EMERG	LIST OF WARNING MESSAGES AWG TEST PROCEDURE
	EMERGENCY AUTOROTATION
	FIRE & SMOKE
	DRIVE SYSTEM
	ENGINE
	ELECTRICAL SYSTEM
	LANDING GEAR & VARIOUS
MALFUNCTION	LIST OF CAUTION MESSAGES
	ENGINE
	ELECTRICAL SYSTEM
	HYDRAULIC SYSTEM
	DRIVE SYSTEM
	FUEL SYSTEM
	COMMUNICATION SYSTEM
	AUTOMATIC FLIGHT CONTROL SYSTEM
	INTEGRATED DISPLAY SYSTEM
	EFIS SYSTEM
	VARIOUS

INTRODUCTION

The majority of the Emergency and Malfunction procedures that follow are presented in the form of logic trees (flow charts). These logic trees have been formulated based on analysis and test of the cockpit indications that would be available to the flight crew following the emergencies/malfunctions that are included in this QRH. For complex emergencies/malfunctions, cockpit indications coupled with the answers to "Yes/No" type questions (as indicated on the charts) should enable the flight crew to analyze the type of emergency/ malfunction that has occurred, the branch of the "tree" that should be followed and the corrective action that should be taken.
In order to analyze some types of emergencies/malfunctions, answers to "+", "IF", "AND" and "OR" statements may be required. In these cases, the statements are presented in bold text ("**+**", "**IF**", "**AND**", "**OR**") to be more conspicuous. It is emphasized that attention should be paid to this symbology to avoid a mistake in the emergency/malfunction analysis and subsequent incorrect crew action. **Required** crew actions are also presented in bold type

DEFINITIONS

SAFE OEI FLIGHT

In general, safe OEI flight is defined to mean flight with one engine inoperative and:

1. a sustainable airspeed of not less than 45 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 / clouds so that required manoeuvring can be reasonably achieved.

EMERGENCY LANDING GUIDANCE

Throughout this QRH, 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.

LAND IMMEDIATELY	Land at once, even if it means landing on water. Landing is the highest priority. The primary consideration is to assure the survival of the occupants. The consequences of continued flight are likely to be more hazardous than those of landing at a site normally considered unsuitable.
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.
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. Extended flight beyond the nearest approved landing area is not recommended.

PILOT ALERTNESS LEVEL

The level of alertness required by the pilot is a function of the flight regime. Throughout this QRH, the following terms are used:

1. **Fly Attentive:** —Pilot to maintain close control of the flight path using hands-on when required.
2. **Fly Manually:** —Pilot directly controls the flight path using hands-on.

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EMERGENCY PROCEDURES

MALFUNCTION PROCEDURES

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WARNING MESSAGES

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CAS WARNING MESSAGES

CAS Caption	Voice Warning	Audio Tone	Emergency/System State
ROTOR LOW (page 23)	ROTOR LOW	Tone + Horn	Rotor speed below 96% (Power-ON). Rotor speed below 95% (Power-OFF). When NR reaches 80%, voice warning, audio tone and horn are deactivated.
ROTOR HIGH (page 24)	ROTOR HIGH	Tone	Rotor speed above 105% (Power-ON). Rotor speed above 110% (Power-OFF).
ENG 1 (2) OUT (page 35)	ENGINE 1(2) OUT	Tone	Engine #1(2) N1 abnormally low (N1 35% and below). Probable engine failure.
ENG 1 (2) FIRE (page 15/page 16)	ENGINE 1(2) FIRE	Tone	Fire in engine #1(2) compartment.
#1(2) ECU FAIL (page 39)	WARNING	Tone	Critical hardware failure of the #1(2) engine electronic control unit (ECU). Automatic reversion of engine #1(2) to manual mode.
#1(2) OIL PRES (page 38)	WARNING	Tone	Oil pressure in associated engine outside the operating range.
XMSN OIL PRES (page 21)	WARNING	Tone	Low pressure in transmission lubricating system. Oil pressure below 30 psi.
XMSN OIL HOT (page 22)	WARNING	Tone	Overheating of transmission lubricating system. Oil temperature above 120 °C.
ROTOR BRK ON (page 25)	WARNING	Tone	Rotor brake in operation. Braking pads of rotor brake not in fully retracted position.
BATT HOT (page 51)	WARNING	Tone	Battery overheating.
BATT DISCH (page 50)	WARNING	Tone	Battery discharging. Output voltage of both generators below 27.0 V (± 0.5 V).
ELECTRICAL (page 43/ page 45)	WARNING	Tone	Failure of both DC generators.

AWG TEST PROCEDURE

The AWG test function can be initiated by holding the AWG switch in the TEST position. The aural message “TEST OK” will be generated to indicate a successful test. Maintaining the TEST position for more than 6 seconds, will generate the entire voice warning sequence in the following priority:

Tone 1 “ROTOR LOW”

Tone 2 “ENGINE ONE OUT”

Tone 2 “ENGINE TWO OUT”

Tone 3 “FIRE ENGINE ONE FIRE”

Tone 3 “FIRE ENGINE TWO FIRE”

Tone 4 “WARNING”

Tone 4 “ROTOR HIGH”

Tone 4 “AUTOPILOT”

Tone 4 “ENGINE IDLE”

Tone 5 “OVERTORQUE”

Tone 5 “AIRSPEED”

Tone 6 “LANDING GEAR”

Tone 6 “DECISION HEIGHT”

Tone 7 “TWO HUNDRED FEET”

Tone 7 “ALTITUDE”

Tone 8 Tone (for autopilot)

SECTION END

EMERGENCY AUTOROTATION

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EMERGENCY AUTOROTATION PROCEDURE

1.	Collective pitch	— Reduce to enter autorotation.
2.	Attitude	— Adjust as required to obtain and maintain desired airspeed.

Note

An airspeed of Vy and 95% RPM ensures the minimum rate of descent in autorotation.

3.	Collective pitch	— Adjust as required to maintain rotor speed within limits (95% to 110% NR).
4.	Landing gear	— DOWN.
5.	Parking brake	— Check OFF.
6.	Landing site	— Select and manoeuvre into wind.
7.	Briefing	— Brief cabin crew and occupants.
8.	Harness	— Tight.

If time and conditions permits:

- ENG MODE switches	— Both OFF.
- FUEL PUMP switches	— Both OFF.
- FUEL VALVE switches	— Both CLOSED.
- XPND / RADIO	— Set emergency / transmit distress call.

9.	Flare	— At approximately 100 to 70 ft AGL, depending on the weight, initiate a flare, at approximately 10 deg per second, to a maximum 30 deg nose-up angle to reduce the rate of descent (500 ± 100 ft/min) and the forward speed (30 ± 10 KIAS).
10.	Collective pitch	— Adjust, as required, to maintain NR at 110% maximum during the flare.
11.	Pitch attitude / Collective pitch	— At approximately 10 ft AGL, reduce pitch attitude to a near level attitude. As the helicopter settles, apply collective pitch, as required, at approximately 4 ft to cushion touchdown.

12. Touchdown airspeed — As required by surface characteristics. If terrain permits, land with forward speed.
13. Collective pitch — Following touchdown, lower promptly.
14. Toe brakes — Apply as required.
15. Shutdown — Execute the **EMERGENCY/POST CRASH SHUTDOWN AND EGRESS** procedure Page 35.

Note

Refer to Section "LIMITATIONS" for FLIGHT HANDLING CHARACTERISTICS in AUTOROTATIVE DESCENT.

SECTION END

FIRE & SMOKE

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ENGINE FIRE ON GROUND

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

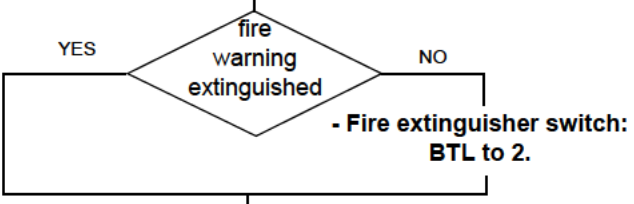
- affected engine power lever grip illuminated.
- affected engine control panel FIRE light illuminated.
- affected engine Eng 1(2) S/OFF FIRE pushbutton FIRE wording illuminated on fire extinguisher panel.

- Confirm engine fire.

- Parking brake: ON.
- ENG MODE 1 & 2 switches: OFF.
- FUEL PUMP 1 & 2 switches: OFF.
- FUEL VALVE 1 & 2 switches: CLOSED.
- XFEED VALVE switch: CLOSED.

On affected engine:
- S/OFF FIRE pushbutton: **Lift appropriate guard and press pushbutton (once only).**
S/OFF wording illuminates.

Fire extinguisher switch: BTL to 1.



Carry out EMERGENCY/POST CRASH SHUTDOWN AND EGRESS procedure Page 37.

END

ENGINE FIRE IN FLIGHT

ENG 1(2) FIRE +

Audio Tone and Voice Warning
"ENGINE 1(2) FIRE"

- affected engine power lever grip illuminated.
- affected engine control panel FIRE light illuminated.
- affected engine ENG 1(2) S/OFF FIRE pushbutton FIRE wording illuminated on fire extinguisher panel.

Achieve Safe OEI Flight

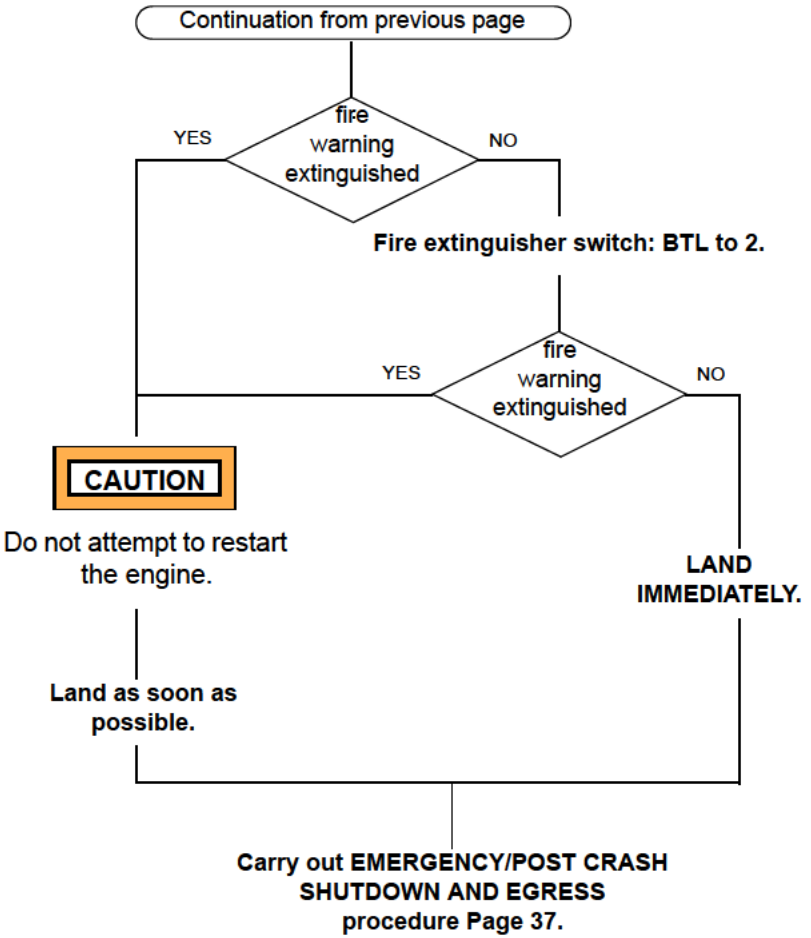
On affected engine:
ENG MODE switch: IDLE.

Confirm engine fire.

On affected engine:

- ENG MODE switch:	**OFF.**
- FUEL PUMP switch:	**OFF.**
- FUEL VALVE switch:	**CLOSED.**
- XFEED VALVE switch:	**CLOSED.**
- S/OFF FIRE pushbutton:	**Lift appropriate guard and press pushbutton (once only).** S/OFF wording illuminates.
- Fire extinguisher switch:	**BTL to 1.**
- GEN switch:	**OFF.**

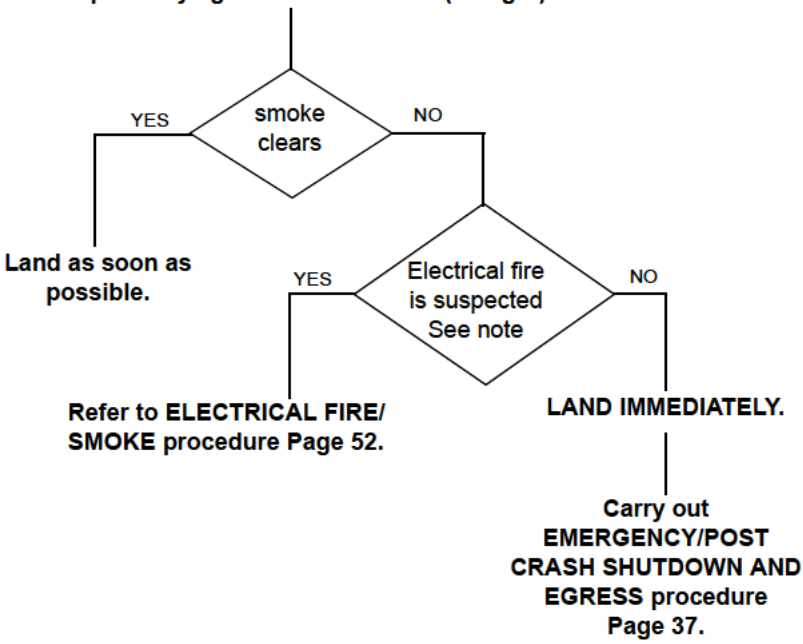
Continued Next Page


Continuation from previous page
fire warning extinguished
YES
NO
Fire extinguisher switch: BTL to 2.
fire warning extinguished
YES
NO
CAUTION
Do not attempt to restart the engine.
LAND IMMEDIATELY.
Land as soon as possible.
Carry out EMERGENCY/POST CRASH SHUTDOWN AND EGRESS procedure Page 37.

END

SMOKE IN CABIN, TOXIC FUMES, ETC.

- **Front ventilation ports:** **Open.**
- **VENT CKPT switch:** **Set to HIGH.**
- **Sliding windows (if installed):** **Open.**
- **ECS / Heater (if installed) :** **Check OFF.**
- **Cockpit utility light :** **ON (at night).**



Note

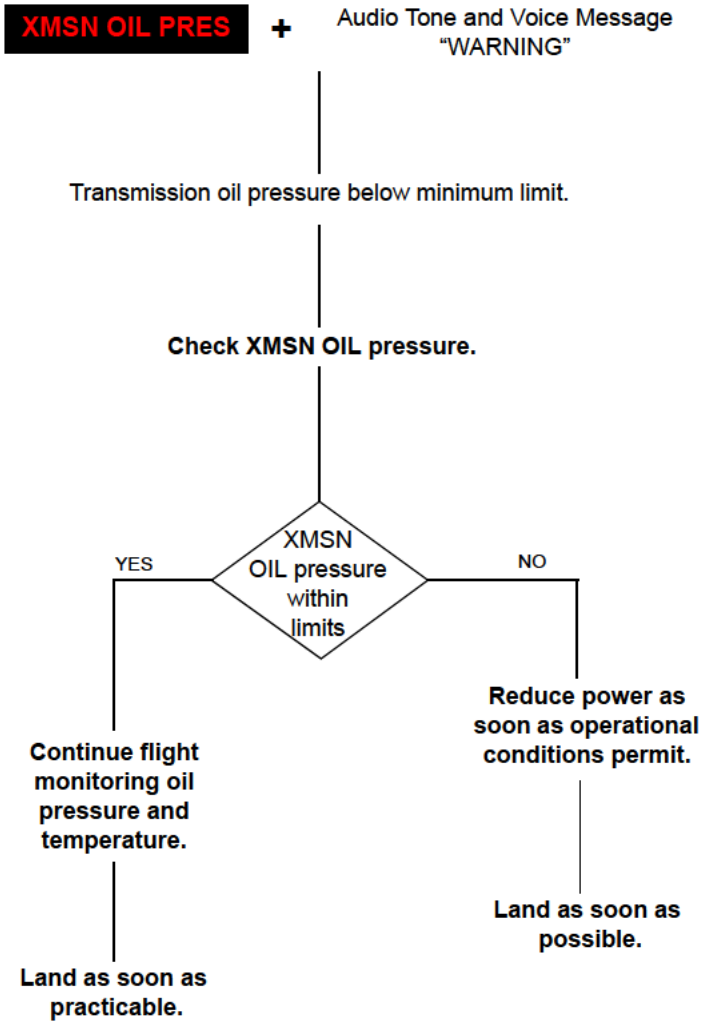
Electrical fire is suspected when there are visible signs of smoke in cockpit, with distinct acrid smell of burning insulation.

SECTION END

TRANSMISSION & ROTORS

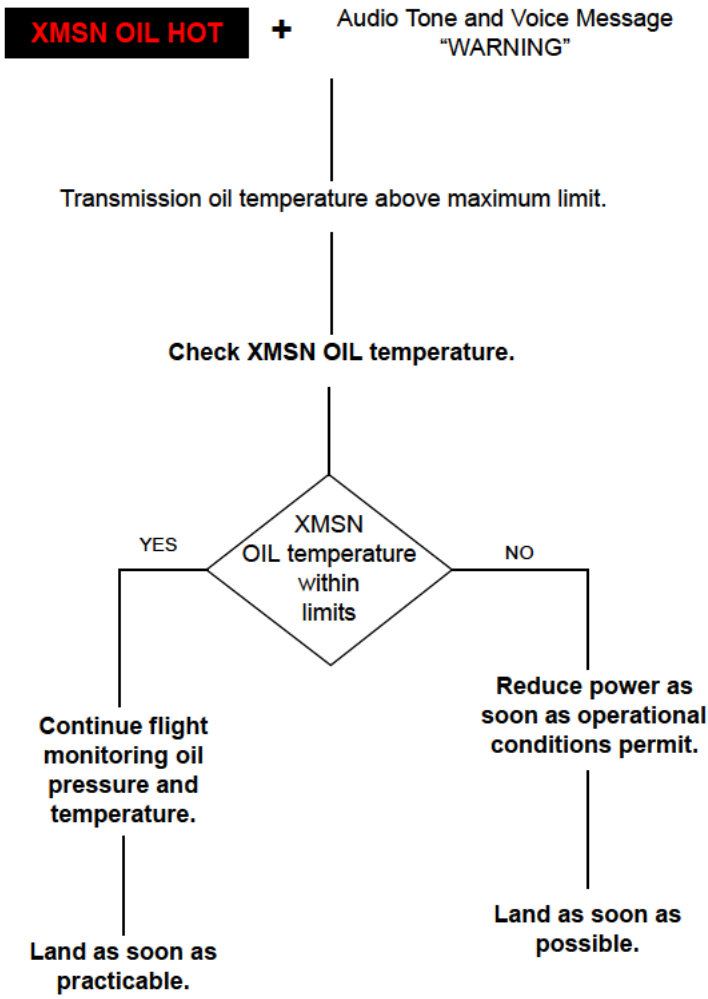
DRIVE

MAIN GEARBOX OIL PRESSURE LOW



END

MAIN GEARBOX OIL TEMPERATURE HIGH



END

ROTOR UNDER SPEED

ROTOR LOW + Audio Tone and Horn and Voice Warning "ROTOR LOW"

Rotor NR outside limits:
Below 96%, Power-ON.
Below 95%, Power-OFF.

- Check NR.

IF rotor speed low.

Lower collective to increase rotor speed.

END

ROTOR OVERSPEED

ROTOR HIGH + Audio Tone and Voice Warning "ROTOR HIGH"

Rotor NR outside limits:
Above 105%, Power-ON.
Above 110%, Power-OFF.

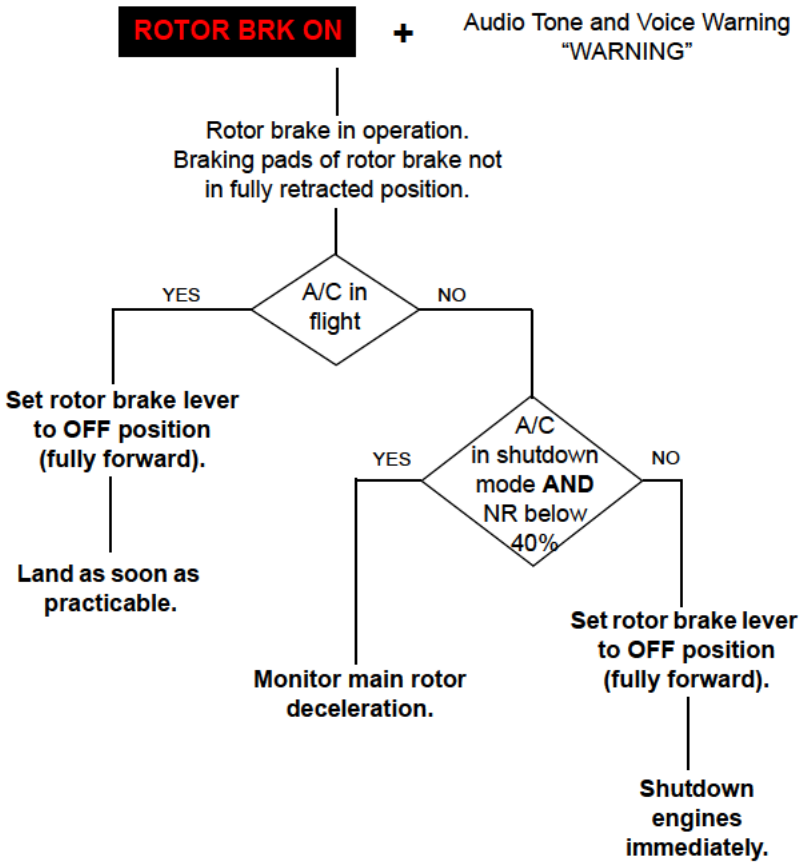
Check NR.

IF rotor speed high.

Raise collective to decrease rotor speed.

END

ROTOR BRAKE FAILURE



END

DRIVE

MAIN ROTOR CONTROLS SEIZURE

WARNING

If a seizure occurs in the flying controls, greater forces will be required to operate the controls. A reduction in the available control ranges may result and, in this situation, the low speed flight envelope may be restricted.

If the seizure occurred at an airspeed greater than 25 KIAS, the helicopter should be landed into the wind as soon as possible using a running landing procedure and a touchdown speed of approximately 25 KIAS.

If the airspeed is less than 25 KIAS, carry out a running landing at the speed at which the seizure occurred. If the helicopter is in a hover, land vertically.

TAIL ROTOR DRIVE FAILURE

In all three following cases these indications are present and determine a definite tail rotor drive failure:

- Attempt to maintain flight condition, may require unusual pedal position.
- Pedal input does NOT produce any sustained helicopter response.
- Possible noise and vibration from the aft fuselage area.

Although there might be some helicopter behaviour differences, the general procedure to bring the helicopter to a safe landing are basically the same in all flight conditions.

Following a tail rotor drive failure, safe landing can be achieved almost solely in autorotation. Even though in some circumstances, powered flight can be maintained or re-established through a correct combination of airspeed and power setting, autorotation must always be re-entered for a safe landing.

CAUTION

Powered run-on landing should not be attempted as airspeed required to maintain directional control is too high compared with landing gear limitations.

TAIL ROTOR DRIVE FAILURE IN HOVER

Collective: Lower immediately.

If time and conditions permit

- Engine power levers: Both OFF.

Collective: As required to cushion touchdown.

Carry out EMERGENCY/ POST CRASH SHUTDOWN AND EGRESS procedure Page 37.

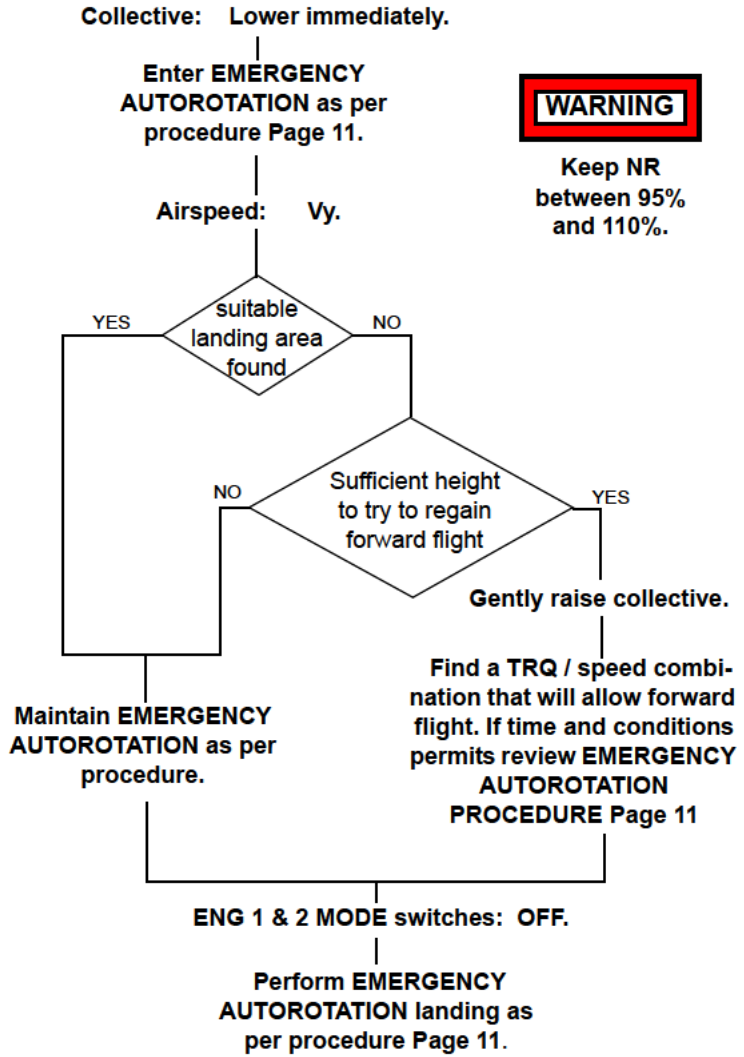
CAUTION

If engines are not shutdown a yaw to the right can be expected when attempting to cushion the touchdown. The yaw rate will be a function of the weight and collective application.

END

DRIVE

TAIL ROTOR DRIVE FAILURE IN FORWARD FLIGHT, POWER-ON



Note

If a run-on landing is not possible, decision should be made to minimize forward speed and accept the yaw rate.

END

TAIL ROTOR DRIVE FAILURE IN FORWARD FLIGHT, LOW POWER OR POWER-OFF

Two cases are thus possible:

1. Development of left yaw, typically coupled with a left roll;

2. Development of right yaw, typically coupled with a right roll and a pitch down attitude.

Note

In a low power descent or in autorotation, a tail rotor drive failure could cause the helicopter to yaw left because of the aerodynamics forces produced by the vertical fin.

Continued on next page.

TAIL ROTOR DRIVE FAILURE IN FORWARD FLIGHT, LOW POWER OR POWER-OFF (CONT'D)

Continuation from previous page

Helicopter develops **LEFT yaw.**

Development of left yaw typically coupled with left roll.

Gradually raise collective to regain directional control.

Maintain or carefully reduce airspeed.

Note

In this condition, a banked, uncoordinated flight is acceptable to maintain directional control.

Helicopter develops **RIGHT yaw.**

Development of right yaw typically coupled with right roll and pitch down attitude.

Acquire EMERGENCY AUTOROTATION as per procedure Page 11.

ENG 1 & 2 MODE SWITCHES: OFF.

Perform EMERGENCY AUTOROTATION landing as per procedure Page 11.

WARNING

Keep NR between 95% and 110%.

Note

If run-on landing is not possible, decision should be made to zero out forward speed and accept the yaw rate.

END

TAIL ROTOR CONTROL FAILURE IN HOVER

Collective: Lower to LAND IMMEDIATELY.

Cyclic: As necessary to maintain level attitude.

ENG 1 & 2 MODE switches: OFF.

END

TAIL ROTOR CONTROL FAILURE IN FORWARD FLIGHT

Helicopter develops **LEFT yaw.**

Gradually raise collective and/or reduce speed to regain directional control.

Helicopter develops **RIGHT yaw.**

Gradually lower collective and/or increase speed to regain directional control.

IF time and conditions permit:
- perform controllability check.

Approach: Perform keeping nose to the left.

Landing: Touchdown at lowest airspeed obtained in the controllability check.

Maintain collective on touchdown, then carefully lower it while slowing down.

Carefully use toe brakes to slow down helicopter.

Carry out EMERGENCY/POST CRASH SHUTDOWN AND EGRESS procedure Page 37.

Note

Wind from the front left quadrant of the helicopter may be beneficial.

END

DRIVE

TAIL ROTOR CONTROL SEIZURE IN HOVER

Collective: Lower gently to LAND IMMEDIATELY.

Note

Lowering the collective may cause the helicopter to start rotating. Touching down while rotating at nearly zero ground speed should result in little or no hazard.

Note

Do not switch engines to OFF unless a severe right yaw develops.

If left yaw develops, reducing NR to 100% may be beneficial.

Carry out EMERGENCY/POST CRASH SHUTDOWN AND EGRESS procedure Page 37.

END

TAIL ROTOR CONTROL SEIZURE IN FORWARD FLIGHT

If time and conditions permit:
- perform controllability check.

Approach and Landing:
Perform at lowest airspeed found in controllability check.

Maintain collective on touchdown, then carefully lower it while slowing down.

Carefully use toe brakes to slow down helicopter.

Carry out EMERGENCY/POST CRASH SHUTDOWN AND EGRESS procedure Page 37.

SECTION END

ENGINE

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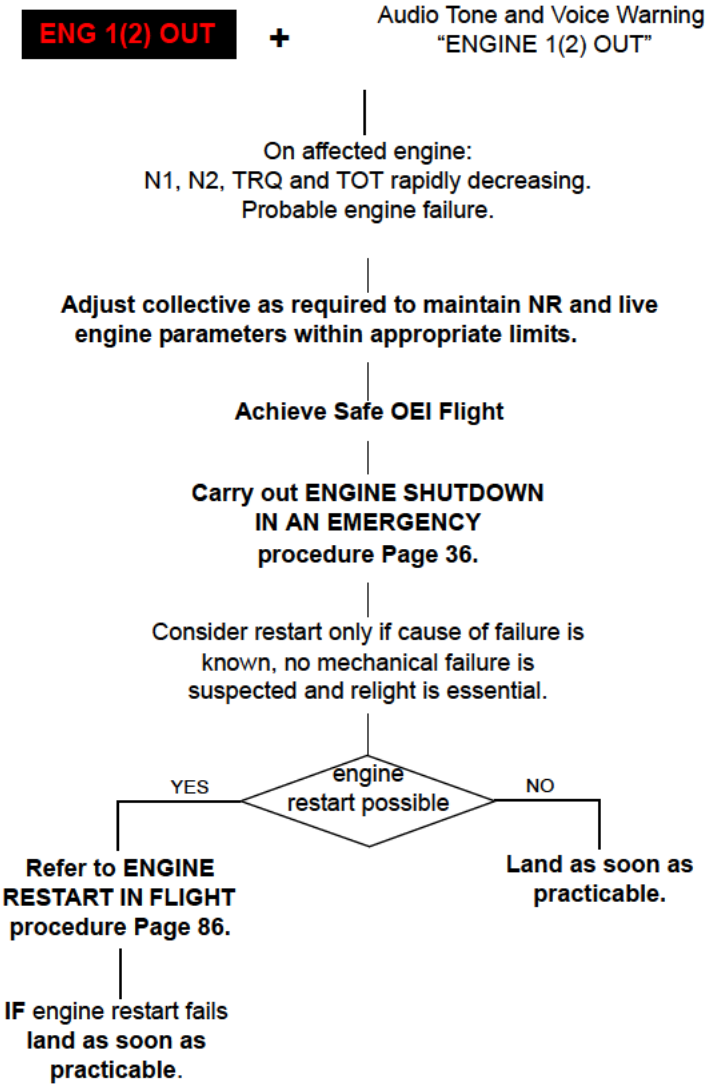
ENGINE FAILURE



END

ENGINE

DOUBLE ENGINE FAILURE

Enter into autorotation immediately.

See **EMERGENCY AUTORATION PROCEDURE** Page 11.

If time and conditions permit, carry out the **ENGINE SHUTDOWN IN AN EMERGENCY** procedure Page 36 while the helicopter is manoeuvred towards the landing area.

If sufficient additional time is available, attempt an engine re-start, refer to the **ENGINE RESTART IN FLIGHT** procedure Page 86.

ENGINE SHUTDOWN IN AN EMERGENCY

CAUTION

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

Following an engine failure/malfunction, achieve Safe OEI Flight. On the failed engine, carry out the following shutdown procedures:

1. ENG MODE switch — OFF.
2. Engine power lever — OFF.
3. FUEL PUMP switch — OFF.
4. FUEL VALVE switch — CLOSED.
5. XFEED VALVE switch — CLOSED.
6. GEN switch — OFF.

CAUTION

If there is evidence of combustion (i.e. a rise in TOT) after engine shutdown in flight, perform **DRY MOTORING RUN** procedure, Page 77, to prevent any possible fire.

7. Fuel contents — Monitor and use XFEED VALVE as necessary.

Land as soon as practicable. If terrain permits, land maintaining some forward speed.

END

EMERGENCY/POST CRASH SHUTDOWN AND EGRESS

In the event of an emergency or crash landing, priority must be given to ensure that personnel are egressed safely at the most appropriate time.

1. ENG 1 & 2 MODE switches — OFF.
2. Engine power levers 1 & 2 — OFF.
3. FUEL PUMP 1 & 2 switches — OFF.
4. FUEL VALVE 1 & 2 switches — CLOSED.

If risk of engine fire exists:

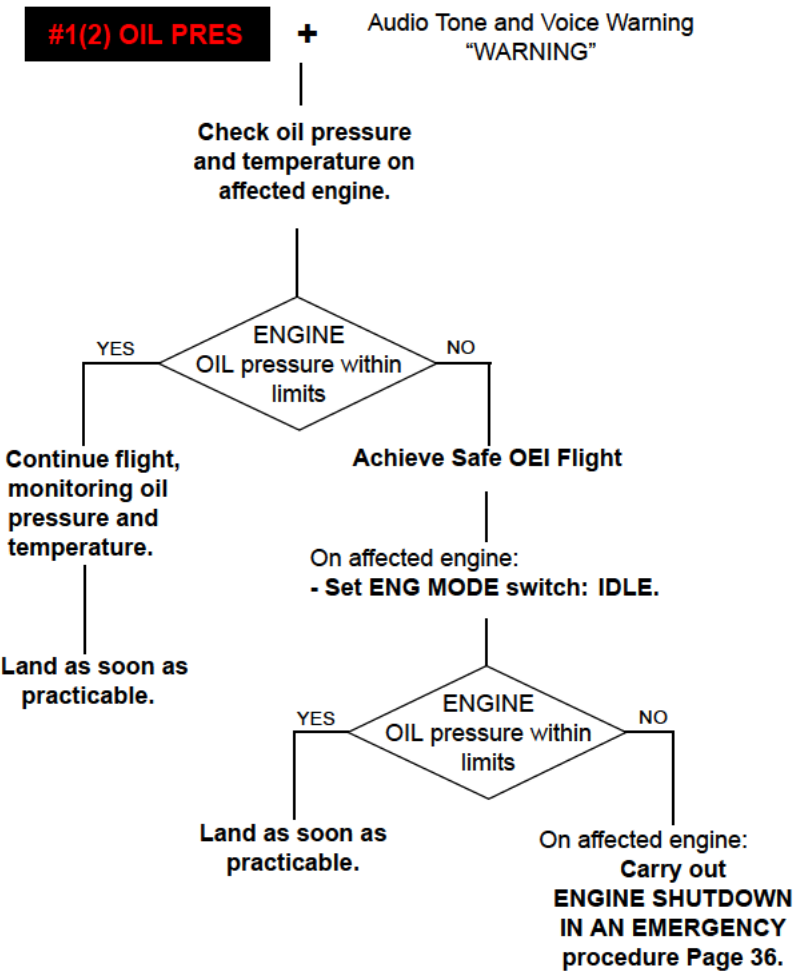
5. S/OFF FIRE pushbutton — Lift appropriate guard and press pushbutton (once only), S/OFF wording illuminates.
6. Fire extinguisher switch — Select BTL to 1 then, if required, select BTL to 2.
7. Rotor brake — ON.
8. BAT switch — OFF.
9. GEN 1 & 2 switches — OFF.

When rotor and helicopter stopped:

10. Helicopter — Egress as soon as possible.

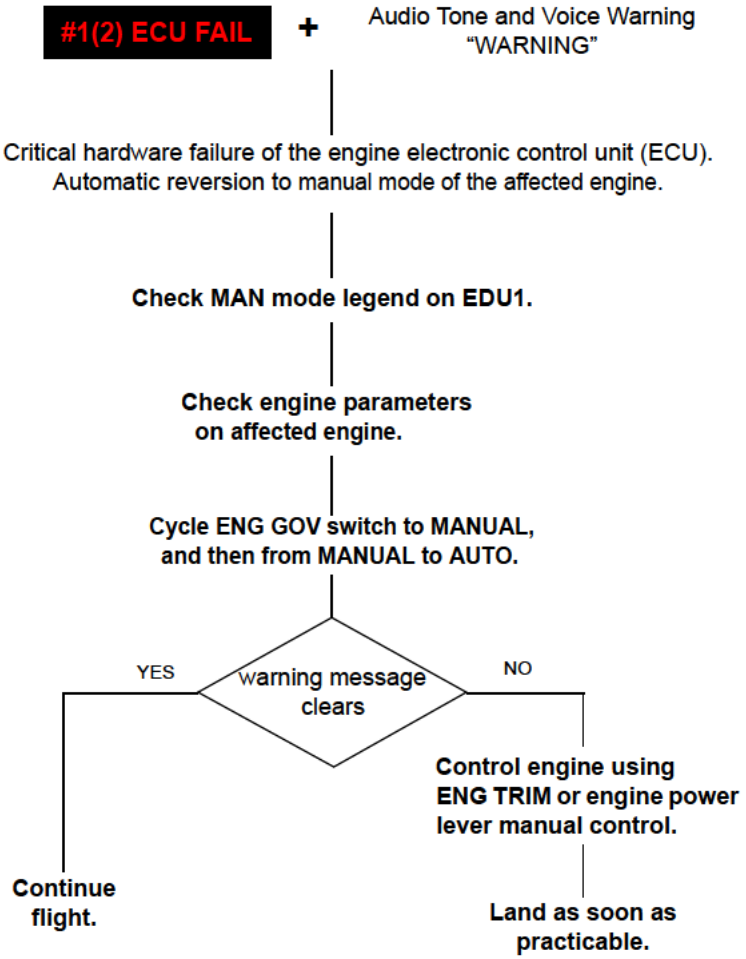
END

ENGINE OIL PRESSURE



END

ENGINE ECU FAIL



Note

In the presence of an ECU failure, the engine control system reverts to MANUAL mode regardless of the ENG GOV switch position. However, it is recommended to set the ENG GOV switch to MANUAL for congruence with the mode condition.

SECTION END

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ELECTRICAL

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DOUBLE DC GENERATOR FAILURE

ELECTRICAL + **BATT DISCH** + Audio Tone and voice warning "WARNING"

Both DC generators failed.

Cockpit pilot utility light: ON (at night)

RTU1: OFF.

- Maximum speed is V_{NE} (Power-ON) - 40 KIAS.

GEN BUS 1: OFF.
GEN BUS 2: OFF.

1 AP OFF + **BUS TIE**

caution messages displayed.

GEN 1 and GEN 2: Reset, then ON.

Both GEN remain ON

YES

GEN BUS 1 & 2: ON.

All caution and warning messages disappear.

AP1: ON.

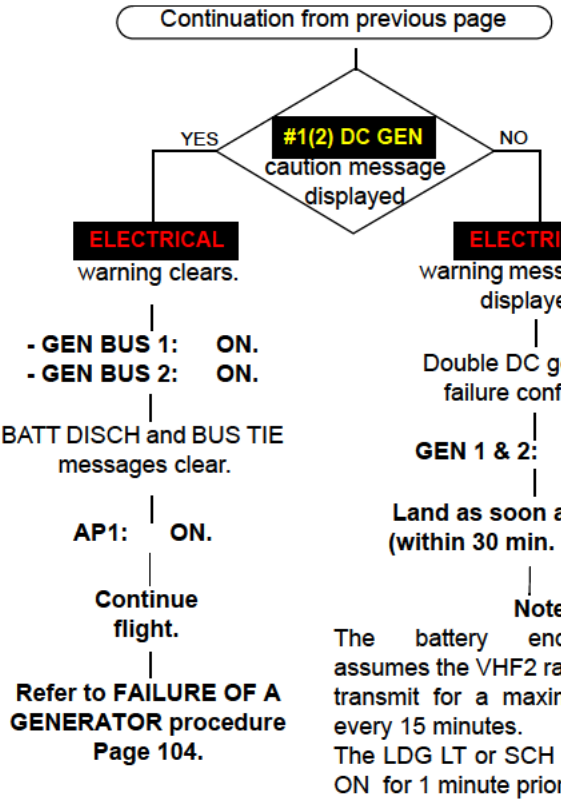
Continue flight.

NO

Continued Next Page

ELECTR

DOUBLE DC GENERATOR FAILURE (CONT'D)



Note

Refer to **SERVICES LOST DURING DOUBLE DC GENERATOR FAILURE** Page 49 for inoperative equipment.

Note

If MAIN BUS 1 & 2 are required, GEN BUS 1 & 2 may be switched ON. The battery endurance will be reduced to 20 minutes.

END

DOUBLE DC GENERATOR FAILURE (EXTENDED FLIGHT ENDURANCE)

ELECTRICAL + **BATT DISCH** +

Audio Tone and voice warning "WARNING"

Both DC generators failed.

Cockpit pilot utility light: ON (at night)

RTU1: OFF.

- Maximum speed is V_{NE} (Power-ON) - 40 KIAS.

GEN BUS 1: OFF.
GEN BUS 2: OFF.

1 AP OFF + **BUS TIE**

caution messages displayed.

GEN 1 and GEN 2: Reset, then ON.

Both GEN remain ON

YES

GEN BUS 1 & 2: ON.

All caution and warning messages disappear.

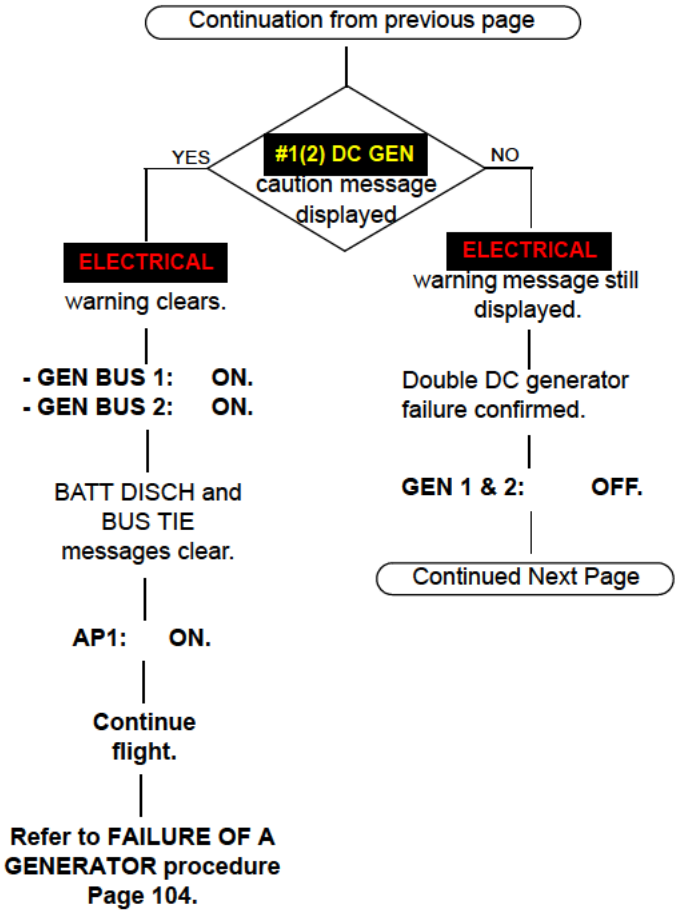
AP1: ON.

Continue flight.

NO

Continued Next Page

DOUBLE DC GENERATOR FAILURE (EXTENDED FLIGHT ENDURANCE) (CONT'D)



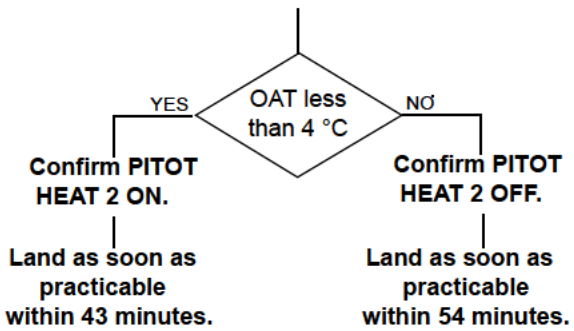
DOUBLE DC GENERATOR FAILURE (EXTENDED FLIGHT ENDURANCE) (CONT'D)

Continuation from previous page

- **Set XFEED VALVE: CLOSED.**
- **FUEL PUMP 1 and 2 switches: OFF.**
- **EDU2 switch: OFF.**

WARNING

When the indicated fuel quantity in each tank is 100 kg or less, avoid bank turns above 30 deg and sustained pitch angle below 0 deg.



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.
The LDG LT or SCH LT can be turned ON for 1 minute before landing.

Note

Refer to **SERVICES LOST DURING DOUBLE DC GENERATOR FAILURE** Page 49 for inoperative equipment.

END

SERVICES RETAINED DURING DOUBLE DC GENERATOR FAILURE

EMERGENCY BUS 1

- INVERTER 1
- ATC TRANSPONDER
- APMS CHANNEL 1 CONTROL
- LANDING GEAR HYDRAULIC CONTROL
- LANDING GEAR CONTROL PANEL
- POSITION LIGHTS
- LANDING LIGHTS
- EMERGENCY FLOATS (if installed)

EMERGENCY BUS 2

- PILOT PFD (EADI)
- PILOT RBP
- PILOT FMS/GPS
- PILOT ICS (AMU)
- ICS SPEAKER AMPLIFIER
- VHF 2
- RTU 2
- RADAR ALTIMETER
- VOR/ILS 2
- AHRS 2
- PITOT HEAT 2
- PILOT UTILITY LIGHT
- SEARCHLIGHT
- EMERGENCY FLOATS (if installed)

ESSENTIAL BUS 1

- PILOT MFD (EHSI)
- EDU SECONDARY
- DAU CH-B
- ENGINE 1 FIRE DETECTION
- ENGINE 1 FIRE EXTINGUISHER
- FUEL PUMP 1
- FUEL SHUT-OFF VALVE 1
- FUEL QUANTITY 1
- FUEL CROSS FEED VALVE
- ECU 1

ESSENTIAL BUS 2

- HYDRAULIC CONTROL PANEL
- ADU 2
- APMS CHANNEL 2 CONTROL
- AFCS CHANNEL 2 (AP 2)
- ENGINE 2 FIRE DETECTION
- ENGINE 2 FIRE EXTINGUISHER
- FUEL PUMP 2
- FUEL SHUT-OFF VALVE 2
- FUEL QUANTITY 2
- ENG GOV CONTROL
- ECU 2

BATTERY BUS

- EDU PRIMARY
- DAU CH-A
- ELT
- ESIS
- COPILOT ICS (AMU)
- FORCE TRIM

END

SERVICES LOST DURING DOUBLE DC GENERATOR FAILURE

ELECTRICAL

BATT DISCH

MAIN BUS 1	MAIN BUS 2
COPILOT PFD (EADI)	COPILOT MFD (EHSI)
AHRS 1 (primary supply)	AHRS 1 (Secondary supply)
VOR/ADF 1	EVS
RTU 1	TAS
VHF 1	DIGITAL MAP
CABIN ICS (PIA amplifier)	OVERHEAD CONSOLE ILLUMINATION
COPILOT RBP	INSTRUMENT PANEL ILLUMINATION
CHIP BURNER	TAXI LIGHTS
PEDESTAL ILLUMINATION	ANTI-COLLISION LIGHTS
COPILOT UTILITY LIGHT	COCKPIT FAN
CABIN LIGHTS	INVERTER 2
PASSENGER WARNING SIGN	PILOT WIPER
COPILOT WIPER	ENG 2 IGN/START (no ENGINE 2 restart)
ENG 1 IGN/START (no ENGINE 1 restart)	HYDRAULIC ACCUMULATOR (*)
PITOT HEATER 1	(loss of MAIN & EMER PRESS indication)
HEATER/ECS (if installed)	

AUX BUS 1	AUX BUS 2
GPS 1	DME
ADU 1	

(*) If Fixed Landing Gear configuration:

HYDRAULIC ACCUMULATOR
(loss of MAIN PRESS indication).

END

BATTERY DISCHARGING

BATT DISCH + Audio Tone and Voice Warning "WARNING"

Battery discharging.

- **Cockpit pilot utility light:ON** (at night).
- **Reduce power** (if practicable).
- **Maximum speed is V_{NE} (Power-ON) - 40 KIAS.**

CAUTION

AP1(2) may be lost due to GEN 2(1), GEN BUS 2(1) and BAT switches disconnecting. AP1(2) may be re-engaged immediately.

ELECTRICAL Warning displayed

YES → Both DC generators failed.

Refer to DOUBLE DC GENERATOR FAILURE procedure.

NO → **- GEN BUS 1: Check ON.**
- GEN BUS 2: Check ON.

BATT DISCH Warning remains

YES → **#1(2) DC GEN** Caution displayed

YES → On affected generator:
- GEN BUS switch: OFF.
- GEN switch: RESET, then to ON.
- GEN BUS switch: ON.

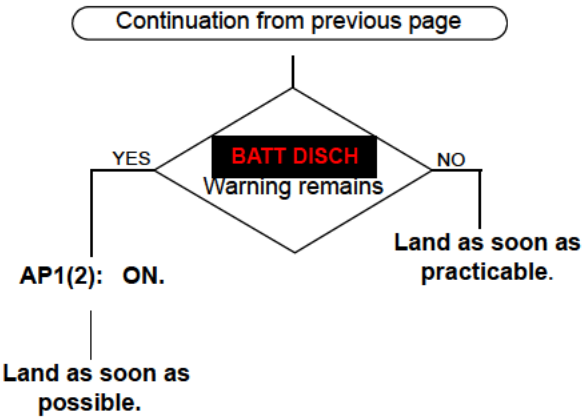
Continued Next Page

NO → **BAT switch: OFF.**

Land as soon as practicable.

NO → **Continue flight.**

BATTERY DISCHARGING (CONT'D)



BATTERY HOT

BATT HOT + Audio Tone and Voice Warning "WARNING"

Battery temperature exceeding limits.

BAT switch: OFF.

Land as soon as practicable.

CAUTION

Do NOT attempt engine restart in case of engine flame-out.

END

ELECTRICAL FIRE / SMOKE (IN FLIGHT)

Visible signs of smoke in cockpit, with distinct acrid smell of burning insulation.

- Ventilate cockpit and cabin.

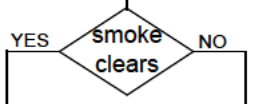
Maintain safe flight condition and use following procedure to isolate bus bars in order to establish source of fire.

Cockpit pilot utility light: ON (at night).

- GEN BUS 1: OFF.
- GEN BUS 2: OFF.
- GEN 1: OFF.
- VHF2 : Check tuned on required ATC frequency.

- BAT: OFF.
- AP 2: ON.

Loss of:
- EDU 1
- ESIS
- RTU
- ATC TRANSPONDER
- APMS ILLUMINATION
- VHF1
- LANDING LIGHTS



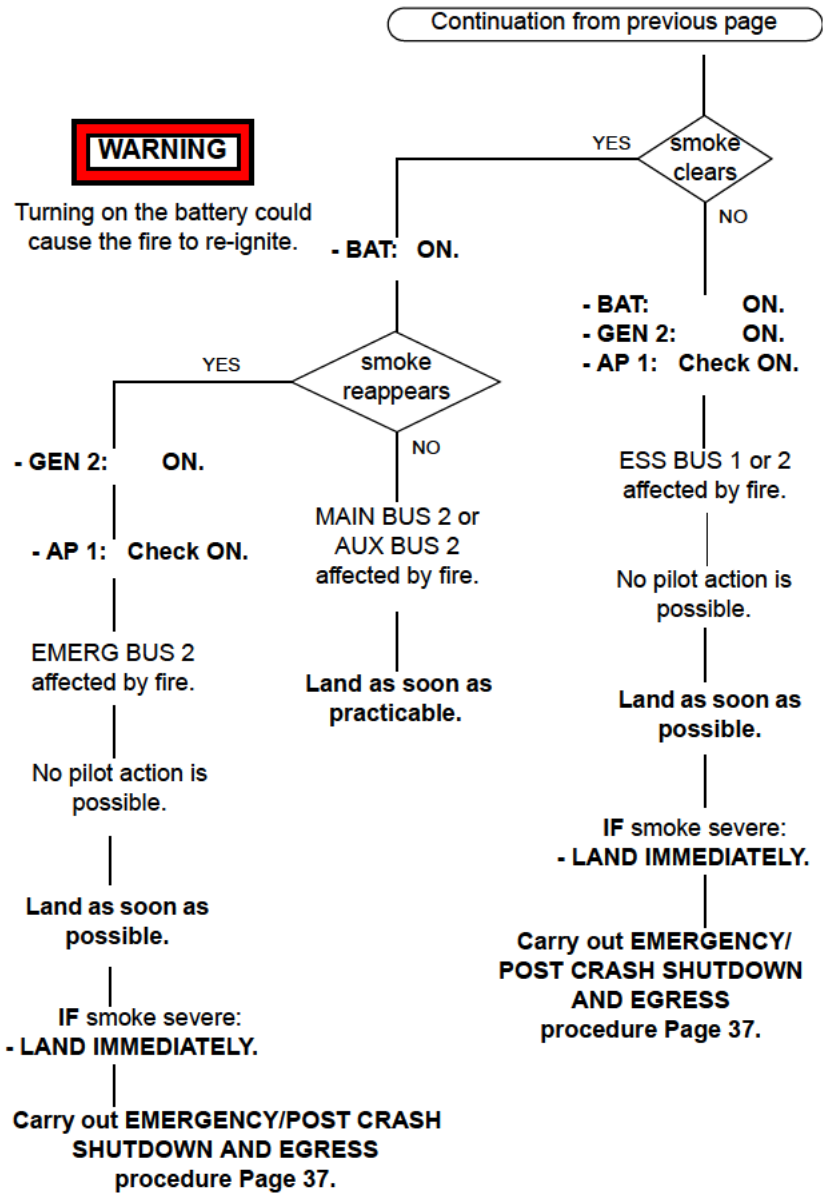
- GEN 1: ON.
- AP2: Check ON.
- GEN 2: OFF.
- AP 1: ON.

Loss of:
- EDU 1
- ESIS
- FORCE TRIM
- VHF2
- SEARCHLIGHT

Land as soon as practicable.

Continued Next Page

ELECTRICAL FIRE / SMOKE (IN FLIGHT) (CONT'D)



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LANDING GEAR & VARIOUS

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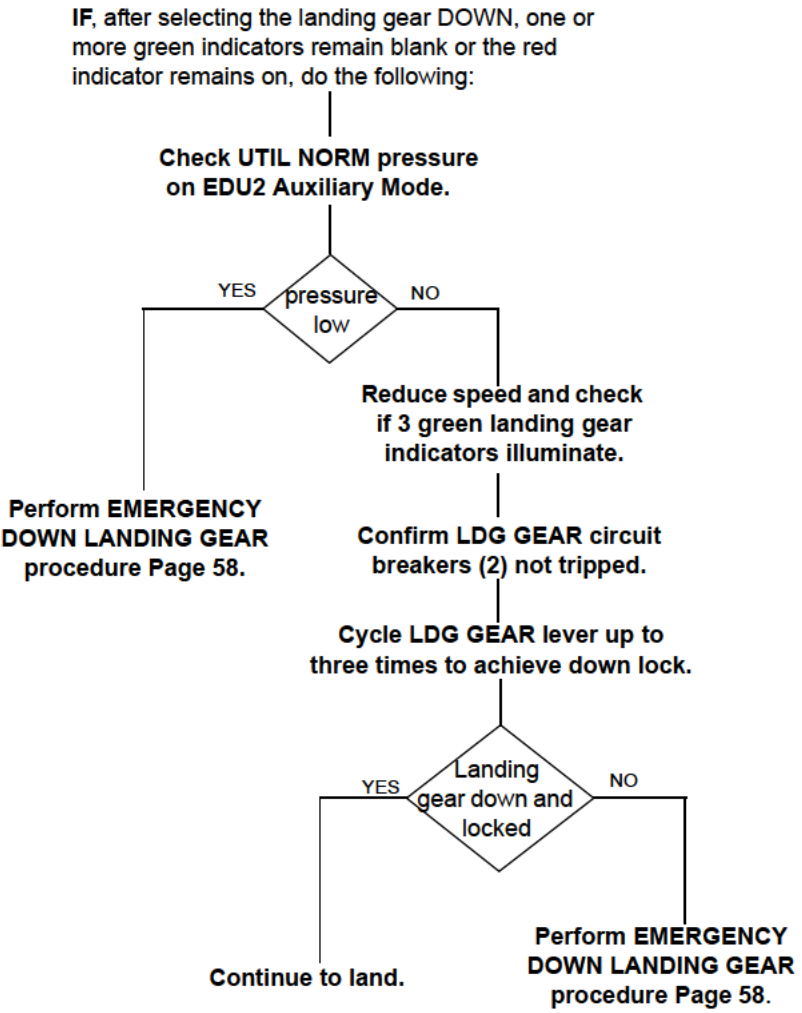
LANDING GEAR FAILS TO LOCK DOWN (TOTAL OR PARTIAL FAILURE)



END

EMERGENCY DOWN LANDING GEAR PROCEDURE

CAUTION

After extending the landing gear using the DOWN EMER lever position, the toe brakes and rotor brake are inoperative.
There is sufficient pressure in the emergency accumulator for only one extension of the landing gear, and for operation of the parking brake handle for emergency braking.

EMER/NORMAL selector: Turn clockwise breaking safety wire and selecting EMER.

Set landing gear lever to DOWN EMER (fully down).

Landing gear down and locked

YES

Land vertically and cautiously on flat level surface.

NO

Proceed to a hover at a height sufficient for ground personnel to check the gear.

END

STATIC PORT OBSTRUCTION

When operating in adverse weather conditions (rain, snow, etc.), if erratic readings from the airspeed indicator and altimeter are suspected, with the STATIC source switch in the NORMAL position, select the ALTERNATE static source which uses cabin air for ADU2 airspeed and altitude. Proceed as follows:

CAUTION

When the ALTERNATE static source is used, decrease the altimeter readings by 120 ft.

Open all vents and turn Heater/ECS OFF.

STATIC source switch: Lift guard. Select ALTERNATE.

Continue flight.

Note

The airspeed indication obtained through the alternate static source is slightly higher than the actual value in all speed range.

END

FLIGHT IN THUNDERSTORM - LIGHTNING STRIKE

When flying near thunderstorm activity, the helicopter may be struck by lightning. If it is suspected that the helicopter has been struck by lightning, proceed as follows:

CAUTION

Avoid performing extreme manoeuvers.

Reduce airspeed to 80 KIAS.

Land as soon as practicable.

If it is suspected that the pilot's Pitot system has been damaged by lightning, proceed as per **STATIC PORT OBSTRUCTION** procedure Page 59.

If it is suspected that the helicopter has been struck by lightning this must be noted in the helicopter log-book.

SECTION END

CAUTION MESSAGES

CAS Caption	Voice Message	Page	Malfunction/System State
#1(2) A/F F FLTR	-	129	Associated airframe fuel filter partially blocked. Impeding by-pass.
#1(2) DC GEN	-	104/101	Associated DC generator failed.
#1(2) DCU	-	78	Associated Data Collection Unit (DCU) failure.
#1(2) ECU DATA	-	79	Loss of data from associated ECU.
#1(2) ECU MAINT	-	79	Associated engine electronic control unit (ECU) non-critical failure.
#1(2) F LOW FAIL	-	130	Associated fuel-low sensor test failed. No fuel-low indication for associated fuel tank.
#1(2) FIRE DET	-	85	Associated engine fire detection system inoperative.
#1(2) FUEL FLTR	-	130	Associated fuel filter partially blocked. Impeding by-pass.
#1(2) FUEL LOW	-	127	Fuel quantity in associated tank below 33 kg.
#1(2) GEN CTL	-	101	Associated DC generator control box breaker in relay box tripped.
#1(2) HOT START	-	80	Associated engine TOT exceeded limit on engine starting.
#1(2) OEI TIME	-	78	Cumulative time at OEI 2.5 min rating has been reached.
#1(2) OIL CHIP	-	72/73	Presence of metal particles in associated engine oil circuit.
#1(2) OIL HOT	-	71	Associated engine oil temperature above maximum limit.

CAS Caption	Voice Message	Page	Malfunction/System State
#1(2) OVSPD	-	76	Engine drive-shaft failure.
#1(2) OVSPD	-	77	Associated engine N2 overspeed control system triggered.
#1(2) OVSPD DET	-	77	Associated engine N2 overspeed control system failed.
#1(2) OVSPD TEST	-	78	Associated engine N2 overspeed control circuit test failure.
#1(2) PLA	-	74	Associated engine power lever (PLA) out of FLIGHT position whilst in AUTO mode.
#1(2) PLA MOTOR	-	74	Associated engine power lever (PLA) remote control inoperative. Beep trim failed.
#1(2) PMS	-	75	Associated ENG MODE switch (PMS) failed.
#1(2) TOT LIMITER	-	81	Associated engine TOT limiter inoperative.
1(2) AP DEGRADED	-	146	Pre-Flight Test completed with some tests skipped. (Not applicable to EDU P/N 109-0900-76-2A05 and subs).
1(2) AP FAIL	"AUTOPILOT AUTOPILOT"	153	Uncommanded disengagement of associated AP channel.
1(2) AP HOT	-	154	Associate FCC temperature is above limit.
1(2) AP MAINT	-	148	Any failure detected on AP channels
1(2) AP OFF	"AUTOPILOT AUTOPILOT"	106/152	Associated AP channel not engaged.
1(2) AP P FAIL	"AUTOPILOT AUTOPILOT"	155	Failure affecting a single series actuator in the pitch axis on associated AP.

CAS Caption	Voice Message	Page	Malfunction/System State
1(2) AP R FAIL	"AUTOPILOT AUTOPILOT"	155	Failure affecting a single series actuator in the roll axis on associated AP.
1(2) AP TEST DGR	-	147	Pre-Flight Test completed with some tests skipped. (Applicable to EDU P/N 109-0900-76-2A05 and subs).
1(2) AP TEST FAIL	-	145	Associated AP channel has failed the pre-flight test.
1(2) AP Y FAIL	"AUTOPILOT AUTOPILOT"	156	Failure affecting a single series actuator in the yaw axis on associated AP.
1(2) DC GEN OVLD	-	106	Associated generator in overload condition.
ADC 1(2)	-	202/178	Associated ADU failed.
AHRS 1(2)	-	203/179	Associated AHRS failed.
AP AHRS 1(2) FAIL	-	142/179	AFCS not receiving associated AHRS information.
AP DEGRADED	-	143	AFCS not receiving ESIS data. (Not applicable to EDU P/N 109-0900-76-2A05 and subs).
AP STDBY FAIL	-	144	AFCS not receiving ESIS data. (Applicable to EDU P/N 109-0900-76-2A05 and subs).
AP-CAS FAIL	-	141	AFCS CAS messages and audio attention getters are unavailable.
APMS PNL FAIL	-	149	Failure of upper mode pushbuttons on APMS panel.
ATT OFF	-	141	ATT mode unavailable or deselected in pitch or roll.
AWG FAIL	-	135	Aural Warning Generator (AWG) system failure.

CAUTION MSGs

CAS Caption	Voice Message	Page	Malfunction/System State
BAG DOOR	-	198	Baggage compartment door not correctly closed.
BATT OFF	-	102	Battery off-line.
BUS TIE	-	105	Bus tie open.
C TRIM FAIL	-	151	AFCS has lost trim actuator drive capability in collective.
CABIN DOOR	-	197	Pilot's, copilot's and/or passengers' door not correctly closed.
CHECK STRAP	-	165	IDS hardware configuration setting incorrect . (Applicable to EDU P/N 109-0900-76-2A05 and subs).
COCKPIT FAN	-	199	Cockpit fan failed.
DAU MISCMP-P	-	165	Miscompare of DAU primary parameters. Possible degradation in system function.
EFIS FAN	-	200	EFIS fans failed
EMER UTIL CHRG	-	115	Solenoid valve of emergency utility hydraulic system open. Emergency utility hydraulic system is operative.
EMER UTIL PRES	-	114	Low pressure in emergency utility hydraulic system.
ENG 1(2) IDLE	-	70	Attempted Take Off with one engine in Idle.
EXT PWR ON	-	103	External power connected to the helicopter or external power door open.
FIRE BTL 1(2)	-	85	Associated fire extinguisher bottle discharged.
FUEL DRAIN 1(2)	-	131	Associated fuel drain valve open.
FUEL PUMP 1(2)	-	128/129	Associated fuel pump failed.

CAS Caption	Voice Message	Page	Malfunction/System State
IDS	-	161/162/ 163/164	Failure of Integrated Display System (IDS). Possible degradation in system function.
INV 1(2)	-	106	Associated inverter failed.
LANDING GEAR	"LANDING GEAR"	200	Height is less than 200 ft radalt and landing gear is retracted.
MAIN RTR SERVO	-	111	A servo valve in one of the three main rotor servo actuators is jammed.
MAIN UTIL CHRG	-	115	Solenoid valve of main utility hydraulic system open. Main utility hydraulic system is operative.
MAIN UTIL PRES	-	113	Low pressure in main utility hydraulic system.
MGT MATCH	-	83	Crosstalk between the 2 ECU failed. No engine TOT matching possible.
MISTRIM	-	149	Series actuators not centered.
P TRIM FAIL	-	150	AFCS has lost trim actuator drive capability in pitch.
PARK BRK ON	-	198	Parking brake ON. (Not applicable to EDU P/N 109-0900-76-2A05 and subs).
PITOT 1(2) FAIL	-	199	Associated Pitot heat failed.
R TRIM FAIL	-	150	AFCS has lost trim actuator drive capability in roll.
ROTOR BRK	-	123	Rotor brake system degraded or rotor brake lever not in OFF position.
RPM SELECT	-	84	NR switch inoperative. Inability to trim NR.
SERVO 1(2)	-	109/110	Associated servo-hydraulic system failed.

CAS Caption	Voice Message	Page	Malfunction/System State
TGB OIL CHIP	-	121/122	Presence of metal particles in the tail rotor gearbox oil.
TRQ LIMITER	-	82	Engine torque limiter inoperative.
XMSN OIL CHIP	-	119/120	Presence of metal particles in the main gearbox oil.
XMSN OVTRQ	"OVERTORQUE"	119	Transmission overtorque: In AEO: TRQ1 + TRQ2 above 214%. In OEI: TRQ1 or TRQ2 above 162%.
Y TRIM FAIL	-	151	AFCS has lost trim actuator capability in yaw.

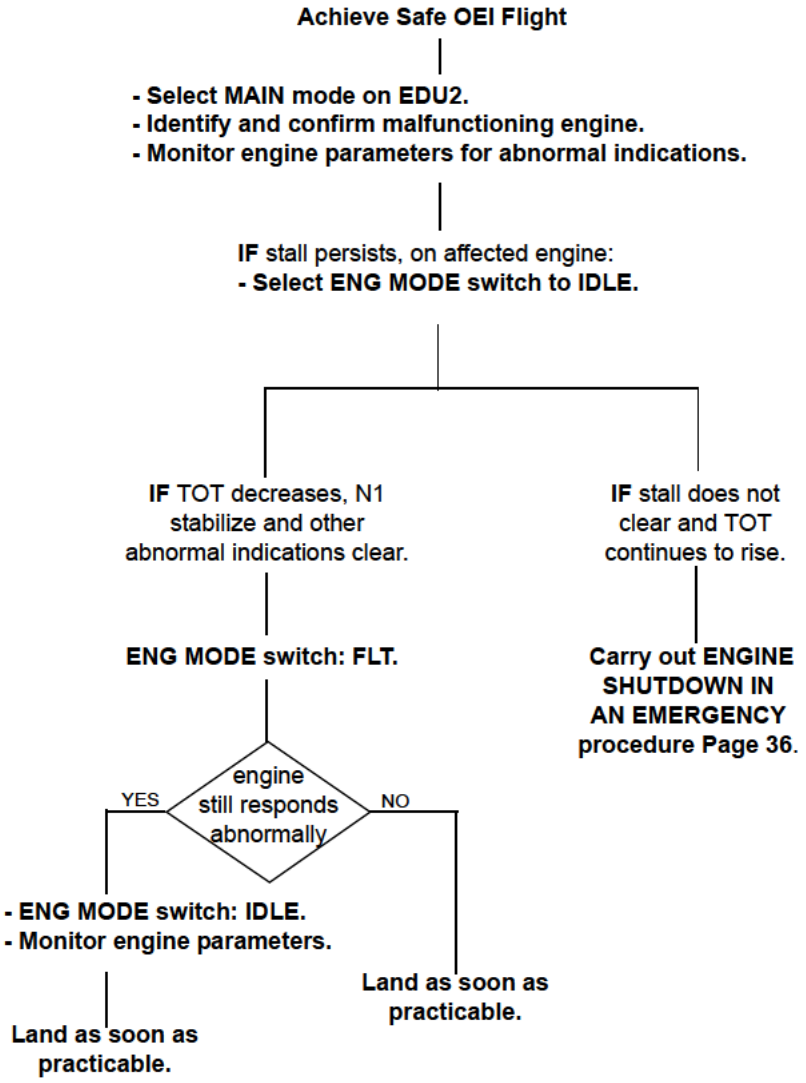
VOICE ONLY CAUTIONS

Voice Message	System State	Page
"TWO HUNDRED FEET"	When helicopter descends below 200 ft RAD ALT.	-
"AIRSPEED"	V_{NE} exceeded.	204
For EFIS SW versions 8.0E or later		
"MINIMUMS, MINIMUMS"	Deviation from above to below minimum altitude bug. Minimum altitude readout turns amber (yellow) and flashes.	204
"DECISION HEIGHT"	Descending below decision height bug causes decision height readout to turn yellow and flash.	-
"ALTITUDE ALTITUDE"	Deviation greater than 150 ft from selected altitude after capture.	204

SECTION END

ENGINE

COMPRESSOR STALL



END

ENGINE

UNUSUAL ENGINE NOISE

Achieve Safe OEI Flight

Monitor engine parameters for abnormal indications.

Select each ENG MODE switch to IDLE then back to FLT sequentially to identify the affected engine.

Use ENGINE SHUTDOWN IN AN EMERGENCY procedure Page 36 to shutdown affected engine as soon as practicable to avoid possible secondary compressor damage.

Land as soon as practicable.

END

ATTEMPTED TAKE-OFF WITH ONE ENGINE IN IDLE

ENG 1(2) IDLE + Audio Tone and voice warning "ENGINE IDLE"

On ground, collective lever raised while Engine #1(2) is still in IDLE.

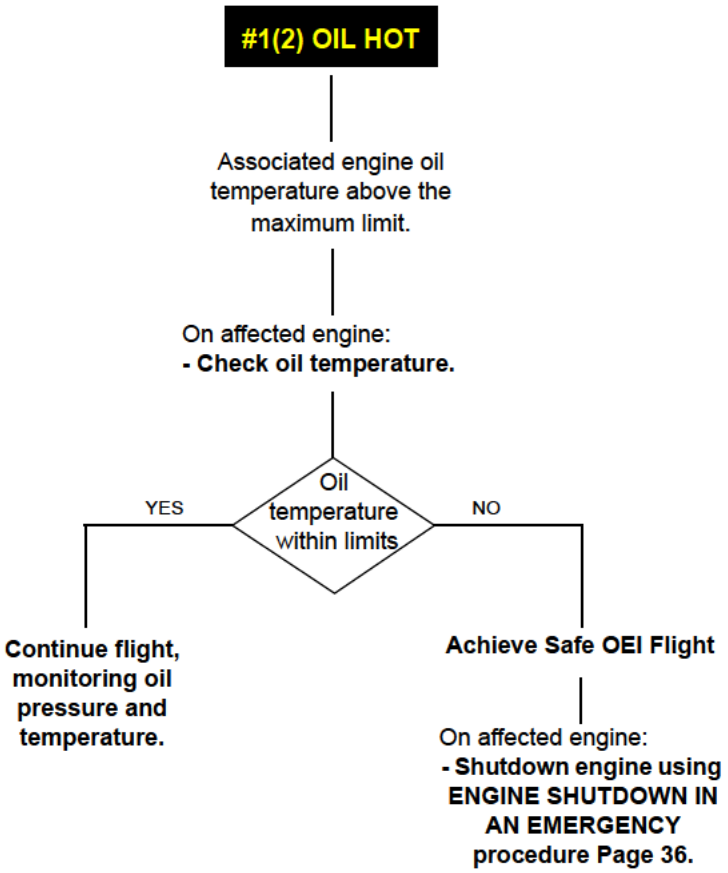
Do NOT take-off.

Lower collective.

Bring Engine #1(2) to FLIGHT regime.

END

ENGINE OIL TEMPERATURE



END

ENGINE OIL CHIP

(Helicopters not equipped with pulsed chip detector system P/N 109-0811-48)

#1(2) OIL CHIP

Presence of metal particles in associated engine oil.

- Check affected engine parameters and engine oil pressure.

Achieve safe OEI flight.

Reduce power by lowering collective.

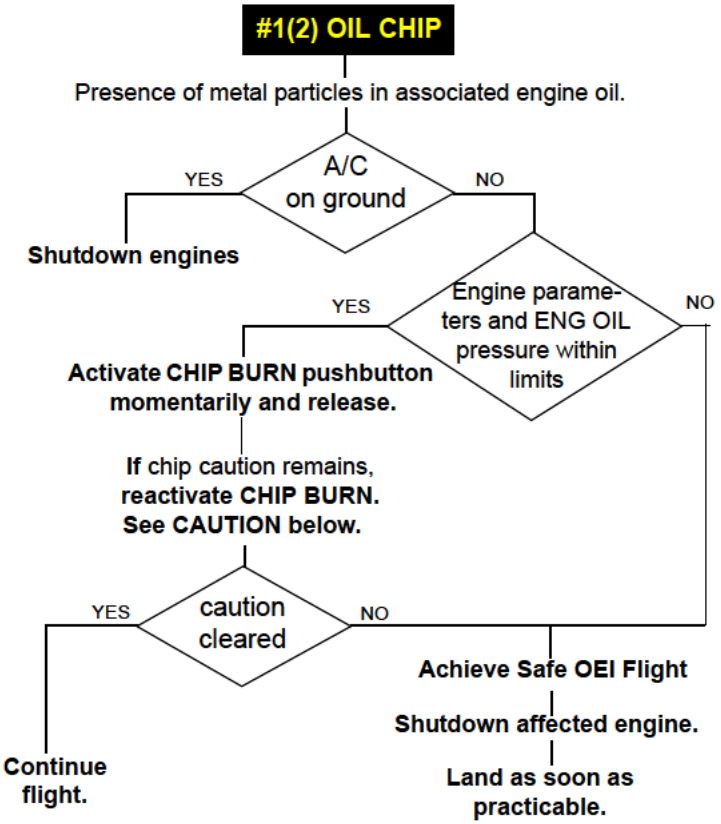
Shutdown affected engine.

Land as soon as practicable.

END

ENGINE OIL CHIP

(Helicopters equipped with pulsed chip detector system P/N 109-0811-48)



CAUTION

A maximum of 3 chip burn activations are permitted per flight to clear the caution.

Note

Appropriate log book entry must be made for each message activation.

If chip burn activation has been recorded, perform maintenance action as per applicable maintenance manual before next flight..

END

ENGINE POWER LEVER REMOTE CONTROL FAIL

#1(2) PLA MOTOR

Associated engine power lever (PLA) remote control beep not functioning.

Continue flight.

If engine manual control is required, this must be carried out by moving the associated engine power lever manually.

END

ENGINE POWER LEVER POSITION

#1(2) PLA

Associated engine power lever (PLA) out of FLIGHT position detent. (Message active in AUTO mode only).

Check engine power lever position and correct if required.

Even if caution message remains:

Continue flight.

On affected engine:
Monitor engine parameters.

END

ENGINE MODE SELECT SWITCH FAILURE

#1(2) PMS

Associated ENG MODE switch failure.

Continue flight.

Note

Engine shutdown may not be accomplished through the affected ENG MODE switch. If necessary, use the engine power lever to shutdown the engine. Refer to **ENGINE SHUT DOWN IN MANUAL MODE** procedure Page 93.

END

ENGINE DRIVE SHAFT FAILURE

Rapid decrease in Eng 1(2) TRQ to 0 % with Eng 1(2) N2 above NR and **#1(2) OVSPD**

Drive shaft failure on affected engine.

Achieve Safe OEI Flight

Carry out ENGINE SHUTDOWN IN AN EMERGENCY procedure Page 36.

Land as soon as practicable.

Note

Following an engine drive shaft failure N2 of affected engine will oscillate between N2 overspeed trip point (111 %) and 109 %.

END

ENGINE POWER TURBINE OVERSPEED

#1(2) OVSPD

Associated engine N2 at or above 111% and engine in overspeed condition.
N2 overspeed control system triggered.
Engine N2 will fluctuate between 111 % and 109 %.

Achieve Safe OEI Flight

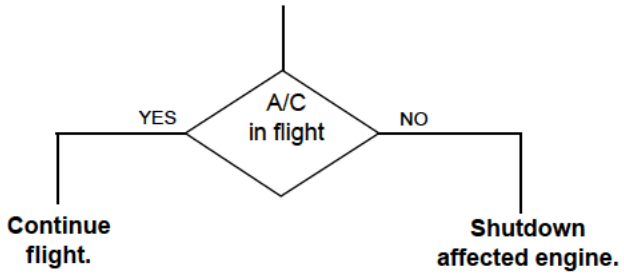
Carry out ENGINE SHUTDOWN IN AN EMERGENCY procedure Page 36.

END

ENGINE POWER TURBINE OVERSPEED DETECT FAILURE

#1(2) OVSPD DET

Associated engine N2 overspeed detection system not operational.



CAUTION

Be aware that N2 overspeed protection system on affected engine will not function in the event of an N2 overspeed.

END

N2 OVERSPEED CONTROL CIRCUIT TEST FAILURE

#1(2) OVSPD TEST

Correct problem before flight.

END

OEI 2.5 MIN RATING OUTSIDE LIMITS

#1(2) OEI TIME

Cumulative time at OEI 2.5 min rating has been reached.

Continue flight.

Avoid flight conditions that require OEI 2.5 min power. Refer to Engine MM for maintenance action.

END

DATA COLLECTION UNIT MALFUNCTION

#1(2) DCU

Correct problem before flight.

Note

#1(2) DCU caution messages active only on ground with ENG MODE switch in OFF position.

END

ENGINE CONTROL UNIT - MAINTENANCE REQUIRED

#1(2) ECU MAINT

Correct problem before flight.

Note

#1(2) ECU MAINT caution messages active only on ground with ENG MODE switch in OFF position.

END

ENGINE CONTROL UNIT - LOSS OF DATA

#1(2) ECU DATA

Loss of data from associated engine ECU.

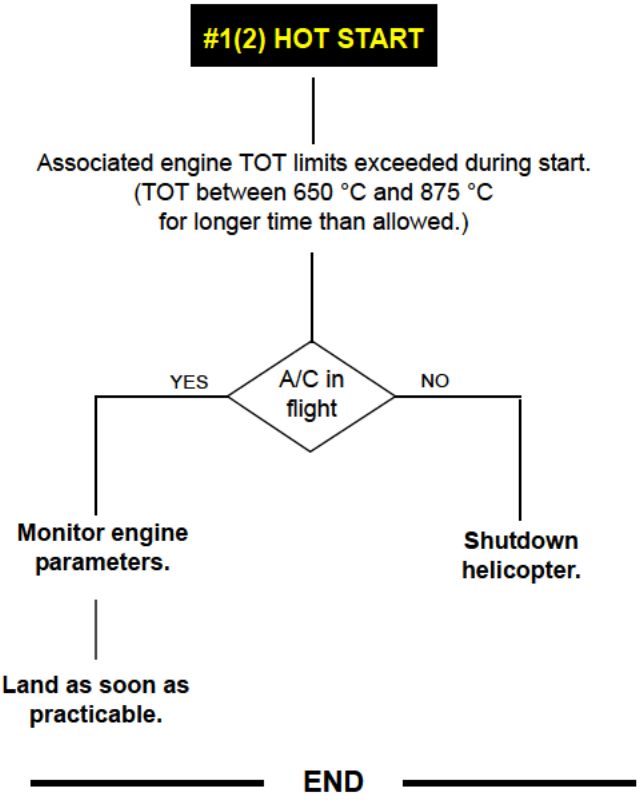
On affected engine:

- Check engine parameters displayed on EDU1 for correctness of backup indications.

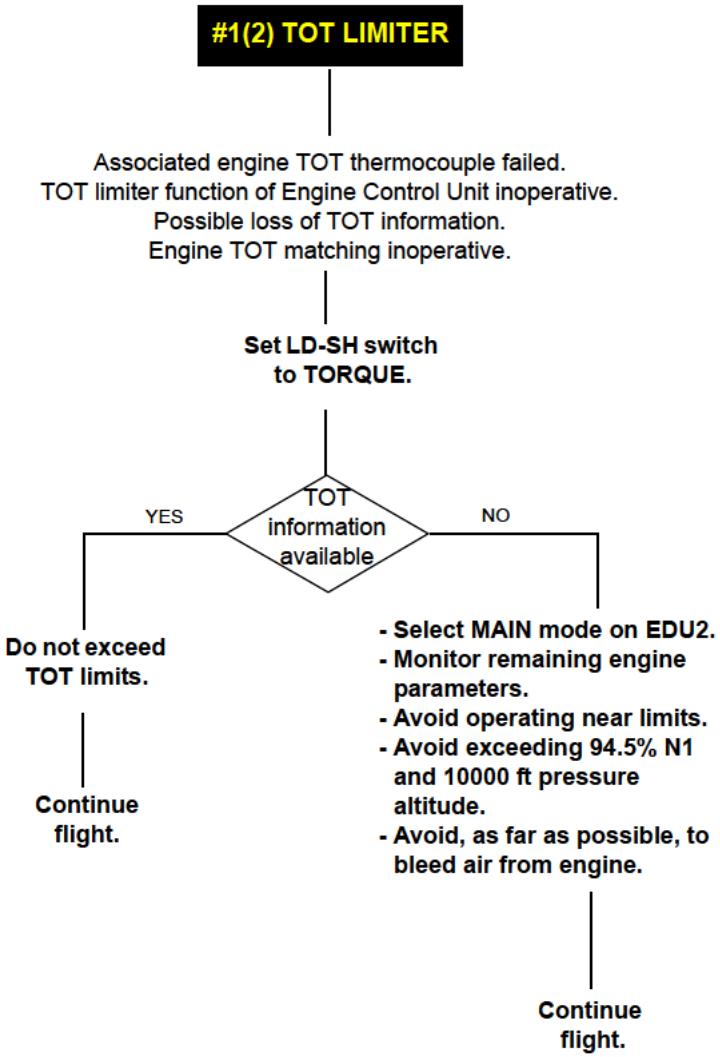
Continue flight.

END

ENGINE HOT START



TOT LIMITER MALFUNCTION



END

TORQUE LIMITER MALFUNCTION

TRQ LIMITER

Torque limiter function of Engine Control Unit inoperative and no communication between Engine Control Units. Engine matching inoperative.

Avoid operating near torque limits.

Continue flight.

ENGINE

CAUTION

The AFCS Upper Modes and Flight Director modes must not be used unless conducting an approach, missed approach, transition to/from the hover or hover.

END

MGT MISMATCH

MGT MATCH

Crosstalk between the 2 ECU failed.
No engine TOT matching possible.

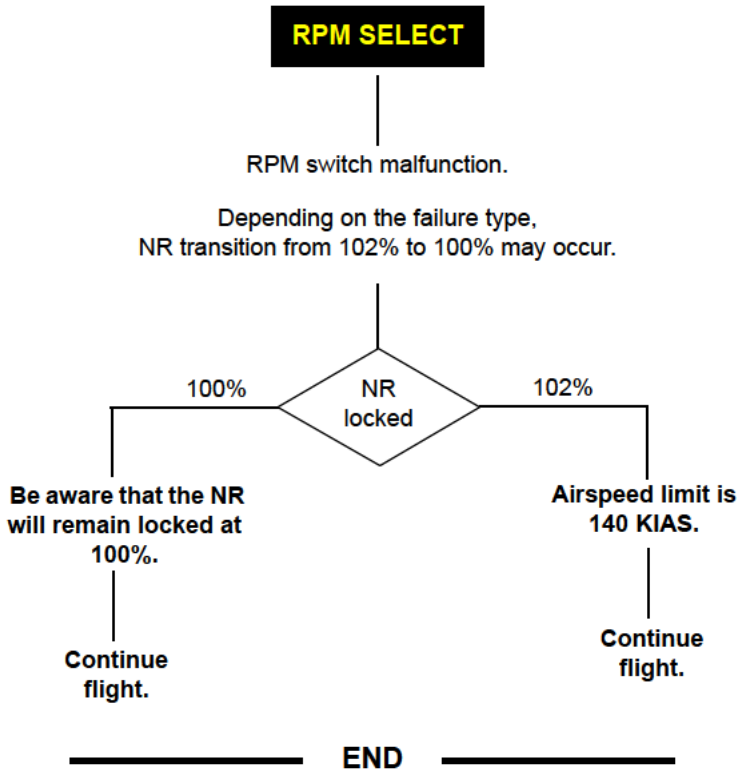
Set LD-SH switch to TORQUE.

Avoid operating near engine limits.

Continue flight.

END

ROTOR SPEED SELECTOR MALFUNCTION



ENGINE FIRE DETECTOR SYSTEM FAILURE

#1(2) FIRE DET

Associated engine fire detection system inoperative.

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

Land as soon as practicable.

END

FIRE EXTINGUISHER BOTTLE DISCHARGED

FIRE BTL 1(2)

Associated fire extinguisher bottle discharged.

Refill bottle before next flight.

END

ENGINE RESTART IN FLIGHT PROCEDURE

Refer to **ENGINE START PROCEDURE** for the indications associated with malfunctions during engine starting and to **ABORTED ENGINE START PROCEDURE** Page 89 for the recommended abort procedure.

CAUTION

If an engine is shutdown or a flame-out occurs during flight, and if there is no indication of a mechanical malfunction or engine fire, the engine may be restarted. Do NOT attempt to restart the engine if the cause of the flame-out has not been ascertained.

IN FLIGHT RESTART PROCEDURE IN AUTO MODE

The following is the procedure for restarting an engine in flight with the ECU operative (in AUTO mode).

CAUTION

For engine restarts below 15000 ft, the ENG MODE switch should only be moved from the OFF position, once N1 is below 20%.
Above 15000 ft, the ENG MODE switch should only be moved from the OFF position, once N1 is below 5%.

1. Recommended airspeed — Vy.
2. Engine power lever — FLIGHT.
3. FUEL VALVE switch — OPEN (Bar vertical).
4. FUEL PUMP switch — ON.

Note

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

5. ENG MODE switch — IDLE.
6. N1 — Note increasing and START legend vertically displayed.
7. TOT — Note increasing and IGN legend vertically displayed.
8. Engine oil pressure — When N1 is greater than 40%, check rising.

9. N2 — Confirm stabilised below 100%.

Note

If the engine was started to FLT, the N2 will stabilize with NR.

10. Engine oil — Confirm temperature and pressure within limits.
11. ENG MODE switch — FLT.
12. N2/NR — Confirm stabilised and matched with NR.
13. XFEED switch — AUTO (bar vertical)

IN FLIGHT RESTART PROCEDURE IN MANUAL MODE

The following is the procedure for restarting an engine in flight with the ECU inoperative (in MANUAL mode).

CAUTION

For engine restarts below 15000 ft, the engine power lever must only be engaged once N1 is below 20%.
Above 15000 ft, the engine power lever must only be engaged, once N1 is below 5%.

1. Recommended airspeed — Vy.
2. Engine power lever — OFF
3. ENG GOV switch — MANUAL
   (MAN legend displayed on EDU1).

Note

In the presence of an ECU failure, the engine control system reverts to MANUAL mode regardless of the ENG GOV switch position. However, it is recommended to set the ENG GOV switch to MANUAL for congruence with the mode condition.

4. FUEL VALVE switch — OPEN (Bar vertical).
5. FUEL PUMP switch — ON.
6. ENG MODE switch — IDLE.
7. Engine power lever — IDLE.
8. Starting button — Push and hold. START and IGN legends vertically displayed on N1 and TOT scales on EDU1.

9. N1 — Note increasing.

10. Engine power lever — Move forward to obtain light-up.

Note

At low altitude (below 3000 ft), light-up is expected to occur when the engine power lever is nearly in FLIGHT position.
At high altitude (above 15000 ft), light-up may occur as soon as the engine power lever is out of the IDLE position.

11. TOT — Note increasing at light-up. Monitor TOT value and control with slight movements of the engine power lever to ensure TOT transient value is not exceeded.

Note

If engine hangs at N1 below 54%, slowly move engine power lever forward, if necessary even beyond FLIGHT position, until the engine accelerates. Monitor TOT, N1 and NR. If engine does not accelerate, shutdown engine by setting engine power lever to OFF position and release starting button.

12. Starting button — Release when N1 reaches 50%. START and IGN legends suppressed.

13. Engine power lever — Set the power as required.

14. Engine oil pressure — When N1 is greater than 40% Check rising.

END

ABORTED ENGINE START PROCEDURE

CAUTION

Failure to follow the abort procedure may cause damage to the engine.

Note

Observe the igniter and starter generator duty cycle limitations, as per Section "LIMITATIONS".

Monitor engine start and if any of the following occur:

- lightup is not obtained within 15 seconds;
- abnormal noises are heard;
- TOT increases beyond start limits (#1(2) HOT START caution message displayed);
- (on ground) rotor has not begun to rotate when N1 is 40%;
- N1 or N2 increase beyond start limits;
- engine hangs (stagnation in N1 below 54%);

shutdown engine by:

1. ENG MODE switch : OFF.

   If engine does not begin to shutdown:

   Engine power lever : OFF.

2. FUEL PUMP : OFF.
3. FUEL VALVE switch : CLOSED (bar horizontal).

END

AUTO TO MANUAL MODE TRANSFER

Transfer from AUTO to MANUAL mode can occur as a result of:

1. Setting ENG GOV switch on collective grip to MANUAL.

2. Automatic reversion to MANUAL due to ECU critical hardware failure.

Note

In the presence of an ECU failure, #1(2) ECU FAIL warning message will be displayed and audio tone and voice warning "WARNING" audible.

Note

In presence of an ECU failure, the engine control system reverts to MANUAL mode regardless of the ENG GOV switch position. However, it is recommended to set the ENG GOV switch to MANUAL for congruence with the mode condition.

Note

#1(2) PLA caution message is active only when operating in AUTO mode.

The MANUAL mode condition is indicated by the activation of the MAN legend displayed vertically on the TRQ gauge.

END

ENGINE START IN MANUAL MODE (ON GROUND)

Following an ECU failure, flight may be initiated only in order to fly (VFR) without passengers on board to a repair facility.

Note

An engine should be started in MANUAL mode only if a start in AUTO mode is not possible.

Before proceeding to start the engine in manual mode, perform an ECU power OFF-ON reset in an attempt to clear all faults.
If critical faults are not cleared (ECU FAIL warning and MAN legend still displayed), proceed as follows:

1. Perform ENGINE PRE-START CHECKS, Page 57.
2. EDU 1 — Confirm START page selected.
3. ENG GOV switch — MANUAL

Note

In the presence of an ECU failure, the engine control system reverts to MANUAL mode regardless of the ENG GOV switch position. However, it is recommended to set the ENG GOV switch to MANUAL for congruence with the mode condition.

4. GEN 1 and 2 switches — ON.
5. FUEL VALVE switch — OPEN (Bar vertical).
6. FUEL PUMP switch — ON.
7. XFEED VALVE switch — Confirm in AUTO position. Confirm bar horizontal.
8. ENG MODE switch — IDLE.
9. Engine power lever — IDLE.

CAUTION

Monitor engine start and if any of the following occur:

- light-up is not obtained within 15 seconds;
- abnormal noises are heard;
- TOT increases beyond start limits (#1(2) HOT START caution message displayed);
- rotor has not begun to rotate when N1 is 40%;
- N1 or N2 increase beyond start limits;
- engine hangs (stagnation in N1 below 54%);

Abort the engine start and shutdown the engine by setting the appropriate power lever to OFF and release the starting button.

Note

If engine hangs at N1 below 54%, slowly move engine power lever forward, if necessary even beyond FLIGHT position, until the engine accelerates. Monitor TOT, N1 and NR. If engine does not accelerate, shutdown engine by setting engine power lever to OFF position and release starting button.

10. Starting button — Push and hold.
    START and IGN legends vertically displayed on N1 and TOT scales on EDU1.
11. N1 — Note increasing.
12. Engine power lever — Move forward to obtain light-up.
13. TOT — Note increasing at light-up. Monitor TOT value and control with slight movements of the engine power lever to ensure TOT transient value is not exceeded.
14. Starting button — Release when N1 reaches 50%. START and IGN legends suppressed.
15. Engine power lever — Set the power as required.

CAUTION

The operation at an engine oil pressure up to 200 psi is permitted for a maximum period of 10 minutes.

Note

During cold starting conditions, the engine oil pressure can rise up to 200 psi and will decrease as the oil temperature rises.

16. Engine oil pressure — When N1 is greater than 40%
    Check rising.

Continue as per NORMAL ENGINE START procedure, Page 65.

END

ENGINE SHUTDOWN IN MANUAL MODE

This procedure applies in case of ECU failure and consequent reversion to MANUAL mode.

Note

#1(2) ECU FAIL warning message and MAN legend displayed vertically on the TRQ gauge.

1. ENG GOV switch : MANUAL.

Note

In the presence of an ECU failure, the engine control system reverts and operates in MANUAL mode regardless of the ENG GOV switch position. However, it is recommended to set the ENG GOV switch to MANUAL for congruence with the mode condition.

2. Engine power lever : IDLE to allow N1 to reduce to approximately 60%.
   : At 60% N1, OFF.
3. ENG MODE switch : OFF.
4. FUEL PUMP switch : OFF. FUEL PUMP 1(2) caution message displayed.

CAUTION

During shutdown, check that N1 decelerates freely. Note any abnormal noise or rapid rundown.

CAUTION

If there is evidence of any abnormal TOT increase after shutdown, perform a **DRY MOTORING RUN**, Page 77.

END

ENGINE OPERATION IN MANUAL MODE

Following a reversion to MANUAL mode (MAN legend displayed vertically on TRQ gauge), the electric stepper motor of the corresponding engine is frozen at its current position, maintaining the engine torque at its current value just prior to MANUAL reversion.
In case of failure during transient condition, the pilot should control engine ensuring that parameters stay within operating range.
The MANUAL mode control characteristics will vary depending on the engine condition at the time of the reversion to MANUAL mode.

ONE ENGINE IN MANUAL MODE AND ONE IN AUTO MODE

It is recommended to set the engine which is in MANUAL mode to a suitable fixed power related to the particular flight condition, and let the ECU of the other engine (in AUTO mode) maintain NR.

Monitor engine parameters and maintain within operating limits.

Any change of fuel flow and consequently of N1 may be accomplished through engine power lever movements.
Each engine power lever is motorized and should be operated through the relative ENG TRIM toggle switch on collective grip.

Land as soon as practicable.

BOTH ENGINES IN MANUAL MODE

In case of critical malfunction of both ECU's (double failure), the pilot shall control both engines in MANUAL mode.
Each electric stepper motor is frozen at its current position and engine power.

Land as soon as practicable.

Perform a running landing, if terrain permits.

Cruise flight to reach the landing site

CAUTION

When adjusting collective, monitor N2 to avoid exceeding limits.

ENG TRIM toggle switches: Operate to adjust torque of one engine to about 50% of the total torque required for the desired airspeed.

Note

To simplify manual control of the engines, only one engine should be adjusted by operating only one toggle switch. Furthermore, avoid adjusting collective and engine at the same time. Transient NR between 95% and 102% is acceptable during adjustments.

Note

Avoid torque settings close to engine operating limits.

Airspeed : It is recommended to respect OEI Vne limits.

Manoeuvres : Avoid any manoeuvre requiring large and rapid changes of torque.

Approach and landing

Landing gear lever : DOWN.

Utility hydraulic system : Check pressure within limits.

Nose wheel lock : ON. (lever up).

Parking brake : OFF.

External lights : As required.

Approach : If GW is 3000 kg or more:
- Set one engine torque at 40%.

If GW is below 3000 kg:
- Set one engine torque at 30%.

Use other engine to establish 35 ± 10 KIAS and 400 ft/min max rate of descent at 102% NR.
Aim for landing area by changing the airspeed and minimize any further power adjustment.

CAUTION

When lowering collective, monitor N2 to avoid exceeding limits.

Landing	: Gently flare helicopter to minimize ground speed at landing. Use collective to cushion touchdown and, if necessary, allow NR to drop down below 95%. After touchdown, simultaneously lower collective and reduce both engines at the same time as necessary to maintain NR within limits.
Toe brakes	: Apply.
Shutdown	: Refer to paragraph **ENGINE SHUTDOWN IN MANUAL MODE** Page 93.

END

ENGINE POWER LEVER (PLA) JAMMED PROCEDURE

1. The engine power lever does not respond (i.e. no movement of the lever).
2. #1(2) PLA MOTOR caution message NOT displayed.

IF, when using ENG TRIM toggle, no response of the relevant engine power lever **AND** #1(2) PLA MOTOR caution message NOT displayed.

Achieve Safe OEI Flight

- **Pull aft (towards IDLE position) the affected engine power lever.**
- **Pull strongly enough to break the internal pin holding the engine power lever stepper motor.**

Once the stepper motor pin is broken, the engine power lever is free to be manually moved.

Set engine power lever as required.

SECTION END

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ELECTRICAL

ELEC

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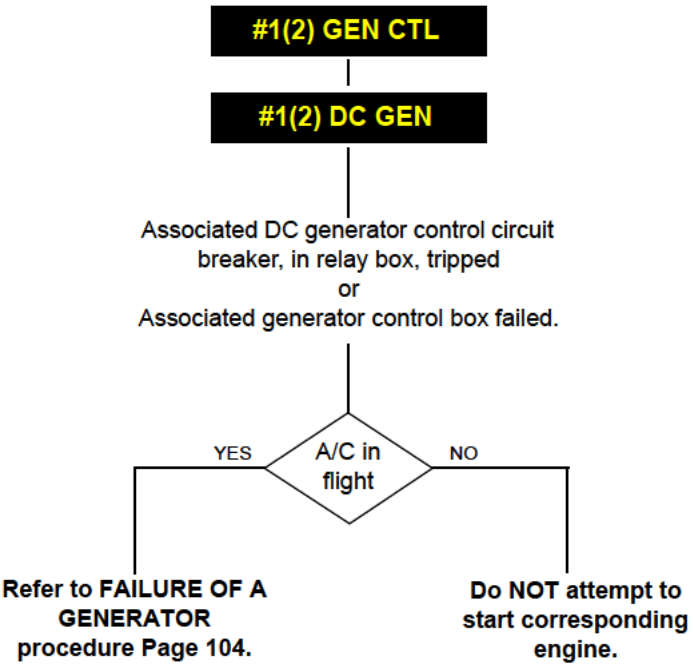
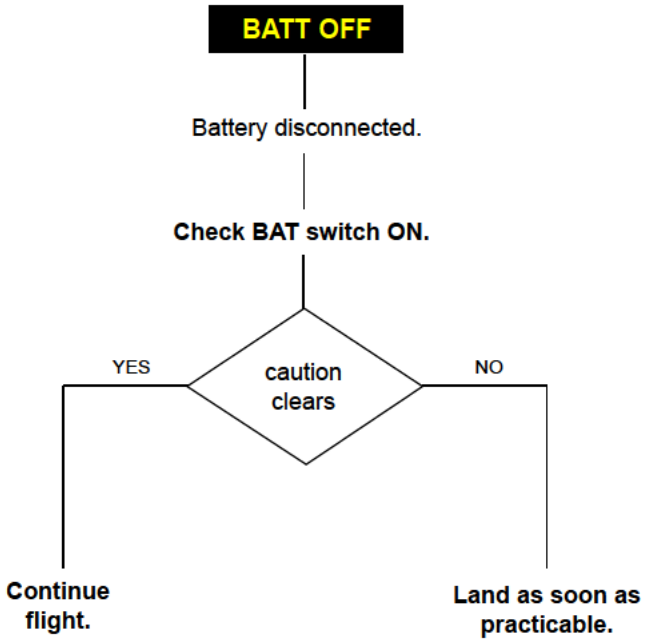
DC GENERATOR CONTROL



END

BATTERY OFF



ELEC

CAUTION

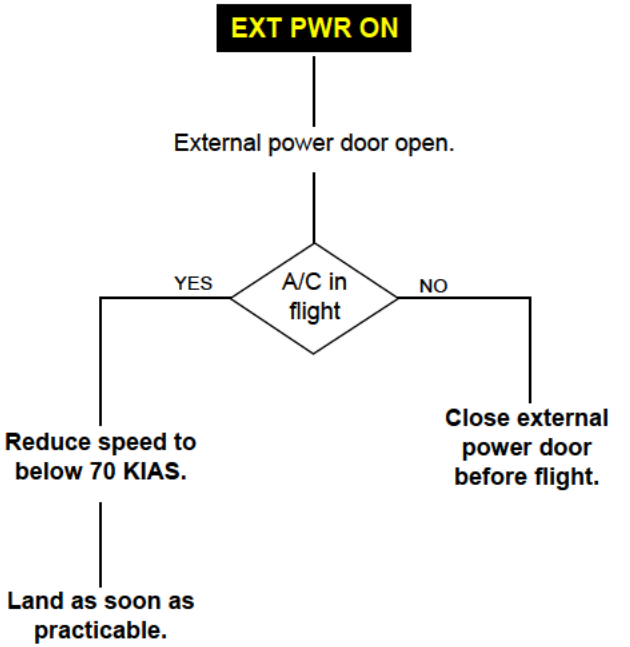
With the battery OFF, do NOT attempt an engine restart following an engine flame-out.

Note

When external power is connected, the battery is automatically disconnected and the BATT OFF caution message is displayed.

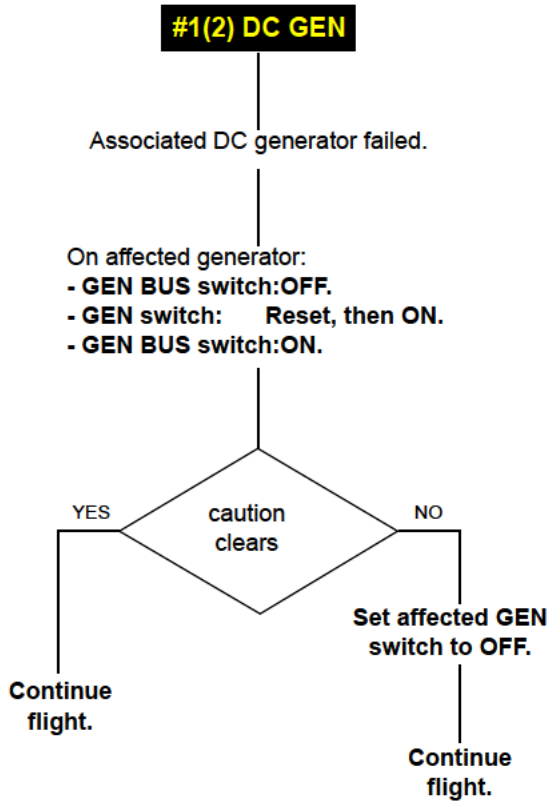
END

EXTERNAL POWER ON



END

FAILURE OF A GENERATOR



CAUTION

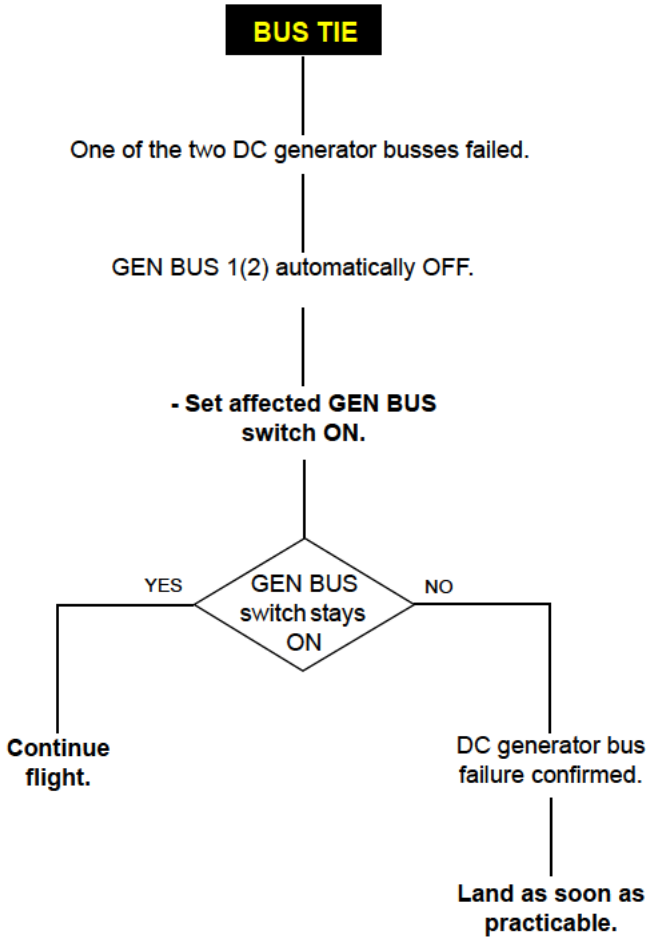
Check that remaining generator does NOT exceed load limit.

Note

Power is supplied to all loads by remaining generator.

END

BUS TIE OPEN



CAUTION

With a Bus Tie open, do NOT attempt an engine restart following an engine flame-out.

END

GENERATOR OVERLOAD

1(2) DC GEN OVLD

Associated generator in overload condition

Reduce electrical load to within green range

Continue flight.

END

INVERTER FAILURE

INV 1(2)

Associated inverter failed.

Also:

2(1) AP OFF + Audio Tone and Voice Message "AUTOPILOT AUTOPILOT"

Confirm affected inverter circuit breaker not tripped.

Try to reset affected inverter.

Re-engage affected AP channel on APMS panel.

Continue flight.

SECTION END

HYDRAULIC SYSTEM

HYD

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SERVO HYDRAULIC SYSTEM N°1 MALFUNCTION

SERVO 1

N°1 Servo hydraulic system failed.

Possible **1 AP Y FAIL** + **2 AP Y FAIL**

Check N°1 servo hydraulic system pressure on EDU2.

pressure above 1200 psi

YES

Continue flight monitoring system pressure.

NO

- **Gradually reduce airspeed below 90 KIAS.**
- **Avoid pull-up manoeuvres and bank angles above 25 deg to maintain acceptable loads.**
- **Avoid rapid movements of flight controls.**

SERVO switch: SOV 1 OFF in order to set the N°1 Servo hydraulic system off.

Land as soon as practicable.

WARNING

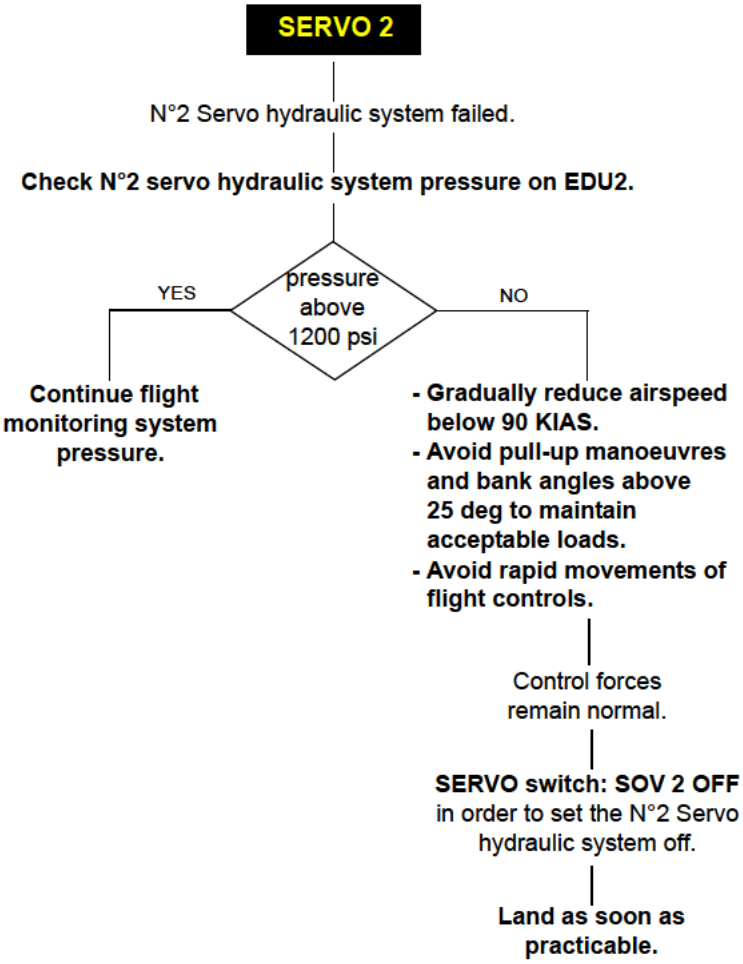
Following the pressure loss of N°1 main servo hydraulic system, avoid landing and/or operating in conditions which require a high degree of control activity such as confined areas or out-of-wind hovering, particularly with wind from right.

Note

Pedals will tend to move to zero thrust position (Right pedal slightly more forward than the left pedal).
Control force on pedals will increase in hover and in forward flight.

END

SERVO HYDRAULIC SYSTEM N°2 MALFUNCTION



HYD

Note

In the event of pressure loss in N°2 main hydraulic system, sufficient pressure remains in the accumulator of the normal utility hydraulic system for one extension of the landing gear and to operate the toe brakes and the rotor brake.

END

JAMMING OF A MAIN ROTOR SERVO VALVE

MAIN RTR SERVO

A servo valve in one of the 3 main rotor servo actuators is jammed.

- **Gradually reduce airspeed below 90 KIAS.**
- **Avoid pull-up manoeuvres.**
- **Avoid bank angle above 25 deg.**
- **Avoid rapid movement of the cyclic and collective controls.**

Land as soon as practicable.

When on the ground, conduct HYDRAULIC SYSTEMS CHECK as described in Section "NORMAL PROCEDURES".

If servo valve jamming is confirmed, do NOT resume flight.

END

TAIL ROTOR SERVO VALVE JAMMING

Possible **1 AP Y FAIL** + **2 AP Y FAIL**

Procedure:

- **Gradually reduce airspeed below 90 KIAS.**
- **Avoid pull-up manoeuvres.**
- **Avoid bank angle above 25 deg.**
- **Avoid rapid movement of the cyclic and collective controls.**

Land as soon as practicable.

WARNING

Following the loss of tail rotor servo actuator avoid landing and/or operating in conditions which require a high degree of manoeuverability (i.e. avoid operating in enclosed areas, avoid operation with sideward winds, in particular with wind from the right).

END

NORMAL UTILITY HYDRAULIC PRESSURE LOW

MAIN UTIL PRES

Failure of the normal utility hydraulic system.
The pressure in the system is below minimum pressure of 500 psi.

- Select AUXILIARY mode on EDU2.
- Confirm low pressure on normal utility system.

IF normal utility pressure below 500 psi:

Reduce speed to 140 KIAS maximum

Perform EMERGENCY DOWN LANDING GEAR procedure Page 58 independently of landing gear position.

WARNING

In the emergency accumulator, there is sufficient pressure for one extension of the landing gear, after which there is sufficient pressure to operate the emergency brakes. The parking brake handle is used for the emergency brake system and does not provide differential braking. The toe brakes and the rotor brake are inoperative.

END

EMERGENCY UTILITY HYDRAULIC PRESSURE LOW

EMER UTIL PRES

Failure of the emergency utility hydraulic system. Pressure in the system is below minimum pressure of 1140 psi.

- Select AUXILIARY mode on EDU2.
- Check emergency utility system pressure.

IF emergency utility pressure below 1140 psi:

- Maintain AUXILIARY mode on EDU2.
- Continue flight, carefully monitoring UTIL NORM pressure.

IF normal utility pressure below 1140 psi:

Reduce speed to 140 KIAS maximum.

Extend landing gear using the normal procedure.

Continue flight.

END

NORMAL UTILITY HYDRAULIC SYSTEM CHARGING

MAIN UTIL CHRG

Normal utility hydraulic system solenoid valve open.
The normal utility hydraulic system is operative.

Continue flight.

Note

If the solenoid valve between the normal utility hydraulic system and the N°2 servo hydraulic system is locked open, an external oil leakage in any of the 2 systems will automatically induce failure of the other system.

END

EMERGENCY UTILITY HYDRAULIC SYSTEM CHARGING

EMER UTIL CHRG

Emergency utility hydraulic system solenoid valve open.
The emergency utility hydraulic system is operative.

Do NOT take-off.

Note

EMER UTIL CHRG is only triggered on ground.

SECTION END

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DRIVE SYSTEM

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MAIN TRANSMISSION OVERTORQUE

XMSN OVTRQ + Audio Tone and Voice Message "OVERTORQUE"

Transmission torque limit exceeded.

Lower collective to maintain torque within limits.

END

MAIN TRANSMISSION CHIP
(Helicopters not equipped with pulsed chip detector system P/N 109-0811-48)

XMSN OIL CHIP

Presence of metal particles in main transmission oil.

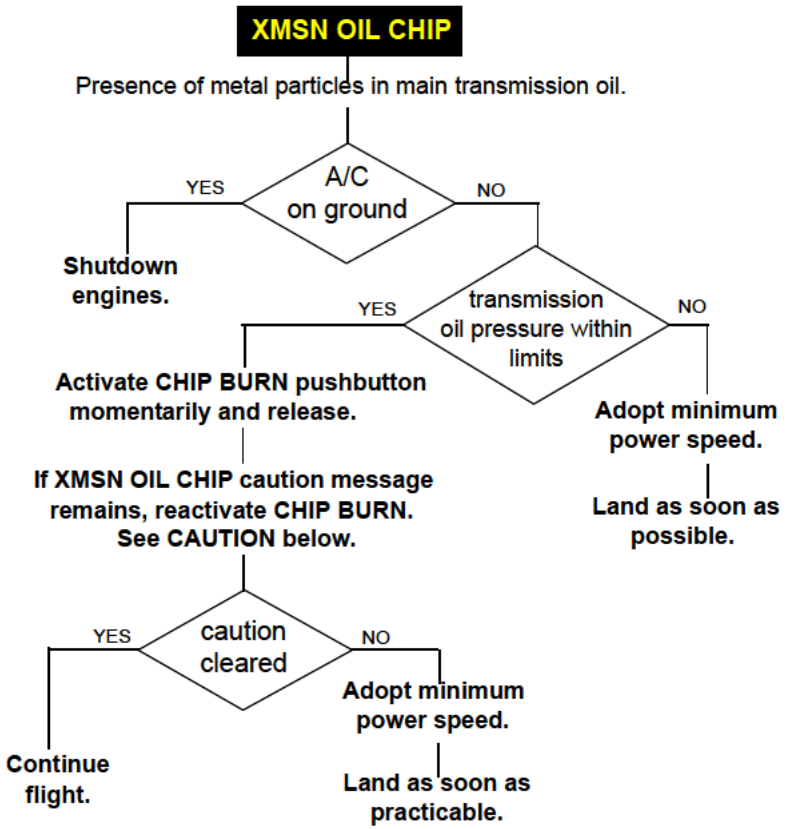
Reduce power by lowering collective.

Monitor XMSN oil pressure and temperature.

Land as soon as practicable.

END

MAIN TRANSMISSION CHIP
(Helicopters equipped with pulsed chip detector system P/N 109-0811-48)



CAUTION

A maximum of 3 chip burn activations are permitted per flight to clear the caution.

Note

Appropriate log book entry must be made for each message activation.

If chip burn activation has been recorded, perform maintenance action as per applicable maintenance manual before next flight.

END

TAIL GEARBOX CHIP
(Helicopters not equipped with pulsed chip detector system P/N 109-0811-48)

TGB OIL CHIP

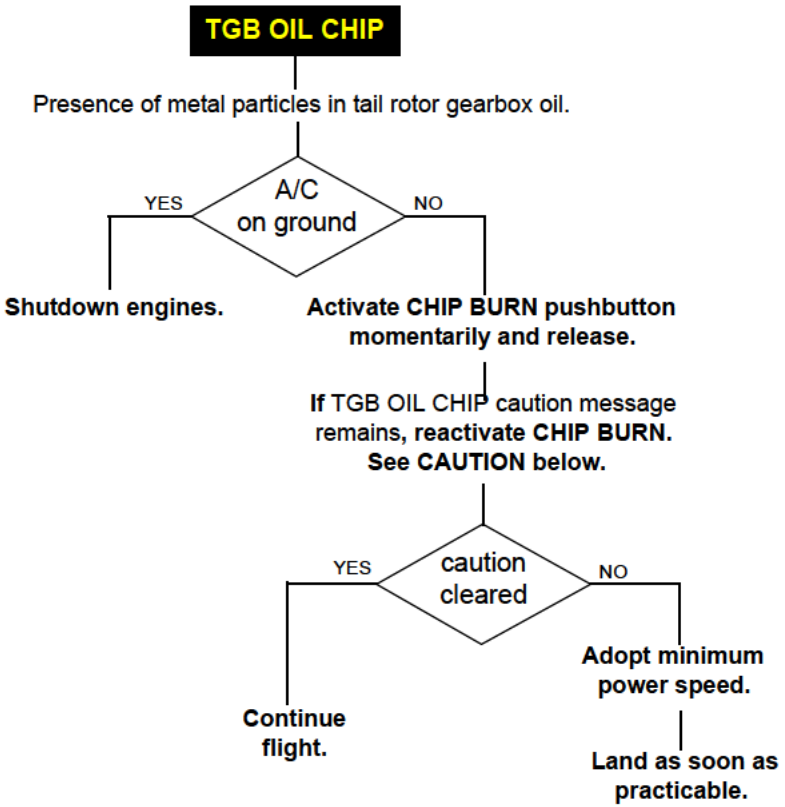
Presence of metal particles in tail rotor gearbox oil.

Reduce power by lowering collective.

Land as soon as practicable.

END

TAIL GEARBOX CHIP
(Helicopters equipped with pulsed chip detector system P/N 109-0811-48)



CAUTION

A maximum of 3 chip burn activations are permitted per flight to clear the caution.

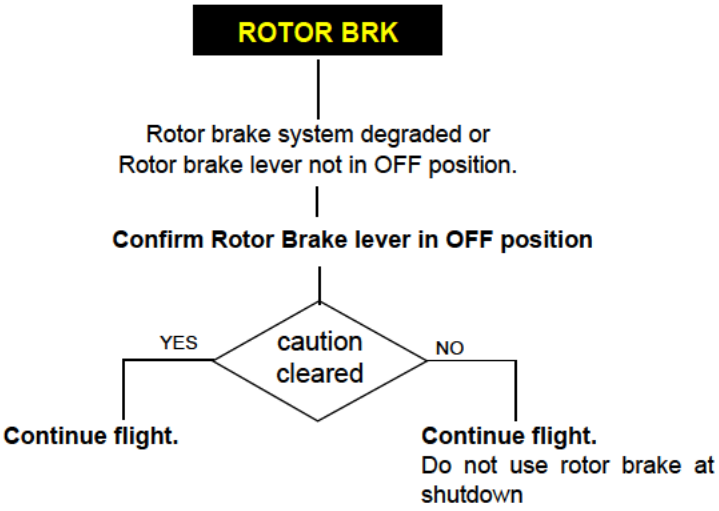
Note

Appropriate log book entry must be made for each message activation.

If chip burn activation has been recorded, perform maintenance action as per applicable maintenance manual before next flight.

END

ROTOR BRAKE SYSTEM DEGRADED



SECTION END

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FUEL SYSTEM

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FUEL LOW

#1(2) FUEL LOW

On affected tank, usable fuel quantity below 33 kg.

WARNING

Hovering in crosswinds or sideways flight with sustained roll angles greater than 10 degrees, when FUEL LOW caution message is illuminated, could lead to a single or double engine flame-out.

- **Fuel contents:** **Check.**
- **XFEED valve:** **Confirm AUTO (valve status Closed).** (see Note)

Land as soon as practicable.
(within time limits stated in the Note below).

Note

When each engine is supplied fuel from its respective tank, the remaining flight duration is approximately 15 minutes from caution message activation. In the unusual event that both engines are supplied fuel from the same tank, the remaining flight duration is approximately 6 minutes from caution message activation.

END

FUEL PRESSURE LOW

FUEL PUMP 1(2)

Associated fuel pump failed or
Low fuel pressure in associated fuel line.

- **Switch OFF associated pump.**
- **Confirm crossfeed valve opens automatically** (bar horizontal).
(XFEED advisory message displayed).

CAUTION

With one fuel pump failed (or OFF) and the crossfeed valve open, the fuel in the affected tank (up to 100 kg) will become unusable.

Fuel pressure within limits

YES

Continue flight.

If it is necessary to use the 100 kg of unusable fuel in the affected tank
AND
#1(2) A/F F FLTR caution message is NOT displayed

When the indicated fuel quantity in either tank is below 100 kg:
- **Set XFEED VALVE:CLOSED.**
(Procedure not applicable when Aviation Gasoline is used)
(See Note)

NO

CAUTION

Possible fuel leak, be attentive for signs of fuel leak or loss of engine

- **Set XFEED VALVE:CLOSED.**
(See Note)

Land as soon as practicable.

WARNING

With the crossfeed valve closed, avoid banked turns above 30 deg and sustained pitch angle below 0 deg.

Note

When a fuel pump has failed (FUEL PUMP 1(2) caution message displayed), #1(2) FUEL LOW caution message will be activated when fuel in affected tank is between 60 and 70 kg. The unusable fuel will be up to 16 kg.

END

FUEL PUMP FAILED AND AIRFRAME FUEL FILTER CLOGGED

FUEL PUMP 1(2) + **#1(2) A/F F FLTR**

Associated fuel pump failed
AND
Associated airframe fuel filter partially clogged.

Switch OFF associated pump.

Confirm cross feed valve opens automatically
(bar horizontal) and increase of fuel pressure
of the affected system.
(XFEED advisory message displayed).

Continue flight monitoring fuel pressure considering the new range and endurance.

CAUTION

With one fuel pump failed and the cross feed valve open, a maximum of 100 kg fuel indicated will become unusable in the tank with the failed fuel pump.

END

AIRFRAME FUEL FILTER CLOGGED

#1(2) A/F F FLTR

Associated airframe fuel
filter partially clogged.

Continue flight monitoring fuel pressure.

END

ENGINE FUEL FILTER CLOGGED

#1(2) FUEL FLTR

Associated engine fuel filter partially clogged.

Continue flight monitoring fuel pressure.

END

FUEL LOW SENSOR FAILURE

#1(2) F LOW FAIL

Associated fuel low sensor failure.
FUEL LOW caution message not available or inconsistent with fuel level.

On affected system:
- Monitor fuel quantity.

Continue flight.

WARNING

Hovering in crosswinds or sideways flight with sustained roll angles greater than 10 degrees, when fuel quantity is below 33 Kg, could lead to a single or double engine flame-out.

END

FUEL DRAIN VALVE OPEN

FUEL DRAIN 1(2)

Associated fuel drain valve open.

Close relevant drain valve, before refuelling and/or take-off.

Continue flight.

Note

The FUEL DRAIN 1(2) caution messages can only be activated when the helicopter is on the ground.

SECTION END

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COMMUNICATION SYSTEM

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AURAL WARNING SYSTEM FAILURE

AWG FAIL

Aural warning generator system failure.
Loss of aural warnings and audio tones.

Continue flight monitoring CAS system as aural warnings and audio tones do not function.

END

PILOT'S OR COPILOT'S ICS FAILURE

Pilot's or Copilot's ICS (Inter-Communication System) failed

Pilot's/Copilot's ICS:BK-UP.

If ICS problem persists

Pilot's/Copilot's ICS:EMER.

Note

When ICS pilot stations are in BK-UP, they are automatically disconnected from the cabin ICS stations.

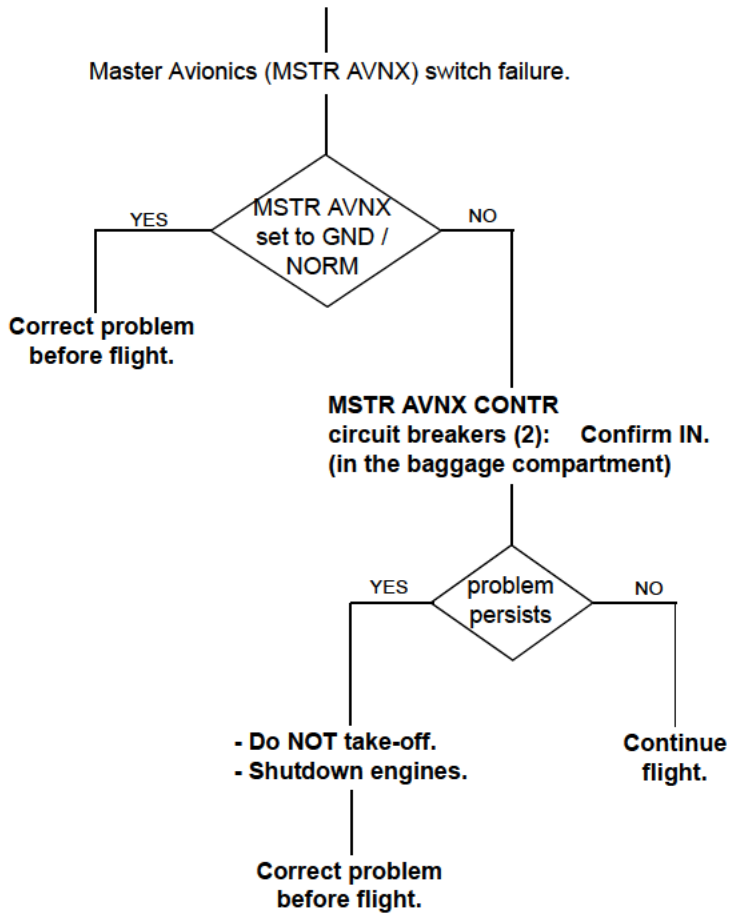
Note

When ICS pilot stations are in EMER, they are automatically disconnected from the cabin ICS stations and the HOT MIKE function is not available.

END

MASTER AVIONICS SWITCH FAILURE

Symptoms:
MSTR AVNX set to GND/NORM and equipment connected to these positions not powered.
or
MSTR AVNX set to GND COM and equipment connected to GND position powered.



END

RADIO TUNING UNIT FAILURE

RTU1 (2) failure (display becomes blank).

Confirm on active RTU the loss of some active frequencies (- - -).

Switch off the failed RTU and check that after 5 seconds all systems come back operative on the active RTU.

Continue flight.
Repair before next flight.

Note

In case of loss of both RTUs, operate the EMERG FREQ pushbutton to tune the 121.5 MHz emergency frequency.

SECTION END

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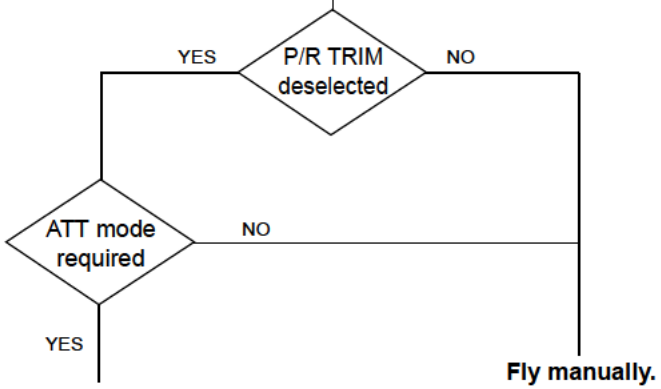
AUTOMATIC FLIGHT CONTROL SYSTEM

ATTITUDE MODE OFF

ATT OFF

ATT mode is unavailable either in pitch or roll axis, due to a fault, and AFCS has reverted to SAS mode on the affected axis.
or
ATT mode, which is the normal condition for flight, is deselected by the P/R TRIM pushbutton on the APMS panel.



Fly manually.

Engage ATT mode by selecting the P/R TRIM pushbutton on the APMS panel (OFF light on pushbutton shall be extinguished).

END

AUTOPILOT CAS FAIL

AP-CAS FAIL

AFCS CAS messages and audio attention getters are unavailable.

Continue flight, monitoring the flight instruments for indications of AFCS faults and be aware that also "ALTITUDE ALTITUDE" attention getter is inoperative.

END

AUTOPILOT AHRS FAIL

AP AHRS 1(2) FAIL

The AFCS is not receiving information from the associated AHRS.
The associated AP channel disengages and cannot be re-engaged.

- Maximum speed is V_{NE} (Power-ON) - 40 KIAS.
Above 500 ft AGL:
- Fly attentive.
At or below 500 ft AGL:
- Fly manually.

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

END

AP DEGRADED
(Not applicable to EDU P/N 109-0900-76-2A05 and subs)

AP DEGRADED

Loss of ESIS data.

- Maximum speed is V_{NE} (Power-ON) - 40 KIAS.
Above 500 ft AGL:
- Fly attentive.
At or below 500 ft AGL:
- Fly manually.

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

CAUTION

In case of one AHRS failure, both AFCS chennels will disengage simultaneously.

END

AP STDBY FAIL
(Applicable to EDU P/N 109-0900-76-2A05 and subs)

AP STDBY FAIL

Loss of ESIS data.

- Maximum speed is V_{NE} (Power-ON) - 40 KIAS.
Above 500 ft AGL:
- Fly attentive.
At or below 500 ft AGL:
- Fly manually.

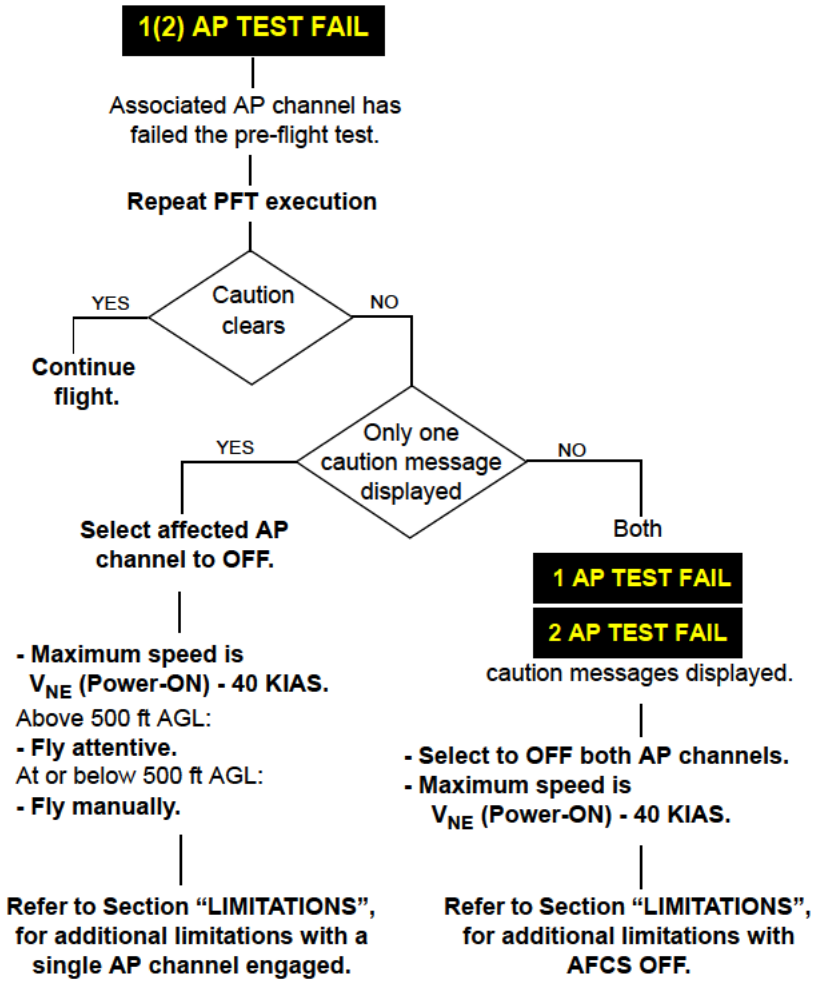
Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

CAUTION

In case of one AHRS failure, both AFCS channels will disengage simultaneously.

END

AUTOPILOT TEST FAIL



WARNING

Maintenance action is necessary unless helicopter dispatch is permitted by a MMEL.

END

AFCS PFT PARTIALLY COMPLETED
(Not applicable to EDU P/N 109-0900-76-2A05 and subs)

1(2) AP DEGRADED

Associated AP channel has completed the pre flight with some tests skipped (not executed) or with not primary failures.

Only one Caution displayed?

YES

Select affected AP channel to OFF.

- **Maximum speed is V_{NE} (Power-ON) - 40 KIAS.**

Above 500 ft AGL:
- **Fly attentive.**

At or below 500 ft AGL:
- **Fly manually.**

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

NO

Both **1 AP DEGRADED** **2 AP DEGRADED** caution messages displayed.

- **Select to OFF both AP channels.**
- **Maximum speed is V_{NE} (Power-ON) - 40 KIAS.**

Refer to Section "LIMITATIONS", for additional limitations with AFCS OFF.

WARNING

Maintenance action is necessary unless helicopter dispatch is permitted by a MMEL.

END

AFCS PFT PARTIALLY COMPLETED
(Applicable to EDU P/N 109-0900-76-2A05 and subs)

1(2) AP TEST DGR

Associated AP channel has completed the pre flight with some tests skipped (not executed) or with not primary failures.

Only one Caution displayed?

YES

Select unaffected AP channel to OFF.

- **Maximum speed is V_{NE} (Power-ON) - 40 KIAS.**

Above 500 ft AGL:

- **Fly attentive.**

At or below 500 ft AGL:

- **Fly manually.**

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

NO

Both

1 AP TEST DGR

2 AP TEST DGR

caution messages displayed.

- **Select to OFF both AP channels.**
- **Maximum speed is V_{NE} (Power-ON) - 40 KIAS.**

Refer to Section "LIMITATIONS", for additional limitations with AFCS OFF.

WARNING

Maintenance action is necessary unless helicopter dispatch is permitted by a MMEL.

END

AP CHANNEL FAILURE

1(2) AP MAINT

Caution displayed on ground only.
Any failure on associated AP channel

Only one caution message displayed?

YES

Select affected AP channel to OFF.

- **Maximum speed is V_{NE} (Power-ON) - 40 KIAS.**

Above 500 ft AGL:
- **Fly attentive.**

At or below 500 ft AGL:
- **Fly manually.**

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

NO

Both
1 AP MAINT
2 AP MAINT
caution messages displayed.

- **Select to OFF both AP channels.**
- **Maximum speed is V_{NE} (Power-ON) - 40 KIAS.**

Refer to Section "LIMITATIONS", for additional limitations with AFCS OFF.

WARNING

Maintenance action is necessary unless helicopter dispatch is permitted by a MMEL.

END

AFCS

APMS PANEL FAIL

APMS PNL FAIL

Failure of upper mode and FD mode pushbuttons on APMS panel.

Upper modes and FD modes unavailable.

Continue flight.

END

MISTRIM

MISTRIM

Series actuators not centered.

- **Manual centering of series actuators is required.**
- **Manual centering is achieved by operating the cyclic FTR and pedal switches, when appropriate.**
- **Continue flight being attentive to AFCS functioning.**

END

PITCH TRIM FAIL

P TRIM FAIL

AFCS has lost trim actuator drive capability in pitch.

Continue flight being aware that the trim function is unavailable in pitch.

END

ROLL TRIM FAIL

R TRIM FAIL

AFCS has lost trim actuator drive capability in roll.

Continue flight being aware that the trim function is unavailable in roll.

END

YAW TRIM FAIL

Y TRIM FAIL

AFCS has lost trim actuator drive capability in yaw.

Continue flight being aware that the trim function is unavailable in yaw.

END

COLLECTIVE TRIM FAIL

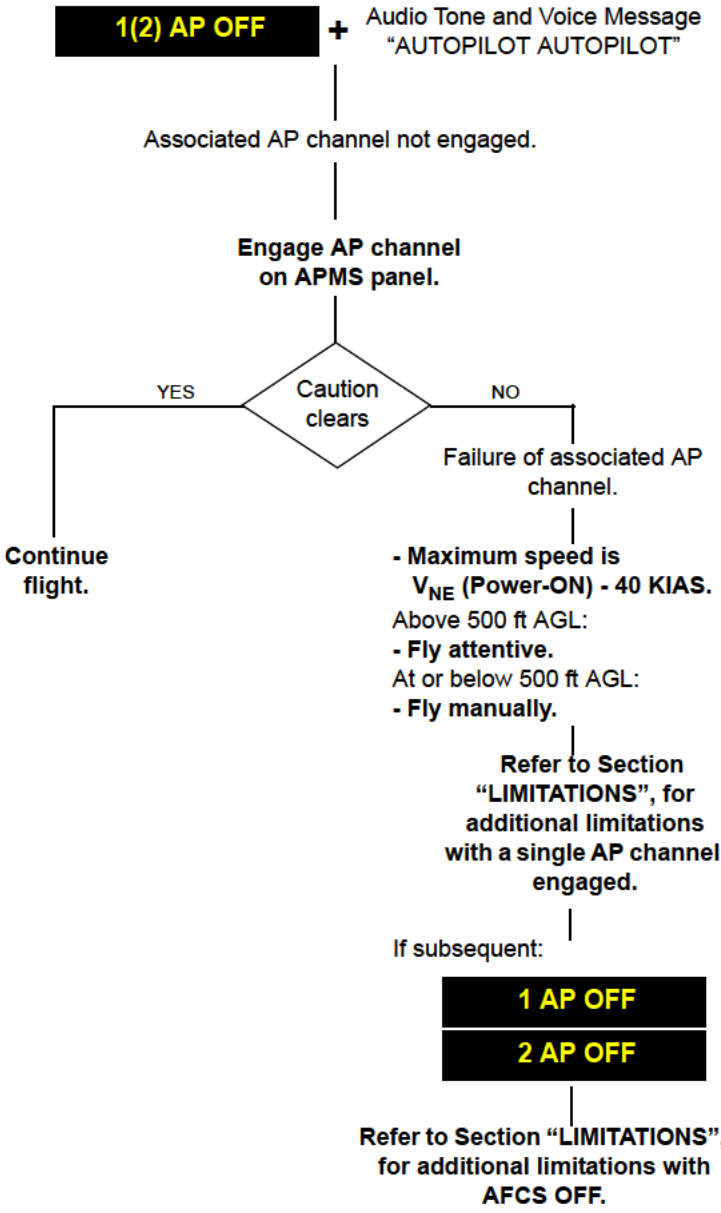
C TRIM FAIL

AFCS has lost trim actuator drive capability in collective.

Continue flight being aware that AFCS collective modes are not available.

END

AUTOPILOT OFF



END

AFCS

AUTOPILOT FAIL

1(2) AP FAIL + Audio Tone and Voice Message "AUTOPILOT AUTOPILOT"

Failure of associated AP channel.

Do NOT attempt to re-engage the affected AP channel.

- Maximum speed is V_{NE} (Power-ON) - 40 KIAS.
Above 500 ft AGL:
- Fly attentive.
At or below 500 ft AGL:
- Fly manually.

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

If subsequent:

1 AP FAIL
2 AP FAIL

Refer to Section "LIMITATIONS", for additional limitations with AFCS OFF.

END

AUTOPILOT HOT

1(2) AP HOT

Associated FCC temperature is above limit.

Continue flight.

Be attentive for possible AP channel disengagement.

IF

1 AP HOT + **2 AP HOT**

Disengage one channel of the AFCS using the pushbutton AP 1(2) on the APMS.

- Maximum speed is V_{NE} (Power-ON) - 40 KIAS.
Above 500 ft AGL:
- Fly attentive.
At or below 500 ft AGL:
- Fly manually.

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

END

PITCH AUTOPILOT FAIL

1(2) AP P FAIL + Audio Tone and Voice Message "AUTOPILOT AUTOPILOT"

Failure affecting a single series actuator in the pitch axis.

- Maximum speed is V_{NE} (Power-ON) - 40 KIAS.

Above 500 ft AGL:

- Fly attentive.

At or below 500 ft AGL:

- Fly manually.

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

END

ROLL AUTOPILOT FAIL

1(2) AP R FAIL + Audio Tone and Voice Message "AUTOPILOT AUTOPILOT"

Failure affecting a single series actuator in the roll axis.

- Maximum speed is V_{NE} (Power-ON) - 40 KIAS.

Above 500 ft AGL:

- Fly attentive.

At or below 500 ft AGL:

- Fly manually.

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

END

YAW AUTOPILOT FAIL

1(2) AP Y FAIL + Audio Tone and Voice Message "AUTOPILOT AUTOPILOT"

Failure affecting a single series actuator in the yaw axis.

- **Maximum speed is V_{NE} (Power-ON) - 40 KIAS.**

Above 500 ft AGL:

- **Fly attentive.**

At or below 500 ft AGL:

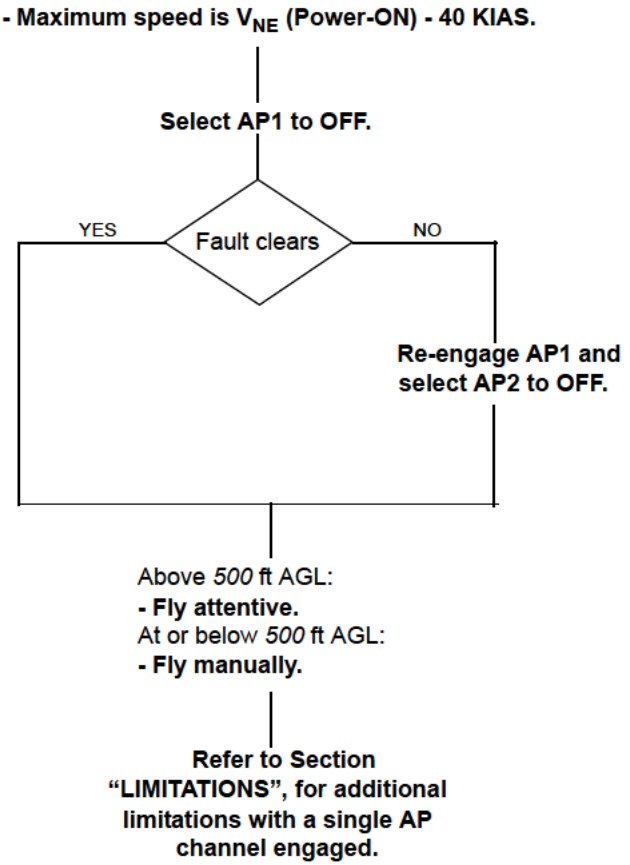
- **Fly manually.**

Refer to Section "LIMITATIONS", for additional limitations with a single AP channel engaged.

END

AFCS OSCILLATORY MALFUNCTION

Repeated disturbances in one or more axes.



SECTION END

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INTEGRATED DISPLAY SYSTEM

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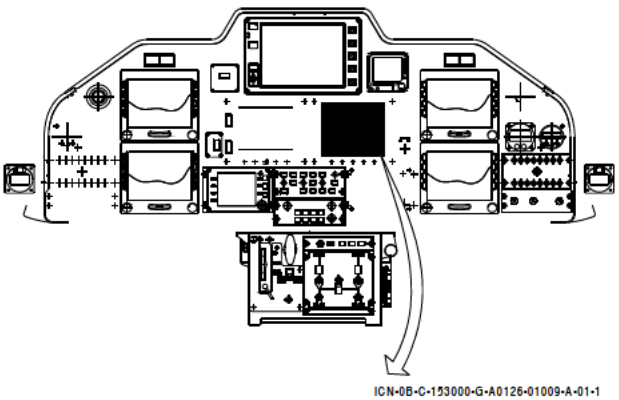
EDU

ELECTRONIC DISPLAY UNIT 1 COMPLETE FAILURE



Complete loss of EDU1 display

IDS displayed on EDU2.

EDU2 automatically switched to reversionary mode.

Right pilot in control of helicopter

YES

dual pilot

YES

When required left pilot take control of helicopter.

Continue flight.

NO

Land as soon as practicable.

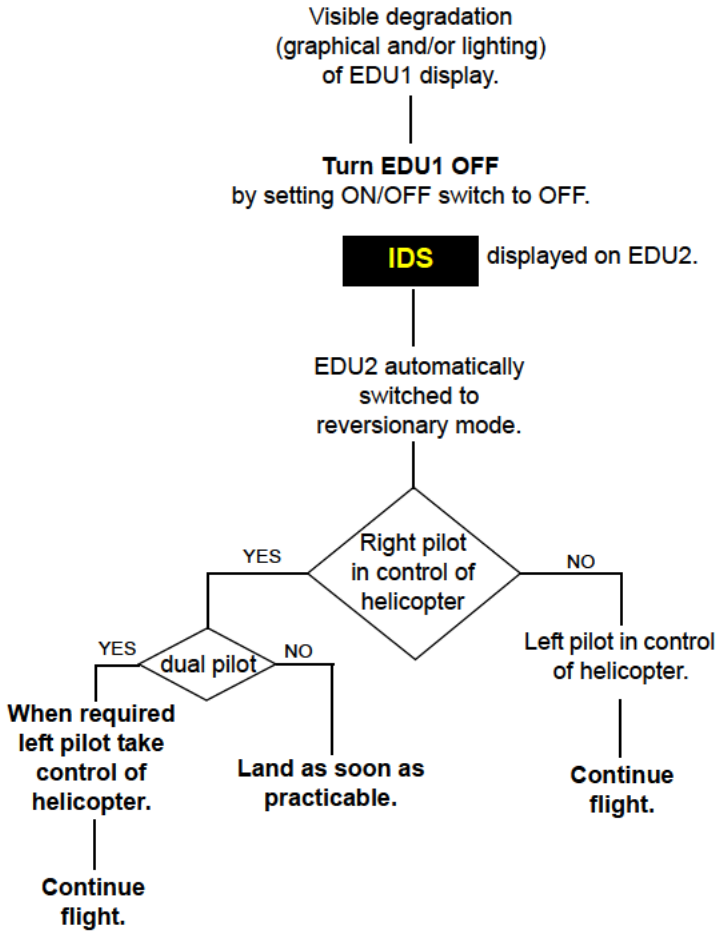
NO

Left pilot in control of helicopter.

Continue flight.

END

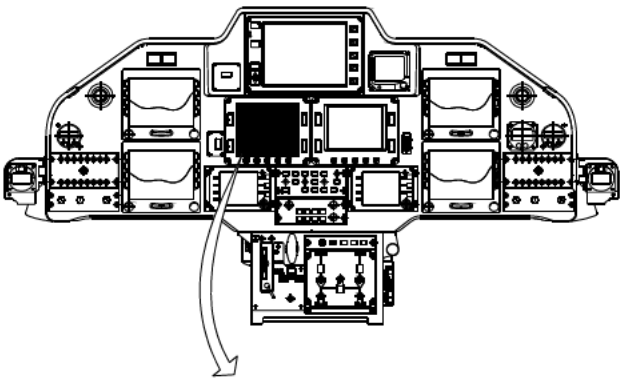
ELECTRONIC DISPLAY UNIT 1 DEGRADATION



END

EDU

ELECTRONIC DISPLAY UNIT 2 COMPLETE FAILURE



Complete loss of EDU2

IDS displayed on EDU1.

EDU1 automatically switched to reversionary mode.

Right pilot in control of helicopter

YES

No action required. Right pilot must remain in control of helicopter.

Continue flight.

NO

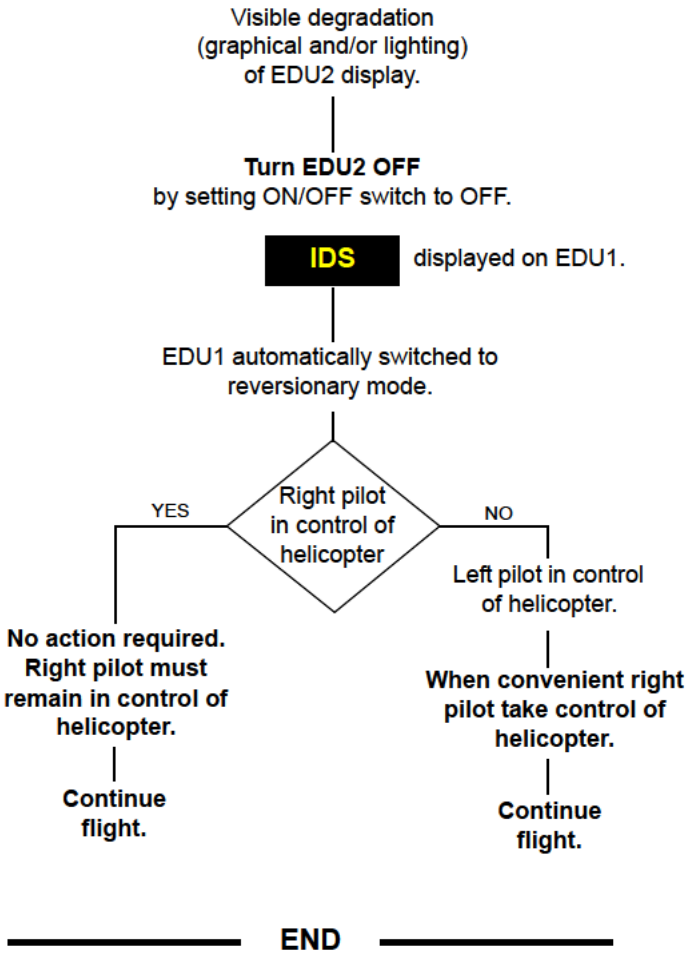
Left pilot in control of helicopter.

When convenient right pilot take control of helicopter.

Continue flight.

END

ELECTRONIC DISPLAY UNIT 2 DEGRADATION



END

EDU

MISCOMPARE OF DAU PRIMARY PARAMETERS

DAU MISCMP-P

Miscompare of DAU primary parameters.
Some primary data from one or both channels of Data Acquisition Unit (DAU) are invalid.
Possible degradation in system functions.

- **Access MENU 2/3 page on EDU1 and check DAU channels status.**
- **Select DAU channel indicated by yellow legend and check for data discrepancy.**
- **Deselect affected channel to return to normal operation mode.**

Continue flight.

END

INCORRECT DAU HARDWARE CONFIGURATION (Applicable to EDU P/N 109-0900-76-2A05 and subs)

CHECK STRAP

IDS hardware configuration incorrect.

Correct configuration before takeoff.

SECTION END

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EDU

EFIS

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EFIS CAUTION ANNUNCIATION CAPTIONS

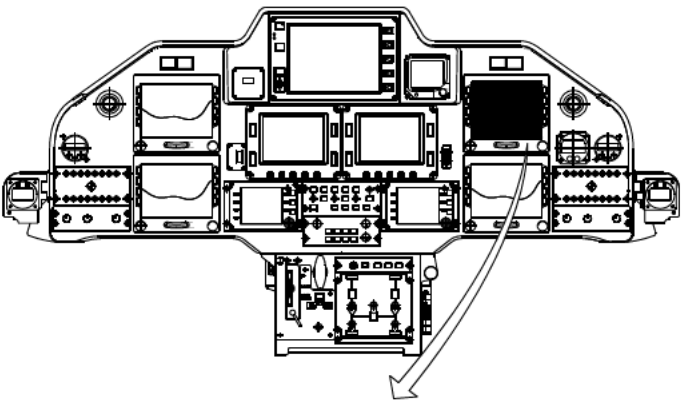
Flag	Aural Annun.	Page	Malfunction
ADS-B FAIL *For EFIS SW versions 8.0E or later*	-	194	ADS-B out failure. Mode S transponder ADS-B out not available.
ADC1(2) FAIL	-	178	ADC #1(2) failure.
AHRS1(2) FAIL	-	179	AHRS #1(2) failure.
ALT MISCOMP	-	182	Altitude Miscompare.
ATT MISCOMP	-	182	Attitude Miscompare.
CHECK IDU1(2)	-	174/175	IDU1(2) fail the internal check.
CPLT MISCOMP *For EFIS SW versions 8.0E or later*	-	191	Co-Pilot side PFD vs MFD Miscompare.
CPLT1(2) SCC *For EFIS SW versions 8.0E or later*	-	194	Co-Pilot side SCC Failed 1 refers to PFD 2 refers to MFD.
CPLT1(2) OVRTMP *For EFIS SW versions 8.0E or later*	-	183	Co-Pilot side IDU overtemperature.
EFIS COOL *For EFIS SW versions up to 7.0F included*	"EFIS Cooling"	183	IDU Overtemperature.
GPS LOI *For EFIS SW versions up to 8.0E included*	-	186	GPS Loss of Integrity.
GPS LON *For EFIS SW versions up to 8.0E included*	-	184/185	GPS Loss of Navigation.
GPS1 FAIL	-	185	GPS #1 Failure.
GPS2 FAIL	-	185	GPS #2 Failure.
GPS1/2 FAIL	-	185	GPS #1 and #2 Failure.
GPS MISCOMP	-	187	GPS Miscompare.
GS MISCOMP	-	187	GlideSlope Miscompare.

Flag	Aural Annun.	Page	Malfunction
HDG MISCOMP	-	188	Heading Miscompare.
IAS MISCOMP	-	189	Airspeed Miscompare.
IDU MISCOMP *For EFIS SW versions up to 7.0F included*	-	190	PFD vs MFD Miscompare.
IDU POWER *For EFIS SW versions up to 7.0F included*	-	189	Power Supply Fail.
LOC MISCOMP	-	192	Localizer Miscompare.
LOI *For EFIS SW versions 8.0H or later*	-	186	GPS Loss of Integrity.
LON *For EFIS SW versions 8.0H or later*	-	184/185	GPS Loss of Navigation.
NO HEADING *For EFIS SW versions up to 8.0E included*	-	179/180	Heading Failure.
NO GPS *For EFIS SW versions up to 7.0F included*	"GPS Failure"	184/185	GPS Failure.
NO POSITION *For EFIS SW version to 8.0E*	-	184/185	GPS and DR Failure.
OAT1(2) FAIL *For EFIS SW versions 8.0H or later*	-	192	OAT Failed.
OAT1(2) SENSOR *For EFIS SW version 8.0E*	-	192	OAT Sensor Failed.
OAT SENSOR *For EFIS SW versions up to 7.0F included*	-	192	OAT Sensor Failed.

EFIS

Flag	Aural Annun.	Page	Malfunction
PLT MISCOMP *For EFIS SW versions 8.0E or later*	-	190	Pilot side PFD vs MFD Miscompare.
PLT1(2) SCC *For EFIS SW versions 8.0E or later*	-	194	Pilot side SCC Failed 1 refers to PFD 2 refers to MFD.
PLT1(2) OVRTMP *For EFIS SW versions 8.0E or later*	-	183	Pilot side IDU overtemperature 1 refers to PFD 2 refers to MFD.
RADALT FAIL *For EFIS SW versions up to 8.0E included*	-	193	Radar Altimeter Failure.
RALT FAIL *For EFIS SW versions 8.0H or later*	-	193	Radar Altimeter Failure.
SCC FAIL *For EFIS SW versions up to 7.0F included*	-	194	SCC Failed.

FAILURE OF PILOT'S PFD



ICN-0B-C-153000-G-A0126-01003-A-01-1

CHECK IDU1 Displayed on Pilot's MFD.

Right pilot in control of helicopter

YES

ADC 2 Momentarily displayed on EDU2

ALT or ALTA modes disengage (if in use)

Flight Director modes disengage (if in use)

Pilot's MFD automatically reverts to PFD format.

Re-engage ALT, ALTA or Flight Director modes as necessary

Continue flight.

NO

Pilot's MFD automatically reverts to PFD format.

Continue flight.

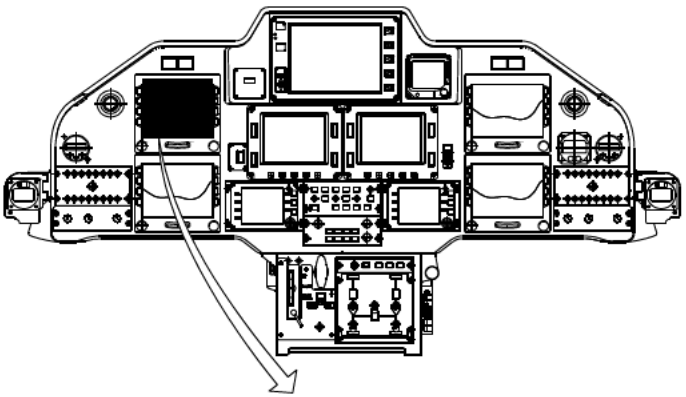
For EFIS with software version A109 7.0D

CAUTION

Before re-engaging Flight Director modes confirm the selected navigation source has not been changed. Do not continue a Non Precision Approach.

END

FAILURE OF COPILOT'S PFD



ICN-0B-C-153000-G-A0126-01004-A-01-1

CHECK IDU1 Displayed on Copilot's MFD.

Left pilot in control of helicopter

YES

ADC 2 Momentarily displayed on EDU2

ALT or ALTA modes disengage (if in use)

Flight Director modes disengage (if in use)

Copilot's MFD automatically reverts to PFD format.

Re-engage ALT, ALTA or Flight Director modes as necessary

Continue flight.

NO

Pilot's MFD automatically reverts to PFD format.

Continue flight.

For EFIS with software version A109 7.0D

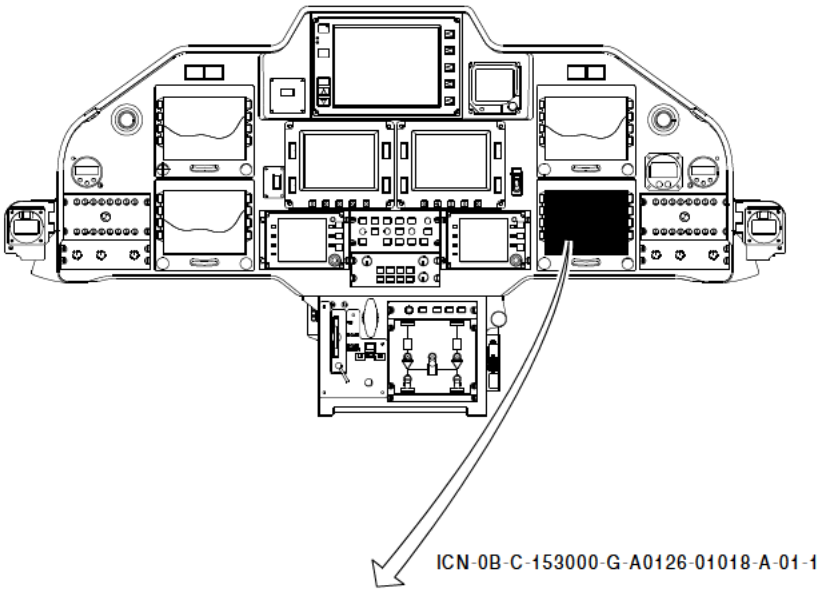
CAUTION

Before re-engaging Flight Director modes confirm the selected navigation source has not been changed. Do not continue a Non Precision Approach.

END

REBOOT OF PILOT'S (OR COPILOT'S) MFD

For EFIS with SW version 7.0F or previous



MFD display blank and subsequent MFD restart

- Wait starting sequence to complete
(Starting sequence will take about 1 minute)

IF flight plan active on FMS

On the RCP, set the ADU knob to the ADU system displaying similar data to the ESIS data.

Note
Do not push any button on MFD otherwise the flight plan will be deleted.

On PFD:
- **Press ACTV soft key twice**
- **Press "DIRECT TO" soft key**
- **Press RH Knob.**

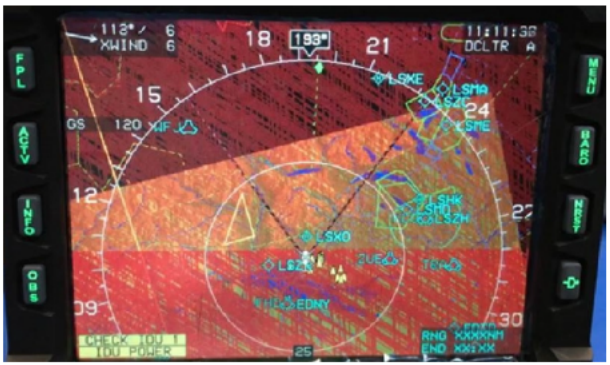
Continue flight.

END

MFD BACKGROUND NOISE

For EFIS with SW version 8.0E

Erroneous airspace line segments on pilot or copilot MFD could be displayed flying further than 60 nm from departure (refer to image below)



ICN-0B-C-153000-G-A0126-01019-A-01-1

On affected MFD:
- **Verify in MAP mode**
- **Press MENU soft key**
- **Press FORMAT soft key**
- **Rotate RH knob and select FNCT DCLT**
- **Un-select AIRSPACES**
- **Rotate RH knob and select DONE.**

Continue flight.

Note

Following this procedure airspace information are no more available on MFD.

END

LOSS OF DATA FROM AIR DATA COMPUTER

ADC1(2) FAIL

displayed on copilot's and pilot's PFD.

ADC 1(2)

also displayed on EDU1.

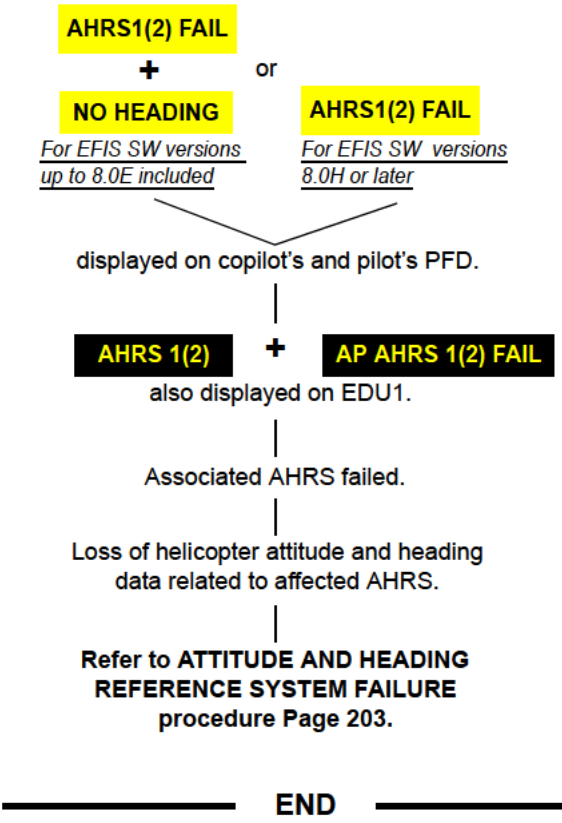
Associated ADC failed.

Loss of helicopter air data (altimeter, airspeed and vertical speed) related to affected ADC.

Refer to
AIR DATA UNIT FAILURE
procedure Page 202.

END

LOSS OF DATA FROM ATTITUDE HEADING REFERENCE SYSTEM



END

LOSS OF HEADING

(For EFIS software versions up to 8.0E included)

NO HEADING

+

AHRS 1(2)

Displayed on EDU1.

+

- HDG pointer not available on affected PFD
- "GPS TRK" indication on affected PFD
- HDG readout not available on affected MFD

On the RCP, **set the AHRS knob to the unaffected AHRS system.**

Continue flight cross-checking AHRS data with the standby instrument.

Note

In case of loss of HEADING on side in command, AFCS Approach modes or HDG mode disengage. The modes can be re-engaged as required after system reconfiguration.

END

LOSS OF HEADING

(For EFIS software versions 8.0H or later)

AHRS 1(2)

Displayed on EDU1.

+

- HDG pointer not available on affected PFD
- "GPS TRK" indication on affected PFD
- HDG readout not available on affected MFD

On the RCP, **set the AHRS knob to the unaffected AHRS system.**

Continue flight cross-checking AHRS data with the standby instrument.

Note

In case of loss of HEADING on side in command, AFCS Approach modes or HDG mode disengage. The modes can be re-engaged as required after system reconfiguration.

END

ALTITUDE DATA DISCREPANCY

ALT MISCOMP

displayed on pilot's and copilot's PFD.

Altitude data discrepancy between the two ADC.
ALT and ALTA modes disengage.

Compare PFDs' data with the ESIS data.

On the RCP, set the ADU knob to the ADU system displaying similar data to the ESIS data.

Continue flight cross-checking PFD altitude data to the ESIS data.

Re-engage AFCS modes as necessary

END

PITCH AND ROLL ATTITUDE DATA DISCREPANCY

ATT MISCOMP

displayed on pilot's and copilot's PFD.

Pitch and roll attitude data discrepancy between the two AHRS's.

Compare PFDs' data with the ESIS data.

On the RCP, set the AHRS knob to the AHRS system displaying similar data to the ESIS data.

Continue flight cross-checking PFD pitch and roll attitude data to the ESIS data.

END

IDU OVERTEMPERATURE

EFIS COOL

For EFIS SW versions up to 7.0F included

displayed on affected MFD/PFD.

or

PLT1(2) OVRTMP

and/or

CPLT1(2) OVRTMP

For EFIS SW versions 8.0E or later

Displayed on pilot and copilot PFD.

"1" refers to PFD
"2" refers to MFD

IDU core temperature above 95°C

Possible display failure if temperature reaches 98°C

In case of display failure

Refer to EFIS DISPLAYS FAILURE procedures Page 174/Page 175.

END

SINGLE GPS SYSTEM FAILURE

GPS LON *For EFIS SW versions up to 8.0E included* or **LON** *For EFIS SW versions 8.0H or later*

+

NO GPS or **NO POSITION**

For EFIS SW versions up to 7.0F included

For EFIS SW version 8.0E only, if also Dead Reckoning not available.

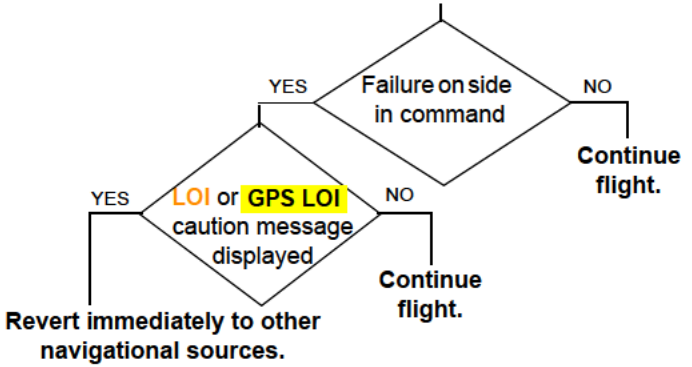
displayed on PFD of affected side.

After 5 seconds, displayed on both pilot's and copilot's PFDs,

GPS1(2) FAIL

Affected GPS system failed with loss of FMS navigation.
TAWS and TERRAIN functions on affected side are not available.

On the RCP, **set the GPS knob to the unaffected GPS system.**
GPS LON or LON caution message disappears.
NO GPS or **NO POSITION** (if applicable) caution message disappears.



If performing RNP/RNAV navigation notify ATC loss of RNP/RNAV capability.

Note

SAME NAV caution message displayed on both pilot's and copilot's PFD.

Note

Before setting unaffected GPS on RCP, HOV mode will degrade and, if LOI or LON displayed, will disengage after 30 seconds. VOR, VAPP, LOC modes will be degraded.

END

EFIS

DOUBLE GPS SYSTEM FAILURE

GPS LON
For EFIS SW versions up to 8.0E included

or

LON
For EFIS SW versions 8.0H or later

+

NO GPS or **NO POSITION**
For EFIS SW versions up to 7.0F included

For EFIS SW version 8.0E only, if also Dead Reckoning not available.

displayed on both pilot's and copilot's PFDs,

After 5 seconds, displayed on both pilot's and copilot's PFDs,

GPS1 FAIL
+
GPS2 FAIL
For EFIS SW versions up to 8.0E included

or

GPS1/2 FAIL
For EFIS SW versions 8.0H or later

Both GPS systems failed with loss of FMS navigation.
TAWS and TERRAIN functions are not available.

Revert immediately to other navigational sources.

If performing RNP/RNAV navigation notify ATC loss of RNP/RNAV capability.

Continue flight.

END

GPS LOSS OF INTEGRITY

GPS LOI
For EFIS SW versions up to 8.0E included

or

LOI
For EFIS SW versions 8.0H or later

displayed on PFD of affected side.
Affected GPS system loss of integrity.

On the RCP, **set unaffected GPS.**

Failure on side in command

YES

NO

Continue flight.

LOI or **GPS LOI** caution message persists

YES

NO

Revert immediately to other navigational sources.

Continue flight.

If performing RNP/RNAV navigation notify ATC loss of RNP/RNAV capability.

Note

SAME NAV and **SAME GPS** caution messages displayed on both pilot's and copilot's PFD.
TAWS and TERRAIN functions on affected side may not be available.

END

GPS DATA DISCREPANCY

GPS MISCOMP

displayed on pilot's and copilot's PFD.

Excessive discrepancy between the two GPS units data.

On the RCP, set the GPS knob to the GPS system displaying valid data.

Continue flight.

END

EXCESSIVE GLIDE SLOPE DISCREPANCY

GS MISCOMP

displayed on pilot's and copilot's PFD.

Excessive discrepancy between the two glide slope's data.

Confirm that both ILS receivers are tuned to the same frequency.

If both receivers are tuned to same frequency:
Abort ILS approach.

END

HEADING DATA DISCREPANCY

HDG MISCOMP

displayed on pilot's and copilot's PFD.

Heading data discrepancy betweenthe two AHRS.
The HDG, HOV, LOC/NLOC, GS/NGS, VOR, VAPP, NAV and GA modes may disengage/decouple.
If NAV mode is engaged the ALT, ALTA, VS, RHT and IAS modes disengage and NAV mode decouples.

Compare PFDs' data with Stand-by magnetic compass data.

On the RCP, set the AHRS knob to the AHRS system displaying similar data to the Stand-by magnetic compass data.

Re-engage/Re-couple AFCS modes as necessary

Note

For AFCS installations previous to P/N 109-0774-04-0A07 (included), the HDG, HOV, LOC/NLOC, GS/NGS, VOR, VAPP, NAV and GA modes may not be available/ coupled. The ALT, ALTA, VS, RHT and IAS modes are available only if NAV mode is not engaged.

Continue flight cross-checking PFD heading data to the Stand-by magnetic compass data.

CAUTION

Do not use the SRCH LT during heading comparison.

END

AIRSPEED DATA DISCREPANCY

IAS MISCOMP

displayed on pilot's and copilot's PFD.

Airspeed data discrepancy betweenthe two ADCs.
Upper Modes and Flight Director Modes will disengage.

Compare PFDs' data with ESIS data.

On the RCP, set the ADU knob to the ADU system displaying similar data to ESIS data.

Re-engage AFCS Modes as necessary.

Continue flight cross-checking PFD airspeed data to the ESIS data.

END

LOSS OF IDU POWER REDUNDANCY

IDU POWER

For EFIS SW versions up to 7.0F included

affected display has lost power redundancy.

Continue flight.

END

IDU DISCREPANCY ON PILOT SIDE

IDU MISCOMP
For EFIS SW versions up to 7.0F included
displayed on pilot side.

or

PLT MISCOMP
For EFIS SW versions 8.0E or later
displayed on both pilot and copilot sides.

Excessive discrepancy between critical parameter processed by PFD and MFD.

Right pilot in control of helicopter

YES

Disengage HOV, ALT, ALTA and Flight Director modes.

Switch MFD to PFD format.

Cross check the following parameters between the 2 displays:
- **Pressure Altitude**
- **Indicated Airspeed**
- **Pitch**
- **Roll**
- **Heading**
- **Glideslope**
- **Localizer**

When a difference is detected, cross check the displays data with the ESIS data. The one displaying different data is the failed display.

Dim the failed display to minimum brightness and continue flight using the functioning display in PFD format.

IF the functioning display is PFD (upper display), **re-engage HOV, ALT, ALTA and Flight Director modes as necessary.**

Continue flight.

NO

Continue flight with the left pilot (copilot side) in control of the helicopter.

END

EFIS

IDU DISCREPANCY ON COPILOT SIDE

IDU MISCOMP
For EFIS SW versions up to 7.0F included
displayed on copilot side.

or

CPLT MISCOMP
For EFIS SW versions 8.0E or later
displayed on both pilot and copilot sides.

Excessive discrepancy between critical parameter processed by PFD and MFD.

Right pilot in control of helicopter

YES

Continue flight with the right pilot (pilot side) in control of the helicopter.

NO

Disengage HOV, ALT, ALTA and Flight Director modes.

Switch MFD to PFD format.

Cross check the following parameters between the 2 displays:
- **Pressure Altitude**
- **Indicated Airspeed**
- **Pitch**
- **Roll**
- **Heading**
- **Glideslope**
- **Localizer**

When a difference is detected, cross check the displays data with the ESIS data. The one displaying different data is the failed display.

Dim the failed display to minimum brightness and continue flight using the functioning display in PFD format.

IF the functioning display is PFD (upper display), **re-engage HOV, ALT, ALTA and Flight Director modes as necessary.**

Continue flight.

END

EXCESSIVE LOCALISER DISCREPANCY

LOC MISCOMP

displayed on pilot's and copilot's PFD.

Excessive discrepancy between the two localiser's data.

Confirm that both ILS receivers are tuned to the same frequency.

If both receivers are tuned to the same frequency:
Abort ILS approach.

END

LOSS OF OAT DATA

OAT SENSOR *For EFIS SW versions up to 7.0F included*

or

OAT1(2) SENSOR *For EFIS SW version 8.0E*

or

OAT1(2) FAIL *For EFIS SW versions 8.0H or later*

displayed on pilot's and/or copilot's PFD.

also displayed on EDU2.

Loss of OAT data.

On the RCP, set the ADU knob to the ADU system displaying valid OAT data.

Note

When there is a loss of OAT data, the "AIRSPEED" voice caution will be activated at the lowest value of V_{NE} for the current pressure altitude.

END

RADIO ALTIMETER DATA LOSS

RADALT FAIL *For EFIS SW versions up to 8.0E included*

or

RALT FAIL *For EFIS SW version 8.0H or later*

displayed on pilot's and copilot's PFD.

Loss of radio altimeter height data on a PFD.
RHT mode disengage and LOC/NLOC, GS/NGS modes may be degraded (if in use).

Refer to barometric altimeter

Continue flight.

CAUTION

Below 2500 ft AGL, height data can still be provided by GPS systems (height data followed by a "G") or by the ADC systems (height data followed by a "B").

END

SCC FAILURE

SCC FAIL

For EFIS SW versions up to 7.0F included

displayed on affected MFD/PFD.

or

PLT1(2) SCC

and/or

CPLT1(2) SCC

For EFIS SW versions 8.0E or later

Displayed on pilot and copilot PFD.

"1" refers to PFD SCC
"2" refers to MFD SCC

System Configuration Card cannot be read upon power up

Do not take off
Shut down Engines

Correct problem before flight.

END

ADS-B TRANSPONDER FAILURE (IF INSTALLED)

ADS-B FAIL

displayed on pilot's and copilot's PFD.

The transponder is not transmitting ADS-B data.
Transponder modes A/C/S are still available.

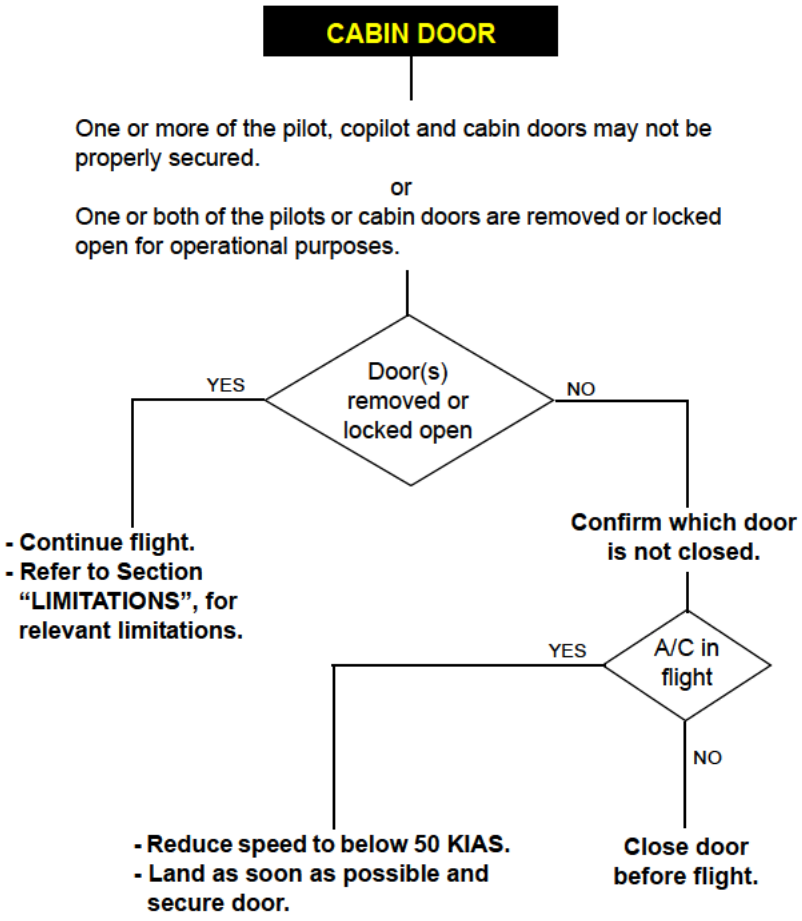
Continue Flight, contact ATC and refer to the applicable operating procedures.

EFIS

SECTION END

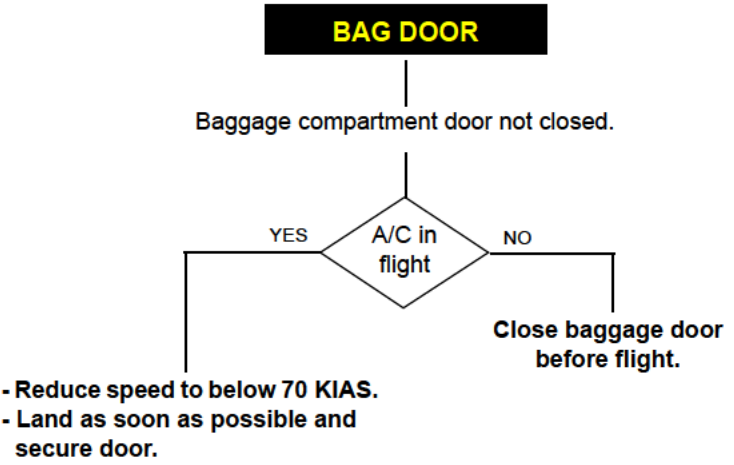
VARIOUS

DOOR OPEN



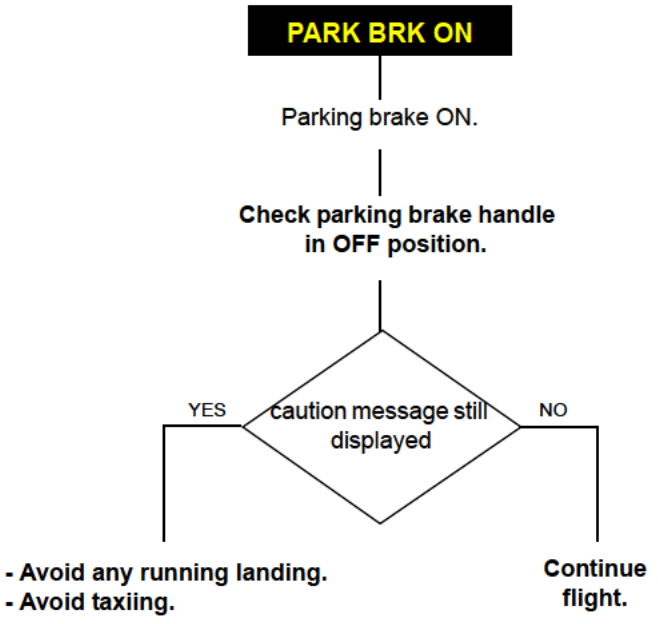
END

BAGGAGE COMPARTMENT DOOR OPEN



END

PARKING BRAKE ON
(Not applicable to EDU P/N 109-0900-76-2A05 and subs)



END

PITOT HEAT FAILED

PITOT 1(2) FAIL

Associated pitot heat failed.

Avoid flight in visible moisture.

Continue flight.

END

COCKPIT FAN FAILED

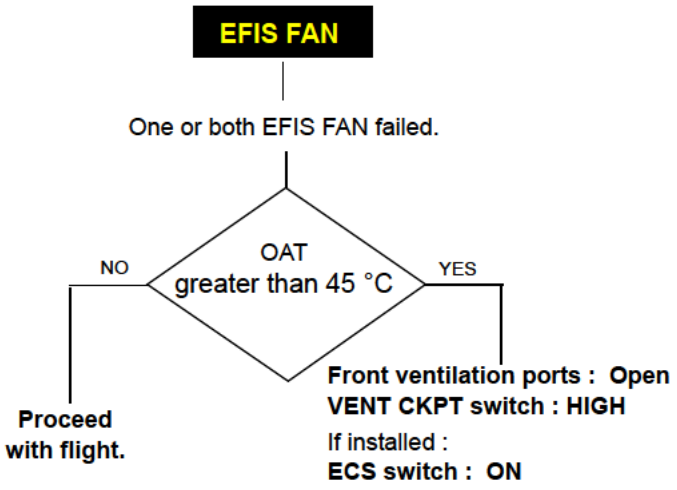
COCKPIT FAN

Cockpit fan failed.

VENT CKPT switch: OFF

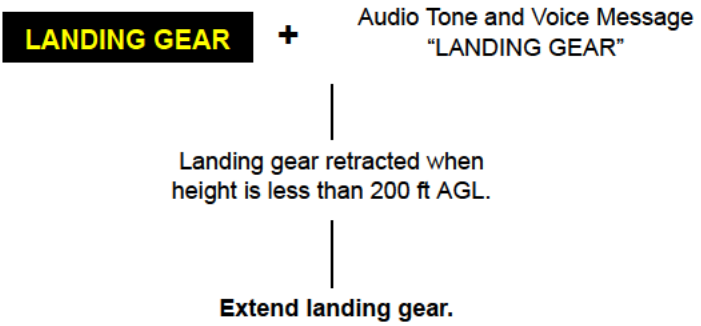
END

EFIS FANS FAILED



END

LANDING GEAR RETRACTED



END

LANDING GEAR FAILS TO RAISE

Landing gear selected up but one or more green lights or the red light remains illuminated.

Confirm landing gear circuit breakers (2) not tripped.

Check EMER / NORMAL selector NOT in EMER position.

- Cycle landing gear from UP to DOWN.
- Check green lights illuminated.
- Select UP

If one or more green lights or the red light remains illuminated:
Select landing gear DOWN.

Continue flight.
Maximum speed = V_{LE} (140 KIAS).

CAUTION

The pilot should have due regard to the performance implications of prolonged flight with the landing gear extended.

END

AIR DATA UNIT FAILURE

ADC 1(2)

Associated Air Data Unit failed.

On the RCP:
- **Set the ADU knob to the unaffected ADU system.**
- **Set the AHRS knob to the same side.**

Continue flight cross-checking ADU data with the ESIS data.

Note

In case of loss of ADC on side in command, Upper Modes and Flight Director Modes disengage. The modes can be re-engaged as required after system reconfiguration.

END

ATTITUDE AND HEADING REFERENCE SYSTEM FAILURE

AHRS 1(2)

Associated AHRS failed.

Also

AP AHRS1(2) FAIL

The AFCS is not receiving information from the associated AHRS.

On the RCP, set the AHRS knob to the unaffected AHRS system.

Continue flight cross-checking AHRS data with the standby instruments.

Refer to AUTOPILOT AHRS FAIL procedure Page 142.

Note

In case of loss of AHRS on side in command, Upper Modes and Flight Director Modes disengage with the exception of NAV mode. The modes can be re-engaged as required after system reconfiguration.

END

VNE EXCEEDED

Audio Tone and Voice Message
"AIRSPEED".

Vne exceeded.

Reduce airspeed below Vne.

END

DEVIATION FROM SELECTED ALTITUDE/HEIGHT

Audio Tone and Voice Message
"ALTITUDE ALTITUDE".

Excessive deviation of altitude / height with respect to the pre-selected value.

Check altitude/height and adjust as required.

END

DEVIATION FROM ABOVE TO BELOW MIN ALTITUDE

Voice Message
"MINIMUMS, MINIMUMS".

Minimum altitude readout turns amber (yellow) and flashes.

Check altitude/height and adjust as required.

SECTION END

LIMITS	GENERAL, TYPE OF OPER, MINIMUM FLT CREW, WEIGHT, CG LIMITATIONS
	AIRSPEED, ALTITUDE, TEMPERATURE, SLOPE LIMITATIONS
	ENGINE, ROTOR, TRANSMISSION LIMITATIONS
	FUEL, LUBRICANTS, HYDRAULICS LIMITATIONS
	GENERATOR LOAD, AVIONIC, MISCELLANEOUS LIMITATIONS
NORMAL PROCEDURES	GEN, FLIGHT PLANNING, PREFLIGHT CHECKS
	ENGINE PRE-START CHECKS
	ENGINE START PROCEDURE
	ABORTED ENGINE START PROCEDURE
	DRY MOTORING RUN PROCEDURE
	SYSTEMS CHECKS
	TAXIING, TAKE OFF
	IN FLIGHT PROCEDURES
	APPROACH AND LANDING
	SHUTDOWN
	POST FLIGHT CHECKS, FLIGHT HANDLING
PERF	DENSITY ALTITUDE, POWER ASSURANCE CHECKS
	HOVER CEILING, ROC, FUEL CONS., H-V, ALLOWABLE WIND

USE OF WARNINGS, CAUTIONS AND NOTES

Warnings, Cautions and Notes are used throughout this manual 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 RFM 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 recommmended.

"May" has been used only when application of a procedure is optional.

"Will" has been used only to indicate futurity, never 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.

"Secured" has been used to determine if the item under examination is correctly locked; mainly referred to doors and disconnectable items.

"Security" has been used to determine if the item under examination is correctly positioned and installed.

LIMITATIONS

NORMAL PROCEDURES

PERFORMANCE

List Of Figures

GENERAL, TYPES OF OPERATION, MINIMUM FLIGHT CREW, NUMBER OF OCCUPANTS WEIGHT AND CG LIMITATIONS

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GENERAL

This QRH includes information from Basic RFM Sections 1, 2, 3 and limited data from Section 4.

TYPES OF OPERATION

The AW109SP helicopter, in its basic configuration, is approved for Day and Night VFR and IFR operations in non-icing conditions.

Aerobatic manoeuvres are prohibited.

MINIMUM FLIGHT CREW

The minimum flight crew consists of one pilot who shall operate the helicopter from the right crew seat.

The left crew seat may be used for an additional pilot when the approved dual controls are installed.

NUMBER OF OCCUPANTS

Eight (pilot included).

WEIGHT AND CENTER OF GRAVITY LIMITATIONS

WEIGHT

Maximum gross weight for ground taxing and towing ..... 3175 kg (7000 lb)

Maximum gross weight for take-off/landing ..... 3175 kg (7000 lb)

Minimum gross weight for flight ..... 2050 kg (4519 lb)

CENTER OF GRAVITY

Longitudinal limits ..... See Figure 1-1

Lateral limits ..... See Figure 1-1

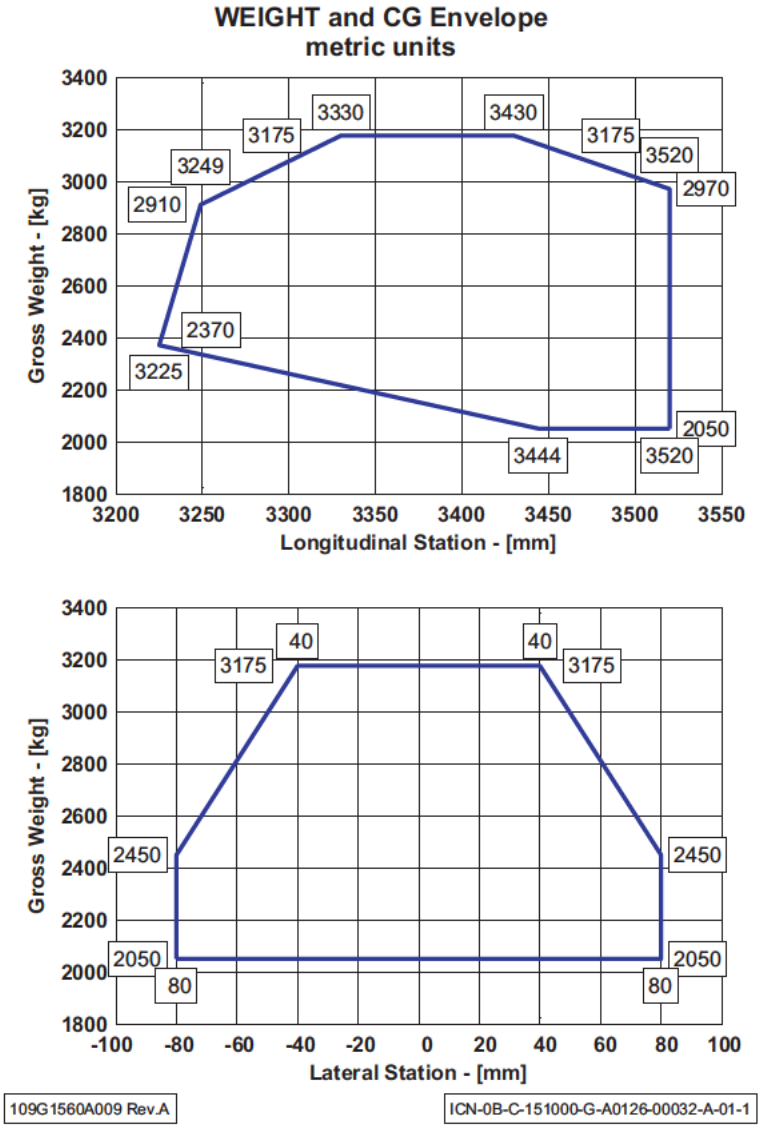

Figure 1-1 (Sheet 1 of 2) Weight, Longitudinal and Lateral CG Envelope (metric)

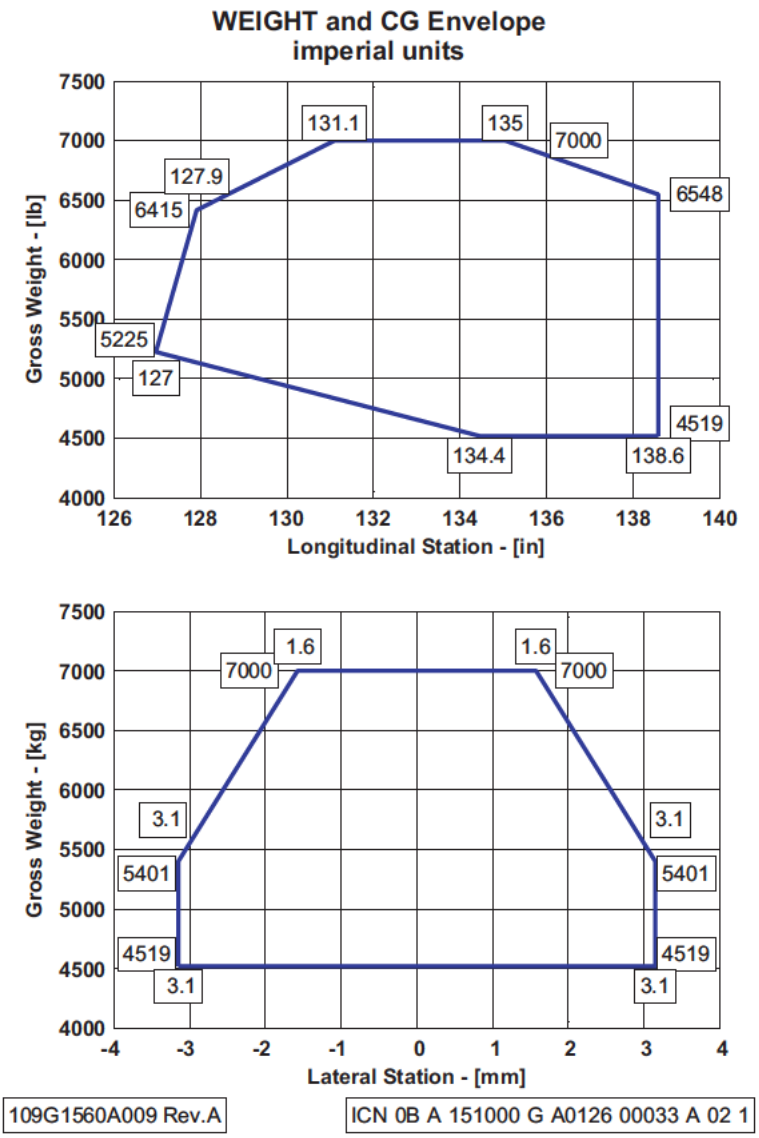

Figure 1-1 (Sheet 2 of 2) Weight, Longitudinal and Lateral CG Envelope (english)

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AIRSPEED, ALTITUDE, TEMPERATURE, SLOPE LIMITATIONS

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AIRSPEED LIMITATIONS

V_{NE} (Power on) ..... Figure 1-2

V_{NE} (OEI/Power-OFF) ..... V_{NE} (Power-ON) - 40 KIAS

V_{NEI} (maximum IFR airspeed) ..... V_{NE} (Power-ON) - 20 KIAS

Vmini (minimum IFR airspeed) ..... 55 KIAS

Maximum airspeed during IFR/VFR approaches ..... 140 KIAS

Maximum landing gear operating airspeed (V_{LO}) ..... 140 KIAS

Maximum landing gear extended airspeed (V_{LE}) ..... 140 KIAS

Minimum airspeed in autorotation (without close external references) ..... 60 KIAS

Maximum airspeed with single AP operational:

— normal flight ..... V_{NE} (Power-ON) - 40 KIAS
— in IFR/VFR approaches ..... 115 KIAS
— in moderate to high turbulence ..... 115 KIAS

Maximum airspeed with AFCS OFF: ..... V_{NE} (Power-ON) - 40 KIAS

Maximum airspeed for searchlight extension, orientation and retraction ..... 135 KIAS

GROUND SPEED LIMITATIONS

ON CONCRETE EVEN SURFACES

Maximum speed for running take-off and landing ..... 40 knots

Maximum taxiing speed (nose wheel unlocked)

• straight: ..... 20 knots

• turning: ..... 10 knots

ON UNPREPARED OR UNEVEN SURFACES

Maximum speed for running take-off and landing ..... 20 knots

Maximum taxiing speed (nose wheel unlocked)

• straight: ..... 20 knots

• turning: ..... 10 knots

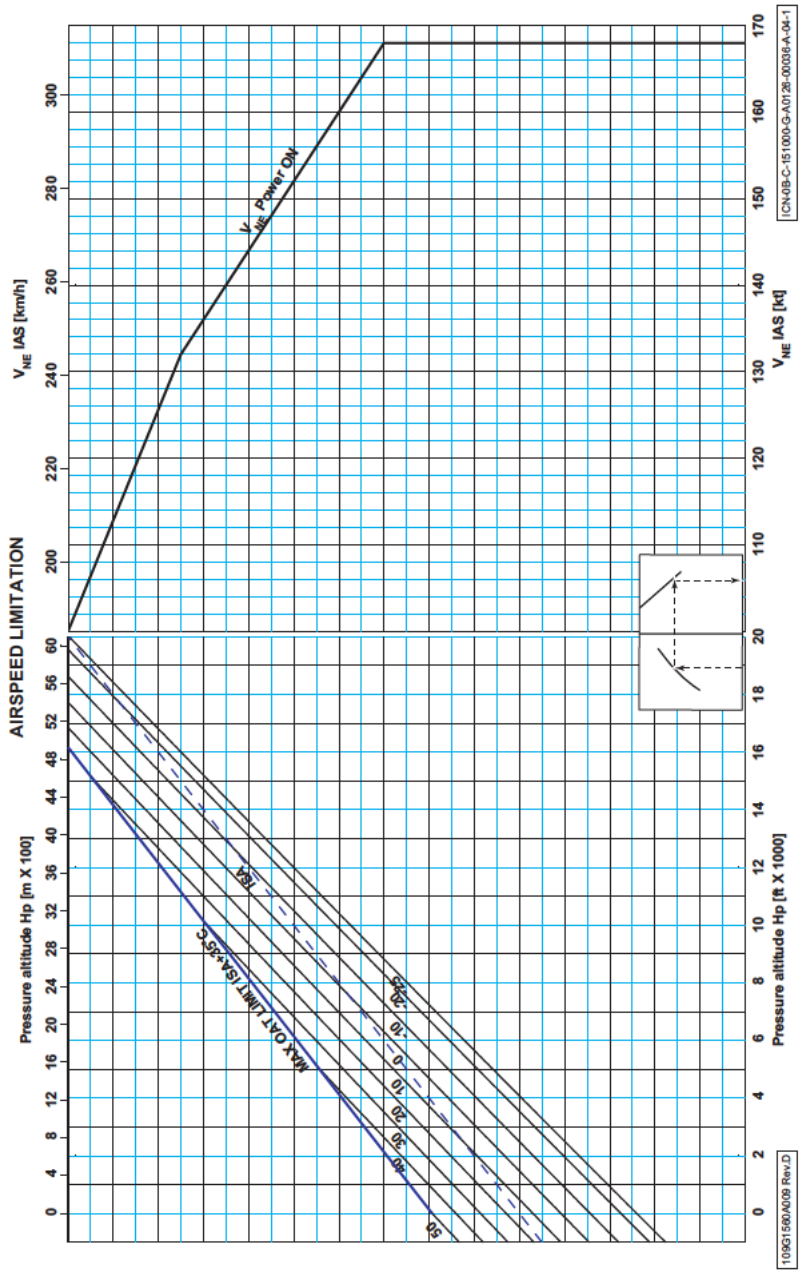

Figure 1-2 Airspeed Limitations - V_{NE} (Power-ON)

WIND SPEED LIMITATIONS FOR ROTOR STARTING AND STOPPING

The maximum wind speed for rotor starting and stopping is 40 knots from any direction.

ALTITUDE LIMITATIONS

Maximum altitude for take-off and landing: ..... Figure 1-3

Minimum and maximum operating altitudes: ..... Figure 1-3

Note

For low speed controllability, IGE and OGE hover performance and H-V refer to Section “PERFORMANCE”.

AMBIENT AIR TEMPERATURE LIMITATIONS

Minimum ambient air temperature ..... -25°C (-13°F)

Maximum sea level ambient air temperature ..... +50°C (122°F)

The maximum ambient air temperature for operation decreases with pressure altitude at the standard lapse rate of 2 °C (3.6 °F) every 1000 ft (305 m) up to 20000 ft (6096 m).

For the Temperature Envelope Extension from -25 °C (-13 °F) to -40 °C (-40 °F), refer to Supplement 15 in the AW109SP RFM OES.

SLOPE LIMITATIONS

Slope operations are prohibited on surfaces with a slope angle steeper than the following:

From 90° to the left of nose up to 90° to the right of nose up ...10 deg

Nose down .....2 deg

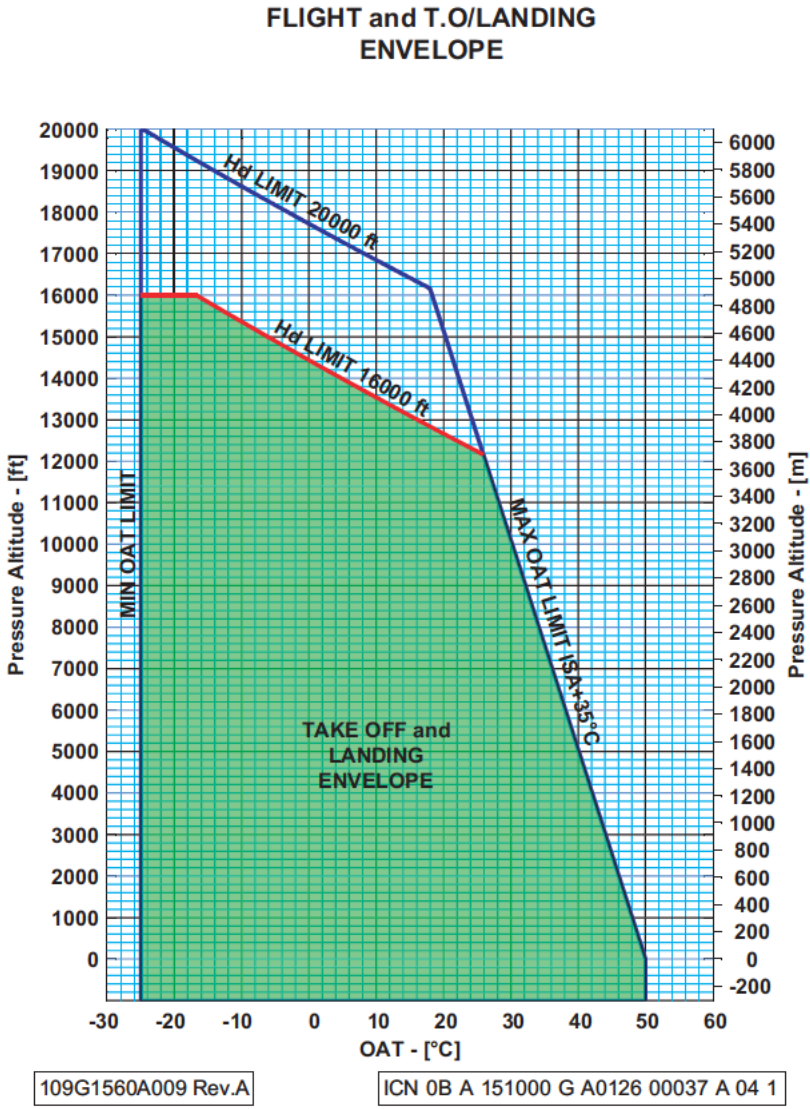

Figure 1-3 Pressure altitude / OAT Envelope

ENGINE, ROTOR, TRANSMISSION LIMITATIONS

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ENGINE LIMITATIONS

Note

The one engine inoperative (OEI) ratings are intended for emergency use only, when one engine becomes inoperative due to an actual malfunction. OEI operations for maintenance or training purposes shall be limited to the OEI Continuous Operation power range.

Note

Transient range must not be used intentionally.

ENGINE STARTER DUTY CYCLE

45 seconds on, 1 minute off
45 seconds on, 1 minute off
45 seconds on, 30 minutes off

GAS GENERATOR SPEED (N1)

All Engines Operating (AEO)

Continuous Operation ..... 50 to 97.1%
Take-Off Range (5 minutes) ..... 97.2 to 99.7%
Maximum 99.7%
Transient (20 seconds) 104.1%

One Engine Inoperative (OEI)

Continuous Operation ..... 50 to 99.7%
2.5 minutes Range ..... 99.8 to 102.9%
Maximum 102.9%
Transient (20 seconds) 104.1%

POWER TURBINE SPEED (N2)

All Engines Operating (AEO)

Transient 95%
Minimum 99%
Continuous Operation (except for Take-Off and Landing) 99 to 101%
Take-Off, Landing and below Vy ..... 101 to 102%
Maximum 102%
Transient (20 seconds) 112%

One Engine Inoperative (OEI)

Transient 85%
Minimum 90%
Cautionary Range ..... 90 to 98%

Continuous Operation (except for Take-Off and Landing) .99 to 101%

Take-Off, Landing and below Vy .....101 to 102%

Maximum 102%

Transient (20 seconds) 112%

TURBINE OUTLET TEMPERATURE (TOT)

Engine Starting

Maximum (unlimited) .....650 °C

Maximum transient (2 seconds).....875 °C

Note

A linear variation applies between 20 seconds at 650 °C and 2 seconds at 760 °C.
A transient of 2 seconds applies above 760 °C.

All Engines Operating (AEO)

Maximum Continuous .....840 °C

Take-Off Range (5 minutes).....841 to 900 °C

Transient (20 seconds) .....1000 °C

One Engine Inoperative (OEI)

Maximum Continuous .....900 °C

2.5 minutes Range.....901 to 970 °C

Transient (20 seconds) .....1000 °C

ENGINE OIL PRESSURE

Note

The oil pressure limits vary as a function of the gas generator speed.

Minimum for ground idle ..... Above lower red line

Continuous Operation.....Green band (variable as a function of N1)

Cautionary Range.....Yellow bands (variable as a function of N1)

Maximum during engine starting..... 200 psi

Note

The engine can operate with oil pressure up to 200 psi during or after start or if the oil temperature drops significantly below 71 °C. Oil pressure will decrease as oil temperature increases and is not expected to endure for more than 5 sec. The operation at an oil pressure up to 200 psi is permitted for a period of 10 minutes.

ENGINE OIL TEMPERATURE

Continuous Operation ..... 10 to 125 °C

Maximum ..... 125 °C

ROTOR LIMITATIONS

POWER-ON (AEO)

Transient 95%

Minimum 99%

Continuous Operation (except for Take-Off and Landing) 99 to 101%

Take-Off, Landing and below Vy ..... 101 to 102%

Maximum 102%

POWER-ON (OEI)

Transient 85%

Minimum 90%

Cautionary Range ..... 90 to 98%

Continuous Operation (except for Take-Off and Landing) 99 to 101%

Take-Off, Landing and below Vy ..... 101 to 102%

Maximum 102%

POWER-OFF

Transient 90%

Minimum 95%

Continuous Operation ..... 95 to 110%

Maximum 110%

TRANSMISSION LIMITATIONS

TORQUE (TRQ%) (AEO)

Maximum Continuous 100%

Take-Off Range (5 minutes) ..... 101 to 107%

Maximum 107%

Transient (6 seconds) 110%

TORQUE (TRQ%) (OEI)

Maximum Continuous 133%

2.5 minutes Range ..... 134 to 162%

Maximum 162%

Transient (6 seconds) 173%

ENG RTR XMSN

TRANSMISSION OIL PRESSURE

Minimum ..... 30 psi

Continuous Operation ..... 30 to 50 psi

Cautionary Range ..... 51 to 70 psi

Maximum ..... 70 psi

Note

During cold starting conditions, the transmission oil pressure may temporarily rise up to 100 psi.

TRANSMISSION OIL TEMPERATURE

Continuous Operation ..... 0 to 120 °C

Maximum ..... 120 °C

FUEL, LUBRICANTS, HYDRAULICS LIMITATIONS

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FUEL LIMITATIONS

FUEL PRESSURE

Cautionary Range ..... 0 to 7 psi

Continuous Operation ..... 8 to 25 psi

Maximum ..... 25 psi

FUEL QUANTITY

Total ..... 460 kg
(575 liters at 0.8 kg/liter)

TOTAL UNUSABLE FUEL

In coordinated flight ..... 10 kg
(12 liters at 0.8 kg/liter)

APPROVED FUELS

Type	Specification
JET A	ASTM D1655
JET A-1	ASTM D1655
JP-5 *	MIL-T-5624
JP-8 *	MIL-T-83133
No. 3 Jet fuel (RP-3)	GB 6537-2006
R.T.	GOST 10227-86
R.T.	GSTU 320.00149943.007-97
TS-1**	GOST 10227-86
TS-1**	GSTU 320.00149943.011-99

Note

An approved fuel or any mixture of acceptable fuels may be used. However, changing to a fuel with a substantially different heating value or specific gravity may require maintenance in the form of engine fuel control (trimmer) adjustment. Refer to the Pratt & Whitney PW207C engine manual.

Note

Fuel grades marked with an asterisk (*) contain a fuel system icing inhibitor (FSII). For JP-8, MIL-T-83133C allows two grades. The grade meeting NATO code F-34 has FSII while the grade meeting code F-35 has no FSII unless specifically requested.

Note

Fuel grades marked with double asterisk (**) are for occasional use only. Refer to Pratt & Whitney PW207C Maintenence Manual for full details and restrictions.

Note

For operations below +4°C, the use of anti-ice additive is authorized but not mandatory since the helicopter is equipped with an airframe anti-ice fuel filter. For additive requirements and blending procedures refer to the Pratt & Whitney PW207C engine manual.

EMERGENCY FUELS

Emergency fuels should only be used whenever any of the authorized fuels are not available.

Fuel Type	Applicable Specification	Restrictions
Automotive Diesel CPW 46	Arctic Grade	Do not use below -15 °C (5 °F) OAT
	Winter Grade	Do not use below -7 °C (20 °F) OAT
	Regular Grade	Do not use below 5 °C (40 °F) OAT
Aviation Gasoline Grades: 80, 100 and 100 LL	MIL-G-5572	Do not use for longer than 150 hours during any period between engine overhauls. Engine operation in suction mode is prohibited.

LUBRICANTS LIMITATIONS

AUTHORIZED ENGINE OILS

Applicable Specification	Brand Names (For reference only)
MIL-PRF-23699	Aero-Shell Turbine Oil 500 Aero-Shell Turbine Oil 560 BP Turbo Oil 2380 (formerly Exxon Turbo Oil 2380) BP Turbo Oil 25 (formerly Exxon Turbo Oil 25) Castrol 5000 Mobil Jet Oil II Royco Turbine Oil 500 Royco Turbine Oil 560 Turbonycoil 525-2A

Note

Engine oil tank capacity is 5.12 liters (1.35 US Gallon).

Note

Mixing of the different brands and types is prohibited.

AUTHORIZED TRANSMISSION OILS

Designation	Specification
BP Turbo oil 2380 (formerly EXXON Turbo oil 2380)	MIL-PRF-23699
Mobil Jet Oil II	MIL-PRF-23699
Mobil Jet Oil 254	MIL-PRF-23699
Aeroshell Turbine oil 500	MIL-PRF-23699
Aeroshell Turbine oil 555	DOD-PRF-85734
Aeroshell Turbine oil 560	MIL-PRF-23699
Castrol Aero 5000	MIL-PRF-23699
BP Turbo oil 2197	MIL-PRF-23699

Oils are limited to ambient temperatures above -40 °C (-40 °F).

Note

Mixing of oils of different brands and types is prohibited.

FUEL
LUB HYD

HYDRAULICS LIMITATIONS

MAIN SYSTEM FLUID PRESSURE

Minimum ..... 1200 psi
Cautionary Range..... 1200 to 1400 psi
Continuous Operation..... 1401 to 1600 psi
Maximum ..... 1600 psi

NORMAL UTILITY SYSTEM - FLUID PRESSURE

Minimum ..... 500 psi
Cautionary Range.....500 to 1140 psi
Continuous Operation.....1141 to 1600 psi
Maximum ..... 1600 psi

EMERGENCY UTILITY SYSTEM - FLUID PRESSURE

Minimum .....1140 psi
Maximum ..... 1600 psi

APPROVED FLUIDS

The following hydraulic fluids are approved:

MIL-PRF-5606
MIL-PRF-83282.

Note

Mixing of fluids of different brands and types is prohibited.

GENERATOR LOAD, AVIONIC, MISCELLANEOUS LIMITATIONS

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GENERATOR LOAD LIMITATIONS (FOR EACH GENERATOR)

Up to 15000 ft Hp:

Continuous Operation ..... 0 to 200 A

Maximum load at MPOG (no time limitiation) ..... 160 A

Maximum load at MPOG (10 minutes)..... 160 to 200 A

Above 15000 ft Hp:

Continuous Operation ..... 0 to 130 A

Maximum load at MPOG (no time limitiation) ..... 130 A

Transient at starting (45 seconds) ..... 300 A

AVIONIC LIMITATIONS

MAGNETIC COMPASS

When operating the SRCH LT, the magnetic compass is unreliable.

FLIGHT MANAGEMENT SYSTEM

The FMS is limited to the following navigation specifications/ approaches:

Table 2-1. FMS Approved Operations

ICAO 9613 PBN manual - Navigation Specification	FMS Flight Phase (RNP)						
	Enroute	Arrival	APPROACH (**)				Dep
			Initial	Intermediate	Final	Missed	
RNAV 5	5	5	-	-	-	-	-
RNAV 2	2	2	-	-	-	-	-
RNAV 1	1	1	1	1	-	1	1
RNP 2	2	-	-	-	-	-	
RNP 1	1	1	1	1	-	1	1
NPA (*)	-	-	1	1	Angular	1	-
RNP APCH LNAV and LNAV/VNAV minima	-	-	1	1	Angular	1	-
RNP APCH LPV minima	-	-	1	1	Angular	1	-
RNP APCH LP minima	-	-	1	1	Angular	1	-
RNP AR APCH RNP 0.3 minima	-	-	0.3	0.3	0.3	1	-
RNP 0.3	0.3	0.3	0.3	0.3	-	0.3	0.3

(*) Non Precision Approach and Circling approach managed by FMS include VOR, VOR-DME, NDB minima.

(**) For FMS approach operations refer to Supplement 34 of Basic RFM.

FMS operations can be carried out provided that the following systems are installed and operative:

Table 2-2. FMS Configuration Limitations

Nav Spec.	Minimum Configuration Requirements (specific P/N or later)		
	EFIS sw version P/N	GPS P/N	AFCS P/N
RNAV 5	All	All	All
RNAV 2	25-EFIS80H-SW-0002	109G3450I01-101	109-0774-04-0A06
RNAV 1	25-EFIS80H-SW-0002	109G3450I01-101	109-0774-04-0A06
RNP 2	25-EFIS80H-SW-0002	109G3450I01-101	109-0774-04-0A06
RNP 1	25-EFIS80H-SW-0002	109G3450I01-101	109-0774-04-0A06
NPA	25-EFIS80H-SW-0002	109G3450I01-101	109-0774-04-0A06
RNP APCH LNAV minima	All	All	All
RNP APCH LNAV/VNAV minima	25-EFIS70F-SW-0001	42-015002-0001 MOD 1, or 109G3450I01-101	109-0774-04-0A05
RNP APCH LPV minima	25-EFIS70F-SW-0001	42-015002-0001 MOD 1, or 109G3450I01-101	109-0774-04-0A05
RNP APCH LP minima	25-EFIS80H-SW-0002	109G3450I01-101	109-0774-04-0A06
RNP AR APCH RNP 0.3 minima	25-EFIS80H-SW-0002	109G3450I01-101	109-0774-04-0A06
RNP 0.3	25-EFIS80H-SW-0002	109G3450I01-101	109-0774-04-0A06

The pilot must verify the currency of the Navigation Data Base (NAV DB) on-board and the coherence of the FMS with the procedure to be flown.

The FMS is not Multi-Sensor Approved for navigation. Therefore in case dual GPS failure or outage occur the pilot must revert to Radio Navigation.

The aircraft must have approved radio navigation equipment installed and operating appropriate to the route of flight.

When out of SBAS coverage or in case of SBAS outage, Predictive RAIM request on Destination waypoint has to be checked on EFIS.

The RNP AR APCH with RNP minima less than RNP 0.3 or RNP AR Missed Approach less than RNP 1.0 are NOT allowed.

It is prohibited to navigate using the Flight Management System in Dead Reckoning mode.

Note

The Dead Reckoning mode will be automatically activated as the navigation mode only if the GPS systems have failed. The accuracy of the Dead Reckoning mode cannot be guaranteed.

For EFIS with SW version 7.0F or previous

CAUTION

Check FMS IFR procedures for continuity on MAP page or NAV LOG page after activating the procedure. In case of discontinuites the FMS could not correctly follow the published procedure. The pilot shall fly attentive and follow the published procedure.

CAUTION

To exit an FMS holding procedure press “CONT” softkey only when inbound holding waypoint.

GEN LD
AVNC, MISC

En route and terminal

It is prohibited to use VNAV mode data for navigation.

FMS approaches

For FMS approach operations refer to Supplement 34 of Basic RFM.

For EFIS with software version A109 7.0D

It is prohibited to continue a Non Precision Approach procedures following a PFD failure.

EFIS

Skyway simbology does not provide precision approach guidance nor does it guarantee terrain separation.
It remains the pilot's responsibility to provide aircraft separation from terrain.

HTAWS

The TAWS installed is a class B HTAWS and it provides the following functions:

- Terrain and Obstruction display;
- Forward Looking Terrain Awareness (FLTA);
- Sink Rate after Takeoff or Missed Approach (GPWS Mode 3).

HTAWS must not be used for navigation.
Do not attempt to navigate using the terrain depiction.

HTAWS must not be used for terrain following flight.
Do not use hue nor grid as cues for altitude or direction.
The HTAWS database installed shall be the last update for the region being flown.

CAUTION

The terrain and obstacle display is intended to serve as a terrain and obstacle awareness tool only. The display and database may not provide the accuracy and fidelity on which to base routine navigation decisions and plan routes to avoid terrain or obstacles.

CAUTION

There are many towers, antennas, power lines, and obstructions that are not in the database.

AUTOMATIC FLIGHT CONTROL SYSTEM

Minimum AFCS configuration for IFR flight.....2 AP in ATT mode

Dual AP operation

Flight at altitude below 1000 ft AGL..... Fly attentive

Flight at airspeed above V_{NE} (Power-ON) - 20 KIAS..... Fly manually

Single AP operation

Flight at altitude above 500 ft AGL..... Fly attentive

Flight at altitude at or below 500 ft AGL..... Fly manually

Flight in moderate to high turbulence ..... Fly manually

In single AP operation, the AFCS Upper Modes and Flight Director Modes must not be used unless conducting an approach, missed approach, transition to/from the hover or hover.

FLIGHT DIRECTOR

UPPER AND FLIGHT DIRECTOR MODES ENGAGEMENT LIMITS AND MINIMUM USE HEIGHT (MUH)

Hold Mode	Applicable Range	MUH	Notes
ALT	0 KIAS to Vne Altitude -1000 ft to 20000 ft	300ft AGL in cruise or 50 ft AGL in hover	
RHT	0 KIAS to Vne 15 ft to 2500 ft AGL	200 ft AGL in cruise (over flat surfaces only) or 50 ft AGL in hover and transition to/from hover	
HDG	0 KIAS to Vne	200 ft AGL in cruise or 50 ft AGL during approach in hover and transition to/from hover	
ALTA	40 KIAS to Vne Altitude -1000 ft to 20000 ft	300 ft AGL	
VS	40 KIAS to Vne within -1500 fpm and 2000 fpm	200 ft AGL	**3**
IAS	40 KIAS to Vne	200 ft AGL in cruise or 50 ft AGL during approach in hover and transition to/from hover	
HOV	Airspeed less than 80 KIAS and Groundspeed — Longitudinal -20 to +60 kts — Lateral -20 to +20 kts	200 ft AGL in cruise or 50 ft AGL during approach in hover and transition to/from hover	
GA	40 KIAS to Vne	50 ft AGL during approach	**1**
TU	Airspeed less than 40 KIAS 10 ft to 2500 ft AGL	200 ft AGL in cruise or 50 ft AGL during approach in hover and transition to/from hover	**2**
NAV	40 KIAS to Vne	200 ft AGL in cruise or 50 ft AGL during approach in hover and transition to/from hover	
VOR	40 KIAS to Vne	200 ft AGL in cruise or 50 ft AGL during approach in hover and transition to/from hover	

UPPER AND FLIGHT DIRECTOR MODES ENGAGEMENT LIMITS AND MINIMUM USE HEIGHT (MUH) (CONTINUED)

Hold Mode	Applicable Range	MUH	Notes
VAPP	40 KIAS to Vne	200 ft AGL in cruise or 50 ft AGL during approach in hover and transition to/from hover	
LOC/ NLOC	40 KIAS to Vne	200 ft AGL in cruise or 50 ft AGL during approach in hover and transition to/from hover	
GS/ NGS	40 KIAS to Vne	200 ft AGL in cruise or 50 ft AGL during approach in hover and transition to/from hover	

Notes

1 GA mode engagement is inhibited (regardless of airspeed value) if HOV mode engaged.

2 TU mode engages also for airspeed less than 40 kts if HOV mode engaged.

3 VS Mode engagement above 2000 fpm or below -1500 fpm will results in the mode returning the aircraft to the maximum rates quoted (2000 fpm or -1500 fpm).

General Limitations

With AFCS Upper Modes and Flight Director Modes engaged the torque limiter must be active (LIMITER ON advisory message displayed).

ILS Approach

The helicopter is certified to carry out CAT 1 ILS approaches (DH minima not less than 200 ft AGL).

Steepest ILS approach gradient .....7,5 deg

Maximum Airspeed according to the following table:

GLIDE PATH ANGLE (deg)	AIRSPEED (KIAS)
3	140
4	120
5	110
6	100
7,5	90

GPS approach

The helicopter is certified to carry out GPS approaches DA(H) minima not less than 250 ft AGL).

Steepest GPS approach gradient ..... 9,0 deg

Maximun Airspeed according to the following table:

GLIDE PATH ANGLE (deg)	AIRSPEED (KIAS)
3	140
4	120
5	110
6	100
7,5	90
8	80
9	70

Upper modes

HOV Mode:

HDG datum shall not be changed with variation greater than ±10° when HOV mode is engaged with relative wind speed and/or non-zero ground-speed reference.

For EFIS with software version A109 7.0D

HOV mode is prohibited if the Magnetic Variation is in excess of 5° [5°W, 5°E].

RHT Mode:

The use of Radar Height (RHT) mode is prohibited in cruise over nonflat surfaces.
When in RHT mode the RadAlt must be continuously cross-checked with BarAlt set to QFE.

TU Mode:

Safe operation of TU mode has been demonstrated up to 25 kts wind speed coming from ±90 deg with respect to rotorcraft heading.

For EFIS with software version A109 7.0D

TU mode is prohibited if the Magnetic Variation is in excess of 5° [5°W, 5°E].

NLOC and NGS Modes

For EFIS with software version A109 7.0D

NLOC and NGS modes are prohibited, either coupled or uncoupled, if the Magnetic Variation is in excess of 2° [2°W, 2°E].

LOC and GS Modes

For EFIS with software version A109 7.0D

LOC and GS modes are prohibited, either coupled or uncoupled, if the Magnetic Variation is in excess of 2° [2°W, 2°E].

MISCELLANEOUS LIMITATIONS

ROTOR BRAKE

Selection of the rotor brake to the ON position is limited as follows:

Rotor Speed (NR) ..... below 40%

BAGGAGE COMPARTMENT

Maximum load ..... 120 kg (264 lb)

Maximum unit load..... 500 kg/m^2 (102 lbs/sq ft)

FUEL MANAGEMENT SYSTEM

It is prohibited to rely upon Fuel Flow data for flight planning and navigation.

PASSENGERS CABIN LIMITATIONS

Baggage storage under the seat is prohibited.

DOORS OPENED OR REMOVED

Flight with either one or both passengers cabin sliding doors open is prohibited if passenger door modification P/N 109-0814-35 is not installed.

It is possible to fly with pilot / copilot doors removed and/or passengers cabin sliding doors opened to lock position or removed in whichever combination.

V_{NE} with any door removed or open to lock position ..... 75 KIAS

Maximum airspeed for passengers cabin sliding doors opening or closing..... 50 KIAS

IFR operation is prohibited with any door opened or removed.

SUN GLASSES

Pilot(s) must not use polarized type sun glasses.

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GENERAL, FLIGHT PLANNING, PREFLIGHT CHECKS

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GENERAL

This section contains instructions and procedures for operating the helicopter from the planning stage, through actual flight conditions, to securing the helicopter after landing.

Normal and standard conditions are assumed in these procedures.

The instructions and procedures contained herein are written for the purpose of standardization and are not applicable to all situations.

The minimum and maximum limits, and the normal and cautionary operating ranges for the helicopter and its subsystems are indicated by instrument markings and placards.

Each time an operating limitation is exceeded, a malfunction or an emergency occurs, an appropriate entry shall be made in the logbook (airframe, engine, etc.). The entry shall state which limit was exceeded, the duration of time, the extreme value attained, and any additional information essential in determining the maintenance action required. As an aid to this task, the IDS software includes logs of limit exceed data, fault data, and caution and warning signals which are stored in a Non-Volatile Memory for subsequent retrieval.

FLIGHT PLANNING

Each flight must be planned adequately to ensure safe operations and to provide the pilot with the data to be used during the flight.

Essential weight and balance, and performance information should be compiled as follows:

- Check type of mission to be performed and destination;
- Select appropriate performance charts to be used from Section 4 of Basic RFM;
- Review the appropriate Supplements of Basic RFM for the optional equipment(s) installed.

Ascertain proper weight and balance of the helicopter as follows:

- Consult Section 6 “Weight and Balance”cof Basic RFM;
- Ascertain weight of fuel, oil, payload, etc;
- Compute take-off and anticipated landing gross weights;
- Check helicopter center of gravity (CG) locations;
- Check that the weight and CG limitations in Section 1 are not exceeded during the flight.

PREFLIGHT CHECKS

WARNING

If a failure is detected during pre-flight checks, maintenance action is necessary unless helicopter dispatch is permitted by a MMEL

Preflight checks are to be performed by the pilot in order to confirm that the helicopter is flightworthy and adequately equipped.
The checks are categorised as follows:

- First flight of the day
- Every flight

PRE FLIGHT

Checks marked with an arrow ➡ are required before the first flight of the day. All other checks are to be carried out before every flight.

Checks in blue may be omitted if the AIRWORTHINESS CHECK has been performed as per MAINTENANCE MANUAL.

The inspection commences at the nose and continues clockwise around the helicopter (Figure 2-1). During the inspection, confirm that there are no leaks from drains, that all vents, air intakes and air outlets are free of obstruction, and all access panels and antennas are secure.

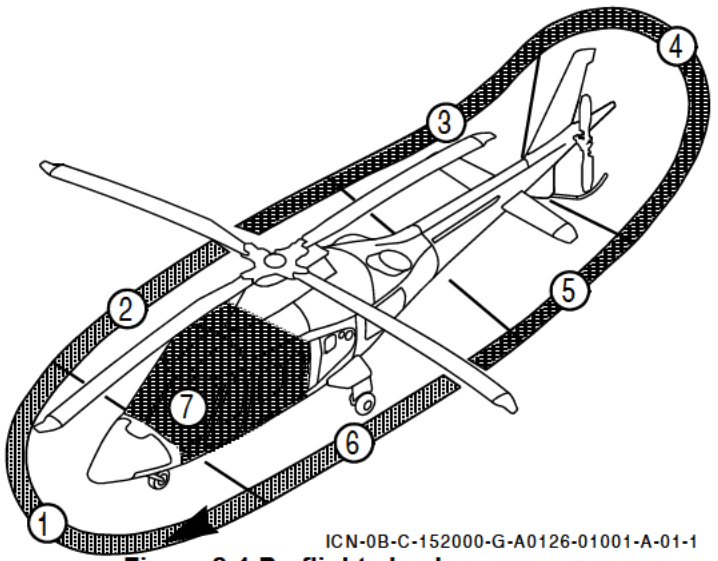

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Figure 2-1 Preflight check sequence

AREA N°1 : Helicopter nose
AREA N°2 : Fuselage - RH side
AREA N°3 : Tail boom - RH side
AREA N°4 : Fins, tail gearbox, tail rotor and skid
AREA N°5 : Tail boom - LH side
AREA N°6 : Fuselage - LH side
AREA N°7 : Cabin interior

1. Main and tail rotor tie-downs : Removed.

Area N°1 (Helicopter Nose)

1. Nose exterior : Condition.
2. Ventilation air intake : Free of obstruction.
3. Pitot-static tubes : Cover removed, condition and free of obstruction.
4. Nose landing gear : Condition, shock strut extension, leaks, tyre condition and pressure.
5. Searchlight : Condition and cleanliness.
6. ➡ Nose compartment access door : Open.
7. ➡ Avionics components : Condition and secured.
8. ➡ Accumulators : Condition and free of leaks. (Only one accumulator is present in FIXED WHEELED LANDING GEAR configuration).
9. Nose compartment access door : Secure.
10. ➡ Accumulators : Discharge by pressing two relevant red pushbuttons. (Only one accumulator is present in FIXED WHEELED LANDING GEAR configuration).

CAUTION

The discharge of accumulators causes loss of parking brakes. Suitable measures (wheel chocks) should be taken to ensure helicopter will not move.

11. ➡ Drains and vents : Free of obstruction.

Area N°2 (Fuselage - RH side)

1. Windshield : Condition and cleanliness.
2. Roof, lateral and lower transparent panels : Condition and cleanliness.
3. ➡ Windshield wiper : Condition.
4. ➡ RH OAT sensor : Condition, free of obstruction.
5. Fuselage exterior : Condition.

PRE FLIGHT

6.	Pilot door window	: Condition, cleanliness, and secure.
7.	➡ Antenna(s)	: Condition.
8.	Emergency floats electrical connector (if installed)	: Cap locked. Chain condition and secure.
9.	Sliding door	: Condition and cleanliness of windows.
10.	➡ Sliding door jettison windows	: Security of windows and seal retainers, condition of emergency markings.
11.	Cowlings and fairings	: Condition and secure.
12.	➡ Fore and middle access doors	: Open.
13.	➡ Servo hydraulic system valves and filter group	: Check for leaks and status (Red button out: filter clogged).
14.	➡ Hydraulic system tanks	: Check fluid level and filler caps for security.
15.	Fore and middle access doors	: Secure.
16.	ENGINE OIL COOLER access door	: Secure.
17.	➡ Service step	: Open and use to reach upper part of helicopter.
18.	➡ Main rotor hub and blades	: Condition and secure.
19.	➡ Main rotor dampers	: Condition and secure. Check for correct charge indication.
20.	➡ Main rotor pitch change links	: Condition and secure.
21.	➡ Swashplate and driving scissors	: Condition and secure.
22.	➡ Upper anti-collision light	: Condition and cleanliness.
23.	➡ HYD. SERVOS access door	: Open.
24.	➡ Servo actuator (actuator with yellow decal)	: Condition and leaks.
25.	➡ Main transmission and accessories (visible area)	: Condition and leaks.
26.	➡ Transmission external oil filter	: By-pass indication (Red button out: filter clogged).

27.	HYD. SERVOS access door	: Secure.
28.	➡ ENGINE OIL COOLER access door	: Open.
29.	➡ Cooler blower air intake	: Free of obstruction.
30.	➡ Cooler system belt	: Condition and secured.
31.	ENGINE OIL COOLER access door	: Secured.
32.	➡ Airframe (A/F) fuel filter	: Condition and leaks.
33.	Service step	: Secure.
34.	Engine air intake screen and chamber	: Covers removed; free of damage and obstruction.
35.	➡ Engine access door	: Open.
36.	➡ Engine compartment drain filters	: Free of obstructions.
37.	➡ Engine area	: Check for fuel and oil leaks.
38.	➡ Engine oil	: Check gauge for oil level.
39.	➡ Engine oil filter impending bypass indicator	: Check for correct indication. (Red pop-up indicator not in sight).
40.	➡ Engine-transmission drive shaft	: Condition.
41.	➡ Engine supports (visible area)	: Condition.
42.	Engine access door	: Condition, secure.
43.	Fuel filler cap	: Secure.
44.	➡ Igniter access door	: Open.
45.	➡ Igniter box	: Condition.
46.	➡ Engine fire extinguisher bottle	: Condition.
47.	Engine Exhaust Support	: Condition.
48.	Igniter access door	: Secured.
49.	Engine fire extinguisher indicator disc	: Confirm in the red position.

Note

If the engine fire extinguisher indicator disc is not in the red position, it means that the relevant bottle has already been discharged and needs to be replaced.

PRE FLIGHT

50.	Tail rotor driveshaft support access door	Secure.
51.	Engine exhaust	: Cover removed, condition and free of fuel.
52.	Main landing gear	: Condition, shock strut extension, leaks, tyre condition and pressure.
53.	➡ Wheel brake disc	: Confirm freedom of movement.
54.	➡ L/G locking system pin	: Confirm freedom of movement.
55.	Landing, taxi light and transparent panel	: Condition and cleanliness.
56.	➡ Antenna(s)	: Condition.
57.	➡ Drain and vents lines	: Free of obstruction.
58.	External Power door	: Secure.
59.	Emergency floats electrical connector (if installed)	: Cap locked. Chain condition and secure.

Area N°3 (Tailboom - RH side)

1.	Tailboom exterior	: Condition.
2.	➡ Antenna(s)	: Condition.
3.	➡ Lower anti-collision light	: Condition and cleanliness.
4.	Stabilizer	: Condition and secure.
5.	Position lights and flood lights (if installed)	: Condition and cleanliness.

Area N°4 (Fins, tail gearbox and skid)

1.	Tail fin and skid	: Condition.
2.	Tail navigation light	: Condition and cleanliness.
3.	➡ Tail rotor driveshaft door	: Open.
4.	➡ Tail rotor driveshaft bearing	: Condition and secured. Check for grease leaks.
5.	➡ Tail rotor driveshaft door	: Secure.
6.	➡ Tail rotor gearbox access door	: Open.
7.	➡ Tail rotor gearbox	: Confirm no leaks.

8. ➡ Tail rotor pitch link control lever : Condition.
9. Tail rotor gearbox access door : Secure.
10. Oil filler cap : Secure.

Area N°5 (Tailboom and tail rotor - LH side)

1. Tail rotor gearbox oil level : Check oil level.
2. Tail rotor hub and blades : Condition, cleanliness and freedom of flapping.
3. Tail rotor pitch change mechanism : Condition and secure.
4. Tailboom exterior : Condition.
5. Stabilizer : Condition and secure.
6. Position lights and flood lights (if installed) : Condition and cleanliness.
7. ➡ Antenna(s) : Condition.
8. ➡ Tail rotor driveshaft cover : Open.
9. ➡ Tail rotor driveshaft bearings : Condition and secured.
   Check for grease leaks.
   Check no marks of slippage.
10. Tail rotor driveshaft cover : Secure.
11. ➡ Tail rotor shaft inspection pins Confirm freedom of movement.

Area N°6 (Fuselage - LH side)

1. Baggage compartment door : Open.
2. Baggage compartment : Cargo (if on board) properly secured.
3. ➡ Tail rotor hydraulic servo actuator : Check for oil leaks.

Note

The tail rotor hydraulic servo actuator is accessible in the baggage compartment through an inspection door.

4. ➡ Circuit breakers (in baggage compartment) : All in.

PRE FLIGHT

PRE FLIGHT

Note

The circuit breakers in the baggage compartment are accessible through an inspection door.

5. Baggage compartment door : Secure.
6. ➡ Drains and vents lines : Free of obstruction.
7. Emergency floats electrical connector (if installed) : Cap locked. Chain condition and secure.
8. Main landing gear : Condition, shock strut extension, leaks, tyre condition and pressure.
9. ➡ Wheel brake disc : Confirm freedom of movement.
10. ➡ L/G locking system pin : Confirm freedom of movement.
11. Landing, taxi light and transparent panel : Condition and cleanliness.
12. Engine exhaust : Cover removed, condition and free of fuel.
13. Engine fire extinguisher indicator disc : Confirm in the red position.

Note

If the engine fire extinguisher indicator disc is not in the red position, it means that the relevant bottle has already been discharged and needs to be replaced.

14. ➡ Tail rotor driveshaft support access door : Open.
15. ➡ Igniter access door : Open.
16. ➡ Igniter box : Condition.
17. ➡ Engine fire extinguisher bottle : Condition.
18. ➡ Tail rotor middle drive shaft bearings : Check condition. Check no marks of slippage.
19. Engine Exhaust Support : Condition.
20. Igniter access door : Secured.
21. Tail rotor driveshaft support access door : Secure.
22. Engine air intake screen and chamber : Cover removed; free of damage and obstruction.
23. ➡ Engine access door : Open.

24.	➡ Engine compartment drain filters	: Free of obstructions.
25.	➡ Engine area	: Check for fuel and oil leaks.
26.	➡ Engine oil	: Check gauge for oil level.
27.	➡ Engine oil filter impending bypass indicator	: Check for correct indication.
28.	➡ Engine-transmission drive shaft	: Condition.
29.	➡ Engine support (visible area)	: Condition.
30.	Engine access door	: Condition, secure.
31.	➡ ENGINE OIL COOLER access door	: Open.
32.	➡ Cooler blower air intake	: Free of obstruction.
33.	➡ Cooler system belt	: Condition and secured.
34.	ENGINE OIL COOLER access door	: Secure.
35.	Service step	: Open and use to reach upper part of helicopter.
36.	➡ Main rotor hub and blades	: Condition and secure.
37.	➡ Main rotor dampers	: Condition and secure. Check for correct charge indication.
38.	➡ Main rotor pitch change links	: Condition and secure.
39.	➡ Swashplate and driving scissors	: Condition and secure.
40.	➡ Transmission oil access door	: Open.
41.	➡ Transmission oil filler cap	: Secure.

CAUTION

The transmission oil level check is to be performed in any case before the first flight of the day and it can be considered valid for a maximum of 5 flights including the first.

PRE FLIGHT

Note

Transmission oil level must be between the MIN and the MAX markings.

42.	➡ Transmission oil	: Confirm correct level.
43.	➡ Transmission oil access door	: Secure.
44.	➡ HYD. SERVOS access door	: Open.
45.	➡ Main transmission and accessories (visible area)	: Condition and leaks.
46.	➡ Servo actuators (visible ones: actuator with red decal and one with blue decal)	: Condition and leaks.
47.	HYD. SERVOS access door	: Secure.
48.	➡ Airframe (A/F) fuel filter	: Condition and leaks.
49.	Service step	: Secure.
50.	Cowling and fairings	: Condition and secure.
51.	➡ Sliding door jettison windows	: Security of windows and seal retainer, condition of emergency markings.
52.	Sliding door	: Condition and cleanliness of windows.
53.	Fuselage exterior	: Condition.
54.	Fore and middle access door	: Open.
55.	Flight control rods	: Confirm freedom of movement.
56.	Fore and middle access door	: Secure.
57.	Co-pilot door and window	: Condition, cleanliness, seal retainer and secure.
58.	➡ LH OAT sensor	: Condition, free of obstruction.
59.	Windshield	: Condition and cleanliness.
60.	Roof, lateral and lower transparent panels	: Condition and cleanliness.
61.	➡ Windshield wiper	: Condition.
62.	➡ Antenna(s)	: Condition.
63.	Emergency floats electrical connector (if installed)	: Cap locked. Chain condition and secure.

Area N°7 (Helicopter interior)

Cabin interior

1. ➡ Sliding door jettison windows (RH and LH) : Security and condition of seal retainer and red strap.
2. ➡ Sliding doors (RH and LH) : Confirm correct operation of locking and mechanical stop devices.
3. Passenger safety belts : Condition and belts fastened.

Note

Operation with passenger sliding doors open or removed requires removal or correct securing of all cabin equipment, installations and trim panels and that passenger safety belts are fastened if seats are unoccupied.

4. Cabin interior : Check security of equipment. Confirm presence of markings.
5. ➡ First aid kit : Check on board and content.
6. Sliding doors (RH and LH) : Closed and secure.

Cockpit interior

7. ➡ Co-pilot door jettison handle : Correct position and secure.
8. ➡ Co-pilot safety belt and inertia reel : Condition and belt fastened.
9. ➡ Co-pilot seat : Secure.
10. ➡ Co-pilot flight controls : Condition and secure.
11. ➡ LH lower and lateral transparent panels : Condition and cleanliness.
12. Co-pilot door : Closed and secure. Sliding windows closed.
13. ➡ Pilot door jettison handle : Correct position and secure.
14. ➡ Pilot safety belt and inertia reel : Condition.
15. ➡ Pilot seat : Secure.
16. ➡ Pilot flight controls : Condition and secure.
17. ➡ RH lower and lateral transparent panels : Condition and cleanliness.

18. ➡ Cockpit fire extinguisher : Charged and secure.
19. ➡ Passive vibration absorber (if installed) : Check cover secured.
20. ➡ Instruments, panels and circuit breakers : Condition and legibility.
21. Circuit breakers : All in. (Main, pilot and co-pilot overhead).
22. ➡ MSTR AVNX switch : As required.
23. ➡ All other switches/controls : Confirm OFF / guarded / normal position when shutdown.

PRE FLIGHT

For the following checks connect the d.c. supply.

Note

The following checks may require a large electrical consumption. Beware of possible battery charge depletion if not using external power.

24. ➡ BAT switch : ON.
25. ➡ GEN BUS 1 and 2 switches : ON.
26. ➡ External Power : Connect (if required). If external power connected, the battery is automatically disconnected. Confirm BATT OFF caution message is displayed. If battery requires charging select BAT switch to EPU.

Note

Confirm that external power source supplies not less than 28 V.

27. ➡ Check following systems for correct operation:
    - — Anticollision lights
    - — Position lights
    - — Taxi lights
    - — Landing lights.

28. ➡ LH airframe (A/F) fuel filter : Gently drain while respective fuel pump is operating. Push red button on filter and check for bypass indication and #1 A/F F FLTR caution message on EDU1.

Note

Fuel is pressurised, therefore drainage should be carried out by gently pushing red button. Failure to comply with this advice could result in some fuel being squirted around.

29. ➡ LH fuel pump : Drain by raising guard and setting FUEL DRAIN switch located in baggage compartment to TNK 1 (upper position).
Check for fuel dripping from the drain and verify FUEL DRAIN 1 caution message displayed on EDU 1.
Set switch to OFF (centre position).
Verify no fuel dripping and FUEL DRAIN 1 caution message suppressed.

30. ➡ RH fuel pump : Drain by setting FUEL DRAIN switch to TNK 2 (lower position).
Check for fuel dripping from the drain and verify FUEL DRAIN 2 caution message displayed on EDU 1.
Set switch to OFF (centre position).
Verify no fuel dripping and FUEL DRAIN 2 caution message suppressed.
Lower guard.

31. ➡ RH airframe (A/F) fuel filter : Gently drain while respective fuel pump is operating. Push red button on filter and check for bypass indication and #2 A/F F FLTR caution message on EDU1.

Note

Fuel is pressurised, therefore drainage should be carried out by gently pushing red button. Failure to comply with this advice could result in some fuel being squirted around.

32. ➡ External Power (if used) : Disconnect.
33. ➡ BAT switch : OFF.
34. ➡ GEN BUS 1 and 2 switches : Check automatically to OFF.
35. Pilot door : Closed and secure.

ENGINE PRE-START

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ENGINE PRE-START CHECKS

Note

Instruction in blue are applicable only if kit P/N 109-B811-02 (fixed landing gear) is not installed

INITIAL CHECKS

1.	Pedals and seats	: Adjust.
2.	Seat belts	: Fasten and adjust.
3.	Doors (pilot and co-pilot)	: Closed and locked.
4.	Jettison handles	: Correct position and secure.
5.	Landing gear lever	: Confirm DOWN.
6.	Landing gear EMER/ NORMAL switch	: Confirm in NORMAL position and wirelocked.
7.	Parking brake	: ON (pull out and turn).
8.	Nose wheel lock	: ON.
9.	Cyclic stick	: Centered, or positioned to counter wind, and friction adjusted.
10.	Collective lever	: Fully down and friction adjusted.
11.	All switches/controls	: Confirm OFF / guarded / normal position when shutdown.

ELECTRICAL POWER-UP

1.	MSTR AVNX switch	: GN.
2.	BAT switch	: ON.
3.	GEN BUS 1 and 2 switches	: ON.
4.	GEN 1 and 2 switches	: ON.
5.	INV 1 and 2 switches	: ON.
6.	Cockpit lights	: As required.
7.	External power	: Connect (if required). If external power is connected, the battery is automatically disconnected. Confirm BATT OFF caution message is displayed. If battery requires charging select BAT switch to EPU.

Note

Confirm that external power source supplies not less than 28 V.

8. MWL and MCL : Acknowledge and reset by:
   - Pressing on MWL and MCL or
   - Master Reset pushbutton on collective lever.

9. Pilot PFD and MFD displays : Confirm on.
   Verify System Status page:
   - SOFTWARE OK.
   - database validity and expiring dates
   - Check EFIS software version for applicable RFM limitations and normal and emergency procedures.

   Press any keys on pilot PFD and MFD to confirm.
   Adjust brightness as required.

Note

Refer to EFIS Pilot's Guide for database updating procedure.

10. EDUs and ESIS displays : Confirm on.
    Adjust brightness as required.

<u>EDU Tests:</u>

Note

The TEST function of both EDUs can be initiated by pressing the TEST key on either EDU.

Note

During the test, the DAU will activate the MWL, MCL, the ENGINE FIRE voice warning message and audio tone; it will also illuminate the engine power lever grips and the FIRE warning lights on the engine control panel. If a failure is detected on engine fire and/or fuel low detectors, the caution message FIRE DET and/or F LOW FAIL will appear.

Note

Due to the short length of the EDU Test, only one of the ENGINE FIRE voice messages is heard. The ENGINE FIRE message of the second engine can be heard by pushing the MASTER WARNING RESET pushbutton.

11. EDU 1 or EDU 2 : Select MENU, press TEST key and check the following test sequences on both EDUs.

11a. EDU 1 : The test sequence shall display the CRUISE page with the following data:

N1	97.4%
TOT	820 °C
TRQ	100%
N2 / NR	101%

11b. EDU 2 : The test sequence shall display the MAIN page with the following data:

ENG OIL pressures	50 PSI
ENG OIL temperatures	100 °C
XMSN OIL pressure	40 PSI
XMSN OIL temperature	100 °C
FUEL pressure	20 PSI
HYD oil pressure	1500 PSI
FUEL quantity	Decreasing
OAT	+25° C

In the advisory area (lower part of the screen) the test sequence shall display:

- EDU 1 and EDU 2 software identification number;
- DAU-A and DAU-B software identification number.
- applicable to EDU P/N 109-0900-76-2A05 and subs:
  - white label “SP RETRACT LG” if in retractable landing gear configuration
  or
  - white label “SP FIXED LG” if in fixed landing gear configuration.

Note

If yellow label “SP FIXED LG” appears, IDS hardware configuration setting is incorrect.

The test sequence shall continue displaying, in the advisory area:

EDU 1 BIT PASS
EDU 2 BIT PASS
DAU-A BIT PASS
DAU-B BIT PASS

11c. EDU 1 and EDU 2 : After 10 seconds the EDUs will automatically return to previous selected pages.

Note

CHECK STRAP caution message displayed if the IDS hardware configuration setting is incorrect.

11d. EDU 1 : Select MENU and enter page 2. Confirm CH-A and CH-B legends are green and white respectively.

AWG Tests:

12. Aural Warning Generator Test : Select and hold AWG switch to TEST. Confirm the aural message "TEST OK" and after about 6 seconds the complete list of aural messages in the following sequence:
Tone 1 "ROTOR LOW"
Tone 2 "ENGINE ONE OUT"
Tone 2 "ENGINE TWO OUT"
Tone 3 "FIRE ENGINE ONE FIRE"
Tone 3 "FIRE ENGINE TWO FIRE"
Tone 4 "WARNING"
Tone 4 "ROTOR HIGH"
Tone 4 "AUTOPILOT"
Tone 4 "ENGINE IDLE"
Tone 5 "OVERTORQUE"
Tone 5 "AIRSPEED"
Tone 6 "LANDING GEAR"
Tone 6 "DECISION HEIGHT"
Tone 7 "TWO HUNDRED FEET"
Tone 7 "ALTITUDE"
Tone 8 Tone (for autopilot).

Engine Trim Function:

13. ENG GOV 1 and 2 switches: AUTO.

CAUTION

The engine power levers may be operated manually only in case of failure of the remote control (PLA MOTOR caution message active), or before starting, to position the levers to FLIGHT.

14. ENG TRIM 1 and 2 toggles (on pilot's collective): Confirm correct operation, then leave the engine power levers in the FLIGHT position.

15. EDU 1 : Confirm #1 PLA and #2 PLA caution messages suppressed.

Miscellaneous:

16. Fire Extinguisher Bottle switch : Centered.
17. Fire Extinguisher Pushbutton covers : Condition.
18. STATIC source switch : NORM and guarded.
19. ELT switch (if installed) : Confirm in ARM position.
20. Pilot's ICS : BK-UP then to EMER and check functionality. Reset to NORM.
21. SERVO (Main hydraulics) : NORM.
22. Cabin ventilation knob : As required.
23. Landing gear indications : Confirm 3 green lights illuminated (Nose, RH, LH) and red light extinguished.
24. LAMP switch : Select and hold LAMP switch to TEST.

24a. Landing gear indication : Confirm red light illuminated.

24b. APMS panel : Confirm all pushbutton lights illuminated.

25. LAMP switch : Release.

25a. Landing gear indication : Confirm red light extinguished.

25b. APMS panel : Confirm all pushbutton lights extinguished.

26. OEI TNG switch : Confirm in off position (centered).
27. Altimeter : Set.
28. Fuel quantity : Check.
29. LD-SH (Load share) switch: As required.
30. NR switch : 100%.
31. Rotor brake : Engage and confirm ROTOR BRK caution message displayed. Disengage and confirm caution message suppressed.

PRE-START

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ENGINE START

START

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ENGINE START

Note

Instruction in blue are applicable only if kit P/N 109-B811-02 (fixed landing gear) is not installed.

1. EDU 1 : Confirm START page selected.

If a quick engine start is to be performed refer to **QUICK ENGINE START** procedure.

NORMAL ENGINE START

Either engine may be started first. In the following procedure Engine 1 is started first.

ENGINE 1 START:

1. GEN 1 and 2 switches : Check ON.
2. FUEL VALVE 1 switch : OPEN (bar vertical).
3. FUEL PUMP 1 switch : ON.
   Confirm FUEL PUMP 1 caution message suppressed.
   Check fuel pressure.

CAUTION

Monitor engine start and if any of the following occurs:
- light-up is not obtained within 15 seconds
- abnormal noises are heard
- TOT increases beyond start limits (#1(2) HOT START caution message displayed)
- rotor has not begun to rotate when N1 is 40%
- N1 or N2 increases beyond limits
- engine hangs (stagnation in N1 below 54%)

Abort the engine start and shutdown the engine by performing the **ABORTED ENGINE START PROCEDURE**.

4. ENG 1 MODE switch : IDLE.
5. N1 : Note increasing and START legend vertically displayed.
6. TOT : Note increasing and IGN legend vertically displayed.
7. Rotors : Begin turning before N1 reaches 40%.

CAUTION

The operation at an engine oil pressure up to 200 psi is permitted for a maximum period of 10 minutes.

8. Engine oil pressure : When N1 is greater than 40 % Check rising.

CAUTION

Do not apply power or allow N1 to rise above 90% until engine oil temperature reaches 10 °C.

9. Engine oil temperature : Check.

CAUTION

Remain at IDLE until the transmission oil presure returns below 70 psi whilst the oil temperature increases.

10. Transmission oil pressure : Check rising.

START

11. Engine starter : At N1 = 50%, engine starter is automatically deactivated.
#1 DC GEN caution message suppressed.
START and IGN legends are also automatically suppressed.

12. Main hydraulic system : Confirm rise in main hydraulic pressure, when the main rotor begins to rotate.

13. Hydraulic utility system (normal and emergency) : When accumulators are initially discharged, note the activation of MAIN UTIL CHRG and EMER UTIL CHRG caution messages as main rotor begins to rotate. Note both caution messages are suppressed when systems are charged.

CAUTION

Below 85% NR, avoid any cyclic movement except to prevent hitting blade stops.

14. N2 : Confirm stabilized to IDLE speed of 65% ± 1%.

15. Engine and transmission oil : Confirm pressure and temperature within limits.

16. ENG 1 MODE switch : FLT.

17. N2 / NR : Confirm stabilized at 100%.

ENGINE 2 START:

CAUTION

Ensure that the second engine engages as the N2 increases to FLT. A non-engaged engine shows positive N2 value and near zero torque. If a non-engagement occurs, shutdown the non-engaged engine first. When the non-engaged engine has stopped, shutdown the engaged engine. If a sudden or hard engagement occurs, shutdown both engines for maintenance action.

Repeat above procedure for engine N°2.

18. Engine parameters : Confirm within limits.

19. Transmission parameters : Confirm within limits.

20. BAT switch : Confirm ON.
(BATT OFF caution message displayed if external power is connected).

21. External power (if used) : Disconnect and close door.
Confirm EXT PWR ON and BATT OFF caution messages suppressed.

22. N2 / NR : Confirm stabilized at 100%.

23. MSTR AVNX : NORM.

24. Co-pilot PFD and MFD displays : Confirm on.
Verify System Status page:
- SOFTWARE OK.
- database validity and expiring dates
- Check EFIS software version for applicable limitations.

Press any keys on pilot PFD and MFD to confirm.
Adjust brightness as required.

Note

Refer to EFIS Pilot's Guide for database updating procedure.

QUICK ENGINE START

Note

It is recommended to start the engine to IDLE using the NORMAL ENGINE START procedure. Nevertheless, when OAT is warmer than 0 °C or during a warm engine start, it is possible to start to FLIGHT using the QUICK ENGINE START procedure.

This procedure can be followed whenever the situation requires to speed up the take-off.
It is possible to start a single engine or both engines in succession.

1. GEN 1 and 2 switches : Check ON.
2. FUEL VALVE 1 switch : OPEN (bar vertical).
3. FUEL PUMP 1 switch : ON.
   Confirm FUEL PUMP 1 caution message suppressed.
   Check fuel pressure.
4. FUEL VALVE 2 switch : OPEN (bar vertical).
5. FUEL PUMP 2 switch : ON.

CAUTION

Monitor engine start and if any of the following occurs:
- light-up is not obtained within 15 seconds
- abnormal noises are heard
- TOT increases beyond start limits (#1(2) HOT START caution message displayed)
- rotor has not begun to rotate when N1 is 40%
- N1 or N2 increases beyond limits
- engine hangs (stagnation in N1 below 54%)

Abort the engine start and shutdown the engine by performing the **ABORTED ENGINE START PROCEDURE**.

6. ENG 1 MODE switch : FLT.
7. ENG 2 MODE switch : FLT, when GEN 1 load is 200 A or less
8. N1 : Note increasing and START legend vertically displayed.
9. TOT : Note increasing and IGN legend vertically displayed.

10. Rotors : Begin turning before N1 reaches 40%.

CAUTION

Operating with an engine oil pressure of up to 200 psi is permitted for a maximum period of 10 minutes.

11. Engine oil pressures : When N1 is greater than 40 % Check rising.

CAUTION

Do not apply power or allow N1 to rise above 90% until engine oil temperature reaches 10 °C.

12. Engine oil temperatures : Check.

CAUTION

Remain at IDLE until the transmission oil pressure decreases below 70 psi whilst the oil temperature increases.

13. Transmission oil pressure : Check rising.

14. Engine starters : At N1 = 50%, engine starters are automatically deactivated.
#1 DC GEN and #2 DC GEN caution messages suppressed.
START and IGN legends are also automatically suppressed.

15. Main hydraulic system : Confirm rise in main hydraulic pressure when the main rotor begins to rotate.

16. Hydraulic utility system (normal and emergency) : When accumulators are initially discharged, note the activation of MAIN UTIL CHRG and EMER UTIL CHRG caution messages as main rotor begins to rotate. Note both caution messages are suppressed when systems are charged.

CAUTION

Below 85% NR, avoid any cyclic movement except to prevent hitting blade stops.

17. Engine and transmission oil : Confirm pressure and temperature within limits.
18. Engine parameters : Confirm within limits.
19. BAT switch : Confirm ON.
(BATT OFF caution message displayed if external power is connected).
20. External power (if used) : Disconnect and close door.
Confirm EXT PWR ON and BATT OFF caution messages suppressed.
21. N2 / NR : Confirm stabilized at 100%.
22. MSTR AVNX : NORM.

START

ABORTED ENGINE START

ABORT

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ABORTED ENGINE START

CAUTION

Failure to follow the abort procedures may cause damage to the engine.

The affected engine should be shutdown by:

1. ENG MODE switch : OFF.

If engine does not begin to shutdown:

2. Engine power lever : OFF.
3. FUEL PUMP switch : OFF.
4. FUEL VALVE switch : CLOSED (bar horizontal).

Perform the following procedure before attempting to restart the engine:

- Allow 30 seconds fuel drain period
- Perform a 30 seconds **DRY MOTORING RUN**.

Refer to **DRY MOTORING RUN** procedure.

Note

Engine start after Dry Motoring Run performance, refer to Section “LIMITATIONS” for engine starter limitations.

ABORT

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DRY MOTORING RUN

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DRY
MOT

DRY MOTORING RUN

The following procedure is used to clear the engine of internally trapped fuel and vapor from within the engine.

1. ENG GOV switch : AUTO.
2. ENG MODE switch : OFF.
3. Engine power lever : OFF.
4. FUEL PUMP switch : OFF.
5. FUEL VALVE switch : CLOSED (bar horizontal).
6. IGN circuit breaker (on overhead circuit breaker panel) : Pull out.
7. Starter pushbutton (on engine power lever) : Push and hold as necessary.
8. N1 : Note increasing.
9. TOT : Note decreasing.

After required Dry Motoring Run period:

10. Starter pushbutton : Release.
11. IGN circuit breaker (on overhead circuit breaker panel) : Reset.

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DRY
MOT

SYSTEMS CHECKS

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SYSTEMS CHECKS

HYDRAULIC SYSTEMS

1. SERVO switch (Main Hydraulic) : NORM, confirm.
   Make small cyclic (clockwise), collective and pedal movements.
   Pressure drops must be equal for both systems (N°1 and N°2) and should not exceed 70 psi.

   Set SERVO switch to SOV 2 OFF.
   SERVO 2 caution message displayed.
   Check operation of system N°1 with same cyclic, collective and pedal movements.
   Pressure drop should not exceed 70 psi and there should be no force increase, discontinuity or cyclic/collective coupling.

   Repeat check setting the switch to SOV 1 OFF to check system N°2.

   Confirm that pedals are unboosted.

   Then set SERVO switch to NORM.

FUEL SYSTEM

1. XFEED VALVE switch : AUTO (bar vertical).

Note

When FUEL PUMP 1 (2) is OFF and crossfeed valve is open, N°2 (1) FUEL quantity box shall appear in magenta.

2. FUEL PUMP 1 switch : OFF.
   FUEL PUMP 1 caution message displayed.
   Crossfeed valve automatically open (bar horizontal) and XFEED advisory message displayed.
   Note N°1 fuel pressure gauge indicating normal operating pressure.

3. FUEL PUMP 1 switch : ON.
   FUEL PUMP 1 caution message suppressed.
   XFEED advisory message suppressed (bar vertical).

4.	FUEL PUMP 2 switch	: OFF. FUEL PUMP 2 caution message displayed. Crossfeed valve automatically open (bar horizontal) and XFEED advisory message displayed. Note N°2 fuel pressure gauge indicating normal operating pressure.
5.	FUEL PUMP 1 switch	: OFF. Note fall in fuel pressure, activation of FUEL PUMP 1 caution message, crossfeed valve still open (bar horizontal) and XFEED advisory message still present. Confirm correct operation of engine-driven fuel pumps by checking that engine parameters are stable.
6.	XFEED VALVE switch	: CLOSED (bar vertical). XFEED advisory message suppressed.
7.	XFEED VALVE switch	: AUTO (bar horizontal). XFEED advisory message activated.
8.	FUEL PUMP 1 and 2 switches	: ON. FUEL PUMP 1 and 2 caution messages suppressed and crossfeed valve automatically closed (bar vertical) and XFEED advisory message suppressed.
9.	XFEED VALVE switch	: OPEN (bar horizontal). XFEED advisory message activated. AUTO (bar vertical). XFEED advisory message suppressed.

ELECTRICAL A.C. SYSTEM

1. INV 1 switch : OFF.
   Confirm INV 1 caution message displayed.
   Check for proper reading (115 V) on both AC systems on EDU 2 AUX page.
2. INV 1 switch : ON.
   Confirm INV 1 caution message suppressed.
3. INV 2 switch : OFF.
   Confirm INV 2 caution message displayed.
   Check for proper reading (115 V) on both AC systems on EDU 2 AUX page.
4. INV 2 switch : ON.
   Confirm INV 2 caution message suppressed.

RCP

1. AHRS knob : Turn AHRS knob to position 1.
   Confirm SAME AHRS yellow message appears on pilot and co-pilot PFD's and 2 AP AHRS FAIL CAS message displayed.
   Turn AHRS knob to position 2.
   Confirm SAME AHRS yellow message appears on pilot and co-pilot PFD's and 1 AP AHRS FAIL CAS message displayed.
   Turn AHRS knob to NORM position.
   Confirm SAME AHRS yellow messages extinguish and no CAS messages displayed.
2. ADU knob : Turn ADU knob to position 1.
   Confirm SAME ADC yellow message appears on pilot and co-pilot PFD's.
   Turn ADU knob to position 2.
   Confirm SAME ADC yellow message appears on pilot and co-pilot PFD's.
   Turn ADU knob to NORM position.
   Confirm SAME ADC yellow messages extinguish.

3. GPS Knob : Turn GPS knob to position 1.
Confirm SAME GPS and SAME NAV yellow messages appears on pilot and co-pilot PFD's.
Turn GPS knob to position 2.
Confirm SAME GPS and SAME NAV yellow messages appears on pilot and co-pilot PFD's.
Turn GPS knob to NORM position.
Confirm SAME GPS and SAME NAV yellow messages extinguish.

AFCS

1. APMS panel : Confirm all pushbutton lights are extinguished except AP1 and AP2 (OFF caption illuminated) and the PFD indicates the Pilot flying.

2. PFD : Check cyclic centered.

Note

During AFCS PFT do not touch flight controls.

3. APMS panel : Press TEST pushbutton and follow instructions displayed on IDS PFT page.
Confirm that 1(2) AP PFT COMPLETED message is displayed on IDS.

Note

If 1(2) AP TEST FAIL or 1(2) AP DEGRADED or 1(2) AP TEST DGR caution messages are displayed, repeat AFCS PFT once.

4. IDS : Confirm that 1(2) AP TEST FAIL or 1(2) AP DEGRADED or 1(2) AP TEST DGR caution messages are not displayed.

5. PFD display : Check consistency between PFD selection arrow on APMS panel and advisory arrow on PFD's.

6. P/R and C/Y TRIM pushbuttons : Check OFF lights extinguished.

7. AP1 and AP2 pushbuttons: Press to engage (OFF lights extinguish).

MISCELLANEOUS

1. PITOT 1 heat switch : ON.
   Check Current peak on generator load meter.
   Confirm PITOT 1 HEAT advisory message displayed.
   Confim PITOT 1 FAIL Caution is not displayed.
   : Reset to OFF.
   Confirm PITOT 1 HEAT advisory message suppressed.

2. PITOT 2 heat switch : ON.
   Check Current peak on generator load meter.
   Confirm PITOT 2 HEAT advisory message displayed.
   Confim PITOT 2 FAIL Caution is not displayed.
   : Reset to OFF.
   Confirm PITOT 2 HEAT advisory message suppressed.

3. Set communication and navigation frequencies on RTU and ICS control panels as required and check audio panel.

4. ADIs : On PFD's check correct alignement and no failure indications.
   Cross-check pilot, co-pilot and ESIS ADI information.

5. MAG/DG switch (on AHRS panel) : Confirm in MAG position.
   Cross-check pilot, co-pilot and ESIS compass headings.

6. Altimeters : Verify automatic baro setting on local QNH.
   Cross-check pilot, co-pilot and ESIS altimeter information.

7. VSIs : Confirm pilot, co-pilot and ESIS VSIs indicating zero (± 50 ft/min).

8. Radio altimeter : Confirm between 0 ft and 5 ft.

9. NR switch : AUTO and confirm N2 / NR stabilise at 102%.
   102% position and confirm N2 / NR remain at 102%.
   Return to AUTO.

10.	HTAWS	As required.
11.	TAS	As required.
12.	EFIS SINCH	As required.

BEFORE TAKE-OFF CHECKS, GROUND TAXIING, TAKE-OFF

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BEFORE TAKE-OFF CHECKS

1. Cockpit lights : As required.
2. Position and anti-collision lights : Check and leave as required.
3. Landing lights : As required.

CAUTION

Turn both pitot heat ON for flight in visible moisture and/or rain regardless of ambient temperature.

4. Pitot heat : As required.
5. NR switch : Confirm in AUTO and N2 / NR stabilised at 102%.

CAUTION

When engine torque limiter is enabled, the AEO engine total torque is limited to a combined torque value of 220%. OEI engine torque limit remains at 162%.

6. TQ LIM pushbutton : If required, push to enable TORQUE limiter function, and confirm LIMITER ON advisory message appears.
7. Parking brake : OFF.
   Confirm PARK BRK ON message suppressed.
8. Warning and Caution messages : Confirm none.
9. Engine Power Assurance Check : As required. Refer to Section "PERFORMANCE".

GROUND TAXIING

1. Nose wheel lock : OFF.
2. Collective and cyclic : Increase collective slowly and move the cyclic stick gently forward to start movement.
3. Pedal brakes : Check operation.
4. Pedals : As required, to select direction.
5. Collective and pedal brakes : To reduce speed and stop, lower the collective and apply pedal brakes.

TAKE-OFF

Note

Instruction in blue are applicable only if kit P/N 109-B811-02 (fixed landing gear) is not installed.

HOVER TAKE-OFF

1.	Nose wheel	: Align forward.
2.	Nose wheel lock	: ON.
3.	Flight controls	: Apply as necessary to lift the helicopter to a 3 ft AGL hover.
4.	Flight instruments	: Check.
5.	Engine parameters	: Confirm within limits.
6.	Transmission parameters	: Confirm within limits.
7.	Hydraulic systems parameters	: Confirm within limits.
8.	N2 / NR	: Confirm N2 / NR 102%.
9.	Cyclic / Collective	: Rotate approximately 10 deg nose down from hover datum. While accelerating increase slightly the torque to avoid loss of altitude. At 30 KIAS increase torque by 15% and adjust cyclic to obtain 0 deg attitude. Continue acceleration to Vy. At Vy increase torque as required for the desired flight path.

CAUTION

Do not fly with landing gear operating or extended at speeds above 140 KIAS.

10.	Landing gear lever	: UP (after 200 ft RAD ALT) MAIN UTIL CHRG caution message is displayed during landing gear retraction, then clears when landing gear is locked. Confirm landing gear is up and locked (3 green lights and red light extinguished).
11.	N2 / NR	: Confirm N2 / NR stabilizes at 100%.

TAXI
T/OFF

ROLLING TAKE-OFF

1. Nose wheel : Align forward.
2. Nose wheel lock : ON.
3. Collective and cyclic : Apply as necessary to obtain forward speed on the ground. Apply collective as necessary to become airborne. Accelerate to Vy and rotate to desired climb attitude.

CAUTION

Do not fly with landing gear operating or extended at speeds above 140 KIAS.

4. Landing gear lever : UP (after 200 ft RAD ALT)
   MAIN UTIL CHRG caution message is displayed during landing gear retraction, then clears when landing gear is locked.
   Confirm landing gear is up and locked (3 green lights and red light extinguished).
5. N2 / NR : Confirm N2 / NR stabilizes at 100%.

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IN FLIGHT

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IN FLIGHT

1. Load Share (LD-SH) switch : As required.
2. TQ LIM pushbutton : As required.
3. Pedals : Apply as necessary to maintain direction.
4. Flight instruments : Check.
5. Engine parameters : Confirm within limits.
6. Transmission parameters : Confirm within limits.
7. Hydraulic systems parameters : Confirm within limits.
8. Landing lights (if used) : OFF.
   LANDING LT ON advisory message suppressed.

CAUTION

Turn both pitot heaters on for flight in visible moisture and/or in rain, regardless of ambient temperature.

9. Pitot heat : As required.
10. Compass : Confirm all synchronized.
11. Radios / Navigation : As required.

Note

When the VHF (COM) systems are tuned on frequencies which are within ±4 MHz, the transmitting radio can produce loss of sensitivities on the receiving radios.

SEARCHLIGHT OPERATING PROCEDURE

CAUTION

Maximum speed for searchlight extension, orientation and retraction 135 KIAS.

Extension

1. SEARCH CONTR / PWR circuit breakers : ON.
2. EXT / RETR / L / R switch (on collective grip) : EXT (to extend light in the desired position).
3. ON / OFF / STOW switch (on collective grip) : ON.

Note

With the switch in OFF position the light remains extinguished in the position where it has been left.

4. EXT / RETR / L / R switch (on collective grip) : Set as necessary.

Note

Moving switch to L or R position the searchlight rotates left or right. It is possible to adjust the light in an intermediate position, from stowed to extended, by temporarily moving the switch to EXT or RETR position.

Retraction

1. ON / OFF / STOW switch (on collective grip) : STOW then OFF.

Note

In STOW position the light is extinguished.

AUTOMATIC FLIGHT CONTROL SYSTEM

Collective Safety Function

The collective safety function (CSF) is active when any collective upper mode (ALT, ALTA,VS, RHT, GS, NGS, GA) is engaged. The function limits, if necessary, the collective commands to prevent:

— Exceedence of Maximum Continuous Power for torque, N1, TOT AEO or OEI. A PWR LIM alert message is displayed on the PFD when Power Limitation is active.

— Entering into autorotation (minimum torque 10% on each engine AEO or 20% OEI). A PWR LIM alert message is displayed on the PFD when Power Limitation is active.

— The aircraft descending through the safety height calculated as a function of descending speed and proximity to the ground. LOW HT alert message is displayed on the PFD when the Low Height Limitation is active.

When Collective Safety Function is active, engaged collective mode is annunciated as degraded (Mode annuciation in amber box flashing for 5 seconds then steady).

ILS APPROACHES

It is recommended that IFR approaches be carried out with both ILS1 and ILS2 receivers tuned on the same frequency.

EFIS SYSTEM

Refer to Chelton Pilot's Operating Guide and Reference for more details on this installation.

FLIGHT MANAGEMENT SYSTEM

Normal operating procedures are outlined in the Flight Management System (FMS) paragraph of EFIS Pilot's Guide for the AW109SP applicable to the software version installed on the aircraft.

Definitions and explanation of terms

Area navigation (RNAV): A method of navigation which permits aircraft operation on any desired lateral track within the coverage of ground or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

Navigation application: The application of a navigation specification and the supporting NAVAID infrastructure, to routes, procedures, and/ or defined airspace volume, in accordance with the intended airspace concept.

Navigation specification: A set of aircraft and aircrew requirements needed to support Performance-based Navigation operations within a defined airspace. There are two kinds of navigation specification:

- RNAV specification: A navigation specification based on area navigation that does not include the requirement for on-board performance monitoring and alerting, designated by the prefix RNAV (RNAV 5, RNAV 2, RNAV 1).
- RNP (Required Navigation Performance) specification: A navigation specification based on area navigation that includes the requirement for on-board performance monitoring and alerting, designated by the prefix RNP (RNP 2, RNP 1, RNP 0.3, RNP APCH).

Performance-based navigation (PBN): Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

RNAV system: A navigation system (as part of a Flight Management System (FMS)) which permits aircraft operation on any desired lateral track within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

In accordance with ICAO 9613 PBN manual (4th edition), AMC 20-27, AMC 20-26, AC 90-105A, AC90-101A and AC20-138D documents the FMS is capable of operations in airspaces designated for the following Navigation Specifications: Basic RNAV (B-RNAV) or RNAV 5 En-route, RNAV 2 En-route, Precision RNAV (P-RNAV) or RNAV 1, RNP 2 Enroute, RNP 1 En-route and Terminal Operations (SID and STAR procedures), PinS departure, RNP APCH approach with LNAV or LNAV/VNAV or LP or LPV minima, PinS Approach with LNAV or LPV minima, RNP AR APCH with RNP 0.3 minima and Missed Approach RNP 1.0.

The FMS meets the requirements for RNP operations with RF legs when used in association with RNP1 and RNP (AR)APCH specifications. The RF functionality can be used during SIDs, STARs, the initial and intermediate approach segments and missed approach.

The FMS provides all Navigation information necessary for the aircraft to permit the navigation along any desired flight path within the coverage of GPS system (augmented with SBAS system, if available) and provide, if coupled, Lateral and Vertical (approach only) steering data to the AFCS system.

The FMS doesn't permit the temperature compensation of the destination airport to be entered therefore it doesn't automatically adjust the vertical flight path for temperature effect during APV Baro-VNAV approach.

In order to be capable of performing RNP operations the FMS automatically determines aircraft position in the horizontal plane using inputs from two Global Navigation Satellite System (GNSS) receivers TSO approved C146c class Gamma; both GNSS receivers are able to provide the GNSS position with SBAS (Satellite-Based Augmentation System) augmented accuracy if the aircraft is flying within any SBAS coverage area (e.g. WAAS, EGNOS, MSAS or GAGAN).

Note

RNP2, RNP1, RNP0.3 procedures or RNP (AR) APCH approach if under SBAS coverage only need to confirm via NOTAM that there is no SBAS outage; while for any RNP procedure or approach outside SBAS coverage area or during a SBAS outage, perform the pre-departure P-RAIM for destination. In the event of a predicted (PRAIM) HIL above the required RNP, for more than 5 minutes for any part of the RNP operation, the flight planning should be revised (e.g. delaying the departure or planning a different ATS route).

Note

In accordance with PBN regulations, RNP procedures and RNP (AR) APCH approaches, including RF legs, are not allowed to be flown manually.

If P-RAIM of destination is required, select "FPL" on PLT or CPLT MFD then select "CREATE-EDIT…" menu. Select the voice "RAIM PREDICTION" and insert the destination airport and the estimated date and time of arrival.

The FMS automatically sets the lateral full scale deflection (±2 dots) of Lateral deviation bar/pointer equal to RNP for current phase of flight.

TAWS

— The FLTA function is automatically inhibited when in the Terminal, Departure, IFR Approach or VFR Approach modes and within 2 NM of the reference point.

— The FLTA function is automatically inhibited when IAS or groundspeed is below 50 Kts.

— GPWS Modes 3 is automatically inhibited when below 50 ft AGL (radar altimeter AGL altitude).

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APPROACH AND LANDING

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APPR
LAND

APPROACH AND LANDING

Note

The VFR approach function does not provide terrein or obstruction clearance. Extreme care should be taken when using the VFR approach function at night or in marginal VFR conditions.

Note

Instruction in blue are applicable only if kit P/N 109-B811-02 (fixed landing gear) is not installed.

1. Landing gear lever : DOWN.
   MAIN UTIL CHRG caution message is displayed during landing gear extension, then clears when landing gear is locked.
   Confirm landing gear is down and locked (3 green lights indicated, red light extinguished).
   If previously activated, LANDING GEAR caution message clears and audio warning ceases.
2. N2 / NR : Below 75 KIAS confirm N2 / NR stabilizes at 102%.
3. Nose wheel lock : ON.
4. Parking brake : OFF. (ON if landing on a slope)
5. Landing lights : As required.

VERTICAL LANDING

CAUTION

While conducting a slope landing, care must be taken to avoid the tail making contact with the ground.

1. Landing path : Reduce the airspeed gradually and at 70 ft AGL flare and apply collective to pass 30 KIAS at 30 ft AGL. Bring the helicopter to a hover at 3 ft AGL. Descend vertically to the ground.
   After ground contact, lower the collective to the minimum pitch or as necessary if taxiing is required.
2. Pedal brakes : As necessary.
3. Nose wheel lock : OFF if taxiing is required.

RUNNING LANDING

1.	Landing path	: Reduce the airspeed gradually and apply collective to bring the helicopter to touchdown at a forward speed suitable for the landing surface and with minimum vertical speed. After ground contact, lower the collective as necessary to control the helicopter.
2.	Pedal brakes	: As necessary to stop the helicopter or to reach a suitable taxiing speed.
3.	Nose wheel lock	: OFF if taxiing is required.

SHUTDOWN

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SHT DN

SHUTDOWN

1. Nose wheel lock : ON.
2. Parking brake : ON.
3. Collective lever : Confirm fully down.
4. Cyclic stick and pedals : Centered and trimmed.

CAUTION

If there is evidence of any abnormal TOT increase after shutdown, perform a **DRY MOTORING RUN**.

CAUTION

Do not apply collective during rotor deceleration, particularly in windy conditions.
Below 85% NR, avoid any cyclic movement except to prevent droop stop contact.

5. ENG 1 and 2 MODE switches : IDLE and then to OFF.

Note

If necessary, the engine may be shut down directly from FLT.

6. FUEL PUMP 1 and 2 switches : OFF.
   FUEL PUMP 1 and FUEL PUMP 2 caution messages displayed.
7. FUEL VALVE 1 and 2 switches : CLOSED (bars horizontal).
8. XFEED VALVE switch : Confirm in AUTO position.
9. Rotor brake : Apply below 40% NR.
10. PITOT 1 and 2 heat switches : OFF.
11. Miscellaneous switches : OFF.
12. MSTR AVNX switch : As required.
13. INV 1 and INV 2 switches : OFF.
14. External lights : OFF.
15. Cockpit lights : OFF.
16. Rotor brake lever : Disengaged (fully forward).
17. BAT, GEN 1 and GEN 2 switches (gang bar) : OFF only when N1 at 0%.

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SHT DN

POST FLIGHT CHECKS, FLIGHT HANDLING

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POST FLIGHT CHECKS

If conditions require, perform the following, referring to Section 8 of Basic RFM for additional information:

1. Pitot-static tubes, engine intake and exhaust covers : Installed.

CAUTION

Following a slope landing, the parking brake holding capability is guarantee for 2 minutes from rotor stop.

2. Wheel chocks : As required.

If conditions require, perform the following:

Pitot, intake and exhaust covers : Installed.

Note

The pitot tube covers must be installed at least 5 minutes after pitot heat has been switched off. The engines exhaust ducts covers must be installed at least 30 minutes after engine shut down.

FLIGHT HANDLING CHARACTERISTICS

Handling is conventional in normal forward, sidewards and rearwards flight manoeuvres. Flight control forces may be adjusted by altering friction settings.

ENGINE LIMIT GOVERNING

The helicopter is provided with an engine torque limiter function aimed at reducing pilot's workload. However, it is still the pilot's responsibility to operate and maintain the helicopter within engine and transmission limits.

The torque limiter can be enabled, upon pilot's decision, by pressing once the TQ LIM pushbutton on the collective grip. Disabling the torque limiter is obtained by pressing again the TQ LIM pushbutton.

At helicopter power-up, the torque limiter is disabled by default, and the ECU will not prevent the pilot from exceeding the applicable limits. With the torque limiter disabled, the ECU controls the engine torque according to the following values:

AEO:	Torque (TRQ1 + TRQ2)	324%
OEI:	Torque	180%

When the TQ LIM pushbutton is depressed (LIMITER ON advisory message displayed), the torque limiter is enabled and the ECU will prevent the pilot from exceeding the following applicable limits:

AEO:	Torque (TRQ1 + TRQ2)	220%
OEI:	Torque	162%

Note

Regardless of torque limiter status, N1 and TOT always remain limited at 103% and 970 °C respectively.

CLIMB SPEED

The climb speed recommended is the best climb speed of the helicopter, Vy.

Vy is 80 KIAS up to 10000 ft, and then decreases by 2 kts every 1000 ft to become 60 KIAS at 20000 ft.

AUTOROTATIVE DESCENT

1. Maintain speed within Power-OFF limits.
2. Reduce collective to enter autorotation.
3. Adjust collective to maintain NR within appropriate limits.
4. Adjust attitude to obtain desired speed:
   - Maximum range is obtained at approximately 120 KIAS and minimum NR
   - Minimum rate of descent is obtained at Vy and minimum NR
   - Maximum rate of descent is obtained at Vne Power-OFF and maximum NR.
5. To recover to powered flight, increase collective pitch until freewheels are joined and finally, increase power to stop the rate of descent.

PST FLT
FLT HND

STEEP APPROACHES AND VERTICAL DESCENT MANOEUVRES

Low speed steep approaches (up to 20 kts) and vertical descent manoeuvres should be performed with a rate of descent not exceeding 900 ft/min.

DENSITY ALTITUDE, POWER ASSURANCE CHECKS

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DENSITY ALTITUDE

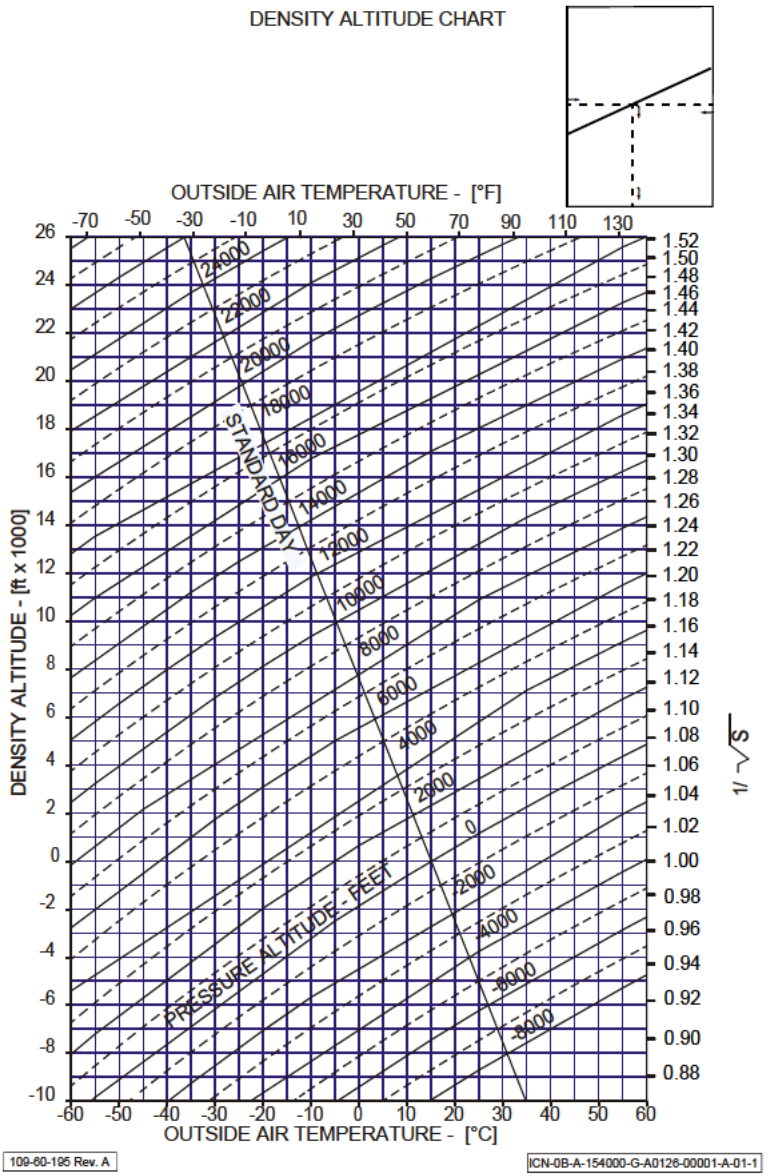

Figure 3-1 Density - altitude chart

POWER ASSURANCE CHECKS

The purpose of the Engine Power Assurance Checks is to provide a means of monitoring engine health on an on-going basis. Two check types are provided for this purpose:

- a Ground/Hover Power Assurance Check
- a Level Flight Power Assurance Check.

A Ground/Hover Power Assurance Check procedure should be used to check if the engine power available, before take-off, is within the limits to guarantee the performance presented in this Section.

Another procedure is provided, to enable the operator to check the engine power in level flight. The procedure should be used to check if the power available is within the limits to guarantee the performance presented in this Section and maintain a trend chart to monitor the deterioration of the engine with operating hours.

CAUTION

The curves below OAT -25 °C apply only to the helicopter configured with Cold Operation Kit (Supplement 15 of RFM).

POWER CHECK INTERVALS

Either ground or inflight power check shall be accomplished:

— at intervals not exceeding 50 flying hours or monthly, whichever comes first, for non Category A operations.

— whenever abnormal engine function is suspected.

Refer to the following graphics.

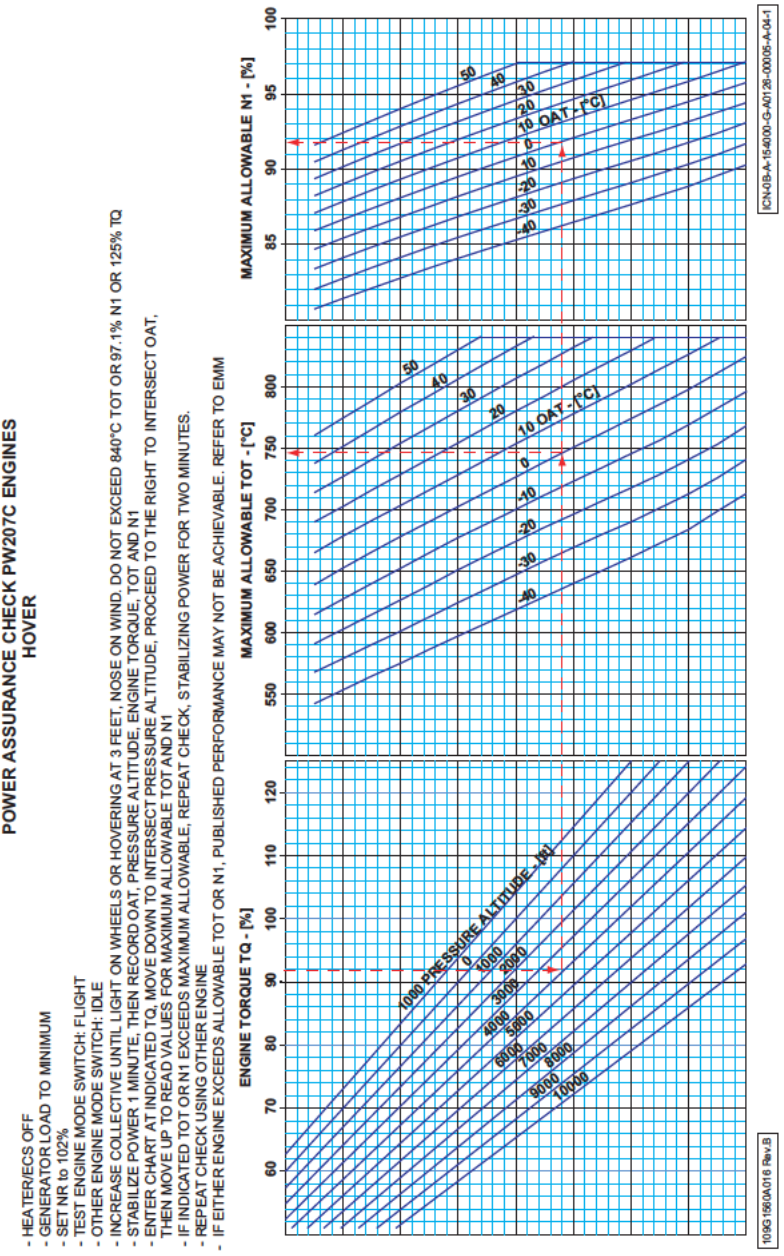

Figure 3-2 Power Assurance Check in Hover

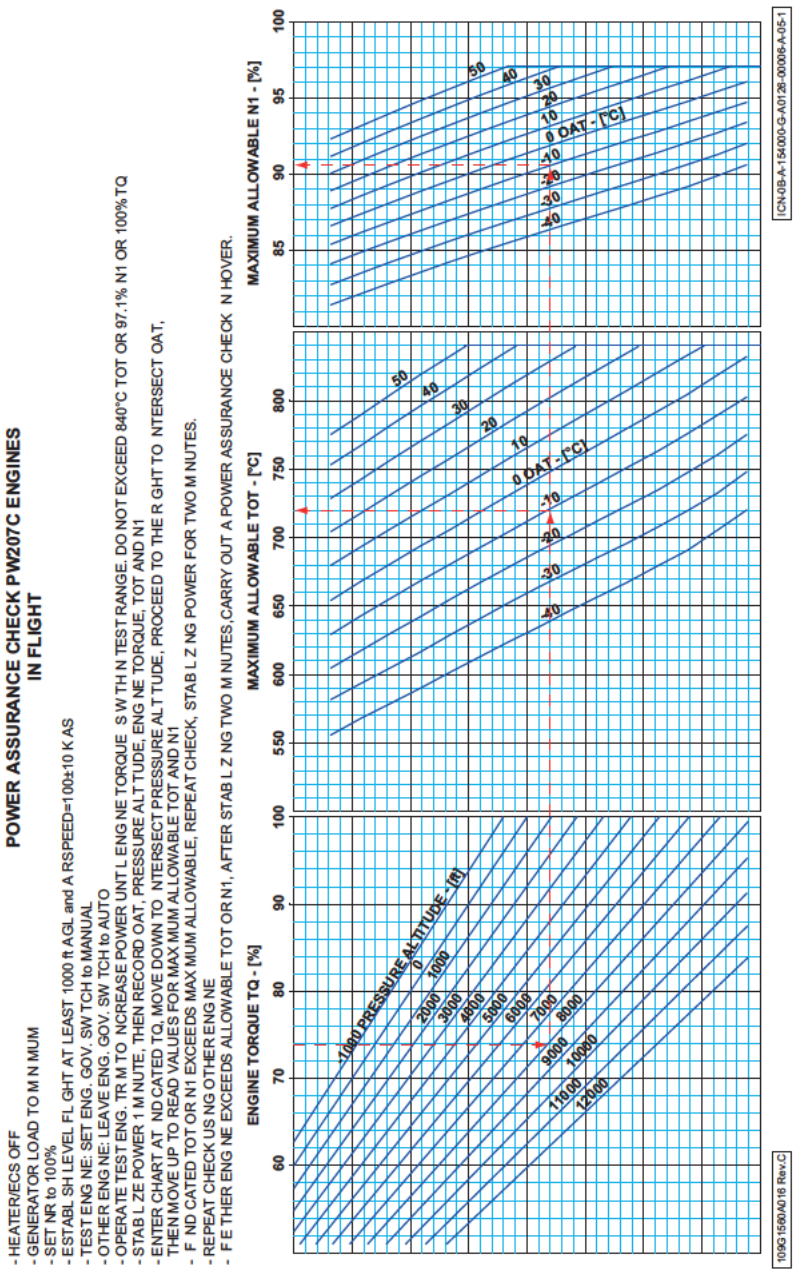

Figure 3-3 Power Assurance Check in Flight

HOVER CEILING, RATE OF CLIMB, FUEL CONSUMPTION, HEIGHT-VELOCITY DIAGRAMS OPERATION VS ALLOWABLE WIND

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HOVER CEILING

The Hover Ceiling charts define the maximum weights at which an IGE hover (at 3 ft wheel height) or an OGE hover (60 ft AGL) is possible for varying combinations of Pressure Altitude and OAT with main rotor speed (NR) at 102% and zero wind conditions

CAUTION

The curves below OAT -25 °C apply only to the helicopter configured with Cold Operation Kit (Supplement 15 of RFM).

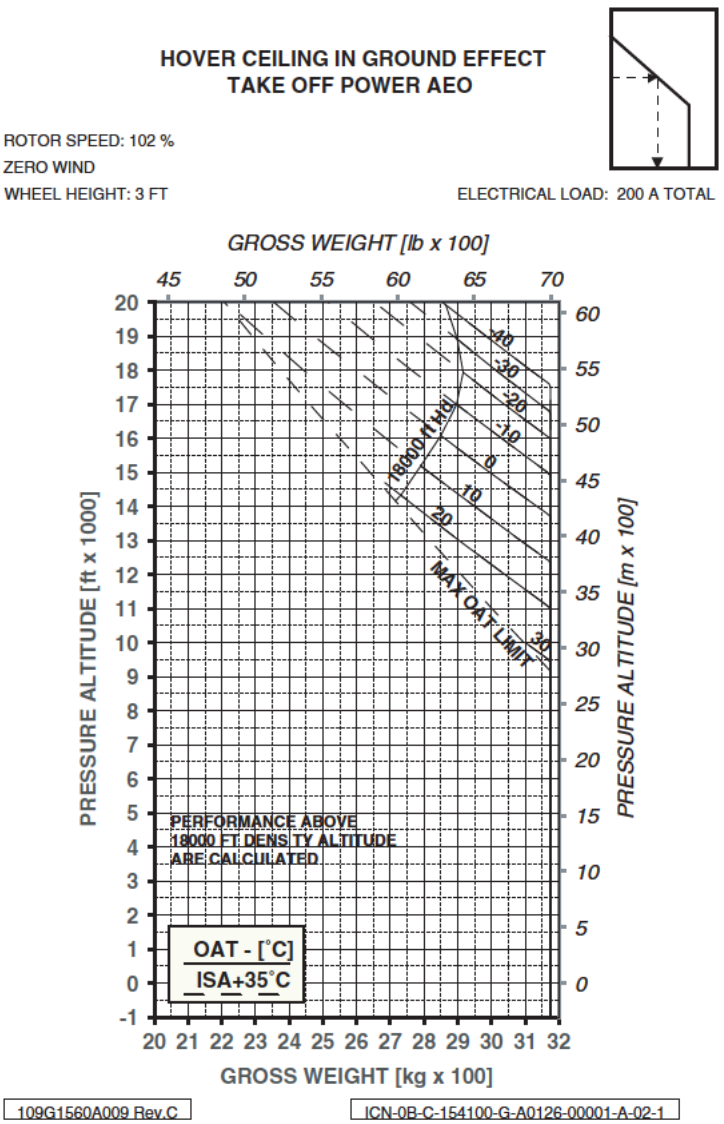

Figure 3-4 Hover Ceiling - IGE at Take-Off Power - AEO

HOVER CEILING IN GROUND EFFECT
MAXIMUM CONTINUOS POWER AEO

ROTOR SPEED: 102 %
ZERO WIND
WHEEL HEIGHT: 3 FT
ELECTRICAL LOAD: 200 A TOTAL

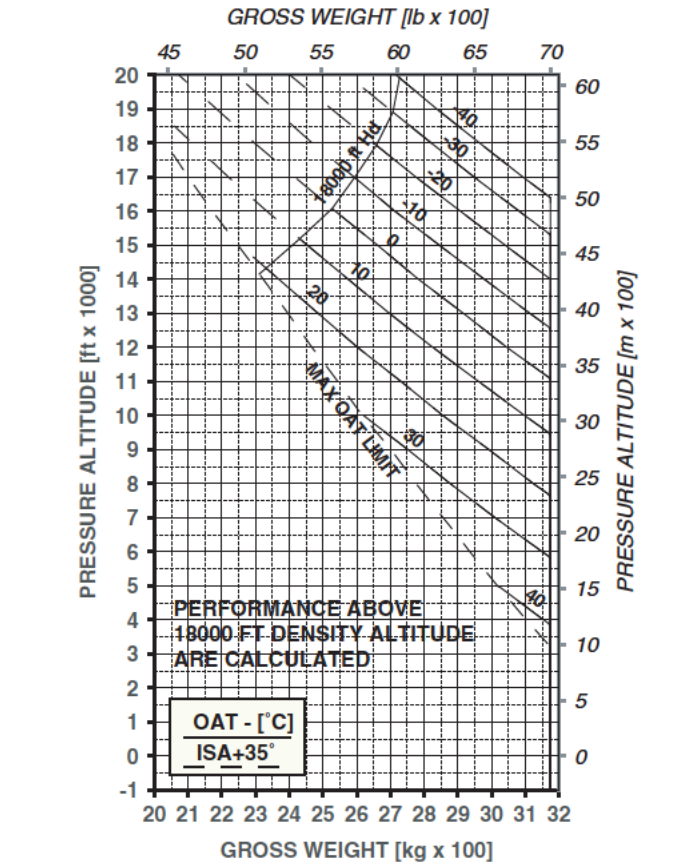

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Figure 3-5 Hover Ceiling - IGE at Maximum Continuous Power - AEO

HOVER CEILING OUT OF GROUND EFFECT
TAKE OFF POWER AEO

ROTOR SPEED: 102 %

ZERO WIND

ELECTRICAL LOAD: 200 A TOTAL

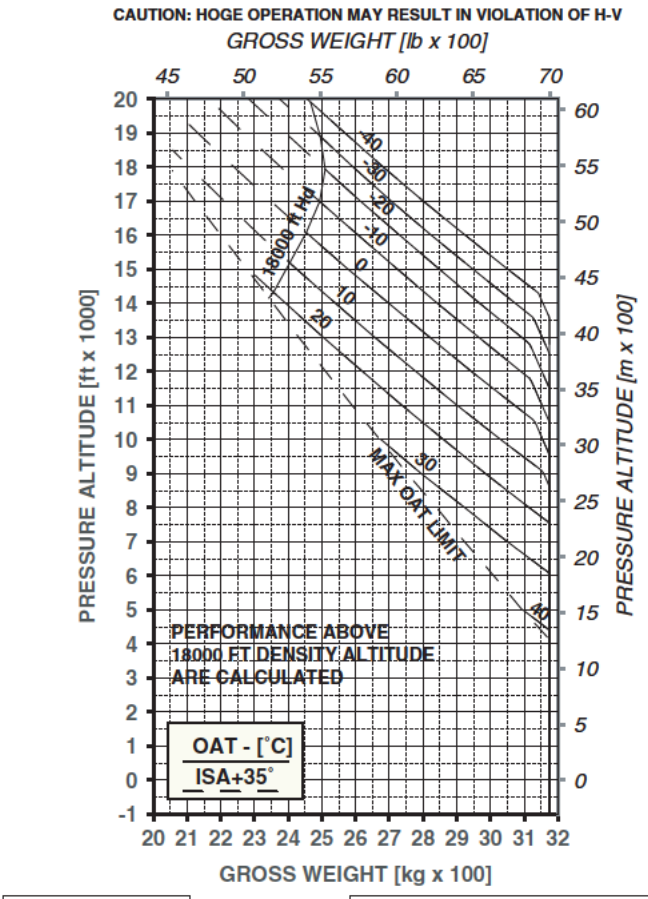

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Figure 3-6 Hover Ceiling - OGE at Take-Off Power - AEO

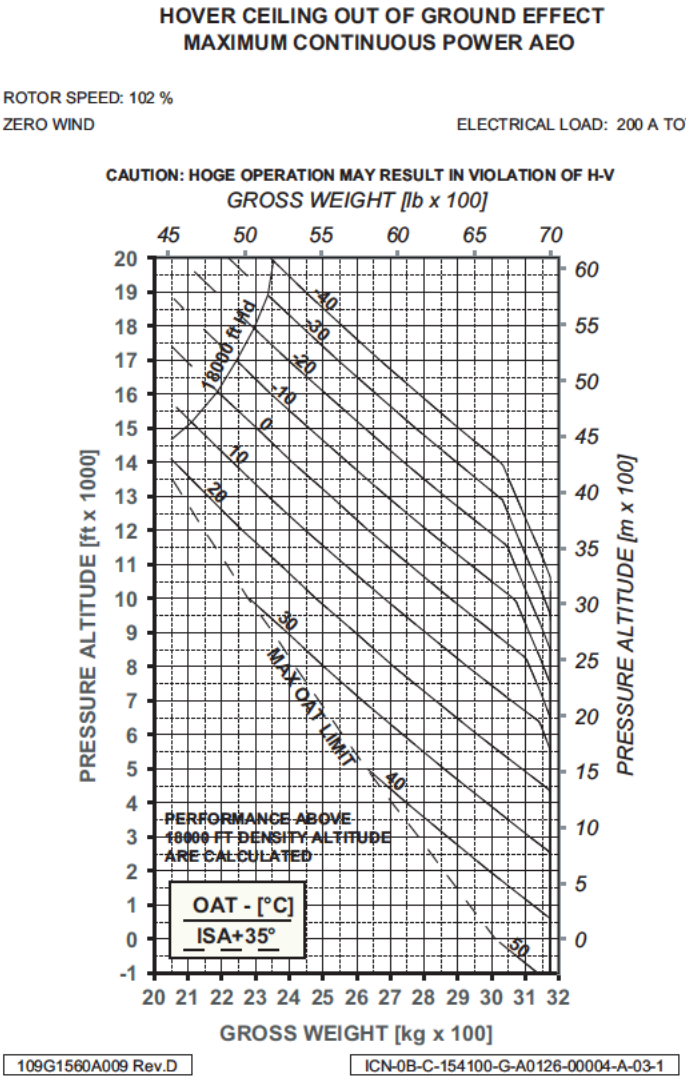

Figure 3-7 Hover Ceiling - OGE at Maximum Continuous Power - AEO

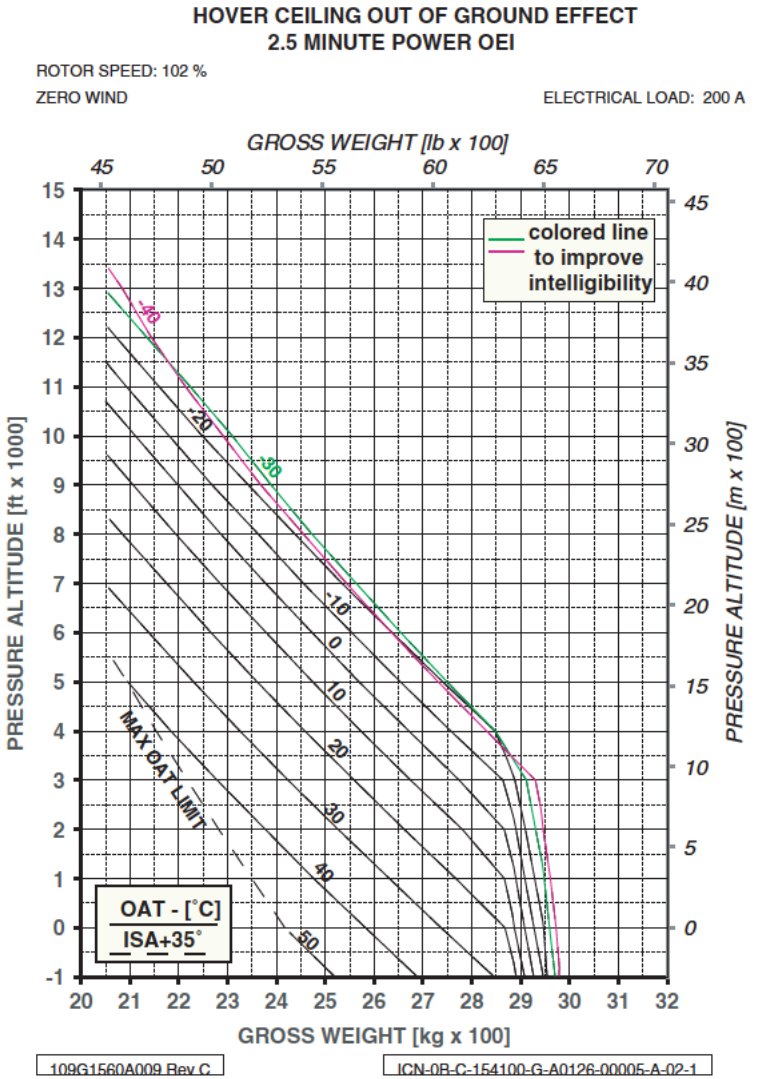

Figure 3-8 Hover Ceiling - OGE OEI, 2.5 Minute Power

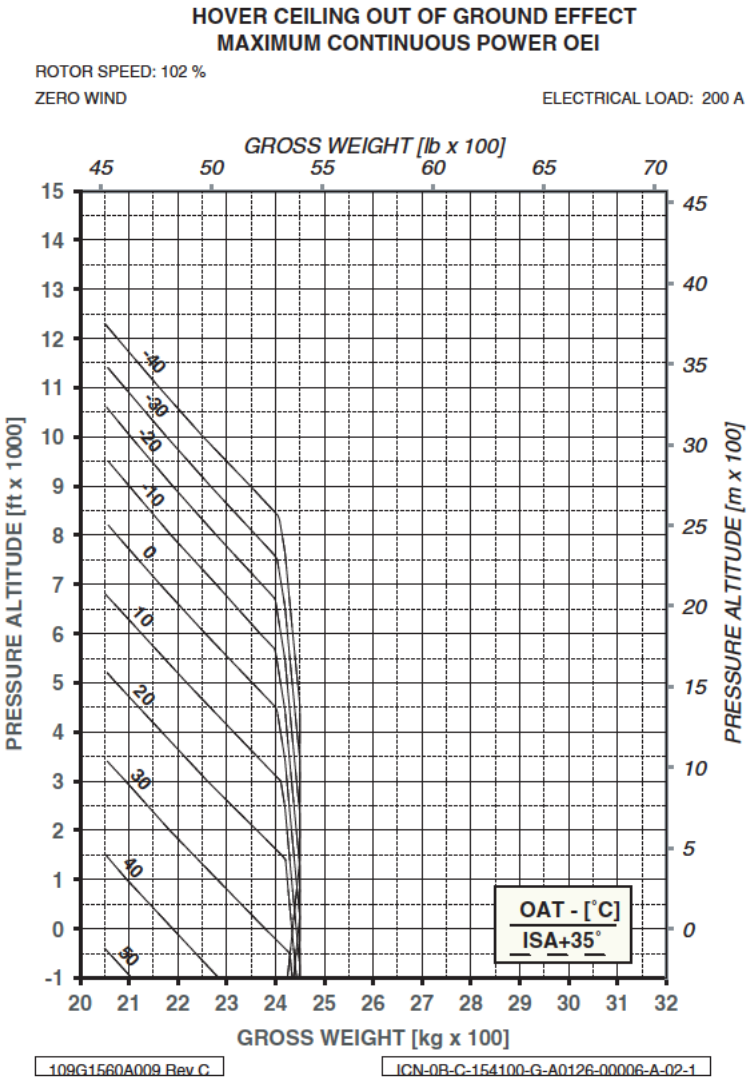

Figure 3-9 Hover Ceiling - OGE at Maximum Continuous Power - OEI

RATE OF CLIMB

The climb performance shown are based on flight test results and cover the range of gross weights from 2300 kg to the Maximum Gross Weight of 3175 kg. Rate of Climb (ROC) is given for the All Engines Operating (AEO) case and for the One Engine Inoperative (OEI) case.

For the AEO case, rate of climb is given with the engines operating at the Take-Off Power (TOP) rating limit and at the Maximum Continuous Power (MCP) rating limits.

For the OEI case, rate of climb is given with the engine operating at the 2.5 minute Power rating limit and at the Maximum Continuous Power rating limits. The datum speed for all Rate of Climb graphs is Vy, which is 80 KIAS up to 10000 ft and then decreases by 2 knots every 1000 ft to become 60 KIAS at 20000 ft.

Each graph presents the information for a specific Gross Weight. On each graph, additional information is provided relative to the applicable engine power rating. Care should be taken to ensure that the correct graph is utilized in obtaining Rate of Climb data.

CAUTION

The curves below OAT -25 °C apply only to the helicopter configured with Cold Operation Kit (Supplement 15 of RFM).

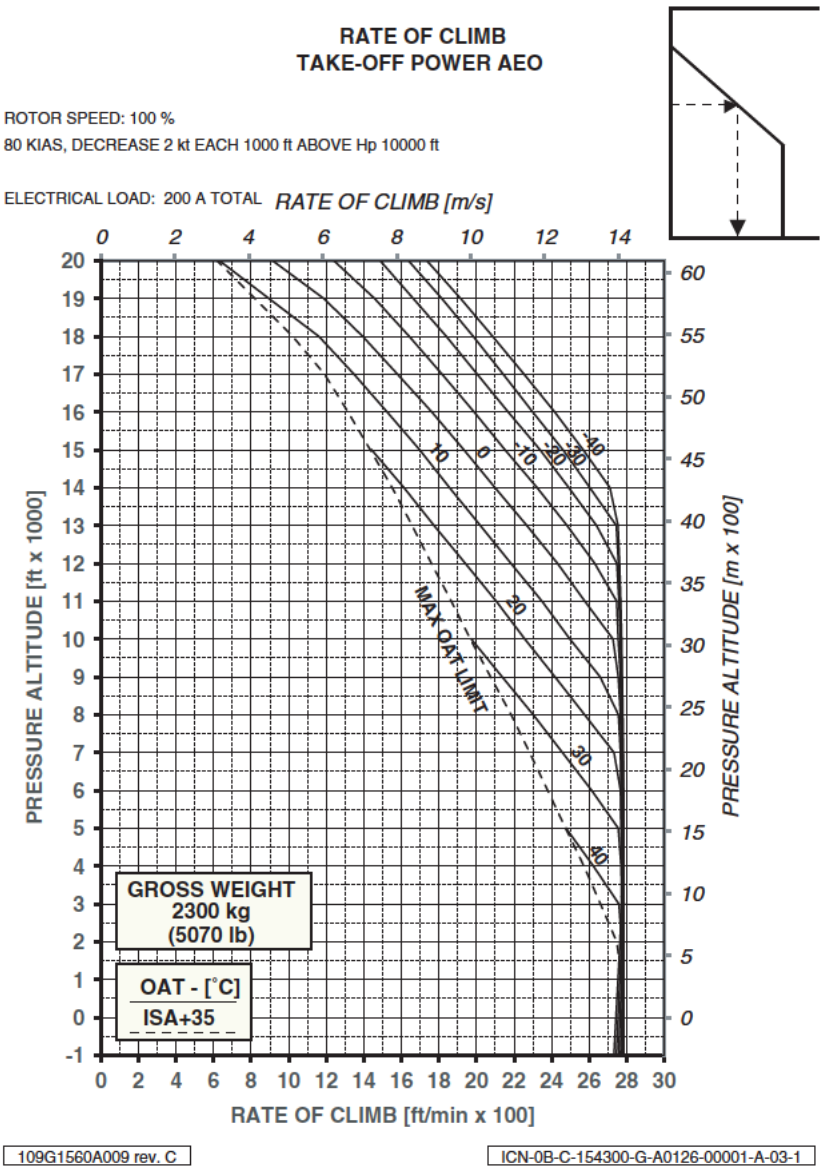

Figure 3-10 Rate of Climb at Take-Off Power - AEO - Gross Weight 2300 kg

RATE OF CLIMB
TAKE-OFF POWER AEO

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A TOTAL

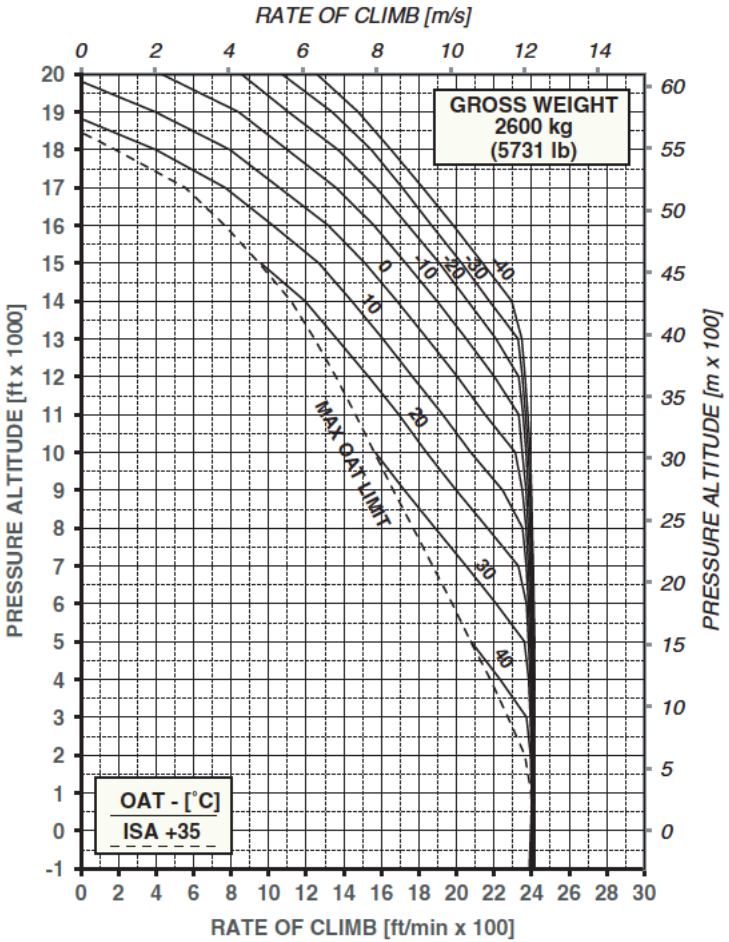

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Figure 3-11 Rate of Climb at Take-Off Power - AEO - Gross Weight 2600 kg

RATE OF CLIMB
TAKE-OFF POWER AEO

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A TOTAL

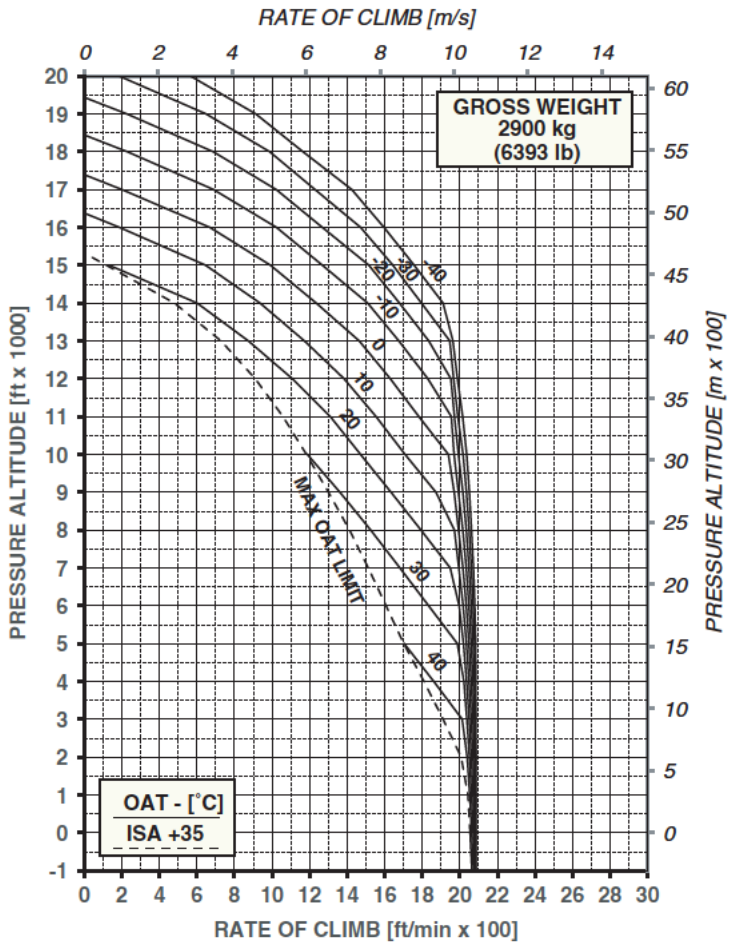

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Figure 3-12 Rate of Climb at Take-Off Power - AEO - Gross Weight 2900 kg

RATE OF CLIMB
TAKE-OFF POWER AEO

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A TOTAL

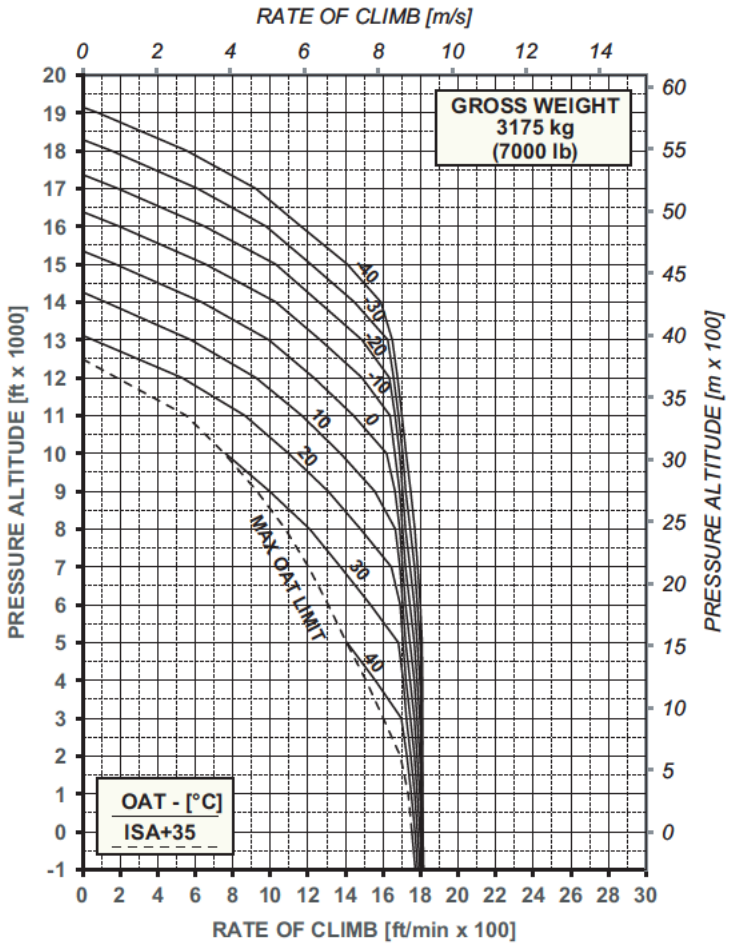

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Figure 3-13 Rate of Climb at Take-Off Power - AEO - Gross Weight 3175 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER AEO

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A TOTAL

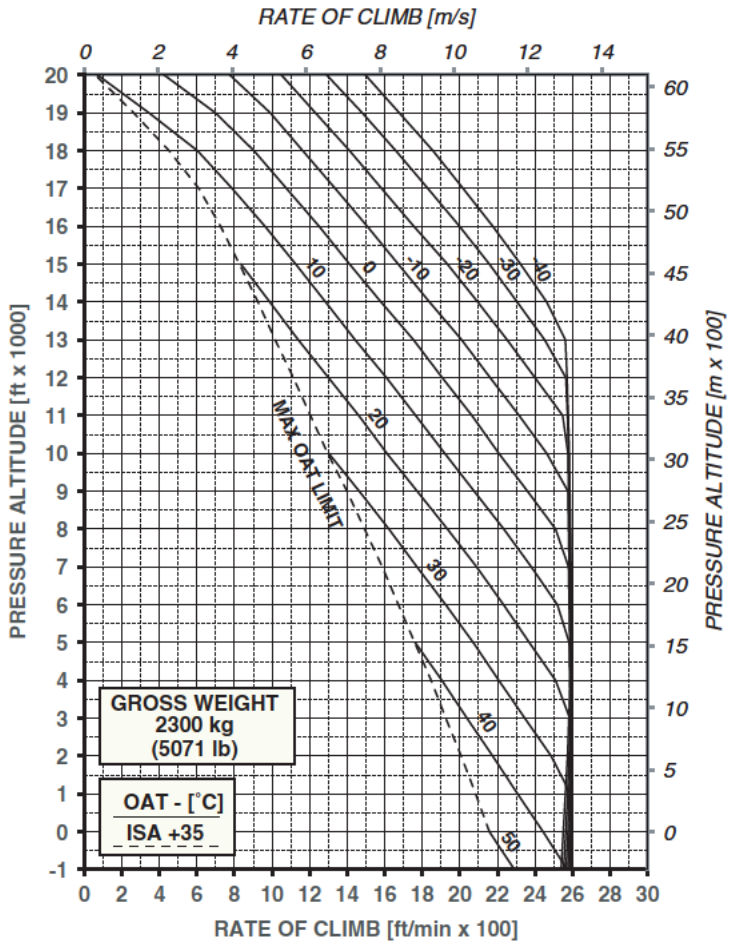

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Figure 3-14 Rate of Climb at Maximum Continuous Power - AEO - Gross Weight 2300 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER AEO

ROTOR SPEED: 100 %

ELECTRICAL LOAD: 200 A TOTAL

80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

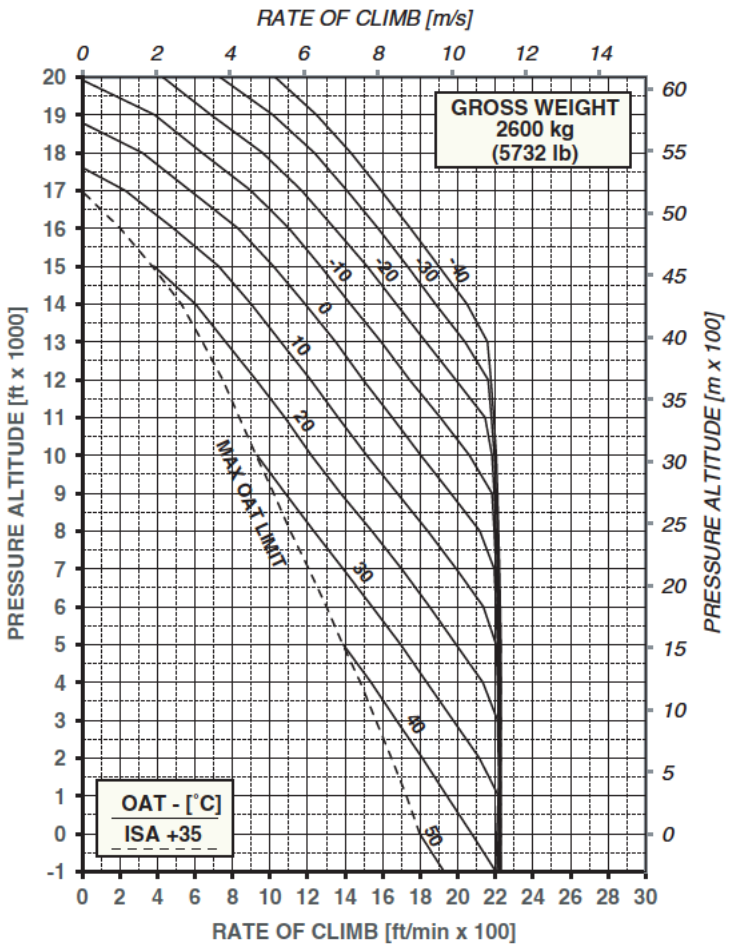

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Figure 3-15 Rate of Climb at Maximum Continuous Power - AEO - Gross Weight 2600 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER AEO

ROTOR SPEED: 100 %
ELECTRICAL LOAD: 200 A TOTAL
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

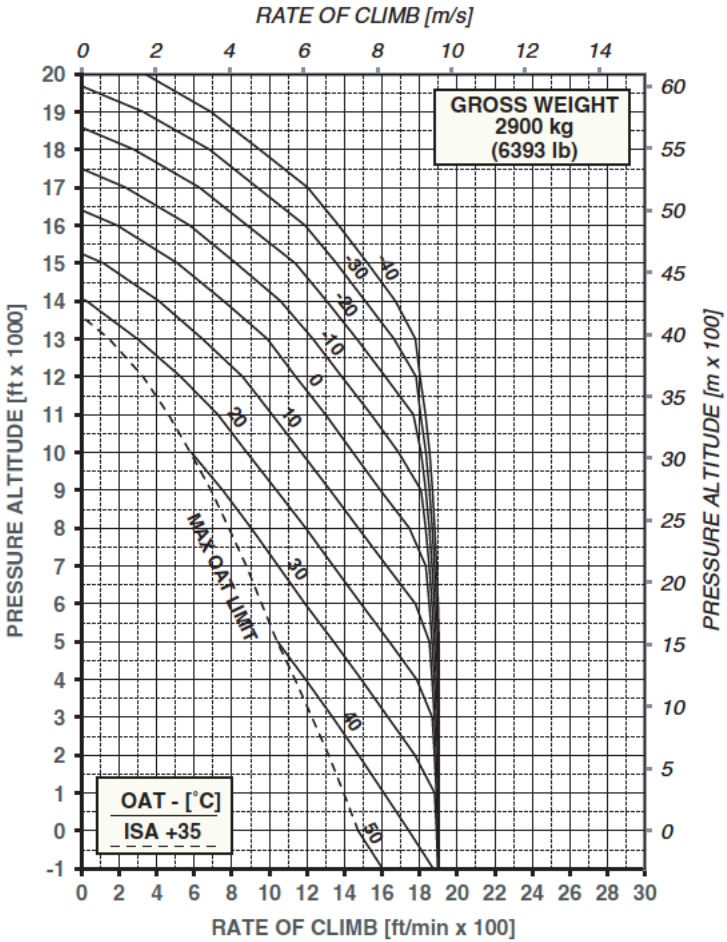

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Figure 3-16 Rate of Climb at Maximum Continuous Power - AEO - Gross Weight 2900 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER AEO

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A TOTAL

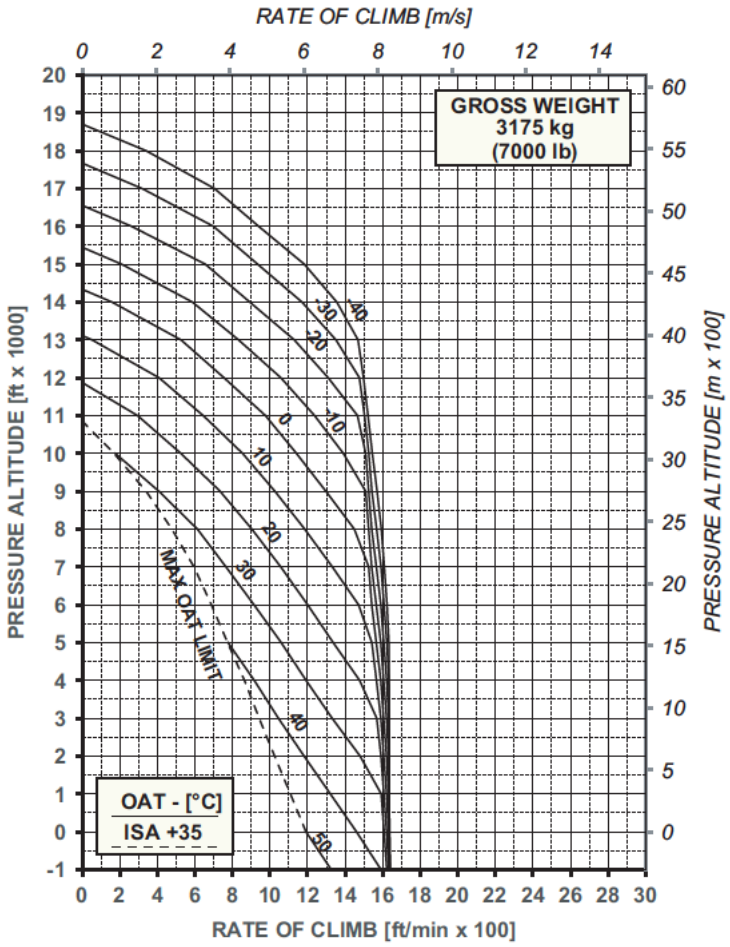

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Figure 3-17 Rate of Climb at Maximum Continuous Power - AEO - Gross Weight 3175 kg

RATE OF CLIMB
2.5 MINUTE POWER OEI

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A

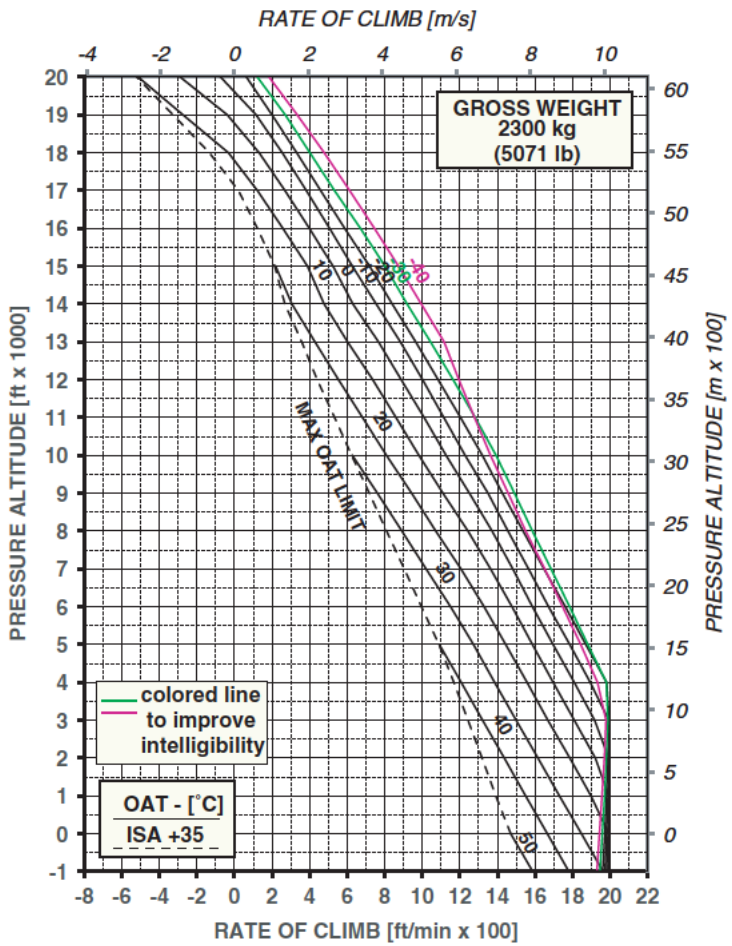

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Figure 3-18 Rate of Climb at 2.5 Minute Power - OEI - Gross Weight 2300 kg

RATE OF CLIMB
2.5 MINUTE POWER OEI

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A

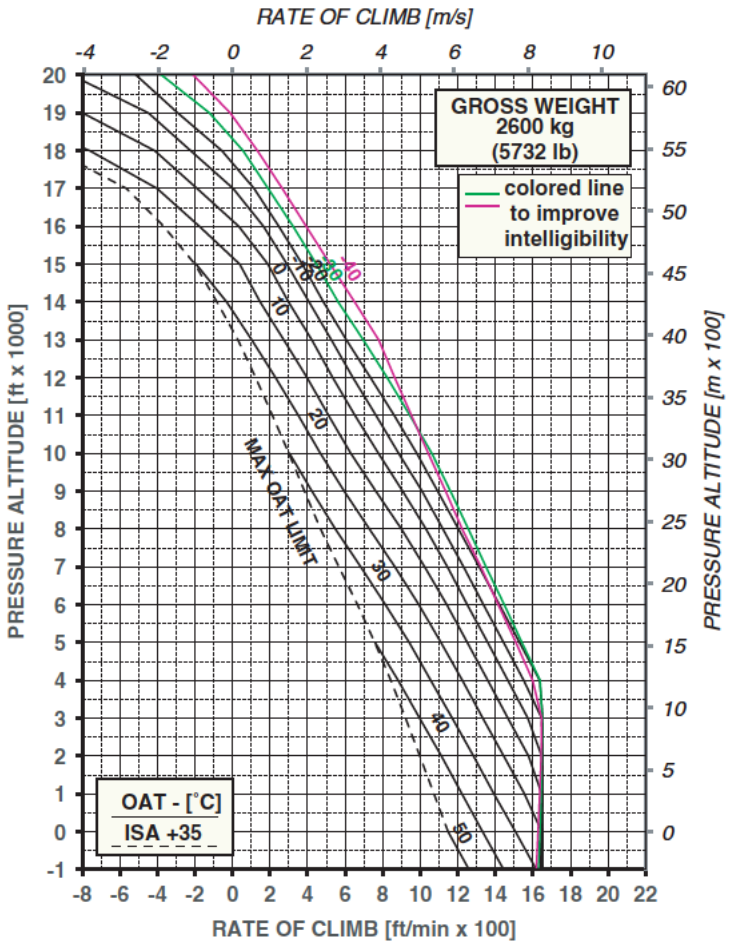

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Figure 3-19 Rate of Climb at 2.5 Minute Power - OEI - Gross Weight 2600 kg

RATE OF CLIMB
2.5 MINUTE POWER OEI

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A

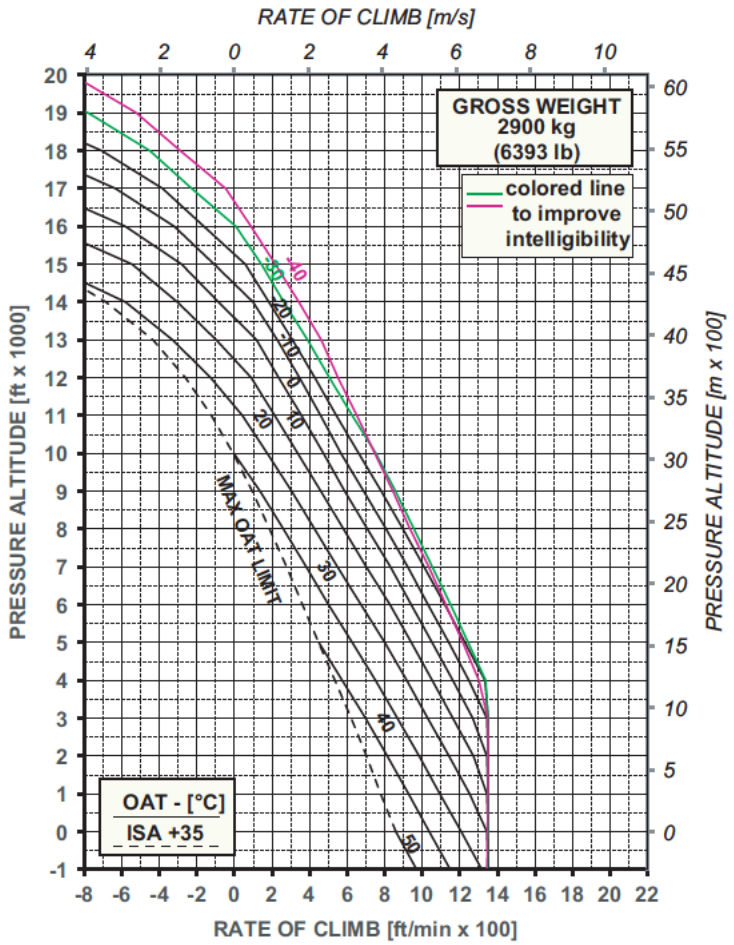

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Figure 3-20 Rate of Climb at 2.5 Minute Power - OEI - Gross Weight 2900 kg

RATE OF CLIMB
2.5 MINUTE POWER OEI

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A

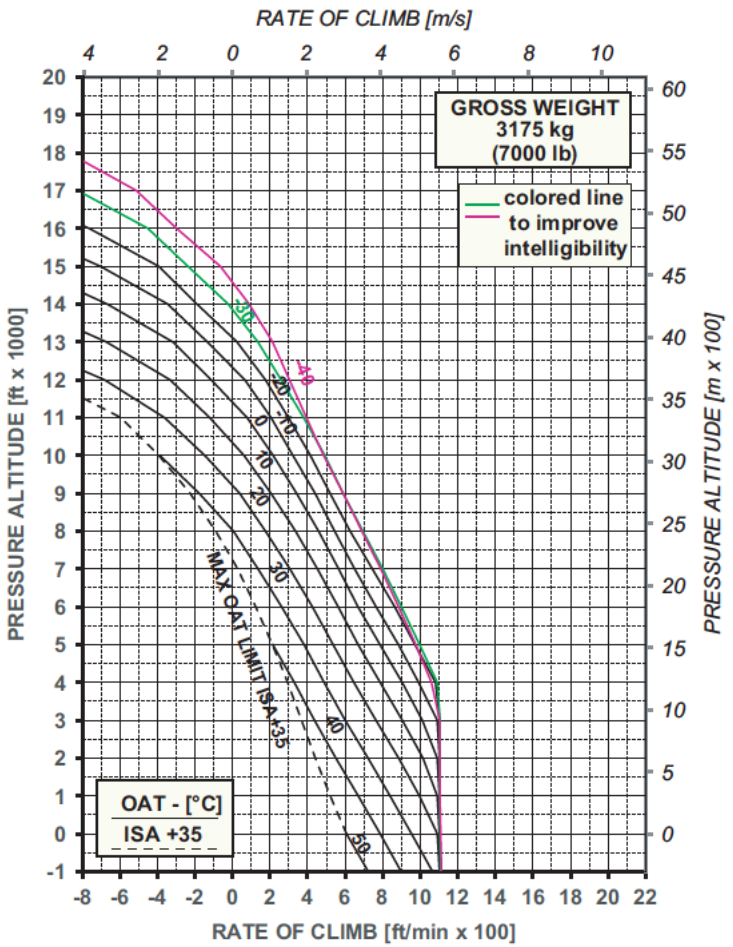

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Figure 3-21 Rate of Climb at 2.5 Minute Power - OEI - Gross Weight 3175 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER OEI

ROTOR SPEED: 100 %

ELECTRICAL LOAD: 200 A

80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

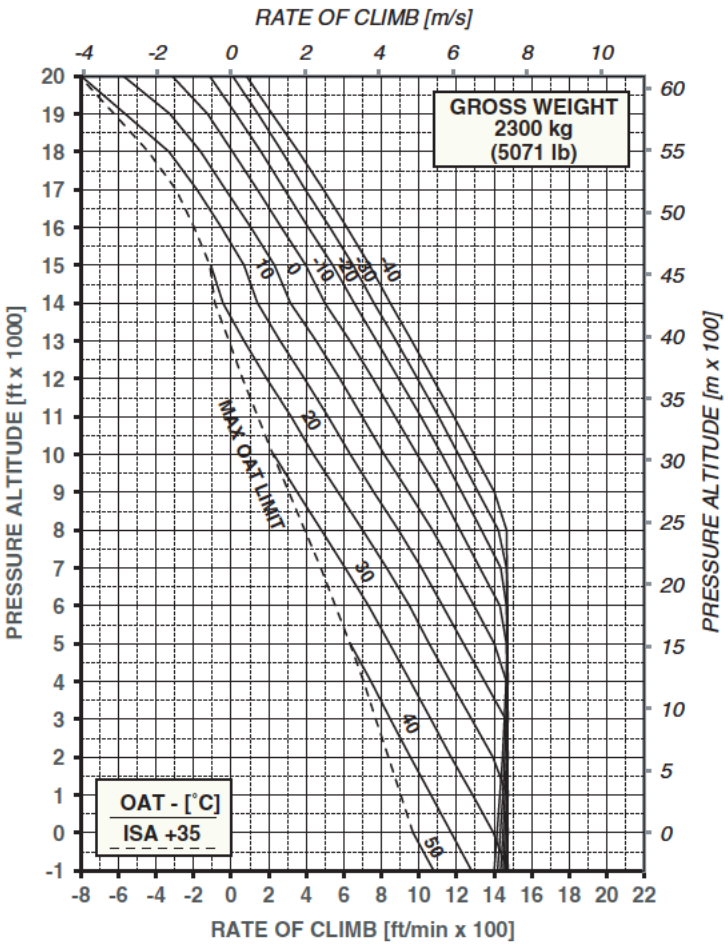

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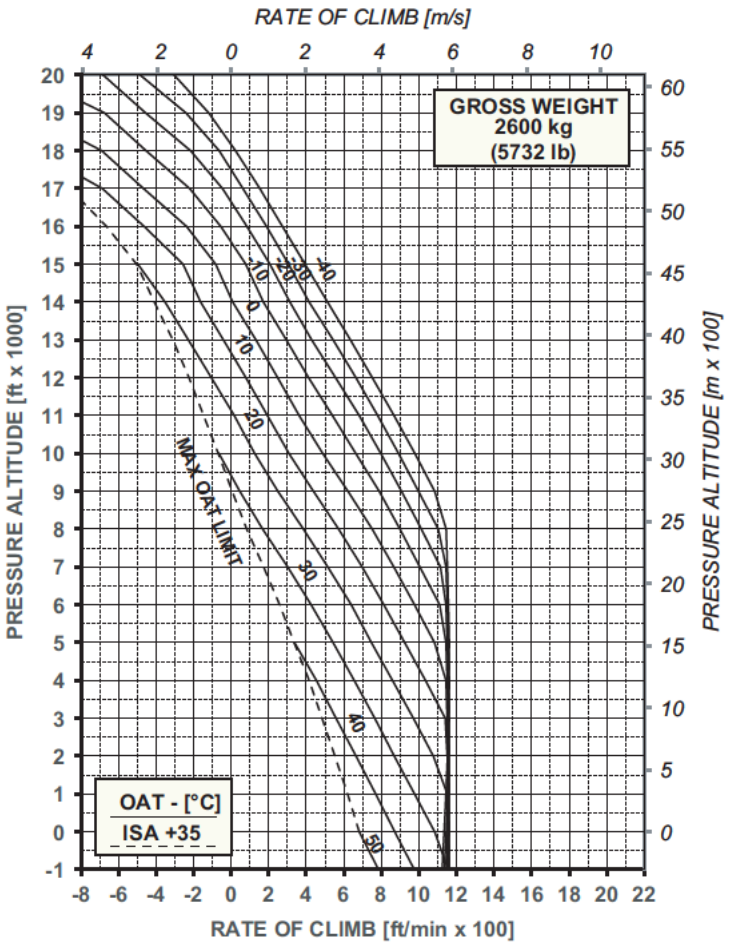
Figure 3-22 Rate of Climb at Maximum Continuous Power - OEI - Gross Weight 2300 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER OEI

ROTOR SPEED: 100 %

ELECTRICAL LOAD: 200 A

80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft



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HVR ROC
FL HV AW

Figure 3-23 Rate of Climb at Maximum Continuous Power - OEI - Gross Weight 2600 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER OEI

ROTOR SPEED: 100 %
80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

ELECTRICAL LOAD: 200 A

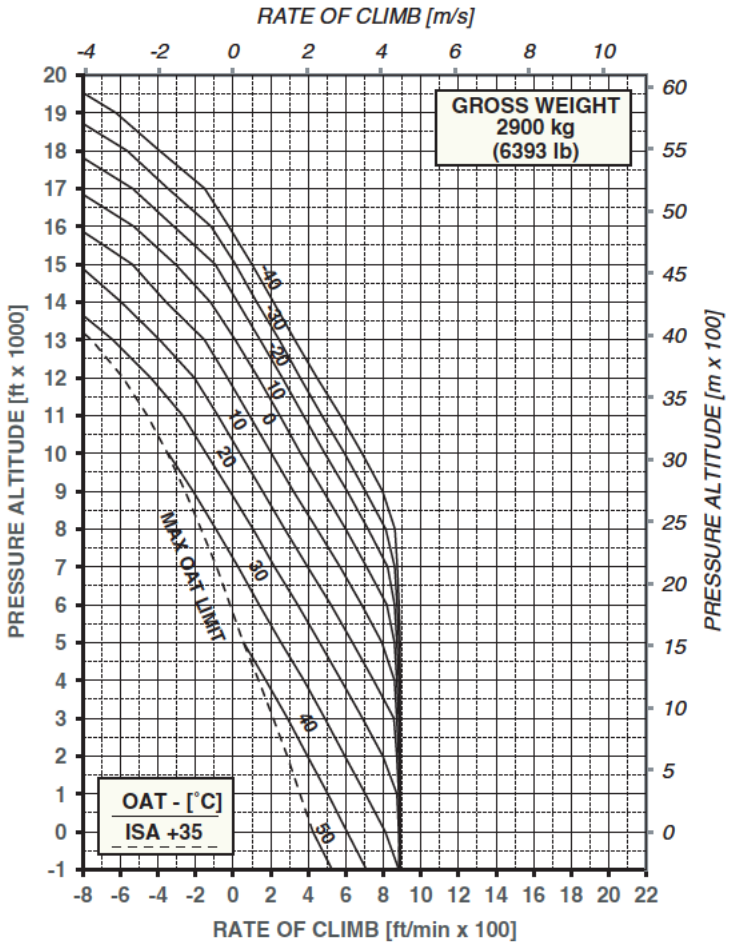

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Figure 3-24 Rate of Climb at Maximum Continuous Power - OEI - Gross Weight 2900 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER OEI

ROTOR SPEED: 100 %

ELECTRICAL LOAD: 200 A

80 KIAS, DECREASE 2 kt EACH 1000 ft ABOVE Hp 10000 ft

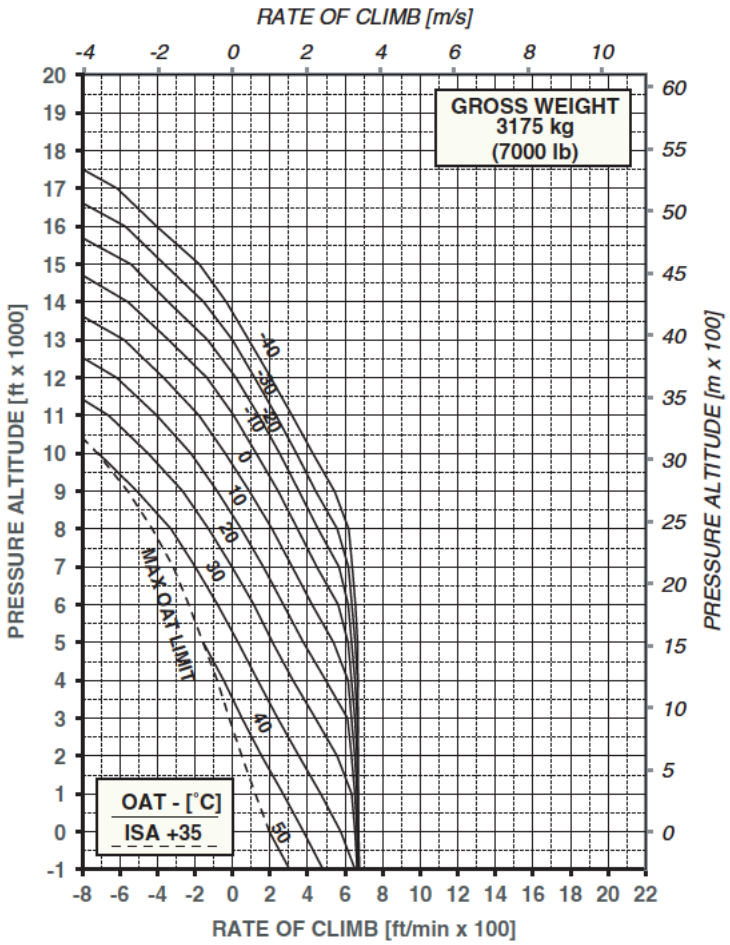

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Figure 3-25 Rate of Climb at Maximum Continuous Power - OEI - Gross Weight 3175 kg

FUEL CONSUMPTION AT 3175 KG

OAT (°C)	-40	-30	-20	0	20	ISA + 25	ISA + 35
2000 ft @ 80 KIAS							
kg/h	146	148	150	155	160	165	168
2000 ft @ 120 KIAS							
kg/h	165	169	172	181	188	196	202
2000 ft @ 150 KIAS							
kg/h	205	210	216	231	250	-	-
4000 ft @ 80 KIAS							
kg/h	142	144	147	152	158	161	164
4000 ft @ 120 KIAS							
kg/h	164	168	173	180	191	198	205
4000 ft @ 150 KIAS							
kg/h	207	215	223	243	-	-	-
6000 ft @ 80 KIAS							
kg/h	139	141	144	150	155	158	161
6000 ft @ 120 KIAS							
kg/h	165	168	172	184	197	205	218
6000 ft @ 150 KIAS							
kg/h	215	225	236	270	-	-	-
8000 ft @ 80 KIAS							
kg/h	136	140	143	148	155	157	161
8000 ft @ 120 KIAS							
kg/h	165	170	176	191	222 (TOP)	233 (TOP)	-
8000 ft @ 150 KIAS							
kg/h	229	246	268	-	-	-	-
10000 ft @ 80 KIAS							
kg/h	136	138	141	149	159	159	167 (TOP)
10000 ft @ 120 KIAS							
kg/h	169	177	186	221	-	-	-
10000 ft @ 150 KIAS							
kg/h	266	-	-	-	-	-	-
12000 ft @ 80 KIAS							
kg/h	135	138	143	154	182 (TOP)	171 (TOP)	-

OAT (°C)	-40	-30	-20	0	20	ISA + 25	ISA + 35
12000 ft @ 120 KIAS							
kg/h	179	192	219	-	-	-	-
12000 ft @ 150 KIAS							
kg/h	-	-	-	-	-	-	-

HEIGHT-VELOCITY DIAGRAMS

The Height-Velocity diagram is used to establish if, in the event of a single engine failure during take-off, landing or other operations near the surface, a combination of airspeed and height above ground exists for which a safe single engine landing on a smooth, level and hard surface cannot be assured (dangerous zone).

The Height-Velocity diagram is split in three charts:

Chart A (Figure 3-26);

Chart B (Figure 3-27);

Chart C (Figure 3-28).

CAUTION

The curves below OAT -25°C apply only to the helicopter configured with Cold OperationKit (Supplement 15 of RFM).

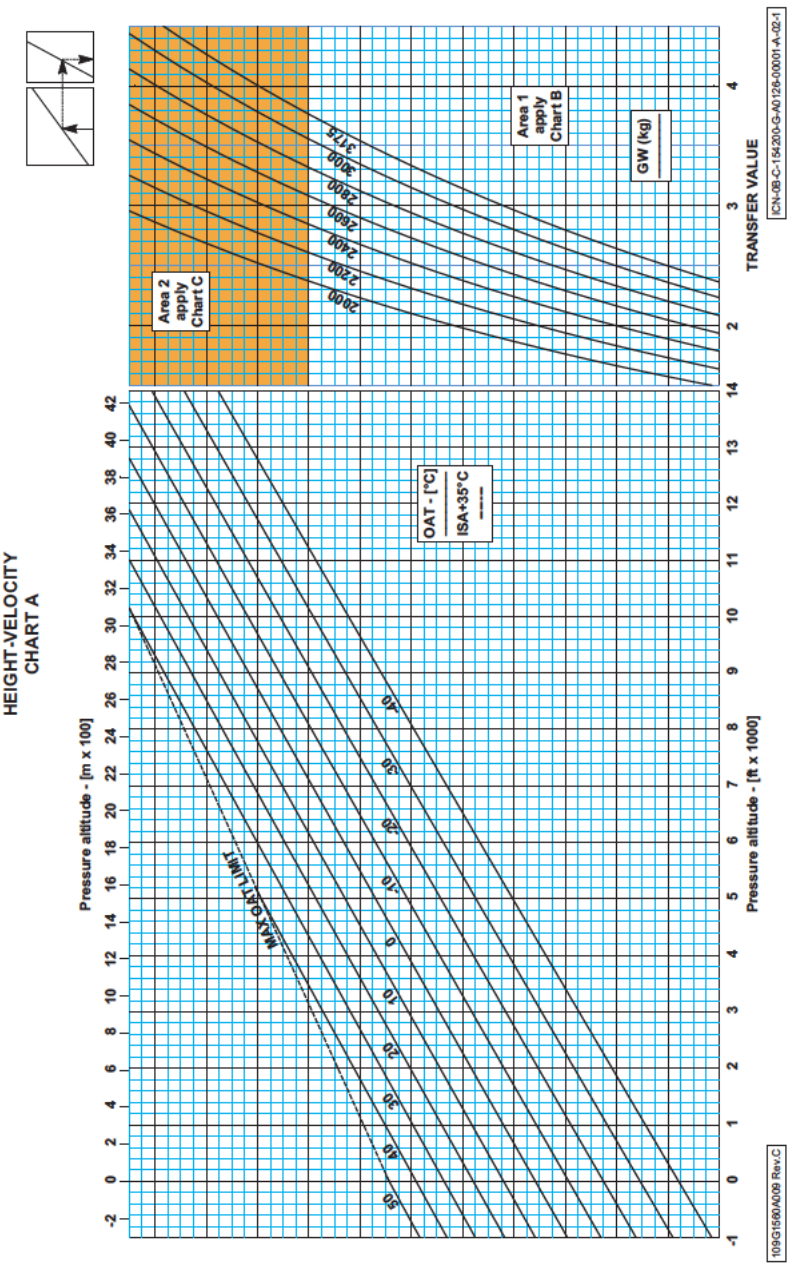

Figure 3-26 Height - Velocity Diagram - Chart A

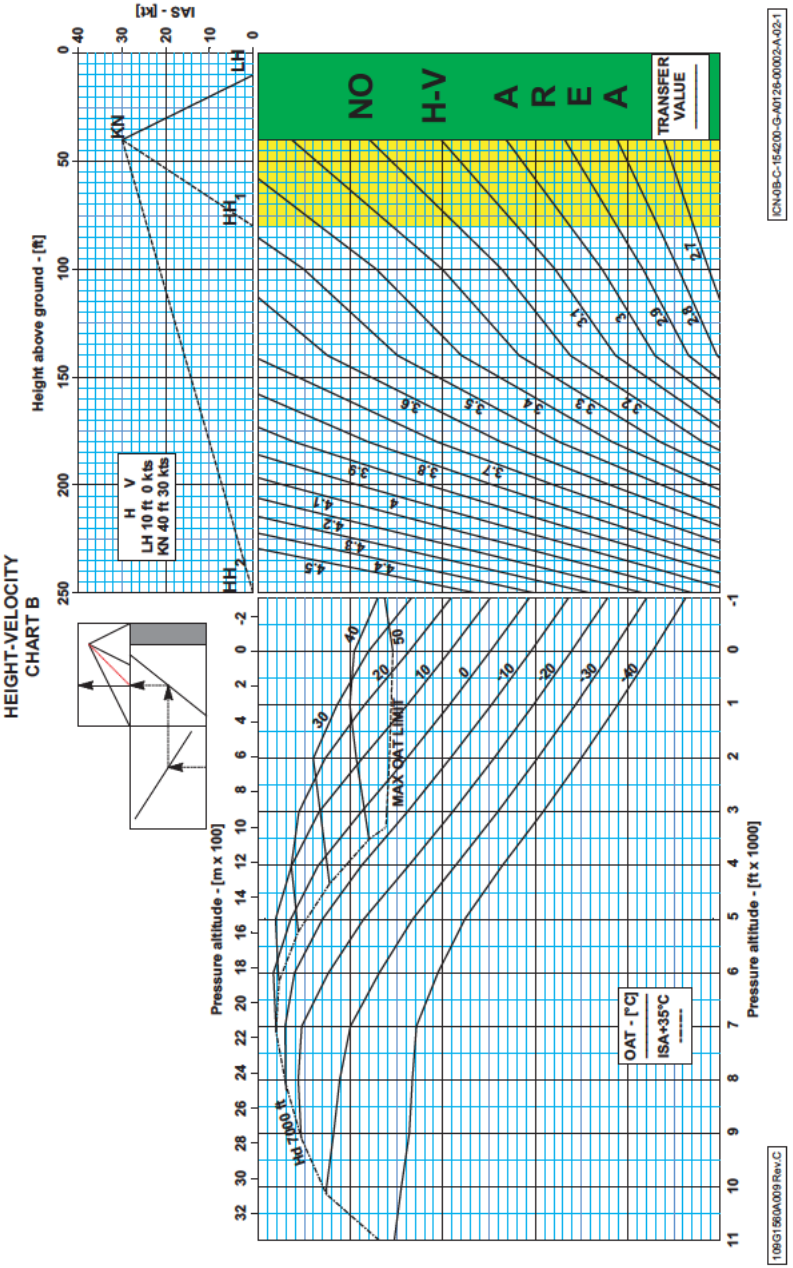

Figure 3-27 Height - Velocity Diagram - Chart B

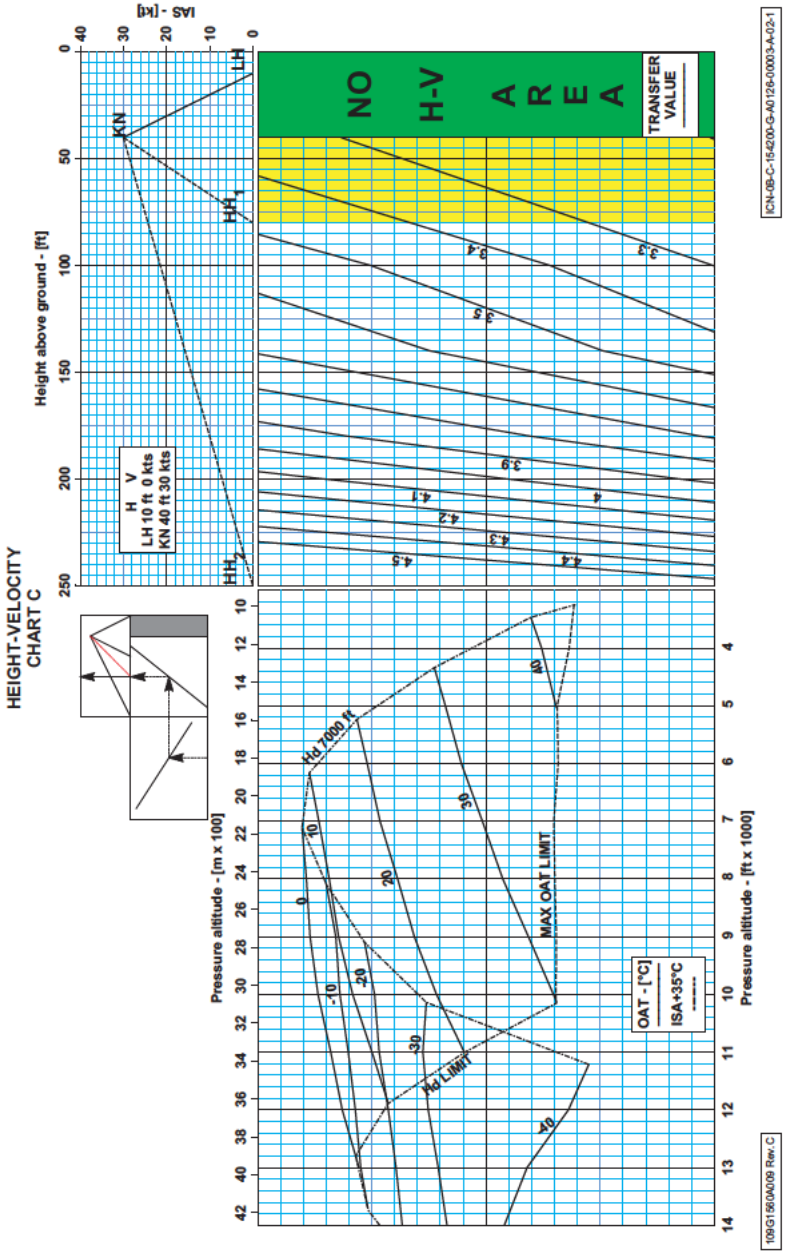

Figure 3-28 Height - Velocity Diagram - Chart C

OPERATION VS ALLOWABLE WIND

Note

Before using Chart A and/or Chart B of this paragraph, the appropriate helicopter maximum gross weight for Hover (IGE/OGE) must be determined using the pertinent Hover performance charts.

The "Wind Ground Speed Azimuth Envelope IGE/OGE" charts define, at each altitude/OAT combination, the maximum weight and maximum allowable wind for which satisfactory stability and control has been demonstrated. Chart A (Figure 3-29) is valid up to a density altitude of 10000 ft Hd.
Maximum relative wind speed in shaded area of Chart A (from 60 to 135 degrees) is determined by Area 2 of Chart B (Figure 3-30). Maximum relative wind speed in all azimuths between 10 and 350 degrees, above 10000 ft Hd is determined by Area 1 of Chart B.
Table 3-1 gives a simplified method to know the maximum wind allowed in the critical azimuths at several helicopter weights and density altitude. For more accurate evaluation refer to Figure 3-29 and Figure 3-30.

CAUTION

The curves below OAT -25°C apply only to the helicopter configured with Cold Operation Kit (Supplement 15 of RFM).

MAXIMUM LATERAL ALLOWABLE WIND ENVELOPE
ALL AZIMUTH (Simplified Table) *

Weight / Altitude Hd	2400 kg	2600 kg	2800 kg	3000 kg	3175 kg
Up to 3000 ft	30	30	30	30	30
Up to 5000 ft	30	30	30	30	25
Up to 7000 ft	30	30	30	25	20
Up to 9000 ft	30	30	25	20	
Up to 10000 ft	30	28	20		
Up to 12000 ft	30	20			
Up to 14000 ft	25				
Up to 16000 ft	20				

*: For a complete Allowable Wind envelope information refer to applicable RFM chart

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Table 3-1 Simplified table

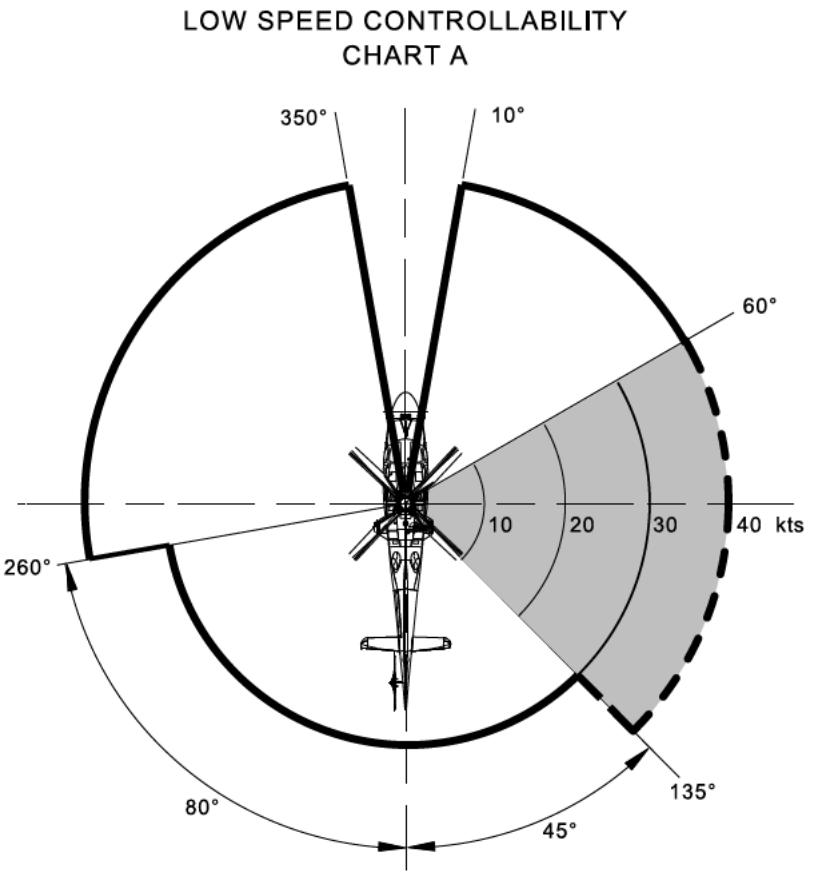

Figure 3-29 Wind/Ground Speed Azimuth Envelope IGE/OGE - Chart A

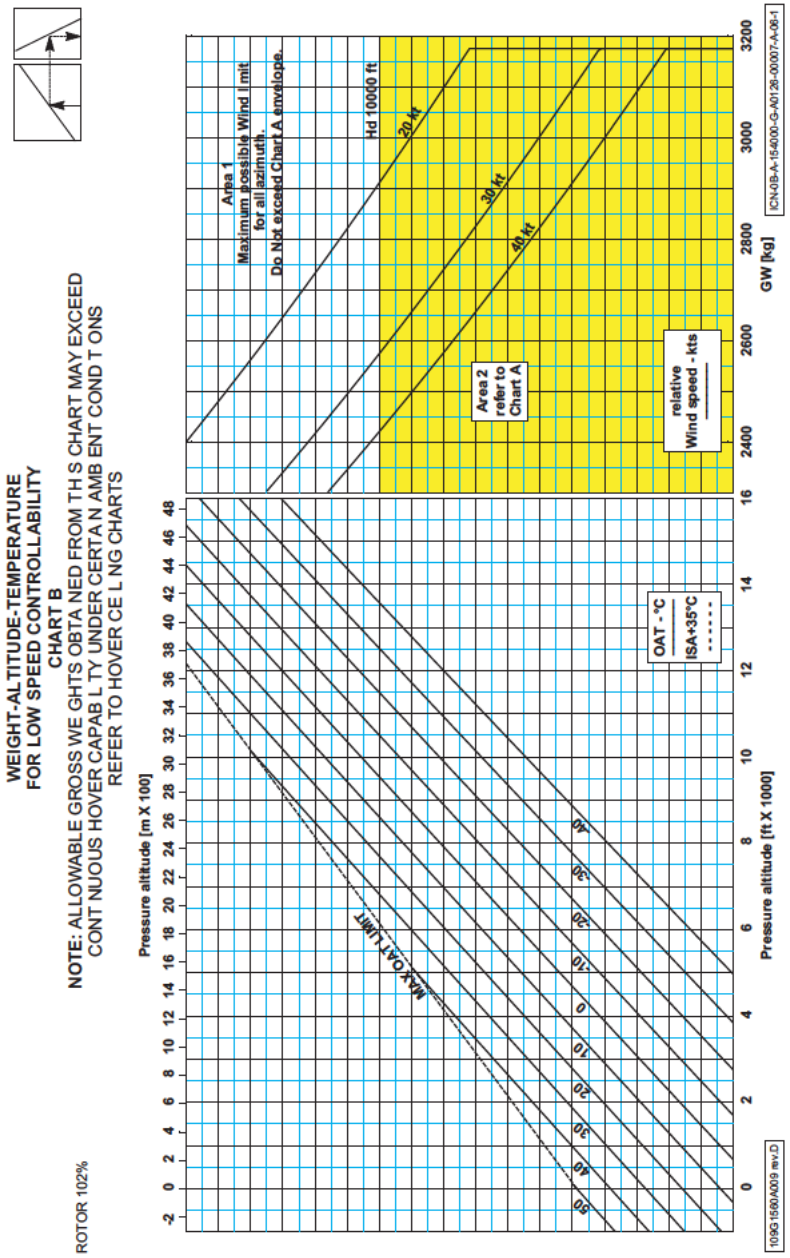

Figure 3-30 Wind/Ground Speed Azimuth Envelope IGE/OGE - Chart B

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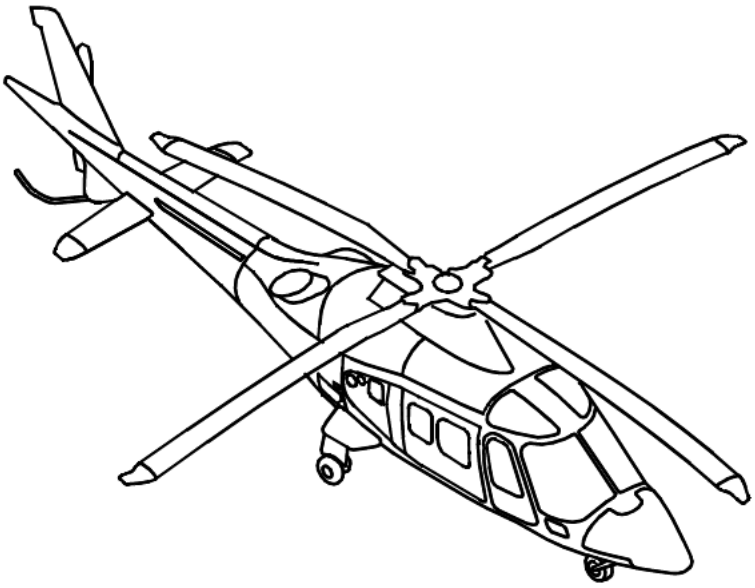

QUICK REFERENCE HANDBOOK

ISSUE 2 : 04 December 2019

Source Document :

RFM Document No. 109G0040A018
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Continuing airworthiness criteria for the AW109SP is developed and maintained by Leonardo S.p.A., who is the holder of the type certificate in the state of design.

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TABLE OF CONTENTS

RECORD OF REVISIONS

QRH REVISION No.	Date	Basis of Revision	Notes
Issue 2	04-12-2019	AW109SP RFM Issue B Rev. 21	-

Note

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

RECORD OF EFFECTIVE PAGES

PAGE	QRH REVISION N°
i thru vi	0
LIMITATIONS, NORMAL PROCEDURES AND PERFORMANCE DATA	
1 and 2	0
TOC-1 thru TOC-4	0
LOF-1 and LOF-2	0
3 thru 154	0
EMERGENCY AND MALFUNCTION PROCEDURES	
1 and 2	0
TOC-1 thru TOC-8	0
3 thru 204	0

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 conflict between the QRH and Approved RFM Limitations the Limitations in the RFM take precedence.

QRH NORMAL PROCEDURES

The normal procedures have been copied simplified from the RFM.

QRH PERFORMANCE

The performance data includes the Power Assurance Charts, Density Altitude, Height-Velocity, Hover Ceiling, Rate Of Climb diagrams and, in tabulated data format, the 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.

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.

TEMPORARY REVISIONS

Temporary Revisions are issued when immediate data is to be included in the manual. The Temporary Revision data can add to or cancel the initial data in the manual. They are numbered progressively for each section of the manual and are with red header and footer. Temporary Revision pages are not written in the "Record of Effective Pages". A complete list of **active** and **inactive** Temporary Revisions is written in the "Record of Temporary Revisions" page.