eurocopter

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

André REVAULT

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

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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	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)

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		
	JK	32-001 and A 00075	X		RC 1	JKM 927247
		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~~	@

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

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LIST OF APPROVED EFFECTIVE PAGES (CONT'D)

PAGE	REV No	REMARKS	PAGE	REV No	REMARKS
3-12	5		5-1A	4	added
3-13	5		5-1B	5	
3-14	5		5-2	4	
3-15	5		5-3	4	
3-16	5		5-4	5	
3-17	5		5-5	4	
3-18	5		5-6	3	
3-19	5		5-7	5	
3-20	5		5-8	5	
3-21	0		5-9	5	
	SECTION 4		5-10	4	
4-i	5		5-11	5	
4-ii	0		5-12	5	
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			

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

DIRECTION GÉNÉRALE DE L'AVIATION CIVILE

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RECORD OF APPROVED REVISIONS

Rev. No	Date Approved	Inserted		Rev. No	Date Approved	Inserted	
		Date	Initials			Date	Initials
5	21NOV 01	FEB06/02	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	
6-10	5	
6-11	5	
6-12	0	
6-13	0	
6-14	5	
6-15	4	
	SECTION 7	
7-i	3	
7-ii	1	
7-iii	3	
7-1	5	
7-2	5	
7-3	5	
7-4	3	
7-5	3	
7-6	1	
7-7	3	
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	

LIST OF EFFECTIVE PAGES REQUIRING NO APPROVAL (CONT'D)

PAGE	REV No	REMARKS	PAGE	REV No	REMARKS
7-25	3		8-19	5	
7-26	5		8-20	2	
7-27	5		8-21	2	
7-28	3		8-22	4	
7-29	5		8-23	2	
7-30	3		8-24	5	
7-31	3		8-25	5	
7-32	3		8-26	5	
7-33	1		8-27	5	
7-34	3		8-28	5	
	SECTION 8		8-29	5	
8-i	2		8-30	5	
8-ii	2		8-31	5	
8-1	5		8-32	5	
8-2	5		8-33	5	
8-3	5			SECTION 10	
8-4	2		10-i	5	
8-5	2		10-ii	5	added
8-6	2		10-1	2	
8-7	5		10-2	2	
8-8	5		10-3	2	
8-9	2		10-4	2	
8-10	2		10-5	2	
8-11	2		10-6	2	
8-12	2		10-7	2	
8-13	2		10-8	5	added
8-14	2		10-9	5	added
8-15	2		10-10	5	added
8-16	3		10-11	5	added
8-17	2		10-12	5	added
8-18	2		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

MAIN TABLE OF CONTENTS

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

LIST OF FIGURES

Page

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 [redacted]

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

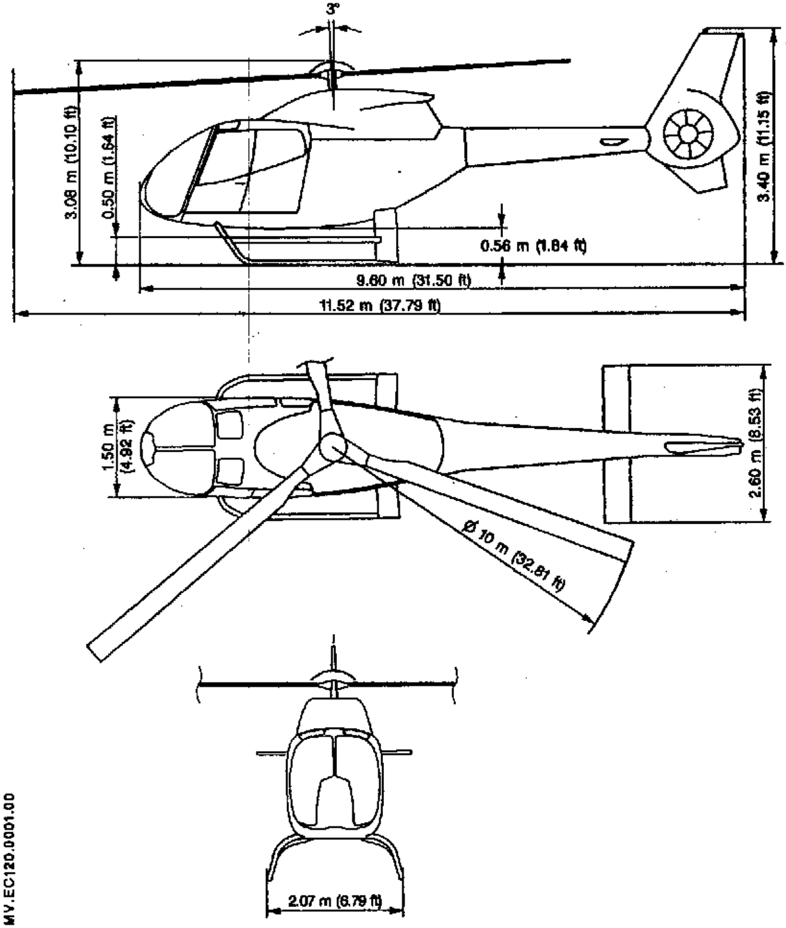
An operating procedure, condition, etc., which is essential to highlight.

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)

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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

Page

LIST OF FIGURES

Page

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

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.EC120.0095.01

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

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:

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.EC120.0095.01

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

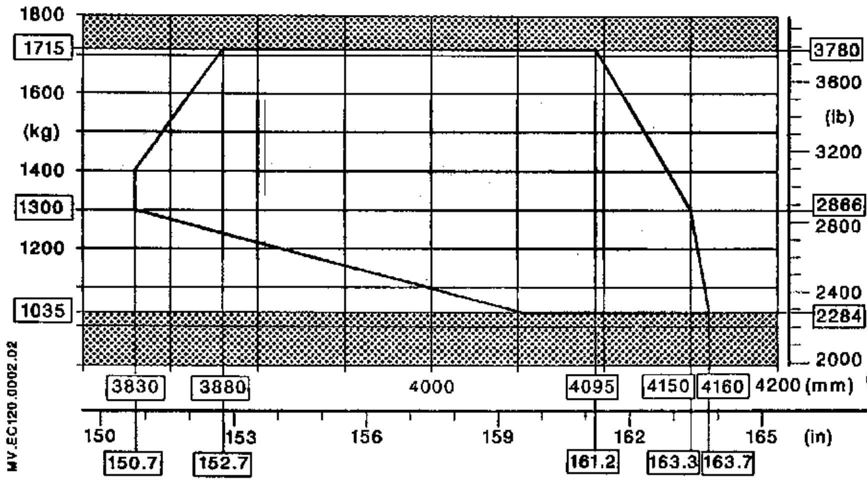


Figure 2-1 : Longitudinal CG Chart

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)

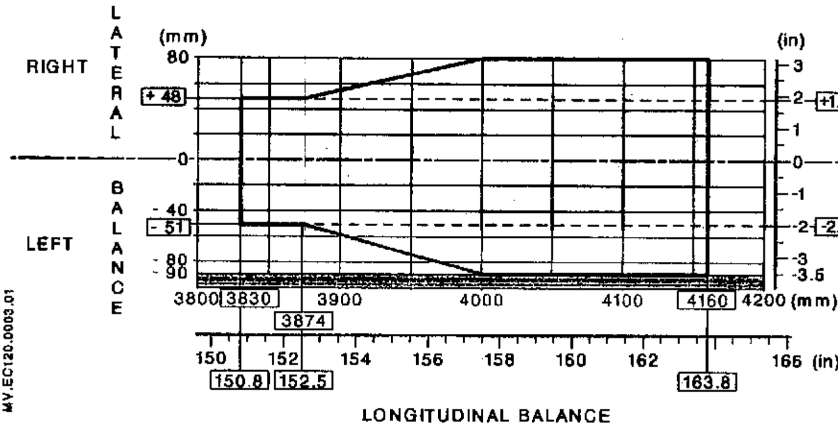


Figure 2-2 : Lateral CG Chart

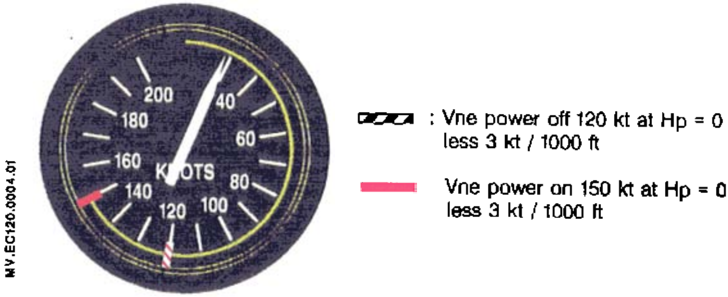
NOTE

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

2.3 FLIGHT ENVELOPE LIMITATIONS

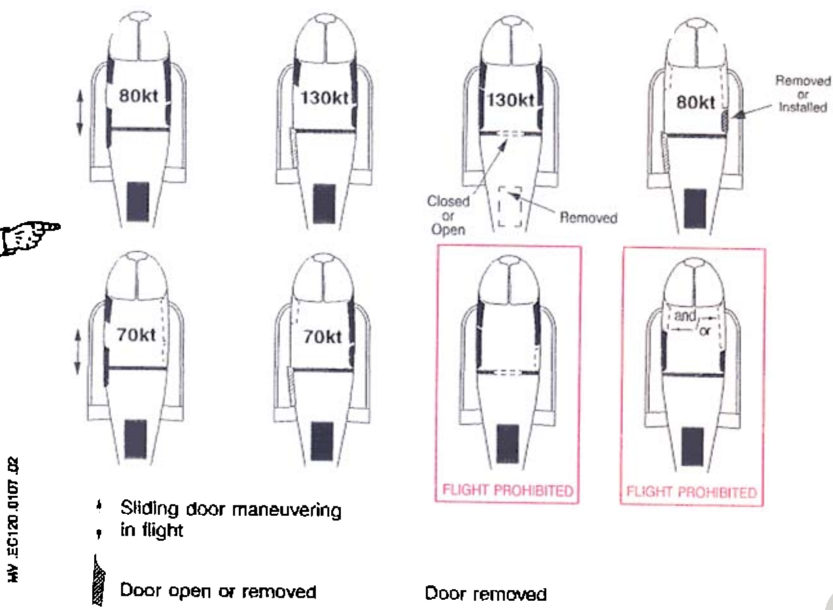
2.3.1 AIRSPEED LIMITATIONS

- Doors closed



- 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.



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
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.

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°

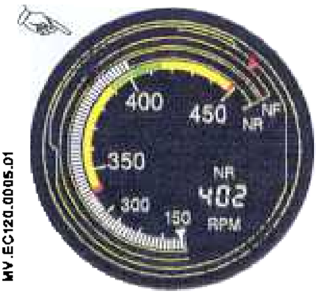
2.3.5 MANEUVERING LIMITATIONS

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.



MV.EC120.0005.01

△ : 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

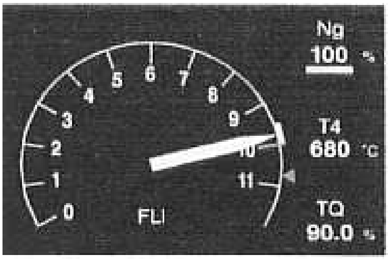
NOTE

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

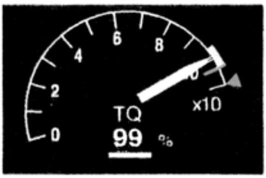
The values (Ng = 100%, T4 = 680°C, Tq = 90%) are given as examples.

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

EC120.0008.

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

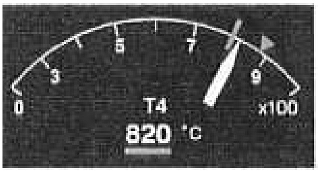
MV.EC120.0009.01

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)
: ΔNg = +2,6% Max. transient rating (5 s)
(Ng = 103,6 %, Hp = 0, ISA)

- T4 LIMITATIONS

Starting limitations

MV.EC120.0010.01

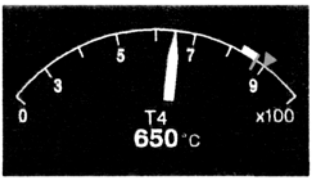


: 800 °C Maximum continuous

▲ : 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

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.EC120.0084.00

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

PULL UP	TO OPEN
PUSH DOWN	TO LOCK

Location : Inside RH door

Placard :

MV.EC120.0068.00

PULL UP	TO OPEN
PUSH DOWN	TO LOCK

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

PULL UP TO OPEN
PUSH DOWN TO LOCK

Location : Inside RH door

Placard :

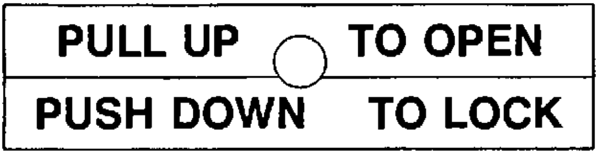
MV.EC120.0068.00

PULL UP TO OPEN
PUSH DOWN TO LOCK

Location : Inside LH door

Placard :

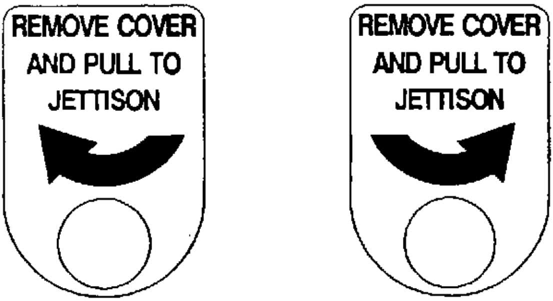
MV.EC120.0068.00



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

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Placard :

MV.EC120.0080.00

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 :

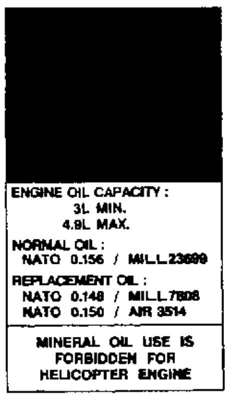
MV.EC120.0065.01

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 :

MV.EC120.0066.RC

CARBURANT :	**JP1-JP5-JP8**	
	JET A1-JET A	
FUEL :	**F34-F35-F43-F44**	
CAPACITE / CAPACITY :		
	109,9	**U.S. GALLONS**
	91,6	**IMP. GALLONS**
	416	**LITRES / LITERS**
	324	**KG**

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 :

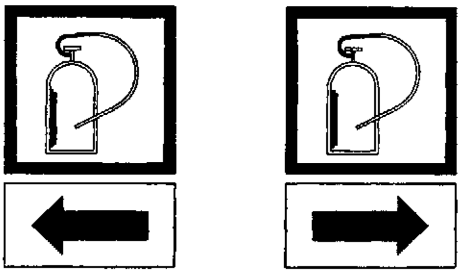
MV.EC120.0073.01

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.

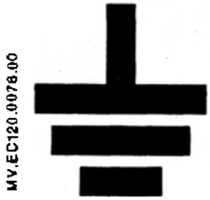
Location : Inside cabin, on console lateral side

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

Page

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 $\boxed{\text{HORN}}$ 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.

- <u>At height ≅ 70 ft</u>

5. Cyclic...................................... FLARE

- <u>At 20 - 25 ft and at constant attitude</u>

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

- <u>When NR stops decreasing</u>

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

3. Autorotation procedure .... APPLY

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 <u>in Flight Position</u>

YES → Autorotation Procedure .... APPLY

NO →
1. Twist grip...... FLIGHT POSITION
2. Collective...... INCREASE When Ng $\geq$ 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 in Flight Position

YES

Autorotation
Procedure....... APPLY

NO

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 :*

Ng limitation
Max Cont Power (%)

Hp (ft) \ OAT (°C)	-40 to -35	-35 to -25	-25 to -15	-15 to -5	-5 to 5	5 to 15	15 to 25	25 to 50
12000 to 20000								
10000 to 12000	95.5	96.5	97.5					
8000 to 10000	94.5	95.5	96.5	97.5				
6000 to 8000	92.5	93.5	95.5	96.5	98.5			
4000 to 6000	91.5	92.5	93.5	95.5	96.5	98.5		
2000 to 4000	90.5	91.5	92.5	94.5	95.5	97.5	98.5	
0 to 2000	89.5	89.5	91.5	93.5	94.5	96.5	97.5	

MV.EC120.0015.00

– 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.

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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.** • <u>On ground</u> : **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. • <u>In flight</u> : 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 <u>ON</u> YES ↓ [ELECT RESET] pushbutton <u>ON</u> **BATT** Goes out ↓ **CONTINUE FLIGHT** **BATT** Remains on ↓ **LAND AS SOON AS PRACTICABLE** NO ↓ [BAT] .....ON pushbutton ↓ **BATT** Remains on ↓ **LAND AS SOON AS PRACTICABLE**

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 <u>ON</u> YES → [ELECT RESET] pushbutton .... <u>ON</u> → GENE Goes out → **CONTINUE FLIGHT** → GENE Remains on → Unnecessary equipment....... OFF → **LAND AS SOON AS PRACTICABLE** **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). NO → [GENE] pushbutton ON

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 .... <u>ON</u> YES ↓ Monitor airspeed indicator NO ↓ [PITOT] push-button..... **ON**
HORN Klaxon inopérant	[HORN] push-button .... <u>ON</u> YES ↓ Aural warning failure NO ↓ [HORN] push-button..... **ON**

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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

Page

LIST OF FIGURES

Page

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

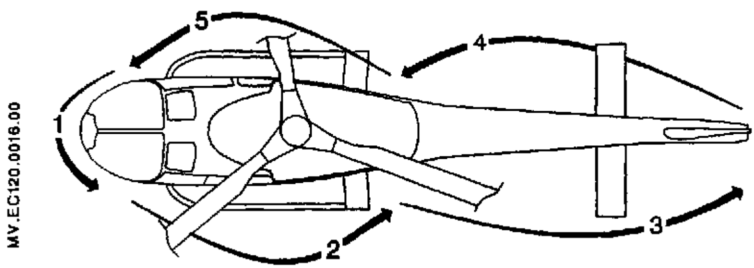

Figure 4-1 : Sequence of Checks

<u>Station 1</u>

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

<u>Station 2</u>

- 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.

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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.

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- <u>Hydraulic accumulator test</u> :

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

   HYDR 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.

- <u>Hydraulic shut-off test</u> :

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

   HYDR 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.

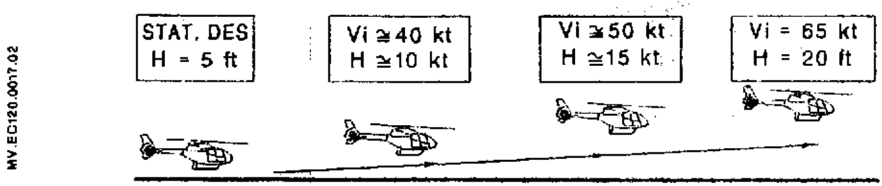


Figure 4-2 : Takeoff Procedure

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

- **<u>BEFORE LEAVING HELICOPTER</u>**

- 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)

Page

LIST OF FIGURES

Page

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".

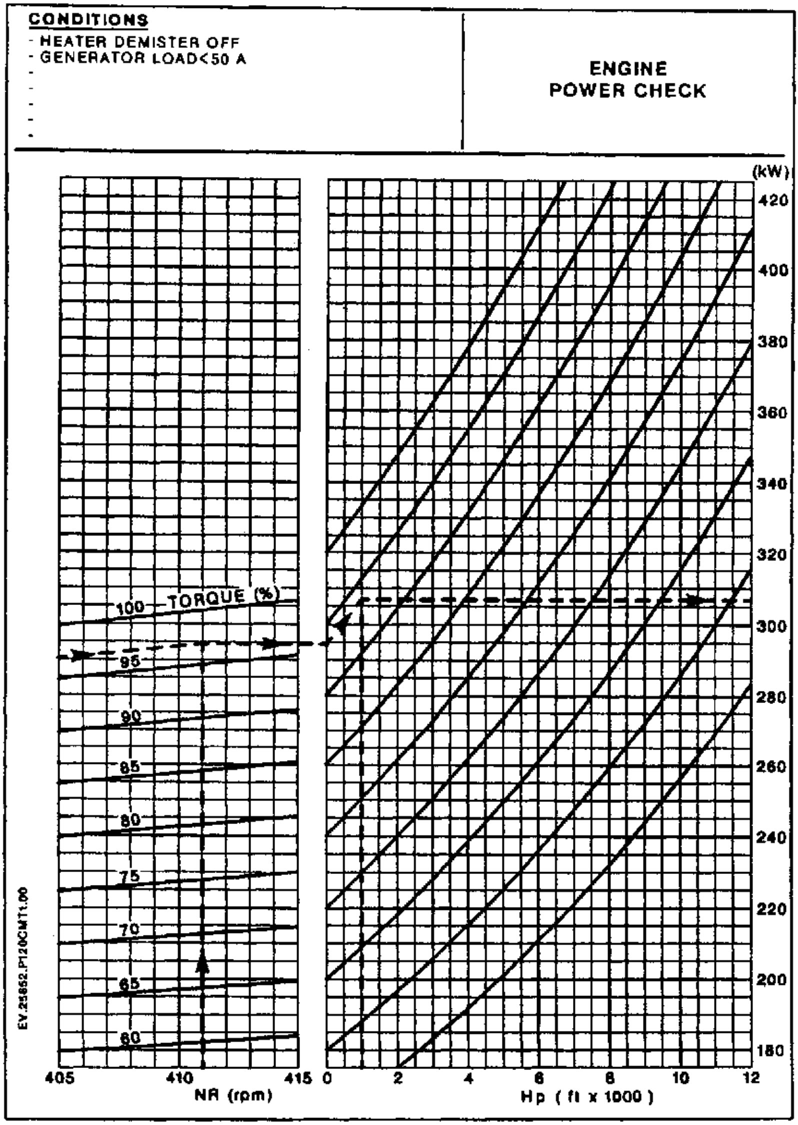

CONDITIONS
- HEATER DEMISTER OFF
- GENERATOR LOAD<50 A
ENGINE
POWER CHECK
TORQUE (%)
100
95
90
85
80
75
70
65
60
405
410
415
NR (rpm)
0
2
4
6
8
10
12
Hp (ft x 1000)
(kW)
420
400
380
360
340
320
300
280
260
240
220
200
180
EV.25652.P120CM11.00

Figure 5 - 1a

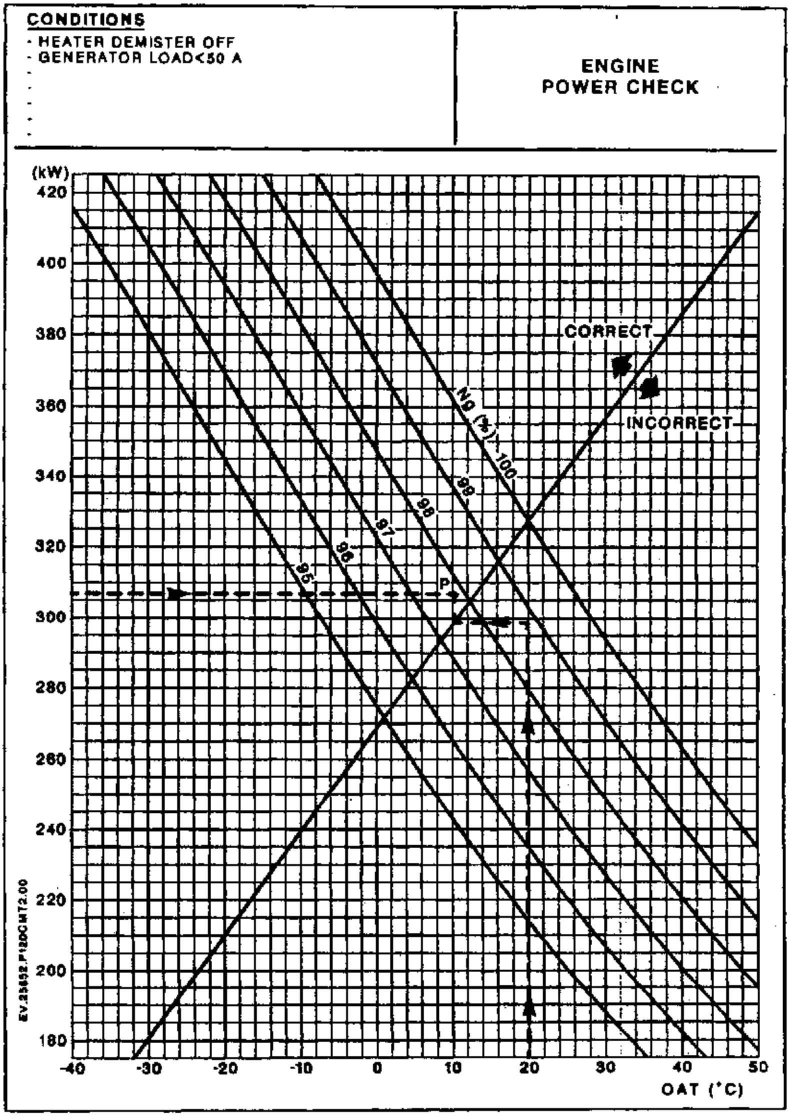

CONDITIONS
- HEATER DEMISTER OFF
- GENERATOR LOAD<50 A
ENGINE
POWER CHECK
(kW)
420
400
380
360
340
320
300
280
260
240
220
200
180
-40
-30
-20
-10
0
10
20
30
40
50
OAT (°C)
Ng (%)
95
96
97
98
99
100
P
CORRECT
INCORRECT

Figure 5 - 1b

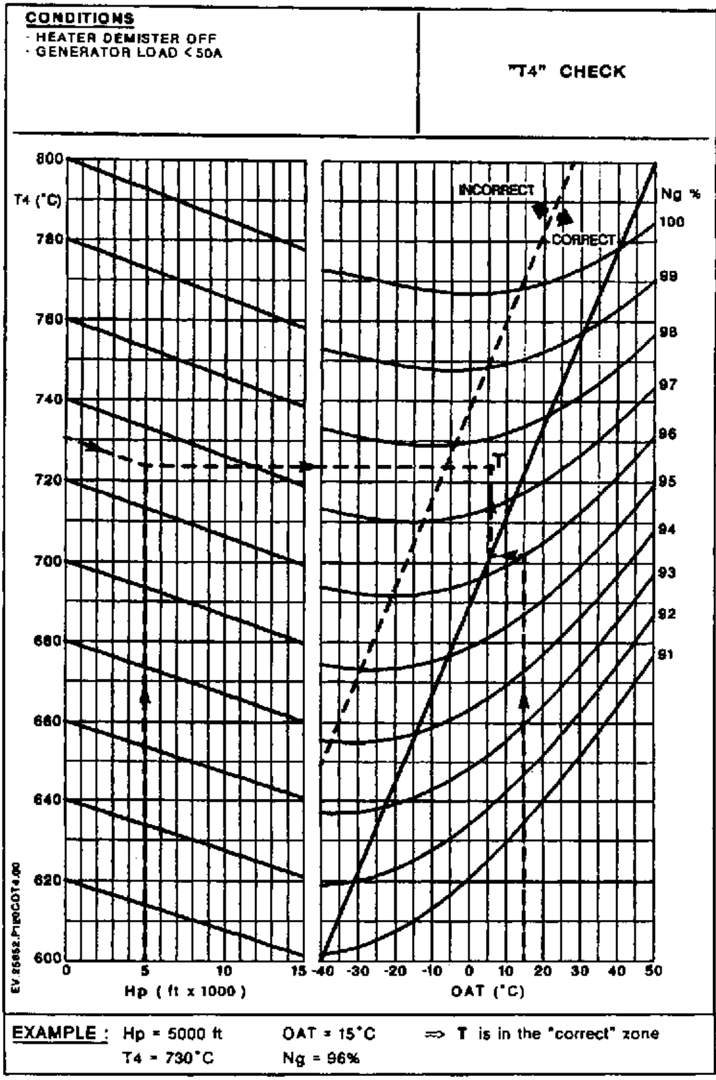

CONDITIONS
- HEATER DEMISTER OFF
- GENERATOR LOAD < 50A
"T4" CHECK
T4 (°C)
800
780
760
740
720
700
680
660
640
620
600
INCORRECT
CORRECT
T
Ng %
100
99
98
97
96
95
94
93
92
91
0
5
10
15
Hp (ft x 1000)
-40 -30 -20 -10 0 10 20 30 40 50
OAT (°C)
EV.25852.P120COT4.00
EXAMPLE : Hp = 5000 ft
OAT = 15°C
=> T is in the "correct" zone
T4 = 730°C
Ng = 96%

Figure 5 - 2

5.4 AIR DATA SYSTEM CALIBRATION

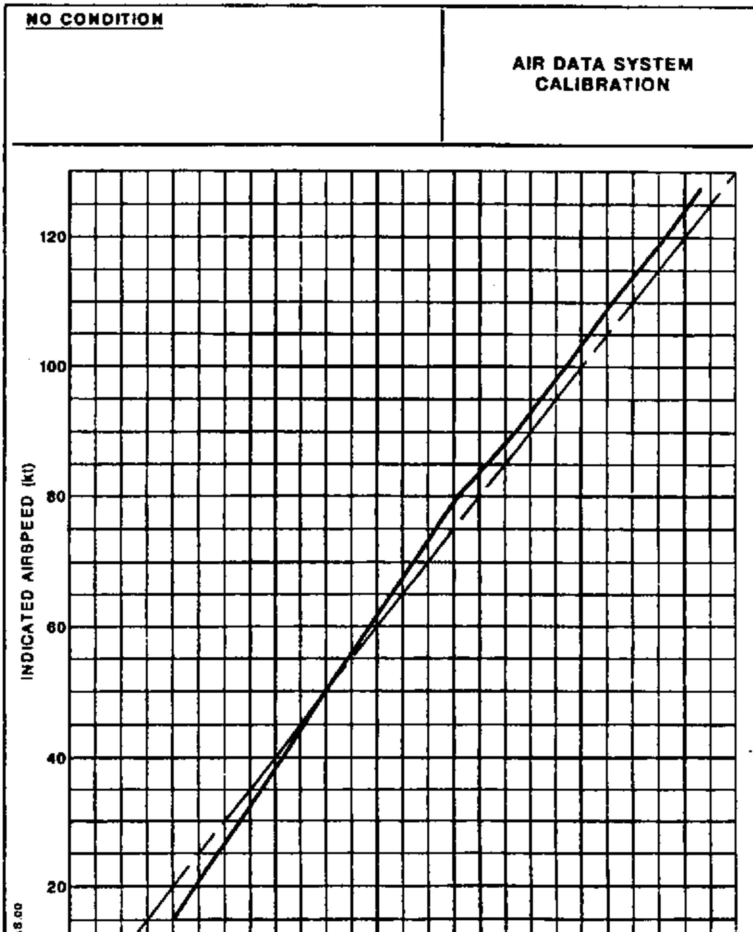


Figure 5 - 3

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

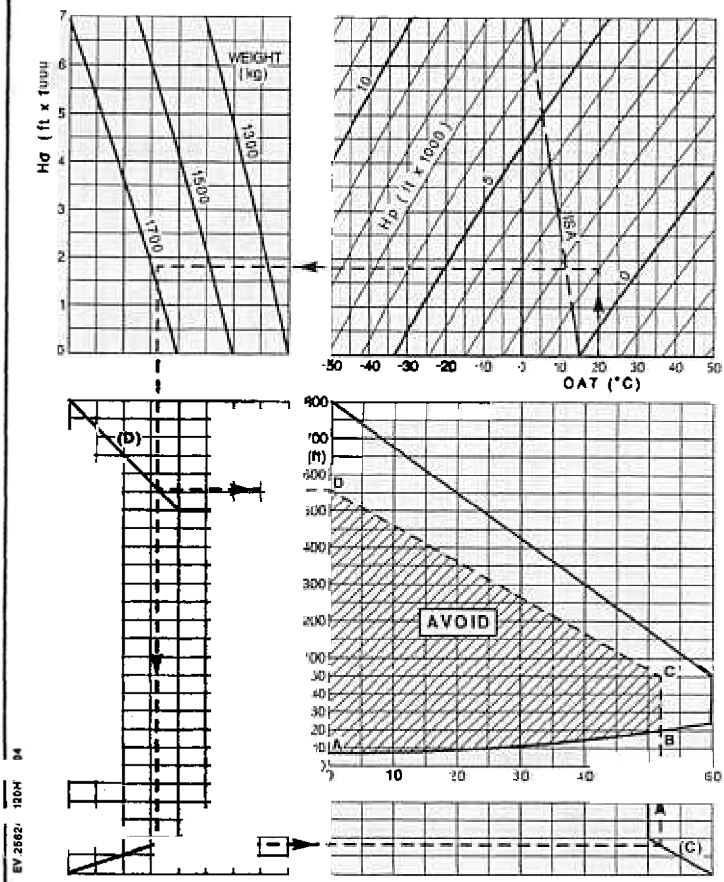
Point C is defined by :
. a constant height of 50 ft (15 m),
. a variable airspeed (50 kt ≤ IAS ≤ 60 kt) depending on the altitude and on the aircraft weight as determined by line (C).

- 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



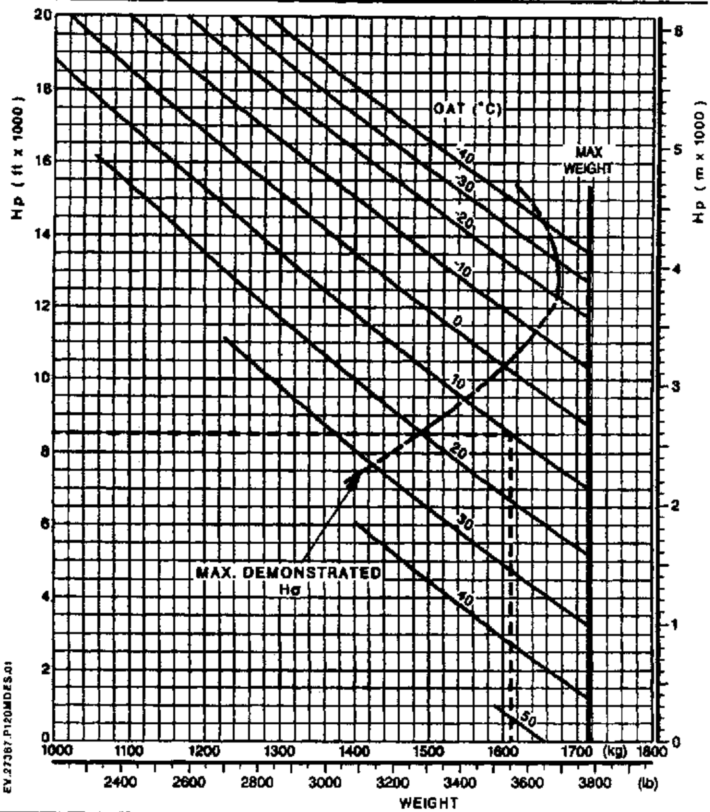
EXAMPLE : OAT = 20°C WEIGHT = 1680 kg
Hp = 1000 ft

Figure 5 - 4

5.6 HOVER IN GROUND EFFECT

CONDITIONS
- HEIGHT 5 ft (1,5 m)
- HEATER DEMISTER OFF
- MAX. TAKEOFF POWER
- -30°C ≤ OAT ≤ ISA +35°C

HOVER IN GROUND EFFECT



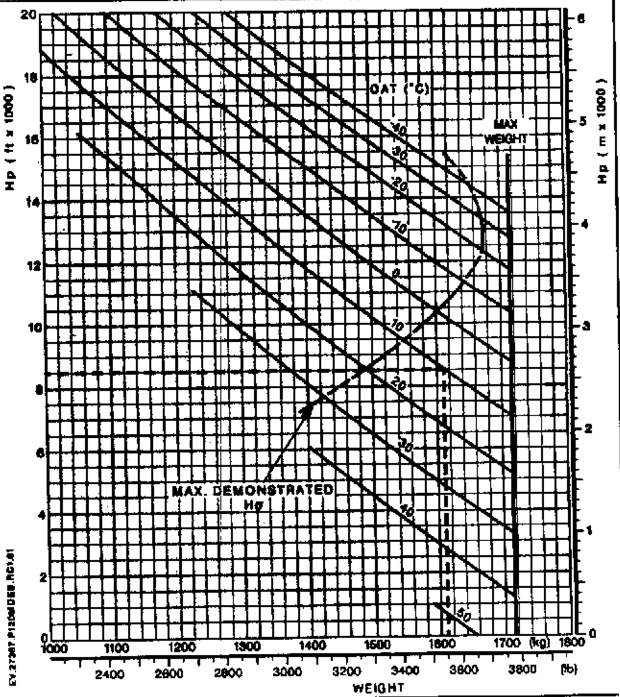
SAFE WIND HAS BEEN DEMONSTRATED UP TO 35 kt AND MAX. WEIGHT FROM ALL DIRECTIONS AT SEA LEVEL AND AT 22 kt FOR A CORRECTED WEIGHT (SEE FIG.5-7) OF 2200 kg.

EXAMPLE : OAT = 10°C, Hp = 8500 ft ⇒ HIGE PERFORMANCE 1610 kg

Figure 5 - 5

Replace figure 5-5 by the following :

CONDITIONS - HEIGHT 5 ft (1.5 m) - HEATER DEMISTER OFF - MAX. TAKEOFF POWER - -30°C ≤ OAT ≤ ISA +35°C - Hp ≤ 2000 ft	HOVER IN GROUND EFFECT



SAFE WIND HAS BEEN DEMONSTRATED UP TO 35 kt AND MAX. WEIGHT FROM ALL DIRECTIONS AT SEA LEVEL AND AT 22 kt FOR A CORRECTED WEIGHT (SEE FIG.5-7) OF 2200 kg.

EXAMPLE : OAT = 10°C, Hp = 8500 ft ⇒ HIGE PERFORMANCE 1610 kg

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

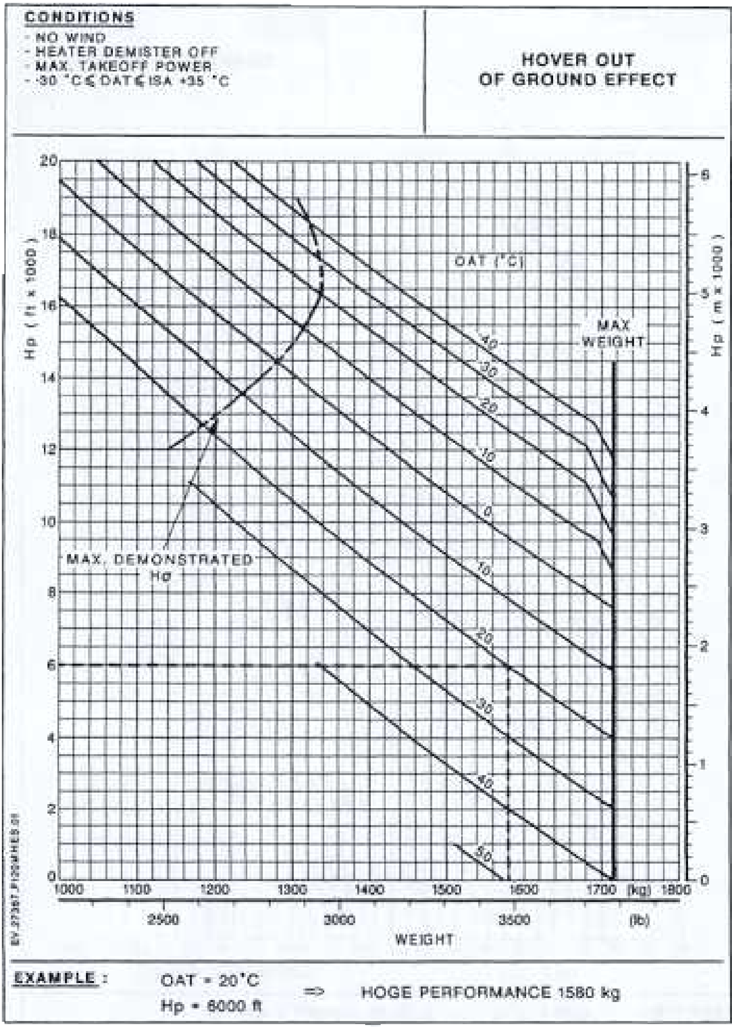
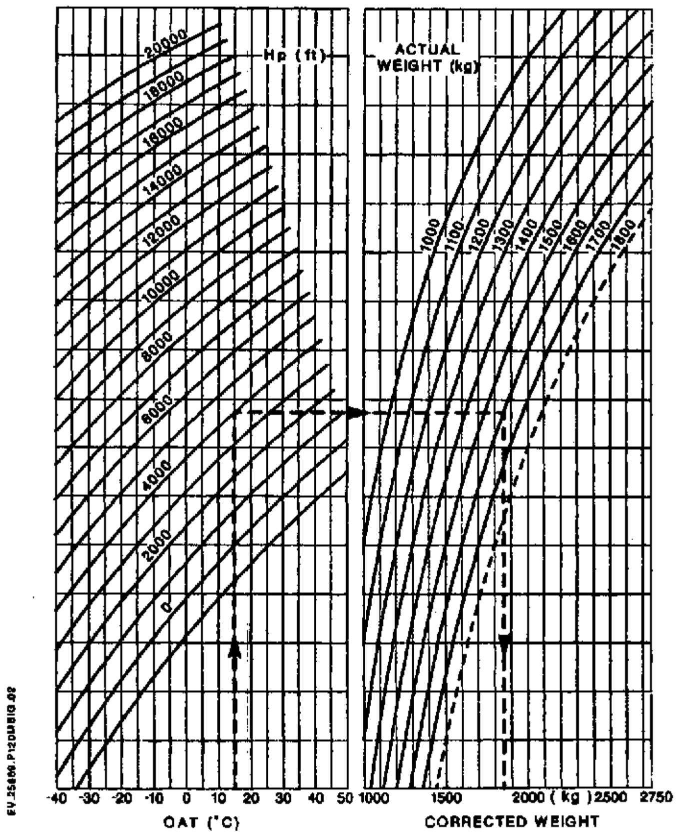


Figure 5 - 6

5.8 CORRECTED WEIGHT

NO CONDITION

CORRECTED WEIGHT



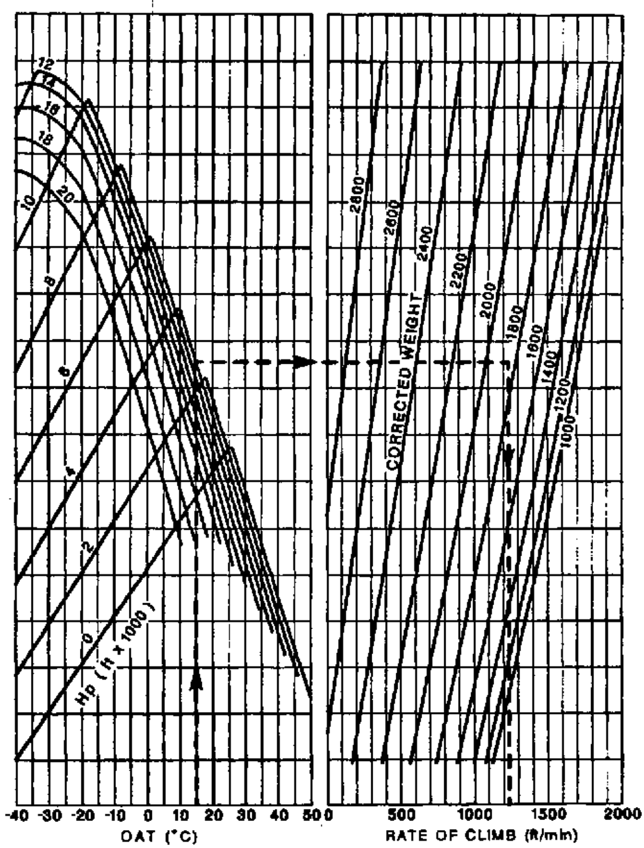
EXAMPLE : OAT = 15°C ACTUAL WEIGHT = 1600 kg
Hp = 4000 ft CORRECTED WEIGHT = 1850 kg

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

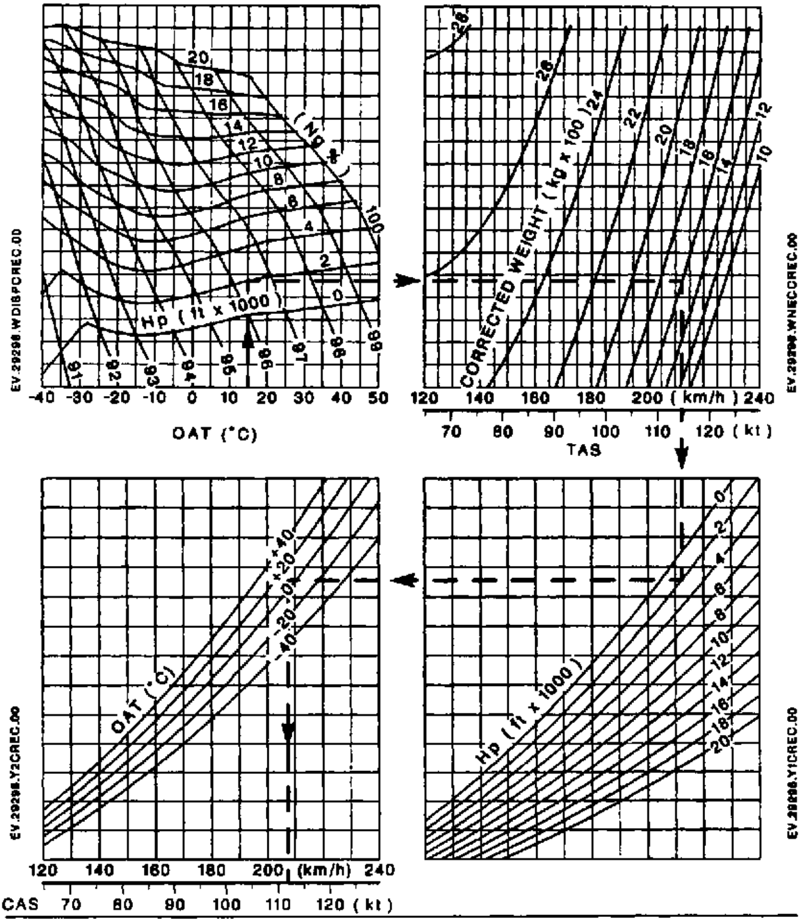
5.11 NOISE LEVEL

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

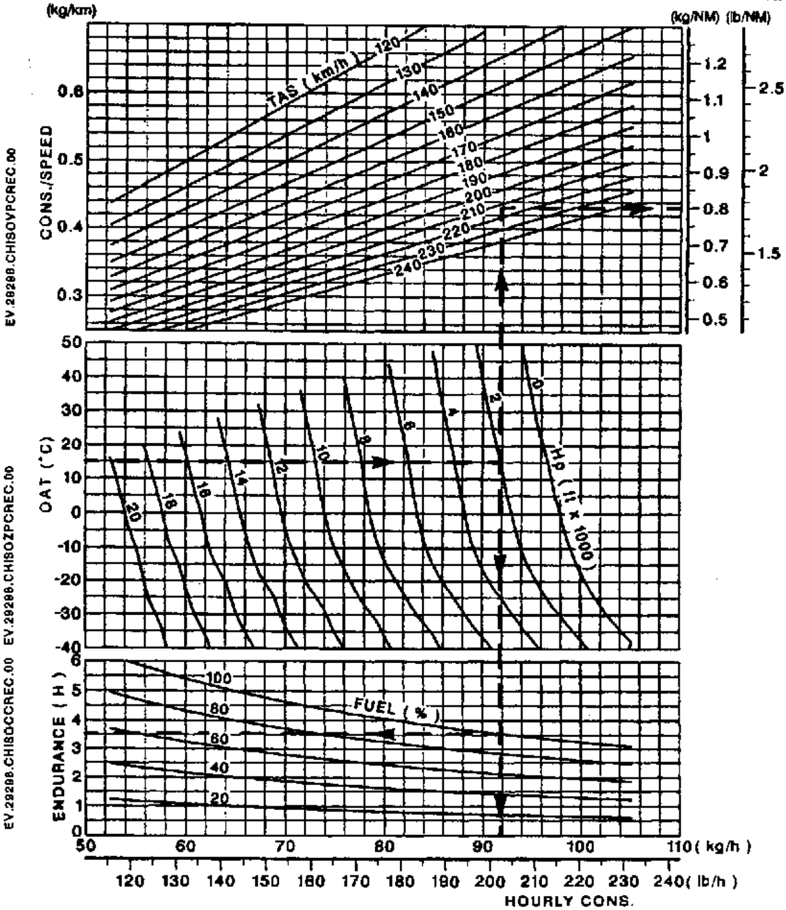


EXAMPLE : OAT = +15°C ACTUAL WEIGHT = 1488 kg (3280 lb) ⇒ TAS = 115 kt
Hp = 2000 ft CORRECTED WEIGHT = 1600 kg (3527 lb) ⇒ CAS = 112 kt

Figure 5 - 9

CONDITIONS
- STABILIZED LEVEL FLIGHT

FUEL CONSUMPTION
ENDURANCE IN RECOMMENDED CRUISE

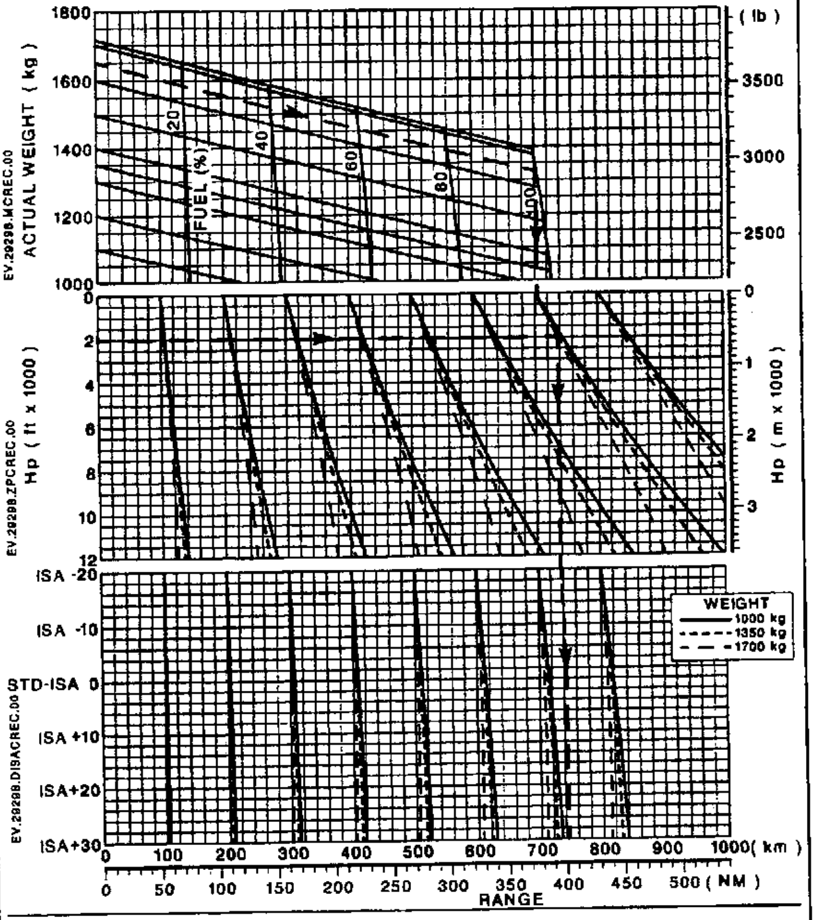


EXAMPLE : OAT = +15°C TAS = 213 km/h (115 kt) ⇒ CONS./SPEED = 1,78 lb/NM
Hp = 2000 ft FUEL = 100 % ⇒ ENDURANCE = 3h30
⇒ HOURLY CONS. = 202 lb/h

Figure 5 - 10

CONDITIONS
- STABILIZED LEVEL FLIGHT

RANGE IN RECOMMENDED CRUISE

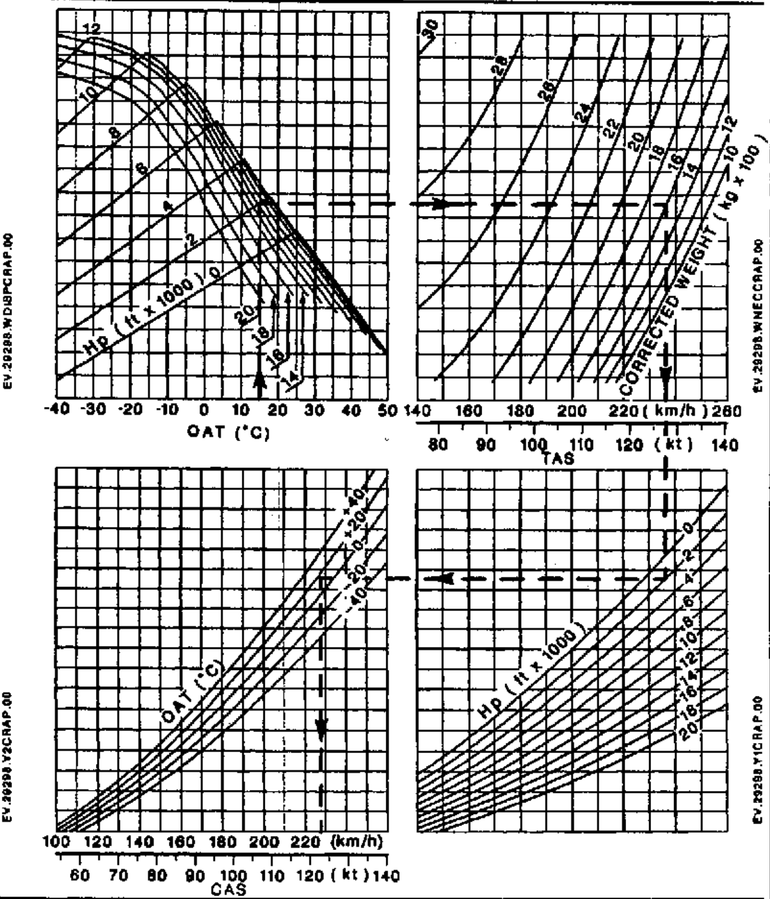


EXAMPLE : OAT = STD-ISA WEIGHT = 1700 kg (3748 lb)
Hp = 2000 ft FUEL = 100% ⇒ RANGE = 402 NM

Figure 5 - 11

CONDITIONS
- STABILIZED LEVEL FLIGHT
-
-
-
-
-
-

TAS/CAS IN FAST CRUISE

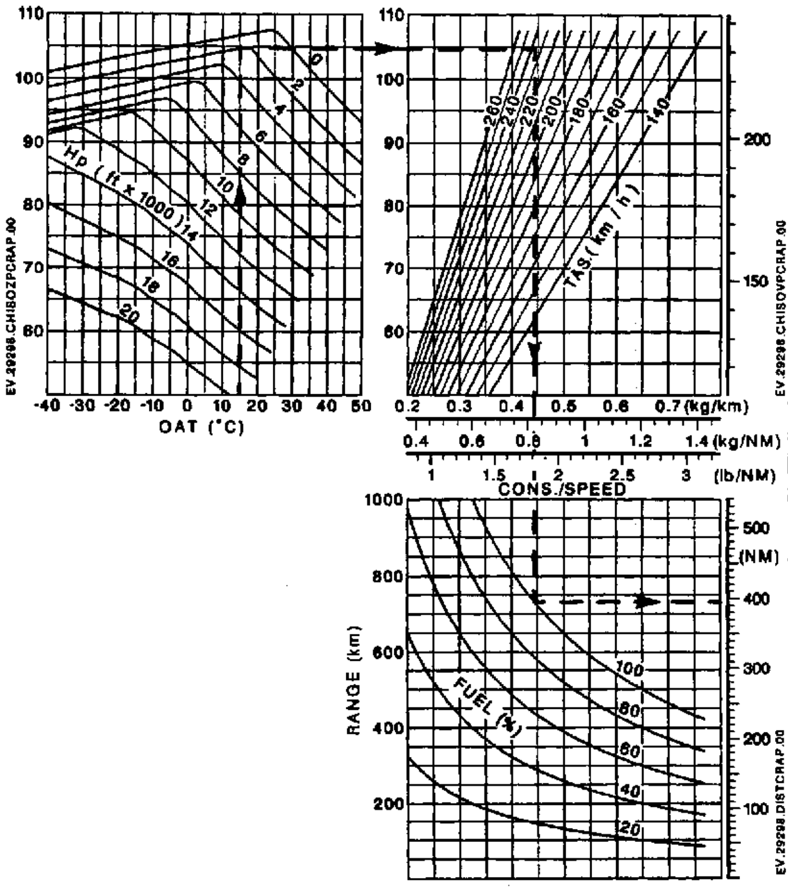


EXAMPLE : OAT = +15°C ACTUAL WEIGHT = 1488 kg (3280 lb) ⇒ TAS = 127 kt
Hp = 2000 ft CORRECTED WEIGHT = 1600 kg (3527 lb) ⇒ CAS = 124 kt

Figure 5 - 12

CONDITIONS
- STABILIZED LEVEL FLIGHT

FUEL CONSUMPTION
RANGE IN FAST CRUISE



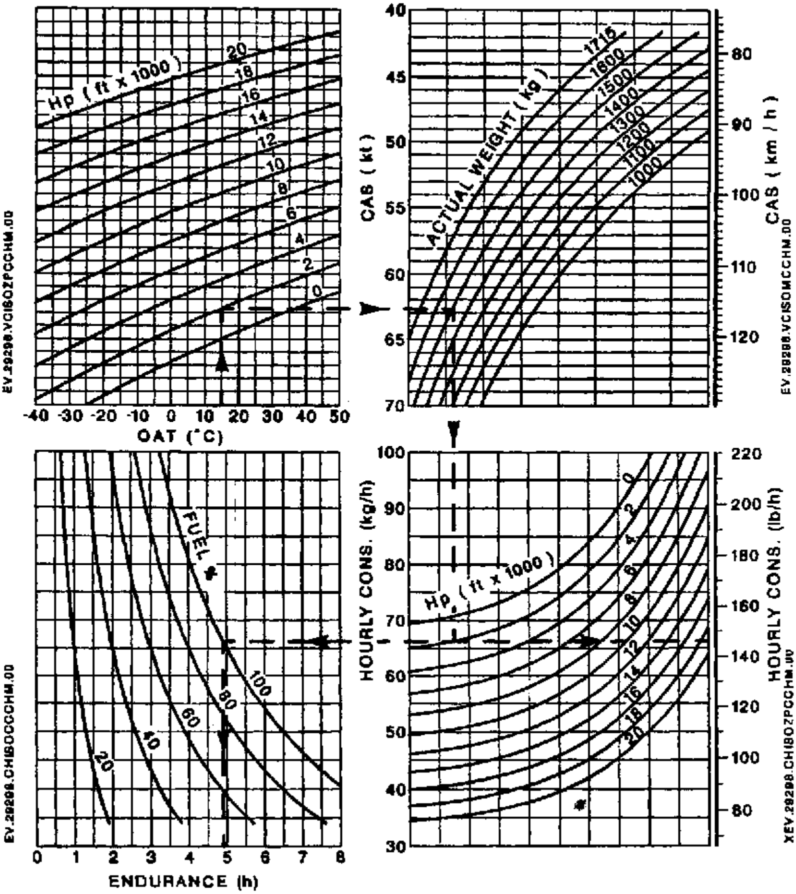
EXAMPLE : OAT = +15°C TAS = 236 km/h (127 kt) ⇒ RANGE = 395 NM
Hp = 2000 ft FUEL = 100%

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

Page

LIST OF FIGURES

Page

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.

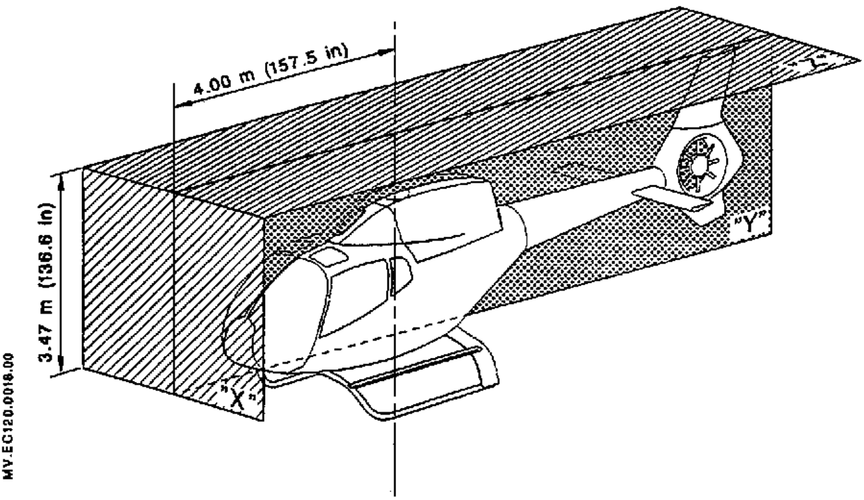


Figure 6 - 1 : Basic datum planes

- 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

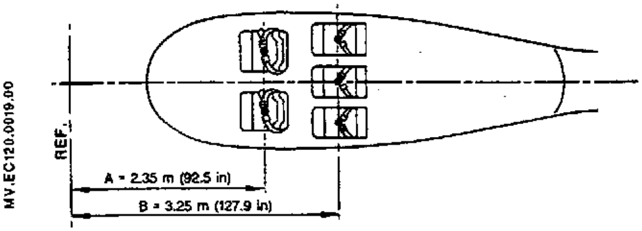


Figure 6 - 2 : Longitudinal location of seats

	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

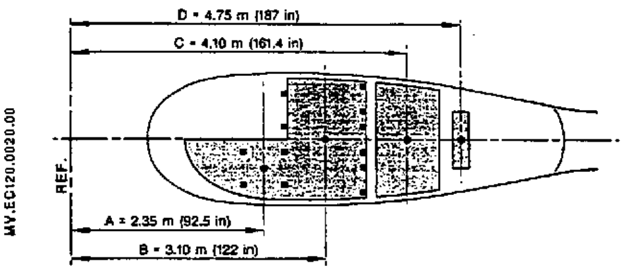


Figure 6 - 3 : Longitudinal location of loads

	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

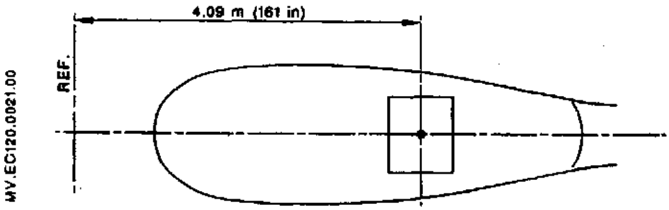


Figure 6 - 4 : Longitudinal location of fuel

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.

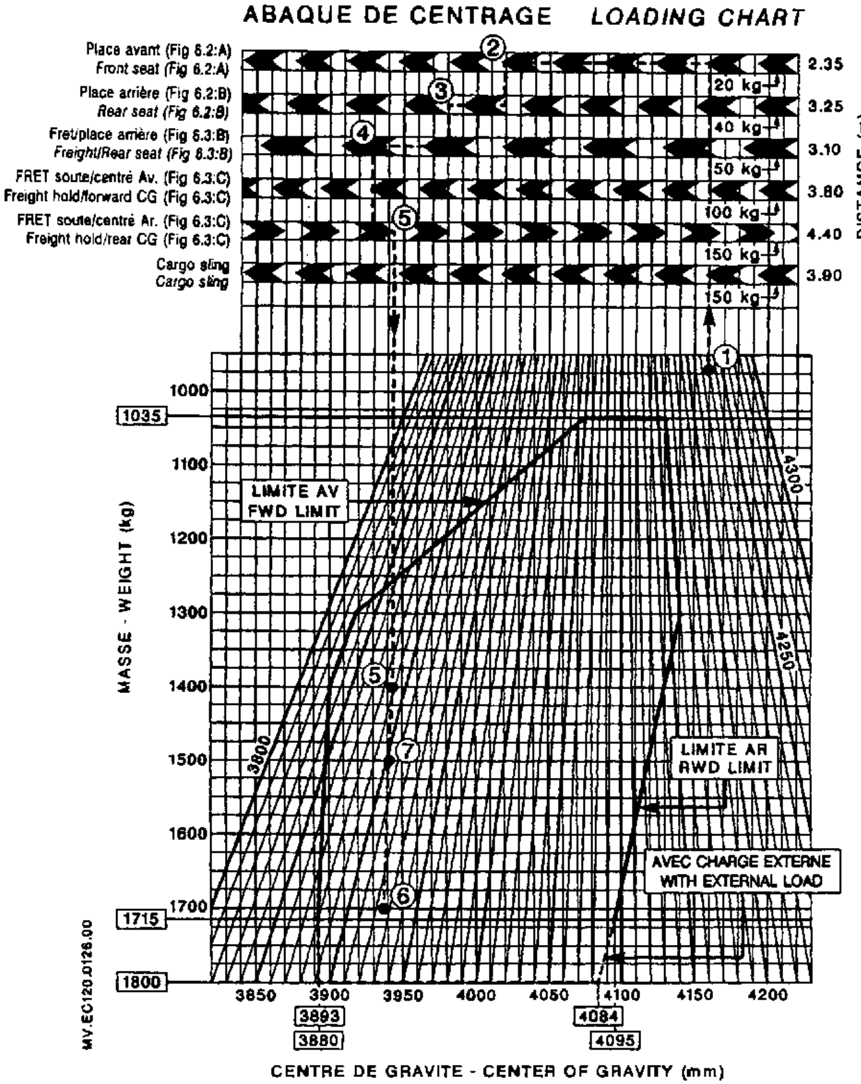


Figure 6-5 : Center of gravity

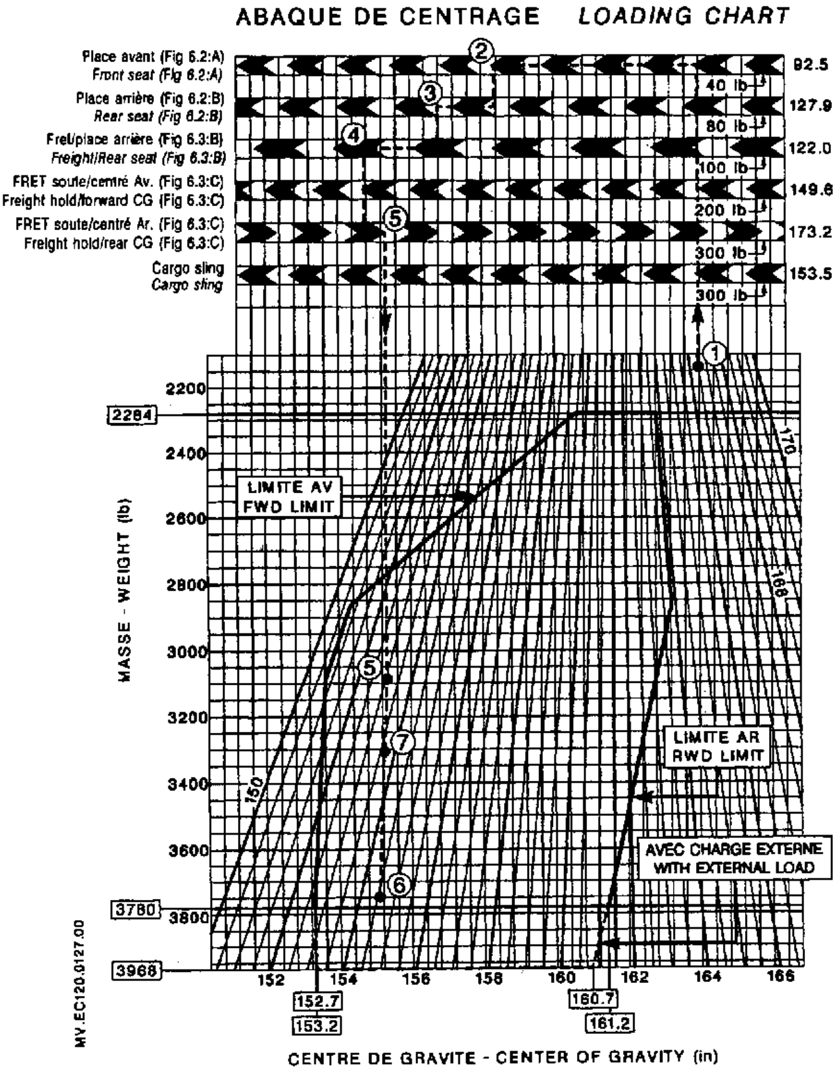


Figure 6 - 5 : Center of gravity (cont'd)

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

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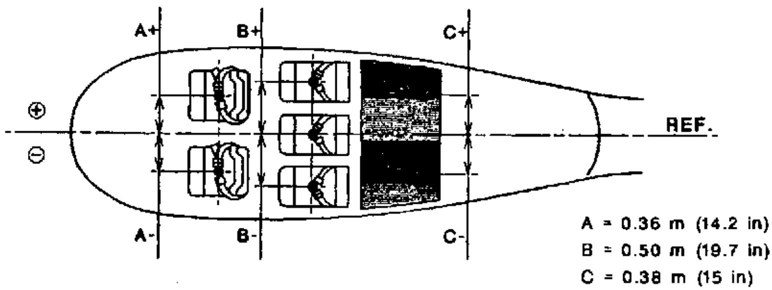


Figure 6 - 6 : Lateral location of seats and loads

METRIC UNITS						
WEIGHT kg	MOMENT : m.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

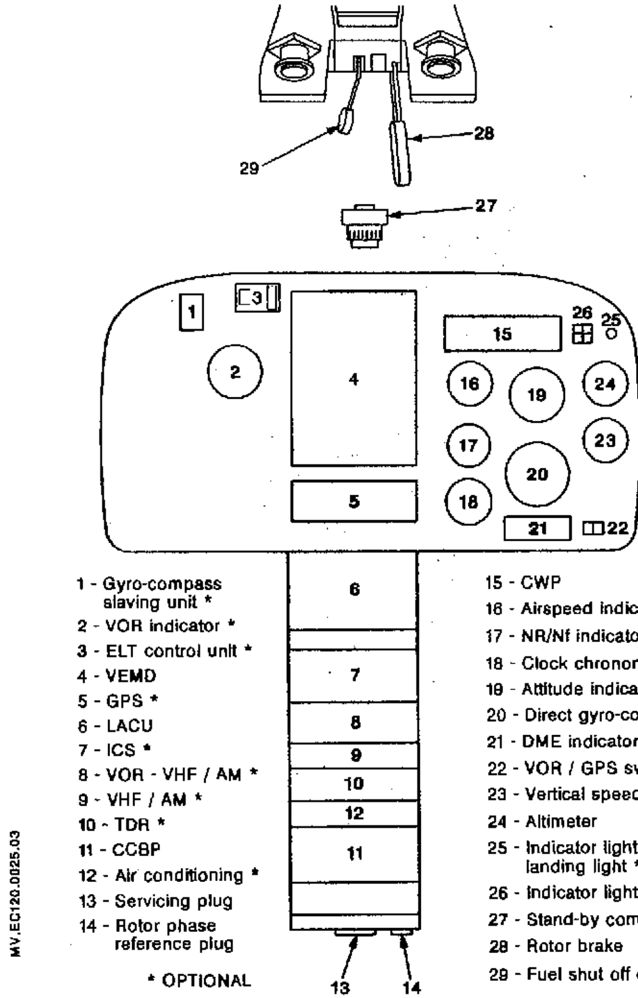
SECTION 7
SYSTEM DESCRIPTION

Page

LIST OF FIGURES

Page

7.1 INSTRUMENT PANEL AND CONSOLE



1 - Gyro-compass slaving unit *
2 - VOR indicator *
3 - ELT control unit *
4 - VEMD
5 - GPS *
6 - LACU
7 - ICS *
8 - VOR - VHF / AM *
9 - VHF / AM *
10 - TDR *
11 - CCBP
12 - Air conditioning *
13 - Servicing plug
14 - Rotor phase reference plug

* OPTIONAL

15 - CWP
16 - Airspeed indicator
17 - NR/Nf indicator
18 - Clock chronometer *
19 - Attitude indicator *
20 - Direct gyro-compass / HSI *
21 - DME indicator *
22 - VOR / GPS switch *
23 - Vertical speed indicator *
24 - Altimeter
25 - Indicator light for swivelling landing light *
26 - Indicator light for GPS *
27 - Stand-by compass
28 - Rotor brake
29 - Fuel shut off cock

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.

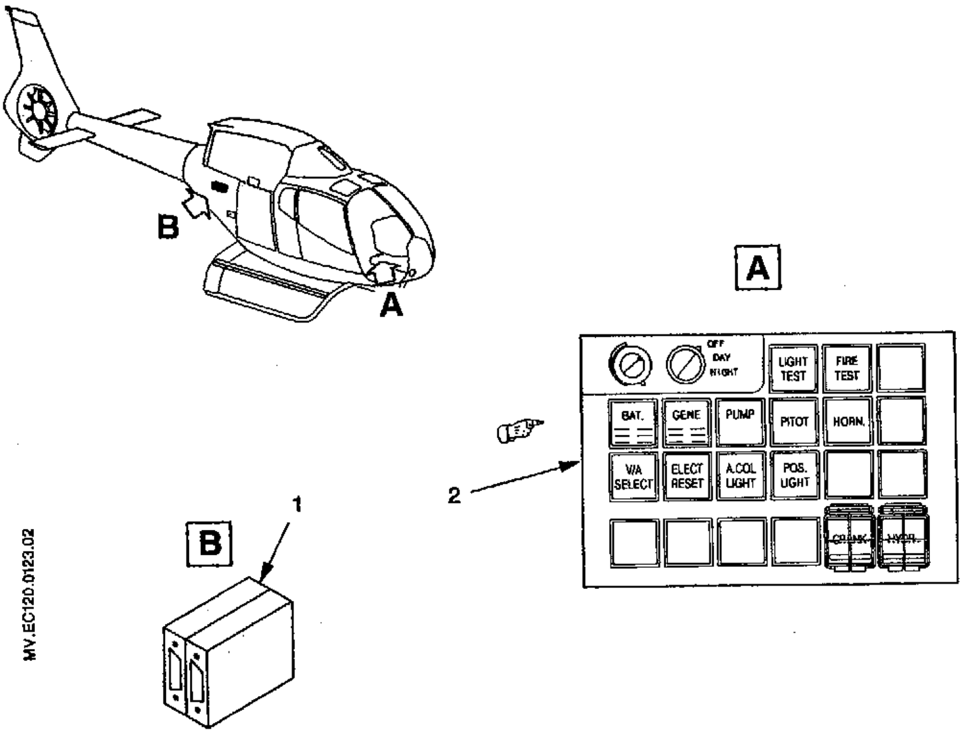


Figure 7 - 2 : Central computers

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.

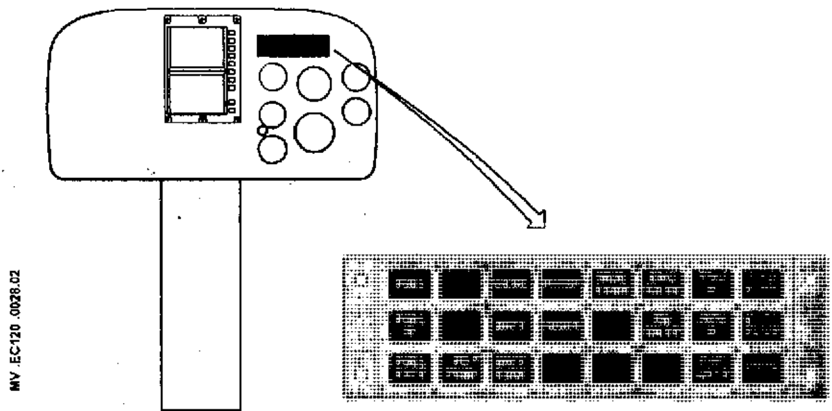


Figure 7 - 3 : Central warning system

- 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

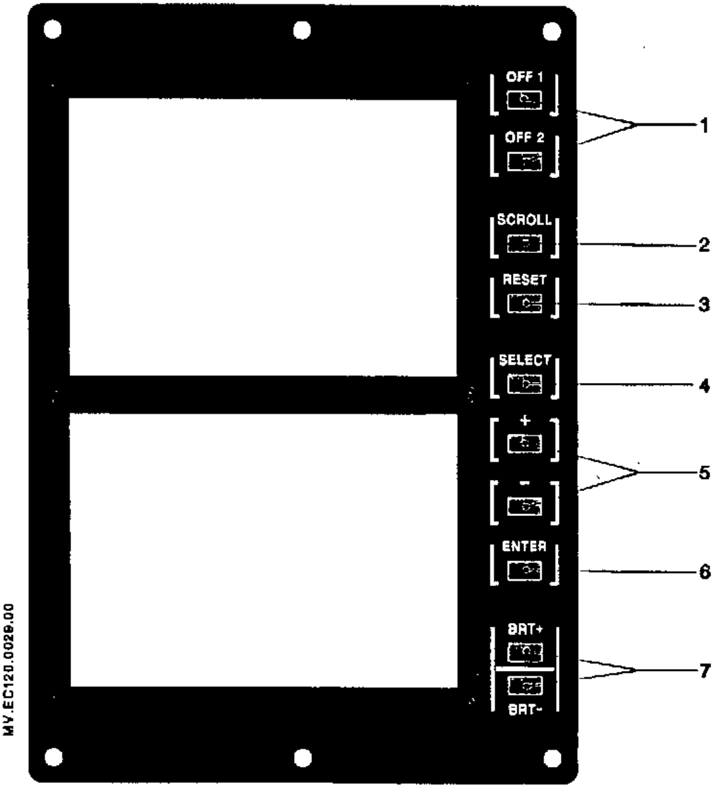
The VEMD is supplied with a dual 28 V DC power supply and is protected by circuit breakers.

- 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

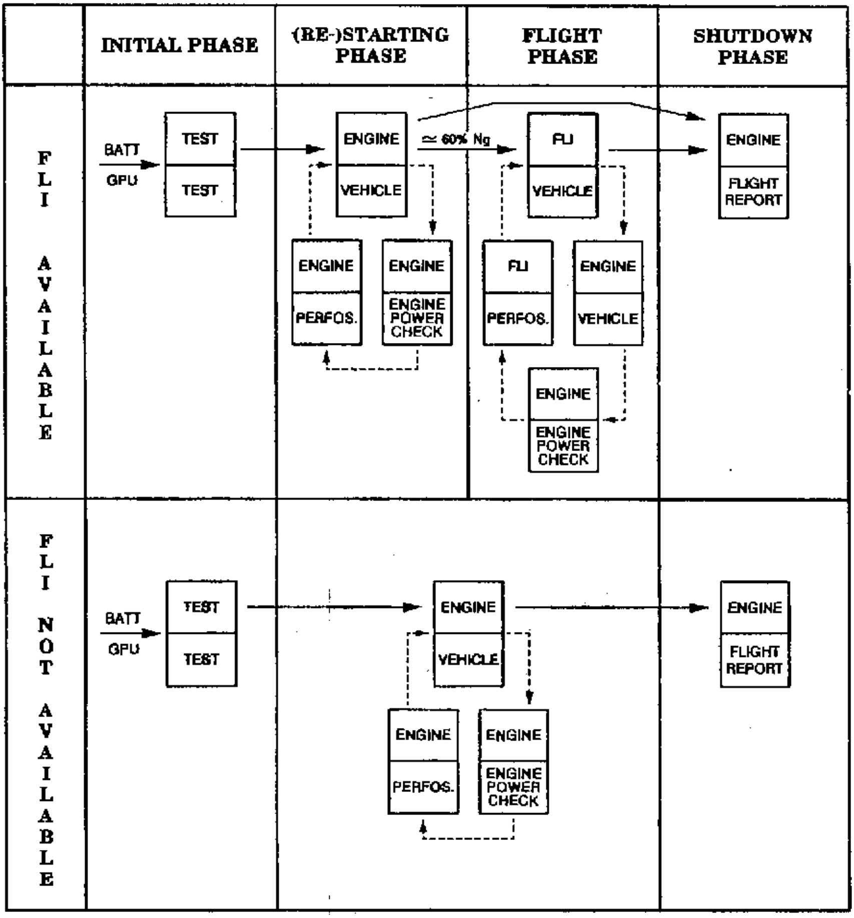


Figure 7 - 5 : Management of pages in normal display mode

→ Automatic change-over at end of phase.

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

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Management of pages in degraded mode.

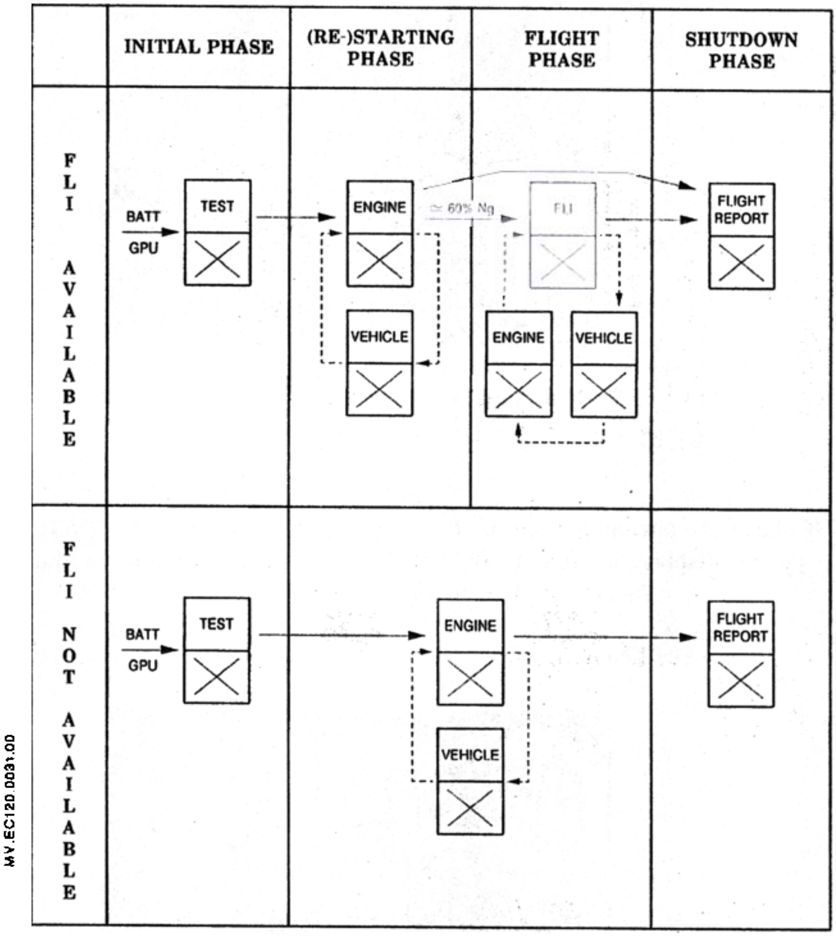

Figure 7 - 6 : Management of pages in degraded display mode

→ 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

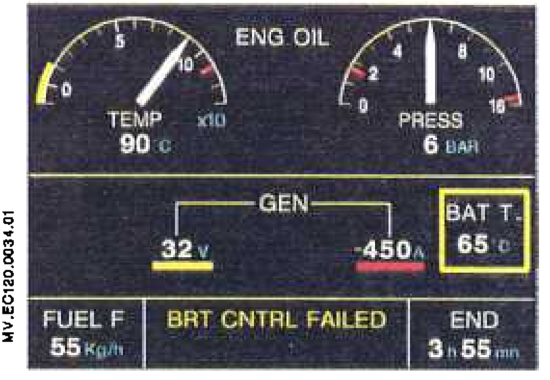

Figure 7 - 9 : VEHICLE page

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.

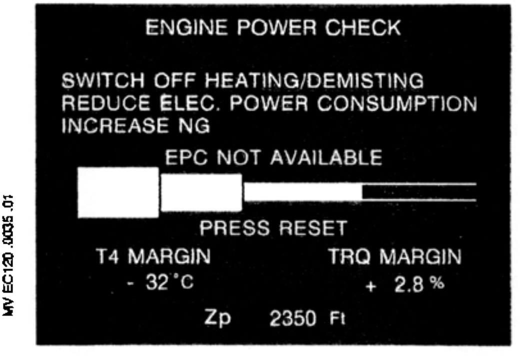

Figure 7 - 10 : First page of the EPC

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.

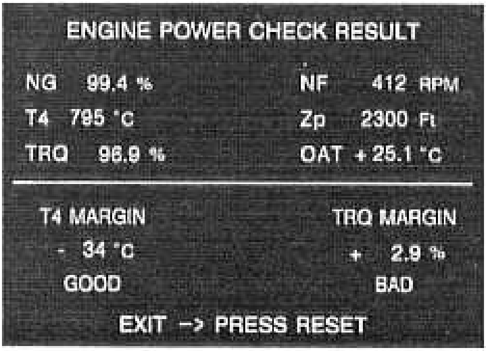

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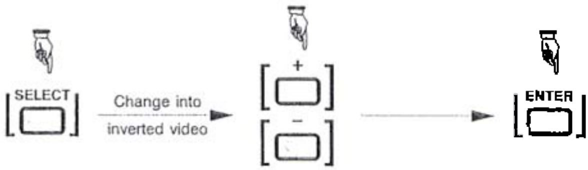
Figure 7 - 11 : Second page of the EPC

- 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)

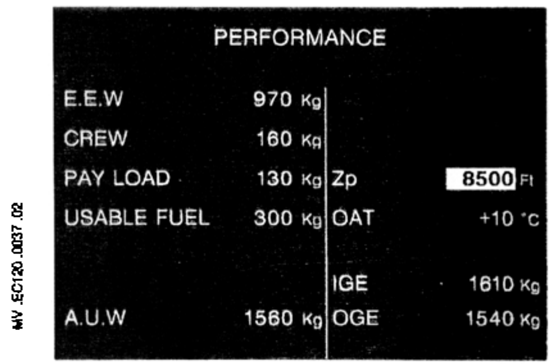


Figure 7 - 12 : PERFORMANCE page

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.

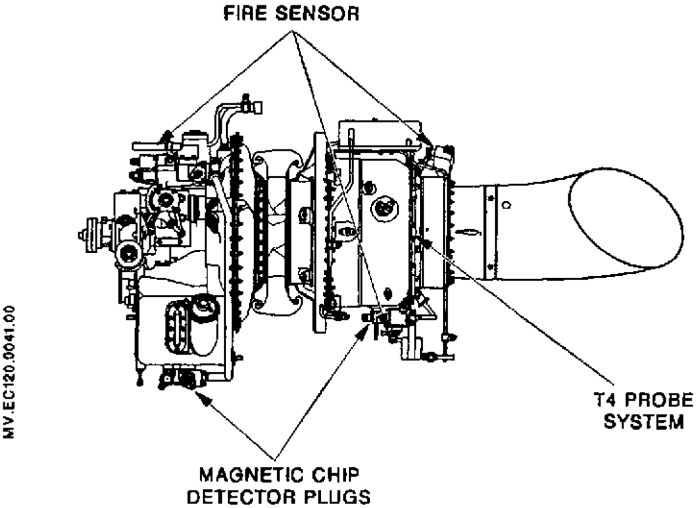


Figure 7 - 14 : Engine view

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

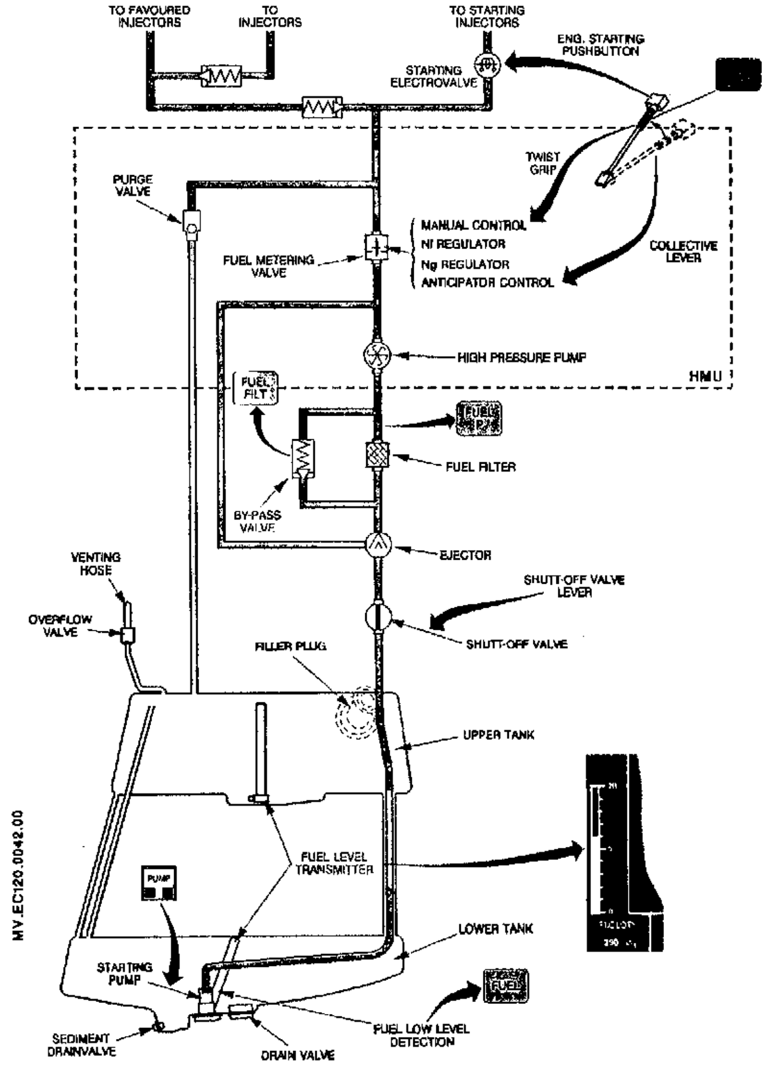


Figure 7 - 15 ; Fuel system

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.

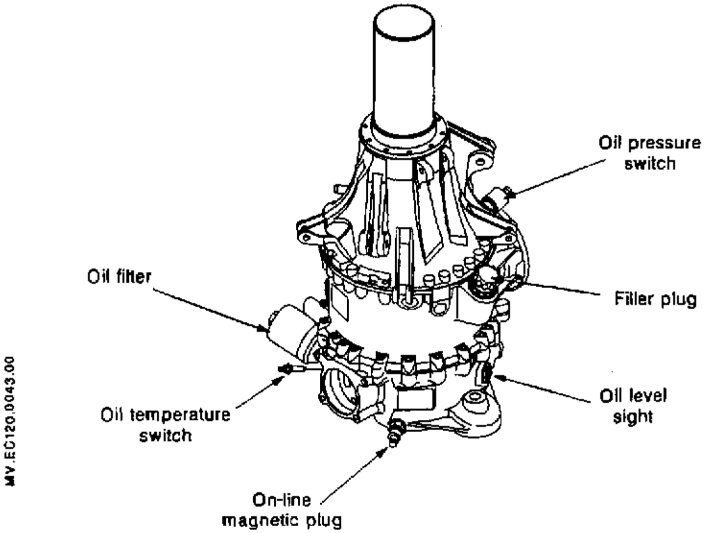


Figure 7 - 16 : Main gear box

• 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).

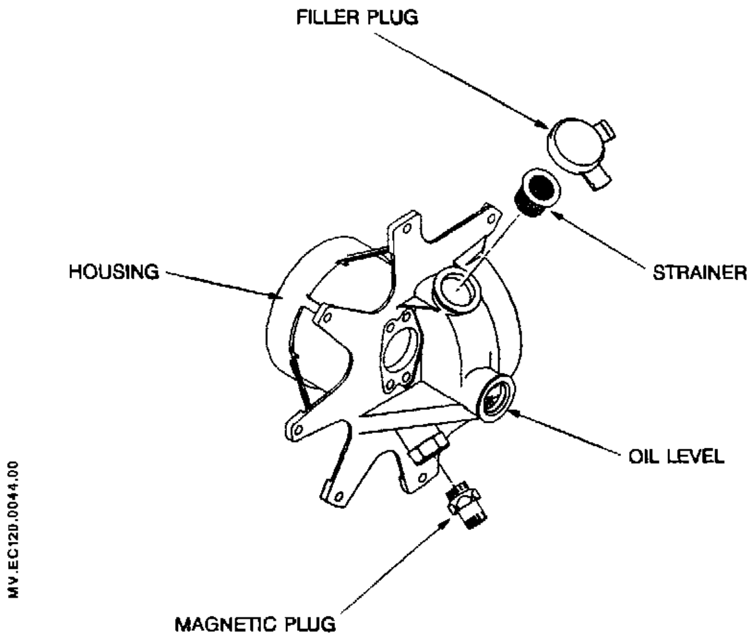
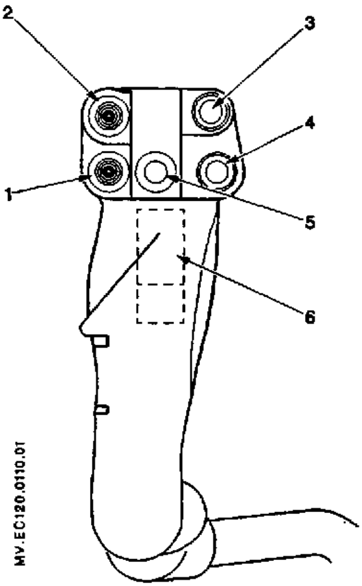


Figure 7 - 17 : Tail gear box

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.

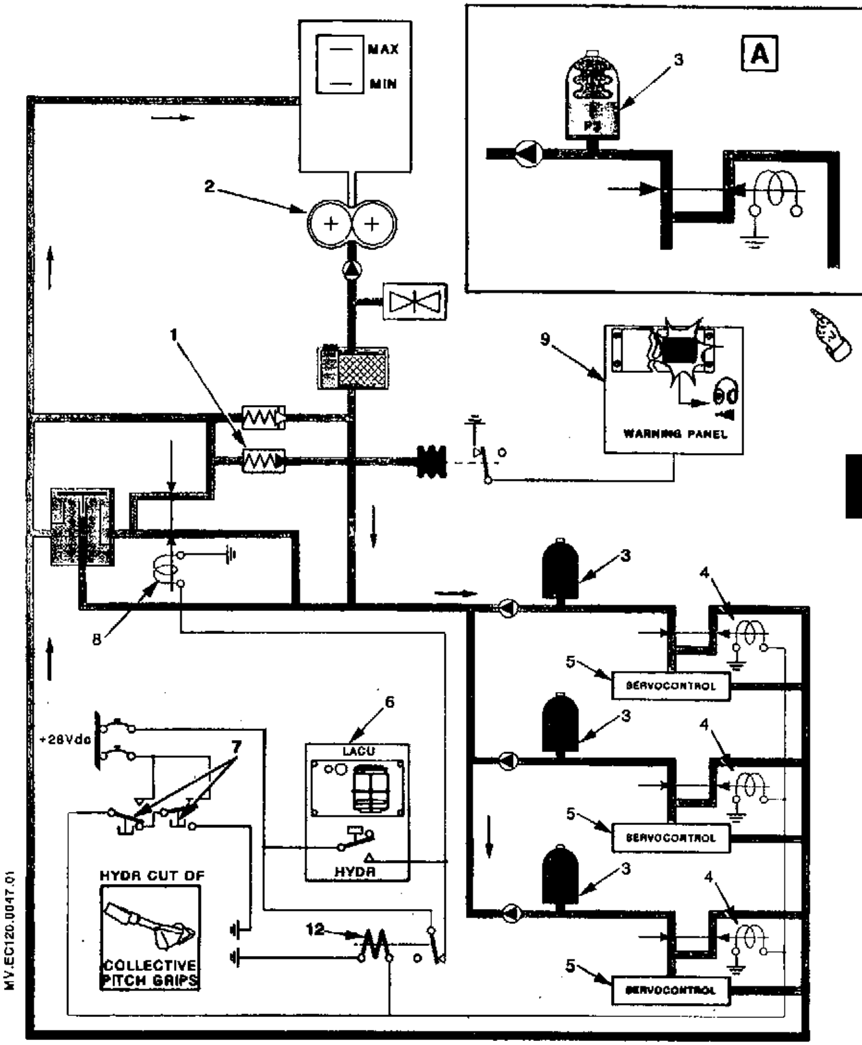


Figure 7 - 20 : Hydraulic system

7.7.2 HYDRAULIC COMPACT UNIT

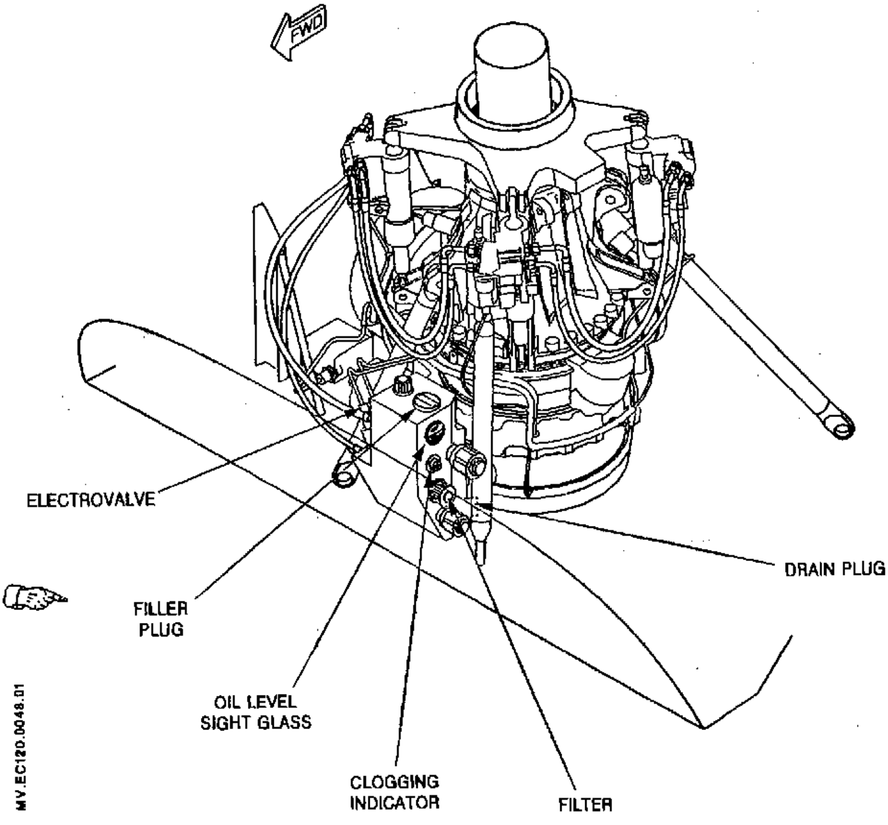
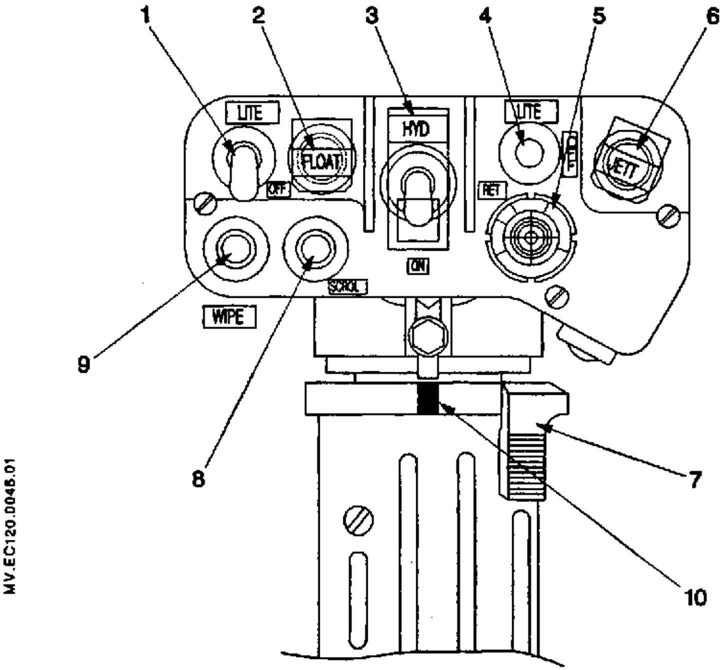


Figure 7 - 21 : Hydraulic compact unit

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).

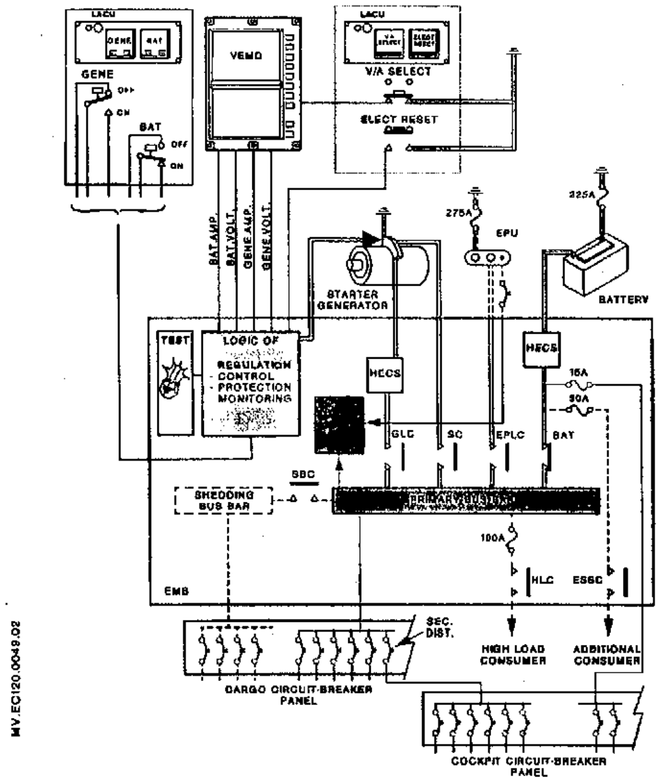


Figure 7 - 22 : Electrical system

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).

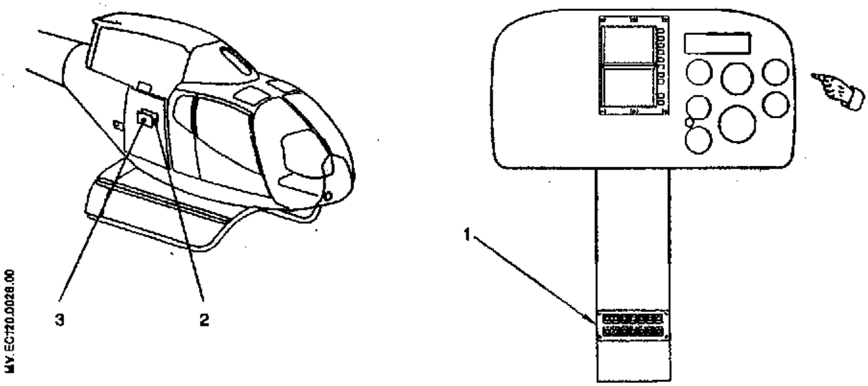


Figure 7 - 23 : DC distribution - General description

• CARGO COMPARTMENT CIRCUIT BREAKER PANEL

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

MV.EC120.0101.02

RETR LT PWR *	RETR LT CTRL *	SLING CTRL *	SLING PWR *	CKPT 28V	PASS DOME LT	
SEC DIST	FLOAT *	VENT FAN CTRL	VENT FAN PWR	LAND LT PWR	LAND LT CTRL	
	CLIM *	ELECT RETRO *	ADI *	WARN 1	STROB LT *	
		ALTI COD *	TDR *	ASU 1	VEMD	
				LACU 1	LACU 2	
		W/S WIPER *		SERVO CUT OFF	HYD CUT OFF	
VOR *	DIREC GYRO *	ELT *	DME *	FUEL GAUG 1	FUEL GAUG 2	
	VHF AM *	ICS *	GPS *	ENG ACC	FUEL PUMP	

* Optional equipments

Figure 7 - 24 : Cargo compartment circuit breaker panel

• COCKPIT CIRCUIT BREAKER PANEL

The CCBP is installed on the console.

MV.EC120.0102.01

FLOAT *		MAP LIGHT				
ICS *	PITOT HEAT	POSITION LT	WARNING PANEL 2	ASU 2	VEMD	NR NTL

* 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.

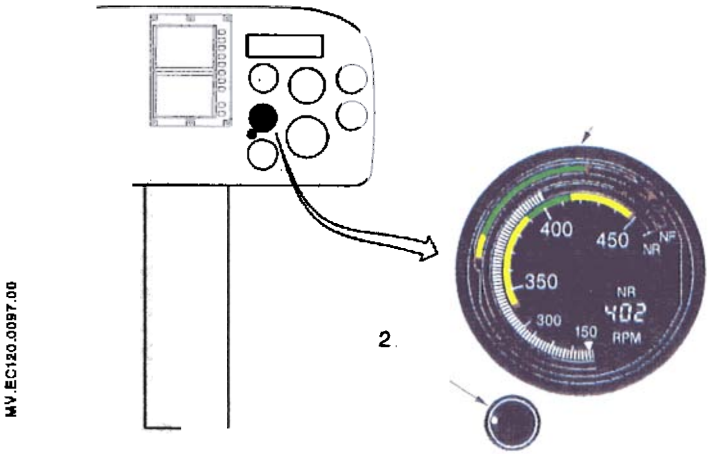


Figure 7 - 26 : NR/NF indicator and lighting potentiometer

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.

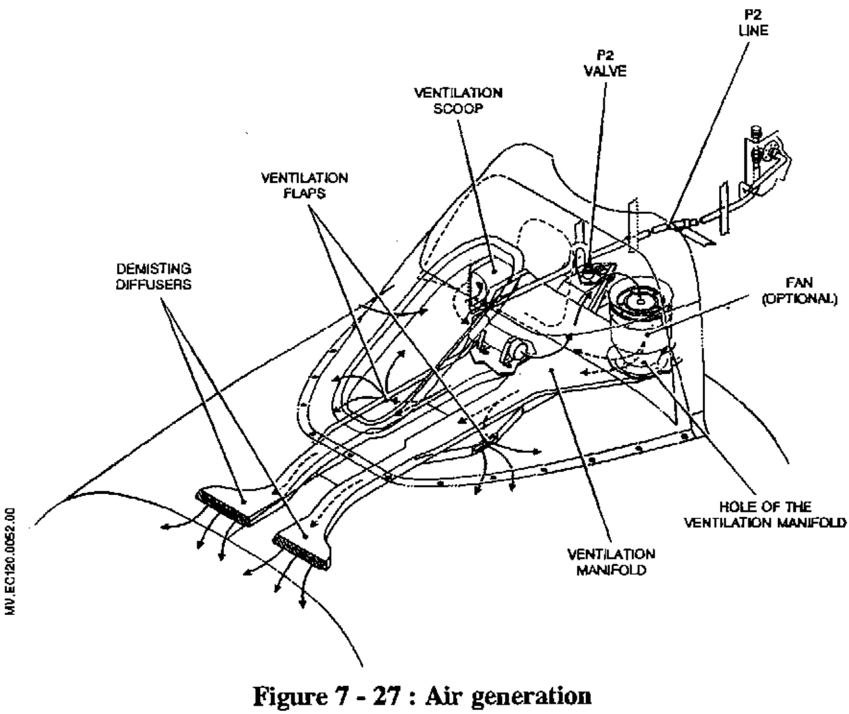


Figure 7 - 27 : Air generation

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).

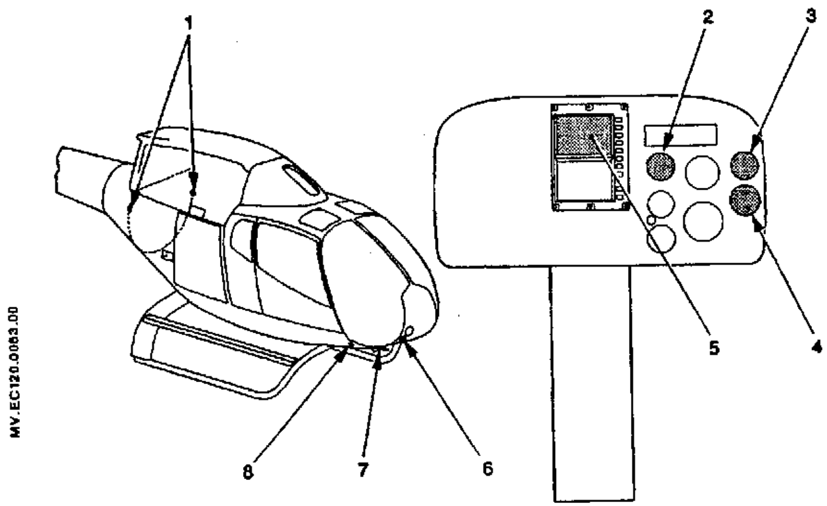


Figure 7 - 28 : Pitot-static system

SECTION 8

HANDLING - SERVICING - MAINTENANCE

Page

LIST OF FIGURES

Page

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.

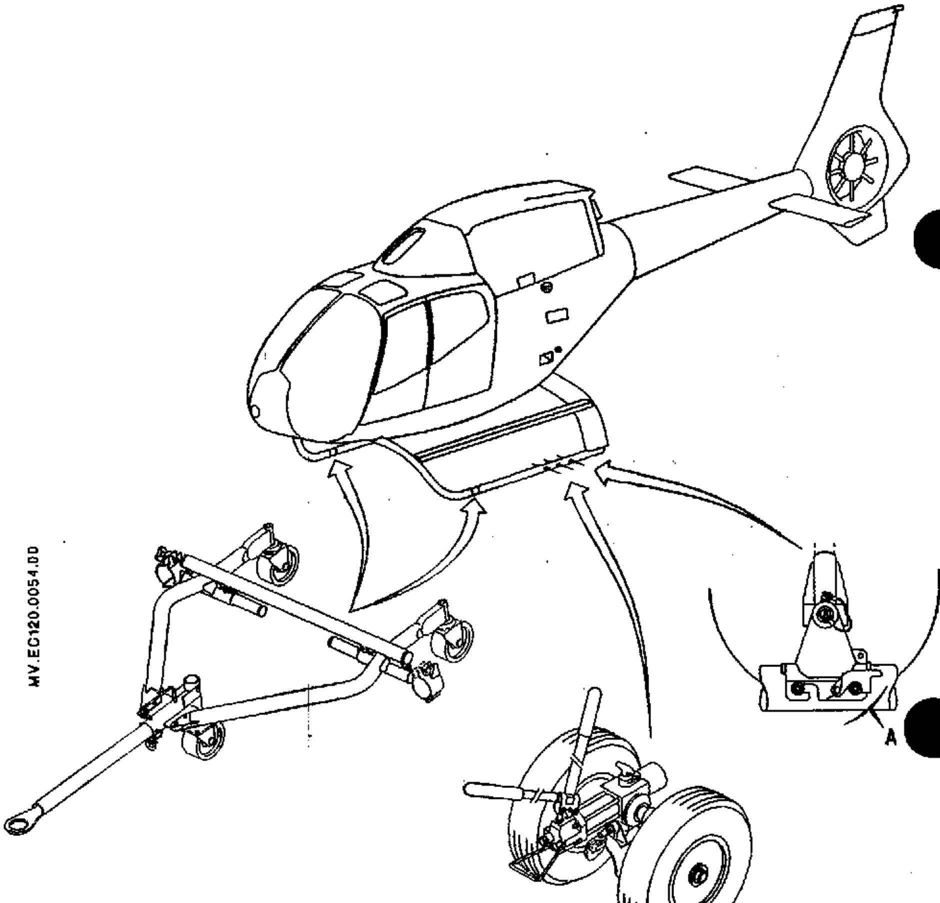


Fig. 8-1 : Towing and manual positioning device

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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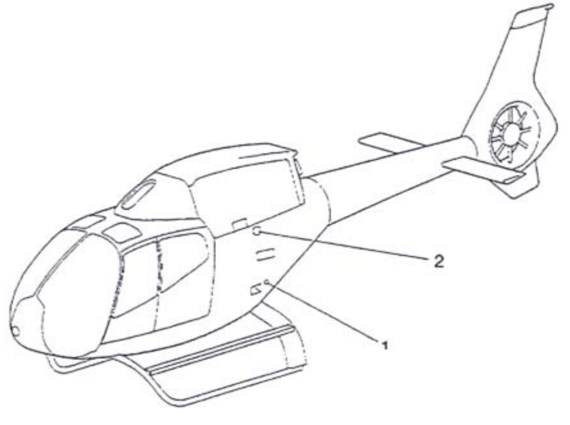

Fig. 8-2 : Filler plug and electro-static connector location

- 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 ➔	0	1		2				3		4	5			6
COMPONENTS REPLACED ↓		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 →	0	1		2				3		4	5			6
COMPONENTS REPLACED ↓		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	HELICOPTER	FLIGHT REPORT
0	EC 120 B	

AIRCRAFT No :

DATE ---------------------- :
FLIGHT START --------- :
DURATION -------------- :
CREW ------------------- :
AREA -------------------- :

VEMD

CYCLES :	Ng		Total	
	Nf		Total	
Over limit :	YES		NO	
Failures :	YES		NO	

METEO

Pressure :
OAT :

WIND

Direction :
Velocity :

WEIGHT

EQUIPPED EMPTY WEIGHT:
CREW ---------------------------- :
BALLAST -------------------------- :
WEIGHT WITHOUT FUEL -- :
FUEL ------------------------------ :
GROSS WEIGHT -------------- :
BALANCE ------------------------ :

MAIN WORK COMPLETED BEFORE FLIGHT

REMARKS MADE BY CREW AFTER FLIGHT

UNITS USED (cross out as applicable)

WEIGHT :		kg	lb
FUEL :		kg	lb
	UK gal	l	US gal
ALTITUDE :		m	ft
AIRSPEED :		km/h	kt
			MPH

SPECIAL INSTALLATIONS

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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)	• Display AIRCRAFT CONFIGURATION page	I or N/I
AIRCRAFT CONFIGURATION PARAMETERS (Refer to SECTION 7 in flight manual)	Confirm options, parameters and unities used on the aircraft.	AUXILIARY FUEL TANK ...: ☐ BATTERY TEMP. PROBE...: ☐ FUEL TYPE JP4 ....: ☐ FLOWMETER ....: ☐ SLING...................................: ☐ UNIT SYSTEM ....: ☐ ALTITUDE UNIT ....: ☐
• Select CONFIGURATION MODE Press [OFF1] then [OFF2] Press Hold [SELECT] and [ENTER] + [OFF1] then [OFF2]		
	• Display TRQ CALIBRATION MANUAL page	
	- Refer to engine log book, to enter output voltage (mV) associated with the torque (%)	see table mV / % below
	(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.	see table kPa / % below

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		- Full low pitch NR stabilized ≈ 393 rpm • __TRACK CHECKS__ The setting must be carried out with the yellow (■) blade as reference. - Record parameters :	track ____ ____ ____ ____
NOTE The balance is to be checked only after obtainning no blade track.		• __BALANCE CHECKS__ - Record parameters : - Unbalance < 0.2 IPS	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.		• <u>HYDRAULIC ACCUMULATOR TEST</u> - "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 • <u>HYDRAULIC SHUT-OFF TEST</u> - Hydraulic collective switch :..................OFF HYDR + Immediate loads come on (< 1 s) - Hydraulic collective switch :..................ON HYDR goes out	YES NO YES NO YES NO YES NO YES NO

SHEET No 2D	HELICOPTER EC 120 B	GROUND RUN
TEST PHASES AND REQUIREMENTS	**RESULTS TO BE OBTAINED / LIMITATIONS**	**RESULTS OBTAINED**
<u>ENGINE SHUT - DOWN</u> (see Normal Procedures : SECTION 4) - Twist grip on ground idle position	• Stabilization	YES NO
	• 66 % $\leq$ Ng $\leq$ 70 %.	Idle Ng :
<u>After 60 s</u> - Twist grip on shut-off position	• VEMD : 3 Informations mode (for Ng $\leq$ 50 %)	YES NO
- Engine shut-down time (*)	from Ng = 50 % to Ng = 2 % (t $\simeq$ 30 s)	Duration : (*)
- Time rotor brake	Apply at 150 rpm (t $\simeq$ 25 s)	Duration :
- Flight report page (automatic display)	• When Nf < 80 rpm	YES NO
	Record parameters :	
	Engine start-up number	No :
	Flight time	Duration :
	Ng cycles	Partial : Total :
	Nf cycles	Partial : Total :
	Failure detected	YES NO Codes
	Over limit detected	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		• No oscillations	YES	NO
- torque = 35%		• Convergence between 3 to 4 cycles	YES	NO
		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.		

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: ☐
			Hp: ☐
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	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			NR: ☐
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.			Design NR: ☐

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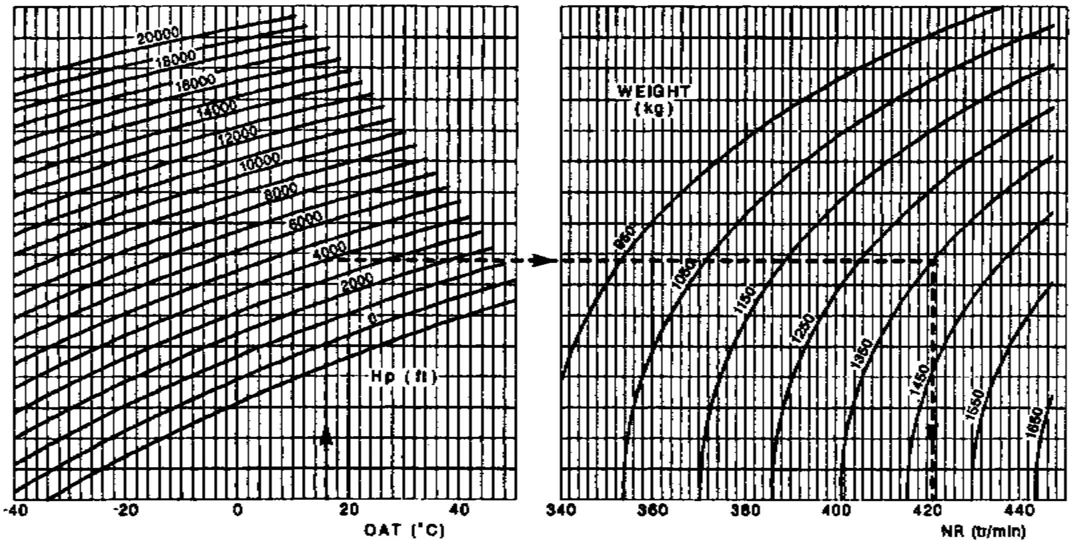
SHEET No. 4	HELICOPTER EC 120 B	AUTOROTATION 65 kt
CONDITIONS		ROTOR SPEED IN AUTOROTATION 65 kt



EXAMPLE : OAT = 16°C, A.U.W = 1350 kg, Hp = 4000 ft ⇒ ROTOR SPEED = 421 rpm

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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.	IPS Phase
		- Confirm the setting using the stroboscope ; the best setting is rarely obtained with a zero track.	track :
		- Note Igen before begining check.	I gen.
ENGINE POWER CHECK			IAS : Hp :
		- Parameters after stabilization	Tq : T4 : Ng : ΔTq % : NR : ΔT4 ° : Eng. T : Eng.P :
		The result of the check can be checked using the flight manual diagrams SECTION 5.	

SHEET No 5B	HELICOPTER EC 120 B	MAXIMUM CONTINUOUS POWER LEVEL FLIGHT
TEST PHASES AND REQUIREMENTS	**RESULTS TO BE OBTAINED / LIMITATIONS**	**RESULTS OBTAINED**
<u>HYDRAULIC CHECKS</u>	Refer to SECTION 4	
Reduce Speed ≤ 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.	Hp : ☐ OAT : ☐
		A FLI of 10 corresponds to a Ng of 101 % in the flight enveloppe of Zp < 14765' OAT > -20°C	FLI : ☐ Ng : ☐ Tq : ☐
All air bleeds shut-off			T4 : ☐
		Audio warning when FLI > 10 for more than 1.5 s (transient rating FLI < 10.8)	YES ☐ NO ☐

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**
<u>BEFORE ENGINE STARTING</u> 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 ☐
<u>ENGINE STARTING</u>			
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
<u>ENGINE SHUTDOWN</u>			
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.

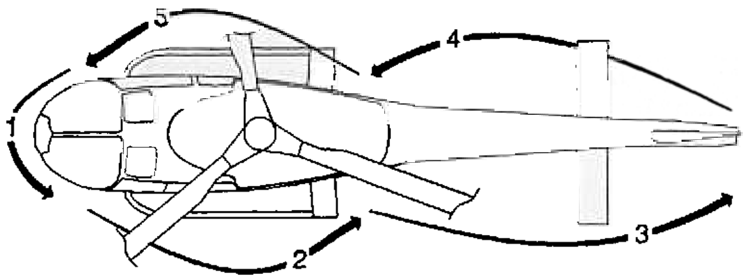

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Figure 8-3 : Sequence of checks

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 <u>and</u> 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