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ROTORCRAFT FLIGHT MANUAL

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ROTORCRAFT FLIGHT MANUAL

AW119 MK II

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REVISION No.	SUBJECT	APPROVAL
—	Issue 1	FAA Approval with Type Certificate Data Sheet (TCDS) No. H7EU dated 22 October 2007
1	Revised pages A-1, B-1, B-2, 2-4, 2-5, 2-9, 2-11, 2-12, 3-49 and 3-50.	Letter EASA D(2011)/MMA/SSI/60003116 dated 20 April 2011
2	Revised pages A-1, B-1, B-2, 2-13, 2-14, 5-1, 5-3 and 5-4. Added 5-5, 5-6 and Supplement 18.	Letter EASA D(2011)/MMA/SSI/10006683 dated 8 April 2011
3	Revised pages A-1, B-1, B-2, 5-3 and 5-5. Added Supplement 19.	Letter EASA D(2011)/MMA/SSI/10006684 dated 19 April 2011
4	Revised pages A-1, B-1, B-2, iii, 1-3, 1-4, 1-20, 1-26, 1-27, 2-i, 2-22, 3-11, 3-36, 4-5, 4-9 thru 4-12, 4-20, 4-22, 5-4, Supplement 10 and Supplement 18. Added pages B-3 and B-4	Letter EASA D(2011)/MMA/SSI/10010060 dated 15 April 2011
5	Revised pages A-1, B-1 thru B-4, 5-3 and 5-4. Added Supplement 16.	Letter EASA D(2011)/MMA/JDE/10007784 dated 15 April 2011
6	Revised pages A-1, B-1 thru B-4, 1-1, 5-3 thru 5-5 and Supplement 18. Added Supplement 20.	EASA Approvals N° 10039252, 10039253 dated 20 April 2012
7	Revised pages A-1, B-1 thru B-4 and 3-10.	Letter EASA D(2013)/MMA/JDE/10022125 dated 14 February 2013
8	Revised pages A-1, B-1 thru B-4, 2-30 and 2-31.	EASA Approval N° 10042627, REV. 1 dated 14 December 2012
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	Revised pages Title page, A-4 and B-1 thru B-4.	Manufacturer's Data
21	Revised page 1-14.	EASA Approval N° 10083793 dated 29 January 2024; Acceptance i.a.w. FAA-EASA TIP Rev.7, Section III, §3.2 (sub§ 3.2.1) and §3.3 (sub§3.3.1) - Design change classified as Basic. (ref. MAF 109G0257A427 dated 29 January 2024)
	Revised pages Title page, A-4 and B-1 thru B-4.	Manufacturer's Data

LIST OF EFFECTIVE PAGES

Note

Revised text is indicated by a black vertical line in the outer margin of the page and the approval revision number is printed in the lower margin.

Note

The yellow pages (marked with *) apply to FAA registered AW119 MKII helicopters only and supersede the corresponding pages of the Rotorcraft Flight Manual. The holders of the Rotorcraft Flight Manual who are affected shall replace the corresponding pages of the basic Rotorcraft Flight Manual.

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Supplement 11 (Refer to the applicable List of Effective Pages)		Supplement 23 (Refer to the applicable List of Effective Pages)	
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INTRODUCTION

GENERAL

It is responsibility of the flight crew to be familiar with the contents of this manual.

REVISIONS (REISSUES)

This manual is subject to revisions (reissues) which will be automatically distributed to all holders of the manual. It is the responsibility of the operator to assure that the revisions (reissues) are incorporated into the manual upon receipt.

At the beginning of the manual there is the “List of Revisions” table that shows all pages of the manual which have been revised as well as number and approval reference of each revision.

REVISION SYMBOL

Revised text is indicated by a black vertical line on the outer margin of the page, adjacent to the affected text and the revision is printed in the lower inner margin. The revision symbol identifies the addition of new information, a change of procedure, the correction of an error, or a rewording of the previous information.

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. Temporary Revision pages are not written in the “List of Effective Pages”. A complete list of **active** and **inactive** Temporary Revision are written in the “List of Temporary Revisions” page.

TERMINOLOGY

WARNINGS, CAUTIONS AND NOTES

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 recommended.

“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.

ABBREVIATION

The use of capitol letters in the text, apart from normal grammatical usage indicates the actual wording or marking of indicators, controls or control positions on the helicopters.

Abbreviations and acronyms used throughout this RFM are defined as follows:

— A/C	: AirCraft
— a.c. / AC	: Alternating current
— ADI	: Attitude Data Indicator
— AGL	: Above Ground Level
— AWG	: Aural Warning Generator
— A/F	: Airframe
— CCW	: CounterClockWise
— CG	: Center of Gravity
— CW	: ClockWise
— d.c. / DC	: Direct current
— EDU	: Electronic Display Unit
— EEC	: Engine Electronic Control
— EMM	: Engine Maintenance Manuall
— GW	: Gross Weight
— Hd	: Density altitude
— Hp	: Pressure Altitude
— HSI	: Horizontal Situation Indicator
— IAS	: Indicated AirSpeed
— ICS	: InterCommunication System
— I.D.S.	: Integrated Display System
— IGE	: In Ground Effect
— ISA	: International Standard Atmosphere

— ITT	: Inter-Turbine Temperature
— KCAS	: Knots Calibrated AirSpeed
— KIAS	: Knots Indicated AirSpeed
— LH	: Left hand
— MAN	: MANual override system
— MCL	: Master Caution Light
— MCP	: Maximum Continuous Power
— MEC	: MEChanical
— MFR	: ManuFactureR
— MGB	: Main Gear Box
— MWL	: Master Warning Light
— N1	: Gas generator speed
— N2	: Power turbine speed
— NR	: Rotor speed
— OAT	: Outside Air Temperature
— OGE	: Out of Ground Effect
— PLA	: Power Lever Angle (throttle)
— QTY	: QuantiTY
— RFM	: Rotorcraft Flight Manual
— RH	: Right Hand
— RMI	: Radio Magnetic Indicator
— ROC	: Rate Of Climb in ft/min
— RPM	: Revolutions Per Minute
— SAS	: Stabilization Augmentation System
— TAS	: True AirSpeed in knots
— TOP	: Take-Off Power
— TQ	: Engine TorQue

— VFR	: Visual Flight Rules
— VHF	: Very High Frequency
— V_{NE}	: Velocity Never Exceed
— VSI	: Vertical Speed Indicator
— V_Y	: Best rate of climb speed
— Xfer	: Transfer
— WCA	: Warning Caution Advisory

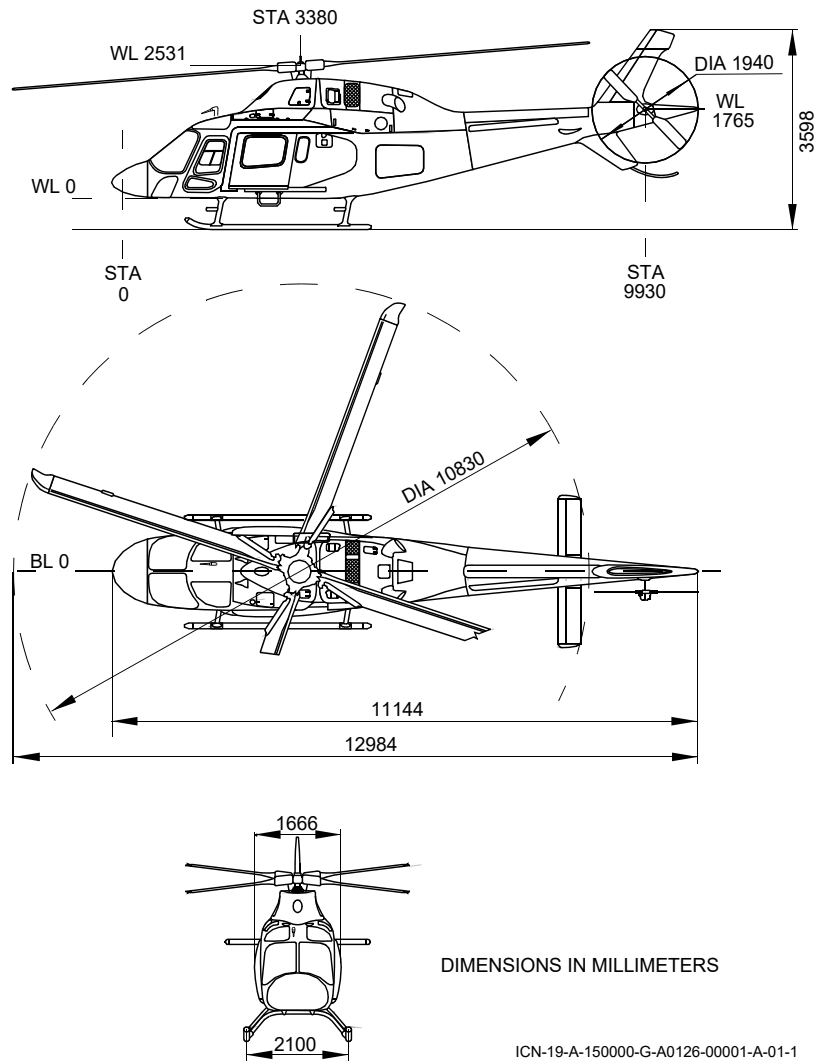


Figure 1. Helicopter — Three views

SECTION 1

LIMITATIONS

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SECTION 1

LIMITATIONS

GENERAL

Compliance with the operating limitations in section 1 of this manual is mandatory.

The helicopter must also be operated in accordance with the appropriate operating rules.

BASIS OF CERTIFICATION

The helicopter is certified under JAR 27 Small Rotorcraft Category, with the exemption of a limited number of paragraphs for which compliance has been demonstrated with CS 27 and FAR part 27.

TYPE OF OPERATION

This helicopter is approved for day and night VFR operation, in non-icing condition.

The helicopter equipped with only the Radio COMM KY196B (as alternative to Radio NAV/COMM KX165A) is approved for day VFR operation only.

No aerobatic manoeuvres are permitted.

FLIGHT CREW

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

NUMBER OF SEATS

Eight (pilot included).

AIRSPPEED LIMITATIONS (IAS)

V_{NE} (Power-ON/OFF)..... : See Figure 1-1

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

Maximum airspeed with torque between
100 and 108.5% (take-off power range).....: 75 KIAS

FLIGHT WITH PASSENGER CABIN DOORS OPEN OR REMOVED

V_{NE} with one or both doors open or removed: 85 KIAS

V_{NE} during doors opening and closing operation: 70 KIAS

Note

When passenger cabin doors are open or removed check
the Weight and Balance of the helicopter.

GROUND SPEED LIMITATIONS

Maximum forward speed at touchdown
after engine failure : 50 kts

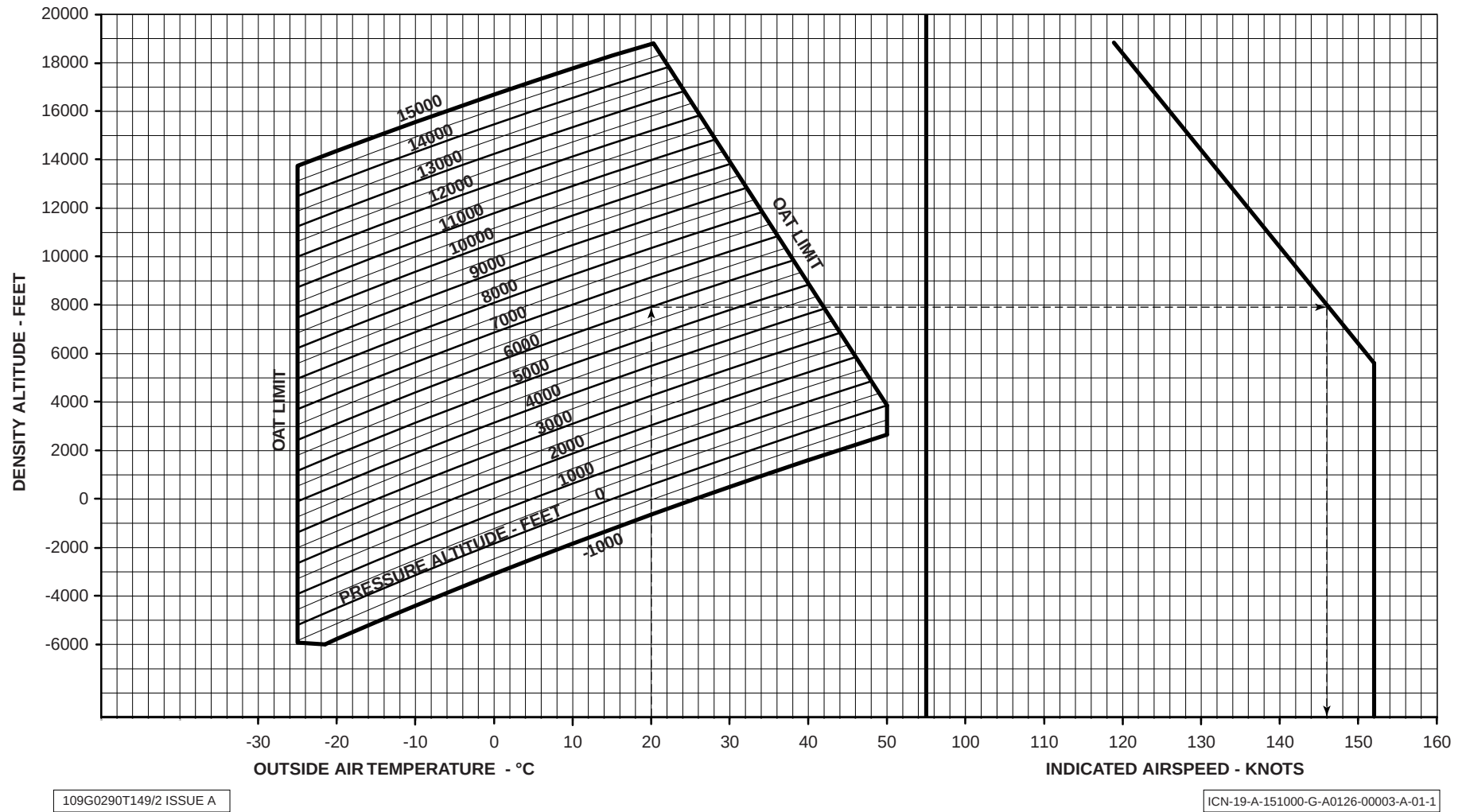


Figure 1-1. Airspeed Limitation - V_{NE} (power on/off)

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SLOPE TAKE-OFF AND LANDING LIMITATIONS

Nose-up operations..... : 12 deg

Side-up operations..... : 10 deg

Nose-down operations..... : 2 deg

WEIGHT LIMITATIONS

Maximum Gross Weight for ground operations
(towing and Take off prohibited)..... : 2900 kg (6393 lb)

Maximum Gross Weight..... : 2850 kg (6283 lb).

Minimum Gross Weight for flight..... : 1725 kg (3803 lb).

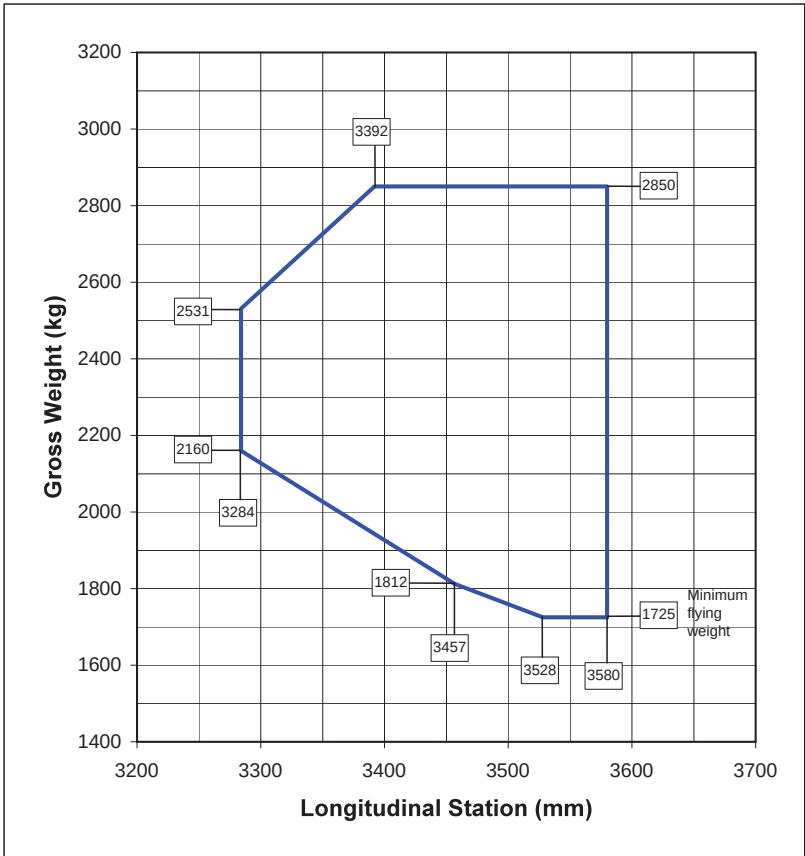
CENTER OF GRAVITY LIMITATIONS

Longitudinal CG limits..... : See Figures 1-2 and 1-3

Lateral CG limits..... : See Figures 1-4 and 1-5

Note

In some loading conditions the longitudinal limitation (aft limit) can be exceeded. Refer to Section 6 for loading instructions.



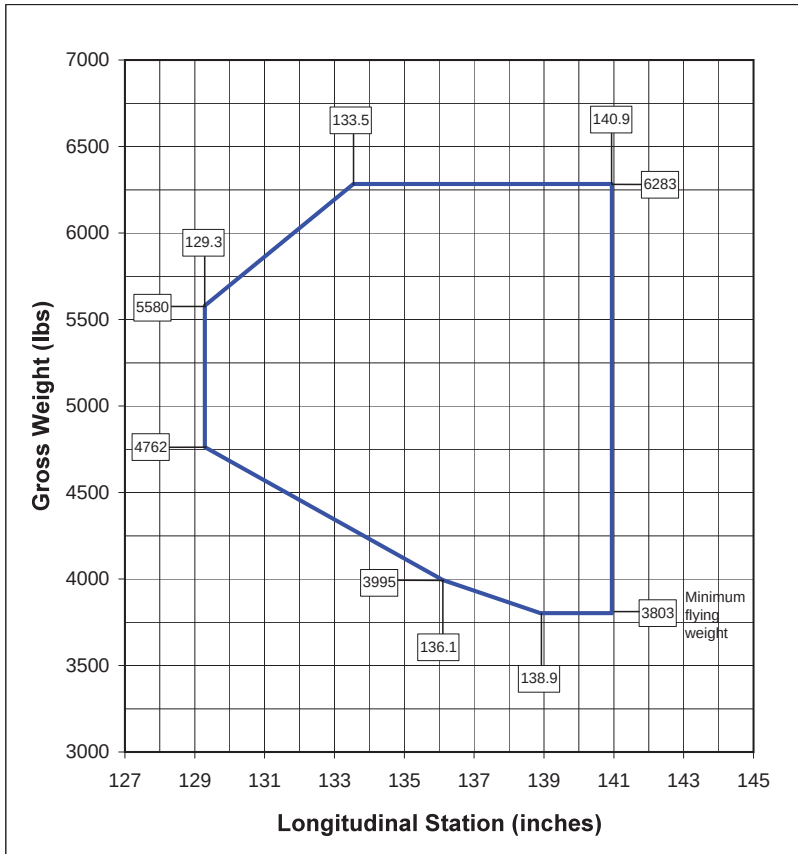
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Note

Longitudinal Station "0" is 1785 mm forward of the front jack point.

**Figure 1-2. Weight and Longitudinal CG Envelope
(metric units)**



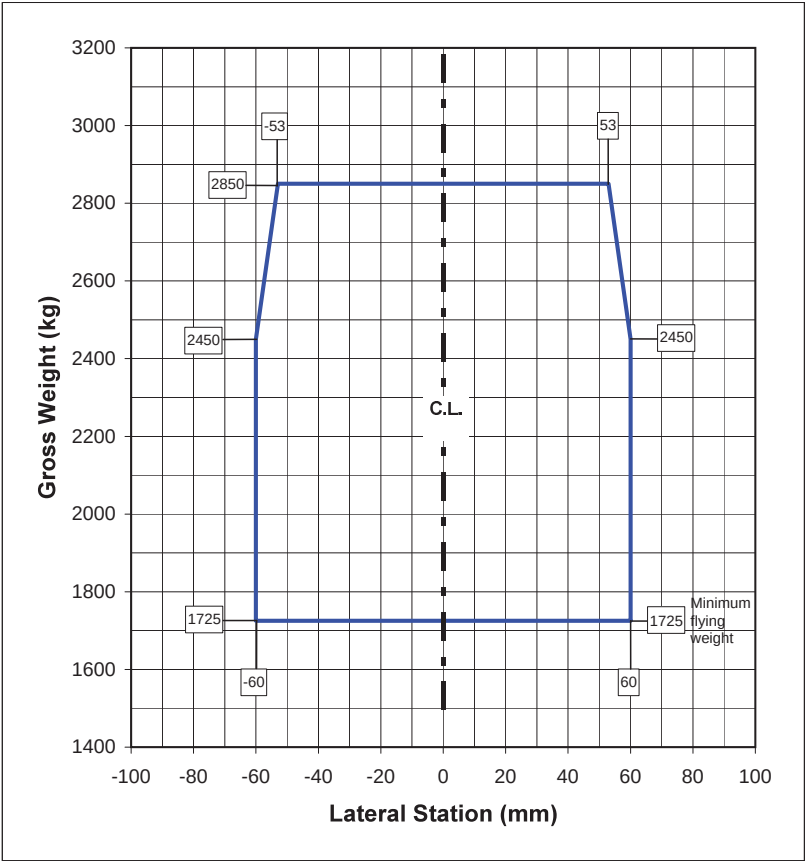
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Note

Longitudinal Station "0" is 70.2 in forward of the front jack point.

**Figure 1-3. Weight and Longitudinal CG Envelope
(imperial units)**



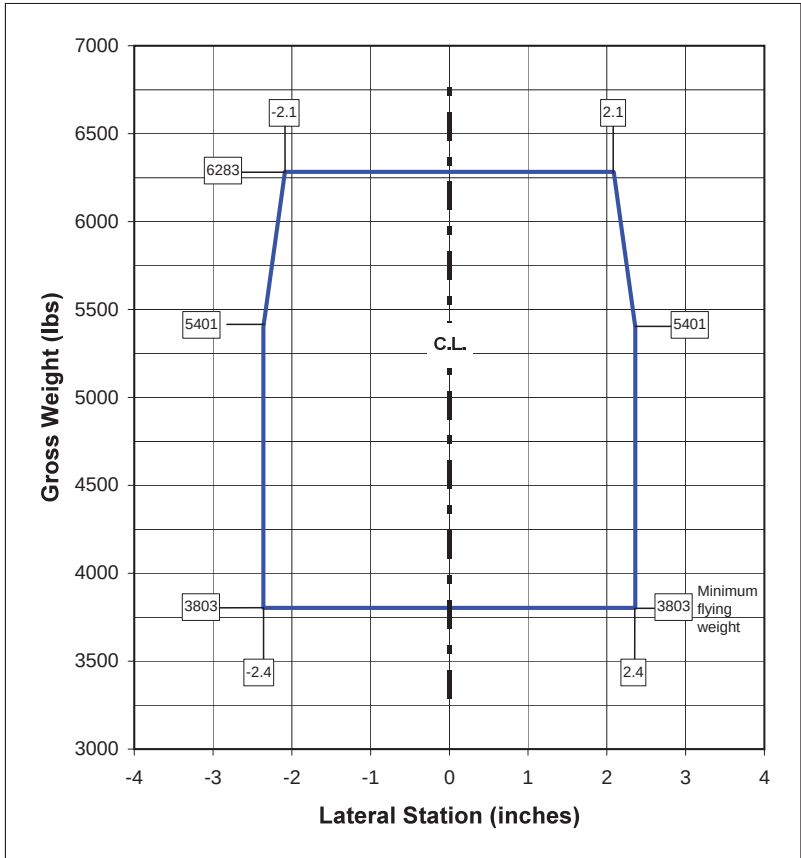
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ICN-19-A-151000-G-A0126-00002-A-01-1

Note

Lateral Station “0” is 450 mm inboard from each main jack point and coincides with the helicopter longitudinal plane of symmetry.

**Figure 1-4. Weight and Lateral CG Envelope
(metric units)**



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Note

Lateral Station "0" is 17.7 in inboard from each main jack point and coincides with the helicopter longitudinal plane of symmetry.

**Figure 1-5. Weight and Lateral CG Envelope
(imperial units)**

ALTITUDE LIMITATIONS

Maximum operating altitude : 15000 ft (4572 m) Hp

AMBIENT AIR TEMPERATURE LIMITATIONS

Refer to Figure 1-1.

POWER PLANT LIMITATIONS

The helicopter is powered by a Pratt & Whitney Canada PT6B-37A Build Specification 1242 turboshaft engine.

GAS GENERATOR SPEED (N1)

Minimum	: 51%
Cautionary (autorotation only).....	: 51 to 60%
Continuous operation.....	: 60 to 100.1%
Take-off (5 minutes)	: 100.1 to 103.2%
Maximum take-off (5 minutes).....	: 103.2%
Transient (30 seconds)	: 103.8%

Note

Transient must not be used intentionally.

POWER TURBINE SPEED (N2)

Minimum	: 95%
Cautionary.....	: 95 to 101%
Continuous operation.....	: 101 to 103%
Maximum	: 103%
Transient (10 seconds)	: 108%

Note

Transient must not be used intentionally.

INTER-TURBINE TEMPERATURE (ITT)

Maximum continuous: 755 °C

Take-off (5 minutes): 755 to 810 °C

Maximum take-off (5 minutes).....: 810 °C

Transient (5 seconds).....: 860 °C

Maximum unlimited at starting: 870 °C

Transient at starting.....: 1090 °C

two second between 980 °C and 1090 °C.

Note

A linear variation applies above 870 °C, ten seconds,
and 980 °C, two seconds.

Note

Transient must not be used intentionally.

ENGINE TORQUE (TQ)

Maximum continuous: 100%

Take-off (5 minutes): 100 to 108.5%

Maximum take-off (5 minutes).....: 108.5%

Transient (6 seconds).....: 115%

Note

Transient must not be used intentionally.

ROTOR LIMITATIONS (NR)

POWER-ON

Minimum : 95%

Cautionary : 95 to 101%

Continuous operation : 101 to 103%

Maximum : 103%

Transient (10 seconds) : 108%

Note

Transient must not be used intentionally.

POWER-OFF

Transient (10 seconds) : 80%

Minimum : 90%

Continuous operation : 90 to 110%

Maximum : 110%

FUEL SYSTEM LIMITATIONS

FUEL PRESSURE

Cautionary : 0 to 7 psi
Continuous operation : 7 to 25 psi
Maximum : 25 psi

Table 1-1. Approved fuel

Type	Specification
JET A	ASTM D1655
JET A-1	ASTM D1655
JET B (**)	ASTM D1655
JP-5 (*)	MIL-T-5624
JP-8 (*)	MIL-T-83133
No. 3 Jet fuel (RP-3) (****)	GB 6537-2018
TS-1 (**)	GOST 10227-86, in addition complying to Decree 118

(*) Contains 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 without prior agreement).

(**) Use of TS-1 fuel complying with GOST 10227-86 specification, but not complying with Decree 118, is prohibited.

(***) Use of Jet B fuel, alone or mixed with other approved fuels, is limited to operation with ambient temperature up to +15 °C.

(****) Use of No. 3 Jet Fuel with additives T1502 or T1602 is prohibited.

Note

Any mixture of approved fuels may be used.

Note

For operation below 4 °C the use of anti-ice additive is authorized but not mandatory since the engine oil system is provided with an oil-to-fuel heater where, depending upon the temperature of the fuel, the engine oil is utilized to preheat the fuel. For additive requirements and blending procedures refer to EMM.

ENGINE LUBRICATION SYSTEM LIMITATIONS

OIL PRESSURE

Minimum: 40 psi

Cautionary (with N1 < 72%): 40 to 80 psi

Continuous operation: 80 to 110 psi

Maximum: 110 psi

Note

During cold starting conditions the oil pressure can temporarily exceed 110 psi; it reduces as oil temperature increases.

OIL TEMPERATURE

Minimum OAT for starting : See Figure 1-1

Continuous operation : 10 to 115 °C

Maximum : 115 °C

Transient (5 minutes with N1 at $61 \pm 1\%$) : 127 °C

Table 1-2. Approved lubricating oils

Designation	Specification
BP Turbo Oil 2380	MIL-PRF-23699
Mobil Oil Jet II	MIL-PRF-23699
Aeroshell Turbine Oil 500	MIL-PRF-23699
Turbonycoil 525-2A	PWA 521
Royco Turbine Oil 500	MIL-PRF-23699
Castrol 5000	MIL-PRF-23699

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

Note

Mixing of oils of different brands, types and manufacturers is prohibited.

MAIN TRANSMISSION LUBRICATION SYSTEM LIMITATIONS

OIL PRESSURE

Minimum: 30 psi

Continuous operation.....: 30 to 55 psi

Cautionary.....: 55 to 70 psi

Maximum: 70 psi

OIL TEMPERATURE

Minimum OAT for starting : See Figure 1-1

Continuous operation..... : 0 to 115 °C

Maximum : 115 °C

Table 1-3. Approved lubricating oils

Designation	Specification
BP Turbo Oil 2380	MIL-PRF-23699
Mobil Oil Jet II	MIL-PRF-23699
Mobil Oil Jet 254	MIL-PRF-23699
Aeroshell Turbine Oil 500	MIL-PRF-23699
Aeroshell Turbine Oil 560	MIL-PRF-23699
Castrol 5000	MIL-PRF-23699
Aeroshell Turbine Oil 555	DOD-L-85734

Oils limited to ambient temperature above -40 °C (-40 °F)

Note

Mixing of oils of different brands, types and manufacturers is prohibited.

TAIL ROTOR GEARBOX LUBRICANT LIMITATIONS

Table 1-4. Approved lubricating oils

Designation	Specification
BP Turbo Oil 2380	MIL-PRF-23699
Mobil Oil Jet II	MIL-PRF-23699
Mobil Oil Jet 254	MIL-PRF-23699
Aeroshell Turbine Oil 500	MIL-PRF-23699
Aeroshell Turbine Oil 560	MIL-PRF-23699
Castrol 5000	MIL-PRF-23699
Aeroshell Turbine Oil 555	DOD-L-85734

Oils limited to ambient temperature above -40 °C (-40 °F)

Note

Mixing of oils of different brands, types and manufacturers is prohibited.

ENGINE STARTER LIMITATIONS

The engine starter duty cycle is the following:

On battery

- 40 seconds on, 60 seconds off
- 40 seconds on, 60 seconds off
- 40 seconds on, 30 MINUTES off

With external power

- 25 seconds on, 30 seconds off
- 25 seconds on, 30 seconds off
- 25 seconds on, 30 MINUTES off

GENERATOR LOAD LIMITATIONS

Continuous operation.....: 0 to 200 A

Maximum: 200 A

Transient (5 seconds): 300 A

HYDRAULIC SYSTEM LIMITATIONS

FLUID PRESSURE

Minimum..... : 1200 psi
Cautionary..... : 1200 to 1400 psi
Continuous operation..... : 1400 to 1550 psi
Maximum..... : 1550 psi

APPROVED FLUIDS

The following hydraulic fluids are approved:

- MIL-PRF-5606
- MIL-PRF-83282.

Note

Mixing of fluids of different types is prohibited.
When changing type of oil, the hydraulic system
must be drained and completely flushed.

MISCELLANEOUS LIMITATIONS

ENGINE CONTROL SYSTEM LIMITATIONS

The primary mode of operation of the engine control system is the electronic engine control (EEC).

The mechanical mode of operation (MEC) is to be used only in emergency when the EEC is failed or for training purposes.

BAGGAGE COMPARTMENT LIMITATIONS

Maximum load..... : 150 kg (330 lb)

Note

Refer to Section 6, Weight and Balance, for load distribution.

Maximum unit load..... : 500 kg/m² (102 lb/sq ft)

LANDING LIGHTS OPERATION VS MAGNETIC COMPASS INDICATION LIMITATIONS

When operating the landing lights, the magnetic compass indications is not reliable.

UPPER DECK WINTER KIT LIMITATIONS (IF INSTALLED)

Maximum ambient air temperature for
Upper Deck Winter Kit P/N 109G2900F01-101 installation : 10 °C

NORMAL IDS MODE OF OPERATION

The normal mode of operation of the IDS is with both the EDUs operating. The reversionary mode of operation is intended only for EDU malfunction or failure cases.

INSTRUMENT MARKINGS

Instruments are marked as follows:

Safe operating limits.....: Red radial line

Safe operating range.....: Green arc

Take-off and cautionary range.....: Yellow arc

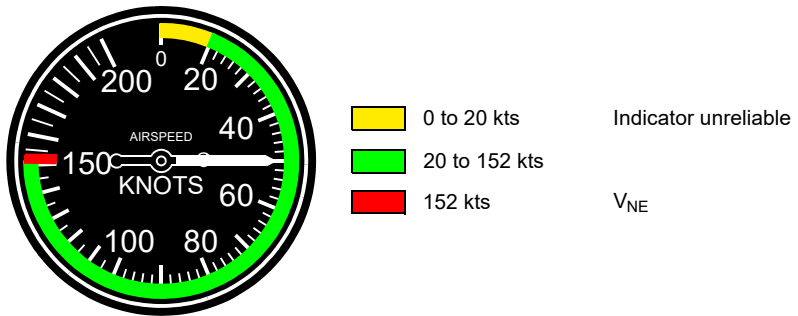
Transient limit.....: Red dot

Transient limit during starting: Red triangle

For the back-up dual tachometer indicator the following markings are provided for the needles:

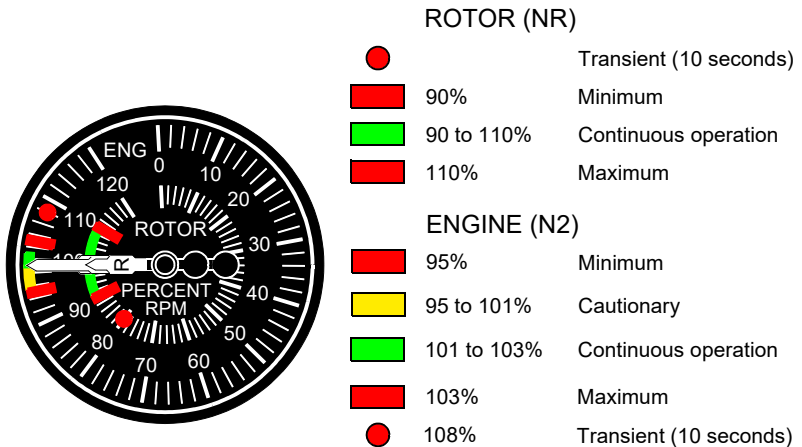
Engine: E

Main rotor: R



ICN-19-A-151000-G-A0126-01001-A-01-1

Figure 1-6. Airspeed Indicator



ICN-19-A-151000-G-A0126-01002-A-01-1

Figure 1-7. Back-up Dual Tachometer Indicator

ELECTRONIC DISPLAY UNIT FORMAT

The EDUs present the following informations:

Table 1-5. EDU parameters

EDU 1 (top - primary parameters)	EDU 2 (bottom - secondary parameters)
- ITT	- Engine oil pressure
- TQ	- Engine oil temperature
- N1	- Transmission oil pressure
- NR/N2	- Transmission oil temperature
- Caution, warning, advisory and status messages	- DC ammeter
	- DC voltmeter
	- AC voltmeter
	- Fuel pressure
	- Fuel quantity
	- Hydraulic pressure
	- OAT
	- Time

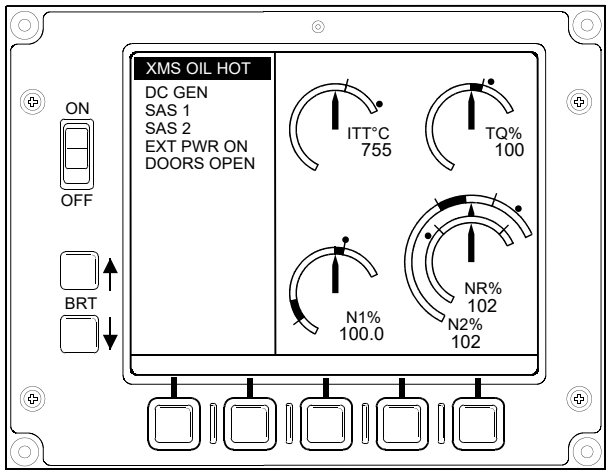
The display modes are:

Table 1-6. EDU mode

EDU1 (primary mode)	EDU2 (secondary mode)
- START format	- MAIN format
- CRUISE format	

Table 1-7. EDU revisionary mode

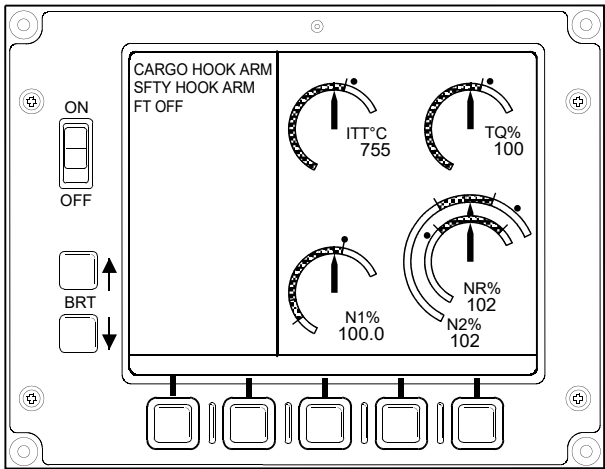
EDU1 & EDU2 (reversionary mode)
- REVERSIONARY format



ICN-19-A-151000-G-A0126-01003-A-01-1

Figure 1-8. EDU1 Primary Mode - START format (typical)

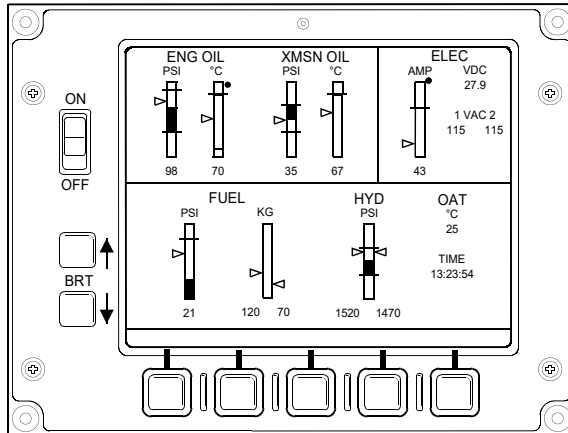
The START format is displayed automatically during engine starting.



ICN-19-A-151000-G-A0126-01004-B-01-1

Figure 1-9. EDU1 Primary Mode - CRUISE format (typical)

The CRUISE format is displayed automatically at the end of the start sequence.



ICN-19-A-151000-G-A0126-01005-A-01-1

Figure 1-10. EDU2 Secondary Mode - MAIN format (typical)
The MAIN format is displayed upon I.D.S. initialization.

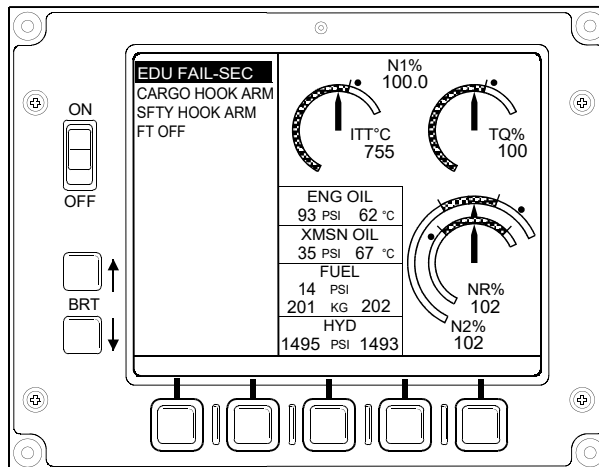


Figure 1-11. EDU1 & EDU2 - REVERSIONARY format (typical)

Any EDU enters in the REVERSIONARY format manually by pressing the ON/OFF switch to OFF on the failed EDU or automatically when a critical failure occurs and is detected by the healthy EDU.

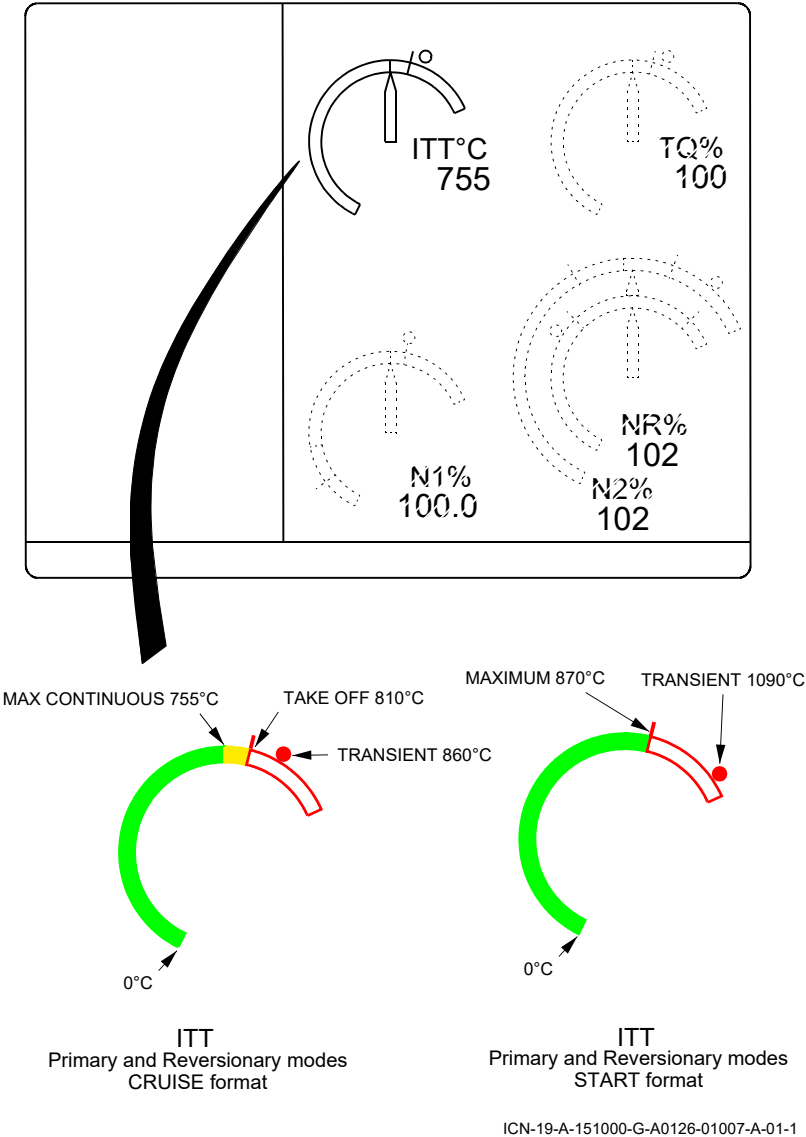
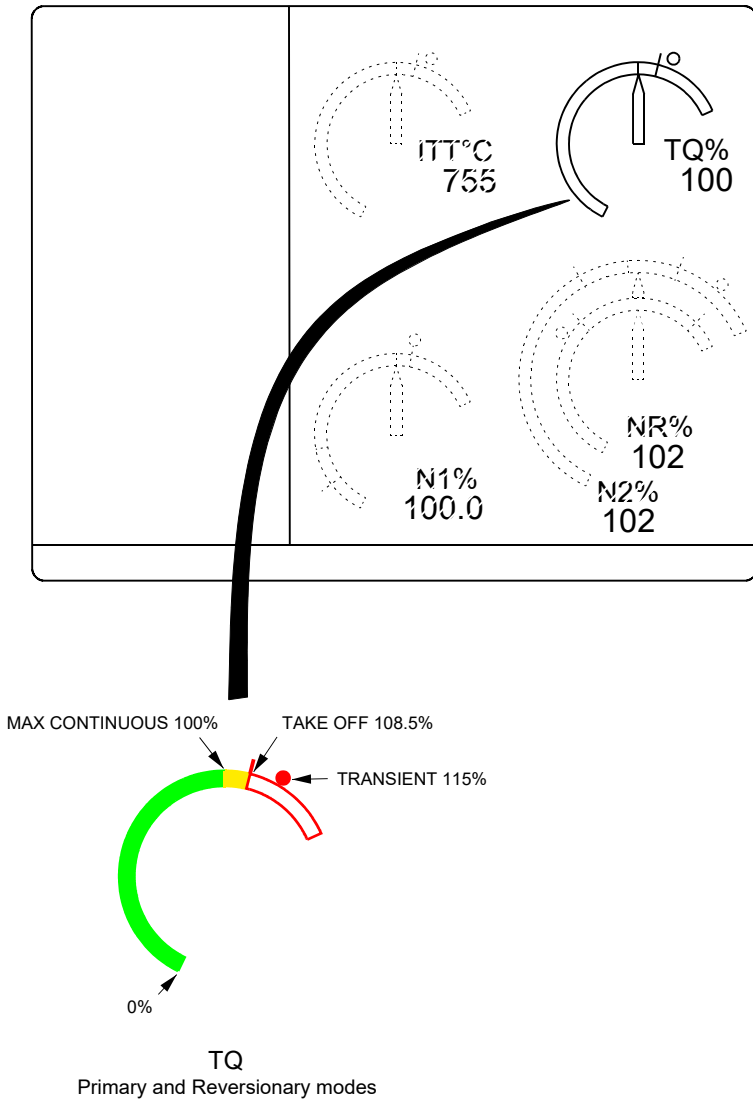
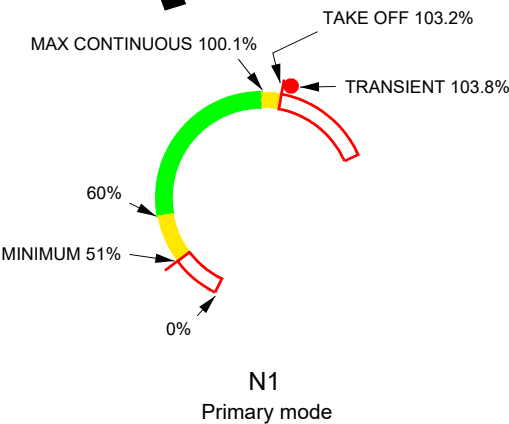
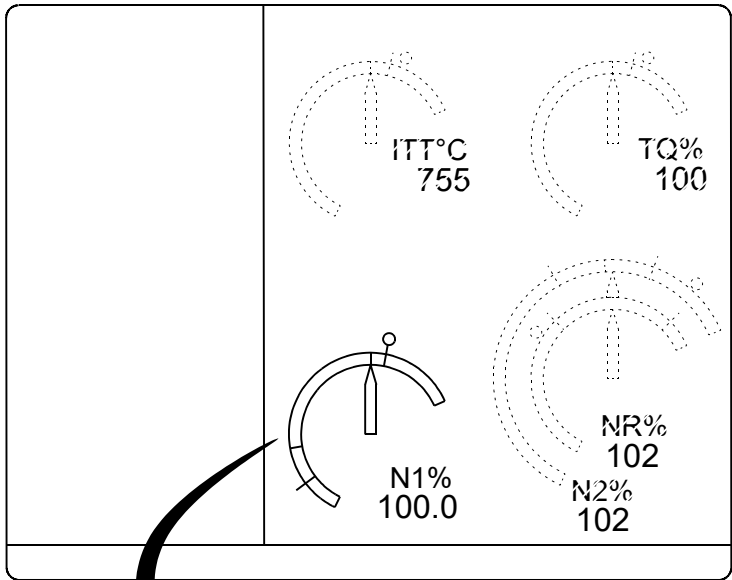


Figure 1-12. EDU 1 - InterTurbine Temperature (ITT)



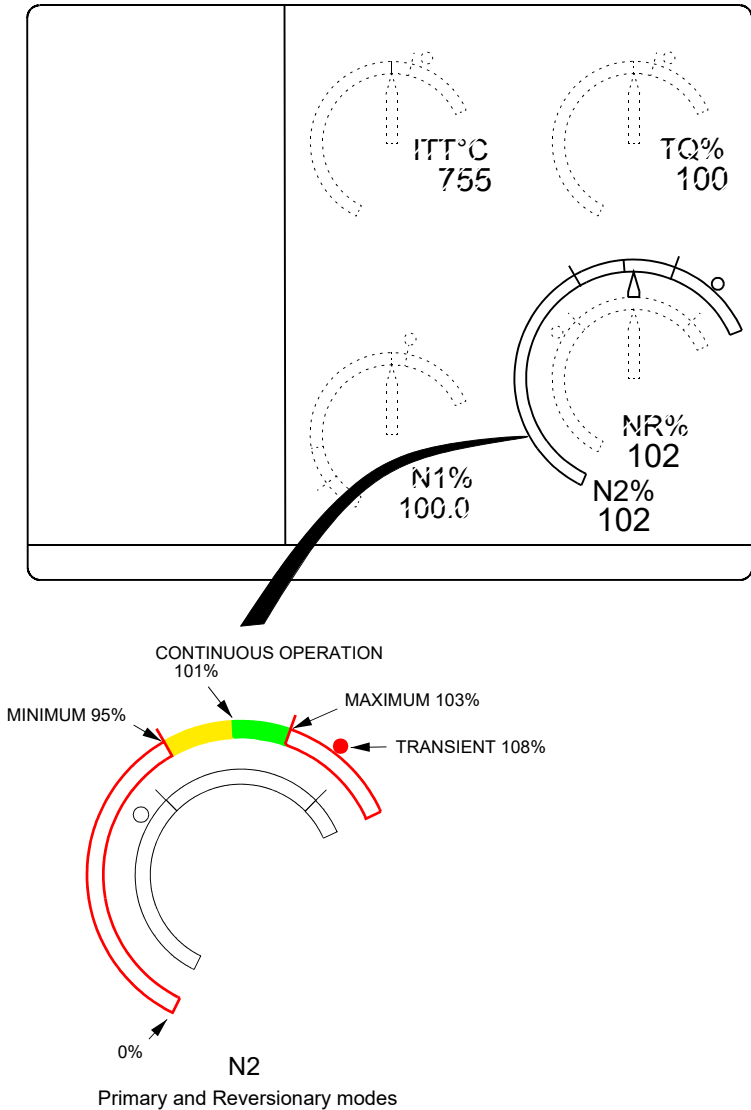
ICN-19-A-151000-G-A0126-01008-A-01-1

Figure 1-13. EDU 1 - Torque (TQ)



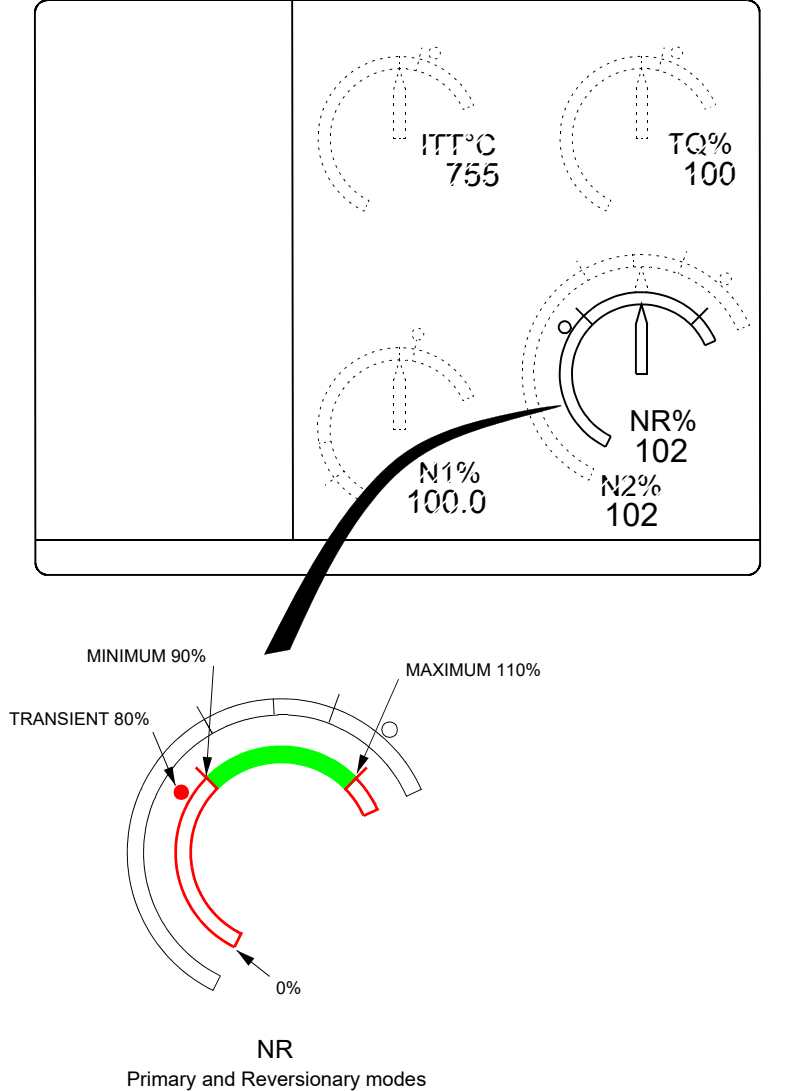
ICN-19-A-151000-G-A0126-01009-A-01-1

Figure 1-14. EDU 1 - Gas Generator Speed (N1)



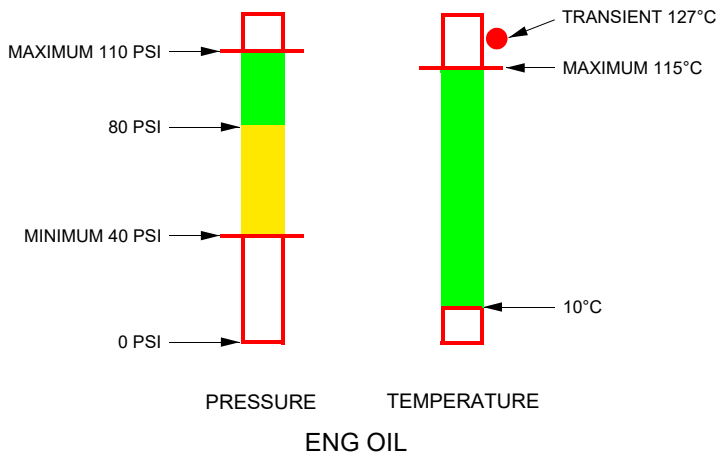
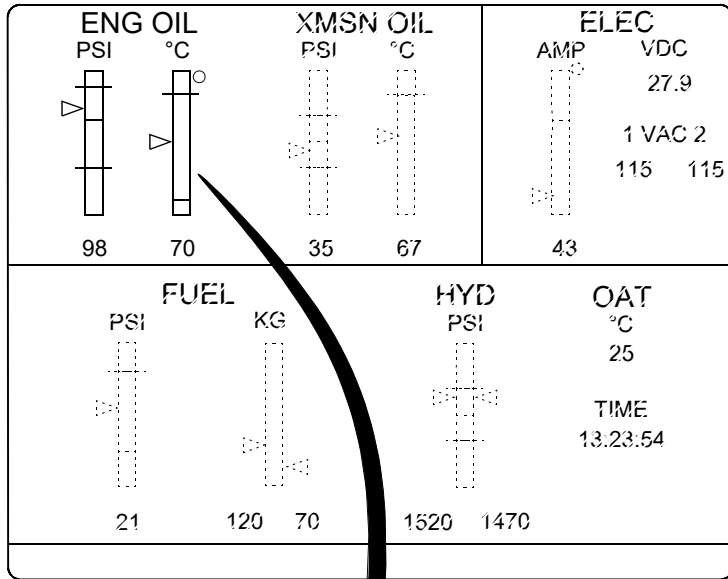
ICN-19-A-151000-G-A0126-01010-A-01-1

Figure 1-15. EDU 1 - Power Turbine Speed (N2)



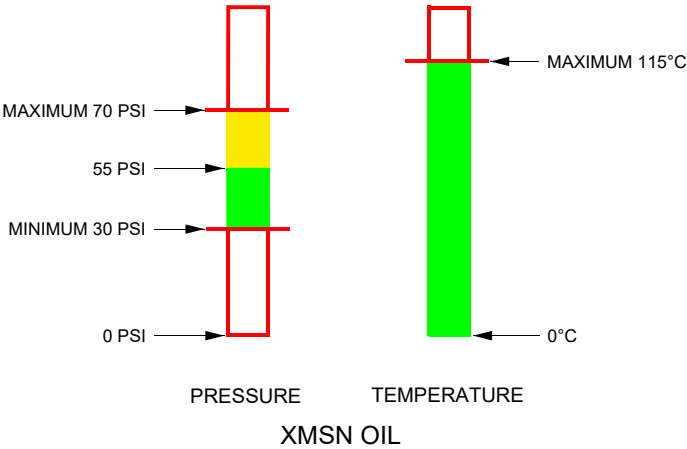
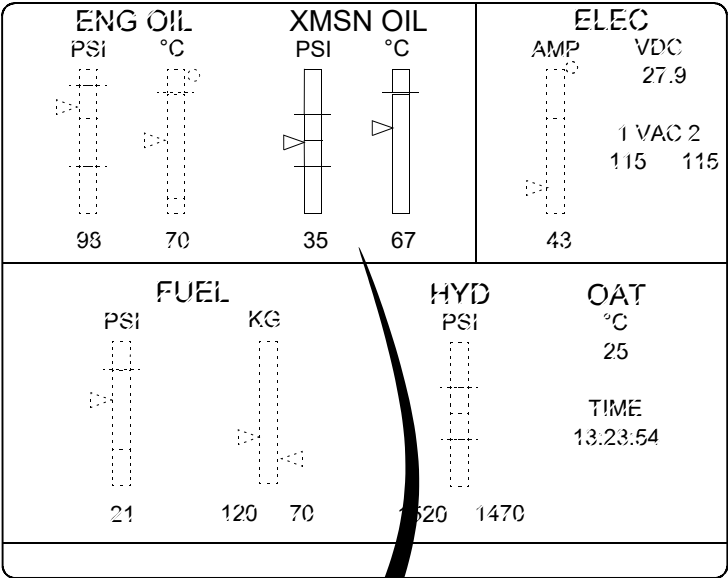
ICN-19-A-151000-G-A0126-01011-A-01-1

Figure 1-16. EDU 1 - Rotor Speed (NR)



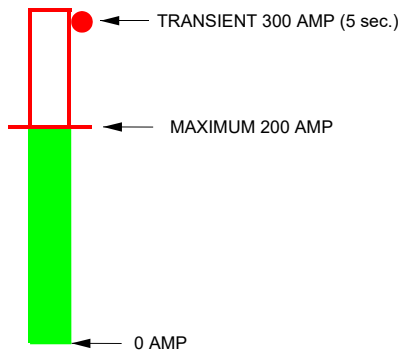
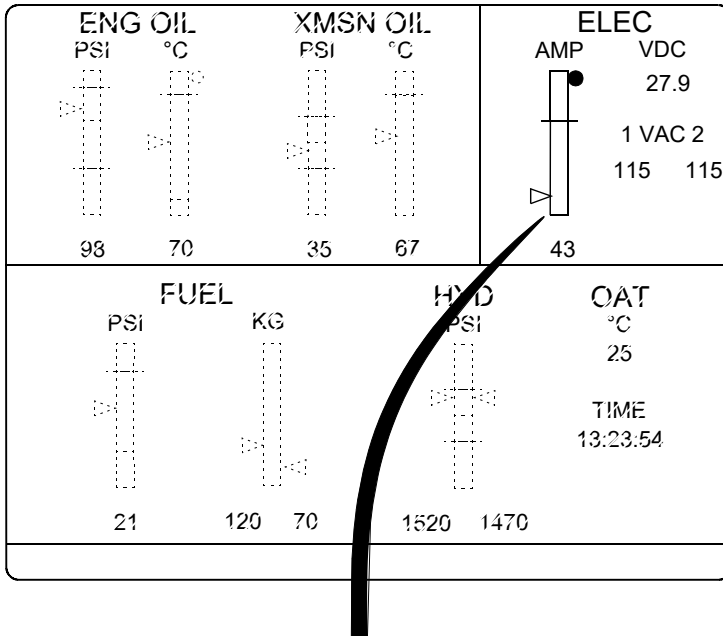
ICN-19-A-151000-G-A0126-01012-A-01-1

Figure 1-17. EDU 2 - Engine Oil (Pressure and Temperature)



ICN-19-A-151000-G-A0126-01013-A-01-1

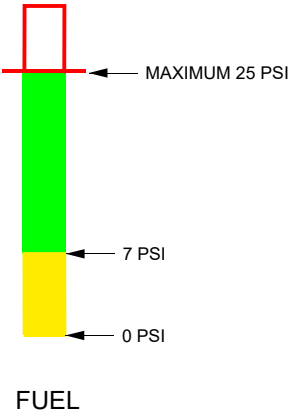
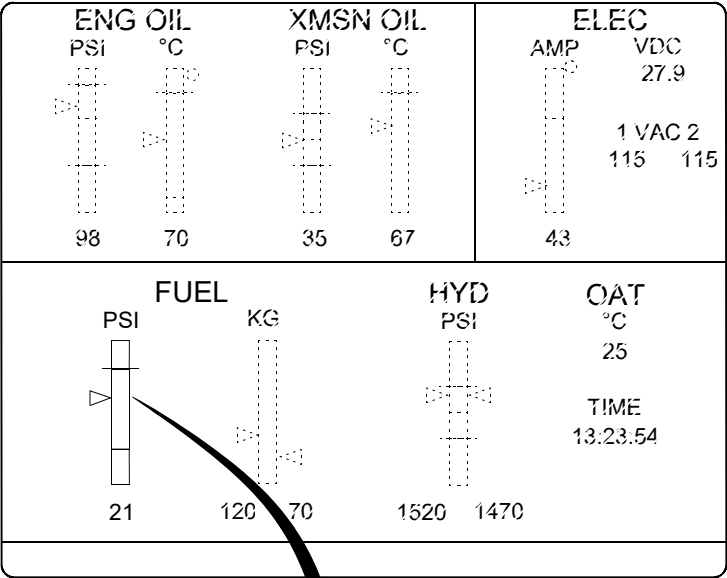
Figure 1-18. EDU 2 - Transmission Oil
(Pressure and Temperature)



AMMETER

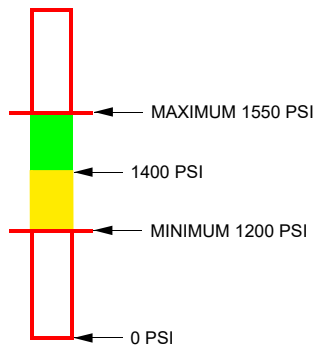
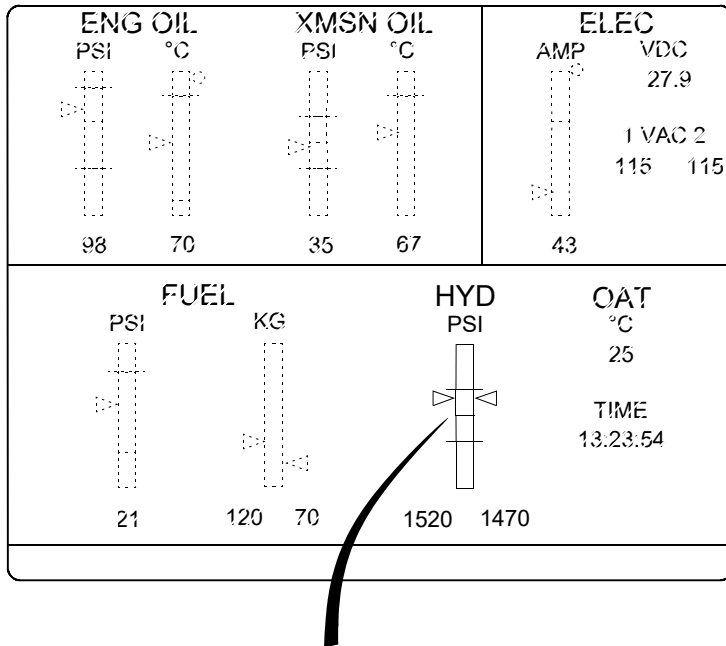
ICN-19-A-151000-G-A0126-01014-A-01-1

Figure 1-19. EDU 2 - Ammeter



ICN-19-A-151000-G-A0126-01015-A-01-1

Figure 1-20. EDU 2 - Fuel Pressure

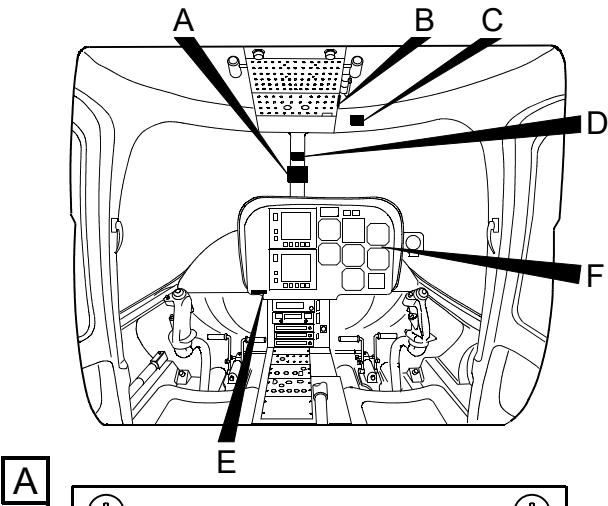


HYD

ICN-19-A-151000-G-A0126-01016-A-01-1

Figure 1-21. EDU 2 - Hydraulic Pressure

PLACARDS



A

Vne AIRSPEED LIMITATIONS - KIAS							
Hp ft OAT °C	-1000 TO SL	3000	6000	9000	12000	15000	
50	152	-	-	-	-	-	
40	152	150	-	-	-	-	
30	152	152	143	134	-	-	
20	152	152	146	137	128	119	
10	152	152	149	140	131	121	
0	152	152	152	143	133	124	
-10	152	152	152	146	136	127	
-20	152	152	152	149	139	130	
-25	152	152	152	150	140	131	

ICN-19-A-151000-G-A0126-01017-A-01-1

Figure 1-22. (sheet 1 of 2). Placards in Clear View of the Pilot

B

IN ALTN POSITION MAINTAIN
INSTRUMENT ACCURACY BY
CLOSING WINDOWS VENTS
AND TURNING HEATER OFF

C

ALTN STATIC
DECREASE ALTIMETER
READINGS BY 250 ft

D

THIS ROTORCRAFT IS
APPROVED FOR DAY AND
NIGHT VFR OPERATIONS
IN NON-ICING CONDITIONS.
IT MUST BE OPERATED
IN ACCORDANCE WITH
THE APPROVED ROTORCRAFT
FLIGHT MANUAL

E

USABLE FUEL	
TANK 1 238 Kg	TANK 2 238 Kg

F

WHEN OPERATING LDG LIGHT OR
SEARCHLIGHT, MAGNETIC COMPASS
INDICATION IS NOT RELIABLE

ICN-19-A-151000-G-A0126-01018-A-01-1

Figure 1-22. (sheet 2 of 2). Placards in Clear View of the Pilot

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SECTION 2

NORMAL PROCEDURES

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SECTION 2

NORMAL PROCEDURES

INTRODUCTION

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. Pertinent data in other sections is referenced when applicable.

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. Refer to Section 1 for a detailed explanation of each operating limitation.

Each time an operating limitation is exceeded, a malfunction or an emergency occurs, an appropriate entry shall be made in the logbook (helicopter, 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.

FLIGHT PLANNING

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

Essential data, 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;
- review the appropriate Appendices of this Rotorcraft Flight Manual for the optional equipment(s) installed.

Ascertain proper weight and balance of the helicopter as follows:

- consult Section 6 - Weight and Balance;
- 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.

COLD WEATHER OPERATIONS

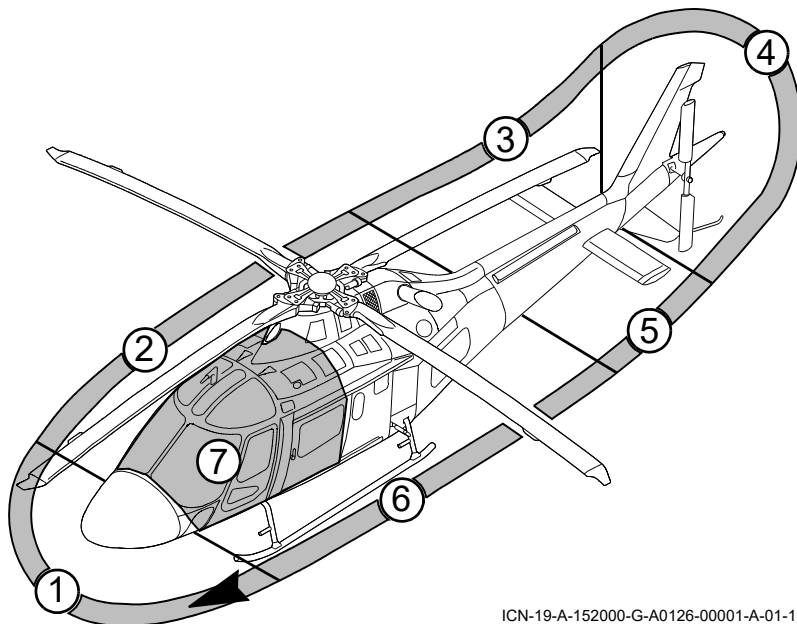
The battery should be stored in a warm place during prolonged helicopter inactivity. Engine starting with a cold, fully charged battery was demonstrated down to an OAT of -10 °C.

PRE-FLIGHT CHECK

Pre-flight checks are intended as those checks to be performed by the pilot in order to ascertain that the helicopter is flightworthy and adequately equipped.

They are therefore not meant as detailed mechanical inspections, but as a guide to check the condition of the helicopter.

Passengers should be briefed on relevant operational procedures and associated hazards.



ICN-19-A-152000-G-A0126-00001-A-01-1

- AREA N°1: Helicopter nose
- AREA N°2: Fuselage - RH side
- AREA N°3: Tail boom - RH side
- AREA N°4: Fins, 90° gearbox, tail rotor, tail skid
- AREA N°5: Tail boom - LH side
- AREA N°6: Fuselage - LH side
- AREA N°7: Cabin interior

Figure 2-1. Pre-flight Check Sequence

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

The following procedure outlines the pilot walk-around and interior checks (see figure 2-1).

Main and tail rotor tie-downs : Removed.
(if present)

Area N°1 (Helicopter Nose)

Nose exterior : Condition.
Landing lights : Condition.
Nose compartment access door : Open.
Battery : Secured; connectors secured.
Electrical/avionic equipment : Secured.
Nose compartment access door : Secured; fastener security pin out.

Area N°2 (Fuselage - RH side)

Lateral panel, windshield and roof transparent panel : Condition and cleanliness.

Windshield wiper (if installed) : Condition.

External power receptacle : Door secured.

OAT probe : Condition.

Pilot door, window and, if installed, sliding window : Condition, cleanliness, security and correct operation of locking mechanism.
Sliding window closed.

Pitot tube/static ports : Cover removed; condition and obstructions.

Fuselage exterior	: Condition.
Ventilation air intake	: Free of obstructions.
Upper Deck Winter kit covers (if installed)	: Condition.
Passenger door, window and, if stalled, sliding window	: Condition, cleanliness and security. Sliding window closed.
Passenger door lock	: Check.
Passenger door jettison window	: Security of window and seal retainer. Check red strap secured.
Drain and vent lines	: Leaks.
Landing gear skid and attachments	: Condition.
Fuel filler cap	: Secured.
Servo hydraulic system valves and filters group	: Leaks and bypass indication (red button out: filter clogged). Door secured.
Hydraulic system reservoirs	: Correct oil level, filler caps secured. Quick-disconnect return lines secured. Door secured.
Main rotor head and blades	: Condition. In cold weather check for the removal of snow, frost or ice. Turn the rotor by hand at least once before start-up.
Main rotor dampers	: Check for correct fluid level.
Main rotor pitch change links	: Condition and security.
Swashplate and driving scissors	: Condition and security.
Upper anticollision light	: Condition.
Servo actuator	: Condition and leaks.

Main transmission and accessories (visible area)	: Condition and leaks.
Transmission external oil filter	: Bypass indication (red button out: filter clogged). Door secured.
Engine upper and RH air intake screens and plenum chamber	: Covers removed; foreign matter and condition.
Engine oil	: Correct level and cap secured.
Engine area	: Leaks of fuel and/or oil.
Engine to transmission drive shaft	: Condition.
Engine cowling	: Condition; secured.
Engine exhaust duct	: Cover removed; condition.
Cowlings and fairings	: Condition and secured.
Access doors	: Secured.

Area N°3 (Tailboom - RH side)

Tail boom exterior	: Condition.
Lower anti-collision light	: Condition.
Antenna(s)	: Condition.
Stabilizer and protective fairing	: Condition and security.
Navigation light	: Condition.

Area N°4 (Fins, 90° gearbox, tail rotor and tail skid)

Exterior	: Condition.
Tail skids	: Condition and security.
Tail rotor (90°) gearbox	: Check oil level. Check for leaks. Filler cap secured.
Access doors	: Secured.
Tail navigation light	: Condition.
Tail rotor hub and blades	: Condition, security and freedom of flapping. In cold weather check for the removal of snow, frost or ice.
Tail rotor pitch change mechanism	: Condition and secured.

Area N°5 (Tail boom - LH side)

Tail boom exterior	: Condition.
Stabilizer and protective fairing	: Condition and security.
Navigation light	: Condition.
Antenna(s) (if installed)	: Condition.
Tail rotor drive shaft bearing	: Condition.
Tail rotor drive shaft dampers	: Condition.
Tail rotor drive fairing	: Secured.

Area N°6 (Fuselage - LH side)

Tail rotor servo actuator (inside baggage compartment)	: Condition and leaks.
Baggage compartment	: Cargo properly secured. Door secured.
Fuselage exterior	: Condition.
Drain and vent lines	: Leaks.
Oil cooler rear end	: Foreign matter.
Transmission to fan shaft	: Condition and security.
Engine area	: Leaks of fuel and/or oil.
Engine oil filter	: Check for bypass indication (button out: filter clogged).
Engine cowling	: Condition; secured.
Engine exhaust duct	: Cover removed; condition.
Main rotor head and blades	: Condition. In cold weather check for the removal of snow, frost or ice.
Main rotor dampers	: Check for correct fluid level.
Main rotor pitch change links	: Condition and security.
Main rotor servo actuators	: Condition and leaks. Door secured.
Main transmission and accessories (visible area)	: Condition and leaks.
Transmission	: Filler cap secured.
Transmission oil	: Correct level. Door secured.
Engine LH air intake screen and plenum chamber	: Cover removed; foreign matter, and condition.

Cowlings and fairings	: Condition and secured.
Access doors	: Secured.
Landing gear skid and attachments	: Condition and security.
LH and RH fuel sumps or (if installed and d.c. power connected) fuel drain valve #1(#2) switch	: Drain.
Upper Deck Winter kit covers (if installed)	: Condition.
Roof transparent panel, windshield and lateral panel	: Condition and cleanliness.
Windshield wiper (if installed)	: Condition.
Passenger door, window and, if installed, sliding window	: Condition, cleanliness and security. Sliding window closed.
Passenger door lock	: Check.
Passenger jettison window	: Security of window and seal retainer. Check red strap secured.
Co-pilot door, window and, if installed, sliding window	: Condition and cleanliness, security and correct operation of locking mechanism. Sliding window closed.
Check following systems for correct operation (connect d.c. electrical power supply):	
— navigation and anticollision lights;	
— landing lights.	
Disconnect the d.c. electrical power supply.	

Area N° 7 (Cabin interior)

Cabin interior : Security of equipment and cargo.

Note

Operation with passenger sliding doors open or removed requires the removal or securing of all cabin equipment.

First aid kit (if installed) : Security and contents on board.

Cabin fire extinguisher (if installed) : Security.

Co-pilot door jettison handle and safety latch : Correct position.

Co-pilot safety belt and inertia reel : Condition and belt fastened if seat is unoccupied.

Pilot door jettison handle and safety latch : Correct position.

Pilot safety belt and inertia reel : Condition.

Relay box circuit breakers : IN.

Pilot flight controls : Condition and security.

Instruments : Condition and legibility.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

Main and tail rotors tie-downs	: Removed.
Nose compartment access door	: Condition; latched.
RH side, windshield and roof transparencies	: Condition and cleanliness.
Pitot tube/static ports	: Cover removed; free of obstructions.
RH side crew/passenger doors	: Condition, hinges and latches. Sliding windows (if installed) closed.
RH forward fuselage	: Condition.
RH landing gear skid assembly	: Condition.
Fuel filler cap	: Secured
Main rotor blades	: Condition and cleanliness.
Main rotor dampers	: Correct fluid level.
RH engine air intake	: Cover removed; free of obstructions.
RH engine exhaust	: Cover removed.
RH side access panels	: Closed and secured.
RH aft fuselage	: Condition.
RH horizontal stabilizer/fairing	: Condition and security.
Vertical fins/tail skid	: Condition and security.
Tail rotor gearbox	: Correct oil level.
Tail rotor blades and hub	: Condition, cleanliness and security.
LH horizontal stabilizer/fairing	: Condition and security

Tail rotor drive shaft cover	: Closed and latches secured.
LH aft fuselage	: Condition.
Antenna(s) (if installed)	: Condition.
Baggage compartment	: Baggage secured; door latched.
LH engine exhaust	: Cover removed.
LH engine air intake	: Cover removed; free of obstructions.
Transmission oil	: Correct level.
LH landing gear skid assembly	: Condition.
LH side access panels	: Closed and secured.
LH side crew/passenger doors	: Condition, hinges and latches. Sliding windows (if installed) closed.
LH forward fuselage	: Condition.
LH side, windshield and roof transparencies	: Condition and cleanliness.
Cabin interior	: Loose items secured.
Seat belts/shoulder harnesses	: Unoccupied belts/harnesses secured.

ENGINE PRE-START CHECK

All switches	: OFF or CLOSED.
Pedals and seats	: Adjust.
Seat belt	: Fasten and adjust.
Cyclic stick	: Centered (or positioned to counter wind) and friction adjusted.
Collective lever	: Fully down and friction adjusted.
Circuit breakers	: IN.
Engine throttle	: OFF. Check IDLE and FLT positions; move MAN/NOR selector to MAN and rotate the throttle full open up to MAX then back to FLT. Return the MAN/NOR selector to NOR and up (locked) position. Rotate the throttle to IDLE. Release the IDLE stop until throttle returns to the OFF position. After prolonged exposure on ground to very low temperature (below - 20 °C), the force required to rotate the engine throttle may slightly increase.
STATIC source switch	: NORM and protected.
Altimeter	: Set.
BAT switch	: ON; check voltage at least 24 V.

Note

In cold weather conditions wait for EDUs warm-up period until the information on the displays are clearly readable.

BUS switch	: ON.
------------	-------

Note

On helicopter power-up, the IDS FAN caution light temporarily illuminates (built-in test). No corrective action is required.

External power (if used) : Connect.

Note

Be sure that external power source supplies not less than 28 V.

Electronic Display Units : Check on.
(EDU 1 and EDU 2)

MCL and MWL : Push to reset.

IGN switch : AUTO.

POS lights switch : As required.

A-COLL lights switch : ON.

ENG HTR switch : ON.

COMPASS MAG/DG switch : MAG

F-TRIM switch : ON

SERVO switch : NORM.

EDU 1 : Press TEST key;
check the following test
sequences on the EDUs and on
the IDS FAN caution light.

EDU 1 : ENG FIRE warning message and FUEL LOW caution message are presented for 4 seconds in the message area.
The ENGINE FIRE aural message is activated.

Note

During the test the IDS will activate the MASTER WARNING/MASTER CAUTION lights: they will be reset automatically at the end of the test sequence.

Note

If a failure is detected on Engine Fire and/or Fuel Low detectors, the caution messages FIRE DET and/or F LOW FAIL will remain displayed on EDU 1. In this case the MCL will not be reset automatically.

EDU 2 : Check that fuel quantity indications decrease on both scales, that the LH fuel quantity indication becomes boxed and yellow and that the RH fuel quantity indication becomes boxed and crossed as soon as the indicated quantity decreases below 120 kg.

IDS FAN caution light : Temporarily illuminates.

EDU 1 and EDU 2 : At the end of the test automatically return to previous formats.

EDU 2 : Press TEST key; observe the same sequences as above on EDU 1 and EDU 2.

Note

In case of different result of test sequence refer to the pertinent paragraph of Section 3 or to the A119/AW119MKII Maintenance Manual.

Aural Warning Generator test	: Set AWG switch on TEST and maintain. Check the aural message "TEST OK" and, after approximately 3 seconds, the AWG FAIL caution message activates and the vocal alarm operates in the following sequence: "ROTOR LOW" "ENGINE OUT" "ENGINE FIRE" "WARNING" "ROTOR HIGH" "ONE HUNDRED FIFTY FEET".
Fuel quantity	: Check.
FUEL VALVE switch	: OPEN and associated light illuminated.
Xfer PUMP switch	: XFER.
EDU 1	: XFER PUMP caution message out.
FUEL PUMP 1 switch	: ON.
EDU 1	: FUEL PUMP 1 caution message out.
EDU 2	: Check fuel pressure.
FUEL PUMP 1 switch	: OFF.
FUEL PUMP 2 switch	: ON.
EDU 1	: FUEL PUMP 2 caution message out.

EDU 2	: Check fuel pressure.
FUEL PUMP 1 switch	: ON.
EEC/MEC switch	: Accomplish EEC self-test by cycling the switch (MEC - EEC): check that EEC FAIL, EEC DEGRADED and MEC OPN caution messages illuminate sequentially. A successful self-test is indicated by the MEC OPN caution message remaining displayed at the end of the test sequence.

Note

With NR below 30%, the MEC OPN caution message is displayed regardless of the EEC/MEC switch position

STARTING PROCEDURE

Collective control : Flat pitch, check.

ENGINE START

START pushbutton : Press and release.
(on collective lever)

EDU 1 : ENG START and IGNITER ON
advisory messages displayed .

Note

Observe starter limitations in Section 1.

Engine throttle (with $N1 > 12\%$: IDLE.
and residual ITT $< 100^{\circ}\text{C}$)

Gas generator ($N1$) : Note increasing.

Engine temperature (ITT) : Note increasing.

CAUTION

Maximum ITT transient during starting is 1090°C , not to exceed two seconds above 980°C . A linear variation applies above 870°C , ten seconds, and 980°C , two seconds. Consult EMM if ITT limits are exceeded.

CAUTION

Monitor engine start and if lightup is not obtained within 10 seconds after the throttle has been set to IDLE, shut-down the engine by returning the throttle to OFF and press and release again the START switch.

Following an aborted start perform the following procedure before restarting:

— after N1 has come to a complete stop, allow a 30 seconds fuel drain period;

perform a 15 seconds DRY MOTORING RUN.

Refer to Section 1 for engine starter limitations and to DRY MOTORING RUN procedure in this section.

Engine oil pressure : Check.

Note

During cold starting conditions, the engine oil pressure can temporarily exceed 110 psi; it reduces as oil temperature increases.

Engine starter : Automatically deactivated when N1 reaches approximately 43%.

EDU 1 : ENG START and IGNITER ON advisory message out.

Note

EDU 1 automatically changes to CRUISE format 5 seconds after N1 reaches 51%.

Hydraulic systems : When main rotor begins to rotate, check rise in hydraulic pressure.

Pedals : Paired.

Note

Avoid any cyclic movement below 85% NR except to prevent hitting blade stops.

Gas generator (N1) : Stabilized at 61 $\pm$ 1%, check.

Note

During cold starting, low IDLE N1 speed may occur. Provided the N1 is not less than 51%, a warm-up period of 3 minutes should restore the correct N1 IDLE setting. If not, an additional 3 minutes warm-up period should be accomplished. At the end, if the N1 IDLE setting is still below 61 $\pm$ 1%, shut down the engine and consult the EMM.

Engine and transmission oil : Check pressures and temperatures.

Note

On ground, in IDLE condition, the transmission oil pressure indication can be below the green arc. No corrective action is required provided that the oil temperature indication is in the green arc.

BAT switch : Check ON.

External power : Disconnect (if used);
door secured.

EDU 1 : EXT PWR ON caution message
out.

GEN switch : ON.
Check DC GEN caution message out.

INV 1 and 2 switches : ON. Check INV 1 (2) OFF caution messages out.

RAD MSTR switch : ON.

Ammeter : Check current within limits.

Engine throttle : Rotate to FLT position.

Note

With engine oil temperature below 10 °C, leave the engine throttle at IDLE until the engine oil temperature reaches 10 °C. Then, if transmission oil temperature is still at 0 °C, the engine throttle should be rotated to FLT position smoothly to prevent exceedance of the transmission oil pressure maximum limit.

Note

During engine throttle increase, if the transmission oil pressure is still below the green arc the XMSN OIL PRESS warning messages activates. No corrective action is required provided that the oil temperature is in the green arc.

EDU 1	: PLA POS caution message out.
NR	: 102%.
EEC/MEC switch (first flight of the day only)	: MEC.
EDU 1	: MEC OPN caution message displayed.

Note

A small power and NR change is to be expected when switching from EEC to MEC and viceversa.

NR	: Check at 97% (adjust, if needed, using NR TRIM switch).
EEC/MEC switch	: EEC. Check MEC OPN caution message out.

Note

With the EEC mode engaged the NR TRIM switch is inoperative.

NR	: 102%.
Proceeded to "SYSTEM CHECK".	

■ DRY MOTORING RUN

The following procedures is used to clear the engine of internally trapped fuel and vapor or if there is evidence of fire within the engine.

Engine throttle	: OFF.
IGN switch	: OFF.
FUEL VALVE switch	: CLOSED.
FUEL PUMP 1 and 2 switches	: OFF.
START pushbutton (on collective lever)	: Push and hold as necessary.

Note

Observe starter limitations in Section 1.

START pushbutton (on collective lever)	: Release.
IGN switch	: AUTO.

SYSTEMS CHECK

Engine and transmission oil : Pressure and temperature within limits.

HYDRAULIC SYSTEMS

Note

During very cold temperature conditions, the longitudinal cyclic control force may increase up to 2 kg maximum.

SERVO switch : NORM, check. Make small clockwise cyclic movements and collective and pedal movements. Pressure drops must be equal for both n.1 and n.2 systems and should not exceed 70 psi.

Set 2 OFF; SERVO 2 caution message displayed on EDU1. 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 with switch set to 1 OFF to check system N°2, then set to NORM.

Note

Tail rotor boost pressure is furnished by system N°1. When system N°2 is being checked, it is normal for the pedals to be unboosted.

FUEL SYSTEM

- Xfer PUMP switch : OFF.
- EDU 1 : XFER PUMP caution message displayed.
- FUEL PUMP 1 and 2 switches : OFF.
- EDU 2 : Note fuel pressure fall.
- EDU 1 : FUEL PUMP 1 and 2 caution messages displayed.
- Engine driven fuel pump : Check operation.
- FUEL PUMP 1 switch : ON.
- EDU 2 : Fuel pressure within limits.
- EDU 1 : FUEL PUMP 1 caution message out.

FUEL PUMP 1 switch : OFF.

Repeat the check on fuel pump 2 following the procedure shown for fuel pump 1 in the two previous steps; check that associated FUEL PUMP caution message is out.

- FUEL PUMP 1 and 2 switches : ON.
- EDU 1 : FUEL PUMP 1 and 2 caution messages out.
- EDU 2 : Fuel pressure within limits.

Note

Due to the sudden pressure variation on the fuel line, a temporary activation of the FUEL FILTER caution message may occur.

- Xfer PUMP switch : XFER.
- EDU 1 : XFER PUMP caution message out.

ELECTRICAL A.C. SYSTEM

INV 1 switch	: OFF.
EDU 1	: INV 1 OFF caution message displayed.
#1 a.c. electrical loads	: No loss, check voltage. Check ADI and HDG flags retracted.
INV 1 switch	: ON.
EDU 1	: INV 1 OFF caution message out.
INV 2 switch	: OFF.
EDU 1	: INV 2 OFF caution message displayed.
#2 a.c. electrical loads	: No loss, check voltage. Check ADI and HDG flags retracted.
INV 2 switch	: ON.
EDU 1	: INV 2 OFF caution message out.

Note

VG 1 (2) caution message temporarily illuminates after
INV 1 (2) is switched off.

MISCELLANEOUS

PITOT heat switch	: ON. Check current peak on ammeter and PITOT HEAT advisory mes- sage displayed on EDU 1; then OFF.
Cyclic stick	: Friction fully unlocked, freedom of movement.
Marker beacon lights (if installed)	: Test.
ADI (if installed)	: Erected and flag retracted.
Altimeter	: Check flag retracted and set.
VSI	: Check zero indication.
HSI (if installed):	
HDG flag	: Retracted.
Gyro compass heading	: Set.
RMI/HSI selector knob	: As desired.
Clock	: Check and set.
Radio Altimeter (if installed):	
Indication	: Zero altitude.
OFF flag	: Retracted.
TEST switch	: Press and maintain.
DH light	: Out.
Needle	: 100 ft.
TEST switch	: Release.
DH light	: On.
Pilot/Co-pilot (if installed):	
NORM/FAIL switch	: FAIL, perform a radio check then back to NORM.

HELIPILOT SYSTEM

SAS 1 switch	: SAS 1.
EDU 1	: SAS 1 caution message out.
SAS 2 switch	: SAS 2.
EDU 1	: SAS 2 caution message out.
ATTD HOLD switch	: OFF.
EDU 1	: ATT OFF caution message displayed.
Cyclic stick	Motion will cause PITCH and ROLL HELIPILOT indicators motion.
Pedals	Motion will cause YAW HELIPILOT indicator motion.
SAS 1 switch	: OFF.
EDU 1	: SAS 1 caution message displayed.
Cyclic stick	: Motion will cause PITCH and ROLL HELIPILOT indicator motion.
SAS 2 switch	: OFF.
EDU 1	: SAS 2 OFF caution message displayed.
ATTD HOLD switch	: Automatically trips to ATTD HOLD.
EDU 1	: ATT OFF caution message out.
SAS 1 switch	: SAS 1.
EDU 1	: SAS 1 caution message out.
SAS 2 switch	: SAS 2.
EDU 1	: SAS 2 caution message out.

BEFORE TAKE-OFF

Communication and navigation frequencies : Set as required.

Voltammeter : Within limits.

Cockpit lights : As required.

External lights : Check and leave as required.

CAUTION

Landing lights operation shall be limited to the time necessary to carry out take-off and landing manoeuvres in order to avoid overheating.

Note

When operating the landing lights, the stand-by magnetic compass indication is not reliable.

Caution and Warning messages : Check none.

TAKE-OFF AND CLIMB

Collective	: Increase slowly and bring the helicopter to a 3 ft AGL hover.
Pedals	: Apply as necessary to maintain direction.
Flight instruments	: Check.
Engine parameters	: Within limits.
Hydraulic systems instruments	: Within limits.
Cyclic and collective	: Rotate the nose down approximately 10° from the hover datum. While accelerating increase slightly the torque to avoid loss of altitude. At 30 KIAS increase torque by approximately 15% and adjust cyclic to obtain 0° attitude. Continue acceleration to V_Y . At V_Y increase torque as required by the desired flight path.

Note

Do not exceed TQ and ITT limits (refer to Section 1).

Force trim pushbutton (on cyclic stick)	: Trim as desired for attitude reference changes during hover and climb out.
--	--

IN FLIGHT

Collective	: Adjust as necessary to keep engine parameters within limits.
Airspeed	: Maintain within limits shown on V_{NE} placards.
Landing lights	: OFF, if used.
EDU 1	: LANDING LT ON advisory message out.
PITOT heat	: As required.

CAUTION

Turn Pitot heat on for flight in visible moisture and in rain regardless of ambient temperature.

Altitude	: As required.
----------	----------------

CAUTION

Refer to applicable operating rules for high altitude oxygen requirements.

Note

Above 7000 ft Hp NR/N2 needle split in autorotation may occur above 103% N2. In this case, in accordance with N2 limitations reduce N2 within the limit of 103% using engine throttle.

If transient limit is exceeded consult EMM.

Note

In case of intentional selection of EEC/MEC switch to MEC position, reduce engine power below 50% TQ before re-selecting the switch to EEC position to minimize torque transients.

HELIPLOT indicators : Monitor and re-center by depressing the FTR pushbutton switch on cyclic grip.

Note

During very cold temperature conditions, the longitudinal cyclic control force may increase up to 2 kg maximum.

ADVERSE WEATHER CONDITIONS

If adverse weather conditions are expected during flight, with possible risk of engine flame out, perform the following.

IGN switch : CONT.
EDU 1 : IGNITER ON advisory message displayed.

Note

When the IGN switch is set to CONT the engine automatic starter feature is armed and permits automatic starting of the engine in case of flame out.

APPROACH AND LANDING

Engine parameters : Within limits.

External lights : As required.

Landing lights : As required.

CAUTION

Landing lights operation shall be limited to the time necessary to carry out takeoff and landing manoeuvres in order to avoid overheating.

Note

When operating the landing lights, the stand-by magnetic compass indications is not reliable.

Approach path : Perform the approach at 75 KIAS.
Reduce the airspeed gradually with the cyclic. At 70 ft make a flare and apply collective as required to bring the helicopter to a 3 ft AGL hover.
After reaching a hover descend slowly to the ground surface.

CAUTION

Additional care must be taken during nose-down slope operations in order not to touch the ground with tail.

SHUTDOWN

Collective lever	: Check fully down.
Cyclic stick and pedals	: Centered and trimmed.
Pedals	: Centered.

Note

Do not apply collective in this phase and during rotor deceleration, particularly in windy conditions.
Below 85% NR, avoid any cyclic movement except to prevent hitting blade stops.

Engine throttle	: IDLE for at least 30 seconds to allow ITT to stabilize.
EDU 1	: PLA POS caution message displayed.
Engine throttle	: OFF.

CAUTION

During shutdown check that the N1 speed decelerates freely. Note any abnormal noise or rapid rundown. In this event perform corrective maintenance action as per EMM.

FUEL PUMP 1 and 2 switches	: OFF.
EDU 1	: FUEL PUMP 1 and 2 caution messages displayed.
FUEL VALVE switch	: CLOSED.
Associated light	: Out.
Xfer PUMP switch	: OFF.
EDU 1	: XFER PUMP caution message displayed.
PITOT heat	: OFF, if used

ENG HTR switch	: OFF.
Cockpit lights	: OFF.
External lights	: OFF.
Landing lights	: OFF, if used.
RAD-MSTR switch	: OFF.
Miscellaneous switches	: OFF.
INV 1 and INV 2 switches	: OFF.
GEN switch	: OFF.
BAT switch	: OFF.

POST FLIGHT CHECK

If conditions require, perform the following:

Pitot, intake and exhaust covers : Installed.



Wait at least 5 minutes after pitot heat has been switched off before installing pitot-static tube covers.

Wait at least 30 minutes after engine shutdown before installing engine exhaust ducts covers.

Refer to the A119/AW119MKII Maintenance Manual for additional information.

SECTION 3

EMERGENCY AND MALFUNCTION PROCEDURES

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SECTION 3

EMERGENCY AND MALFUNCTION PROCEDURES

INTRODUCTION

The following procedures contain the indications of equipment or system failure or malfunction, the use of emergency features of primary and backup systems, and appropriate cautions, warnings and explanatory notes.

All corrective action procedures listed herein assume the pilot gives first priority to aircraft control and a safe flight path.

DEFINITIONS

The following items indicate the degree of urgency in landing the helicopter.

LAND IMMEDIATELY : The urgency of the landing is paramount.
The primary consideration is to assure the survival of the occupants.

LAND AS SOON AS POSSIBLE : Land without delay at the nearest suitable area (i.e., open field) at which a safe approach and landing is reasonably assured.

LAND AS SOON AS PRACTICABLE: The duration of the flight and landing site are at the discretion of the pilot.
Extended flight beyond the nearest approved landing area is not recommended.

WARNING SYSTEM

(Figure 3-1)

Many of the malfunctions described in this Section are indicated through the display of red warning messages or yellow caution messages on the EDU 1. Aircrew attention is drawn to the warnings/cautions by flashing MASTER WARNING/CAUTION lights. Some of the red warnings are accompanied by an audio warning tone and by a vocal warning.

Green advisory and cyan status messages are also displayed on EDU 1.

Whenever a warning/caution message activates, appropriate actions should be taken to deal with the indicated malfunction, after which the associated warning/caution message should be acknowledged either by pressing the MASTER RESET pushbutton on the cyclic stick or by pressing the MCL/MWL light(s) on the instrument panel.

By cancelling the red/yellow master light(s) also the audio warning tone and aural messages are suppressed for future indications while the warning/caution visual messages on EDU1 switch from inverse video to normal video mode.

The ROTOR LOW warning is an exception as the visual message and the master warning light can not be reset, remaining active until the causative condition no longer exists.

The EDU 1 presents a specific area capable of displaying up to 18 lines of 15 characters each, for warning, caution, advisory and status messages.

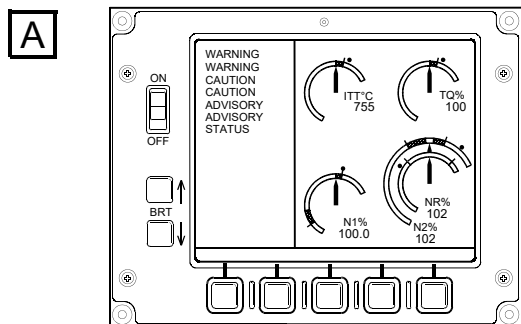
The order of priority of the messages is:

Priority	Messages	Color
1	WARNING	red
2	CAUTION	yellow
3	ADVISORY	green
4	STATUS	cyan

The “last-in” message goes always on the top of the relative screen area and displace the existing list down.

When the messages list exceeds 18, the additional caution/advisory/status messages can be displayed by pressing the MORE key on the bottom side of the EDU, while the warning messages always remain displayed at the top of the list.

Warning and caution messages remain presented until the causative condition has been corrected.



EDU 1- WARNING, CAUTION, ADVISORY AND STATUS MESSAGES



YELLOW MASTER CAUTION
LIGHT (MCL)

RED MASTER WARNING
LIGHT (MWL)



IDS FAN
CAUTION LIGHT

ICN-19-A-153000-G-A0126-00001-A-01-1

Figure 3-1. Cockpit Layout of the Warning and Caution System

MASTER WARNING AND MASTER CAUTION LIGHT

Panel wording	Fault condition	Corrective action
MASTER WARNING	See warning message on EDU 1.	Reset after malfunction acknowledgement and relative action.
MASTER CAUTION	See caution message on EDU 1.	Reset after malfunction acknowledgement and relative action.

WARNING (RED) AND ASSOCIATED AURAL MESSAGES

Panel wording (aural message)	Fault condition	Corrective action
ROTOR LOW ("rotor low")	Rotor RPM low. Rotor RPM between 80 and 96%.	Use collective to adjust RPM.

Note

With rotor RPM between 80 and 96%, a cabin acoustic signal is activated.

ROTOR HIGH ("rotor high")	Rotor RPM high. Rotor RPM above 108%.	Use collective to adjust RPM.
XMSN OIL HOT ("warning")	Transmission oil temperature above maximum limit (115 °C).	Reduce power, land as soon as possible.
XMSN OIL PRESS ("warning")	Transmission oil pressure below minimum limit (30 psi).	Reduce power, land as soon as possible.
BATT HOT ("warning")	Battery temperature exceeding limits.	Switch battery off (BATT OFF warning message activates). Land as soon as possible.

Panel wording (aural message)	Fault condition	Corrective action
BATT OFF ("warning")	Battery disconnected	Check battery switch position. If the switch is ON land as soon as practicable. Correct trouble before next flight.
ENG OUT ("engine out")	N1 RPM abnormally low (below 51%). Engine power failure.	Reduce collective immediately to autorotate. If altitude permits investigate failure and attempt engine restart. (See the pertinent paragraphs in this section).

Note

With ENG OUT warning message illuminated, a cabin acoustic signal is activated.

ENG FIRE ("engine fire")	Fire in engine compartment.	Shut down engine. Perform autorotative landing. (See the pertinent paragraphs in this section).
ENG OIL PRESS ("warning")	Engine oil pressure low (< 40 psi).	Reduce power by lowering collective, land as soon as possible.
ENG OIL HOT ("warning")	Engine oil temperature high (>115 °C)	Reduce power by lowering collective. Check oil temperature indication: if rising above maximum, land as soon as possible.

CAUTION MESSAGES (YELLOW)

Panel wording	Fault condition	Corrective action
FUEL LOW	Fuel quantity is low.	Verify fuel quantity in tank 1. Land as soon as practicable (10 minutes of flight remain- ing at MCP).

Note

Avoid sideways flight and hovering in crosswind when the indicated fuel quantity is less than 10 kg.

F LOW FAIL	Fuel low sensor failure. No fuel low indication.	Keep under control the fuel quantity and proceed with flight.
FUEL DRAIN 1 (2)	Fuel drain valve 1(2) (if installed) open.	Close the valve before refuelling and/or taking off.
FUEL PUMP 1 (2)	Fuel pump n.1 (n.2) in tank 1 failed.	Affected fuel pump OFF. Land as soon as practicable.
XFER PUMP	Fuel tank 2 empty or, if fuel quantity in tank 2 is not empty, transfer fuel pump failed.	Set PUMP switch to OFF.

Note

In case the transfer fuel pump is switched off or fails and the fuel quantity in tank 2 is less than 120 kg, the RH fuel quantity indication becomes boxed and crossed to indicate that the remaining fuel in tank 2 is not usable.

FUEL FILTER	Engine fuel filter partially clogged.	Land as soon as practicable. Correct malfunction before next flight.
EXT PWR ON	External power receptacle door not closed.	Close door before flight.

Panel wording	Fault condition	Corrective action
GEN CONTR	Generator relay box circuit breaker tripped out.	Correct malfunction before operating the engine starter.
DC GEN	See paragraph " Failure of the generator and d.c. bus " in this section.	
INV 1 (2) OFF	Failure of inverter n.1 (n.2).	See paragraph " Failure of an inverter " in this section.
SAS 1 (2)	No power to the system.	Check SAS 1 (2) engage switch, breakers and VG 1 (2) caution message. Proceed with flight (refer to paragraph " Failure of one Helipilot " in this section).
ATT OFF	No pitch and roll attitude retention. Probable switch failure.	Check ATTD HOLD switch. Proceed with flight. Correct malfunction before next flight.
VG 1 (2)	Gyro not erected, loss of power to gyro.	Check breaker. Check SAS 1 (2) engage switch and SAS 1 (2) caution message. Proceed with flight (refer to paragraph " Failure of one Helipilot " in this section).
SERVO 1 (2)	Failure of one of the two hydraulic systems.	Check for low hydraulic pressure. Land as soon as practicable (refer to paragraph " Hydraulic system malfunction " in this section).
FIRE DET	Engine fire detection system inoperative	Land as soon as practicable. Correct trouble before next flight
ENG OIL PRESS	Engine oil pressure low (in yellow arc).	Proceed as per paragraph " Engine oil pressure below normal range " in this section.

Panel wording	Fault condition	Corrective action
EEC DEGRADED	See paragraph " Electronic engine control (EEC) malfunctions " in this section.	
EEC FAIL	Electronic engine control (EEC) failure.	Engine control automatically trips to MEC mode. Proceed with flight (refer to paragraph " Electronic engine control (EEC) malfunctions " in this section).
MEC OPN	Mechanical (MEC) mode of operation following an EEC failure.	Refer to paragraph " Engine operation in mechanical mode (MEC) " in this section.
ENG AGB CHIPS	Metallic particles in engine accessory gearbox lubricating oil.	Reduce power by lowering collective. Land as soon as possible.
ENG RGB CHIPS	Metallic particles in engine reduction gearbox lubricating oil.	Reduce power by lowering collective. Land as soon as possible.
XMSN OIL CHIPS	Metallic particles in the main transmission oil.	Reduce power by lowering collective. Land as soon as possible.
T/R BOX CHIPS	Metallic particles in the 90 deg tail rotor gearbox lubricating oil.	Reduce power by lowering collective. Land as soon as possible.
DOORS OPEN	The door(s) of pilot and/or passenger and/or baggage compartments is (are) not correctly closed.	Close door(s) correctly before flight. If the message illuminates in flight, reduce speed below 70 KIAS and check door(s) closed. If the light is still illuminated, maintain speed below 70 KIAS and land as soon as practicable.
AWG FAIL	Aural warning system failure.	Proceed with flight, correct trouble before next flight.

Panel wording	Fault condition	Corrective action
IDS FAN	Failure of the IDS cooling fan.	<u>In flight:</u> Open windows and vents and select VENT to HIGH. Land as soon as practicable within 30 minutes. Correct malfunction before next flight. <u>On ground:</u> Correct malfunction before taking off.
PLA POS	Engine throttle out of FLT position.	Check throttle position. <u>In flight</u> (power on condition only): - set throttle correctly and check MAN/NOR selector to NOR and up (locked). - If still illuminated, toggle the EEC/MEC switch to MEC and proceed with flight (refer to paragraph “Engine operation in mechanical mode (MEC)” in this section. Correct trouble before next flight. <u>On ground:</u> - before take off set throttle correctly and check MAN/ NOR selector to NOR and up (locked). - If still illuminated, shut down the engine and refer to A119/AW119MKII Main-maintenance Manual for the proper action to be taken.
PITOT HTR FAIL (if caution light is installed)	Failure of the pitot heater.	During night flight land as soon as practicable.

Panel wording	Fault condition	Corrective action
MISCMP-P(S)	Some primary (secondary) data from one of the two EDUs invalid. Possible degradation in system function.	Try to identify the faulty information and take the pertinent corrective action. Refer to paragraph " Integrated Display System Failure " in this section.
CHECK CONFIG	IDS system configuration setting in disagreement between EDU 1 and 2 (only programmable parameters).	<u>In flight:</u> proceed with flight, correct trouble before next flight. <u>On ground:</u> correct trouble before taking-off.
CHECK STRAP	IDS hardware configuration setting incorrect.	<u>In flight:</u> proceed with flight, correct trouble before next flight. <u>On ground:</u> correct trouble before taking-off.
CHECK CAL	Some parameter calibration discordance (greater than $\pm 1.5\%$) between EDU 1 and 2.	<u>In flight:</u> proceed with flight, correct trouble before next flight. <u>On ground:</u> correct trouble before taking-off.
EDU FAIL-PRI	Failure of primary EDU	<u>In flight:</u> proceed with flight, correct trouble before next flight. <u>On ground:</u> correct trouble before taking-off.
EDU FAIL-SEC	Failure of secondary EDU	<u>In flight:</u> proceed with flight, correct trouble before next flight. <u>On ground:</u> correct trouble before taking-off.
BATT DISCH	Battery discharging, probable d.c. generator failure.	Refer to paragraph "Battery discharging" procedure in this section.

ENGINE FAILURES

FAILURE OF ENGINE

INDICATIONS

Helicopter	: Left yaw.
Audio signal	: Present.
EDU 1	: ROTOR LOW warning message displayed and “ROTOR LOW” aural warning activated. ENG OUT warning message displayed and “ENGINE OUT” aural warning activated when N1 below 51% and decreasing.
Gas generator (N1)	: Rapidly decreasing.
NR	: Rapidly decreasing.
ITT	: Rapidly decreasing.
Torque	: Rapidly decreasing.

PROCEDURE - HOVER IGE and TAKE-OFF (up to 30 KIAS)

Pedals	: Control yaw rate.
Collective	: Maintain initially then increase to cushion the touchdown.
Cyclic	: Adjust as required to obtain a level attitude touchdown (landing skid parallel to the ground).

PROCEDURE - HOVER OGE

- Pedals : Control yaw rate.
- Collective : Lower immediately to stop the NR decay.
- Cyclic : Forward to obtain approximately 25 deg nose down. Increase airspeed up to 80 KIAS.

Perform an autorotative landing (refer to "**Autorotative landing**" procedure).

PROCEDURE - TAKE-OFF ABOVE 30 KIAS

- Pedals : Control yaw rate.
- Collective : Lower immediately to stop the NR decay.
- Cyclic : Flare as required to increase NR above 100%.
- Collective : Apply at the end of the flare, before touchdown, to reduce the rate of descent.
- Cyclic : Forward to obtain a level attitude (landing skid parallel to the ground).
- Collective : Continue application to cushion the touchdown.
- Pedals : Maintain direction.

Note

In case of ground contact on the aft portion of the landing skid, avoid counteracting the pitch down with cyclic.

PROCEDURE - CRUISE

Pedals	: Control yaw rate.
Collective	: Lower immediately to stop the NR decay. Then maintain the NR between 90 and 110%.
Cyclic	: Adjust to obtain desired autorotative airspeed.

Note

Airspeed for minimum rate of descent is 80 KIAS.

Airspeed for maximum glide distance is 110 KIAS.

If conditions permit, confirm engine failure:

If N2 and ITT not rapidly decreasing : N1 tachometer failure.

Engine : Still available.

Manoeuvre to exit from autorotation.

Land as soon as practicable, monitoring N2 and ITT values.

If N2 and ITT rapidly decreasing : Engine failure confirmed.

Engine throttle : OFF.

If altitude permits, attempt to restart the engine (see "**Engine restart in flight**" procedure).

CAUTION

When the cause of engine failure is suspected to be of a mechanical nature, do not attempt a restart.

If the engine cannot be restarted:

FUEL VALVE switch : CLOSED.

FUEL PUMP 1 and 2 switches : OFF.

Xfer PUMP switch : OFF.

GEN switch : OFF.

Perform an autorotative landing (refer to "**Autorotative landing**" procedure).

AUTOROTATIVE LANDING

Cyclic : At approximately 150 ft AGL, initiate a flare and hold the flare to reduce the forward speed.

Collective : Apply at the end of the flare, before touchdown, to reduce the rate of descent.

Cyclic : Forward to obtain a level attitude (landing skid parallel to the ground).

Collective : Continue application to cushion the touchdown.

Pedals : Maintain direction.

Note

In case of ground contact on the aft portion of the landing skid, avoid counteracting the pitch down with cyclic.

ENGINE RESTART IN FLIGHT

Note

Engine restart in flight has not been demonstrated.

If altitude permits and a restart is attempted, proceed as follows:



When the cause of an engine failure is suspected to be of a mechanical nature, do not attempt a restart.

- | | |
|------------|---|
| Collective | : Adjust to maintain NR between 90 and 110%. |
| Cyclic | : Adjust to obtain desired autorotative airspeed. |

Note

Airspeed for minimum rate of descent is 80 KIAS.

Airspeed for maximum glide distance is 110 KIAS.

- | | |
|----------------------------|----------------|
| GEN switch | : OFF. |
| Engine throttle | : OFF. |
| FUEL VALVE switch | : Check OPEN. |
| Associated light | : Illuminated. |
| FUEL PUMP 1 and 2 switches | : Check ON. |
| Fuel pressure | : Check. |
- START pushbutton (on collective lever): Press and release.
- | | |
|-------|---|
| EDU 1 | : ENG START and IGNITER ON advisory messages displayed. |
|-------|---|
- | | |
|---|---------|
| Engine throttle (N1 between 10 and 20%) | : IDLE. |
|---|---------|

Note

A lightup should be obtained within 10 seconds. If this is not the case, engine restart may be attempted with the manual override system. (See "**Engine restart in flight with manual override system (MAN)**" procedure).

Gas generator N1	: Note increasing to $61\pm 1\%$.
ITT	: Note increasing.
Engine oil pressure	: Check positive indication.
Engine starter	: Automatically deactivated when N1 reaches approximately 43%.
EDU 1	: ENG START and IGNITER ON advisory messages out, check.
Gas generator N1	: Stabilized at $61\pm 1\%$.
Engine throttle	: FLT.
EDU 1	: PLA POS caution messages out, check
GEN switch	: ON.
Engine oil	: Pressure and temperature in green arc.
Xfer PUMP switch	: Check XFER.

MALFUNCTION OF THE FUEL CONTROL SYSTEM

INDICATIONS

EDU 1 : N1 and/or ITT unstable.

Engine power : Uncommanded change.

PROCEDURE

If an automatic fuel control system malfunction arises in flight, the manual override system (MAN) can be used. The MAN overrides automatic control features associated with normal operation of the engine. The pilot will have to compensate for collective and pedal movements by rotating the engine throttle.



When using the MAN, the engine response is directly related to the rate at which the engine throttle is rotated. Additional care is required during engine acceleration.

Monitor cockpit indicators closely to avoid the possibility of overtemperature, overtorque, overspeed or engine surge.

Note

An initial dead band (no engine response) may occur while operating in MAN.

If the fuel control system malfunction causes an increase in power:

Engine throttle : Slowly rotate towards IDLE.

If the fuel control system malfunction causes a decrease in power:

Collective : Adjust.

MAN/NOR selector (on collective) : MAN.

Engine throttle : Slowly rotate towards MAX.

WARNING

Monitor N1 closely. Do not allow N1 to decrease below minimum speed (51%).

WARNING

If N1 is below 60%, extreme caution is required when rotating the throttle towards MAX as engine surge or over-temperature is possible.

Land as soon as possible.

ENGINE RESTART IN FLIGHT WITH MANUAL OVERRIDE SYSTEM (MAN)

Note

Engine restart in flight has not been demonstrated.

If engine restart fails or automatic fuel control system failure causes engine shutdown, engine restart may be attempted when altitude permits by using the MAN.

Collective : Adjust to maintain NR between 90 and 110%.

Cyclic : Adjust to obtain desired autorotative airspeed.

Note

Airspeed for minimum rate of descent is 80 KIAS.

Airspeed for maximum glide distance is 110 KIAS.

GEN switch : OFF.

Engine throttle : OFF.

FUEL VALVE switch : Check OPEN.

Associated light : Illuminated.

FUEL PUMP 1 and 2 switches : Check ON.

Fuel pressure : Check.

MAN/NOR selector (on collective) : MAN.

START pushbutton (on collective lever) : Press and release.

EDU 1 : ENG START and IGNITER ON advisory messages displayed.

Engine throttle (N1 between 10 and 20%) : Slowly rotate until engine lightup.

Note

During a start using the MAN, a dead band (no engine response) may occur between the OFF and the IDLE positions and extend beyond the FLT position of the throttle.

N1 and ITT : Note increasing.

Engine throttle : Continue rotating towards MAX until N1 is $61 \pm 1\%$.

Engine starter : Automatically deactivated when N1 reaches approximately 43%.

EDU 1 : ENG START and IGNITER ON advisory messages out, check.

WARNING

When operating using the MAN, the engine response is directly related to the rate at which the engine throttle is rotated. Additional care is required during engine acceleration.

WARNING

If N1 is below 60%, extreme caution is required when rotating the throttle towards MAX as engine surge or over-temperature is possible.

N1 should not remain below 60% for more than 40 seconds.

Gas generator (N1) : Stabilized at $61 \pm 1\%$, check.

Engine throttle : Slowly rotate towards MAX to increase power.

CAUTION

When operating using the MAN, monitor cockpit indicators closely to avoid the possibility of overtemperature, over-torque, overspeed or engine surge.

GEN switch : ON.

Land as soon as possible.

If restart is unsuccessful, abort the engine start as follows:

Engine throttle : OFF.

FUEL VALVE switch : CLOSED.

FUEL PUMP 1 and 2 switches : OFF.

Xfer PUMP switch : OFF.

GEN switch : OFF.

Perform an autorotative landing (refer to "**Autorotative landing**" procedure).

ELECTRONIC ENGINE CONTROL (EEC) MALFUNCTIONS

There are two levels of electronic engine control (EEC) malfunctions:

- EEC failed;
- EEC degraded.

EEC failed malfunctions

INDICATIONS

EDU 1	: EEC FAIL caution message displayed.
Engine mode of operation	: Automatic reversion from EEC to MEC.
EDU 1	: MEC OPN caution message displayed.

PROCEDURE

EEC/MEC switch : MEC.

Proceed with flight. Refer to paragraph "**Engine operation in mechanical mode (MEC)**" in this section.

- Refer to the A119/AW119MKII Maintenance Manual for the proper action to be taken.

EEC degraded malfunctions

"EEC degraded" malfunctions have no impact on engine performance. The EEC DEGRADED caution message is only displayed on ground (at NR < 20%), for maintenance purposes.

INDICATIONS

On ground (at NR < 20%)

EDU 1	: EEC DEGRADED caution message displayed.
-------	---

PROCEDURE

On ground, "EEC degraded" malfunctions may be cleared by cycling the EEC/MEC switch from EEC to MEC and back to EEC.

EEC/MEC switch : MEC then EEC.

If the EEC DEGRADED caution message is still illuminated:

- Refer to the A119/AW119MKII Maintenance Manual for the proper action to be taken.

ENGINE OPERATION IN MECHANICAL MODE (MEC)

Note

MEC mode is to be used only in case of EEC failure or for training purposes.

The mechanical mode is an automatic mode of operation which is accomplished through a mechanical N2 governor connected to the collective control by a mechanical linkage. A droop compensator, connected to the collective, maintains the NR at approximately 102% as collective pitch is raised. A rotor speed beep trim allows fine adjustment to maintain NR within limits (refer to Section 1 for NR/N2 limitations).

Note

In MEC mode it may not be possible to obtain NR/N2 needle split in autorotation without retarding the throttle to IDLE. Therefore autorotation practice is not recommended in MEC mode.

Engine operation in mechanical mode (MEC) in flight

N2/NR : Maintain at 102% (using NR TRIM switch, as required)

ENGINE HOT START

A hot start is caused by an accumulation of fuel in the combustion chamber, and/or delay in light-up, causing flames to be emitted from the exhausts and/or an overtemperature.

INDICATIONS

ITT : Increasing beyond transient starting limits.

CAUTION

Maximum ITT transient during starting is 1090 °C, not to exceed two seconds above 980 °C. A linear variation applies between 870°C, ten seconds, and 980 °C, two seconds.

Engine exhausts : Visible smoke, flames or fire.

PROCEDURE

Abort engine start as follows:

Engine throttle : OFF.

IGN switch : OFF.

Engine starter : Continue to operate.

CAUTION

Observe starter limitations in Section 1.

FUEL VALVE switch : CLOSED.

FUEL PUMP 1 and 2 switches : OFF.

Xfer PUMP switch : OFF.

Refer to EMM for inspection requirements.

ENGINE OIL PRESSURE BELOW NORMAL RANGE

INDICATIONS

EDU 1 : ENG OIL PRESS caution message displayed.

PROCEDURE

If N1 is above 72% and engine oil pressure is between 40 and 80 psi (yellow arc).

Cyclic : As required to obtain level attitude.

Collective : Reduce power by lowering.

Airspeed : 60 to 70 KIAS level flight.

When N1 is below 72% proceed as follow:

Engine oil pressure : Check:

- if stable between 40 and 80 psi (yellow arc) land as soon as practicable.
- if below 40 psi (ENG OIL PRESS warning message activated) or between 40 and 80 psi (yellow arc) and decreasing land as soon as possible .

ENGINE COMPRESSOR STALL

INDICATIONS

Engine	: "Popping" sounds.
ITT	: Abnormally increasing.
N1	: Decreasing.

PROCEDURE

Collective	: Reduce power by lowering.
Airspeed	: 60 to 70 KIAS, level flight.
ITT and N1	: Check for normal indications.

Note

The consequences of a compressor stall may vary depending upon its severity.

Avoid the condition that resulted in compressor stall.
Land as soon as practicable.

ENGINE DROOP COMPENSATION BINDING

The mechanical engine droop compensator is connected to the collective lever through a linkage incorporating a shear section.

If engine droop compensator linkage binding occurs, an increased collective force of 4 kg (8.8 pounds) maximum will be necessary to cut the shear section.

When the section has been cut, the collective force will return to normal level but the mechanical droop compensator (MEC) will be inoperative.

The EEC mode of operation will not be affected.

PROCEDURE

EEC/MEC switch : EEC, check.

Land as soon as practicable.

TAIL ROTOR FAILURES

Tail rotor failures may typically result in a complete loss of tail rotor control or in a jamming of the tail rotor pitch.

COMPLETE LOSS OF TAIL ROTOR CONTROL

A tail rotor drive failure results in a loss of yaw control with a consequent yaw to the right, which increases in rapidity at low forward speeds and high torque levels.

A tail rotor drive failure may be accompanied by noise, vibration or oscillation in the tail section.

The vertical fin produces an antitorque component which is a function of the forward speed and which assists in controlling the helicopter in low torque conditions.

The action to be taken depends upon whether the helicopter is in hover or in forward flight. In both cases, the landing should be made at the lowest possible power or even with the engine out.

While a tail rotor drive failure in hovering is immediately detected, the same failure may be less evident in cruise.

If trouble in the tail rotor is suspected when flying at cruise speed, proceed as follows:

- | | |
|----------------------------|--|
| Altitude | : Maintain the cruise altitude. |
| Airspeed and pedal control | : Reduce gradually to 60 KIAS and meanwhile check the helicopter response to pedal control displacement and the appearance of any anomalous vibrations and/or noise. |

If the check confirms the tail rotor failure, proceed as per paragraph **"Complete loss of tail rotor control in cruise"**, otherwise accomplish the following further check:

- | | |
|----------|---------------------|
| Airspeed | : Maintain 60 KIAS. |
|----------|---------------------|

- Collective : Slowly raise, to increase the antitorque demand, as close as possible to maximum continuous power and let the helicopter climb.
- Pedals : Check the pedals effectiveness in controlling the yaw and any anomalous vibration and/or noise.

If the pedals are not effective in controlling the yaw, proceed as per paragraph "**Complete loss of tail rotor control in cruise**".

If on the contrary nothing seems to confirm a tail rotor failure, proceed with flight.

Complete loss of tail rotor control in hovering

PROCEDURE

- Engine throttle : Chop to IDLE.
- Collective : As necessary to cushion the touchdown.

Note

A slight rotation can be expected at touchdown.

Complete loss of tail rotor control in cruise

PROCEDURE

If a suitable landing site is not available:

Collective : Lower as necessary to eliminate yaw to the right.

Airspeed/power : As necessary in order to reach a suitable landing site.

Note

Power may be increased if necessary; however an increase in power necessitates an increase in speed to prevent the helicopter from turning.

On reaching the point of intended landing:

Collective : Decrease and enter autorotation.

Engine throttle : OFF.

FUEL VALVE switch : CLOSED.

FUEL PUMP 1 and 2 switches : OFF.

Xfer PUMP switch : OFF.

GEN switch : OFF.

BAT switch : OFF (except as needed in night flight).

Perform an autorotative landing, into wind, maintaining forward speed (35 KIAS).

JAMMING OF TAIL ROTOR PITCH

This condition produces an inability to change tail rotor thrust with pedals.

INDICATIONS

Helicopter response : No yaw response when pedals are moved.

OR

Pedals : Locked.



If the pedals cannot be moved with a moderate amount of force, do not apply excessive force since a more serious malfunction could result.

Note

If helicopter is in a trimmed flight condition when malfunction occurs, TQ and airspeed should be noted and helicopter flown to a suitable landing area. Combinations of torque and airspeed will correct yaw attitude and these should be adjusted to land the helicopter.

PROCEDURE

HOVERING

Do not close engine throttle unless a severe right yaw occurs. If pedals lock in any position during hovering, landing can be accomplished with greater safety under power-controlled flight rather than closing engine throttle and entering autorotation.

IN FLIGHT - HIGH POWER CONDITION

In a high power condition, helicopter will yaw to the left when the power is reduced. If airspeed is increased, vertical fin will become more effective and left yaw will increase.

To accomplish landing proceed as follows:

Collective : Reduce to establish a power-on approach.

Airspeed : Reduce to ensure an acceptable sideslip.

At about 3 ft above touchdown area:

Collective : Apply to stop the rate of descent, left yaw will be reduced.

Airspeed : Zero.

Land.

IN FLIGHT - LOW POWER CONDITION

In a low power cruise flight or descent condition, helicopter will yaw to the right when power is increased.

A low power run-on type landing will be necessary:

Airspeed : Approach at 60 to 70 KIAS.

At about 50 feet AGL, reduce airspeed to arrive at the intended landing point at about 30 KIAS.

At 2 to 5 feet AGL, apply collective to cushion landing and simultaneously gradually reduce engine throttle to maintain heading. If right yaw becomes excessive, rotate engine throttle to IDLE.

SYSTEM FAILURES

HYDRAULIC SYSTEM MALFUNCTION

The helicopter is equipped with two independent hydraulic systems for cyclic and collective pitch control.

Either system can deliver adequate power to control the helicopter.

The tail rotor pedals are boosted by system n.1 only.

PRESSURE LOSS IN SYSTEM N.1

INDICATIONS

EDU 1	: SERVO 1 caution message displayed.
EDU 2	: N.1 HYD system pressure below minimum.
Pedals	: In hover and in high power condition tendency to move slowly to the tail rotor traction zero position. In all other flight conditions tendency to maintain the initial position.
Cyclic and collective	: No change in control force.

PROCEDURE

Airspeed	: Reduce gradually avoiding pull up manoeuvres; recommended maximum 90 KIAS and 25 deg bank angle in order to maintain acceptable control loads.
Flight controls	: Avoid rapid movements.
Failed hydraulic system	: OFF.
Land as soon as practicable.	

PRESSURE LOSS IN SYSTEM N.2

INDICATIONS

- EDU 1 : SERVO 2 caution message displayed.
- EDU 2 : N.2 HYD system pressure below minimum.
- Cyclic, pedals and collective : No change in control force.

PROCEDURE

Proceed as per failure of hydraulic system n.1.

Land as soon as practicable.

JAMMING OF A SERVO VALVE

The helicopter is equipped with three hydraulic servo actuators, dual body type, on main rotor controls (cyclic and collective) and with one hydraulic servo actuator, single body type, on tail rotor control (pedals).

INDICATIONS

The jamming of a servo valve of main rotor servo actuators can be detected only during the system check on ground before take-off (refer to Section 2) when hydraulic systems are alternatively deactivated.

PROCEDURE

Airspeed : Reduce gradually avoiding pull up manoeuvres; maximum 90 KIAS and 25 deg bank angle.

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 manoeuvrability (i.e. avoid operating in enclosed areas, avoid operation with sideward winds, in particular with wind from the right).

ELECTRICAL POWER FAILURE

Failure of the generator and d.c. bus

INDICATIONS

EDU 1 : DC GEN caution message displayed.

Following the generator and d.c. bus failure the caution messages listed below will also be displayed:

- INV 2 OFF;
- VG 2;
- SAS 2;
- FUEL PUMP 2;
- BATT DISCH.

PROCEDURE

GEN switch : RESET, then ON.
If DC GEN caution message is still displayed, set the switch to OFF.

GEN BUS switch : If ON, set to OFF (loss of d.c. bus).

Copilot ICS (if installed)
NORM/FAIL switch : FAIL.

WARNING

With this failure, the battery is capable of supplying power for approximately 30 minutes. In this condition the engine is fed by the fuel pump n. 1 only.

Land as soon as practicable and before battery discharge (within max. 30 minutes).

Note

The battery will supply the following indicators and systems:

- N1 and ITT indicators (on EDU 1);
- torquemeter indicator (on EDU 1);
- dual tachometer indicator (on EDU 1);
- warning, caution and advisory messages (on EDU 1);
- transmission & engine oil indicators (on EDU 2);
- voltammeter indicator (except for VDC - on EDU 2);
- fuel pressure indicator (on EDU 2);
- fuel quantity indicator (on EDU 2);
- hydraulic pressure indicator (on EDU 2);
- backup dual tachometer indicator;
- fuel pump n.1;
- fuel transfer pump;
- fuel valve;
- EEC;
- SAS n.1 system;
- inverter n.1;
- force trim;
- landing light (max. 3 minutes before landing);
- anticollision light;
- pilot spot light;
- ADI indicator (if installed);
- pilot/copilot ICS (if installed);
- transponder (if installed);
- pilot windshield wiper (if installed).

Battery Discharging

INDICATIONS

EDU 1 : BATT DISCH caution message displayed.

Probable DC generator failure: following a DC generator failure the caution messages listed below may or may not be displayed:

- DC GEN;
- INV 2 OFF;
- VG 2;
- SAS 2;
- FUEL PUMP 2.

PROCEDURE

GEN switch : Check ON.

- If GEN switch is OFF, reset to ON:

EDU 1 : BATT DISCH, DC GEN, INV 2 OFF, FUEL PUMP 2, VG 2 caution messages out.

SAS 2 switch : When VG 2 caution message is out, set to ON.

EDU 1 : SAS 2 caution message out.

Proceed with flight.

- If GEN switch is already ON, undetected DC generator failure confirmed:

EDU 1 : DC GEN caution message not displayed.

GEN BUS switch : If ON, set to OFF (loss of
d.c. bus).

Copilot ICS (if installed)
NORM/FAIL switch : FAIL.

WARNING

With this failure, the battery is capable of supplying power for approximately 28 minutes. In this condition the engine is fed by the fuel pump n. 1 only.

Land as soon as practicable and before battery discharge (within max. 28 minutes).

Refer to **Failure of the generator and d.c. bus** procedure for the list of equipment supplied by the battery.

Failure of an inverter

In the event of an inverter failure (#1 or #2) the remaining inverter will automatically power the 115 V and 26 V busses of the failed inverter.

INDICATIONS

EDU 1 : INV 1 (2) OFF caution message displayed.
SAS 1 (2) caution message displayed.

PROCEDURE

INV 1 (2) switch : Attempt reset.
If INV 1 (2) OFF caution message is still illuminated set failed inverter switch to OFF.

SAS 1 (2) switch : ON.

EDU 1 : SAS 1 (2) caution message out.

Proceed with flight.

Correct malfunction before next flight.

RAD MSTR (radio master) switch failure

In case of RAD MSTR (radio master) switch failure disengage the RADIO MASTER circuit breaker; then use the radio equipment as desired, by means of their control panels.

HELIPILOT SYSTEM MALFUNCTION

During operation of the Helipilot system, malfunctions may occur which require pilot intervention.

These malfunctions are treated in detail in the following paragraphs.

Note

The Helipilot indicators normally refer to Helipilot 1. Turning SAS 1 off, the Helipilot indicators will automatically switch to SAS 2.

Note

Following one of the two Helipilot failures, attitude beep trim on the cyclic is inoperative.

Failure of one Helipilot

PROCEDURE

- | | |
|-----------------------|-------------------------------|
| Cyclic and collective | : Hands on. |
| Max. airspeed | : Reduce V_{NE} by 30 KIAS. |
| Max. ROC | : 750 ft/min. |
- Proceed with flight.
Repair failed system before next flight.

Repeated disturbances during pitch, roll or yaw operation

PROCEDURE

Retrim the helicopter; failed Helipilot system can be identified by observing the Helipilot indicators. Disengage the failed system and proceed as per "**Failure of one Helipilot**" procedure.

Note

SAS 2 pitch and roll linear actuator positions may be observed by pressing the SAS 2 PUSH pushbutton on the Helipilot control panel.

Oscillatory malfunction during pitch, roll or yaw operation

PROCEDURE

Identify affected axis; isolate SAS 1 or SAS 2 by observing Helipilot indicators, or switch SAS 1 off.

If SAS 1 disengagement eliminates the oscillation, disengage the failed system and proceed as per "**Failure of one Helipilot**" procedure.

If oscillations persist, re-engage SAS 1 and switch SAS 2 off.

If oscillations occur in yaw, disengage Helipilot 1 by switching SAS 1 off and proceed as per "**Failure of one Helipilot**" procedure leaving SAS 2 on.

WARNING

Landing should not be attempted while an oscillatory malfunction exists.

Note

SAS 2 pitch and roll linear actuator positions may be observed by pressing the SAS 2 PUSH pushbutton on the Helipilot control panel.

INTERCOMMUNICATION SYSTEM FAILURE

PROCEDURE

FAIL/NORM switch (on intercommu-
nication panel) : FAIL.

Resume normal operation.

INTEGRATED DISPLAY SYSTEM FAILURE

The internal I.D.S. failures may differ according to the following cases:

EDU failure

INDICATIONS

Affected EDU : Blank or unusable.

Healthy EDU : Automatically set to
REVERSIONARY mode.

PROCEDURE

ON/OFF switch on affected EDU : OFF.

Proceed with flight and correct trouble before next flight

EDU display degradation

INDICATIONS

Affected EDU : Visible display degradation (i.e.
graphical and/or lighting
degradation)

PROCEDURE

ON/OFF switch on affected EDU : OFF.

Healthy EDU : REVERSIONARY mode dis-
played.

Proceed with flight and correct trouble before next flight.

Failure of both EDUs

INDICATIONS

EDU1 and EDU 2 : Blank or unusable.

PROCEDURE

EDU 1 and EDU 2 : Switch to OFF.

CAUTION

Primary and secondary parameters, warning, caution and advisory visual and aural messages no more available except:

- N2/NR (on backup tachometer)
- “ONE-FIFTY FEET” aural message

Note

Engine and rotor governing still maintained by EEC.

Land as soon as practical taking care that fuel quantity and FUEL LOW caution indications are no more available.

Loss of EDU primary (secondary) parameter(s)

Each EDU receives electrical signals from the sensors of all primary and secondary parameters but displays only the parameters data related to its current display format. Two failure cases are possible:

- loss of primary parameter(s) in EDU 1 or secondary parameter(s) in EDU 2;
- loss of secondary parameter(s) in EDU 1 or primary parameter(s) in EDU 2.

LOSS OF PRIMARY (SECONDARY) PARAMETER(S) IN EDU 1(2)

INDICATIONS

- EDU 1(2) : No indication of the affected parameter and white dashes (---) in the digital box.
- EDU 1 : MISCMP-P(S) caution message displayed.

PROCEDURE

- ON/OFF switch on affected EDU : OFF.
- Healthy EDU : REVERSIONARY mode automatically displayed.

Note

If affected EDU is the EDU 2, then OAT and electrical parameters no more available.

Proceed with flight and correct trouble before next flight.

LOSS OF SECONDARY (PRIMARY) PARAMETER(S) IN EDU 1(2)

INDICATIONS

- EDU 1 : MISCMP-P(S) caution message displayed.

PROCEDURE

Refer to the following paragraph “**Miscompare of EDU primary (secondary) parameter(s)**”.

Miscompare of EDU primary (secondary) parameter(s)

The two EDUs perform a continuous cross-comparison of the electrical signals received from the sensors of all primary and secondary parameters. In case a discrepancy results from this comparison, two failure cases are possible:

- miscompare between primary parameter(s) of the two EDUs;
- miscompare between secondary parameter(s) of the two EDUs.

MISCOMPARE OF PRIMARY PARAMETER(S)

INDICATIONS

EDU 1 : MISCMP-P caution message displayed.

PROCEDURE

If flight conditions permit, try to identify the faulty information by comparing indications on EDU 1 with indications on EDU 2 forced to REVISIONARY display mode.

Note

To force each EDU to REVERSIONARY display mode, switch the other EDU to OFF.

Return EDUs to normal mode of operation, proceed with flight monitoring the faulty parameter.
Correct trouble before next flight.

MISCOMPARE OF SECONDARY PARAMETER(S)

INDICATIONS

EDU 1 : MISCMP-S caution message displayed.

PROCEDURE

If flight conditions permit, try to identify the faulty information by comparing indications on EDU 2 with indications on EDU 1 forced to REVISIONARY display mode.

Note

In case no information discrepancy results from displays comparison, the faulty information is OAT or voltammeter indication.

Return EDUs to normal mode of operation, proceed with flight monitoring the faulty parameter.
Correct trouble before next flight.

FIRE

ENGINE FIRE ON GROUND

INDICATIONS

- EDU 1 : ENG FIRE warning message displayed and “ENGINE FIRE” aural warning activated. █
- Engine area : Smoke, fumes and fire.

PROCEDURE

Shutdown the engine as follows:

- Engine throttle : OFF.
- FUEL VALVE switch : CLOSED.
- FUEL PUMP 1 and 2 switches : OFF.
- Xfer PUMP switch : OFF.
- GEN switch : OFF.
- BAT switch : OFF.

Evacuate the helicopter as soon as possible.

ENGINE FIRE DURING FLIGHT

INDICATIONS

EDU 1 : ENG FIRE warning message displayed and "ENGINE FIRE" aural warning activated.

Engine area : Smoke, fumes and fire.

PROCEDURE

Collective : Immediately reduce as required to maintain NR between 90 and 110%.

Cyclic : Adjust to obtain desired autorotative airspeed.

Note

Airspeed for minimum rate of descent is 80 KIAS.

Airspeed for maximum glide distance is 110 KIAS.

Shutdown the engine as follows:

Engine throttle : OFF.

FUEL VALVE switch : CLOSED.

FUEL PUMP 1 and 2 switches : CLOSED.

Xfer PUMP switch : OFF.

GEN switch : OFF.

Execute an autorotative descent and landing (refer to "**Autorotative landing**" procedure).

After landing:

BAT switch : OFF.

Evacuate the helicopter as soon as possible.

SMOKE IN CABIN, TOXIC FUMES, ETC.

INDICATIONS

Cabin : Smoke, toxic fumes.

PROCEDURE

VENT switch : ON.

Sliding windows (if installed) and
vents : Open.

Note

If the altitude permits and the source is suspected to be of an electrical origin, attempt to isolate the source by switching OFF electrical circuits.

Land as soon as possible.

STATIC PORT OBSTRUCTION

When operating in adverse weather conditions, if erratic readings from the airspeed indicator and altimeter occur, with the STATIC source switch in NORM position, proceed as follows:

■ Doors, vents and, if installed, sliding windows : Closed.

STATIC source switch : Remove the guard and select ALTERNATE.

This procedure selects an alternate static source utilizing cabin air.

Proceed with flight.



When the alternate static source is used decrease the altimeter readings by 250 ft.

Note

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

FLIGHT IN THUNDERSTORMS – LIGHTNING

When flying in thunderstorms, the helicopter may be struck by lightning.

If it is suspected that the helicopter has been struck by lightning proceed as follows:

Airspeed : Reduce (V_{NE} 80 KIAS)



Avoid extreme manoeuvres.

Land as soon as possible.

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SECTION 4

PERFORMANCE DATA

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SECTION 4

PERFORMANCE DATA

GENERAL

The performance data presented herein are derived from the engine manufacturer's minimum specification power for the engine less installation losses.

These data are applicable to the basic helicopter without any optional equipment which would appreciably affect lift, drag or power available.

USING THE GRAPHS

The performance information is presented graphically and on the sequence in which it would ordinarily be used. The introduction to each performance item contains an example of graph usage. Additionally, each graph contains a pictogram showing the correct sequence of steps in graph usage. As aircraft performance can be substantially affected by many factors (weight, altitude, temperature, power levels, etc.), careful attention should be paid to the explanatory text accompanying each graph to assure that the correct set of factors is being used.

When quick estimates of performance are required (no interpolation between curves), it is recommended that the most critical curves be used for estimates (higher weight, higher density altitude, etc.).

DENSITY ALTITUDE CHART

(Figure 4-1)

Enter the graph at the desired value of Outside Air Temperature (OAT), on the horizontal axis. Proceed vertically until intercepting the desired value of Pressure Altitude. Proceed left to read the resulting Density Altitude (in feet). Proceed right to read the corresponding value of the reciprocal of square root of the density ratio, which is used to calculate True Airspeed.

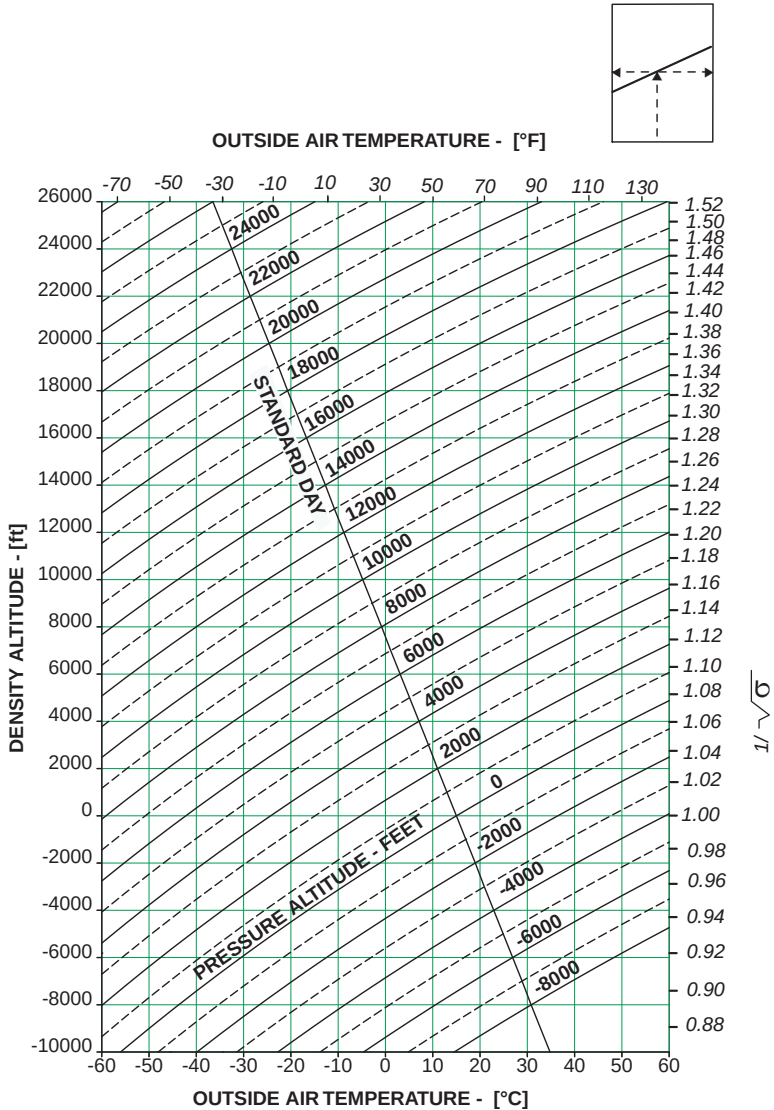
Example:

At a Pressure Altitude of 5,000 ft and OAT of +25 °C, determine the corresponding Density Altitude.

Solution:

Enter Figure 4-1 at an OAT of +25 °C, and proceed vertically until intersecting a Pressure Altitude of 5,000 ft (diagonal curves). From this point, proceed left to read a Density Altitude of 7,300 ft.

DENSITY ALTITUDE CHART



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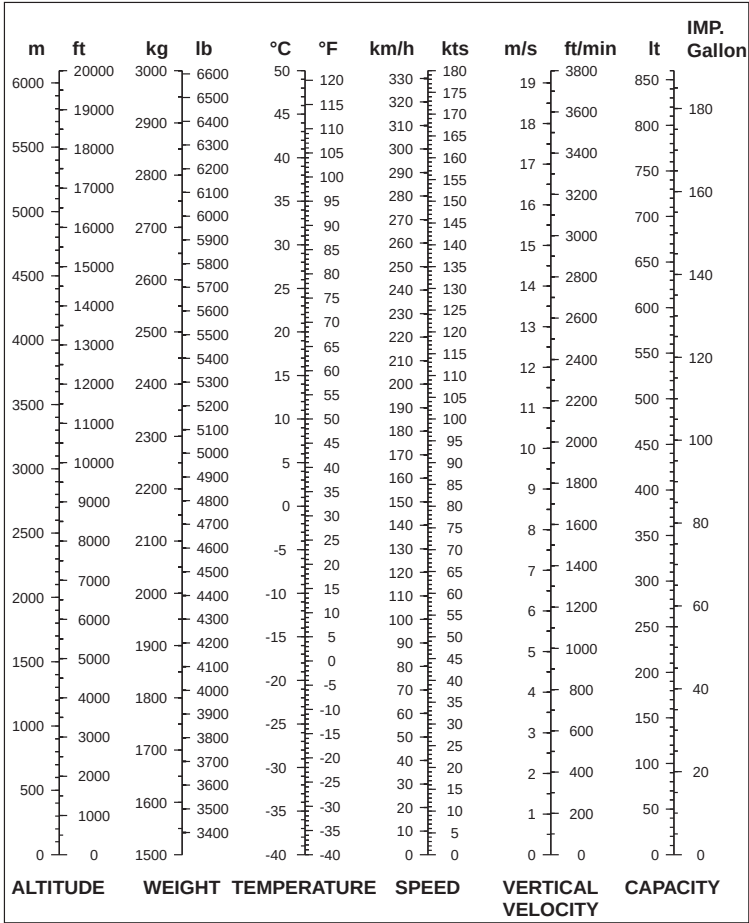
Figure 4-1. Density / Altitude Chart

CONVERSION CHART

(Figure 4-2)

The table in Figure 4-2 is self-explanatory. The conversion from Metric System values to Imperial System values, and vice-versa, is given for a number of useful flight parameters.

CONVERSION CHART



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Figure 4-2. Conversion Chart

AIRSPEED CALIBRATION CURVE

(Figure 4-3)

Calibration curves is presented for the pilot's Air Data System.

The Indicated Airspeed shown on the cockpit instrument is produced by pressure readings at the aircraft pitot and static ports and, in general, these pressure readings contain errors which must be corrected in order to obtain Calibrated Airspeed (the airspeed which would be shown on the cockpit instrument if there were no errors). Calibrated airspeed must be used in order to calculate correct values of the True Airspeed.

The magnitude of the error depends on the Indicated Airspeed. Enter the Airspeed Calibration Curve graph (Figures 4-3), with the desired value of Indicated Airspeed, and proceed vertically until intercepting the curve. Proceed to the left to read the corresponding value of Calibrated Airspeed. Use this value to calculate the corresponding True Airspeed, as required.

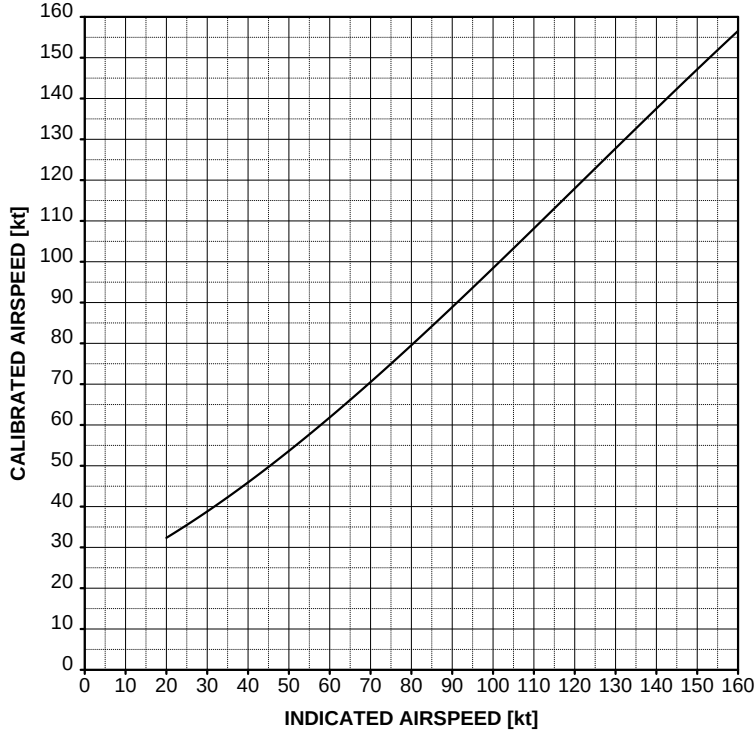
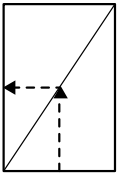
Example:

On the Air Data System Indication, determine the Calibrated Airspeed corresponding to an Indicated Airspeed of 50 knots.

Solution:

Use Figure 4-3. Enter the graph at an Indicated Airspeed of 50 knots and proceed vertically until intersecting the curve. Proceed left and read the corresponding Calibrated Airspeed of 54 knots.

AIRSPEED CALIBRATION CURVE
PILOT INDICATOR
(FORWARD FLIGHT)



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Figure 4-3. Airspeed Calibration Curve - Pilot

POWER ASSURANCE CHECK

The Power Assurance Check charts indicate if the engine power available is within the limits established for the legitimate use of the RFM.

A power assurance check should be performed daily. Additional checks should be made if unusual operating conditions or indications arise. Three power assurance charts are provided, one for a hover check and the remaining charts for a level flight check at 130 KIAS or, if this condition is not attainable because engine MCP limits are first encountered, at 100 KIAS. The heading of each chart contains the procedure to be followed during the power assurance check.

The hover check is performed prior to takeoff and the in-flight check is provided for periodic in-flight monitoring of engine performance. Either power assurance check method may be selected at the discretion of the pilot.

It is the pilot's responsibility to accomplish the procedure safely, considering passenger load, terrain being overflown and the qualification of persons on board to assist in watching for other air traffic and to record power check data.

If the hover check is unsuccessful, engine performance is less than minimum specification and performance data contained in this manual cannot be achieved.

Refer to EMM.

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POWER ASSURANCE CHECK in HOVER

HEATER OFF

GENERATOR LOAD TO MINIMUM

NR 102%

INCREASE COLLECTIVE UNTIL LIGHT ON SKID OR HOVERING AT 3 FEET. DO NOT EXCEED ITT 755°C OR N1 100.1% OR TQ 100%

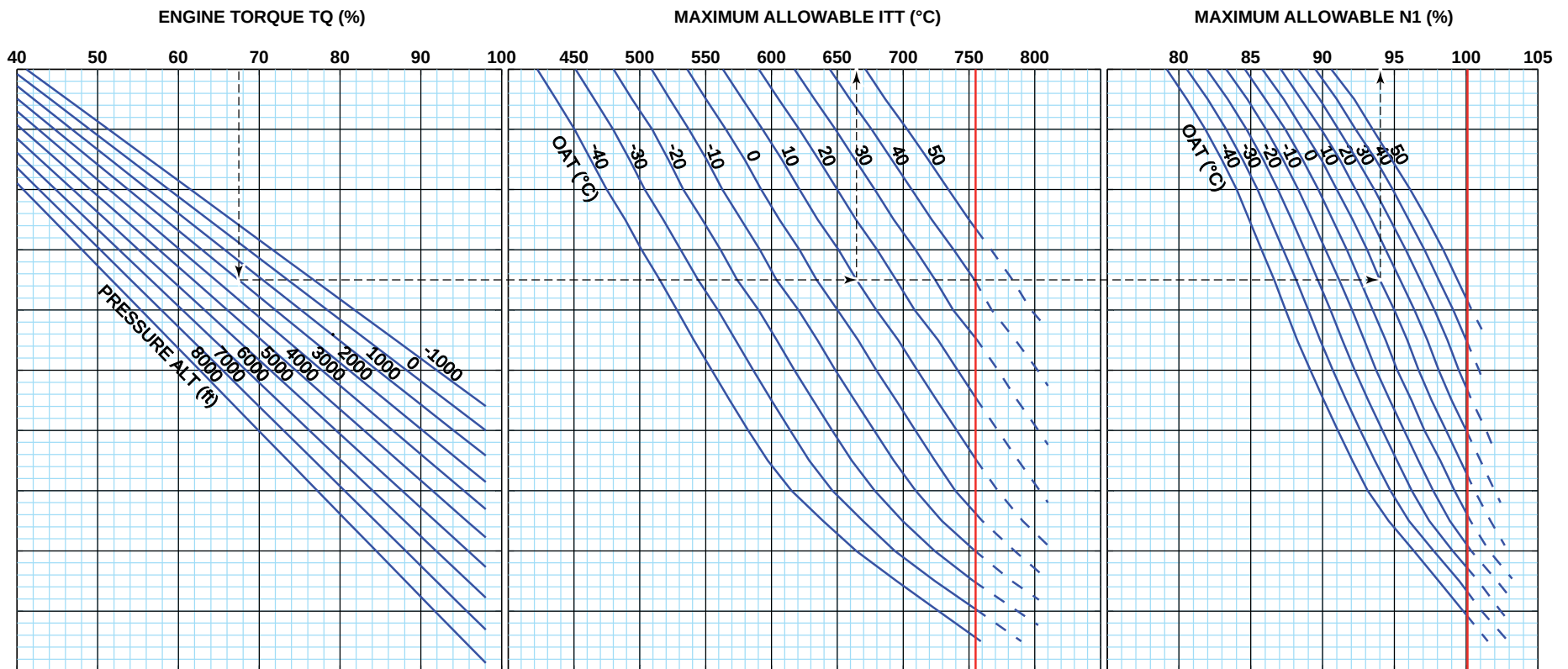
STABILIZE POWER 1 MINUTE, THEN RECORD OAT, PRESSURE ALTITUDE, ENGINE TORQUE, ITT AND N1

ENTER CHART AT INDICATED TQ, MOVE DOWN TO INTERSECT PRESSURE ALTITUDE, PROCEED TO THE RIGHT TO INTERSECT OAT, THEN MOVE UP TO READ VALUES FOR MAXIMUM ALLOWABLE ITT AND N1

IF INDICATED ITT OR N1 EXCEEDS MAXIMUM ALLOWABLE, REPEAT CHECK, STABILIZING POWER FOR THREE MINUTES

IF THE ENGINE EXCEEDS ALLOWABLE ITT OR N1 AFTER STABILIZING POWER FOR THREE MINUTES, PUBLISHED PERFORMANCE MAY NOT BE ACHIEVABLE. REFER TO EMM

NOTE: ENGINE TORQUE SHOULD BE PREFERABLY SET ABOVE 70% FOR REPEATABILITY OF THE TESTS.



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Figure 4-4. Power Assurance Check - Hover

POWER ASSURANCE CHECK in LEVEL FLIGHT 130 KIAS

ESTABLISH LEVEL FLIGHT ABOVE 1000 FT AGL

HEATER OFF

GENERATOR LOAD TO MINIMUM

NR 102%

STABILIZE A 130 KIAS LEVEL FLIGHT WITHOUT EXCEEDING TQ 100%, ITT 755°C OR N1 100.1%.

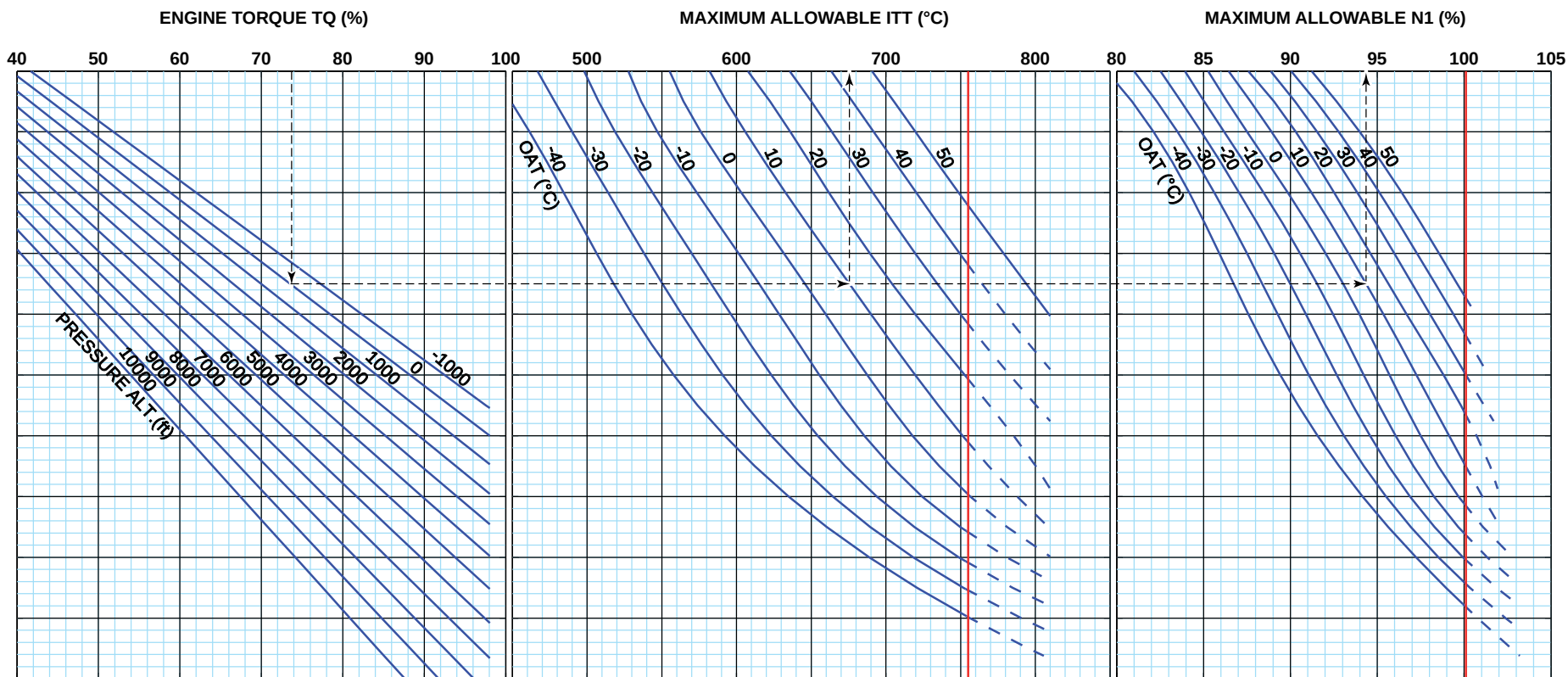
NOTE: IF 130 KIAS CAN NOT BE REACHED DUE TO ATMOSPHERIC CONDITIONS OR ENGINE LIMITATIONS, THEN LEVEL FLIGHT CAN BE ESTABLISHED AT 100 KIAS (REFER TO NEXT CHART).

STABILIZE POWER 1 MINUTE, THEN RECORD OAT, PRESSURE ALTITUDE, ENGINE TORQUE, ITT AND N1

ENTER CHART AT INDICATED TQ, MOVE DOWN TO INTERSECT PRESSURE ALTITUDE, PROCEED TO THE RIGHT TO INTERSECT OAT, THEN MOVE UP TO READ VALUES FOR MAXIMUM ALLOWABLE ITT AND N1

IF INDICATED ITT OR N1 EXCEEDS MAXIMUM ALLOWABLE, REPEAT CHECK, STABILIZING POWER FOR THREE MINUTES

IF THE ENGINE EXCEEDS ALLOWABLE ITT OR N1 AFTER STABILIZING FOR THREE MINUTES, CARRY OUT A POWER ASSURANCE CHECK IN HOVER.



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Figure 4-5. Power Assurance Check - In Flight (130 KIAS)

POWER ASSURANCE CHECK in LEVEL FLIGHT 100 KIAS

ESTABLISH LEVEL FLIGHT ABOVE 1000 FT AGL

HEATER OFF

GENERATOR LOAD TO MINIMUM

NR 102%

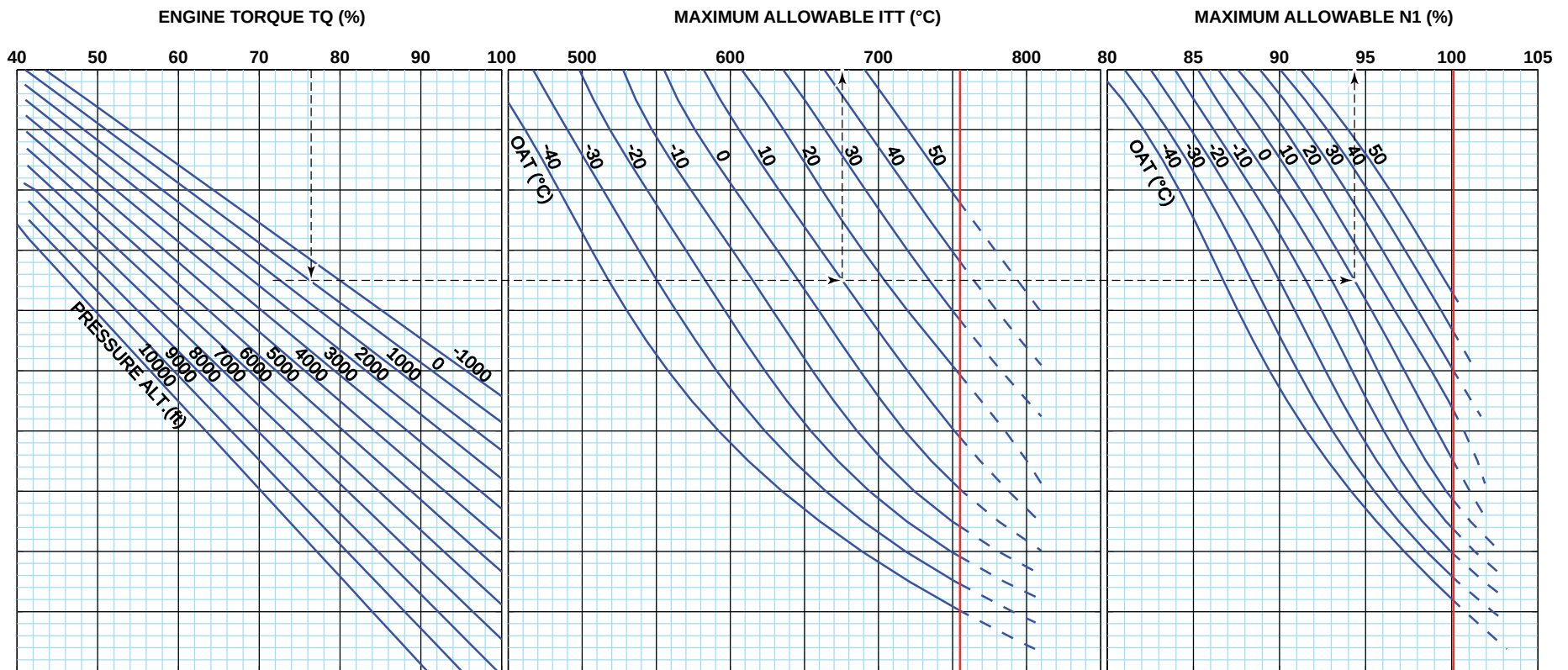
STABILIZE A 100 KIAS LEVEL FLIGHT WITHOUT EXCEEDING TQ 100%, ITT 755°C OR N1 100.1%.

STABILIZE POWER 1 MINUTE, THEN RECORD OAT, PRESSURE ALTITUDE, ENGINE TORQUE, ITT AND N1

ENTER CHART AT INDICATED TQ, MOVE DOWN TO INTERSECT PRESSURE ALTITUDE, PROCEED TO THE RIGHT TO INTERSECT OAT, THEN MOVE UP TO READ VALUES FOR MAXIMUM ALLOWABLE ITT AND N1

IF INDICATED ITT OR N1 EXCEEDS MAXIMUM ALLOWABLE, REPEAT CHECK, STABILIZING POWER FOR THREE MINUTES.

IF THE ENGINE EXCEEDS ALLOWABLE ITT OR N1 AFTER STABILIZING POWER FOR THREE MINUTES, CARRY OUT A POWER ASSURANCE CHECK IN HOVER



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Figure 4-6. Power Assurance Check - In Flight (100 KIAS)

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OPERATION VS ALLOWABLE WIND

(Figure 4-7)

Satisfactory stability and control was demonstrated for sideways and rearward flight up to the maximum weight, in hover IGE or OGE in the following wind/ground speed azimuth envelope.

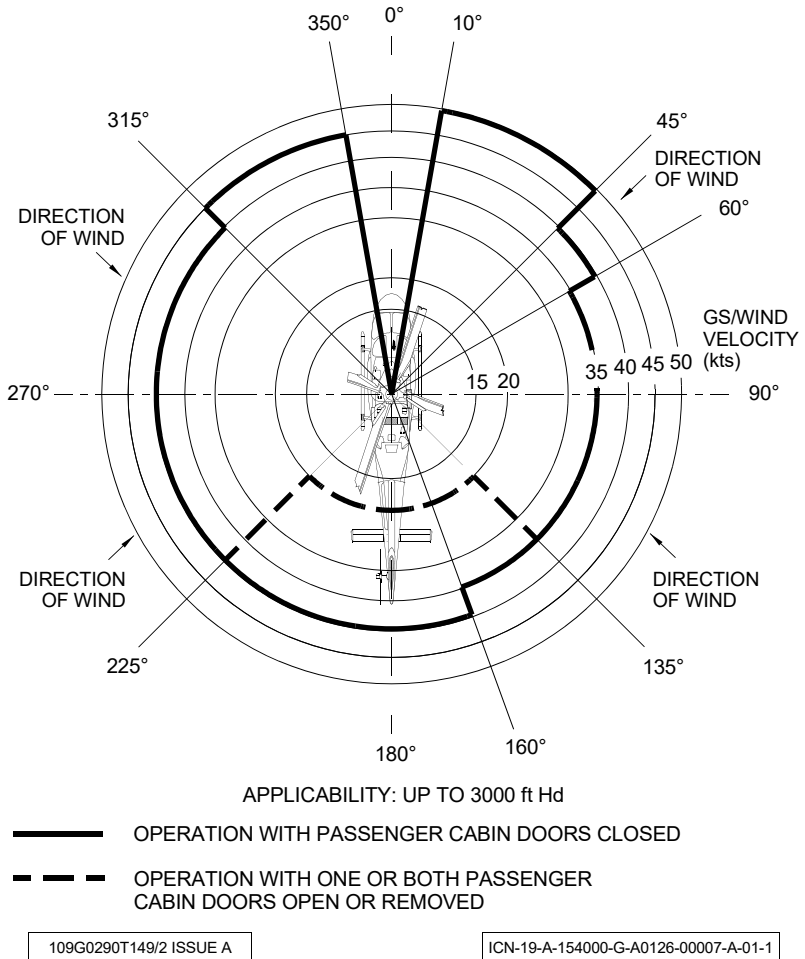
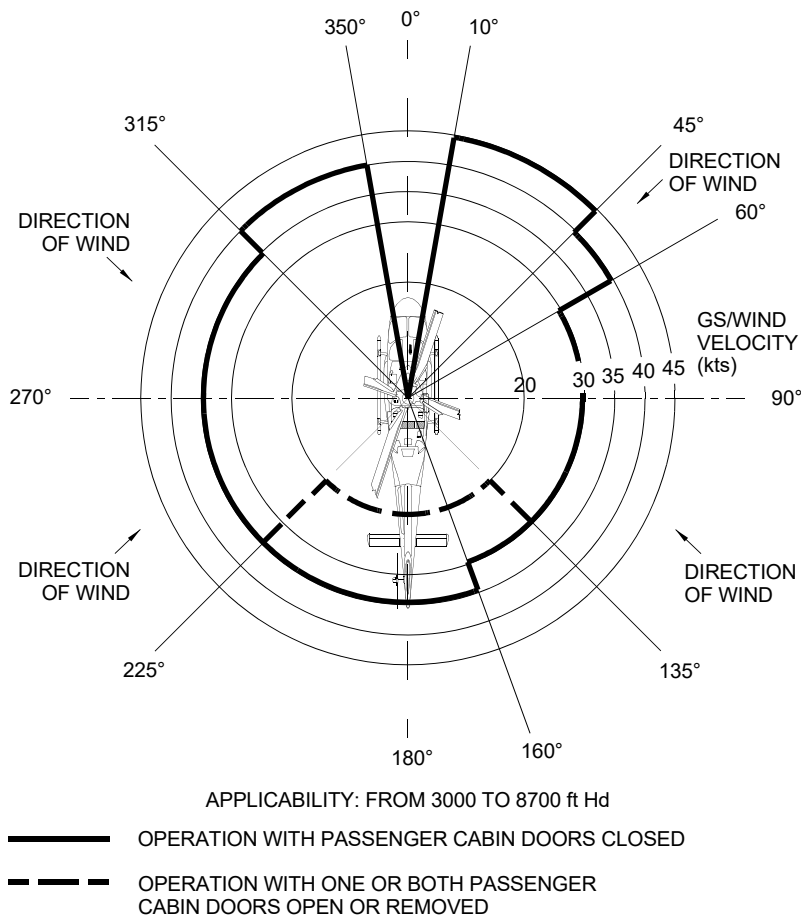


Figure 4-7. (sheet 1 of 2). Wind/Ground Speed Azimuth Envelope



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Figure 4-7. (sheet 2 of 2). Wind/Ground Speed Azimuth Envelope

HOVER CEILING

(Figures 4-8 thru 4-11)

The Hover Ceiling charts define the maximum weight at which an In Ground Effect (IGE) hover (3 ft skid height AGL) or an Out of Ground Effect (OGE) hover (at least 60 ft skid height AGL) is possible for different combinations of Pressure Altitude and OAT with main rotor speed (NR) at 102% and zero wind conditions.

The performance presented for Take-Off Power (TOP) and for Maximum Continuous Power (MCP) refer to an electrical load of 100 A. When the electrical load is greater than 100 A, reduce the maximum weight obtained from the charts according to Table 4-1.

Table 4-1. Hover ceiling - Correction table

CORRECTION TABLE

WHEN **ELECTRICAL LOAD > 100 A** REDUCE GROSS WEIGHT BY [KG]:

OAT	IGE TOP	IGE MCP	OGE TOP	OGE MCP
-35	0	0	0	0
-30	0	0	0	0
-20	0	0	0	10
-10	0	15	0	15
0	10	40	10	35
10	25	50	20	40
20	40	55	35	50
30	45	65	40	65
40	50	70	45	70
50	85	85	75	80

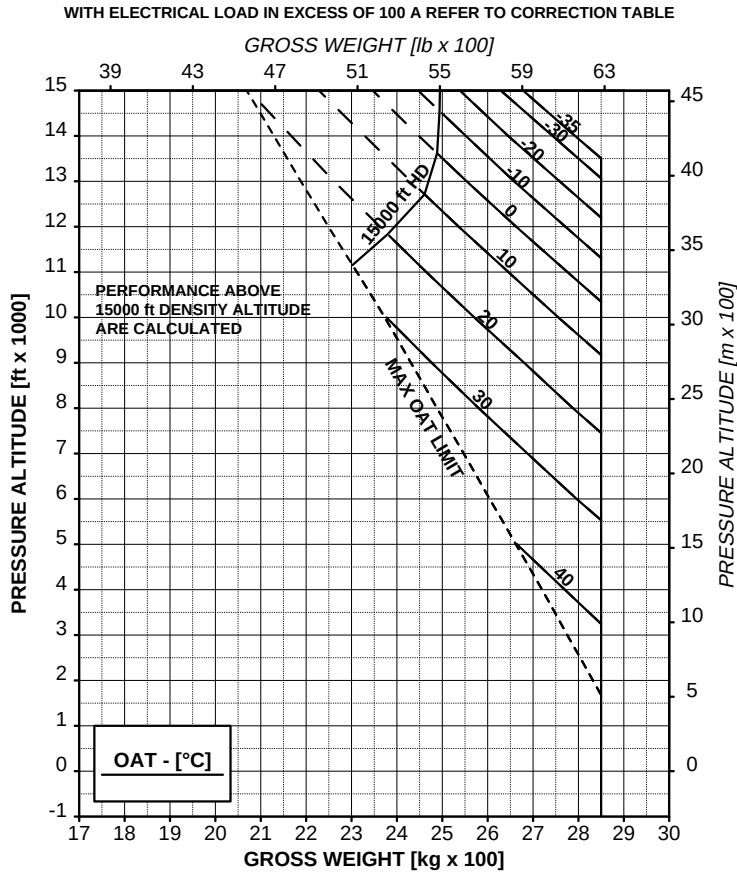
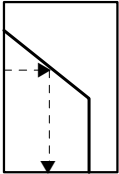
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HOVER CEILING IN GROUND EFFECT
TAKE-OFF POWER

ROTOR SPEED: 102%
ZERO WIND

ELECTRICAL LOAD: 100 A
SKID HEIGHT: 3 ft

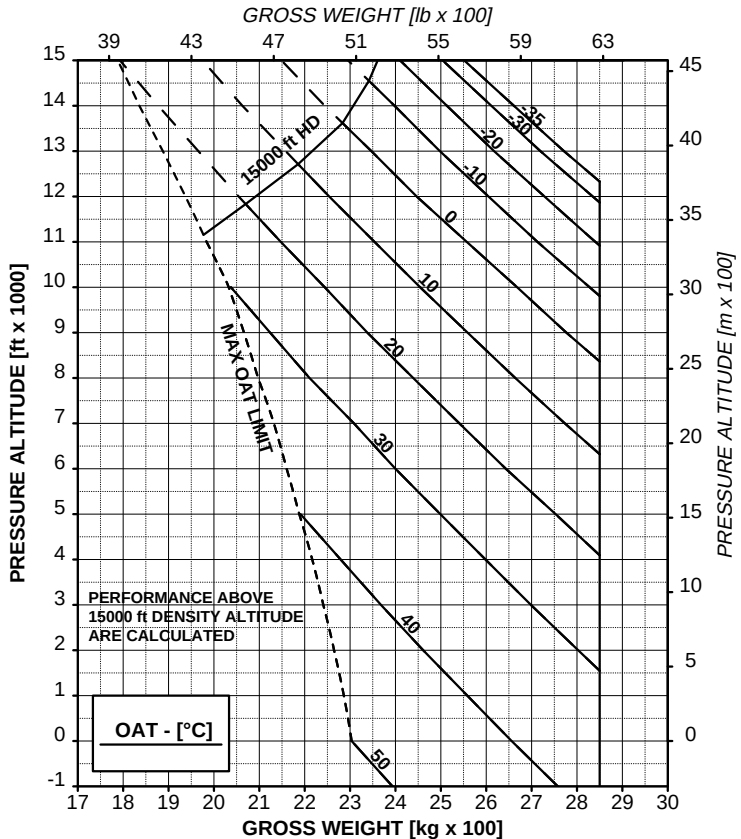


HOVER CEILING IN GROUND EFFECT
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ZERO WIND

ELECTRICAL LOAD: 100 A
SKID HEIGHT: 3 ft

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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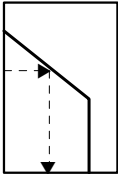
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Figure 4-9. In Ground Effect (IGE) - Maximum Continuous Power (MCP) (Heater Off)

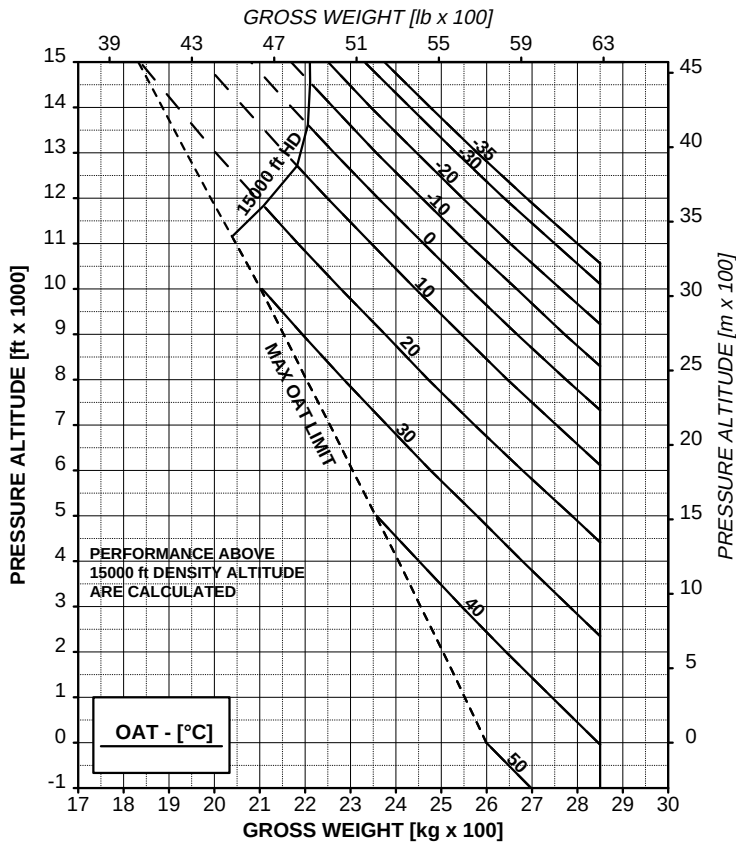
HOVER CEILING OUT OF GROUND EFFECT
TAKE-OFF POWER

ROTOR SPEED:102%
ZERO WIND

ELECTRICAL LOAD: 100 A



WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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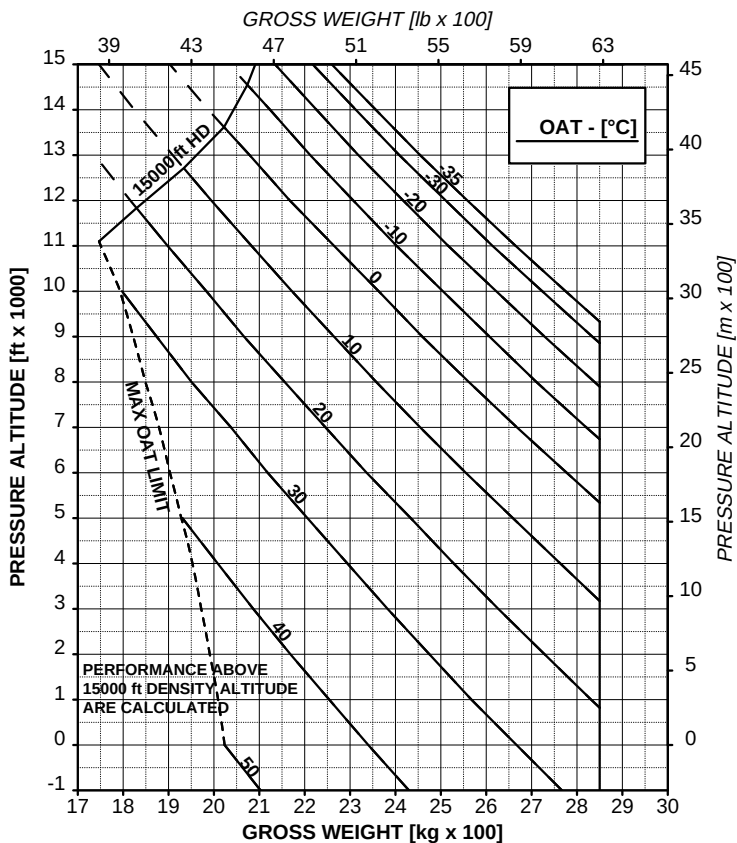
Figure 4-10. Out of Ground Effect (OGE) - Take-Off Power (TOP)
(Heater Off)

HOVER CEILING OUT OF GROUND EFFECT
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ZERO WIND

ELECTRICAL LOAD: 100 A

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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Figure 4-11. Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater Off)

HEIGHT - VELOCITY DIAGRAM

(Figures 4-12 and 4-13)

The Height-Velocity diagram defines the combination of airspeed and height above ground from which a safe landing on a smooth, level and hard surface cannot be assured following an engine failure.

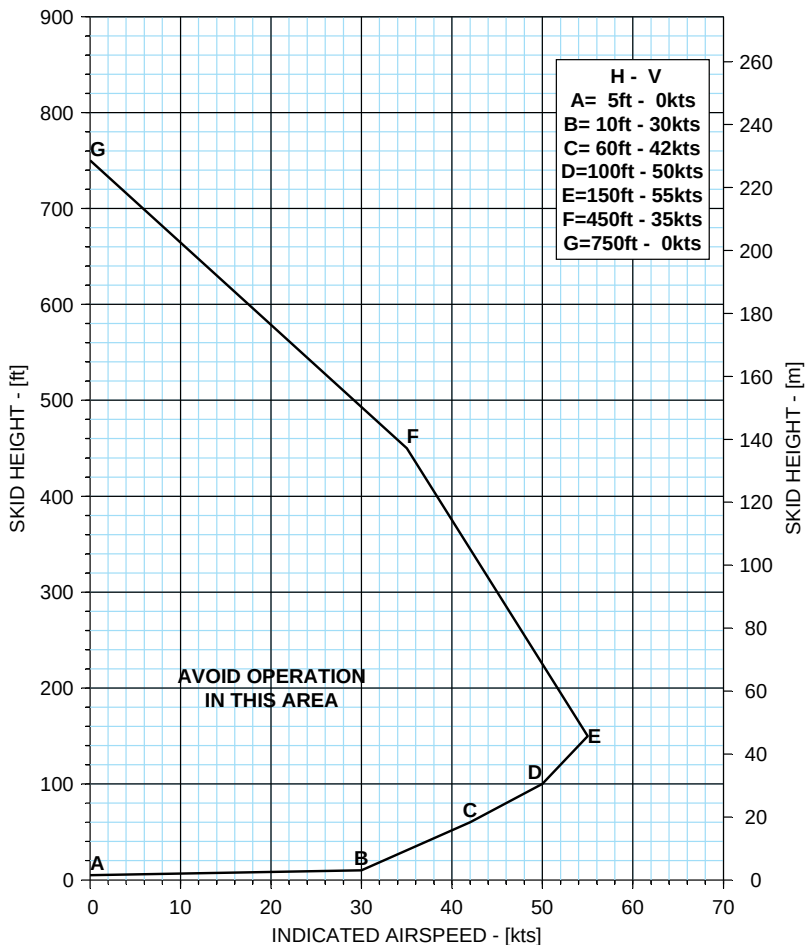
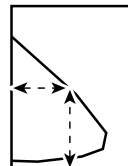
The Height-Velocity diagram is valid up to the maximum GW of 2850 kg.

■ Two Height-Velocity charts are provided:

- CHART A is applicable up to 3,000 ft Hd;
- CHART B is applicable from 3,000 to 7,000 ft Hd.

HEIGHT-VELOCITY DIAGRAM FOR SMOOTH, LEVEL, HARD SURFACES

Chart A
APPLICABILITY: UP TO 3000 ft Hd



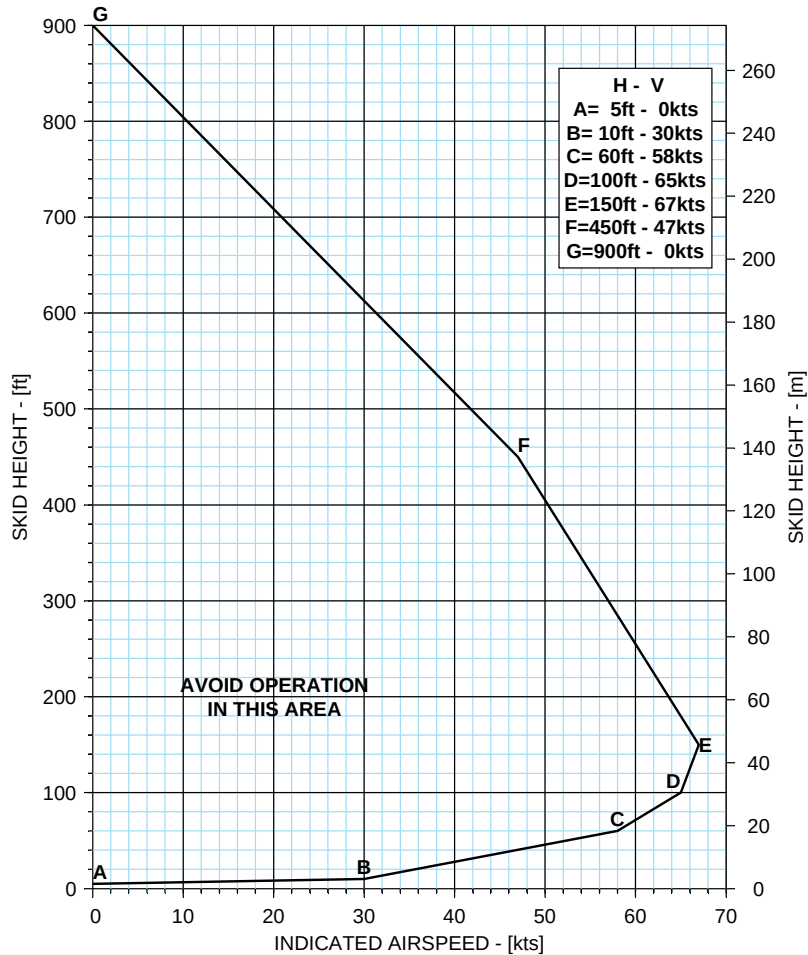
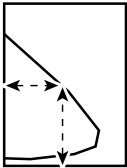
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Figure 4-12. Height - Velocity Diagram - Chart A

HEIGHT-VELOCITY DIAGRAM
FOR SMOOTH, LEVEL, HARD SURFACES

Chart B
APPLICABILITY: from 3000 TO 7000 ft Hd



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Figure 4-13. Height - Velocity Diagram - Chart B

RATE OF CLIMB

(Figures 4-14 thru 4-23)

The Rate Of Climb (ROC) charts are presented for Take-Off Power (TOP) rating and for Maximum Continuous Power (MCP) rating, both with NR at 102%.

They refer to the best Rate of Climb airspeed V_y of 60 KIAS up to 15,000 ft Hp.

The performance presented for Take-Off Power (TOP) and for Maximum Continuous Power (MCP) refer to an electrical load of 100 A. When the electrical load is greater than 100 A, reduce the maximum Rate of Climb obtained from the charts according to Table 4-2.

Table 4-2. Rate of climb - Correction table

CORRECTION TABLE

WHEN ELECTRICAL LOAD > 100 A REDUCE RATE OF CLIMB BY [ft/min]:

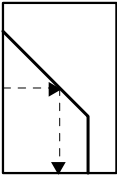
OAT	TOP	MCP
-35	0	0
-30	0	5
-20	0	15
-10	0	25
0	15	55
10	45	70
20	55	80
30	60	110
40	65	110
50	80	115

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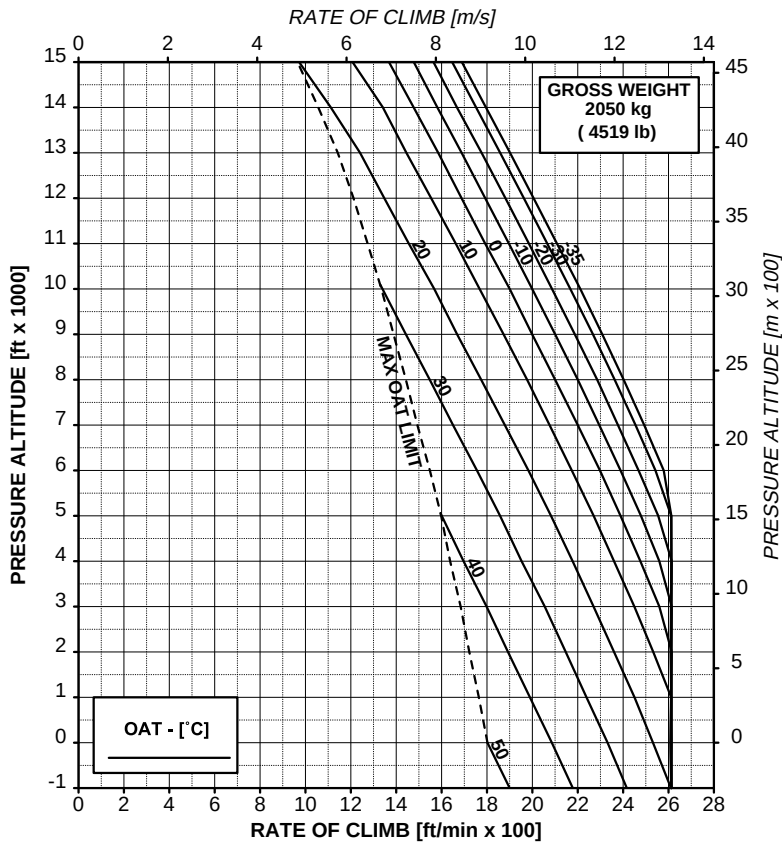
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RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS



WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



119G1560A001 ISSUE A

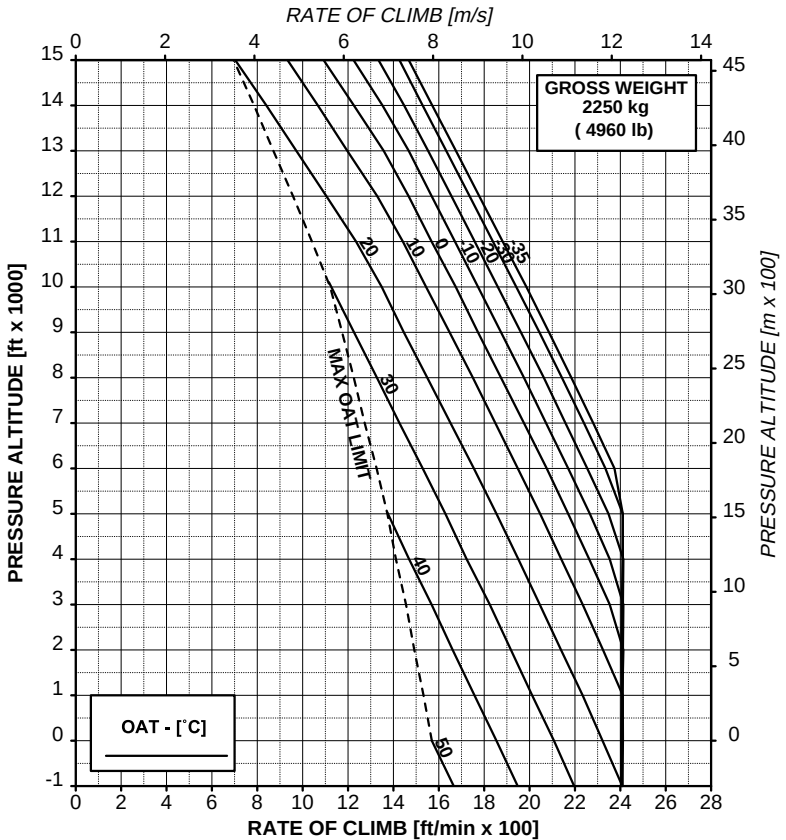
ICN-19-A-154300-G-A0126-00001-A-01-1

Figure 4-14. Take-Off Power (TOP) (Heater Off)
- Gross Weight 2050 kg

**RATE OF CLIMB
TAKE-OFF POWER**

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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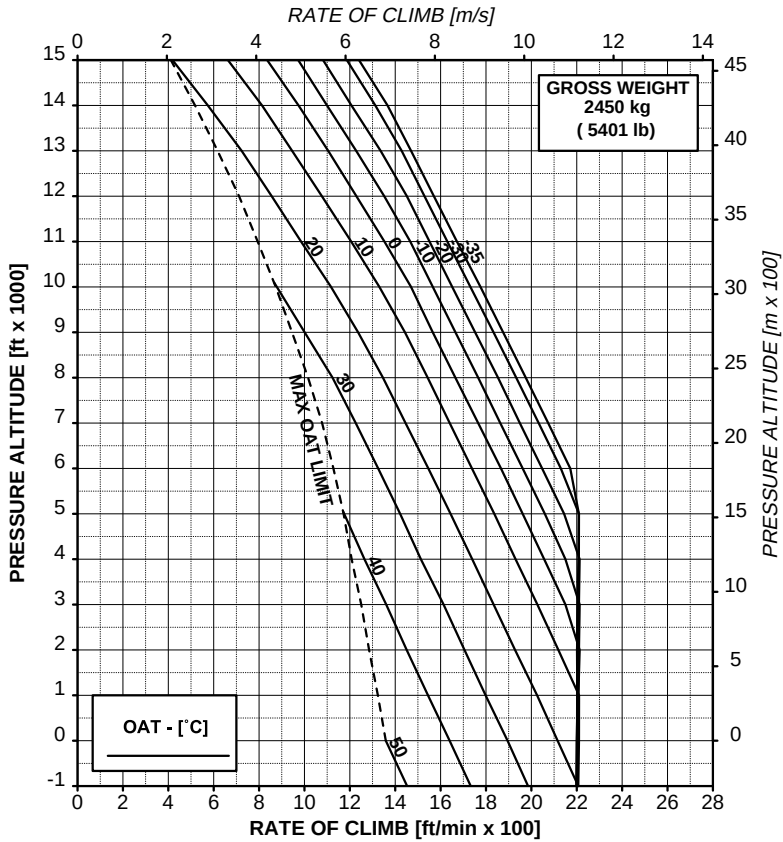
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**Figure 4-15. Take-Off Power (TOP) (Heater Off)
- Gross Weight 2250 kg**

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



119G1560A001 ISSUE A

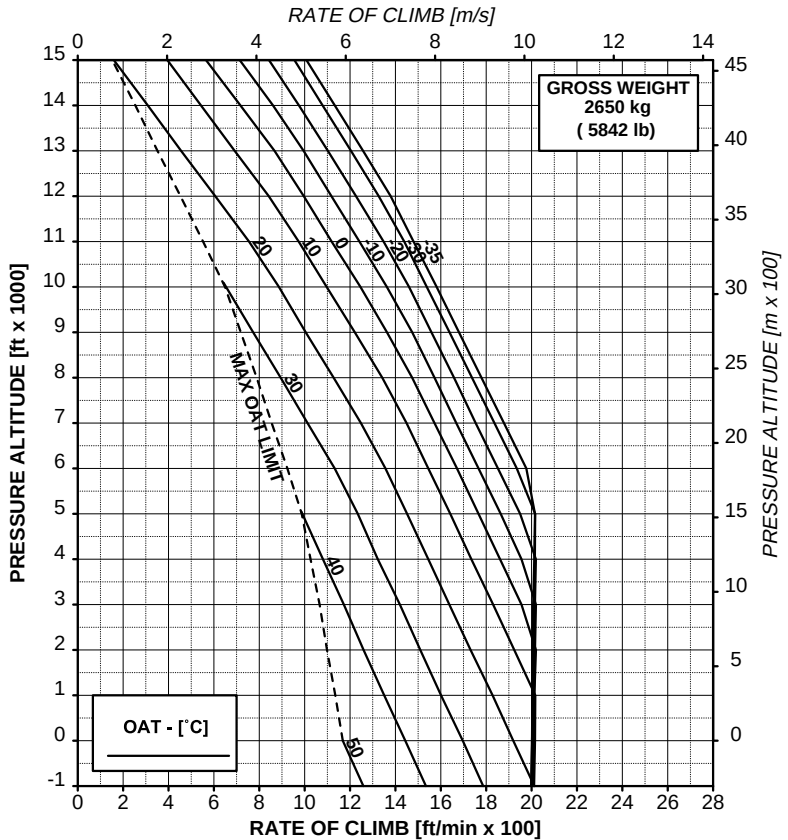
ICN-19-A-154300-G-A0126-00003-A-01-1

Figure 4-16. Take-Off Power (TOP) (Heater Off)
- Gross Weight 2450 kg

**RATE OF CLIMB
TAKE-OFF POWER**

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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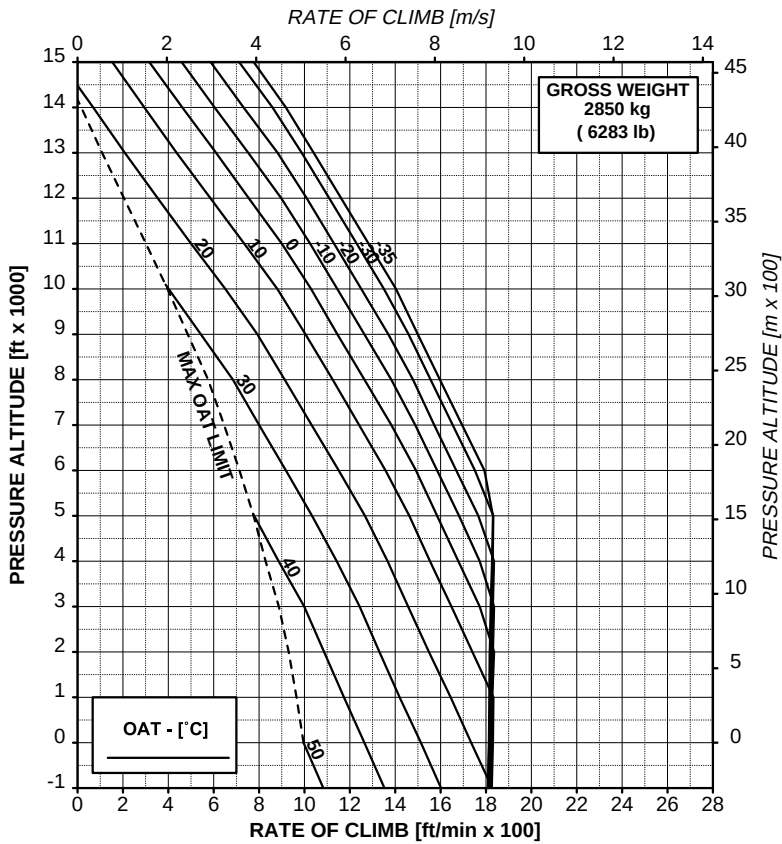
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**Figure 4-17. Take-Off Power (TOP) (Heater Off)
- Gross Weight 2650 kg**

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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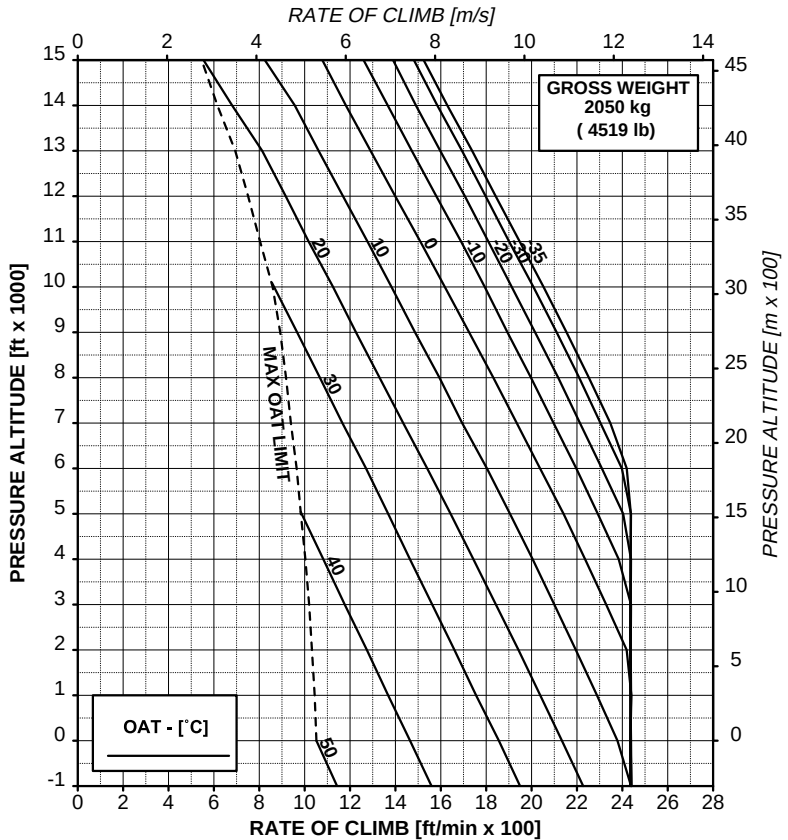
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Figure 4-18. Take-Off Power (TOP) (Heater Off)
- Gross Weight 2850 kg

**RATE OF CLIMB
MAXIMUM CONTINUOUS POWER**

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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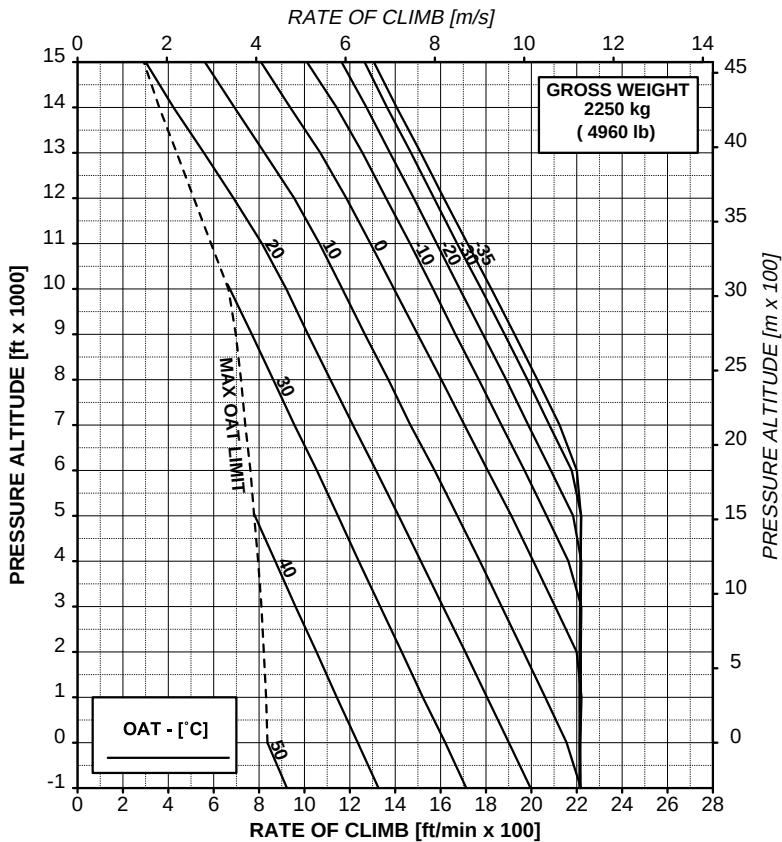
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**Figure 4-19. Maximum Continuous Power (MCP) (Heater Off)
- Gross Weight 2050 kg**

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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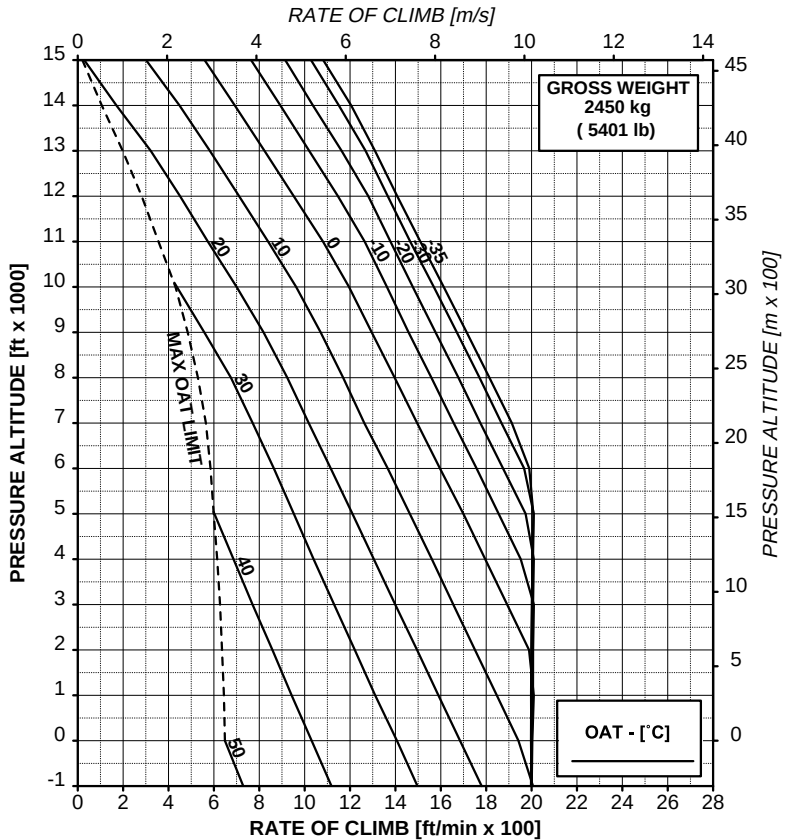
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Figure 4-20. Maximum Continuous Power (MCP) (Heater Off)
- Gross Weight 2250 kg

**RATE OF CLIMB
MAXIMUM CONTINUOUS POWER**

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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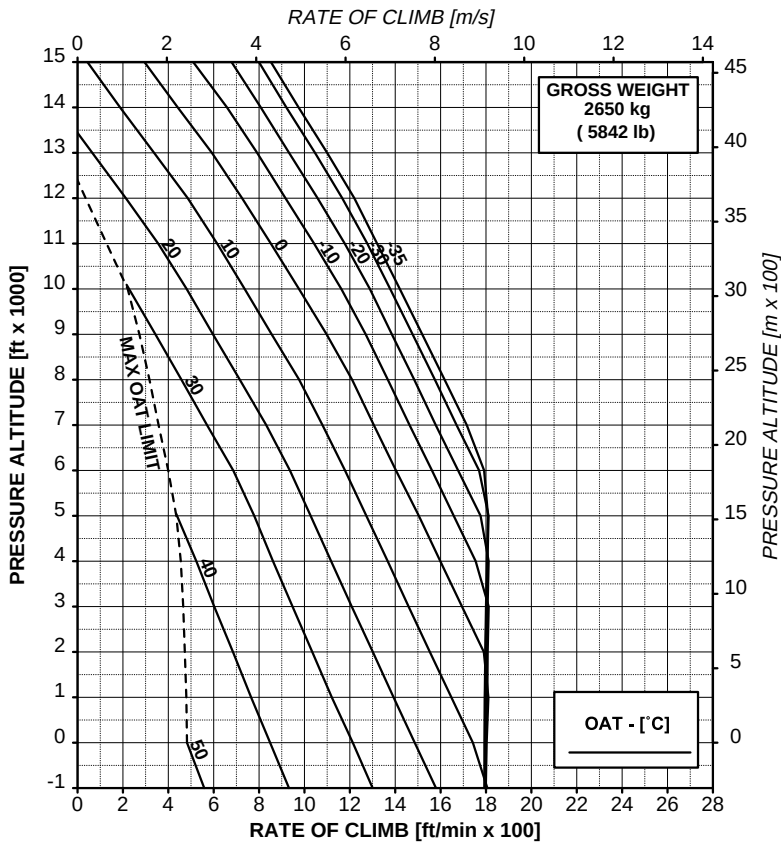
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**Figure 4-21. Maximum Continuous Power (MCP) (Heater Off)
- Gross Weight 2450 kg**

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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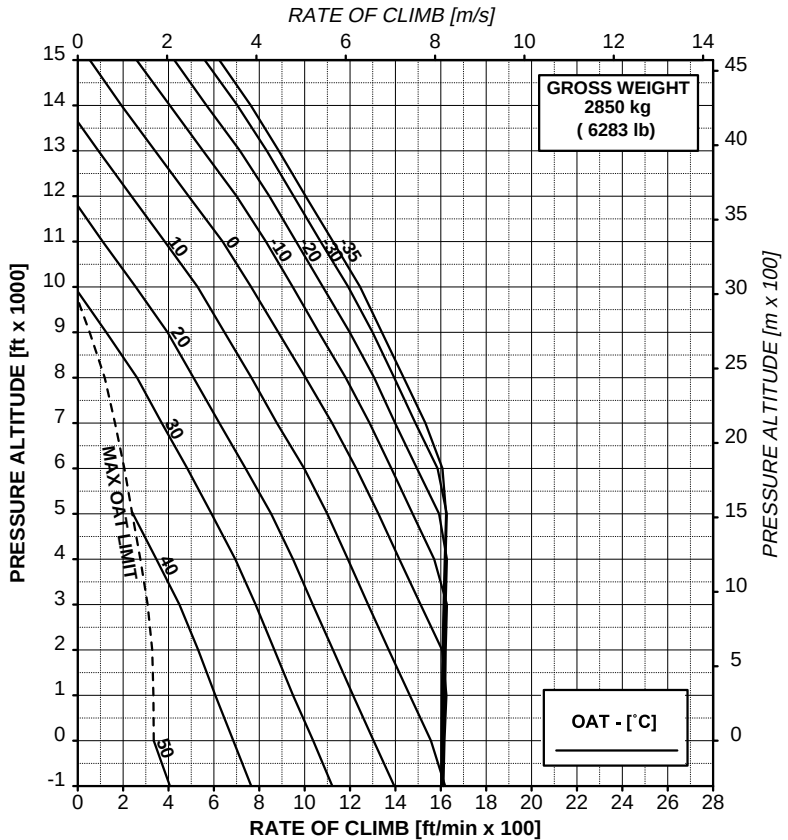
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Figure 4-22. Maximum Continuous Power (MCP) (Heater Off)
- Gross Weight 2650 kg

**RATE OF CLIMB
MAXIMUM CONTINUOUS POWER**

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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ICN-19-A-154300-G-A0126-00010-A-01-1

**Figure 4-23. Maximum Continuous Power (MCP) (Heater Off)
- Gross Weight 2850 kg**

AUTOROTATION GLIDE DISTANCE

(Figure 4-24)

The autorotation glide distance chart presents the autorotation glide distance as function of altitude, at 100% NR and is applicable to all GW.

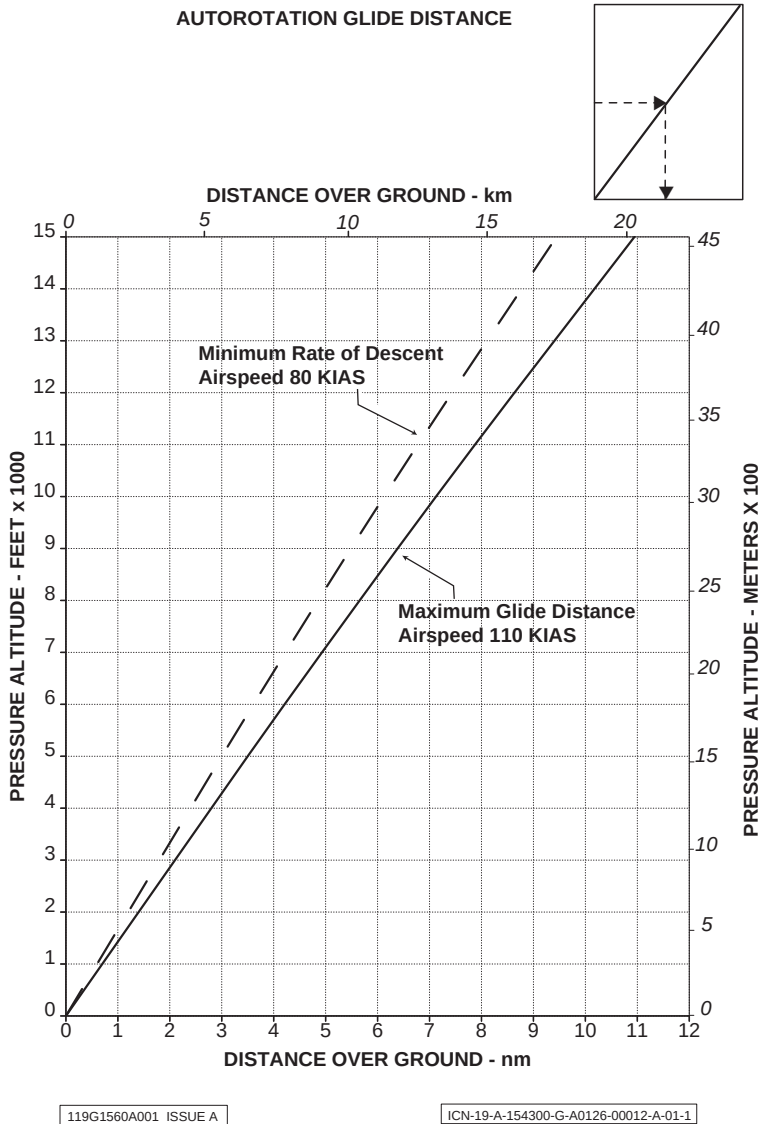


Figure 4-24. Autorotation Glide Distance

NOISE CHARACTERISTICS

The following noise level complies with ICAO Annex 16, Chapter 8, 4th Edition:

Model: AW119 MKII Engine Pratt & Whitney PT6B-37A Maximum Gross Weight 2850 kg			
Configuration	Level Flyover EPNL (EPNdB)	Take-off EPNL (EPNdB)	Approach EPNL (EPNdB)
Clean aircraft. No external kit installed	88.2	90.8	91.0

SECTION 5

OPTIONAL EQUIPMENT SUPPLEMENTS

GENERAL

This section contains all supplements related to optional equipments or specific operation applicable to AW119 MKII Helicopter.

The supplements may modify any of the limitations, procedures (both normal and emergency), and performance characteristics of the basic RFM.

It is responsibility of the flight crew to be familiar with the contents of each supplement.

LIST OF SUPPLEMENTS

The RFM supplement for each optional equipment must be carried in the aircraft whenever the optional equipment is installed on the aircraft.

Table 5-1. List of supplements

Supplement No.	Name of equipment	P/N	Helicopter applicability S/N
1	"Green aircraft" configuration	--	All
2	Bleed-air heater	109-0811-60	All
3	External hoist	109-0812-68	All
4	Searchlight	109-0812-83	All
5	Snow skis	109-0812-92	All
6	Cargo hook	109-0810-31	All
7	Dual cargo hook	109-0810-31 plus 109-0811-75	All
8	Dual controls	109-0810-01	All
9	Supplementary fuel tanks	109-0811-49	All
10	Rotor brake	109-0811-87	All
11	Emergency Medical Transportation (E.M.T.)	109-0812-34	All
12	Emergency Medical Service (E.M.S.)	109-0811-70	All
13	GPS/COMM system GNC 250 XL	109-0772-18	All
14	Oxygen system	109-0811-76	All
15	Pulsed chip detector	109-0813-78	All

Table 5-1. List of supplements

Supplement No.	Name of equipment	P/N	Helicopter applicability S/N
16	Battery in Baggage Compartment	109G2406R01	All
17	Reserved	--	--
18	Low Temperature Operations	--	All
19	Digital AWG with DH Tone	109-B811-08	All
20	GPS/NAV/COMM system GARMIN GNS430AW	109-0772-18	All
21	Operator seat	109G2520F24	All
22	HF System Type KHF1050	109G2310F13	All
23	Cockpit Voice Data Recorder (CVDR)	109G3130F01	All
24	SWE400 Camera	109G9300F04	14707, 14732, 14735.
25	Rearview Mirrors	109G2590F01	All

OPTIONAL EQUIPMENT INCOMPATIBILITY

The following table shows the incompatibility of one or more optional equipment when installed on board the helicopter.

Table 5-2. Optional equipment incompatibility

Supplements No.	Name of equipment	Incompatibility (Supplements No.)
1	“Green aircraft” configuration	16
2	Bleed-air heater	None
3	External hoist	16
4	Searchlight	5
5	Snow skis	4
6	Cargo hook	None
7	Dual cargo hook	None
8	Dual controls	12
9	Supplementary fuel tanks	11 and 12 (-147 and -153)
10	Rotor brake	None
11	Emergency Medical Transportation (E.M.T.)	9, 12 and 14
12	Emergency Medical Service (E.M.S.)	8, 9 (-147 and -153) and 11
13	GPS/COMM system GNC 250 XL	20
14	Oxygen system	11 and 16
15	Pulsed chip detector	None
16	Battery in Baggage Compartment	1, 3 and 14

Table 5-2. Optional equipment incompatibility

Supplements No.	Name of equipment	Incompatibility (Supplements No.)
17	Reserved	--
18	Low Temperature Operations	None
19	Digital AWG with DH Tone	None
20	GPS/NAV/COMM system GARMIN GNS430AW	13
21	Operator Seat	11, 12
22	HF System Type KHF1050	None
23	Cockpit Voice Data Recorder (CVDR)	None
24	SWE400 Camera	(*)
25	Rearview Mirrors	None

(*) This installation is certified under No Hazard principle and for this reason it cannot be declared compatible with installations not included into the helicopter configuration at the moment of the certification.

Note

The VHF radio systems KY196B (P/N 109-0772-18-169) and KX165A (P/N 109-0772-18-149) are incompatible.

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**EASA Approval with TCDS N° R.005
dated 11 June 2007**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

”GREEN AIRCRAFT” CONFIGURATION

The “Green Aircraft” configuration as defined in the Agusta Report N° 109G0000Q007, includes the following non-conformities with respect to the General Arrangement Drawing N° 119-9000-01-111:

- Interior arrangement (soundproofing, upholstery, ashtrays, etc.), seats and safety belts not installed except for the pilot seat and relative safety belt and ashtray. The helicopter may not be painted.

ISSUE 1: 11 JUNE 2007
REVISION 1: 5 NOVEMBER 2014

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LIST OF REVISIONS

REVISION No.	SUBJECT	APPROVAL
—	Issue 1	EASA Approval with Type Certificate Data Sheet (TCDS) N° R.005 dated 11 June 2007
1	Revised pages Title page, A-1 and B-1.	Approved under the Authority of DOA N° EASA 21J.005 dated 05 November 2014

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LIST OF EFFECTIVE PAGES

NOTE: Revised text is indicated by a black vertical line in the outer margin of the page and the approval revision number is printed in the lower margin.

Page	Revision N°	Page	Revision N°
Title page	1		
A-1	1		
A-2	0		
B-1	1		
B-2	0		
i and ii	0		
PART I — EASA Approved			
1 and 2 of 2	0		

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"GREEN AIRCRAFT" CONFIGURATION

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NUMBER OF SEATS 1 of 2

SECTION 2 - NORMAL PROCEDURES 1 of 2

**SECTION 3 - EMERGENCY AND MALFUNCTION
PROCEDURES 1 of 2**

SECTION 4 - PERFORMANCE DATA 1 of 2

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SECTION 1 - LIMITATIONS

NUMBER OF SEATS

Two (pilot included).

SECTION 2 - NORMAL PROCEDURES

No change, apart from the checks relevant to the items that are not installed in the green configuration.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

No change.

SECTION 4 - PERFORMANCE DATA

No change.

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**EASA Approval with TCDS N° R.005
dated 11 June 2007**

*The information contained herein supplements the information of the basic Rotorcraft Flight Manual
For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.*

BLEED-AIR HEATER

The Bleed-Air Heater P/N 109-0811-60 consists of a Venturi tube, a shut-off valve, a mixing valve with solenoid control valve, an outside air intake, a temperature sensor control for pilot and passenger area outlets, connecting ducts and tubing and control switches to operate the shut-off valve and solenoid control valve.

Bleed air and outside air are fed into the mixing valve where a sensor determines the mixing ratio to produce the desired temperature. The temperature is regulated by a manual control knob and flexible cable connected to a variable remote sensor in the mixing valve.

The system is provided with an overtemperature switch.

ISSUE 1: 11 JUNE 2007

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LIST OF REVISIONS

REVISION No.	SUBJECT	APPROVAL
—	Issue 1	EASA Approval with Type Certificate Data Sheet (TCDS) N° R.005 dated 11 June 2007

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LIST OF EFFECTIVE PAGES

NOTE: Revised text is indicated by a black vertical line in the outer margin of the page and the approval revision number is printed in the lower margin.

Page	Revision N°	Page	Revision N°
Title page	0		
A-1 and A-2	0		
B-1 and B-2	0		
i and iv	0		
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BLEED-AIR HEATER

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SECTION 1 - LIMITATIONS

BLEED-AIR HEATER OPERATION

The bleed-air heater shall be OFF during take off and landing and in all flight conditions requiring the maximum engine power available.

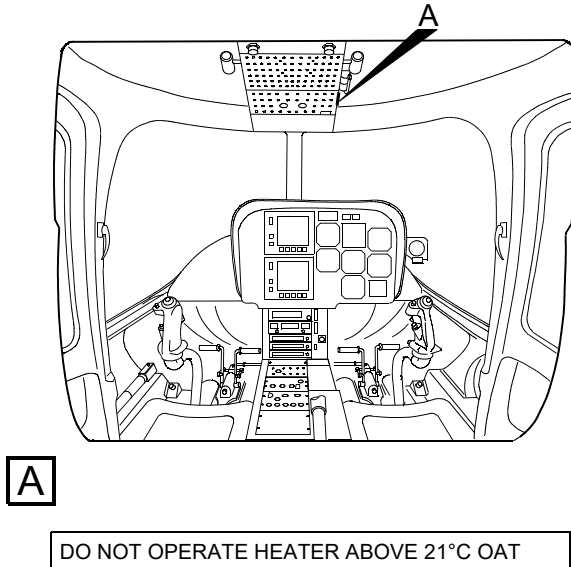
Note

If necessary the bleed-air heater may be used in hovering.

CENTER OF GRAVITY LIMITATIONS

After bleed-air heater installation the new empty weight and CG location must be determined.

PLACARDS



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Figure 1-1. Placards

SECTION 2 - NORMAL PROCEDURES

ENGINE PRE-START CHECK

HEATER switch : OFF.
S/OFF switch : OFF.
MIX switch : OFF.

SYSTEM CHECK

BLEED-AIR HEATER OPERATIONAL CHECK

TEMPerature CONTrol knob : Minimum (fully counterclockwise).
HEATER switch : ON.
EDU1 : HEATER ON advisory message displayed.
TEMPerature CONTrol knob : Turn the knob clockwise (to increase temperature) and observe no air-flow from outlets.
MIX switch : ON and observe no air-flow.
S/OFF switch : ON and observe warm air-flow from outlets.
TEMPerature CONTrol knob : Turn the knob fully counterclockwise and observe that the air-flow decreases, then turn the knob clockwise.
MIX switch : OFF, observe that the air-flow stops, then set the switch to ON.

HEATER switch	: OFF, observe that the air-flow stops.
EDU1	: HEATER ON advisory message out.
TEMPerature CONTrol knob	: Turn fully counterclockwise.
MIX switch	: OFF.
S/OFF switch	: OFF.

IN FLIGHT

If heater operation is desired:

TEMPerature CONTrol knob	: Fully counterclockwise.
S/OFF switch	: ON.
MIX switch	: ON.
HEATER switch	: ON.
TEMPerature CONTrol knob	: Turn clockwise (to increase temperature) and set to desired temperature.

CAUTION

Do not operate heater above 21 °C OAT.

APPROACH AND LANDING

HEATER switch	: OFF.
S/OFF switch	: OFF.
MIX switch	: OFF.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

ENGINE FAILURES

FAILURE OF ENGINE

Note

Whenever an engine out condition is detected (ENG OUT warning message displayed on EDU1), the Bleed-Air Heater shut-off valve is automatically closed, thus switching off the air bleed.

PROCEDURE

HEATER switch : OFF.

S/OFF switch : OFF.

MIX switch : OFF.

ENGINE RESTART IN FLIGHT

Before attempting a restart:

HEATER switch : OFF, check.

S/OFF switch : OFF, check.

MIX switch : OFF, check.

ENGINE RESTART IN FLIGHT WITH MANUAL OVERRIDE SYSTEM (MAN)

Before attempting a restart:

HEATER switch : OFF, check.

S/OFF switch : OFF, check.

MIX switch : OFF, check.

FIRE

ENGINE FIRE DURING FLIGHT

Note

Whenever an engine fire condition is detected (ENG FIRE warning message displayed on EDU1), the Bleed-Air Heater shut-off valve is automatically closed, thus switching off the air bleed.

PROCEDURE

HEATER switch : OFF.

S/OFF switch : OFF.

MIX switch : OFF.

SMOKE IN CABIN, TOXIC FUMES, ETC.

PROCEDURE

HEATER switch : OFF.

S/OFF switch : OFF.

MIX switch : OFF.

STATIC PORT OBSTRUCTION

PROCEDURE

HEATER switch : OFF.

S/OFF switch : OFF.

MIX switch : OFF.

BLEED-AIR HEATER MALFUNCTION

If a malfunction in the bleed-air heater occurs deactivate the system as follows:

HEATER switch : OFF.

S/OFF switch : OFF.

MIX switch : OFF.

Proceed with flight, correct trouble before next flight.

SECTION 4 - PERFORMANCE DATA

GENERAL

The maximum power available with the Bleed-Air Heater system operating is less than that available with the helicopter in basic configuration.

This power loss is caused by the compressor bleed-air used for the heater system. Performance with the bleed-air heater system switched OFF is the same as that shown in the basic Rotorcraft Flight Manual.

HOVER CEILING

(Figures 4-1 thru 4-4)

The Hover Ceiling charts define the maximum weight at which an In Ground Effect (IGE) hover (3 ft skid height AGL) or an Out of Ground Effect (OGE) hover (at least 60 ft skid height AGL) is possible for different combinations of Pressure Altitude and OAT with main rotor speed (NR) at 102% and zero wind conditions.

The performance presented for Take-Off Power (TOP) and for Maximum Continuous Power (MCP) refer to an electrical load of 100 A. When the electrical load is greater than 100 A, reduce the maximum weight obtained from the charts according to Table 4-1.

Table 4-1. Hover ceiling - Correction table

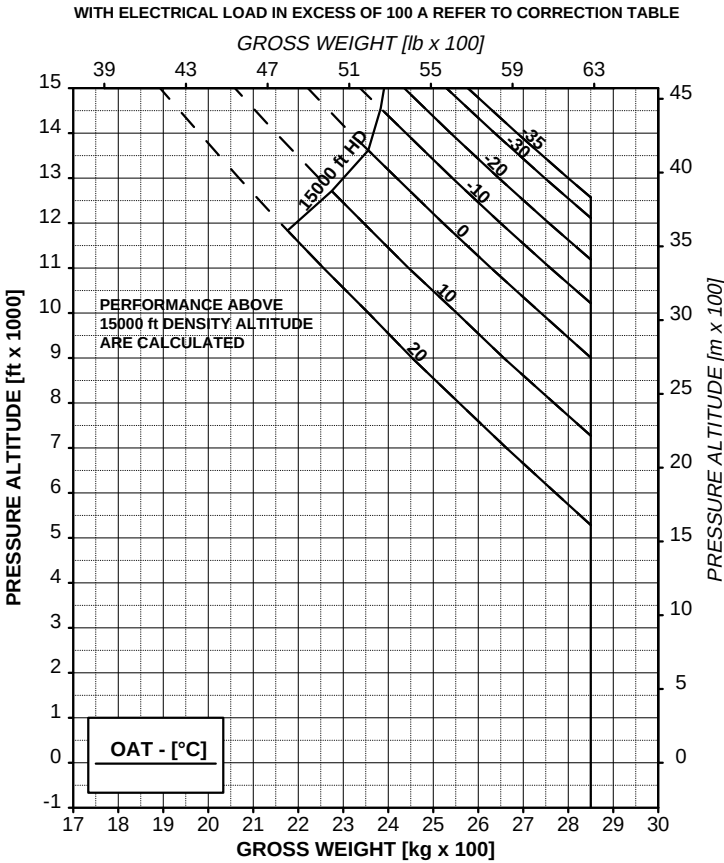
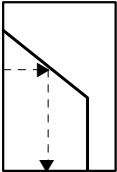
CORRECTION TABLE

WHEN ELECTRICAL LOAD > 100 A REDUCE GROSS WEIGHT BY [KG]:

OAT	IGE TOP Heater ON	IGE MCP Heater ON	OGE TOP Heater ON	OGE MCP Heater ON
-35	0	0	0	0
-30	0	0	0	0
-20	0	15	0	10
-10	10	40	10	35
0	20	50	20	40
10	40	60	35	55
20	50	85	45	75
30	-	-	-	-
40	-	-	-	-
50	-	-	-	-

HOVER CEILING IN GROUND EFFECT
TAKE-OFF POWER

ROTOR SPEED:102%
ZERO WIND
ELECTRICAL LOAD: 100 A
SKID HEIGHT: 3 ft
HEATER ON



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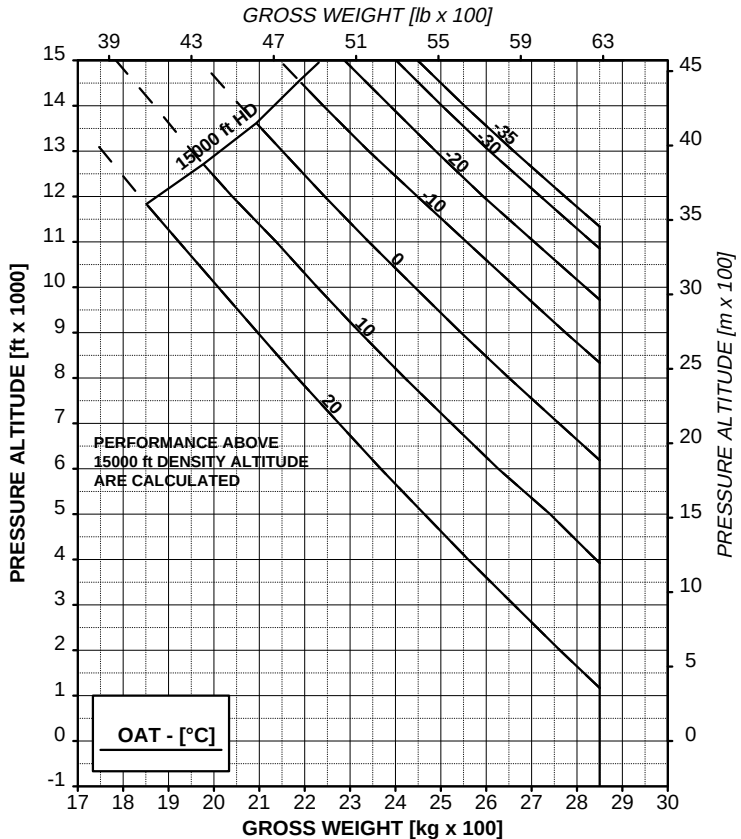
Figure 4-1. In Ground Effect (IGE) - Take-Off Power (TOP)
(Heater On)

HOVER CEILING IN GROUND EFFECT
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ZERO WIND

ELECTRICAL LOAD: 100 A
SKID HEIGHT: 3 ft
HEATER ON

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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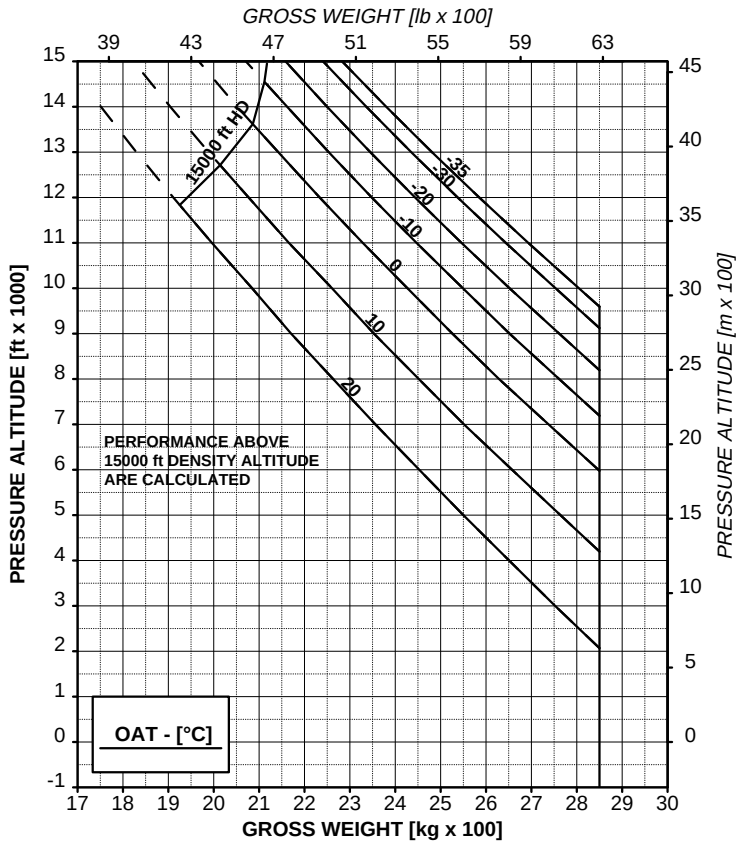
Figure 4-2. In Ground Effect (IGE) - Maximum Continuous Power (MCP) (Heater On)

HOVER CEILING OUT OF GROUND EFFECT
TAKE-OFF POWER

ROTOR SPEED:102%
ZERO WIND

ELECTRICAL LOAD: 100 A
HEATER ON

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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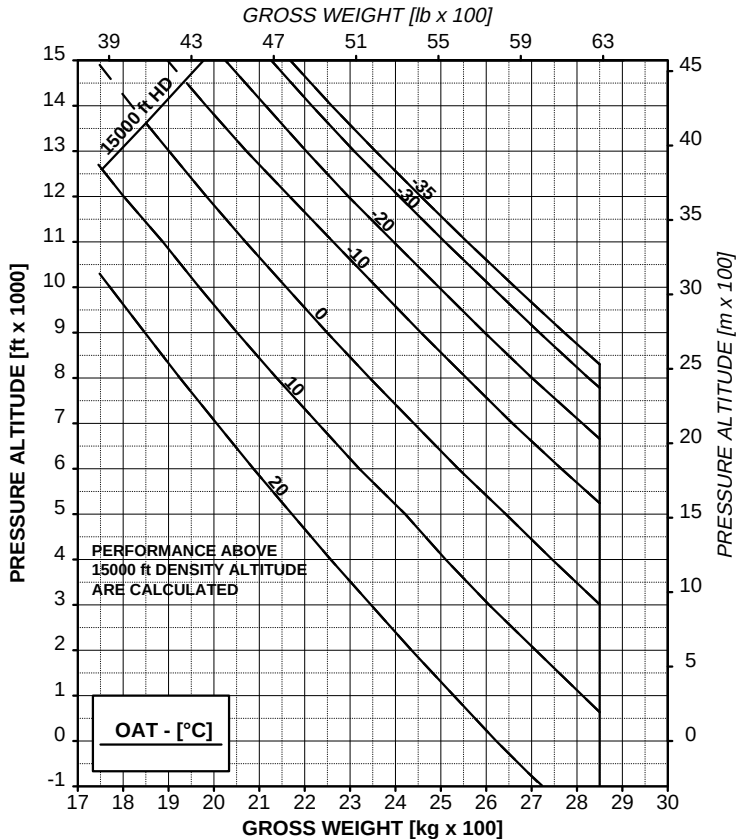
Figure 4-3. Out of Ground Effect (OGE) - Take-Off Power (TOP)
(Heater On)

HOVER CEILING OUT OF GROUND EFFECT
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ZERO WIND

ELECTRICAL LOAD: 100 A
HEATER ON

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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ICN-19-A-155102-G-A0126-40004-A-01-1

Figure 4-4. Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater On)

RATE OF CLIMB

(Figures 4-5 thru 4-14)

The Rate Of Climb (ROC) charts are presented for Take-Off Power (TOP) rating and for Maximum Continuous Power (MCP) rating, both with NR at 102%, Heater ON.

They refer to the best Rate of Climb airspeed V_y of 60 KIAS up to 15,000 ft Hp.

The performance presented for Take-Off Power (TOP) and for Maximum Continuous Power (MCP) refer to an electrical load of 100 A. When the electrical load is greater than 100 A, reduce the maximum Rate of Climb obtained from the charts according to Table 4-2.

Table 4-2. Rate of climb - Correction table

CORRECTION TABLE

WHEN ELECTRICAL LOAD > 100 A REDUCE RATE OF CLIMB BY [ft/min]:

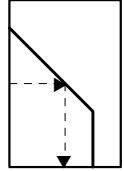
OAT	TOP Heater ON	MCP Heater ON
-35	0	0
-30	0	10
-20	0	20
-10	20	25
0	45	50
10	55	80
20	75	130
30	-	-
40	-	-
50	-	-

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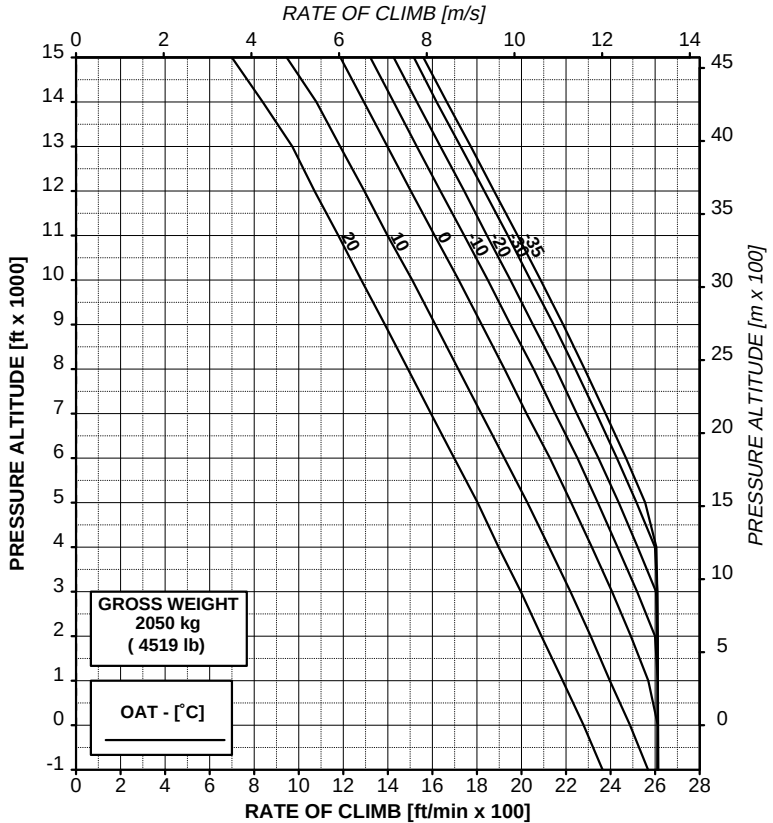
ICN-19-A-155302-G-A0126-40011-A-01-1

**RATE OF CLIMB
TAKE-OFF POWER**

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS
HEATER ON



WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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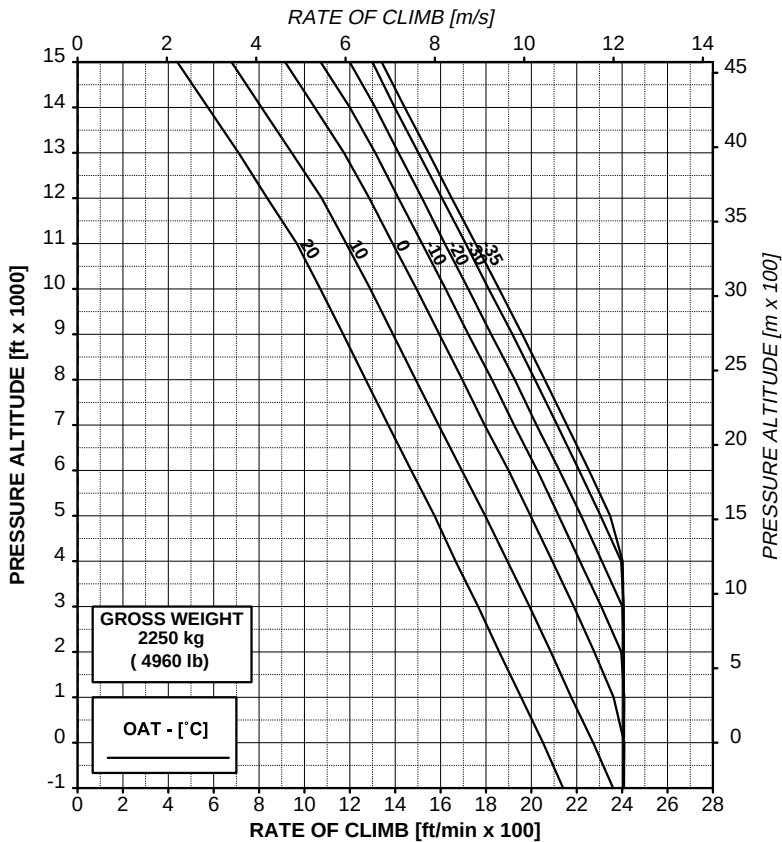
**Figure 4-5. Take-Off Power (TOP) (Heater On)
- Gross Weight 2050 kg**

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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ICN-19-A-155302-G-A0126-40002-A-01-1

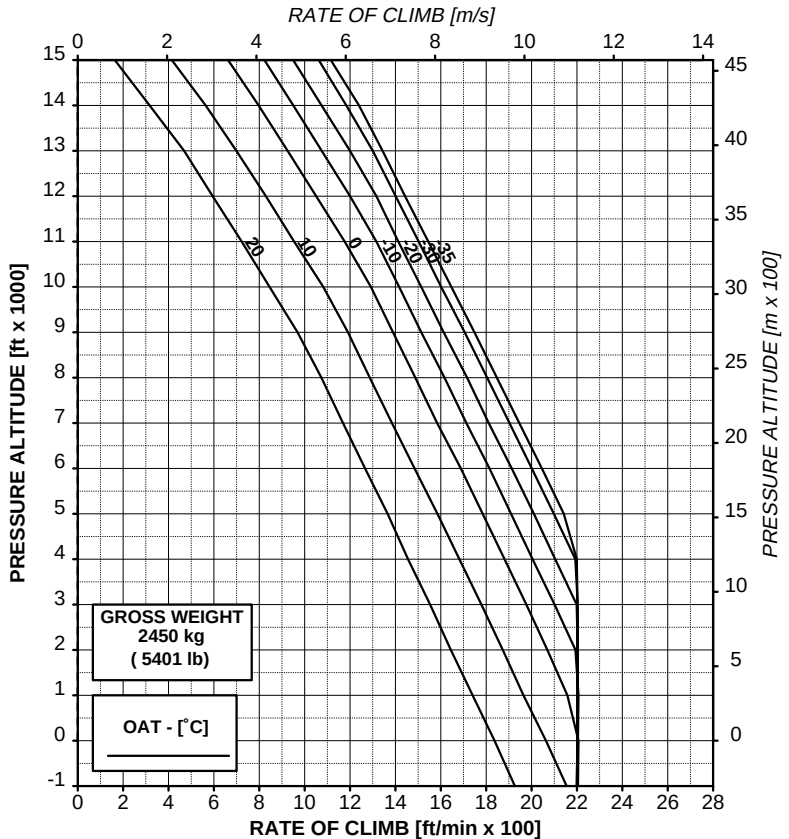
Figure 4-6. Take-Off Power (TOP) (Heater On)
- Gross Weight 2250 kg

**RATE OF CLIMB
TAKE-OFF POWER**

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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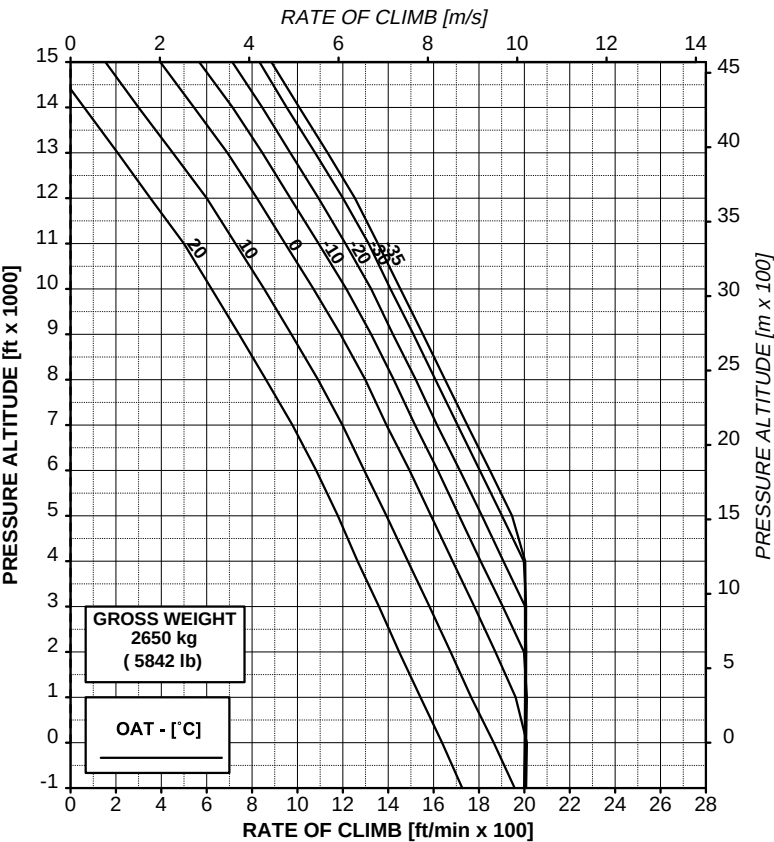
**Figure 4-7. Take-Off Power (TOP) (Heater On)
- Gross Weight 2450 kg**

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE

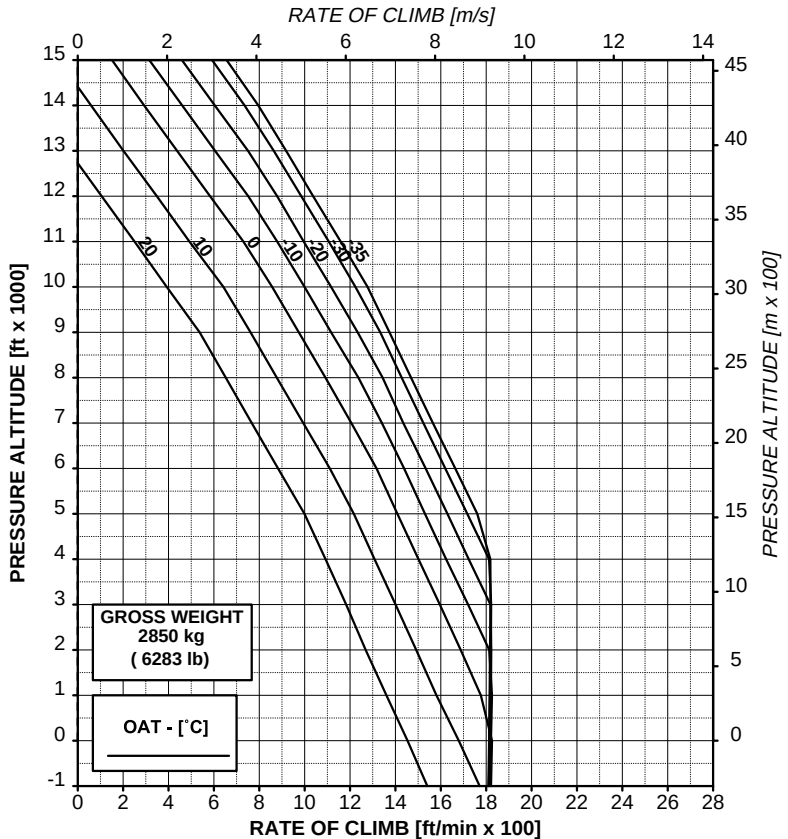


**RATE OF CLIMB
TAKE-OFF POWER**

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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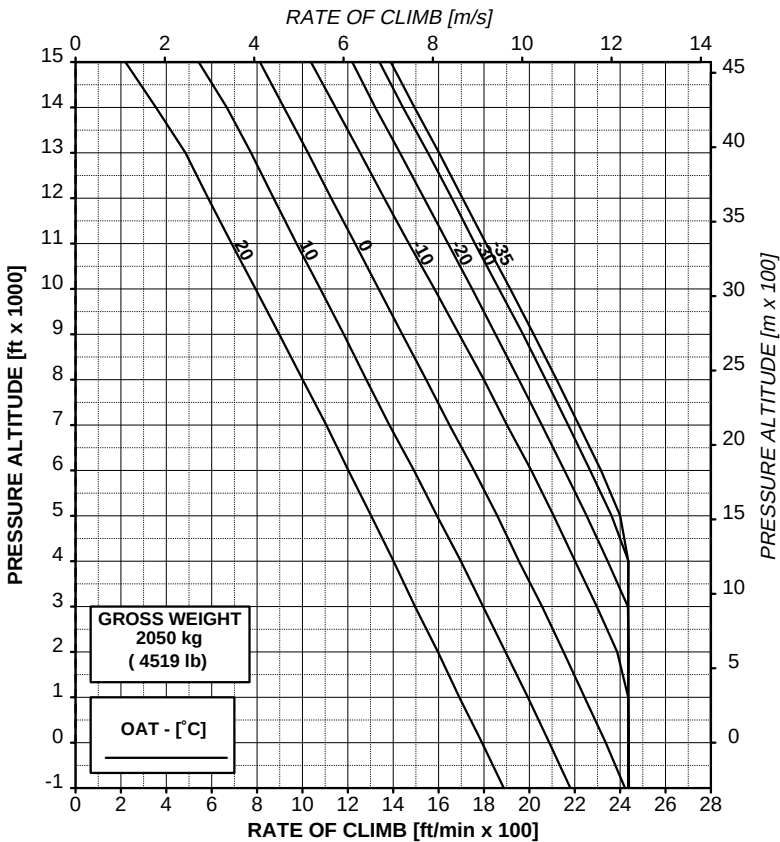
**Figure 4-9. Take-Off Power (TOP) (Heater On)
- Gross Weight 2850 kg**

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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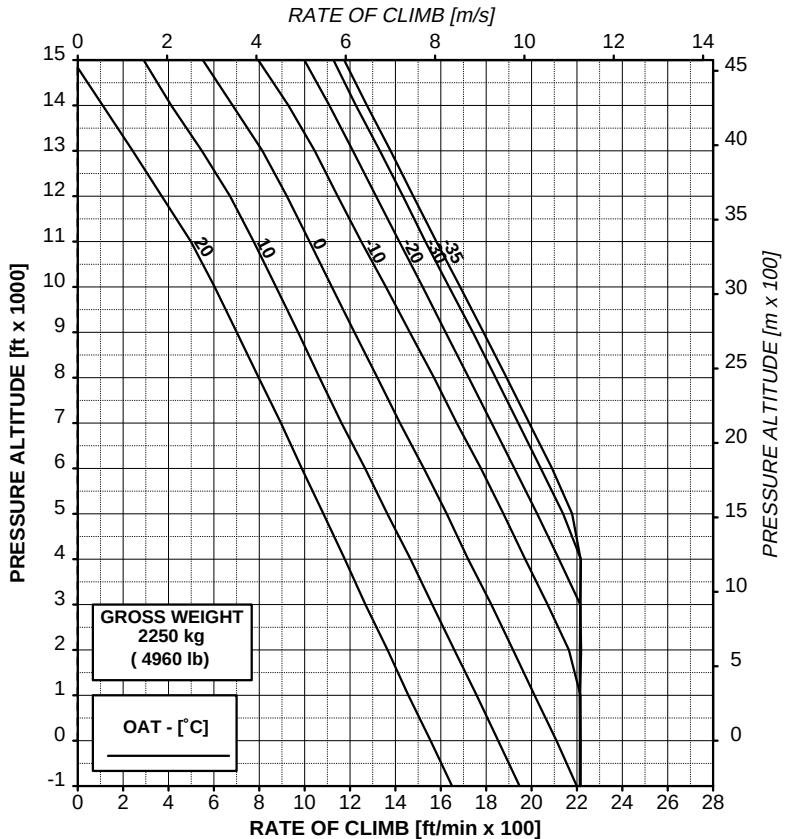
Figure 4-10. Maximum Continuous Power (MCP) (Heater ON)
- Gross Weight 2050 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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ICN-19-A-155302-G-A0126-40007-A-01-1

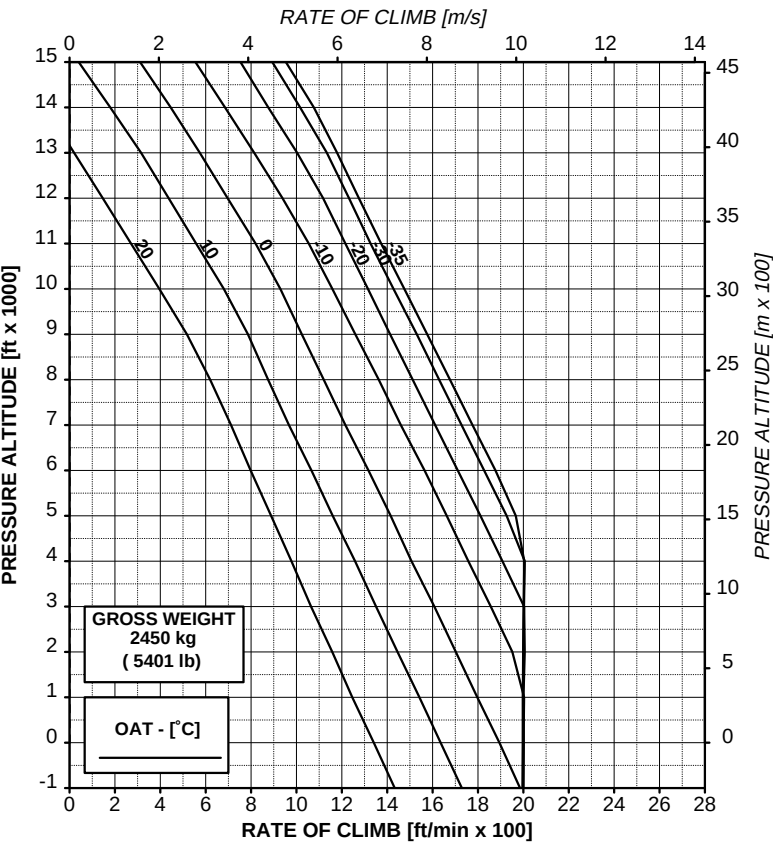
Figure 4-11. Maximum Continuous Power (MCP) (Heater On)
- Gross Weight 2250 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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ICN-19-A-155302-G-A0126-40008-A-01-1

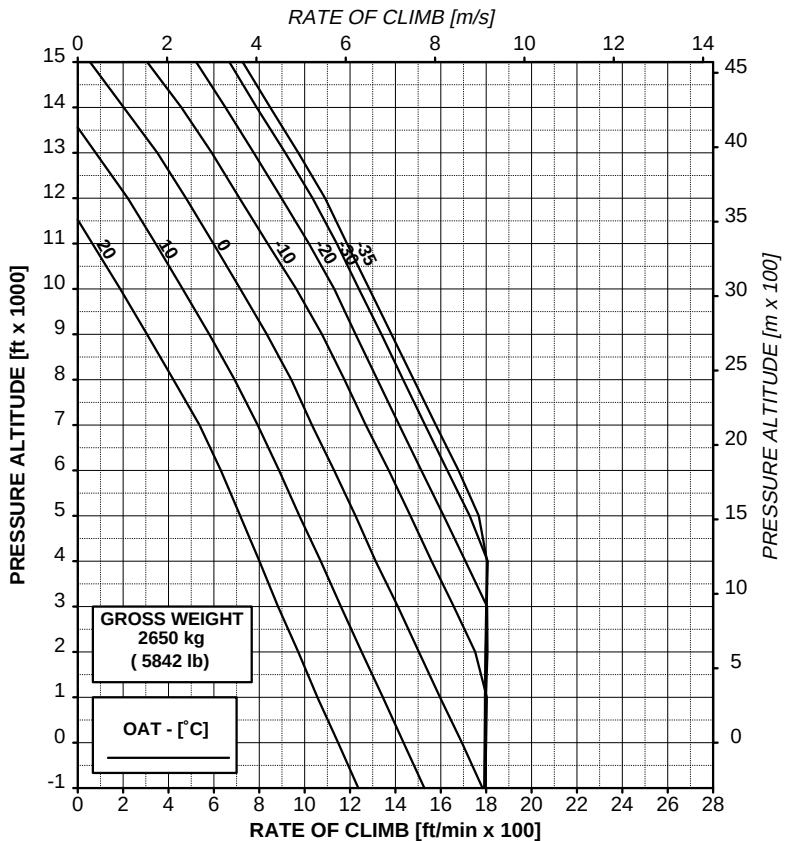
Figure 4-12. Maximum Continuous Power (MCP) (Heater On)
- Gross Weight 2450 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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ICN-19-A-155302-G-A0126-40009-A-01-1

Figure 4-13. Maximum Continuous Power (MCP) (Heater On)
- Gross Weight 2650 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE

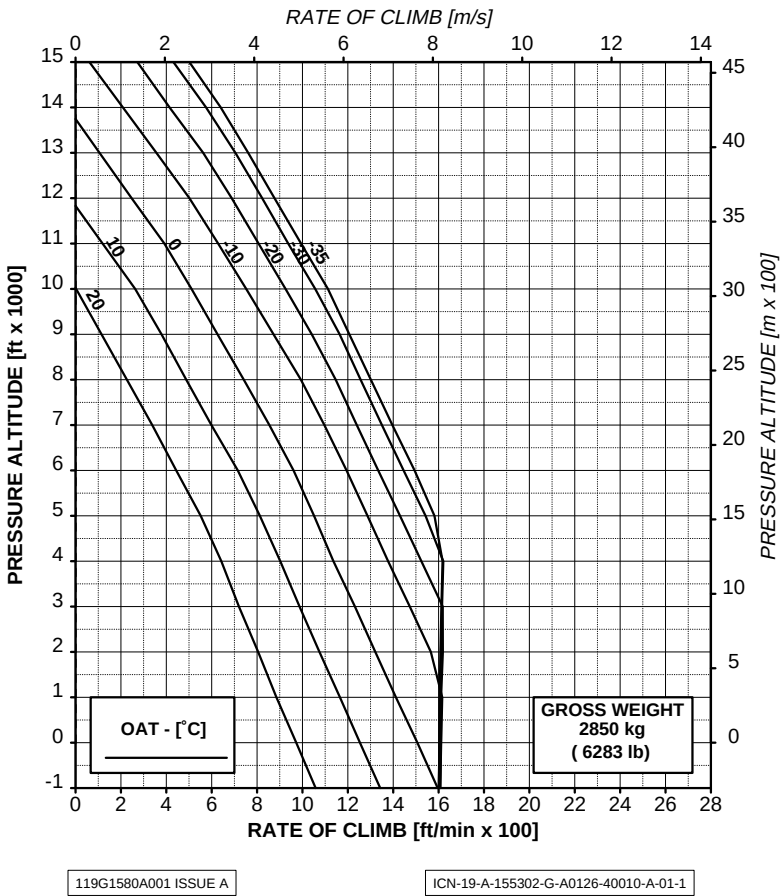


Figure 4-14. Maximum Continuous Power (MCP) (Heater On)
- Gross Weight 2850 kg

**EASA Approval with TCDS N° R.005
dated 11 June 2007**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

EXTERNAL HOIST

The external hoist installation P/N 109-0812-68 consists of:

- an electric hoist motor and winch assembly;
- a mounting frame;
- a protection for the RH skid;
- an hoist electronic control system with two cable payout displays, one in the cockpit and one on the hoist operator pendant;
- a radio-ICS system to allow communication among the crewmembers and the human external cargo (HEC);
- electrical components, wiring and relative hardware;
- an hoist operator safety shoulder harness;
- a manual cable cutter (located on the forward RH cabin strut), provided for emergency use.

ISSUE 1: 11 JUNE 2007

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LIST OF REVISIONS

REVISION No.	SUBJECT	APPROVAL
—	Issue 1	EASA Approval with Type Certificate Data Sheet (TCDS) N° R.005 dated 11 June 2007

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LIST OF EFFECTIVE PAGES

NOTE: Revised text is indicated by a black vertical line in the outer margin of the page and the approval revision number is printed in the lower margin.

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A-1 and A-2	0		
B-1 and B-2	0		
i thru iv	0		
PART I — EASA Approved			
1 thru 22 of 26	0		
PART II — Manufacturer's data			
23 thru 26 of 26	0		

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EXTERNAL HOIST

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SECTION 1 - LIMITATIONS

TYPE OF OPERATION

Operations of the hoist must be authorised by the Competent Authority in accordance with applicable national operational regulations.

The design of the external hoist installation is suitable to lower or haul on board loads or a human cargo, with the aircraft in stationary hover, in areas where landing cannot be accomplished provided that, for human external cargo, a personnel-carrying device system approved by the Competent Authority is also installed.

Use of the radio-ICS system must be in accordance with the national operating regulations.

Hoist operation is approved for day-VFR with ground visual contact. Hoist operation is approved also with the right passenger door removed.

Normal helicopter operation is approved, with the hoist installed, providing the hoist is not used and the hoist electrical system is deactivated.

FLIGHT CREW

One pilot and one hoist operator.

The hoist operator must be restrained by a safety shoulder harness during all phases of hoist operation and shall wear protective gloves for guiding cable during operation.

The maximum weight of hoist operator must be 90 kg (198 lb).

The hoist operator shall be familiar with hoist operating procedures and limitations.

A manual cable cutter must be always available for the hoist operator during all phases of hoist operation.

AIRSPPEED LIMITATIONS (IAS)

MAXIMUM OPERATING LIMIT SPEED (V_{NE})

Hoist operation (cable reeling-in/-out, load raising or lowering) is permitted with aircraft in stationary hover only.

WARNING

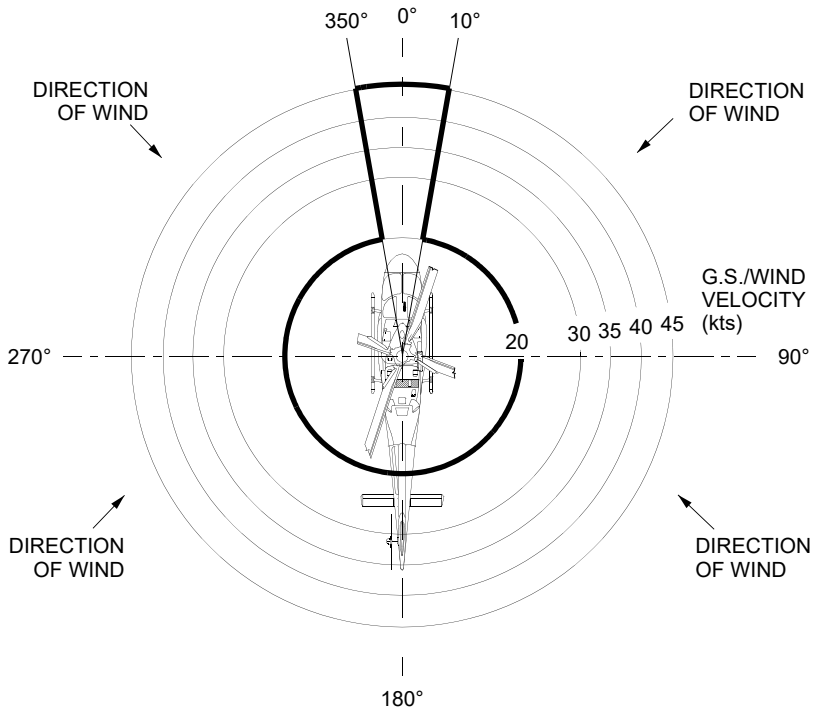
Aircraft horizontal translation with hoist cable deployed and no external hoisted load is prohibited.

Aircraft horizontal traslation with external hoisted load outside the aircraft cabin is approved up to 8000 ft Hd in accordance with the wind/ground speed azimuth envelope of Figure 1-1.

CAUTION

Airspeed with external load is limited by controllability. Caution should be exercised when carrying an external load as the handling characteristics may be affected by the size, weight and shape of the load.

The vertical speed shall be limited to ± 200 ft/min.



APPLICABILITY: UP TO 8000 ft Hd

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**Figure 1-1. Wind/Ground Speed Azimuth Envelope
with Load on Hoist**

At altitudes higher than 8000 ft, flight with external hoisted load outside the aircraft cabin is prohibited.

Note

Flight with external hoisted load shall be limited to reach a place suitable for load recovering.



Hoisting or lowering an empty litter in open position is prohibited.

HOIST LIMITATIONS

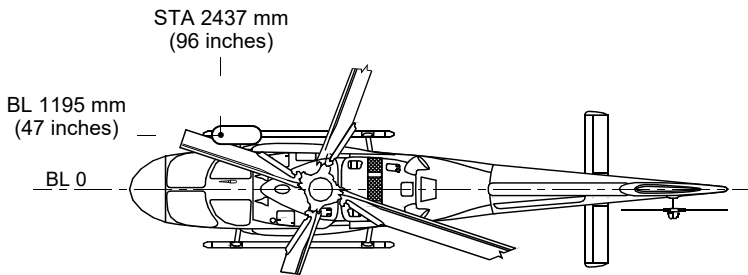
Maximum hoist load : 204 kg (450 lb).

Maximum available hoist cable length : 50 m (164 ft).

CENTER OF GRAVITY LIMITATIONS

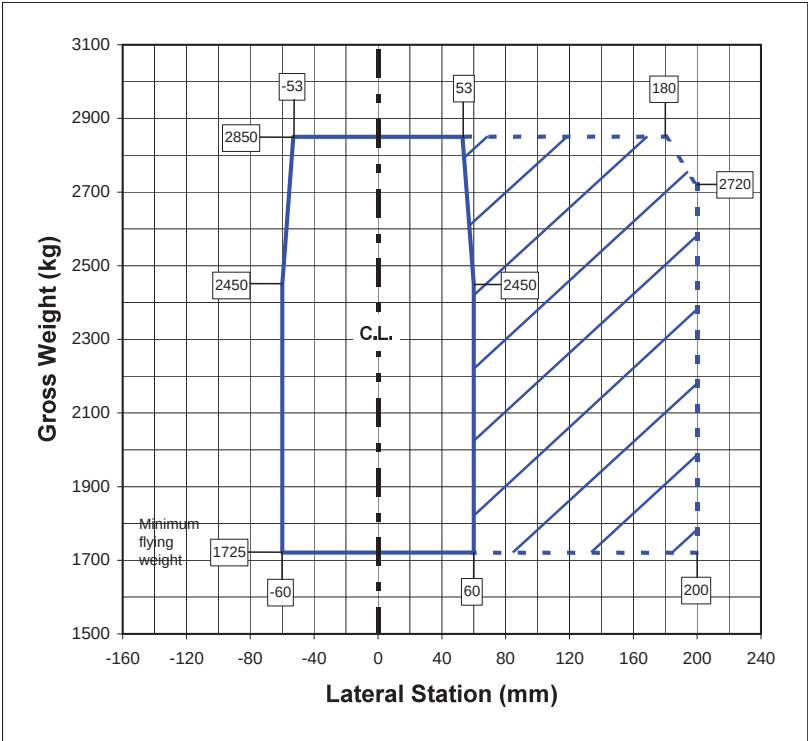
After hoist installation the new empty weight and CG location must be determined.

See Figures 1-3 and 1-4 for lateral CG limits; the longitudinal CG limit do not change from basic aircraft.



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Figure 1-2. Hoist Station and Butt Line



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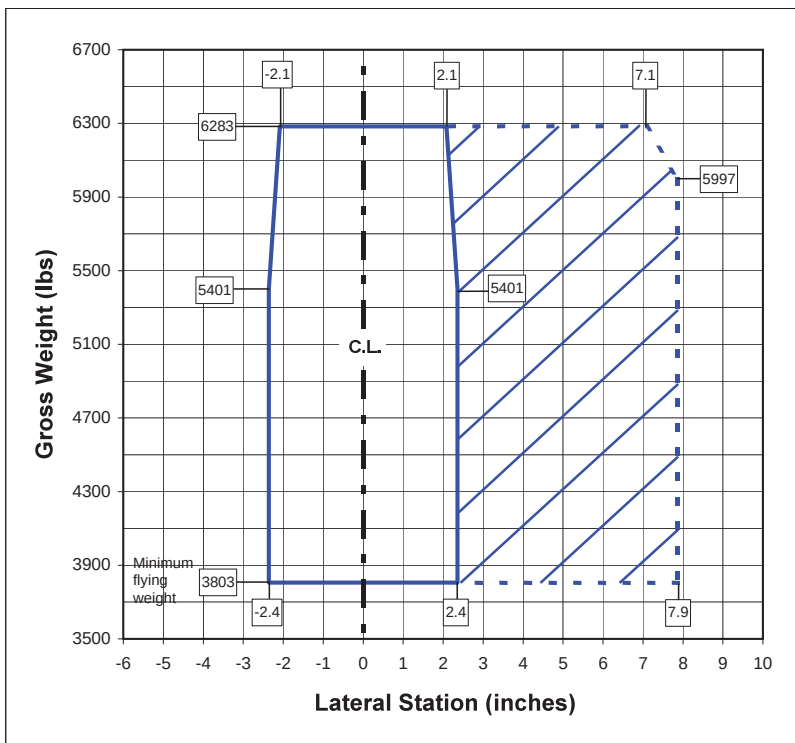
Note

Lateral Station "0" is 450 mm inboard from each main jack point and coincides with the helicopter longitudinal plane of symmetry.

Note

The diagram shaded area is only applicable during hoist operation.

**Figure 1-3. Lateral CG Limits for Hoist Operations
(metric units)**



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Note

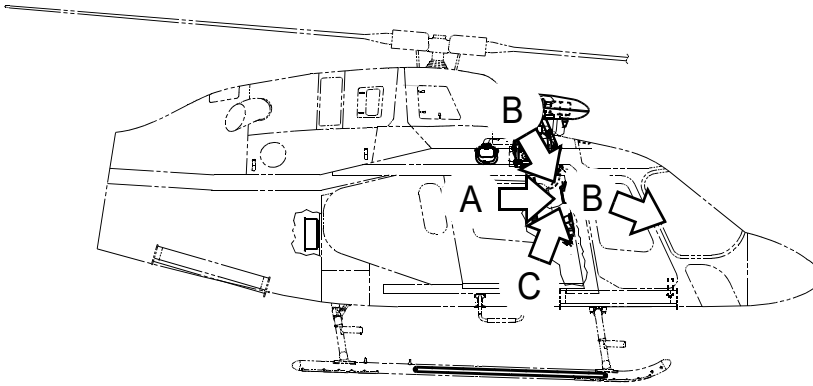
Lateral Station "0" is 17.7 in inboard from each main jack point and coincides with the helicopter longitudinal plane of symmetry.

Note

The diagram shaded area is only applicable during hoist operation.

**Figure 1-4. Lateral CG Limits for Hoist Operations
(imperial units)**

PLACARDS



A

CAUTION

THE HOIST OPERATOR MUST BE RESTRAINED BY A SAFETY HARNESS DURING ALL PHASES OF HOIST OPERATION AND SHALL WEAR PROTECTIVE GLOVES TO GUIDE THE CABLE AT ANY TIME DURING HOIST OPERATION.

IN CLEAR VIEW OF
HOIST OPERATOR

C

RESCUE HOIST
MAX LOAD CAPACITY
450 lb (204 kg)

IN CLEAR VIEW OF
HOIST OPERATOR

B

TYPICAL IN 2 PLACES

CAUTION

IF FOR ANY REASON THE HOIST STOPS, DURING RAISING OR LOWERING OPERATION, DO NOT ATTEMPT TO FREE IT BY ACTUATING THE CONTROLLER. CONTINUED OPERATION MAY CAUSE TOTAL CABLE FAILURE. LAND AS SOON AS POSSIBLE

IN CLEAR VIEW OF
PILOT AND HOIST OPERATOR

ICN-19-A-155003-G-A0126-11001-A-01-1

Figure 1-5. Placards

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N°2 (Fuselage - RH side)

Hoist	: Condition, security, oil leaks and wiring connected.
Skid protection	: Inspect for condition and damages.
Hoist cowling	: Secured.
Hoist mount	: Condition and security.
Hook	: Check for condition, security and freedom of rotation on cable.
Hook rubber bumper	: Inspect for crushing.

AREA N°7 (Cabin interior)

CABLE CUT switch (on pilot's cyclic stick) : OFF, guard closed.

HOIST PWR circuit breaker : In.

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

HOIST switch : ON.

EDU1 : HOIST ON advisory message displayed.

Hoist cable payout display (both
pilot and pendant control) : Check built-in-test reading is
"88.8".



Care should be taken to prevent cable damage caused by kinking when handling it on the ground. The cable should lie onto a clean surface whenever possible.

Hoist operation : Check by reeling-out and
reeling-in approximately three
(3) meters of cable.

Note

When reeling-in the cable with no load, apply tension with gloved hands to ensure smooth and even wrapping.



Hoist operator should always wear protective gloves whenever handling the hoist cable to prevent injury from any possible broken cable strands.

Cable terminal : Condition and security

Note

Ensure that the two locking screws, located above the hook assembly and rubber bumper, are in place and each one has a cotter pin securing it. See Figure 2-1.

Reel in cable : Check hoist automatically stops
when cable fully reeled in.

Hoist operator:

Hoist pendant control : Verify correct installation and condition.

Manual cable cutter : Verify presence and condition (forward RH cabin strut).

Safety shoulder harness and gloves : Verify presence and condition.

Radio-ICS portable transceiver and interface box : Verify presence and condition of portable transceiver. Verify the portable transceiver and interface box are set on the same frequency.

HOIST switch : OFF. Check HOIST ON advisory message extinguishes on EDU 1.

Disconnect the d.c. electrical supply.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

AREA N°7 (Cabin interior)

Hoist operator:

Hoist pendant control : Verify condition.

Manual cable cutter : Verify presence (forward RH cabin strut).

Safety shoulder harness and gloves : Verify presence and condition.

Radio-ICS portable transceiver : Verify presence and condition. Check the transceiver and interface box are set on the same frequency.

ENGINE PRESTART CHECK

CABLE CUT switch (on pilot's cyclic stick) : OFF, guard closed. HOIST CUT ARMD caution message not illuminated on EDU1.

HOIST circuit breakers : Check in.

SYSTEMS CHECK

HOIST switch : ON.

EDU1 : HOIST ON advisory message displayed.

CABLE CUT switch (on pilot's cyclic stick) : ON (guard raised).

EDU1 : HOIST CUT ARMD caution message displayed.

CABLE CUT switch : OFF (guard closed). Check HOIST CUT ARMD caution message extinguishes.

HOIST control switch (on pilot's cyclic stick) : DN.

HOIST hook : Check lowering.

Cable payout display : Check for meter counting.

HOIST control switch : UP.

Note

When reeling-in the cable with no load, apply tension with gloved hands to ensure smooth and even wrapping.

HOIST hook : Check raising.

Hoist operator:

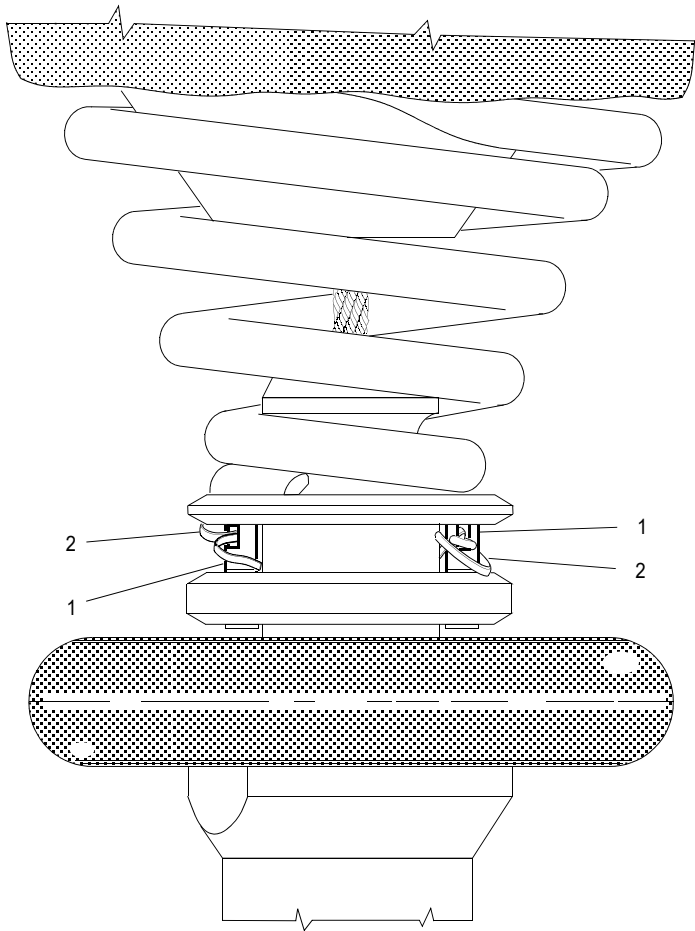
HOIST thumb wheel (on pendant control) : Rotate to DN and to UP.

HOIST hook : Check lowering or raising according to thumb wheel selection.

HOIST control switch (on pilot's cyclic stick) : DN or UP, checking that it overrides the thumb wheel selection.

HOIST thumb wheel (on pendant control) : Off position.

HOIST switch : OFF. Check HOIST ON advisory message extinguishes on EDU1.



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- 1. Locking screw
- 2. Cotter pin

Figure 2-1. Hook Locking Screws

IN FLIGHT

HOIST OPERATING PROCEDURE

Note

When the OAT is below 4 °C verify the hoist functionality by lowering and hauling the cable by at least 2 meters.

HOIST switch : ON.

EDU1 : HOIST ON advisory message displayed.

WARNING

Hoist operator shall be secured to helicopter with the safety harness during hoist operations.

Establish hover over hoist operation area.

CAUTION

Avoid, whenever possible, operating the hoist with cross-wind or rear wind.

Verify positive audio communication is achieved among all crewmembers using the onboard ICS and portable radio-ICS transceiver.

Note

If necessary select an alternative channel on both the radio-ICS interface box and portable transceiver.

Right passenger door (if installed) : Open and locked.

WARNING

During hoist operation the operator must always maintain his hand on the cable and verify the correctness of cable unwinding and rewinding.

HOIST control switch (pilot) or HOIST
thumb wheel (operator) : DN.

Cable speed (operator only) : As desired by means of the
HOIST thumb wheel on pendant
control.

Note

As hook approaches the up or down limits (colored sections of the cable), hoist speed should slow automatically: if not, manually control hoist speed.

CAUTION

During hoist operation the cable trail angle must be kept to minimum. If for any reason the trail angle exceeds 15 degrees (30 degrees cone angle), refer to helicopter Maintenance Manual for pertinent actions.

CAUTION

Do not allow cable to drag on the ground or any other surface which could contaminate or damage the cable.

WARNING

Static electricity should be dissipated by suitable means before ground personnel touch the hook or cable.

HOIST control switch (pilot) or HOIST
thumb wheel (operator) : UP.

Cable speed (operator only) : As desired by means of the
HOIST thumb wheel on pendant
control.

Maintain hover until load is into cabin.

If the place is not suitable to complete the load recovery on board,
make transition to forward flight into wind, if possible, allowing
adequate hoist load clearance over obstacles.

Airspeed : As required for adequate
controllability, within load on
hoist limits. See Limitations.

Once a suitable place has been reached, establish a hover and
proceed to recover load on board or to lay it on ground.



Hoist operation (load raising or lowering) is permitted with
aircraft in stationary hover only.

Maintain hover until hoist operations are completed.

Right passenger door (if installed) : Close.

HOIST switch : OFF. Check HOIST ON
advisory message extinguishes
on EDU1.

Note

During hoist operation, the operator shall record any shock
load to the cable; in this event, the cable must be replaced
prior to the next flight.

LITTER HOISTING

When the use of a litter is necessary and landing is possible the option to land the helicopter for litter loading should be taken.

Litter hoisting can be hazardous and should be accomplished only when a landing is not feasible. In addition to all other procedures contained herein, the following shall apply to litter hoisting operations.

LITTER

WARNING

Hoisting or lowering an empty litter in open position is prohibited. An empty litter suspended from hoist in open position can oscillate uncontrollably in rotor wash and can fly upward, striking fuselage or tail rotor.

Prior to hoisting or lowering an empty litter, litter shall be closed and secured with straps. Litter should be suspended in a near-vertical position and sling straps should be drawn tight.

Litter sling straps should be adjusted so that litter is 610 to 710 mm (24 to 28 inches) below hoist hook.

Note

If litter is suspended too far below hook, litter can not be loaded into helicopter with hoist hook at up limit.

CAUTION

A loaded litter can rotate around cable during hoisting. Hoist operator may have to grasp litter sling straps to control rotation as litter approaches skid landing gear.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

WARNING SYSTEM

CAUTION MESSAGES (YELLOW)

Panel wording	Fault condition	Corrective action
HOIST CUT ARMD	Hoist cable cut system armed.	No corrective action is required. Take care to avoid accidental jettison of hoisted load.
HOIST CABL LKD	Hoist electrical circuit deactivated (pilot and operator's HOIST control switches inoperative) because of cable foul detected on hoist drum.	See paragraph "Cable foul" in this section.

HOIST LOAD JETTISON

The external hoist installation is provided with an electrical cable cut system operated by the pilot. If an emergency condition should require the release of the hoisted load proceed as follows:

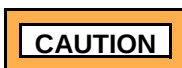
CABLE CUT switch (on pilot's cyclic stick)

: Lift the guard to arm the system.
HOIST CUT ARMD caution message illuminates on EDU1.
Operate the switch.

In the event of failure of the electrical cable cut system, cut the cable with the manual cable cutter accessible to the hoist operator.
Cut the cable as close to the hoist as possible.

HOIST MOTOR OVERTEMPERATURE

The hoist motor overtemperature is indicated by the flashing of the indication on the cable payout display on the hoist pendant control.
In the event of a motor overtemperature, complete the hoist cycle and wait for the motor to cool down (indication on hoist pendant control display stops flashing) before resuming the hoist operation.



Prolonged operation of hoist with flashing indication on hoist pendant control display will result in damaged or "burned out" hoist motor.

CABLE FOUL

The external hoist installation is provided with a cable foul protection system which prevents operation with a fouled cable.

When a cable foul develops on the hoist drum, the actuation of the cable foul system interrupts the electrical circuit to the hoist motor.

INDICATIONS

EDU1 : HOIST CABL LKD caution message displayed.

HOIST control switch (pilot) and
HOIST thumb wheel (operator) : Inoperative.

PROCEDURE



If for any reason the hoist stops during rising or lowering operation, do not attempt to free it by actuating the controller. Continued operation may cause total cable failure. Land as soon as possible.

Proceed in forward flight with hoisted load suspended to a suitable site, allowing adequate hoist load clearance over obstacles.

Airspeed : As required for adequate controllability, within load on hoist limits. See Limitations.

Once a suitable site has been reached establish hover, then slowly descend to lay the load on ground.

Recover the cable on board manually then proceed to land.

Correct the cause of cable foul before restoring hoist to operational conditions.

SYSTEM FAILURES

ELECTRICAL POWER FAILURE

Failure of generator and d.c. bus

In case of failure of generator during hoist operation the pilot is allowed to complete only the recovery cycle.

Refer to Section 3 of the basic Rotorcraft Flight Manual for procedures.

Note

One hoist recovery cycle reduces the flight time on battery power to 17 minutes.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 7 - SYSTEM DESCRIPTION

The winch unit contains 50 usable meters (164 ft) of hoist cable.

Cargo hoisting and lowering can be controlled by the hoist operator through the pendant control thumb wheel, providing variable cable speeds on command, or by the pilot through the hoist control switch on the cyclic stick at a fixed cable speed. The fixed speed control mode of operation permits a 30 m/min (100 ft/min) cable speed throughout the usable cable range with automatic slow down and stop at the cable extremes. The maximum cable speed, when operated by the crew member thumb wheel, is 43 m/min (140 ft/min) when raising a load up to 204 kg (450 lbs) and 64 m/min (210 ft/min) when lowering a 204 kg (450 lbs) load.

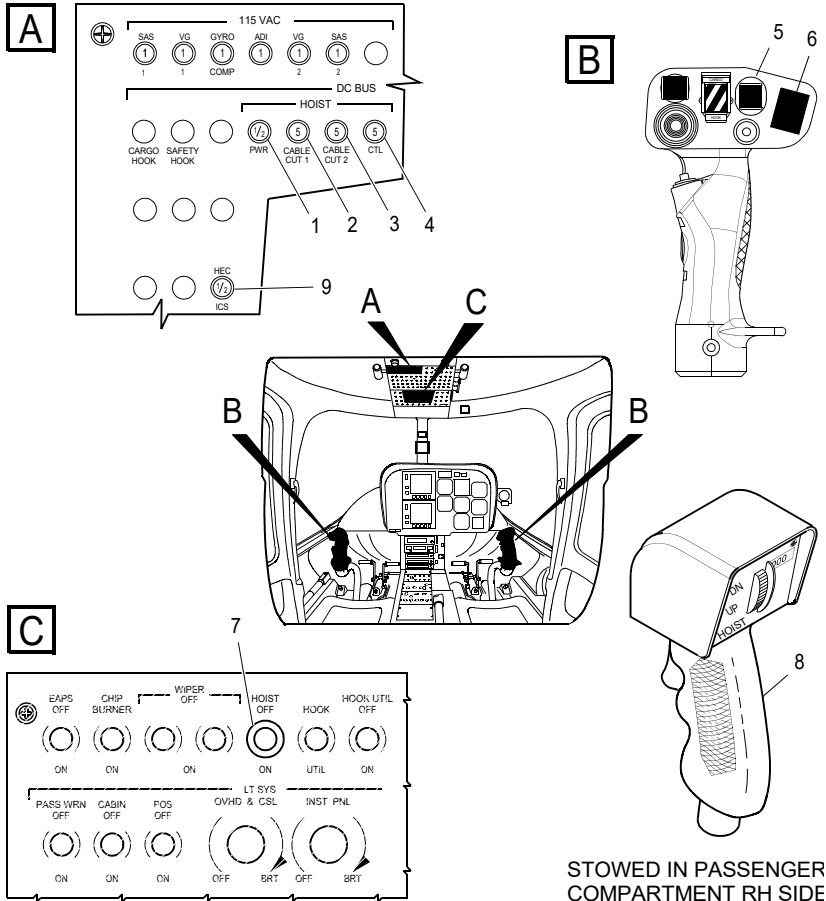
The hoist system is provided with a cable foul protection system that stops the hoist if the cable is not properly stowed on the drum. The protection system activates the HOIST CABL LKD caution message on EDU1.

The hoist system is also provided with a hoist motor overtemperature protection system that activates a malfunction annunciation on the cable payout displays.

The radio-ICS system is an extension of the onboard intercommunication system. It consists of two main components, a Handhold Transceiver and an Interface Box with the relative wiring. The Interface Box is connected to the helicopter ICS system.

The system is provided with the following features:

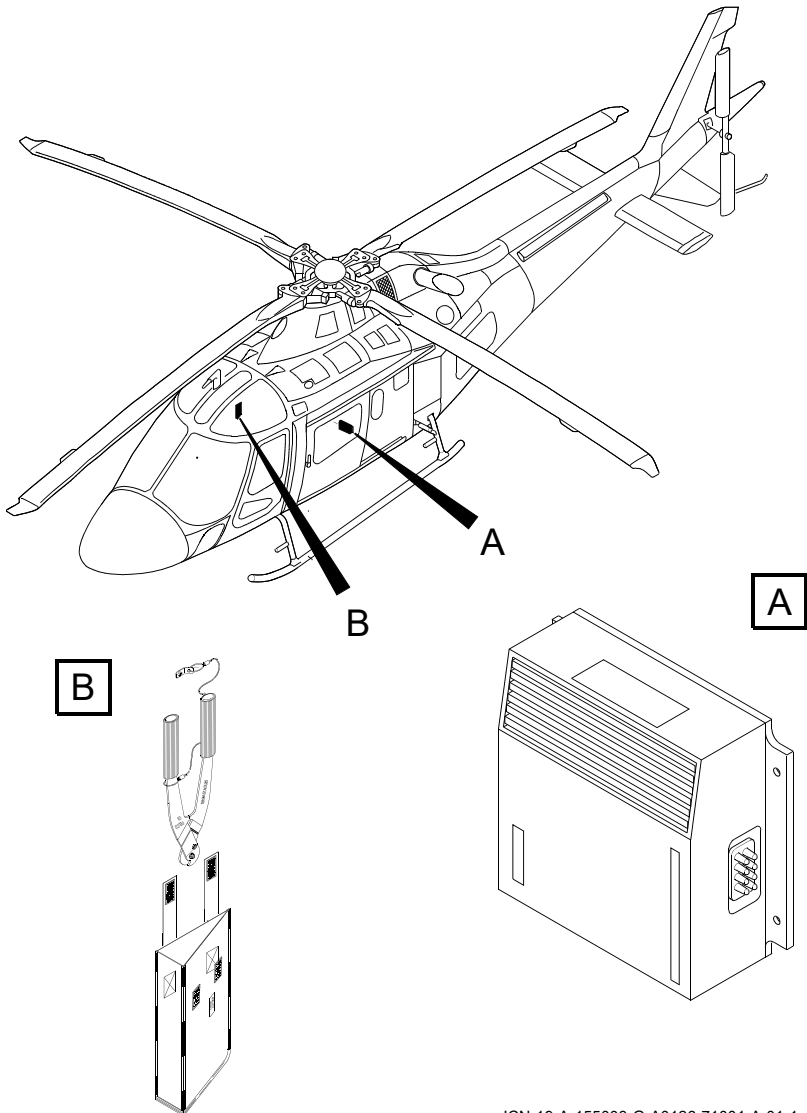
- it is activated by the pilot through the HOIST switch alongside the hoist motor and controls;
- the pilot has the ability to isolate himself from the Hoist Operator-Handhold Transceiver communications, using the ICS pushbutton on the front console, in order to perform normal VHF radio operations;
- the hoist operator has the ability to isolate the crew communications from the Handhold Transceiver communications using the TX ON/OFF pushbutton on the Interface Box.



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1. HOIST PWR circuit breaker
2. HOIST CABLE CUT 1 circuit breaker
3. HOIST CABLE CUT 2 circuit breaker
4. HOIST CTL circuit breaker
5. HOIST control switch
6. HOIST CABLE CUT switch
7. HOIST switch
8. Pendant (hoist remote control)
9. HEC ICS circuit breaker

Figure 7-1. Hoist Controls



ICN-19-A-155003-G-A0126-71001-A-01-1

Figure 7-2. Radio-ICS Interface Box and Manual Cable Cutter Positions (typical)

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**EASA Approval with TCDS N° R.005
dated 11 June 2007**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

SEARCHLIGHT

The searchlight installation P/N 109-0812-83 consists of a steerable light installed at the centre of the fuselage under the baggage compartment, or alternatively (P/N 109-0812-83-139), on the left side of fuselage under the passenger compartment. The light can be extended, stowed or directed as required by operating a switch on the collective lever.

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1	Revised pages Title page, A-1, B-1 i, 1 and 2 of 6.	EASA Approval N° 10042719 dated 14 December 2012

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SEARCHLIGHT

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SECTION 1 - LIMITATIONS

AIRSPEED LIMITATIONS (IAS)

Maximum speed for searchlight extension, orientation and retraction : 120 KIAS.

V_{NE} with searchlight extended : No change with respect to the basic RFM.

CENTER OF GRAVITY LIMITATIONS

After searchlight installation the new empty weight and CG location must be determined.

MISCELLANEOUS LIMITATIONS

SEARCHLIGHT OPERATION

Use of searchlight P/N 109-0812-83-139 when any rearview mirror is installed is only permitted with the lamp in stowed position.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

■ AREA N° 6 (Fuselage - RH side)

Searchlight : Condition and cleanliness.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

Searchlight : Condition and cleanliness.

IN FLIGHT

SEARCHLIGHT OPERATING PROCEDURE

Searchlight extension and orientation

EXT/RETR/L/R switch on
collective lever : EXT (to extend the light).

■ ON/OFF/STOW switch on
collective lever : ON (to switch the lamp on).

Note

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

EXT/RETR/L/R switch on
collective lever : 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.

Searchlight stowing

ON/OFF/STOW switch on
collective lever : STOW then OFF.

Note

In STOW position the light is extinguished.

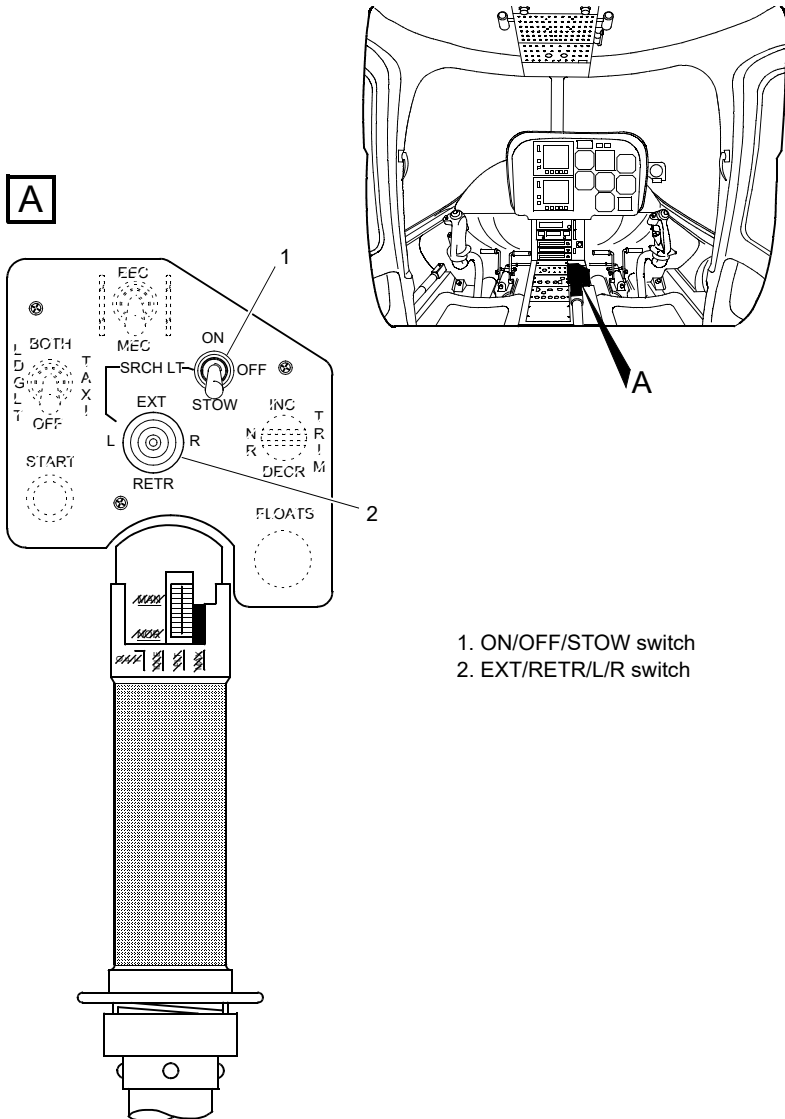
SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

No change.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 7 - SYSTEM DESCRIPTION



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Figure 7-1. Searchlight Controls

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The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

SNOW SKIS

The snow skis installation P/N 109-0812-92 consists of two fiberglass skis fixed to the landing gear skids.

Each ski is held in position by six clamps which allow the ski to rotate around the landing gear skid axis, in order to adapt to ground surface during landings.

Furthermore, each ski is provided with two stiffening structures in its aftermost portion.

The attachment system of each ski to the landing gear skid also include four mechanical stops to limit its rotation around the skid axis.

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SECTION 1 - LIMITATIONS

CENTER OF GRAVITY LIMITATIONS

After snow skis installation the new empty weight and C.G. location must be determined.

GROUND SPEED LIMITATIONS

Maximum forward speed at touch down after an engine failure.

Snow/ice covered surfaces : 30 kts.

Other surfaces : 50 kts.

SLOPE TAKE OFF AND LANDING LIMITATIONS

Nose-up and side-up operations : 8 degrees.

Nose-down operations : 2 degrees.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 2 (Fuselage - RH side)

Snow ski, attaching clamps, rotation
limiters : Cleanliness, condition and
security.

Note

Remove accumulated snow/ice. Check that the ski is not
frozen and stuck to the ground.

AREA N° 6 (Fuselage - LH side)

Snow ski, attaching clamps, rotation
limiters : Cleanliness, condition and
security.

Note

Remove accumulated snow/ice. Check that the ski is not
frozen and stuck to the ground.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

Snow skis, attaching clamps, rotation
limiters : Cleanliness, condition and
security.

Note

Remove accumulated snow/ice. Check that the ski is not
frozen and stuck to the ground.

OPERATIONS ON SNOW / ICE COVERED SURFACES

Use caution when starting the engine with the helicopter on snow/ice
covered surfaces due to the possibility of helicopter drift before tail
rotor reaches effective RPM.

Use caution when taxiing on soft and/or uneven snow.

A rectangular box with a thick orange border and a thin black inner border. Inside the box, the word "CAUTION" is written in bold, black, uppercase letters.

CAUTION

Adapt forward touchdown speed according to the condi-
tion of snow and ground.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

If any malfunction of the skis occurs in flight, reduce speed and land as soon as practical.

AUTOROTATIVE LANDING ON SNOW COVERED SURFACES



The conditions of snow and ground may alter significantly the helicopter handling at landing. For this reason the forward speed at touchdown must be limited as much as possible.

Proceed as per "AUTOROTATIVE LANDING" in the basic Rotorcraft Flight Manual.

SECTION 4 - PERFORMANCE DATA

No change.

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The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

CARGO HOOK

The cargo hook P/N 109-0810-31 consists of a support frame, a hook, a rearview mirror P/N 109-0812-02, an electrical and manual (emergency) release system, attaching hardware, an electronic hook load measuring system and a digital readout indicator. A spring system is attached to the cargo hook which provides the stowing when the hook is not in use.

Note

The swiveling link is not supplied with the cargo hook; however, it is recommended to use it between the suspension cable and the cargo hook

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CARGO HOOK

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SECTION 1 - LIMITATIONS

CARGO HOOK OPERATION

The cargo hook is approved as "Class B rotorcraft-load combination". Class B rotorcraft-load combination means "a load combination in which the external load is jettisonable and is lifted free of land or water during the rotorcraft operation".

Operation of the helicopter with cargo on the hook shall be conducted in accordance with day VFR.

Note

The external load operations must be authorized by the competent Operational Authority.

FLIGHT CREW

When operating with cargo on the hook, only the personnel involved in the mission is allowed on board.

AIRSPEED LIMITATIONS (IAS)

V_{NE} with external loads attached to cargo hook:

From sea level to 5000 ft : 100 KIAS

Above 5000 ft : Decrease 3 Kts every 1000 ft from 100 KIAS.

CAUTION

Controllability and stability of the load may limit the airspeed of the rotorcraft with an external load. Particular rotorcraft-load combination flight characteristics may reduce the limits above.

Note

Caution should be exercised, when carrying external cargo, as the handling characteristics and the controllability may be affected by the size, weight and shape of the cargo load, as well as by the length of the sling.

WEIGHT LIMITATIONS

Maximum Gross Weight with external
load attached to cargo hook : 3150 kg (6944 lb)

Note

For maximum takeoff and landing weight refer to Section 1 of the basic Rotorcraft Flight Manual.

CARGO HOOK LIMITATIONS

Cargo hook loading limit:

From -1000 ft to 9000 ft : 1400 kg (3086 lb)

Above 9000 ft : decrease 50 kg (110 lb) every
1000 ft from 1400 kg (3086 lb)

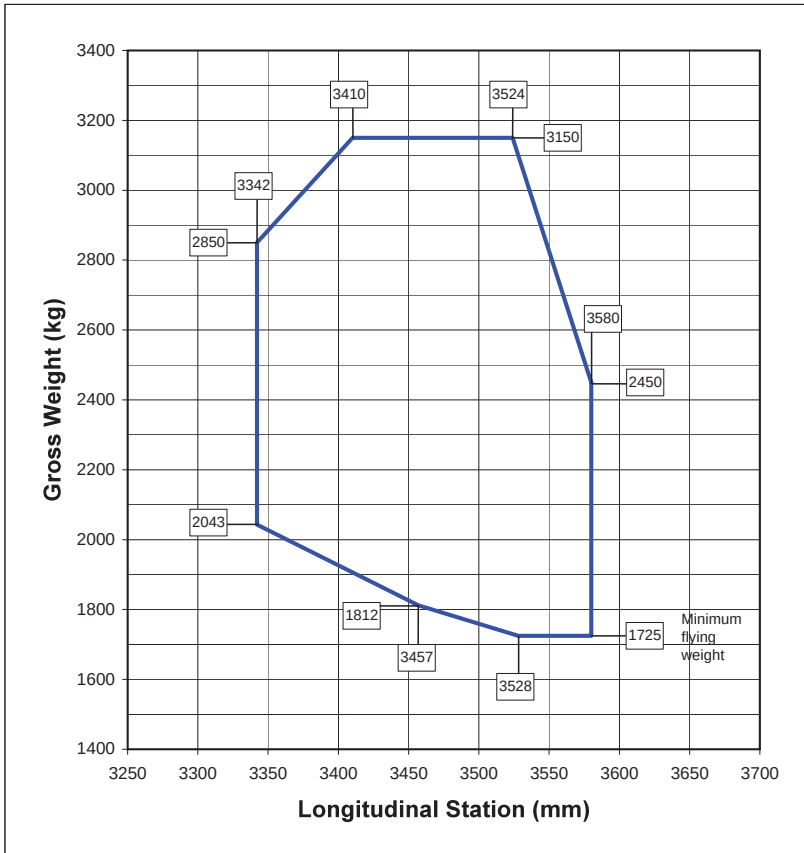
WARNING

Flight with unballasted sling as an external load is prohibited.

CENTER OF GRAVITY LIMITATIONS

After cargo hook installation the new empty weight and C.G. location must be determined.

Refer to Figures 1-1 and 1-2 for Longitudinal CG limits and Figures 1-3 and 1-4 for Lateral CG limits when flying with external load attached to cargo hook.



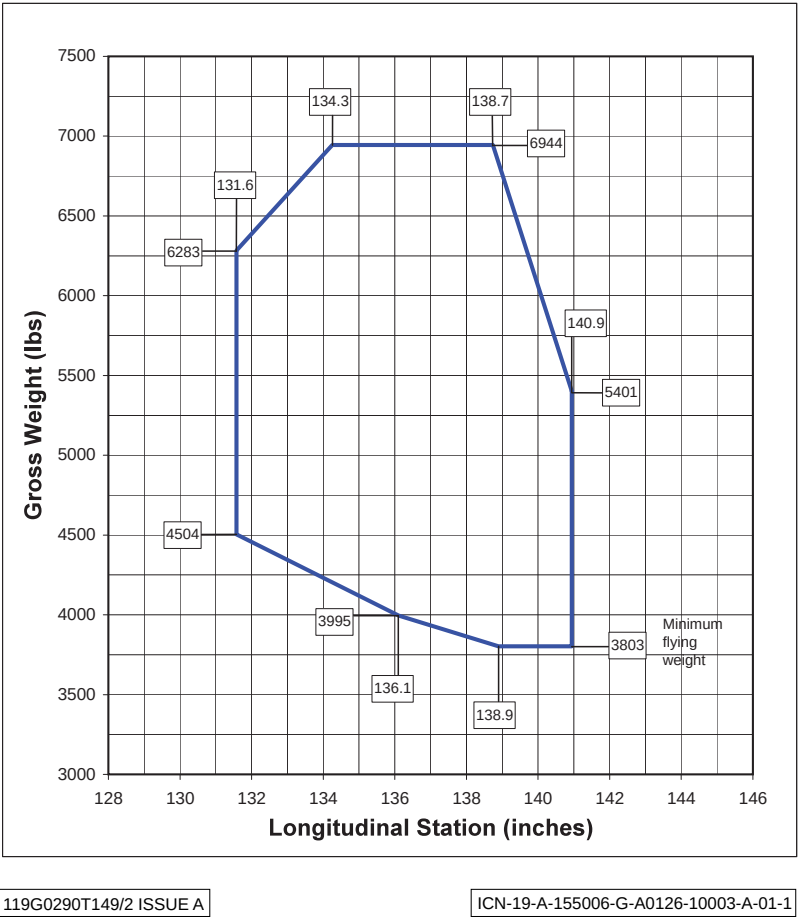
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Note

Longitudinal Station "0" is 1785 mm forward of the front jack point.

Figure 1-1. Longitudinal CG Limits (metric units)



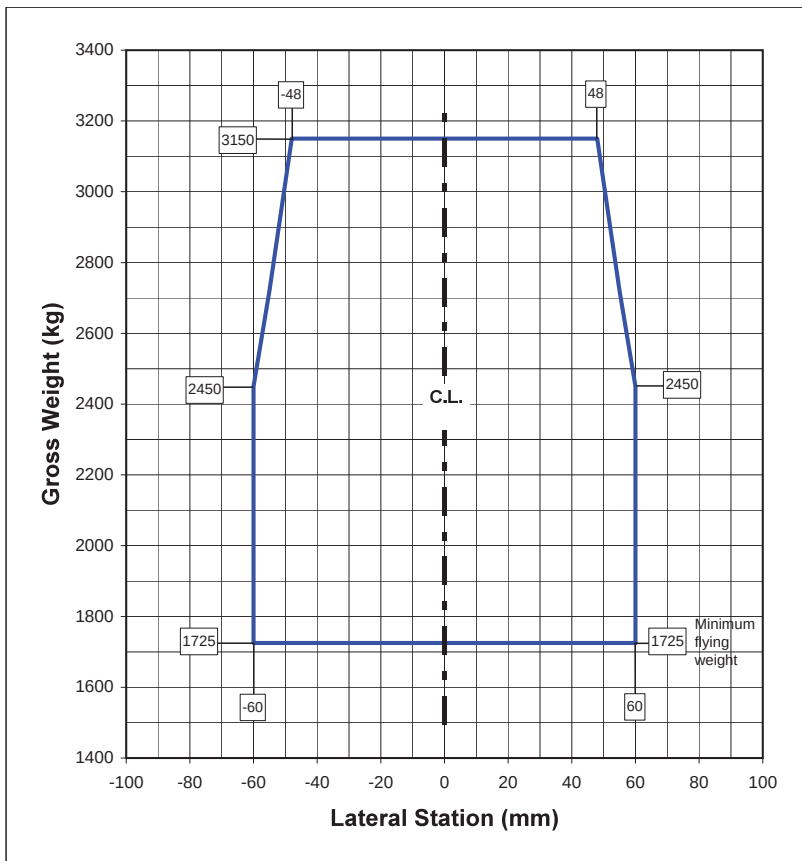
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Note

Longitudinal Station "0" is 70.2 in forward of the front jack point.

Figure 1-2. Longitudinal CG Limits (imperial units)



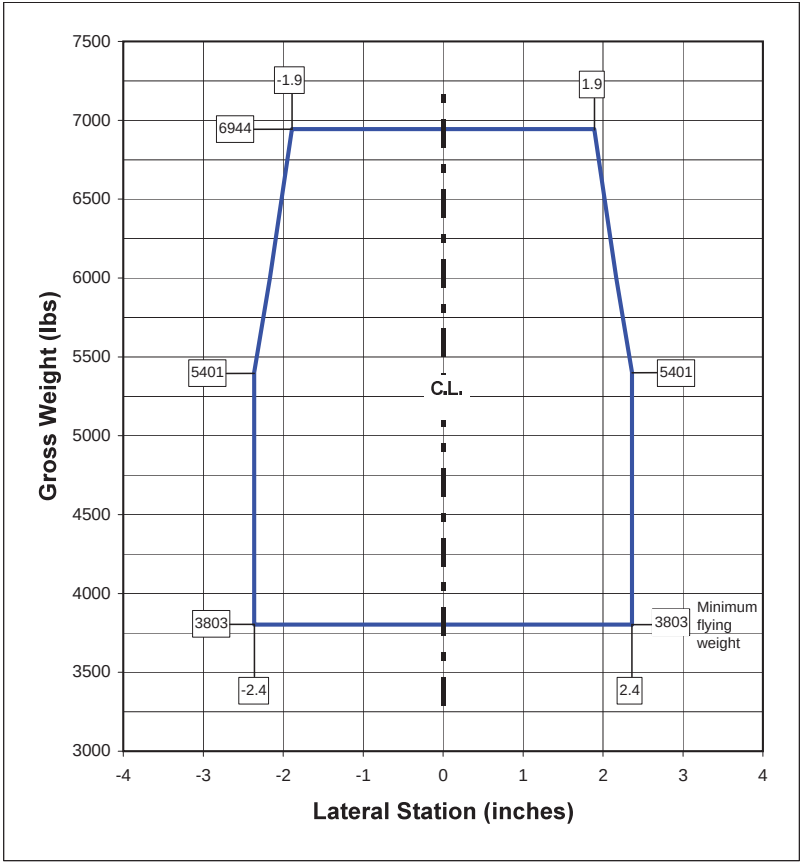
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Note

The Lateral Station "0" is 450 mm inboard from each main jack point and coincides with the helicopter longitudinal plane of symmetry.

Figure 1-3. Lateral CG Limits (metric units)



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Note

The Lateral Station "0" is 17.7 in inboard from each main jack point and coincides with the helicopter longitudinal plane of symmetry.

Figure 1-4. Lateral CG Limits (imperial units)

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N°1 (Helicopter nose)

Rearview mirror : Condition, cleanliness and security.

AREA N°2 (Fuselage - rh side)

Cargo hook : Condition and security.

AREA N°7 (Cabin interior)

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

Note

Ground personnel shall assist the pilot during the cargo hook checks.

EDU1 : CARGO HOOK ARM caution message out, check.
CARGO HOOK OPEN caution message out, check.

CARGO HOOK pushbutton on pilot cyclic stick : Lift the guard to arm the release system.

EDU : CARGO HOOK ARM caution message displayed.

CARGO HOOK pushbutton on
pilot cyclic stick

: Push. Verify the opening of the cargo hook and that CARGO HOOK OPEN caution message is displayed on EDU1. Release the switch and verify that the cargo hook returns to closed position and that CARGO HOOK OPEN caution message on EDU1 extinguishes.



CARGO HOOK pushbutton operation longer than 20 seconds may cause damage to the solenoid of the release system.

Note

The cargo hook is provided with a spring which keeps it permanently in closed position even when the opening system releases the lock device.

A force of approximately 5 kg must be applied to the cargo hook to overcome the spring force and to verify the hook opening.

CARGO HOOK pushbutton on
pilot cyclic stick

: Lower the guard to protect the release pushbutton.

EDU1

: CARGO HOOK ARM caution message extinguishes.

Repeat cargo hook checks by using CARGO HOOK pushbutton on copilot cyclic stick (if installed).

EMER CARGO RELEASE PULL

handle (emergency) : Pull to full travel. Verify the opening of the cargo hook and that CARGO HOOK OPEN caution message is displayed on EDU1. Release the handle and verify that the cargo hook returns to closed position, that CARGO HOOK OPEN caution message on EDU1 extinguishes and that the handle returns to the full down position.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

Rearview mirror : Condition, cleanliness and security.

Cargo hook : Condition and security.

SYSTEM CHECK

Hook load indicator : Set to zero.

Note

Adjust the hook load indicator after a 5 minutes warm up with no load on the hook.

TAKE-OFF

Note

For cargo attachment to the hook an approved installation has to be used.



Discharge helicopter static electricity, before attaching cargo, by touching the airframe with a ground wire or if a metal sling is used, the hook-up ring can be struck against the cargo hook.

If contact has been lost after initial grounding of the helicopter, it should be electrically regrounded and, if possible, contact maintained until hook-up is completed.

Note

Attachment of cargo sling to the hook can be monitored by means of the rearview mirror.

After cargo attachment slowly increase the collective pitch and ascend vertically to take-up the slack of cargo sling.

Lift vertically cargo from surface and read the hook load indicator to verify the cargo weight to be within the hook loading limitations.

Hover to check for satisfactory controllability and power within limits.

IN FLIGHT

Enter into slow forward speed and verify that uncontrollable or hazardous flight conditions do not exist. Allow adequate sling load clearance over obstacles. Increase forward speed and select an operational airspeed at which no hazardous oscillation is encountered.

APPROACH AND LANDING

CARGO RELEASE

CARGO HOOK pushbutton
on cyclic stick

: Lift the guard to arm the release
system.

EDU1

: CARGO HOOK ARM caution
message displayed.

Perform the approach to the cargo release area with care and at low speed. Stabilize hover above release point, then slowly descend until cargo lays down on ground.

CARGO HOOK pushbutton
on cyclic stick

: Push to release cargo.
Verify that CARGO HOOK
OPEN caution message is displayed on EDU1.

Note

The load is released only when its weight overcomes the spring-force of the hook.

Rearview mirror

: Check load released.

Note

In case of non-release of cargo, the pilot should slowly increase the collective pitch to ascend, as much as necessary to tension the cable, before operating the CARGO HOOK pushbutton again.

Note

In the event of an electrical failure pull to full travel the mechanical manual release control handle (EMER CARGO RELEASE PULL) to drop cargo.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

WARNING SYSTEM

CAUTION MESSAGES (YELLOW)

Panel wording	Fault condition	Corrective action
CARGO HOOK ARM	Cargo release system armed.	No corrective action is required. Take care to avoid accidental release of cargo.
CARGO HOOK OPEN	Cargo release system (normal or emergency) in operation or hook jammed in open position.	Verify the status of hook release pushbutton or emergency release handle and, through the rearview mirror, the presence of cargo. If the release system is not in operation take maintenance actions before attaching the cargo.

EMERGENCY CARGO RELEASE

In case that an emergency situation requires to release the cargo, operate the electrical release system through the pushbutton on cyclic stick.

In case this fails to operate, pull to full travel the handle of the mechanical release system.

SECTION 4 - PERFORMANCE DATA

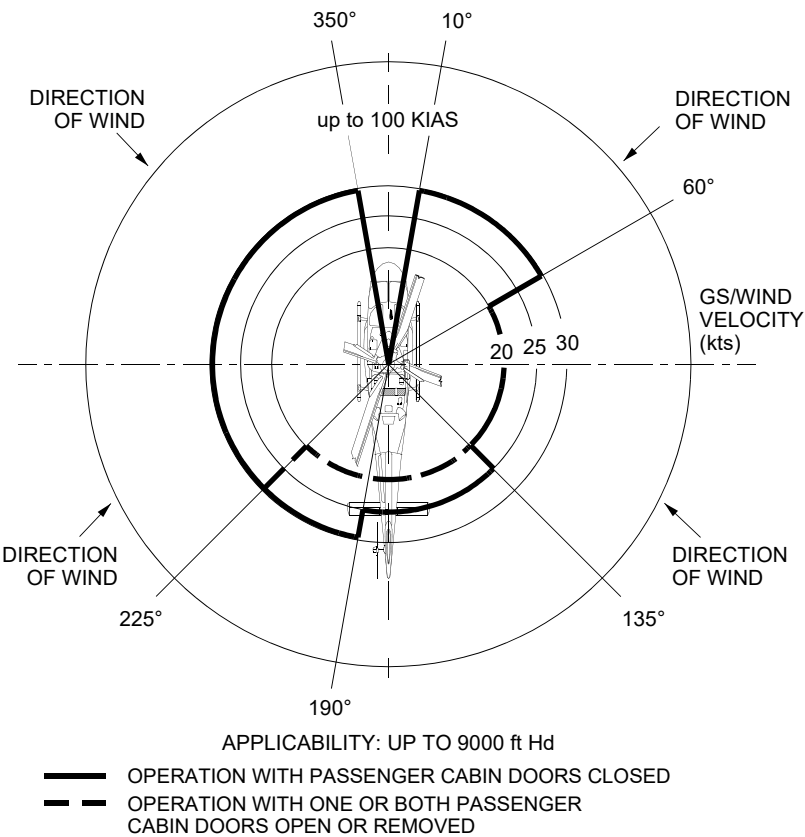
Note

Forward flight performance will be degraded due to the load aerodynamic drag. The level of degradation will be dependent on load size and shape.

There are no significant load effects on hover performance.

OPERATION VS ALLOWABLE WIND

Satisfactory stability and control in rearward and sideward flight are guaranteed for hover out of ground effect up to takeoff power, from -1,000 ft to 9,000 ft Hd, in the wind/ground speed azimuth envelope of Figure 4-1.



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Figure 4-1. Wind/Ground Speed Azimuth Envelope

HOVER CEILING OGE

(Figures 4-2 thru 4-9)

Two set of Hover Ceiling charts are presented for Take-Off Power (TOP) and Maximum Continuous Power (MCP) rating, both heater off and on.

The Hover Ceiling Out of Ground Effect (OGE) charts provide the maximum gross weight for hovering OGE (at least 60 ft skid height AGL) as a function of Hp and OAT, with NR at 102% and zero wind. The performance presented for Take-Off Power (TOP) and for Maximum Continuous Power (MCP) refer to an electrical load of 100 A. When the electrical load is greater than 100 A, reduce the maximum weight obtained from the charts according to Table 4-1.

Table 4-1. Hover ceiling - Correction table

CORRECTION TABLE

WHEN ELECTRICAL LOAD > 100 A REDUCE GROSS WEIGHT BY [KG]:

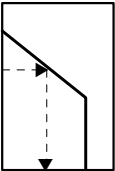
OAT	OGE TOP	OGE MCP	OGE TOP Heater ON	OGE MCP Heater ON
-35	0	0	0	0
-30	0	0	0	0
-20	0	10	0	10
-10	0	15	10	35
0	10	35	20	40
10	20	40	35	55
20	35	50	45	75
30	40	65	-	-
40	45	70	-	-
50	75	80	-	-

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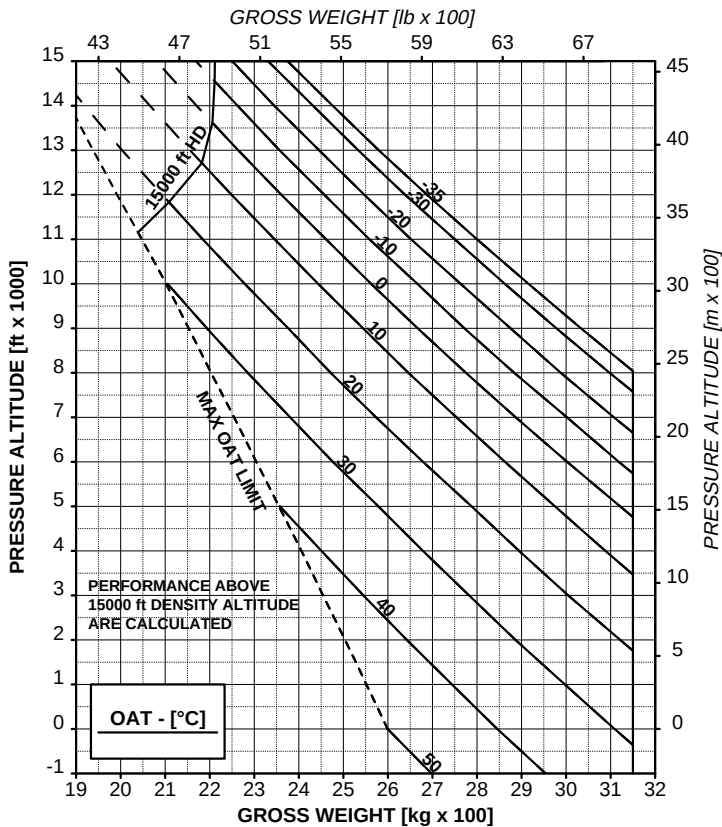
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HOVER CEILING OUT OF GROUND EFFECT
TAKE-OFF POWER

ROTOR SPEED:102%
ZERO WIND
ELECTRICAL LOAD: 100 A
HEATER OFF



WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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Figure 4-2. Out of Ground Effect (OGE) - Take-Off Power (TOP)
(Heater Off)

HOVER CEILING OUT OF GROUND EFFECT
TAKE-OFF POWER

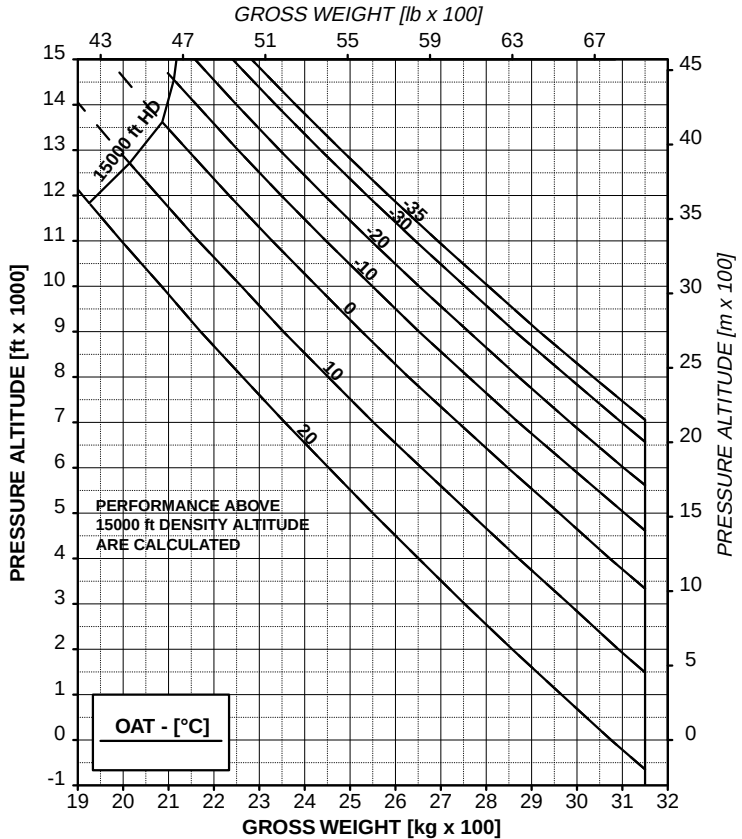
ROTOR SPEED: 102%

HEATER ON

ZERO WIND

ELECTRICAL LOAD: 100 A

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



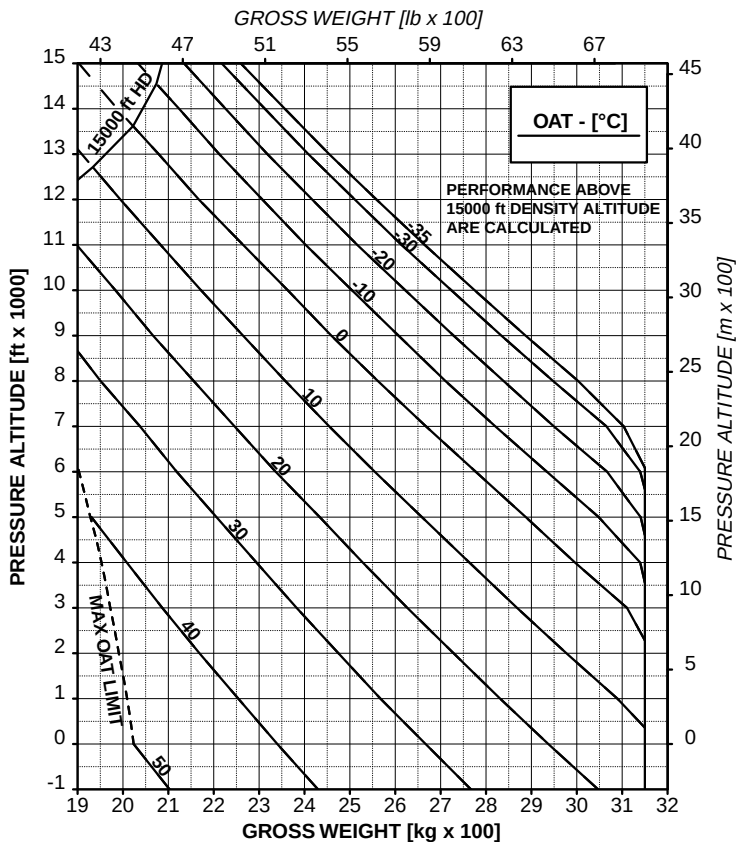
119G1580A002 ISSUE A

ICN-19-A-155106-G-A0126-40002-A-01-1

Figure 4-3. Out of Ground Effect (OGE) - Take-Off Power (TOP)
(Heater On)

HOVER CEILING OUT OF GROUND EFFECT
MAXIMUM CONTINUOUS POWER

ROTOR SPEED:102%
ZERO WIND
ELECTRICAL LOAD: 100 A
HEATER OFF
WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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Figure 4-4. Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater Off)

HOVER CEILING OUT OF GROUND EFFECT
MAXIMUM CONTINUOUS POWER

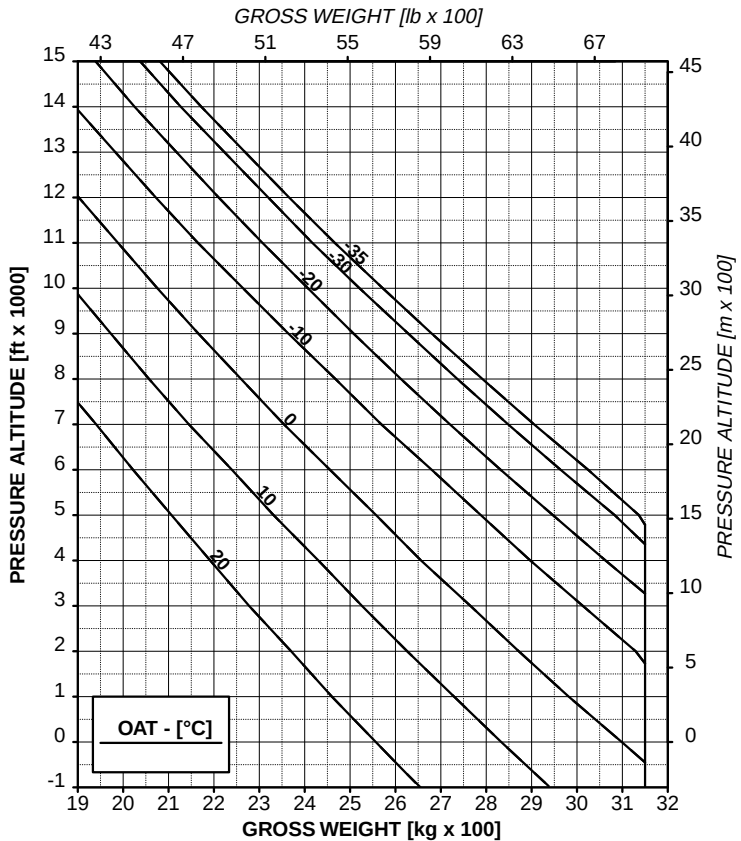
ROTOR SPEED: 102%

HEATER ON

ZERO WIND

ELECTRICAL LOAD: 100 A

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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ICN-19-A-155106-G-A0126-40004-A-01-1

Figure 4-5. Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater On)

HEIGHT - VELOCITY DIAGRAM

Operations with external load attached to the cargo hook could result in an excursion inside the area of Height-Velocity diagram. Therefore in such a circumstance a safe landing following an engine failure could not be guaranteed.

RATE OF CLIMB

(Figures 4-6 thru 4-13)

The Rate Of Climb (ROC) charts are presented for Take-Off Power (TOP) rating and for Maximum Continuous Power (MCP) rating, with NR at 102%, both heater off and on.

They refer to the best Rate of Climb airspeed V_y of 60 KIAS up to 15,000 ft Hp.

The performance presented for Take-Off Power (TOP) and for Maximum Continuous Power (MCP) refer to an electrical load of 100 A. When the electrical load is greater than 100 A, reduce the maximum Rate of Climb obtained from the charts according to Table 4-2.

Table 4-2. Rate of climb - Correction table

CORRECTION TABLE

WHEN ELECTRICAL LOAD > 100 A REDUCE RATE OF CLIMB BY [ft/min]:

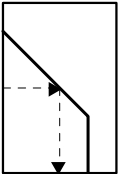
OAT	TOP	MCP	TOP Heater ON	MCP Heater ON
-35	0	0	0	0
-30	0	5	0	10
-20	0	15	0	20
-10	0	25	20	25
0	15	55	45	50
10	45	70	55	80
20	55	80	75	130
30	60	115	-	-
40	65	110	-	-
50	80	115	-	-

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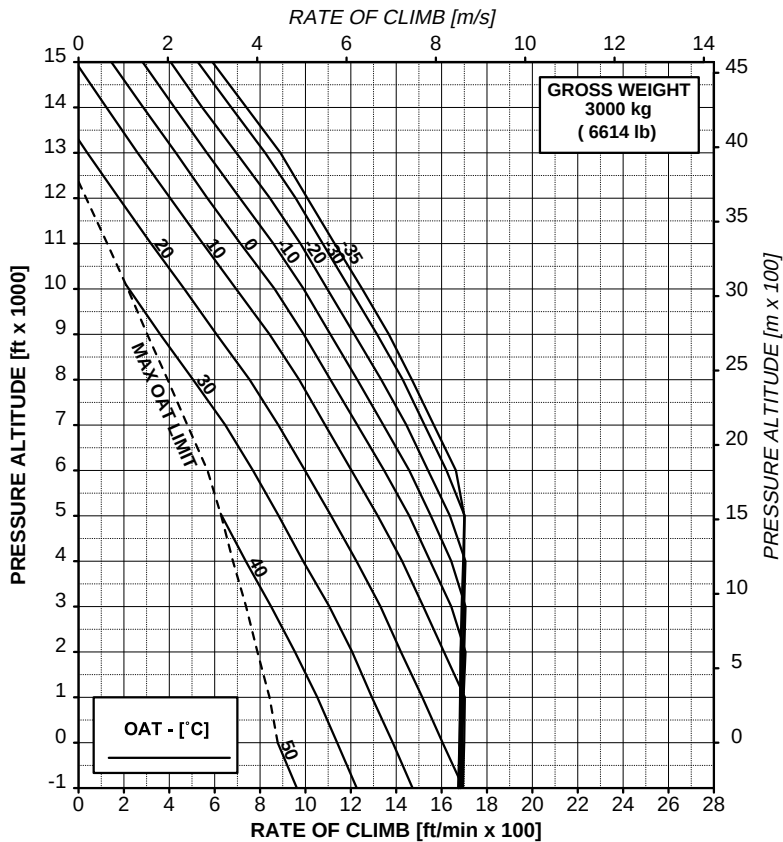
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RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS



WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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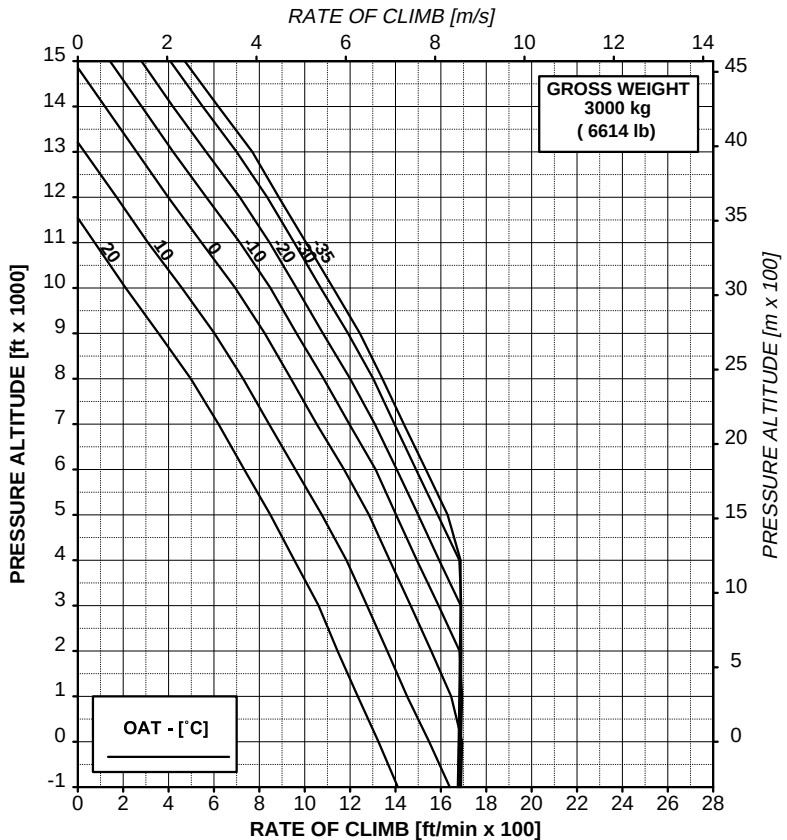
Figure 4-6. Take-Off Power (TOP) (Heater Off)
- Gross Weight 3000 kg

**RATE OF CLIMB
TAKE-OFF POWER**

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

V_y: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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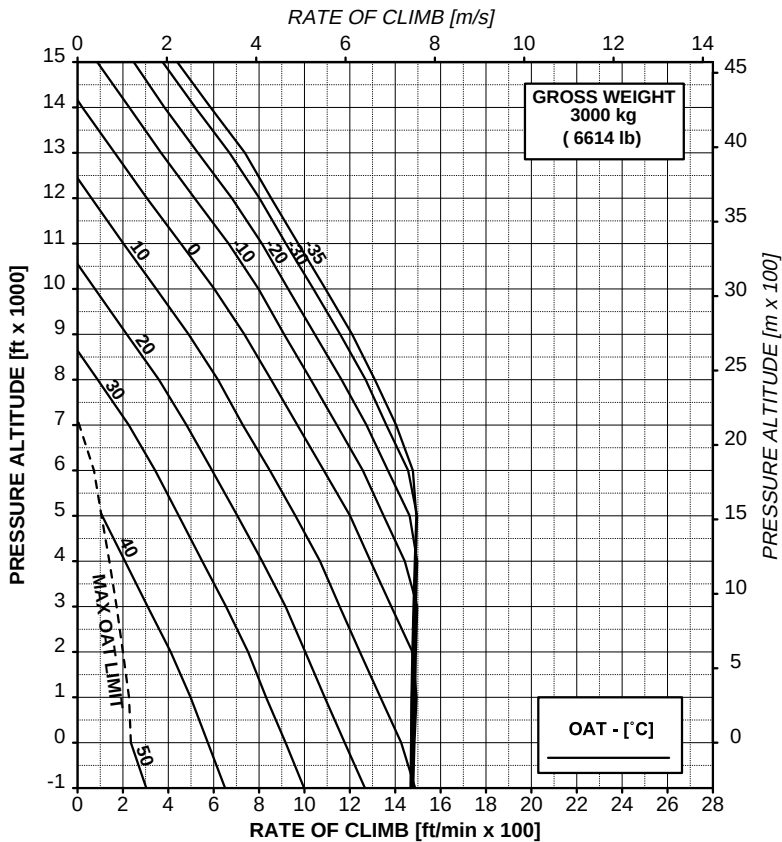
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**Figure 4-7. Take-Off Power (TOP) (Heater On)
- Gross Weight 3000 kg**

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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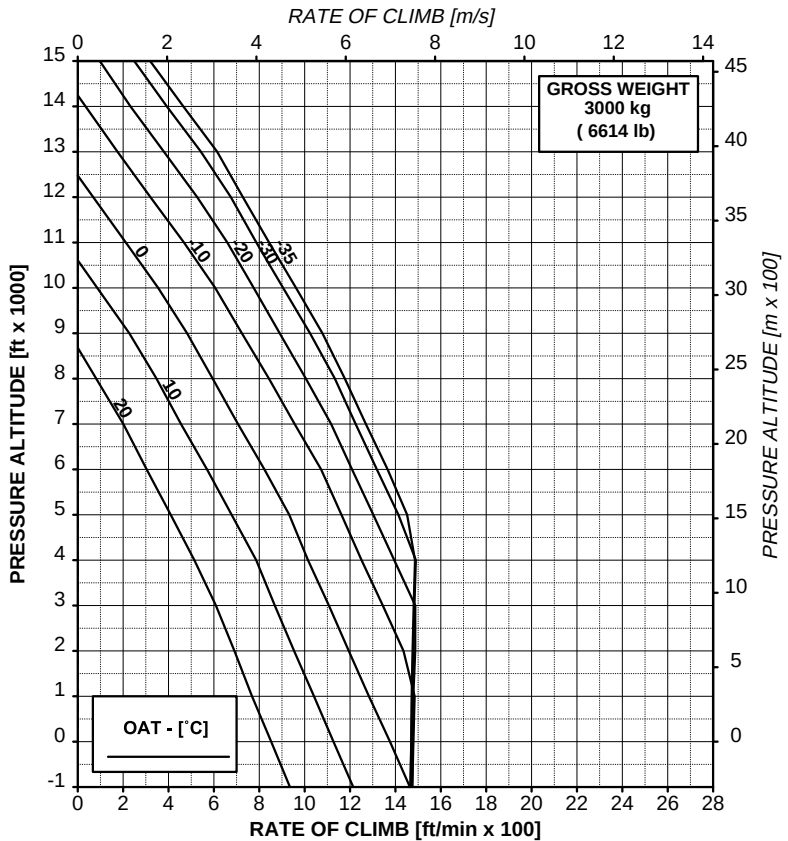
Figure 4-8. Maximum Continuous Power (MCP) (Heater Off)
- Gross Weight 3000 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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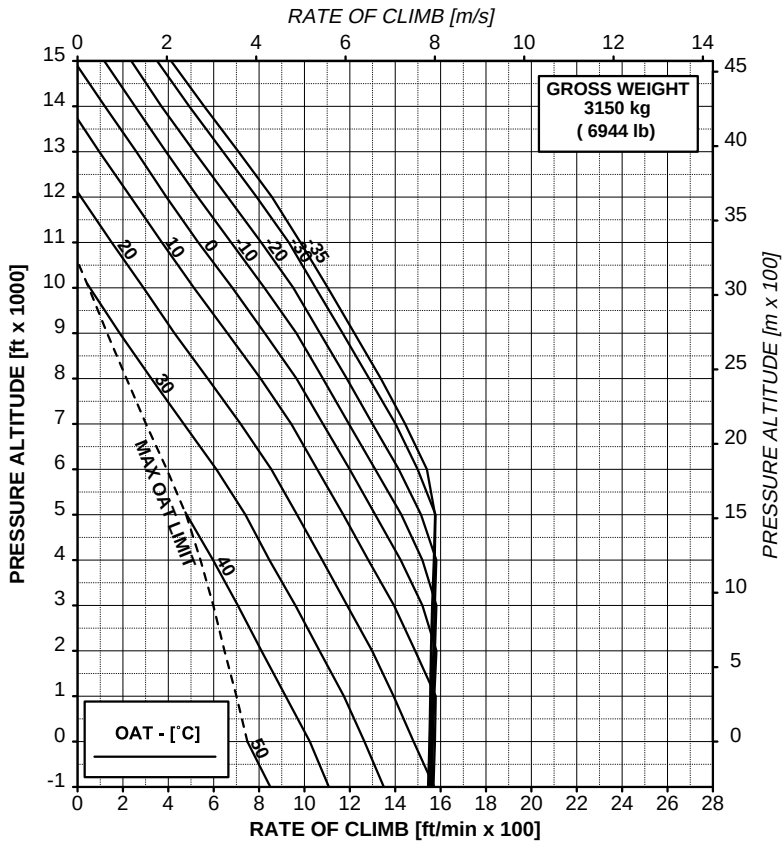
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Figure 4-9. Maximum Continuous Power (MCP) (Heater On)
- Gross Weight 3000 kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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Figure 4-10. Take-Off Power (TOP) (Heater Off)
- Gross Weight 3150 kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE

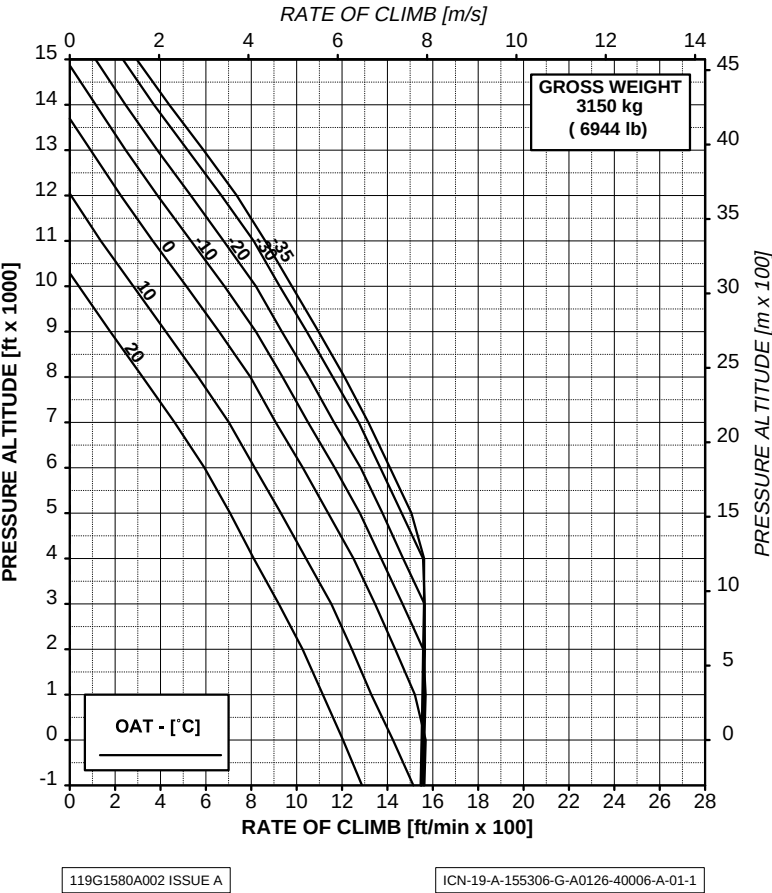
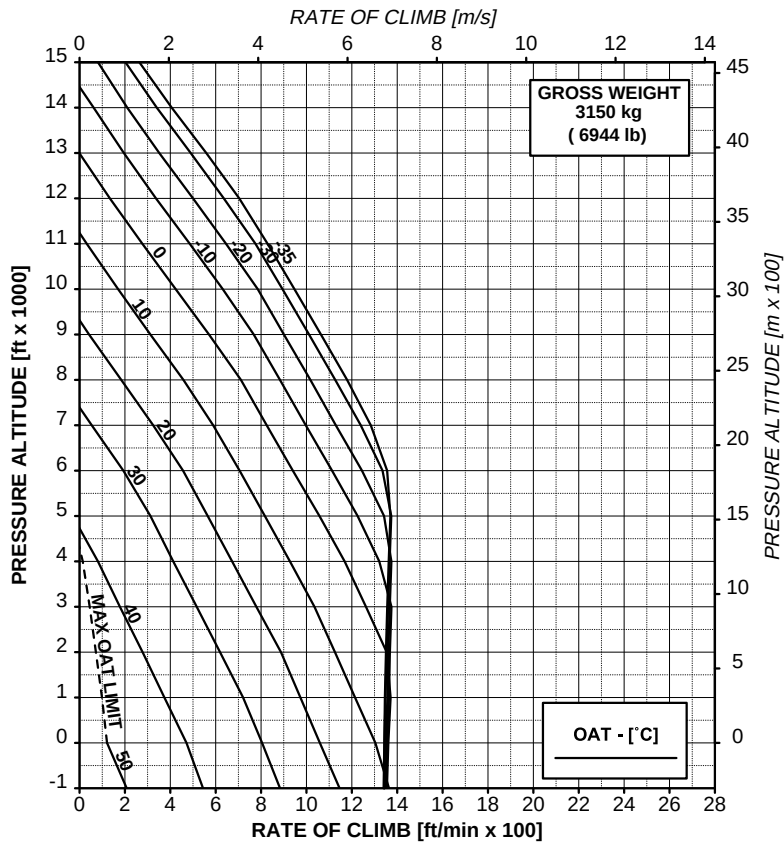


Figure 4-11. Take-Off Power (TOP) (Heater On)
- Gross Weight 3150 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE



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ICN-19-A-155306-G-A0126-40007-A-01-1

Figure 4-12. Maximum Continuous Power (MCP) (Heater Off)
- Gross Weight 3150 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON

Vy: 60 KIAS

WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE

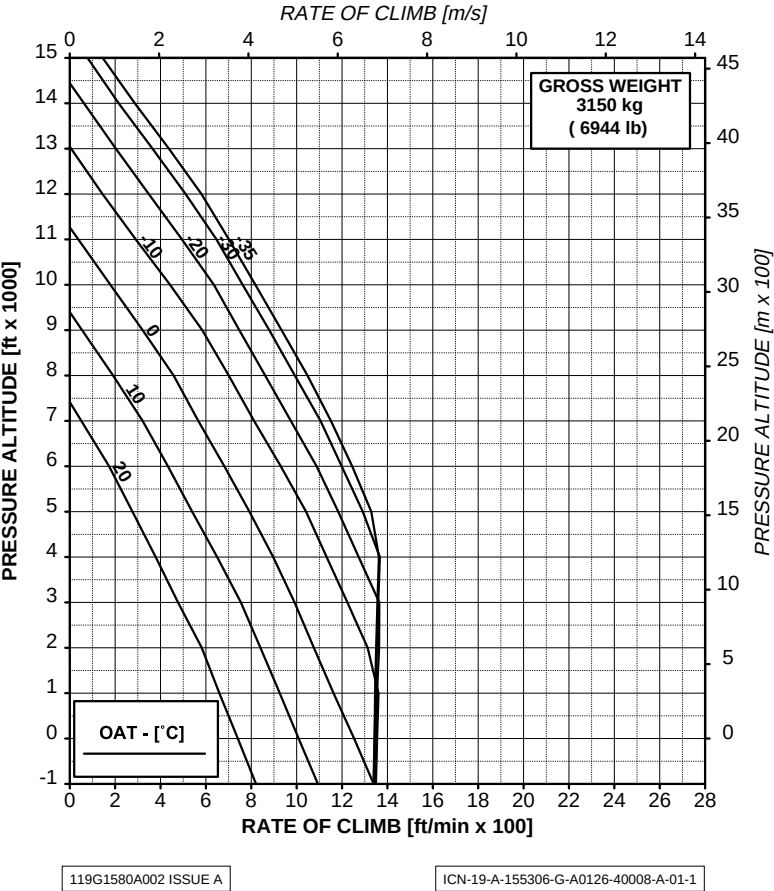


Figure 4-13. Maximum Continuous Power (MCP) - (Heater On)
- Gross Weight 3150 kg

SECTION 6 - WEIGHT AND BALANCE

DATUM LINE LOCATION

Figure 6-1 presents the cargo hook station data to aid in weight and balance computations.

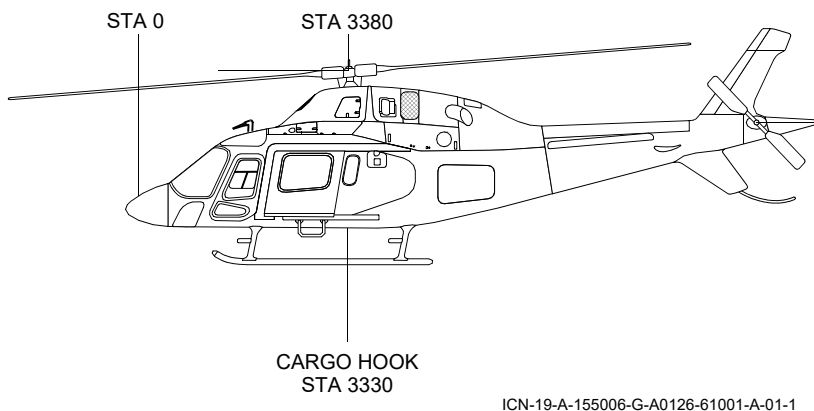
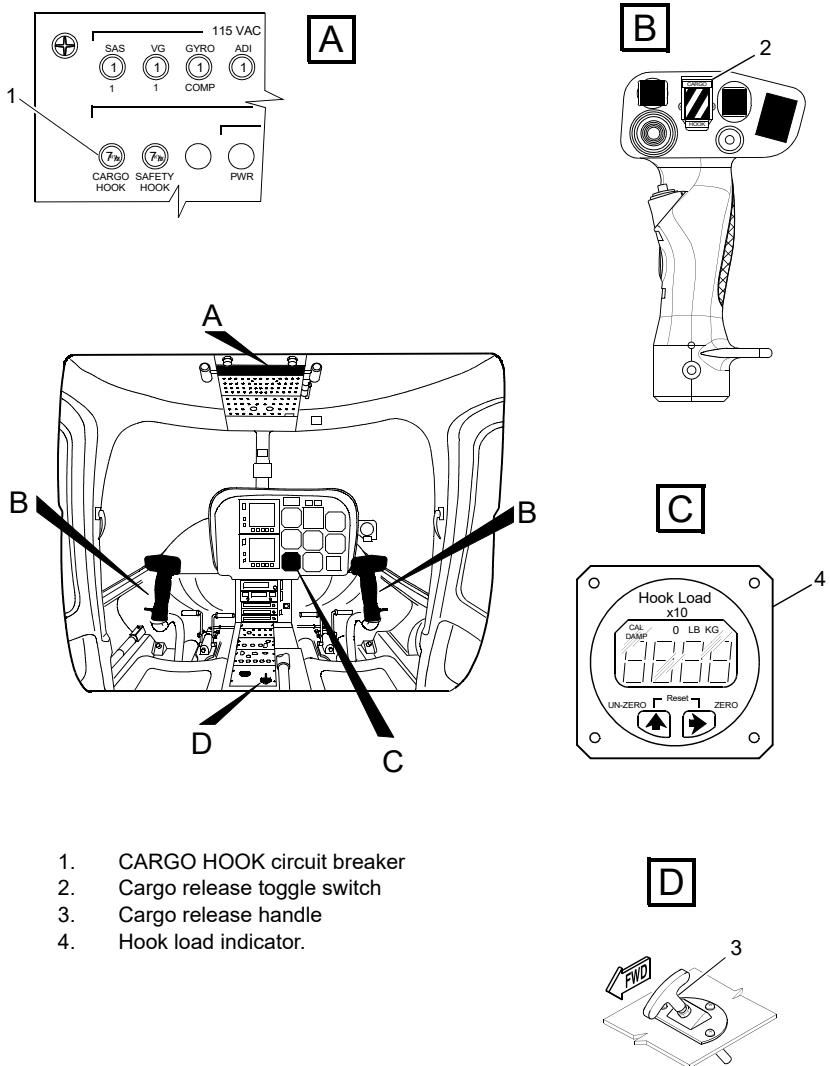


Figure 6-1. Cargo Hook Station Diagram

SECTION 7 - SYSTEM DESCRIPTION



1. CARGO HOOK circuit breaker
2. Cargo release toggle switch
3. Cargo release handle
4. Hook load indicator.

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Figure 7-1. Cargo Hook Controls and Indicators

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dated 11 June 2007**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

DUAL CARGO HOOK

Note

This Supplement must be used in conjunction with Supplement 6.

The Dual Cargo Hook consists of Cargo Hook P/N 109-0810-31 (see Supplement 6), and Safety Hook P/N 109-0811-75.

The Safety Hook P/N 109-0811-75 consists of a hook, attached to the support frame of the cargo hook, the safety cable P/N 109-0811-86-159 to connect the suspended load to the cargo and to the safety hook, an independent (from the cargo hook) manual (emergency) release system and attaching hardware. The electrical release system is common to both hooks.

The safety hook can not be installed as a stand alone device (i.e. without the cargo hook). When both are installed the load must be suspended to the cargo hook while the second hook, through the safety cable, is only for safety in case the first one should fail.

Note

The swiveling link is not supplied with the cargo hook; however, it is recommended to use it between the suspension cable and the cargo

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LIST OF REVISIONS

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—	Issue 1	EASA Approval with Type Certificate Data Sheet (TCDS) N° R.005 dated 11 June 2007

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NOTE: Revised text is indicated by a black vertical line in the outer margin of the page and the approval revision number is printed in the lower margin.

Page	Revision N°	Page	Revision N°
Title page	0		
A-1 and A-2	0		
B-1 and B-2	0		
i and iv	0		
PART I — EASA Approved			
1 and 16 of 22	0		
PART II — Manufacturer's data			
17 and 22 of 22	0		

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DUAL CARGO HOOK

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SECTION 1 - LIMITATIONS

DUAL CARGO HOOK OPERATION

The dual cargo hook is approved as "Class B rotorcraft-load combination". Class B rotorcraft-load combination means "a load combination in which the external load is jettisonable and is lifted free of land or water during the rotorcraft operation".

The operation must be authorized by the competent authority in accordance with the applicable National Operating Regulation.

The load must be secured to the cargo hook through the safety cable and connected to the safety hook. The function of the safety hook is to serve as a back-up in the event of failure of the cargo hook.



Simultaneous operation with individual loads, attached separately to the two hooks, is prohibited.

Note

When the safety hook is utilized it is necessary the use of cable P/N 109-0811-86-159 to connect the safety hook with the cargo hook.

WEIGHT LIMITATIONS

Maximum Gross Weight with external
load attached to cargo hook : 2850 kg (6283 lb)

CARGO HOOK LIMITATIONS

Cargo hook loading limit : 500 kg (1102 lb)

CAUTION

When the safety hook is used the load must be attached to cargo hook which is provided with a load indicator, and however must not exceed 500 Kg (1102 lb).

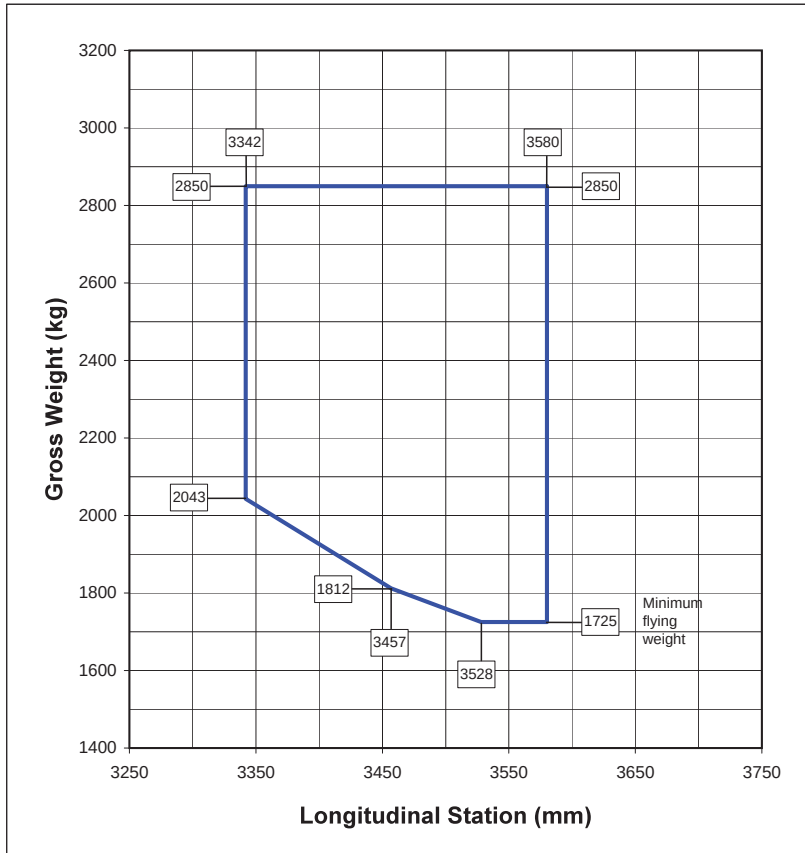
WARNING

Flight with unballasted sling as an external load is prohibited.

CENTER OF GRAVITY LIMITATIONS

After cargo hook installation the new empty weight and CG location must be determined.

Refer to Figures 1-1 and 1-2 for Longitudinal CG limits and Figures 1-3 and 1-4 for Lateral CG limits when flying with external load attached to cargo hook.



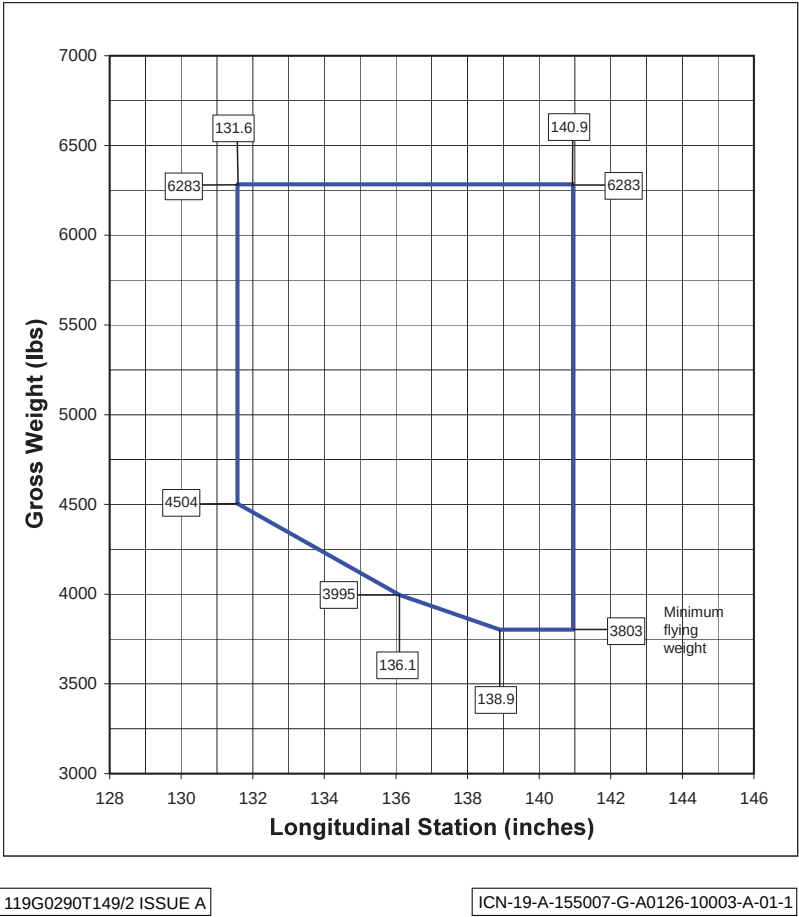
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Note

Longitudinal Station "0" is 1785 mm forward of the front jack point.

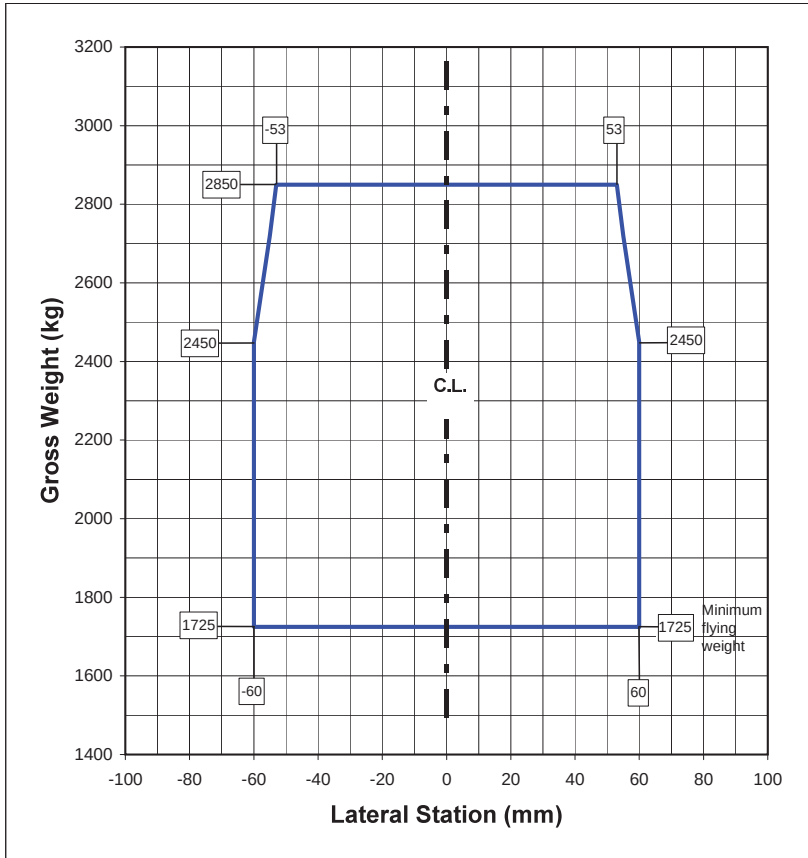
Figure 1-1. Longitudinal CG Limits (metric units)



Note

Longitudinal Station "0" is 70.2 in forward of the front jack point.

Figure 1-2. Longitudinal CG Limits (imperial units)



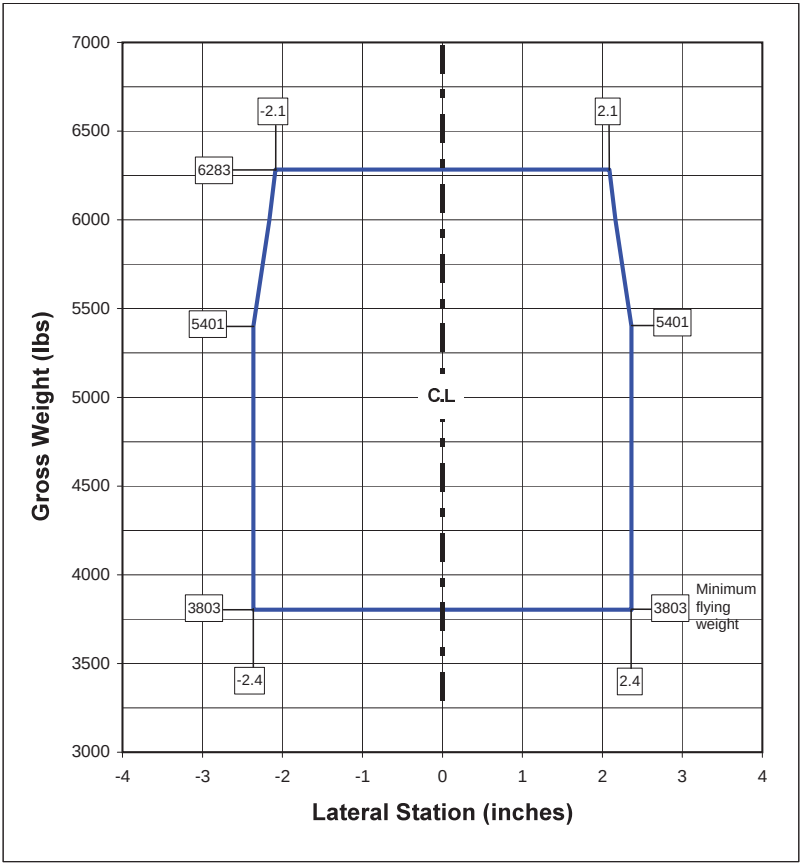
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Note

Lateral Station "0" is 450 mm inboard from each main jack point and coincides with the helicopter longitudinal plane of symmetry.

Figure 1-3. Lateral CG Limits (metric units)



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Note

Lateral Station "0" is 17.7 in inboard from each main jack point and coincides with the helicopter longitudinal plane of symmetry.

Figure 1-4. Lateral CG Limits (imperial units)

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECK

Note

The following pre-flight checks complete those scheduled for cargo hook in Supplement 6.

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

Safety cable and harnesses : Condition and security. Check for presence and condition of placards on the safety cable. (see Figure 2-1).

AREA N°2 (Fuselage - rh side)

Cargo and safety hooks : Condition and security.

AREA N°7 (Cabin interior)

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

Note

Ground personnel shall assist the pilot during the cargo hook checks.

EDU1 : CARGO HOOK ARM and CARGO HOOK OPEN caution message out, check.
SFTY HOOK ARM and SFTY HOOK OPEN caution messages out, check.

CARGO HOOK pushbutton
on pilot cyclic stick

: Lift the guard to arm the release system.

EDU1

: CARGO HOOK ARM and SFTY HOOK ARM caution messages displayed.

CARGO HOOK pushbutton
on pilot cyclic stick

: Push. Verify the opening of both cargo hooks and that CARGO HOOK OPEN and SFTY HOOK OPEN caution messages illuminate on EDU1. Release the switch and verify that both cargo hooks return to closed position and that CARGO HOOK OPEN and SFTY HOOK OPEN caution messages on EDU1 extinguish.

Note

CARGO HOOK pushbutton operation longer than 20 seconds may cause damage to the solenoid of the release system.

Note

Both hooks are provided with a spring which keeps them permanently in closed position even when the opening system releases the lock-device.

A force of approximately 5 kg must be applied to each hook to overcome the spring force and to verify the hook opening.

CARGO HOOK pushbutton
on pilot cyclic stick

: Lower the guard to protect the release pushbutton.

EDU1 : CARGO HOOK ARM and SFTY
HOOK ARM caution messages
out.

Repeat hooks checks by using CARGO HOOK pushbutton on copilot cyclic stick (if installed).

CARGO HOOK emergency handle
(EMER CARGO RELEASE PULL) : Pull to full travel.
Verify opening of the cargo
hook and that CARGO HOOK
OPEN caution message is displayed on EDU1. Release the
handle and verify that the cargo
hook returns to closed position,
that CARGO HOOK OPEN caution message on EDU1 extinguishes and that the handle
returns to the full down position.

SAFETY HOOK emergency handle
(EMER CARGO RELEASE PULL) : Pull to full travel.
Verify opening of the safety
hook and that SFTY HOOK
OPEN caution message is displayed on EDU1. Release the
handle and verify that the safety
hook returns to closed position,
that SFTY HOOK OPEN caution message on EDU1 extinguishes and that the handle
returns to the full down position.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

Cargo and safety hooks : Condition and security.

SYSTEM CHECK

Hook load indicator
(primary hook only) : Set to zero.

Note

Adjust the hook load indicator after a 5 minutes warm up with no load on the hook.

TAKE-OFF

CAUTION

The cargo must be secured to cargo hook through the cargo hook cable, while the safety hook must be used to attach the safety hook cable. (refer to Figure 2-1).

WARNING

Discharge helicopter static electricity, before attaching cargo, by touching the airframe with a ground wire or if a metal sling is used, the hook-up ring can be struck against the cargo hook. If contact has been lost after initial ground-ing of the helicopter, it should be electrically regrounded and, if possible, contact maintained until hook-up is com-pleted.

Note

Attachment of cargo sling to the hook can be observed by means of the rearview mirror.

After cargo attachment slowly increase the collective pitch and ascend vertically to take-up the slack of cargo sling.

Lift vertically cargo from surface and read the hook load indicator to verify the cargo weight to be within the hook loading limitations.

Hover to check for satisfactory controllability and power within limits.

IN FLIGHT

Enter into slow forward speed and verify that uncontrollable or hazardous flight conditions do not exist. Allow adequate sling load clearance over obstacles. Increase forward speed and select an operational airspeed at which no hazardous oscillation is encountered.

Note

Check periodically the attachment of cargo to the hooks by means of the rearview mirror.

APPROACH AND LANDING

CARGO RELEASE

CARGO HOOK pushbutton on
cyclic stick

: Lift the guard to arm the release
system.

EDU1

: CARGO HOOK ARM and SFTY
HOOK ARM caution messages
displayed.

Perform the approach to the cargo release area with care and at low speed.

Stabilize hover above release point, then slowly descend until cargo lays down on ground.

CARGO HOOK pushbutton
on cyclic stick

: Push to release cargo.
Verify the CARGO HOOK
OPEN and SFTY HOOK OPEN
caution messages displayed on
EDU1.

Note

The load is released only when its weight overcomes the spring force of the hooks.

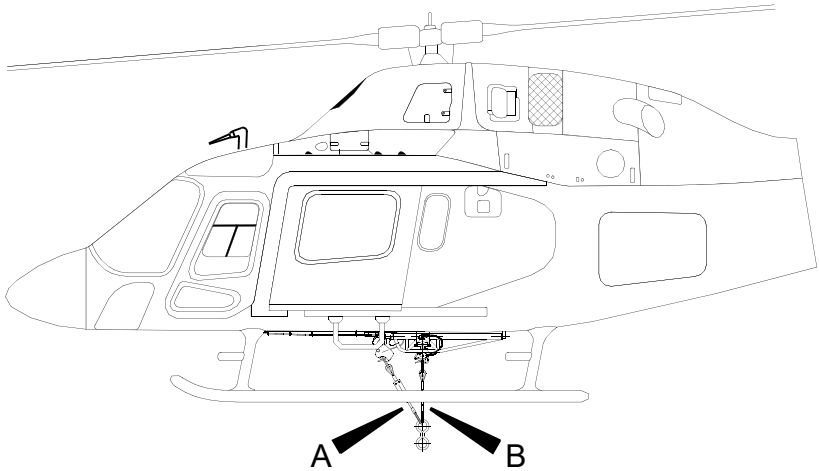
Rearview mirror : Check load released.

Note

In case of non-release of cargo, the pilot should slowly increase the collective pitch to ascend, as much as necessary to tension the cable, before operating the CARGO HOOK pushbutton again.

Note

In the event of an electrical failure of one or both cargo hooks, pull to full travel the mechanical manual release control handle EMER CARGO RELEASE PULL of safety hook then the mechanical manual release control handle EMER CARGO RELEASE PULL of the cargo hook to release cargo.



A

SAFETY HOOK
CABLE

B

CARGO HOOK CABLE
MAX LOAD 500 KG

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**Figure 2-1. Placards and Correct Installation of the Cable
P/N 109-0811-86-159**

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

WARNING SYSTEM

CAUTION MESSAGES (YELLOW)

Panel wording	Fault condition	Corrective action
SFTY HOOK ARM	Safety hook release system armed.	No corrective action is required.
SFTY HOOK OPEN	Safety hook release system (normal or emergency) in opera- tion or safety hook jammed in open posi- tion.	Verify the status of hook release pushbut- ton or safety hook emergency release handle and, through the rearview mirror, the correct attaching of the safety hook cable. If the release system is not in operation take maintenance actions before attaching the cargo.

EMERGENCY CARGO RELEASE

In case that an emergency situation requires to release the cargo, operate the electrical release system through the pushbutton on cyclic stick. In case this fails to operate, pull to full travel the mechanical manual release control handle EMER CARGO RELEASE PULL of safety hook then the mechanical manual release control handle EMER CARGO RELEASE PULL of cargo hook to release load.

FAILURE OF CARGO HOOK

A failure of cargo hook may result in the impossibility to release the cargo or, on the contrary, in an unforeseen release of cargo in flight.

IMPOSSIBILITY TO RELEASE THE CARGO

In case of unsuccessful release of cargo through the electrical release system proceed as per "EMERGENCY CARGO RELEASE". If also the mechanical manual release fails, approach to a suitable landing area with care and at low speed stabilize the helicopter in hovering. Slowly descend until cargo lays down on ground, move backward and sideway to keep the cable in sight while laying it down, then land.

UNFORESEEN RELEASE OF CARGO IN FLIGHT

In case of loss of the load from cargo hook (load transfer to safety hook):

EDU1 : CARGO HOOK OPEN caution message displayed temporarily.

Hook load indicator : Check for zero indication.

Rearview mirror : Check for load suspended to safety hook.

Lay down the cargo as soon as possible.

FAILURE OF SAFETY HOOK

A failure of safety hook may result in the impossibility to release the cargo or in an unforeseen opening of safety hook in flight.

IMPOSSIBILITY TO RELEASE THE CARGO

In case of unsuccessful release of cargo through the electrical release system proceed as per "EMERGENCY CARGO RELEASE". If also the mechanical manual release fails, approach to a suitable landing area with care and at low speed and stabilize the helicopter in hovering. Slowly descend until cargo lays down on ground, move backward and sideway to keep the cable in sight while laying it down, then land.

UNFORESEEN OPENING OF SAFETY HOOK IN FLIGHT

In case of opening of safety hook with consequent detachment of safety cable:

EDU1 : SFTY HOOK OPEN caution
message displayed temporarily.

HOOK load indicator : Check for positive load
indication.

Rearview mirror : Check for load suspended to
cargo hook.

Lay down the cargo as soon as possible.

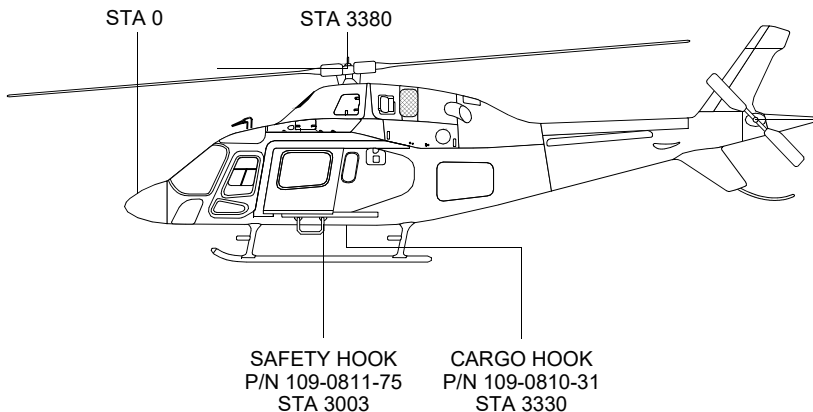
SECTION 4 - PERFORMANCE DATA

Refer to basic Rotorcraft Flight Manual.

SECTION 6 - WEIGHT AND BALANCE

DATUM LINE LOCATIONS

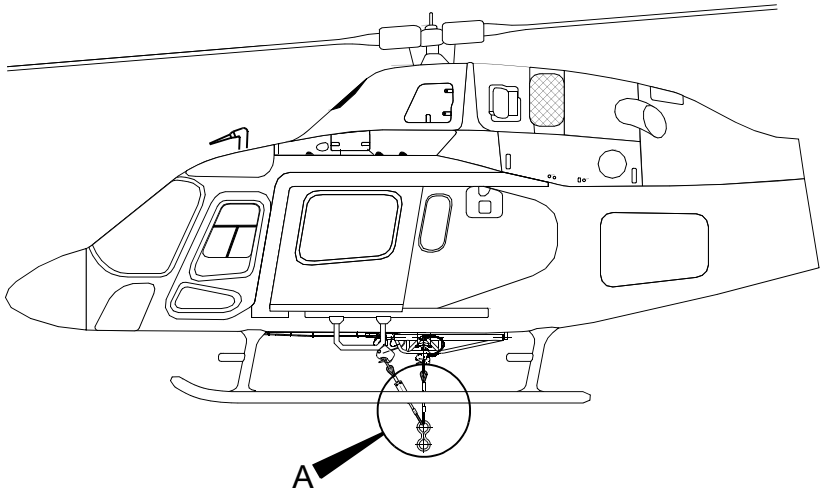
Figure 6-1 presents the cargo hook and safety hook stations data to aid in weight and balance computations.



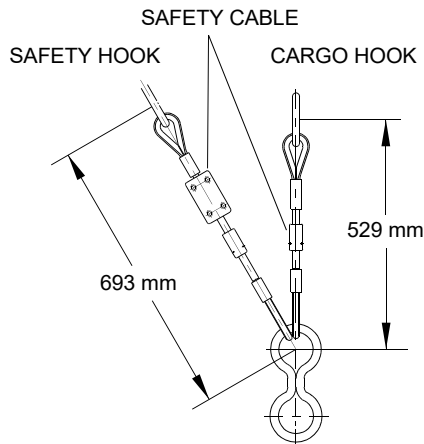
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Figure 6-1. Cargo Hook and Safety Hook Stations Diagram

SECTION 7 - SYSTEM DESCRIPTION



A



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Figure 7-1. External Load Rigging

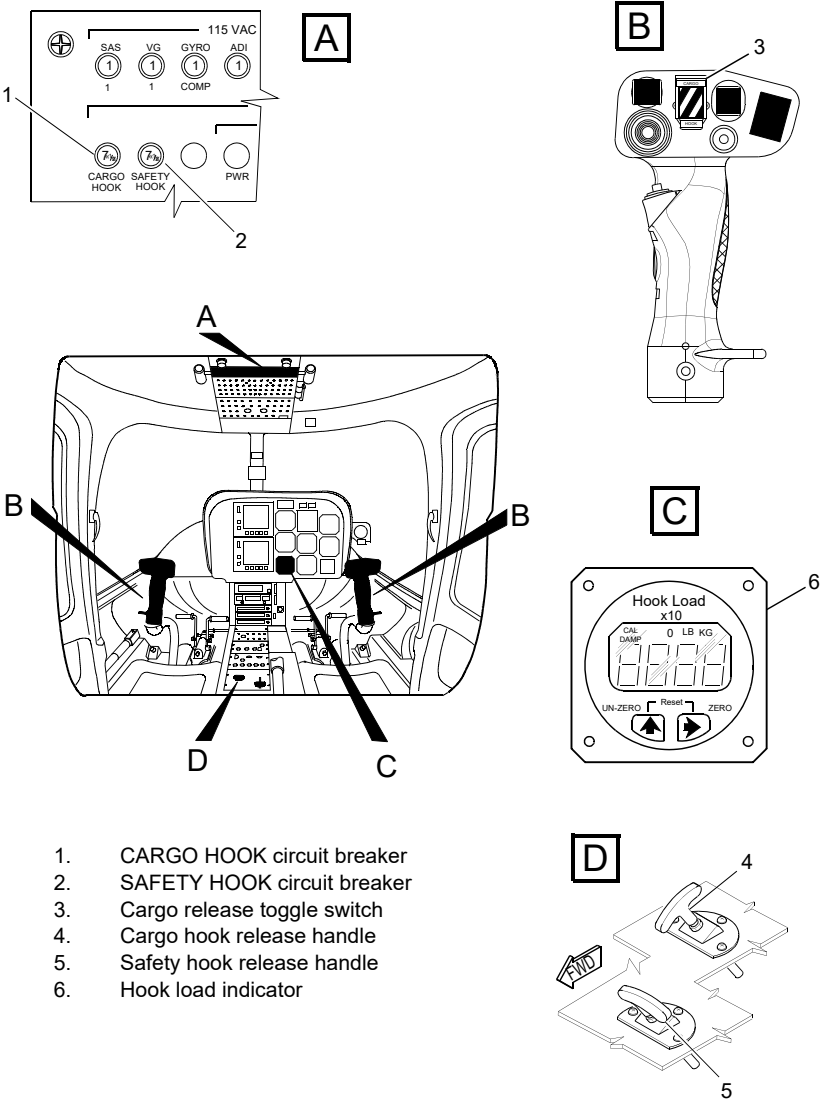


Figure 7-2. Dual Cargo Hook Controls and Indicators

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The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

DUAL CONTROLS

The dual controls P/N 109-0810-01 consist mainly of a cyclic stick, a collective lever and a set of pedals. Installation of the dual controls converts the forward LH crew seat into a station for an additional pilot. The additional pilot controls are similar to those of the pilot controls except for the collective lever switch box that is equipped with the NR TRIM selector switch only. The engine throttle on the collective lever is not provided with the MAN/NOR selector switch and the IDLE stop disengagement device.

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SECTION 1 - LIMITATIONS

FLIGHT CREW

The left crew seat may be used for an additional pilot.

CENTER OF GRAVITY LIMITATIONS

After dual controls installation the new empty weight and CG location must be determined.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 7 (Cabin interior)

Copilot flight controls : Condition and security.

ENGINE PRE-START CHECK

Note

The copilot engine throttle on collective lever is not provided with the MAN/NOR selector switch and the IDLE stop disengagement device.

Note

The copilot collective switch box is not provided with the EEC/MEC switch.

ENGINE START

Note

The copilot collective switch box is not provided with the START pushbutton.

Note

The copilot collective switch box is not provided with the EEC/MEC switch.

DRY MONITORING RUN

Note

The copilot collective switch box is not provided with the START pushbutton.

IN FLIGHT

Note

The copilot collective switch box is not provided with the landing lights switch.

APPROACH AND LANDING

Note

The copilot collective switch box is not provided with the landing lights switch.

SHUTDOWN

Note

The copilot engine throttle is not provided with the IDLE stop disengagement device.

Note

The copilot collective switch box is not provided with the landing lights switch.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

ENGINE FAILURES

FAILURES OF ENGINE

Note

The copilot engine throttle is not provided with the IDLE stop disengagement device.

ENGINE RESTART IN FLIGHT

Note

The copilot collective switch box is not provided with the START pushbutton.

MALFUNCTION OF THE FUEL CONTROL SYSTEM

Note

The copilot engine throttle on collective lever is not provided with the MAN/NOR selector switch.

ENGINE RESTART IN FLIGHT WITH MANUAL OVERRIDE SYSTEM (MAN)

Note

The copilot engine throttle on collective lever is not provided with the MAN/NOR selector switch and the IDLE stop disengagement device.

Note

The copilot collective switch box is not provided with the START pushbutton.

ELECTRONIC ENGINE CONTROL (EEC) MALFUNCTIONS

Note

The copilot collective switch box is not provided with the EEC/MEC switch.

ENGINE HOT START

Note

The copilot collective switch box is not provided with the START pushbutton.

ENGINE DROOP COMPENSATION BINDING

Note

The copilot collective switch box is not provided with the EEC/MEC switch.

TAIL ROTOR FAILURES

Complete loss of tail rotor control in cruise

Note

The copilot engine throttle is not provided with the IDLE stop disengagement device.

FIRE

ENGINE FIRE ON GROUND

Note

The copilot engine throttle is not provided with the IDLE stop disengagement device.

ENGINE FIRE DURING FLIGHT

Note

The copilot engine throttle is not provided with the IDLE stop disengagement device.

SECTION 4 - PERFORMANCE DATA

No change.

**EASA Approval with TCDS N° R.005
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The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

SUPPLEMENTARY FUEL TANKS

The supplementary fuel tanks installation P/N 109-0811-49 provides an additional 265 liters capacity. It consists of two tank cells (RH cell of 105 liters and LH cell of 160 liters) installed behind the passenger seat. However the installation can be arranged as follows:

- both LH and RH tank cells installed, or
- only RH tank cell installed.

The fuel transfer from the supplementary fuel tank cells to the main fuel tank cells is by gravity. The two tank cells are separated by panels; each cell is provided with a fuel level probe.

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SECTION 1 - LIMITATIONS

CENTER OF GRAVITY LIMITATIONS

After supplementary fuel tank installation, the new empty weight and CG location must be determined.

Note

In some loading conditions the longitudinal limitations (aft limit) can be exceeded. Refer to Section 6 for loading instructions.

SECTION 2 - NORMAL PROCEDURES

ENGINE START

EDU2 : check fuel quantity indication.

CAUTION

When only RH tank cell is installed and fuel system is fully serviced, a difference of fuel quantity indication, equivalent to the fuel contained into the RH tank cell, is normal. Such difference decreases with the consumption up to zero when about 110 kg of fuel is reached in each main tank.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

No change.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

WEIGHTS — ARMS AND MOMENTS

LONGITUDINAL MOMENTS

Table 6-1. Usable fuel — Main fuel tanks plus RH and LH supplementary tanks (for JP5 / JET A / JET A-1)

WEIGHT (kg)	CAPACITY (l) (0.8 kg/l)	ARM (mm)	MOMENT (kgmm)
20.0	25.0	3324	66480
40.0	50.0	3327	133080
60.0	75.0	3329	199740
80.0	100.0	3331	266480
100.0	125.0	3399	339900
120.0	150.0	3461	415320
140.0	175.0	3505	490700
160.0	200.0	3539	566240
180.0	225.0	3543	637740
200.0	250.0	3551	710200
220.0	275.0	3571	785620
240.0	300.0	3614	867360
260.0	325.0	3641	946660
280.0	350.0	3668	1027040
300.0	375.0	3691	1107300
320.0	400.0	3711	1187520
340.0	425.0	3729	1267860
360.0	450.0	3746	1348560
380.0	475.0	3760	1428800
400.0	500.0	3773	1509200
420.0	525.0	3785	1589700
440.0	550.0	3796	1670240

Table 6-1. Usable fuel — Main fuel tanks plus RH and LH supplementary tanks (for JP5 / JET A / JET A-1) (Cont.d)

WEIGHT (kg)	CAPACITY (l) (0.8 kg/l)	ARM (mm)	MOMENT (kgmm)
460.0	575.0	3806	1750760
480.0	600.0	3815	1831200
500.0	625.0	3823	1911500
520.0	650.0	3831	1992120
540.0	675.0	3838	2072520
560.0	700.0	3845	2153200
580.0	725.0	3851	2233580
600.0	750.0	3857	2314200
620.0	775.0	3863	2395060
640.0	800.0	3868	2475520
660.0	825.0	3873	2556180
680.0	850.0	3883	2640440
688.0	860.0	3887	2674256

Table 6-2. Usable fuel — Main fuel tanks plus RH supplementary tank only (for JP5 / JET A / JET A-1)

WEIGHT (kg)	CAPACITY (l) (0.8 kg/l)	ARM (mm)	MOMENT (kgmm)
20.0	25.0	3324	66480
40.0	50.0	3327	133080
60.0	75.0	3329	199740
80.0	100.0	3331	266480
100.0	125.0	3399	339900
120.0	150.0	3461	415320
140.0	175.0	3505	490700
160.0	200.0	3539	566240
180.0	225.0	3543	637740
200.0	250.0	3551	710200
220.0	275.0	3571	785620
240.0	300.0	3614	867360
260.0	325.0	3645	947700
280.0	350.0	3671	1027880
300.0	375.0	3695	1108500
320.0	400.0	3715	1188800
340.0	425.0	3733	1269220
360.0	450.0	3750	1350000
380.0	475.0	3774	1434120
400.0	500.0	3778	1511200
420.0	525.0	3796	1594320
440.0	550.0	3816	1679040
460.0	575.0	3834	1763640
480.0	600.0	3851	1848480
500.0	625.0	3866	1933000
520.0	650.0	3880	2017600
540.0	675.0	3893	2102220
560.0	700.0	3906	2187360

LATERAL MOMENTS

Table 6-3. Usable fuel — Main fuel tanks plus RH and LH supplementary tanks (for JP5 / JET A / JET A-1)

Weight (kg)	Capacity l (0.8 kg/l)	BL (mm)	Moment (kgmm)
20.0	25.0	-330	-6600
40.0	50.0	-330	-13200
60.0	75.00	-330	-19800
80.0	100.0	-330	-26400
100.0	125.0	-330	-33000
120.0	150.0	-330	-39600
140.0	175.0	-236	-33040
160.0	200.0	-165	-26400
180.0	225.0	-110	-19800
200.0	250.0	-66	-13200
220.0	275.0	-30	-6600
240.0	300.0	0	0
260.0	325.0	0	0
280.0	350.0	0	0
300.0	375.0	0	0
320.0	400.0	0	0
340.0	425.0	0	0
360.0	450.0	0	0
380.0	475.0	0	0
400.0	500.0	0	0
420.0	525.0	0	0
440.0	550.0	0	0
460.0	575.0	0	0
480.0	600.0	0	0
500.0	625.0	0	0
520.0	650.0	0	0
540.0	675.0	0	0
560.0	700.0	0	0
580.0	725.0	0	0
600.0	750.0	0	0

Table 6-3. Usable fuel — Main fuel tanks plus RH and LH supplementary tanks (for JP5 / JET A / JET A-1) (Cont.d)

Weight (kg)	Capacity l (0.8 kg/l)	BL (mm)	Moment (kgmm)
620.0	775.0	0	0
640.0	800.0	0	0
660.0	825.0	0	0
680.0	850.0	0	0
688.0	860.0	0	0

Table 6-4. Usable fuel — Main fuel tanks plus RH supplementary tank only (for JP5 / JET A / JET A-1)

Weight (kg)	Capacity l (0.8 kg/l)	Arm (mm)	Moment (kgmm)
20.0	25.0	-330	-6600
40.0	50.0	-330	-13200
60.0	75.0	-330	-19800
80.0	100.0	-330	-26400
100.0	125.0	-330	-33000
120.0	150.0	-330	-39600
140.0	175.0	-236	-33040
160.0	200.0	-165	-26400
180.0	225.0	-110	-19800
200.0	250.0	-66	-13200
220.0	275.0	-30	-6600
240.0	300.0	0	0
260.0	325.0	15	3900
280.0	350.0	28	7840
300.0	375.0	40	12000
320.0	400.0	49	15680
340.0	425.0	58	19720
360.0	450.0	66	23760
380.0	475.0	73	27740
400.0	500.0	79	31600
420.0	525.0	79	33180
440.0	550.0	75	33000
460.0	575.0	72	33120
480.0	600.0	69	33120
500.0	625.0	66	33000
520.0	650.0	64	33280
540.0	675.0	61	32940
560.0	700.0	59	33040

SECTION 8 - HANDLING AND SERVICING

SERVICING

SUPPLEMENTARY FUEL TANKS

Table 8-1. Supplementary fuel tanks servicing

	RH FUEL CELL	LH FUEL CELL
CAPACITY	105 LITERS	160 LITERS
USABLE	105 LITERS	160 LITERS

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ROTOR BRAKE

The Rotor Brake P/N 109-0811-87 consists of a cockpit lever commanded by the pilot that, through a mechanical cable, moves a hydraulic pump. This pump delivers hydraulic pressure through a flexible hose to a calliper acting on a disk secured to a dedicated pad on the main gear box.

The rotor brake system permits a rapid deceleration of the rotor after the engine shutdown.

The rotor brake operation is indicated by the activation of the RTR BRK ON warning message on EDU1 while any malfunction of the warning system is indicated by the activation of the ROTOR BRK caution message on EDU1.

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ROTOR BRAKE

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SECTION 1 - LIMITATIONS

CENTER OF GRAVITY LIMITATIONS

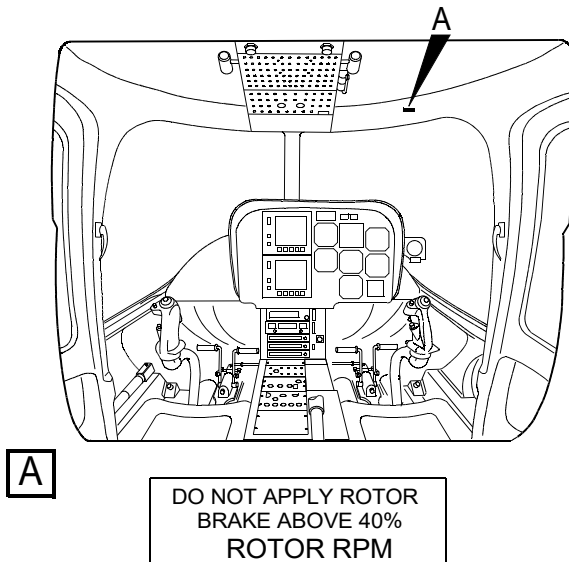
After rotor brake installation the new empty weight and C.G. location must be determined .

ROTOR BRAKE LIMITATIONS

The rotor brake application is limited to ground operations and shall be applied after engine shutdown and rotor RPM (NR) below 40%.

Engine starting with rotor brake on is prohibited.

PLACARDS



ICN-19-A-155010-G-A0126-11001-B-01-1

Figure 1-1. Placard

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 6 (Fuselage - LH side)

Rotor brake pump, flexible hose,
calliper : Check for condition and leaks.

Transmission oil : Correct level. Door secured.

Note

If rotor brake has been used, the oil level indication could be lower than the actual level.

When the oil level is below the minimum level mark, the determination of the correct amount of oil, required to top up the transmission, can be made only after a shutdown without operating the rotor brake.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

Transmission oil : Correct level. Door secured.

Note

If rotor brake has been used, the oil level indication could be lower than the actual level.

When the oil level is below the minimum level mark, the determination of the correct amount of oil, required to top up the transmission, can be made only after a shutdown without operating the rotor brake.

ENGINE PRE-START CHECK

- | | |
|-------------------|--|
| Rotor brake lever | : Move from OFF to ON. Check for freedom of movement. |
| EDU 1 | : Verify that the RTR BRK ON warning message activates. |
| Rotor brake lever | : Select OFF. Check locked and warning message on EDU1 extinguished. |

Note

The ROTOR BRK caution message can be temporarily displayed on EDU1 during the rotor brake lever travel.

STARTING PROCEDURE

ENGINE START



The rotor brake must be disengaged before starting.

SHUTDOWN

- | | |
|-------------------|---|
| Rotor brake lever | : ON and locked below 40% rotor RPM. RTR BRK ON warning message displayed on EDU 1. |
|-------------------|---|



In case of use of rotor brake outside the limitations any further use of the system is prohibited until maintenance checks have been carried out.

POST FLIGHT CHECK

- | | |
|-------------------|-------------------|
| Rotor brake lever | : OFF and locked. |
|-------------------|-------------------|

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

WARNING MESSAGE (RED)

Panel wording	Fault condition	Corrective action
RTR BRK ON	Rotor brake in operation	Check rotor brake lever position. <u>In flight:</u> - if the lever is in the OFF position land immediately. - if the lever is not in the OFF position, set it to OFF and land immediately. <u>On ground:</u> - if the lever is in the OFF position, shut down the engine immediately. - if the lever is not in the OFF position, set it to OFF and shut down the engine immediately.

CAUTION MESSAGE (YELLOW)

Panel wording	Fault condition	Corrective action
ROTOR BRK	Rotor brake warning system degraded.	Proceed with flight without operating the rotor brake and correct malfunction before next flight. Refer to Maintenance Manual for proper action.

SECTION 4 - PERFORMANCE DATA

No change.

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For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

E.M.T. EMERGENCY MEDICAL TRANSPORTATION

The Emergency Medical Transportation P/N 109-0812-34 provides the possibility to convert the Utility Interior Arrangement P/N 109-0812-30-101 configured helicopters into an E.M.T. interior. This interior, obtained by removing the seats cushions and by folding the seat back panel to provide the supporting structure at which a standard litter can be fitted, allows the transportation, in an emergency situation, of an injured person.

The litter is positioned on the left hand side of passengers compartment. The E.M.T. interior provides also seats for up to four (4) passengers into the passengers compartment.

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E.M.T. EMERGENCY MEDICAL TRANSPORTATION

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SECTION 1 - LIMITATIONS

TYPE OF OPERATION

The helicopter in EMT configuration permits rescue and transportation of injured people.

REQUIRED EQUIPMENT

The E.M.T. requires the installation of the Utility Interior Arrangement P/N 109-0812-30-101.

FLIGHT CREW

The minimum flight crew consists of one pilot and one attendant; both of whom shall be trained in and capable of assisting in litter patient emergency evacuation procedures.

NUMBER OF SEATS

Seven (7) - including the pilot and the litter patient.

FLIGHT WITH PASSENGER CABIN DOORS OPEN OR REMOVED

Operation with passenger cabin doors open or removed is prohibited when patient is on board.

CENTER OF GRAVITY LIMITATIONS

After E.M.T. interior installation the new empty weight and CG location must be determined.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N°7 (Cabin interior)

E.M.T. interior	: Check for condition.
Cabin seats and litter	: Check for condition and straps fastened if unoccupied.

PILOT PRE-FLIGHT CHECK

(Every flight)

E.M.T. interior	: Check for condition.
Cabin seats and litter	: Check for condition and straps fastened if unoccupied.

LITTER OPERATIONS

LITTER LOADING

- secure patient to the litter using the three straps provided;
- unlock and lower the back of the central aft seat;
- load the litter from the left door;
- secure litter to the inboard locks;
- raise the back of the central aft seat and lock.

LITTER UNLOADING

- unlock and lower the back of the central aft seat;
- unlock the litter from the locks;
- unload the litter from the left door.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

EVACUATION THROUGH EMERGENCY EXITS

Unstrap the patient and evacuate either through the LH or RH emergency exits.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

LITTER ARM

Longitudinal	: 3050 mm (120 inches) from STA 0.
Lateral (left)	: 410 mm (16.1 inches) from the helicopter plane of symmetry.

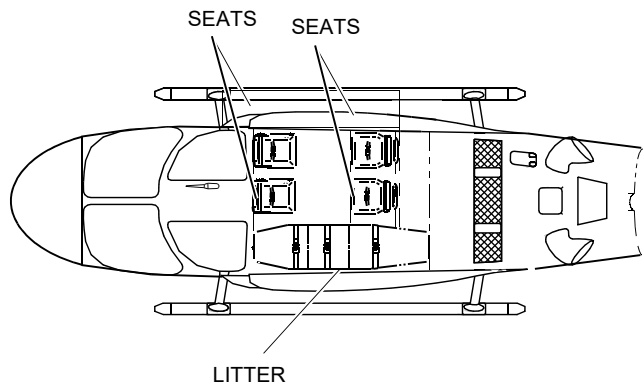
FORWARD SEATS ARM

Longitudinal	: 2455 mm (96.6 inches) from STA 0.
Lateral, inboard seat	: BL 0.
Lateral, outboard seat	: 410 mm (16.1 inches) from the helicopter plane of symmetry.

AFT SEATS ARM

Longitudinal	: 3200 mm (126 inches) from STA 0.
Lateral, inboard seat	: BL 0.
Lateral, outboard seat	: 410 mm (16.1 inches) from the helicopter plane of symmetry.

SECTION 7 - SYSTEM DESCRIPTION



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Figure 7-1. E.M.T. Interior Arrangement

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**EASA Approval with TCDS N° R.005
dated 11 June 2007**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

E.M.S. EMERGENCY MEDICAL SERVICE

The Emergency Medical Service P/N 109-0811-70, for emergency, rescue and ambulance operation, may be equipped as follows:

- -147 consists of a litter, a medical storage chest and three seats: two in the cabin aft position, fixed, facing forward and one, swiveling type, that can either be installed facing aft, with laterally sliding capability, or facing forward in the central position. The E.M.S. is completed with panels, at the upper side of lateral and aft walls, for medical devices and lights. The litter, when installed, is equipped with three straps and is mounted longitudinally in the left hand side of the cabin.
- -153 consists of a second litter, installed on the right hand side of the cabin, in conjunction with E.M.S. P/N 109-0811-70-147.
- -157 is the same as -147 except for its compatibility with the RH Supplementary fuel tank installation P/N 109-0811-49-201.

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The E.M.S. includes an intercommunication system for the patient attendants. A specific swivel based seat in the copilot position is provided. The seat may be positioned forward facing to be used by a copilot or it may be swiveled to face into the cabin to be used by a medical attendant.



All medical equipment incorporating electronic devices must satisfy the electromagnetic compatibility requirements.

Note

For E.M.S. P/N 109-0811-70, the electromagnetic compatibility has been verified with the following equipment:

- Lifepak 12 defibrillator plus monitor P/N VLP 12-02-000412
- HEART START P/N M5518A Model BVS1207503DCN power supplier for Lifepak 12 defibrillator
- HEART START 4000 defibrillator plus monitor P/N M5500B
- Oxylog 2000 pulmonary ventilator P/N 8411790
- IVAC P7000 syringe infusion pump P/N 7001FAUUN2
- MED SYSTEM III syringe infusion pump P/N 2866AXC 1EE
- LSU Laerdal suction unit P/N 78000
- OXIPAC 2500 pulse oximeter P/N 2M8G473

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E.M.S. EMERGENCY MEDICAL SERVICE

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SECTION 1 - LIMITATIONS

TYPE OF OPERATION

The helicopter in E.M.S. configuration permits rescue and ambulance operation under day and night VFR operation, in non-icing conditions.

FLIGHT CREW

The minimum flight crew consists of one pilot and one attendant, both of whom shall be trained in and capable of assisting in litter patient emergency evacuation procedures.

NUMBER OF OCCUPANTS

Six (6) - including the pilot and litter patient(s).

FLIGHT WITH PASSENGER CABIN DOOR OPEN OR REMOVED

Operation with passenger cabin doors open or removed is prohibited when patient is on board.

CENTER OF GRAVITY LIMITATIONS

After E.M.S. installation the new empty weight and CG location must be determined.

MISCELLANEOUS LIMITATIONS

DEFIBRILLATOR OPERATING LIMITATIONS (IF INSTALLED)

The use of handle type electrodes is prohibited in flight.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 7 (Cabin interior)

Cabin seats and litter(s) : Check for condition and straps fastened if unoccupied.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

Cabin seats and litter(s) : Check for condition and straps fastened if unoccupied.

LITTER OPERATIONS

LITTER(S) LOADING

- Secure patient(s) to the litter using the three straps provided;
- unlock and raise the central aft seat;
- load left litter from LH door and right litter (if installed) from RH door, and ensure the patient is head forward oriented;
- secure litter(s) to the locks.

LITTER(S) UNLOADING

- Unlock and raise the central aft seat;
- unlock the litter(s);
- unload the left litter from LH door and right litter (if installed) from RH door.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

EVACUATION THROUGH EMERGENCY EXITS

Unstrap the patient(s) and evacuate either through the LH or RH emergency exit.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

LITTER ARM

Longitudinal	: 3050 mm (120 inches) from STA 0.
Lateral (left)	: 410 mm (16.1 inches) from the helicopter plane of symmetry.

LITTER ARM (-153 ONLY)

Longitudinal	: 3050 mm (120 inches) from STA 0.
Lateral (right)	: 410 mm (16.1 inches) from the helicopter plane of symmetry.

FORWARD SEAT ARM (-147 AND -157)

Forward position

Longitudinal	: 2150 mm (84.6 inches) from STA 0.
Lateral	: 0 to 410 mm (15.1 inches) (right) from helicopter plane of symmetry.

Central position

Longitudinal	: 2520 mm (99.2 inches) from STA 0.
Lateral	: BL 0.

FORWARD SEAT ARM (-153 ONLY)

Longitudinal : 2150 mm (84.6 inches) from
STA 0.

Lateral : BL 0.

AFT SEAT ARM (-147 AND -157)

Longitudinal : 3200 mm (126 inches) from
STA 0.

Lateral, inboard seat : BL 0.

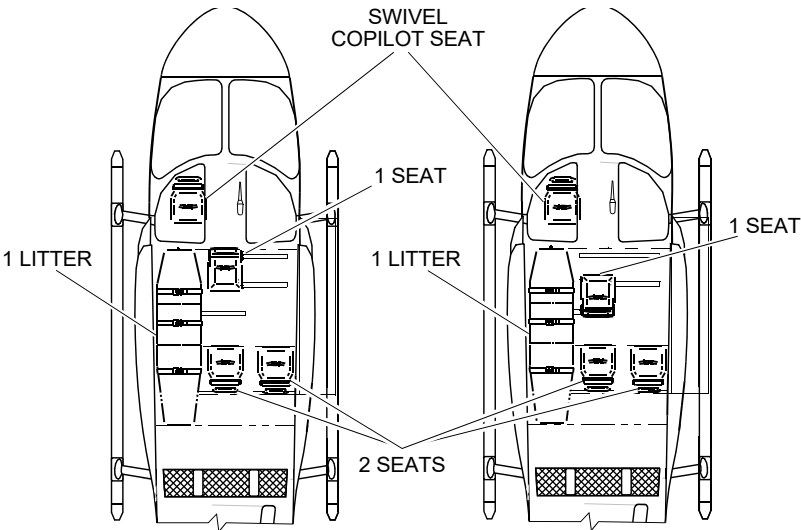
Lateral, outboard seat : 410 mm (16.1 inches) (right)
from the helicopter plane of
symmetry.

AFT SEAT ARM (-153 ONLY)

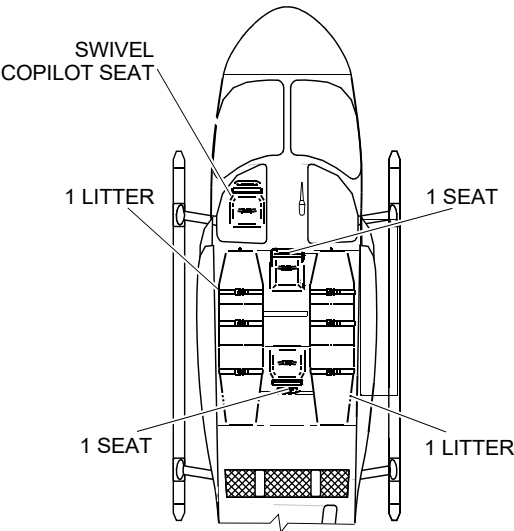
Longitudinal : 3200 mm (126 inches) from
STA 0.

Lateral : BL 0.

SECTION 7 - SYSTEM DESCRIPTION



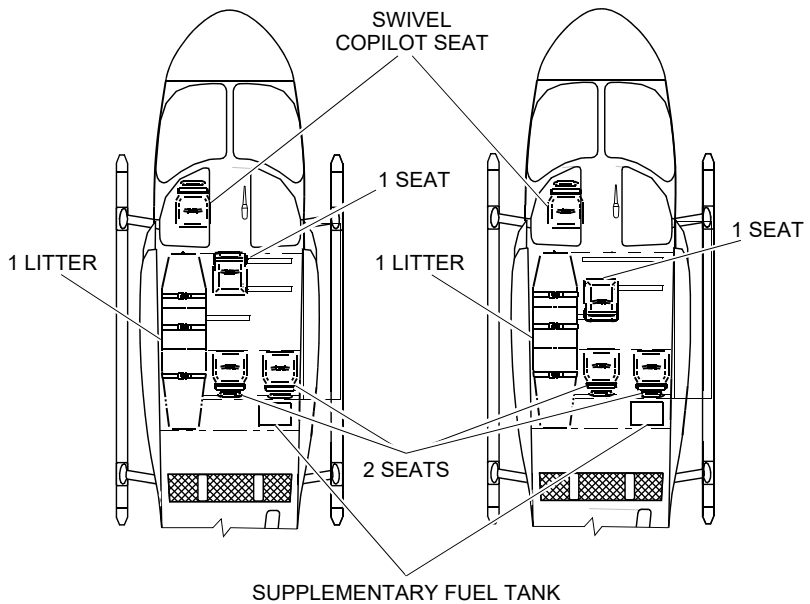
E.M.S. P/N 109-0811-70-147



E.M.S. P/N 109-0811-70-153

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Figure 7-1. (sheet 1 of 2). E.M.S. Interior Arrangement



E.M.S. P/N 109-0811-70-157

ICN-19-A-155012-G-A0126-71002-A-01-1

Figure 7-1. (sheet 2 of 2). E.M.S. Interior Arrangement

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dated 11 June 2007**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

GPS/COMM SYSTEM GARMIN GNC 250 XL

The GPS/COMM Garmin GNC 250 XL system P/N 109-0772-18 consists of a GPS antenna fitted on the top of the upper vertical fin, a VHF-AM antenna located on fuselage underside and a receiver installed in the front console of the cockpit. A built-in battery pack integral with the receiver will continue to power the GPS/COMM for up to two hours in the event of an aircraft power failure.

The GPS/COMM provides both navigational data and communication capabilities (VHF 2). As a navigational source it provides position, course, speed, status and flight planning information. As a communication source it operates in the VHF band from 118.000 to 136.975 MHz, in 25 kHz steps (760 channels).

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GPS/COMM SYSTEM
GARMIN GNC 250 XL

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SECTION 1 - LIMITATIONS

CENTER OF GRAVITY LIMITATIONS

After GPS/COMM installation the new empty weight and CG location must be determined.

SECTION 2 - NORMAL PROCEDURES

SYSTEM CHECK

Note

For a correct and complete use of GPS/COMM Garmin GNC 250 XL, refer to Garmin GNC 250 XL Pilot's Guide, publication No 190-00067-60 Rev. A or latest.

Power/volume knob (on bottom
left of receiver)

: Turn clockwise to mid-range.

Welcome page

: Displayed; self test in progress.

Database page

: Displayed; press ENT key to
acknowledge information.

Satellite status page

: Displayed.

After a successful self-test:

Message page

: "Ready for navigation" appears.

On completion of self-test:

Power/volume knob (on bottom
left of receiver)

: As desired.

BEFORE TAKE-OFF

GPS/COMM receiver : Set as required.

IN FLIGHT

GPS/COMM receiver : Set as required for enroute or
direct to navigation/
communication frequencies.

Note

To automatically tune emergency channel frequency (121.50 MHz), press and hold the <> key for more than two seconds.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

ELECTRICAL POWER FAILURE

In the event of an electrical failure with consequent power loss, the GPS/COMM will automatically revert to its built-in battery pack. To continue navigation/communication with the GPS/COMM, the pilot must press any key when the power down page appears.

The GPS/COMM will continue to operate for approximately two hours.

Failure of the generator and d.c. bus

Note

The helicopter battery will supply the GPS/COMM (VHF No. 2) for the following duration:

- 15 minutes RX;
- 3 minutes TX.

SECTION 4 - PERFORMANCE DATA

No change.

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The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

OXYGEN SYSTEM

The helicopter in E.M.S. configuration can be provided with the oxygen system P/N 109-0811-76 that can contain up to 2200 liters of compressed oxygen supplied by a bottle of 16.5 liters, installed in the baggage compartment.

The oxygen is provided at a pressure of 70 psi and may be shut-off by means of a knob mounted on the left hand side of the pilot overhead panel.

Note

The oxygen system must be used in conjunction with E.M.S. P/N 109-0811-70.

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OXYGEN SYSTEM

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SECTION 1 - LIMITATIONS

TYPE OF OPERATION

The helicopter with the oxygen system and E.M.S. permits rescue and ambulance operation under day and night VFR operation, in non-icing conditions.

CENTER OF GRAVITY LIMITATIONS

After oxygen system installation the new empty weight and CG location must be determined.

MISCELLANEOUS LIMITATIONS

Smoking is prohibited with the oxygen system installed.

BAGGAGE COMPARTMENT LIMITATIONS

Maximum load : 138 kg (304 lb).

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 2 (Fuselage - RH side)

Utility access door to the oxygen
bottle socket : Secured.

OXY H.P. RELIEF green
indicator plug : Check in position.

Note

If the OXY H.P. RELIEF green indicator plug is not in position, the oxygen bottle is discharged.

AREA N° 6 (Fuselage - LH side)

Baggage compartment : Check the oxygen bottle fairing
is properly secured.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

Utility access door to the oxygen
bottle socket : Secured.

OXY H.P. RELIEF green
indicator plug : Check in position.

Note

If the OXY H.P. RELIEF green indicator plug is not in position, the oxygen bottle is discharged.

Baggage compartment : Check the oxygen bottle fairing
is properly secured.

ENGINE PRE-FLIGHT CHECK

OXYGEN MANUAL SHUT-OFF
knob : Check in closed position (IN).

EDU1 : OXYGEN OPEN advisory message out.

OXYGEN SYSTEM OPERATIONS

OXYGEN MANUAL
SHUT-OFF knob : Open (OUT).

EDU1 : OXYGEN OPEN advisory message displayed.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

WARNING SYSTEM

CAUTION MESSAGES (YELLOW)

Panel wording	Fault condition	Corrective action
UTIL DOOR	The utility access door to the oxygen bottle socket is not correctly closed.	Close utility door correctly before flight. If the message illuminates in flight reduce speed below 70 KIAS and land as soon as practicable.

In emergency, pilot(s) must close the shut-off valve of the oxygen supply system through the OXYGEN MANUAL SHUT-OFF knob on the overhead panel (OXYGEN OPEN advisory message extinguished on EDU1).

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

ALLOWABLE BAGGAGE LOAD

The baggage compartment is divided in five zones. In Figure 6-1, the maximum baggage load for each zone is presented. The maximum allowable baggage load is 138 kg.

The following table defines the baggage moments for each zone. The maximum allowable baggage moment is 676000 kgmm.

Table 6-1. Baggage moment

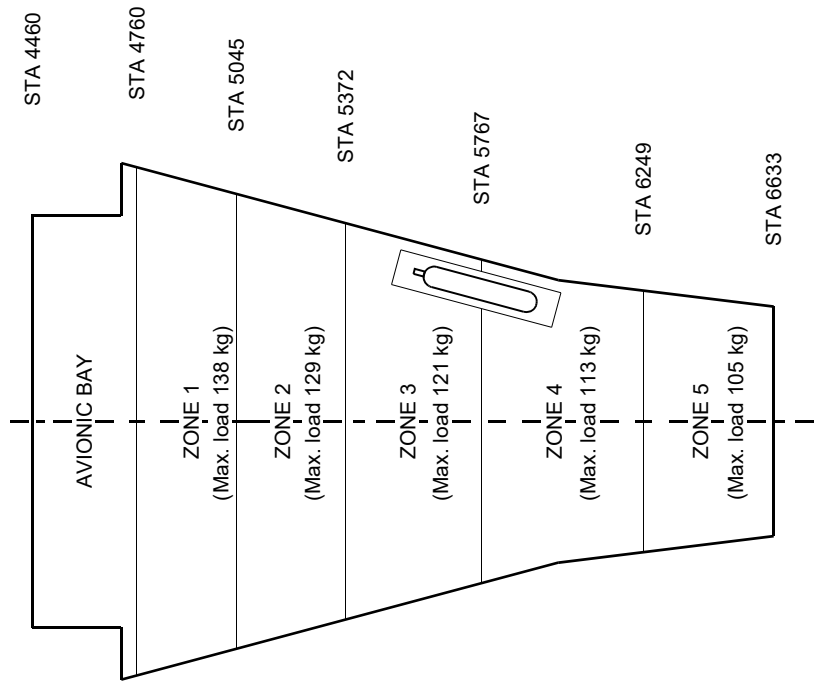
	ZONE 1 Arm 4880	ZONE 2 Arm 5240	ZONE 3 Arm 5560	ZONE 4 Arm 5960	ZONE 5 Arm 6430
Baggage load (kg)	Baggage moment (kgmm)				
10	48800	52400	55600	59600	64300
20	97600	104800	111200	119200	128600
30	146400	157200	166800	178800	192900
40	195200	209600	222400	238400	257200
50	244000	262000	278000	298000	321500
60	292800	314400	333600	357600	385800
70	341600	366800	389200	417200	450100
80	390400	419200	444800	476800	514400
90	439200	471600	500400	536400	578700
100	488000	524000	556000	596000	643000
105	512400	550200	583800	625800	675150
110	536800	576400	611600	655600	
113	551440	592120	628280	673480	
120	585600	628800	667200		
121	590480	634040	672760		
125	610000	655000			
129	629520	675960			
135	658800				
138	673440				

An example of baggage loading is provided below; the total baggage moment shall be less than 676000 kgmm.

Table 6-2. Example of baggage loading

	Weight (kg)	Moment (kgmm)
ZONE 1	50	244000
ZONE 2	40	209600
ZONE 3	20	111200
ZONE 4	10	59600
ZONE 5	—	—
TOTAL	120	624400

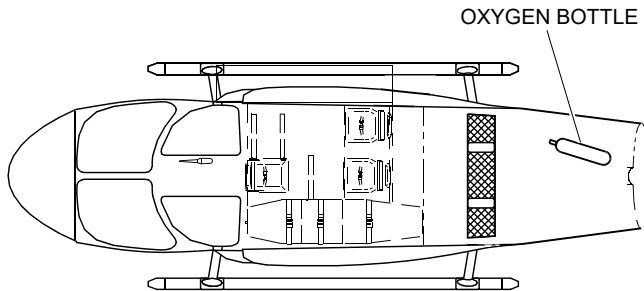
The total baggage load and moment calculated above are less than the maximum allowable.



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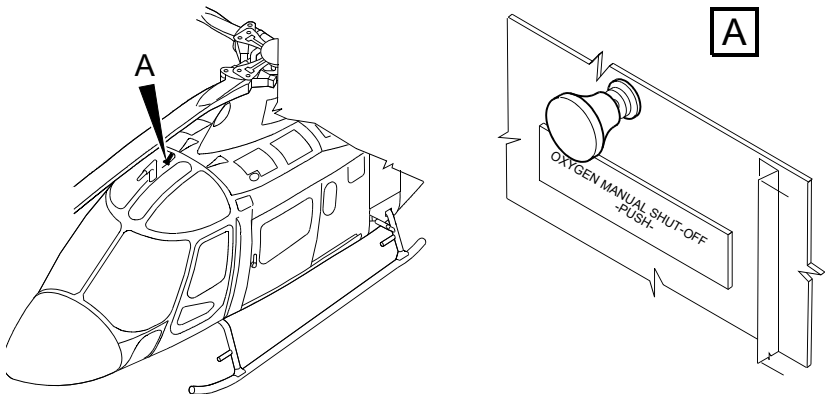
Figure 6-1. Baggage Loading Zones

SECTION 7 - SYSTEM DESCRIPTION



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Figure 7-1. Oxygen Bottle



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Figure 7-2. Oxygen Manual Shut-Off Knob

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The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

PULSED CHIP DETECTOR

The Pulsed Chip Detector system P/N 109-0813-78 enables the pilot to burn the particles collected by the chip detectors of the lubricating system located inside the main transmission, the tail rotor gearbox and the reduction gearbox of the engine.

The presence of particles on the chip detectors is indicated by the activation of the XMSN OIL CHIPS, T/R BOX CHIPS and ENG RGB CHIPS caution lights.

The Pulsed Chip Detector is activated by means of the CHIP BURNER switch located on the overhead panel.

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PULSED CHIP DETECTOR

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SECTION 1 - LIMITATIONS

No change.

SECTION 2 - NORMAL PROCEDURES

No change.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

WARNING SYSTEM

CAUTION MESSAGES (YELLOW)

Panel wording	Fault condition	Corrective action
ENG RGB CHIPS	Presence of metal particles in engine reduction gearbox oil.	Activate CHIP BURNER switch momentarily and release. It is permitted to activate the CHIP BURNER up to 3 times to clear a chip. If the message does not extinguish, reduce power and land as soon as possible. Maintenance action is required before next flight.

Panel wording	Fault condition	Corrective action
XMSN OIL CHIPS	Presence of metal particles in main transmission oil.	Activate CHIP BURNER switch momentarily and release. It is permitted to activate the CHIP BURNER up to 3 times to clear a chip. If the message does not extinguish, reduce power and land as soon as possible. Maintenance action is required before next flight.
T/R BOX CHIPS	Presence of metal particles in tail rotor gearbox oil.	Activate CHIP BURNER switch momentarily and release. It is permitted to activate the CHIP BURNER up to 3 times to clear a chip. If the message does not extinguish, reduce power and land as soon as possible. Maintenance action is required before next flight.

PULSED CHIP DETECTOR ACTIVATION

A maximum of 3 chips for each detector can be cleared per flight. On the 4th activation of the same chip caution light **land as soon as possible**. Make an appropriate log book entry for each message activation.



The use of engine or main transmission pulsed chip detector when the relative oil pressure is below the limits is prohibited.

Note

The pulsed chip detector shall not be used to suppress a chip detector caution light when the aircraft is on the ground.

SECTION 4 - PERFORMANCE DATA

No change.

**EASA Approval Letter No. 10034526
dated 18 April 2011**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

BATTERY IN BAGGAGE COMPARTMENT

The battery installation P/N 109G2406R01 consists of the battery relocation from the nose compartment to the baggage compartment and a ballast installation in lieu of the battery in the nose compartment.

The installation includes a dedicated access door and the external power receptacle on the right side of the fuselage.

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BATTERY IN BAGGAGE COMPARTMENT

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SECTION 1 - LIMITATIONS

CENTER OF GRAVITY LIMITATIONS

After the battery relocation, in some loading conditions the longitudinal CG limitation can be exceeded, verify if ballast is necessary to remain in the approved longitudinal CG limits.

MISCELLANEOUS LIMITATIONS

NOSE COMPARTMENT LIMITATIONS

Maximum ballast load : 35 kg (77 lb).

BAGGAGE COMPARTMENT LIMITATIONS

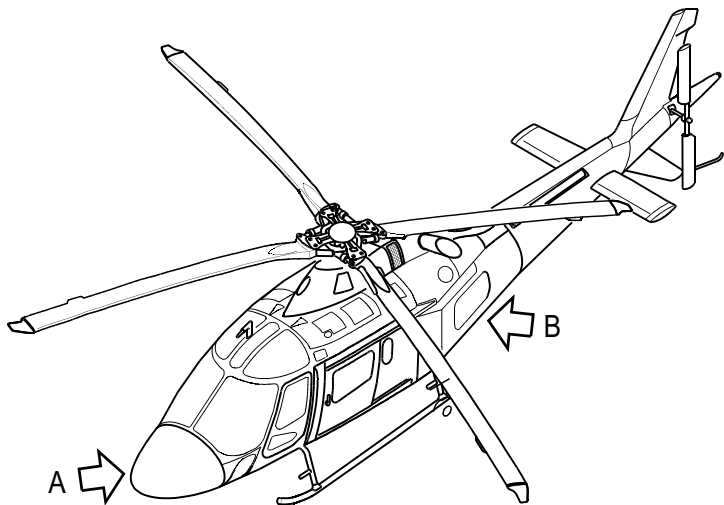
Maximum load..... : 120 kg (110 lb)

Maximum unit load..... : 500 kg/m² (102 lb/sq ft)

Note

Refer to Section 6, Weight and Balance, for load distribution.

PLACARDS



A NOSE COMPARTMENT

MAXIMUM ALLOWABLE BALLAST LOAD 35 KG (77 LB)

B BAGGAGE COMPARTMENT

MAXIMUM ALLOWABLE BAGGAGE LOAD					
ZONE	1	2	3	4	5
KG (LB)	120 (264)	110 (242)	102 (224)	93 (205)	84 (185)
MAXIMUM TOTAL LOAD 120 KG (264 LB)					
MAX UNIT FLOOR LOADING 500 KG/M2(102 LB/SQ.FT.)					
ALL CARGO MUST BE SECURED					
MAX LOAD PER TIE DOWN RING 91KG (200 LB)					

ICN-19-A-155016-G-A0126-01001-A-01-1

Figure 1-1. Placards

SECTION 2 - NORMAL PROCEDURES

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

Area N°1 (Helicopter Nose)

Nose compartment access door : Open.

Ballast : Check secured.

Nose compartment access door : Secured; fastener security pin out.

Area N°2 (Fuselage - RH side)

Battery compartment access door : Open.

Battery : Secured; connectors secured.

Battery compartment access door : Secured; door latched.

Area N°6 (Fuselage - LH side)

Relay box circuit breakers : IN.
(in battery compartment)

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

No change.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

ALLOWABLE BALLAST LOAD IN THE NOSE

The maximum allowable ballast load in the nose compartment is 35 kg.

The Table 6-1 defines the longitudinal and lateraral ballast moments for the nose comparment.

Table 6-1. Ballast moment

NOSE COMPARTMENT		
Ballast load (kg)	STA 200 mm	BL 57 mm
	Longitudinal moment (kg mm)	Lateral moment (kg mm)
10	2000	570
15	3000	855
20	4000	1140
25	5000	1425
30	6000	1710
35	7000	1995

ALLOWABLE BAGGAGE LOAD

The baggage compartment is divided in five zones. In Figure 6-1, the maximum baggage load for each zone is presented.

The maximum allowable baggage load is 120 kg.

The Table 6-2 defines the longitudinal baggage moments for each zone.

The maximum allowable longitudinal baggage moment is 585600 kg mm.

The Table 6-3 provides an example of baggage loading in conjunction with Figure 6-1.

The total baggage longitudinal moment shall be less than 585600 kg mm.

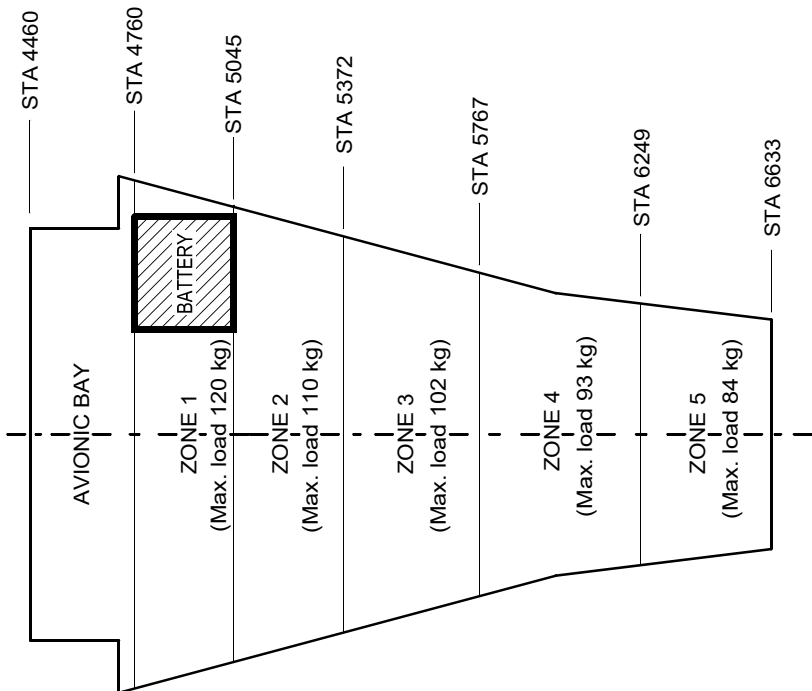
Table 6-2. Baggage moment

Baggage load (kg)	ZONE 1 STA 4880 mm	ZONE 2 STA 5240 mm	ZONE 3 STA 5560 mm	ZONE 4 STA 5960 mm	ZONE 5 STA 6430 mm
	Baggage moment (kg mm)				
10	48800	52400	55600	59600	64300
20	97600	104800	111200	119200	128600
30	146400	157200	166800	178800	192900
40	195200	209600	222400	238400	257200
50	244000	262000	278000	298000	321500
60	292800	314400	333600	357600	385800
70	341600	366800	389200	417200	450100
75	366000	393000	417000	447000	482250
78	380640	408720	433680	464880	501540
80	390400	419200	444800	476800	514400
84	409920	440160	467040	500640	540120
85	414800	445400	472600	506600	
90	439200	471600	500400	536400	
93	453840	487320	517080	554280	
100	488000	524000	556000		
102	497760	534480	567120		
105	512400	550200			
110	536800	576400			
120	585600				

Table 6-3. Example of baggage loading

	Weight (kg)	Moment (kg mm)
Zone 1	50	244000
Zone 2	40	209600
Zone 3	23	127880
Zone 4	—	—
Zone 5	—	—
Total	113	581480

The total baggage load and moment calculated above are less than the maximum allowable.



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Figure 6-1. Baggage Loading Zone

SECTION 7 - SYSTEM DESCRIPTION

The Battery relocation retrofit kit is made by all the equipment part of the basic electrical installation located in the baggage compartment in lieu of in the nose compartment as per standard configuration. The only purpose of this modification is to move the helicopter CG location in a rear position, but there are no changes in terms of normal and emergency procedures and performances.

The battery access door is in the right side of the helicopter together with the external power receptacle access door; also the relay box is moved in the rear avionic bay, visible through a dedicated window in the avionic bay panel (refer to figure 7-1). The DC generation system schematic diagram remain the same of the basic installation (refer to figure 7-14 of the Section 7).

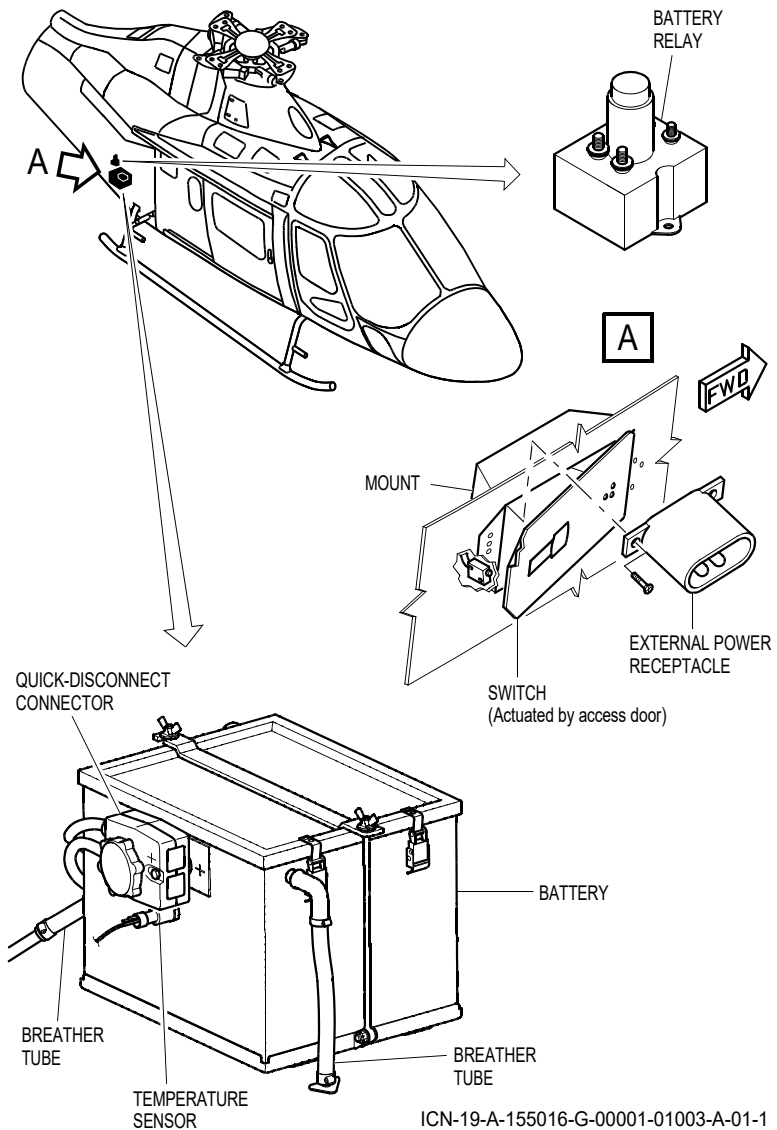


Figure 7-1. Battery in Baggage Compartment - Component Location

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**EASA Approval N° 10031176
dated 26 July 2010**

*The information contained herein supplements the information of the basic Rotorcraft Flight Manual
For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.*

LOW TEMPERATURE OPERATIONS

The contents of this Supplement include the information to be complied with for operating the AW119 MKII helicopter in Low Temperature (-25 °C to -35 °C range) ambient conditions.

**ISSUE 1: 26 JULY 2010
REVISION 3: 2 DECEMBER 2022**

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—	Issue 1	EASA Approval N° 10031176 dated 26 July 2010
1	Revised pages Title page, A-1, B-1, i and 2 of 8.	EASA Approval N° 10033985 dated 24 February 2011
2	Revised pages Title page, A-1, B-1 and 6 of 8.	EASA Approval N° 10039252 dated 20 April 2012
3	Revised pages Title page, A-1, B-1, 1 and 6 of 8.	EASA Approval N° 10080801 dated 02 December 2022

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SECTION 1 - LIMITATIONS

TYPE OF OPERATION

The AW119 MKII is approved for low temperature operations (-25 °C to -35 °C range) provided that the following equipments are fitted:

- Bleed Air Heater P/N 109-0811-60;
- Pilot collective control stick P/N 109-0010-81-201;
- Co-pilot collective control stick P/N 109-0010-81-205 (only if the Dual Controls kit P/N 109-0810-01 is installed);
- 28 Ah Marathon battery (P/N 31995-002);
- Vne placard P/N 109-0740L37-115.
- Portable Fire Extinguisher P/N 109-0810-11-211/-217/-219.

AIRSPEED LIMITATIONS

V_{NE} (Power-ON/OFF) : See Figure 1-1.

Minimum airspeed in autorotation
(without close external references) : no change.

Maximum airspeed with torque between
100 and 108.5% (take-off power range) : no change.

AMBIENT AIR TEMPERATURE LIMITATIONS

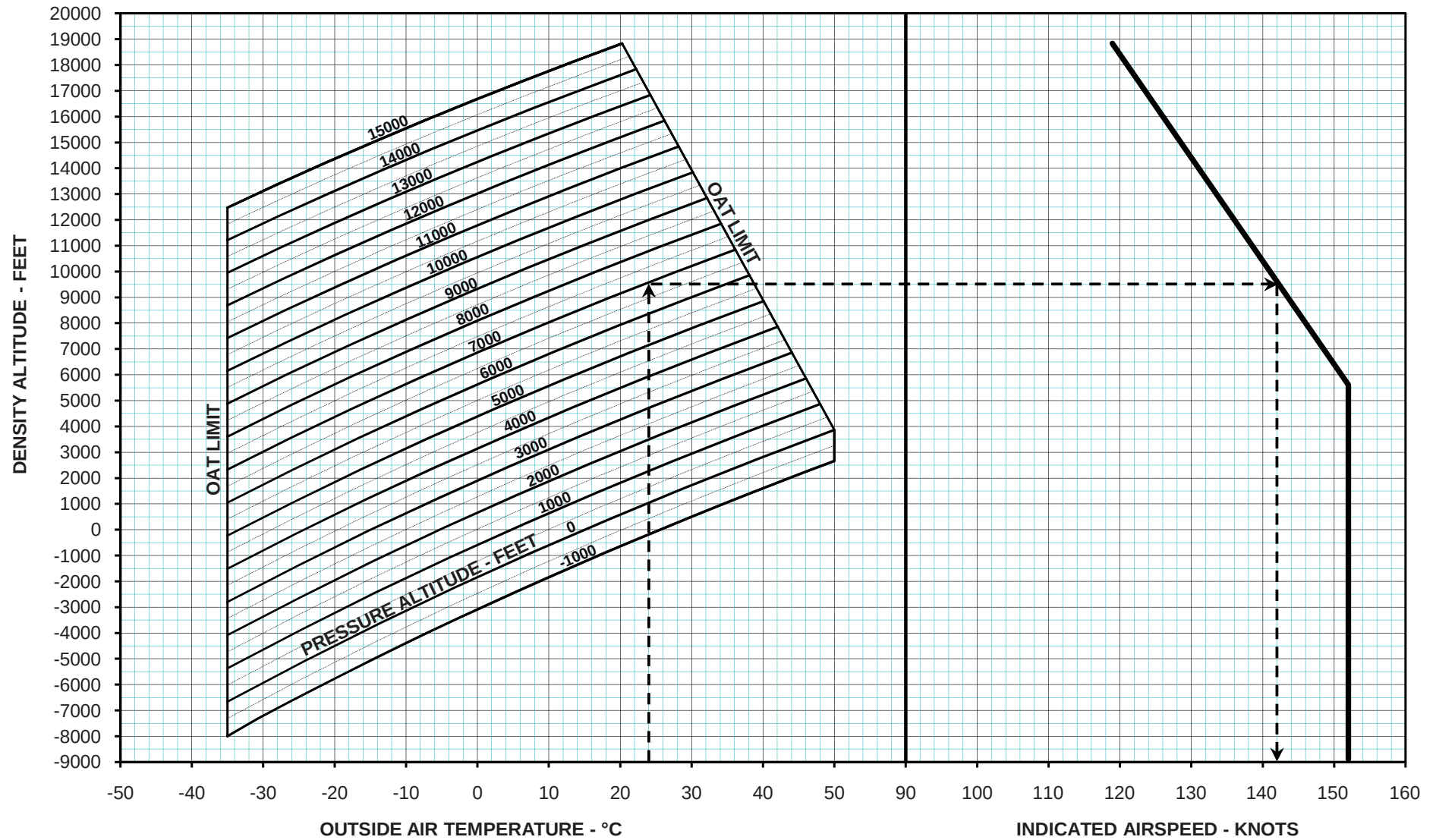
Minimum ambient temperature : -35 °C (refer to Figure 1-1).

HYDRAULIC SYSTEM LIMITATIONS

APPROVED FLUIDS

The following hydraulic fluid is approved:

MIL-PRF-5606.



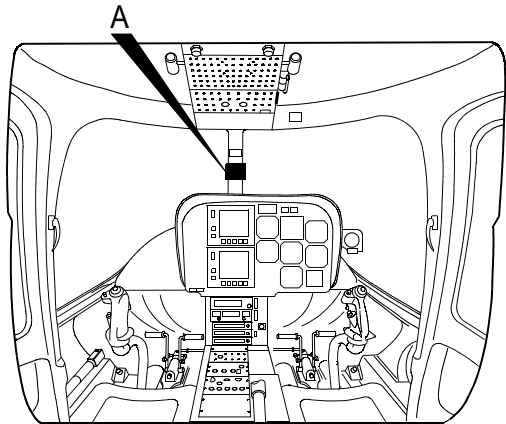
109G0290T208/2 Rev. A

ICN-19-A-155018-A0126-00002-A-01-1

Figure 1-1. Airspeed Limitation - V_{NE} (power on/off)

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PLACARDS



A

Vne AIRSPEED LIMITATIONS - KIAS						
Hp ft OAT °C	-1000 TO SL	3000	6000	9000	12000	15000
50	152	-	-	-	-	-
40	152	150	-	-	-	-
30	152	152	143	134	-	-
20	152	152	146	137	128	119
10	152	152	149	140	131	121
0	152	152	152	143	133	124
-10	152	152	152	146	136	127
-20	152	152	152	149	139	130
-30	152	152	152	150	141	133
-35	152	152	152	150	144	135

ICN-19-A-155018-G-A0126-00001-A-01-1

Figure 1-2. Placard in Clear View of the Pilot

SECTION 2 - NORMAL PROCEDURES

COLD WEATHER OPERATIONS

Store the battery in a warm place during prolonged helicopter inactivity.

In addition, the engine inlet cover P/N 109-0702-86 shall be installed if the H/C is exposed to overnight cold soak.

STARTING PROCEDURE

ENGINE START

CAUTION

During cold starting conditions, the transmission oil pressure can temporarily rise up to 100 psi; leave the engine throttle at IDLE until the pressure returns in the continuous operation range as oil temperature increases.

CAUTION

During engine start after cold soak, a temporary blanking of the engine oil pressure can occur (three dashes instead of digital readout). Pilot has to monitor that engine oil pressure return into green arc within a maximum of 5 minutes, otherwise shutdown engine.

Note

If GPS/COMM system GNC250XL or GPS/NAV/COMM system GNS430AW is installed, wait for warm-up period after light-up.

CAUTION

For ambient temperatures below -25 °C let hydraulic fluids to warm-up, leaving the engine throttle at IDLE, for a period of 1 minute for every Celsius degree of OAT below -25 °C.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

No change.

SECTION 4 - PERFORMANCE DATA

No change.

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**EASA Approval with Letter N° 10031065
dated 26 July 2010**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

DIGITAL AWG WITH DH TONE

The digital Aural Warning Generator (AWG) Installation Kit P/N 109-B811-08-103 provides precursor tones and synthesized voice warning messages through the ICS system.

The digital AWG includes a new audio tone associated to the Radio Altimeter Decision Height (DH) setting, the audio tone advises the pilot when the helicopter passes the DH previously set on the Radio Altimeter Indicator (if installed).

ISSUE 1: 26 JULY 2010
REVISION 1: 14 DECEMBER 2012

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LIST OF REVISIONS

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DIGITAL AWG WITH DH TONE

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SECTION 4 - PERFORMANCE DATA 3 of 4

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SECTION 1 - LIMITATIONS

No change.

SECTION 2 - NORMAL PROCEDURES

ENGINE PRE-START CHECK

Aural Warning Generator test : Set AWG switch on TEST and maintain. Check the aural message "TEST OK" and, after approximately 3 seconds, the AWG FAIL caution message activates and the vocal alarm operates in the following sequence:
"ROTOR LOW"
"ENGINE OUT"
"ENGINE FIRE"
"WARNING"
"ROTOR HIGH"
Audio Tone DH (Decision Height)
"ONE HUNDRED FIFTY FEET".

SYSTEMS CHECK

MISCELLANEOUS

Radio Altimeter (if installed):

Indication : Zero altitude.

OFF flag : Retracted.

TEST switch : Press and maintain.

DH light : Out.

Needle : 100 ft.

TEST switch : Release.

DH light : On and Audio Tone DH.

TAKE-OFF AND LANDING

To avoid possible overlap with normal ATC communications, during take-off and landing:

DH knob : Set below Zero.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

No change.

SECTION 4 - PERFORMANCE DATA

No change.

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**EASA Approval N° 10039252
dated 20 April 2012**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

GPS/NAV/COMM SYSTEM GARMIN GNS430AW

The GPS/NAV/COMM Garmin GNS430AW system P/N 109-0772-18 consists of a GPS antenna fitted on the top of the upper vertical fin, a VHF-AM antenna located on fuselage underside, two VOR/ILS antennas located on the tail boom sides and a receiver installed in the front console of the cockpit.

The GPS/NAV/COMM provides both navigational data and communication capabilities (VHF 2). As a navigational source it provides position, course, speed, status and flight planning information. As a communication source it operates in the VHF band from 118.000 to 136.975 MHz.

ISSUE 1: 20 APRIL 2012

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GPS/NAV/COMM SYSTEM GARMIN GNS430AW

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SECTION 1 - LIMITATIONS

CENTER OF GRAVITY LIMITATIONS

After installation of the GPS/NAV/COMM Garmin GNS430AW system, the new empty weight and CG location must be determined.

MISCELLANEOUS LIMITATIONS

B-RNAV information provided by the GPS section of the GNS430AW system may be utilized for advisory information only.

Note

The accuracy of the information provided by the GPS data base can not be guaranteed. The Pilot should verify each selected waypoint for accuracy by reference to approved and valid documents.

SECTION 2 - NORMAL PROCEDURES

SYSTEM CHECK

C PWR/VOL/SQ knob

(on top left corner of receiver)

: Turn clockwise to power on the unit and set the desired radio volume.

Welcome page

: Briefly displayed during unit self test, followed sequentially by the Unit Type Page and SW Versions Page.

Depending on unit configuration, the following pages might be sequentially displayed:

- Weather Page;
- Traffic Page;
- Aviation Data Page;
- Land/Terrain/Obstacles Database Page;
- Situational Awareness Page.

After a successful self-test:

Database Confirmation Page : Displayed, showing effective and expiration date of Jeppesen database on the NavData card .

ENT key : Press to acknowledge the Database page and proceed to Panel Self-test Page .

Instrument Panel Self-test Page : Compare on screen indications with information depicted on connected instruments and/or external annunciators.

ENT key : Press again to display Satellite Status Page.

BEFORE TAKE-OFF

GPS/NAV/COMM receiver : Set as required.

IN FLIGHT

GPS/NAV/COMM receiver : Set as required for enroute or direct to navigation/communication frequencies.

Note

To quickly tune and activate the emergency channel frequency (121.50 MHz), press and hold the  key (top left corner) for approximately two seconds.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

SYSTEM FAILURE

NAV SECTION FAILURE

In case of failure of the VOR/ILS section of GNS430AW, the NAV and/or GS failure flags will appear on the HSI.

ELECTRICAL POWER FAILURE

Failure of the generator and d.c. bus

Note

The helicopter battery will supply the GPS/NAV/COMM (VHF No. 2) for the following duration:

- 15 minutes RX;
- 3 minutes TX.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

No change.

SECTION 7 - SYSTEM DESCRIPTION

GENERAL

Note

For a correct and complete use of GPS/NAV/COMM Garmin GNS430AW, refer to 109-00356-00 400W Series Pilot's Guide & Reference.

The GPS/NAV/COMM provides both navigational data and communication capabilities (VHF 2). As a navigational source it provides position, course, speed, status and flight planning information. As a communication source it operates in the VHF band from 118.000 to 136.975 MHz, in 25 KHz or 8.33 KHz spacing for 760 or 2280 channels configuration respectively.

The system includes a control panel (see Figure 7-1) mount unity type located in the front console of the cockpit that integrates the following sections:

- a GPS;
- a VHF/AM transceiver;
- a NAV VOR/LOC/GS with the system tuned in on a LOC frequency the corresponding GS frequency is automatically selected.

GNS430AW KEY AND KNOB FUNCTIONS



Figure 7-1. GNS430AW Control Panel

Table 7-1 GNS430AW Key and Knob Functions

Ref.	Key/Knobs	Function
1	PWR VOL/ PUSH SQ	The COM power/volume knob controls unit power and communications radio volume. Press momentarily to disable automatic squelch control.
2	VOL/ PUSH ID	The VLOC volume knob controls audio volume for the selected VOR/ Localizer frequency. Press momentarily to enable/disable the ident tone.
3	PUSH C/V	The large left knob (COM/VLOC) is used to tune the megahertz (MHz) value (to the left of the decimal point) of the standby frequency for the communications transceiver (COM) or the VLOC receiver, whichever is currently selected by the tuning cursor. The small left knob (COM/VLOC) is used to tune the kilohertz (kHz) value (to the right of the decimal point) of the standby frequency for the communications transceiver (COM) or the VLOC receiver, whichever is currently selected by the tuning cursor. Press this knob momentarily to toggle the tuning cursor between the COM and VLOC frequency fields.

Ref.	Key/Knobs	Function
4	C 	The COM flip-flop key is used to swap the active and standby COM frequencies. Press and hold to select emergency channel (121.500 MHz).
5	V 	The VLOC flip-flop key is used to swap the active and standby VLOC Frequencies.
6		Data Card slot; to use the left for loading the data-base.
7		The range key (RNG) allows you to select the desired map scale. Use the up arrow side of the key to zoom out to a larger area, or the down arrow side to zoom in to a smaller area.
8		The direct-to key provides access to the direct-to function, which allows you to enter a destination waypoint and establishes a direct course to the selected destination.
9	MENU	The MENU key displays a context-sensitive list of options. This options list allows you to access additional features or make settings changes which relate to the currently displayed page.
10	CLR	The clear key (CLR) is used to erase information or cancel an entry. Press and hold this key to immediately display the Default Navigation Page, regardless of which page is currently displayed.
11	ENT	The enter key (ENT) is used to approve an operation or complete data entry. It is also used to confirm information, such as during power on.
12	PUSH CSRS	The large right knob is used to select between the various page groups: NAV, WPT, AUX or NRST. With the on-screen cursor enabled, the large right knob allows you to move the cursor about the page. The small right knob (CRSR) is used to select between the various pages within one of the groups listed above. Press this knob momentarily to display the on-screen cursor. The cursor allows you to enter data and/or make a selection from a list of options.

Ref.	Key/Knobs	Function
13	CDI	The CDI key is used to toggle which navigation source (GPS or VLOC) provides output to an external HSI or CDI.
14	OBS	The OBS key is used to select manual or automatic sequencing of waypoints. Pressing the OBS key selects OBS mode, which will retain the current "active to" waypoint as navigation reference even after passing the waypoint (i.e., prevents sequencing to the next waypoint). Pressing the OBS key again will return to normal operation, with automatic sequencing of waypoints. Whenever OBS mode is selected, may set the desired course to/from a waypoint using the OBS Page, or an external OBS selector on HSI or CDI.
15	MSG	The message key (MSG) is used to view system messages and important warnings and requirements.
16	FLP	The flight plan key (FPL) allows to create, edit, activate and invert flight plans, as well as access approaches, departures and arrivals. A closest point to flight plan feature is also available from the flight plan key.
17	PROC	The procedures key (PROC) allows to select and remove approaches, departures and arrivals from flight plan. When using a flight plan, available procedures for departure and/or arrival airport are offered automatically. Otherwise, may select the desired airport, then the desired procedure.

**EASA Approval N° 10042717
dated 14 December 2012**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

OPERATOR SEAT

The operator seat, installation P/N 109G2520F24, consists of a swivelling and crashworthy seat secured to the longitudinal rails at the centre of passenger cabin floor. The operator seat replaces the forward seat row of the basic helicopter configuration.

**ISSUE 1: 14 DECEMBER 2012
REVISION 1: 2 APRIL 2020**

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OPERATOR SEAT

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SECTION 1 - LIMITATIONS

NUMBER OF SEATS

Three (3) - Including pilots

The use of the aft forward-facing passenger row seats is prohibited.

CENTER OF GRAVITY LIMITATIONS

After the operator seat installation the new empty weight and CG location must be determined.

MISCELLANEOUS LIMITATIONS

OPERATOR SEAT LIMITATIONS

During take-off, landing and whenever the pilot judges necessary for the safety, the operator seat must be locked in forward facing direction, in its rearmost position and with the armrests stowed.

PLACARDS

DURING TAKE-OFF, LANDING AND EMERGENCY CONDITIONS, THE OPERATOR SEAT MUST BE LOCKED IN FORWARD FACING DIRECTION, IN ITS REARMOST POSITION AND WITH THE ARMRESTS STOWED.

In clear view of the operator

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECK

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 7 (Cabin interior)

Operator's seat : Check swivel mechanism for correct operation.
Seat locked in forward facing position.
Safety belts fastened.

BEFORE TAKE-OFF

Operator's seat : Locked in forward facing direction, in its rearmost position and with the armrests stowed.



If the operator seat is occupied, the shoulder harness must be locked in fully retracted position.

IN FLIGHT

Operator's seat : Swivelled and locked as desired.

APPROACH AND LANDING

Operator's seat : Locked in forward facing direction, in its rearmost position and with the armrests stowed.

CAUTION

If the operator seat is occupied, the shoulder harness must be locked in fully retracted position.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

EMERGENCY LANDING

Operator's seat : Aligned in forward facing position and locked, armrests stowed, shoulder harness locked in full retracted position.

SECTION 4 - PERFORMANCE DATA

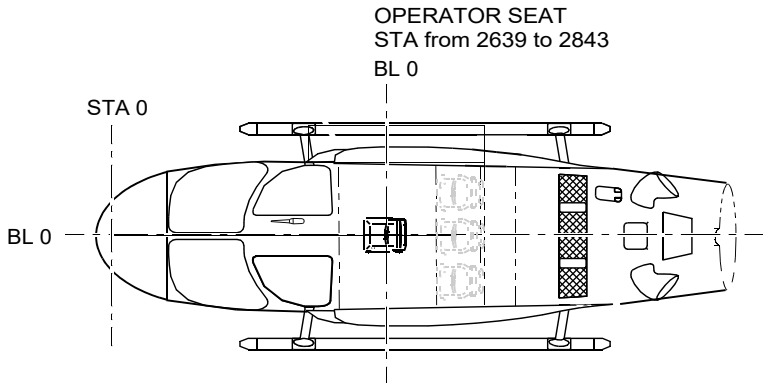
No change.

SECTION 6 - WEIGHT AND BALANCE

DATUM LINE LOCATIONS

Figure 6-1 presents fuselage stations (STA) data to aid in weight and balance computations.

For the calculation of the operator seat moment refer to the "LONGITUDINAL MOMENTS" paragraph of this supplement.



ICN-19-A-155021-G-A0126-01001-A-01-1

Figure 6-1 Helicopter Stations Diagram - Operator Seat

WEIGHTS, ARMS AND MOMENTS

LONGITUDINAL MOMENTS

Weight (kg)	(STA 2741 mm) (*) Moment (kg mm)
60	164460
65	178165
70	191870
75	205575
80	219280
85	232985
90	246690
95	260395
100	274100
105	287805
110	301510
115	315215
120	328920
(*) Adjustable from 2639 to 2843 mm.	

SECTION 7 - SYSTEM DESCRIPTION

GENERAL

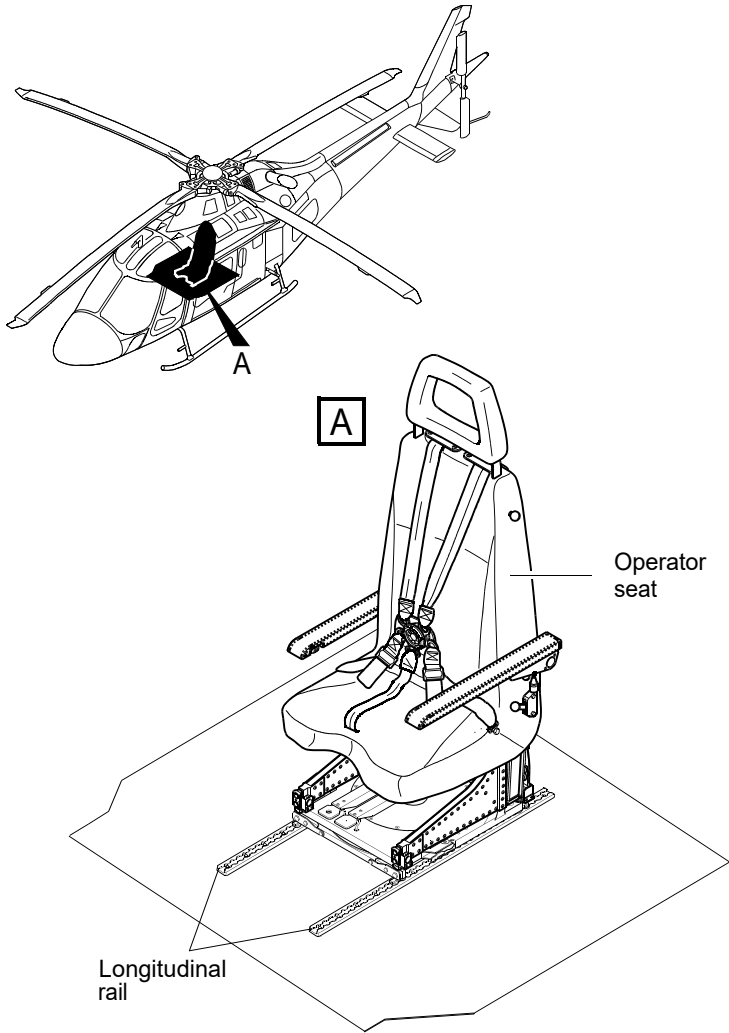
The operator seat installed in the passenger compartment furnishing includes:

- Operator seat
- Longitudinal rails

A typical installation of the operator seat is shown in Figure 7-1.

The seat is equipped with a 5-point safety-belt system, two retractable armrests, a manual lock device for the shoulder harnesses and a recliner lever.

When the operator seat is installed, the aft facing seats row must be removed.



ICN-19-A-155021-G-00005-10001-A-01-1

Figure 7-1. Operator Seat - Component Location

**EASA Approval N° 10042643, REV. 1
dated 14 December 2012**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

HF SYSTEM - TYPE KHF1050

The HF system, type KHF1050 P/N 109G2310F13, is used for long distance communications in the 2 to 29.999 MHz frequency range in 1 KHz increments. The system, connected to the I.C.S., provides two-way voice radio communications in USB (voice and data) and AM mode.

The system mainly consists of:

- a control panel;
- a transceiver;
- a power amplifier;
- an antenna coupler;
- an antenna installed on the tail boom.

ISSUE 1: 14 DECEMBER 2012

Supplement 22
HF System
Type KHF1050

AW119 MKII RFM
Optional Equipment Supplements
Document No. 109G0040A017

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—	Issue 1	EASA Approval N° 10042643, REV. 1 dated 14 December 2012

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LIST OF EFFECTIVE PAGES

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PART II — MANUFACTURER’S DATA

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7-3. HF Radio System - Controls and Displays	11 of 12

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SECTION 1 - LIMITATIONS

TYPE OF OPERATION

The HF System type KHF1050 must not be used during approach and landing.

CENTER OF GRAVITY LIMITATIONS

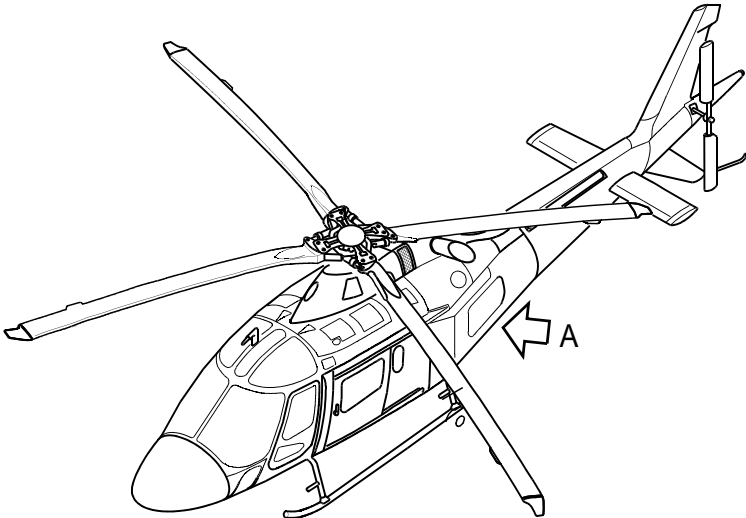
After HF System type KHF1050 installation the new empty weight and CG location must be determined.

MISCELLANEOUS LIMITATIONS

BAGGAGE COMPARTMENT LIMITATIONS

Maximum load..... 108 kg (238 lb)

PLACARDS



BAGGAGE COMPARTMENT

MAXIMUM ALLOWABLE BAGGAGE LOAD			
ZONE	1	2	3
KG (LB)	108 (238)	100 (220)	90 (198)
MAXIMUM TOTAL LOAD 108 KG (238 LB) MAX UNIT FLOOR LOADING 500 KG/M2 (102 LB/SQ.FT.) ALL CARGO MUST BE SECURED			

ICN-19-A-155022-G-A0126-01001-A-01-1

Figure 1-1. Placards in Baggage Compartment

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECK

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 3 (Tail boom - RH side)

Antenna : Condition.

SYSTEMS CHECK

HF System type KHF1050
control panel : Press PUSH PWR button to
switch on the system and start
the built-in test. Verify no fail
messages are present.

IN FLIGHT

HF System type KHF1050
control panel : As desired.

ICS control panel : As desired.

SECTION 3 - EMERGENCY AND MAL- FUNCTION PROCEDURES

No change.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

No change.

SECTION 7 - SYSTEM DESCRIPTION

GENERAL

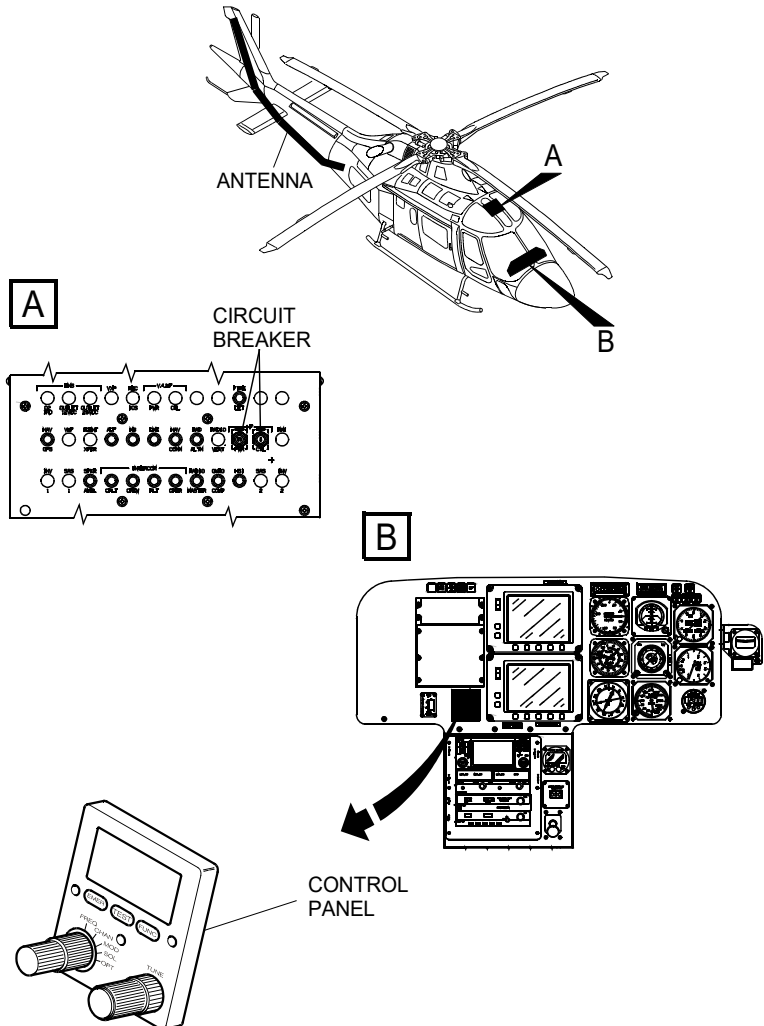
The HF radio system consists of five units: a KAC 1052 Antenna Coupler, a KPA 1052 Power Amplifier, a KRX 1053 Receiver/Exciter, a control Panel and a wire antenna. The Coupler, the power amplifier and the receiver/exciter are installed in the avionics bay (baggage compartment). The control panel is located in the instrument panel. The antenna is installed under tail boom.

The radio system is a solid-state high frequency (HF) single sideband (SSB) transceiver system providing voice and data communication. The HF band covers from 2 MHz to 30 MHz.

The HF system is powered by the 28 Vdc No 1 bus bar through the HF PWR and HF CTL circuit breakers.

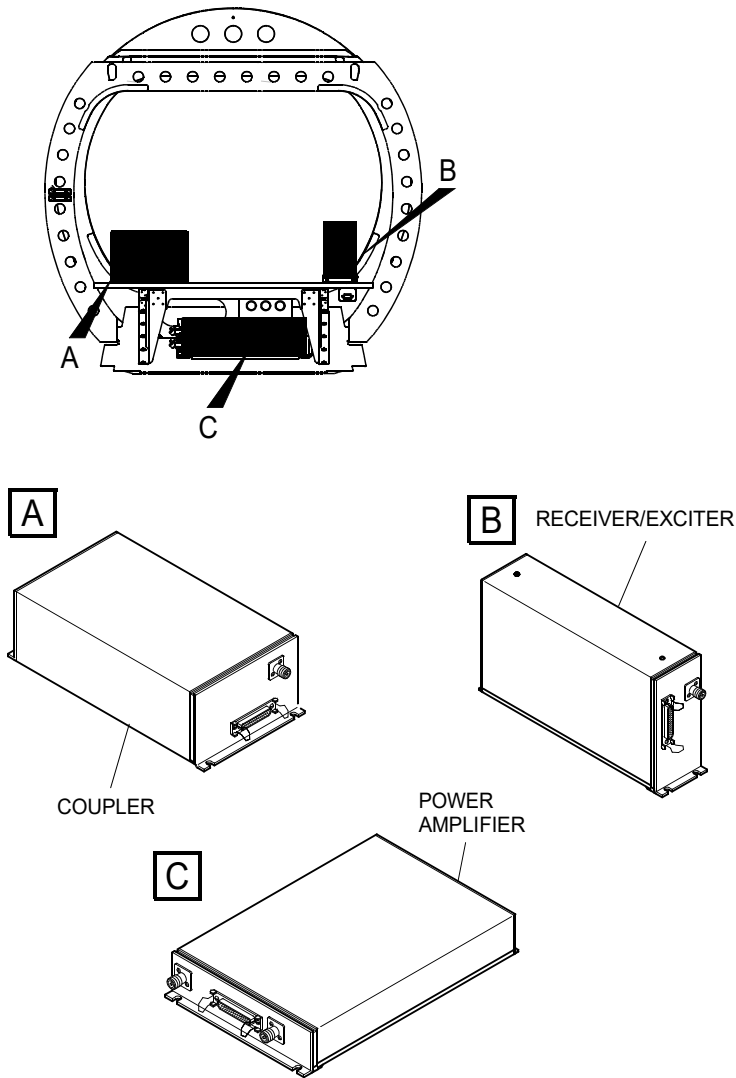
The main components of the HF radio system are shown in Figure 7-1.

Refer to Figure 7-2 for the schematic diagram of HF radio system.



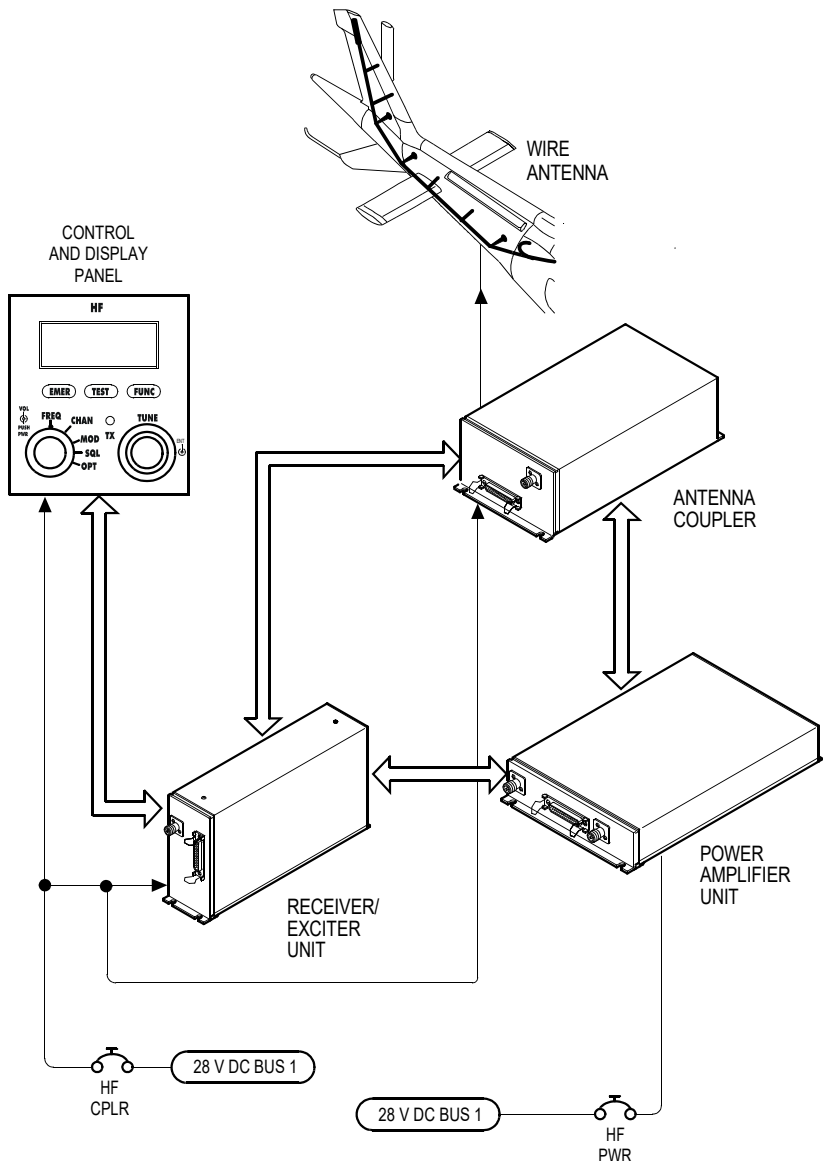
ICN-19-A-155022-G-00005-10001-A-01-1

Figure 7-1. HF Radio System - Component Location
(Sheet 1 of 2)



ICN-19-A-155022-G-00005-10002-A-01-1

Figure 7-1. HF Radio System - Component Location
(Sheet 2 of 2)

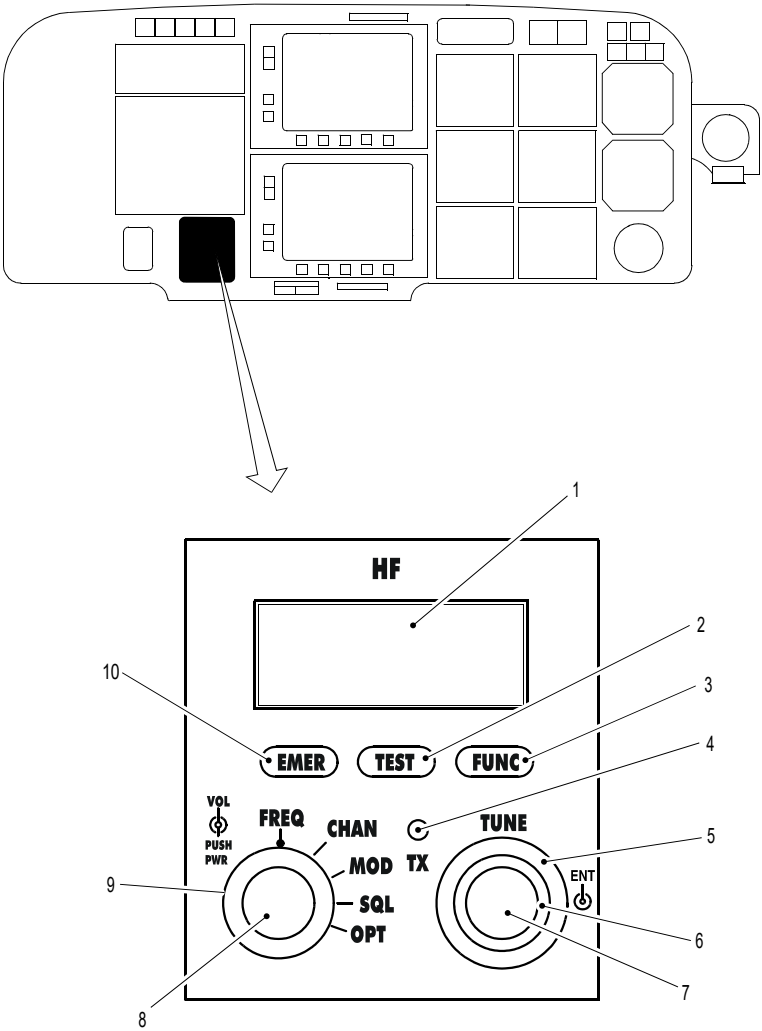


ICN-19-A-155022-G-00005-10004-A-01-1

Figure 7-2. HF Radio System - Schematic Diagram

HF RADIO SYSTEM CONTROLS AND DISPLAYS

Refer to Figure 7-3.



ICN-19-A-155022-G-00005-10003-A-01-1

Figure 7-3. HF Radio System - Controls and Displays

Key to Figure 7-2

Ref.	Control/ Display	Function
1	Display	Shows frequencies, modes, channels and other data.
2	TEST button	Press to start the built-in functional test.
3	FUNC button	Press to enter and select sub-functions.
4	TX light	The light is on when the system transmits.
5	Outer selector knob	Rotate to select frequency, channel numbers and other options.
6	Inner selector knob	Rotate to select frequency, channel numbers and other options.
7	Enter button	Press to store data into the system memory.
8	ON/OFF knob	Press to switch the system ON or OFF. Turn to adjust the volume.
9	Function selector knob	Rotate to select one of the following options: FREQ. The upper row of the display shows the receive frequency. The indication RX is also displayed. CHAN. Allows the selection of one of the 100 programmable channels available. MOD. Allows the selection of one of the following emission modes: Upper Sideband Voice (USB V), Upper Sideband Data (USB D), AM Voice (AM). SQL. Allows the selection of one of the following squelch types: Syllabic Squelch High (SBH), Syllabic Squelch Low (SBL), Signal/noise Squelch High (SQH), Signal Level Squelch (SQL). The value of the active squelch is displayed in the right bottom row of the display. OPT. Allows the selection of one of the following options: clarifier, maritime radiotelephone network channel operation, transmit power selection.
10	EMER button	Press to get access to the selection of the emergency channels.

**EASA Approval N° 10042641, REV. 1
dated 14 December 2012**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

COCKPIT VOICE DATA RECORDER (CVDR)

The Cockpit Voice Data Recorder system (CVDR) P/N 109G3130F01 allows recording of several helicopter parameters and audio signals in a solid state, non volatile memory. The CVDR system mainly consists of:

- a CVDR unit, located in the baggage compartment;
- a CVDR control panel, located on the overhead console;
- FDR FAULT / CVR FAULT indicator, located on the upper LH section of the instrument panel;
- a cockpit microphone, located on the windshield central post;
- an impact switch, located in the baggage compartment.

The unit provides comprehensive Built-In Test (BIT) functions. The Flight Data Recorder (FDR) and the Cockpit Voice Recorder (CVR) functions are separately monitored. Failure of the FDR and/or of the CVR functions cause the illumination of the associated caution message on the instrument panel.

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**COCKPIT VOICE DATA RECORDER
(CVDR)**

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MADRAS 6 of 10

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SECTION 1 - LIMITATIONS

CENTER OF GRAVITY LIMITATIONS

After the CVDR system installation the new empty weight and CG location must be determined.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECK

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 7 (Cabin interior)

CVDR Test

BATT : ON.

FDR FAULT and CVR FAULT lights : 5 seconds after GEN BUS power-up, check both lights extinguished.

CVDR test : Press and hold the TEST switch on CVDR control panel for at least five seconds;
Check TEST green lamp stays on (TEST lamp stays on as long as the TEST button is pressed).

BATT : OFF.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

BATT : ON.

FDR FAULT and CVR FAULT lights : 5 seconds after GEN BUS power-up, check both lights extinguished.

CVDR test : Press and hold the TEST switch on CVDR control panel for at least five seconds;
Check TEST green lamp stays on (TEST lamp stays on as long as the TEST button is pressed).

BATT : OFF.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

WARNING SYSTEM

CAUTION LIGHTS (YELLOW)

Caution wording	Fault condition	Corrective action
CVR FAULT	Failure of the cockpit voice recorder.	Proceed with flight.
FDR FAULT	Failure of the flight data recorder.	Proceed with flight.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

No change.

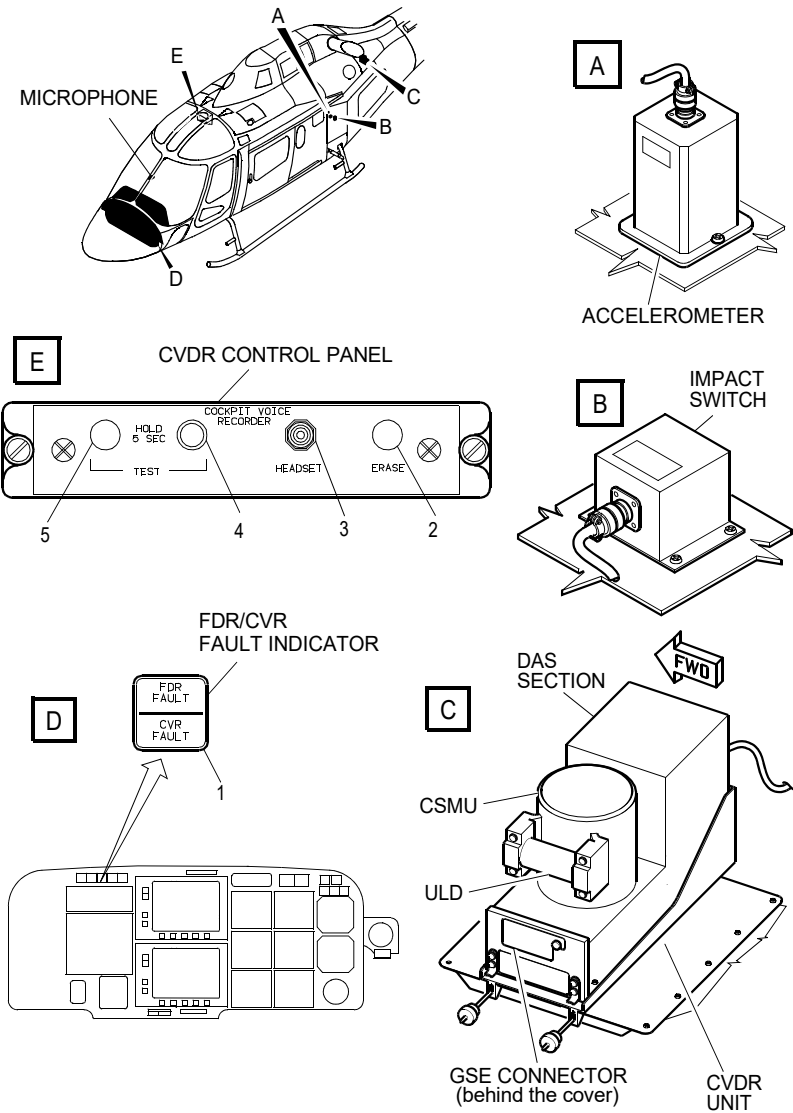
SECTION 7 - SYSTEM DESCRIPTION

GENERAL

The Cockpit Voice Data Recorder (CVDR) System Model FA23XX MADRAS consists of:

- a Recorder Unit;
- a Control Unit;
- an Area Microphone;
- a Mounting Tray.

The CVDR is housed in ARINC 404A, 1/2-ATR short case (refer to Figure 7-1).



ICN-19-A-155023-G-00005-10001-A-01-1

**Figure 7-1. Cockpit Voice Data Recorder -
Model FA23XX MADRAS**

The chassis and Crash Survivable Memory Unit (CSMU) are painted international orange. Two reflective stripes are located on the CSMU. The CSMU contains the solid state flash memory used as the recording medium. The micro Data Acquisition Section (DAS) input is self-contained in the rear chassis assembly.

An Underwater Locator Device (ULD) is mounted horizontally on the front of the CSMU and is also used as the recorder's carrying handle.

The Ground Support Equipment (GSE) connector is located on the front of the MADRAS. This connector provides the interface from the recorder to GSE for checkout of the recorder, or to transfer data to a readout devices.

The CVDR is a "On Condition Line Replaceable Unit" (LRU) that simultaneously records both cockpit voice and flight data.

The CVDR recording starts when the electrical system is powered on.

The Cockpit Voice Recorder (CVR) function simultaneously records four separate channels of cockpit audio, converts the audio to a digital format, and stores the data in a solid state memory.

The CVDR-MADRAS records a minimum of 120 minutes of high quality audio from the following four cockpit audio inputs:

- Channel 1: Pilot's Audio;
- Channel 2: Co-Pilot's Audio;
- Channel 3: Operator's Audio;
- Channel 4: Cockpit Area Microphone (CAM) Audio.

The Flight Data Recorder (FDR) function receives flight data at 256 words-per-second (wps). The flight data is stored in flash memory segregated from the cockpit voice data. The CVDR is capable of storing a minimum of 25 hours of flight data. Flight data stored in 25-hour configuration CVDRs can be downloaded in approximately five minutes.

Previously recorded voice information cannot be read from the CVDR while it is installed in the aircraft. However, the flight data may be monitored real time, or copied out to the Ground Station Equipment.

The following information and data are provided to CVDR unit:

- A collection of Engines' and Helicopter's parameters, WARNING/CAUTION/ADVISORY messages by mean of serial con-nection between the Data Acquisition Unit (DAU) of the Integrated Display System (IDS) and the CVDR unit;
- Flight controls position by means of synchro-transmitters located on flight controls rods underneath pilot's seats;
- Helicopter's center of gravity accelerations by means of accelerometer located in the rear avionic bay;
- Airspeed and altitude by means of serial connection between the Air Data Unit (ADU) and the CVDR;
- Pilot/co-pilot's and operator's ICS communications, cockpit and passengers cabins audio signals by means of an area microphone located in the cockpit's front window central post (left side).

CVDR SYSTEM CONTROLS AND DISPLAYS

Operator's interface with CVDR unit is obtained by means of a control panel located in cockpit roof, in the vicinity of overhead panel.

The control panel is shown in Figure 7-1.

Key to Figure 7-1

Ref.	Control/ Display	Function
1	FDR/CVR fault indicator	FDR FAULT OFF - The system is operative (goes off within 5 seconds) ON - The indicator comes on within 5 seconds if no data is received from the DAS section. CVR FAULT OFF - The system is operative (goes off within 5 seconds) ON - If the indicator comes on within 60 seconds, a possible CVDR system hardware problem exists.
2	ERASE push-button	Is used to activate the bulk erase function. Press and hold this push-button for a minimum of 2 seconds.
3	Headset jack	Lets connection of the headset.
4	TEST led	The led is green when the TEST push-button is pressed. If the test fails the led does not come on.
5	TEST push-button	When pushed, performs the CVR test by injecting a tone into the four audio channels. If the test fails, the TEST led does not come on.

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**Approved with NDC-109G2590-002
dated 23 May2019
under the authority of DOA ref EASA.21J.005**

The information contained herein supplements the information of the basic Rotorcraft Flight Manual.

For limitations, procedures and performance data not contained in this supplement, consult the basic Rotorcraft Flight Manual.

REARVIEW MIRRORS

The Rearview Mirrors installation P/N 109G2590F01 consists of two mirrors installed on supports fitted on the right and left hands side of the helicopter nose.

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REARVIEW MIRRORS

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SECTION 1 - LIMITATIONS

No change.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S PRE-FLIGHT CHECK

(Every flight)

AREA N° 2 (Fuselage - RH side)

1. Rearview Mirror : - Condition, cleanliness and secure.

AREA N° 6 (Fuselage - LH side)

1. Rearview Mirror : - Condition, cleanliness and secure.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

No change.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

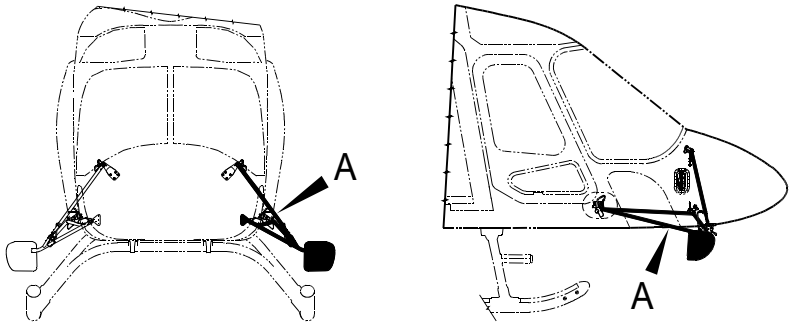
No change.

SECTION 7 - SYSTEM DESCRIPTION

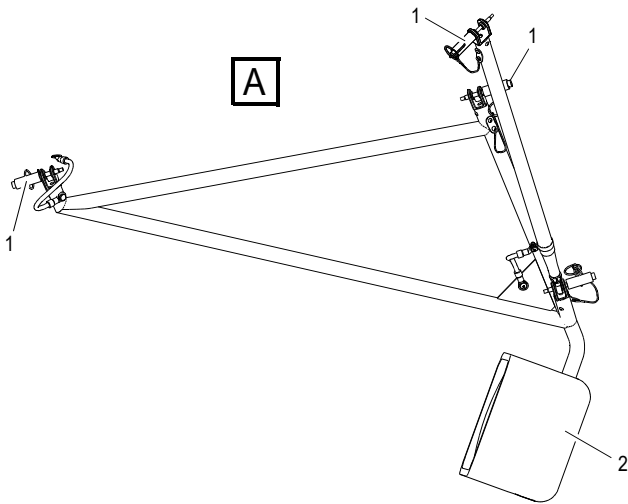
GENERAL

The rearview mirrors installation consists of two metallic tubular frames used to fit the two rearview mirrors.

Each frame is connected to the external surface of the helicopter by mean of three constraints. The frames are located in the helicopter nose fuselage in order to have the mirror in the pilot and copilot field of views (Figure 7-1).



VIEW LOOKING INBORD RIGHT SIDE



ICN-19-A-155000-G-00005-01001-A-01-1

Figure 7-1. Rearview Mirrors Installation

PART II

MANUFACTURER'S DATA

LIST OF REVISIONS

REVISION No.	SUBJECT	DATE
—	First Issue	11 June 2007
1	—	Not affected
2	Revised pages C-1, 7-i and 7-ii. Added pages 7-14A thru 7-14D.	26 July 2010
3	—	Not affected
4	Revised pages C-1, 6-i, 6-8, 6-9, 6-11 thru 13, 6-15 thru 6-17 and entirely Section 9.	24 February 2011
3	—	Not affected
4	—	Not affected
5	—	Not affected
6	—	Not affected
7	—	Not affected
8	—	Not affected
9	Revised pages C-1, 7-ii, 7-3, 7-4, 7-4A and 7-4B .	14 December 2012
10	—	Not affected
11	—	Not affected
12	—	Not affected
13	—	Not affected
14	—	Not affected
15	—	Not affected
16	—	Not affected
17	Revised pages C-1 and 7-22.	4 November 2021
18	Revised pages C-1, 6-i and 6-4.	02 December 2022

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SECTION 6

WEIGHT AND BALANCE

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SECTION 6

WEIGHT AND BALANCE

Note

In accordance with EASA procedures, the detail weight and balance data of this Section are not subject to EASA approval.

The loading instructions of this Section, however, have been accepted by EASA as satisfying all requirements for instructions on loading of the rotorcraft within approved limits of weight and center of gravity, and on maintaining the loading within such limits.

GENERAL

This Section provides information for the weight and balance computation of the AW119 MKII helicopter.

It is the pilot's responsibility to ensure that the helicopter is properly loaded to maintain for the duration of the flight the Center of Gravity (CG) within the limitations defined in Section 1 of the Rotorcraft Flight Manual.

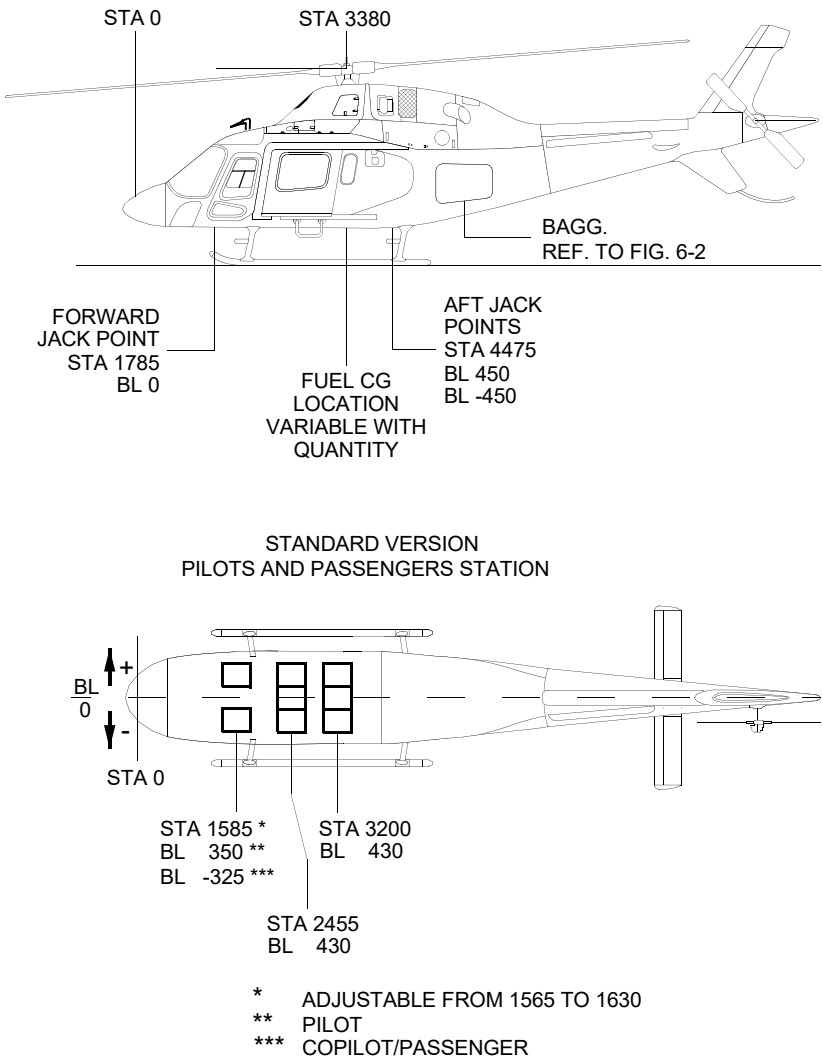
WARNING

Operation outside of prescribed weight and balance limitation could result in an accident and serious or fatal injury.

Figures, charts and examples are provided to assist the pilot in computing the proper loading conditions.

DATUM LINE LOCATIONS

Figure 6-1 presents fuselage stations and butt lines data to aid in weight and balance computations.



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Figure 6-1. Stations and Butt Lines

DOORS OPEN OR REMOVED

Opening or removing doors results in center of gravity changes. Door removal or opening is limited to passenger doors. The table below lists weight and moment adjustments which shall be made in determining the gross weight and CG when doors are opened or removed.

Table 6-1. Weight and Moment Adjustment

Door configuration	Weight change (kg)	Arm (mm)	Moment change (kg mm)
Right sliding door removed	-8.000	2650	-21200
Left sliding door removed	-8.000	2650	-21200
Right sliding door fully open	—	3650	+8000
Left sliding door fully open	—	3650	+8000

WEIGHTS - ARM AND MOMENTS

LONGITUDINAL MOMENTS

Table 6-2. Pilots and Passengers

Weight (kg)	Pilot (*) Copilot or Passenger (Arm 1585) Moment (kg mm)	Passengers 3 places central seat aft facing (Arm 2455) Moment (kg mm)	Passengers 3 places aft seat (Arm 3200) Moment (kg mm)
60	95100	147300	192000
65	103025	159575	208000
70	110950	171850	224000
75	118875	184125	240000
80	126800	196400	256000
85	134725	208675	272000
90	142650	220950	288000
95	150575	233225	304000
100	158500	245500	320000
120	198125	294600	384000
140	221900	343700	448000
160	253600	392800	512000
180	285300	441900	576000
200	317000	491000	640000
220		540100	704000
240		589200	768000
260		638300	832000
280		687400	896000
300		736500	960000
320		785600	1024000

(*) Adjustable from 1565 to 1630 mm

Table 6-3. Usable fuel - Main fuel tank (for JP5 / JET A / JET A-1)

Weight (kg)	Capacity l (0.8 kg/l)	Arm (mm)	Moment (kg mm)
20.0	25.0	3324	66480
40.0	50.0	3327	133080
60.0	75.0	3329	199740
80.0	100.0	3331	266480
100.0	125.0	3399	339900
120.0	150.0	3461	415320
140.0	175.0	3505	490700
160.0	200.0	3539	566240
180.0	225.0	3543	637740
200.0	250.0	3551	710200
220.0	275.0	3571	785620
240.0	300.0	3614	867360
260.0	325.0	3662	952120
280.0	350.0	3703	1036840
300.0	375.0	3739	1121700
320.0	400.0	3770	1206400
340.0	425.0	3797	1290980
360.0	450.0	3821	1375560
380.0	475.0	3843	1460340
400.0	500.0	3863	1545200
420.0	525.0	3880	1629600
440.0	550.0	3897	1714680
460.0	575.0	3911	1799060
476.0	595.0	3912	1862112

Table 6-4. Unusable fuel for (JP5 / JET A / JET A-1)

Weight (kg)	l (0.8 kg/l)	Arm (mm)	Moment (kg mm)
8	10	3320	26560

Table 6-5. Engine oil (Arm 4673)

Weight (kg)	Liter (l)	Moment (kg mm)
10.2	10.45	47665

Table 6-6. Undrainable engine oil (Arm 4673)

Weight (kg)	Liter (l)	Moment (kg mm)
1.6	1.64	7477

Table 6-7. Main transmission oil (Arm 3355)

Weight (kg)	Liter (l)	Moment (kg mm)
10	10.3	33550

LATERAL MOMENTS

Table 6-8. Usable fuel - Main fuel tank (for JP5 / JET A / JET A-1)

Weight (kg)	Capacity l (0.8 kg/l)	BL (mm)	Moment (kg mm)
20.0	25.0	-330	-6600
40.0	50.0	-330	-13200
60.0	75.0	-330	-19800
80.0	100.0	-330	-26400
100.0	125.0	-330	-33000
120.0	150.0	-330	-39600
140.0	175.0	-236	-33040
160.0	200.0	-165	-26400
180.0	225.0	-110	-19800
200.0	250.0	-66	-13200
220.0	275.0	-30	-6600
240.0	300.0	0	0
260.0	325.0	0	0
280.0	350.0	0	0
300.0	375.0	0	0
320.0	400.0	0	0
340.0	425.0	0	0
360.0	450.0	0	0
380.0	475.0	0	0
400.0	500.0	0	0
420.0	525.0	0	0
440.0	550.0	0	0
460.0	575.0	0	0
476.0	595.0	0	0

ALLOWABLE BAGGAGE LOAD

The baggage compartment is divided in five zones. In Figure 6-2, the maximum baggage load for each zone is presented. The maximum allowable baggage load is 150 kg.

The following table defines the baggage moments for each zone. The maximum allowable baggage moment is 734000 kg mm.

Table 6-9. Baggage moment

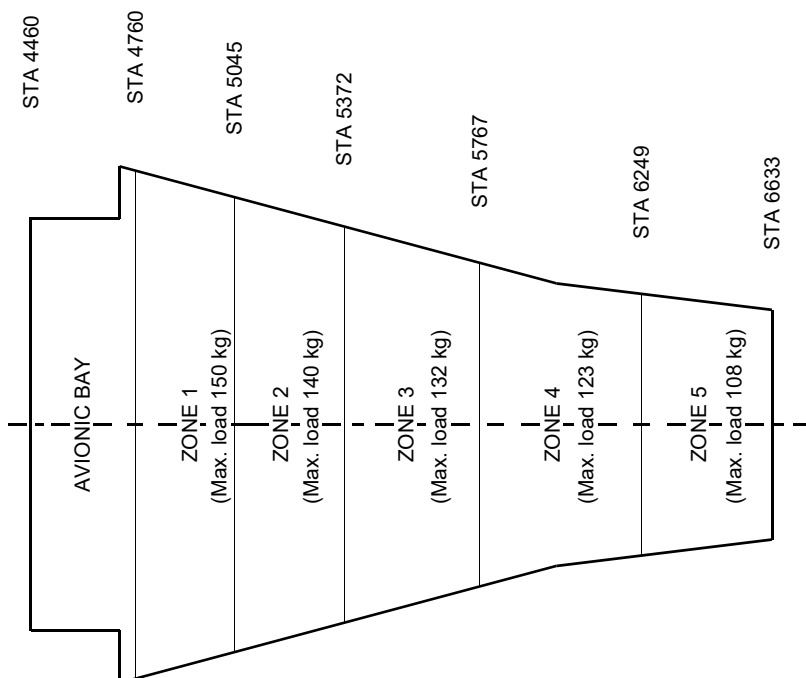
	ZONE 1 Arm 4880	ZONE 2 Arm 5240	ZONE 3 Arm 5560	ZONE 4 Arm 5960	ZONE 5 Arm 6430
Baggage load (kg)	Baggage moment (kg mm)				
10	48800	52400	55600	59600	64300
20	97600	104800	111200	119200	128600
30	146400	157200	166800	178800	192900
40	195200	209600	222400	238400	257200
50	244000	262000	278000	298000	321500
60	292800	314400	333600	357600	385800
70	341600	366800	389200	417200	450100
80	390400	419200	444800	476800	514400
90	439200	471600	500400	536400	578700
100	488000	524000	556000	596000	643000
105	512400	550200	583800	625800	675150
108	527040	564920	600480	643680	694440
110	536800	576400	611600	655600	
115	561200	602600	639400	685400	
120	585600	628800	667200	715200	
123	600240	644520	683880	733080	
130	634400	681200	722800		
132	644160	691680	733920		
135	658800	707400			
140	683200	733600			
150	732000				

An example of baggage loading is provided below; the total baggage moment shall be less than 734000 kg mm.

Table 6-10. Example of baggage loading

	Weight (kg)	Moment (kgmm)
Zone 1	50	244000
Zone 2	40	209600
Zone 3	20	111200
Zone 4	10	59600
Zone 5	—	—
Total	120	624400

The total baggage load and moment calculated above are less than the maximum allowable.



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Figure 6-2. Baggage Loading Zone

LATERAL ARMS

Table 6-11. Lateral arms

Item	Butt line (Arm) (mm)
Pilot	+350
Copilot/passenger	-325
Passengers	See Figure 6-1
Baggage	0
Engine oil	0
Transmission oil	0

COMPUTATION OF LOADING

LONGITUDINAL LOADING SAMPLES

The empty weight and moment of the A119 helicopter can be found in Chart B (Helicopter Weighing Record). The values in Chart B are obtained by weighing the aircraft and computing the empty weight, moment and CG therefrom.

Subsequently as items of equipment are added or removed, entries shall be made in Chart C (Basic Weight and Balance Record) and the new empty weight and moment computed.

The empty weight includes fixed ballast, hydraulic fluid, transmission oil, engine oil and unusable fuel.

Three sample loadings are shown below (in the sample loading the empty weight and CG arm are assumed to be 1541 kg and 3703 mm).

Table 6-12. Longitudinal loading sample a)

a)	Item	Weight (kg)	CG Arm (mm)	Moment (kg mm)
	Empty Weight	1541	3703	5706323
	Pilots (2)	160	1585	253600
	Passenger (1 right)	80	2455	196400
	Passenger (1 center)	80	2455	196400
	Passenger (1 left)	80	2455	196400
	Baggage	50	5240	262000
	Fuel (JET A-1)	100	3399	339900
	Take-off weight	2091	3420	7151023

Table 6-13. Longitudinal loading sample b)

b)	Item	Weight (kg)	CG Arm (mm)	Moment (kg mm)
	Empty Weight	1541	3703	5706323
	Pilot	70	1585	110950
	Passengers (3) front	250	2455	613750
	Passengers (3) rear	220	3200	704000
	Baggage	90	5240	471600
	Fuel (JP-5)	370	3832	1417840
	Take-off weight	2541	3552	9024463

Table 6-14. Longitudinal loading sample c)

c)	Item	Weight (kg)	CG Arm (mm)	Moment (kg mm)
	Empty weight	1541	3703	5706323
	Pilots (2)	150	1585	237750
	Passengers (3) front	220	2455	540100
	Passengers (3) rear	200	3200	640000
	Baggage	125	5240	655000
	Fuel (JET A-1)	476	3912	1862112
	Take-off weight	2712	3555	9641285
	Empty weight	1541	3703	5706323

The weight - CG combination in the three examples above fall within the approved limits

LATERAL LOADING SAMPLE

The empty weight CG is assumed to be at station "- 4 mm" unless a different entry has been made in Chart C. With the empty CG at station "- 4 mm" the approved lateral loading limits will not be exceeded if passengers are seated with the sequence shown in the example given below.

Table 6-15. Lateral loading sample

Item	Weight (kg)	CG Arm (mm)	Moment (kgmm)
Empty Weight	1541	-4	-6124
Pilot	80	350	28000
Pass (1) right	80	430	34400
Pass (1) center	80	0	0
Pass (1) left	80	-430	-34400
Fuel (JET A-1)	240	0	0
Take-off weight	2101	10	21836

The weight-CG combination computed above falls within the approved limits.

WEIGHT AND BALANCE DETERMINATION

Instructions for weight and balance determination are herewith enclosed with instructions for use of charts to enable the operator to obtain all necessary data as to basic helicopter configuration, empty weight and center of gravity. These charts will also provide for continuous control of weight and balance of the helicopter.

This system of weight and balance computation requires the use of charts and forms. They are identified as follows:

- a. Chart A - Equipment List.
- b. Chart B - Helicopter Weighing Record.
- c. Chart C - Basic Weight and Balance Record.
- d. Chart D - Data for Helicopter Weight and Balance Computation
- e. Chart E - Weight and Balance Computation

WEIGHT AND BALANCE DATA RESPONSIBILITY

The aircraft manufacturer inserts all helicopter identifying data on the various charts. This record constitutes the basic weight and balance data of the helicopter, to which the Rotorcraft Flight Manual was assigned, for the condition shown on Chart A. The operator shall keep this data up-to-date by recording all changes made to the configuration of the helicopter.

HELICOPTER WEIGHING

The helicopter must be weighed:

- a. When major modifications or repairs are made, or optional equipment are installed/removed.
- b. When the basic weight data is suspected to be in error.
- c. At time of major overhaul.
- d. In accordance with EASA instructions.

USE OF CHARTS AND FORMS

USE OF CHART A

The Chart A gives the weight, arm and moment of all the basic and optional equipment. The manufacturer of the helicopter places check marks in the "Basic Configuration" column to identify which items are installed in the helicopter during the weighing. A check (V) in the columns headed "In Helicopter" indicates the presence of the item in the helicopter, and a zero (0) indicates its absence. The next columns of Chart A will permit inspection of the helicopter for equipment actually installed. When making an inventory, note whether any items have been installed or removed and if so enter corresponding weight and moment change on Chart C.

Subsequent check list inventories shall be carried out in the following cases:

- a. When the helicopter undergoes modification, major repair or overhaul.
- b. When changes in equipment are made for a different type of operation.
- c. When the helicopter is reweighed.

USE OF CHART B

- a. Enter the actual scale readings in the first column of sheet 1. Subtract tare, if any, from the scale readings to obtain the net weight.
- b. Multiply the net weights by their respective arms.
- c. Add the net weight and moments.
- d. Divide the total moment by the net weight to obtain "as weighed" CG position. Transfer the "TOTAL" (as weighed) weight arm and moment to the sheet 2 of Chart B.
- e. Subtract the total weight and moment of equipment weighed but not part of the basic helicopter (list these items in column one).

- f. Add the weight and moment of unusable fuel.
- g. Add the total weight and moment of the basic items not in helicopter when weighed (list these in column two). Added items shall be marked on Chart A.
- h. Enter the new basic weight and moment on Chart C.

USE OF CHART C

Chart C is a continuous history of the basic weight and moment resulting from modifications and equipment which alter the current weight and balance status of the basic helicopter. Make additions or subtractions to the basic weight and moment in Chart C as follows:

- a. When the helicopter undergoes modification, major repair or overhaul.
- b. When changes in equipment are made for a different type of operation
When the helicopter is reweighed.

Note

If any equipment is not listed on Chart A, determine its weight and arm, and list corresponding data on Charts A and C.

USE OF CHART D

Chart D provides information necessary for weight and balance computation.

USE OF CHART E

Chart E serves as a work sheet and records the calculations and any corrections that must be made to ensure that helicopter will be within weight and CG limits.

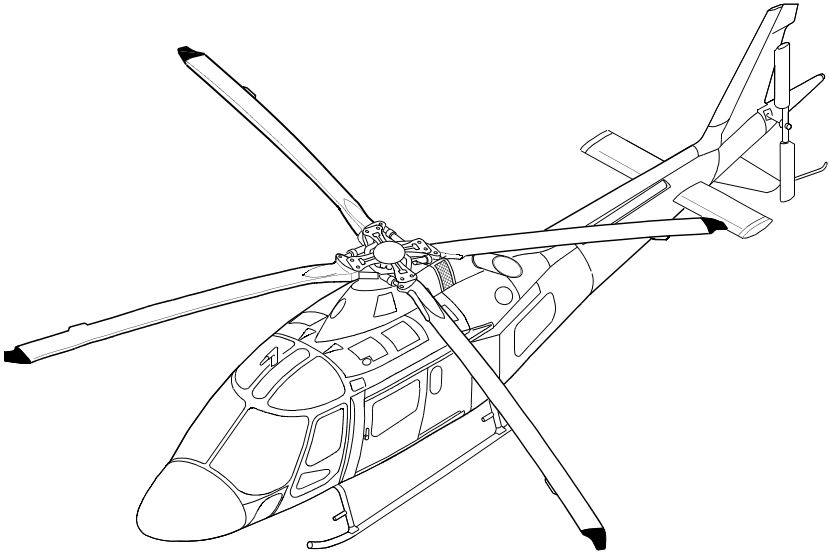
Note

A Chart E shall be filled prior to any flight.

- a. Enter the helicopter basic weight and moment. Obtain these values from the last entry on Chart E.
- b. Enter the weight of all applicable items in the marked "Weight". Obtain the corresponding arms from Chart D and calculate the moments.
- c. Add weights and add moments. Divide total moment by total weight to obtain CG arm.
- d. Ascertain that CG is within allowable limits.
- e. Should corrections be required, readjust ballast to return CG within allowable limits.

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WEIGHT AND BALANCE



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HELICOPTER AW119 MKII

SERIAL NUMBER.

REGISTRATION MARKS

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CHART B - HELICOPTER WEIGHING RECORD						Sheet 1 of 2	
MODEL:	S/N:	REGISTRATION MARKS:					
DATE:	PLACE:	SIGNATURE:					
Reason for weighing:							
Scale type:							
JACKPOINTS	SCALE READING	TARE	NET WEIGHT	STA (1)	LONGITUDINAL MOMENT	BL (2)	LATERAL MOMENT
	(Kg)	(Kg)	(Kg)	(mm)	(Kg mm)	(mm)	(Kg mm)
FORWARD				1785		0	
LH AFTERWARD				4475		-450	
RH AFTERWARD				4475		450	
TOTAL (as weighed) (to Sht. 2 of 2)							

Note 1

The forward lower Central Cabin is provided by two FWD jack points, only one FWD jack point is assured by using a proper tool which collect both jacking points.

The Station Reference Datum (STA 0) is located 1785 mm forward the FWD jack points. Therefore the STA are positive.

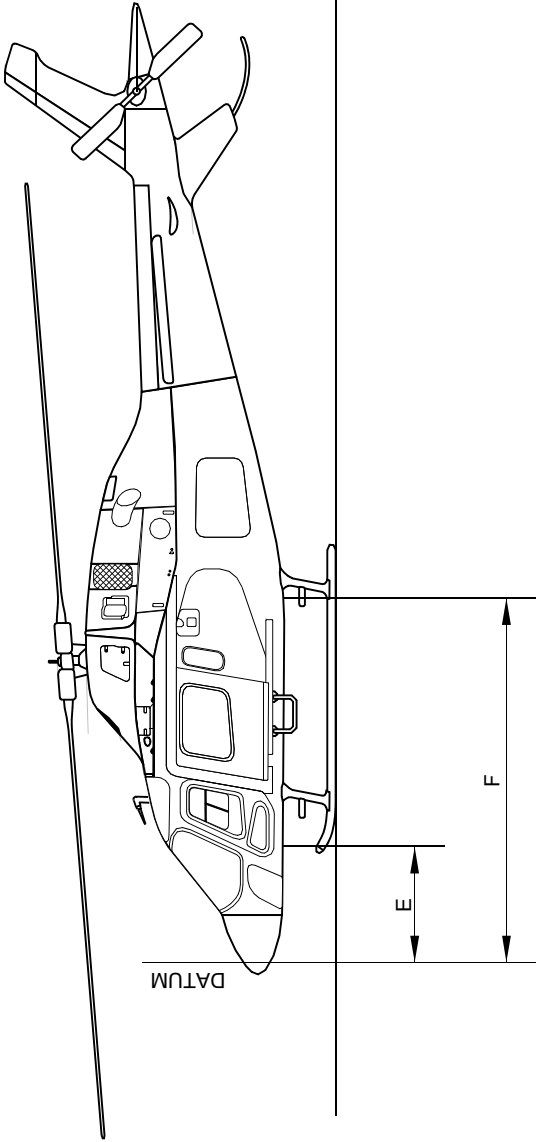
E = Distance from the reference datum (STA 0) to the FWD jackpoint Station of 1785 mm.

F = Distance from the reference datum (STA 0) to the LH and RH aft jackpoints Station of 4475 mm.

Note 2

The Butt Line Reference Datum (BL 0) is located on the fuselage Center Line.

Therefore the BL are negative on the Left Hand side and positive on the Right Hand side.



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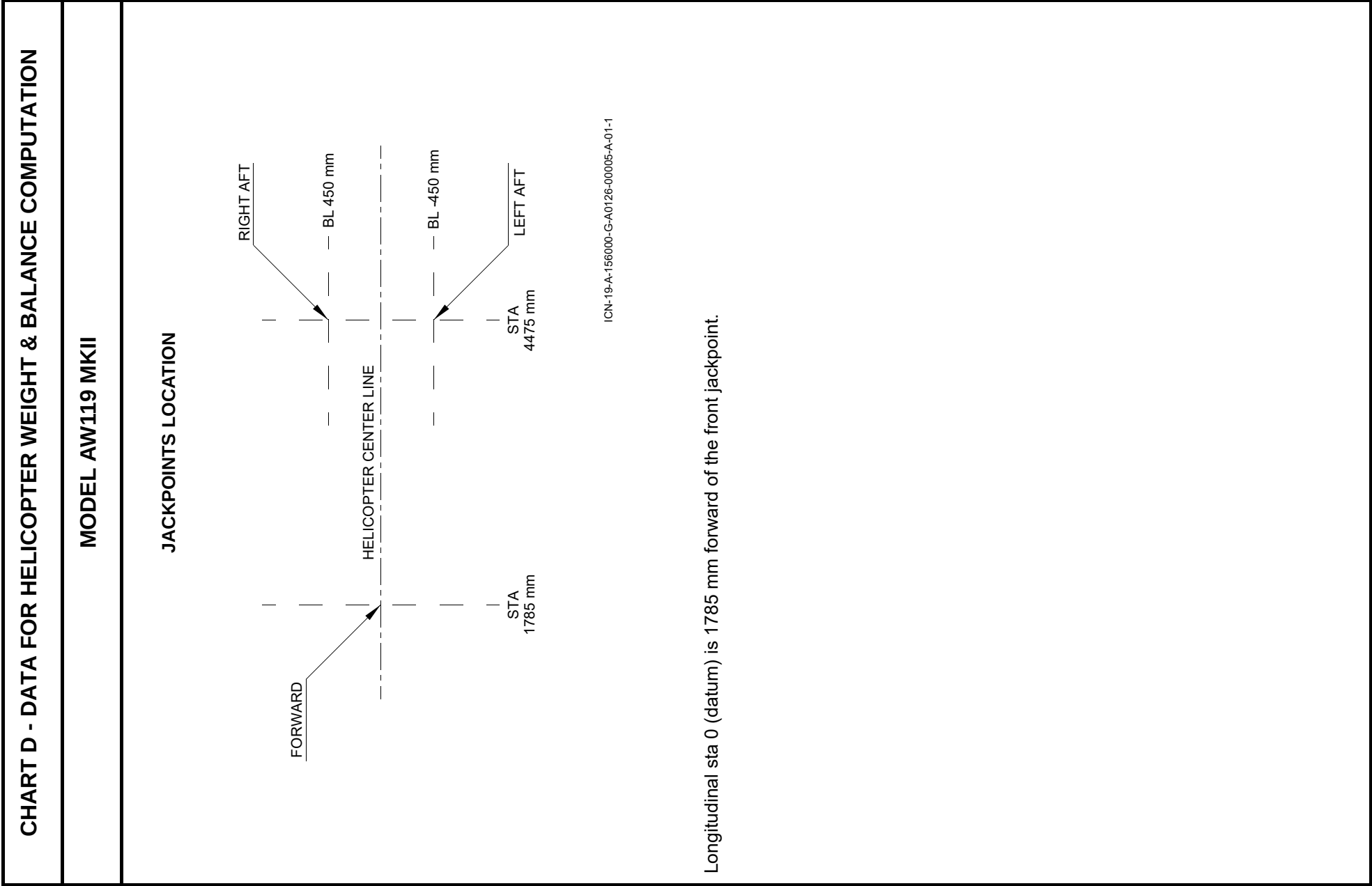
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CHART B - HELICOPTER WEIGHING RECORD					Sheet 2 of 2
DESCRIPTION	NET WEIGHT	STA	LONG. MOMENT	BL	LAT. MOMENT
	(Kg)	(mm)	(Kg mm)	(mm)	(Kg mm)
TOTAL (as weighed) (from Sht. 1 of 2)					
SUBTRACT (from Tab. 1)					
ADD (from Tab. 2)					
BASIC AIRCRAFT (to Chart C)					
TABLE 1 ITEMS WEIGHED BUT NOT PART OF BASIC WEIGHT					
DENOMINATION	WEIGHT	STA	LONG. MOMENT	BL	LAT. MOMENT
	(Kg)	(mm)	(Kg mm)	(mm)	(Kg mm)

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CHART E - WEIGHT & BALANCE COMPUTATION FORM									
MODEL	S/N	REGISTRATION MARKS	WEIGHT (Kg)	STA (mm)	DATE	PLACE	COMPUTED BY		
Ref.	ITEM				LONG.MOMENT (Kg mm)	BL (mm)	LAT.MOMENT (Kg mm)		
1	HELICOPTER BASIC (Ref. To Chart C)								
2	PILOT								
3	COPILOT								
4	PASSENGER								
5	PASSENGER								
6	PASSENGER								
7	PASSENGER								
8	PASSENGER								
9	PASSENGER								
10	LOOSE EQUIPMENT LOAD								
11	CABIN LOAD								
12	BAGGAGE COMPARTMENT LOAD								
13									
14									
15									
16									
17									
18									
19									
20									
21	DRY WEIGHT								
22	FUEL (at Take-off)								
23	GROSS WEIGHT (at Take-off)								
24	FUEL (at Landing)								
25	GROSS WEIGHT (at Landing)								
26	BALLAST (if required)								
LIMITATIONS			REMARKS						
Refer to Section 1									

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SECTION 7

SYSTEM DESCRIPTION

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SECTION 7

SYSTEM DESCRIPTION

INTRODUCTION

This section provides a general description of the AW119 MKII helicopter systems.

HELICOPTER DESCRIPTION

The AW119 MKII helicopter is a high-speed, high performance, multi-purpose helicopter powered by a single Pratt & Whitney Canada PT6B-37A Build Specification 1242 turboshaft engine, with four-bladed fully articulated main rotor, two-bladed tail rotor and a fixed landing gear skid.

The airframe consists of two major assemblies: the forward fuselage and the aft fuselage (tail boom).

The forward fuselage comprises the nose section, the cabin and the rear section. The nose section houses the electrical and electronic equipment.

The cabin includes the crew compartment (cockpit) and the passenger compartment. Seating is provided for the pilot (right side) and a passenger (or copilot) in the cockpit, and up to six passengers in the relevant compartment.

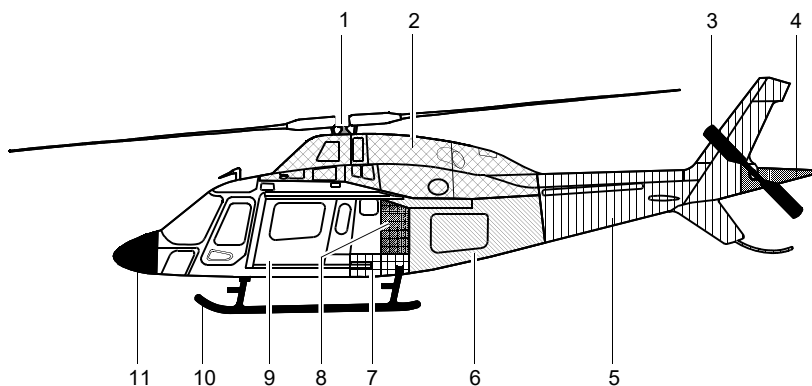
The rear section accommodates the fuel tanks, the electrical and electronic equipment compartment and the baggage compartment. The landing gear skid is secured to the undersides of the cabin and rear sections.

The upper deck, located above and aft of the cabin area, accommodates the hydraulic system reservoirs and filter groups, the main transmission, the oil cooler and the engine.

The tail boom is bolted to the forward fuselage and supports the tail rotor and the relevant drive system. The tail boom includes the stabilizers, the upper and lower vertical fins, the tail skid and the tail cone.

MAJOR ZONES

Refer to Figure 7-1 for the airframe major zones.



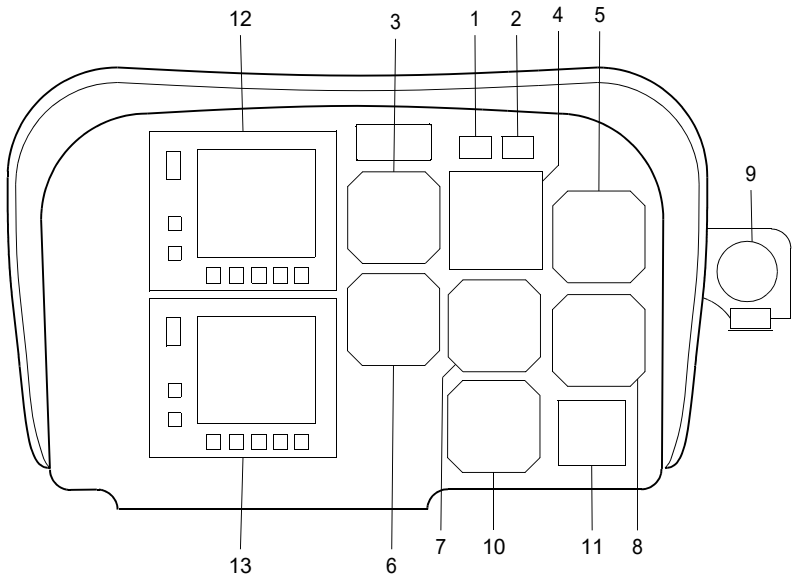
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1. Main rotor
2. Upper deck
3. Tail rotor
4. Tail cone
5. Tail boom
6. Fuselage rear section
7. Fuel tank compartment
8. Avionic equipment compartment
9. Cabin
10. Skid landing gear
11. Nose compartment

Figure 7-1. Airframe Major Zones

INSTRUMENT PANEL AND CONSOLES

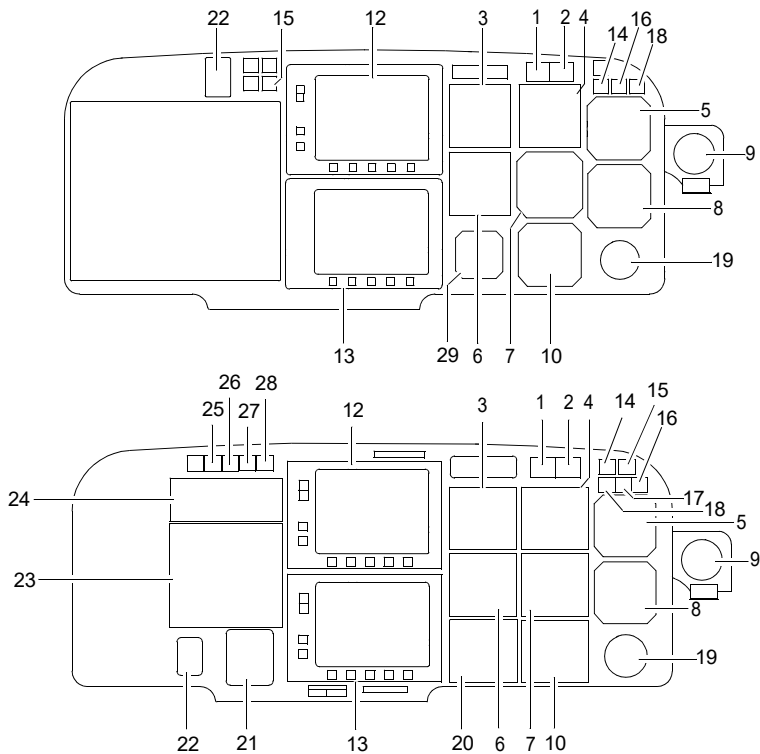
Refer to Figure 7-2 for instrument panel, to Figure 7-3 for front console, to Figure 7-4 for central console and to Figure 7-5 for overhead console.



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1. Master Caution Light (MCL)
2. Master Warning Light (MWL)
3. Airspeed indicator
4. Attitude Director Indicator (ADI)
5. Encoder altimeter
6. Dual tachometer
7. Horizontal Situation Indicator (HSI)
8. Integrated Vertical Speed Indicator (VSI)
9. Magnetic compass
10. Radar altimeter
11. Clock
12. EDU 1 (primary)
13. EDU 2 (secondary)

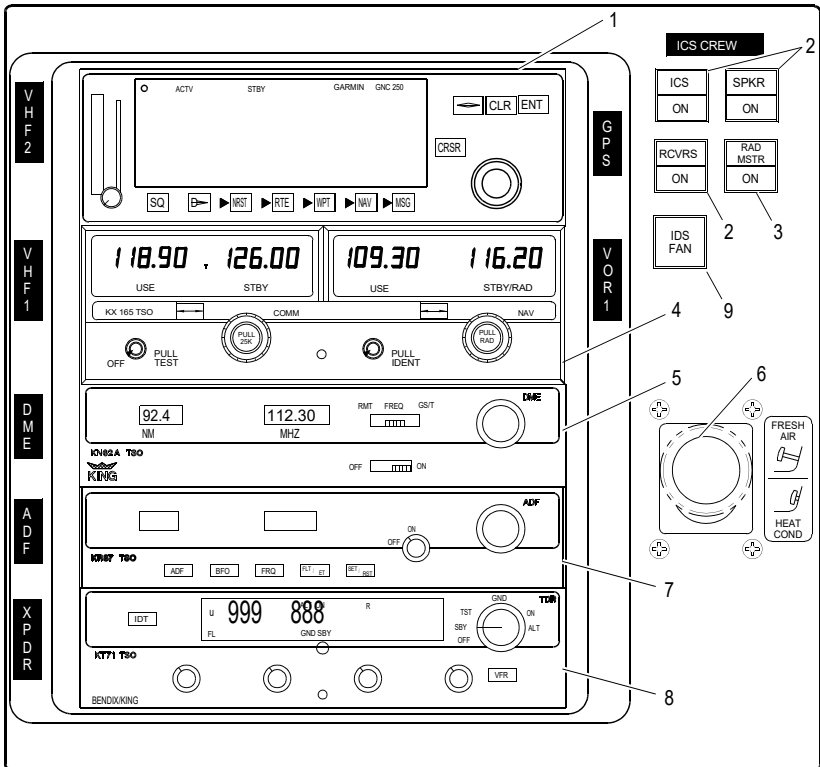
Figure 7-2. (sheet 1 of 2) Instrument Panel (Typical)



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- | | |
|------------------------------------|-------------------------|
| 14. ICS/ON | 22. ELT remote switch |
| 15. RAD MSTR/ON | 23. IFF control panel |
| 16. SPKR/ON | 24. V/UHF control panel |
| 17. XMTR/ON | 25. IDS FAN |
| 18. RCVR/ON | 26. FDR/CVR FAULT |
| 19. Digital clock | 27. V/UHF CODE ERASE |
| 20. Radio magnetic indicator (RMI) | 28. IBF |
| 21. HF control panel | 29. HOOK Load indicator |

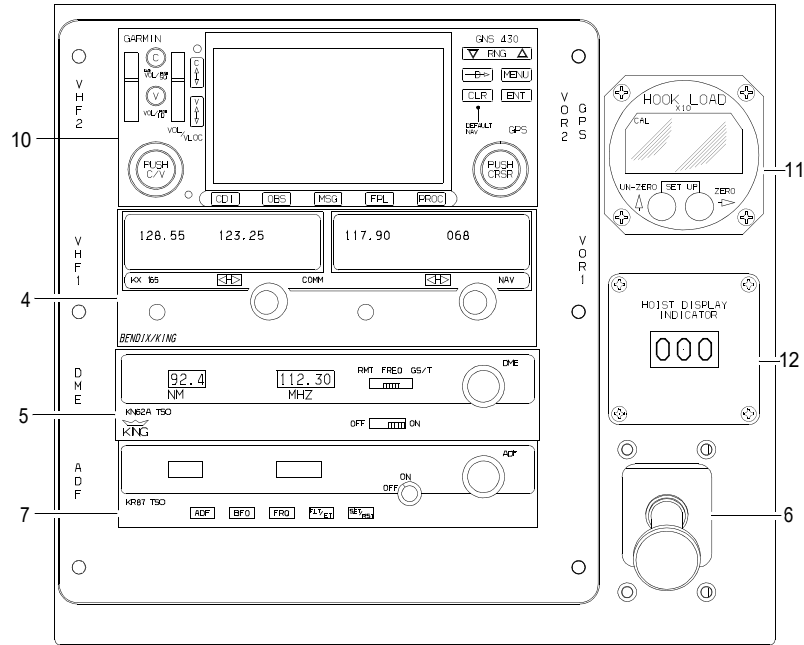
Figure 7-2. (sheet 2 of 2) Instrument Panel (Alternative)



ICN-19-A-157000-G-A0126-00003-A-01-1

1. GPS control panel (if installed)
2. ICS control pushbutton switches
3. RAD/MSTR pushbutton switch
4. VHF control panel (if installed)
5. DME control panel (if installed)
6. Cabin ventilation knob
7. ADF control panel (if installed)
8. XPDR control panel (if installed)
9. IDS FAN caution light

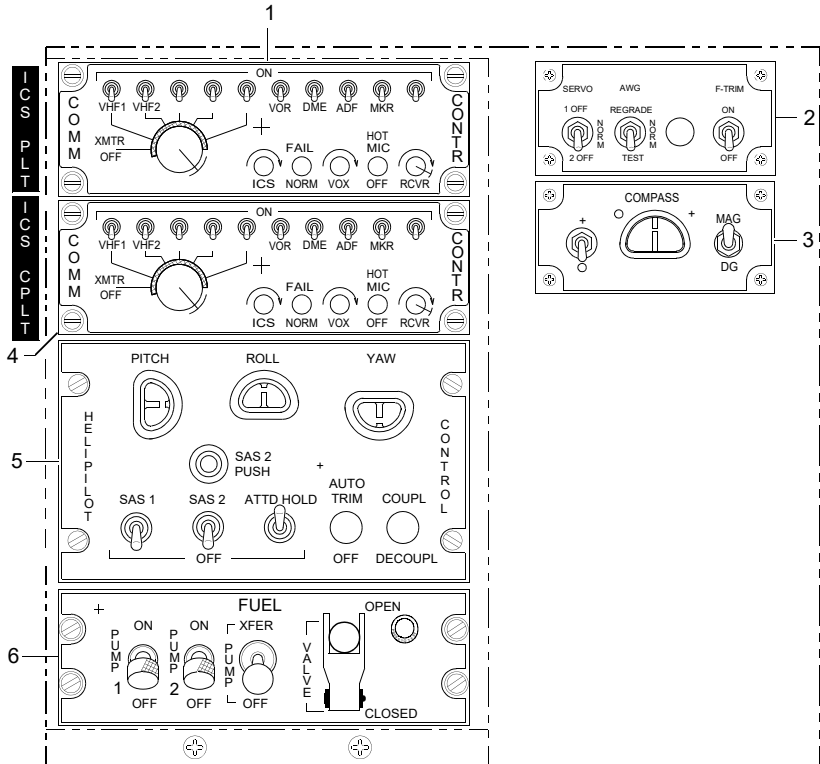
Figure 7-3. (sheet 1 of 2) Front Console (Typical)



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- 10. Garmin GNS430
- 11. Hook load indicator
- 12. Hoist display indicator

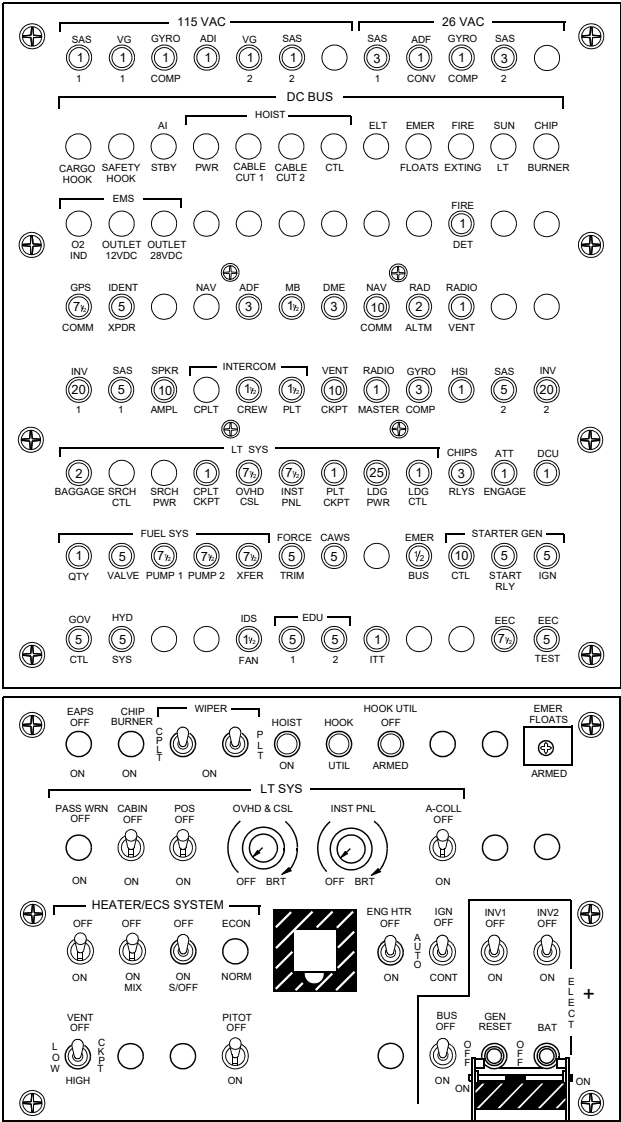
Figure 7-3. (sheet 2 of 2) Front Console (Alternative)



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1. Pilot ICS control panel (if installed)
2. Miscellaneous control panel
3. Gyrocompass control panel
4. Copilot ICS control panel
5. Helipilot control panel
6. Fuel management control panel

Figure 7-4. Central Console (typical)



1. Circuit breaker panel
2. Electrical control panel

Figure 7-5. Overhead Console (typical)

INTEGRATED DISPLAY SYSTEM

The Integrated Instrument Display System (IDS) consists of two Electronic Display Unit (EDU) capable of displaying all the aircraft parameters, warnings, messages and annunciations necessary to operate the aircraft.

The Primary unit (EDU1) in the upper position displays primary flight parameters and all the warnings, cautions and annunciations. The Secondary unit (EDU2) in the lower position displays secondary parameters concerning the fuel system, hydraulic systems, electrical AC and DC systems, engine and transmission oil systems.

The following operating modes are available on the EDUs:

- Primary mode** : This is the normal operating mode on EDU1 when both displays are active. The indications available are: N1, ITT, TQ, N2 and NR together with all the WARNING, CAUTION, ADVISORY and STATUS messages. The ITT markings differ between engine start and normal engine conditions in accordance with the certified limits.
- Secondary mode** : This is the normal operating mode on EDU2 when both displays are active. The indications available are engine oil pressure and temperature, transmission oil pressure and temperature, fuel pressure and fuel quantity (LH & RH), n.1 & n.2 hydraulic systems pressure, DC electrical system load and voltage, AC electrical system voltage, OAT and clock.
- Reversionary mode** : In the event one EDU fails, the remaining unit switches to this mode displaying all the Primary mode information together with the critical information of the Secondary Mode in order to conduct the flight.

Specific maintenance pages are accessible on each EDU when the aircraft is on ground (rotor RPM below 75%). These pages are intended for use by ground personnel. The information available is:

- Exceedance log** : N1, N2, NR, ITT and TQ limits are monitored in real time from engine start to engine shutdown. In the event of an exceedance of one these

parameters, the max value, duration outside the approved limits and description of the exceedance are logged together with the time the event occurred.

- Fault log** : If a warning or caution message is displayed in flight, its occurrence is logged together with the duration of the event. If the message is triggered by a specific flight parameter (such as the hydraulic pressure), the max/min value of the parameter is logged as well.
- EEC Fault log** : The current status of the EEC internal fault log is accessible through each EDU. Detected faults leading to an EEC FAIL condition are marked as critical. Those leading to an EEC DEGRADED condition are marked as noncritical. Historical faults are accessible as well.
- Calibration page** : This page is intended to set the offset on certain sensors. In addition to this, the collective position and the throttle position indications are displayed in order to check the rigging.
- Configuration page** : The IDS hardware and software configuration is displayed together with the EDU Built In Test Log. Date, Time and aircraft configuration can be updated as well.

Each EDU features an ON/OFF switch, two keys to allow for brightness control and five keys on the bottom of the display. These are used to perform an EDU test, scroll warning and caution messages, access maintenance information such as the logs, and to access the configuration page as well.

The EDUs are provided with a cooling fan. The cooling fan failure is indicated by the activation of an IDS FAN caution light on the front console.

Note

For a correct and complete use of the I.D.S., refer to Astronautics A119 I.D.S. Pilot's Guide, publication n. PLG08909D.

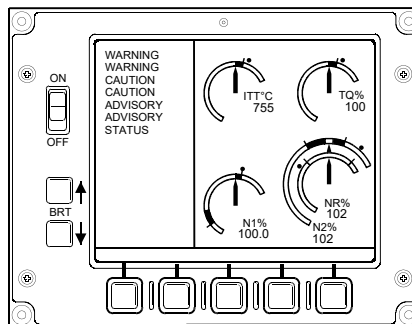
ADVISORY MESSAGES AND STATUS INDICATIONS

(Figure 7-6)

The EDU1 presents a specific area, at the LH side of the display, capable of displaying up to 18 lines of 15 characters each, for warning, caution, advisory and status messages.

The order of priority of the displayed messages is: warnings, cautions, advisories and status. The “last-in” message goes always on the top of the relative screen area and displace the existing list down.

When the messages list exceeds 18, the additional caution/advisory/status messages can be displayed by pressing the MORE key on the bottom side of the EDU, while the warning messages always remain displayed at the top of the list.



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Figure 7-6. Advisory Lights Message and Status Indications

The following table provides a list of the advisory messages and status annunciations displayable on the IDS.

Table 7-1. List of advisory messages and status indication

PANEL WORDING	EXPLANATION
ENG START IGNITER ON PITOT HEAT LANDING LT ON FT OFF VENT ON CHECK DATA	Engine starter activated. Engine ignition system activated. Pitot heater activated. Landing/taxi lights are activated. Force trim is deactivated. Cockpit forced ventilation activated. The calibration curve offset of one or more parameters in the CAL page exceeds $\pm 3\%$ of the full scale.
MAINTENANCE CHECK EDU	Entries present in the maintenance pages of IDS. One or more entries are present in the internal BIT log of one EDU.

POWER PLANT

(Figure 7-7)

The AW119 MKII helicopter is powered by a single Pratt & Whitney Canada PT6B-37A Build Specification 1242 turboshaft engine.

The engine is a free turbine turboshaft propulsion engine incorporating a compressor consisting of 3 axial stages and 1 centrifugal impeller driven by a single-stage compressor turbine. Metered fuel from the fuel control unit is sprayed into an annular combustion chamber by fourteen (14) individual fuel nozzles mounted around the gas generator case.

The engine is separated into two modules:

- power section module;
- reduction gearbox module.

The power section module incorporates the cold section and the hot section, whilst the reduction gearbox module reduces turbine speed to a range suitable for the main and tail rotor drive.

Power is managed by an electronic-hydro pneumatic control system.

The mode select torque motor is used to select the mode of governing. It is actuated by an EEC/MEC mode select switch located in the cockpit. In case of emergency the EEC is by-passed and mechanical Nf governing starts.

The manual override system enables the pilot to manually modulate fuel flow directly with the PLA twist grip on the collective lever.

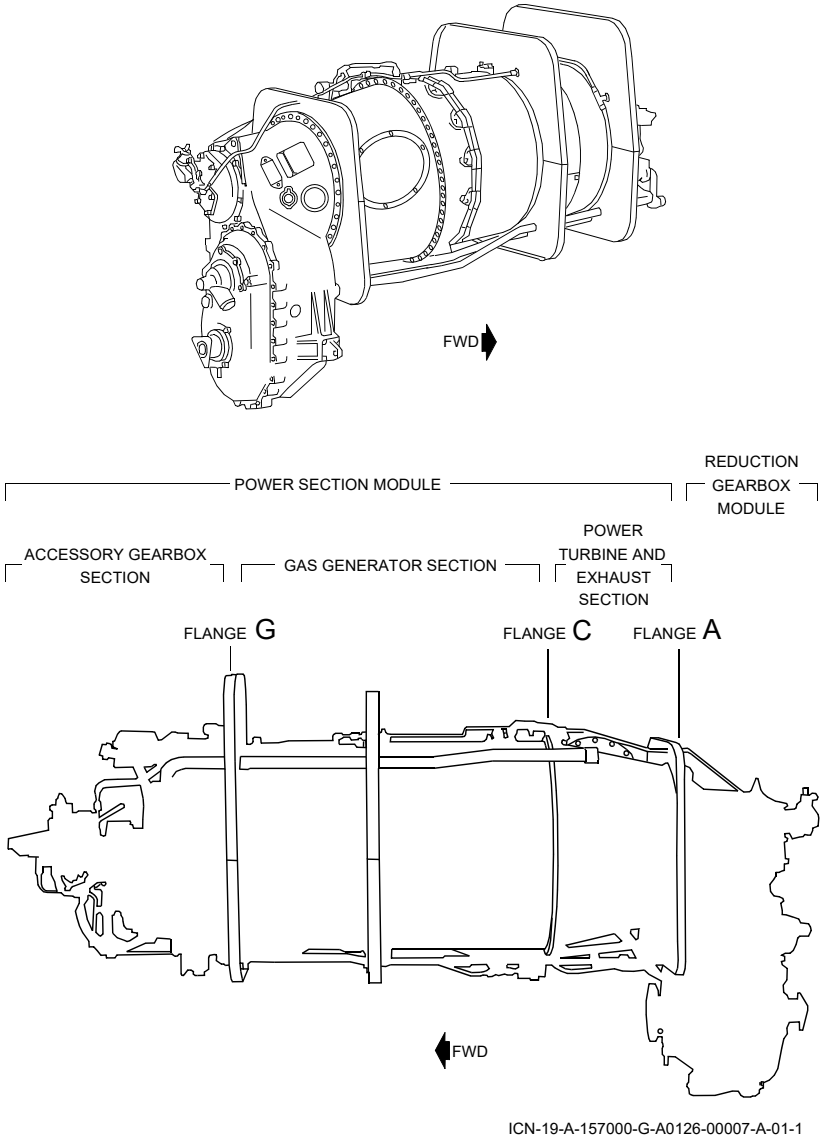


Figure 7-7. Pratt & Whitney Canada PT6B-37A Build Spec. 1242 Engine

ENGINE OIL SYSTEM

(Figure 7-8)

The engine oil system consists of a pressure system, a scavenge system and breather system. The oil tank is integrated in the engine air inlet case and incorporates a drain plug to permit oil drainage. Two chip detectors, one located in the accessory gearbox and the other in the reduction gearbox detect ferrous metal particles and warn pilot of metal contamination.

A low pressure switch is installed in the pressure line; the switch is electrically connected to both EDUs, but the ENG OIL PRESS warning and caution messages are displayed only on EDU1.

A temperature switch is located on the return line from the oil cooler; the switch is electrically connected to both EDUs, but the ENG OIL HOT warning message is displayed only on EDU1.

A temperature and a pressure transmitter are connected to the pressure line; the transmitters are electrically connected to both EDUs, but the engine temperature/pressure indicators are displayed only on EDU2.

The operation of the oil system is fully automatic and therefore no action is required from the pilot except for monitoring of the system indicator and relative caution lights.

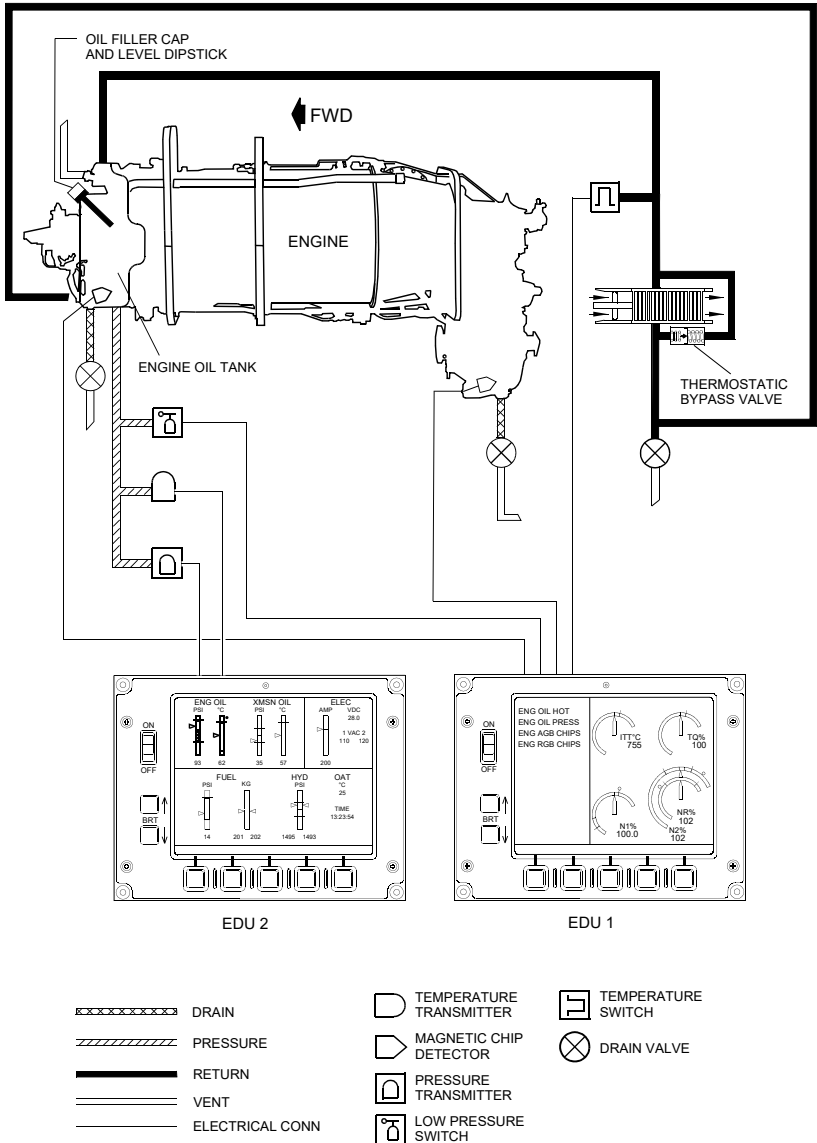


Figure 7-8. Engine Oil System Schematic

ENGINE MONITORING SYSTEM

(Figure 7-8A)

The Aircraft Data Acquisition System (ADAS) is a recording device and exceedance monitor. It is designed as a tool for the maintenance staff to monitor the overall health of the aircraft as well as to document any abuse while in service. The system records the date, time, duration, maximum value and average value of any exceedance. It counts cycles, records flight times, identifies and measures hot starts and records the maximum value observed by each sensor during flight. Identification of exceedances or hot start temperatures are based on user-programmed values for these limits.

The engine/aircraft parameter monitored are mainly:

- Inlet Turbine Temperature (ITT)
- DC Voltmeter
- Torque
- Compressor Speed (N1)
- Turbine Speed (N2)
- Rotor Speed (NR).

With the exception of the ENG MON / TREND switch/fault lamp, the ADAS has no interface with the aircraft pilot or crew. Communication with the system processor is done using a WindowsTM based computer and Altair Avionics Monitor Link Program (MLP). All features of the ADAS are set using MLP.

Note

Required engine maintenance, as prescribed in the applicable airframe or engine documentation, shall not be predicated on the data obtained from the ADAS.

Note

This system shall not be used to supersede or replace the pilot's responsibility to monitor and record engine exceedance information.

Because the ADAS may be programmed with engine operating limits different from those in the Rotorcraft Flight Manual, the rotorcraft's existing engine instruments shall be used to ensure that the engine is operated within the limits specified in the Rotorcraft Flight Manual, and shall also be used to identify exceedances of these limits.

SYSTEM OPERATION

The system incorporates a single ENG MON / TREND switch/fault lamp (ENG MON identifies the switch, TREND is the fault lamp). The lamp ENG MON / TREND switch/fault lamp is white in color. When power is first applied to the processor, the TREND fault lamp will illuminate for approximately 1 to 5 seconds while the system performs self-tests. If any of these tests fail, the TREND fault lamp will remain on.

Note

The TREND fault lamp may momentarily flash during the self-test. This is normal and is part of the lamp self-test.

If the test passes, the TREND fault lamp will extinguish and the processor will enter a system state as described below:

TREND fault lamp off - Normal State:

This is the normal condition of the ADAS when all systems checks have passed and there are no previous flight exceedances recorded.

TREND fault lamp flashing, extinguishing when pressing ENG MON switch - Maintenance State:

When the ADAS is in Maintenance State, either a previous flight exceedance has occurred, or the system has detected a minor fault condition that will not affect its ability to function as an exceedance monitor.

TREND fault lamp flashing, NOT extinguishing when pressing ENG MON switch - Caution State:

When the ADAS is in Caution State, the system has detected a fault condition that may affect its ability to function as an exceedance monitor.

TREND fault lamp Solid - Fault State:

When the ADAS is in Fault State, the system has detected a fault condition that WILL affect its ability to function as an exceedance monitor.

Note

The ADAS will extinguish any of the above TREND fault lamp conditions once the engine has started.

Once the engine has been started the ADAS TREND fault lamp is used to display trend and exceedance information to the pilot and/or crew as follows:

Trend Mode:

The ADAS can be configured to take an automatic trend sample whenever certain engine/flight conditions are met. Once the trend criteria are met, the system will collect a sample of data for later review by maintenance personnel. During this trend sample the ADAS TREND fault lamp will flash at a slow (1 Hz) rate. Pressing the ENG MON switch will manually initiate the same trend data sample.

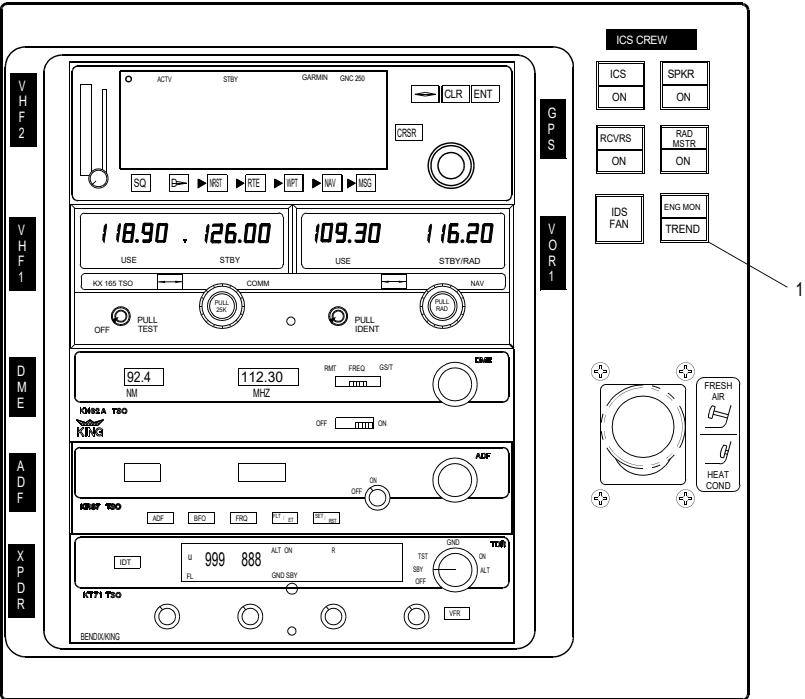
Exceedance Mode:

exceedance Mode is defined as anytime the aircraft or engine has met the criteria defined for an exceedance. exceedance Mode is displayed to the pilot via a 2 Hz lamp flash.

The exceedance can be configured such that exceedance Mode can be acknowledged by pressing the ENG MON switch. If configured this way, the exceedance Mode TREND fault lamp display will extinguish when the ENG MON switch is pressed.

Engine Functions:

The ADAS monitoring system monitors and records engine run, trend, cycle and exceedance information.



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1. ENG MON / TREND switch/fault lamp

Figure 7-8A. Engine Monitoring System - Controls and Indicators

FUEL SYSTEM

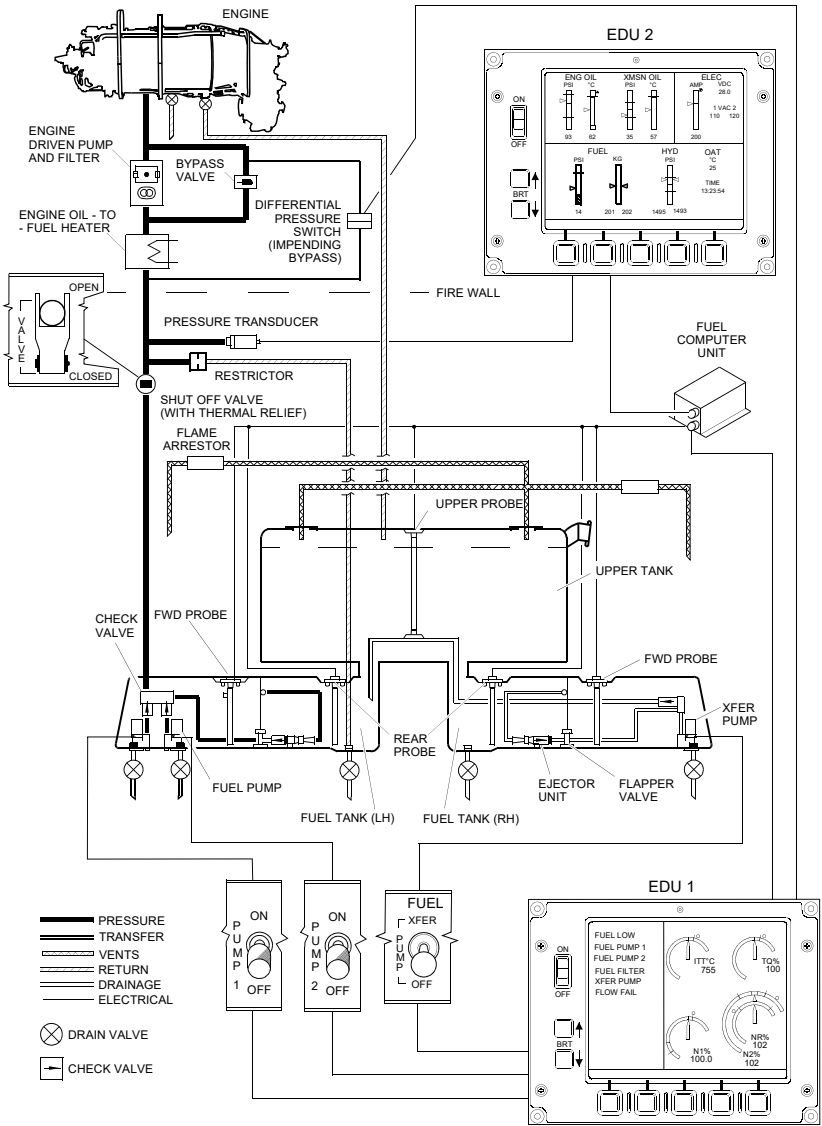
(Figure 7-9)

The fuel system consists of the following sub-systems:

- the storage system
- the distribution system
- the indication system.

The storage system consists of two main lower tanks, the left (n.1) that feeds the engine and the right (n.2) that transfers fuel to the left tank, and one main upper tank, connected to both lower tanks.

The distribution system comprises two fuel pumps on the LH (n.1) lower tank, a transfer pump on the RH (n.2) lower tank, three pressure switches, a shut-off valve and a pressure transducer. The indicating system comprises the pressure indicating system, the fuel quantity indicating system and the fuel low caution circuit, all electrically connected to both EDUs. The caution message is displayed only on EDU1 while the fuel pressure and quantity indications are displayed only on EDU2.



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Figure 7-9. Fuel System Schematic

FLIGHT CONTROL SYSTEMS

(Figure 7-10)

The flight control systems provide the correct control responses when the pilot makes control selections, giving him positive control of the attitude, speed and altitude of the helicopter. The helicopter is provided with conventional flight controls: collective pitch lever, cyclic stick and tail rotor pedals. A mixing unit in the collective/cyclic control systems integrates the control inputs from both systems and provides a common output to the collective/cyclic actuators. Refer to Figure 7-11 for the collective grip assembly and to Figure 7-12 for the cyclic grip assembly.



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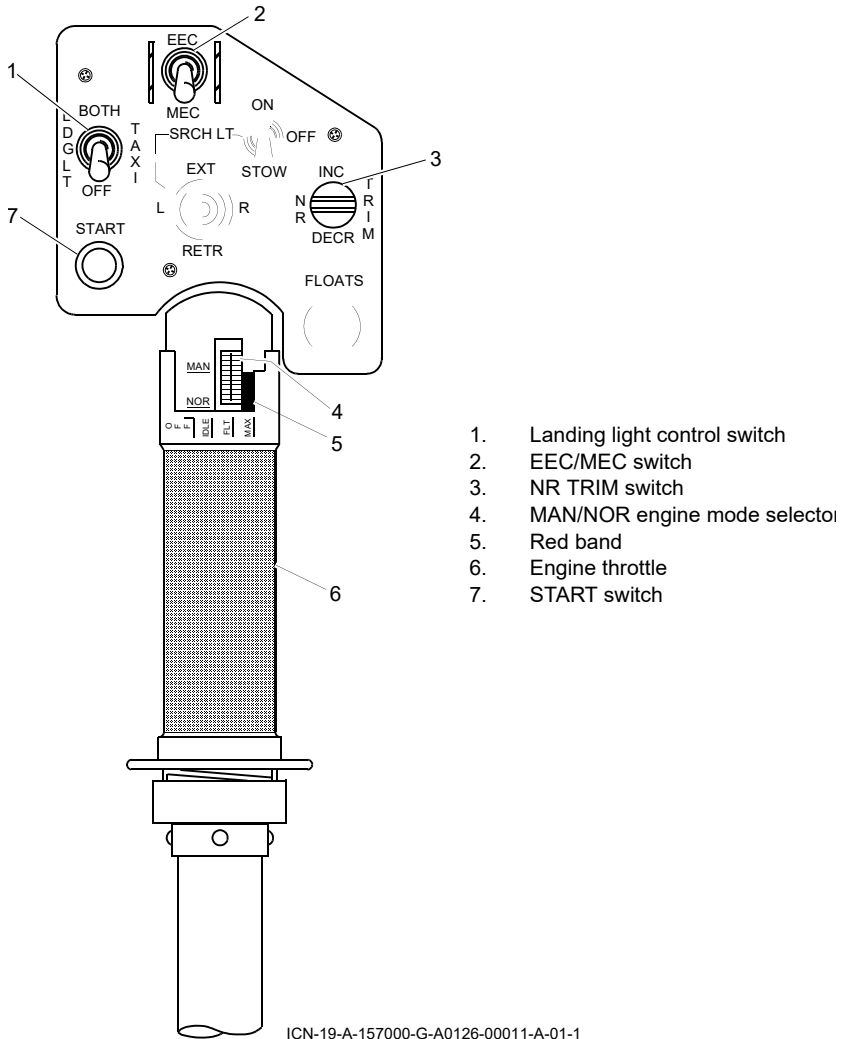
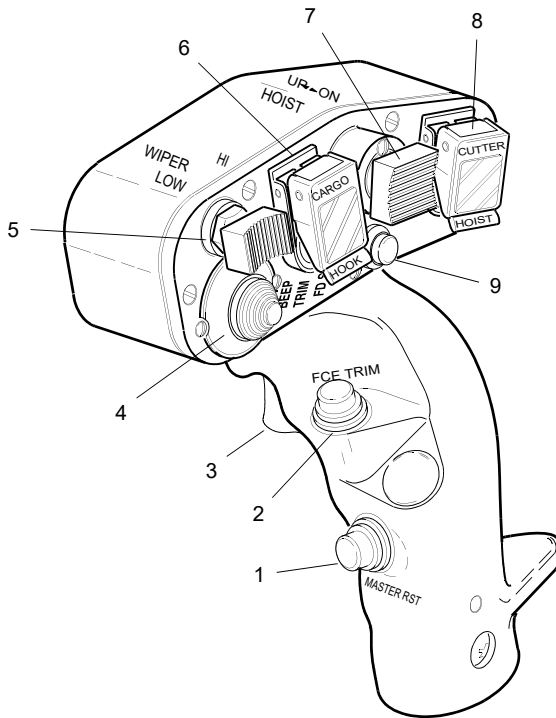


Figure 7-11. Collective Grip Assembly (typical)



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1. Master reset pushbutton switch
2. Force trim pushbutton switch
3. Microphone/ICS trigger switch
4. Beeper trim selector switch
5. Wiper selector switch
6. Cargo hook pushbutton switch (if installed)
7. Hoist switch (if installed)
8. Hoist cable cut pushbutton switch (if installed)
9. FD STBY pushbutton switch

Figure 7-12. Cyclic Grip Assembly (typical)

HYDRAULIC POWER

(Figure 7-13)

Two independent systems supply the power to operate the flight control system and are used to provide the hydraulic power for operation of the main rotor servo actuators (both systems) and the tail rotor servo actuator (n.1 system only).

The hydraulic power consists of the following sub-systems:

- N.1 hydraulic system;
- N.2 hydraulic system.

N.1 HYDRAULIC SYSTEM

This system, which operates at a maximum pressure of 1550 psi, consists of a suction circuit, a pressure circuit, a return circuit and a bypass circuit. The hydraulic fluid is contained in the reservoir located on the right side of the cabin roof. The fluid is sucked by a pump, driven by the main transmission, and is supplied to the servo actuators through the filter group and the accumulator. The system is controlled by the SERVO switch located on the central console. The system comprises ground test fittings, a pressure monitoring circuit and a low pressure monitoring circuit.

The system supplies the main rotor servo actuators and the tail rotor servo actuator.

N.2 HYDRAULIC SYSTEM

This system operates as the n.1 system, but it does not boost the tail rotor servo actuator.