

SECTION 2

LIMITATIONS

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2.1 GENERAL

The helicopter is approved on the basis of the FAR part 27 “NORMAL” rotorcraft category.

The helicopter shall be operated in compliance with the limitations of this section.

2.1.1 TYPE OF OPERATIONS

The helicopter is approved to operate :

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

The following are forbidden :








- Aerobatic maneuvers.
- Leave the aircraft with no pilot at the controls while rotor is spinning.
- Flight in freezing rain or icing conditions.
- (visible moisture and temperatures conducive to producing ice).
- In flight engine power reduction using twist grip control except for engine failure training, emergency procedures referring to it, or for a technical flight.

2.1.2 OCCUPANTS

- Minimum flight crew : One pilot in right seat.
- Maximum number of occupants
(including flight crew)..... : Six

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
MV.EC130.0004.00	Yellow or amber	 or 	: Caution range or takeoff rating range
	Green		: Normal operating range
	White mark		: Equipment operating limit
	Red triangle		: Transient limit

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 enhance safety, red underlining flashes.

2.2 WEIGHT AND BALANCE LIMITATIONS

2.2.1 WEIGHT LIMITATION

Maximum permissible internal weight in flight : 2250 kg (4961 lbs).

Maximum permissible internal weight for IGE, takeoff and landing : 2250 kg (4961 lbs).

2.2.2 LONGITUDINAL CG

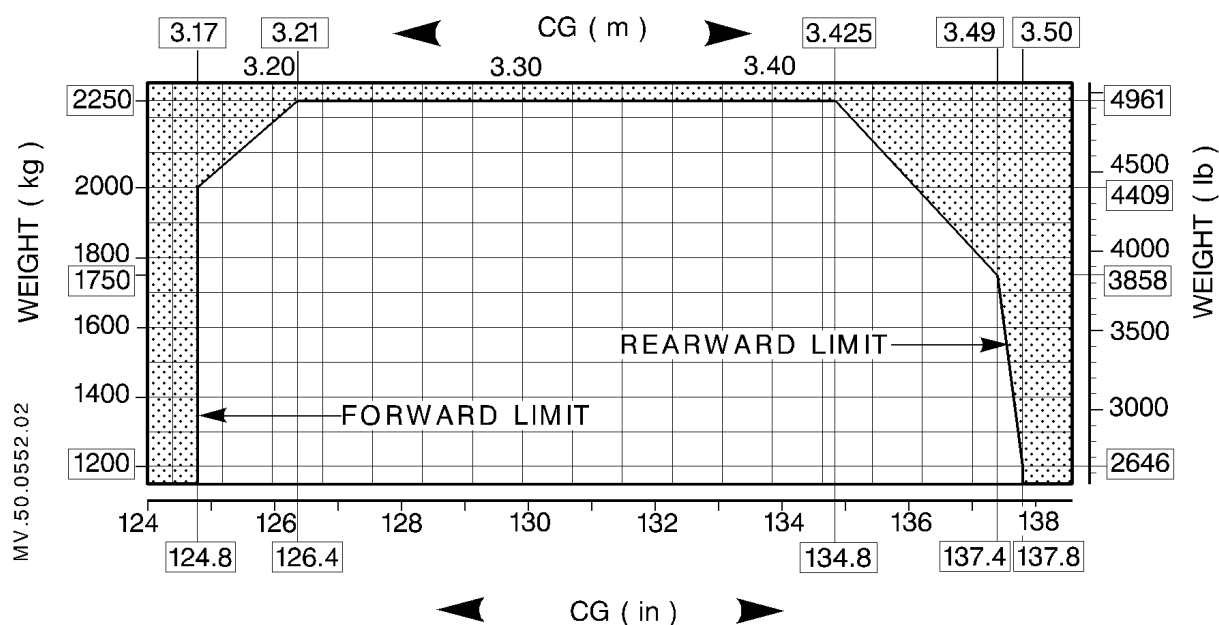


Figure 2-1 : Longitudinal CG Chart

NOTE

The datum is located 3.40 m (133.8 in) forward of the main rotor head center line.

2.2.3 LATERAL CG

Maximum left CG : 0.18 m (7.08 in)

Maximum right CG : 0.14 m (5.51 in)

NOTE

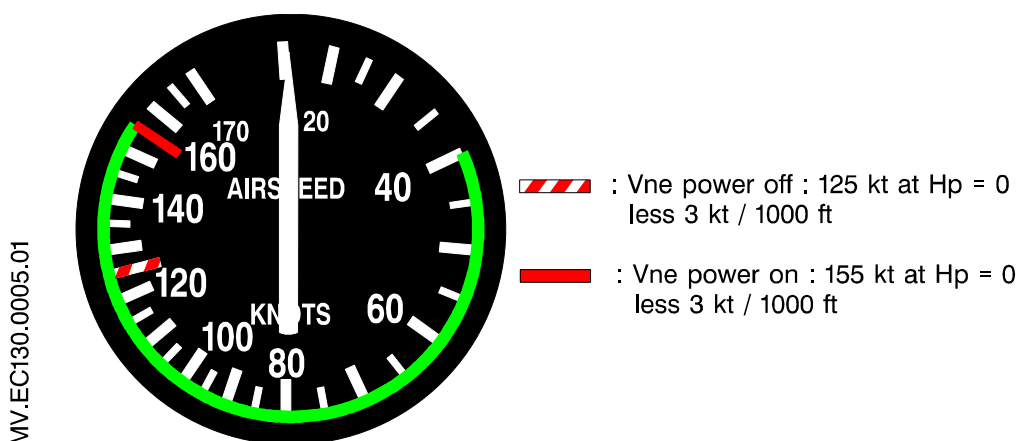
The datum is located in the plane of symmetry of the helicopter.

2.3 FLIGHT ENVELOPE LIMITATIONS

2.3.1 AIRSPEED LIMITATIONS

All airspeed limitations are Indicated Airspeeds.

2.3.1.1 With doors closed :



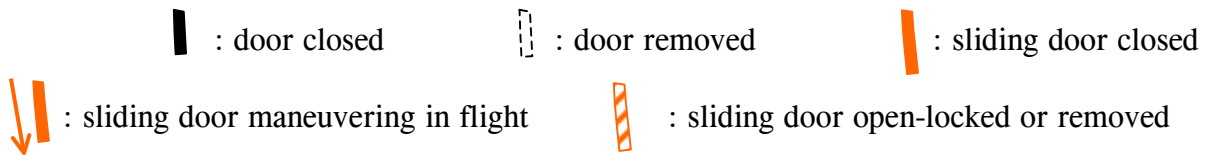
- When OAT < -30°C, computed VNE power on must be reduced by - 10 kts,
- When OAT < -20°C, computed VNE power off must be reduced by - 20 kts, (with a minimum VNE power off of 65 kts).

2.3.1.2 With doors open or removed :







NOTE

Flight with any configuration not shown is prohibited.

In all open doors configurations, loose objects shall not be in the cabin, cushions of unoccupied seats shall be removed and belts shall be stowed.








Caption code used for open doors limitations :



- Aircraft fitted with four standard doors (LH and RH hand doors)**

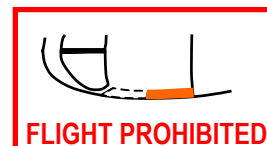
RH doors \ LH doors			
	VNE	VNE	110 kt (204 km/h) or VNE*
	VNE	110 kt (204 km/h) or VNE*	110 kt (204 km/h) or VNE*
	100 kt (185 km/h) or VNE*	110 kt (204 km/h) or VNE*	110 kt (204 km/h) or VNE*

* : lowest value

- Aircraft fitted with LH sliding door (optional) and RH standard doors**






RH doors \ LH doors				
	VNE	VNE	70 kt (130 km/h) or VNE*	110 kt (204 km/h) or VNE*
	135 kt (250 km/h) or VNE*	110 kt (204 km/h) or VNE*	100 kt (185 km/h) or VNE*	110 kt (204 km/h) or VNE*
	100 kt (185 km/h) or VNE*	110 kt (204 km/h) or VNE*	100 kt (185 km/h) or VNE*	110 kt (204 km/h) or VNE*

	opening : 110 kt (204 km/h) or VNE*
	closing : 80 kt (148 km/h) or VNE*





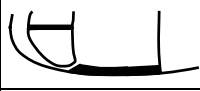
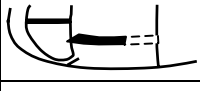

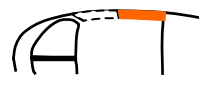


* : lowest value

Caption code used for open doors limitations :








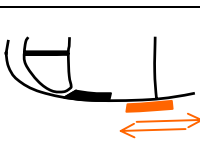


-  : door closed
-  : door removed
-  : sliding door closed
-  : sliding door maneuvering in flight
-  : sliding door open-locked or removed

• Aircraft fitted with LH standard doors and RH sliding door (optional)

RH doors LH doors				
	VNE	110 kt (204 km/h) or VNE*	100 kt (185 km/h) or VNE*	<u>opening</u> : 60 kt (111 km/h) or VNE*
	VNE	110 kt (204 km/h) or VNE*	110 kt (204 km/h) or VNE*	<u>closing</u> : 60 kt (111 km/h) or VNE*
	100 kt (185 km/h) or VNE*	110 kt (204 km/h) or VNE*	110 kt (204 km/h) or VNE*	 FLIGHT PROHIBITED

* : lowest value

• Aircraft fitted with RH and LH sliding doors (optional)

LH doors				
	VNE	110 kt (204 km/h) or VNE*	100 kt (185 km/h) or VNE*	<u>opening</u> : 60 kt (111 km/h) or VNE*
	135 kt (250 km/h) or VNE*	110 kt (204 km/h) or VNE*	110 kt (204 km/h) or VNE*	<u>closing</u> : 60 kt (111 km/h) or VNE*
	100 kt (185 km/h) or VNE*	110 kt (204 km/h) or VNE*	110 kt (204 km/h) or VNE*	
	<u>opening</u> : 60 kt (111 km/h) or VNE* <u>closing</u> : 60 kt (111 km/h) or VNE*	 FLIGHT PROHIBITED	 FLIGHT PROHIBITED	

* : lowest value

2.3.7 FLIGHT IN FALLING SNOW

- Flight when visibility is greater than 1500 m (0.81 NM) :
 - flight in falling snow is authorized.
- Flight when visibility is within 800 to 1500 m (0.43 to 0.81 NM) :

- total flying time in falling snow is limited to 10 min.

This time limit includes the time required to leave all snowy conditions, irrespective of the visibility.

- Flight when visibility is lower than 800 m (0.43 NM) :
 - flight in falling snow is prohibited.

NOTE

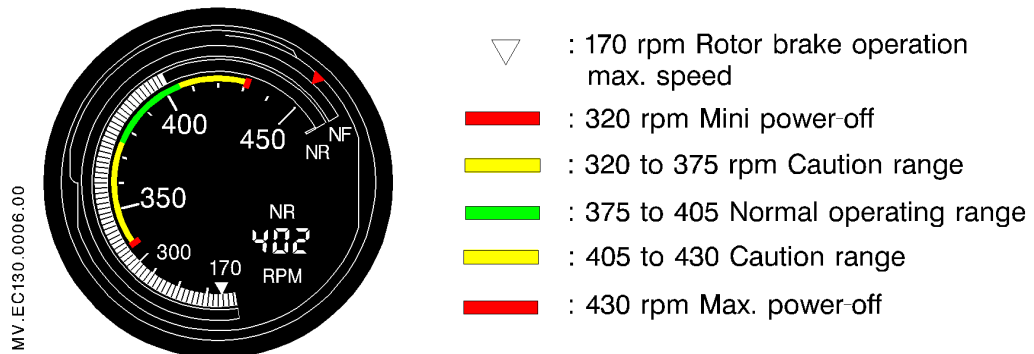
Refer to SECTION 9 supplement 9-4 for check before flight.

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.

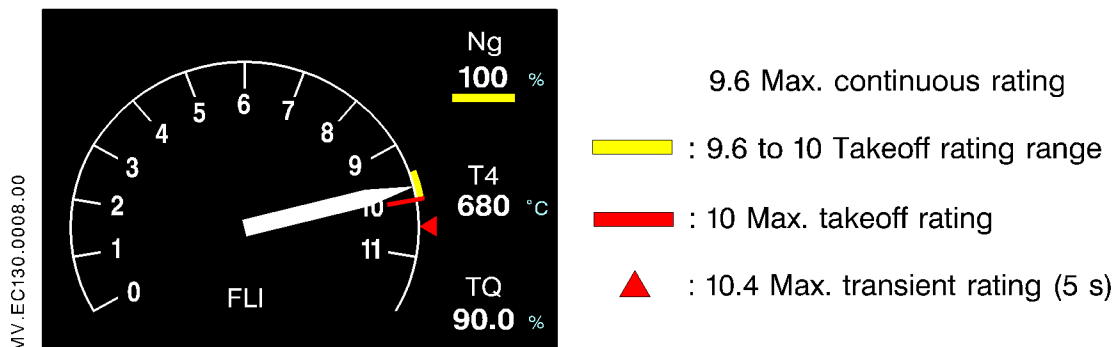


NOTE

Low NR aural warning ≤ 360 rpm

High NR aural warning ≥ 410 rpm

2.4.2 FIRST LIMITATION INSTRUMENT



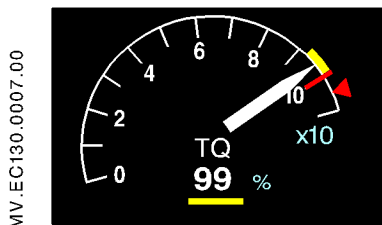
Use of P2 air bleeds is forbidden above the engine maximum continuous rating (Ng or T4).

NOTE


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


2.4.3 MAIN TRANSMISSION LIMITATIONS


- TORQUE LIMITATIONS



92.7 % Max. continuous rating

 : 92.7 % to 100 % Takeoff rating torque range from 0 to 40 kt

 : 100 % Max. takeoff rating torque

 : 104 % Max. transient rating (5 s)

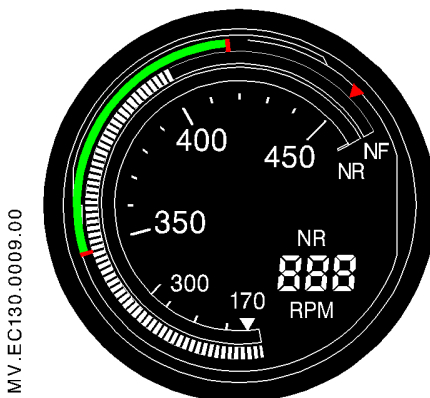
NOTE


Use of Takeoff rating torque range has no time limit.
100 % torque corresponds to 536 kW at 386 NR rpm.

2.4.4 ENGINE LIMITATIONS

Use of engine takeoff rating range, is limited to 5 continuous minutes.

- Nf LIMITATIONS



 : 349 rpm Mini.

 : 349 to 418 rpm Normal operating range

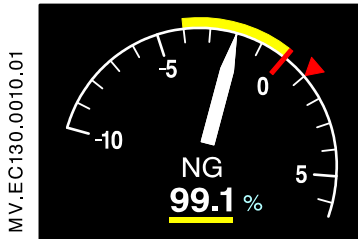
 : 418 rpm Max. continuous

 : 450 rpm Max. transient limit (5 s)

NOTE

A NR rotor speed of 386 rpm corresponds to a Nf speed of 39158 rpm.

• Ng LIMITATIONS



- Ng = 67 % : Mini stabilized speed
- $\Delta Ng = -4 \%$ Max. continuous rating
(Ng = 97.1 %, Hp = 0, ISA)
- ▬ : $\Delta Ng = -4 \%$ to $\Delta Ng = 0 \%$ Takeoff rating range
- ▬ : $\Delta Ng = 0 \%$ Max. takeoff rating
(Ng = 101.1 %, Hp = 0, ISA)
- ▲ : $\Delta Ng = +1 \%$ Max. transient rating (5 s)
(Ng = 102.3 %, Hp = 0, ISA)

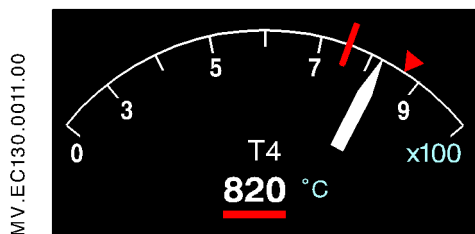
Use of P2 air bleeds is forbidden above the engine maximum continuous rating (Ng or T4).

NOTE

100 % Ng corresponds to 52110 rpm.

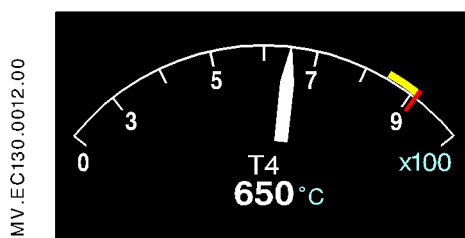
• T4 LIMITATIONS

Starting limitations :



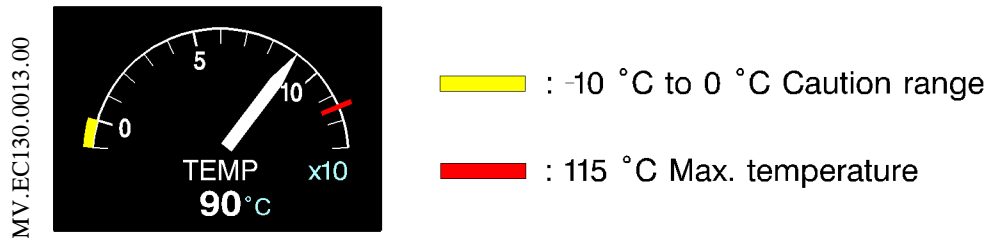
- ▬ : 750 °C Max. continuous
- ▲ : 865 °C Max. transient (10 s)

Flight limitations :



- 849 °C Max. continuous rating
- ▬ : 849 °C to 915 °C Takeoff rating range
- ▬ : 915 °C Max. takeoff rating

- OIL TEMPERATURE LIMITATIONS



Minimum oil temperature before power application : 0 °C (Oil 5 cSt).

- OIL PRESSURE LIMITATIONS



2.4.5 ELECTRICAL CIRCUIT LIMITATIONS

Maximum voltage : 31.5 V
(Rated voltage 26-29 V)

Maximum current : 150 A Max. continuous.
200 A with option OP 2783

2.5 MISCELLANEOUS LIMITATIONS

2.5.1 APPROVED FUELS

NOTE

Commercial designations of authorized fuels are specified in TURBOMECA documentation.

- **NORMAL FUELS**

(Fuels approved to operate in the whole flight envelope without any restrictions).

Type of fuel	NATO code	Specifications			Anti-ice additive included
		FRANCE	USA	UK	
Kerosene - 50 (AVTUR-FSII) (JP8)	F 34	AIR 3405 F 34	MIL-T-83133 (JP8)	D.ENG. RD 2453	Yes
Kerosene - 50 (AVTUR) (JP1)	F 35	AIR 3405 F 35	ASTM-D-1655 JET A1	D.ENG.RD 2494	No
Kerosene	-	-	ASTM-D-1655 JET A	-	No
High flash point (JP5) (AVCAT)	F 43	AIR 3404 F 43	-	D.ENG. RD 2498	No
High flash point (JP5) (AVCAT FSII)	F 44	AIR 3404 F 44	MIL-T-5624 (JP5)	D.ENG.RD 2452	Yes
Chinese fuel PRC National Standard N°3 Jet fuel	-	-	-	-	No

**The OAT range for using approved fuel is : - 40 °C to + 50 °C.
Below -20°C, anti-ice additive is mandatory for approved fuels which do not contain it.**

NOTE

All specifications are effective at latest issue or amendment.

- REPLACEMENT FUELS

(Fuel allowing operations in a restricted flight envelope.)

- Fuels with restricted flight envelope of :
OAT ≤ 25 °C and Hp ≤ 5000 ft

Type of fuel	NATO code	Specifications			Anti-ice additive included
		FRANCE	USA	UK	
WIDE CUT (JP4) (AVTAG FSII)	F 40	AIR 3407	MIL-T-5624 (JP4)	D.ENG.RD 2454	Yes
WIDE CUT (JET B) (AVTAG)	-	-	ASTM-D-1655 (JET B)	-	No

- Fuel with restricted flight envelope of :
OAT ≤ 40 °C and Hp ≤ 15000 ft

Type of fuel	NATO code	Specifications			Anti-ice additive included
		-	RUSSIA	-	
KEROSENE TS 1	-	-	GOST 10227	-	No
KEROSENE RT	-	-	GOST 10227	-	No

- REFUELING

Fuel temperature must be inside the above OAT limitations specified for the fuel actually used for refueling.

- ADDITIVES

Anti-ice additive:

If the fuel does not contain a freezing inhibitor and if the OAT is below -20 °C, the use of an anti-icing additive is mandatory. The additive shall comply with French specification AIR 3652B (equivalent to : MIL-I 27686, D-ENG-RD 2451, MB-NATO S 748, MIL-I 85470A).

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

Anti-static additive:

SHELL ASA 3, maximum concentration 0.0001% by volume.

Fungicide additive:

BIOBOR JF.

Jet fuel thermal stability improver additive :

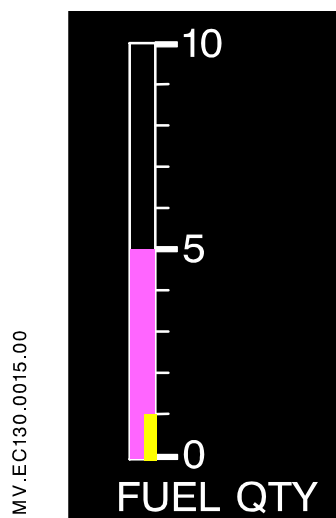
Type +100: NATO symbol 1749, MIL-DTL 83133E, SPEC AID 8Q462, APA 101.


Concentration by volume: 256 mg/l.

NOTE

Additive for F43 and F35

• **FUEL GAUGE**



 : 15 min of flight time remains at MCP

NOTE

10 = 538.7 litres (426 kg) (142.7 US gal) = usable fuel quantity.
The unusable fuel quantity is reached when zero is indicated on the fuel gauge.

2.5.2 APPROVED LUBRICANTS AND FLUIDS

• ENGINE LUBRICANTS

NORMAL USE (forbidden for OAT < -30°C)						
Oil type	NATO Code	Specification			Class	Approved oil trademarks
		FRANCE	USA	UK		
Recommended use Average synthetic 5 cSt at 98.9° C	0.156	-	MIL-L-23699	DERD 2499	HTS (High thermal stability)	Aero SHELL Turbine Oil 560 EXXON Turbo Oil 2197 MOBIL Jet Oil 254 MOBIL Jet Oil 291
Normal use Average synthetic 5 cSt at 98.9° C	0.156	-	MIL-L-23699	DERD 2499	(Corrosion inhibiting)	CASTROL Aerojet 5
					Standard	CASTROL 5000 Aero SHELL 500 EXXON Turbo Oil 2380 MOBIL Jet Oil 2 TURBO NYCOIL 600 TOTAL Aero turbine 535 ELF Turbo Jet 2

OTHER OILS (forbidden for OAT > 30°C)						
Oil type	NATO Code	Specification			Class	Approved oil trademarks
		FRANCE	USA	UK		
Synthetic fluid 3 to 3.5 cSt at 98.9° C	0.148	-	MIL-L-7808	-	-	EXXON Turbo Oil 2389 MOBIL AVREX 256 CASTROL 325 CASTROL 3C TURBO NYCOIL 160
	0.150	AIR 3514	-	-	-	ELF Jet Synthetic Oil 15 TURBO NYCOIL 13B
Synthetic fluid 3.9 cSt at 98.9° C	-	-	-	DEF STAN 91-94	-	Aero SHELL Turbine Oil 390

NOTE 1

When the oil specification/grade/ trademark differs from the approved one, TURBOMECA approval shall be obtained before using this oil.

NOTE 2

In case of oil change with trademark/NATO code/category/grade or specification change, apply instructions as prescribed in the TURBOMECA Maintenance Manual.

NOTE 3

All specifications are effective at latest issue or amendment.

- MAIN AND TAIL GEARBOX LUBRICANTS

NORMAL USE					
Oil type	NATO Code	Specification			Approved operating temperatures
		FRANCE	USA	UK	
Mineral oil	0.155	AIR 3525	MIL-L-6086	-	-20°C ≤ OAT ≤ +50°C
NOTE : The "SHELL" trademark is prohibited					

USE IN COLD WEATHER					
Oil type	NATO Code	Specification			Approved operating temperatures
		FRANCE	USA	UK	
Synthetic oil	0.150	AIR 3514	-	-	-40°C ≤ OAT ≤ +0°C
Synthetic oil	0.148	AIR 3513	MIL-L-7808	-	-40°C ≤ OAT ≤ +0°C

- TAIL GEARBOX LUBRICANTS

NORMAL USE					
Oil type	NATO Code	Specification			Approved operating temperatures
		FRANCE	USA	UK	
Synthetic oil 5 cSt	0.156		MIL-L-23699	DERD 2499	-20°C ≤ OAT ≤ +50°C

- SERVO CONTROL FLUID

NORMAL USE					
Oil type	NATO Code	Specification			Notes
		FRANCE	USA	UK	
Synthetic oil	-	-	MIL-H-83282	-	Recommended
Mineral oil	H 515	AIR 3520	MIL-H-5606	DTD 585	

NOTE 1

All specifications are effective at latest issue or amendment.

NOTE 2

In case of fluid change with trademark/NATO code/category/grade or change in specification, apply instructions as prescribed in the Maintenance Manual.

2.5.3 BAGGAGE COMPARTMENTS LOAD LIMITATIONS

RH cargo compartment :100 kg (220 lbs)
LH cargo compartment :120 kg (264 lbs)
with a max. distributed load of 300 kg/m² (62.5 lb/ft²)

Rear cargo compartment:80 kg (176 lbs)
with a max. distributed load of 145 kg/m² (30 lb/ft²)

2.5.4 CABIN COMPARTMENT LOAD LIMITATIONS

Rear cabin floor:310 kg (682 lbs)
Forward left cabin floor:150 kg (330 lbs)
with a max. distributed load of 300 kg/m² (62.5 lb/ft²)

2.5.5 MANDATORY EQUIPMENT

A minimum of two adequate radio / audio headsets shall be on-board the helicopter, one worn by the pilot at the controls to monitor the audio warning delivered through the ICS system and a spare one.

2.5.6 OPTIONAL EQUIPMENT

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

2.6 PLACARDS

Placard :

VNE EN PUISSANCE		VNE POWER ON	
Zp (ft)	Vi (kts)	Hp (ft)	IAS (kts)
0	155	0	155
2000	149	2000	149
4000	143	4000	143
6000	137	6000	137
8000	131	8000	131
10 000	125	10 000	125
12 000	119	12 000	119
14 000	113	14 000	113
16 000	107	16 000	107
18 000	101	18 000	101
20 000	95	20 000	95
22 000	89	22 000	89
SANS PUISSANCE: -30 kts		POWER OFF: -30 kts	

MV.50.0553.03

Location : Inside cabin, on center post.

Placard :

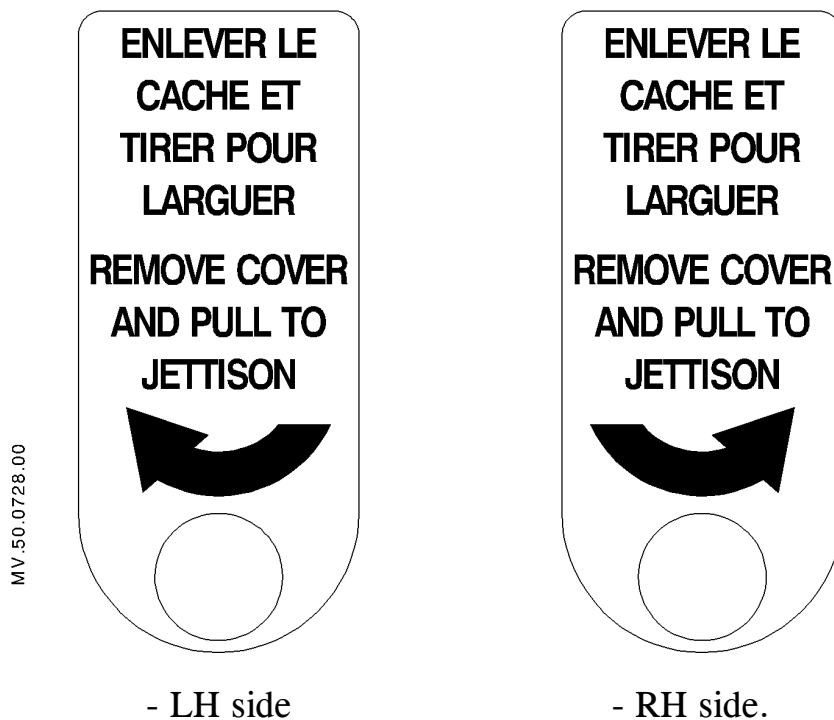
LES REPERES ET PLAQUETTES INDICATRICES INSTALLEES SUR CET HELICOPTERE CONTIENNENT LES LIMITATIONS D'UTILISATION QUI DOIVENT ETRE RESPECTEES LORS DE L'UTILISATION DE CE GIRAVION. LES AUTRES LIMITATIONS D'UTILISATION QUI DOIVENT ETRE RESPECTEES LORS DE L'UTILISATION DE CE GIRAVION SONT CONTENUES DANS LE MANUEL DE VOL DU GIRAVION. LA SECTION LIMITATIONS DE NAVIGABILITE DU MANUEL D'ENTRETIEN DU GIRAVION DOIT ETRE RESPECTEE

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.

MV.50.0054.00

Location : Inside cabin, on overhead canopy bow.

Placard :



Location : Inside cabin, at doors bottom.

Placard :

MV.50.0729.00

N° APPAREIL A/C SERIAL N°:	WERK Nr.
MASSE WEIGHT :	GEWICHT
C. OF G. :	SCHWERPKT
DATE :	DATUM

Location : Console RH side.

Placard :

MV.EC130.0022.00

COMPASS AIRCRAFT DATE	
HEADING	
MAGNETIC	CORRECTED
000	
045	
090	
135	
180	
225	
270	
315	

Location : Inside cabin, on center post.

Placard :

MV.50.0051.00

CHARGES REPARTIES MAXI	
DISTRIBUTED LOADS MAXI	
SUR PLANCHER CABINE ARRIERE	310 kg
ON REAR CABIN FLOOR	682 lb
SUR PLANCHER AVANT GAUCHE	150 kg
ON L.H. FORWARD CABIN FLOOR	330 lb

Location : on console.

Placard :

MV.50.0052.00

CHARGE MAXI. 120 kg
MAX. LOAD 264 lb

Location : Cargo hold LH side

MV.50.0053.00

CHARGE MAXI. 100 kg
MAX. LOAD 220 lb

Location : Cargo hold RH side

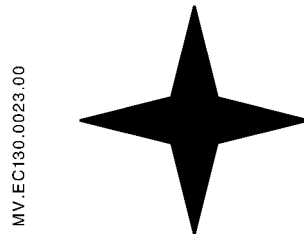
Placard :

MV.50.0050.00

CHARGE REPARTIE MAXI	80 kg
DISTRIBUTED LOAD MAXI	176lb

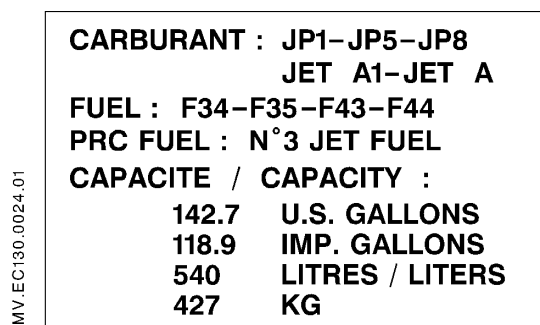
Location : Rear cargo hold

Placard :



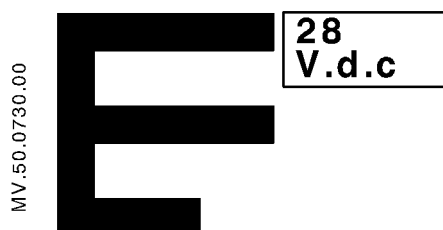
Location : Near filler neck, LH side.

Placard :



Location : Near filler neck, LH side.

Placard :



Location : RH side, on ground power receptacle cover.

SECTION 3

EMERGENCY PROCEDURES

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3.1 GENERAL

Emergency procedures describe the actions that the pilot must take relative to the various possible failures that can occur.

Meanwhile, depending on the many variable external environment, such as the type of terrain overflow, 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 SCU, a [HORN] pushbutton is used to activate the audio warning .

When [HORN] pushbutton is pressed in: **HORN**.

NOTE

The pilot at the controls shall wear an adequate radio / ICS audio headset to monitor the audio warning 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 360 rpm (310 Hz tone).
- When maximum take-off limitations are exceeded for more than 1,5 seconds or immediately when transient power limitation is or will be exceeded during fast power increase (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 410 rpm.

Collective pitch **INCREASE** to maintain NR in green arc

Apply 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**..... **V_y**
- If relighting impossible or after tail rotor failure
 3. Twist grip **IDLE detent**
 4. Maneuver the aircraft into the wind on final approach.
 - At height \cong 70 ft
 5. Cyclic **FLARE**
 - At 20/25 ft and at constant attitude
 6. **Collective pitch**..... **GRADUALLY INCREASE**
to reduce the rate of descent and forward speed.

- 7. Cyclic FORWARD to adopt a slightly nose-up landing attitude ($< 10^\circ$).
- 8. Pedal ADJUST
to cancel any sideslip 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 FULL DOWN
 - 12. Rotor brake..... APPLY below 170 rotor 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 speed (IAS < 30 kt) and rate of descent. Then apply following check list for items 10, 11, 12.

- After touch-down
 - 10. Collective pitch MAINTAIN
 - 11. Door emergency handles.... PULL-UP
 - 12. Rotor brake..... APPLY

Abandon aircraft once the rotor has stopped.

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

WARNING

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) OR IN CONFINED AREA.

1. Collective pitch **FULL LOW PITCH**
 - When NR stops decreasing
2. Cyclic **FORWARD**
to gain airspeed according to available height.
3. Autorotation procedure **APPLY**

3.2.4 IN FLIGHT RELIGHTING

According to available height and cause of flame-out :

1. Starting selector..... **OFF position**
2. [FUEL PUMP]..... **ON**
3. Starting selector..... **ON position**

The relighting sequence will therefore be automatically carried out as soon as $N_g < 17\%$.

- After relighting
 4. [FUEL PUMP]..... **OFF**

At least 1000 ft are necessary to complete relighting procedure after flame-out.

3.3 TAIL ROTOR FAILURES

3.3.1 COMPLETE LOSS OF TAIL ROTOR EFFECTIVENESS

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.

WARNING

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) OR IN CONFINED AREA.

3.3.1.1 HOVER-IGE (or OGE in HV diagram)

LAND IMMEDIATELY

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

3.3.1.2 HOVER-OGE (Clear area, out of HV diagram)

Simultaneously,

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

LAND AS SOON AS POSSIBLE

If a go-around has been performed, carry out an autorotative landing on a suitable area for landing procedure.

3.3.1.3 IN CRUISE FLIGHT

1. Cyclic **ADJUST** to set IAS to V_y and control yaw
2. Collective **REDUCE** to avoid sideslip

LAND AS SOON AS POSSIBLE

APPROACH AND LANDING

On a suitable area for autorotative landing :

1. Twist grip IDLE detent
2. Carry out an autorotative landing as landing procedure.

3.3.2 TAIL ROTOR CONTROL FAILURE

Symptom : jamming of pedals or pedals effectiveness loss. These conditions induce an inability to change tail rotor thrust with the pedals.

WARNING

LANDING IS MADE EASIER BY LANDING WITH A RH WIND COMPONENT.

WHEN AIRSPEED IS LOWER THAN 20 KT, GO-AROUND IS IMPOSSIBLE DUE TO LOSS OF VERTICAL FIN EFFICIENCY.

1. Cyclic and collective..... ADJUST to set IAS to 70 kt (130 km/h) in level flight.
2. [HYD TEST] pushbutton DEPRESS, green light on, load compensator depressurizes.

After 5 seconds :

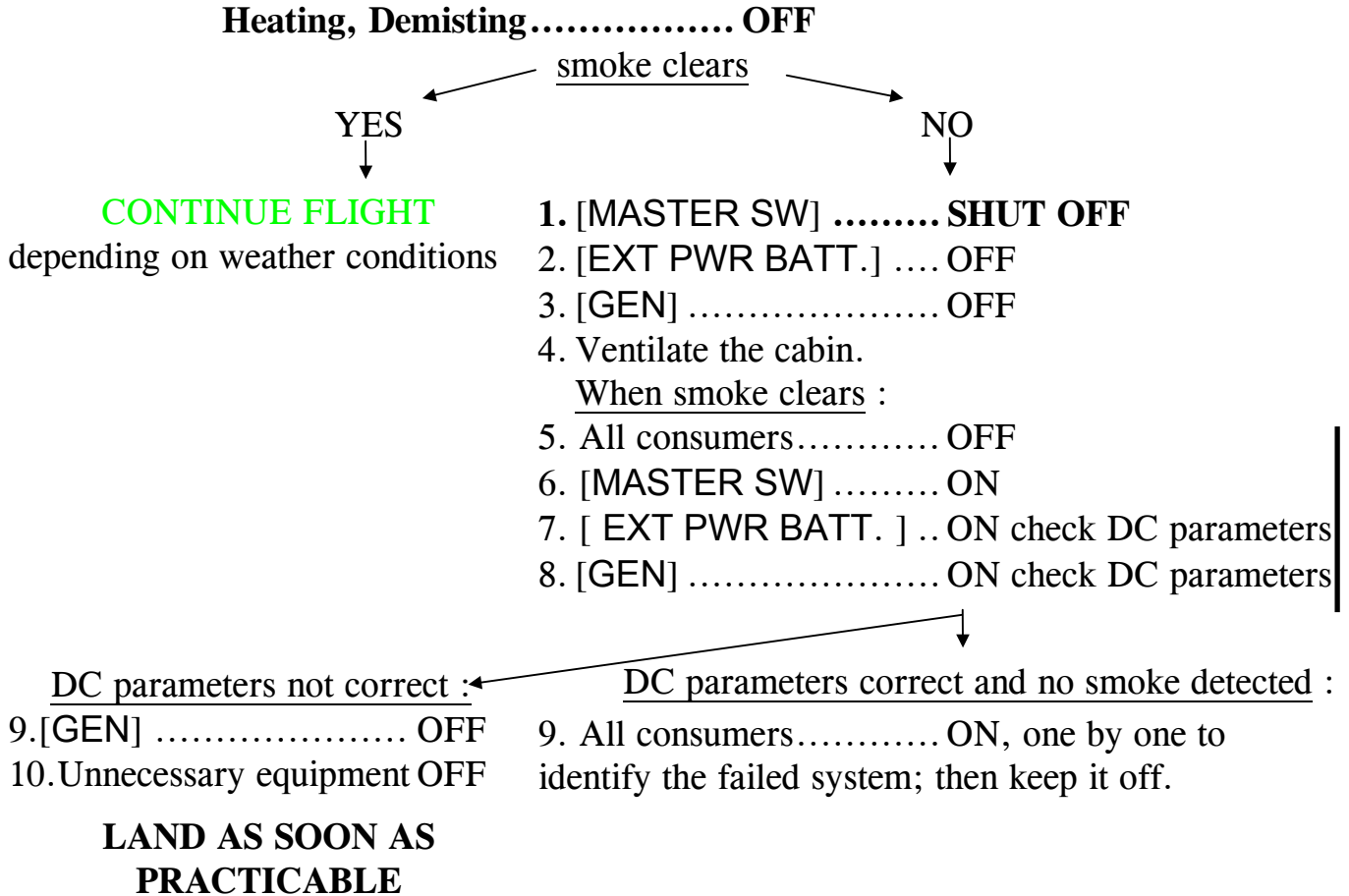
3. [HYD TEST] DEPRESS, green light off.

On a suitable area for a running landing procedure:

Make a shallow approach with a slight left sideslip. Perform a running landing, the sideslip will be reduced progressively as airspeed is reduced and collective is applied to cushion the landing.

3.4 SMOKE IN THE COCKPIT/CARGO

3.4.1 SOURCE NOT IDENTIFIED



CAUTION

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

3.4.2 SOURCE IDENTIFIED

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

CONTINUE FLIGHT
depending on system failed.

NOTE

After DC had been switched-off and on in flight, **GOV** light will remain on until the next normal full engine and battery switch-off on the ground.

3.5 VEMD FAILURE

3.5.1 VEMD SCREEN FAILURE

- **Failure of one screen**

Failed Screen..... OFF.

Read all available informations on the other screen.

Informations are available using the SCROLL pushbutton either on the VEMD or on the collective pitch lever.

If top screen fails, the 3-parameters engine page will be automatically displayed on lower screen but with torque and Ng off line. Only T4 and digital Ng will be available, refer to paragraph 3.5.4 for compliance with limitations.

- **Failure of both screens**

Can be a single failure when battery and DC generator are in "OFF" position (fire and smoke detection procedure).

In this case, to avoid any power overlimit, the maximum authorized power will be the power needed to establish level flight with the following law :

$$\text{IAS kt} = 100 \text{ kt at sea level} - (2 \text{ kt} / 1000 \text{ ft Hp})$$

LAND AS SOON AS PRACTICABLE

Landing procedure : carry out a no hover landing.

3.5.2 CAUTION MESSAGES ON VEMD

When a parameter is off line, the parameter value is not displayed on the corresponding VEMD 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 OUT RANGE : Abnormal vehicule parameter

ENG PARAM OUT RANGE : Abnormal engine parameter

These messages appear when a parameter usually displayed on these 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.

CROSSTALK FAILED
 ----- > **PRESS OFF 1 (or 2)** : Self explanatory.

BRT CNTRL FAILED : Brightness control failed.

FLI FAILED
 ----- > **CHECK PARAM** : One power parameter (Ng, T4, Tq) not consistent.

- Parameters consistency : CHECKED
- Relevant procedures in paragraph ABNORMAL ENGINE PARAMETER INDICATION (SECTION 3).....: APPLY

GEN PARAM OVER LIMIT : Abnormal generator parameter

BAT PARAM OVER LIMIT : Abnormal battery parameter

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

GPS NOT AVAILABLE : GPS system data are not available (no absolute time reference)

- GPS navigation system : CHECK ON

OVERLIMIT DETECTED : Engine or vehicle overlimit recorded

This message appears as soon as one power parameter overlimit have been recorded in the VEMD. It will be displayed on the FLI or engine page until 40 % Ng during the next engine start.

3.5.3 ABNORMAL NR/Nf INDICATION

- **NR indication Failure**

Collective MAINTAIN $Tq > 10 \%$

NR reading is given by Nf pointer.

LAND AS SOON AS PRACTICABLE

- **Nf indication Failure**

NR gauge CHECK in green range with $Tq > 0$.

CONTINUE FLIGHT

NOTE 1

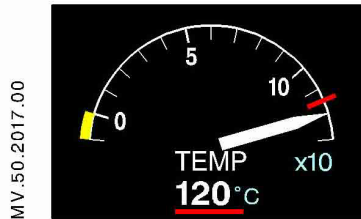
The Nf value can be read on the VEMD screen. Press "SELECT", then "+" as many times as required to display the parameter in the rectangular window at the bottom of the FLI or 3-data screen.

NOTE 2

In case of Nf indication failure, the EBCAU may not be available.

3.5.4 ABNORMAL ENGINE PARAMETER INDICATION

- Engine Oil Temperature over 115° C



Airspeed SET to 80 kt

Temperature reduces,

YES

NO

LAND AS SOON AS PRACTICABLE

LAND AS SOON AS POSSIBLE

Check cooler fan operation

- Low Engine Oil Pressure



- CWP CHECK **ENG P**

NO

YES

CWP light test COMPLETED

ENG P

ENG P

LAND AS SOON AS
PRACTICABLE

LAND IMMEDIATELY

- Autorotation procedure .. APPLY.
- Shutdown engine time permitting.

- **Loss of 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 is displayed in yellow.

The First Limitation Indicator (FLI) is replaced by the 3 data symbology (Ng/ Δ Ng, T4 and torque) and a failure message is displayed.

- **Ng/ Δ Ng Indicator Failure :**

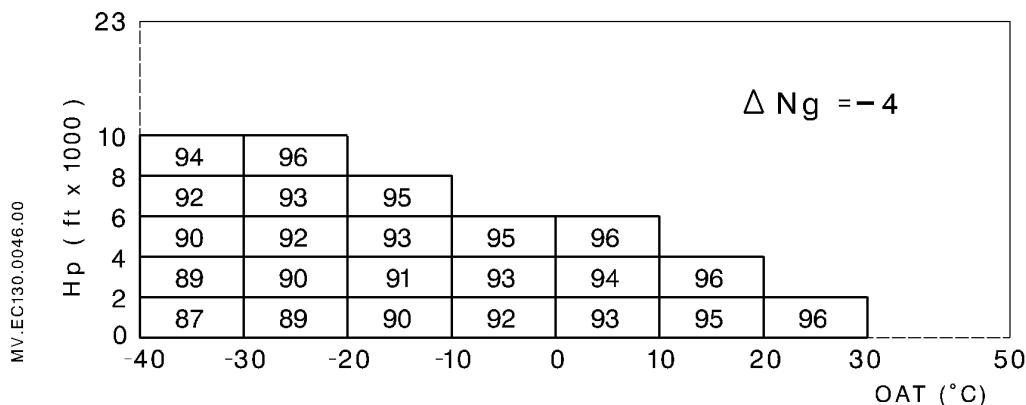
Respect the maximum torque value and T4 limit of 810°C.

NOTE

In this case, T4 limitations displayed are starting limitations

- **Torquemeter Failure :**

Respect the Ng given in the following table :



- **Δ Ng and Torquemeter indications failure :**

GOV warning can also induce loss of Δ Ng and torque indications.

The VEMD switches to 3-data symbology with only T4 and numeric Ng as valid parameter. Comply with Ng limitations in the above table, substituting the Δ Ng = - 4 limit by a T4 limit of 810°C.

- **T4 Indicator Failure :**

Switch off heating and demisting.

Respect Ng and torque limitations.

On ground : do not try to start the engine.

For all these failures :

LAND AS SOON AS PRACTICABLE

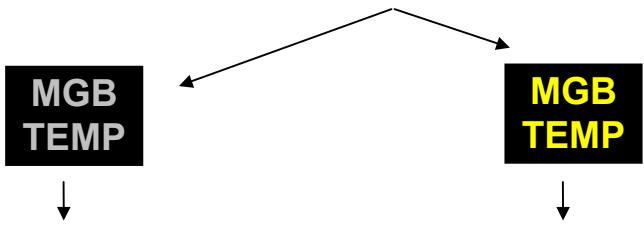
3.6 CAUTION AND WARNING PANEL

3.6.1 ENGINE EMERGENCY


WARNING PANEL	CORRECTIVE ACTIONS
<div style="background-color: black; color: red; padding: 5px; text-align: center; width: fit-content; margin-bottom: 10px;">ENG FIRE</div> Fire in engine bay	<ul style="list-style-type: none"> • At start-up : <ol style="list-style-type: none"> 1. Starting selector..... OFF position 2. Emergency fuel shut-off handle AFT 3. Booster pump..... OFF 4. [CRANK] DEPRESS (10 s) 5. [MASTER SW]..... OFF 6. Rotor brake APPLY (≤ 170 rpm) 7. Evacuate aircraft and fight fire from outside. • Hover, Takeoff, Final : <p style="text-align: center; color: red; margin: 10px 0;">LAND IMMEDIATELY</p> Carry out a no hover, powered landing then, ounce on ground, apply same procedure as above. • In Flight : <p style="text-align: center; color: red; margin: 10px 0;">LAND IMMEDIATELY</p> <ol style="list-style-type: none"> 1. Collective pitch..... REDUCE 2. IAS..... Vy 3. Autorotation procedure ... APPLY 4. Emergency fuel shut-off handle AFT 5. Starting selector..... OFF position • After landing : <ol style="list-style-type: none"> 6. [MASTER SW]..... OFF 7. Rotor brake APPLY (≤ 170 rpm) 8. Evacuate aircraft and fight fire from outside.

WARNING PANEL	CORRECTIVE ACTIONS
<p style="text-align: center;">GOV</p> <p>Major governor failure</p> <p>Emergency mode engaged</p>	<ul style="list-style-type: none"> • IN FLIGHT: <ol style="list-style-type: none"> 1. Flight parametersCHECK Emergency mode automatically self-engages. GOV illuminates. 2. Collective pitchAVOID abrupt changes Maintain Ng > 80% Hp < 20000 ft Maintain Ng > 85% Hp ≥ 20000 ft LAND AS SOON AS PRACTICABLE Approach and Landing : Make a powered approach. Avoid steep angle. After touch down, shut-down : Collective pitch.....SLOWLY down to low pitch. Starting selectorOFF. <p style="text-align: center;">NOTE On FLI page: FF and END. This failure can also results in loss of ΔNg and torque parameters on the VEMD.</p> • DURING ENGINE STARTING : Starting selector.....OFF position immediately
<p style="text-align: center;">GOV</p> <p>Minor FADEC failure</p>	<ul style="list-style-type: none"> • Governing function degraded : <ol style="list-style-type: none"> 1. CollectiveAVOID abrupt power changes 2. IASMAINTAIN below VNE power off LAND AS SOON AS PRACTICABLE On ground : do not start engine. • Flashing at idle or during starting or shut down : Governor redundancy failure, no impact on governing function. <ul style="list-style-type: none"> . Start-up procedure: abort, report to Maintenance Manual . Autorotation training: cancel training, return to base.

3.6.2 TRANSMISSION EMERGENCY

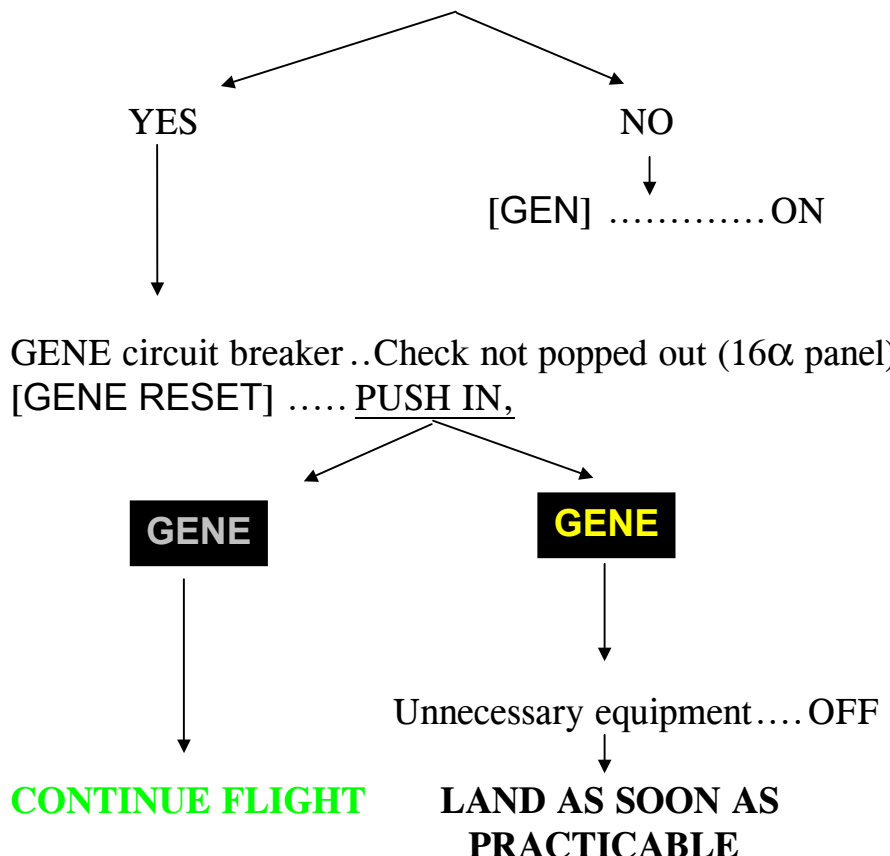
WARNING PANEL	CORRECTIVE ACTIONS
<p>MGB P</p> <p>Main Gear Box low oil pressure (< 1 bar)</p>	<p>CollectiveREDUCE power</p> <p>LAND AS SOON AS POSSIBLE</p> <p>If a safe landing is not possible, continue flight to the nearest appropriate landing site, reduce power to fly at minimum power speed (Vy).</p> <p>WARNING</p> <p>AT LOW POWER (VY) A MAXIMUM OF 55 MIN. OF SIMULATED FLIGHT TIME HAS BEEN DEMONSTRATED DURING BENCH TEST</p>
<p>MGB TEMP</p> <p>Main Gear Box oil overheating (> 115°C)</p>	<p>IASSET TO Vy</p> <p>CWPMONITOR</p>  <p>LAND AS SOON AS PRACTICABLE</p> <p>LAND AS SOON AS POSSIBLE</p>
<p>MGB CHIP</p> <p>Metal particles in MGB oil circuit.</p>	<p>CollectiveREDUCE power</p> <p>MGB P and MGB TEMP ...MONITOR</p> <p>LAND AS SOON AS POSSIBLE</p>
<p>TGB CHIP</p> <p>Metal particles in TGB oil circuit.</p>	<p>Avoid prolonged hovering</p> <p>CONTINUE FLIGHT</p>

3.6.3 HYDRAULIC EMERGENCY

WARNING PANEL	CORRECTIVE ACTIONS
<div style="text-align: center; margin-bottom: 10px;">  </div> <p>Loss of hydraulic pressure</p> <p style="text-align: center;">or</p> <p>pressure < 30 bar</p>	<p>Keep aircraft to a more or less level attitude Avoid abrupt maneuvers</p> <div style="text-align: center; border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto 10px auto;">CAUTION</div> <p>Do not use [HYD TEST] pushbutton as this will depressurize the yaw load compensator resulting in heavy pedals control loads. Do not attempt to carry out hover flight or any low speed maneuver. The intensity and direction of the control feedback force will change rapidly. This will result in poor aircraft control and possible loss of control.</p> <p style="text-align: center;">As controls loads increase, be careful not to inadvertently move twist grip out of FLIGHT detent (TWT GRIP light out).</p> <p style="text-align: center;">NOTE</p> <p>Pressure in accumulators allows enough time to secure the flight and to establish the hydraulic failure safety speed.</p> <ul style="list-style-type: none"> • <u>In hover</u> : <ol style="list-style-type: none"> 1. Land normally 2. Twist gripSet to IDLE detent 3. Collective.....LOCK 4. Starting selectorOFF • <u>In flight</u> : Smoothly, <ol style="list-style-type: none"> 1. Collective/CyclicSET IAS within 40 to 60 kt (hydraulic failure safety speed) 2. Collective HYD switchOFF. Pilot has to exert forces:- on collective increase or decrease around no force feedback point, - on forward and left cyclic. <p style="text-align: center;">LAND AS SOON AS POSSIBLE</p> <p style="text-align: center;">NOTE</p> <p>Speed may be increased as necessary but controls loads will increase with speed.</p> <ul style="list-style-type: none"> • <u>Approach and landing</u> : over a clear and flat area, <ul style="list-style-type: none"> - perform a flat approach into wind, - make a no-hover slow running landing around 10 kt, - Do not hover or taxi without hydraulic pressure. • <u>After landing</u>: <ul style="list-style-type: none"> - CollectiveLOCK - Shutdown procedureApply

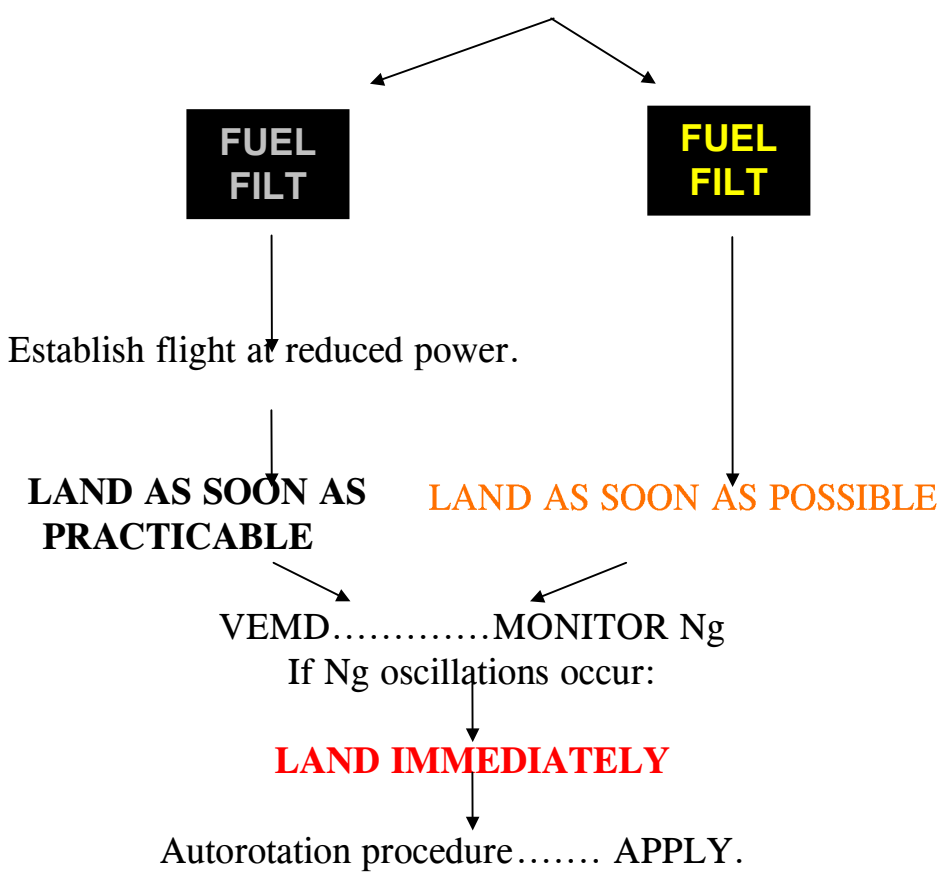
3.6.4 ELECTRICAL EMERGENCY

WARNING PANEL	CORRECTIVE ACTIONS
<p>BATT TEMP</p> <p>Maximum battery temperature.</p>	<p>1. [EXT PWR BATT.]OFF 2. U bus voltageCHECK</p> <pre> graph TD A[2. U bus voltageCHECK] --> B[NORMAL] A --> C[ABOVE U max] B --> D[LAND AS SOON AS PRACTICABLE] C --> E["1. [EXT PWR BATT.]...ON 2. [GEN].....OFF 3. Unnecessary equipments..... OFF"] E --> D </pre>
<p>BATT</p> <p>Battery off line</p>	<pre> graph TD A["[EXT PWR BATT.].....CHECK <u>ON</u>"] --> B[YES] A --> C[NO] B --> D["CHECK voltage on VEMD"] D --> E[LAND AS SOON AS PRACTICABLE] C --> F["[EXT PWR BATT.] ON"] F --> G[BATT] G --> H[CONTINUE FLIGHT] </pre>

WARNING PANEL	CORRECTIVE ACTIONS
<p>GENE</p> <p>DC generator off line</p>	<p>1. U bus on VEMD CHECK</p> <p>2. [GEN] CHECK ON</p>  <pre> graph TD A[1. U bus on VEMD CHECK 2. [GEN] CHECK ON] --> B{YES / NO} B -- YES --> C[GENE circuit breaker ..Check not popped out (16α panel) [GENE RESET] PUSH IN,] B -- NO --> D[[GEN] ON] C --> E{GENE} D --> E E --> F[CONTINUE FLIGHT] E --> G[Unnecessary equipment.... OFF] G --> H[LAND AS SOON AS PRACTICABLE] </pre> <p>CAUTION</p> <p>If the battery fails, the VEMD will go out and only the analog NR gauge will remain.</p> <p>Maximum flight time on battery:</p> <ul style="list-style-type: none"> . day : 50 minutes (1 VHF 1 VOR). . night : 20 minutes (same as day plus instrument lighting and external lights).

3.6.5 FUEL EMERGENCY

WARNING PANEL	CORRECTIVE ACTIONS
<p style="text-align: center;">FUEL</p> <p>Fuel quantity < 48 kg</p>	<p style="text-align: center;">LAND AS SOON AS POSSIBLE</p> <p style="text-align: center;">NOTE 15 mn of flight time remain at MCP</p> <p style="text-align: center;">WARNING AVOID LARGE ATTITUDE CHANGES</p>
<p style="text-align: center;">FUEL P</p> <p>Low fuel pressure</p>	<ul style="list-style-type: none"> • IN FLIGHT: <ol style="list-style-type: none"> 1. Collective pitchREDUCE POWER 2. Booster pumpON <p style="text-align: center;">LAND AS SOON AS POSSIBLE</p> <p>. Low power approach and landing</p> <p style="text-align: center;">WARNING BE PREPARED IN CASE OF AN ENGINE FLAME-OUT.</p>

WARNING PANEL	CORRECTIVE ACTIONS
<p>FUEL FILT</p> <p>Fuel filter clogged</p>	<p style="text-align: center;">WARNING</p> <p style="text-align: center;">FUEL FILTER BY-PASS OPENING DRIVES POLLUTION INTO THE FUEL LINES, AND THE GOVERNOR, WHICH MAY INDUCE OSCILLATIONS, LIMITED POWER OR EVENTUALLY FLAME-OUT.</p> <p style="text-align: center;">Collective pitch REDUCE POWER</p> <div style="text-align: center;">  <pre> graph TD A[REDUCE POWER] --> B[FUEL FILT] A --> C[FUEL FILT] B --> D[LAND AS SOON AS PRACTICABLE] C --> E[LAND AS SOON AS POSSIBLE] D --> F[VEMD.....MONITOR Ng] E --> F F --> G[If Ng oscillations occur:] G --> H[LAND IMMEDIATELY] H --> I[Autorotation procedure..... APPLY.] </pre> </div>

3.6.6 MISCELLANEOUS

WARNING PANEL	CORRECTIVE ACTIONS
<p>PITOT</p> <p>Pitot heating not operative</p>	<p>[PITOT] CHECK ON</p> <pre> graph TD A["[PITOT] CHECK ON"] --> B[YES] A --> C[NO] B --> D["Monitor airspeed indicator"] C --> E["[PITOT] ON"] </pre> <p>CONTINUE FLIGHT</p>
<p>HORN</p> <p>Aural warning not operative</p>	<p>[HORN] CHECK ON</p> <pre> graph TD A["[HORN] CHECK ON"] --> B[YES] A --> C[NO] B --> D["Aural warning failure"] C --> E["[HORN] ON"] </pre> <p>CONTINUE FLIGHT</p>
<p>DOOR</p> <p>One or both cargo hold unlocked</p>	<p>Airspeed REDUCE to 70 kts</p> <p>LAND AS SOON AS PRACTICABLE descent and approach at low rate of descent.</p>

3.7 VARIOUS WARNINGS, FAILURES AND INCIDENTS NOT INDICATED ON THE CWP

3.7.1 ROTOR BRAKE INOPERATIVE

WARNING

WAIT FOR FULL ROTOR SHUTDOWN BEFORE LEAVING THE AIRCRAFT.

Rotor stopping with wind blowing:

1. Aircraft..... INTO WIND.
2. Cyclic stick..... slightly INTO WIND.

3.7.2 HYDRAULIC SYSTEM FAILURES

Yaw servo-control slide-valve seizure :

- In hover

. If no movement about yaw axis :

LAND normally.

. If yaw axis rotation :

HYD switch (collective grip) ... OFF.

- In cruise flight

1. Airspeed REDUCE between 40 to 60 kt in level flight, enter sideslip if necessary.

2. HYD switch (collective grip)... OFF. Proceed as in case of **HYDR** |

Main servo-control slide-valve seizure :

1. HYD switch (collective grip) OFF.
Control loads are immediatly felt :.... - on collective increase,
- on forward and left cyclic.

Aerodynamic loads to counteract may be heavy at high speed:

collective pitch : up to 20 daN to pull
cyclic : 7 to 12 daN topush left
cyclic : 2 to 4 daN to push forward.

2. Airspeed **REDUCE** between 40 to 60 kt in level flight. Proceed as in case of **HYDR**.

3.7.3 BLEED VALVE FAILURE :

When the bleed valve opens,  a flag appears on the FLI or 3-data page.

The Flag disappears when the bleed valves closes.

The bleed valve is normally open when then the engine is shut down, during starting and at low power settings.

- If the flag does not disappear at high power setting (i.e. near MCP or above), the maximum available engine power is reduced, specifically by cold weather.
- If the flag does not reappear at low power settings, the engine may surge. Avoid abrupt changes in power settings.
- Bleed valve failure results in **GOV**.

LAND AS SOON AS PRACTICABLE

3.7.4 ICS INOPERATIVE (GMA 340 H):

1. ICS OFF.
2. COM 1 Check ON, adjust volume.

NOTE 1

VHF communications will remain available for the RH pilot only via COM 1 transceiver. Audio warnings will be transmitted via the COM 1 audio system

NOTE 2

Abort or cancel hoisting operations in case of ICS failure.

SECTION 4

NORMAL PROCEDURES

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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 standardisation 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 center 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 (SECTION 8) or by a qualified mechanic complying with the Aircraft Maintenance Manual.
- Make sure that all flightworthiness-required corrective maintenance operations have been performed.
- These preflight checks can be done without opening any cowlings unless the helicopter had been parked for more than 2 days or in case of any visible leak or doubt.
- Check that the aircraft area is clean and unobstructed.
- Remove all picketing items if applicable
- Carry out the following checks :

4.2.1 EXTERIOR CHECK

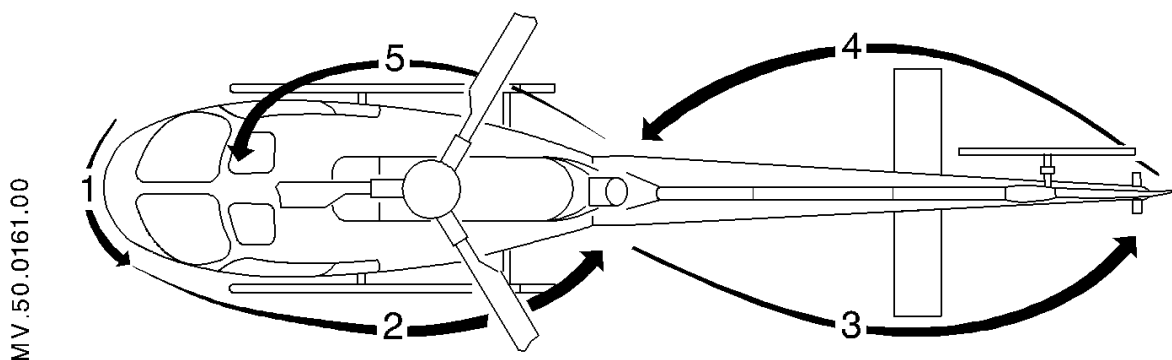


Figure 4-1 : Sequence of checks

Station 1

- Transparent panelsCondition – Cleanliness
- MGB – Engine oil cooler air inletCheck no obstruction nor debris.
- Side slip indicatorCondition.
- Pitot tubeCover removed - Condition.
- Landing lightsCondition.

Station 2

- Front door Condition, jettison system check.
- Rear door Condition, closed or open-locked (sliding door).
- Left cargo door Open.
- Loads and objects carried Secured.
- Left cargo door Closed, locked.
- Fuel tank and system Filler plug closed – Tank sump drained
- MGB cowl MGB oil level - Cowl locked.
- All lower fairing panels Locked.
- Landing gear and foot step Secure – Visual check.
- Static ports Clear, covers removed.
- OAT sensors, antennas Condition.
- Main rotor head and blades Visual inspection , no impact.
- Engine air intake Clear (water, snow, foreign object).
- Engine cowl Locked.
- Exhaust cover Removed
- Rear cargo door Open.
- Loads and objects carried Secured.
- ELT Check ARMED.
- Rear cargo door Closed, locked.
- Oil drain No oil under scupper.

Station 3

- Heat shield on tail drive Condition, attachment.
- Tail boom, antennas Condition - Fairings fasteners locked.
- Stabiliser, fin, external lights General condition.
- Tail rotor guard (if fitted) Condition, attachment.
- TGB fairing Secured, fasteners locked
- TGB oil level Checked.
- Tail skid Condition, attachment.

Station 4

- Tail rotor head.....Condition, laminated bearing.
- Checked for separation, cracks, etc.
- Tail rotor bladesVisual inspection , no impact.
- Stabiliser, fin, external lightsGeneral condition.
- Tail boom, antennasCondition - Fairings fasteners locked
- Heat shield on tail driveCondition, attachment

Station 5

- Oil drainNo oil under scupper.
- EPU door.....Closed or EPU plugged-in.
- Engine cowlLocked
- Right cargo doorOpen.
- Loads and objects carriedSecured.
- Right cargo doorLocked.
- Main rotor head and blades.....Visual inspection, no impact.
- MGB cowl.....No foreign object on transmission deck.
Cowl locked.
- Hydraulic oil levelCheck reservoir level
- Engine oil levelCheck reservoir level
- Landing gear and foot stepSecure – Visual check.
- All lower fairing panelsLocked.
- DoorCondition, jettison system check.
- External mirror (if fitted)Set to avoid dazzling (night flight).

4.2.2 INTERIOR CHECK

- CabinClean.
- Fire extinguisherSecured - Check.
- Fuses or breakersAll set.
- Loads and objects carriedStowed and secured.
- Front doors jettison systemCheck - Plastic guard condition.

4.2.3 TURNAROUND CHECK

- Overall aspect Condition, cleanliness.
- Engine / MGB / TGB Oil level.
- Main and tail rotor blades Condition.
(from ground)
- Loads Secured
- All cowlings Locked
- Doors Closed or open-locked (sliding door)
- Every 15 flight hours maximum :
 - Check engine forward and aft reduction gear magnetic plugs (without electrical indication).

NOTE

**If the aircraft is to be parked some time between flights, temporary picketing is recommended by fitting blanks, covers, and blade socks in winds above 40 kt.
In this case, perform a complete pre-flight check**

4.3 START UP

4.3.1 ENGINE PRESTART CHECK

- Seats and control pedals.....ADJUST.
- Seat beltsFASTEN.

NOTE

Copilot seat belts shall be fastened in all cases.

1. Rotor brakeRELEASE, fully forward.
2. Fuel shut-off lever.....FORWARD, plastic guard condition.
3. Twist grip.....IDLE position.
4. Hydraulic pressure switch.....ON.
5. [MASTER SW].....CHECK UP position
6. Starting selectorOFF.
7. [EXT PWR BATT.] [GEN].....ON.
8. Lighting circuits 1 and 2 testPERFORM (if night flight intended).
9. ICS and GPS nav. systemON.
10. Electrical mirror (if fitted)SET to avoid dazzling (night flight).
11. [W/LT TEST]PERFORM.
12. [FIRE/TEST]PERFORM.
13. [ACCU TEST]DEPRESS for 2 seconds, then up.

14. CWP lights CHECK:

- With battery power

GENE	PITOT	ENG P
FUEL P	HORN	MGB P
	HYDR	TWT GRP

- With EPU power Same lights as above +

BATT

15. VEMD CHECK:

- . 3-data page: no message,
- . Vehicle page: no message
- . Battery voltage > 22 V.

16. Control pedals Free travel, then left pedal 2 cm (0.8 in) forward.

17. Cyclic pitch..... CENTER, friction adjusted.

18. Collective pitch LOCK, friction adjusted.

19. Heating, demisting,
air conditioning (if fitted)..... OFF.

4.3.2 ENGINE STARTING

1. CWPCHECK **GOV**
2. [FUEL PUMP]ON
3. [A/COL Lt]ON
 - After 30 s
4. Starting selectorON position
5. Engine parameters.....CHECK
 - . Ng increases
 - . T4 remains below its limits
 - . Rotor is turning at Ng $\geq 25\%$
 - . Engine oil pressure increases
 - When Ng $\geq 67\%$
6. Warning panel.....**ENG P MGB P HYDR**
7. [PITOT]ON, **PITOT**
8. [FUEL PUMP]OFF
9. Starting selector guardLOWER

NOTE 1

In strong wind apply little cyclic into wind.

NOTE 2

If the starting procedure has to be aborted, return the starting selector to OFF, switch off the fuel pump and the generator.

NOTE 3

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

- If EPU is used :

10. EPUDISCONNECT:
GENE BATT.
Make sure EPU door is closed.

4.3.3 RUN-UP CHECK

1. All necessary systems..... ON – TEST.
(Avionics, lights, etc.)
 - When Engine oil temp. $\geq 0^{\circ}\text{C}$:
2. Twist grip FLIGHT detent.
 - When NR ≥ 340 rpm :
3. [HORN]..... ON, **HORN**.
CHECK audio warning :
 - . ON for NR ≤ 360 rpm and
 - . OFF for NR > 360 rpm.
4. NR indication CHECK in lower green range.
5. Parameters check No warning light illuminated,
Electrical system voltage and current,
Engine oil pressure.
6. Hydraulic checks :

CAUTION

If not locked the collective pitch will come up when the accumulators are depleted or when the hydraulic cutoff switch on the collective is set to OFF.

- Accumulators check :
- **Collective pitch Check correctly locked.**
- [HYD TEST]..... Depress on SCU.
- CWP Check **HYDR** + Gong sounds.
- Collective / cyclic controls..... Hands on.
- Move the cyclic control 2 or 3 times on each axes (+/- 10% of travel) and check for accumulator hydraulic assistance on pitch and roll (no control loads). Check that forces are felt on the pedals.
- [HYD TEST]..... Reset in up position.
- CWP Check **HYDR**.

- Hydraulic pressure isolation check :
- Collective pitch Check correctly locked.
- Hydraulic cutoff switch Set to OFF.
- CWP Check **HYDR** + Gong sounds.
- Check that forces are immediately felt and that cyclic can be displaced in pitch and roll with normal feedback force. Yaw pedals force should stay low (yaw load compensator effect).
- Hydraulic cutoff switch Set to ON.
- CWP Check **HYDR** in 2 to 3 sec.

Maintenance action must be performed prior to flight if this time is reduced to 1 second. (at least one of the accumulators is defective).

4.3.4 CRANKING

The cranking procedure can be performed after an aborted start or for check or maintenance purposes.

Proceed as follows :

- **Check :**

1. Start selectorOFF
2. Emergency fuel shut-off lever.....FORWARD
3. Ng.....CHECK $\leq 10\%$.
4. [FUEL PUMP].....ON.
5. [CRANK].....PRESSED IN for 20 seconds max
6. [CRANK].....RELEASED.
7. [FUEL PUMP].....OFF

CAUTION

Do not crank the engine with the emergency fuel shutoff valve closed or with the fuel pump off as this could damage the engine high pressure fuel pump.

4.4 TAKEOFF

4.4.1 BEFORE TAKEOFF CHECK

1. Doors CLOSE or OPEN LOCK
(sliding doors)
2. Cyclic and collective frictions AS REQUIRED
3. Landing light AS REQUIRED
4. Temperatures and pressures NORMAL RANGE
5. CWP All lights OFF
6. Collective pitch UNLOCK

NOTE

Adjust collective and cyclic friction 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 is forbidden above engine 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 HIGE power until IAS = 40 kt, then begin to climb so as to clear 40 ft at IAS = 50 kt.

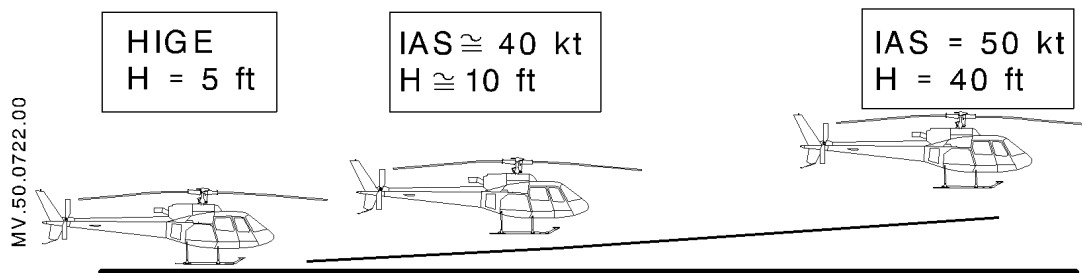


Figure 4-2 : Takeoff Procedure

CAUTION

For safe operation, takeoff path should avoid HV diagram (refer to SECTION 5).

4.5 CLIMB

Above 100 ft (30 m), for maximum climb performance, select Maximum Continuous Power and optimum climbing speed (V_y) :

$$\text{IAS} = 65 \text{ kt (120 km/h)} - 1 \text{ kt per 1000 ft.}$$

4.6 CRUISE

Fast cruise is obtained by the first limitation reached corresponding to the beginning of the FLI amber area :

Corresponding mechanical or engine limit (T_q , N_g , T_4) are pointed out with underlined numerical value.

Economic cruise : refer to SECTION 5 "Performances Data" (Not approved).

Reduce indicated airspeed in turbulence.

4.7 APPROACH AND LANDING

4.7.1 APPROACH

- Begin approach at V_y
- 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 touchdown, then fully reduce collective pitch.

CAUTION

Use of P2 air bleeds is forbidden above engine maximum continuous rating (N_g or T_4)

4.8 ENGINE AND ROTOR SHUTDOWN

1. Cyclic stick NEUTRAL
2. Collective pitch..... LOCK
3. Twist grip..... IDLE detent
4. Engine oil cooling..... WAIT for 30 seconds
5. [PITOT], [HORN], landing light.... OFF
6. Starting selector OFF position
7. [GEN] OFF
- For NR \leq 140 RPM normal NR
170 RPM maximum NR (in strong wind operations)
8. Rotor brake APPLY
- When rotor is stopped :
9. GPS navigation system..... OFF
10. [HYD TEST]DEPRESS for 2 seconds.,
re-centralize pedals if necessary.
11. [A/COL Lt] OFF
- **BEFORE LEAVING HELICOPTER**
12. VEMD CHECK for Flight Report page data :
 - Operating time (counted from Ng > 60 % until Ng < 50 %)
 - Ng and Nf cycles CHECK (written in white characters and above 0).
 - Advisory messages of **FAILURE** or **OVERLIMIT DETECTED**
13. [EXT PWR BATT.]..... OFF
14. Pitot, air intake and exhaust covers, blade socks as require.

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 40 kt (74 km/h) the helicopter must be tied down.

- **Start up**

- When the rotor begins to turn, put little cyclic stick into wind.
- As soon as $N_g > 67\%$:

Twist grip..... FLIGHT detent.

- **Run up check**

- Perform the hydraulic checks with the twist grip in FLIGHT detent and NR at nominal speed.

- **Engine and rotor shutdown**

- Perform engine oil cooling with twist grip in FLIGHT detent.

NOTE

Start up and shut down have been demonstrated up to 40 kt (74 km/h) of wind from any directions and for 50 kt (93 km/h) headwinds.

4.9.2 COLD WEATHER OPERATION

Refer to SECTION 9, supplement 4 "Instructions for use in cold weather".

Start-up procedure :

Same start-up procedure as normal (see paragraph 4.3.2) except:

- Engine oil temperature MONITOR.

- When Engine oil temperature $\geq 0^{\circ}\text{C}$

CWP CHECK **ENG P**

Twist grip FLIGHT detent

NOTE

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