Pilot Operating Handbook

Dynali H3 EasyFlyer Sport

Ultralight Helicopter

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REVISION LOG

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2	Dynali SPRL	2.4	12.11.2017
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PILOT OPERATING HANDBOOK FOR DYNALI H3 EASYFLYER SPORT

Model : _____

Serial N° : _____

Registration : _____

Type Certificate N° : _____

Aircraft builder and
type certificate holder : _____

Distribution Partner : _____

Owner : _____

NOTE

This helicopter may be operated only in strict compliance with the limitations and procedures contained in this manual. The pilot must imperatively remain within the flight envelope indicated by the instruments and by the contents of this manual.

This flight manual is designed as an operational guide for the pilot and includes all necessary information required by the regulations. It cannot be considered in any case as an instruction manual.

It also includes additional information provided by the manufacturer.

It is the responsibility of the pilot to ensure the certification and the flight condition of the helicopter. The pilot in command is the only decision maker on board, and should cancel the flight in any case of doubt.

The manual is not a substitute for competent theoretical and practical training on the operation of this aircraft. Failure to adhere to its provisions or to take proper flight instruction can have fatal consequences.

This flight manual is always to be carried on board of the aircraft and must be kept in current, up-to-date status. The latest revisions and version status is available at www.dynali.com. Extent and revision status of the manual is recorded in the revision log and the table of contents.

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SECTION 1 - GENERAL

1.1 INTRODUCTION

This manual is designed as an operating guide for pilots, instructors, and owners/operators, providing information for the safe and efficient operation of this helicopter. It includes documentation required by the competent certification authority. This handbook is not however designed as a substitute for adequate and competent flight instruction.

Pilots of this aircraft must hold a proper license, including the class rating “helicopter”, corresponding to the aircraft’s model. A special endorsement may be required to fly with passengers. It is the pilot’s responsibility to be familiar with this handbook, the special characteristics of this helicopter, and all other information and legal requirements relevant for the operation in his country. The pilot is responsible for determining that the helicopter is in a safe condition for flight, and for operation of the aircraft with in compliance with the procedures and limitations set out in this manual.

It is the owner’s/operator’s responsibility to have this helicopter registered and insured, according to country-specific regulations. The aircraft owner/operator is also responsible for maintaining the helicopter in airworthy condition. Maintenance instructions are provided in SECTION 8 of this manual as well as in the Assembly Manual.

Note that depending on the kind of operation, type of maintenance activity or component involved, the competent authority may dictate qualified personnel and/or certified facilities.

1.2 CERTIFICATION

The H3 EasyFlyer Sport is designed, tested and certified according to the French design specifications for ultralight helicopters (Code HUL) including the latest amendment published on the date of this revision, it has also been designed and tested for conformity with the British Civil Airworthiness Requirements (BCAR) and CS-VLR, although these latter two certifications have not been solicited.

The corresponding certification documents (Fiche d’identification) have been issued by the French DGAC (General Directorate of Civil Aviation).

1.3 PERFORMANCE DATA AND OPERATING PROCEDURES

The legal basis for operating a helicopter is provided by national laws and regulations. The helicopter must be operated in compliance with any technical specifications and limitations under which national approval may be conditional (e.g. Type Approval Data Sheet).

All documented performance data and operating procedures have been identified within the certification processes for this helicopter by means of ground tests, flight tests and detailed analysis.

1.4 DEFINITION OF TERMS

This manual uses “WARNING”, “CAUTION” and “NOTE” in bold capital letters to indicate especially critical and important instructions. Additionally, the color of the panel (red, yellow and grey shading) highlights the significance of the instruction.

Definitions for each term are given below.

WARNING !

A warning means that the neglect of the appropriate procedure or condition could result in personal injury or death.

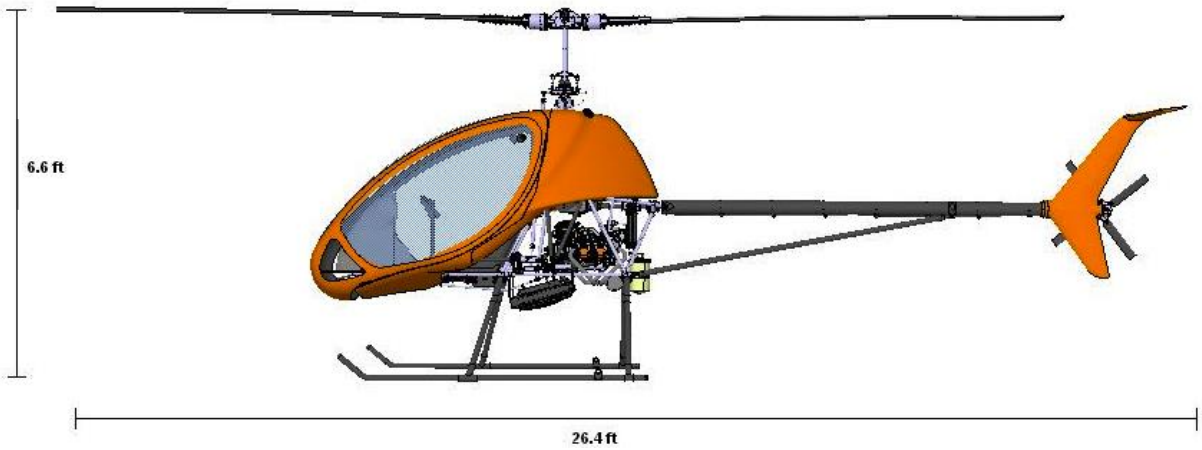
CAUTION

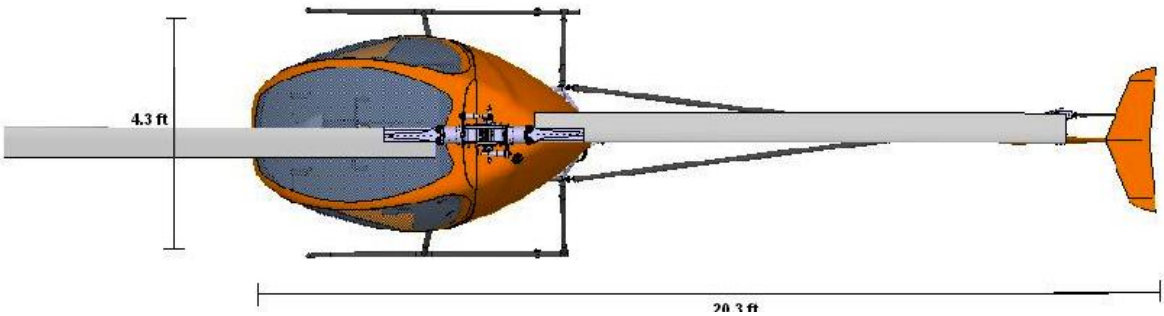
A caution means that the neglect of the appropriate procedure or condition could result in damage or destruction of equipment.

NOTE

A note stresses the attention for a special circumstance, which is essential to emphasize.

1.5 3-VIEW DRAWING OF THE H3 EASYFLYER SPORT





1.6 DESCRIPTION

The Dynali H3 EasyFlyer Sport is an ultralight two-seat helicopter in a side-by-side seating configuration. The main structure is a stainless steel chassis which frames the engine, the cabin, the tail structure and all the main and rear transmission.

The main rotor mast is made from steel and the main rotor blades are in extruded aluminum or molded carbon. The rotor head is controlled by push-pull rods through the swash plate.

The tail structure is made of an aluminum boom, supported by two carbon tail struts. The tail rotor blades are formed in carbon and are controlled by push-pull cables. The cabin cell and the stabilizer are made from vacuum infused carbon fiber and the canopy is in perspex.

1.7 TECHNICAL CHARACTERISTICS

GENERAL

Airframe length ..... **6.20 m**
Maximum Length (including main rotor) ..... **8.00 m**
Height ..... **2.50 m**
Height on wheels ..... **2.60 m**
Interior cabin width ..... **1.30 m**
Width of undercarriage ..... **1.80 m**

Empty weight..... **285 kg (standard configuration)**
MTOW (max.)..... **450 kg**

Fuel tank capacity ..... **60 L**
Regular fuel..... **Unleaded 98 or UL91**
Low level warning light ..... **15 L**
Instrument reading ..... **(1/2 = 34L) (1/4 = 22L) (0/4 = 15L)**

MAIN ROTOR

2-blade pitch articulated, semi-rigid on teetering hinge

Diameter..... **7.14 m**
Number of blades..... **2**
Blade chord..... **18 cm**
Blade twisting ..... **0°**
Blade weight..... **12 kg**
Blade tip speed at 100% of nominal configuration ..... **690 km/h**

TAIL ROTOR

4-blade, pitch articulated, rigid type without articulation

Diameter	**0.8 m**
Number of blades	**4**
Blade chord	**5.5 cm**
Blade twisting	**5°**
Blade weight	**120 g**
Blade tip speed at 100% of nominal configuration	**580 km/h**

TRANSMISSION

Main transmission and Main Transmission Gearbox (MTG)

Main Transmission	**Pulleys & Four V-belts**
Main transmission gearbox (MTG)	**90° conic spiral gearing**
Reduction ration MTG	**3.55 / 1**
Freewheel	**6.6kN - 6 rollers**

Rear transmission and Rear Transmission Gearbox (RTG)

Rear transmission	**Shaft**
Rear transmission gearbox (RTG)	**90° conic spiral gearing**
Reduction ratio RTG	**2 / 1**

Reduction ratios

Engine / main transmission shaft	**2.9 / 1**
Engine / engine gear	**2.4 / 1**
Engine / main rotor	**10.6 / 1**
Tail rotor / main rotor	**7.3 / 1**

ROTAX ENGINE CONFIGURATIONS

- 4-cylinder, four-stroke spark-ignition engine with opposed cylinders
- Liquid cooled cylinder heads
- Air cooled cylinders
- Dry sump forced lubrication with separate oil tank
- Automatic valve adjustment by hydraulic tappet
- Mechanical and/or electrical fuel pump
- Electronic dual ignition
- Electric starter (12V 0.6kW)
- Air intake system, exhaust system with muffler

H3 EasyFlyer Sport	100 CV	115 CV	115 CV
Engine	Rotax 912ULS	Rotax 912ULS-I	Rotax 914UL
Bore	1350 cm^3	1350 cm^3	1200 cm^3
Specificity	Carburretors	Injection M150	Turbo

ENGINE COOLING AND LUBRICATION

Engine coolant

Glycol diluted at 50%
Quantity..... **6L maximum**

Engine oil

Type .....**Synthetic oil with anti-friction additive for 4-stroke engine**
Capacity ..... **3.2 L**
Recommended oils ..... **Motorcycle 5W40**
Consumption ..... **0.1 L/h maximum**

Oil MTG

Type ..... **Hypoid SAE 70 to 90 (SWEPCO 201)**
Capacity ..... **0.8 L**

Oil RTG

Type ..... **Hypoid SAE 70 to 90 (SWEPCO 201)**
Capacity ..... **125 ml**

Oil in the free-wheel

Type ..... **Anti-friction additive oil FUCHS RENOLIN MR30 VG100**
Capacity ..... **40 ml**

SECTION 2 - LIMITS IN USE

2.1 GENERAL

This section contains operating limitations, instrument markings and basic placards which are required for safe operation of the helicopter, including its engine, and standard equipment or systems.

WARNING !

The operation of a helicopter demands professional pilot instruction and dedicated training on helicopters. Without valid license, the helicopter must not be operated.

WARNING !

During the entire flight, adequate rotor loading must be maintained. Do not perform any manœuvres resulting in the sensation of feeling lightness or near weightlessness.

WARNING !

Smoking on board is strictly prohibited.

CAUTION

This helicopter has been designed and tested for a safe design load at maximum gross weight. Flying at high speed in turbulent air, especially in combination with aggressive manœuvres or a steep turn, can easily create higher loads on the aircraft.

NOTE

This helicopter does not comply with the terms of the international authority for civil aviation (ICAO). There is no international common regulatory system for ultralight helicopters.

NOTE

During the certification process, all required safe loads have been successfully demonstrated with an adequate safety margin. However hard landings or landing on uneven surfaces may result in excessive loads on certain components. Following such incidents extra attention should be given during the external pre-flight check.

2.2 ENVIRONMENTAL LIMITATIONS

Minimum operating Outside Air T°, pour vol en sécurité ..... -15 °C
Maximum operating Outside Air T°, pour vol en sécurité ..... +40 °C
Maximum wind speed or gust intensity, pour vol en sécurité…..... 60 km/h
Maximum demonstrated crosswind component…… .....30 km/h (16kts)
Maximum tailwind component for take-off and landing…..30 km/h (16kts)
Maximum demonstrated operating altitude……..... 10 000 ft
Slope landing .....8° longitudinal / 4° lateral

WARNING !

Do not consider flying in the likelihood of severe weather. Thunderstorms may develop rapidly with the risk of heavy precipitation or hail, severe turbulence with strong vertical air movements, and lightning strikes. If, despite proper flight planning, a thunderstorm should be encountered, consider a precautionary landing immediately.

NOTE

It is the responsibility of the pilot / operator to make the decision if flight operation is safe.

2.3 COLOUR CODE FOR INSTRUMENT MARKINGS

Red	Operating limits (needle should not enter red during operation)
Yellow	Precautionary or special operating procedure range
Green	Normal operating range

2.4 LIMITATIONS

Max speed.....140 km/h
Speed to never exceed (VNE).....155 km/h
Speed to never exceed (VNE) without windows…….... 80 km/h

Green arc ..... 70 km/h - 140 km/h
Yellow arc ..... 140 km/h - 155 km/h
Red arc .....155 km/h

WARNING !

The VNE must never be exceeded.

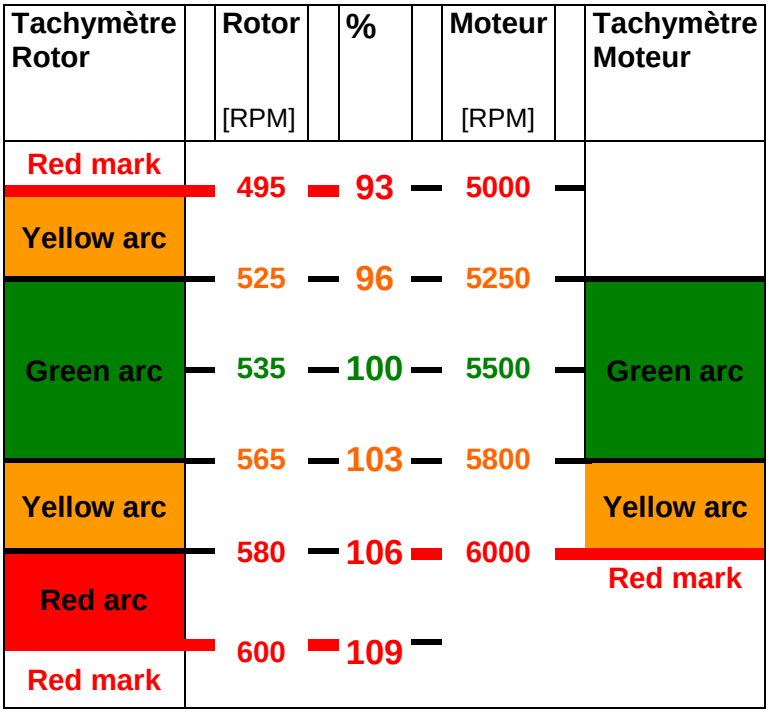
WARNING !

Depending on installed optional equipment, VNE may be lower !

WARNING !

Sudden or large forward input on the controls must be avoided at all means, even at airspeed within green arc. Do not exceed maximum speed when flying through turbulence, gusts or rough winds.

2.5 ROTOR AND ENGINE SPEED LIMITATION



CAUTION

After engine start, the engine RPM will rise to between 2500 and 3000 RPM. Clutch should only be engaged with engine idling.

2.6 ENGINE AND TRANSMISSION LIMITATIONS

Engine limits as found in the Rotax manual or its appendices take priority over information provided in this manual for information purposes.

Battery voltage

Minimum voltage ..... 12 V
Low voltage caution range ..... 12 – 12.5 V
Normal range ..... 12.5 - 14 V
High voltage caution range ..... 14 – 15.5 V
Maximum voltage ..... 15.5 V

NOTE

Some versions of the engine are equipped with two batteries. These are then identical and have the characteristics listed above

Cylinder Head Temperature (CHT°)

Minimum CHT° ..... 60 °C
Low CHT° caution range ..... 60 - 75 °C
Normal range ..... 75 - 110 °C
High CHT° caution range ..... 110 - 115 °C
Maximum CHT° ..... 115 °C

Engine Oil Temperature

Minimum oil temperature ..... 60 °C
Minimum oil temperature caution range ..... 60 – 90 °C
Normal range ..... 90 - 115 °C
Caution range ..... 115 - 125 °C
Maximum ..... 125 °C

Engine Oil Pressure

Low oil pressure warning light ..... 1 bar
Low oil pressure caution range ..... 1 – 1.8 bar
Normal range ..... 1.8 – 5 bar
High oil pressure caution range ..... 5 – 7 bar
Maximum oil pressure ..... 7 bar

Main Transmission Gearbox Oil Temperature

Normal range ..... 60 - 110 °C
Caution range ..... 110 - 125 °C
Maximum ..... 125 °C

Fuel Type

Regular fuel ..... EN 228 Super (min RON) 98 or UL91
Occasional fuel ..... AVGAS 100 LL

N.B : Green fuels such as Ethanol are prohibited. AVGAS may be used. Caution, some fuels induce knock in the cylinders and can cause piston destruction instantly.

ROTOR RPM	505	505-515	515-565	565-575	575
ENGINE RPM	1500	1500-5300	5300-5800	5800-5900	5900
VOLTS	12	12 - 12.5	12.5 - 14	14 - 15.5	15.5
CH T°	60	60 - 75	75 - 110	110 - 115	115
OIL T°	60	60 - 90	90 - 115	115 - 125	125
OIL PRESS.	1	1 - 1.8	1.8 - 5	5 - 7	7
MTG T°	0	20 - 40	40 - 110	110 - 125	125

2.7 WEIGHT LIMITS

Maximum take-off weight at sea level ..... **450 kg (UL)**
Standard empty weight ..... **285 kg**
Minimum total weight of solo pilot ..... **50 kg**
Maximum total weight of solo pilot (imperatively left hand seat)..... **125 kg**
Maximum total weight in cockpit for safe operation..... **200 kg**
Maximum weight in storage compartment..... **10 kg**

NOTE

***The maximum take-off weight (MTOW) is limited by the national regulations related to ultralight helicopters and by the engine output. See Type Approval Data Sheet.**

NOTE

Minimum crew is one pilot ALWAYS on the left seat ! Harness in the RH seat must be fastened and tight if seat is not occupied.

In most countries, the law prohibits flights with dual controls except in training flights accompanied by a qualified instructor. Without an instructor, it is necessary to remove the cyclic stick on the passenger side.

CAUTION

The flight controls must never be restricted by passenger or objects. Passengers must be briefed before the flight.

WARNING !

Always keep 1 inHg (MAP) power margin in relation to atmospheric pressure !

CAUTION

The take-off weight is the total weight of the helicopter including empty weight, optional / additional equipment, occupants, fuel and luggage at take-off. The maximum value specified above must never be exceeded.

2.8 CENTER OF GRAVITY (C.G.) LIMITS

CAUTION

The balance envelope is conditioned by the correct adjustment of the flight controls, which allow for full travel. The original settings must not be modified.

Longitudinal balance is limited between the extreme aft balance and the extreme forward balance, corresponding to the limits tested in flight.

Between the forward and aft balance limits, all variations are authorised insofar as the maximum takeoff weight is not exceeded.

Datum point..... **Rotor mast**
Extreme forward balance authorised (from the mast) .....**+136mm**
Extreme aft balance authorised (from the mast) .....**-136mm**

WARNING !

SOLO PILOT ALWAYS ON THE LEFT SEAT !

SOLO PILOT ON THE RIGHT SEAT IS PROHIBITED !

2.9 LOAD FACTOR LIMITS

Limit of safe operation positive load factor .....**+2.5g**
Limit of negative load factor ..... **Negative load factor prohibited !**

WARNING !

+2.5g can not be exceeded. Beyond that limit, dynamic stall can occur.

WARNING !

As with all 2-blade helicopters, negative load factors are strictly prohibited !!!

2.10 AUTHORISED OPERATION

Only daytime VFR flight is approved !

Night time VFR or IFR flight is prohibited !

Low-G manoeuvre is prohibited !

WARNING !

Any manoeuver resulting in a low-G condition can result in a loss of control. Always maintain adequate load on the rotor and avoid aggressive forward control input performed from level flight or following a pull-up.

Aerobatic flight is prohibited !

NOTE

Manœuvres involving bank angles of more than 60° are considered to be aerobatic flight.

Flight in icing conditions is prohibited !

NOTE

Icing may occur even at temperatures above freezing.

Operation in severe turbulence is prohibited !

2.11 NOISE LEVEL

REFERENCE MEASUREMENT	NOISE LEVEL (EPNDB)
Takeoff	71
Approach	73
Overflight	69

2.12 PLACARDS

Cabin

In view of pilot and passenger (must be installed by the customer/distributor depending on the applicable regulation) :

SOLO PILOT IN LEFT SEAT **HEAVIEST PASSENGER IN LEFT SEAT**

However, if the pilot on the right seat weighs up to maximum 20 kg more than the one on the left seat, the helicopter remains perfectly manoeuvrable.

MAX MASS SOLO PILOT	**125 KG**
MIN MASS SOLO PILOT	**50 KG**

VMAX	**140 KM/H**
VNE	**155 KM/H**

FUEL SP98 / SP95 / UL91

SECTION 3 - EMERGENCY PROCEDURES

This chapter contains all the checklists and procedures to be executed in emergency situations.

Emergencies due to defects of the helicopter or its engine are extremely rare if the aircraft is checked thoroughly before each flight and continuously maintained. If there should occur a case of emergency, the guidelines of this chapter should be followed in order to manage the emergency. However, evaluation of the situation and remedial actions to deal with it remain the responsibility of the pilot.

This ultralight helicopter, like most ultralight aircraft, is fitted with a non-certified engine. This means that there may be a higher risk of engine failure than with a certified aircraft engine, with the associated risks of damage or injury as the result of an unplanned landing. Therefore, strict compliance with the engine manufacturer's maintenance schedules, operational procedures is essential. The helicopter must always be flown with the risk of engine failure in mind, and must not be flown over any large bodies of water where a forced landing cannot be safely executed.

3.1 ENGINE FAILURE – AUTOROTATION

WARNING !

A loss of power may be caused by a failure of engine or transmission.

A change in the noise level, a yawing movement or a loss of revolutions (RPM) may indicate an engine failure.

An unusual noise, shock, alert, vibrations or serious yawing may indicate a transmission failure.

In all events, lower the collective and perform precautionary landing.

EVERY PILOT MUST BE TRAINED FOR AUTOROTATION. ALWAYS PLAN YOUR ROUTE TO REMAIN WITHIN SAFE GLIDING DISTANCE TO AREAS WHERE A SAFE FORCED LANDING CAN BE PERFORMED.

Engine failure during take-off acceleration

- Maintain directional control.
- Attempt a flare to reduce speed.
- Lower the collective.
- Make sliding landing.

Engine failure at low altitude and low speed

- Left pedal down.
- Above 5ft, slightly lower collective.
- Use collective to cushion contact with the ground.
- If insufficient speed to make a quick stop make sliding landing.

Engine failure above 500ft

- Lower the collective completely and immediately initiate autorotation.
- Cut the throttle and push the left pedal down.
- Maintain the speed around 70 to 100 km/h, with 100% rotor RPM.
- Use collective to maintain rotor RPM.
- Select landing point facing into wind.
- Approaching the ground, act on the cyclic stick to flare and reduce rate of descent WITHOUT RISING THE COLLECTIVE.
- At around 10ft, push the cyclic forward to bring the machine to horizontal and raise the collective to halt the descent.
- Preferably land into the wind.

WARNING !

The first “hold” is necessary to reduce the rate of descent. A rotor can only support +2.5 to +3G ; beyond this limit, the helicopter risks “passing through” the flare, i.e. the sink rate is not sufficiently reduced and the machine impacts the ground.

Training procedure for autorotation

Immediately after engine failure :

- Lower collective to lower stop.
- Reduce throttle.
- Reach and maintain airspeed of 70-100km/h.
- Manage rotor RPM during descent to keep 100%
- Approaching the ground, start to flare by acting on the cyclic without touching the collective.
- Maintain heading to ensure that on impact with the ground there is no sideways movement.
- In completing flare, flatten out and start to provide lift with the collective without causing the machine to climb.

NOTE

This is the most common safety procedure that must be performed naturally. It is strongly advised to learn to perform this operation as often as possible, in order for it to become completely reflexive.

NOTE

It is strongly recommended to practice emergency procedures regularly, preferably with a qualified flight instructor.

3.2 FORCED DITCHING

- Autorotation procedure until contact with water.
- Lay the helicopter down on the left as soon as contact has been made with water in order to stop the rotation of the main rotor.
- Detach the safety belts and evacuate the cabin rapidly as soon as possible.

3.3 EMERGENCY EVACUATION

CAUTION

In normal circumstances, occupants should never leave the helicopter while the rotors are turning. If abandoning the aircraft in an emergency, the pilot should turn off the engine and turn the master switch OFF if this can be done without endangering the occupants.

If leaving the aircraft with the rotor turning, the occupants should follow a path in line with the nose of the helicopter, to minimise the risk of being injured by a rotor.

Occupants should be briefed before flight on emergency evacuation procedures, including :

- Actions to be taken in the event of a forced landing
- Operation of the seat harness
- How to open the doors
- How to safely exit and move away from the aircraft

3.4 TAIL ROTOR OR TRANSMISSION FAILURE IN TRANSLATION

- Sudden yaw to the left cannot be controlled with the right pedal if the airspeed is below 100km/h. Above 100km/h, the vertical stabilisers remain efficient enough to maintain heading (with slight deviation however).
- Initiate autorotation immediately and then adjust power.
- Maintain 110 km/h so that the vertical stabilisers keep efficient and assist in keeping heading.
- Close throttle to idle and slightly increase collective. Hold the cyclic to the right to limit sideslip.
- On final, throttle to idle and sliding landing under autorotation.

3.5 TAIL ROTOR OR TRANSMISSION FAILURE IN HOVER

- Sudden yaw to the left cannot be controlled with the right pedal.
- Keep machine horizontal and raise collective to cushion impact.
- Cut the throttle immediately.

3.6 ENGINE FIRE/SMOKE ON GROUND

- Both magnetos OFF and master switch OFF to shut-down engine and fuel pumps.
- Evacuate the aircraft.
- Extinguish the fire with an extinguisher, a fire hose, or a woollen blanket, sand or earth.

3.7 ENGINE FIRE/SMOKE IN FLIGHT

- Open ventilation for fresh air.
- Initiate emergency descent under autorotation.
- Perform emergency call, if time and situation permits.
- Continue procedure as described in “Engine failure”
- Finish procedure as described in “Engine fire/smoke on ground”

3.8 LANDING INTO TREES OR HIGH VEGETATION

- Assume the surface of treetops or vegetation as level.
- Plan touch-down and flare with minimum ground speed and minimum rate of descent.
- Plan the contact with a positive pitch attitude (not horizontal)
- Shut down engine by switching magnetos OFF and master switch OFF.

3.9 LOSS OF VISIBILITY

In case of canopy misting, open air vents and lateral sliding vents to ensure proper ventilation. If the situation cannot be corrected or occurs suddenly, such as after a bird strike or canopy icing, maintain safe altitude by visual reference to the sides, using the open sliding window, if necessary. Stabilize the aircraft and land at the nearest suitable place.

3.10 GOVERNOR FAILURE

- Use the throttle to maintain rotor RPM manually and land using an average angle approach. The throttle control must be used to ensure full power and RPM.

WARNING !

The pilots must be trained to control the throttle manually !

3.11 ALARM AND WARNING LIGHTS

General (Red)

The GEN light indicates that there is no voltage being supplied from the regulator circuit to the battery. In general, it means that there is a failure in generating current to the electric components. The failure can be either from the engine alternator, the engine regulator or the battery.

- Land immediately.

WARNING !

If the generator fails, the engine continues running but you should land as soon as possible as the electrical components may cease operating.

Required actions :

- ***Rotax 912ULS***

If GEN warning is alight, switch off all unnecessary electrical systems and land at the nearest place. The battery is expected, in good condition, to provide 15 minutes of reserve power to supply the aircraft instrumentation, avionics and fans, after which time electrical equipment may cease to function. If maintaining translation flight, Oil T° and Coolant T° may continue to show nominal values.

- ***Rotax 912ULS-I (injection system)***

If GEN warning is alight, the battery is expected, in good condition, to provide 15min of reserve power to supply the aircraft fuel pumps, instrumentation, avionics and fans, after which time electrical systems, including fuel pumps may cease to function Be prepared for an engine failure.

- ***Rotax 914UL (turbo)***

If GEN warning is alight, switch off all unnecessary electrical systems and land at the nearest suitable place. The battery is expected, in good condition, to provide 15min of reserve power to supply the aircraft fuel pumps, instrumentation, avionics and fans, after which time electrical systems, including fuel pumps, may cease to function. The TCU (Turbo Control Unit) will not be powered anymore and will remain in whatever position it was when power was lost – so mixture and manifold pressure control will also be lost. Take care to use minimum power required to land safely to prevent engine damage.

CAUTION

The Rotax 914UL (turbo) is fed by two electrical fuel pumps. The engine is controlled by a Turbo Control Unit (TCU). The probability of an electrical failure is of a very low order but any failure can cause the engine to stop.

The Rotax 912ULS-I (injection system) is fed by two electrical fuel pumps. The engine is controlled by an Engine Control Unit (ECU) and is fuel injected. Various sensors send permanent data to the ECU. The probability of an electrical failure is of a very low order but any failure can cause the engine to stop.

Low RPM rotor (White) + Audio alarm

- Lower the collective and override the governor with the throttle grip to recover rotor RPM immediately.

- If you are close to terrain and can not recover RPM by opening the throttle, land at the nearest suitable spot.

CAUTION

In any case, you should not follow your initially planned approach if you have a Low RPM warning.

Fuel (Orange)

This warning will light up when there are 15L of fuel remaining. The engine will run dry after about 45 minutes of operation at nominal power.

- Land within 30 minutes (no emergency).

MTG (Orange)

This warning lights up if metallic particles are detected in the main transmission gearbox.

- Land within 5 minutes (no emergency).

RTG (Orange)

This warning lights up if metallic particles are detected in the rear transmission gearbox.

- Land within 5 minutes (no emergency).

ECU (Red) – Rotax 912ULS-I Injection system

NOTE

This indicator lights up at start-up for 3 seconds, for the internal check.

It can light up, undifferently, when :

- Air intake temperature exceeds 60°C
- Coolant temperature exceeds 118°C
- Fuel pressure below 2.2bar or above 3.5bar
- Oil temperature exceeds 140°C
- Oil pressure below 0.8bar
- Battery voltage below 12V / above 15V
- Internal ECU T° exceeds 70°C
- MTG temperature exceeds 125°C

- Land immediately.

Pump 2 (Orange) – Rotax 912ULS-I Injection system

This indicator lights up when Pump 2 starts, which means that Pump 1 has a failure.

Fan 1 (Green)

This indicator lights up when Fan 1 thermo switch has closed and Fan 1 is activated. Monitor engine instruments and register the higher electrical power consumption. If possible, reduce engine power and increase speed.

Fan 2 (Green)

This indicator lights up when Fan 2 thermo switch has closed and Fan 2 is activated. Monitor engine instruments and be aware of the higher electrical power consumption. If possible, reduce engine power and increase speed.

SECTION 4 - NORMAL PROCEDURES

This section contains check list items, instructions and procedures for the normal operation of the helicopter. However, these procedures do not replace the pilot's appreciation of any specific situation.

The pilot shall be familiar with the aircraft limitations detailed in SECTION 2 of this manual and shall have performed proper flight planning considering required legal aspects, as well as SECTION 5 and SECTION 6 of this manual. The use of check lists as provided in this Pilot Operating Handbook is mandatory for safe operation.

4.1 DAILY OR EXTERNAL PRE-FLIGHT CHECKLIST

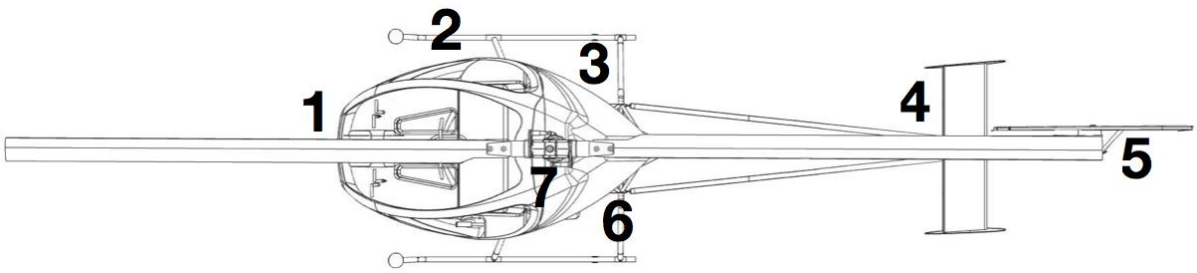
All daily or pre-flight check list items consist of visual checks and does not replace professional mechanical inspection and maintenance. The following check list applies for the all versions of the H3 EasyFlyer 'Sport', with notations covering the engine variants.

Note that depending on optional equipment installed, it is recommended for the owner/operator to add any appropriate items to suit his specific configuration.

4.1.1 Before pre-flight check

- Check that nothing can be sucked into the rotors (clothes, pollution,…).
- No human or animal presence closer than 20m.
- Check weather condition (wind speed and direction, no snow/ice).
- There should be no obstacles and sufficient clearance in departure zones.
- Check documentation is complete.

4.1.2. Complete pre-flight check of the helicopter



Station 1 (cabin)

- Perform complete walk around, check and observe everything.
- Check that the pitot tube is oriented forward.
- Check the cabin straps properly attached.
- Check the cleanliness of the windshield.

- Check the condition of the door hinges.
- Check the wool thread.

Station 2 (skids and lateral cabin)

- Check that the wheels are removed or locked on the undercarriage.
- Check that the horizontal pitch rod, under the chassis has sufficient clearance from the skids.
- Check for oil, coolant or fuel leaks on and below the engine and transmissions.
- Check the condition of the skids (no cracks, no excessive wear).

NOTE

Skids may have a slight bend in the center section (see SECTION 7)

Station 3 (engine, RH side)

- Carburettors and their venting hoses, cups, injection collector, filters, tanks and hoses are firmly attached, dry, without any trace of leak or fuel and the collars are tight. (Rotax 912ULS & 914UL).
- The throttle and choke (Rotax 912ULS & Rotax 914UL) springs are in perfect condition.
- The turbocharger is properly attached (Rotax 914UL)
- The intake butterfly is properly attached (Rotax 912ULS-I)
- No trace of wear on the drive pulley (on engine).
- Check inner and outer condition of the drive belts and check that no foreign objects can obstruct them.
- Check the tension of the belts.

CAUTION

Drive belts must be tensioned to the recommended value. In case of doubt, see the maintenance manual for adjusting the tension of the belts.

If they are too tight, the engine will immediately engage the rotor at start-up which may cause engine stall.

If they are too loose, belt slipping may be noticed during flight.

NOTE

After the first hours of use of the belts (following delivery or after maintenance replacement), the tension should be re-adjusted.

- Check that the belt guides are parallel to the belts.
- No deformation of the rubber coupling attachment (the main transmission shaft has not moved to the rear).
- Check the shaft bearing and the pressure screws.
- Check the absence of leak on the freewheel.
- Check the tightening rings (pulley and shaft bearing).
- Check the water level in the water expansion tank.

Station 4 (stabilizer)

- For early models, check no objects are left lying on the stabilizer
- Check the attachments carefully.
- Check the vertical stabilizers.
- Check the attachment of the tail struts and of the tail tube.

Station 5 (tail rotor)

- Check for leaks and oil level in the Rear Transmission Gearbox.
- Check the Telatemp.
- Check appearance of tail rotor blades.
- Test the full pitch on rotor blades.
- Test the full travel of the rear rotor control cables.
- Check the six studs and their locking wire.
- Check the attachment of the cable bracket.

Station 6 (engine, LH side)

- On the fuel tank, check the fuel level, filler cap closed, both taps open, filters clean, no trace of leak, bottom dry.
- Check that there are no leaks below the Main Transmission Gearbox.
- Check the Telatemp.
- Check the three control marks are aligned (on the base of the mast).
- Check that there are no cracks on the exhaust.
- On radiators and fans, check for grass or debris and check for leaks.
- Check all attachment collars for the radiators.
- Check receiving pulley for signs of wear and check there is no oil leak.
- Check the oil level in the oil tank (do not fill above the maximum level).
- Check for fuel smell.

Station 7 (main rotor)

- Remove the parking strap from rear facing rotor.
- Check the rotor blades along their full length (leading and trailing edge).
- Check the attachment of the blade tips.
- Check the upper and lower surface of blades.
- Check the absence of any damage.
- Check the cleanliness.

NOTE

The cleanliness of the rotor blades may have important effect on the performance of the helicopter.

- Check the free tilting of the rotor.
- Check the tilt stop on the nylon ring.
- Check the free movement of the pitch rods.
- Check all ball joints on the swash plate (greased, not bent).
- Check the condition of the bellows.
- Test the sliding movement of the swash plate.
- Check the condition of the sliding guide.
- Check the absence of cracks and the correct attachment on the mast of the drive collar.
- Check the absence of leaks at the blade roots (if any, clean).

4.2 STANDARD CHECKLIST FOR H3 EASYFLYER 'SPORT'

BEFORE ENGINE START CHECKLIST

HELICOPTER CONDITION ..... AIRWORTHY
FUEL QUANTITY ..... _____LTS / GAL
RANGE ..... CALCULATED
WEIGHT & BALANCE ..... CHECKED
DOCUMENTATION ..... PREPARED
CANOPY ..... CLOSED AND LATCHED
CABIN ..... NO LOOSE OBJECTS
SEATBELTS ..... FASTENED
ALL FLIGHT CONTROLS ..... CHECK FULL TRAVEL
GENERAL SWITCH (IF INSTALLED) ..... OFF
LEFT HAND COLLECTIVE ..... FULL DOWN
CENTRAL COLLECTIVE ..... IN CONTACT WITH LOWER STOP
MAXIMUM MANIFOLD PRESSURE ..... MAX_____inHG
ALTIMETER ..... SET
INSTRUMENTS ..... CHECKED
ALL SWITCHES ..... OFF
BREAKERS ..... PUSHED IN
THROTTLE ..... IDLE
DUAL CONTROLS ..... ONLY IF INSTRUCTION FLIGHT

ENGINE START CHECKLIST

GENERAL SWITCH (IF INSTALLED) ..... TURNED ON
MASTER KEY ..... ON
IGNITION ..... BOTH ON
GOVERNOR SWITCH ..... ON
ROTOR AREA ..... CLEAR
CHOKE (ROTAX 912ULS & ROTAX 914UL)..... PULL
STARTER ..... ENGAGE (2200 – 3000 RPM)
OIL PRESSURE..... MINIMUM 1,5 BAR
CHOKE (ROTAX 912ULS & ROTAX 914UL)..... OFF
CLUTCH..... ENGAGE (ON/OFF/ON/OFF)
CHT° ..... WAIT FOR 70°C
MAGNETOS..... CHECK (MAX. DROP 10%)
RPM ..... INCREASE TO 100% RPM
NEEDLE SPLIT (FREEWHEEL) ..... CHECKED
SWITCH LOW RPM..... ON + CHECK LIGHT & HORN LOW RPM
ENGINE RPM ..... INCREASE TO 100% RPM
WARNING LOW RPM..... OFF
GOVERNOR ..... PUSH ON (5500 / 5800)
CHT° ..... MIN 70°C – MAX 120°C
OIL T°..... MIN 60°C – MAX 130°C

NOTE

In very cold climatic conditions, the engine should be run up with rotors turning at 100% to heat the transmission before takeoff.

TAKE OFF CHECKLIST

WARNING LIGHTS..... ALL OFF
AVIONICS..... ON
FUEL..... CHECKED
RPM ..... BOTH 100 TO 106 %
HOVER ..... CHECK POWER AND STABILITY DURING 30 SEC
VIBRATIONS & NOISE..... NO ABNORMAL LEVEL
WIND DIRECTION..... CHECKED
WEIGHT & BALANCE..... CHECKED
CONTROLS ..... NORMAL & FREE
CHT° ..... MIN 70°C – MAX 120°C
OIL T°..... MIN 60°C – MAX 130°C
OIL PRESSURE..... MIN 1,5 BAR
INSTRUMENTS ..... ALL GREEN

CAUTION

Perform take-off into the wind and with least possible crosswind component.

TRANSITION .....INCREASE SEPEED & CONTROL TRAJECTORY
SPEED .....MINIMUM 80 KM/H BEFORE CLIMB

WARNING !

The so-called “dead man’s curve”, shown in the height-speed diagram should be constantly kept in mind. Both on takeoff and landing,the areas indicated in the diagram should be avoided.

CRUISE CHECKLIST

COLLECTIVE ..... ADJUST
CYCLIC .....KEEP IN HAND
INSTRUMENTS .....CHECKED
EXTERNAL .....PERMANENT VIGILANCE
RPM ..... MONITOR

LANDING CHECKLIST

WIND DIRECTION .....CHECKED
WARNING LIGHTS .....ALL OFF
INSTRUMENTS ..... ALL GREEN
FUEL .....CHECKED
AIRSPEED .....80 – 100 km/h
AFTER TOUCHDOWN .....COLLECTIVE FULL DOWN

NOTE

Where possible, always opt for an upwind approach and check wind direction during your observation of planned landing zone.

ENGINE SHUT DOWN PROCEDURE

AFTER TOUCHDOWN ..... COLLECTIVE FULL DOWN
GOVERNOR ..... OFF
THROTTLE ..... FULL IDLE
CLUTCH..... OFF AFTER 3 MIN (BELT T°)
LOW RPM WARNING..... OFF
T° ..... COOL DOWN FOR 2 MIN
AVIONICS..... OFF
IGNITION ..... BOTH OFF
MASTER KEY ..... OFF

CAUTION

On shut down, do not brake the rotor by raising the collective.

When left free, the wind may cause the rotor to swing over to head height. The pilot should survey the aircraft's surroundings and hold the cyclic to prevent the rotor swinging over.

WARNING !

Mind the spinning rotor close to obstructions or persons. A fast turning rotor is almost invisible.

Do not vacate the helicopter until rotor is at a complete stop.

It is mandatory to keep controls neutral during rotor deceleration !

CAUTION

Having shut down the engine, observe the time that it takes for the rotor to stop. If rotor RPM fall off unusually quickly there may be a transmission problem.

NOTE

To test belt tension, a sudden increase on the throttle in hover shows correct tension (if rotor and engine RPM remain synchronized).

NOTE

If the fuel level is low, lower the tail to check the LOW FUEL level sensor.

SECTION 5 - PERFORMANCE

The following data were determined by flight testing and demonstrated with average piloting skills, with engine and aircraft in good condition, as well as clean main rotors

The parameters apply to standard conditions (15°C at sea level and standard pressure) and a gross weight of 450kg.

Note that a higher airfield elevation, increased temperature and/or low air pressure will have a negative effect on performance.

5.1 GENERAL

WARNING !

Always keep at least 1'' inHG (MAP) in relation to atmospheric pressure.

NOTE

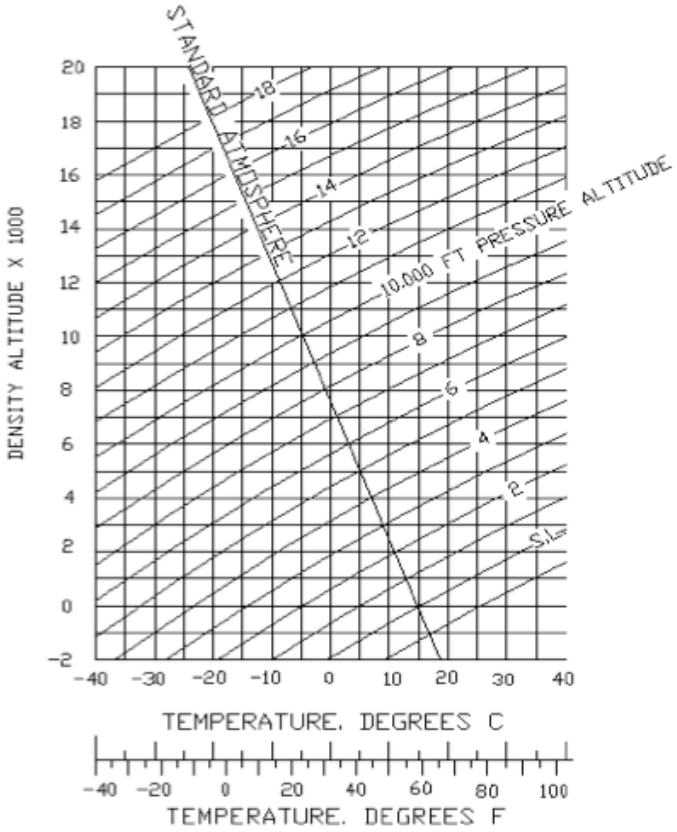
Satisfactory engine cooling has been demonstrated at outside air temperatures up to 35°C. If needed for hotter climates, an additional oil radiator can be installed.

The owner/operator must remain within the normal operating temperatures. Duration of hover flight is limited by the engine temperature.

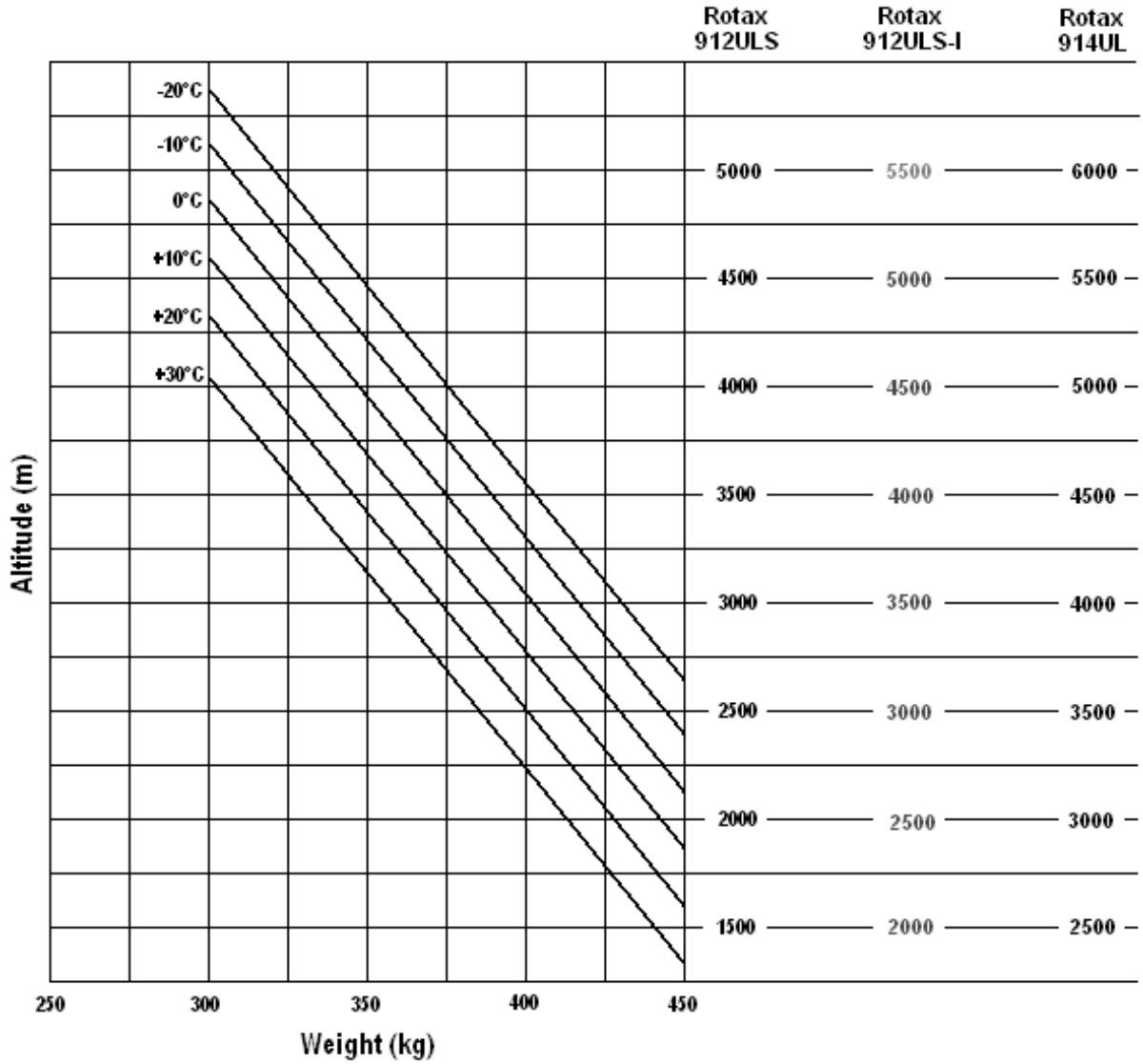
NOTE

Information regarding performance indicated in this chapter was obtained under optimal flight conditions. Performance shown under other conditions may vary substantially from this.

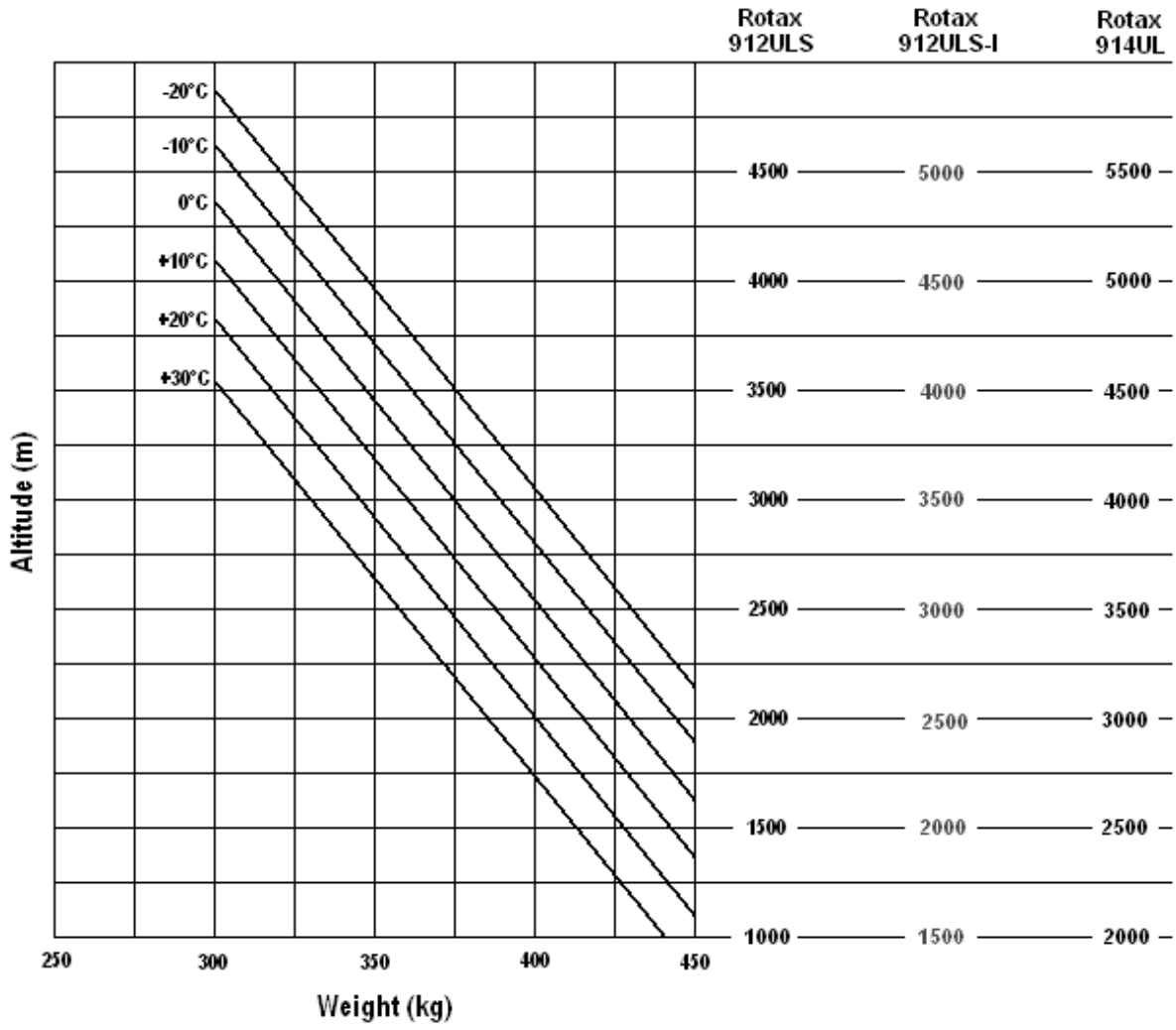
5.2 ALTITUDE DENSITY DIAGRAM



5.3 HOVER IN GROUND EFFECT



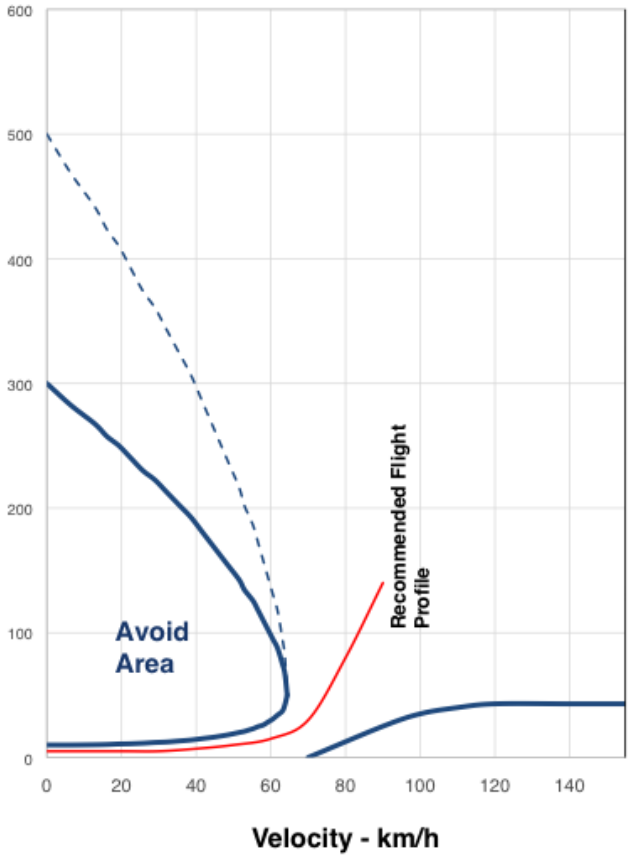
5.4 HOVER OUTSIDE GROUND EFFECT



5.5 HEIGHT-SPEED DIAGRAM

This diagram indicates combinations of height and speed (avoid area in blue) where a safe landing may not be possible in case of an engine failure.

Take-offs and landings should always be conducted according to the recommended flight profile, provided as blue dashed line.



Rate of climb and glide ratio

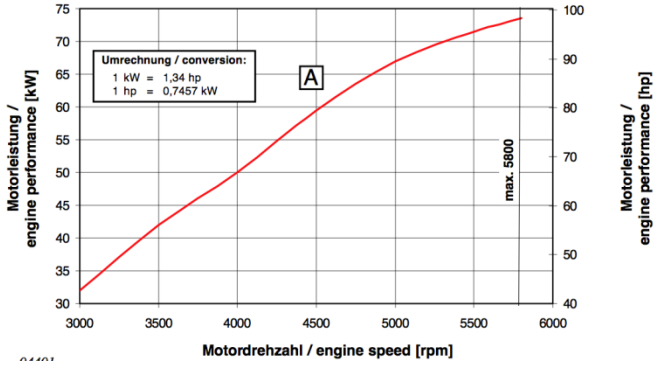
Rate of climb, (450 kg) V_Y ..... 1100 ft/min
Speed for best angle of climb V_X..... 80 km/h
Speed for best rate of climb V_Y ..... 85 km/h
Best glide ratio, (450 kg – 80km/h)..... 2 : 1

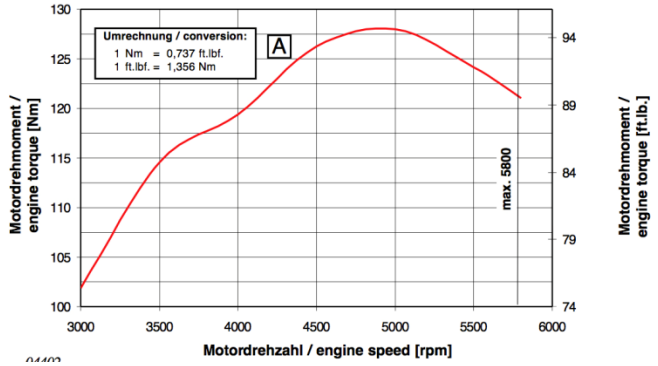
5.6 ENGINE PERFORMANCE

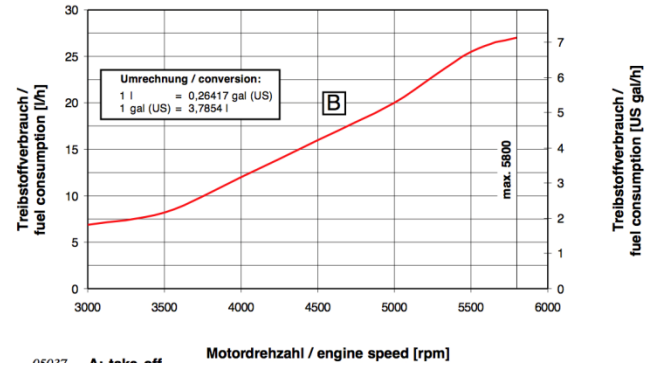
Please refer to Rotax 912ULS engine manual to find performance curves.

Performances Rotax 912ULS

Max. power (5 minutes)	100 HP / 73,5 kW @ 5800 RPM
Max. power (continuous)	95 HP / 70,0 kW @ 5500 RPM
Max. torque	128 Nm @ 5000 RPM

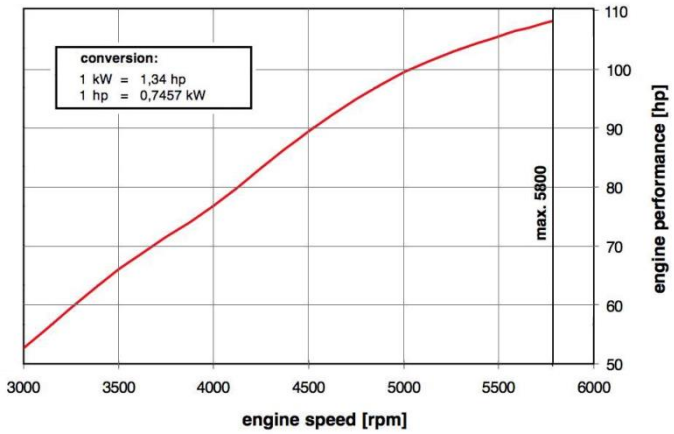


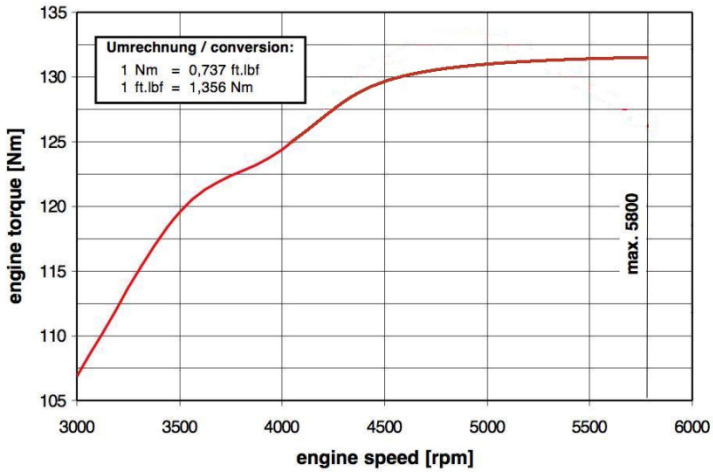


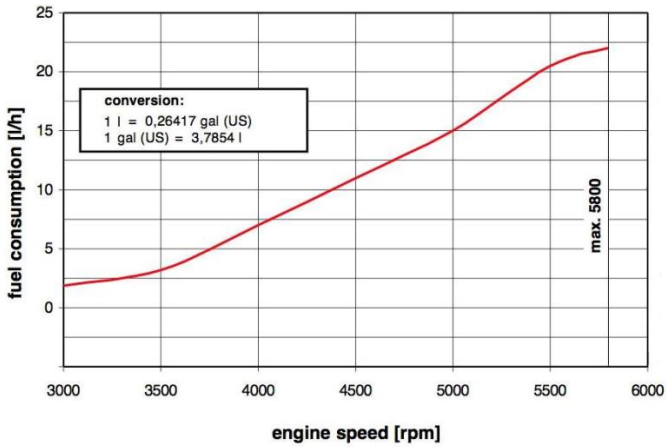


Performances Rotax 912ULS-I

Max. power (5 minutes)	110 HP / 81 kW @ 5800 RPM
Max. power (continuous)	105 HP / 77 kW @ 5500 RPM
Max. torque	133 Nm @ 5000 RPM

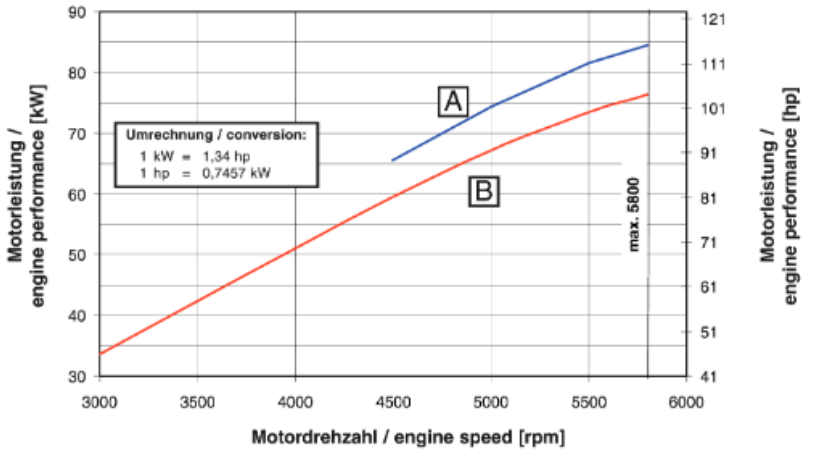


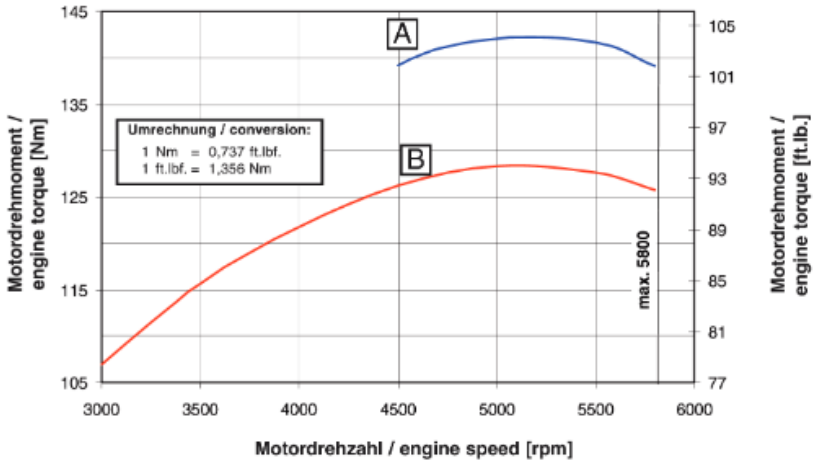


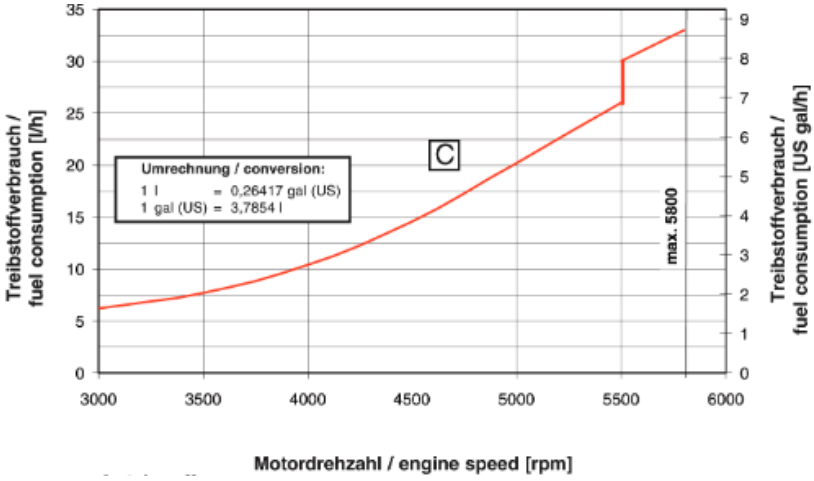


Performances Rotax 914UL

Max. power (5 minutes)	115 HP / 85 kW @ 5800 RPM
Max. power (continuous)	111 HP / 77 kW @ 5500 RPM
Max. torque	144 Nm @ 5000 RPM







SECTION 6 - WEIGHT AND BALANCE

The helicopter must be operated within the weight and balance limits as specified in SECTION 2 of this manual. Loading situations outside these limits can result in restricted flight control and can ultimately lead to degraded safety.

6.1 EMPTY WEIGHT ET BALANCE

The empty weight of a Dynali H3 EasyFlyer 'Sport' helicopter includes :

- Basic flight equipment
- Engine oil, transmission gearbox oils
- Coolant liquid
- The quantity of unusable fuel

The empty weight and the empty C.G. must be measured for each Dynali H3 EasyFlyer 'Sport' helicopter, once assembly is completed. The empty weight may not in any case (except for options) exceed the standard reference empty weight as indicated in this manual.

Maximum takeoff weight at sea level ..... **450 kg (UL) / 600 kg***
Standard empty weight ..... **285 kg**

Datum ..... **Rotor mast**
Forward balance limit in relation to datum..... **136 mm**
Aft balance limit in relation to datum ..... **-136mm**

Minimum total weight of solo pilot ..... **50 kg**
Maximum total weight of solo pilot (imperatively left hand seat)..... **125 kg**
Maximum total weight in cockpit for safe operation..... **200 kg**
Maximum weight in storage compartment..... **10 kg**

NOTE

The owner/operator must refer to SECTION 2 of this manual to have complete information about the weight and balance limits.

Exceeding these limits may lead to an insufficient amplitude in the flight controls.

6.2 PROCEDURE FOR WEIGHING THE HELICOPTER

Preparation of the aircraft

- Purge the fuel.
- Check oil levels.
- Check that all equipment included in the basic configuration are correctly installed.
- Check the cleanliness of the aircraft and remove any foreign body.

Method to determine empty C.G. position and empty weight

- Place a water level on the rotor mast or on the tail boom.
- Hang the helicopter from a hoist.
- **Note the empty weight _____kg.**
- Place a tube under the skids, perpendicular to the helicopter.
- Lower the helicopter on the tube.
- Roll the helicopter on the tube until finding the equilibrium (tail tube at 0°).
- Measure the distance between the tube under the skids and the rotor mast.
- **Note the empty C.G._____kg.**

6.3 CALCULATION OF WEIGHT AND BALANCE

For each part of a helicopter there is an associated weight expressed in kilos and a moment in relation to the datum point (the rotor mast) expressed in kg*m. This moment corresponds to the weight of the part multiplied by the distance from the centre of gravity of the part by reference to the datum.

Before each flight you should :

- Check that the position of the C.G. of the Dynali H3 EasyFlyer ‘Sport’, as it will be on takeoff, is within the fore and aft balance limits.

- Ensure that the takeoff weight of the Dynali H3 EasyFlyer ‘Sport’ does not exceed the maximum authorised takeoff weight.

These two conditions are met if the point defined by the takeoff weight and the position of the C.G. are within the range of the longitudinal CG (see figure showing longitudinal balance range). If either of these conditions is not met, pilot/operator must cancel the flight.

The table below sums up the weights and distances from the datum and the moment associated with the various parts of the helicopter and its payload.

ITEM	WEIGHT (KG)	DISTANCE % DATUM (MM)	MOMENT (KG.MM)
Standard empty weight	280	-136	-38080
Passenger	W_{PAX}	606	W_{PAX} x 606
Useable fuel (0.7 kg/l)	W_{FUEL}	-170	W_{FUEL} x 170

CAUTION

The solo pilot must weigh at least 50 kg. Below this weight the rear balance limit is exceeded. Below this weight, ballast must be added to maintain an equivalent of 50 kg minimum on the passenger seat.

CAUTION

The maximum weight of the solo pilot is 125kg.

WARNING !

THE SOLO PILOT MUST IMPERATIVELY TAKE THE LEFT HAND SEAT !

6.4 WEIGHT SHEET

INDIVIDUAL WEIGHT SHEET	***DYNALI H3 EASYFLYER 'SPORT'***	
DATE	**N° AIRFRAME** (S/N)	**REGISTRATION**
OWNER		
NAME	ADDRESS	
PLACE OF WEIGHING		
METHOD OF WEIGHING		
EMPTY WEIGHT		**kg**
POSITION EMPTY CG % DATUM*		**mm**
at …….. mm in front of wheel axles		
= …..... mm rear of axis of rotor mast		
**Datum = axis of rotor mast*		
NOTES		
The empty CG measured at ……mm aft of the mast axis, i.e., forward of**, aligned with**, aft of** the standard CG of the H3 'Sport' (located at 136 mm behind the mast axis)		
* *delete where not applicable		

6.5 LATERAL BALANCE

The Dynali H3 EasyFlyer 'Sport' is equipped with dual controls. Apart from solo flights, for which the pilot must be in the left hand seat, the Dynali H3 'Sport' may be flown from the left or the right hand seat. In order to guarantee the easy piloting of the aircraft, the left hand side must always be heavier than the right hand side.

The condition for balancing the aircraft to compensate for the thrust of the tail rotor is 13 kg more on the left hand seat (**) so that the rotor mast is vertical in hover. However the aircraft remains maneuverable, although listing.

(**) This explains the obligation for the solo pilot to take the left hand seat.

WARNING !

Minimum weight of solo pilot in left hand seat : 50kg

Maximum weight of solo pilot without ballast in right hand seat : 125 kg

When flying with two people onboard, place the heavier person on left hand seat.

NOTE

The maximum acceptable weight of 125kg on the left hand seat corresponds to the limit of travel of the cyclic to maintain acceptable manoeuverability. Above 125 kg in the left hand seat, additional ballast in the right hand seat must be added, corresponding to the weight of the pilot relative to 125 kg.

SECTION 7 - SYSTEMS

The purpose of this chapter is to introduce the pilot who has not assembled his Dynali H3 EasyFlyer 'Sport' to the various systems forming part of this helicopter.

Further information can be found in the assembly manual. We advise all pilots to read through this in order to better understand the design and mechanics of the Dynali H3 EasyFlyer 'Sport'.

7.1 CHASSIS & UNDERCARRIAGE

The basic protective structure of the chassis is made from **welded tubular stainless steel** tubes to provide maximum **passive safety for the crew**. The tubes are all connected to each other by TIG welding. **The main tubes are all of a diameter 25mm with a thickness of 2mm**, providing thus **excellent resistance to fatigue**, inspite of a higher mass (total weight of the chassis is around 25kg). In addition (and mostly for check), **a pressure indicator is located at the aft of the chassis**. As long as the green indicator can be seen, there is pressure in the chassis. If it disappears, it means that there is a loss of pressure in the chassis.

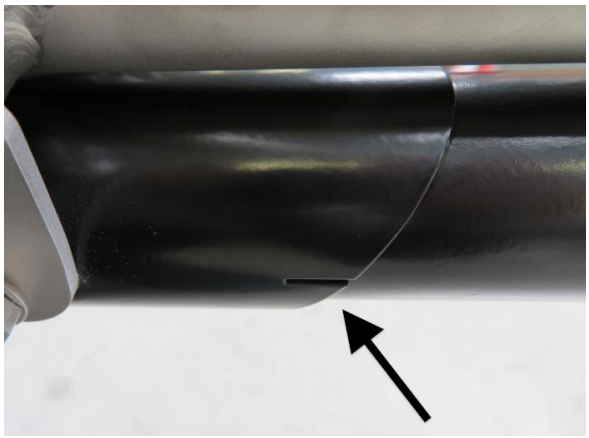
Nominal pressure = 3 bar

Pressure lost

The possible leak can come either from the valve, or, in the worst case, from a crack in the chassis. In any case of doubt, inflate pressure in the chassis and search for the origin of the leak.

The undercarriage is made of aluminum and stainless steel tubing. It is of shock absorbing design with two legs designed for progressive deformation on each side (passive safety). The two black balls (or metal inserts as from 2016) located in the front are necessary to avoid vibration of the skids. They can be removed but vibration of the skids may be observed in certain flight conditions. The two central tubes of the skids (that bond left and right side) can bend in a curve, giving some flexibility to the undercarriage. Deformation of these central tubes may not exceed 17mm at the midpoint.

The stainless steel sleeves have a small slot in the middle. It enables the sleeves to open under shock, preventing the breaking of the aluminum legs.



The tail boom of the Dynali H3 EasyFlyer 'Sport' is made of aluminum. It is supported by two carbon struts.

The cabin body is made from vacuum-infused carbon fiber but **has no structural role.**

7.2 ENGINE & ENGINE MOUNT

The engine mount is made from stainless steel. It is mounted on two silentblocs which damp the vibrations throughout the airframe and is **suspended on two rods which act as a clutch by lowering** (for tensioning the belts) **or raising the engine** (releasing the belts). When tensioned, the system is automatically locked (rods are on the other side of the tensioner axis).

Different engines can be installed in the H3, all based on the 900 series of BRP ROTAX :

From this engine, Dynali can offer three different engine configurations :

- The **Rotax 912ULS 100HP**, which is suitable for pilots who have a sound mastery of power management. This engine is equipped with two carburettors and is well known and very popular on account to its simplicity and reliablity. However, the useful payload is limited due to the reduced power reserve.

- The **Rotax 912ULS-I 110HP with INJECTION**, which provides additional horsepower thanks to the ECU controlled electronic injection system and increased air supply through the manifold intake. This configuration has been bench tested by Rotax Germany in additional to many hours of flight tests by Dynali. The advantage of this solution is that it provides an improved air supply to the cylinders thus maintaining the torque at high RPM, without increasing the weight of the engine. In addition, the fuel consumption remains around 20L/h. However, any electrical failure (sensor, harness, ECU,…) causes the engine to stop as it is considered as a "single-point-failure" installation.

- The **Rotax 914UL 115HP with TURBO**, which provides for the maintenance of the full power range at any altitude. Although there is some added weight resulting from the addition of a turbo and associated equipment, this version promises to be popular for heavy pilots in hot and high environments. However, in the case of a failure of the turbo system, the power drops down to 80HP and the helicopter is not able to provide enough power reserve.

	Carburettors	Injection	Turbo
Engine	Rotax 912ULS	Rotax 912ULS-I	Rotax 914UL
Bore	1350 cm^3	1350 cm^3	1200cm^3
Max. power output	100 HP	110 HP	115 HP
Cooling system	Water, oil, air		

NOTE

The Rotax 900 series are among the best engines in the world. However, Rotax does not guarantee its engines when these are used in rotary wing aircraft.

WARNING !

Rotax engines are not certified for being installed in light helicopters because of their inherent transmission system using pulleys and belts.

Instead of axial loads generated by an aircraft propeller, the drive pulley of a helicopter generates radial loads on the engine reduction gear.

Radial loads on the engine reduction gear can cause premature wear of the engine gear bearing. There is no standard service lifetime and the possibility of a failure must be considered during all the helicopter service life.

In case of a sudden failure of the reduction gear bearing, an autorotation must be performed.

CAUTION

Some brands of fuel generate engine knock and then destruction of the pistons in a very short time.

7.3 MAIN TRANSMISSION

The drive pulley is bolted directly onto the engine shaft.

Four V-belts transfer the movement to the **receiving (driven) pulley which houses one freewheel**. The **freewheel is oil lubricated** and can bear a torque of 660Nm. **It drives the rotor while the engine is running and keeps it free of movement when the engine is stopped or idle (failure or landing).**

The tension in the drive belts is provided by the two tensioning rods linked to the tensioner arm. **An electric actuator moves the bellcrank of the tensioner arm for tensioning the belts.**

The clutch system of the H3 is commanded from the cockpit. It serves to connect or disconnect the engine to the transmission system. When disconnected, it allows the engine to start with the rotor stationary, ensuring the safety of those on the ground during warm-up. Once ready for takeoff, the rotor is engaged by the pilot using a switch on the instrument panel.

The V-belts are sloted for better power transmission. **Adequate tensioning is mandatory.** The adequate tension can be easily checked before the flight with a spring dynamometer. The belts may not flap, this can cause premature wear of the freewheel. **Correct belt tensioning = 15kg for 1cm deflexion in the middle of the belt.**

The transmission shaft transmits the movement forward to the main rotor via the main transmission gearbox and to the tail rotor via a rubber coupling joint and then to the rear transmission.

The **long shaft which drives the tail rotor is supported by seven intermediate bearings** in the tail tube.

7.4 MAIN TRANSMISSION GEARBOX (MTG)

The main transmission gearbox **transfers the rotating movement from the main transmission shaft to the main rotor mast**. The MTG of the H3 is **dimensioned to support 250 HP** whereas in reality it only has to bear a maximum of 115 HP. The total weight of the assembled MTG is 15kg.

The MTG contains conic gearing with spiral teeth providing a single stage of reduction. The gearings are fabricated from aviation quality steel which is thermally treated and **lubricated in a mineral oil bath**. The large upper bearing in the main transmission gearbox may leak a little. This is not a problem as all precautions have been taken : sponge clean and watch the oil level. No intervention is required as long as the lip of the bearing flange fills up clearly.

The MTG is equipped with a T° sensor and with a chip detector, wired to a warning light in the cockpit, which indicates the pilot of every metallic particle detected.

The conical spiral gearing of the main transmission gearbox is a part that wears out rapidly. The gearbox should be emptied every 50h to filter the oil or renew it and also, the magnetic plug should be surveyed.

Every 250h, the main transmission gearbox should be opened in order to inspect the conical gear and the bearings.

7.5 MAIN ROTOR

The rotor mast is **made of Cr-Mo steel** and designed to bear a load of +22G.

The blades are made of **extruded high resistance aluminum**. As a safety precaution, their service life is provisionally limited to 500h before complete inspection. **They can be used in all weather condition**. A mark is traced on the upper side of the blade to check for possible permanent elongation of the blades. They are held by stainless steel sheets and aluminum blade roots.

In option, carbon blades can be installed. They have no theoretical lifetime limit but their use must be limited to day VFR fair weather conditions only. They can be damaged if flown under rainy, dusty or hail condition.

Four stop bearings with oblique contact allow for the blade root to oscillate to set the pitch. **They are over-dimensioned and can support excess speed up to 600RPM.** These bearings oscillate very little and the bearing balls, over the long term can make traces in their seating, causing shimmy in the cyclic pitch control. They should be replaced as soon as the shimmy can be strongly felt.

The ball joints of the blade rods have a little play ; they should be greased with traditional grease.

The seven bolts and the two blade screws are set in position on a template. Dismounting them may cause misalignment. When removing the blades, it is done by unscrewing the 2 x 4 M8 bolts, holding the blade supports.

7.6 TAIL ROTOR

The tail rotor is equipped with four blades in order to keep a small diameter which provides for a greater degree of safety. The blades have a N° relative to their manufacturing balancing. It is not possible to replace one single blade. Blades must all be replaced together.

The four blades (120g each) are composed of carbon, held by blade roots which are not articulated. The blade roots are held in nylon bearings which rapidly develop play.

This play does not affect the performance as the nylon bearings are held by stop bearings with flat rollers. **In operation, the centrifugal force maintains the roots firmly in place which press uniformly on the whole crown of the bearings.**

Only the rollers of these bearings must be greased and all surplus grease is immediately evacuated by the 1kg of centrifugal force. The rollers dry and sometime corrode rapidly but no intervention is required as long as the rudder pedals do not show stiffness. All that has to be done then is to dismantle, clean with gasoline and grease the corroded rollers without necessarily changing them.

The rear transmission gearbox (RTG) also has a pair of conic gears with spiral teeth and splash lubrication. The entry and exit shafts are of stainless steel. It does not present any problem of wear. A chip detector is also installed.

The left lateral bearing of the RTG, even if fitted with a sealing ring, may leak a little !

Regularly sponge the oil drop in the lip of this lateral bearing.

7.7 FLIGHT CONTROLS

Standard equipment includes dual controls. The cyclic on the passenger side can be folded away. The regulation only allows dual control during training flights with instructor.

All controls operate through control rods with ball joint endings. The flight controls of the Dynali H3 EasyFlyer ‘Sport’ operate in the same manner as those of most other helicopters. **The cyclic and the collective control the pitch of each blade via the swash plate.**

WARNING !

The controls are very sensitive, this being why we recommend frictions on the three controls. Fully unscrew and re-screw 6 threads the lateral frictions and 11 threads the pitch friction.

The collective is also of the classical type with a throttle twist grip. A correlator activates the throttle in relation to the collective position but a fine adjustment is still necessary using a **servo-motor called a "governor"**.
The governor acts as a « cruise control » and allows the pilot to avoid having to constantly adjust the throttle to maintain engine and rotor RPM. The governor is a standard equipment on the H3.

The governor operates on the pilot's throttle control and gathers its information from the probe of the rotor rev-counter.

During take-off and climb, for more power, the governor is engaged at 5800RPM. Later, during the flight, the governor can be slowed down to 5500RPM.

There are two different types of governors :

- **Variable governor**

Keeps the RPM selected by the pilot at the moment is has been switched on. It is thus possible to fly at any selected RPM.

- **Pre-selected governor**

Keeps 5500 RPM or 5800 RPM. If the governor is switched on at other regime, the governor will stabilize at the nearest pre-selected RPM.

NOTE

Takeoff with a failed governor is possible but the pilot must control the throttle himself to maintain 100% rotor RPM until after landing. Do not fear LOW or HIGH RPM. The total RPM acceptable zone ranges from 450 to 600 rotor RPM.

NOTE

Since June 2016, a new governor has been introduced. It is a pre-selected governor 5500/5800 RPM. The RPM is controlled by a switch on the cyclic. In addition, a slow motion push button is added for slowing down the regulation of the governor during descent, enabling the pilot to keep the governor ON during descent, if needed.

The friction of the collective lever is set by the degree of tightening of its attachment bolt.

The rudder pedals act on the pitch variator lever of the rear rotor through two teleflex cables.

The teleflex cables do not bear any particular stress. A system of counter rotating pinions neutralises the pushing effort on the pedals.

7.8 RADIATORS

The coolant radiator of the H3 is a very important item for training schools. It is very large and allows for the H3 to be flown in hover flight for long periods without over-heating, without the requirement for periodic circuits to cool the engine oil. One (or two for hot climates) oil radiators are positioned on the coolant radiator and provide the same high efficiency performance.

Two large fans, equipped with thermo switches allow for the automatic independent regulation of coolant and oil temperatures at ideal levels.

7.9 STABILIZER

The horizontal stabiliser provides excellent pitch stability. The vertical stabilisers are oriented 4° in relation to the longitudinal axis of the helicopter. They compensate for the rotor torque by their aerodynamic effect. Thus the pilot does not need to use the tail rotor permanently. In the unlikely event of an engine failure, the pilot can easily keep his heading by simply maintaining forward speed until flare.

7.10 FUEL CIRCUIT

The engine is fed directly by 2 fuel taps, connected to the fuel tank. The two fuel taps each have a filter. The two fuel taps can be kept opened for checking state of the hoses.

The fuel tank has a LOW FUEL sensor and a level sensor. Both are wired to an instrument/warning light in the cabin.

The central tank has a capacity of 60L of gasoline. In option, an 80L fuel tank can be installed.

The air vent of the fuel tank is made through the filler cap. The fuel flows with gravity, there is no fuel pump at the exit of the fuel tank.

7.11 CABIN

This helicopter has one large undivided glazed canopy, locked with two lateral hinges on the left and right hand side. A gas strut in the front allow for the canopy to stay open during boarding.

The locking mechanism can be operated from the Inside and outside by moving a steel locking device. The door is properly locked when both hinges are in upper position.

In option, two adjustable fresh air vents on each side are provided for ventilation. The sliding window can be used as a photography opening and is large enough to pass a hand through.

Thanks to its 1.3m wide cabin, the H3 is the most spacious ultralight helicopter on the market. It allows two large people to sit comfortably and easily in the cabin, with plenty of elbow room, giving a feeling of space, while providing a panoramic view.

Storage lockers are provided for personal effects and documents beneath the cabin seats.

SECTION 8 - HANDLING & MAINTENANCE

8.1 GENERAL

This chapter describes the recommended procedures for the handling and the maintenance of the Dynali H3 Easyflyer 'Sport' helicopter.

Any person designated by Dynali or its distributors is authorised to perform maintenance operations, under the authority of the above cited.

We ask that each new owner/operator contacts us and remains in close contact with Dynali SPRL or his local authorised distributor in order to receive the latest service bulletins concerning the Dynali H3 EasyFlyer 'Sport'.

In the event of sale of his helicopter, the original owner/operator should inform the new owner/operator of the manuals that he requires and suggest that he contact Dynali SPRL or the authorised distributor.

Furthermore, the internet website www.dynali.com regularly shows new information made available to everybody.

Under the regulations, the responsibility for the maintenance of an ultralight helicopter lies exclusively with the **builder / owner / operator** of the helicopter. He must ensure that servicing is performed in compliance with the Maintenance Manual and the recommendations of Dynali SPRL.

All limits, procedures, safety practices, part life cycles and TBO life cycles shown in the present manual are considered as mandatory.

8.2 OBLIGATORY DOCUMENTS

The following documents must be permanently left aboard the aircraft :

1. Airworthiness Certificate
2. Registration Certificate
3. Radio operation certificate (if a radio equipment is installed)
4. Insurance Certificate
5. Weight sheet
6. Checklists
7. Flight manual

8.3 MAINTENANCE LOGBOOK

All maintenance work must be logged in the appropriate logbook which must contain, at the least, the following information :

- Date of performance of the work.
- Number of hours flight logged.
- Description of the work and remarks.
- Name of the technician.
- Superviser signature.

NOTE

Telephone contact with Dynali Helicopter Company is always possible, if any doubt subsists if there is any doubt concerning the work.

8.4 MAINTENANCE AND PROCEDURES

Dynali SPRL requires that the maintenance inspections should be made :

1) Every 25h. The pilot may perform this after having followed a training course with an authorised distributor.
2) Every 50h. The pilot may perform this after having followed a training course with an authorised distributor.
3) Every 100h. This operation must be performed in an authorised maintenance center by a qualified technician.
4) Every 300h. This operation must be performed in an authorised maintenance center by a qualified technician.
5) Every 600h. This operation must be performed in an authorised maintenance center by a qualified technician.
6) Every 1200h. This operation must be performed in an authorised maintenance center by a qualified technician.
7) Every 2400h. This operation must be performed in an authorised maintenance center by a qualified technician.

Dynali SPRL recommends a full inspection of the machine every 12 months. This must be performed by an authorised maintenance center.

Furthermore as from the 50th hour, the operation to be undertaken is, in fact, a series of operations. For example, after 2000 hours, all the maintenance operations included in the 25h, 50h, 100h, 300h, 600h, 1200h and 2400h checks must be performed.

8.5 MAINTENANCE TRACKING

H3 EasyFlyer Sport :

Registration	
Serial N°	
Delivery date	
Observations	

Owner :

Name	
First name	
Address	
Telephone	

Maintenance calendar :

Hours	Date	Place of flight – Technical operation - Remarks	Technician	Visa
25				
50				
75				
100				
125				
150				
175				
200				
225				
250				
275				
300				
325				
350				
375				
400				
425				
450				
etc.				

8.6 SCHEDULED MAINTENANCE

Refer to Maintenance Manual published by Dynali SPRL.

SECTION 9 - SAFETY TIPS

General

This section provides miscellaneous suggestions and guidance to help the pilot operate the helicopter more safely.

It is essential to warn the owner/operator about several risks that are too often underestimated or neglected through force of habit and to provide with the experience acquired by the whole family of pilots of light helicopters.

On the first pages are listed all the warnings that all pilots must constantly bear in mind.

A helicopter is, by its nature, a capricious and unstable machine which is subject to both the laws of the air and of physics. Furthermore, its mechanical components comprise a total chain which is both complex and precise. A helicopter requires care and maintenance. Please study carefully the specific characteristics and the recommendations which follow.

Pilot airmanship

- Keep both hands on the controls especially when close to the ground (it is prohibited to release the controls).
- Be attentive at all times and beware of overconfidence.
- Never fly if you are not feeling in perfect shape. In no case when you are influenced by alcohol, lack of sleep or stress.
- There is a high danger if there is an obligation to fly, to perform demonstration flights, or to fly from point A to point B.
- Do not perform risky or unusual manoeuvres.
- Do not perform low pass above friend’s home.

Mental faculties

Keep in mind that, in flight, we are not in our natural element. The analytical capacity is reduced by unconscious stress and this becomes more severe in the event of problems as we lose part of our faculties. We no longer notice factors which worsen the situation and we easily accumulate errors. Accidents are always the consequence of an accumulation of errors. In addition, our analytical capacity is reduced in flight.

Low-G avoidance

Never push the control stick forward to descend or to terminate a pull-up (as you would in an airplane). This may produce a low-G (near weightless) condition which may result in a mast bumping occurrence, causing fatal damage to the rotor mast.

Entering the vortex

In the event of descending too fast or moving forward with a tail wind, there is a danger of entering your own vortex and catching up with your own turbulence. The rotor operates in turbulent air and loses a large part of its lift. This phenomenon is present at all altitudes.

Power management

Helicopters have relatively low reserve power in certain conditions such as transition phases, high altitude flight or air conditions (high temperature, turbulence,…).

Maximum loading of the rotor can be suddenly attained and a marked difference between the aircraft's characteristics in solo flight and heavy dual flight can be observed. With a heavy payload, limitations are more restricted and the power margin is reduced.

A piston engine has little inertia. With the slightest drop in engine speed the rotor will "freewheel". In icing conditions, for example, the engine may simply stop as compared with a fixed wing aircraft which will still be provided with thrust for a moment by its propeller. The governor system may hide the early stages of icing.

- Keep up your speed and never remain "hanging on your engine", it may fail.
- Never fly in a helicopter which is not adjusted for autorotation.
- To keep in training, descend as often as possible in autorotation, stopping short of the ground.
- Always watch your manifold pressure. This instrument will tell you the reserve power available. Before initiating any manœuver, check that you have at least 1" inHg MAP in reserve.
- Do not continue with a landing if the LOW RPM warning is alight.
- Check that the engine runs smoothly at idle.
- The throttle sandow must be kept in good condition.

WARNING !

Manoeuvres close to ground and takeoffs and landings should be performed with the governor set at 5800 RPM to provide more power.

If you have, in climb or on take-off, exceeded the available power, the rotor will lose RPM. The worst reaction is to further raise the collective, which will even further reduce the RPM. The correct reaction is to lower the collective and open the throttle to the limit. Then, allow the helicopter to lose a little more height while awaiting for the RPM to increase.

Lateral translation

Excessive and longer lateral translation has to be avoided at all means. An engine failure during a lateral translation close to the ground may have fatal consequences.

Flying low on fuel is dangerous

Never intentionally allow the fuel level to become critically low. A forced landing into unknown terrain always poses unnecessary and unpredictable risk with danger to material or life.

Do not push the envelope and remain easy on the controls

Avoid abrupt control inputs or accelerated manoeuvres, particularly at high speed. These produce high fatigue loads in the dynamic components and could cause a premature and catastrophic failure of a critical component.

Strobe lights ON – for your own and other's safety

Turn the strobe lights (if installed) ON before starting the engine and leave it on until the rotor stops turning. The strobe lights provide a warning to ground personnel. Leaving them on in flight is also advisable since the helicopter may be difficult for other aircraft to see.

Rotors can be extremely dangerous

Never attempt to start the engine until the area around the rotor is completely clear of any persons or objects. Do not start the engine while standing beside the helicopter.

Be sure ground personnel or onlookers don't walk into the main rotor. Mind the spinning rotor when hovering close to obstructions or persons. It is advisable to maintain at least one rotor diameter distance from obstructions or persons when hovering with spinning rotor. A fast turning rotor is almost invisible, but may contain enough energy to kill a person.

Never let go of the control stick and make sure the rotor blades spin down in level/horizontal attitude until the rotor is at a complete stop. Wind or negligent behaviour on the control stick may cause the blades to flap dangerously low and hit control stops, stabilizer, or people.

Power lines and cables are deadly

Flying into wires, cables, and other objects is by far the number one cause of fatal accidents in rotary wing aircraft. Pilots must constantly be on the alert for this very real

hazard.

- Watch for the towers ; you will not see the wires in time.
- Fly directly over the towers when crossing power lines.
- Constantly scan the higher terrain on either side of your flight path for towers
- Always maintain at least 500 feet AGL except during take-off and landing.

Loss of visibility can be fatal

Flying a helicopter in obscured visibility due to fog, snow, low ceiling, or even a dark night can be fatal. Helicopters have less inherent stability and much faster roll and pitch rates than airplanes. Loss of the pilot's outside visual references, even for a moment, can result in disorientation, wrong control inputs, and an uncontrolled crash. This type of situation is likely to occur when a pilot attempts to fly through a partially obscured area and realizes too late that he is losing visibility. He loses control of the helicopter when he attempts a turn to regain visibility but is unable to complete the turn without visual references.

You must take corrective action before visibility is lost! Remember, a precautionary landing in a helicopter will always be safer than a flight with impaired or no visibility.

Carrying passengers

Take the time to get familiar with your H3. Carrying a passenger increases the difficulty of managing the power. 30 hours of solo flight is recommended for beginners and 5 hours for experienced pilots before carrying a passenger.

Beware of any stiffening in the controls

Cyclic plate, freezing or hardening of the grease on the mast. Rapid complete blockage can occur in these cases. In the pedals, the grease hardens in the stop bearings of the rear rotor blades. Never force the controls but fix the problem.

Overconfidence prevails in accidents

A personal trait most often found in pilots having serious accidents is overconfidence.

High-time fixed-wing/gyroplane pilots converting to helicopters and private owners are particularly susceptible. Airplane pilots feel confident and relaxed in the air, but have not yet developed the control feel, coordination, and sensitivity demanded by a helicopter. Private owners must depend on self-discipline, which is sometimes forgotten. When flown properly and conservatively, helicopters are potentially the safest aircraft built. But especially helicopters also allow little tolerance when flown to their limits. Helicopters must always be flown defensively.

Flying low over water is very hazardous

Accidents repeatedly occur while manoeuvring low over water. Many pilots do not realize their loss of depth perception when flying over water. Flying over calm glassy water is particularly dangerous, but even choppy water, with its constantly varying surface, interferes with normal depth perception and may cause a pilot to misjudge his height above the water.

MAINTAIN SAFETY ALTITUDE AT ALL TIMES !

Conversion pilots constitute high risk when flying helicopters

There have been a number of fatal accidents involving experienced pilots who have many hours in airplanes or gyroplanes but with only limited experience flying helicopters.

The ingrained reactions and habits of an experienced airplane pilot can be deadly when flying a helicopter. The airplane pilot may fly the helicopter well when doing normal manoeuvres under ordinary conditions when there is time to think about the proper control response. But when required to react suddenly under unexpected circumstances, he may revert to his airplane reactions and commit a fatal error.

Under those conditions, his hands and feet move purely by reaction without conscious thought. Those reactions may well be based on his greater experience, i.e., the reactions developed flying airplanes.

For example, in an airplane his reaction to an engine failure would be to immediately and considerably go forward with the stick. In a helicopter, application of inadequate forward stick could result in a low-G situation or, if the engine failure occurred during initial climb, a reduction of rotor RPM combined with a high sink rate with the consequence of a hard landing or impact.

Airplane pilots may also underestimate pedal work. Especially in a helicopter, pedal control is most critical as it has the highest rate response with the smallest static and dynamic damping effect of all other controls. Being used to the high directional stability of an airplane, a conversion pilot may neglect proper pedal. Very much like gyroplanes, helicopters cannot be flown by control position or control force, but solely by resulting attitude. That means that the pilot together with his built-in senses and programmed reflexes represents a vital part in the active control feedback loop.
Gyroplane pilots, on the other hand, may underestimate the characteristics of helicopters and the necessity for proper training.

To develop safe helicopter reactions, conversion pilots must practice each procedure over and over again with a competent instructor until hands and feet will always make the right move without requiring conscious thought.

AND, ABOVE ALL, HE MUST NEVER ABRUPTLY PUSH THE CONTROL STICK FORWARD.

Beware of demonstration or initial training flights

A disproportionate number of fatal and non-fatal accidents occur during demonstration or Initial training flights. The accidents occur because individuals other than the pilot are allowed to manipulate the controls without being properly prepared or indoctrinated.

If a student begins to lose control of the aircraft, an experienced flight instructor can easily regain control provided the student does not make any large or abrupt control movements. If, however, the student becomes momentarily confused and makes a sudden large control input in the wrong direction, even the most experienced instructor may not be able to recover control. Instructors are usually prepared to handle the situation where the student loses control and does nothing, but they are seldom prepared for the student who loses control and does the wrong thing.

Before allowing someone to touch the controls of the aircraft, they must be thoroughly briefed concerning the sensitivity of the controls in a helicopter. They must be firmly instructed to never make a large or sudden movement with the controls. And, the pilot-in-command must be prepared to instantly grip the controls should the student start to make a wrong move.

Manœuvering on the ground

At the tail rotor, do not force the blades as doing so may mis-align them. Do not use force on the tail rotor surround. The manoeuvering wheels should only be used on hard and smooth ground. The machine should not be moved by pushing on the canopy or the horizontal stabiliser.

Parking

Restrain/strap the rotor blades which flap in the wind. The shocks leave traces of impacts on the balls of the bearings.

Transporting the helicopter on a trailer

Without main rotor blades or support the rearward blade. Possibly, on a short trip, let the blades hang and prevent flapping by using straps left fairly loose.

Flight in hard weather condition

Heavy rain, dust, hail or snow may damage main rotor blades.

Hovering above high-level grass

Do not take off in high level grass. There is a danger of fire. Do not perform hover flight above high level grass. The ground effect may be lost.

Mechanical noise

All mechanical noises are propagated and amplified by the carbon fiber parts. The cabin wall acts as a resonating membrane. Carbon also grinds on the tubes of the frame. It is in the cabin that noise is amplified. Tough, an insulated carbon fiber reduces noise but causes additional weight.

The origin of the transmission noise is erroneous. **The sound seems to come from each of the elements that are listened**. The noise coming from the belts, at startup, is inevitable because ribbed belts are noisier than smooth ones, but they are more powerful. The pilot has to get used to the sounds of the helicopter but must remain constantly attentive to other noises he could hear.

In the engine reduction gear, the damping system of instant torque claw is very noisy. It is a noise like "bumping" or "scrap".

The rear rotor siren sound comes from the 4 blades but also the gear of the RTG that resonates in the rear propeller shaft, and the tail pipe.

At intermediate regimes, or when the rotors are not driven, the transmission belts are flapping, causing a mechanical noise flappement. That noise appears at deceleration.

A "tic-tic" or a “grunt” comes from the 15 drive wheels on the base of the mast. The mast is never perfectly aligned and the rollers operate a mini longitudinal displacement.

This sound always accompanies a blade in the same position.

The "roar" in the tail pipe comes from the pinions of the RTG. When the tail rotor turns slowly, rear blades, one after the other, falls in its roots, causing a “knock”.

The main rotor blades, when they are about to stop, can let a metallic noise like "dwing jump” be heard.

Vibration level

Horizontal vibration	➢ Unproper rotor balancing
Vertical vibration	➢ Rotor tracking ➢ Worn tilt bearing
Shimmy (or vibration in the cyclic)	➢ A misaligned blade in his root ➢ Blade bearing deteriorated

After a hard landing

The chassis can not be repaired if damaged. It must be replaced. The angle between main transmission shaft, main rotor mast and tail boom must be checked.

The skids must bend of maximum 17mm in the central section.

Check that the blade are not misaligned and that all the ball joint of the rotor head keep their movement free.

Check the free movement of the controls, in all directions.

FLY SAFE.

SECTION 10 - WARRANTY CONDITIONS

1. The Dynali warranty covers the design of its helicopters as a whole as well as all parts designed by Dynali and manufactured by Dynali or sub-contracted by Dynali. Warranty conditions applying to the engines, equipment, instruments and battery are those of the suppliers concerned. Where this is not the case the general warranty of Dynali applies, this being of 24 months from the date of delivery ex-works Dynalii or 200 hours in operation, whichever of these events should occur first. Assembly of the helicopters is only covered by warranty when the helicopter has been assembled by Dynali SPRL.

2. Dynali SPRL guarantees all products against defective assembly, or manufacture as follows :

    a. Products are guaranteed for a period of 24 months from date of delivery or 200 hours in operation, whichever event occurs first, in terms of both parts and labour.

    b. Under the terms of the warranty, Dynali may choose to replace or repair any part found to be defective at no charge for the owner;

    c. The warranty does not apply to parts subject to normal wear (drive belts, filters, spark plugs, oil, etc.).

    d. The Dynali warranty only applies insofar as :

        i. The products have been used according to the instructions in the current manuals in force at the time of the occurrence of the failure.

        ii. The servicing of the products have been implemented in compliance with the instructions contained in the service manual supplied with the products at the time of delivery, as well as with any updates of service bulletins published by Dynali prior to the failure of the part.

        iii. No modification has been made to the product by the buyer or any other person after delivery without the express written permission of Dynali SPRL;

        iv. No repair has been implemented by the buyer or any third party without the express agreement of Dynali SPRL ;

        v. Neither the maintenance nor the storage conditions of the products have been inappropriate;

        vi. The user has not continued to use the products when a problem has been identified, thus provoking further damage or failure, (e.g. oil leak, overheating of the engine, noise from bearing, unusual vibration, etc.) ;

        vii. Parts are assembled according to the rules of the art and used and used in the way intended.

        viii. The helicopter is not flown in destructive conditions which may cause premature wear or damage (sand, salt, heavy rain, hail, dust),

        ix. The helicopter has not been flown under extreme conditions, engine or rotor overspeed, hard landings, road or maritime transport under poor conditions, manœuvres in flight generating excessive load factors ;

        x. The logbook recording flight hours, unusual events, incidents, comments technical interventions, and regular servicing has been regularly kept up to date

according to the regulations. The owner of the helicopter should provide this logbook to Dynali in the event of any claim under warranty;

xi. The aircraft hasn't been transported on a trailer with the main rotor blades still mounted;

xii. The owner has notified Dynali or the authorised distributor of any technical incident, accident or defect within five (5) working days of the event and has given Dynali the opportunity to provide remedy;

xiii. The product has not been modified by the addition of items not approved by the manufacturer, or caused repairs to be implemented by any non-qualified third parties.

e. In order to make a valid claim under warranty, the buyer must :

i. Inform Dynali in writing in the shortest possible time of any defect, stating the nature of the defect and supply all related information to Dynali;

ii. Abstain from causing any repair or technical intervention by any other person or organization other than Dynali or a Dynali approved distributor,.

iii. Make available to Dynali or an authorised Dynali representative, at their registered address, the defective part, within 15 days of notification of the defect.

3. It is understood that some adjustments may be necessary during the first hours in flight following the entry to service. These adjustments are normal and are not covered by warranty. .

4. Service lives of parts are indicated but, subject to the loads applied during use, some parts may wear more rapidly than foreseen. If a part, subject to wear, is observed to wear more rapidly than the service life indicated, it will be replaced and invoiced at a price pro-rata of the expected lifetime (e.g. a part with an indicated service life of 200 hours, which is worn after 80 hours will be invoiced at a price representing 80/200^{ths} of its standard sale price).

5. Technical evolution and improvements in products sold by Dynali SPRL are not covered by warranty for previously sold products.

6. If a defect can not be remedied, or if the buyer can not reasonably accept the remedies proposed by Dynali, the buyer may demand a voiding of the contract of sale or re-negotiation of the sale price.

7. Normal wear is not covered by the warranty.