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FLIGHT MANUAL

EC 120 B

TRANSPORT CANADA TYPE APPROVAL No H-102

REGISTRATION No

SERIAL Nc

APPROVED BY
LA DIRECTION GENERALE DE
L'AVIATION CIVILE

BY

DATE 13 DEC. 1998

THE EFFECTIVITY OF THIS MANUAL AT THE LATEST REVISION IS SPECIFIED ON THE EFFECTIVE PAGES.

IT IS THE OPERATOR'S RESPONSIBILITY TO MAINTAIN THIS MANUAL IN A CURRENT IN ACCORDANCE WITH THE LIST OF EFFECTIVE PAGES.

THIS ROTORCRAFT FLIGHT MANUAL IS APPROVED FOR CANADIAN REGISTERED AIRCRAFT IN ACCORDANCE WITH THE CANADIAN AIRWORTHINESS MANUAL.
THE TRANSPORT CANADA FLIGHT MANUAL CONSISTS OF ALL UNCODED AND CODED C PAGES MARKED "DGAC APPROVED".

THIS DOCUMENT SHALL BE CARRIED IN AIRCRAFT AT ALL TIMES.

EUROCOPTER Direction Technique Support
Aéroport international Marseille-Provence 13725 Marignane Cedex - France

LIST OF CONDITIONAL REVISIONS (CR)
EFFECTIVE PAGES

This manual assigned to the helicopter mentioned on the title page, contains the following pink pages except those cancelled when the conditions are complied with.

CAUTION

If a normal revision (NR) modifies the page number for any information concerned below, the reader will have to change the number of the pink page by hand, so that the information remains in accordance with the paragraph concerned.

No	PAGE	DATE	REMARKS / EFFECTIVITY

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LIST OF INTERMEDIATE TEMPORARY REVISIONS (ITR) EFFECTIVE PAGES

The manual contains the following additional yellow pages.

No	PAGE	DATE	No	PAGE	DATE

Replace page A1 by the following :

LIST OF APPLICABLE CONDITIONAL REVISIONS (RC) PAGES

This manual assigned to the helicopter mentioned on the title page, contains the following pink pages except those canceled when the conditions are complied with.

CAUTION

If a normal revision (NR) modifies the page number for any information concerned below, the reader will have to change the number of the pink page by hand, so that the information remains in accordance with the paragraph concerned.

No	PAGE	DATE	APPLICABLE BEFORE CONDITION IS MET :
RC 1	2 - 5	SEPT.99	SB N°32-001 (Skid blades landing gear) and Mod. N° A 00075 (installation of tail skid)
RC 1	5 - 7	NOV.00	SB N°32-001 (Skid blades landing gear) and Mod. N° A 00075 (installation of tail skid)
RC 1	5 - 8	NOV.00	SB N°32-001 (Skid blades landing gear) and Mod. N° A 00075 (installation of tail skid)
RC 2	2 - 1	SEPT.99	SB N°34-001 (Cabin adaptation for night VFR)
RC 2	2 - 14	SEPT.99	SB N°34-001 (Cabin adaptation for night VFR)
RC 2	2 - 15	SEPT.99	SB N°34-001 (Cabin adaptation for night VFR)
RC 3	4 - 5	SEPT.99	SB N°76-002 (Engine controls)
RC 3	4 - 6	SEPT.99	SB N°76-002 (Engine controls)
RC 4	2 - 10	JULY 00	SB N°28-007 (Use of JP 4 and JET B)
RC 4	2 - 18	JULY 00	SB N°28-007 (Use of JP 4 and JET B)

LIST OF APPLICABLE CONDITIONAL REVISIONS (RC) PAGES

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No	PAGE	DATE	APPLICABLE BEFORE CONDITION IS MET :
RC 1	2 - 5	SEPT.99	SB N°32-001 (Skid blades landing gear) and Mod. N° A 00075 (installation of tail skid)
	5 - 7	NOV.00	SB N°32-001 (Skid blades landing gear) and Mod. N° A 00075 (installation of tail skid)
	5 - 8	NOV.00	SB N°32-001 (Skid blades landing gear) and Mod. N° A 00075 (installation of tail skid)
RC 2	2 - 1	SEPT.99	SB N°34-001 (Cabin adaptation for night VFR)
	2 - 14	SEPT.99	SB N°34-001 (Cabin adaptation for night VFR)
	2 - 15	SEPT.99	SB N°34-001 (Cabin adaptation for night VFR)
RC 3	4 - 5	OCT.01	SB N°76-002 (Engine controls)
	4 - 6	SEPT.99	SB N°76-002 (Engine controls)
RC 4	2 - 10	JULY 01	SB N°28-007 (Use of JP 4 and JET B)
	2 - 18	JULY 00	SB N°28-007 (Use of JP 4 and JET B)

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LIST OF APPLICABLE CONDITIONAL REVISIONS (RC) PAGES (CONT'D)

No	PAGE	DATE	APPLICABLE BEFORE CONDITION IS MET :
RC 5	3 – 20	OCT 01	SB N° 21.008 (P2 TEMP warning light)

LIST OF VALID CONDITIONAL REVISIONS (RC) PAGES

This manual assigned to the helicopter mentioned on the title page, contains the following conditional revisions printed on pink pages after the last indicated date.

CAUTION

If a normal revision (NR) modifies the page number for any information concerned below, the reader will have to change the number of the pink page by hand, so that the information remains in accordance with the paragraph concerned.

DATE	NAME	SB N°	Embodiment of SB		VALID RC N°	VISA
			Yes	No		
	K	32-001 and A 00075	X		RC 1	
		34-001			RC 2	
		76-002			RC 3	

EXAMPLE
OF A LIST OF VALID CONDITIONAL REVISIONS (RC) PAGES

This page must not be included in Flight Manual.

Suppose SB 34-001 and SB 76-002 are embodied.

The corresponding RC are crossed-out by the user and removed from the Flight Manual.

DATE	NAME	SB N°	Embodiment of SB		VALID RC N°	VISA
			Yes	No		
01.09.99	USER	32-001 and A 00075		X	RC 1	@
01.09.99	USER	34-001	X		~~RC 2~~	@
01.09.99	USER	76-002	X		~~RC 3~~	@

EXAMPLE

LIST OF VALID CONDITIONAL REVISIONS (RC) PAGES (CONT'D)

DATE	NAME	SB N°	Embodiment of SB		VALID RC N°	VISA
			Yes	No		

LIST OF INTERMEDIATE TEMPORARY REVISIONS (ITR) EFFECTIVE PAGES

The manual contains the following additional yellow pages.

No	PAGE	DATE	No	PAGE	DATE
5 A	C	FEB 00			
5 A	4 - 6	FEB 00			
5 B	C	JUN 00			
5 B	2 – 11	JUN 00			
5 C	A 1	JUL 00			
5 C	C	JUL 00			
5 C	1 - 3	JUL 00			
5 C	2 - 10	JUL 00			
5 C	2 - 11	JUL 00			
5 C	2 - 18	JUL 00			

LIST OF INTERMEDIATE TEMPORARY REVISIONS (ITR) EFFECTIVE PAGES

The manual contains the following additional yellow pages :

N°	PAGE	DATE	N°	PAGE	DATE
5 A	4 - 6	FEV 00			
5 C	1 - 3	JUL 00			
5 C	2 - 10	JUL 00			
5 C	2 - 11	JUL 00			
5 C	2 - 18	JUL 00			
	RR 5C supersedes RR 5B				
5 D	A 1	NOV 00			
5 D	C	NOV 00			
5 D	2 - 5	NOV 00			
5 D	2 - 13	NOV 00			
5 D	2 - 19	NOV 00			
5 D	5 - 7	NOV 00			
5 D	5 - 8	NOV 00			
5 D	5 - 9	NOV 00			
5 D	5 - 11	NOV 00			

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No	PAGE	DATE	No	PAGE	DATE

LIST OF INTERMEDIATE TEMPORARY REVISIONS (ITR) REQUIRING NO APPROVAL

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The manual contains the following additional yellow pages.

No	PAGE	DATE	No	PAGE	DATE
5A	10 - 8	NOV 99			
5A	10 - 9	NOV 99			
5A	10 - 10	NOV 99			
5A	10 - 11	NOV 99			

LIST OF INTERMEDIATE TEMPORARY REVISIONS (ITR) REQUIRING NO APPROVAL

The manual contains the following yellow pages.

No	PAGE	DATE	No	PAGE	DATE
6 a	5 - 18	FEB 02			
6 b	8 – 9	JULY 02			
6 b	8 – 24A	JULY 02			
6 c	D	JULY 02			
6 c	8 – 28	JULY 02			

LIST OF APPROVED EFFECTIVE PAGES

PAGE	REV No	REMARKS
Title	0	
A1	5	
A2	5	
C	4	
E	5	
F	5	
G	5	
M	5	
i	0	
ii	0	
iii	0	
iv	4	
v	4	
vi	4	added
	SECTION 1	
1-i	0	
1-1	5	
1-2	0	
1-3	5	
1-4	5	
1-5	3	
1-6	5	
	SECTION 2	
2-i	5	
2-ii	0	
2-1	5	
2-2	5	
2-3	5	
2-4	5	
2-5	5	
2-6	4	
2-7	5	
2-8	5	
2-9	5	
2-10	5	
2-10A	5	added
2-10B	5	added
2-11	5	
2-12	5	
2-13	5	
2-13A	5	added
2-13B	5	added
2-14	3	
2-15	3	
2-16	3	
2-17	3	
2-18	5	
2-19	5	
2-20	3	
	SECTION 3	
3-i	0	
3-ii	3	
3-1	5	
3-2	3	
3-3	5	
3-4	5	
3-5	0	
3-6	0	
3-7	5	
3-8	0	
3-9	5	
3-10	4	
3-11	4	

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LIST OF APPROVED EFFECTIVE PAGES (CONT'D)

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3-12	5	
3-13	5	
3-14	5	
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3-16	5	
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3-18	5	
3-19	5	
3-20	5	
3-21	0	
	SECTION 4	
4-i	5	
4-ii	0	
4-1	0	
4-2	5	
4-3	5	
4-3A	5	
4-3B	2	blank
4-4	5	
4-5	5	
4-6	5	
4-7	5	
4-8	5	
4-9	5	
4-10	5	
4-11	0	
4-12	5	
	SECTION 5	
5-i	5	
5-ii	5	
5-1	5	added
5-1A	4	added
5-1B	5	
5-2	4	
5-3	4	
5-4	5	
5-5	4	
5-6	3	
5-7	5	
5-8	5	
5-9	5	
5-10	4	
5-11	5	
5-12	5	

LOG OF APPROVED NORMAL REVISIONS

ORIGINAL	0	JUNE 1997
REVISION	1	SEPTEMBER 1997
REVISION	2	MARCH 1998
REVISION	3	JANUARY 1999
REVISION	4	SEPTEMBER 1999
REVISION	5	NOVEMBER 2001

NORMAL REVISION 5 APPROVED BY : DGAC

DATE : **21 NOV 2001**

I.C.T.
Mathieu HENRY

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RECORD OF APPROVED REVISIONS

Rev. No	Date Approved	Inserted		Rev. No	Date Approved	Inserted	
		Date	Initials			Date	Initials
5	21 NOV 01	FEB 06/02	JDK				

LIST OF EFFECTIVE PAGES REQUIRING NO APPROVAL

PAGE	REV No	REMARKS
B1	4	
B2	4	
D	4	
H	4	
I	5	
J	5	
K	5	
L	4	
N	5	
	SECTION 5	
5-13	5	added
5-14	5	added
5-15	5	added
5-16	5	added
5-17	5	added
5-18	5	added
	SECTION 6	
6-i	0	
6-ii	0	
6-1	0	
6-2	4	
6-3	5	
6-4	5	
6-5	0	
6-6	0	
6-7	0	
6-8	5	
6-9	5	
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7-8	1	
7-9	1	
7-10	1	
7-11	5	
7-12	5	
7-13	5	
7-14	5	
7-15	1	
7-16	5	
7-17	1	
7-18	5	
7-19	5	
7-20	1	
7-21	4	
7-22	5	
7-23	1	blank
7-24	1	

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7-25	3	
7-26	5	
7-27	5	
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7-29	5	
7-30	3	
7-31	3	
7-32	3	
7-33	1	
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8-9	2	
8-10	2	
8-11	2	
8-12	2	
8-13	2	
8-14	2	
8-15	2	
8-16	3	
8-17	2	
8-18	2	
8-19	5	
8-20	2	
8-21	2	
8-22	4	
8-23	2	
8-24	5	
8-25	5	
8-26	5	
8-27	5	
8-28	5	
8-29	5	
8-30	5	
8-31	5	
8-32	5	
8-33	5	
	SECTION 10	
10-i	5	
10-ii	5	added
10-1	2	
10-2	2	
10-3	2	
10-4	2	
10-5	2	
10-6	2	
10-7	2	
10-8	5	added
10-9	5	added
10-10	5	added
10-11	5	added
10-12	5	added
10-13	5	added

LOG OF NORMAL REVISIONS REQUIRING NO APPROVAL

ORIGINAL	0	JUNE 1997
REVISION	1	JANUARY 1998
REVISION	2	JULY 1998
REVISION	3	FEBRUARY 1999
REVISION	4	SEPTEMBER 1999
REVISION	5	NOVEMBER 2001

RECORD OF REVISIONS REQUIRING NO APPROVAL

Rev. No	Date	Inserted		Rev. No	Date	Inserted	
		Date	Initials			Date	Initials

CUSTOMIZATION

A/C : EC 120B – S/N :

LIST OF ADDITIONAL APPROVED PAGES

PAGE	REV N°	REMARKS	PAGE	REV N°	REMARKS

CUSTOMIZATION

A/C : EC 120B – S/N :

LIST OF ADDITIONAL APPROVED PAGES

PAGE	REV N°	REMARKS	PAGE	REV N°	REMARKS

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GENERAL

LIMITATIONS

EMERGENCY PROCEDURES 3

NORMAL PROCEDURES

PERFORMANCE DATA
(APPROVED PART / NON APPROVED PART)

WEIGHT AND BALANCE 6

SYSTEMS DESCRIPTION 7

HANDLING, SERVICING, MAINTENANCE 8

FLIGHT MANUAL SUPPLEMENTS
(SPECIAL OPERATIONS / OPTIONAL EQUIPMENT)

OPERATIONAL TIPS 10

APPENDIX 11

ORGANIZATION OF THE MANUAL

1 GENERAL

To achieve the required degree of safety, this manual must be used in conjunction with the relevant regulations covering aircraft operation, such as aerial navigation laws in the operator's country. It is essential for the crew to become familiar with the contents of this manual, special certification requirements and any information specific to customized configurations, and to check all revisions and related requirements.

2 PAGE NUMBERING

The numbering of pages within each section consists of the section number or designation, a dash and the consecutive number of the page beginning with "1"; e.g. for SECTION 3: 3-1, 3-2, etc.

Figures are likewise numbered consecutively by section, such as Fig. 3-1, Fig. 3-2, etc.

Exceptions :

- The numbering of the TABLE OF CONTENTS pages preceding each section in this manual consists of the section number, a dash and the consecutive roman numeral (lower case) of the page, beginning with "i"; e.g. for SECTION 3: 3-i, 3-ii, etc.
- The page numbers of the FLIGHT MANUAL SUPPLEMENTS (FMS) and APPENDICES consist of the section number, a dash, the number of the SUPPLEMENT/APPENDIX, a dash and the consecutive number of the page; e.g. for FMS 9-17 : 9-17-1, 9-17-2, etc.
- Figures within a FMS and APPENDIX are numbered consecutively, such as Fig. 1, Fig. 2, etc.

The number of a blank page within a page block is printed on the preceding or following page by using dual page numbering; e.g. 3-9/(3-10 blank) or (3-9 blank)/3-10.

If, at a later date, pages have to be added to the initial printing, the new pages may carry the number of the preceding page plus a letter suffix; e.g. 2-6A, 2-6B, etc.

3 FLIGHT MANUAL SUPPLEMENTS (FMS)

Information concerning optional equipment systems and operational procedures is covered by FMS.

Each FMS is self-contained and corresponds in its general arrangement to the basic FLIGHT MANUAL, but only additional information or different data will be the subject of an FMS.

Each FMS, although complete in nature, shall therefore be used in conjunction with the basic FLIGHT MANUAL.

A LOG OF SUPPLEMENTS is provided in SUPPLEMENT 9.0 as an index listing the current supplements.

The manufacturer retains the right to convert optional equipment to standard equipment at any time as a product improvement program. FLM coverage of the converted optional equipment, however, will remain as an FMS in SECTION 9 and also as an optional equipment item entry in the EQUIPMENT LIST.

4 REVISION SERVICE

This manual is kept up-to-date by normal revisions and intermediate temporary revisions.

4.1 REVISIONS

Normal revisions are issued periodically. They are printed on white paper and incorporated into the manual in accordance with a "CHANGE INSTRUCTIONS" sheet which does not need to be inserted in the manual. Revisions are numbered consecutively beginning with the No. 1.

4.2 INTERMEDIATE TEMPORARY REVISIONS (ITR)

ITRs are provided to transmit information between revisions. They are printed on yellow paper and are accompanied by an updated list of intermediate temporary revision effective pages.
The modified page is filed in the manual facing the existing page which is to be kept.

ITRs are identified by the number of the next normal revision and a letter suffix in normal alphabetical order. Several ITRs may be issued between two normal revisions. All ITRs are canceled when the normal revision bearing the same number is issued. If certain ITR provisions remain after the subsequent normal revision, they are confirmed by a new ITR with another identification code.

4.3 CONDITIONAL REVISIONS (RC)

The revised manual is issued on white pages and corresponds to the latest recommended standard.

The conditional revisions, corresponding to the previous standard, are issued on pink pages.

The list of pink pages corresponding to the modification applicable to the helicopter is given on white pages A1/A2 and/or 9-0-A1/9-0-A2.
This list of pink pages is subjected to approval and is updated by EUROCOPTER.

The list of valid conditional revisions that must remain in the FLM because the corresponding modification or SB has not been embodied to the aircraft, is given on pink pages B1/B2 and/or 9-0-B1/9-0-B2. This list of conditional revisions is not subjected to approval and must be updated by the user.

The conditional revisions must not be removed from the FLM until the modification or SB has been embodied to the aircraft.

When the user embodies/removes a modification or SB, the corresponding pages of the conditional revision (pink pages) must be removed from/incorporated in FLM. The list of valid conditional revisions (pages B1/B2 and/or 9-0-B1/9-0-B2) must be up-dated accordingly and validated by a visa.

From the present revision onward, at the delivery of the aircraft, the list of the valid modifications or SBs will be specified by EUROCOPTER on the pink pages B1/B2 and /or 9-0-B1/9-0-B2, according to the configuration of the aircraft delivered. The valid conditional revisions are those validated by the visas.

NOTE

The RC are unaffected by normal and intermediate temporary revisions or by customization.

4.4 IDENTIFYING REVISED MATERIAL

Changes (except as noted below) to the text and tables (including new material on added pages) are indicated by a vertical line in the outer margin.

Change symbols will not be shown for :

- Introductory material.
- Blank space resulting from the deletion of text, or an illustration or a part of an illustration, or table.
- Correction of minor inaccuracies, such as spelling, punctuation, relocation of material, etc., unless such correction changes the meaning of instructive information and procedures.

Changes to illustrations may be indicated by a miniature pointing hand. A vertical line next to changed text and call-outs on illustrations may be used in lieu of a pointing hand. Shading and screening may be used for diagrams and schematics to highlight the area containing the changed information. Extensively changed presentations may be indicated by a screen border around the affected area.

4.5 "ERRATUM" PROCEDURE

In the case of minor errors (typing errors, bad printing) likely to affect the understanding of the text, the "ERRATUM" procedure is used to make quick corrections between revisions.
In this case, the pages affected by the procedure are re-issued completely and the page number is underlined for identification.
These pages are summarized on an accompanying sheet which is not identified.

5 CUSTOMIZATION OF MANUAL (PRINTED ON GREEN PAPER)

Special features of a particular aircraft may justify the incorporation, on certain pages, of information differing from that of the basic manual and Supplements. These pages, printed on green paper, are filed in the manual over the corresponding white pages.

The information contained in the green pages supersedes or supplements the information covered by the relevant white page. No white page is deleted.

SECTION 1
GENERAL

Page

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1.2 MAIN AIRCRAFT DIMENSIONS ..... 1 - 2
1.3 DESCRIPTIVE DATA ..... 1 - 3
1.3.1 ENGINE ..... 1 - 3
1.3.2 ROTOR ..... 1 - 3
1.3.3 TAIL ROTOR ..... 1 - 3
1.3.4 FUEL ..... 1 - 3
1.3.5 OIL ..... 1 - 3
1.4 SYMBOLS AND ABBREVIATIONS ..... 1 - 4
1.5 CONVERSION FACTORS ..... 1 - 6
1.5.1 METRIC UNITS TO ANGLO-SAXON UNITS ..... 1 - 6
1.5.2 ANGLO-SAXON UNITS TO METRIC UNITS ..... 1 - 6

LIST OF FIGURES

Page

FIGURE 1-1 : THREE-VIEW DRAWING ..... 1 - 2

1.1 TERMINOLOGY

- Unless otherwise specified in the text, altitudes are pressure-altitudes.
- Warnings, Cautions and Notes are used throughout this manual to emphasize important and critical instructions and are used as follows:

WARNING

AN OPERATING PROCEDURE, PRACTICE, ETC., WHICH, IF NOT CORRECTLY FOLLOWED, COULD RESULT IN PERSONAL INJURY OR LOSS OF LIFE.

CAUTION

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

NOTE

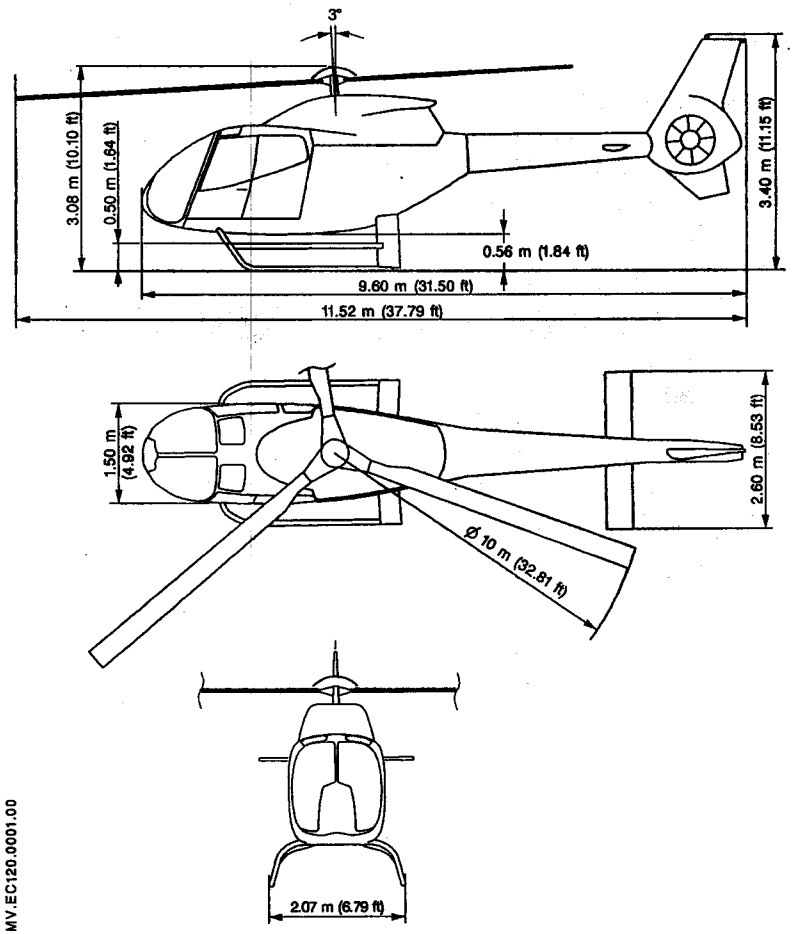
An operating procedure, condition, etc., which is essential to highlight.

USE OF PROCEDURAL WORDS

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

- "Shall" has been used only when application of a procedure is mandatory.
- "Should" has been used only when application of a procedure is recommended.
- "May" and "need not" have been used only when application of a procedure is optional.
- "Will" has been used only to indicate future event or action, never to indicate a mandatory procedure.

1.2 MAIN AIRCRAFT DIMENSIONS



NOTE

The values which vary according to weight are given at the maximum weight.

Figure 1-1 : three-view drawing

1.3 DESCRIPTIVE DATA

1.3.1 ENGINE

- Number : 1
- Manufacturer : TURBOMECA
- Model : ARRIUS
- Type : 2F

- Power with engine torque limit (ISA, at sea level) :
  - . Takeoff : 322 kW (432 SHP)
  - . Max. continuous : 322 kW (432 SHP)
- Power without engine torque limit (ISA at sea level):
  - . Takeoff : 376 kw (504 SHP)
  - . Max continuous : 335 kw (449 SHP)

1.3.2 ROTOR

- Type : SPHERIFLEX
- Number of blades : 3
- Diameter : 10 m (32.81 ft)
- Nominal rotor speed : 406 rpm

1.3.3 TAIL ROTOR

- Type : FENESTRON
- Diameter : 0.75 m (2.46 ft)
- Number of blades : 8
- Nominal tail rotor speed : 4567 rpm

1.3.4 FUEL

- Total capacity : 410.5 liters (326.3 kg) 108.5 US gal)
- Usable fuel : 406 liters (323 kg) (107.3 US gal)

1.3.5 OIL

- MGB oil capacity including filter : 4 l
- TGB oil capacity : 0.2 l
- Engine oil capacity : 2.5 l min. (0.66 US gal) : 4.6 l max. (1.22 US gal)

1.4 SYMBOLS AND ABBREVIATIONS

DESIGNATION	SYMBOL OR ABBREVIATION
SPEEDS	
Calibrated airspeed	CAS
Indicated airspeed	IAS
True airspeed	TAS
Never exceed speed	Vne
Best rate of climb speed	Vy
Rate of climb	R/C
METEOROLOGY	
International standard atmosphere	ISA
Outside air temperature	OAT
Outside air pressure	p
Relative air density	σ
Wind velocity	Vw
ALTITUDE / HEIGHT	
Geometric altitude	H
Pressure altitude	Hp
Density altitude	Hσ
Radio altimeter height	HRA
Height	h
POWER / ENGINE PARAMETERS	
Maximum continuous power	MCP
Maximum takeoff power (5 min.)	MTOP
Power	PWR
Engine power check	EPC
Rotor speed	NR
Engine generator speed	Ng
Engine generator deviation indication	ΔNg
Free turbine speed	Nf
Torque	Tq
Power turbine inlet temperature	T4
First limitation indicator	FLI

DESIGNATION	SYMBOL OR ABBREVIATION
HOVER / TAKEOFF / LANDING	
Hover in ground effect	HIGE
Hover out of ground effect	HOGE
WEIGHT AND BALANCE	
Center of gravity	CG
Empty weight	EW
Equipped empty weight	EEW
Operating empty weight	OEW
Useful load	UL
Payload	P/L
All-up weight	AUW
Maximum takeoff weight	MTOW
MISCELLANEOUS	
Automatic direction finder	ADF
Automatic flight control system	AFCS
Ancillary system unit	ASU
Battery contactor	BATC
Cockpit circuit breaker panel	CCBP
Caution and warning panel	CWP
Direct current	DC
Emergency locator transmitter	ELT
Electrical master box	EMB
Engine	ENG
Equivalent	≅
Essential contactor	ESSC
External power line contactor	EPLC
External power unit	EPU
Hall effect sensors	HECS
Generator line contactor	GLC
Global positioning system	GPS
High load contactor	HLC
Horizontal situation indicator	HSI
Height-Velocity	HV

DESIGNATION	SYMBOL OR ABBREVIATION
MISCELLANEOUS (cont'd)	
Intercommunication system	ICS
Light and ancillary control unit	LACU
Main gear box	MGB
Radio magnetic indicator	RMI
Shed bus contactor	SBC
Starting contactor	SC
To be defined	TBD
Tail gear box	TGB
Vehicle and engine management display	VEMD
Flight-related check	VLV

1.5 CONVERSION FACTORS

1.5.1 METRIC UNITS TO ANGLO-SAXON UNITS

1 cm	= 0.3937 in	cm - centimeter
1 m	= 3.2808 ft	m - meter
1 km	= 0.5400 NM	km - kilometer
1 l	= 0.2642 US gal	l - liter
1 l	= 0.2200 UK gal	l - liter
1 kg	= 2.2046 lb	kg - kilogram
1 bar	= 14.5040 psi	bar - bar

1.5.2 ANGLO-SAXON UNITS TO METRIC UNITS

1 in	= 2.5400 cm	in - inch
1 ft	= 0.3048 m	ft - foot
1 NM	= 1.8520 km	NM - nautical mile
1 US gal	= 3.7850 l	US gal - US gallon
1 UK gal	= 4.5460 l	UK gal - UK gallon
1 lb	= 0.4536 kg	lb - pound
1 psi	= 0.0689 bar	psi - pound per square inch
1.013 Hpa	= 29.92 in.hg	in.hg-inches of mercury

SECTION 2
LIMITATIONS

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FIGURE 2-1 : LONGITUDINAL CG CHART 2-2
FIGURE 2-2 : LATERAL CG CHART 2-3

Replace the paragraph 2.1 by the following paragraph :

2.1 GENERAL

The helicopter is approved in compliance with JAR part 27 issue 1.
The helicopter shall be operated in compliance with the limitations of this section.

2.1.1 TYPE OF OPERATION

The helicopter is approved to operate by day in VFR.
The following are forbidden :

- Night flight
- Flight in freezing rain.
- Flight in icing conditions.
- Aerobatics maneuvers.

(visible moisture and temperatures conducive to producing ice).

2.1.2 OCCUPANTS

The helicopter in its basic configuration is approved as a 5-seat rotorcraft.

Minimum crew : One pilot in right or left seat.

2.1.3 INSTRUMENT MARKINGS

Limitations are marked on instruments with the following color code:

Red		: Safety limit or takeoff limitation
Red with white hatching		: Vne, power off
Yellow or amber	or	: Caution range or takeoff rating range
Green		: Normal operating range
White mark	or	: Equipment operating limit
Red triangle		: Transient limit

MV.EC120.0085.01

CAUTION
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2.1 GENERAL

The helicopter is approved in compliance with JAR part 27 issue 1.
The helicopter shall be operated in compliance with the limitations of this section.

2.1.1 TYPE OF OPERATION

The helicopter is approved to operate :

- by day in VFR.
- by night in VFR, when the equipment required by operational regulations are installed and serviceable.

The following are forbidden :

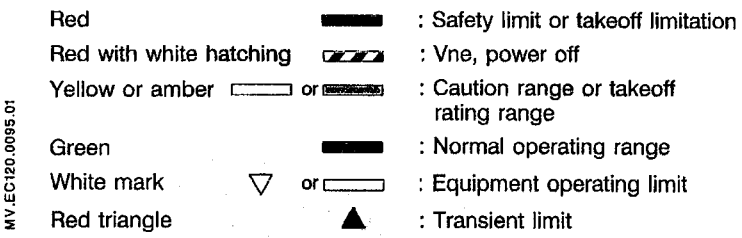
- Aerobatic maneuvers
- Flight in freezing rain.
- Flight in icing conditions
  (visible moisture and temperatures conducive to producing ice).

2.1.2 OCCUPANTS

- Minimum flight crew.....: One pilot in right or left seat.
- Maximum number of seats ..... : 5
  (including flight crew)

2.1.3 INSTRUMENT MARKINGS

Limitations are marked on instruments with the following color code:



On the VEMD, related numerical value of parameters underlined :
- in yellow when the parameter is in caution or takeoff range,
- in red when at or above safety limit or maximum takeoff power.

Moreover, to enforce safety, red underlining flashes.

2.2 WEIGHT AND BALANCE LIMITATIONS

2.2.1 WEIGHT LIMITATION

Maximum permissible weight in flight : 1715 kg (3780 lb)
Maximum permissible weight for IGE, takeoff and landing : 1715 kg (3780 lb).
Minimum permissible weight in flight : 1035 kg (2284 lb).

2.2.2 LONGITUDINAL CG

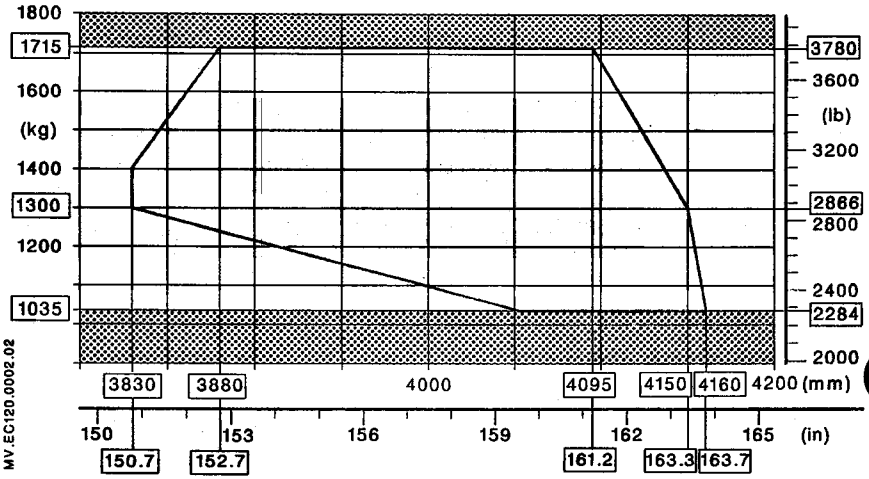


Figure 2-1 : Longitudinal CG Chart

NOTE

The datum is located 4 m forward of the main rotor head center line.

2.2.3 LATERAL CG

Maximum left CG : 0.09 m (3.54 in)
Maximum right CG : 0.08 m (3.15 in)

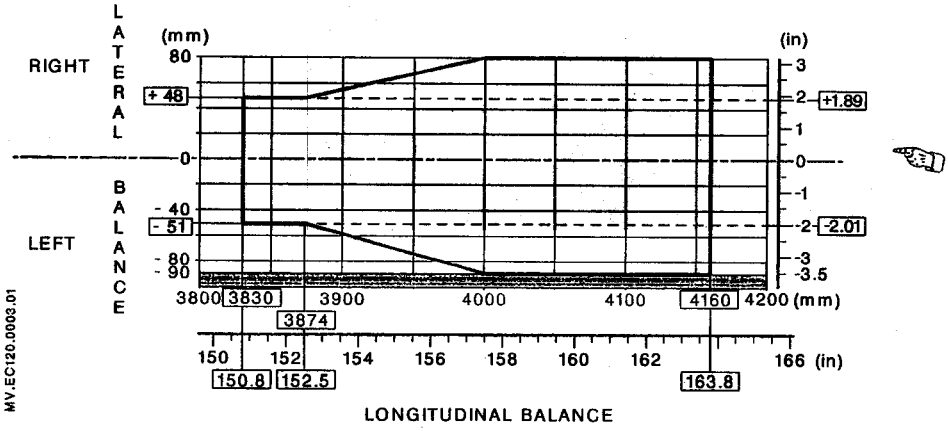


Figure 2-2 : Lateral CG Chart

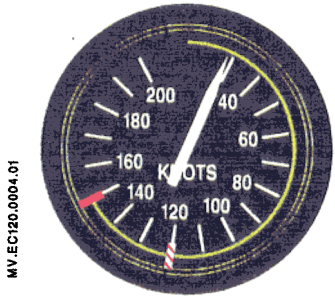
NOTE

The datum is located in the plane of symmetry of the helicopter.

2.3 FLIGHT ENVELOPE LIMITATIONS

2.3.1 AIRSPEED LIMITATIONS

- Doors closed



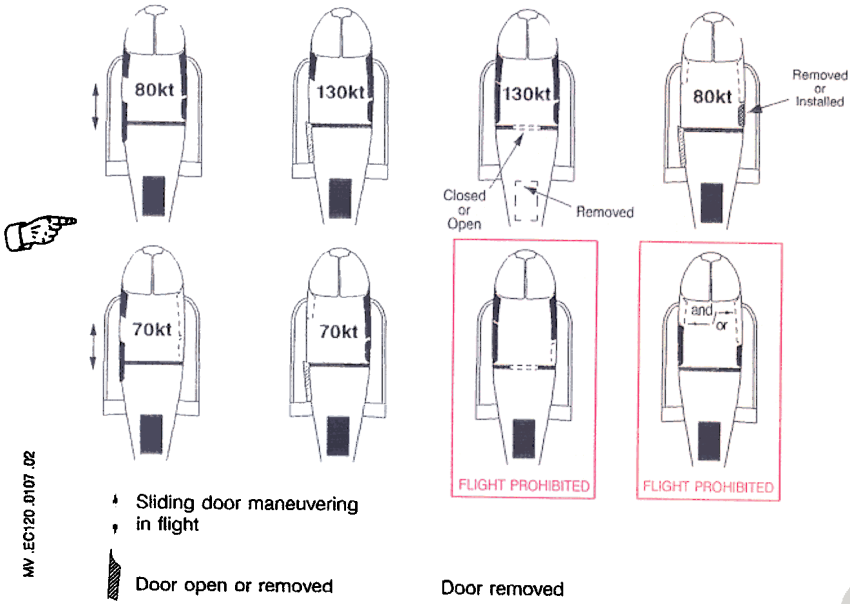
MV.EC120.0004.01

: Vne power off 120 kt at Hp = 0
less 3 kt / 1000 ft

Vne power on 150 kt at Hp = 0
less 3 kt / 1000 ft

- Doors open

The Vne to be taken into account is the lowest value given either on the drawing hereafter (adapted to the doors configuration) or in the above « doors closed » paragraph.



MV .EC120.0107 .02

Replace the paragraph 2.3.2 by the following paragraph :

2.3.2 ALTITUDE LIMITATION

Maximum operating altitude in flight	Hp = 20 000 ft
Maximum operating altitude for HIGE, takeoff and landing	Hp = 2 000 ft

CAUTION

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2.3.2 ALTITUDE LIMITATION

Maximum operating altitude in flight Hp = 20000 ft

2.3.3 TEMPERATURE LIMITATION

Minimum temperature : - 30°C
Maximum temperature : ISA + 35°C
limited to + 50°C

NOTE

The use at - 40°C ≤ OAT ≤ - 30°C forms the subject of the supplement 9 - 4 (see SECTION 9).

2.3.4 LANDING AND ROTOR STOPPING LIMITATIONS ON SLOPE

- Nose up.....: 10°
- Nose down.....: 6°
- Sideways.....: 8°

2.3.5 MANEUVERING LIMITATIONS

Maximum load factor is determined by the servo-control reversibility limit. This phenomenon is smooth and presents no danger.
Maximum load factor is a combination of TAS / Hσ / Weight.
This servocontrol reversibility limit may be reached in a turn or in a pull-up or when maneuvering near VNE. In this case reduce collective pitch and airspeed.

2.4 VEHICLE LIMITATIONS

2.4.1 MAIN ROTOR LIMITATIONS

It is prohibited to use the rotor brake prior to engine shutdown. Minimum time between two consecutive brakings : 5 min.

△ : 150 rpm Rotor brake operation max. speed

: 340 rpm Minimum power-off

: 340 to 390 rpm Caution range

: 390 to 415 Normal operating range

: 415 to 447 rpm Caution range

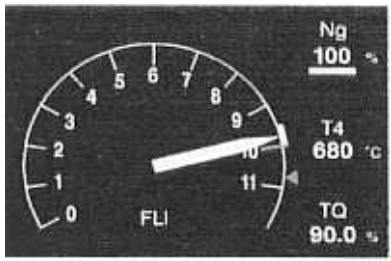
: 447 rpm Maximum power-off

NOTE

Low NR aural warning ≤ 370 rpm

High NR aural warning ≥ 420 rpm

2.4.2 FIRST LIMITATION INSTRUMENT



MV_EC120_00006.02

9.6 Max. continuous rating

9.6 to 10 Takeoff rating range

10 Max. takeoff rating

▲ : 10.8 Max. transient rating

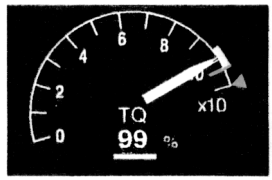
NOTE

The values (Ng = 100%, T4 = 680°C, Tq = 90%) are given as examples.

Use of P2 air bleeds is forbidden above the maximum continuous rating (Ng or T4).

2.4.3 MAIN TRANSMISSION LIMITATIONS

- TORQUE LIMITATIONS



MV_EC120_00007.02

97 % Max. continuous rating

: 97 % to 103 % Takeoff rating torque range

: 103 % Max. takeoff rating torque with IAS< Vy

▲ : 110 % Max. transient rating

NOTE

In hover flight, maximum takeoff torque has no time limit.

2.4.4 ENGINE LIMITATIONS

- STARTER LIMITATIONS
  Starter shall not be energized more than 3 consecutive times. After the 3rd attempt wait 30 minutes.

- Nf LIMITATIONS

:C120.0008.

365 rpm Minimum
365 to 373 rpm Caution range (5 s)
373 to 422 rpm Normal operating range
422 rpm Maximum continuous
447 rpm Transient limit (5 s)

- Ng LIMITATIONS

MV.EC120.0009.01

Ng 63 % : Minimum stabilized speed
Δ Ng = -1,5 % Max. continuous rating (Ng = 99,5 %, Hp = 0, ISA)
: Δ Ng = -1,5 % à 0 % Takeoff power rating range
: Δ Ng = 0 % Maximum takeoff rating (Ng = 101 %, Hp = 0, ISA)
: Δ Ng = +2.6% Max. transient rating (5 s) (Ng = 103,6 %, Hp = 0, ISA)

- T4 LIMITATIONS

Starting limitations

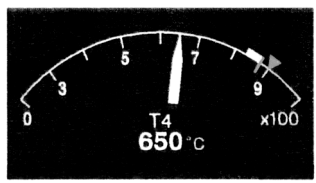
MV.EC120.0010.01

: 800 °C Maximum continuous

▲ : 870 °C Transient (5 s)

Flight limitations

MV.EC120.0011.01



830 °C Max. continuous rating

830 °C to 870 °C Takeoff rating range

870 °C Max. takeoff rating

▲ 900 °C Max. transient rating (5 s)

- OIL TEMPERATURE LIMITATIONS

MV.EC120.0012.01

-10 °C to +10 °C Caution range

110 °C Maximum temperature

Minimum oil temperature before power application :
0°C (Oil 3 cSt) or 10°C (Oil 5 cSt)

- OIL PRESSURE LIMITATIONS

MV.EC120.0013.02

1.7 bar (24.66 psi) minimum for Ng ⩾ 70 %

: 15 bar Maximum pressure

2.4.5 GENERATOR LOAD LIMITATIONS

Maximum continuous : 150 A

Maximum transient : 240 A (2 min.)

2.4.6 BATTERY TEMPERATURE LIMITATION

Caution temperature : 60 °C

Maximum temperature : 75 °C

2.5 MISCELLANEOUS LIMITATIONS

2.5.1 APPROVED FUEL

- NORMAL FUELS

USE FOR: - 30°C ≤ OAT ≤ + 50°C					
Type of fuel	NATO code	Spécifications			Anti-ice additive included
		FRANCE	USA	UK	
Kerosene - 50 (AVTUR-FSII) JP8)	F 34	AIR 3405 F 34	MIL-T-83133 (JP8)	D.ENG. RD 2453	Yes
Kerosene - 50 (AVTUR) (JP1)	F 35	AIR 3405 F 35	ASTM-D-1655 JET A1	D.ENG.RD 2494	No
Kerosene	—	—	ASTM-D-1655 JET A	—	No
Hight flash point (JP5) (AVCAT)	F 43	AIR 3404 F 43	—	D.ENG. RD 2498	No
Hight flash point (JP5) (AVCAT SII)	F 44	AIR 3404 F 44	MIL-T-5624 (JP5)	D.ENG.RD 2452	Yes

- REPLACEMENT FUELS

USE FOR: - 30°C ≤ OAT ≤ + 30°C AND FOR Hp ≤ 9842ft (3000 m) ONLY					
Type of fuel	**NATO code**	**Specifications**			**Anti-ice additive included**
		FRANCE	**USA**	**UK**	
Wide cut (AVTAG FSII) (JP 4)	F 40	AIR 3407	MIL-T-5624 (JP 4)	D.ENG. RD 2454	Yes
Wide cut	—	—	ASTM-D-1655 (JET B)	—	No

NOTE 1

The use of an anti-icing additive is compulsory for OAT ≤ + 0°C and for all approved fuels.

NOTE 2

All specifications are effective at latest issue or amendment for all approved fuels.

- ADDITIVES

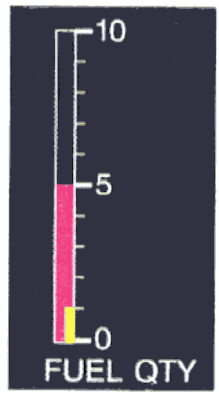
Anti-ice additive : If the fuel does not contain a freezing inhibitor and if the OAT is below or equal to 0°C, the use of an anti-icing additive is compulsory. The additive shall comply with French specification AIR 3652 (equivalent to : MIL-I 27686, D-ENG-RD 2451,S 748, PHILLIPS PFA/55 MB).

NOTE

Concentration shall be between 0.10 % and 0.15 % by volume.

Anti-static additive : SHELL ASA 3, maximum concentration 0.0001 % by volume.

- FUEL GAUGE



MV_EC120.0014.01

: 15 min of flight time remains at MCP

NOTE

10 = 406 litres (323 kg) (107.3 US gal) = usable fuel quantity.

The unusable fuel quantity is reached when zero is indicated on the fuel gauge.

2.5.2 APPROVED LUBRICANTS

- ENGINE LUBRICANTS

NORMAL USE (- 30°C ≤ OAT ≤ + 50°C)					
Oil type	NATO Code	Specification			Approved oil grades
		FRENCH	USA	UK	
Synthetic 5 cSt at 98.9° C	0.156	-	MIL-L-23699	-	AEROSHELL OIL/500/560 CASTROL/5000/AEROJET 5 ELF TURBOJET II ESSO TURBO OIL/II/2380/2197 MOBIL JET OIL/II/254/291 TURBONYCOIL 600

OTHER OILS (- 30°C ≤ OAT ≤ + 30°C)					
Oil type	NATO code	Specification			Approved oil grades
		FRENCH	USA	UK	
Synthetic 3 to 3.5 cSt at 98.9° C	0.148	-	MIL-L-7808	-	ESSO TURBO OIL 2389 MOBIL OIL AVREX 256 TURBONYCOIL 160
	0.150	AIR 3514	-	-	ELF JET SYNTHETIC OIL 15 TOTAL AERO TURBINE 312 TURBONYCOIL 13B
Synthetic 3.9 cSt at 98.9° C	-	-	-	DEF STAN 91-94	AEROSHELL TURBINE OIL 390

NOTE 1

When the oil specification or grade differs from the approved one, the engine manufacturer's approval shall be obtained before using this oil.

NOTE 2

In the event of a change in oil grade or specification, the oil system shall be flushed as prescribed in TURBOMECA Maintenance Manual.

NOTE 3

All specifications are effective at latest issue or amendment.

- MAIN GEARBOX LUBRICANTS

NORMAL USE (- 25°C ≤ OAT ≤ + 50°C)					
Oil type	NATO Code	Spécifications			Approved lubricants
		FRANCE	USA	UK	
Mineral	0.155	AIR 3525	MIL-L-6086		ESSO GEAR OIL MEDIUM NYCOLUBE 3525 TOTAL AEROGEAR 823
THE « SHELL » TRADEMARK IS PROHIBITED					

COLD WEATHER USE (- 30°C ≤ OAT ≤ + 0°C)					
Oil type	NATO Code	Specifications			Approved lubricants
		FRANCE	USA	UK	
Synthétic	0.148	AIR 3513	MIL-L-7808		ESSO TURBO OIL 2389 MOBIL OIL AVREX 256 TURBONYCOIL 160
	0.150	AIR 3514			ELF JET SYNTHETIC OIL 15 TOTAL AERO TURBINE 312 TURBONYCOIL 13B

- TAIL GEARBOX LUBRICANTS
  Same as MGB.

- SERVO CONTROL LUBRICANT

Hydraulic fluid NATO H 537 or MIL-H-83282

2.5.3 ANTICRASH SYSTEM ON REAR SEATS

When the rear seats are unoccupied, check that unused safety belts are not fastened and the button on the shoulder straps is not visible.

2.5.4 BAGGAGE COMPARTMENT LOAD LIMITATIONS

Maximum unit load : 300 kg/m2 (62.5 pounds/sq feet)

2.5.5 CABIN COMPARTMENT LOAD LIMITATIONS

Maximum unit load : 300 kg/m2 (62.5 pounds/sq feet)

2.5.6 MANDATORY MINIMUM EQUIPMENT

A minimum of two adequate radio / ICS audio headsets shall be onboard the helicopter, one worn by the pilot at the controls and one in stand-by to monitor the audio warnings delivered through the ICS system.

2.5.7 OPTIONAL EQUIPMENT

When optional equipment is installed, refer to supplements (SECTION 9) for additional limitations, procedures and performance data.

2.6 PLACARDS

V.N.E. POWER ON	
HP (ft)	Vi (kts)
0	150
2 000	144
4 000	138
6 000	132
8 000	126
10 000	120
12 000	114
14 000	108
16 000	102
18 000	96
20 000	90
* V.N.E. POWER OFF : LESS 30 kts	

MV.EC120.0094.00

Location : Inside cabin, on center post, above standby compass.

Replace the VNE placard by the following:

V.N.E. ↓ HP		POWER ON
0		150
1000		147
2000		144
3000		141
4000		138
5000		135
6000		132
7000		129
8000		126
9000		123
10000		120
11000		117
12000		114
13000		111
14000		108
15000		105
16000		102
17000		99
18000		96
19000		93
20000		90
*V.N.E POWER OFF : LESS 30 KTS		

Location : Inside cabin, instrument panel RH side.

CAUTION
THIS PAGE MUST NOT BE REMOVED FROM THE MANUAL UNTIL MODIFICATION SB N° 34.001 HAS BEEN EMBODIED TO THE AIRCRAFT.

Replace the page 2–15 by the following page:

Placard :

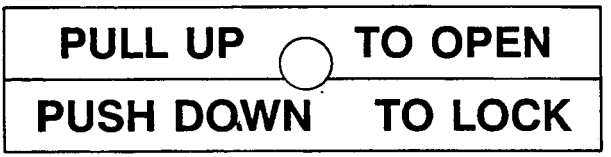
MV.EC120.0067.00

THE HELICOPTER IS APPROVED TO OPERATE BY DAY IN VFR.
THE MARKINGS AND PLACARDS INSTALLED ON THIS HELICOPTER CONTAIN OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH WHEN OPERATING THIS ROTORCRAFT. OTHER OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH WHEN OPERATING THIS ROTORCRAFT ARE CONTAINED IN THE ROTORCRAFT FLIGHT MANUAL. THE "AIRWORTHINESS LIMITATIONS" SECTION OF THE ROTORCRAFT MAINTENANCE MANUAL MUST BE COMPLIED WITH.

Location : Inside cabin, aft of overhead control quadrant.

Placard :

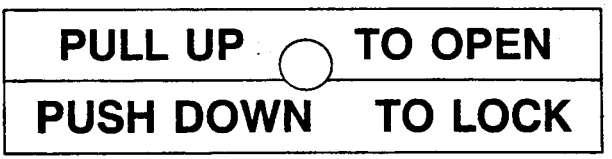
MV.EC120.0068.00



Location : Inside RH door

Placard :

MV.EC120.0068.00



Location : Inside LH door

CAUTION
THIS PAGE MUST NOT BE REMOVED FROM THE MANUAL UNTIL MODIFICATION SB N° 34.001 HAS BEEN EMBODIED TO THE AIRCRAFT.

Placard :

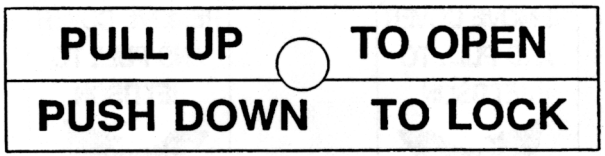
MV.EC120.0067.01

THE HELICOPTER IS APPROVED TO OPERATE BY DAY AND NIGHT IN VFR.
THE MARKINGS AND PLACARDS INSTALLED ON THIS HELICOPTER CONTAIN OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH WHEN OPERATING THIS ROTORCRAFT. OTHER OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH WHEN OPERATING THIS ROTORCRAFT ARE CONTAINED IN THE ROTORCRAFT FLIGHT MANUAL. THE "AIRWORTHINESS LIMITATIONS" SECTION OF THE ROTORCRAFT MAINTENANCE MANUAL MUST BE COMPLIED WITH.

Location : Inside cabin, aft of overhead control quadrant.

Placard :

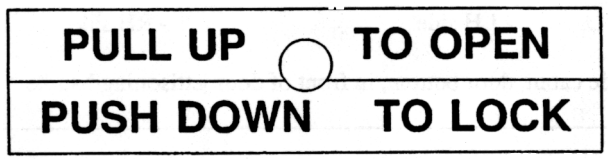
MV.EC120.0068.00



Location : Inside RH door

Placard :

MV.EC120.0068.00



Location : Inside LH door

Placard :

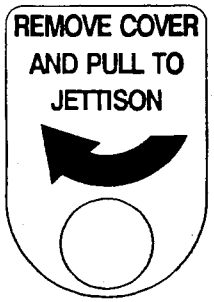
MV.EC120.0068.00

PULL UP ○ TO OPEN
PUSH DOWN TO LOCK

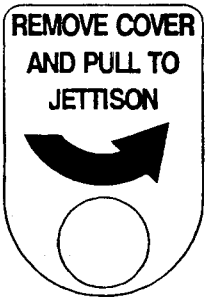
Location : Sliding door, inside LH side.

Placard :

MV.EC120.0072.00



- LH side



- RH side.

Location : Inside cabin, door bottom, in front of door jettisoning handle

---

Placard :

MV.EC120.0060.00

DO NOT STOW ANYTHING
UNDER ALL THE SEATS

Location : - RH forward seat, at bottom RH side;
- LH forward seat, at bottom LH side ; Bench seat, LH side.

Placard :

MV.EC120.0061.00

A/C SERIAL N°:
WEIGHT :
C. OF G. :
DATE :

Location : Console RH side.

Placard :

MV.EC120.0062.01

DISTRIBUTED LOADS MAXI
ON FLOOR
62.5 POUNDS/SQ FEET - 300 kg/m²

MAX WEIGHT 970 lb - 441 kg

Location : Console LH side, cargo hold, RH side.

Placard :

MV.EC120.0063.00

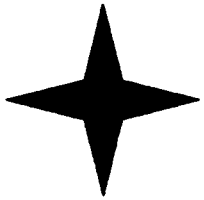
COMPASS
AIRCRAFT
DATE

HEADING MAGNETIC	CORRECTED
000	
045	
090	
135	
180	
225	
270	
315	

Location : Inside cabin, on center post, under standby compass.

Placard :

MV.EC120.0064.00



Location : LH filler neck, LH side.

Placard :

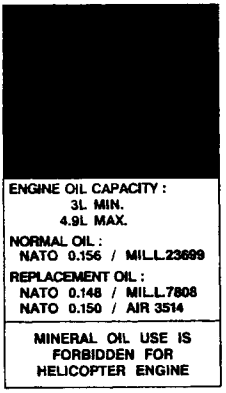
MV.EC120.0065.01

CARBURANT :	JP1-JP4-JP5-JP8 JET A1-JET A-JET B
FUEL :	F34-F35-F40-F43-F44
CAPACITE / CAPACITY :	
108,5	U.S. GALLONS
90,4	IMP. GALLONS
410,5	LITRES / LITERS
326,3	KG

Location : RH of filler neck, LH side.

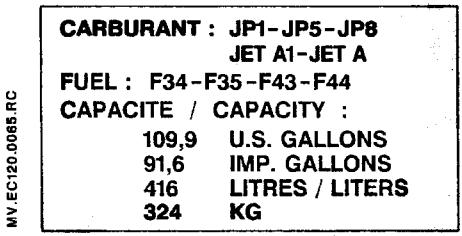
Placard :

MV.EC120.0066.00



Location : RH of engine oil filler cap.

Replace Fuel placard by the following :



NOTE

The total fuel capacities to be taken into account are those shown in page 1 - 3.

CAUTION

THIS PAGE MUST NOT BE REMOVED FROM THE FLIGHT MANUAL UNTIL MODIFICATION SB N° 28 007 HAS BEEN EMBODIED TO THE AIRCRAFT.

Placard :

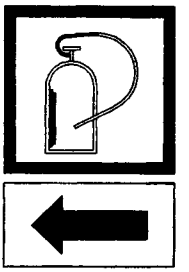
MV.EC120.0073.01

OIL AIR 3525 0.155	or	OIL AIR 3513 0.148	or	OIL AIR 3514 0.150

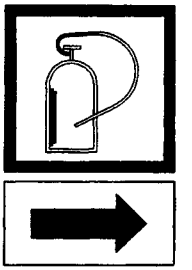
Location : Near TGB and MGB filler neck RH side.

Placard :

MV.EC120.0074.00



RH side

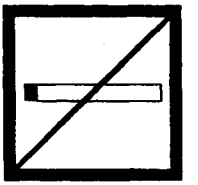


LH side.

Location : Inside cabin, on console lateral side

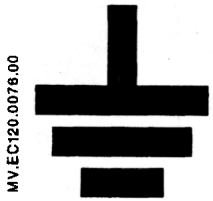
Placard :

MV.EC120.0075.00



Location : Inside cabin, near reading light.

Placard :



Location : LH side of aircraft, above grounding point.

Placard (If fitted)

Location : RH side, on ground power receptacle cover.

SECTION 3
EMERGENCY PROCEDURES

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3.1 GENERAL

Emergency procedures describe the actions that the pilot must take relative to the various possible failures that can occur.
Meanwhile, depending on the many variable external environment, such as the type of terrain flown over, the pilot may have to adapt to the situation according to his experience.
To help the pilot in his decision process, four recommendations are used :

. **LAND IMMEDIATELY**
Self explanatory.

· LAND AS SOON AS POSSIBLE
Emergency conditions are urgent and require landing at the nearest landing site at which a safe landing can be made.

. **LAND AS SOON AS PRACTICABLE**
Emergency conditions are less urgent and in the pilot's judgement, he may proceed to the nearest airfield where he can expect appropriate assistance.

. CONTINUE FLIGHT
Continue flight as planned. Repair at the destination according to the maintenance manual.

NOTE

Immediate actions that the pilot shall take are written in bold characters.

3.1.1 AUDIO WARNINGS

On the LACU, a pushbutton is used to activate the audio warning.
When pressed in, the HORN light on the warning panel goes out.

NOTE

The pilot at the controls shall wear an adequate radio / ICS audio headset to monitor the audio warnings delivered through the ICS system.

- GONG
  A gong is generated each time a red warning appears on the warning panel.

- CONTINUOUS TONE
  Two continuous tone can be heard :
  - When NR is below 370 rpm (310 Hz tone).
  - When maximum take-off limitations are exceeded for more than 1,5 seconds (285 Hz tone).

  1. Collective pitch.....REDUCE to maintain NR in green arc or power within limitations
  2. Engine parameters.....CHECK

- INTERMITTENT TONE
  An intermittent tone (310 Hz) is heard when the NR is above 420 rpm.
  Collective pitch.....INCREASE to maintain NR in green arc

Apply applicable procedure according to the situation.

3.2 ENGINE FLAME-OUT

3.2.1 CRUISE FLIGHT

AUTOROTATION PROCEDURE OVER LAND

1. Collective pitch ..... REDUCE
to maintain NR in green arc.

2. IAS..... Vy
3. Twist Grip..... SHUT OFF position
4. Maneuver the aircraft into the wind on final approach.

- At height ≅ 70 ft

5. Cyclic..... FLARE

- At 20 - 25 ft and at constant attitude

6. Collective pitch..... GRADUALLY INCREASE
to reduce the rate of descent and forward speed.
7. Cyclic..... FORWARD slightly
to adopt landing attitude.
8. Pedal ..... ADJUST
to cancel any side-slip tendency.

9. Collective pitch ..... INCREASE
to cushion touch-down.

- After touch-down

10. Cyclic, collective, pedal ..... ADJUST
to control ground run.

- Once the aircraft has stopped

11. Collective pitch ..... FULLY DOWN
12. Rotor brake ..... APPLY below 150 rpm.

AUTOROTATION PROCEDURE OVER WATER

Apply same procedure as over land, except items 10, 11 and 12, but maneuver to head the aircraft equally between the wind and wave direction on final approach. Ditch with minimum forward and vertical speed. Then apply following check list for items 10, 11 and 12.

- At touch-down

10. Collective pitch ..... MAINTAIN
11. Door emergency handles ..... PULL-UP
12. Rotor brake ..... APPLY
Evacuate aircraft once the rotor has stopped.

RELIGHTING

When Ng is less than 10%, according to available height and cause of flame-out, try to relight using starting procedure. At least 1000 ft are necessary to complete restarting procedure after flame-out.

3.2.2 HOVER-IGE

1. Collective ..... MAINTAIN
2. Pedals ..... CONTROL YAW
3. Collective ..... INCREASE as needed to cushion touch-down.

3.2.3 HOVER-OGE

1. Collective pitch ..... FULLY DOWN

- When NR stops decreasing

2. Cyclic ..... FORWARD
to gain airspeed according to available height.

3. Autorotation procedure ..... APPLY

[redacted]

SAFE AUTOROTATIVE LANDING CAN NOT BE WARRANTED IN CASE OF A FAILURE IN HOGE BELOW THE TOP POINT OF THE HV DIAGRAM (REFER TO SECTION 5).

3.3 ENGINE GOVERNOR FAILURE

Engine governor failure leads either to NR drop, or to NR increase.

3.3.1 NR DROP

- IN CRUISE FLIGHT
  Simultaneously to maintain NR in green arc:
  1. Collective ..... REDUCE
  2. Twist grip ..... CHECK in Flight Position

YES ← NO

Autorotation Procedure ..... APPLY

1. Twist grip ..... FLIGHT POSITION
2. Collective ..... INCREASE When Ng ≥ 70%

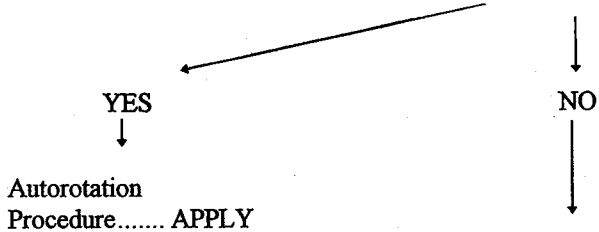
- HOVER-IGE

LAND IMMEDIATELY

1. Collective ..... MAINTAIN
2. Yaw ..... CONTROL
3. Collective ..... INCREASE to cushion touch-down

- HOVER-OGE

Simultaneously
1. Collective ..... FULLY DOWN
2. Twist grip ..... CHECK <u>in Flight Position</u>



Autorotation
Procedure..... APPLY

1. Twist grip....FLIGHT POSITION
2. Collective....INCREASE When Ng ≥ 70%

3.3.2 NR INCREASE

Simultaneously to maintain NR in green arc :
1. Collective ..... INCREASE
2. Twist Grip ..... SLIGHTLY REDUCE
LAND AS SOON AS POSSIBLE

NOTE
During flight, the pilot shall control NR using the twist grip.

APPROACH AND LANDING

Initiate a shallow approach at Vy.
On final approach reduce speed slowly and adjust collective pitch to set torque at around 30%.
Reduce forward speed and increase collective to cushion landing at low speed (ground speed below 10 kt).
After touch down, reduce throttle before lowering collective pitch.

3.4 TAIL ROTOR CONTROL FAILURE

Symptom : the helicopter will yaw to the left with a rotational speed depending on the amount of power and the forward speed set at the time of the failure.

3.4.1 HOVER-IGE

LAND IMMEDIATELY

1. Twist Grip ..... **IDLE STOP POSITION**
2. Collective ..... **INCREASE** to cushion touch-down

3.4.2 HOVER-OGE

Simultaneously

1. Collective ..... **REDUCE depending on available height**
2. Cyclic ..... **FORWARD to gain speed**
3. Cyclic ..... ADJUST to set IAS to Vy and control yaw

LAND AS SOON AS POSSIBLE
Carry out an autorotative landing

3.4.3 IN CRUISE FLIGHT

1. Cyclic ..... ADJUST to set IAS to Vy and control yaw
2. Collective ..... REDUCE to maintain flight level

LAND AS SOON AS POSSIBLE
APPROACH AND LANDING
Carry out an autorotative landing.

3.5 SMOKE IN THE COCKPIT/CARGO

3.5.1 SOURCE NOT IDENTIFIED

Heating, Demisting..... OFF

smoke cleared

YES

CONTINUE FLIGHT
depending on weather conditions

NO

1. Battery.....OFF
2. Generator .....OFF
3. Ventilate the cabin

When smoke clears
All Consumers .....OFF
1. Battery.....ON check DC voltage
2. Generator .....ON check DC voltage

If all is normal
All Consumers .....ON one by one to identify the failed system; then keep it off.

CAUTION

When battery and generator are off line the VEMD goes out and only the analog NR remains. Apply both screen failure procedure (§ VEMD SCREEN FAILURE - SECTION 3).

3.5.2 SOURCE IDENTIFIED

1. Corresponding system..... OFF
2. Ventilate the cabin

3.6 VEMD FAILURE

3.6.1 VEMD SCREEN FAILURE

- **Failure of one screen**

Failed Screen ..... OFF.
Read all information on the other screen.
All information is available using the SCROLL pushbutton either on the VEMD or on the collective pitch lever.

- **Failure of both screens**

Can be a single failure when battery and DC generator are in "OFF" position (fire and smoke detection procedure).
Set maximum power to establish level straight flight with the following law :

IAS kt = 100 kt at sea level - (2 kt / 1000 ft)

For landing carry out a no hover landing.

3.6.2 CAUTION MESSAGES ON VEMD

When a parameter is off line, the parameter value is not displayed on the VEMD upper screen and the parameter scale symbology is displayed in yellow. Caution messages are self explanatory and the pilot shall comply with the action requested. If no light is lit on the caution and warning panel, no other action is required from the pilot.

- LANE 1 (or 2) FAILED
  ---> PRESS OFF 1 (or 2) : Self explanatory
- VEH PARAM OVER LIMIT : Vehicle parameter over limit
  ENG PARAM OVER LIMIT : Engine parameter over limit

These messages appear when a parameter usually displayed on this page reaches a limitation, as the relevant (vehicle or engine) pages are not displayed.
- SCROLL ..... : DEPRESS to reach the relevant page and check the parameter.

- CROSS TALK FAILED
  ---> PRESS OFF 2 : Self explanatory
- BRT CNTRL FAILED : Brightness control has failed
- FLI FAILED
  ---> CHECK PARAM : One parameter (Ng, T4, torque) is not consistent

  - Parameter consistancy .....: CHECKED
  - Relevant procedures in § ABNORMAL ENGINE PARAMETER INDICATION (SECTION 3) .....: APPLY

- GENE PARAM OVER LIMIT : Generator parameter over limit

  BAT PARAM OVER LIMIT : Battery parameter over limit

These messages appear when the relevant parameter is not displayed on the vehicle page and when a limitation is reached.

- [V/A SEL] LACU pushbutton .....: ACTUATE

- BAT.T : This message appears when battery temperature is off line.

3.6.3 ABNORMAL NR/Nf INDICATION

- **NR Indication Failure**

Maintain the torque above 20%.

LAND AS SOON AS PRACTICABLE

- **Nf Indication Failure**

CONTINUE FLIGHT
Avoid abrupt collective reduction.

NOTE

Failure of the NR/Nf indicator DC power supply switches off the Nf indication and the digital NR indication.
After the failure of the Nf indicator, the FLI is replaced by the 3 data symbology (Ng/ΔNg, t4 and torque) and a failure message is displayed.

3.6.4 ABNORMAL ENGINE PARAMETER INDICATION

- **Engine Oil Temperature Over 110° C**

Set IAS to Vy kt, temperature reduces,

YES → **LAND AS SOON AS PRACTICABLE**

NO → LAND AS SOON AS POSSIBLE

- **Loss of OAT, Ng, Torque or t4 parameters**

When a parameter is off line, the parameter value is not displayed on the VEMD upper screen and the parameter scale symbology (if applicable) is displayed in yellow.
The FLI is replaced by the 3-data symbology (Ng/ΔNg, t4 and torque) and a failure message is displayed.

CONTINUE FLIGHT

– **OAT Indicator Failure**

OAT : appears in lower right corner of upper screen when OAT is off line with ΔNg gauge in yellow.

Respect the maximum Ng values given below :

- Maximum tacke off power (MTOP) Ng = 100 %
- Maximum continuous power (MCP) Ng = 98.5 %

– **Ng Indicator Failure**

Respect the maximum t4 values below :

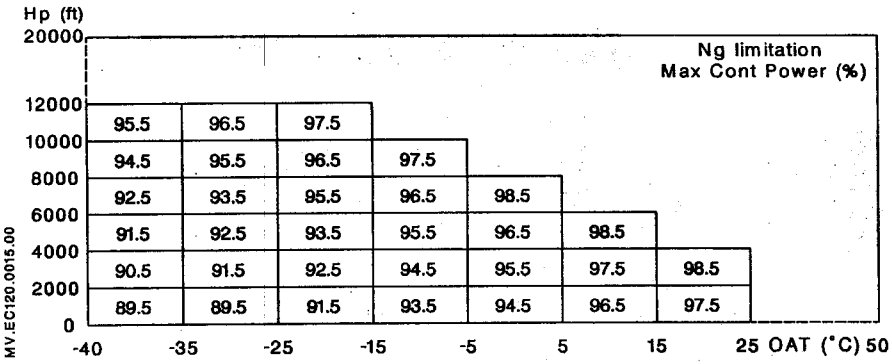
- OAT > - 10°C t4 limited to 760°C
- OAT < - 10°C t4 limited to 750°C

NOTE

t4 limitations displayed are starting limitations

– **Torquemeter Failure**

Respect the Ng given in the *following table :*



– **t4 Indicator Failure**

Respect Ng and torque limitations.
Do not try to start the engine.

3.7 CAUTION AND WARNING PANEL

3.7.1 ENGINE EMERGENCY

WARNING PANEL	CORRECTIVE ACTIONS
ENG FIRE Fire in engine bay	• **At start-up :** **1. Twist grip..... SHUT-OFF position** **2. Emergency fuel shut-off handle..... AFT** 3. Booster pump..... OFF 4. Crank pushbutton..... DEPRESS (10 s) 5. Battery pushbutton..... OFF 6. Rotor brake ..... APPLY (≤ 150 rpm) 7. Evacuate aircraft and fight fire from outside. • **Hover, Takeoff, Final :** LAND IMMEDIATELY Carry out a no hover powered landing then, after landing, apply same procedure as above. • **In Flight :** LAND IMMEDIATELY **1. Collective pitch..... REDUCE** **2. IAS..... Vy** **3. Twist grip..... SHUT-OFF position** **4. Emergency fuel shut-off handle..... AFT** 5. Autorotation procedure..... APPLY • **When on ground :** 6. Battery pushbutton..... OFF 7. Rotor brake ..... APPLY (≤ 150 rpm) 8. Evacuate aircraft and fight fire from outside.

WARNING PANEL	CORRECTIVE ACTIONS
ENG P Engine oil pressure < 1,7 bar.	Oil pressure..... CHECK LOW OR NIL → 1. Autorotation Procedure..... APPLY → **LAND IMMEDIATELY** NORMAL → **LAND AS SOON AS PRACTICABLE**
TWT GRIP Twist grip outside flight position	**Twist grip .....INCREASE to flight position**
ENG CHIP Metal particles in engine oil circuit.	LAND AS SOON AS POSSIBLE Execute a minimum power approach landing and be prepared in case of an engine flame-out.

3.7.2 TRANSMISSION EMERGENCY

WARNING PANEL	CORRECTIVE ACTIONS
MGB P Main Gear Box low oil pressure	**Set Torque < 45%** LAND AS SOON AS POSSIBLE [redacted] **AT LOW POWER (Tq < 45%) MAXIMUM 30 MN OF FLIGHT TIME REMAINS**
MGB TEMP Main Gear Box oil overheating	IAS ..... SET TO Vy MGB TEMP (Goes out) → **LAND AS SOON AS PRACTICABLE** MGB TEMP (Remains on) → LAND AS SOON AS AS POSSIBLE
GB CHIP Metal particles in MGB or TGB oil circuit.	LAND AS SOON AS POSSIBLE

3.7.3 HYDRAULIC EMERGENCY

WARNING PANEL	CORRECTIVE ACTIONS
HYDR Hydraulic pressure < 20 bar	**NOTE** **Pressure in accumulator allows enough time to secure the flight.** • On ground : **1. Collective ..... LOCK** 2. HYD switch (on Collective lever) ..... OFF CAUTION If not locked, the collective pitch will pull up when HYD switch is in "OFF" position. • In flight : Simultaneously **1. Collective ..... REDUCE** **2. Cyclic ..... SET IAS at Vy** 3. HYD switch (on Collective lever) ..... OFF. To counter effort 4. Cyclic ..... PUSH FORWARD 5. Collective ..... ADJUST CAUTION If HYD switch is not switched off on the collective lever, collective pitch may increase. **NOTE** **Efforts increase with speed.** Approach : perform a shallow approach and terminate to a hover landing. • In hover : Landing possible : LAND AS SOON AS POSSIBLE Normal landing. WHEN ON THE GROUND SHUT DOWN THE ENGINE, THEN LOCK THE COLLECTIVE PITCH.

3.7.4 ELECTRICAL EMERGENCY

WARNING PANEL	CORRECTIVE ACTIONS
BATT TEMP Maximum battery temperature. • Above 60° C, AMBER alarm is displayed on VEMD. • Above 75°C, RED alarm is displayed on VEMD and warning panel.	Battery temperature and voltage ..... CHECK If overheating confirmed : 1. Battery pushbutton..... OFF 2. Generator Voltage..... CHECK NORMAL → Battery temp.....CHECK STEADY → **LAND AS SOON AS PRACTICABLE** DECREASES → **CONTINUE FLIGHT** When bat temp < 65 °C, Battery.....ON ABOVE U max (32V) 1. Battery.....ON 2. Generator.....OFF 3. Unnecessary equipment.....OFF → **LAND AS SOON AS PRACTICABLE**
BATT Battery off line	[BAT] pushbutton.....CHECK ON YES → [ELECT RESET] pushbutton ON → BATT goes out → **CONTINUE FLIGHT** ON → BATT remains on → **LAND AS SOON AS PRACTICABLE** NO → [BAT].....ON pushbutton

WARNING PANEL	CORRECTIVE ACTIONS
BATT FUSE Battery fuse has blown. Battery is off line.	LAND AS SOON AS PRACTICABLE
GENE DC Generator off line	[GENE] pushbutton..... CHECK ON YES → [ELECT RESET] ..... ON pushbutton GENE (Goes out) → CONTINUE FLIGHT GENE (Remains on) → Unnecessary equipment.....: OFF → LAND AS SOON AS PRACTICABLE NO → [GENE] pushbutton ON CAUTION If the battery fails, the VEMD will go out and only analog NR information will remain. Before battery failure, Nr audio alarm will come on (U < 18V).

3.7.5 FUEL EMERGENCY

WARNING PANEL	CORRECTIVE ACTIONS
FUEL Fuel quantity < 30 kg	LAND AS SOON AS POSSIBLE **NOTE** **15 mn of flight time remain at MCP** [redacted] **AVOID MAINTAINING SIDESLIP OVER 15°**
FUEL P Low fuel pressure	• **At engine start up :** Booster pump.....ON ↓ FUEL P Goes Out • **In flight :** 1. Collective pitch.....REDUCE POWER 2. Booster pump.....ON Be prepared in case of an engine flame-out. LAND AS SOON AS POSSIBLE Execute a minimum power approach and landing.

WARNING PANEL	CORRECTIVE ACTIONS
FUEL FILT Fuel filter clogged	[redacted] **FUEL FILTER BY-PASS OPENING DRIVES POLLUTION INTO THE FUEL LINE, AND THE GOVERNOR, INTRODUCING OSCILLATIONS, LIMITED POWER OR EVENTUALLY FLAME-OUT.** Collective pitch..... REDUCE POWER FUEL FILT → Goes out → Continue flight at reduced power. → **LAND AS SOON AS PRACTICABLE** FUEL FILT → Remains lit → LAND AS SOON AS POSSIBLE MONITOR Ng Ng oscillations occur Twist grip .....MANUAL GOVERNING **LAND IMMEDIATELY** Ng oscillations persist Autorotation procedure .....APPLY

3.7.6 MISCELLANEOUS

WARNING PANEL	CORRECTIVE ACTIONS
PITOT Pitot heating not operative	[PITOT] push-button ..... ON YES → Monitor airspeed indicator NO → [PITOT] push-button .....ON
HORN Horn not operative	[HORN] push-button ..... ON YES → Aural warning failure NO → [HORN] push-button .....ON
P2 TEMP Maximum temperature in demisting heating duct exceeded	Cabin outlet nozzles ... Check Air flow → Heating control .... ..Reduce until P2 TEMP light ges out No air flow → Heating control……close

Replace the table by the following:

WARNING PANEL	CORRECTIVE ACTIONS
PITOT Réchauffage Pitot non opérant	[PITOT] push-button ..... ON YES → Monitor airspeed indicator NO → [PITOT] push-button..... **ON**
HORN Klaxon inopérant	[HORN] push-button ..... ON YES → Aural warning failure NO → [HORN] push-button..... **ON**

CAUTION
THIS PAGE MUST NOT BE REMOVED FROM THE MANUAL UNTIL MODIFICATIONS SB N° 21.008 HAVE BEEN EMBODIED TO THE AIRCRAFT.

3.8 VARIOUS FAILURES AND INCIDENTS NOT INDICATED ON THE CWP

- Flight control hardover or servojam.

Hardover is manifested by uncommanded movements of one or two flight controls.
Servojam is manifested by a higher than normal force to move the control.

1. Attitude ..... MAINTAIN
2. HYD switch ..... OFF
   (on collective lever)
3. IAS ..... Vy

LAND AS SOON AS POSSIBLE

SECTION 4
NORMAL PROCEDURES

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FIGURE 4-2 : TAKEOFF PROCEDURE ..... 4 - 8

4.1 GENERAL

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

Normal and standard conditions are assumed in these procedures. 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.

4.1.1 OPERATING LIMITATIONS

For minimum and maximum limits, refer to SECTION 2.

Each time an operating limitation is exceeded, 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.

4.1.2 FLIGHT PLANNING

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

Flight planning must comply with helicopter limitations and performances (Refer to SECTIONS 2, 5, 6 and 9).

4.1.3 TAKEOFF AND LANDING DATA

Refer to SECTION 2 - LIMITATIONS and
SECTION 5 - PERFORMANCE DATA.

4.1.4 WEIGHT AND BALANCE DATA

Ascertain proper weight and balance of the helicopter as follows :

- Consult SECTION 6 - WEIGHT AND BALANCE.
- Ascertain weight of fuel, oil, payload, etc.
- Compute takeoff and anticipated landing gross weights.
- Check helicopter centre of gravity (CG) locations.
- Check that the weight and CG limitations in SECTION 2 are not exceeded.

4.2 PREFLIGHT CHECK

- Make sure that the Flight-Related Checks (VLV) after the last flight of the previous day or before the first flight of the day have been performed either by a pilot suitably trained to perform VLV and referring to present Flight Manual (see SECTION 8) or by a qualified mechanic complying with the Aircraft Maintenance Manual.

- Check that the aircraft area is clean and unobstructed.
- Carry out the following checks :

4.2.1 EXTERIOR CHECK

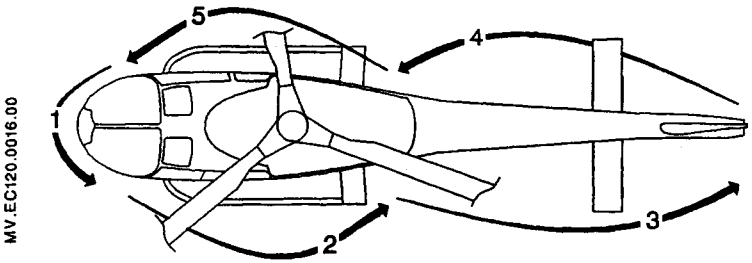


Figure 4-1 : Sequence of Checks

Station 1

- Pitot tube	Cover removed - check condition.
- Landing gear (crossmembers, skids, wear resistant plates)	Secure - visual check.
- Engine air intake	Clear (water, snow, foreign matter)

Station 2

- Doors	Closed.
- Fuel tank and system	Filler plug closed.
- MGB cowl	MGB and engine oil levels. Cowl closed.
- All lower and upper fairing panels	Closed.

- Main rotor head ..... Visual inspection, rotor head, sleeves, spherical thrust bearing, adapters, bonding braids.
- Hydraulic unit/system ..... Check hydraulic reservoir fluid level.
- Main rotor blades ..... Secure, visual inspection from ground.
- Static port ..... Clear.
- Exhaust pipe ..... Condition – Cover removed.
- Rear door cargo compartment ..... Check for snow in the tail boom – Closed.
- Tail boom ..... Condition, condition of antennas.

Station 3

- Stabilizer ..... General condition.
- Tail rotor blades ..... No impact.
- Tail rotor hub fairing ..... No rotation (paint marks).

Station 4

- Yaw control rod ..... Secured.
- TGB ..... Oil level.
- Stabilizer ..... General condition.
- Tail boom ..... Condition, condition of antennas.

Station 5

- Static port ..... Clear.
- Starboard cargo door ..... Door opening action. No loose objects. Electrical panel. Closing, latching.
- Landing gear (crossmembers, skids, wear resistant plates) ..... Secure, visual inspection.
- All lower fairing panels ..... Closed.
- EPU door ..... Closed.
- MGB cowl ..... No foreign object on transmission deck. Deck wiped clean. Cowl closed.

4.2.2 INTERIOR CHECK

- Cabin .....Clean.
- Blanking plate of pedal unit.....Installed (if single pilot configuration).
- Fire extinguisher.....Fitted and checked.
- Breakers.....All set.
- Objects carried.....Stowed.
- Freight .....Stowed.
- Door jettison.....Checked, lockwired.

4.2.3 TURNAROUND CHECK

- Overall aspect .....condition, cleanliness.
- Engine / MGB .....oil level.
- Main and tail rotor blades .....condition. (from ground)
- Loads .....secured.
- All doors and cowlings .....locked.

NOTE 1

If the aircraft is to be parked some time between flights, temporary picketing is recommended by fitting blanks, covers, and blade socks. In this case, perform a complete exterior check.

NOTE 2

Perform a complete exterior check if the aircraft is to be parked under snow precipitations.

4.3 START UP

4.3.1 ENGINE PRESTART CHECK

- Seats and control pedals ..... ADJUSTED.
- Seat belts ..... FASTENED.

NOTE 1

Copilot seat belts shall be fastened in all cases.

NOTA 2

When the rear seats are unoccupied, check that the unused safety belts are not fastened and the button on the shoulder straps is not visible.

NOTE 3

Check that, when flying with doors opern there are no loose objects in the cabin, and the belts of unoccupied rear seats are stowed between the backrest foam and the backrest.

1. Heating, demisting, air conditioner..... OFF.
2. Rotor brake..... FORWARD.
3. Fuel shut-off lever..... FORWARD. LOCKWIRED.
4. Battery and Generator ..... ON.
5. Light test..... COMPLETE.
6. Engine fire test ..... COMPLETE.
7. Warning panel remaining lights ..... CHECK
   - With battery power..... GENE PITOT ENG FUEL HORN MGB TWT GRIP HYDR illuminated
   - With EPU power ..... Same lights as above + BATT illuminated
8. VEMD ..... Engine page DISPLAYED.
9. Control pedals ..... Freedom of travel, then NEUTRAL.
10. Collective pitch ..... LOCKED.
11. Twist grip ..... SHUT OFF position.
12. Hydraulic switch (both collective levers) ..... ON.

Replace the paragraph 4.3.2 by the following paragraph :

4.3.2 ENGINE STARTING

1. Booster pump ..... ON
   FUEL P goes out
2. Anticollision light..... ON

- After 30 s

3. Starter ..... DEPRESS
4. Twist grip ..... GROUND IDLE position

NOTE

If remaining T4 is above 150°C wait until 10% Ng before actuating twist grip.

5. Twist grip ..... MONITOR T4
   depending upon T4 rate of increase.

- When Ng = 50%

6. Starter ..... RELEASED
7. Twist grip ..... FLIGHT POSITION
   Maintain Tq < 40%

Check that ENG P, HYDR and MGB P lights go out on the warning panel.

- When NR ≥ 350 rpm.

Switch ON the aural warning and check that HORN light goes out on the warning panel.

- When Twist Grip is in flight position.

Check that NR indication is in the lower part of the green arc and that TWT GRIP light is out.

CAUTION
THIS PAGE MUST NOT BE REMOVED FROM THE MANUAL UNTIL MODIFICATION SB N° 76.002 HAS BEEN EMBODIED TO THE AIRCRAFT.

4.3.2 ENGINE STARTING

1. Booster pump ..... ON
   FUEL P goes out
2. Anticollision light ..... ON

- After 30 s

3. Twist grip ..... on START position
4. Starter ..... DEPRESS

5. Twist grip ..... MONITOR T4
   depending upon T4 rate of increase.

- When Ng = 50%

6. Starter ..... RELEASED
7. Twist grip ..... FLIGHT POSITION
   Maintain Tq < 40%

Check that ENG P, HYDR and MGB P lights go out on the warning panel.

- When NR ≥ 350 rpm.

Switch ON the aural warning and check that HORN light goes out on the warning panel.

- When Twist Grip is in flight position.

Check that NR indication is in the lower part of the green arc and that TWT GRIP light is out.

NOTE

At Ng > 60 % the VEMD upper screen automatically switches to FLI display.

- If EPU is used :

EPU ..... DISCONNECTED

Check that GENE and BATT are not illuminated on the caution and warning panel.

NOTE

- In case of an aborted start, keep the starter button depressed, set twist grip to shut off position, release the starter button, then switch off the booster pump and the generator.

- In case of t4 higher than 200°C or aborted start due to excessively high T4, check the battery voltage :

- **Normal voltage :**
  - **Crank (LACU pushbutton) during 10 s.**
  - **Apply Normal start procedure.**

- **Voltage under 15 Vdc when starting :**
  No start possible.

4.3.3 RUN-UP CHECK

1. Pitot heat.....ON.
   PITOT goes out
2. Booster pump.....OFF.
3. Check :
. No warning light illuminated.
. Electrical system voltage and current.
. Engine oil pressure.
4. All necessary systems.....ON. TESTED
   (Radio, radio navigation, lights, windshield wiper* etc.).

NOTE

Do not use the wiper on a dry windshield or in light rain.

* Optional

Replace the paragraph 4.3.2 by the following paragraph (cont'd):

NOTE

At Ng > 60 % the VEMD upper screen automatically switches to FLI display.

- If EPU is used :

EPU..... DISCONNECTED

Check that GENE and BATT are not illuminated on the warning panel.

NOTE 1

- In case of an aborted start, keep the starter button depressed, set twist grip to shut off position, release the starter button, then switch off the booster pump and the generator.

- In case of aborted start due to excessively high T4, check the battery voltage :

- **Normal voltage :**
  Try to restart, wait until Ng = 10 % before actuating twist grip, then gradually increase the fuel flow without Ng drop.

- **Voltage under 15 Vdc when starting :**
  No start possible.

NOTE 2

After a failed start or if T4 is higher than 200°C, crank the engine before actuating the starter button, then control T4 with twist grip.

CAUTION
THIS PAGE MUST NOT BE REMOVED FROM THE MANUAL UNTIL MODIFICATION SB N° 76.002 HAS BEEN EMBODIED TO THE AIRCRAFT.

- Hydraulic accumulator test :

1. Collective pitch ..... LOCKED.
2. Hydraulic LACU pushbutton..... OFF.

[redacted] comes on

. Move the cyclic stick 2 or 3 times along both axes separately ± 10 % of total travel (± 2.5 cm). Check hydraulic assistance for absence of control load.

3. Hydraulic LACU pushbutton..... ON.

HYDR goes out

CAUTION

If not locked, the collective pitch will increase when HYD switch is in "OFF" position.

- Hydraulic shut-off test :

1. Collective pitch ..... LOCKED.
2. Hydraulic collective switch ..... OFF.

[redacted] Comes on.

Control loads are immediately felt.

3. Hydraulic collective switch ..... ON.

HYDR goes out immediately.

4.4 TAKEOFF

4.4.1 BEFORE TAKEOFF CHECK

1. Doors.....CLOSED.
2. Collective, cyclic friction locks.....AS REQUIRED.
3. Landing light.....AS REQUIRED
4. Pressures and temperatures.....NORMAL RANGE.
5. Warning panel.....All lights OFF.
6. Collective pitch.....UNLOCKED.

NOTE

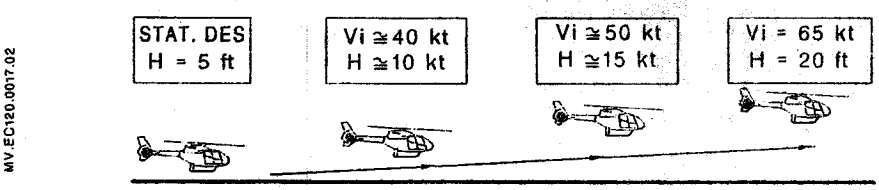
Adjust collective and cyclic friction locks so that friction forces are felt by the pilot when moving the flight controls.

4.4.2 TAKEOFF CHECK AND PROCEDURE

CAUTION

Use of P2 air bleeds are forbidden above the maximum continuous rating (Ng or T4)

- Gradually increase collective pitch to hover at 5 ft. Check engine and mechanical control instruments, no warning light.
- Increase airspeed with the HIGE power until IAS = 40 kt, then begin to climb so as to clear 20 ft at IAS = 65 kt.



MV_EC120.0017.02

Figure 4-2 : Takeoff Procedure

CAUTION

For safe operation, takeoff path should comply with HV diagram (refer to SECTION 5)

4.5 CLIMB

Above 100 ft (30 m) select Maximum Continuous Power and optimum climbing speed of (Vy) : IAS = 65 kt (120 km/h) - 1 kt per 1000 ft.

4.6 CRUISE

Fast cruise is obtained by the first limitation reached corresponding to the beginning of the FLI amber area :
Corresponding mechanical limit Tq or Ng are pointed out with underlined numerical value.
Economic cruise : set Tq to 10% less than MCP Tq.
Reduce indicated airspeed in turbulence.

4.7 APPROACH AND LANDING

4.7.1 APPROACH

- Perform approach at a minimum rate of descent and at ≅ Vy.
- At approximately 100 ft, reduce airspeed down to HIGE at 5 ft.

• Approach check :

1. Landing light.....AS REQUIRED.
2. All parameters.....CHECK.

4.7.2 LANDING

- In hover, gradually reduce collective pitch until touch-down, then fully reduce collective pitch.

CAUTION

Use of P2 air bleeds are forbidden above the maximum continuous rating (Ng or T4)

4.8 ENGINE AND ROTOR SHUTDOWN

1. Cyclic stick ..... NEUTRAL
2. Collective pitch ..... LOCK
3. Pitot, Horn, Landing light ..... OFF
4. Twist grip ..... GROUND IDLE position
   63 % ≤ Ng ≤ 68 %, wait 30 s. for temperature stabilization.
5. Generator and all systems ..... OFF
6. Twist grip ..... SHUT OFF position
   Cancel the idle stop by briefly pressing the starter button.

- For NR ≤ 150 rpm

7. Rotor brake ..... APPLY
8. Anticollision light ..... OFF

- **BEFORE LEAVING HELICOPTER**

- VEMD ..... CHECK flight report page information.
- Ng and Nf cycles ..... written in white characters and above 0.
- Switch off the battery.
- Pitot, intake, exhaust covers, blade socks as required.

4.9 EXTREME WEATHER OPERATIONS

4.9.1 HIGH WIND OPERATION (WIND ABOVE 30 KT)

- **Parking**

- Park the helicopter head into the wind. Maintain rotor brake applied with one blade at 12 o'clock. Keep blade socks until start up.
- For wind above 50 kt the helicopter must be tied down.

- **Start up**

- When the rotor begins to turn, push the cyclic stick slightly forward and accelerate the engine as soon as possible until NR = 320 rpm within T4 limitation.
- Then carry out the normal procedure.

NOTE

Start up and shut down have been demonstrated up to 55 kt of wind from all directions.

4.9.2 COLD WEATHER OPERATION

NOTE

Use of 3 cSt synthetic oil is recommended for low temperature operation.

- **Operation in Snow**

  - Clean the helicopter before takeoff ; blades, rotor head, windshield...
  - Do not stay in HIGE with snow recirculation.
  - Replace the turnaround check by a complete exterior check.

SECTION 5

PERFORMANCE DATA

(APPROVED PART / NON APPROVED PART)

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5.3 ENGINE CHECK PROCEDURE ..... 5 - 1
5.3.1 BEFORE TAKEOFF ..... 5 - 1
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5.3.3 MANUAL ENGINE POWER CHECK ..... 5 - 1B
5.4 AIR DATA SYSTEM CALIBRATION ..... 5 - 4
5.5 HEIGHT - VELOCITY DIAGRAM ..... 5 - 6
5.6 HOVER IN GROUND EFFECT ..... 5 - 8
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5.8 CORRECTED WEIGHT ..... 5 - 10
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5.1 INTRODUCTION

The following performance curves apply to the basic version of the aircraft. Refer to SECTION 9 when optional equipment is fitted.

NOTE

Values obtained on VEMD PERFORMANCE and ENGINE POWER CHECK pages can be checked with the ENGINE POWER CHECK, T4 CHECK, HOVER IN GROUND EFFECT, and HOVER OUT OF GROUND EFFECT curves.

For AUW over 1680 kg, the performances have to be checked manually with the figures 5-5, 5-6 and 5-7.

CAUTION

Pilot shall limit the flight envelope and weight displayed on VEMD PERFORMANCE pages to the relevant limitations of SECTION 2.

5.2 STARTING AND STOPPING THE ROTOR ENVELOPE

Maximum wind velocity from any direction for starting and stopping the rotor is 55 kt

5.3 ENGINE CHECK PROCEDURE

5.3.1 BEFORE TAKEOFF

In HIGE at 5ft and before initiating forward flight, pull the collective pitch lever slightly to ensure that the Ng can increase by at least 1%.

5.3.2 IN FLIGHT

Perform a VEMD engine check (Pressure Altitude - Hp - less than 12000 ft (3657 m) and heater and demister OFF).

Apply to the "TRQ MARGIN" given by the VEMD, the correction factor of the following table :

Pressure altitude (ft)	**0**	**1000**	**2000**	**3000**	**4000**	**5000**
TRQ (%)	**+1.7**	**+1.3**	**+1**	**+0.7**	**+0.4**	**0**

Example :

OAT = 20 °C
Ng = 98.7 %
TORQUE = 97 %

Hp = 1000 ft
NR = 411 tr/min

"TRQ MARGIN" (VEMD) = + 1 %
"TRQ (%) Correction = + 1.3 %

"TRQ MARGIN" Real = + 2.3 %

5.3.3 MANUAL ENGINE POWER CHECK

In stabilized level flight at the maximum Ng displayed, note the following parameters : torque, Ng, NR, Hp, OAT and T4. Read the figures ENGINE POWER CHECK and T4 CHECK in the direction indicated by the arrows. Engine power check is OK if point "P" is located in the area marked "CORRECT". T4 check is OK if point "T" is located in the area marked "CORRECT".

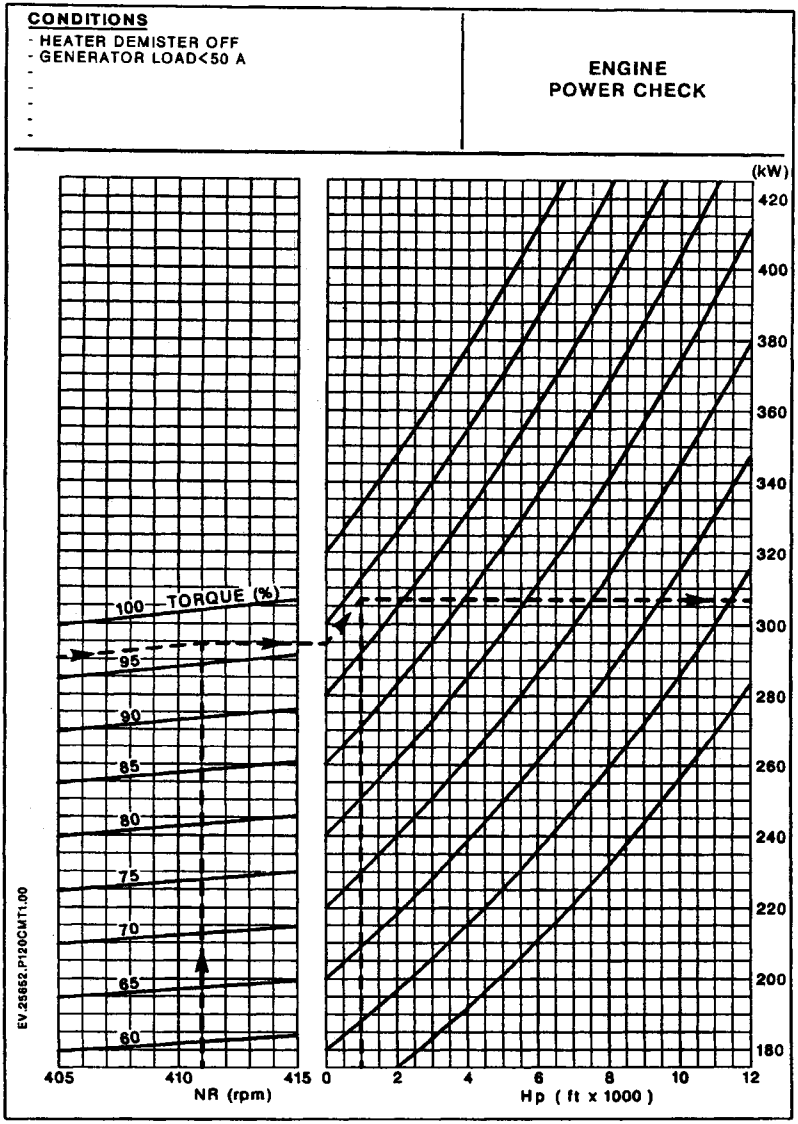

CONDITIONS
- HEATER DEMISTER OFF
- GENERATOR LOAD<50 A
ENGINE
POWER CHECK
(kW)
420
400
380
360
340
320
300
280
260
240
220
200
180
100
TORQUE (%)
95
90
85
80
75
70
65
60
405
410
415
NR (rpm)
0
2
4
6
8
10
12
Hp (ft x 1000)
EV 25662.P120CMT1.00

Figure 5 - 1a

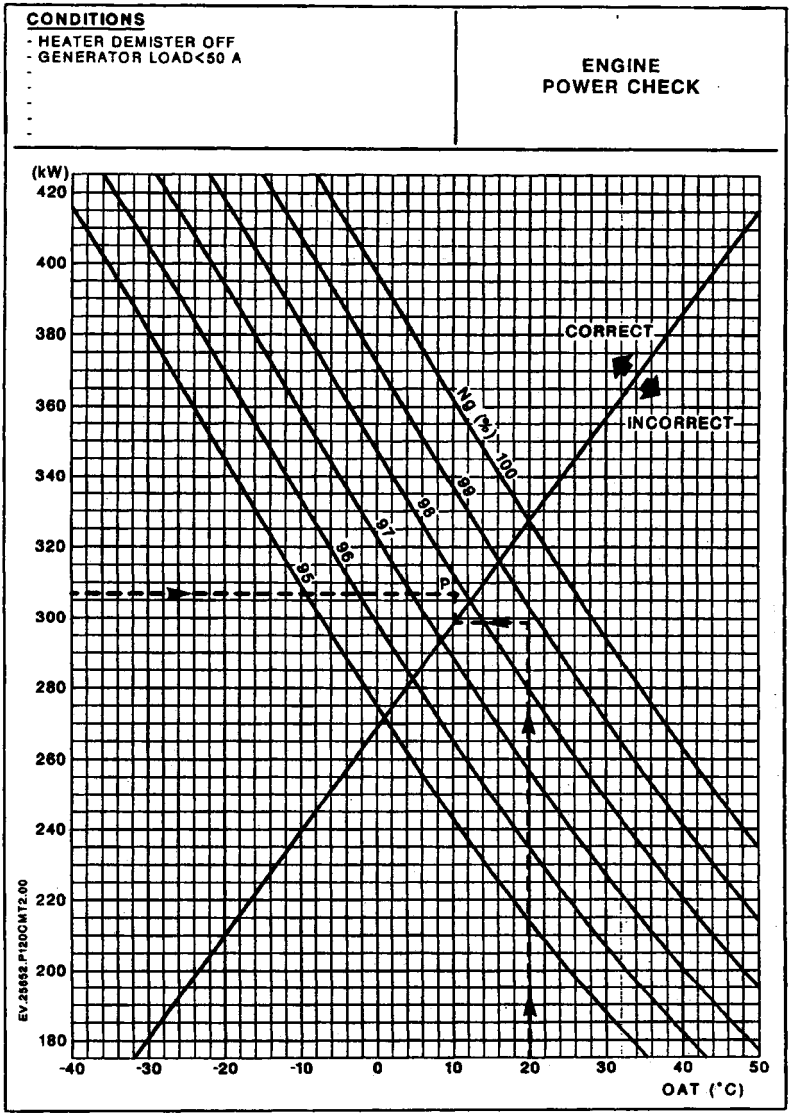

CONDITIONS
- HEATER DEMISTER OFF
- GENERATOR LOAD<50 A
-
-
-
-
-
ENGINE
POWER CHECK
(kW)
420
400
380
360
340
320
300
280
260
240
220
200
180
CORRECT
INCORRECT
Ng (%) 100
99
98
97
96
95
A
-40
-30
-20
-10
0
10
20
30
40
50
OAT (°C)
EV.25652.P120CMT2.00

Figure 5 - 1b

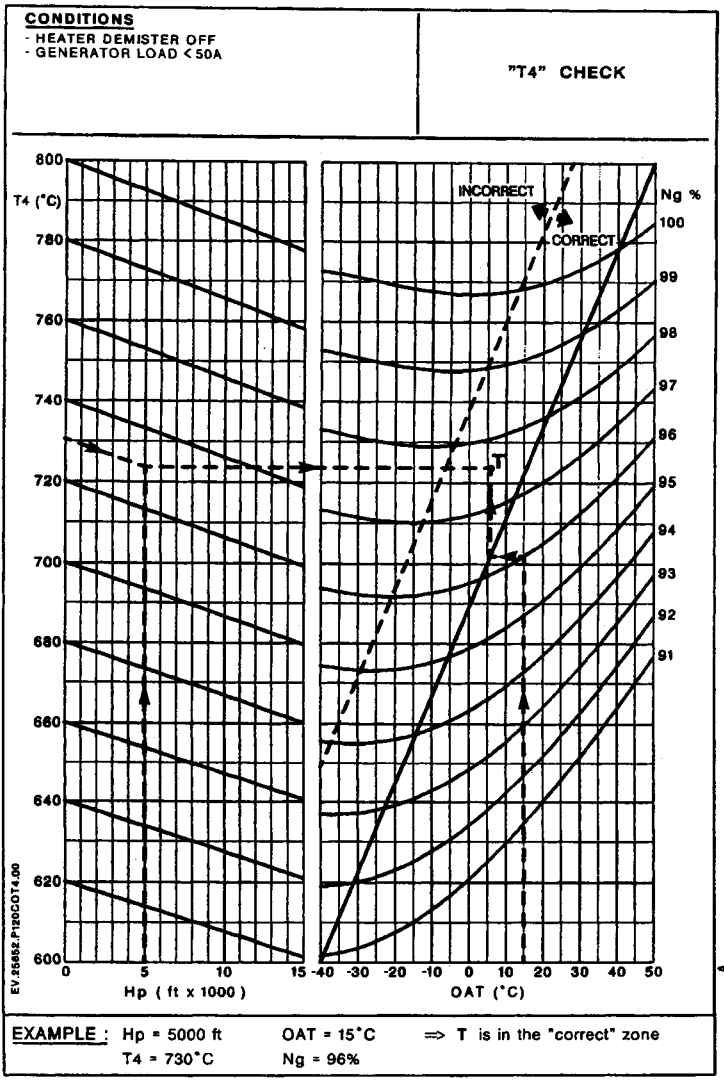

CONDITIONS
- HEATER DEMISTER OFF
- GENERATOR LOAD < 50A
"T4" CHECK
T4 (°C)
800
780
760
740
720
700
680
660
640
620
600
INCORRECT
CORRECT
Ng %
100
99
98
97
96
95
94
93
92
91
T
0
5
10
15
Hp (ft x 1000)
-40
-30
-20
-10
0
10
20
30
40
50
OAT (°C)
EV.25652.P120COT4.00
EXAMPLE : Hp = 5000 ft
T4 = 730°C
OAT = 15°C
Ng = 96%
⇒ T is in the "correct" zone

Figure 5 - 2

5.4 AIR DATA SYSTEM CALIBRATION

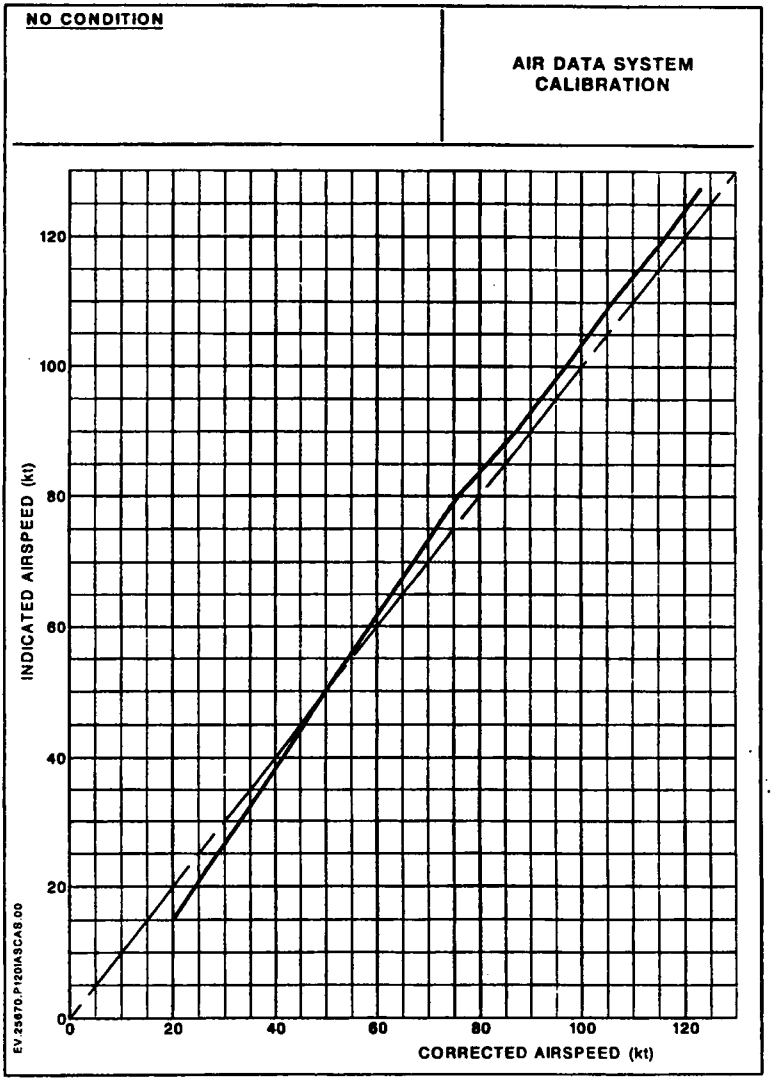


Figure 5 - 3

5.5 HEIGHT - VELOCITY DIAGRAM

The avoidance zone is defined by 4 points : A, B, C, D.

- Point A : low hover point

Point A is at 6 ft (1.80 m) skid height at zero airspeed.

- Point B

Point B is defined by :
. a variable height (18 ft ≤ height ≤ 24 ft) depending on the altitude and on the aircraf weight as determined by line (C),
. a variable airspeed (50 kt ≤ IAS ≤ 60 kt) depending on the altitude and on the aircraft weight as determined by line (C).

- Point C

Point C is defined by :
. a constant height of 50 ft (15 m),
. a variable airspeed (50 kt ≤ IAS ≤ 60 kt) depending on the altitude and on the aircraft weight as determined by line (C).

- Point D

Point D is defined by :
. a variable height (500 ft ≤ height ≤ 800 ft) depending on the altitude and on the aircraf weight as determined by line (D),
. a constant zero airspeed.

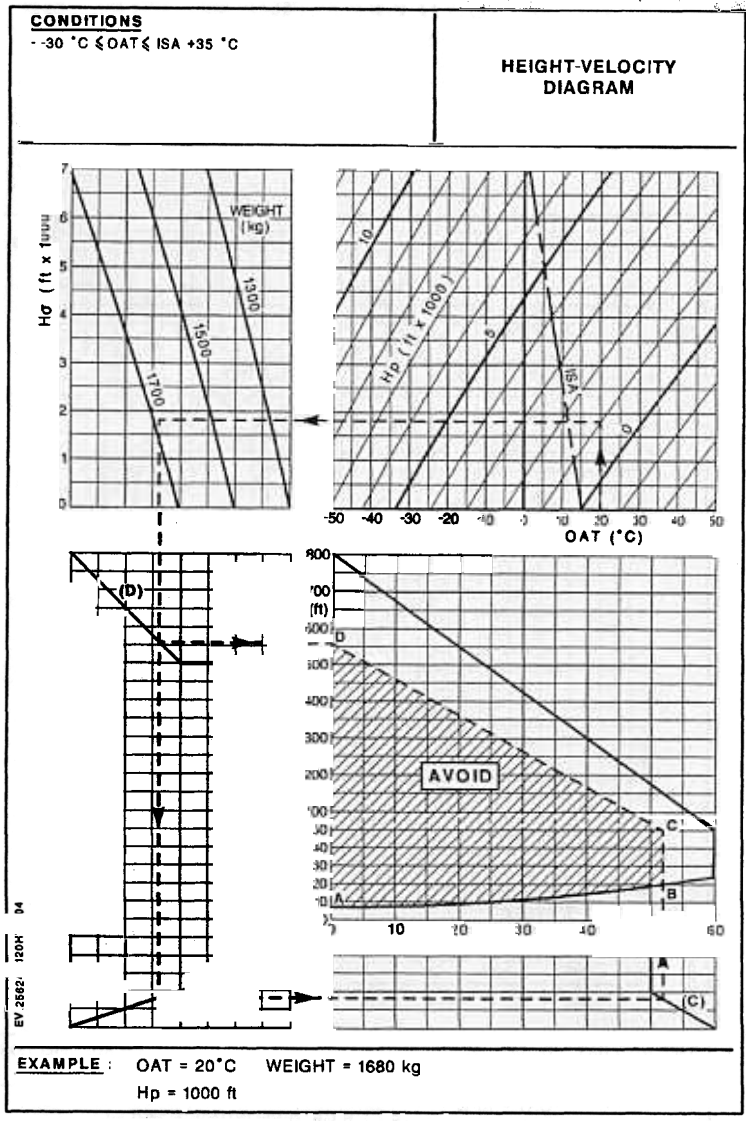

CONDITIONS
- -30 °C ≤ OAT ≤ ISA +35 °C
HEIGHT-VELOCITY DIAGRAM
Hσ (ft x 1000)
WEIGHT (kg)
1300
1500
1700
Hp (ft x 1000)
ISA
OAT (°C)
(D)
AVOID
(ft)
A
B
C
D
(C)
EXAMPLE : OAT = 20°C WEIGHT = 1680 kg
Hp = 1000 ft

Figure 5 - 4

5.6 HOVER IN GROUND EFFECT

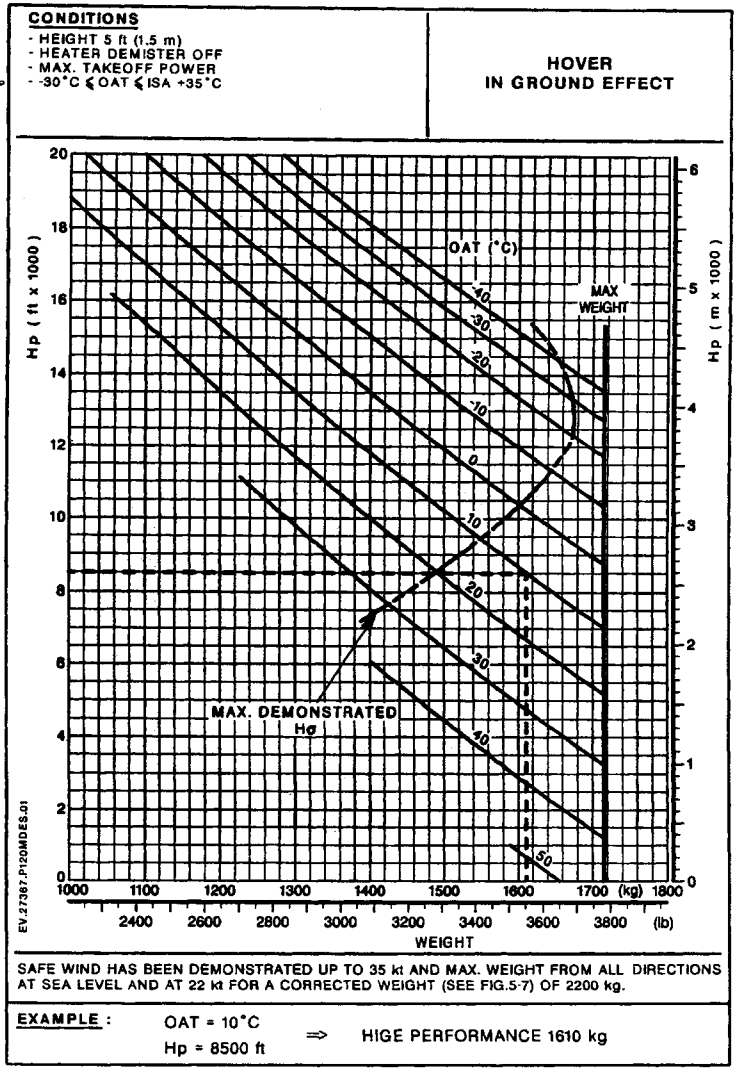


Figure 5 - 5

Replace figure 5-5 by the following :

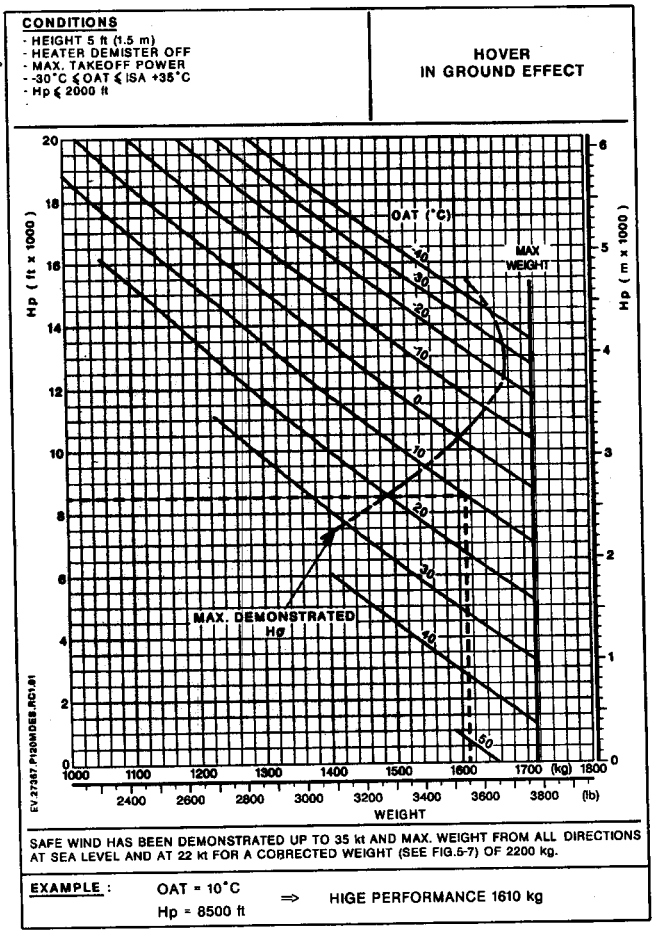


Figure 5 - 5

CAUTION

THIS PAGE MUST NOT BE REMOVED FROM THE MANUAL UNTIL MODIFICATIONS N° A 00075 AND SB N° 32.001 HAVE BEEN EMBODIED TO THE AIRCRAFT.

5.7 HOVER OUT OF GROUND EFFECT

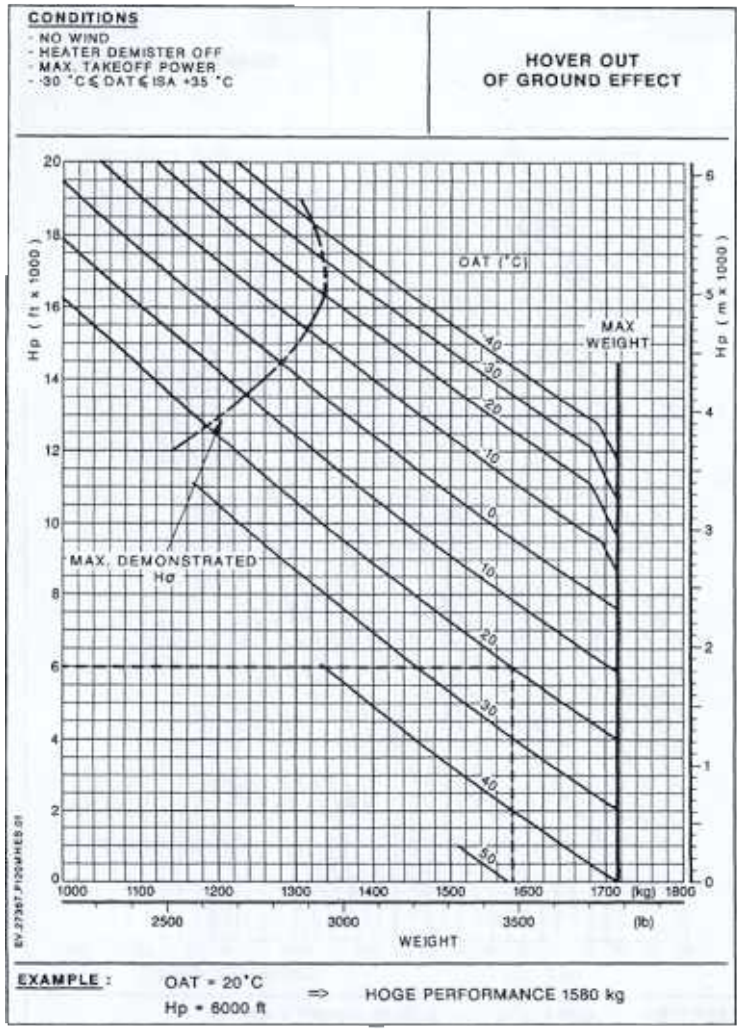


Figure 5 - 6

5.8 CORRECTED WEIGHT

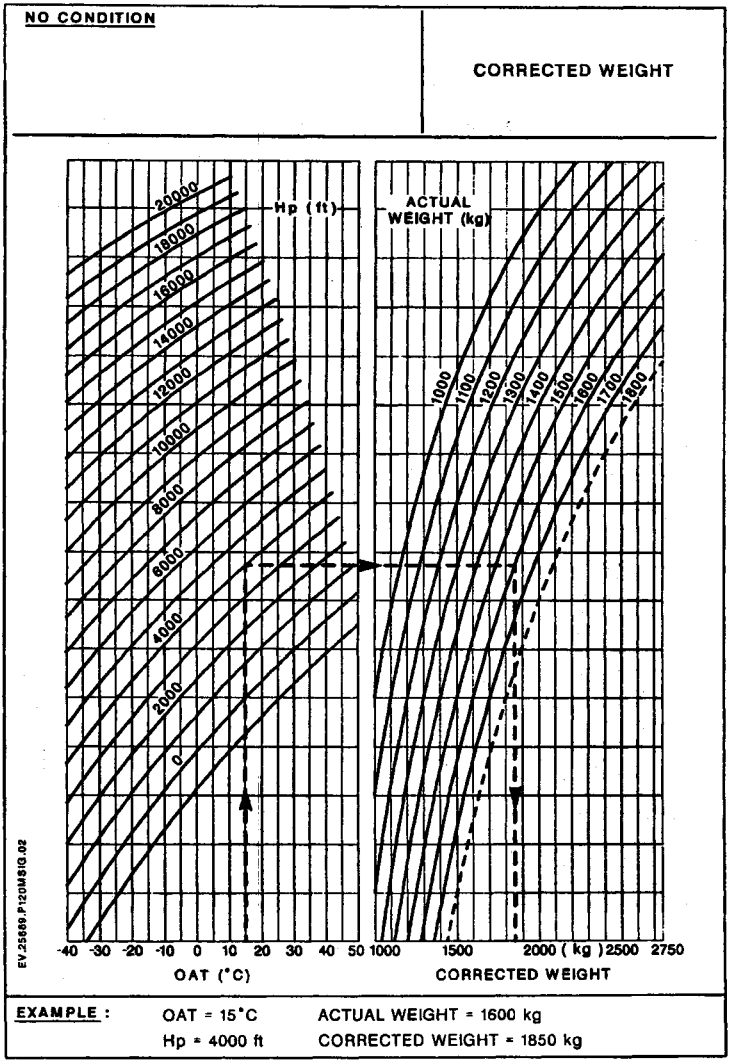
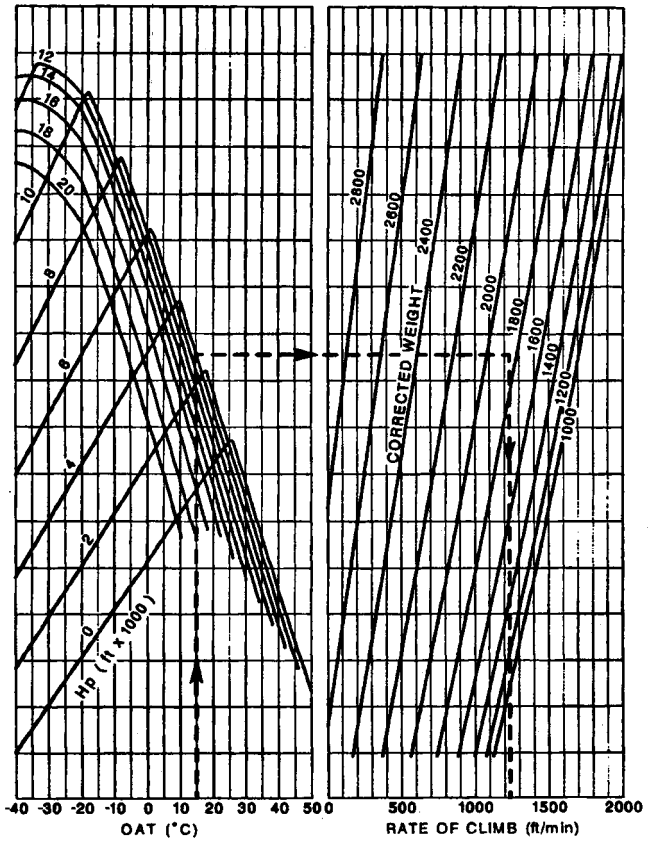


Figure 5 - 7

5.9 RATE OF CLIMB

CONDITIONS
- CAS = 65 kt - 1 kt / 1000 ft
- MAX. CONTINUOUS POWER
- HEATER DEMISTER OFF
- -30°C≤OAT≤ISA + 35°C

RATE OF CLIMB



EXAMPLE : OAT = 15°C ACTUAL WEIGHT = 1600 kg CORRECTED WEIGHT = 1850 kg
Hp = 4000 ft RATE OF CLIMB = 1230 ft/min

Figure 5 - 8

5.10 GLIDE DISTANCE IN AUTOROTATION

The distance flown in autorotation is :
0.7 Nm (1300 m)/1000 ft at Vy and NR ≅ 410 rpm

5.11 NOISE LEVEL

Noise characteristics defined by chapter 11 and appendix 4 of the ICAO annex 16 are as follows :

Measurement Reference Point	Noise Level SEL (dBA)	ICAO Noise Limits SEL (dBA)
Overflight (at Max. gross weight)	78.7	85.4

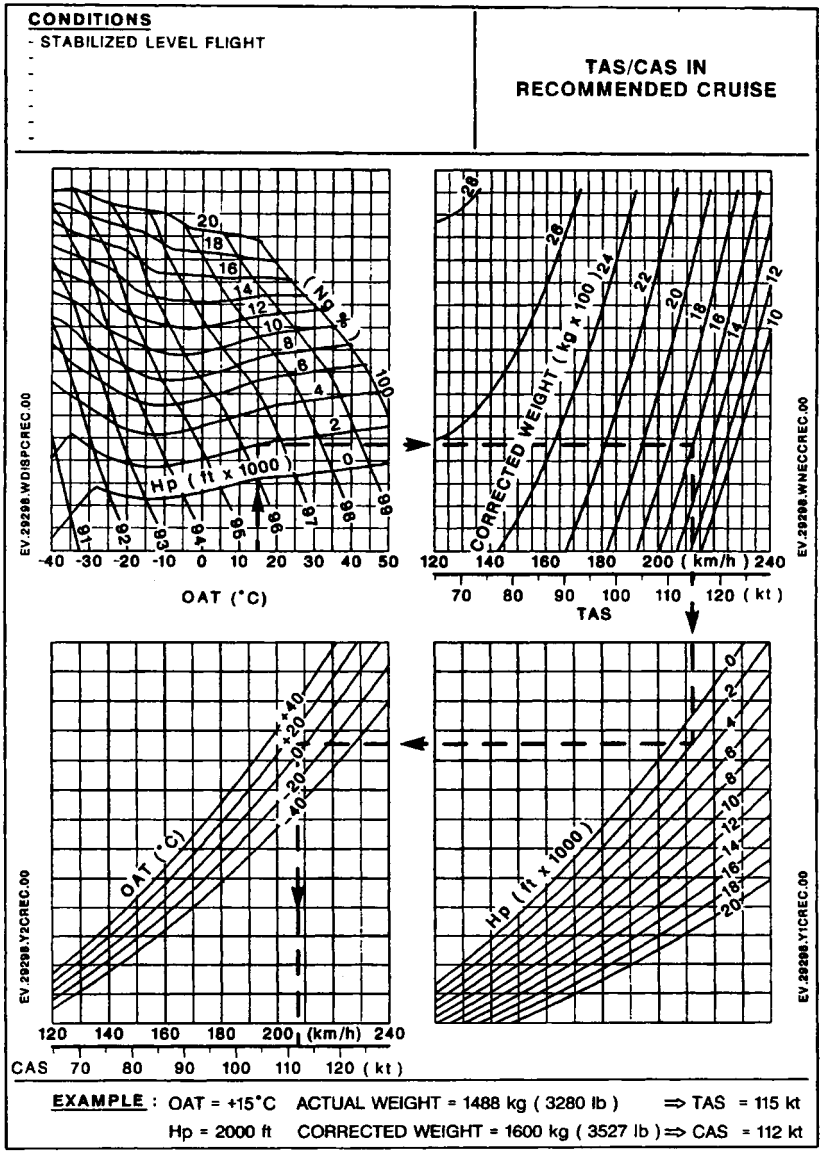
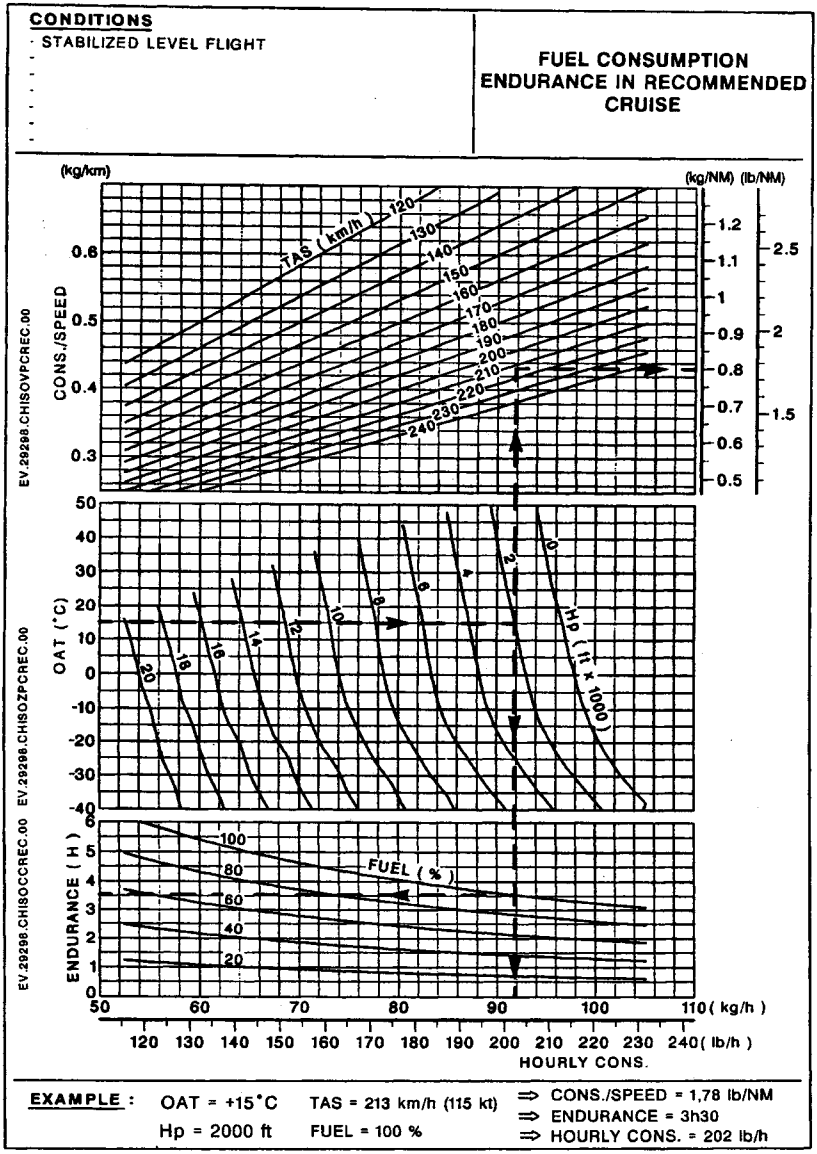

CONDITIONS
- STABILIZED LEVEL FLIGHT
TAS/CAS IN
RECOMMENDED CRUISE
EV.29298.WDISPCREC.00
OAT (°C)
Hp (ft x 1000)
EV.29298.WNECCREC.00
CORRECTED WEIGHT (kg x 100)
TAS
EV.29298.Y2CREC.00
OAT (°C)
CAS
EV.29298.Y1CREC.00
Hp (ft x 1000)
EXAMPLE : OAT = +15°C ACTUAL WEIGHT = 1488 kg (3280 lb) ⇒ TAS = 115 kt
Hp = 2000 ft CORRECTED WEIGHT = 1600 kg (3527 lb) ⇒ CAS = 112 kt

Figure 5 - 9



EXAMPLE : OAT = +15°C TAS = 213 km/h (115 kt) ⇒ CONS./SPEED = 1,78 lb/NM
Hp = 2000 ft FUEL = 100 % ⇒ ENDURANCE = 3h30
⇒ HOURLY CONS. = 202 lb/h

Figure 5 - 10

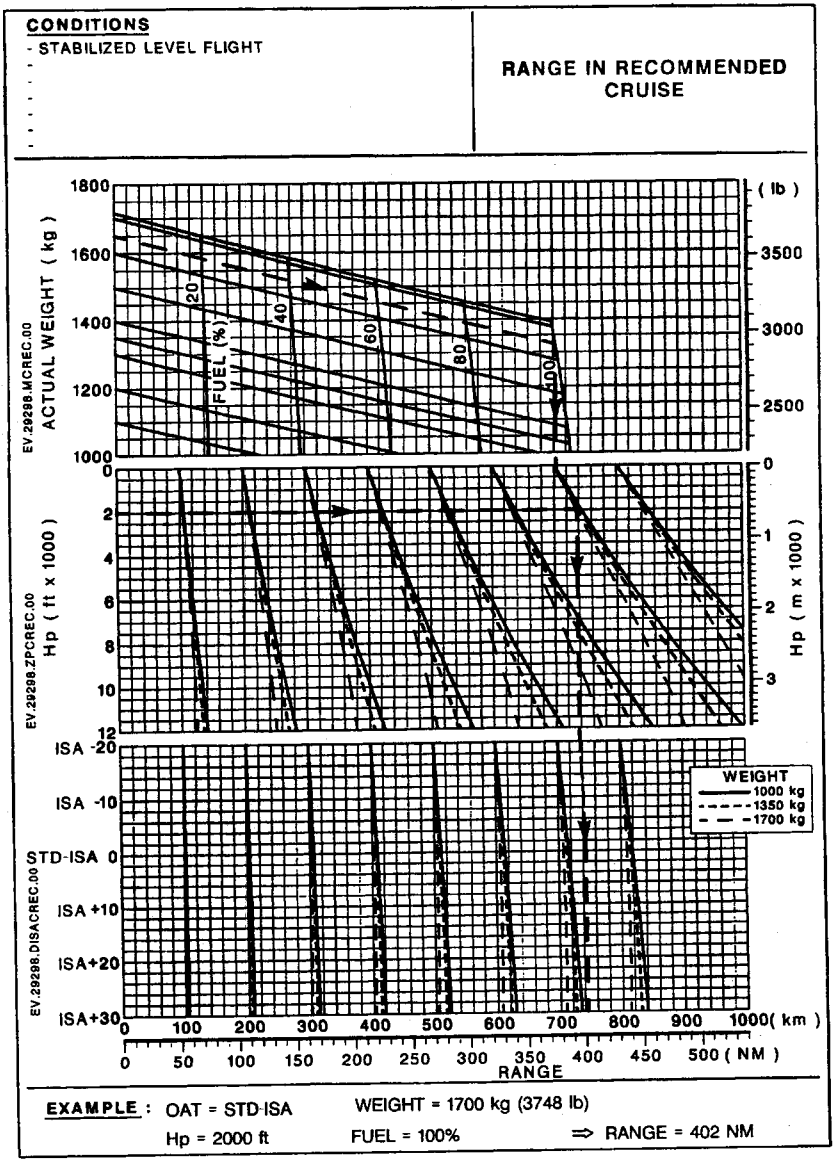

CONDITIONS
- STABILIZED LEVEL FLIGHT
RANGE IN RECOMMENDED CRUISE
EV.29298.MCREC.00
ACTUAL WEIGHT (kg)
1800
1600
1400
1200
1000
(lb)
3500
3000
2500
FUEL (%)
20
40
60
80
100
EV.29298.ZPCREC.00
Hp (ft x 1000)
0
2
4
6
8
10
12
Hp (m x 1000)
0
1
2
3
EV.29298.DISACREC.00
ISA -20
ISA -10
STD-ISA 0
ISA +10
ISA+20
ISA+30
WEIGHT
1000 kg
1350 kg
1700 kg
0 100 200 300 400 500 600 700 800 900 1000(km)
0 50 100 150 200 250 300 350 400 450 500 (NM)
RANGE
EXAMPLE : OAT = STD-ISA
WEIGHT = 1700 kg (3748 lb)
Hp = 2000 ft
FUEL = 100%
⇒ RANGE = 402 NM

Figure 5 - 11

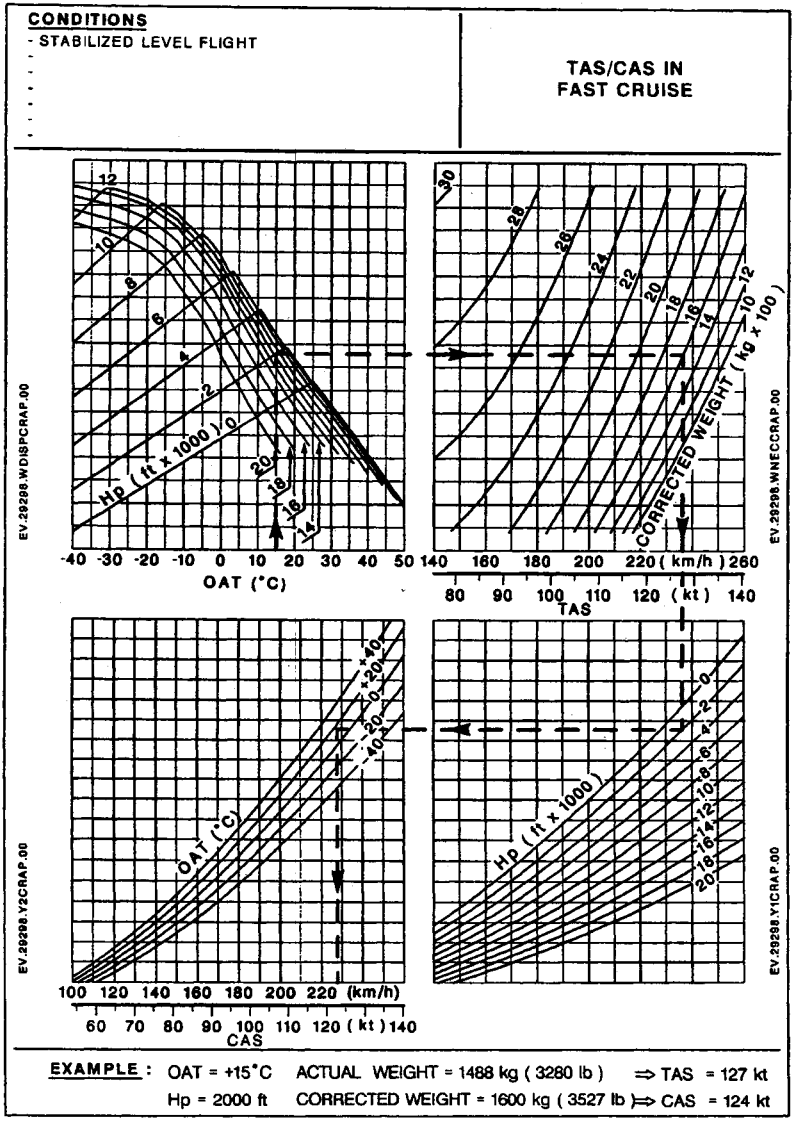
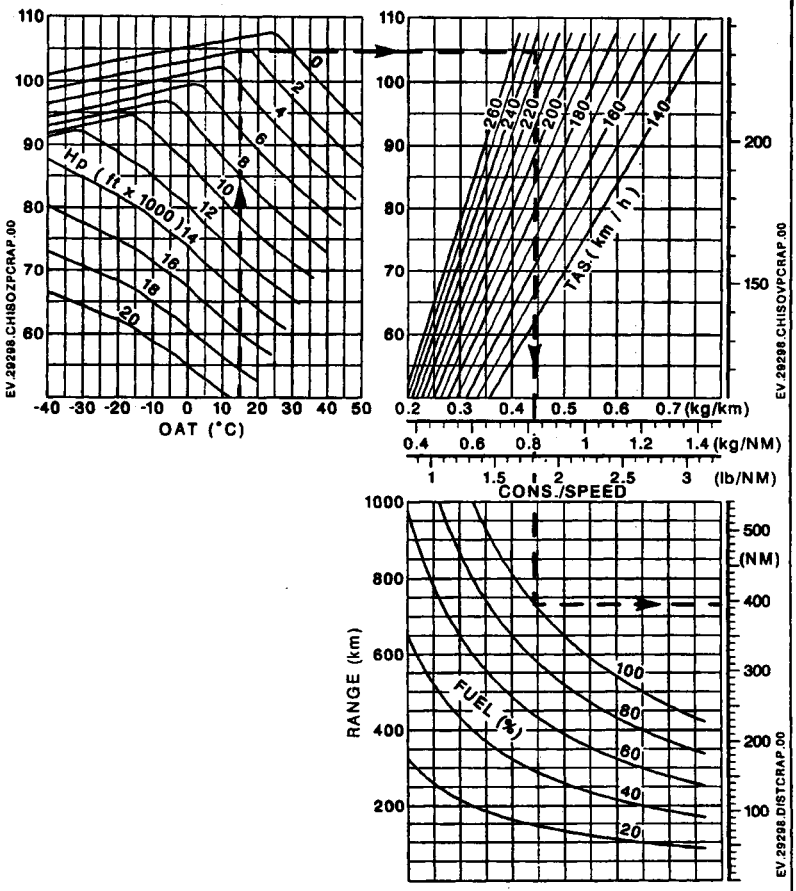

CONDITIONS
- STABILIZED LEVEL FLIGHT
TAS/CAS IN
FAST CRUISE
Hp (ft x 1000)
OAT (°C)
CORRECTED WEIGHT (kg x 100)
TAS
EV.29298.WDISPCRAP.00
EV.29298.WNECCRAP.00
OAT (°C)
CAS
Hp (ft x 1000)
EV.29298.Y2CRAP.00
EV.29298.YICRAP.00
EXAMPLE : OAT = +15°C ACTUAL WEIGHT = 1488 kg (3280 lb) ⇒ TAS = 127 kt
Hp = 2000 ft CORRECTED WEIGHT = 1600 kg (3527 lb) ⇒ CAS = 124 kt

Figure 5 - 12

CONDITIONS

- STABILIZED LEVEL FLIGHT

FUEL CONSUMPTION
RANGE IN FAST CRUISE



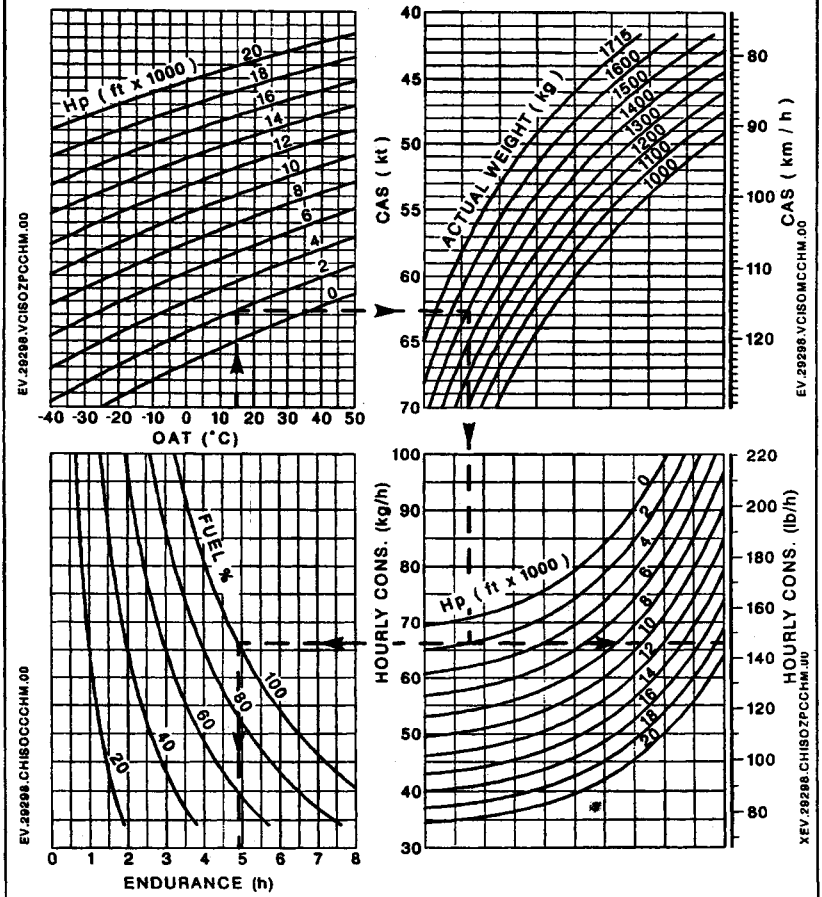
EXAMPLE : OAT = +15°C TAS = 236 km/h (127 kt) ⇒ RANGE = 395 NM
Hp = 2000 ft FUEL = 100%

Figure 5 - 13

CONDITIONS

- STABILIZED LEVEL FLIGHT TAS = 65 kt

ENDURANCE IN CRUISE AT MINIMUM HOURLY FUEL CONSUMPTION



EXAMPLE: OAT = +15°c ACTUAL WEIGHT = 1488 kg (3280 lb) HOURLY CONS. = 146 lb/h
Hp = 2000 ft FUEL = 100% ⇒ ENDURANCE = 4h54

Figure 5 - 14

SECTION 6

WEIGHT AND BALANCE

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6.1 GENERAL

The purpose of this section is to provide data for use when evaluating a proposed loading configuration or calculating the weight and center of gravity of an aircraft in service.

6.2 WEIGHT AND BALANCE

6.2.1 Weight - Standard Definitions

- Empty Weight (EW)

  This corresponds to the sum of the permanent assemblies and equipment:

  – The vehicle and its power plant.

  – Equipment common to all missions.

  – Lubricants and hydraulic fluids.

  – Unusable fuel.

  EW then, is constant for a given aircraft.

- Equipped Empty Weight (EEW)

  This is the sum of :

  – Empty weight (EW)

  – Specific operational or mission equipment.

  EEW varies according to the proposed mission.

- All-up Weight (AUW)

  This is the sum of :

  – Equipped empty weight (EEW)

  – Crew

  – Payload

  – Usable fuel

- Maximum Weight

  Weight is limited on takeoff and landing. See limitations (SECTION 2).

6.2.2 Center of Gravity Conventional Terms

- The center of gravity is defined by dimensions measured perpendicular to the three basic datum planes. These planes are as follows :
  - A horizontal plane parallel to the cabin floor datum, the Z datum plane, located 3.47 m (136.6 in) above this datum.
  - A vertical plane perpendicular to the cabin floor datum. This Y datum plane is the aircraft plane of symmetry. Dimensions to the left (port) are negative, dimensions to the right (starboard) are positive.
  - A vertical plane perpendicular to the two mentioned above, situated 4.00 m (157.5 in) forward of the center of the main rotor. This is the X datum plane, from which the longitudinal reference stations and CG positions are measured.

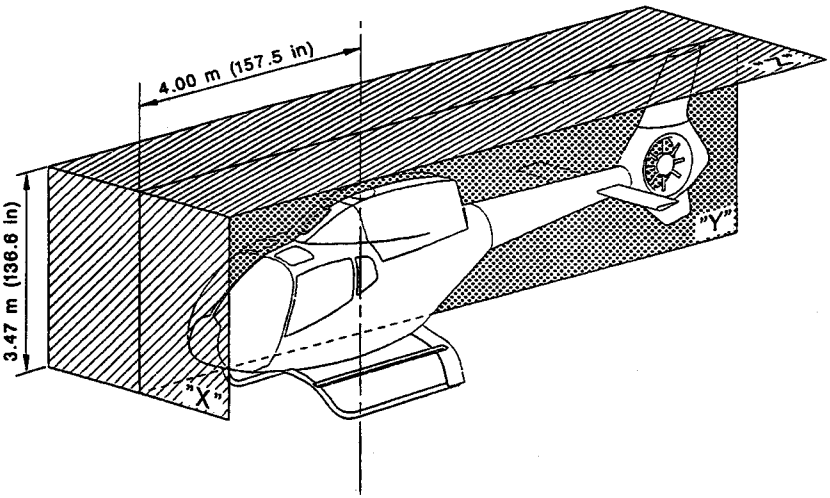

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Figure 6 - 1 : Basic datum planes

- CG location limits are never to be exceeded. See Limitations (SECTION 2).

CAUTION

A CG location which is correct on takeoff may vary during the mission, due to the reduction in load and therefore exceed acceptable limits.

- Longitudinal CG must be monitored more closely.
- Lateral CG need be considered only in very asymmetrical loading configurations.

6.3 WEIGHING

Weighing is the only reliable way of obtaining :

- Equipped empty weight (EEW).
- Aircraft center of gravity (CG) location.

The aircraft must be weighed :

- On leaving the works.
- Following any major modification.

6.4 LONGITUDINAL CG LOCATION

6.4.1 Calculating CG

- Procedure

The distance from the aircraft center of gravity to the datum plane is obtained using the formula :

$$\frac{\text{Sum of moments}}{\text{Sum of weights}} = \text{CG in flight order.}$$

- Example : Analysis for a passenger transport mission
  - Before takeoff
    1) Determine the maximum permissible takeoff weight.
    2) Note the equipped empty weight and the moment.
    3) Refer to the tables given below to determine loading conditions ; totalize weights and moments.
    4) Calculate the CG location.
    5) Check that CG falls within permissible limits.

    Example :

	Kg	m.Kg
EEW	970	4103.1
Crew	160	376.0
Passengers	-	-
Cargo	40	164
Fuel	300	1227.0
TOTAL	1470	5870.1

$$CG = \frac{5870.1}{1470} = 3.993 \text{ m}$$

Longitudinal CG is within the permissible limits.

  - In flight or on landing

    The aircraft will normally keep within its weight and balance diagram regardless of fuel consumption.

6.4.2 Loading data

- Crew and passengers

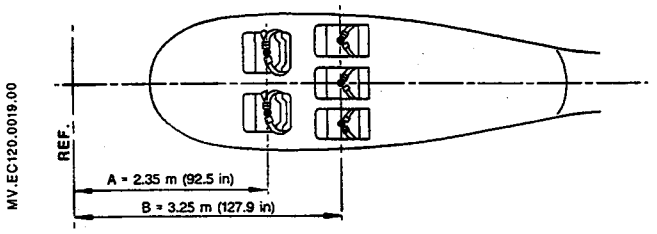

Figure 6 - 2 : Longitudinal location of seats

	METRIC UNITS	
WEIGHT kg	MOMENT : m.kg (A)	(B)
60	141.00	195.00
80	188.00	260.00
100	235.00	325.00
120	282.00	390.00
140	329.00	455.00
160	376.00	520.00
180	423.00	585.00
200	470.00	650.00
220	517.00	715.00
240		780.00
260		845.00
280		910.00
300		975.00
320		1 040.00
330		1 072.50

	ANGLO-SAXON UNITS	
WEIGHT	MOMENT : in.lb	
lb	(A)	(B)
100	9 250	12 790
150	13 875	19 185
200	18 500	25 580
250	23 125	31 975
300	27 750	38 370
350	32 375	44 765
400	37 000	51 160
450	41 625	57 555
485	44 863	62 032
500		63 950
550		70 345
600		76 740
650		83 135
700		89 530
730		93 367

- Freight and baggage transport

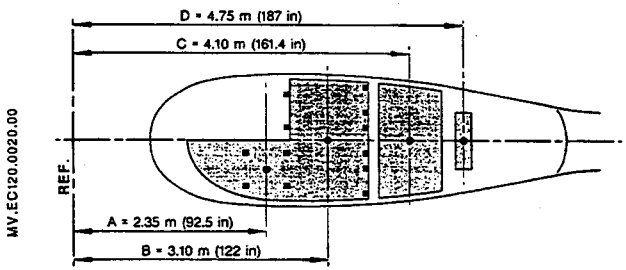

Figure 6 - 3 : Longitudinal location of loads

	METRIC UNITS			
WEIGHT	MOMENT : m.kg			
kg	(A)	(B)	(C)	(D)
10	23,50	31,00	41,00	47,50
20	47,00	62,00	82,00	95,00
50	117,50	155,00	205,00	237,50
70	164,50	217,00	287,00	
80	188,00	248,00	328,00	
100	235,00	310,00	410,00	
120	282,00	372,00	492,00	
150	352,50	465,00	615,00	
200		620,00	820,00	
250		775,00	1 025,00	
300		930,00	1 230,00	
320		992,00	1 312,00	

	ANGLO-SAXON UNITS			
WEIGHT	MOMENT : in.lb			
lb	(A)	(B)	(C)	(D)
50	4 625	6 100	8 070	9 350
100	9 250	12 200	16 140	18 700
110	10 175	13 420	17 754	20 570
150	13 875	18 300	24 210	
200	18 500	24 400	32 280	
250	23 125	30 500	40 350	
300	27 750	36 600	48 420	
330	30 525	40 260	53 262	
350		42 700	56 490	
400		48 800	64 560	
450		54 900	72 630	
500		61 000	80 700	
550		67 100	88 770	
600		73 200	96 840	
650		79 300	104 910	
700		85 400	112 980	

- Fuel

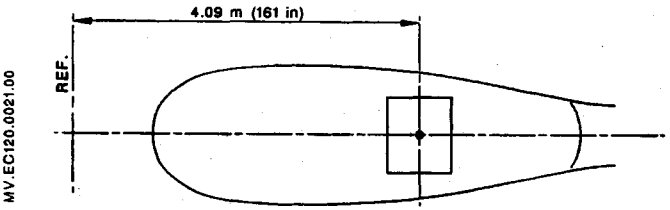

Figure 6 - 4 : Longitudinal location of fuel

NOTE

Fuel specific gravity : 0.795

METRIC UNITS					
Liter	kg	m. kg	Liter	kg	m.kg
25.16	20	81.80	226.42	180	736.20
50.31	40	163.60	251.57	200	818.00
75.47	60	245.40	276.73	220	899.80
100.63	80	327.20	301.89	240	981.60
125.79	100	409.00	327.04	260	1063.40
150.94	120	490.80	352.20	280	1145.20
176.10	140	572.60	377.36	300	1227.00
201.26	160	654.40	406.00	323	1321.07

ANGLO-SAXON UNITS							
US gal	UK gal	lb	in.lb	US gal	UK gal	lb	in.lb
7.54	6.28	50	8050	67.84	56.54	450	72450
15.08	12.56	100	16100	75.38	62.82	500	80500
22.61	18.85	150	24150	82.92	69.10	550	88550
30.15	25.13	200	32200	90.45	75.39	600	96600
37.69	31.41	250	40250	97.99	81.67	650	104650
45.23	37.69	300	48300	105.53	87.95	700	112700
53.76	44.98	350	56350	107.30	89.40	711.5	114551
60.30	50.26	400	64400				

6.4.3 CG Charts

The following charts (metric and anglo-saxon units) are used to easily determine the aircraft center-of-gravity. When the point obtained is close to the limits, it should be confirmed by calculations.

Example (SEE chart 6.5) :		Item on chart
- The weighing operation locates the CG at 4.23 m (166.5 in) for an EEW of	: 970 kg (2138 lb) :	①
- 2 front seats used	: 160 kg (353 lb) :	②
- 1 rear seat used	: 80 kg (176 lb) :	③
- Freight in the rear seat	: 100 kg (220 lb) :	④
- Freight in the hold with a rear CG	: 90 kg (198 lb) :	⑤
- Fuel	: 300 kg (661 lb) :	⑥

The longitudinal CG is within the permissible limits.

These charts are designed so that the variations in fuel weight and freight in the hold (SEE figure 6.3 ; item C at 4,10 m (161.4 in)) make the CG move along a vertical line :

- The total weight is 1700 kg (3748 lb) with a center of gravity at 3.925 m (154.5 in). During the flight, after consuming 200 kg (441 lb) of fuel (SEE item ⑦), the center of gravity will be 3.903 m (153.6 in).

The weight and CG limits are given in LIMITATIONS (SEE SECTION 2) and may be modified by the Supplements corresponding to the optional items fitted.

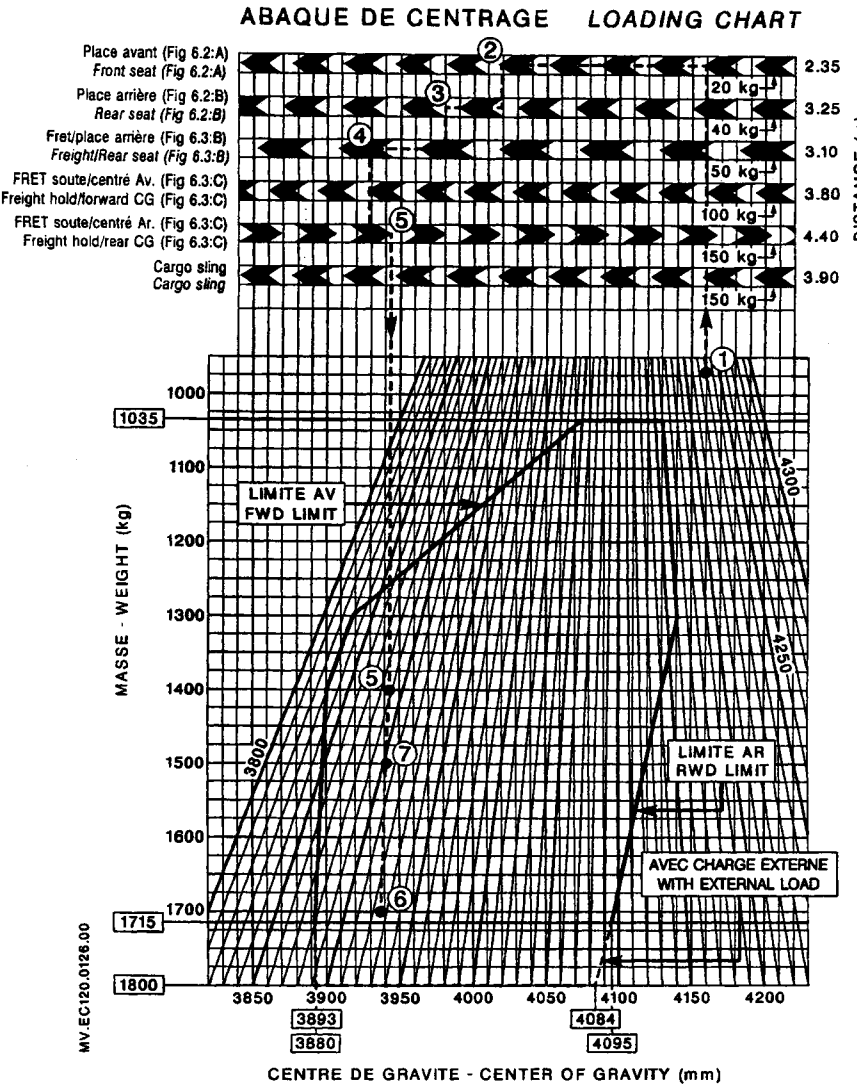

Figure 6-5 : Center of gravity

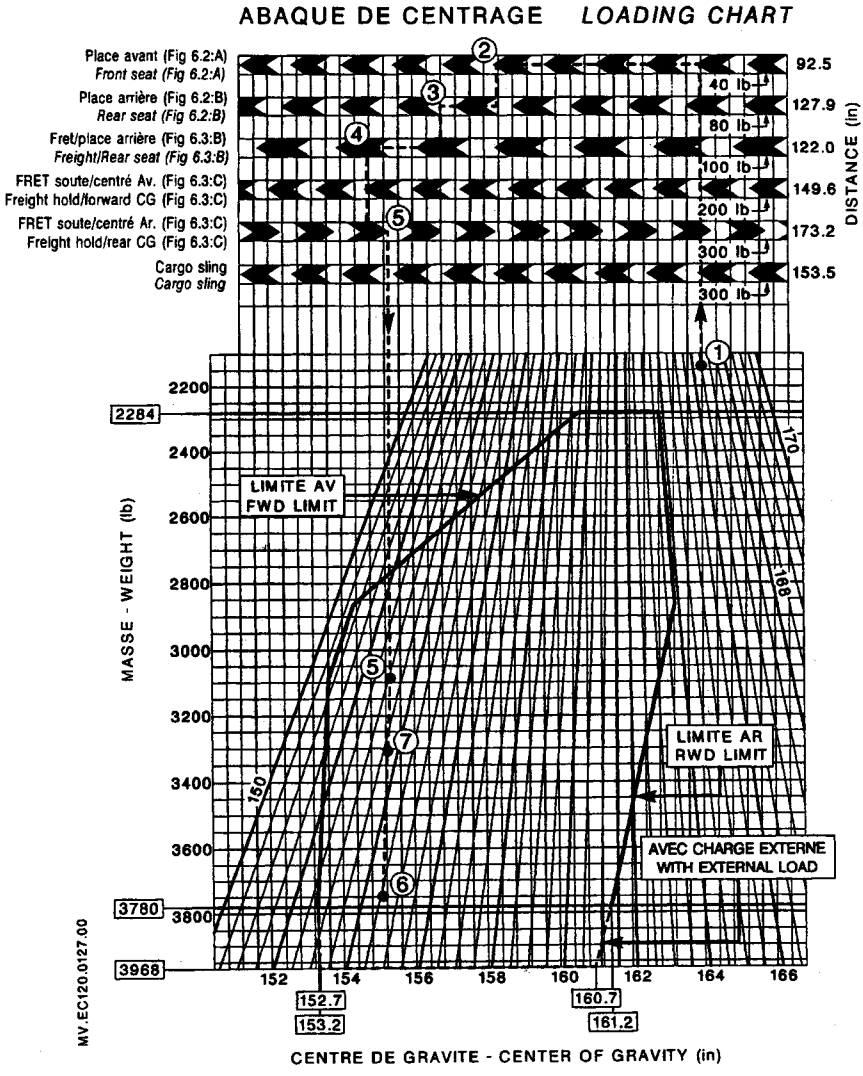

Figure 6 - 5 : Center of gravity (cont'd)

6.5 LATERAL CG

The tables below give the lateral CG positions for different weights and their moments with respect to the Y plane (positive dimensions on the right, negative dimensions on the left).

6.5.1 Crew and passengers

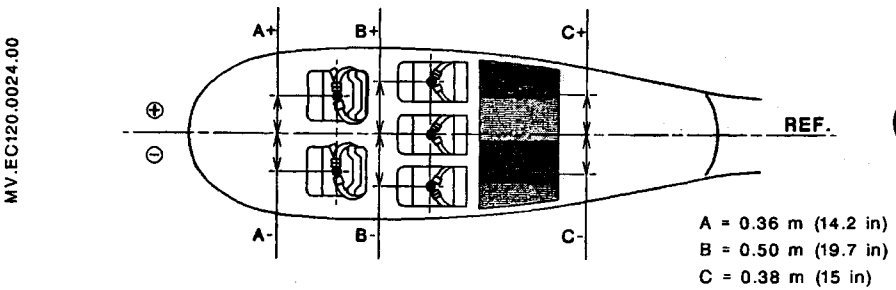

Figure 6 - 6 : Lateral location of seats and loads

METRIC UNITS						
WEIGHT	MOMENT : m.kg					
kg	A +	A -	B +	B -	C +	C -
50	18.00	- 18.00	25.00	- 25.00	19.00	- 19.00
60	21.60	- 21.60	30.00	- 30.00	22.80	- 22.80
70	25.20	- 25.20	35.00	- 35.00	26.60	- 26.60
80	28.80	- 28.80	40.00	- 40.00	30.40	- 30.40
90	32.40	- 32.40	45.00	- 45.00	34.20	- 34.20
100	36.00	- 36.00	50.00	- 50.00	38.00	- 38.00
110	39.60	- 39.60	55.00	- 55.00	41.80	- 41.80
120	43.20	- 43.20	60.00	- 60.00	45.60	- 45.60
130	46.80	- 46.80	65.00	- 65.00	49.40	- 49.40
140	50.40	- 50.40	70.00	- 70.00	53.20	- 53.20
150	54.00	- 54.00	75.00	- 75.00	57.00	- 57.00

ANGLO-SAXON UNITS						
WEIGHT	MOMENT : in.lb					
lb	A +	A -	B +	B -	C +	C -
50	71	- 71	99	- 99	75	- 75
100	142	- 142	197	- 197	150	- 150
150	213	- 213	296	- 296	225	- 225
200	284	- 284	394	- 394	300	- 300
250	355	- 355	493	- 493	375	- 375
300	426	- 426	591	- 591	450	- 450
330	469	- 469	650	- 650	495	- 495

6.5.2 Determination of lateral CG location

The computation method is the same as that used for determining the longitudinal CG location (§ CALCULATING CG - SECTION 6).

Add weights and moments to the aircraft empty weight and moment referring to preceding pages.

Lateral CG location values during the mission shall fall within the permissible limits.

Example during hoisting operation

	Kg	m.Kg
EEW	970	9.70
Pilot	80	28.80
Copilot	80	-28.80
Right passenger	80	40.00
Right cargo	150	57.00
Fuel	250	0.00
TOTAL	1610	106.7
Lateral C.G. location		

$$\text{Lateral CG} = \frac{106.7}{1610} = 0.0662 \text{ m}$$

This value falls within the permissible limits.

(Longitudinal CG = 3.993 m)

6.6 WEIGHT AND MOMENT OF EQUIPMENT ITEMS

The following list covers the equipment items. It gives the approximate weight and moment of the removable components.

DESCRIPTION	WEIGHT		MOMENT	
	kg	lb	m.kg	in.lb
Aircraft tool kit	TBD	TBD	TBD	TBD
Cabin fire extinguisher	2.01	4.43	4.82	418.59
RH front large door	11.10	24.47	27.75	2407.95
LH front door	8.90	19.62	20.47	1776.24
RH rear fixed panel	3.50	7.72	11.55	1002.23
LH rear sliding door	10.40	22.93	33.28	2887.81
Dual control	5.34	11.77	10.63	922.10
Front seat	12.10	26.68	30.25	2624.88
Three place seat rear (complete with armrests)	30.80	67.90	104.72	9086.87
First aid kit	TBD	TBD	TBD	TBD
LH side main flight controls	TBD	TBD	TBD	TBD

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SYSTEM DESCRIPTION

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7.1 INSTRUMENT PANEL AND CONSOLE

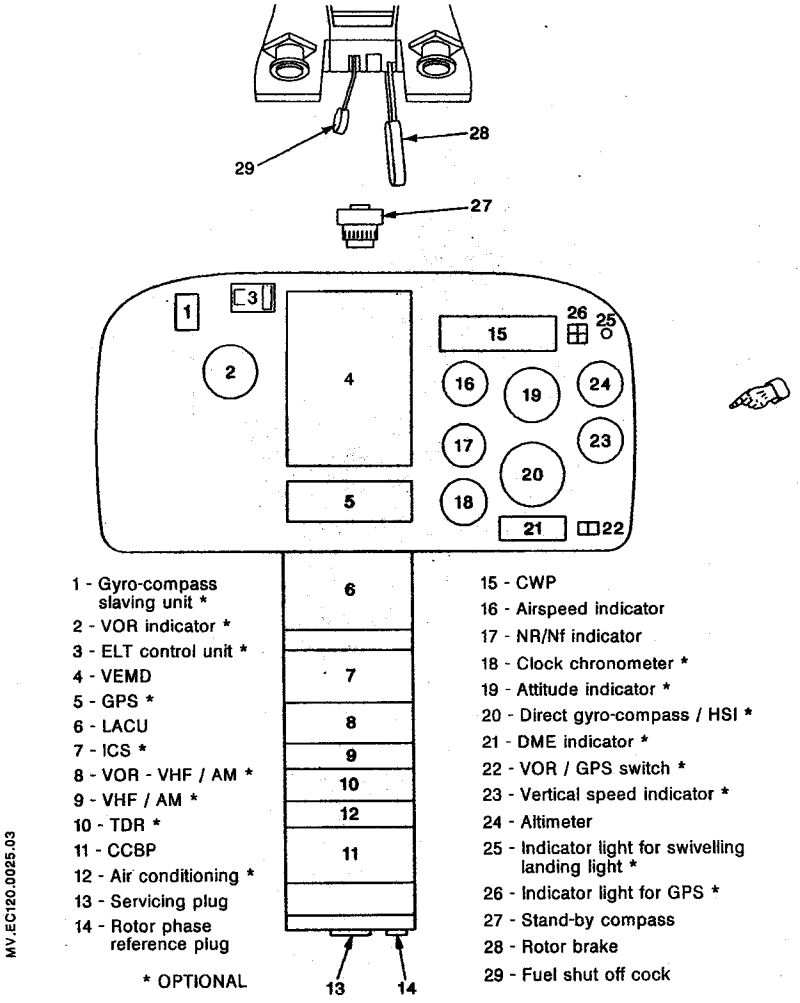

Figure 7 - 1 : Instrument panel and console

7.2 FLIGHT INSTRUMENTS AND COMPUTERS

7.2.1 CENTRAL COMPUTERS

- General

The central computers perform the ancillary service functions of the helicopter. They include two subassemblies :

- the ancillary systems unit (ASU) (1),
- the lighting and ancillary control unit (LACU) (2).

The ASU manages all the aural alarms, some visual warnings, and the processing of specific electrical signals.

The LACU includes all the electrical indicating and control components of the main systems and lighting systems.

- Characteristics

The ASU and the LACU are both supplied with a dual 28 V DC power supply, and are protected by circuit breakers.

- Description

The ASU (1) performs the following functions :

- management of the ENG FIRE warning light,
- generation of the aural max. and min. NR alarms,
- management of aural "gong" alarms, due to red alarms and maximum takeoff rating,
- generation of the FLIGHT/GROUND signal for the VEMD,
- time delay for maintaining the electro-magnetic pointer of the twist grip after releasing the starter button,
- management of the ENG CHIP caution light,

The front panel of the LACU (2) includes :

- A lighting selector : OFF/DAY/NIGHT. In the DAY position, lighting is at nominal brightness. In the NIGHT position, the VEMD lighting, NR/NF indicator lighting and warning lights are dimmed.
- Two potentiometers for adjusting the brightness of the instrument panel, console and standby compass lighting, which are active when the selector is in the DAY or NIGHT position.
- Control and monitoring pushbuttons.

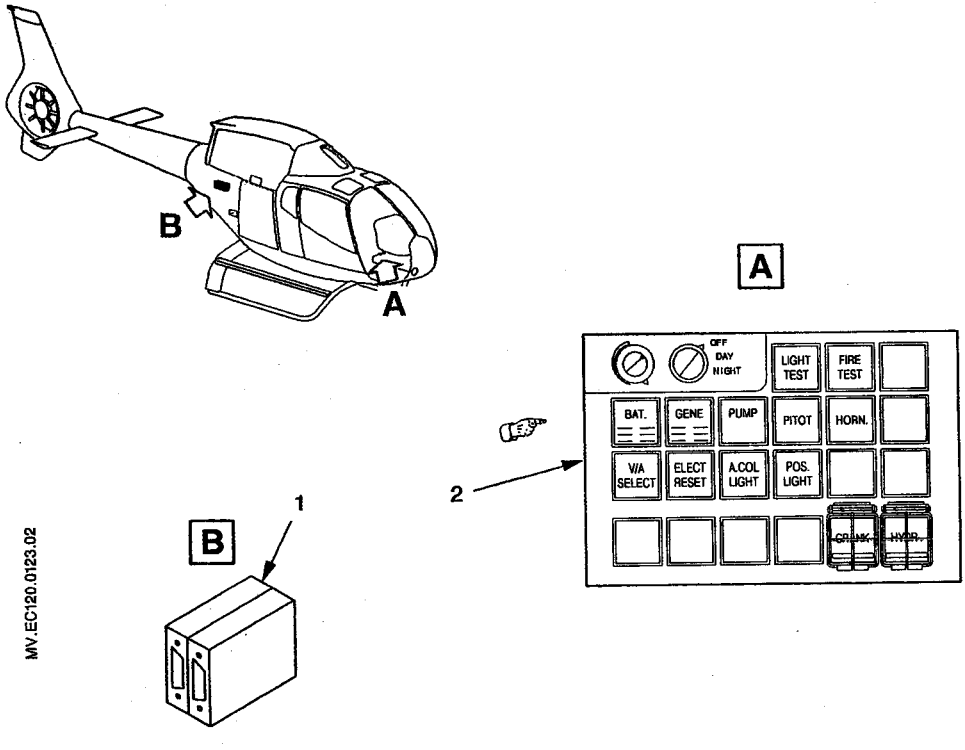

Figure 7 - 2 : Central computers

7.2.2 CENTRAL WARNING SYSTEM

- Description

Visual indicators are provided by a caution and warning panel which comprises the following components :

- 6 red warning lights for alarms which require immediate action,
- 18 amber caution lights for alarms requiring action which can be deferred.

Aural alarms are generated via the intercommunications system. The aural warning is activated by pushing in the HORN pushbutton on the Lighting and Ancillary Control Unit (LACU). In this case, the HORN light extinguishes on the caution and warning panel.

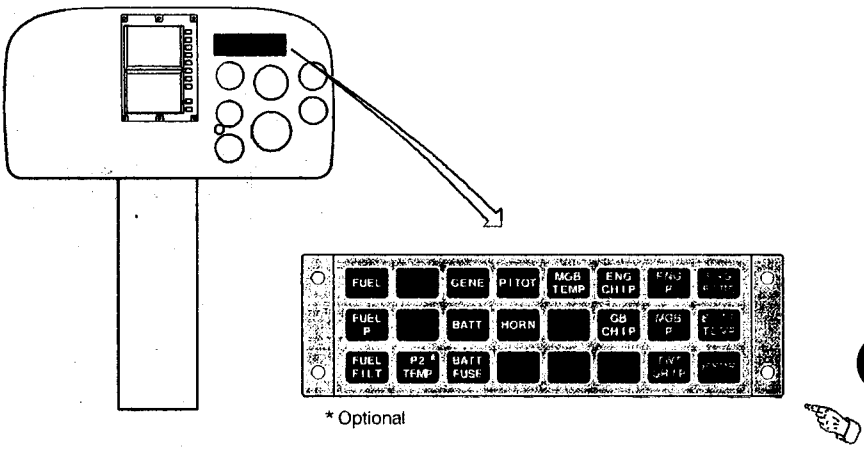

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Figure 7 - 3 : Central warning system

• Characteristics

The central warning system is supplied by a dual 28 V DC power supply and is protected by circuit breakers.

7.2.3 VEHICLE AND ENGINE MANAGEMENT DISPLAY

• General

The system, which comprises the VEMD multi-function screen, provides a display of engine and vehicle parameters. The VEMD is located in the center of the instrument panel and comprises :

- two calculating modules : LINE 1 and LINE 2,
- one "screen" module which comprises two screens and control pushbuttons.

• Characteristics

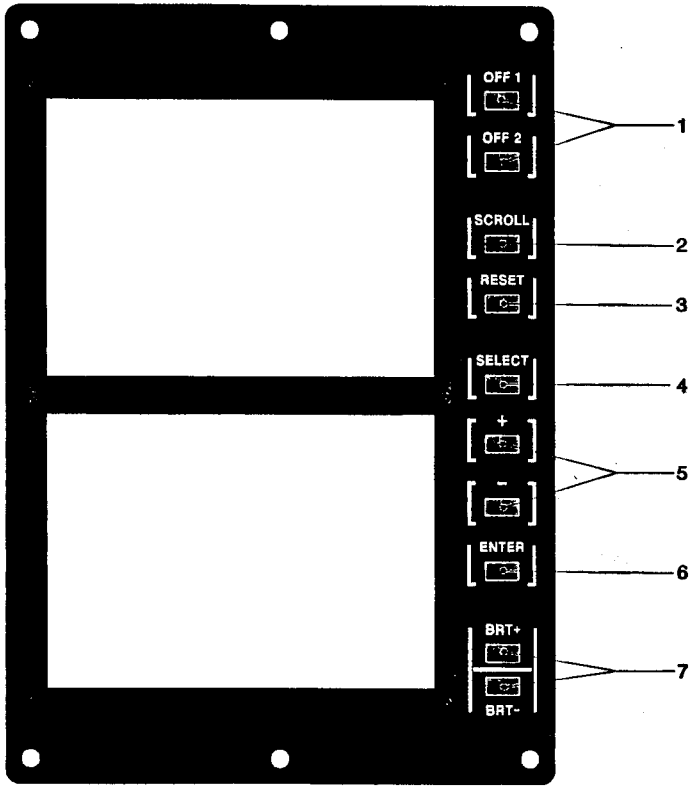
The VEMD is supplied with a dual 28 V DC power supply and is protected by circuit breakers.

• Operating modes

Three operating modes are accessible :

- "FLIGHT" mode : by default, this constitutes the main operating mode of the equipment. It contains the ENGINE, VEHICLE, FLI, FLIGHT REPORT, ENGINE POWER CHECK and PERFORMANCE pages.
- Access to "CONFIG" mode :
  1. Switch Battery OFF.
  2. Maintain [SELECT] and [ENTER] depressed, while switching battery ON.
  3. Maintain until message "RELEASE KEY" appears on two screens.
- Access to "MAINT" mode :
  same procedure as "CONFIG" mode except item 2, replace by following :
  .maintain [SCROLL] and [RESET] depressed, while switching battery ON.

- VEMD controls



1 - OFF1 (2) pushbuttons:
. Energize or cut the processing module 1 (2) and the upper (lower) screen.

2 - SCROLL pushbutton:
. Commute the page

3 - RESET pushbutton:
. Return to nominal display configuration.

4 - SELECT pushbutton:
. Select the data field

5 - +/- pushbuttons:
. Increase/decrease the numerical value of the selected data.

6 - ENTER pushbutton:
. Validate the selected data.

7 - BRT +/- pushbuttons:
. Screen brightness control

Figure 7 - 4 : VEMD control

- Operation

The VEMD is switched on when the "BAT" switch is set to "ON".

The equipment performs an initialization test which checks correct operation of each of the two lines. During the test, the following message is displayed :

"TEST IN PROGRESS"

If the test is faulty, the following is displayed :

"LANE1 FAILED" "PRESS OFF1" or "LANE 2 FAILED" "PRESS OFF2"

The line concerned can be cut by pressing the associated pushbutton (OFF1 or OFF2). This validates the initialization tests and switches the remaining line to operating mode.

If the test is correct, the VEMD automatically goes to operating mode.

- FLIGHT mode

The flight mode is displayed by default, when no other mode is selected. The "SCROLL" pushbutton is used to scroll the pages as shown on the following diagrams (Fig. 7.5 and Fig. 7.6).

– Management of pages in normal mode

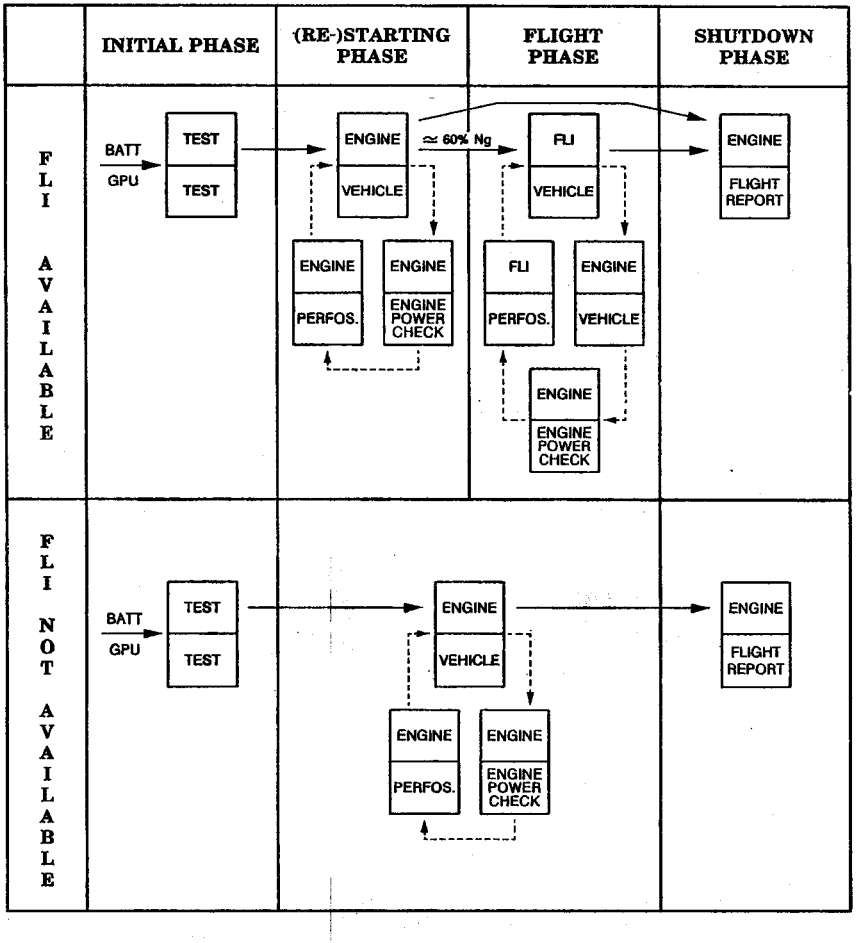


Figure 7 - 5 : Management of pages in normal display mode

→ Automatic change-over at end of phase.

---> Page selected manually by pressing "SCROLL".

Management of pages in degraded mode.

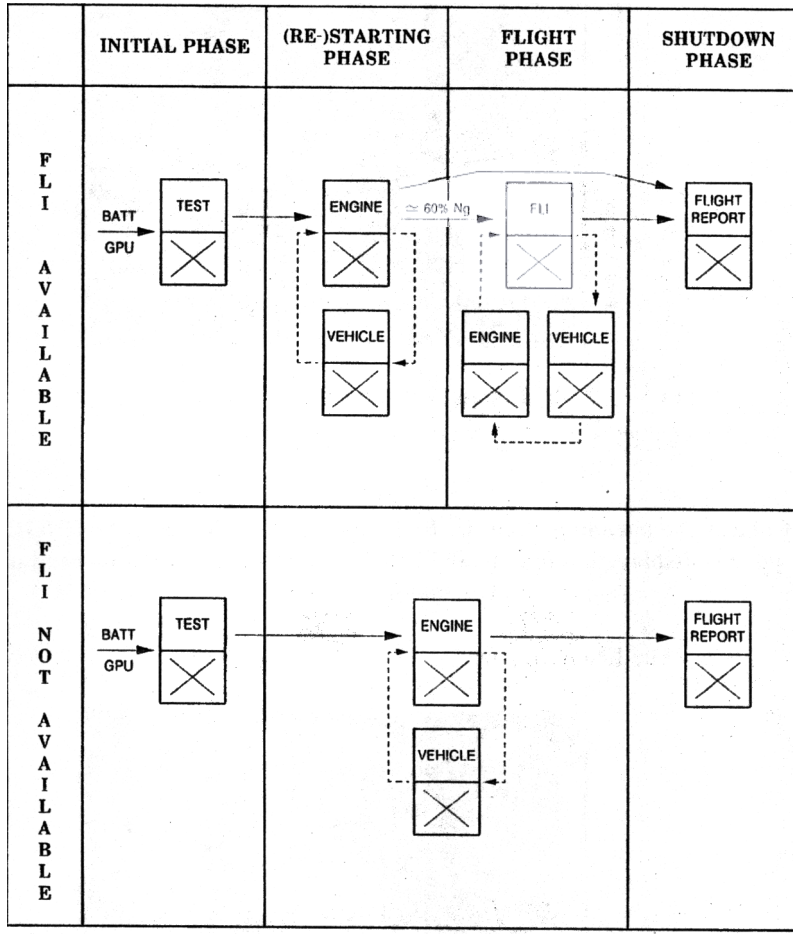


Figure 7 - 6 : Management of pages in degraded display mode

→ Automatic change-over at end of phase.

---> Page selected manually by pressing "SCROLL".

- The FIRST LIMITATION INDICATOR (FLI) page

Figure 7 - 7 : FLI page (Values given as an example)

Fuel gauge with auxilary tank installed (optional)

NOTE

If one of the parameters on the FLI page becomes invalid, the ENGINE page is displayed automatically ; the parameters can then be read on independent indicators.

The ENGINE page

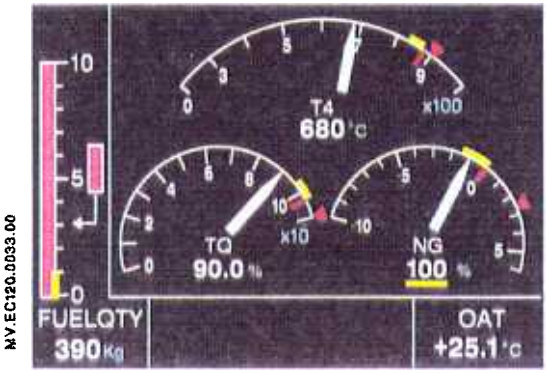


Figure 7 - 8 : ENGINE page

– The VEHICLE page

Figure 7 - 9 : VEHICLE page

The fuel flowmeter (Optional) delivers an instantaneous fuel consumption and the VEMD computes the remaining endurance as a function of the remaining fuel quantity.

– The ENGINE POWER CHECK (EPC) page

The first page displays the conditions of compliance, where applicable, when the EPC is requested, in order to obtain a correct engine power check. The check is broken down into three phases :

* a value stabilization phase,
* a more restrictive stabilization phase,
* a margin stabilization phase.

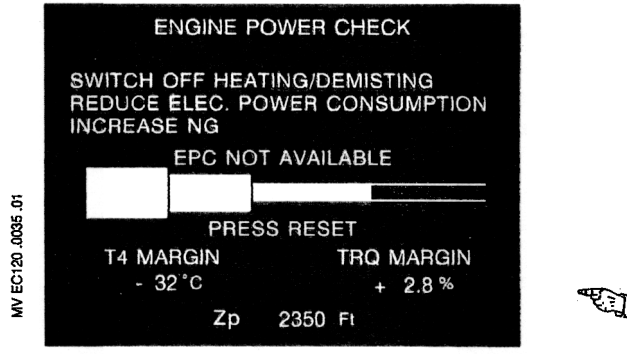


Figure 7 - 10 : First page of the EPC

The second page displays the result of the EPC according to 6 parameters (Ng, Nf, T4, Zp, Tq, OAT) and the positive or negative differences in T4 and torque.

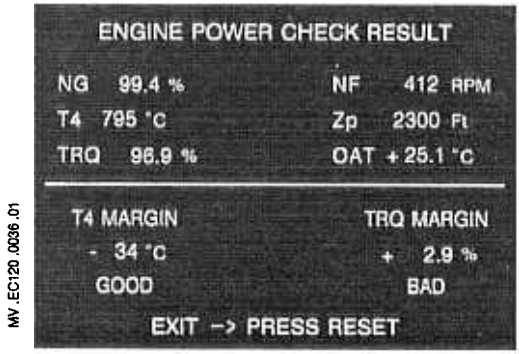


Figure 7 - 11 : Second page of the EPC

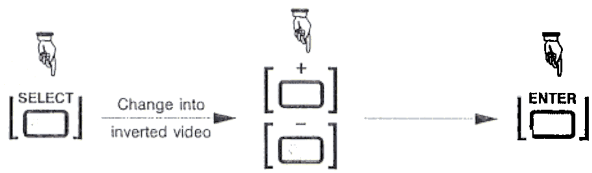
– The PERFORMANCE page

This page is used to calculate aircraft weight and performance in the form of takeoff weights, in and out of ground effect.
The following parameters must be set :

- the equipped empty weight of the aircraft
- the weight of the crew
- the weight of the payload
- the sling load if installed (optional)

Fuel and external parameters Zp and OAT are taken into account automatically.

For mission planning purposes, Zp and OAT can be modified.
When Zp is modified, the OAT decreases in accordance with the standard atmosphere law. When the page is changed or another parameter is selected, the VEMD takes into account the actual Zp and OAT values. To set or modify the parameters, apply the following procedure :



Use of + / – Keys

	Weight	Zp	OAT
Press > 5s	± 100 kg (200 lb)	± 500 ft (150 m)	± 5°C (10°F)
Press < 5s	± 2 kg (4 lb)	± 100 ft (30 m)	± 1°C (2°F)

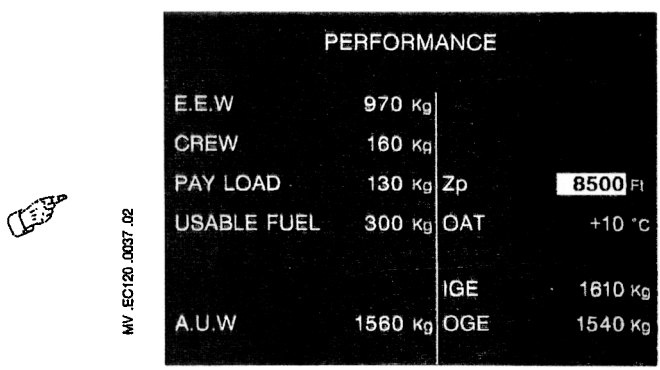


Figure 7 - 12 : PERFORMANCE page

NOTE

When the IGE and OGE values are less than the aircraft all-up weight, they are displayed in yellow.

– The FLIGHT REPORT page

The purpose of this page is to provide the crew with a synthetic report of the last flight performed. The end of flight report automatically replaces the "VEHICLE" page when the VEMD detects the engine "shutdown" state.

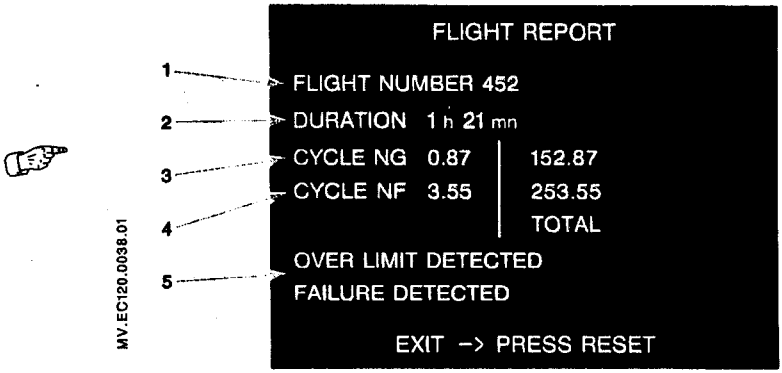


Figure 7 - 13 : FLIGHT REPORT page

1 - Flight number, which is incremented automatically.
2 - Flight time
3 - Compressor cycles / Total cycles
4 - Free turbine cycles / Total cycles
5 - Message area (in yellow) if a discrepancy is detected during the flight.

If a message appears, refer to the "MAINTENANCE" mode in the systems description manual.
To exit this page, press the "RESET" key.

7.3 ENGINE SYSTEM

7.3.1 GENERAL

The engine is located in a separate fireproof compartment after the MGB and above the LH rear cargo compartment. The TURBOMECA ARRIUS 2F engine is a free-wheel turbo shaft type engine with a single stage centrifugal compressor, an annular reverse flow combustion chamber and a single gas generator turbine.

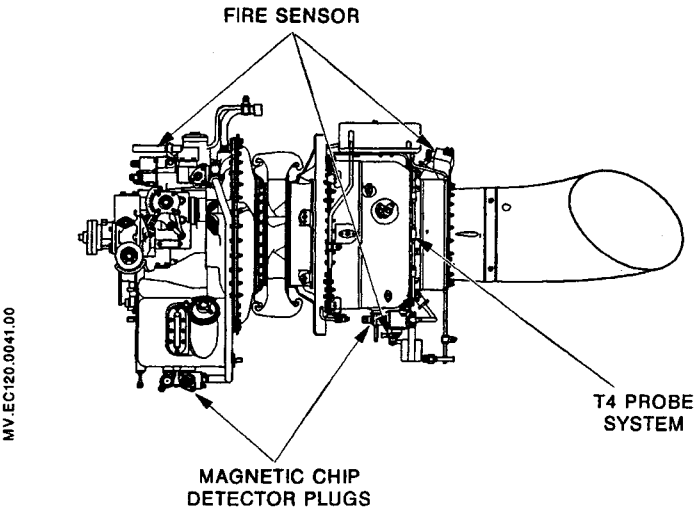


Figure 7 - 14 : Engine view

7.3.2 ENGINE OIL SYSTEM

The engine oil system is divided into two systems :

- an external system installed in both the MGB and engine compartments. It includes two coolers crossed in parallel by the oil and a thermostatic valve which bypasses the coolers for low temperature starting. The hoses installed in the engine compartment are fireproof.
- an internal system integrated into the engine. It includes a tank, pressure and scavenge pumps, a filter and electrical magnetic chip detector plugs.

7.4 FUEL SYSTEM

7.4.1 GENERAL

The fuel system comprises two tanks with crashworthy elastomer bladders, a supply system, refueling equipment and a monitoring system. The connections are anti-crash treated.

7.4.2 FUEL TANKS

The upper tank is located above the cargo compartment and feeds the lower tank by gravity. The lower tank is located below the cargo compartment floor. The engine is supplied from this tank.

Both tanks are equipped with a mounting plate and a fuel level transmitter.

As soon as the upper tank is dried, the indicated fuel quantity is approximately 145 kg (180 l – 48 US gal). According to the fuel flow, this value reaches 120 kg (150 l – 40 US gal) due to the fuel lines between the two tanks after about 15 minutes flight.

The lower tank also includes a starting pump, a quick fuel drain valve and a decanting sump with a sediment drain valve. A venting device on the RH side and a filler on the LH side are fitted to the upper tank.

7.4.3 FUEL SUPPLY SYSTEM AND REGULATION

The fuel is sucked up through the filter by the high pressure pump.

The fuel flow is regulated in the metering valve according to the power required in normal flight mode. The principle is to govern a constant Nf regardless of the power required from the engine, by controlling Ng:

For starting, the twist grip opens the metering valve, regulators supply the fuel necessary for lighting up Ng ≅ 15 % under starter generator effect. The twist grip is then moved forward to its flight position.

The fuel is then distributed to the injectors.

7.4.4 CONTROLS AND MONITORING

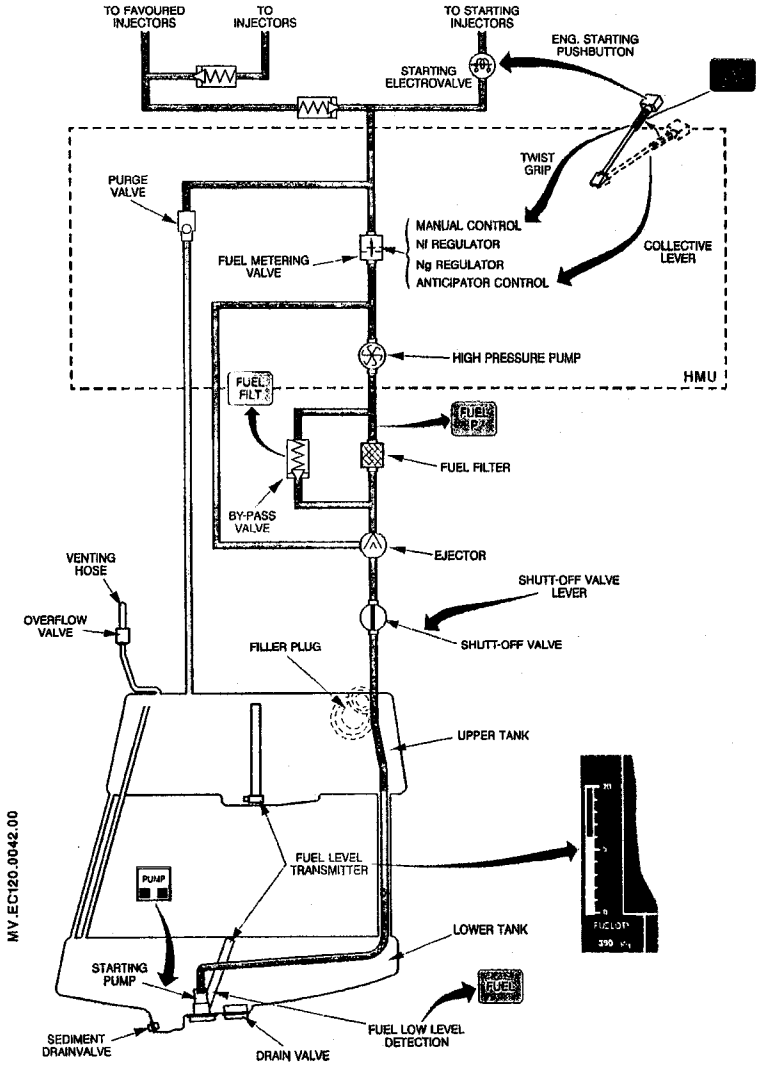


Figure 7 - 15 : Fuel system

7.5 TRANSMISSION SYSTEM

7.5.1 ROTORS

- MAIN ROTOR

The main rotor is fully articulated and includes three blades. It rotates clockwise when viewed from above at a nominal speed of 406 rpm. Flapping, lead-lag and pitch hinges are provided by a spherical elastomeric bearing. An elastomeric lead-lag damper links each blade to the hub.

- TAIL ROTOR

The tail rotor is shrouded (FENESTRON), and is housed in the vertical fin ; it comprises eight blades.
The blades rotate clockwise when viewed from the LH side of the aircraft.

7.5.2 TRANSMISSION

The transmission system consists of:

- Engine / MGB coupling,
- Main gear box (MGB),
- Tail rotor drive shaft,
- Tail gear box (TGB).

- ENGINE / MGB COUPLING

The engine / MGB coupling transmits the engine power to the MBG.
It consists of :

- A coupling shaft with a triangular flange at each end.
- Two flexible couplings at each end of the shaft.
- An antifail system in case of flexible couplings failure.
- A fixed housing bolted to the engine on one side and attached to the input casing on the other side.

- MGB
  - It transmits the power from the engine to the main rotor with a speed reduction.
  - It drives the tail rotor drive.
  - It drives and supports the hydraulic compact unit, the MGB lubricating pump, the rotor brake and the oil cooler fan.
  - It supports the servocontrols and suspension bar attachment fittings.

It includes its own lubricating system, monitoring systems and access for maintenance.

The lubricating pump sucks the oil up from the MGB sump through a strainer and delivers it through a filter. The oil returns to the sump by gravity.

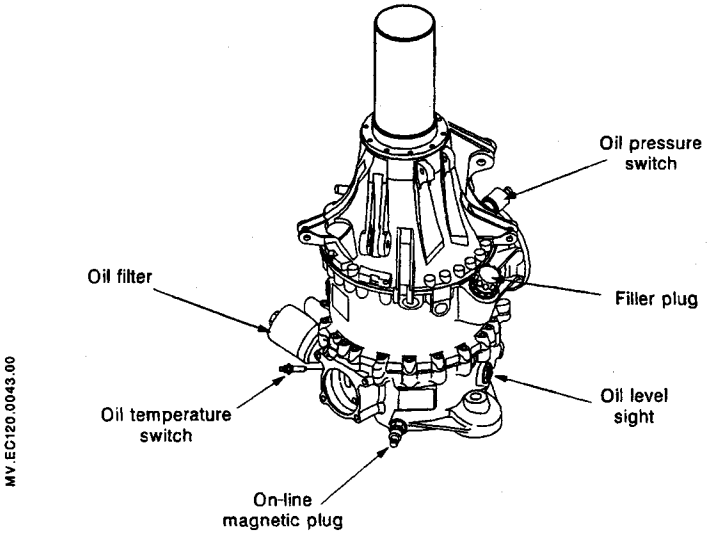


Figure 7 - 16 : Main gear box

- TAIL ROTOR DRIVE SHAFT AND TGB

The tail rotor drive shaft is composed of two shafts, a front shaft which is shorter, and a rear shaft.
The TGB is fitted to the rear end of the tail boom and it comprises power and control modules contained in one housing.
The TGB is splash-lubricated and comprises a visual oil level indicator and a chip detection device (amber « GB CHIP » caution light).

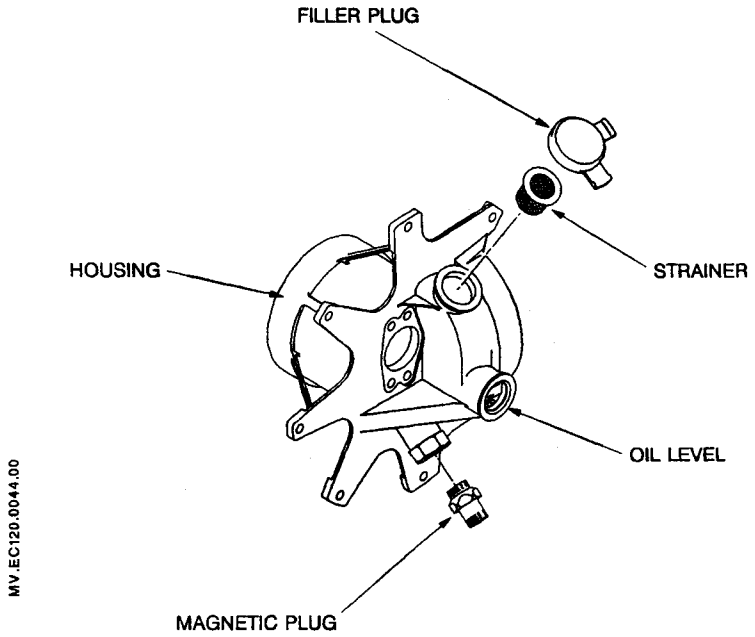
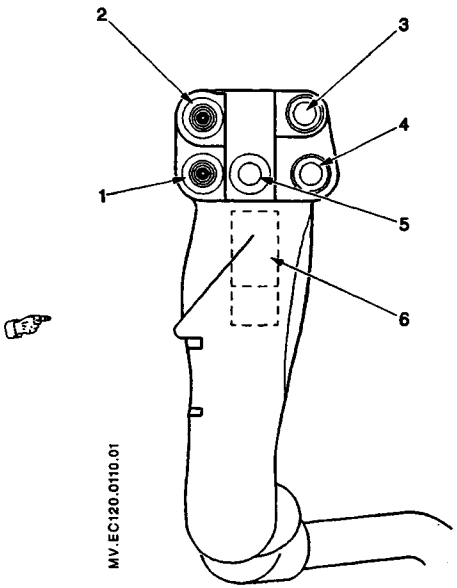


Figure 7 - 17 : Tail gear box

7.6.2 CYCLIC STICK GRIP



1 - Radio frequency selection switch
2 - Four-way mirror switch *
3 - Cargo release pushbutton *
4 - AFCS release pushbutton *
5 - Camera pushbutton *
6 - ICS switch

* OPTIONAL

Figure 7 - 19 : Cyclic stick grip

7.7 HYDRAULIC SYSTEM

7.7.1 GENERAL

The hydraulic system reduces the pilot's workload by providing hydraulic assistance to actuate the main rotor controls. It comprises two separate assemblies :

- a hydraulic compact unit, supported and driven by the MGB, which generates the hydraulic power, pressure and flowrate.
- a distribution system which comprises flexible pressure and return hoses, supplying the three servo-controls.

• Normal operation

At start-up, hydraulic pressure is nil and the red "HYDR" warning light (9) is lit on the caution and warning panel. When the pressure in the system is between 20 and 30 bar (290 psi and 435 psi) the warning light (9) must go out.

When the pushbutton (6) is released, and the switches (7) are in the off position, the electro-valves (4) and (8) are not energized and are open.

The hydraulic pump (2) operates when the rotor is spinning.

The regulating valve (1) regulates the pressure to between 37 and 40 bar. The hydraulic warning light (9) is out.

The servo-controls are supplied normally.

The nitrogen in the accumulators (3) is compressed by the hydraulic fluid. The pressure of the nitrogen P1 equalizes with the pressure of the hydraulic fluid P2 (Detail A). The accumulator (3) is ready to release its energy (expansion of gas) in case of a pressure drop.

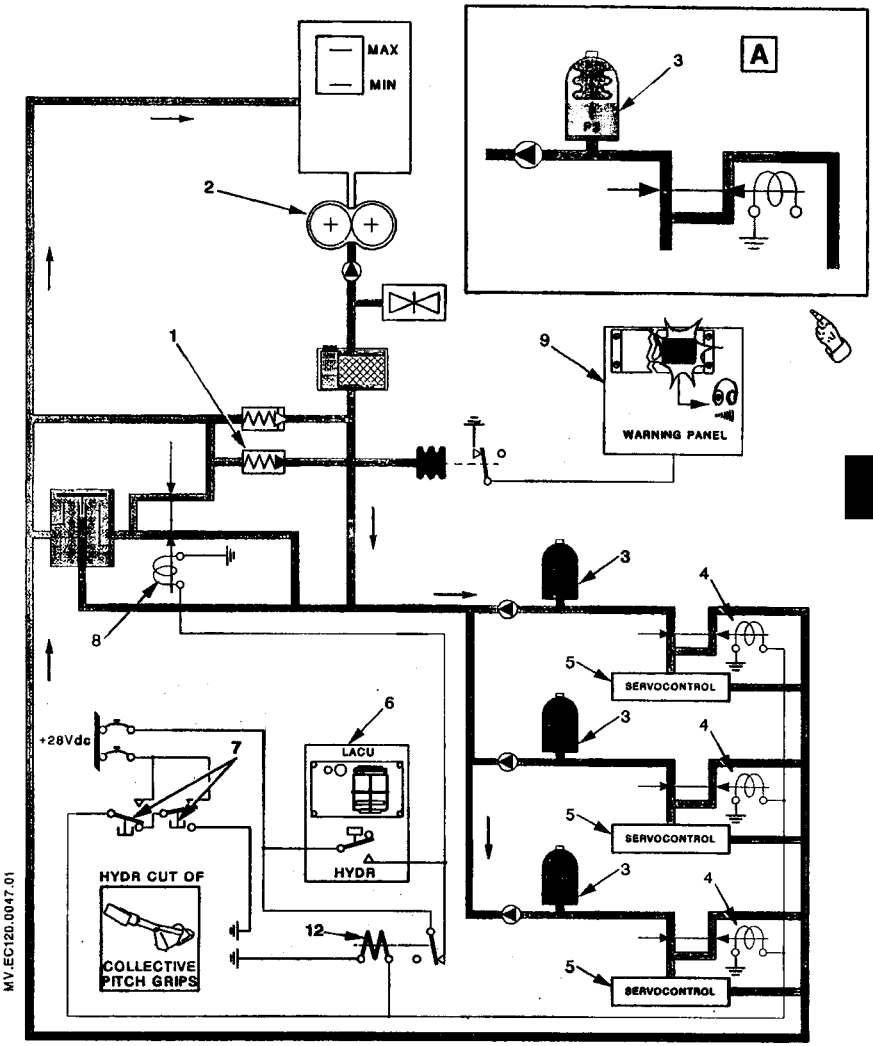


Figure 7 - 20 : Hydraulic system

7.7.2 HYDRAULIC COMPACT UNIT

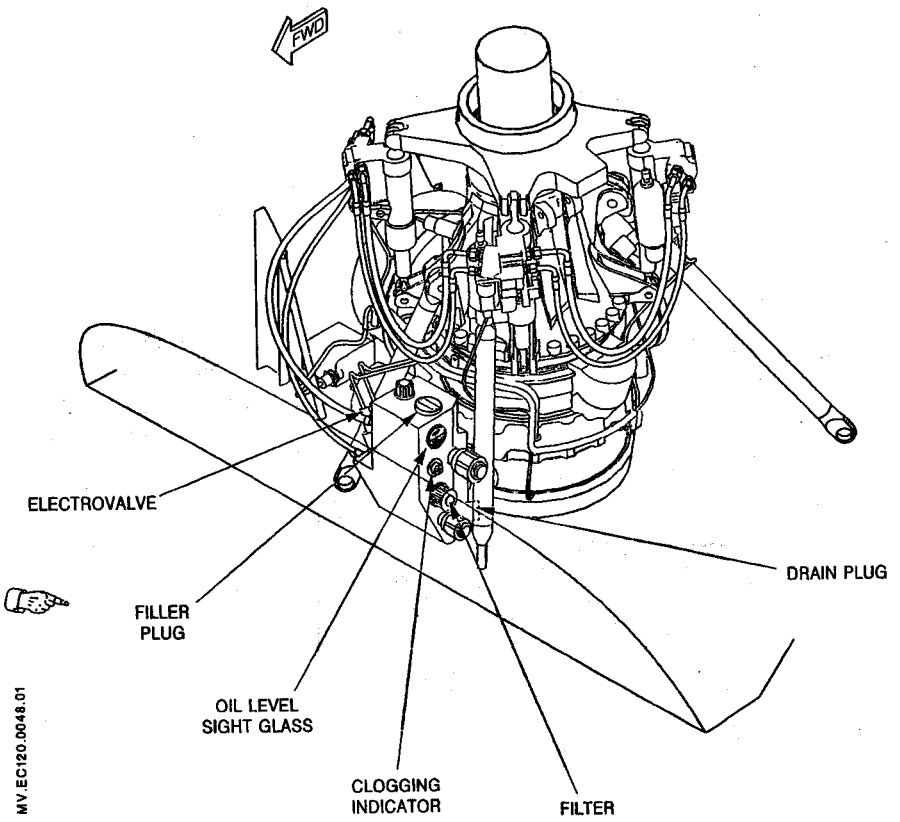
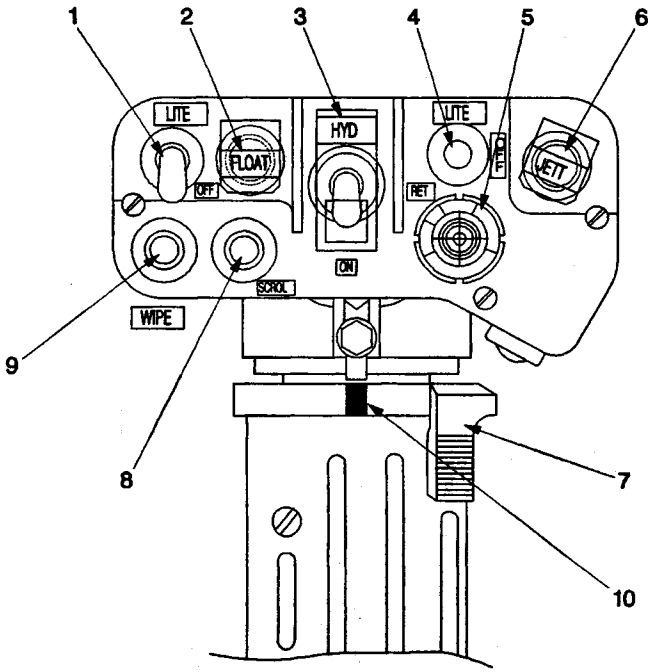


Figure 7 - 21 : Hydraulic compact unit

7.6 FLIGHT CONTROL GRIPS

7.6.1 COLLECTIVE LEVER GRIP



1 - Fixed landing light switch
2 - Emergency floatation switch *
3 - Hydraulic cut-off switch
4 - Retractable landing light switch *
5 - Retractable landing light position control *
6 - Hoist cable cutter *
7 - Engine starting pushbutton
8 - VEMD scroll pushbutton
9 - Windshield wiper pushbutton *
10 - Start position (22° on governor twist grip input)

* OPTIONAL

Figure 7 - 18 : Collective lever grip

7.8 ELECTRICAL SYSTEM

7.8.1 GENERAL

The generation and distribution system supplies the electrical network with 28 V DC regulated voltage. The network may be supplied by:

- A starter generator located on the engine accessory gear box.
- A battery located in the cargo bay at the tail boom-to-fuselage junction frame.
- An external power unit (EPU) plug (if fitted) on the right side (400A max).

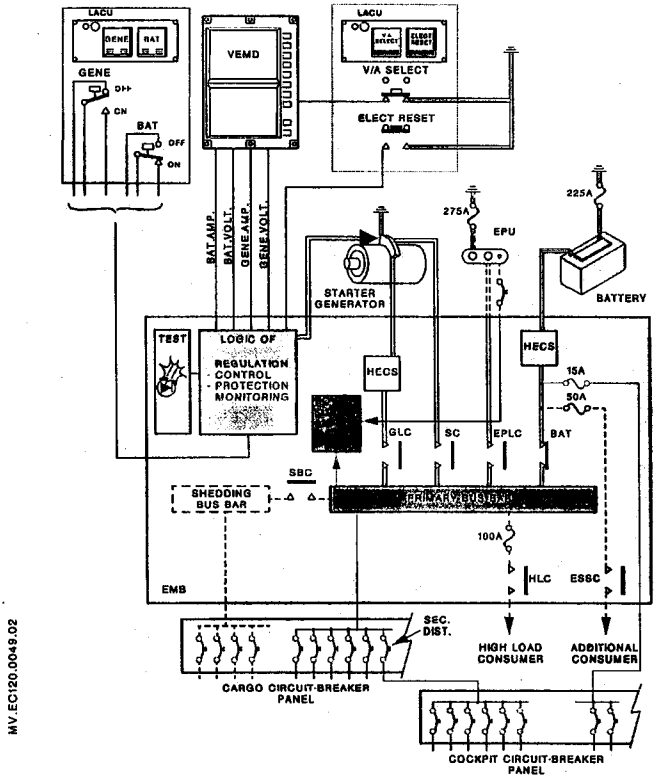


Figure 7 - 22 : Electrical system

7.8.2 DESCRIPTION OF ELECTRICAL SYSTEM

Power sources are connected to the electrical master box (EMB) which ensures the following functions :

- regulation of the starter generator.
- electrical network protection against failure of power sources and distribution.
- connection of power sources to the electrical network.
- operating logic (network reconfiguration).
- interface between generation, distribution system and indicating, control and monitoring system.
- its own testability.

Power distribution is ensured by :

- a cargo compartment circuit breaker panel ,
- a cockpit circuit breaker panel (CCBP).

7.8.3 ELECTRICAL DISTRIBUTION

The DC distribution system includes :

- an electrical master box (EMB) (2),
- a cargo compartment circuit breaker panel (3),
- a cockpit circuit breaker panel (CCBP) (1).

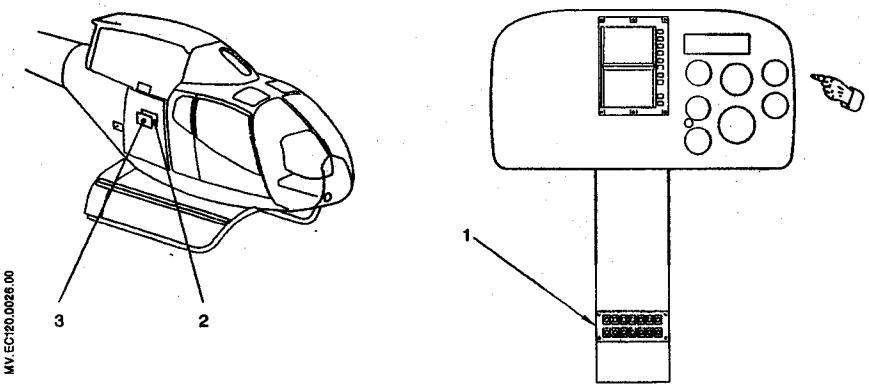


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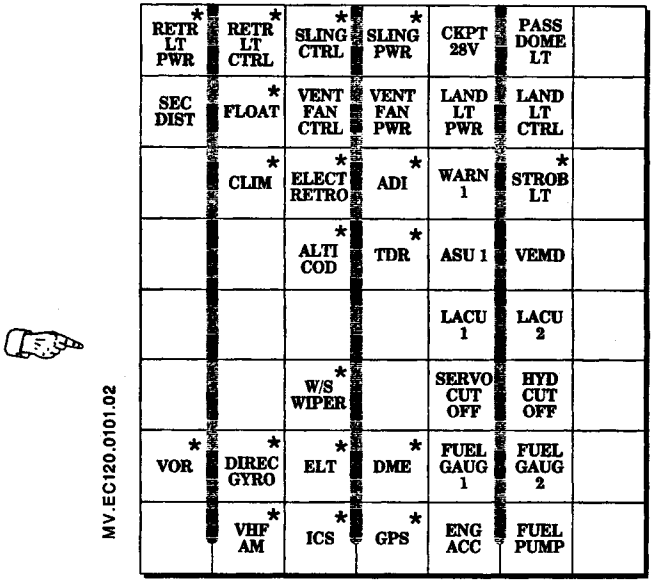
Figure 7 - 23 : DC distribution - General description

• CARGO COMPARTMENT CIRCUIT BREAKER PANEL

The cargo compartment circuit breaker panel is installed in front of the EMB.

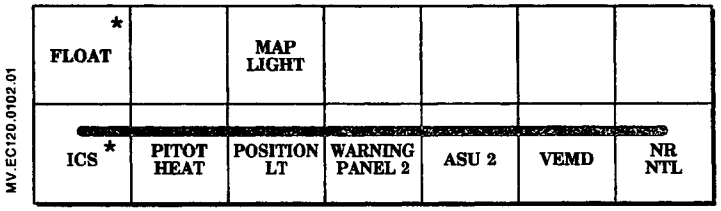


* Optional equipments

Figure 7 - 24 : Cargo compartment circuit breaker panel

• COCKPIT CIRCUIT BREAKER PANEL

The CCBP is installed on the console.



* Optional equipments

Figure 7 - 25 : CCBP

7.9 LIGHTING SYSTEM

7.9.1 INTERIOR LIGHTING

- GENERAL

Interior lighting is provided by :

- a spot light located on the overhead panel, for normal instrument panel lighting.
- two map lights on the overhead panel, which are supplied directly by the battery, for instrument panel and console emergency lighting.
- integral lighting of console instruments (including standby compass).
- LCD displays on VEMD and NR/Nf indicator.
- CWP integral lighting.
- a dome light for the passengers.
- an internal light for the stand-by compass.

- CONTROLS

Except for the map lights, the interior lighting is controlled by the OFF/DAY/NIGHT switch, the general lighting potentiometers on the LACU, and the NR/NF lighting potentiometer :

- OFF : the spot light and console instrument lighting are off; the LCD displays and CWP lights are at nominal brightness.
- DAY : the spot light and console instrument lighting are on ; the LCD displays and CWP lights are at nominal brightness.
- NIGHT : the spot light and console instrument lighting are on ; the LCD displays and CWP lights are dimmed.

- The brightness of the spot light and console instrument lighting can be adjusted using the general lighting potentiometers.
- Each map light is switched on by rotating the head of the light. Brightness is adjusted using a potentiometer located near the light.
- The passenger dome light is controlled by a switch located in front of the light.
- The stand-by compass light is controlled by a switch located on the compass.
- The brightness of LCD displays on NR/NF indicator (1) can be ajusted using the NR/NF lighting potentiometer (2) when the LACU switch is on NIGHT position.

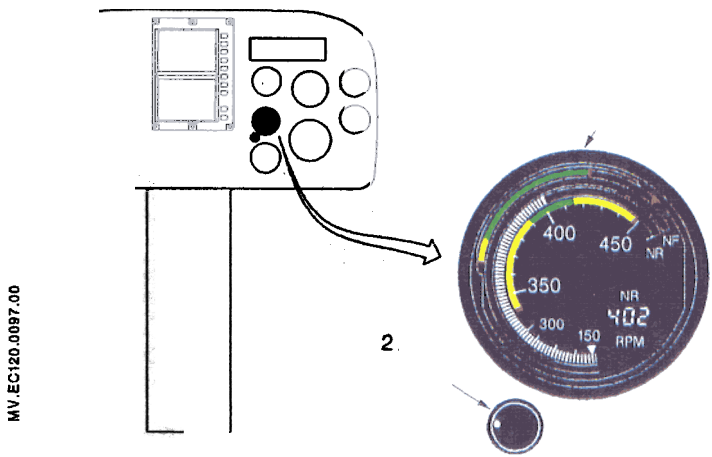


Figure 7 - 26 : NR/NF indicator and lighting potentiometer

7.9.2 EXTERIOR LIGHTING

The exterior lighting comprises position lights, anticollision light and a fixed landing light.

The position lights and anticollision light are switched ON/OFF by POS.LIGHT and A.COL LIGHT LACU pushbuttons. The landing light is switched ON/OFF by a switch on the collective lever grip.

7.10 CABIN VENTILATION / HEATING AND DEMISTING

7.10.1 AIR GENERATION

In flight, some outside air taken in through the front air intake, is diverted into the RH forward cowling compartment by the ventilation scoop. This air crosses the P2 venturi nozzle where it is mixed with P2 air. This air then supplies the distribution system via a hole in the cabin ceiling.

The cabin air distribution system comprises a duct fitted underneath the cabin ceiling and positioned on the aircraft center line. This duct is divided into two arms.

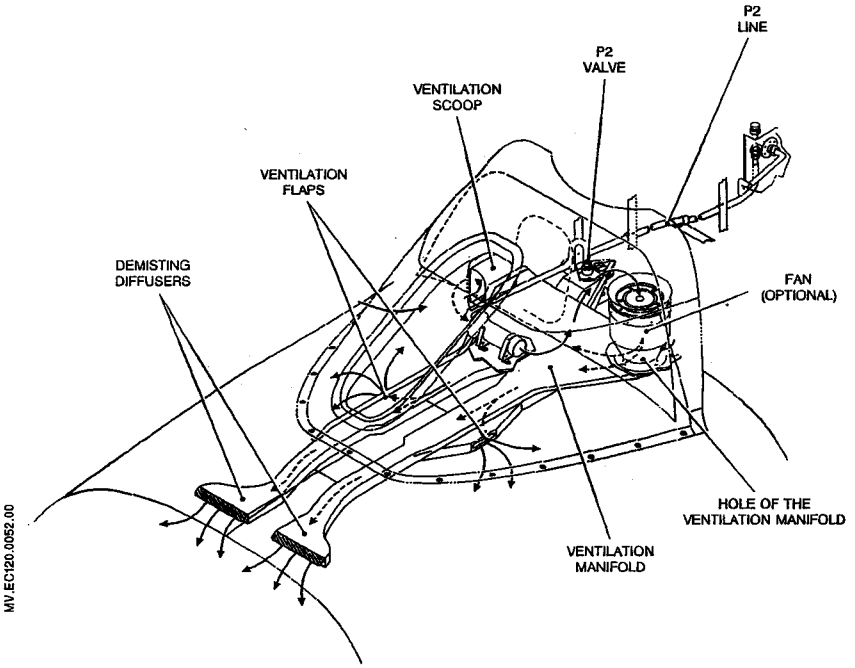


Figure 7 - 27 : Air generation

7.10.2 CONTROLS AND MONITORING

- VENTILATION CONTROL

The ventilation is controlled by adjusting louvres:

- Open/closed.
- Air flow adjustment.

- HEATING AND DEMISTING CONTROL

The warm air temperature setting is performed by the P2 gate valve control knob located on the cabin ceiling.
The louvres have to be closed for demisting operation.

- MONITORING

The crew is informed that the P2 gate valve is in the open position by a P2 flag on the VEMD upper screen.

7.11 PITOT-STATIC SYSTEM

- GENERAL

The Pitot tube picks up the total pressure (Pt) which is transmitted to the airspeed indicator. The tube incorporates a resistor for heating. An amber "PITOT" caution light on the caution and warning panel indicates that the heating system is not operating or has failed.
The two static pressure ports pick up the static pressure (Ps) which is transmitted to the pilot's conventional instruments (airspeed indicator, rate-of-climb indicator, altimeter) and to the VEMD for performance calculation.
The bleed valve is used to drain any condensation water which may accumulate within the system.
The air data system comprises a Pitot tube (7), two static pressure ports (1), a bleed valve (8), an altimeter (3), a rate-of-climb indicator (4), an airspeed indicator (2), and a temperature probe (6) connected to the VEMD (5).

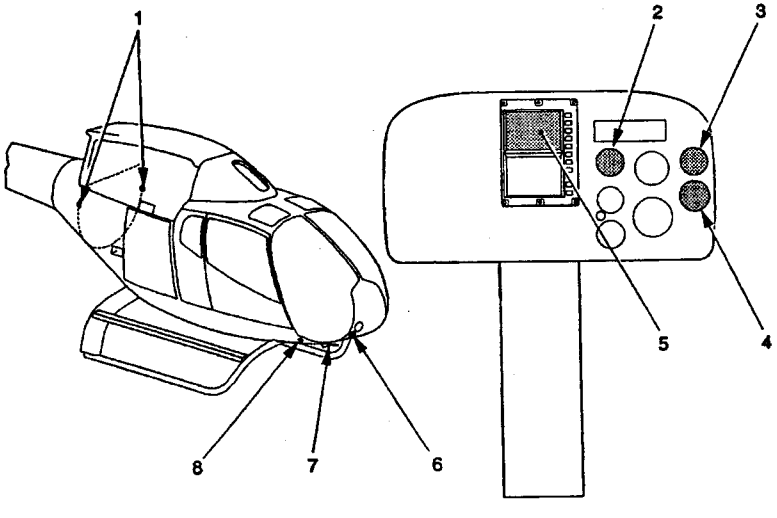


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Figure 7 - 28 : Pitot-static system

SECTION 8

HANDLING - SERVICING - MAINTENANCE

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8.1 GROUND HANDLING

8.1.1 EQUIPMENT REQUIRED

- For moving the aircraft by hand :
  - single or twin handling (optional) wheels.
  - jacking lever.
- For towing the aircraft with a tractor :

  the above-mentioned equipment, plus :
  - a towing bar installation.

8.1.2 HANDLING

- Moving the helicopter by hand

  On prepared ground
  - Position the ground handling wheels on the mounting studs according to aircraft balance.
  - Install ground handling wheels (wheels outside skids).
  - Check that wheels are correctly locked (see Detail A).

    Lift the aircraft onto the wheels using a jacking lever.

    Lock in this position with retaining pins.

ATTENTION

Do not use the single handling wheels if the weight of the aircraft exceeds 1400 kg (3086 lb).

On rough ground
- Use twin ground handling wheels (optional)
- Install as described above.
- Lift the aircraft with the hydraulic towing and manual positioning device (Fig. 8-1).

- Towing the helicopter with a tractor

  Prepare the aircraft as above and attach the towing bar.

NOTE

The fenestron handle should always be used to guide the aircraft when towed.

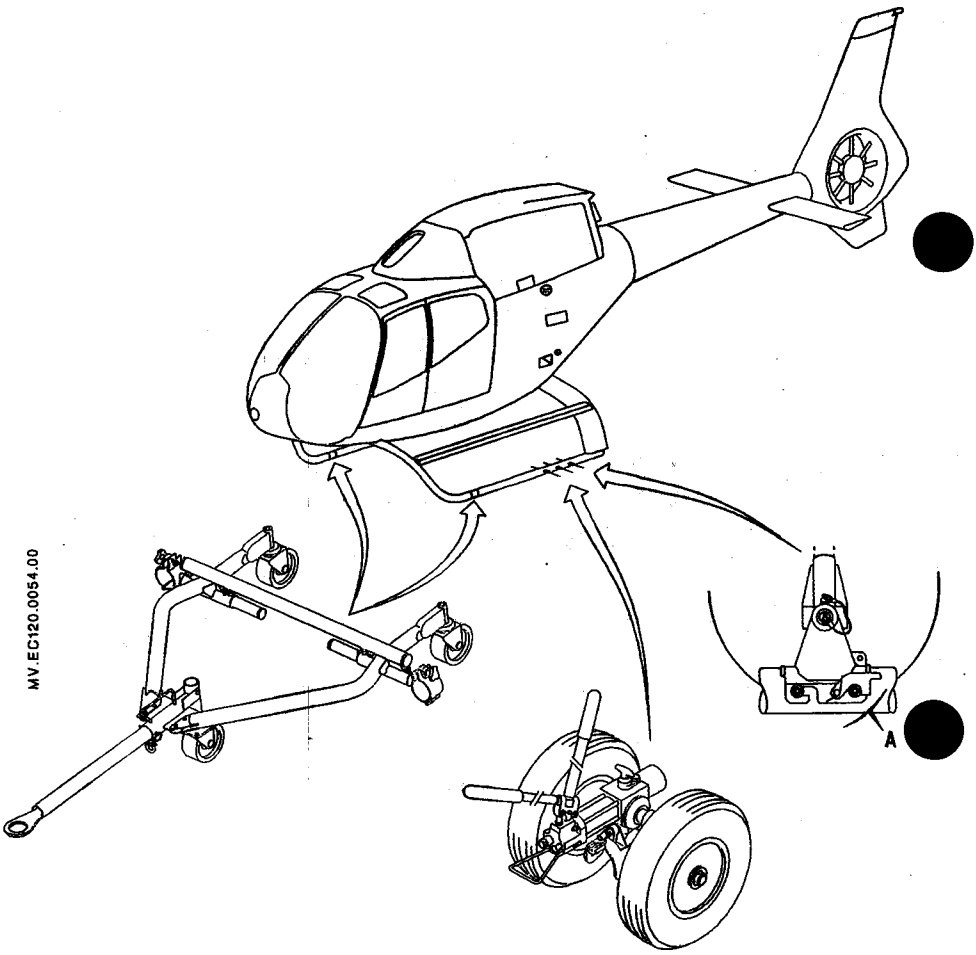

Fig. 8-1 : Towing and manual positioning device

8.2 SERVICING INSTRUCTIONS

8.2.1 FUELS

The authorized fuels are given in the LIMITATIONS sections.

- Capacity

	Litres	U.S. gal	U.K. gal		Kg	lb
TOTAL FUEL TANK CAPACITY	410.5	108.5	90.4		326.3	719.4
NON-CONSUMABLE FUEL	4.5	1.19	0.99		3.6	7.89
CONSUMABLE FUEL REMAINING WHEN LIGHT COMES ON	38	10.04	8.37		30.2	66.6

8.2.2 FUEL ADDITIVES

The anti-ice additive when used shall meet the requirements of French Specification AIR 3652 or the equivalent non-French specifications :

MIL.I 27686 - D.Eng. RD 2451 - PHILIPS PFA/55 MB - NATO S.748.

The additive is to be mixed with the fuel in the following proportions :

- Minimum concentration, by volume :
  - 0.035 % in a tank already filled.
  - 0.06 % in fuel to be used for refuelling.
- Maximum concentration, by volume : 0.15 %.

If there exists any doubt as to the concentration of additive in the contents of a fuel tank, the fuel is to be drained from the tank and replaced by fuel containing a known proportion of additive within the afore-mentioned limits unless it is possible to measure the concentration using a differential refractometer.

Instructions permitting the correct concentration of additive to be obtained are given by the vendor.

8.2.3 LUBRICANTS

- Engine Oil System

  Lubricants and Commercial Descriptions

  – Authorized lubricants : Refer to the LIMITATIONS section.

  – Commercial descriptions : Refer to the TURBOMECA publications.

  Capacity

  Engine oil tank and system capacity : 4.6 litres (1.21 U.S. gal)

- Transmission Components

  Lubricants

  The authorized lubricants are given in the LIMITATIONS section.

  Capacity

  Main gearbox (system included) : 4 litres (1.05 U.S. gal)

  Tail gearbox (system included) : 0.22 litre (0.05 U.S. gal)

8.2.4 HYDRAULIC FLUIDS

- Hydraulic Fluids

  The authorized hydraulic fluids are given in the LIMITATIONS section.

- System

  - Total capacity of system : 2.2 litres (0.58 U.S. gal)
  - Operating pressure : 37 bars (536 psi).

  The warning light situated on the warning-caution-advisory panel illuminates when the pressure is lower than 20 bars (290 psi).

8.2.5 REFUELLING

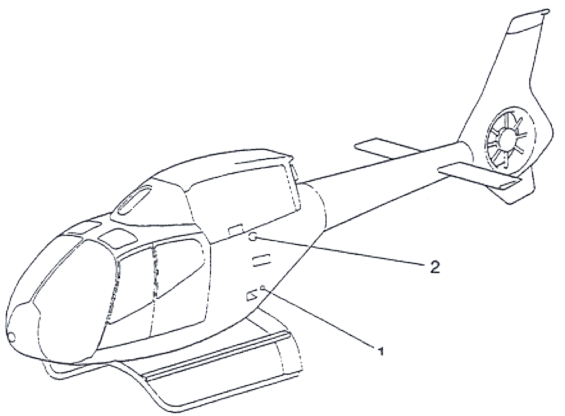

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Fig. 8-2 : Filler plug and electro-static connector location

- Normal refuelling

  - Place the helicopter on a level surface.

  - Connect the bowser earthing cable to the electro-static balance connector (1) on the helicopter.

  - Check the quantity of fuel remaining in the tanks on VEMD fuel indicator.

  - Observe the following safety precautions :
    - Ensure that the aircraft electrical power supply is switched off.
    - Place a fire extinguisher near the work area.
    - Strictly prohibit smoking in the security area.
    - Prohibit the use of any means of lighting not conforming to the rules of safety.
    - Ensure, during refuelling (or defuelling), that the bowser (or the defuelling unit) is connected to the aircraft by the electro-static balance connectors (1).
    - Strictly prohibit draining of fuel tanks, whether partial or total, inside a hangar or shop.

  - Fill the tanks, monitoring the quantity of fuel delivered on the bowser flowmeter.

  - Position and lock the filler plug (2).

  - Disconnect the bowser earthing connector from the aircraft electro-static balance connector.

  - Check that the difference in the aircraft fuel gauge readings corresponds to the quantity of fuel delivered and determine the corresponding weight.

- Refuelling with rotors spining.

WARNING

REFUELLING WITH ROTORS SPINING SHALL BE PERFORMED ONLY AFTER PRIOR AGREEMENT IS GIVEN BY THE COMPETENT AUTHORITY IN COMPLIANCE WITH OPERATIONAL REGULATIONS.

- Strictly comply with the instructions defined below.
- Head aircraft into forward wind sector ± 45° if wind above 10 kt.
- Lock the collective pitch lever in full low pitch position.
- Check main rotor is at nominal speed with twist grip in flight position (TWT GRIP light "off").
- Limit refuelling at 95% in order to prevent any fuel spillage.
- The pilot must always have someone in view who can signal to the mechanic to stop refuelling.

8.3 TEST SCHEDULE

8.3.1 GENERAL

The test sheets are intended to sum up the checks to be carried out in flight or on the ground, with rotors turning either after replacement of main components, or after an extensive operation, or further to periodic inspections.

The test sheets are in the form of reproductible sheets which can directly be filled in by the crew.

CAUTION

Since these checks do not form part of normal helicopter operation, they shall be carried out only by qualified personnel under the operator's responsability.

8.3.2 LIST OF TEST SHEETS

No 0 FLIGHT REPORT
No 1 VEMD CONFIGURATION
No 2 GROUND RUN
No 3 HOVER FLIGHT
No 4 AUTOROTATION 65 kt
No 5 MAXIMUM CONTINUOUS POWER LEVEL FLIGHT
No 6 MAX TAKEOFF POWER
No 7 PREFERENCE INJECTOR VALVE TESTING
(AS SHEDULED BY THE ENGINE MANUFACTURER)

TEST SHEETS TO BE CONDUCTED ACCORDING TO THE COMPONENT REPLACED :

TEST SHEETS No → / COMPONENTS REPLACED ↓	0	1		2				3		4	5			6
		A	B	A	B	C	D	A	B		A	B	C	
ENGINE OR MODULE REPLACEM.	●	/	●	●	●	/	●	●	●	●	●	/	●	●
MGB OR MODULE REPLACEMENT	●	/	/	●	●	●	●	●	●	●	/	●	/	/
MAIN ROTOR HUB	●	/	/	●	●	/	●	●	●	●	●	/	●	/
TAIL ROTOR	●	/	/	●	●	/	●	●	/	/	/	/	/	●
HYDRAULIC SYSTEM	●	/	/	/	/	●	/	/	/	/	/	●	/	/
VEMD REPLACEMENT	●	●	●	/	/	/	/	/	/	/	●	/	/	/

8.3.2 LIST OF TEST SHEETS

No 0 FLIGHT REPORT

No 1 VEMD CONFIGURATION

No 2 GROUND RUN

No 3 HOVER FLIGHT

No 4 AUTOROTATION 65 kt

No 5 MAXIMUM CONTINUOUS POWER LEVEL FLIGHT

No 6 MAX TAKEOFF POWER

TEST SHEETS TO BE CONDUCTED ACCORDING TO THE COMPONENT REPLACED :

TEST SHEETS No → / COMPONENTS REPLACED ↓	0	1		2				3		4	5			6
		A	B	A	B	C	D	A	B		A	B	C	
ENGINE OR MODULE REPLACEM.	●	/	●	●	●	/	●	●	●	●	●	/	●	●
MGB OR MODULE REPLACEMENT	●	/	/	●	●	●	●	●	●	●	/	●	/	/
MAIN ROTOR HUB	●	/	/	●	●	/	●	●	●	●	●	/	●	/
TAIL ROTOR	●	/	/	●	●	/	●	●	/	/	/	/	/	●
HYDRAULIC SYSTEM	●	/	/	/	/	●	/	/	/	/	/	●	/	/
VEMD REPLACEMENT	●	●	●	/	/	/	/	/	/	/	●	/	/	/

SHEET No 0	HELICOPTER EC 120 B	FLIGHT REPORT	
AIRCRAFT No :		VEMD	METEO
DATE----------: FLIGHT START---------: DURATION ----------: CREW ----------: AREA----------:		Ng [ ] Total [ ] CYCLES : Nf [ ] Total [ ] Over limit : YES NO Failures : YES NO	Pressure : [ ] OAT : [ ] WIND Direction : [ ] Velocity : [ ]
WEIGHT		MAIN WORK COMPLETED BEFORE FLIGHT	REMARKS MADE BY CREW AFTER FLIGHT
EQUIPPED EMPTY WEIGHT: CREW ----------: BALLAST----------: WEIGHT WITHOUT FUEL --: FUEL ----------: GROSS WEIGHT----------: BALANCE----------:			
UNITS USED (cross out as applicable)			
WEIGHT : kg lb			
FUEL : kg lb UK gal l US gal			
ALTITUDE : m ft		SPECIAL INSTALLATIONS	WRITER'S VISA
AIRSPEED : km/h kt MPH			

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SHEET No 1A	HELICOPTER EC 120 B	VEMD CONFIGURATION

TEST PHASES AND REQUIREMENTS	RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
(Before starting) **AIRCRAFT CONFIGURATION PARAMETERS** (Refer to SECTION 7 in flight manual) • Select CONFIGURATION MODE Press [OFF1] Press [SELECT] [OFF1] Press [OFF1] then [OFF2] Hold and [ENTER] + [OFF1] then [OFF2]	• Display AIRCRAFT CONFIGURATION page Confirm options, parameters and unities used on the aircraft. • Display TRQ CALIBRATION MANUAL page - Refer to engine log book, to enter output voltage (mV) associated with the torque (%) (or) • Display TRQ CALIBRATION AUTO page - Refer to engine log book, to enter torque pressure (kPa) in test bench pressure transmitter : Output voltage (mV) is automatically displayed.	1 or N/I AUXILIARY FUEL TANK ..: BATTERY TEMP. PROBE...: FUEL TYPE JP4 .....: FLOWMETER .....: SLING.....: UNIT SYSTEM .....: ALTITUDE UNIT .....: mV / % : POINT 1 0 POINT 2 50 POINT 3 80 POINT 4 103 kPa / % : POINT 1 0 POINT 2 50 POINT 3 80 POINT 4 103

SHEET No 1B	HELICOPTER EC 120 B	VEMD CONFIGURATION	
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
VEMD CYCLE COUNTING (after removal and installation)		- Removed VEMD (1) cycles	Ng (1) ____ Nf (1) ____
		- Installed VEMD (2) cycles	Ng (2) ____ Nf (2) ____
		• Correction value of new VEMD cycles	= ____ = ____
		- VEMD total cycles after 1st Start-up	+ ____ + ____
		• Engine cycles after 1st Start-up	= ____ = ____
		- VEMD total cycles after 2nd Start-up	+ ____ + ____
		• Engine cycles after 2nd Start-up	= ____ = ____
		- VEMD total cycles after 3rd Start-up	+ ____ + ____
		• Engine cycles after 3rd Start-up	= ____ = ____
		- VEMD total cycles after 4th Start-up	+ ____ + ____
		• Engine cycles after 4th Start-up	= ____ = ____

SHEET No 2A	HELICOPTER EC 120 B	GROUND RUN	
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
BEFORE ENGINE STARTING		Record parameters :	Hp : ____ OAT : ____
		Battery Voltage ≈ 25 V	U : ____
ENGINE STARTING		Battery Voltage ≥ 18 V	U min : ____ T4 max : ____ (See limitation SECTION 2)
Comply with the Normal Procedures of the Flight Manual SECTION 4		• On warning panel :	
• 45 % ≤ Ng ≤ 65 %		ENG. P Light goes out	YES NO
• Ng ≈ 50 %		GENE Light goes out	YES NO
• Ng = 60 %		FLI page is displayed on VEMD	YES NO
• 150 ≤ NR ≤ 250 rpm		MGB. P Light goes out	YES NO
• NR ≤ 250 rpm		HYDR. Light goes out	YES NO
• "HORN" is engaged		- Aural warning sounds for NR between 250 and 370 rpm.	Begining Alarm: NR min : ____ Fuel QTY : ____ T4 : ____ U Batt : ____ I Batt : ____ Eng. P. : ____ NR : ____ End of Alarm: NR min : ____ Tq : ____ Ng : ____ U Gen. : ____ I Gen. : ____ Eng.T. : ____ Nf : ____
Record Parameters when twist grip in Flight position		- Nf = NR stabilized ≈ 393 rpm.	FLI ____

SHEET No 2B	HELICOPTER EC 120 B	GROUND RUN	
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
Aircraft on ground TRACK AND BALANCE TESTS Record track with stroboscope NOTE The balance is to be checked only after obtainning no blade track.		- Full low pitch NR stabilized ≈ 393 rpm • TRACK CHECKS The setting must be carried out with the yellow (■) blade as reference. - Record parameters : • BALANCE CHECKS - Record parameters : - Unbalance < 0.2 IPS	track _____ _____ _____ _____ IPS ☐ Phase ☐

SHEET No 2C	HELICOPTER EC 120 B	GROUND RUN		
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED	
Aircraft on ground HYDRAULIC CHECKS **CAUTION** **The collective pitch must be locked in full low pitch before performing tests.** Refer to SECTION 4 in flight manual. Move the cyclic stick along the longitudinal and lateral axes (± 10 % total travel). Continue until the control is entirely stiff.		• HYDRAULIC ACCUMULATOR TEST - "HYDR" LACU pushbutton : OFF HYDR + GONG comes on The loads must not appear before 3 or 4 maneuvers have been made. - Hydraulic collective switch :.....OFF - "HYDR" LACU pushbutton :.....ON - Hydraulic collective switch :.....ON HYDR goes out after 2.5 to 3 s • HYDRAULIC SHUT-OFF TEST - Hydraulic collective switch :.....OFF HYDR + Immediate loads come on (< 1 s) - Hydraulic collective switch :.....ON HYDR goes out	YES YES YES YES YES	NO NO NO NO NO

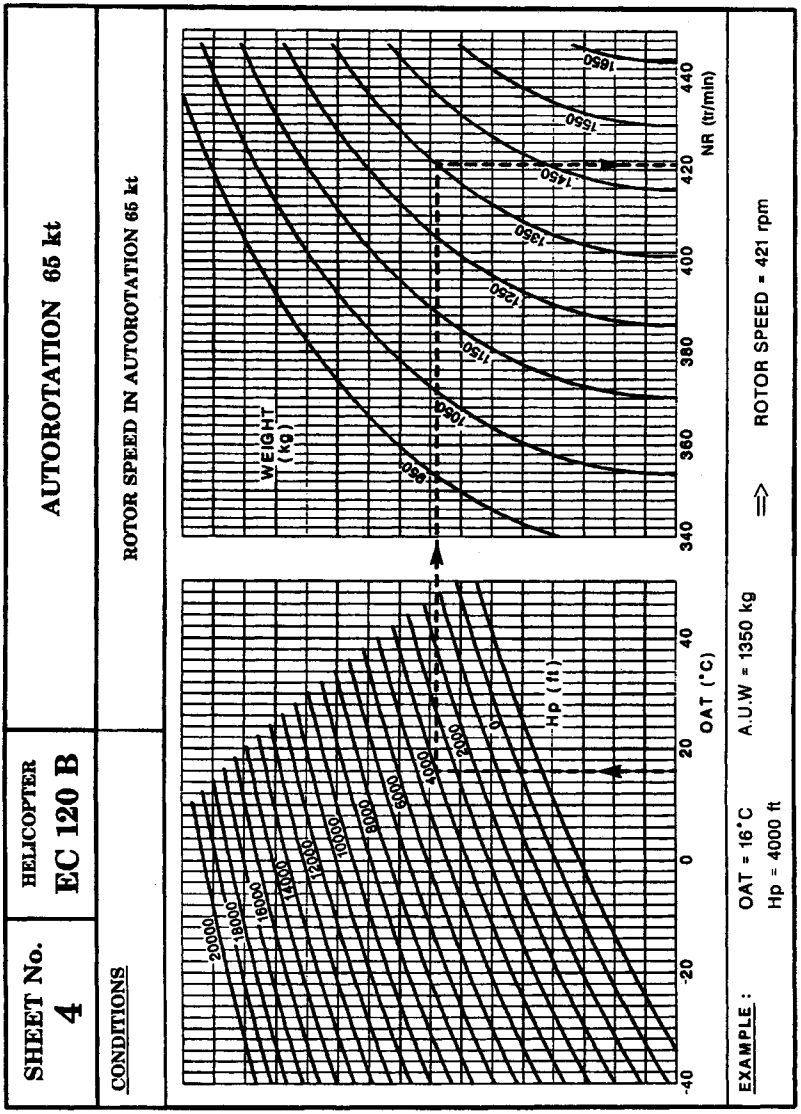
SHEET No 2D	HELICOPTER EC 120 B	GROUND RUN	
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
ENGINE SHUT - DOWN (see Normal Procedures : SECTION 4) - Twist grip on ground idle position After 60 s - Twist grip on shut-off position - Engine shut-down time (*) - Time rotor brake - Flight report page (automatic display)		• Stabilization • 66 % ≤ Ng ≤ 70 %. • VEMD : 3 Informations mode (for Ng ≤ 50 %) from Ng = 50 % to Ng = 2 % (t ≈ 30 s) Apply at 150 rpm (t ≈ 25 s) • When Nf < 80 rpm Record parameters : Engine start-up number Flight time Ng cycles Nf cycles Failure detected Over limit detected	YES NO Idle Ng : YES NO Duration : (*) Duration : YES NO No : Duration : Partial : Total : Partial : Total : YES NO Codes YES NO Values

(*) for information only, not needed by Turbomeca.

SHEET No 3A	HELICOPTER EC 120 B	HOVER FLIGHT	
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
Aircraft on ground **GROUND RESONANCE CHECKS** On concrete ground Check with cyclic pitch stick exitation (± 5 % of the full course) : - full low pitch - torque = 35%		• No oscillations • Convergence between 3 to 4 cycles NOTE Some oscillations can be accepted if the phenomena stops when cyclic pitch stick is in neutral position or collective pitch lever in full low pitch.	YES NO YES NO

SHEET No 3B	HELICOPTER EC 120 B	HOVER FLIGHT	
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
HOVER FLIGHT CHECKS Increase collective pitch to hover at 6 ft in 2 s (max)		• The rotor speed decay must be weak	YES ☐ NO ☐
		• No alarm NR min	YES ☐ NO ☐
TRACK AND BALANCE TESTS		• Check unbalance < 0.2 IPS	IPS : ☐ Phase : ☐
		• Check track with stroboscope	track : ☐
		• Report parameters Nf = NR stab. ≅ 406 rpm	Fuel QTY : ☐ Tq : ☐ T4 : ☐ Ng : ☐ U Batt : ☐ U Gen. : ☐ I Batt : ☐ I Gen. : ☐ Eng. P. : ☐ Eng.T. : ☐ NR : ☐ Nf : ☐ FLI : ☐

SHEET No 4	HELICOPTER EC 120 B	AUTOROTATION 65 kt	
TEST PHASES AND REQUIMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
CHECK OF MAX. NR WARNING Perform autorotation with Vy = 65 kt and adjust the collective pitch to obtain NR > 420 rpm		Max aural NR warning release at 420 rpm	YES ☐ NO ☐
ADJUSTMENT OF THE LOW PITCH STOP If possible, the minimum weight must be < 1450 kg.		Record parameters :	AUW: ☐
Perform, a good steady state autorotation with, Vy = 65 kt, and the pitch on the minimum stop.		NR in compliance with the values computed by means of Figure 1, ± 5 rpm	Hp: ☐ OAT: ☐
If it is impossible to position the pitch on the stop without exceeding the max rpm, decrease the altitude if possible or decrease the weight.		Correction: 1 turn of screw on the pitch stop screw to be tightened ≅ -7 rpm	Fuel Qty: ☐
NOTE **If the test is performed with the SURFAIR skis installed, add 4 rpm to the value read in flight before comparing the value with the rotor speed given by the chart.**			NR: ☐ Design NR: ☐


SHEET No. 4
HELICOPTER EC 120 B
AUTOROTATION 65 kt
CONDITIONS
ROTOR SPEED IN AUTOROTATION 65 kt
EV 25830.P120NR.00
Hp (ft)
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
OAT (°C)
-40
-20
0
20
40
WEIGHT (kg)
850
1050
1150
1250
1350
1450
1550
1650
NR (tr/min)
340
360
380
400
420
440
EXAMPLE :
OAT = 16°C
Hp = 4000 ft
A.U.W = 1350 kg
⇒
ROTOR SPEED = 421 rpm

SHEET No 5A	HELICOPTER EC 120 B	MAXIMUM CONTINUOUS POWER LEVEL FLIGHT	
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
NR IN MCP LEVEL FLIGHT CHECKS All air bleeds shut-off		Low altitude NR = 412 ± 1 rpm High altitude NR = 414 ± 1 rpm	NR :
TRACK CHECKS Obtain FLI = 9.6 Refer to limitations in flight manual SECTION 2		• Using the nose section accelerometer and diagram correct tabs of red and blue blades. - Confirm the setting using the stroboscope ; the best setting is rarely obtained with a zero track.	IPS Phase track :
		- Note Igen before begining check.	I gen.
ENGINE POWER CHECK		- Parameters after stabilization The result of the check can be checked using the flight manual diagrams SECTION 5.	IAS : Hp : Tq : T4 : Ng : ΔTq % : NR : ΔT4 ° : Eng. T : Eng.P :

SHEET No 5B	HELICOPTER EC 120 B	MAXIMUM CONTINUOUS POWER LEVEL FLIGHT	
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
HYDRAULIC CHECKS		Refer to SECTION 4	
Reduce Speed $\leq$ 70 kt		. Hydaulic shut off test.	
CAUTION		- Hydraulic collective switch : OFF	
Hydraulic cut-off on collective switch is forbidden with speed > 70 kt.		HYDR comes on	YES ☐ NO ☐
		Weak loads at 70 kt	YES ☐ NO ☐
Increase speed at 100 kt.		No excessive load at 100 kt	YES ☐ NO ☐
		- Hydraulic collective switch : ON	
Reduce speed ≤ 70 kt		HYDR goes out	YES ☐ NO ☐

SHEET No 5C	HELICOPTER EC 120 B	MAXIMUM CONTINUOUS POWER LEVEL FLIGHT	
TEST PHASES AND REQUIREMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
ANTI-VIBRATOR ADJUSTEMENT		(TBD)	

SHEET No 6	HELICOPTER EC 120 B	MAXIMUM TAKEOFF POWER	
TEST PHASES AND REQUIMENTS		RESULTS TO BE OBTAINED / LIMITATIONS	RESULTS OBTAINED
MAXIMUM TAKEOFF POWER		Record parameters :	
It is recommended to perform this check with Hp > 5000 ft to reach the engine limit rather than the torque limit.		When IAS < 40 kt increase pitch to obtain FLI = 10. A FLI of 10 corresponds to a Ng of 101 % in the flight enveloppe of Zp < 14765' OAT > -20°C	Hp : [ ] OAT : [ ] FLI : [ ] Ng : [ ] Tq : [ ] T4 : [ ]
All air bleeds shut-off		Audio warning when FLI > 10 for more than 1.5 s (transient rating FLI < 10.8)	YES [ ] NO [ ]

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SHEET No 7	HELICOPTER EC 120 B	PREFERENCE INJECTOR VALVE TESTING (AS SHEDULE BY THE ENGINE MANUFACTURER)	
TEST PHASES AND REQUIMENTS		RESULTS TO BE OBTAIN / LIMITATIONS	RESULTS OBTAINED
BEFORE ENGINE STARTING And after changing the setting of the idle stop (in accordance with the Aircraft Maintenance Manual task). Record the setting of the idle stop on the fuel control unit from the FLIGHT position.		Fuel control unit setting = 25°	Setting ☐
ENGINE STARTING Comply with the normal procedures of the Flight Manual SECTION 4.		Engine oil temperature stabilized	Oil engine Temperature ☐
Reduce quickly the twist grip from the FLIGHT position to the IDLE position (perform a total of 3 tests).		The engine must not flame out	1st test ☐ YES ☐ NO 2nd test ☐ YES ☐ NO 3rd test ☐ YES ☐ NO
ENGINE SHUTDOWN Comply with the normal procedures of the Flight Manual SECTION 4.			

NOTE : Do not omit to re-adjust the pitch in accordance with the Aircraft Maintenance Manual task.

8.4 DAILY OPERATING CHECKS

The FLIGHT-RELATED and INSPECTION CHECKS (VLV) to be performed after the last flight of the previous day and before the first flight of the day and the EXTERIOR CHECKS before each flight must be performed, either by a suitably trained pilot referring to present Flight Manual or by a qualified mechanic complying with the Aircraft Maintenance Manual (MMA).

In the course of daily inspections, if any doubt or defect is noted, the pilot must report to the maintenance supervisor for the action to be taken. The defect acceptance criteria for defects on the items checked during the daily inspections are listed in the Aircraft Maintenance Manual.

If as a result of a daily inspection, a detailed inspection or a maintenance operation is required in order to make the aircraft flight worthy, this must be performed under the responsibility of a qualified aircraft maintenance specialist, and must be recorded in the aircraft documents.

8.3.3 INSPECTION ASSOCIATED WITH THE FLIGHTS OF THE DAY : FLIGHT-RELATED CHECKS (VLV)

- GENERAL

  This inspection is to be performed once at the end of a day of flying or before a new day of flying.

  The inspection associated with the flights of the day is intended to maintain the aircraft in a flight worthy condition for a new day of flying. It consists in performing a visual or tactile inspection of the condition of a component, or an assembly, without the use of special techniques or tooling, in order to detect any defects which could be detrimental to its correct operation

NOTE 1

Pay particular attention to those operations identified by an asterisk (*).

NOTE 2

In the event that the FLIGHT-RELATED CHECKS are performed by the pilot immediately before a new day of flying, it replaces the EXTERIOR CHECK to be performed prior to each flight.

NOTE 3

After a grounding lasting in excess of one week :

- **Perform an inspection associated with the flights of the day before resuming flying.**
- **Wipe the servo piston rods with a cloth impregnated with hydraulic operating fluid before moving the flight controls.**

- FLIGHT RELATED CHECKS

  Remove picketing equipment if necessary, or install it if the inspection is performed after the last flight of the day.

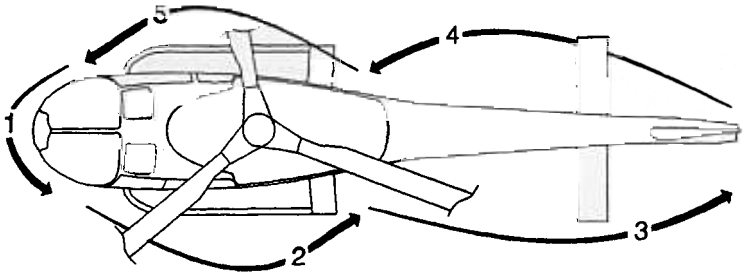

Figure 8-3 : Sequence of checks

POSITION 1

- Transparent panels ..... condition, cleanliness, clean if necessary

  Door pillars, canopy arches ... condition.

  Pitot pressure point (pilot) ..... blank removed or fitted as applicable.

  Sideslip indicator paddle..... condition

  Air intake ..... blank removed or fitted (clear of snow or foreign objects)

POSITION 2

- Cabin access doors.....condition, attachment points, locking.
- Static pressure port .....blanking removed or installed (as applicable).
- Landing gear.....condition.
- LH side engine-MGB cowling .....opening, condition of locking devices.
- MGB .....oil level.
- Hydraulic compact unit .....oil level, attachment points, pipes, clogging indicator retracted.
- Servos and hydraulic system .....attachment points, absence of leaks, pipes.
- MGB suspension bars.....condition, attachment points.

ENGINE AND ENGINE BAY

- Plenum chamber .....condition, attachment points.
- Engine and accessories .....general condition, absence of leaks, cleanliness, pipes.
- Engine casing.....condition around bossings.
- Oil filter .....pre-clogging indicator retracted.
- Fuel filter .....clogging indicator retracted.
- Engine.....oil level.
- Oil system.....absence of leaks.
- Engine controls.....condition, absence of interference points.
- Engine mounts.....condition, attachment points.
- Cowling upper acess panel.....closed and locked.

- Transmission and engine deck ..... condition, cleanliness, absence of leaks.
- Ports and drains in transmission deck ..... unobstructed.
- Exhaust pipe ..... condition, blanking cover removed or installed.
- LH engine-MGB cowling ..... closed and locked.
- MAIN ROTOR HUB ..... attachment points, general condition of all components.
- Laminated spherical thrust bearings (elastomeric part)..... condition, absence of cracks.
- Bonding braids ..... condition.
- Reciprocal ring contact surfaces..... condition, greased.
- Blade droop restrainers ..... condition.
- Frequency adaptater (elastomeric part) ..... condition of elastomer.
- Frequency adaptater ball ends.. condition, attachment point.
- Pitch change rods ..... condition, absence of end play.
- Swashplate..... condition.
- Rotating and stationary scissors ..... condition.
- Swashplate guide..... condition.
- Anti-vibration system..... condition, attachment points.
- Dome ..... condition, attachment points.
- MAIN ROTOR BLADES attachment points, general condition, check for de-bonding at the leading edge, impact damage or erosion.
- Cargo bay opened.
- Battery condition, attachment points.
- Cargo bay..... Check for snow in the tail boom – Closed.

POSITION 3

- Horizontal stabiliser, fin, rotor tunnel, tail skid.....condition, attachment points, condition of navigation lights.
- TRH, hub body and fairing.....condition, absence of impact or cracks, no rotation of fairing, paint marks, clearance between blade tips and rotor tunnel.
- Tail rotor blades, visible part.....condition, absence of scores, erosion. Check for abnormal gap at the blades.
- Tail boom.....condition, condition of antennas.

POSITION 4

- TGB .....oil level.
- Stator.....condition.
- Tail rotor blades.....condition.
- Horizontal stabiliser, fin, rotor tunnel, tail skid.....condition, attachment points, condition of navigation lights.
- Tail boom.....condition, condition of antennas.

POSITION 5

- Static pressure point ..... blank removed or installed (as applicable).
- RH cargo bay door ..... opening, attachment points, condition.
- Electrical master box circuit-breakers ..... engaged.
- RH cargo bay door ..... closing, locking.
- Ground power plug access panel ..... closed.
- RH engine-MGB cowling ..... opening, condition of locking systems.
- Fan and cooling radiator ..... condition, cleanliness, absence of leaks.
- Engine air intake and transmission deck ..... cleanliness, absence of foreign bodies.
- Servos and hydraulic system ..... attachment points, absence of leaks, pipes.
- RH engine-MGB cowling ..... closing, correct locking.
- Landing gear ..... condition.
- Lower central cowling ..... closed.
- MAIN ROTOR BLADES ..... attachment points, general condition, absence of bonding separation on the leading edge, absence of impact damage or erosion.
- Cabin access door ..... condition, attachment, locking.

CABIN INTERIOR

- Seats ..... condition, attachment points.
- Cabin ..... general cleanliness.

8.3.4 OPERATION OF OPTIONAL INSTALLATIONS

The daily commissioning of each optional installation fitted to the aircraft requires :

- an inspection before the first flight of the day,
- an inspection after the last flight of the day.

These inspections consist in performing a visual examination of each optional installation, to check their general condition and their attachment points to the aircraft, in particular :

- windscreen wipers,
- fire extinguishers,
- ski landing-gear installations,
- emergency equipment,
- emergency flotation equipment,
- cargo sling,
- sand filters.

Optional installations requiring special inspection are listed below.

- EMERGENCY FLOTATION EQUIPMENT

  Inspection before the first flight of the day :

  - Lower the emergency flotation equipment, pins locked, locking pin installed.
  - Check that the circuit breakers located in the cockpit and in the right hand cargo bay, are engaged.

  Inspection after the last flight of the day : In the event of low level flight over the sea, wash down the landing gear arch assemblies.

- AGRICULTURAL SPRAYING INSTALLATION

  This optional installation requires the presence of qualified personnel to perform the daily commissioning inspections.

- CARGO SLING

  - After the last flight of the day, lightly grease (G354) the end of the load hook at the bolt attachment point.

8.3.5 COMMISSIONING IN COLD WEATHER CONDITIONS

NOTE

Use of 3 cSt synthetic oil is recommended for low temperature operation.

- OPERATION IN SNOW

  - Clean the helicopter before takeoff ; blades, rotor head, windshield...
  - Do not stay in HIGE with snow recirculation.
  - Replace the turnaround check by a complete exterior check

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

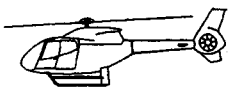
LIST OF SUPPLEMENTS AND OPTIONALS
INCOMPATIBILITY OF UTILIZATION
EFFECT ON PERFORMANCE DATA

IMPORTANT NOTE

THE INFORMATION CONTAINED HEREIN SUPPLEMENTS OR SUPERSEDES THE INFORMATION GIVEN IN THE BASIC FLIGHT MANUAL AND/OR SUPPLEMENTS LISTED IN SECTION 9 - 0.

THE EFFECTIVITY OF THE SUPPLEMENT AT THE LATEST REVISION IS SPECIFIED ON THE LIST OF EFFECTIVE PAGES.

THIS SUPPLEMENT SHALL BE CARRIED IN AIRCRAFT AT ALL TIMES.



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REVISION 2 : NOVEMBER 1998

LIST OF APPLICABLE CONDITIONAL REVISIONS (RC) PAGES

This manual assigned to the helicopter mentioned on the title page, contains the following pink pages except those canceled when the conditions are complied with.

CAUTION

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No	PAGE	DATE	APPLICABLE BEFORE CONDITION IS MET:
RC 1	9-14-4	NOV. 00	SB N°32-001 (Skid blades landing gear)and MOD. N° A00075 (installation of tail skid)
RC 2	9-4-1	AUG. 01	SB N°04.003 (Cold weather installation kit)

LIST OF APPLICABLE CONDITIONAL REVISIONS (RC) PAGES (CONT'D)

No	PAGE	DATE	APPLICABLE BEFORE CONDITION IS MET:

LIST OF CONDITIONAL REVISIONS (CR)
EFFECTIVE PAGES

This manual assigned to the helicopter mentioned on the title page, contains the following pink pages except those canceled when the conditions are complied with.

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No	PAGE	DATE	REMARKS / EFFECTIVITY

LIST OF INTERMEDIATE TEMPORARY REVISIONS (ITR) EFFECTIVE PAGES

The manual contains the following additional yellow pages.

No	PAGE	DATE	No	PAGE	DATE

LIST OF VALID CONDITIONAL REVISIONS (RC) PAGES

This manual assigned to the helicopter mentioned on the title page, contains the following conditional revisions printed on pink pages after the last indicated date.

CAUTION

If a normal revision (NR) modifies the page number for any information concerned below, the reader will have to change the number of the pink page by hand, so that the information remains in accordance with the paragraph concerned.

DATE	NAME	SB N°	Embodiment of SB		VALID RC N°	VISA
			Yes	No		
		32-001 and A 00075			RC 1	

LIST OF VALID CONDITIONAL REVISIONS (RC) PAGES (CONT'D)

DATE	NAME	SB N°	Embodiment of SB		VALID RC N°	VISA
			Yes	No		

LIST OF INTERMEDIATE TEMPORARY REVISIONS (ITR) EFFECTIVE PAGES

The manual contains the following additional yellow pages.

No	PAGE	DATE	No	PAGE	DATE

LIST OF APPROVED EFFECTIVE PAGES

PAGE	REV No	REMARKS	PAGE	REV No	REMARKS
9-0-Title	2				
9-0-A1	5				
9-0-A2	3				
9-0-C	3				
9-0-D	6				
9-0-E	6				
9-0-F	0				
9-0-i	6				
9-0-ii	0				
9-0-1	0				
9-0-2	0				

LOG OF APPROVED NORMAL REVISIONS

ORIGINAL	0	APRIL 1998
REVISION	1	JULY 1998
REVISION	2	NOVEMBER 1998
REVISION	3	SEPTEMBER 1999
REVISION	4	OCTOBER 2000
REVISION	5	AUGUST 2001
REVISION	6	NOVEMBER 2001

NORMAL REVISION 6

APPROVED BY : DGAC

DATE : 21 NOV 2001

I.C.T.
Mathieu HENRY

CUSTOMIZATION

A/C : EC 120 – S/N :

SECTION	PAGE	ISSUE	SECTION	PAGE	ISSUE
THIS AIRCRAFT DOES NOT OFFER ANY PARTICULAR FEATURES REQUIRING THE CUSTOMIZATION ON THE FLIGHT MANUAL ON GREEN PAGES					

LIST OF SUPPLEMENTS

Some supplements covering installations or procedures not used on this helicopter may be withdraw from this manual. The complete list of supplements appears on this page.

No	DESCRIPTION	
0	Operational and Optional Supplements	
1	Reserved	
2	Reserved	
3	Reserved	
4	Operation in cold weather (- 40°C ≤ OAT ≤ - 30°C)	
5	Reserved	
6	Engine failure training procedure	
7	Hydraulic pressure failure training procedure	
11	Ski	
12	External Load Transport : Cargo Sling	
13	LH Side Main Flight Controls	
14	Sand Filter	
15	Reserved	
16	Reserved	
17	Emergency Floatation Gear	
18	Electrical Hoist	(not available)
19	Air Conditioning System	
20	Swiveling Landing Light Installation	(not available)

SPECIAL SUPPLEMENTS

No	DESCRIPTION	
50	Auxiliary Fuel Tank Operational	(not available)
51	Agricultural Spraying System	(not available)
52	Gyrostabilized Installation for Camera	(not available)
53	Night Vision Goggles	(not available)
54	Reserved	
55	G.P.S	

1 INCOMPATIBILITY OF UTILIZATION BETWEEN OPTIONAL EQUIPMENT ITEMS

(none)

2 INFLUENCE OF OPTIONAL EQUIPMENT ON PERFORMANCE DATA

(none)

Rotorcraft FM Supplement No: 682

Eurocopter EC120 B

Rotorcraft Flight Manual Supplement No: 682 Issue 1

For

Installation of Left Hand Bubble Window

on

C-GRTN	**1058**
C-GRTA	**1076**

This supplement must be attached to the DGAC Approved Rotorcraft Flight Manual, , with the installation of **LH Bubble window** in accordance with Outback Aviation Drawing No: 1480 Issue 1, or later DOT/DAR approved revision, per **P-LSH01- /D.**

The information contained herein supersedes and supplements the information of the basic Rotorcraft Flight Manual; **compliance with SECTION 1 - Limitations - is mandatory.** For limitations, procedures and performance information not contained in this supplement, consult the basic Rotorcraft Flight Manual.

DOT Approved: _____
H W Wong
Aircraft Certification Engineer
Pacific Region

Dated: _____

Rotorcraft FM Supplement No: 682

Log of Amendments

Installation of LH Bubble Window

Issue No:	Date Inserted	Signature	Effective Pages	DOT approval by/Date
1	23 Jan 2001		All	

DOT Approved:
Dated: _____

Rotorcraft FM Supplement No: 682

SECTION 1 - GENERAL

The Eurocopter EC120 B rotorcraft may be fitted with a bubble window in the left hand crew door for vertical reference operations. The bubble window is approx 14 inches deep and replaces the original window.

Rotorcraft FM Supplement No: 682

SECTION 2 - LIMITATIONS

The limitations laid down in the basic Flight Manual remain applicable but are amended by the following limitations with the Bubble window fitted.

2.1 GENERAL

2.1.1 Types of operation

Day VFR only

2.3 FLIGHT ENVELOPE LIMITATIONS

2.3.1 Airspeed limitations

Doors closed — **V_{ne} 110 KIAS**

2.6 PLACARDS

Adjacent Airspeed Indicator: — V_{ne} with bubble door 110 KIAS

SECTION 3 - EMERGENCY PROCEDURES

NO CHANGE

SECTION 4 - NORMAL PROCEDURE

4.1 **GENERAL**

4.1.1 OPERATING LIMITATIONS

Refer to SECTION 2

4.2 **PREFLIGHT CHECK**

4.2.1 EXTERIOR CHECK

Add to station 2

Check bubble window for condition and security

SECTION 5 - PERFORMANCE

Performance evaluation has not been carried out. However it remains the pilots responsibility to ensure that adequate performance is available prior to executing all maneuvers.

Use of the LH bubble Window result in the following degradation in performance;

- Rate of climb — no change
- cruise — **an increase up to 4% in torque**

DOT Approved:

Dated: _____.

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

OPERATION
IN COLD WEATHER
(- 40°C ≤ OAT < - 30°C)

IMPORTANT NOTE

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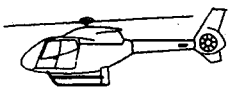

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PAGE	REV No	REMARKS	PAGE	REV No	REMARKS
9-4-Title	0				
9-4-A	0				
9-4-B	0				
9-4-1	0				
9-4-2	0				
9-4-3	0				

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DIRECTION GÉNÉRALE DE L'AVIATION CIVILE

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Replace the paragraph 2 by the following:

2 LIMITATIONS

Flight is forbidden if the OAT is below - 30°C.

CAUTION

THIS PAGE MUST NOT BE REMOVED FROM THE FLIGHT MANUAL UNTIL MODIFICATION SB N° 04.003. HAS BEEN EMBODIED TO THE AIRCRAFT.

1 GENERAL

This supplement specifies the operating envelope of the aircraft for:

$-40°C \leq OAT < -30°C$

2 LIMITATIONS

The limitations specified in the basic flight manual and in the flight manual supplements remain applicable (SEE SECTION 2) and are supplemented or modified by the following procedures:

2.1 VNE

- Reduce VNE power on by 5 kt for $OAT \leq -35°C$

2.2 APPROVED FUELS

- MAIN FUELS

USE FOR: $-40°C \leq OAT \leq +50°C$					
Type of fuel	NATO code	Specifications			Anti-ice additive included
		FRANCE	USA	UK	
Kerosene - 50 (AVTUR-FSII) (JP8)	F 34	AIR 3405 F 34	MIL-T-83133 (JP8)	D.ENG. RD 2453	Yes
Kerosene - 50 (AVTUR) (JP1)	F 35	AIR 3405 F 35	ASTM-D-1655 JET A1	D.ENG.RD 2494	No
Kerosene	—	—	ASTM-D-1655 JET A	—	No

REPLACEMENT FUELS

USE FOR: $-40°C \leq OAT \leq +30°C$ AND FOR $Hp \leq 9842$ ft (3000 m)					
Type of fuel	NATO code	Specifications			Anti-ice additive included
		FRANCE	USA	UK	
Wide cut (AVTAG FSII) (JP 4)	F 40	AIR 3407	MIL-T-5624 (JP4)	D.ENG.RD 2454	Yes
Wide cut	-	-	ASTM-D-1655 JET B	-	no

Anti-ice additive is mandatory for $OAT \leq +0°C$.

2.3 APPROVED LUBRICANTS

- ENGINE LUBRICANTS

USE FOR: - 40°C ≤ OAT ≤ + 30°C					
Oil type	NATO Code	Specifications			Approved oil grades
		FRANCE	USA	UK	
Synthétic 3 to 3,5 cSt at 98,9°C	0.148	AIR 3513	MIL-L-7808	-	ESSO TURBO OIL 2389 MOBIL OIL AVREX 256 TURBONYCOIL 160
	0.150	AIR 3514	-	-	TOTAL AERO TURBINE 312 ELF JET SYNTHETIC OIL 15 TURBONYCOIL 13 B

- MAIN GEARBOX LUBRICANTS

USE FOR: - 40°C ≤ OAT ≤ + 0°C					
Oil type	NATO Code	Specifications			Approved oil grades
		FRANCE	USA	UK	
Synthétic 3 to 3,5 cSt at 98,9°C	0.148	AIR 3513	MIL-L-7808	-	ESSO TURBO OIL 2389 MOBIL OIL AVREX 256 TURBONYCOIL 160
	0.150	AIR 3514	-	-	ELF JET SYNTHETIC OIL 15 TOTAL AERO TURBINE 312 TURBONYCOIL 13 B

- TAIL GEARBOX LUBRICANTS

Same as MGB.

3 EMERGENCY PROCEDURES

Procedure provided in the basic flight manual and in the flight manual supplements remain applicable and are supplemented by the following:

WARNING PANEL	CORRECTIVE ACTIONS
HYDR Hydraulic pressure < 20 bar	**Approach :** - Perform a shallow approach, reduce speed gradually. **Landing :** - Carry out a running landing at ground speed below 20 kt. - On ground, reduce the twist-grip to IDLE. - Lock the collective pitch when NR ≈ 260 rpm.

4 NORMAL PROCEDURES

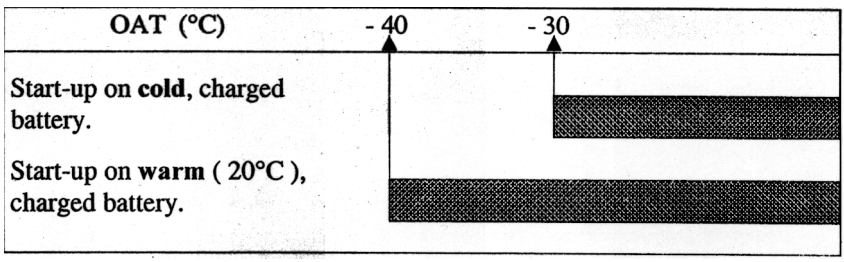
The procedure specified in the basic flight manual and in the flight manual supplements remain applicable and are supplemented by the following:

- Disregard the possible illumination of FUEL FILT during the engine starting as long as engine oil has not reached the minimum temperature (0°C) for power input.

5 PERFORMANCE

Performance specified in the basic flight manual and in the flight manual supplements remain applicable .

- Read charts until – 40°C.
- Use of the battery for starting:



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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

ENGINE FAILURE

TRAINING PROCEDURE

IMPORTANT NOTE

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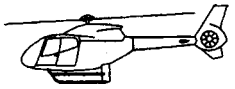

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PAGE	REV No	REMARKS	PAGE	REV No	REMARKS
9-6-Title	0				
9-6-A	0				
9-6-B	0				
9-6-1	0				
9-6-2	0				

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ORIGINAL 0 NOVEMBER 2001

ORIGINAL ISSUE

APPROVED BY : DGAC

DATE : 21 NOV 2001

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ORIGINAL ISSUE

1 GENERAL

This procedure allows training for autorotation landing with a simulated engine flame-out or loss of power.
In case of engine sudden loss of power or flame-out, the helicopter will yaw to the right, the NR will drop down and the low NR warning sound will come on if NR goes below 370 RPM.

2 LIMITATIONS

The limitations specified in the basic flight manual and in the flight manual supplements remain applicable.

3 EMERGENCY PROCEDURES

The emergency procedures specified in the basic flight manual and in the flight manual supplements remain applicable.

4 NORMAL TRAINING PROCEDURES

4.1 Failure simulation

1. Collective pitch ..... LOWER to enter autorotation
2. NR ..... MAINTAIN within the green range
3. Twist grip ..... REDUCE to IDLE position
   . red TWT GRP warning light lights up
   . engine is set to idle, Ng ≅ 67%

then :

4.2 Full touchdown autorotation training procedure

1. Autorotation procedure..... APPLY
   See SECTION 3 paragraph 3.2 page 3.2 of the present flight manual except for twist grip shut-off.

   <u>After landing</u> :
2. Collective pitch ..... DOWN to full low pitch
3. Twist grip ..... INCREASE to FLIGHT position
   . red TWT GRP warning light extinguishes,
   . rotor speed accelerates to its normal governed value.

4.3 Power recovery autorotation training procedure

1. Collective pitch ..... REDUCE, maintain NR in green range.
2. IAS ..... Vy
3. Maneuver the aircraft into the wind on final approach.

- At height ≅ 70 ft

4. NR ..... CHECK in green arc
5. Twist grip ..... INCREASE to FLIGHT position
   . red TWT GRP light extinguishes,
   . Nf accelerates to its governed value
6. Collective pitch ..... INCREASE slightly to maintain NR in green range.
7. Cyclic ..... FLARE.

- At 20 - 25 ft and at constant attitude

8. Collective pitch ..... GRADUALLY INCREASE to reduce the rate of descent and forward speed.
9. Cyclic ..... FORWARD slightly to adopt a landing attitude.
10. Pedal ..... ADJUST to cancel any side-slip tendency.
11. Collective pitch ..... INCREASE as necessary.

NOTE

If necessary, it is possible to quickly switch back to the FLIGHT position of the twist grip at any time and for any NR value. However, it is better if the NR value is in the green range.

Autorotation training shall be conducted within gliding distance of a running landing suitable area.

5 PERFORMANCE

The performances specified in the Basic Flight Manual and in the flight manual supplements remain applicable.

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

HYDRAULIC PRESSURE FAILURE

TRAINING PROCEDURE

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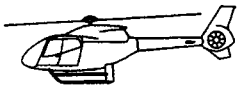

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Aéroport International Marseille-Provence 13725 Marignane Cedex - France

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ORIGINAL ISSUE : NOVEMBER 2001

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DATE : 21 NOV 2001

I.C.T.
Mathieu HENRY

DIRECTION GENERALE DE L'AVIATION CIVILE FRANCAISE

DGAC APPROVED
ORIGINAL ISSUE

1. GENERAL

This procedure allows training for hydraulic pressure failure on EC 120 B.

In case of loss of hydraulic pressure : [redacted] illuminates and the « gong » reach sounds, the hydraulic pressure accumulators allow sufficient time to rejoin the recommended speed of 65 Kt. Then, the pilot must cut-off the residual hydraulic pressure by means of the switch on the collective lever and apply the emergency procedure.

2. LIMITATIONS

The limitations specified in the basic flight manual and in the flight manual supplements remain applicable.

3. EMERGENCY PROCEDURES

The emergency procedures specified in the basic flight manual and in the flight manual supplements remain applicable.

4. NORMAL TRAINING PROCEDURES

4.1 FAILURE SIMULATION

In steady cruise flight, depressing the "HYDR." guarded pushbutton on the LACU produces the same effects as a real failure :

- The hydraulic pump pressure is by-passed,
- The main rotor accumulators give hydraulic assistance for a limited time.

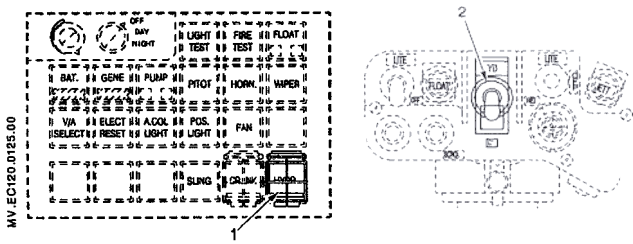

Figure 1 : Hydraulic failure simulation pushbutton.

4.2 TRAINING PROCEDURE

1. LACU "HYDR." guarded pushbutton (1) ... DEPRESS.

   [redacted] Comes on + "GONG" sounds.

2. Hydraulic failure procedure ..... APPLY.

   See FLM SECTION 3 (§ 3.7.3).

When HYD switch (2) on collective lever is in OFF position :

3. LACU "HYDR." pushbutton ..... RESET.

When on ground, or at any moment to restore hydraulic assistance :

4. HYD switch (on collective lever) ..... ON.

   HYDR goes out.

CAUTION

If the HYDR. guarded push button on the LACU is not reset no hydraulic assistance can be restored.

5. PERFORMANCE

The performance given in the Basic Flight Manual and in the flight manual supplements remain applicable.

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

EXTERNAL LOAD TRANSPORT

" CARGO SLING "

IMPORTANT NOTE

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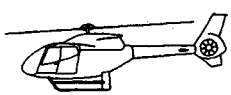

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NORMAL REVISION 3

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DATE : 21 NOV 2001

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Mathieu HENRY

DGAC APPROVED
REVISION 3

1 GENERAL

The "CARGO SLING" external load carrying installation is composed of :

- A cargo hook suspended by four cables, equipped with a release unit. The release unit hook can be opened electrically in normal operation and mechanically in emergency conditions.

- An underslung load weight value in the VEMD PERFORMANCE page (figure 1).

NOTE

When fitting the cargo-sling equipment, the VEMD has to be configured with the cargo-sling installed.

The "SLING LOAD" line in the VEMD PERFORMANCE page is valid only if the "SLING" pushbutton on the LACU is "ON".

For AUW over 1750 kg, the performances have to be checked manually with the HOGE charts figures 5 or 6.

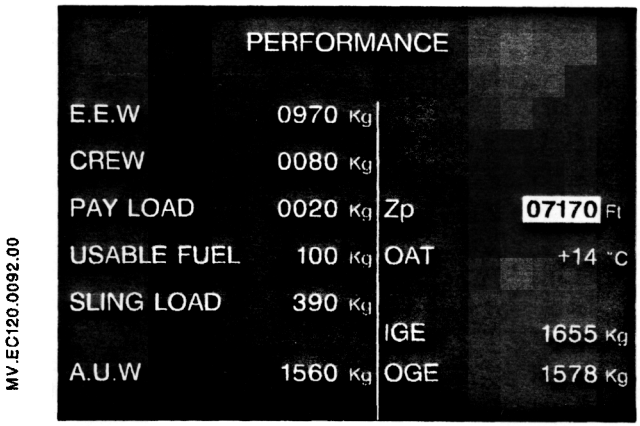

Figure 1 : Performance page

- A control system is provided for the pilot (figure 2) :
  . a "SLING" pushbutton (1) located on the LACU, for switching on the installation,
  . a normal release control (2) on the cyclic stick (electrical mode),
  . an emergency release handle (3) located under the collective stick (mechanical mode).

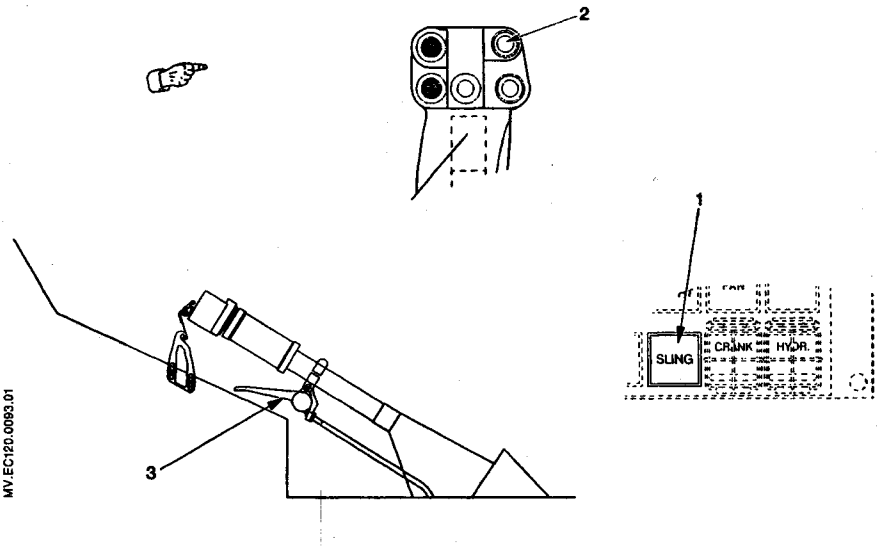

Figure 2 : Cargo sling controls

NOTE

A minimum weight of 2.5 kg (6 lb) is required to open the hook.

- Electric circuits protection :
  . the load indicator is protected by a 3 A fuse,
  . the release circuit is protected by a 15 A fuse.

  The fuses are located on the cargo breakers panel.

2 LIMITATIONS

All limitations specified in the basic flight manual and in the flight manual supplements remain applicable, independantly of the following.

2.1 Weight limitation

- Maximum permissible sling load : .....700 kg (1543 lb).
- Maximum take-off weight with an external load : .....1800 kg (3968 lb).

The maximum authorized take-off weight with external load is that which allows hovering flight out of ground effect.

CAUTION

The maximum take-off weight without external load remains limited to that specified in the limitations section of the basic flight manual.

2.2 Longitudinal CG. limits

With an external load, the longitudinal limits are defined according to the weight as per the graph below.

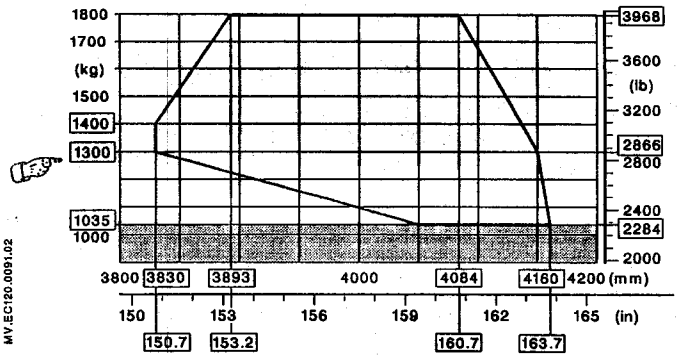

Figure 3 : Longitudinal CG chart with external load

2.3 Airspeed limitation

- Absolute maximum permissible speed with external load :.....110 kt.

NOTE

The pilot is responsible for determining the limit speed according to the load and sling length. Particular care must be exercised when bulky loads are being carried on the sling.

2.4 Instruction placards

An instruction placard in the cockpit indicates :

CARRYING OF EXTERNAL LOADS

CLASS OF APROVED AIRCRAFT/LOAD COMBINATION : B.
WHEN EXTERNAL LOADS ARE CARRIED, NO PERSON MAY BE CARRIED UNLESS :
- HE IS A FLIGHT CREW MEMBER ;
- HE IS A FLIGHT CREW MEMBER TRAINEE ; OR
- HE PERFORMS AN ESSENTIAL FUNCTION IN CONNECTION WITH THE EXTERNAL-LOAD OPERATION.

OR

EMPORT DE CHARGES EXTERNES

CLASSE DE COMBINAISONS GIRAVION-CHARGE APPROUVEE : B
AUCUNE PERSONNE NE PEUT ETRE TRANSPORTEE A MOINS DE :
- ETRE UN DES MEMBRES DE L'EQUIPAGE
- SUIVRE UN COURS DE FORMATION EN TANT QUE MEMBRE D'EQUIPAGE OU
- REMPLIR UNE FONCTION ESSENTIELLE AYANT TRAIT A L'UTILISATION DU GIRAVION AVEC CHARGE EXTERIEURE.

A placard visible to the ground operator and located on the lower fairing near to the hook, indicates the maximum sling load.

3 EMERGENCY PROCEDURES

The procedures provided in the basic flight manual and in flight manual supplements remain applicable and are supplemented by the following :

3.1 Engine failure with external load

- IN CRUISE FLIGHT

1. Autorotation procedure ..... APPLY
2. External load ..... Release as soon as possible.

- IN HOVER

1. Collective pitch. ..... Reduce according to the height.
2. External load ..... Release as soon as possible
3. Pedals ..... Control yaw.
4. Cyclic ..... Forward to gain forward speed according to the height.
5. Collective pitch ..... Increase as needed to cushion touch-down

NOTE

Except during hooking phase, the pilot should move away to the right. Ground personals are to be forewarned that in the event of engine failure they are to move away to the left of the helicopter.

3.2 Sling load indication failure on VEMD

Sling load indication in yellow

- [Sling] pushbutton..... CHECKED ON

SLING LOAD INDICATION

WHITE → CONTINUE FLIGHT

YELLOW → 1 CONTINUE FLIGHT
- Once the mission is completed

2 INSTALLATION....Ground Check

NOTE

With yellow sling load indication on VEMD the electrical release control may be not available.

4 NORMAL PROCEDURES

The procedure provided in the basic flight manual and flight manual supplements remain applicable and are supplemented by the following.

- Carrying heavy loads is a delicate operation, due to the possible effects of a swinging load on the flight behavior of the helicopter. Consequently, pilots are advised to train with gradually increased sling loads before undertaking heavy load carrying operations.

CAUTION

In wet weather, thick rubber gloves should be worn by the operator handling the hook and load. Release the charge of stactic electricity by placing an electrical conductor cable or tube between the ground and the cargo release unit (hook).

4.1 Ground check of the installation

- interior check
  - . [SLING] pushbutton ..... CHECK ON
    on LACU
  - . PERFORMANCE page ..... SELECT
  - . SLING LOAD line ..... WHITE

NOTE

If the "SLING LOAD" line is missing, check the VEMD configuration.

- EXTERIOR CHECK
  - . Electrical hook opening ..... CHECKED
  - . Mechanical hook opening ..... CHECKED

4.2 Take off check and procedure with external load

CAUTION

Use of P2 air bleeds are forbidden above the maximum continuous rating (Ng or T4)

1. External load ..... Secured.
2. Collective ..... Increase very smoothly while maintening the aircraft directly above the load.
3. Cables tanted ..... Dwell briefly before raising the load.
4. Lift off the load ..... Vertically.
5. Load indication ..... checked.
6. Take-off path ..... ADJUST to adopt an immediate forward climb attitude.
7. All parameters ..... Checked.

4.3 Manoeuvres

All control movements should be made very gently, with very gradual acceleration and deceleration, and only slightly banked turns.

4.4 Approach and landing with external load.

CAUTION

Use of P2 air bleeds are forbidden above the maximum continuous rating (Ng or T4)

- Perform approach at minimum rate of descent.
- Establish zero translational ground speed sufficiently hight to ensure that the load is not dragged along the ground.
- Then descent vertically until the load is on the ground.
- Release the load.
- Load released ..... CHECKED

NOTE

If the load is not released, actuate the emergency release handle

5 PERFORMANCE

The performance given in the Basic Flight Manual and in flight manual supplements remain applicable and are supplemented as following :

The performance curves for weights in excess of 1715 kg (3780 lb) are plotted in dotted line on the following performance charts.

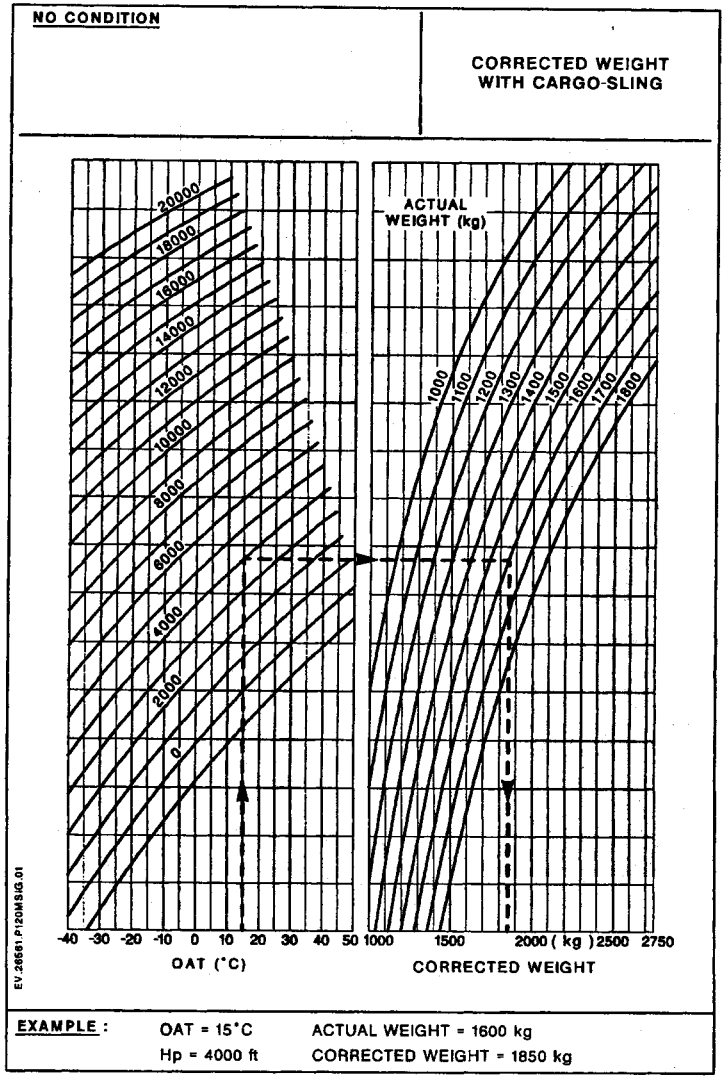

Figure 4 : Corrected weight with cargo-sling

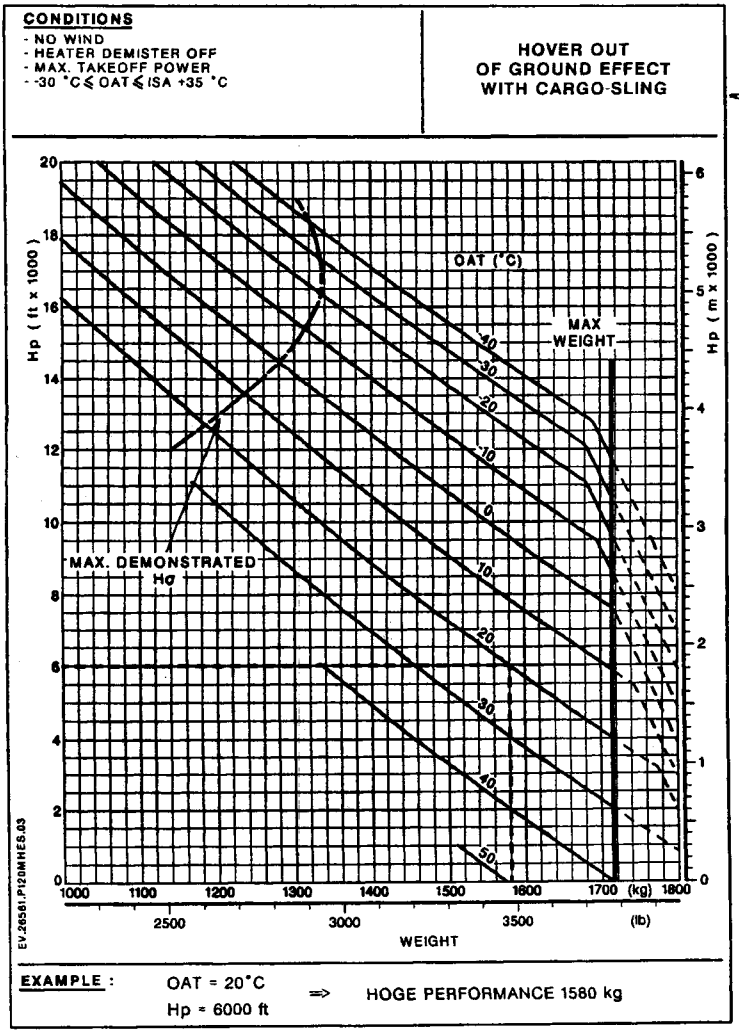

Figure 5 : HOGE with cargo-sling

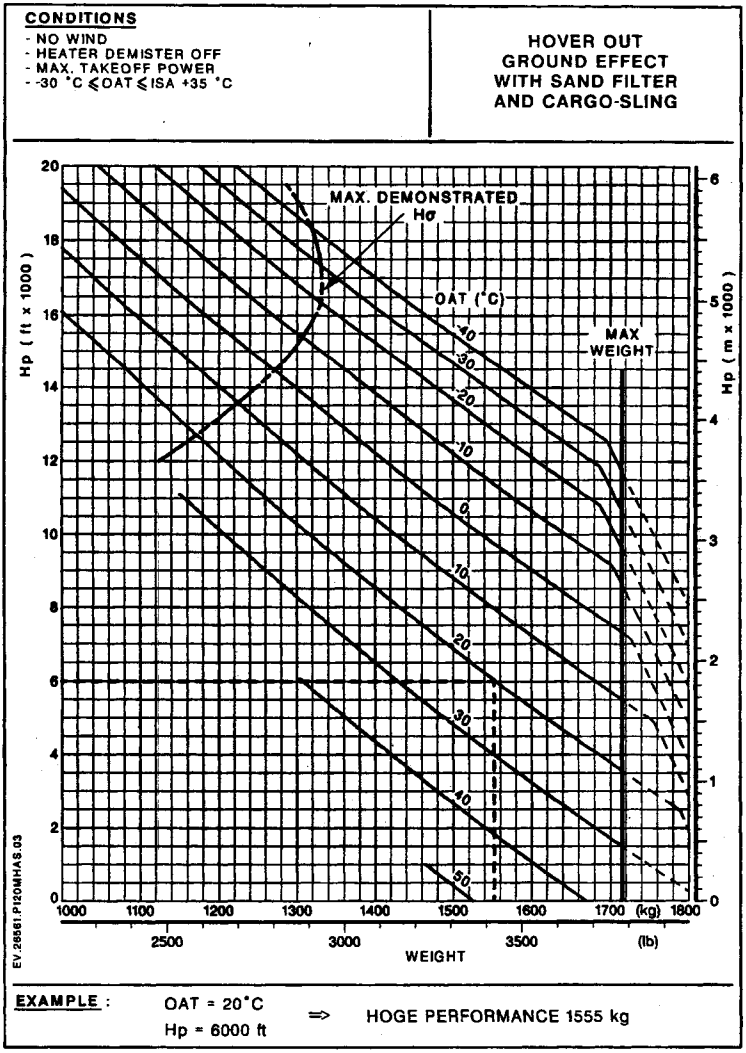

Figure 6 : HOGE with sand filter and cargo-sling

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

LH SIDE MAIN FLIGHT CONTROLS

IMPORTANT NOTE

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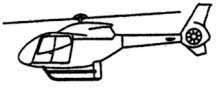

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Ingénieur Principal des Etudes et de l'Exploitation
de l'Aviation Civile

B. TRANCHANT

DGAC APPROVED
ORIGINAL ISSUE

1 GENERAL

This optional equipment consists of moving the main flight controls from the RH station to the LH station. The following equipment is moved :

- Cyclic stick friction lock.

  Collective lever low-pitch locking device when the aircraft is fitted with single controls (1)

  Emergency release handle when the aircraft is fitted with the "SLING" optional equipment (2)

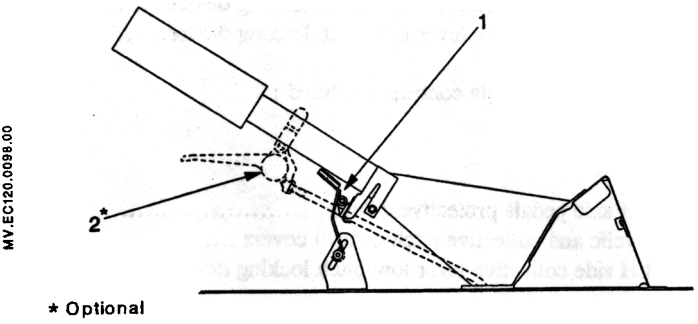

Figure 1 : LH side locking of the collective lever

2 LIMITATIONS

The limitations specified in the basic flight manual and in the flight manual supplements remain applicable.

3 EMERGENCY PROCEDURES

The emergency procedures specified in the basic flight manual and in the flight manual supplements remain applicable.

4 NORMAL PROCEDURES

The normal procedures specified in the basic flight manual and in the flight manual supplements remain applicable and are supplemented by the following procedures :

- When dual controls are fitted :

  Interior checks

  - RH side collective lever low-pitch locking device .....Installed
  - LH side collective lever low-pitch locking device.....Removed

- When LH side single controls are fitted :

  Interior checks

  - RH side pedals protective device .....Installed
  - Cyclic and collective pitch control covers .....Installed
  - LH side collective lever low-pitch locking device.....Installed

5 PERFORMANCE

The performances specified in the Basic Flight Manual and in the flight manual supplements remain applicable.

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

SAND FILTER

AEROFLO

IMPORTANT NOTE

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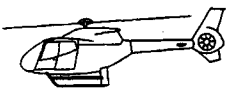

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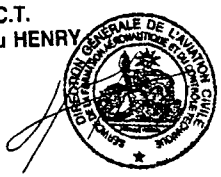

DGAC APPROVED
REVISION 3

1 GENERAL

The sand filter installation is intended to protect the engine from sand ingestion, during hovering flight or when flying in sand-laden atmosphere.

It operates permanently whenever it is fitted on the aircraft.

The installation consists essentially of :

- A structural sand filter support fitted in front of the engine air intake,
- A rectangular filtering panel fitted on structural support,
- A pressurised air (P2) supply system.

In operation, the ambient air passes through the VORTEX tubes of the filtering panel. The sand is centrifuged and is ejected out towards the rear of the aircraft, through a duct which is flushed by the P2 air system.

2 LIMITATIONS

The limitations provided in the basic flight manual and flight manual supplements remain applicable and are supplemented by :

CAUTION

The flight is forbidden if the filtering panel is not fitted on his support.

3 EMERGENCY PROCEDURES

The overall emergency procedures provided in the basic flight manual and flight manual supplements remain applicable.

4 NORMAL PROCEDURES

The normal procedures provided in the basic flight manual and flight manual supplements, remain applicable and are supplemented by :

- Exterior checks :
  MGB cowl (starboard side) ..... OPENED
  Rectangular filtering panel ..... fitted, clear of snow or ice
  MGB cowl ..... CLOSED

- Flight in Sand-laden Atmosphere :
  Switch off the heating-demisting system.

5 PERFORMANCE

The performance given in the basic flight manual and in flight manual supplements remain applicable and are supplemented by graphs hereafter.

NOTE

VEMD engine power check and hovering performances are automatically modified if the sand filter is fitted.

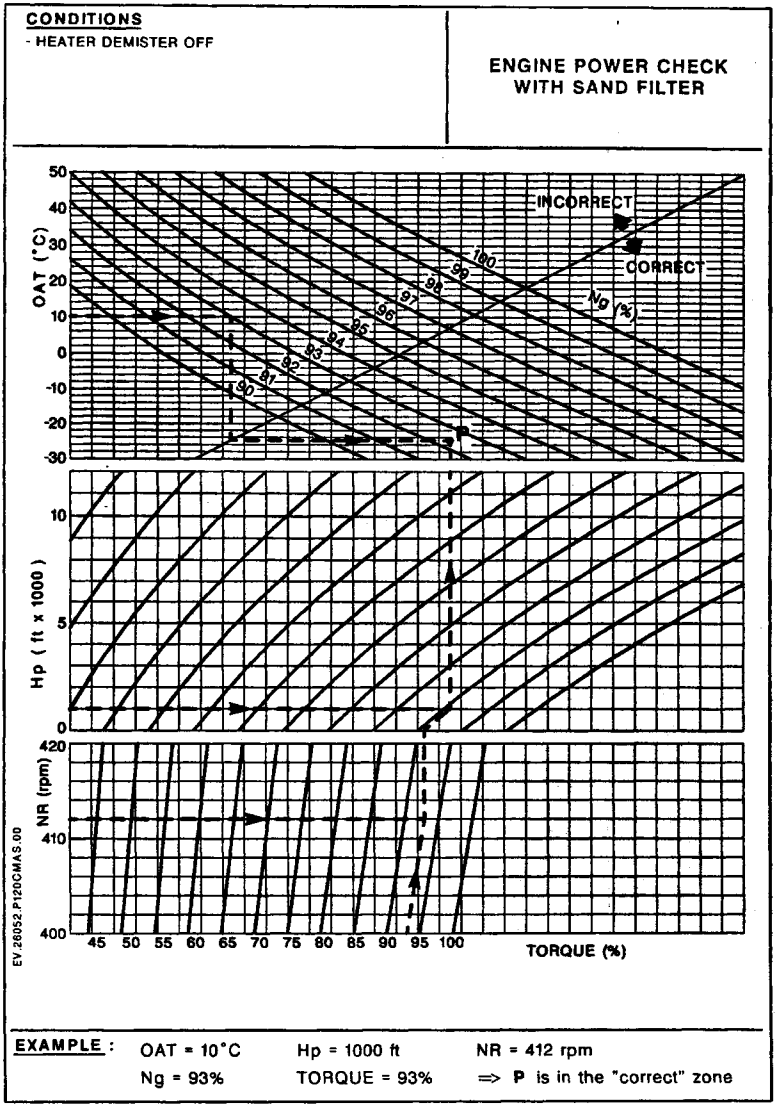

Figure 1 : Engine power check with sand filter

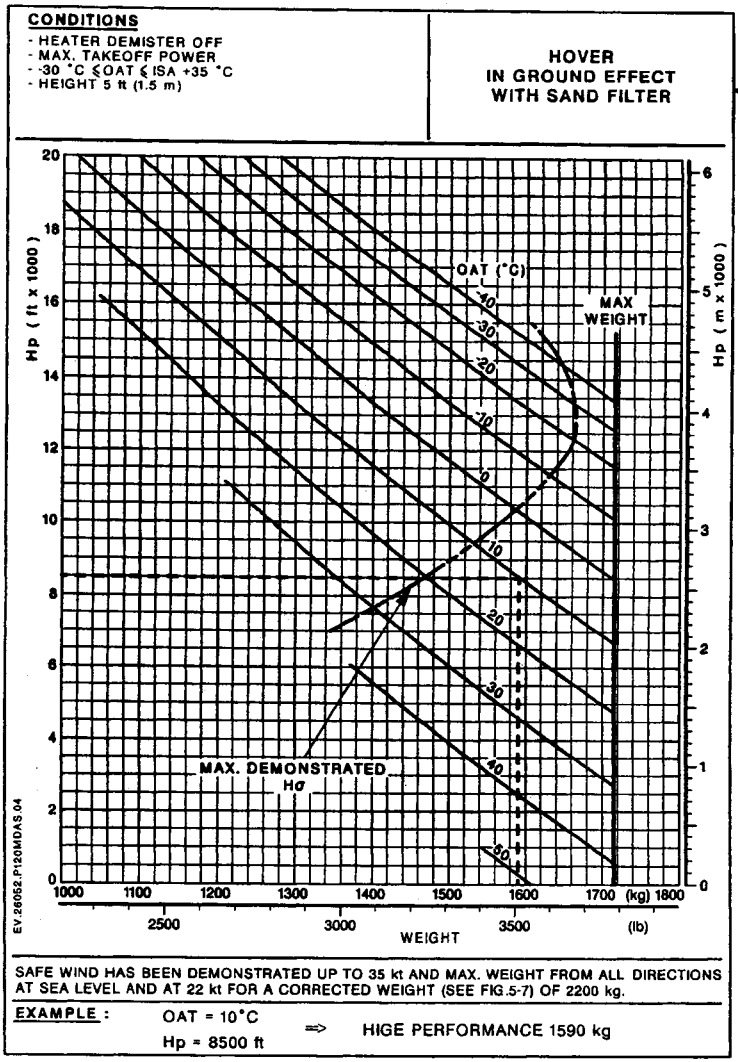

Figure 2 : Hover in ground effect with sand filter

Replace figure 2 by the following :

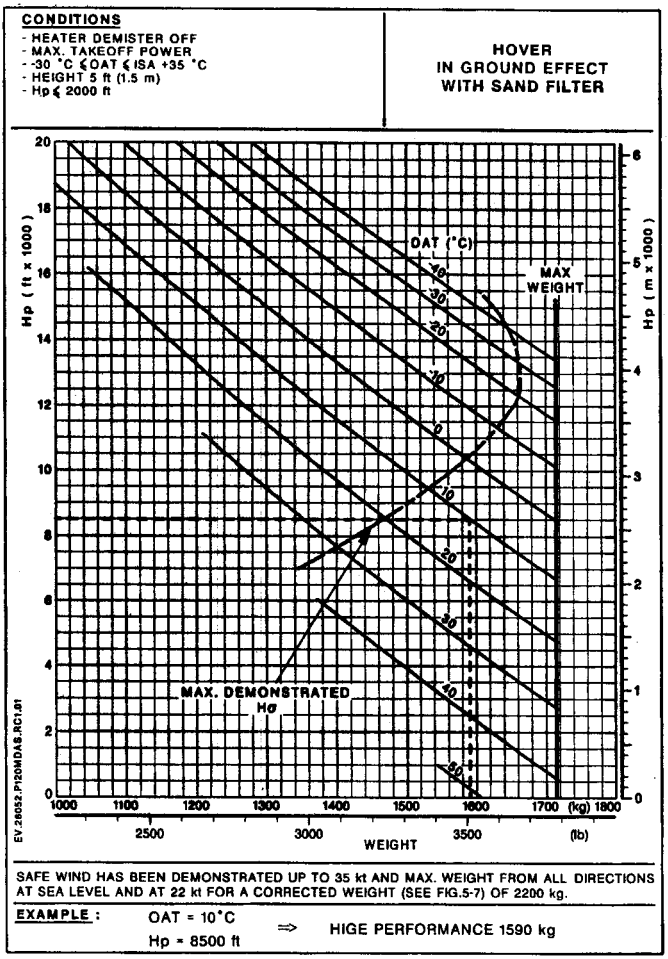

Figure 2 : HIGE with sand filter

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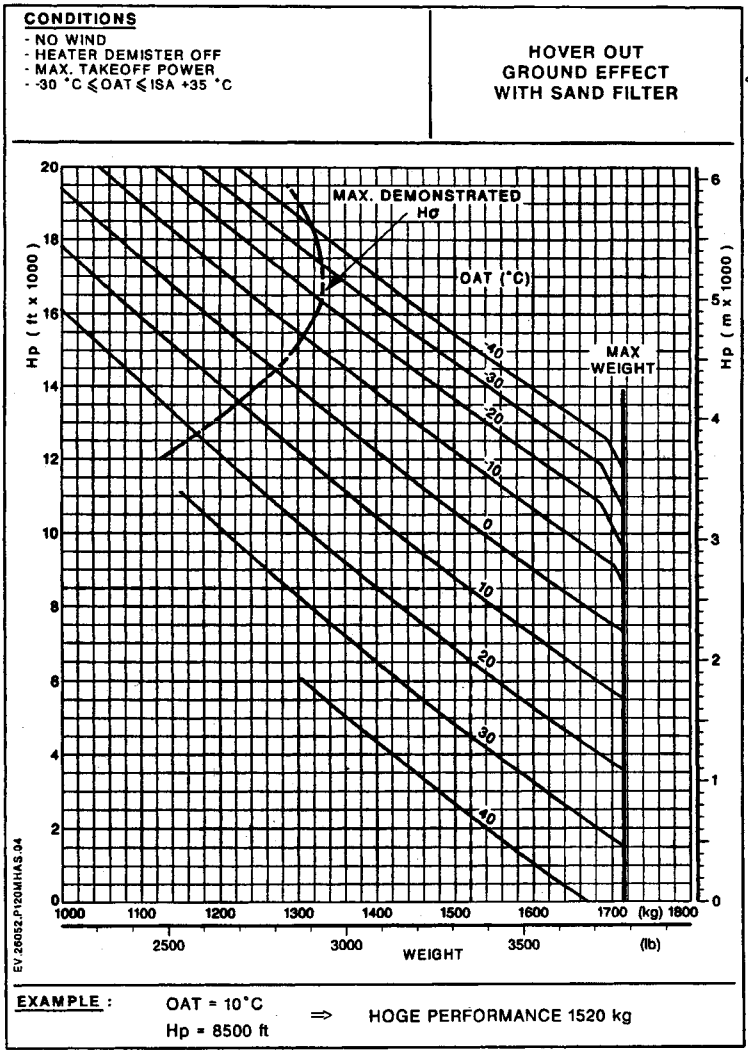
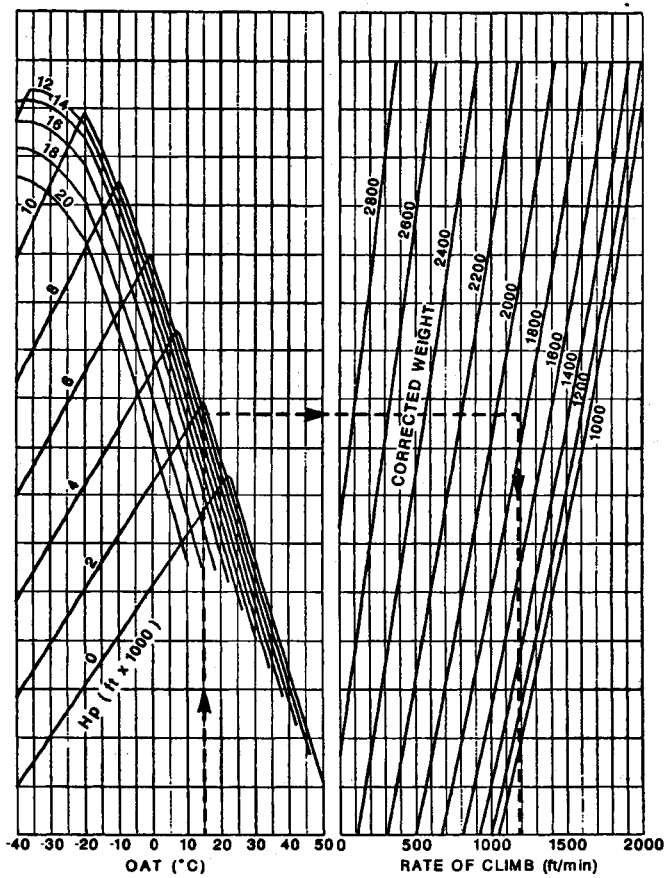


Figure 3 : Hover out ground effect with sand filter

CONDITIONS

- CAS = 65 kt - 1 kt / 1000 ft
- MAX. CONTINUOUS POWER
- HEATER DEMISTER OFF
- -30 °C ≤ OAT ≤ ISA +35 °C

RATE OF CLIMB WITH SAND FILTER



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EXAMPLE : OAT = 15°C, Hp = 4000 ft → ACTUAL WEIGHT = 1600 kg, CORRECTED WEIGHT = 1850 kg, RATE OF CLIMB = 1180 ft/min

Figure 4 : Rate of climb with sand filter

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

EMERGENCY FLOATATION GEAR

AERAZUR

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NORMAL REVISION 1

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I.C.T.
Mathieu HENRY

1 GENERAL

The emergency floatation gear is approved for emergency use (not for ditching according to JAR / FAR 27) i. e. to aid in keeping rotorcraft sufficiently upright and in adequate trim to permit safe and orderly evacuation in emergency water landing.

The installation allows the aircraft to be landed also with floatation bags inflated, on a runway or a hard prepared surface.

The emergency floatation equipment consists of :

a landing gear assembly fitted with :

- two floatation units mounted parallel along each skid of the aircraft (1) (1')
- a system for inflating the floats from a cylinder (2) with pressure indicator.
- an electrical control system with a **[FLOAT]** pushbutton to arm the system on the LACU (4).
- a firing pushbutton (3) mounted on the pilot's collective grip, protected by a switch guard.

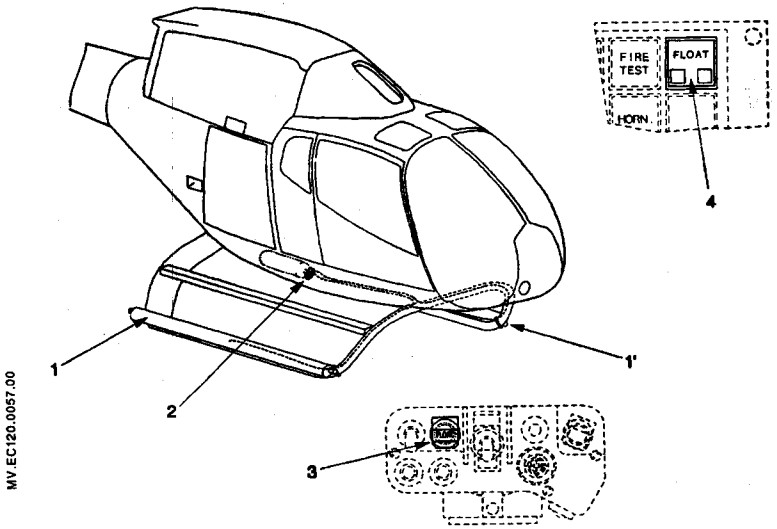

Figure 1 : Emergency floatation equipment

2 LIMITATIONS

All limitations specified in the basic flight manual and flight manual supplements remain applicable, independantly of the following.

- Floatation equipment stowed - system armed or floatation equipment inflated :
  . maximum indicated airspeed : 120 kt.

- Maximum inflation altitude : 13200 ft (4000 m).

- Maximum permissible loss of altitude after inflation : 6600 ft (2000 m).

  When flying at less than 400 ft (122 m) above water, the floatation equipment must always be armed.

- The limit values of pressure in the inflation cylinder, provided by the following table, are applicable if the flight requests the emergency floatation gear in order to be operated.

TEMPERATURE	°C	-45	-40	-30	-20	-10	0	10	20	30	40	50	60	70
	°F	-49	-40	-22	-4	14	32	50	68	86	104	122	140	158
MAX. PRESSURE	BAR	170	174	181	188	195	202	209	216	223	230	237	244	251
	PSI	2466	2524	2625	2727	2828	2930	3031	3133	3234	3336	3437	3539	3640
MIN PRESSURE	BAR	154	157	164	171	178	185	192	199	206	213	220	227	234
	PSI	2234	2277	2378	2480	2582	2683	2785	2886	2988	3089	3191	3292	3394

NOTE

The placard located adjacent to the cylinder provides the limit values.

3 EMERGENCY PROCEDURES

The procedures provided in the basic flight manual and in the flight manual supplements remain applicable and are supplemented by the following :

- **INFLATION PROCEDURE**

In the event of engine failure or other urgent requirement to ditch, check the rotor speed then apply the following procedure :

- **[FLOAT]** pushbutton ..... PRESSED IN, two lights on.
- Floatation equipment cartridge ..... FIRED (recommended firing IAS : below 80 kt - 148 km/hP).

NOTE

A deceleration with a pitch down movement can occur when firing the floatation equipment at a speed greater than 80 kt (148 km/h).

AUTORATION PROCEDURE OVER WATER WITH EMERGENCY FLOATATION GEAR

1. Collective pitch ..... REDUCE
to maintain NR in green arc.
2. IAS ..... Vy.

- If relighting impossible or after tail rotor failure.

3. Twist Grip..... SHUT OFF position.
4. Maneuver to head the aircraft equally between the wind and wave direction on final approach.

- At height ≅ 70 ft

5. Cyclic..... Flare.

- At 20-25 ft at constant attitude

6. Collective pitch .... GRADUALLY INCREASE
to reduce the rate of descent and forward speed.

7. Cyclic ..... FORWARD slightly
to adopt ditching attitude of 10° nose-up and a forward speed less than 10kt on touch-down..

8. Pedal ..... ADJUST
to cancel any side-slip tendency.

9. Collective pitch ..... INCREASE
to cushion touch down with minimum speed.

- After touch-down

10. Collective pitch ..... Gradually decrease to fully down.
11. Rotor brake ..... APPLY.
12. Evacuate aircraft once the rotor has stopped.

NOTE

Inflation of the emergency floatation bags reduces the rotor speed in autorotation by 10 rpm.

4 NORMAL PROCEDURE

The procedures provided in the basic flight manual and flight manual supplements remain applicable and are supplemented by the following :

- External checks :
  - Floatation units ..... locked in the lowered position.
  - Protective cover ..... check condition.
  - Pressure in the inflation cylinder..... checked.

- Interior check
  - Arming of the emergency floatation equipment :
    * **[FLOAT]** pushbutton..... PRESSED IN (2 lights ON).
  - Disarming the emergency floatation equipment
    * **[FLOAT]** pushbutton..... PRESSED OUT (2 lights OFF).

5 PERFORMANCE

When the floatation equipment is stowed, only the climb performance provided in section 5 is affected :

- the rate of climb must be reduced by 11%.

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

AIR CONDITIONING SYSTEM

IMPORTANT NOTE

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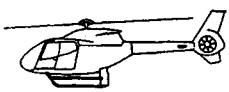

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NORMAL REVISION 1

APPROVED BY : DGAC

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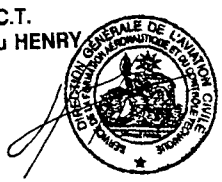
I.C.T.
Mathieu HENRY



DGAC APPROVED
REVISION 1

1 GENERAL

1.1 Description of the System

The purpose of the system is to maintain a comfortable temperature in the cabin. It is composed of:

. A compressor which is mechanically driven by a belt from the MGB output driving the engine oil cooler fan.
. A condenser located between the MGB fan and the engine oil cooler.
. A cabin fan.
. An evaporator.
. An air supply system only operating for cabin air recirculation.
The cabin outlet nozzles are identical to those of the basic aircraft.
. A control unit located on the console comprising:
- a three-position selector (1)
- a fan speed adjustment potentiometer (2).

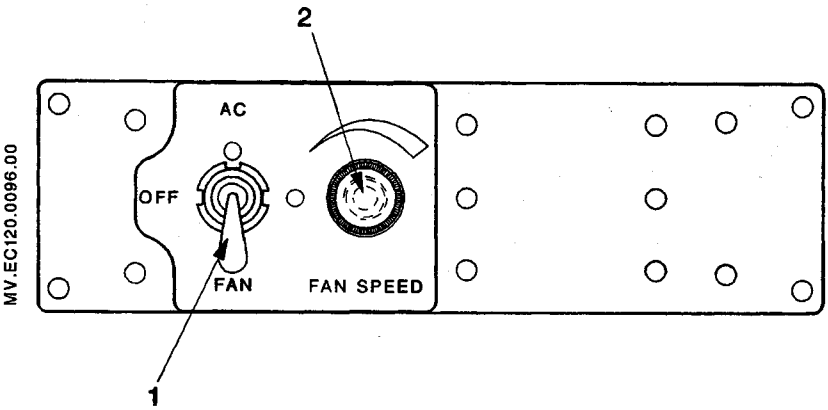


Figure 1 : Air Conditioning Control Unit

. An electrical supply and monitoring system. The cabin fan is switched on automatically when the heating system is on. A "P2 TEMP" amber light on the warning panel indicates that the maximum temperature has been reached in the cabin ventilation duct.

1.2 Air production

With the air conditioning option, cold and hot air production uses an internal air recirculation system. The air is no longer taken in from the outside, it is taken from the interior of the cabin at the rear RH side of the distribution duct. This air flows through the fan and then the evaporator where it is cooled, finally flowing through the P2 diffuser where it can be mixed with the hot air. This air then flows through the cabin roof to reach the cabin distribution duct. The air distribution in the cabin has not changed with regard to the basic version.

2 LIMITATIONS

The limitations provided in the basic flight manual and flight manual supplements remain applicable and are supplemented by the following limitations :

3 EMERGENCY PROCEDURES

The emergency procedures given in the basic flight manual and flight manual supplements remain applicable and are supplemented by the following procedures.

3.1 Ventilation System Failure

If the ventilation system does not operate (no air distribution via outlet nozzles), set the selector to the OFF position.

3.2 Air Conditioning System Failure

If the air conditioning system does not operate (no fresh air distribution via outlet nozzles), set the selector to OFF or FAN position.

3.3 Heating/Cabin Ventilation Failure

Caution and Warning Panel	Corrective Actions
P2 TEMP Maximum temperature in demisting heating duct exceeded	Cabin outlet nozzles ... Check Air flow: Heating control..... Reduce until P2 TEMP light goes out. No air flow: Heating control..... Close

4 NORMAL PROCEDURES

The normal procedures provided in the basic flight manual and flight manual supplements, remain applicable and are supplemented by the following procedures :

4.1 Prestart Check

- Heating cock .....OPEN
- Cabin fan .....Automatically ACTIVATED
- Heating cock .....CLOSE

4.2 Switching on and Switching off the System

Set the selector to the
- FAN position to obtain cabin ventilation
- A/C position to obtain air conditioning.
- OFF position to switch off the system.

Use the potentiometer to adjust the air flow distributed in the cabin.

4.3 Heating System Operation

Open the cock located in the ceiling.
The "P2" open information is displayed on the VEMD screen. The air distribution fan is automatically activated at its maximum flow rate even if the air conditioning selector is set to OFF position.
Close the ceiling cock to stop heating ; this will also switch off the fan if the air conditioning selector is set to OFF position.

5 PERFORMANCE

The performances given in the basic flight manual and in flight manual supplements remain applicable and are supplemented by the following procedures when the air conditioning is in operation.

5.1 Hover Flight

When the air conditioning system is in operation, the pilot must reduce the hover performances given in SECTION 5 of the basic flight manual by 20 kg.

NOTE

The operation of the air conditioning system is not taken into account by the VEMD. When the air conditioning system is in operation, the pilot must reduce by 20 kg the performances calculated by the VEMD.

5.2 Climb

Performances in climb given in SECTION 5 of the basic flight manual are reduced by 20 ft/min.

5.3 Engine Power Check

The operation of the air conditioning system does not affect the engine power check given in the basic flight manual.

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

GPS

TRIMBLE TNL 1000 DC

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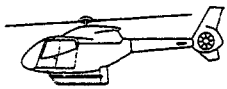

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1 GENERAL

The TRIMBLE 1000 DC Global Positioning System complies with AC 20-138 requirements for use in day VFR conditions in sight of the ground or water.

2 LIMITATIONS

The limitations in the basic flight manual and flight manual supplements remain applicable and are supplemented or modified by the following limitations.

A placard located within pilot's sight field indicates :

GPS OPERABLE IN DAY VFR CONDITIONS IN SIGHT OF GROUND OR WATER ONLY	GPS UTILISABLE EN VFR DE JOUR EN VUE DU SOL OU DE L'EAU UNIQUEMENT

– Use of the GPS is prohibited in approach mode.

3 EMERGENCY PROCEDURES

The emergency procedures in the basic flight manual and flight manual supplements remain applicable.

NOTE

Press the MSG key on the CDU to display the situation of the GPS and to scroll through next messages if any.

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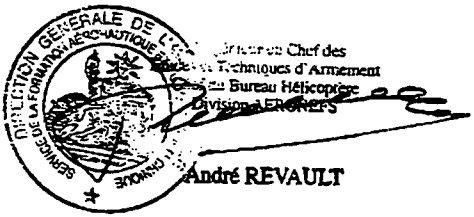

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4 NORMAL PROCEDURE

The normal procedures in the basic flight manual and flight manual supplements in use remain applicable, and are supplemented by the following normal procedures :

4.1 BEFORE STARTING

- The PILOT GUIDE operating manual (reference : 80455-0612) must be up-to-date and kept on-board the aircraft.
- The crew must check the validity and accuracy of the data base (28 day validity) relative to the official documentation.
- Before the start of navigation, check that all the data is valid by reading the messages on the CDU.

NOTE

During the « en route » phase, the integrity of the position supplied by the GPS is not ensured. Consequently it is the responsibility of the crew to check the accuracy of the position every 15 minutes using either conventional VFR method or other navigation equipment if available.

Transmissions from the helicopter, via transmitters KX165 and KY196 can lead to momentary losses of GPS reception at the following frequencies:

121.150 MHz , 121.175 Mhz, 121.250 Mhz, 131.275 MHz.

Navigation calculation becomes nominal 2 to 3 seconds after the end of transmission.

5 STATUTORY PERFORMANCE

The statutory performance in the basic flight manual and flight manual supplements remains applicable.

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

GPS

TNL 2000 APPROACH PLUS

IMPORTANT NOTE

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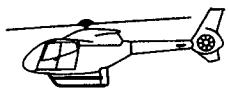

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Ingénieur en Chef de l'Armement
Chef du Bureau : Avions de Transport
Division Aéronefs

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1 GENERAL

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2 LIMITATIONS

The limitations in the basic flight manual and flight manual supplements remain applicable and are supplemented or modified by the following limitations.

A placard located within pilot's sight field indicates :

GPS OPERABLE IN DAY VFR CONDITIONS IN SIGHT OF GROUND OR WATER ONLY	GPS UTILISABLE EN VFR DE JOUR EN VUE DU SOL OU DE L'EAU UNIQUEMENT

Use of the GPS is prohibited in approach mode.

3 EMERGENCY PROCEDURES

The emergency procedures in the basic flight manual and flight manual supplements remain applicable.

NOTE

Press the MSG key on the CDU to display the situation of the GPS and to scroll through next messages if any.

4 NORMAL PROCEDURE

The normal procedures in the basic flight manual and flight manual supplements in use remain applicable, and are supplemented or modified by the following normal procedures :

4.1 BEFORE STARTING

- The PILOT GUIDE operating manual (reference : 82877) must be up-to-date and kept on-board the aircraft.
- The crew must check the validity and accuracy of the data base (28 days validity) relative to the official documentation.
- Before the start of navigation, check that all the data is valid by reading the messages on the CDU.

NOTE

During the « en route » phase, if the integrity of the position supplied by the GPS is not ensured, consequently it is the responsibility of the crew to check the accuracy of the position every 15 minutes using either conventional VFR method or the other navigation equipment if available.

Transmissions from the helicopter, via KX165 and KY196 can lead to momentary losses of GPS reception at the following frequencies:

121.175 $\pm$ 0.025 Mhz, 131.275 $\pm$ 0.025 Mhz and 131.200 Mhz

Navigation calculation becomes nominal few seconds after the end of transmission.

5 STATUTORY PERFORMANCE

The statutory performance in the basic flight manual and flight manual supplements remains applicable.

SECTION 10

OPERATIONAL TIPS

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10.1 RECOMMENDATIONS FOR CARGO SLING OPERATIONS

10.1.1 Personnel Training

Cargo sling operations may only be conducted by pilots who already have considerable experience with this type of aircraft.

No pilot should perform solo external load flights without first having accomplished such operations in the company of an instructor.

Mechanics on ground duty must be fully informed by the pilot before each new operation, in particular as regards :

- their position on the ground considering the proposed flight path ;
- the direction in which to move away ;
- the hook-up operation ;
- hand signals to be used or radio instructions ;
- protective equipment : helmets, gloves, glasses (if applicable) ;
- the number of round trips between replenishments ;
- the manner of retrieving slings and nets.

10.1.2 Mandatory pre-operational checks

- Helicopter Condition
  In addition to the normal pre-flight checks of the helicopter, the release unit must be carefully inspected and the mechanism checked for correct release operation.
- Condition of Sling Equipment
  The nets, straps and slings must be examined thoroughly. Any worn or frayed components are to be discarded.
  The cables, strops and shackles must be capable of carrying three times the maximum anticipated load.
- Preparation of Loads
  Make sure that all participants are well aware of the weight of the loads.
  Ensure that the method of suspension is understood.

- Condition of Loading and Unloading Areas
  Remove or tie down all that might be displaced by the rotor downwash.
- Total Weight of Helicopter with Load
  Define maximum acceptable load compatible with terrain configuration and atmospheric conditions. The maximum all up weight of the aircraft is that at which O.G.E. hover can be held over the higher of the take-off or landing platforms.

10.1.3 Airborne loads

Heavy loads, such as bags of cement or drums of kerosen, which are carried in a net, present no particular problem.

Special precautions must be taken in the case of bulky loads, which have a tendency to oscillate and even to "float" during transport on the sling.
Permeability to air can have a stabilizing effect on a bulky load : for example, a teleferic car should be carried with both its doors open.

Never carry an airfoil alone : there is a great risk of the airfoil flying up into the tail rotor.

If several cables are used to sling the load, they must be long enough to form an angle of less than 45° between cables at the point of suspension under the helicopter ; experience shows that oscillation of the load is thus less likely to occur.

On the other hand, if the load is slung on a single sling cable, it is preferable that a fairly short cable be used as there is then less risk of the load swinging, and it is easier to judge the height of the load during approach.

For the retrieval of crashed helicopters it is generally possible to use a lifting ring on the rotor shaft.

Airplanes are carried using straps passing under the fuselage or under the wings. The cables must be attached in such a way that the airplane is in a slightly nose-down attitude when the helicopter is in the hover.

10.1.4 In-flight precautions

After hooking on the load the ground mechanic is to check the position of the sling cables then move away. The pilot must then make sure that the mechanic has moved clear and then be advised by signs that he may lift off the load.

Power must be applied slowly enough to allow the helicopter to centre itself above the load.

A vertical take-off must be made, avoiding dragging the load along the ground or striking any obstacle.

Carefully avoid flying over houses, vehicles and persons.

If the load starts to swing, slowly reduce speed or make a gentle left turn.

Approach must be made head into the wind with gradual reduction in airspeed, and transition into hover high enough above the ground to eliminate the risk of dragging the load.

Set the load down, then reduce collective pitch sufficiently to slacken the cables before opening the release unit hook ; this also allows the pilot to ensure that the load is deposited. If the cables are long enough, move sideways a little before opening the hook, to prevent the ring and tackle from falling onto the freight.

Even after the mechanic has signalled that the load is released, move away as if it were not ; this is an advisable precaution against possible misinterpretation of signals.

Never fly away with an empty net or an unballasted sling.

10.2 EMERGENCY LOCATOR TRANSMITTER (JOLLIET JE-2 NG)

10.2.1 General

The JOLLIET JE-2 NG emergency locator transmits radio beacon signals simultaneously on the international distress frequencies (121.5 Mhz and 243.0 Mhz) to aid helicopter search and rescue operations.

The unit operates automatically in the event of crash impact exceeding 5 g along the accelerometer axis.
It may be operated manually by means of a MANU-OFF-AUTO switch (3) on the transmitter front panel, or by means of a MANU-AUTO (2) remote control switch, on "MANU" position.

10.2.2 Description-Operation

– Components & location

- A transmitter, located on the RH side in the cargo hold : a placard (4) indicates its location and its use in the cockpit (1).
- An external antenna (6) permits signal transmission when operated on board.
- A cockpit remote control switch.
- A flexible antenna (5) on the transmitter can be used in MANUAL operation outside the helicopter.

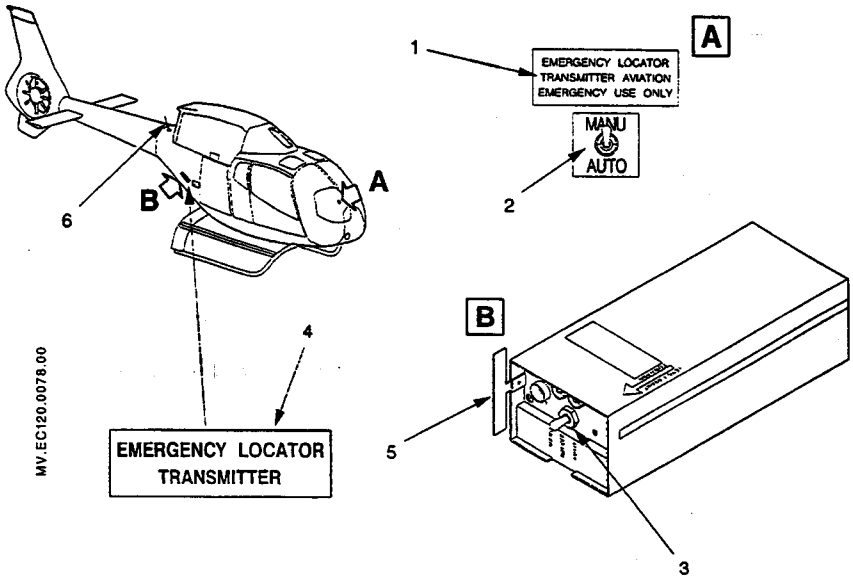


Figure 10-1 : Remote control switch and emergency locator

10.2.3 Testing Procedure

NOTE

Testing is authorized only during the first five minutes of each hour for no more than three consecutive audio signals.

- Select an international distress frequency (121.5 Mhz or 243.0 Mhz) on the aircraft VHF or UHF system.
- Set the AUTO-MANU remote control switch to MANU for approximately one second.
- The transmitter output signal should be audible in the headphones.
- Set the switch to AUTO.

10.2.4 Operating Procedure

- Pre-Flight Checks
  - In cockpit : check that remote control switch is set to AUTO.
  - On transmitter : check that MANU-OFF-AUTO switch is set to AUTO.

- Post-Flight Check
  After landing, set the VHF communications receiver to 121.5 Mhz to ensure that the emergency locator transmitter has not accidentally been switched on.

- Automatic Operation
  The transmitter is actuated automatically in the event of an impact of at least 5 g (assuming the MANU-AUTO switch is set to AUTO).

NOTE

The impact detector (accelerometer) may be reset by means of the switch control on the transmitter front panel on "OFF/RST" position (2 à 3 s.). The reset stops the transmitter output signals if the unit is operating.

- Manual Operation
  The unit may be actuated manually by setting the control switch to "MANU".

– Portable Operation
The transmitter may be used for self-contained operation on the ground as follows :

- Remove the transmitter from its mounting bracket.
- Select an unobstructed area.
- Extend the built-in whip antenna.
- Place the unit upright with the antenna on top.
- Switch on the transmitter by setting the MANU-OFF-AUTO switch to "MANU".

– Complete cut-off
Set the transmitter switch to OFF/RST.

10.3 EMERGENCY LOCATOR TRANSMITTER (ELT 96 – 406)

10.3.1 GENERAL

The ELT 96- 406 radio beacon is an emergency transmitter which is used to locate the helicopter in an emergency. It transmits simultaneously on the international frequencies (121.5 -243 -406 MHz).

The transmitter starts operating automatically in case of impact or in case of breakage of the electric cable loom A-B between the remote control switch and the emergency locator.

It may be switched on manually via the switch located on the top face of the transmitter or via the remote control switch located on the instrument panel.

10.3.2 DESCRIPTION OPERATION

- Components & location :

- A transmitter (4) attached to the structure inside the rear RH cargo hold.
- An external label indicating transmitter location (5).
- An (AUTO – MANU) control switch located on the instrument panel on the left hand side (2).
- An (AUTO TEST/RESET) pushbutton located next to the control switch (1).
- A amber (XMIT ALERT) indicator light located on the instrument panel on the right hand side (3).
- A 3 Amp circuit breaker on CCBP.
- An external antenna (6) .

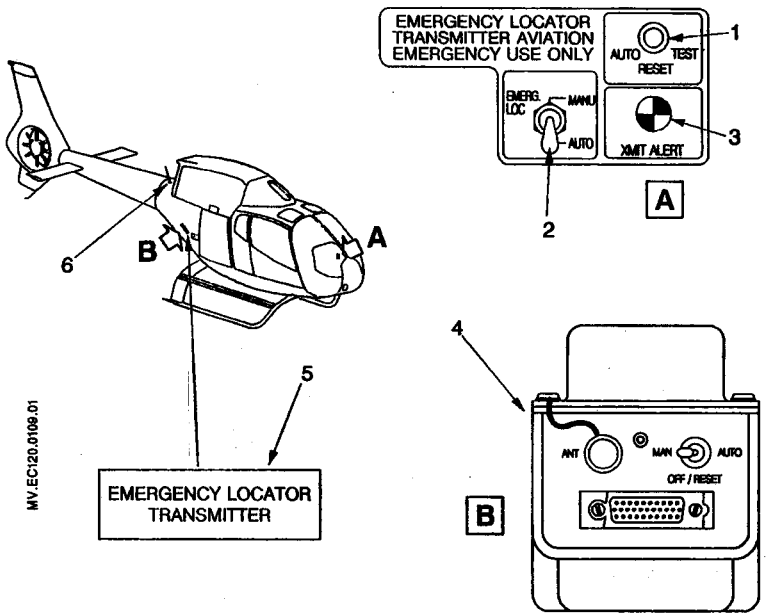


Figure 10-2 : Remote control switch and emergency locator ELT 96- 406

10.3.3 TESTING PROCEDURE

The manual testing procedure for emergency locator ELT 96- 406 is prohibited.

Only the following auto-test procedure is authorised:

- Perform the test, by pressing the "AUTO TEST/RESET"(1) pushbutton..
- The amber "XMIT ALERT" (3) light comes on for approximately 1.5 s.

10.3.4 OPERATING PROCEDURE

- Pre-flight check:

Check the following under the instrument panel:

- The remote control switch is set to "AUTO".

CAUTION

If the switch is set to"AUTO" and the connector is unplugged, the transmitter will operate.

- Check the following on the transmitter:
  - The connector is plugged in.
  - The switch is set to "AUTO".

NOTE

If the indicator light flashes, it indicates that the batteries are faulty or the transmitter is inoperative.

- Post-flight check:

After landing, check for untimely transmitter operation (the amber "XMIT ALERT" light should be extinguished).

- Automatic operation:

The transmitter will begin operating automatically in case of impact if the remote control switch is set to the "AUTO" position. The amber "XMIT ALERT" light comes on during transmitter operation.

Resetting the impact detector :

- Control switch set to "AUTO".
- Press the "AUTO TEST/RESET" pushbutton.
- The transmitter should cease operating.

NOTE

If the transmitter continues transmitting, perform the operation again. If, after several attempts, the transmitter remains in operation, set the switch on its top face to "OFF".
In the event of untimely activation, advise the local authorities and give the aircraft call sign.

- Manual operation

The transmitter will begin operating when the remote control switch is set to "MANU".
The amber "XMIT ALERT" light comes on during transmitter operation.

- Portable operation:

This transmitter may be used on the ground, as follows:

- Set the switch to "OFF".
- Remove the transmitter from its support.
- Work in a clear space.
- Hold the transmitter in the vertical position with the antenna upwards.
- Set the switch to "MAN/RESET" to begin transmission

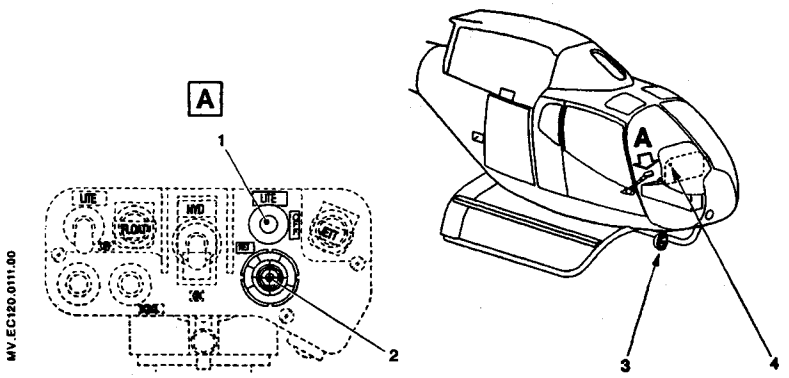
10.4 ADDITIONAL LANDING LIGHT, CONTROLLABLE IN ELEVATION AND AZIMUTH

10.4.1 GENERAL

The additional landing light, controllable in elevation and azimuth, is an optional equipment designed for improving safety during approach and taxiing maneuvers.

This optional equipment is mounted on the underside of the lower structure, in the center of the fairing in front of the forward cross-tube of the landing gear.

Its power is 450 Watts.



10.4.2 DESCRIPTION

The installation comprises :

- a retractable and controllable light (3),
- a three-way switch (1) on each (pilot's and copilot's) collective pitch lever. This switch is used to turn on light and retract it automatically,
- a four-way switch (2) on each (pilot's and copilot's) collective pitch lever. This switch is used to control the light in elevation and azimuth,

- a blue "LAND LT" indicator light (4) on the instrument panel, which shows that the landing light is illuminated.

10.4.3 OPERATION

The landing light is turned on and off by means of the three-way switch (ON-OFF-RETRACT) on the collective pitch lever:

- In the "ON" position of the switch, the landing light is turned on and the "LAND TL" indicator light is illuminated.
- In the center "OFF" position of the switch, the landing light is turned off and the "LAND LT" indicator is out.
- The spring-loaded "RETRACT" position of the switch must be used to turn off and retract the landing light automatically. **In this way, the landing light will always be turned off in the retracted position.**

The extension and orientation of the landing light are controlled by means of the four-way switch.

10.4.4 PROTECTION OF THE CIRCUITS

The circuits are protected by means of:

- a 3 Amp fuse for the control circuits,
- a 20 Amp fuse for the lighting circuit .

The fuses are located on the side panel of the cargo compartment

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FLIGHT MANUAL

EC 120 B

SUPPLEMENT

GPS

TNL 2000 APPROACH

IMPORTANT NOTE

THE INFORMATION CONTAINED HEREIN SUPPLEMENTS OR SUPERSEDES THE INFORMATION GIVEN IN THE BASIC FLIGHT MANUAL AND/OR APPLICABLE FLIGHT MANUAL SUPPLEMENTS.

THE EFFECTIVITY OF THE SUPPLEMENT AT THE LATEST REVISION IS SPECIFIED ON THE LIST OF EFFECTIVE PAGES.

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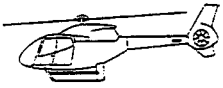

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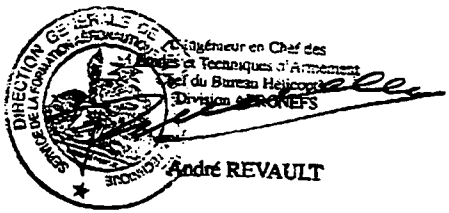

DGAC APPROVED
ORIGINAL ISSUE

1 GENERAL

The Global Positioning System TRIMBLE 2000 APPROACH complies with AC 20-138 requirements for use in day VFR conditions in sight of the ground or water.

2 LIMITATIONS

The limitations in the basic flight manual and flight manual supplements remain applicable and are supplemented or modified by the following limitations.

- A placard located within pilot's sight field indicates :

GPS OPERABLE IN DAY VFR CONDITIONS IN SIGHT OF GROUND OR WATER ONLY	GPS UTILISABLE EN VFR DE JOUR EN VUE DU SOL OU DE L'EAU UNIQUEMENT

- Use of the GPS is prohibited in approach mode.

3 EMERGENCY PROCEDURES

The emergency procedures in the basic flight manual and flight manual supplements remain applicable.

NOTE

Press the MSG key on the CDU to display the situation of the GPS and to scroll through next messages if any.

4 NORMAL PROCEDURE

The normal procedures in the basic flight manual and flight manual supplements in use remain applicable, and are supplemented or modified by the following normal procedures :

4.1 BEFORE STARTING

- The PILOT GUIDE operating manual (reference : 81449) must be up-to-date and kept on-board the aircraft.
- The crew must check the validity and accuracy of the data base (28 days validity) relative to the official documentation.
- Before the start of navigation, check that all the data is valid by reading the messages on the CDU.

NOTE

During the « en route » phase, the integrity of the position supplied by the GPS is not ensured. Consequently it is the responsibility of the crew to check the accuracy of the position every 15 minutes using either conventional VFR method or the other navigation equipment if available.

Transmissions from the helicopter, via KY196 can lead to momentary losses of GPS reception at the following frequencies:

121.175 $\pm$ 0.25 MHz and 131.275 $\pm$ 0.25 MHz.

Navigation calculation becomes nominal 2 to 3 seconds after the end of transmission.

5 STATUTORY PERFORMANCE

The statutory performance in the basic flight manual and flight manual supplements remains applicable.

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AD or SB Number	Subject Description	Compliance Due At	Initial
AD 2000-285-005 (A) R2	Sliding door inspection IAW SB 05A005	Each door installation.	
*AD 2000-176-004 (a) R2	Inspection of Engine-to-Main Gear Box (MGB) – Coupling Tube AssemblyIAW Alert Service Bulletin # 05A003	Daily or 5 hrs	
AD 1999-233	Replacement of fuel injection manifolds IAW SB A319 73 4001	200 hrs or 'Bad' Pwr check	
SB A319 72 4003	Dye Penetrant inspection of P3 air tapping bosses and FCU supply boss for cracks	100 hrs	
TD 28C004	Clean the in-line fuel strainer IAW Technical Directive 28C004	500 hrs or 2 years	