LEONARDO HELICOPTERS

AgustaWestland AW119Kx

ROTORCRAFT FLIGHT MANUAL with G1000H installation

Publication Code 502051501

ROTORCRAFT FLIGHT MANUAL

AW119MKII

with G1000H installation

applicable from 14901 and subs

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LEONARDO S.p.A.
HELICOPTERS
CUSTOMER SUPPORT & SERVICES - ITALY
Via Indipendenza, 2
21018 Sesto Calende (VA) Italy
http://www.leonardo.com
e-mail: gestpubs@leonardo.com

RECORD OF REVISIONS

REVISION No.	SUBJECT	APPROVAL
—	Issue 1	EASA Approvals N° 10054263, 10054264 dated 30 July 2015
1	Revised pages Title page, A-1, B-1, B-2, 1-ii, 1-22, 2-5, 2-6 and 2-9.	EASA Approval N° 10056621 REV. 1 dated 19 February 2016
2	Revised pages Title page, A-1, B-1, B-2, 1-25, 2-14, 2-16, 2-29, 3-15, 3-24, 3-25, 3-28, 3-66, 3-73, 3-74, 3-77, 3-84, 3-104, 3-108, 5-2 and 5-4. Added Supplement 4 and Supplement 7.	Approved with NDC 109G0257-017 NDC 109G3340-011 NDC 109G5020-001 dated 30 June 2016 under the authority of DOA ref EASA.21J.005
3	Revised pages Title page, A-1, B-1, B-2 and 3-77.	Approved with NDC-109G2400-002 dated 22 May 2017 under the authority of DOA ref EASA.21J.005
4	Revised pages Title page, A-1, B-1, B-2, 1-5, 3-ii, 3-15, 3-16, 4-i, 4-ii, 4-9 thru 4-11, 4-13, 4-14, 5-3 thru 5-5 and Supplement 6. Added pages B-3, B-4, 3-26A, 3-26B, 4-14A thru 4-14F and Supplement 25.	EASA Approval N° 10063634 dated 06 November 2017
5	Revised pages Title page, A-1, B-1 thru B-4, 5-3 and 5-5, Added Supplement 26.	Approved with NDC-109G2300-002 dated 06 November 2017 under the authority of DOA ref EASA.21J.005

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6	Revised pages Title page A-2, B-1 thru B-4, vii, 1-ii, 1-21, 2-ii, 2-36, 2-41, 3-iii, 3-vii, 3-3, 3-6, 3-30, 3-31, 3-53, 3-67 thru 3-69, 3-82, 3-83, 3-98, 3-99, 3-101, 3-102, 3-107, 5-1, Supplement 2, Supplement 3, Supplement 6, Supplement 7 and Supplement 25. <u>Applicable to G1000H:</u> Revised pages 1-i, 1-iii, 1-11, 1-24, 1-26 thru 1-35, 2-32, 3-iv, 3-v, 3-vi, 3-7, 3-21, 3-51, 3-57, 3-59, 3-60, 3-85 thru 3-88, 3-90, 3-95 thru 3-97, 3-104, 3-105, 3-108 thru 3-111, 5-3 and 5-5. Added pages 3-84A and 3-84B. <u>Applicable to G1000H NXi:</u> Revised pages 1-i, 1-iii, 1-11, 1-24, 1-26 thru 1-35, 2-32, 3-iv, 3-v, 3-vi, 3-7, 3-21, 3-51, 3-57, 3-59, 3-60, 3-85 thru 3-88, 3-90, 3-95 thru 3-97, 3-104, 3-105, 3-108 thru 3-111, 5-3 and 5-5. Added pages 1-30A,1-30B, 3-84A and 3-84B. Added Supplement 24.	EASA Approval N° 10068178 dated 21 December 2018
7	Revised pages Title page A-2, B-1 thru B-4, 2-i, 2-18, 2-31, 3-58, 5-2, Supplement 6 and C-1. Added pages B-5, B-6 and Supplement 14. <u>Applicable to G1000H:</u> Revised pages 2-14, 2-15, 2-19, 2-33, 3-13, 3-57 and 5-4. <u>Applicable to G1000H NXi:</u> Revised pages 1-33, 2-14, 2-15, 2-19, 2-33, 3-iv, 3-13, 3-57, 3-84A, 5-4 and 5-5.	Approved with NDC-109G2590-002 NDC-109G0257-021 dated 23 May 2019 under the authority of DOA ref EASA.21J.005

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8	Revised pages Title page B-1 thru B-6 and 3-iii . Added pages A-3 and A-4. Applicable to G1000H: Revised pages 1-22, 2-ii, 2-46, 3-13, 5-3 and 5-5. Added Supplement 27. Applicable to G1000H NXi: Revised pages 1-22, 1-31, 2-ii, 2-15, 2-46, 3-85, 3-95, 5-3 and 5-5.	Approved with NDC-109G4640-008 NDC-109G2310-036 dated 13 September 2019 under the authority of DOA ref EASA.21J.005
9	Revised pages Title page A-3, B-1 thru B-6 and 1-5.	EASA Approval N° 10072157 dated 23 December 2019
10	Revised pages Title page, A-3 and B-1 thru B-6 and C-1. Applicable to G1000H NXi: Revised Supplement 24.	Approved with NDC-109G3340-016 dated 21 October 2020 under the authority of DOA ref EASA.21J.005
11	Revised pages Title page A-3 and B-1 thru B-6. Applicable to G1000H: Revised pages 5-3 thru 5-5. Applicable to G1000H NXi: Revised pages 5-3 thru 5-5. Added Supplement 28.	EASA Approval N° 10074964 dated 25 November 2020
12	Revised pages Title page A-3, B-1 thru B-6, 3-69, 3-70 and Supplement 25. Applicable to G1000H: Revised pages 1-iii, 1-25, 1-36, 2-38, 4-i, 4-ii, 4-7 and 4-8. Applicable to G1000H NXi: Revised pages 1-iii, 1-25, 1-26, 1-36, 2-ii, 2-38, 4-i, 4-ii, 4-7 and 4-8. Added pages 1-26A, 1-26B, 4-8A and 4-8B.	EASA Approval N° 10075564 dated 3 February 2021

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13	Revised pages Title page A-4 and B-1 thru B-6. Applicable to G1000H: Revised pages 5-3 and 5-5. Applicable to G1000H NXi: Revised pages 1-iii, 5-3 and 5-5. Added pages 1-36A, 1-36B and Supplement 29.	EASA Approval N° 10076798 dated 1 July 2021
	Applicable to G1000H NXi: Added Supplement 30.	Approved with NDC-109G2310-041 dated 29 June 2021 under the authority of DOA ref EASA.21J.005
14	Revised pages Title page A-4 and B-1 thru B-6, vii, 2-6, 2-26, 3-78 and C-1. Applicable to G1000H NXi: Revised pages 1-22, 2-ii and 2-46.	Approved with NDC-109G0257-024 dated 4 November 2021 under the authority of DOA ref EASA.21J.005
15	Revised pages Title page A-4 and B-1 thru B-6, vii and Supplement 4. Applicable to G1000H: Revised pages 5-3 and 5-5. Added Supplement 31. Applicable to G1000H NXi: Revised pages 5-3 and 5-5.	EASA Approval N° 10078678 dated 28 February 2022
16	Revised pages Title page A-4, B-1 thru B-6, 2-13, 2-21 thru 2-23, 2-32, 3-17, 3-18, 3-26A and C-1. Applicable to G1000H: Revised page 2-14, 2-19 and 2-33. Applicable to G1000H NXi: Revised page 2-14, 2-19 and 2-33.	Approved with NDC-109G0257-026, NDC-109G6720-002 dated 31 May 2022 under the authority of DOA ref EASA.21J.005

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17	Applicable to G1000H NXi: Revised page 5-3 thru 5-5.	EASA Approval N° 10080973 dated 21 December 2022 Approved with NDC-109G2310-011, dated 21 December 2022 under the authority of DOA ref EASA.21J.005
	Applicable to G1000H NXi: Added Supplement 33.	EASA Approval N° 10080973 dated 21 December 2022
	Applicable to G1000H NXi: Added Supplement 33 (Section 7).	Approved with NDC-109G4360-003, dated 21 December 2022 under the authority of DOA ref EASA.21J.005
	Applicable to G1000H NXi: Added Supplement 34.	Approved with NDC-109G2310-011, dated 21 December 2022 under the authority of DOA ref EASA.21J.005
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18	Revised pages Title page A-5, B-1 thru B-6, 3-73, 3-75 and 3-76.	EASA Approval N° 10081340 dated 24 February 2023

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19	Applicable to G1000H: Revised Supplement 31.	Approved with NDC-109G9300-014 dated 29 September 2023 under the authority of DOA ref EASA.21J.005
	Revised pages 3-25 and 3-26.	Approved with NDC-109G0257-029 dated 29 Septenber 2023 under the authority of DOA ref EASA.21J.005
	Revised pages Title page ROR-1 thru ROR-6, LOEP-1 thru LOEP-6 and Page i.	Manufacturer's Data
20	Revised page 1-14.	EASA Approval N° 10083793 dated 29 January 2024
	Revised pages Title page, ROR-6 and LOEP-1 thru LOEP-6.	Manufacturer's Data
21	Revised Supplement 6.	Approved with NDC-109G9750-004, NDC-109G3440-003 dated 24 April 2024 under the authority of DOA ref EASA.21J.005
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	Revised pages 2-31.	Approved with NDC-109G9300-013, dated 24 April 2024 under the authority of DOA ref EASA.21J.005

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21 (Cont'd)	Revised pages Title page, ROR-6 and LOEP-1 thru LOEP-8, TOC-1, TOC-2, I-1 thru I-6, 2-i, 2-13, 2-29 thru 2-30, 2-33, Supplement 3 and C-2. Added pages ROR-7, ROR-8, 5-i thru 5-iv. Applicable to G1000H: Revised pages 2-ii, 2-32. Applicable to G1000H NXi: Revised pages 2-ii, 2-32, 5-3 and 5-5.	Manufacturer's Data
22	Applicable to G1000H: Revised page 3-50. Applicable to G1000H NXi: Revised page 3-50.	Approved with NDC-109G0257-031 dated 11 November 2025 under the authority of DOA ref EASA.21J.005
	Revised pages 1-12, 1-19, 3-71, 3-79, 3-80, 3-89, 3-91, 3-92, 3-103, 6-23, 7-46, 7-47 and 8-1. Applicable to G1000H: Revised pages 2-38 and 3-88. Applicable to G1000H NXi: Revised pages 1-30 and Supplement 28.	Approved under the Authority of DOA ref. EASA.21J.005 (ref. MAF 109G0257A458 dated 11 November 2025)
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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
— EEC	:	Engine Electronic Control
— EIS	:	Engine Indication System
— EMM	:	Engine Maintenance Manual
— ESIS	:	Electronic Standby Instrument System
— GDC	:	Garmin air Data Computer
— GEA	:	Garmin Engine/Airframe unit
— GIA	:	Garmin Integrated Avionic unit
— GW	:	Gross Weight
— GSC	:	Garmin Signal Conditioner
— Hd	:	Density altitude

— Helipilot	:	Automatic Flight Control System (SAS + Attitude Hold)
— Hp	:	Pressure Altitude
— HSI	:	Horizontal Situation Indicator
— HTAWS	:	Helicopter Terrain Awareness and Warning System
— IAS	:	Indicated AirSpeed
— ICS	:	InterCommunication System
— IGE	:	In Ground Effect
— ISA	:	International Standard Atmosphere
— ITT	:	Inter-Turbine Temperature
— KCAS	:	Knots Calibrated AirSpeed
— KIAS	:	Knots Indicated AirSpeed
— LH	:	Left hand
— LRU	:	Line Replaceable Units
— MAN	:	MANual override system
— MCL	:	Master Caution Light
— MCP	:	Maximum Continuous Power
— MEC	:	MEChanical
— MFD	:	Multi Function Display
— 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
— PFD : Primary Flight Display
— PLA : Power Lever Angle (throttle)
— QTY : QuantiTY
— RFM : Rotorcraft Flight Manual
— RH : Right Hand
— RMI : Radio Magnetic Indicator
— RNP : Required Navigation Performance
— ROC : Rate Of Climb in ft/min
— RPM : Revolutions Per Minute
— SAS : Stabilization Augmentation System
— SVS : Synthetic View System
— TAS : True AirSpeed in knots
— TAS : Traffic Advisory System
— TIS : Traffic Information Service
— TOP : Take-Off Power
— TRQ : ToRQue
— TQ : Engine TorQue
— VFR : Visual Flight Rules
— VHF : Very High Frequency
— V_{MAX} : Maximum Airspeed with external kit installed
— V_{NE} : Velocity Never Exceed
— VSI : Vertical Speed Indicator
— V_Y : Best rate of climb speed
— Xfer : Transfer
— WCA : Warning Caution Advisory

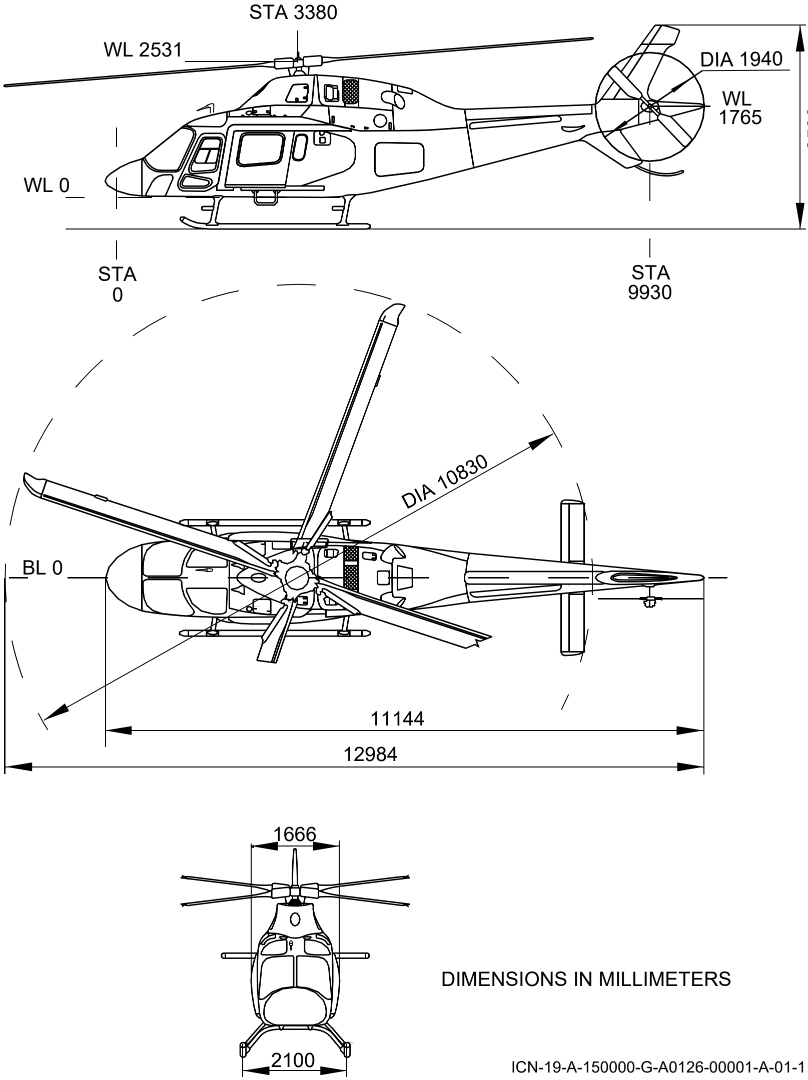

Figure 1. Helicopter — Three views

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.

No aerobatic maneuvres 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).

AIRSPEED 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

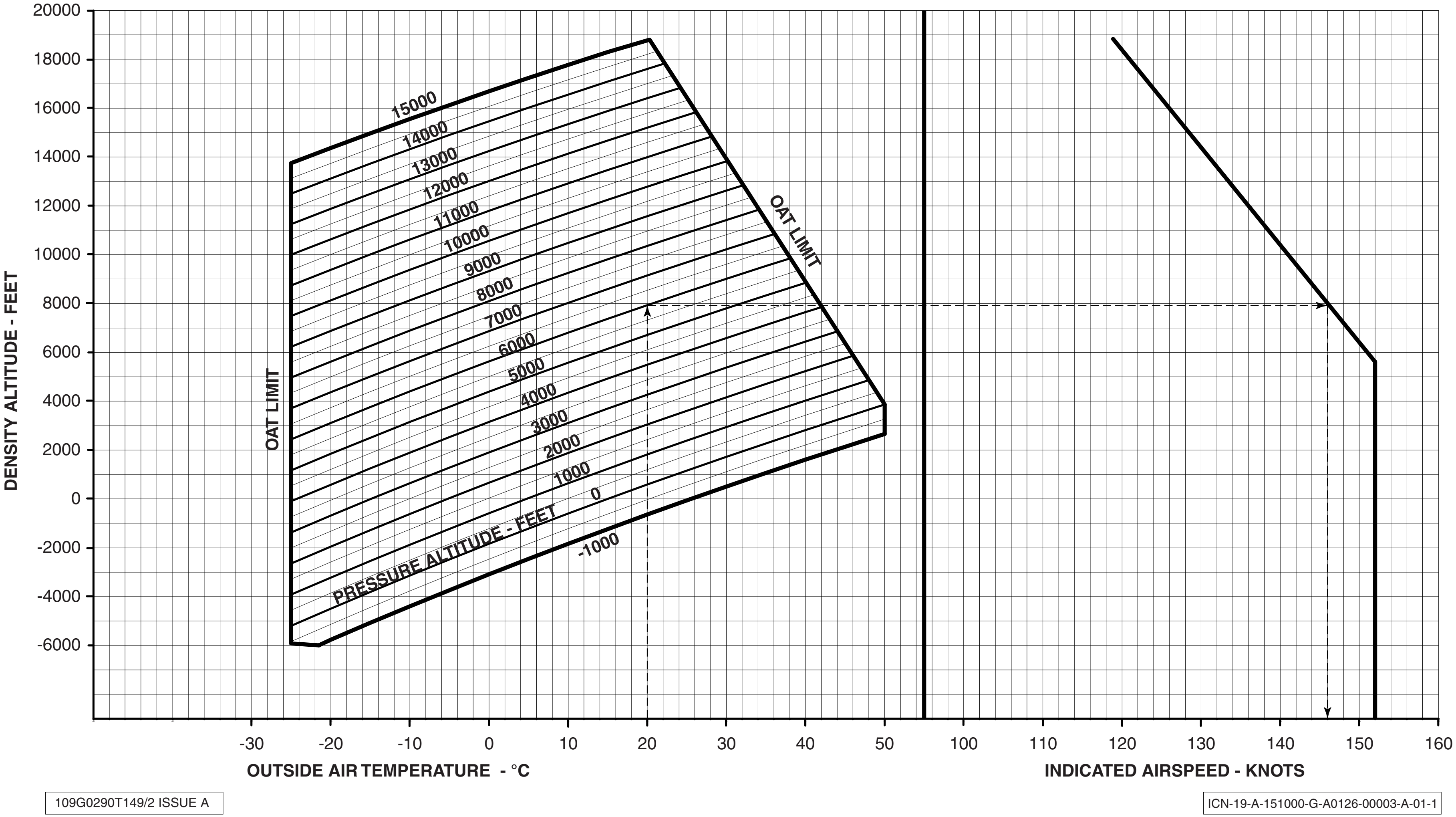

Figure 1-1. Airspeed Limitation - V_{NE} (power on/off)

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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

Nose-down operations (unobstructed tail) .... : 5 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).

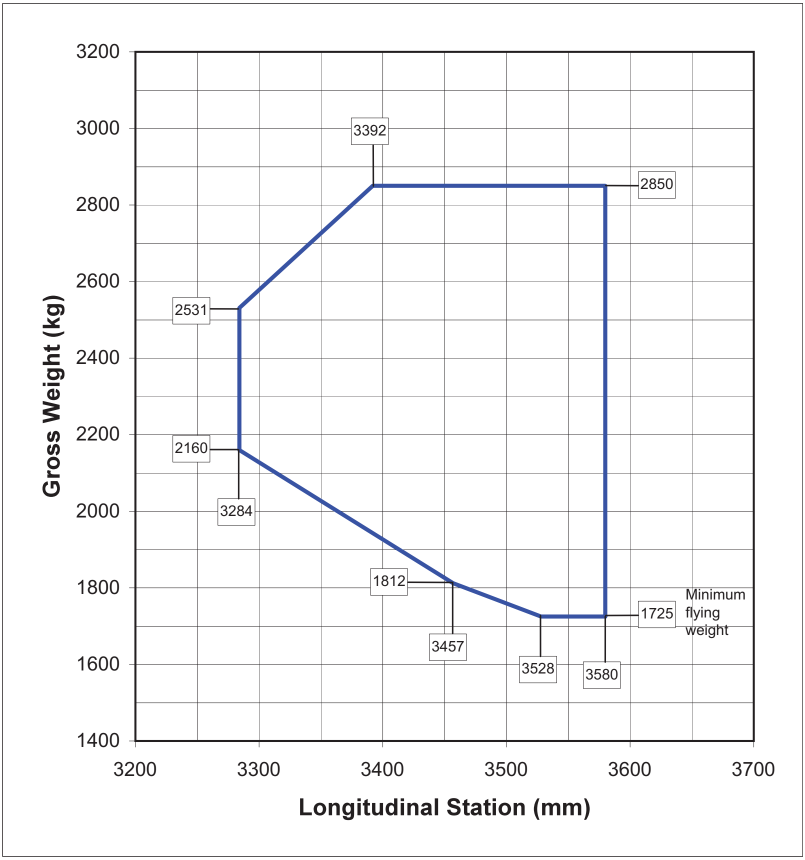
CENTER OF GRAVITY LIMITATIONS

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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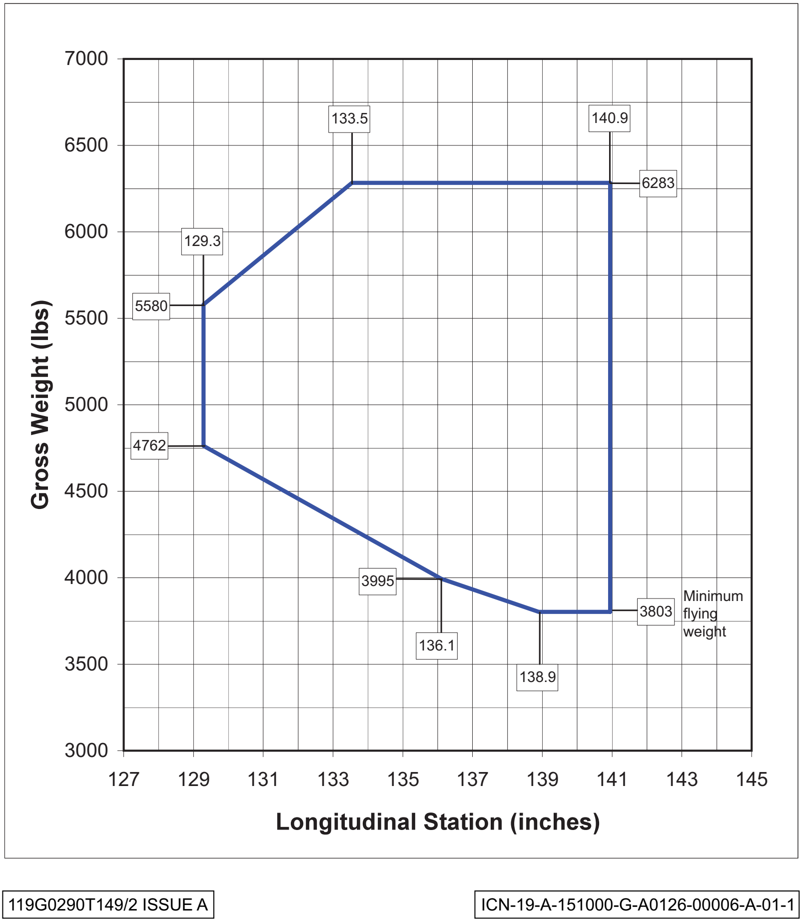
Note

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

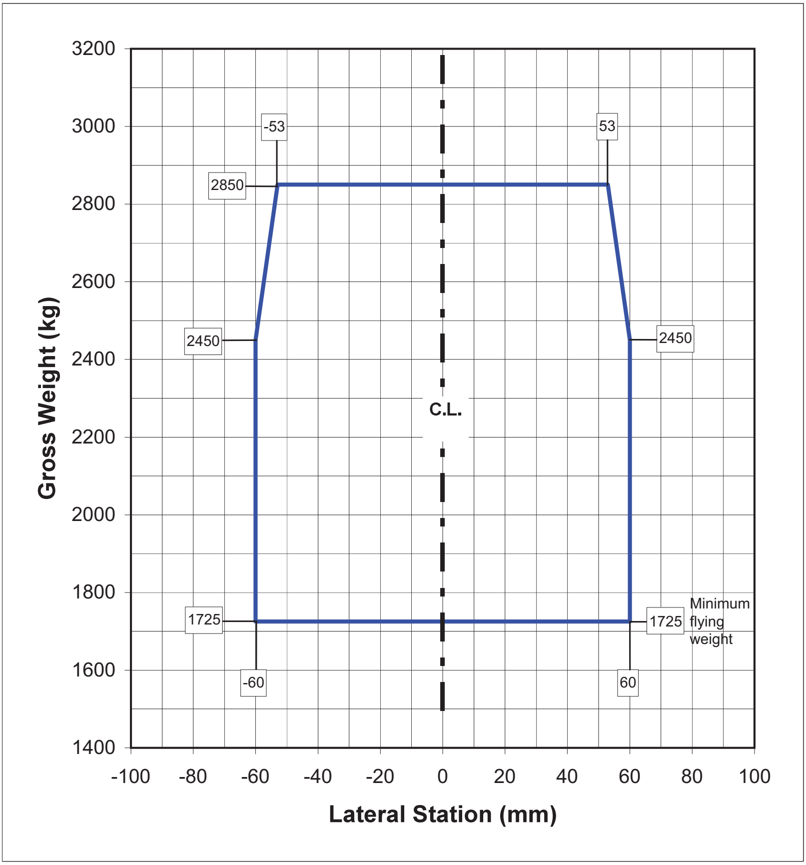
Figure 1-2. Weight and Longitudinal CG Envelope (metric units)



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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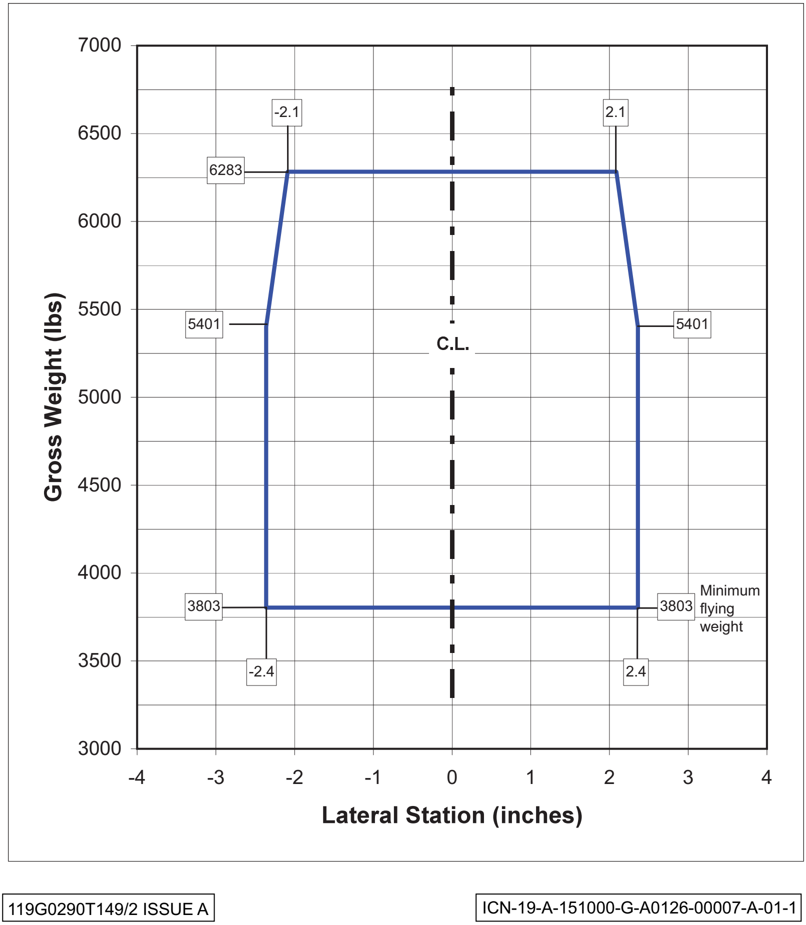
Note

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)



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

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

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

The maximum ambient air temperature for operation decreases with pressure altitude at the standard lapse rate of 2 °C (3.6 °F) every 1000 ft (305 m) up to 15000 ft (4572 m).

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)

Normal Operation

Maximum continuous ....: 755 °C

Take-off (5 minutes) ....: 755 to 810 °C

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

Transient (5 seconds)..: 860 °C

Starting

Maximum...: 870 °C

Transient ....: 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 (TRQ)

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 ± 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 minutes)..: 300 A

HYDRAULIC SYSTEM LIMITATIONS

FLUID PRESSURE

Minimum.. : 1200 psi

Cautionary.. : 1200 to 1400 psi

Continuous operation .... : 1400 to 1600 psi

Maximum... : 1600 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.

AVIONIC LIMITATIONS

SYSTEM LIMITATIONS

Synthetic View System Limitations

Terrain-following flight using Synthetic View System is prohibited. Do not use hue or grid as cues for altitude or direction.

Do not attempt to navigate using the terrain depiction provided by the Synthetic View System.

Use of Pathway symbology to provide guidance or guarantee terrain separation is prohibited.

It remains pilot's responsibility to provide self-separation from terrain or obstacles.

Helicopter Terrain Awareness and Warning System (HTAWS) Limitations

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

HTAWS must not be used for terrain-following flight. Do not use hue or grid as cues for altitude or direction.

HTAWS can be useful as an aid to situational awareness only.

CAUTION

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

CAUTION

Obstacles database may not include all existing obstructions.

Traffic Avoidance System (TAS) Limitations

The TAS is an aid to the situational awareness only.

The pilot must maneuvre the helicopter based only on positive visual acquisition of the conflicting traffic.

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/m^2 (102 lb/sq ft)

LANDING LIGHTS OPERATION VS MAGNETIC COMPASS INDICATION LIMITATIONS

Do not rely on standby magnetic compass indications when landing lights are in use.

UPPER DECK WINTER KIT LIMITATIONS (IF INSTALLED)

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

INSTRUMENT MARKINGS

Instruments are marked as follows:

Maximum/Minimum operating limits............................ : Red radial line

Normal operating range .... : Green arc

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

Transient limit...: Red “T”

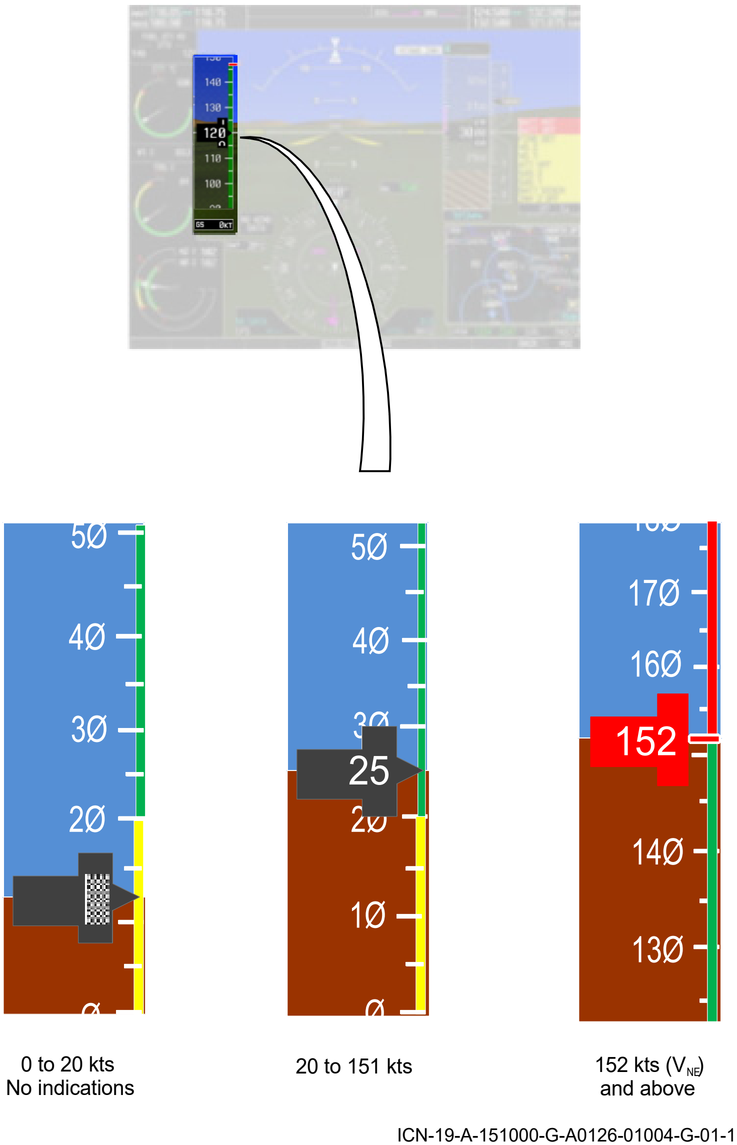
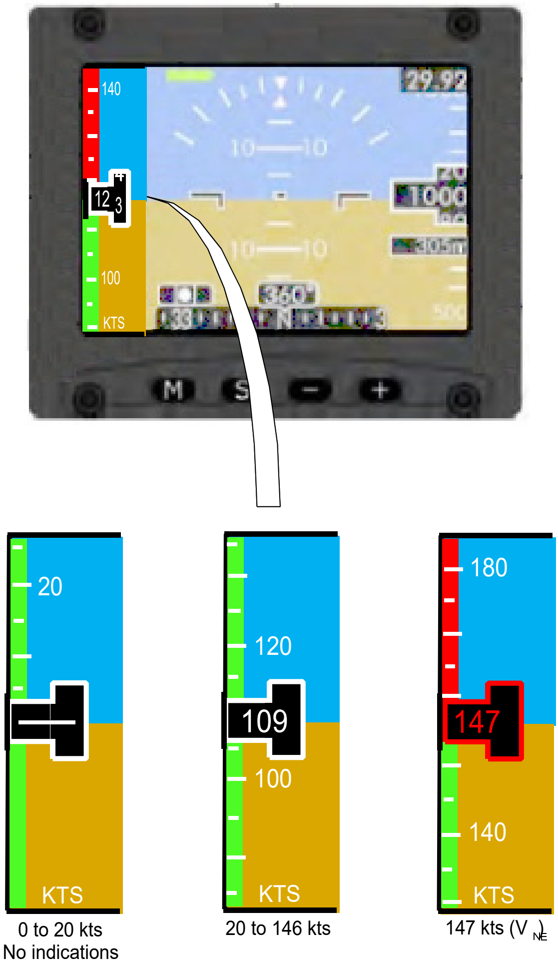


Figure 1-6. PFD Airspeed indicator



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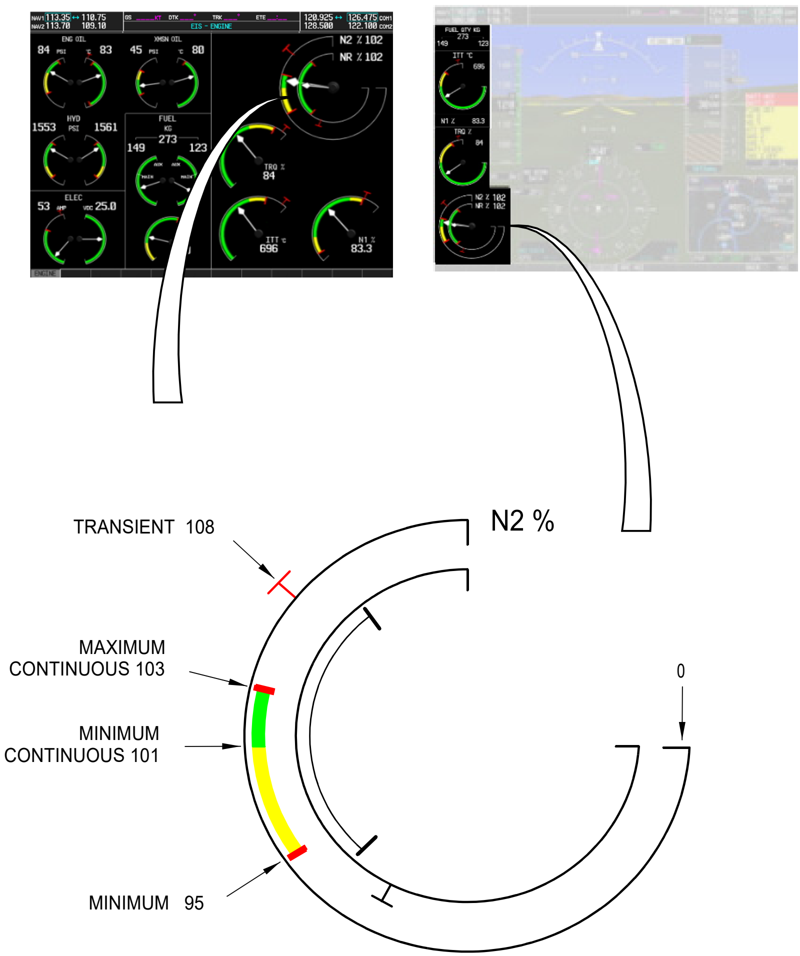
Note

Due to lack of s/w correction capability the ESIS reading is up to 5 kts less than the PFD indicated airspeed.

Figure 1-7. ESIS Airspeed indicator



MFD (ENGINE page) and PFD

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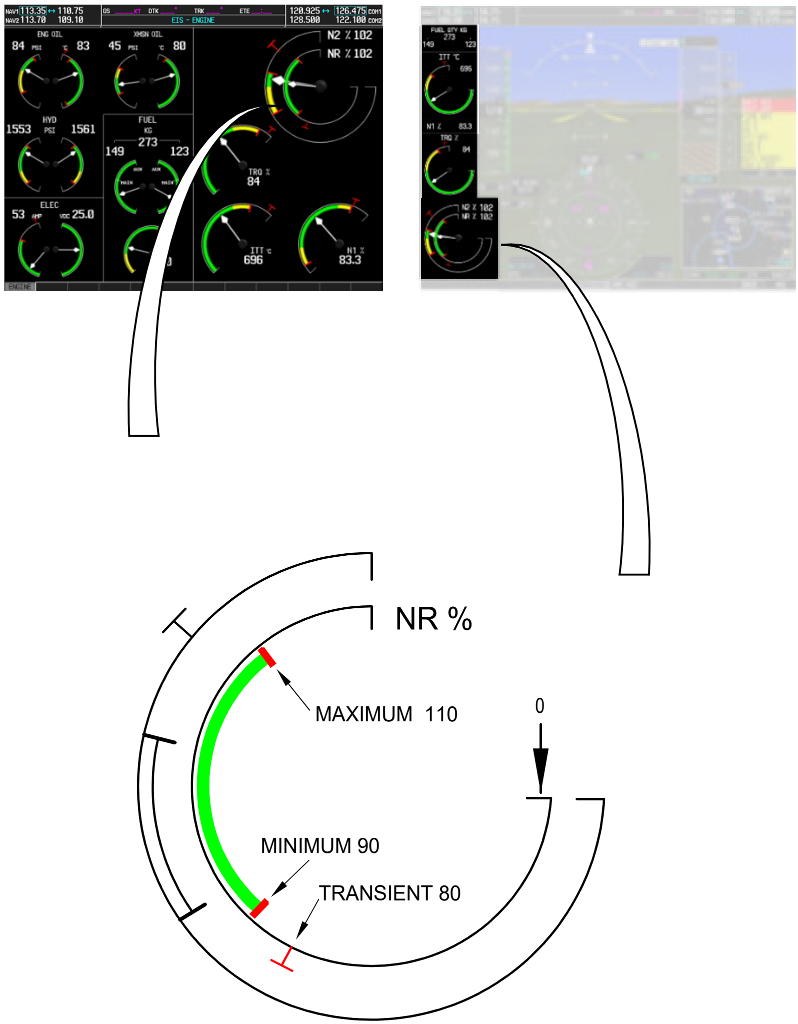
Figure 1-8. Power Turbine Speed (N2)



MFD (ENGINE page) and PFD

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Figure 1-9. Rotor Speed (NR)

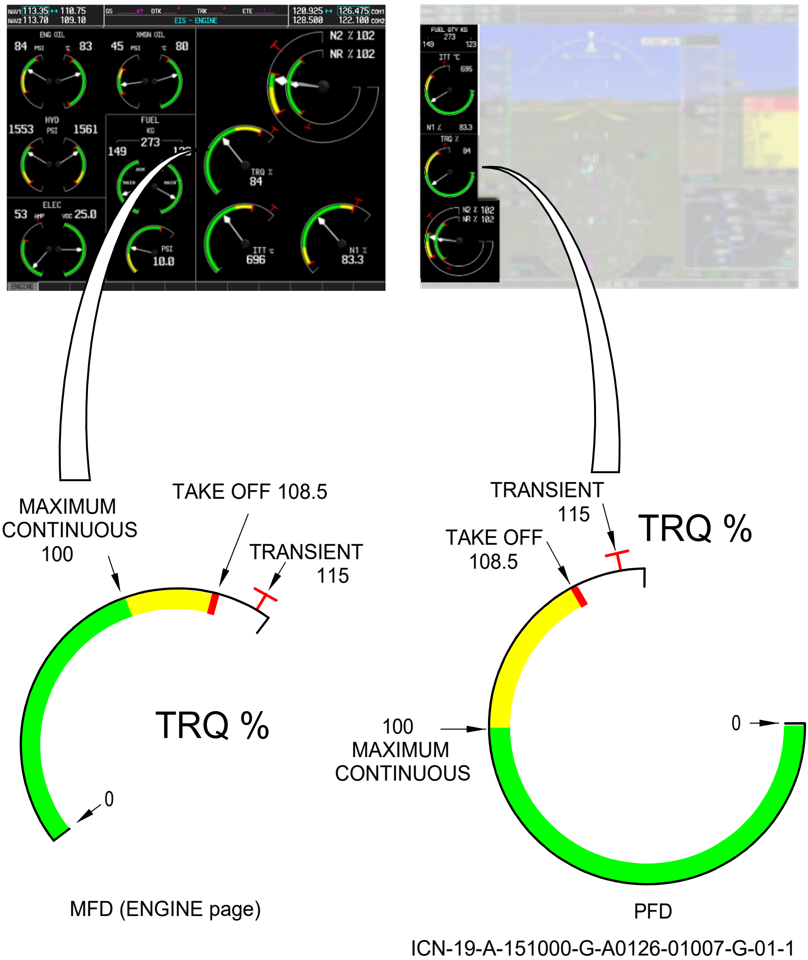

Figure 1-10. Torque (TRQ)

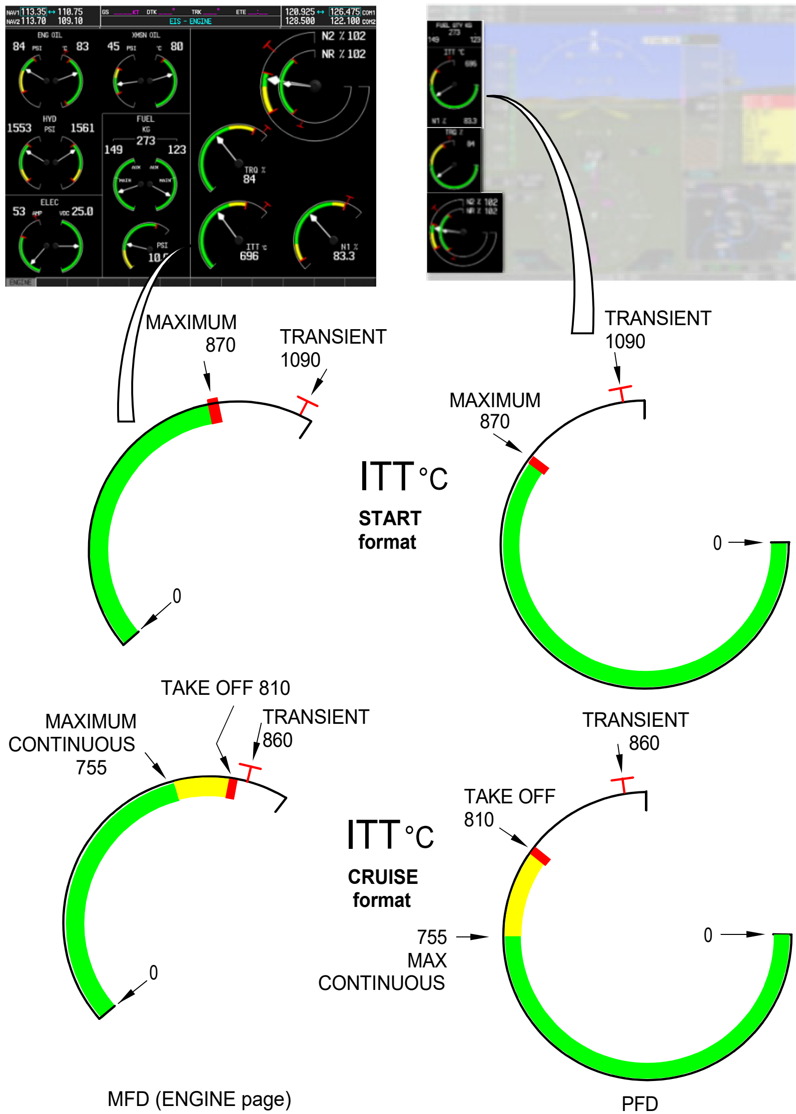

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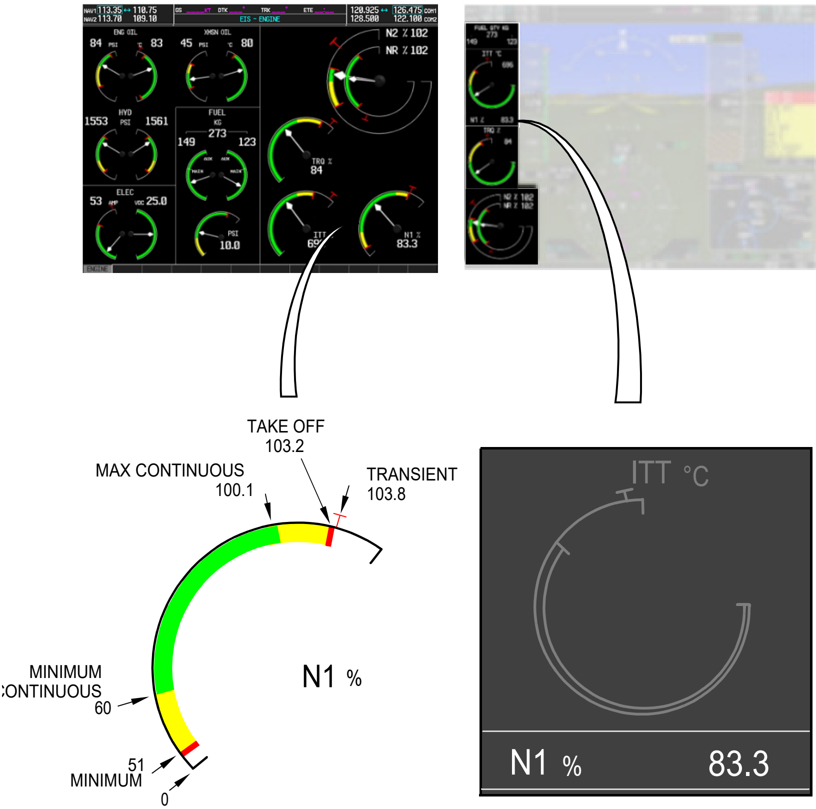
Figure 1-11. Inter Turbine Temperature (ITT)



MFD (ENGINE page) PFD

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Figure 1-12. Gas Generator Speed (N1)

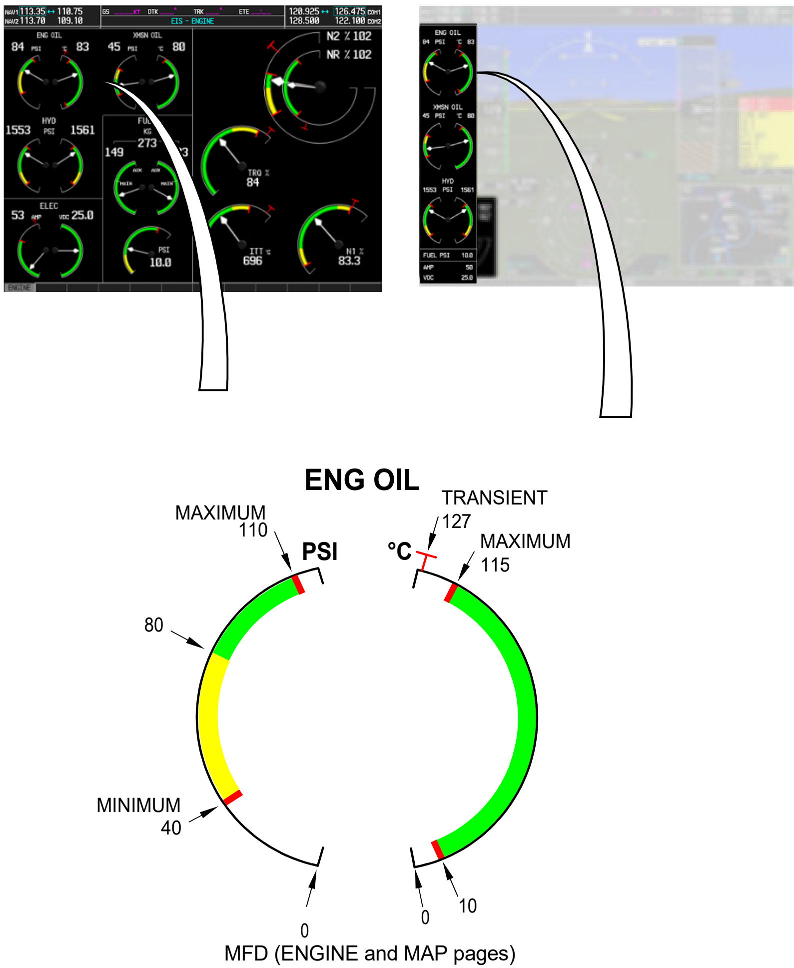

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Figure 1-13. Engine oil (pressure and temperature)

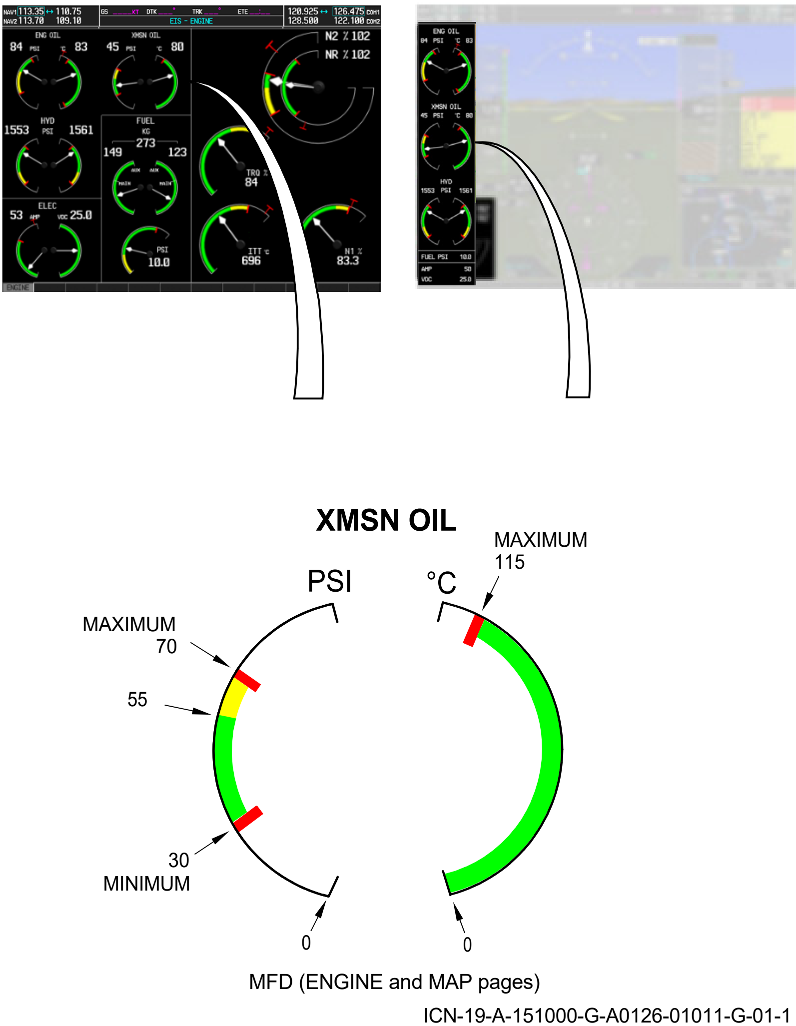


Figure 1-14. Transmission oil (pressure and temperature)

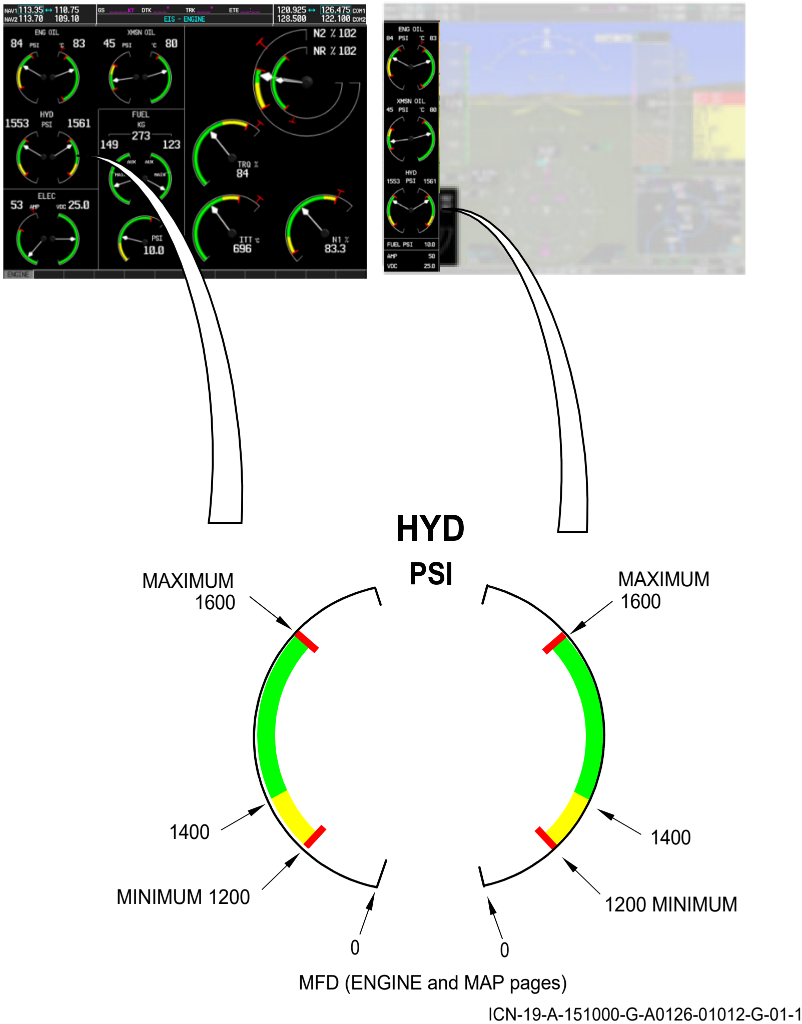
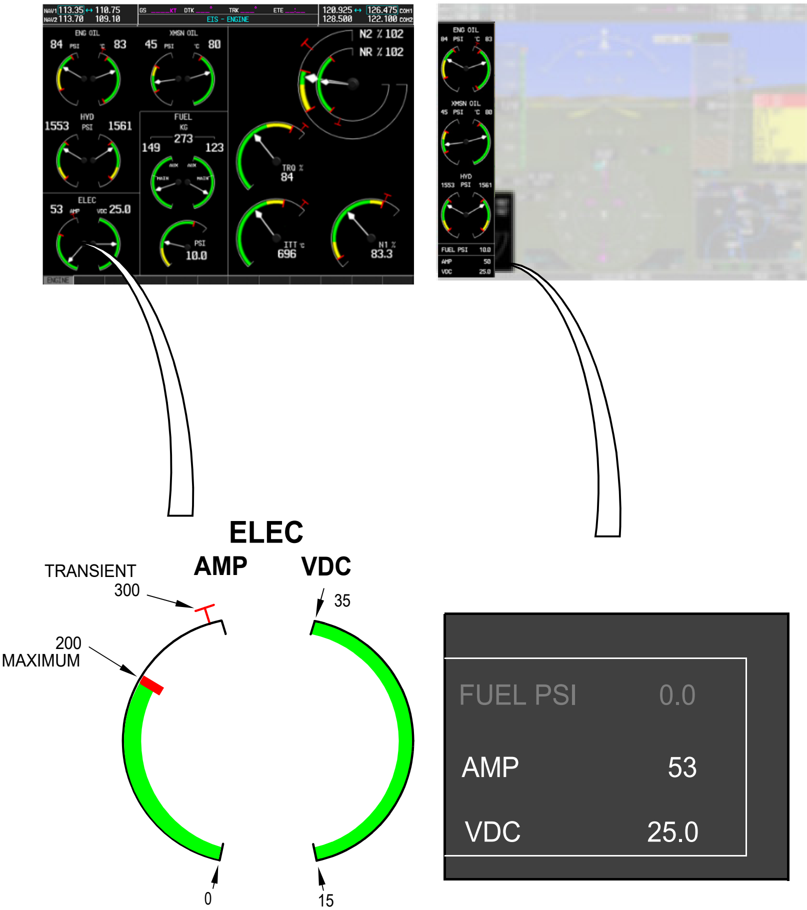


Figure 1-15. Hydraulic systems N° 1 and N° 2 pressure



MFD (ENGINE and MAP pages)

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Figure 1-16. Ammeter / Voltmeter

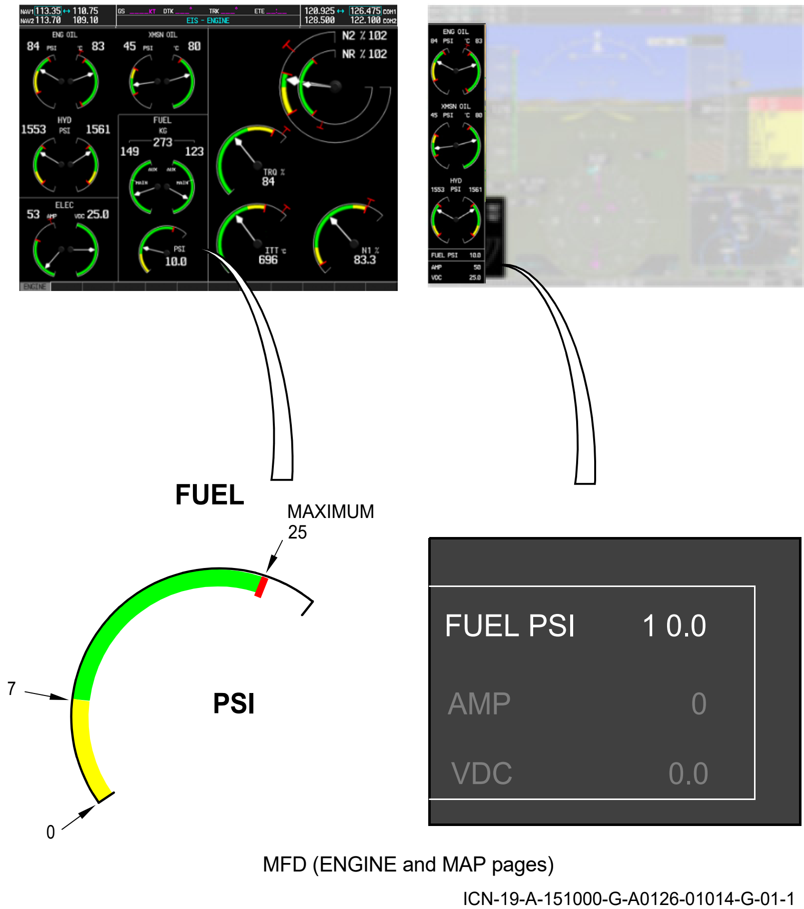
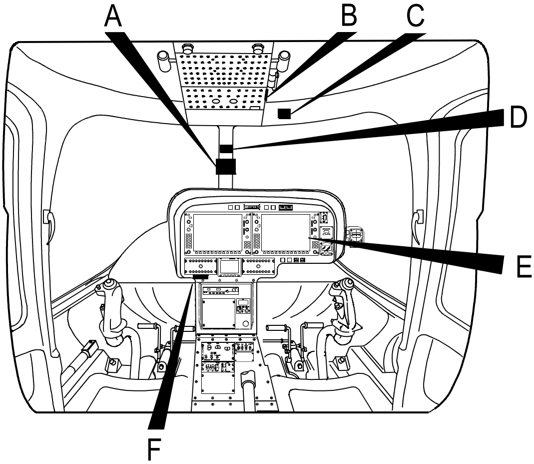


Figure 1-17. Fuel pressure

PLACARDS



A

Vne AIRSPEED LIMITATIONS - KIAS						
OAT °C \ Hp ft	-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

ESIS Vne : Reduce Vne by 5 kts

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Figure 1-18. Cockpit Placards (sheet 1 of 2)

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

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

F

USABLE FUEL	
TANK 1 238 Kg	TANK 2 238 Kg

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

Figure 1-18. Cockpit Placards (sheet 2 of 2)

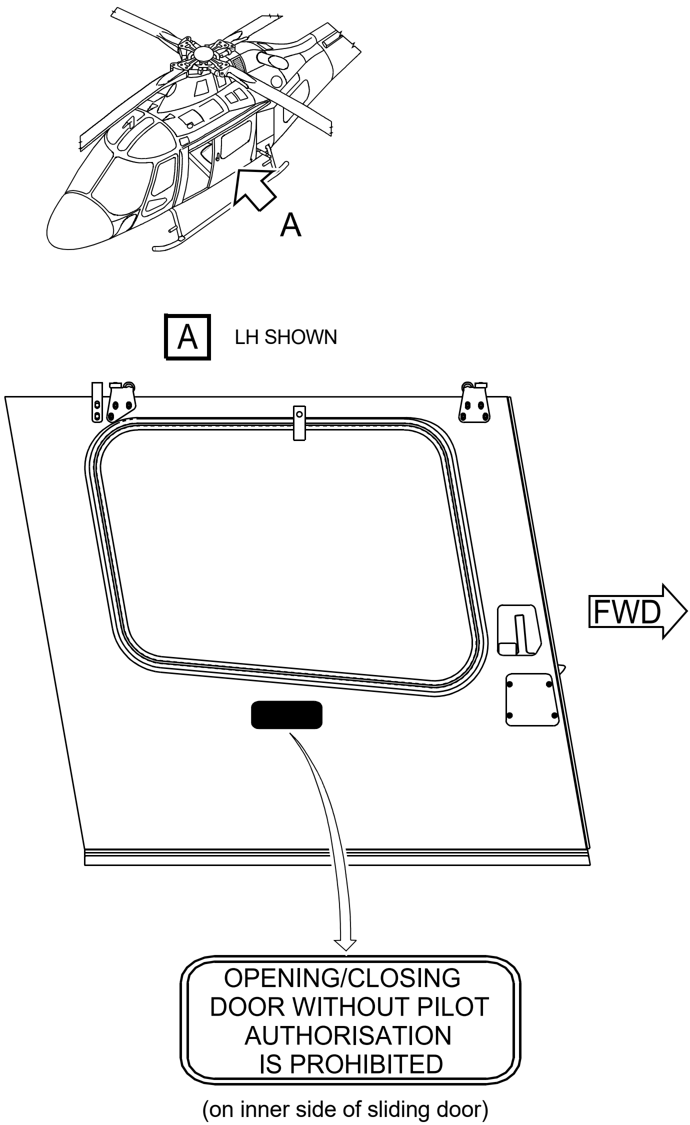

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Figure 1-19. Cabin Placards

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 Supplements 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

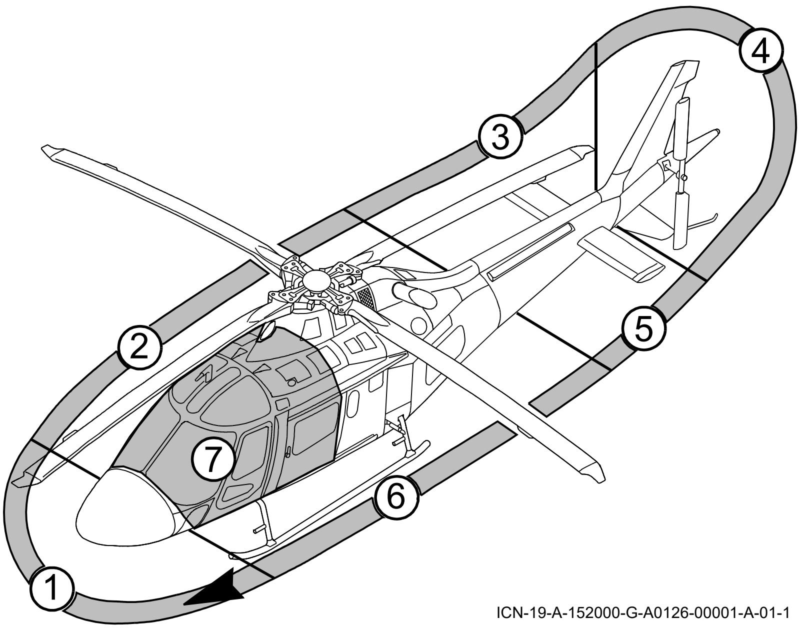
The battery should be stored in a warm place during prolonged helicopter inactivity. Engine starting with a cold, fully charged battery was demonstrated down to an OAT of -10 °C.

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.



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).

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

Area N°1 (Helicopter Nose)

1.	Nose exterior	: - Condition.
2.	Landing lights	: - Condition.
3.	Nose compartment access door	: - Open.
4.	Battery	: - Secured; connectors secured.
5.	Electrical/avionic equipment	: - Secured.
6.	Nose compartment access door	: - Secured; fastener security pin out.

Area N°2 (Fuselage - RH side)

1.	Lateral panel, windshield and roof transparent panel	: - Condition and cleanliness.
2.	Windshield wiper (if installed)	: - Condition.
3.	External power receptacle	: - Door secured.
4.	OAT probe	: - Condition.
5.	Pilot door, window and, if installed, sliding window	: - Condition, cleanliness, security and correct operation of locking mechanism. - Sliding window closed.

6.	Pitot tube/static ports	: - Cover removed; condition and obstructions.
7.	Fuselage exterior	: - Condition.
8.	Ventilation air intake	: - Free of obstructions.
8A.	Upper Deck Winter kit covers (if installed)	: - Condition.
9.	Passenger door, window and, if installed, sliding window	: - Condition, cleanliness and security. - Sliding window closed.
10.	Passenger door lock	: - Check.
11.	Passenger door jettison window	: - Security of window and seal retainer. - Check red strap secured.
12.	Antennas	: - Condition.
13.	Drain and vent lines	: - Leaks.
14.	Landing gear skid and attachments	: - Condition.
15.	Fuel filler cap	: - Secured.
16.	Servo hydraulic system valves and filters group	: - Leaks and bypass indication (red button out: filter clogged). - Door secured.
17.	Hydraulic system reservoirs	: - Correct oil level, filler caps secured. - Quick-disconnect return lines secured. Door secured.
18.	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.

19. Main rotor dampers	: - Check for correct fluid level.
20. Main rotor pitch change links	: - Condition and security.
20A. Swashplate and driving scissors	: - Condition and security.
21. Upper anticollision light	: - Condition.
22. Servo actuator	: - Condition and leaks.
23. Main transmission and accessories (visible area)	: - Condition and leaks.
24. Transmission external oil filter	: - Bypass indication (red button out: filter clogged). - Door secured.
25. Engine upper and RH air intake screens and plenum chamber	: - Covers removed; foreign matter and condition.
26. Engine oil	: - Correct level and cap secured.
27. Engine area	: - Leaks of fuel and/or oil.
28. Engine to transmission drive shaft	: - Condition.
29. Engine cowling	: - Condition; secured.
30. Engine exhaust duct	: - Cover removed; condition.
31. Cowlings and fairings	: - Condition and secured.
32. Access doors	: - Secured.

Area N°3 (Tailboom - RH side)

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

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

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

Area N°5 (Tail boom - LH side)

1. Tail boom exterior	: - Condition.
2. Stabilizer and protective fairing	: - Condition and security.
3. Navigation light	: - Condition.
4. Antenna(s) (if installed)	: - Condition.
5. Tail rotor drive shaft bearing	: - Condition.
6. Tail rotor drive shaft dampers	: - Condition.
7. Tail rotor drive fairing	: - Secured.

Area N°6 (Fuselage - LH side)

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

19.	Cowlings and fairings	: - Condition and secured.
20.	Access doors	: - Secured.
21.	Landing gear skid and attachments	: - Condition and security.
22.	LH and RH fuel sumps or (if installed and d.c. power connected) fuel drain valve #1(#2) switch	: - Drain.
22A.	Upper Deck Winter kit covers (if installed)	: - Condition.
23.	Roof transparent panel, windshield and lateral panel	: - Condition and cleanliness.
24.	Windshield wiper (if installed)	: - Condition.
25.	Passenger door, window and, if installed, sliding window	: - Condition, cleanliness and security. - Sliding window closed.
26.	Passenger door lock	: - Check.
27.	Passenger jettison window	: - Security of window and seal retainer. - Check red strap secured.
28.	Co-pilot door, window and, if installed, sliding window	: - Condition and cleanliness, security and correct operation of locking mechanism. - Sliding window closed.

29. Check following systems for correct operation (connect d.c. electrical power supply):

— navigation and anticollision lights;

— landing lights.

30. d.c. electrical power supply. :- Disconnect.

Area N° 7 (Cabin interior)

1. 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.

2. First aid kit : - Security and contents on board.
3. Cabin fire extinguisher : - Security.
4. Co-pilot door jettison handle and safety latch : - Correct position.
5. Co-pilot safety belt and inertia reel : - Condition and belt fastened if seat is unoccupied.
6. Pilot door jettison handle and safety latch : - Correct position.
7. Pilot safety belt and inertia reel : - Condition.
8. Relay box circuit breakers : - IN.
9. Pilot flight controls : - Condition and security.
10. Instruments : - Condition.
11. PFD and MFD : - Check SD cards properly engaged.

PILOT'S PRE-FLIGHT CHECK

(Every flight, excluding the first of the day)

1. Main and tail rotors tie-downs (if present)	: - Removed.
2. Nose compartment access door	: - Condition; latched.
3. RH side, windshield and roof transparencies	: - Condition and cleanliness.
4. Pitot tube/static ports	: - Cover removed; free of obstructions.
5. RH side crew/passenger doors	: - Condition, hinges and latches. - Sliding windows (if installed) closed.
6. RH forward fuselage	: - Condition.
7. RH landing gear skid assembly	: - Condition.
8. Fuel filler cap	: - Secured
9. Main rotor blades	: - Condition and cleanliness.
10. Main rotor dampers	: - Correct fluid level.
11. RH engine air intake	: - Cover removed. - Check free of obstructions..
12. RH engine exhaust	: - Cover removed.
13. RH side access panels	: - Closed and secured.
14. RH aft fuselage	: - Condition.
15. RH horizontal stabilizer/fairing	: - Condition and security.
16. Vertical fins/tail skid	: - Condition and security.
17. Tail rotor gearbox	: - Correct oil level.

18. Tail rotor blades and hub	: - Condition, cleanliness and security.
19. LH horizontal stabilizer/fairing	: - Condition and security
20. Tail rotor drive shaft cover	: - Closed and latches secured.
21. LH aft fuselage	: - Condition.
22. Antenna(s)	: - Condition.
23. Baggage compartment	: - Baggage secured; door latched.
24. LH engine exhaust	: - Cover removed.
25. LH engine air intake	: - Cover removed. - Check free of obstructions.
26. Transmission oil	: - Correct level.
27. LH landing gear skid assembly	: - Condition.
28. LH side access panels	: - Closed and secured.
29. LH side crew/passenger doors	: - Condition, hinges and latches. - Sliding windows (if installed) closed.
30. LH forward fuselage	: - Condition.
31. LH side, windshield and roof transparencies	: - Condition and cleanliness.
32. Cabin interior	: - Loose items secured.
33. Seat belts/shoulder harnesses	: - Unoccupied belts/harnesses secured.

ENGINE PRE-START CHECK

1. All switches	: - OFF or CLOSED.
2. Pedal and seats	: - Adjust.
2A. Pedals (if P/N 109G6720F05 is installed)	: - Check that the pedal footrest are symmetrically adjusted, by ensuring that the same number of holes are visible on each pedal extension. - Verify that the pedal footrest are locked in position by: - Checking that about 5 mm (0.2 inch) of locking pin head is visible on the inner side of the footrests. - Checking that the pin handlebar is not in view (fully down).
3. Seat belt	: - Fasten and adjust.
4. Cyclic stick	: - Centered (or positioned to counter wind) and friction adjusted.
5. Collective lever	: - Fully down and friction adjusted.
6. Circuit breakers	: - IN.
7. 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.

Note

After prolonged exposure on ground to very low temperature (below - 20 °C), the force required to rotate the engine throttle may slightly increase.

8. STATIC source switch : - NORM and protected.
9. BAT switch : - ON.
10. PFD/MFD power pushbuttons : - Verify ON illuminated.

Note

The PFD and MFD are automatically activated when the helicopter is electrically powered.
Each display has an automatic built-in test function; the test starts automatically at display power up.

Note

In cold weather operations wait for PFD/MFD warm-up period until the information on the displays are clearly readable.

11. GSC1 and GSC2 pushbuttons : - Not in FORCED status, check.
12. MFD initial page (power up) : - Verify Database validity and expiration dates.
    - Press ENT or furthest right soft key on MFD to continue.
13. Cyclic control : - Press MASTER RESET switch to reset MWL/MCL
    - Press START/AUTOROT pushbutton to bring up the ENGINE page on the MFD.
14. BUS switch : - ON.
15. MFD : - Check VDC (DC voltage) at least 24 Volt.
16. External power (if required) : - Connect.

Note

Be sure that external power source supplies at least 28 V.

17. PFD : - Check status messages.
18. IGN switch : - AUTO.
19. POS lights switch : - As required.
20. A-COLL lights switch : - ON.
21. ENG HTR switch : - ON.
22. SERVO switch : - NORM.

23.AWG switch (first test)	: - Momentarily set to to TEST position. - Verify that the “AURAL WARNING OK” audio message is heard.
24.AWG switch (second test)	: - Set and hold (about five seconds after activation of the AURAL WARNING OK message) to TEST position. - Verify that the AWG FAIL caution message activates on the PFD. - Verify the following aural alert sequence : Tone 1 + “ROTOR LOW” Tone 2 + “ENGINE OUT” Tone 3 + “ENGINE FIRE” Tone 4 + “WARNING” Tone 5 + “ROTOR HIGH” Tone 6 + “ONE HUNDRED FIFTY FEET”.
25.TEST switch (LAMP)	: - Set to LAMP position and hold as required. Verify that the following annunciators on the instrument panel illuminate: — GSC1 FORCED — GSC2 FORCED — PFD ON/OFF — MFD ON/OFF — Annunciators for optional installations may also be tested at this time; refer to separate RFM supplements as needed.

26. TEST switch (FCU/FIRE first test) : - Momentarily set to FCU/FIRE position. Verify that the following sequences occur:

- ENG FIRE warning message and FUEL LOW caution message activate (caution message tones will be heard but may be delayed by audio warning message).
- Aural two-tone alert followed by ENGINE FIRE warning is heard.
- Aural two-tone alert followed by ENGINE FIRE warning is heard a second time.
- ENG FIRE warning message extinguishes.
- Test ends with FUEL LOW caution extinguishing.

Note

During the test, the MASTER WARNING and MASTER CAUTION lights are activated; they will be automatically reset at the end of the test sequence.

Note

If a failure occurs with the Engine Fire detector, the FIRE DET caution message will appear on the PFD and remain after the end of the test.
If a failure is detected with the Fuel Low detector, the caution messages F LOW FAIL will appear on the PFD and remain after the end of the test.
In either of the above cases the MCL will not be reset automatically at the end of the test.

27. TEST switch (FCU/FIRE second test)	: - Momentarily set to FCU/FIRE position. Verify that the following sequences occur:
- PFD EIS strip and MFD	: - LH fuel indication changes from white text on black background to black test on yellow background. - Both fuel quantity indications drop to “0” (less than 10 kg is acceptable). A reading below “0” is a failure. - RH fuel quantity indication covered by a yellow “X” as soon as the indicated fuel quantity decreases below 120 kg. - Fuel quantity returns to normal readings at the end of the test.
- PFD/MFD	: - At the end of the test automatically return to previous formats.
28. H/L/T SENS switch (on Marker Beacon panel)	: - T (Test) Check A-O-M lights illuminated. - Set to H or L, as required; Check A-O-M lights extinguished.
29. F-TRIM switch	: - ON.
30. Fuel quantity	: - Check fon PFD/MFD.
31. FUEL VALVE switch	: - OPEN and associated light illuminated.
32. FUEL XFER PUMP switch	: - XFER.
- PFD	: - XFER PUMP caution message out.

33.FUEL PUMP 1 switch	: - ON.
- PFD	: - FUEL PUMP 1 caution message out.
- MFD	: - Check fuel pressure.
34. FUEL PUMP 1 switch	:- OFF.
35. FUEL PUMP 2 switch	:- ON.
- PFD	:- FUEL PUMP 2 caution message out.
- MFD	:- Check fuel pressure.
36.FUEL PUMP 1 switch	: - ON.
37.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 and a sequence of tones is played in the headset. - A successful self-test is indicated by the MEC OPN caution message remaining displayed at the end of the test sequence. - Check that PLA POS caution message reactivates at at the end of the test.

Note

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

38.PFD	: - Check system message window. - If GIA1 (GIA2) COOLING TEMPERATURE TOO LOW message is present, allow time for warm-up until the message extinguishes.

- If any of the following messages are present, correct the problem before starting the engine:
  — GIA1 (GIA2) COOLING-OVER TEMPERATURE
  — GIA1 (GIA2) SERVICE
  — PFD1 (MFD1) COOLING
  — PFD1 (MFD1) SERVICE
  — XTALK ERROR

STARTING PROCEDURE

1. Collective control	: - Flat pitch, check.
2. Pedals	: - Centered and trimmed.
3. PFD	: - Verify valid attitude, heading, airspeed, altitude, vertical speed and OAT displays.
4. MFD	: - Check EIS-ENGINE page displayed.

ENGINE START

1. START pushbutton (on collective lever)	: - Press and release.
- PFD	: - ENG START and IGNITER ON advisory messages displayed .
- MFD	- IGN and START advisory messages displayed in the ITT and N1 gauges (respectively).

Note
Observe starter limitations in Section 1.

Note

The ENG START and IGNITER ON advisory messages may not be displayed in the CAS window if the number of messages exceeds 12, requiring to scroll down the list with the CAS softkey of the PFD.

2. Engine throttle (with N1 > 12% and residual ITT < 100°C) : - IDLE.
   - 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. Maintenance actions are required 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, shutdown 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.

3. Engine oil pressure : - Check.

Note

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

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

   - PFD : - ENG START and IGNITER ON advisory message out.

   - MFD :- IGN and START advisory messages out.

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

5. MFD : - Check ITT gauge automatically switches to Cruise format.

Note

ITT gauge changes from Start format to Cruise format about 5 seconds after N1 reaches 51 %. With N1 decreasing, the change occurs when reaching 51% without 5 seconds delay.

Note

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

6. Gas generator (N1) : - Stabilized at 61 ±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 ±1%, shut down the engine. Maintenance actions could be required.

7. 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.

8. BAT switch : - Check ON.

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

- PFD : - EXT PWR ON caution message out.

10. GEN switch : - ON.

- PFD : - Check DC GEN caution message out.

11. INV 1 and 2 switches : - ON.

- PFD : - Check INV 1 (2) OFF caution messages out.

12. Ammeter : - Check AMP within limits.

13. AVNX MSTR switch : - ON.

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.

14. Engine throttle : - Rotate to FLT position.

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.

- PFD :- PLA POS caution message out.
- NR :- Check at 102%.

15. Proceed to “SYSTEMS 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.

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

Note

Observe starter limitations in SECTION 1.

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

SYSTEMS CHECK

1. 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.

1. 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 CAS. 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

1. FUEL XFER PUMP switch : - OFF.
   - PFD : - XFER PUMP caution message displayed.
2. FUEL PUMP 1 and 2 switches : - OFF.
   - PFD : - FUEL PUMP 1-2 and FUEL PRES caution messages displayed.
   - MFD : - Note fuel pressure fall.
3. Engine driven fuel pump : - Check operation.
4. FUEL PUMP 1 switch : - ON.
   - PFD : - FUEL PUMP 1 caution message out.
   - MFD : - Fuel pressure within limits.
5. FUEL PUMP 1 switch : - OFF.
6. 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.
7. FUEL PUMP 1 and 2 switches : - ON.
   - PFD : - FUEL PUMP 1-2 caution messages out.
   - MFD : - 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.

8. FUEL XFER PUMP switch : - XFER.
   - PFD : - XFER PUMP caution message out.

ELECTRICAL A.C. SYSTEM

1. INV 1 switch	: - OFF.
- PFD	: - INV 1 OFF caution message displayed.
	: - Check VG1 caution message out (it may appear briefly and then extinguish).
2. INV 1 switch	: - ON.
- PFD	: - INV 1 OFF caution message out.
3. INV 2 switch	: - OFF.
- PFD	: - INV 2 OFF caution message displayed.
	- Check VG2 caution message out (it may appear briefly and then extinguish).
4. MFD	:- Set to Navigation Map page (if required).
- EIS strip	: - Verify valid instrument data.
- Traffic Map page	: - Select and activate the system TEST. At the end of the test reselect Navigation Map page (if required).
- TRAFFIC	: - Set as desired.
5. INV 2 switch	: - ON.
- PFD	: - INV 2 OFF caution message out.

MISCELLANEOUS

1. PITOT heat switch	: - ON. - Check current peak on ammeter and PITOT HEAT advisory message displayed on PFD; then OFF.
2. Cyclic stick	: - Friction fully unlocked, freedom of movement.
3. MFD	: - Set to Navigation Map page (if required).
- EIS strip	: - Verify valid instrument data.
4. PFD	: - Check all failure flags retracted.
- Attitude Indicator	: - Check correct alignment.
- Altimeter	: - Set barometric pressure as required.
- VSI	: - Check zero indication.
- HSI	: - Set desired heading reference.
- CDI	: - As desired.
- DH	: - Set as desired.
- Clock	: - Check and set.
- EIS strip	: - Verify valid instrument data.
- Message window	: - If any of the following messages are present, they must be corrected before take-off: — GIA1 (GIA2) COOLING-OVER TEMPERATURE — GIA1 (GIA2) SERVICE — PFD1 (MFD1) COOLING — PFD1 (MFD1) SERVICE

5. ESIS	:- Check aligned and absence of failures
- Attitude indicator	-Check correct alignment.
- Altimeter	-Set barometric pressure as required.
6. Pilot audio control panel	: - Set NORM/BK-UP/EMER switch to EMER. Verify transmit and receive with COM 2 and received audio from NAV 2.
7. Copilot audio control panel	: - Set NORM/BK-UP/EMER switch to EMER.Verify transmit and receive with COM 1 and received audio from NAV 1 - Verify keyed ICS between pilot and copilot.
8. Pilot and copilot audio control panels	: - Set NORM/BK-UP/EMER switch to NORM.

HELIPILOT SYSTEM

1. SAS 1 switch	: - SAS 1.
- PFD	: - SAS 1 caution message out.
2. SAS 2 switch	: - SAS 2.
- PFD	: - SAS 2 caution message out.
3. ATTD HOLD switch	: - OFF.
- PFD	: - ATT OFF caution message displayed.
4. Cyclic stick	: - Motion will cause PITCH and ROLL HELIPILOT indicators motion.

5. Pedals	: - Motion will cause YAW HELIPILOT indicator motion.
6. SAS 1 switch	: - OFF.
- PFD	: - SAS 1 caution message displayed.
7. Cyclic stick	: - Motion will cause PITCH and ROLL HELIPILOT indicator motion.
8. SAS 2 switch	: - OFF.
- PFD	: - SAS 2 OFF caution message displayed.
- ATTD HOLD switch	: - Automatically trips to ATTD HOLD.
- PFD	: - ATT OFF caution message out.
9. SAS 1 switch	: - SAS 1.
- PFD	: - SAS 1 caution message out.
10. SAS 2 switch	: - SAS 2.
- PFD	: - SAS 2 caution message out.

N2 DROOP COMPENSATOR CHECK

1. EEC/MEC switch (first flight of the day only)	: - MEC.
- PFD	: - 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).
2. EEC/MEC switch	: - EEC, check MEC OPN caution message out.

Note

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

- NR	: - Check at 102%.

HOT CREW SWAP/CHANGE

CAUTION

Extreme care must be observed during the following procedure to avoid inadvertent displacement of flight controls.
Pedals adjustment with engine running must be carried out with:
- Engine throttle set to IDLE;
- SAS 1/2 switches set to OFF;
- Flight controls steadily held by a pilot occupying one seat, while the pedals of the other seat are adjusted.

1. Pedals (if P/N 109G6720F05 is installed and adjustment is required with engine running)	: - Adjust as required. - Check that the pedal footrests are symmetrically adjusted, by ensuring that the same number of holes are visible on each pedal extension. - Verify that the pedal footrests are locked in position by: - Checking that about 5 mm (0.2 inch) of locking pin head is visible on the inner side of the footrests. - Checking that the pin handlebar is not in view (fully down).

BEFORE TAKE-OFF

1. Communication and navigation frequencies	: - Set as required.
2. MFD	: - Set as required
- Voltmeter	: - Within limits.
- Ammeter	: - Within limits
3. Cockpit lights	: - As required.
4. 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 manoeuvers in order to avoid overheating.

Note

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

5. Caution and Warning messages	: - Check none.

TAKE-OFF AND CLIMB

1. Collective	:	- Increase slowly and bring the helicopter to a 3 ft AGL hover.
2. Pedals	:	- Apply as necessary to maintain direction.
3. PFD/MFD	:	- Check.
- Engine parameters	:	- Within limits.
- Hydraulic systems instruments	:	- Within limits.
4. 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 PI 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).

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

IN FLIGHT

1. Collective : - Adjust as necessary to keep engine parameters within limits.

2. Airspeed : - Maintain within limits shown on V_{NE} placards.

3. Landing lights : - OFF, if used.
   - PFD : - LANDING LT ON advisory message out.

4. PITOT heat : - As required.

CAUTION

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

5. 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 maintenance actions are required.

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.

6. HELIPILOT 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.:

1. IGN switch : - CONT.
   - PFD : - 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.
Automatic starter activation pointed out by the IGN advisory message displayed beside ITT scale on MFD.

APPROACH AND LANDING

Note

RNP Approaches are intended for pilot awareness only.

1. Engine parameters : - Within limits.
2. External lights : - As required.
3. 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.

4. 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

1. Collective lever : - Check fully down.
2. Cyclic stick and pedals : - Centered and trimmed.
3. 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.

4. Engine throttle : - IDLE for at least 30 seconds to allow ITT to stabilize.
   - PFD : - PLA POS caution message displayed.
5. Engine throttle : - OFF.
   - PFD : - ENG OUT and OIL PRESS warning messages displayed;
     - MEC OPN and DC GEN caution messages displayed.

CAUTION

During shutdown check that the N1 speed decelerates freely. Note any abnormal noise or rapid rundown. In this event maintenance actions are required.

6. FUEL PUMP 1 and 2 switches : - OFF.
   - PFD : - FUEL PUMP 1 and 2 caution messages displayed.
7. FUEL VALVE switch : - CLOSED.
   - Associated light : - Out.
8. FUEL XFER PUMP switch : - OFF.

- PFD : - XFER PUMP caution message displayed.

9. PITOT heat : - OFF, if used.
10. ENG HTR switch : - OFF.
11. Cockpit lights : - OFF.
12. External lights : - OFF.
13. Landing lights : - OFF, if used.
14. AVNMX MSTR switch : - OFF.
15. Miscellaneous switches : - OFF.
16. INV 1 and INV 2 switches : - OFF.
17. GEN switch : - OFF.
18. BAT switch : - OFF.
19. ESIS :- Proceed to manual shut down or let it automatically shut down without hitting any key.

Note

By hitting any ESIS key after electrical power removal, the internal battery power supply is activated. In this case proceed to ESIS manual shut down.

POST FLIGHT CHECK

If conditions require, perform the following:

1. Pitot, intake and exhaust covers : - Installed.

CAUTION

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 shut-down before installing engine exhaust ducts covers.

SAFE OPERATION ADVISORY MESSAGES (CAS)

Caption	Aural message	Meaning
ENG START	None	START pushbutton actuated, engine is starting.
PITOT HEAT	None	Pitot heater activated.
IGNITER ON	None	Engine igniter activated.
LANDING LT ON	None	Landing light activated.
FT OFF	None	Force Trim disengaged.
VENT ON	None	Ventilation system activated.

AVIONIC SYSTEM ALERTS AND ANNUNCIATIONS

HTAWS ALERTS

Alert on PFD/ HTAWS page	Aural message	Meaning
TERRAIN	"Warning, terrain terrain"	Reduced Required Terrain Clearance (RTC) or Imminent Terrain Impact (ITI).
OBSTACLE	"Warning, obstacle obstacle"	Reduced Required Obstacle Clearance (ROC) or Imminent Obstacle Impact (IOI).
TERRAIN	"Caution, terrain terrain"	Reduced Required Terrain Clearance (RTC) or Imminent Terrain Impact (ITI).
OBSTACLE	"Caution, obstacle obstacle"	Reduced Required Obstacle Clearance (ROC) or Imminent Obstacle Impact (IOI).

HTAWS STATUS ANNUNCIATIONS

Annunciation on PFD/HTAWS page	Aural message	Meaning
HTAWS TEST	None	System test in progress.
HTAWS FAIL	"HTAWS failure"	HTAWS system failure or Terrain or Obstacle database unavailable or invalid on all displays, invalid software configuration, HTAWS audio fault.
HTAWS N/A	"HTAWS not available"	HTAWS not available or No GPS position or GPS signal excessively degraded or Helicopter out of database coverage area.
None	"HTAWS available"	Aural message is generated as the GPS signal returns or is sufficient, and HTAWS system is not inhibited or when aircraft enters database coverage area and HTAWS is not inhibited.

Annunciation on PFD/HTAWS page	Aural message	Meaning
HTAWS INH	None	HTAWS FLTA alerting inhibited.
RP MODE	None	Reduced protection mode enabled.

TERRAIN - SVS ALERTS

Alert on PFD/ MFD Terrain SVS page	Aural message	Meaning
TERRAIN	"Warning, terrain terrain"	Reduced Required Terrain Clear-ance (RTC) or Imminent Terrain Impact (ITI).
OBSTACLE	"Warning, obstacle obstacle"	Reduced Required Obstacle Clear-ance (ROC) or Imminent Obstacle Impact (IOI).
TERRAIN	"Caution, terrain terrain"	Reduced Required Terrain Clear-ance (RTC) or Imminent Terrain Impact (ITI).
OBSTACLE	"Caution, obstacle obstacle"	Reduced Required Obstacle Clear-ance (ROC) or Imminent Obstacle Impact (IOI).

TERRAIN - SVS STATUS ANNUNCIATIONS

Annunciation on PFD/MFD	Aural message	Meaning
TER TEST	None	System test in progress.
TER INH	None	Terrain alerting disabled.
TER FAIL	"Terrain system failure"	Terrain system test failed or Terrain or obstacle database unavailable or invalid or invalid software configuration or system audio fault.
TER N/A	"Terrain system not available"	NO GPS position or GPS signal excessively degraded or helicopter out of database coverage area.

TRAFFIC - TAS ALERTS ANNUNCIATIONS

Annunciation on PFD	Aural message	Meaning
TRAFFIC	Traffic, bearing information, relative altitude and approximate distance alerts.	Traffic intruder detected.

SECTION 3

EMERGENCY AND MALFUNCTION PROCEDURES

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SECTION 3

EMERGENCY AND MALFUNCTION PROCEDURES

INTRODUCTION

This section contains the procedures that must be performed in the event of an emergency or malfunction. These procedures are based on experience acquired in the operation of helicopters, in general, and on flight tests conducted on this particular model of helicopter.

The procedures used in each actual emergency or malfunction must result from consideration of the complete situation. Multiple emergencies or malfunctions may require a departure from normal corrective procedures detailed in this section.

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

PROCEDURES LOGIC

The majority of the Emergency and Malfunction procedures that follow are presented in the form of logic trees (flow charts). These flow charts have been formulated based on analysis and test of the cockpit indications that would be available to the flight crew following the failures/ malfunctions that are included in this section. For complex failures/ malfunctions, cockpit indications coupled with the answers to “Yes/No” type questions (as indicated on the charts) should enable the flight crew to analyze the type of failure/malfunction that has occurred, the branch of the “tree” that should be followed and the corrective action that should be taken.

In order to analyze some types of failures/malfunctions, answers to “+”, “IF”, “AND” and “OR” statements may be required. In these cases, the statements are presented in bold text (“**+**”, “**IF**”, “**AND**”, “**OR**”), as an attention getting device. It is emphasized that attention should be paid to this symbology to avoid a mistake in the emergency/malfunction analysis and subsequent incorrect crew action. **Required** crew actions are also presented in bold type.

DEFINITIONS

EMERGENCY LANDING GUIDANCE

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

1. **Land immediately:** — Land at once. Landing is the highest priority. The primary consideration is to assure the survival of the occupants.

2. **Land as soon as possible:** — Do not continue flight for longer than is necessary to achieve a safe and unhurried landing at the nearest site.

3. **Land as soon as practicable:** — Land at the nearest aviation location or, if there is none reasonably close, at a safe landing site selected for subsequent convenience. Extended flight beyond the nearest approved landing area is not recommended.

CREW ALERTING SYSTEM

The Crew Alerting System (CAS) is a dedicated window on the Primary Flight Display (PFD), ref. Figure 3-1, and on the Multi-Function Display (MFD) when in Reversionary format. Many of the emergencies described in this section are indicated by the illumination of red CAS warning messages and with the flashing of the red Master Warning Light (MWL), ref. Figure 3-2 or by the illumination of amber CAS caution messages with the flashing of the amber Master Caution Light (MCL), ref. Figure 3-2.

An active Warning message is displayed in inverse video (white text on red background) accompanied with an audio tone / voice warning and the flashing of the MWL until it is acknowledged by pressing the MWL or the Master Reset pushbutton on the cyclic grip. Once acknowledged, the Warning message changes to red text on a black background, the audio tone and voice warning is cancelled and the MWL is reset for future indication.
Exception to this rule is the “ROTOR LOW” warning message, which remains in inverse video even after acknowledgement.

Warning messages cannot be scrolled off the CAS display area.The Warning message remains until the cause of the warning is corrected.

The amber caution messages are accompanied by an aural alert tone (single chime) and can be acknowledged by pressing the MCL (on the instrument panel) or the Master Reset pushbutton (on the cyclic grip).

The green advisory messages relative to the airframe are also presented on the CAS system.

A scrollable list of messages can be held in the CAS window with any 12 being available for display at one time. There are CAS up-arrow and CAS down-arrow softkeys located on the left end of the PFD row of softkeys. When only 12 messages, or less, are present the softkeys are disabled and all available messages are shown in the CAS window.When more than 12 messages are present, the CAS up-arrow and CAS down-arrow softkeys are enabled to allow the pilot to scroll up or down through the CAS message list.

The G1000H and G1000H NXi systems internally generated alerts and messages appear in a window below the CAS window, see Figure 3-1. These alerts and messages are not warnings or cautions and are not associated with any audio.

CAS MESSAGE PRIORITIZATION

The messages are grouped in the CAS list according to their color, with the most important group of messages at the top of the list and the least important at the bottom of the list. The order of priority of the messages is:

Priority	Messages	Color
1	WARNING	red
2	CAUTION	amber
3	ADVISORY	green

The messages are displayed, within each color group, in the order they appeared, with the most recent being at the top of each group.

When a new message occurs, it will appear at the top of the associated color group in the CAS list and new messages will always appear in inverse video until acknowledged.

When a new message occurs the existing message, of that color and any lower prioroty color, will be moved down the list. Once 12 messages are present, the message at the bottom of the list drops out of view and the CAS scroll softkeys are used to view them.

Because the advisory messages appear at the bottom of the list, it is possible for a new advisory to occur but not to be shown in the list as it will not displace a warning or caution message. When this happens, the pilot is alerted of the new advisory by the CAS down-arrow softkey flashing.

USING THE CAS WARNING AND CAUTION SYSTEM

Whenever a warning or caution illuminates, appropriate actions should be taken to deal with the indicated emergency or malfunction. Whenever convenient, the MWL and/or the MCL must be reset for possible future warnings or cautions, by pressing on them or the Master Reset pushbutton (on the cyclic grip).

In this section, the following convention is used:

WARNING	- CAS RED WARNING
CAUTION	- CAS AMBER CAUTION

MESSAGE FORMAT

Similar messages displayed on the CAS are combined within a single message. For example “1-2” is embedded in the same line of message without the need to have two separate messages as shown below:

HYD PRESS 1-2	The notation HYD PRESS 1-2 shows the combined CAS captions and is displayed when a failure involves n.1 and n.2 Hydraulic system Pressures at the same time.
HYD PRESS 1(2)	Within this RFM, use of the caption notation HYD PRESS 1(2) (for example) is to indicate captions that can apply to more than one component.
HYD PRESS 1	This notation therefore indicates that a failure involving n.1 Hydraulic System Pressure would be displayed as HYD PRESS 1....
HYD PRESS 2	....or a failure involving n.2 Hydraulic System Pressure would be displayed as HYD PRESS 2.

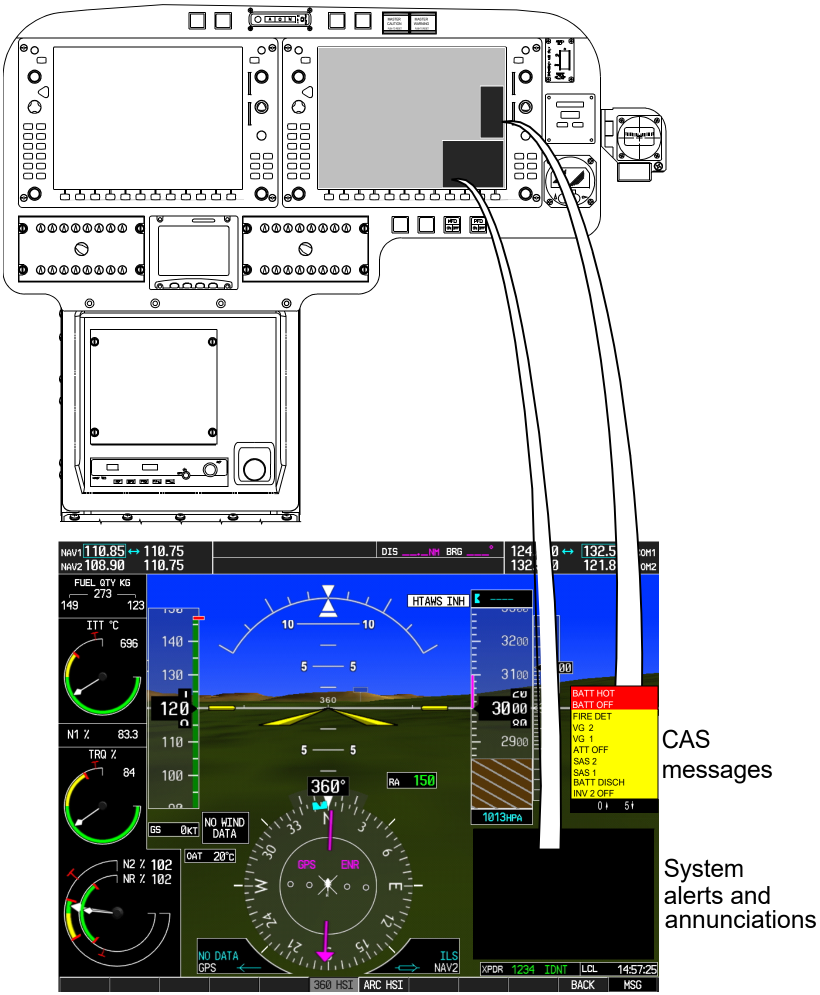

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Figure 3-1. CREW ALERTING SYSTEM Layout

MASTER WARNING AND MASTER CAUTION LIGHT

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

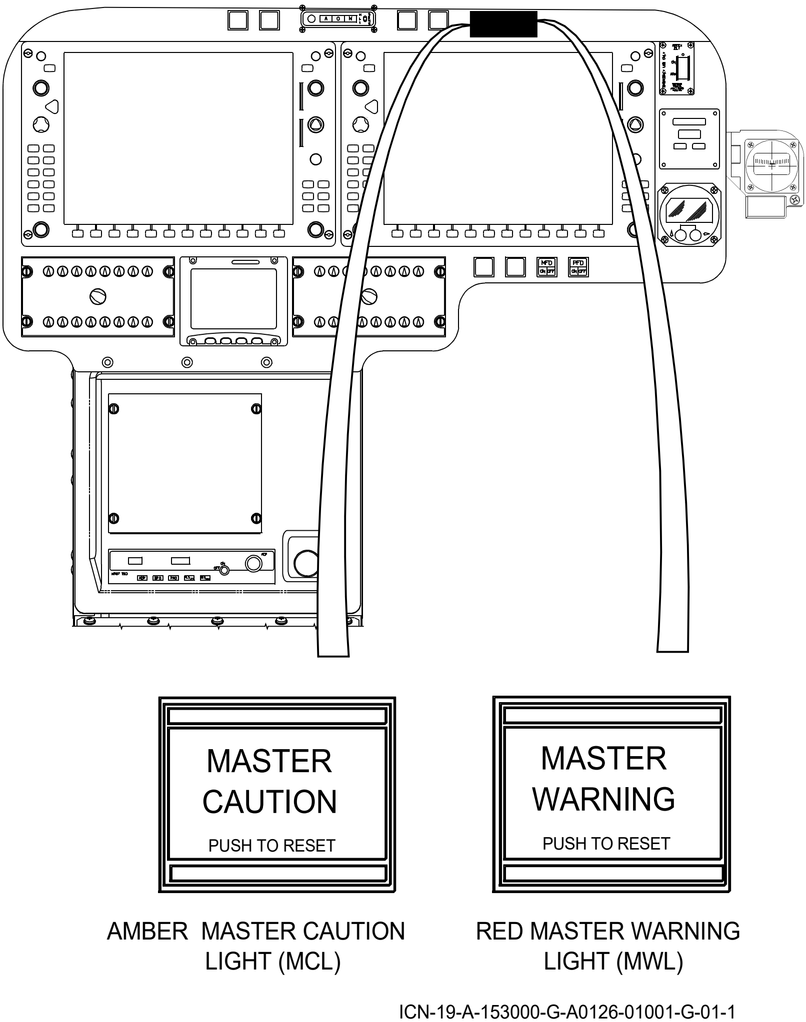

Figure 3-2. CREW ALERTING SYSTEM, MWL and MCL Location

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EMERGENCY PROCEDURES

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CAS WARNING MESSAGES

Table 3-1 lists the Warning captions, the voice warnings and the corresponding failure.

AWG MESSAGES

Note

The AWG FAIL caution message is displayed on CAS as long as the AWG test switch is set to TEST.

Tones and voice messages generated by the AWG system are as listed, in priority sequence, in the following list:

Tone 1 “ROTOR LOW “

Tone 2 “ENGINE OUT“

Tone 3 “ENGINE FIRE”

Tone 4 “WARNING“

Tone 5 “ROTOR HIGH”

Tone 6 “ONE HUNDRED FIFTY“

The system logic will cause a high priority message to interrupt a lower priority message.

Table 3-1. Table of Warning Messages

CAS Caption	Voice Warning	Audio	Failure/System State
BATTERY HOT Page 3-43	WARNING	Tone	Battery temperature exceeding limits.
BATTERY OFF Page 3-43	WARNING	Tone	Battery disconnected.
ENG FIRE Page 3-27	ENGINE FIRE	Tone	Fire in engine compartment.
ENG OIL HOT Page 3-33	WARNING	Tone	Engine oil temperature high (>115 °C).

CAS Caption	Voice Warning	Audio	Failure/System State
ENG OIL PRESS Page 3-32	WARNING	Tone	Engine oil pressure low (< 40 psi).
ENG OUT Page 3-22	ENGINE OUT	Tone + Horn	N1 RPM abnormally low (below 51%). Engine power failure.
Note With ENG OUT warning message illuminated, a cabin acoustic signal is activated.			
ROTOR HIGH Page 3-20	ROTOR HIGH	Tone	Rotor RPM high. Rotor RPM above 108%.
ROTOR LOW Page 3-19	ROTOR LOW	Tone + Horn	Rotor RPM low. Rotor RPM between 75 and 96%.
Note With rotor RPM between 75 and 96%, a cabin acoustic signal is activated.			
XMSN OIL HOT Page 3-36	WARNING	Tone.	Transmission oil temperature above maximum limit (115 °C).
XMSN OIL PRESS Page 3-35	WARNING	Tone	Transmission oil pressure below minimum limit (30 psi).

AUTOROTATIVE LANDING

The following procedure provides the information to carry out a safe autorotative landing, with different parameters depending on the helicopter weight and the altitude where the maneuver is executed.

Airspeed: trim the aircraft in autorotation with airspeed
- 75 KIAS from SL to 10000 ft Hp, or
- 70 KIAS from 10000 to 15000 ft Hp;
and a rotor speed of
- 101 to 103 % NR (-1800 to - 2000 ft/min vertical speed).

Cyclic: initiate a flare at approximately
- 180 to 150 ft AGL (from SL to 10000 ft Hp), or
- 140 to 130 ft AGL (from 10000 to 15000 ft Hp)
applying the cyclic at approximately 5 to 7 deg/s pitch rate, to a maximum of 25 to 30 deg nose-up pitch attitude.

Cyclic: hold the flare to reduce the rate of descent (500±100 ft/min) and the forward speed (30±10 KIAS).

Collective pitch: adjust as required to maintain NR as high as possible (maximum 110%) during the flare.

Cyclic: at approximately 20 to 30 ft AGL, forward to obtain a near level attitude (landing skid parallel to ground).

Collective: as the helicopter settles, at approximately 4 ft AGL, apply as required to cushion touchdown with:
- less than 50 kts ground speed (as required by surface characteristics and conditions), and
- less than 400 ft/min vertical speed.

Continued Next Page

Continuation from previous page

Collective pitch: continue application to cushion the touchdown.

Pedals: maintain direction.

Note

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

Shutdown: carry out the **"**EMERGENCY/POST CRASH SHUTDOWN AND EGRESS**"** procedure**.**

EMERGENCY/POST CRASH SHUTDOWN AND EGRESS

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

IF engine is running:

- Engine throttle:	**OFF**
- FUEL VALVE switch:	**CLOSED**
- FUEL PUMP 1 and 2 switches:	**OFF**
- Xfer PUMP switch:	**OFF**

Rotor brake (if installed): ON

- GEN switch: OFF

- BAT switch: OFF

When rotor stops:
- Helicopter: Egress.

EMERGENCY EXITS

Figure 3-3 and Figure 3-4 show the positions of the aircraft emergency entrances and exits. The emergency release mechanisms are also illustrated.

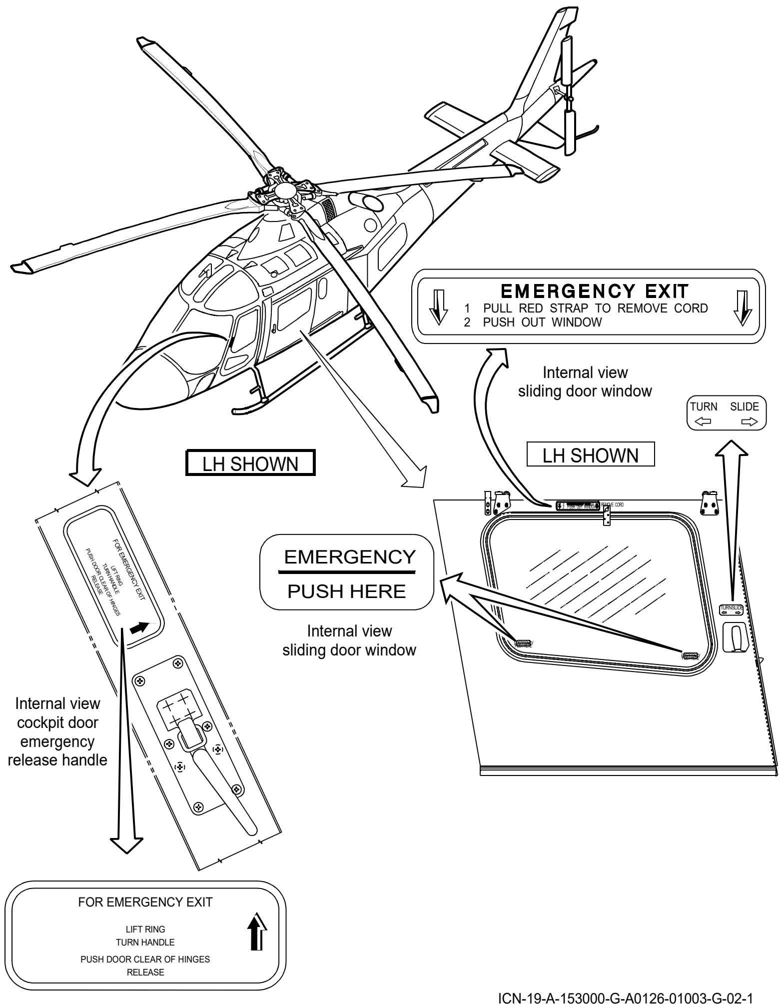

Figure 3-3. Internal Markings

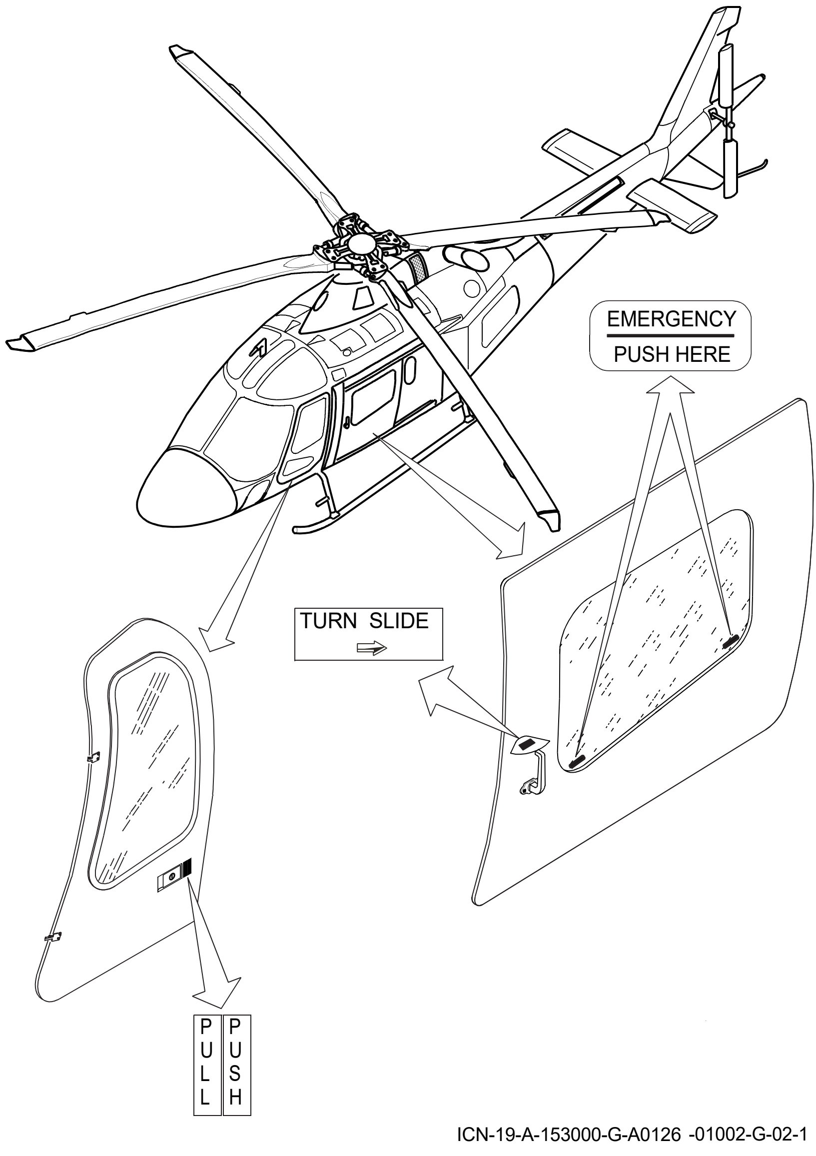

Figure 3-4. External Markings

ROTOR UNDER SPEED

ROTOR LOW + Audio tone, horn and "ROTOR LOW" voice warning.

Rotor NR between 75 and 96%.

Check NR.

IF rotor speed low:

- **Lower collective to increase rotor speed.**

ROTOR OVERSPEED

ROTOR HIGH + Audio tone and "ROTOR HIGH" voice warning.

Rotor NR above 108 %.

Check NR.

IF rotor speed high:

- **Raise collective to decrease rotor speed.**

ENGINE FAILURES

ENGINE FAILURE RECOGNITION

The following cues will be available to the crew following an engine failure:

— Helicopter left yaw;

— Illumination of the MWL and CAS Warning ENG OUT caption;

— ROTOR LOW warning message displayed, “ROTOR LOW” aural warning activated and cabin acoustic signal activated;

— ENG OUT warning message displayed and “ENGINE OUT” aural warning activated when N1 below 51% and decreasing;

— Gas generator (N1) rapidly decreasing;

— N2/NR rapidly decreasing;

— ITT rapidly decreasing;

— Torque rapidly decreasing.

Note

The MFD “ENGINE” page is automatically displayed when N1 decays below 51%.

ENGINE FAILURE - HOVER IGE AND TAKE-OFF UP TO 30 KIAS

ENG OUT + Audio tone and
"ENGINE OUT" voice warning.

Pedals: control yaw rate.

Collective: maintain initially, then increase to cushion the touchdown.

Cyclic: adjust to obtain level attitude touchdown (landing skid parallel to the ground).

ENGINE FAILURE - TAKE-OFF ABOVE 30 KIAS

ENG OUT + Audio tone and "ENGINE OUT" voice warning.

Pedals: control yaw rate.

Collective: lower immediately to stop NR decay.

Cyclic: flare as required to increase NR above 100%.

Collective: apply at the end of the flare, before touch-down, to reduce the rate of descent.

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

Collective: continue application to cushion the touchdown.

Pedals: maintain the direction.

CAUTION

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

ENGINE FAILURE - HOVER OGE

ENG OUT + Audio tone and "ENGINE OUT" voice warning.

Pedals: control yaw rate.

Collective: lower immediately to stop NR decay.

Cyclic: forward to obtain approximately 25 deg nose down.

Airspeed: increase up to 70 KIAS.

Perform an autorotative landing.
Refer to **AUTOROTATIVE LANDING** procedure.

ENGINE FAILURE - CRUISE

ENG OUT + Audio tone and "ENGINE OUT" voice warning.

Pedals: control yaw rate.

Collective: lower immediately to stop NR decay.

CAUTION

Keep rotor speed (NR) between 90% and 110%.

Cyclic : adjust to obtain desired autorotative airspeed.

Note

Airspeed for minimum rate of descent is 70 KIAS.
Airspeed for maximum glide distance is 100 KIAS.

IF conditions permit, **confirm engine failure**:

N2 and ITT rapidly decreasing

NO

N1 tachometer failure.
Engine still available.

Manoeuver to exit from autorotation.

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

YES

Engine failure confirmed.

Continued Next Page

ENGINE FAILURE - CRUISE (CONT'D)

Continuation from previous page

- **Engine throttle:** **OFF;**
- **Landing site:** **Select and maneuver into wind;**
- **Briefing:** **Brief cabin crew an occupants;**
- **Harness:** **Locked and tight;**
- **Radar altimeter:** **Verify working.**

FUEL VALVE switch: **CLOSED;**
FUEL PUMP 1 and 2 switches: **OFF;**
Xfer PUMP switch: **OFF;**
GEN switch: **OFF.**

The following captions are displayed on CAS:

DC GEN

BATT DISCH

INV 2 OFF

SAS 2

FUEL PUMP 2

Perform an autorotative landing.
Refer to the **AUTOROTATIVE LANDING** procedure.

ENGINE RESTART IN FLIGHT

Note

Engine restart has not been tested in flight.

CAUTION

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

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

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

Note

Airspeed for minimum rate of descent is 70 KIAS.
Airspeed for maximum glide distance is 100 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.**
PFD:	ENG START and IGNITER ON advisory messages displayed.
MFD:	IGN and START advisory flags displayed beside ITT and N1 scale.

Continued Next Page

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Engine throttle: **IDLE when N1 is between 10% and 20%.**

Gas generator (N1): note increasing to 61±1%.
ITT: note increasing.
Engine oil pressure: check positive indication.

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

PFD: ENG START and IGNITER ON advisory messages out, check.
MFD: IGN and START advisory flags out, check.

Gas generator (N1): stabilized at 61±1%

Engine throttle: FLT
PFD: PLA POS caution message out, check.

GEN switch: ON

Engine oil pressure and temperature: check in green arc.

Xfer PUMP switch: check XFER.

FIRE

ENGINE FIRE ON GROUND

ENG FIRE + Audio Tone and "ENGINE FIRE" voice warning.

Shut down 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 helicopter as soon as possible.

ENGINE FIRE DURING FLIGHT

ENG FIRE **+** Audio Tone and "ENGINE FIRE " voice warning.

Enter autorotation as follows:

- **Collective: immediately reduce as required to maintain NR between 90 and 110%.**
- **Cyclic: adjust to obtain desired autorotative speed.**

Note

Airspeed for minimum rate of descent is 70 KIAS.
Airspeed for maximum glide distance is 100 KIAS.

Shut down engine as follows:

Engine thottle:	**OFF;**
FUEL VALVE switch:	**CLOSED;**
FUEL PUMP 1 and 2 switches:	**OFF;**
Xfer PUMP switch:	**OFF.**

GEN switch: OFF.

Perform an autorotative descent and landing.
Refer to the **AUTOROTATIVE LANDING** procedure.

After landing:
- **BAT switch: OFF.**

Evacuate helicopter as soon as possible.

COCKPIT / CABIN FIRE ON GROUND

No single set of detailed procedures can address all the fire scaenarios that are possible. The most urgent action is to get the aircraft shut down and evacuated immediately.

Confirm fire in cockpit or cabin.

Declare an emergency.

Carry out EMERGENCY/ POST CRASH SHUTDOWN AND EGRESS procedure, **Page 3-16**

COCKPIT / CABIN FIRE IN FLIGHT

An in-flight fire has no single set of detailed procedures that can address all the fire scenarios that are possible in flight. The most urgent action is to get the aircraft on ground as soon as possible with a reasonable degree of safety.

Confirm fire in cockpit or cabin.

Declare an emergency.

Prepare to land as soon as possible.

- VENT CKPT switch:	**OFF;**
- Cockpit and cabin sliding windows(if installed) :	**CLOSE**
- Cockpit/utility light (at night):	**ON**
- ECS/Heater (if installed):	**check OFF**

IF the fire source is determined

Use the on board hand fire extinguisher to fight the fire

Fire persist

NO

Increase ventilation

Land as soon as possible

YES

LAND IMMEDIATELY

Carry out EMERGENCY/ POST CRASH SHUTDOWN AND EGRESS procedure, Page 3-16

IF the fire source is not determined and the fire persists

LAND IMMEDIATELY

Carry out EMERGENCY/ POST CRASH SHUTDOWN AND EGRESS procedure, Page 3-16

CAUTION

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

SMOKE IN CABIN, TOXIC FUMES, ETC.

Smoke, toxic fumes, etc. in the cabin.

- VENT switch: ON.
- Sliding windows (if installed): Open.

IF the altitude permits and the source is suspected to be of an electrical origin:
- attempt to isolate source by switching OFF every not essential electrical circuit.

smoke signs persist

NO

Smoke signs disappear and no indication of fire.

Land as soon as possible.

YES

LAND IMMEDIATELY.

Carry out **EMERGENCY/POST CRASH SHUTDOWN AND EGRESS** procedure, **Page 3-16**.

ENGINE SYSTEMS

ENGINE OIL PRESSURE LOW

ENG OIL PRESS + Audio Tone and “WARNING” voice warning .

Engine oil pressure below 40 psi

- Monitor engine parameters.

- Reduce power

Be prepared to carry out an autorotative landing.
Refer to **AUTOROTATIVE LANDING** procedure.

Land as soon as possible.

ENGINE OIL TEMPERATURE HIGH

ENG OIL HOT + Audio Tone and "WARNING" voice warning.

Engine oil temperature above 115°C.

- Collective: lower to reduce power.

MFD:
- ENG OIL temperature: check.

Land as soon as possible.

TRANSMISSION SYSTEM FAILURES

The most common transmission system (main and tail rotor gearbox) failures are of three general types:

1. Lubrication system failure (oil pump, ducts, nozzles, etc);
2. Transmission component failure (gears, bearings, etc);
3. Accessory component failure (hydraulic pumps, coolers, etc).

The main gearbox is monitored with oil pressure and oil temperature indicators and chip detectors, whilst the tail rotor gearbox is monitored with chip detector. These indicators and chip detectors, as well as the CAS Warning and Caution messages inform the pilot of operating condition of the system. It is probable that one or more of these indications will be present if a mechanical transmission failure is imminent. However, whether these indications are present or not, crew sensory perceptions such as:

- abnormal mechanical noise and/or
- heavy vibration levels and/or
- the smell of hot metal fumes

all play an important part in the diagnosis of impending transmission system failures and assist the pilot in determining what actions are required.

MAIN GEARBOX

OIL PRESSURE LOW

XMSN OIL PRESS + Audio Tone and "WARNING" voice warning.

Transmission oil pressure below minimum limit.

- Monitor transmission oil pressure.

Reduce power as soon as operational conditions permit.

Land as soon as possible.

OIL TEMPERATURE HIGH

XMSN OIL HOT + Audio Tone and "WARNING" voice warning.

Transmission oil temperature above maximum limit.

- Monitor transmission oil temperature.

Reduce power as soon as operational conditions permit.

Land as soon as possible.

MAIN ROTOR CONTROLS SEIZURE

Increase of forces to operate the flight controls and possible reduction of flight control ranges.

WARNING

The low speed flight envelope may be reduced.

IF in hovering:
- Land vertically

IF at low speed (less than 35 KIAS):
- **Proceed to a running landing at the speed at which the seizure occurred.**

IF at high speed:
- **Land as soon as practicable into the wind using a running landing procedure and a touch-down speed of 35 KIAS.**

TAIL ROTOR SYSTEM 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.

Flight condition: Hovering

Further to the general indications of a drive failure, the helicopter will start a slow but accelerated swing to the right. Application of left pedal down to control stop does not diminish the phenomenon.

Engine throttle: Chop to IDLE.

Collective: as necessary to cushion touchdown.

CAUTION

A slight rotation to the right can be expected on touch-down.

Flight condition: Cruise

Further to the general indications of a drive failure, the helicopter will exhibit symptoms that will differ depending on the combination of air-speed, power setting, density altitude, gross weight and rotor speed.

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

CONTROLLABILITY CHECK

Maintain the cruise altitude.

Airspeed: reduce gradually to 60 KIAS

Helicopter: check response to pedal control displacement and the appearance of any anomalous vibrations and/or noise.

IF the check resulted not sufficient to confirm the tail rotor failure, accomplish the following further check:

- Airspeed: maintain 60 KIAS

- Collective: slowly raise to increase the anti-torque demand, as close as possible to maximum continuous power and let the helicopter climb.

Pedals: check the pedals effectiveness in controlling the yaw.

IF nothing seems to confirm a tail rotor failure:

- Continue flight.

On the contrary, **IF** the pedals are not effective in controlling the yaw, proceed as follows:

- Collective: lower as necessary to eliminate the yaw to the right.

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

LANDING AFTER LOSS OF TAIL ROTOR CONTROL

- 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.

Shut down the engine as follows:

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

Perform an autorotative landing, into wind, maintaining forward speed (35 KIAS). Refer to the **AUTOROTATIVE LANDING** procedure.

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.

CAUTION

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.

Procedure: 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 three ft above touchdown area:

- Collective: apply to stop the rate of descent, left yaw will be reduced.
- Airspeed: zero.

- Helicopter: land.

Procedure: In flight - Low power condition

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

- Helicopter: Perform a low power run-on landing
- Airspeed: approach at 60 to 70 KIAS

At about 50 feet AGL:
- Airspeed: reduce to arrive at the intended landing point at about 30 KIAS.

At 2 to 5 feet AGL:
- Collective: apply to cushion landing, and simultaneously
- Throttle: gradually reduce to maintain heading.

IF right yaw becomes excessive:
- Throttle: rotate to IDLE.

ELECTRICAL SYSTEM

BATTERY HIGH TEMPERATURE

BATT HOT + Audio Tone and "WARNING" voice warning.

Battery temperature exceeding limits.

BAT switch: OFF.

BATT OFF + Audio Tone and "WARNING" voice warning.

Land as soon as possible.

BATTERY DISCONNECTED

BATT OFF + Audio Tone and "WARNING" voice warning

Battery disconnected

Check BAT switch.

BAT switch is ON

- NO: **BAT switch: ON**
  - **Continue flight.**
- YES: **Land as soon as practicable.**

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:

Close all vents, doors and sliding windows (if installed).

STATIC source switch: **Lift guard**
Select ALTERNATE.

Proceed with flight

CAUTION

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 proximity of 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).

Maneuver smoothly.

Land as soon as possible.

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MALFUNCTION PROCEDURES

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CAUTION SYSTEM

Many of the malfunctions described in this section are indicated by the illumination of the amber caution captions on the CAS window of the PFD and the flashing of the amber Master Caution Light (MCL).

CAS CAUTION MESSAGES

Note

All caution messages are displayed accompanied by an audio alert (single chime).

Table 3-2. Table of CAS Caution messages (yellow)

CAS Caption	Page	Failure/System State/Corrective action
ATT OFF	-	No pitch and roll attitude retention. Check ATT HOLD switch position. **Proceed with flight.**
AVN FAN FAIL	-	PFD (MFD) fan failed. **IF** possible**, ventilate che cockpit.** **Land as soon as pratical.**
AWG FAIL	-	Aural Warning Generator failure. No aural warnings and audio tones. **Continue flight monitoring CAS system.**
BATT DISCH	3-76	Battery is discharging.
DC GEN	3-73	Failure of the generator and d.c. bus.
DOORS OPEN	3-81	One or more cockpit/cabin door(s) or baggage door not properly secured, removed or open.
EEC DEGRADED	3-61	Electronic engine control (EEC) degraded.
EEC FAIL	-	Electronic engine control (EEC) failure. Automatic reversion to MEC Mode. Refer to procedure **ENGINE OPERATION IN MECHANICAL MODE (MEC)** on **Page 3-62**.

CAS Caption	Page	Failure/System State/Corrective action
ENG AGB CHIPS	-	Metallic particles in engine accessory gearbox lubricating oil. **Reduce power. Land as soon as possible.**
ENG OIL PRESS	3-64	Engine oil pressure low (in yellow arc)
ENG RGB CHIPS	-	Metallic particles in engine reduction gearbox lubricating oil. **Reduce power. Land as soon as possible.**
EXT PWR ON	-	External power receptacle door not closed. **IF** in flight: **reduce speed below 60 KIAS. Land as soon as practicable.**
F LOW FAIL	-	Fuel low sensor failure. No FUEL LOW indication. **Continue flight monitoring fuel quantity.**
FIRE DET	-	Engine fire detection system inoperative. **Monitor engine parameters for anomalies. Land as soon as possible.**
FUEL DRAIN 1 (2)	-	Fuel drain valve 1(2) (if installed) open. Close the drain valve before refuelling and/or take-off.
FUEL DRAIN 1-2	-	Temporarily activated after GIA1 failure
FUEL FILTER	-	Engine fuel filter partially clogged. **Monitor engine parameters. Land as soon as practicable.**
FUEL LOW	3-67	Fuel quantity is low.
FUEL PRESS	-	Fuel pressure low (**in** yellow **arc**). **Monitor engine parameters. Land as soon as practicable.**
FUEL PUMP 1 (2)	-	Fuel pump n.1 (n.2) in tank 1 failed. **Land as soon as practicable.**

CAS Caption	Page	Failure/System State/Corrective action
FUEL PUMP 1-2	-	Both fuel pumps deactivated.
GEN CONTR	3-75	Generator relay box circuit breaker tripped out.
HYD PRESS 1(2)	3-68	Hydraulic pressure of system n.1 (n.2) low (yellow band) for more than 3 seconds.
HYD PRESS 1-2	-	Both hydraulic systems pressure low (yellow band) for more than 3 seconds.
INV 1 (2) OFF	3-77	Failure of inverter n.1 (n.2).
INV 1-2 OFF	-	Both inverters not engaged.
MEC OPN	3-62	EEC mechanical (MEC) mode of operation following an EEC failure.
MISCMP - P	3-110 3-111	GSC1/2 failure or miscompare of primary parameters.
PITOT HTR FAIL	-	Failure of the Pitot heater. Do not fly in visible moisture.
PLA POS	3-63	Engine throttle out of FLT position.
SAS 1 (2)	3-78	No power to n.1 (n.2) SAS system.
SAS 1-2	-	Both SAS systems not powered.
SERVO 1 (2)	3-69 3-70	Failure of the hydraulic system n.1 (n.2).
SERVO 1-2	-	No pressure in both hydraulic systems (displayed on ground only before engine start).
T/R BOX CHIPS	-	Metallic particles in the tail rotor gearbox lubricating oil. **Reduce power. Land as soon as possible.**
VG 1 (2)	-	Gyro n.1 (n.2) not erected, loss of power to gyro. Refer to procedure FAILURE OF ONE SAS on page 3-78.
VG 1-2	-	Both VG systems not erected, no power to both gyros.

CAS Caption	Page	Failure/System State/Corrective action
XFER PUMP	3-66	Fuel tank 2 empty or, if fuel quantity in tank 2 is not zero, fuel transfer pump failed.
XMSN OIL CHIPS	-	Metallic particles in the main transmission oil. **Reduce power. Land as soon as possible.**
XMSN OIL PRESS	3-65	Transmission oil pressure high (yellow band).

AVIONIC SYSTEM INTEGRITY MESSAGES

If any of the following messages activates after system power-up, abort the mission.

Note
Messages not accompanied by any audio.

Table 3-1. Avionic system integrity messages

MFD and PFD Messages	
Caption	**Meaning and Corrective Action**
PFD1 (MFD1) SERVICE-PFD1 (MFD1) needs service. Return unit for repair.	The PFD and/or MFD self-test has detected a trouble. The system should be serviced.
PFD1 (MFD1) COOLING-PFD1 (MFD1) has poor cooling. Reducing power usage.	PFD and/or MFD is overheating and is reducing power consumption by dimming the display. If trouble persists, the system should be serviced.
PFD1 (MFD1) KEYSTK-PFD1 (MFD1) (key name) key is stuck.	A key is stuck on PFD (MFD) bezel. Attempt to free the stuck key by pressing it several times. If trouble persists, the system should be serviced.
PFD1 (MFD1) VOLTAGE - PFD1 (MFD1) has low voltage. Reducing power usage	The PFD (MFD) voltage is low. The system should be serviced.

GIA Messages	
Caption	**Meaning and Corrective Action**
GIA1 (GIA2) COOLING-GIA1 (GIA2) over temperature.	GIA1 and/or GIA2 temperature is too high. If trouble persists, the system should be serviced.
GIA1 (GIA2) SERVICE-GIA1 (GIA2) needs service. Return the unit for repair.	The GIA1 and/or GIA2 self-test has detected a trouble in the unit. The system should be serviced.
COM1 (COM2) TEMP-COM1 (COM2) over temp. Reducing transmitted power.	The system has detected an over temperature condition in COM1 and/or COM2. The transmitter is operating at reduced power. If trouble persists, the system should be serviced.
COM1 (COM2) SERVICE-COM1 (COM2) needs service. Return unit for repair.	The system has detected a failure in COM1 and/or COM2. COM1 and/or COM2 may still be usable. The system should be serviced when possible.
COM1 (COM2) PTT-COM1 (COM2) push-to-talk key is stuck.	The COM1 and/or COM2 external push-to-talk switch is stuck in the enabled (pressed) position.Press the PTT switch again to cycle its operation. If trouble persists, the system should be serviced.

GMU Messages	
Caption	**Meaning and Corrective Action**
HDG FAULT-AHRS1 magnetometer fault has occurred.	A fault has occurred in the #1GMU 44. Heading is flagged as invalid.The AHRS uses GPS for backup mode operation. The system should be serviced.

GTX Messages	
Caption	**Meaning and Corrective Action**
XPDR1 SRVC- XPDR1 needs service. Return unit for repair.	The transponder should be serviced when possible.
XPDR1 FAIL- XPDR1 is inoperative.	There is no communication with the transponder.

ENGINE MALFUNCTIONS

ENGINE HOT START

Indications

ITT	:- Increasing beyond transient starting limits.
Engine exhausts	:- Visible smoke, flames or fire.

Procedure

Abort engine start as follows:

1. Engine throttle	:- OFF.
2. IGN switch	:- OFF.
3. FUEL VALVE switch	:- CLOSED.
4. FUEL PUMP 1 and 2 switches	:- OFF.
5. Xfer PUMP switch	:- OFF.
6. Engine starter	:- Continue to operate.

ENGINE COMPRESSOR STALL

A compressor stall is normally recognized by an audible bang or pop accompanied by a possible increase in ITT and fluctuating N1 and TRQ. The compressor stall may be transient or steady.

The degree of compressor stall may be indicated by one or all of the following:

— Fluctuating N1 speed coupled with failure to respond to power demand;

— Loud banging or popping noises (similar to back-firing);

— A reduction in TRQ (due to reduced air flow through the engine);

— Abnormal ITT increase (due to mis-matching between fuel flow and N1 speed).

IF compressor stall occurs, carry out the following procedure:

- Collective: Lower to reduce power.
- Airspeed: 60 to 70 KIAS; level flight.
- ITT and N1: Check for normal indication.

Land as soon as practicable.

UNUSUAL ENGINE NOISE

Compressor damage as a result of FOD may increase the engine noise level and is detectable by a high-pitched whining sound. The noise level of the high pitched whine should vary with N1 and should be significantly higher than the usual engine noise.

If an unusual noise is detected and FOD damage suspected:

-Reduce power;
MFD:
- Select EIS-ENGINE format;
- Monitor engine parameters for abnormal indications.

Engine parameters stable

NO

Continue monitoring engine parameters.

Be prepared to carry out an autorotative landing.
Refer to **ENGINE FAILURE** and **AUTOROTATIVE LANDING** procedures.

Land as soon as possible.

YES

Continue monitoring engine parameters.

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

1. EEC/MEC switch :- EEC, check.

2. Land as soon as practicable.

MALFUNCTION OF THE FUEL CONTROL SYSTEM

Indications

PFD and MFD :- 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.

WARNING

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.

Malfunction causes a power increase

NO

- **Collective: Adjust**
- **MAN/NOR selector** (on collective)**: MAN**
- **Engine throttle: Slowly rotate towards MAX.**

WARNING

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

YES

- **Engine throttle: Slowly rotate towards IDLE.**

WARNING

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

Land as soon as possible.

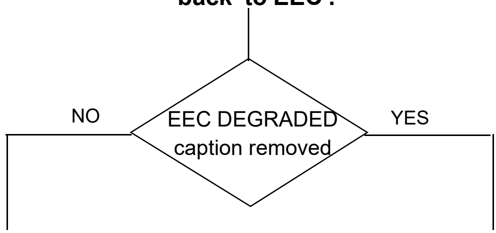
ELECTRONIC ENGINE CONTROL (EEC) MALFUNCTIONS

Electronic Engine Control (EEC) degraded

”EEC degraded” malfunction has no impact on engine performance. The EEC DEGRADED caution message is only displayed on ground (with NR < 20%), for maintenance purposes.

EEC DEGRADED

On ground (NR < 20%):
EEC / MEC switch: cycle from EEC to MEC and back to EEC .



Maintenance action required.

Continue flight.

ENGINE OPERATION IN MECHANICAL MODE (MEC)

Note

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

Engine operation in mechanical mode (MEC) in flight

MEC OPN

Also caption

EEC FAIL

displayed.

N2/NR: use NR TRIM switch as required to maintain at 102%.

Proceed with flight.

ENGINE THROTTLE (PLA) NOT IN FLIGHT POSITION

PLA POS

IF throttle not intentionally reduced**:**
- Check throttle position:

In flight

NO

Before take off:
- **Set throttle correctly and check MAN/NOR selector to NOR and up (locked).**

Caption extinguished

YES

Continue flight.

NO

Shut down engine.

YES

- **Set throttle correctly and check MAN/NOR selector to NOR and up (locked).**

Caption extinguished

YES

Continue flight.

NO

- **Toggle EEC/MEC switch to MEC.**
- **Proceed with flight.**

ENGINE OIL PRESSURE LOW

ENG OIL PRESS

Engine oil pressure between 40 and 80 psi.

Check N1.

N1 above 72%

NO

MFD:
- **Select to EIS-ENGINE format;**
- **Monitor engine oil pressure.**

YES

- **Cyclic: as required to obtain level attitude;**
- **Collective: lower to reduce power ;**
- **Airspeed: 60 to 70 KIAS, level flight;**

MFD:
- **Select to EIS-ENGINE format;**
- **Monitor engine oil pressure.**

Engine oil pressure stable in yellow arc

NO

Pressure between 40 and 80 psi and decreasing, or below 40 psi and

ENG OIL PRESS

+ Audio Tone and "WARNING" voice warning.

- **Monitor engine parameters**;
- Be prepared to carry out an autorotative landing;

(Refer to **AUTOROTATIVE LANDING** procedure**).**

Land as soon as possible.

YES

Land as soon as practicable.

DRIVE SYSTEM MALFUNCTIONS

TRANSMISSION OIL PRESSURE HIGH

XMSN OIL PRESS

Transmission oil pressure in the 55 to 70 psi range (yellow band).

Monitor transmission oil pressure and temperature.

Continue flight

Note

XMSN OIL PRESS caution message can be active if main transmission oil is still cool.

FUEL SYSTEM MALFUNCTIONS

TRANSFER PUMP FAILURE

XFER PUMP

Fuel tank 2 empty or, if not empty,
failure of the transfer pump.

Xfer PUMP switch: OFF.

Continue flight monitoring fuel quantity.

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 crossed to indicate that the remaining fuel in tank 2 is not usable.

FUEL LOW

FUEL LOW

Fuel quantity is low.

Verify fuel quantity in tank 1.

Land as soon as practicable.

CAUTION

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

Note

Remaining flight time at MCP is 10 minutes.

HYDRAULIC SYSTEM MALFUNCTIONS

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.

LOW PRESSURE IN ONE HYDRAULIC SYSTEM

HYD PRESS 1(2)

No.1 (2) servo hydraulic system pressure in the 1200-1400 psi range (yellow band) for more than three seconds.

Monitor affected hydraulic pressure.

Hyd pressure stable in yellow arc

NO

Pressure dropping in the red band (less than 1200 psi).

SERVO 1(2)

Caption displayed in CAS window.

Refer to **PRESSURE LOSS IN SYSTEM N.1** (Page 3-69) or **PRESSURE LOSS IN SYSTEM N.2** (Page 3-70) procedure.

YES

Continue flight monitoring affected pressure.

Note

No change in cyclic, collective and pedals control force.

PRESSURE LOSS IN SYSTEM N.1

SERVO 1

N°1 Servo hydraulic system pressure below 1200 psi.

No change in cyclic and collective control force.

Hovering and high power condition:
- pedals tendency to move slowly to tail rotor traction zero position.

All other flight conditions:
- pedals tendency to maintain initial position.

Avoid rapid movements of flight controls.

For non-hovering conditions:

- **Gradually reduce airspeed below 90 KIAS;**
- **Avoid pull-up manoeuvres and bank angles above 25 deg to maintain acceptable loads.**

SERVO switch: 1 OFF.

Land as soon as practicable.

PRESSURE LOSS IN SYSTEM N.2

SERVO 2

N°2 Servo hydraulic system pressure below 1200 psi.

No change in cyclic, collective and pedals control force.

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

SERVO switch: 2 OFF.

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).

Main rotor servo valve jamming

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

Jamming of a servo valve on one of the main rotor servo actuators is detectable in flight by:

— a force increase on the cyclic stick and collective lever and/or

— a helicopter response which is not fully consistent with the control input, during a manoeuvre.

If one of these effects is noted, proceed as follows:

- Gradually reduce airspeed below 90 KIAS.
- Avoid pull-up manoeuvres.
- Avoid bank angle above 25 deg.
- Avoid rapid movement of the cyclic and collective controls.
- Avoid operation in enclosed areas.
- Avoid operation with sideward wind, in particular with wind from the right.

Land as soon as practicable.

When on the ground:
conduct HYDRAULIC SYSTEMS Check described in Section 2.

IF servo valve jamming is confirmed:
do NOT resume flight.

Tail rotor servo valve jamming

Jamming of the servo valve of the tail rotor servo actuator will result in an increase of pedal control force.

- Gradually reduce airspeed below 90 KIAS.
- Avoid pull-up manoeuvres.
- Avoid bank angle above 25 deg.
- Avoid flight conditions requiring high manoeuvrability on the yaw axis.

Land as soon as practicable.

WARNING

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

ELECTRICAL POWER MALFUNCTIONS

FAILURE OF THE GENERATOR AND D.C. BUS

DC GEN

Also the following captions are displayed on CAS:

BATT DISCH

INV 2 OFF

SAS 2

FUEL PUMP 2

GEN switch: RESET, then ON.

- **IF** DC GEN caption still active:

GEN switch: OFF.

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

Pilot and Copilot ICS NORM/BK-UP/EMER switches: NORM, check.

Land as soon as practicable and before battery discharging (within 24 minutes maximum).

WARNING

With this failure, the battery is capable of supplying power for approximately 24 minutes. In this condition the engine is fed by the fuel pump n. 1 only.

Note

The battery will supply the following indicators and systems:

— N1 and ITT indicators (on PFD and MFD);

— TRQ indicator (on PFD and MFD);

— N2/NR indicator (on PFD and MFD);

— warning, caution and advisory messages (on PFD);

— engine oil pressure and temperature indicators (on MFD);

— transmission oil pressure and temperature indicators (on MFD);

— ammeter indicator (on MFD);

— fuel pressure indicator (on MFD);

— fuel quantity indicator (on PFD and MFD);

— hydraulic 1 and 2 pressure indicators (on MFD);

— 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/map light;

— airspeed, altitude and vertical speed indicators (on PFD);

— attitude and heading indicators (on PFD);

— ESIS instrument;

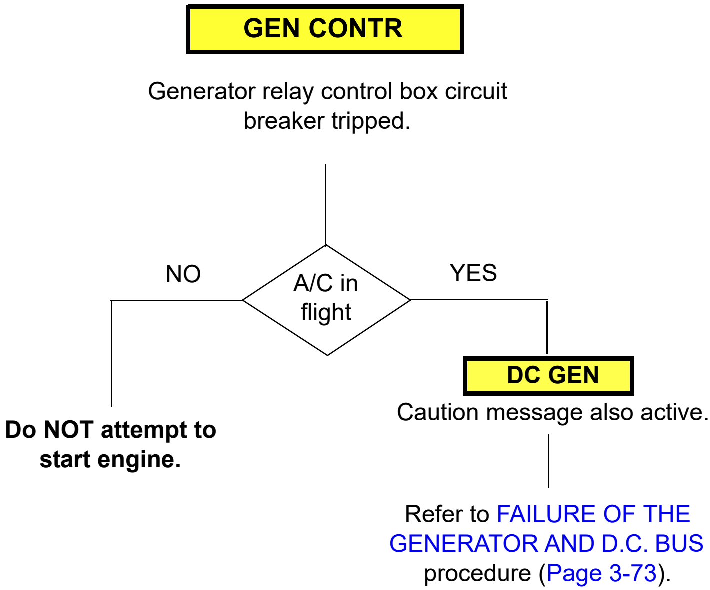
— pilot/copilot ICS (operated in EMER mode);

— COM/NAV/GPS 2;

— transponder;

— pilot windshield wiper (if installed).

D.C. GENERATOR CONTROL FAILURE



BATTERY DISCHARGING

BATT DISCH

Battery discharging.
The following captions may or may not be displayed on CAS:

DC GEN

INV 2 OFF

SAS 2

FUEL PUMP 2

DC GEN switch set to OFF

NO

Undetected DC GEN failure confirmed.

- GEN switch: OFF.
- GEN BUS switch: set to OFF.
(loss of d.c. bus).

Pilot and Copilot ICS NORM/BK-UP/EMER switches: check NORM.

Land as soon as practicable and before battery discharging (within 22 minutes maximum).

YES

- DC GEN switch: set to ON.
- BATT DISCH, DC GEN, INV 2 OFF and FUEL PUMP 2 cautions: check extinguished.

SAS 2 switch: re-select to ON position.

Continue flight.

WARNING

With this failure, the battery is capable of supplying power for approximately 22 minutes. In this condition the engine is fed by the fuel pump n. 1 only.

Refer to **FAILURE OF THE GENERATOR AND D.C. BUS** procedure (page 3-73) for the list of equipment supplied by the battery.

FAILURE OF ONE 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.

INV 1 (2) OFF

Inverter 1 (2)failed.

SAS 1 (2)

caution message also active.

Note

VG 1 (2) Caution message could be temporarily displayed (2 - 3 minutes)

INV 1 (2) switch: cycle to attempt reset.

IF INV 1 (2) OFF caption still displayed:
- INV 1 (2) switch: OFF;

WITH VG 1 (2) caution message cleared:
- SAS 1 (2) switch: ON, check SAS 1 (2) caption out.

Continue flight.

HELIPILOT SYSTEM MALFUNCTION

Note

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

Note

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

Note

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

FAILURE OF ONE SAS

.

SAS 1 (2)

No power to SAS 1 (SAS 2) system.

Cyclic and collective: Hands on.

Max airspeed: Reduce V_{NE} by 30 KIAS.
Max Rate Of Climb: 750 ft/min.

SAS 1(2) switch: check ON.

Continue flight.

REPEATED DISTURBANCES DURING PITCH, ROLL OR YAW OPERATION

Helicopter: **retrim.**

Helipilot indicators: **monitor to identify failed system.**

Failed system: **disengage.**

Proceed per **FAILURE OF ONE SAS** procedure (page 3-78).

OSCILLATORY MALFUNCTION DURING PITCH, ROLL AND YAW OPERATION

- Reduce power (if practicable).
- Reduce airspeed to 120 KIAS maximum.
- Reduce rate of climb to 750 ft/min maximum.

Try Identifying affected axis by either:
- observing Helipilot indicators

or
- using the following procedure:

SAS 1 switch: OFF.

Oscillation stops

NO

- SAS 1 switch: ON;
- SAS 2 switch: OFF.

Oscillation stops

NO

IF oscillation is on yaw axis:
- SAS 1 switch: OFF;
- SAS 2 switch: ON.

YES

SAS 2 system failed.

YES

SAS 1 system failed.

Continue flight with single SAS functioning.
Refer to **FAILURE OF ONE SAS** procedure (page 3-78).

WARNING

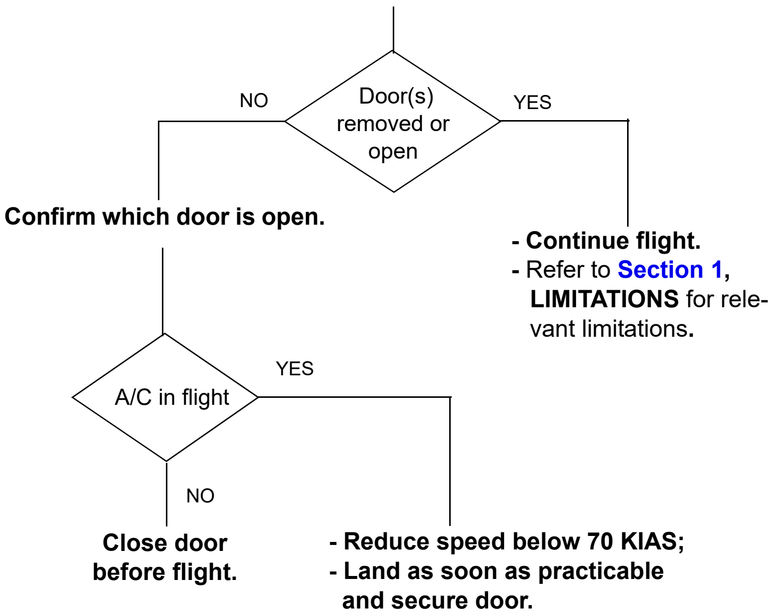
Landing should not be attempted while an oscillatory malfunction exists.

MISCELLANEOUS

COCKPIT, CABIN, OR BAGGAGE COMPARTMENT DOORS OPEN

DOORS OPEN

One or more cockpit/cabin door(s) or baggage door not properly secured.
One of both cabin doors removed or open.



MSTR AVNX SWITCH FAILURE

- COM/NAV windows blank with large red “X” superimposed on PFD and MFD.
  Failure of MSTR AVNX switch.

MSTR AVNX circuit breakers (2): **Disengage both.**

Operate the COM/NAV systems as desired by means of their dedicated controls on PFD and MFD.

Continue flight.

FAILURE OF COM 1(2)

- COM 1(2) window blank with large red “X” superimposed on PFD and MFD;

- COM 1(2) SERVICE message displayed in the G1000H and G1000H NXi annunciations window on PFD.

Use COM 2(1) for normal radio communications.

Continue flight.

FAILURE OF NAV 1(2)

- NAV 1(2) window blank with large red “X” superimposed on PFD and MFD;
- NAV 1(2) bearing information window blank with large red “X” superimposed on PFD;
- NAV 1(2) SERVICE message displayed in the G1000H and G1000H NXi annunciations window on PFD.

Select NAV 2(1) as navigation source.

Continue with flight.

FAILURE OF GPS1(2)

- “AHRS1 GPS” and “GPS 1(2) SERVICE” messages displayed in the G1000H and G1000H NXi annunciations window on PFD;

- Amber LOI caption displayed on PFD.

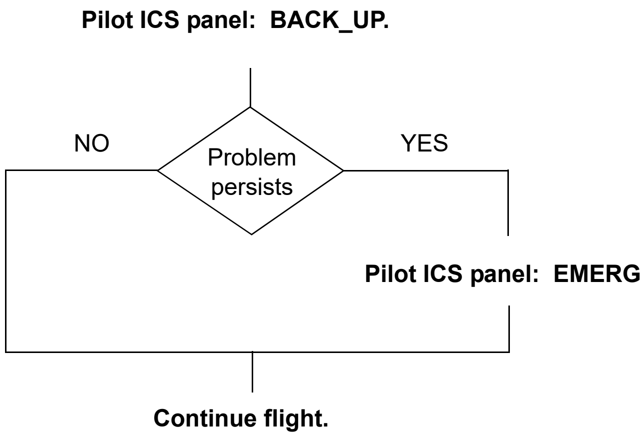
Continue with flight.

Note

Backup GPS is automatically selected as source for GPS information.

INTERCOMMUNICATION SYSTEM FAILURE

In case of Pilot ICS (Inter-Communication System) failure:



Note

When ICS pilot stations are in BACK-UP, the forward RH passenger station is disconnected.

Note

When ICS pilot stations are in EMER, they are automatically disconnected from the cabin ICS stations and the HOT MIKE function is not available (use cyclic PTT key). When in EMER mode, the pilot is directly connected to COM2/NAV2 and the copilot to COM1/NAV1.

LOSS OF TORQUE SENSOR POWER

In any condition different from autorotation:
- 0% TRQ indication (PFD/MFD).

Disregard TRQ instrument indications.

MFD: Select EIS-ENGINE format.

ITT and N1:
- **Note current values.**
- **Monitor and avoid exceeding noted values.**

Land as soon as possible.

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COCKPIT DISPLAY SYSTEM FAILURES

PRIMARY FLIGHT DISPLAY (PFD) FAILURE

The internal PFD failures may differ according to the following cases: PFD blank or PFD unusable.

- MFD automatically displays REVERSIONARY format.
- COM 2 and NAV 2 windows on PFD blank with large red “X” superimposed;
- “XTALK ERROR” message displayed in the G1000H annunciations window on MFD.

ON/OFF pushbutton of PFD: OFF.

Use MFD.

Land as soon as practicable.

CAUTION

- Helicopter systems instruments no longer available but some CAS messages for those instruments are still available;
- EIS-ENGINE format not selectable;
- AWG REGRADE function no longer available.

CAUTION

The following CAS advisory messages are no longer available:

Advisories
LANDING LT ON VENT ON

Note

COM 2 automatically tuned to emergency frequency 121.5 MHz.

MULTI-FUNCTION DISPLAY (MFD) FAILURE

The internal MFD failures may differ according to the following cases: MFD blank or unusable;

- PFD COM 1 and NAV 1 windows on PFD blank with large red “X” superimposed;

- “XTALK ERROR” message displayed in the G1000H annunciations window on PFD.

ON/OFF pushbutton of MFD: OFF.

Use PFD only.

Land as soon as practicable.

CAUTION

- Helicopter systems instruments no longer available, but some CAS messages for those instruments are still available.
- MASTER RESET button on cyclic control grip no longer available.
- EIS-ENGINE format not selectable.

CAUTION

The following CAS messages (cautions and advisories) are no longer available:

Cautions	Advisories
ATT OFF EXT PWR ON FIRE DET FUEL PUMP 1 FUEL PUMP 2 INV 1 INV 2 SAS 1 SAS 2 VG 1 VG 2 XFER PUMP	ENG START FT OFF IGNITER ON

Note

COM 1 automatically tuned to emergency frequency 121.5 MHz.

Note

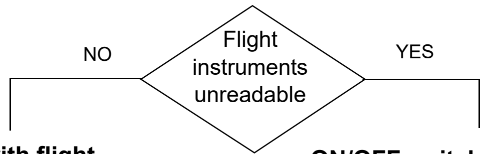
Monitor fuel quantity and in the event Tank 2 fuel quantity becomes boxed and crossed, proceed as per **TRANSFER PUMP FAILURE** procedure (page 3-66).

DISPLAY DEGRADATION (PFD OR MFD)

INDICATIONS

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

PROCEDURE



Proceed with flight

ON/OFF switch of affected display: OFF.

Refer to **PRIMARY FLIGHT DISPLAY (PFD) FAILURE** (page 3-85) or **MULTI-FUNCTION DISPLAY (MFD) FAILURE** (page 3-87) procedure, as applicable.

LOSS OF DISPLAY PARAMETER(S)

Each display receives electrical signals from the sensors, but displays only the parameters data related to its current display format. When an LRU or LRU function fails, a large red "X" is displayed over the window associated with the failed data. See Figure 3-5.

INDICATIONS

PFD (MFD) :- Red cross displayed on affected parameter (Figure 3-5). Refer to paragraph "**G1000H LRU FAILURES**" for relevant procedure.

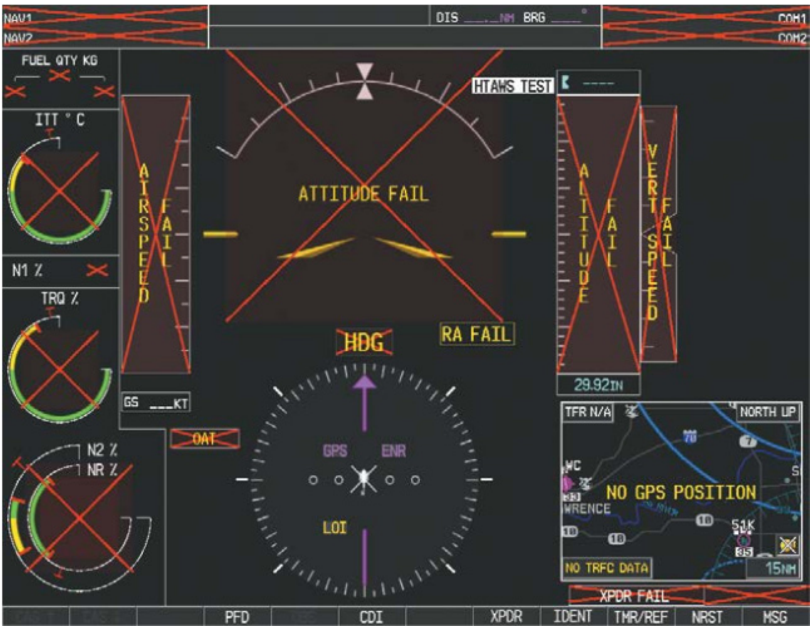


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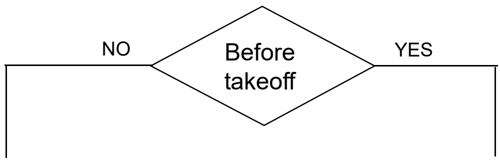
Figure 3-5. G1000H System Failure Annunciations

PFD/MFD SERVICE MESSAGE

PFD1(MFD1) SERVICE - PFD (MFD) needs service. Return unit for repair.

The PFD (MFD) internal self-monitoring function has detected a critical failure of the unit..



Refer to COCKPIT DISPLAY SYSTEM FAILURES procedures (page 3-85), as applicable.

Abort flight.

PFD/MFD OVERHEATING

PFD1 (MFD1) COOLING - PFD1 (MFD1) has poor cooling. Reducing power usage.

PFD (MFD) overheating and reducing power consumption by dimming the display.

IF possible, ventilate the cockpit:

- VENT switch: ON.

- Sliding windows (if installed): Open.

PFD (MFD): Monitor for possible excessive auto dimming impairing readibility.

IF readability is impaired:

- Affected display: OFF.

Refer to COCKPIT DISPLAY SYSTEM FAILURES procedures (page 3-85), as applicable.

PFD BEZEL KEY STUCK

PFD1 KEYSTK - PFD1 [key name] is stuck.

Specified softkey stuck on PFD bezel.

Stuck key: attempt to free by pressing it several times.

Key operation resumes:
- **Continue flight.**

Key still stuck and affects transponder controls:
- **Refer to ATC instructions.**

MFD BEZEL KEY STUCK

MFD1 KEYSTK - MFD [key name] is stuck.

Specified softkey stuck on MFD bezel.

Stuck key: attempt to free by pressing it several times

Continue flight.

PFD (MFD) VOLTAGE

PFD1 (MFD1) VOLTAGE - PFD1 (MFD1) has low voltage. Reducing power usage.

The PFD (MFD) voltage is low.
The system should be serviced

G1000H LRU FAILURES

AIR DATA UNIT (ADU) FAILURES

The internal ADU failures may differ according to the following cases.

Total Failure of ADU

- Airspeed, Barometric Altitude, Vertical Speed and OAT indications on PFD blank with large red 'X' superimposed.
- Amber AIRSPEED FAIL, ALTITUDE FAIL, VERT SPEED FAIL and OAT captions displayed on PFD.
- "AHRS1 TAS" message displayed in the G1000H annunciations window on PFD.

Refer to ESIS for Airspeed and Barometric Altitude indications.

Estimate Vertical Speed from Barometric Altitude indication.

Do not exceed the lowest value of Vne for the applicable pressure altitude as displayed on the Airspeed Placard, Section 1 (LIMITATIONS).

Avoid flight in visible moisture;
IF flight in visible moisture can not be avoided:
- PITOT HEAT switch: ON.

Loss of Airspeed Indication

- Airspeed indication on PFD blank with large red ‘X’ superimposed;
- Amber AIRSPEED FAIL caption displayed on PFD;
- “AHRS1 TAS” message displayed in the G1000H annunciations window on PFD.

Refer to ESIS for Airspeed indication.

Land as soon as practicable.

Discrepancy between Airspeed Indications

- Airspeed indication difference between PFD and ESIS greater than 5 kts (PFD higher) or PFD Airspeed indication smaller than ESIS Airspeed indication.

Refer to instrument providing greater Airspeed indication.

Continue flight.

Loss of Barometric Altitude Indication

- Barometric Altitude indication on PFD blank with large red ‘X’ super imposed;
- Amber ALTITUDE FAIL caption displayed on PFD.

Refer to ESIS for
Barometric Altitude indication.

Land as soon as practicable.

Discrepancy between Barometric Altitude Indications

- Significant difference (greater than 50 ft) between PFD and ESIS Barometric Altitude indication.

Refer to instrument providing lower
Barometric Altitude indication.

Continue flight.

Loss of Vertical Speed Indication

- Vertical Speed indication on PFD blank with large red ‘X’ superimposed;
- Amber VERT SPEED FAIL caption displayed on PFD;

Estimate Vertical Speed from Barometric Altitude indication on PFD.

Continue flight.

Inconsistent Vertical Speed Indication

- Vertical Speed indication not consistent with pilot perception and with rate of change of Barometric Altitude indication.

Estimate Vertical Speed from Barometric Altitude indication on PFD.

Continue flight.

Loss of Ambient Temperature Indication

- OAT indications on PFD blank with large red ‘X’ superimposed;

- Amber OAT caption displayed on PFD;

Do not exceed the lowest value of Vne for the applicable pressure altitude as displayed on the Airspeed Placard, **Section 1** (LIMITATIONS).

Avoid flight in visible moisture;
if flight in visible moisture can not be avoided:
- PITOT HEAT switch: ON.

Continue flight.

ATTITUDE AND HEADING REFERENCE SYSTEM (AHRS) FAILURES

Total Failure of AHRS

- Pitch and Roll Attitude, Heading and Slip/Skid indications on PFD blank with large red ‘X’ superimposed;

- VSI indication degraded - ADC VS caution;
- Display background blank on PFD;
- “HDG FAULT” message displayed in the G1000H and G1000H NXi annunciations window on PFD.

- Loss of wind indication.

- Loss of SVS (G1000H)/SVT (G1000H NXi).

Refer to ESIS for Pitch and Roll Attitudes, Heading and Slip/Skid indication.

Land as soon as practicable.

Note

Vertical Speed indication reliable after initial transient.

Loss of Pitch and Roll Attitude Indication

- Pitch and Roll Attitude indications on PFD blank with large red ‘X’ superimposed;
- Amber ATTITUDE FAIL caption displayed on PFD.

Refer to ESIS for Pitch and Roll Attitudes, indications.

Land as soon as practicable.

Discrepancy between Pitch Attitude Indications

- Pitch Attitude indications difference between PFD and ESIS instruments.

- Refer to PFD Pitch attitude indication.
- Cross check Altitude, Airspeed and Vertical Speed indications between PFD and ESIS for setting the desired values.

Land as soon as practicable.

Discrepancy between Roll Attitude Indications

- Roll Attitude indications difference between PFD and ESIS instruments.

Roll attitude indication : Zeroize on either PFD or ESIS indicators and observe Heading indication for any drift.

Refer to roll attitude indication on instrument that provides constant Heading indication.

Land as soon as practicable.

Loss of Heading Indication

- Heading indications on PFD blank with large red ‘X’ superimposed.

- Amber HDG caption displayed on PFD.

Refer to ESIS or Standby Magnetic Compass for Heading indication.

Land as soon as practicable.

Note

AHRS automatically reverts to GPS for backup mode of operation.

Discrepancy between Heading Indications

- Significant difference (greater than 5 degrees) between PFD and ESIS Heading indications.

Refer to Standby Magnetic Compass to determine the correct source.

Continue flight.

MAGNETIC REFERENCE UNIT (MU) FAILURE

HDG FAULT - AHRS1 magnetometer fault has occurred.

A fault occurred to the Magnetometer Unit.

Refer to LOSS OF HEADING INDICATION procedure (page 3-102).

INTEGRATED AVIONIC UNIT 1 (GIA1) FAILURE

- COM1/NAV1 windows on PFD and MFD blank with large red ‘X’ superimposed;
- Loss of Radar Altimeter

COM1 is automatically tuned to emergency frequency 121.500 MHz (no indication on PFD/MFD).

GPS1 is no longer available.

Land as soon as practicable.

CAUTION

The following CAS messages (cautions and advisories) are no longer available:

Cautions	Advisories
ATT OFF FIRE DET INV 1 OFF INV 2 OFF SAS 1 SAS 2 VG 1 VG 2	ENG START FT OFF IGNITER ON

Note

FUEL DRAIN 1-2 caution message temporarily actuated.

INTEGRATED AVIONIC UNIT 2 (GIA2) FAILURE

- COM2/NAV2 windows on PFD and MFD blank with large red ‘X’ superimposed;
- ADF and DME indications on PFD blank with large red ‘X’ superimposed;

COM2 is automatically tuned to emergency frequency 121.500 MHz (no indication on PFD/MFD).

COM/NAV/ICS volumes are not faded-out in case of aural warning message activation.

GPS2 (backup) is no longer available.

Land as soon as practicable.

CAUTION

ROTOR LOW horn no longer available

CAUTION

The following CAS advisory messages are no longer available:

Advisories
LANDING LT ON VENT ON

INTEGRATED AVIONIC UNIT (GIA1/GIA2) OVERHEATING

GIA1 (GIA2) COOLING - GIA1 (GIA2) over temperature

- GIA1 (GIA2) temperature too high.

IF in flight, and the unit fails:

-Refer to **INTEGRATED AVIONIC UNIT 1(2) (GIA1/GIA2) FAILURE** procedure**.**
See pages 3-104 or 3-105.

INTEGRATED AVIONIC UNIT (GIA1/GIA2) SERVICE MESSAGE

GIA1 (GIA2) SERVICE - GIA1 (GIA2) needs service. Return unit for repair.

The GIA1 / GIA2 self-test has detected a problem in the unit. The system should be serviced.

Before takeoff

NO

Refer to the **INTEGRATED AVIONIC UNIT 1 (GIA1) FAILURE** or to the **INTEGRATED AVIONIC UNIT 2 (GIA2) FAILURE** procedure, as applicable.

YES

Abort flight.

ENGINE AIRFRAME UNIT 1 (GEA1) FAILURE

- The following indications are no longer available on MFD (blank with large red 'X' superimposed):
  — ENG OIL Pressure;
  — XMSN OIL Temperature;
  — HYD 1 Oil Pressure.

.

Land as soon as practicable.

IF ENG OIL PRESS caution appears on PFD:

Land as soon as possible.

WARNING

ENG OIL PRESS warning is no longer available.

CAUTION

The following CAS caution messages are no longer available:

Cautions
EXT PWR ON FUEL PUMP 1 FUEL PUMP 2 HYD PRESS 1 XFER PUMP

CAUTION

The loss of the XFER PUMP caution message, regardless of the XFER PUMP status, also prevents from showing the crossed digital readout of FUEL quantity 2 (fuel quantity no longer usable) in case of loss of XFER PUMP when the fuel quantity in tank 2 is less than 120 kg. Monitor fuel tank quantities to detect uneven emptying and consequent unusable fuel.

ENGINE AIRFRAME UNIT 2 (GEA2) FAILURE

- The following instruments are no longer available on MFD (blank with large red ‘X’ superimposed):
  — ENG OIL Temperature;
  — FUEL Pressure;
  — HYD Pressure 2;
  — XMSN OIL Pressure;
  — DC Voltmeter;
  — DC Ammeter.

Land as soon as possible

WARNING

ENG OIL HOT warning is no longer available.

CAUTION

The following CAS caution messages are no longer available:

Cautions
FUEL PRESS
HYD PRESS 2
XMSN OIL PRESS

SIGNAL CONDITIONER UNIT 1 (GSC1) FAILURE

MISCMP - P

-The following indication is no longer available on PFD and MFD (EIS-ENGINE page):
- NR (blank digital readout, red-backgrounded label, red dial).

- Momentary activation of two audio tones and of ROTOR HIGH (visual and aural) warning message.
- Failure of GSC1 unit.

GSC2 pushbutton on instrument panel - Push;

- Confirm FORCED light illuminates.

- NR indication: Recovered.
- Caution message: Clears.
- Momentary activation of one audio tone and of ROTOR LOW and ENGINE OUT (visual and aural) warning messages.

Note

NR indication provided by the remaining GSC unit.

Continue flight.

SIGNAL CONDITIONER UNIT 2 (GSC2) FAILURE

MISCMP - P

- The following indications are no longer available on PFD and MFD (EIS-ENGINE page):
  - N1 (blank digital readout, red-backgrounded label).
  - N2 (blank digital readout, red-backgrounded label, red dial).
- Momentary activation of two audio tones and of ROTOR HIGH (visual and aural) warning message.
- Failure of GSC2 unit.

GSC1 pushbutton on instrument panel - Push;
- Confirm FORCED light illuminates.

- N1 and N2 indications: Both recovered.
- Caution message: Clears.
- Momentary activation of one audio tone and of ROTOR LOW (visual and aural) warning message.

Note

N1 and N2 indications provided by the remaining GSC unit.

Continue flight.

COM 1 (COM2) OVER TEMPERATURE

COM1 (COM2) TEMP - COM1 (COM2) over temp. Reducing transmitter power.

- Over temperature condition in COM1 and/or COM2.
- Transmitter operating at reduced power.

Continue flight using COM2 (COM1).

COM 1 (COM2) SERVICE MESSAGE

COM1 (COM2) SERVICE - COM1 (COM2) needs service. Return unit for repair

- Failure detected in COM1 and/or COM2.
- COM1 and/or COM2 may still be usable.

Continue flight using COM2 (COM1).

COM 1 (COM2) PTT KEY STUCK MALFUNCTION

COM1 (COM2) PTT - COM1 (COM2) push-to-talk key is stuck.

- COM1 and/or COM2 PTT switches (cyclic grips or foot switches) stuck in the enabled (pressed) position,

OR

- Internal failure in one ICS panel,

OR

- Internal failure in GIA1(2) section managing the related COM system.
- PFD/MFD: TX label active in either COM box when any COM is selected to TX on one ICS panel.

Note

After 35 seconds of continuous transmission, the COM in use stops transmitting. This is normal even if no malfunction is detected. Release of the PTT resumes full COM functionality.

- **All PTT switches: try to identify failed switch by pressing several times to cycle their operation.**

IF trouble persists:

- **TX knob (ICS panels): select one at a time to ICS or to an unused position.**
- **ICS panels: re-select to TX mode with COM1(2) only when required for transmission.**

TRANSPONDER FAILURE

XPDR1 FAIL - XPDR1 is inoperative.

No communication with the transponder.

IF in flight:

- Refer to ATC instructions.

TRANSPONDER SERVICE MESSAGE

XPDR1 SRVC - XPDR1 needs service. Return unit for repair.

The transponder should be serviced when possible.

IF in flight:

- Refer to ATC instructions.

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

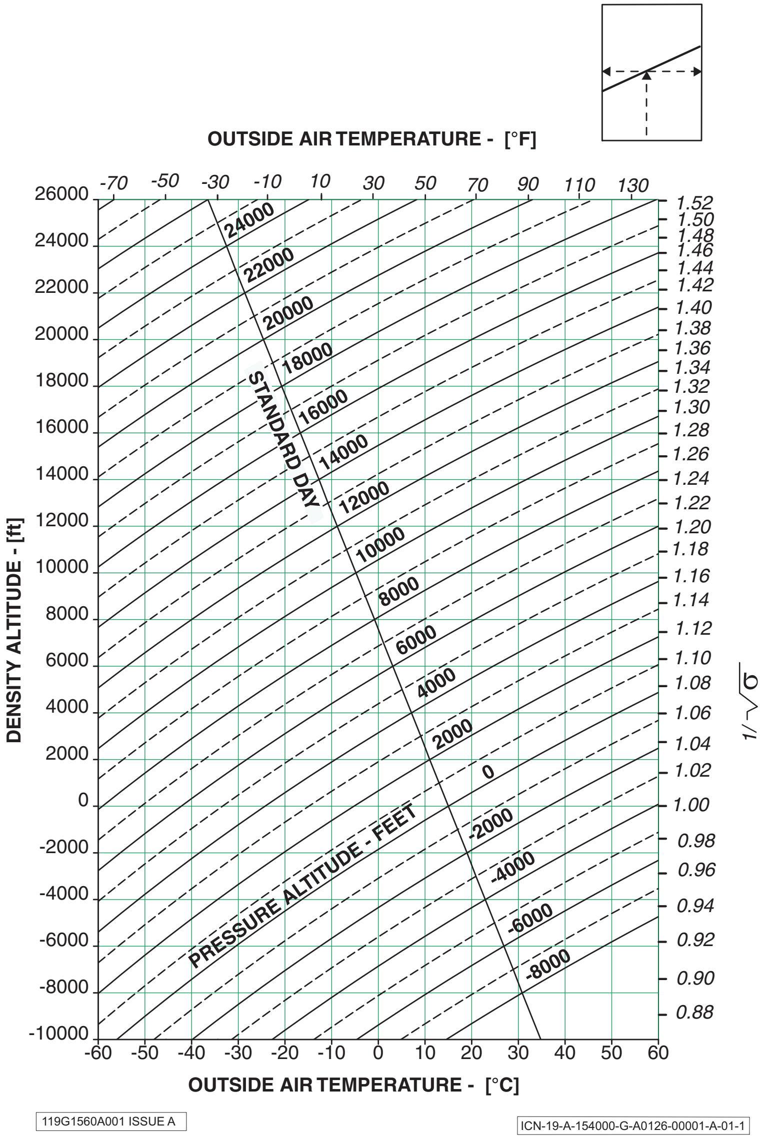


Figure 4-1. Density / Altitude Chart

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.

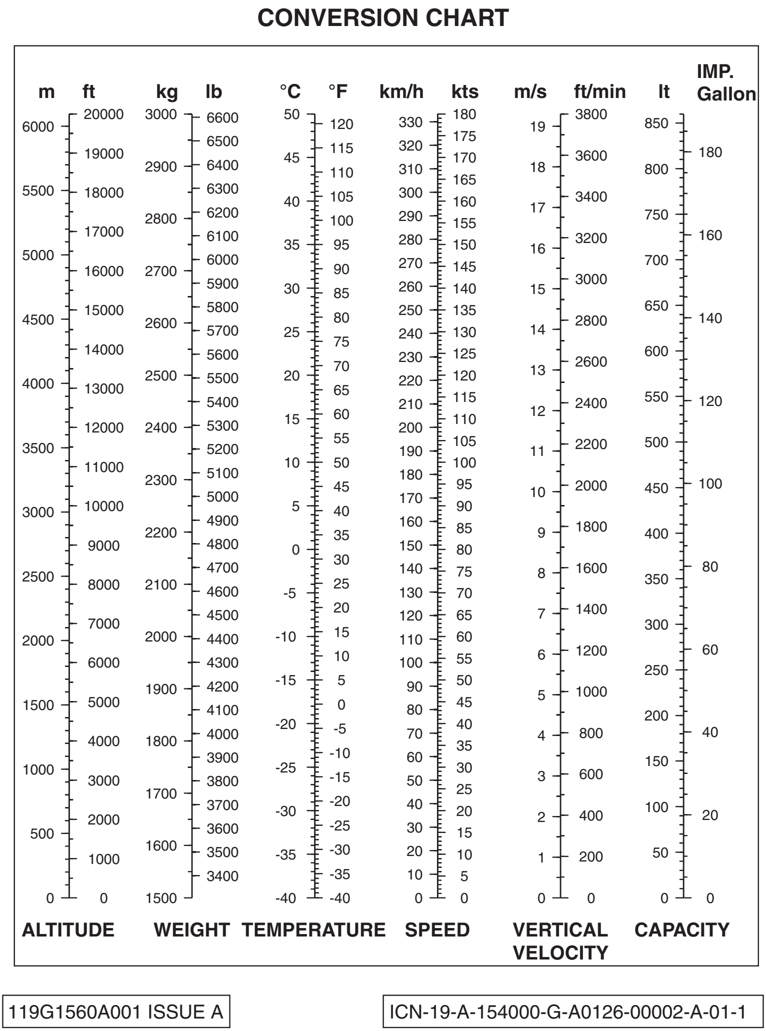


Figure 4-2. Conversion Chart

AIRSPEED CALIBRATION CURVE

(Figure 4-3 thru 4-4)

Calibration curves are presented for the PFD and ESIS indicators.
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.

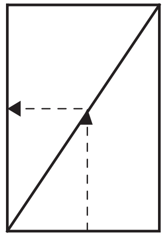
Example:

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

Solution:

Use Figure 4-3 for PFD indicator. 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 52 knots.

AIRSPEED CALIBRATION CURVE
PFD INDICATOR
(FORWARD FLIGHT)



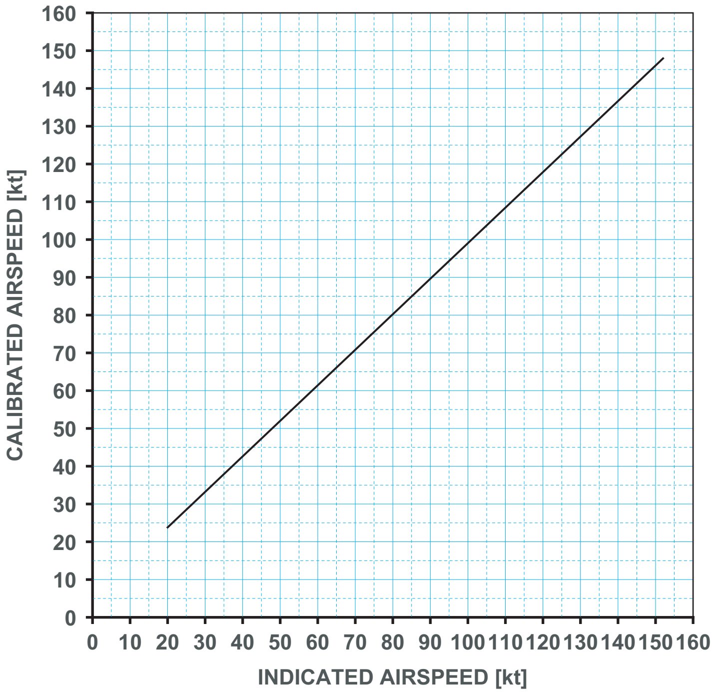


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Figure 4-3. Airspeed Calibration Curve - Pilot

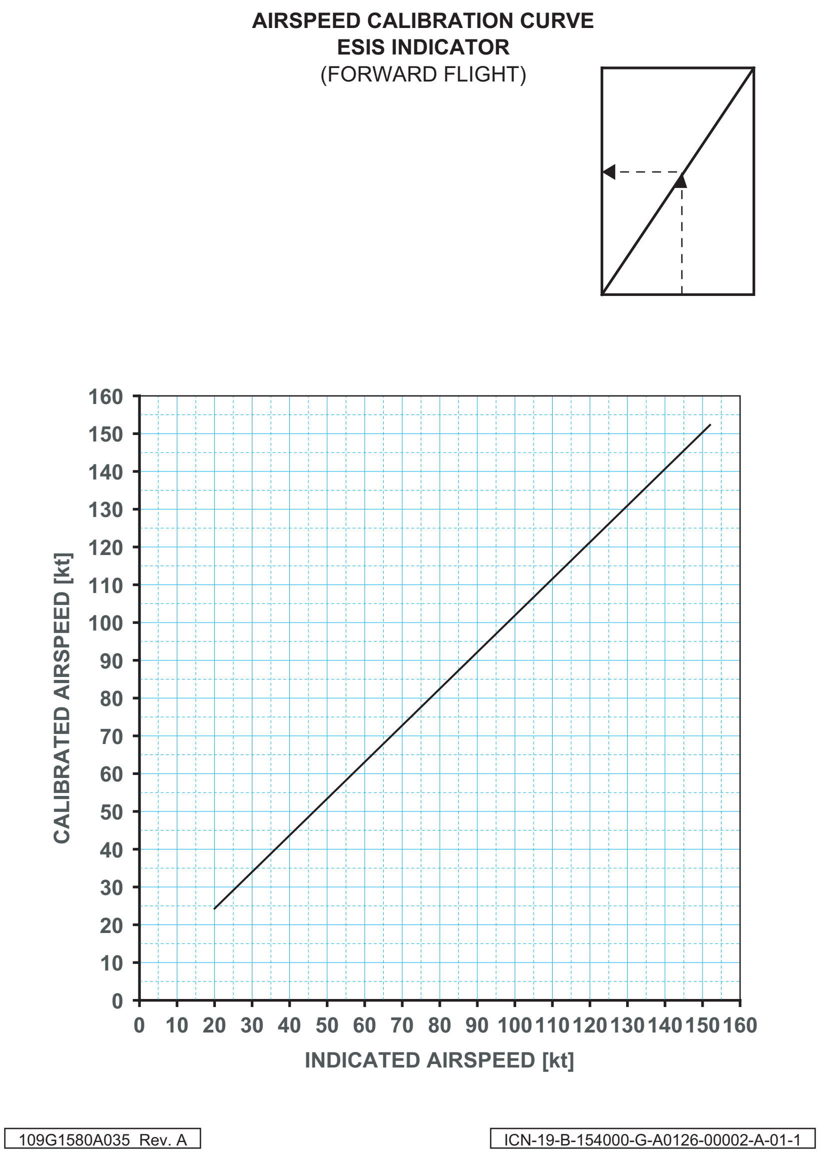

Figure 4-4. Airspeed Calibration Curve - ESIS

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.

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 755°C ITT OR 100.1% N1 OR 100% TQ
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 ENGINE EXCEEDS ALLOWABLE ITT OR N1, PUBLISHED PERFORMANCE MAY NOT BE ACHIEVABLE. REFER TO EMM
NOTE: TORQUE SHOULD BE PREFERABLY SET ABOVE 70% OF ENGINE TORQUE FOR REPEATABILITY OF TEST

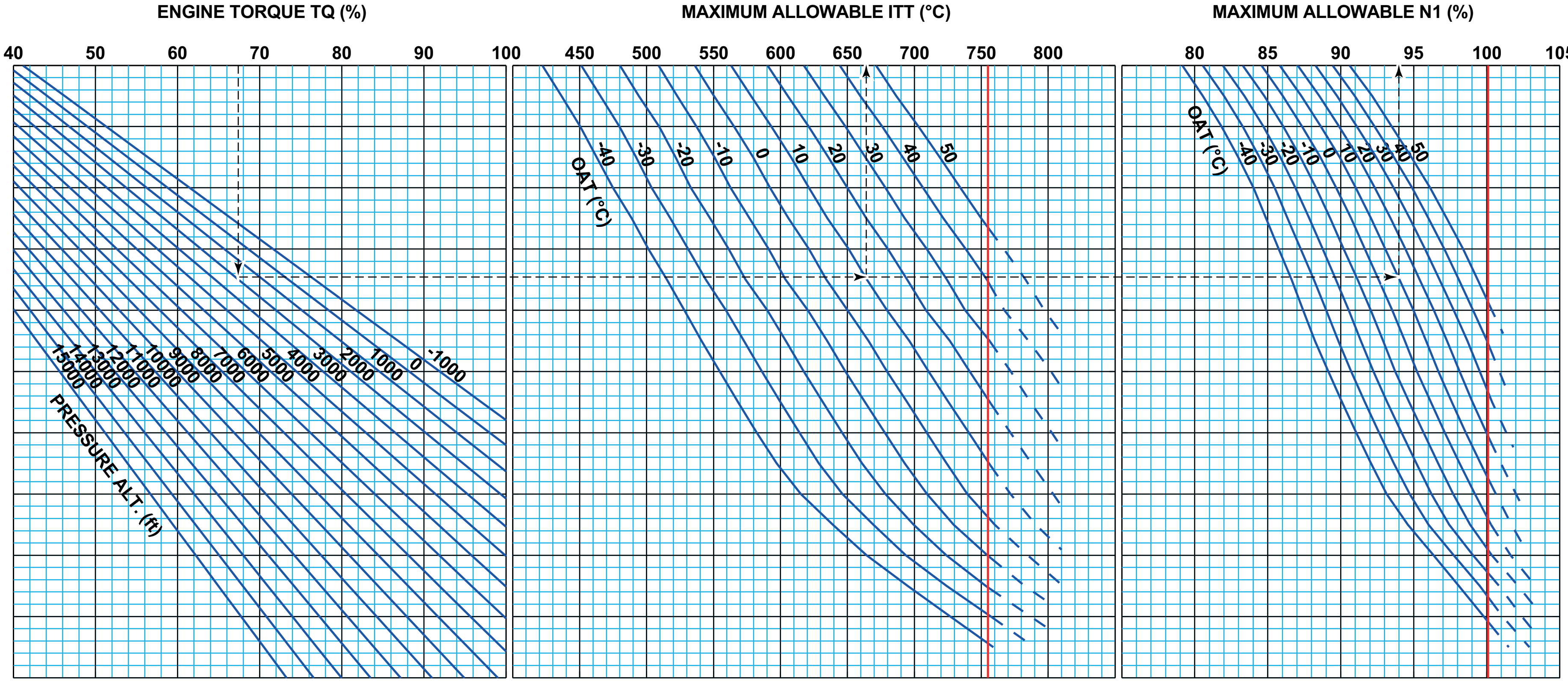

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Figure 4-5. Power Assurance Check - Hover

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
IF THE ENGINE EXCEEDS ALLOWABLE ITT OR N1, CARRY OUT A POWER ASURANCE CHECK IN HOVER.

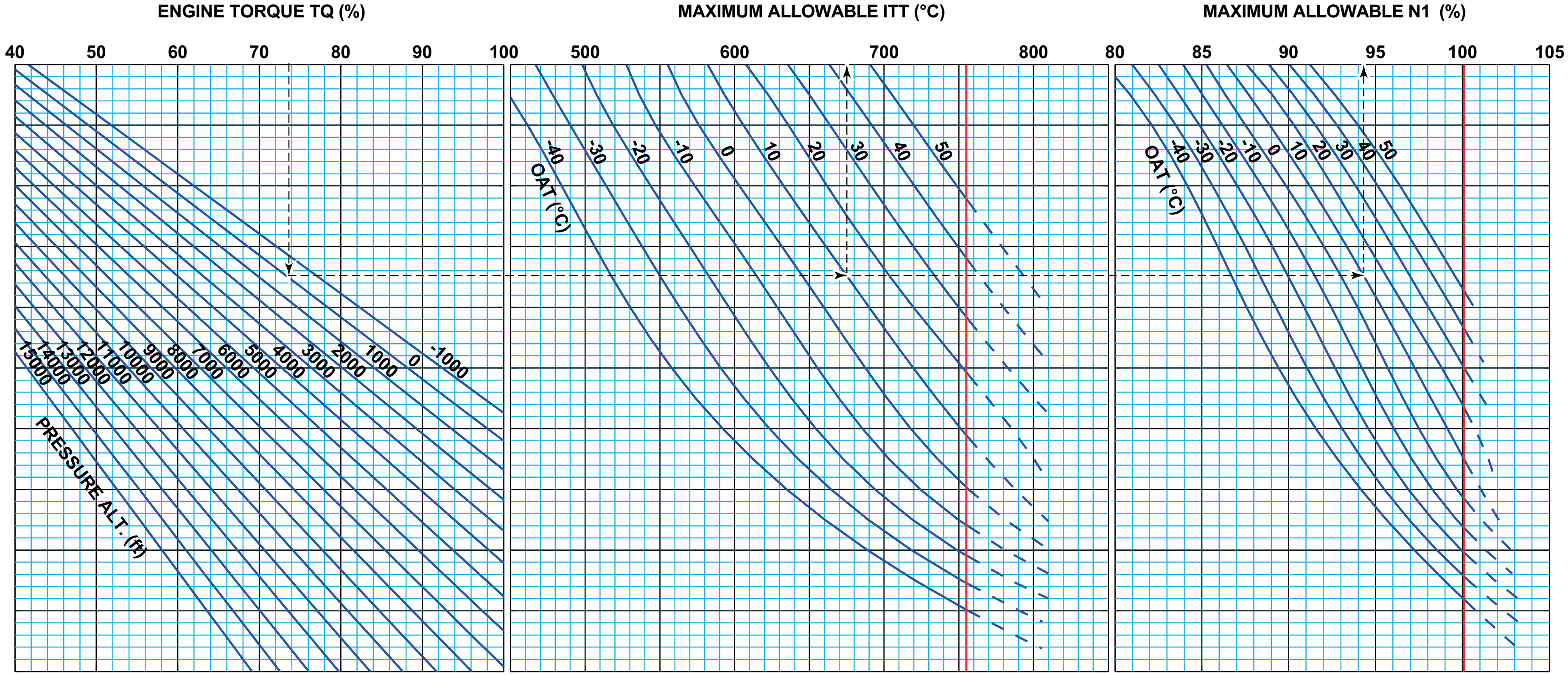

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Figure 4-6. Power Assurance Check - In Flight (130 KIAS)

POWER ASSURANCE CHECK in LEVEL FLIGHT
100 KIAS

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, CARRY OUT A POWER ASURANCE CHECK IN HOVER.

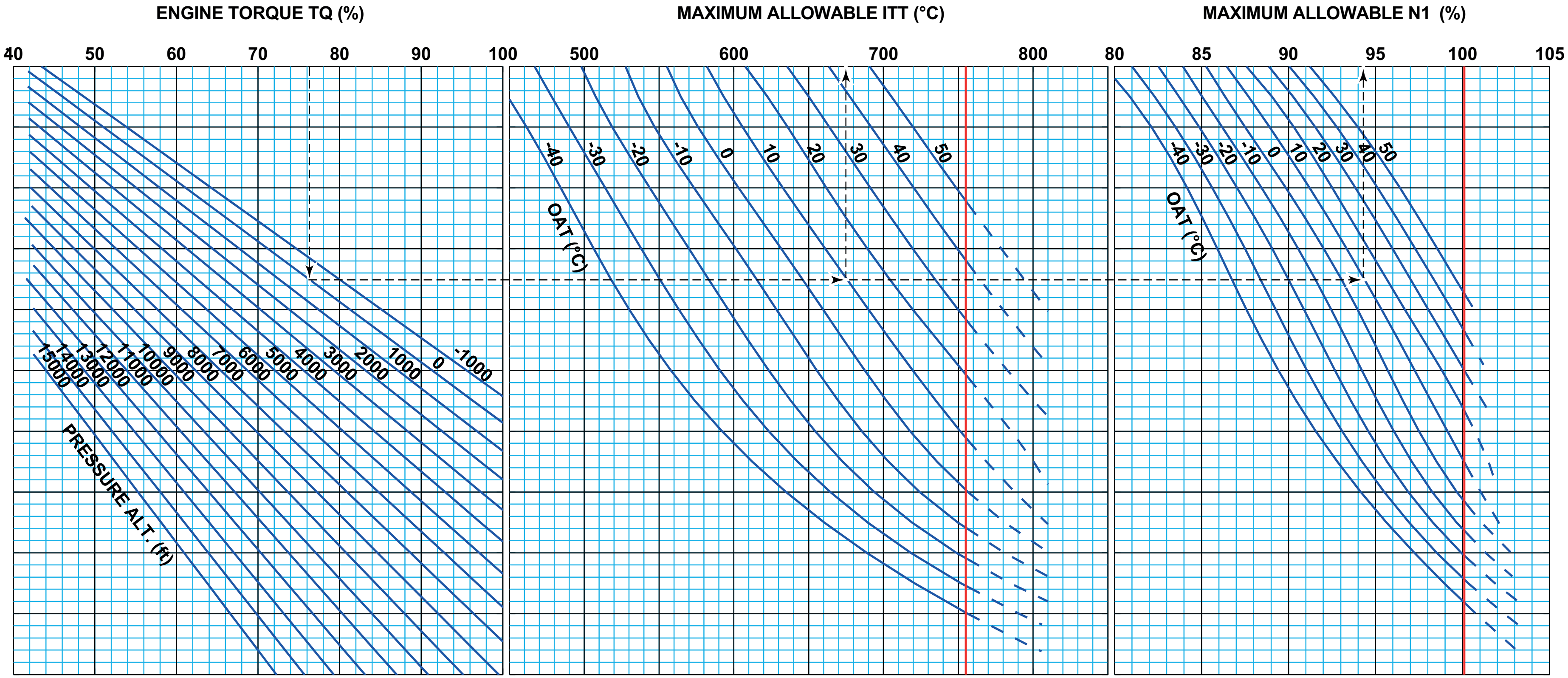

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Figure 4-7. Power Assurance Check - In Flight (100 KIAS)

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OPERATION VS ALLOWABLE WIND

(Figure 4-8)

Satisfactory stability and control was demonstrated, in IGE and OGE condition, for sideways and rearward flight up to the maximum Gross Weight defined in WAT diagram (Figure 4-8, sheet 4 of 4), in the Wind/ Ground speed azimuth envelopes defined by the following diagrams:

- Chart A (Figure 4-8, sheet 1 of 4), valid up to 3000 ft density altitude for IGE/OGE controllability;
- Chart B (Figure 4-8, sheet 2 of 4), valid from:
  - 3000 to 8700 ft density altitude for IGE/OGE controllability, and
  - 8700 to 13200 ft density altitude for IGE controllability;
- Chart C (Figure 4-8, sheet 3 of 4), valid from 13200 to 15000 ft density altitude for IGE controllability.

Note

Before using Chart A, B or C of this paragraph, the appropriate helicopter maximum gross weight for Hover (IGE/ OGE) must be determined using the pertinent Hover performance charts.

EXAMPLES

Determine the gross weight at which a specific controllability is guaranteed.

Data 1 (Wind limiting)

Pressure altitude = 6000 ft
OAT = -5°C
Windspeed = 35 kts

— Using the hover OGE at Maximum Continuous Power performance chart Figure 4-12, starting on the Pressure Altitude axes from 6000 ft, move to the right to interpolate between the 0°C and the -10°C lines, then move down to read the gross weight of 2850 kg in zero wind conditions.

Enter left part of WAT diagram (Figure 4-8, sheet 4 of 4), starting on the Pressure Altitude axes from 6000 ft, move up to interpolate between the 0°C and the -10°C lines, then move right to the solid line in the right part of WAT diagram. The diagram provides:

— the Low Speed controllability Chart to be used (Chart B);

— the capability to operate in OGE hovering in presence of wind;

— moving down, the maximum gross weight for the wind conditions provided by Chart B (2850 kg, same as for zero wind conditions).

Enter Chart B with the known wind conditions (35 kts). The chart provides the relative-windspeed azimuth information where satisfactory stability and control was demonstrated in OGE condition at 2850 kg gross weight: azimuths from 0° to 60° and azimuths from 160° to 360°.

Data 2 (Weight limiting)

Pressure altitude = 9000 ft
OAT = 0°C
Windspeed = 20 kts

Using the hover OGE at Maximum Continuous Power performance chart Figure 4-12, starting on the Pressure Altitude axes from 9000 ft, move to the right to intercept the 0°C line, then move down to read the gross weight of 2450 kg in zero wind conditions. Repeat using the hover IGE at Maximum Continuous Power performance chart Figure 4-10, reading a gross weight of 2775 kg in zero wind conditions

Enter left part of WAT diagram (Figure 4-8, sheet 4 of 4), starting on the Pressure Altitude axes from 9000 ft, move up to intercept the 0°C line, then move right to the solid line in the right part of WAT diagram. The diagram provides:

— the Low Speed controllability Chart to be used (Chart B);

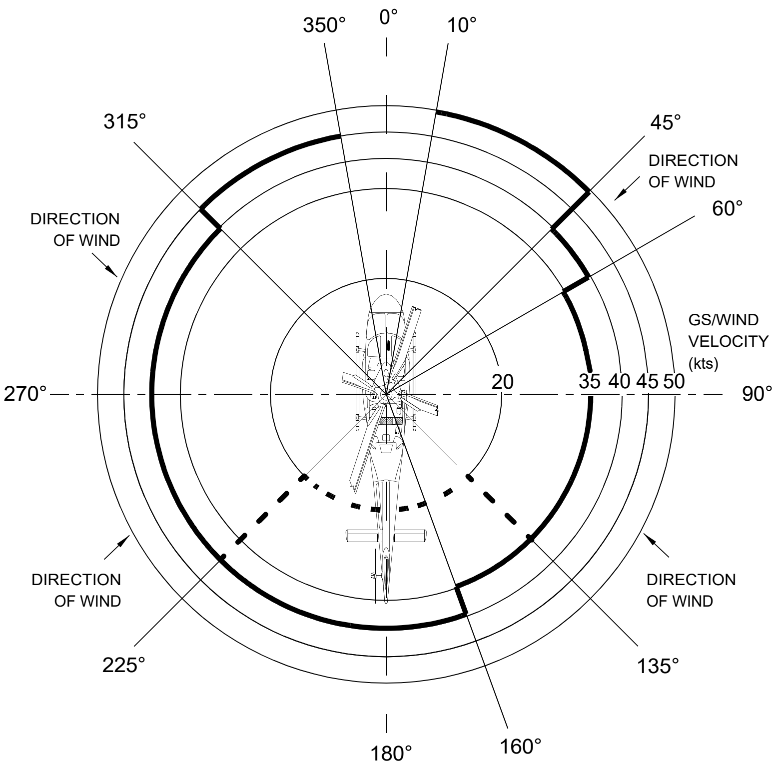
— the capability to operate in IGE hovering in presence of wind;

— moving down, the maximum gross weight for the wind conditions provided by Chart B (2800 kg).

In this case the hovering performance, both in OGE and IGE conditions, is more limiting than the Low Speed Controllability.

Enter Chart B with the known wind conditions (20 kts). The chart provides the relative-windspeed azimuth information where satisfactory stability and control was demonstrated in IGE condition at 2775 kg gross weight: all azimuths. No controllability information is provided for OGE condition at 2450 kg gross weight in presence of the known wind.

LOW SPEED CONTROLLABILITY
CHART A



APPLICABILITY: **IGE/OGE** UP TO 3000 ft Hd
REFER TO WAT FOR GROSS WEIGHT

OPERATION WITH PASSENGER CABIN DOORS CLOSED

OPERATION WITH ONE OR BOTH PASSENGER CABIN DOORS OPEN OR REMOVED

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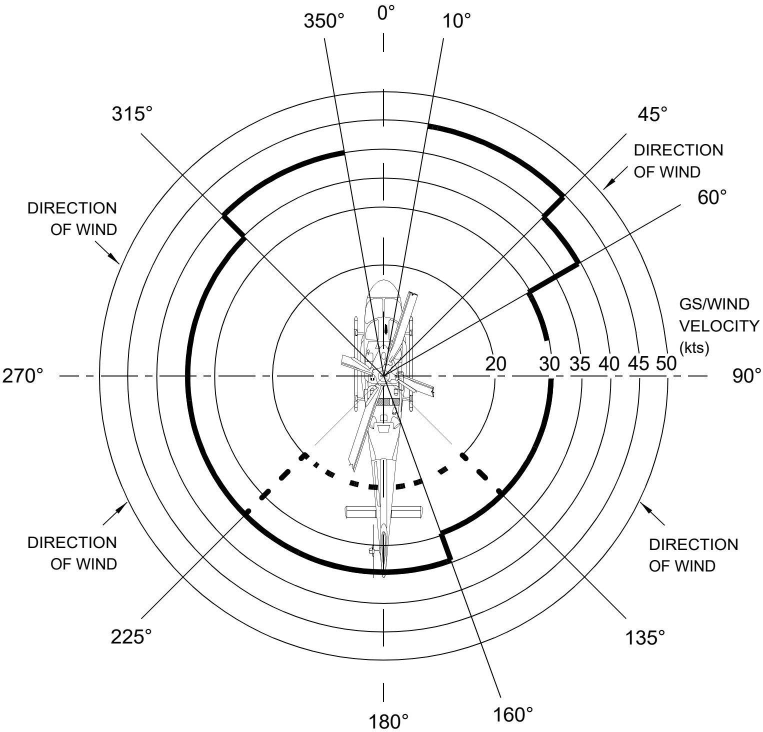
Figure 4-8. Wind/Ground Speed Azimuth Envelope (sheet 1 of 4)

LOW SPEED CONTROLLABILITY
CHART B



APPLICABILITY: **IGE/OGE** FROM 3000 TO 8700 ft Hd
IGE FROM 8700 TO 13200 ft Hd
REFER TO WAT FOR GROSS WEIGHT

OPERATION WITH PASSENGER CABIN DOORS CLOSED

OPERATION WITH ONE OR BOTH PASSENGER CABIN DOORS OPEN OR REMOVED

ICN-19-A-154000-G-A0126-00008-A-03-1

Figure 4-8. Wind/Ground Speed Azimuth Envelope (sheet 2 of 4)

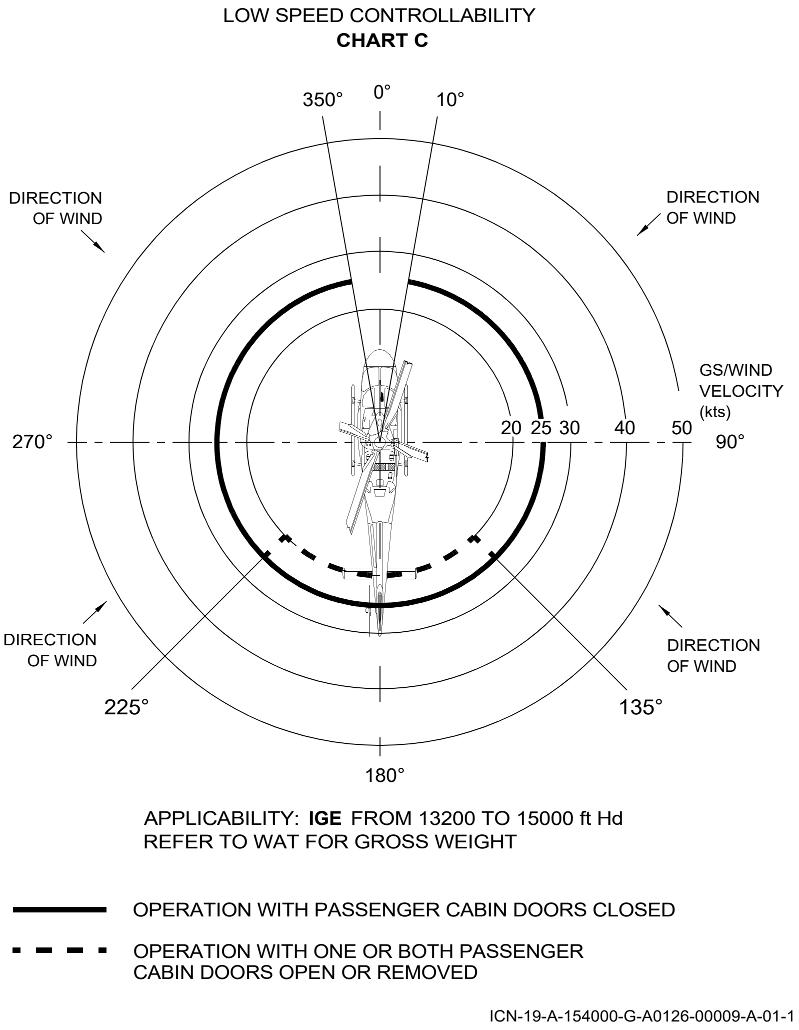
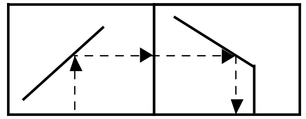


Figure 4-8. Wind/Ground Speed Azimuth Envelope (sheet 3 of 4)



WEIGHT-ALTITUDE-TEMPERATURE DIAGRAM
FOR LOW SPEED CONTROLLABILITY IGE-OGE

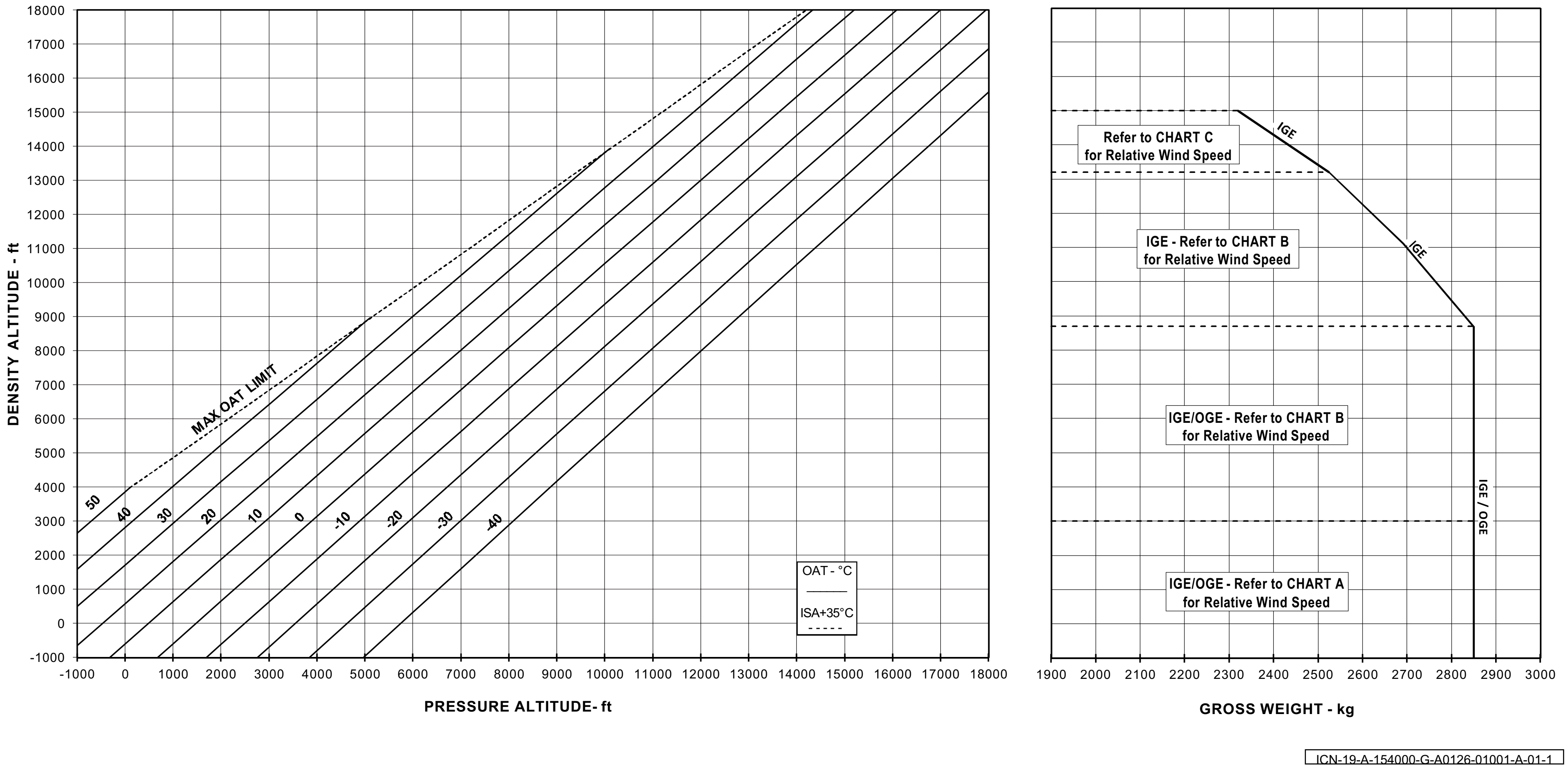


Figure 4-8. WAT diagram (sheet 4 of 4)

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HOVER CEILING

(Figures 4-9 thru 4-12)

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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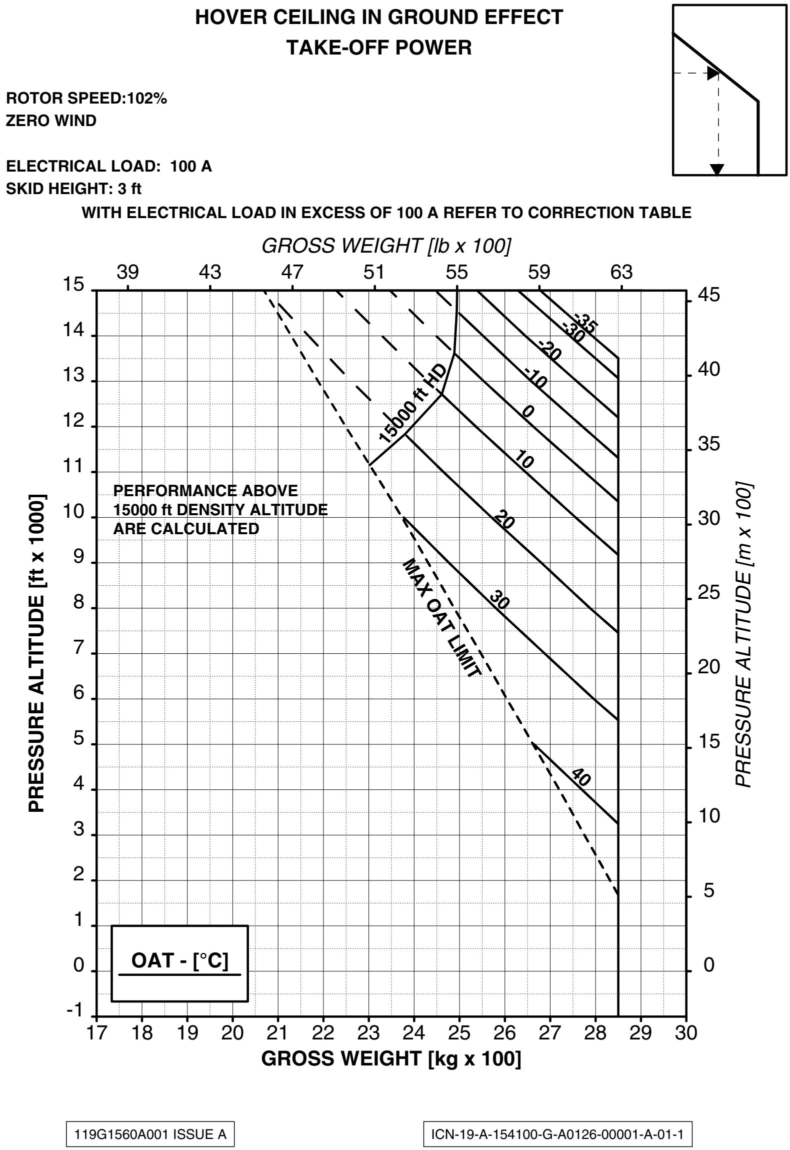

Figure 4-9. In Ground Effect (IGE) - Take-Off Power (TOP) (Heater Off)

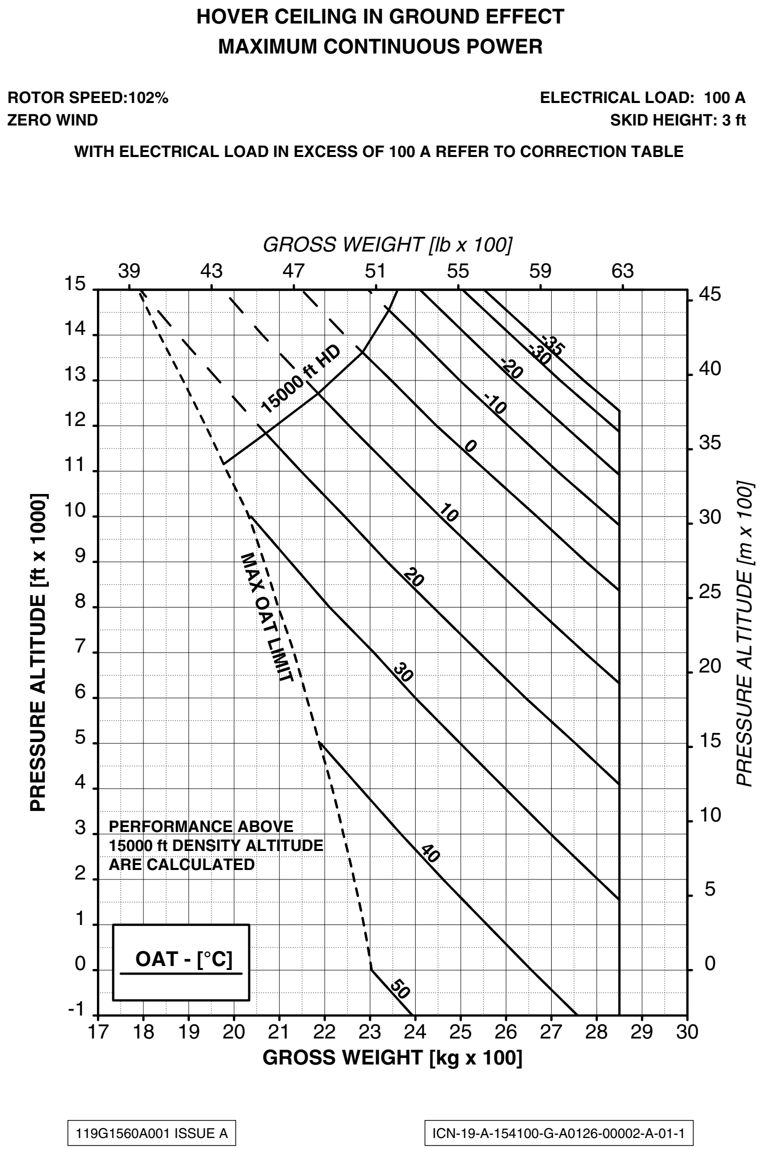

Figure 4-10. In Ground Effect (IGE) - Maximum Continuous Power (MCP) (Heater Off)

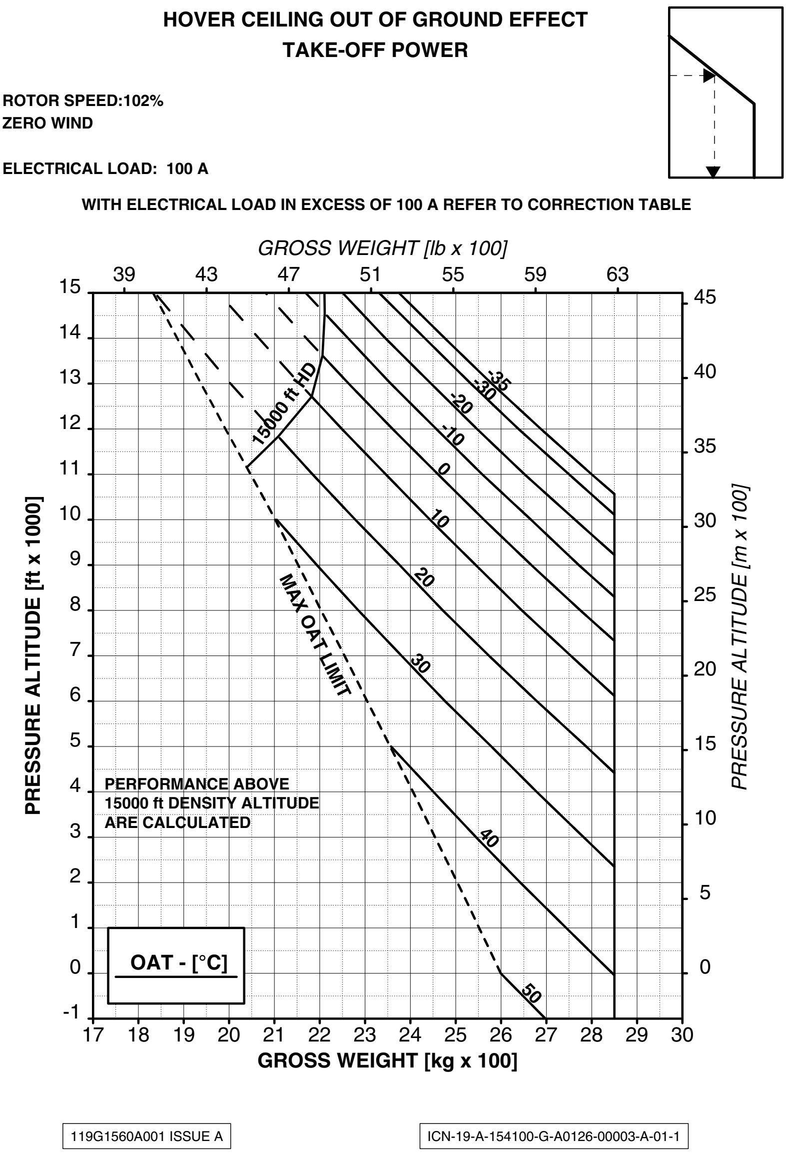

Figure 4-11. Out of Ground Effect (OGE) - Take-Off Power (TOP) (Heater Off)

HOVER CEILING OUT OF GROUND EFFECT
MAXIMUM CONTINUOUS POWER

ROTOR SPEED:102% ELECTRICAL LOAD: 100 A
ZERO WIND

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

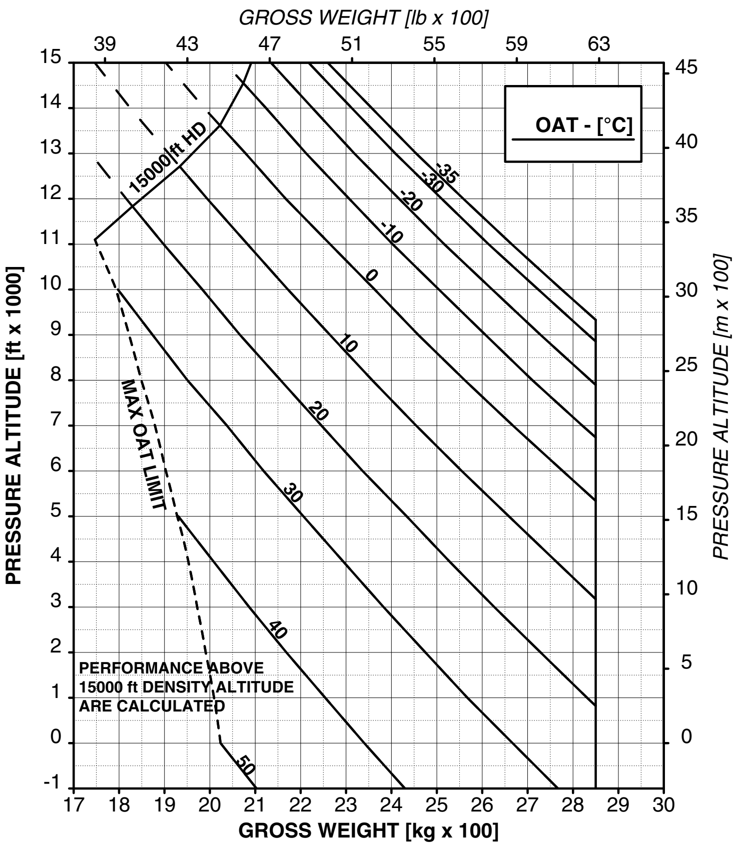

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Figure 4-12. Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater Off)

HEIGHT - VELOCITY DIAGRAM

(Figures 4-13 and 4-14)

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.

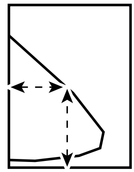
Two Height-Velocity charts are provided:

— 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



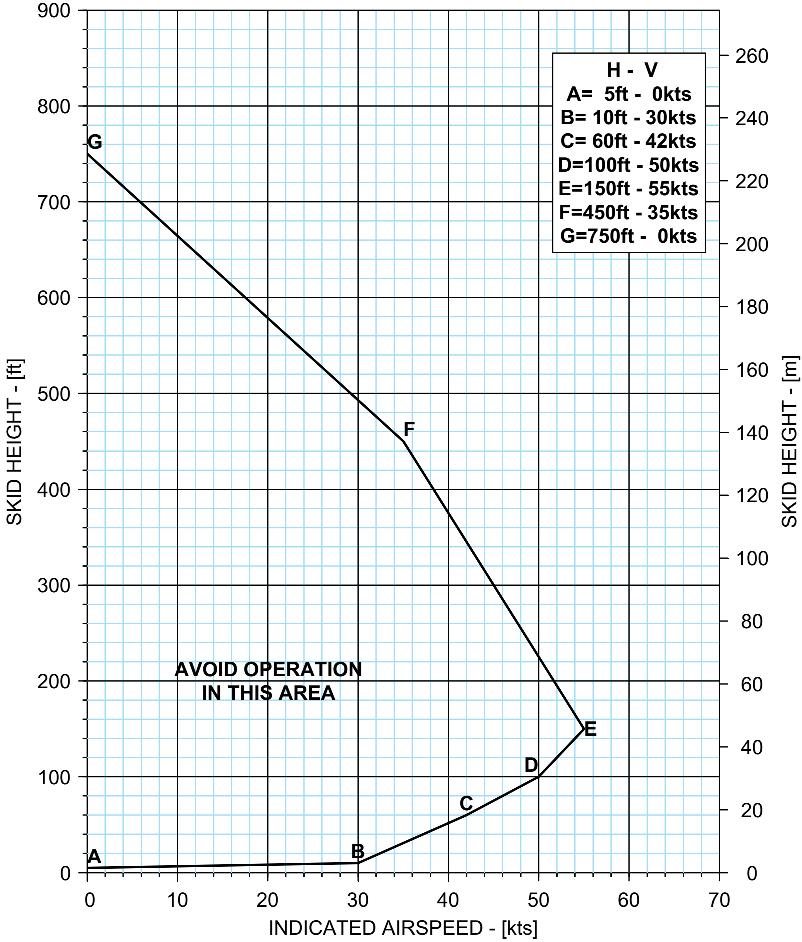


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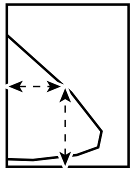
Figure 4-13. Height - Velocity Diagram - Chart A

HEIGHT-VELOCITY DIAGRAM
FOR SMOOTH, LEVEL, HARD SURFACES

Chart B
APPLICABILITY: from 3000 TO 7000 ft Hd



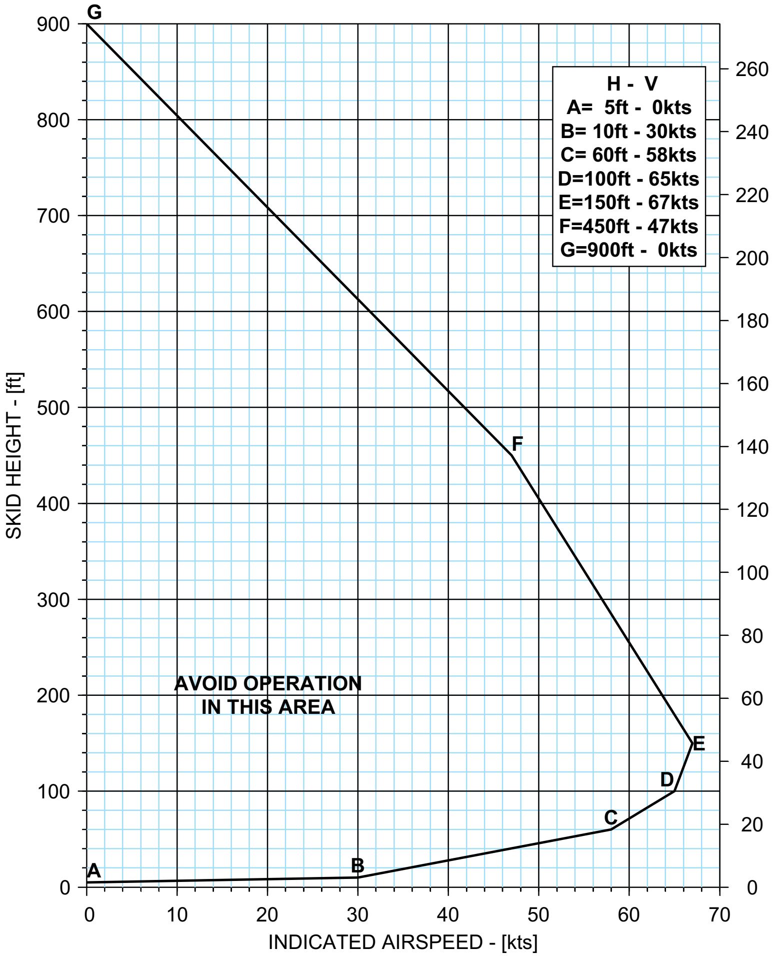


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Figure 4-14. Height - Velocity Diagram - Chart B

RATE OF CLIMB

(Figures 4-15 thru 4-24)

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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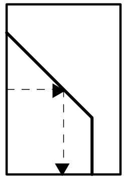
RATE OF CLIMB
TAKE-OFF POWER

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



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

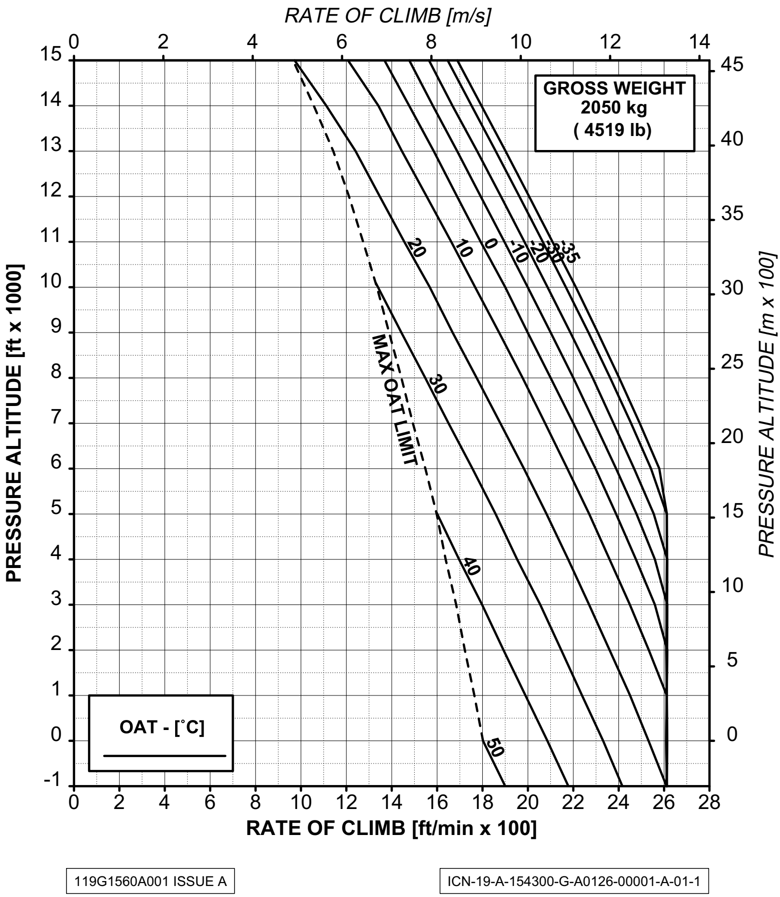


Figure 4-15. Take-Off Power (TOP) (Heater Off) - Gross Weight 2050 kg

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

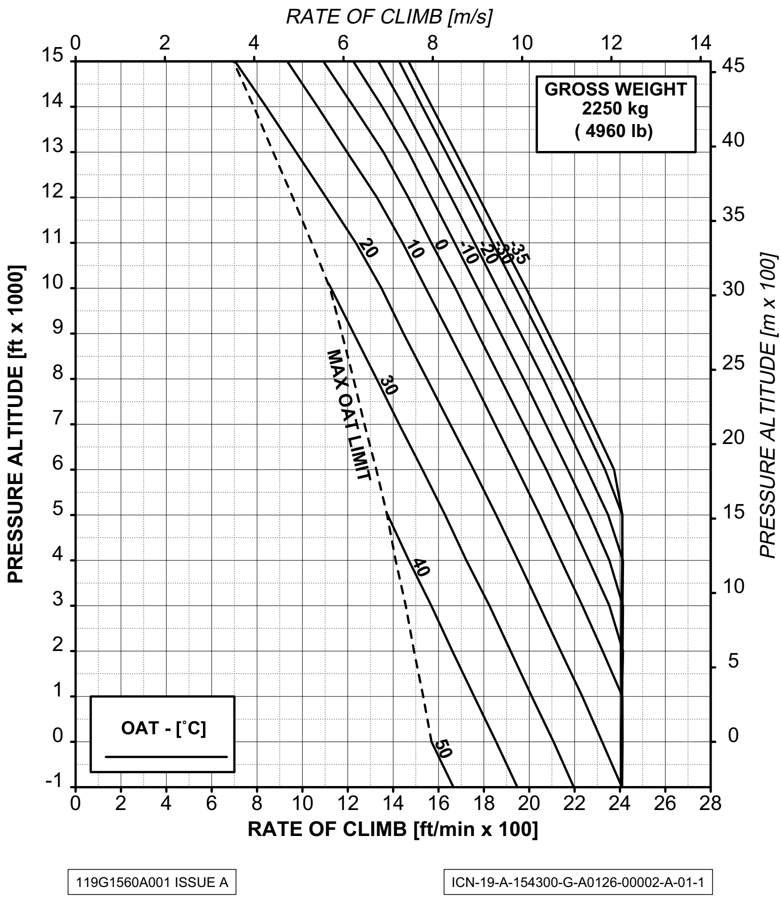


Figure 4-16. Take-Off Power (TOP) (Heater Off) - Gross Weight 2250 kg

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

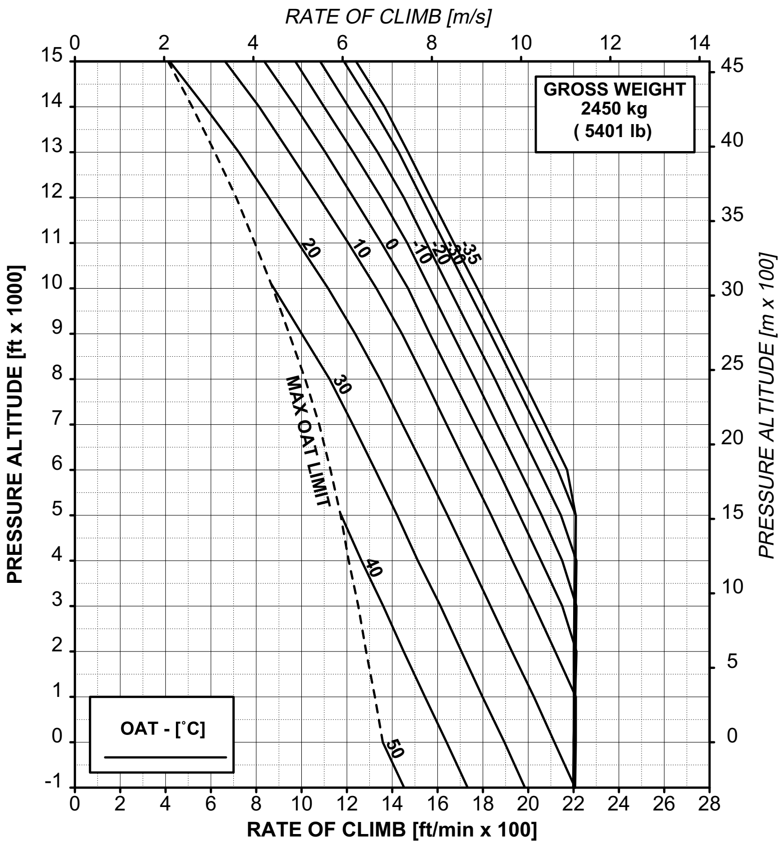


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Figure 4-17. Take-Off Power (TOP) (Heater Off) - Gross Weight 2450 kg

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

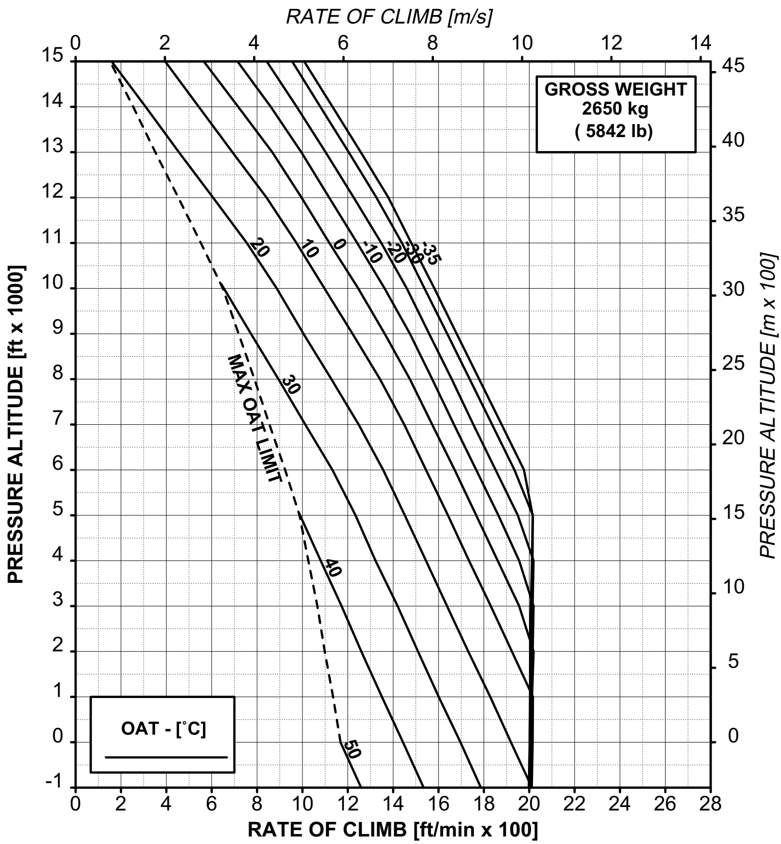

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Figure 4-18. Take-Off Power (TOP) (Heater Off) - Gross Weight 2650 kg

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

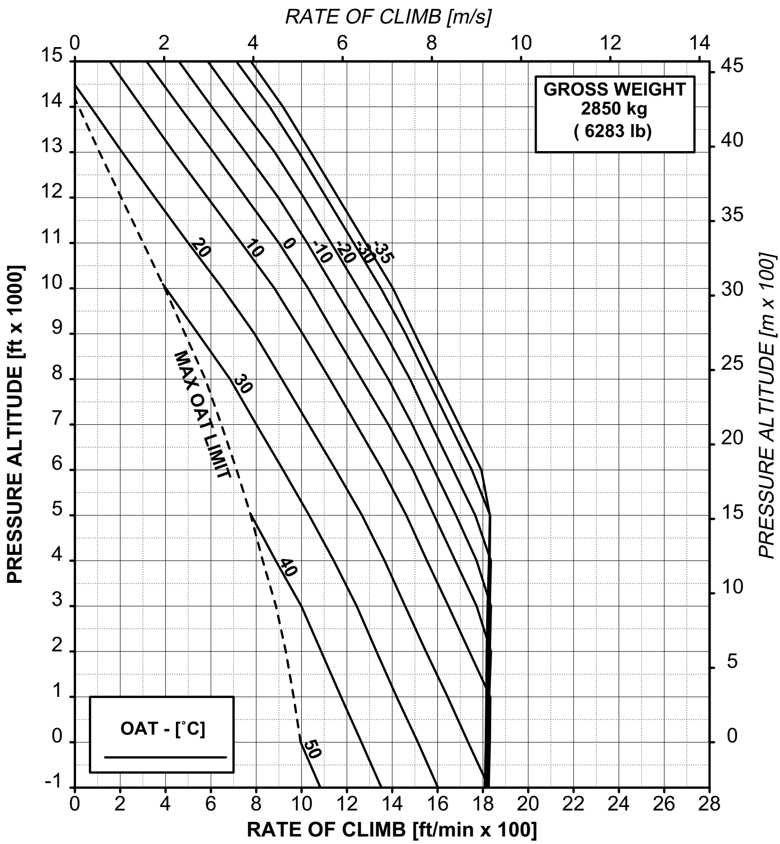

Figure 4-19. Take-Off Power (TOP) (Heater Off) - Gross Weight 2850 kg

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

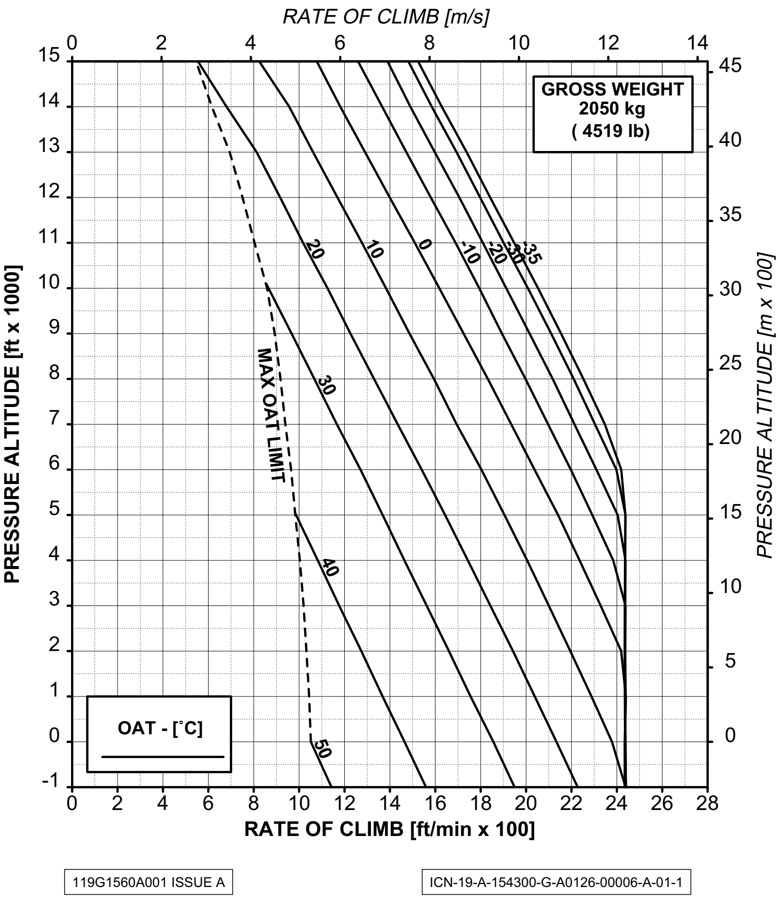

Figure 4-20. Maximum Continuos Power (MCP) (Heater Off) - Gross Weight 2050 kg

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

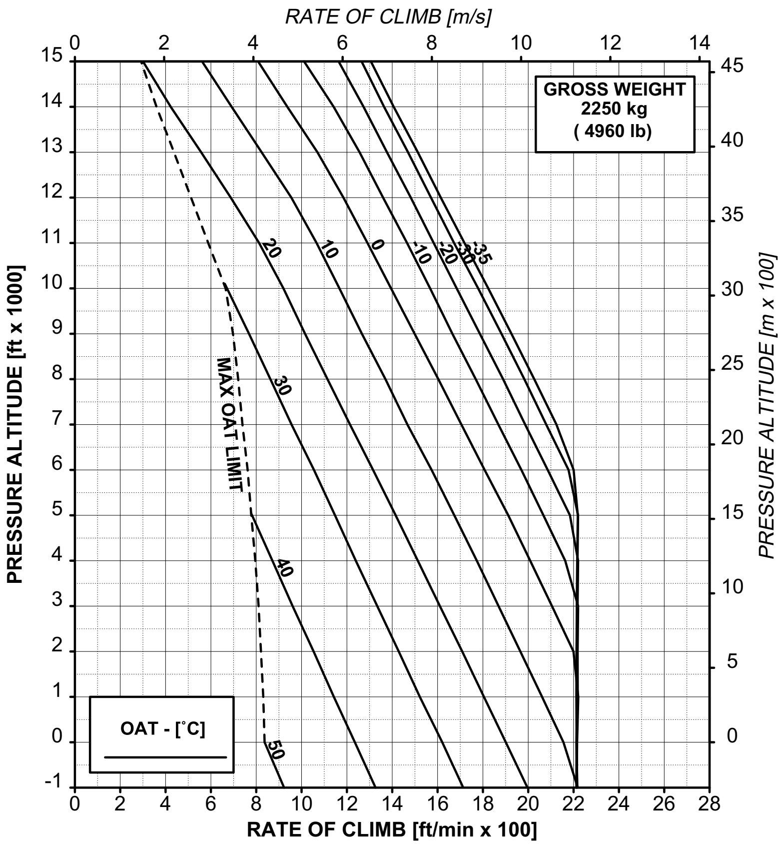

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Figure 4-21. Maximum Continuos Power (MCP) (Heater Off) - Gross Weight 2250 kg

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

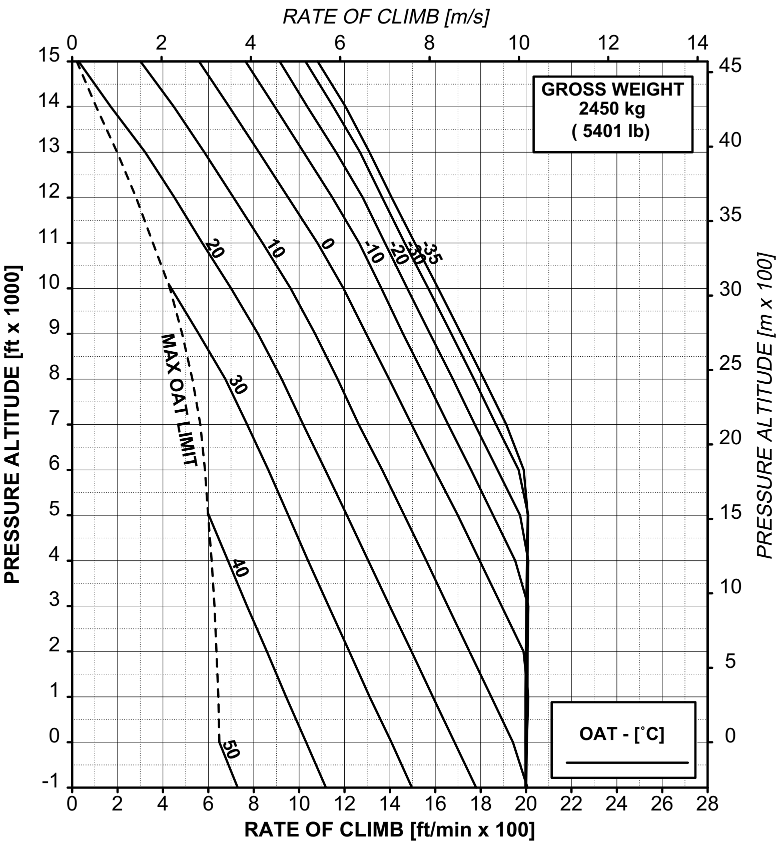

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Figure 4-22. Maximum Continuos Power (MCP) (Heater Off) - Gross Weight 2450 kg

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

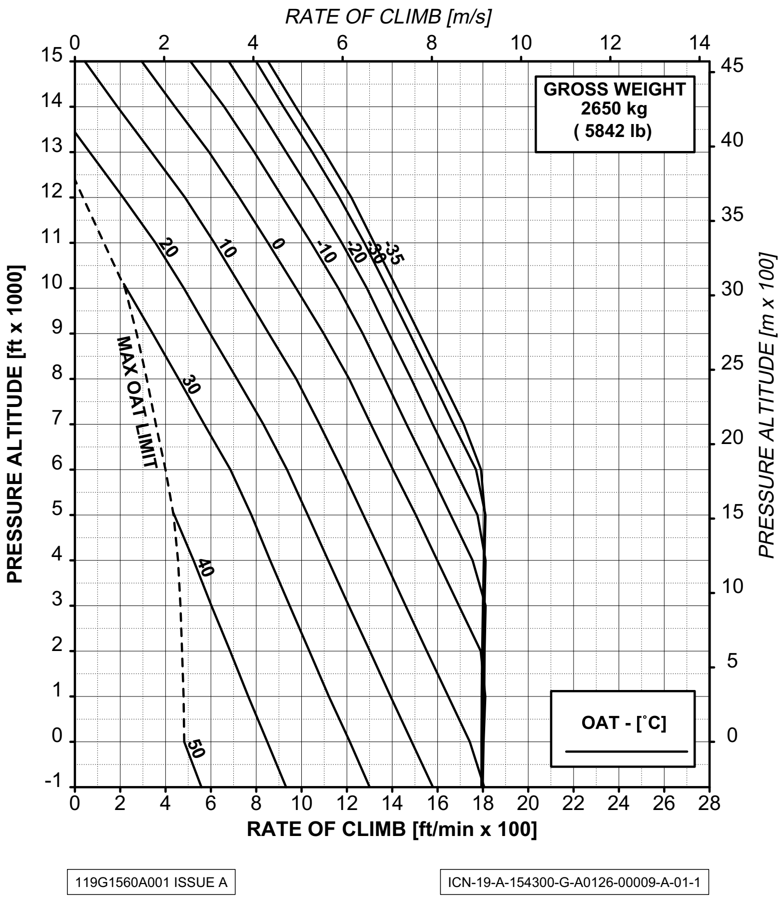

Figure 4-23. Maximum Continuos Power (MCP) (Heater Off) - Gross Weight 2650 kg

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

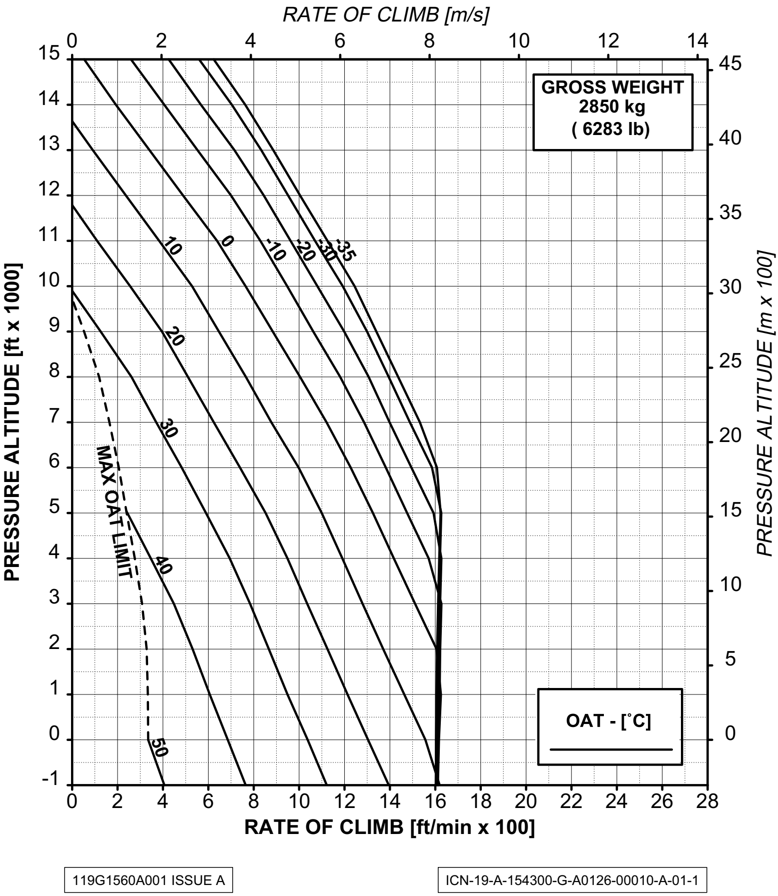

Figure 4-24. Maximum Continuos Power (MCP) (Heater Off) - Gross Weight 2850 kg

AUTOROTATION GLIDE DISTANCE

(Figure 4-25)

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

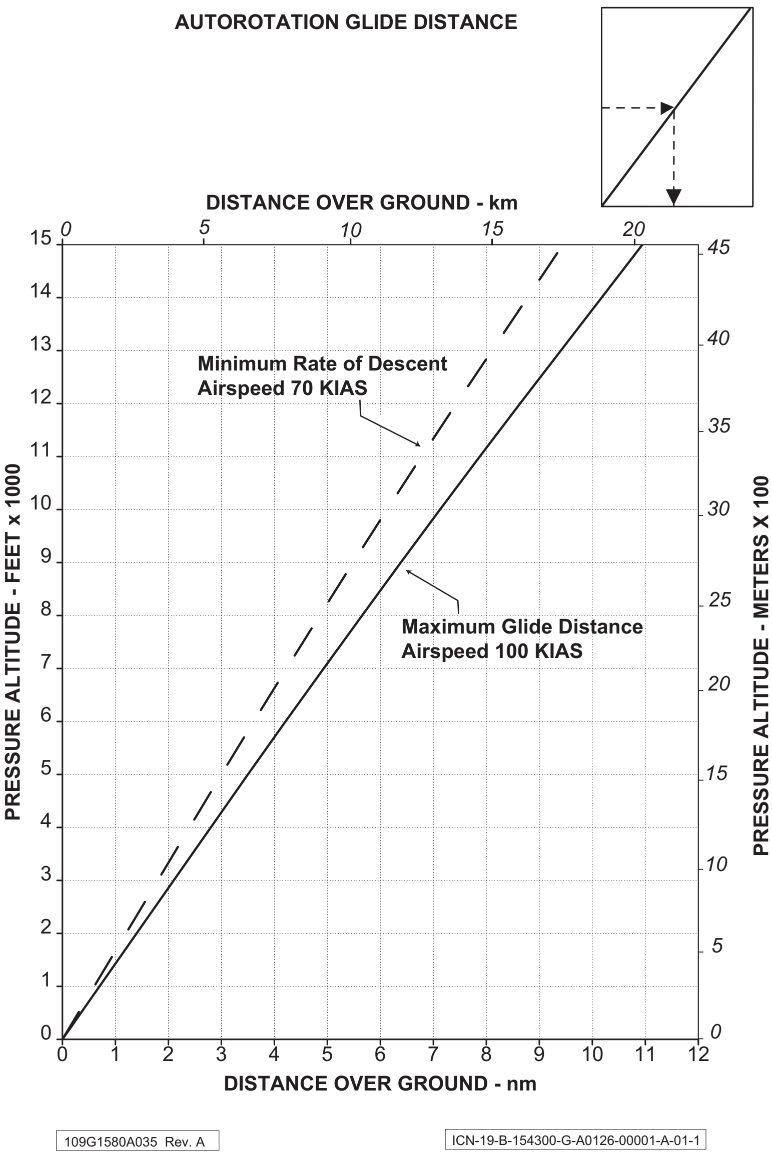

Figure 4-25. Autorotation Glide Distance

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

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SECTION 5

OPTIONAL EQUIPMENT SUPPLEMENTS

GENERAL

This section contains all supplements related to optional equipments or specific operation applicable to AW119 MKII G1000H and G1000H NXi 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	Reserved	--	--
13	Reserved	--	--
14	Rearview Mirrors	109G2590F01	All
15	Pulsed chip detector	109-0813-78	All

Table 5-1. List of supplements (Cont.d)

Supplement No.	Name of equipment	P/N	Helicopter applicability S/N
16	Reserved	--	--
17	Reserved	--	--
18	Reserved	--	--
19	Reserved	--	--
20	Reserved	--	--
21	Operator seat	109G2520F24	All
22	Reserved	--	--
23	Reserved	--	--
24	Reserved	--	--
25	Operating Envelope Extension	--	All
26	External Loudspeaker	109G2300F03	All
27	UHF APX6500 radio	109G2310F27	14964, 14969
28	Reserved	--	--
29	Reserved	--	--
30	Reserved	--	--
31	FLIR Wescam MX-10	109G9300F08	All
32	Reserved	--	--
33	Reserved	--	--
34	Reserved	--	--

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	--
2	Bleed-air heater	None
3	External hoist	25
4	Searchlight	5
5	Snow skis	4, 25
6	Cargo hook	None
7	Dual cargo hook	None
8	Dual controls	--
9	Supplementary fuel tanks	11
10	Rotor brake	None
11	Emergency Medical Transportation (E.M.T.)	9, 21
12	Reserved	--
13	Reserved	--
14	Rearview Mirrors	None
15	Pulsed chip detector	None
16	Reserved	--
17	Reserved	--

Table 5-2. Optional equipment incompatibility (Cont.d)

Supplements No.	Name of equipment	Incompatibility (Supplements No.)
18	Reserved	--
19	Reserved	--
20	Reserved	--
21	Operator Seat	11
22	Reserved	--
23	Reserved	--
24	Reserved	--
25	Operating Envelope Extension	3, 5
26	External Louspeaker	None
27	UHF APX6500 radio	None
28	Reserved	--
29	Reserved	--
30	Reserved	--
31	FLIR Wescam MX-10	None
32	Reserved	--
33	Reserved	--
34	Reserved	--

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EASA Approvals N° 10054263, 10054264
dated 30 July 2015

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.

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LIST OF REVISIONS

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LIST OF EFFECTIVE PAGES

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”GREEN AIRCRAFT” CONFIGURATION

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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 N° 10054263, 10054264
dated 30 July 2015**

*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: 30 JULY 2015
REVISION 1: 21 DECEMBER 2018**

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LIST OF REVISIONS

REVISION No.	SUBJECT	APPROVAL
—	Issue 1	EASA Approvals N° 10054263, 10054264 dated 30 July 2015
1	Revised pages Title page, A-1 and B-1. Added pages 6A and 6B of 22. Applicable to G1000H: Revised pages ii and 6 of 22. Applicable to G1000H NXi: Revised pages ii and 6 of 22.	EASA Approvals N° 10068178 dated 21 Decmber 2018

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BLEED-AIR HEATER

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SECTION 1 - LIMITATIONS

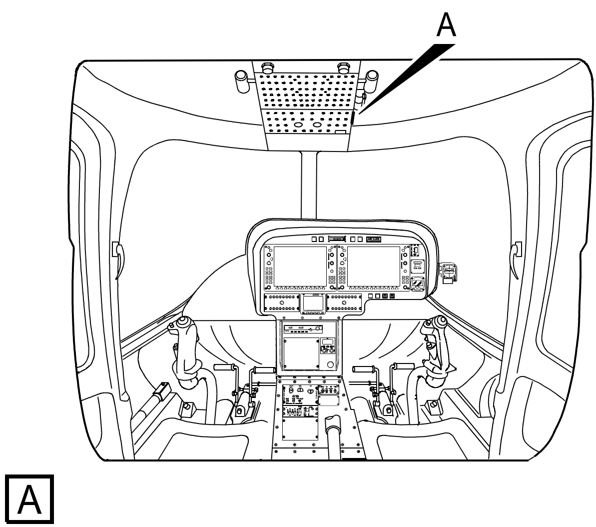
BLEED-AIR HEATER OPERATION

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.

PLACARDS



DO NOT OPERATE HEATER ABOVE 21°C OAT

ICN-19-A-155002-G-A0126-01001-G-01-1

Figure 1-1. Placards

SECTION 2 - NORMAL PROCEDURES

ENGINE PRE-START CHECK

1. HEATER switch	: - OFF.
2. S/OFF switch	: - OFF.
3. MIX switch	: - OFF.

SYSTEMS CHECK

BLEED-AIR HEATER OPERATIONAL CHECK

1. TEMPerature CONTrol knob	: - Minimum (fully counterclockwise).
2. HEATER switch	: - ON.
- PFD	: - HEATER ON advisory message displayed on CAS.
3. TEMPerature CONTrol knob	: - Turn the knob clockwise (to increase temperature) and observe no air-flow from outlets.
4. MIX switch	: - ON and observe no air-flow.
5. S/OFF switch	: - ON and observe warm air-flow from outlets.
6. TEMPerature CONTrol knob	: - Turn the knob fully counterclockwise and observe that the air-flow decreases, then turn the knob clockwise.
7. MIX switch	: - OFF, observe that the air-flow stops, then set the switch to ON.
8. HEATER switch	: - OFF, observe that the air-flow stops.
- PFD	: - HEATER ON advisory message out.

9. TEMPerature CONTrol knob : - Turn the knob fully counter-clockwise.
10. MIX switch : - OFF.
11. S/OFF switch : - OFF.

IN FLIGHT

If heater operation is desired:

1. TEMPerature CONTrol knob : - Fully counterclockwise.
2. S/OFF switch : - ON.
3. MIX switch : - ON.
4. HEATER switch : - ON.
   - PFD : - HEATER ON advisory message displayed on CAS.
5. 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

1. HEATER switch : - OFF.
   - PFD : - HEATER ON advisory message out.
2. S/OFF switch : - OFF.
3. 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 CAS), the Bleed-Air Heater shut-off valve is automatically closed, thus switching off the air bleed.

PROCEDURE

1. HEATER switch : - OFF.

2. S/OFF switch : - OFF.

MIX switch : - OFF.

ENGINE RESTART IN FLIGHT

Before attempting a restart:

1. HEATER switch : - OFF, check.

2. S/OFF switch : - OFF, check.

3. MIX switch : - OFF, check.

ENGINE RESTART IN FLIGHT WITH MANUAL OVERRIDE SYSTEM (MAN)

Before attempting a restart:

1. HEATER switch : - OFF, check.
2. S/OFF switch : - OFF, check.
3. MIX switch : - OFF, check.

FIRE

ENGINE FIRE DURING FLIGHT

Note

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

PROCEDURE

1. HEATER switch : - OFF.
2. S/OFF switch : - OFF.
3. MIX switch : - OFF.

SMOKE IN CABIN, TOXIC FUMES, ETC.

PROCEDURE

1. HEATER switch : - OFF.
2. S/OFF switch : - OFF.
3. MIX switch : - OFF.

STATIC PORT OBSTRUCTION

PROCEDURE

1. HEATER switch : - OFF.
2. S/OFF switch : - OFF.
3. MIX switch : - OFF.

BLEED-AIR HEATER MALFUNCTION

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

1. HEATER switch : - OFF.
2. S/OFF switch : - OFF.
3. MIX switch : - OFF.

Proceed with flight, correct trouble before next flight.

COCKPIT DISPLAY SYSTEM FAILURES

PRIMARY FLIGHT DISPLAY (PFD) FAILURE

CAUTION

The following CAS advisory message is no longer available:

Advisory
HEATER ON

LRU FAILURES

INTEGRATED AVIONIC UNIT 2 (GIA2) FAILURE

CAUTION

The following CAS advisory message is no longer available:

Advisory
HEATER ON

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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	-	-	-	-

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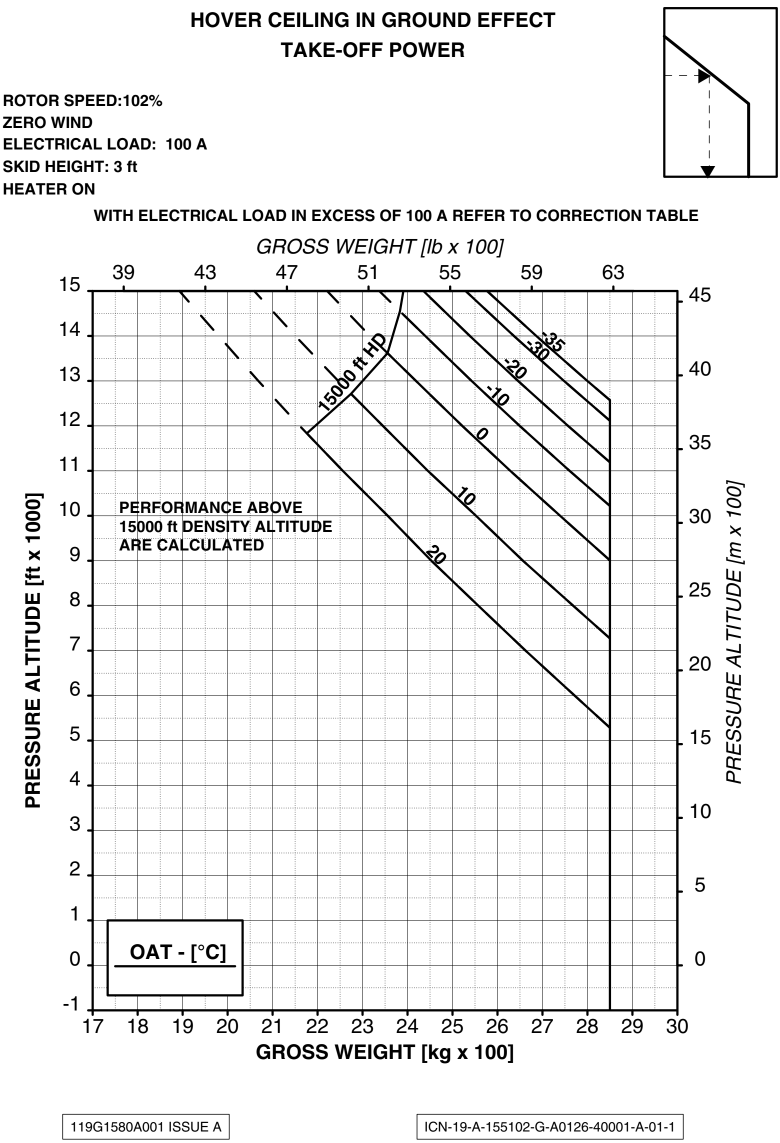

Figure 4-1. In Ground Effect (IGE) - Take-Off Power (TOP) (Heater On)

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

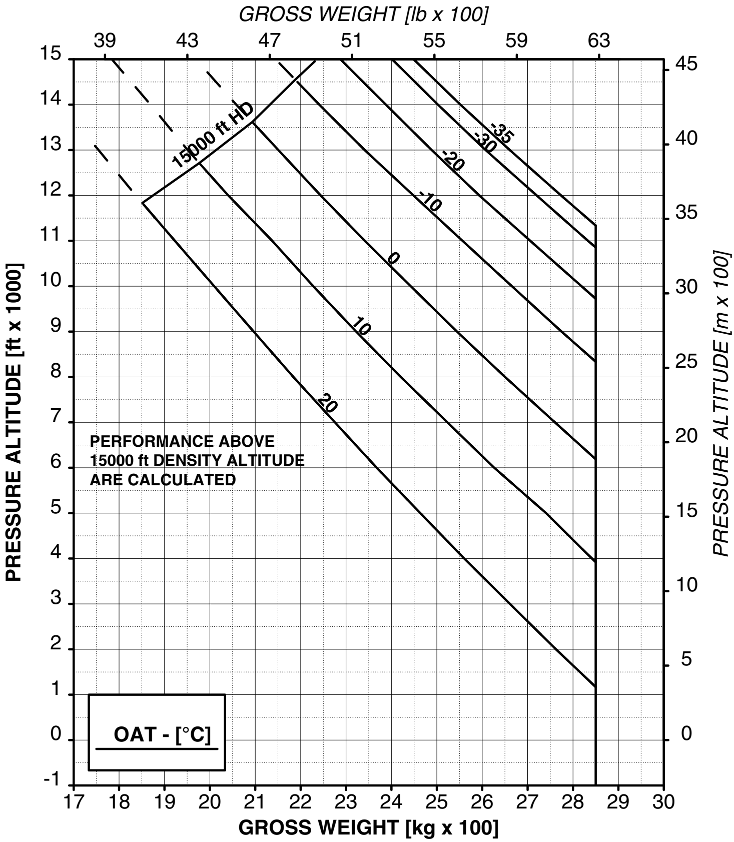

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Figure 4-2. In Ground Effect (IGE) - Maximum Continuous Power (MCP) (Heater On)

HOVER CEILING OUT OF GROUND EFFECT
TAKE-OFF POWER

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

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

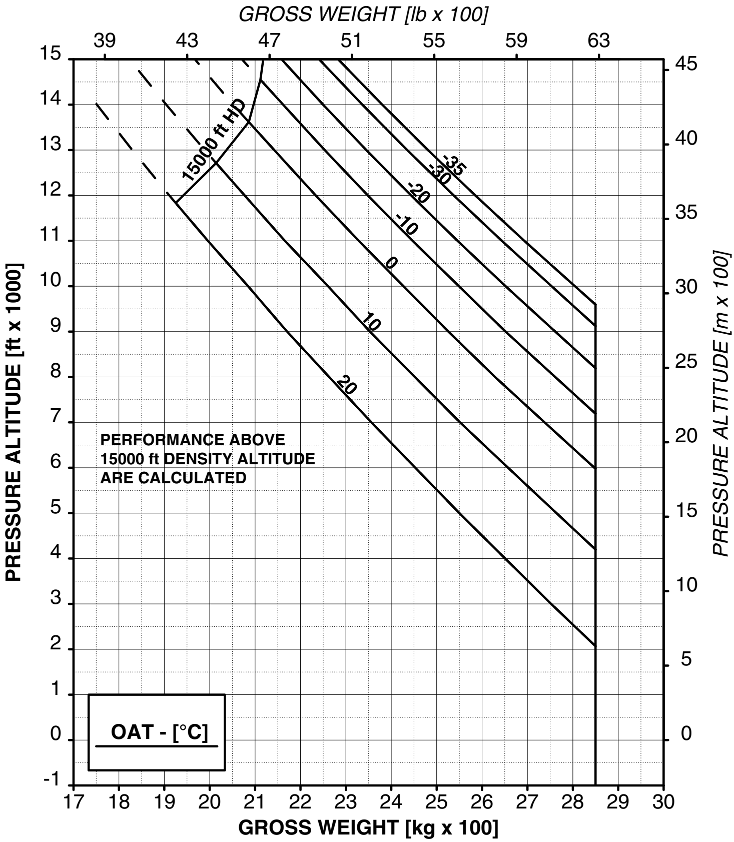

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Figure 4-3. Out of Ground Effect (OGE) - Take-Off Power (TOP) (Heater On)

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

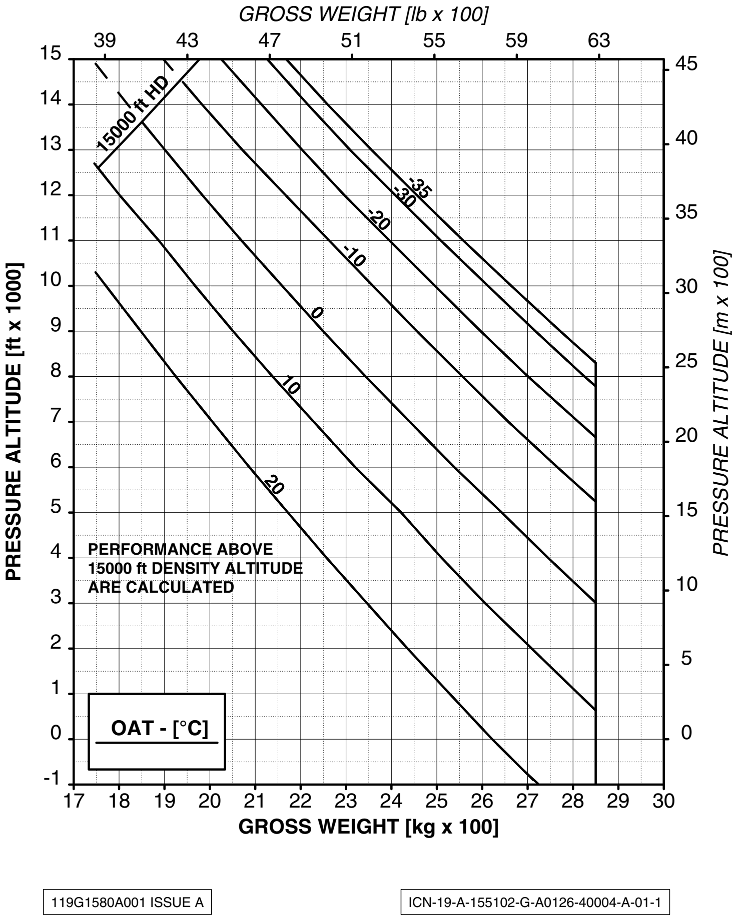

Figure 4-4. Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater On)

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 [KG]:

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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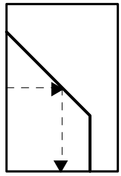
RATE OF CLIMB
TAKE-OFF POWER

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



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

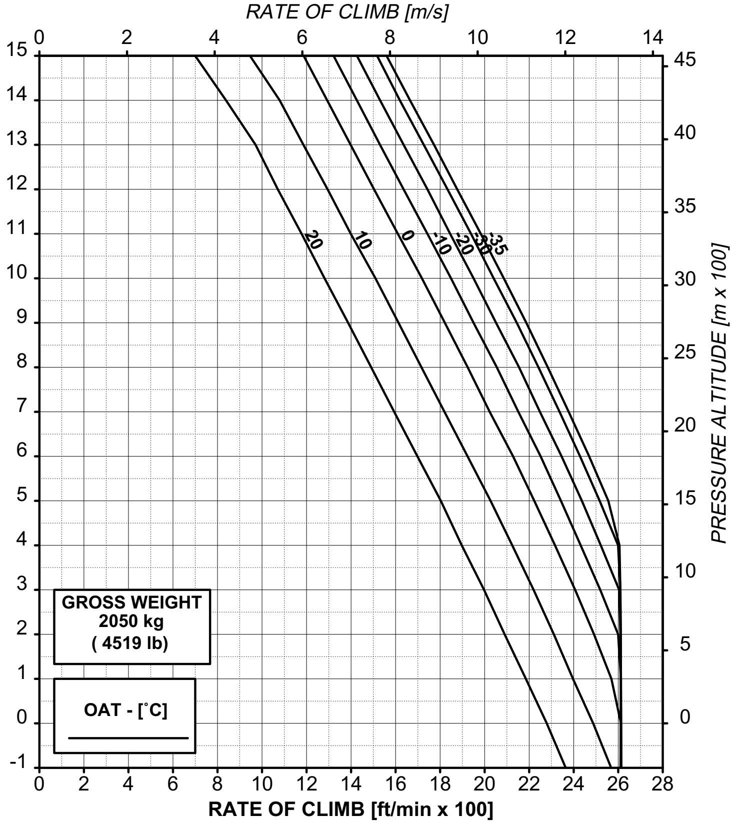


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Figure 4-5. Take-Off Power (TOP) (Heater On) - Gross Weight 2050 kg

RATE OF CLIMB
TAKE-OFF POWER

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

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

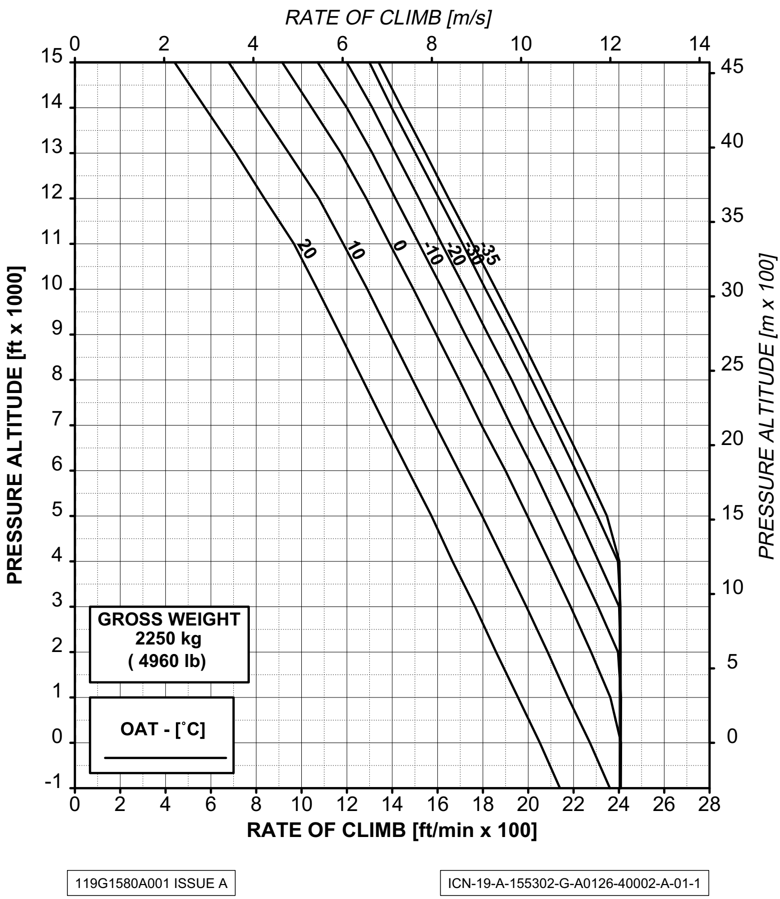

Figure 4-6. Take-Off Power (TOP) (Heater On) - Gross Weight 2250 kg

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

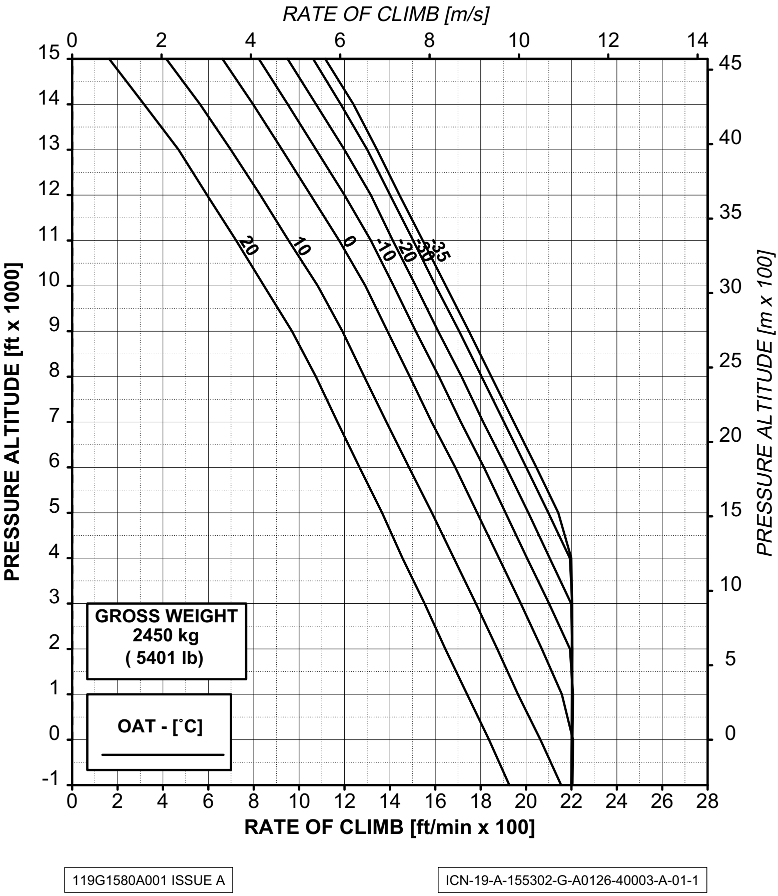

Figure 4-7. Take-Off Power (TOP) (Heater On) - Gross Weight 2450 kg

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

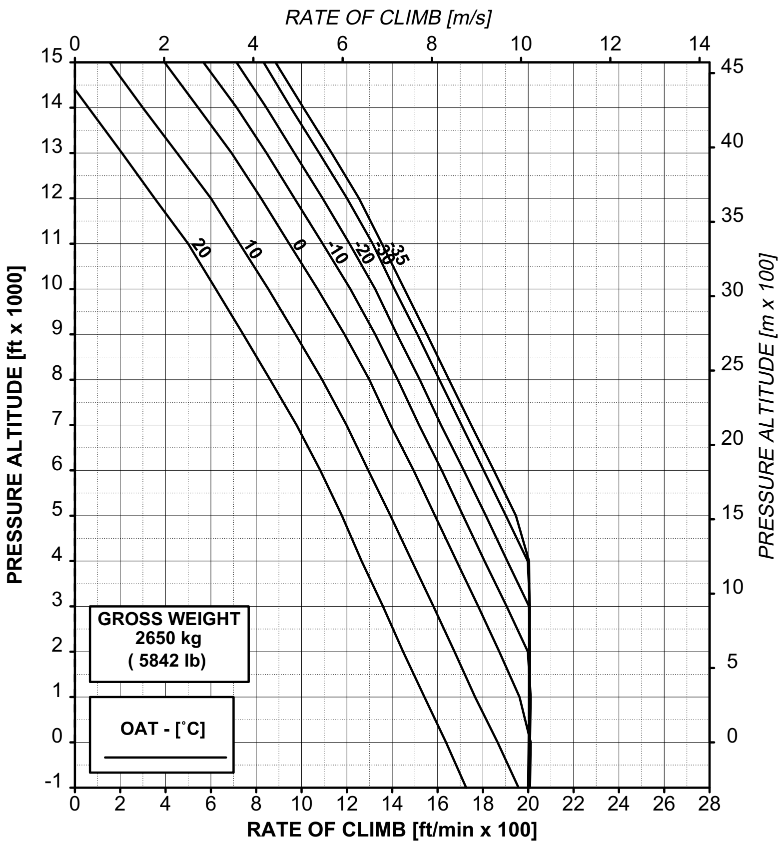

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Figure 4-8. Take-Off Power (TOP) (Heater On) - Gross Weight 2650 kg

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

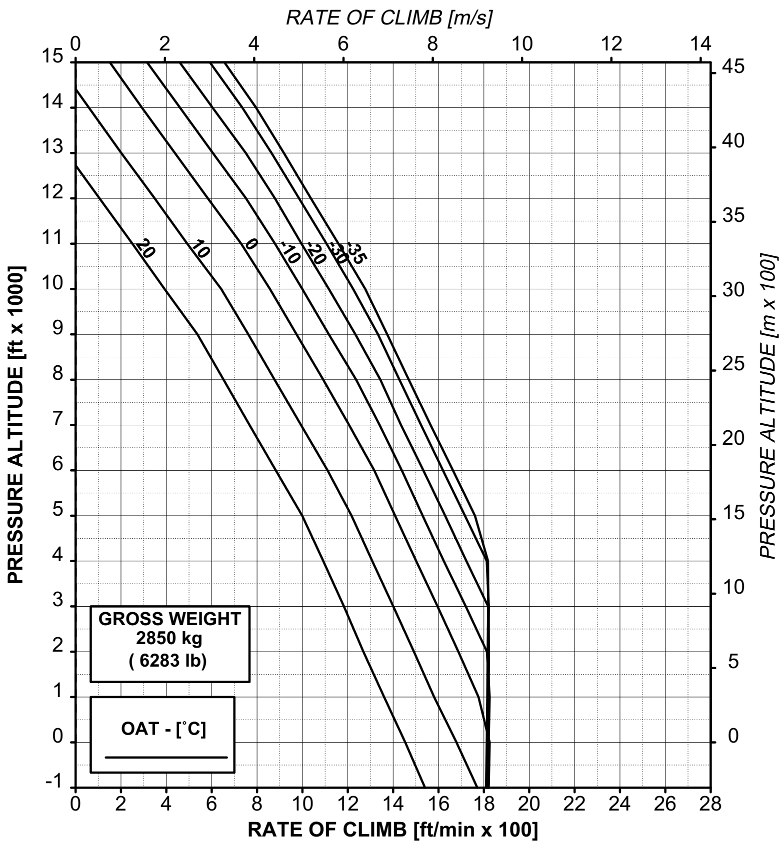

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Figure 4-9. Take-Off Power (TOP) (Heater On) - Gross Weight 2850 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

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

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

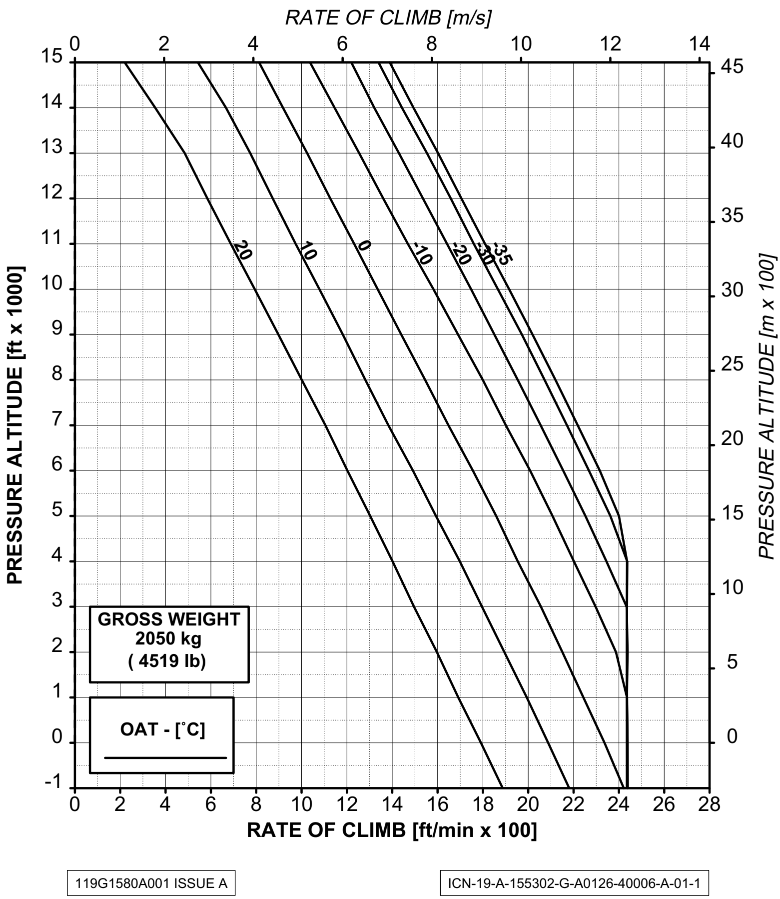

Figure 4-10. Maximum Continuous Power (MCP) (Heater ON) - Gross Weight 2050 kg

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

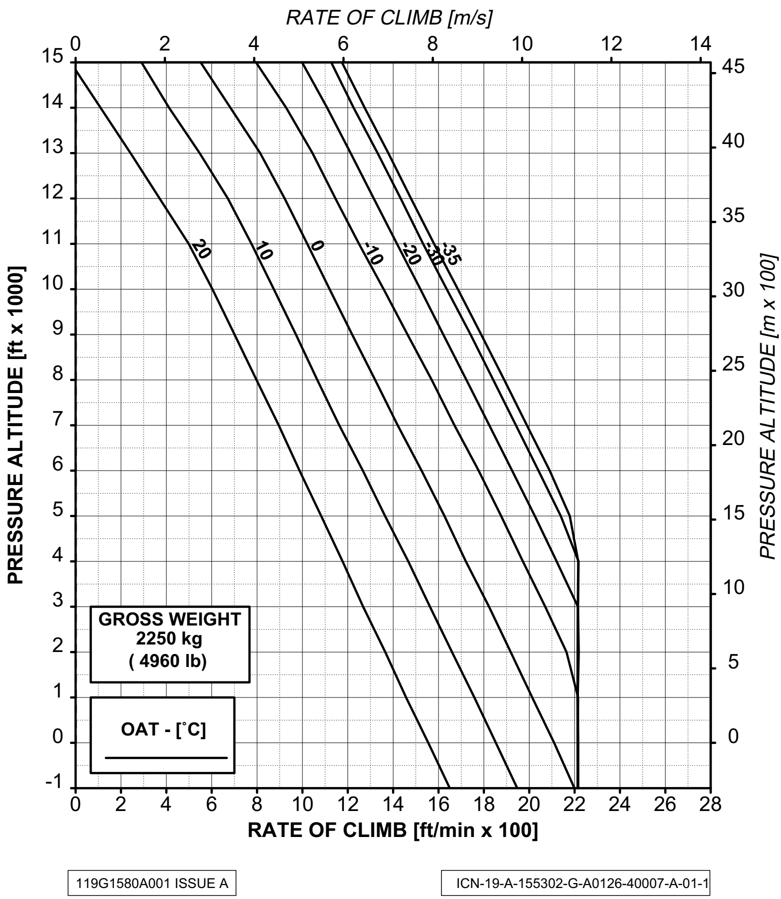

Figure 4-11. Maximum Continuous Power (MCP) (Heater On) - Gross Weight 2250 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

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

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

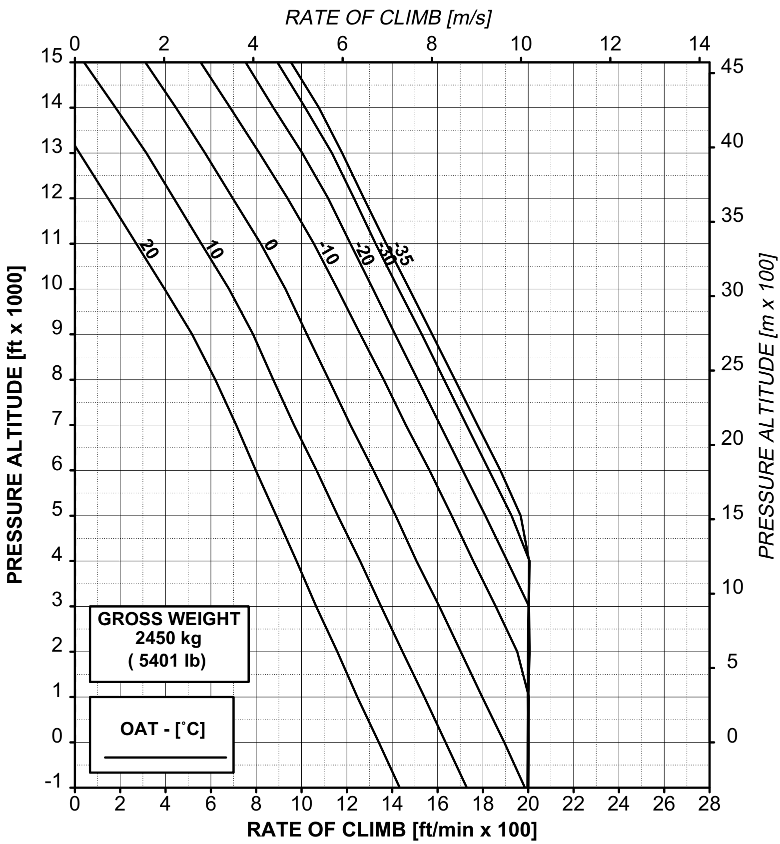

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Figure 4-12. Maximum Continuous Power (MCP) (Heater On) - Gross Weight 2450 kg

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

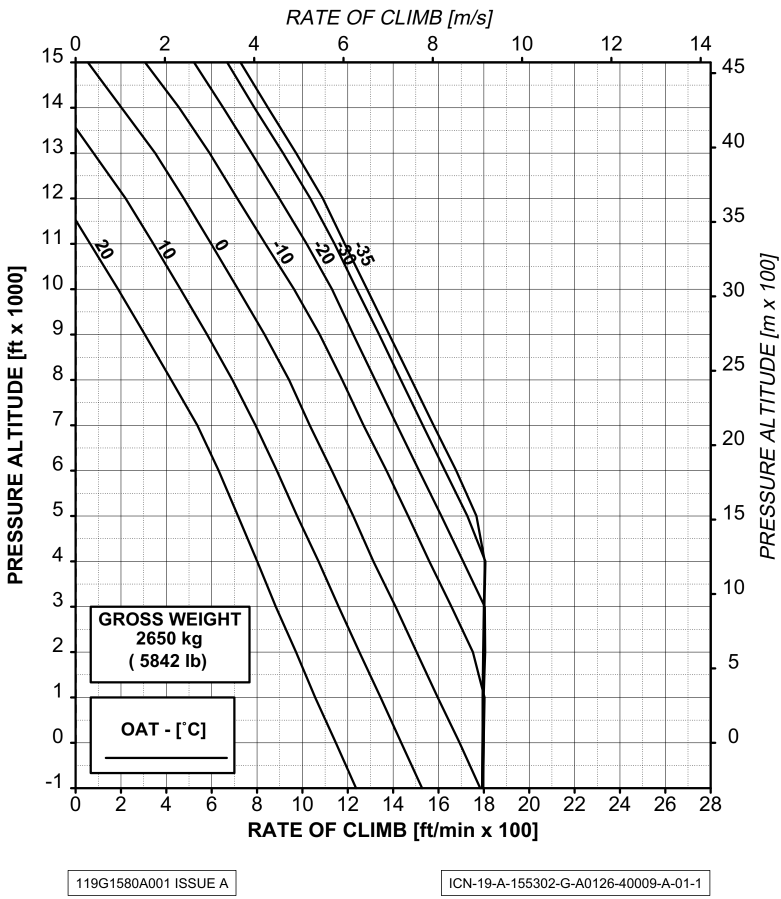

Figure 4-13. Maximum Continuous Power (MCP) (Heater On) - Gross Weight 2650 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

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

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

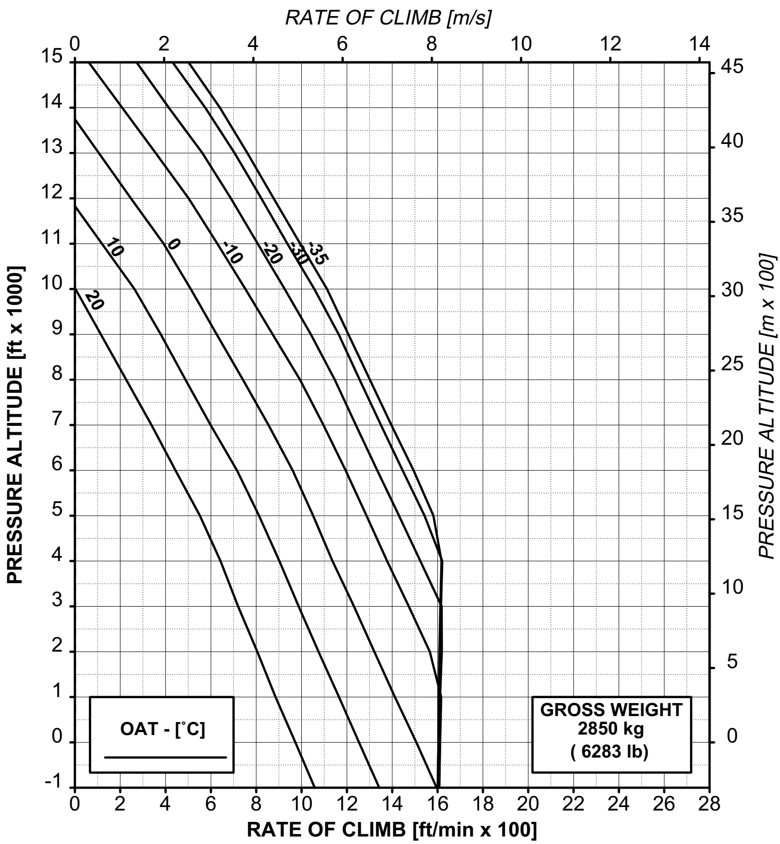

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Figure 4-14. Maximum Continuous Power (MCP) (Heater On) - Gross Weight 2850 kg

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dated 30 July 2015

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.

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LIST OF REVISIONS

REVISION No.	SUBJECT	APPROVAL
—	Issue 1	EASA Approvals N° 10054263, 10054264 dated 30 July 2015
1	Revised pages Title page, A-1, B-1 and 24 of 28. <u>Applicable to G1000H:</u> Revised pages ii and 23 of 28. <u>Applicable to G1000H NXi:</u> Revised pages ii and 23 of 28.	EASA Approvals N° 10068178 dated 21 Decmber 2018
2	Revised pages Title page, A-1 and B-1 and 24 of 28. <u>Applicable to G1000H:</u> Revised pages iii and 26 thru 28 of 28. <u>Applicable to G1000H NXi:</u> Revised pages iii and 26 thru 28 of 28.	Manufacturer's Data
3	Revised pages Title page, A-1, B-1 and i.	Manufacturer's Data

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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.

AIRSPEED 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.

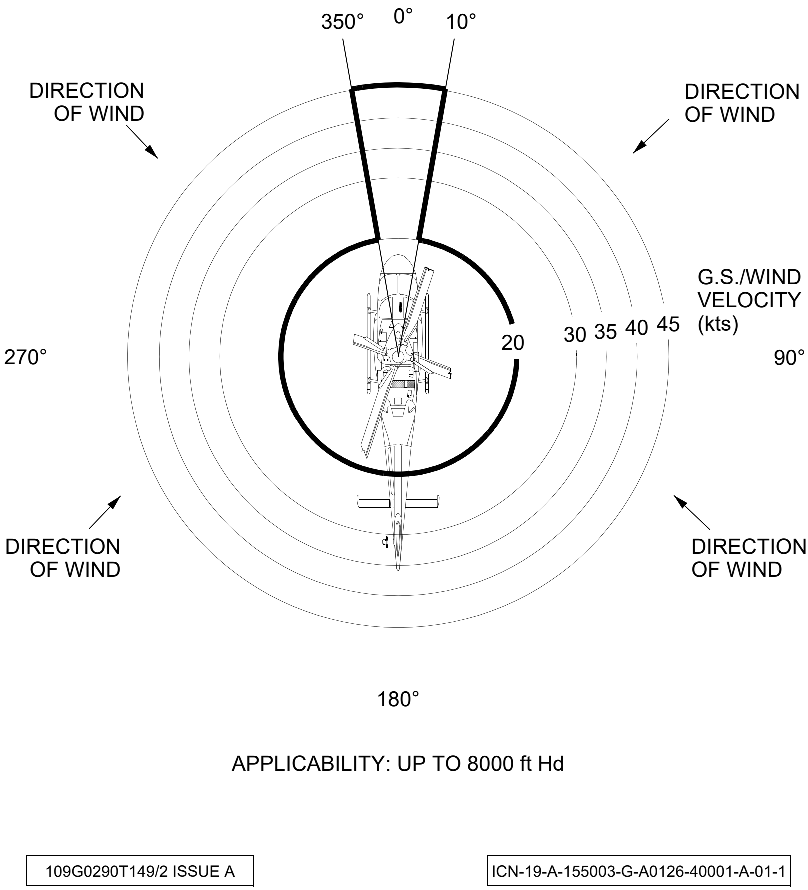


Figure 1-1. Wind/Ground Speed Azimuth Envelope with Load on Hoist

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.

WARNING

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

HOIST LIMITATIONS

Maximum hoist load : 204 kg (450 lb).

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

CENTER OF GRAVITY LIMITATIONS

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

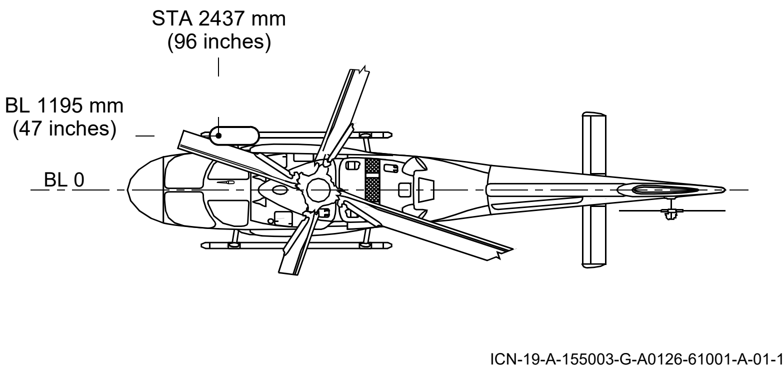
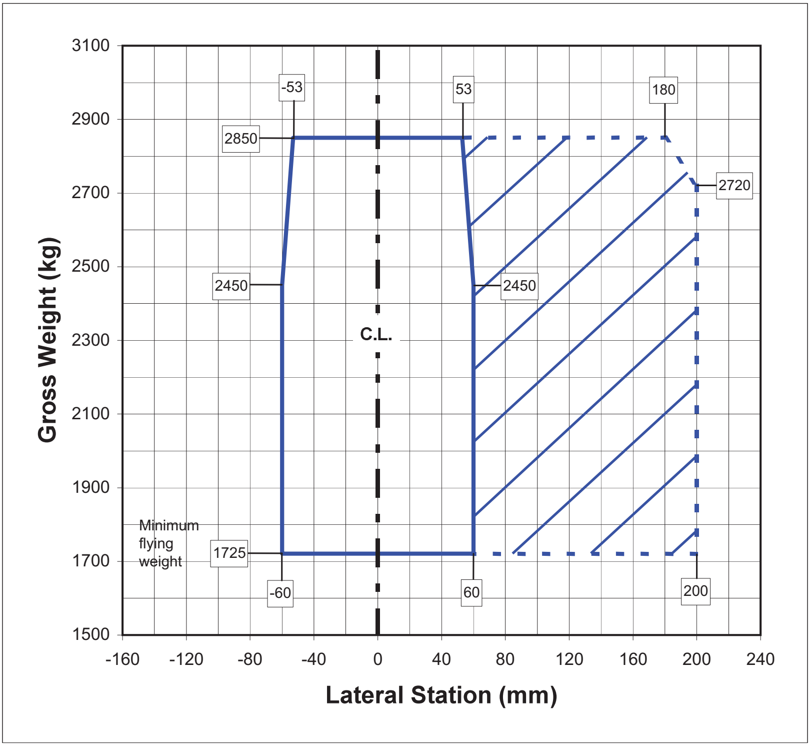


Figure 1-2. Hoist Station and Butt Line



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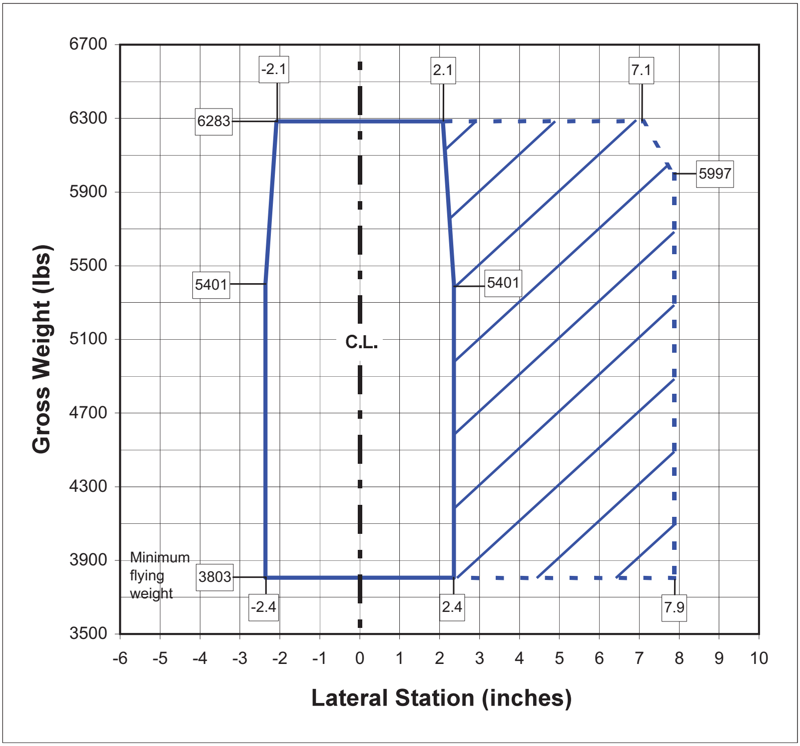
Note

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

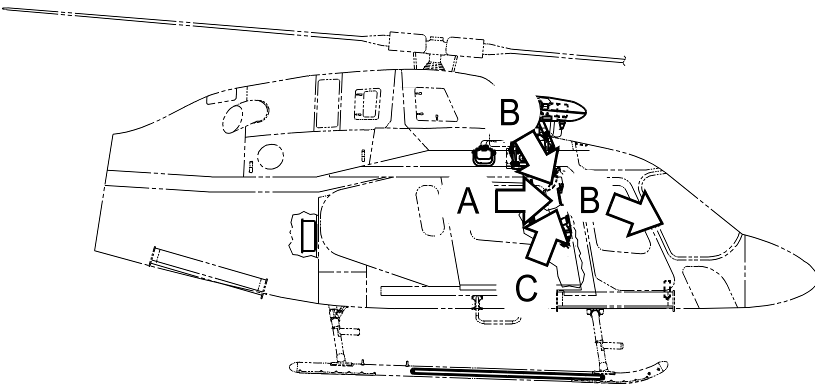
Lateral Station “0” is 17.7 in inboard from each main jack point and coincides with the helicopter longitudinal plane of symmetry.

Note

The diagram shaded area is only applicable during hoist operation.

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

PLACARDS



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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)

1. Hoist	: - Condition, security, oil leaks and wiring connected.
2. Skid protection	: - Inspect for condition and damages.
3. Hoist cowling	: - Secured.
4. Hoist mount	: - Condition and security.
5. Hook	: - Check for condition, security and freedoom of rotation on cable.
6. Hook rubber bumper	: - Inspect for crushing.

AREA N°7 (Cabin interior)

1. CABLE CUT switch (on pilot's cyclic stick	: - OFF, guard closed.
2. HOIST PWR circuit breaker	: - In.

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

1. HOIST switch	: - ON.
- PFD	: - HOIST ON advisory message displayed on CAS.

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

CAUTION

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.

3. 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.

WARNING

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

4. 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.

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

Hoist operator:

1.	Hoist pendant control	: - Verify correct installation and condition.
2.	Manual cable cutter	: - Verify presence and condition (forward RH cabin strut).
3.	Safety shoulder harness and gloves	: - Verify presence and condition.
4.	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.
5.	HOIST switch	: - OFF.
	- PFD	: - HOIST ON advisory message out.

Disconnect the d.c. electrical supply.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

AREA N°7 (Cabin interior)

Hoist operator:

1.	Hoist pendant control	: - Verify condition.
2.	Manual cable cutter	: - Verify presence (forward RH cabin strut).
3.	Safety shoulder harness and gloves	: - Verify presence and condition.
4.	Radio-ICS portable transceiver	: - Verify presence and condition. : - Check the transceiver and interface box are set on the same frequency.

ENGINE PRESTART CHECK

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

   - PFD : - HOIST CUT ARMD caution message out.

2. HOIST circuit breakers : - Check in.

SYSTEMS CHECK

1. HOIST switch : - ON.

   - PFD : - HOIST ON advisory message displayed on CAS.

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

   - PFD : - HOIST CUT ARMD caution message displayed on CAS.

3. CABLE CUT switch : - OFF (guard closed).

   - PFD : - HOIST CUT ARMD caution message out.

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

5. HOIST hook : - Check lowering.

6. Cable payout display : - Check for meter counting.

7. HOIST control switch : - UP.

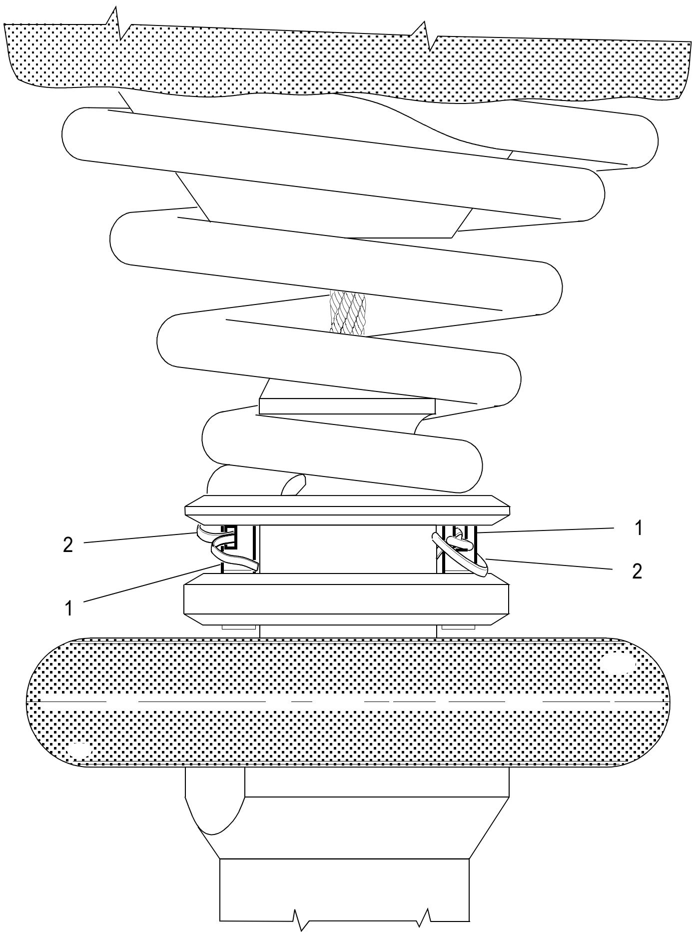
Note

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

8. HOIST hook : - Check raising.

Hoist operator:

1. HOIST thumb wheel (on pendant control) : - Rotate to DN and to UP.
2. HOIST hook : - Check lowering or raising according to thumb wheel selection.
3. HOIST control switch (on pilot's cyclic stick) : - DN or UP, checking that it overrides the thumb wheel selection.
4. HOIST thumb wheel (on pendant control) : - Off position.
5. HOIST switch : - OFF.
   - PFD : - HOIST ON advisory message out.



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.

1. HOIST switch : - ON.
   - PFD : - HOIST ON advisory message displayed on CAS.

WARNING

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

2. Establish hover over hoist operation area.

CAUTION

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

3. Onboard ICS and portable radio-ICS transceiver : - Verify positive audio communication is achieved among all crewmembers.

Note

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

4. 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.

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

6. 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.

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

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

9. 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.

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

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

CAUTION

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

12. Maintain hover until hoist operations are completed.

13. Right passenger door (if installed) : - Close.

14. HOIST switch : - OFF.
    - PFD : - HOIST ON caution message out.

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

CAUTION SYSTEM

CAS CAUTION MESSAGES (YELLOW)

CAS Caption	Page	Failure/System State
HOIST CUT ARMD	20	Hoist cable cut system armed.
HOIST CABL LKD	21	Hoist electrical circuit deactivated (pilot and operator’s HOIST control switches inoperative) because of cable foul detected on hoist drum.

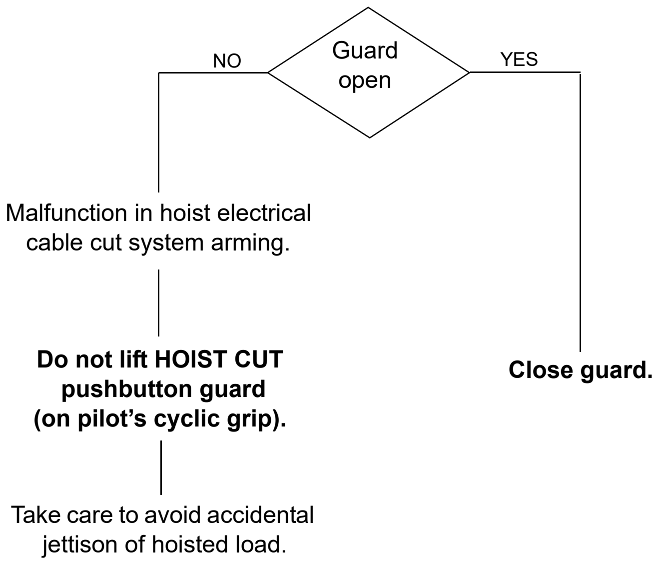
EXTERNAL HOIST CABLE CUT ARMED

HOIST CUT ARMD

External hoist electrical cable cut system armed.
Guard open on HOIST CUT pushbutton (on pilot's cyclic grip)

or

Malfunction detected in hoist electrical cable cut system arming.



EXTERNAL HOIST CABLE FOULED

HOIST CABL LKD

External hoist cable fouled.

HOIST control switch (on pilot's cyclic grip) and HOIST thumbwheel (on pendant control) are inoperative.

Appropriate landing area available

NO

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

Airspeed as required for adequate controllabiity, within load on hoist limits. Refer to **AIRSPEED LIMITATIONS (IAS)** paragraph.

Proceed to land.

YES

- Establish hover;
- Initiate a slow descent.

- Lay load on ground;
- Manually recover cable on board.

Proceed to land.

CAUTION

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.

Note

In case of MFD failure, it is hoist operator responsability to prevent operation with a fouled cable through a continuous cable check.

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:

HOIST CUT pushbutton (on pilot's cyclic stick)	: Lift the guard to arm the system. HOIST CUT ARMD caution message illuminates on CAS. Push to cut.

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.

CAUTION

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

ELECTRICAL POWER MALFUNCTION

Failure of the 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.

COCKPIT DISPLAY SYSTEM FAILURES

PRIMARY FLIGHT DISPLAY (PFD) FAILURE

CAUTION

The following CAS messages (caution and advisory) are no longer available:

Caution	Advisory
HOIST CUT ARMD	HOIST ON

Note

In case of operation with the External Hoist, continually monitor the status of the guard protecting the hoist cable cut switch.

MULTI-FUNCTION DISPLAY (MFD) FAILURE

CAUTION

The following CAS caution message is no longer available:

Caution
HOIST CABLE LKD

Note

In case of External Hoist operations, it is hoist operator responsability to prevent operation with a fouled cable though a continuous cable check.

LRU FAILURES

INTEGRATED AVIONIC UNIT 1 (GIA1) FAILURE

CAUTION

The following CAS caution message is no longer available:

Caution
HOIST CABLE LKD

Note

In case of External Hoist operations, it is hoist operator responsability to prevent operation with a fouled cable though a continuous cable check.

ENGINE AIRFRAME UNIT 2 (GEA2) FAILURE

CAUTION

The following CAS caution message is no longer available:

Caution
HOIST CUT ARMD

Note

In case of opertation with External Hoist, continually monitor the status of the guard protecting the hoist cable cut switch.

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 CABLE LKD caution message on CAS.

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 ISO/CALL pushbutton on the ICS control panel located 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.

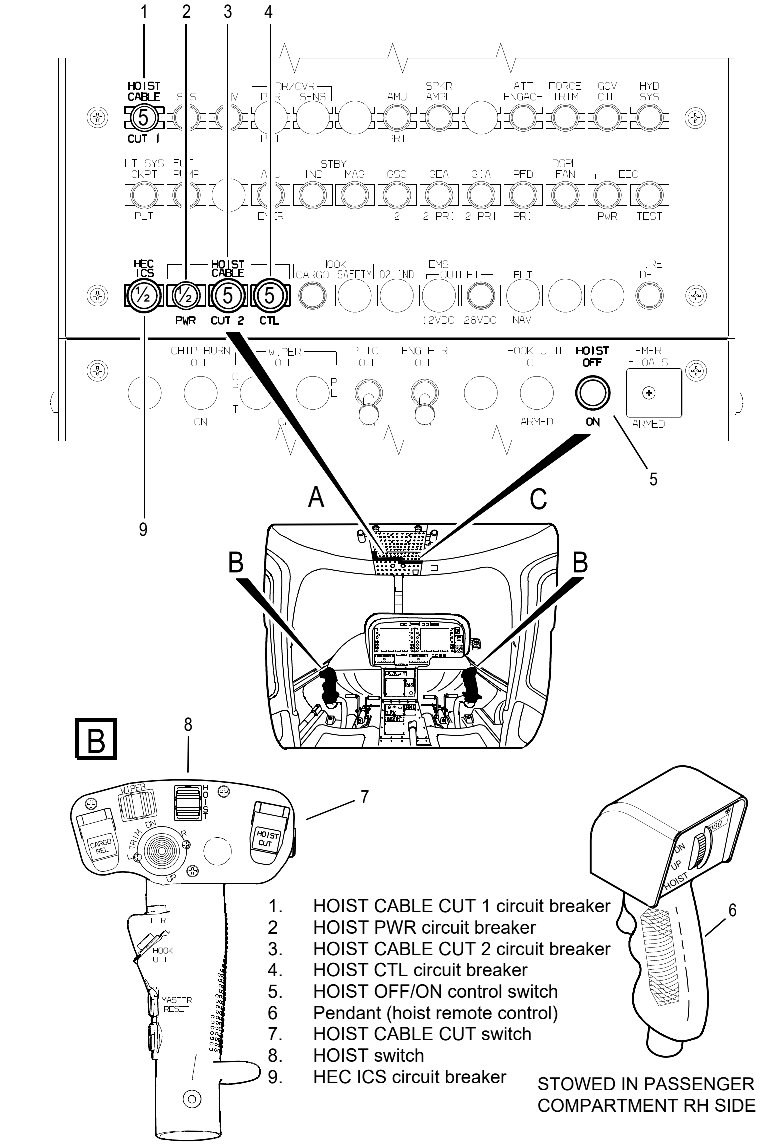


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Figure 7-1. Hoist Controls

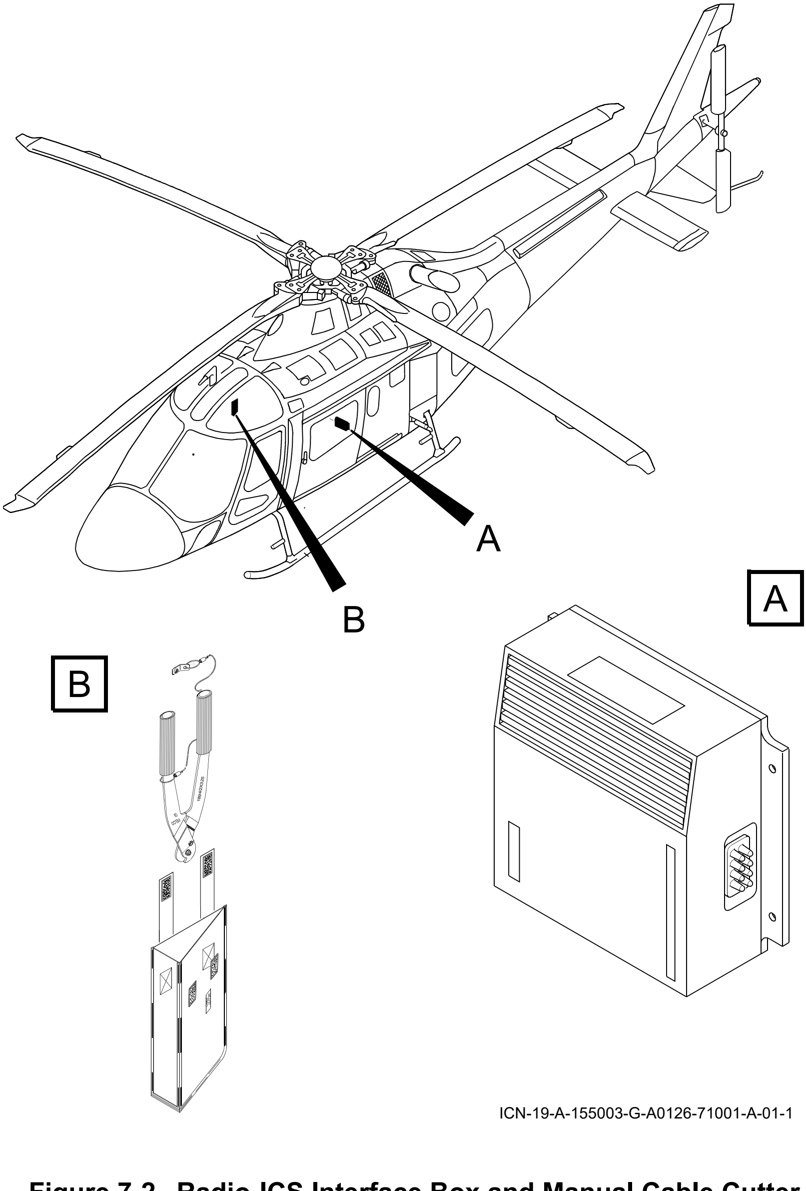

Figure 7-2. Radio-ICS Interface Box and Manual Cable Cutter Positions (typical)

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Approved with NDC 109G3340-011
dated 30 June 2016
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.

SEARCHLIGHT

The searchlight installation P/N 109-0812-83-139 consists of a steerable light installed 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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LIST OF REVISIONS

REVISION No.	SUBJECT	APPROVAL
—	Issue 1	Approved with NDC 109G3340-011 dated 30 June 2016 under the authority of DOA ref EASA.21J.005
1	Revised pages Title page, A-1 and B-1. Applicable to G1000H: Revised pages 1 of 6. Applicable to G1000H NXi: Revised pages 1 of 6.	EASA Approval N° 10078678 dated 28 February 2022

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SEARCHLIGHT

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SECTION 2 - NORMAL PROCEDURES

PART II — MANUFACTURER'S DATA

LIST OF FIGURES

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.

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.

Use of searchlight P/N 109-0812-83-139 when the FLIR Wescam MX-10 is installed is only permitted with the lamp in stowed position.

SEARCHLIGHT OPERATION VS MAGNETIC COMPASS INDICATION LIMITATIONS

Do not rely on standby magnetic compass indications when searchlight lamp is on.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 6 (Fuselage - RH side)

1. Searchlight : - Condition and cleanliness.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

1. Searchlight : - Condition and cleanliness.

IN FLIGHT

SEARCHLIGHT OPERATING PROCEDURE

Searchlight extension and orientation

1. ON/OFF/STOW switch on collective lever : - ON (to switch the lamp on).
2. EXT/RETR/L/R switch on collective lever : - EXT (to extend the light).

Note

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

3. 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

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

Note

In STOW position the light is extinguished.

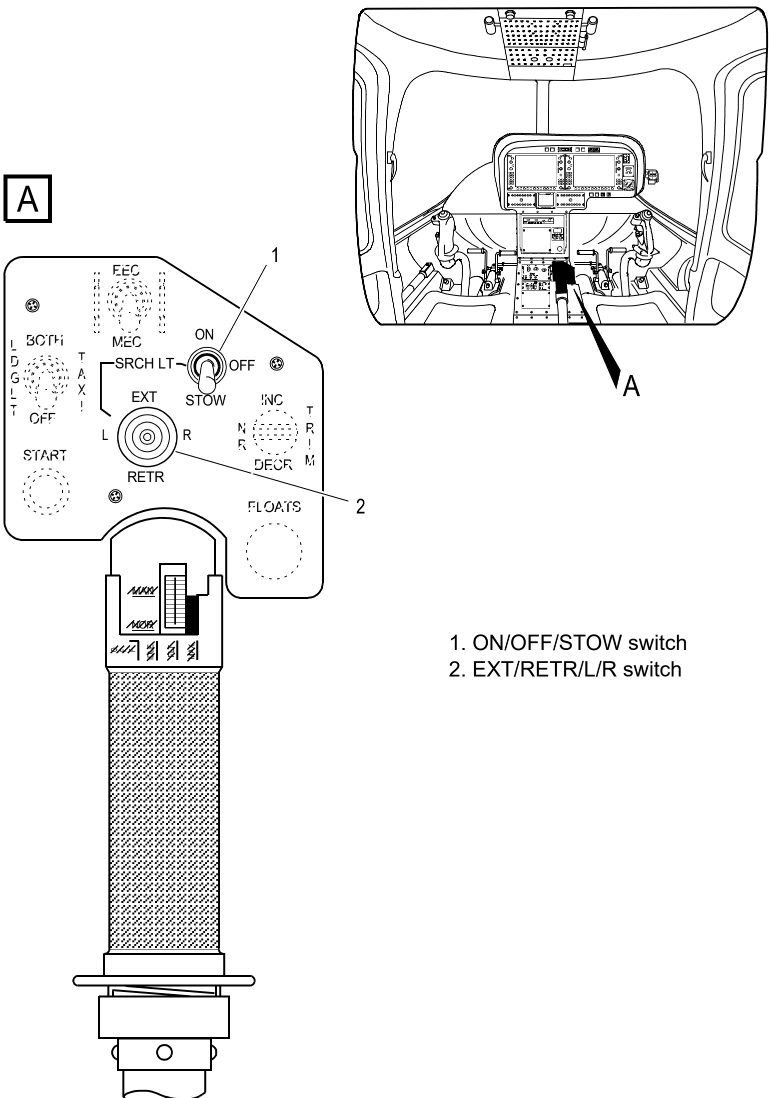
SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

No change.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 7 - SYSTEM DESCRIPTION



1. ON/OFF/STOW switch
2. EXT/RETR/L/R switch

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Figure 7-1. Searchlight Controls

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EASA Approvals N° 10054263, 10054264
dated 30 July 2015

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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LIST OF REVISIONS

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—	Issue 1	EASA Approvals N° 10054263, 10054264 dated 30 July 2015

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SNOW SKIS

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SECTION 1 - LIMITATIONS

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SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

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SECTION 1 - LIMITATIONS

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)

1. 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)

1. 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)

1. 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.

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.

CAUTION

Adapt forward touchdown speed according to the condition 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

CAUTION

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.

EASA Approvals N° 10054263, 10054264
dated 30 July 2015

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.

A Hook Camera P/N 109G9750F04-101, interfaced with the cockpit MFD, may be installed (applicable to G1000H NXi only).

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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LIST OF REVISIONS

REVISION No.	SUBJECT	APPROVAL
—	Issue 1	EASA Approvals N° 10054263, 10054264 dated 30 July 2015
1	Revised pages Title page, A-1, B-1, ii thru iv and 14 thru 18 of 34. Added pages 18A and 18B of 34	EASA Approval N° 10063634 dated 06 November 2017
2	Revised pages Title page, A-1, B-1, i. Applicable to G1000H: Revised pages ii, 7 thru 9 of 34 and 11 thru 15 of 34 Added pages 6A and 6B of 34, 14A and 14B of 34. Applicable to G1000H NXi: Revised pages ii, 7 thru 9 of 34 and 11 thru 15 of 34. Added pages 6A and 6B of 34.	EASA Approval N° 10068178 dated 21 December 2018
3	Revised pages Title page, A-1, B-1, 18A of 34 and 24 of 34.	Approved with NDC-109G0257-021 dated 23 May 2019 under the authority of DOA ref EASA.21J.005
4	Revised page 1 of 34. Applicable to G1000H NXi: Revised pages 7, 9 thru 11 of 34, 13 and 14.	Approved with NDC-109G9750-004, NDC-109G3440-003 dated 24 April 2024 under the authority of DOA ref EASA.21J.005
	Revised pages Title page, A-1, B-1, B-2 and 2 of 34. Applicable to G1000H: Revised page i, 10 and 34 of 34. Applicable to G1000H NXi: Revised pages i and 34 of 34.	Manufacturer's Data

REVISION No.	SUBJECT	APPROVAL
5	Revised pages Title page, A-2, B-1. Applicable to G1000H: Revised page ii.	Manufacturer's Data

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ii	5 G1000H
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3 thru 6 of 34	0
6A and 6B of 34	2 G1000H
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7 thru 9 of 34	2 G1000H
10 of 34	4 G1000H
7 of 34	4 G1000H NXi
8 of 34	2 G1000H NXi
9 thru 11 of 34	4 G1000H NXi
11 thru 14 of 34 14A and 14B of 34 15 of 34	2 G1000H
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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:

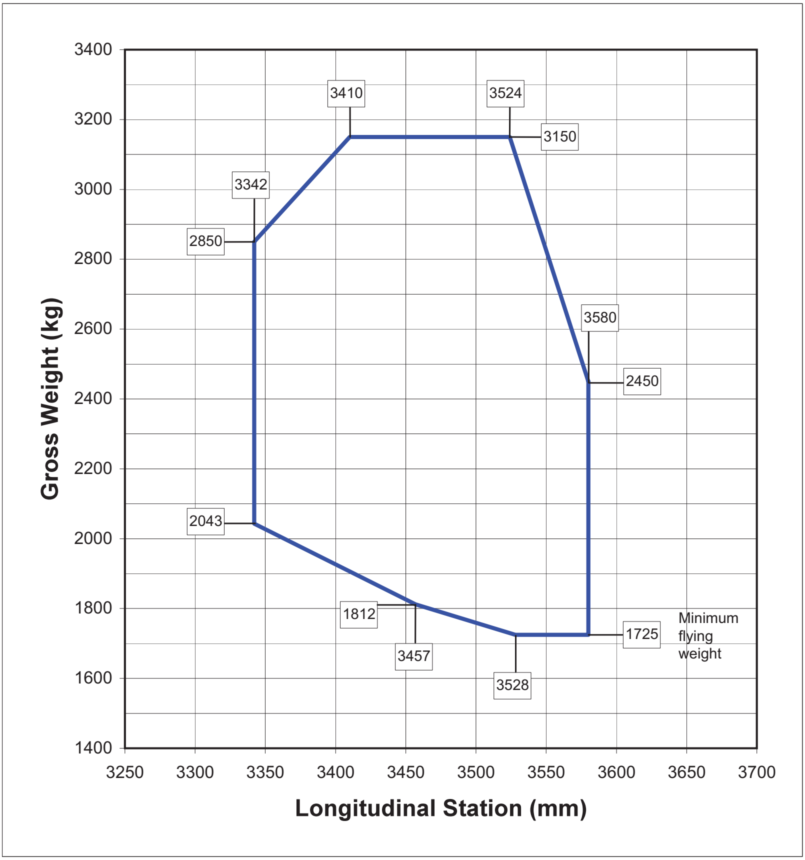
From -1000 ft to 9000 ft	: 1400 kg (3086 lb).
Above 9000 ft	: Decrease 50 kg (110 lb) every 1000 ft from 1400 kg (3086 lb).

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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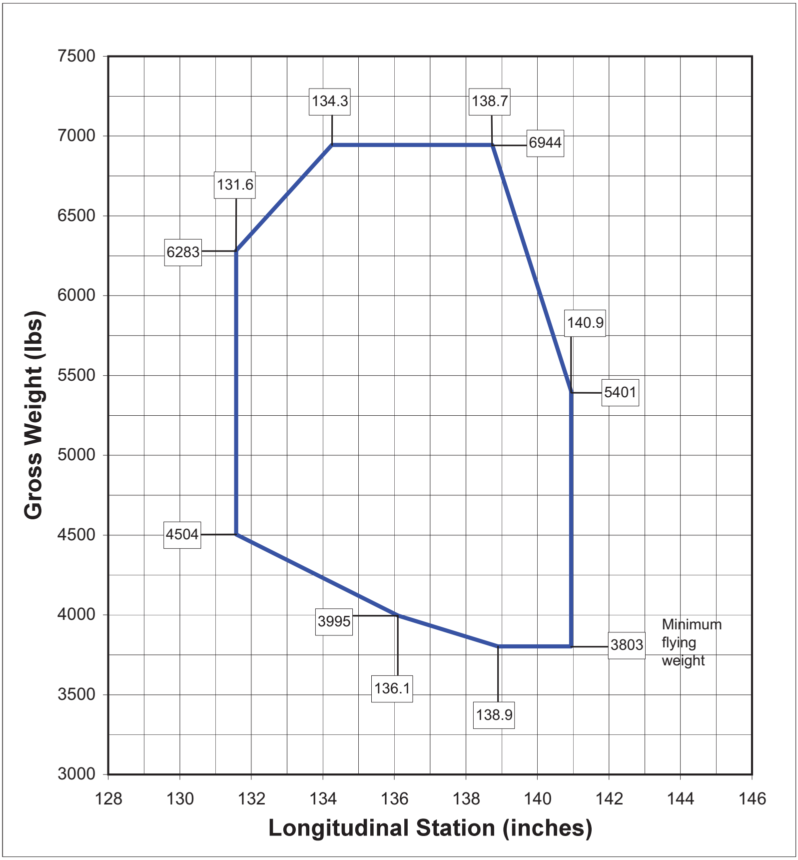
Note

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

Figure 1-1. Longitudinal CG Limits (metric units)



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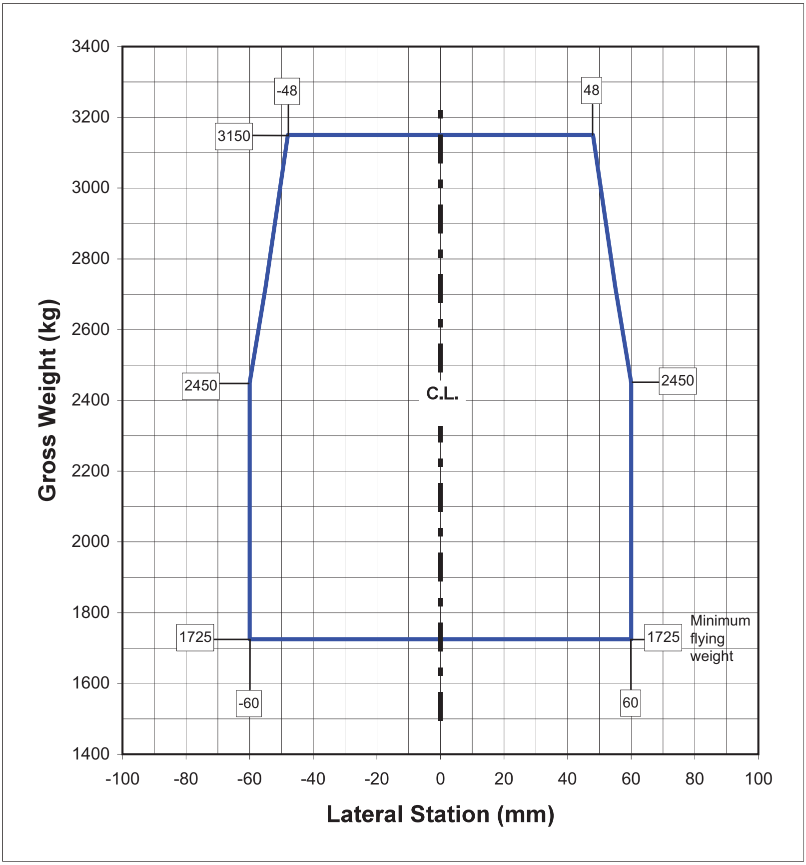
Note

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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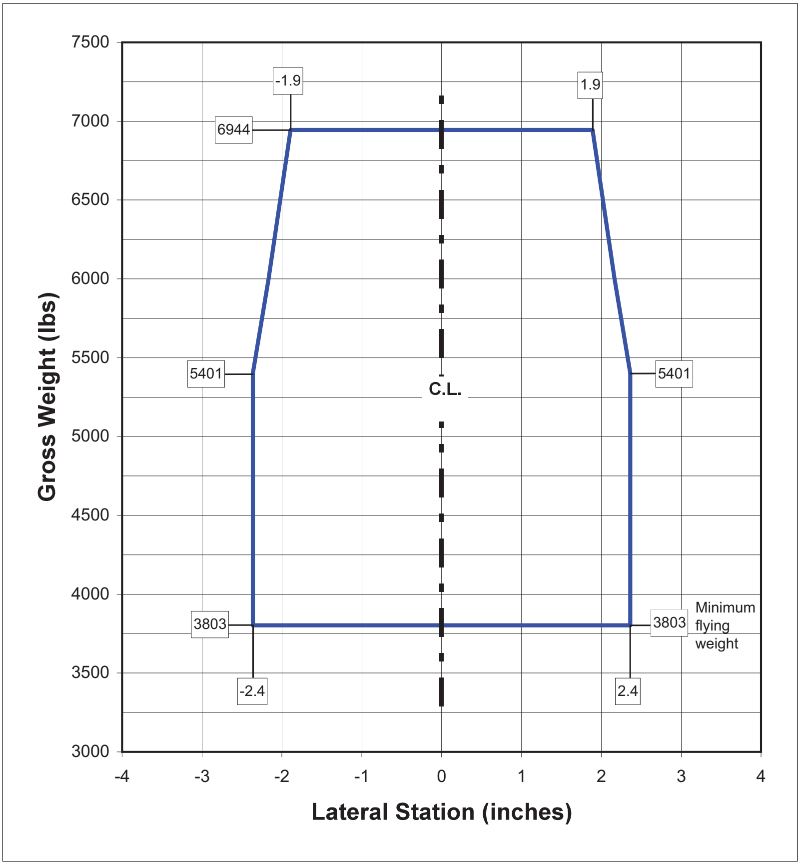
Note

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)

MISCELLANEOUS LIMITATIONS

For helicopter night operations with the Searchlight P/N 109-0812-83-139 the rearview mirror must be covered or removed.

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SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N°1 (Helicopter nose)

1. Rearview mirror (if installed)	: - Condition, cleanliness and security.
2. Mirror cover (if installed)	: - Condition and security.

AREA N°2 (Fuselage - rh side)

1. 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.

1. PFD	: - Check that the following caution messages are out: - CARGO HOOK ARM. - CARGO HOOK OPEN.
2. CARGO REL pushbutton (on pilot cyclic stick)	: - Lift the guard to arm the release system.
- PFD	: - CARGO HOOK ARM caution message displayed on CAS.

3. CARGO REL pushbutton (on pilot cyclic stick)	: - Push. Verify the opening of the cargo hook.
- PFD	: - CARGO HOOK OPEN caution message displayed on CAS.
4. CARGO REL pushbutton (on pilot cyclic stick)	: - Release. Verify that the cargo hook returns to closed position.
- PFD	: - CARGO HOOK OPEN caution message out.

CAUTION

CARGO REL 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.

5. CARGO REL pushbutton (on pilot cyclic stick)	: - Lower the guard to protect the release pushbutton.
- PFD	: - CARGO HOOK ARM caution message out.
6. EMER CARGO RELEASE PULL handle (emergency)	: - Pull to full travel. Verify the opening of the cargo hook.
- PFD	: - CARGO HOOK OPEN caution message displayed on CAS.

7. EMER CARGO RELEASE PULL handle (emergency)	: -	Release the handle. Verify that the cargo hook returns to closed position.
- PFD	: -	CARGO HOOK OPEN caution message out.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

1. Rearview mirror (if installed)	: -	Condition, cleanliness and security.
2. Mirror cover (if installed)	: -	Condition and security.
3. Cargo hook	: -	Condition and security.

SYSTEMS CHECK

1. 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.

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 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

1. CARGO REL pushbutton (on cyclic stick) : - Lift the guard to arm the release system.

   - PFD : - CARGO HOOK ARM caution message displayed on CAS.

2. 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.

3. CARGO REL pushbutton (on cyclic stick) : - Push to release cargo.

   - PFD : - CARGO HOOK OPEN caution message displayed on CAS.

Note

The load is released only when its weight overcomes the spring-force of the hook.

4. 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 REL 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

CAUTION SYSTEM

CAS CAUTION MESSAGES (YELLOW)

CAS Caption	Page	Failure/System State
CARGO HOOK ARM	13	Cargo release system armed.
CARGO HOOK OPEN	14	Cargo release system (normal or emergency) in operation or hook jammed in open position.

CARGO HOOK ARMED

CARGO HOOK ARM

Cargo release system armed

or

Malfunction detected in cargo release system arming.

Guard open.

NO

Malfunction detected in cargo release system arming.

Do not lift CARGO REL guard to avoid inadvertent release of the load.

YES

IF load release not necessary:

- Close CARGO REL pushbutton guard (on pilot's cyclic stick).

CARGO HOOK OPEN

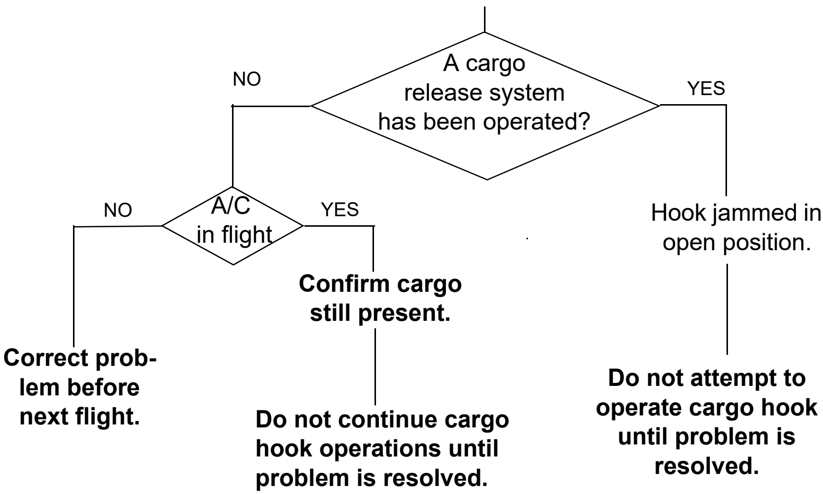
CARGO HOOK OPEN

Cargo hook in open position

or

Hook jammed in open position.

IF caution message remains active:



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.

COCKPIT DISPLAY SYSTEM FAILURES

PRIMARY FLIGHT DISPLAY (PFD) FAILURE

CAUTION

The following CAS caution message is no longer available:

Caution
CARGO HOOK ARM

Note

In case of operation with the Cargo Hook, continually monitor the status of the guard protecting the hook load release switch.

MULTI-FUNCTION DISPLAY (MFD) FAILURE

CAUTION

The following CAS caution message is no longer available:

Caution
CARGO HOOK OPEN

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LRU FAILURES

INTEGRATED AVIONIC UNIT 2 (GIA2) FAILURE

CAUTION

The following CAS caution message is no longer available:

Caution
CARGO HOOK ARM

Note

In case of opertation with Cargo Hook continually monitor the status of the guard protecting the hoist cable cut switch.

ENGINE AIRFRAME UNIT 1 (GEA1) FAILURE

CAUTION

The following CAS caution message is no longer available:

Caution
CARGO HOOK OPEN

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 hovering Out of Ground Effect condition up to takeoff power, in the wind/ground speed azimuth envelope defined in the Figure 4-1 (sheet 1of 2), up to the maximum Gross Weight defined in WAT diagram of Figure 4-1 (sheet 2 of 2).

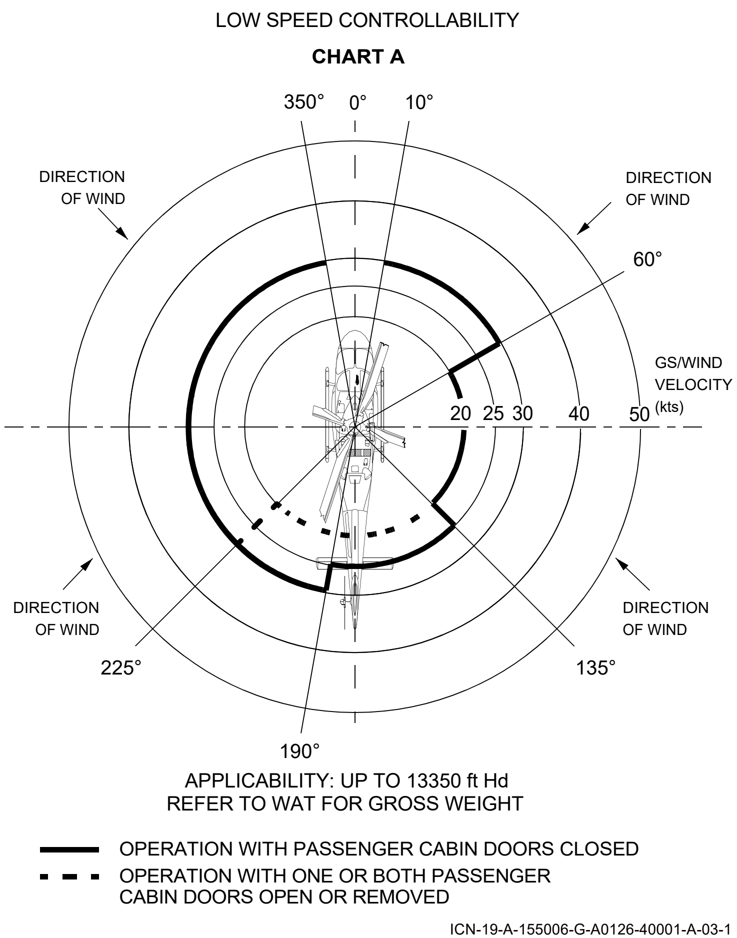
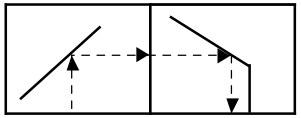


Figure 4-1. Wind/Ground Speed Azimuth Envelope (sheet 1 of 2).



WEIGHT-ALTITUDE-TEMPERATURE DIAGRAM
FOR CARGO HOOK LOW SPEED CONTROLLABILITY

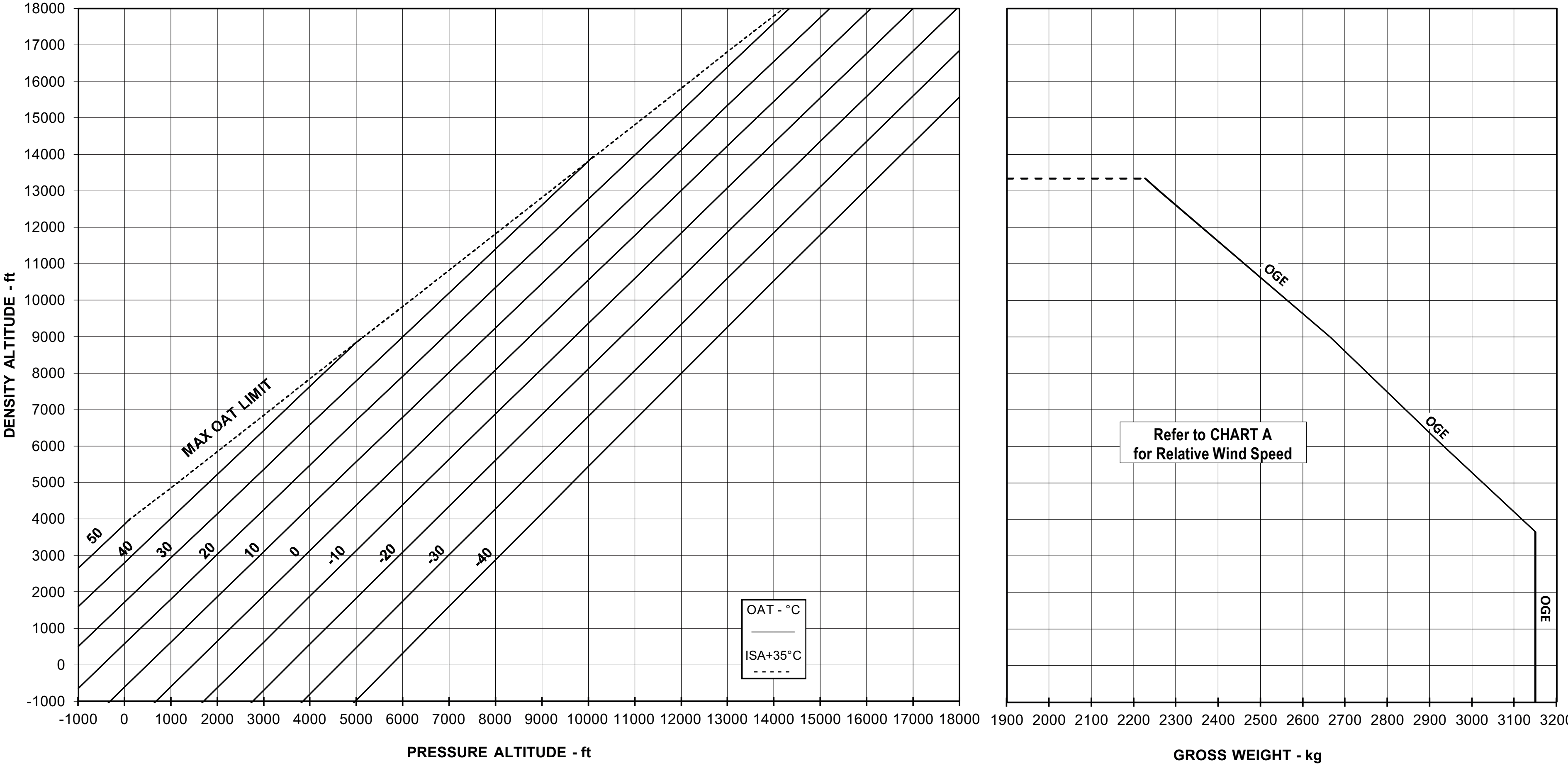


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Figure 4-1. WAT diagram (sheet 2 of 2)

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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 (al 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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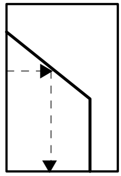
HOVER CEILING OUT OF GROUND EFFECT
TAKE-OFF POWER



ROTOR SPEED:102%
ZERO WIND
ELECTRICAL LOAD: 100 A
HEATER OFF

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

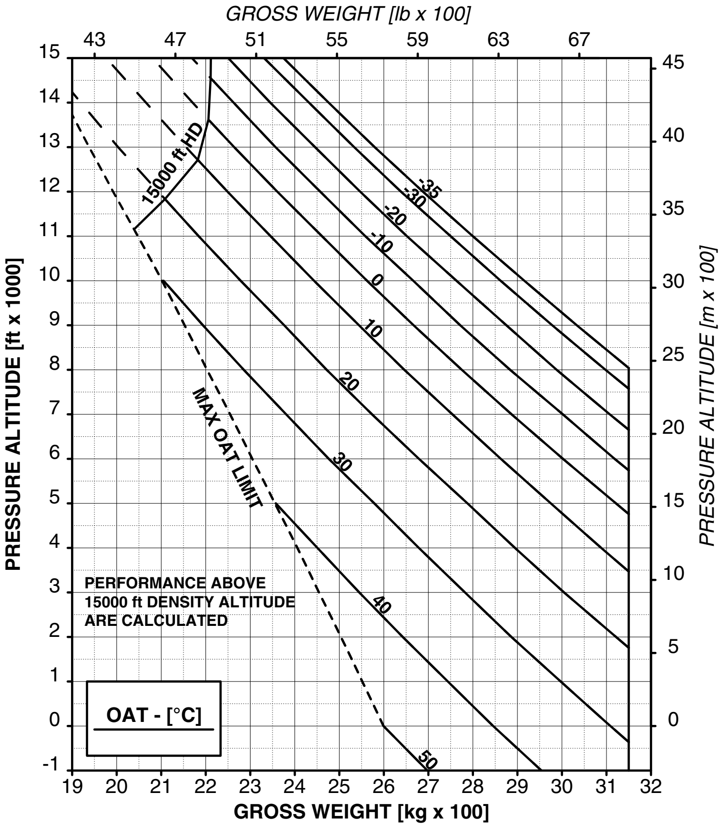


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Figure 4-2. Out of Ground Effect (OGE) - Take-Off Power (TOP) (Heater Off)

HOVER CEILING OUT OF GROUND EFFECT
TAKE-OFF POWER

ROTOR SPEED:102%
ZERO WIND
ELECTRICAL LOAD: 100 A

HEATER ON

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

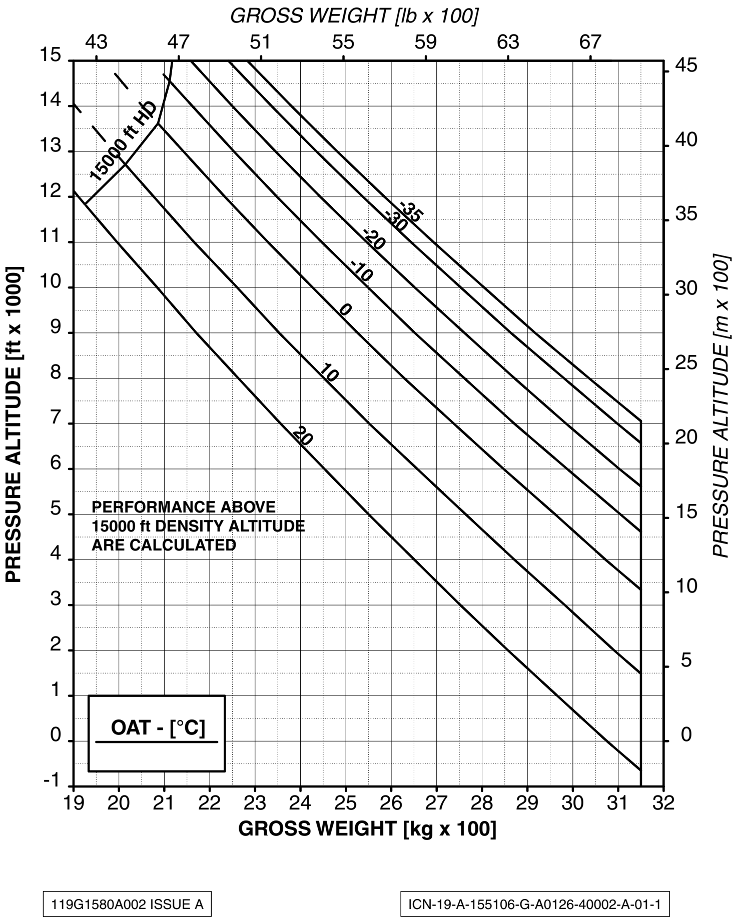

Figure 4-3. Out of Ground Effect (OGE) - Take-Off Power (TOP) (Heater On)

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

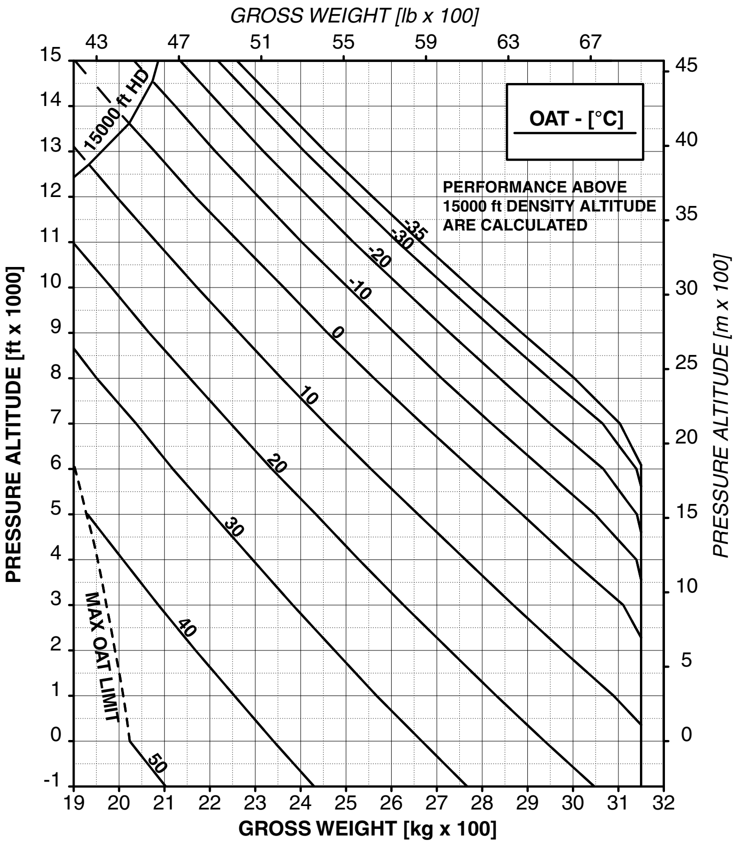

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Figure 4-4. Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater Off)

HOVER CEILING OUT OF GROUND EFFECT
MAXIMUM CONTINUOUS POWER

ROTOR SPEED:102%
ZERO WIND
ELECTRICAL LOAD: 100 A
WITH ELECTRICAL LOAD IN EXCESS OF 100 A REFER TO CORRECTION TABLE

HEATER ON

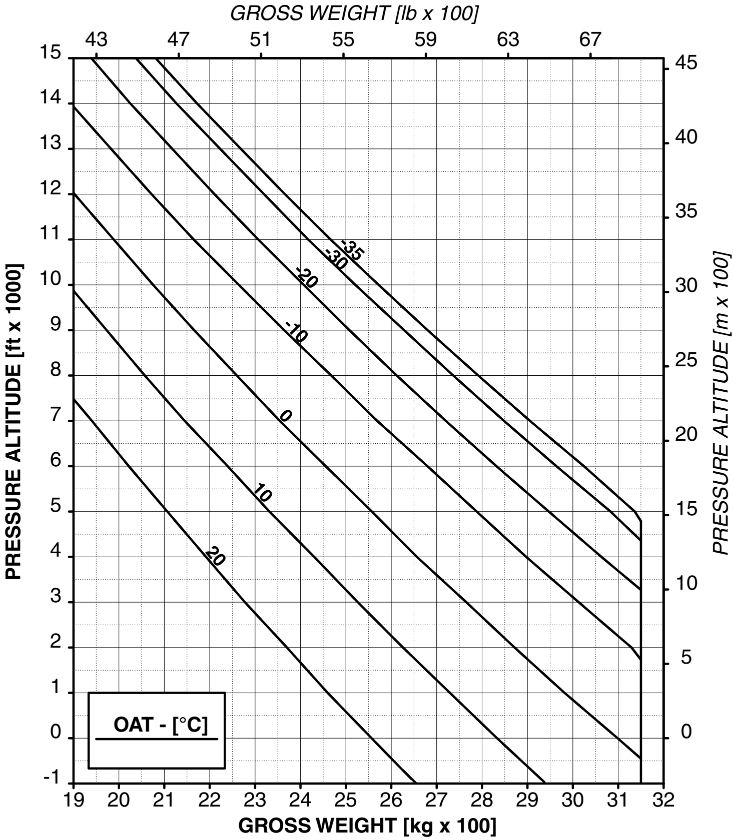

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Figure 4-5. Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater On)

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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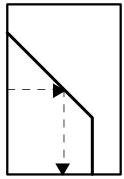
RATE OF CLIMB
TAKE-OFF POWER



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

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

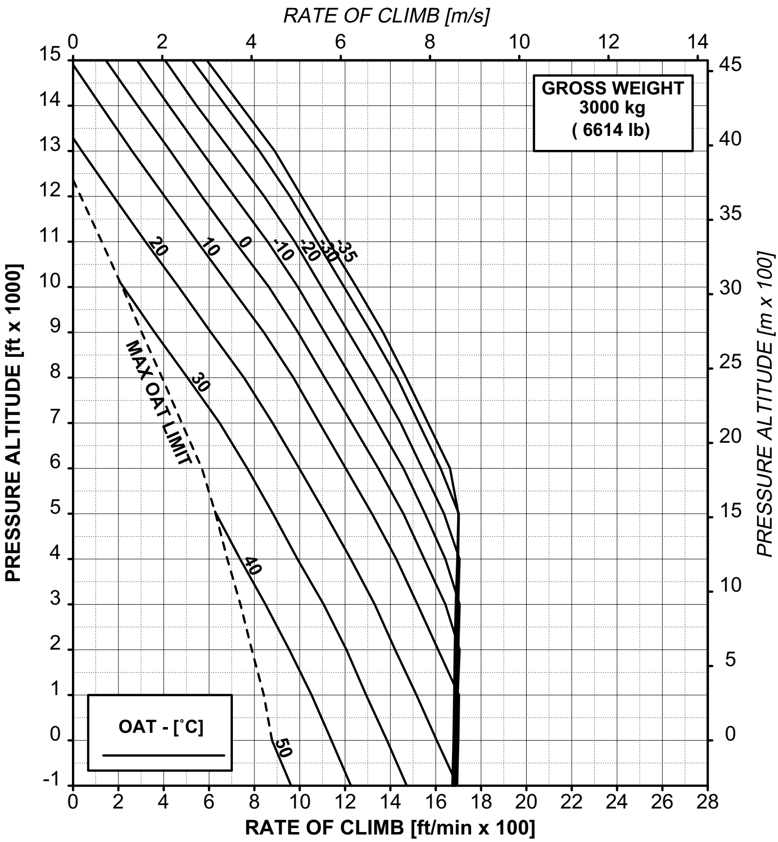


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Figure 4-6. Take-Off Power (TOP) (Heater Off) - Gross Weight 3000 kg

RATE OF CLIMB

TAKE-OFF POWER

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

Vy: 60 KIAS

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

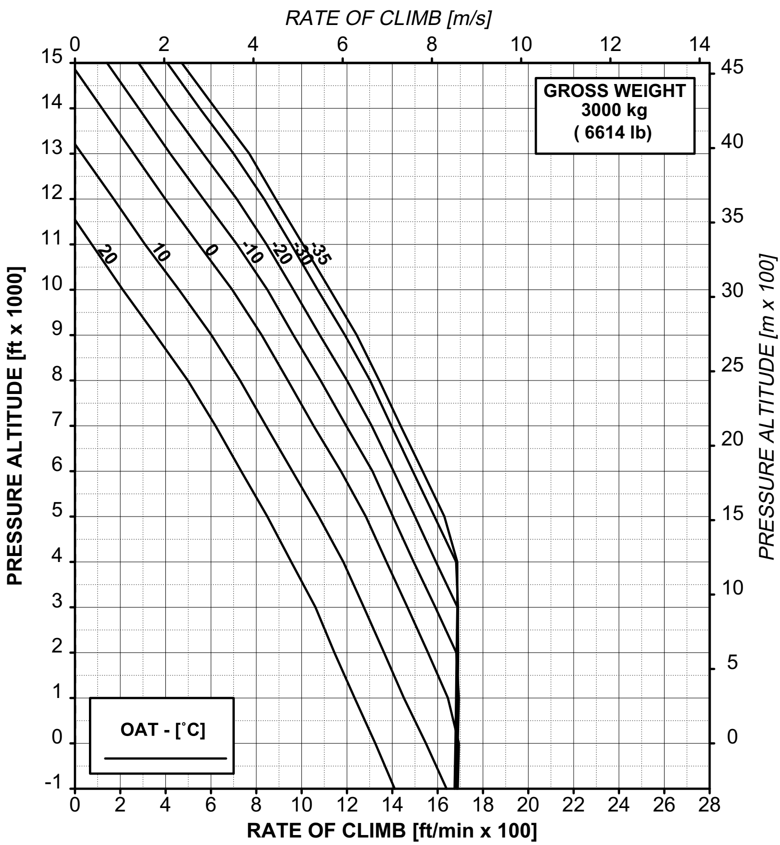

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Figure 4-7. Take-Off Power (TOP) (Heater On) - Gross Weight 3000 kg

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

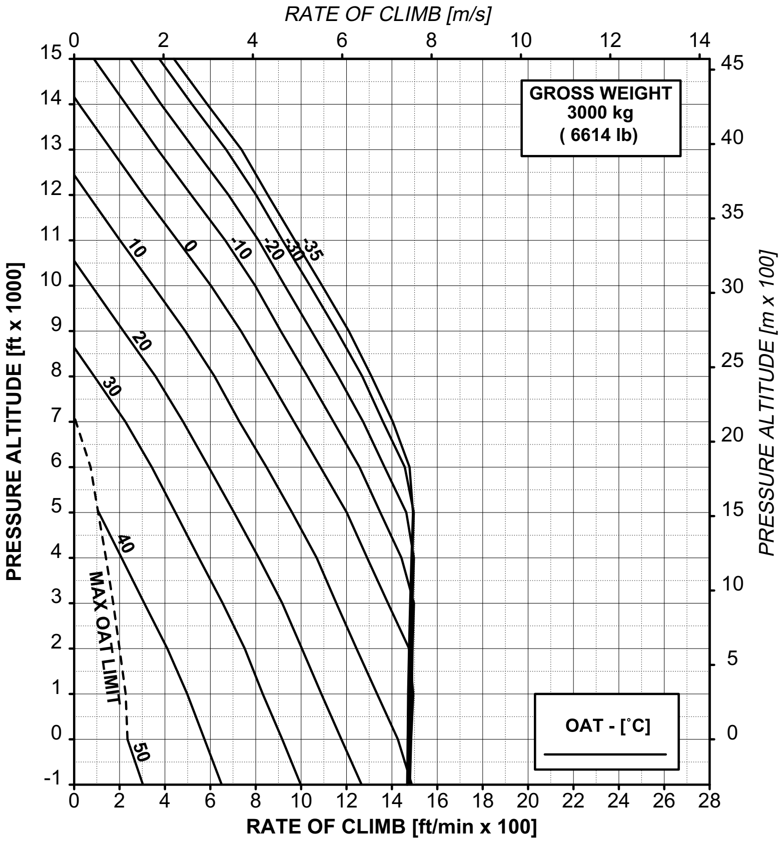

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Figure 4-8. Maximum Continuous Power (MCP) (Heater Off) - Gross Weight 3000 kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

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

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

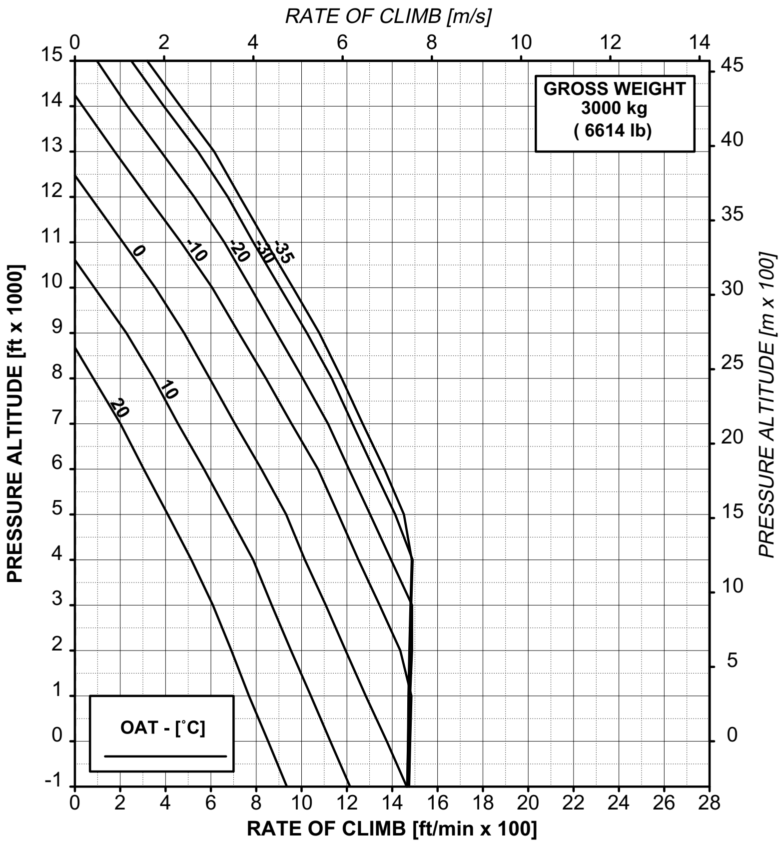

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Figure 4-9. Maximum Continuous Power (MCP) (Heater On) - Gross Weight 3000 kg

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

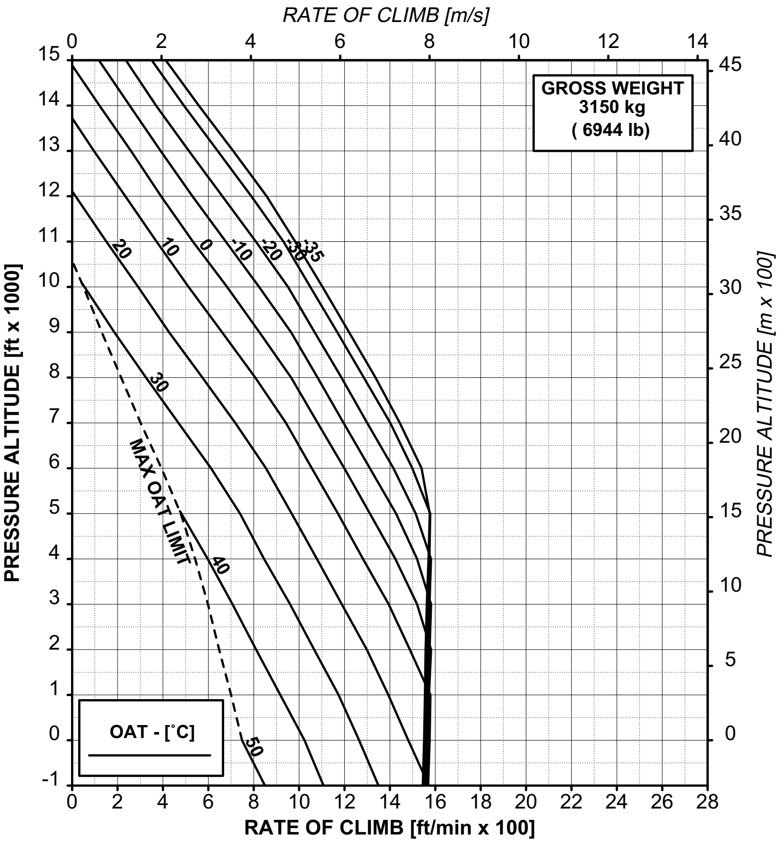

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Figure 4-10. Take-Off Power (TOP) (Heater Off) - Gross Weight 3150 kg

RATE OF CLIMB
TAKE-OFF POWER

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

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

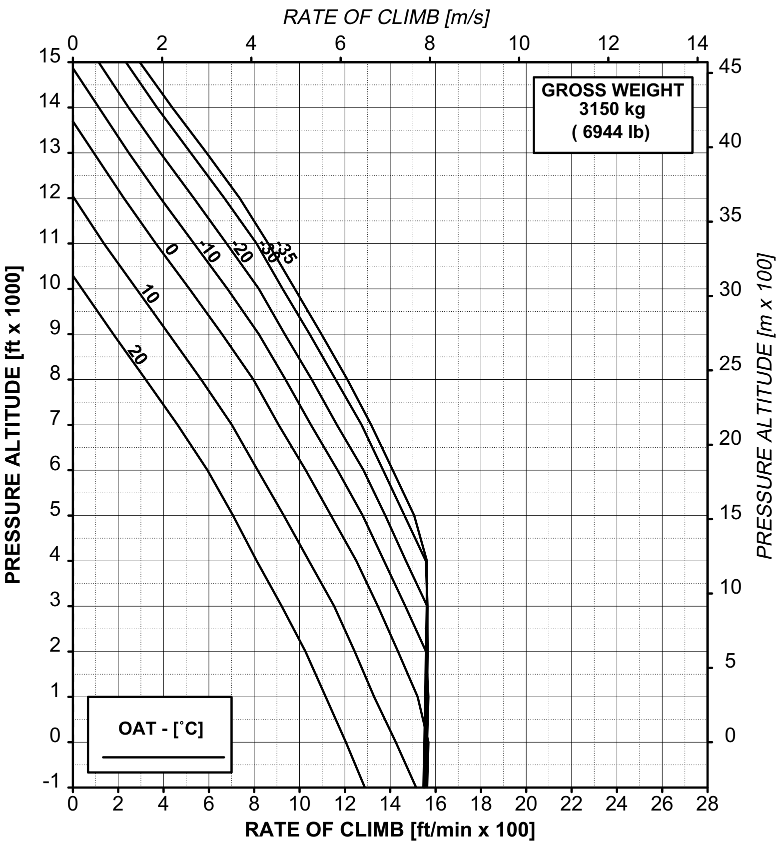

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Figure 4-11. Take-Off Power (TOP) (Heater On) - Gross Weight 3150 kg

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

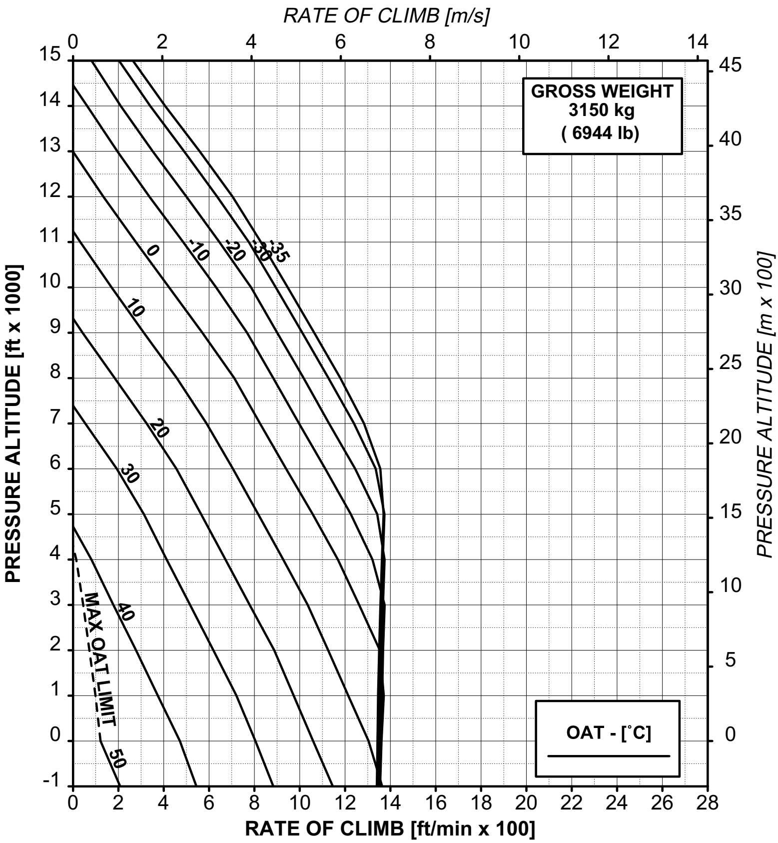

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Figure 4-12. Maximum Continuous Power (MCP) (Heater Off) - Gross Weight 3150 kg

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

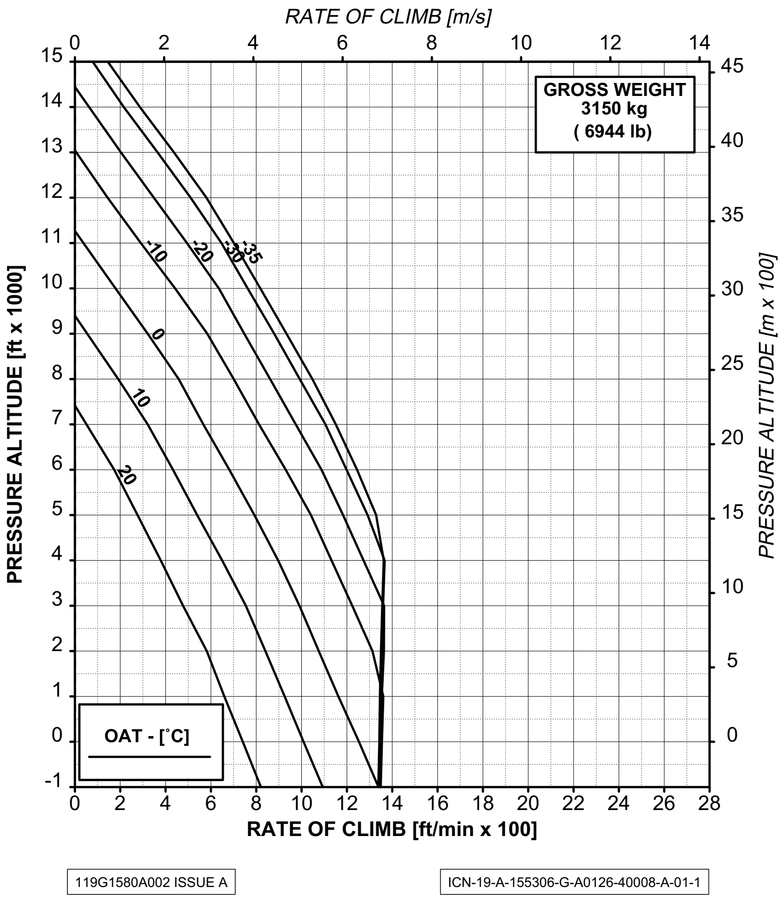


Figure 4-13. Maximum Continuous Power (MCP) - (Heater On) - Gross Weight 3150 kg

SECTION 6 - WEIGHT AND BALANCE

DATUM LINE LOCATIONS

Figure 6-1 presents the cargo hook station data to aid in weight and balance computations.

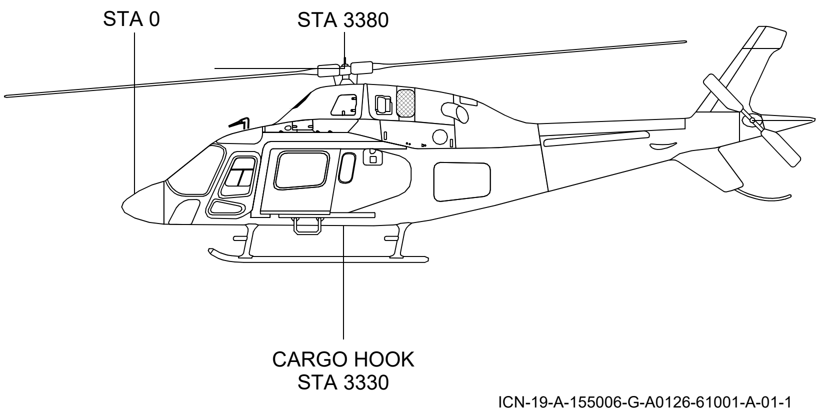
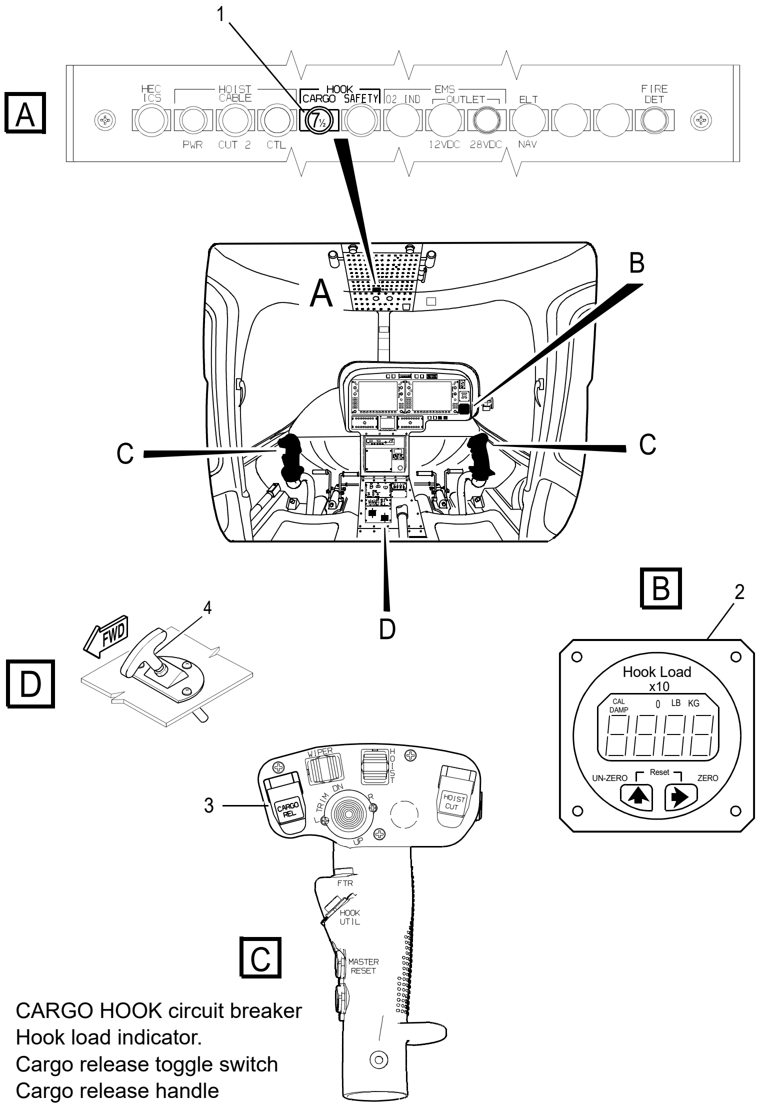


Figure 6-1. Cargo Hook Station Diagram

SECTION 7 - SYSTEM DESCRIPTION



1. CARGO HOOK circuit breaker
2. Hook load indicator.
3. Cargo release toggle switch
4. Cargo release handle

ICN-19-A-155006-G-A0126-01001-G-01-1

Figure 7-1. Cargo Hook Controls and Indicators

Approved with NDC 109G5020-001
dated 30 June 2016
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.

DUAL CARGO HOOK

Note

This Supplement must be used in conjunction with Supplement 6.

The Dual Cargo Hook installation 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 hooks, 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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REVISION 1: 21 DECEMBER 2018

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—	Issue 1	Approved with NDC 109G5020-001 dated 30 June 2016 under the authority of DOA ref EASA.21J.005
1	Revised pages Title page, A-1 and B-1. Applicable to G1000H: Revised pages 7 thru 9 of 22 11 of 22 and 17 of 22. Applicable to G1000H NXi: Revised pages 7 thru 9 of 22 11 of 22 and 17 of 22.	EASA Approval N° 10068178 dated 21 December 2018

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DUAL CARGO HOOK

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SECTION 1 - LIMITATIONS

DUAL CARGO HOOK OPERATION

Simultaneous operation with individual loads attached separately to the two hooks is prohibited.

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.

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

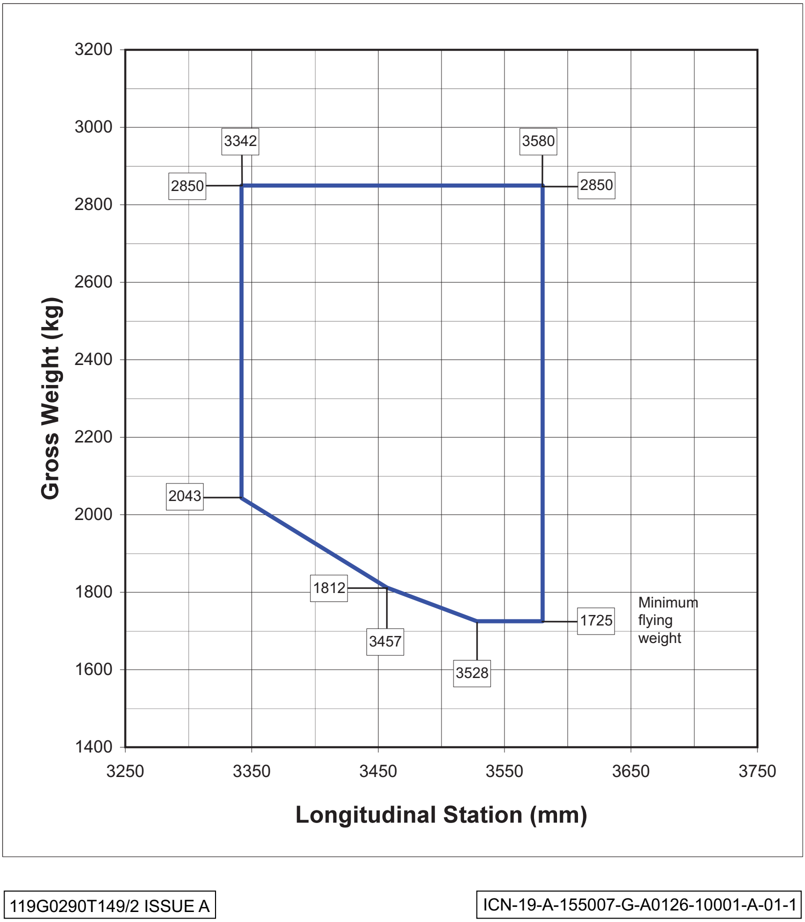
When the safety hook is used the load must be attached to cargo hook which is provided with a load indicator, and however must not exceed 500 Kg (1102 lb).

WARNING

Flight with unballasted sling as an external load is prohibited.

CENTER OF GRAVITY LIMITATIONS

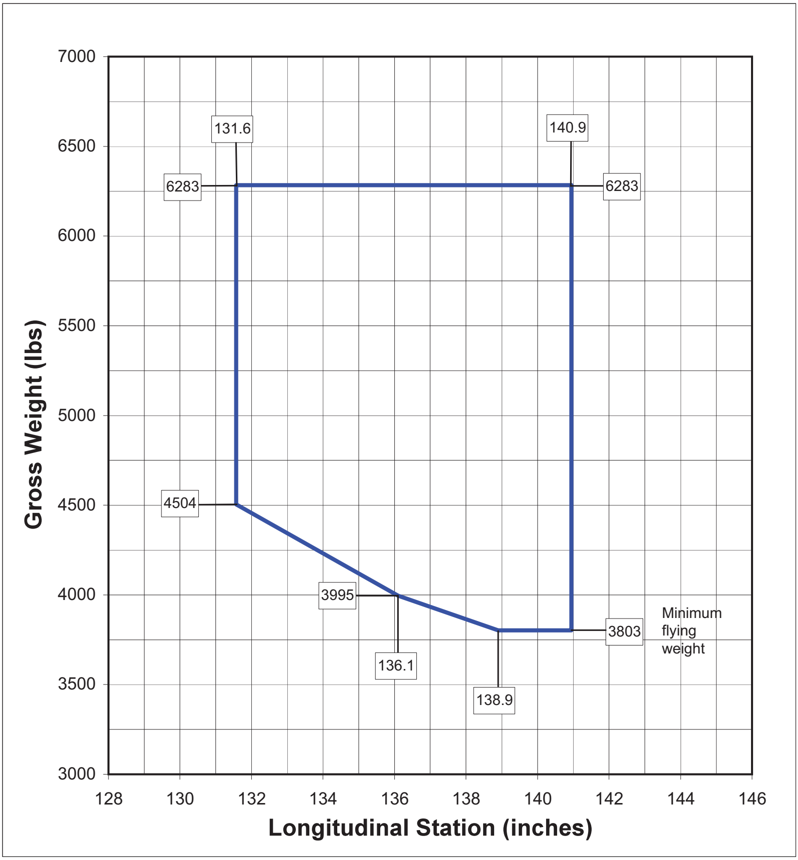
Refer to Figures 1-1 and 1-2 for Longitudinal CG limits and Figures 1-3 and 1-4 for Lateral CG limits when flying with external load attached to cargo hook.



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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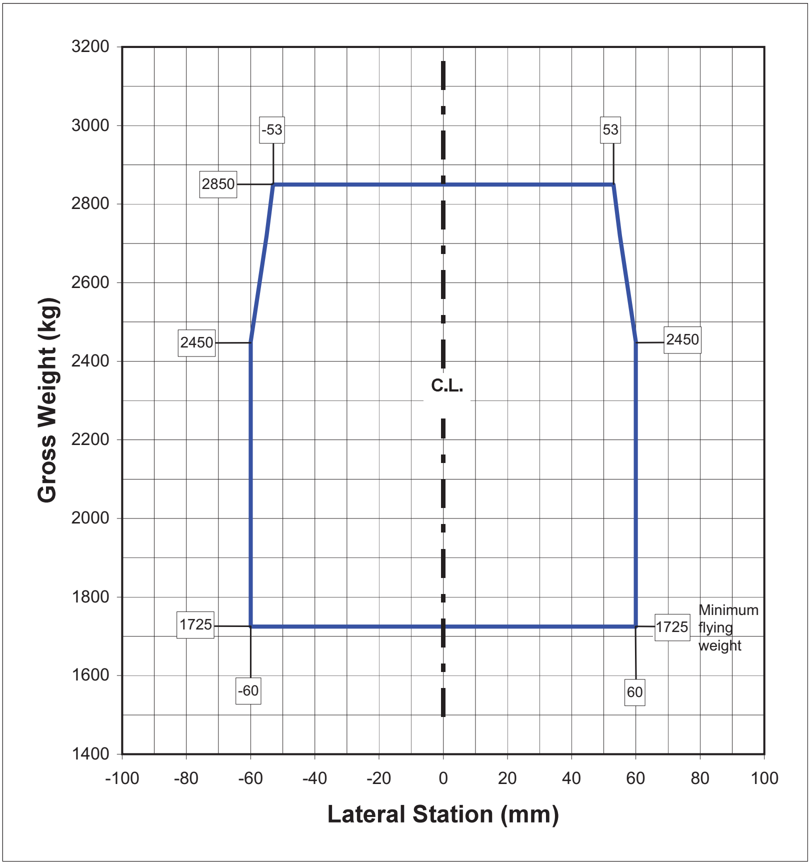
Note

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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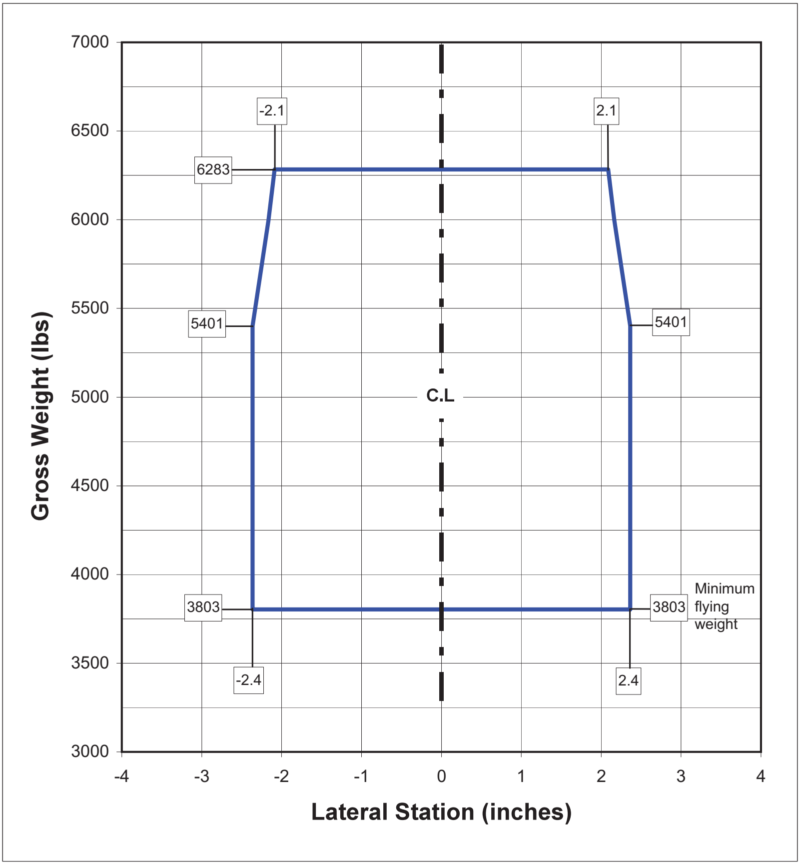
Note

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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ICN-19-A-155007-G-A0126-10004-A-01-1

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)

1. 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)

1. 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.

1. PFD : - Check that following caution messages are out:
   - CARGO HOOK ARM
   - CARGO HOOK OPEN
   - SFTY HOOK ARM
   - SFTY HOOK OPEN.

2. CARGO REL pushbutton (on pilot cyclic stick) : - Lift the guard to arm the release system.

   - PFD : - CARGO HOOK ARM and SFTY HOOK ARM caution messages displayed on CAS.

3. CARGO REL pushbutton (on pilot cyclic stick) : - Push, verify the opening of both cargo hooks.

   - PFD : - CARGO HOOK OPEN and SFTY HOOK OPEN caution messages displayed on CAS.

4. CARGO REL pushbutton (on pilot cyclic stick) : - Release, verify that both cargo hooks return to closed position.

   - PFD : - CARGO HOOK OPEN and SFTY HOOK OPEN caution messages out.

Note

CARGO REL 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.

5. CARGO REL pushbutton (on pilot cyclic stick) : - Lower the guard to protect the release pushbutton.

   - PFD : - CARGO HOOK ARM and SFTY HOOK ARM caution messages out.

6. Repeat hooks checks by using CARGO REL pushbutton on copilot cyclic stick (if installed).

7. Cargo Hook emergency handle (EMER CARGO RELEASE PULL)	:	- Pull to full travel, verify opening of the cargo hook.
- PFD	:	- CARGO HOOK OPEN caution message displayed on CAS.
8. Cargo Hook emergency handle (EMER CARGO RELEASE PULL)	:	- Release the handle, verify that the cargo hook returns to closed position and that the handle returns to full down position.
- PFD	:	- CARGO HOOK OPEN caution message out.
9. Safety Hook emergency handle (EMER CARGO RELEASE PULL)	:	- Pull to full travel, verify opening of the safety hook.
- PFD	:	- SFTY HOOK OPEN caution message displayed on CAS.
10. Safety Hook emergency handle (EMER CARGO RELEASE PULL)	:	- Release the handle, verify that the cargo hook returns to closed position and that the handle returns to full down position.
- PFD	:	- SFTY HOOK OPEN caution message out.

PILOT'S PRE-FLIGHT CHECK

(Every flight)

1. Cargo and safety hooks : - Condition and security.

SYSTEMS CHECK

1. 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 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 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

1. CARGO REL pushbutton (on cyclic stick) : - Lift the guard to arm the release system..

   - PFD : - CARGO HOOK ARM and SFTY HOOK ARM caution messages displayed on CAS.

2. 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.

3. CARGO REL pushbutton (on cyclic stick) : - Push to release cargo.

   - PFD : - CARGO HOOK OPEN and SFTY HOOK OPEN caution messages displayed on CAS.

Note

The load is released only when its weight overcomes the spring force of the hooks.

4. 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 REL 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.

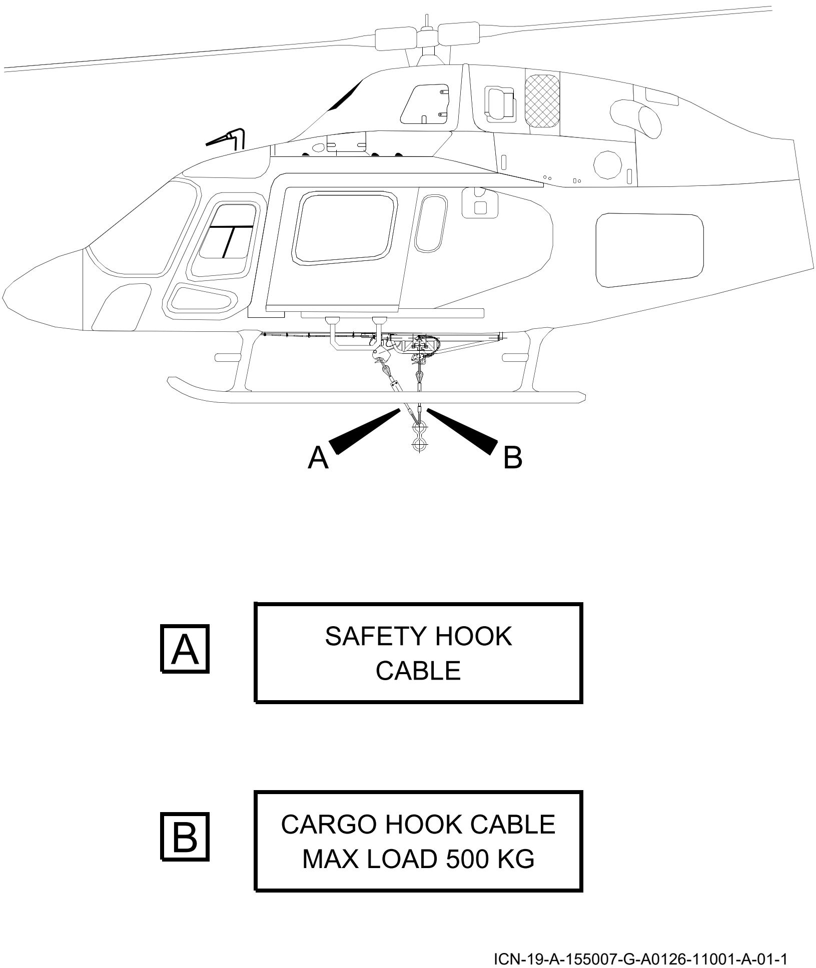


Figure 2-1. Placards and Correct Installation of the Cable P/N 109-0811-86-159

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

CAUTION SYSTEM

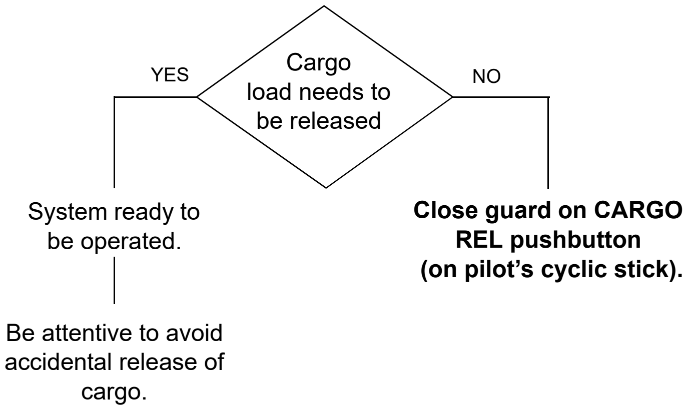
CAS CAUTION MESSAGES (YELLOW)

Panel wording	Page	Failure/System State
SFTY HOOK ARM	See Page 15	Safety hook release system armed.
SFTY HOOK OPEN	See Page 16	Safety hook release system (normal or emergency) in operation or safety hook jammed in open position.

SAFETY CARGO HOOK ARMED

SFTY HOOK ARM

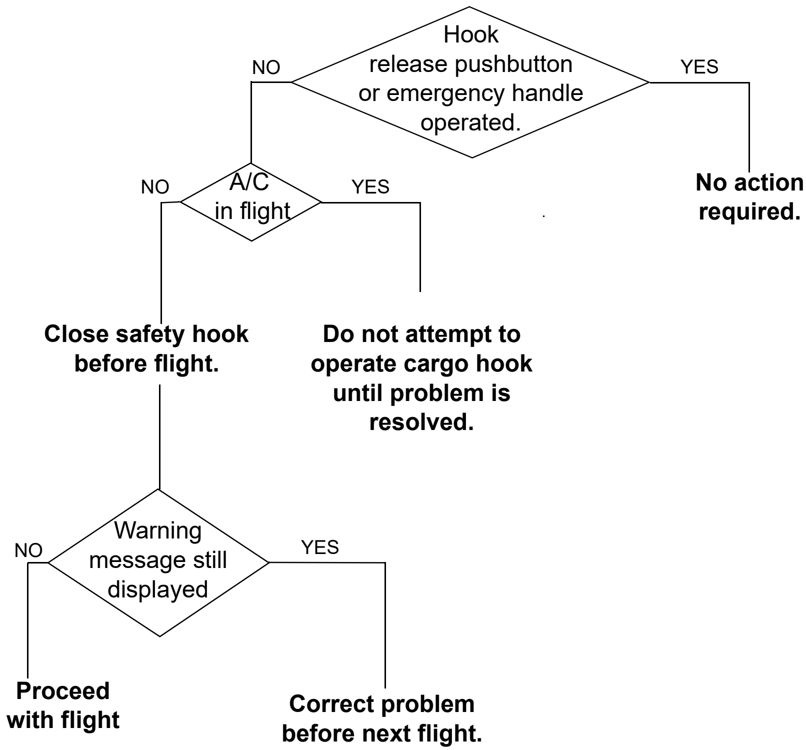
Safety cargo hook release system armed



SAFETY CARGO HOOK OPEN

SFTY HOOK OPEN

Safety cargo hook in open position



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 in sequence 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):

1. PFD : - CARGO HOOK OPEN caution message displayed temporarily on CAS.
2. HOOK load indicator : - Check for zero indication.
3. Rearview mirror : - Check for load suspended to safety hook.
4. 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:

1. PFD : - SFTY HOOK OPEN caution message displayed temporarily on CAS.
2. HOOK load indicator : - Check for positive load indication.
3. Rearview mirror : - Check for load suspended to safety hook.
4. 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.

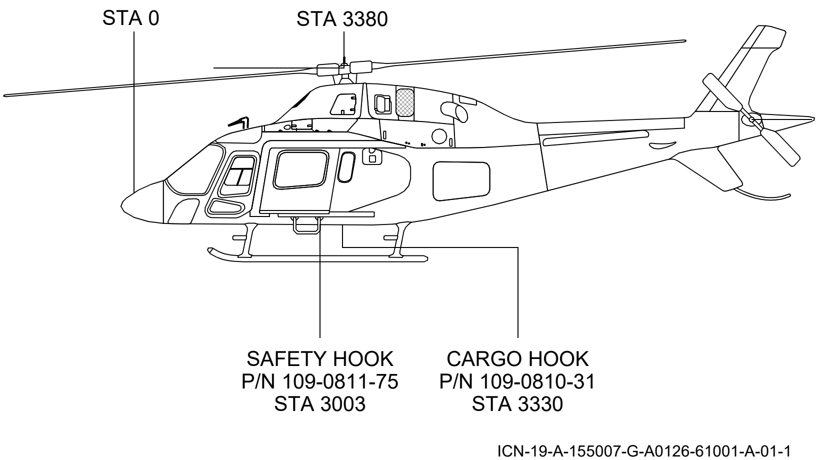


Figure 6-1. Cargo Hook and Safety Hook Stations Diagram

SECTION 7 - SYSTEM DESCRIPTION

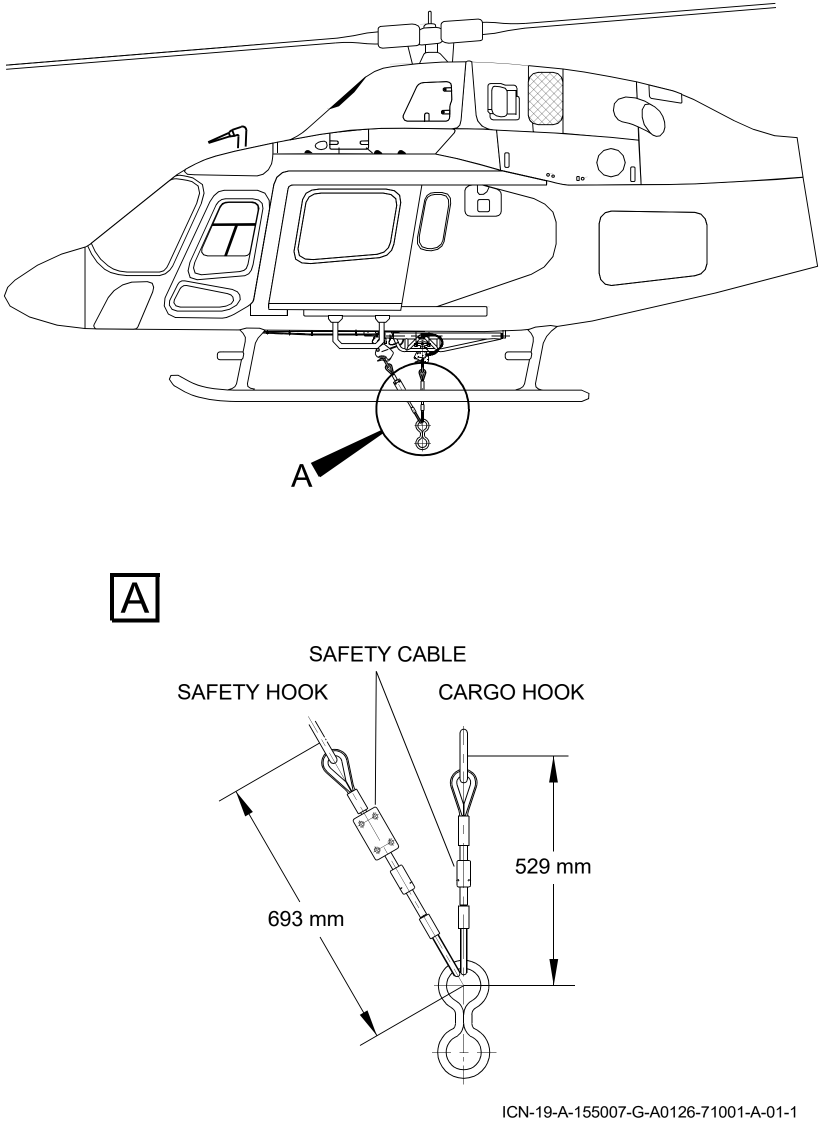
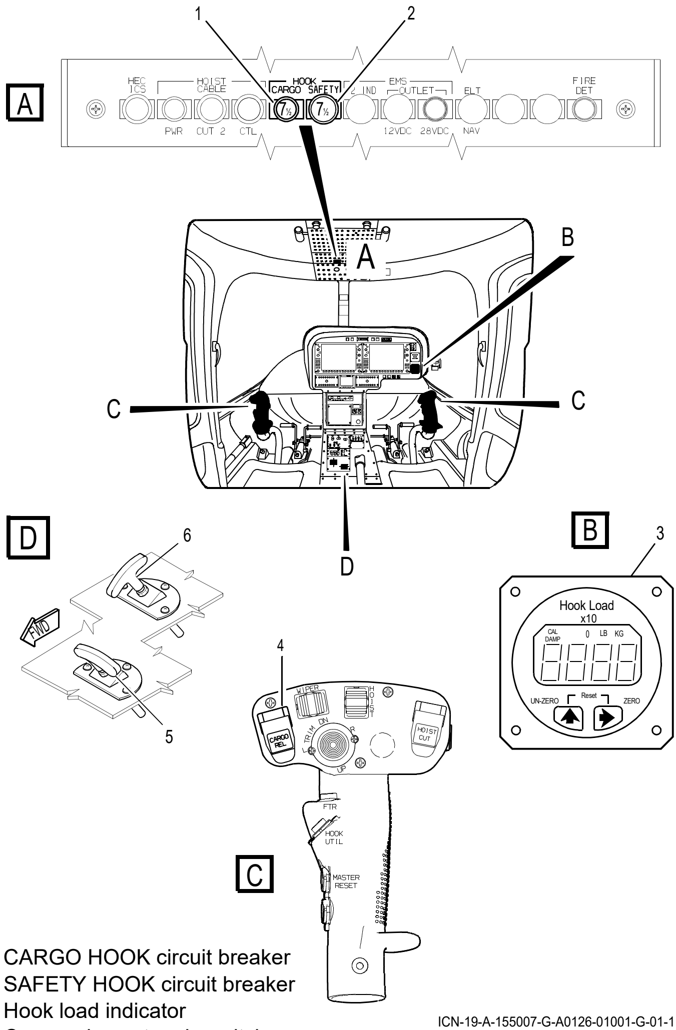


Figure 7-1. External Load Rigging



1. CARGO HOOK circuit breaker
2. SAFETY HOOK circuit breaker
3. Hook load indicator
4. Cargo release toggle switch
5. Safety Hook release handle
6. Cargo Hook release handle

Figure 7-2. Dual Cargo Hook Controls and Indicators

EASA Approvals N° 10054263, 10054264
dated 30 July 2015

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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DUAL CONTROLS

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SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

SECTION 1 - LIMITATIONS

FLIGHT CREW

The left crew seat may be used for an additional pilot.

MISCELLANEOUS LIMITATIONS

- Cargo Hook operations prohibited from the left crew seat.
- External Hoist operations prohibited from the left crew seat.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N° 7 (Cabin interior)

1. 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.

STARTING PROCEDURE

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.

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.

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.

ENGINE MALFUNCTIONS

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.

MALFUNCTION OF THE FUEL CONTROL SYSTEM

Note

The copilot engine throttle on collective lever is not provided with the MAN/NOR selector switch.

ELECTRONIC ENGINE CONTROL (EEC) MALFUNCTIONS

Note

The copilot collective switch box is not provided with the EEC/MEC switch.

SECTION 4 - PERFORMANCE DATA

No change.

EASA Approvals N° 10054263, 10054264
dated 30 July 2015

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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SUPPLEMENTARY FUEL TANKS

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SECTION 1 - LIMITATIONS

CENTER OF GRAVITY LIMITATIONS

Note

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

SECTION 2 - NORMAL PROCEDURES

STARTING PROCEDURE

ENGINE START

1. PFD/MFD : - 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

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 (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

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

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 (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

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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EASA Approvals N° 10054263, 10054264
dated 30 July 2015

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.

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 CAS while any malfunction of the warning system is indicated by the activation of the ROTOR BRK caution message on CAS.

ISSUE 1: **30 JULY 2015**
REVISION 1: **11 NOVEMBER 2025**

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ROTOR BRAKE

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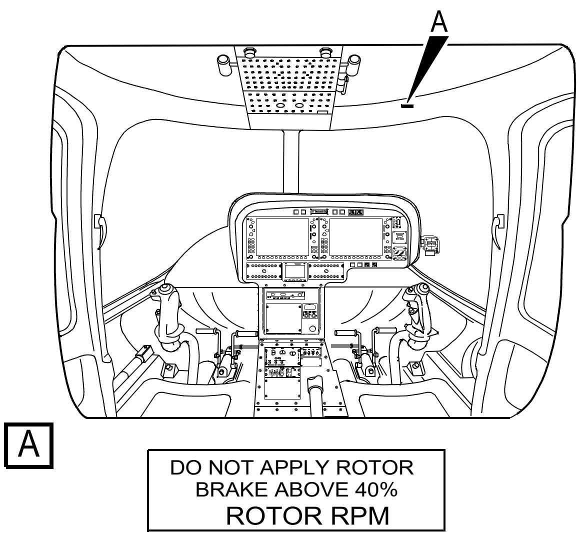
SECTION 1 - LIMITATIONS

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-A0126-01001-G-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)

1. Rotor brake pump, flexible hose, calliper : - Check for condition and leaks.
2. 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)

1. 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

1. Rotor brake lever	: - Move from OFF to ON. Check for freedom of movement.
- PFD	: - RTR BRK ON warning message displayed on CAS.
2. Rotor brake lever	: - Select OFF, check locked.
- PFD	: - RTR BRK ON warning message out.

Note

The ROTOR BRK caution message can be temporarily displayed on CAS during the rotor brake lever travel.

STARTING PROCEDURE

ENGINE START

CAUTION

The rotor brake must be disengaged before starting.

SHUTDOWN

1. Rotor brake lever : - ON and locked below 40% rotor RPM.

   - PFD : - RTR BRK ON warning message displayed on CAS.

CAUTION

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

1. Rotor brake lever : - OFF and locked.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

WARNING SYSTEM

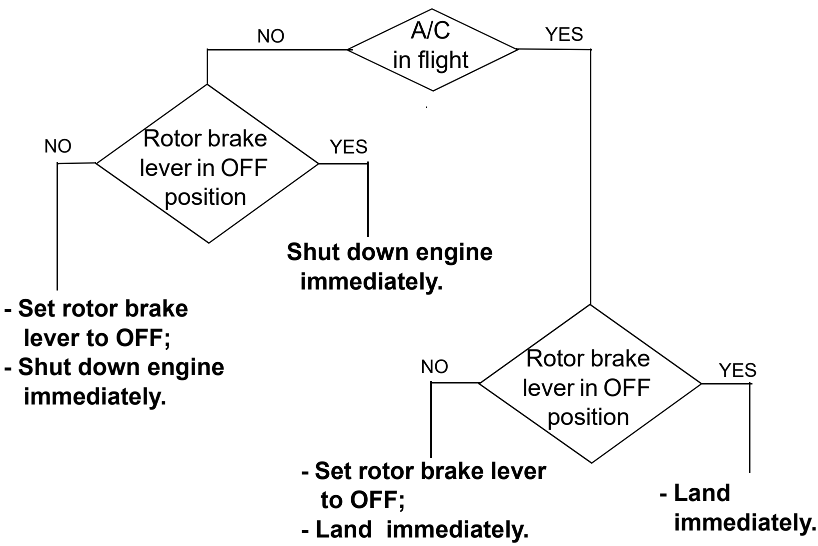
CAS WARNING MESSAGES (RED)

CAS Caption	Page	Failure/System State
RTR BRK ON	See page 5	Rotor brake in operation

ROTOR BRAKE ON

ROTOR BRK ON

Rotor brake system in operation.



CAUTION SYSTEM

CAS CAUTION MESSAGES (YELLOW)

CAS Caption	Page	Failure/System State
ROTOR BRK	6	Rotor brake warning system degraded

ROTOR BRAKE WARNING SYSTEM DEGRADED

ROTOR BRK

Rotor brake warning system degraded

- Proceed with flight;
- Do not operate the rotor brake;
- Correct problem before next flight.

SECTION 4 - PERFORMANCE DATA

No change.

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EASA Approvals N° 10054263, 10054264
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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.

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.
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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.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

AREA N°7 (Cabin interior)

1. E.M.T. interior	: - Check for condition.
2. Cabin seats and litter	: - Check for condition and straps fastened if unoccupied.

PILOT PRE-FLIGHT CHECK

(Every flight)

1. E.M.T. interior	: - Check for condition.
2. Cabin seats and litter	: - Check for condition and straps fastened if unoccupied.

LITTER OPERATIONS

LITTER LOADING

1. Secure patient to the litter using the three straps provided.
2. Unlock and lower the back of the central aft seat.
3. Load the litter from the left door.
4. Secure litter to the inboard locks.
5. Raise the back of the central aft seat and lock.

LITTER UNLOADING

1. Unlock and lower the back of the central aft seat.
2. Unlock the litter from the locks.
3. 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

WEIGHTS - ARMS AND MOMENTS

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

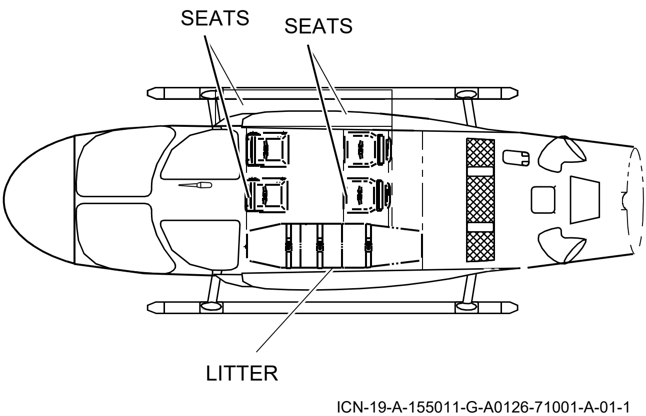

Figure 7-1. E.M.T. Interior Arrangement

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Approved with NDC-109G2590-002
dated 23 May 2019
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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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

he 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).

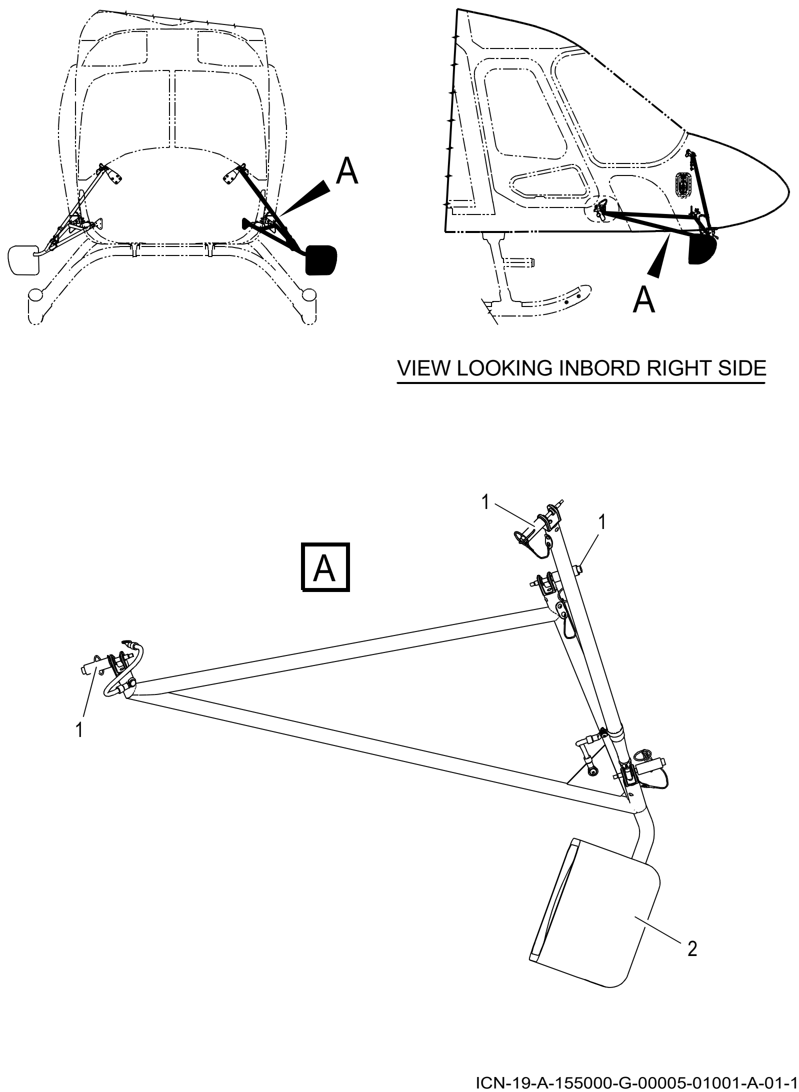

Figure 7-1. Rearview Mirrors Installation

EASA Approvals N° 10054263, 10054264
dated 30 July 2015

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 3 - EMERGENCY AND MALFUNCTION PROCEDURES

CAUTION SYSTEM

CAS CAUTION MESSAGES (YELLOW)

CAS Caption	Page	Failure/System State
ENG RGB CHIPS	3	Presence of metal particles in engine reduction gearbox oil..
XMSN OIL CHIPS	4	Presence of metal particles in main transmission oil
T/R BOX CHIPS	5	Presence of metal particles in tail rotor gearbox oil.

ENGINE REDUCTION GEARBOX OIL CHIPS

ENG RGB CHIPS

Presence of metal particles in engine reduction gearbox oil.

Activate CHIP BURNER switch momentarily and release.

caution message extinguishes

NO

Collective: lower to reduce power.

Land as soon as possible.

Correct problem before next flight.

YES

Continue flight.

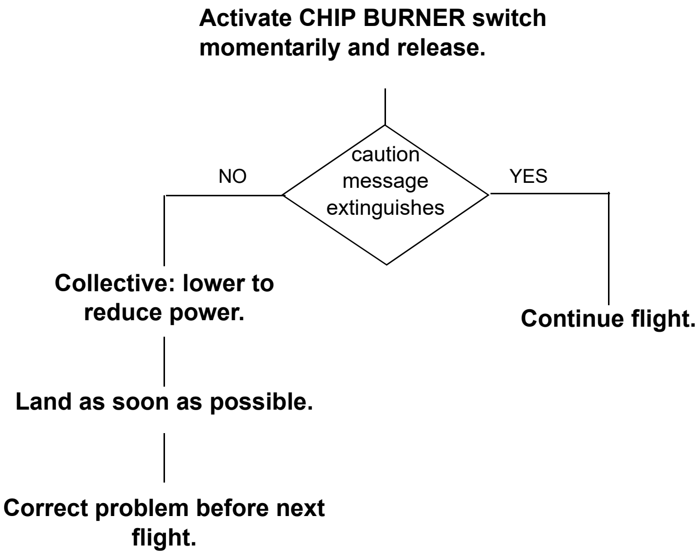
Note

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

MAIN TRANSMISSION OIL CHIPS

XMSN OIL CHIPS

Presence of metal particles in main transmission oil.



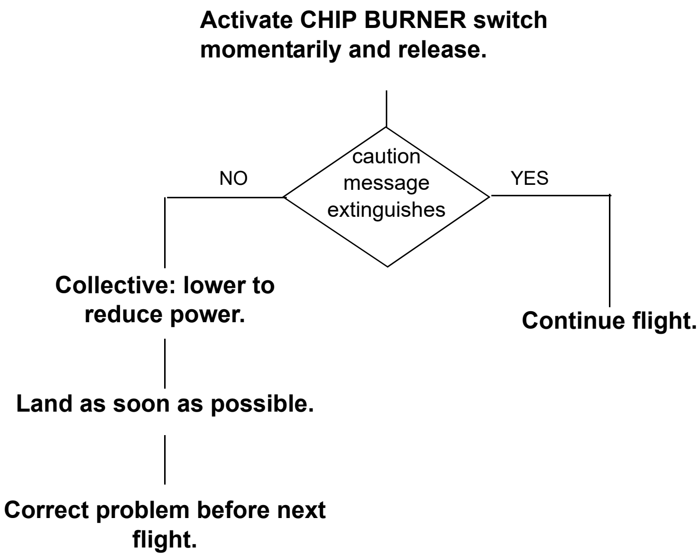
Note

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

TAIL ROTOR GEARBOX OIL CHIPS

T/R BOX CHIPS

Presence of metal particles in tail rotor gearbox oil.



Note

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

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.

CAUTION

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 Approvals N° 10054263, 10054264
dated 30 July 2015

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.

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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)

1. Operator's seat	: - Check swivel mechanism for correct operation.
	: - Seat locked in forward facing position.
	: - Safety belts fastened.

BEFORE TAKE-OFF

1. 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.

IN FLIGHT

1. Operator's seat	: - Swivelled and locked as desired.

APPROACH AND LANDING

1. 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

1. 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 suplement.

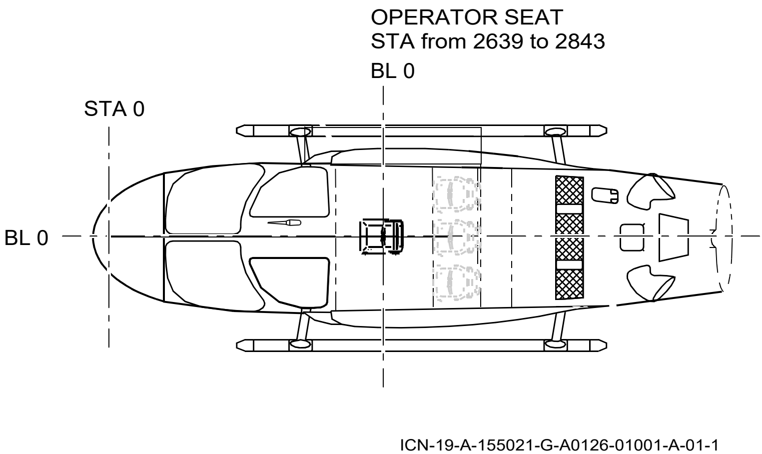

Figure 6-1 Helicopter Stations Diagram - Operator Seat

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.

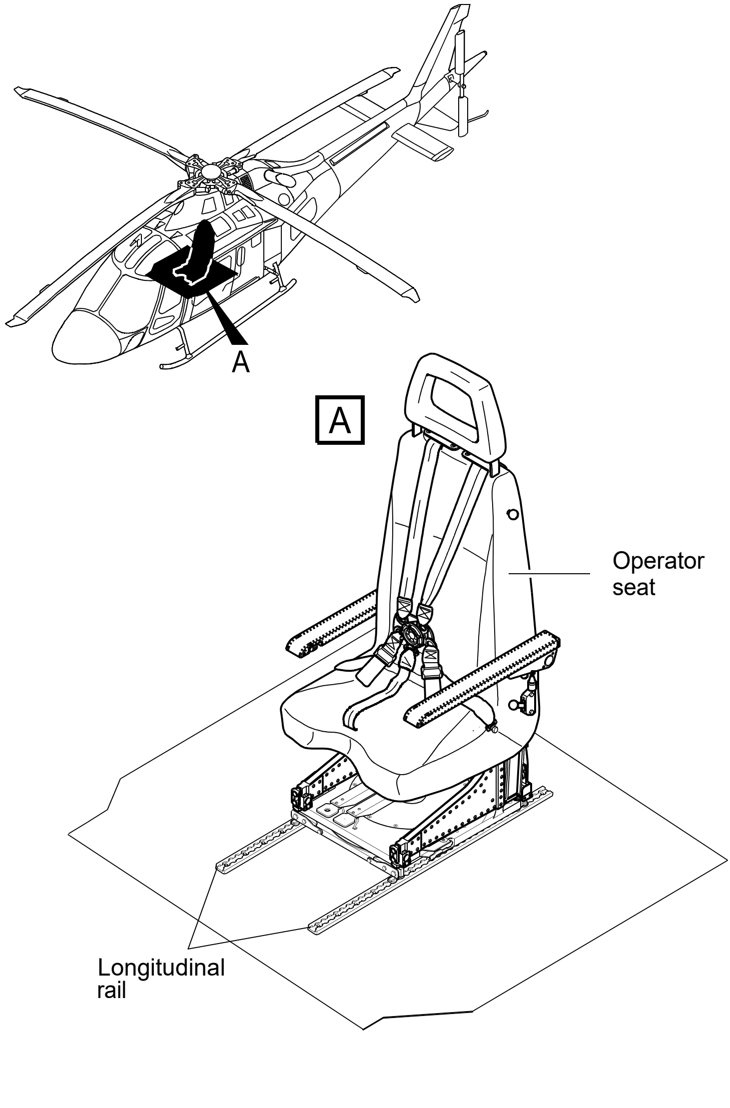

Figure 7-1. Operator Seat - Component Location

EASA Approval N° 10063634
dated 06 November 2017

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.

OPERATING ENVELOPE EXTENSION

The content of this supplement (related to kit P/N 109G0200F01-101) includes the information to be complied with for operating the AW119MKII helicopter with G1000H and G1000H NXi kit in the extended flight envelope of:

— maximum altitude (up to the lesser of 24000 ft pressure altitude or 25000 ft density altitude;

— minimum ambient temperature down to -35 °C OAT.

Information for sling load operations with Cargo Hook kit and Dual Cargo Hook kit up to a density altitude of 20000 ft are also included.

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REVISION 3: 11 NOVEMBER 2025

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1	Revised pages Title page, A-1, B-1 and 7 of 58. <u>Applicable to G1000H:</u> Revised page 1 of 58. <u>Applicable to G1000H NXi:</u> Revised page 1 of 58	EASA Approval N° 10068178 dated 21 December 2018
2	Revised pages Title page, A-1, B-1, iv, v and 31 thru 54 of 58. <u>Applicable to G1000H:</u> Revised pages i, iii, 7 and 8 of 58. <u>Applicable to G1000H NXi:</u> Revised pages i, iii, 7 and 8 of 58. Added pages 8A and 8B of 58.	EASA Approval N° 10075564 dated 3 February 2021
3	Revised pages Title page, A-1, B-1, 17 of 58 and 18 of 58	Manufacturer's data

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1 of 58	1 G1000H
1 of 58	1 G1000H NXi
2 thru 6 of 58	0
7 and 8 of 58	2 G1000H
7, 8, 8A and 8B of 58	2 G1000H NXi
9 thru 16 of 58	0
17 and 18 of 58	3
19 thru 30 of 58	0
31 thru 54 of 58	2
55 and 56 of 58	0
PART II — MANUFACTURER'S DATA	
57 and 58 of 58	0

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OPERATING ENVELOPE EXTENSION

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SECTION 1 - LIMITATIONS

TYPES OF OPERATION

Operation above 15000 ft Pressure Altitude, with ambient temperatures down to -35 °C, is approved for day and night VFR non-icing conditions, provided that the following equipments are installed:

— Bleed Air Heater P/N 109-0811-60;

— 28 Ah Marathon battery (P/N 31995-002);

— Vne placard P/N 109-0740L18-129.

The PFD SW must be implemented through the SW Loader Card P/N 010-12160-05.

AIRSPEED LIMITATIONS (IAS)

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

AIRSPEED LIMITATIONS (IAS) FOR SLING LOAD OPERATIONS

V_{NE} with external loads attached to cargo hook:

Above 5000 ft Hp and up to
the lesser of 20000 ft Hp or Hd ....: Decrease 3 kts every 1000 ft from 100 KIAS.

ALTITUDE LIMITATIONS

Maximum operating altitude .... :The lesser of 24000 ft (7315 m) Hp or 25000 ft (7620 m) Hd.

See Figure 1-2.

ALTITUDE LIMITATIONS FOR SLING LOAD OPERATIONS

Maximum operating altitude .... :The lesser of 20000 ft (6096 m) Hp or Hd.

AMBIENT AIR TEMPERATURE LIMITATIONS

Minimum ambient air temperature ....: -35 °C (-31 °F)

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

The maximum ambient air temperature for operation decreases with pressure altitude at the standard lapse rate of 2 °C (3.6 °F) every 1000 ft Hp (305 m) up to the lesser of 24000 ft (7315 m) Hp or 25000 ft (7620 m) Hd.

COLD WEATHER OPERATIONS

During prolonged helicopter inactivity, the battery must be stored in a place with temperature above -10 °C. Engine starting with a cold, fully charged battery was demonstrated down to an OAT of -10 °C.

Helicopter exposure to OAT below -25 °C with engine off is limited to the time strictly needed to recover the helicopter in a place with temperature above -25 °C or to make the helicopter ready for takeoff.

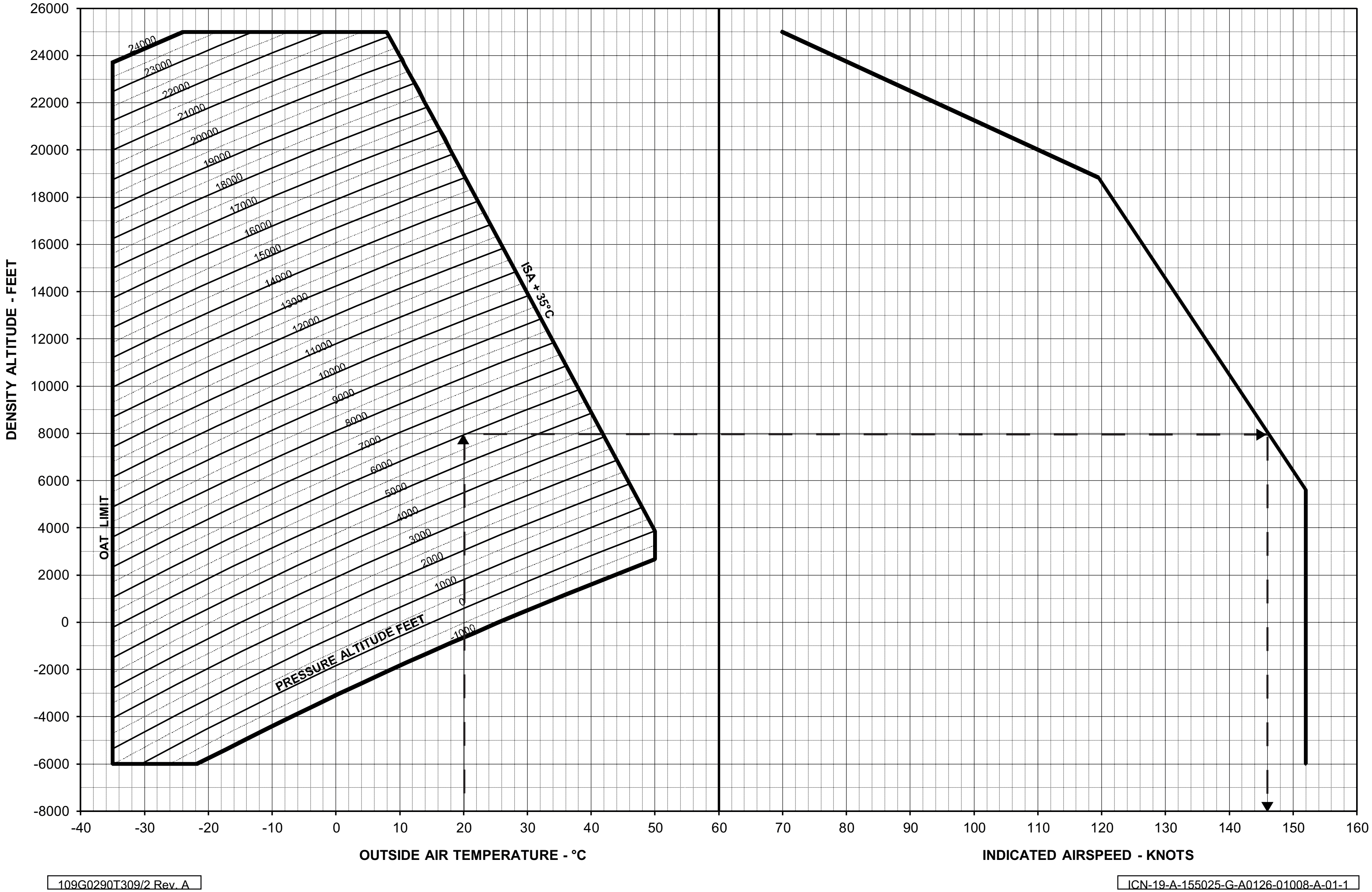

Figure 1-1. Airspeed Limitation - V_{NE} (power on/off)

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FLIGHT ENVELOPE

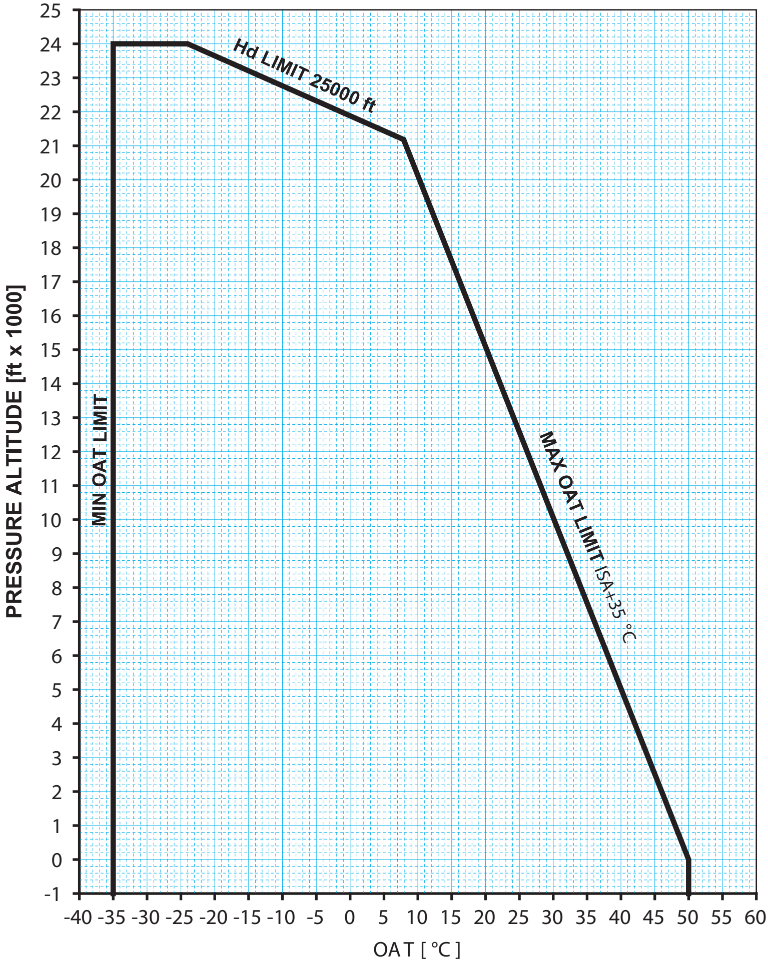

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Figure 1-2. Pressure Altitude / OAT Envelope

GENERATOR LOAD LIMITATIONS

Above 15000 ft Hp:

Continuous operation ....: 0 to 100 A

Maximum...: 100 A

ENGINE STARTING LIMITATIONS

Maximum altitude for engine restart in flight .... : 20000 ft Hp

Note

Refer to ENGINE RESTART IN FLIGHT procedure in Section 3 of the basic RFM.

MISCELLANEOUS LIMITATIONS

MANEUVER LIMITATION

Maximum angle of bank in turn - Power on flight

Above 20000 ft Hd ....: 20 degrees

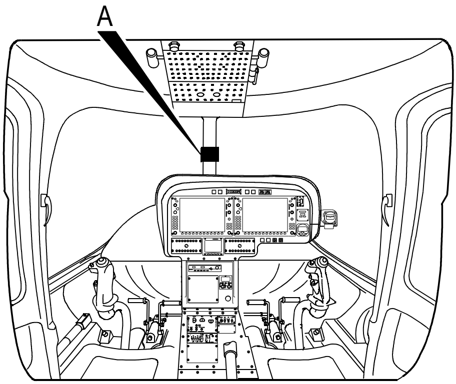
Maximum angle of bank in turn - Autorotation

Above 20000 ft Hd ....: 10 degrees

Maximum angle of bank in turn for cargo hook operation - Power on flight

From 15000 ft up to 20000 ft Hd ....: 20 degrees

PLACARD



A

Vne AIRSPEED LIMITATIONS - KIAS										
OAT °C / Hp-ft	-35	-25	-20	-10	0	10	20	30	40	50
-1000	152	152	152	152	152	152	152	152	152	152
0	152	152	152	152	152	152	152	152	152	152
2000	152	152	152	152	152	152	152	152	152	150
4000	152	152	152	152	152	152	152	150	147	144
6000	152	152	152	152	152	149	146	143	141	—
8000	152	152	152	149	146	143	140	138	135	—
10000	151	147	146	143	140	137	134	131	129	—
12000	144	140	139	136	133	131	128	126	—	—
14000	138	135	133	130	127	125	122	120	—	—
16000	132	129	127	124	122	118	110	—	—	—
18000	126	122	121	116	107	99	91	—	—	—
20000	119	110	105	96	88	80	72	—	—	—
22000	100	91	86	77	69	61	—	—	—	—
24000	80	71	67	58	—	—	—	—	—	—
ESIS: REDUCE Vne BY 5 KTS										

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Figure 1-3. V_{NE} limitation placard

SECTION 2 - NORMAL PROCEDURES

STARTING PROCEDURE

1. Collective control : - Flat pitch, check.

ENGINE START

1. PFD/MFD : - Wait for warm-up period until the information on the displays are clearly readable.

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

For ambient temperatures below -25 °C allow 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.

IN FLIGHT

HIGH POWER CONDITION

During flight at high altitude, engine limits should be approched slowly and incrementally. Any rapid power increase must be avoided when close to the engine Take Off Power limitations.

CAUTION

When approaching high power conditions, in proximity of the engine limits (ITT, NG, TRQ), extreme care should be exercised. After the collective is stopped, power may continue to build-up, potentially resulting in an exceedance.

AUTOROTATION

CAUTION

During autorotation entry, extreme care should be taken to avoid exceeding Power Turbine Speed (N2) limitations.

CAUTION

During recovery from autorotation, extreme care should be taken to let Gas Generator Speed (N1) to spool-up, while also controlling N2 to remain within limitations, before recovering to fully powered flight.

FLIGHT HANDLING CHARACTERISTICS

AUTOROTATIVE DESCENT

Adequate control of rotor speed (NR) has been demonstrated during autorotations up to the maximum flight altitude. Considering the increased rotor speed sensibility to maneuvers in autorotation at very high altitude and the greater workload required to manage the engine limitations, a sufficient margin of controllability and adequate rate of descent is guaranteed, with lower piloting workload, respecting the following rotor speeds:

Rotor Speed (NR) management in Autorotation

Minimum...: 95%

Continuous operation ....: 95 to 105%

Maximum...: 105%

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

AUTOROTATIVE LANDING

The following procedure provides the information required to carry out a safe autorotative landing, with different parameters depending on the helicopter weight and the altitude where the maneuver is executed.

Airspeed: Trim the aircraft in autorotation with airspeed
- 65 KIAS above 15000 ft Hp
and a rotor speed of
- 101 to 103 % NR (-1800 to -2000 ft/min vertical speed).

Cyclic: initiate a flare at approximately
- 120 ft AGL (above 15000 ft Hp)
applying the cyclic at approximately 5 to 7 deg/s pitch rate , to a maximum of 25 to 30 deg nose-up pitch attitude.

Cyclic: hold the flare to reduce the rate of descent (500±100 ft/min) and the forward speed (30±10 KIAS).

Collective pitch: adjust as required to maintain NR as high as possible (maximum 110%) during the flare.

Cyclic: at approximately 20 to 30 ft AGL, forward to obtain a near level attitude (landing skid parallel to ground).

Continued Next Page

Continuation from previous page

Collective: as the helicopter settles, at approximately 4 ft AGL, apply as required to cushion touchdown with:
- **less than 50 kts ground speed (as required by surface characteristics and conditions), and**
- **less than 400 ft/min vertical speed.**

Collective pitch: continue application to cushion the touchdown.

Pedals: maintain direction.

Note

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

Shutdown: execute the "**EMERGENCY/POST CRASH SHUTDOWN AND EGRESS**" procedure.

SECTION 4 - PERFORMANCE DATA

POWER ASSURANCE CHECK

The Power Assurance Check chart indicates 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. The heading in the chart contains the procedure to be followed during the power assurance check.

Only a hover check procedure is provided, for high altitude operations, to permit periodic in-flight monitoring of engine performance.

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 recording 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 755°C ITT OR 100.1% N1 OR 100% TQ
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 ENGINE EXCEEDS ALLOWABLE ITT OR N1, PUBLISHED PERFORMANCE MAY NOT BE ACHIEVABLE. REFER TO EMM
NOTE: TORQUE SHOULD BE PREFERABLY SET ABOVE 70% OF ENGINE TORQUE FOR REPEATIBILITY OF TEST

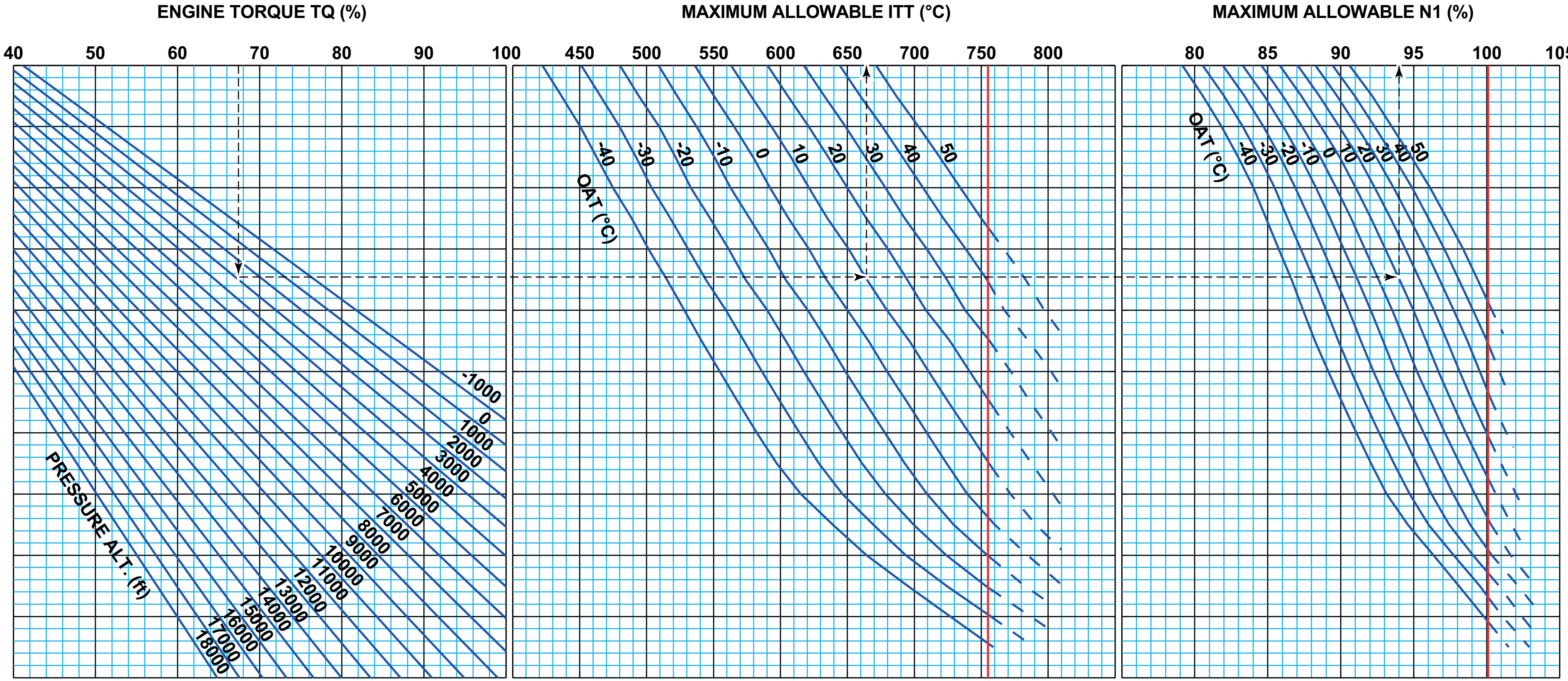

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Figure 4-1. Power Assurance Check - Hover

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OPERATION VS ALLOWABLE WIND

Note

Forward flight performance during sling operations 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.

Satisfactory stability and control was demonstrated in IGE condition for sideways and rearward flight up to the maximum Gross Weight defined in the WAT diagram (Figure 4-2, sheet 2 of 2), in the Wind/ Ground Speed azimuth envelope defined by the following diagram:

— (Chart D - Figure 4-2 sheet 1 of 2), valid from 13200 to 16750 ft density altitude for IGE controllability.

Note

For Chart A and Chart B refer to Section 4 of the basic RFM.

Note

Chart D of Figure 4-2 (sheet 1 of 2 in this supplement) replaces Chart C of Figure 4-8 (sheet 3 of 4) in Section 4 of the basic RFM.

Note

Before using Chart A or B in Section 4 of the basic RFM, or Chart D of this paragraph, the appropriate helicopter maximum gross weight for Hover (IGE/OGE) must be determined using the pertinent Hover performance charts.

EXAMPLES

Refer to Section 4 of the basic RFM for examples of gross weight determination at which a specific controllability is guaranteed.

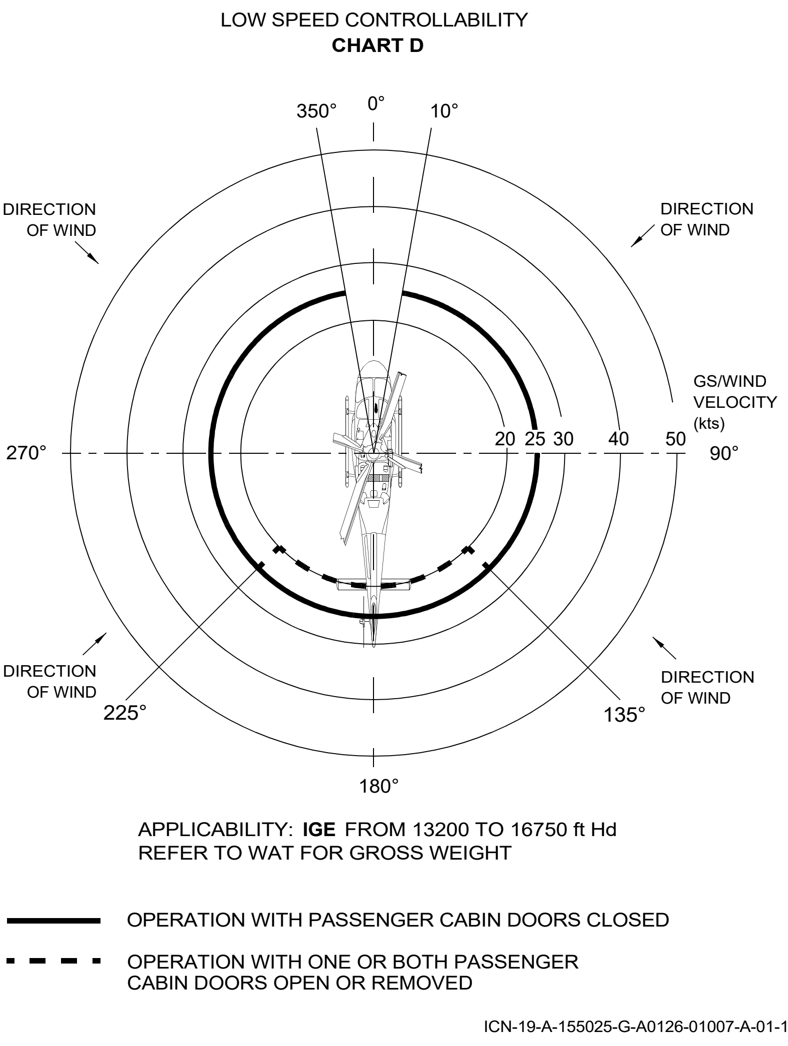
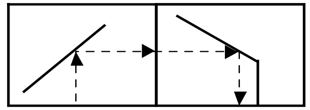


Figure 4-2. Wind/Ground Speed Azimuth Envelope (sheet 1 of 2)



WEIGHT-ALTITUDE-TEMPERATURE DIAGRAM FOR LOW SPEED CONTROLLABILITY IGE-OGE

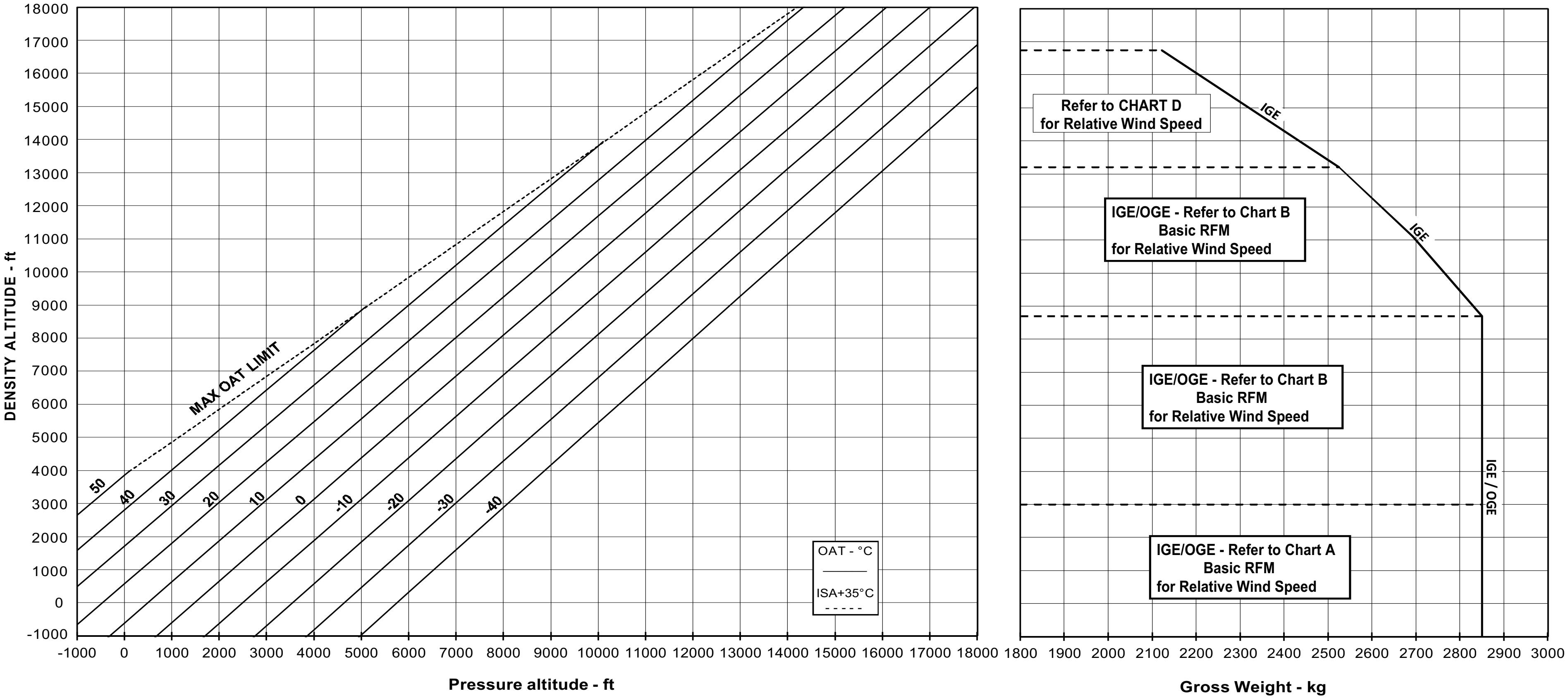


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Figure 4-2. WAT diagram (sheet 2 of 2)

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HOVER CEILING

(Figures 4-3 thru 4-10)

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.

Note

Below 15000 ft, with electrical load in excess of 100 A refer to correction Table 4-1 in Section 4 of basic RFM.

Note

The hovering out of ground effect charts also apply to sling load operations.

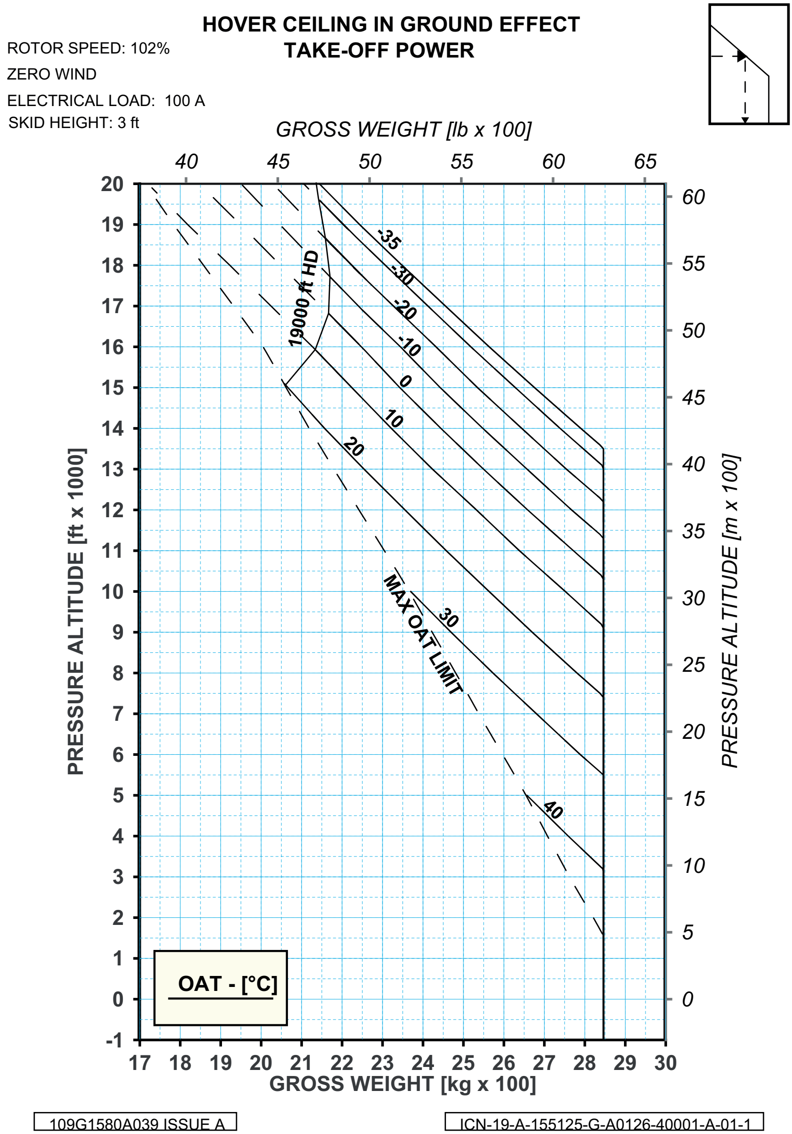


Figure 4-3. In Ground Effect (IGE) - Take-Off Power (TOP) (Heater Off)

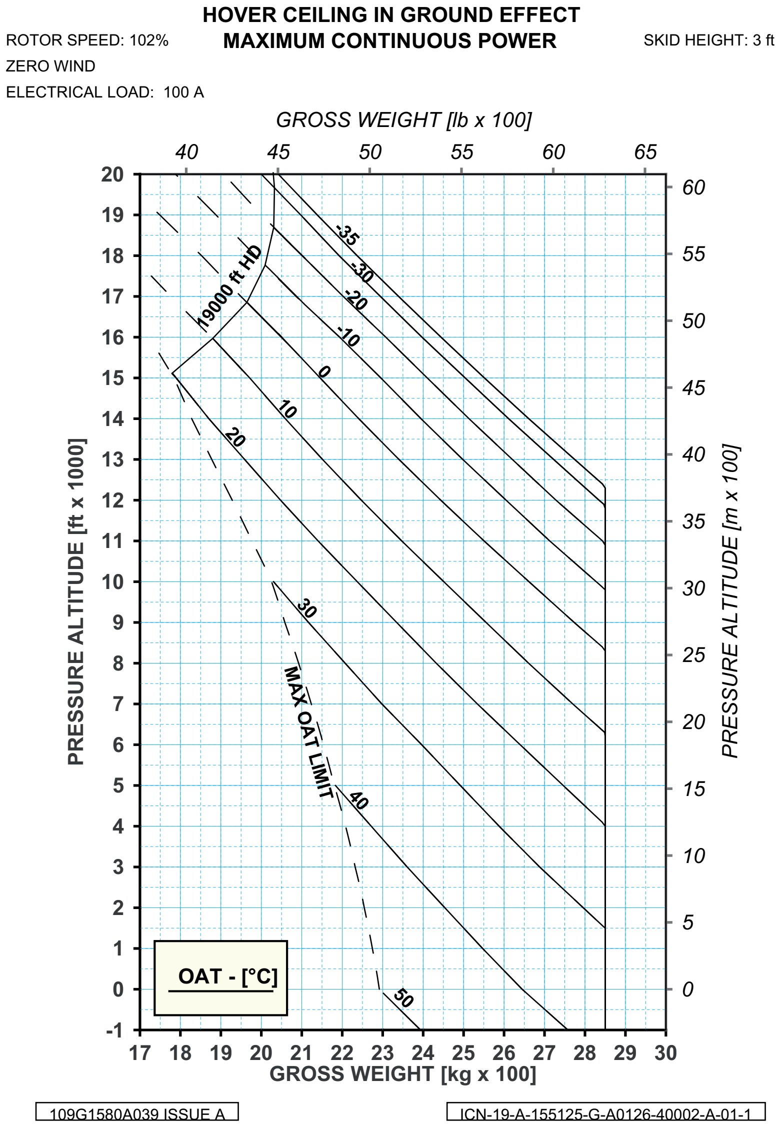


Figure 4-4. In Ground Effect (IGE) - Maximum Continuous Power (MCP) (Heater Off)

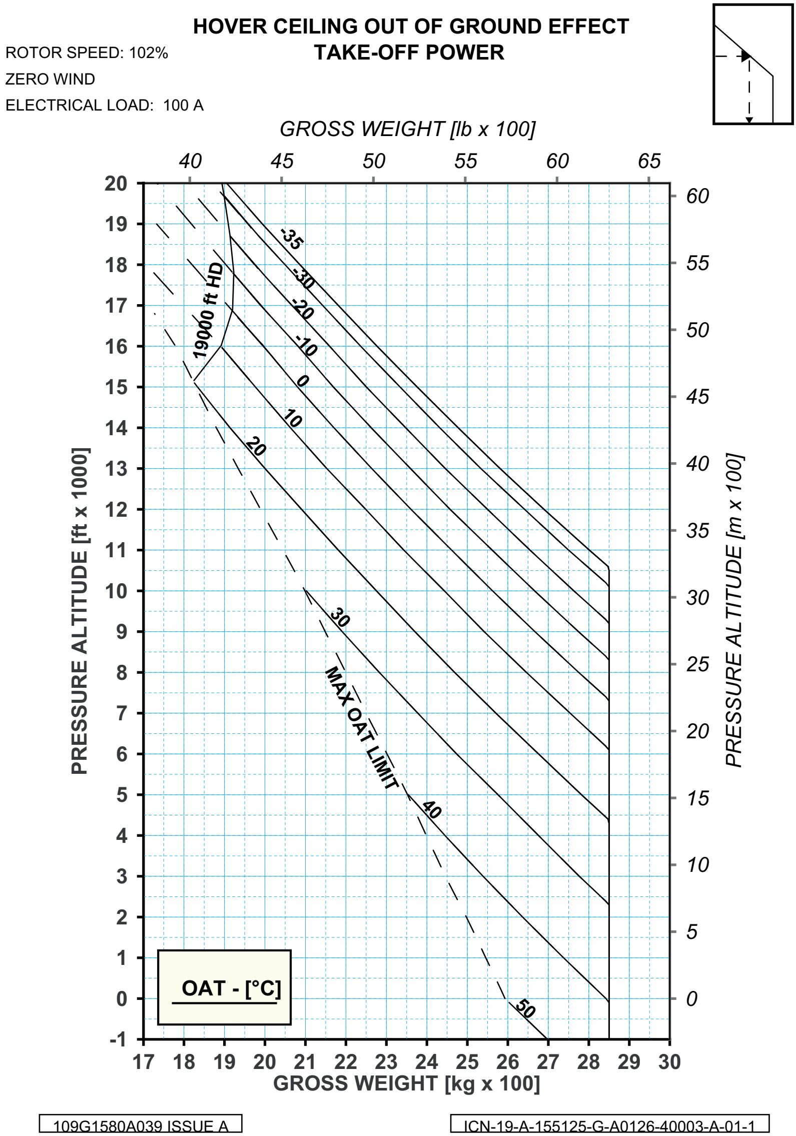


Figure 4-5. Out Ground Effect (OGE) - Take-Off Power (TOP) (Heater Off)

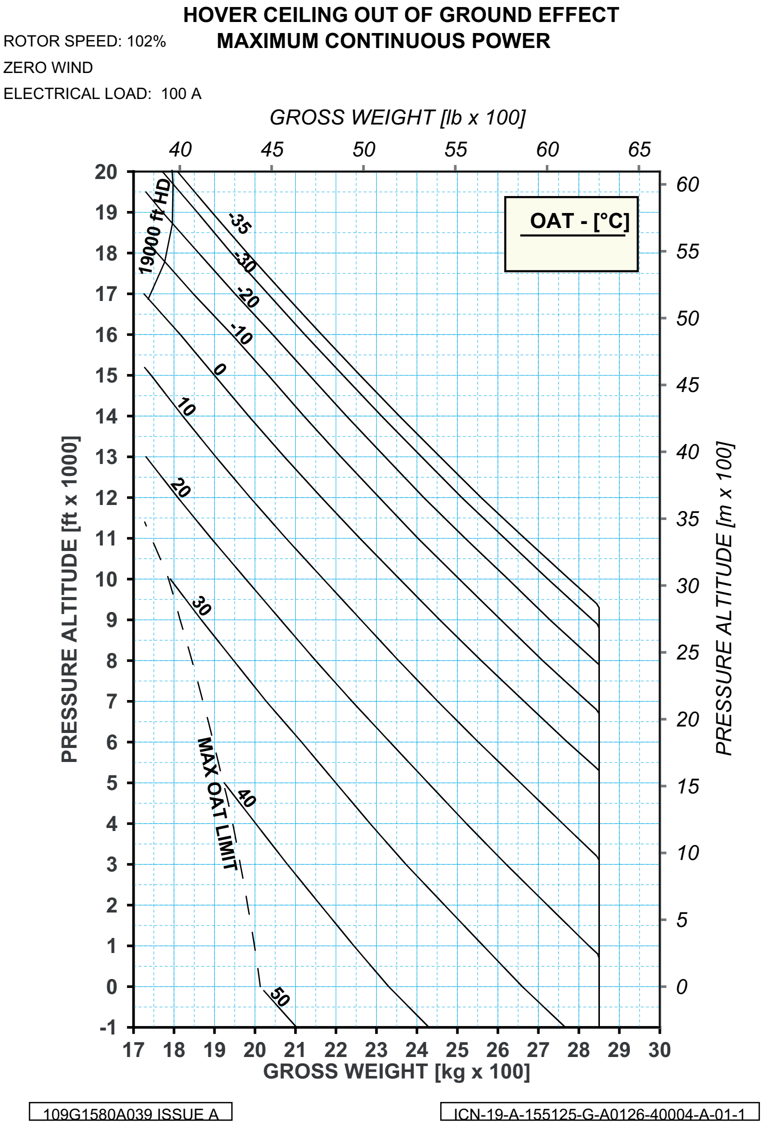


Figure 4-6. Out Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater Off)

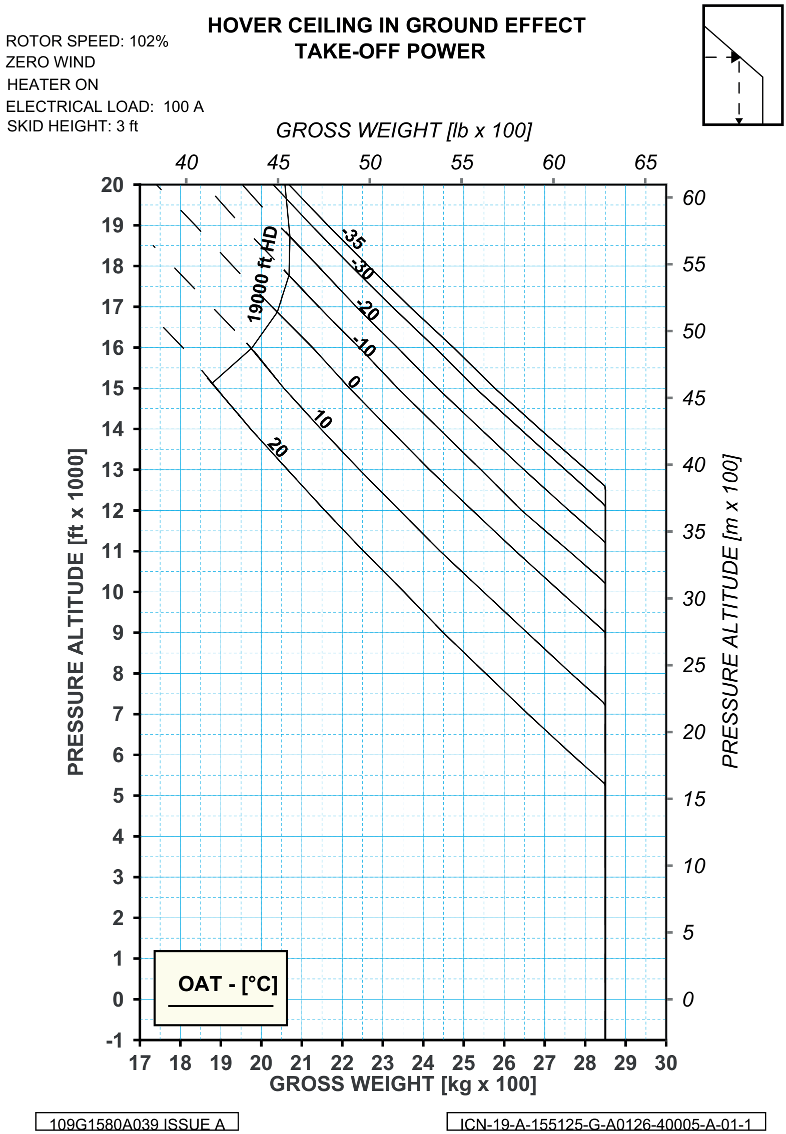


Figure 4-7. In Ground Effect (IGE) - Take-Off Power (TOP) (Heater On)

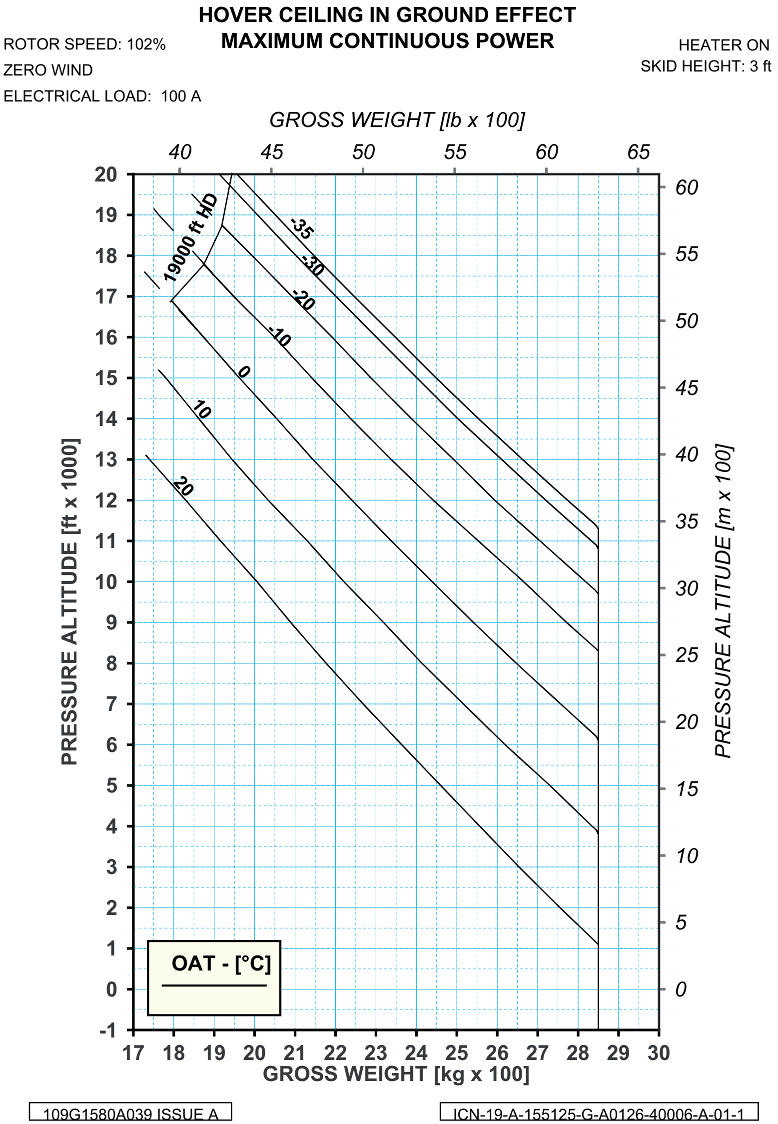


Figure 4-8. In Ground Effect (IGE) - Maximum Continuous Power (MCP) (Heater On)

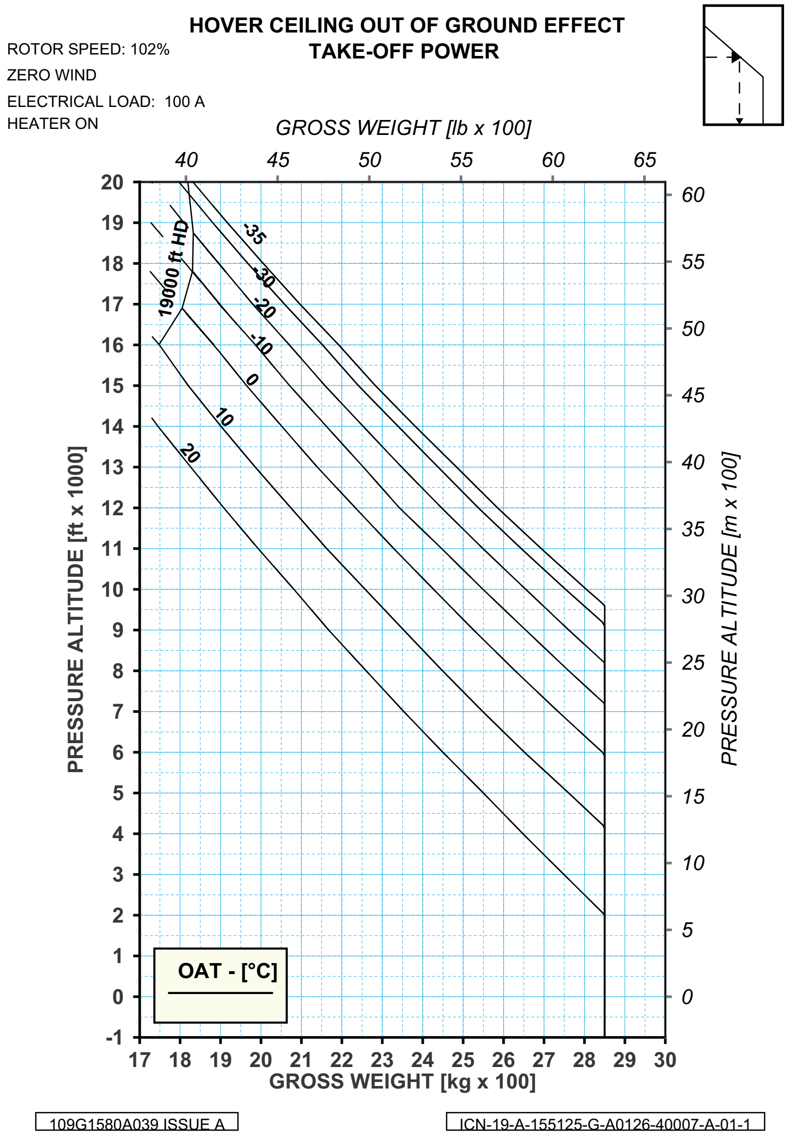


Figure 4-9. Out Ground Effect (OGE) - Take-Off Power (TOP) (Heater On)

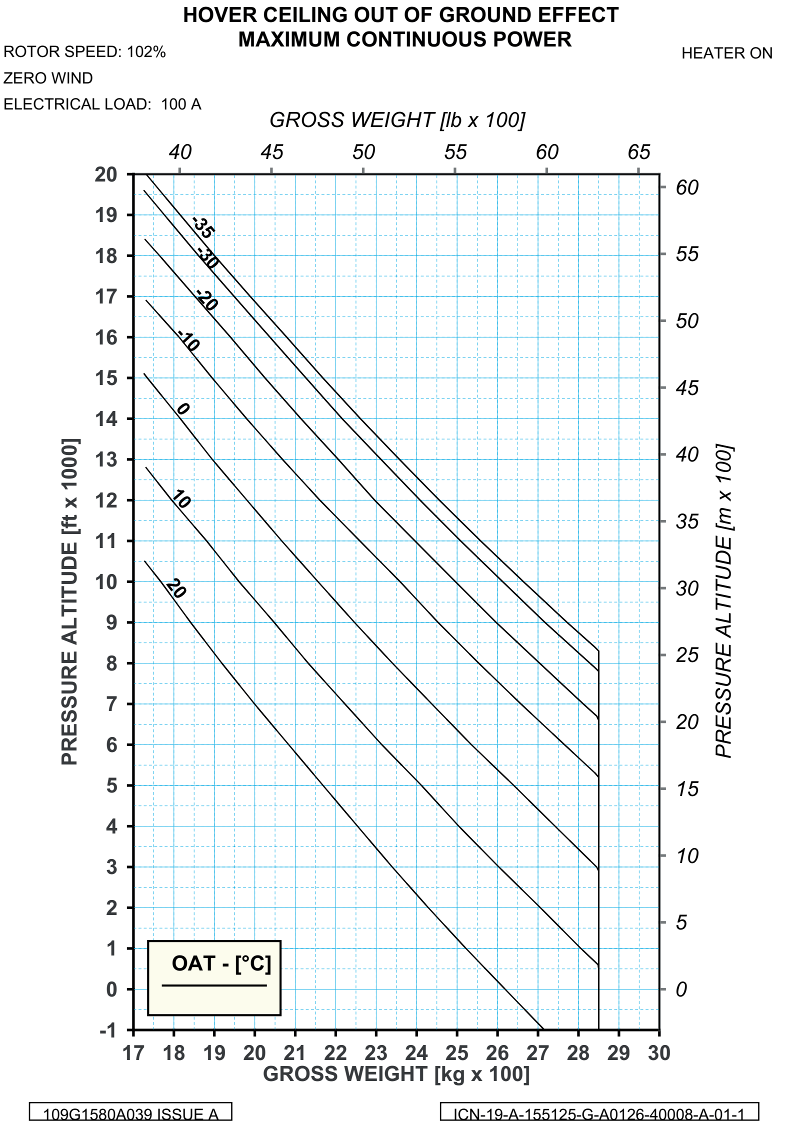


Figure 4-10. Out Ground Effect (OGE) - Maximum Continuous Power (MCP) (Heater On)

RATE OF CLIMB

(Figures 4-11 thru 4-34)

The Rate Of Climb (ROC) charts are presented for Take-Off Power (TOP) and Maximum Continuous Power (MCP) rating, both with NR at 102%, and in the two conditions HEATER ON/OFF.

They refer to the following airspeed for best Rate of Climb (Vy):

— From 15000 to 20000 ft Hp : 55 KIAS;

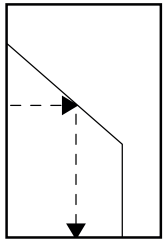
— Above 20000 ft Hp : 50 KIAS.

The performance presented for Take-Off Power (TOP) and Maximum Continuous Power (MCP), refer to an electrical load of 100 A.

Note

The rate of climb charts also apply to sling load operations.

RATE OF CLIMB
TAKE-OFF POWER



ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

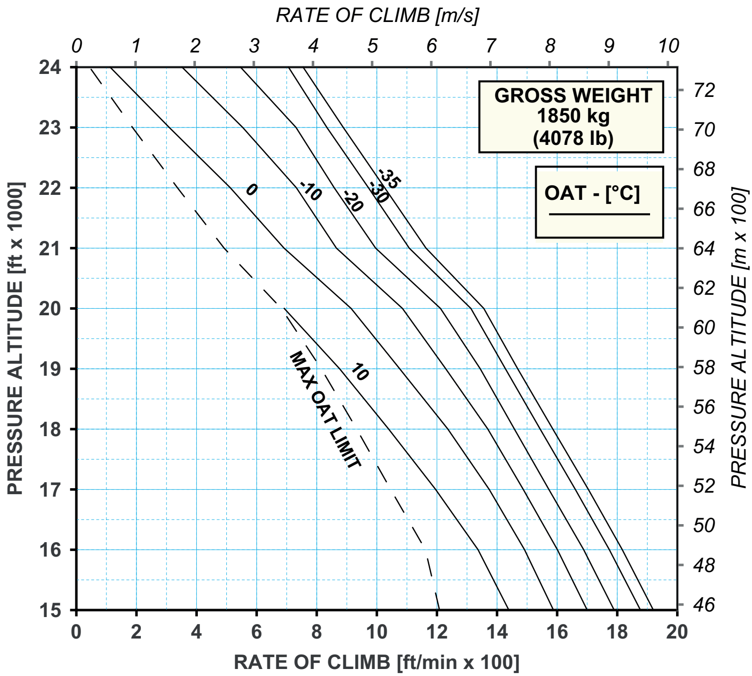


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Figure 4-11. Take-Off Power (TOP) (Heater Off) - Gross Weight 1850 Kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

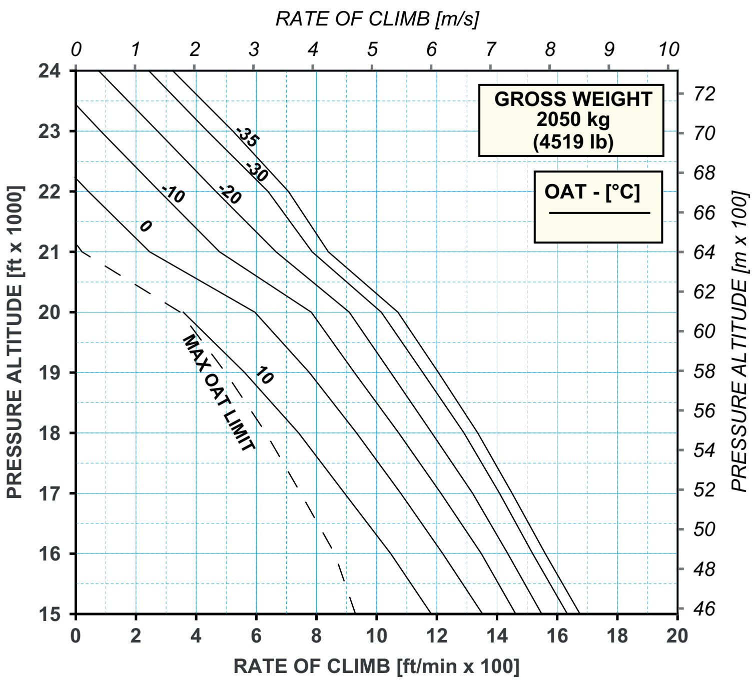

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Figure 4-12. Take-Off Power (TOP) (Heater Off) - Gross Weight 2050 Kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

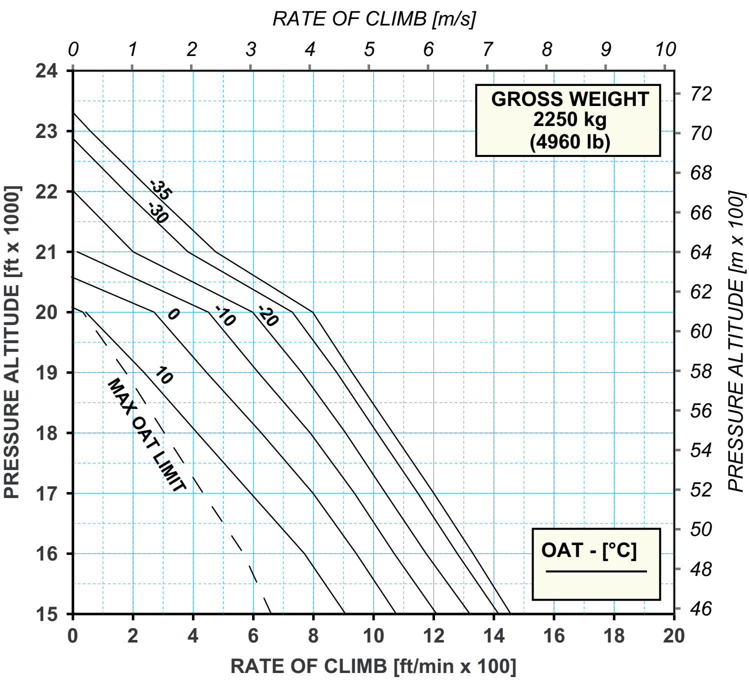

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Figure 4-13. Take-Off Power (TOP) (Heater Off) - Gross Weight 2250 Kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

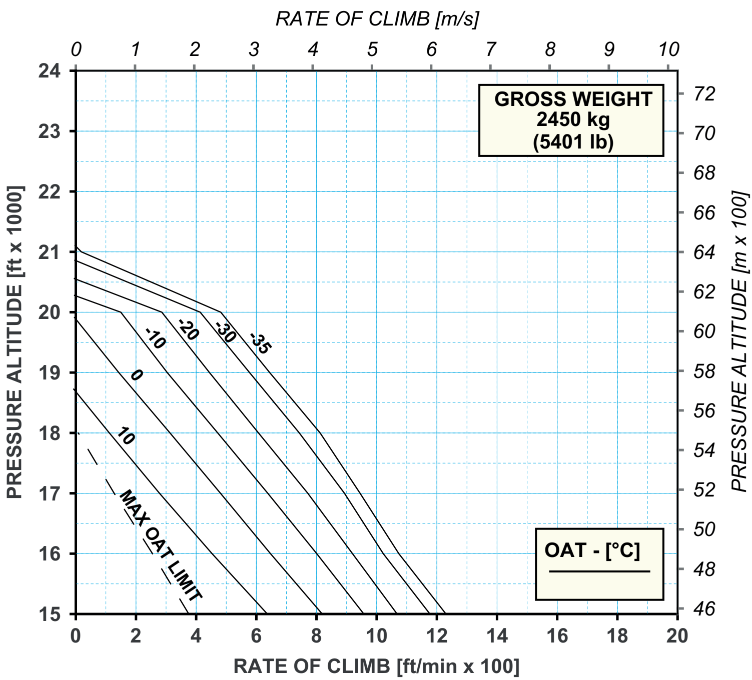

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Figure 4-14. Take-Off Power (TOP) (Heater Off) - Gross Weight 2450 Kg

RATE OF CLIMB

TAKE-OFF POWER

ROTOR SPEED:102%

ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS

Vy above 20000 ft: 50 KIAS

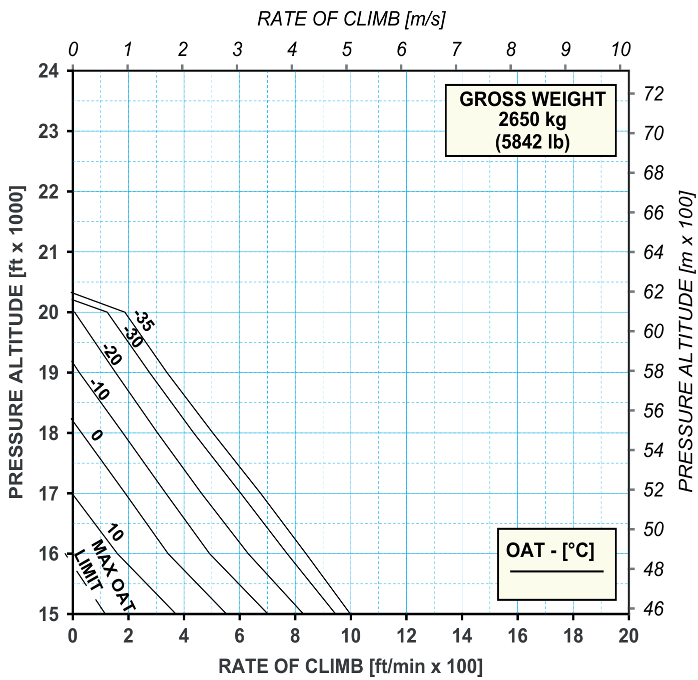

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Figure 4-15. Take-Off Power (TOP) (Heater Off) - Gross Weight 2650 Kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

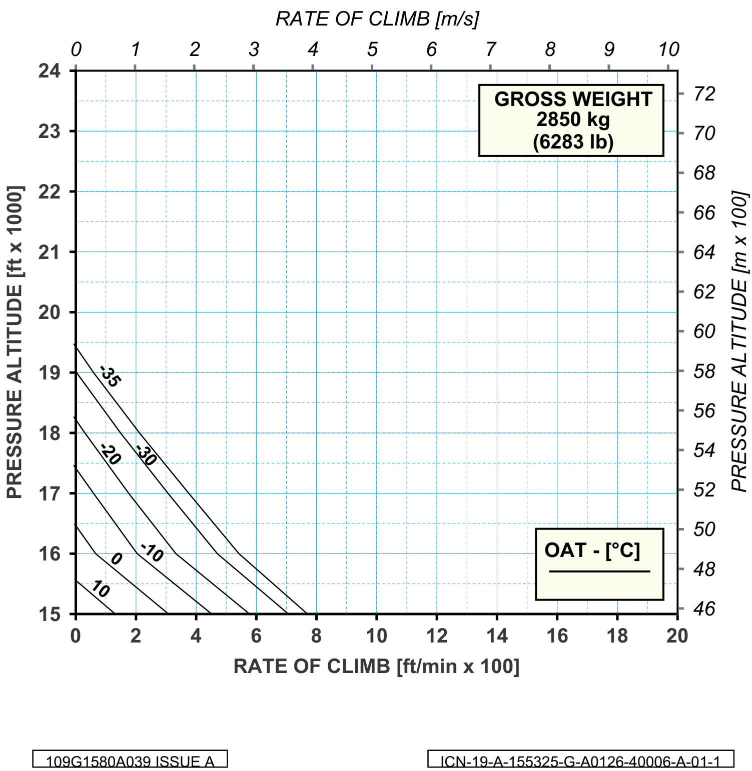
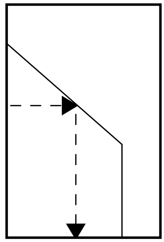


Figure 4-16. Take-Off Power (TOP) (Heater Off) - Gross Weight 2850 Kg

RATE OF CLIMB
TAKE-OFF POWER



ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON
Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

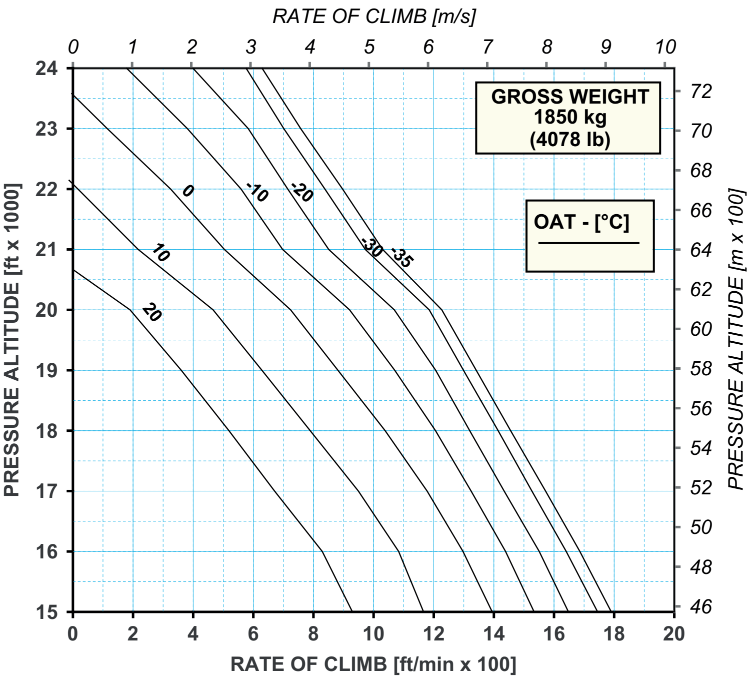


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Figure 4-17. Take-Off Power (TOP) (Heater On) - Gross Weight 1850 Kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON
Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

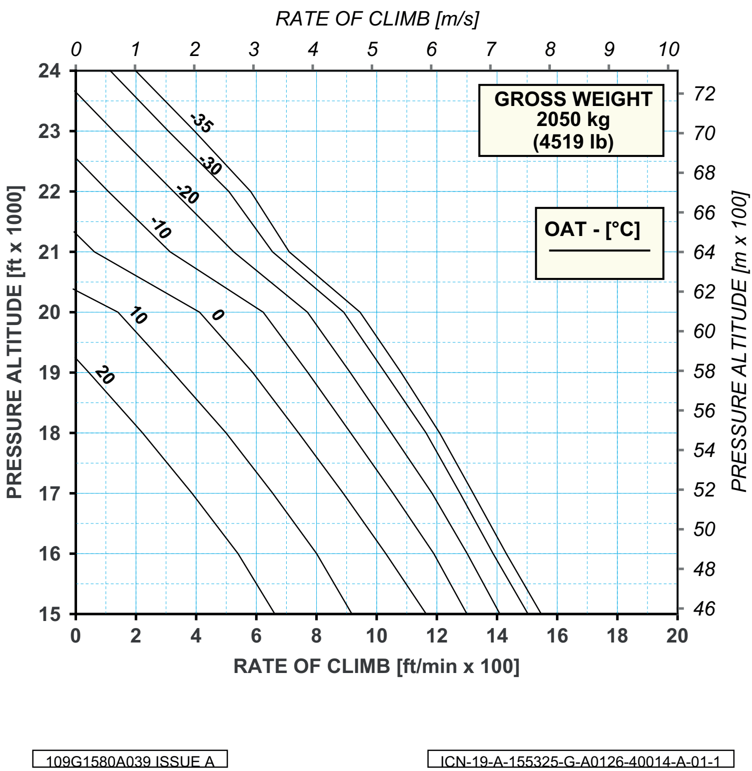


Figure 4-18. Take-Off Power (TOP) (Heater On) - Gross Weight 2050 Kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON
Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

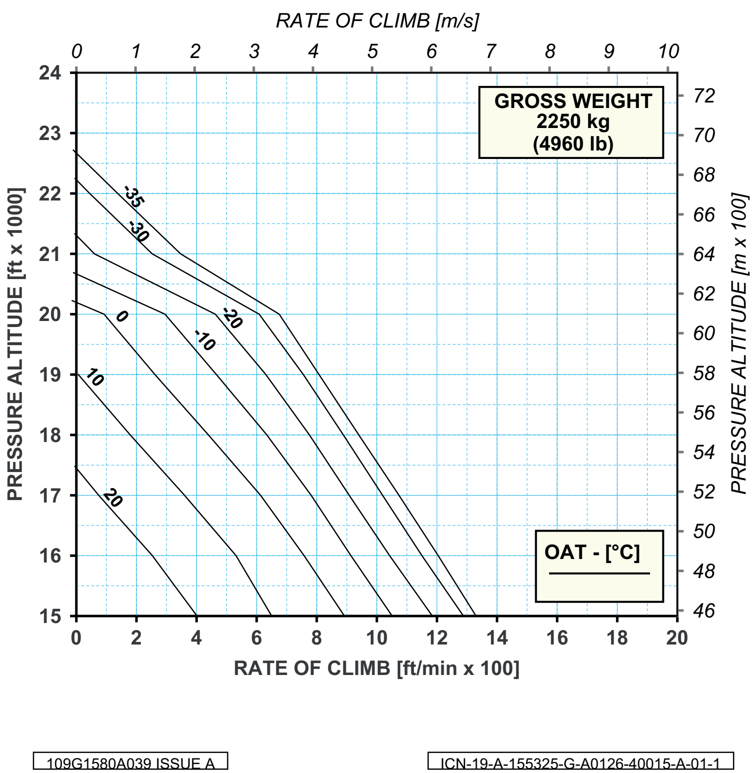


Figure 4-19. Take-Off Power (TOP) (Heater On) - Gross Weight 2250 Kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON
Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

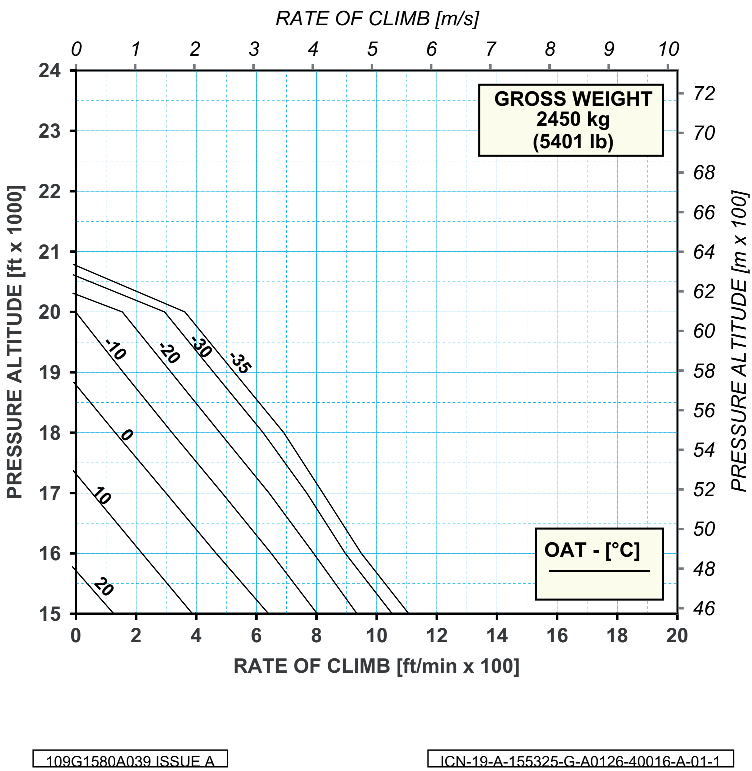


Figure 4-20. Take-Off Power (TOP) (Heater On) - Gross Weight 2450 Kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON
Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

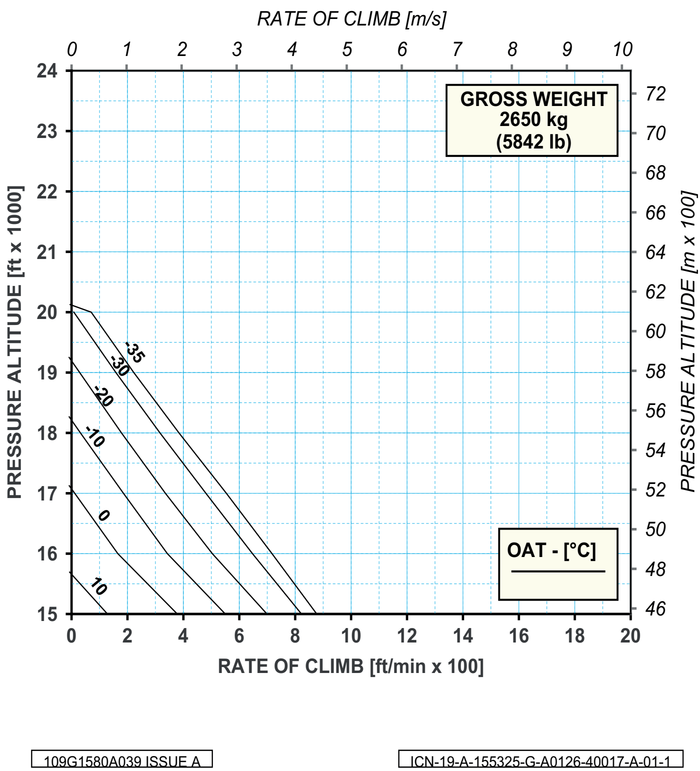


Figure 4-21. Take-Off Power (TOP) (Heater On) - Gross Weight 2650 Kg

RATE OF CLIMB
TAKE-OFF POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON
Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

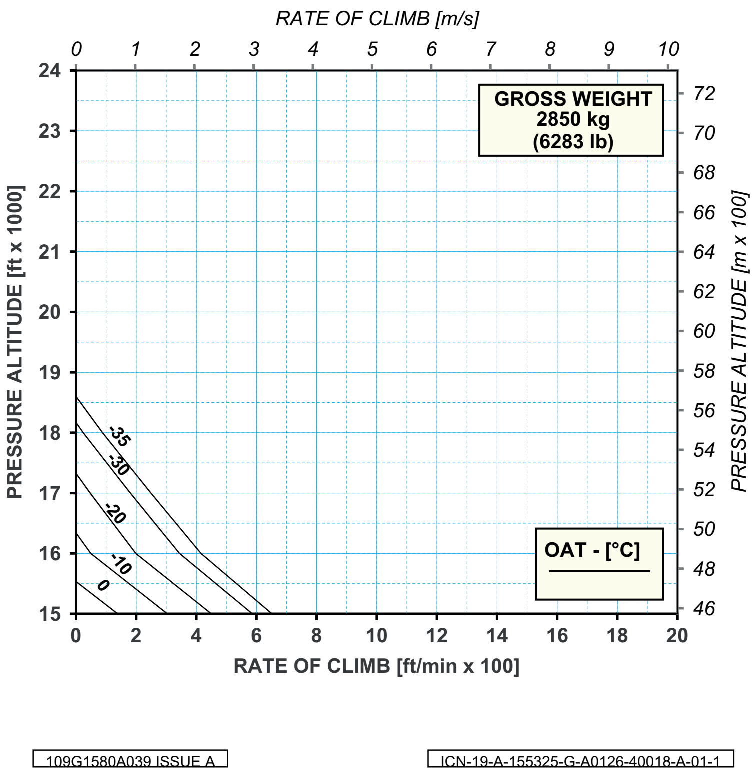
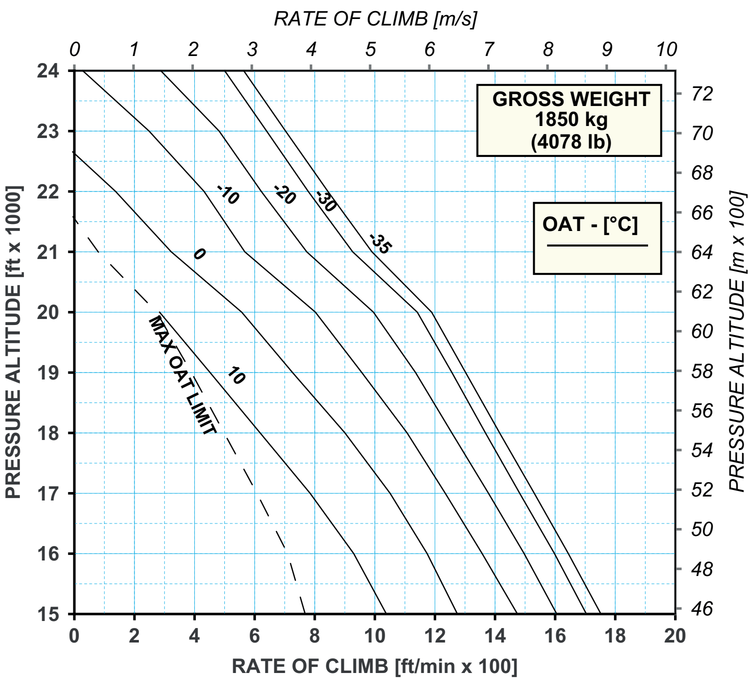


Figure 4-22. Take-Off Power (TOP) (Heater On) - Gross Weight 2850 Kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS



109G1580A039 ISSUE A

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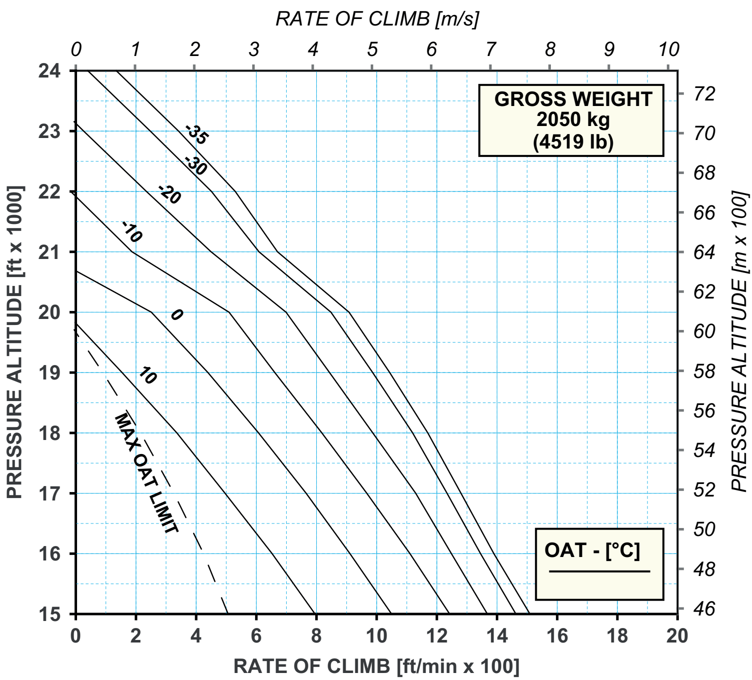
Figure 4-23. Maximum Continuous Power (MCP) (Heater Off) - Gross Weight 1850 Kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS



109G1580A039 ISSUE A

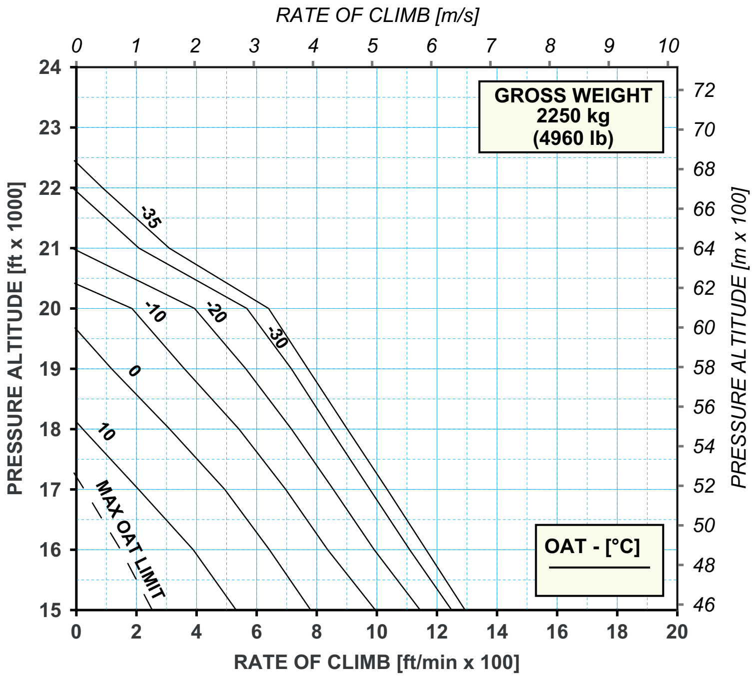
ICN-19-A-155325-G-A0126-40008-A-01-1

Figure 4-24. Maximum Continuous Power (MCP) (Heater Off) - Gross Weight 2050 Kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS



109G1580A039 ISSUE A

ICN-19-A-155325-G-A0126-40009-A-01-1

Figure 4-25. Maximum Continuous Power (MCP) (Heater Off) - Gross Weight 2250 Kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED:102%

ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS

Vy above 20000 ft: 50 KIAS

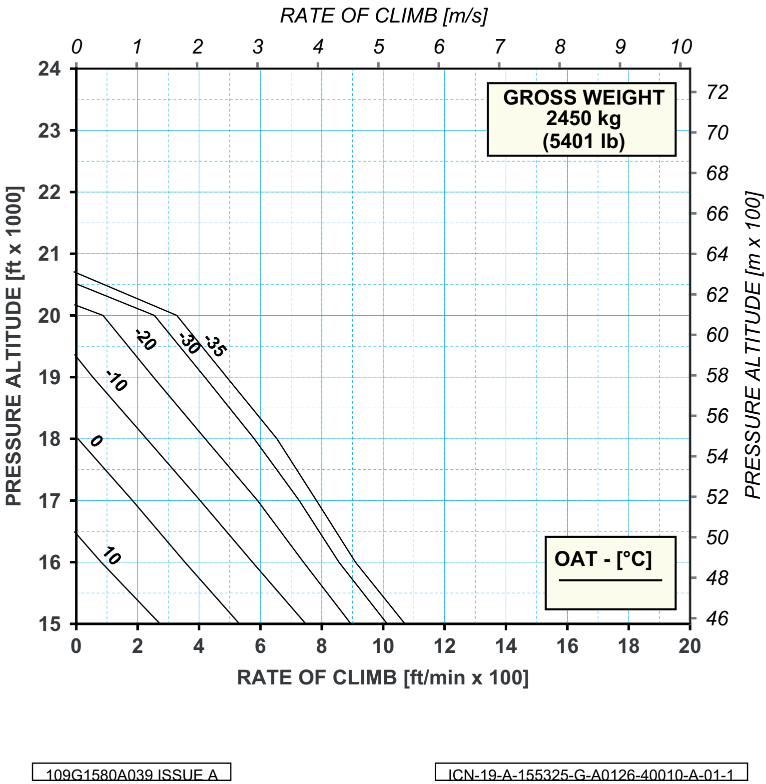
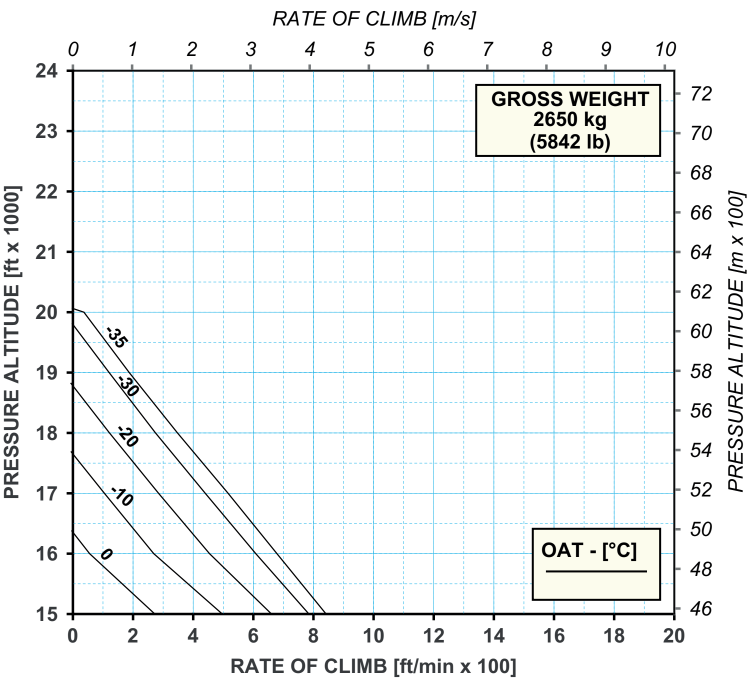


Figure 4-26. Maximum Continuous Power (MCP) (Heater Off) - Gross Weight 2450 Kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS



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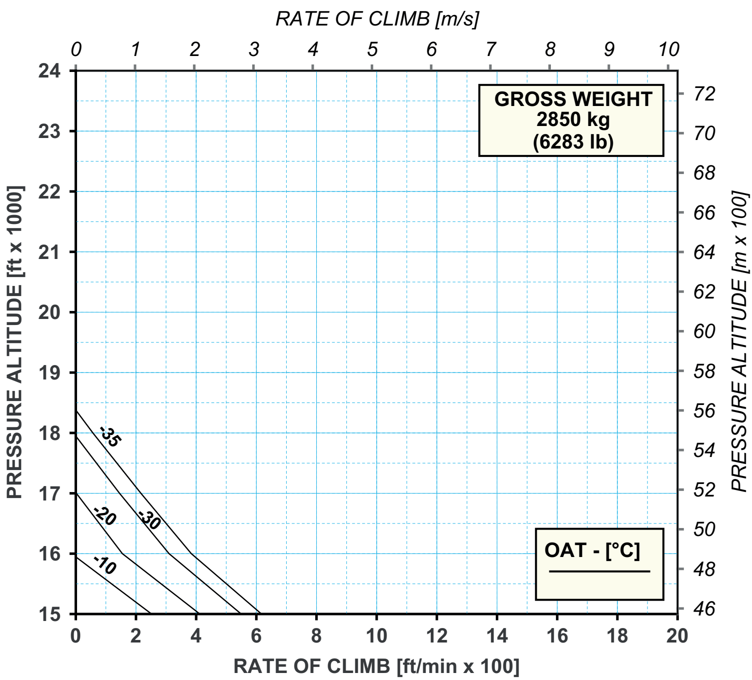
ICN-19-A-155325-G-A0126-40011-A-01-1

Figure 4-27. Maximum Continuous Power (MCP) (Heater Off) - Gross Weight 2650 Kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED:102%
ELECTRICAL LOAD: 100 A

Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS



109G1580A039 ISSUE A

ICN-19-A-155325-G-A0126-40012-A-01-1

Figure 4-28. Maximum Continuous Power (MCP) (Heater Off) - Gross Weight 2850 Kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%

ELECTRICAL LOAD: 100 A

HEATER ON

Vy from 15001 to 20000 ft: 55 KIAS

Vy above 20000 ft: 50 KIAS

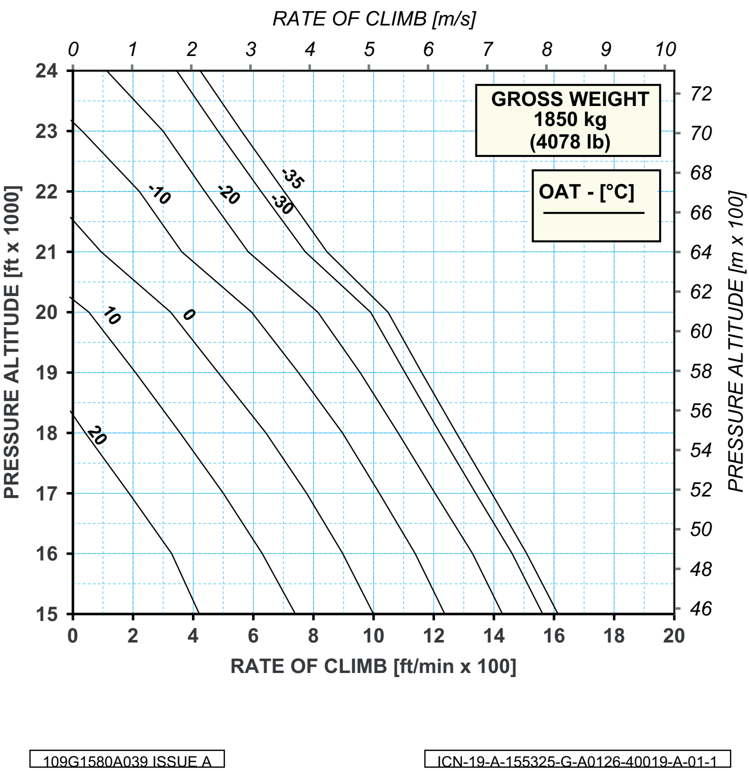
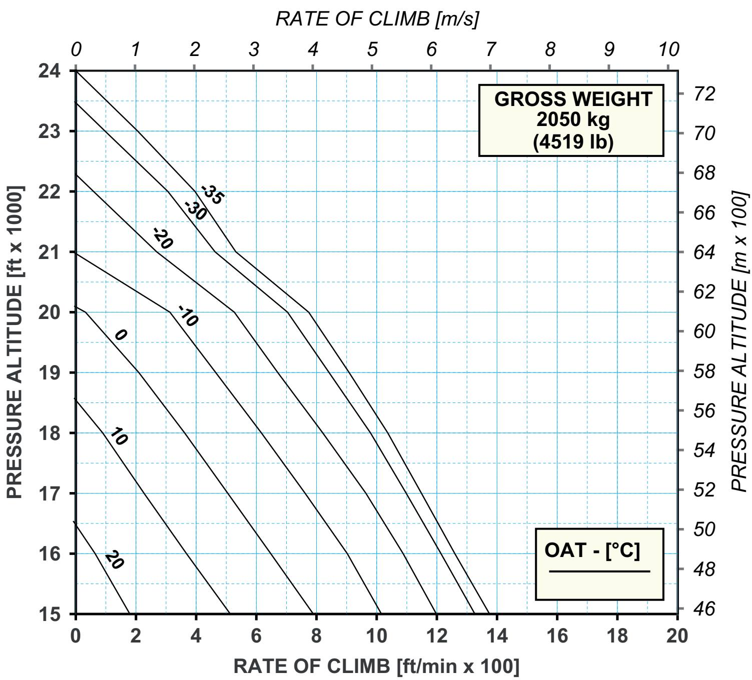


Figure 4-29. Maximum Continuous Power (MCP) (Heater On) - Gross Weight 1850 Kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A
HEATER ON
Vy from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS



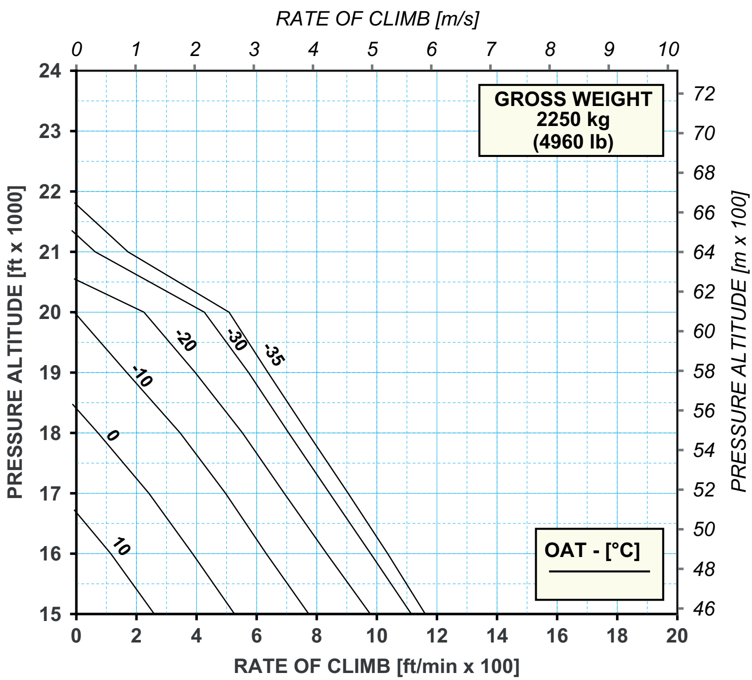
109G1580A039 ISSUE A

ICN-19-A-155325-G-A0126-40020-A-01-1

Figure 4-30. 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 from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS



109G1580A039 ISSUE A

ICN-19-A-155325-G-A0126-40021-A-01-1

Figure 4-31. 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 from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

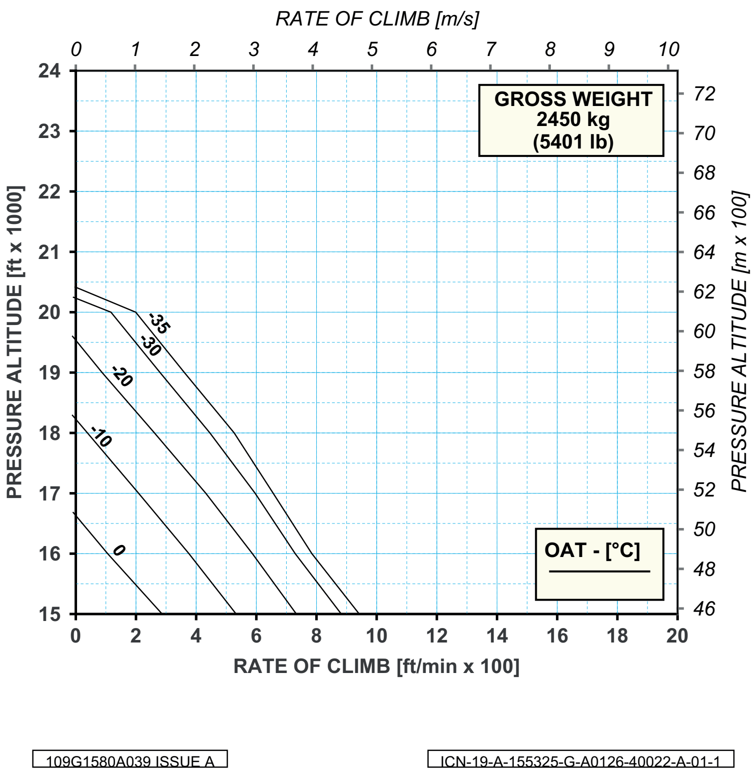


Figure 4-32. Maximum Continuous Power (MCP) (Heater On) - Gross Weight 2450 Kg

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER

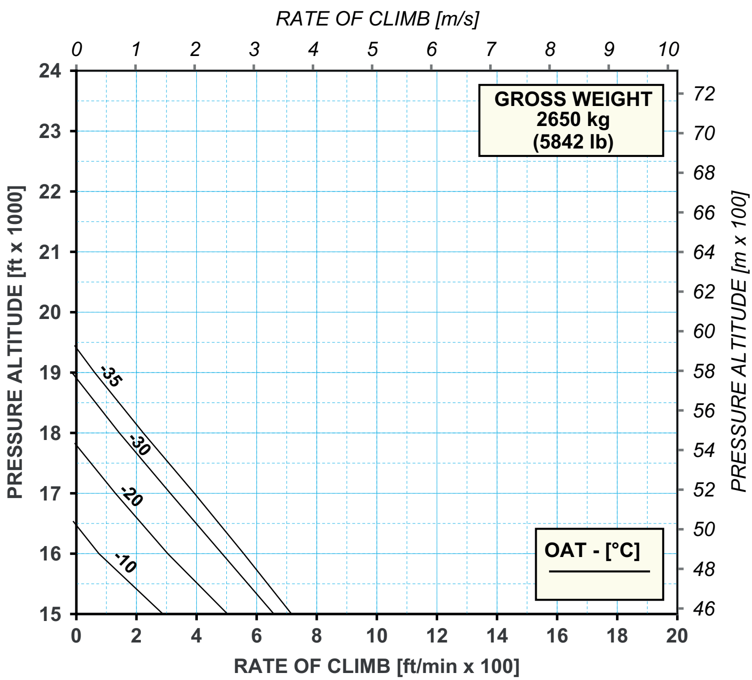
ROTOR SPEED: 102%

ELECTRICAL LOAD: 100 A

HEATER ON

Vy from 15001 to 20000 ft: 55 KIAS

Vy above 20000 ft: 50 KIAS



109G1580A039 ISSUE A

ICN-19-A-155325-G-A0126-40023-A-01-1

Figure 4-33. 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 from 15001 to 20000 ft: 55 KIAS
Vy above 20000 ft: 50 KIAS

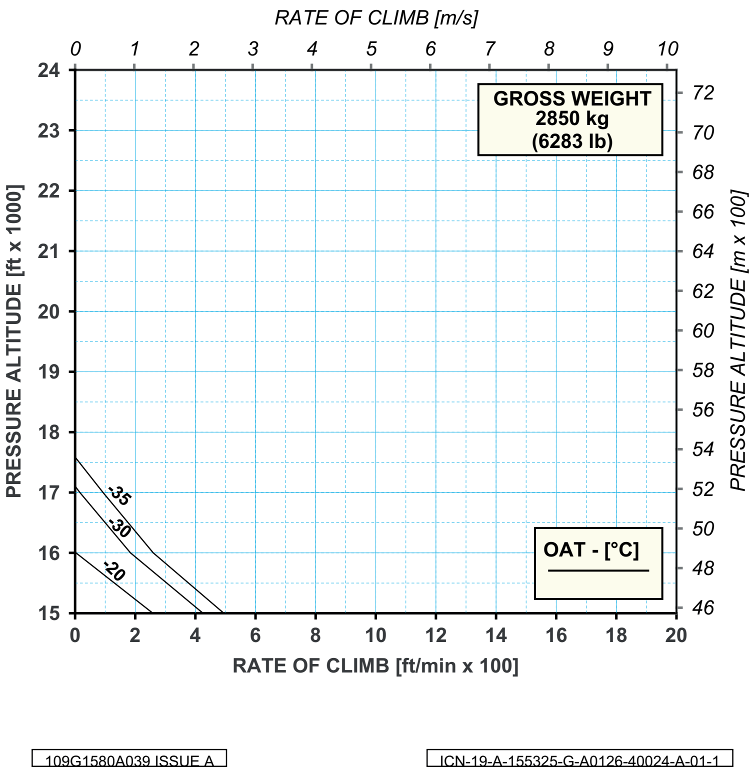
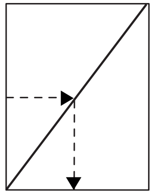


Figure 4-34. Maximum Continuous Power (MCP) (Heater On) - Gross Weight 2850 Kg

AUTOROTATION GLIDE DISTANCE

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

AUTOROTATION GLIDE DISTANCE



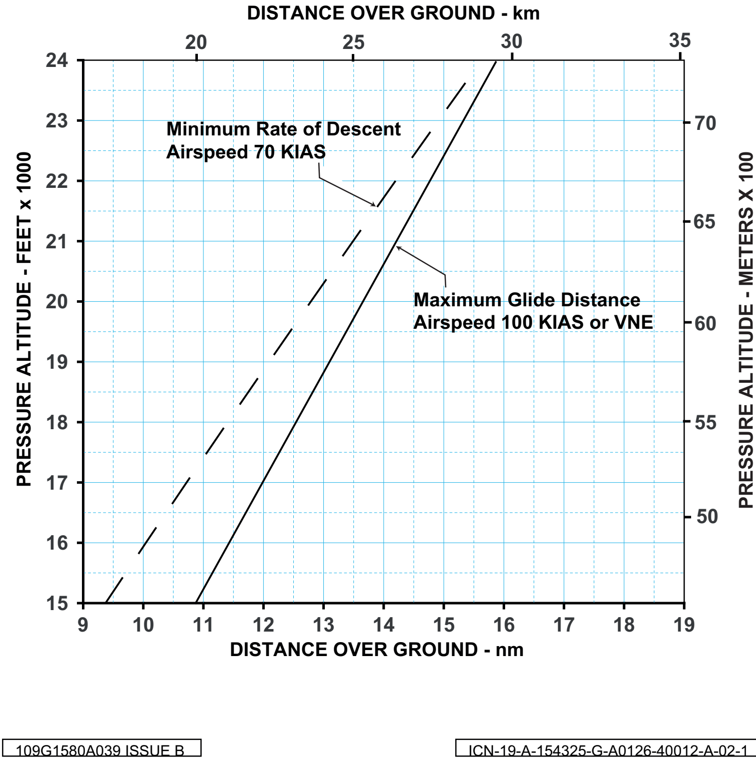


Figure 4-35. Autorotation Glide Distance

SECTION 6 - WEIGHT AND BALANCE

No change.

SECTION 7 - SYSTEM DESCRIPTION

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.

EXTERNAL LOUDSPEAKER

The external loudspeaker system 109G2300F03, allow the crew to communicate to ground personnel while remaining in flight.
The system consists of one external loudspeaker, a control panel and an amplifier.

ISSUE 1: 06 NOVEMBER 2017
REVISION 1: 11 NOVEMBER 2025

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LIST OF REVISIONS

REVISION No.	SUBJECT	APPROVAL
—	Issue 1	Approved with NDC-109G2300-002 dated 06 November 2017 under the authority of DOA ref EASA.21J.005
1	Revised pages Title page, A-1, B-1, ii	Manufacturer’s Data

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EXTERNAL LOUDSPEAKER

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No change.

SECTION 2 - NORMAL PROCEDURES

PRE-FLIGHT CHECK

PILOT'S DAILY PRE-FLIGHT CHECK

Area N°2 (Fuselage - RH side)

1. External loudspeaker	: - Check condition and secured. Check wiring connections for condition and security.

Area N°7 (Cockpit interior)

1. PA PWR circuit breaker	: - In.
2. SPKR AMPL circuit breaker	: - In.
3. POWER switch	: - Confirm to OFF.

BEFORE TAKE-OFF

WARNING

Avoid loudspeakers operation when on ground as this may cause injury to personnel. Ground support personnel in vicinity of helicopter should wear protective hearing devices.

IN FLIGHT

CAUTION

At maximum volume in PA mode the loudspeaker can only be ON for a maximum period of 1 minute followed at least by a 3 minutes OFF interval.

CAUTION

At 25% volume in siren mode the loudspeaker can only be ON for a maximum period of 1 minute followed at least by a 3 minutes OFF interval.

Note

During external loudspeaker operations, all helicopter doors and windows should be closed to avoid feedback to the microphone.

PUBLIC ADDRESS (PA) OPERATION

Audio Control Panel :

1. TX knob : - Select PA.

Loudspeaker Control Panel :

1. POWER switch : - ON.
   - Check POWER ON indicator light illuminated.
2. PA / RADIO switch : - Check PA.
3. EXT / INT switch : - Check EXT.
4. PTT foot switch : - Press.
   or
   TX switch on COMM panel - Push Down (TX position).
   or
   PTT trigger on cyclic - Push first position.

Note

Any message spoken to the headset microphone will be spread through the loudspeakers.

5. VOL knob : - As required.

When PA system operation is no longer required:

6. POWER switch : - OFF.
   - Check POWER ON light extinguished.

Audio Control Panel :

1. TX knob : - As required.

SIREN OPERATION

Loudspeaker Control Panel :

1. POWER switch	: - ON. - Check POWER ON indicator-light illuminated.

Note

The switch identified PA / RADIO is active only in PA (Public Address) position.

2. PA / RADIO switch	: - Check in PA.
3. EXT / INT switch	: - Check EXT.
4. WAIL / OFF / YELP switch	: - Set to WAIL or YELP, as required.
5. VOL knob	: - As required.

When system operation is no longer required:

6. WAIL / OFF / YELP switch	: - Set to OFF.
7. POWER switch	: - OFF. - Check POWER ON light extinguished.

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 external loudspeakers allows the crew to communicate to ground personnel while remaining in flight.

The system consists of an external loudspeaker, a control panel and an amplifier.

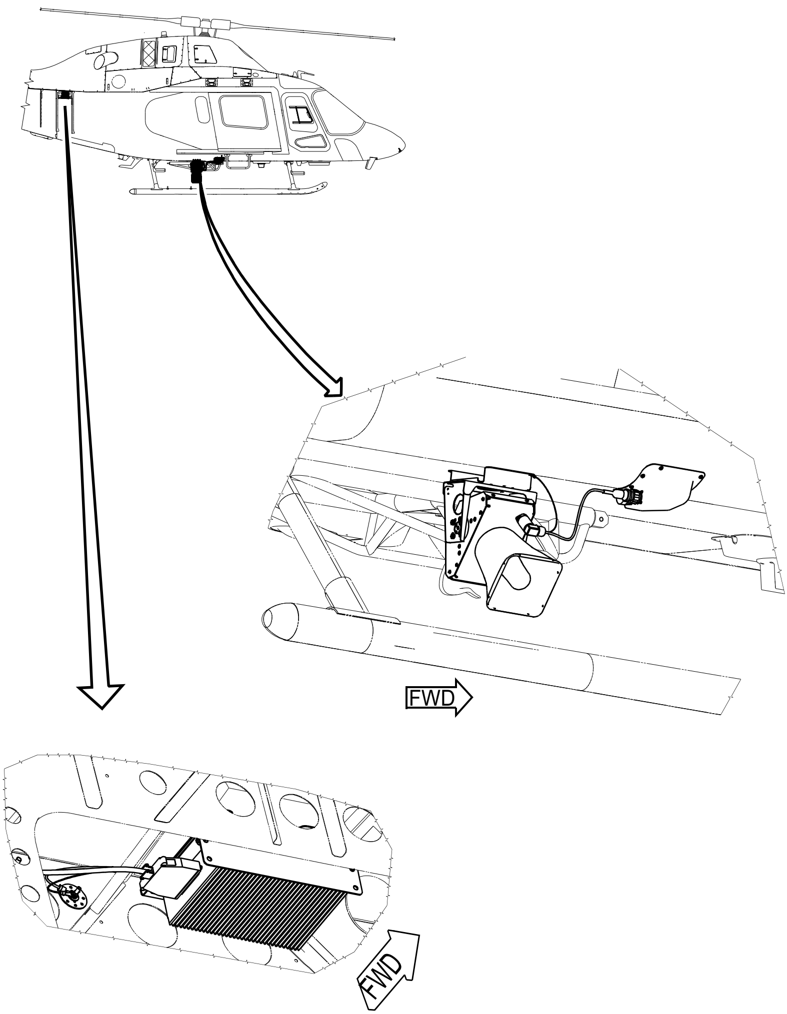
The control panel, located on the interseat console, permits to operate the system by means of four switches, identified POWER ON; EXT / INT; WAIL / OFF / YELP for the siren mode and PA / RADIO and a VOL control knob for the volume (operative only for PA function).

The EXT / INT switch allows to utilize the system to communicate with passengers on board through internal loudspeakers.

Note

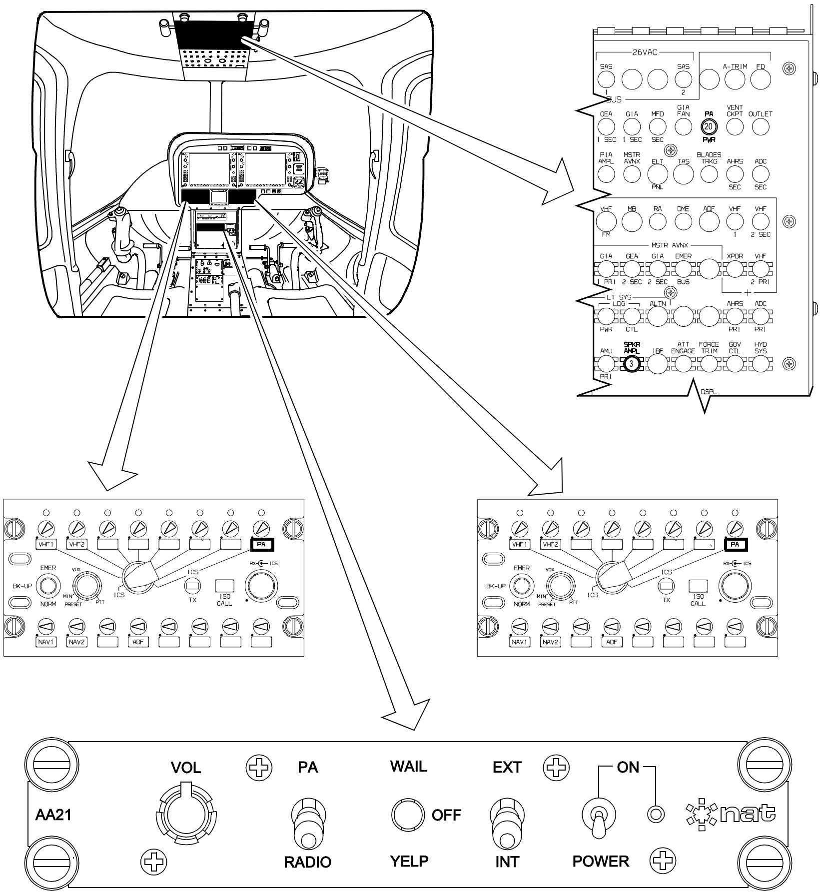
The switch identified PA / RADIO is active only in PA (Public Address) position.

When the system is operating, the POWER ON indicator light on the control panel is illuminated.



ICN-19-A-155026-G-A0126-01001-G-01-1

Figure 7-1. External Loudspeaker - Component Location



ICN-19-A-155026-G-A0126-01002-G-01-1

Figure 7-2. External Loudspeaker - Controls and Indicators

Approved with NDC 109G2310-036
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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.

Note

The "No Hazard" certification demands that the replacement of any equipment subject to this supplement is not allowed without the approval of the Manufacturer and of the competent Authority.
Changes to helicopter configuration (installation of approved equipments) are allowed only upon removal of the equipment subject of this supplement or after specific approval of the Manufacturer and of the competent Authority.

UHF APX6500 RADIO

The UHF APX6500 Radio 109G2310F27, is an UHF radio communication system.
The system consists of one APX6500 transceiver equipped with a Control Panel installed in cockpit on the front console and connected to the dedicated antenna Cobham 16-16P3 installed in the tail lower side.
The UHF APX6500 is connected to the AMU UHF interface and available from Pilot and copilot related ICS control panel.

Copy assigned to helicopter S/N: 14964, 14969.

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UHF APX6500 RADIO

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PRE-FLIGHT CHECK

PILOT'S DAILY PRE-FLIGHT CHECK

Area N°3 (Tailboom - LH side)

1. UHF Antenna : - Condition.

Area N°3 (Tailboom - LH side)

2. UHF Antenna : - Condition.

Area N°7 (Cockpit interior)

1. UHF circuit breaker : - In.

SYSTEM CHECK

UHF APX6500 RADIO

1.	UHF APX6500 control panel (on front console)	: - Push the power on/off button to start the systemt.
2.	ICS control panel (on instrument panel)	: - Select as required.

IN FLIGHT

1.	UHF APX6500 contro panel (on front console)	: - Select as required.
2.	ICS control panel (on instrument panel)	: - Select as required.

Note

UHF communication can be disturbed by VHF transmission.

SHUTDOWN

1.	UHF APX6500 control panel (on front console)	: - Push the power on/off button to shutdown the system.

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 MOTOROLA APX6500 radio is part of a family having common transceiver hardware with plug-and-play control panel.

The UHF APX6500 Radio Communication system consists of one APX6500 transceiver equipped with a Control Panel installed in the cockpit on the front console (refer to Figure 7-2) and connected to the dedicated antenna Cobham 16-16P3 installed in the tail lower side. (refer to Figure 7-1).

The transceiver works at 380 – 470 MHz frequency band. It has an Ignition Sense input and power-down timer for remote on/off switching.

The UHF APX6500 transceiver is powered from a UHF Circuit Breaker on overhead console through dedicated 28VDC/14VDC converter KGS LT-71 (refer to Figure 7-2).

The UHF APX6500 is connected to the AMU UHF interface and available from Pilot and copilot relevant ICS Control Panel (refer to Figure 7-2).

It is capable to receive and process the GPS signal (provision). The APX6500 transceiver has the following features implemented: P25, 12.5k//20k/25k selectable channel spacing, 10-40W RF output and Simple User Interface.

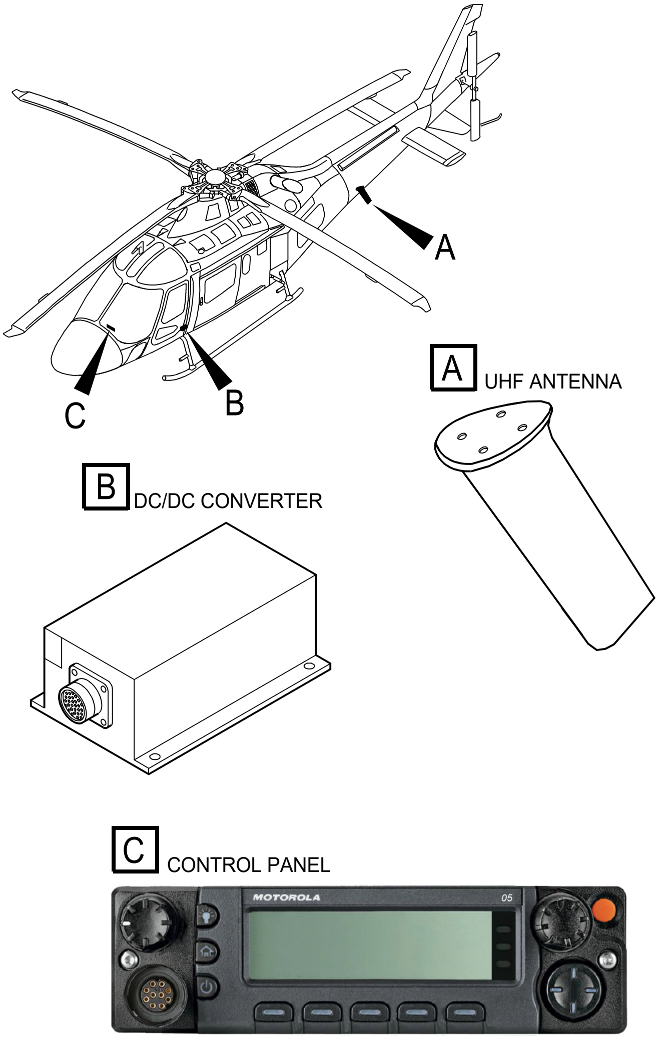

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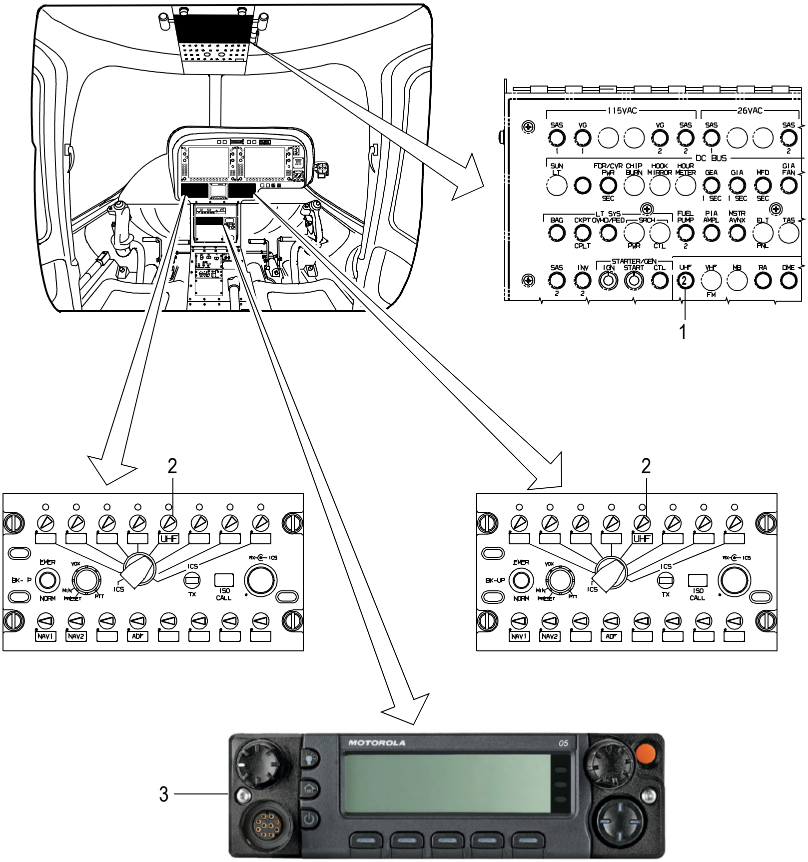
Figure 7-1. UHF APX6500 Radio Communication System - Component Location

CONTROLS AND INDICATORS



1. UHF circuit breaker.
2. UHF knob on ICS ontrol panels.
3. UHF APX6500 control panel.

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Figure 7-2. UHF APX6500 Radio Communication System - Controls and Indicators

Figure 7-3. UHF APX6500 Control Panel

Key To Figure 7-3

Ref.	Control/Display	Function
1	Home button	Used to exit all menu functions.
2	Volume knob	Change the audio volume.
3	Dim button	Dims the backlight through three levels of brightness including backlight off.
4	Led Indicators	Used to indicate radio status. Refer to the next "LED INDICATORS" paragraph
5	Channel Knob	Used to change channels.
6	Emergency	Field-programmable button via CPS, typically programmed for the emergency feature.
7	Navigation Button	Used to scroll through menu items and selections.
8	Soft Menu keys	Field Programmable button via CP, typically programmed for the emengency feature.
9	Power on/off button	Turns the radio on and off.
10	MMP Connector	Used to connect accessories, such as the microphone, to the control head.

DISPLAY ICONS

	Receiving Radio is receiving a call or data.
	Transmitting Radio is transmitting a call or data.
	Call Received Radio has received an Individual Call.
	Received Signal Strength Indicator (RSSI) The number of bars displayed represents the received signal strength for the current site, for trunking only. The more stripes in the icon, the stronger the signal.
	Direct • **On** = Radio is currently configured for direct radio to radio communication (during conventional operation only). • **Off** = Radio is connected with other radios through a repeater.
H or L	**Power Level** • **L** = Radio is set at Low power. • **H** = Radio is set at High power.
	Priority-One Channel Scan • **Blinking dot** = Radio detects activity on channel designated as Priority-One. • **Steady dot** = Radio detects activity on channel designated as Priority-Two.
	Scan Radio is scanning a scan list.
AES	**AES Secure Operation** • **On** = AES Secure operation. • **Off** = Clear operation. • **Blinking** = Receiving an encrypted voice call.
	Location Signal • **On** = Location feature is enabled, and location signal is available. • **Off** = Location feature is disabled. • **Blinking** = Location feature is enabled, but no location signal is available.
IP	**User Login Indicator (IP Packet Data)** • **On** = User is currently associated with the radio. • **Off** = User is currently not associated with the radio. • **Blinking** = Device registration or user registration with the server failed due to an invalid username or pin.

STANDARD ICONS

	In-Call User Alert • **On** = The feature is enabled. Voice muting of the affiliated trunking talkgroup or selected conventional channel is activated. • **Off** = The feature is disabled. Voice muting of the affiliated trunking talkgroup or selected conventional channel is deactivated.
	Vote Scan Enabled The vote scan feature is enabled.
	Secure Operation • **On** = Secure operation. • **Off** = Clear operation. • **Blinking** = Receiving an encrypted voice call.
	Data Activity Data activity is present.
	View/Program Mode Radio is in the view or program mode. • **On steady** = View mode • **Blinking** = Program mode

LED INDICATORS

The LED indicator shows the operational status of the radio. (Refer to Figure 7-3)

Status	Description
Solid red	Radio is trasmitting.
Rapidly blinking red	Radio has failed the self test upon powering up or encountered a fatal error.
Solid yellow	Channel is busy.
Blinking yellow	Radio is receiving a secured transmission.
Solid green	Radio is powering up, or is on a non-priority channel while in the Scan List Programming Mode.
Blinking green	Radio is receiving and individual or telephone call, or is on a Priority. Two channel while in the Scan List Programming Mode.
Rapidly blinking green	Radio is on a Priority-One channel while in the Scan List Programming Mode.

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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.

Note

The replacement of the equipment detailed in this Supplement is not allowed without the successful of the additional verifications reported in the Maintenance Manual.

Changes to the helicopter configuration (ie. installation of approved equipments) are not allowed without the successful completion of the verifications reported in the Maintenance Manual.

FLIR WESCAM MX-10

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—	Issue 1	EASA Approval N° 10078678 dated 28 February 2022
1	Revised pages 1, 2, 4 thru 9 and 12 thru 14 of 26.	Approved with NDC-109G9300-014 dated 29 September 2023 under the authority of DOA ref EASA.21J.005
	Revised pages Title page, A-1, B-1, i, and 5 thru 9 of 26.	Manufacturer's Data
—	Issue 2	Approved with NDC-109G9300-013, NDC-109G4360-004 dated 24 April 2024 under the authority of DOA ref EASA.21J.005

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SECTION 1 - LIMITATIONS

FLIGHT CREW

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

The FLIR Wescam MX-10 system can only be operated by an operator in the passenger cabin.

NUMBER OF SEAT

The number of seats is five (pilot included).

AIRSPEED LIMITATIONS

V_{MAX} with FLIR MX-10 installed ....: 138 KIAS

MISCELLANEOUS LIMITATIONS

FLIR WESCAM MX-10 SYSTEM LIMITATIONS

The FLIR system must be OFF before engine starting and must be turned OFF before engine shutdown.

The FLIR must not be used for navigation, flight path control or obstacle avoidance.

The FLIR system can be operated only from the passenger cabin console and the operator must be authorized by the pilot.

FLIR THERMAL LIMITATIONS

TCU maximum continuous operating temperature ....:+40°C

TCU maximum operating temperature for up to
3.5 hours ....:+45°C

TCU maximum operating temperature for up to
2 hours with minimum 5 kts airflow speed.................................: +50°C

TCU maximum operating temperature for up to
1 hours with minimum 10 kts airflow speed...............................:+55°C

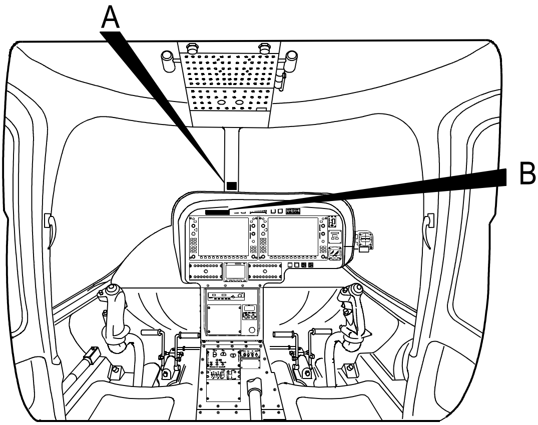
LASER LIMITATIONS

LASER Type	LASER Class	Wavelength	NOHD (7x50 optics)	
			Unaided	Aided
Range finder	1	1540 nm	Eye-safe	Eye-safe

Note

The Nominal Ocular Hazard Distance (NOHD) is the distance from the laser aperture, along the beam path, to the human eye beyond which the radiance or radiant exposure is not expected to cause hazardous effects or adverse biological changes in the eye or skin.

PLACARD



A

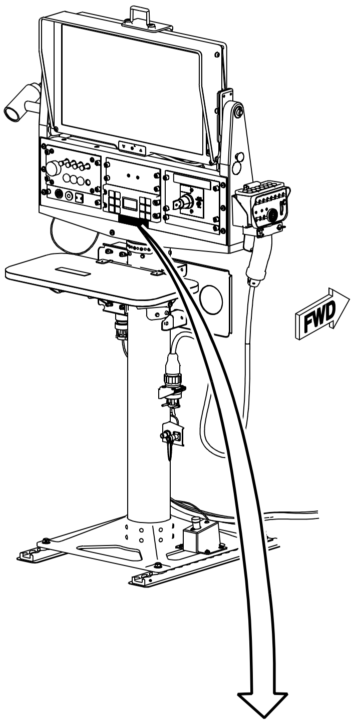
V_{MAX} EO/IR SYSTEM:
138 KIAS

B

CAUTION
THE TURRET CAMERA UNIT MUST
BE IN STOWED POSITION DURING
TAXIING, TAKE-OFF AND LANDING

ICN-19-A-155031-G-A0126-01001-G-01-1

Figure 1-1. Cockpit Placards



TURN OFF THE FLIR BEFORE ENGINE
STARTING AND SHUT DOWN.

DURING TAXIING, TAKE OFF AND LANDING:
- STOW THE FLIR TURRET
- STOW AND SECURE HAND CONTROLLERS
- CLOSE AND SECURE CONSOLE TABLE

ICN-19-A-155031-G-A0126-01002-G-02-1

Figure 1-2. Cabin Placards (G1000H only)

SECTION 2 - NORMAL PROCEDURES

PREFLIGHT CHECKS

PILOT'S DAILY PRE-FLIGHT CHECK

(First flight of the day)

Area N° 6 (Fuselage - LH side)

1. FLIR Wescam MX-10 TCU : - Condition and secure.

Note

When the FLIR is not powered, the TCU gimbal and sensors' container are unlocked and can be freely rotated by hand.
If they are moved for the next check, reposition them in the original orientation (STOW position) before continuing with the following controls.

- Check EO/IR lens condition and cleanliness.

AREA N°7 (Cabin interior)

1. FLIR Wescam MX-10 HCU (on mission console) : - Check system switched OFF.

ENGINE PRE-START CHECKS

1. FLIR Wescam MX-10 HCU (on mission console) : - Confirm in STOW position and system switched OFF.
2. MISSION BUS switch : - OFF.

SYSTEM CHECK

After engine starting:

1.	MISSION BUS switch (overhead console)	: - ON.
2.	Cockpit Mission Display (if installed)	: - Verify display illuminated. - Set as required.

On mission console:

3.	CSL knob	: - Adjust brightness as required.
4.	Spot light	: - As required.
5.	Monitor	: - (If required) Turn ON and set formats as needed.
6.	D-VAR control panel	: - Verify display illuminated.

If FLIR use is required during the mission:

7.	FLIR Wescam MX-10 HCU	: - Switch system ON.
8.	FLIR Wescam MX-10 image	: - Select EO camera(s) or IR sensor as required.

Note

The IR sensor may require up to 10 minutes to cool down. IR image will not be available during this period.

- Verify images presence and quality.

9.	FLIR Wescam MX-10 HCU	: - Stow FLIR. - Stow HCU.
10.	Console tilting table	: - Stowed and secured.

BEFORE TAKE-OFF

1. FLIR Wescam MX-10 : - If FLIR is ON, confirm stowed.

On mission console:

2. D-VAR status : - As required.

IN FLIGHT

FLIR OPERATIONS

On mission console:

1. FLIR Wescam MX-10 HCU : - Switch system ON.
2. FLIR Wescam MX-10 image : - Select the VIC sensor as required.
3. FLIR Wescam MX-10 HCU : - Control FLIR direction and settings as required.

Note

When FLIR is not being used it should be stowed to protect the FLIR camera(s) and the TCU.

LASER SYSTEM OPERATIONS

When the Laser System use is required, the operator must be authorized by the pilot before activating the system.

CAUTION

Reflected laser energy from objects closer than 50 m (164 ft) can cause damage to the LRF receiver.

Range Finder Operations

1.	FLIR Wescam MX-10 HCU	: - Push one time the LRF button
2.	Mission console MFD	: - Check correct system indications (LRF energized, status NONE) on overlay information
3.	FLIR Wescam MX-10 HCU	: - Aim the TCU at the desired Target. - Push again the LRF button as required to fire the ESLRF.
4.	Mission console MFD	: - Check that LRF status changes to VALID. - Read the target distance, heading and coordinates (if function is active) on the overlay information.

APPROACH AND LANDING

1.	FLIR Wescam MX-10 HCU	: - Before landing set the FLIR TCU to STOW position and switch OFF. - Stow HCU.
2.	Console tilting table	: - Stowed and secured.

PRE-SHUTDOWN

1.	FLIR Wescam MX-10 HCU	: - Confirm FLIR switched OFF and HCU stowed.

On mission console:

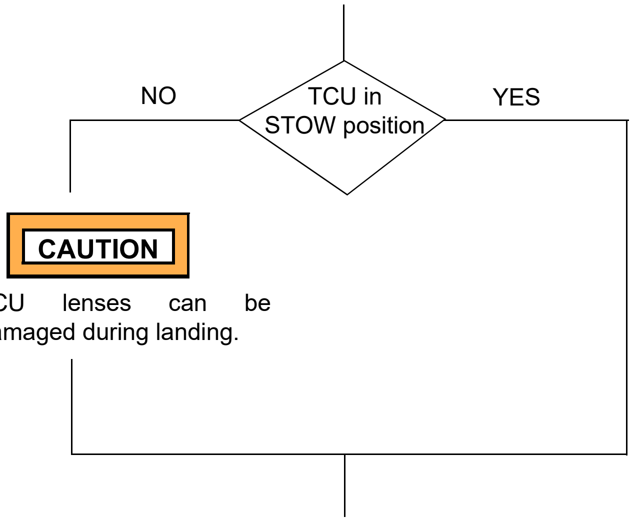
2.	D-VAR	: - Stop recording.
3.	MISSION BUS switch (overhead console)	: - Select OFF.

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

FAILURE OF THE GENERATOR AND D.C. BUS

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

MISSION BUS switch: OFF



Continue with **FAILURE OF THE GENERATOR AND D.C. BUS** malfunction procedure in the basic Rotorcraft Flight Manual.

SECTION 4 - PERFORMANCE DATA

No change.

SECTION 6 - WEIGHT AND BALANCE

No change.

SECTION 7 - SYSTEM DESCRIPTION

GENERAL

The Wescam MX-10 FLIR installation is composed by two main subsystems: the external Turret Camera Unit (TCU) and the internal Mission Console, with a dedicated GPS antenna.

The TCU is a digital, multi-spectral sensor system that is intended for surveillance and/or designating applications from a moving platform.
It contains a payload of sensors and lasers to provide long standoff range day/night imaging capabilities. It is capable of 360° rotation in azimuth and limited rotation in elevation.

The GPS antenna provides the system with Universal Time Coordinated (UTC), vehicle position and altitude data which are then displayed in the sensor overlays. This data is used by the system to determinate target coordinates and slant range values.

A Hand Control Unit (HCU) is the operator interface to the surveillance system. It manages all operator input commands.

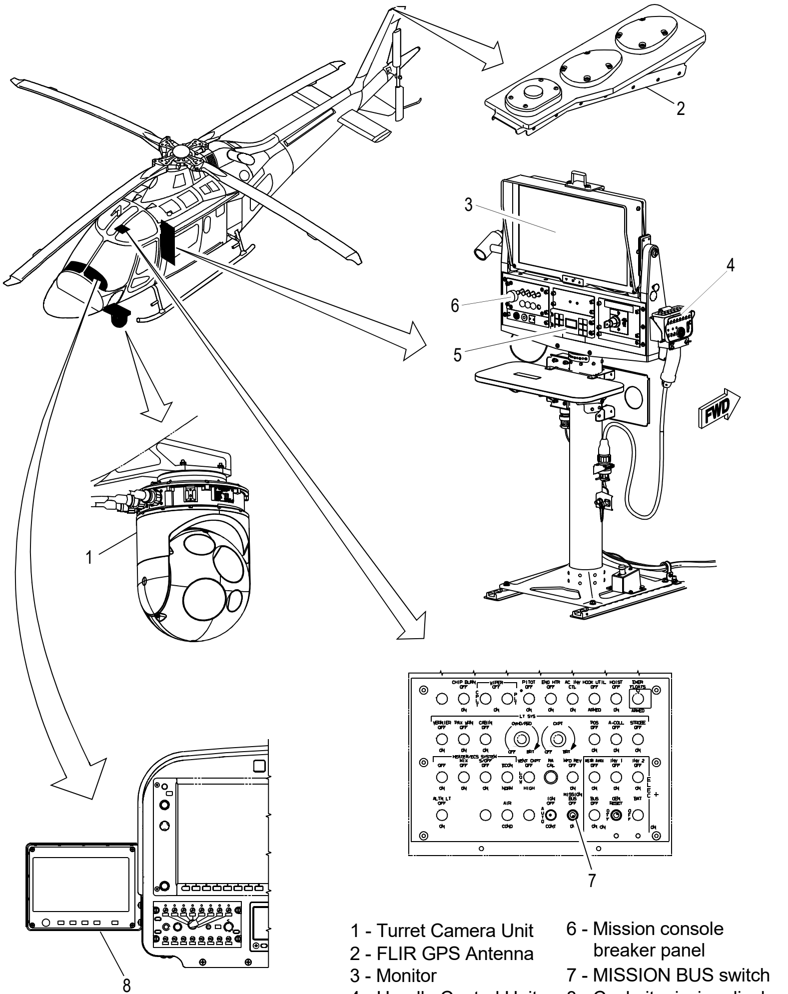
The internal Mission Console is located in the cabin, and includes:

— a 17.3" LCD full-HD monitor, vertically tiltable;
— a D-VAR control panel;
— a Video Downlink control panel (only applicable to G1000H NXi);
— an illumination control and CB panel;
— an Utility Light;
— a tilting table;
— a PTT foot-switch.

The upper part of the mission console can be oriented laterally to a maximum of 45° left and right.

A 7" cockpit Mission Display P/N 109G9300F11, interfaced with MX-10 FLIR, may be installed (only applicable to G1000H).
The cockpit EFIS MFD is interfaced with MX-10 FLIR (only applicable to G1000H NXi).

On AW119MKII G1000H NXi helicopter, the Downlink D-ATKS system receives one video signal from Wescam MX-10 FLIR through Video Distribution Unit and audio input picked up from the AMU.



1 - Turret Camera Unit
2 - FLIR GPS Antenna
3 - Monitor
4 - Handle Control Unit
5 - Video recorder
6 - Mission console breaker panel
7 - MISSION BUS switch
8 - Cockpit mission display

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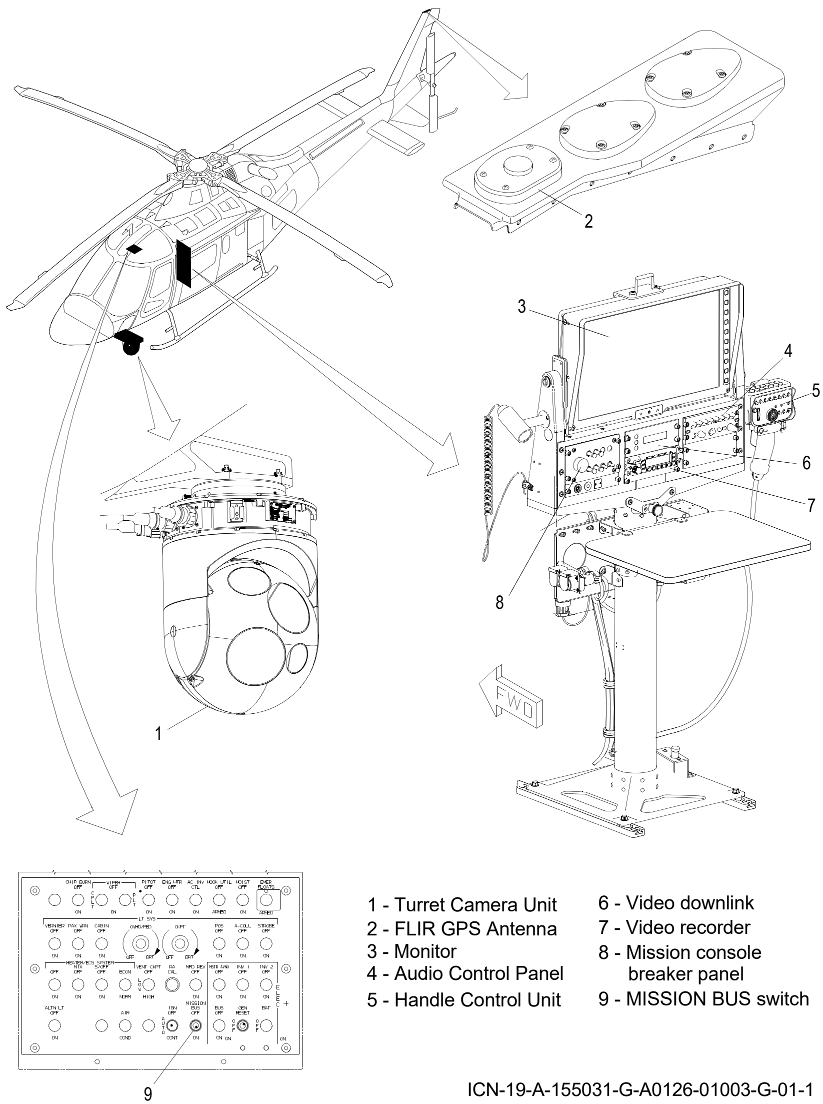
Figure 7-1. Flir MX-10 installation (G1000H only) (sheet 1 of 2)



1 - Turret Camera Unit
2 - FLIR GPS Antenna
3 - Monitor
4 - Audio Control Panel
5 - Handle Control Unit
6 - Video downlink
7 - Video recorder
8 - Mission console breaker panel
9 - MISSION BUS switch

ICN-19-A-155031-G-A0126-01003-G-01-1

Figure 7-1. Flir MX-10 installation (G1000H NXi only) (sheet 2 of 2)

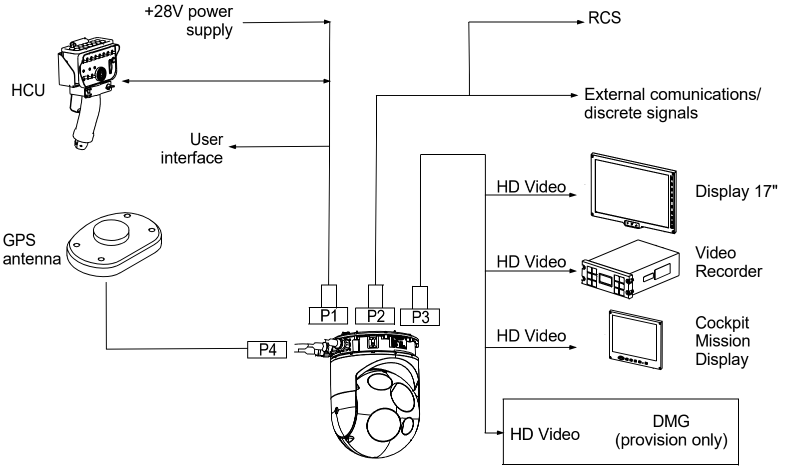


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Figure 7-2. Mission System Configuration (G1000H only) (sheet 1 of 2)

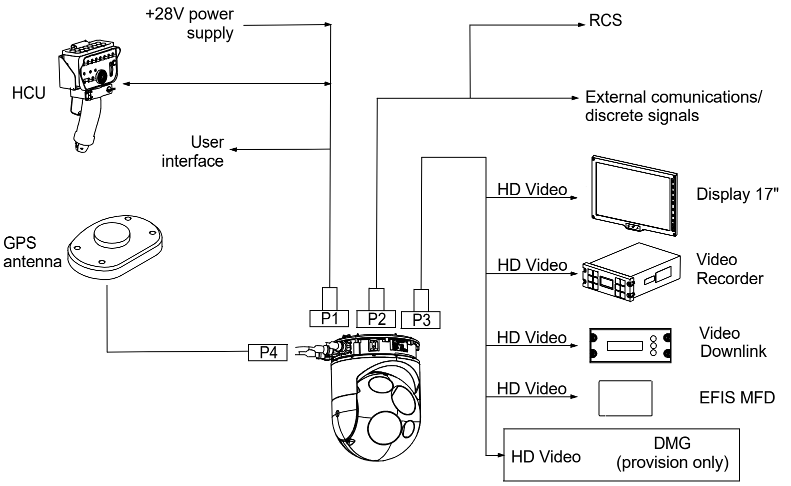

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Figure 7-2. Mission System Configuration (G1000H NXi only) (sheet 2 of 2)

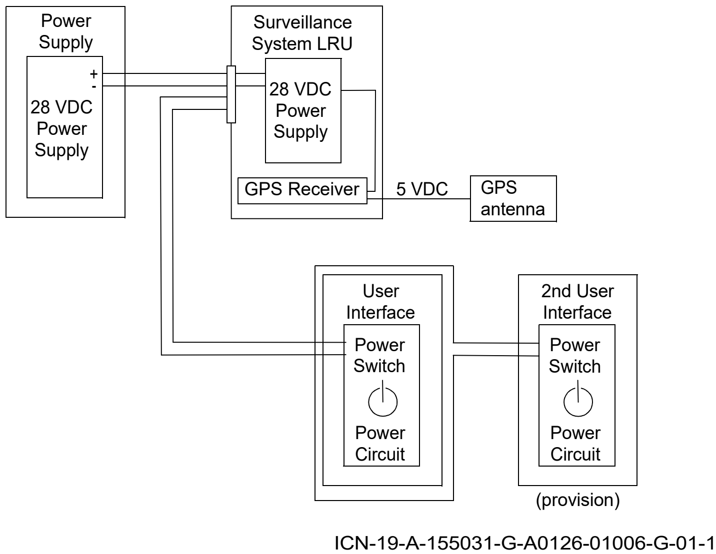

Figure 7-3. System Power Distribution

CONTROLS AND INDICATORS

HAND CONTROLLER - FACE CONTROLS

Face controls of HCU are shown in Figure 7-4 and explained in Table 7-1. .

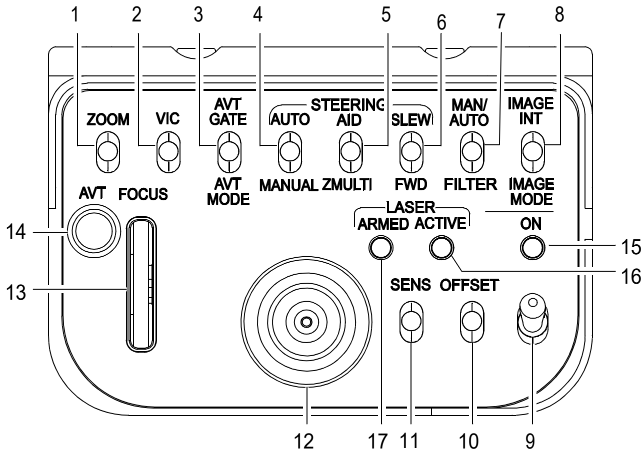

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Figure 7-4. Hand controller Face Plate Switch

Table 7-1. Hand controller Face Commands

ITEM	CONTROL	DESCRIPTION
1	ZOOM SWITCH	Sensor: For the Video-In-Control, click up to zoom-in on the video image. For the Video-In-Control, click down to zoom-out on the video image. **NOTE 1:** Menu: When in a user menu, click up or down to navigate one step in the menu options. When in a user menu, hold up or down to scroll through the menu options. **NOTE 2:** the Video-In-Control's sensor must have zoom capability.
2	VIC switch	Click up to change the Video-In-Control (VIC) to another sensor view. **NOTE :** the VIC is the sensor that is affected by all common controls: i.e. zoom and focus.
3	AVT GATE switch AVT MODE switch	Click up to select an AVT gate size. **NOTE :** the AVT button must also be pressed and held when selecting gate size. Click down to select an AVT tracking algorithm.

ITEM	CONTROL	DESCRIPTION
4	AUTO switch MANUAL switch	Click up to enable an Auto steering mode. Click down to enable a Rate (Manual) steering mode. **NOTE :** Excluding Stow, this selection will cancel all other disabled, assisted or automated steering modes.
5	AID switch ZMULTI switch	When operating in a Rate (Manual) steering mode, click up to enable a Rate-Aid steering mode. When operating in an Auto steering mode, click up to enable an Auto-Aid steering mode. **NOTE :** for the Video-In-Control, Turret steering will speed or slow to compensate for focal length changes. Unzoomed viewing will steer quickly while zoomed viewing will be less responsive.

ITEM	CONTROL	DESCRIPTION
6	SLEW switch	When operating in a Rate (Manual) steering mode, click up to enable a Rate-Aid steering mode.
	FWD switch	When operating in an Auto steering mode, click up to enable an Auto-Aid steering mode. **NOTE :** for the Video-In-Control, Turret steering will speed or slow to compensate for focal length changes. Unzoomed viewing will steer quickly while zoomed viewing will be less responsive.
7	MAN/AUTO switch	When operating in a Rate (Manual) steering mode, click up to enable a Rate-Aid steering mode.
	FILTER switch	When operating in an Auto steering mode, click up to enable an Auto-Aid steering mode. **NOTE :** for the Video-In-Control, Turret steering will speed or slow to compensate for focal length changes. Unzoomed viewing will steer quickly while zoomed viewing will be less responsive.

ITEM	CONTROL	DESCRIPTION
8	IMAGE INT switch	Click up to select the strength of an applied Image Processor mode.
	IMAGE MODE switch	Click down to select an available Image Processing mode.
9	POWER switch	Lift up and push forward to enable turret power. Lift up and pull back to disable turret power. NOTE : this is a protected switch with detents that prevents accidental switching. You must lift up to pass the detent to either enable or disable system power.
10	OFFSET switch	IR Sensor: When in Manual Sensitivity mode, click up to increase the IR temperature offset. When in Manual Sensitivity mode3, click down to decrease the IR temperature offset. EOW & EON sensors: Click up to increase the video's black level. Click down to decrease the video's black level. **NOTE :** Sensitivity is similar to a contrast control on a television or computer monitor.

ITEM	CONTROL	DESCRIPTION
11	SENS switch	IR Sensor: When in Manual Sensitivity mode, click up to increase the sensitivity value. When in Manual Sensitivity mode, click down to decrease the sensitivity value. EOW & EON Sensors: When in Manual Sensitivity mode, click up to increase the sensitivity value. When in Manual Sensitivity mode, click down to decrease the sensitivity value. Menu: When in a user menu, click up or down to change selected field values. **NOTE :** sensitivity is similar to a brightness control on a television or computer monitor.
12	Slew Transducer Joy-stick	Press up or down to change the elevation (vertical) position of the turret. Press left or right to change the azimuth (horizontal) position of the turret. Map Mode: Moves map screen cursor.

ITEM	CONTROL	DESCRIPTION
13	FOCUS dial	For the Video-In-Control, scroll up or down to adjust the VIC sensor's focus.
14	AVT button	AVT Mode: Push and hold the button to enable AVT function. Release button to set the target lock. Map Mode: Press button to initiate a left mouse click on a Moving Map.
15	ON Status Light	Lit LED indicates that the turret is powered. Unlit LED indicates that the turret has no power.
16	Reserved	Reserved
17	Reserved	Reserved

HAND CONTROLLER - BUTTON CONTROLS

The button controls of HCU are shown in Figure 7-5 and explained in Figure 7-2.

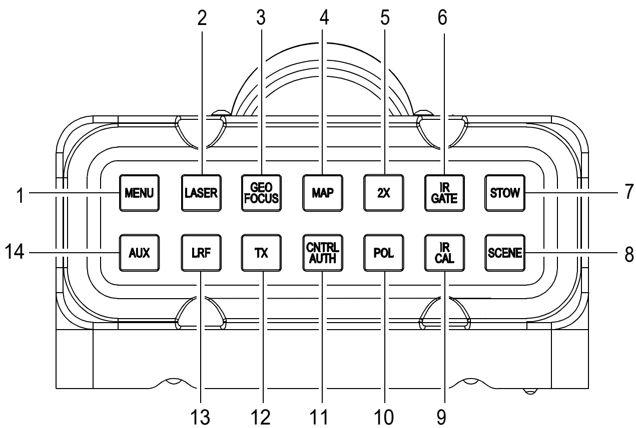

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Figure 7-5. Hand controller Top Button

Table 7-2. Hand controller Top button Commands

ITEM	CONTROL	DESCRIPTION
1	MENU button	Menu: Press once to display the user menus. When in a user menu, press once to select a menu option. Press and hold for 2 seconds to exit from all user menus. Sensor: For the Video-In-Control, press to clear displayed Pop-up alerts.
2	Reserved	Reserved
3	GEO FOCUS button	Press to enable or disable sensor Geo Focus. Push and hold for 2 seconds to enable Geo Focus Trim mode. Use the focus wheel to adjust the sensor’s focus. When in Trim mode, press once to return to Geo Focus with trim settings applied. **NOTE 1:** In Geo Focus mode, all sensors are auto-focused to a distance set by the range-to-target value. **NOTE 2:** In Trim mode, the focus wheel sets a trim offset that compensates for accuracy errors introduced by calculated target distances.

ITEM	CONTROL	DESCRIPTION
4	MAP button	Press to enable Hand Controller steering control of a moving map cursor position (not supported with all MAP type).
5	2X button	Press once to enable 2x E-Zoom for the IR sensor. Press twice to enable 4x E-zoom for the IR sensor. Press a third time to disable E-Zoom for the IR sensor.
6	IR GATE button	Press to toggle through gate size options. **NOTE:** Gate size samples an area of contrast level in an IR image. The system software then applies the sampled level to balance the entire IR image.
7	STOW button	Press to enable automated steering control of the turret to the stow position.

ITEM	CONTROL	DESCRIPTION
8	SCENE button	EOW &EON Sensors: Press to change scene type to compensate for high or low image contrast. IR Sensor: Press to change scene type to compensate for high or low image contrast. **NOTE:** Scene will provide new parameters for video correction after a 1-Point calibration is initiated. Press the IR CAL button after pressing the SCENE button.
9	IR CAL button	For the IR sensor, press to initiate a 1-Point calibration.
10	POL button	For the IR sensor, press to change polarity of the video image from white hot to black hot.
11	CNTRL AUTH button	Press to transfer steering control authority in a multi Hand Controller configuration (provision).
12	TX button	Press to enable or disable MX-POD microwave transmission.

ITEM	CONTROL	DESCRIPTION
13	LRF button	Press once to enable the Laser Range Finder. When the laser is enabled, press once for a single fire of the laser. When the laser is enabled, press and hold for 2 seconds to fire the laser in a continuous Pulse mode.
14	AUX	Spare button for optional system integration.

LIST OF REVISIONS

REVISION No.	SUBJECT	DATE
—	Issue 1	30 July 2015
1	Not affected	—
2	Revised pages C-1, 7-20 and 7-21.	30 June 2016
3	Not affected	—
4	Revised pages C-1, 9-i, 9-iii and 9-47 thru 9-62.	06 November 2017
5	Not affected	—
6	Revised pages C-1, 7-ii thru 7-iv, 7-3. Added pages 7-v, 7-vi, 7-4A, 7-4B, 7-12, 7-13 and 7-26A thru 7-26T.	21 December 2018
7	Revised pages C-1, 7-iii, 7-v, 7-27, 7-41, 7-48, 8-i thru 8-iii and 8-6 thru 8-10. Added 7-40A, 7-40B, 7-49 and 7-50.	23 May 2019
8	Not affected	—
9	Not affected	—
10	Revised pages C-1, 7-44 and 7-45.	21 October 2020
11	Not affected	—
12	Not affected	—
13	Not affected	—
14	Revised pages C-1 and 7-38.	4 November 2021
15	Not affected	—
16	Revised pages C-1, 9-i and 9-iii thru 9-iv. Added pages 9-v thru 9-viii and 9-63 thru 9-124.	31 May 2022
17	Revised pages C-1 and 6-21.	21 December 2022
18	Not affected	—
19	Not affected	—
20	Not affected	—

REVISION No.	SUBJECT	DATE
21	Revised pages C-2, 7-ii, 7-iii, 7-v, 7-3, 7-4, 7-4A, 7-26R thu 7-26T and 7-27. Added pages, 7-26U, 7-26V and 7-36A thru 7-36H.	24 April 2024
22	Revised pages C-2, 9-ix and 9-x.	11 November 2025

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.

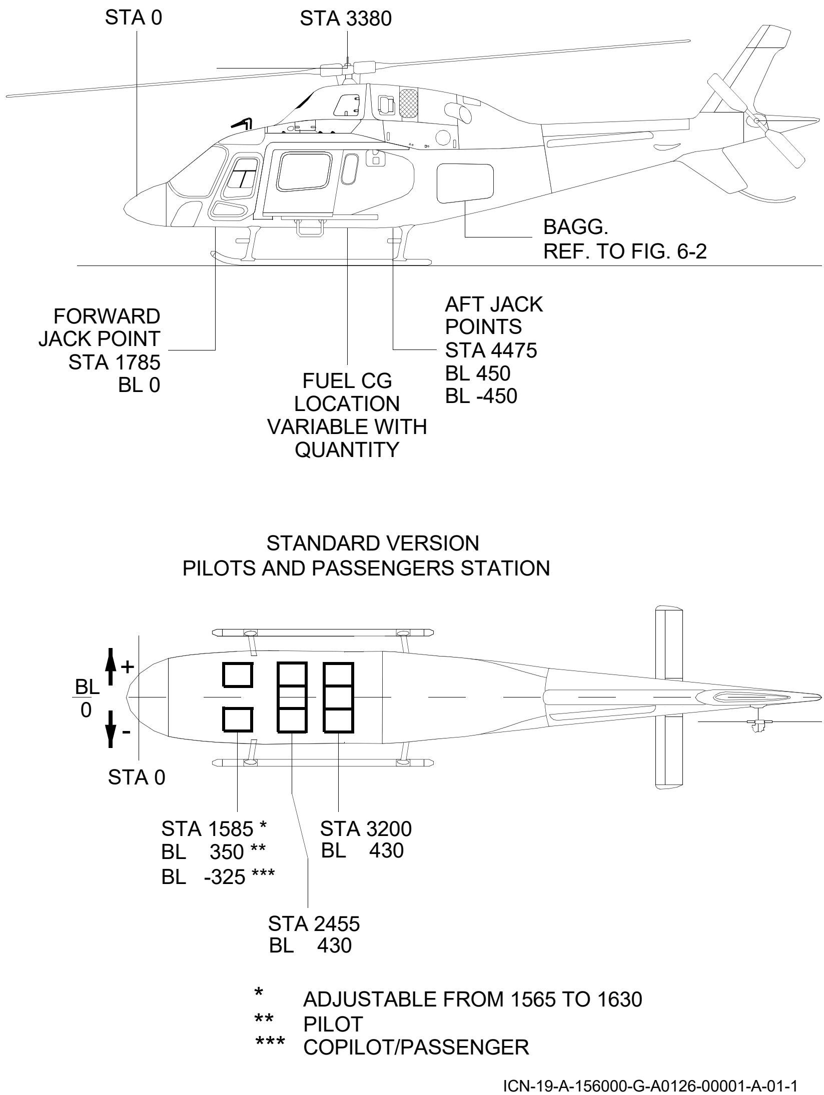

Figure 6-1. Stations and Butt Lines

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

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

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

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.

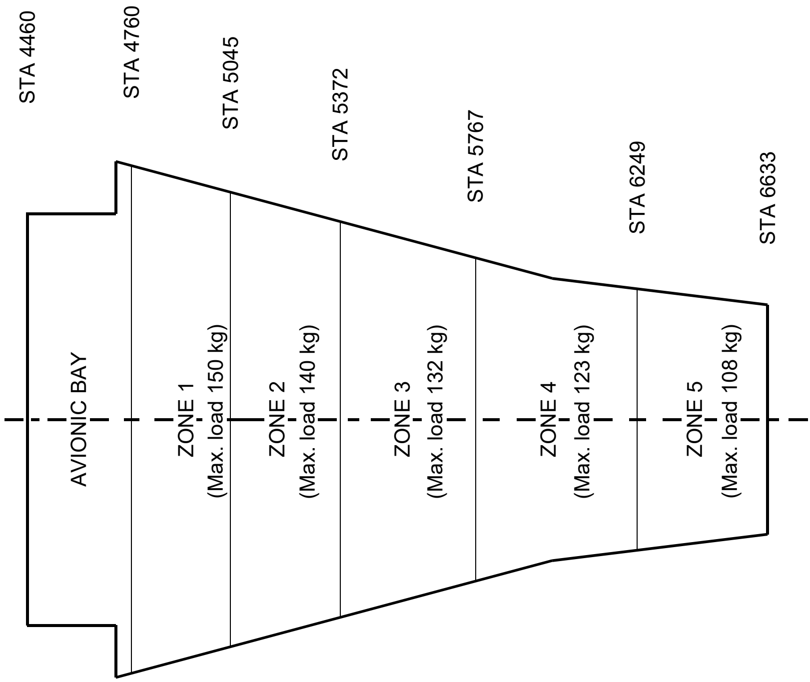

Figure 6-2. Baggage Loading Zone

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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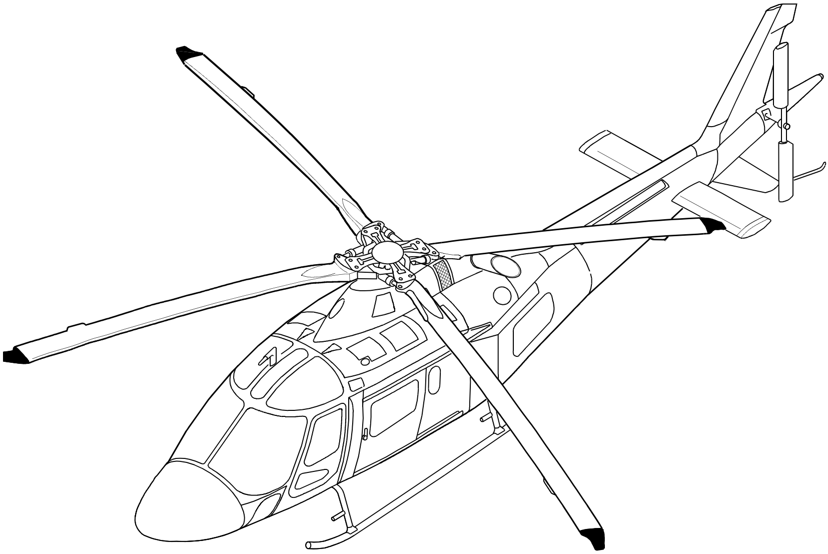
WEIGHT AND BALANCE



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HELICOPTER AW119 MKII

APPLICABLE FROM 14901 AND SUBS

SERIAL NUMBER. . . . .

REGISTRATION MARKS . . . .

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For all pages of Chart A:

— √ Means installed on the helicopter

— ○ Means not installed on the helicopter

Page 1 of 1

RECORD OF CHECKING (Date and Signature)

CHART A - EQUIPMENT LIST

Report 109G0840W046

MODEL: AW119 MKII	**REGISTRATION MARKS**	**S/N**

ITEM NUMBER	**POWER PLANT SYSTEM**		**Q.ty**	**WEIGHT (Kg)**	**ARM (mm)**	**MOMENT (Kg mm)**	Basic configuration	In helicopter	Chart C entry	In helicopter	Chart C entry	In helicopter	Chart C entry
	P/N	**DENOMINATION**											

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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 with one forward jack point and two aft jackpoints.

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.

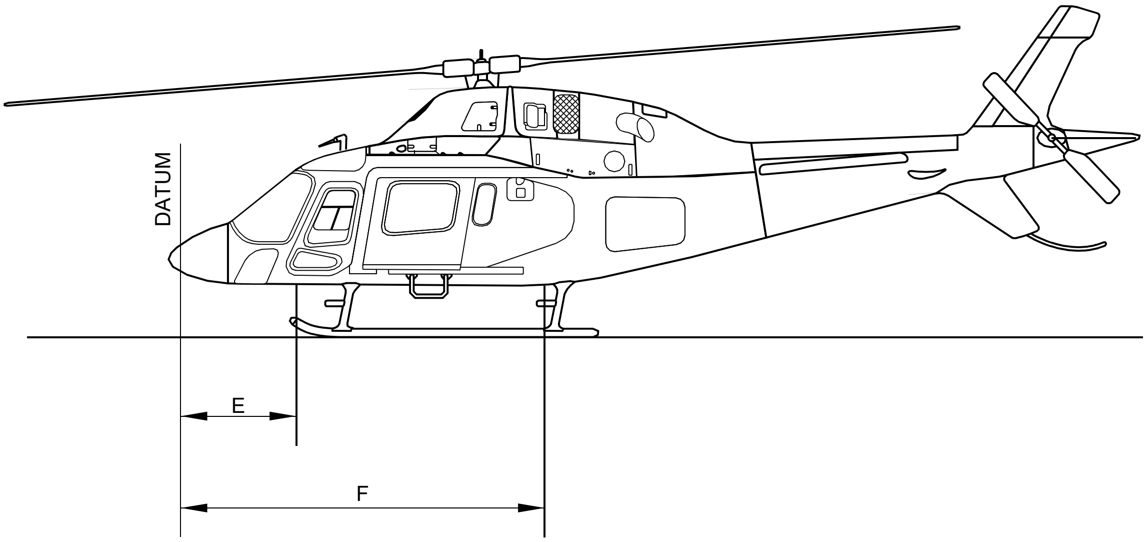

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CHART B - HELICOPTER WEIGHING RECORD					Sheet 2 of 2
DESCRIPTION	NET WEIGHT	STA	LONG. MOMENT	BL	LAT. MOMENT
	(Kg)	(mm)	(Kg mm)	(mm)	(Kg mm)
TOTAL (as weighed) (from Sht. 1 of 2)					
SUBTRACT (from Tab. 1)					
ADD (from Tab. 2)					
BASIC AIRCRAFT (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)
TOTAL					

TABLE 2 BASIC ITEMS NOT INSTALLED WHEN WEIGHED

DENOMINATION	WEIGHT	STA	LONG. MOMENT	BL	LAT. MOMENT
	(Kg)	(mm)	(Kg mm)	(mm)	(Kg mm)
TOTAL					

Reasons of the weighing:	Type Scales:

NOTE:
Remove the weight of the mission equipment items, which are pointed out in Chart A

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CHART C - BASIC WEIGHT AND BALANCE RECORD

Page N°

MODEL	S/N	REGISTRATION MARKS

DATE	Item n° see Chart A IN (1)	Item n° see Chart A OUT (2)	DENOMINATION	LOADING CHANGE WGT (3) (Kg)	LOADING CHANGE STA CG (mm)	LOADING CHANGE LONG MOMENT (Kg mm)	LOADING CHANGE BL CG (mm)	LOADING CHANGE LATERAL MOMENT (Kg mm)	BASIC WEIGHT, MOMENT & CG WGT (Kg)	BASIC WEIGHT, MOMENT & CG LONG MOMENT (Kg mm)	BASIC WEIGHT, MOMENT & CG STA CG (mm)	BASIC WEIGHT, MOMENT & CG LATERAL MOMENT (Kg mm)	BASIC WEIGHT, MOMENT & CG BL CG (mm)	SIGNAT.

Note 1 IN = installed component **Note 2** OUT = removed component
Note 3 Weight of an installed component is positive (+) Weight of a removed component is negative (-)

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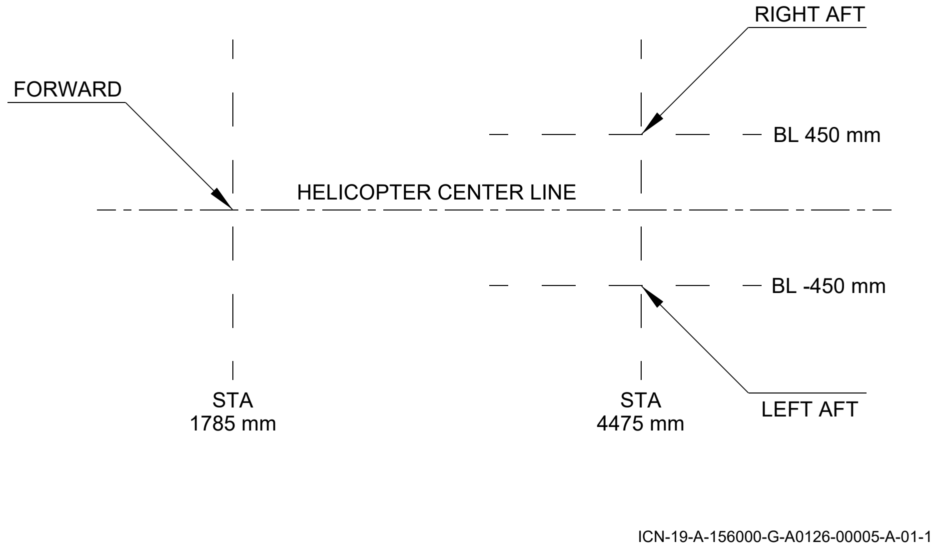
CHART D - DATA FOR HELICOPTER WEIGHT & BALANCE COMPUTATION

MODEL AW119 MKII G1000H

JACKPOINTS LOCATION



Longitudinal sta 0 (datum) is 1785 mm forward of the front jackpoint.

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CHART E - WEIGHT & BALANCE COMPUTATION FORM

MODEL	S/N	REGISTRATION MARKS	DATE	PLACE	COMPUTED BY

Ref.	ITEM	WEIGHT (Kg)	STA (mm)	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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LIST OF FIGURES

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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.

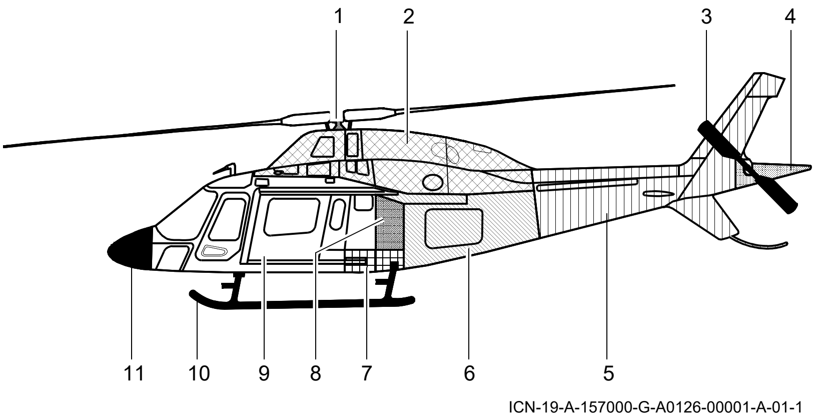
The rear section accommodates the fuel tanks, the electrical and electronic equipment compartment and the baggage compartment. The landing gear skid is secured to the undersides of the cabin and rear sections.

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.

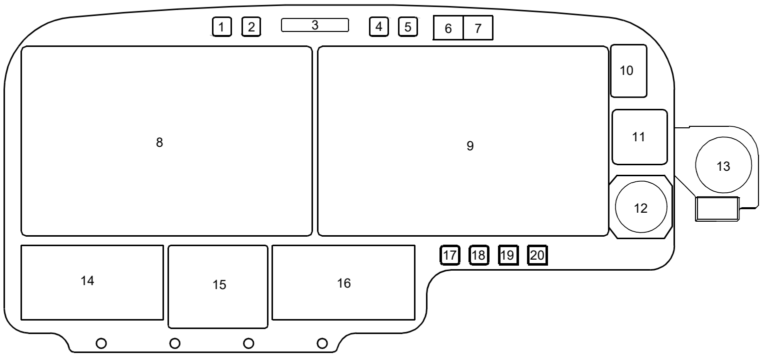


1. Main rotor
2. Upper deck
3. Tail rotor
4. Tail cone
5. Tail boom
6. Fuselage rear section
7. Fuel tank compartment
8. Avionic equipment compartment
9. Cabin
10. Skid landing gear
11. Nose compartment

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 interseat console and to Figure 7-5 for overhead console.



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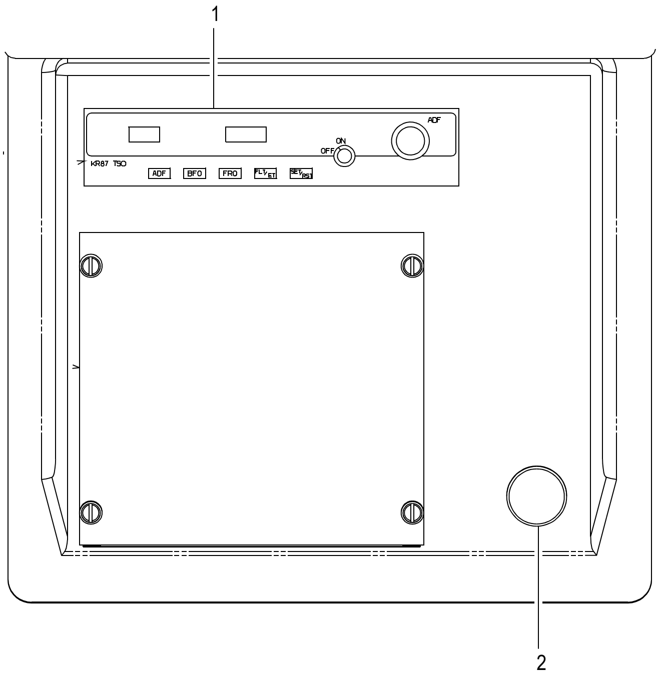
1. Provision for illuminated switch/annunciator
2. Provision for illuminated switch/annunciator
3. Marker Beacon / ADF
4. Provision for illuminated switch/annunciator
5. Provision for illuminated switch/annunciator
6. Master Caution Light (MCL)
7. Master Warning Light (MWL)
8. Multi Function Display (MFD)
9. Primary Flight Display (PFD)
10. ELT Remote switch
11. Hoist cable payout indicator
12. Hook Load Indicator
13. Magnetic Compass
14. Copilot ICS control panel
15. Stand-by Indicator
16. Pilot ICS control panel
17. GSC 1 switch (G1000H only)
18. GSC 2 switch (G1000H only)
19. MFD on/off switch
20. PFD on/off switch

Figure 7-2. Instrument Panel



AW119MKII G1000H

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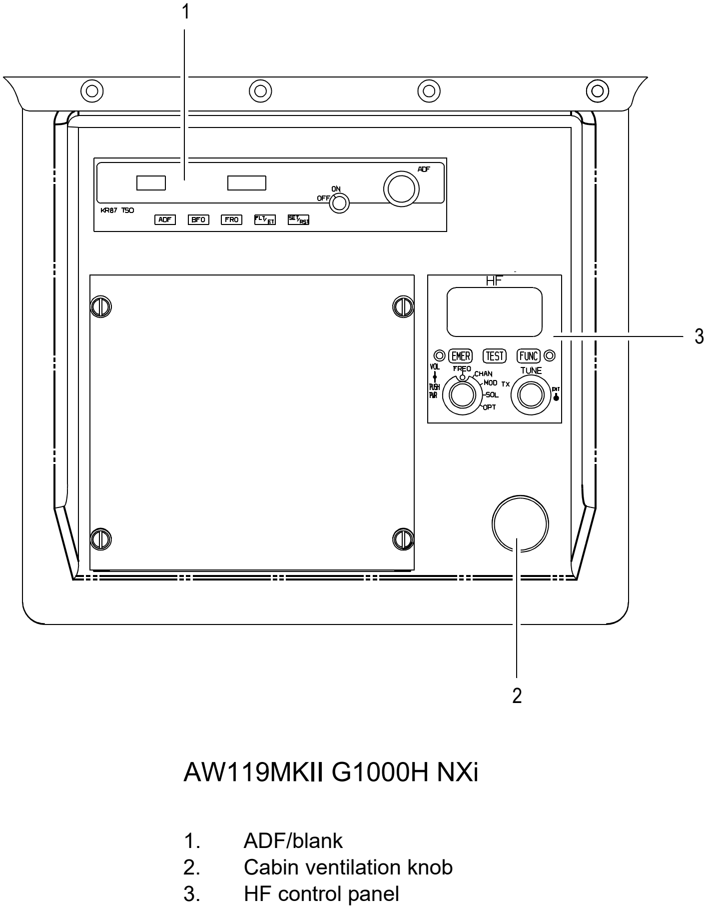
1. ADF
2. Cabin ventilation knob.

Figure 7-3. Front Console (sheet 1 of 2)



AW119MKII G1000H NXi

1. ADF/blank
2. Cabin ventilation knob
3. HF control panel

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Figure 7-3. Front Console (sheet 2 of 2)

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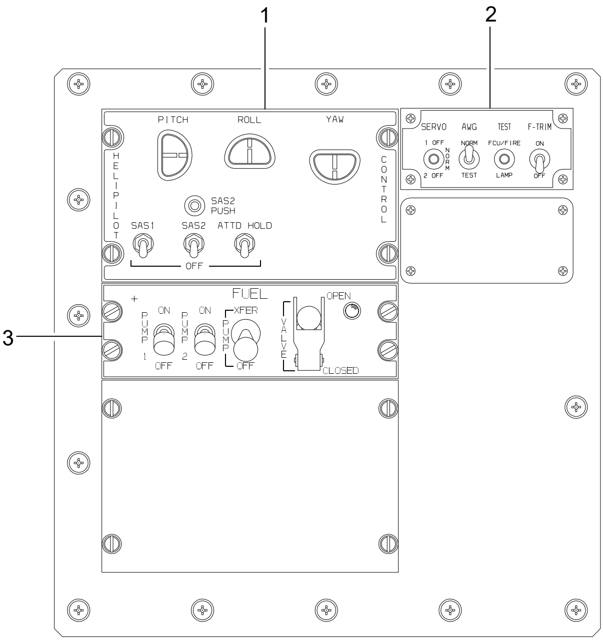

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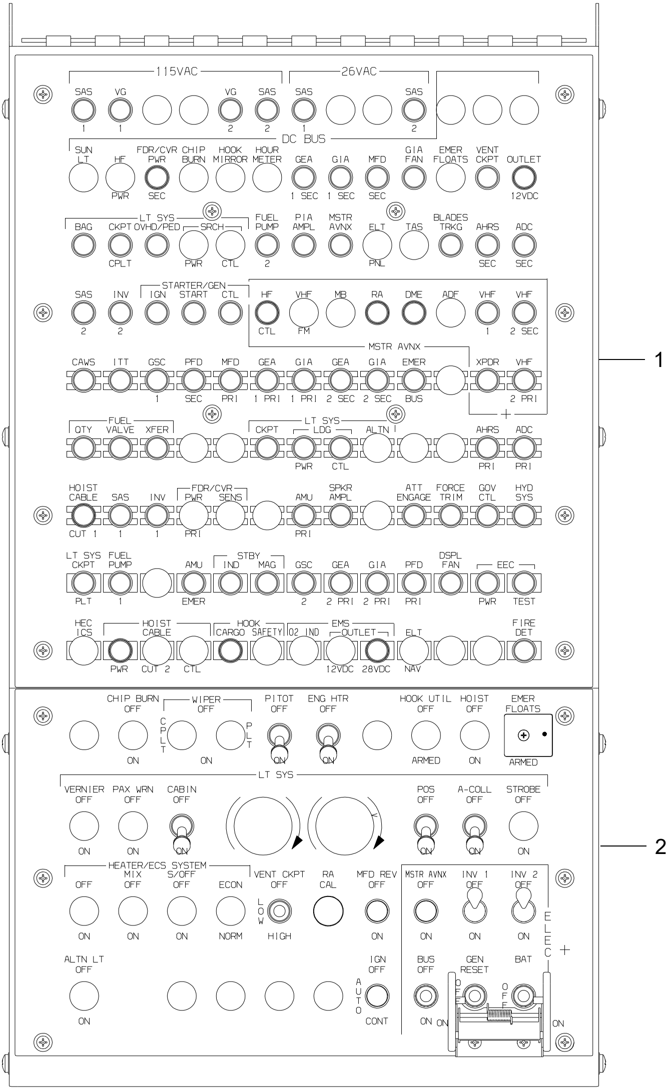
1. Helipilot control panel
2. Miscellaneous control panel
3. Fuel management control panel

Figure 7-4. Interseat Console



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1. Circuit breaker panel
2. Electrical control panel

Figure 7-5. Overhead Console

INTEGRATED FLIGHT DECK G1000H

The G1000H package is an avionics system that includes the integrated functions of communication, navigation, identification, audio, air data, attitude and heading reference. This system uses color active matrix liquid crystal displays that incorporate multiple flight instrument functions and annunciations. Additionally, the system provides engine indicating system (EIS), crew alerting system (CAS) and diagnostic functions on the displays to eliminate traditional engine gauges, annunciator panels and external diagnostic equipment.

The AW119MKII G1000H cockpit layout is composed by three display:

— One PFD (Primary Flight Display) and One MFD (Multi Function Display) units, respectively located on the right and left side of the cockpit instrument panel, in front of the Pilot.

— One ADI STBY unit located under the right side of the MFD on the cockpit instrument panel.

AVIONICS FUNCTIONAL DESCRIPTION

A significant change has been introduced in the AW119MkII with G1000H avionic system.

A modern glass cockpit configured with Garmin's G1000HTM Integrated Flight Deck system enhances situational awareness. The avionic suite comprises a Synthetic Vision System with Highway In The Sky (HITS) depiction, moving map and a Helicopter Terrain Avoidance Warning System (HTAWS) with worldwide terrain and obstacle database.

The AW119MkII with G1000H VFR avionics system consists of the main subsystems and components listed below:

— Two GDU-1040 10.4" display units providing a Primary Flight Display (PFD) and a Multifunction Display (MFD) and integrating Synthetic Vision System.

— Two GIA-63H Integrated Avionics Units (IAU) comprising:

  — COM 1&2

  — NAV 1&2

  - GPS 1&2
  - Aural Alert Generator
  - DME tuning interface
- GTX-33H Mode-S Transponder with Extended Squitter (ES) capability
- Digital Audio Control System (DACS) NAT with two cockpit panels
- Magnetic Compass indicator
- L3 Avionics System ESI-2000 Electronic Stand-by Indicator
- Engine Hour meter

In addition to the aforementioned avionic system the following systems are integrated:

- Helicopter Terrain Awareness and Warning System (HTAWS);
- Radar Altimeter RA-4500 FreeFlight Systems;
- Traffic Advisory System (TAS).

GDU 1040 DISPLAY UNITS

The GDU 1040 unit provides primary display and control capabilities of the G1000H System. As shown below in Figure 7-6 it allows for tuning of communication and navigation frequencies, flight planning interfaces, barometric correction inputs, cursor control, map range selection and panning, and context-sensitive soft keys. The GDU 1040 has two SD cards slots to facilitate data transfer such as flight plan, database uploading such as aviation, terrain, obstacles, and IGRF (international Geomagnetic Reference Field) model Download capabilities focus on the retrieval of system data for maintenance troubleshooting and various engineering data collection.

The GDU 1040 can operate as a PFD or MFD depending upon the wiring connection and can operate in reversionary mode.

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Figure 7-6. G1000H Primary Flight Display (PFD) with Inset Display of EIS (for reference only)

As shown below in Figure 7-7, on the GDUs, COM 1 and COM 2 are controlled with conventional rotary selectors for frequency and volume/squelch and a frequency transfer button in the upper right-hand corner. Similar controls exist in the upper left-hand-corner for the VOR/ILS 1 and VOR/ILS 2 frequency and volume control. In the middle of the right side bezel is a knob for Baro-select. The joystick control, below the Baro knob, enables easy zooming and panning on the map. The lower right concentric knob facilitates control and entry of flight management navigation functions.

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Figure 7-7. Representative G1000H Multi-Function Display (MFD) (for reference only)

PFD FUNCTIONS

When used as a PFD, the GDU displays airspeed, attitude, altitude, heading, and slip / skid indicators in a standard aircraft “T”. Figure 7-8 depicts the PFD in 360° HSI mode.

In the PFD, bank and pitch information is intuitive by virtue of a full-screen horizon that is visible behind translucent tapes and other translucent indications. The slip / skid indication, provided by the white slider bar below the bank-angle pointer, is co-located with bank indication for turn-coordination convenience.

The airspeed tape on the left highlights the current calibrated airspeed at the center of the moving tape, along with standard color coding for helicopter specific airspeed ranges / limits. The box immediately below the airspeed tape indicates Ground Speed (as applicable) when in flight. Overspeed awareness is represented at the high end of the airspeed tape.

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Figure 7-8. PFD with 360° HSI depicts basic PFD functionality (shown with SVT) (for reference only)

On the right side of the pitch ladder, barometric-corrected altitude is displayed at the center of the tape. The Baro-correction setting, which is controlled using the BARO knob, is displayed below the altitude tape. If an altitude has been preselected, it will appear directly above the altitude tape. An altitude select bug is shown on the left side of the altitude tape. An altitude alerting function also uses this pre-select value to provide visual and aural cues to the flight crew. In addition, an altitude minimums function exists for alerting the decision height or minimum descent altitude has been transitioned.

Vertical speed is displayed in a box that moves up/down along the static vertical speed tape (to the right of Baro-altitude).

Complementing the primary information on the PFD on a full-time basis are the following information types:

— COM 1 / 2 Communication frequencies (upper right), both active and stand-by

— VOR/LOC 1 / 2 NAV frequencies (upper left), both active and stand-by

— FLIGHT PLAN STATUS that includes active waypoint, distance to waypoint, desired track, and current track.

— CLOCK (lower right)

— OAT/SAT/RAT (whichever one is applicable; lower left)

— XPDR current status (lower right).

SYNTHETIC VISION TECHNOLOGY

Synthetic vision technology (SVT) is intended to provide the pilot with a greater awareness of the aircraft‘s position relative to surrounding terrain, obstacles, and traffic. This is to be accomplished by placing a three dimensional depiction of terrain, obstacles, and traffic in the primary field of view such that their proximity is more easily understood during instrument scanning.

A primary element of the SVT is a computer-generated image of the external scene topography from the pilot‘s perspective. This image is shown behind the primary flight instruments on the PFDs and is derived from aircraft attitude, a high-precision GPS navigation solution, and terrain and obstacle databases. Additionally, the system presents pathway boxes that provide a “highway in the sky” (HITS) depiction of the selected or programmed navigation path using a pilot‘s perspective view of the path through the air.

MFD FUNCTIONS

The MFD provides a fully-capable synthetic moving map with user-selectable overlays including terrain, political boundaries, Victor and Jet airways, airspace, navigation aids, airports, flight plan.

Additional map-related capabilities include auto zoom, NAV range ring overlay, fuel range ring overlay, wind vector, map de-clutter features, bearing/distance measurements, and nearest airport/frequency features.

Terrain Proximity is a terrain awareness system that increases situational awareness and aids in reducing controlled flight into terrain.

It does not comply with TSO-C151b certification standards and must not be confused with the Helicopter Terrain Awareness and Warning System (HTAWS).

HTAWS is more sophisticated and robust, and it is TSO-C151b certified.

Terrain Proximity does not provide warning annunciations or voice alerts. It only provides color indications on map displays when terrain and obstacles are within a certain altitude threshold from the aircraft. Although the terrain and obstacle color map displays are the same, HTAWS uses more sophisticated algorithms to assess aircraft distance from terrain and obstacles.

Terrain Proximity requires the following components to operate properly:

— Valid 3-D GPS position

— Valid terrain/obstacle database

Terrain Proximity displays altitudes of terrain and obstructions relative to the aircraft position and altitude with reference to a database that may contain inaccuracies. Terrain and obstructions are shown only if they are in the database. Terrain and obstacle information should be used as an aid to situational awareness. They should never be used to navigate or manoeuvre around terrain.

Note that all obstructions may not be available in the terrain and obstacle database, and may not be displayed. No terrain and obstacle information is shown without a valid 3-D GPS position.

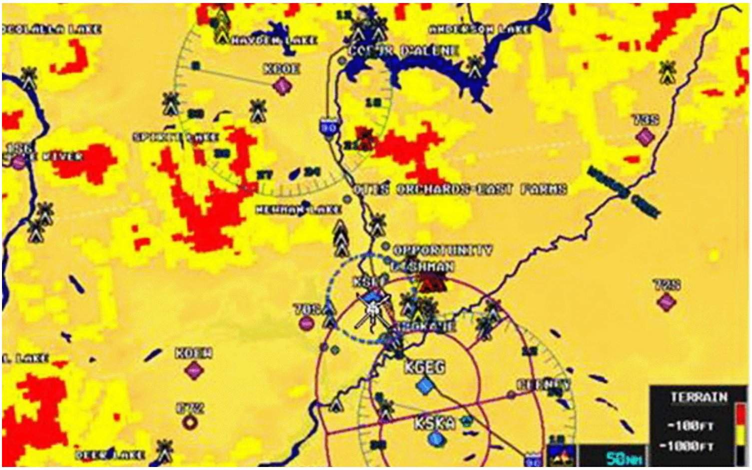

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Figure 7-9. Terrain overlay on moving map (for reference only)

DISPLAY REVERSION INTERFACE

The display units operate in the following modes:

Normal mode (Figure 7-10) Reversionary mode (Figure 7-11) Start/ Auto mode (Figure 7-12)

In reversionary mode, flight information is presented on the remaining display in the same format as the PFD operating in normal mode. The secondary EIS (Engine Indication System) indications normally presented on the MFD are no longer available in reversionary mode. However, a CAS message is displayed on the remaining display in the event that a secondary EIS indication is out-of-range.

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Figure 7-10. Representative Normal Mode Display for G1000H (for reference only)

ICN-19-A-157000-G-00005-10012-A-01-1

Figure 7-11. Representative Reversionary Mode Display for G1000H (shown with SVT) (for reference only)

ICN-19-A-157000-G-00005-10013-A-01-1

Figure 7-12. Representative Start/Auto Mode Display for G1000H (for reference only)

GEA 71H ENGINE AND AIRFRAME UNIT

The GEA 71H (two installed) interfaces to analog sensors and transducers in the engine compartment, fuselage and tail boom. It conditions the signals and transmits results to be displayed.

GRS 77H ATTITUDE AND HEADING REFERENCE SYSTEM

The GRS 77H is a remote-mounted AHRS that outputs attitude and heading data for primary display.

The GRS 77H uses a combination of internal solid-state sensors and external input data to determine an aircraft‘s attitude and heading. External inputs to the GRS 77H include one magnetometer, one air data computer, and two GPS sources. The magnetometer is the sensor source for magnetic direction, and hence is a required to determine magnetic heading.

GDC 74H AIR DATA COMPUTER

The GDC 74H is a remote-mounted air data computer that provides air data for flight instrumentation. The system measures aircraft static and impact pressure information from pressure transducers and raw air temperature from an outside temperature probe. Using the raw data from the appropriate sensors, the unit computes pressure altitude, vertical speed, airspeed values, air temperature information and density altitude.

GIA 63H INTEGRATED AVIONICS UNIT

The GIA 63H (two installed) is a remote-mounted avionics unit that houses a GPS/WAAS, VHF COM, VHF NAV, and Glideslope receivers in addition to supporting I/O processing, aural alert generation, and flight director functions.

GPS/WAAS Receiver

The GIA 63H‘s GPS navigation receiver has the following distinguishing properties as standard:

a) Compliant with DO-229 specifications for Class 3 for use of GPS with Wide Area Augmentation System (WAAS)

b) Designed to interact with future Satellite-Based Augmentation Systems (SBAS)

c) Primary means for all phases of flight including Oceanic

d) Fault Detection and Exclusion (FDE)

VHF COM Receiver

The GIA 63H‘s VHF communications receiver has the following distinguishing properties as standard:

1. Minimum 16 watt transmit power capability

2. Communications transceiver tuning from 118.00 to 136.990 MHz

3. User-selectable channel spacing of 8.33 kHz or 25 kHz

4. Communications audio output

With two GIA 63H units and two COM radios the pilot and copilot can transmit simultaneously on on-side COM.

VHF NAV and Glideslope Receivers

The GIA 63H‘s VHF navigation receiver has the following distinguishing properties as standard:

1. VOR/Localizer receiver tuning from 108.00 to 117.95 MHz in 50 kHz increments

2. ILS glideslope receiver tuning from 328.6 to 335.4 MHz as paired with the frequency tuned on the VOR/ILS localizer receiver

3. VOR audio and automatic Morse code identifier output

Aural Alert Generation

The G1000H determines the prioritization, sequencing, and inhibiting of individual alerts from both the G1000H system and most external sources. Only one alert generated by the G1000H may be played at a time.

In the G1000H system, the GDU 1040 units provide the logic for commanding and stopping most G1000H aural alerts. Each GIA 63H maintains a prioritized queue of aural alerts to be played.

Each GIA 63H is capable of generating a digital aural alert stream to source both digital audio processors. This dual channel system provides redundancy for aural alerting.

DIGITAL AUDIO CONTROL SYSTEM (DACS) NAT WITH TWO COCKPIT PANELS

The NAT Digital Audio Communication System (DACS) shall be installed as Intercommunication System (ICS).

The DACS shall monitor the received audio signals, select the signals to be transmitted and provide for interphone communications between the pilots and the passengers. It shall control the audio output of the communication and navigation receivers to the pilots' headphones, and the output of the passengers' microphones to the communication transmitters.

The ICS shall receive the audio inputs from the following components:

— VHF/AM radio (Q.ty 2);

— VOR/ILS receiver (Q.ty 2);

— ADF;

— DME;

— AWG;

— TAWS (EFIS);

— TAS.

Up to 6 spare COM inputs are provided for some customer specific requirements.

The system shall also interface the Cockpit Voice Recorder (CVR) and shall have provisions for the installation of additional equipment such as stereo rack and external loudspeaker (PA).The system shall be composed by:

— Cockpit Audio Panel (Q.ty 2) ACP-53;

— ICS mode controller to isolate or permit the interphone communications between the pilots, the passengers and the patient;

— Audio Management Unit (AMU);

— Receptacles for the connection of pilot’s headset;

— Receptacles for connection of passenger’s headsets;

— Receptacles for connection of ground crew headsets.

The primary component in the system is the AMU. Connected to it are transceivers and receivers in the aircraft, as well as all the Audio Panels. The AMU shall digitize and distribute all radio audio to the Audio Panels over separate serial data links. The microphone audio shall be digitized in the Audio Panels and then sent to the AMU over these same serial data links. The digitized microphone audio shall be re-routed back to the other Audio Panels or transceivers (if transmitting).

The system architecture will be setup in a star configuration (separate serial connections to each Audio Panel) to prevent the loss of the entire system because of a failure of one connection.

Each radio will be provided a receive audio input, a microphone output and a transmit key line. These radio connections can be configured using the digital ICS configuration management software to support transceivers, receivers, PA or unswitched audio sources in any combination up to the maximum of thirty.

The system shall be configurable using a PC connected to the AMU via a USB serial port and NAT supplied configuration management software. Configuration options will include the number of radios accessible by each user, customer defined names for each radio, ICS talk groups, soft button function assignments, etc..

The system will provide power-on Built-In-Test (BIT) as well as a user initiated Built In Test function, accessible from each Audio Panel. This function will offer fault analysis down to the LRU (Line Replaceable Unit) level. Continuous Built In Test at a lower level will also be implemented.

Multiple levels of safety shall be available in this system. Four modes of operation shall be available: normal, backup, slaved and emergency modes. Backup mode shall enable redundant power supplies/AMU/microphone & headphone amplifiers.

Slaved mode shall disconnect the number one user of an Audio Panel from their own Audio Panel and shall connect them to another. Emergency mode directly connects the number one user of an Audio Panel to a specific transceiver, allowing operation of the transceiver under any condition.

For an optimal setting of available volumes and a harmonization of radio-communication RX volumes and sidetones, it is suggested to proceed as follows:

— reduce to 48÷52% the volume of COM receivers using the COM VOL knob on PFD/MFD;

— set to 100% (fully right) the individual VHF volume knobs on all ICS control panels;

— set to mid-range the master RX volume (outer) knob on all ICS control panels.

RX volume (and sidetone) can be therefore adjusted for all COM receivers at the same time using the master RX knob, while the individual RX volume (and sidetone) can be further reduced using the relative VHF volume knob.

GTX 33H EXTENDED SQUITTER (ES) MODE S TRANSPONDER

The GTX 33H is a remote-mounted Mode S transponder without diversity. The GTX 33H functions are controlled by the two GDU-1040.

The GTX 33H supports the following features:

1. Supports European Mode S mandates for Elementary Surveillance and Enhanced Surveillance
2. TIS-A Traffic Information Service
3. Supports remote IDENT, automatic selection and de-selection of on-the-ground mode, and flight ID capability

MAGNETIC COMPASS

The helicopter is provided with a magnetic compass installed on suitable supports on the right side of the instrument panel.

The magnetic compass, of a conventional type, indicates the helicopter heading with reference to the magnetic North. The compass consists of a rotating compass card, and two magnetic bars, attached to the compass card, as compensation system.

The compass card and the magnetic bars are contained in a sealed case filled with damping fluid.

The compass card is graduated in 5-degrees intervals and shows letters and numerals every 30 degrees, heading is read against a lubber line through a transparent window.

The compensation system permits errors correction by changing magnetic bars position through two screws in front of the instrument. A lamp provides the necessary illumination for use in nightlight conditions.

L3 AVIONICS SYSTEM ESI-2000 ELECTRONIC STAND-BY INDICATOR

The ESI-2000 Electronic Standby Inicator (ESI) is a panel-mounted solid-state instrument connected to the MAG-3000 Magnetometer that provides dependable backup for attitude, altitude, airspeed and heading information in the event of complete loss of Garmin G1000H. An internal battery provides backup power for at least 1 hour.

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Figure 7-13. ESI-2000 Electronic Stand-by Instrument Display (for reference only)

HELICOPTER TERRAIN AVOIDANCE WARNING SYSTEM (HTAWS)

The HTAWS (Helicopter Terrain Awareness and Warning System) is designed to increase situational awareness and aid in reducing controlled flight into terrain and obstacles. HTAWS provides visual annunciations and voice alerts when terrain and obstacles are within the given altitude threshold from the aircraft. The visual and voice alerts and warnings are advisory in nature only.

RADIO ALTIMETER FREEFLIGHT RA-4500

The FreeFlight RA-4500 radio altimeter system shall provide instantaneous indication of the height of the helicopter above the terrain up to 2000 feet. The Radio Altimeter shall consist of the following major components: FreeFlight RA-4500 Radio Altimeter Transceiver, Dual antennas.

The information provided by Radio Altimeter shall be displayed on the PFD. A separate aural warning shall also be provided to the crew when the actual height is less or lower than the selected DH value.

The altitude accuracy shall be as follows: 0 to 100 feet: +/- 3 feet 100 to 500 feet: +/- 3% Above 500 feet: +/- 5%

A warning facility shall also be provided to visually and aurally alert the pilot when the helicopter has reached the selected DH.

A control function will also be provided to inhibit the DH setting aural indication when operation at low level is required.

TAS GTS 800 GARMIN

The Garmin GTS 800 Traffic Advisory System (TAS) enhances flight crew situational awareness by displaying traffic information for transponder-equipped aircraft. The system also provides visual and aural traffic alerts including voice announcements to assist in visually acquiring traffic.

The system is capable of tracking up to 45 intruding aircraft equipped with Mode A or C transponders, and up to 30 intruders equipped with Mode S transponders. A maximum of 30 aircraft with the highest threat potential can be displayed simultaneously.

When the traffic system is in Operating Mode, the unit interrogates the transponders of intruding aircraft while monitoring transponder replies. The system uses this information to derive the distance, relative bearing, and if reported, the altitude and vertical trend for each aircraft within its surveillance range. The traffic system then calculates a closure rate to each intruder based on the projected Closest Point of Approach (CPA). If the closure rate meets the threat criteria for a Traffic Advisory (TA), visual and aural alerting is provided.

The GTS 800 surveillance system monitors the airspace within ±10,000 feet of own altitude. Under ideal conditions, the GTS 800 unit scans transponder traffic up to 12 nm in the forward direction.

WARNING, CAUTION, AND ADVISORY LIGHTS

(Figure 7-14)

The PFD provides a dedicate area capable to display up to 14 characters each, for warning, caution, advisory, and status annunciator (also in reversionary mode).

The messages area is displayed in the right portion of PFD screen.

Warning and Cautions activate dedicate attention getters (MWL and MCL respectively) together with an acoustic getter (AWG) when applicable.

The GIA provides an interface for a remotely Master reset Push-button to be used to reset all the attention lights (MWLs and MCLs) and the AWG when they are active.

WARNINGS

Warnings are color code Red.

Warnings have precedence over cautions, advisory, and status messages.

When a warning signal is displayed, the GIA causes the flashing of the MWL, and it disables the MWL when a remote Reset is active.

CAUTIONS

Cautions are color code Amber.

Cautions have precedence over advisory, and status messages.

When a caution signal is displayed, the GIA causes the flashing of the MCL, and it disables the MCL when a remote Reset is active.

ADVISORIES

Advisories are color code Green.

Advisories have precedence over status messages.

The advisory signals do not activate any external attention light.

The demonstration that Warnings, Cautions, Advisories and Status messages colors are easily discernible respect to any other color used to display graphics will be performed during the Cockpit Evaluation.

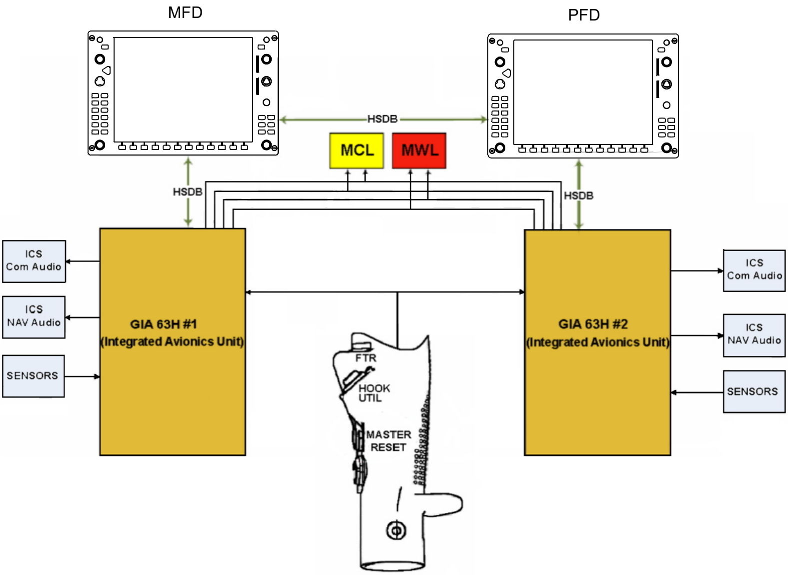

Figure 7-14. Caution / Warning System Architecture

INTEGRATED FLIGHT DECK G1000H NXI

The G1000H NXi package is an avionics system that includes the integrated functions of communication, navigation, identification, audio, air data, attitude and heading reference. This system uses color active matrix liquid crystal displays that incorporate multiple flight instrument functions and annunciations. Additionally, the system provides engine indicating system (EIS), crew alerting system (CAS) and diagnostic functions on the displays to eliminate traditional engine gauges, annunciator panels and external diagnostic equipment.

The AW119MKII G1000H NXi cockpit layout is composed by three display:

— One PFD (Primary Flight Display) and One MFD (Multi Function Display) units, respectively located on the right and left side of the cockpit instrument panel, in front of the Pilot.

— One ADI STBY unit located under the right side of the MFD on the cockpit instrument panel.

AVIONICS FUNCTIONAL DESCRIPTION

A significant change has been introduced in the AW119MkII with G1000H NXi avionic system.

A modern glass cockpit configured with Garmin’s G1000H NXi Integrated Flight Deck system enhances situational awareness. The avionic suite comprises a Synthetic Vision System with Highway In The Sky (HITS) depiction, moving map and a Helicopter Terrain Avoidance Warning System (HTAWS) with worldwide terrain and obstacle database.

The AW119MkII with G1000H NXi VFR avionics system consists of the main subsystems and components listed below:

— Two GDU-1050H 10.4” display units providing a Primary Flight Display (PFD) and a Multifunction Display (MFD) and integrating Synthetic Vision System.

— Two GIA-64H Integrated Avionics Units (IAU) comprising:

    — COM 1&2

- — NAV 1&2
- — GPS 1&2
- — Aural Alert Generator
- — DME tuning interface

— GTX-345R Mode A/C Transponder with ADS-B OUT along with ADS-B IN (1090 and UAT)

— Digital Audio Control System (DACS) NAT with two cockpit panels

— Magnetic Compass indicator

— L3 Avionics System ESI-2000 Electronic Stand-by Indicator

— Engine Hour meter

In addition to the aforementioned avionic system the following systems are integrated:

— Helicopter Terrain Awareness and Warning System (HTAWS);

— Radar Altimeter GRA 55;

— Traffic Advisory System (TAS) GTS 800.

GDU 1050 DISPLAY UNITS

The GDU 1050H is designed as an open architecture system that uses typical ARINC 429, RS-232, and Ethernet communications interfaces. The GDU 1050H communicates with the following LRUs:

— GRS 7800 AHRS (ARINC 429)

— GDC 72H Digital Air Data Computer (ARINC 429)

— GIA 64H IAU (HSDB)

— GTS 800 Traffic Advisory System (HSDB, PFD only)

— GTX 345R Transponder (HSDB, PFD only).

The EFIS System installed on the AW119MKII G1000H NXi is a complete flight and navigation instrumentation system that intuitively provides information to a pilot.

In normal operating mode, the PFD presents graphical flight instrumentation (attitude, heading, airspeed, altitude, vertical speed) in 360 HSI or Arc HSI format, replacing the traditional flight instrument cluster, CAS messages are also displayed on the PFD.

The MFD normally displays a full-color moving map with navigation information, also a traffic map and a terrain proximity are available.

The G1000H NXi Engine Indication System (EIS) displays primary engine, Power Index, electrical, fuel, and other system parameters on the left side of the Primary Flight Display (PFD) and fully EIS information (EIS - Engine Page) on Multi Function Display (MFD) during normal operations (see Figure 7-14A and Figure 7-14B). Using the **ENGINE** Softkey on the MFD the Navigation Map Page (see Figure 7-14C) will be displayed with the secondary EIS indications presented on the right side. EIS information can be fully expanded to an entire page (EIS - Engine Page) using again the ENGINE Softkey on the MFD or pressing the dedicated START/AUTOROT pushbutton on cyclic grip or turning the large **FMS** Knob (the Engine Page is not available in reversionary mode).

Both displays offer control for COM and NAV frequency selection.

In case of a failure of the PFD, the MFD automatically reconfigures as a reversionary PFD.

The G1000H NXi system controls are located on the PFD and MFD bezels.

The EFIS system is a proper FMS: the crew can create, edit, delete Flight plans; the EFIS uses a Jeppesen NavData for the navigation database. In addition to the Jeppesen DB the system uses a Terrain DB to render the forward looking synthetic view on the displays more realistic and to alert the crew in case of too close to terrain flying (see HTAWS).

The EFIS receives information from a 2 different 15 channels WAAS/SBAS certified GPS receivers (GPS1 and GPS2) embedded in the GIA1 and GIA2 respectively. The GPS sends position, time and integrity data to the displays. The GPS position is also used together with a valid Terrain/Obstacle database for terrain awareness alerting (HTAWS). The HTAWS functions alert the crew, visually and through aural tones sent to the ICS that the aircraft is flying too close to terrain.

The AW119MKII G1000H NXi EFIS system is composed of one PFD installed on pilot side and one MFD installed in the centre of the cockpit.

The EFIS System is interfaced with the following equipements:

— 1 AHRS system that provides on Arinc 429 lines Attitude and Heading data;

— 1 ADC that provides on Arinc 429 Air data;

— 2 GIAs (Integrated Avionics Unit) that communicate via HSDB bus with the GDU which contains:

  — VOR/LOC1 (embedded inside GIA1)

  — VOR/LOC2 (embedded inside GIA2)

  — VHF1 (embedded inside GIA1)

  — VHF2 (embedded inside GIA2)

  — GPS1 (embedded inside GIA1)

  — GPS2 (embedded inside GIA2)

  — AWG (embedded inside GIA1 & 2).

— Transponder (GTX 345R) (directly connected to GIA1 & 2 via RS-232 and PFD via HSDB);

— ADF (KR87) (directly connected to GIA2);

— DME (KN63) (directly connected to GIA2);

— RADALT (directly connected to GIA1 & 2 via Arinc 429);

— DMG (embedded);

— TAS (GTS 800) interfaced with PFD via HSDB bus (when installed).

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Figure 7-14A. G1000H NXi Primary Flight Display (PFD) with Inset Display of EIS (for reference only)

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Figure 7-14B. MFD EIS Page (for reference only)

ICN-19-A-157000-G-00005-10024-A-01-1

Figure 7-14C. Representative G1000H NXi Multi-Function Display (MFD) (for reference only)

PFD FUNCTIONS

In normal operating mode, the PFD presents graphical flight instrumentation (attitude, heading, airspeed, altitude, vertical speed).

The left portion of the PFD is dedicated to the Engine Indication System (primary engine parameters only) and part of the right portion to the CAS messages.

SYNTHETIC VISION TECHNOLOGY

The Synthetic Vision Technology (SVT) (see Figure 7-14D) is a visual enhancement to the G1000H NXI Integrated Flight Deck. SVT depicts a forward-looking attitude display of the topography immediately in front of the aircraft. The field of view is 30 degrees to the left and 35 degrees to the right. SVT information is shown on the Primary Flight Display (PFD), or on the Multifunction Display (MFD) in Reversionary Mode. The depicted imagery is derived from the aircraft attitude, heading, GPS three-dimensional position, and a six arc-second database of terrain, obstacles, and other relevant features. The terrain data resolution of six arc-seconds, meaning that the terrain elevation contours are stored in squares measuring six arc-seconds on each side, is required for the operation of SVT. Loss of any of the required data, including temporary loss of the GPS signal, will cause SVT to be disabled until the required data is restored.

The SVT terrain display shows land contours, large water features, towers, and other obstacles over 200’ AGL that are included in the obstacle database. Cultural features on the ground such as roads, highways, railroad tracks, cities, and state boundaries are not displayed even if those features are found on the MFD map. The terrain display also includes a north–south east–west grid with lines oriented with true north and spaced at one arc-minute intervals to assist in orientation relative to the terrain. The colors used to display the terrain elevation contours are similar to that of the topo map display.

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Figure 7-14D. Synthetic Vision Imagery (for reference only)

MFD FUNCTIONS

The MFD normally displays the EIS - Engine Page, which displays all engine, electrical, fuel, alerts, and power calculations (see Figure 7-14B).

Other pages that are pilot selectable are Map and Auxiliary pages: Navigation Map page (with navigation information), Waypoint pages, Auxiliary pages, Flight Plan pages, Nearest pages. These pages are selectable by turning the large **FMS** Knob to select the group and then the small **FMS** knob until the desired page is selected. Several pages (Airport Information and XM Information pages) which are selected first from within a main page group with the FMS Knobs, then with the appropriate softkey at the bottom of the page. The left portion of the MFD is dedicated to the Engine Indication System (only secondary engine parameters)

In the event of the PFD failure, the MFD display automatically reconfigures to reversionary (backup) mode. The reversionary mode can be manually selected by means of the training mode switch (MFD REV) on the overhead panel.

In reversionary mode, all important flight information are presented on the remaining display in the same format as the PFD in normal operating mode.

TERRAIN PROXIMITY AND HTAWS

Terrain Proximity (Figure 7-14E) is a terrain awareness system that increases situational awareness and aids in reducing controlled flight into terrain.

It does not comply with TSO-C151b certification standards and must not be confused with the Helicopter Terrain Awareness and Warning System (HTAWS).

HTAWS is more sophisticated and robust, and it is TSO-C151b certified.

The HTAWS Page is specialized to show terrain, obstacle, and potential impact point data in relation to the aircraft's current altitude, without clutter from the basemap.

Aviation data (airports/heliports, VORs, and other NAVAIDs) can be displayed for reference. If an obstacle and the projected flight path of the aircraft intersect, the display automatically zooms in to the closest potential point of impact on the HTAWS Page.

Aircraft orientation on this map is always heading up unless there is no valid heading. Two views are available relative to the position of the aircraft: the 360° default display (see Figure 7-14F) and the radar-like ARC (120°) display (see Figure 7-14G). Map range is adjustable with the RANGE Knob from 1 to 200 nm, as indicated by the map range rings (or arcs).

Alerts are issued when flight conditions meet parameters that are set within HTAWS software algorithms.
HTAWS alerts typically employ a CAUTION or a WARNING alert severity level, or both. When an alert is issued, visual annunciations are displayed and aural alerts are simultaneously issued.

When an alert is issued, annunciations appear on the PFD and MFD.

Aural HTAWS caution alerts can be muted while an alert is occurring. Muting an active caution alert has no effect on visual caution annunciations or aural or visual warnings. If new HTAWS cautions occur, muting will have no effect until it is enabled again.

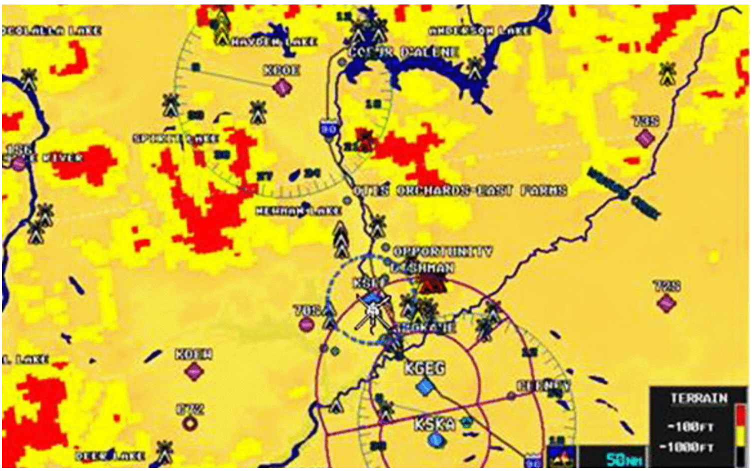

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Figure 7-14E. Terrain overlay on moving map (for reference only)

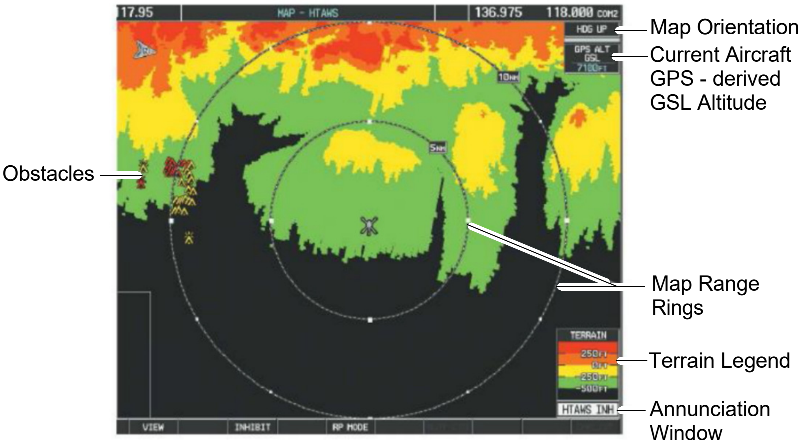

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Figure 7-14F. HTAWS Page (360 View) (for reference only)

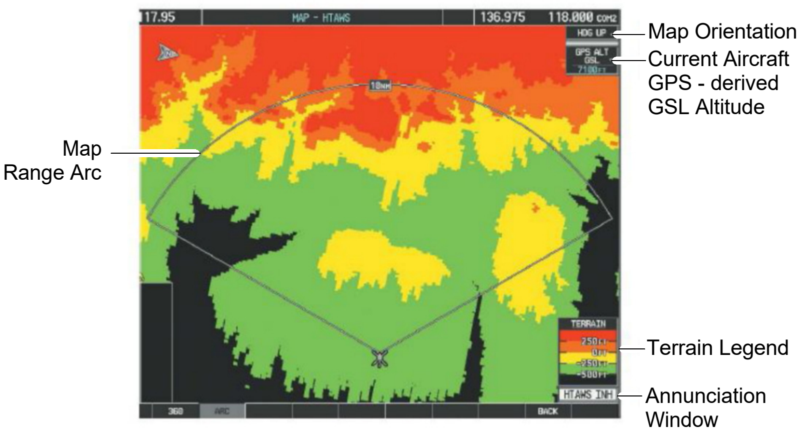

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Figure 7-14G. HTAWS Page (Arc View) (for reference only)

GEA 71BH ENGINE AND AIRFRAME UNIT

The GEA 71BH (two installed) interfaces to analog sensors and transducers in the engine compartment, fuselage and tail boom. It conditions the signals and transmits results to be displayed.

GRS 7800 ATTITUDE AND HEADING REFERENCE SYSTEM

The GRS 7800 provides aircraft attitude and heading information via ARINC 429 to both GDU 1050H units and the both GIA 64H units. The GRS 7800 contains advanced sensors (including accelerometers and rate sensors) and interfaces with the GMU 44 to obtain magnetic field information, with the GDC 72H to obtain air data, and with both GIA 64H to obtain GPS information.

GDC 72H AIR DATA COMPUTER

The GDC 72H processes data from the pitot/static system as well as the OAT probe. This unit provides pressure altitude, airspeed, vertical speed and OAT information to the G1000H NXi system, and it communicates with the each GIA 64H, GDU 1050H and GRS 7800, using an ARINC 429 digital interface (it also interfaces directly with the GTP 59).

GIA 64H INTEGRATED AVIONICS UNIT

The GIA 64H (two installed) communicate with each other and with the onside GDU 1050H through a High-Speed Data Bus (HSDB) connection, and with both GEA 71BH using RS-485 digital interface. Each GIA 64H consisting of a:

— 16 watt VHF communication transceiver with 8.33 KHz spacing

— VOR receiver

— GPS SBAS receiver

— Glideslope receiver

— Integrated Flight Management System (FMS) functionality.

GPS/WAAS Receiver

The GIA 64H's GPS navigation receiver has the following distinguishing properties as standard:

a) Compliant with DO-229 specifications for Class 3 for use of GPS with Wide Area Augmentation System (WAAS)

b) Designed to interact with future Satellite-Based Augmentation Systems (SBAS)

c) Primary means for all phases of flight including Oceanic

d) Fault Detection and Exclusion (FDE)

VHF COM Receiver

The GIA 64H's VHF communications receiver has the following distinguishing properties as standard:

1. Minimum 16 watt transmit power capability

2. Communications transceiver tuning from 118.00 to 136.990 MHz

3. User-selectable channel spacing of 8.33 kHz or 25 kHz

4. Communications audio output

With two GIA 64H units and two COM radios the pilot and copilot can transmit simultaneously on on-side COM.

VHF NAV and Glideslope Receivers

The GIA 64H's VHF navigation receiver has the following distinguishing properties as standard:

1. VOR/Localizer receiver tuning from 108.00 to 117.95 MHz in 50 kHz increments

2. ILS glideslope receiver tuning from 328.6 to 335.4 MHz as paired with the frequency tuned on the VOR/ILS localizer receiver

3. VOR audio and automatic Morse code identifier output

Aural Alert Generation

The G1000H NXi determines the prioritization, sequencing, and inhibiting of individual alerts from both the G1000H NXi system and most external sources. Only one alert generated by the G1000H NXi may be played at a time.

In the G1000H NXi system, the GDU 1050 units provide the logic for commanding and stopping most G1000H NXi aural alerts. Each GIA 64H maintains a prioritized queue of aural alerts to be played.

Each GIA 64H is capable of generating a digital aural alert stream to source both digital audio processors. This dual channel system provides redundancy for aural alerting.

DIGITAL AUDIO CONTROL SYSTEM (DACS) NAT WITH TWO COCKPIT PANELS

The NAT Digital Audio Communication System (DACS) shall be installed as Intercommunication System (ICS).

The DACS shall monitor the received audio signals, select the signals to be transmitted and provide for interphone communications between the pilots and the passengers. It shall control the audio output of the communication and navigation receivers to the pilots' headphones, and the output of the passengers' microphones to the communication transmitters.

The ICS shall receive the audio inputs from the following components:

— VHF/AM radio (Q.ty 2);

— VOR/ILS receiver (Q.ty 2);

— ADF;

— DME;

— AWG;

— TAWS (EFIS);

— TAS.

Up to 6 spare COM inputs are provided for some customer specific requirements.

The system shall also interface the Cockpit Voice Recorder (CVR) and shall have provisions for the installation of additional equipment such as stereo rack and external loudspeaker (PA).The system shall be composed by:

— Cockpit Audio Panel (Q.ty 2) ACP-53;

— ICS mode controller to isolate or permit the interphone communications between the pilots, the passengers and the patient;

— Audio Management Unit (AMU);

— Receptacles for the connection of pilot's headset;

— Receptacles for connection of passenger's headsets;

— Receptacles for connection of ground crew headsets.

The primary component in the system is the AMU. Connected to it are transceivers and receivers in the aircraft, as well as all the Audio Panels. The AMU shall digitize and distribute all radio audio to the Audio Panels over separate serial data links. The microphone audio shall be digitized in the Audio Panels and then sent to the AMU over these same serial data links. The digitized microphone audio shall be re-routed back to the other Audio Panels or transceivers (if transmitting).

The system architecture will be setup in a star configuration (separate serial connections to each Audio Panel) to prevent the loss of the entire system because of a failure of one connection.

Each radio will be provided a receive audio input, a microphone output and a transmit key line. These radio connections can be configured using the digital ICS configuration management software to support transceivers, receivers, PA or unswitched audio sources in any combination up to the maximum of thirty.

The system shall be configurable using a PC connected to the AMU via a USB serial port and NAT supplied configuration management software. Configuration options will include the number of radios accessible by each user, customer defined names for each radio, ICS talk groups, soft button function assignments, etc..

The system will provide power-on Built-In-Test (BIT) as well as a user initiated Built In Test function, accessible from each Audio Panel. This function will offer fault analysis down to the LRU (Line Replaceable Unit) level. Continuous Built In Test at a lower level will also be implemented.

Multiple levels of safety shall be available in this system. Four modes of operation shall be available: normal, backup, slaved and emergency modes. Backup mode shall enable redundant power supplies/AMU/microphone & headphone amplifiers.

Slaved mode shall disconnect the number one user of an Audio Panel from their own Audio Panel and shall connect them to another. Emergency mode directly connects the number one user of an Audio Panel to a specific transceiver, allowing operation of the transceiver under any condition.

GTX 345R MODE A/C TRANSPONDER

The GTX 345R unit communicate with PFD GDU 1050H through a High-Speed Data Bus (HSDB) connection, and with both GIA 64H using RS-232 digital interface.

The GTX 345R transponder is a Mode A/C transponder, provides ADS-B OUT along with ADS-B IN (1090 and UAT).

MAGNETIC COMPASS

The helicopter is provided with a magnetic compass installed on suitable supports on the right side of the instrument panel.

The magnetic compass, of a conventional type, indicates the helicopter heading with reference to the magnetic North. The compass consists of a rotating compass card, and two magnetic bars, attached to the compass card, as compensation system.

The compass card and the magnetic bars are contained in a sealed case filled with damping fluid.

The compass card is graduated in 5-degrees intervals and shows letters and numerals every 30 degrees, heading is read against a lubber line through a transparent window.

The compensation system permits errors correction by changing magnetic bars position through two screws in front of the instrument. A lamp provides the necessary illumination for use in nightlight conditions.

L3 AVIONICS SYSTEM ESI-2000 ELECTRONIC STAND-BY INDICATOR

The ESI-2000 Electronic Standby Inicator (ESI) is a panel-mounted solid-state instrument connected to the MAG-3000 Magnetometer that provides dependable backup for attitude, altitude, airspeed and heading information in the event of complete loss of Garmin G1000H NXi. An internal battery provides backup power for at least 1 hour.

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Figure 7-14H. ESI-2000 Electronic Stand-by Instrument Display (for reference only)

HELICOPTER TERRAIN AVOIDANCE WARNING SYSTEM (HTAWS)

The HTAWS (Helicopter Terrain Awareness and Warning System) is designed to increase situational awareness and aid in reducing controlled flight into terrain and obstacles. HTAWS provides visual annunciations and voice alerts when terrain and obstacles are within the given altitude threshold from the aircraft. The visual and voice alerts and warnings are advisory in nature only.

RADIO ALTIMETER GRA 55

The GRA 55 radio altimeter system communicates with GIA 64H#1 using RS-422 digital interface.

The GRA 55 is a digitally-based airborne low-range radar altimeter designed to calculate and provide precise Above Ground Level (AGL) altitude information. The GRA 55 features a standard two-antenna architecture, operation from ground to 2500 ft AGL, accuracy of +/- 1.5 ft (0 – 100 ft AGL), +/- 2% (>100 – 2500 ft AGL).

The information provided by Radio Altimeter shall be displayed on the PFD. A separate aural warning shall also be provided to the crew when the actual height is less or lower than the selected DH value.

A warning facility shall also be provided to visually and aurally alert the pilot when the helicopter has reached the selected DH.

A control function will also be provided to inhibit the DH setting aural indication when operation at low level is required.

Radar Altimeter GRA55 CBIT inhibition

At power-up the Radar Altimeter GRA55 normally performs a functional IBIT (Internal Built-in Test). Then, during normal operation, the Radar Altimeter includes an advanced altitude self-test functionality (CBIT - Continuous Built-in Test) which provides the ability to detect and log faults within the entire internal transmitter and receiver circuitry and processing chain at various internally simulated altitudes.

The altitude self-test functionality (CBIT) is completely automated and is characterized by the following features:

- Functionality is completely transparent to the pilot or any user of radar altitude data from the RA.
- Runs every 1 minute during normal unit operation at calculated altitudes above 250 ft AGL or during “No Computed Data” conditions (such as at actual altitudes above 2550 ft AGL, during excess pitch or roll manoeuvring, or anytime the ground reflection is poor enough to cause “No Computed Data” to appear on the altitude outputs).
- The automated altitude self-test functionality is never initiated at calculated altitudes of 250 ft AGL or below.

During sling load operations it is possible that the RA transmission beam intercepts the external load, and provides an intermittent return that is computed by the system as an erroneous data: under certain circumstances, this can cause a fault indication leading to declaration of system internal failure.

To avoid this event, the CBIT function can be inhibited by an electrical circuitry that is commanded by a dedicated cockpit control (RA CBIT ON/OFF button). CBIT function inhibition must be used strictly during operations with an external load, to avoid incapacity of the system to self-detect functionality faults.

TAS GTS 800 GARMIN

The Garmin GTS 800 Traffic Advisory System (TAS) enhances flight crew situational awareness by displaying traffic information for transponder-equipped aircraft. The system also provides visual and aural traffic alerts including voice announcements to assist in visually acquiring traffic.

The system is capable of tracking up to 45 intruding aircraft equipped with Mode A or C transponders, and up to 30 intruders equipped with Mode S transponders. A maximum of 30 aircraft with the highest threat potential can be displayed simultaneously.

When the traffic system is in Operating Mode, the unit interrogates the transponders of intruding aircraft while monitoring transponder replies. The system uses this information to derive the distance, relative bearing, and if reported, the altitude and vertical trend for each aircraft within its surveillance range. The traffic system then calculates a closure rate to each intruder based on the projected Closest Point of Approach (CPA). If the closure rate meets the threat criteria for a Traffic Advisory (TA), visual and aural alerting is provided.

The GTS 800 surveillance system monitors the airspace within ±10,000 feet of own altitude. Under ideal conditions, the GTS 800 unit scans transponder traffic up to 12 nm in the forward direction.

WARNING, CAUTION, AND ADVISORY LIGHTS

(Figure 7-14I)

The PFD provides a dedicate area capable to display up to 14 characters each, for warning, caution, advisory, and status annunciator (also in reversionary mode).

The messages area is displayed in the right portion of PFD screen.

Warning and Cautions activate dedicate attention getters (MWL and MCL respectively) together with an acoustic getter (AWG) when applicable.

The GIA provides an interface for a remotely Master reset Push-button to be used to reset all the attention lights (MWLs and MCLs) and the AWG when they are active.

WARNINGS

Warnings are color code Red.

Warnings have precedence over cautions, advisory, and status messages.

When a warning signal is displayed, the GIA causes the flashing of the MWL, and it disables the MWL when a remote Reset is active.

CAUTIONS

Cautions are color code Amber.

Cautions have precedence over advisory, and status messages.

When a caution signal is displayed, the GIA causes the flashing of the MCL, and it disables the MCL when a remote Reset is active.

ADVISORIES

Advisories are color code Green.

Advisories have precedence over status messages.

The advisory signals do not activate any external attention light.

The demonstration that Warnings, Cautions, Advisories and Status messages colors are easily discernible respect to any other color used to display graphics will be performed during the Cockpit Evaluation.

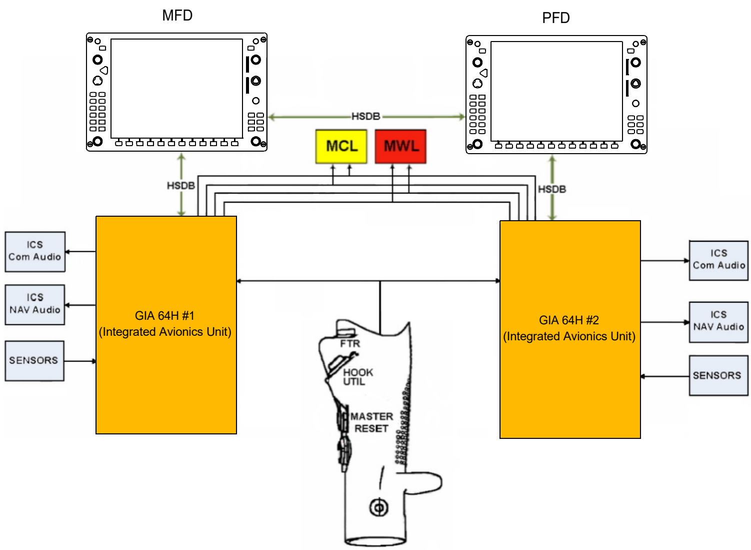

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Figure 7-14I. Caution / Warning System Architecture

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POWER PLANT

(Figure 7-15)

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;

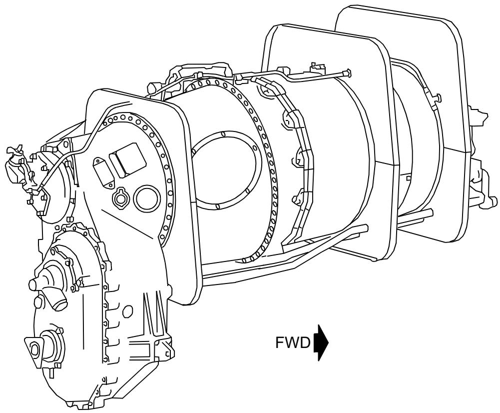
— reduction gearbox module.

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 N2 governing starts.
The manual override system enables the pilot to manually modulate fuel low directly with the PLA twist grip on the collective lever.

Engine heaters

Heating of the engine pneumatic lines is required to prevent ice formation from any moisture that could be present in the lines. The heaters are basically electrical wires wrapped around the pneumatic lines. The heaters must be turned ON (ENG HTR switch) before starting the engine and remain ON until either engine shutdown or operated at Takeoff power, and in any case with ambient temperature at or below 0 °C.

The engine is also equipped with a Fuel Heater which heats the fuel (using heat from the engine oil system) to prevent the fuel filter from getting clogged with ice crystal formation.



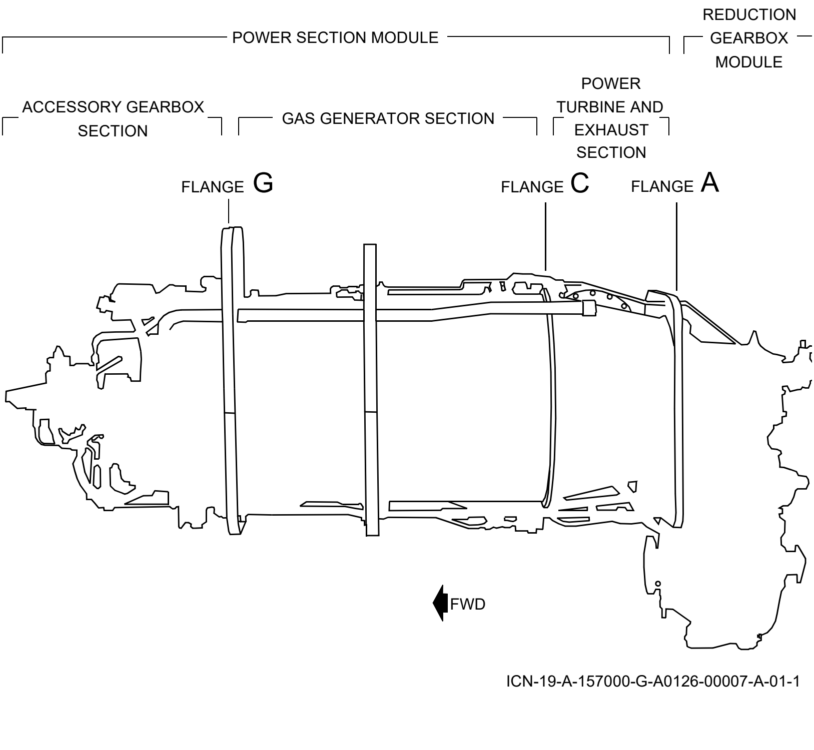


Figure 7-15. Pratt & Whitney Canada PT6B-37A Build Spec. 1242 Engine

ENGINE OIL SYSTEM

(Figure 7-16)

The engine oil system consists of a pressure system, a scavange 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 GDUs, but the ENG OIL PRESS warning and caution messages are displayed only on PFD.

A temperature switch is located on the return line from the oil cooler; the switch is electrically connected to both GDUs, but the ENG OIL HOT warning message is displayed only on PFD.

A temperature and a pressure transmitter are connected to the pressure line; the transmitters are electrically connected to both GDUs, but the engine temperature/pressure indicators are displayed only on MFD.

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.

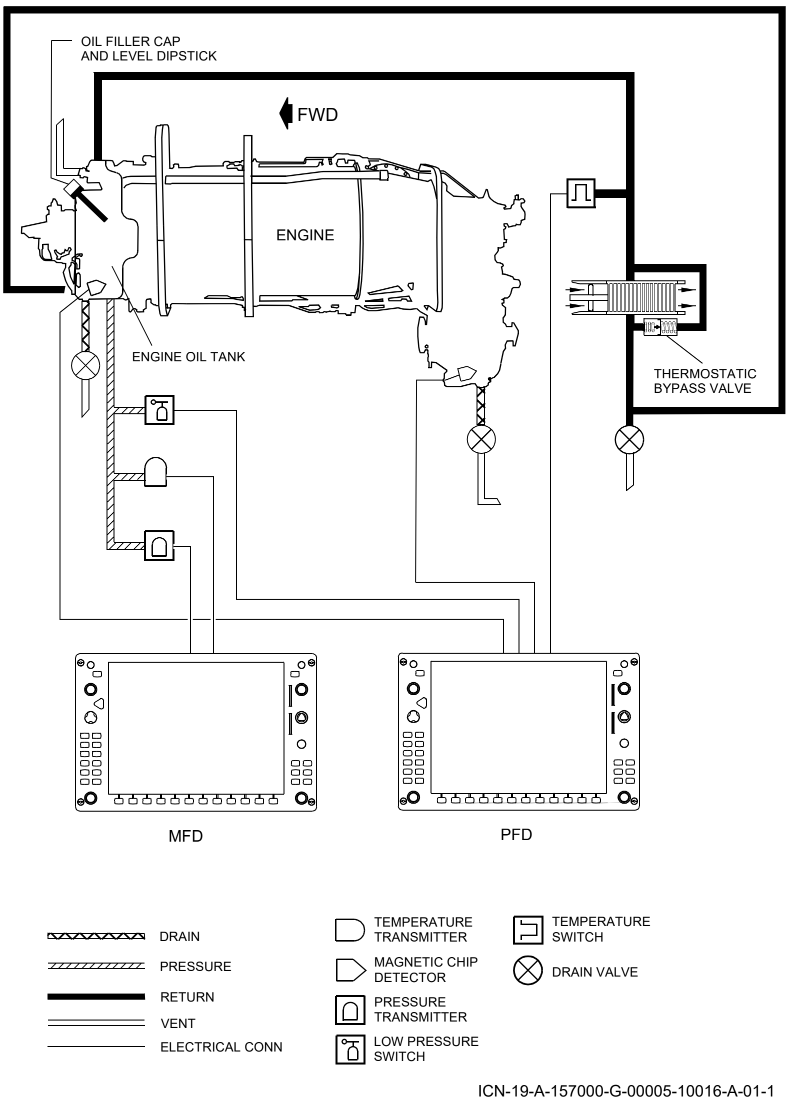


Figure 7-16. Engine Oil System Schematic

FUEL SYSTEM

(Figure 7-17)

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 MFD and PFD. The caution message is displayed only on PFD.
On the MFD the fuel quantity and pressure analog and digital indication are given.
On the PFD and on the MFD is given the digital indication of the fuel quantity.

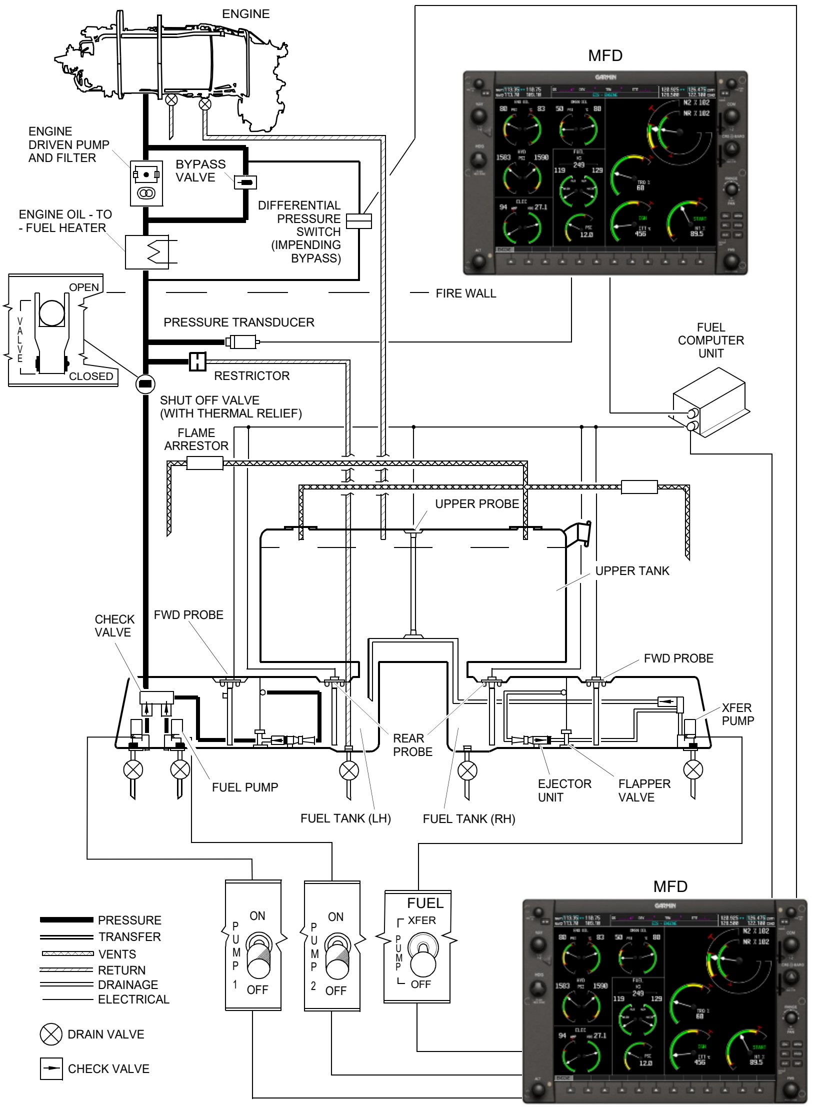


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Figure 7-17. Fuel System Schematic

FLIGHT CONTROL SYSTEMS

(Figure 7-18)

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 7-19 for the collective grip assembly and to Figure 7-20 for the cyclic grip assembly.

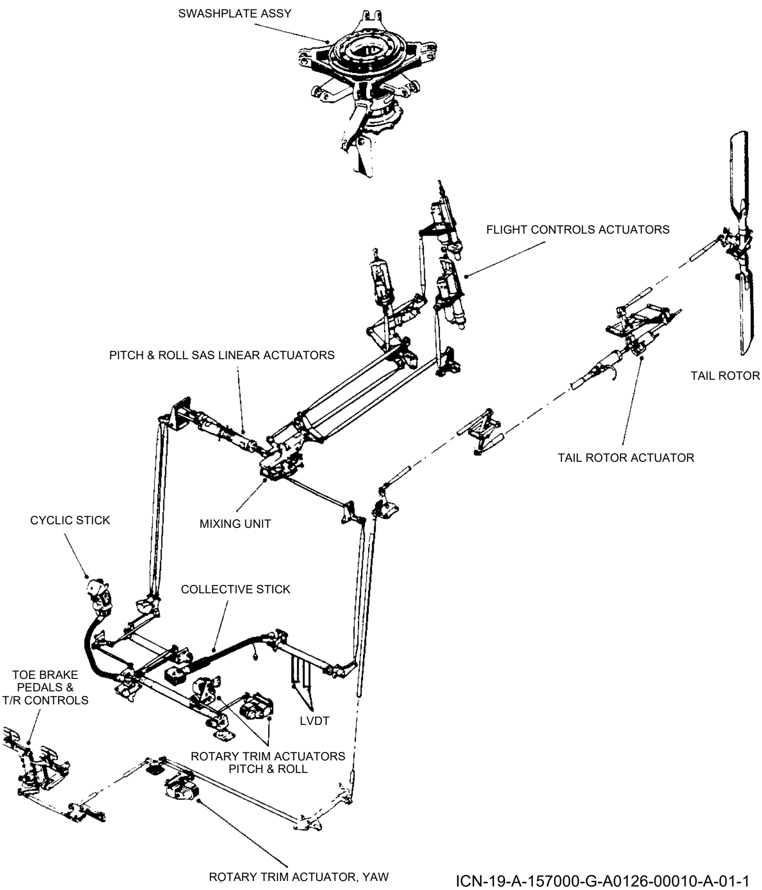
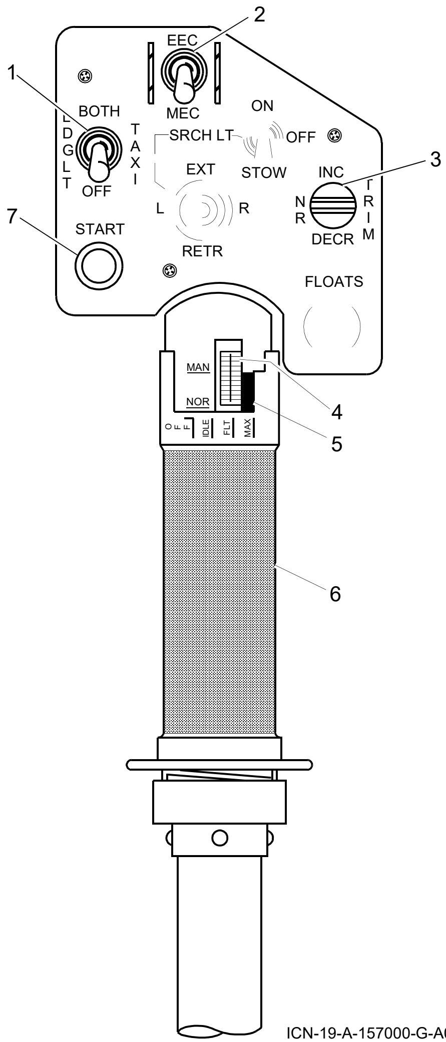
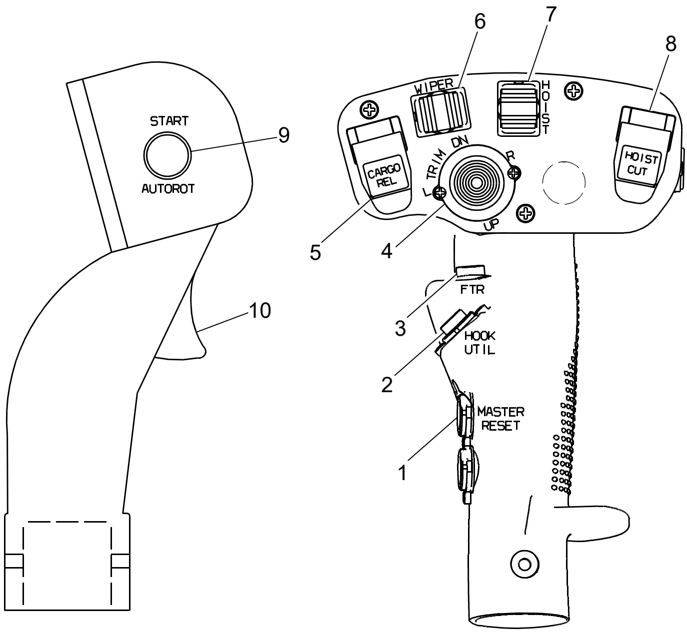


Figure 7-18. Flight Controls System



1. Landing light control switch
2. EEC/MEC switch
3. NR TRIM switch
4. MAN/NOR engine mode select
5. Red band
6. Engine throttle
7. START switch

Figure 7-19. Collective Grip Assembly



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1. Master reset pushbutton switch
2. Hook util
3. FTR
4. Beeper trim selector switch
5. Cargo hook rel
6. Wiper selector switch
7. Hoist switch
8. Hoist cable cut pushbutton switch
9. Start autorot
10. Microphone / ICS trigger switch

Figure 7-20. Cyclic Grip Assembly

ENVIRONMENT CONTROL SYSTEM

(Figure 7-20A)

GENERAL

The Environment Control System gives a means of heating, cooling and treating the air used for the ventilation and the conditioning of the cockpit, the cabin and the avionic equipment. The environment control system includes:

— The ventilation system;

— The integrated ECS (optional);

— The heating system (optional).

VENTILATION SYSTEM

The air distribution system consists of a cockpit ventilating-windshield defogging system, and a passenger cabin ventilating system.

The cockpit ventilation-windshield defogging system consists mainly of an air intake located on lower forward fuselage. From the air intake the ram air is ducted to eight diffusers. The airflow from forward air intake is controlled by the gate valve, installed in the air mixing box, mechanically connected to the VENT knob on the right side of the front console. The airflow from the forward air intake may be increased by means of an electrical fan installed between the air intake and the air mixing box.

The electrical fan is controlled by the VENT CKPT switch located on the overhead console and is powered by the 28 VDC bus bar through the VENT CKPT circuit breaker on the overhead console.The passenger cabin ventilation system consists mainly of an air scoop installed front of the main gearbox fairing that captures the outside air. There is no fan, the air flow depends of the wind velocity or the aircraft airspeed. The passengers can regulate the air flow from the upper air intake with 4 diffusers located on the ceiling of the cabin.

Controls and Indicators

The air distribution system is provided with a VENT CKPT switch, and a VENT knob, which have the following function:

VENT CKPT switch:

— OFF: the ventilating fan is de-energized.

— LOW: the ventilating fan is operating at low speed.

— HIGH: the ventilating fan is operating at maximum speed.

When activated, the VENT ON advisory message illuminates on the instrument panel.

VENT knob:

When pulled, opens the gate valve of the air mixing box permitting the ram air from the forward intake to enter the cockpit and the passenger compartment.

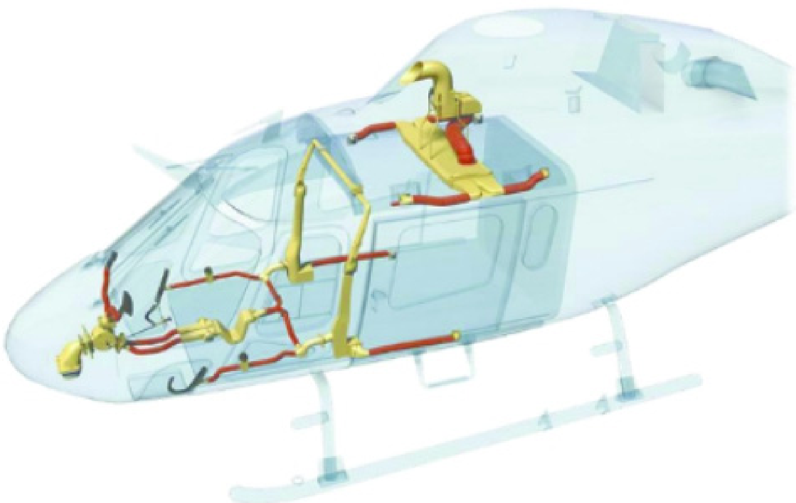

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Figure 7-20A. Ventilation System Installation

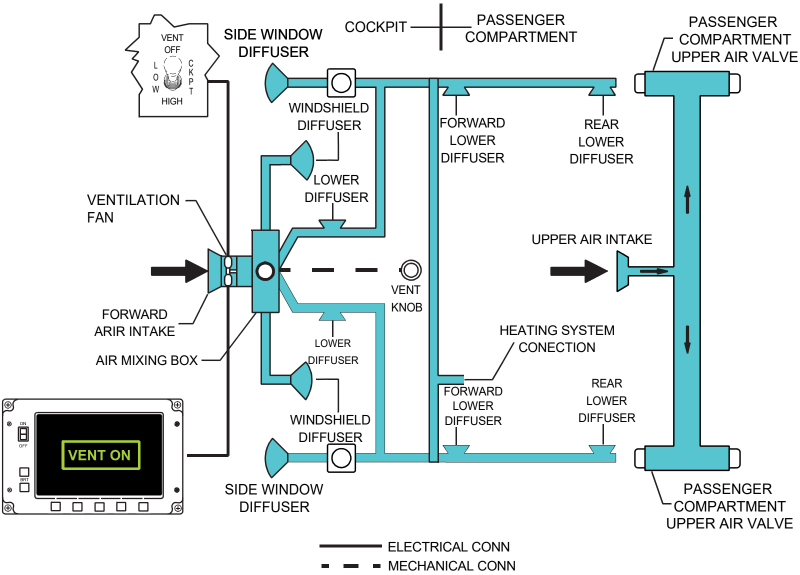

Figure 7-20B. Ventilation System - Schematic Diagram

HEATING SYSTEM (OPTIONAL)

Cockpit/Cabin heating is obtained by mixing hot from the engine compressor with fresh ambient air.

A shut-off valve is fitted on the bleed air line of the engine. The valve is provided with a nonreturn device and a solenoid which controls the opening and the closing of the shut-off valve in response to the operation of the S/OFF switch on the cabin overhead console. After the shut-off valve, the engine hot air reaches the mixing valve, passing through a duct installed on upper deck.

The mixing valve blends hot air with fresh ambient air, sucked from air intake and adjusts the cabin heating air flow temperature in response to the setting of the temperature mechanical sensor. Temperature mechanical sensor settings are obtained by operating a TEMP CONT knob located on the overhead console.

The temperature sensor, of the thermal pole expansion type, discharges hot air from the mixing valve inlet port, altering the mixing valve internal pressure and adjusting the mixed air flow through the valve. The temperature operation range is between 18 °C and 113 °C ± 5 °C.

Whenever the temperature of the blended air becomes excessive (above 127 °C) the over temperature switch, interrupts system operation.

The blended air is then distributed from the chamber connected to the ventilating system ducts, which supply the windshield diffusers and two symmetrical series of diffusers located in the pilot and passenger compartments. The switch labelled ON/OFF provides 28 VDC power to the heating system.

Cabin heating is controlled by two switches located on the left of the overhead console.

The switch labelled S/OFF controls the shut-off valve located on the pipe at the compressor outlet.

The switch labelled MIX controls the solenoid fitted in the mixing valve.

The electrical system is supplied with 28VDC through the HEATER switch, located on the overhead console.

Controls and Indicators

Heating system controls and indicators are as follows:

HTR switch:

- OFF: the heater electrical circuit is not powered
- ON: the heater electrical circuit is powered in 28 VDC BUS

When activated, the HTR ON advisory messagee illuminates on the instrument panel.

MIX switch:

- OFF: the solenoid of the mixing valve is not energized (valve closed). The mixing valve is not operative.
- ON: the solenoid of the mixing valve is (valve open). The mixing valve is operative. Energized.

S/OFF switch:

- OFF: the shut-off valve on air duct is closed.
- ON: the shut-off valve on air duct is open.

TEMP CONT knob:

- To adjust the temperature of the heated air.

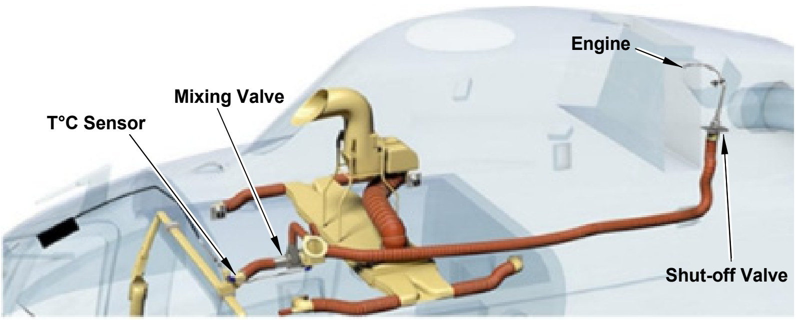

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Figure 7-20C. Heating System Installation

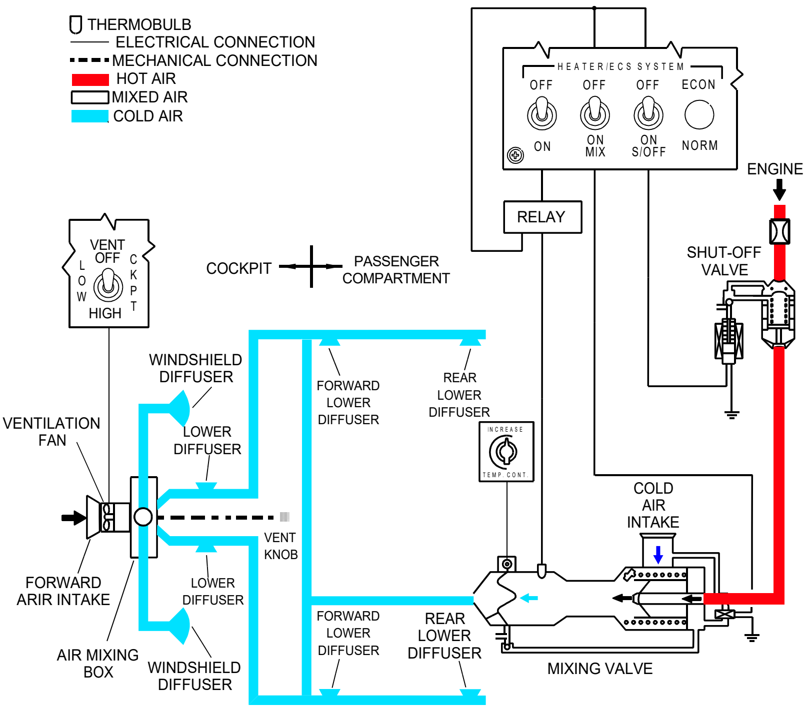

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Figure 7-20D. Heating system - Schematic Diagram

HYDRAULIC POWER

(Figure 7-21)

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 1600 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.

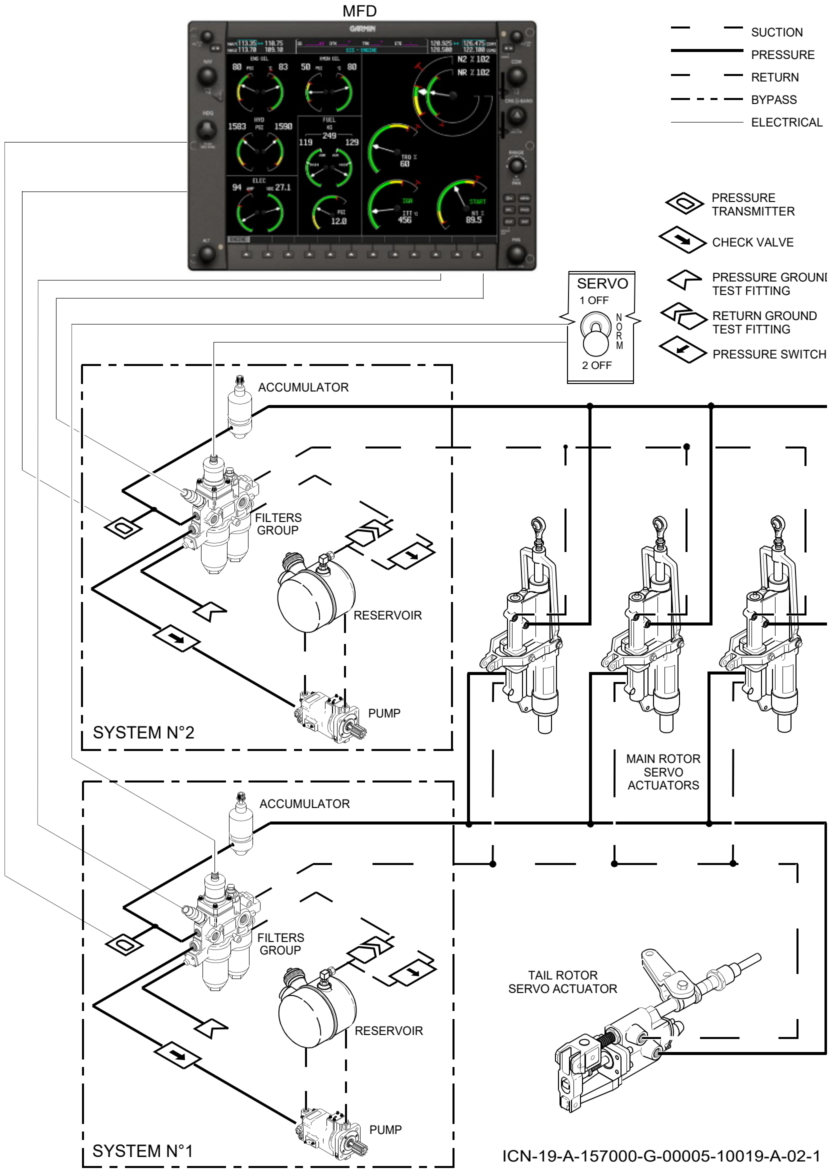


Figure 7-21. Hydraulic Power Schematic

ELECTRICAL POWER

(Figure 7-22)

The electrical and electronics systems are powered by a single wire circuit with common ground return through the helicopter structure.
The helicopter power supplies are:

— 28 V d.c.

— 115 V a.c. 400 Hz single phase

— 26 V a.c. 400 Hz single phase.

A generator, a battery and for ground handling, an external power receptacle are the dc power main sources.
Two static inverters, powered by dc voltage, are the ac sources.
Both dc and ac power supplies are distributed through a bus bar system and operated by control switches located on the overhead console.
The electrical system is interfaced with the voltammeter and with the caution and warning indication systems.

DC ELECTRICAL SYSTEM

The d.c. electrical system is a 28 V direct current single conductor system, using the helicopter structure as a negative ground.
The main components of the system are:

— starter generator

— d.c. control box

— battery

— external power receptacle; d.c. relay box.

Battery

The helicopter is equipped with a 24 V, 27 Ah nickel-cadmium battery located in the nose compartment.
A temperature switch, inside of the battery and connected to the warning indication system, detects the internal temperature of the battery, giving a BATT HOT warning message on PFD display in case of battery overtemperature.

External power

The helicopter is provided with an external power receptacle on the right side of the fuselage. A microswitch, activated by the receptacle door, gives the EXT PWR ON caution message on PFD display when the door is in the open condition.

Starter-generator

A starter-generator, installed on the engine accessory gearbox, provides the power required to start the engine when operated as an electric starter motor. After engine start the starter-generator, driven by the engine, reverts into a d.c. generator providing the necessary 28 V d.c. power.

AC ELECTRICAL SYSTEM

The alternating current is supplied by two 250 VA single phase static inverters via two sensor relays. The inverters require 28 V d.c. input supplied by the d.c. bus bar. The a.c. supply is controlled through the INV 1 and 2 switches located on the overhead panel.
Each inverter supplies 115 V a.c. and 26 V a.c. to respective 115 V a.c. and 26 V a.c. distribution busses to which the helicopter a.c. loads are connected. In the event of an inverter failure, the relative sensing relay de-energizes, connecting the failed inverter loads to the other operating inverter.

220V AC UTILITY SOCKET INSTALLATION

(Figure 7-22A)

The 220V AC utility socket system provides the user with one 220V AC, 50Hz outlet.

This V AC is achieved via a lightweight static inverter (SB120). The static inverter input power is provided from the GEN BUS via a 60A "AC OUTLET" circuit breaker using 6 AWG cable.

The 220V AC, 50Hz socket has power provided from the inverter using 16 gauge twisted pair cable via the Ground Fault Interrupt Unit.

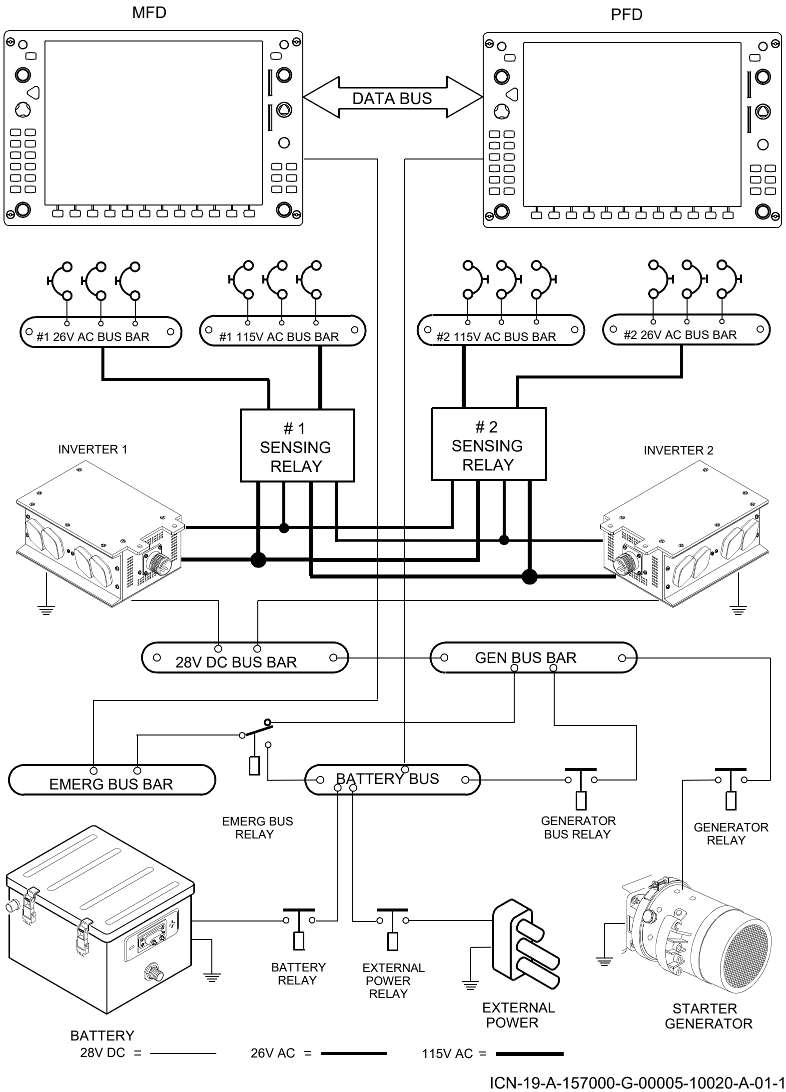
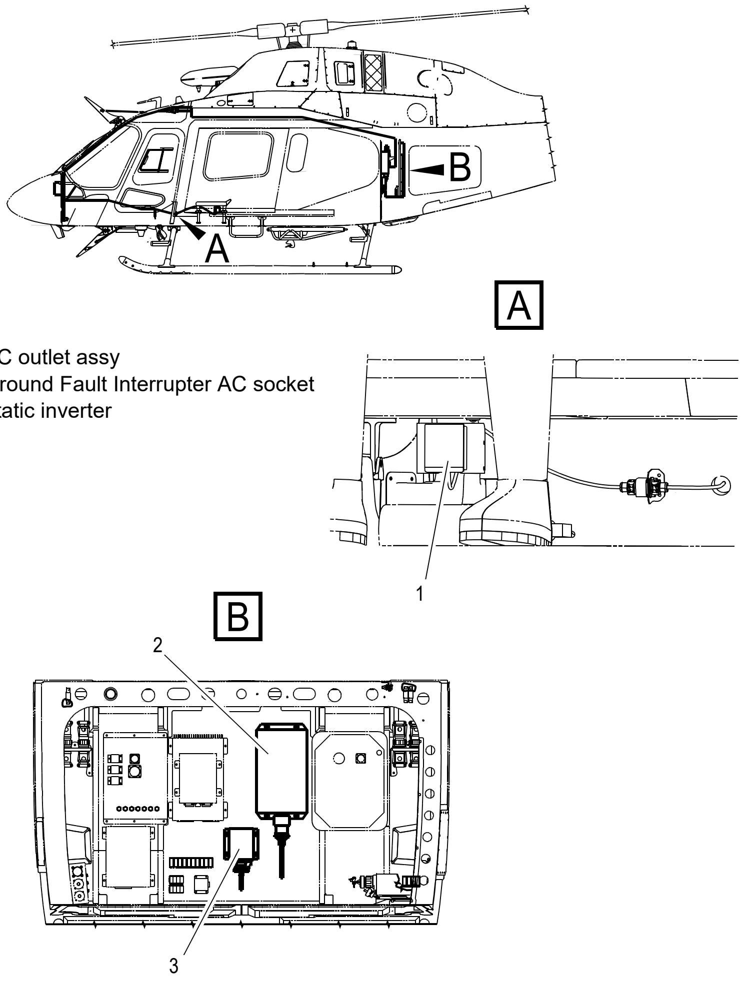


Figure 7-22. Electrical Power Schematic



1. AC outlet assy
2. Ground Fault Interrupter AC socket
3. Static inverter

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Figure 7-22A. 220V AC utility socket installation

HELIPILOT SYSTEM

(Figure 7-23)

The system consists of two independent sub-systems controlled by a common control panel. Each sub-system consists of a computer, two linear actuators and two position synchro-transmitters (roll and pitch axes). The linear actuator is inserted in the cyclic pitch control linkage. The n.1 system, in addition, is provided with a linear actuator and a position synchro-transmitter for the yaw axis. The linear actuator is inserted in the tail rotor control linkage. The n.1 computer processes attitude and heading signals from the vertical and directional gyroscopes and position signals from the cyclic stick and rudder pedals position synchro-transmitters and develops the appropriate control signals for the linear actuators.

The n.2 computer operates in the same manner as the n.1 computer, but is not provided with the yaw (tail rotor) channel.

The Helipilot system has two modes of operation: stability augmentation (SAS) and attitude hold (ATTD HOLD).

In the SAS mode, the automatic stabilization system provides a dampening effect to stabilize the helicopter with respect to external forces (such as air turbulence, etc.). In this mode, operation of the Helipilot system does not interfere with attitude changes controlled by the pilot. In the ATTD HOLD mode, the Helipilot system is capable of maintaining the attitude of the helicopter, providing the pilot with limited hands-off flying capabilities. The pilot has the possibility of trimming the helicopter by operating the beeper trim selector switch on the cyclic stick grip.

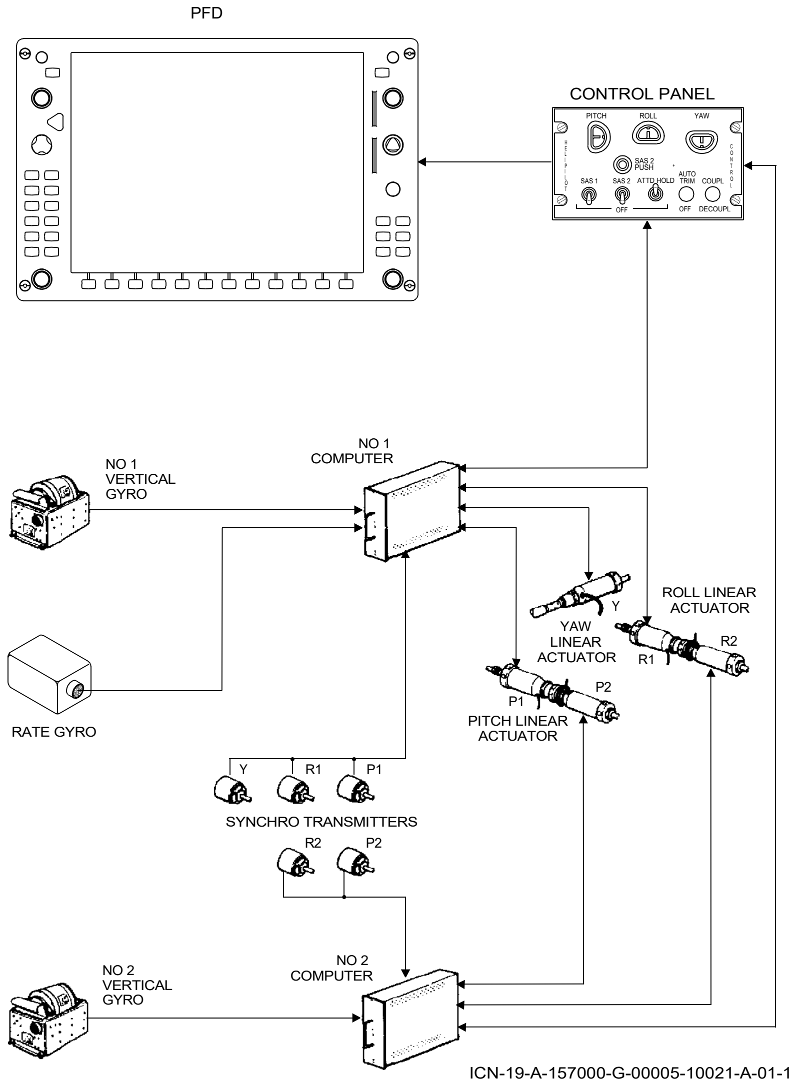
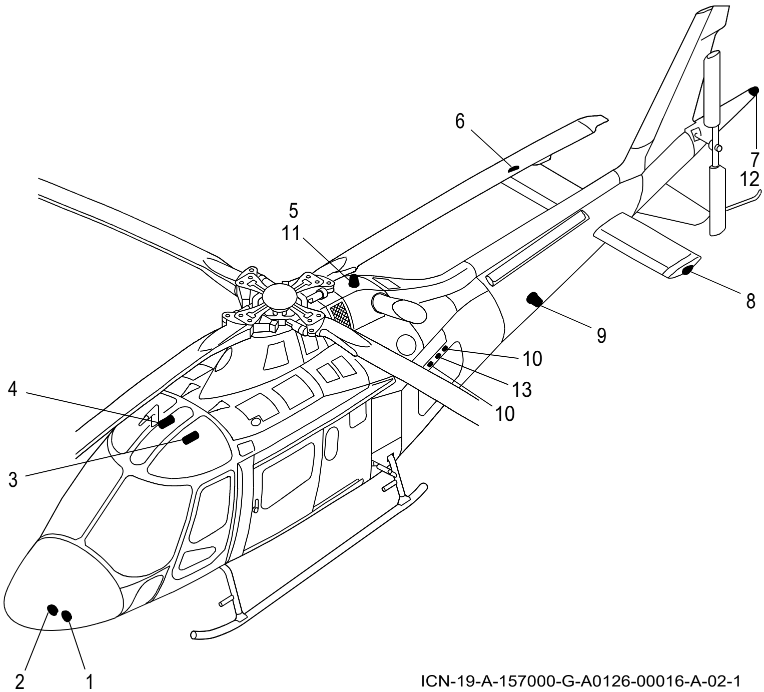


Figure 7-23. Helipilot System Schematic

LIGHTING SYSTEMS

(Figure 7-24)

The lighting systems include all the lights utilized for the helicopter interior and exterior illumination.
The exterior lights include three navigation lights, two anticollision lights and two landing lights and the Formation lights kit (if installed), consisting of one IR source in the upper anti-collision light and three IR formation lights.
The interior lights include instrument lights, utility lights and baggage lights.



1. LH landing light (pointing down)
2. Rh landing light (pointing forward)
3. LH spot light
4. RH spot light
5. Upper anticollision light
6. RH stabilizer navigation light (green)
7. Tail cone navigation light (white)
8. LH stabilizer navigation light (red)
9. Lower anticollision light
10. Baggage light (two)
11. Formation light (if installed)
12. Formation light (if installed)
13. Formation light (two) (if installed)

Figure 7-24. Lighting Systems

EMERGENCY EQUIPMENT

(Figure 7-25)

FIRST AID KIT

The first aid kit consists of a medical bag secured with strips of velcro to the vertical panel below the rear passenger seat.

PORTABLE FIRE EXTINGUISHER

The helicopter is equipped with portable, manually operated fire extinguishers installed on the central console, between the pilot's and copilot's seats and/or below the pilot's seat.

A quick release clamp allows for rapid removal of the portable fire extinguisher in the event of a fire.

The helicopter can be equipped with different extinguishers which contains different extinguishing agents.

The extinguishers that follow can be installed on the helicopter:

– The Halon extinguisher which contains the HALON 1211 extinguishing agent;
– The Halon Free extinguisher which contains the Halotron BrX extinguishing agent. This extinguisher can be installed only below the pilot's seat.

The extinguisher can be used against small carbonaceous fires, flammable liquid fires and electrical fires. The extinguisher has a discharge time of 10 seconds. However once the extinguisher has been used it must be replaced at the first possible opportunity even if there is still some extinguishing agent in the bottle.

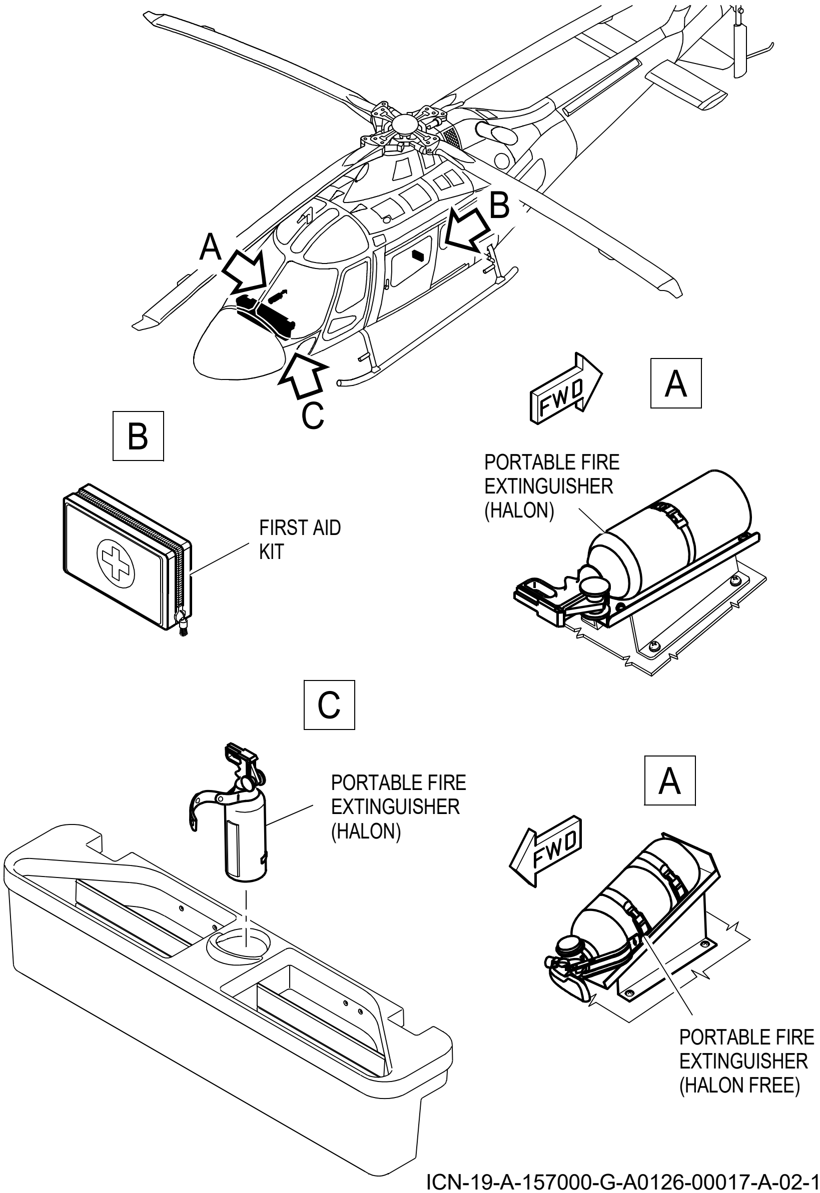


Figure 7-25. Emergency Equipment

EQUIPMENT/FURNISHINGS

EXTERNAL HANDLES KIT

(Figure 7-26)

The external handles kit allows to the operators to facilitate the access in the passengers cabin. The handles are one for each side of the helicopter and are located on the beams over the passengers sliding doors.

CABIN ROOF ATTACHMENT

(Figure 7-27)

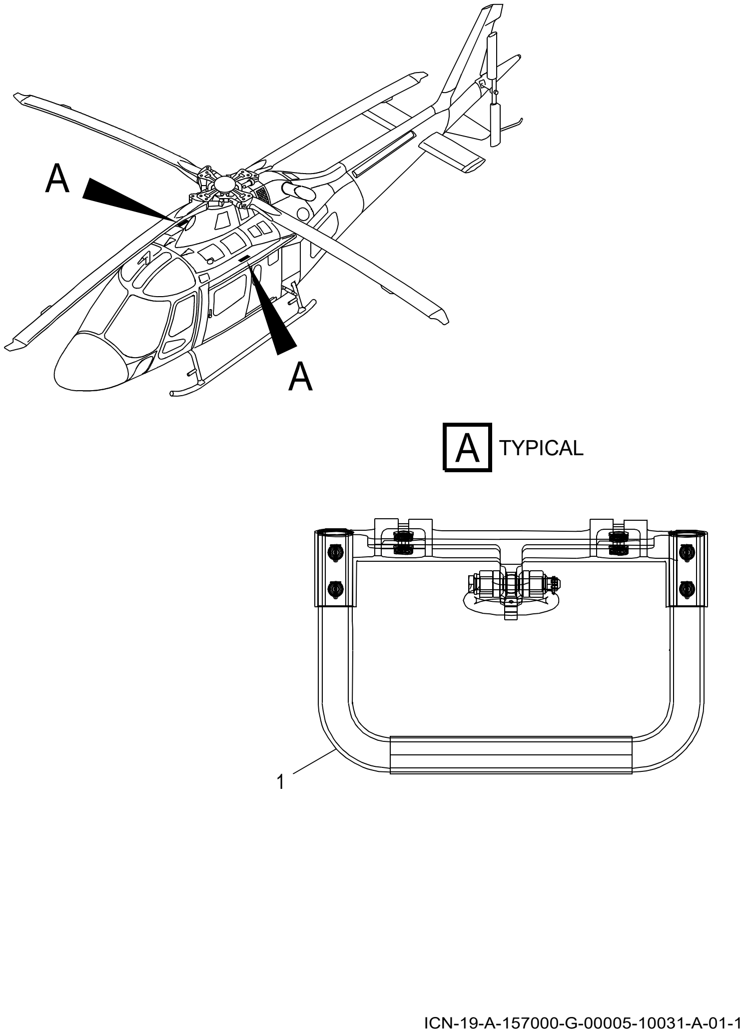
Into the passenger compartment are installed four eye hooks fastened to the cabin ceiling by bolts.

WARNING

WARNING:THE KIT SUPPORTS A MASS OF 140 KG (308 LB.) MAX.

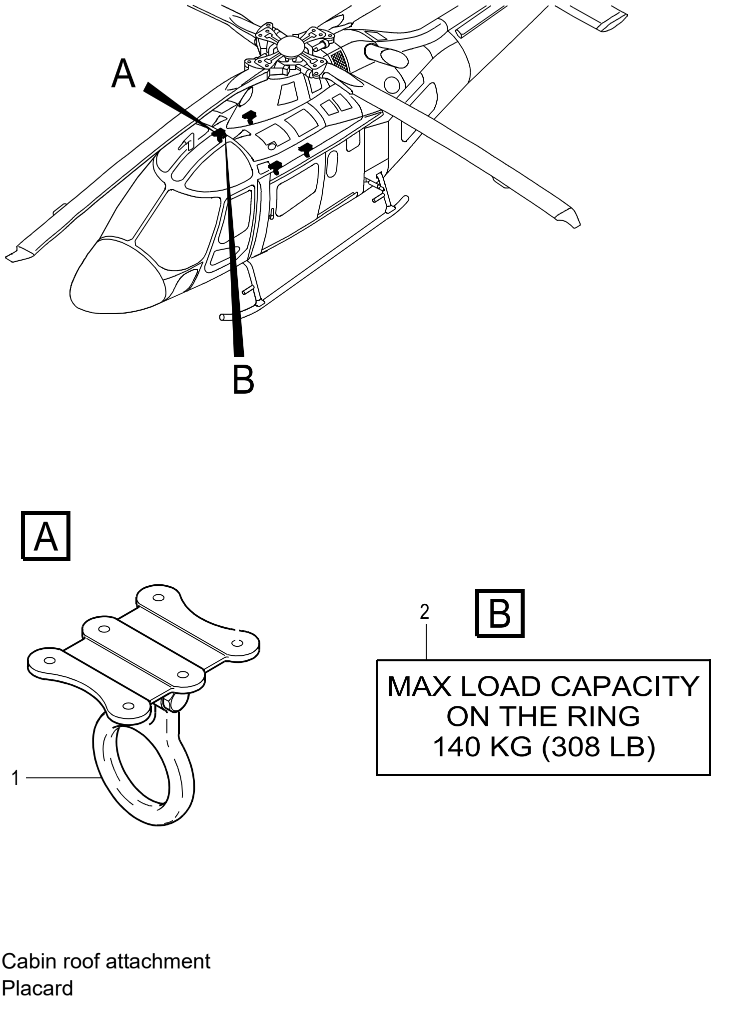
STRUCTURAL PROVISION P/N 109-0816-32

The design criteria of the structural provision P/N 109-0816-32 are detailed in document N° 109G2590S008.



1. External handle

Figure 7-26. External handles kit



1. Cabin roof attachment
2. Placard

ICN-19-A-157000-G-00005-10032-A-01-1

Figure 7-27. Cabin roof attachment

SECTION 8

HANDLING AND SERVICING

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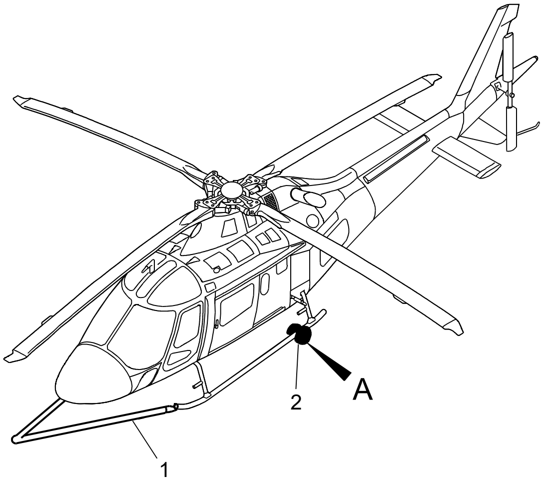
SECTION 8

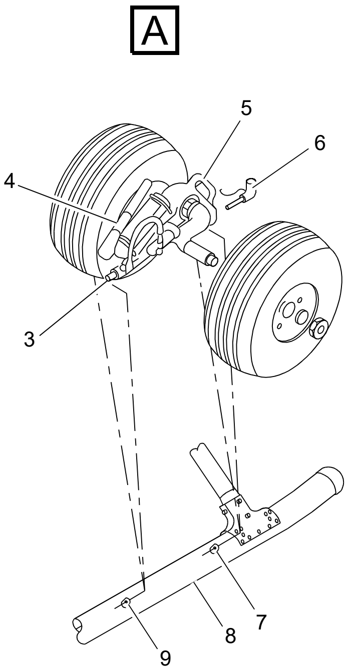
HANDLING AND SERVICING

TOWING

(Figure 8-1)

The helicopter can be manoeuvered on the ground, or by a suitable vehicle, using the tow bar secured to the forward end of the landing gear skid and ground handling wheels attached to each side of the aft end of the landing gear skid.





1. Tow bar
2. Ground handling wheels
3. Fixed pin
4. Handle
5. Cradle assembly
6. Spring loading pin
7. Eyebolt
8. Skid tube
9. Eyebolt

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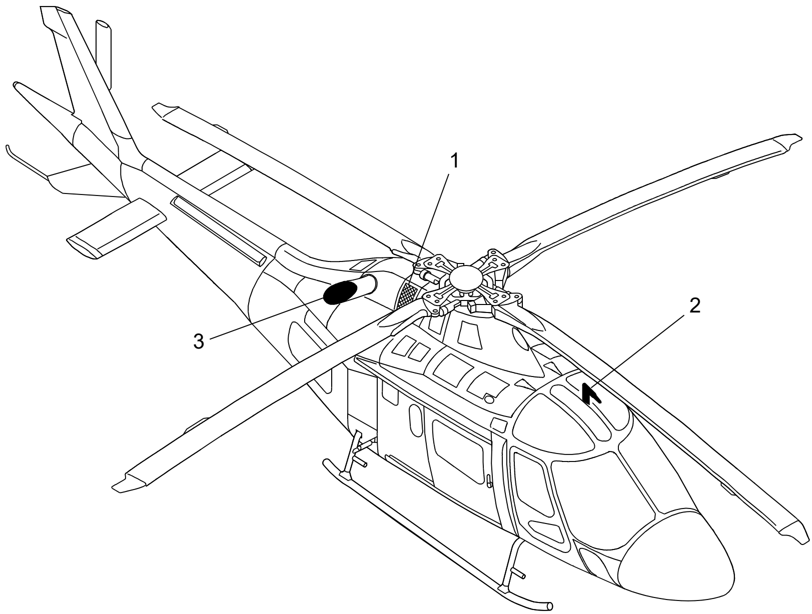
Figure 8-1. Towing

PARKING

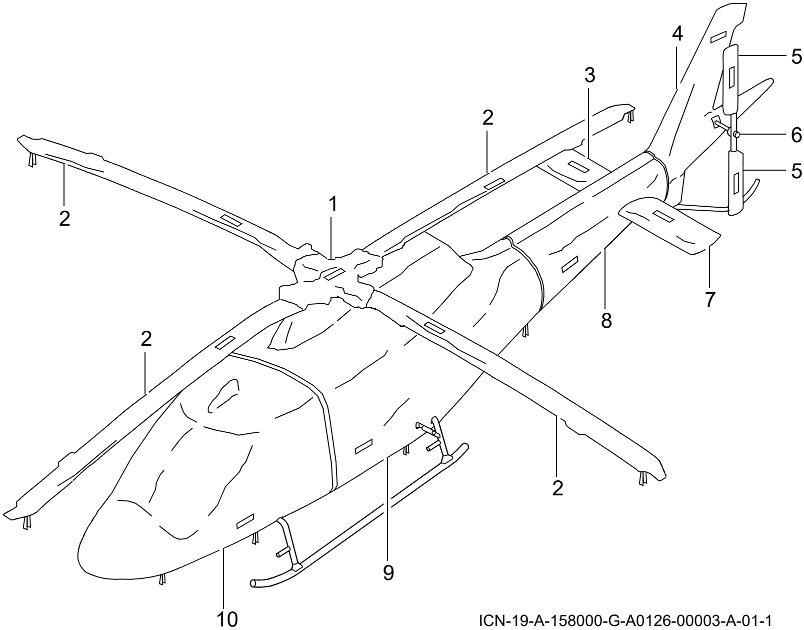
(Figure 8-2)

Park the helicopter in desired parking area on a level surface, when possible.
Attach static ground wire and check that all switches are in OFF or neutral position. Install the approved straps and covers as required.
For extended parking, disconnect the battery, close all access doors and panels and install protective covers as shown in Figure 8-3.



1. Engine air intake cover (three required)
2. Pitot tube cover
3. Engine exhaust duct cover (two required)

Figure 8-2. Parking in Normal Weather Conditions



1. Main rotor hub cover
2. Main rotor blade cover (four)
3. Right stabilizer cover
4. Vertical empennage cover
5. Tail rotor blade cover (two)
6. Tail rotor hub cover
7. Left stabilizer cover
8. Tail boom cover
9. Fuselage rear section cover
10. Fuselage nose section cover

Figure 8-3. All-weather Protective Covers

MOORING

(Figure 8-4)

The helicopter can be moored on a paved ramp, if available, with suitably spaced tie-down rings, and headed in direction from which forecast wind is expected.

CAUTION

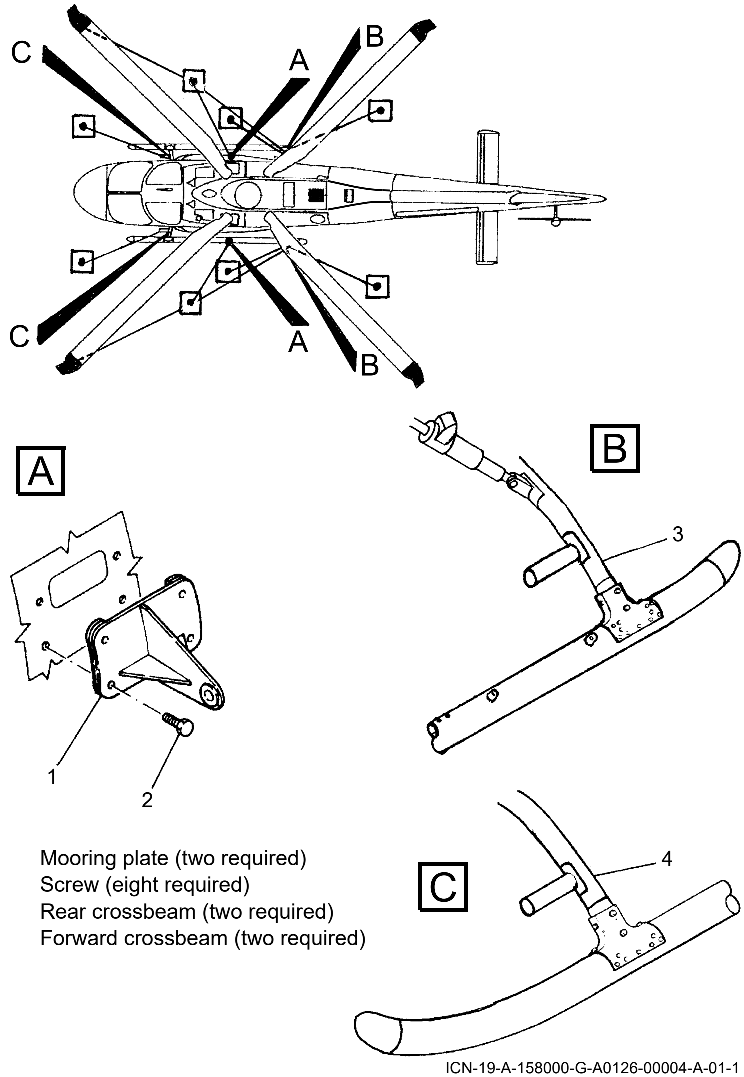
If forecast wind velocity exceeds 60 kts, moor helicopter in a sheltered area, or place it in a hangar.

If suitable paved ramp and tie-down rings are not available, park helicopter on an appropriate parking area, headed in to the wind and use appropriate mooring anchors or make ”dead man“ anchors. Close all access doors and panels. Remove from parking area all loose equipment that can be swept away by wind.

MOORING WITH KIT 109G1000F01

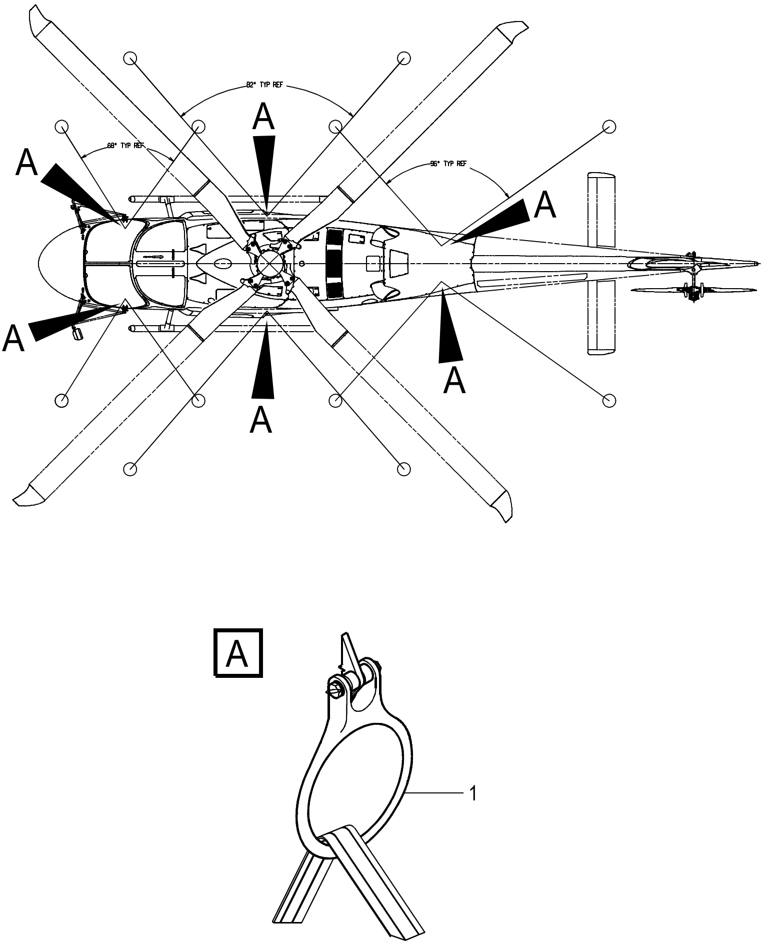
(Figure 8-4A)

If equipped with suitable approved shankles, the helicopter can be moored on a ground or on decks as per Figure 8-4A.



1. Mooring plate (two required)
2. Screw (eight required)
3. Rear crossbeam (two required)
4. Forward crossbeam (two required)

Figure 8-4. Mooring



1. Mooring ring

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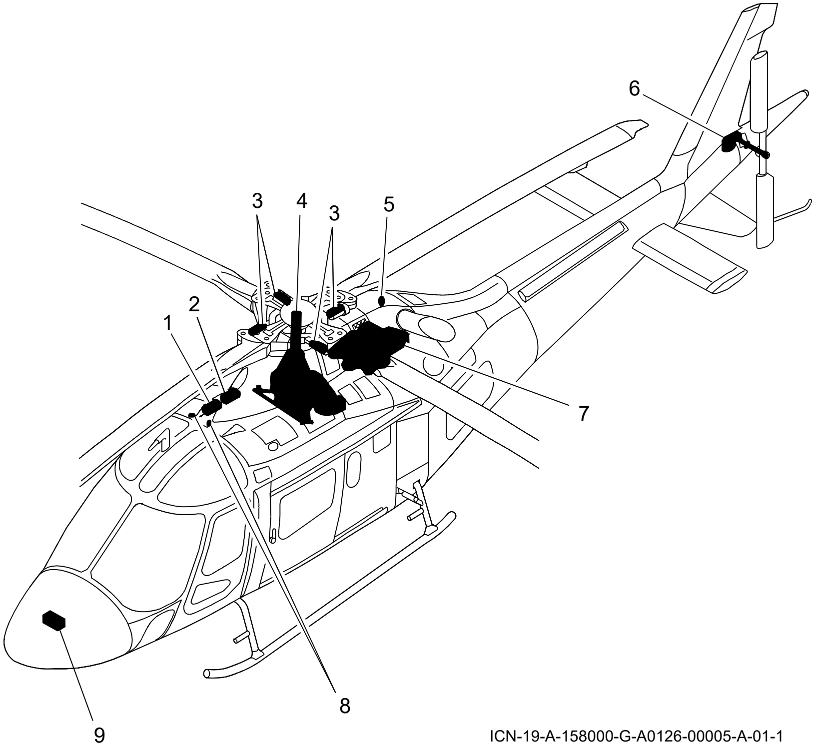
Figure 8-4A. Mooring with Kit 109G1000F01

SERVICING

Refer to Figure 8-5.



1. N°1 hydraulic system reservoir
2. N°2 hydraulic system reservoir
3. Main rotor damper (four)
4. Main transmission
5. Fuel
6. 90° gearbox
7. Engine
8. Flight control accumulator (two)
9. Battery

Figure 8-5. Servicing Diagram

Table 8-1. Servicing

N°	ITEM	CAPACITY (liter)	NOTE
1	N° 1 hydraulic system	1.6	
2	N° 2 hydraulic system	1.6	
3	Main rotor damper	0.05	Each damper
4	Main transmission	10.3	
5	Fuel system	605	
6	90° gearbox	0.40	
7	Engine oil system	10.45	
8	Flight control accumulators		Nitrogen: charge to 1100 psi at 15 °C ambient tempera-ture
9	Battery		Distilled water. Add as necessary.

For list of approved fuels and oils refer to Section 1 of this manual.

SECTION 9

SUPPLEMENTAL PERFORMANCE INFORMATION

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SECTION 9

SUPPLEMENTAL PERFORMANCE INFORMATION

GENERAL INFORMATION

The Supplemental Performance Information contained in this section is provided for use in conjunction with Section 4 and optional equipment Appendices, as applicable.
This section contains useful cruise charts to determine:

- Max Endurance cruise: airspeed required to achieve the maximum flight time;
- Max Range cruise: airspeed required to achieve the maximum range;
- Recommended cruise: a reasonable increase in airspeed for a 1% increase in specific fuel consumption compare to the Max Range.

HELICOPTER INFORMATION

Clean configuration.

CRUISE CHARTS

Cruise Charts do not include the effect of bleed air on fuel consumption.
Fuel Flow data is applicable to the basic helicopter configuration without any optional equipment which would appreciably affect lift, drag or available power.

EXAMPLE FOR INTERPOLATION AMONG CHARTS

Wanted IAS, Torque and Fuel Consumption at 125 KTAS and V_{max}.

Known Pressure altitude: 1350 m (4500 ft)
OAT: 10 °C
Gross weight: 2550 kg.

Method - Velocity = 125 KTAS:
Select suitable charts (Figures 9-18, 9-19, 9-25, 9-26).
On each of the 4 charts intersect the Gross Weight 2550 kg line with the recommended cruise line to read, 125 KTAS, IAS, TQ and Fuel Consumption. See Table 9-1.

- Velocity = V_{max} :
Select suitable charts (Figures 9-18, 9-19, 9-25, 9-26). On each of the 4 charts intersect the Gross Weight 2550 kg line with the recommended cruise line to read, TAS, IAS, TQ and Fuel Consumption. See Table 9-2.

Table 9-1 Velocity = 125 kt TAS

TAS = 125 kt	DATA (GW=2550 kg)				INTERPOLATION		
	Fig. 9-18	Fig. 9-19	Fig. 9-25	Fig. 9-26			
Pressure Altitude (ft)	3000	3000	6000	6000	3000	6000	4500
OAT (°C)	0	20	0	20	10	10	10
Torque (%)	71	68	66	63	70	65	68
IAS (kt)	124	119	117	112	122	115	119
Fuel Consumption (kg/h)	180	177	165	162	179	164	172

Table 9-2 Velocity = V_{max}

V_{max} at MCP	DATA (GW=2550 kg)				INTERPOLATION		
	Fig. 9-18	Fig. 9-19	Fig. 9-25	Fig. 9-26			
Pressure Altitude (ft)	3000	3000	6000	6000	3000	6000	4500
OAT (°C)	0	20	0	20	10	10	10
Torque (%)	86	71	75	62	79	69	74
TAS (kt)	136	128	133	124	132	129	131
IAS (kt)	134	122	124	112	128	118	123
Fuel Consumption (kg/h)	204	182	179	161	193	170	182

CRUISE
PRESSURE ALTITUDE = -1000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102 %
ELECTRICAL LOAD: 100 A TOTAL

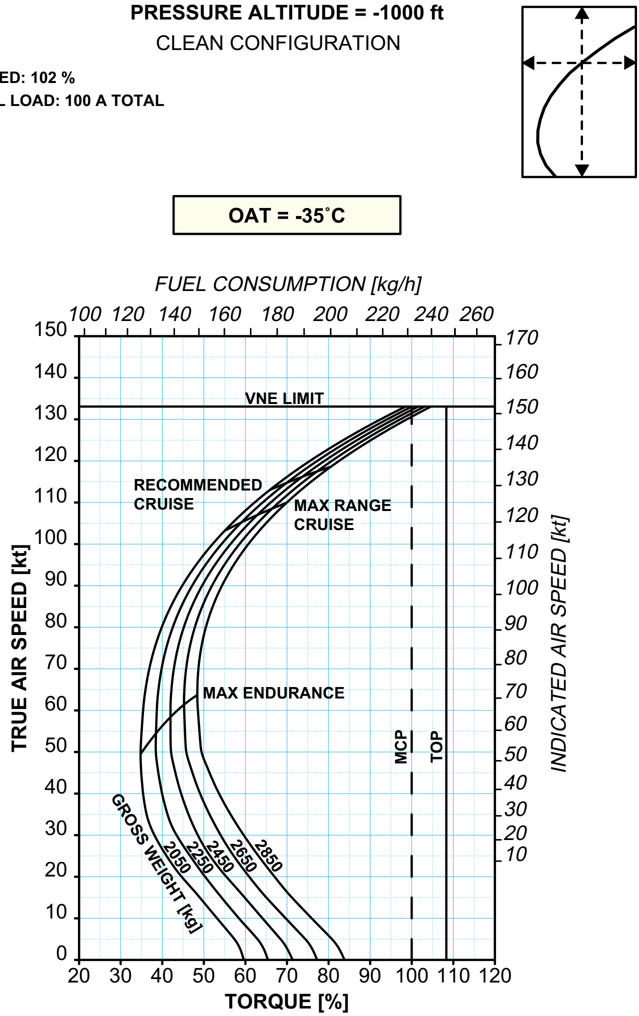

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Figure 9-1. OAT = -35 °C - Altitude Pressure = -1000 ft

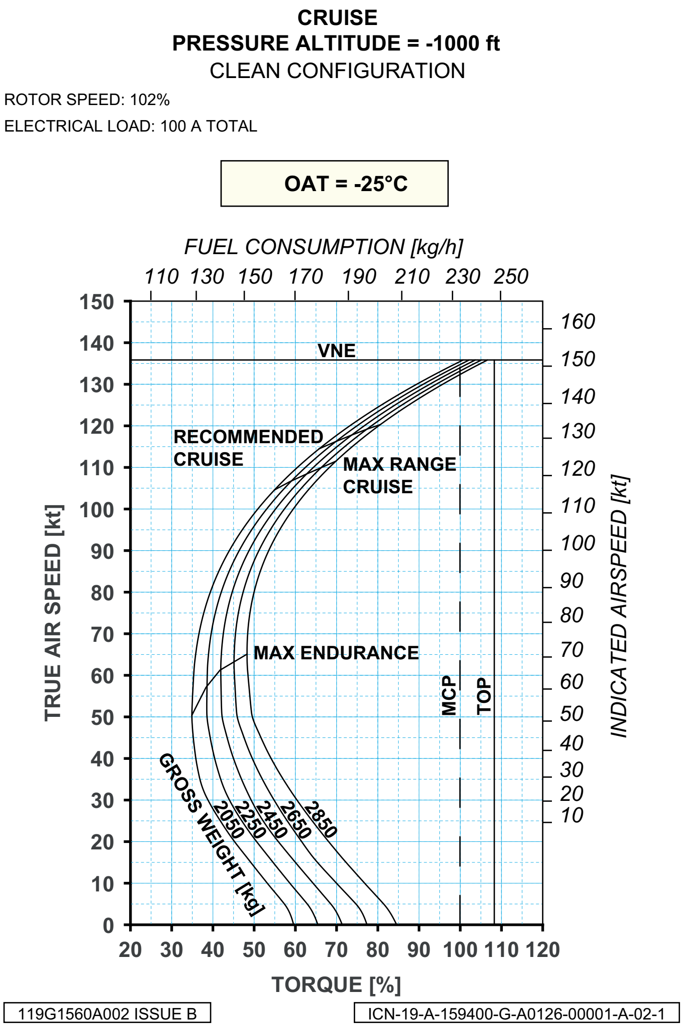

Figure 9-2. OAT = -25 °C - Altitude Pressure = -1000 ft

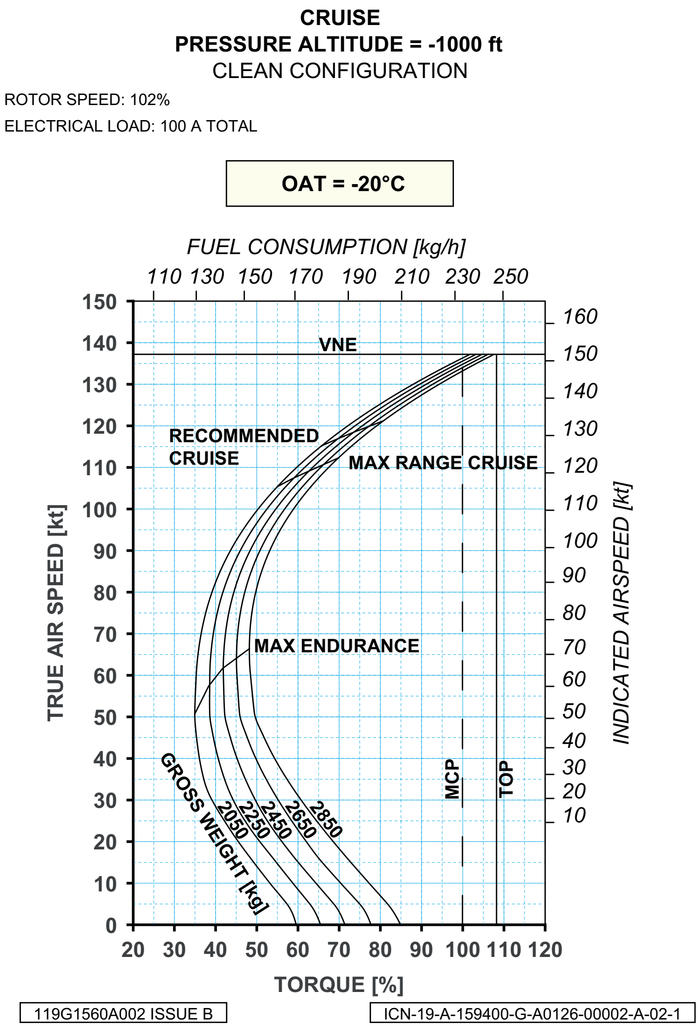

Figure 9-3. OAT = -20 °C - Altitude Pressure = -1000 ft

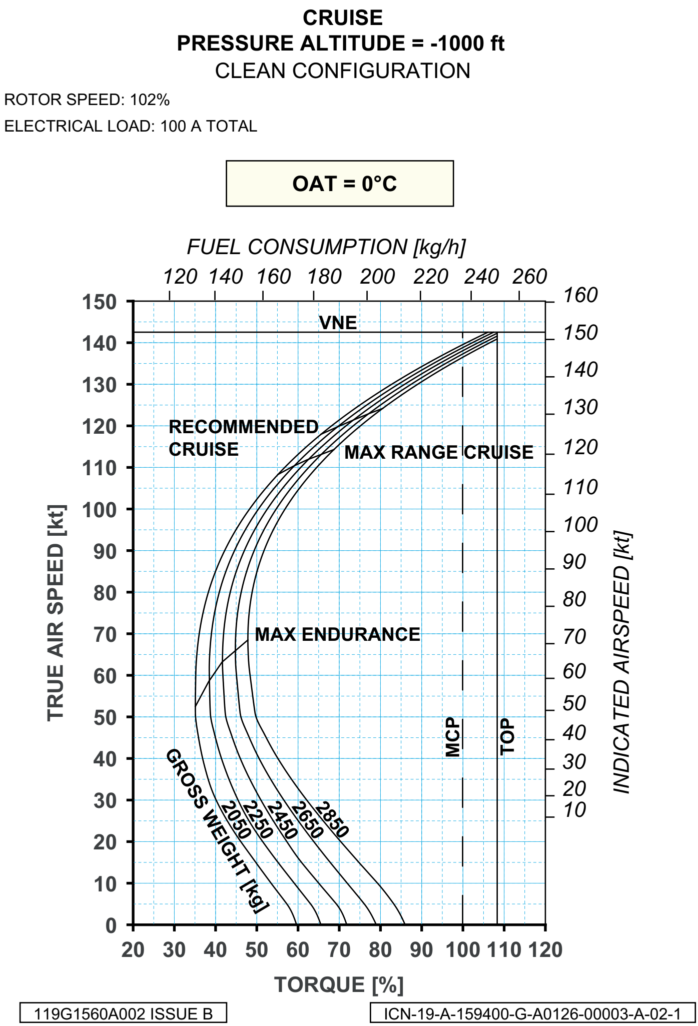

Figure 9-4. OAT = 0 °C - Altitude Pressure = -1000 ft

CRUISE
PRESSURE ALTITUDE = -1000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 20°C

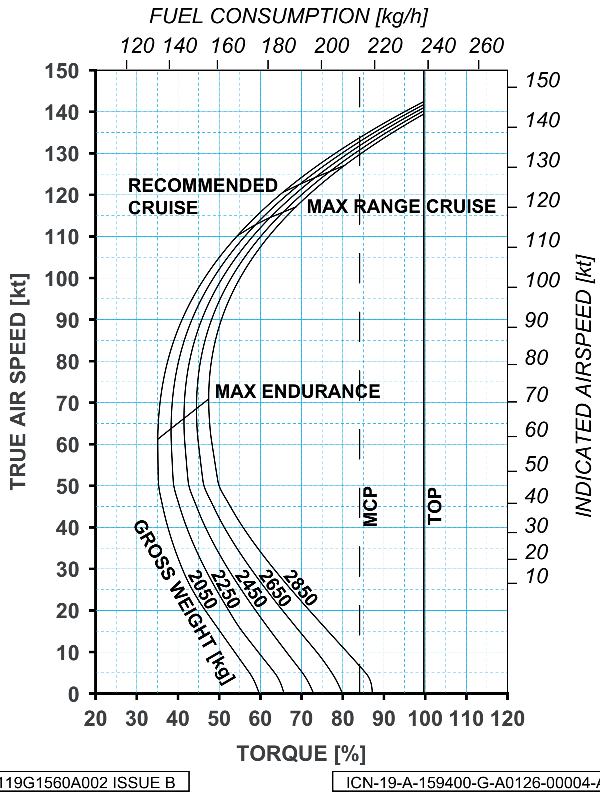

Figure 9-5. OAT = 20 °C - Altitude Pressure = -1000 ft

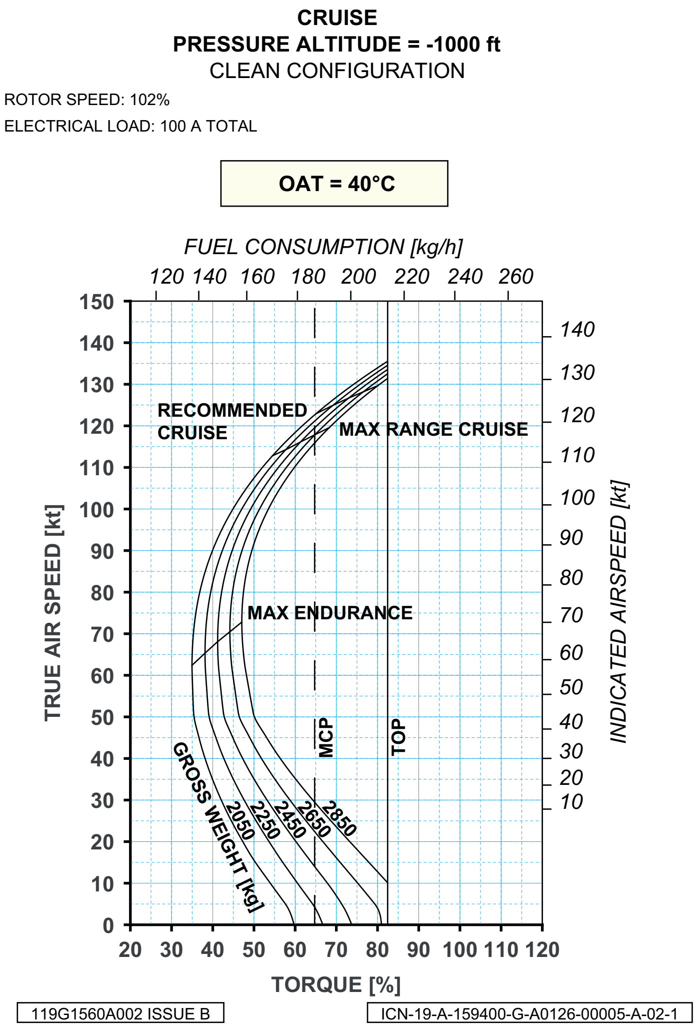

Figure 9-6. OAT = 40 °C - Altitude Pressure = -1000 ft

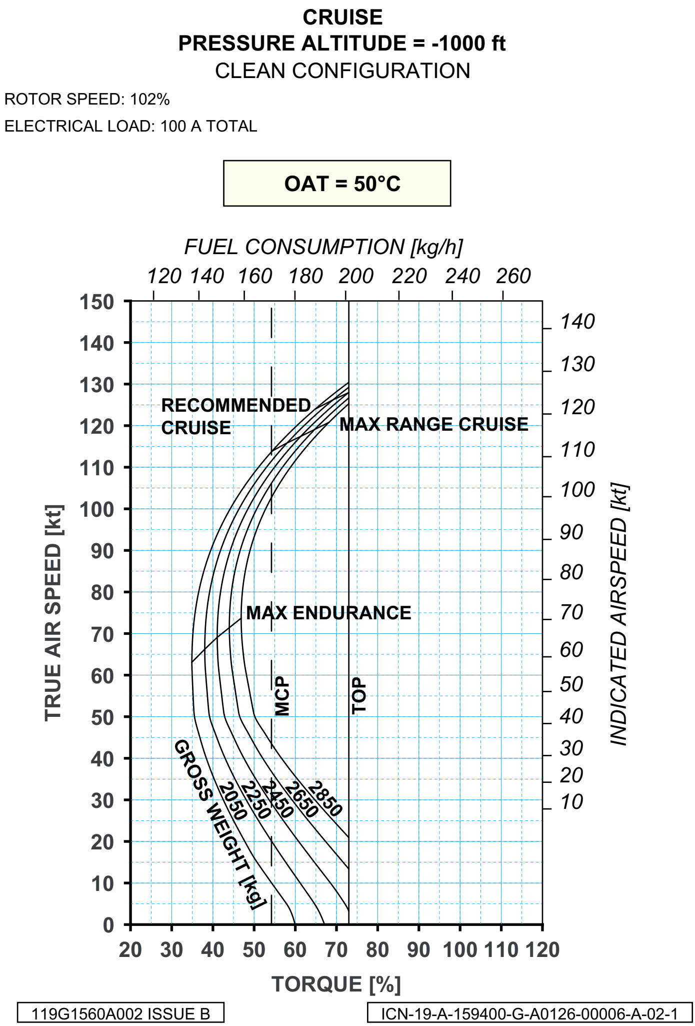

Figure 9-7. OAT = 50 °C - Altitude Pressure = -1000 ft

CRUISE
PRESSURE ALTITUDE = 0 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102 %
ELECTRICAL LOAD: 100 A TOTAL

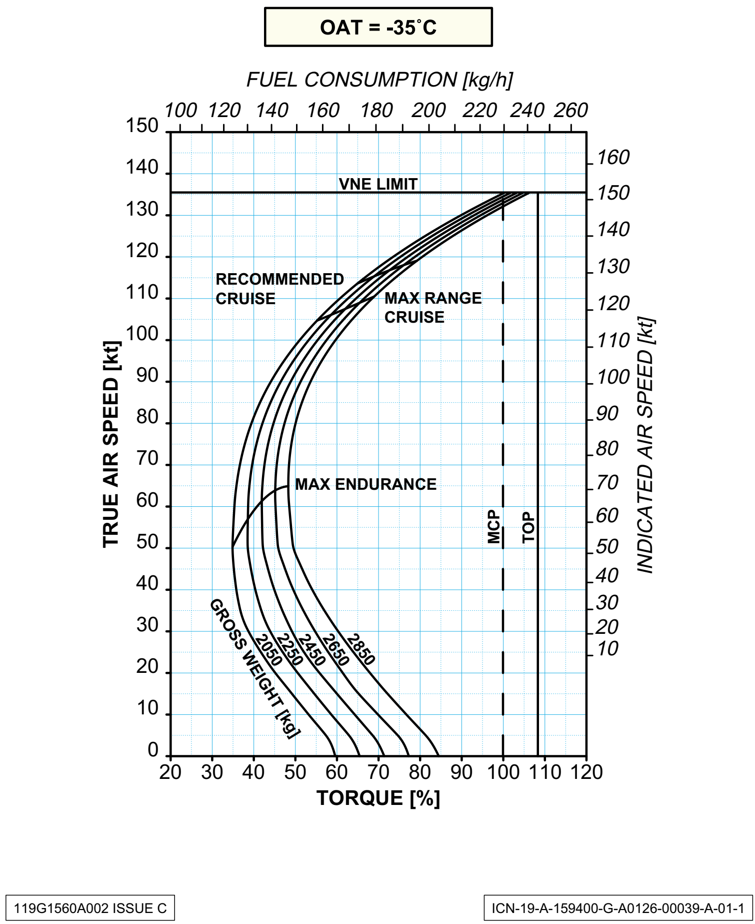

Figure 9-8. OAT = -35 °C - Altitude Pressure = 0 ft

CRUISE
PRESSURE ALTITUDE = 0 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = -25°C

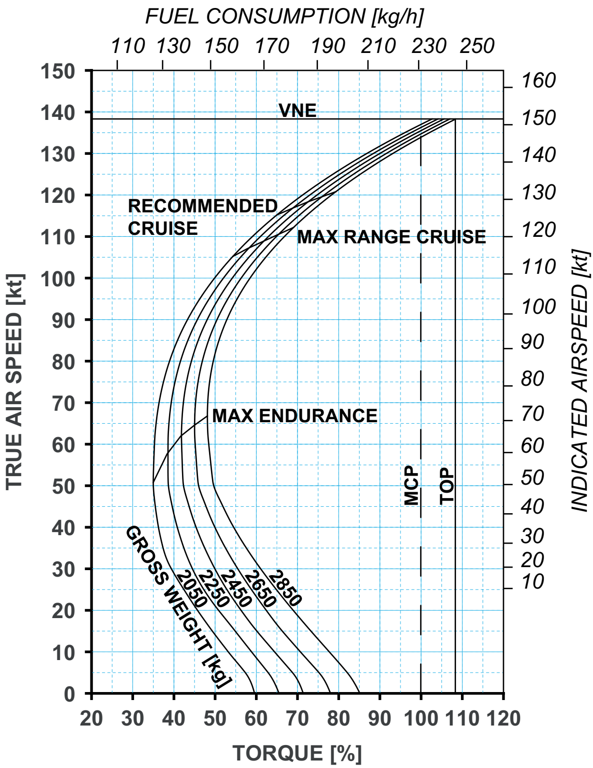

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Figure 9-9. OAT = -25 °C - Altitude Pressure = 0 ft

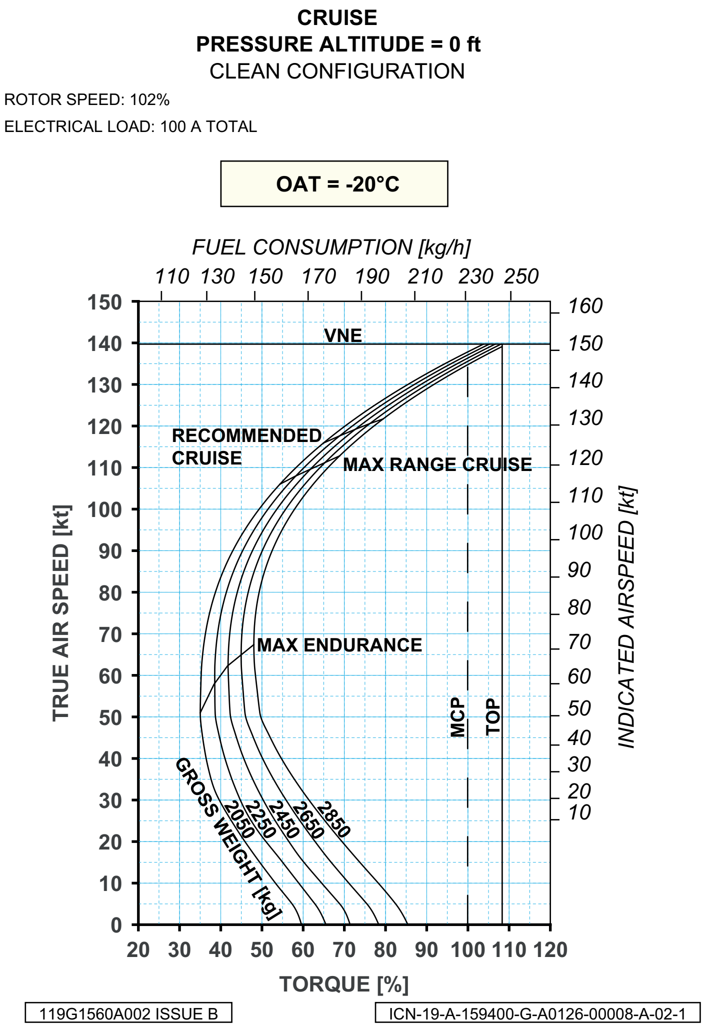

Figure 9-10. OAT = -20 °C - Altitude Pressure = 0 ft

CRUISE
PRESSURE ALTITUDE = 0 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 0°C

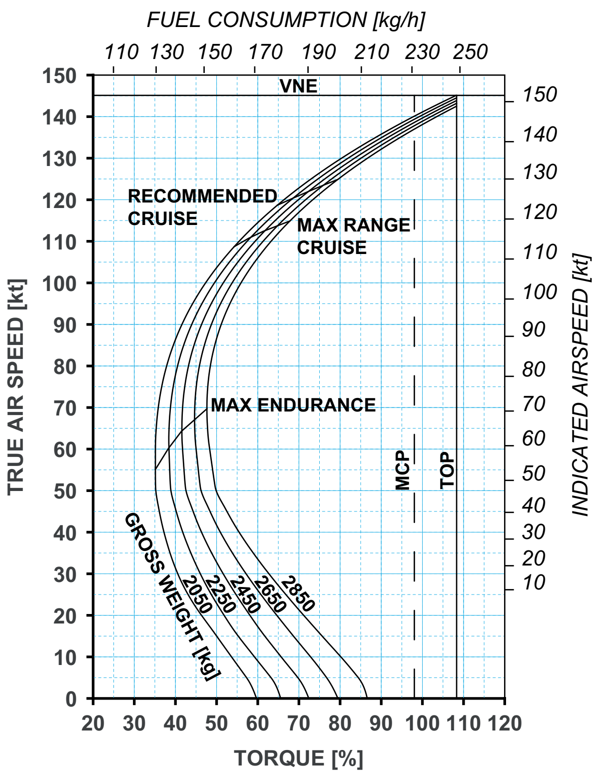

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Figure 9-11. OAT = 0 °C - Altitude Pressure = 0 ft

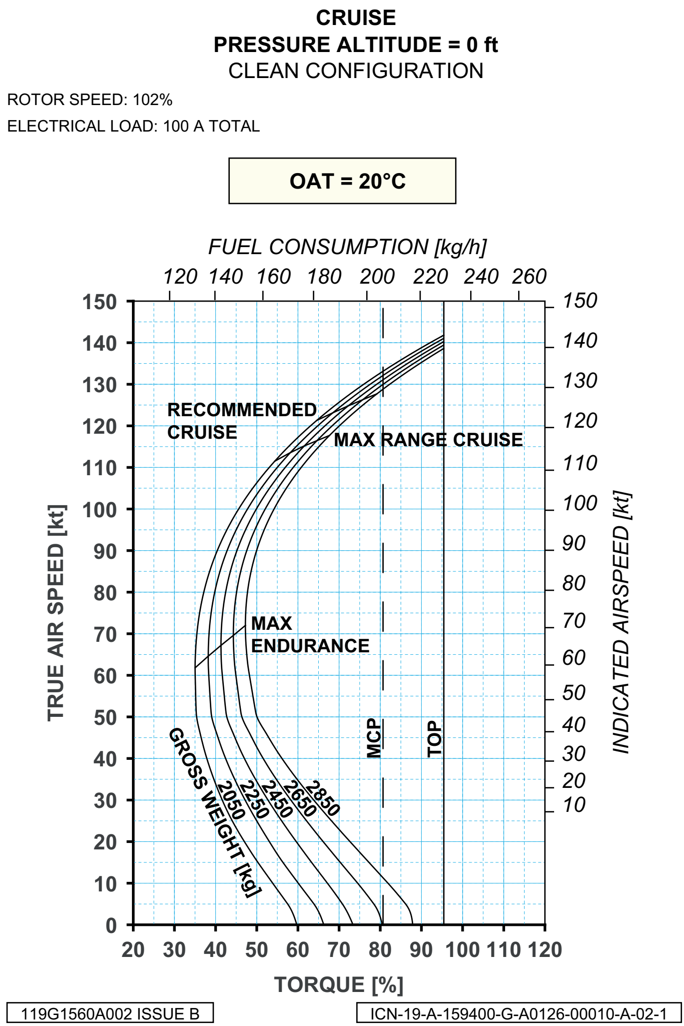

Figure 9-12. OAT = 20 °C - Altitude Pressure = 0 ft

CRUISE
PRESSURE ALTITUDE = 0 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 40°C

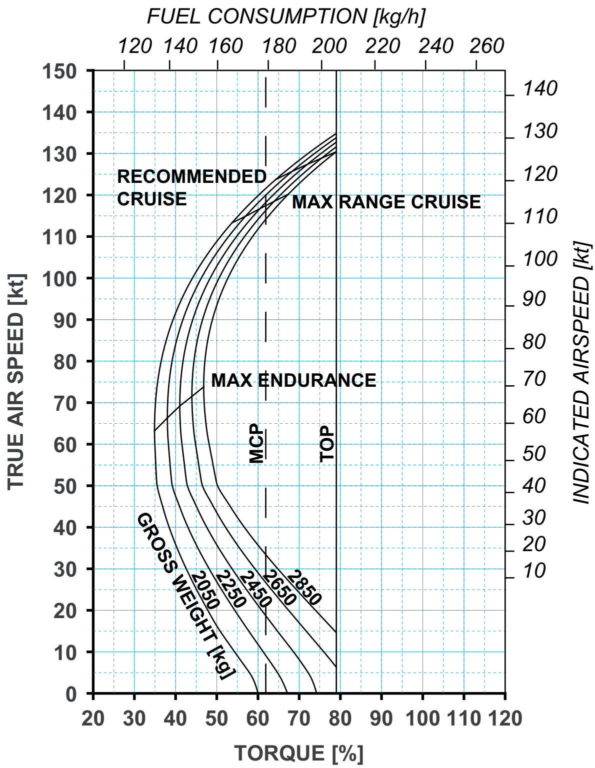

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Figure 9-13. OAT = 40 °C - Altitude Pressure = 0 ft

CRUISE
PRESSURE ALTITUDE = 0 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 50°C

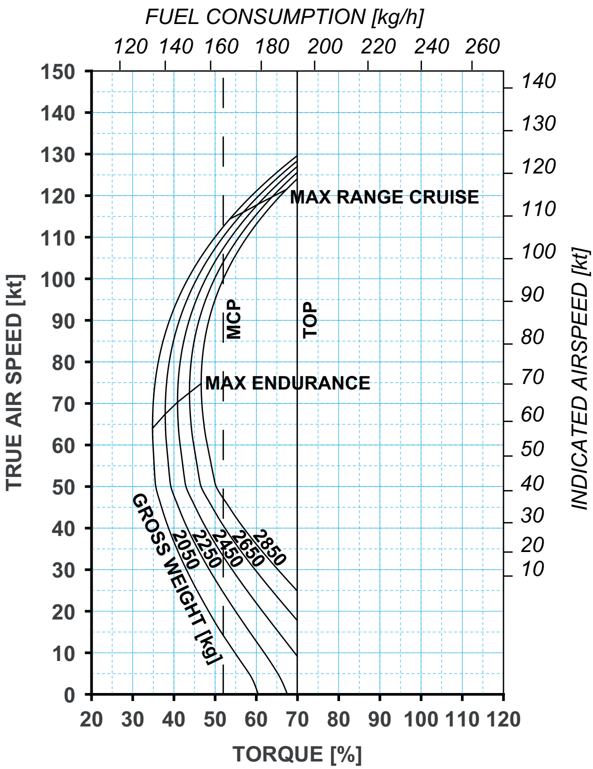

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Figure 9-14. OAT = 50 °C - Altitude Pressure = 0 ft

CRUISE
PRESSURE ALTITUDE = 3000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102 %
ELECTRICAL LOAD: 100 A TOTAL

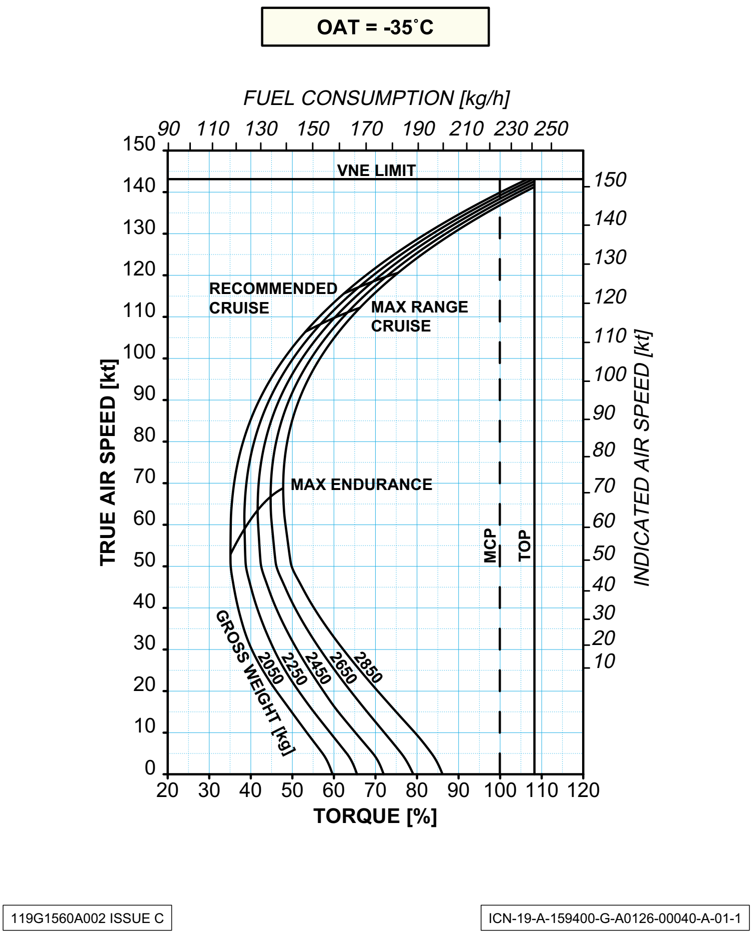

Figure 9-15. OAT = -35 °C - Altitude Pressure = 3000 ft

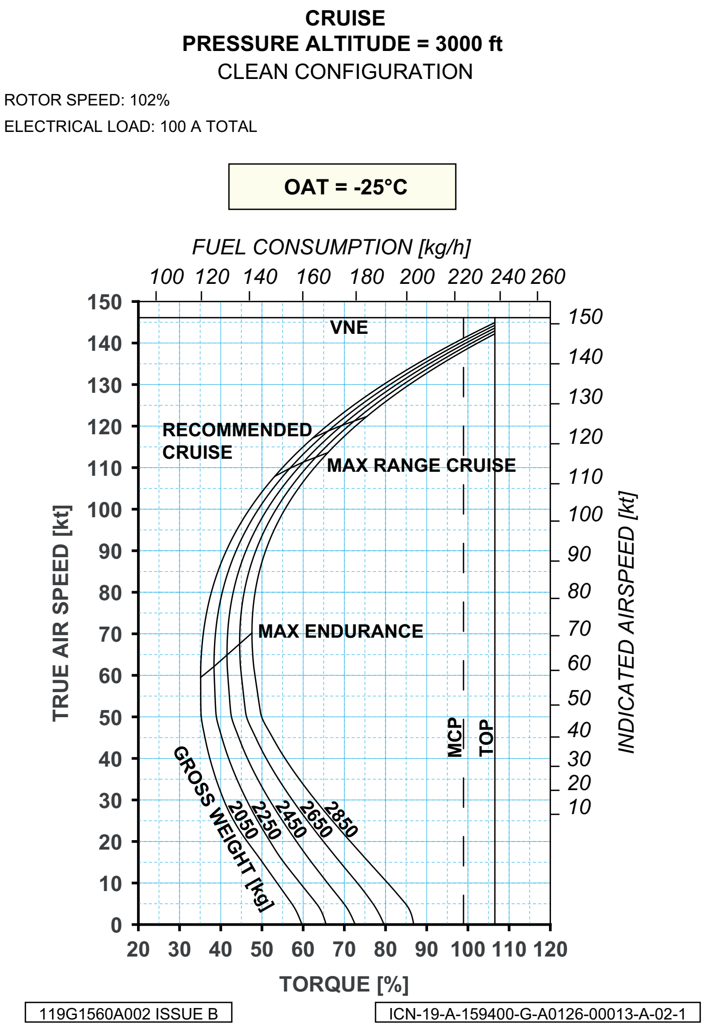

Figure 9-16. OAT = -25 °C - Altitude Pressure = 3000 ft

CRUISE
PRESSURE ALTITUDE = 3000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = -20°C

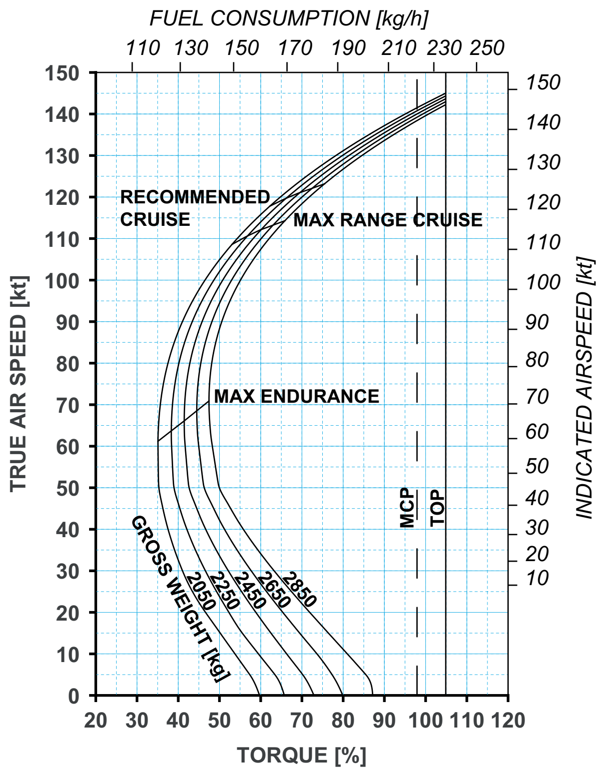

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Figure 9-17. OAT = -20 °C - Altitude Pressure = 3000 ft

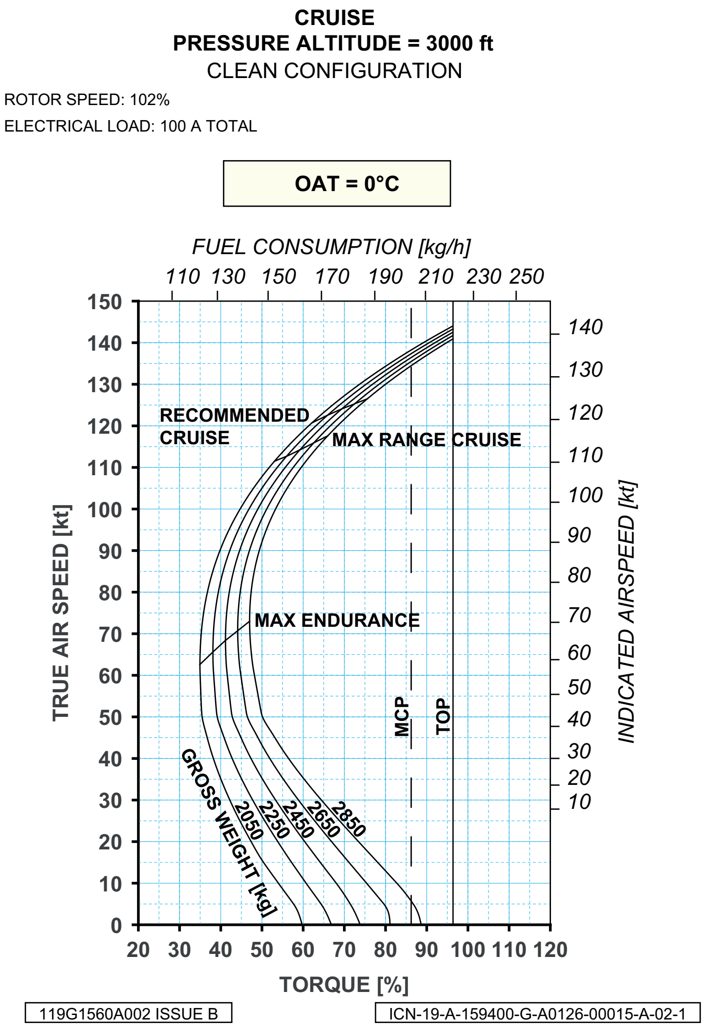

Figure 9-18. OAT = 0 °C - Altitude Pressure = 3000 ft

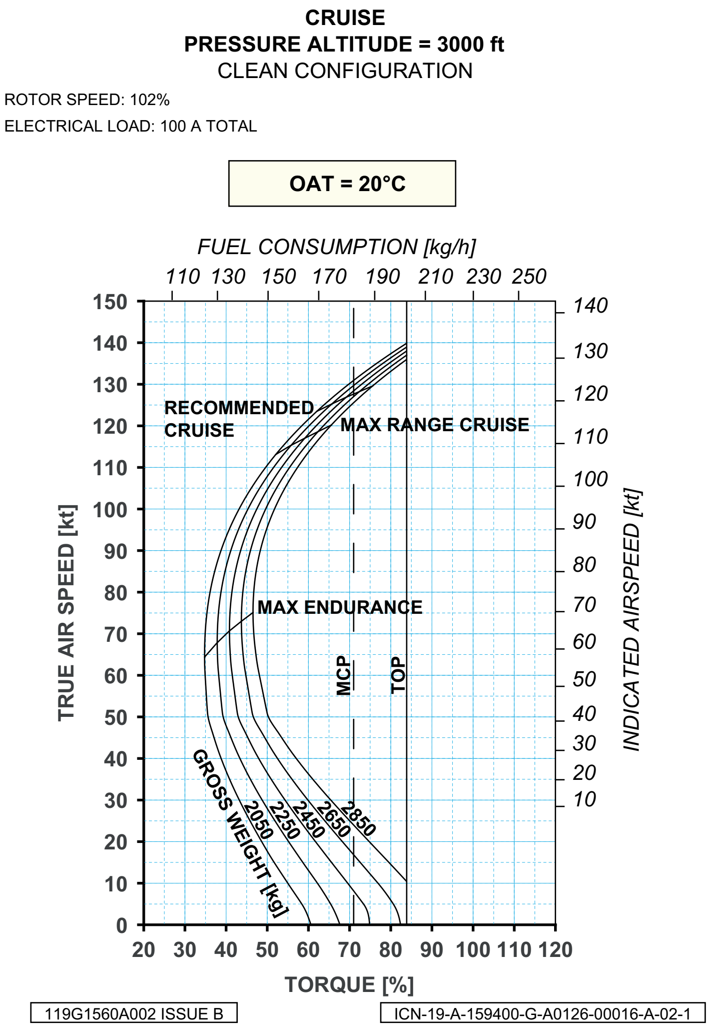

Figure 9-19. OAT = 20 °C - Altitude Pressure = 3000 ft

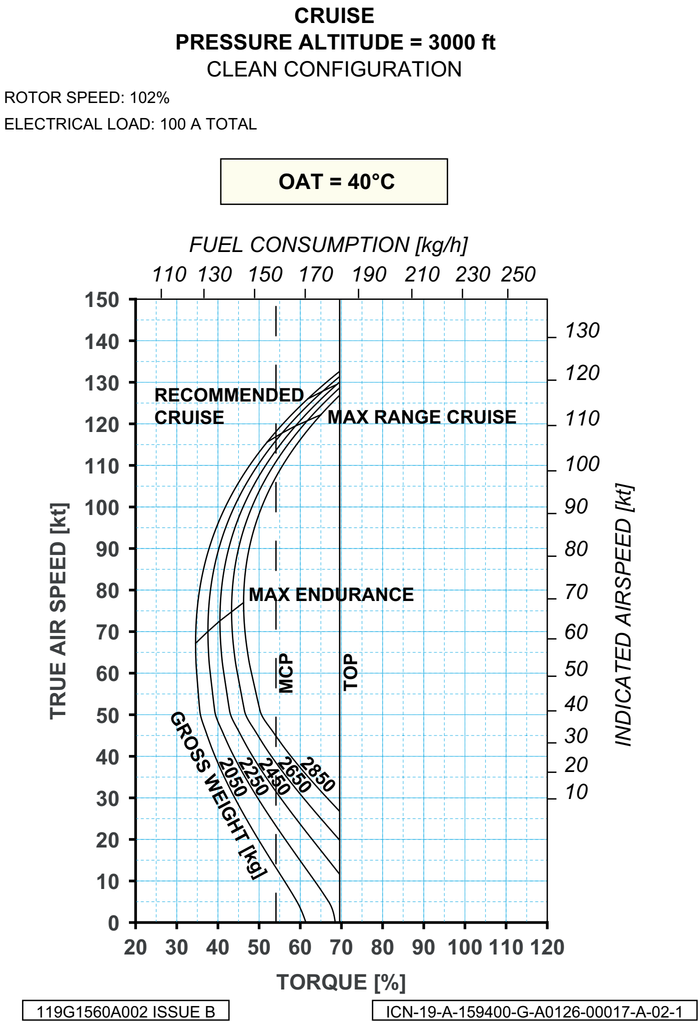

Figure 9-20. OAT = 40 °C - Altitude Pressure = 3000 ft

CRUISE
PRESSURE ALTITUDE = 3000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 50°C

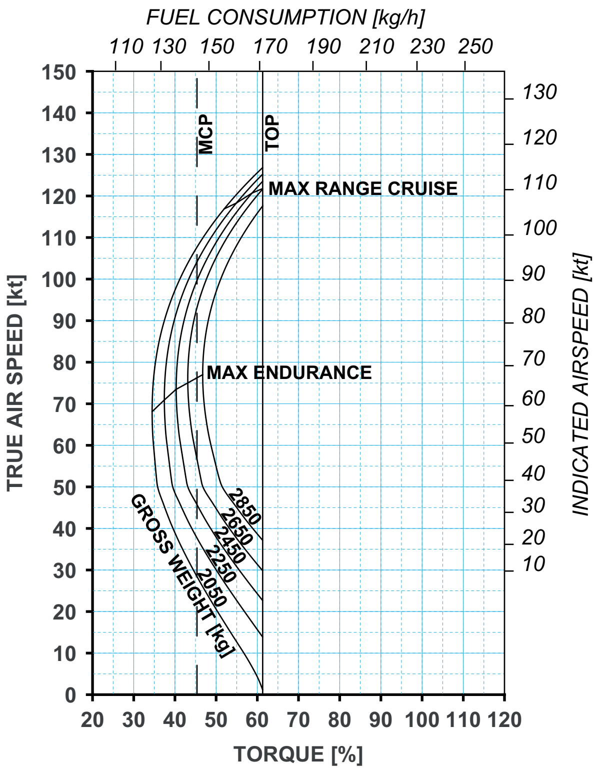

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Figure 9-21. OAT = 50 °C - Altitude Pressure = 3000 ft

CRUISE
PRESSURE ALTITUDE = 6000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102 %
ELECTRICAL LOAD: 100 A TOTAL

OAT = -35˚C

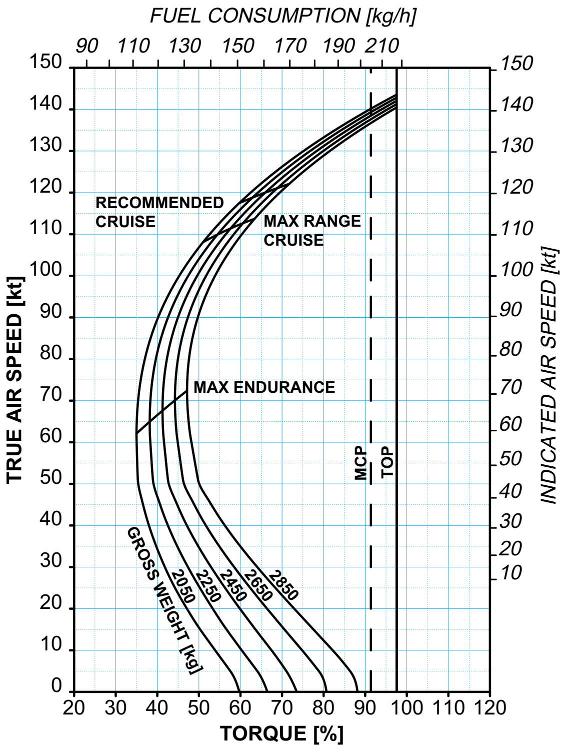

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Figure 9-22. OAT = -35 °C - Altitude Pressure = 6000 ft

CRUISE
PRESSURE ALTITUDE = 6000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = -25°C

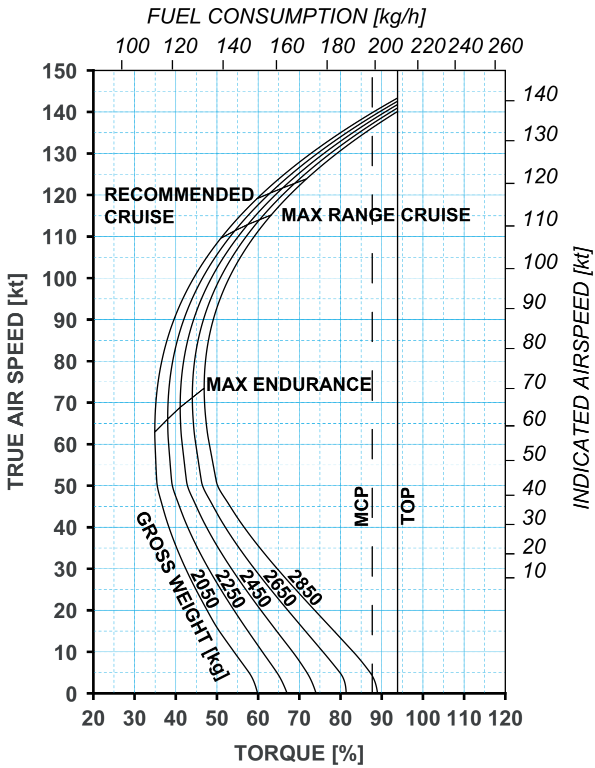

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Figure 9-23. OAT = -25 °C - Altitude Pressure = 6000 ft

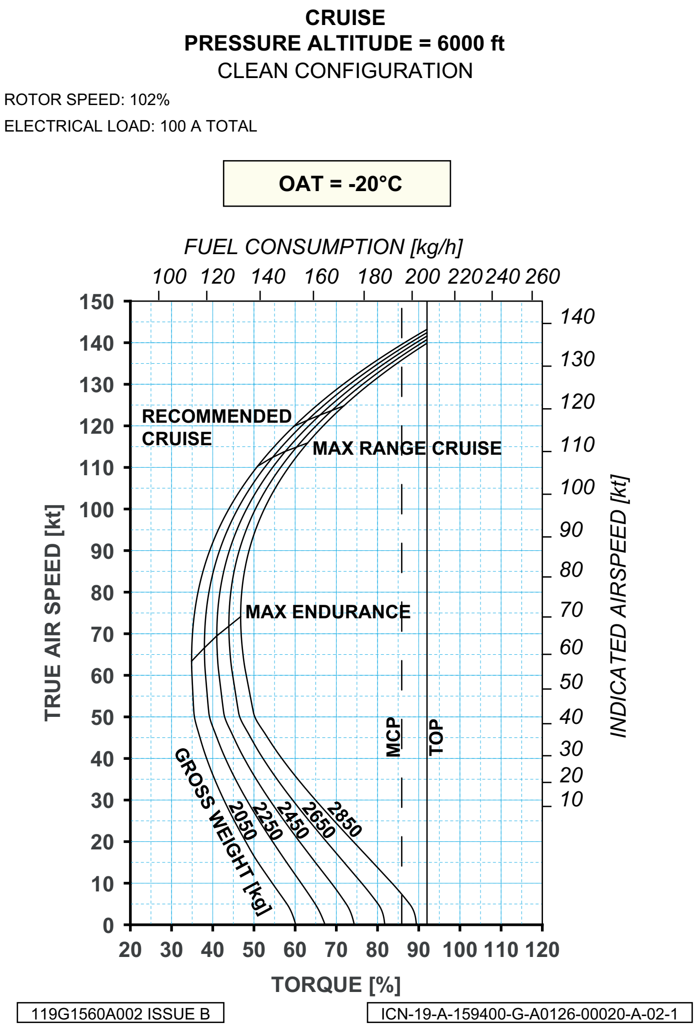

Figure 9-24. OAT = -20 °C - Altitude Pressure = 6000 ft

CRUISE
PRESSURE ALTITUDE = 6000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 0°C

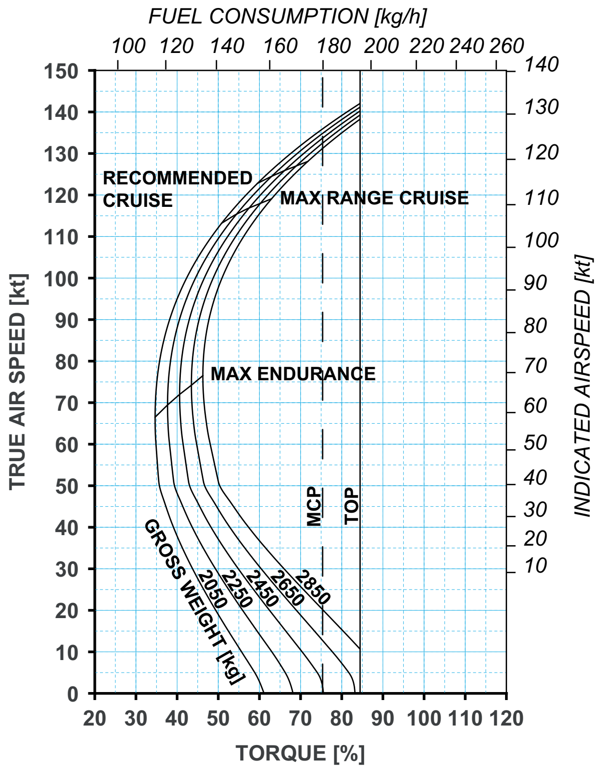

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Figure 9-25. OAT = 0 °C - Altitude Pressure = 6000 ft

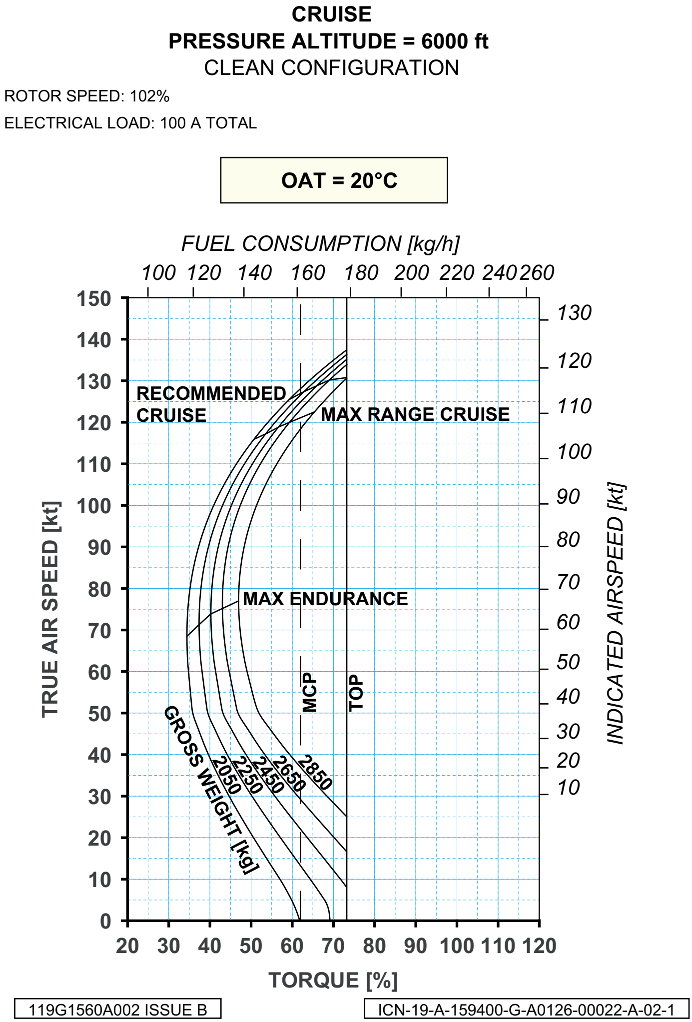
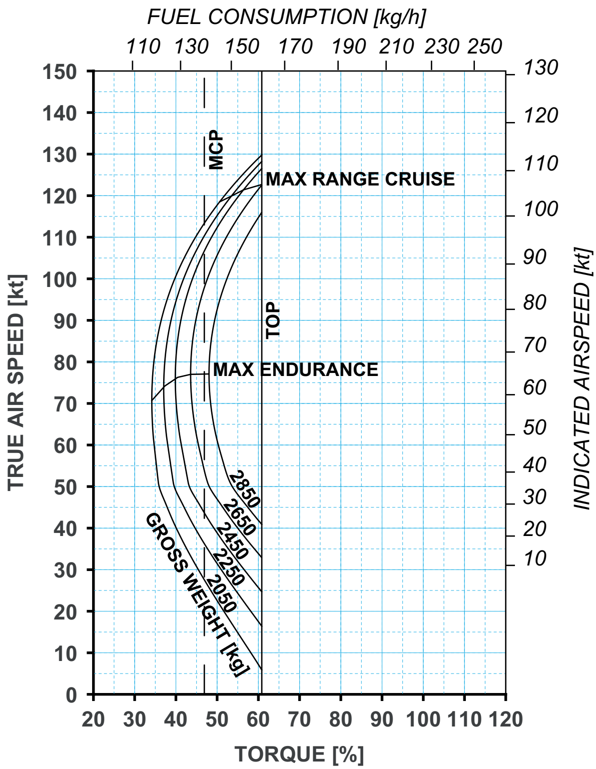


Figure 9-26. OAT = 20 °C - Altitude Pressure = 6000 ft

CRUISE
PRESSURE ALTITUDE = 6000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 40°C



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ICN-19-A-159400-G-A0126-00023-A-02-1

Figure 9-27. OAT = 40 °C - Altitude Pressure = 6000 ft

CRUISE
PRESSURE ALTITUDE = 9000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102 %
ELECTRICAL LOAD: 100 A TOTAL

OAT = -35˚C

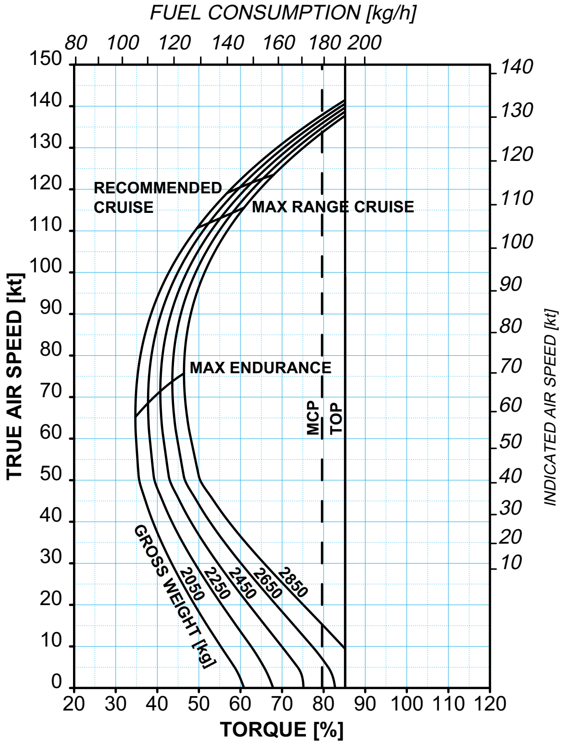

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Figure 9-28. OAT = -35 °C - Altitude Pressure = 9000 ft

CRUISE
PRESSURE ALTITUDE = 9000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = -25°C

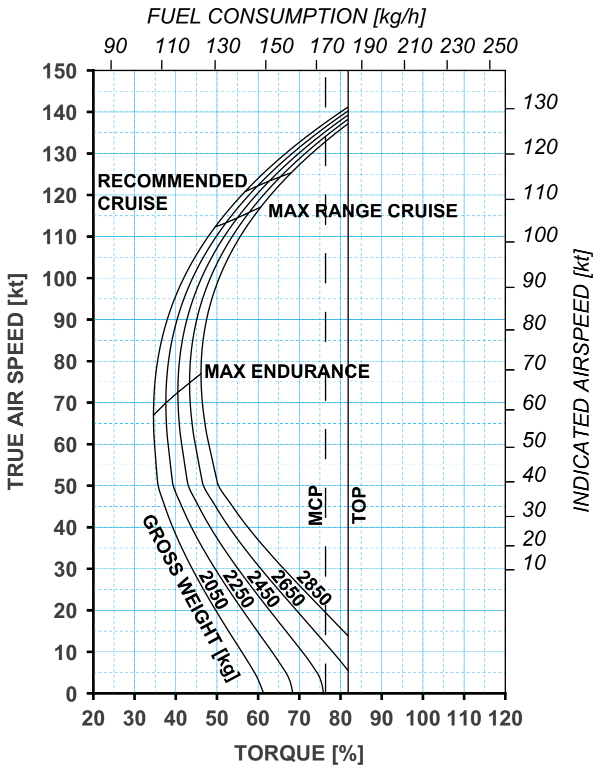

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Figure 9-29. OAT = -25 °C - Altitude Pressure = 9000 ft

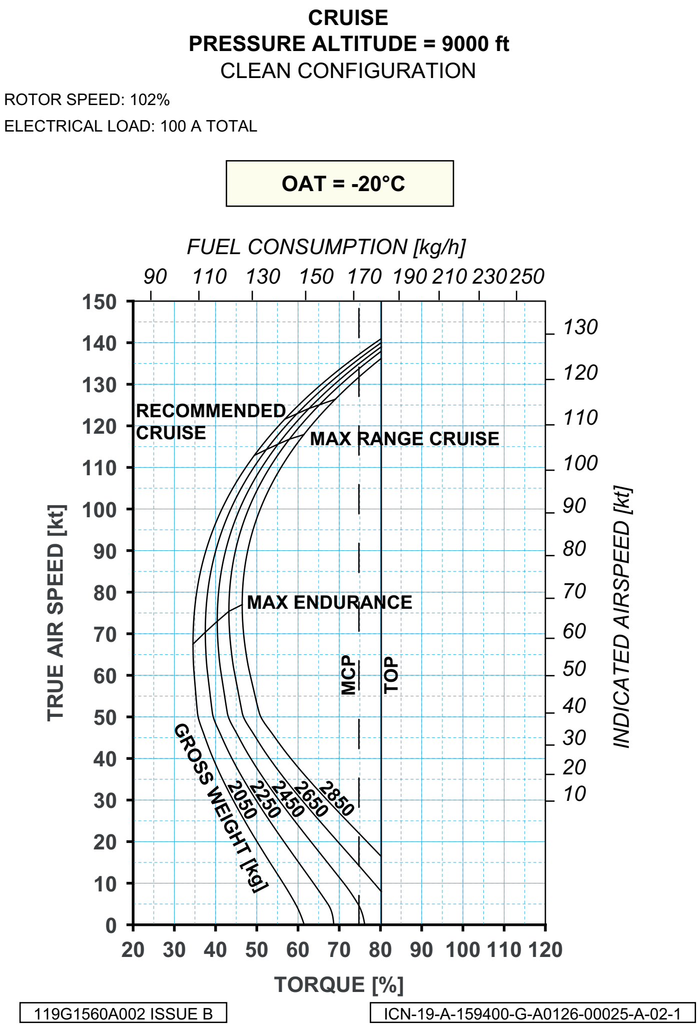

Figure 9-30. OAT = -20 °C - Altitude Pressure = 9000 ft

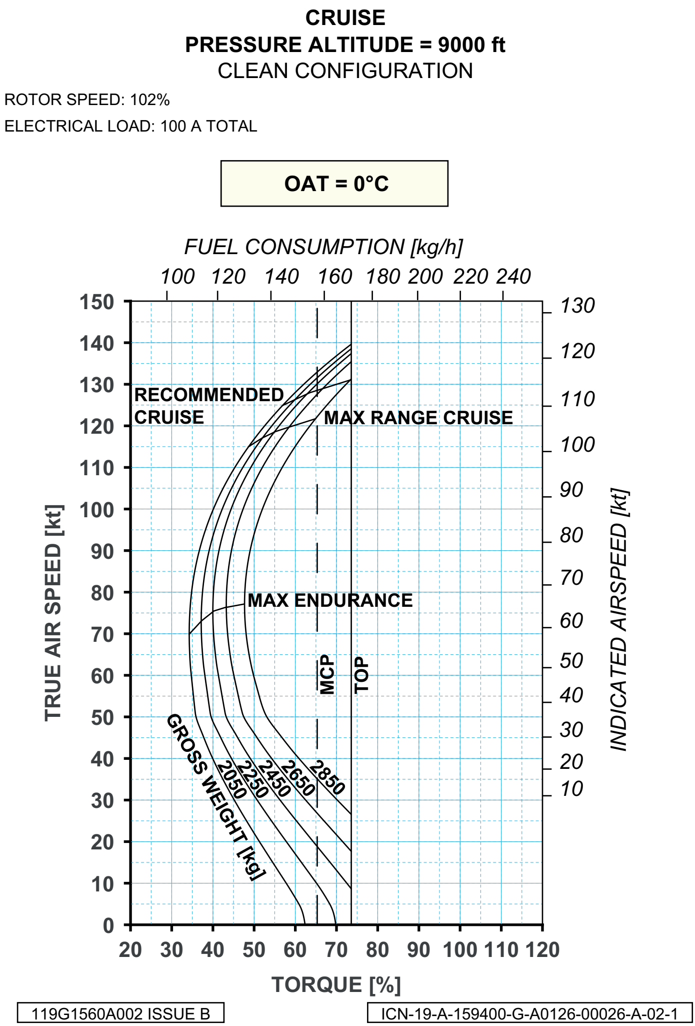

Figure 9-31. OAT = 0 °C - Altitude Pressure = 9000 ft

CRUISE
PRESSURE ALTITUDE = 9000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 20°C

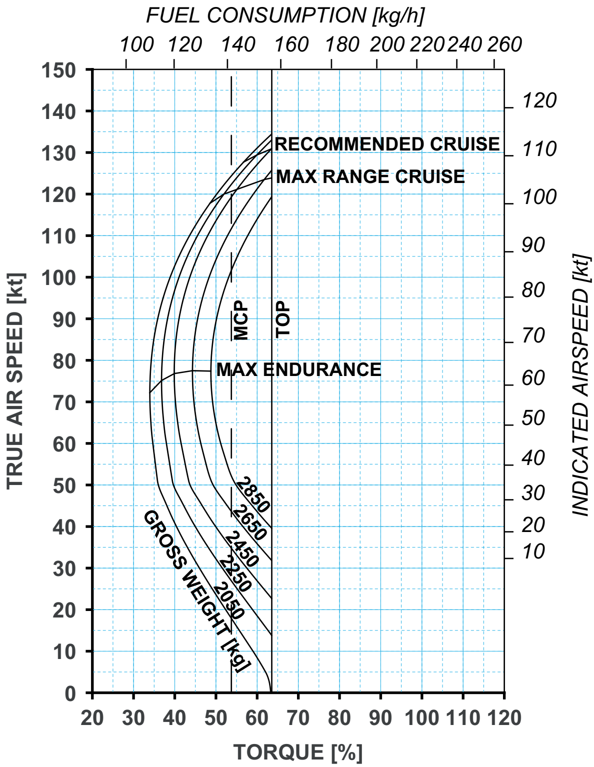

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Figure 9-32. OAT = 20 °C - Altitude Pressure = 9000 ft

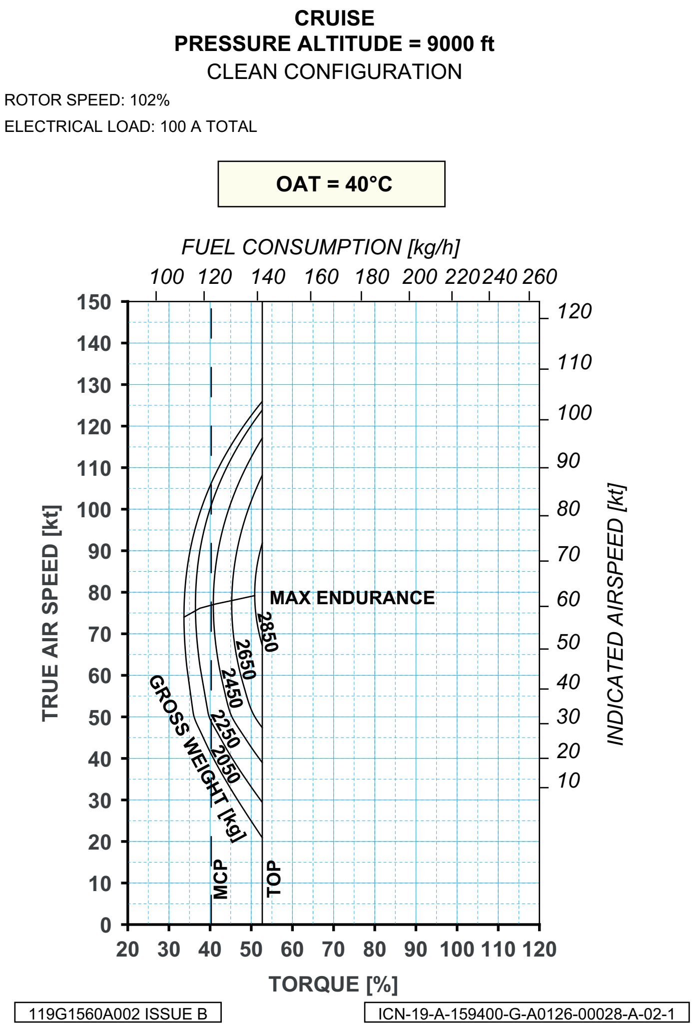

Figure 9-33. OAT = 40 °C - Altitude Pressure = 9000 ft

CRUISE
PRESSURE ALTITUDE = 12000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102 %
ELECTRICAL LOAD: 100 A TOTAL

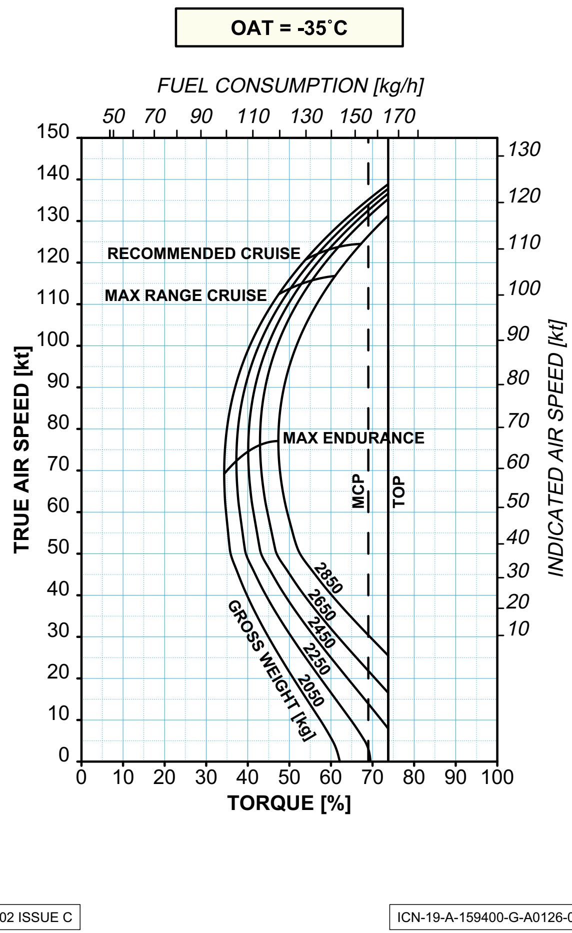

Figure 9-34. OAT = -35 °C - Altitude Pressure = 12000 ft

CRUISE
PRESSURE ALTITUDE = 12000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = -25°C

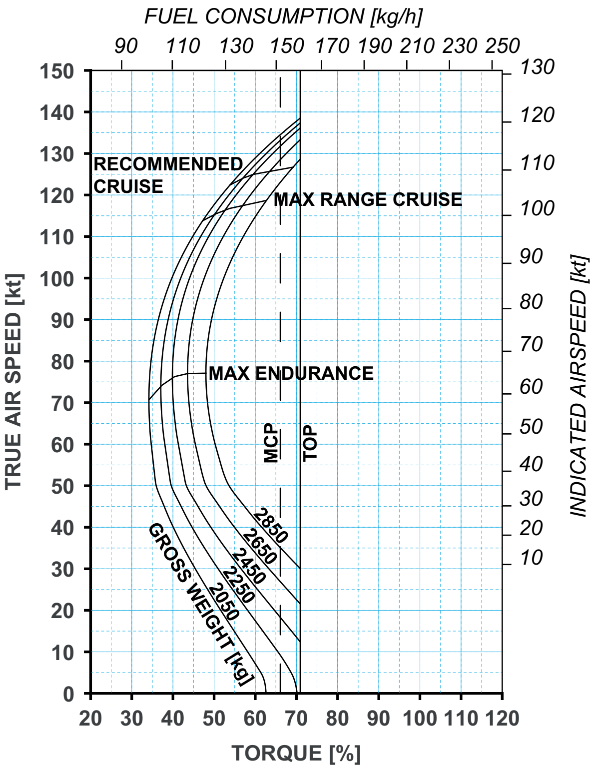

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Figure 9-35. OAT = -25 °C - Altitude Pressure = 12000 ft

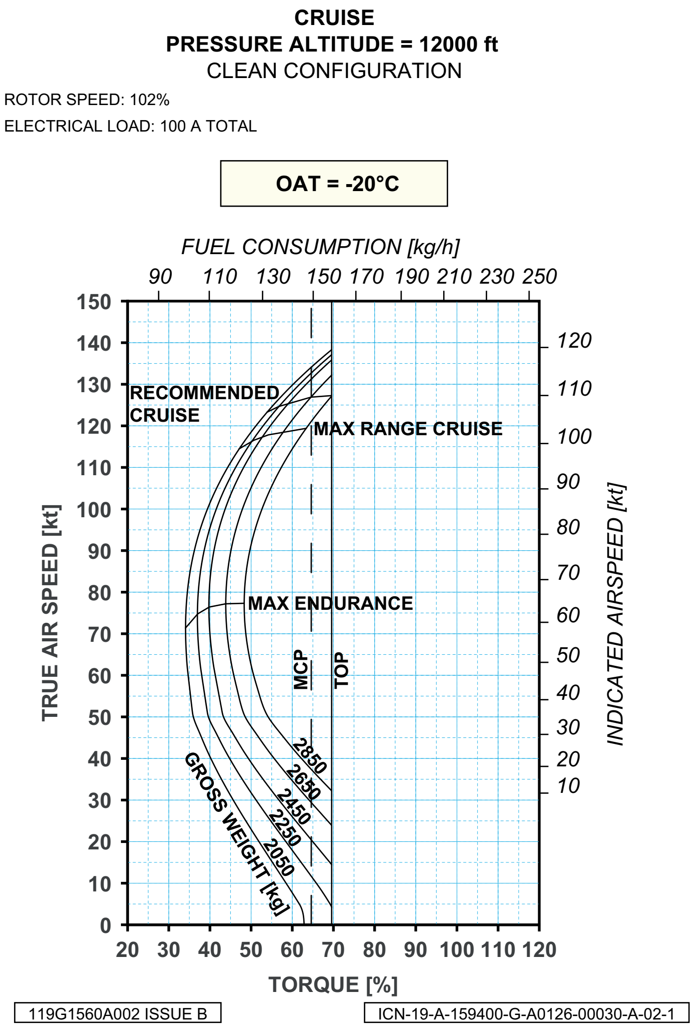

Figure 9-36. OAT = -20 °C - Altitude Pressure = 12000 ft

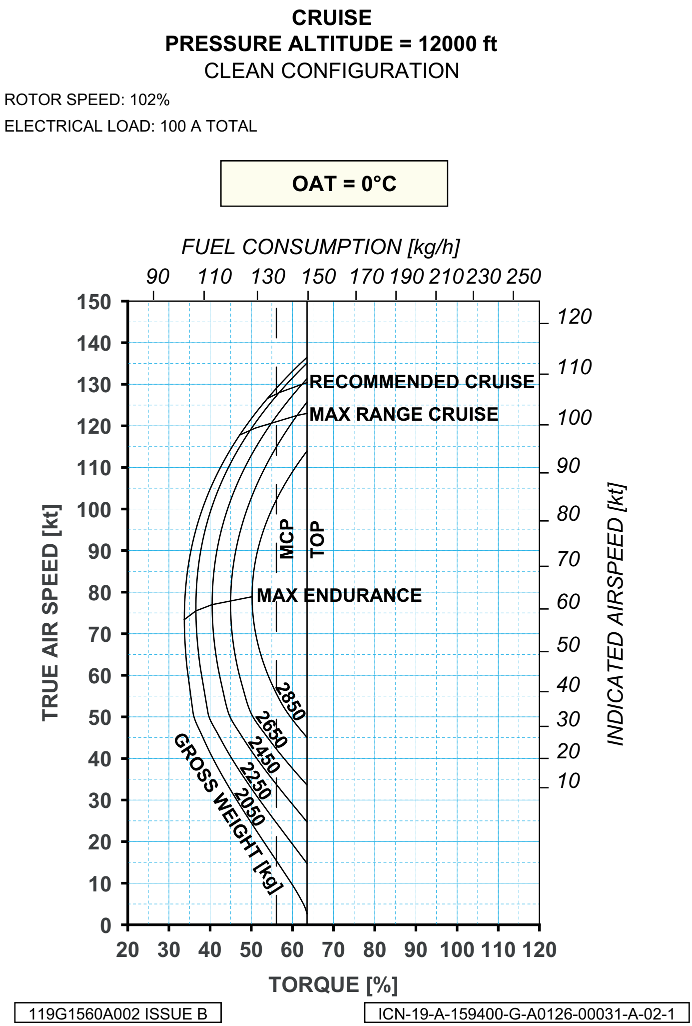

Figure 9-37. OAT = 0 °C - Altitude Pressure = 12000 ft

CRUISE
PRESSURE ALTITUDE = 12000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 20°C

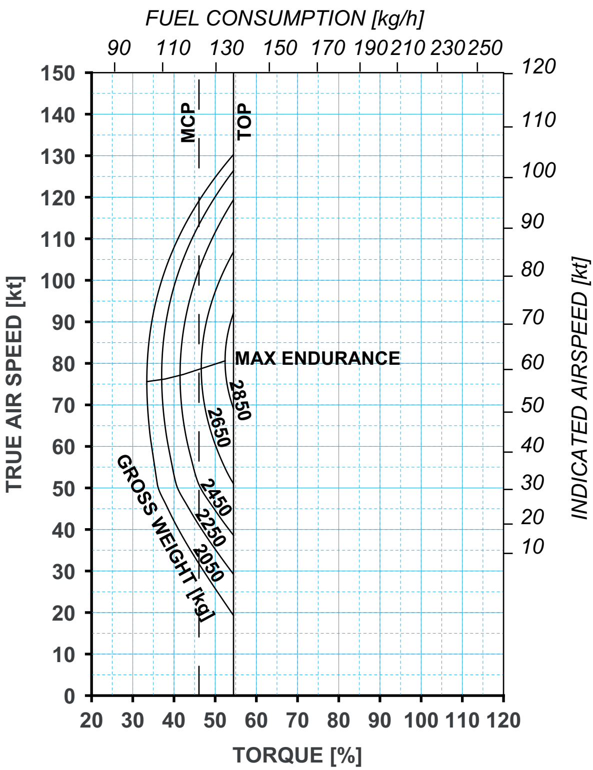

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Figure 9-38. OAT = 20 °C - Altitude Pressure = 12000 ft

CRUISE
PRESSURE ALTITUDE = 12000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 40°C

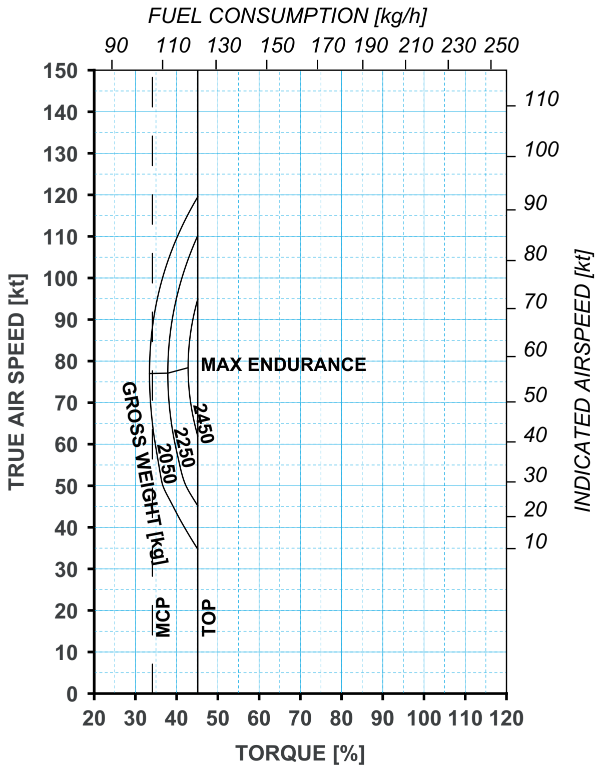

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Figure 9-39. OAT = 40 °C - Altitude Pressure = 12000 ft

CRUISE
PRESSURE ALTITUDE = 15000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102 %
ELECTRICAL LOAD: 100 A TOTAL

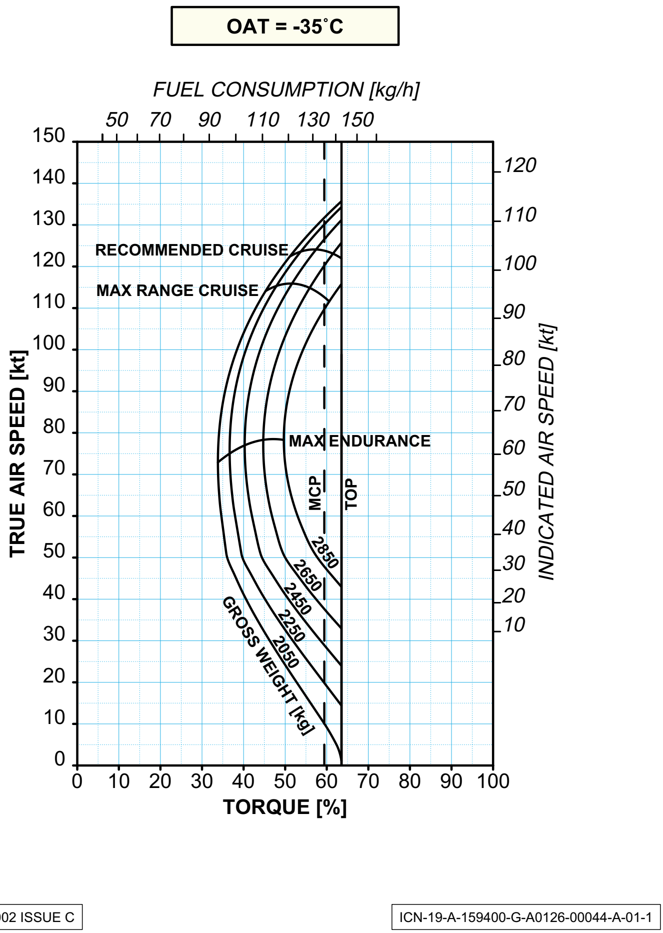

Figure 9-40. OAT = -35 °C - Altitude Pressure = 15000 ft

CRUISE
PRESSURE ALTITUDE = 15000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = -25°C

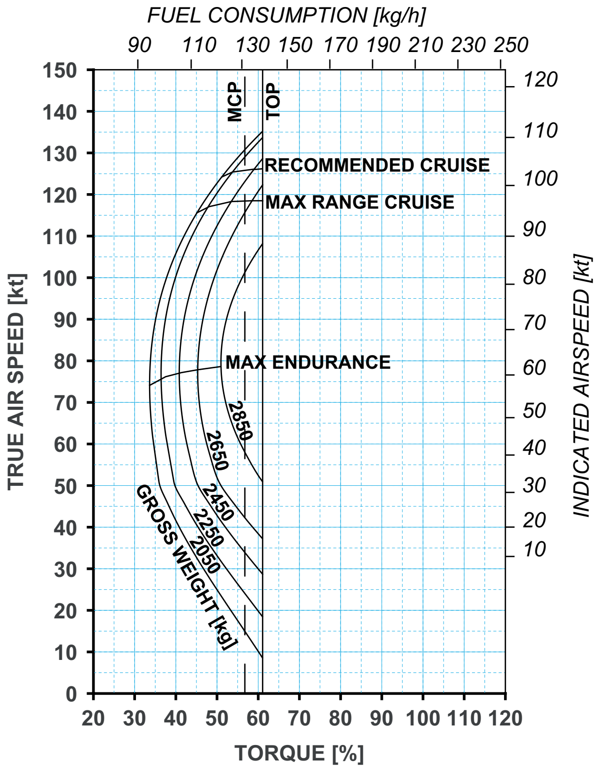

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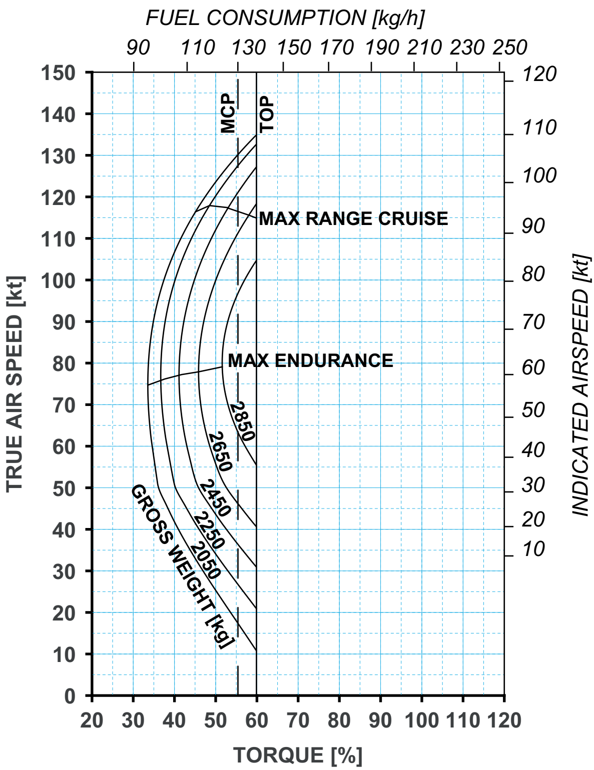
Figure 9-41. OAT = -25 °C - Altitude Pressure = 15000 ft

CRUISE
PRESSURE ALTITUDE = 15000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = -20°C



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ICN-19-A-159400-G-A0126-00035-A-02-1

Figure 9-42. OAT = -20 °C - Altitude Pressure = 15000 ft

CRUISE
PRESSURE ALTITUDE = 15000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 0°C

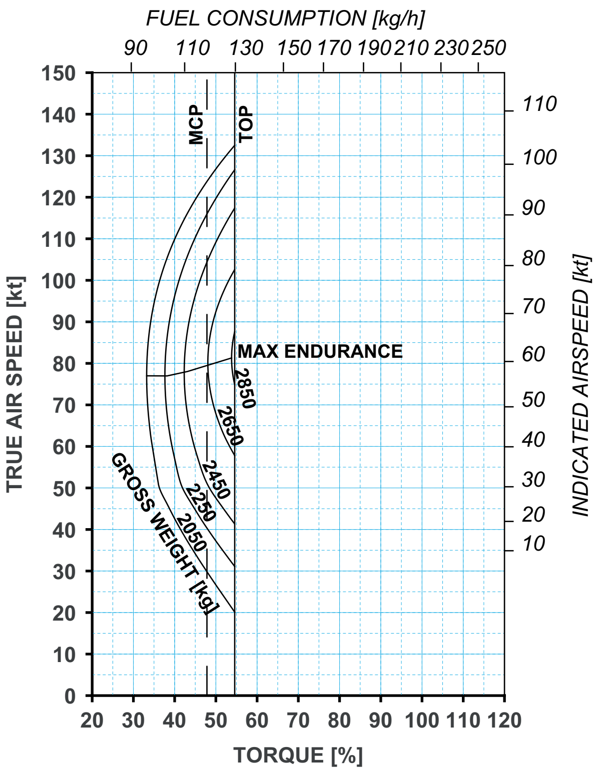

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Figure 9-43. OAT = 0 °C - Altitude Pressure = 15000 ft

CRUISE
PRESSURE ALTITUDE = 15000 ft
CLEAN CONFIGURATION

ROTOR SPEED: 102%
ELECTRICAL LOAD: 100 A TOTAL

OAT = 20°C

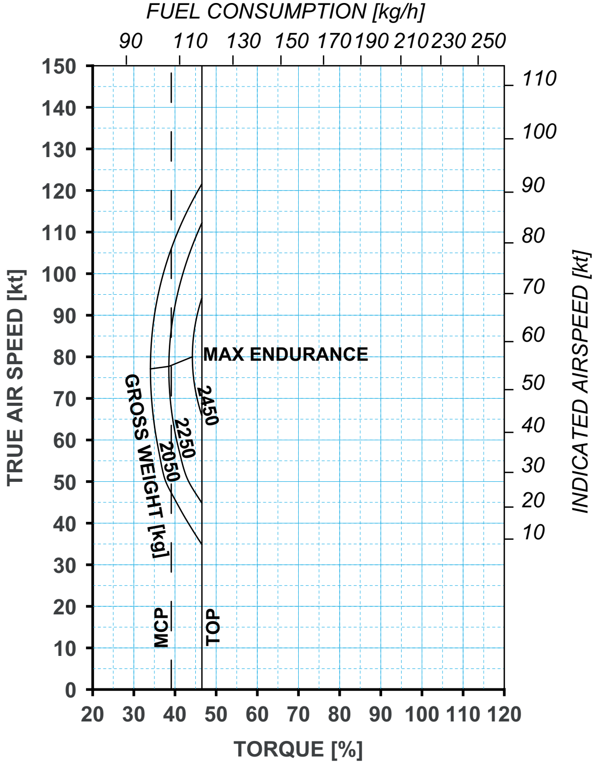

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Figure 9-44. OAT = 20 °C - Altitude Pressure = 15000 ft

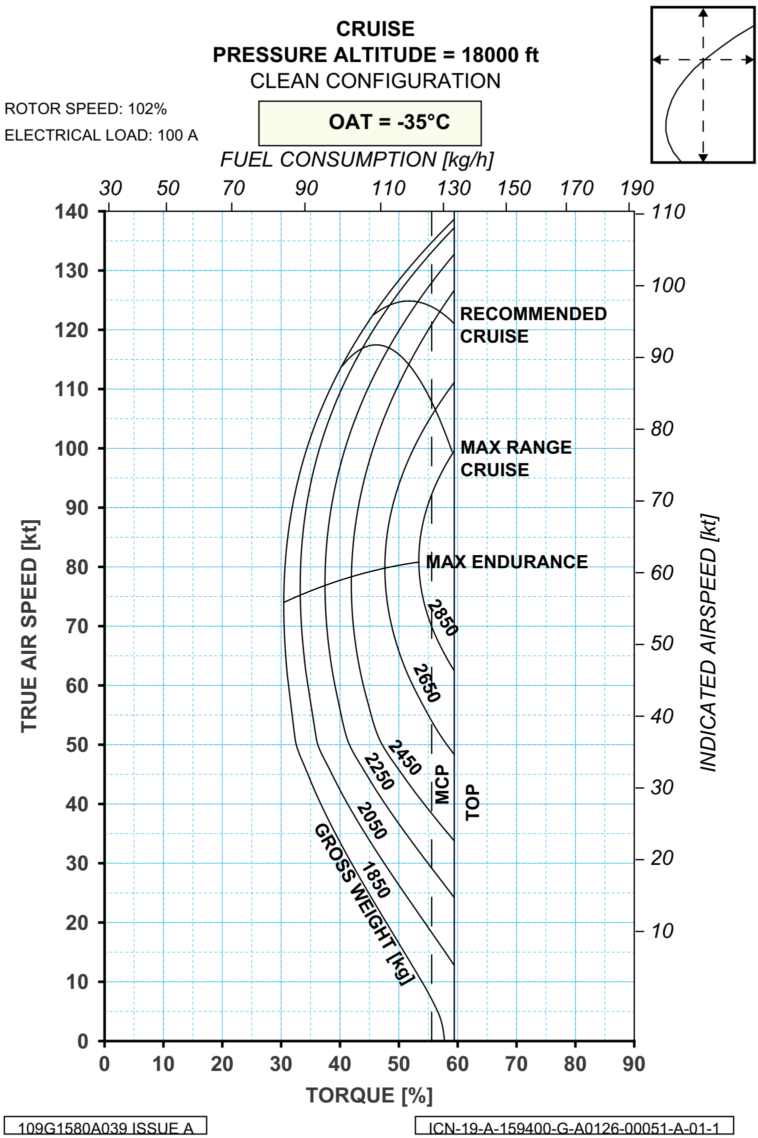

Figure 9-45. OAT = -35 °C - Altitude Pressure = 18000 ft

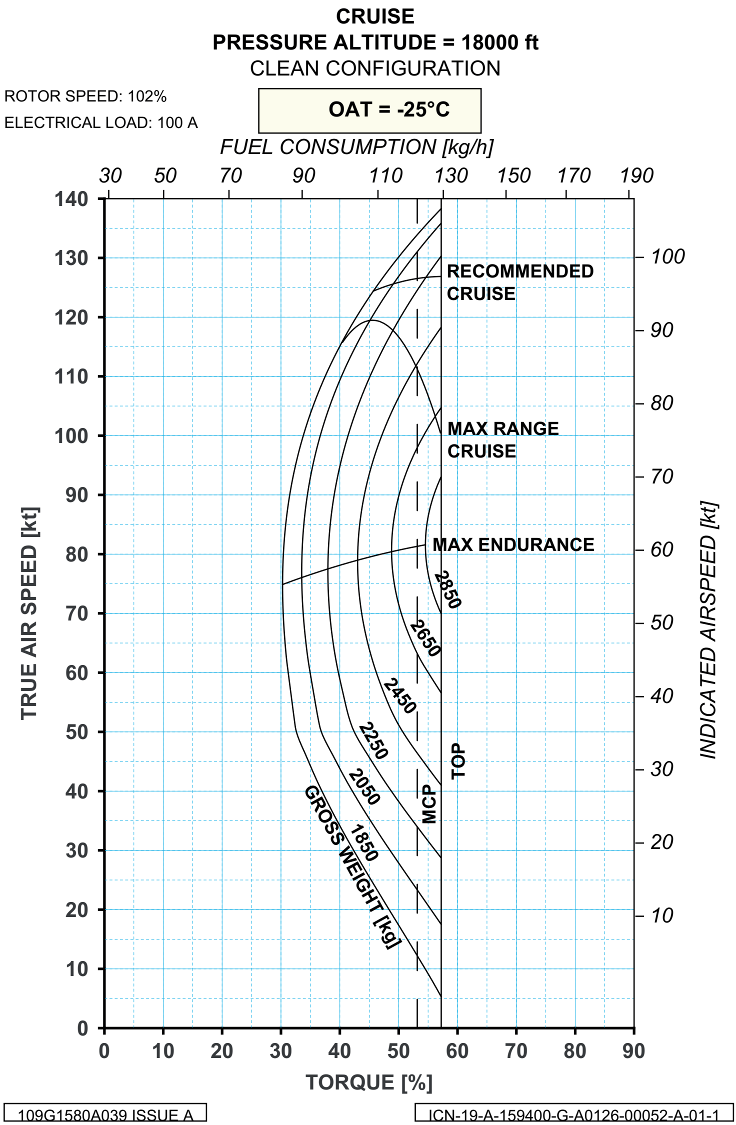

Figure 9-46. OAT = -25 °C - Altitude Pressure = 18000 ft

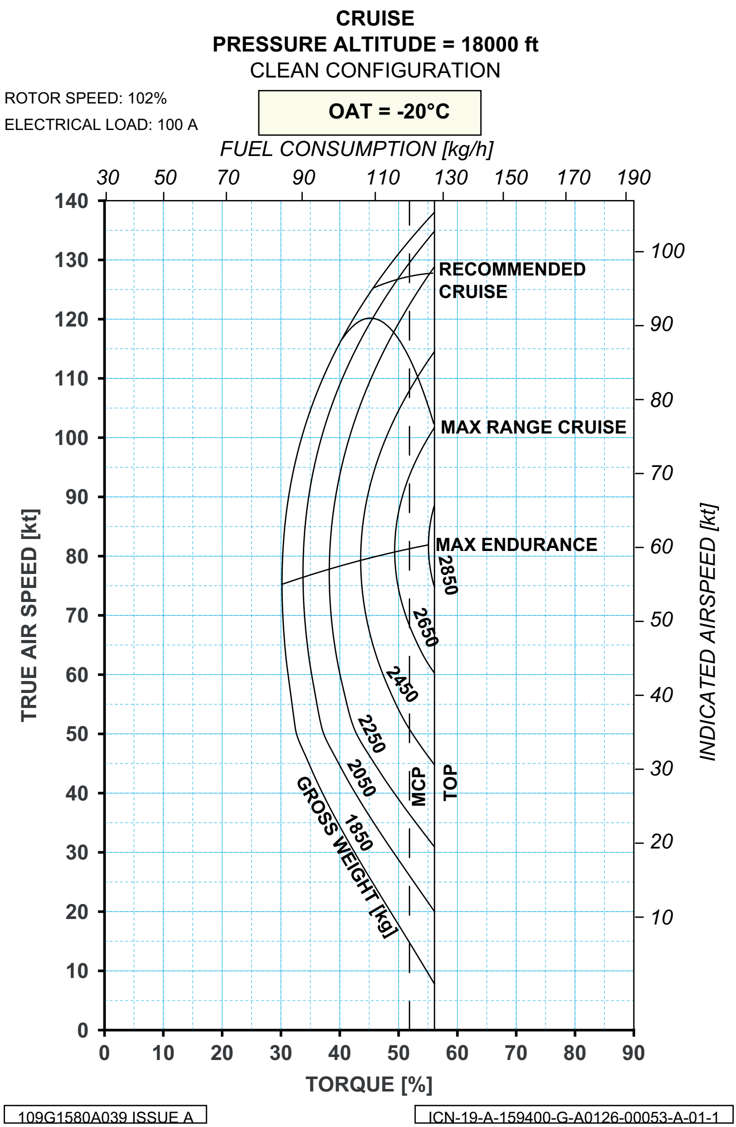

Figure 9-47. OAT = -20 °C - Altitude Pressure = 18000 ft

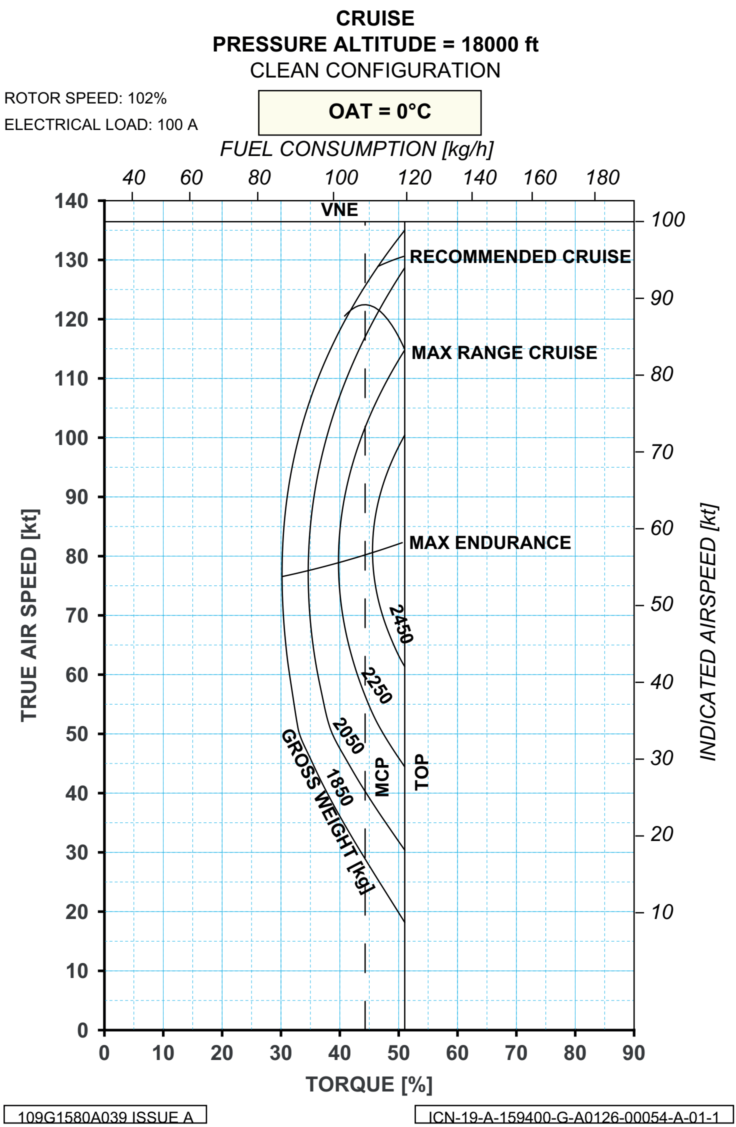

Figure 9-48. OAT = 0 °C - Altitude Pressure = 18000 ft

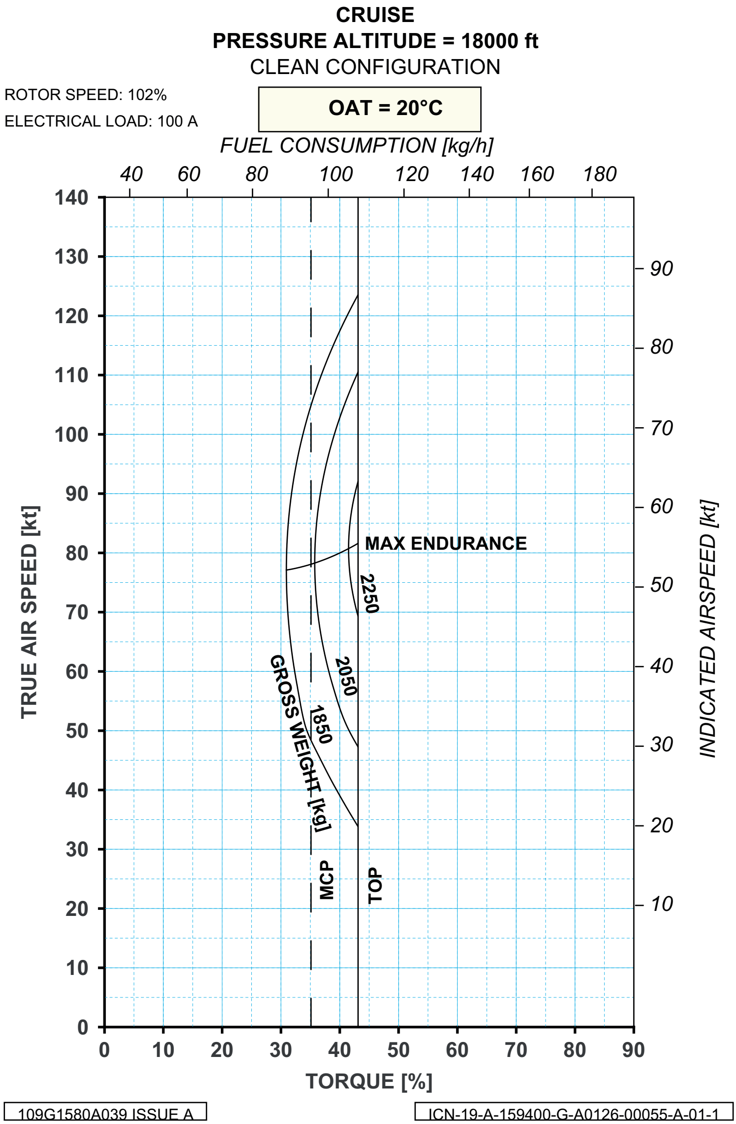

Figure 9-49. OAT = 20 °C - Altitude Pressure = 18000 ft

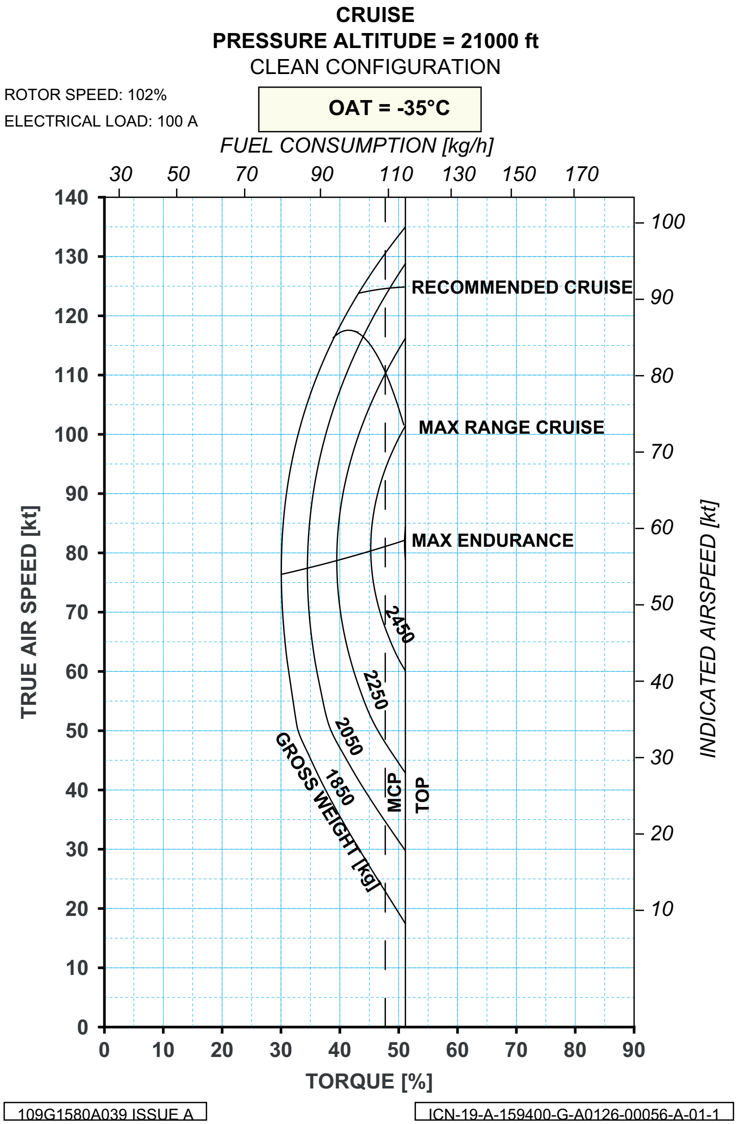

Figure 9-50. OAT = -35 °C - Altitude Pressure = 21000 ft

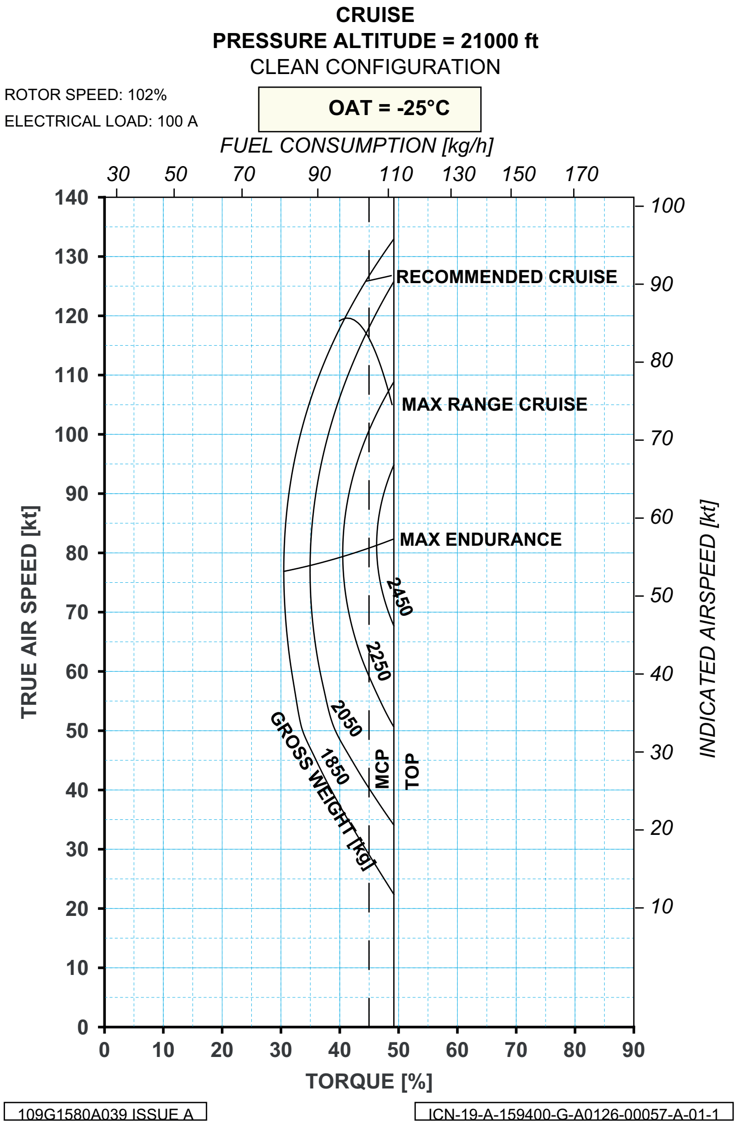

Figure 9-51. OAT = -25 °C - Altitude Pressure = 21000 ft

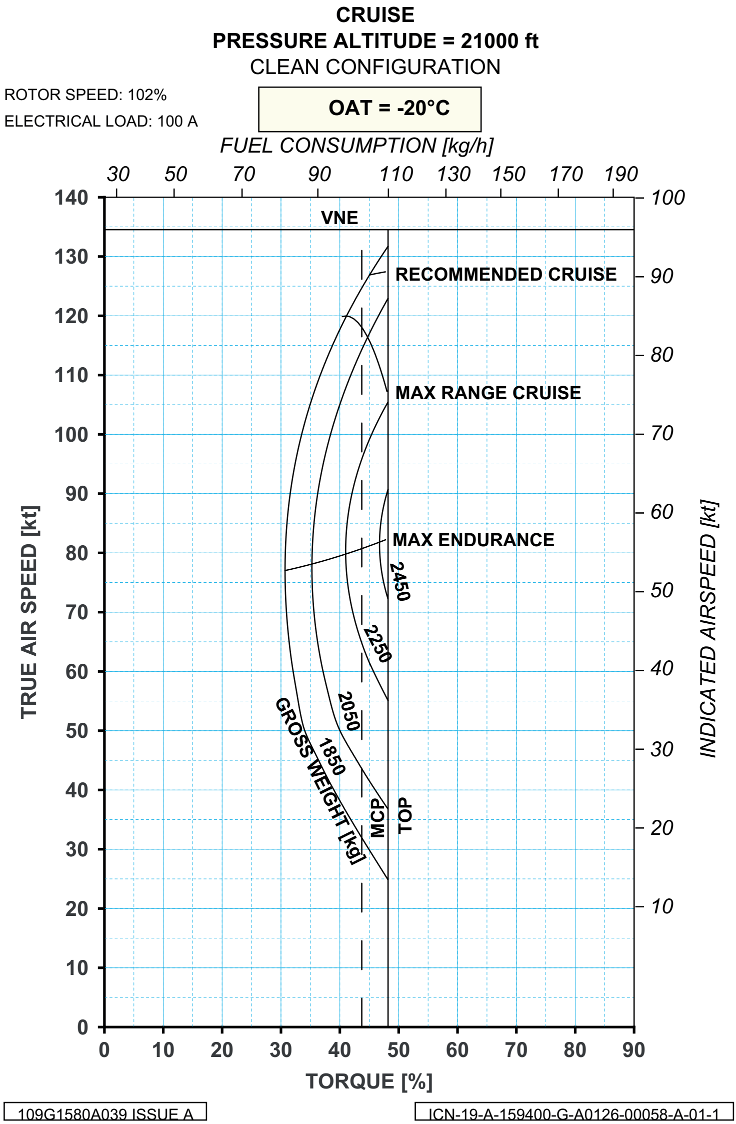

Figure 9-52. OAT = -20 °C - Altitude Pressure = 21000 ft

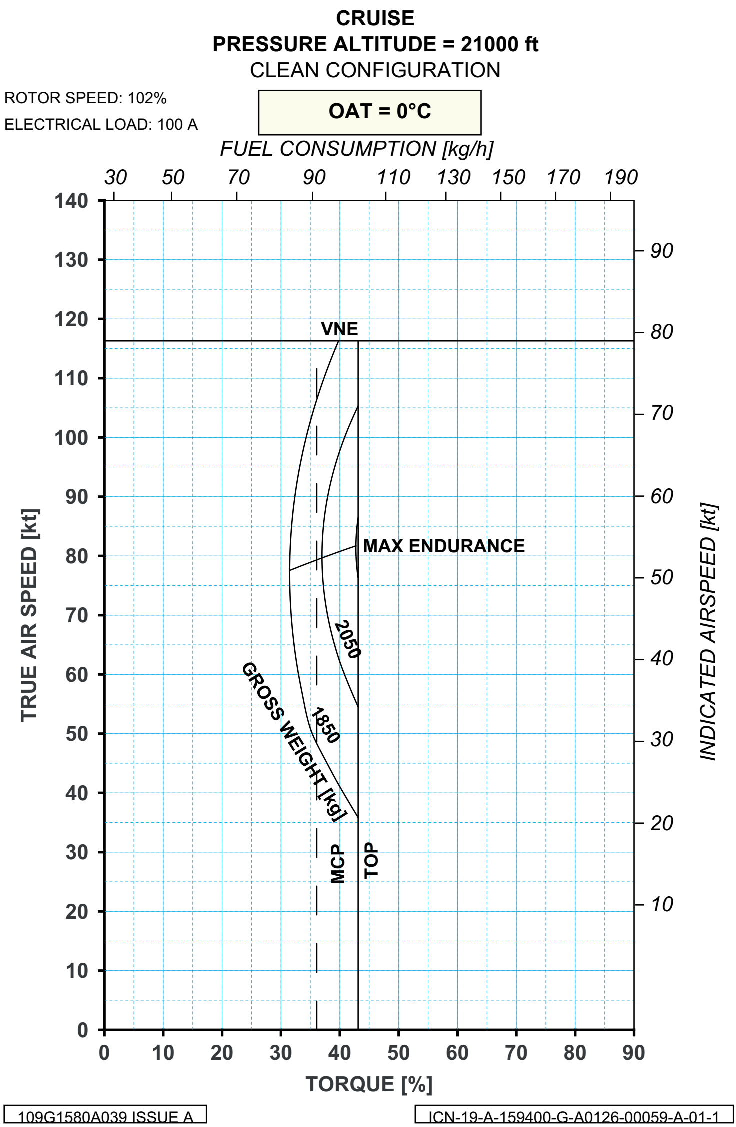

Figure 9-53. OAT = 0 °C - Altitude Pressure = 21000 ft

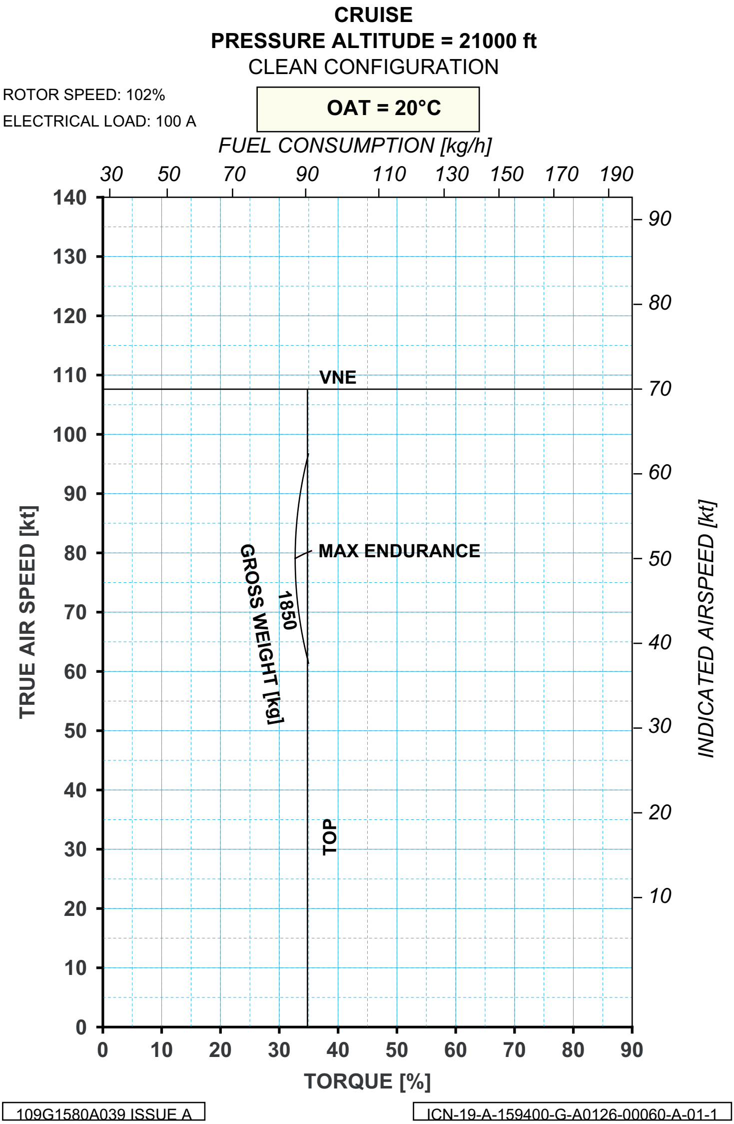

Figure 9-54. OAT = 20 °C - Altitude Pressure = 21000 ft

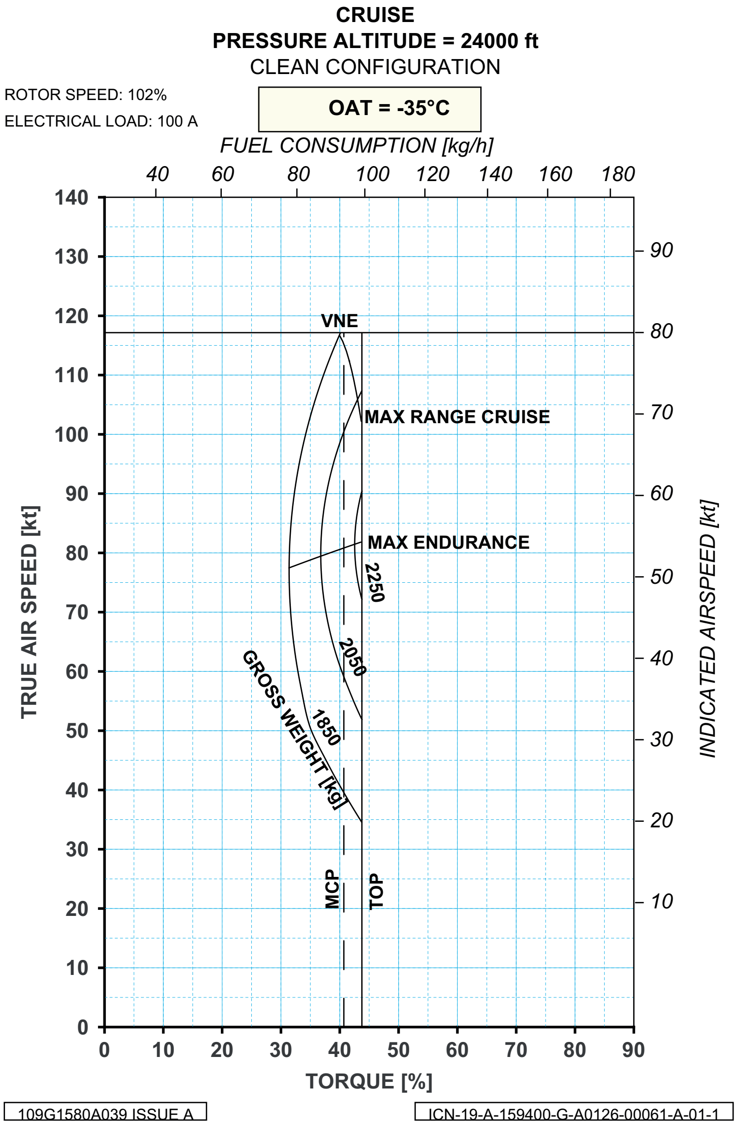

Figure 9-55. OAT = -35 °C - Altitude Pressure = 24000 ft

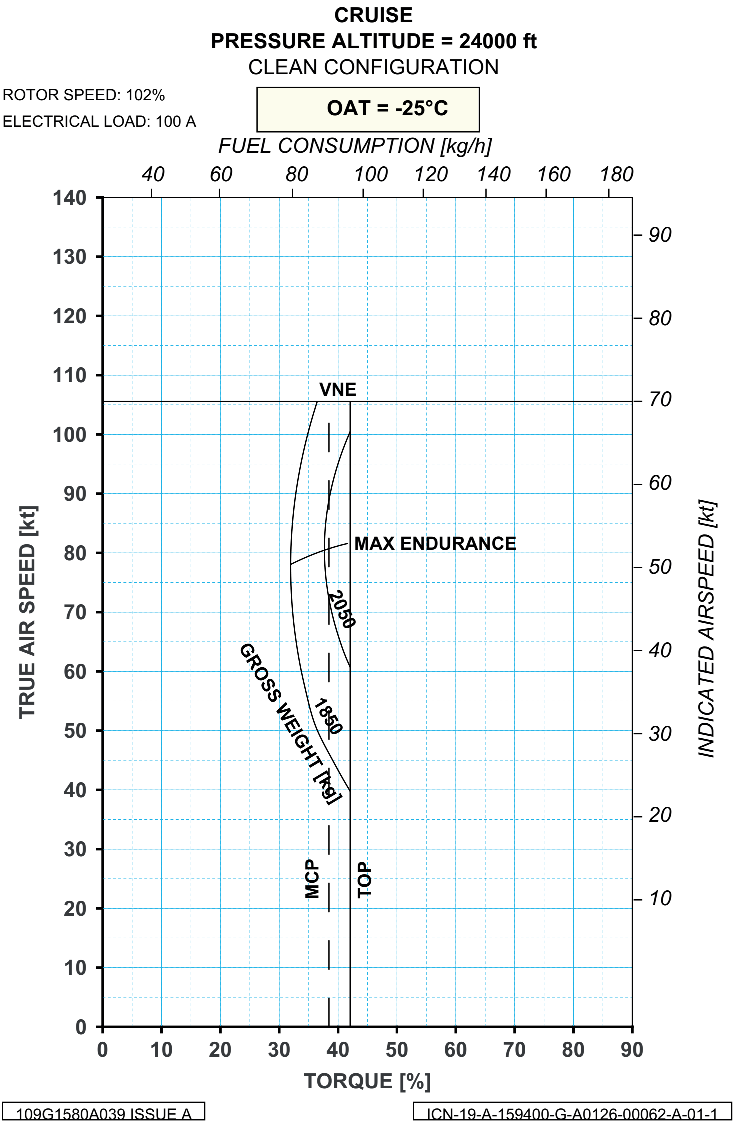

Figure 9-56. OAT = -25 °C - Altitude Pressure = 24000 ft

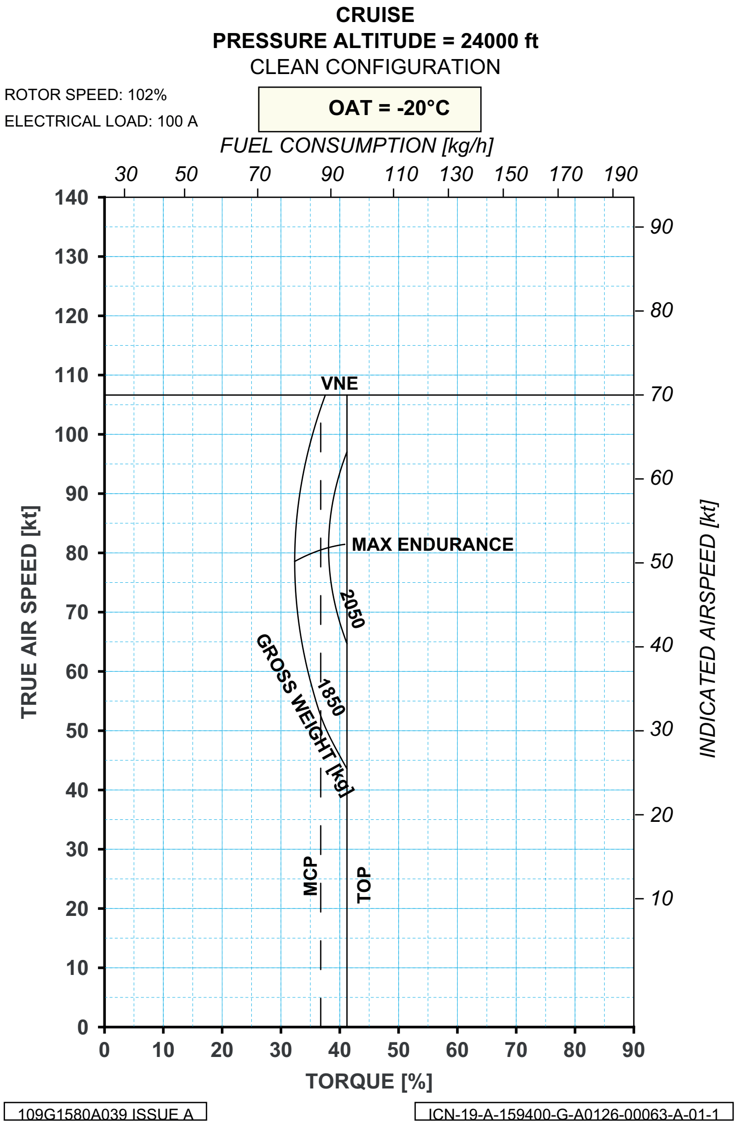

Figure 9-57. OAT = -20 °C - Altitude Pressure = 24000 ft

RANGE AND ENDURANCE

Figure 9-58 shows the chart to obtain endurance, distance and specific range in relation to fuel consumption.

Note

The range determined with the diagram correspond to effective range on ground (zero wind). To take into account the wind effect in the range calculation, use TAS reduced by the headwind component (ground speed) before entering the chart.

RANGE AND ENDURANCE

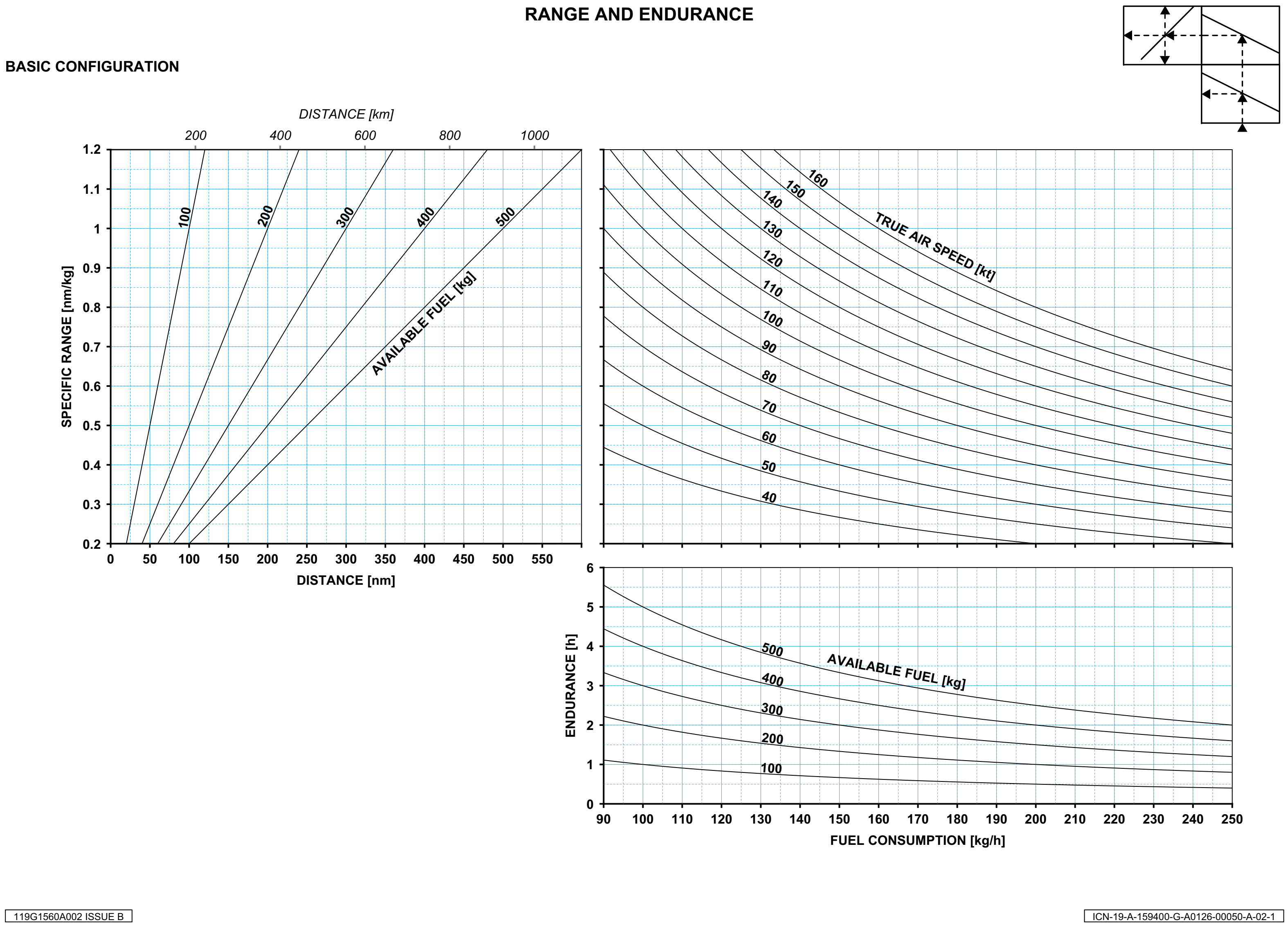

Figure 9-58 Range and Endurance

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IBF PERFORMANCE CHARTS

This paragraph refers to specific performance informations related the Inlet Barrier Filter (IBF) kit. This kit (the IBF) has been approved by a dedicated Supplemental Type Certificate. This paragraph is aimed to show performance information to be considered in addition to those included in the specific RFM supplement.

As a general rule, if the filter is kept clean no performance degradations are foreseen for the helicopter and the performance charts of Section 4 of basic RFM are considered applicable.
In such case the filter must be cleaned before every flight and it is pilot responsibility to provide that the helicopter will be operated without clogging the filter.

Note

It shall be pilot and operator responsibility to ensure that the filter is adequately kept clean before and during the flight.

If the status of the filter is unknown, the “Fully Contaminated by pass closed” set of charts are applicable since the worst engine conditions have been considered (fully deteriorated engine with filter fully contaminated).

If the filter will be clogged beyond a certain level during the flight, the performance will degrade beyond the case of the “fully contaminated and by pass closed” charts. In such event, overcoming the maximum allowable clogging, the “Filter” light will illuminate in the cockpit indicating to the crew that the pressure differential pre-set value for the engine has been reached or exceeded. In this case, the by pass can be opened.

Opening the by-pass allows to partially recover the performances reduction that can be seen from the “Fully Contaminated” set of charts with respect to the “Clean” charts.

In the following pages several performance informations are presented for the IBF installation. In particular two main paragraphs are presented:

— Hover Ceiling data and Rate of Climb Performance data.

All the charts here presented for IBF are related to the IBF FULLY CLOGGED condition and with the "IBF by pass" closed.

The Hover Ceiling charts define the maximum weights at which an IGE hover (at 3 ft wheel height) or an OGE hover (60 ft AGL) is possible for varying combinations of Pressure Altitude and OAT with main rotor speed (NR) at 102% and zero wind conditions.

Information is presented for both Take-Off Power (TOP) and Maximum Continuous Power (MCP) referring to an electrical load of 132 A.

Additionally, the hover perfomance is presented for the following combination of kits:

1. Clean aircraft (no kits installed);
2. Aircraft fitted with Cargo Hook;
3. Aircraft fitted with Cargo Hook and Heater ON;
4. Aircraft fitted with Cargo Hook and ECS ON;
5. Clean aircraft (no kits installed) with ECS ON;
6. Clean aircraft (no kits installed) with Heater ON.

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 Vy 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 132 A.

Additionally, the Rate Of Climb charts are presented for the following combination of kits:

1. Clean aircraft (no kits installed);
2. Aircraft fitted with Cargo Hook;
3. Aircraft fitted with Cargo Hook and Heater ON;
4. Aircraft fitted with Cargo Hook and ECS ON;
5. Clean aircraft (no kits installed) with ECS ON;
6. Clean aircraft (no kits installed) with Heater ON.

HOVER CEILING
(Filter Clogged and by pass closed)

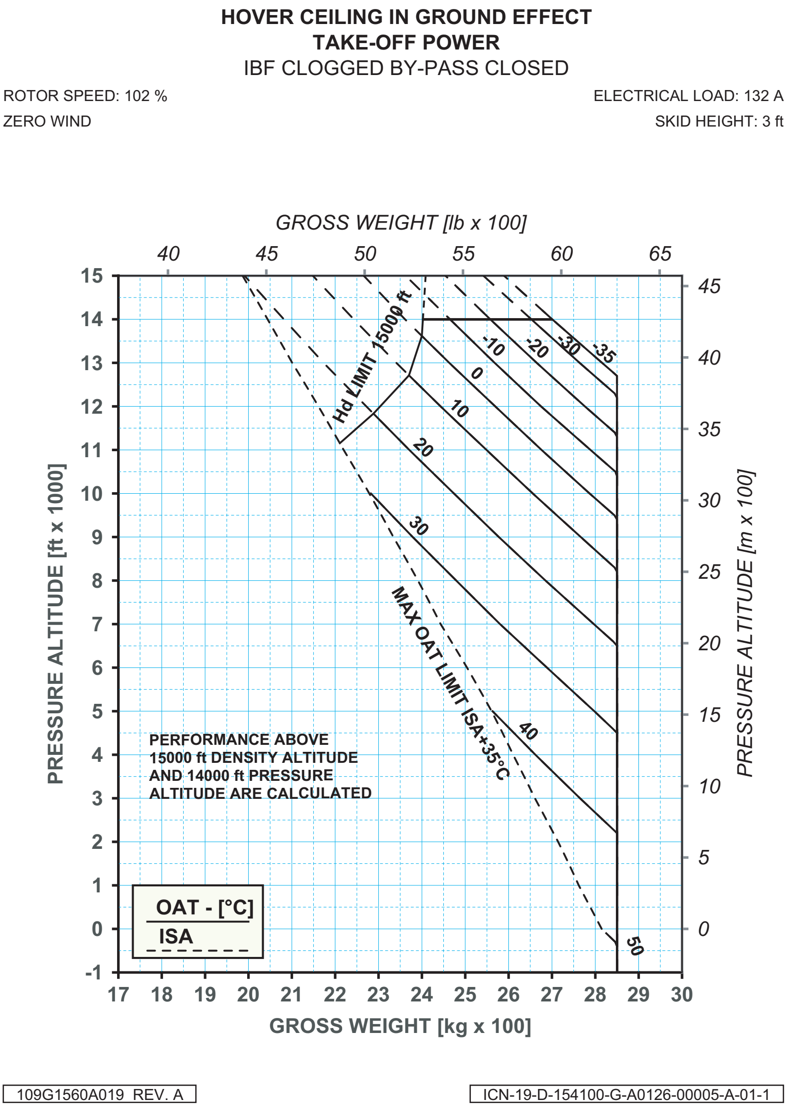

Figure 9-59. Hover Ceiling In Ground Effect (IGE) - Take-Off Power (TOP) - IBF Clogged

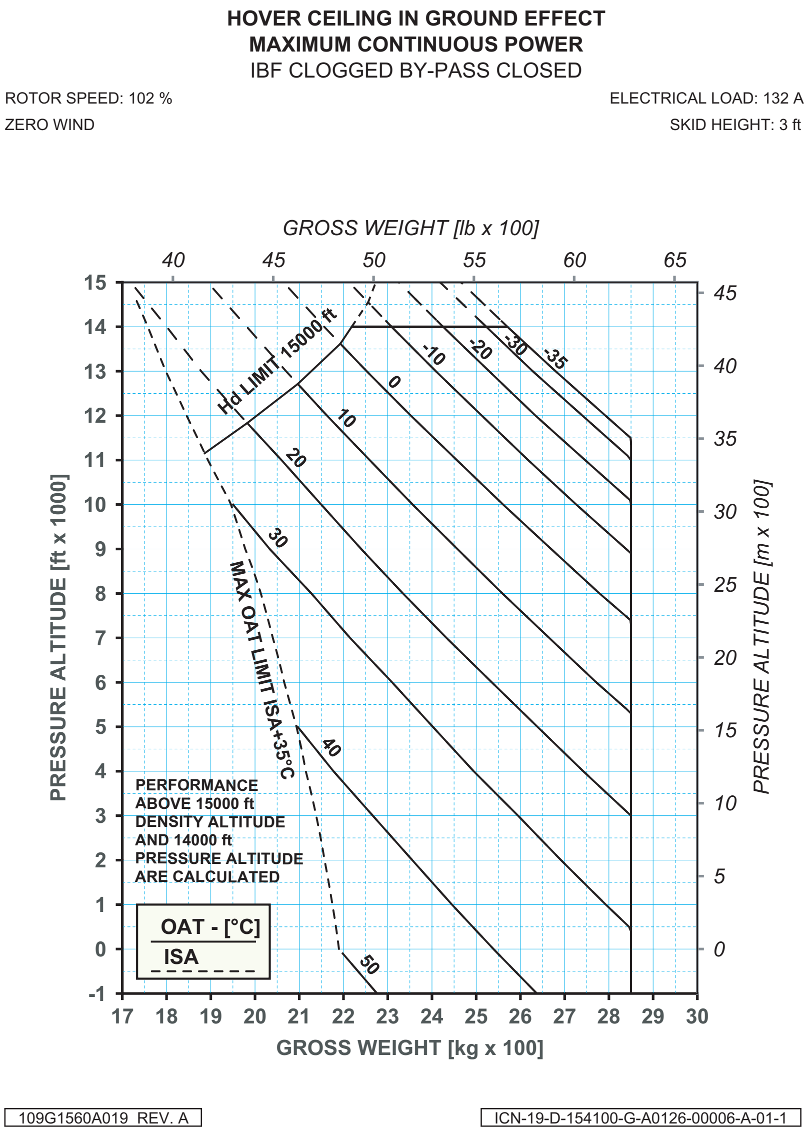

Figure 9-60. Hover Ceiling In Ground Effect (IGE) - Maximum Continuous Power (MCP) - IBF Clogged

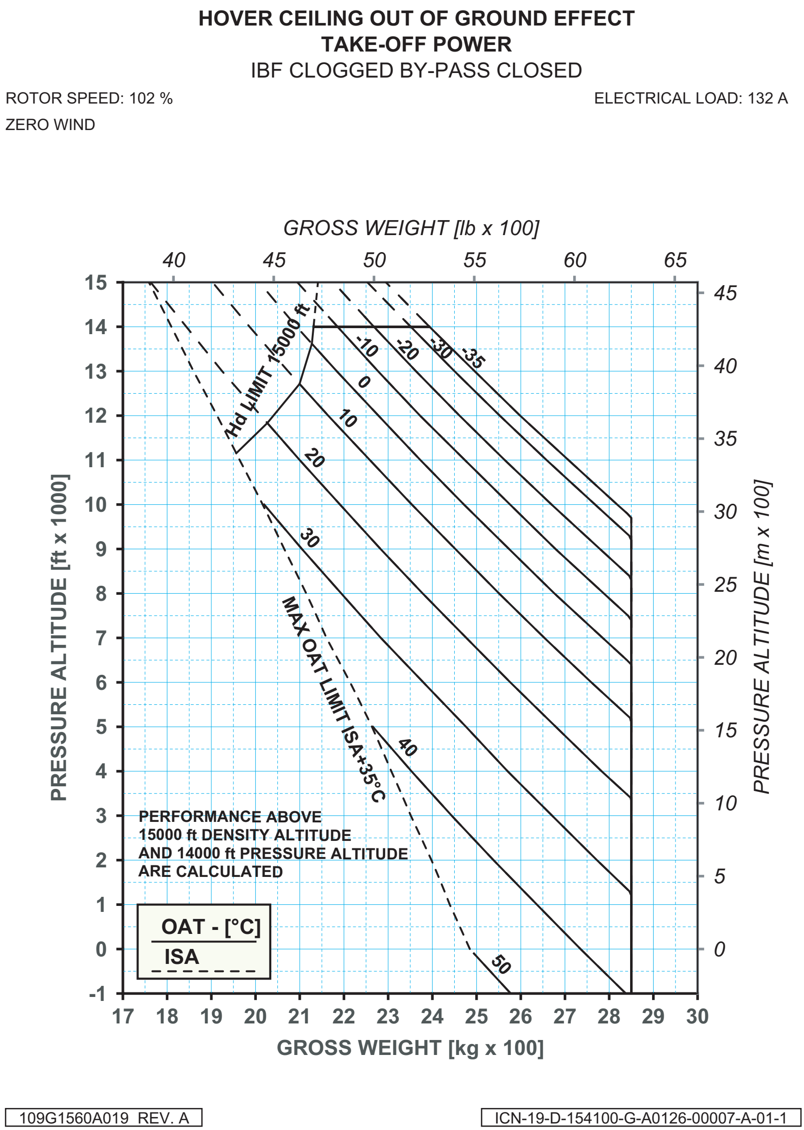

Figure 9-61. Hover Ceiling Out of Ground Effect (OGE) - Take-Off Power (TOP) - IBF Clogged

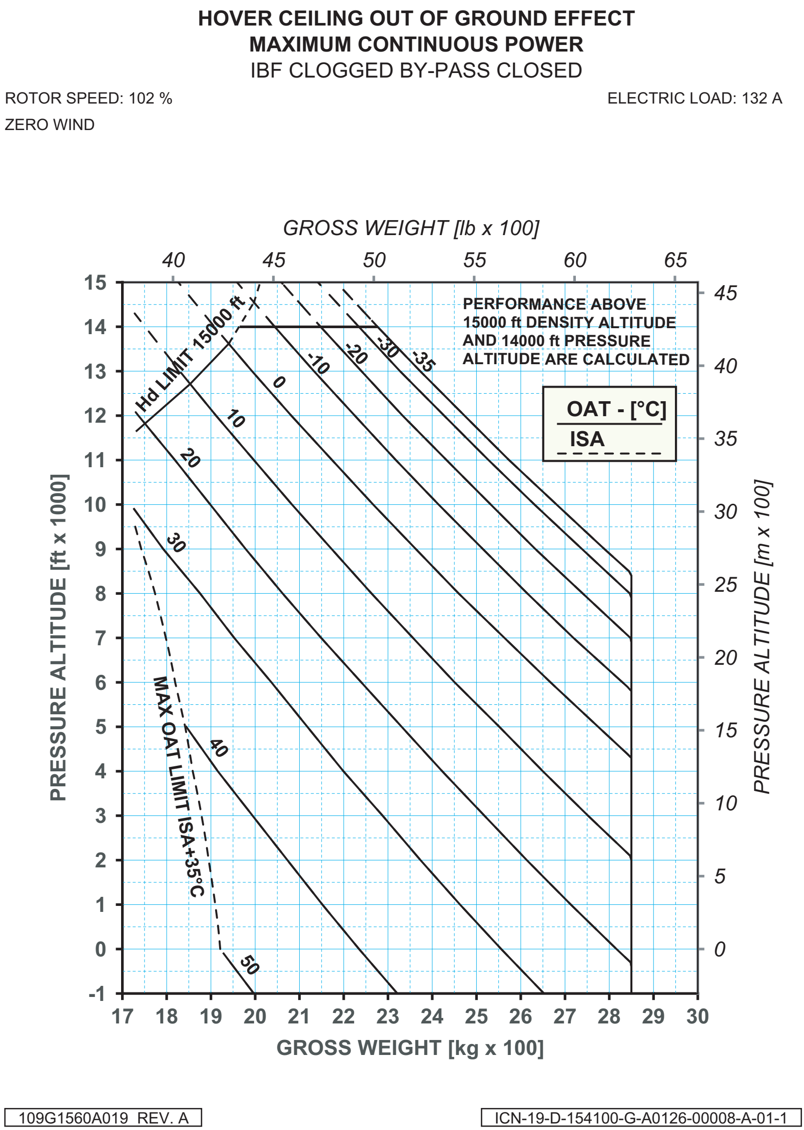

Figure 9-62. Hover Ceiling Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) - IBF Clogged

HOVER CEILING OUT OF GROUND EFFECT
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
ZERO WIND

ELECTRICAL LOAD: 132 A

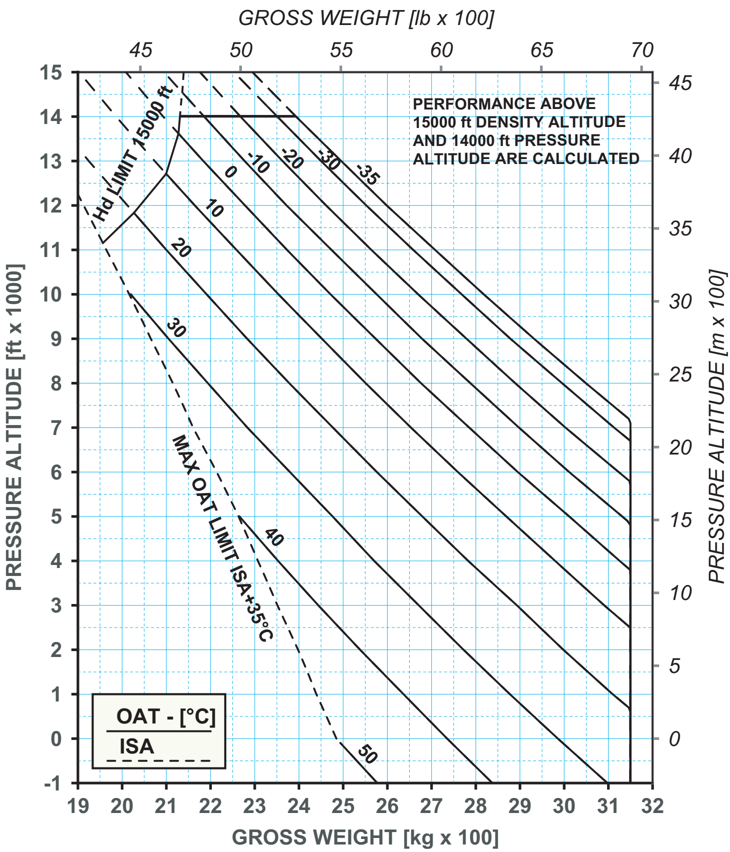

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Figure 9-63. Hover Ceiling Out of Ground Effect (OGE) - Take-Off Power (TOP) - IBF Clogged (Cargo Hook)

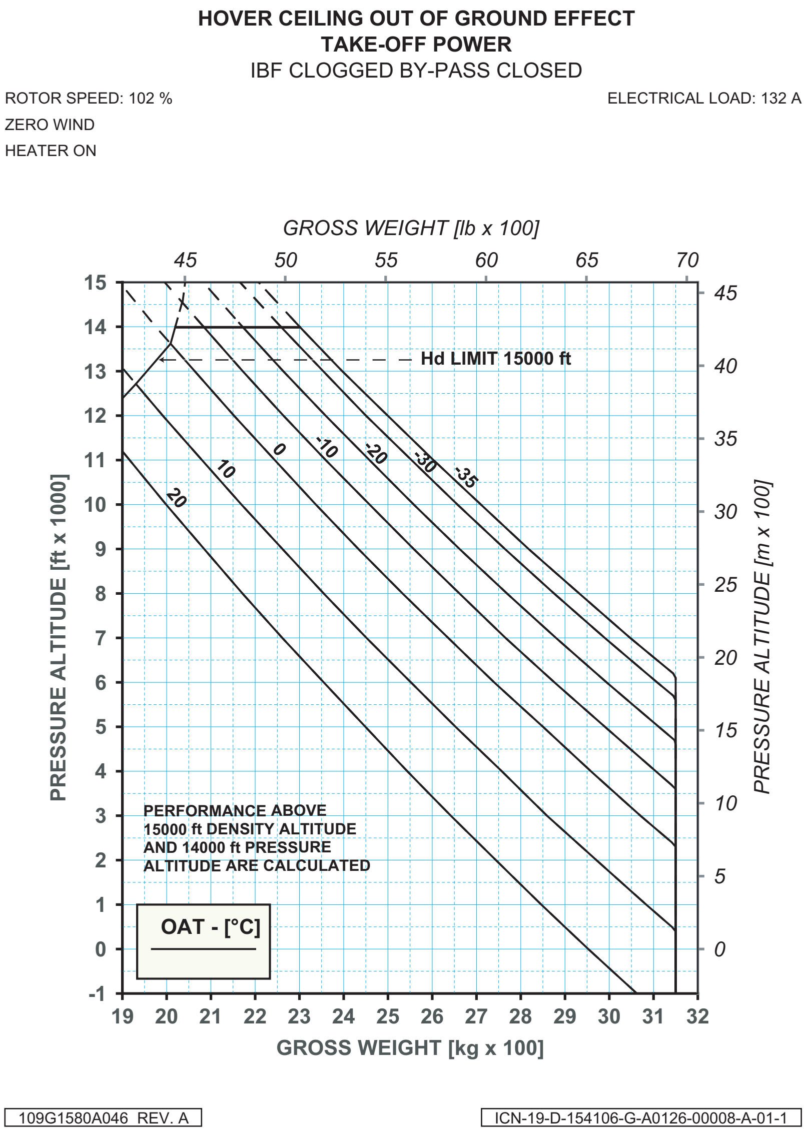

Figure 9-64. Hover Ceiling Out of Ground Effect (OGE) - Take-Off Power (TOP) - IBF Clogged - Heater ON (Cargo Hook)

HOVER CEILING OUT OF GROUND EFFECT
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
ZERO WIND
ECS ON

ELECTRICAL LOAD: 132 A

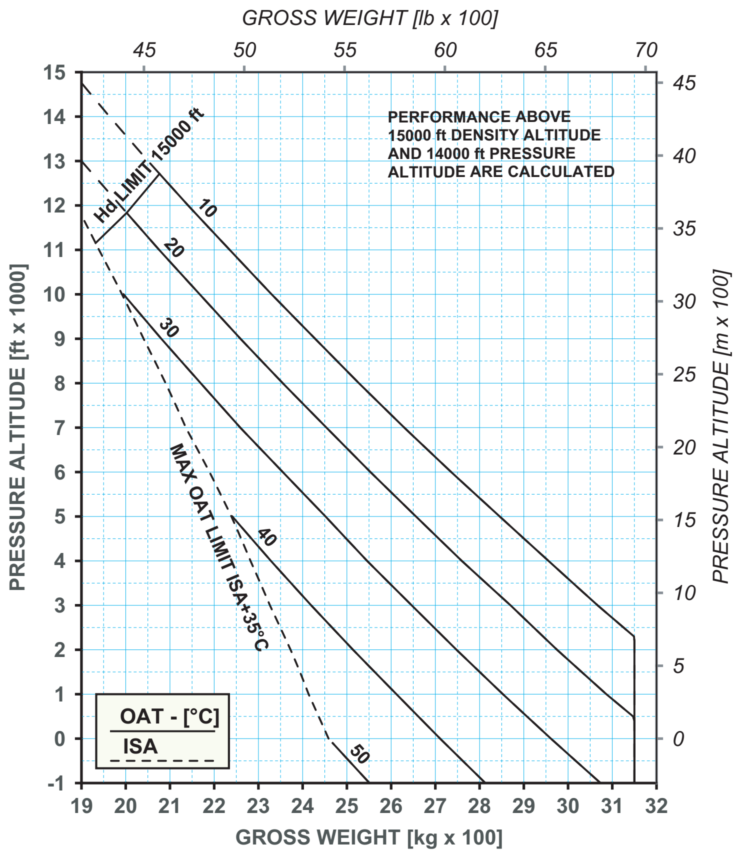

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Figure 9-65. Hover Ceiling Out of Ground Effect (OGE) - Take-Off Power (TOP) - IBF Clogged - ECS ON (Cargo Hook)

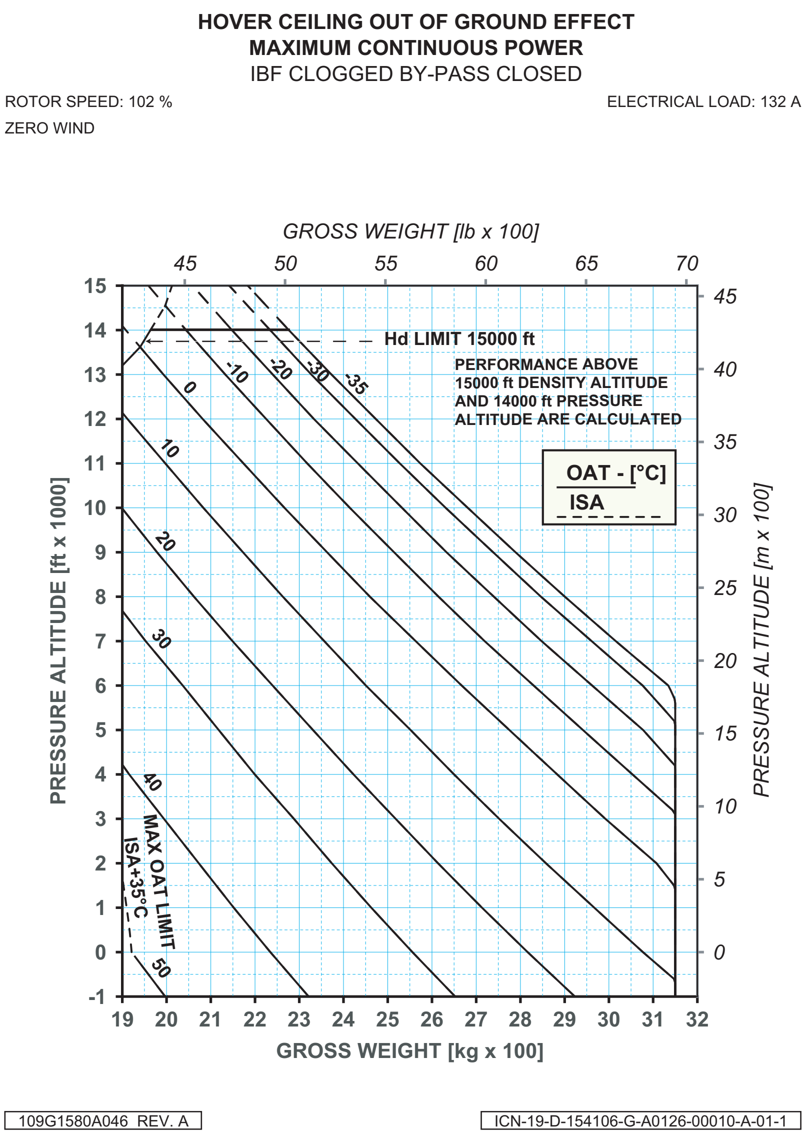

Figure 9-66. Hover Ceiling Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) - IBF Clogged (Cargo Hook)

HOVER CEILING OUT OF GROUND EFFECT
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
ZERO WIND
HEATER ON

ELECTRICAL LOAD: 132 A

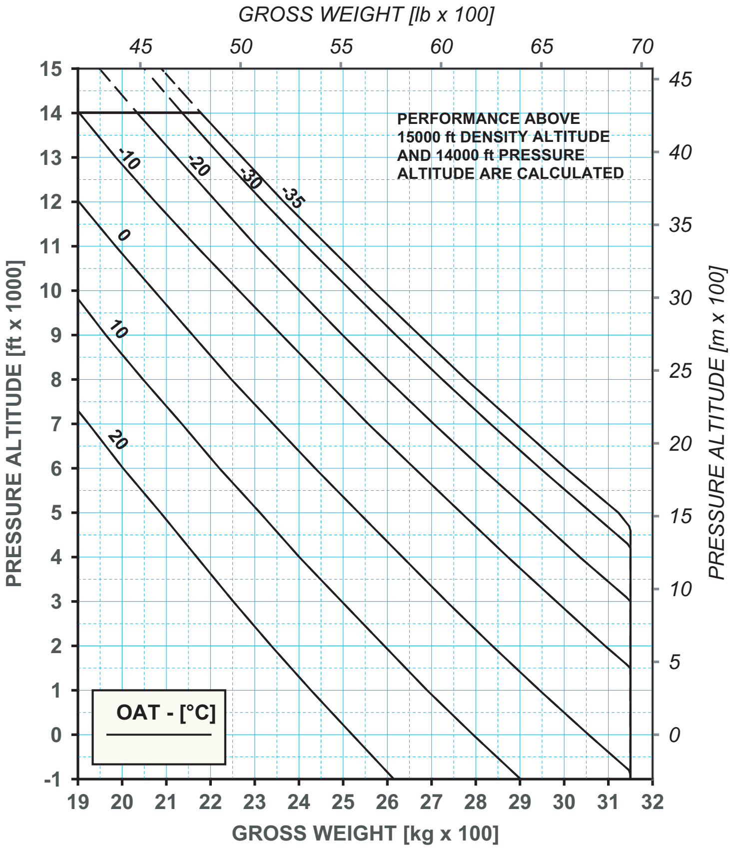

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Figure 9-67. Hover Ceiling Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) - IBF Clogged - Heater ON (Cargo Hook)

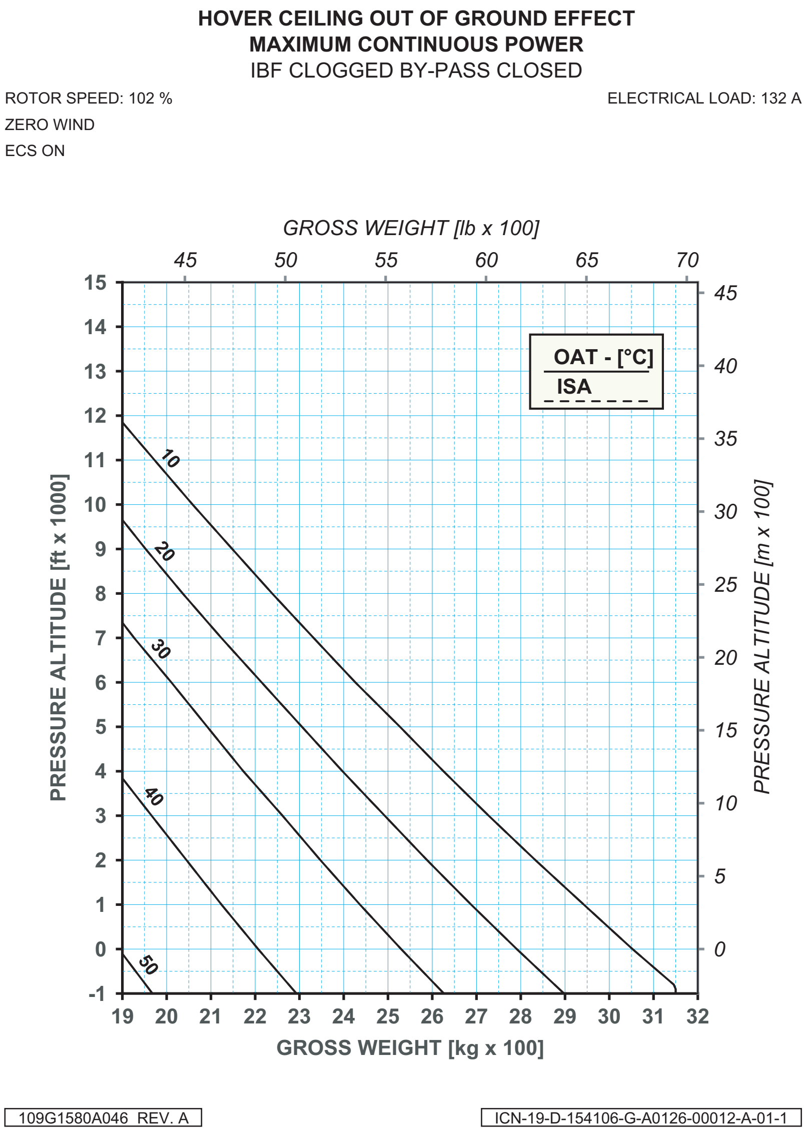

Figure 9-68. Hover Ceiling Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) - IBF Clogged - ECS ON (Cargo Hook)

HOVER CEILING IN GROUND EFFECT
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
ZERO WIND
ECS ON

ELECTRICAL LOAD: 132 A
SKID HEIGHT: 3 ft

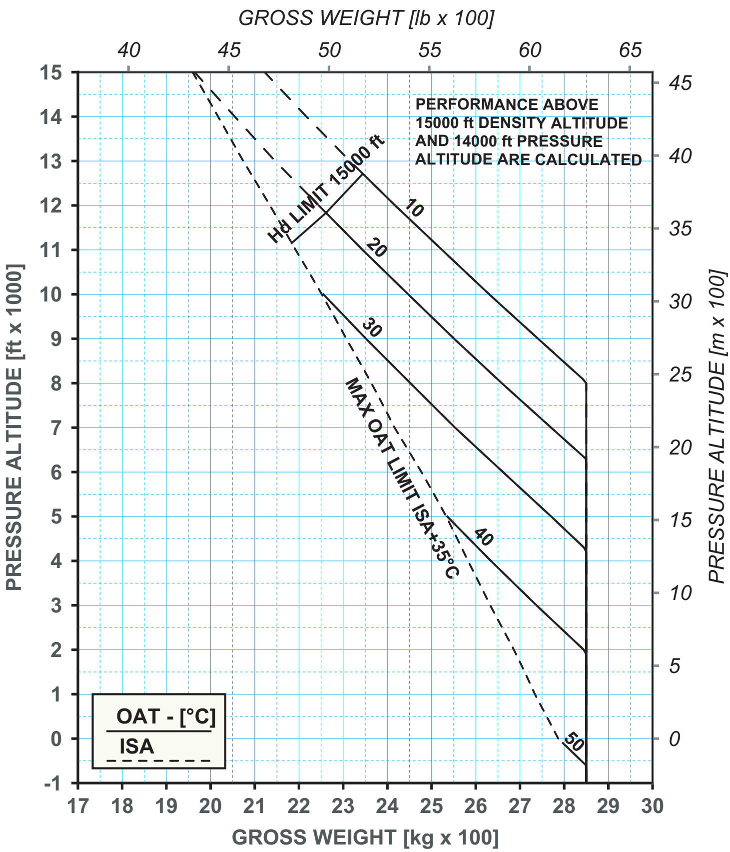

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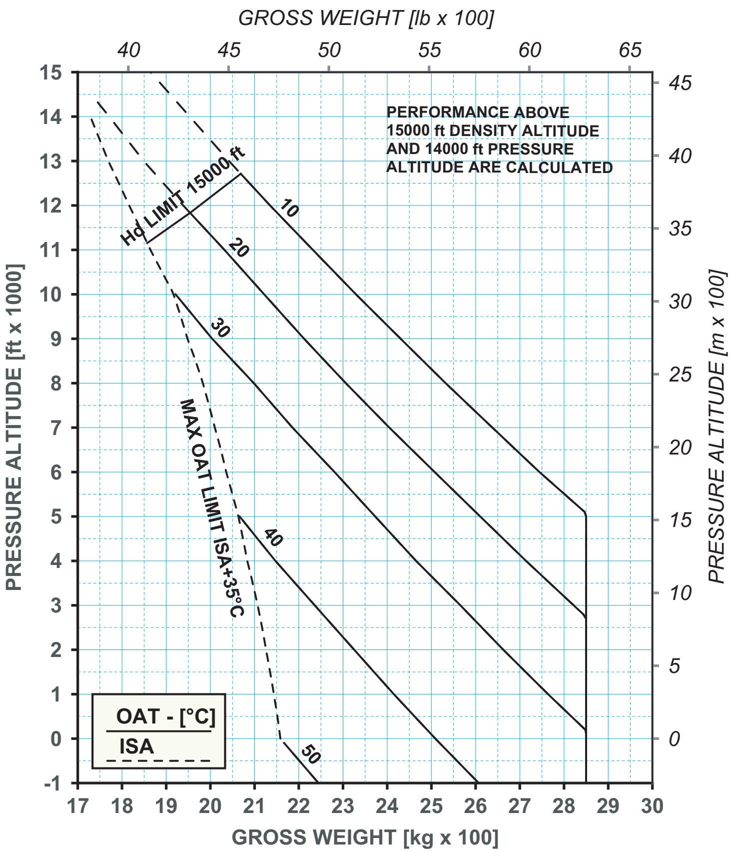
Figure 9-69. Hover Ceiling In Ground Effect (IGE) - Take-Off Power (TOP) - IBF Clogged - ECS ON

HOVER CEILING IN GROUND EFFECT
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
ZERO WIND
ECS ON

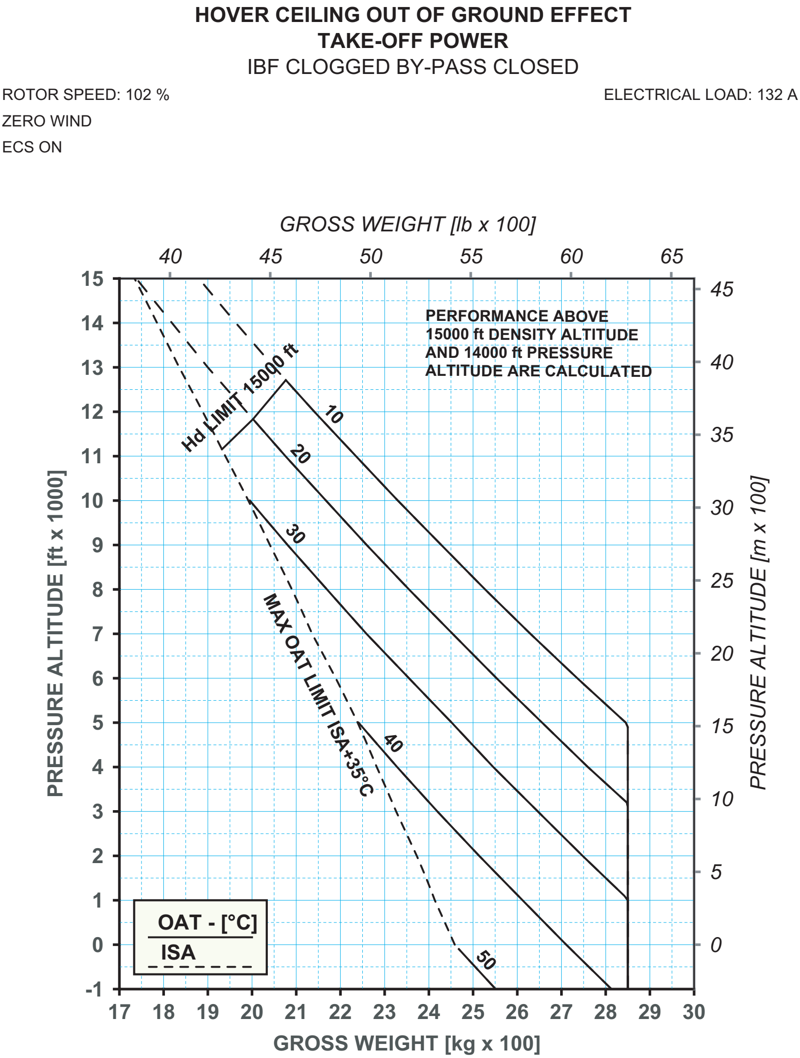
ELECTRICAL LOAD: 132 A
SKID HEIGHT: 3 ft



109G1580A045 REV. A

ICN-19-D-154129-G-A0126-00006-A-01-1

Figure 9-70. Hover Ceiling In Ground Effect (IGE)
- Maximum Continuous Power (MCP) - IBF Clogged - ECS ON



109G1580A045 REV. A

ICN-19-D-154129-G-A0126-00007-A-01-1

Figure 9-71. Hover Ceiling Out of Ground Effect (OGE) - Take-Off Power (TOP) - IBF Clogged - ECS ON

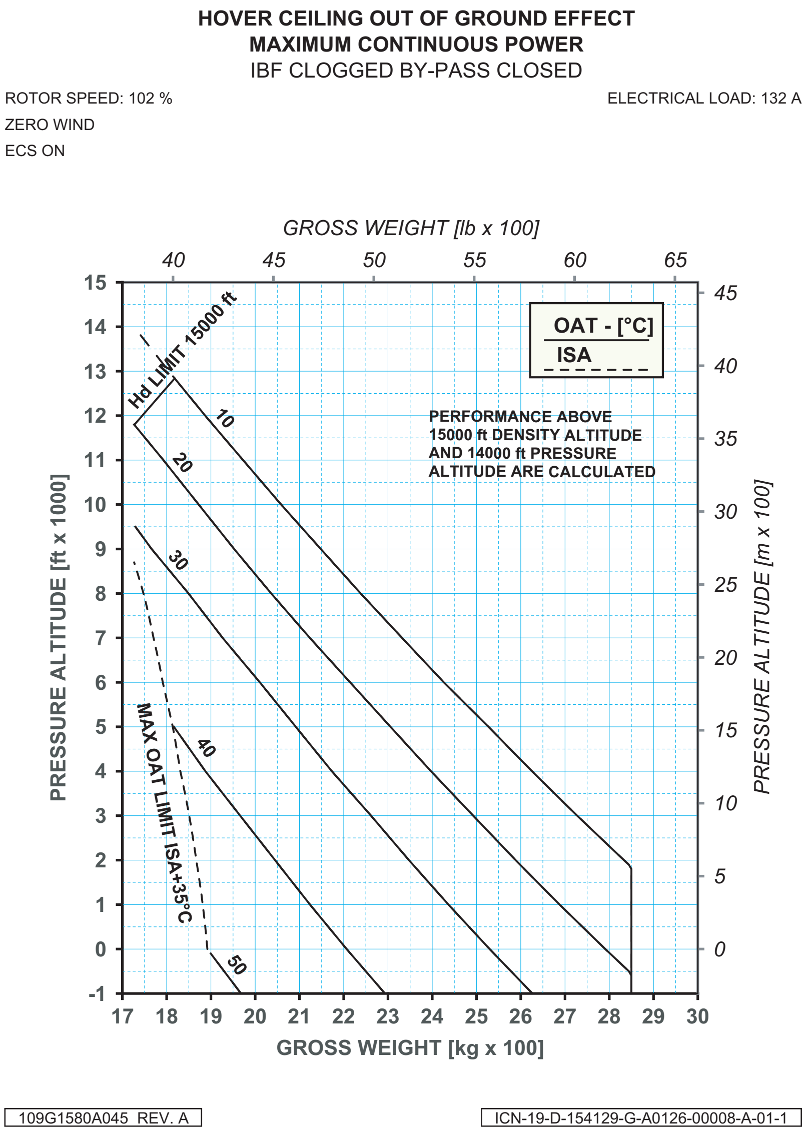


Figure 9-72. Hover Ceiling Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) - IBF Clogged - ECS ON

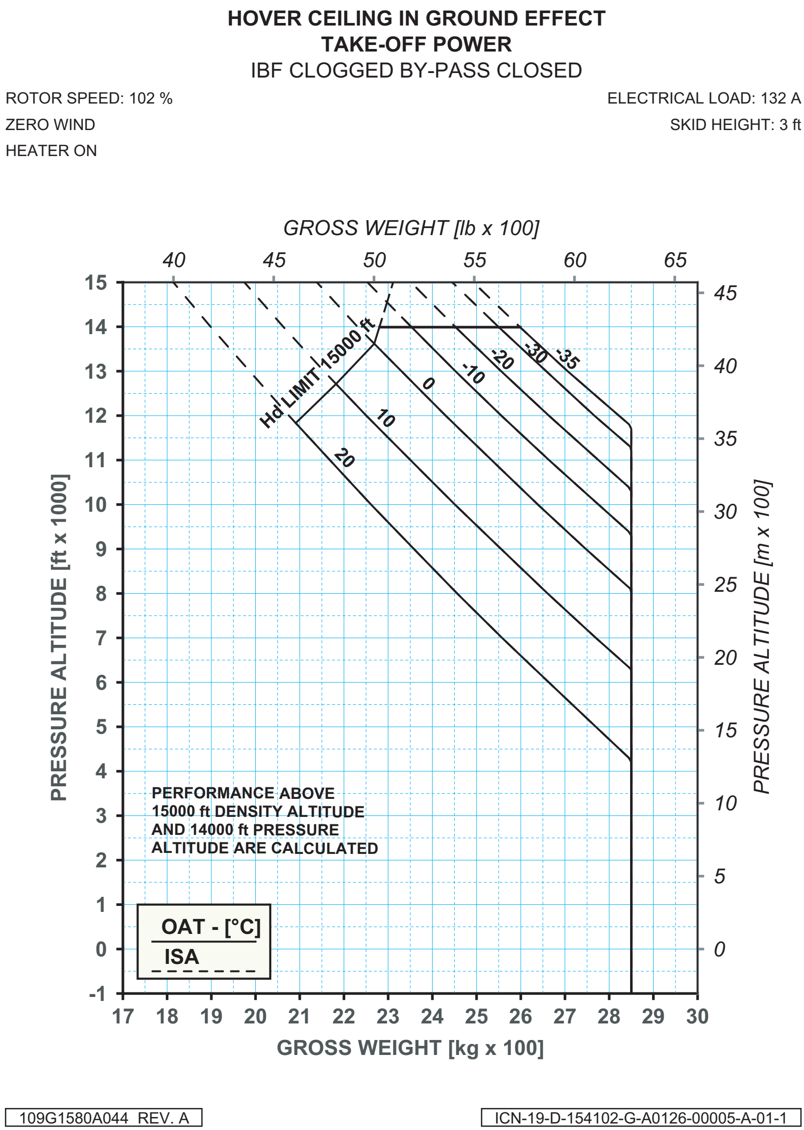


Figure 9-73. Hover Ceiling In Ground Effect (IGE) - Take-Off Power (TOP) - IBF Clogged - Heater ON

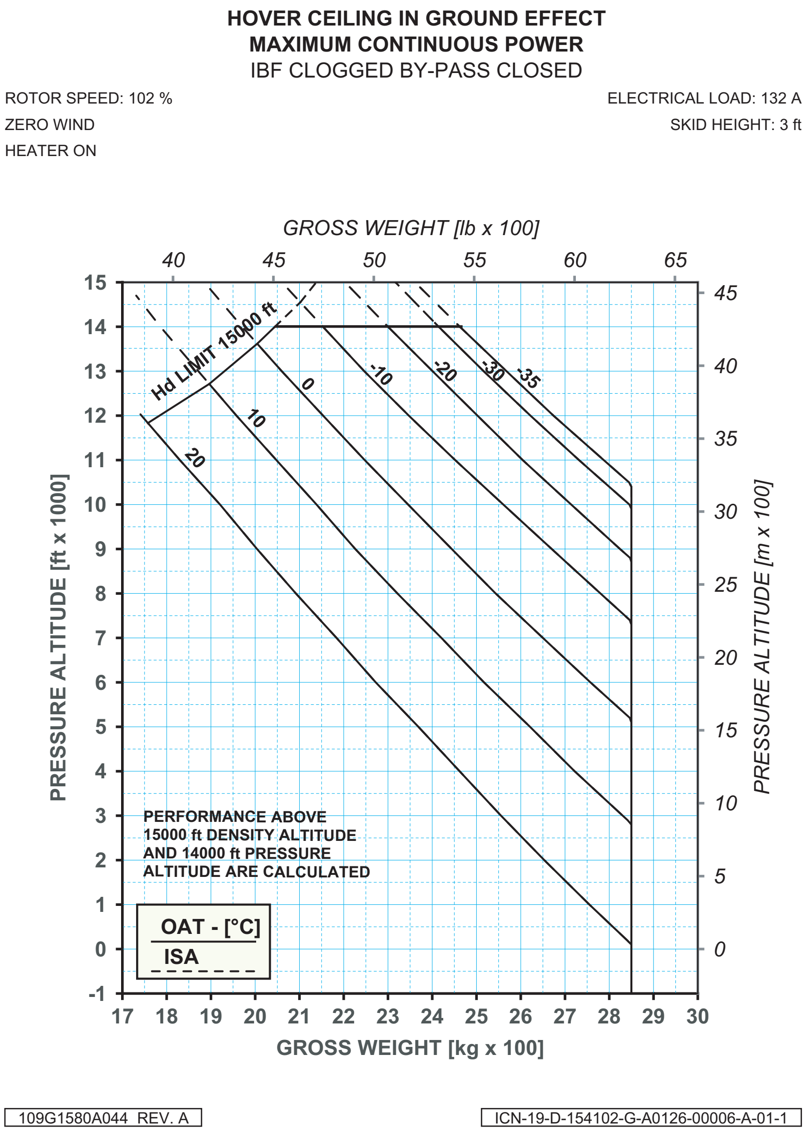


Figure 9-74. Hover Ceiling In Ground Effect (IGE) - Maximum Continuous Power (MCP) - IBF Clogged - Heater ON

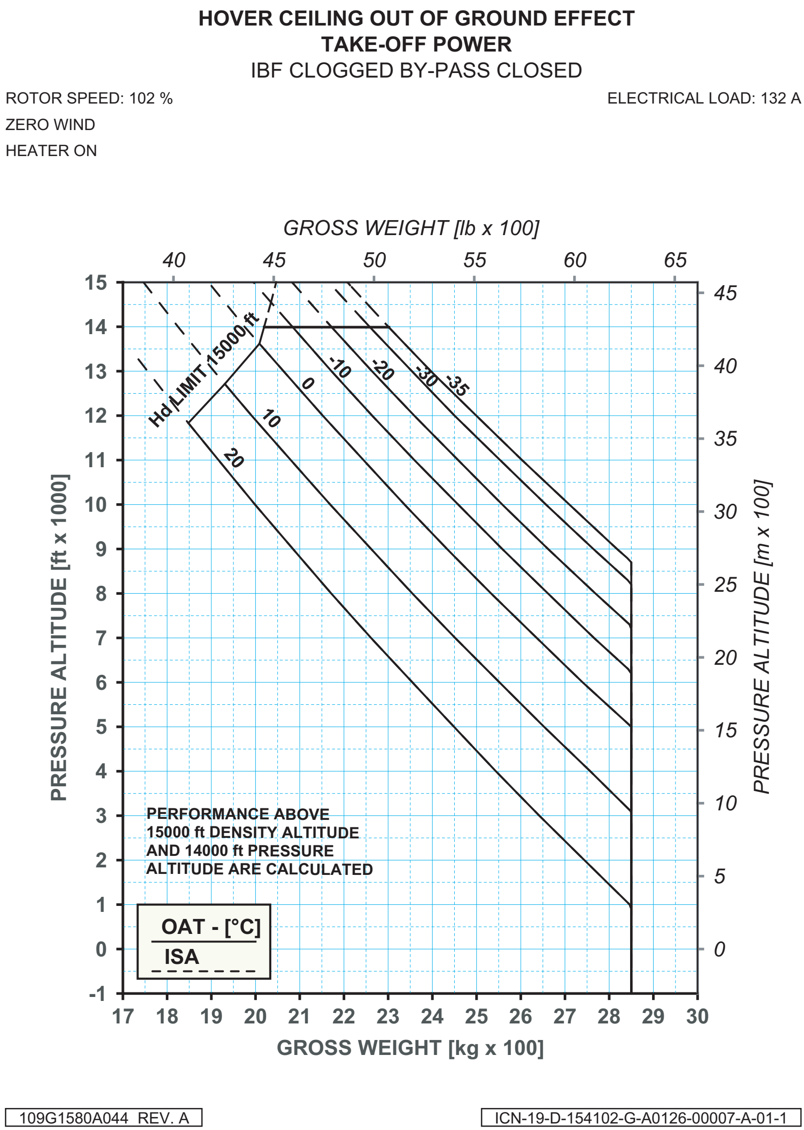


Figure 9-75. Hover Ceiling Out of Ground Effect (OGE) - Take-Off Power (TOP) - IBF Clogged - Heater ON

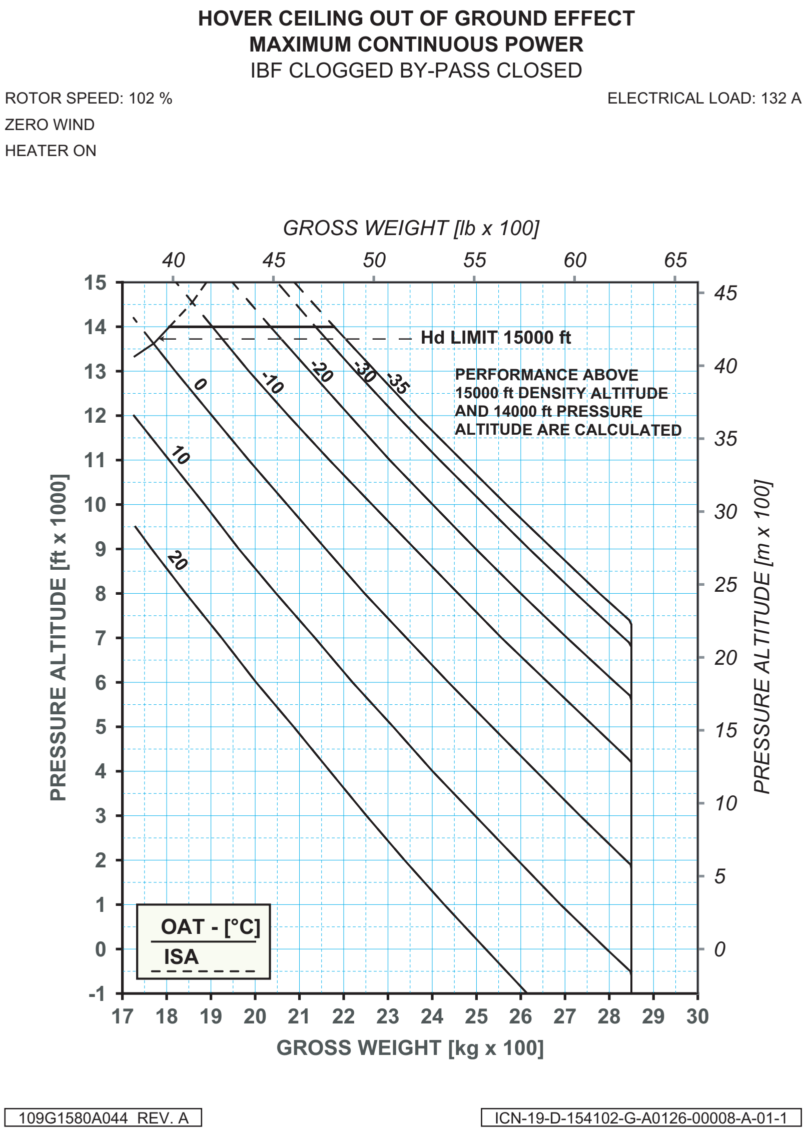


Figure 9-76. Hover Ceiling Out of Ground Effect (OGE) - Maximum Continuous Power (MCP) - IBF Clogged - Heater ON

RATE OF CLIMB
(Filter Clogged and by-pass closed)

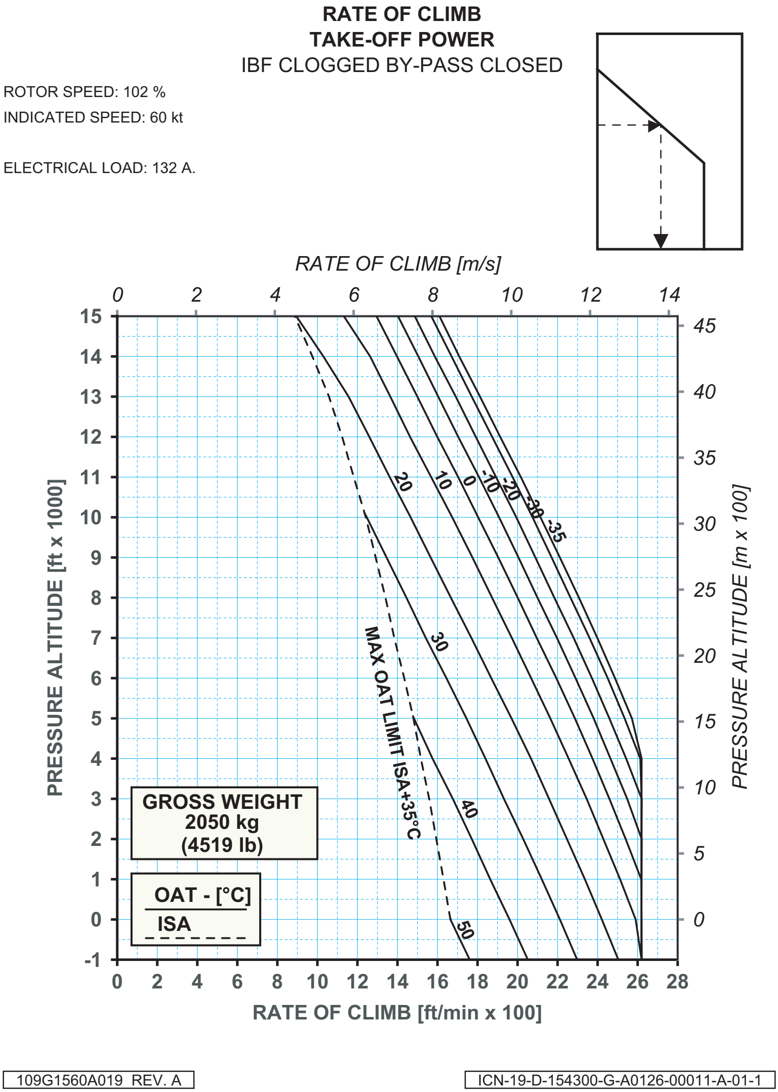


Figure 9-77. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2050 kg - IBF Clogged

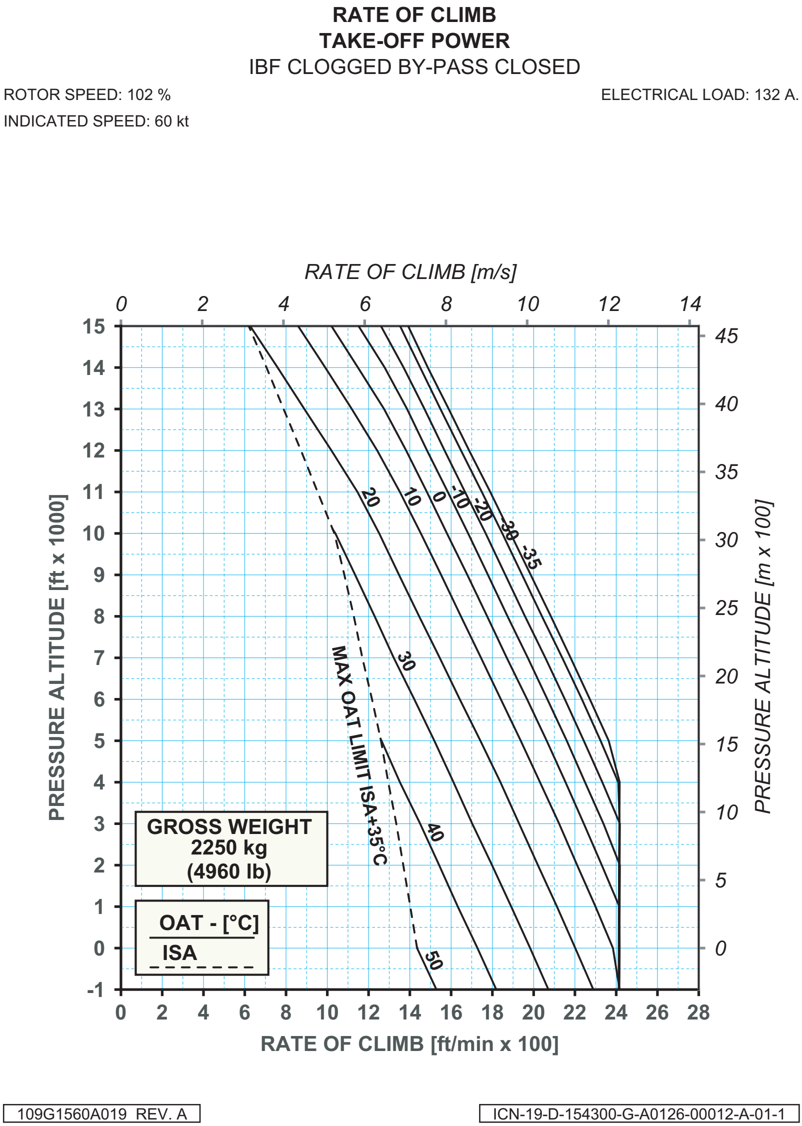
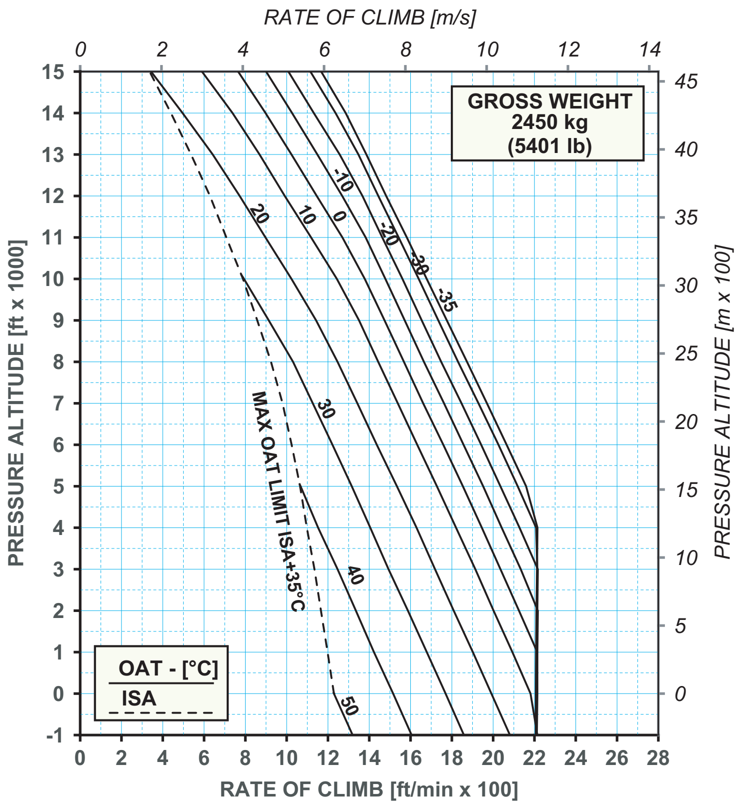


Figure 9-78. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2250 kg - IBF Clogged

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt

ELECTRICAL LOAD: 132 A.



109G1560A019 REV. A

ICN-19-D-154300-G-A0126-00013-A-01-1

Figure 9-79. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2450 kg - IBF Clogged

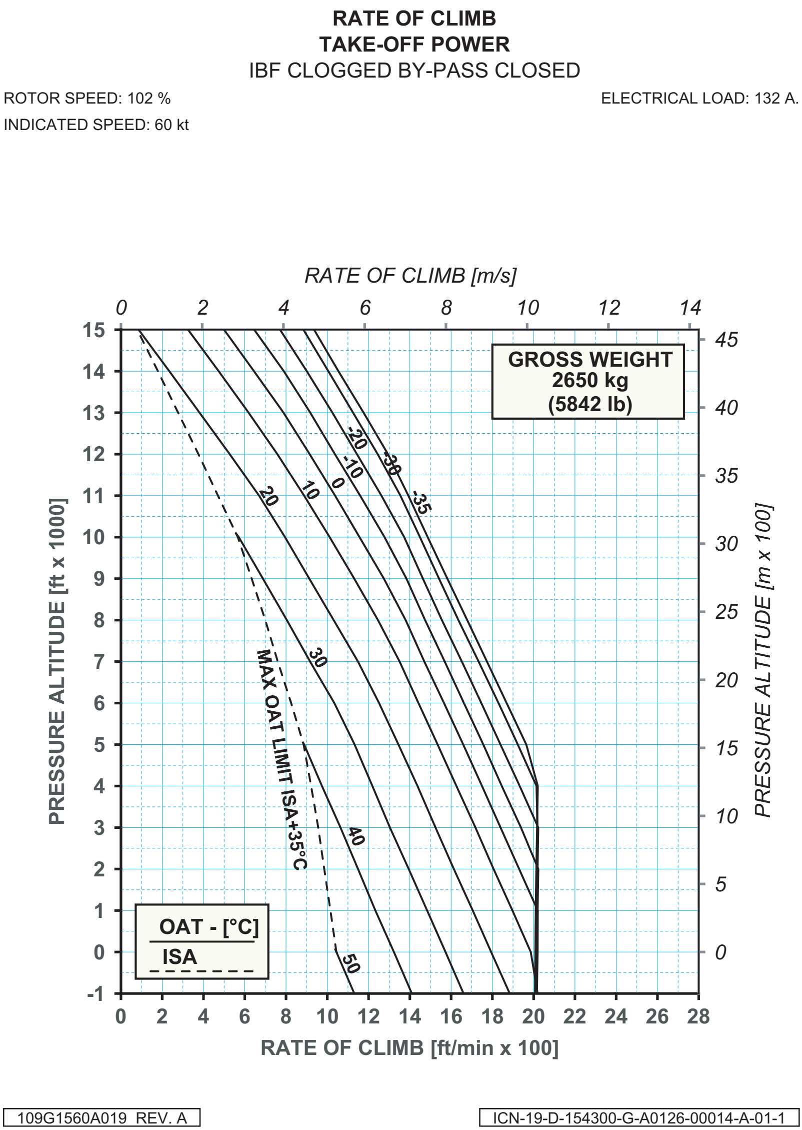
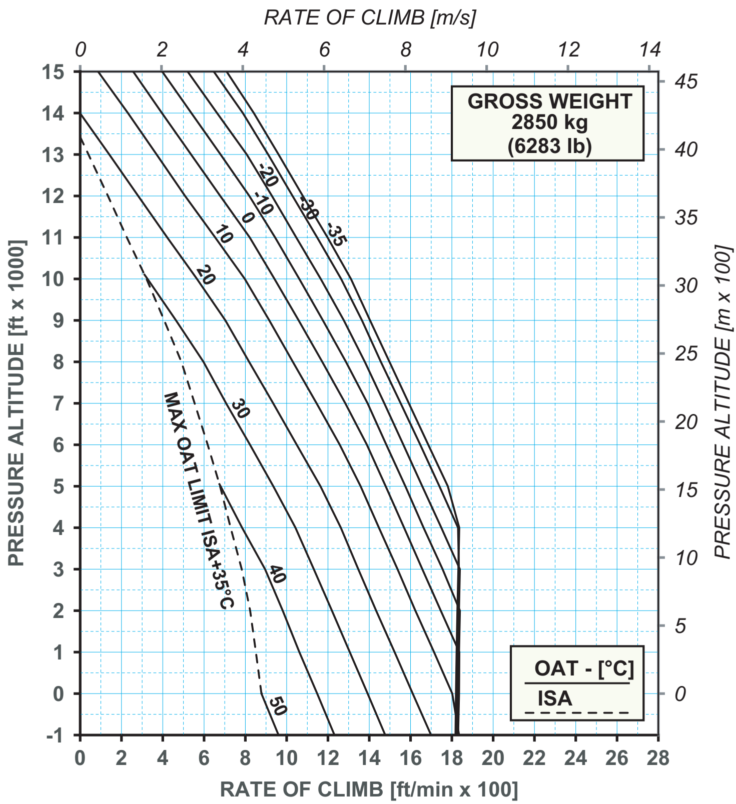


Figure 9-80. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2650 kg - IBF Clogged

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt

ELECTRICAL LOAD: 132 A.



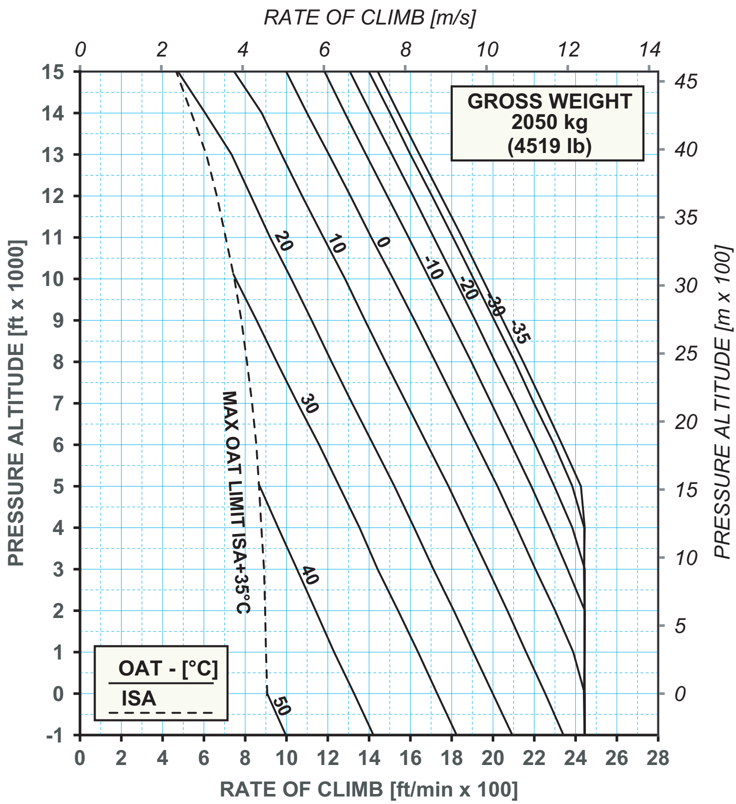
109G1560A019 REV. A

ICN-19-D-154300-G-A0126-00015-A-01-1

Figure 9-81. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2850 kg - IBF Clogged

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 % ELECTRICAL LOAD: 132 A.
INDICATED SPEED: 60 kt



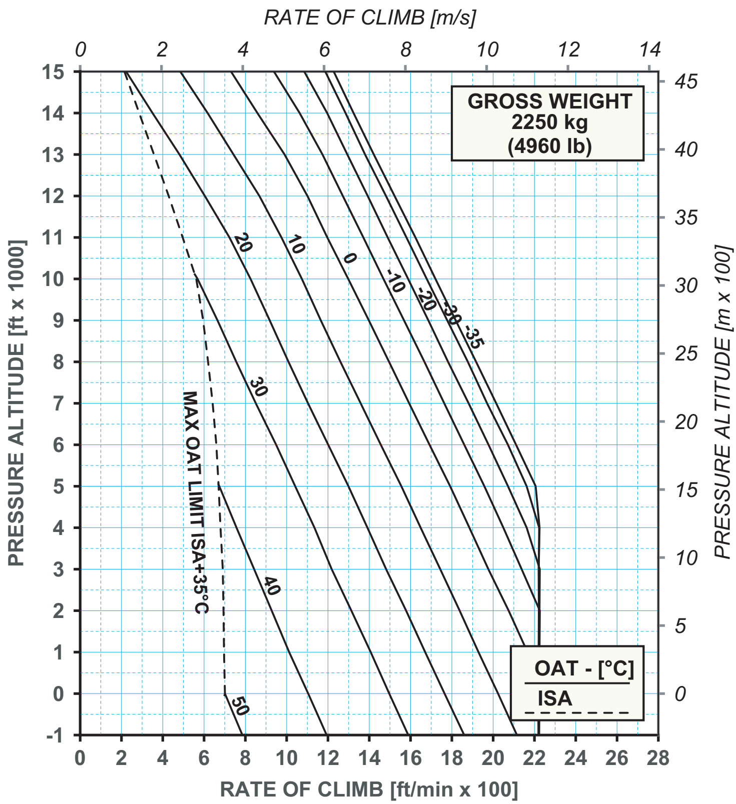
109G1560A019 REV. A ICN-19-D-154300-G-A0126-00016-A-01-1

Figure 9-82. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2050 kg - IBF Clogged

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt

ELECTRICAL LOAD: 132 A.



109G1560A019 REV. A

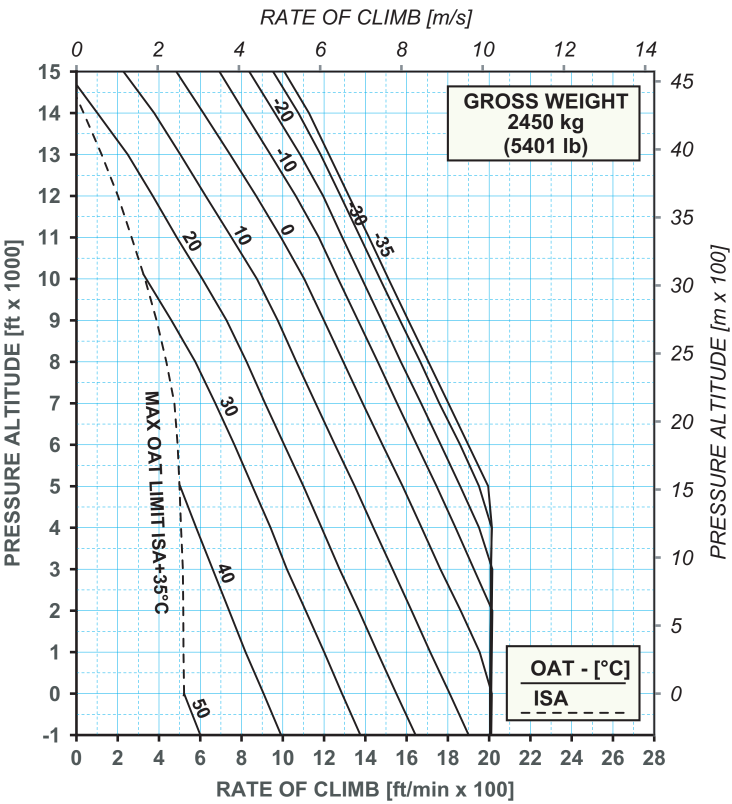
ICN-19-D-154300-G-A0126-00017-A-01-1

Figure 9-83. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2250 kg - IBF Clogged

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt

ELECTRICAL LOAD: 132 A.



109G1560A019 REV. A

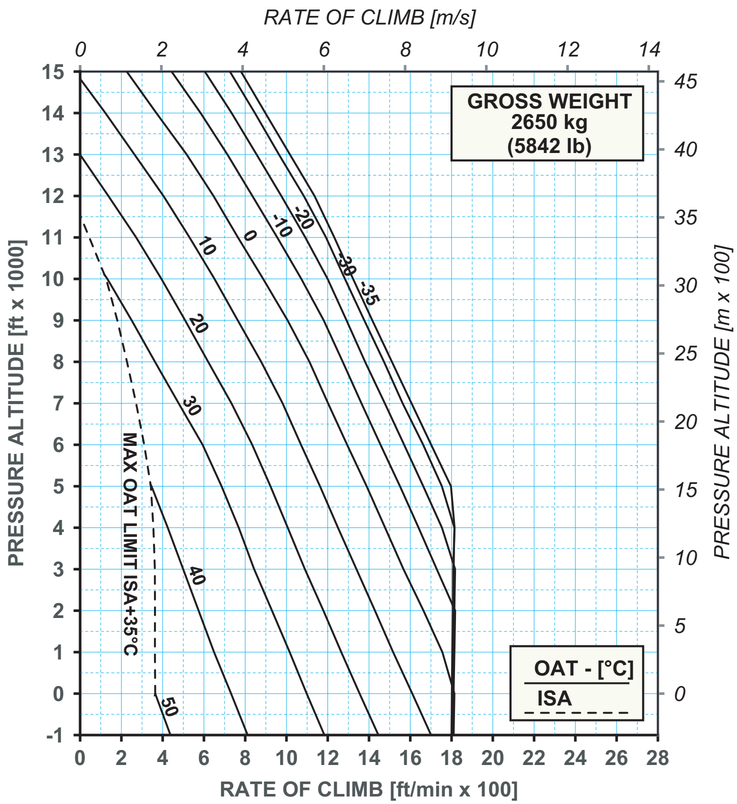
ICN-19-D-154300-G-A0126-00018-A-01-1

Figure 9-84. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2450 kg - IBF Clogged

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt

ELECTRICAL LOAD: 132 A.



109G1560A019 REV. A

ICN-19-D-154300-G-A0126-00019-A-01-1

Figure 9-85. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2650 kg - IBF Clogged

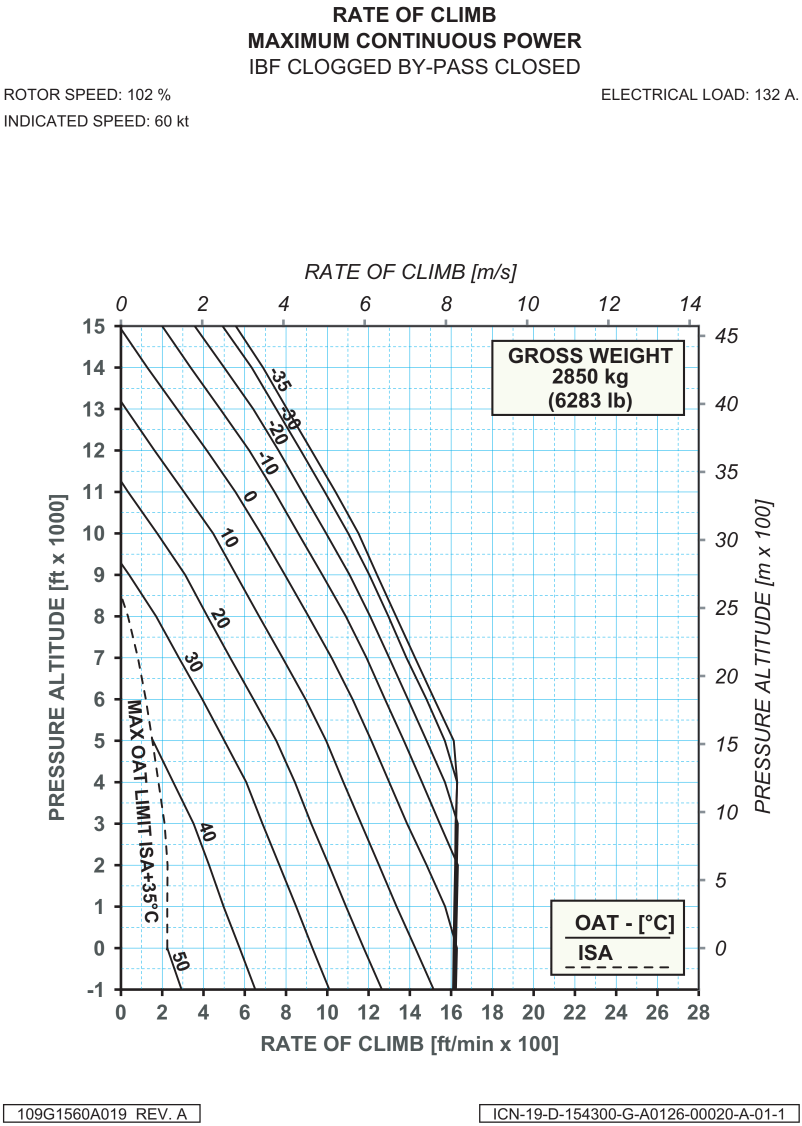
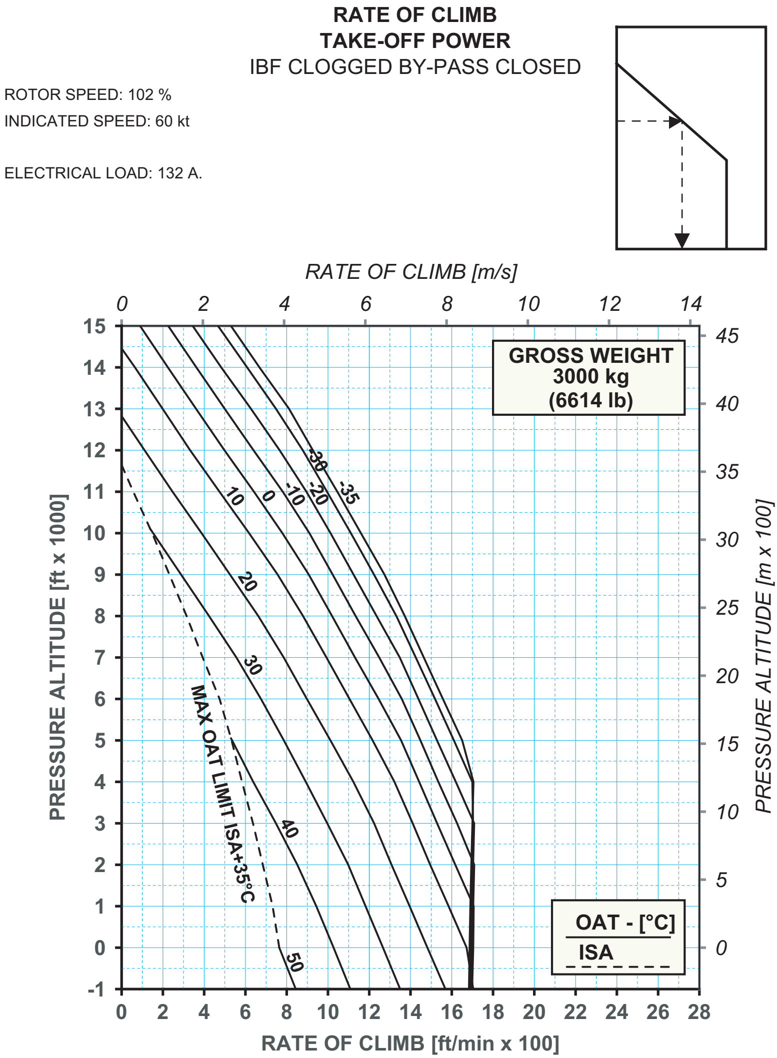


Figure 9-86. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2850 kg - IBF Clogged



109G1580A046 REV. A

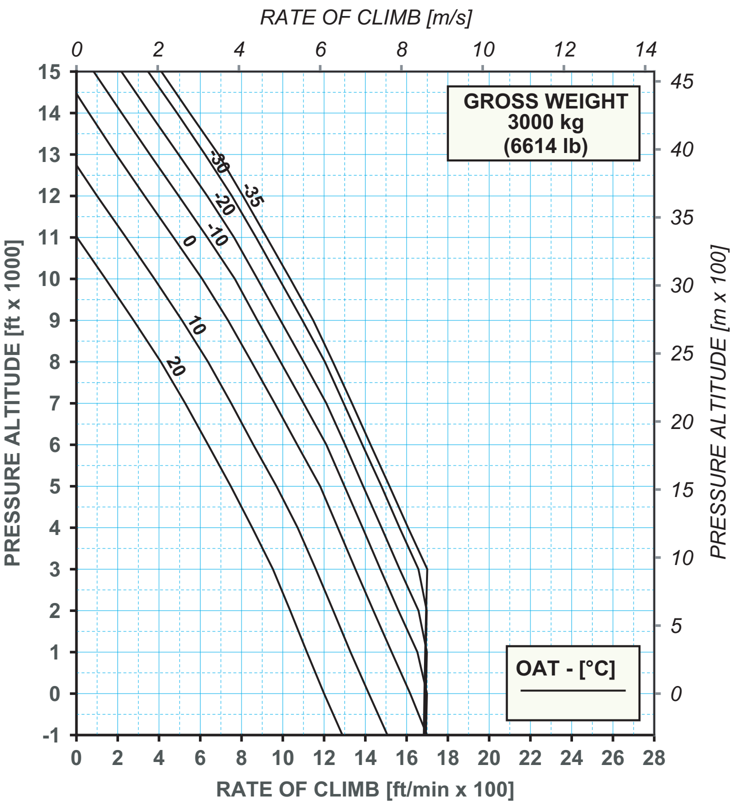
ICN-19-D-154306-G-A0126-00013-A-01-1

Figure 9-87. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 3000 kg - IBF Clogged (Cargo Hook)

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
HEATER ON

ELECTRICAL LOAD: 132 A.



109G1580A046 REV. A

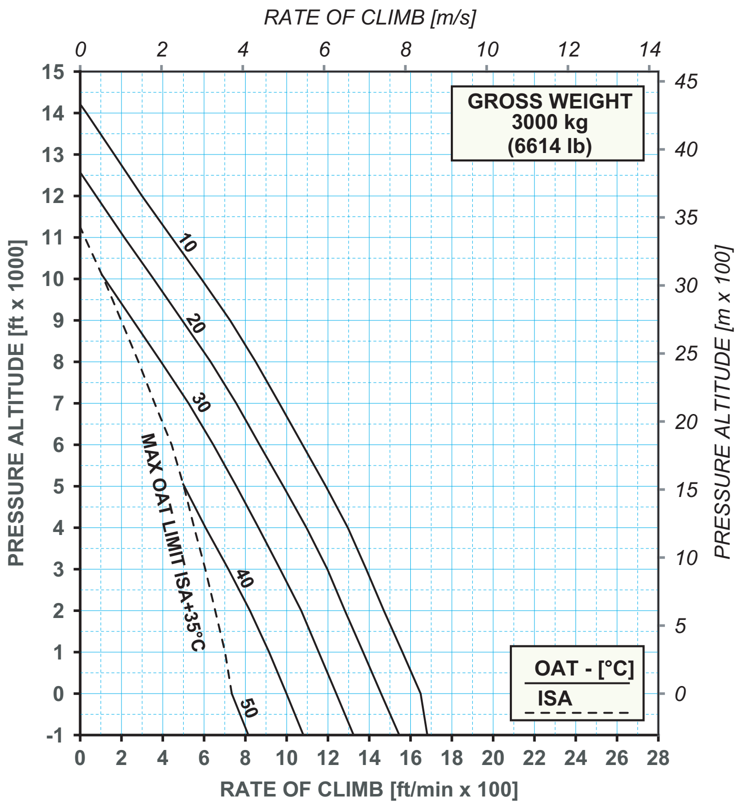
ICN-19-D-154306-G-A0126-00014-A-01-1

Figure 9-88. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 3000 kg - IBF Clogged - Heater ON (Cargo Hook)

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ECS ON

ELECTRICAL LOAD: 132 A.



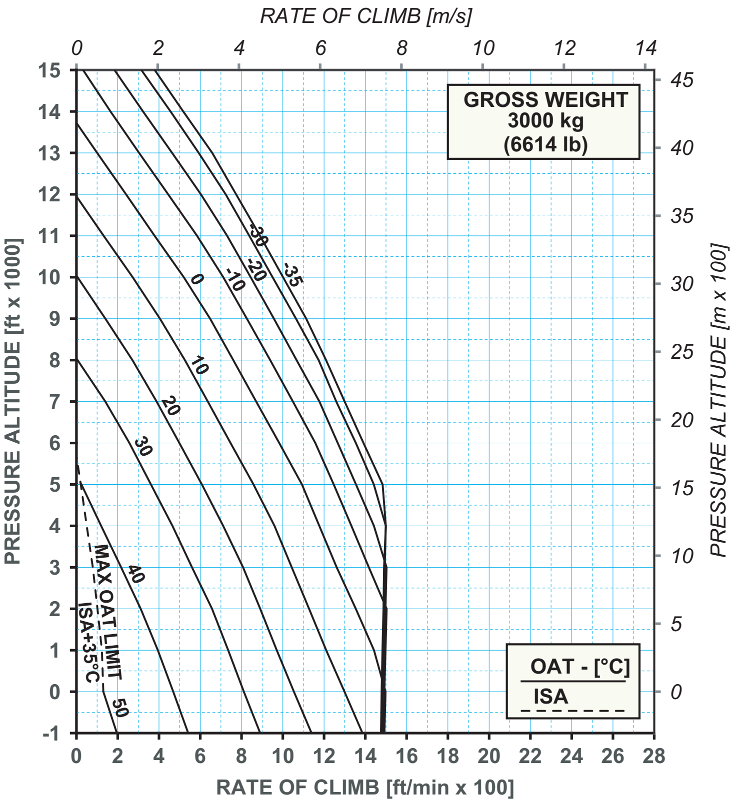
109G1580A046 REV. A

ICN-19-D-154306-G-A0126-00015-A-01-1

Figure 9-89. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 3000 kg - IBF Clogged - ECS ON (Cargo Hook)

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ELECTRICAL LOAD: 132 A.



109G1580A046 REV. A

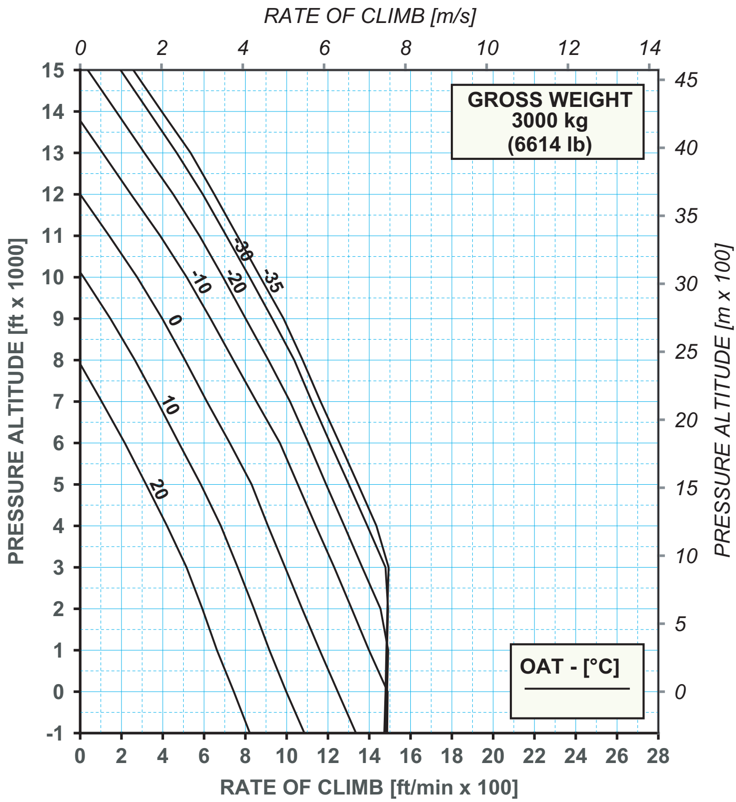
ICN-19-D-154306-G-A0126-00016-A-01-1

Figure 9-90. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 3000 kg - IBF Clogged (Cargo Hook)

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
HEATER ON

ELECTRICAL LOAD: 132 A.



109G1580A046 REV. A

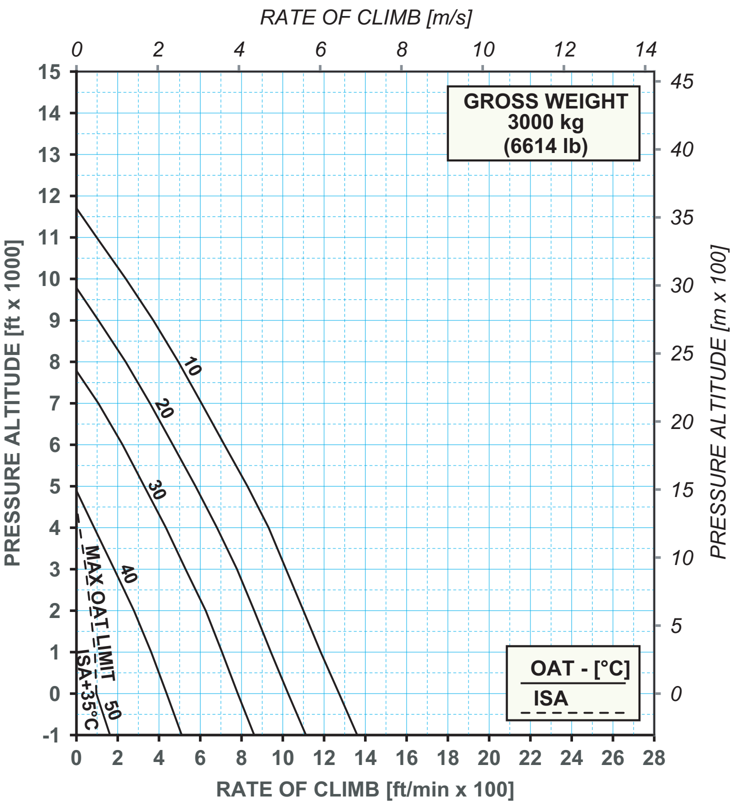
ICN-19-D-154306-G-A0126-00017-A-01-1

Figure 9-91. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 3000 kg - IBF Clogged - Heater ON (Cargo Hook)

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ECS ON

ELECTRICAL LOAD: 132 A.



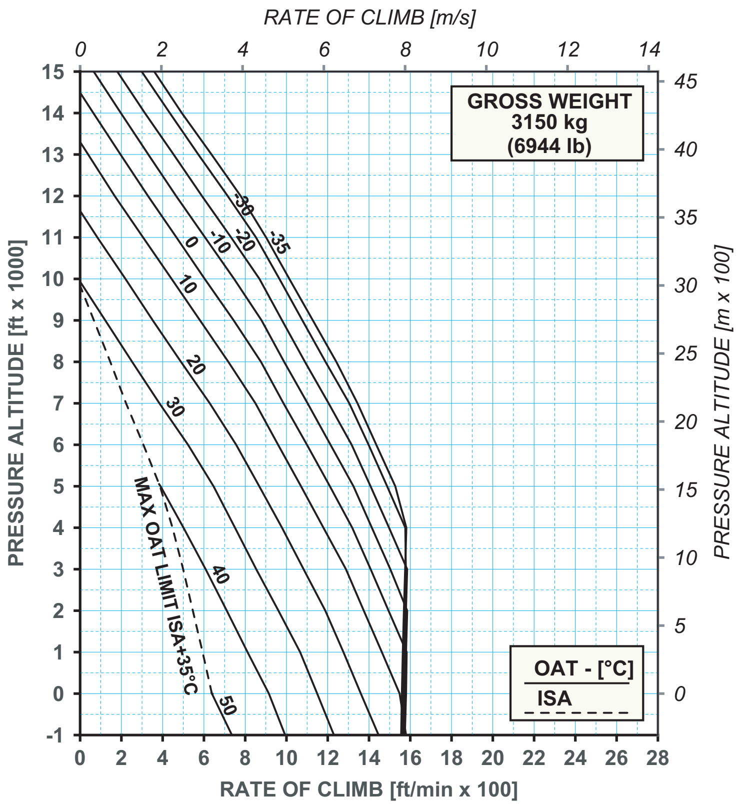
109G1580A046 REV. A

ICN-19-D-154306-G-A0126-00018-A-01-1

Figure 9-92. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 3000 kg - IBF Clogged - Heater ON (Cargo Hook)

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ELECTRICAL LOAD: 132 A.



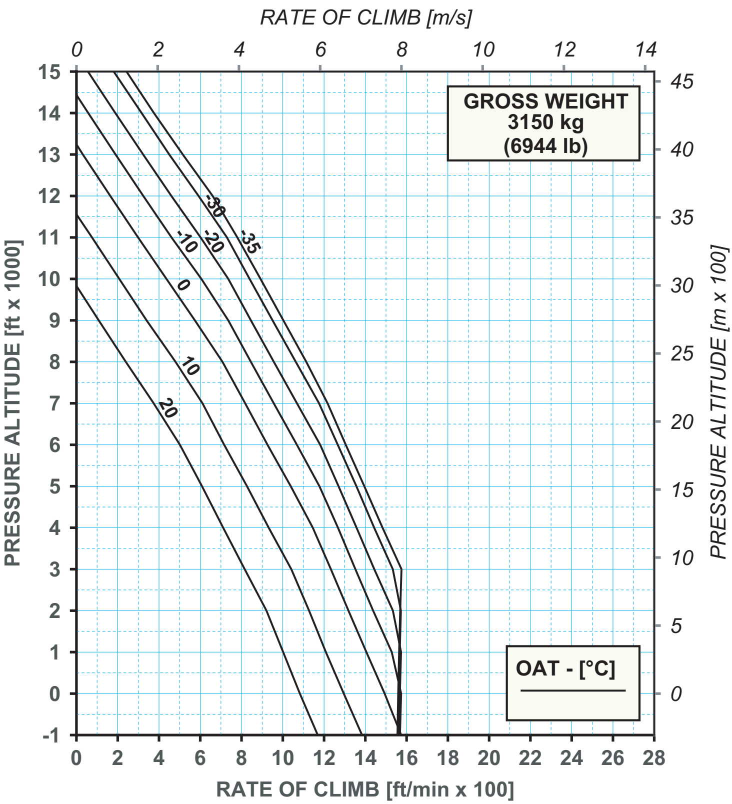
109G1580A046 REV. A
ICN-19-D-154306-G-A0126-00019-A-01-1

Figure 9-93. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 3150 kg - IBF Clogged (Cargo Hook)

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
HEATER ON

ELECTRICAL LOAD: 132 A.



109G1580A046 REV. A

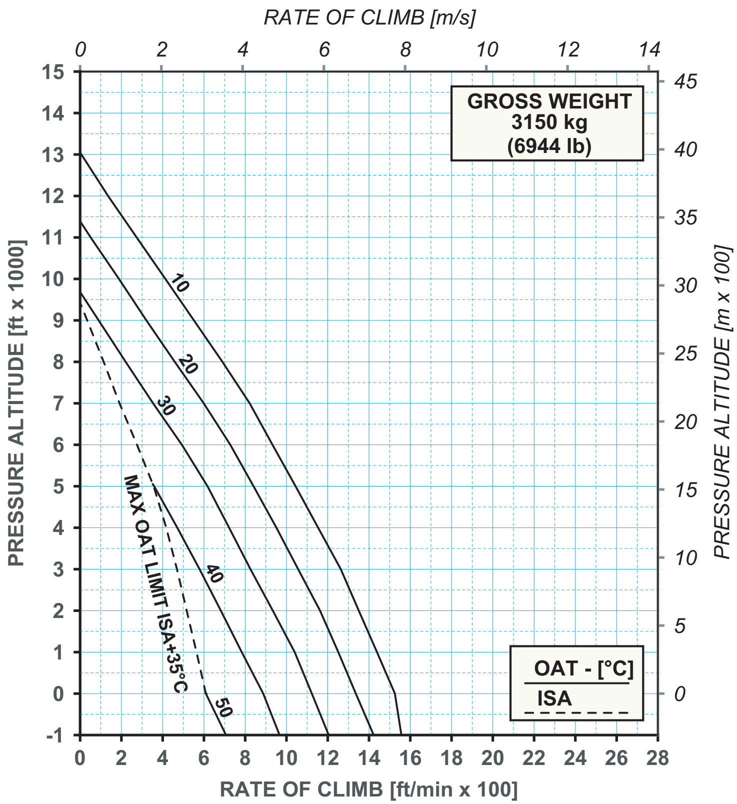
ICN-19-D-154306-G-A0126-00020-A-01-1

Figure 9-94. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 3150 kg - IBF Clogged - Heater ON (Cargo Hook)

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ECS ON

ELECTRICAL LOAD: 132 A.



109G1580A046 REV. A

ICN-19-D-154306-G-A0126-00021-A-01-1

Figure 9-95. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 3150 kg - IBF Clogged - ECS ON (Cargo Hook)

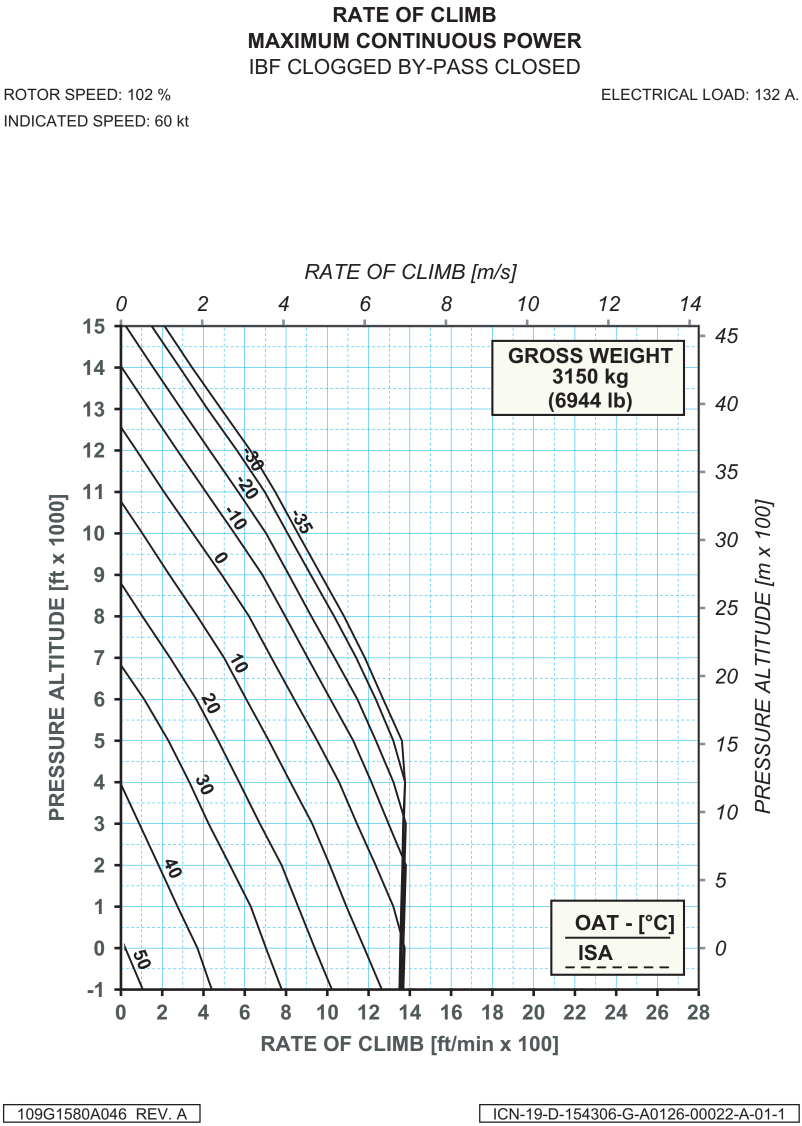
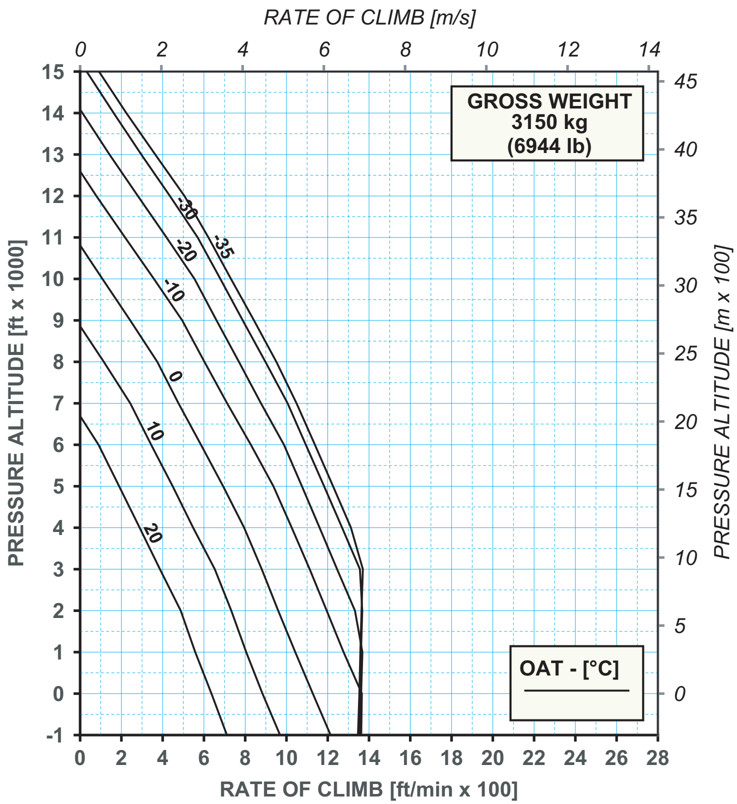


Figure 9-96. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 3150 kg - IBF Clogged (Cargo Hook)

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
HEATER ON

ELECTRICAL LOAD: 132 A.



109G1580A046 REV. A

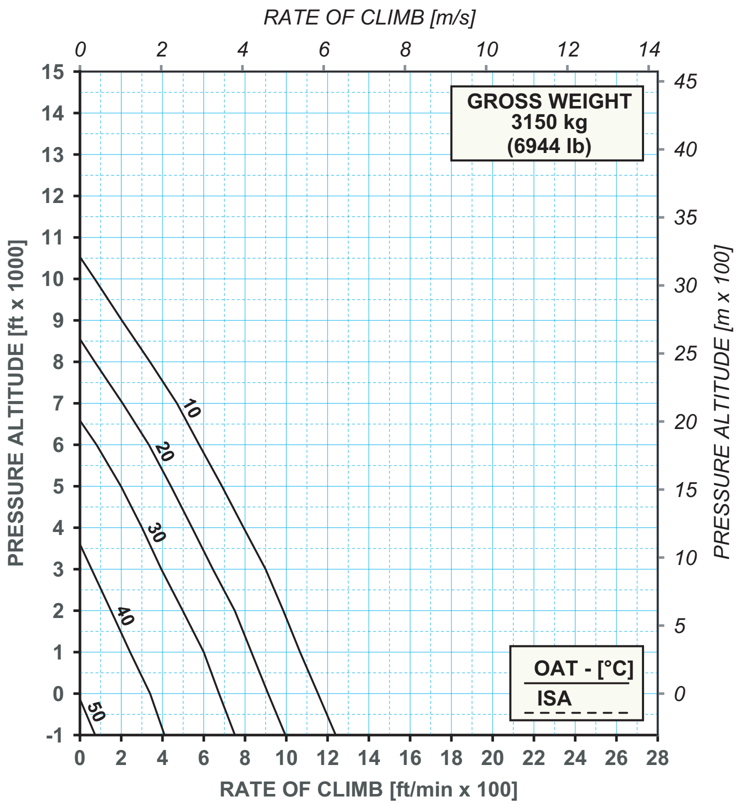
ICN-19-D-154306-G-A0126-00023-A-01-1

Figure 9-97. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 3150 kg - IBF Clogged - Heater ON (Cargo Hook)

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ECS ON

ELECTRICAL LOAD: 132 A.



109G1580A046 REV. A

ICN-19-D-154306-G-A0126-00024-A-01-1

Figure 9-98. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 3150 kg - IBF Clogged - ECS ON (Cargo Hook)

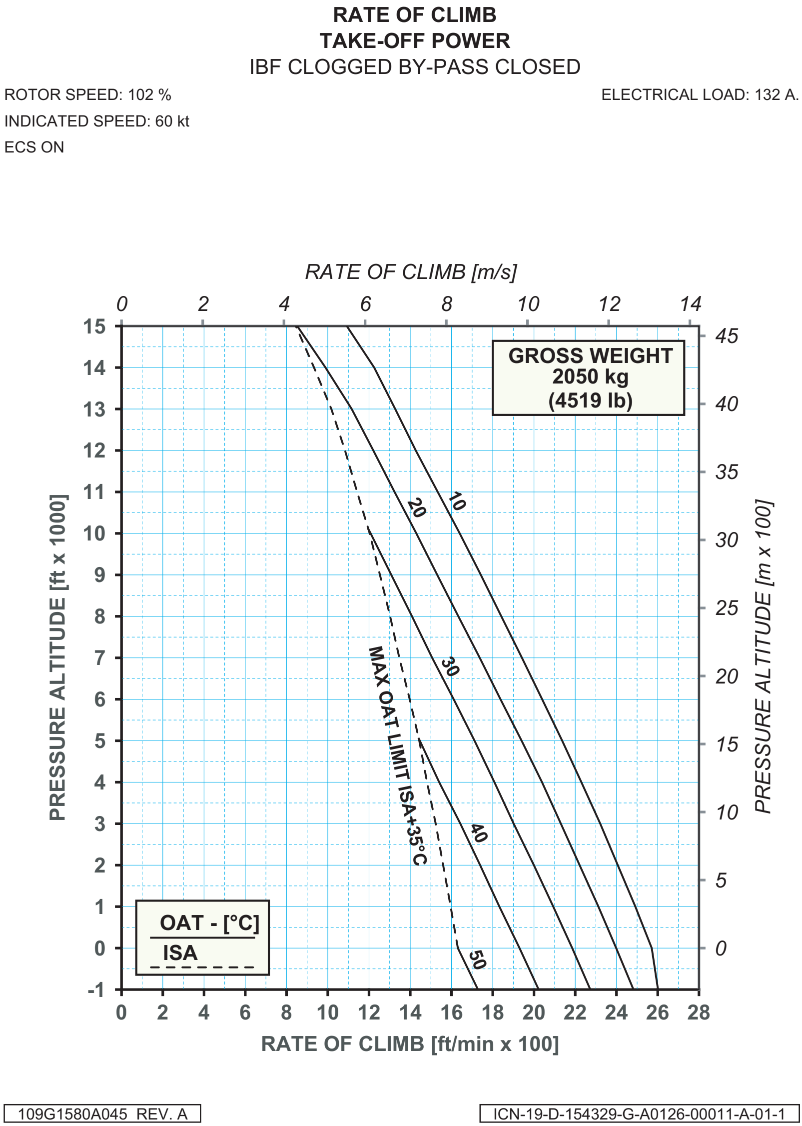


Figure 9-99. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2050 kg - IBF Clogged - ECS ON

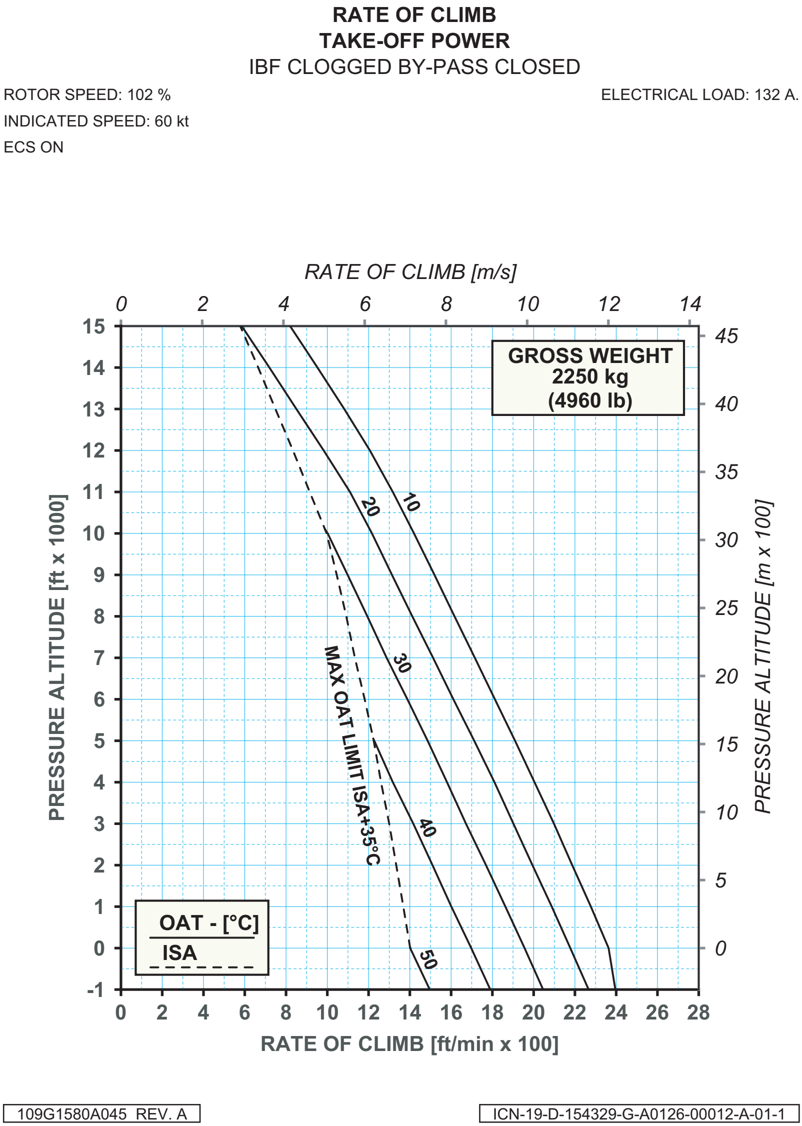
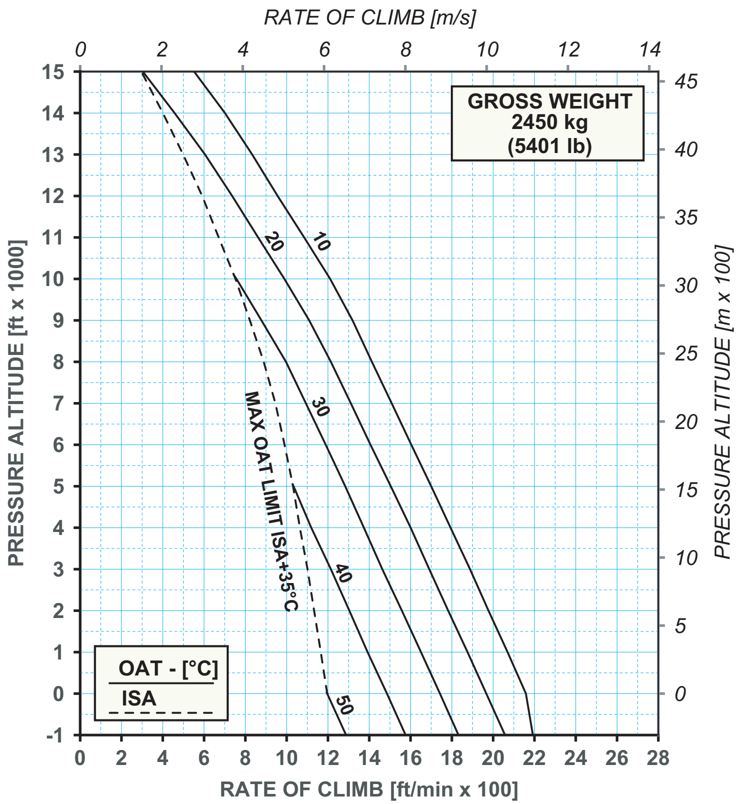


Figure 9-100. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2250 kg - IBF Clogged - ECS ON

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt

ELECTRICAL LOAD: 132 A.



109G1560A019 REV. A

ICN-19-D-154300-G-A0126-00013-A-01-1

Figure 9-101. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2450 kg - IBF Clogged - ECS ON

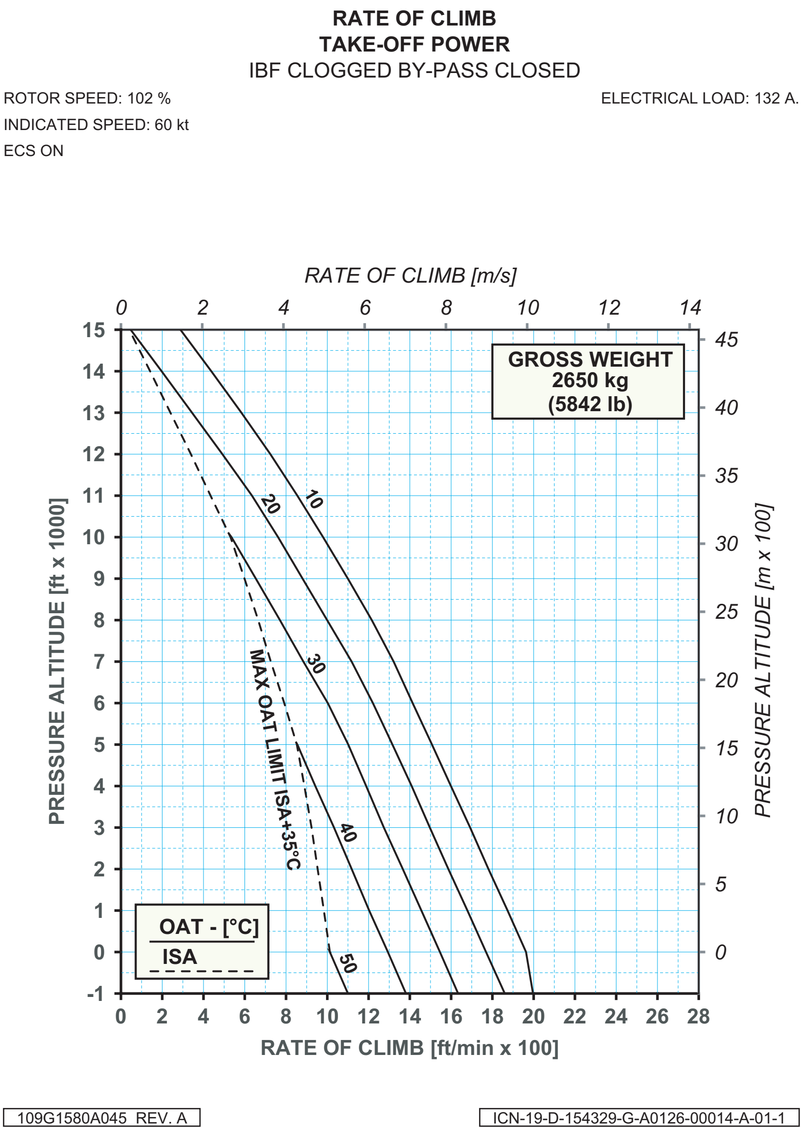
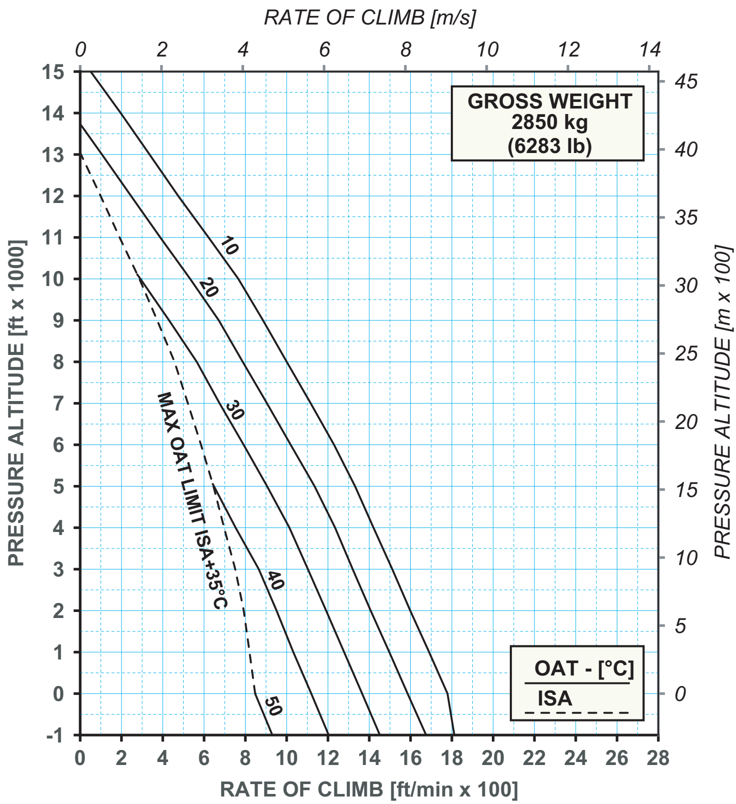


Figure 9-102. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2650 kg - IBF Clogged - ECS ON

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ECS ON

ELECTRICAL LOAD: 132 A.



109G1580A045 REV. A

ICN-19-D-154329-G-A0126-00015-A-01-1

Figure 9-103. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2850 kg - IBF Clogged - ECS ON

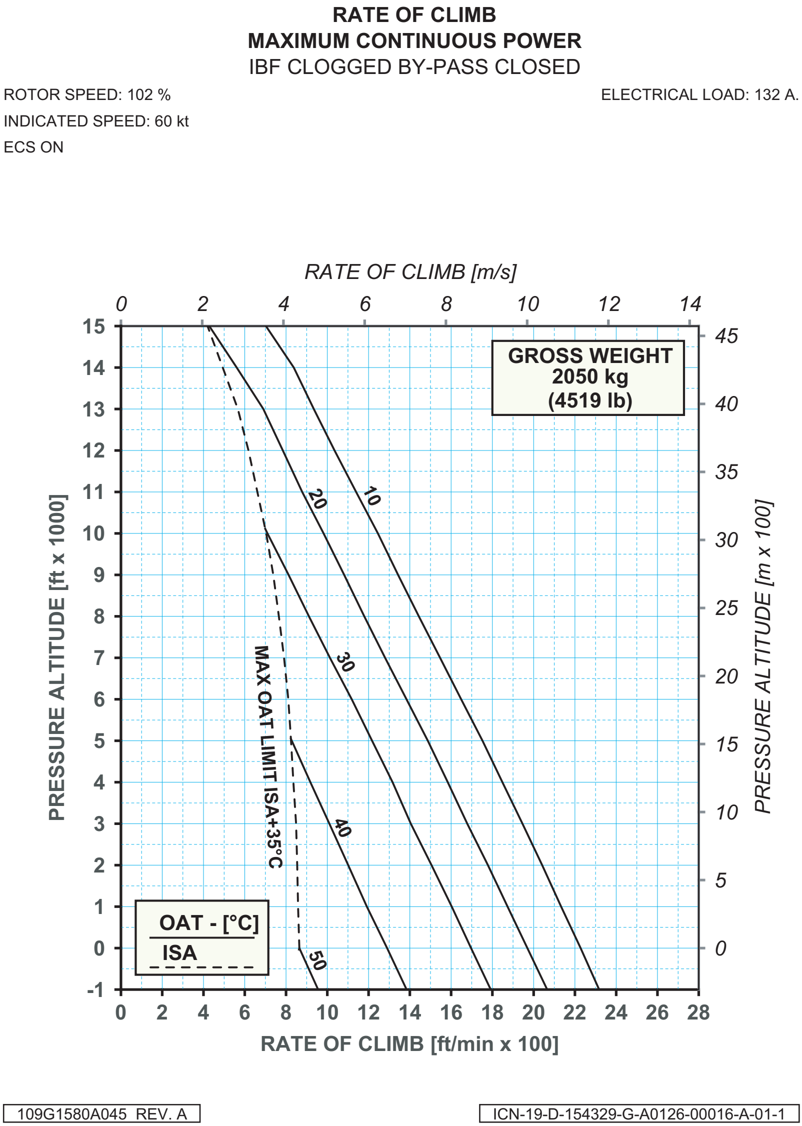
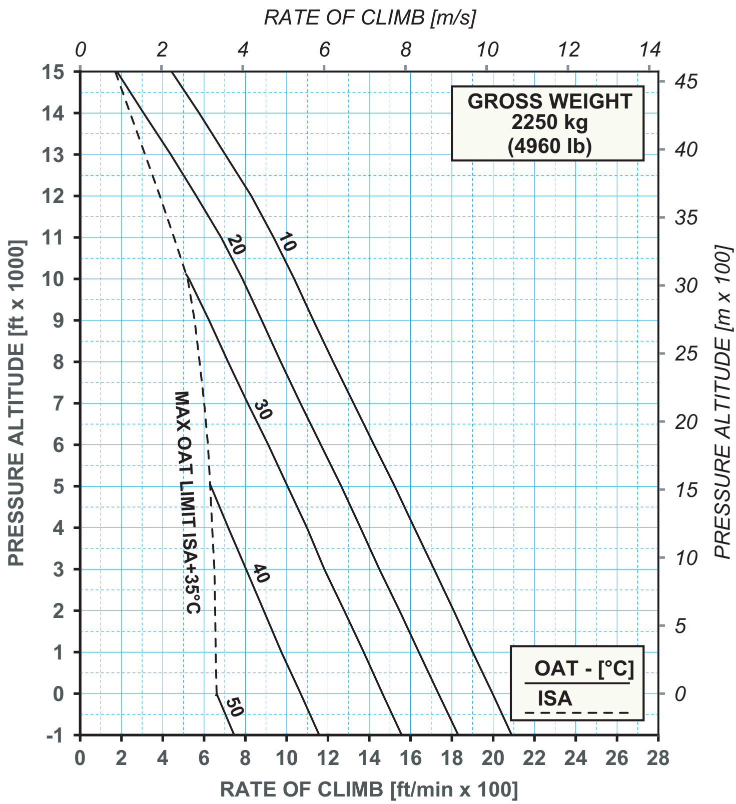


Figure 9-104. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2050 kg - IBF Clogged - ECS ON

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ECS ON

ELECTRICAL LOAD: 132 A.



109G1580A045 REV. A

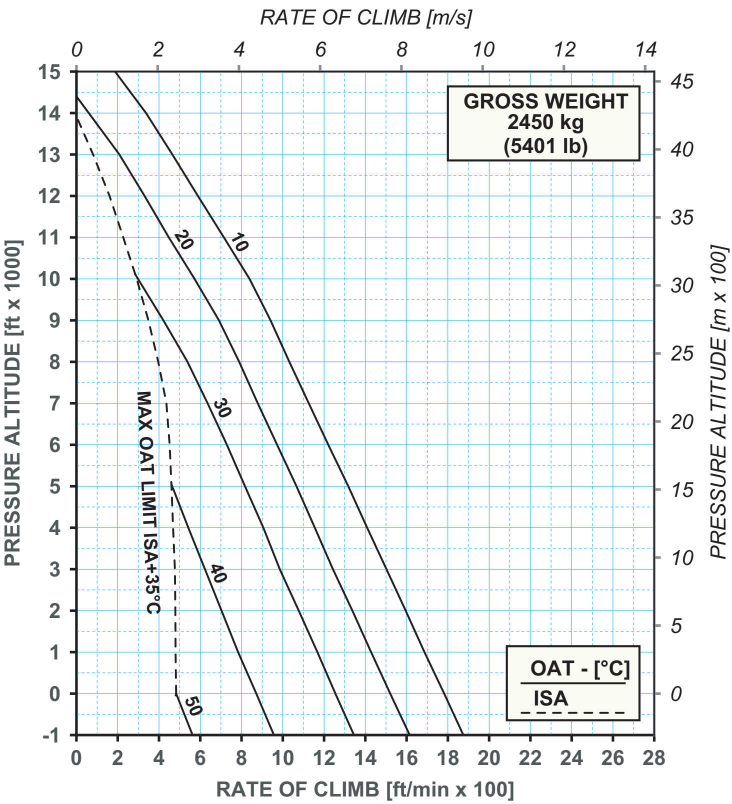
ICN-19-D-154329-G-A0126-00017-A-01-1

Figure 9-105. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2250 kg - IBF Clogged ECS ON

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ECS ON

ELECTRICAL LOAD: 132 A.



109G1580A045 REV. A

ICN-19-D-154329-G-A0126-00018-A-01-1

Figure 9-106. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2450 kg - IBF Clogged - ECS ON

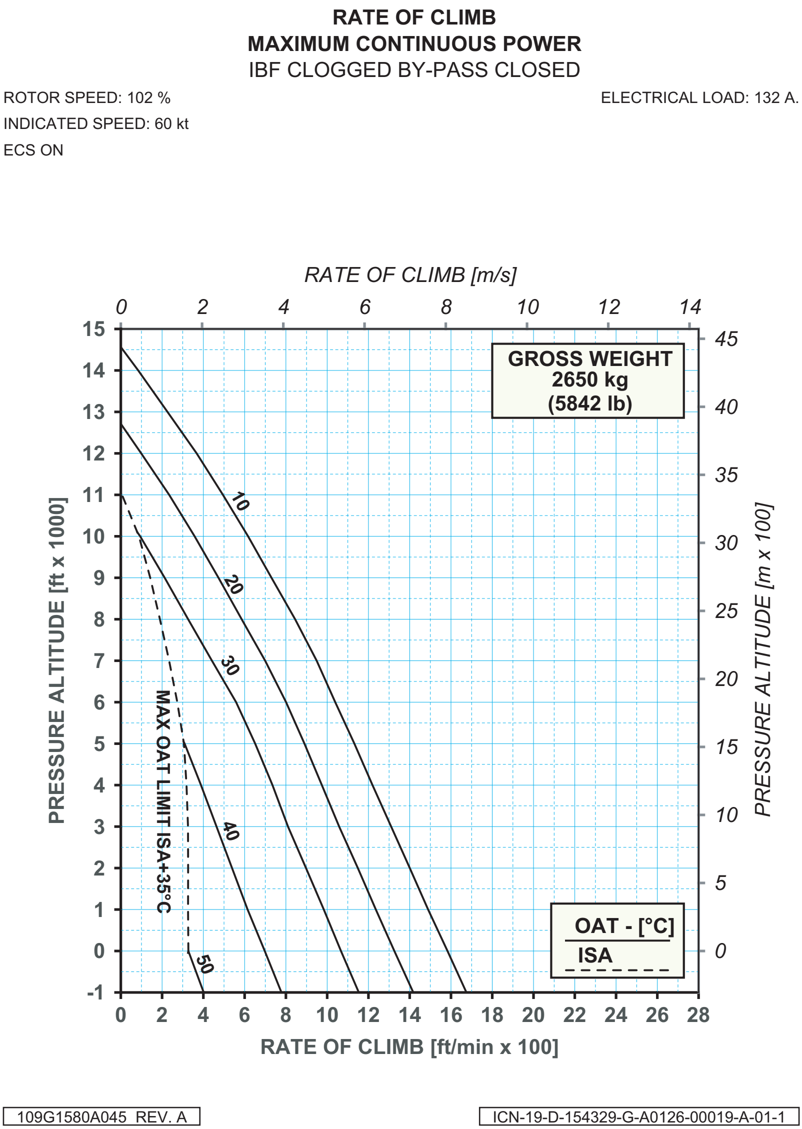
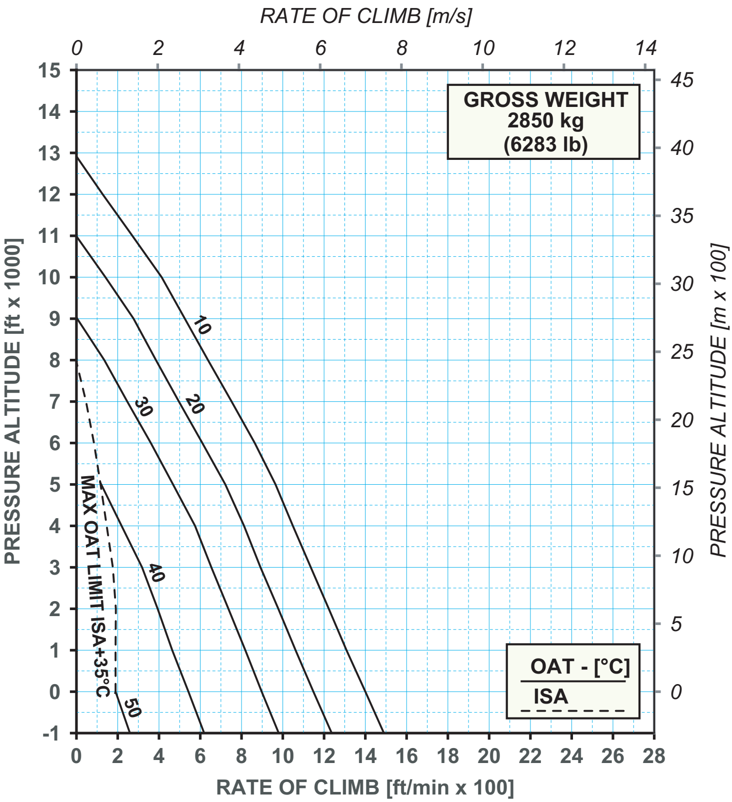


Figure 9-107. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2650 kg - IBF Clogged - ECS ON

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
ECS ON

ELECTRICAL LOAD: 132 A.



109G1580A045 REV. A

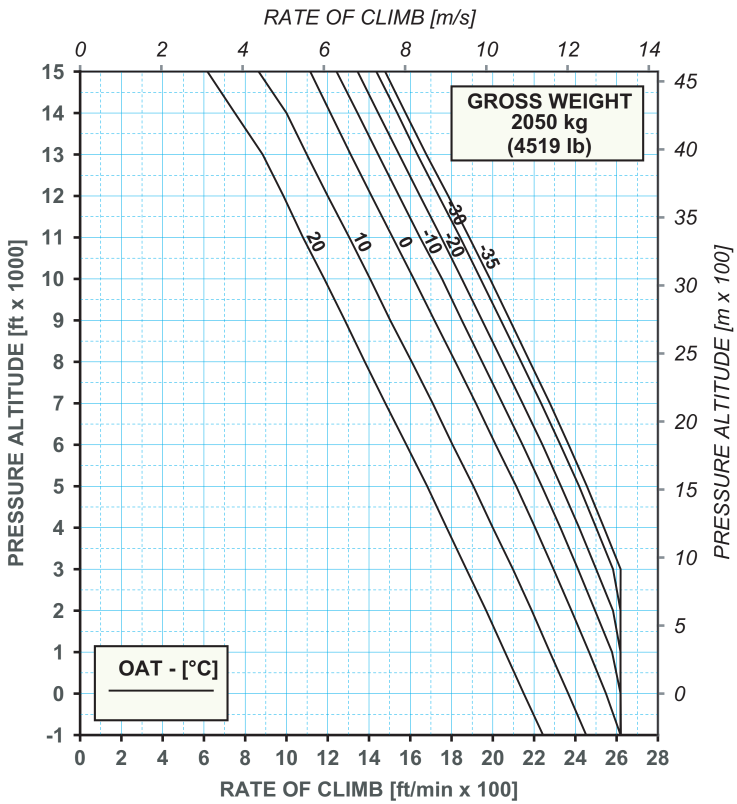
ICN-19-D-154329-G-A0126-00020-A-01-1

Figure 9-108. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2850 kg - IBF Clogged - ECS ON

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
HEATER ON

ELECTRICAL LOAD: 132 A.



109G1580A044 REV. A

ICN-19-D-154302-G-A0126-00011-A-01-1

Figure 9-109. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2050 kg - IBF Clogged - Heater ON

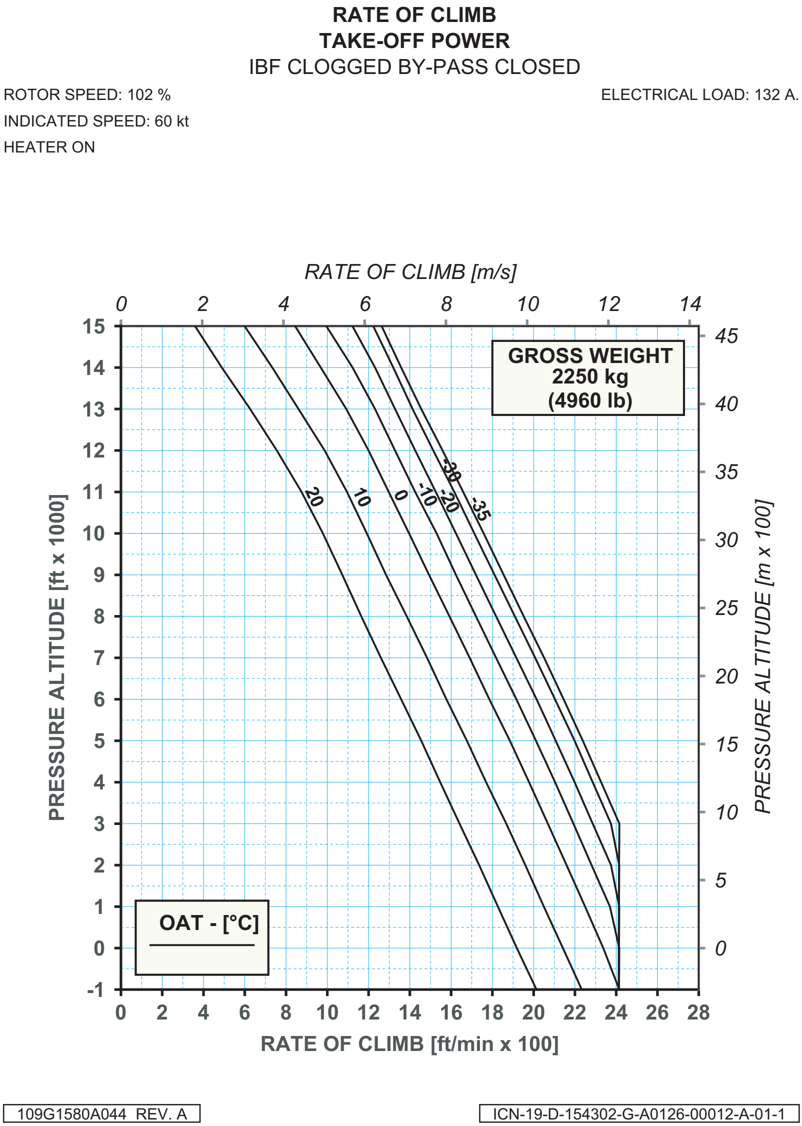
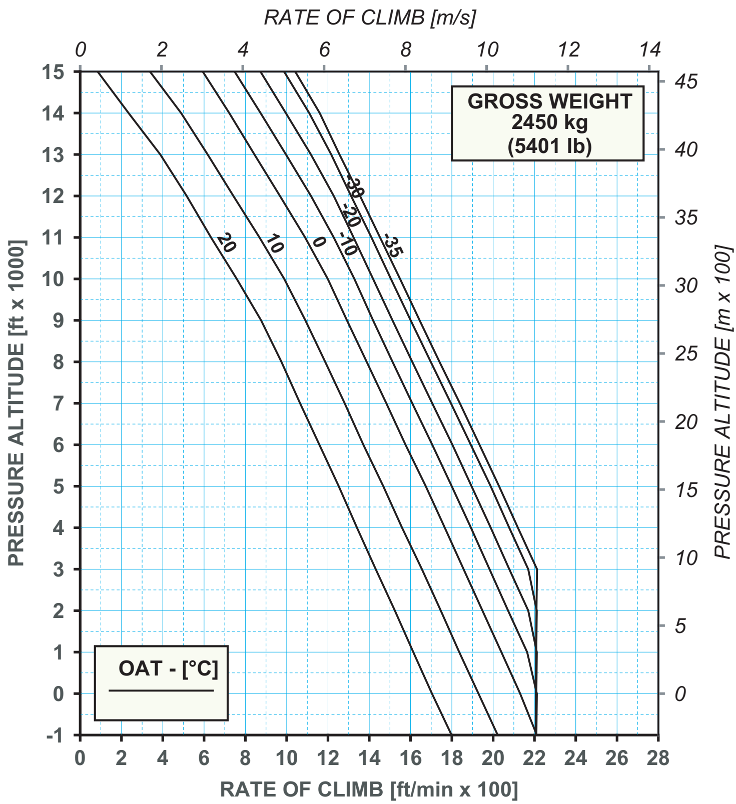


Figure 9-110. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2250 kg - IBF Clogged - Heater ON

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
HEATER ON

ELECTRICAL LOAD: 132 A.



109G1580A044 REV. A

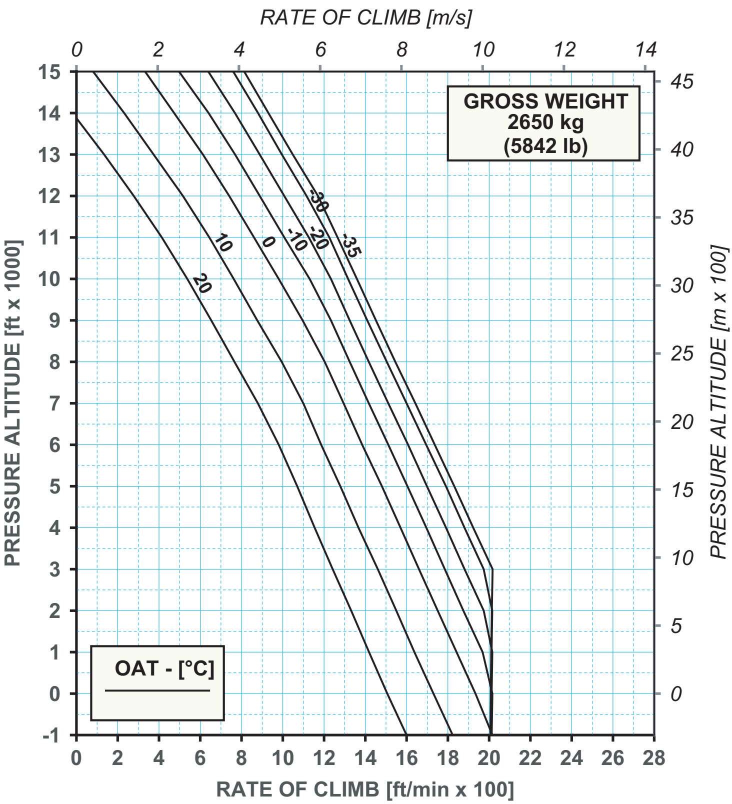
ICN-19-D-154302-G-A0126-00013-A-01-1

Figure 9-111. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2450 kg - IBF Clogged - Heater ON

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
HEATER ON

ELECTRICAL LOAD: 132 A.



109G1580A044 REV. A

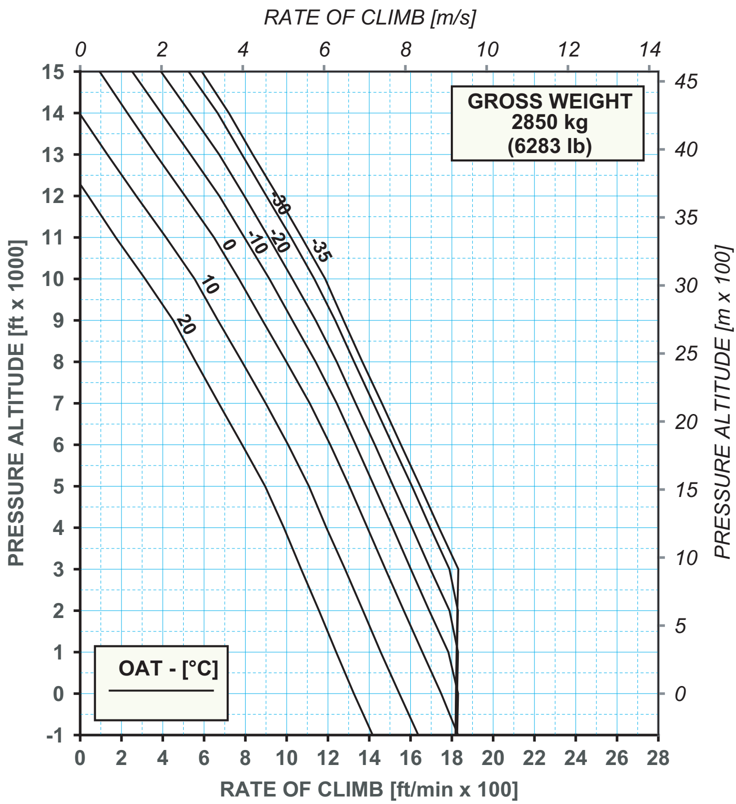
ICN-19-D-154302-G-A0126-00014-A-01-1

Figure 9-112. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2650 kg - IBF Clogged - Heater ON

RATE OF CLIMB
TAKE-OFF POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
HEATER ON

ELECTRICAL LOAD: 132 A.



109G1580A044 REV. A

ICN-19-D-154302-G-A0126-00015-A-01-1

Figure 9-113. Rate Of Climb - Take-Off Power (TOP) - Gross Weight 2850 kg - IBF Clogged - Heater ON

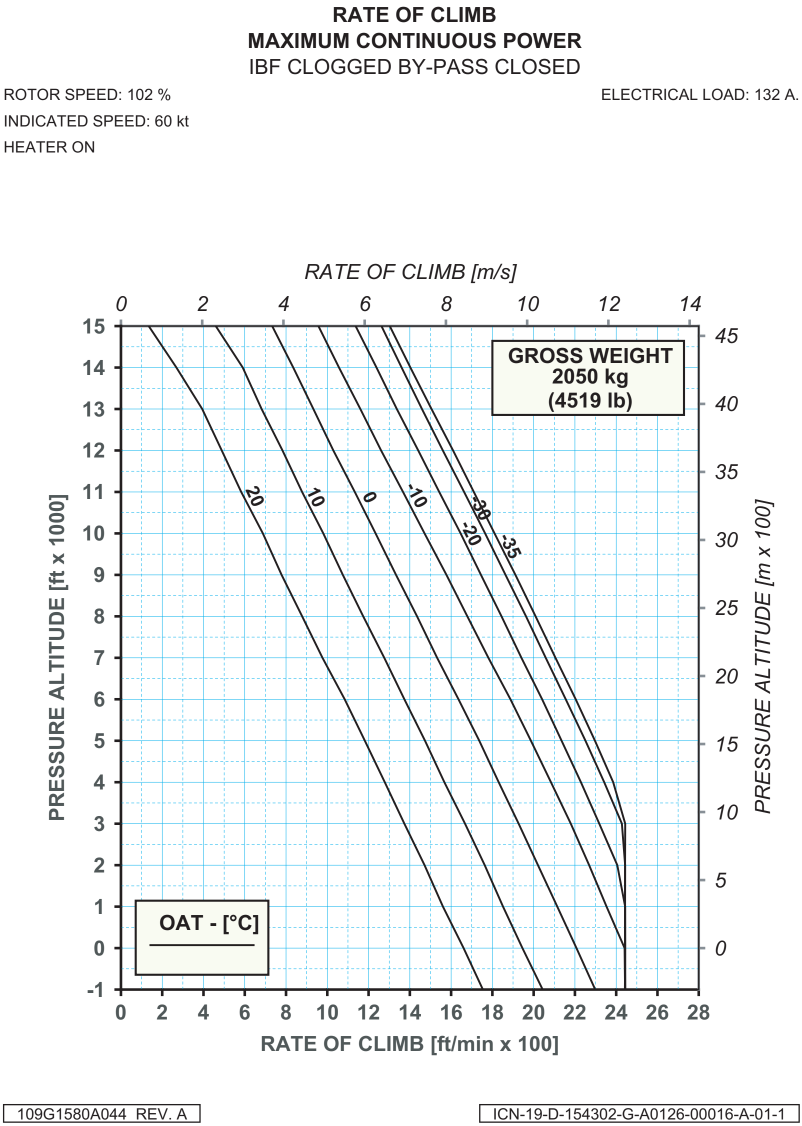
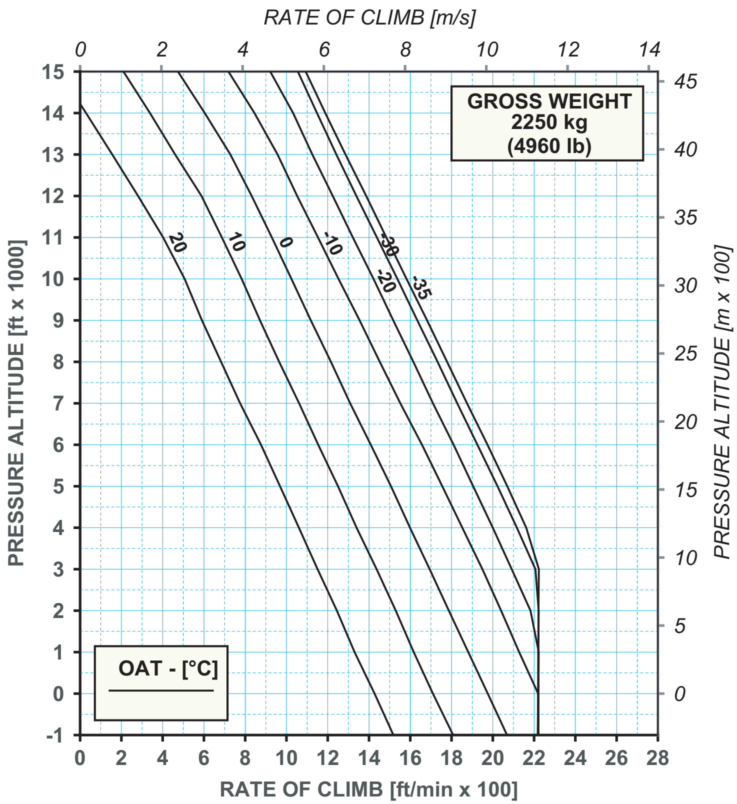


Figure 9-114. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2050 kg - IBF Clogged - Heater ON

RATE OF CLIMB
MAXIMUM CONTINUOUS POWER
IBF CLOGGED BY-PASS CLOSED

ROTOR SPEED: 102 %
INDICATED SPEED: 60 kt
HEATER ON

ELECTRICAL LOAD: 132 A.



109G1580A044 REV. A

ICN-19-D-154302-G-A0126-00017-A-01-1

Figure 9-115. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2250 kg - IBF Clogged - Heater ON

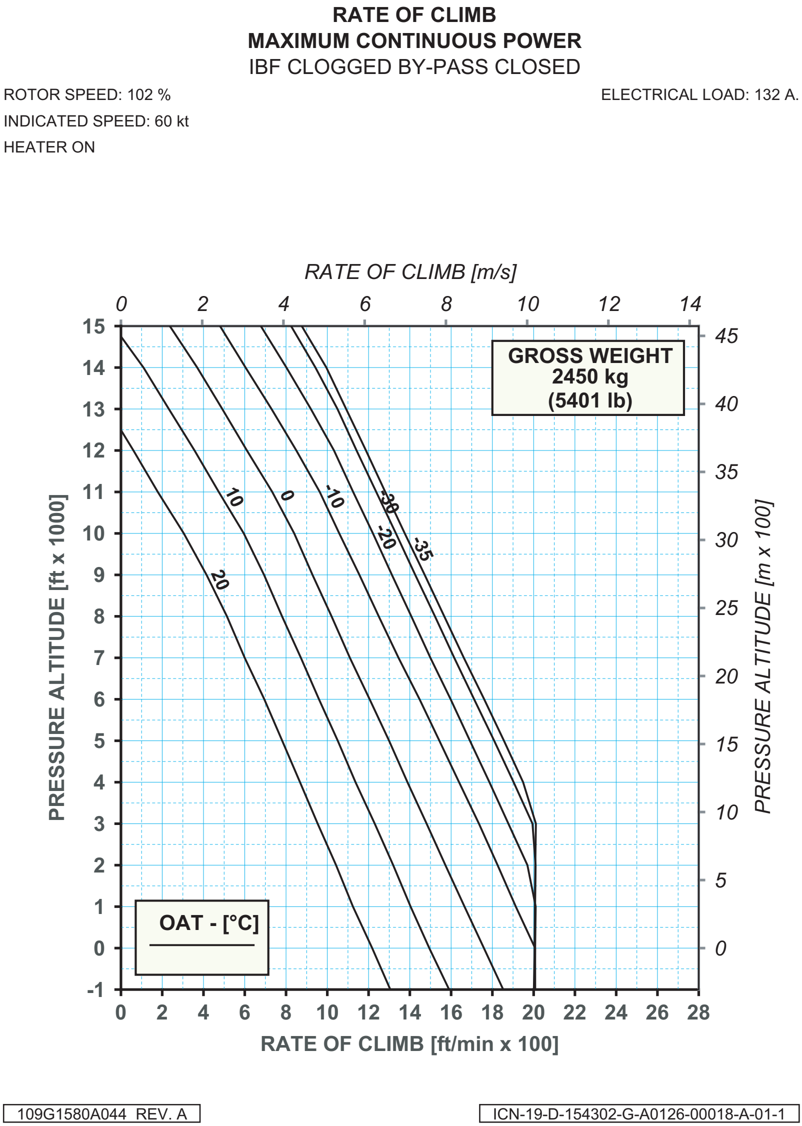


Figure 9-116. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2450 kg - IBF Clogged - Heater ON

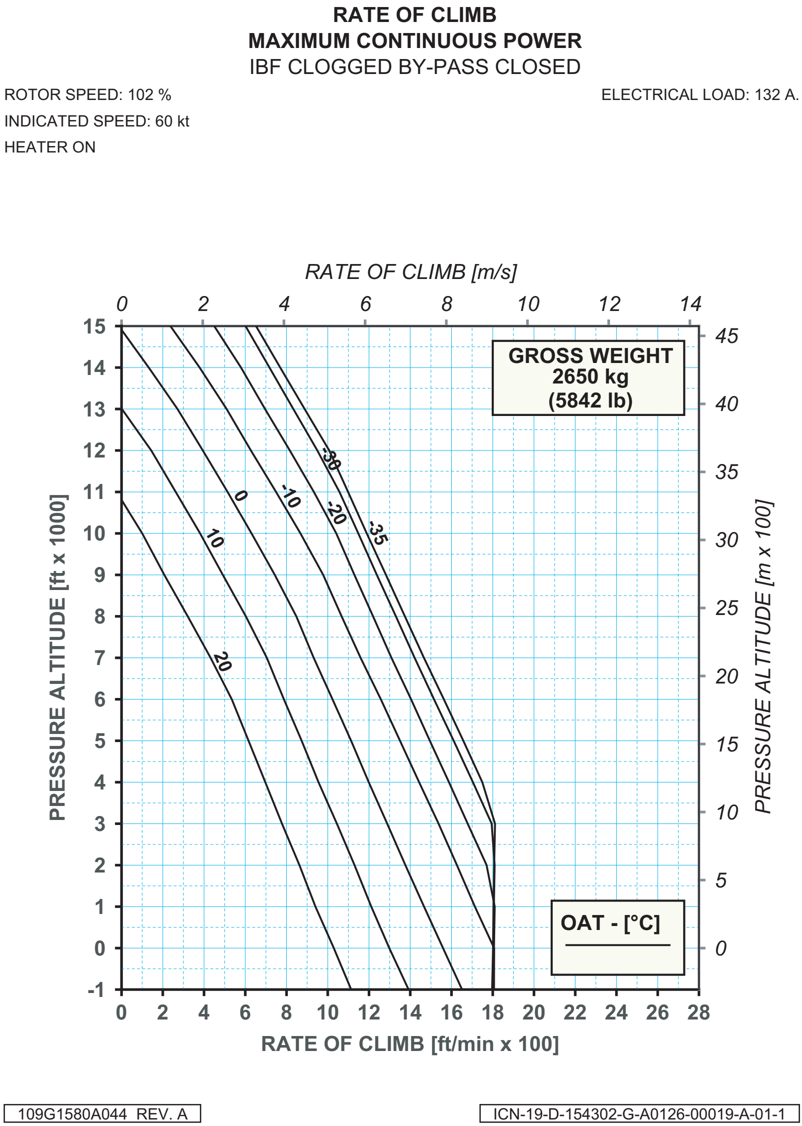


Figure 9-117. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2650 kg - IBF Clogged - Heater ON

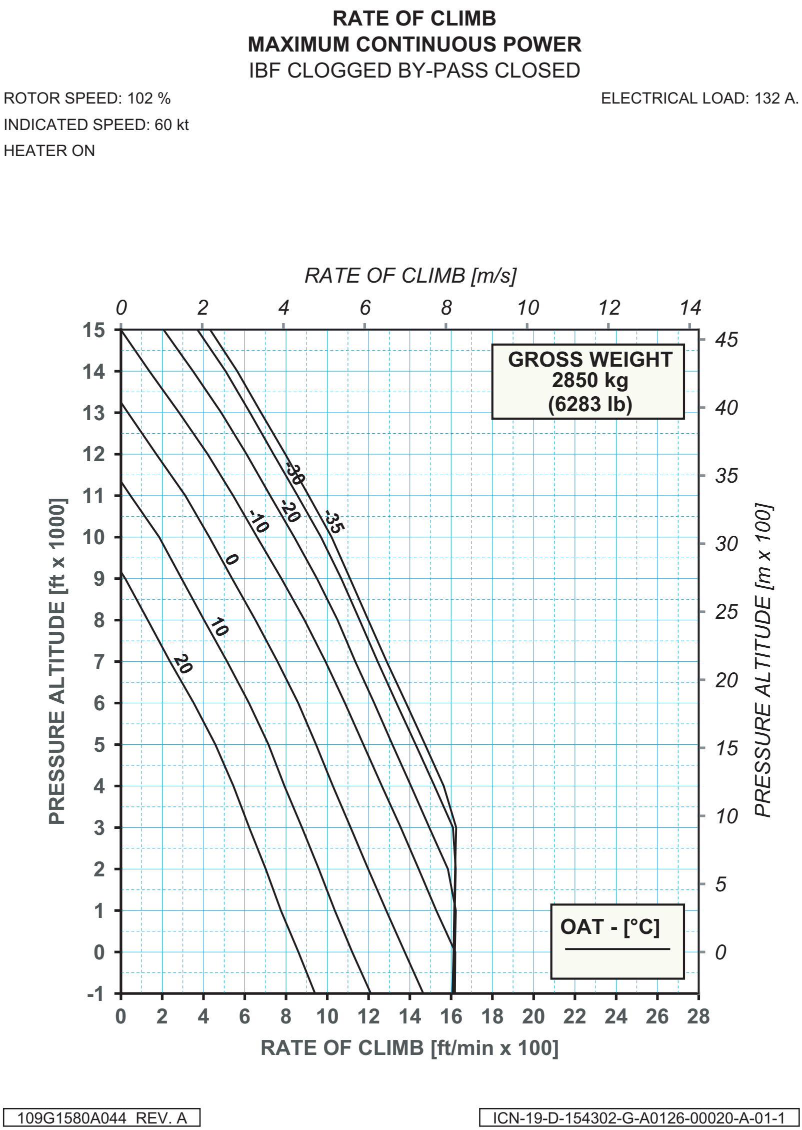


Figure 9-118. Rate Of Climb - Maximum Continuous Power (MCP) - Gross Weight 2850 kg - IBF Clogged - Heater ON