

AW139



QUICK REFERENCE HANDBOOK

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AW139 and AB139 are two names of the same product.

They identify two batches of aircraft manufactured in conformity with a unique Type Certificate Data Sheet

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.



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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: The QRH includes Limitations, Procedures and Emergency Malfunction Procedures on a small number of Optional Equipment Supplements that may be applicable to the aircraft. The RFM must be consulted for comprehensive information and applicability of the Limitations, Normal Procedures etc. for the Optional Equipment Supplements that are included on the aircraft.

**Record of Revisions**

REVISION No.	Date	Basis of Revision	Notes
Issue 1	15-09-2006	AW139-RFM-4D Issue 1	-
Rev. 1	14-12-2006	AW139-RFM-4D Issue 1 Rev. 1	-
Rev. 2	11-05-2007	AW139-RFM-4D Issue 1 Rev. 2	-
Rev. 3	18-06-2007	AW139-RFM-4D Issue 1 Rev. 3	-
Rev. 4	30-07-2007	AW139-RFM-4D Issue 1 Rev. 4	-
Rev. 5	19-10-2007	AW139-RFM-4D Issue 1 Rev. 5	-
Rev. 6 and 7	06-12-2007	AW139-RFM-4D Issue 1 Rev. 6 and 7	-
Rev. 8	01-02-2008	AW139-RFM-4D Issue 1 Rev. 8	-
Rev. 9	28-02-2008	AW139-RFM-4D Issue 1 Rev. 9	-
Rev. 10	06-08-2008	AW139-RFM-4D Issue 1 Rev. 10	-
Rev. 11, 12 and 13	18-12-2008	AW139-RFM-4D Issue 1 Rev. 11, 12 and 13	-
Rev. 14 and 15	15-05-2009	AW139-RFM-4D Issue 1 Rev. 14 and 15	-
Rev. 16 and 17	28-09-2009	AW139-RFM-4D Issue 1 Rev. 16 and 17	-
Rev. 18 and 19	19-02-2010	AW139-RFM-4D Issue 1 Rev. 18 and 19	-
Rev. 20	04-06-2010	AW139-RFM-4D Issue 1 Rev. 20	-
Rev. 21	09-08-2010	AW139-RFM-4D Issue 1 Rev. 21	-

Note

For revisions of the RFM which do not affect the QRH no revision of the QRH is carried out.

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(*) Yellow pages, T.C. only

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Record of
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L I M I T S	GENERAL, TYPE OF OPER, MIN CREW, WEIGHT, CG LIMITATIONS	GEN WT/CG
	SPEED, ALTITUDE, TEMP LIMITATIONS	SPD ALT TEMP
	H-V, CAT A/B LIMITATIONS	H-V CAT A/B
	ENGINE, FUEL, LUBRICANTS, HYDRAULICS LIMITATIONS	ENG FUEL LUB HYD
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N O R M A L P R O C E D U R E S	GENERAL, FLIGHT PLANNING, EXTERNAL CHECKS	EXTN CHECKS
	PRE-START CHECKS	PRE START
	ABORTED ENGINE START DRY MOTORING PROCEDURE	ABORT DRY MOT
	ENGINE START PROCEDURE	ENG START
	SYSTEM CHECKS	SYS CHECKS
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	ADVISORY CAPTIONS, PDF MESSAGES	CAPTS MSGs
P E R F	DENSITY ALTITUDE, POWER ASSUR FLYAWAY HEIGHT LOSS	Hd PAV FLYAWAY
	HOVER CEILING, ROC, FUEL CONSUMPTION	HVR ROC FL CONS

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 recommended.

"**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.

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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: Heater, Rotor Brake, Flight Director, CATEGORY A, Increased Gross Weight 6800 kg and Take Off and Landing Altitude Extension.

TYPES OF OPERATION

In the basic configuration the rotorcraft is approved CAT B and CAT A operations for Day/Night VFR and Day/Night IFR operations.

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

GEN
WT/CG

CENTER OF GRAVITY

Longitudinal limits See Figure 1-1

Lateral limits See Figure 1-2

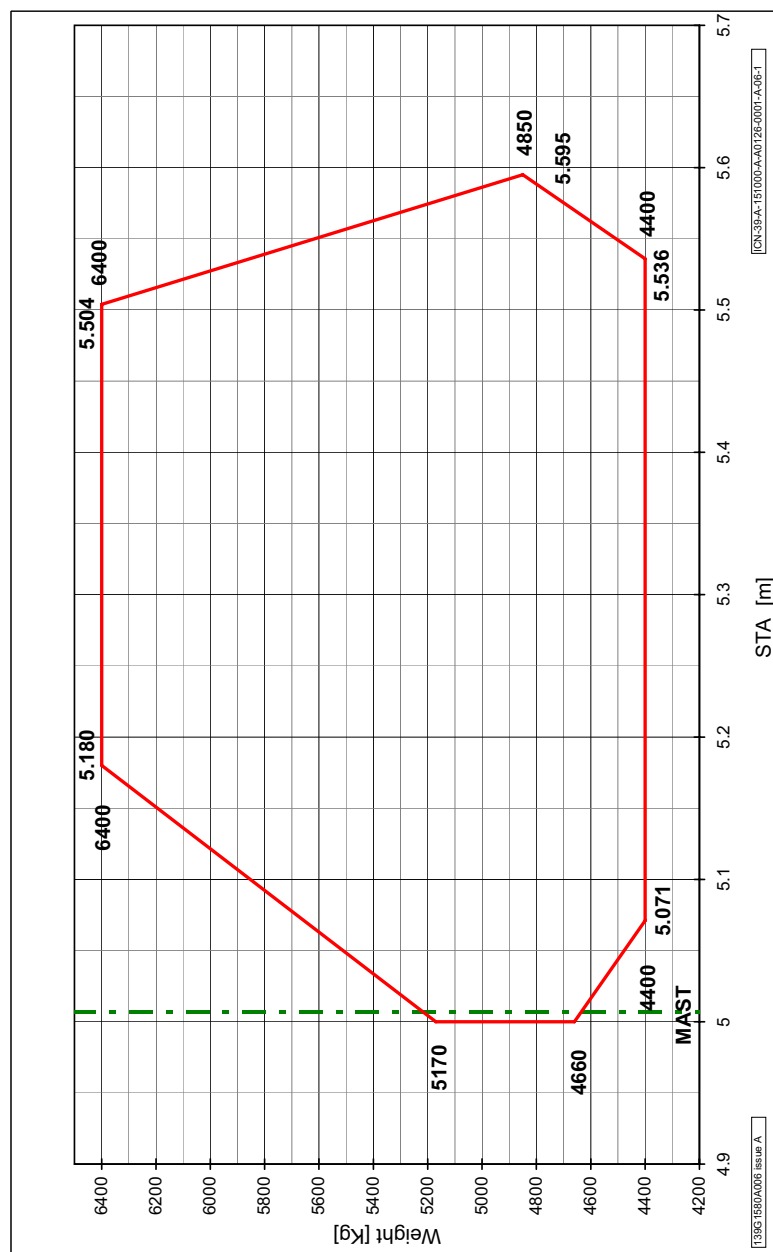


Figure 1-1 Weight and Longitudinal CG Envelope

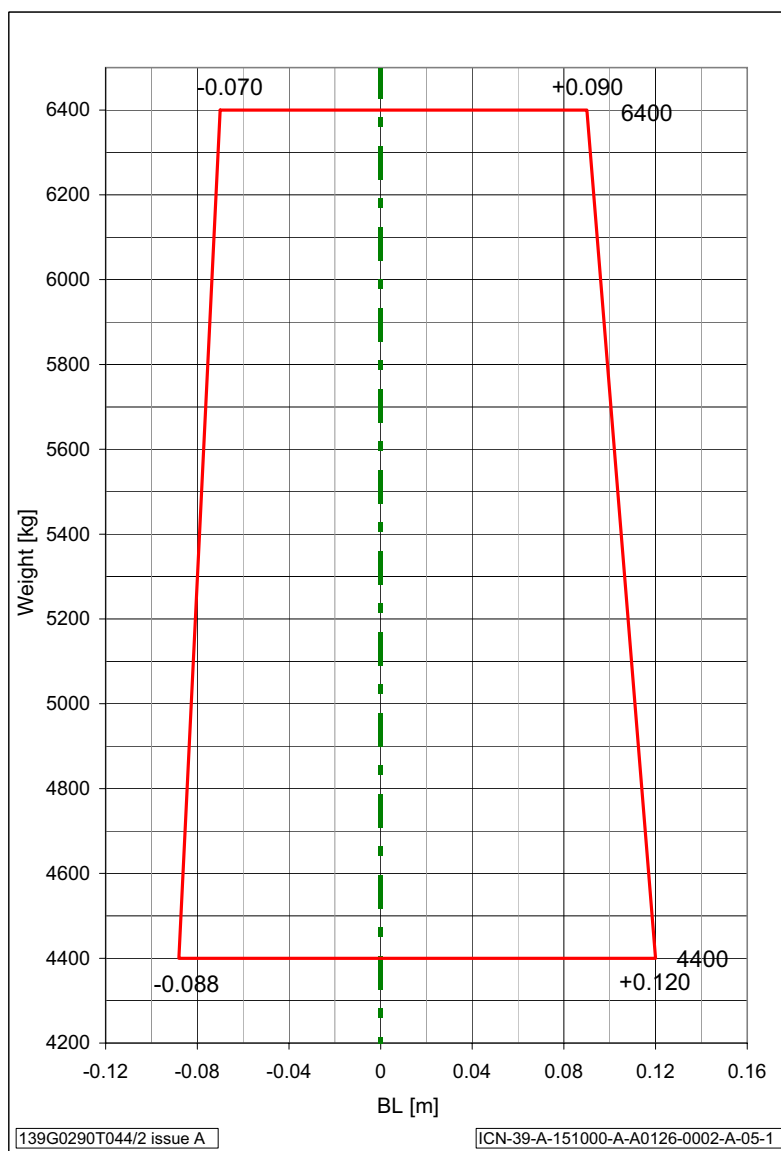


Figure 1-2 Weight and Lateral CG Envelope

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AIRSPPEED 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 (V_{mini})	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	140 KIAS
Maximum airspeed for operation of windscreen wipers	140 KIAS
Minimum airspeed in autorotation	40 KIAS
CAT A Take-Off & Bailed 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 10000ft Hp 80 KIAS Above 10000ft 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	40 knots
(above 20 knots nose wheel must be locked fore and aft)	
Maximum for emergency landing speed (nose wheel locked in fore and aft position)	60 knots
Maximum towing speed	37 km/hr(23mph)
Maximum GS with PARK BRAKE ON	5 kts

ON GRASS SURFACES

Maximum taxi speed (nose wheel locked fore and aft)	20 knots
(above 10 knots nose wheel must be locked fore and aft)	
Maximum speed for emergency landing (nose wheel locked fore and aft)	40 knots

**SPD ALT
TEMP**

SPD ALT
TEMP

WIND SPEED LIMITATIONS FOR ROTOR STARTING & STOPPING

Maximum wind speed 50 knots

Note

Each rotor starting and stopping in wind speeds above 27kts must be recorded in the helicopter log book.

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 35ft 14000ft Hp of Hd
whichever comes first

TDP 36ft to 70ft 7000ft Hp of Hd
whichever comes first

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

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

Maximum altitude for CAT A Confined Area Take Off
and Landing 10000ft Hp or Hd
whichever comes first

Maximum altitude for CAT A Offshore Helideck Take Off
and Landing 5000ft Hp or Hd
whichever comes first

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.

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°

SPD ALT
TEMP

ALTITUDE AND TEMPERATURE LIMITATIONS CHART

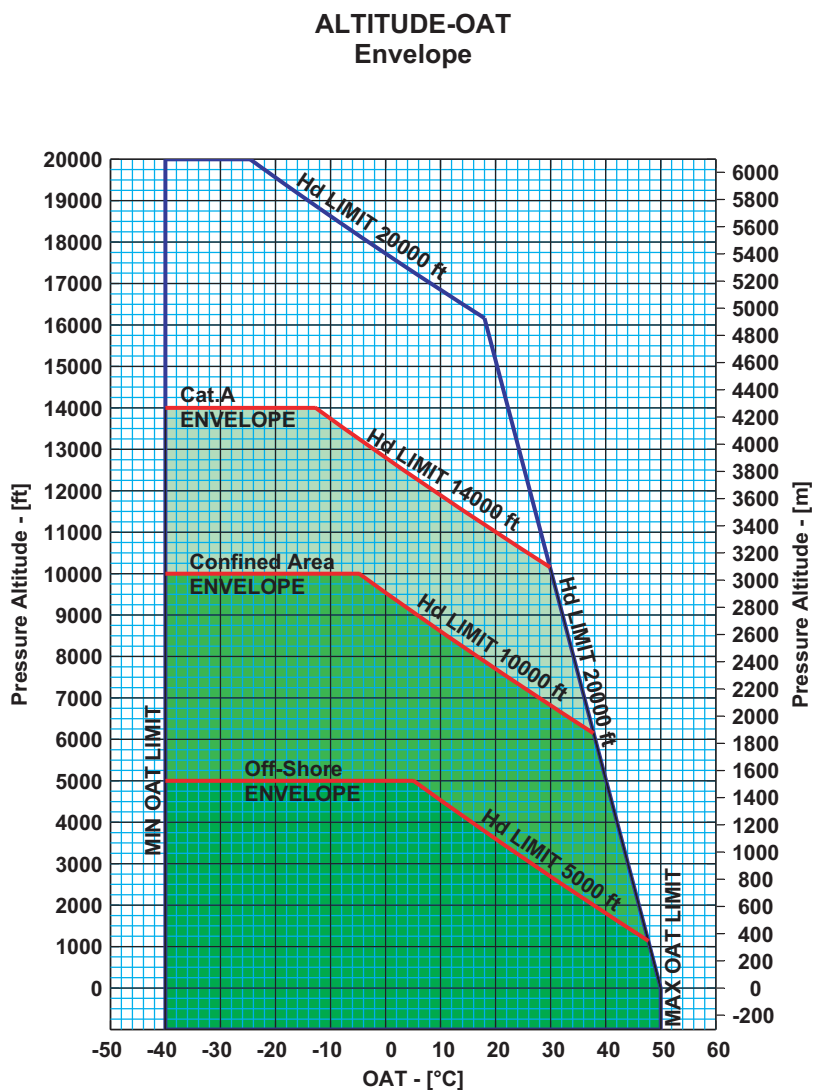


Figure 1-3 Altitude - Temperature Limitations

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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 A MISCELLANEOUS LIMITATIONS

Ground and Elevated Helipoint / Helideck Size

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

Minimum demonstrated helipoint 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.

For the Offshore Helideck procedures for cross wind components between 10 kts and 20 kts a headwind component of at least 5 kts is required.

Take Off or Landing with tail wind is prohibited.

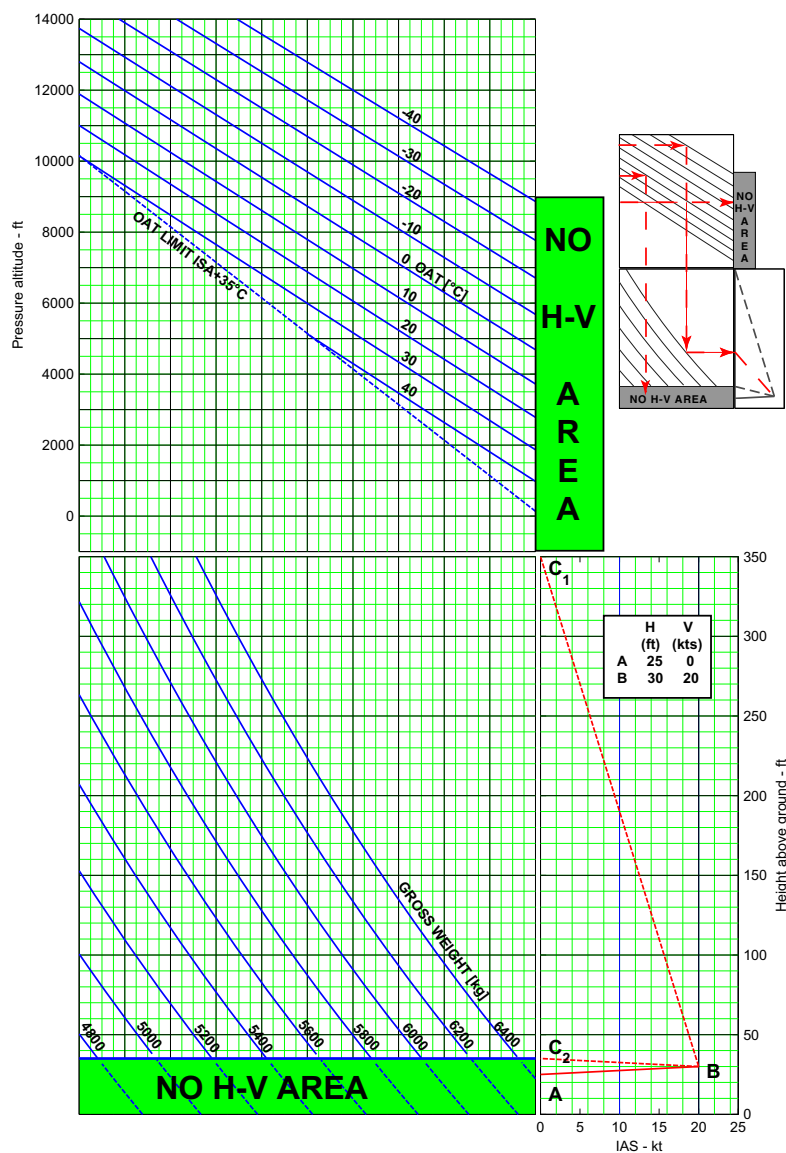
Heater Limitations

Heater must be switched off for Take Off and Landing.

H-V
CAT A/B

HEIGHT - VELOCITY DIAGRAM

H-V
CAT A/B



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Figure 1-4 Height Velocity Limitations

CATEGORY B OPERATION LIMITATIONS

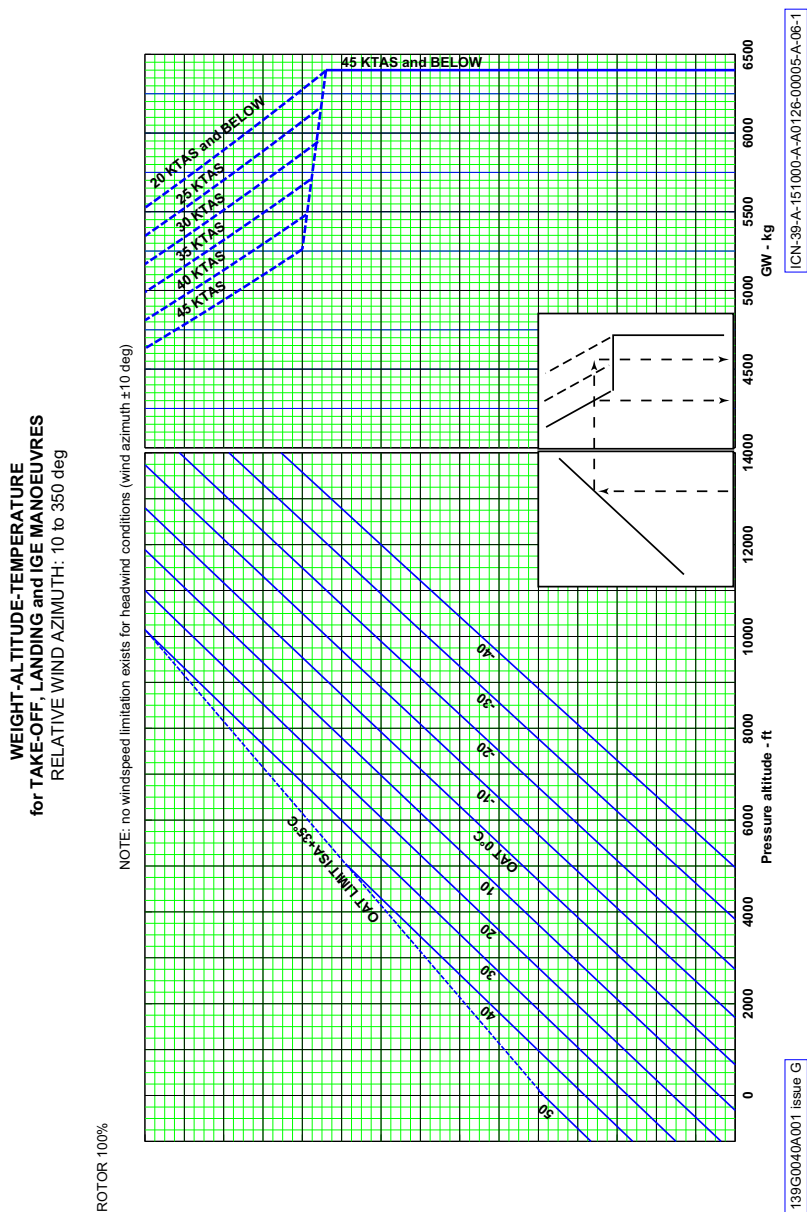


Figure 1-5 CATEGORY B - Weight Limitations

H-V
CAT A/B

CATEGORY A OPERATION LIMITATIONS

H-V
CAT A/B

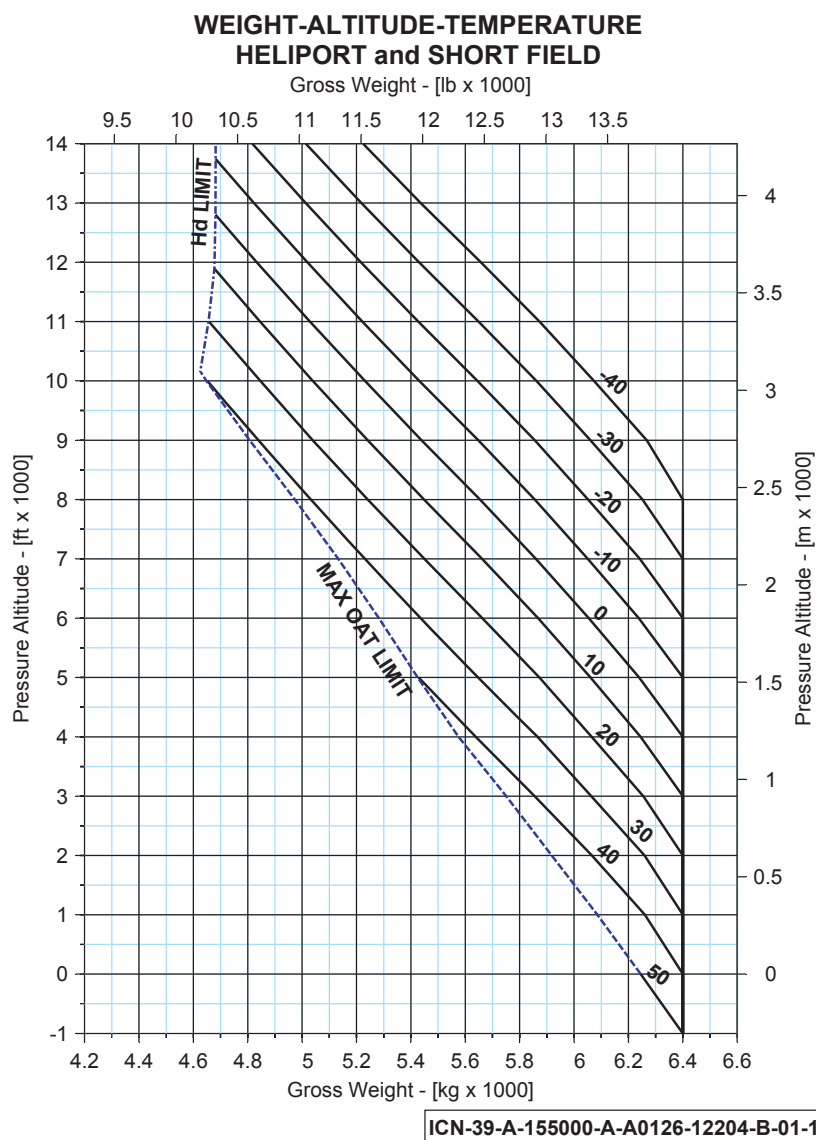
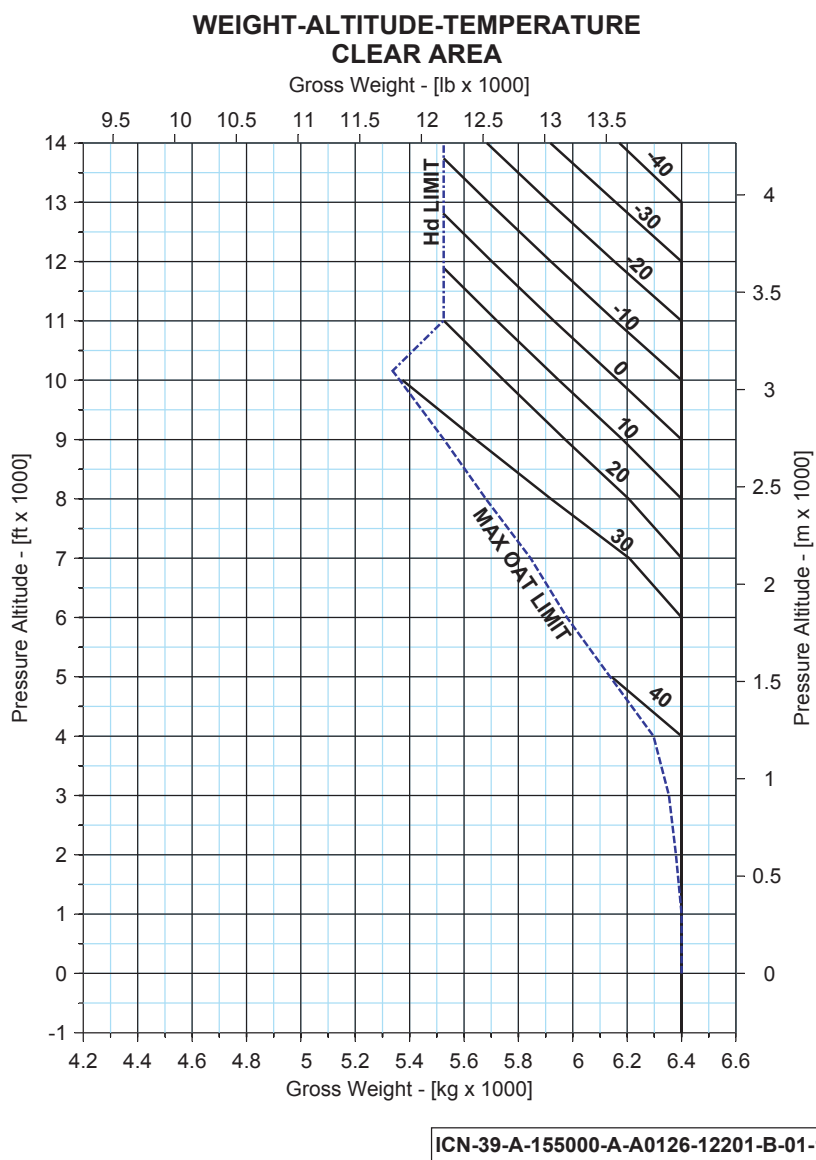


Figure 1-6 CATEGORY A Ground and Elevated Heliport/Helideck
Vertical, Back Up & Short Field Procedure Weight Limitations



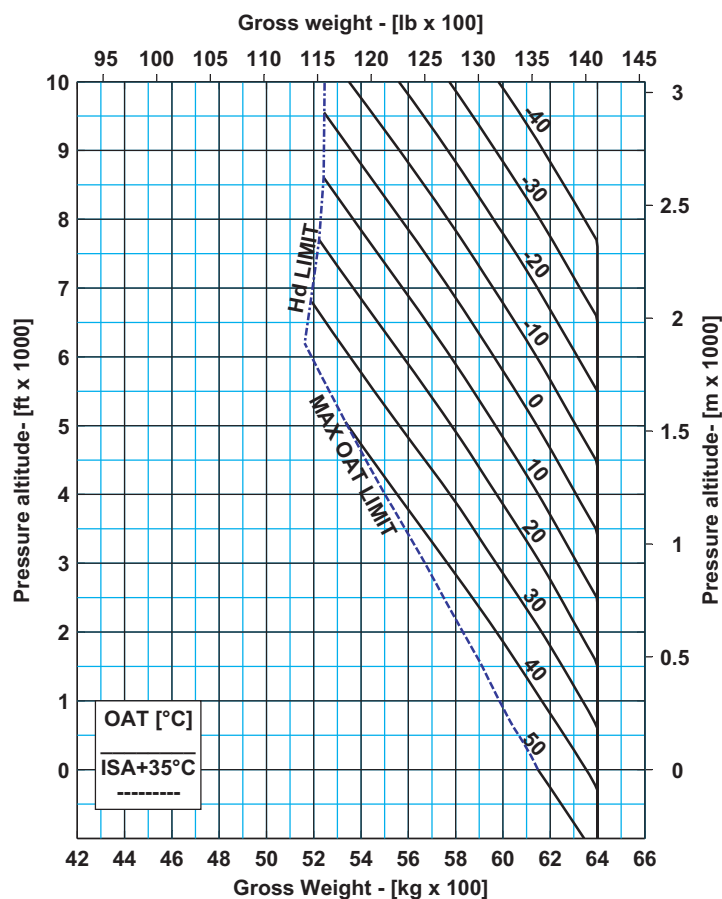
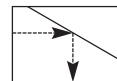
**Figure 1-7 CATEGORY A Clear Area Procedure Weight
Limitations**

H-V
CAT A/B

H-V
CAT A/B

WEIGHT-ALTITUDE-TEMPERATURE
CONFINED AREA

ROTOR SPEED 102%



139G1580A012 issue A

ICN-39-A-155000-G-A0126-12248-A-01-1

Figure 1-8 CATEGORY A Ground and Elevated Heliport Confined Area Procedure Weight Limitations

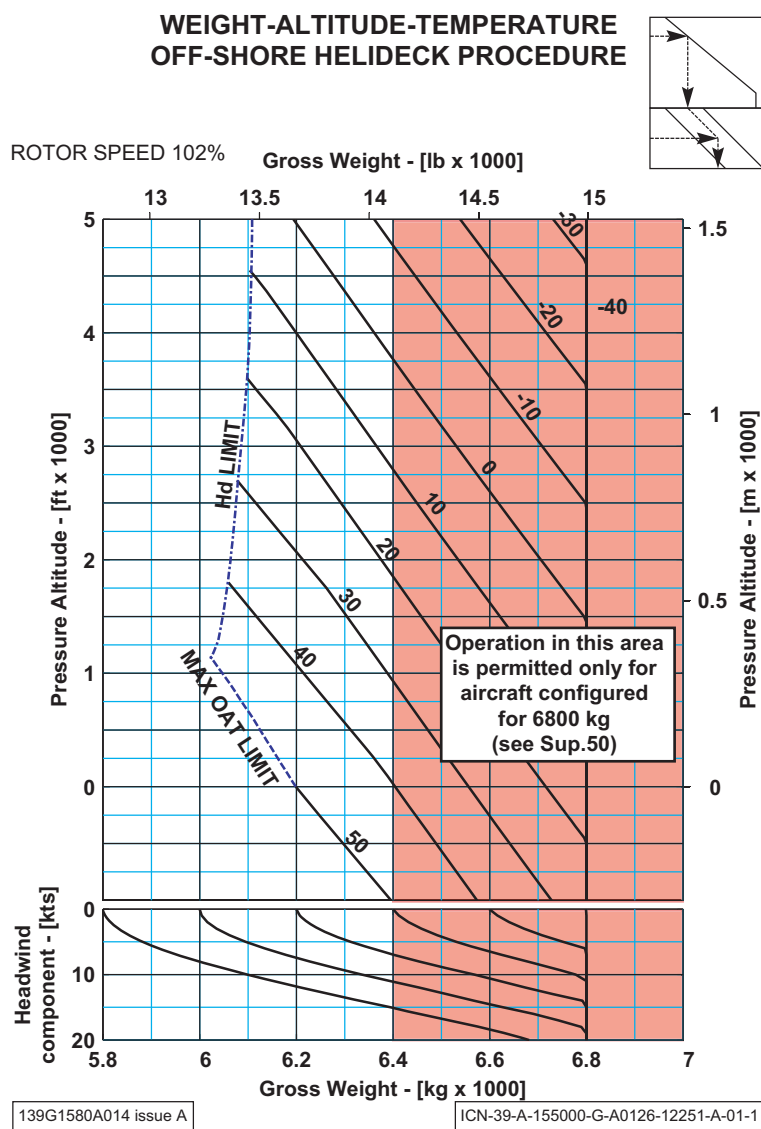


Figure 1-9 CATEGORY A Offshore Helideck Procedure Weight Limitations

H-V
CAT A/B

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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
Minimum Continuous				90	90
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 second 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

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: 0kg (0lb) indicated/
(8 kg(18lb)/10 litres per tank actual)

Hovering in cross winds or sideways flight with sustained roll angles greater than $\pm 15^\circ$ is prohibited when fuel indication, in either tank, is less than 70kg.

Cross feeding (tank with pump off, not supplying engines)

.....Maximum 228 kg/500lb

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-83138D NATO Code F-34
JET A-1	ASTM D1655		
JP5	DEF STAN 91-86 AVCAT/FSII MIL -PRF-5624F NATO Code F-44	JP8+100	Aeroshell Performance Additive 101
JP8	DEF STAN 91-87-2002	GOST 10227RT GOST 10227TS1	GOST 10227-86 GOST 10227-86 (See RFM restrictions)

**ENG FUEL
LUB HYD**
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 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 Turbonycoil 525-2A
Third Generation (5 cs)	PWC 521	Aero Shell Turbine Oil 560 Royco Turbine Oil 560 Mobil Jet Oil 254

CAUTION

Mixing of any oils, by type, specification or brand name, is prohibited.

AUTHORIZED TRANSMISSION OIL

Applicable Specification	Brand Names
MIL PRF23699F	BP Turbo Oil 2380

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	Brand Names (For reference only)
MIL-PRF-83282	AEROSHELL FLUID 31
Alternative: MIL-PRF-5606 (see NOTE below)	AEROSHELL FLUID 41

Note

MIL-PRF-5606 can be used for enhanced performance of hydraulic system in low temperature environments below -30°C.

CAUTION

Mixing of hydraulic liquid, by specification or brand name, is prohibited.

MISCELLANEOUS LIMITATIONS
DC GENERATOR LOAD

Normal Operation Range..... 0 to 100%

Cautionary Range (for engine starting only)..... 101 to 155%

Maximum Cautionary 155%

(Maximum cautionary may be exceeded for maximum of 45 seconds for engine start only)

Max normal operating load up to 15000ft Hp 100% (equivalent 300A)

Max normal operating load above 15000ft Hp..... reduce by 13.4%
.....every 1000ft

(See placard on RFM page 1-62 or, for aircraft fitted with EPIC S/W Phase 5 or later, Supplement 68)

Max normal operating load 20000ft Hp 33%

MPOG with generator load at 75% or less No time limitations

MPOG with generator load greater than 75% Max 20 minutes

WHEEL BRAKE LIMITATIONS

Maximum running speed for brake application.....40 knots

Parking on slopes up to 10° is permitted for a maximum of 1 hour.

PITOT HEATING LIMITATIONS

Pitot heating must be switched **ON** for conditions of visible moisture at 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 VFR flight.....2 AP in SAS mode

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

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

MISC

FLIGHT DIRECTOR LIMITATIONS

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)

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
APP*/BC*/GA*	60 KIAS to Vne	50 ft AGL
VS*	60 KIAS to Vne within -1500 fpm and 2000 fpm	150 ft AGL
ALT	0 KIAS to Vne	300 ft AGL (airspeed greater than 55 KIAS 50ft AGL in HOV or airspeed less than 55 KIAS (Enhanced FD system only)
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 air-speed less than 55 KIAS)
GA	60 KIAS to Vne 0 to 2000 ft AGL	N/A
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, or later	0 KIAS to 60 KIAS 0 to 2000 ft AGL	150 ft AGL (airspeed greater than 55KIAS) 30 ft AGL in HOV (air-speed less than 55 KIAS)

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).

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
- VOR NAV at ranges greater than 10 nm

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

Maximum recommended Localizer Intercept angle 30°
..... ranges less
..... than 10nm

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.

MISC

FMS AND GPS LIMITATIONS

1. The software status stated in the Honeywell Flight Management System (FMS) Pilot's Manual for the Agusta AW139 must match that displayed on the equipment MCDU page at power up.
2. IFR en route and terminal navigation is prohibited unless the pilot verifies the currency of the Navigation Data Base (NDB) or verifies each selected waypoint for accuracy by reference to current approved data.
3. Instrument approaches must be carried out in accordance with approved instrument approach procedures that are retrieved from the FMS data base. The FMS data base must incorporate the current update cycle.
 - For instrument approaches GPS integrity monitoring (RAIM) must be available at the Final Approach Fix.

Note

The Pilot must not continue an instrument approach inside the Final Approach Fix (FAF), unless the 'APP' advisory is displayed on the PFD. If during an instrument approach the amber 'DGR' advisory is displayed, the pilot must initiate a missed approach.

- Use of ILS, LOC, LOC-BC, LDA, (landing directional aid), SDF (simplified directional facility) and MLS (microwave landing system) approaches are not authorized.
 - When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS navigation and the aircraft must have operational equipment capable of using that navigation aid, and the required navigation aid must be operational.
4. The aircraft must have other approved navigation equipment installed and operating appropriate to the route of flight.

TORQUE LIMITER FUNCTION

If TORQUE LIMITER is set, max AEO TQ available is 114%/114%

ENGINE EEC LIMITATIONS

In ambient conditions above 43°C, if the aircraft is to be parked with engine off, internal or external electrical power must not be supplied.

Electrical power may be supplied for Pre Start Checks and Engine Start. For maintenance checks refer to AW139 Maintenance Publication Document No. 39-A-AMP-00-P.

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 6800KG
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	6800 kg
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 knots
Maximum for emergency landing speed for weights above 6400kg (nose wheel locked in fore and aft position)	40 knots
Taxiing on grass surfaces at weights above 6400kg is prohibited	

ALTITUDE LIMITATIONS

Maximum operating altitude for weights above 6400kg	8000 ft Hp or Hd
.....	whichever comes first

AMBIENT AIR TEMPERATURE LIMITATIONS (OAT)

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
--	-----------------

**GW EXT
6800 kg**

**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 OffDiameter 15 m (50 ft)

.....or 15 m x 15 m (50 ft x 50 ft)

LandingDiameter 22 m (72 ft)

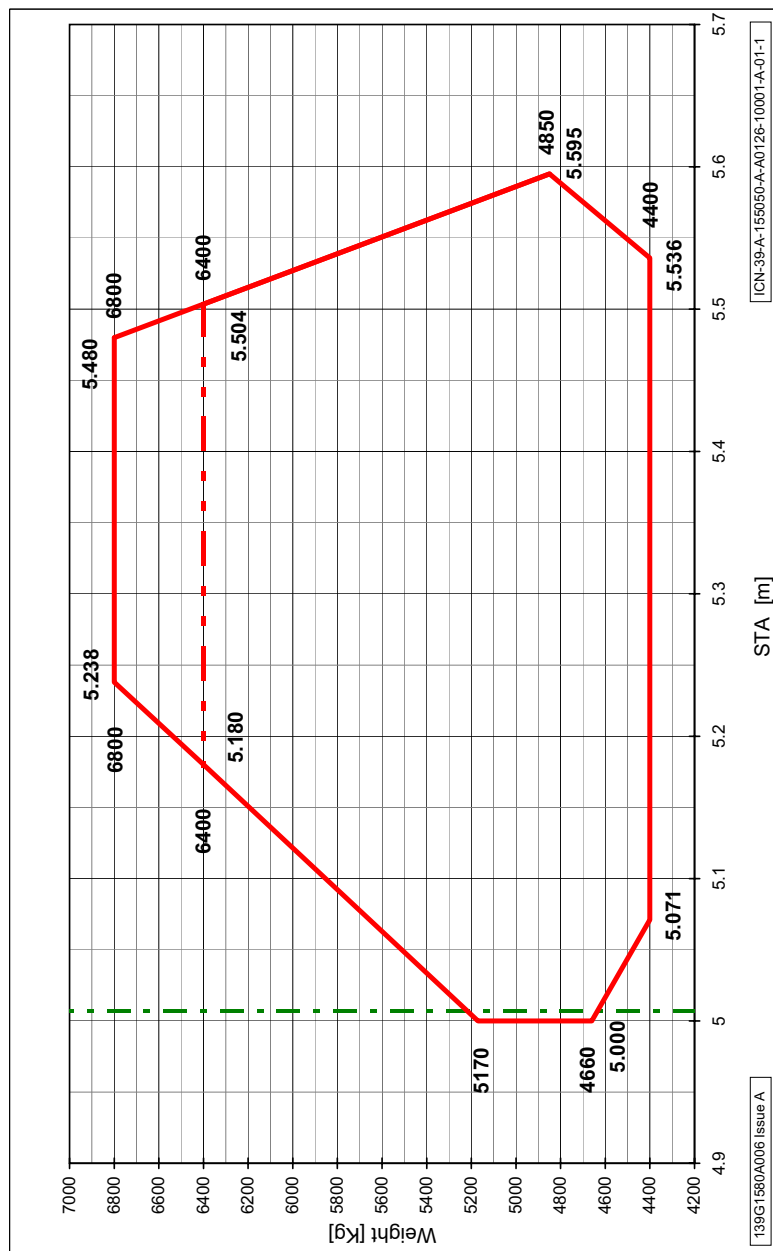
..... or 22 m x 22 m (72 ft x 72 ft)

PERFORMANCE INFORMATION

Single Engine Failure in Hover OGE Flyaway procedure

weights between 6400 kg and 6800 kg Figure GW EXT 10

**GW EXT
6800 kg**



GW EXT
6800 kg

Figure GW EXT 1 Weight and Longitudinal CG Envelope 6800 kg

GW EXT
6800 kg

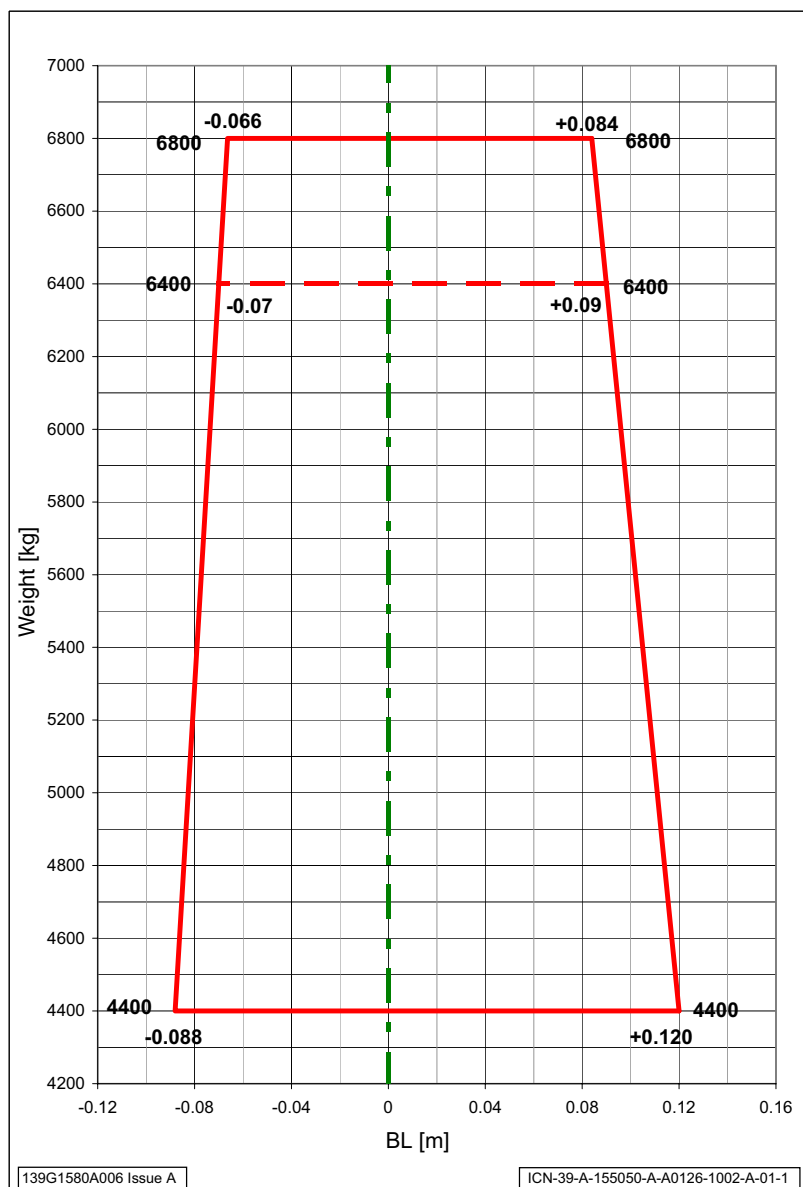
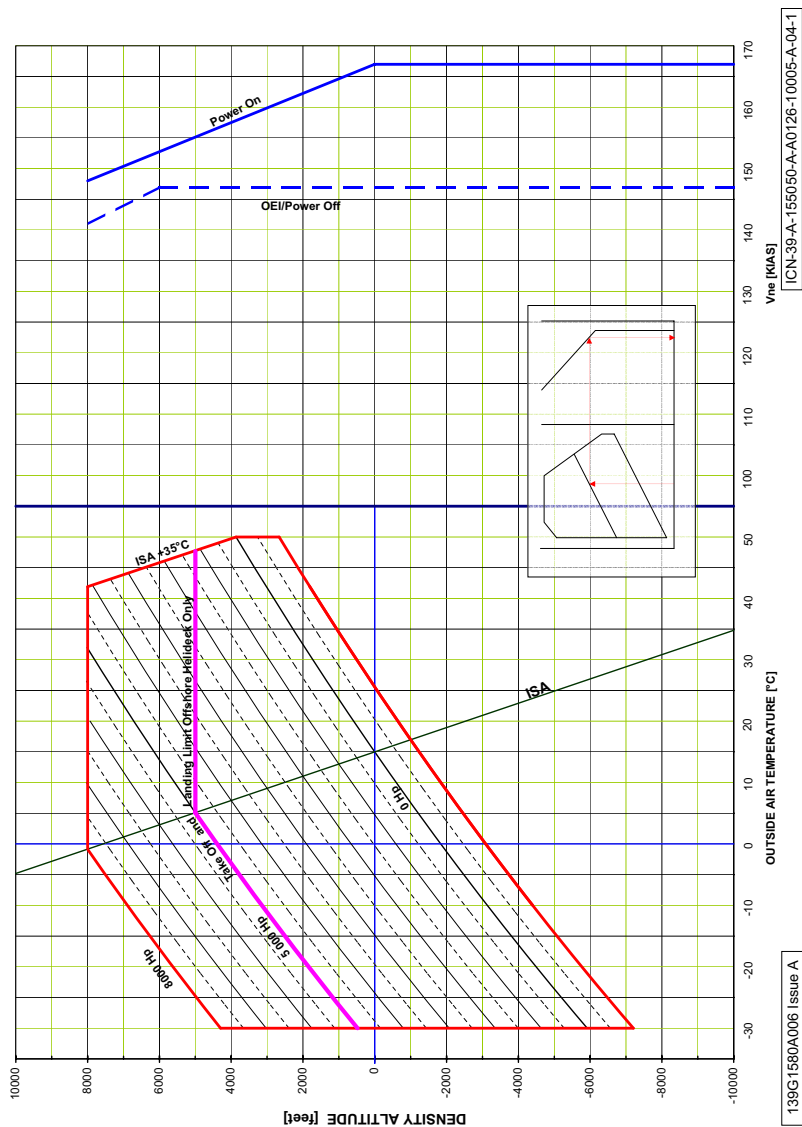


Figure GW EXT 2 Weight and Lateral CG Envelope 6800 kg



GW EXT
6800 kg

GW EXT
6800 kg

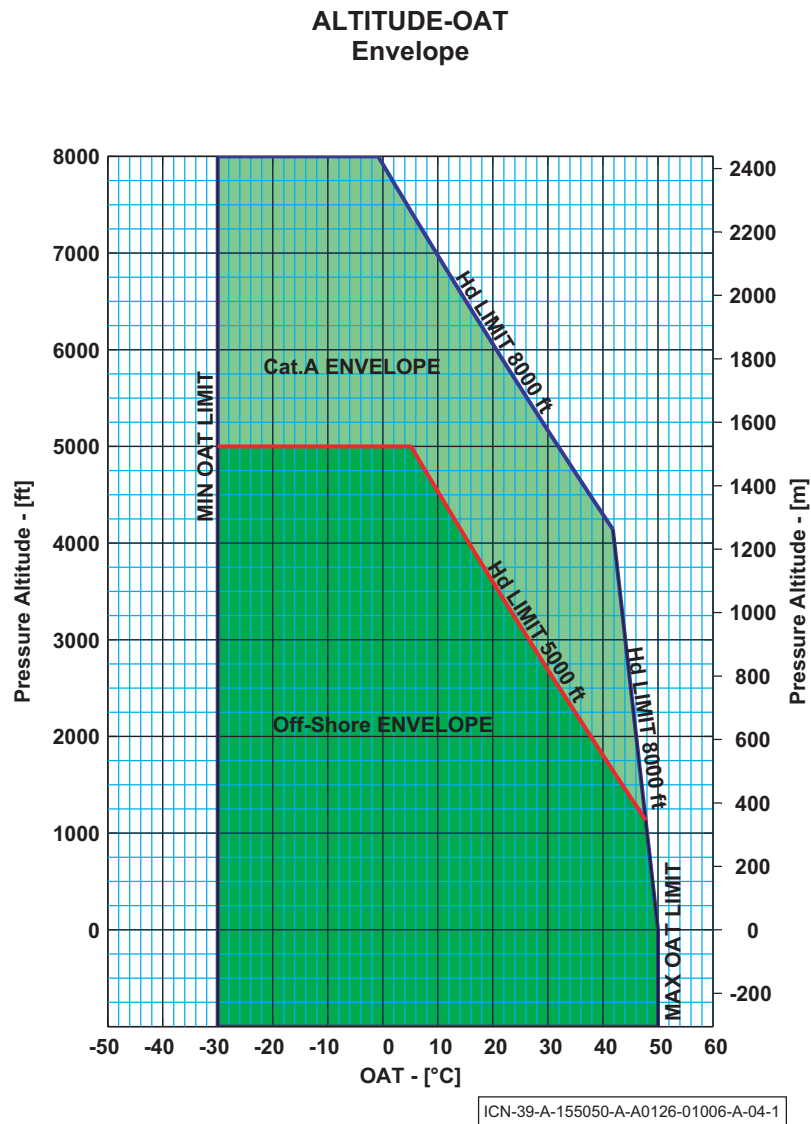


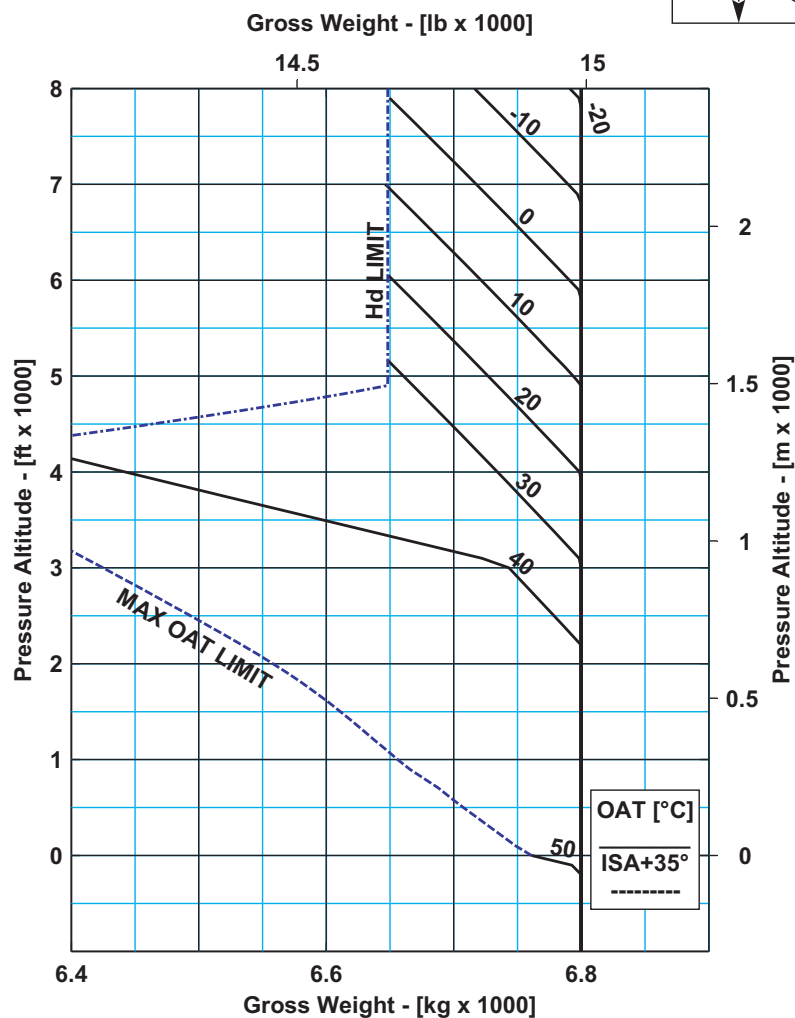
Figure GW EXT 4 Altitude- Temperature Limitations for Weights above 6400 kg

WEIGHT-ALTITUDE-TEMPERATURE

EAPS NOT INSTALLED

Cat.A NR=102%

Cat.B NR=100%

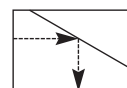


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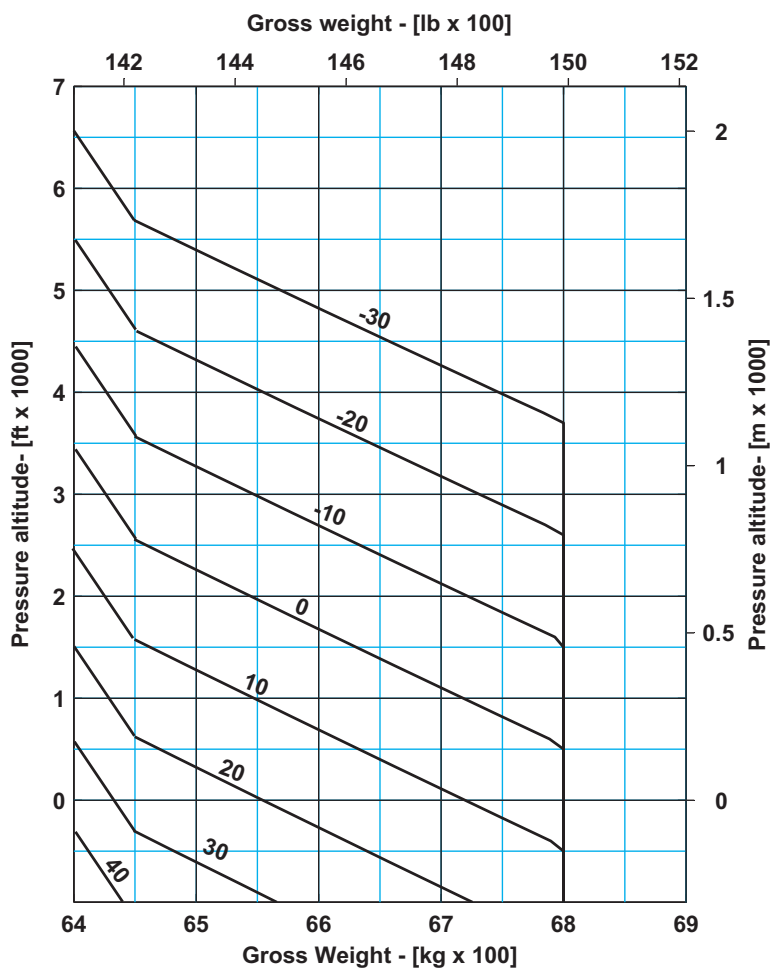
Figure GW EXT 5 Weight Limitations CAT A Clear Area and CAT B for weights above 6400 kg

WEIGHT-ALTITUDE-TEMPERATURE CONFINED AREA



ROTOR SPEED 102%

GW EXT
6800 kg

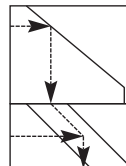


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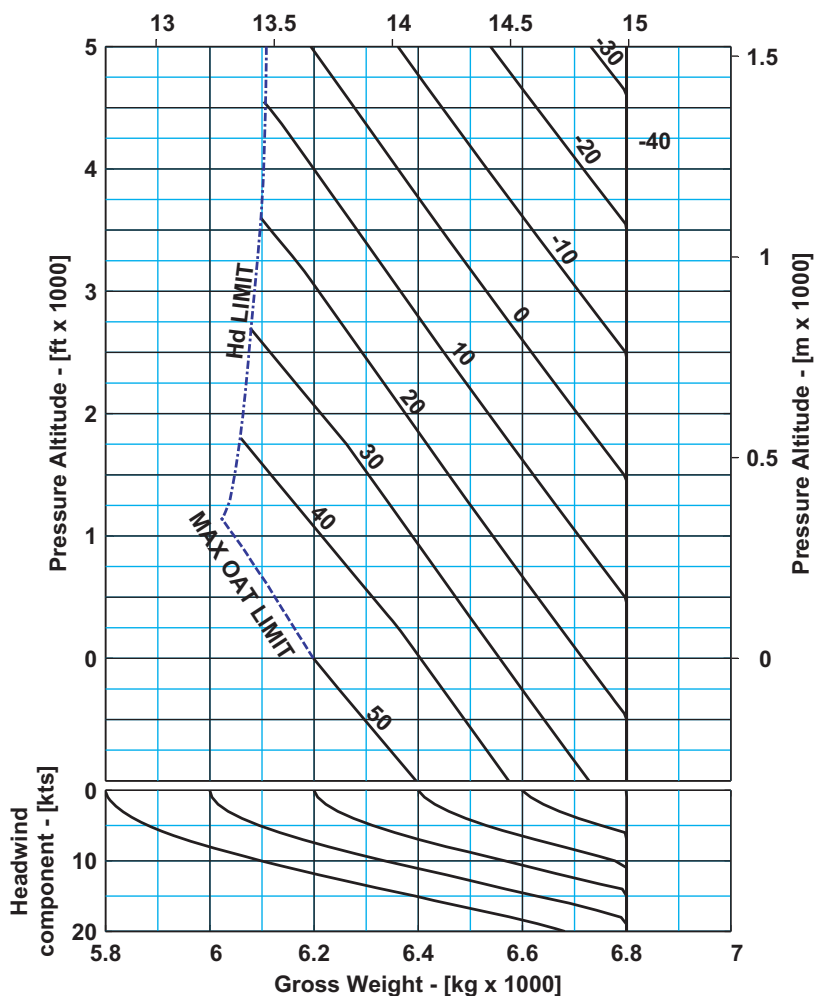
Figure GW EXT 6 Weight Limitations CAT A Confined Area for weights above 6400 kg

WEIGHT-ALTITUDE-TEMPERATURE OFF-SHORE HELIDECK PROCEDURE



ROTOR SPEED 102%

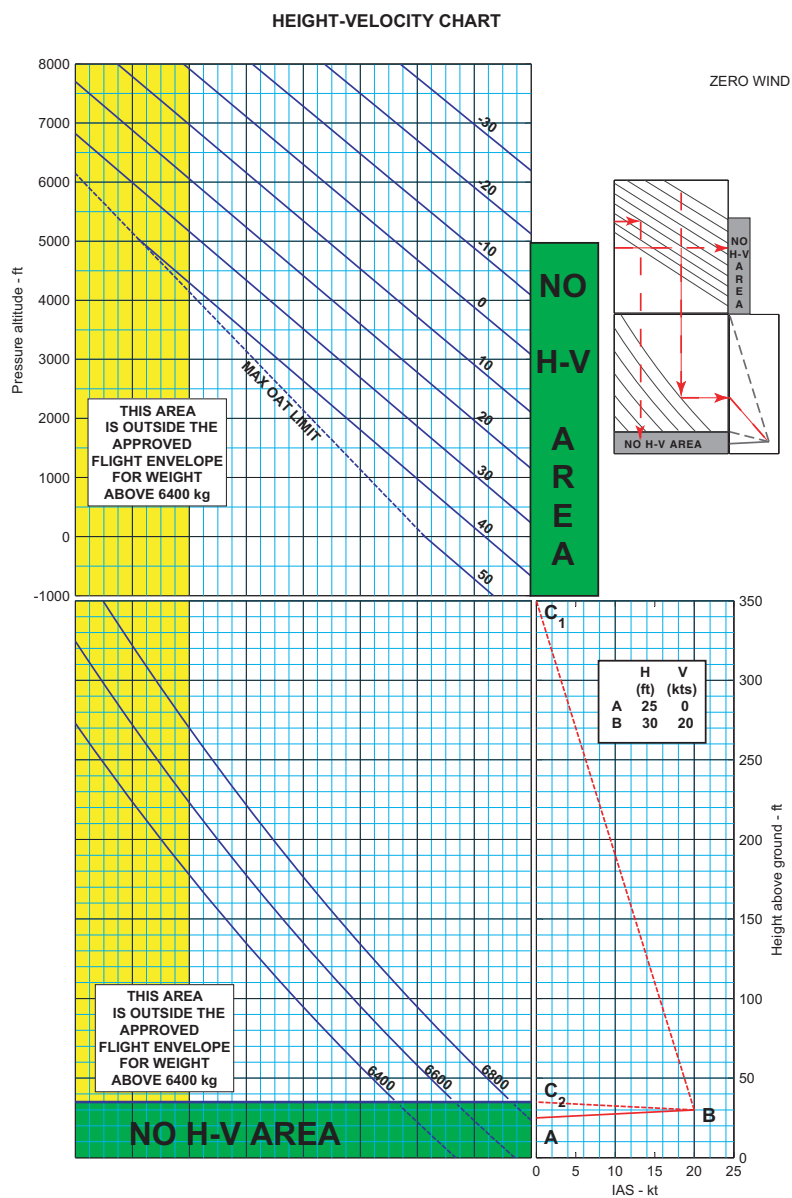
Gross Weight - [lb x 1000]



GW EXT
6800 kg

Figure GW EXT 7 Weight Limitations CAT A Offshore Helideck for weights up to 6800 kg

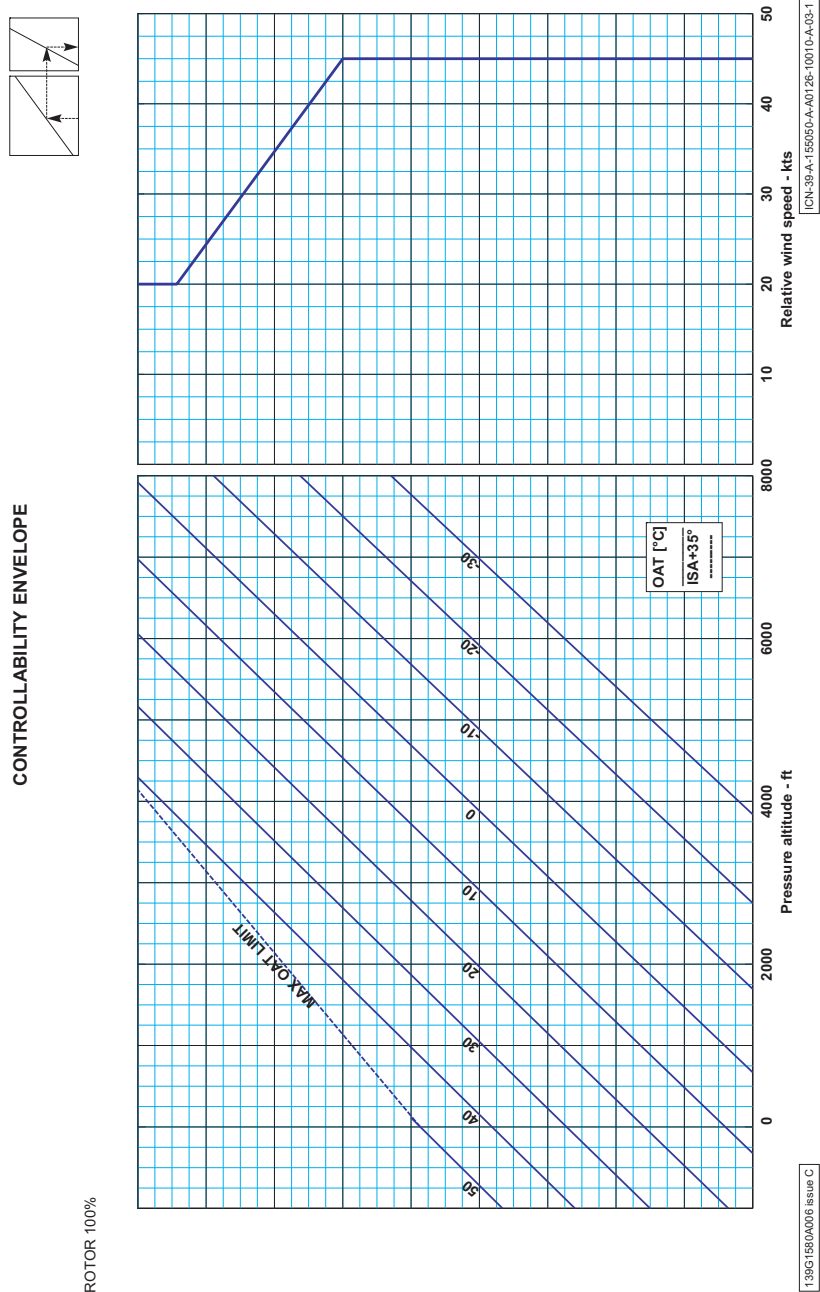
GW EXT
6800 kg



139G1580A006 issue C

ICN-39-A-155050-A-A0126-10011-A-03-1

Figure GW EXT 8 Height Velocity Limitations for Weights above 6400 kg



**GW EXT
6800 kg**

Figure GW EXT 9 Controllability Envelope for Low Speed Manoeuvres for weights above 6400 kg

HEIGHT LOSS DURING FLYAWAY MANOEUVRE WEIGHTS BETWEEN 6400 KG AND 6800 KG

GW EXT
6800 kg

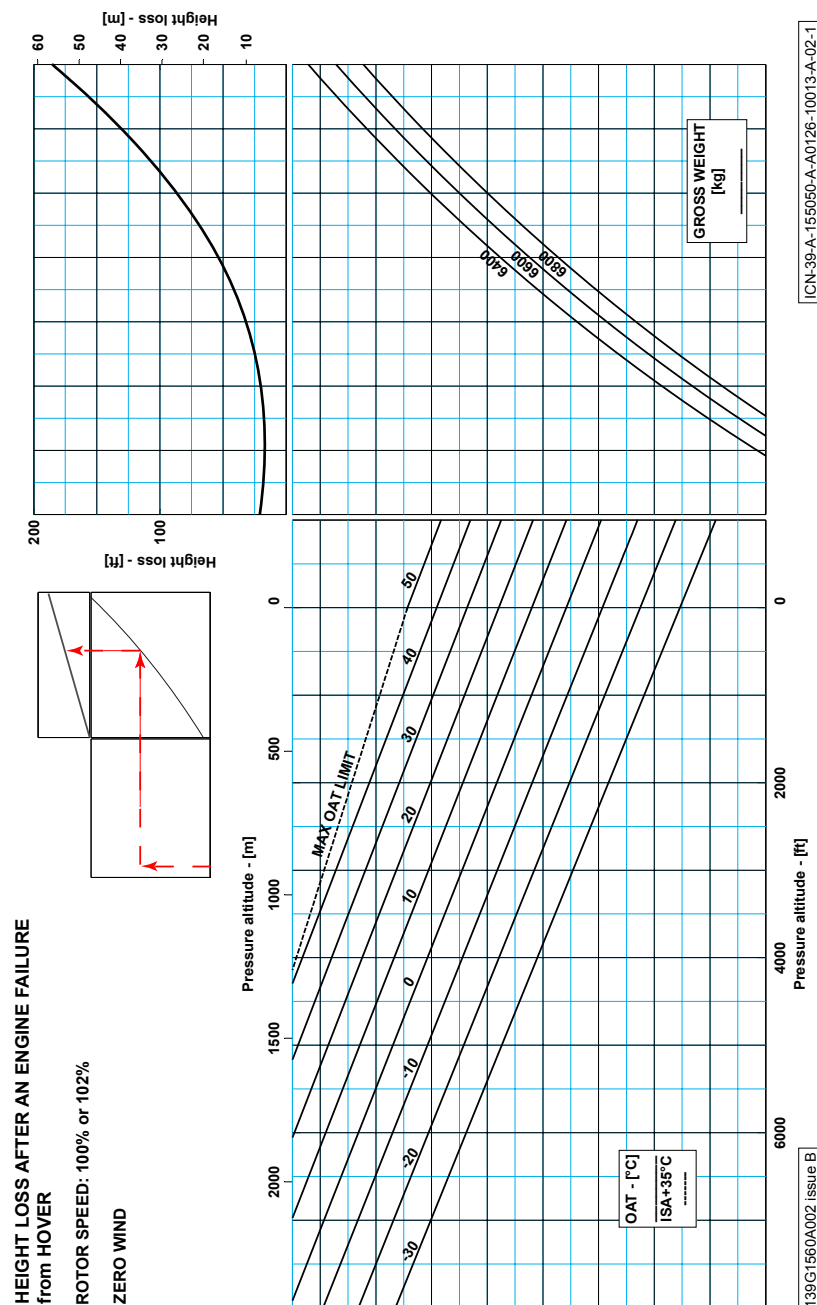


Figure GW EXT 10 Height Loss During Flyaway Weights from
6400 kg to 6800 kg

**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 exceed9

WEIGHT LIMITATIONS

CAT B WAT T-O and Landing see Hover Ceiling IGE @ TOP

..... Figure ALT EXT 1

AIRSPPEED LIMITATIONS

Maximum airspeed in sideward or rearward flight Figure ALT EXT 4

..... (for operations above
..... 14000 ft 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

**ALT EXT
9 PAX**

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ALT EXT
9 PAX

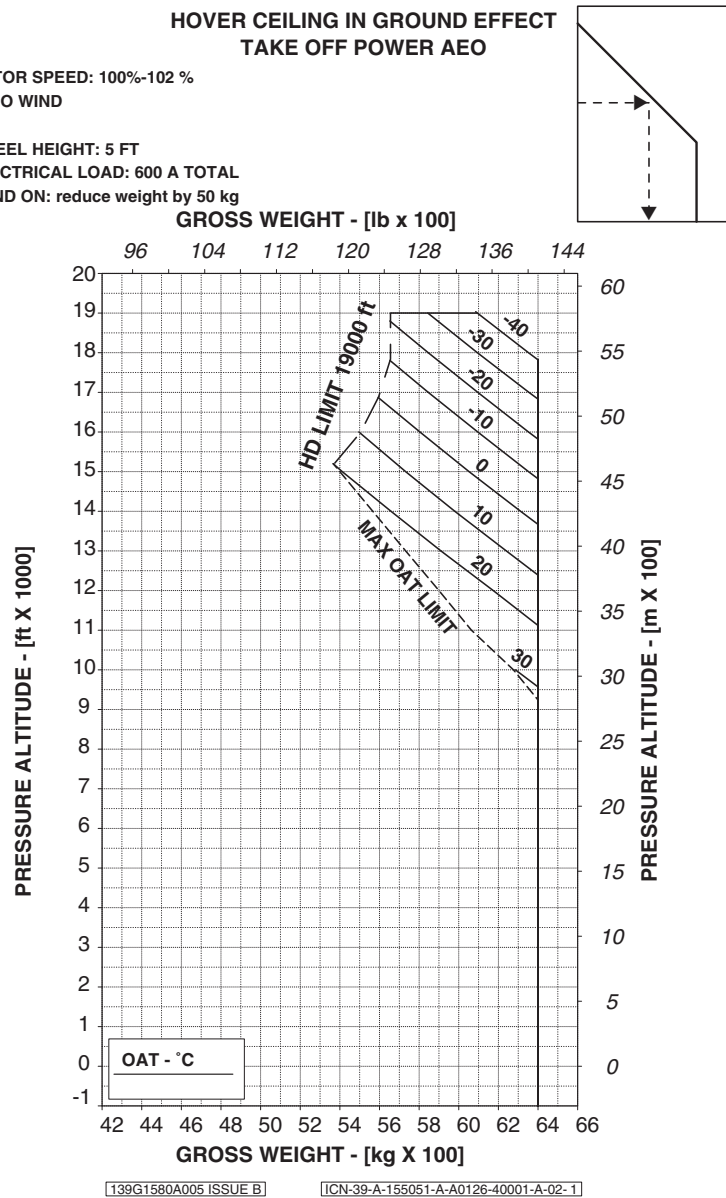
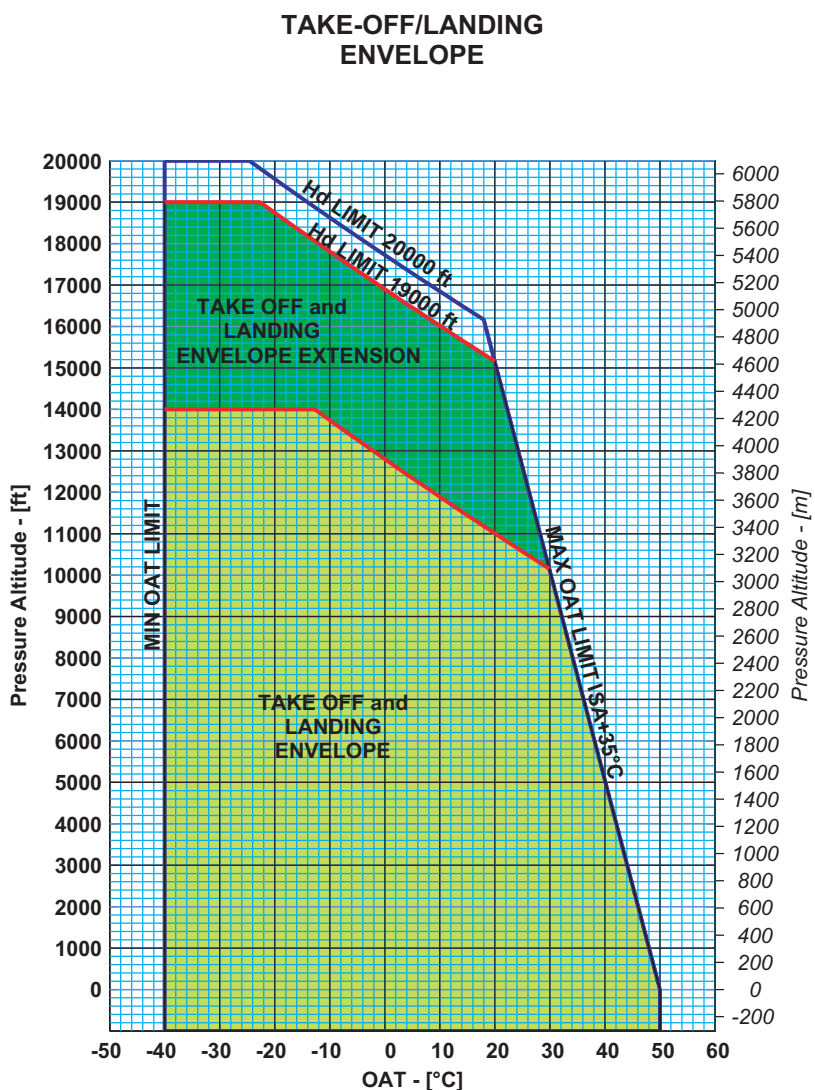


Figure ALT EXT 1 Hover Ceiling IGE at TOP



139G1580A005 issue B

ICN-39-A-155051-A-A0126-10001-A-02-1

**Figure ALT EXT 2 Altitude and OAT Limitations for Extended
Envelope Operations (Maximum 9 passenger seats)**

**ALT EXT
9 PAX**

ALT EXT
9 PAX

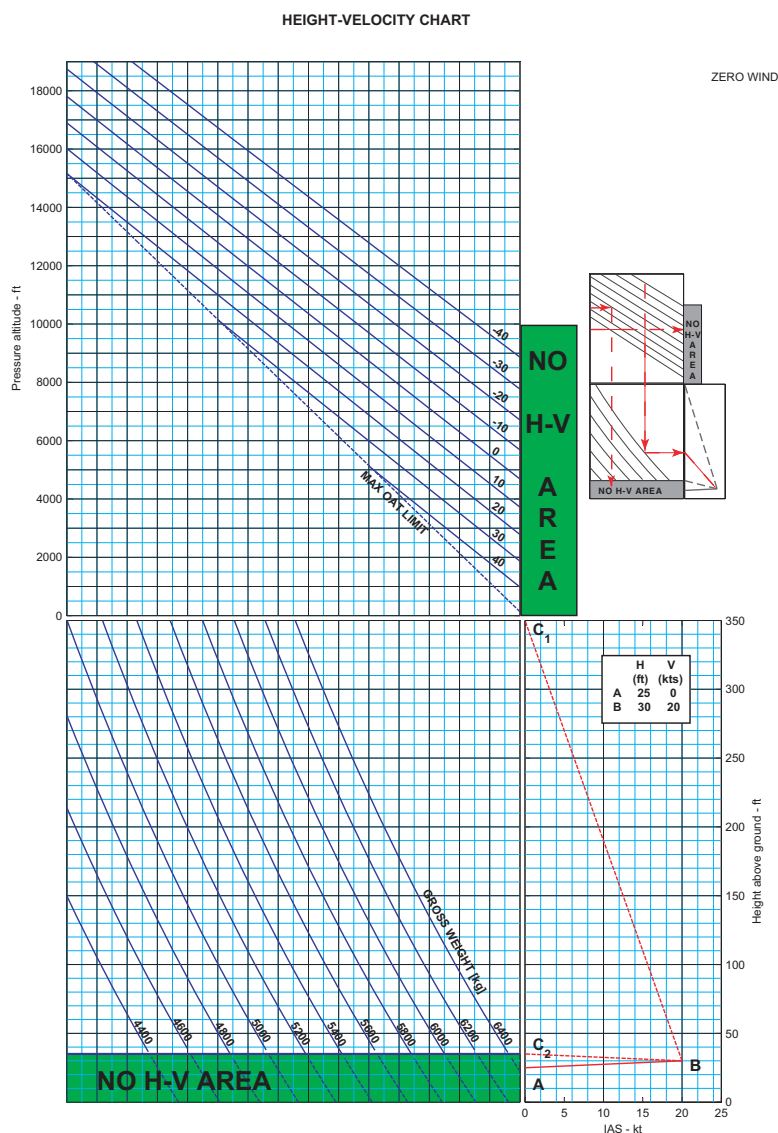
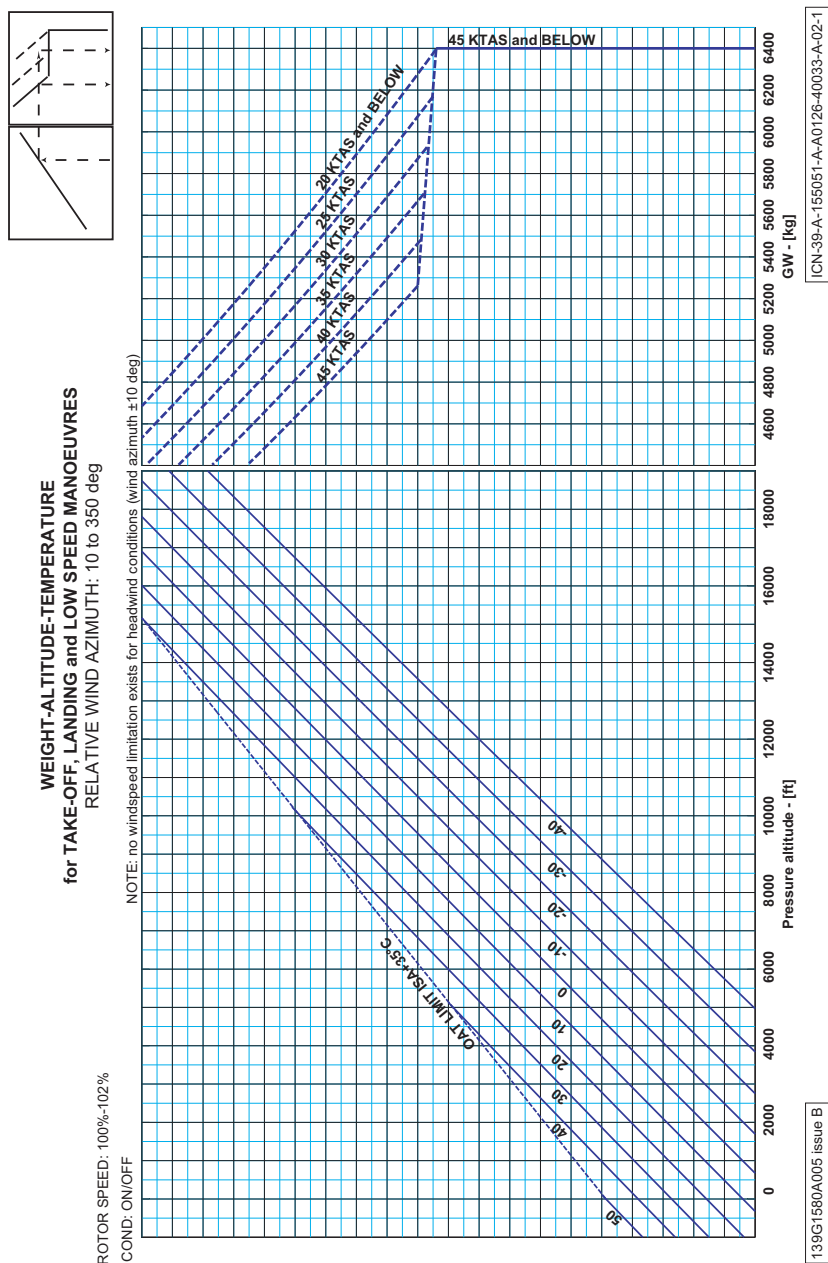


Figure ALT EXT 3 Height Velocity Chart for Extended Envelope Operations (Maximum 9 passenger seats)



**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

ALT EXT
9 PAX

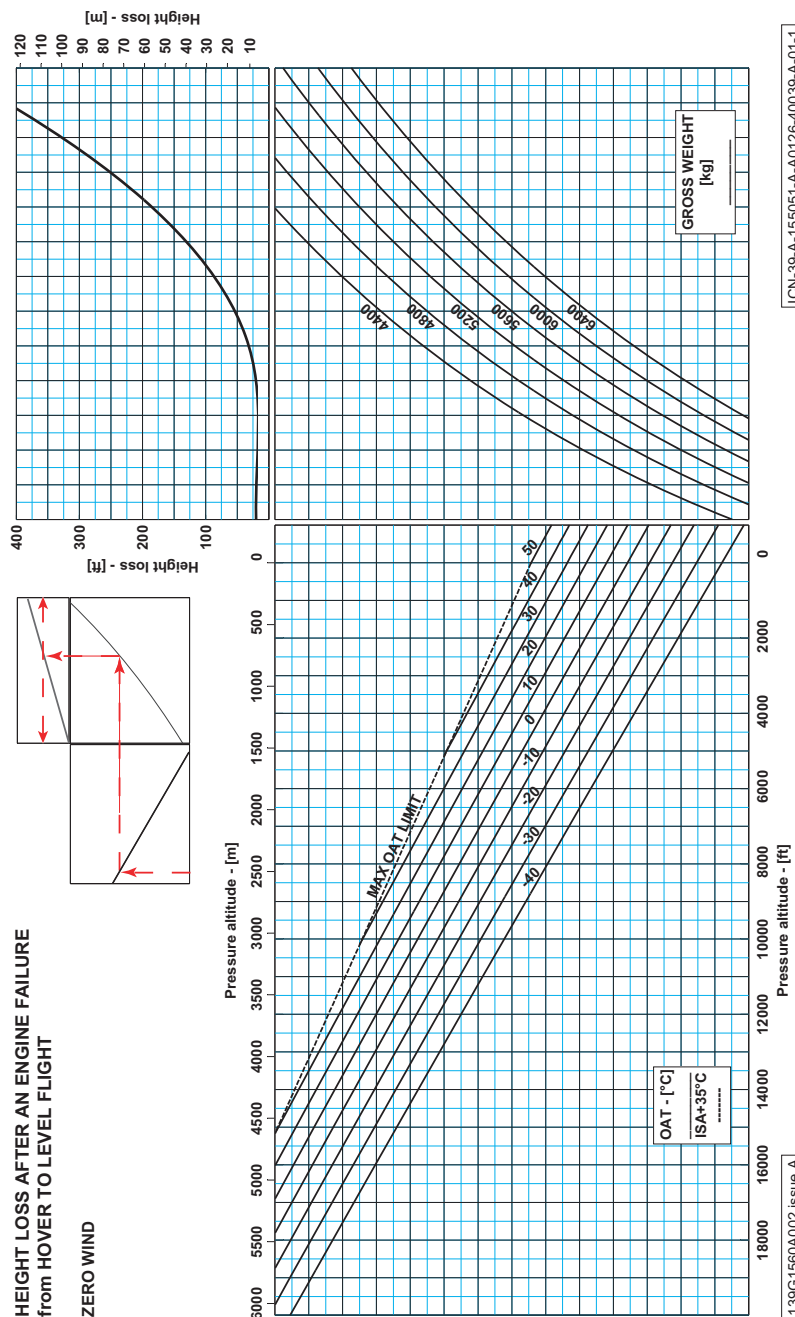


Figure ALT EXT 5 Height Loss during Flyaway up to 19000 ft

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 for detailed information on CATEGORY A procedures.

CATEGORY A TAKE OFF:

VERTICAL PROCEDURE

TDP 35ft ATS

TDP_E 35ft to 70ft 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 35ft AGL

TDP_E 35ft to 400ft AGL

Minimum height during CTO TDP or (TDP_E - 20ft)

Height at end of CTO distance TDP or TDP_E

BACK UP PROCEDURE

TDP_E 85ft to 400ft ATS

Minimum height during CTO (TDP_E - 70ft) ATS

Height at end of CTO distance See Supp 12

CLEAR AREA PROCEDURE

TDP 30ft AGL

EXTN CHECKS

**EXTN
CHECKS**

CONFINED AREA PROCEDURE

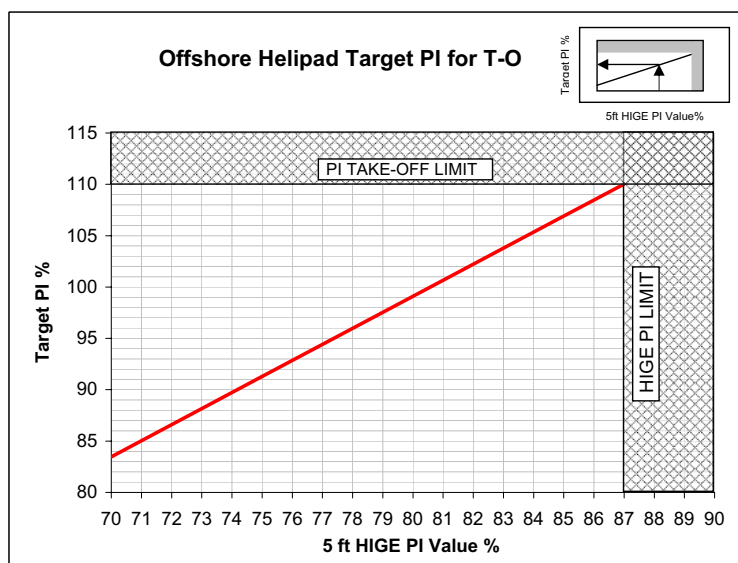
TDP Min 100 ft to Max 400 ft ATS

OFFSHORE HELIDECK PROCEDURE

TDP 20 ft ATS

Rotation Point 30 ft ATS

See chart below for Take Off Target PI



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 PROCEDURE**

LDP Height	40 ft ALS
LDP Groundspeed	15 kts
LDP Rate of descent	0 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

**EXTN
CHECKS**

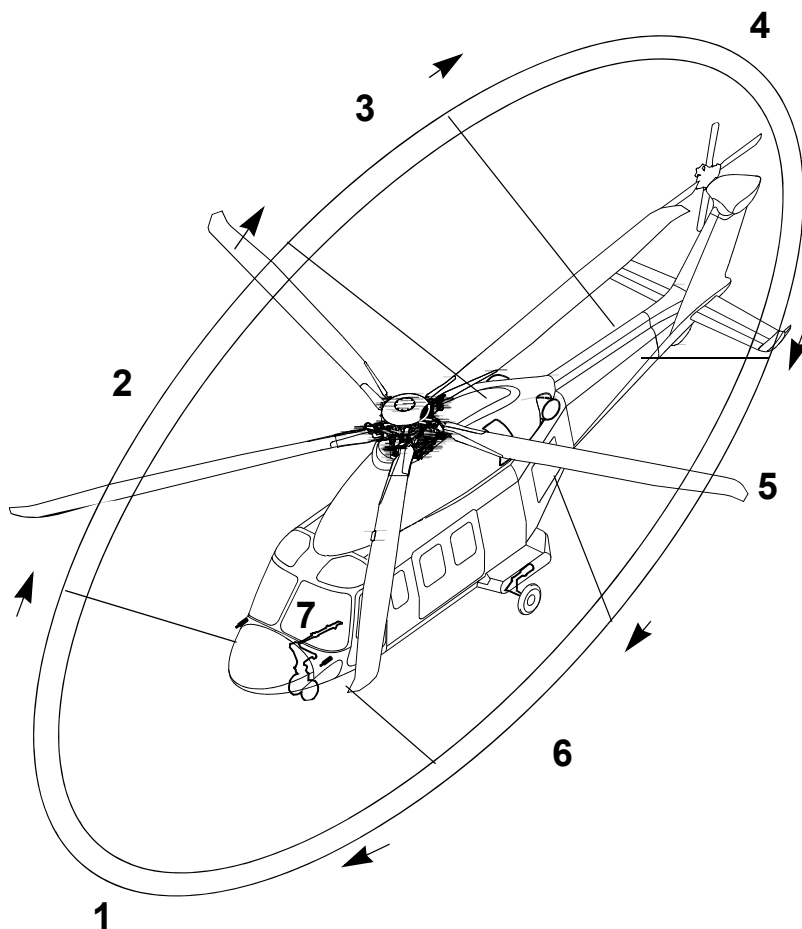
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EXTERNAL PRE-FLIGHT CHECKS

The inspection commences at the nose and continues clockwise around the helicopter. During the inspection, check that there are no leaks from over-board 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)



EXTN
CHECKS

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 cabin door — Condition, cleanliness, window secure.
14. Passenger cabin door — Condition, cleanliness.
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.

EXTN CHECKS

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| 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 over-pressure indicator | — Green. |

AREA N°3 (Tail Boom - Right Hand Side)

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| 31. Tail boom exterior | — Condition. |
| 32. Antenna (1) ➡ | — Condition. |
| 33. Stabilizer | — Condition and secure. |
| 34. Navigation light ➡ | — Condition. |

AREA N°4 (Fin, Intermediate and Tail Gearbox, Tail Rotor)

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| 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)

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| 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)

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| 45. Fuselage exterior | — Condition. |
| 46. Engine exhaust | — Cover removed, condition. |
| 47. Fire Bottle over-pressure 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. |

**EXTN
CHECKS**

EXTN
CHECKS

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| 57. Fuel tank sump area (Left side) | — Confirm no leaks. |
| 58. Main landing gear | — Condition, shock strut extension, leaks, tire pressure. |
| 59. Passenger door | — Secure. |
| 60. Cowling and fairings ➡ | — Condition. |
| 61. Co-pilot cabin door | — Condition, cleanliness, window secure. |
| 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 | — Secure. |
| 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 (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. ♦ Main and Aux Battery — 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:
No EB 7030191-00105 Phase 4 or
No EB 7030191-00107 Phase 5 or
No EB 7030191-00108 Phase 6
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)

**PRE
START**

PRE START

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| 21. ♦ CAS messages | — Check |
| 22. ♦ MFD | — Check fuel quantity |
| 23. ♦ LDG GEAR panel | — Check 3 green lights and EMER DOWN switch secure |
| 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 62 |
| 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

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| 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,

PRE START

AUTOPILOT, AIRSPEED,
LOW SPEED*, ALTITUDE,
CHECK HEIGHT*, LANDING GEAR,
150 FEET, AURAL SYSTEM TEST

* EPIC S/W Phase 5 or later

- | | |
|--|--|
| <p>39. ♦ OIL LEVEL
Pushbutton</p> | <p>— Press MGB pushbutton and confirm CAS caution: MGB OIL LOW and MCL illuminates</p> <p>— Press IGB pushbutton and confirm CAS caution: IGB OIL LOW and MCL illuminates</p> <p>— Press TGB pushbutton and confirm CAS caution: TGB OIL LOW and MCL illuminates</p> |
| <p>40. ♦ LAMP TEST
pushbutton ➡</p> | <p>— Press and confirm the following illuminate.</p> <ul style="list-style-type: none"> - 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 |
| <p>41. ♦ RPM switch
(on collective)</p> | <p>— Set 100% (102% for CAT A)</p> |
| <p>42. ♦ 1 ENG GOV
(on collective)</p> | <p>— AUTO</p> |
| <p>43. ♦ 2 ENG GOV
(on collective)</p> | <p>— AUTO</p> |
| <p>44. ENG TRIM beep
switches
(collective)</p> | <p>— Verify operation, then leave the engine control levers in the FLIGHT position.</p> <p>♦ On BATTERY power use a single “click” back and forward to confirm ECL stops in FLIGHT gate.</p> |

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.

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

**ABORT
DRY MOT**

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 igniter and 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

**ABORT
DRY MOT**

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.

ENG
START

ENG START

13. ENG 1 MODE switch — FLT
14. ♦ If BATTERY start carried out, complete pre-start checks

ENGINE 2 START

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
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 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
19. BUS TIE switch — Confirm AUTO
20. RAD MSTR switch — ON
21. Clock — Set
22. Rotor speed — Confirm 100%
23. VENT switches — As required

**ENG
START**

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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.
- 7a. 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.
8. FUEL PUMP 1 & 2 — ON. 1 & 2 FUEL PUMP caution out and cross feed automatically closed (bar vertical) FUEL XFEED advisory extinguishes.
9. OEI TNG switch — Check (if required).
10. MFD page — Select as required.
11. MCDU — Set COM and NAV as required.
12. FD panel — Check in SBY.

**SYS
CHECKS**

**SYS
CHECKS**

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| 13. TEST button on Autopilot controller | — 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. |
| 14. ICS panels | — Set as required. Set BKUP volume as required. |
| 15. AHRS, ADS and display reversion switches | — NORM. |
| 16. LT panels | — Set as required. |
| 17. CABIN LT panel | — Set as require. |
| 18. COMPASS switches | — MAG. |
| 19. RAD ALT | — Confirm zero altitude (± 5 ft). |
| 20. DH TEST button on remote instrument controller | — Press, confirm RAD ALT 100ft (± 10 ft) and 'TEST' message displayed, release, confirm zero altitude (± 5 ft). |
| 21. DH selector on remote instrument controller | — Set as required. |
| 22. Altimeters: Pilot, Standby Copilot | — Set and check. |
| 23. PITOT HEATER 1 & 2 | — ON for conditions of visible moisture at indicated OAT of $+4^{\circ}$ C or less. |
| 24. POSITION light switch | — As required. |
| 25. RPM switch | — Set 100%. |
| 26. NR/NF | — Confirm stabilized at 100%. |
| 27. LDG LT & LDG LT2 | — As required. |
| 28. PARK BRAKE | — OFF. Check no PARK BRK ON caution message. |
| 29. Warning and Caution messages | — Check as required. |

TAXIING

1. NOSE WHEEL lock — Press to UNLK.
2. Collective and cyclic — Increase collective slowly then move the cyclic stick forward moderately to start movement.
3. Pedal brakes — Check operation.
4. Pedal control — As required to select direction.
5. Collective and pedal brakes — To reduce speed and stop, lower collective and apply pedal brakes.
6. NOSE WHEEL lock — Press to LOCK .

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 — 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 (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.

TAXI T-O
CAT A/B

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 daily power checks 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 200ft AGL).
13. NR/NF — Confirm 100%.
14. After Take-Off checks — Complete.
15. Power — Adjust, as required, for cruise flight or continued climb.

**TAXI T-O
CAT A/B**

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 — 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 daily power checks 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.

TAXI T-O
CAT A/B

**TAXI T-O
CAT A/B**

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| 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 200ft 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 1000ft ATS. |
| 20. At 1000ft 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

- | | |
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| 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 daily power checks in accordance with IN FLIGHT POWER CHECKS procedure in PERF section. |
| 5. Pilot Altimeter | — Set 0ft, or nearest 1000ft setting to T-O altitude, with collective at MPOG. |
| 6. Hover | — Establish a 5ft 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 30ft 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 200ft 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 1000ft ATS.
17. After Take-Off checks — Complete.
18. At 1000ft 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 daily power checks in accordance with ENGINE POWER CHECKS procedure in PERF section.

**TAXI T-O
CAT A/B**

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| 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 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. |
| 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 200ft 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 1000ft ATS. |
| 19. After Take-Off checks | — Complete |

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| 20. Power | — Adjust collective to continue climb at V_y , utilizing up to Take- Off power, as required, to 1000ft ATS. |
| 21. After Take-Off checks | — Complete |
| 22. At 1000ft 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 |

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 daily power checks in accordance with ENGINE 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 IGE | — Establish HIGE at 5ft ATS and note hovering PI value.
From chart on page 26 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. |
| 10. Warnings and Cautions | — Confirm none displayed. |
| 11. PI/NR | — Check PI's matched, NR 102%. |

**TAXI T-O
CAT A/B**

**TAXI T-O
CAT A/B**

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| 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 30ft ATS. |
| 15.Rotation | — At 30ft 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. |
| 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 200ft ATS) |
| 19.NR/NF | — Select 100% at V_y |
| 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 1000ft ATS. |
| 22.At 1000ft 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 |

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.

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.

TAXI T-O
CAT A/B



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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 1000ft 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 68.

4. Airspeed — Maintain within limits.

**IN
FLIGHT**



IN
FLIGHT

5. PITOT HEATER switches — ON for temperature of below 4°C or flight in visible moisture.
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 15000ft 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 retraction 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 to 4 and 7.5 degrees	100 KIAS

Note

When descending below 150ft 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 62.

**APPR
LAND**

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 200ft above touchdown point with a rate of descent of no more than 500fpm. Initiate a deceleration to achieve 30 KIAS at 50ft. At 50ft 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 — UNLK if ground taxiing is required.

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.

**APPR
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| 9. Initial point | — Establish an approach to pass through 200ft ALS at a rate of descent of no more than 500fpm. Initiate deceleration to achieve LDP, (50ft ALS) at 20KIAS and rate of descent less than 350ft/min. Heliport/Helideck in sight. |
| 10. Landing | — Continue the deceleration and descent to a HIGE. Maximum allowed GS at touchdown 5kts. |
| 11. PARK BRAKE | — As required. |
| 12. LDG LT & LDG LT2 switches | — OFF, if used. |

CATEGORY A CLEAR AREA LANDING PROCEDURE

- | | |
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| 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 200ft ALS at a rate of descent of no more than 500fpm. Initiate deceleration to achieve LDP, (50ft ALS) at 50KIAS and rate of descent less than 350ft/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. |

**APPR
LAND**
CATEGORY A CONFINED AREA LANDING PROCEDURE
For LDP 250 ft ALS and below:

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| 1. Landing direction | — If possible orientate the aircraft for an approach into the prevailing wind. |
| 2. Pre-landing checks | — Complete. |

**APPR
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| 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 wind-screen 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 5kts. |
| 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:

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| 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). |

- | | |
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| 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 wind-screen 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 500fpm rate of descent passing through LDP and continue to a HIGE. Maximum allowed GS at touchdown 5kts. |
| 13. PARK BRAKE | — As required. |
| 14. LDG LT & LDG LT2 switches | — OFF, if used. |

CATEGORY A OFFSHORE 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% |

**APPR
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| 8. PARK BRAKE | — Apply, PARK BRAKE ON advisory message illuminated on CAS. |
| 9. Initial point | — Establish an approach to pass through 200ft ALS at 80 KIAS and a rate of descent of no more than 500fpm. |
| 10. Approach | — Progressively reduce speed and height to achieve LDP at 15kts GS and 40ft 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 parallel 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 30ft ALS reduce nose up attitude to maximum 10° (See Figure 2I-4). 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 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.

APPR
LAND



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POST LANDING AND SHUTDOWN PROCEDURES

POST LANDING CHECKS

1. AFCS — Disengage.
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 BRAKE 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. Avionics — As required.
7. PITOT HEATER switches — OFF (if used).
8. 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 120 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.

POST LD
SHT DN

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| 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 below 0%.

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| 11. BATTERY MASTER and GENERators | — OFF. |
| 12. MAIN and AUX BATTERies | — 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 repressurization of the system.

**POST LD
SHT DN**

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 10000ft 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 15000ft) 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 *	35ft

FD/FMS
OPER

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 All other conditions	Variable *	15 ft 75 ft
TDH	All conditions	Variable *	35 ft
TD	All conditions	Variable *	75 ft
VPTH	All conditions	Variable *	150 ft

* Safety Height = Rad Alt Reference - $(7 + 1/8 \times \text{Rad Alt Reference})$

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

SPECIFIC MODE INFORMATION

ALT Barometric Altitude Hold Mode.

CAUTION

In ALT mode the voice message "Altitude Altitude" is triggered when altitude exceeds the reference altitude by $\pm 150\text{ft}$.

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.

**FD/FMS
OPER**

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.

GA Go Around Mode.

Note

This mode can be used, when the IAS is greater than 60 KIAS, to recover the aircraft from an unusual attitude and initiate a rate of climb at 1000 fpm.

ALVL Autolevel Mode.

CAUTION

In VGP mode, 4 axis FD system only, the ALVL will not activate if the MAP (Missed Approach Point) is lower than 150 ft AGL.

When MAP is higher than 150 ft the VGP mode will disengage at the MAP (preceded, at 100 ft above, by a Vertical Track Alert (VTA) caption displayed above the vertical guidance scale on PFD) and a chime is generated.

RHT Radar Height Hold Mode.

CAUTION

In RHT mode the voice message "Altitude Altitude" is triggered when height exceeds the reference 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 reference altitude by ± 150 ft. Therefore, if ALT mode is engaged as an alternative to RHT, at a height below 300ft, set DH at a value 10 ft below the reference height in order to have an additional height deviation exceedance cue.

**FD/FMS
OPER**

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 2000ft AGL the ALT mode does not automatically engage. Therefore the pilot must control collective manually or engage ALT mode.

TD/TDH/MOT Transition Down, Transition Down to Hover, Mark On Target (Enhanced FD Phase 5, or later, with SAR Modes only).

Note

When TD, TDH or MOT modes are selected the CAS caution and audio message 'LANDING GEAR' are inhibited.

**FD/FMS
OPER**

FMS OPERATION NORMAL PROCEDURES

GENERAL

Normal operating procedures are outlined in the Honeywell Flight Management System (FMS) Pilots Manual for the Agusta AW/AB 139.

Note

For complete FMS operations, refer to the Honeywell Flight Management System (FMS) Pilot Manual for the AW/AB139.

In the GPS status page (MCDU) RAIM (Receiver Autonomous Integrity Monitor) and FOM (Figure of Merit) are displayed. RAIM and FOM indicate current uncertainty of position expressed in nautical miles. In addition to RAIM for current condition, the GPS receiver predictive RAIM calculation gives the pilot an indication as to whether the GPS geometry will be satisfactory for approach at the selected or expected arrival time. YES indicates RAIM is predicted to be within approach criteria. NO indicates RAIM is predicted to be unacceptable or unavailable.

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.

**FD/FMS
OPER**

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

In VFR flight, the pilot can fly VPATH indication in day VMC only.

- 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

The pilot must not fly VPATH indication unless:

- when under ATC control
 - flying a published approach
- or**
- during VMC Day conditions

CAUTION

When the vertical profile includes two consecutive slopes with different angles, a discontinuity in the vertical indicator may be shown at the transition.

**FD/FMS
OPER**

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 (IF FITTED)

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 an advisory (**amber**) annunciator that is displayed on the PFD (first line below PI indicator). This annunciator is displayed when a message is shown in the scratchpad. The annunciator is removed after the message has been cleared from the scratchpad.

Messages are displayed in the MCDU scratchpad at various times. They inform or alert the pilot as to system status.

Messages are divided into the following two major groups:

- **ADVISORY MESSAGES.** Advisory messages contain information that is helpful to the pilot. Advisory messages are usually the result of a pilot action on the MCDU (e.g., making an entry with the incorrect format).
- **ALERTING MESSAGES.** Alerting messages alert the pilot to the FMS status, assuming the pilot is not looking at the MCDU (e.g., message annunciating, sensor failure).

**FD/FMS
OPER**

Messages are stacked for display in priority order on a first in, last out basis. In cases where there are multiple messages stacked, the message annunciator remains displayed until all messages are cleared. Only one message can be cleared per CLR key push.

b) Offset (OFST)

OFST is an advisory (**green**) annunciator on the PFD (along side way-point 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 way-point 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, SDF or MLS 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.
- The FMS must be using approved sensors for the selected approach procedure. Approved sensors for non precision approach procedures are described in table below:

Approach procedure	Approved Sensors (Navigation Mode)		
	GPS	DME-DME	VOR/DME
GPS/RNAV	X		
VOR/DME	X	X	X
VOR	X	X	X (see note)
NDB	X	X	
NOTE: VOR approaches with a procedure specified navaid that does NOT have DME capability can be flown by the FMS only if GPS or DME/DME is available			

**FD/FMS
OPER**

ADVISORY CAPTIONS 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	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	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) WTR button pressed and function not fitted
WTR NOT INSTALLED	(Caption present for 5secs) WTR button pressed and function not fitted

CAS Caption (White) System State

MAINTENANCE	(Caption only active on ground) Informs maintenance crew to interrogate maintenance system. No pilot action.
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CAPTS
MSGs

CAS Caption (White) System State

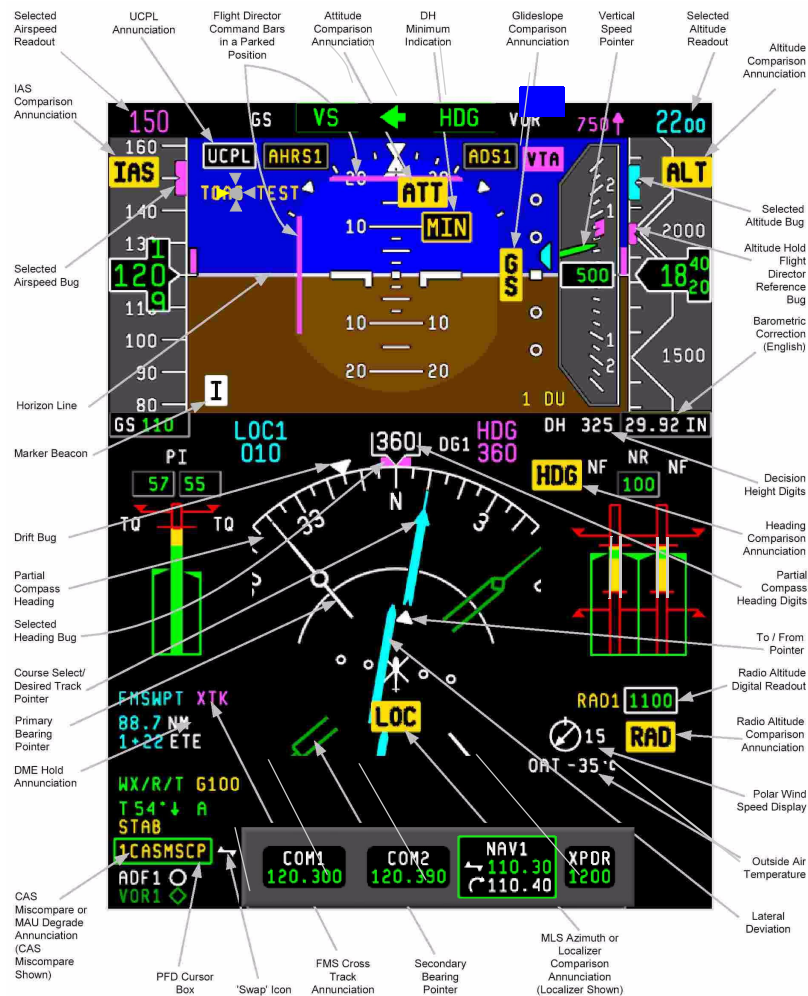
NOSE FAN 1(2) OFF (Caption only active on ground)
 Informs crew that associated nose bay vent fan has failed. No pilot action.

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

PFD MESSAGES

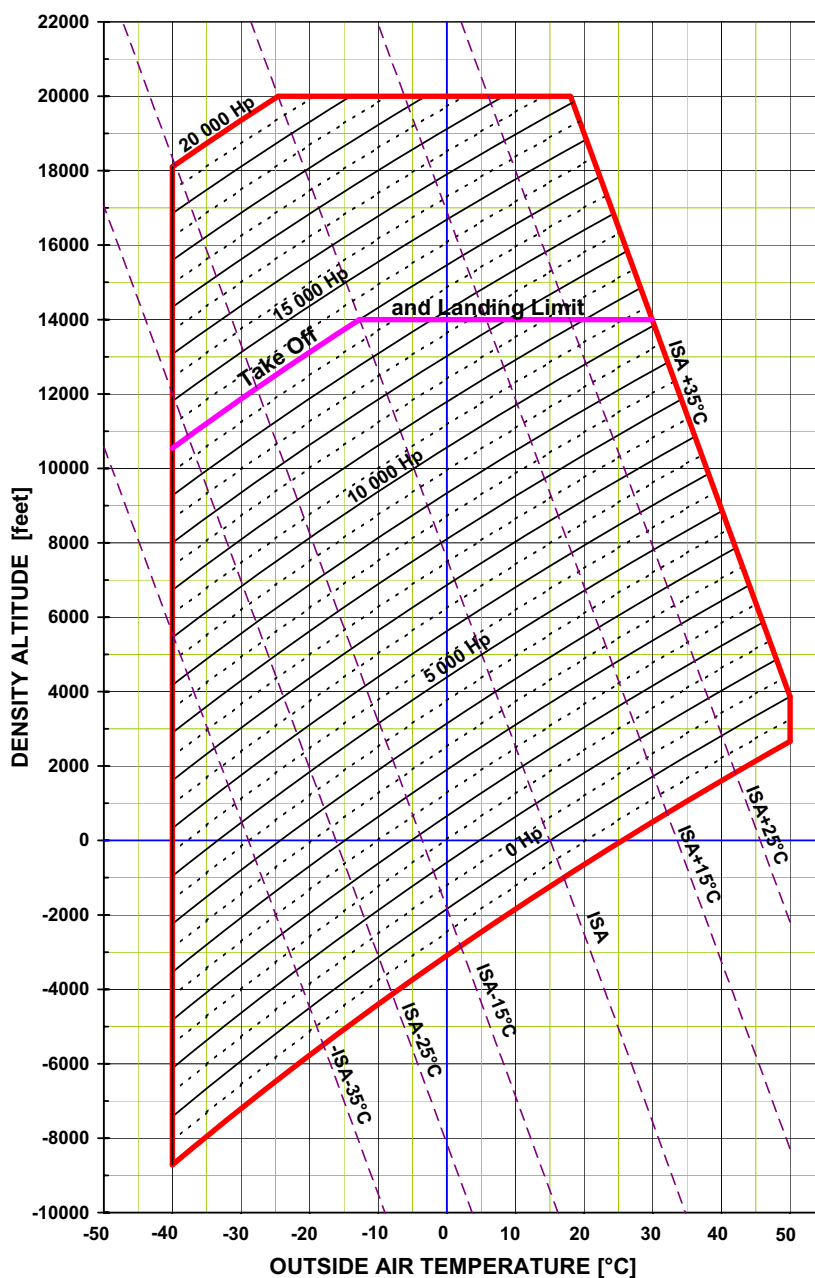


CAPTS
MSGs

PFD Messages

PERFORMANCE

DENSITY ALTITUDE CHART



Hd PAV
FLYAWAY

PWC\PT6C-67C HOVER POWER CHART 100%NR

Hd PAV
FLYAWAY

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.

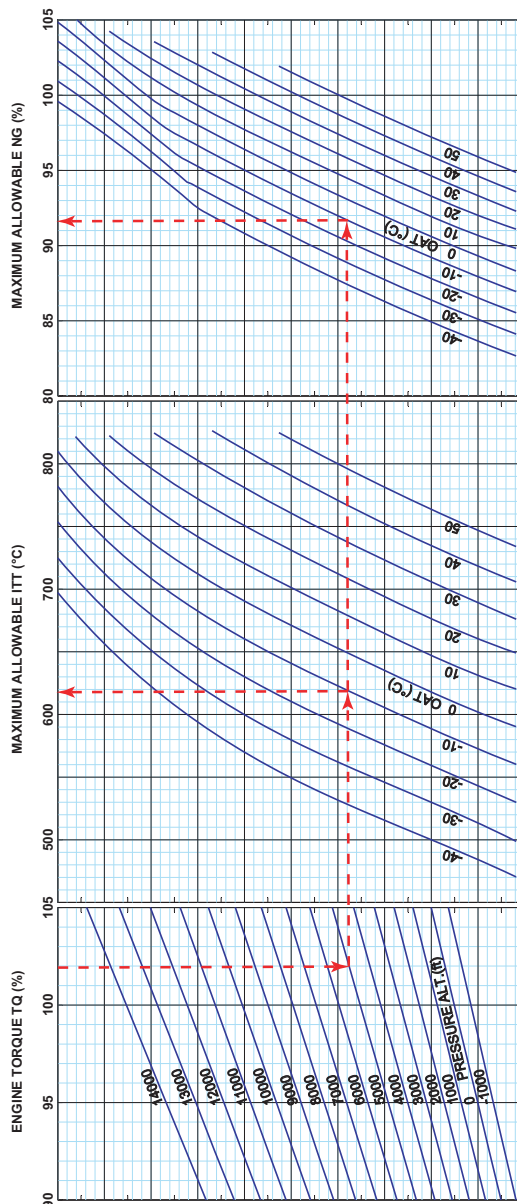
ENTER CHART AT INDICATED TQ. MOVE DOWN TO INTERSECT PRESSURE ALTITUDE. PROCEED TO THE RIGHT TO INTERSECT OAT.

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.



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PWC\PT6C-67C HOVER POWER 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

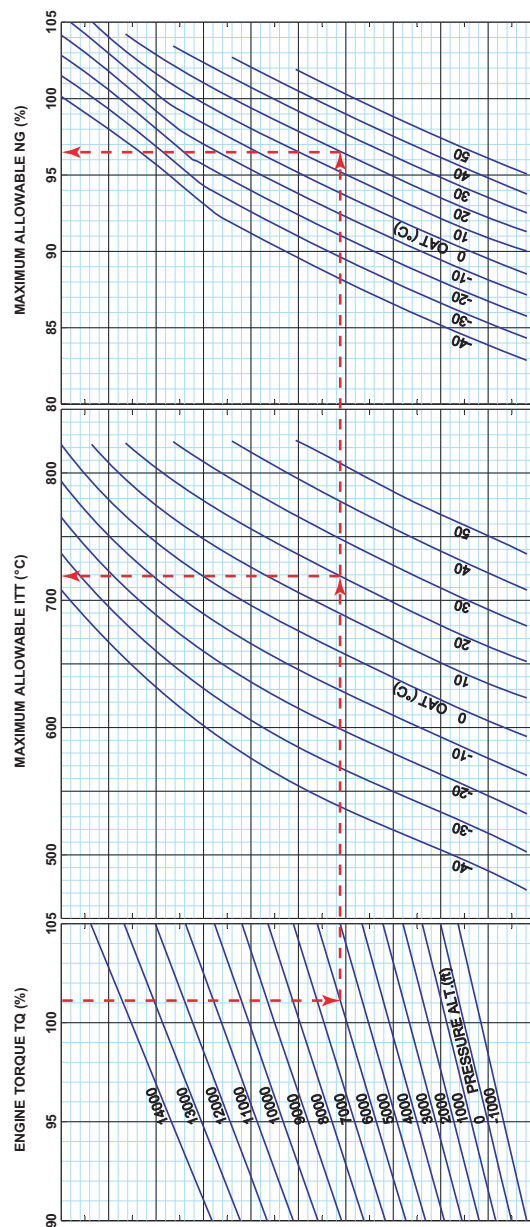
ENTER CHART AT INDICATED TQ. MOVE DOWN TO INTERSECT PRESSURE ALTITUDE. PROCEED TO THE RIGHT TO INTERSECT OAT.

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

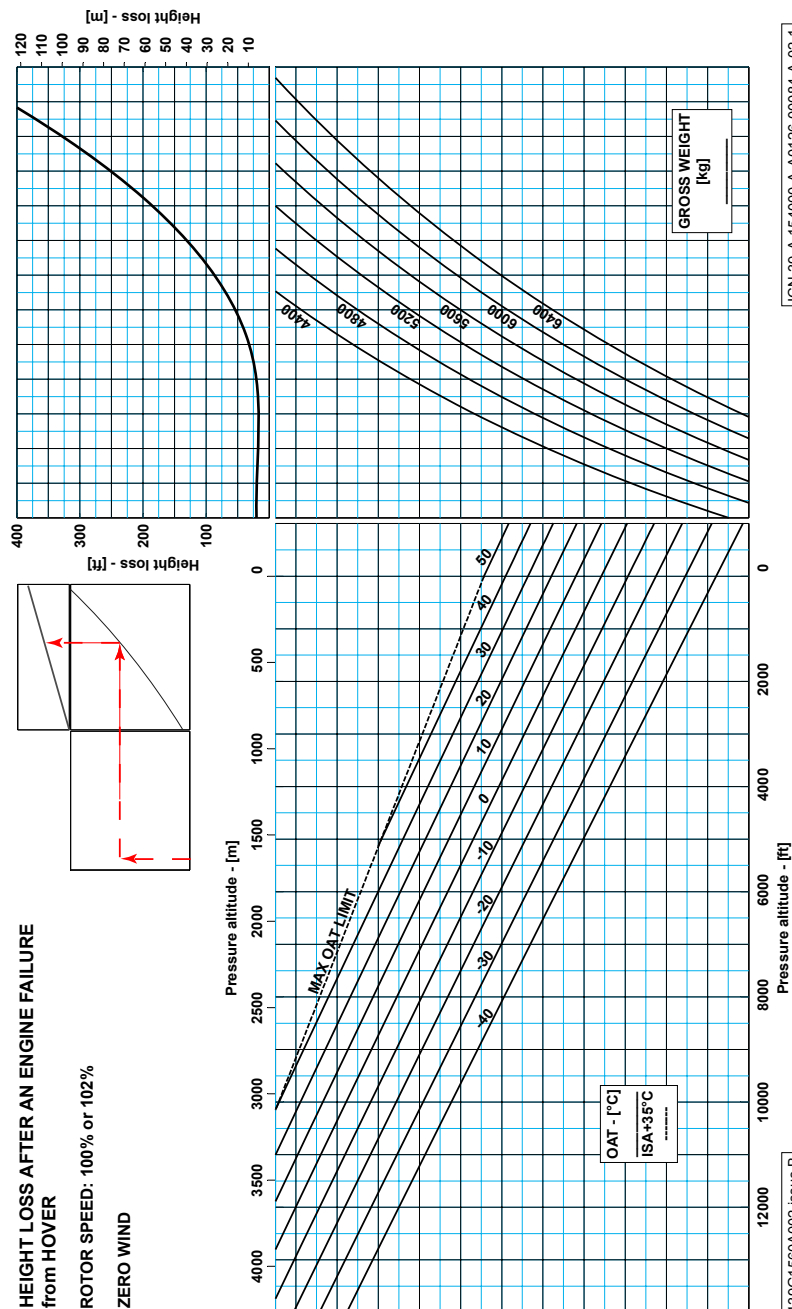


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Hd PAV
FLYAWAY

HEIGHT LOSS DURING FLYAWAY MANOEUVRE



Hd PAV
FLYAWAY

HOVER CEILING						
OAT	-40°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
IGE Hover ceiling TOP AEO						
Weight 5000kg						
ft Hp	>18000	>18000	>18000	>18000	>18000	14200
Weight 5500kg						
(ft Hp)	>18000	>18000	>18000	16300	15200	14000
Weight 6000kg						
(ft Hp)	>18000	17500	17000	15000	13500	11000
Weight 6400kg						
(ft Hp)	17800	15700	15300	13000	11500	9000
IGE Hover ceiling MCP AEO						
Weight 5000kg						
ft Hp	>18000	>18000	>18000	>18000	15200	14200
Weight 5500kg						
(ft Hp)	>18000	>18000	>18000	16000	14000	10500
Weight 6000kg						
(ft Hp)	>18000	16400	16000	13000	11000	6000
Weight 6400kg						
(ft Hp)	16900	14800	14000	11300	8300	1000
IGE Hover ceiling 2.5 min OEI						
Weight 5000kg						
ft Hp	13300	11500	10000	8000	6500	4700
Weight 5500kg						
(ft Hp)	11000	9000	7000	5000	3000	1000
Weight 6000kg						
(ft Hp)	9000	7000	4200	2000	100	—
Weight 6400kg						
(ft Hp)	4000	1500	—	—	—	—
IGE Hover ceiling MCP OEI						
Weight 5000kg						
ft Hp	12000	11000	7700	5000	1450	—
Weight 5500kg						
(ft Hp)	9000	8000	4400	1000	—	—
Weight 6000 to 6400kg						
(ft Hp)	—	—	—	—	—	—

HVR ROC
FL CONS

OAT	-40°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
OGE Hover ceiling TOP AEO						
Weight 5000kg						
ft Hp	>18000	>18000	>18000	16300	14800	12800
Weight 5500kg						
(ft Hp)	18000	16000	16000	13500	11800	9500
Weight 6000kg						
(ft Hp)	16000	14000	13000	10800	9000	6000
Weight 6400kg						
(ft Hp)	12000	10000	8000	6100	5100	3000
OGE Hover ceiling MCP AEO						
Weight 5000kg						
ft Hp	>18000	17700	17000	14500	12300	7500
Weight 5500kg						
(ft Hp)	17000	15000	14000	11500	8500	1000
Weight 6000kg						
(ft Hp)	12000	10000	8000	6000	4500	—
Weight 6400kg						
(ft Hp)	6000	3700	100	—	—	—
OGE Hover ceiling 2.5 min OEI						
Weight 5000kg						
ft Hp	9800	7700	5250	3000	1350	—
Weight 5500kg						
(ft Hp)	5000	2500	—	—	—	—
Weight 6000 to 6400kg						
(ft Hp)	—	—	—	—	—	—
OGE Hover ceiling MCP OEI						
Weight 5000kg						
ft Hp	4000	2000	—	—	—	—
Weight 5500kg						
(ft Hp)	—	—	—	—	—	—
Weight 6000 to 6400kg						
(ft Hp)	—	—	—	—	—	—

HVR ROC
FL CONS

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 5000ft						
ft/min	2100	2100	2100	2100	2100	2000
Altitude 10000ft						
ft/min	2100	2100	2000	2000	1700	1400
Altitude 15000ft						
ft/min	2000	1600	1500	1100	800	400
ROC @ MCP AEO						
Altitude 2000ft						
ft/min	1800	1800	1800	1800	1800	1200
Altitude 5000ft						
ft/min	1800	1800	1800	1800	1700	1100
Altitude 10000ft						
ft/min	1800	1700	1700	1600	1200	800
Altitude 15000ft						
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 2000ft						
ft/min	1100	1100	1100	1000	900	700
Altitude 5000ft						
ft/min	1100	1100	1000	800	600	400
Altitude 10000ft						
ft/min	900	700	500	300	100	—
Altitude 15000ft						
ft/min	200	—	—	—	—	—
ROC @ MCP OEI						
Altitude 2000ft						
ft/min	700	700	700	600	400	100
Altitude 5000ft						
ft/min	700	700	700	400	200	—
Altitude 10000ft						
ft/min	700	500	300	—	—	—
Altitude 15000ft						
ft/min	—	—	—	—	—	—

HVR ROC
FL CONS

FUEL CONSUMPTION AT 6400kg

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)	—	—	—	—	—

HVR ROC
FL CONS

HOVER CEILING 6800 kg (if applicable)

OAT	-30°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
IGE Hover ceiling TOP AEO						
Weight 6800kg						
ft Hp	>8000	>8000	>8000	—	—	—
IGE Hover ceiling MCP AEO						
Weight 6800kg						
ft Hp	>8000	>8000	>8000	—	—	—
OGE Hover ceiling TOP AEO						
Weight 6800kg						
ft Hp	5600	4500	1500	—	—	—
OGE Hover ceiling MCP AEO						
Weight 6800kg						
(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 5000ft						
ft/min	1920	1920	1900	1880	1860	1650
Altitude 8000ft						
ft/min	1920	1900	1850	—	—	—
ROC @ MCP AEO						
Altitude 2000ft						
ft/min	1600	1600	1600	1600	1500	1060
Altitude 5000ft						
ft/min	1600	1600	1780	1560	1460	950
Altitude 8000ft						
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 2000ft						
ft/min	950	950	950	900	700	520
Altitude 5000ft						
ft/min	950	950	800	620	450	300
Altitude 8000ft						
ft/min	860	740	500	—	—	—

HVR ROC
6800 kg

OAT	-30°C	-20°C	ISA	ISA+15	ISA+25	ISA+35
ROC @ MCP OEI						
Altitude 2000ft						
ft/min	620	620	600	520	300	10
Altitude 5000ft						
ft/min	620	620	550	510	110	-120
Altitude 8000ft						
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)	—	—	—

HVR ROC
6800 kg

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	ROTOR XMSN
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	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

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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. "LANDING GEAR" | 10. "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 19	WARNING	None	Automatic reversion of associ- ated engine to manual mode
MGB OIL PRESS page 30	WARNING	None	Low pressure in MGB lubricat- ing systems (less than 3.1 bar)
MGB OIL TEMP page 30	WARNING	None	Overheating of MGB lubricating system (greater than 109°C)
1(2) ENG OIL PRESS page 19	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 ONLY 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)

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.

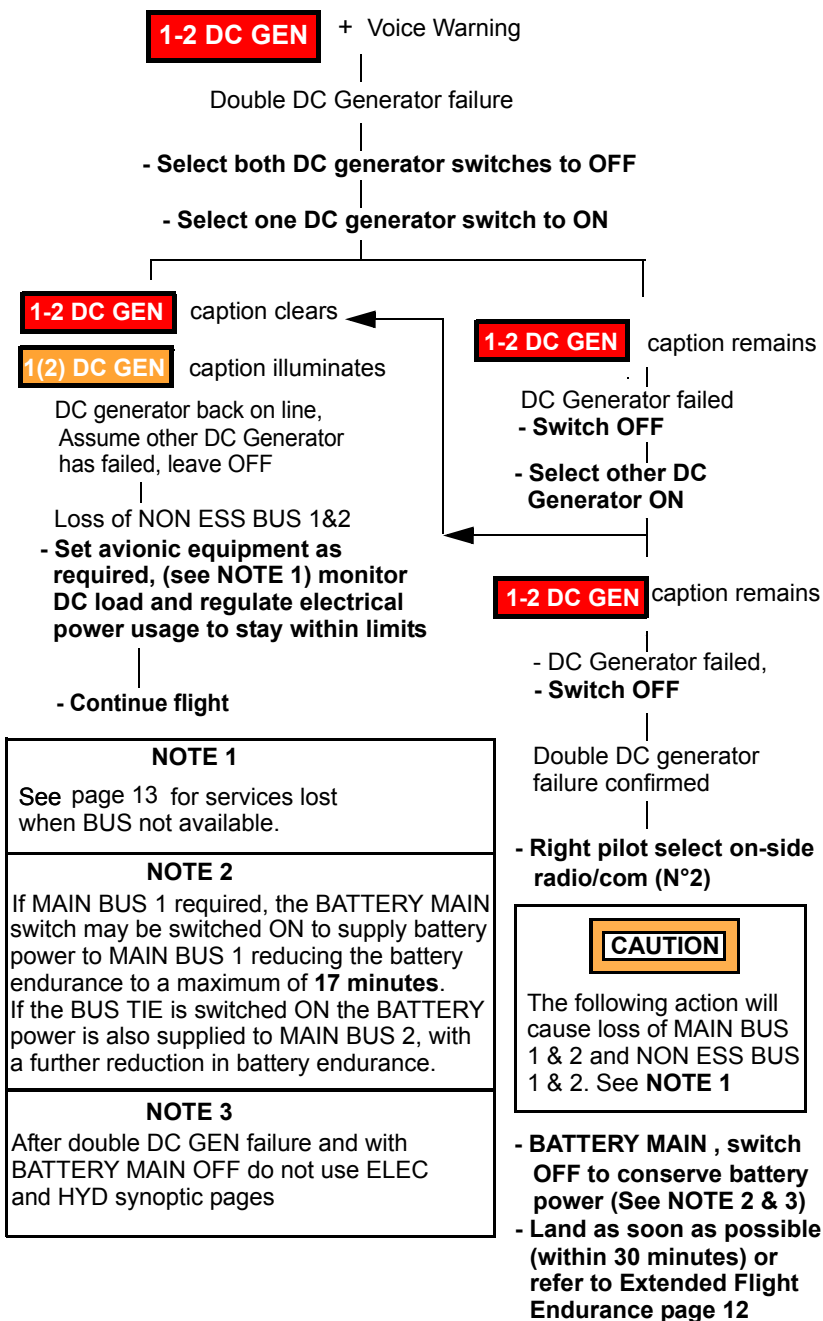
EMERGENCY LANDING GUIDANCE

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

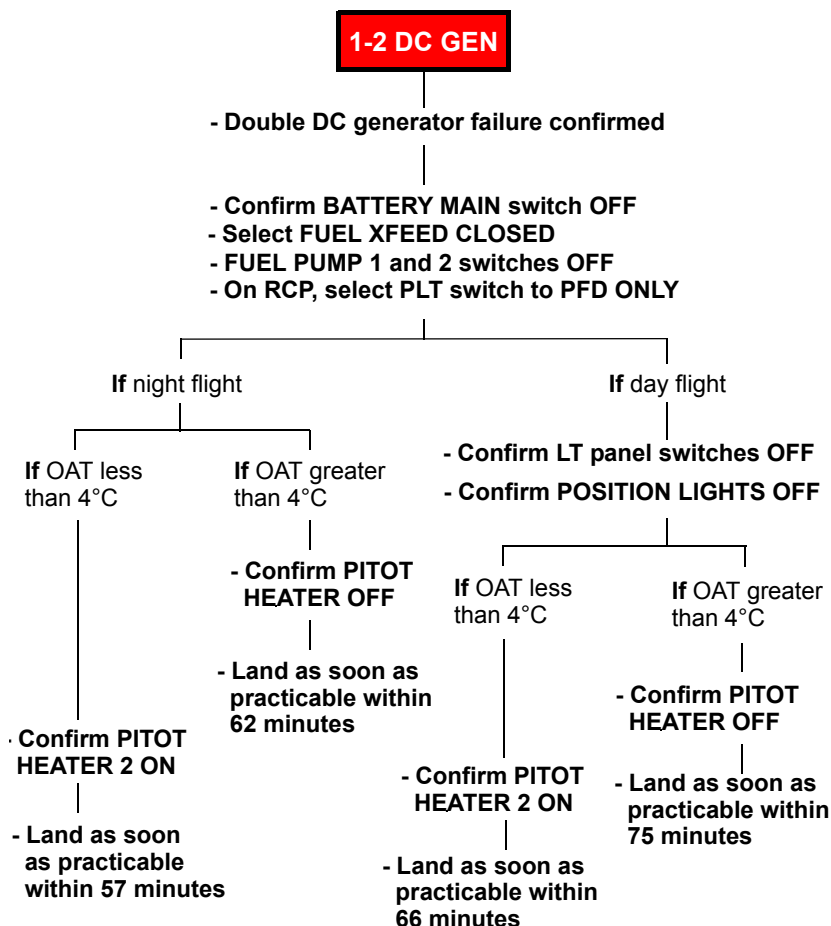


ELEC

ELEC

**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.



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

ELEC
DC NON ESS BUS 1

CABIN VENT
 COCKPIT VENT (CPLT)
 CPLT W/WIPE
 ECS (COCKPIT)
 FUEL DRAIN VALVE
 STEP LIGHT

DC NON ESS BUS 2

ECS (CABIN)
 EXT/SPKR POWER

ELEC

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

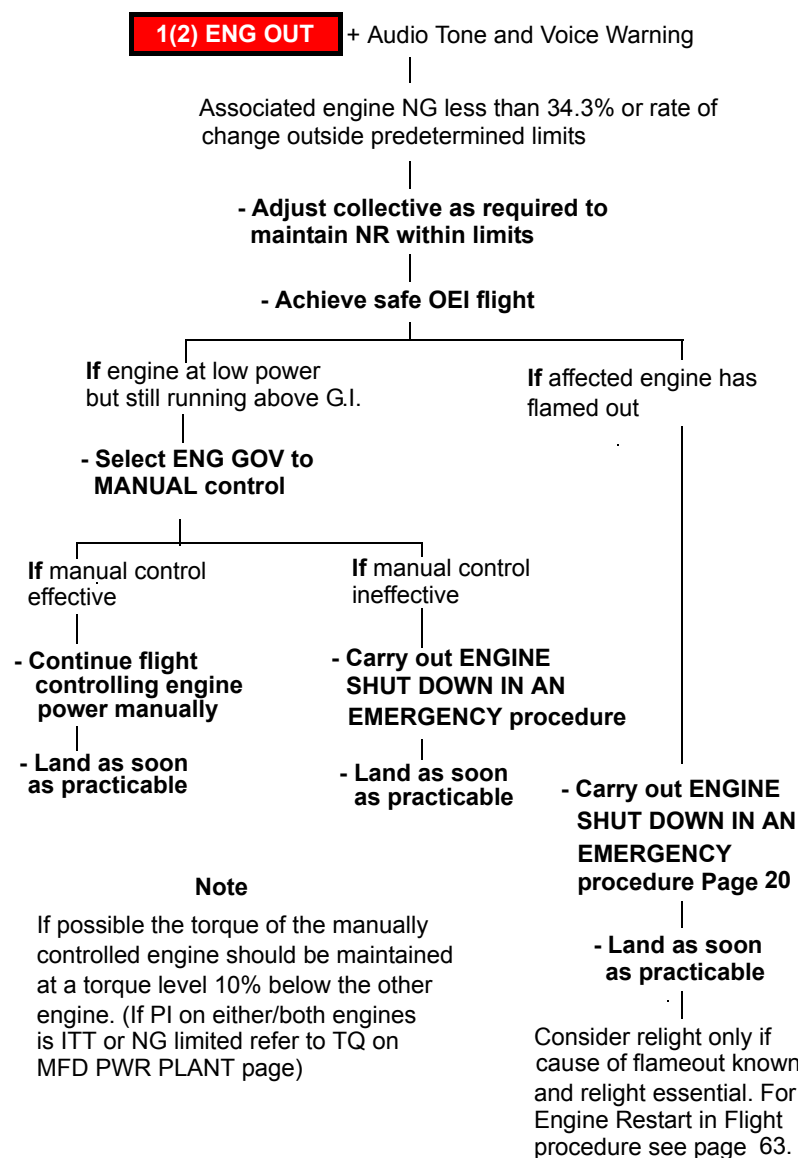
- Switch BATTERY AUX OFF, Switch BATTERY MAIN OFF
- Continue flight

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



ENG FAIL
SHT DWN

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 AN EMERGENCY** procedure Page 20

- 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

**ENG FAIL
SHT DWN**

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 63 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 to 110% 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.
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.

**ENG FAIL
SHT DWN**

ENG FAIL
SHT DWN

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 66 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. Climb — 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.

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 airspeed 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.

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 AN EMERGENCY** procedure page 20

- Land as soon as practicable

**ENG FAIL
SHT DWN**

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)

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
2. FUEL PUMP switch — OFF, unless required for crossfeed
3. ENG FUEL switch — OFF, fuel valve indicator horizontal
4. HEATER SOV 1 & 2 — CLOSE
(if fitted)
5. COND/HEATER — OFF, (HEATER ON or AIR COND ON
(if fitted) 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.
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 PARK (Braking from 90% NR permitted in an Emergency)

When rotor stopped.

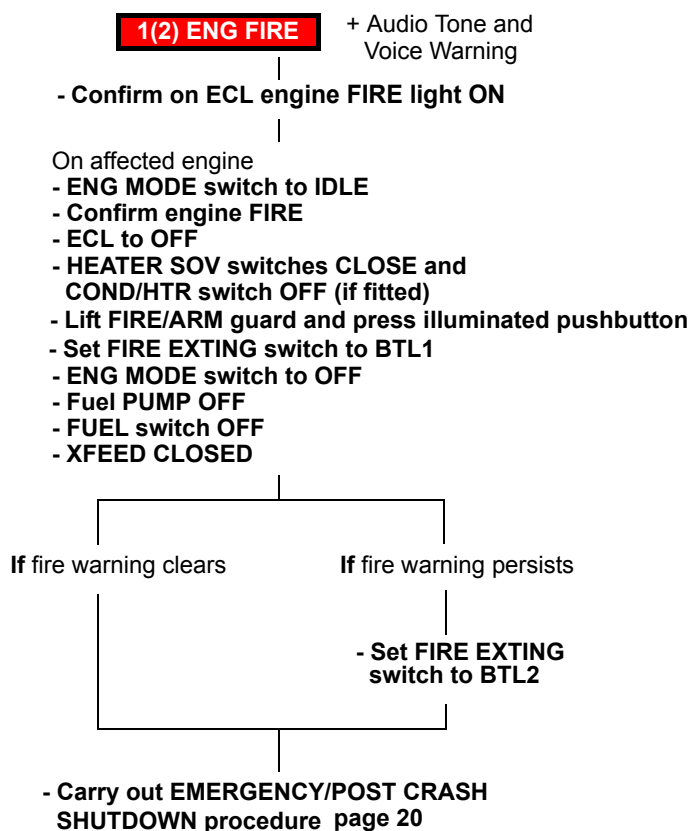
7. GEN 1 & 2 and BATT MASTER switches — OFF (using gang-bar).

**ENG FAIL
SHT DWN**

FIRE

In the event of smoke or fire, prepare to land the aircraft without delay while completing fire suppression and/or smoke evacuation procedures. If it cannot be visually verified that the fire has been completely extinguished, whether the smoke has cleared or not, land immediately at the nearest suitable airfield or landing site.

ENGINE BAY FIRE (GROUND)



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.

FIRE

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

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.

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

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.

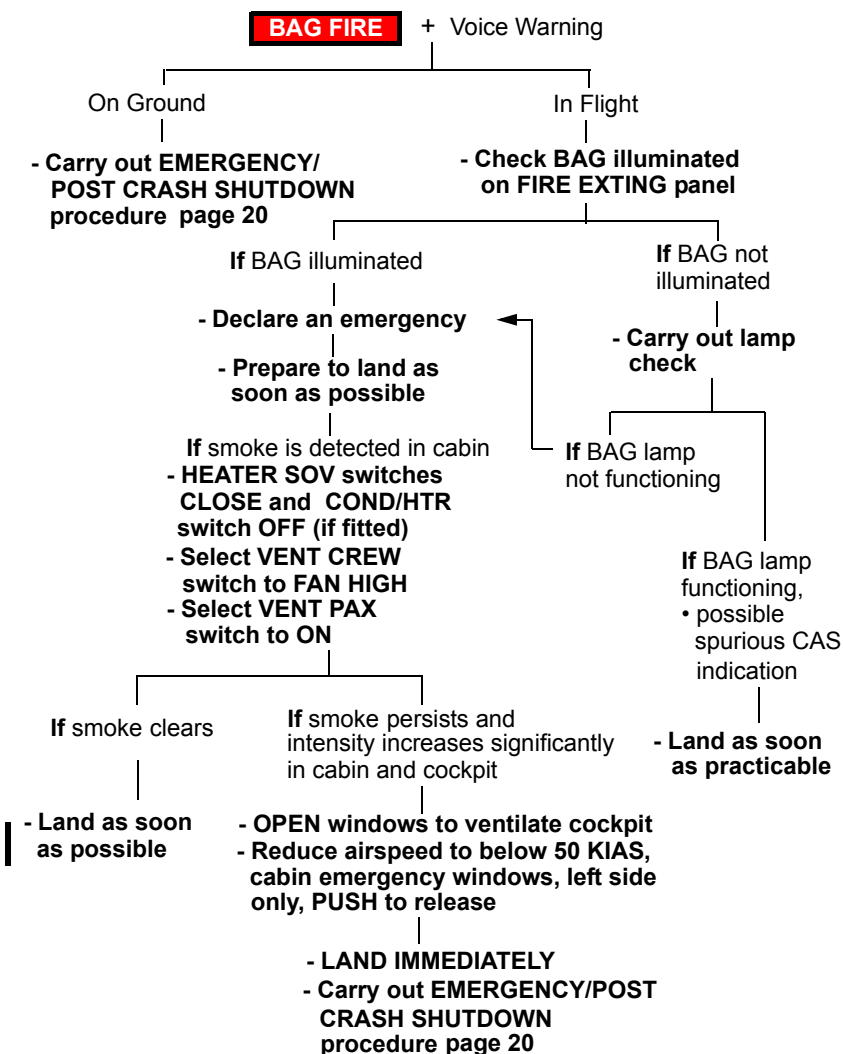
ENGINE EXHAUST FIRE AFTER SHUTDOWN

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

BAGGAGE BAY FIRE

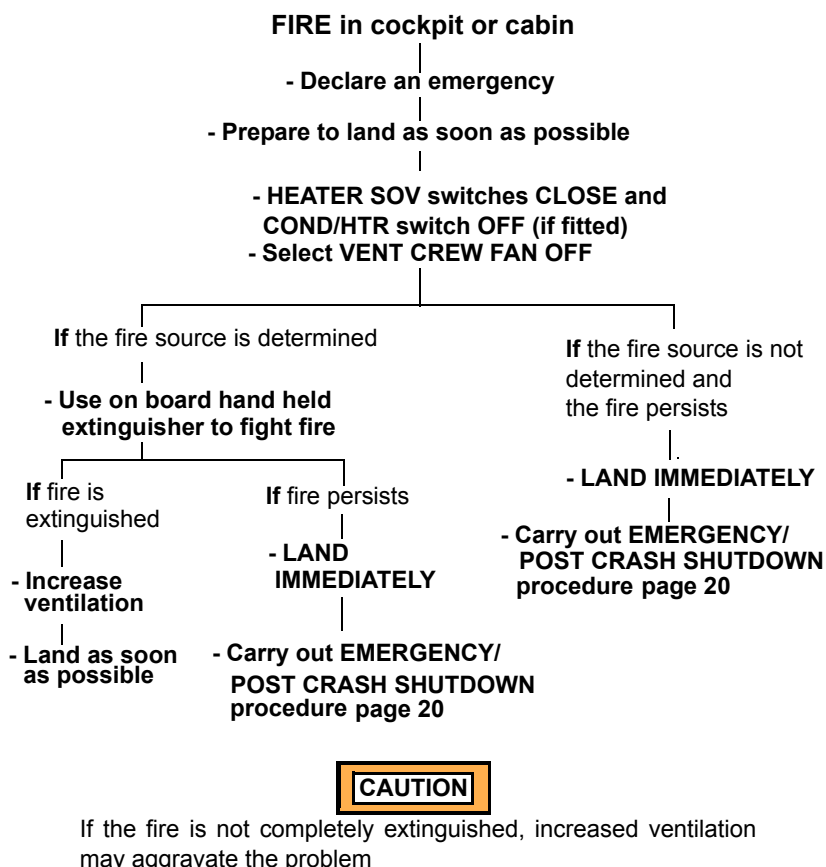


COCKPIT / CABIN FIRE (GROUND)

- 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



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.

**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. If the source of the smoke or fire can be positively identified remove electrical power to the equipment, either by switching off, or by pulling the associated circuit breaker.

If the source of the smoke or fire cannot be positively identified, carry out the procedure detailed on next page.

FIRE

**UNMAINTAINED COPY
FOR INFORMATION ONLY**

ELECTRICAL FIRE/SMOKE PROCEDURE (FLIGHT)

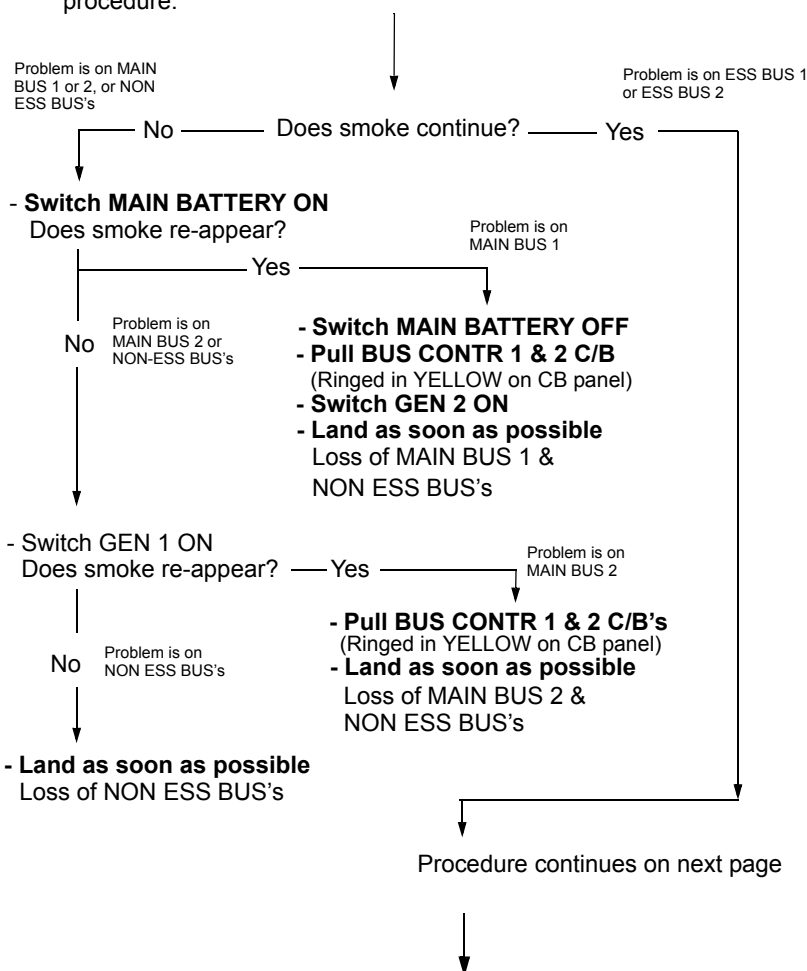
FIRE

- Right pilot select on-side radio/com (N°2)
- Switch FLOOD LT ON (for night operation)
- Switch GEN 1 & GEN 2 OFF
- Switch BATTERY MAIN OFF
- Loss of NON-ESS BUS 1 & 2, MAIN BUS 1 & 2
- Open windows to ventilate cockpit
- If operational conditions permit
- Land as soon as possible

Note

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

If unable to land and continued flight necessary continue the following procedure:



ELECTRICAL FIRE/SMOKE PROCEDURE (FLIGHT) Cont.

Continues from previous page

Yes

- Pull BUS CONTR 1 & 2 C/B's
- Pull ESS BUS TIE C/B
(Ringed in YELLOW on CB panel)
- Switch GEN 1 ON
- Re-engage AP1
- On RCP select AHRS and
ADS switches to "1"
- Pull AUX BATT C/B
(Ringed in YELLOW on CB panel)

Does smoke continue?

No

Problem is on
ESS BUS 2

- Land as soon as possible
Loss of ESS BUS 2, MAIN
BUS 2 & NON ESS BUS's

Problem is on
ESS BUS 1

Yes

- Land as soon as possible
- Reset BUS CONTR 1 & 2,
ESS BUS TIE &
AUX BATT C/B's.
At pilot's discretion
- Pull ESS BUS 1 services
C/B's as deemed necessary.
(Ringed in BLUE on C/B panel,
except IGN 1 ringed in WHITE)

Note

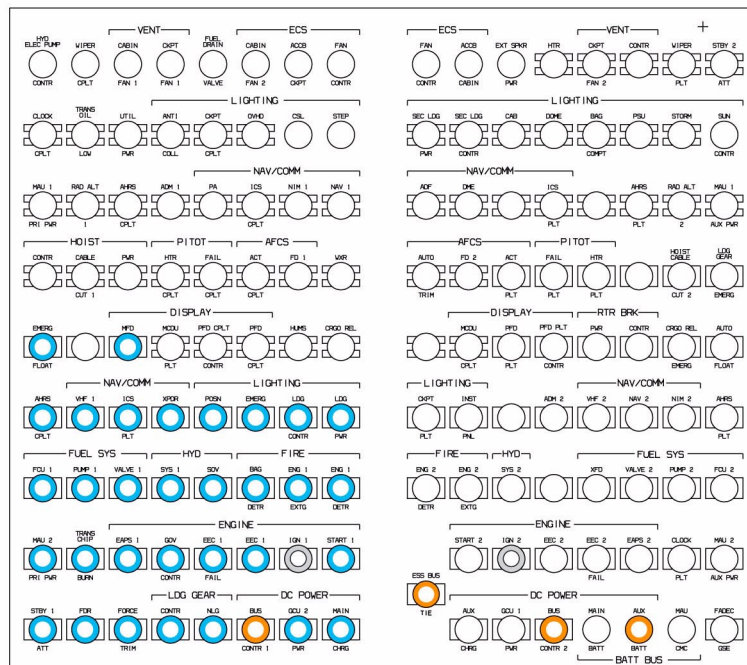
Circuit Breaker panel diagram shown on next page.

CAUTION

Pulling the FORCE TRIM C/B will cause the FTR switches to be inoperative. Flight controls must therefore be moved against the trim spring.

FIRE

FIRE



ICN-39-A-157000-A-00003-00215-A-01-1

Overhead Circuit Breaker Panel

ELECTRICAL FIRE/SMOKE PROCEDURE (FLIGHT)

- Reduce speed, recommended Vy
- Open windows to ventilate cockpit

If operational conditions permit

- Land as soon as possible

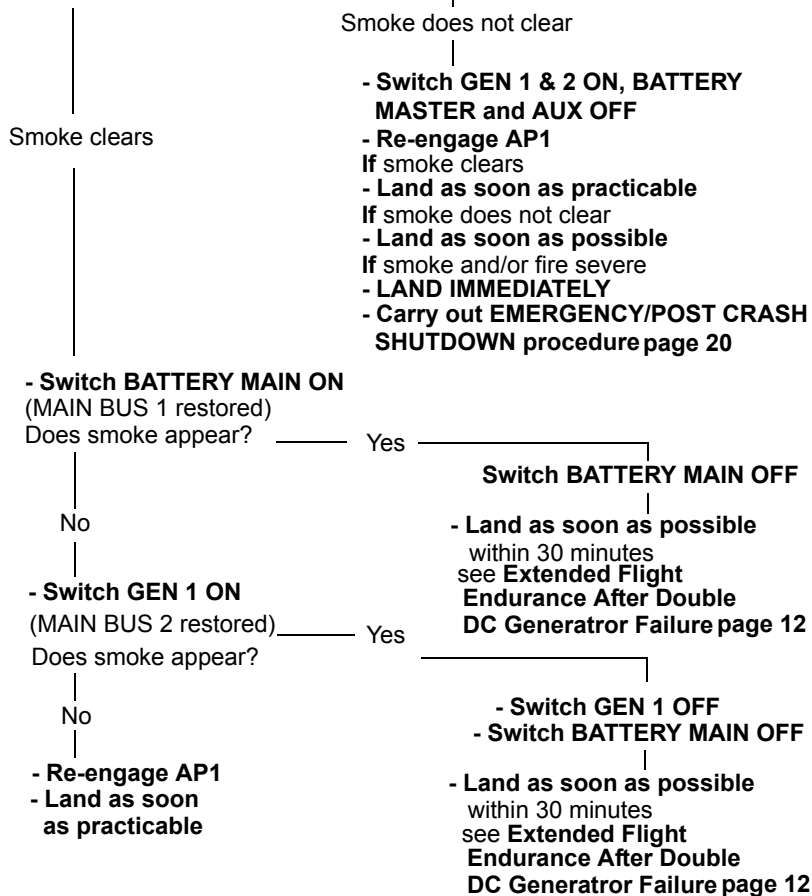
- Right pilot select on-side radio/com (N°2)
- Switch pilot UTILITY light ON (for night operation)
- Set MFD to PWR PLANT page to monitor continuously
ESS BUS 2 voltage during the complete procedure
- Switch GEN 1 & GEN 2 OFF
- Switch BATTERY MAIN OFF (Loss of NON-ESS BUS 1 & 2, MAIN 1 & 2)

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



FIRE

FIRE

WHEEL BRAKE FIRE

ON GROUND

When aircraft is stationary:

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

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

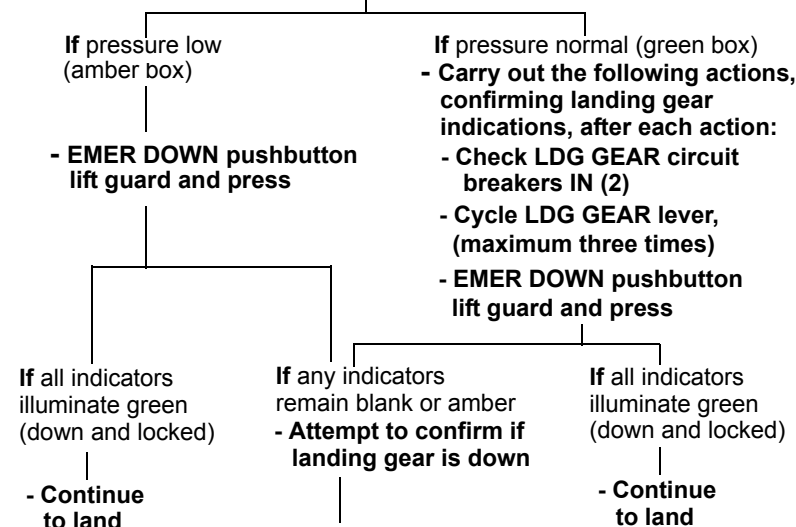
Consider using one of the cabin hand fire extinguishers or other available extinguishers to extinguish the fire.

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)



LDG GR
STC PRT

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.

Note

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

LDG GR
STC PRT

STATIC PORT OBSTRUCTION

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

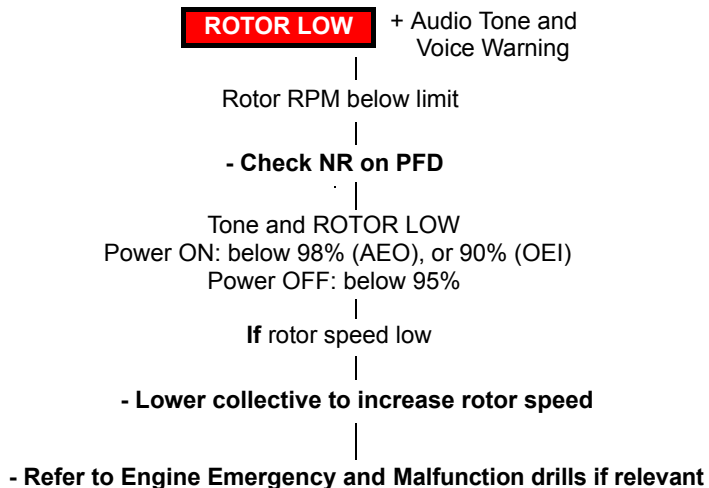
1. Storm window and vents — Closed
2. COND/HEATER (if installed) — OFF
3. STATIC source switch — Remove guard and select ALTERNATE
4. Proceed with flight

This procedure selects an alternate static source utilizing cabin air.

CAUTION

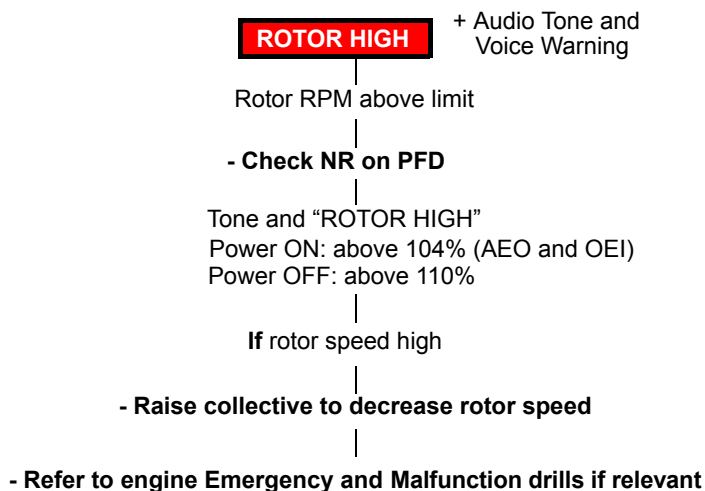
When utilizing the alternate static source, decrease the altimeter reading by 200ft

ROTOR UNDER-SPEED



**ROTOR
XMSN**

ROTOR-OVERSPEED



TRANSMISSION SYSTEM FAILURES

In general a single failure indication dictates that the helicopter **Land as soon as practicable** while a double failure dictates **Land as soon as possible**. If multiple failure indication, including abnormal noise and/or vibration are present **LAND IMMEDIATELY**

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 low, invalid and/or caution illuminates
1-2 BRG TEMP

- Reduce power as soon as operational conditions permit

- Land as soon as possible

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.

ROTOR
XMSN

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 as soon as operational conditions permit

- Land as soon as possible

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	42	Associated ADS failed
AFCS DEGRADED	40a	AFCS functioning degraded
1(2) AHRS FAIL	43	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	40a	AFCS Test procedure aborted (only active on ground)
ATT OFF	39	AFCS attitude mode OFF
1(2)-(8) AUDIO FAIL	48	Associated audio system failed
AUX BATT OFF	50	Auxiliary battery off line
AVIONIC FAULT	44	Avionic fault
AWG FAIL	43	Aural warning generator failed
BAG DOOR	77	Baggage door open
BATT OFF LINE	51	MAIN battery and/or AUX battery not connected to ESS BUS
1(2) BRG TEMP	89	Associated ENG-MGB input bearing over heating
BUS TIE OPEN	51	DC MAIN bus tie open
CABIN DOOR	77	Cabin door open
CHIP DET TEST	91	Drive system chip detect testing system failed
CHIP DET UNIT	91	Drive system chip detect unit failed
CHIP MAST FAIL	91	Chip detector on main gearbox mast failed
CHIP SUMP FAIL	91	Chip detector on main gearbox sump failed
COCKPIT DOOR	76	Cockpit door open
1(2) COL FAIL	40c	Collective Autopilot Failure
CVR FAIL	47	Cockpit voice recorder failed
DC BUS FAIL	52	DC bus failed
1(2) DC GEN	49	Associated generator failed
1(2) DC GEN HOT	49	Associated generator overheating

**CAUTION
MSGs**

**CAUTION
MSGs**

CAS Caption	Page	Failure/System State
1(2) DCU	59	Associated engine control functions degraded
1(2)(3)(4) DU OVHT	42	Associated display unit overheating
1(2)(3)(4) DU DEGRADED	42	Associated display unit degraded
1(2) ECL FAIL	57	Associated engine control lever beep trim failed
1(2) ECL POS	57	Associated engine control lever out of flight position.
1(2) EEC DATA	58	Associated engine data degraded
EMER LDG PRESS	70	Emergency landing gear deployment system pressure low
ENG ANALOG FAILURE	62	Engine analogue monitoring systems failed
1(2) ENG CHIP	55	Associated engine chip detected
1(2) ENG LIM EXPIRE	54	Associated engine exceeded 2.5min OEI rating.
1(2) ENG MODE SEL	57	Associated engine MODE switch failed
1(2) ENG OIL TEMP	54	Associated engine oil overtemp (> 140°C)
EXT PWR DOOR	77	External Power door open
1(2) FCU FAIL	66	Associated fuel contents gauging unit failed
1(2) FCU TEST FAIL	68	Associated fuel contents gauging unit self test failed (only active on ground)
FDR FAIL	46	Flight data recorder failed
1(2) FIRE DET	56	Associated fire detect system failed
1(2) FMS FAIL	47	Associated FMS failed
1(2) FMS/GPS MSCP	47	Miscompare between FMS and GPS position data
FMS/GPS MSCP UNAVL	48	FMS/GPS position data checking function not available
1(2) FUEL FILTER	60	Associated fuel filter impending bypass
1(2) FUEL HEATER	61	Fuel heater system failed
1(2) FUEL ICING	61	Associated fuel temperature less than 5°C
1(2) FUEL LOW	65	Associated fuel level less than 92kg
1(2) FUEL LOW FAIL	67	Associated fuel low sensor failed
1(2) FUEL PROBE	67	Associated fuel contents probe failed
1(2) FUEL PUMP	65	Associated fuel pump failed (< 0.6 bar)
FWD(AFT) COND FAIL	78a	Crew(PAX) conditioner failure
1(2) GEN OVLD	50	Associated DC Generator Overload (EPIC Phase 5, or later)
GPS FAIL	47	GPS failed
HEATER FAIL	78a	Heater system failed

CAS Caption	Page	Failure/System State
1(2) HOT START	59	Associated engine ITT limits exceeded on engine starting
1(2) HYD MIN	71	Associated hydraulic system fluid level low
1(2) HYD OIL PRESS	69	Associated hydraulic system pressure low (less than 163 bar)
1(2) HYD OIL TEMP	70	Associated hydraulic system overtemp (greater than 134°C)
1(2)(4) HYD PUMP	71	Associated hydraulic pump failed
HYD UTIL PRESS	69	Utility hydraulic pressure low
IGB CHIP	90	Intermediate gearbox chip detected
IGB CHIP FAIL	91	Chip detector on intermediate gearbox failed
IGB OIL LOW	90	Intermediate gearbox oil level low (only active on ground)
IGB OIL TEMP	90	Intermediate gearbox oil overtemp (greater than 109°C)
1(2) ITT LIMITER	60	Associated ITT limiter not functioning
1(2) ITT MISCOMPARE	62	Discrepancy between EEC and analog value of ITT
LANDING GEAR	73	Landing gear retracted and aircraft below 150 ft AGL
MAIN BATT OFF	52	Main battery off line
1(2) MAU OVHT	44	Associated MAU overtemp
1(2) MCDU OVHT	46	Associated MCDU overtemp
MGB CHIP MAST	88	Main gearbox mast chip detected
MGB CHIP SUMP	88	Main gearbox sump chip detected
MGB OIL FILTER	88	Main gearbox oil filter in bypass
MGB OIL LOW	88	Main gearbox oil level low (only active on ground)
1(2) MGB OIL PRESS	89	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	48	Modular Radio/NAV unit overheat
1(2) NF MISCOMPARE	62	Discrepancy between EEC and analogue value of NF
1(2) NG MISCOMPARE	62	Discrepancy between EEC and analog value of NG
NOSE WHL UNLK	72	Nose wheel unlocked
NR MISCOMPARE	62	Discrepancy between EEC and analogue value of NR
1(2) OVSPD	58	Associated engine NF overspeed triggered
1(2) OVSPD DET	60	Associated engine overspeed detection system failed
PARK BRK ON	73	Park brake on

**CAUTION
MSGs**

**CAUTION
MSGs**

CAS Caption	Page	Failure/System State
PARK BRK PRESS	73	Park brake system low pressure
1(2) PITOT FAIL	75	Associated pitot heating failed
1(2) PITOT HEAT OFF	75	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	78	Rotor brake system in failure condition
RPM SELECT	87	RPM selector switc failed
1(2) SAS DEGRADED	40a	Associated SAS system degraded
1(2) SERVO	72	Associated hydraulic servo actuator in bypass
SYS CONFIG FAIL	46	Software or hardware system configura- tion error (only active on ground)
TGB CHIP	90	Tail gearbox chip detected
TGB CHIP FAIL	91	Tail gearbox chip detect system failed
TGB OIL LOW	90	Tail gearbox oil low (only active on ground)
TGB OIL TEMP	91	Tail gearbox oil overtemp (> 109°C)
1(2) TQ LIMITER	59	Associated engine torque limiter failed
1(2) TQ MISCOMPARE	62	Discrepancy between EEC and analogue value of TQ
1(2) TRIM FAIL	40	Trim system failed
VALIDATE CONFIG	46	Software or hardware configuration needs validation.
VENT FAIL	78	Cockpit ventilation fan failed or nose avionic fans failure
VNE MISCOMPARE	75	Miscompare between ADS 1 and 2 value of VNE
1(2) VHF COM OVHT	48	Associated VHF radio overheat
1(2) WOW FAIL	76	Associated Weight On Wheels (WOW) switch failed
XMSN OVTQ	87	Main gearbox overtorque

TABLE OF PFD AND MFD MESSAGES

Message	Page	Failure/System State
RED Messages		
'ATT FAIL'	79	Failure of attitude information (on associated side)
'1(2)CASMSCP' on PFD	81	MAU 1 (MAU 2) CAS WARNING message list discrepancy.
'HDG FAIL'	79	Failure of heading information (on associated side)
'RAD' on display	86a	Double RAD ALT failure
'VEL FAIL' on compass display	86b	Double AHRS groundspeed failure
AMBER Messages		
'1-2-3-4 DU' on attitude indicator	83	Display unit graphics symbology malfunction
'2.5m' on side of PI and between NG and ITT indications	84	Associated side engine in 2.5 minute rating, message will flash 10"sec before 2.5min limit expires.
'ADS1(2)' on attitude indicator	80	Pilot and Copilot ADS information from the same source. (1-Copilot side 2-Pilot side)
'AHRS1(2)' on attitude indicator	79	Pilot and Copilot attitude information from the same source. (1-Copilot side 2-Pilot side)
'ALT' on altitude display tape	85	Miscompare between ADS 1 & 2 for altitude information (± 150 ft)
'ATT' on attitude indicator	81	Miscompare between AHRS 1 & 2 for Pitch and Roll information ($\pm 5^\circ$ in pitch and $\pm 6^\circ$ in roll)
'1(2)CASMSCP' on PFD	81	MAU 1 (MAU 2) CAS CAUTION message list discrepancy.
DG1(2)	79	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	86	Dual Flight Director failure
'HDG' on attitude indicator	85	Miscompare between AHRS 1 & 2 for Heading information ($\pm 10^\circ$ heading)
'HTML' on attitude indicator	86c	Aircraft passed Safety Height and/or Ultimate Fly Up Limit (EPIC Software Phase 5, or later)
'IAS' on airspeed tape	85	Miscompare between ADS 1 & 2 airspeed information. (± 20 kts)
'LOC' on HSI	85	Miscompare between LOC Lateral and/or Vertical deviation

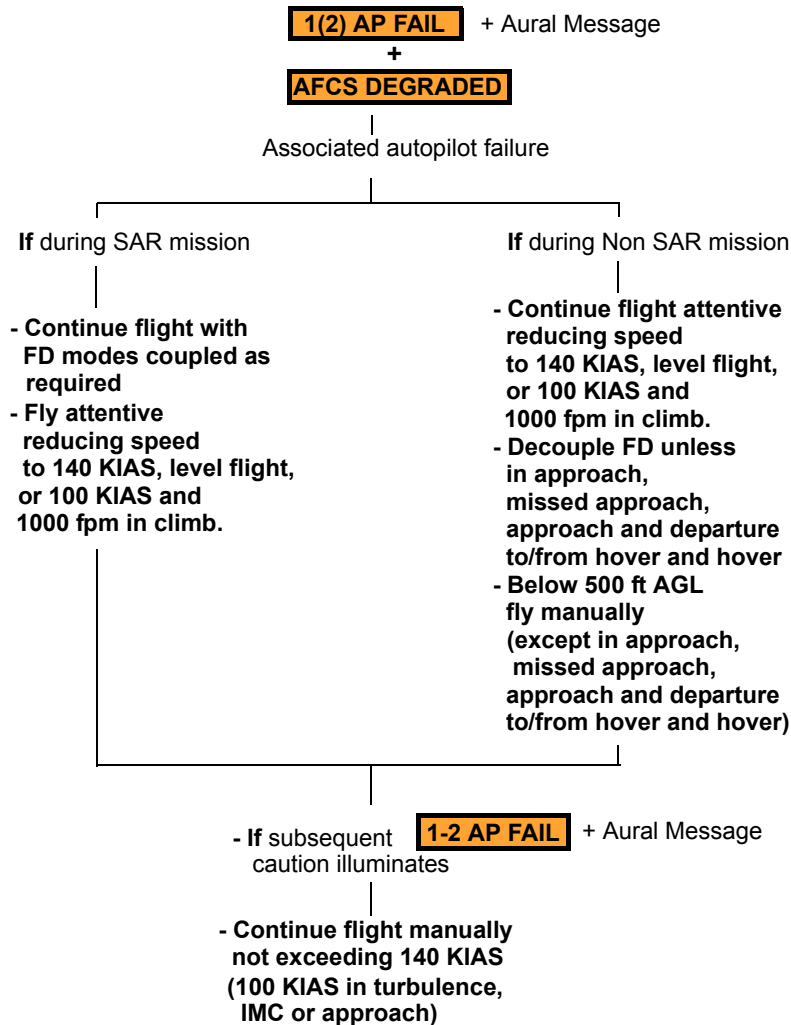
**CAUTION
MSGs**

**CAUTION
MSGs**

Message	Page	Failure/System State
MAG 1(2)	79	Pilot and Copilot heading information from the same source. (1-Copilot side 2-Pilot side) and selection of AHRS 1(2)
1(2) MAU	82	Associated MAU degraded
'MIN' on attitude indicator	84	Altitude equal or less than decision height (DH)
'NAV' on PFD	85	Miscompare between navigation LOC information from MAU 1 and 2.
'OAT ##°C' amber on PFD	86c	Miscompare between the two OAT probes is 6°C or greater (EPIC Software Phase 5, or later)
'PITCH' on attitude indicator	85	Miscompare between AHRS 1 & 2 for Pitch information ($\pm 5^\circ$ in pitch)
RAD 1(2) on RAD ALT display	86	RAD ALT failure, on double RAD ALT system, reconfiguration to functioning system
RAD on RAD ALT display	86a	Miscompare between MAU 1 & 2 Radio Altimeter altitude information ($10\text{ft} + 0.625 \times (\text{rad alt } 1 + \text{rad alt } 2)$)
'ROLL' on attitude indicator	85	Miscompare between AHRS 1 & 2 for Roll information ($\pm 6^\circ$ in roll)
'VEL' on compass display	86b	Miscompare between AHRS 1 & 2 GS data when groundspeed below 20 kts (EPIC Software Phase 5, or later)
'VTA' on attitude indicator	86b	During VGP approach when RAD ALT height between MAP and MAP+100ft

AUTOMATIC FLIGHT CONTROL SYSTEM

AUTOPILOT FAIL



AFCS

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

During non SAR mission

- Continue flight with FD modes coupled as required
- Fly attentive reducing speed to 140 KIAS, level flight, or 100 KIAS and 1000fpm in climb.

- Continue flight attentive reducing speed to 140 KIAS, level flight, or 100 KIAS and 1000fpm in climb.
- Decouple FD unless in approach, missed approach, approach and departure to/from hover and hover
- Below 500 ft AGL fly manually (except 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)

AFCS

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 140 KIAS, level flight, or 100 KIAS and 1000fpm in climb**
- **Below 500ft AGL fly manually**

AUTOPILOT AXIS DISENGAGE

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

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

If fault remains

- **Continue flight attentive**
- **If PITCH axis failed reduce speed to 140 KIAS, level flight, or 100 KIAS and 1000fpm in climb**
- **Below 500ft 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

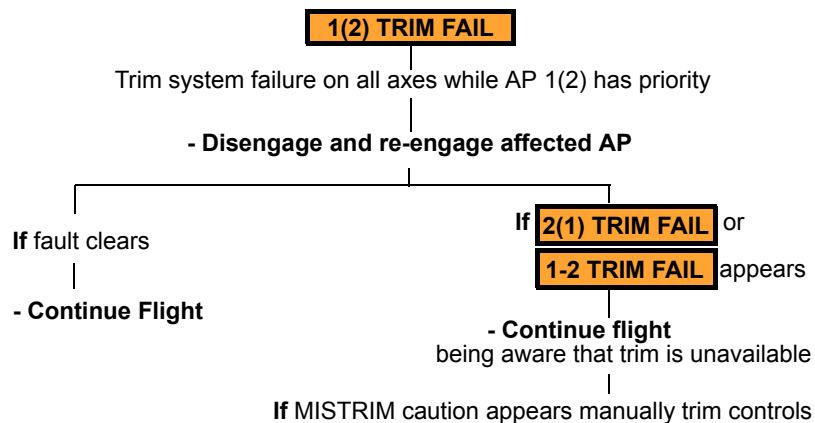
- **Fly manually**

Note

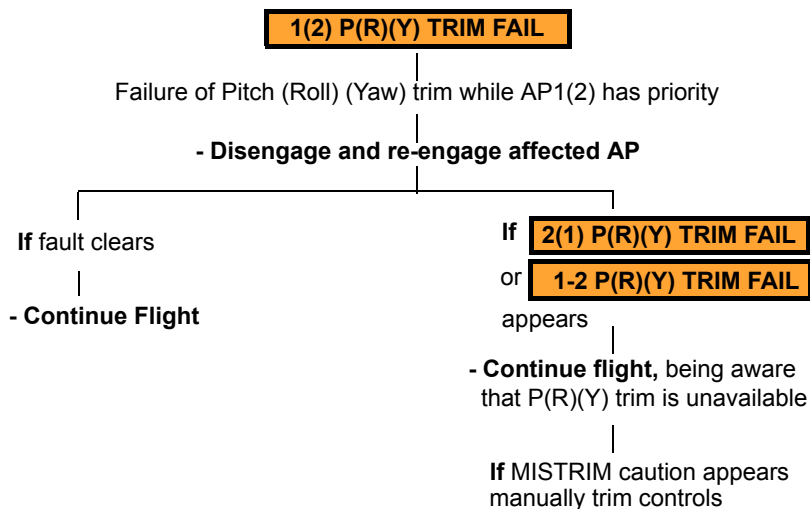
With ATT system not engaged the aircraft flies in SAS mode only (SAS message on PFD).

AFCS

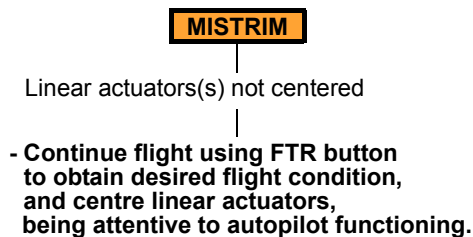
AFCS TRIM FAILURE



PITCH, ROLL, YAW TRIM FAIL



MISTRIM



AFCS DEGRADED

AFCS DEGRADED

AFCS functions degraded

- Continue flight attentive reducing speed to 140 KIAS, level flight, or 100 KIAS and 1000fpm in climb
- Below 500ft 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 (i.e. IAS) is engaged and the cyclic beep trim used to maintain the required flight condition. Coupled SAR mode operations are not affected.

AFCS

AFCS

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 annunciation 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 not affected.

AFCS QUICK DISCONNECT PROCEDURE

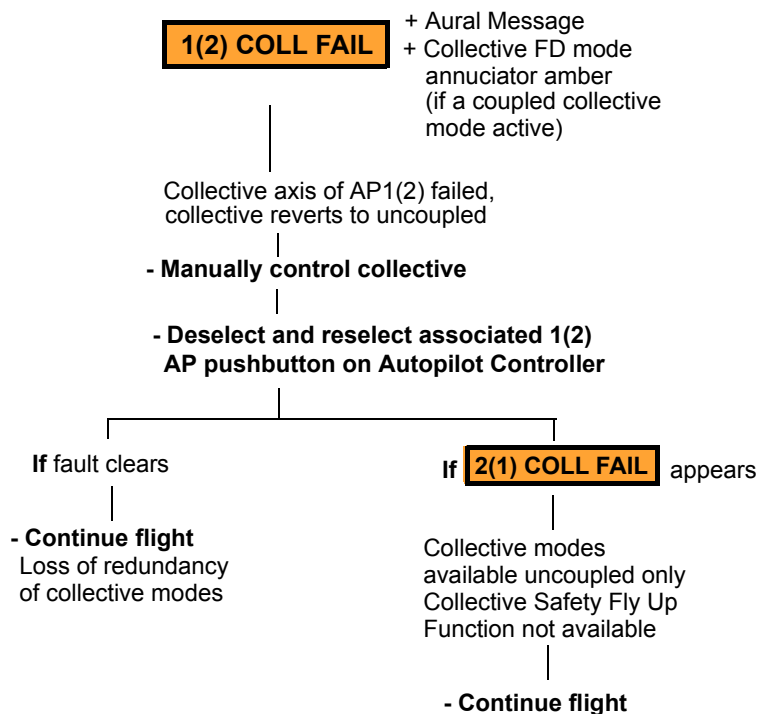
For situations where faults are suspected in the AFCS, but with no CAS cautions illuminated, and the AP functions need to be disengaged, all AP/AFCS functions can be disconnected by pressing the SAS REL button on the cyclic grip.

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.

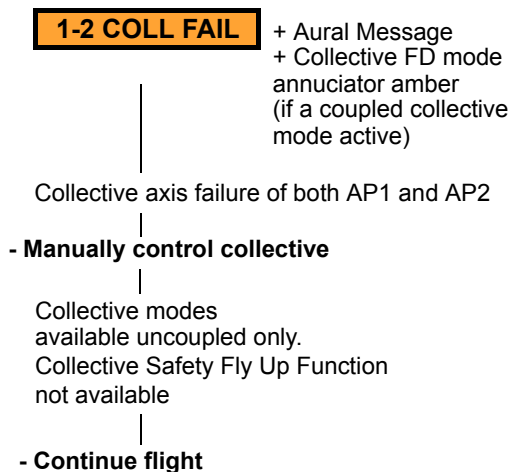
Continue flight, using the FD modes already engaged as required. However, use the cyclic FD STBY button to disengage modes when required. When disengaged FD is no longer available.

SINGLE COLLECTIVE AUTOPILOT FAILURE



AFCS

DUAL COLLECTIVE AUTOPILOT FAILURE



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. Follow procedure below for FD action and refer to page 82 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, IAS, VS + Audio Chime 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 38

AFCS DEGRADED page 40a

AFCS

- Continue flight attentive
- On RCP move ADS switch to non failed ADS
- Reduce speed to 140 KIAS, level flight, or 100 KIAS and 1000fpm in climb
- Below 500ft 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.

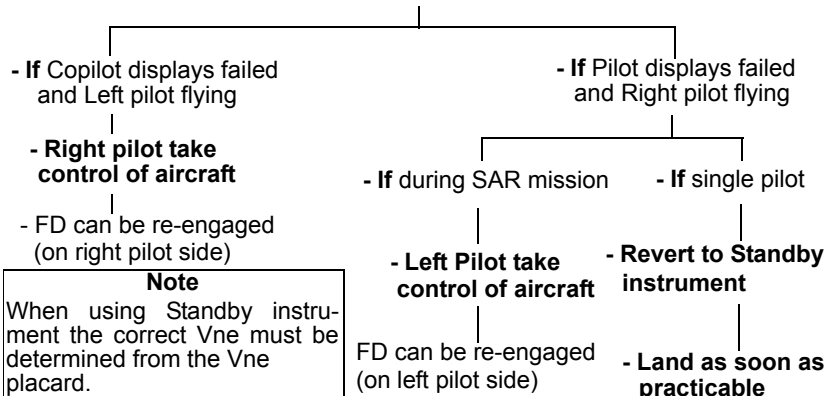
Note

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



Reversion Control Panel



AVIONIC

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

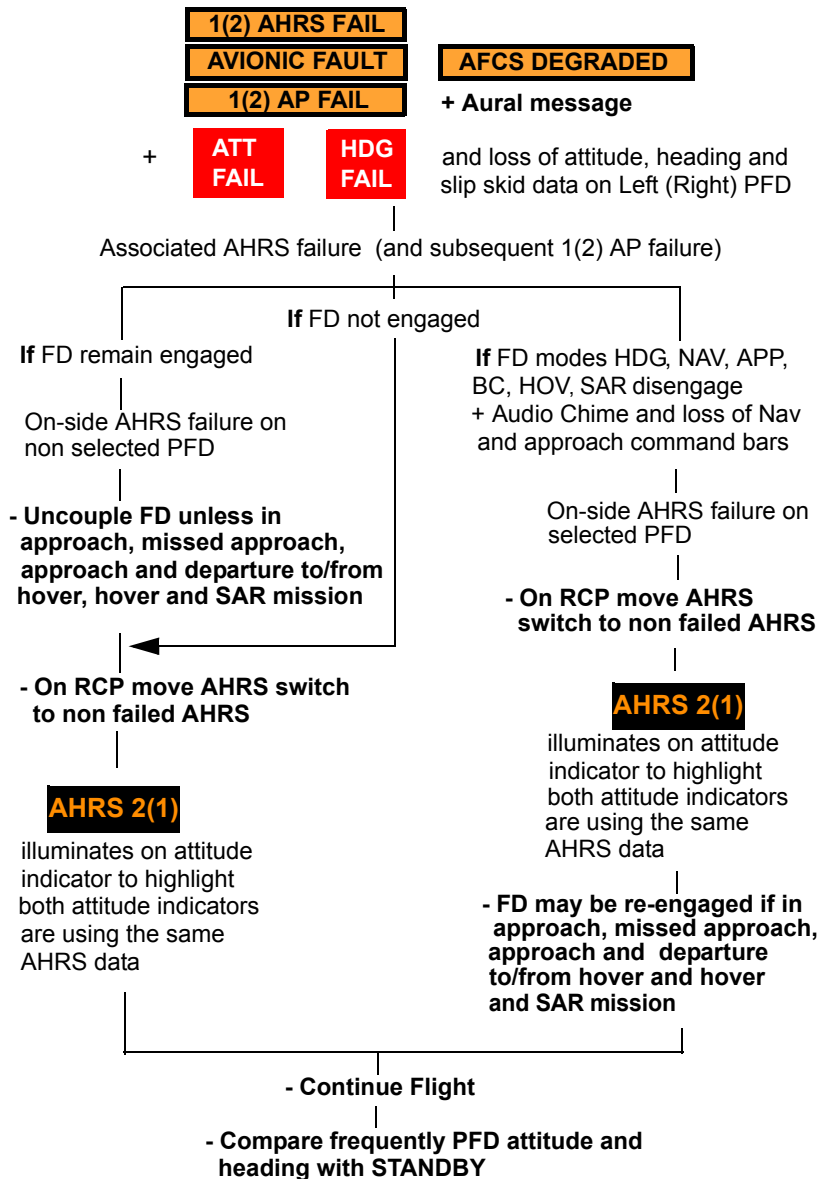
ADS1(2)

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

- Re-engage FD modes as required

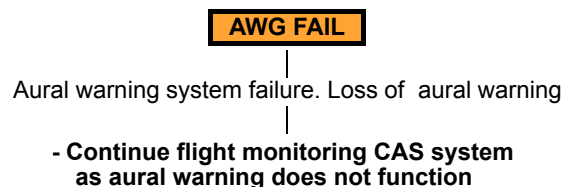
- Compare frequently PFD IAS data with STANDBY indicator.

AHRS FAILURE

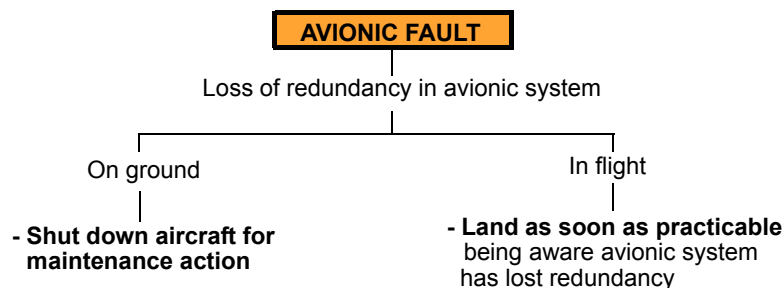


AVIONIC

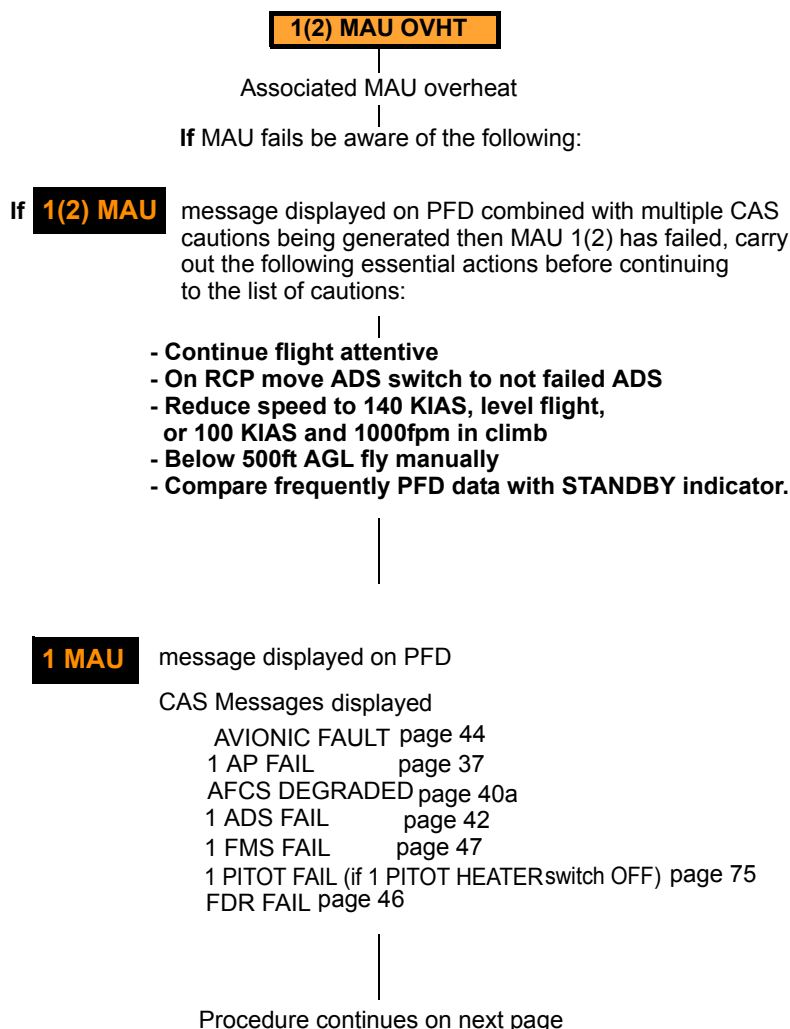
AURAL WARNING SYSTEM FAILURE



AVIONIC FAULT



MODULAR AVIONICS UNIT OVERHEAT/FAIL



AVIONIC

MODULAR AVIONICS UNIT OVERHEAT/FAIL (CONT)

Secondary engine 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 syn-optic page information.

If MAU 2 fails

2 MAU message displayed on PFD

CAS Messages displayed:

AVIONIC FAULT page 44
2 AP FAIL page 37
AFCS DEGRADED page 40a
2 ADS FAIL page 42
2 FMS FAIL page 47
AWG FAIL page 44
GPS FAIL page 47
2 PITOT FAIL (if 2 PITOT HEATER switch OFF) page 75

Secondary engine 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 syn-optic page information.

AVIONIC

AVIONIC

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 software configuration problem (displayed on ground only)

- Maintenance action

VALIDATE CONFIGURATION

VALIDATE CONFIG

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

- Select **SYSTEM** on MFD **SYS CONFIG** page
press **ENTER** to validate configuration

If caution remains

- Maintenance Action

FLIGHT DATA RECORDER FAILURE

FDR FAIL

Flight Data Recorder failed

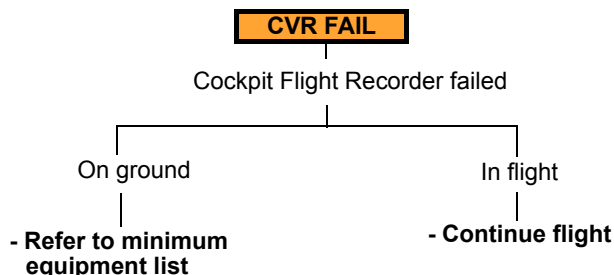
On ground

- Refer to minimum equipment list

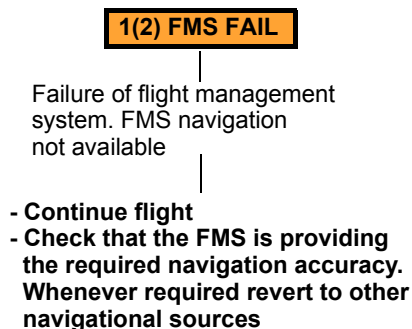
In flight

- Continue flight

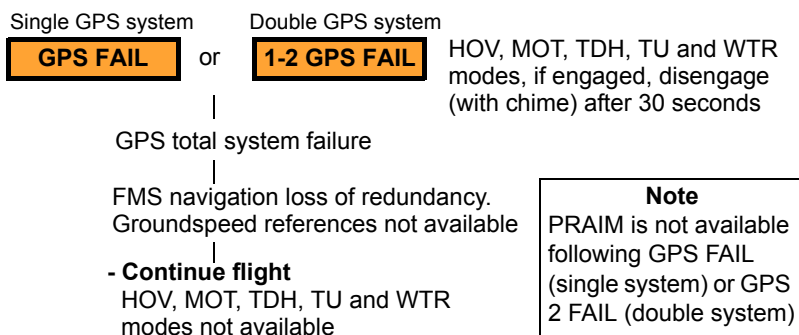
COCKPIT VOICE RECORDER FAILURE



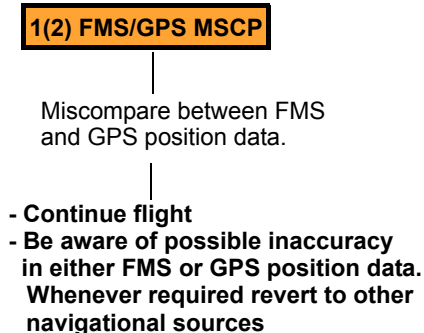
FLIGHT MANAGEMENT SYSTEM FAILURE



GPS FAILURE



FMS/GPS MISCOMPARE



AVIONIC

FMS/GPS MISCOMPARE UNAVAILABLE
FMS/GPS MSCP UNAVL

FMS/GPS miscompare function
not available due to FMS or GPS
data invalid

- Continue flight
 - Be aware position accuracy checking
not available.
- Whenever required revert to other
navigational sources
-

COMMUNICATION SYSTEM
VHF OVERHEAT
1(2) VHF COM OVHT

Associated radio transmitter overheat

On affected radio

- Minimise operation if possible
-

AVIONIC
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 instal-
led) 7-8 Reserved

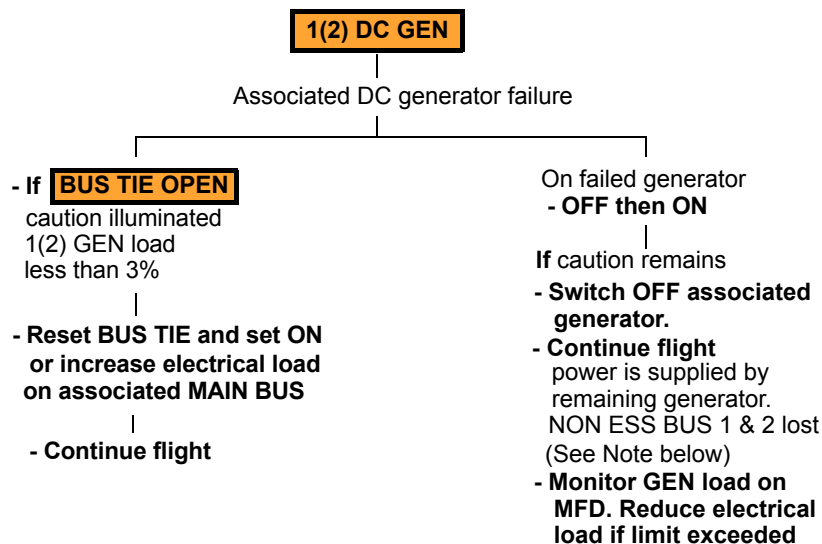
MRC OVERHEAT
1(2) MRC OVHT

Associated Radio/Nav modular system overheat

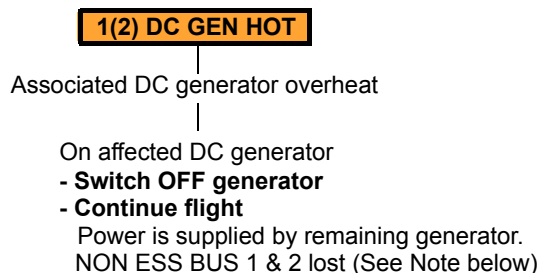
- Continue flight
being aware that Radio
or Nav system may malfunction.
-

ELECTRICAL

SINGLE DC GENERATOR FAILURE



DC GENERATOR OVERHEAT



NOTE

Services lost for DC NON ESS BUS 1 & 2 failure

DC NON ESS BUS 1

CABIN VENT
COCKPIT VENT (CPLT)
CPLT W/WIPE
ECS (COCKPIT)
FUEL DRAIN VALVE
STEP LIGHT

DC NON ESS BUS 2

ECS (CABIN)
EXT/SPKR POWER

ELEC

DC GENERATOR OVERLOAD
(EPIC Phase 5 or later)

1(2) GEN OVLD

Associated 1(2) DC generator in overload condition
(above 155% 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.

ELEC

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

Note

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

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.

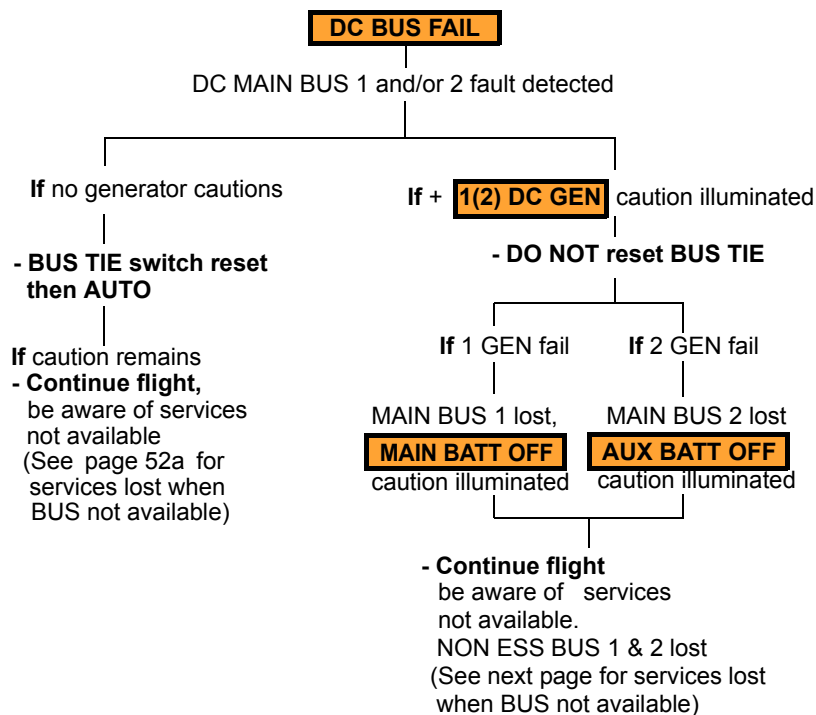
- Continue flight

CAUTION

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

ELEC

DC MAIN BUS FAILURE



ELEC

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

DC NON ESS BUS 2

ECS (CABIN)
 EXT/SPKR POWER

ELEC



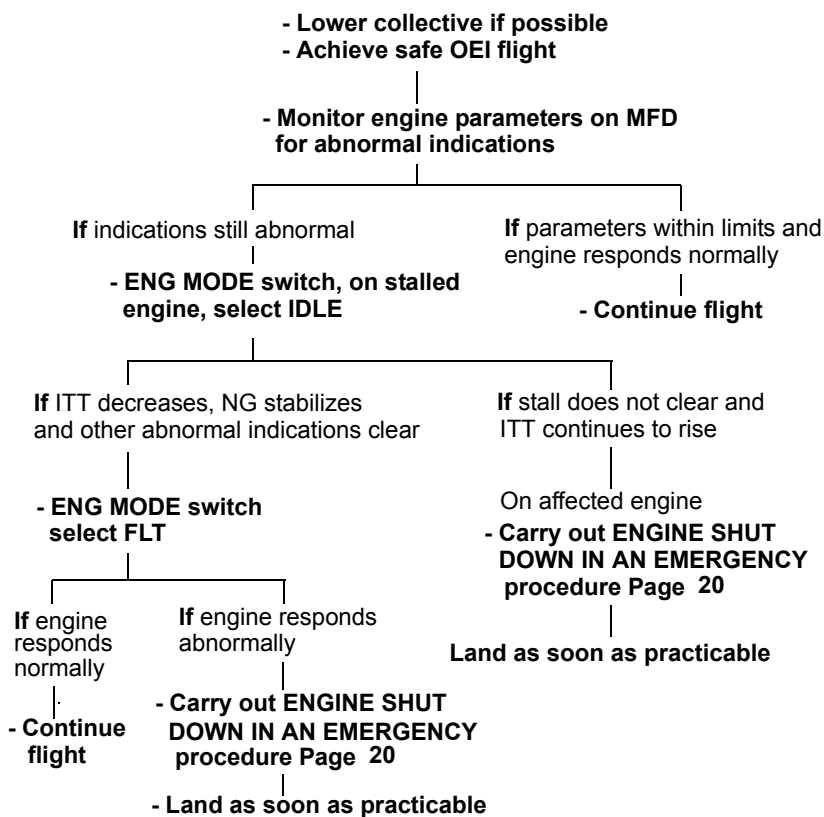
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UNMAINTAINED COPY
FOR INFORMATION ONLY

ENGINE MALFUNCTIONS

COMPRESSOR STALL

If compressor stall occurs, carry out the following procedure



ENG

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 SHUT DOWN IN EMERGENCY procedure, page 20.
4. Land as soon as practicable

ENGINE LIMIT EXCEEDANCE

1(2) ENG LIM EXPIRE

Associated 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/105.4%,
102.4%NG on MFD)

- 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

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

- Continue flight
monitoring engine
oil pressure

If oil temperature
greater than 150°C

If oil temperature
between 145°C
and 150°C

- Continued running for
a maximum of 1 min.

- Achieve safe OEI flight

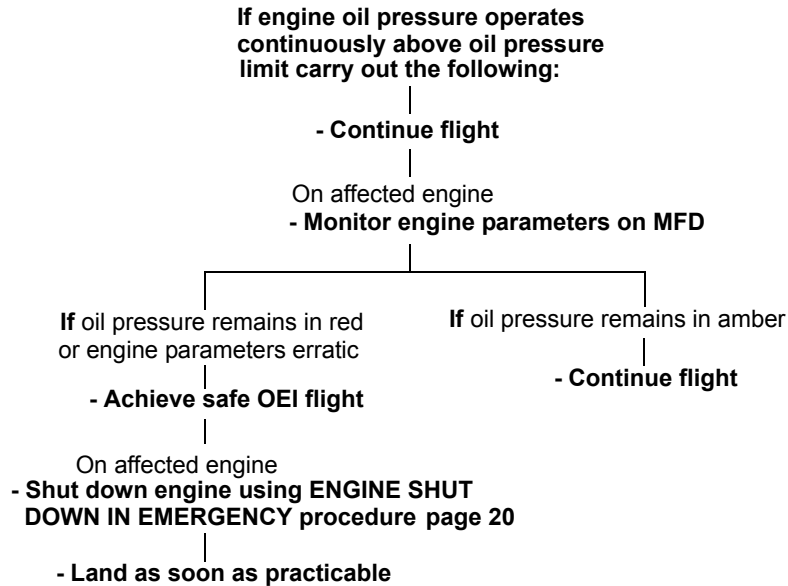
On affected engine

- Shut down engine using
ENGINE SHUT DOWN IN
EMERGENCY procedure page 20

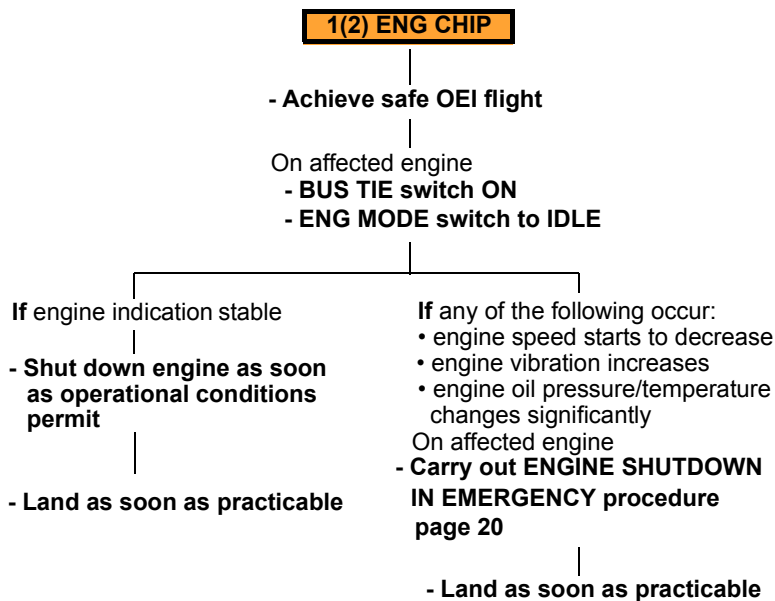
- Land as soon as practicable

ENG

ENGINE OIL PRESSURE HIGH



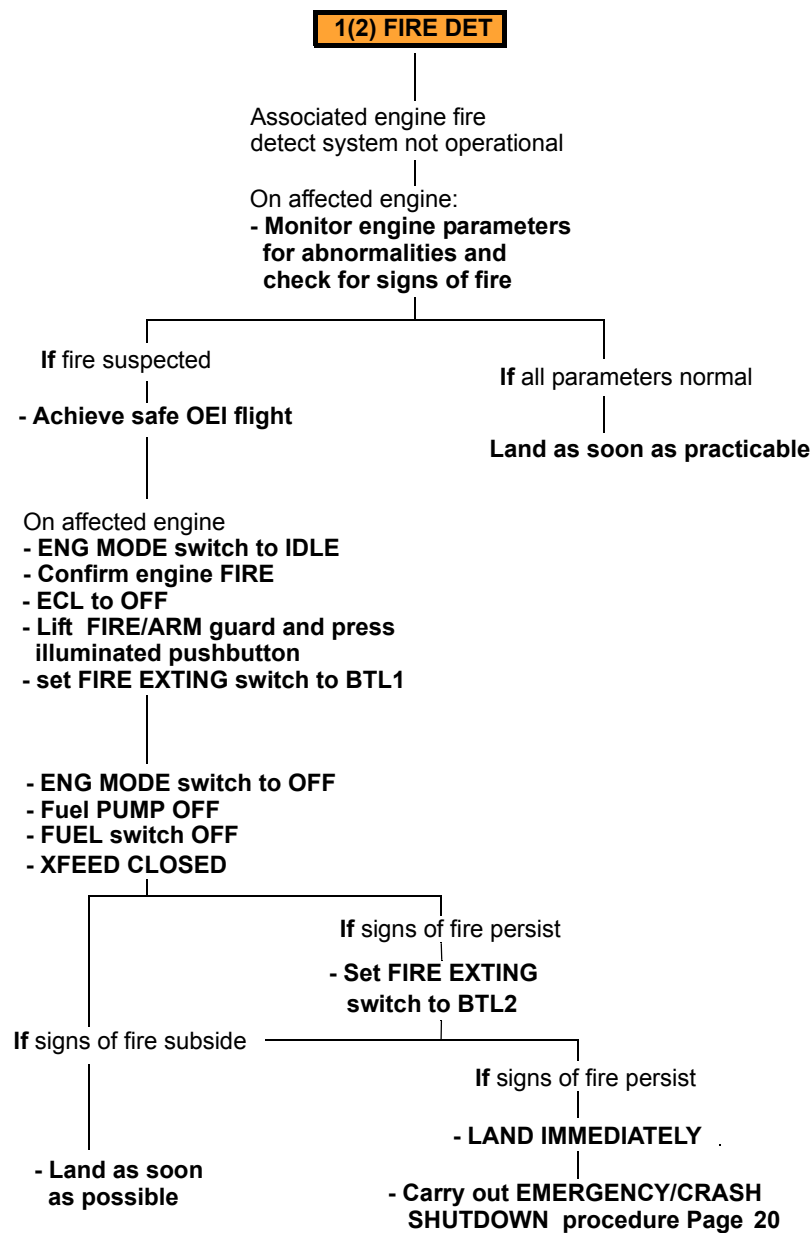
ENGINE OIL CHIP DETECTOR



ENG

ENGINE FIRE DETECTOR SYSTEM

ENG



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

- **Monitor engine parameters being**
aware that engine may need
to be shut down using ECL

ENG

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 occurred

- Confirm engine in overspeed condition (CAS caution message)

On affected engine

- ENG GOV switch to MANUAL

- Control ECL using beep switch

If engine cannot be controlled manually

- Land as soon as practicable

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 AN EMERGENCY procedure Page 20

- 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)

Note

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

ENG

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 AUTO-MANUAL-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 36
- 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 36
- 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

- Respect engine limits manually.

Note

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

ENG

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 that NF overspeed protection system will not function at the correct NF speed in the event of an NF overspeed.

ENG

FUEL FILTER BY-PASS

1(2) FUEL FILTER

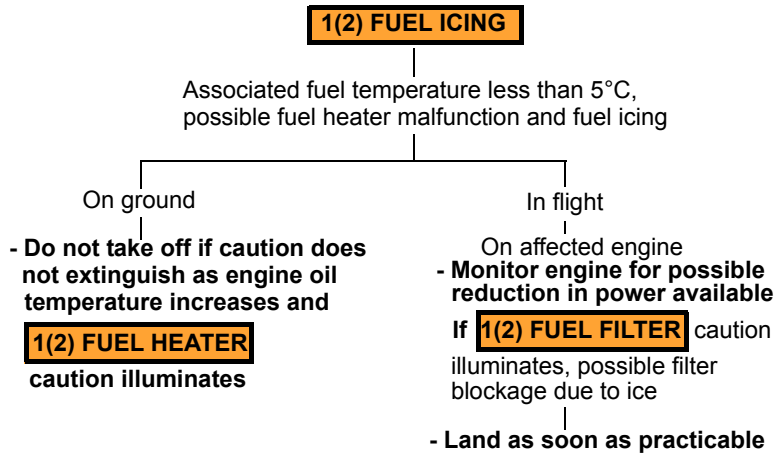
Fuel filter blockage, impending bypass condition

On affected engine

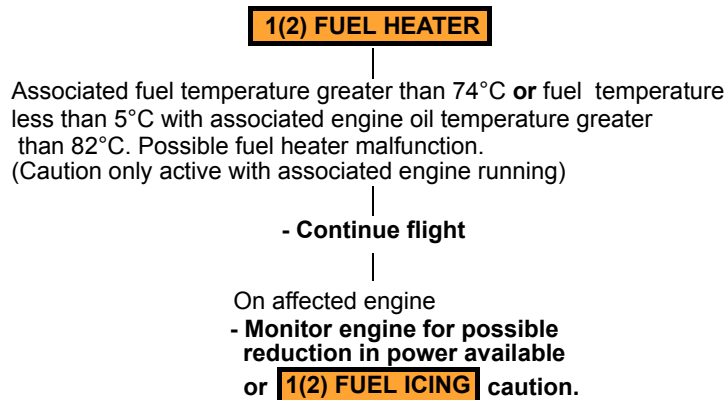
- Monitor engine for possible reduction in power available

- Land as soon as practicable

FUEL ICING



FUEL HEATER



ENG

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	5%
NR	3%

Note

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

ENG

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 igniter and starter generator duty cycle limitations.

RESTARTING PROCEDURE

CAUTION

During starter activation AP1 may disengage

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

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.

**ENG FLT
RESTART**

- | | |
|-------------------------------------|---|
| 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 starter | — Disengaged by 49% NG. |
| 10. Engine power turbine speed (NF) | — Confirm stabilized to IDLE speed below 100% |

Note

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

- | | |
|-----------------------|--|
| 11. ENG MODE switch | — FLT |
| 12. 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 movement 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.

**ENG FLT
RESTART**

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 36.

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% and 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.

**ENG FLT
RESTART**

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 15000ft Hp select IDLE when NG below 20%
— Above 15000ft 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. 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% and 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.

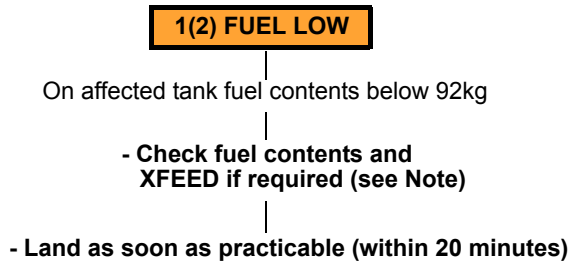
CAUTION

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

**ENG FLT
RESTART**

FUEL SYSTEM

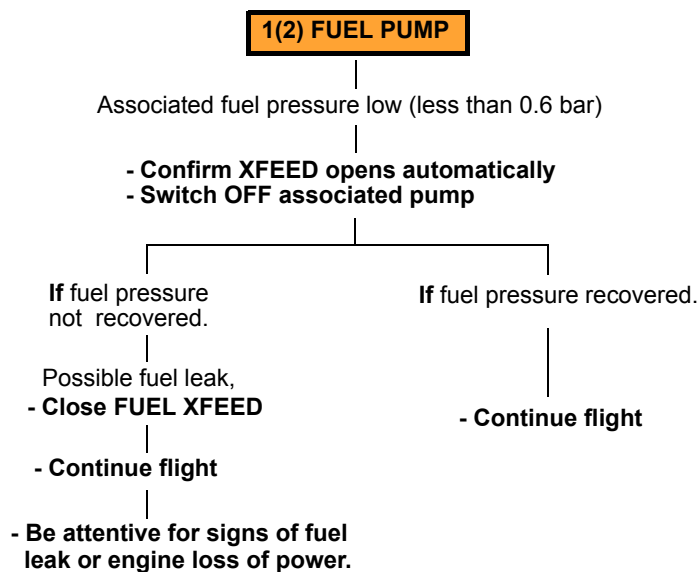
FUEL LOW



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



Note

When cross feeding, the tank with pump off, NOT supplying the engines, will have a maximum quantity of unusable fuel of 228kg. 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 228kg of fuel. Engine operation, in suction mode, is assured and FUEL pressure, on MFD, is invalid displaying amber 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

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

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

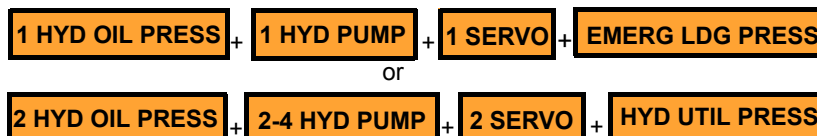
or

- Land as soon as practicable

FUEL

HYDRAULIC SYSTEM

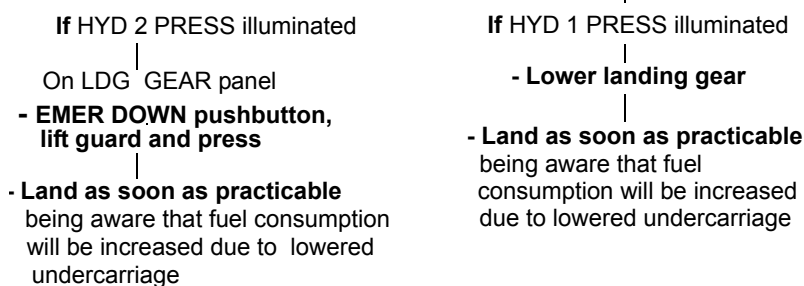
HYDRAULIC PRESSURE LOW



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

- Confirm hydraulic pressure low (hydraulic synoptic page)

- Check hydraulic control panel,



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.

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

HYD
LDG GR

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

On affected system

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

HYD PRESS

SERVO

cautions illuminate

- Land as soon as practicable,

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

WARNING

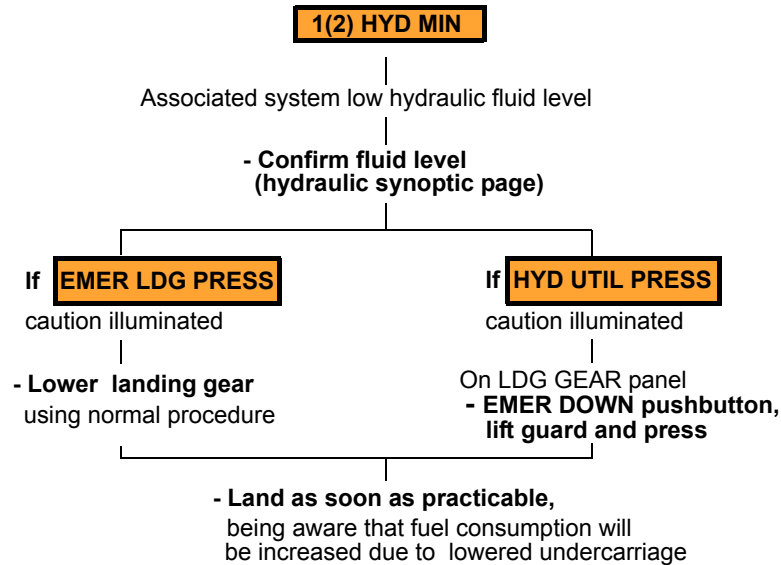
If a 1(2) SERVO caution has illuminated previously do NOT switch SOV to CLOSE on the 2(1) Hydraulic system since this will cause loss of control in the affected servo jack.

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.

HYD
LDG GR

HYDRAULIC FLUID LEVEL LOW



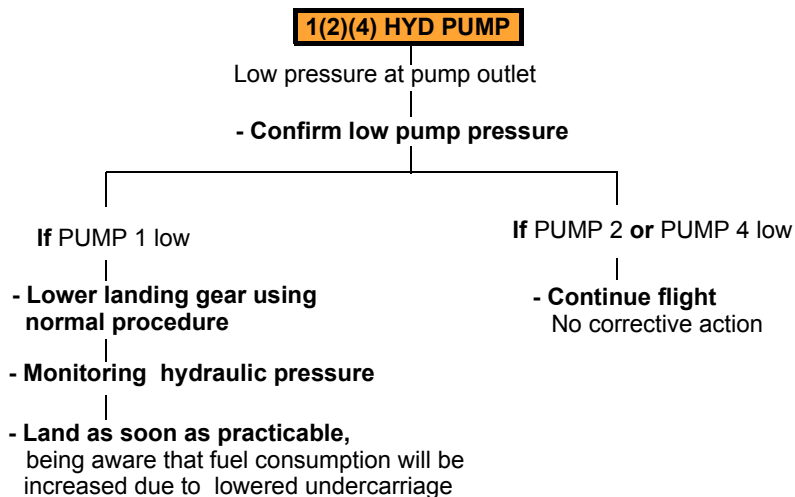
Note

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.

HYDRAULIC PUMP 1, 2 OR 4 FAILURE



**HYD
LDG GR**

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 switch on 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

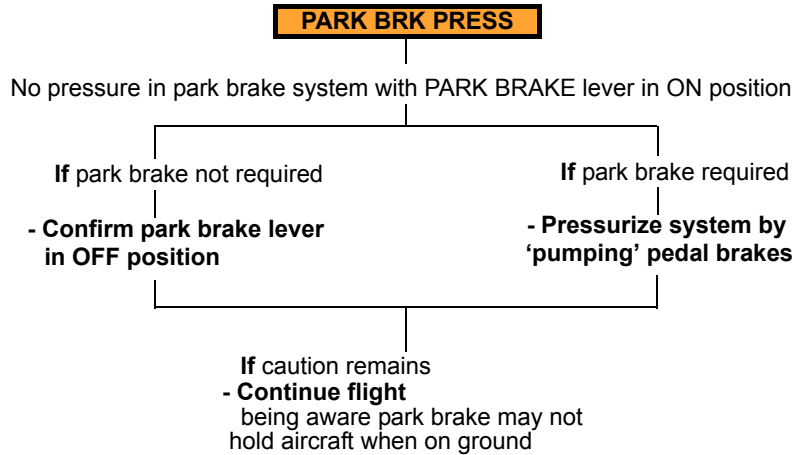
- Avoid run on landing

Note

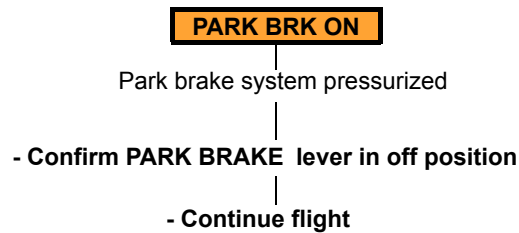
Landing gear retraction inhibited with NOSE WHL UNLK caution illuminated

HYD
LDG GR

PARK BRAKE MALFUNCTION



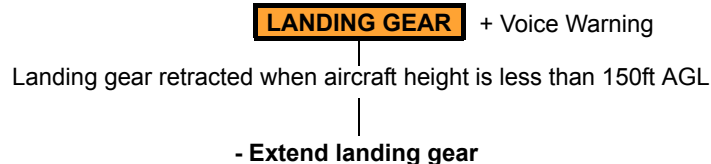
PARK BRAKE ON IN FLIGHT



CAUTION

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

LANDING GEAR RETRACTED



HYD
LDG GR

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.

HYD
LDG GR

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.

MISC

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)

Note

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

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

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**

In flight

- **Close and lock cockpit door, if possible**

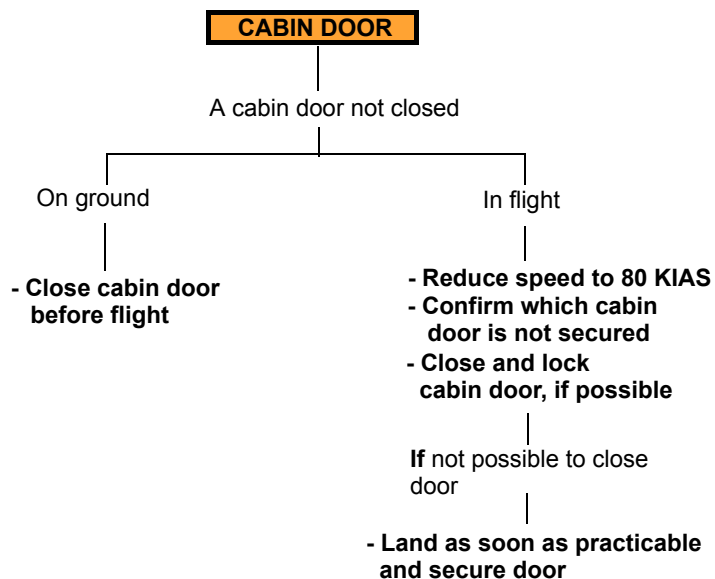
If not possible to close door

- **Reduce speed to below 100KIAS**

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

MISC

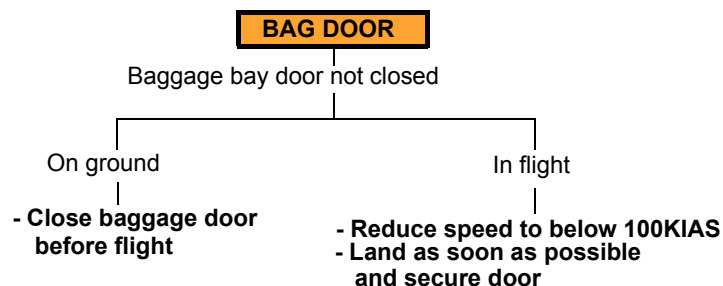
CABIN DOOR OPEN



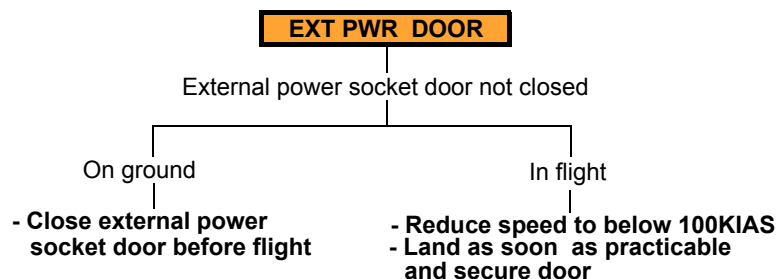
CAUTION

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

BAGGAGE BAY DOOR OPEN



EXTERNAL POWER SOCKET DOOR OPEN



MISC

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

- If caliper DOWN

- Land as soon as practicable

- Continue flight

MISC

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.

MISC



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FOR INFORMATION ONLY

PFD AND MFD DISPLAY MESSAGES

ATTITUDE DISPLAY FAILURE

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

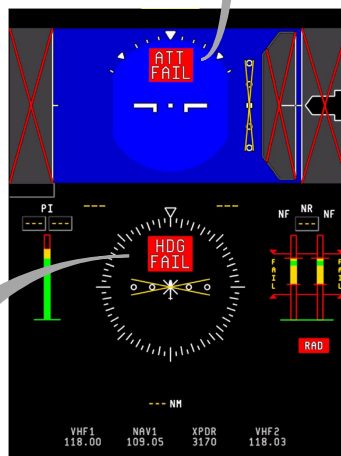
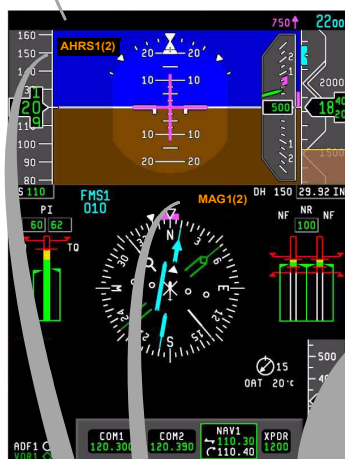
**ATT
FAIL**

- 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.



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)

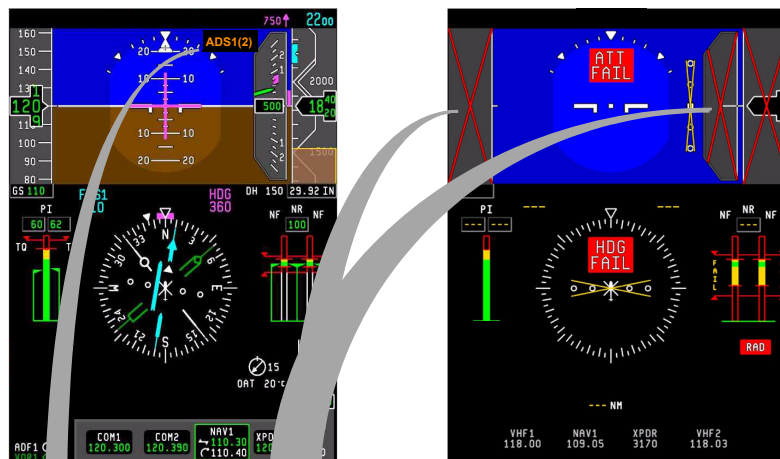
AHRS1(2) + MAG1(2) or DG1(2)

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

- Compare frequently PFD heading with STANDBY Compass.

PFD/MFD
MSGs

ADS FAILURE



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.

PFD/MFD
MSGs

CAS WARNING AND CAUTION MESSAGE LIST DISCREPANCY



1(2) CASMSCP

or

1(2) CASMSCP

on PFD display

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

- 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'

PFD/MFD
MSGs

MAU MESSAGE ON PFD

CAUTION

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



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:

- Continue flight attentive
- On RCP move ADS switch to non failed ADS
- Reduce speed to 140 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 44
- 1 AP FAIL page 37
- AFCS DEGRADED page 40
- 1 ADS FAIL page 42
- 1 FMS FAIL page 47
- 1 PITOT FAIL (only if 1 PITOT HEATER switch OFF) page 75
- FDR FAIL page 46

Procedure continues on next page

PFD/MFD
MSGs

MAU MESSAGE ON PDF (CONT)

Continues from previous page

and secondary power plant 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 infor-
mation

2 MAU

failure will be associated with the
following CAS cautions:

AVIONIC FAULT page 44
2 AP FAIL page 37
AFCS DEGRADED page 40
2 ADS FAIL page 42
2 FMS FAIL page 47
AWG FAIL page 44
GPS FAIL page 47
2 PITOT FAIL (only if 2 PITOT HEATER
switch OFF) page 75

Procedure continues on next page

**PFD/MFD
MSGs**

MAU MESSAGE ON PDF (CONT)

Continues from previous page

and secondary power plant 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 infor-
 mation

**PFD/MFD
 MSGs**

DISPLAY UNIT GRAPHIC MALFUNCTION



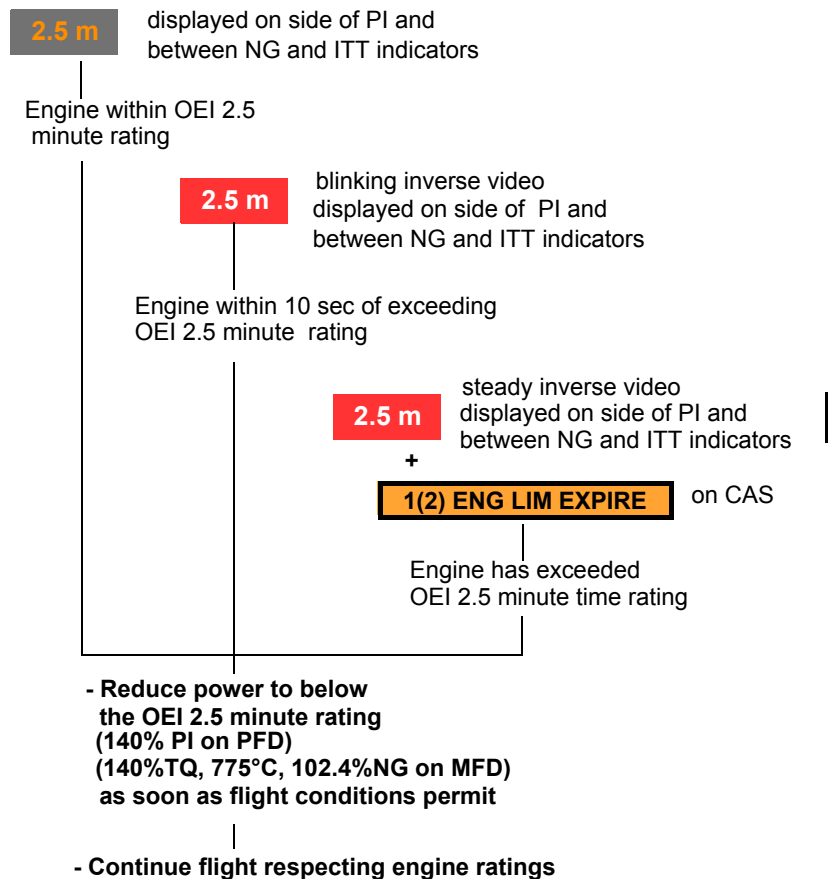
1(2)(3)(4) DU on attitude indicator

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

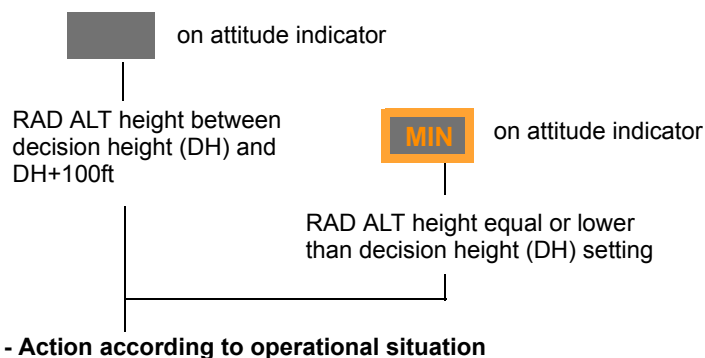
- Revert unaffected DU to Composite Mode by switching associated RCP switch to functioning DU

**PFD/MFD
MSGs**

2.5 MINUTE RATING MESSAGE ON PFD



DECISION HEIGHT CAPTION



PFD/MFD
MSGs

AHRS MISCOMPARE

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

on attitude indicator

Miscompare between AHRS 1 and 2 information.
($\pm 5^\circ$ Pitch, $\pm 6^\circ$ Roll, $\pm 10^\circ$ Heading)

- By comparison with Standby instrument 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.
(± 150 ft for ALT, ± 20 kts for IAS)

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

NAV MISCOMPARE

LOC on PFD HSI display

Miscompare between LOC Lateral and/or vertical deviation.

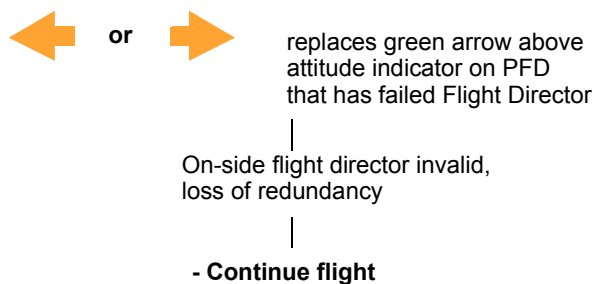
- Compare the Pilot and Copilot NAV indications to establish the correct data.

**PFD/MFD
MSGs**

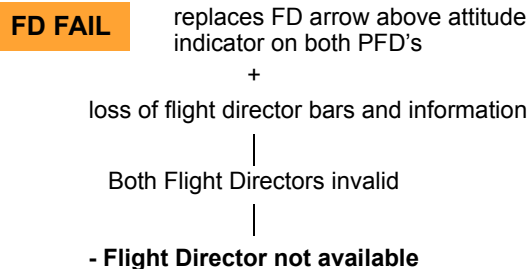
FLIGHT DIRECTOR FAILURE

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.

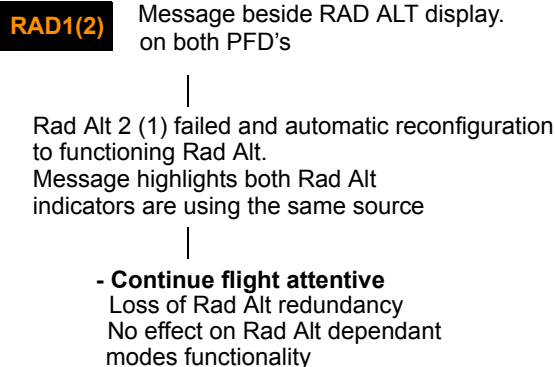
SINGLE FLIGHT DIRECTOR FAILURE



DUAL FLIGHT DIRECTOR FAILURE



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



CAUTION

When either RAD ALT fails, the LANDING GEAR CAS caution and associated audio message 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 and SAR modes disengage with audio chime

Failure of both RAD ALT systems

- Continue flight

- RAD ALT functioning is lost
- RHT, TDH, TD, TU, MOT 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 150ft 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 and SAR modes, if engaged, disengages with audio chime

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 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.

**PFD/MFD
MSGs**

VERTICAL TRACK ALERT CAPTION

VTA

on attitude indicator during VGP approach when RAD ALT height between Missed Approach Point (MAP) and MAP+100ft. This caption only appears when the MAP is higher than 150ft AGL. The VGP will disengage, with chime, at the MAP

Be aware that the ALVL mode will not engage

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 or 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

**PFD/MFD
MSGs**

HEIGHT LIMIT CAPTION

(EPIC Phase 5 or 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 coupled

- Monitor 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

**PFD/MFD
MSGs**

FMS MESSAGES

DEAD RECKONING (DR)

DR is an alerting (**amber**) annunciator. This annunciator is displayed when operating in the DR mode for longer than 2 minutes. The DR mode is defined as the loss of radio updating and all other position sensors (GPS).

DEGRADED (DGR)

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 availability. Practically the annunciator appears when the EPU (estimated position uncertainty) is greater than RNP (required navigation performance). Default RNP is 1.0 for Departure and Arrival, 2.0 for en-route and 0.3 for approach.

Approved sensors for the different flight phases are indicated on the following table.

Flight Phase	Approved Sensors (Navigation Mode)		
	GPS	DME- DME	VOR/ DME
Departure or Terminal	X	X	X
Enroute	X	X	X
VOR/DME or VOR Approach	X	X	X
GPS Approach	X		
NDB Approach	X	X	

UNABLE RNP

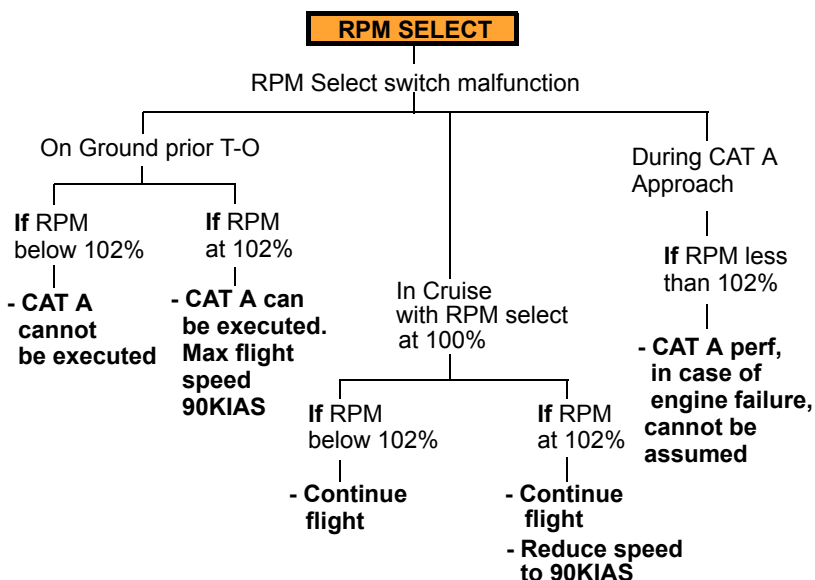
If EPU (Estimated Position Uncertainty) show a value greater than the RNP (Required Navigation Performance) required for the current navigation phase (i.e. DGR message) a UNABLE RNP message will appear on the scratch pad and a MSG caption on the PFD.

Continue navigation using the GPS equipment or reverse to an alternate means of navigation appropriate to the route and phase of flight. When continuing to use GPS navigation, position should be verified every 15 minutes using another IFR-approved navigation system.

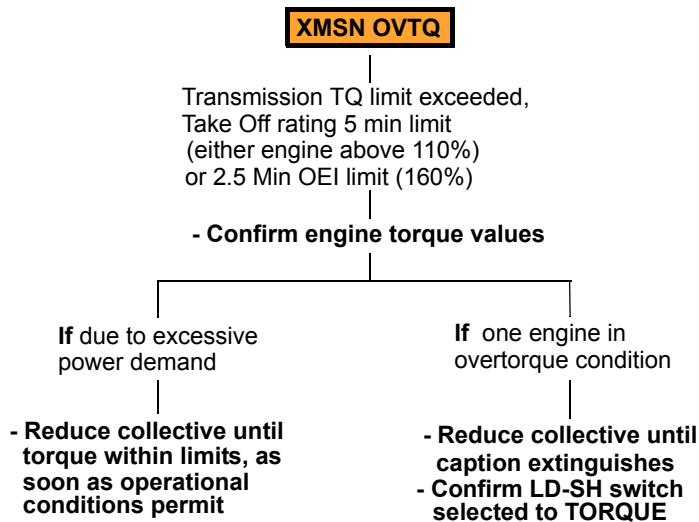
PFD/MFD
MSGs

ROTOR AND TRANSMISSION

ROTOR SPEED SELECTOR



MAIN GEARBOX OVERTORQUE



**ROTOR
XMSN**

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

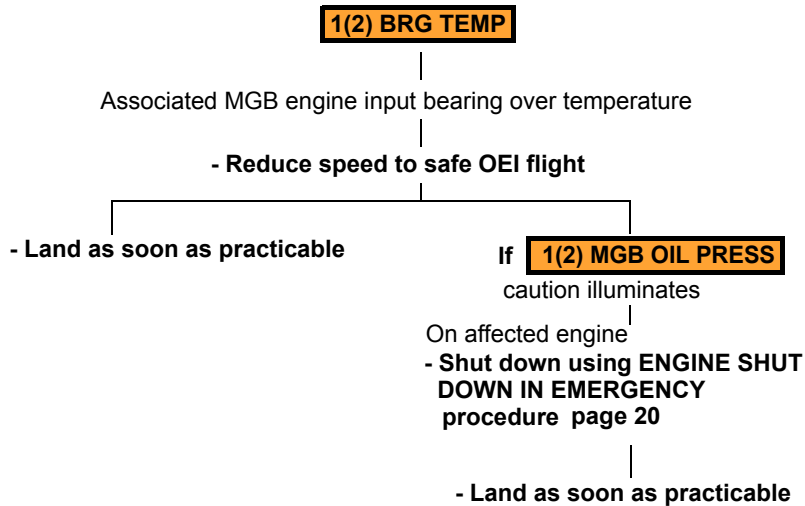
MGB OIL LOW

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

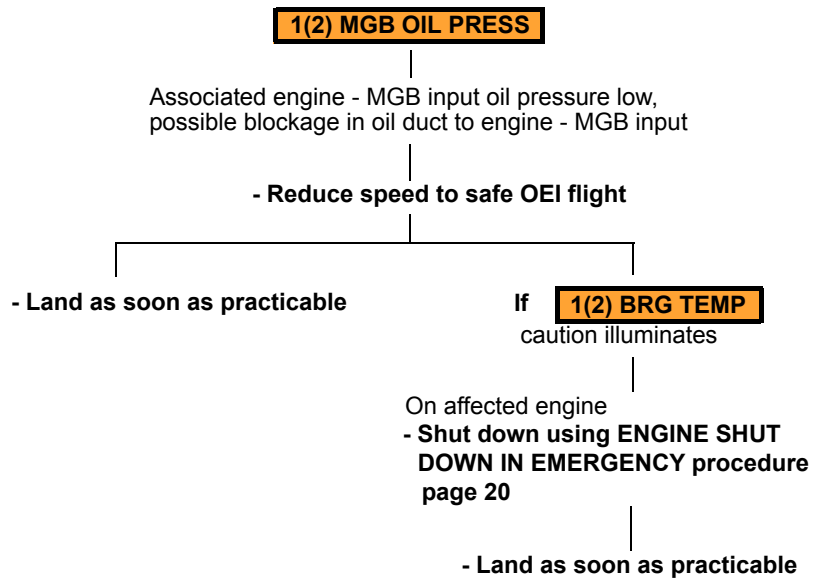
- Replenish MGB oil before flight

ROTOR
XMSN

MAIN GEARBOX INPUT BEARING TEMPERATURE

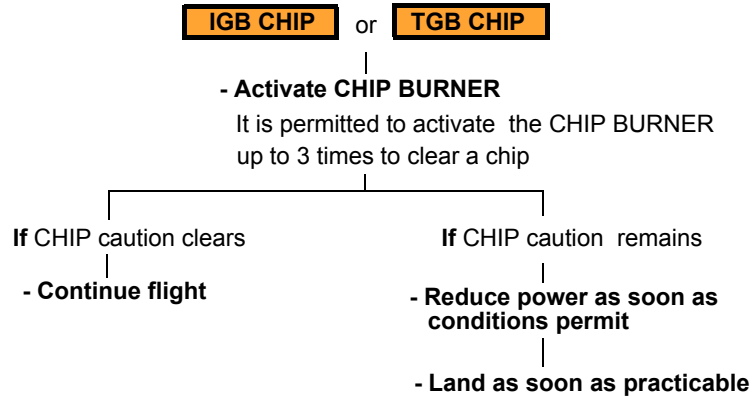


MAIN GEARBOX INPUT OIL PRESSURE



ROTOR
XMSN

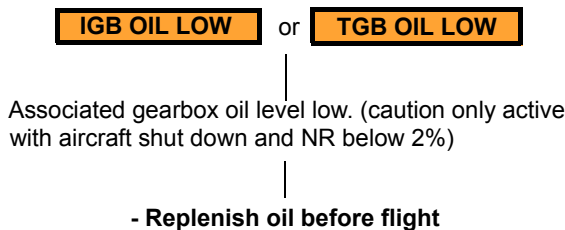
INTERMEDIATE OR TAIL GEARBOX CHIP



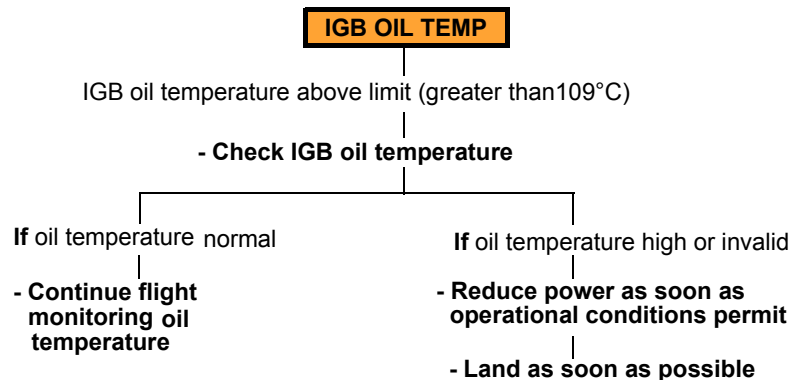
CAUTION

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

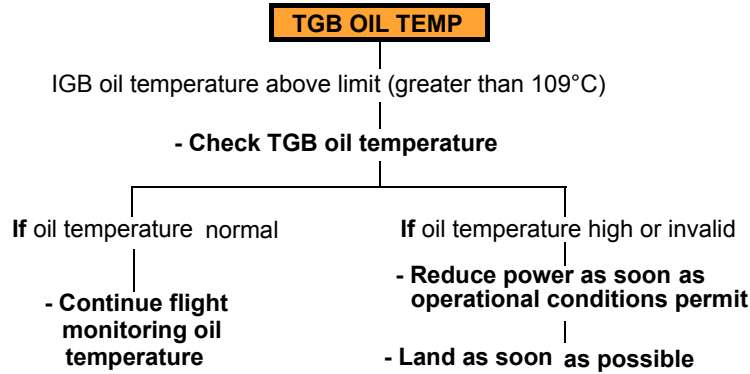


INTERMEDIATE GEARBOX OIL TEMPERATURE HIGH

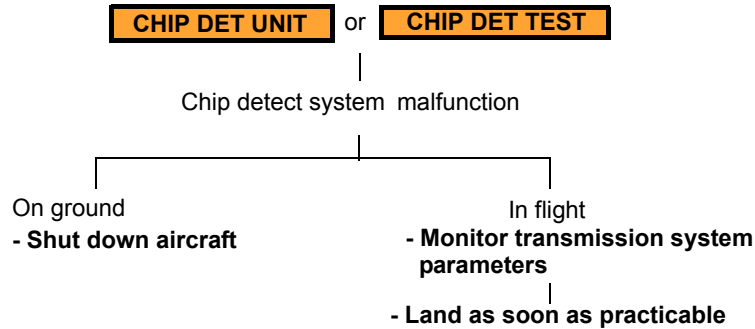


ROTOR
XMSN

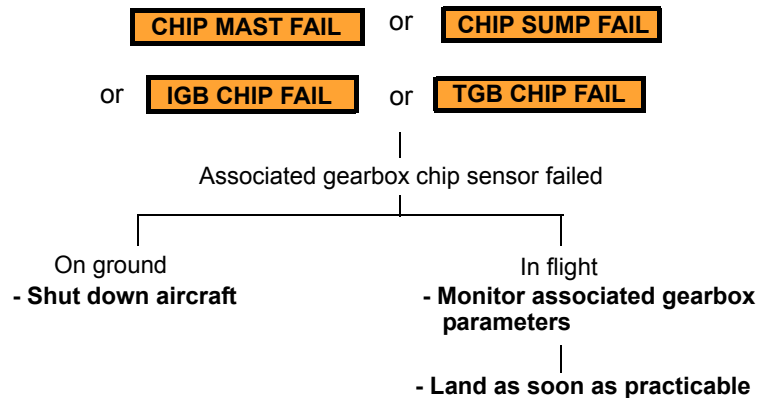
TAIL ROTOR GEARBOX OIL TEMPERATURE HIGH



GEARBOX CHIP DETECT UNIT MALFUNCTION



GEARBOX CHIP DETECTOR SENSOR FAILURE



ROTOR
XMSN

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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 63.
5. Engine — If engine restart fails or no attempt to restart is made carry out the **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20

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 200ft above touchdown point with a rate of descent of no more than 500fpm. Initiate a deceleration to achieve 30 KIAS at 50ft. At 50ft 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 AN EMERGENCY** procedure page 20.
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 5-10ft 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 AN EMERGENCY** procedure page 20.
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 50ft AGL (or approximately 20ft if TDP_E less than 50ft 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 AN EMERGENCY** procedure page 20.
7. PARK BRAKE — As required.

CAT A/B
PROCS

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 5-10ft ATS increase collective to cushion landing as touchdown becomes imminent. Maximum permitted GS at touchdown 5kts
4. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.
5. Engine — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.
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 5-10ft 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 AN EMERGENCY** procedure page 20.
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 AN EMERGENCY** procedure page 20.
6. PARK BRAKE — As required.

CAT A/B
PROCS

OFFSHORE HELIDECK PROCEDURE RTO

1. Collective/Cyclic — Decrease collective to arrest climb and adjust 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 5-10ft 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 SHUT-DOWN IN AN EMERGENCY** procedure page 20.
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} (40KIAS).
3. Climb — When the aircraft achieves V_{TOSS} (40KIAS) 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 200ft ATS, with 2.5min power.
4. At 200ft ATS — While climbing accelerate to V_y . Continue climb using OEI continuous power.
5. Landing gear — UP (when reaching V_y)
6. Rotor Speed — Select 100% at V_y
7. At 1000ft ATS — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.
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.

CAT A/B
PROCS

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 adjust pitch attitude to approximately 10° nose up. Lower collective to recover NR to 102%. Continue climb with 2.5min power to 200ft and level aircraft.
4. At 200ft ATS — While climbing accelerate to V_y . Continue climb using OEI continuous power.
5. Landing gear — UP (when reaching V_y)
6. Rotor Speed — Select 100% at V_y
7. At 1000ft AGL — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.
8. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CONFINED AREA 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 200ft or TDP height+100 ft ATS, with 2.5min power.
4. At 200ft ATS (or TDP height +100 ft) — While climbing accelerate to V_y . Continue climb using OEI continuous power.
5. Landing gear — UP (when reaching V_y)
6. Rotor Speed — Select 100% at V_y
7. At 1000ft ATS — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.
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.

CAT A/B
PROCS

OFFSHORE HELIPAD CTO

1. Collective control — Maintain collective and continue climb to 30ft ATS.
2. At 30ft 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} (40KIAS).
4. Climb — When the aircraft achieves V_{TOSS} (40KIAS), adjust pitch attitude to approximately 5° nose up and lower collective to recover NR to 102%. Continue climb to 200ft ATS, with 2.5min power.
5. At 200ft ATS — While climbing accelerate to V_y . Continue climb using OEI continuous power.
6. Rotor Speed — Select 100% at V_y
7. Landing gear — UP (when reaching V_y)
8. At 1000ft ATS, or before, if cruise altitude lower — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.
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.

CAUTION

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

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 63
5. Engine — If engine restart fails or no attempt to restart is made carry out the **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.

CAT A/B
PROCS

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} (40KIAS).
2. Climb — When the aircraft achieves V_{BLSS} (40KIAS) and a positive rate of climb, lower collective to recover NR to 102%. Continue climb to 200ft or LDP_V height+150ft ALS with 2.5min power.
3. At 200ft ALS — Reduce pitch attitude to 2° nose up and accelerate aircraft to V_y while climbing. Lower collective to obtain OEI continuous power.
4. Landing gear — UP (when reaching V_y)
5. Rotor speed — Select 100% at V_y
6. At 1000ft ALS — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.
7. PARK BRAKE — Release. Confirm PARK BRAKE ON advisory not illuminated on CAS.
8. LDG LT & LDG LT2— OFF, if used.
switches
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} (50KIAS).
2. Climb — When the aircraft achieves V_{BLSS} (50KIAS) and a positive rate of climb, lower collective to recover NR to 102%. Continue climb to 200ft AGL with 2.5min power.
3. At 200ft AGL — Reduce pitch attitude to 2° nose up and accelerate aircraft to V_y while climbing. Lower collective to obtain OEI continuous power.
4. Landing gear — UP (when reaching V_y)
5. Rotor speed — Select 100% at V_y
6. At 1000ft AGL — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.
7. LDG LT & LDG LT2— OFF, if used.
switches
8. MFD — During OEI cruise every 30 minutes select PWR PLANT page to verify engine normal operation.

CAT A/B
PROCS

CONFINED AREA BALKED LANDING

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} (40KIAS) 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 aircraft to V_y while climbing. Lower collective to obtain OEI continuous power
4. Landing gear — UP (when reaching V_y)
5. Rotor speed — Select 100% at V_y
6. At 1000 ft ALS — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.
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 BALKED LANDING

1. Engine failure — Simultaneously adjust pitch attitude, nose down to 0° to initiate an acceleration to V_{BLSS} (40KIAS) and apply collective to control NR droop, to a minimum of 90%.
2. Climb — When the aircraft achieves V_{BLSS} (40KIAS) select 5° nose up attitude and progressively lower collective to recover NR to 102% and OEI continuous power. Continue climb and acceleration to V_y .
3. Landing gear — UP (when reaching V_y)
4. Rotor speed — Select 100% at V_y
5. At 1000ft ALS — On affected engine, carry out **ENGINE SHUTDOWN IN AN EMERGENCY** procedure page 20.
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 Landing Procedure, is not possible. If a helideck landing is required the Elevated Heliport/Helideck Landing Procedure and WAT weight (maximum 6400 kg) should be used.

**CAT A/B
PROCS**

SINGLE ENGINE FAILURE RECOGNIZED AT AFTER LDP (OEI LANDING)

HELIPORT OEI LANDING

1. Collective/cyclic — Continue the descent. At 50ft ALS increase pitch attitude to reduce speed. Apply collective to reduce rate of descent.
2. Touchdown — At 20ft 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 AN EMERGENCY** procedure page 20.
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 20ft AGL apply collective to cushion the touchdown. At touchdown maximum nose up attitude 15° and maximum GS 30kts
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 AN EMERGENCY** procedure page 20.
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 AN EMERGENCY** procedure page 20.
5. PARK BRAKE — As required.
6. LDG LT & LDG LT2 switches — OFF, if used.

CAT A/B
PROCS

**OFFSHORE HELIDECK OEI LANDING**

1. Collective/cyclic — Fly the aircraft forwards, sideways and downwards towards the landing point, decreasing collective slightly. When descending through 30ft ALS reduce nose up attitude to maximum of 10°. At approximately 15ft 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 5kts.
2. Landing — After touchdown, centralize cyclic and simultaneously reduce collective to MPOG.
3. Engine — On affected engine, carry out **ENGINE SHUT-DOWN IN AN EMERGENCY** procedure page 20.
4. PARK BRAKE — As required.
5. LDG LT & LDG LT2 switches — OFF, if used.

CAT A/B
PROCS

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