be advanced to adjust engine power. This should be carried out using the ECL beep switch. It is recommended that the manual engine be set to a torque 10% lower than the other engine.

ENGINE SHUTDOWN USING ECL/MANUAL

If and engine malfunction has occured but an **Engine Shut Down in Emergency** or **Emergency/Post Crash Shutdown** procedure is not required follow the procedure below to shut down engines after flight:

1. ENG 1 and 2 MODE switches — Set to IDLE.

   If ENG MODE selection is ineffective then:

   ENG GOV switch (on affected engine) — Set MANUAL

   ECL — Set MIN

Note

A period of 60 seconds stabilization at IDLE is recommended.

2. BUS TIE switch — ON (for night operations).
3. Fuel PUMP 1 and 2 switches — OFF.
4. ENG 1 and 2 MODE switches — OFF.

   If ENG MODE selection is ineffective then:

   ECL (on affected engine) — OFF

CAUTION

- During shut down note that:
- NG speed decelerates freely without abnormal noise or rapid run down
- ITT does not rise abnormally.

5. ENG 1 and 2 FUEL valve — OFF 1 & 2 FUEL PUMP caution messages. (Fuel valve indicator bar horizontal).
6. Fuel XFEED switch — CLOSED (indicator bar vertical)
7. Cockpit lights — OFF.
8. ANTI-COL lights — OFF.
9. BUS TIE switch — Confirm AUTO.

CAUTION

Prior to switching electrical power OFF ensure engine NG values are at 0%.

10. BATTERY MASTER and GENerators — OFF.
11. BATTERY MAIN and AUX — OFF.

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FUEL SYSTEM

FUEL LOW

1(2) FUEL LOW

On affected tank fuel contents below 92 kg

- Check fuel contents and XFEED if required (see Note)

- Land as soon as practicable (within 20 minutes)

Note

If the XFEED is open and a FUEL PUMP is OFF, the tank with FUEL PUMP OFF, not supplying the engines, will have a maximum level of unusable fuel of 228 kg. The unusable fuel level value will change to grey to indicate the tank is no longer supplying fuel.

FUEL PRESSURE LOW

1(2) FUEL PUMP

Associated fuel pressure low (less than 0.6 bar)

- Confirm XFEED opens automatically
- Switch OFF associated pump

If fuel pressure not recovered.

Possible fuel leak,
- Close FUEL XFEED

- Continue flight

- Be attentive for signs of fuel leak or engine loss of power.

If fuel pressure recovered.

- Continue flight

Note

When cross feeding, the tank with pump off, NOT supplying the engines, will have a maximum quantity of unusable fuel of 228 kg. This unusable fuel level value will change to grey to indicate the tank can no longer supply fuel.
Close X-FEED to restore the availability of up to 228 kg of fuel. Engine operation, in suction mode, is assure and FUEL pressure, on MFD, is invalid displaying amber “0” or dashed. Avoid abrupt aircraft manoeuvres.

FUEL

DOUBLE FUEL PUMP FAILURE

1-2 FUEL PUMP

Fuel pressure low (less than 0.6 bar)
in both fuel systems

- Select XFEED CLOSED
- Switch OFF PUMP 1 and PUMP 2

- Land as soon as practicable

Note

Engine operation, in suction mode, is assured and FUEL pressure, on MFD, is invalid displaying amber ‘0’ or dashed.
Avoid abrupt aircraft manoeuvres.

FUEL CONTENTS GAUGING UNIT FAILURE

1(2) FCU FAIL

Associated FCU failure and possible loss
or degradation of fuel contents indication

- Continue flight

If 1 FCU FAIL

If FUEL 2
below 228kg

- Monitor for 1 FUEL LOW caution when remaining fuel will be 92 kg

If FUEL 2
above 228kg

- FUEL 1 level can be taken as equal to FUEL 2 level

If 2 FCU FAIL

If FUEL 1
below 228kg

- Monitor for 2 FUEL LOW caution when remaining fuel will be 92 kg

If FUEL 1
above 228kg

- FUEL 2 level can be taken as equal to FUEL 1 level

FUEL LOW SENSOR FAILURE

1(2) FUEL LOW FAIL

Associated fuel low sensor failure

- Continue flight

On affected system
- Monitor fuel quantity, low level caution inoperative

FUEL PROBE FAILURE

1(2) FUEL PROBE

Associated fuel probe failure and degradation of fuel contents indication

- Continue flight

- **If 1 FUEL PROBE**
  - **If** FUEL 2 below 228kg
    - **- Monitor for 1 FUEL LOW caution when remaining fuel will be 92 kg**
  - **If** FUEL 2 above 228kg
    - **- FUEL 1 level can be taken as equal to FUEL 2 level**
- **If 2 FUEL PROBE**
  - **If** FUEL 1 below 228kg
    - **- Monitor for 2 FUEL LOW caution when remaining fuel will be 92 kg**
  - **If** FUEL 1 above 228kg
    - **- FUEL 2 level can be taken as equal to FUEL 1 level**

Note
Be aware that aircraft fuel quantity roll angle compensation will not be functioning.

FUEL CONTENTS GAUGING UNIT TEST SYSTEM FAILURE

1(2) FCU TEST FAIL

Associated fuel contents unit test system failed
(Only active on ground)

- Shut down aircraft for maintenance action

ABNORMAL FUEL CONSUMPTION

Monitor fuel quantity frequently. If an abnormal fuel consumption is confirmed, a fuel leakage may be present. therefore, depending on remaining fuel quantity:

- Land as soon as possible

or

- Land as soon as practicable

HYDRAULIC SYSTEM

HYDRAULIC PRESSURE LOW

1 HYD OIL PRESS + **1 HYD PUMP** + **1 SERVO** + **EMERG LDG PRESS**

or

2 HYD OIL PRESS + **2-4 HYD PUMP** + **2 SERVO** + **HYD UTIL PRESS**

Loss of pressure in associated hydraulic system (less than 163 bar)

- Confirm hydraulic pressure low (hydraulic synoptic page)

- Check hydraulic control panel,

If HYD 2 PRESS illuminated

On LDG GEAR panel

- EMER DOWN pushbutton, lift guard and press

- Land as soon as practicable being aware that fuel consumption will be increased due to lowered undercarriage

If HYD 1 PRESS illuminated

- Lower landing gear

- Land as soon as practicable being aware that fuel consumption will be increased due to lowered undercarriage

Note

When EMER DOWN is selected the amber lights will remain illuminated even though the LDG GEAR is down. If the LDG GEAR lever is moved to the DOWN position the lights will extinguish. After landing, if taxiing is required, the EMERG DOWN pushbutton must be de-selected to permit the NOSE WHEEL steering to be unlocked.

NORMAL LANDING GEAR PRESSURE LOW

HYD UTIL PRESS

Low pressure in landing gear NORM hydraulic system

- Confirm low pressure in LDG NORM system.

- Lower LDG GEAR using normal procedure

If after 15 sec LDG GEAR not locked down

- EMER DOWN pushbutton, lift guard and press

- Continue flight being aware that fuel consumption will be increased due to lowered undercarriage

EMERGENCY LANDING GEAR PRESSURE LOW

EMER LDG PRESS

Low pressure in emergency landing gear hydraulic system

- Confirm low pressure in EMER LDG GEAR system.

- Lower landing gear using normal procedure

- Continue flight
being aware that fuel consumption will
be increased due to lowered undercarriage

HYDRAULIC FLUID OVERHEATING

1(2) HYD OIL TEMP

Associated hydraulic system overheat (greater than 134°C)

- Confirm hydraulic temperature and check HYD control panel

- Lower undercarriage

WARNING

If a **1(2) SERVO** caution has illuminated previously do **NOT** switch SOV to CLOSE on the **2(1)** Hydraulic system since this will cause loss of control in the affected servo jack.

On affected system
- Switch off system by moving SOV switch to CLOSE on HYD control panel

1(2) HYD OIL PRESS and **1(2) SERVO**
cautions illuminate

- Land as soon as practicable,
being aware that fuel consumption will
be increased due to lowered undercarriage

Note

With one hydraulic system SOV shut off, a subsequent drop of pressure in the other system will over-ride the SOV selection and reinstate pressure to the servo's. In these conditions the SOV switch will not be automatically reset.

HYDRAULIC FLUID LEVEL LOW

1(2) HYD MIN

Associated system low hydraulic fluid level

- Confirm fluid level
(hydraulic synoptic page)

If **EMER LDG PRESS** caution illuminated

- Lower landing gear using normal procedure

If **HYD UTIL PRESS** caution illuminated

On LDG GEAR panel
- EMER DOWN pushbutton, lift guard and press

- Land as soon as practicable, being aware that fuel consumption will be increased due to lowered undercarriage

Note

Loss of hydraulic fluid in system No2 will automatically close the Tail Rotor Shut Off Valve (TRSOV). This will be indicated on the hydraulic synoptic page. Once the TRSOV has operated the SOV No1 is inhibited.

Note

When EMER DOWN is selected the amber lights will remain illuminated even though the LDG GEAR is down. If the LDG GEAR lever is moved to the DOWN position the lights will extinguish. After landing, if taxiing is required, the EMERG DOWN pushbutton must be de-selected to permit the NOSE WHEEL steering to be unlocked.

HYDRAULIC PUMP 1, 2 OR 4 FAILURE

1(2)(4) HYD PUMP

Low pressure at pump outlet

- Confirm low pump pressure

If PUMP 1 low

- Lower landing gear using normal procedure

- Monitoring hydraulic pressure

- Land as soon as practicable, being aware that fuel consumption will be increased due to lowered undercarriage

If PUMP 2 **or** PUMP 4 low

- Continue flight
No corrective action

MAIN VALVE SEIZURE IN MAIN OR TAIL ROTOR SERVO

1(2) SERVO

Main control valve seizure in one (or more) servo jacks

|

- Lower landing gear by normal procedure

|

- Land as soon as practicable
being aware that fuel consumption will be increased due to lowered undercarriage

WARNING

Do **NOT** switch SOV to CLOSE on the **UNAFFECTED** system since this will cause loss of control in the affected servo jack.

Note

Loss of hydraulic fluid in system No2 will automatically close the Tail Rotor Shut Off Valve (TRSOV). This will be indicated by a **2 SERVO** caution on the CAS and a TRSOV closed indication on the hydraulic synoptic page. Once the TRSOV has operated the SOV No1 is inhibited.

NOSEWHEEL UNLOCKED (IN FLIGHT)

NOSE WHL UNLK

|

Nose wheel not locked in fore and aft direction

|

- Cycle NOSE WHEEL switchon LDG GEAR panel

|

If caution remains
- **Do not raise landing gear**
- **Continue flight**being aware that fuel consumption will be increased due to lowered undercarriage
- **Avoid run on landing**

Note

Landing gear retraction inhibited with NOSE WHL UNLK caution illuminated.

HYD
LDG GR

PARK BRAKE MALFUNCTION

PARK BRK PRESS

No pressure in park brake system with PARKE BRAKE lever in ON position

If park brake not required

- Confirm park brake lever in OFF position

If park brake required

- Pressurize system by ‘pumping’ pedal brakes

If caution remains

- Continue flight

being aware park brake may not hold aircraft when on ground

PARK BRAKE ON IN FLIGHT

PARK BRK ON

Park brake system pressurized

- Confirm PARK BRAKE lever in off position

- Continue flight

CAUTION

Do not carry out run on landing or taxi as park brake system may be pressurized.

LANDING GEAR RETRACTED

LANDING GEAR + Voice Warning

Landing gear retracted when aircraft height is less than 150 ft AGL
Additionally
For Phase 7 and later (if option enabled) landing gear retracted when aircraft groundspeed falls below 30 kt

- Extend landing gear

LANDING GEAR FAILS TO RAISE

Landing gear selected up but one or more amber lights remains illuminated

- Confirm landing gear circuit breakers in

- Check DOWN EMERG pushbutton not selected

- Cycle landing gear lever from UP to DOWN and allowing time for the landing gear to lock down and then select UP

If one or more amber lights remain illuminated
- Select landing gear DOWN
- Continue flight being aware that fuel consumption will be increased due to lowered undercarriage

Note

If undercarriage has been extended using the EMER DOWN then subsequent retraction is not possible.

Note

For OAT of -30°C and below undercarriage retraction time may double.

MISCELLANEOUS SYSTEMS

PITOT HEATER FAILURE

1(2) PITOT FAIL

Associated pitot heater failure

- Exit icing conditions as soon as possible

PITOT HEATER OFF

1(2) PITOT HEAT OFF

Associated pitot heater is selected OFF and OAT below 4°C

- Select associated PITOT HEATER switches ON

AIRCRAFT NEVER EXCEED SPEED

Voice warning ‘AIRSPEED AIRSPEED’ and airspeed indication RED

- Confirm airspeed

- Reduce/maintain speed below Vne

AIRCRAFT NEVER EXCEED SPEED MISCOMPARE

VNE MISCOMPARE

Difference between ADS 1 and 2 VNE airspeed calculated values

- Continue flight respecting the lower VNE value.

- When convenient confirm, using the STANDBY ASI and placard, and the ambient atmospheric conditions which ADS VNE airspeed indication is correct.

WEIGHT ON WHEELS SWITCH FAILURE

1(2) WOW FAIL

Associated WOW switch failure

On ground

- Shut down aircraft for Maintenance action

In flight

- Continue flight being aware of system limitations (FUEL TEST and AHRS TEST not inhibited in flight

1 WOW FAIL to ground:

1 AHRS TEST function not inhibited in flight

2 WOW FAIL to ground:

2 AHRS TEST function not inhibited in flight

FUEL TEST function not inhibited in flight

Note

1(2) WOW FAIL caution may illuminate spuriously during slope take-off or landing procedure.

Note

Illumination of the WOW FAIL caution, when the LDG GEAR is DOWN, will cause the LDG GEAR lever to be locked in the down position so subsequent retraction of the landing gear is not possible.

COCKPIT DOOR OPEN

COCKPIT DOOR

A cockpit door not closed

- Confirm which cockpit door not secure

On ground

- Close cockpit door before flight

If CAS caution does not extinguish

Maintenance action

In flight

- Close and lock cockpit door, if possible

If not possible to close door

- Reduce speed to below 100 KIAS

- Land as soon as possible and secure door

CABIN DOOR OPEN

CABIN DOOR

A cabin door not closed

On ground

- **Close cabin door before flight**

If CAS caution does not extinguish

Maintenance action

In flight

- **Reduce speed to 80 KIAS**
- **Confirm which cabin door is not secured**
- **Close and lock cabin door, if possible**

If not possible to close door

- **Land as soon as practicable and secure door**

CAUTION

When opening or closing cabin door in flight hold door handle until door is at full travel and locked.

BAGGAGE BAY DOOR OPEN

BAG DOOR

Baggage bay door not closed

On ground

- **Close baggage door before flight**

If CAS caution does not extinguish

Maintenance action

In flight

- **Reduce speed to below 100 KIAS**
- **Land as soon as possible and secure door**

EXTERNAL POWER SOCKET DOOR OPEN

EXT PWR DOOR

External power socket door not closed

On ground

- **Close external power socket door before flight**

If CAS caution does not extinguish

Maintenance action

In flight

- **Reduce speed to below 100 KIAS**
- **Land as soon as practicable and secure door**

VENT FAN FAILURE

VENT FAIL

Failure of the CREW and/or PAX (if fitted) vent fan

- Confirm, using Advisory indications, if fan has failed (not illuminated)

On failed vent fan

- Switch OFF

- Open windows if operating below 25 kts, MPOG, HIGE or HOGE

NOSE AVIONIC FANS FAILURE

VENT FAIL + NOSE FAN 1 OFF + NOSE FAN 2 OFF

(Caution triggered on ground only)

Failure of both nose avionic bay fans

- Shutdown aircraft

ROTOR BRAKE FAIL

ROTOR BRK FAIL

Rotor brake system in one of the failure conditions noted:

- Brake pads not withdrawn
- With both engines OFF brake caliper not UP
- With an engine in FLT, brake caliper not DOWN
- With an engine in GI, brake caliper not DOWN
- Rotor brake lever not in OFF, one engine to FLT or in GI (displayed on ground only)

- Confirm, using ROTOR BRAKE panel, pressure and status of the brake caliper

On ground

- Shut down aircraft

In flight

If caliper UP

- Land as soon as practicable

If caliper DOWN

- Continue Flight

HEATER FAILURE

HEATER FAIL

Heater system failure

- Switch HTR to OFF

If HEATER required for demist:

1. HTR — MAN.
2. VENT CREW FAN — As required.
3. TEMP CONTR — Control temperature manually using ± position on rotary switch.

COND FAILURE

FWD(AFT) COND FAIL

Crew(PAX) conditioner failure

- Switch OFF the COND/HTR and leave for minimum of 4 minutes.
Switch NORM

If system fails again
- Switch OFF

CAUTION

Be aware that failure of a ventilation fan with the COND system operative may cause the COND to fail after several minutes, in which case switch COND to OFF.

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ICE PROTECTION SYSTEM (IPS)

PILOT ACTIONS IN CASE OF SEVERE ICE ENCOUNTERS

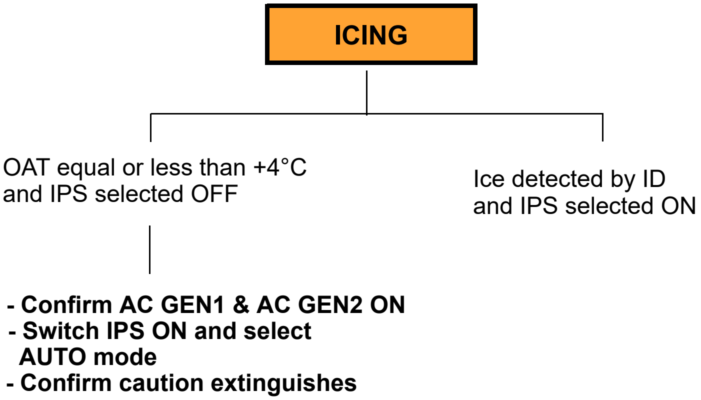
Severe icing conditions are indicated by some or all of the following:

- High PI rise (>30% above normal for flight condition)
- Steady increase in base PI with heating cycles
- High LWC (>1.5 g/m^3)
- Heavy amounts of water streaming across windscreens
- Evidence of SLD (ice forming on sides of aircraft, SLD Marker)
- Increase in vibration
- Tendency for significant speed loss.

Actions:

- Reduce speed to 80 KIAS
- Select 102% NR
- Use up to 110% PI
- Check for system failures
- Select MAN
  - if PI reduces Select AUTO, and use MANUAL to reduce subsequent PI rise.
  - if PI does not reduce, or rises steadily, select AUTO and do not select MAN again (possible runback ice)
- Change altitude – severe ice conditions are usually near the top of the clouds
- Consider vacating icing conditions if severity does not reduce.

ICING CONDITIONS



ICING

OAT equal or less than +4°C
and IPS selected OFF

Ice detected by ID
and IPS selected ON

- Confirm AC GEN1 & AC GEN2 ON
- Switch IPS ON and select AUTO mode
- Confirm caution extinguishes

IPS PANEL WARNING AND CAUTIONS

MAIN AND TAIL ROTOR HEATING FAILURE

+

+ aural message
“Warning – Warning”

Loss of MR heating and TR heating

- **If** 1 AC & 2 AC generator messages displayed refer to procedure on page IPS6

- **If** 1 AC & 2 AC generator messages NOT displayed

CAUTION

Do NOT attempt a system TST/RST or select OFF/ON

- **Reduce speed to 80 KIAS**
- **Vacate the icing condition as soon as possible.** Aircraft may experience ani increase in vibrations.
- **Monitor PI, A/C vibrations. Maintain 80 KIAS until clear evidence indicates all ice accretions have been shed from MR and TR blades**

TAIL ROTOR HEATING FAILURE

Loss of TR blades heating.

CAUTION

Do NOT attempt a system TST/RST or select OFF/ON

- **Vacate the icing condition as soon as practicable**
  Aircraft may experience an increase in vibrations
- **Monitor PI, A/C vibrations and SLD marker**

MAIN ROTOR HEATING DEGRADED

Loss of MR non critical zones heating

CAUTION

Do NOT attempt a system TST/RST or select OFF/ON

- **Vacate the icing condition as soon as practicable**
  Aircraft may experience an increase in MR 1xRev vibrations
- **Monitor PI, A/C vibrations and SLD marker**

TAIL ROTOR HEATING DEGRADED

Loss of TR blade pair heating

CAUTION

Do NOT attempt a system TST/RST or select OFF/ON

- **Continue flight**
  Aircraft may experience an increase in TR 1xRev vibrations.
- **Monitor PI, A/C vibrations and SLD marker.**

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SINGLE OAT SENSOR FAILURE

OAT N°1 signal failure to IPS

- Continue flight

or

OAT N°2 signal failure to IPS

- Continue flight

SINGLE ICE DETECTOR FAILURE

Ice Detector N°1 failed

- Continue flight

or

Ice Detector N°2 failed

- Continue flight

SINGLE WINDSHIELD HEATER FAILURE

Copilot windshield heater failure

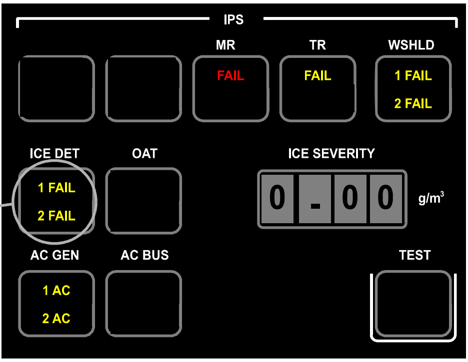
- Continue flight

or

Pilot windshield heater failure

- Continue flight

DOUBLE AC GENERATOR FAILURE



These messages will illuminate within 3 minutes

ICN-39-A-155071-A-00003-00677-A-01-1

\+

Aural message “Warning – Warning”

Double AC GEN failure

- **AC GEN 1 & 2 switches, select OFF then ON**
- **Switch the IPS to OFF, wait approximately 2 seconds, then to ON.**

If cautions extinguishes

- **Continue flight**

If cautions remain illuminated

- **Switch IPS OFF**
- **Switch AC GEN 1 & 2 OFF**

- **Reduce speed to 80 KIAS**
- **Vacate the icing condition as soon as possible**
- **Monitor PI, A/C vibrations. Maintain 80 KIAS until clear evidence indicates all ice accretions have been shed from MR and TR blades**

If

remains

- **Switch AC GEN 1 OFF**

- **Vacate the icing condition as soon as practicable**

If

remains

- **Switch AC GEN 2 OFF**

- **Continue flight** (Loss of IPS redundancy)

DOUBLE DC GENERATOR FAILURE

The following assumes the DC BUS FAIL procedures, presented in Section 3 of the Basic Manual, have been followed and MAIN BUS 1 is confirmed as lost:

+

Loss of system redundancy

- Continue flight

IPS SERVICES AVAILABLE ON ESSENTIAL BUS 2 (IPS CONFIGURATION)

On IPS C/B panel

TRD CH-A CONTROL
MRLD CH-A CONTROL
ICB CH-A CONTROL
IPS CKPT PNL CH-A
WSHLD PLT CONTROL
ICE DET 2 CONTROL
GCU 1 POWER

IPS SERVICES LOST DURING BUS FAILURES (IPS CONFIGURATION)

DC MAIN BUS 1

On IPS C/B panel

TRD CH-B CONTROL
MRLD CH-B CONTROL
ICB CH-B CONTROL
IPS CKPT PNL CH-B
WSHLD CPLT CONTROL
ICE DET 1 CONTROL
GCU 2 POWER

AC GENERATOR 1 FAILURE

AND

+

+

This message will illuminate within 3 minutes

AC GEN 1 failure

- **AC GEN 1 switch, select OFF then ON**
- **Switch the IPS to OFF, wait approximately 2 seconds, then to ON.**

If cautions extinguishes

- **Continue flight**

If cautions remain illuminated

- **Switch AC GEN 1 OFF**
- **Vacate the icing condition as soon as practicable**

AC GENERATOR 2 FAILURE

AC GEN 2 failure

When conditions permit

- **AC GEN2 switch, select OFF then ON**
- **Switch the IPS to OFF, wait approximately 2 seconds, then ON**

If caution extinguishes

- **Continue flight**

If caution remains illuminated

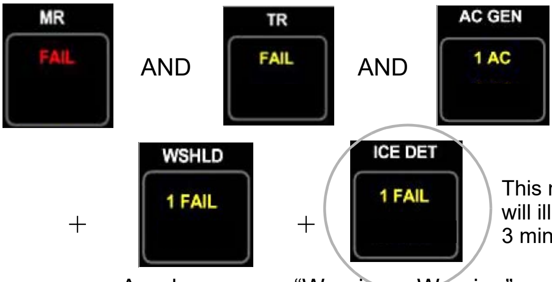
- **Switch AC GEN 2 OFF**

- **Continue flight**

(Loss of IPS redundancy)

IPS

AC GENERATOR 1 FAILURE AFTER “BOUT” DISPLAYED



This message will illuminate within 3 minutes

Aural message “Warning – Warning”

AC GEN 1 failure after “BOUT” displayed

- AC GEN 1 switch, select OFF then ON
- Switch IPS to OFF, wait approximately 2 seconds, then ON

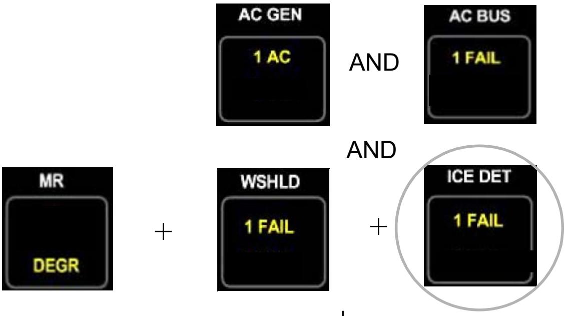
If warning / cautions extinguish

- Vacate the icing condition as soon as practicable

If warning / cautions remain illuminated

- Switch IPS OFF
- Switch AC GEN 1 & 2 OFF
- Reduce speed to 80 KIAS
- Vacate the icing condition as soon as possible
- Monitor PI, A/C vibrations. Maintain 80 KIAS until clear evidence indicates all ice accretions have been shed from MR and TR blades

AC GENERATOR 1 AND AC BUS 1 FAILURE



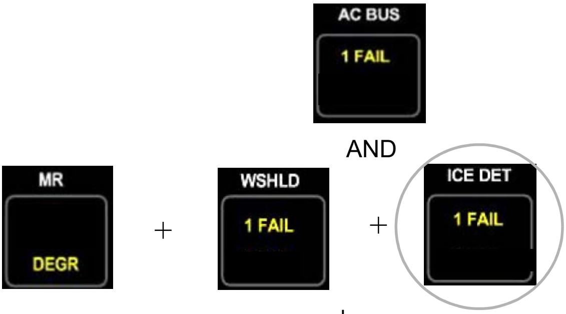
This message will illuminate within 3 minutes

AC GEN 1 and AC BUS 1 failure

- AC GEN 1 switch select OFF

- Vacate icing conditions as soon as practicable

AC BUS 1 FAILURE



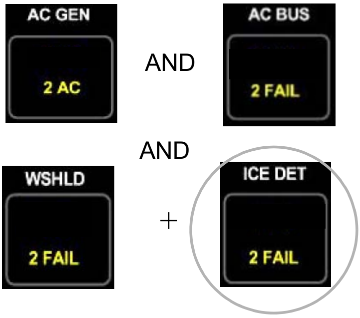
This message will illuminate within 3 minutes

AC BUS 1 failure

- AC GEN 1 switch select OFF

- Vacate icing conditions as soon as practicable

AC GENERATOR 2 AND AC BUS 2 FAILURE



This message will illuminate within 3 minutes

AC GEN 2 and AC BUS 2 failure

- AC GEN2 switch select OFF

- Continue flight
(Loss of IPS redundancy)

AC BUS 2 FAILURE

AND

AND

This message
will illuminate within
3 minutes

AC BUS 2 failure

|

- AC GEN2 switch select OFF

|

- Continue flight
(Loss of IPS redundancy)

AC SHED BUS 1 FAILURE

|

AC SHED BUS 1 failure
(ATRU 1 lost)

|

- Vacate icing conditions as soon as practicable
(Loss of ATRU redundancy, Loss of non critical zones)

AC SHED BUS 2 FAILURE

|

AC SHED BUS 2 failure
(ATRU 2 lost)

|

- Continue flight
(Loss of ATRU redundancy)

DOUBLE ICE DETECTOR FAILURE

\+ —,— — displayed on IPS ICE SEVERITY window

Both Ice Detectors failed

- Switch IPS to OFF, wait approximately 2 seconds then switch ON

If cautions do not extinguish
the system continues to function
using a default LWC value of 0.8 g/m^3

- Continue flight, monitoring the SLD marker for type of ice being encountered and A/C vibrations. Consider use of IPS MAN mode page IPS13

If PI and A/C vibrations return to normal values

- Select IPS AUTO/MAN switch to AUTO mode

- Consider whether to vacate icing conditions.

DOUBLE OAT SENSOR FAILURE


OAT
1 FAIL
2 FAIL

AND


ICE DET
1 FAIL
2 FAIL

\+ —,— — displayed on IPS ICE SEVERITY window

Failure of both OAT signals to IPS and consequent loss of Ice Detectors

- Switch IPS to OFF, wait approximately 2 seconds then switch ON

If cautions do not extinguish the system continues to function using a default OAT of -12°C and LWC of 0.8 g/m^3

- Continue flight, monitoring OAT on Standby instrument and SLD accretion for type of ice being accreted and A/C vibrations. Consider use of IPS MAN mode page IPS13

If PI and A/C vibrations return to normal values

- Select IPS AUTO/MAN switch to AUTO mode

- Consider whether to vacate icing conditions

DOUBLE WINDSHIELD HEATER FAILURE

Pilot and copilot windshield heater failure

- Switch IPS to OFF, wait approximately 2 seconds then switch ON

If cautions do not extinguish

- Continue flight
Exit icing conditions if visibility through windscreen unacceptable.
If forward visibility severly degraded, consider opening the storm window to enhance vision for landing

---

IPS TEMP CAPTION

IPS mode switched to MAN and OAT greater than +4°C

- Check if the ambient conditions require the IPS MAN mode
If not, switch IPS to AUTO or OFF

- **If** message extinguishes
  - Continue flight

- **If** message remains
  - Switch IPS OFF
  - Switch AC GEN 1 & 2 OFF

CAUTION

Use of IPS in Manual mode above +4°C could damage the blades.

USE OF IPS MAN MODE

IPS mode switched to MAN

- Continue flight

CAUTION

Pilot should be aware that a prolonged use of IPS in Manual Mode can cause “runback ice”, which can give steady torque rise. In this case reduce speed to 80 KIAS and vacate icing condition as soon as possible.
Monitor PI, A/C vibrations, OAT and SLD marker.

IPS PANEL FAILURE MESSAGES

The IPS panel ICE SEVERITY window can display the following error codes, either during the system pre-flight test or in flight.

On Ground

CHK	- Flight in icing may be commenced (Loss of redundancy of W/S and/or TR blades temperature sensors)
CH A - Panel Ch.A failure	- Do not commence flight in icing conditions
CH B - Panel Ch.B failure	- Do not commence flight in icing conditions
BOUT	- Do not commence flight in icing conditions
—,— —	- Do not commence flight in icing conditions

In Flight

CHK*	- Continue flight (Loss of redundancy of W/S and/or TR blades temperature sensors)
BOUT*	- Continue flight (Loss of IPS redundancy)
—,— —	See page IPS10B

Note*

In flight they are displayed only in non-icing conditions for a limited time (20 secs) after the ICB IBIT function, if initiated by the crew.

IPS PANEL FAILURE

Loss of all IPS Panel indications

IPS panel power failure and/or internal failure

On Ground

- **IPS ON/OFF switch OFF**
- **AC GEN1 & AC GEN2 switches OFF**

- **Operation in icing conditions is not permitted**

In Flight

- **Reduce speed to 80 KIAS**
- **Vacate icing conditions as soon as possible**

- **When out of icing conditions**
- **IPS ON/OFF switch OFF**
- **AC GEN1 & AC GEN2 switches OFF**
- **Monitor PI, A/C vibrations. Maintain 80 KIAS until clear evidence indicates all ice accretions have been shed from MR and TR blades**

ICB DATA FAILURE

IPS panel not receiving data from ICB

- **Switch IPS to OFF, wait approximately 2 seconds then switch ON**

If caution does not extinguish

On Ground

- **IPS ON/OFF switch OFF**
- **AC GEN1 & AC GEN2 switches OFF**

- **Operation in icing conditions is not permitted**

In Flight

- **Reduce speed to 80 KIAS**
- **Vacate icing conditions as soon as possible**

- **When out of icing conditions**
- **IPS ON/OFF switch OFF**
- **AC GEN1 & AC GEN2 switches OFF**
- **Monitor PI, A/C vibrations. Maintain 80 KIAS until clear evidence indicates all ice accretions have been shed from MR and TR blades**

LIMITED ICE PROTECTION SYSTEM (LIPS)

PILOT ACTIONS IN CASE OF SEVERE ICE ENCOUNTERS

Severe icing conditions are indicated by some or all of the following:

- High PI rise (>30% above normal for flight condition)
- High LWC (>1.5 g/m^3)
- Heavy amounts of water streaming across windscreens
- Evidence of SLD (ice forming on sides of aircraft, SLD Marker)
- Increase in vibration
- Tendency for significant speed loss

Actions:

- Reduce speed to 80 KIAS
- Select 102% NR
- Use up to 110% PI
- Check for system failures
- Vacating icing conditions immediately

CAS CAUTION (ON MFD)

ICING CONDITION

ICE CONDITION

When caution illuminated continuously
Time limited icing zone entered

- Continue flight monitoring
TIME IN ICE, PI values, SLD marker
and aircraft vibrations.
Prepare to change flight condition
to reduce ice severity or vacate icing

TIME LIMIT IN ICE

ICE LIMIT + **ICE CONDITION**

Maximum Time in Limited Ice reached
or flight in the ‘VACATE ZONE’

- When caution remains illuminated
Manoeuvre to a reduced icing condition
or vacate icing as soon as possible

IPS SYSTEM FAIL

IPS FAIL

LIPS control box has failed,
AC power not available to LIPS or
OAT 1 and 2 data to ICB are lost

- Vacate the icing condition
as soon as possible

AC GENERATOR FAILURE

AC GEN

AND

IPS FAIL

AC GEN failure
(No AC power available to IPS)

- AC GEN switch, select OFF then ON

If cautions extinguishes

- Continue flight

If cautions remain
illuminated

- Switch AC GEN OFF
- Vacate the icing condition
as soon as possible

AC GENERATOR AND AC BUS FAILURE OR AC BUS FAILURE

AC GEN

AND

AC GEN BUS

or

AC GEN BUS

AND

IPS FAIL

AC GEN and/or AC BUS failure

- AC GEN switch, select OFF then ON

If cautions extinguishes

- Continue flight

If cautions remain illuminated

- Switch AC GEN OFF
- Vacate the icing condition as soon as possible

DOUBLE DC GENERATOR FAILURE

The following assumes the DC BUS FAIL procedures, presented in Section 3 of the Basic Manual, have been followed and MAIN BUS 1 is confirmed as lost

1 WSHLD HTR FAIL

AND

1 ICE DET FAIL

+

Loss of all LIPS Ice condition panel LWC and TIME IN ICE indications

LIPS condition panel and 1 ICE DET power failure and/or internal failure

- **Continue flight**
  LIPS condition panel not available.

If NOT in icing conditions

- **Do not enter icing conditions**

If in icing conditions

- **Consider vacating icing conditions**

- **Monitor ICE CONDITION and ICE LIMIT cautions**

If ICE CONDITION caution illuminates continuously or ICE CONDITION and ICE LIMIT caution illuminate

- **Vacate icing conditions as soon as possible**

ICE DETECTORS OFF

1-2 ICE DET OFF

Both Ice Detectors OFF with OAT less than or equal to +4°C

- Switch ICE DET ON
- Switch AC GEN ON
- Switch WSHLD ON

If cautions extinguish

- Continue flight

If cautions remain illuminated

- Do NOT enter icing conditions
or
- Vacate icing conditions as soon as possible

SINGLE ICE DETECTOR FAILURE

1 ICE DET FAIL

Ice Detector N°1 failed

- Continue flight

or

2 ICE DET FAIL

Ice Detector N°2 failed

- Continue flight

SINGLE WINDSHIELD HEATER FAILURE

1 WSHLD HTR FAIL

Copilot windshield heater failure

- Continue flight

or

2 WSHLD HTR FAIL

Pilot windshield heater failure

- Continue flight

DOUBLE ICE DETECTOR FAILURE

1-2 ICE DET FAIL + —,— — displayed on IPS ICE SEVERITY window

Both Ice Detectors failed

- Do NOT enter icing conditions
or
- Vacate icing conditions as soon as possible

DOUBLE WINDSHIELD HEATER FAILURE

1-2 WSHLD HTR FAIL

Pilot and copilot windshield heater failure or LIPS ICB communication failure

Note

Be aware when the SYS TEST is activated the TIME IN ICE indication is reset. Take note of the TIME IN ICE indication prior to selecting SYS TEST.

- Select and hold the ICE DET ON/OFF/SYS TST switch to SYS TEST, confirm following cautions illuminate:
2 ICE DET FAIL
1 ICE DET FAIL
IPS FAIL
ICE CONDITION
ICE LIMIT

If cautions do not illuminate

IPS failure

- Vacate icing conditions as soon as possible

If cautions illuminate

- Continue flight
Confirm, by touching windshields they are being heated.
Vacate icing conditions if visibility through windscreen unacceptable or ICE LIMIT caution illuminates

SINGLE WINDSHIELD HEATER DEGRADED

1 WSHLD HTR DEGR or **2 WSHLD HTR DEGR**

1 WSHLD HTR DEGR

Copilot windshield heater degraded

- Continue flight

2 WSHLD HTR DEGR

Pilot windshield heater degraded

- Continue flight

DOUBLE WINDSHIELD HEATER DEGRADED

1-2 WSHLD HTR DEGR

Pilot and copilot windshield heater degraded

- Continue flight
Vacate icing conditions if visibility
through windscreen unacceptable.
If forward visibility severly degraded,
consider opening the storm window
to enhance vision for landing

LIPS PANEL MESSAGES

The LIPS panel SEVERITY and TIME window can display the following error codes, either during the system pre-flight test or in flight. (SEVERITY windows displays ice detector messages and TIME window displays windshield messages). They are displayed with ascending priority order as shown in the following list.

SEVERITY window	TIME window	System Status
###	###	LIPS panel test in progress
IPS	TEST	LIPS system test in progress
PNL	FAIL	LIPS panel failed
-.--		Both ice detectors failed
	---	All four IPS control box channels failed
WARM/UP		Ice detectors in warm up phase
	CHA/ FAIL	Loss of system Channel A, loss of redundancy (Displayed on ground only)
	CHB/ FAIL	Loss of system Channel B, loss of redundancy (Displayed on ground only)
MNT1		ICE DET 1, Maintenance Required (Displayed on ground only)
	MNT1	Loss of one sensor in windshield 1 (copilot) (Displayed on ground only)
MNT2		ICE DET 2, Maintenance Required (Displayed on ground only)
	MNT2	Loss of one sensor in windshield 2 (pilot) (Displayed on ground only)
MNT1/ MNT2		ICE DET 1 & 2 Maintenance Required (Displayed on ground only)
	MNT1/ MNT2	Loss of one sensor in windshield 1 & 2 (Displayed on ground only)

PFD AND MFD DISPLAY MESSAGES

ATTITUDE DISPLAY FAILURE

ATT FAIL

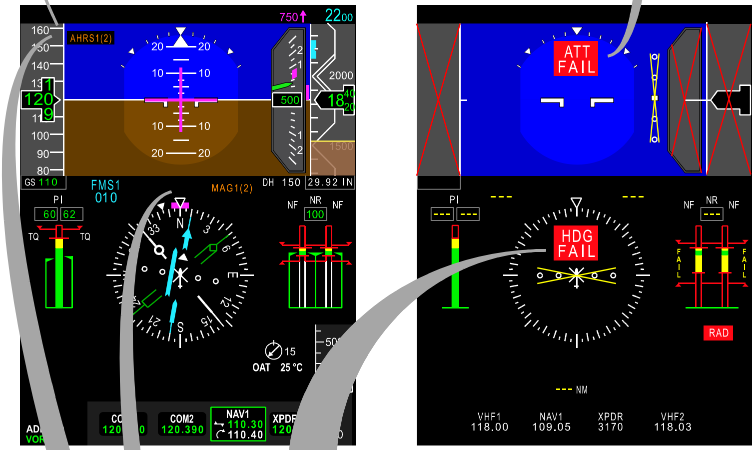
loss of attitude data and slip skid indicator on associated attitude display

- On RCP move AHRS switch to other AHRS (1 = Copilot side, 2 = Pilot side)

AHRS1(2)

illuminates on attitude indicator to highlight both attitude indicators are using the same source data

- Compare frequently PFD attitude with STANDBY attitude indicator



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HEADING DISPLAY FAILURE

HDG FAIL

loss of heading data on associated HSI display

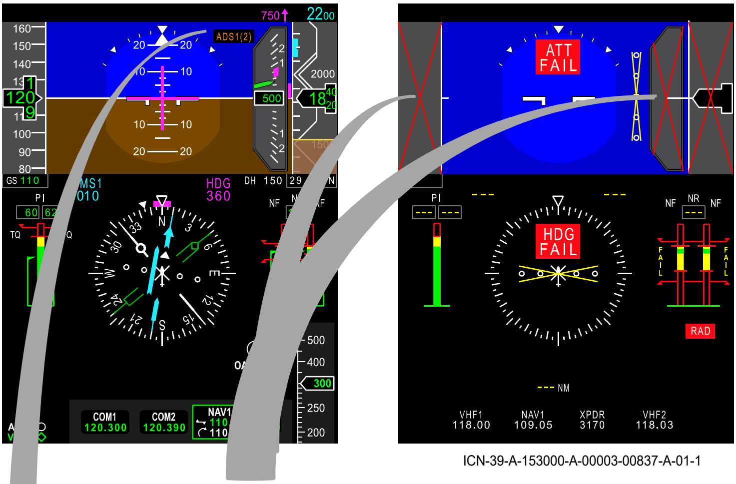
- On RCP move AHRS switch to other AHRS (1 = Copilot side, 2 = Pilot side)

AHRS1(2) + MAG1(2) or DG1(2)

illuminates on PFD to highlight both attitude indicators are using the same source data

- Compare frequently PFD heading with STANDBY Compass

ADS FAILURE



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✗ on affected indicators and loss of data on:

Airspeed and/or
Altitude and/or
Vertical Speed
displays on PFD

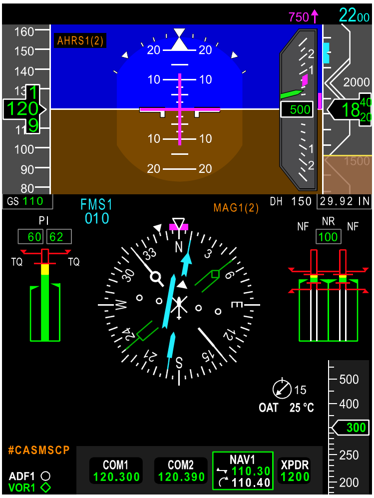
Failure of ADS system

- On RCP move ADS switch to other ADS (1 = Copilot side, 2 = Pilot side)

ADS1(2) illuminates on attitude indicator to highlight both air data indicators systems are using the same source data

- Compare frequently PFD data with STANDBY indicator

CAS WARNING AND CAUTION MESSAGE LIST DISCREPANCY



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1(2) CASMSCP or **1(2) CASMSCP** on PFD display

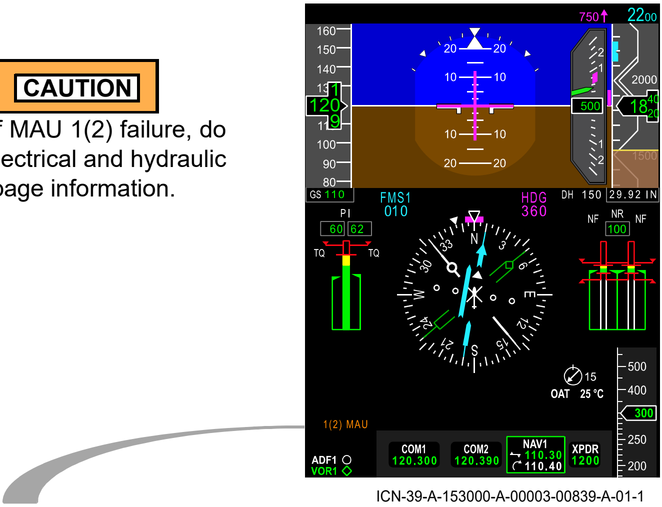
MAU 1 (MAU 2) CAS WARNING or CAUTION message list has discrepencies

- **Pilot press “ENTER” key on CCD while ▲▼ symbol is displayed adjacent the caption to toggle between CAS LIST 1 and 2. Confirm which message(s) are giving the ‘MISCOMPARE’**

MAU MESSAGE ON PFD

CAUTION

In case of MAU 1(2) failure, do not use electrical and hydraulic synoptic page information.



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1(2) MAU message displayed on PFD without multiple CAS cautions being generated

Associated MAU degraded

- No pilot action

If **1(2) MAU** message combined with multiple CAS cautions being generated then MAU1(2) has failed, carry out the following essential actions before continuing to the list of cautions:

(For MAU failure with FD engaged see also page 44)

- Continue flight attentive
- On RCP move ADS switch to non failed ADS
- Reduce speed to Vne-27 KIAS, level flight, or 100 KIAS and 1000fpm in climb
- Below 500ft AGL fly manually
- Compare frequently PFD data with STANDBY indicator.

1 MAU failure will be associated with the following CAS cautions:

AVIONIC FAULT page 48
1 AP FAIL page 37
AFCS DEGRADED page 41
1 ADS FAIL page 46
1 FMS FAIL page 51
1 PITOT FAIL (only if 1 PITOT HEATER switch OFF) page 83
FDR FAIL page 50

Procedure continues on next page

MAU MESSAGE ON PDF (CONT)

Continues from previous page

and system parameters not valid (amber dashed):

MGB OIL TEMP, MGB OIL PRESS
1 HYD OIL TEMP, 1 HYD OIL PRESS
1 ENG OIL TEMP, 1 ENG OIL PRESS
1 FUEL PUMP, MAIN BUS 2 VOLT
ESS BUS 1 VOLT, DC GEN 1 AMP,
NON ESS BUS 1, AUX BATTERY AMP
Loss of redundancy in backup engine parameters N°1 engine
Loss of redundancy in monitor warning functions N°1
Loss of redundancy of MCDU 1 Primary Radio Control

CAS Cautions NOT Available

- 1 ENG OIL TEMP
- EMERG LDG PRESS
- MAIN BATT OFF
- EXT PWR DOOR
- 1 PITOT HEAT OFF
- 1 WOW FAIL
- 1 MCDU OVHT
- 1 MAU OVHT
- 1 ECL FAIL
- 1 ECL POS
- 1 FUEL HEATER
- 1 FUEL ICING

CAS Advisories NOT Available

- LANDING LT ON
- EXT PWR READY
- FWD VENT

CAUTION

In case of MAU 1(2) failure, do not use electrical and hydraulic synoptic page information.

2 MAU failure will be associated with the following CAS cautions:

AVIONIC FAULT page 48
2 AP FAIL page 37
AFCS DEGRADED page 41
2 ADS FAIL page 46
2 FMS FAIL page 51
AWG FAIL page 47
GPS FAIL page 52
2 PITOT FAIL (only if 2 PITOT HEATER switch OFF) page 83

Procedure continues on next page

MAU MESSAGE ON PDF (CONT)

Continues from previous page

and system parameters not valid (amber dashed):

IGB OIL TEMP, TGB OIL TEMP
2 HYD OIL TEMP, 2 HYD OIL PRESS
2 ENG OIL TEMP, 2 ENG OIL PRESS
2 FUEL PUMP, MAIN BUS 1 VOLT
ESS BUS 2 VOLT, DC GEN 2 AMP,
NON ESS BUS 2, MAIN BATTERY AMP
Loss of redundancy in backup engine parameters N°2 engine
Loss of redundancy in monitor warning functions N°2
Loss of redundancy of MCDU 2 Primary Radio Control

CAS Cautions NOT Available

- 2 ENG OIL TEMP
- TGB OIL TEMP
- IGB OIL TEMP
- AUX BATT OFF
- 2 PITOT HEAT OFF
- 2 WOW FAIL
- 2 MCDU OVHT
- 2 MAU OVHT
- 2 ECL FAIL
- 2 ECL POS
- 2 FUEL HEATER
- 2 FUEL ICING

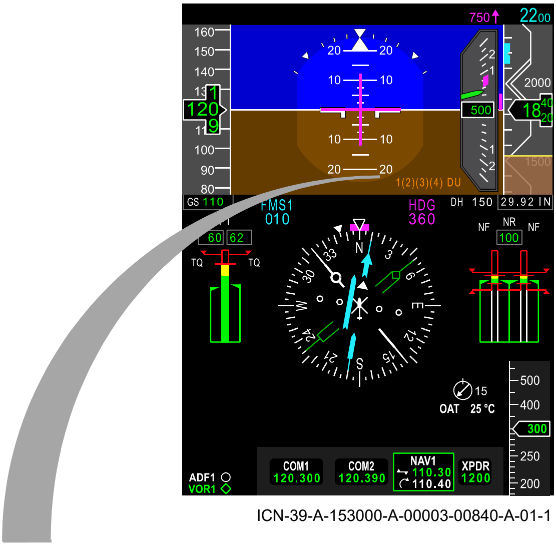
CAS Advisories NOT Available

- LDG EMER DOWN
- EXT PWR ON
- PARK BRK ON
- SEARCH LT ON

CAUTION

In case of MAU 1(2) failure, do not use electrical and hydraulic synoptic page information.

DISPLAY UNIT GRAPHIC MALFUNCTION



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1(2)(3)(4) DU on attitude indicator

|

On associated display unit,
possible misleading/loss of graphics data.

|

- **Revert unaffected DU to Composite Mode by switching associated RCP switch to functioning DU**

2.5 MINUTE RATING MESSAGE ON PFD

2.5 m displayed on side of PI and between NG and ITT indicators

Engine within OEI 2.5 minute rating

2.5 m blinking inverse video displayed on side of PI and between NG and ITT indicators

Engine within 10 sec of exceeding OEI 2.5 minute rating

2.5 m steady inverse video displayed on side of PI and between NG and ITT indicators

\+

1(2) ENG LIM EXPIRE on CAS

Engine has exceeded OEI 2.5 minute time rating

- Reduce power to below the OEI 2.5 minute rating (140% PI on PFD) (140%TQ, 775°C, 102.4%NG on MFD) as soon as flight conditions permit

- Continue flight respecting engine ratings

DECISION HEIGHT CAPTION

▆ on attitude indicator

RAD ALT height between decision height (DH) and DH+100ft

MIN on attitude indicator

RAD ALT height equal or lower than decision height (DH) setting

- Action according to operational situation

AHRS MISCOMPARE

ATT or **PITCH** or **ROLL** or **HDG**

on attitude/HSI indicator

Miscompare between AHRS 1 and 2 information.
(±5° Pitch, ±6° Roll, ±10° Heading)

- By comparison with Standby instruments establish which AHRS is providing correct data and switch to this on RCP, if required

ADS MISCOMPARE

ALT and / or **IAS**

on altitude tape | on airspeed tape

Miscompare between ADS 1 and 2 information.
(±150ft for ALT, ±20kts for IAS)

- By comparison with Standy instrument establish which ADS is providing correct data and switch to this on RCP, if required

LOC/GS MISCOMPARE

LOC on PFD HSI display

and / or

GS on PFD attitude indicator display

Miscompare between LOC Lateral and/or Glideslope vertical deviation.

- Discontinue Approach

FLIGHT DIRECTOR FAILURE

No CAS Warning or Caution messages are generated to indicate FD malfunctions. However indication on both PFD displays indicate the state of the flight director system.

SINGLE FLIGHT DIRECTOR FAILURE

⬅ **or** ➡ replaces green arrow above attitude indicator on PFD

|

At least one On-side flight director parameter invalid

|

- **Confirm which parameter(s) are invalid**
- **Either select functioning cross side parameter on RCP panel or select cross side PFD on Guidance Controller.**

DUAL FLIGHT DIRECTOR FAILURE

FD FAIL replaces FD arrow above attitude indicator on both PFD’s

\+

loss of flight director bars and information

|

Both Flight Directors invalid

|

- **Flight Director not available**

SINGLE RAD ALT FAILURE WITH RHT (OR SAR MODES) ENGAGED

RAD1(2) Message beside RAD ALT display. on both PFD’s

|

Rad Alt 2 (1) failed and automatic reconfiguration to functioning Rad Alt.
Message highlights both Rad Alt indicators are using the same source

|

- **Continue flight attentive**
  Loss of Rad Alt redundancy
  No effect on Rad Alt dependant modes functionality

CAUTION

When either RAD ALT fails, the LANDING GEAR CAS caution and associated audio message may activate erroneously when the aircraft is above 150 ft AGL and the LDG GEAR is retracted.

PFD/MFD
MSGs

DOUBLE RAD ALT FAILURE WITH RHT (OR SAR MODES) ENGAGED

RAD

Message replaces RAD ALT height information on both PFD's
RHT, TU, VRT and SAR modes disengage with audio chime (if engaged)

Failure of both RAD ALT systems

- Continue flight

- RAD ALT functioning is lost
- RHT, TDH, TD, TU, MOT, VRT modes and ALVL not available
- Collective Safety Fly Up function not available
- MIN message is inactive
- 'CHECK HEIGHT' aural warning inactive

Note

If RHT mode engaged, ALT will automatically engage 5 seconds after RAD failure indication.

CAUTION

When both RAD ALT's fail, the 150 ft aural warning message does not function and the LANDING GEAR caution will be displayed if the LDG GEAR is retracted, regardless of height.

RAD ALT MISCOMPARE WITH RHT (OR SAR MODES) ENGAGED

RAD on RAD ALT display
RHT, TU, VRT and SAR modes, if engaged, disengages with audio chime (if engaged)

Miscompare between MAU 1 and 2 RAD ALT information.
(single RAD ALT) or RAD ALT 1 and 2 (dual RAD ALT)

- Compare the Pilot and Copilot RAD ALT indications and/or outside visual references to establish the correct data.
- Continue flight

RHT, TDH, TD, TU, MOT, VRT modes and Safety Fly-Up function not available while message displayed

Note

If RHT mode engaged, ALT will automatically engage 5 seconds after RAD failure indication.

DOUBLE RAD ALT FAILURE DURING CUSTOM APPROACH WITH LEVEL SEGMENT (PHASE 8 AND LATER)

RAD Message replaces RAD ALT height information on both PFD's

Failure of both RAD ALT systems

If during descent VRT and optional DCL modes disengage with chime

- Discontinue Approach
Be aware that fly-up safety function not available

If during segment level RHT transitions to ALT with chime and current altitude held.
DCL modes disengage with chime (if engaged).
Be aware that fly-up safety function not available

If required visual references NOT achieved

- Discontinue Approach

CAUTION

When both RAD ALT's fail, the 150 ft aural warning message does not function and the LANDING GEAR caution will be displayed if the LDG GEAR is retracted, regardless of height.

RAD ALT MISCOMPARE DURING CUSTOM APPROACH WITH LEVEL SEGMENT (PHASE 8 AND LATER)

RAD on RAD ALT display

Miscompare between RAD ALT 1 and 2 information

If during descent VRT and optional DCL modes disengage with chime

- Discontinue Approach
Be aware that fly-up safety function not available

If during segment level RHT transitions to ALT with chime and current altitude held.
DCL modes disengage with chime (if engaged).
Be aware that fly-up safety function not available

If required visual references NOT achieved

- Discontinue Approach

VERTICAL TRACK ALERT CAPTION FOR PHASE 5, 6 & 7:

VTA on attitude indicator during VGP mode approach, when within 100 ft above the Missed Approach Point (MAP) altitude.

The VGP will disengage, with chime, at MAP or transition to ALVL, if still engaged at 150 ft (46 m) AGL.

CAUTION

- ALVL mode will not engage when MAP is above 150 ft (46 m) AGL
- VTA annunciation will not appear when MAP is below 50 ft AGL due to engagement of ALVL at 150 ft AGL.
- VTA annunciation is not availabe when 'MIN' annunciator is illuminated.

PHASE 8 AND LATER:

VTA on attitude indicator during VGP mode approach, when within 200 ft above the Missed Approach Point (MAP) altitude.

The VGP will disengage, with chime, at MAP or transition to ALVL, if still engaged at 150 ft (46 m) AGL.

CAUTION

- ALVL mode will not engage when MAP is above 150 ft (46 m) AGL
- VTA annunciation is not availabe when 'MIN' annunciator is illuminated.

GROUNDSPEED VELOCITY FAIL

VEL FAIL

Message below and to left of compass display
Velocity vector, on hover display, removed
GS digital readout source changes to FMS (F)
HOV and SAR Mode (except TD)
disengage, if engaged

Failure of valid velocity data
from both AHRS

- Continue flight
HOV and SAR modes (except TD) not available

GROUNDSPEED VELOCITY MISCOMPARE
(EPIC Phase 5 and later)

VEL Message below and to left of compass display

Miscompare between AHRS 1 & 2
velocity data (2 kts or greater)
when groundspeed below 20 kts

- Compare PFD indications

- Continue flight
If fault on coupled side AHRS
aircraft may be affected
by drift in HOV or SAR modes

HEIGHT LIMIT CAPTION
(EPIC Phase 5 and later)

HTLM Message left of attitude indicator on both PFD's

Aircraft passed Safety Height
and/or Ultimate Fly Up Limit.
Safety Fly-Up function activated, if any
collective mode engaged and coupled

- Monitor height
Ensure separation from terrain visually or, if not possible, establish a positive rate of climb to a safe height

OAT SENSOR MISCOMPARE
(EPIC Phase 5 or later)

OAT ## °C OAT displayed in amber on PFD

Miscompare between the two Outside
Air Temperature probes is 6 °C or greater

- Continue flight
Use OAT standby instrument

FMS MESSAGES

DEAD RECKONING (DR)

DR is an alerting (**amber**) annunciator. This annunciator is displayed when the FMS is Navigation Source and has been operating in the DR mode for longer than 2 minutes. The DR mode is activated following the loss of all other position sensors apart from AHRS (GPS, DME/DME and VOR/DME).

DEGRADED (DGR) + AMBER RNP AND MSG ON PFD + UNABLE RNP ON MCDU

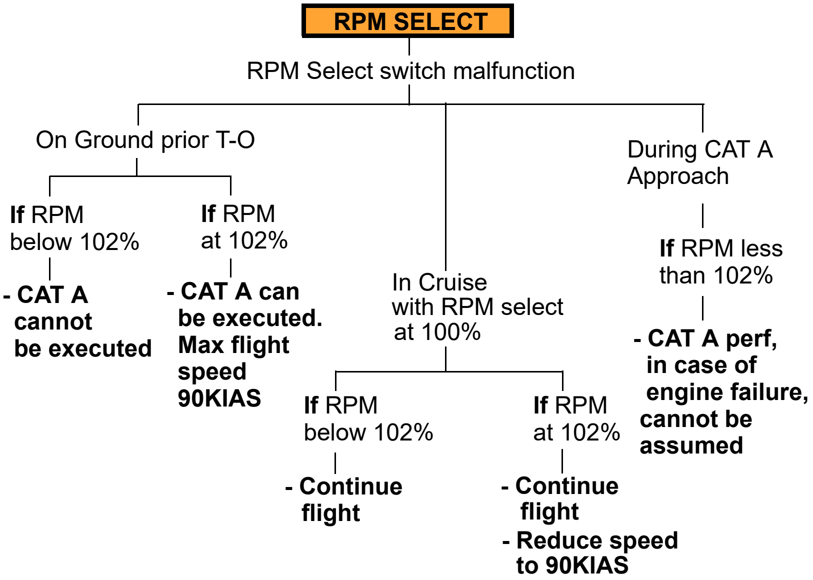
DGR is an alerting (**amber**) annunciator. This annunciator is displayed when the FMS cannot guarantee the position accuracy for the present phase of flight due to sensor unavailability. Practically the annunciator appears when the EPU (estimated position uncertainty) is greater than RNP (required navigation performance).

UNABLE RNP

If EPU (Estimated Position Uncertainty) show a value greater than the RNP (Required Navigation Performance) required for the current navigation phase (i.e. DGR message) a UNABLE RNP message will appear on the MCDU scratch pad and a MSG caption on the PFD.

ROTOR AND TRANSMISSION

ROTOR SPEED SELECTOR

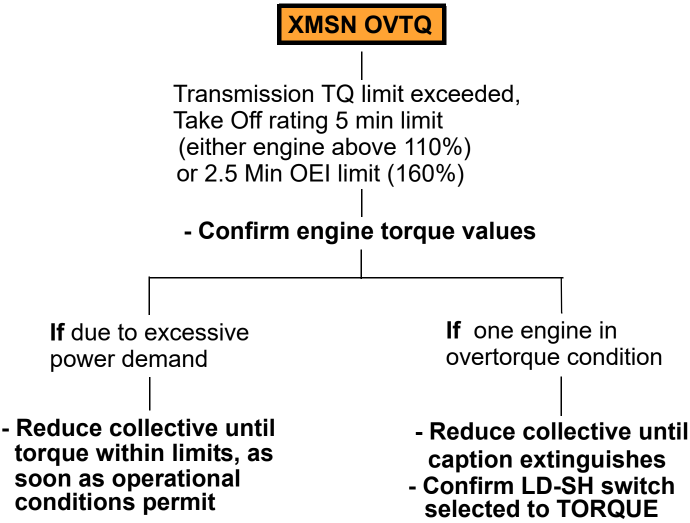


RPM SELECT

RPM Select switch malfunction

- On Ground prior T-O
  - **If** RPM below 102%
    - **- CAT A cannot be executed**
  - **If** RPM at 102%
    - **- CAT A can be executed. Max flight speed 90KIAS**
- In Cruise with RPM select at 100%
  - **If** RPM below 102%
    - **- Continue flight**
  - **If** RPM at 102%
    - **- Continue flight**
    - **- Reduce speed to 90KIAS**
- During CAT A Approach
  - **If** RPM less than 102%
    - **- CAT A perf, in case of engine failure, cannot be assumed**

MAIN GEARBOX OVERTORQUE



XMSN OVTQ

Transmission TQ limit exceeded, Take Off rating 5 min limit (either engine above 110%) or 2.5 Min OEI limit (160%)

- Confirm engine torque values

- **If** due to excessive power demand
  - **- Reduce collective until torque within limits, as soon as operational conditions permit**
- **If** one engine in overtorque condition
  - **- Reduce collective until caption extinguishes**
  - **- Confirm LD-SH switch selected to TORQUE**

MAIN GEARBOX CHIP DETECTOR

MGB CHIP MAST

or

MGB CHIP SUMP

- Activate CHIP BURNER
It is permitted to activate the CHIP BURNER up to 3 times to clear a chip

If CHIP caution clears

- Continue flight

If CHIP caution remains

- Reduce power as soon as conditions permit

- Land as soon as practicable

CAUTION

A maximum of 3 chips can be cleared in one flight. On the 4th CHIP caution **Land as soon as practicable.**

Note

If MGB CHIP MAST or MGB CHIP SUMP cautions illuminate when MGB OIL PRESS warning is illuminated the CHIP BURNER must not be activated.

MAIN GEARBOX OIL FILTER

MGB OIL FILTER

Main gearbox oil filter blockage and in bypass

- Continue flight monitoring MGB oil pressure and temperature

---

MAIN GEARBOX OIL LOW

MGB OIL LOW

Main gearbox oil level low. (caution only active with aircraft shut down and NR below 2%)

- Replenish MGB oil before flight

MAIN GEARBOX INPUT BEARING TEMPERATURE

1(2) BRG TEMP

Associated MGB engine input bearing over temperature

- Reduce speed to safe OEI flight

- Land as soon as practicable

If **1(2) MGB OIL PRESS** caution illuminates

On affected engine
- Shut down using ENGINE SHUT DOWN IN EMERGENCY procedure **page 19**

- Land as soon as practicable

MAIN GEARBOX INPUT OIL PRESSURE

1(2) MGB OIL PRESS

Associated engine - MGB input oil pressure low, possible blockage in oil duct to engine - MGB input

- Reduce speed to safe OEI flight

- Land as soon as practicable

If **1(2) BRG TEMP** caution illuminates

On affected engine
- Shut down using ENGINE SHUT DOWN IN EMERGENCY procedure **page 19**

- Land as soon as practicable

Note

It is acceptable for the 1(2) MGB OIL PRESS caution to illuminate transiently when accelerating from GI to FLT condition providing the caution is not illuminated at 100%NR.

INTERMEDIATE OR TAIL GEARBOX CHIP DETECTOR

IGB CHIP or **TGB CHIP**

- Activate CHIP BURNER

It is permitted to activate the CHIP BURNER up to 3 times to clear a chip

If CHIP caution clears

- Continue flight

If CHIP caution remains

- Reduce power as soon as conditions permit

- Land as soon as practicable

CAUTION

A maximum of 3 IGB or 3 TGB chips can be cleared in one flight. On the 4th CHIP caution **Land as soon as practicable.**

INTERMEDIATE OR TAIL GEARBOX OIL LOW

IGB OIL LOW or **TGB OIL LOW**

Associated gearbox oil level low. (caution only active with aircraft shut down and NR below 2%)

- Replenish oil before flight

INTERMEDIATE GEARBOX OIL TEMPERATURE HIGH

IGB OIL TEMP

IGB oil temperature above limit (greater than109°C)

- Check IGB oil temperature

If oil temperature normal

- Continue flight monitoring oil temperature

If oil temperature high or invalid

- Reduce power as soon as operational conditions permit

- Land as soon as possible

ROTOR XMSN

TAIL ROTOR GEARBOX OIL TEMPERATURE HIGH

TGB OIL TEMP

TGB oil temperature above limit (greater than 109°C)

- Check TGB oil temperature

If oil temperature normal

- Continue flight monitoring oil temperature

If oil temperature high or invalid

- Reduce power as soon as operational conditions permit

- Land as soon as possible

GEARBOX CHIP DETECT UNIT MALFUNCTION

CHIP DET UNIT or **CHIP DET TEST**

Chip detect system malfunction

On ground

- Shut down aircraft

In flight

- Monitor transmission system parameters

- Land as soon as practicable

GEARBOX CHIP DETECTOR SENSOR FAILURE

CHIP MAST FAIL or **CHIP SUMP FAIL**

or **IGB CHIP FAIL** or **TGB CHIP FAIL**

Associated gearbox chip sensor failed

On ground

- Shut down aircraft

In flight

- Monitor associated gearbox parameters

- Land as soon as practicable

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CAT B SINGLE ENGINE FAILURE PROCEDURES

CATEGORY B SINGLE ENGINE FAILURE IN HOVER (5 TO 10 FT)

1. Collective pitch — Maintain collective pitch setting or lower collective slightly if required to establish descent.
2. Touchdown — Increase collective to cushion landing as touchdown becomes imminent.
3. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to minimum. Apply wheel brakes as required.

CATEGORY B SINGLE ENGINE FAILURE ON TAKE OFF

If gross weight and flight path permit, takeoff and climb out may be continued. For a rejected take off carry out the following:

1. Collective pitch — Reduce as necessary to maintain rotor RPM if altitude permits.
2. Cyclic — Make a partial flare to reduce ground speed. Limit flare to 15° when close to the ground.
3. Collective pitch — Apply to cushion touchdown.
4. Landing — After touchdown centralize cyclic and simultaneously reduce collective to minimum.
5. Brakes — Apply wheel brakes to minimize ground roll.

SINGLE ENGINE FAILURE DURING CRUISE

1. Collective — Adjust as necessary to maintain rotor RPM and torque within limits.
2. Cyclic — Establish Safe OEI flight.
3. Collective — Re-adjust collective to minimize altitude loss by applying up to maximum OEI power.
4. Engine restart — Consider engine re-start if cause of initial failure has been determined and corrected. See **ENGINE RESTART IN FLIGHT** procedure page 69.
5. Engine — If engine restart fails or no attempt to restart is made carry out the **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.

CATEGORY B SINGLE ENGINE LANDING

1. Pre-landing checks — Establish normal approach and carry out pre landing checks.
2. Landing direction — Orientate the aircraft for an approach into the prevailing wind.
3. Initial point — During the approach, reduce airspeed gradually to arrive at a point 200 ft above touchdown point with a rate of descent of no more than 500fpm. Initiate a deceleration to achieve 30 KIAS at 50 ft. At 50 ft rotate nose up to a maximum of 20° to decelerate.
4. Collective — Continue deceleration to running touchdown or hover. Use collective to cushion touchdown. Maximum nose up attitude on touchdown 15°.
5. Landing — After touchdown, centralize cyclic and reduce collective to minimum.
6. Braking — Apply wheel brakes, as required.

CAT A SINGLE ENGINE FAILURE PROCEDURES

When Take Off or Landing is carried out from the left hand seat the right hand pilot should call out rotor speed during the engine failure procedures.

IN HOVER (5 feet ATS) ALL PROCEDURES

1. Collective — Maintain collective pitch setting or lower collective slightly if required to land.
2. Touchdown — Increase collective to cushion landing as touchdown becomes imminent. Maximum permitted GS at touchdown 5 kts.
3. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG. Apply wheel brakes if necessary.
4. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
5. PARK BRAKE — As required.

RECOGNIZED IN CLIMB, PRIOR TO TDP (REJECTED TAKE-OFF)

VERTICAL PROCEDURE RTO

1. Collective — Adjust collective gently to stop climb and establish descent. Maintain the rotor speed close to 100%NR.
2. Cyclic — Adjust pitch attitude as required to maintain position over the helipad.
3. Touchdown — At approximately 5-10 ft ATS increase collective to cushion landing as touchdown becomes imminent. Maximum permitted GS at touchdown 5 kts.
4. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.
5. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
6. PARK BRAKE — As required.

SHORT FIELD PROCEDURE RTO

1. Collective — Rotate nose down to a maximum of -20° to obtain forward speed and commence the descent to the field. Adjust collective to maintain the rotor droop within 90%NR.
2. Cyclic — At 50 ft AGL (or approximately 20 ft if TDP_E less than 50 ft AGL) rotate nose up as necessary (maximum 20°) to decelerate.
3. Touchdown — Continue deceleration to running touchdown or hover. Use collective to cushion touchdown. Maximum nose up attitude on touchdown 15°.
4. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.
5. Braking — Apply wheel brakes, as required.
6. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
7. PARK BRAKE — As required.

BACK UP PROCEDURE RTO

1. Collective — Lower collective gently to stop climb and establish descent. Maintain rotor speed close to 100%NR.
2. Cyclic — Adjust pitch attitude to -10° nose down to start descent back to the Take-Off position on heliport/helideck.
3. Touchdown — At approximately 5-10 ft ATS increase collective to cushion landing as touchdown becomes imminent. Maximum permitted GS at touchdown 5 kts.
4. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.
5. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
6. PARK BRAKE — As required.

CLEAR AREA PROCEDURE RTO

1. Collective — Adjust collective to maintain the rotor droop within 90%NR or lower collective slightly, if required, to establish descent.
2. Cyclic — Adjust pitch attitude as required to reduce speed below 30 kts GS.
3. Touchdown — At approximately 5-10 ft AGL level aircraft and increase collective to cushion landing as touchdown becomes imminent. Maximum nose up attitude at touchdown 15°.
4. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG. Apply wheel brakes, as required.
5. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
6. PARK BRAKE — As required.

CONFINED AREA PROCEDURE RTO

1. Initial action — Initially maintain collective position while applying 2-3 degrees nose down attitude change to commence movement to helipad.
2. Descent — As aircraft descends, adjust collective to droop NR to 100 % ±1 %NR. Maintain the helipad position in chin window.
   - When left hand pilot flying, right hand pilot call out rotor speed.
3. Touchdown — At approximately 15 ft ATS increase collective to cushion landing as touchdown becomes imminent. Maximum nose up attitude at touchdown, 15 degrees. Maximum allowed GS at touchdown 5 kts.
4. Landing — After touchdown, lower nose and centralize cyclic and simultaneously reduce collective to MPOG.
5. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
6. PARK BRAKE — As required.

OFFSHORE & ENHANCED OFFSHORE HELIDECK PROCEDURE RTO

1. Collective/Cyclic — Decrease collective to arrest climb and adjusts pitch attitude by 2° to 3° nose down to commence vertical movement toward helideck. Maintain the rotor speed close to 100%NR.
2. Touchdown — At approximately 5-10 ft ATS increase collective to cushion landing as touchdown becomes imminent. Maximum permitted GS at touchdown 5 kts.
3. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.
4. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
5. PARK BRAKE — As required.

SINGLE ENGINE FAILURE, RECOGNIZED AT/AFTER TDP (CONTINUED TAKE-OFF)

VERTICAL, SHORT FIELD AND BACK UP PROCEDURES CTO

1. Collective/Cyclic control — Rotate nose down to -10° in 1 second. Maintain for 1 second. Then recover pitch attitude to 0° in 1 second. Maintain 0° while using collective to droop NR to minimum of 90% and to set 2.5min power.
2. Acceleration/climb — Maintain pitch attitude at 0° and continue the acceleration up to V_{TOSS} (40 KIAS).
3. Climb — When the aircraft achieves V_{TOSS} (40 KIAS) and a positive rate of climb, adjust pitch attitude to approximately 5° nose up and lower collective to recover NR to 102%. Continue climb to 200 ft ATS, with 2.5min power.
4. At 200 ft ATS — Continue climb and accelerate to Vy using 2.5 min power rating. After achieving Vy, continue to 1000ft ATS reducing power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
5. Landing gear — UP (when reaching V_y).
6. Rotor Speed — Select 100% at V_y.
7. At 1000 ft ATS — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
8. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
9. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CLEAR AREA CTO

1. Collective/Cyclic — Continue the acceleration using collective to droop NR to minimum of 90% and to set 2.5min power
2. Acceleration/climb — Adjust pitch attitude to 5° nose up and continue acceleration to V_{TOSS}(50 KIAS).
3. Climb — When the aircraft achieves V_{TOSS} (50 KIAS) and a positive rate of climb lower collective to recover NR to 102%. Continue climb with 2.5min power to 200 ft
4. At 200 ft ATS — Accelerate to Vy and continue climbing at 2.5 m power to 1000 ft AGL. Reduce power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
5. Landing gear — UP (when reaching V_y).
6. Rotor Speed — Select 100% at V_y.
7. At 1000 ft AGL — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
8. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CONFINED AREA CTO (STANDARD CLIMB TECHNIQUE)

1. Collective/Cyclic control — Rotate nose down to -10° in 1 second. Maintain for 1 second. Then recover pitch attitude to 0° in 1 second. Maintain 0° while using collective to droop NR to minimum of 90% and to set 2.5min power.
2. Acceleration/climb — Maintain pitch attitude at 0° and continue the acceleration up to V_{TOSS} (40 KIAS).
3. Climb — When the aircraft achieves V_{TOSS} (40 KIAS) and a positive rate of climb, adjust pitch attitude to approximately 5° nose up and lower collective to recover NR to 102%. Continue climb to 200 ft or TDP height+100 ft ATS, with 2.5min power.
4. At 200 ft ATS (or TDP height +100 ft) — Continue climb and accelerate to Vy using 2.5 min power rating. After achieving Vy, continue to 1000 ft AGL reducing power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
5. Landing gear — UP (when reaching V_y).
6. Rotor Speed — Select 100% at V_y.
7. At 1000 ft ATS — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
8. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
9. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CONFINED AREA CTO (ALTERNATIVE CLIMB TECHNIQUE)

1. Collective/Cyclic control — Rotate nose down to -10° in 1 second. Maintain for 1 second. Then recover pitch attitude to 0° in 1 second. Maintain 0° while using collective to droop NR to minimum of 90% and to set 2.5min power.

2. Acceleration/climb — Maintain pitch attitude at 0° and continue the acceleration up to V_{TOSS} (40 KIAS).

3. Climb — When the aircraft achieves V_{TOSS} (40 KIAS) and a positive rate of climb continue acceleration to 60 KIAS adjust pitch attitude to approximately 5° nose up and lower collective to recover NR to 102%. Continue climb at 60 KIAS using 2.5 min power rating to 1000 ft ATS. At 1000 ft ATS accelerate to Vy. Reduce power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.

4. Landing gear — UP (when reaching 60 KIAS but not before 200 ft ATS).

5. Rotor Speed — Select 100% at 1000 ft ATS.

6. At 1000 ft ATS — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.

7. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.

8. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

OFFSHORE HELIPAD CTO (STANDARD CLIMB TECHNIQUE)

1. Collective control — Maintain collective and continue climb to 30 ft ATS.

2. At 30 ft ATS cyclic/ collective control — Rotate nose down to -10° in 1 second. Maintain -10° for 1 second, then recover pitch attitude to 0°. Use collective to droop NR to minimum of 90% and to set 2.5min power.

3. Acceleration/climb — Maintain pitch attitude at 0° and continue the acceleration up to V_{TOSS} (40 KIAS).

4. Climb — When the aircraft achieves V_{TOSS} (40 KIAS), adjust pitch attitude to approximately 5° nose up and lower collective to recover NR to 102%. Continue climb to 200 ft ATS, with 2.5min power.

5. At 200 ft ATS — Continue climb and accelerate to Vy using 2.5 min power rating. After achieving Vy, continue to 1000ft ATS, or as required, reducing power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.

6. Rotor Speed — Select 100% at V_y.

7. Landing gear — UP (when reaching V_y).

7A. Compass Cont. — Select MAG.

8. At 1000 ft ATS, or cruise altitude — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.

9. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.

10. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

OFFSHORE HELIPAD CTO (ALTERNATIVE CLIMB TECHNIQUE)

1. Collective control — Maintain collective and continue climb to 30 ft ATS.

2. At 30 ft ATS cyclic/collective control — Rotate nose down to -10° in 1 second. Maintain -10° for 1 second, then recover pitch attitude to 0°. Use collective to droop NR to minimum of 90% and to set 2.5min power.

3. Acceleration/climb — Maintain pitch attitude at 0° and continue the acceleration up to V_{TOSS} (40 KIAS).

4. Climb — When the aircraft achieves V_{TOSS} (40 KIAS) continue acceleration to 60 KIAS, adjust pitch attitude to approximately 5° nose up and lower collective to recover NR to 102%. Continue climb at 60 KIAS using 2.5min power rating to 1000 ft (300 m) ATS, or as required. At 1000 ft (300 m) ATS accelerate to Vy. Reduce power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.

5. Landing gear — UP (when reaching 60 KIAS but not below 200 ft ATS))

6. Rotor Speed — Select 100% at 1000 ft (300 m) ATS.

6A.Compass Cont — Select MAG.

7. At 1000 ft ATS, or cruise altitude — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.

8. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.

9. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CAUTION

Following an engine failure after TDP an OEI Landing, using the Offshore Helideck Level Approach Landing Procedure, is not possible. If a helideck landing is required the Offshore Descending Approach Procedure and WAT weight (maximum 6400 kg) should be used.

ENHANCED OFFSHORE HELIDECK CTO

1. Collective control — Continue nose down rotation to -10° to accelerate to 25 kts GS using collective to droop NR to a minimum of 90% and to set 2.5 min power.
   - PNF calls out rotor speed

2. At 20 kts GS — PNF calls ‘Approaching 25 kts’.

3. At 25 kts — Rotate noe up to +5° and continue accelerate to V_{TOSS} (40 KIAS).

4. Climb — When the aircraft achieves V_{TOSS} (40 KIAS) continue acceleration to V_{COSS}, and lower collective to recover NR to 102%. Continue climb at V_{COSS} using 2.5min power rating to 1000 ft (300 m) ATS, or cruise altitude if lower and accelerate to Vy. Reduce power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.

5. Landing gear — UP (when reaching V_{COSS} but not below 200 ft ATS)
6. Rotor Speed — Select 100% at 1000 ft (300 m) ATS or cruise altitude if lower.
7. At 1000 ft ATS, or cruise altitude — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 19.
8. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
9. LDG LT & LDG LT2 switches — OFF (if used).
10. Compass controller — Select MAG.
11. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

SINGLE ENGINE FAILURE DURING CRUISE

1. Collective — Adjust as necessary to maintain rotor RPM and torque within limits.
2. Cyclic — Establish Safe OEI flight.
3. Collective — Re-adjust collective to minimize altitude loss by applying up to maximum OEI power.
4. Engine restart — Consider engine re-start if cause of initial failure has been determined and corrected. See **ENGINE RESTART IN FLIGHT** procedure page 69
5. Engine — If engine restart fails or no attempt to restart is made carry out the **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.

CATEGORY A SINGLE ENGINE FAILURE DURING APPROACH AND LANDING:

DURING LANDING PRIOR TO LDP (BALKED LANDING)

HELIPORT BALKED LANDING

1. Engine failure prior to LDP — Apply collective to control NR droop to a minimum of 90% and adjust pitch attitude to 5° nose up to initiate an acceleration to V_{BLSS} (40 KIAS).
2. Climb — When the aircraft achieves V_{BLSS} (40 KIAS) and a positive rate of climb, lower collective to recover NR to 102%. Continue climb to 200 ft or LDP_V height+150 ft ALS with 2.5min power.
3. At 200 ft ALS — Reduce pitch attitude to 2° nose up and accelerate aircraft to Vy, continue to 1000 ft GL reducing power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
4. Landing gear — UP (when reaching Vy).
5. Rotor speed — Select 100% at Vy.
6. At 1000 ft ALS — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
7. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
8. LDG LT & LDG LT2 switches — OFF, if used.
9. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CLEAR AREA BALKED LANDING

1. Engine failure prior to LDP — Apply collective to control NR droop to a minimum of 90% and adjust pitch attitude to 5° nose up to initiate an acceleration to V_{BLSS} (50 KIAS).
2. Climb — When the aircraft achieves V_{BLSS} (50 KIAS) and a positive rate of climb, lower collective to recover NR to 102%. Continue climb to 200 ft AGL with 2.5min power.
3. At 200 ft AGL — Accelerate aircraft to Vy while climbing. After achieving Vy, continue to 1000 ft ATS reducing power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
4. Landing gear — UP (when reaching Vy).
5. Rotor speed — Select 100% at Vy.
6. At 1000 ft AGL — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
7. LDG LT & LDG LT2 switches — OFF, if used.
8. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CONFINED AREA BALKED LANDING (STANDARD CLIMB TECHNIQUE)

1. Engine failure — Apply collective to control NR droop to a minimum of 90% and adjust pitch attitude to 0° to initiate an acceleration to V_{BLSS} (40 KIAS).
2. Climb — When the aircraft achieves V_{BLSS} (40 KIAS) and a positive rate of climb, select 5° nose up attitude and progressively lower collective to recover NR to 102%. Continue climb to 200 ft or LDP height + 100 ft ALS with 2.5min power.
3. At 200 ft ALS (or LDP height + 100 ft) — Continue to accelerate to Vy using 2.5 min power rating. After achieving Vy, continue climb to 1000 ft ALS reducing power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
4. Landing gear — UP (when reaching Vy).
5. Rotor speed — Select 100% at Vy.
6. At 1000 ft ALS — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
7. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
8. LDG LT & LDG LT2 switches — OFF, if used.
9. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CONFINED AREA BALKED LANDING (ALTERNATIVE CLIMB TECHNIQUE)

1. Engine failure — Apply collective to control NR droop to a minimum of 90% and adjust pitch attitude to 0° to initiate an acceleration to V_{BLSS} (40 KIAS).
2. Climb — When the aircraft achieves V_{BLSS} (40 KIAS) and a positive rate of climb continue acceleration to 60 KIAS, select 5° nose up attitude and progressively lower collective to recover NR to 102%. Continue climb at 60 KIAS using up to 2.5 min power rating to 1000 ft ALS. At 1000 ft ATS accelerate to Vy. Reduce power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
3. Landing gear — UP (when reaching 60 KIAS (but not before 200 ft ALS))
4. Rotor speed — Select 100% at 1000 ft ALS.
5. At 1000 ft ALS — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
6. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
7. LDG LT & LDG LT2 switches — OFF, if used.
8. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

OFFSHORE HELIDECK LEVEL APPROACH PROCEDURE BALKED LANDING (STANDARD CLIMB TECHNIQUE)

1. Engine failure — Simultaneously adjust pitch attitude, nose down to 0° to initiate an acceleration to V_{BLSS} (40 KIAS) and apply collective to control NR droop, to a minimum of 90%.
2. Climb — When the aircraft achieves V_{BLSS} (40 KIAS) select 5° nose up attitude and lower collective to recover NR to 102%. Continue climb to 200 ft ALS with 2.5 min power.
3. At 200 ft ALS — Continue climb and accelerate to V_y using 2.5 min power rating. After achieving V_y, continue climb to 1000 ft ALS, or as required, reducing power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
4. Landing gear — UP (when reaching V_y).
5. Rotor speed — Select 100% at V_y.

5A.Compass Cont. — Select MAG.

6. At 1000 ft ALS or cruise altitude if lower — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
7. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
8. LDG LT & LDG LT2 switches — OFF, if used.
9. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

OFFSHORE HELIDECK LEVEL APPROACH PROCEDURE BALKED LANDING (ALTERNATIVE CLIMB TECHNIQUE)

1. Engine failure — Simultaneously adjust pitch attitude, nose down to 0° to initiate an acceleration to V_{BLSS} (40 KIAS) and apply collective to control NR droop, to a minimum of 90%.
2. Climb — When the aircraft achieves V_{BLSS} (40 KIAS) continue acceleration to 60 KIAS, select 5° nose up attitude and lower collective to recover NR to 102%. Continue climb at 60 KIAS using up to 2.5 min power rating to 1000 ft ALS, or as required. At 1000 ft ALS accelerate to V_y. Reduce power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
3. Landing gear — UP (when reaching 60 KIAS but not before 200 ft ALS)
4. Rotor speed — Select 100% at 1000 ft ALS.

4A.Compass Cont. — Select MAG.

5. At 1000 ft ALS or cruise altitude — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
6. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
7. LDG LT & LDG LT2 switches — OFF, if used.

8. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CAUTION

Following an engine failure before LDP this procedure dictates a Balked Landing be carried out . An OEI Landing, using the Offshore Helideck Level Approach Landing Procedure, is not possible. If a helideck landing is required the Offshore Descending Approach Procedure and WAT weight (maximum 6400 kg) should be used.

OFFSHORE HELIDECK DESCENDING APPROACH PROCEDURE BALKED LANDING (STANDARD CLIMB TECHNIQUE)

1. Engine failure — Simultaneously adjust pitch attitude, nose down to 0° to initiate an acceleration to V_{BLSS} (40 KIAS) and apply collective to control NR droop, to a minimum of 90%.
2. Climb — When the aircraft achieves V_{BLSS} (40 KIAS) select 5° nose up attitude and lower collective to recover NR to 102%. Continue climb to 200 ft ALS with 2.5 min power.
3. At 200 ft ALS — ontinue climb and accelerate to V_y using 2.5 min power rating. After achieving V_y, continue climb to 1000 ft ALS, or as required, reducing power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.
4. Landing gear — UP (when reaching V_y).
5. Rotor speed — Select 100% at V_y.

5A.Compass Cont. — Select MAG.

6. At 1000 ft ALS or cruise altitude if lower — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
7. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
8. LDG LT & LDG LT2 switches — OFF, if used.
9. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

OFFSHORE HELIDECK DESCENDING APPROACH PROCEDURE BALKED LANDING (ALTERNATIVE CLIMB TECHNIQUE)

1. Engine failure — Simultaneously adjust pitch attitude, nose down to 0° to initiate an acceleration to V_{BLSS} (40 KIAS) and apply collective to control NR droop, to a minimum of 90%.
2. Climb — When the aircraft achieves V_{BLSS} (40 KIAS) continue acceleration to 60 KIAS. Select 5° nose up attitude and lower collective to recover NR to 102%. Continue climb at 60 KIAS using up to 2.5 min power rating to 1000 ft ALS, or as required. At 1000 ft ALS accelerate to Vy. Reduce power to OEI MCP rating (140% PI) when convenient before expiry of the “2.5 m” rating.

3. Landing gear — UP (when reaching 60 KIAS but not before 200 ft ALS)
4. Rotor speed — Select 100% at 1000 ft ALS.
4A.Compass Cont. — Select MAG.
5. At 1000 ft ALS or cruise altitude — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
6. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
7. LDG LT & LDG LT2 switches — OFF, if used.
8. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CAUTION

Following an engine failure before LDP an OEI Landing, using the Offshore Helideck Descending Profile Landing Procedure, is possible only for WAT weight up to a maximum of 6400 kg.

SINGLE ENGINE FAILURE RECOGNIZED AT OR AFTER LDP (OEI LANDING)

HELIPORT OEI LANDING

1. Collective/cyclic — Continue the descent. At 50 ft ALS increase pitch attitude to reduce speed. Apply collective to reduce rate of descent.
2. Touchdown — At 20 ft ALS apply collective to cushion touchdown. Minimum rotor speed 90% NR. Maximum nose up attitude on touchdown 15°. Maximum allowed GS at touchdown 5 kts.
3. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.
4. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
5. PARK BRAKE — As required.
6. LDG LT & LDG LT2 switches — OFF, if used.

CLEAR AREA OEI LANDING

1. Collective/cyclic — Continue to landing point applying collective to control the rotor droop to a minimum or 90%NR and controlling the aircraft pitch attitude to decelerate the helicopter.
2. Touchdown — At 20 ft AGL apply collective to cushion the touchdown. At touchdown maximum nose up attitude 15° and maximum GS 30 kts.
3. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG. Apply wheel brakes as required.
4. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.
5. PARK BRAKE — As required.
6. LDG LT & LDG LT2 switches — OFF, if used.

CONFINED AREA OEI LANDING

1. Collective/cyclic — Continue the descent at 400 to 500 fpm. Use up to 2.5 Min power and maintain NR at 100 % ± 1 %.

2. Touchdown — At 15 ft ALS apply collective to cushion touchdown. Minimum rotor speed 90% NR. Maximum nose up attitude on touchdown 15°. Maximum allowed GS at touchdown 5kts.

3. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.

4. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.

5. PARK BRAKE — As required.

6. LDG LT & LDG LT2 switches — OFF, if used.

OFFSHORE HELIDECK LEVEL APPROACH PROCEDURE OEI LANDING

1. Collective/cyclic — Fly the aircraft forwards, sideways and downwards towards the landing point, decreasing collective slightly. When descending through 30 ft ALS reduce nose up attitude to maximum of 10°. At approximately 15 ft ALS apply collective using 2.5min power, if required, to cushion touchdown and touchdown with 30° to 45° heading offset. Minimum rotor speed 90% NR. Maximum nose up attitude on touchdown 15°. Maximum allowed GS at touchdown 5 kts.

2. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.

3. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.

4. PARK BRAKE — As required.

5. LDG LT & LDG LT2 switches — OFF, if used.

OFFSHORE HELIDECK DESCENDING APPROACH PROCEDURE OEI LANDING

1. Collective/cyclic — Fly the aircraft forwards and downwards towards the landing point. When descending through 30 ft ALS reduce nose up attitude to maximum of 10°. At approximately 15 ft ALS apply collective using 2.5min power, if required, to cushion touchdown. Minimum rotor speed 90% NR. Maximum nose up attitude on touchdown 15°. Maximum allowed GS at touchdown 5 kts.

2. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.

3. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN EMERGENCY** procedure page 19.

4. PARK BRAKE — As required.

5. LDG LT & LDG LT2 switches — OFF, if used.

USE OF WARNINGS, CAUTIONS AND NOTES

Warnings, Cautions and Notes are used to emphasize important and critical instructions and are used as follows:

WARNING

An operating procedure, practice, etc., which, if not correctly followed, could result in personal injury or loss of life.

CAUTION

An operating procedure, practice, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment.

Note

An operating procedure, condition, etc., which is essential to highlight.

USE OF PROCEDURAL WORDS

The concept of procedural word usage and intended meaning which has been adhered to in preparing this QRH is as follows:

”**Shall**” or ”**Must**” have been used only when application of a procedure is mandatory.
”**Should**” has been used only when application of a procedure is re-commended.
”**May**” has been used only when application of a procedure is optional.
”**Will**” has been used only to indicate future events, not to indicate a mandatory procedure.
”**Condition**” has been used to determine if the item under examination presents external damage which could jeopardize its safe operation.
”**Secure**” has been used to determine if the item under examination is correctly locked, referring to doors and disconnectable items, or correctly positioned and installed.

LIMITATIONS

NORMAL PROCEDURES

PERFORMANCE

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LIMITATIONS

GENERAL

This QRH includes:

- Information from RFM Sections 1, 2, 3 and limited data from Section 4;
- Optional Supplements included see TOC page v.

TYPES OF OPERATION

See Basic Flight Manual for further information.

CAT A Take Off and Landing can be carried out from the right or left hand seat.

MINIMUM FLIGHT CREW

See Basic Flight Manual.

When CAT A Take Off or Landing is carried out from left hand seat or the CAT A Offshore Helideck procedure is required, minimum flight crew is 2 pilots.

NUMBER OF OCCUPANTS

The total number of occupants, including the crew, shall not exceed:

— Low density configuration	14
— High density configuration	17

— Each occupant must have a seat and seat belt.

— The low density or high density configuration may have a reduced number of passenger seats installed in cabin. A minimum of 3 seats, in at least one row, must be installed.

— After seat removal or installation the new empty weight and C of G position must be determined to ensure C of G limits are not exceeded.

WEIGHT AND CENTER OF GRAVITY LIMITATIONS

WEIGHT

Minimum flight/rotor running gross weight	4400 kg
Maximum towing or taxi gross weight	6450 kg
Maximum gross weight for take-off/landing	6400 kg
CAT B WAT Limitations chart	Figure 1-5
CAT A Heliport Vertical, Short Field and Back Up Procedure WAT Limitations chart	Figure 1-6
CAT A Clear Area WAT Limitations chart	Figure 1-7
CAT A Confined Area WAT Limitations chart	Figure 1-8
CAT A Offshore Helideck WAT Limitations chart	Figure 1-9
CAT A Enhanced Offshore Helideck Take Off WAT Limitations chart	Figure 1-10

CENTER OF GRAVITY

Longitudinal limits .... See Figure 1-1

Lateral limits .... See Figure 1-2

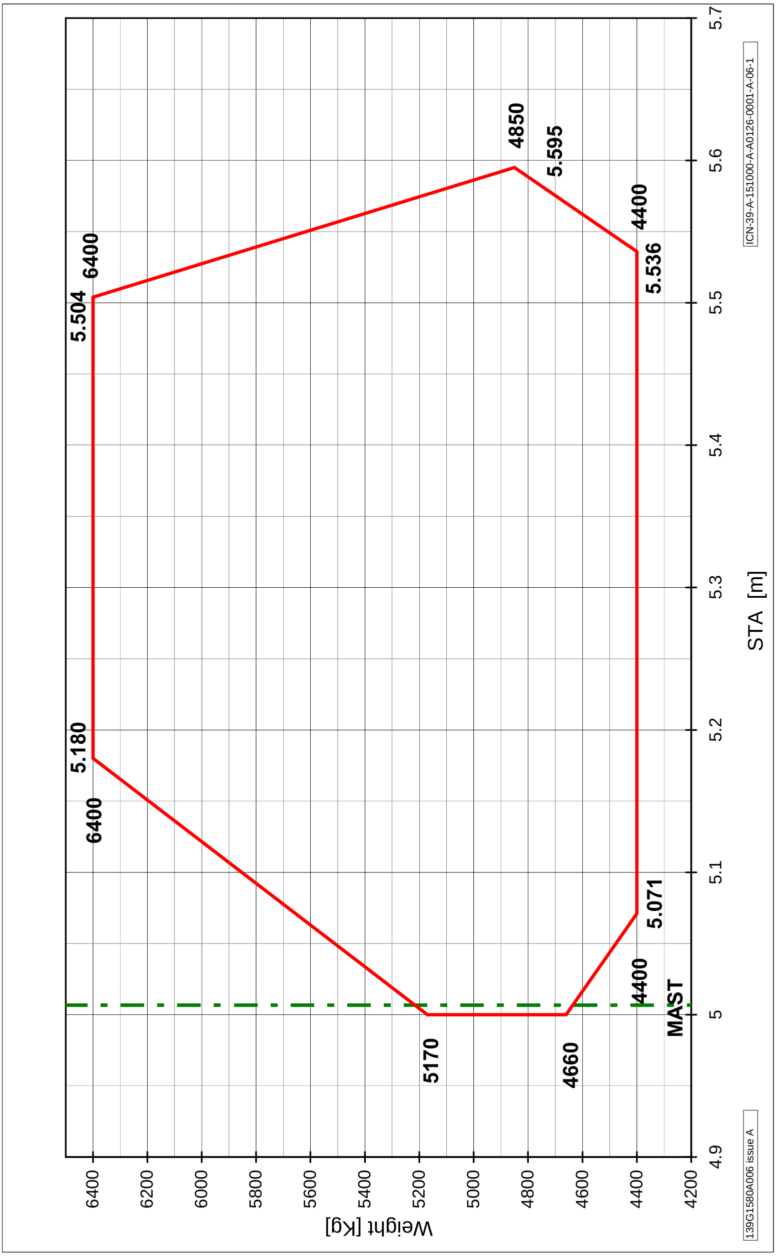

Figure 1-1 Weight and Longitudinal CG Envelope

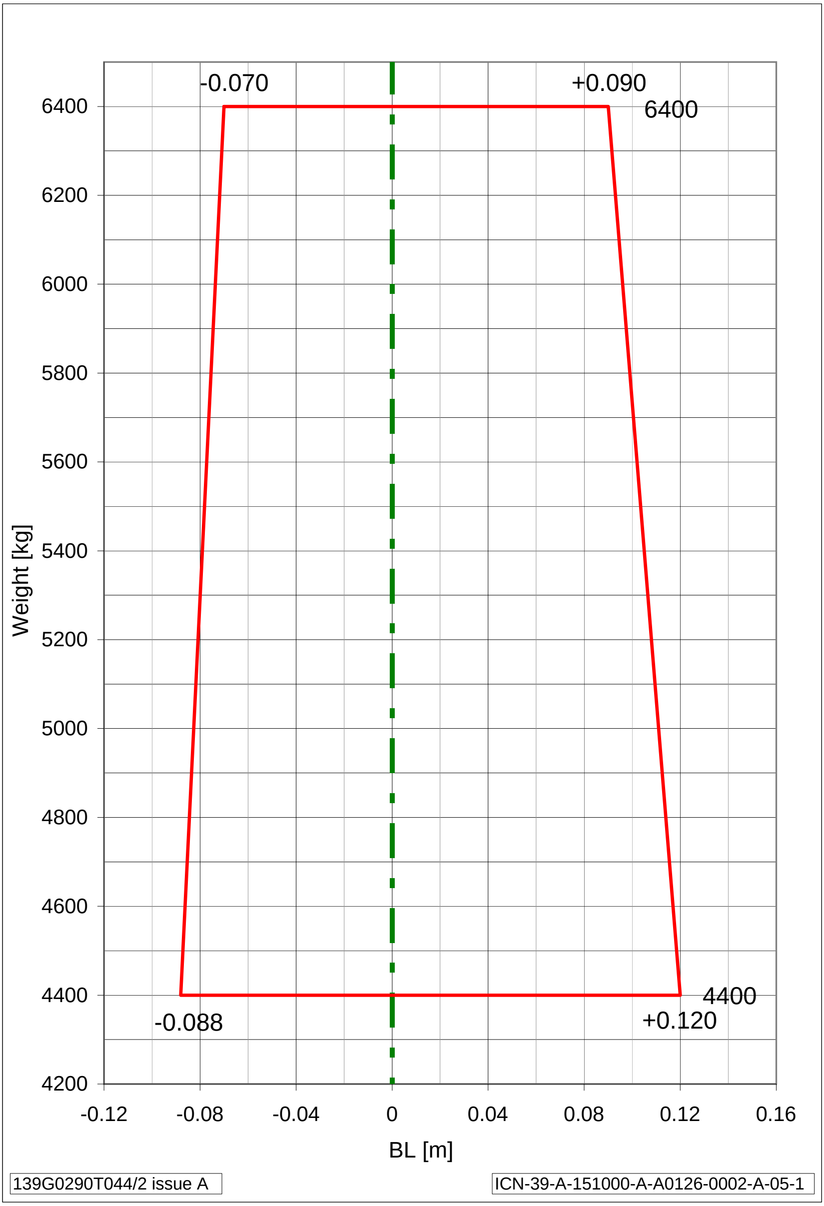

Figure 1-2 Weight and Lateral CG Envelope

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AIRSPEED LIMITATIONS

Maximum airspeed with Take-Off Power	90 KIAS
Maximum airspeed with NR at 102%	90 KIAS
Maximum airspeed in sideward or rearward flight	Figure 1-5
Maximum allowable tailwind and crosswind	Figure 1-5
Maximum airspeed for landing gear V_{LO} or V_{LE}	150 KIAS or Vne if less
Minimum airspeed for flight under IFR (Vmini)	50 KIAS
Maximum airspeed for IFR approach	150 KIAS
Maximum airspeed for climb with one AP failed	100 KIAS
Maximum rate of climb with one AP failed	1000 fpm
Maximum airspeed with one AP failed	Vne-27 KIAS
Maximum airspeed for operation of windscreen wipers	140 KIAS
Minimum airspeed in autorotation	40 KIAS
CAT A Take-Off & Balked Landing Safety Speed (V_{TOSS}/V_{BLSS}):	
Vertical, Short Field and Back Up Procedures	40 KIAS
Clear Area Procedure	50 KIAS
Best Rate Of Climb speed (V_Y)	Below 10000 ft Hp 80 KIAS (Below 3000 m Hp 80 KIAS) Above 10000 ft Hp 70 KIAS (Above 3000 m Hp 70 KIAS)
Maximum airspeed with right cabin door locked open	100 KIAS
Maximum airspeed with left or both cabin doors locked open	80 KIAS
Maximum airspeed for opening/closing cabin doors	80 KIAS

GROUND SPEED LIMITATIONS

ON PAVED SURFACES

Maximum taxi speed (above 20 kts (36 km/hr) nose wheel must be locked fore and aft)	40 knots (74 km/hr)
Maximum for emergency landing speed (nose wheel locked in fore and aft position)	60 knots (110 km/hr)
Maximum towing speed	37 km/hr (23 mph)
Maximum GS with PARK BRAKE ON	5 kts (9 km/hr)

ON PREPARED GRASS SURFACES

Maximum taxi speed (nose wheel locked fore and aft) (above 10 kts (18 km/hr) nose wheel must be locked fore and aft)	20 knots (37 km/hr)
Maximum speed for emergency landing (nose wheel locked fore and aft)	40 knots (74 km/hr)

WIND SPEED LIMITATIONS FOR ROTOR STARTING & STOPPING

Maximum wind speed .... 60 knots (30 m/s)

Note

During rotor starting and stopping the high crosswind (greater than 30 kts (15 m/s)), lateral cyclic movememnt up to 50mm (2 inches) into the direction of the wind may be used to counteract any crosswind rolling tendancy at higher rotor speeds.

Note

Actual windspeed values must be recorded in the helicopter log book for all rotor starting and stopping with windspeeds above 33 kts (17 m/s).

ALTITUDE LIMITATIONS

Maximum operating altitude ....See Figure 1-3

Minimum operating altitude .... See Figure 1-3

Maximum CAT B Take-Off and Landing altitude.................... See Figure 1-3

Maximum altitude for CAT A Heliport Vertical Take-Off Procedure:
TDP 35 ft ....14000 ft (4300 m) Hp of Hd whichever comes first

TDP 36 ft to 70 ft .... 7000 ft (2100 m) Hp of Hd whichever comes first

Maximum altitude for CAT A Short Field, Back Up and Clear Area Take-Off Procedures........................ 14000 ft (4300 m) Hp of Hd whichever comes first

Maximum altitude for CAT A Heliport, Short Field or Clear Area Landing Procedures ....14000 ft (4300 m) Hp or Hd whichever comes first

Maximum Altitude for CAT A Confined Area Take Off and Landing 10000 ft (3000 m) Hp or Hd whichever comes first

Maximum Altitude for CAT A Offshore Helideck Take Off and Landing 5000 ft (1500 m) Hp or Hd whichever comes first

Maximum Altitude for CAT A Enhanced Offshore Helideck Take-Off 1000 ft (300 m) Hp

AMBIENT AIR TEMPERATURE LIMITATIONS (OAT)

Minimum temperature for ground starting .... -40°C

Maximum and minimum air temperature limitations ....See Figure 1-3

MANOEUVRING LIMITATIONS

Aerobatic manoeuvres are prohibited.

ICING LIMITATIONS

Flight into known icing conditions or freezing rain is prohibited.

(If fitted and functioning refer to Icing Protection System or Limited Icing Protection System)

AUTOROTATION LIMITATIONS

Practice autorotative landings are prohibited.

During autorotation the ENG MODE select switch must not be retarded from FLIGHT to IDLE except in an emergency.

SLOPE LIMITATIONS

Sloped Take Off and Landing is limited to the following:

Nose up	5°
Nose Down	5°
Left Wing Low	5°
Right Wing Low	5°

ALTITUDE AND TEMPERATURE LIMITATIONS CHART

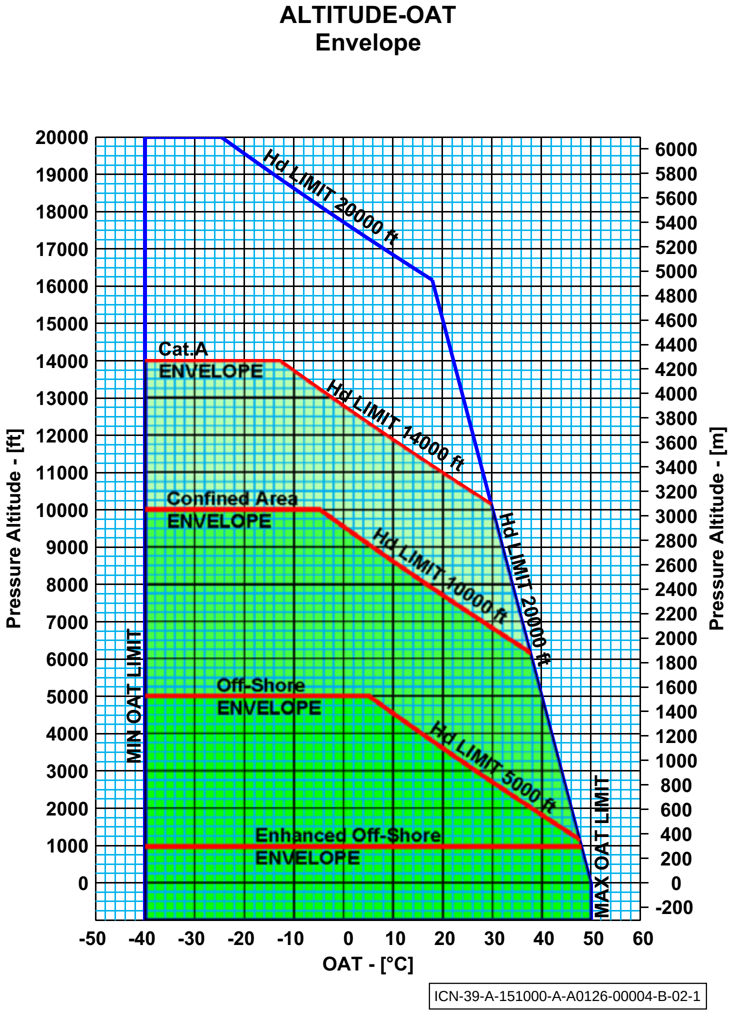


Figure 1-3 Altitude - Temperature Limitations

HEIGHT- VELOCITY LIMITATIONS

The Height-Velocity diagram defines, in the event of a single engine failure during take off, landing or other operation near the surface, a combination of airspeed and height above ground from which a safe single engine landing on a smooth, level and hard surface cannot be assured.

CAUTION

Prior to the determination of the H-V envelope the CATEGORY B weight should be defined for the ambient conditions. See Flight Planning in Section 2 for use of the CAT B W.A.T. and H-V envelope charts.

Height Velocity Diagram ....See Figure 1-4

CAT B OPERATIONS CABIN CONFIGS UP TO 9 PAX SEATS

CAT B Operation Limitations see ALT EXT 9 PAX.

Height Velocity envelope

For Cabin Configurations up to 9 PAX seats the H-V diagram is considered performance information.

CAT A MISCELLANEOUS LIMITATIONS

Ground and Elevated Heliport / Helideck Size

Minimum demonstrated heliport/helideck size for Vertical,
Back Up and Offshore procedures ....15 m x15 m (50 ft x 50 ft)
Diameter 15 m (50 ft)

Minmum demonstrated Heliport Size for Confined Area
Procedure ....20 m x 20 m (65 ft x 65 ft)
or Diameter 20 m (65 ft)

Wind Limitations

Maximum cross wind component must not exceed 20 kts (10 m/s).

For the Offshore Helideck procedures for cross wind components between 10 kts (5 m/s) and 20 kts (10 m/s) a headwind component of at least 5 kts (2.5 m/s) is required.

Note

The Offshore Helideck Gross Weight Benefit for Headwind Component may only be used when there is an air gap under the helideck of at least 3 m.

Enhanced Offshore Take Off Procedure Wind benefit Chart..........Figure 1-11

Note

Unless otherwise authorized by operation regulations, the pilot is not authorized to credit more than 50 percent of the performance increase resulting from the wind component presented in Figure 1-11.

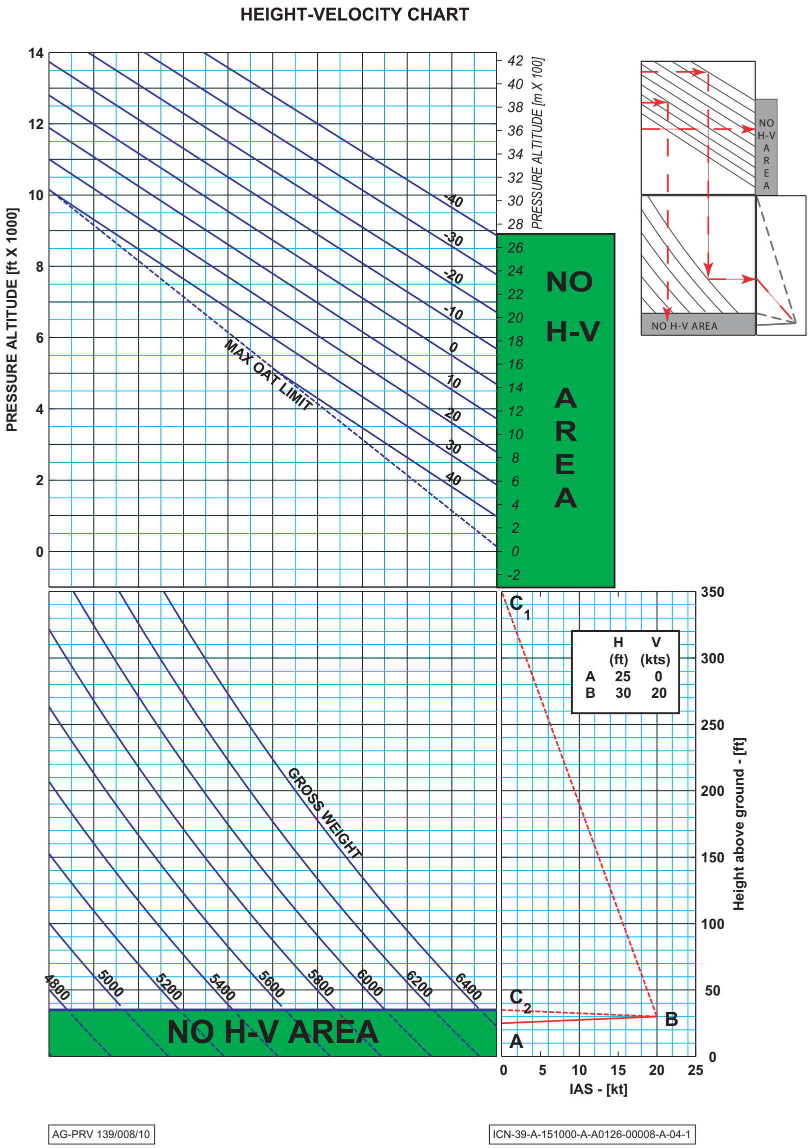
Take Off or Landing with tail wind is prohibited

Heater Limitations

Heater must be switched OFF for Take Off and Landing.

HEIGHT - VELOCITY DIAGRAM

H-V
CAT A/B



	H (ft)	V (kts)
A	25	0
B	30	20

Figure 1-4 Height Velocity Limitations

CATEGORY B OPERATION LIMITATIONS

WEIGHT-ALTITUDE-TEMPERATURE
for TAKE-OFF, LANDING and IGE MANOEUVRES
RELATIVE WIND AZIMUTH: 10 to 350 deg
Note: no windspeed limitation exists for headwind conditions (wind azimuth ±10deg)
10 or more passengers seats

ROTOR 100%

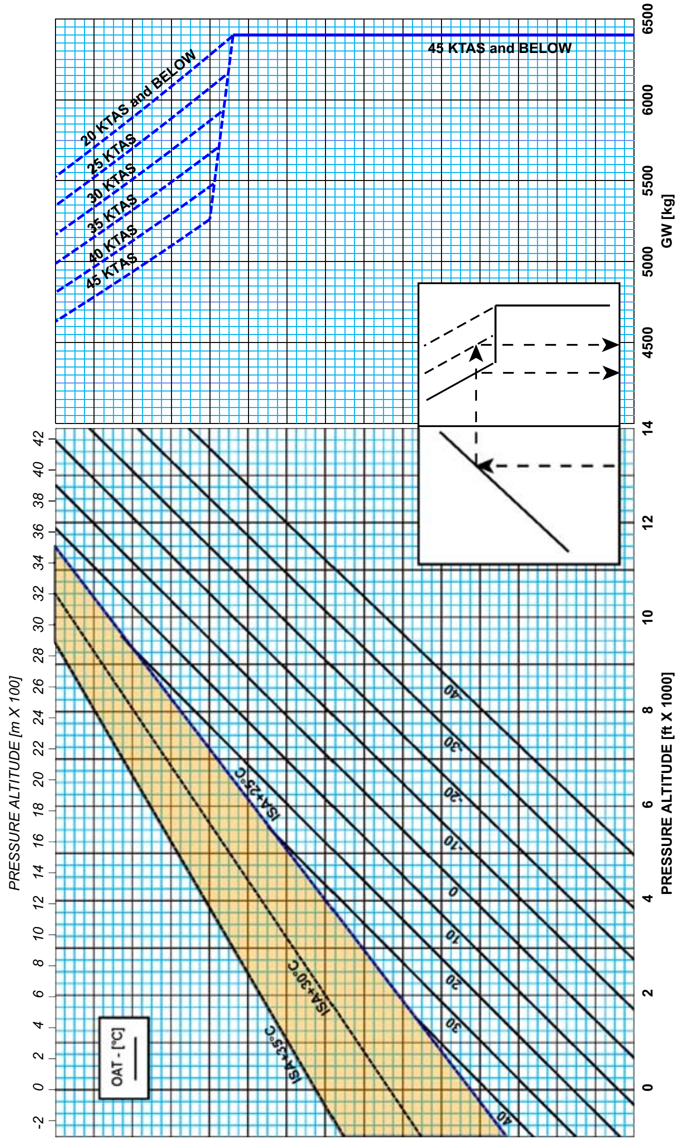


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Figure 1-5 CATEGORY B - Weight Limitations

CATEGORY A OPERATION LIMITATIONS

WEIGHT-ALTITUDE-TEMPERATURE
HELIPORT and SHORT FIELD

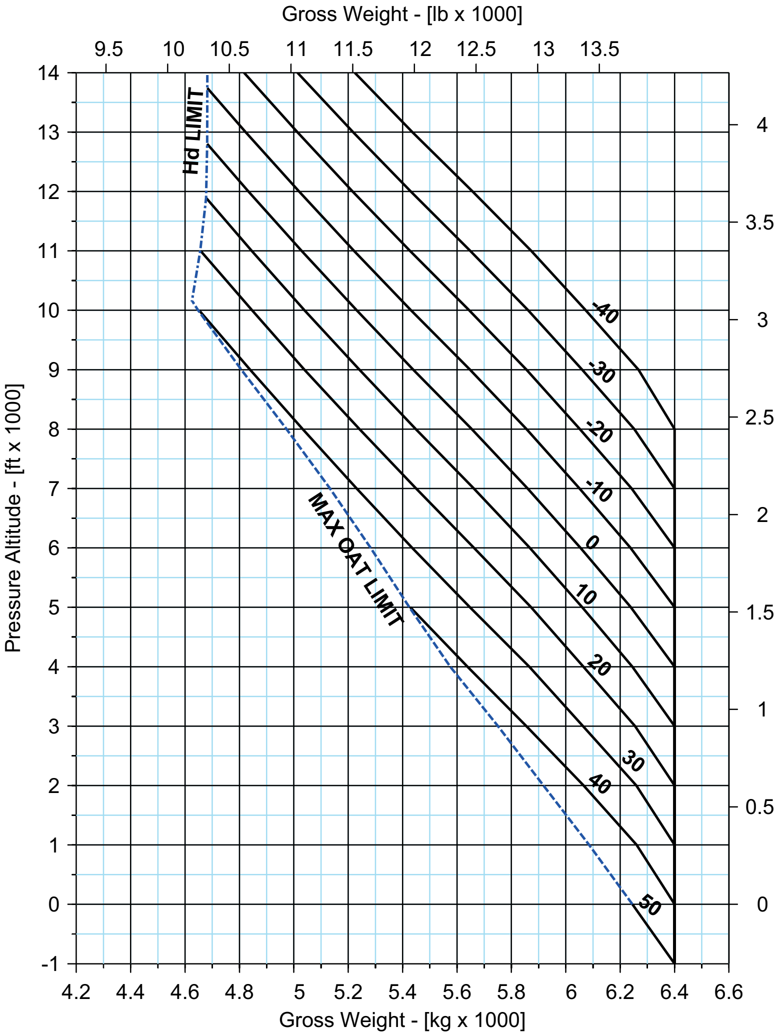

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Figure 1-6 CATEGORY A Ground and Elevated Heliport/Helideck Vertical, Back Up & Short Field Procedure Weight Limitations

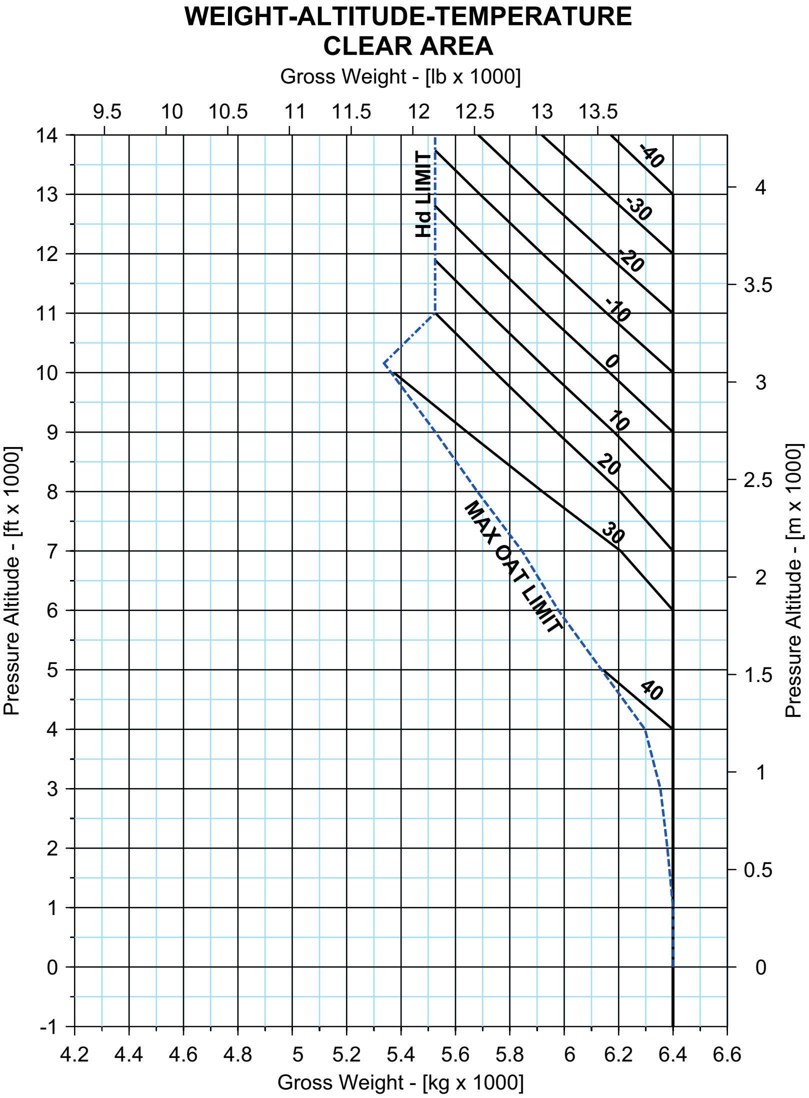

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Figure 1-7 CATEGORY A Clear Area Procedure Weight Limitations

WEIGHT-ALTITUDE-TEMPERATURE
CONFINED AREA

ROTOR SPEED 102%

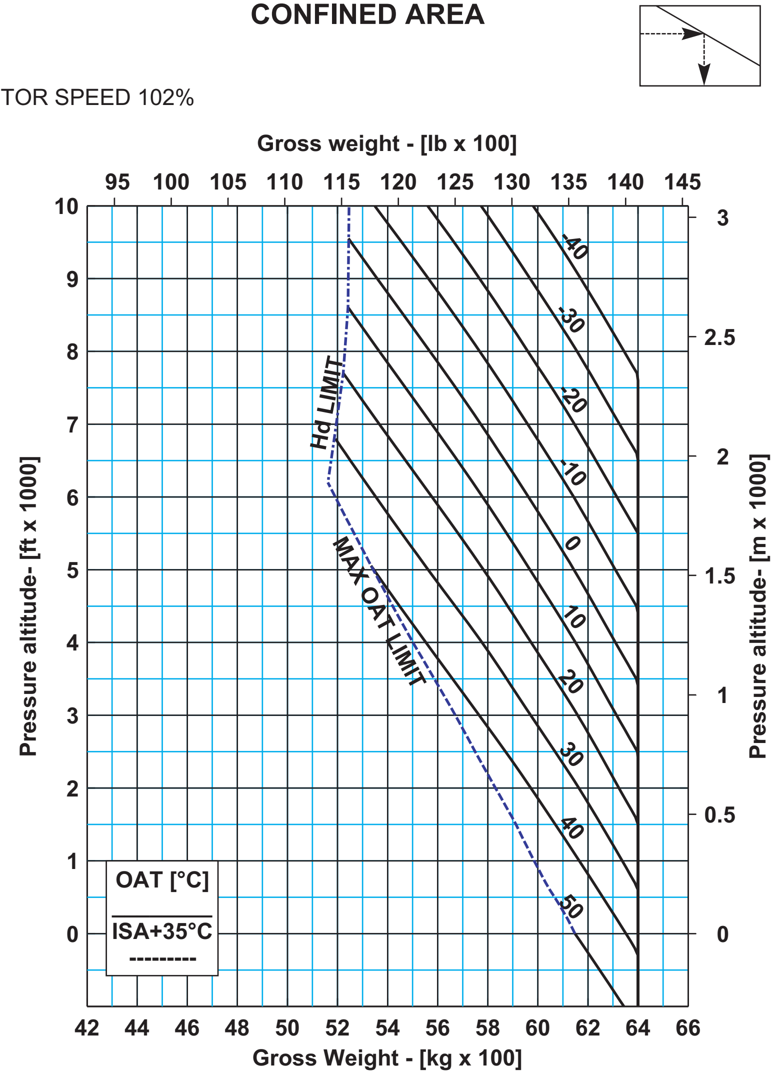

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Figure 1-8 CATEGORY A Ground and Elevated Heliport Confined Area Procedure Weight Limitations

H-V
CAT A/B

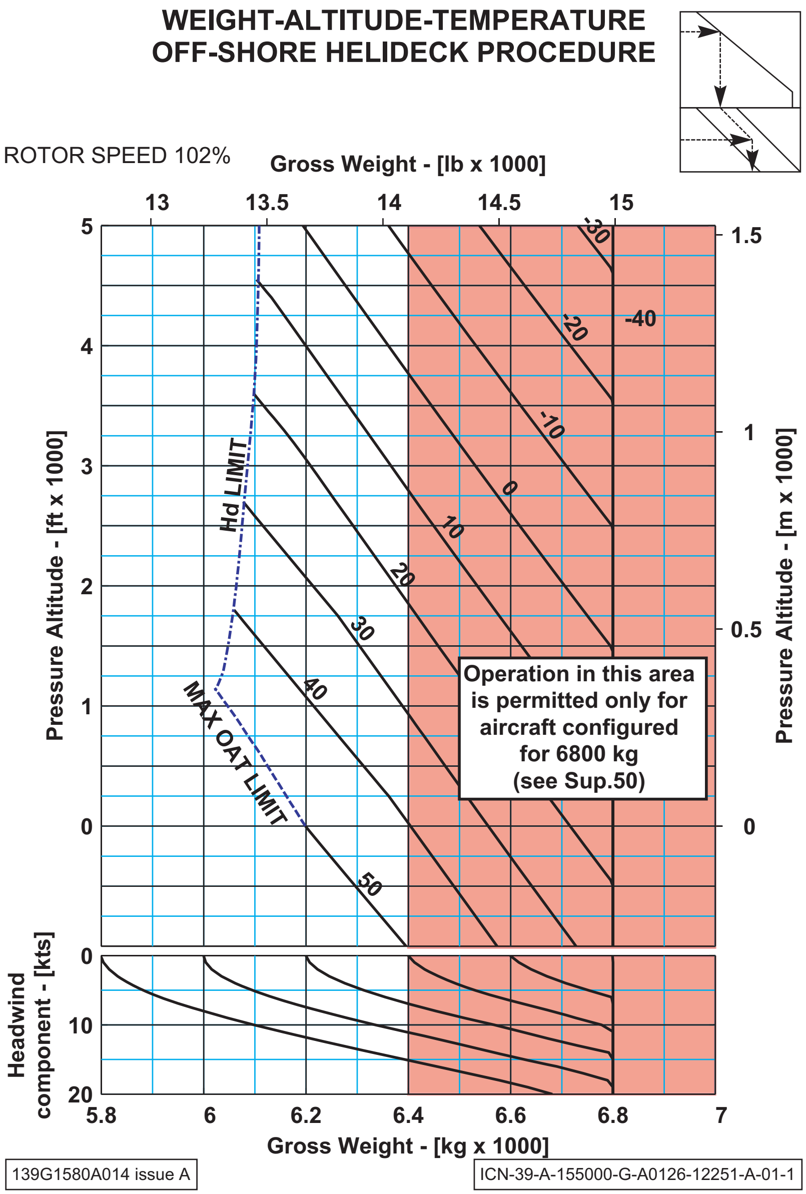

Figure 1-9 CATEGORY A Offshore Helideck Procedure Weight Limitations

WEIGHT-ALTITUDE-TEMPERATURE
ENHANCED OFFSHORE PROCEDURE

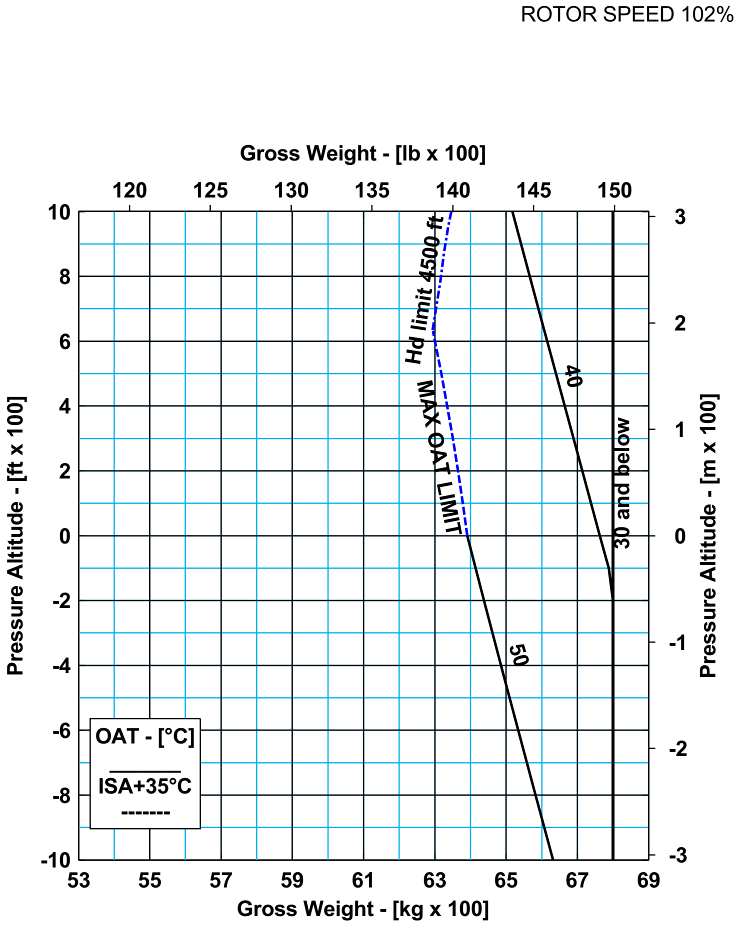

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Figure 1-10 CATEGORY A Enhanced Offshore Helideck Take Off Procedure Weight Limitations

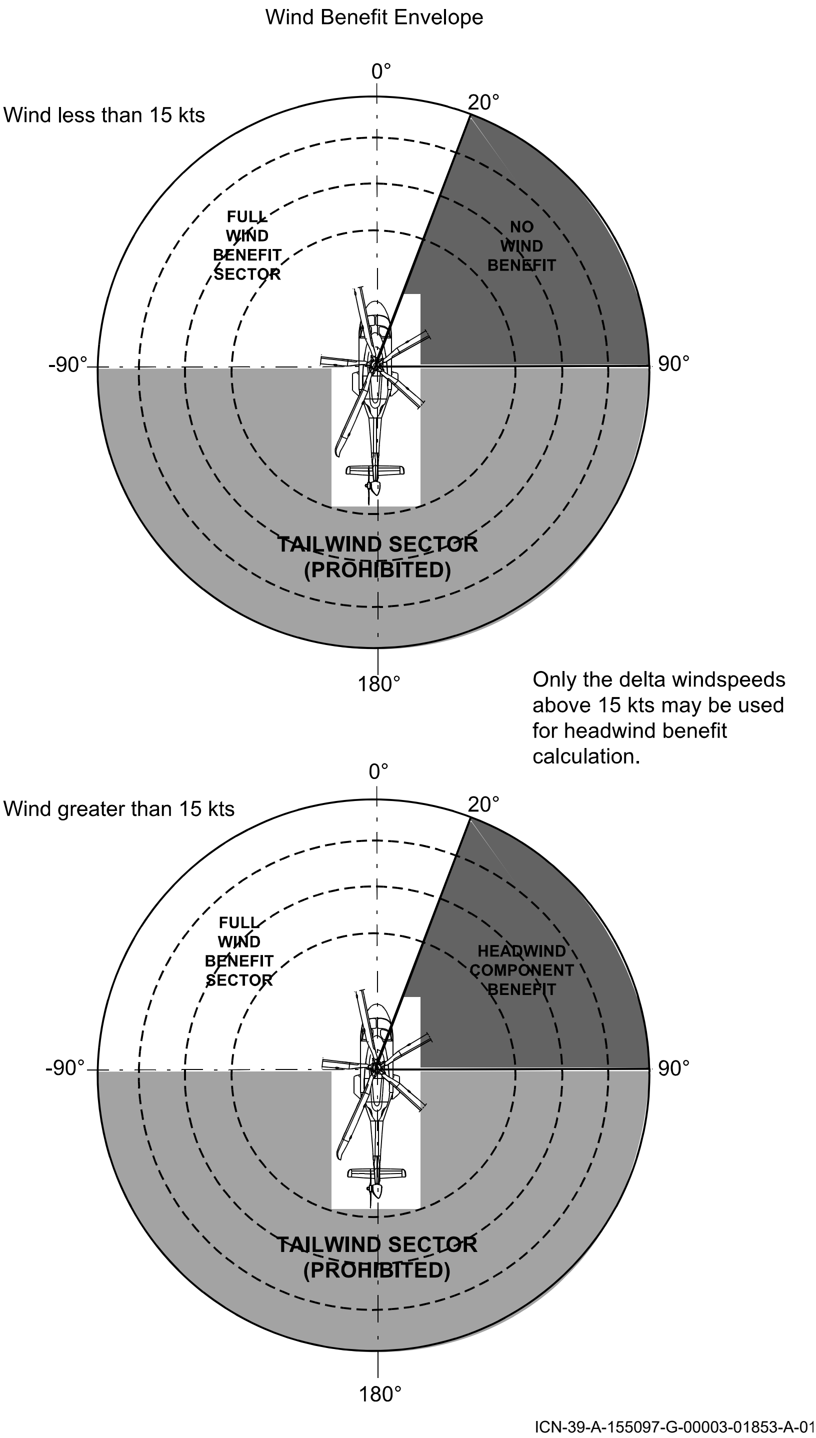

Figure 1-11 Wind Benefit Chart

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ENGINE AND TRANSMISSION DIGITAL LIMITATIONS

The following represent the digital values for PFD and MFD limitations indicated by colours

	PI & TQ %	Ng %	ITT °C/%	Nf %	NR %
All Engines Operating					
Minimum Transient				95	95
Minimum Continuous		55.0		98	98
Maximum Continuous	100	100.0	735/100.0	101	101
Maximum Take Off (5 min)	110	102.4	775/105.4		
Cautionary				103	103
Maximum Transient (5 secs)	121	107.0	847/115.2	106*	106*
One Engine Inoperative					
Minimum Transient				85	85
Cautionary (OEI Landing Only)				90	90
Minimum Continuous				98	98
Maximum Continuous	140	102.4	775/105.4	101	101
Maximum 2.5 min OEI	160	106.0	835/113.6		
Cautionary				103	103
Maximum Transient (5 secs)	176	107.0	847/115.2	106*	106*

* 10 seconds transient

	NR %
Power Off	
Minimum Transient	90
Minimum Continuous	95
Maximum Continuous	110
Maximum Transient	116

	ITT °C/%
Engine Starting	
Maximum Unlimited	869/118.2
Maximum Transient (2 secs)	1000/136.0

ENG FUEL
LUB HYD

	EOT °C%	EOP BAR	MGBOT °C	MGBOP BAR	IGBOT °C	TGBOT °C	HYDOT °C	HYDOP BAR
Minimum for Starting and GI	**-40**	**+4.2**	**-40**	**+2.3**	**-40**	**-40**	**-40**	
Minimum Normal Operation	**+10**	**+6.3**	**+1**	**+3.1**	**+1**	**+1**	**-20**	**+180**
Maximum Normal Operation	**+140**	**+8.9**	**+110**	**+6.0**	**+110**	**+110**	**+119**	**+225**
Maximum Cautionary TQ < 60%	**+145**							
Maximum Cautionary for eng accel OAT<0°C		**+10**						
Maximum Cautionary							**+134**	**+250**
Maximum for Engine Start (5 min)		**+15.2**						
Maximum Transient (1 min)	**+150**							

	BATTERY LOAD AMPS
Maximum Battery Discharge	**-200**
Maximum Battery Charge	**+200**

	MAIN BUS VOLTAGE	ESS BUS VOLTAGE
Minimum Normal Operation	**22**	**22**
Maximum Normal Operation	**29**	**29**

ENGINE LIMITATIONS

ENGINE STARTER DUTY CYCLE

45 seconds on, 1 minute off.

45 seconds on, 1 minute off.

45 seconds on, 30 minutes off.

POWER MARGIN TREND MONITORING

Every 50 flight hours record engine power assurance check values for engine power margin trend monitoring purposes.

ENGINE TRAINING MODE LIMITATIONS

Selection of Engine Training Mode (OEI TNG) is permitted only for Category A Training in OEI simulated conditions.

CAUTION

Intentional use of actual OEI rating for training is prohibited.

FUEL LIMITATIONS

FUEL CAPACITIES

Total Usable	1588 litres
Unusable	20 litres

UNUSABLE FUEL

In coordinated (ball centered) flight: .... 0 kg (0 lb) indicated/ (8 kg(18 lb)/10 litres per tank actual)

Hovering in cross winds or sideways flight with sustained roll angles greater than ±15° is prohibited when fuel indication, in either tank, is less than 70 kg.

Cross feeding (tank with pump off, not supplying engines) ....Maximum 228 kg/500 lb

Note

During XFEED the unusable fuel level indication will change to grey to indicate the tank can no longer supply fuel.

AUTHORIZED FUEL TYPES

The fuels shown in the table below have been authorized for use with the Pratt and Whitney PT6C-67C engines:

Fuel Type	Applicable Specification	Fuel Type	Applicable Specification
JET A	ASTM D1655	JP8	AVTUR/FSII MIL-T-83133H NATO Code F-34
JET A-1	ASTM D1655 NATO Code F-35		
JP5	DEF STAN 91-86 AVCAT/FSII MIL-PRF-5624F NATO Code F-44	JP8+100	Aeroshell Performance Additive 101
		GOST 10227 RT GOST 10227 TS-1	GOST 10227-86 GOST 10227-86 (See RFM restrictions)
JP8	DEF STAN 91-87-2002	No. 3 Jet Fuel	GB 6537-2018
		The use of No. 3 Jet Fuel with additives T1502 or T1602 is prohibited	

Note

Any mixture of authorized fuels may be used.

Note

ASTM D 1655, JET A and JET A-1 fuel specification allows the use of Di-Ethylene Glycol Monomethyl Ether (Di-EGME) with the limitations reported in the Engine Maintenanace Manual for the purpose of fuel system icing protection.

Note

GOST 10227 TS-1 fuel is considered by Pratt and Whitney to be satisfactory for a maximum 1000 hrs of use (intermittently or continuously) before maintenance action is required. Refer P&WC Maintenance Manual #3045332 Section 72-00-00 for details.

LUBRICANT LIMITATIONS

AUTHORIZED ENGINE OILS

The oils shown in the table below have been authorized for use with the Pratt and Whitney PT6C-67C engines. Any brand approved under the applicable specification may be used.

Oil Type	Applicable Specification	Brand Names (For reference only)
Type I (3cs)	PWC 521	BP Turbo Oil 2389 EASTMAN Turbo Oil 2389 Mobil Avrex S Turbo 256
Type II (5cs)	PWC 521	Aero-Shell Turbine Oil 500 Castrol 5000 Mobil Jet Oil II Royco Turbine Oil 500 BP Turbo Oil 2380 EASTMAN Turbo Oil 2380 Turbonycoil 525-2A Turbonycoil 600
Third Generation (5 cs)	PWC 521	Aero Shell Turbine Oil 560 Royco Turbine Oil 560

CAUTION

Mixing of any oils is not recommended and should be limited to oil brands of the same Type/Viscosity, Refer to Engine Maintenance Manual No 3045332 for information.

AUTHORIZED TRANSMISSION OIL

Applicable Specification	Brand Names
MIL PRF23699F DOD-PRF-85734	BP Turbo Oil 2380 EASTMAN Turbo Oil 2380 AeroShell Turbine OIL (ASTO) 555

ELECTRICAL HYDRAULIC PUMP

The electrical hydraulic pump is for ground operation only.

AUTHORIZED HYDRAULIC FLUIDS

The hydraulic fluids shown in the table below have been authorized for use in all hydraulic components. Any brand approved under the applicable specifications may be used.

Applicable Specification	For Brand Names Refer to:
MIL-PRF-83282	QPL-83282
Alternative: MIL-PRF-5606 (see NOTE below)	QPL-5606

Note

MIL-PRF-5606 can be used for enhanced performance of hydraulic system in low temperature environments below -30 °C.

CAUTION

Mixing of hydraulic fluid of different specification is prohibited.

MISCELLANEOUS LIMITATIONS

DC GENERATOR LOAD

Normal Operation Range	0 to 100%
Cautionary Range (for engine starting only)	101 to155%
Maximum Cautionary	155%

(Maximum cautionary may be exceeded for maximum of 45 seconds for engine start only)

Max normal operating load up to 15000ft (4570 m) Hp	100% (equivalent 300A)
Max normal operating load above 15000ft (4570 m) Hp	reduce by 13.4% every 1000 ft (300 m)

(see placard on RFM page 1-66 or, for aircraft fitted with EPIC S/W Phase 5 or later, Supplement 68)

Max normal operating load 20000 ft (6100 m) Hp	33%
MPOG with generator load at 75%or less	No time limitaiton
MPOG with generator load greater than 75%	Max 20 minutes

WHEEL BRAKE LIMITATIONS

Maximum running speed for brake application	40 knots (74 km/hr)

Parking on slopes up to 10° is permitted for a maximum of 1 hour.

PITOT HEATING LIMITATIONS

Pitot heating must be switched **ON** for indicated OAT of +4° C or less.

Pitot heating must be switched **OFF** at indicated OAT of +10° C or more.

AUTOMATIC FLIGHT CONTROL SYSTEM LIMITATIONS

Minimum AFCS configuration for IFR flight	2 AP in ATT mode

Intentional ATT MODE de-selection during IFR flight is prohibited.

AVIONIC LIMITATIONS

ILS Mode Limitations.

The helicopter is certified to carry out CAT 1 ILS approaches up to 7.5 deg glideslope.

Maximum airspeed for glideslope up to 4 degrees	150 KIAS
Maximum airspeed for glideslopes between 4 and 7.5 degrees (Steep Approach)	120 KIAS

CAUTION

During steep approach, take care not to use less than 5% PI.

FLIGHT DIRECTOR LIMITATIONS (WHEN FD FITTED)

4 Axis Basic and Enhanced FD system

- Basic FD system only: HOV mode not operative.
- SAR Guidance Controller, TD/H, MOT, WTR, modes only operative for Enhanced FD with EPIC Software Phase 5, or later, SAR modes operative.
- VNAV mode inoperative.
- Collective modes must not be engaged if either or both engines are in MANUAL MODE.
- The RHT, TD, TDH, TU, MOT, WTR modes can only be engaged over flat surfaces which are clear of obstacles (EPIC Software Phase 5, or later).
- The RHT must not be engaged in cruise over land (EPIC Software Phase 4 only).

PHASE 4, 5 & 6 FLIGHT DIRECTOR MODES ENGAGEMENT LIMITS AND MINIMUM USE HEIGHT (MUH)

Hold Mode	Applicable Range	MUH
IAS*	60 KIAS to Vne less 5 KIAS	150 ft AGL or 50 ft AGL during approach
HDG*/NAV*	60 KIAS to Vne	150 ft AGL or 50 ft AGL during approach
ALT	0 KIAS to Vne	300 ft AGL (airspeed greater than 55 KIAS 50 ft AGL in HOV or airspeed less than 55 KIAS (Enhanced FD system only)
VS*	60 KIAS to Vne within -1500 fpm and 2000 fpm	150 ft AGL
APP*/BC*	60 KIAS to Vne	50 ft AGL
GA*	60 KIAS to Vne 0 to 2000 ft AGL	N/A
DCL*	60 KIAS to Vne	50 ft AGL
ALTA*	60 KIAS to Vne	150 ft AGL
RHT	0 to Vne 15 ft to 2000 ft AGL	150 ft AGL (airspeed greater than 55 KIAS) 30 ft AGL in HOV or airspeed less than 55 KIAS)
HOV Enhanced FD systems only	Groundspeed — less than 60 kts forward — less than 40 kts lateral or aft with IAS less than 75 KIAS	30 ft AGL
TU Enhanced FD Phase 5 & 6	0 KIAS to 60 KIAS 0 to 2000 ft AGL	150 ft AGL (airspeed greater than 55KIAS) 30 ft AGL in HOV (airspeed less than 55 KIAS)

PHASE 4, 5 & 6 FLIGHT DIRECTOR MODES ENGAGEMENT LIMITS AND MINIMUM USE HEIGHT (MUH)

The following modes only available with Enhanced FD Phase 5, or later, and SAR modes installed		
TD	60 KIAS to Vne 135 ft to 2000 ft AGL	150 ft AGL
TDH	0 KIAS to 90 KIAS 50 ft to 300 ft AGL	50 ft AGL
MOT	0 KIAS to Vne 50 ft to 2000 ft AGL	PTH - 50 ft AGL VPTH - 250 ft AGL VRHT - 150 ft AGL DCL - 50 ft AGL
WTR	HOV Mode engaged	30 ft AGL

For operations on the sea the MUH must be increased by one half the maximum reported/observed wave height.

Note*

— Automatic disengagement of these modes below 55 KIAS.

— VS engagement above 2000 fpm or below -1500 fpm will result in the mode returning the aircraft to the maximum rates quoted (2000 fpm or -1500 fpm).

PHASE 7 AND LATER FLIGHT DIRECTOR MODES ENGAGEMENT LIMITS AND MINIMUM USE HEIGHT (MUH)

Hold Mode	Applicable Range	MUH
IAS[*1]	60 KIAS to Vne less 5 KIAS 50 KIAS to Vne less 5 KIAS during approach see Note**	150 ft AGL or 50 ft AGL during approach
HDG[*1]**/NAV**[*1]	60 KIAS to Vne less 5 KIAS 50 KIAS to Vne less 5 KIAS during approach see Note**	150 ft AGL or 50 ft AGL during approach
ALT	0 KIAS to Vne	300 ft AGL (airspeed greater than 55 KIAS 50 ft AGL in HOV or airspeed less than 55 KIAS (Enhanced FD system only)
VS[*2]	60 KIAS to Vne within -1500 fpm and 2000 fpm	150 ft AGL
APP[*2]**/BC**[*2]	60 KIAS to Vne	50 ft AGL
APP[*1] (VGP)	50 KIAS to Vne	50 ft AGL
APP[*1] (VRT) Note***	50 KIAS to Vne 150 ft to 2400 ft AGL	150 ft AGL
GA[*1]	41 KIAS to Vne 0 to 2000 ft AGL	N/A
DCL[*1]	50 KIAS to Vne	50 ft AGL
ALTA[*2]	60 KIAS to Vne	150 ft AGL
RHT	0 to Vne 15 ft to 2000 ft AGL	150 ft AGL (airspeed greater than 55 KIAS) 30 ft AGL in HOV or airspeed less than 55 KIAS)

PHASE 7 AND LATER FLIGHT DIRECTOR MODES ENGAGEMENT LIMITS AND MINIMUM USE HEIGHT (MUH)

HOV **Enhanced FD systems only**	Groundspeed — less than 60 kt forward — less than 40 kt lateral or aft with IAS less than 75 KIAS	30 ft AGL
TU **Enhanced FD**	0 KIAS to 41 KIAS 0 to 2000 ft AGL	150 ft AGL (airspeed greater than 55 KIAS) 30 ft AGL in HOV (airspeed less than 55 KIAS)
The following modes only available with SAR modes installed		
TD[*2]	60 KIAS to Vne 135 ft to 2000 ft AGL	150 ft AGL
TDH	0 KIAS to 90 KIAS 50 ft to 300 ft AGL	50 ft AGL
MOT	0 KIAS to Vne 50 ft to 2000 ft AGL	PTH - 50 ft AGL VPTH - 250 ft AGL VRHT - 150 ft AGL DCL - 50 ft AGL
WTR	HOV Mode engaged	30 ft AGL

For operations on the sea the MUH must be increased by one half the maximum reported/observed wave height.

Note*

—[1] Automatic disengagement of these modes below 41 KIAS

—[2] Automatic disengagement of these modes below 55 KIAS.

Note**

Use of IAS, HDG and LNAV modes below 60 KIAS is only for Flight Director operations associated with RNP APCH and Custom approaches.

Selecting IAS mode speed to less than 55 KIAS will result in normal automatic disengagement of APP, ALTA, VS & TD modes at 55 KIAS and loss of associated collective safety function.

Note***

Phase 8 and later and when Custom Approach with Level Segment enabled in option file.

Note

At GA automatic LNAV arming is allowed down to 41 KIAS.

SAR Limitations

Flight below 50 KIAS (Vmini) in IMC is only permitted when coupled to a SAR mode.

FD VOR Limitations

In case of invalid DME/FMS distance, select:

- VOR APP at ranges below 10 nm (18 km)
- VOR NAV at ranges greater than 10 nm (18 km).

VGP Limitations

When being radar vectored or autonomously flying to the final approach course, the VECTORS approach transition and/or ACT VECTORS function must be used to program the FMS for the approach and the flight crew must ensure that published altitudes are complied with.

FD ILS APPROACH MODE LIMITATION

The helicopter is certified to carry out CAT 1 ILS approaches up to 7.5 deg glideslope.

Maximum recommended Localizer Intercept angle .... 45°
.... ranges greater
.... than 10nm (18 km)

Maximum recommended Localizer Intercept angle .... 30°
.... ranges less
.... than 10nm (18 km)

In case of invalid DME and FMS distance and with both Rad Alt signals invalid an ILS approach must be initiate at a distance of not less than 10 nm (18 km).

FMS LIMITATIONS

1. The pilot must verify the currency of the Navigation Data Base (NAV DB) on-board and the coherence of the FMS data with the procedure to be flown.
2. When SBAS GPS are not installed (refer RFM Supp. 68) or the a/c is out of SBAS coverage or in case of SBAS outages, predictive RAIM (P-RAIM) on destination waypoint shall be checked on MCDU.

Note

The Pilot must not continue an instrument approach inside the Final Approach Fix (FAF), unless the 'APP' advisory is displayed on the PFD.

3. Use of LDA, (landing directional aid), SDF (simplified directional facility) and MLS (microwave landing system) approaches are not authorized.

PHASE 8 AND LATER SPECIFIC LIMITATIONS

FMS Limitations

Upload of Flight Plans from an external device to the FMS selected as Navigation Source for PFD in command is forbidden.

2D TERRAIN/OBSTACLE LIMITATIONS

The 2D Terrain and Obstacle display on PFD HSI and MFD is intended to enhance awareness only:

— Navigation shall not be based upon the use of the 2D Terrain/ Obstacle display

— Terrain and obstacle avoidance must not rely upon 2D Terrain/ Obstacle display only.

INAV DATABASE LIMITATIONS

Approval of the Honeywell INAV is based upon Terrain, Obstacle and Navigation databases from a database provider who has obtained a Type 2 Letter of Acceptance (LOA). The operator must ensure compliance with section 13 of AC 20-153B.
The last updated INAV database must be loaded on the displays.

CUSTOM APPROACH LIMITATIONS

Type of Operation

- Custom Approach overland, without level segment, is approved under Day/Night VFR operation.
- Custom Approach with level segment is approved under DAY/ Night VFR and IFR operation.

  For IMC operations the Honeywell Weather Radar Series (Supplement 21) must be installed and operational.
- All Custom Approaches must only be flown with FD coupled.
- Custom Approach with level segment, final approach segment must be carried out over water.

CAUTION

It is the pilot's responsibility to check that the Custom Approach Profile stays clear of obstacles and terrain during planning and execution of the procedure. The altitude MSL of the destination waypoint must be known in order to set the MAP altitude accordingly to guarantee safe terrain clearance. Pilot must also set correct baro setting for the area of the approach.

Custom Approach Airspeed/ROD Limitations

Minimum APP mode engagement airspeed for Custom Approach.. 50 KIAS

Maximum ROD:
Approach, without level segment, while approaching the MAP with any Glideslope .... 1000 fpm

Approach, with level segment, while approaching the BOD with 4 deg glideslope.. 1000 fpm

TORQUE LIMITER FUNCTION

If TORQUE LIMITER is set, max AEO TQ available is 114%/114%.

VENTILATION

At MPOG / HIGE / HOGE or with helicopter forward velocity below 25 kts (46 km/hr), operate cockpit fans or open pilot or copilot window.

SYNOPTIC MFD PAGE LIMITATIONS

In case of MAU1(2) failure, do not refer to the electrical and hydraulic synoptic page. The information presented is not reliable.

HEADSET/HELMET LIMITATIONS

Headset/Helmet type used in the aircraft must be of the same electrical characteristics and authorised by Aircraft Manufacturer.

INCREASED GROSS WEIGHT 6800 KG

General

For operations with Increased Gross Weight the aircraft must be in accordance with the requirements as detailed in RFM Supplement 50.

The following limitations are for operations between 6400 kg and 6800 kg, all other limitations remain unchanged.

Normal and Emergency Procedures remain unchanged.

WEIGHT AND CENTER OF GRAVITY LIMITATIONS

Maximum gross weight for towing	6450 kg
Maximum gross weight for taxiing	6800 kg
Maximum gross weight for take-off and landing	6800kg
CAT B WAT Limitations chart	Figure GW EXT 5
CAT A Clear Area WAT Limitations chart	Figure GW EXT 5
CAT A Confined Area WAT Limitations	Figure GW EXT 6
CAT A Off Shore WAT Limitations chart	Figure GW EXT 7

CENTER OF GRAVITY

Longitudinal Limits	Figure GW EXT 1
Lateral limits	Figure GW EXT 2

AIRSPEED LIMITATIONS

Maximum airspeed for weights above 6400kg	Figure GW EXT 3
Maximum airspeed in sideward or rearward flight for weights above 6400 kg	Figure GW EXT 9
Maximum allowable tailwind and crosswind for weights above 6400 kg	Figure GW EXT 9

GROUND SPEED LIMITATIONS

Maximum taxi speed for weights above 6400kg	20 kts (37 km/hr)
Maximum for emergency landing speed for weights above 6400kg (nose wheel locked in fore and aft position)	60 kts (110 km/hr)

Taxiing on grass surfaces at weights above 6400kg is prohibited

ALTITUDE LIMITATIONS

Maximum operating altitude for weights above 6400kg	8000 ft (2400 m) Hp or 11000 ft (3350 m) Hd whichever comes first
Maximum altitude for CAT B, CAT A Clear Area and Confined Area Take Off and Landing at weights above 6400kg	8000 ft (2400 m) Hp or Hd whichever comes first

Maximum altitude for CAT A Offshore Helideck
Take Off and Landing at weights above 6400kg ....5000 ft (1500 m)
Hp or Hd
whichever comes first

AMBIENT AIR TEMPERATURE LIMITATIONS (OAT)

Minimum temperature for ground starting ....-30°C

If Landing Gear P/N 3G3200F00211 or P/N 4G0000F00311
fitted ....-40°C

Maximum and minimum air temperature limitations for
operations above 6400 kg... Figure GW EXT 4

HEIGHT- VELOCITY LIMITATIONS

Height Velocity Diagram for weights above 6400kg .... Figure GW EXT 8

SLOPE LIMITATIONS

Sloped Take Off and Landing are limited to the following, provided the build standard as defined in Supplement 6 Slope Operation Envelope Extension is incorporated:

Nose up .... 10°

Nose Down .... 10°

Left Wing Low .... 10°

Right Wing Low .... 10°

CAUTION

When landing nose down on slopes up to 10° attention should be given to have a slope that does not endanger striking the tail of the aircraft. A slope which allows the tail to overhang the top of the slope is recommended.

CAT A MISCELLANEOUS LIMITATIONS

Offshore Heliport / Helideck Size

Minimum demonstrated helideck size for Take-Off and Landing
for weights between 6400 kg & 6800 kg
Take Off and Landing ....Diameter 15 m (50 ft)
....or 15 m x 15 m (50 ft x 50 ft))

PERFORMANCE INFORMATION

Single Engine Failure in Hover OGE Flyaway procedure
weights between 6400 kg and 6800 kg............................ Figure GW EXT 10

(See Flyaway Procedure ENG FAIL/SHUT DWN Emerg-Malfunc page 18)

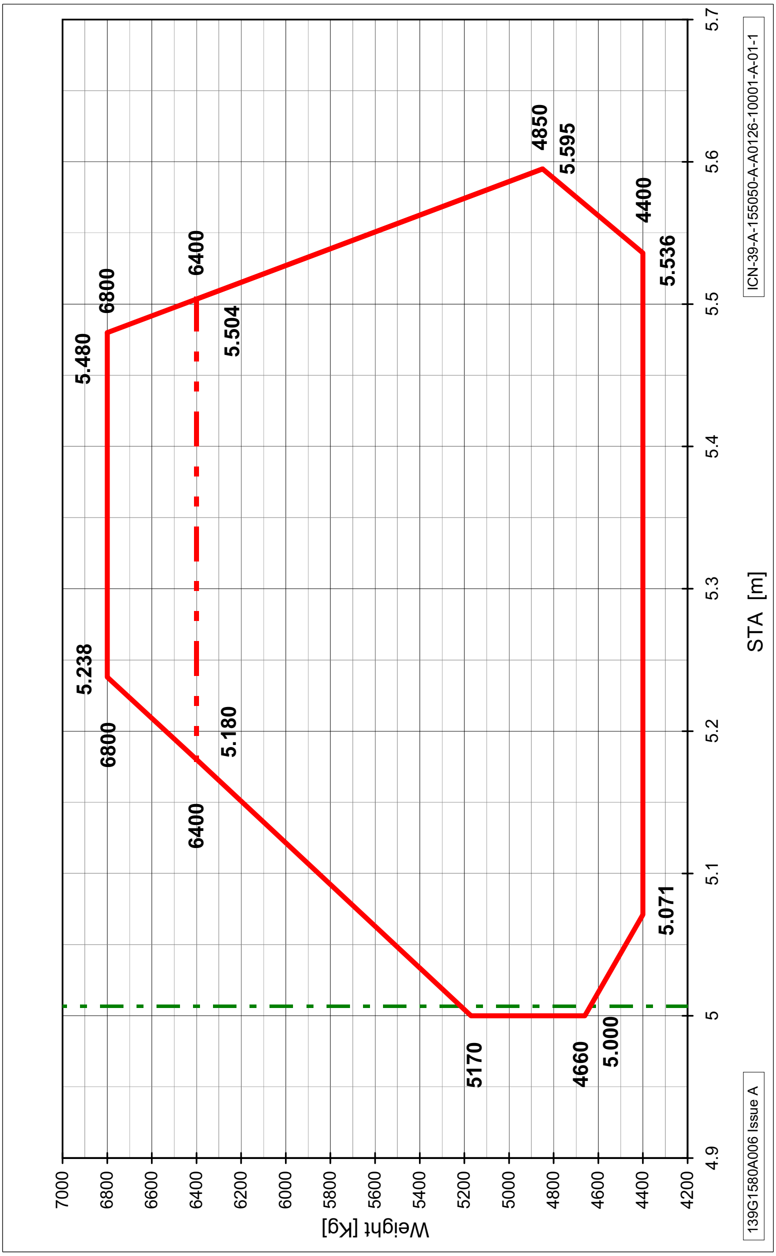

Figure GW EXT 1 Weight and Longitudinal CG Envelope 6800 kg

GW EXT 6800 kg

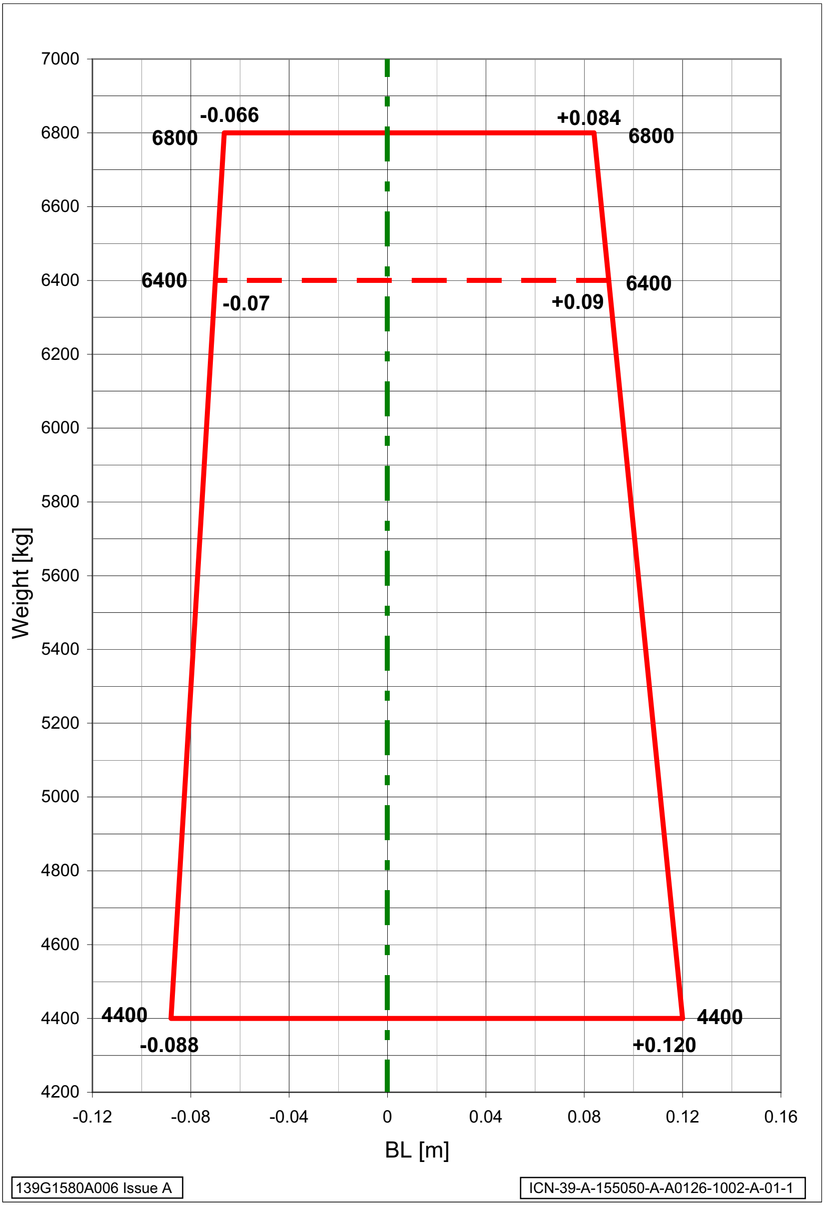

Figure GW EXT 2 Weight and Lateral CG Envelope 6800 kg

AIRSPEED LIMITATION

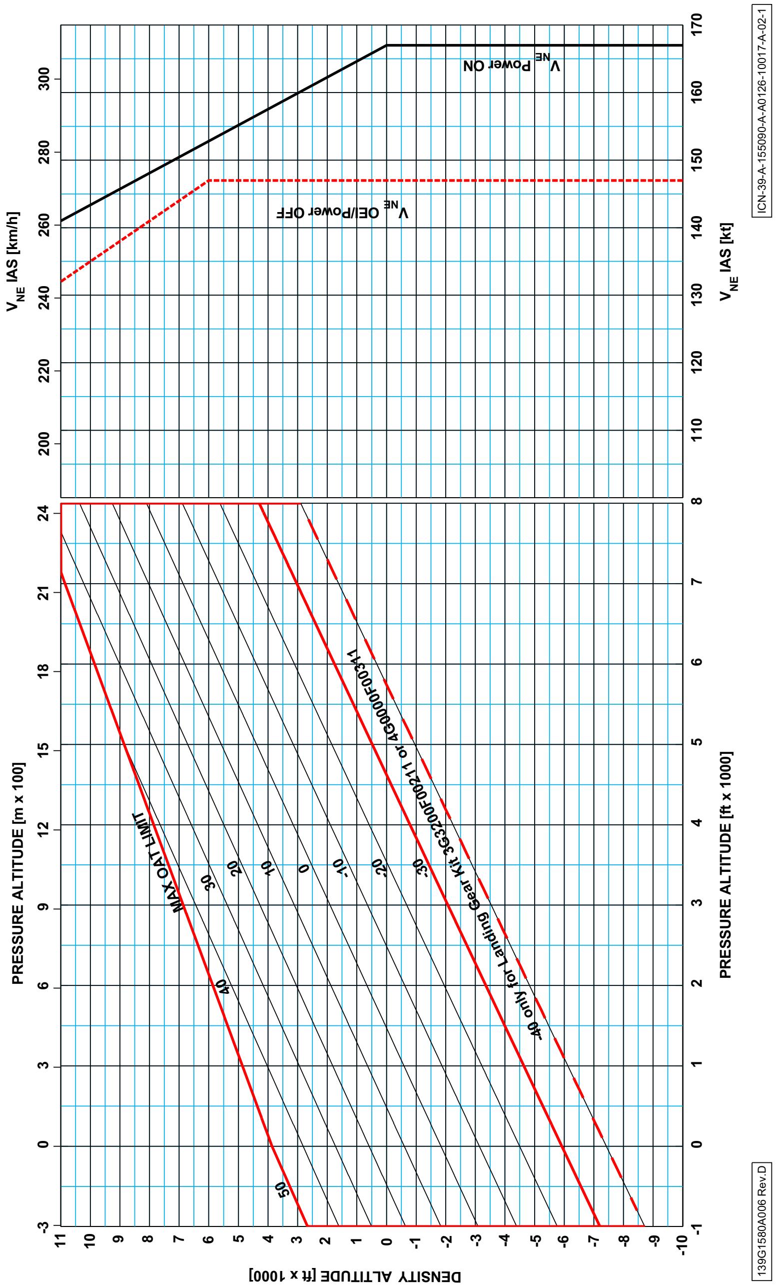

Figure GW EXT 3 Vne Limitations for Weights above 6400 kg

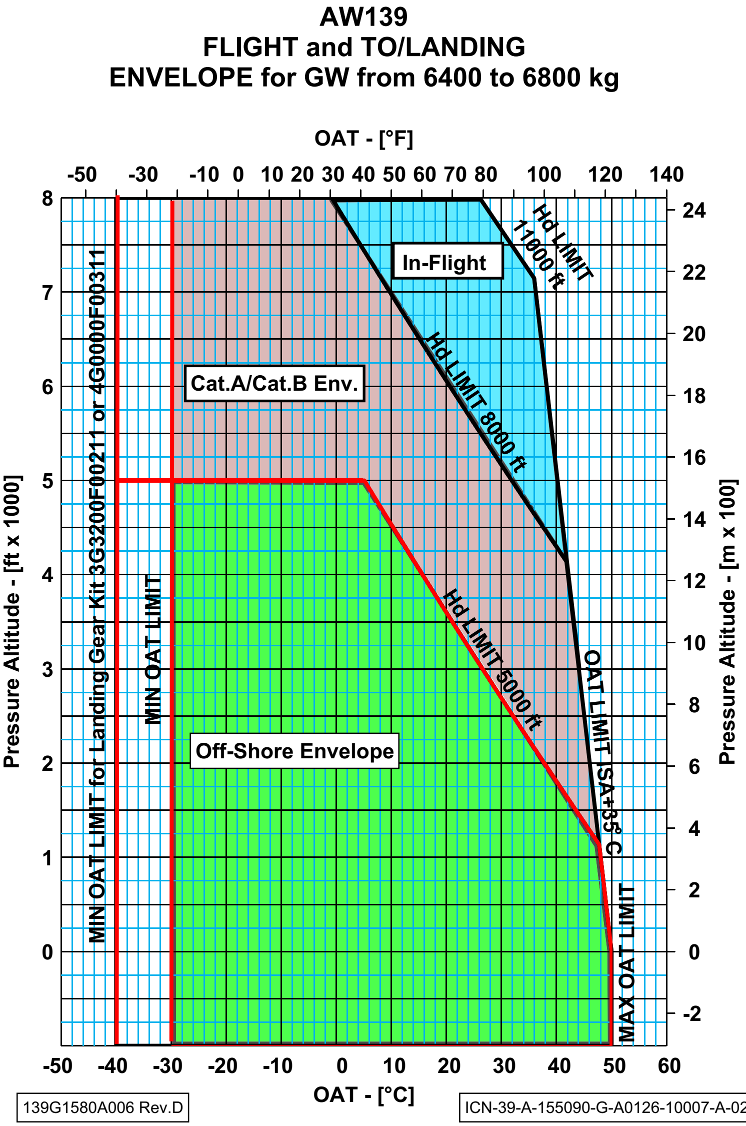

Figure GW EXT 4 CAT A Take Off/Landing Altitude and OAT Limitations for Weights above 6400 kg

WEIGHT-ALTITUDE-TEMPERATURE

EAPS NOT INSTALLED
Cat.A NR=102%
Cat.B NR=100%

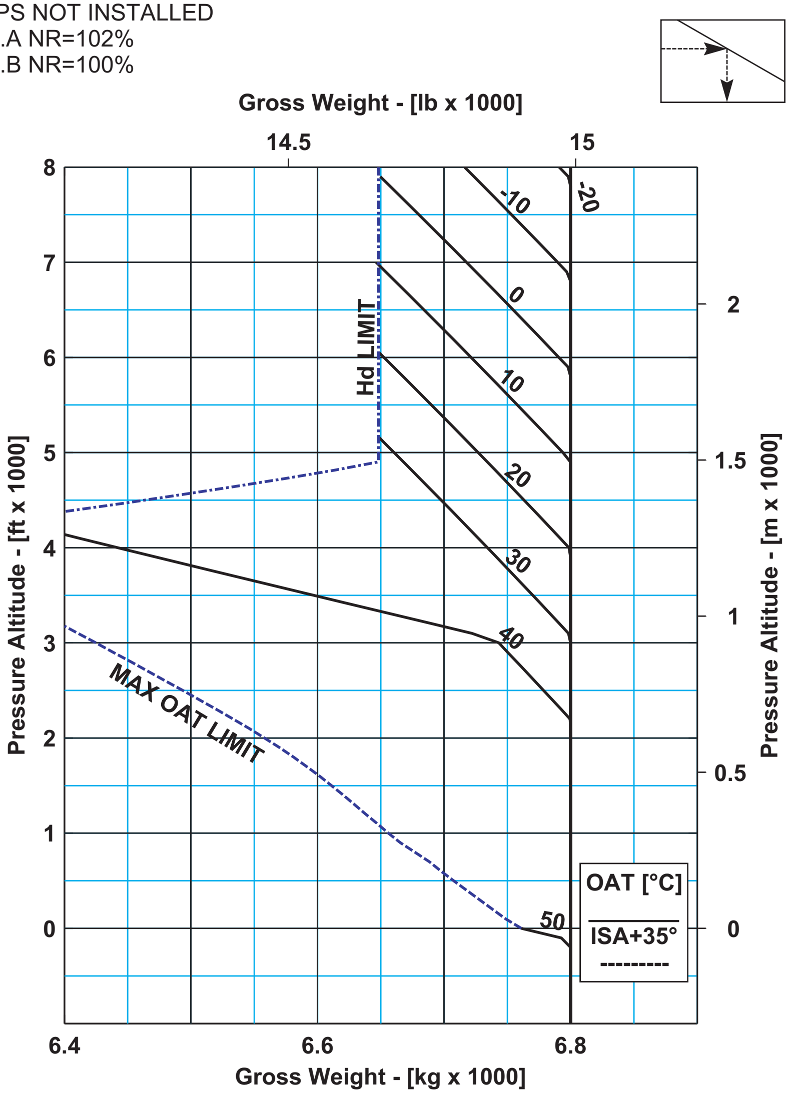

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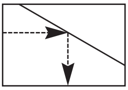
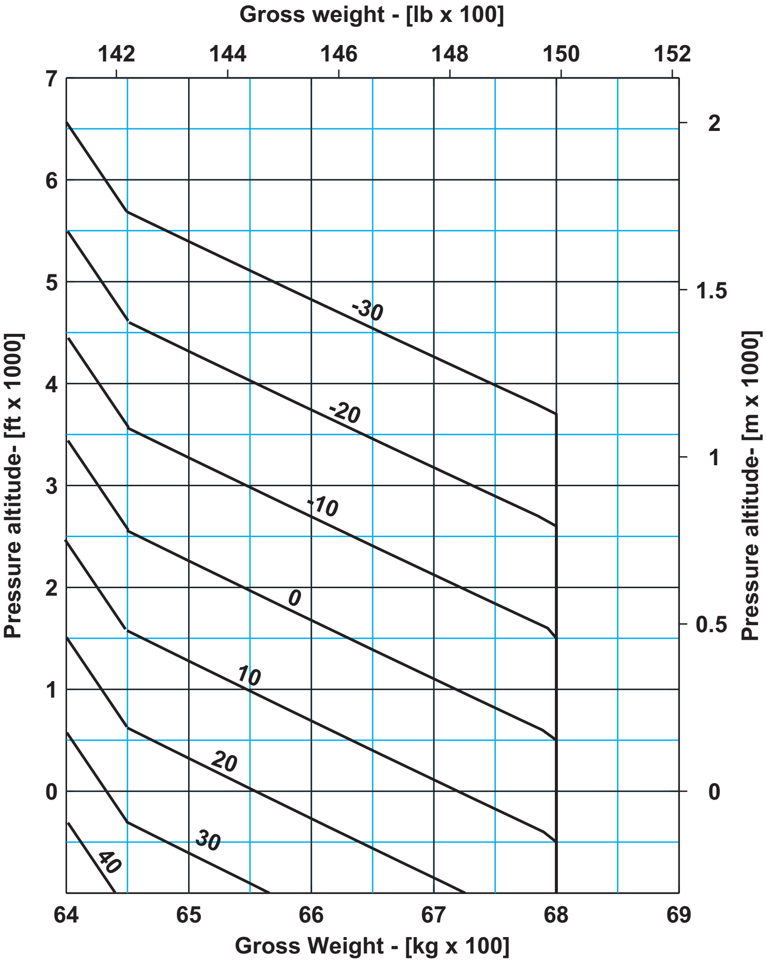
Figure GW EXT 5 Weight Limitations CAT A Clear Area and CAT B for weights above 6400 kg

WEIGHT-ALTITUDE-TEMPERATURE CONFINED AREA



ROTOR SPEED 102%



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ICN-39-A-155050-G-A0126-10014-A-01-1

Figure GW EXT 6 Weight Limitations CAT A Confined Area for weights above 6400 kg

WEIGHT-ALTITUDE-TEMPERATURE OFF-SHORE HELIDECK PROCEDURE

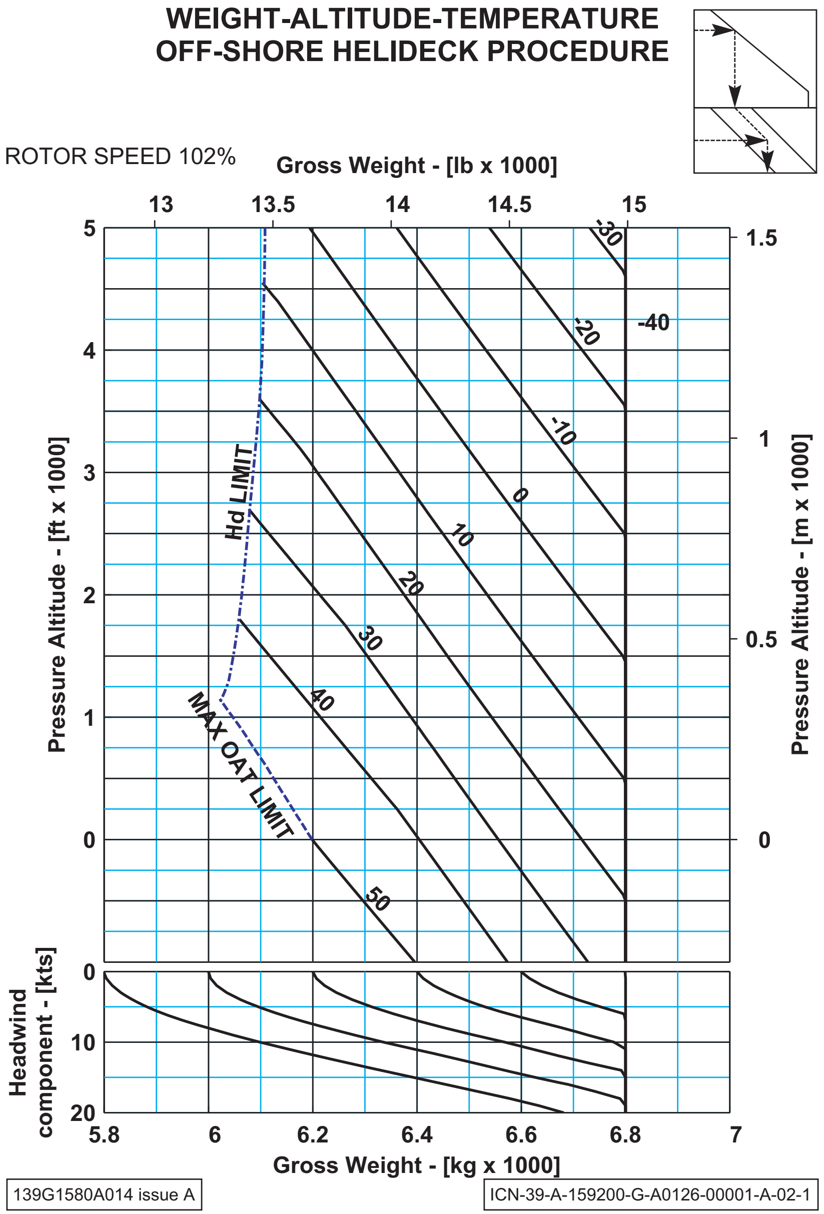

Figure GW EXT 7 Weight Limitations CAT A Offshore Helideck for weights up to 6800 kg

HEIGHT-VELOCITY CHART

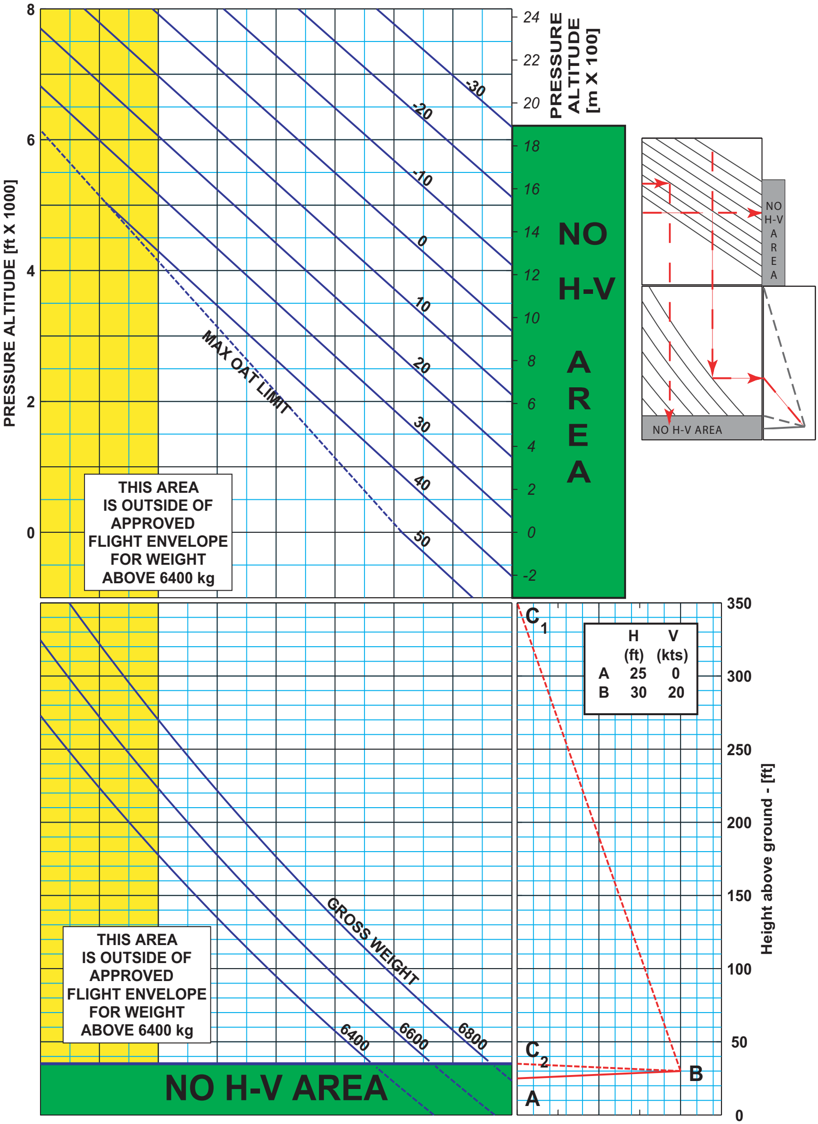

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Figure GW EXT 8 Height Velocity Limitations for Weights above 6400 kg

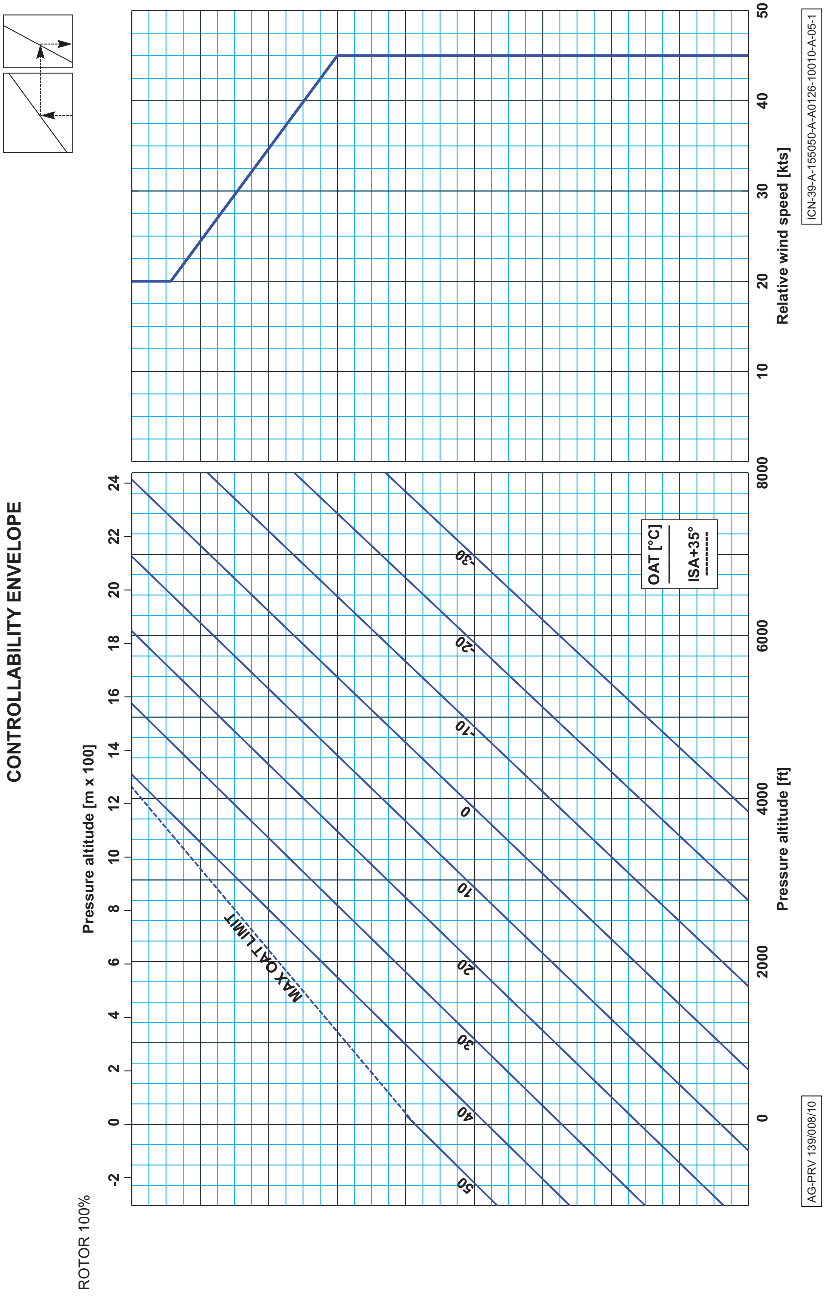

Figure GW EXT 9 Controlability Envelope for Low Speed Manoeuvres for weights above 6400 kg

HEIGHT LOSS DURING FLYAWAY MANOEUVRE WEIGHTS BETWEEN 6400 KG AND 6800 KG

(See Single Engine Failure in Hover Flyaway Procedure
Emerg-Malfunc page 18)

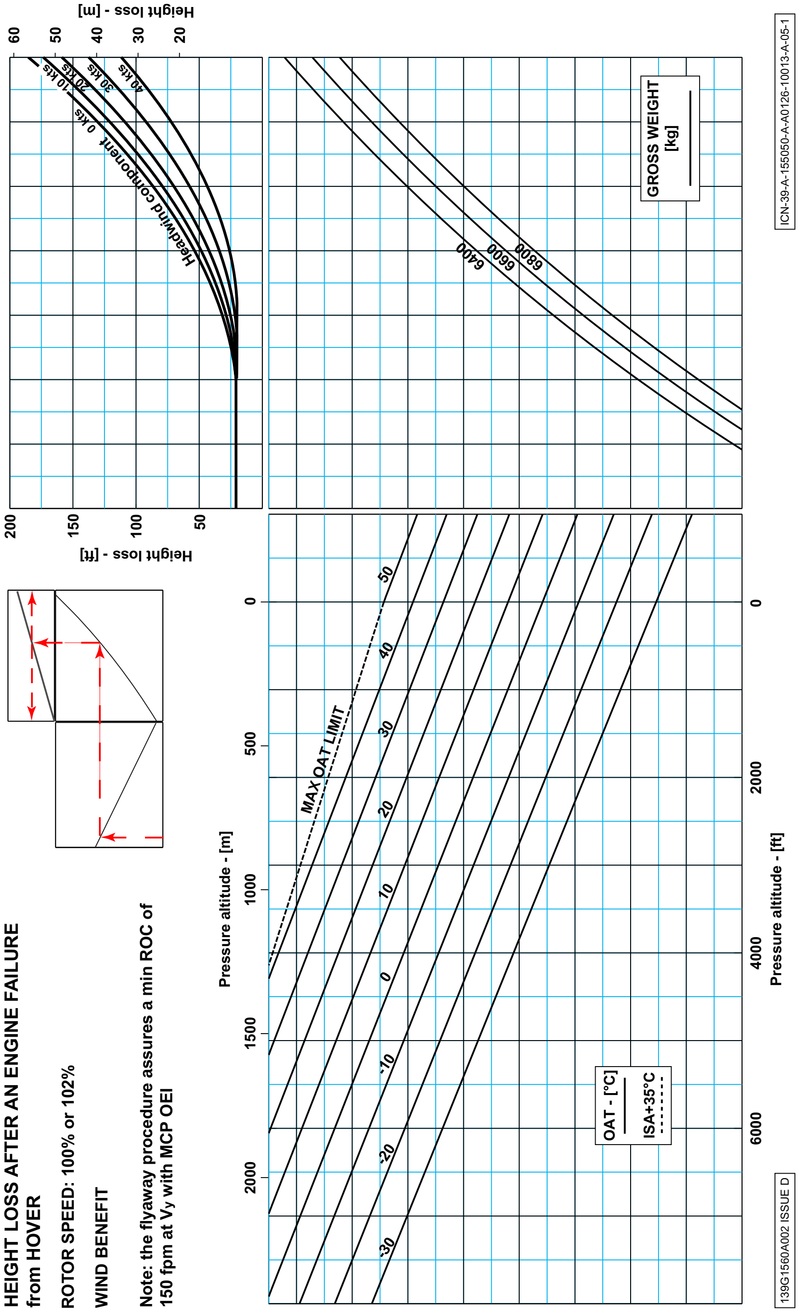

Figure GW EXT 10 Height Loss During Flyaway Weights from 6400 kg to 6800 kg

WEIGHT EXTENSION 7000 KG

General

For operations with Increased Gross Weight of 7000 kg the aircraft must be in accordance with the requirements as detailed in RFM Supplement 90.

The following limitations are for operations between 6800 kg and 7000 kg, all other limitations remain unchanged.

See Increased Gross Weight 6800 kg for operations between 6400 kg and 6800 kg

Normal and Emergency Procedures remain unchanged.

WEIGHT AND CENTER OF GRAVITY LIMITATIONS

Maximum gross weight for towing ....6450 kg

Maximum gross weight for taxiing ....7050 kg

Maximum gross weight for take-off and landing ....7000 kg

CAT B WAT Limitations chart .... Figure WE 5

CAT A Clear Area WAT Limitations chart (Supplement 12) ......Figure WE 6

CAT A Enhanced Offshore Procedure Take-Off WAT Limitations chart (Supplement 97)...................................Figure WE 6

CENTER OF GRAVITY

Longitudinal Limits...Figure WE 1

Lateral limits ....Figure WE 2

AIRSPEED LIMITATIONS

Maximum airspeed for weights above 6800kg ....Figure WE 3

Maximum airspeed in sideward or rearward flight for weights above 6800 kg ....Figure WE 8

Maximum allowable tailwind and crosswind for weights above 6800 kg ....Figure WE 8

GROUND SPEED LIMITATIONS

Maximum taxi speed for weights above 6800kg
  OAT at or above -30°C .... 20 kts (37 km/hr)
  OAT below -30°C .... 10 kts (18 km/hr)

Maximum for emergency landing speed for weights above 6400kg (nose wheel locked in fore and aft position) .... 60 kts (110 km/hr)

Taxiing on grass surfaces at weights above 6800kg is prohibited

WHEEL BRAKE LIMITATIONS

Maximum running speed for brake application................................40 knots (74 km/hr)

ALTITUDE LIMITATIONS

Maximum operating altitude for weights above 6800kg ....6000 ft (1800 m)
Hp or Hd
whichever comes first

Maximum altitude for CAT B Take Off and Landing
above 6800kg ....4500 ft (750 m)
Hp or Hd
whichever comes first

Maximum altitude for CAT A Clear Area above 6800kg.........2500 ft (750 m)
(Supplement 12)
Hp or Hd
whichever comes first

Maximum altitude for CAT A Enhanced Offshore
Helideck Take Off (Supplement 97) .... 1000 ft (300 m) Hp

AMBIENT AIR TEMPERATURE LIMITATIONS (OAT)

Minimum temperature for ground starting .... -40°C

Maximum and minimum air temperature limitations for
operations above 6800 kg ....Figure WE 4

COLD WEATHER OPERATION

If the helicopter is to be operated with an OAT at or below -30°C, ensure that the flight logbook records that the nitrogen pressure on the NLG and MLG is appropriate and in accordance with Maintenance Manual.

HEIGHT- VELOCITY LIMITATIONS

Height Velocity Diagram for weights above 6800kg ....Figure WE 7

CAT A MISCELLANEOUS LIMITATIONS

CAT A Clear Area Take Off and Landing (Suppplement 12) and Enhanced Offshore Take-Off (Supplement 97) only may be performed above 6800 kg.

Maximum crosswind for Take Off and Landing CAT A
Clear Area Procedure ....15 kts (8 m/s)

Enhanced Offshore Take-Off Wind benefit chart .... Figure 1-11

Take-Off with tail wind component is prohibited.

FLIGHT DIRECTOR LIMITATIONS

Above 6800 kg use of the following Flight Director modes is prohibited:

— HOV
— TDH (Transition Down to Hover)
— MOT
— WTR

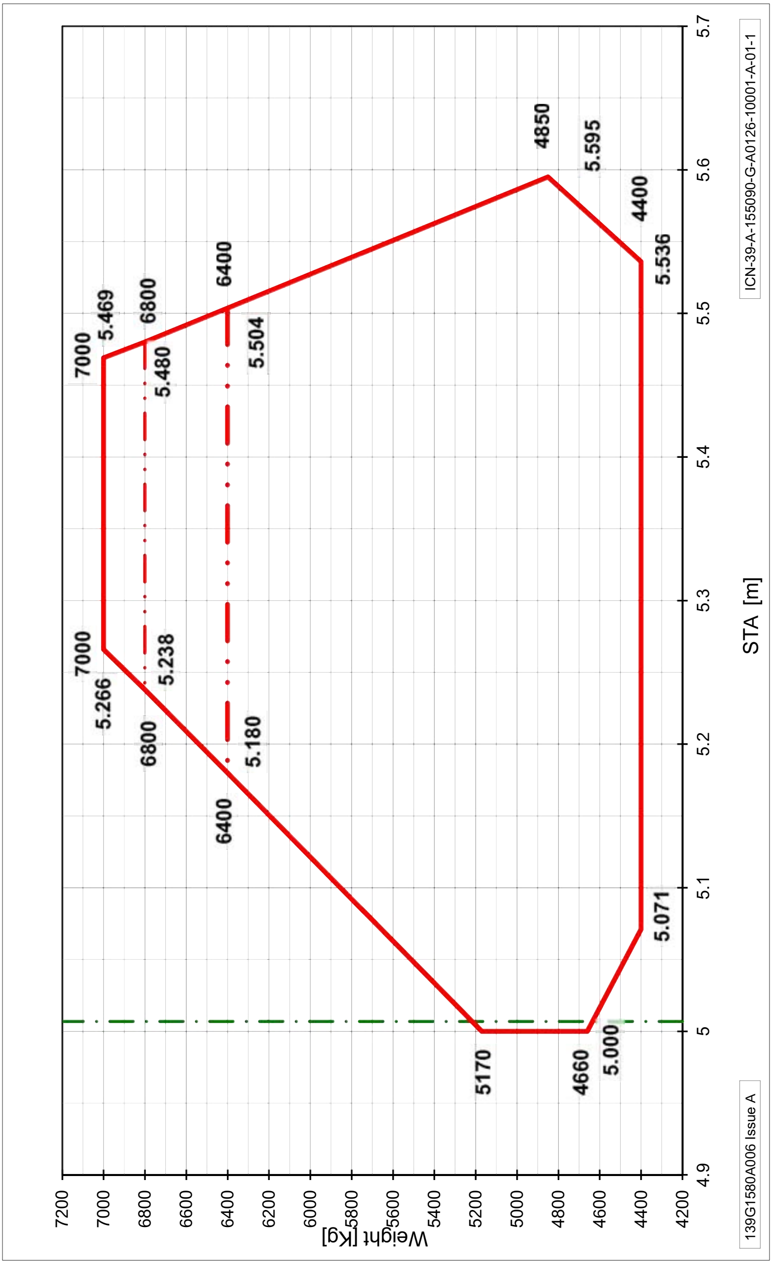

Figure WE 1t Weight and Longitudinal CG Envelope 7000 kg

GW EXT 7000 kg

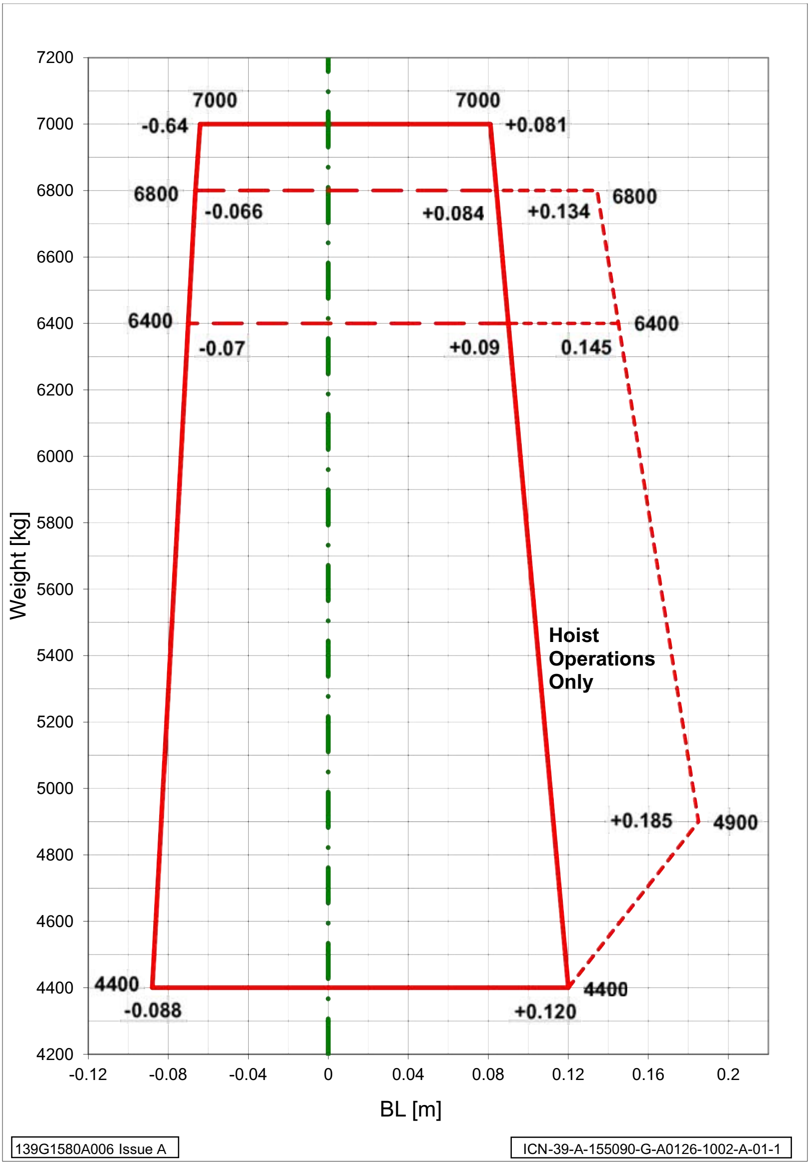

Figure WE 2 Weight and Lateral CG Envelope 7000 kg

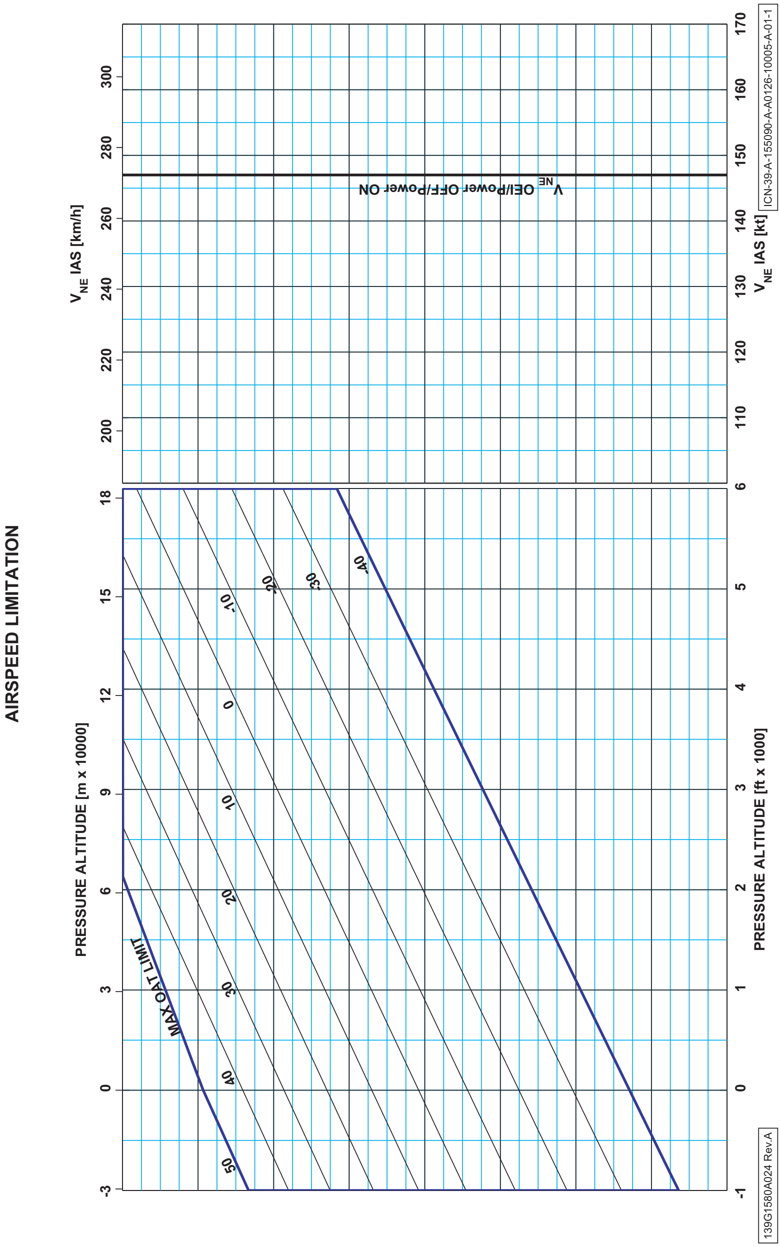

Figure WE 3 Vne Limitations for Weights above 6800 kg

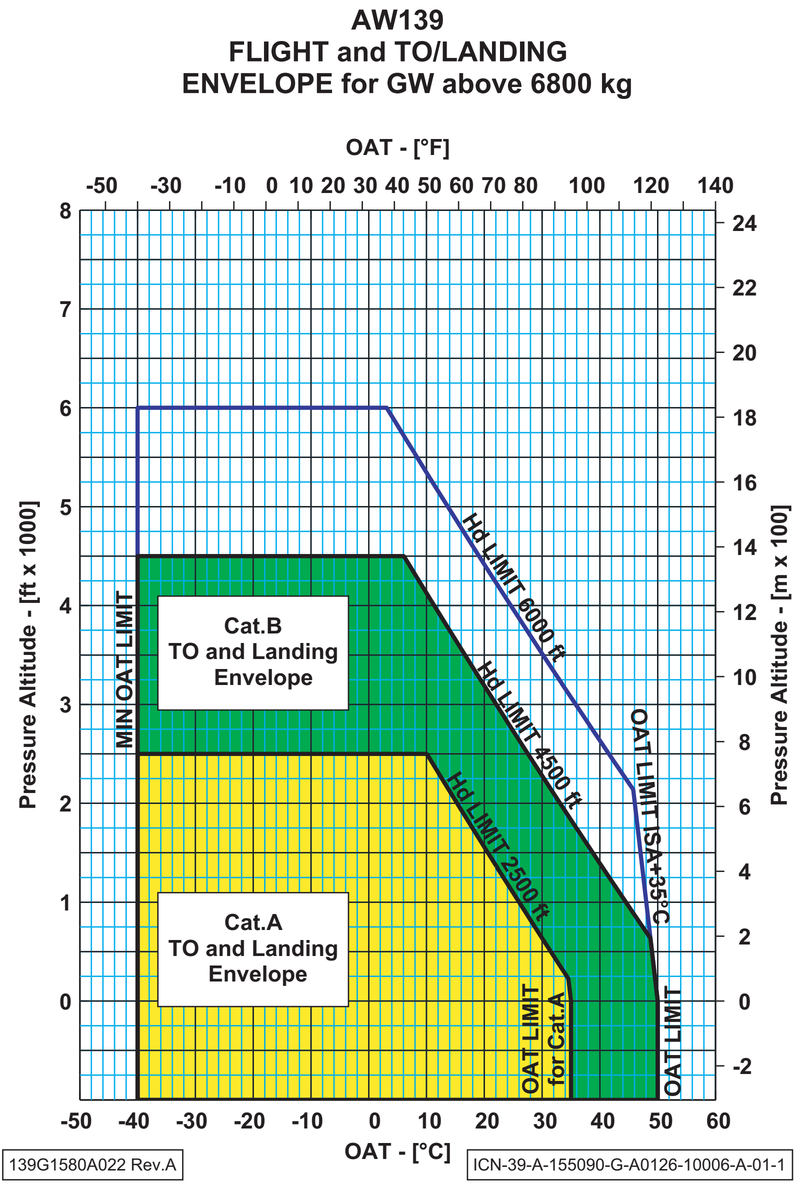

Figure WE 4 CAT A Take Off/Landing Altitude and OAT Limitations for Weights above 6800 kg
(CAT A Clear Area Limitation shown)

WEIGHT-ALTITUDE-TEMPERATURE
Cat.B PROCEDURE

NR=100%

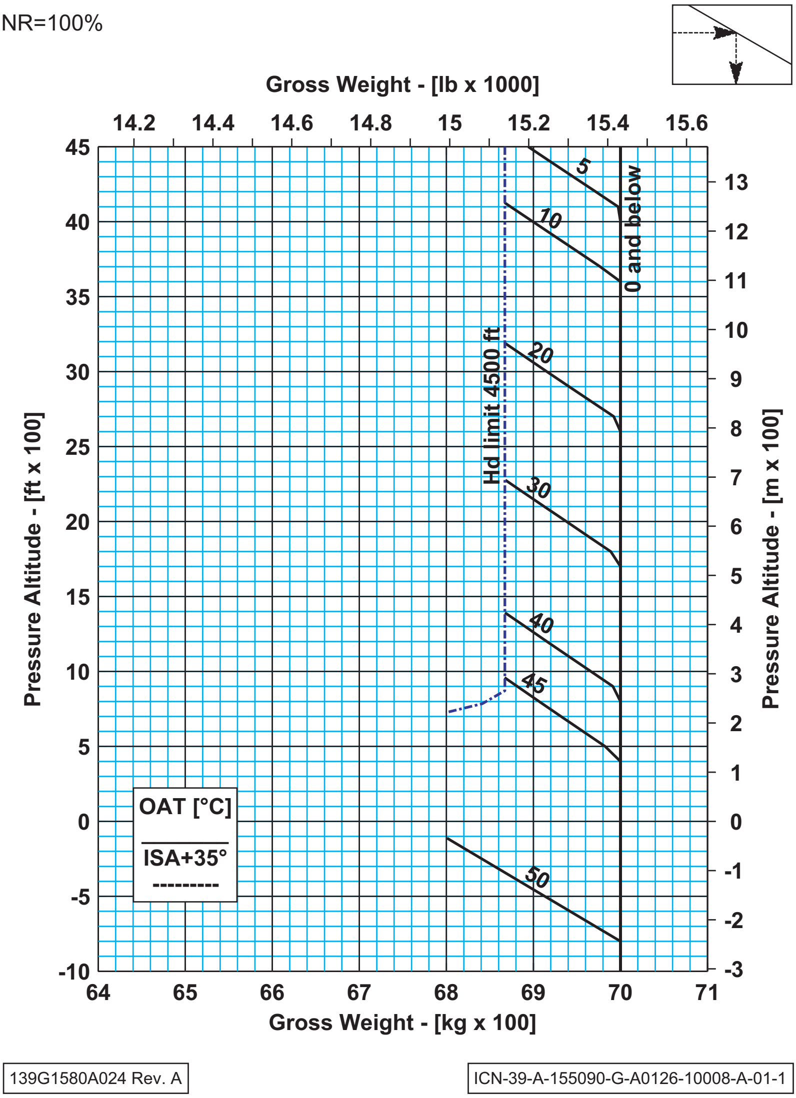

Figure WE 5 Weight Limitations CAT B for weights above 6800 kg

**GW EXT
7000 kg**

WEIGHT-ALTITUDE-TEMPERATURE
Cat.A CLEAR AREA PROCEDURE

NR=102%

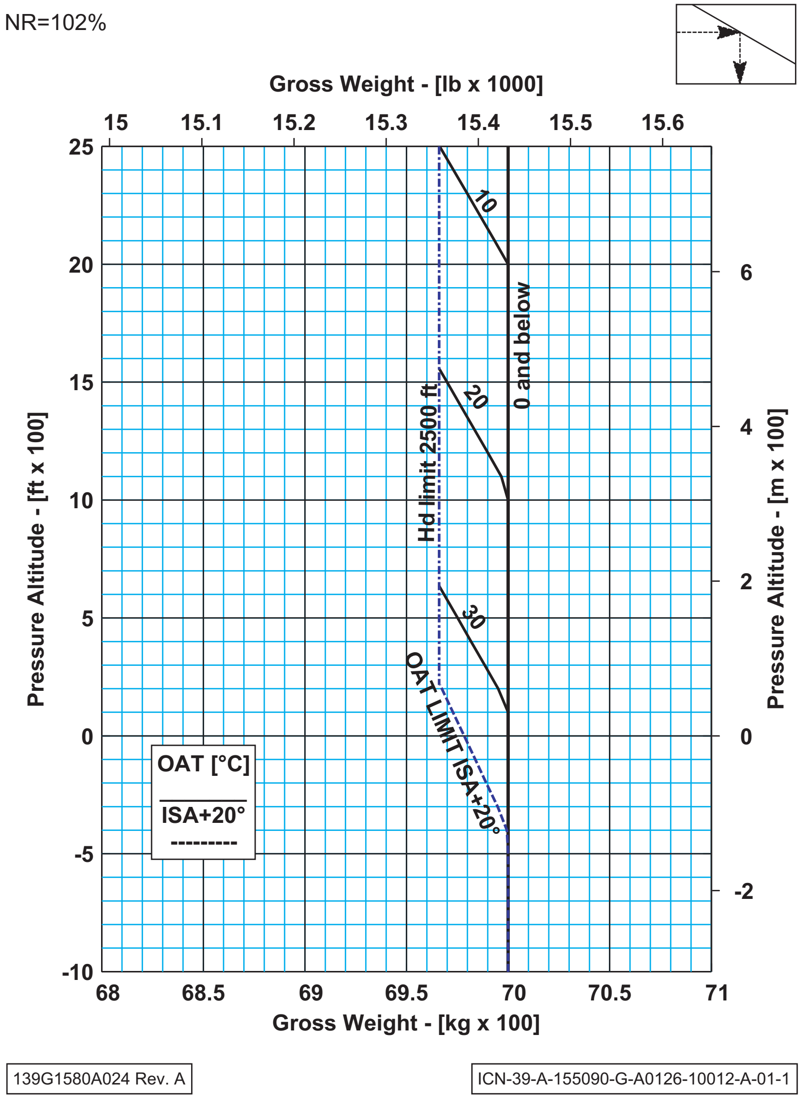

Figure WE 6 Weight Limitations CAT A Clear Area for weights above 6800 kg

WEIGHT-ALTITUDE-TEMPERATURE
ENHANCED OFFSHORE PROCEDURE

ROTOR SPEED 102%

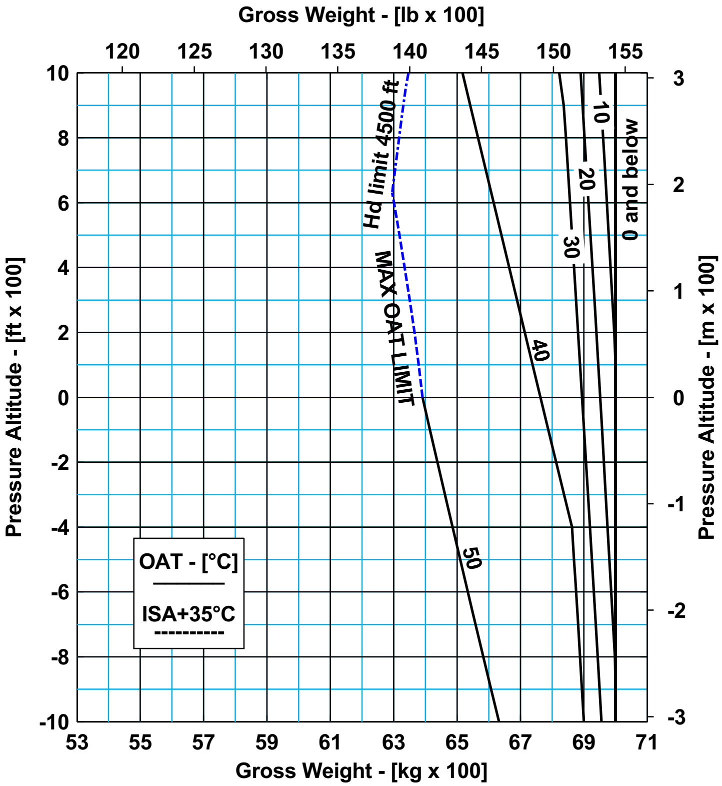

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Figure WE 6A Weight Limitations CAT A Enhanced Offshore Take-Off for weights up to 7000 kg

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HEIGHT-VELOCITY
CHART
for GW above 6800 kg

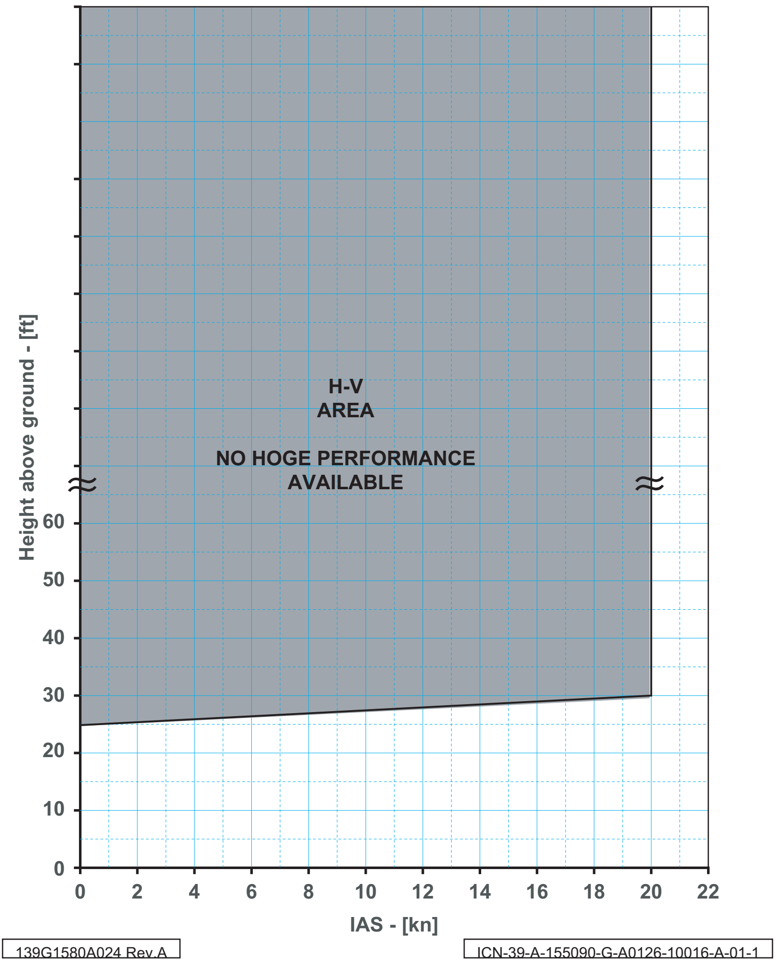

Figure WE 7 Height Velocity Limitations for Weights above 6800 kg

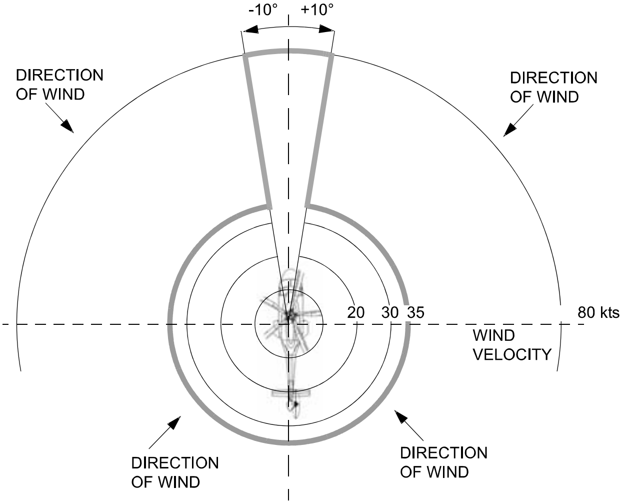

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Figure WE 8 Controlability Envelope for Low Speed Manoeuvres for weights above 6800 kg

T-O AND LANDING ALTITUDE EXTENSION (9 PASSENGER SEAT CONFIGURATION)

General

For operations within the Take Off and Landing Altitude Extension the aircraft must be in accordance with the requirements as detailed in RFM Supplement 51.

The following Limitations are for operations in the T-O and Landing Altitude Extension, all other limitations remain unchanged.

Normal and Emergency Procedures remain unchanged.

NUMBER OF OCCUPANTS

The total number of occupants in passenger cabin shall not exceed 9

WEIGHT LIMITATIONS

CAT B WAT T-O and Landing see Hover Ceiling IGE @ TOP .... Figure ALT EXT 1

CAUTION

> The IGE TOP hover ceiling chart, referenced above, shows performance in zero wind conditions. The maximum hover weight to maintain heading controllability may be reduced considerably for crosswind or tailwind above zero kts. Refer to CAT B Low Speed IGE Manoeuvres Envelope in Figure ALT EXT 4 to define maximum weight for the cross/tail wind heading controllability required.

AIRSPEED LIMITATIONS

Maximum airspeed in sideward or rearward flight .... Figure ALT EXT 4 (for operations above 14000 ft (4300m), NR must be set to 102%)

AMBIENT AIR TEMPERATURE LIMITATIONS (OAT)

Maximum and minimum air temperature limitation .... Figure ALT EXT 2

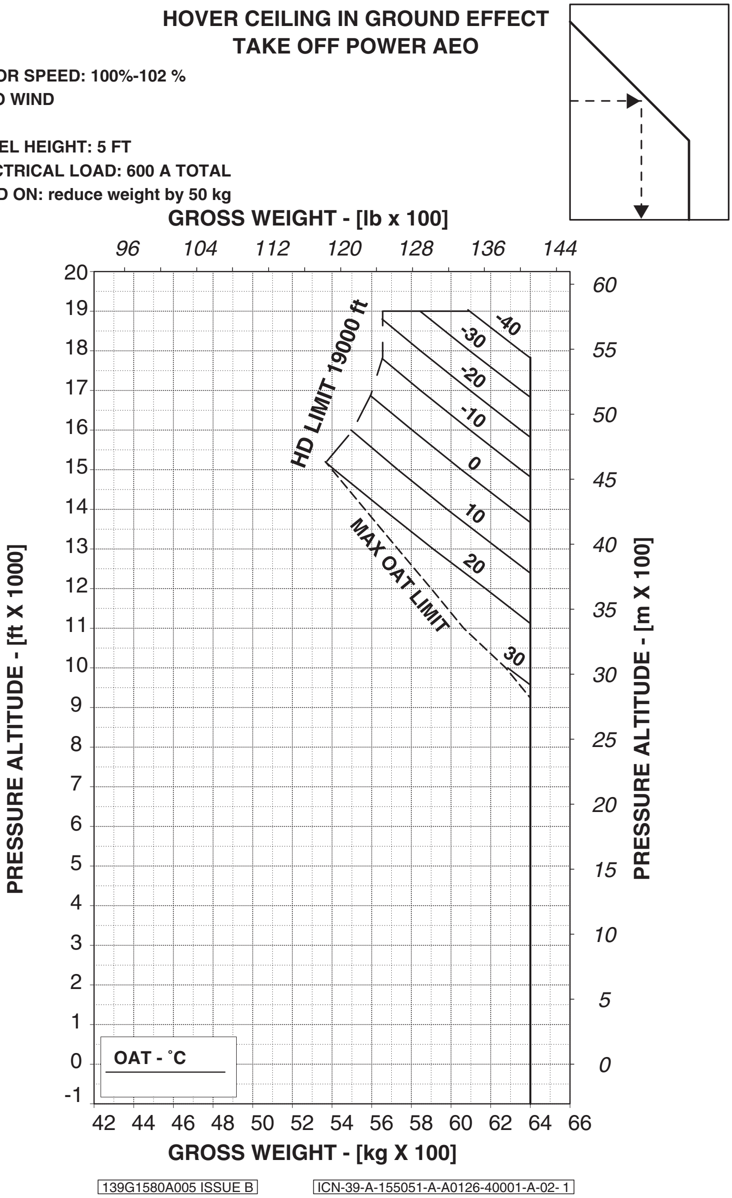
HEIGHT- VELOCITY LIMITATIONS

Height velocity diagram is considered performance information... Figure ALT EXT 3

PERFORMANCE INFORMATION

Single engine Failure in Hover OGE flyaway procedure .. Figure ALT EXT 5

(See Flyaway Procedure ENG FAIL/SHUT DWN Emerg-Malfunc page 18)



HOVER CEILING IN GROUND EFFECT
TAKE OFF POWER AEO

ROTOR SPEED: 100%-102 %
ZERO WIND

WHEEL HEIGHT: 5 FT
ELECTRICAL LOAD: 600 A TOTAL
COND ON: reduce weight by 50 kg

Figure ALT EXT 1 Hover Ceiling IGE at TOP

TAKE-OFF/LANDING ENVELOPE

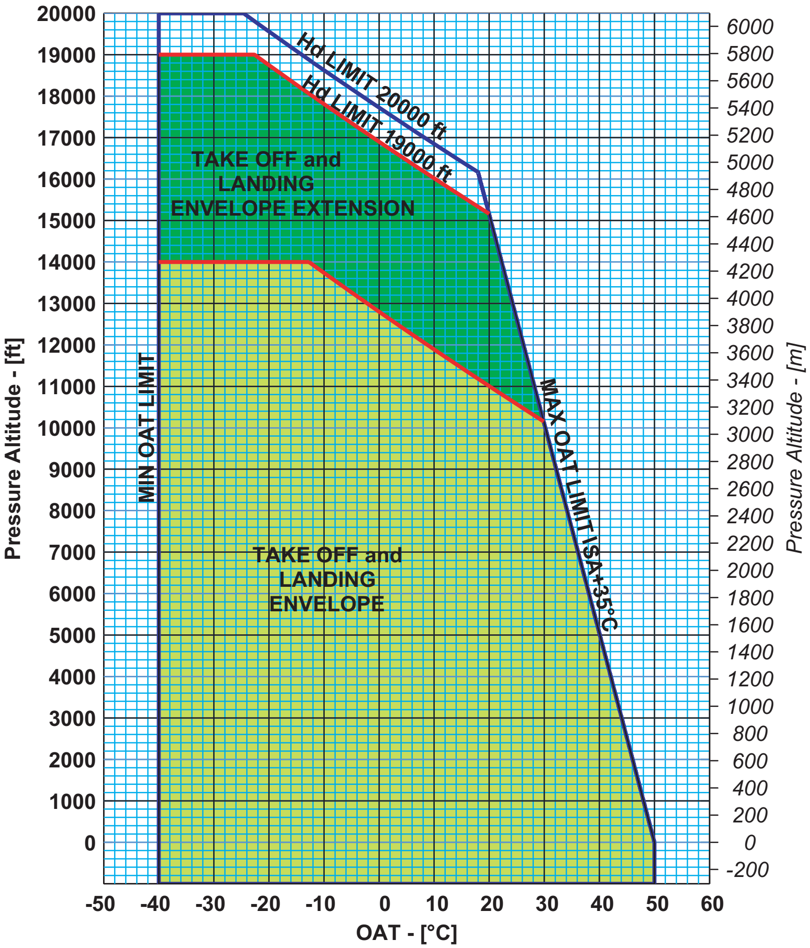


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Figure ALT EXT 2 Altitude and OAT Limitations for Extended Envelope Operations (Maximum 9 passenger seats)

HEIGHT-VELOCITY CHART

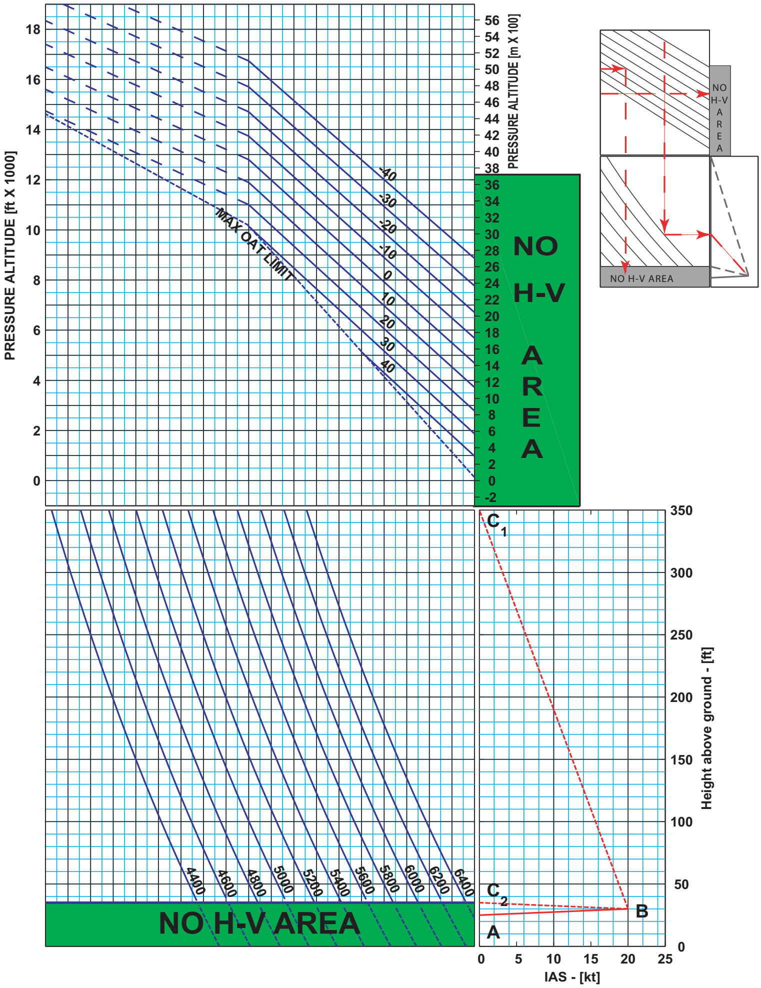

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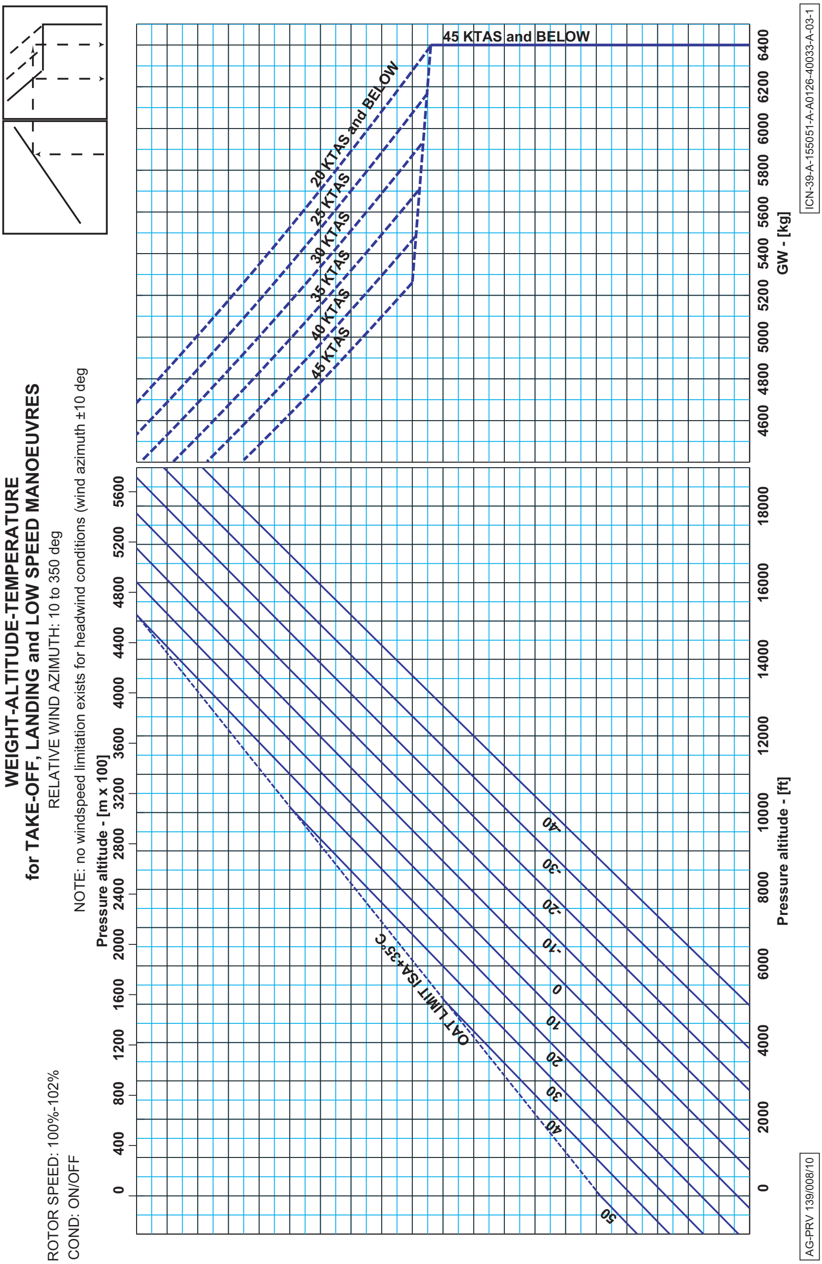
Figure ALT EXT 3 Height Velocity Chart for Extended Envelope Operations (Maximum 9 passenger seats)



WEIGHT-ALTITUDE-TEMPERATURE for TAKE-OFF, LANDING and LOW SPEED MANOEUVRES

RELATIVE WIND AZIMUTH: 10 to 350 deg

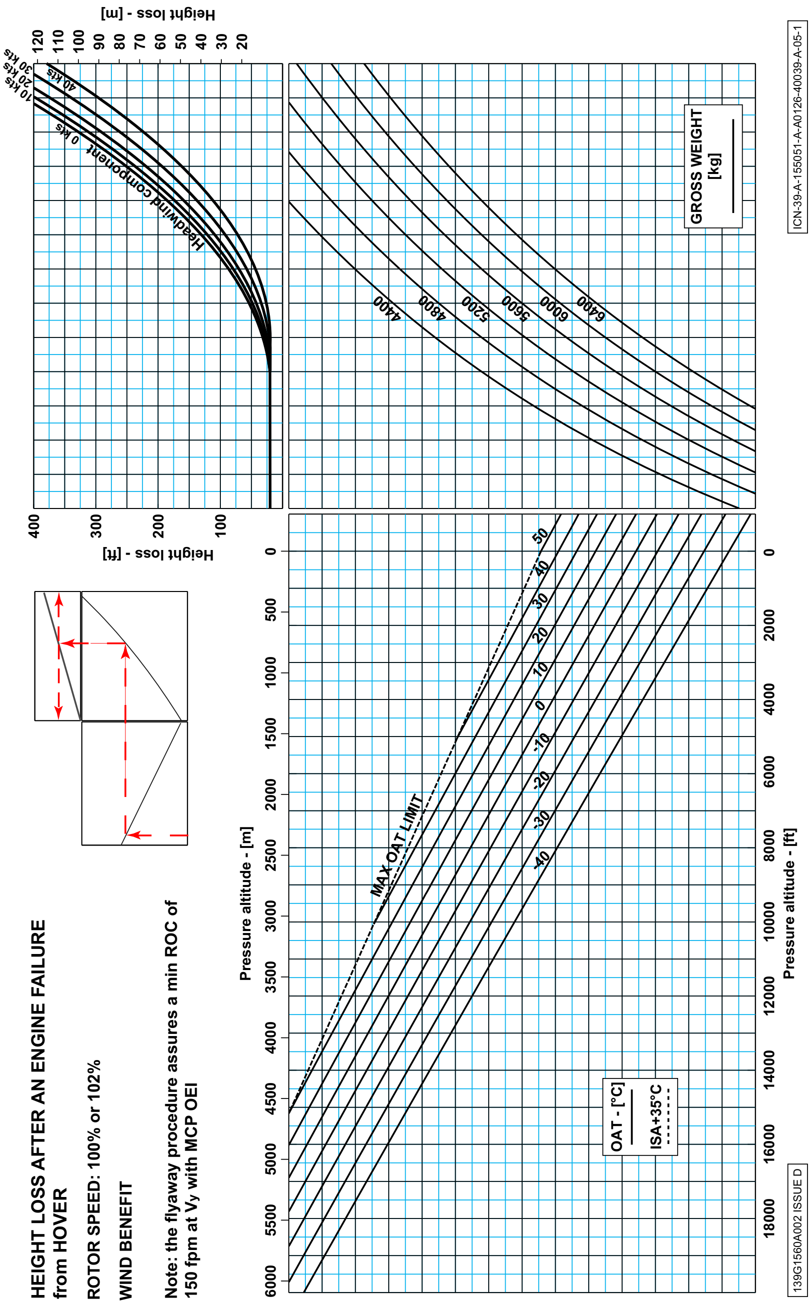
NOTE: no windspeed limitation exists for headwind conditions (wind azimuth ±10 deg

ROTOR SPEED: 100%-102%
COND: ON/OFF

Figure ALT EXT 4 Controlability Envelope for Low Speed Manoeuvres for Extended Envelope Operations (Maximum 9 passenger seats)

HEIGHT LOSS DURING FLYAWAY MANOEUVRE EXTENSION TO 19000 FT

(See Single Engine Failure in Hover Flyaway Procedure Emerg-Malfunc page 18)



HEIGHT LOSS AFTER AN ENGINE FAILURE from HOVER

ROTOR SPEED: 100% or 102%

WIND BENEFIT

Note: the flyaway procedure assures a min ROC of 150 fpm at Vy with MCP OEI

Figure ALT EXT 5 Height Loss during Flyaway up to 19000 ft

ICING PROTECTION SYSTEM, FLIGHT IN ICING

GENERAL

For operation in icing conditions the aircraft must be in accordance with the requirememnts as detailed in RFM Supplement 71.

TYPE OF OPERATIONS

Instrument Flight Rules (IFR) Day/Night in known icing conditions.

AIRSPEED LIMITATIONS

V_{NE} Icing .... Figure IPS-1

Maximum airspeed in icing conditions with IPS failed.......................... 80 KIAS

CAUTION

With the IPS failed the icing condition must be vacated as soon as possible. See relevant procedure under MALFUNCTION MISC..

ALTITUDE AND TEMPERATURE LIMITATIONS

Altitude and temperature limitations for icing conditions .... Figure IPS-2

RATE OF DESCENT

Maximum Rate of descent in icing conditions .... 1000 fpm
(or after icing encountered if ice is still present on the aircraft)

FREEZING RAIN / FREEZING DRIZZLE / SUPERCOOLED LARGE DROPLETS (SLD)

Flight in known Freezing Rain, Freezing Drizzle or SLD conditions is prohibited.

In case of an encounter with Freezing Rain, Freezing Drizzle or SLD conditions, take immediate action to vacate the flight conditions.

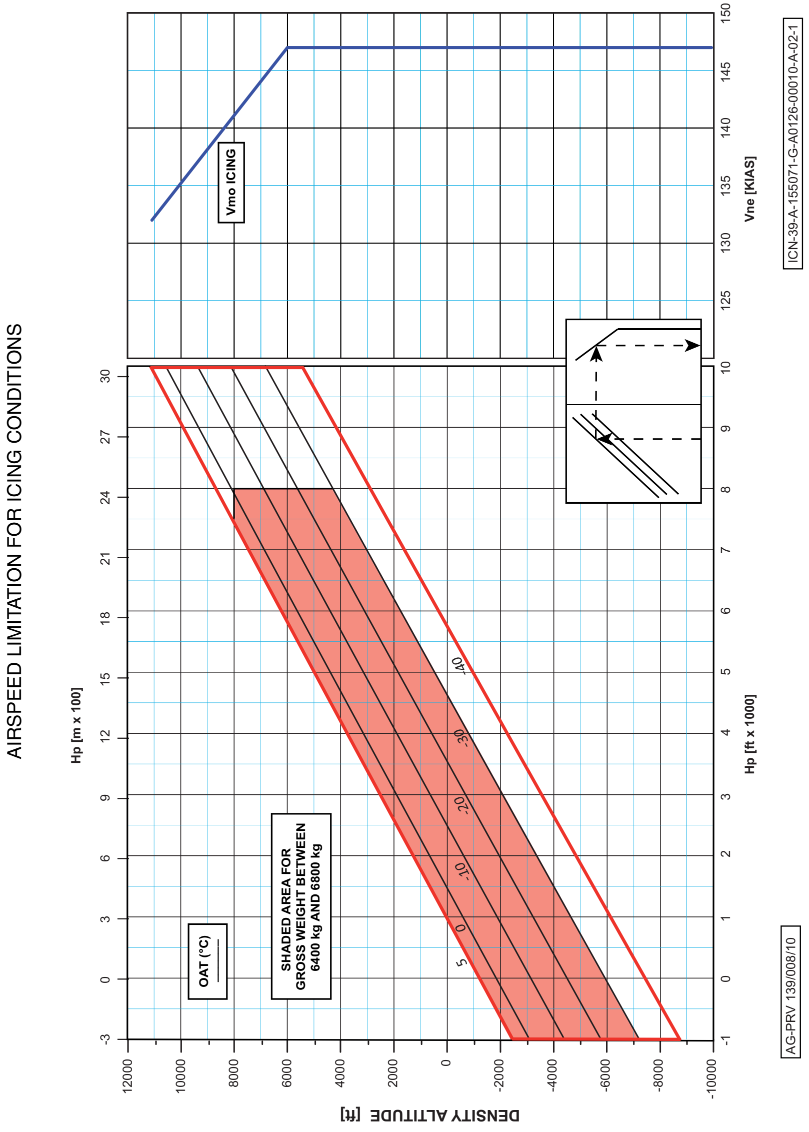


Figure IPS-1 Airspeed Limitations for Icing Conditions

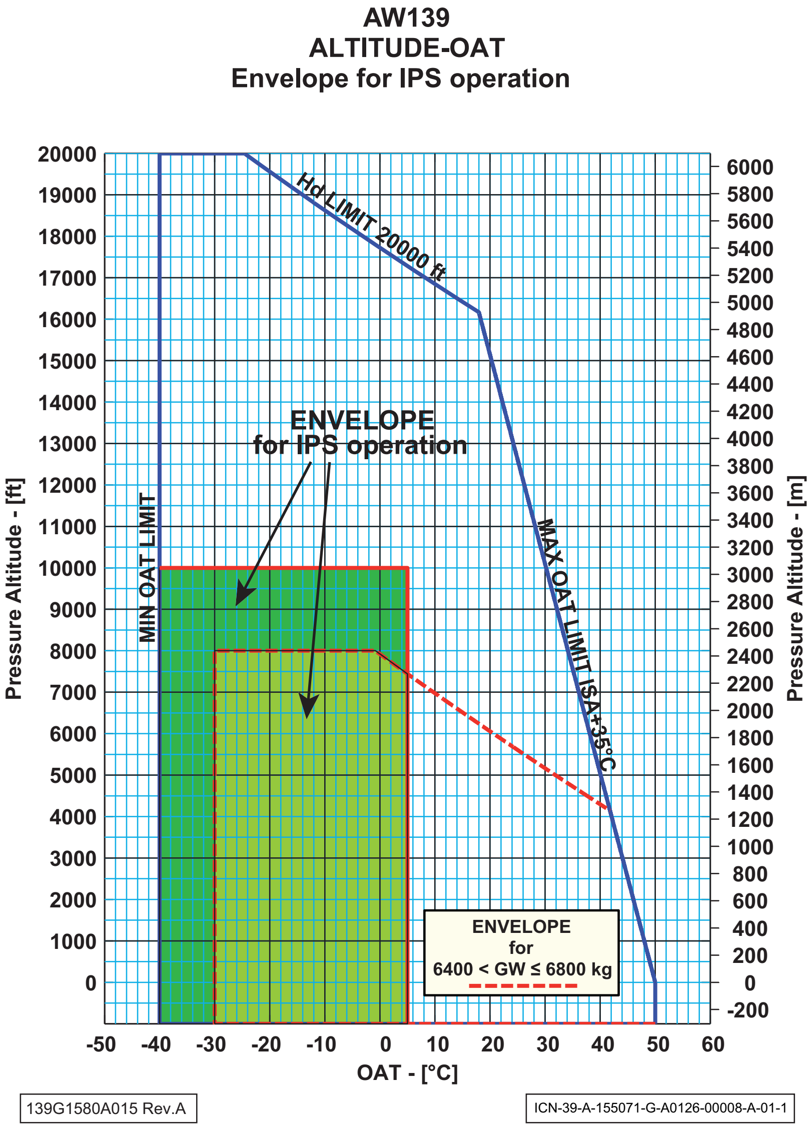
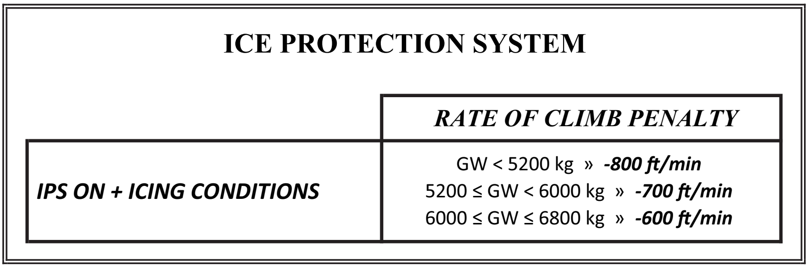


Figure IPS-2 Altitude Temperature Limitations for IPS Operation

RATE OF CLIMB REDUCTION IN ICING CONDITIONS



ICE PROTECTION SYSTEM

	RATE OF CLIMB PENALTY
IPS ON + ICING CONDITIONS	GW < 5200 kg » ***-800 ft/min*** 5200 ≤ GW < 6000 kg » ***-700 ft/min*** 6000 ≤ GW ≤ 6800 kg » ***-600 ft/min***

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Figure IPS-3 Performance Reduction in Icing Conditions

Note

The table above is valid for both AEO and OEI conditions.

Note

Fuel consumption (See Basic RFM Section 9) will be increased by a maximum of 55 kg/hr when the aircraft is operating with IPS on, in icing condition and with ice accretion on the aircraft.

LIMITED ICING PROTECTION SYSTEM, FLIGHT IN LIMITED ICING CONDITIONS

GENERAL

For operation in Limited Icing Conditions the aircraft must be in accordance with the requirememnts as detailed in RFM Supplement 76.

Any flight where Limited Icing conditions are encountered must be recorded in the helicopter log-book.

TYPE OF OPERATIONS

Limited icing assumes that the aircraft has the ability to vacate the icing conditions, at any time, with the availability of a band of positive air temperature of at least 500 ft height into which the aircraft can descend to de-ice naturally.

MINIMUM FLIGHT CREW

Limited Ice conditions - Two pilots

AIRSPEED LIMITATIONS

V_{NE} Icing .... Figure LIPS-2

ALTITUDE AND TEMPERATURE LIMITATIONS

Altitude and temperature limitations for icing conditions .... Figure LIPS-3

RATE OF DESCENT

Maximum Rate of descent in icing conditions .... 1000 fpm
(or after icing encountered if ice is still present on the aircraft)

TIME IN LIMITED ICE

Maximum Time in Limited Ice (Intermittent...5 minutes
(Figure LIPS-1 Yellow Zone)

FREEZING RAIN / FREEZING DRIZZLE / SUPERCOOLED LARGE DROPLETS (SLD)

Flight in known Freezing Rain, Freezing Drizzle or SLD conditions is prohibited.

In case of an encounter with Freezing Rain, Freezing Drizzle or SLD conditions, take immediate action to vacate the flight conditions.

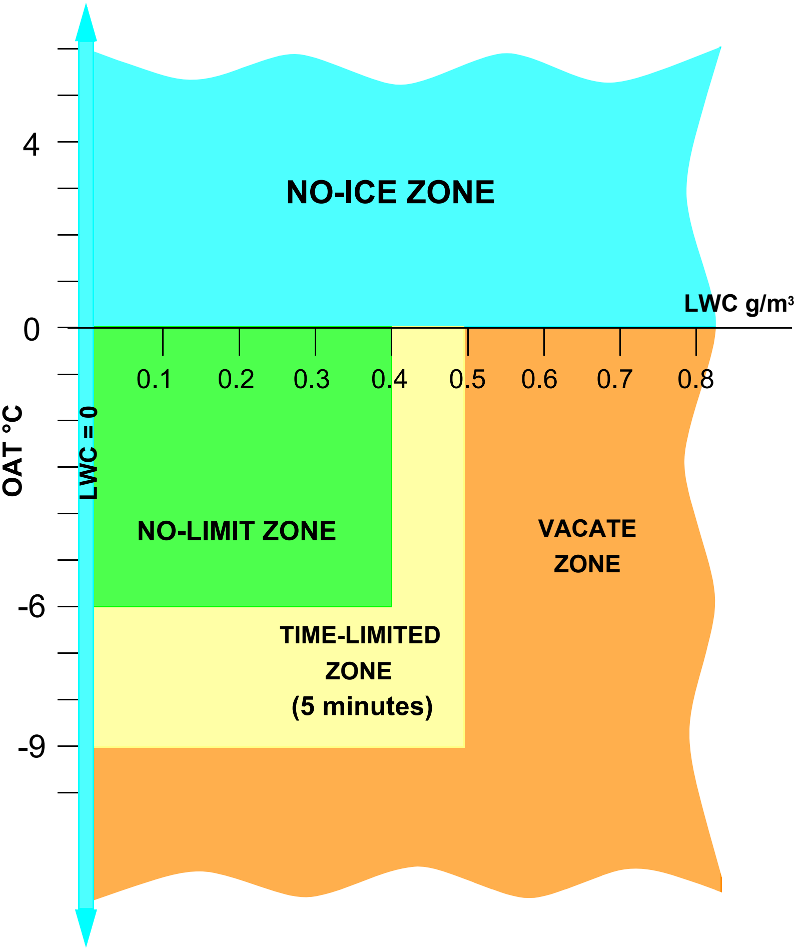

Figure LIPS-1 Icing zones for conditions withLMC above 0.0 g/m^3

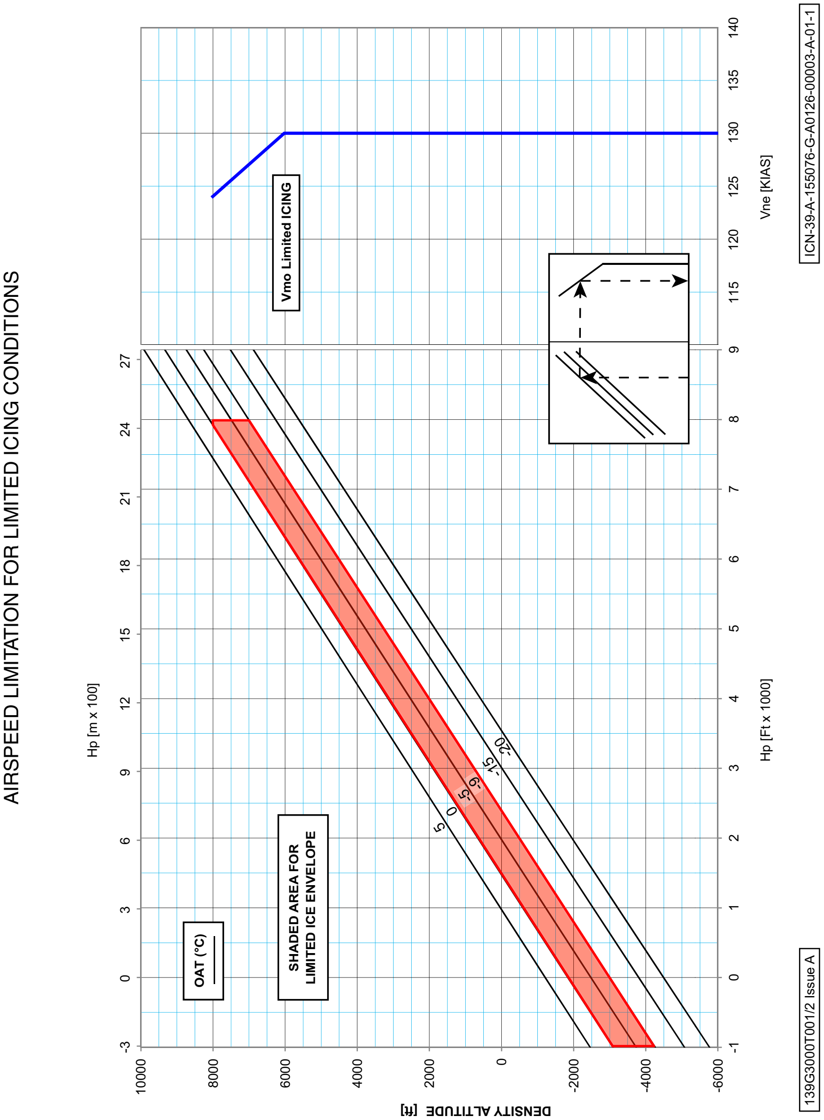

Figure LIPS-2 Airspeed Limitations for Limited Icing Conditions

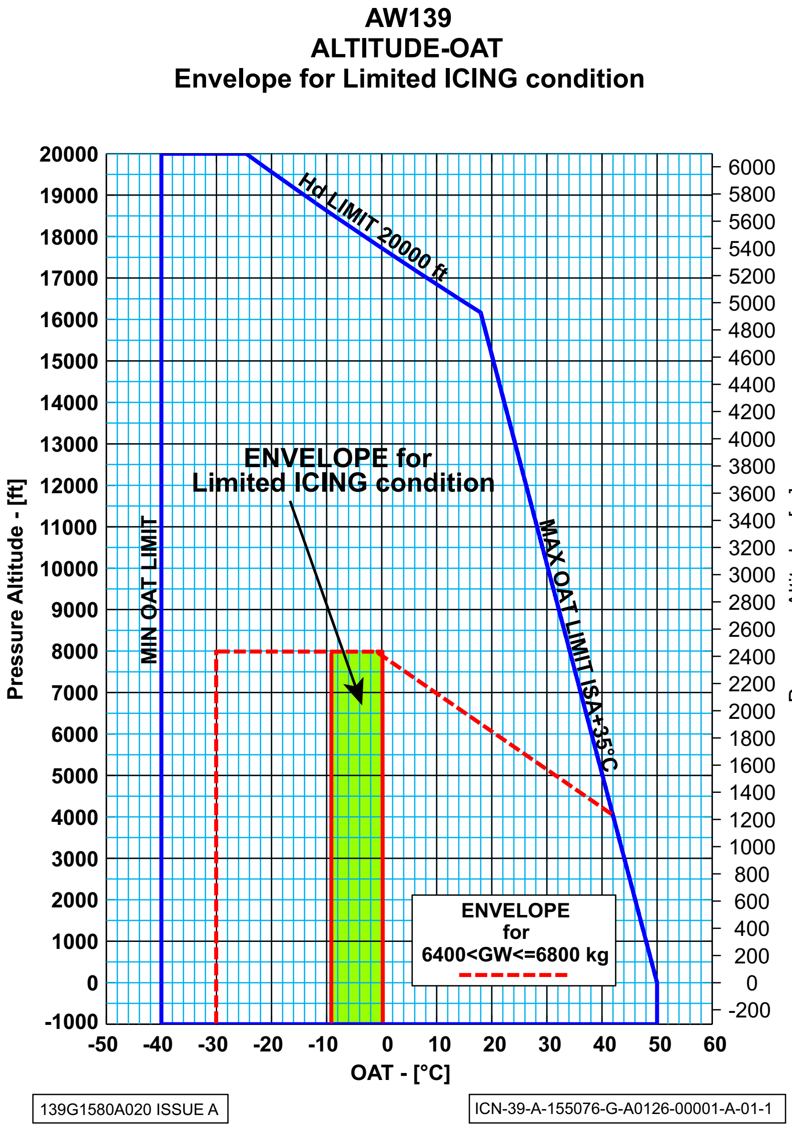

Figure LIPS-3 Altitude Temperature Limitations for LIPS Operation

RATE OF CLIMB REDUCTION IN LIMITED ICING CONDITIONS

LIMITED ICE PERFORMANCE

	MAXIMUM EXPECTED RATE OF CLIMB PENALTY
NO-LIMIT ZONE	GW < 5400 kg » ***-800 ft/min*** 5400 ≤ GW < 6400 kg » ***-700 ft/min*** 6400 ≤ GW ≤ 6800 kg » ***-600 ft/min***
TIME-LIMITED ZONE	GW < 5400 kg » ***-1500 ft/min*** 5400 ≤ GW < 6400 kg » ***-1200 ft/min*** 6400 ≤ GW ≤ 6800 kg » ***-1050 ft/min***

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Figure LIPS-4 Performance Reduction in Limited Icing Conditions

Note

The table above is valid for both AEO and OEI conditions and considers the maximum icing that would be expected in the zone.

Note

Fuel consumption (See Basic RFM Section 9) will be increased by a maximum of 55 kg/hr. when the aircraft is operating with LIPS ON, in the “No-Limit Zone” icing conditions. This value will may increase during time in the “Time Limited Zone” depending on the severity of the icing whilst in that zone.

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GOODRICH LANDING GEAR

General

The following Limitations are for operations with the Goodrich Landing Gear installation, all other limitations remain unchanged.

Normal and Emergency Procedures remain unchanged.

WEIGHT

Maximum Gross weight for towing 6450kg

Maximum Gross weight for taxiing 6800kg

Maximum Gross weight for CAT B Take Off / Landing 6800kg

Maximum Gross weight for CAT A Take Off / Landing
(Clear Area only) 6800kg

GROUND SPEED LIMITATIONS

On Paved Surfaces

Maximum taxi speed...40 knots
(74 km/hr)

(above 20 knots (36km/hr) nose wheel must be locked fore and aft)

Maximum for emergency landing speed
(nose wheel locked in fore and aft position ....60 knots
(110 km/hr)

Maximum towing speed .... 37 km/hr
(23 mph)

On Prepared Grass Surfaces

Maximum taxi speed
(above 10 knots (18 km/hr) nose wheel must be locked fore
and aft) ....20 knots
(37 km/hr)

Maximum for emergency landing speed
(nose wheel locked fore and aft) ....40 knots
(74 km/hr)

ALTITUDE LIMITATIONS

Maximum operating altitude weight up to 6400 kg .... 20000 ft (6100 m)

Maximum operating altitude for weights
between 6400 kg 6800 kg .... 8000 ft (2400 m)

Minimum operating altitude ....Figure LDG GEAR-1

Maximum Take Off and Landing Altitude ....Figure LDG GEAR-1

AMBIENT AIR TEMPERATURE LIMITATIONS

Minimum temperature for ground starting .... -40° C

Maximum ambient air temperature...............................Figure LDG GEAR-1

Minimum ambient Air Temperature...............................Figure LDG GEAR-1

Maximum ambient temperature for Take-Off and Landing at weights between 6400 kg & 6800 kg) (GW EXT 6800kg) ....Figure LDG GEAR-1

Maximum ambient temperature for Take-Off and Landing Envelope Extension (ALT EXT 9 PAX) ....Figure LDG GEAR-1

SLOPE LIMITATION

Sloped Take Off and Landing are limited to the following, provided the build standard as defined in Supplement 6 Slope Operation Envelope Extension is incorporated:

Nose up .... 10°

Nose Down .... 10°

Left Wing Low .... 10°

Right Wing Low .... 10°

HYDRAULIC SYSTEM LIMITATIONS

The only hydraulic fluid authorised for use with the Goodrich Landing Gear is as follows:

AUTHORIZED HYDRAULIC FLUIDS

Applicable Specification	Brand Names (For reference only)
MIL-PRF-83282	AEROSHELL FLUID 31
MIL-PRF-5606	AEROSHELL FLUID 41

CATEGORY A LIMITATIONS

Only Category A Clear Area and Clear Area Training procedures may be carried out with the Goodrich Landing Gear. All other Category A procedures are prohibited.

TAKE-OFF/LANDING ENVELOPE

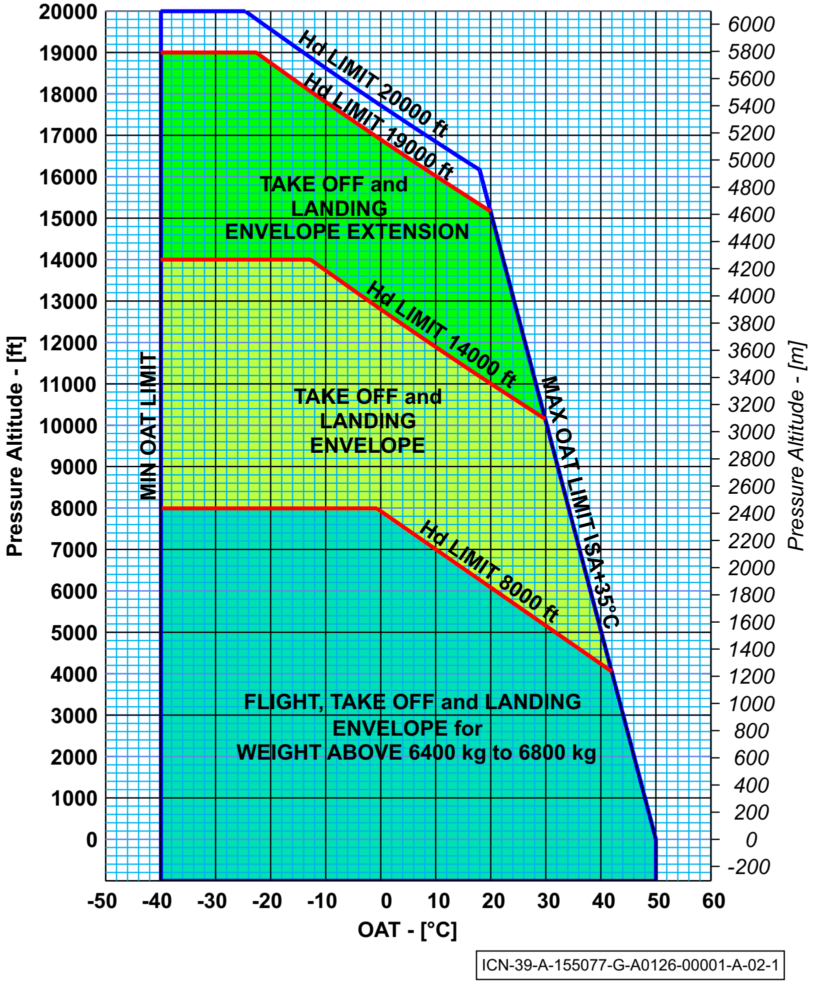

Figure LDG GEAR-1 Altitude and OAT Limitations

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RNP OPERATIONS (PRIMUS EPIC SOFTWARE PHASE 7 AND LATER)

RNP Navigation Specifications (for full details of RNP operations refer Supplement 80)

ICAO 9613 Ed. 4th PBN manual - Navigation Specification	Flight Phase						
	En-route	Arrival	APPROACH				Dep
			Initial	Intermediate	Final	Missed	
RNP 2	2	-	-	-	-	-	-
RNP 1	1	1	1	1	-	1	1
RNP APCH LNAV & LNAV/VNAV minima	-	-	1	1	0.3	1	-
RNP APH LPV minima	-	-	1	1	Angular	1	-
RNP AR APCH RNP 0.3 NM minima (*)	-	-	0.3	0.3	0.3	1	-
RNP 0.3	0.3	0.3	0.3	0.3	-	0.3	0.3

Table 1 Navigation Specification

(*) Procedures with RNP lower than 0.3 NM in the approach segment or 1.0 NM in the missed approach are not authorized.

Note

RNP AR APCH 0.3/MA 1.0 certification approval does NOT constitute operational approval.

TYPE OF OPERATION

RNP operations are approved under Day/Night VFR and Day/Night IFR operation.

GLIDE SLOPE LIMITATIONS

Maximum Glideslope angle for LPV approaches .... 9°

Maximum Glideslope angle for RNP AR APCH, LNAV/VNAV and LNAV approaches .... 8.3°

AIRSPEED AND ALTITUDE LIMITATIONS FOR APPROACHES

Minimum APP mode engagement airspeed for
RNP APCH approach procedures .... 50 KIAS

Maximum ROD while approaching the MAP .... 1000 fpm

Minimum DA(H) for RNP AR APCH,
LNAV/VNAV and LNAV approaches .... 250 ft

Minimum DA(H) for LPV approaches .... 200 ft

Note

The airspeed at the FAF and MAP, as indicated on the the Approach Plate being used, must not be exceeded.

Note

Use of IAS mode is recommended with RNP APCH and RNP AR APCH approaches below 60 KIAS.

AUTOMATIC FLIGHT CONTROL SYSTEM LIMITATIONS

RNP operations must be flown using the default Flight Director coupled mode or by following raw data. Use of Flight Director in uncoupled mode for RNP operations is not approved.

For RNP APCH approaches with a glide slope angle greater than 7.5 degrees the final approach segment (from FAF to MAP) must be flown with AFCS approach modes coupled. In case a failure occurs after the FAF, causing the FD to decouple, the pilot must initiate a Missed Approach Procedure (GA).

RNP procedures including RF legs must be flown with LNAV Flight Director mode coupled. In case a failure occurs, causing the FD to decouple, the pilot must discontinue the current procedure.

FLIGHT MANAGEMENT SYSTEM LIMITATIONS

Use of FMS offset function during RNP 0.3 operations is forbidden.

CAUTION

The Honeywell FMS cannot automatically retrieve the 0.3 NM RNP value from Navigation Database for airways. Before the start of a RNP 0.3 airway, the crew shall manually enter 0.3 as RNP value by accessing the PROGRESS 2/3 RNP MCDU page. Following the manual entry, current RNP value shall be checked on PFD or PROGRESS 1/3 MCDU page.

NORMAL PROCEDURES

GENERAL

The following procedures are intended to ensure that the level of safety required by the design and certification process is achieved.

Note

Throughout this Section, checks marked with a large ➡ are required only before the first flight of the day. All other checks are to be carried out before each flight.

Normal and standard conditions are assumed in these procedures.

The minimum and maximum limits, and the normal and cautionary operating ranges are indicated on the PFD and MFD displays.

FLIGHT PLANNING

CAT B WEIGHT AND H-V DETERMINATION

Graphs are presented in Limitations to determine maximum weight for CAT B Take Off/Landing/IGE manoeuvres (Figure 1-5) and to determine the H-V (Figure 1-4) avoid area diagram.

The order of flight planning is first to determine the CAT B weight for Take Off and Landing at the ambient conditions then to confirm the H-V avoid area diagram applicable for the weight chosen.

CATEGORY A PROCEDURES

See Supplement 12 and 97 for detailed information on CATEGORY A procedures.

CATEGORY A TAKE OFF:

VERTICAL PROCEDURE

TDP	35 ft ATS
TDP$_E$	35 ft to 70 ft ATS
Minimum height during CTO	15ft or (TDP$_E$ - 20ft) ATS
Height at end of CTO distance	TDP or TDP$_E$

SHORT FIELD PROCEDURE

TDP	35 ft AGL
TDP$_E$	35 ft to 400 ft AGL
Minimum height during CTO	TDP or (TDP$_E$ - 20 ft)
Height at end of CTO distance	TDP or TDP$_E$

BACK UP PROCEDURE

TDP$_E$	85 ft to 400 ft ATS
Minimum height during CTO	(TDP$_E$ - 70ft) ATS
Height at end of CTO distance	See Supp 12

CLEAR AREA PROCEDURE

TDP .... 30 ft AGL

CONFINED AREA PROCEDURE

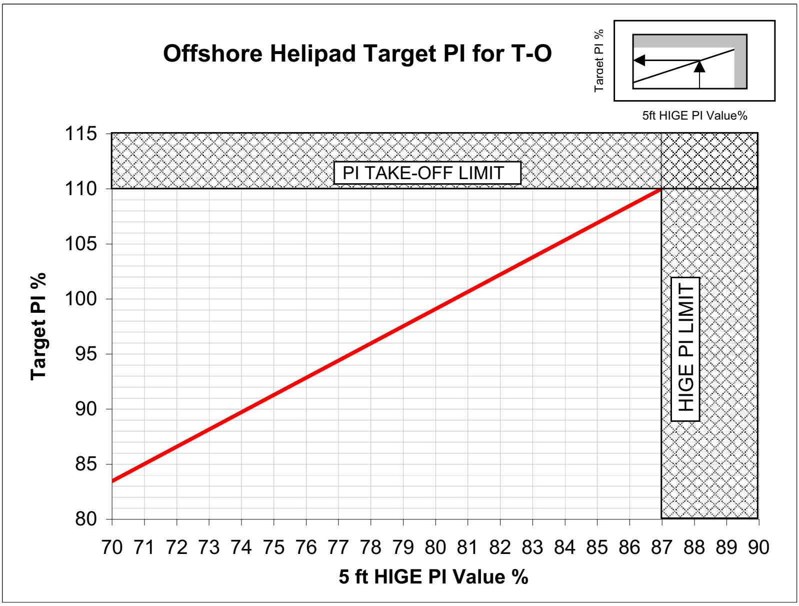
TDP .... Min 100 ft to Max 400 ft ATS

OFFSHORE HELIDECK PROCEDURE

TDP ....20 ft ATS

Rotation Point ....30 ft ATS

See chart below for Take Off Target PI

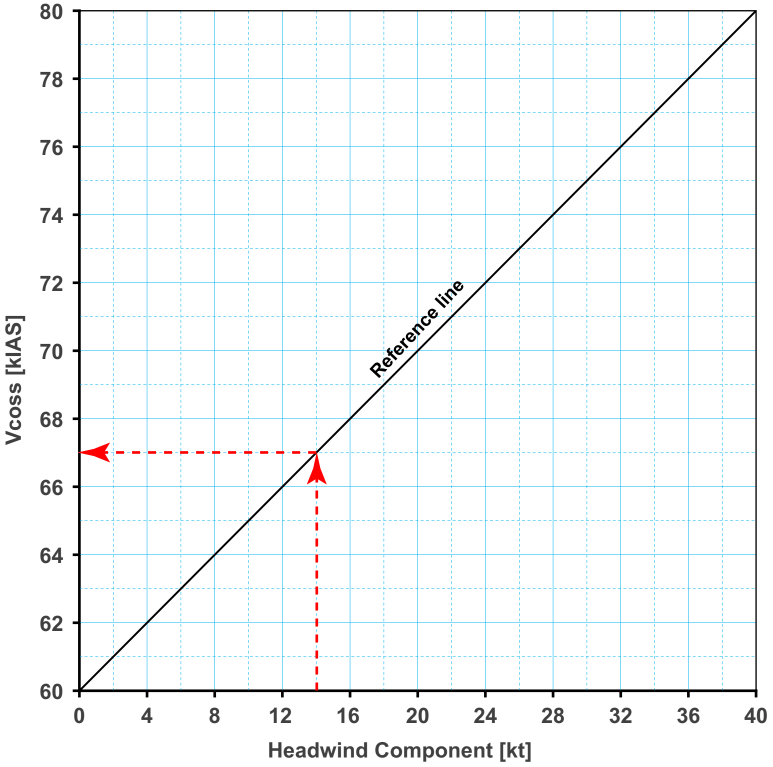


ENHANCED OFFSHORE HELIDECK PROCEDURE

TDP ....25 ft ATS

Climb Out Safety Speed (VCOSS) for PATH 1-2, see chart below:

Vcoss SELECTION for PATH 1-2



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CATEGORY A LANDING:

HELIPORT/HELIDECK PROCEDURE

LDP$_V$ Height .... 50 ft to 400 ft ALS

LDP$_V$ Airspeed.. 20 KIAS

LDP$_V$ Rate of Descent .... Less than 350 ft/min

CLEAR AREA PROCEDURE

LDP Height ....50 ft AGL

LDP Airspeed .... 50 KIAS

LDP Rate of Descent... Less than 350 ft/min

CONFINED AREA PROCEDURE

LDP Height .... Max 400 ft to Min 100 ft ALS

Groundspeed:

- for LDP between 400 ft and 250 ft ....15 to 20 kts
- for LDP below 250 ft to 100 ft.........................Defined by height only

Rate of Descent...400 ft/min to 500 ft/min

OFFSHORE HELIDECK LEVEL APPROACH PROCEDURE

LDP Height .... 40 ft ALS

LDP Groundspeed .... 15 kts

LDP Rate of descent .... 0 ft/min

OFFSHORE HELIDECK DESCENDING APPROACH PROCEDURE

LDP Height .... 50 ft ALS

LDP Groundspeed .... 15 kts

LDP Rate of descent .... 200 ft/min

GROSS WEIGHT AND CENTER OF GRAVITY

Determine both the take-off and estimated landing Gross Weight, Center of Gravity and verify that they are within approved envelope limits. The Weight and Balance and appropriate performance charts must be used to ascertain the weight and balance data as follows:

- Consult RFM Section 6 - Weight and Balance
- Ascertain weight of fuel, oil, payload etc.
- Compute take off and anticipated gross landing weight
- Check helicopter centre of gravity (CG) position
- Confirm that the weight and CG limitations in Limitations are not exceeded.

COLD WEATHER OPERATION

If the helicopter is to remain parked outside with an OAT at or below -20°C both Main and Auxiliary batteries should be removed and stored in a heated room. Confirm batteries have been installed before flight.

EXTERNAL PRE-FLIGHT CHECKS

DAILY FUEL DRAIN CHECK

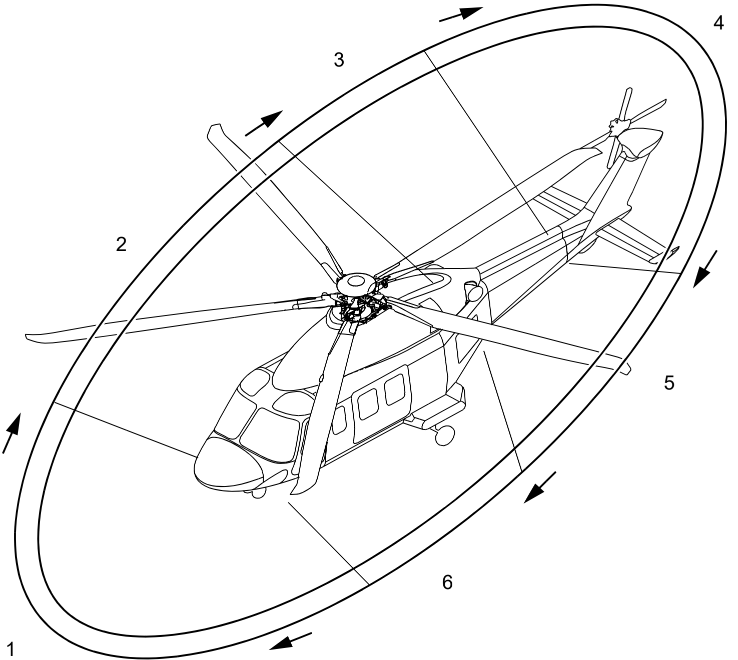
Carry out a fuel tank drain check, before the first flight of the day. The check is to be carried out before moving the aircraft and by a trained person. Drain 10 to 20cc from each fuel sump water drain valve by activating the relevant push button. Release the pushbutton, confirm that the fuel is free of water and no fuel is dripping from the aircraft drains.

The term “trained person” refers to a mechanic or pilot who has received sufficient training to perform this task.

GENERAL

The inspection commences at the nose and continues clockwise around the helicopter. During the inspection, check that there are no leaks from overboard drains, that all vents, air intakes, air outlets and fire access points are clear of obstructions, and all access panels and antennas are secure.

Pilot’s Pre Flight Check (pilot walk around and interior checks)



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Preflight Check Sequence

AREA N°1 : Helicopter nose
AREA N°2 : Fuselage - RH side
AREA N°3 : Tail boom - RH side
AREA N°4 : Fin, intermediate/tail gearbox, tail rotor
AREA N°5 : Tail boom LH side
AREA N°6 : Fuselage - LH side
AREA N°7 : Cabin and Cockpit interior

CHECKS

1. Main and tail rotor tie downs (if present) — Removed.

AREA N°1 (Helicopter Nose)

2. Nose exterior — Condition.
3. Pitot-Static Probe (Left side) — Cover removed, condition and un-obstructed.
4. Left side brake lines in brake pedal area (looking through bottom transparent panel) — Condition.
5. Nose landing gear — Condition, shock strut extension, leaks, tire pressure.
6. Ventilation air intakes (in landing gear bay) — Un-obstructed.
7. Nose compartment access door — Latched and Secure.
8. Pitot-Static Probe (Right side) — Cover removed, condition and obstructions.
9. Right side brake lines in brake pedal area (looking through bottom transparent panel) — Condition.

AREA N°2 (Fuselage - Right Hand Side)

10. Windshield and roof transparent panel — Condition, cleanliness.
11. Windscreen wiper ➡ — Condition.
12. Fuselage exterior — Condition.
13. Pilot cockpit door — Condition, cleanliness, window secure.
14. Passenger cabin door — Condition, cleanliness, secure. Check window for presence of cracks.
15. Right side emergency exits ➡ — Verify secure.
16. Main landing gear — Condition, shock strut extension, leaks, tire pressure.
17. Drains and vent lines ➡ — Free of obstructions.
18. Fuel tank sump area (Right side) — Confirm no leaks.
19. Baggage compartment, tie down/net — Condition, cargo (if on board) correctly secure.
20. Baggage door — Secure.
21. Engine area ➡ — Check for fuel and/or oil leaks.
22. Cowling and fairings ➡ — Condition and latched.
23. Air intakes ➡ — Clear and unobstructed.
24. Main rotor components and blades — General condition.

25. Main rotor damper indicators — Position.
26. Engine air intake screen ➡ — Cover removed, free of damage and obstruction.
27. Engine cowling — Secure.
28. Gravity fuel filler cap — Secure.
29. Engine exhaust ➡ — Cover removed, condition.
30. Fire Bottle discharge indicator — Green.

AREA N°3 (Tail Boom - Right Hand Side)

31. Tail boom exterior — Condition.
31a. Tail rotor drive shaft cover — Secure.
32. Antenna (1) ➡ — Condition.
33. Stabilizer — Condition and secure.
34. Navigation light ➡ — Condition.

AREA N°4 (Fin, Intermediate and Tail Gearbox, Tail Rotor)

35. Tail fin ➡ — Condition.
36. Intermediate and tail rotor gearbox — Check for leaks.
37. Tail navigation and anticollision lights — Condition.
38. Tail rotor hub and blades — Condition, cleanliness.
39. Tail rotor pitch change mechanism ➡ — Condition.

AREA N°5 (Tail Boom Left Hand Side)

40. Tail boom exterior — Condition.
41. Stabilizer — Condition and secure.
42. Navigation light ➡ — Condition.
43. Antenna (1) ➡ — Condition.
44. Tail rotor drive shaft cover — Secure.

AREA N°6 (Fuselage Left Hand Side)

45. Fuselage exterior — Condition.
46. Engine exhaust — Cover removed, condition.
47. Fire Bottle discharge indicator — Green.
48. Baggage compartment, tie down/net — Condition, cargo (if on board) correctly secure.
49. Baggage door — Secure.
50. Engine area ➡ — Check for fuel and/or oil leaks
51. Engine air intake screen ➡ — Cover removed, clear of damage and obstructions.
52. Engine cowling — Secure.
53. Air intakes ➡ — Clear and unobstructed.
54. Main rotor components and blades — General condition.

55. Left side emergency exits ➡ — Confirm secure.

56. Drains and vent lines ➡ — Free of obstructions.

57. Fuel tank sump area (Left side) — Confirm no leaks.

58. Main landing gear — Condition, shock strut extension, leaks, tire pressure.

59. Passenger cabin door — Condition, cleanliness, secure.

60. Cowling and fairings ➡ — Condition.

61. Co-pilot cockpit door — Condition, cleanliness, window secure. Check window for presence of cracks.

62. Windshield and roof transparent panel — Condition and cleanliness.

63. Windscreen wiper ➡ — Condition.

AREA N°7 (Cabin and Cockpit Interior)

64. Passenger Emergency exits — Verify secure.

65. Cabin interior — Equipment and cargo secure.

66. First Aid Kit ➡ — On board.

67. Cabin fire extinguisher ➡ — secure, charge.

68. Passenger doors — Closed and secure, confirm levers fully down in locked position.

69. Pilot and Copilot safety belt and inertia reel. — Condition.

70. Pilot and Copilot seat — Secure.

71. Pilot and Copilot flight controls ➡ — Condition and secure.

72. Lower and lateral transparent panels — Integrity, cleanliness and no signs of brake fluid.

73. Pilot and Copilot door — Secure.

74. Instruments, panels and circuit breakers — Condition and legibility.

COCKPIT/ENGINE PRE-START CHECKS

1. Pedals and seats — Adjust.
2. Seat belt — Fasten and adjust.
3. Circuit breakers — All engaged.
4. ECL's — Confirm at FLIGHT.
5. All switches — OFF or closed.
6. ENG 1 and ENG 2 MODE switches — OFF.
7. ELT switch on instrument panel — Confirm ARM.
8. LDG GEAR lever — Confirm DOWN.
9. External Power Unit (if used) — Connect and switch ON.
10. Ground support personnel — Connected (If required).
11. BATTERY MASTER — ON.

Note

If External Power not available carry out checks marked with ♦ on BATTERY to conserve battery power. The remaining checks should be completed after the first engine start.

12. ♦ BATTERY MAIN and AUX — ON.
13. EXT PWR — ON (if required).
14. ♦ GEN 1 & 2 — ON.
15. ♦ BUS TIE — AUTO.
16. POSITION lights switch — Confirm functioning then leave as required.
17. ♦ ANTI-COLL lights switch — ON.(confirm functioning).
18. LT Panel switch — ON. confirm emergency lights functioning: cabin (2), sponson (left and right), cockpit door (left and right).
    — OFF or ARM, as required.
19. MFD — Set SYSTEM page, select SYS CONFIG, verify Top Level System Part Number (EPIC software release) installed:
    EB 7030191-00105 Phase 4 or
    EB 7030191-00107 Phase 5 or
    EB 7030191-00108 Phase 6 or
    EB 7030191-00109 Phase 6 or
    EB 7030191-00110 Phase 7 or
    EB 7030191-00111 Phase 7 or
    EB 7030191-00112 Phase 7 or
    EB 7030191-00114 Phase 7 or
    EB 7030191-00115 Phase 7 or

PRE START

EB 7030191-00117 Phase 7 or
EB 7030191-00118 Phase 7 or
EB 7030191-00113 Phase 8 or
EB 7030191-00120 Phase 8.

20. ♦ MFD — Set powerplant page and check configuration setting.

Note

If MFD/PFD are in composite mode, reset to NORMAL before starting using RCP switches (MFD ONLY-PFD ONLY-NORMAL).

21. ♦ CAS messages — Check.

22. ♦ MFD — Check fuel quantity.

23. ♦ LDG GEAR panel — Check 3 green lights and EMER DOWN switch secure.

23A. ♦ NOSE WHEEL lock — Confirm LOCK illuminated and/or aircraft suitably chocked.

24. ♦ PARK BRAKE — Pull and turn handle and press pedals until PARK BRAKE ON advisory illuminates.

25. ♦ RAD MSTR switch -— As required (GND if battery start).

26. ♦ FORCE TRIM switch — ON.

27. ♦ CLTV/YAW TRIM switch — ON.

28. ♦ AWG switch — As required (REGRADE or INHIBIT position disables “150 FEET” voice message)
See Note page 82.

29. LD-SH switch — TORQUE.

30. AFCS — Confirm not engaged.

31. Cyclic stick — Centred.

32. Collective lever — Full down, friction as required.

33. ♦ Flight Controls ➡ — Push ELEC PUMP on HYD panel. Carry out cyclic, collective and yaw pedals full and free check. Utilizing the cyclic position indicator, on PFD, centralize cyclic control.
— ELEC HYD PUMP select OFF.

CAUTION

Full and free check should be carried out with slow displacement of the controls and one control at a time in order not to overload the electric pump.

Note

Cyclic position indicator is only presented on the PFD when the aircraft is on the ground and the collective is near its down position (MPOG).

Note

Electric hydraulic pump disengages automatically after 2 minutes.

34. HYD SOV switch — Centred and guarded.

35. ♦ FIRE WARNING TEST push button

— Press, on the TEST control panel, BAG and confirm the following visual warnings:
- MWL illuminate
- ‘BAG FIRE’ CAS warning
- ‘BAG’ on FIRE EXTING panel
- Audio tone and voice warning (“WARNING WARNING”).

— Press ENG1, confirm the following visual and audio warnings:
- ENG 1 ECL fire light
- ENG 1 FIRE on FIRE EXTING panel
- MWL and MCL illuminate
- ‘1 ENG FIRE’ , CAS warning
- ‘1 FIRE DET’, CAS caution
- Audio tone and voice warning (“ENGINE 1 FIRE”)
- FIRE 1 on ENG CONTROL panel.

— Press, ENG2, confirm the following visual and audio warnings:
- ENG 2 ECL fire light
- ENG 2 FIRE on FIRE EXTING panel
- MWL and MCL illuminate
- ‘2 ENG FIRE’, CAS warning
- ‘2 FIRE DET’, CAS caution
- Audio tone and voice warning (“ENGINE 2 FIRE”)
- FIRE on 2 ENG CONTROL panel.

36. FUEL pushbutton

— Fuel test starts automatically at electrical power on.
Confirm 1(2) FCU TEST FAIL caution not illuminated.

— If further test required press pushbutton and confirm the following:

- ‘TEST’ replaces ‘FUEL’ legend on Pilot and Copilot MFD

- 1(2) FCU TEST FAIL caution not illuminated.

37. CHIP DETECTOR pushbutton

— Press ENG 1 pushbutton and confirm CAS caution: 1 ENG CHIP and MCL illuminates.

— Press ENG 2 pushbutton and confirm CAS caution: 2 ENG CHIP and MCL illuminates.

38. AWG TEST pushbutton	— Press, momentarily, on the TEST control panel, AWG. Confirm the AURAL SYSTEM TEST message is heard. If required PRESS and hold pushbutton for 6 seconds and confirm the following aural warnings: Audio tone and voice warning ("WARNING") ROTOR LOW ENGINE 1 OUT, ENGINE 2 OUT ENGINE 1 FIRE, ENGINE 2 FIRE ROTOR HIGH, ENGINE 1 IDLE ENGINE 2 IDLE, WARNING, AUTOPILOT, AIRSPEED, LOW SPEED*, ALTITUDE, CHECK HEIGHT*, LANDING GEAR, 150 FEET, AURAL SYSTEM TEST. * EPIC S/W Phase 5 or later.
39. ♦ OIL LEVEL Pushbutton	— Press MGB pushbutton and confirm CAS caution: MGB OIL LOW and MCL illuminates. — Press IGB pushbutton and confirm CAS caution: IGB OIL LOW and MCL illuminates — Press TGB pushbutton and confirm CAS caution: TGB OIL LOW and MCL illuminates.
40. ♦ LAMP TEST pushbutton ➡	— Press and confirm the following illuminate: - MWL and MCL Illuminate - ENG 1 & 2 FIRE/ARM and BAG on FIRE EXTING panel - FIRE lights on ENG CONTROL panel - HYD 1 & 2 PRESS/TEMP & ELEC PUMP ON, on HYD panel - NOSE/LH/RH red and green lamps, NOSE WHEEL UNLK/LOCK lamps on LDG GEAR panel - All green indications on the AUTOPILOT and GUIDANCE CONTROL panel.
41. ♦ RPM switch (on collective)	— Set 100% (102% for CAT A).
42. ♦ 1 ENG GOV (on collective)	— AUTO.
43. ♦ 2 ENG GOV (on collective)	— AUTO.

44. ENG TRIM beep switches (collective)	— Verify operation, then leave the engine control levers in the FLIGHT position. ♦ On BATTERY power use a single 'click' back and forward to confirm ECL stops in FLIGHT gate.

Note

Each engine trim beep switch controls the respective control lever from MIN to FLIGHT position when in AUTO mode, and from MIN to MAX position when in MANUAL mode.

Note

Both engines control levers should always be operated through the beep switches located on the collective control. They should be operated manually only in case of failure of the remote control (ECL FAIL caution message), or before starting, to position the lever to FLIGHT.

Note

NOSE WHEEL should be LOCKed, yaw pedals certralized and the aircraft suitably chocked to avoid possible aircraft movement during rotor start.

45. COND/HTR (if fitted)	— OFF, Confirm HEATER SOV 1 & 2 NORMAL.

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ABORTED ENGINE START PROCEDURES

CAUTION

Failure to follow the appropriate Abort Procedure may cause damage to the engine.

Engine starting malfunctions are most likely to occur during the engine acceleration cycle to IDLE speed. The list below details the cockpit indications associated with malfunctions and the recommended Abort Procedure. It is important that flight crews be thoroughly familiar with these procedures.

Monitor engine start and if any of the following occur:

— light up is not within 10 seconds of ENG MODE to IDLE

— abnormal noise heard

— ITT increases beyond engine limits (HOT START caution illuminated)

— engine hangs (stagnation in NG below 54%)

— the main rotor has not begun to rotate when the gas generator (NG) reaches 40%

— engine starter fails to disengage by 49% NG.

shut down engine by:

1. ENG MODE switch — OFF.

   If engine does not SHUT OFF then:

   ECL — OFF.
2. FUEL PUMP — OFF.
3. ENG FUEL switch — OFF.

DRY MOTORING PROCEDURE

Following an aborted start shutdown, perform the following procedure allowing a 30 seconds fuel drain period before restarting. The procedure is used to clear internally trapped fuel and vapor:

Note

Observe the starter generator duty cycle limitations during re-start attempts. Refer Limitations.

1. ENG GOV switch — AUTO.
2. ENG MODE switch — OFF.
3. ECL — OFF.
4. FUEL PUMP switch — OFF.
5. ENG FUEL switch — OFF (fuel valve indicator bar horizontal).
6. ENGINE IGN circuit breaker (Ringed in WHITE on CB panel) — Out (Overhead CB panel).
7. ENG MODE switch — Select idle as necessary (not more than 45 seconds. Starter Duty Cycle must be respected).

Note

To operate the starter it is possible to select ENG GOV switch to MANUAL mode, then push the starter push button on the ECL.

8. Gas generator (NG) — Note increasing.
9. ENG MODE switch — OFF as necessary.
10. ENGINE IGN circuit breaker — In.

NORMAL ENGINE START

CAUTION

An engine battery start should not be attempted if the MAIN BUS 1 voltage is below 23V.

Note

During battery start FUEL PUMP 1(2) may illuminate temporarily.

Either engine may be started first and it is recommended that normal engine starts be made using the AUTO mode. For starting procedure in MANUAL mode refer to Emergency and Malfunction Procedures.

Note

If engine N°2 is to be started first, set BUS TIE switch to ON and confirm MAIN BUS 2 voltage is not below 23V.

1. Rotor brake (if fitted) — Confirm OFF, ROTOR BRAKE ON advisory extinguished.
2. ENG 1 FUEL switch — ON - Fuel valve indicator bar vertical.
3. MFD display — Confirm PWR PLANT page.
4. FUEL PUMP 1 switch — ON - 1 FUEL PUMP caution out, check pressure.
5. ENG 1 MODE switch — IDLE.

Note

It is recommended to start the engine to IDLE, if necessary, it is possible to start to FLIGHT by setting the ENG MODE switch directly to FLT.

6. Gas Producer (NG) — Note increasing and START legend displayed.
7. Engine temperature (ITT) — Note increasing and IGN legend displayed.
8. Engine oil pressure — Confirm rising.
9. Engine N°1 starter — Disengaged by 49% NG.
10. Main hydraulic system — When the main rotor begins to rotate, confirm rise in main hydraulic pressure.
    — Confirm cyclic control centralized on PFD indicator.
11. N°1 engine power turbine speed (NF) and rotor speed (NR) — Confirm both stabilized to IDLE speed of 65%±1%.

Note

If the engine was started directly to FLT the NF will stabilize at 100% with rotor speed (NR).

12. Engine and transmission oil — Check pressures and temperatures within limits.

13. ENG 1 MODE switch — FLT.

13A. GEN 1 Confirm ON (reset if required).

14. ♦ If BATTERY start carried out, complete pre-start checks.

ENGINE 2 START

Note

> If required the BUS TIE may be selected to ON to allow continuation of the ENG 2 start in case of EXT PWR failue or ENG/GEN 1 failure during the ENG 2 start cycle.

15. ENG 2 FUEL switch — ON - Fuel valve indicator vertical.

16. FUEL PUMP 2 switch — ON - 2 FUEL PUMP caution out, check pressure.

17. GEN 1 — Check loadmeter in GREEN band (if EXT PWR not used).

18. Repeat above procedure for engine N°2.

CAUTION

> Ensure second engine engages as the NF reaches FLIGHT condition. A failed engagement is indicated by positive NF value and near zero torque. If this occurs, shut down the non engaged engine first and when engine stopped shut down other engine. If a hard engagement occurs, shut down both engines for maintenance action.

19. Engine and transmission parameters — Check within limits.

20. External power switch — OFF and disconnect external power (if used).

21. GEN 1 and GEN 2 switches — Confirm ON (reset if required).

22. BUS TIE switch — Confirm AUTO.

23. RAD MSTR switch — ON.

24. Clock — Set.

25. Rotor speed — Confirm 100%.

QUICK ENGINE START

This procedure may be carried out on BATTERY or External Power to speed up the Take Off.

1. BUS TIE switch — ON.
2. Rotor brake (if fitted) — Confirm OFF, ROTOR BRAKE ON advisory extinguished.
3. ENG 1 FUEL switch — ON - Fuel valve indicator vertical.
4. MFD display — Confirm PWR PLANT page.
5. FUEL PUMP 1 switch — ON - Check pressure.
6. ENG 2 FUEL switch — ON - Fuel valve indicator vertical.
7. FUEL PUMP 2 switch — ON - Check pressure.
8. ENG 1 MODE switch — FLT.
9. ENG 2 MODE switch — FLT when N°1 engine NG is above 25%.

CAUTION

Avoid operating the ENG MODE switches simultaneously.

10. Gas Producer (NG) — Note increasing and START legend displayed.
11. Engine temp.(ITT) — Note increasing and IGN legend displayed.
12. Engine oil pressure — Confirm rising.
13. Engine N°1 & N°2 starters — Disengaged by 49% NG.
14. Main hydraulic system — When the main rotor begins to rotate, confirm rise in main hydraulic pressure.
    — Confirm cyclic control centralized on PFD indicator.
15. N°1 & N°2 engine power turbine speed (NF) — Confirm stabilized at 100%.
16. Engine and transmission oil — Check pressures and temperatures within limits.
17. External power switch — OFF and disconnect external power (if used).
18. GEN 1 and GEN 2 switches — Confirm ON (reset if required).
19. BUS TIE switch — Confirm AUTO.
20. RAD MSTR switch — ON.
21. Clock — Set.
22. Rotor speed — Confirm 100%.
23. VENT switches — As required.

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SYSTEM CHECKS

1. MFD PWR PLANT page — Check all parameters within limits.
2. Main Hydraulic — Pressure and temperature within limits. Make small cyclic, collective and pedal movements and confirm hydraulic pressure drop not excessive.
   — Centralize cyclic control on PFD indicator.
3. Fuel XFEED switch — Select OPEN, confirm bar horizontal.
   — Select NORM, confirm bar vertical.
4. FUEL PUMP 1 — OFF. Note fall in fuel N°1 pressure, 1 FUEL PUMP caution displayed, automatic operation of cross feed valve (bar horizontal), FUEL XFEED advisory displayed on CAS and consequent increase of fuel N°1 pressure.
5. FUEL PUMP 1 — ON. 1 FUEL PUMP caution out, cross feed automatically closed (bar vertical) and FUEL XFEED advisory extinguishes.
6. FUEL PUMP 2 — OFF. Note fall in fuel N°2 pressure, 2 FUEL PUMP caution displayed, automatic operation of cross feed valve (bar horizontal), FUEL XFEED advisory displayed on CAS and consequent increase of fuel N°2 pressure.
7. FUEL PUMP 1 — OFF. Note fall in fuel N°1 pressure, 1 FUEL PUMP caution displayed, cross feed valve still open (bar horizontal), FUEL XFEED advisory still present. Confirm correct engine operation on engine driven suction pumps.
8. Fuel XFEED switch — Select CLOSED, confirm bar vertical, wait 15 seconds then confirm correct engine operation on engine 1 and 2.
   Select NORM, confirm bar horizontal.
9. FUEL PUMP 1 & 2 — ON. 1 & 2 FUEL PUMP caution out and cross feed automatically closed (bar vertical) FUEL XFEED advisory extinguishes.
10. OEI TNG switch — Check (if required).
11. MFD page — Select as required.
12. MCDU — Set COM and NAV as required.
13. FD panel — Check in SBY.

SYS CHECKS

14. TEST button on Autopilot controller (If more convenient this check may be carried out previously whilst A/C in IDLE mode)	— Press and follow instruction on MFD AFCS synoptic page. Confirm test completes successfully and no AP messages are displayed on Crew Alert System. — Reselect TEST button to return MFD to NORMAL.
15. ICS panels	— Set as required. Set BKUP volume as required.
16. AHRS, ADS and display reversion switches	— NORM.
17. LT panels	— Set as required.
18. CABIN LT panel	— Set as require.
19. COMPASS switches	— MAG.
20. RAD ALT	— Confirm zero altitude (±5 ft).
21. DH TEST button on remote instrument controller (If more convenient this check may be carried out previously whilst A/C in IDLE mode)	— Press, confirm RAD ALT 100ft (±10 ft) and 'TEST' message displayed, release, confirm zero altitude (±5 ft).
22. DH selector on remote instrument controller	— Set as required.
23. Altimeters: Pilot, Standby Copilot	— Set and check.
24. PITOT HEATER 1 & 2	— ON for indicated OAT of +4 °C or less.
25. POSITION light switch	— As required.
26. RPM switch	— Set 100%.
27. NR/NF	— Confirm stabilized at 100%.
28. LDG LT & LDG LT2	— As required.
29. PARK BRAKE	— OFF. Check no PARK BRK ON caution message.
30. Warning and Caution messages	— Check as required.

TAXIING

1.	AFCS	— As required.
2.	NOSE WHEEL lock	— Press to UNLK.
3.	Collective and cyclic	— Increase collective slowly then move the cyclic stick forward moderately to start movement.
4.	Pedal brakes	— Check operation.
5.	Pedal control	— As required to select direction.
6.	Collective and pedal brakes	— To reduce speed and stop, lower collective and apply pedal brakes.
7.	NOSE WHEEL lock	— For ground taxiing confirm: • Pedals centred • Cyclic centred • Collective down — Press UNLK.

Note

If the nose wheel is not aligned forward (UNLK caption flashing) it will self centre and lock as soon as the helicopter lifts off.

CAUTION

Do not use aft cyclic to slow the aircraft. The use of large cyclic displacements in conjunction with low collective can cause main rotor hub and cowling damage.

Note

Turning, whilst taxiing, should be carried out with collective at minimum pitch and cyclic central or as required to compensate for crosswind.

PRE TAKE-OFF CHECKS

1.	AFCS	— Confirmed engaged.
2.	MFD	— Select PWR PLANT page.
3.	PARK BRAKE handle	— Released.
4.	ENG MODE	— Confirm both to FLIGHT.
5.	ECL	— Confirm both to FLIGHT.
6.	TQ LIMiter pushbutton	— Push, if required, to enable TQ limiter function (TQ LIMITER ON advisory message).

CAUTION

With TQ LIMiter enabled the AEO engine total torque will be limited to a combined torque value of 228%TQ. OEI engine torque limit will remain at 160%TQ.

7.	CAS	— Clear/as required.

TAKE-OFF PROCEDURES

TAKE-OFF CATEGORY B PROCEDURE

1. Hover — Establish at 5 feet AGL. If possible avoid relative winds between 135° and 225° (quartering tail winds).
2. NOSE WHEEL steering — Confirm LOCK.
3. Power checks — Carry out as required in accordance with IN FLIGHT POWER CHECKS procedure in PERF section.
4. Engines/Rotor — Check TQ/ITT matching and NR 100%.
5. Warnings and cautions — Confirm none displayed.
6. MFD PWR PLANT page — Check all parameters within normal operating limits and confirm no engine matching abnormalities.
7. Flight controls — Check correct functioning.
8. Collective/Cyclic Control — Apply cyclic to commence a nose down attitude change of 7°. At approximately half way through the rotation apply collective to increase PI to 5% above the hover PI.
9. Acceleration and Climb — Accelerate forward and climb to achieve 50ft above take off surface at 50 KIAS, continue up to 80 KIAS.
10. Climb — At 80KIAS (Vy) adjust attitude to stabilize at Vy and climb smoothly.
11. Power limits — Observe PI limitations for Take Off power rating.
12. Landing gear — UP (by 200 ft AGL).
13. NR/NF — Confirm 100%.
14. After Take-Off checks — Complete.
15. Power — Adjust, as required, for cruise flight or continued climb.

CATEGORY A TAKE-OFF GENERAL

When Take-Off is carried out from the left hand seat the right hand pilot should monitor engine parameters.

CATEGORY A TAKE-OFF VERTICAL, SHORT FIELD AND BACK UP PROCEDURE

1. LDG LT & LDG LT2 switches — As required.
2. Rotor speed — Set 102% NR.
3. PARK BRAKE
    - Short Field T-O — Confirm released.
    - Vertical/Back Up T-O — Apply. Confirm PARK BRAKE ON advisory illuminated on CAS.
4. HEATER (if fitted) — Confirm SOV 1 & 2 switches selected to NORMAL. Select HTR switch to AUTO, note ITT increase on both engines, and HEATER ON advisory illuminates. Select HTR switch to OFF, note ITT decrease, on both engines, and HEATER ON advisory extinguished.
5. Power checks — Carry out as required in accordance with IN FLIGHT POWER CHECKS procedure in PERF section.
6. Pilot Altimeter — Set 0ft, or nearest 1000ft setting to T-O altitude, with collective at MPOG.
7. Hover — Establish a 5ft ATS hover.
8. Flight controls — Check correct functioning.
9. MFD PWR PLANT page — Check all parameters within normal operating limits.
10. Warnings and Cautions — Confirm none displayed.
11. PI/NR — Check PI's matched, NR 102%. Note PI value.
12. Collective/Cyclic Control — Increase PI by 23% above hover value (if 23% is not available, without exceeding Take Off PI, increase to 110%) in 2 seconds,
    - for **Vertical procedure** initiate a vertical climb to TDP while adjusting the pitch attitude to maintain position over the Take Off point.
    - for **Back Up procedure** initiate a rearwards climb to TDP while maintain view of the heliport/helideck.
13. Take-Off Decision Point (TDP) — At required TDP height rotate nose down to 10° attitude in 1 second. Maintain this attitude for 1 second then recover pitch

attitude to 0° to climb and accelerate to V_{TOSS} (40 KIAS). Maintain collective position.

14.Acceleration/Climb — When V_{TOSS} (40KIAS) is achieved adjust pitch attitude to approximately 5° nose up. Maintain collective position, continue climb and acceleration until V_y.

15.Climb — At V_y adjust attitude to stabilize speed. Continue climb.

16.Landing gear — UP (when reaching V_y but not below 200 ft ATS).

17.NR/NF — Select 100% at V_y.

18.After Take-Off checks — Complete.

19.Power — Adjust collective to continue climb at V_y, utilizing up to Take- Off power, as required, to 1000 ft ATS.

20.At 1000 ft (300 m) ATS — Adjust collective and cyclic to continue climb at V_y or accelerate to cruise speed as required.

21.HEATER — As required.

22.PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.

23.LDG LT & LDG LT2 switches — OFF (if used).

24.Pilot Altimeter — Set as required.

CATEGORY A TAKE-OFF CLEAR AREA PROCEDURE

1. LDG LT & LDG LT2 switches — As required.

2. Rotor speed — Set 102% NR.

3. HEATER (if fitted) — Confirm SOV 1 & 2 switches selected to NORMAL.
Select HTR switch to AUTO, note ITT increase on both engines, and HEATER ON advisory illuminates.
Select HTR switch to OFF, note ITT decrease, on both engines, and HEATER ON advisory extinguished.

4. Power checks — Carry out as required in accordance with IN FLIGHT POWER CHECKS procedure in PERF section.

5. Pilot Altimeter — Set 0 ft, or nearest 1000 ft setting to T-O altitude, with collective at MPOG.

5a.PARK BRAKE — Confirm released.

6. Hover — Establish a 5 ft AGL hover.

7. Flight controls — Check correct functioning.

8. MFD PWR PLANT page — Check all parameters within normal operating limits.

9. Warnings and Cautions — Confirm none displayed.

10.PI/NR — Check PI's matched, NR 102%. Note PI value.

11.Collective/Cyclic Control— Apply cyclic to commence a nose down attitude change to -5° and maintain. At approximately half way through the rotation apply collective to increase PI to 18% above hover value (if 18% is not available, without exceeding Take Off PI, increase to 110%).

12.Take-Off Decision Point (TDP) — At 30 ft AGL (TDP) continue acceleration Verify V_{TOSS} (50 KIAS) already achieved.

13.Acceleration/Climb — Adjust pitch attitude to approximately 5° nose up and continue climb up to 200 ft AGL.

14.Landing gear — UP (when reaching V_y but not below 200ft AGL)

15.NR/NF — Select 100% at V_y.

16.Power — Adjust collective to continue climb at V_y, utilizing up to Take- Off power, as required, to 1000 ft ATS.

17.After Take-Off checks — Complete.

18.At 1000 ft (300 m) ATS — Adjust collective and cyclic to continue climb at V_y or accelerate to cruise speed as required.

19.HEATER — As required.

20.LDG LT & LDG LT2 switches — OFF (if used).

21.Pilot Altimeter — Set as required.

CATEGORY A TAKE-OFF CONFINED AREA PROCEDURE

1. LDG LT & LDG LT2 switches — As required.

2. Rotor speed — Set 102% NR.

3. PARK BRAKE — Apply. Confirm PARK BRAKE ON advisory illuminated on CAS.

4. HEATER (if fitted) — Confirm SOV 1 & 2 switches selected to NORMAL.
Select HTR switch to AUTO, note ITT increase on both engines, and HEATER ON advisory illuminates.
Select HTR switch to OFF, note ITT decrease, on both engines, and HEATER ON advisory extinguished.

5. Power checks — Carry out as required in accordance with ENGINE POWER CHECKS procedure in PERF section.

6. Pilot Altimeter — Set 0 ft, or nearest 1000 ft setting to T-O altitude, with collective at MPOG.

7. Hover — Establish a 5 ft ATS hover.

8. Flight controls — Check correct functioning.

9. MFD PWR PLANT page — Check all parameters within normal operating limits.

10. Warnings and Cautions — Confirm none displayed.

11. PI/NR — Check PI's matched, NR 102 %. Note PI value.

12. Collective/Cyclic Control — Increase PI by 10 to 12% above hover value in 2 seconds to initiate a climb, immediately adjusting the attitude to allow slight backwards and left movement with 10 to 15 degrees of left yaw to establish the centre of the heliport in the chin window by 40 ft ATS. (Take Off carried out from left hand seat move right and yaw right)
After applying initial 10 to 12% PI, continuously and progressively increase PI to achieve the full 23% above hover PI by 40 ft
From 40 ft maintain a constant aspect of the heliport in the chin window until reaching TDP.

13. Take-Off Decision Point (TDP) — At required TDP height maintain collective position, recover the 10-15 degrees of yaw, rotate nose down to -10° attitude in 1 second. Maintain this attitude for 1 second then recover pitch attitude to 0° and maintain to accelerate to V_{TOSS} (40 KIAS). Maintain collective position.

Confined Area Standard Climb Technique:

14. Acceleration/Climb — When V_{TOSS} (40 KIAS) is achieved adjust pitch attitude to 5° nose up. Maintain collective position, continue climb and acceleration until V_y.

15. Climb — At V_y adjust attitude to stabilize speed. Continue climb.

16. Landing gear — UP (when reaching V_y but not below 200 ft ATS).

17. NR/NF — Select 100% at V_y.

18.Power — Adjust collective to continue climb at V_y, utilizing up to Take- Off power, as required, to 1000 ft ATS.

19.After Take-Off checks — Complete

20.Power — Adjust collective to continue climb at V_y, utilizing up to Take- Off power, as required, to 1000 ft ATS.

21.After Take-Off checks — Complete.

22.At 1000 ft (300 m) ATS — Adjust collective and cyclic to continue climb at V_y or accelerate to cruise speed as required.

23.HEATER — As required.

24.PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.

25.LDG LT & LDG LT2 switches — OFF (if used).

26.Pilot Altimeter — Set as required.

Confined Area Alternative Climb Technique:

14.Acceleration/Climb — When V_{TOSS} (40 KIAS) is achieved continue acceleration to 60 KIAS, adjust pitch attitude to 5° nose up. Maintain collective position.

15.Climb — At 60 KIAS adjust attitude to stabilize speed. Continue climb.

16.Landing gear — UP (when reaching 60 KIAS but not below 200 ft ATS)

17.Power — Adjust collective to continue climb at 60 KIAS, utilizing up to Take- Off power, as required, to 1000 ft ATS.

18.NR/NF — Select 100% at 1000 ft ATS

19.After Take-Off checks — Complete

20.At 1000 ft (300 m) ATS — Adjust collective and cyclic to achieve climb at V_y or accelerate to cruise speed as required.

21.HEATER — As required

22.PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.

23.LDG LT & LDG LT2 switches — OFF (if used)

24.Pilot Altimeter — Set as required

CATEGORY A TAKE-OFF OFFSHORE HELIDECK PROCEDURE

1. LDG LT & LDG LT2 switches	— As required.
2. Rotor speed	— Set 102% NR.
3. PARK BRAKE	— Apply. Confirm PARK BRAKE ON advisory illuminated on CAS.
4. HEATER (if fitted)	— Confirm SOV 1 & 2 switches selected to NORMAL. Select HTR switch to AUTO, note ITT increase on both engines, and HEATER ON advisory illuminates. Select HTR switch to OFF, note ITT decrease, on both engines, and HEATER ON advisory extinguished.
5. Power checks	— Carry out as required in accordance with ENGINE POWER CHECKS procedure in PERF section.
6. Pilot Altimeter	— Set 0 ft, or nearest 1000 ft setting to T-O altitude, with collective at MPOG.
7. Hover IGE	— Establish HIGE at 5 ft ATS and note hovering PI value. From chart on page 32 confirm HIGE PI value within limit and note corresponding Target PI value.
8. Flight controls	— Check correct functioning.
9. MFD PWR PLANT page	— Check all parameters within normal operating limits.
9A.Compass Controller	— Select DG.
10.Warnings and Cautions	— Confirm none displayed.
11.PI/NR	— Check PI's matched, NR 102%.
12.Hover	— Establish a hover where the aircraft is in the take-off attitude and the aircraft is held light on the main wheel(s) (nose wheel up) or a 1 to 2 ft hover if more practicable.
13.Collective/Cyclic Control	— Increase PI to Target PI value (from item 7), in 2 seconds, and initiate a vertical climb to TDP while adjusting the pitch attitude to maintain position over the center of helideck.
14.Take-Off Decision Point (TDP)	— PNF calls TDP, continue vertical climb above centre of helideck to 30 ft ATS.
15.Rotation	— At 30 ft height PNF calls 'ROTATE', rotate nose down to -10° attitude in 1 second. Maintain -10° attitude for 1 second then recover pitch attitude to 0°. Maintain attitude and accelerate to an airspeed of V_{TOSS} (40 KIAS). Maintain collective position.

Offshore Helideck Standard Climb Technique:

16.Acceleration/Climb — When V_{TOSS} (40KIAS) is achieved adjust pitch attitude to approximately 5° nose up. Maintain collective position, continue climb and acceleration until V_y.

17.Climb — At V_y adjust attitude to stabilize speed. Continue climb.

18.Landing gear — UP (when reaching V_y but not below 200 ft ATS).

19.NR/NF — Select 100% at V_y.

19A.Compass Controller — Select MAG.

20.After Take-Off checks — Complete.

21.Power — Adjust collective to continue climb at V_y, utilizing up to Take- Off power, as required, to 1000 ft ATS or cruise altitude if lower.

22.At 1000 ft (300 m) ATS or cruise altitude if lower — Adjust collective and cyclic to continue climb at V_y or accelerate to cruise speed as required.

23.HEATER — As required.

24.PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.

25.LDG LT & LDG LT2 switches — OFF (if used).

26.Pilot Altimeter — Set as required.

Offshore Helideck Alternative Climb Technique:

16.Acceleration/Climb — When V_{TOSS} (40KIAS) is achieved continue acceleration to 60 KIAS, adjust pitch attitude to approximately 5° nose up. Maintain collective position.

17.Climb — At 60 KIAS adjust attitude to stabilize speed. Continue climb.

18.Landing gear — UP (when reaching 60 KIAS but not below 200 ft ATS).

19.Power — Adjust collective to continue climb at 60 KIAS, utilizing up to Take- Off power, as required, to 1000 ft ATS or cruise altitude if lower.

20.NR/NF — Select 100% at 1000 ft ATS.

20A.Compass Controller — Select MAG.

21.After Take-Off checks — Complete.

22.At 1000 ft (300 m) ATS or cruise altitude if lower — Adjust collective and cyclic to estasblish climb at V_y or accelerate to cruise speed as required.

23.HEATER — As required.

24. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.

25. LDG LT & LDG LT2 switches — OFF (if used).

26. Pilot Altimeter — Set as required.

CAUTION

If the CAT A procedures are modified, it may not be possible, if an engine fails in the Take-Off path, to carry out a safe OEI landing or achieve the scheduled OEI performance.

CATEGORY A TAKE-OFF ENHANCED OFFSHORE HELIDECK PROCEDURE

1. V_{COSS} — Select V_{COSS} based on headwind component
2. LDG LT & LDG LT2 switches — As required.
3. Rotor speed — Set 102% NR
4. PARK BRAKE — Apply. Confirm PARK BRAKE ON advisory illuminated on CAS.
5. HEATER (if fitted) — Confirm SOV 1 & 2 switches selected to NORMAL.
   Select HTR switch to AUTO, note ITT increase on both engines, and HEATER ON advisory illuminates.
   Select HTR switch to OFF, note ITT decrease, on both engines, and HEATER ON advisory extinguished.
6. Power checks — Carry out as required in accordance with ENGINE POWER CHECKS procedure in PERF section.
7. Pilot Altimeter — Set 0 ft, or nearest 1000 ft setting to T-O altitude, with collective at MPOG.
8. Rad Alt — Check.
9. Flight controls — Check correct functioning.
10. MFD PWR PLANT page — Check all parameters within normal operating limits.
11. Compass controller — Select DG.
12. Warnings and Cautions — Clear/as required.
13. PI/NR — Check PI's matched, NR 102%.
14. Hover — Establish a 2 ft hover with the helicopter nose wheel between 1.5 and 4.0 m from the front edge of the helideck and note hovering PI.

15.Collective/Cyclic Control — Apply PI Delta value of 25% in 1-2 seconds, to climb vertically maintain hover position.

16.Take-Off Decision Point (TDP) — At 25 ft ATS rotate nose down to -10° to accelerate to 25 kts GS.

17.At 20 kts groundspeed — PNF calls ‘Approaching 25 kts’

18.At 25 kts groundspeed — Rotate nose up to +5° and accelerate to V_{TOSS} (40 KIAS)

19.Acceleration/Climb — When V_{TOSS} (40KIAS) is achieved continue acceleration to V_{COSS}. Maintain collective position.

20.Climb — At V_{COSS} adjust attitude to stabilize speed. Continue climb.

21.Landing gear — UP (when reaching V_{COSS} but not below 200 ft ATS)

22.Power — Adjust collective to continue climb at V_{COSS}, utilizing up to Take- Off power, as required, to 1000 ft ATS or cruise altitude if lower.

23.Compass controller — Select MAG

24.After Take-Off checks — Complete

25.At 1000 ft (300 m) ATS or cruise altitude if lower — Adjust collective and cyclic to estasblish climb at V_y or accelerate to cruise speed as required

26.NR/NF — Select 100% at V_Y.

27.HEATER — As required

28.PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.

29.LDG LT & LDG LT2 switches — OFF (if used)

30.Pilot Altimeter — Set as required

CAUTION

If this procedures is modified, it may not be possible, if an engine fails in the Take-Off path, to carry out a safe OEI landing or achieve the scheduled OEI performance.

SLOPING GROUND OPERATION

Note

1(2) WOW FAIL caution may illuminate spuriously during slope Take-Off or Landing procedure.

TAKE OFF PROCEDURE

1. PARK BRAKE applied.
2. Increase collective and move cyclic in a coordinated manner to achieve a lift off.
3. Establish hover above take off surface.
4. Release PARK BRAKE.
5. Take Off as required.

IN-FLIGHT PROCEDURES

AFTER TAKE-OFF

1. Landing gear — Confirm up.
2. LDG LT & LDG LT2 switches — Confirm OFF.
3. Engine parameters, temps and pressures — Normal, temperatures and pressures within limits.
4. LD-SH switch — As required; (TORQUE or TEMP) confirm parameters matched.

Note

The LD-SH switch allows the pilot to maintain engine TORQUE or ITT matched, as required.

5. TQ LIMiter pushbutton — As required.
6. CAS — Clear/as required.

Note

During flight below 1000 ft (300 m) AGL fly attentive.

7. MFD As required.

CLIMB CHECKS

1. VENT — As required.
2. Radios/Navigation — As required.
3. Autopilot mode — As required.

CRUISE CHECKS

1. Collective — Adjust as necessary to keep engine parameters within limits.
2. LD-SH switch — As required; (TORQUE or TEMP) confirm parameters matched.

Note

The LD-SH switch allows the pilot to maintain engine TORQUE or ITT matched, as required.

Note

If the engines are ITT limited on the PI indicator, and there is a large ITT mismatch, the PI matching can be restored by selecting LD-SH switch to TEMP.

3. FUEL — Every 30 minutes:
   Check quantity, XFEED closed or as required.

Note

If fuel consumption is greater than expected see Abnormal Fuel Consumption procedure MALFUNCTION / FUEL page 76.

4. Airspeed — Maintain within limits.

5. PITOT HEATER switches — ON for indicated OAT of +4°C or less.
6. Compass — Check all synchronized.
7. Radios/Navigation — As required.
8. Standby instrument — Check airspeed, altimeter and artificial horizon against primary flight display.
9. Autopilot modes — As required.
10. LDG LT & LDG LT2 switches — OFF, if used.
11. MFD — Every flight hour select PWR PLANT page and confirm no engine matching abnormalities.
    — Above 15000 ft (4560 m) the PWR PLANT page should be selected and the DC generator load monitored.

APPROACH AND LANDING

PRE-LANDING CHECKS

1. RPM switch — Confirm 100%.
2. NR/NF — Confirm 100%.
3. MFD — Select PWR PLANT page.
4. TQ LIMiter pushbutton — As required.
5. Landing gear lever — DOWN; three green lights on LDG control panel.

Note

For OAT of -30°C and below undercarriage extension time may double.

6. NOSEWHEEL steering — LOCK.
7. LDG LT & LDG LT2 switches — As required.
8. Temperatures and Pressures — Within limits.
9. Fuel — Quantity, XFEED closed unless required.
10. RAD ALT bug — As required.
11. Altimeters: Pilot, Standby, Copilot — Set.
12. PARK BRAKE handle — As required.
13. Cabin — Secure.
14. PITOT HEATER — As required.

Note

If an ILS approach is required select both NAV’s to the same frequency. On STBY instrument (ESIS) select NAV ON and set the course to the final ILS course.

Recommended airspeed:

Glideslopes up to 4 degrees	120 KIAS
Glideslopes between 4 and 7.5 degrees	100 KIAS

Note

When a Multi Band Mission Radio (if installed) is transmitting it may cause inteference to VOR, ILS, VHF and GPS systems.

Note

When descending below 150 ft AGL vocal message ‘ONE FIFTY FEET’ is activated regardless of the landing gear status. This message is suppressed if AWG switch is set to REGRADE or INHIBIT. See Note page 82.

LANDING

CATEGORY B LANDING PROCEDURE

1. Pre-landing checks	— Complete.
2. AWG switch	— NORMAL.
3. Landing direction	— If possible orientate the aircraft for an approach into the prevailing wind.
4. Initial point	— During the approach, reduce airspeed gradually to arrive at a position 200 ft above touchdown point with a rate of descent of no more than 500fpm. Initiate a deceleration to achieve 30 KIAS at 50 ft. At 50 ft rotate nose up to approximately 20° to decelerate.
5. Landing	— Continue the deceleration and descent to hover.
6. MFD PWR PLANT page	— In hover check all parameters within normal operating limits and confirm no engine matching abnormalities.
7. Touch down	— Maximum nose up attitude at touch down 15°. Apply wheel brakes, as required.
8. NOSE WHEEL lock	— For ground taxiing confirm: • Pedals centred • Cyclic centred • Collective down — Press UNLK.

CATEGORY A LANDING GENERAL

When Landing is carried out from the left hand seat the right hand pilot should monitor engine parameters.

CATEGORY A HELIPORT LANDING PROCEDURE

1. Landing direction	— If possible orientate the aircraft for an approach into the prevailing wind.
2. Pre-landing checks	— Complete.
3. AWG switch	— NORMAL.
4. LDG LT and LDG LT2 switches	— As required.
5. Pilot Altimeter	— Set QNH (landing surface elevation should be known).
6. HEATER (if used)	— Confirm SOV 1 & 2 switches selected to NORMAL. Select HTR switch to OFF, note ITT decrease and confirm HEATER ON advisory extinguished.
7. Rotor speed	— Set 102%.
8. PARK BRAKE	— Apply, PARK BRAKE ON advisory message illuminated on CAS.

9. Initial point — Establish an approach to pass through 200 ft ALS at a rate of descent of no more than 500fpm. Initiate deceleration to achieve LDP, (50 ft ALS) at 20 KIAS and rate of descent less than 350 ft/min. Heliport/Helideck in sight.
10. Landing — Continue the deceleration and descent to a HIGE. Maximum allowed GS at touchdown 5 kts.
11. PARK BRAKE — As required.
12. LDG LT & LDG LT2 switches — OFF, if used.

CATEGORY A CLEAR AREA LANDING PROCEDURE

1. Landing direction — If possible orientate the aircraft for an approach into the prevailing wind.
2. Pre-landing checks — Complete.
3. AWG switch — NORMAL.
4. LDG LT and LDG LT2 switches — As required.
5. Pilot Altimeter — Set QNH (landing surface elevation should be known).
6. HEATER (if used) — Confirm SOV 1 & 2 switches selected to NORMAL.
   Select HTR switch to OFF, note ITT decrease and confirm HEATER ON advisory extinguished.
7. Rotor speed — Set 102%.
8. PARK BRAKE — Confirm released.
9. Initial point — Establish an approach to pass through 200 ft ALS at a rate of descent of no more than 500 fpm. Initiate deceleration to achieve LDP, (50 ft ALS) at 50 KIAS and rate of descent less than 350 ft/min.
10. Landing — Continue the deceleration and descent to a HIGE.
11. PARK BRAKE — As required.
12. LDG LT & LDG LT2 switches — OFF, if used.

CATEGORY A CONFINED AREA LANDING PROCEDURE

For LDP 250 ft ALS and below:

1. Landing direction — If possible orientate the aircraft for an approach into the prevailing wind.
2. Pre-landing checks — Complete.

3. AWG — NORMAL.

4. LDG LT and LDG LT2 switches — As required.

5. Pilot Altimeter — Set QNH (landing surface elevation should be known).

6. HEATER (if used) — Confirm SOV 1 & 2 switches selected to NORMAL.
Select HTR switch to OFF, note ITT decrease and confirm HEATER ON advisory extinguished.

7. Rotor speed — Set 102%.

8. PARK BRAKE — Apply, PARK BRAKE ON advisory message illuminated on CAS.

9. Initial point — Establish an approach to pass through 350 ft ALS at a rate of descent of no more than 400 fpm and 30 kts groundspeed.

10.Aircraft position — Position helipad in bottom right part of windscreen with nose yawed left by approximately 15 degrees.
- When left hand pilot flying, helipad in bottom left part of windscreen and nose yawed right.

11.Descent — Progressively reduce airspeed and height to position helipad into centre of chin window at or just before reaching 250 ft ALS with 15 to 20 kts groundspeed.

12.Landing — Maintain constant flight path aspect to helipad using 400 to 500 fpm rate of descent passing through LDP and continue to a HIGE. Maximum allowed GS at touchdown 5 kts.

13.PARK BRAKE — As required.

14.LDG LT & LDG LT2 switches — OFF, if used.

CATEGORY A CONFINED AREA LANDING PROCEDURE

For LDP above 250 ft ALS:

1. Landing direction — If possible orientate the aircraft for an approach into the prevailing wind.

2. Pre-landing checks — Complete.

3. AWG — NORMAL.

4. LDG LT & LDG LT2 switches — As required.

5. Pilot Altimeter — Set QNH (landing surface elevation should be known).

6. HEATER (if used) — Confirm SOV 1 & 2 switches selected to NORMAL. Select HTR switch to OFF, note ITT decrease and confirm HEATER ON advisory extinguished.

7. Rotor speed — Set 102%.

8. PARK BRAKE — Apply, PARK BRAKE ON advisory message illuminated on CAS.

9. Initial point — Establish an approach to pass through LDP+100 ft ALS at a rate of descent of 400 to 500 fpm and 30 kts groundspeed.

10. Aircraft position — Position helipad in bottom right part of windscreen with nose yawed left by approximately 15 degrees.
    - When left hand pilot flying, helipad in bottom left part of windscreen and nose yawed right.

11. Descent — Progressively reduce airspeed and height to position helipad into centre of chin window at or just before reaching LDP with 15 to 20kts groundspeed.

12. Landing — Maintain constant flight path aspect to helipad using 400 to 500 fpm rate of descent passing through LDP and continue to a HIGE. Maximum allowed GS at touchdown 5 kts.

13. PARK BRAKE — As required.

14. LDG LT & LDG LT2 switches — OFF, if used.

CATEGORY A OFFSHORE LEVEL APPROACH HELIDECK LANDING PROCEDURE

1. Landing direction — If possible orientate the aircraft for an approach into the prevailing wind.

2. Pre-landing checks — Complete.

3. AWG — NORMAL.

4. LDG LT & LDG LT2 switches — As required.

5. Pilot Altimeter — Set QNH (landing surface elevation should be known).

6. HEATER (if used) — Confirm SOV 1 & 2 switches selected to NORMAL. Select HTR switch to OFF, note ITT decrease and confirm HEATER ON advisory extinguished.

7. Rotor speed — Set 102%.

8. PARK BRAKE — Apply, PARK BRAKE ON advisory message illuminated on CAS.

8A.Compass Controller — Select DG.

9. Initial point — Establish an approach to pass through 200 ft ALS at 80 KIAS and a rate of descent of no more than 500 fpm.

10.Approach — Progressively reduce speed and height to achieve LDP at 15 kts GS and 40 ft ALS and approach into wind with the helideck to the side of the PF. Maintain the rotor tip path plane outboard, but close to the edge of the helideck and the aircraft center line paralell to the edge of the helideck.

11.LDP — Maintain 15 kts groundspeed and 40 ft ALS level, the LDP is achieved when the aircraft is at an angle of approximately 45° from the center of the landing point.

12.Landing — From the 45° position fly the aircraft forwards, sideways and downwards towards the landing point, decreasing collective slightly. When descending through 30 ft ALS reduce nose up attitude to maximum 10°. Continue to a hover over the helideck.

13.Touchdown — When over the landing position descend vertically and use collective to cushion touchdown and touch down with 30° to 45° heading offset, if wind speed is less than 10 kts. If wind speed is greater than 10 kts maintain heading with respect to the heading at LDP. Do not exceed 20 kts crosswind. Maximum allowed GS at touchdown 5 kts.

14.PARK BRAKE — As required.

15.LDG LT & LDG LT2 switches — OFF, if used.

CATEGORY A OFFSHORE DESCENDING APPROACH HELIDECK LANDING PROCEDURE

1. Landing direction — If possible orientate the aircraft for an approach into the prevailing wind.

2. Pre-landing checks — Complete.

3. AWG — NORMAL.

4. LDG LT & LDG LT2 switches — As required.

5. Pilot Altimeter — Set QNH (landing surface elevation should be known).

6. HEATER (if used) — Confirm SOV 1 & 2 switches selected to NORMAL.
Select HTR switch to OFF, note ITT decrease and confirm HEATER ON advisory extinguished.

7. Rotor speed — Set 102%

8. PARK BRAKE — Apply, PARK BRAKE ON advisory message illuminated on CAS.

8A.Compass Controller — Select DG.

9. Initial point — Establish an approach to pass through 400 ft ALS at 50 KIAS and a rate of descent of 500 fpm or less. Position the helideck in the bottom right hand of windscreen

10.Approach — Progressively reduce speed and height to achieve LDP at 15 kts GS, 50 ft ALS and 200 fpm ROD, approach into wind. Maintain the flight path to keep the helideck in the bottom right of screen and rotor tip path plane outboard, but close to the edge of the helideck.

11.LDP — The LDP is positioned with the aircraft approximately 45° from the centre of the helideck viewed through the lower part of the windscreen.

12.Landing — When passing LDP fly directly to landing position and reduce ROD and speed to achieve HIGE over landing position, with the helideck centre moving progressively from the lower part of the windscreen and through the chin window.

13.Touchdown — When over the landing position descend vertically and use collective to cushion touchdown. Do not exceed 20 kts crosswind. Maximum allowed GS at touchdown 5kts.

14.PARK BRAKE — As required.

15.LDG LT & LDG LT2 switches — OFF, if used.

CAUTION

If the CAT A procedures are modified, it may not be possible, if an engine fails in the landing path, to carry out a safe OEI landing or achieve the scheduled OEI performance.

SLOPING GROUND OPERATION

Note

1(2) WOW FAIL caution may illuminate spuriously during slope Take-Off or Landing procedure.

LANDING PROCEDURE

1. Establish hover above landing area.
2. PARK BRAKE applied, (PARK BRAKE ON advisory message on CAS).
3. Lower collective to commence vertical descent.

When the wheels contact the ground:

4. Move cyclic and collective in a coordinated manner to achieve the cyclic centralized as the collective reaches MPOG.
5. If taxiing required release PARK BRAKE.

POST LANDING AND SHUTDOWN PROCEDURES

POST LANDING CHECKS

1. AFCS — As required.
2. LDG LT & LDG LT2 switches — OFF (if used).
3. Position lights — OFF (if used).

PRE-SHUTDOWN CHECKS

1. PARK BRAKE handle — Pull and turn handle, PARK BRK PRESS caution illuminates, press pedals until caution extinguishes and PARK BRK ON advisory illuminates.
2. NOSE WHEEL — Push to LOCK, if required.
3. Collective lever — MPOG.
4. Cyclic stick — Centralized on PFD cyclic indicator.
5. Pedals — Centered.
6. AFCS — Confirm disengaged.
7. Avionics — As required.
8. PITOT HEATER switches — OFF (if used).
9. External Power — If required, carry out EXTERNAL POWER connection procedure.

ENGINES AND ROTOR SHUTDOWN

When it is intended to shutdown engines and rotor, carried out the following procedure:

1. ENG 1 & 2 MODE switches — Set to IDLE.

Note

A period of 60 seconds stabilization at IDLE is recommended.

2. BUS TIE switch — ON (for night operations).
3. Fuel PUMP 1 & 2 switches — OFF.
4. ENG 1 & 2 MODE switches — OFF.

CAUTION

During shut down note that:
- NG speed decelerates freely without abnormal noise or rapid run down
- ITT does not rise abnormally.

5. Rotor brake (if fitted) — At 40% NR select rotor brake lever to BRAKE position, ROTOR BRAKE ON advisory illuminates. Confirm no abnormal pressure messages illuminate on brake monitor panel, When rotor stopped move lever to OFF.

6. ENG 1 and 2 FUEL valve — OFF. 1 & 2 FUEL PUMP caution messages. (Fuel valve indicator bar horizontal).

7. Fuel XFEED switch — CLOSED (indicator bar vertical).

8. Cockpit lights — OFF.

9. BUS TIE switch — Confirm AUTO.

10. ANTI-COL lights — OFF.

CAUTION

Prior to switching electrical power OFF ensure engine NG values are at 0%.

11. BATTERY MASTER and GENerators — OFF.

12. BATTERY MAIN and AUX — OFF.

POST SHUTDOWN CHECKS

Before leaving the aircraft:

— If the helicopter is to be parked for prolonged periods (greater than 1 hour) the wheels should be chocked.

— If the helicopter is to be parked on sloping ground the wheels should be chocked as soon as possible.

— If the helicopter is to remain outside with an OAT at or below -20°C both Main and Auxiliary batteries should be removed and stored in a heated room.

— If parking with rotor brake required, cycle rotor brake lever (if fitted) from PUMPING LIMIT mark to BRAKE position as necessary to increase pressure to at least 40 BAR, on digital readout, and leave in BRAKE detent.

CAUTION

Up to 8 hours of parking pressure are guaranteed before re-pressurization of the system.

FLIGHT DIRECTOR COUPLED AND UNCOUPLED OPERATIONS

CAUTION

• Whenever the FD is coupled and the AP reverts to SAS or has a complete loss of autostabilization, the FD will revert to uncoupled mode.
• When the AP reverts to SAS no UCPL caption will appear on the PFD.

COLLECTIVE PI LIMITING FUNCTION (4 AXIS FD SYSTEM ONLY)

During collective coupled operation the collective movement is limited by the following PI values:

— Maximum 97% AEO (95% at altitudes above 10000 ft (3050 m) Hp)

— Maximum 106% AEO for airspeed less than 60 KIAS (5 MIN message displayed beside collective cue)

— Maximum 140% OEI

— Minimum 5% AEO

— Minimum 10% OEI.

CAUTION

If PI limiting is active with ALT/RHT engaged and the reference height cannot be maintained the aural warning “Altitude Altitude” will warn the pilot when the maximum allowed deviation from the reference height has been exceeded.

When flying at high altitude (above 15000 ft (4580 m)) select the Load Share switch to TORQUE (MISC panel) to improve the helicopter manoeuvre during automatic turns.

SAFETY FLY-UP FUNCTIONALITY WHEN FD MODES ENGAGED
(Enhance FD with EPIC Software Phase 5, or later).

The following table gives the Safety Height Rad Alt limits and Ultimate Fly-Up Limit for the different collective modes:

Hold Mode	**Applicable Range**	**Safety Height (ft AGL)**	**Ultimate Fly - Up Limit (ft AGL)**
VS	All conditions	150 ft	150 ft
ALTA	All conditions	150 ft	150 ft
ALT	Airspeed less than 55 KIAS or HOV	35 ft	35 ft
	All other conditions	150 ft	150 ft
MOT	All conditions	Variable *	35 ft

Hold Mode	Applicable Range	Safety Height (ft AGL)	Ultimate Fly - Up Limit (ft AGL)
RHT	Airspeed less than 55 KIAS, HOV or MOT-DCL or TDH-Pitch	Variable *	15 ft
	All other conditions		75 ft
TDH	All conditions	Variable *	35 ft
TD	All conditions	Variable *	75 ft
VPTH	All conditions	Variable *	150 ft
Phase 8 and later and when Custom approach with Level Segment enabled in option file.			
APP (VRT)	All conditions	Variable	75 ft

* Safety Height = Rad Alt Reference - (7+1/8xRad Alt Reference)

When the collective is automatically driven up, it is normally limited by the PI limiting function. Should the relevant MUH limits be exceeded the PI limits will be moved up as follows:

— Maximum 121% AEO for airspeeds below 60 KIAS

— Maximum 176% OEI for airspeeds below 60 KIAS

— Maximum 110% AEO for airspeeds above 60 KIAS

— Maximum 160% OEI for airspeeds above 60 KIAS.

CAUTION

When voice message “Altitude Altitude” is triggered with a **HTLM** message then the aircraft has descended below the safety height. Ensure separation from terrain visually or, if not possible, establish a positive rate of climb to a safe height.

CAUTION

(Applicable only for Phase 5 or 6)

When descending over terrain, with collective mode engaged and after a continous descent of at least 2500 ft, at approximately 2500 ft Rad Alt height, the Fly Up safety function may erroneously intervene and increase PI to above the MCP level. This condition should be controlled manually with the collective to maintain the PI within the MCP limits until the HTML message on the PFD extinguishes.

SPECIFIC MODE INFORMATION

ALT Barometric Altitude Hold Mode.

CAUTION

In ALT mode the voice message “Altitude Altitude” is triggered when altitude exceeds the refererence altitude by ±150 ft.

Note

ALT mode can be engaged with HOV mode, (as an alternative to the RHT mode).

ALTA Altitude Acquire Mode.

Note

For EPIC Software Phase 5, or later, when engaging ALTA while climbing with a rate of climb greater than 1500 fpm or descending with a rate of descent greater than 1500 fpm, the system may erroneously transition to ALT. The aircraft will, however, reach the selected final altitude.

APP 1) VOR/ILS Approach FD functions.

Note

To avoid false localizer captures, APP mode should be armed when the helicopter is flying inbound to the ILS radial.

2) FMS approach function (VGP).

CAUTION

During steep approach without automatic collective control be attentive not to use less than 5% PI.

BC Back Course Approach Mode.(APP on SAR Guidance Controller).

CAUTION

The course selected for a BC approach must be the ILS approach front course.

ALVL Autolevel Mode.

CAUTION

In VGP mode the ALVL will activate if the MAP (Missed Approach Point) is lower than 150 ft AGL.
For Phase 5, 6 & 7:
When MAP is higher than 150 ft (46 m) AGL the VGP mode will disengage at the MAP and a chime is generated (preceded, at 100 ft (30 m) above, by a Vertical Track Alert (VTA) caption displayed above the vertical guidance scale on the PFD).
For Phase 8 and later:
When MAP is higher than 150 ft (46 m) AGL the VGP mode will disengage at the MAP and a chime is generated (preceded, at 200 ft (60 m) above, by a Vertical Track Alert (VTA) caption displayed above the vertical guidance scale on the PFD).

RHT Radar Height Hold Mode.

CAUTION

In RHT mode the voice message “Altitude Altitude” is triggered when height exceeds the refererence by a value proportional to the reference height.

HOV Hover/velocity Hold Mode (Enhanced FD system Only).

CAUTION

For FD system not installed with EPIC Software Phase 5, or later, in ALT mode the voice message “Altitude Altitude” is triggered when altitude exceeds the refererence altitude by ±150 ft. Therefore, if ALT mode is engaged as an alternative to RHT, at a height below 300 ft, set DH at a value 10 ft below the reference height in order to have an additional height deviation exceedance cue.

CAUTION

The HOV mode maintains a groundspeed reference therefore pilot must ensure that crosswind and rearwind speed limits are not exceeded. If wind limits are exceeded directional control may not be maintained.

CAUTION

When HOV mode is engaged above 2000 ft AGL the ALT mode does not automatically engage. Therefore the pilot must control collective manually or engage ALT mode.

TD
TD/H
MOT Transition Down, Transition Down to Hover, Mark On Target (Enhanced FD Phase 5, or later, with SAR Modes only).

CAUTION

With Phase 7 S/W Release-00110/00111/00112 installed, when airspeed is above 60 KIAS, pressing the IAS button or cyclic FTR button while THD is engaged will engage IAS mode on the pitch axis, and subsequently the TDH mode on the collective axis will disengage. After pressing the IAS button or cyclic FTR button during TDH operation, confirm the flight director mode engagement status in all axes.

Note

When TD, TDH or MOT modes are selected the CAS caution and audio message ‘LANDING GEAR’ is inhibited.

FMS OPERATION NORMAL PROCEDURES

GENERAL

For Complete information about FMS operations, refer to the latest issue of Honeywell AW139 FMS Pilot's Guide that applies to the installed Primus Epic Software Release.

BASIC OPERATIONS

PRE-DEPARTURE OPERATIONS

At the power-up of the system, NAV IDENT page is presented on MCDU. Basic pre departure operations are:

- Initialize the position by pressing POS INIT key and loading present position (right keys on POSITION INIT page)
- Press FLT PLAN key (6R) to prompt ACTIVE FLT PLAN page and recall or create a FPL
- Press FPL key and activate the flight plan
- Press PERF pushbutton, enter performance data and confirm (CONFIRM INIT key)
- If required select and activate arrival and departure
- If required insert ALTERNATE data and waypoints
- If required press PATTERNS key (on NAV page) to select and activate holdings, flyovers and other patterns.

Note

Above procedures may be monitored on PLAN page of MCDU.

IN FLIGHT OPERATIONS

General

ACTIVE FLT PLAN page 1 and PROGRESS page 1 are considered the primary pages of the FMS during flight.

Once activated on the ground, the flight plan may be:

- flown directly by the pilot monitoring MAP page on MFD and LNAV/VNAV (VPATH) presentation on PFD
- flown coupled to FD, LNAV only, once LNAV is presented on PFD and FD is engaged.

Departure, climb and cruise

— Set altitude selector at the reference altitude cleared by ATC.

— Monitor leg sequencing on MFD (MAP page) and on the MCDU display.

Descent.

— Check/activate, if required, approach on destination airport and alternate airport on the flight plan.

— Set altitude selector at the reference altitude cleared by ATC.

— Start descent, once cleared by ATC, at TOD (Top Of Descent) mark using the rate of descent indicated on MCDU display.

A VPATH will be shown during a descent if:

- ....a vertical constraint is entered or,
- ....an approach is activated.

VPATH vertical indicator is presented on the PFD in the same spot and with the same layout as the Glideslope indicator. During PRV operation both vertical indicators are concurrently presented, VPATH pointer is presented on the right of the vertical deviation scale and Glideslope on the left. Within the pointers there will be a letter I for ILS or V for VPATH.

WARNING

VPATH indication does not provide obstacle clearance. During VFR flight it is the pilot’s responsibility to ensure that the aircraft flight path will be clear of obstacles.

— Monitor leg sequencing on MFD (MAP page) and on the MCDU display.

Approach

— Check published approach plate.

— Set altitude selector to the MDA (ASEL).

— Set DH.

— Intercepting VPATH, engage IAS and fly the vertical pointer with the collective.

WARNING

VPATH indication does not provide obstacle clearance unless normal IFR or VFR separation methods are used, for example:
— when under ATC control
— when flying a published approach
— when flying above normal route MSA.

During VFR flight it is the pilot’s responsibility to ensure that the aircraft flight path will be clear of obstacles.

CAUTION

When the vertical profile includes two consecutive slopes with different angles, a discontinuity in the vertical indicator may be shown at the transition.

Note

If an ILS approach is selected flying a FMS flight plan, PRV mode must be armed and ILS course set.

- Monitor leg sequencing on MFD (MAP page) and on the MCDU display.
- At MDA/DH take over manually for landing.
- If a missed approach is required press the GA button to activate the Missed Approach sequencing.

AUTOPILOT COUPLED OPERATIONS WITH FLIGHT DIRECTOR

To couple FMS lateral navigation (LNAV) to Flight Director, pilot must:

- Select, on the PFD's, HIS, FMS1 or FMS2 (by pressing LNAV on DICP)
- Press the NAV key on the Flight Director Guidance Controller
- Engaging the FD to the FMS.

Engaging the FD to the FMS:

Course arrow and FMS 1/2 source indicator on PFD's HSI will turn magenta (from cyan);

- Active leg on MAP page will turn magenta (from cyan).

Note

Vertical Navigation (VNAV) cannot be coupled to FD.

Note

ASEL does not capture ALT reference. It can be used only for visual reference. Altitude selector does not influence the vertical navigation but must be initially activated to have NAV vertical presentation.

FMS ADVISORY ANNUNCIATORS

a) Message (MSG)

MSG is displayed on the PFD (first line below PI indicator). This annunciator is displayed when an alert message is shown in the MCDU scratchpad. The annunciator is removed after the message has been cleared from the scratchpad.

b) Offset (OFST)

OFST is an advisory (**green**) annunciator on the PFD (along side waypoint identifier). The annunciator is displayed when a lateral offset has been entered on the PROGRESS 3 page. The annunciator is removed or turned off when the offset is removed.

c) Approach (APP)

APP is an advisory (green) annunciator on the PFD (along side waypoint identifier). The annunciator indicates the FMS is in the approach mode of operation.

In this mode, the HSI deviation sensitivity and FMS tracking gains are increased. The approach annunciator is displayed if ALL of the following conditions are valid:

- The FMS is the selected aircraft navigation source on PFD
- A non-precision instrument approach has been activated from the navigation database
- If no approach, or an ILS, LOC, LOC--BC, LDA approach is selected, the APP annunciator does not light
- The aircraft position is between 2 NM outside the final approach fix (FAF) and the missed approach point (MAP)
- The DGR annunciator must not be present.

d) RNP Digital Readout (RNP X.X NM)

The RNP digital readout is displayed on the PFD display when-ever the FMS is selected as Navigation Source (unless replaced by LPV identifier when in terminal area, see Supplement 80 if applicable). The RNP display indicates that 2 dots deflection in Lateral Deviation/ Pointer display within the HSI. The RNP digital readout is cyan when selected FMS is not coupled to the Flight Director, magenta when coupled to the Flight Director, amber when the Total System Error is greater than RNP.

ADVISORY/STATUS MESSAGE DEFINITIONS

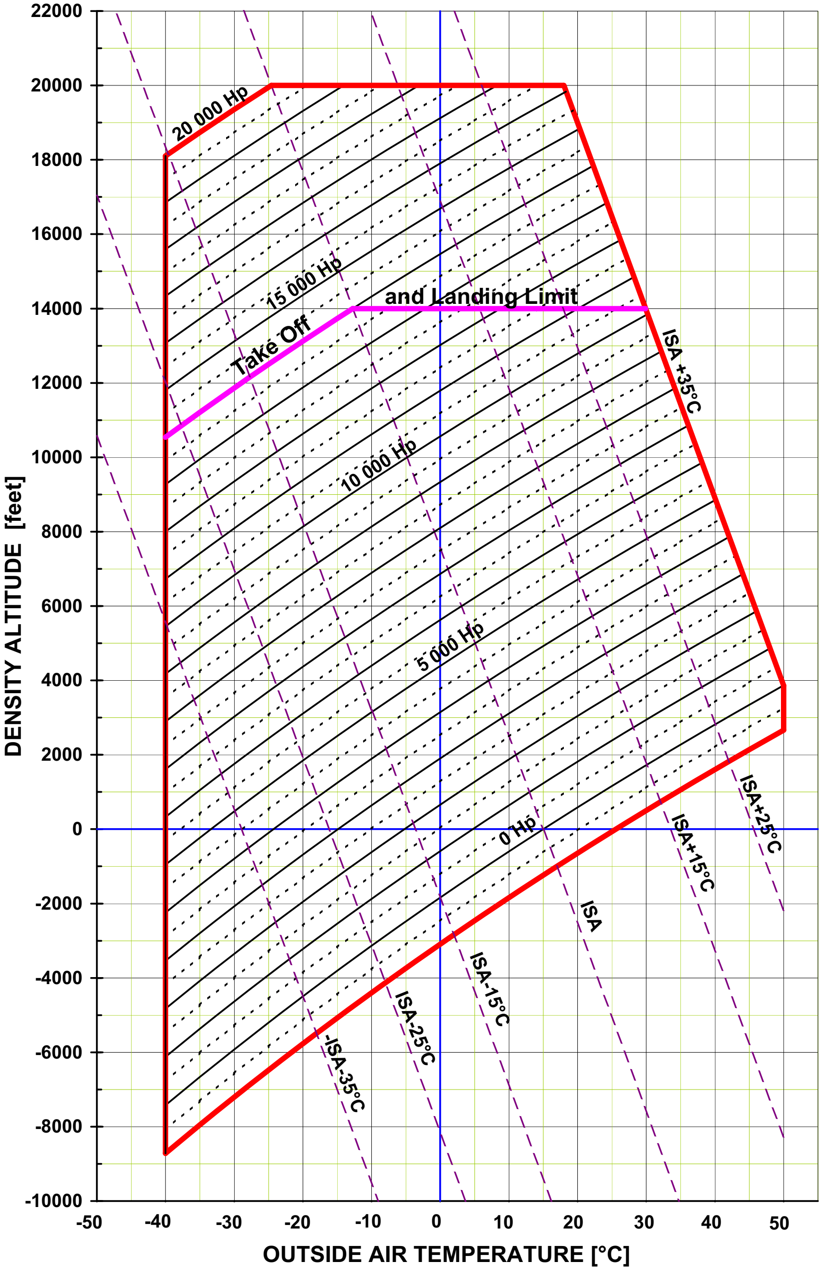
CAS Caption (Green)	System State
AIR COND ON	Air conditioning system switched ON
AFT VENT ON	Cabin fan switched ON
CLTV/YAW OFF	Collective yaw coupling OFF
EXT PWR READY	External power connected
EXT PWR ON	External power ON
FORCE TRIM OFF	Cyclic force trim switched OFF
FUEL XFEED	Fuel cross feed open
FWD VENT	Forward vent fan ON
HEATER ON	Heater switched ON
LANDING LT ON (or LANDING LT RH ON when EPIC Phase 7 installed)	LDG LT switched ON
LDG EMER DOWN	Landing gear lowered using emergency down system
PARK BRK ON	Park brake ON
1(2) PITOT HEAT ON	Pitot heating ON
ROTOR BRAKE ON	Rotor brake lever selected to PARK
SEARCH LT ON (or LANDING LH ON when EPIC PHase 7 installed)	LDG LT2 switched ON
TQ LIMITER ON	Engine torque limiter ON
DCL NOT INSTALLED	(Caption present for 5secs) DCL button pressed and function not fitted
ALTA NOT INSTALLED	(Caption present for 5secs) ALTA button pressed and function not fitted
RHT NOT INSTALLED	(Caption present for 5secs) RHT button pressed and function not fitted
HOV NOT INSTALLED	(Caption present for 5secs) HOV button pressed and function not fitted
MOT NOT INSTALLED	(Caption present for 5secs) MOT button pressed and function not fitted
TD/H NOT INSTALLED	(Caption present for 5secs) TD/H button pressed and function not fitted
VNAV NOT INSTALLED	(Caption present for 5secs) VNAV button pressed and function not fitted
WTR NOT INSTALLED	(Caption present for 5secs) HOV button pressed and function not fitted
SVS NOT INSTALLED	(Caption present for 5secs) SVS button pressed and function not fitted
CVS NOT INSTALLED	(Caption present for 5secs) CVS button pressed and function not fitted

CAS Caption (White)	System State
MAINTENANCE	(Caption only active on ground) Informs that a new Maintenance message is present in the maintenance log. No pilot action.

CAS Caption (White)	System State
NOSE FAN 1(2) OFF	(Caption only active on ground) Informs crew that associated nose bay vent fan has failed. No pilot action.
150 FT AURAL INHIBIT	Informs crew that the AWG switch is set to REGRADE or INHIBIT. **Note** Caption only active for aircraft modified with kit P/N 4G2350F01511.
1(2)(3)(4) DU DB OLD	(Caption only active on ground) Informs crew that one or more Databases loaded on affected display is outdated.

PERFORMANCE

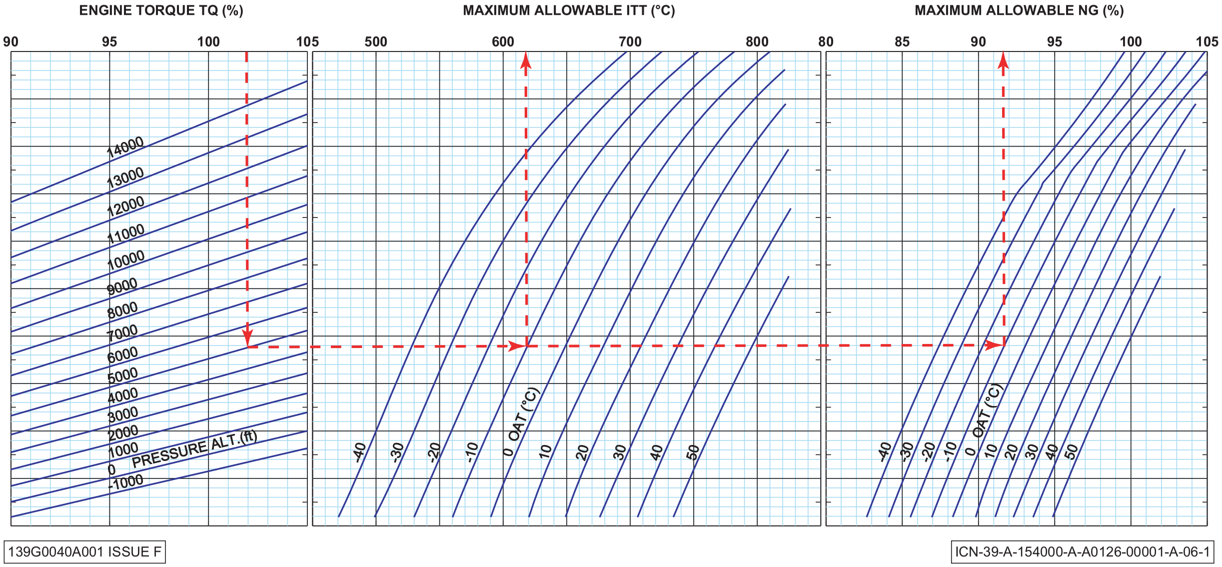
DENSITY ALTITUDE CHART



PWC\PT6C-67C HOVER POWER ASSURANCE CHART 100%NR

POWER ASSURANCE CHECK in HOVER FLIGHT (NR=100%)

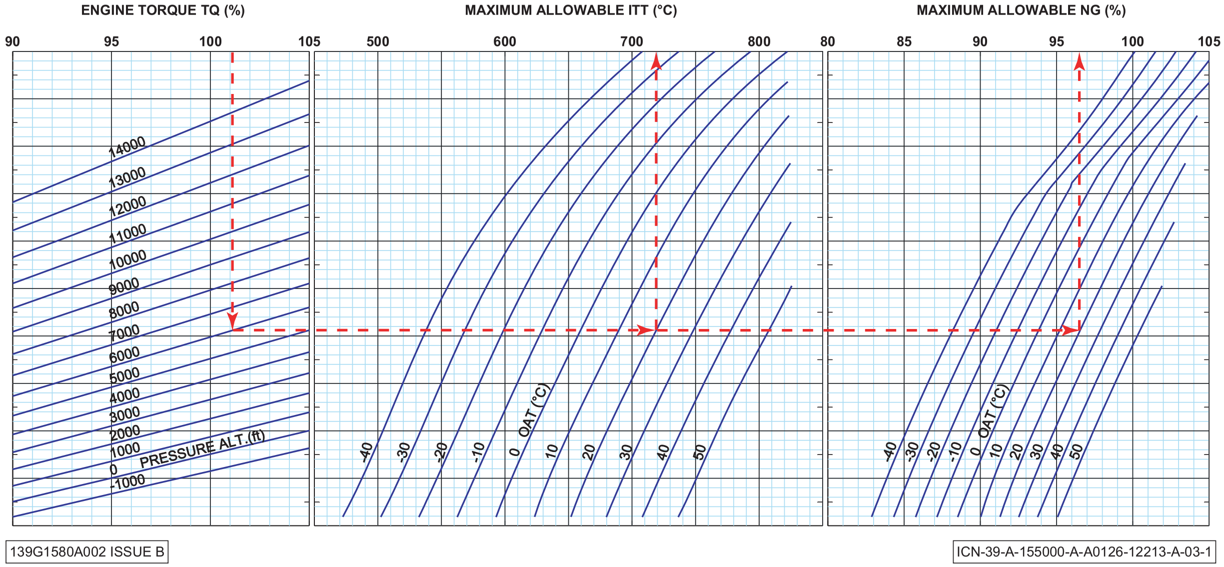
HEATER/COND OFF
GENERATOR LOAD TO MINIMUM (BELOW 17%)
SET NR to 100%
TEST ENGINE MODE SWITCH: FLIGHT
OTHER ENGINE MODE SWITCH: IDLE
INCREASE COLLECTIVE UNTIL LIGHT ON WHEELS OR HOVERING AT 5 FEET, NOSE ON WIND. DO NOT EXCEED 775°C ITT OR 102.4% NG OR 105% TQ
STABILIZE POWER 1 MINUTE, THEN RECORD OAT, PRESSURE ALTITUDE, ENGINE TORQUE, ITT AND NG
ENTER CHART AT INDICATED TQ, MOVE DOWN TO INTERSECT PRESSURE ALTITUDE, PROCEED TO THE RIGHT TO INTERSECT OAT, THEN MOVE UP TO READ VALUES FOR MAXIMUM ALLOWABLE ITT AND NG
IF INDICATED ITT OR NG EXCEEDS MAXIMUM ALLOWABLE, REPEAT CHECK
REPEAT CHECK USING OTHER ENGINE
IF EITHER ENGINE EXCEEDS ALLOWABLE ITT OR NG, PUBLISHED PERFORMANCE MAY NOT BE ACHIEVABLE. REFER TO EMM



PWC\PT6C-67C HOVER POWER ASSURANCE CHART 102%NR

POWER ASSURANCE CHECK in HOVER FLIGHT (NR=102%)

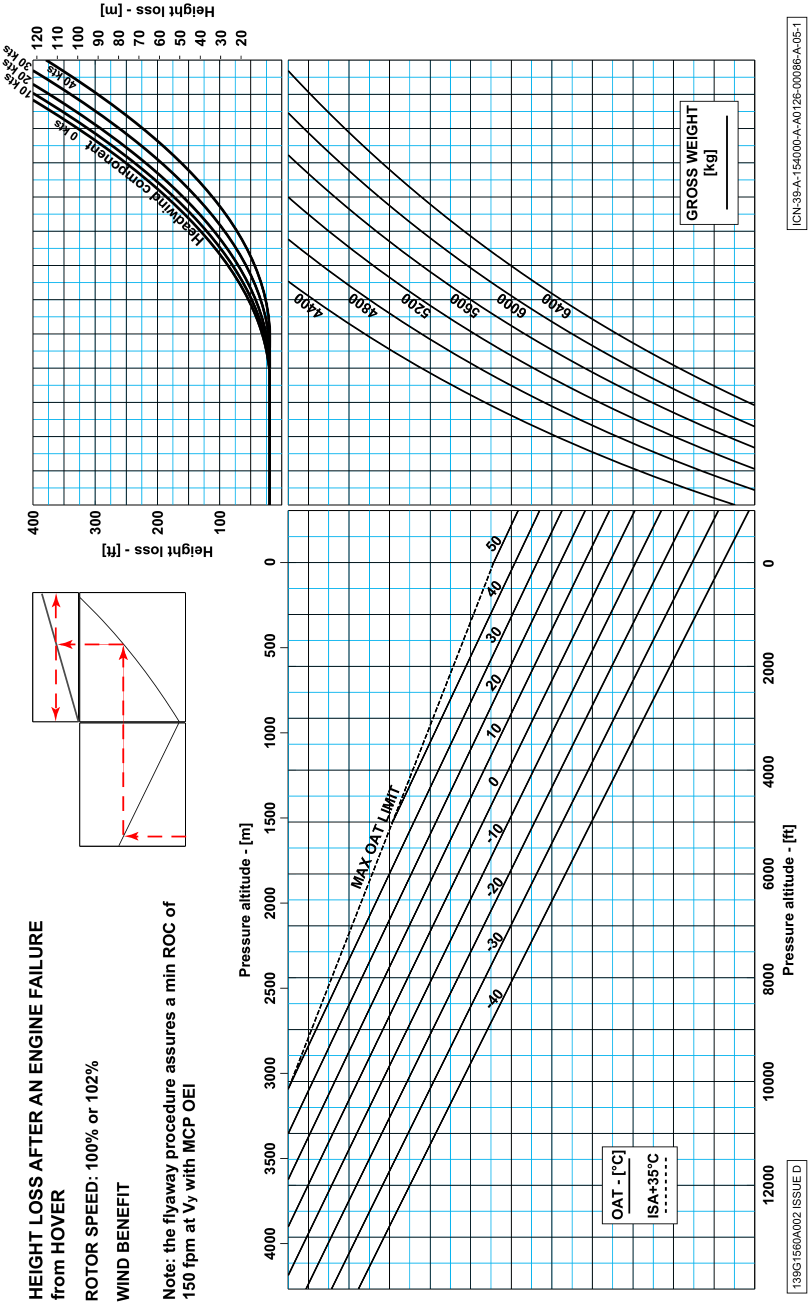
HEATER/COND OFF
GENERATOR LOAD TO MINIMUM (BELOW 17%)
SET NR to 102%
TEST ENGINE MODE SWITCH: FLIGHT
OTHER ENGINE MODE SWITCH: IDLE
INCREASE COLLECTIVE UNTIL LIGHT ON WHEELS OR HOVERING AT 5 FEET, NOSE ON WIND. DO NOT EXCEED 775°C ITT OR 102.4% NG OR 105% TQ
STABILIZE POWER 1 MINUTE, THEN RECORD OAT, PRESSURE ALTITUDE, ENGINE TORQUE, ITT AND NG
ENTER CHART AT INDICATED TQ, MOVE DOWN TO INTERSECT PRESSURE ALTITUDE, PROCEED TO THE RIGHT TO INTERSECT OAT, THEN MOVE UP TO READ VALUES FOR MAXIMUM ALLOWABLE ITT AND NG
IF INDICATED ITT OR NG EXCEEDS MAXIMUM ALLOWABLE, REPEAT CHECK
REPEAT CHECK USING OTHER ENGINE
IF EITHER ENGINE EXCEEDS ALLOWABLE ITT OR NG, PUBLISHED PERFORMANCE MAY NOT BE ACHIEVABLE. REFER TO EMM



Hd PAV
FLYAWAY

HEIGHT LOSS DURING FLYAWAY MANOEUVRE

(See Single Engine Failure in Hover Flyaway Procedure Emerg-Malfunc page 18)



HEIGHT LOSS AFTER AN ENGINE FAILURE from HOVER

ROTOR SPEED: 100% or 102%

WIND BENEFIT

Note: the flyaway procedure assures a min ROC of 150 fpm at Vy with MCP OEI

HOVER CEILING

OAT	-40°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
IGE Hover ceiling TOP AEO						
Weight 5000 kg						
ft Hp	>18000	>18000	>18000	>18000	>18000	14200
Weight 5500 kg						
(ft Hp)	>18000	>18000	>18000	16300	15200	14000
Weight 6000 kg						
(ft Hp)	>18000	17500	17000	15000	13500	11000
Weight 6400 kg						
(ft Hp)	17800	15700	15300	13000	11500	9000
IGE Hover ceiling MCP AEO						
Weight 5000 kg						
ft Hp	>18000	>18000	>18000	>18000	15200	14200
Weight 5500 kg						
(ft Hp)	>18000	>18000	>18000	16000	14000	10500
Weight 6000 kg						
(ft Hp)	>18000	16400	16000	13000	11000	6000
Weight 6400 kg						
(ft Hp)	16900	14800	14000	11300	8300	1000
IGE Hover ceiling 2.5 min OEI						
Weight 5000 kg						
ft Hp	13300	11500	10000	8000	6500	4700
Weight 5500 kg						
(ft Hp)	11000	9000	7000	5000	3000	1000
Weight 6000 kg						
(ft Hp)	9000	7000	4200	2000	100	—
Weight 6400 kg						
(ft Hp)	4000	1500	—	—	—	—
IGE Hover ceiling MCP OEI						
Weight 5000 kg						
ft Hp	12000	11000	7700	5000	1450	—
Weight 5500 kg						
(ft Hp)	9000	8000	4400	1000	—	—
Weight 6000 to 6400 kg						
(ft Hp)	—	—	—	—	—	—

OAT	-40°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
OGE Hover ceiling TOP AEO						
Weight 5000 kg						
ft Hp	>18000	>18000	>18000	16300	14800	12800
Weight 5500 kg						
(ft Hp)	18000	16000	16000	13500	11800	9500
Weight 6000 kg						
(ft Hp)	16000	14000	13000	10800	9000	6000
Weight 6400 kg						
(ft Hp)	12000	10000	8000	6100	5100	3000
OGE Hover ceiling MCP AEO						
Weight 5000 kg						
ft Hp	>18000	17700	17000	14500	12300	7500
Weight 5500 kg						
(ft Hp)	17000	15000	14000	11500	8500	1000
Weight 6000 kg						
(ft Hp)	12000	10000	8000	6000	4500	—
Weight 6400 kg						
(ft Hp)	6000	3700	100	—	—	—
OGE Hover ceiling 2.5 min OEI						
Weight 5000 kg						
ft Hp	9800	7700	5250	3000	1350	—
Weight 5500 kg						
(ft Hp)	5000	2500	—	—	—	—
Weight 6000 to 6400 kg						
(ft Hp)	—	—	—	—	—	—
OGE Hover ceiling MCP OEI						
Weight 5000 kg						
ft Hp	4000	2000	—	—	—	—
Weight 5500 kg						
(ft Hp)	—	—	—	—	—	—
Weight 6000 to 6400 kg						
(ft Hp)	—	—	—	—	—	—

RATE OF CLIMB AT 6400 KG AEO

OAT	-40°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
ROC @ TOP AEO						
Altitude 2000 ft						
ft/min	2100	2100	2100	2100	2100	2100
Altitude 5000 ft						
ft/min	2100	2100	2100	2100	2100	2000
Altitude 10000 ft						
ft/min	2100	2100	2000	2000	1700	1400
Altitude 15000 ft						
ft/min	2000	1600	1500	1100	800	400
ROC @ MCP AEO						
Altitude 2000 ft						
ft/min	1800	1800	1800	1800	1800	1200
Altitude 5000 ft						
ft/min	1800	1800	1800	1800	1700	1100
Altitude 10000 ft						
ft/min	1800	1700	1700	1600	1200	800
Altitude 15000 ft						
ft/min	1600	1400	1300	800	400	—

RATE OF CLIMB AT 6400 KG OEI

OAT	-40°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
ROC @ 2.5min OEI						
Altitude 2000 ft						
ft/min	1100	1100	1100	1000	900	700
Altitude 5000 ft						
ft/min	1100	1100	1000	800	600	400
Altitude 10000 ft						
ft/min	900	700	500	300	100	—
Altitude 15000 ft						
ft/min	200	—	—	—	—	—
ROC @ MCP OEI						
Altitude 2000 ft						
ft/min	700	700	700	600	400	100
Altitude 5000 ft						
ft/min	700	700	700	400	200	—
Altitude 10000 ft						
ft/min	700	500	300	—	—	—
Altitude 15000 ft						
ft/min	—	—	—	—	—	—

FUEL CONSUMPTION AT 6400 KG

OAT	-40°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
2000ft @ 90 KIAS						
kg/hr (lb/hr)	320 (705)	327 (720)	336 (740)	339 (748)	342 (753)	345 (761)
2000ft @ 120 KIAS						
kg/hr (lb/hr)	348 (768)	355 (783)	368 (812)	377 (832)	383 (842)	390 (861)
2000ft @ 150 KIAS						
kg/hr (lb/hr)	413 (910)	427 (942)	457 (1007)	474 (1045)	485 (1070)	—
4000ft @ 90 KIAS						
kg/hr (lb/hr)	310 (682)	315 (695)	322 (709)	326 (719)	331 (730)	336 (741)
4000ft @ 120 KIAS						
kg/hr (lb/hr)	338 (744)	344 (758)	361 (795)	371 (817)	379 (869)	388 (854)
4000ft @ 150 KIAS						
kg/hr (lb/hr)	408 (899)	424 (934)	458 (1009)	477 (1052)	—	—
8000ft @ 90 KIAS						
kg/hr (lb/hr)	289 (636)	293 (647)	303 (669)	311 (686)	318 (701)	324 (715)
8000ft @ 120 KIAS						
kg/hr (lb/hr)	321 (708)	335 (738)	352 (776)	367 (808)	383 (844)	401 (883)
8000ft @ 150 KIAS						
kg/hr (lb/hr)	417 (919)	446 (982)	480 (1059)	—	—	—
12000ft @ 90 KIAS						
kg/hr (lb/hr)	274 (603)	286 (630)	294 (647)	306 (674)	317 (699)	337 (744)
12000ft @ 120 KIAS						
kg/hr (lb/hr)	323 (712)	351 (774)	374 (825)	407 (897)	—	—
12000ft @ 150 KIAS						
kg/hr (lb/hr)	468 (1032)	—	—	—	—	—

HOVER CEILING 6800 KG (IF APPLICABLE)

OAT	-30°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
IGE Hover ceiling TOP AEO						
			Weight 6800 kg			
ft Hp	>8000	>8000	>8000	—	—	—
IGE Hover ceiling MCP AEO						
			Weight 6800 kg			
ft Hp	>8000	>8000	>8000	—	—	—
OGE Hover ceiling TOP AEO						
			Weight 6800 kg			
ft Hp	5600	4500	1500	—	—	—
OGE Hover ceiling MCP AEO						
			Weight 6800 kg			
(ft Hp)	—	—	—	—	—	—

RATE OF CLIMB AT 6800 KG AEO (IF APPLICABLE)

OAT	-30°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
ROC @ TOP AEO						
			Altitude 2000 ft			
ft/min	1920	1920	1920	1920	1920	1850
			Altitude 5000 ft			
ft/min	1920	1920	1900	1880	1860	1650
			Altitude 8000 ft			
ft/min	1920	1900	1850	—	—	—
ROC @ MCP AEO						
			Altitude 2000 ft			
ft/min	1600	1600	1600	1600	1500	1060
			Altitude 5000 ft			
ft/min	1600	1600	1780	1560	1460	950
			Altitude 8000 ft			
ft/min	1600	1600	1520	—	—	—

RATE OF CLIMB AT 6800 KG OEI (IF APPLICABLE)

OAT	-30°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
ROC @ 2.5min OEI						
			Altitude 2000 ft			
ft/min	950	950	950	900	700	520
			Altitude 5000 ft			
ft/min	950	950	800	620	450	300
			Altitude 8000 ft			
ft/min	860	740	500	—	—	—

OAT	-30°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
ROC @ MCP OEI						
Altitude 2000 ft						
ft/min	620	620	600	520	300	10
Altitude 5000 ft						
ft/min	620	620	550	310	110	-120
Altitude 8000 ft						
ft/min	600	530	300	—	—	—

FUEL CONSUMPTION AT 6800 KG (IF APPLICABLE)

OAT	-20°C	0°C	ISA	ISA+15	ISA+25	ISA+35
2000ft @ 90 KIAS						
kg/hr (lb/hr)	336 (740)	336 (740)	340 (750)	348 (767)	353 (778)	358 (789)
2000ft @ 120 KIAS						
kg/hr (lb/hr)	360 (794)	366 (740)	373 (822)	386 (851)	395 (871)	400 (882)
2000ft @ 150 KIAS						
kg/hr (lb/hr)	428 (943)	456 (1005)	467 (1030)	480 (1058)	492 (1085)	—
4000ft @ 90 KIAS						
kg/hr (lb/hr)	320 (706)	330 (728)	333 (734)	338 (745)	344 (758	349 (769)
4000ft @ 120 KIAS						
kg/hr (lb/hr)	350 (772)	362 (791)	368 (811)	380 (838)	392 (864)	402 (886)
4000ft @ 150 KIAS						
kg/hr (lb/hr)	436 (961)	462 (1019)	472 (1041)	490 (1080)	—	—
8000ft @ 90 KIAS						
kg/hr (lb/hr)	303 (668)	315 (695)	315 (695)	—	—	—
8000ft @ 120 KIAS						
kg/hr (lb/hr)	346 (763)	370 (816)	370 (816)	—	—	—
8000ft @ 150 KIAS						
kg/hr (lb/hr)	468 (1032)	480 (1058)	480 (1058)	—	—	—

HOVER CEILING 7000 KG (IF APPLICABLE)

OAT	-30°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
IGE Hover ceiling TOP AEO						
ft Hp	>6000	>6000	>6000	—	—	—
IGE Hover ceiling MCP AEO						
ft Hp	>6000	>6000	>6000	—	—	—

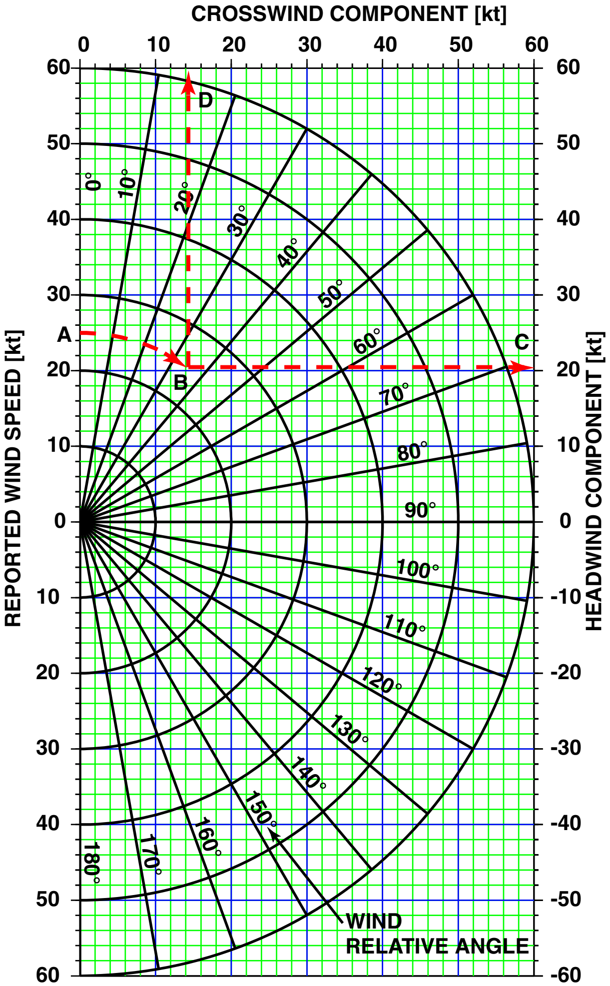
RATE OF CLIMB AT 7000 KG AEO (IF APPLICABLE)

OAT	-30°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
ROC @ TOP AEO						
Altitude 2000 ft						
ft/min	1840	1840	1840	1840	1800	1740
Altitude 6000 ft						
ft/min	1840	1840	1760	1740	1720	1440
ROC @ MCP AEO						
Altitude 2000 ft						
ft/min	1520	1520	1510	1500	1400	960
Altitude 6000 ft						
ft/min	1510	1510	1470	1440	1240	780

RATE OF CLIMB AT 7000 KG OEI (IF APPLICABLE)

OAT	-30°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
ROC @ 2.5min OEI						
Altitude 2000 ft						
ft/min	870	870	870	770	610	440
Altitude 6000 ft						
ft/min	870	870	620	420	270	120
ROC @ MCP OEI						
Altitude 2000 ft						
ft/min	550	550	550	440	220	—
Altitude 6000 ft						
ft/min	550	550	400	150	—	—

WIND COMPONENT CHART



139G0040A001 issue A

39-A-159000-A-A126-00035-A-01-1

AW139

QUICK REFERENCE HANDBOOK

ISSUE 2 : 10 11 2010
Rev. 31 : 19 11 2024

Source Document :
RFM Document No. 139G0290X002
ISSUE 2 : 10-11-2010 - Rev. See Record of Revisions

AW139 and AB139 are two names for the same product.

They identify two batches of aircraft manufactured in conformity with a unique Type Certificate Data Sheet

- AB139 up to SN 31054;

- AW139 from SN 31055 onward.

Where not specifically declared, the content of this document is applicable to both AW139 and AB139 helicopters.

Continuing airworthiness criteria for the AW139 is developed and maintained by Agusta, who is the holder of the type certificate in the state of design.

TOC, REC
of REVS

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TABLE OF CONTENTS

QRH GENERAL INFORMATION

CONTENT. The QRH consists of 4 sections which have been grouped into two parts. The first part combines Limitations, Normal Procedures and Performance Data. The second part contains Emergency/Malfunction Procedures. The two parts are mounted back-to-back to allow quick access to either.

The various sections/systems are colour tabbed for ease and quickness of locating the page required.

A Index of Content is included at the start of each of the two parts.

FLIGHT MANUAL. The QRH does not replace the RFM, however, all information contained in the QRH is based on the RFM. To operate the aircraft safely and efficiently, the RFM must be read and thoroughly understood.

If any conflict should exist between this QRH and the Approved RFM the RFM shall take precedence.

QRH Limitations: The limitations have been copied from the RFM, however any limitations that are covered by colour markings on the PFD/MFD (e.g engine limits, rotor limits) have not been included.

QRH Normal Procedures: The normal procedures have been copied from the RFM, CAT A and CAT B procedures have been included.

QRH Performance: The performance data includes only the Power Assurance Charts and, in tabulated data format, Hover Ceiling, Rate Of Climb and Fuel Consumption.

QRH Emergency and Malfunction Procedure: The procedures have been copied from the RFM and grouped into systems. The systems are then highlighted with RED tabs for Emergency Procedures, AMBER tabs for Malfunction Procedures, which have been placed in alphabetical order.

Additionally a table of Warning and Caution messages and the appropriate page number for the procedure is included at the start of each section (Emergency/Malfunction) to aid in rapid location of the correct page.

Optional Equipment: This QRH only carries selected information from a small selection of the Optional Supplement kits that are available. The information supplied in this QRH for these kits is mainly Limitations and if appropriate Emergency and Malfunction Procedures. The table below lists the Supplements that are included in the QRH.
The Supplements marked with a *1 the Limitations, Normal procedure and Emergency/Malfunction procedures, where appropriate, are presented alongside the basic information.
The Supplements marked with a *2 dedicated sections are included for Limitations and Emergency and Malfunction Procedures, where applicable. See Table of Contents.
Performance information is not included and reference must be made to the appropriate RFM Supplement. It is the responsibility of the pilot to ensure he knows which of these Optional Supplements are installed on the aircraft and be familiar with the operation of the kits

TABLE OF SUPPLEMENTS

Supplement No.	Name of equipment	P/N
1^{*1}	Rotor Brake	3G6351F00113
2^{*1}	Forced Ventilation Kit, Heating Kit, Forced Ventilation and Heating Kit, Air Conditioning System	3G2121F00111 3G2140F00112, 3G2141F00114, 3G2150F00114
12^{*1}	Category A Operations	-
34^{*1}	4 Axis Enhanced Flight Director (EPIC Phase 4)	3G2210F00211
50^{*2}	Increased Gross Weight 6800kg	-
51^{*2}	Take Off and Landing Altitude Extension (9 Passenger Seat Configuration)	-
67^{*1}	4 Axis Enhanced Flight Director (EPIC S/W Phase 5, 6, & 7)	4G2210F00411
68^{*1}	EPIC S/W Phase 5,6 & 7 Additional Functions	-
69^{*1}	4 Axis Enhanced FD with SAR Modes (EPIC S/W Phase 5, 6, & 7)	4G2210F00111
71^{*2}	Ice Protection System Flight in Icing Conditions	4G3000F00211
76^{*2}	LIPS	4G3000F00111
77^{*2}	Goodrich Landing Gear	4G3200F00111 4G3200F00112 4G3200F00113
80^{*2}	RNP Operations (EPIC Phase 7)	-
90^{*2}	Weight Extension 7000 kg	-
97^{*1}	CAT A Enhanced Offshore Procedure	-

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Record of Revisions

REVISION No.	Date	Basis of Revision	Notes
Issue 2	10-11-2010	AW139-RFM-4D Issue 2	-
Rev. 1	20-12-2010	AW139-RFM-4D Issue 2 Rev. 1	-
Rev. 2	05-12-2011	AW139-RFM-4D Issue 2 Rev. 2	-
Rev. 3	18-07-2012	AW139-RFM-4D Issue 2 Rev. 3	-
Rev. 4	06-12-2012	AW139-RFM-4D Issue 2 Rev. 4	-
Rev. 5	25-02-2013	AW139-RFM-4D Issue 2 Rev. 5	-
Rev. 6	05-04-2013	AW139-RFM-4D Issue 2 Rev. 6	-
Rev. 7	05-09-2013	AW139-RFM-4D Issue 2 Rev. 7	-
Rev. 8 and 9	07-03-2014	AW139-RFM-4D Issue 2 Rev. 9	-
Rev. 10	26-06-2014	AW139-RFM-4D Issue 2 Rev. 10	-
Rev. 11	26-11-2014	AW139-RFM-4D Issue 2 Rev. 11	-
Rev. 12 and 13	03-03-2015	AW139-RFM-4D Issue 2 Rev. 13	-
Rev. 14, 15 and 16	27-10-2015	AW139-RFM-4D Issue 2 Rev. 16	-
Rev. 17 and 18	31-05-2016	AW139-RFM-4D Issue 2 Rev. 18	-
Rev. 19 and 20	24-11-2016	AW139-RFM-4D Issue 2 Rev. 20	-
Rev. 21	20-09-2017	AW139-RFM-4D Issue 2 Rev. 21	-
Rev. 22	19-10-2017	AW139-RFM-4D Issue 2 Rev. 22	-
Rev. 23	01-08-2018	AW139-RFM-4D Issue 2 Rev. 23	-
Rev. 24 and 25	02-03-2020	AW139-RFM-4D Issue 2 Rev. 25	-
Rev. 26	29-07-2020	AW139-RFM-4D Issue 2 Rev. 26	-
Rev. 27 and 28	28-10-2022	AW139-RFM-4D Issue 2 Rev. 28	-
Rev. 29, 30 and 31	19-11-2024	AW139-RFM-4D Issue 2 Rev. 31	-

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Note

For revisions of the RFM which do not affect the QRH no revision of the QRH is carried out.

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49	31

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51	25
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52A	26
52B	25
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52F	25
53	25
54	21
55	2
56	0
57	6
58	0
59	4
60	5
61	9
62	31
63	7
64	10
65	5
66 and 67	0
68	22
69	10
70	0
71 and 72	3
72A	31
72B	3
73	3
74 thru 76	0
77 thru 79	3
80	0
81	26
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IPS1	11
IPS2	0
IPS3 and IPS4	11
IPS4A and IPS4B	11
IPS5 thru IPS8	5
IPS9 and IPS10	9
IPS10A and IPS10B	9
IPS11 and IPS12	5
IPS13	23
IPS14	5
LIPS1 thru LIPS10	6
89 and 90	2
91	0
92	25
93	31
94	25
95	0
96	2
97	25
98	10
99 and 100	26
100A and 100B	26
101	26
102	25
103 and 104	0
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109 thru 111	4
112	21
113	4
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114A and 114B	31
115 and 116	4
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120	4

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