24.8.00

FLIGHT MANUAL

Bailey-Moyes DRAGONFLY

Manufactured by
Moyes Microlites Pty Ltd.
173 Bronte Road
Waverley
2024 NSW
Australia
Ph. +61 2 9387 5114
Fax + 61 2 9369 3342
Email moyes@zip.com.au

Bailey-Moyes DRAGONFLY

FLIGHT AND OPERATIONS MANUAL

Manual revised August, 2000

This manual belongs to the aircraft:

Type: Bailey-Moyes DRAGONFLY

Aircraft Identification Number: _____

Aircraft Serial Number: _____

Airworthiness Certificate Number: _____

Manufacturer: **Moyes Microlites Pty Ltd.**
173 Bronte Road
Waverley
2024 NSW
Australia

Owner: _____

_____

_____

This manual should be kept with the aircraft at all times.

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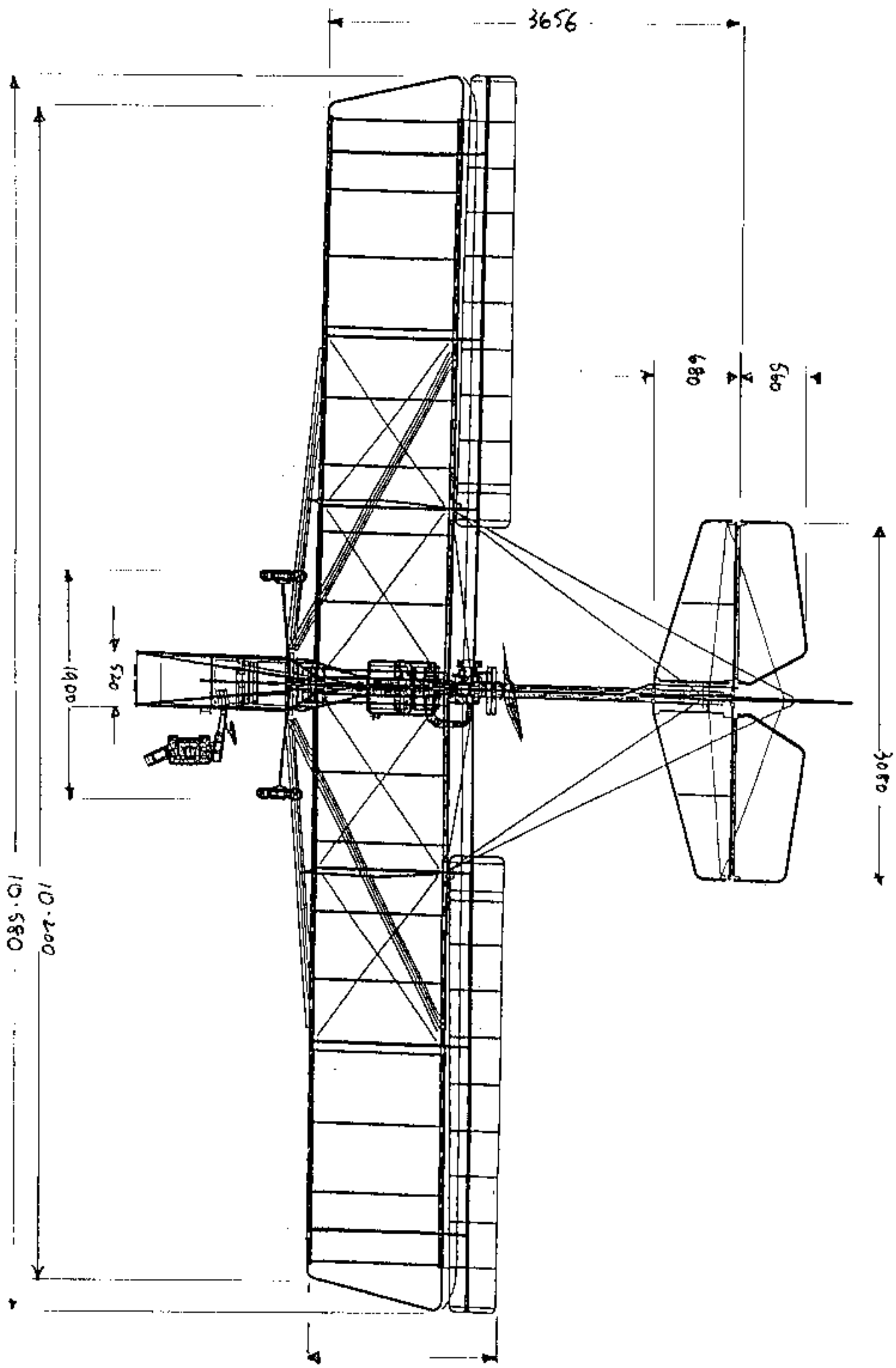
APENDICIES


3656
680
560
1400
520
10.580
10.200
3080

SPECIFICATIONS

Wing Span	10.200 m	Leading Edge	
	10.580 m	Trailing Edge	
Mean Span	10.39 m		
Wing Area	10.39 m x 1.305m	=	13.558 m.sq
Flapperon Area	8.2 m x .423m	=	3.468 m.sq
Wing + Flapperon Area		=	17.02 m.sq
MAC =	17.02 / 10.39	=	1.638 m
Horizontal Stabilizer	Span		3.080 m
	Area		1.479 m.sq
Elevators	1.271 m x .480 m	=	.610 m.sq
Two Elevators	.610 x 2	=	1.220 m.sq
Rudder Area	1.4 m x .700 m	=	.98 m.sq
Weight with parachute			225 Kg.
Length			5.858 m

INSPECTION STATUS

LOGBOOK

MAINTENANCE MANUAL

The FAA recommend that the owner/Pilot record in the Log Book all inspections and maintenance performed, together with performance information.

This will create an AIRCRAFT MAINTENANCE HISTORY and will be invaluable in spotting trends.

1. ABBREVIATIONS AND GLOSSARY OF TERMS

The following abbreviations are used in this flight manual.

CG - Center of Gravity. Denotes the static center of gravity. An imaginary point on the aircraft around which the aircraft is in equilibrium when static that is, the point where the weight forward and aft of the point balances each other if the aircraft was suspended from the CG.

MAC - Mean aerodynamical chord. The mean chord of the wing including the lift producing ailerons.

DP - Datum point. The reference point for determining the position of the center of gravity and the maximum allowable range of this.

Rpm - Rotations per minute

Mph - Miles per hour.

Fpm - Feet per minute.

VFR - Visual Flight Rules

VNE - Velocity Never Exceed

MTOW - Maximum Take Off Weight

G - Acceleration due to Gravity

Vs - Stall Speed or Minimum Steady Flight Speed

Va - Design Manouvering Speed.

PREFACE

This light aircraft is manufactured to meet the requirements of several national categories.

Australia accepts the Dragonfly as a Single Place Amateur Build Aircraft Registered as a 95/10 cat. or Experimental Two Place Aircraft.

The F.A.A. in America accepts the Dragonfly as a Two Place Trainer Aircraft or an Experimental.

The pilots weight range is from 60 kg to 100 kg and this aircraft when flown solo must only be flown from the front seat. The pilots weight is essential to be in the front seat to keep the aircraft balanced within its Center of Gravity Range.

The pilot must have a valid Pilots License.

Light aircraft must be flown and operated within the current local Airspace Regulations.

The Dragonfly is designed to fly with the Flapperons in permanent Flaps on position. The low speed capabilities of this aircraft create a particular set of characteristics and each pilot should become familiar with its ground handling and flight characteristics before towing or carrying passengers.

Light aircraft engines are not certified aircraft engines. This should always be considered when choosing a flight path. The path chosen should allow for emergency landings.

Changes to the controls and control surfaces should not be attempted. There is a balance of aerodynamic forces to consider.

3. AIRCRAFT AND ENGINE DESCRIPTION

3.1 Aircraft Description

The DRAGONFLY is a light, high wing, open cockpit monoplane The Airframe and fuselage is constructed of aluminium tube framework reinforced by struts and wire bracing.
The wing, the stabilizer and the three axis control surfaces are covered by pre-manufactured dacron sails.
The landing gear consists of two main wheels on chrome molly steel and axles, and a steerable tail wheel in a tail dragger configuration. The flexible steel axles work as shock absorbers during taxiing and landing. The tail wheel is steerable by mean of the rudder pedals. The main wheels are equipped with drumbrakes that are operated by means of the brake lever mounted on the throttle lever.

3.2 Engine Description.

The engine is mounted, on rubber mounts, in a pusher configuration level with the wing and just behind the central part of the trailing edge.
ENGINES
The most popular engine chosen is the 582 Rotax Liquid Cooled two stroke motor and the weight and balance table is calculated with this engine.
The Dragonfly can be fitted with a number of alternatives. When a lighter or heavier engine is fitted it is essential to maintain the CG range. This can be achieved by moving fixed items such as:

1: Radiator and Water
2: Battery
3: Parachute

When moving one or more of these items careful consideration is necessary so that the operation of the item is not impaired.
All chosen engines must operate in the pusher configuration.
Dragonflys with intended tow use should use a reduction gearbox of 4 to 1 ratio and a 4 to 6 blade propeller.
A large propulsion disc is necessary to achieve good towing results.
Direct drive can be used with a suitable propeller. A longer take off run will be required and towing is not recommended.
This configuration is useful only for cruising solo
The 582 Rotax two stroke is mounted on a plate with its gearbox and radiator and muffler. This plate is mounted on 6 lord mounts to isolate vibration. The plate and engine can be removed and installed as a package.

OPERATOR PARAMETERS AND LIMITS

4 AIRSPEED:-

The total load that may be carried by an ultralite aircraft will in some cases exceed the weight of the aircraft.

The pilot in control must consider the airborne mass and the atmospheric conditions before executing maneuvers at a high speed.

Maximum air speed at MTOW	56 mph
Stall Speed at MTOW	28 mph
Maximum air speed at MIN TOW	66 mph
Stall Speed at MIN TOW	20 mph
Weight Empty	225 kg.
Maximum weight including pilot and passenger	450 kg
Maximum load (See Sec. 8)	
Minimum load Pilot	60 kg

SAFE OPERATIONS LOAD LIMITS

Maximum positive dynamic load of aircraft	6 G
Maximum negative dynamic load of aircraft	4 G

Location of Center of Gravity C G in Flight
Aircraft Attitude - Horizontal Stabilizer at 0 degrees
Datum point - Nose or Fwd Cockpit Tube
Maximum permissible FWD CG Location 1.921 m AFT of DP
Maximum permissible AFT CG Location 2.077 m AFT of DP

ENGINE SPEED:

The permissible rpm limit will depend on the manufacturers recommendation (See Manual) for chosen engine.
The 582 Rotax two cycle rpm limit is 6500 rpm

5 OPERATIONAL RESTRICTIONS

This aircraft must not be used for aerobatic maneuvers.

Maximum bank angle 60 degrees.

Daylight flight between sunrise and sunset only and in VFR conditions.
Flights into icing conditions should be avoided.
Flights in turbulent conditions or when wind strength is in excess of 30 mph must be avoided.

AIRCRAFT HANDLING - OPERATION

6.1 OPERATING THE ENGINE

WARNING: **Hand starting by turning the propeller is dangerous**.

FUEL: See manufacturers advice on the engine you have installed

STARTING THE ENGINE;

1. Pump fuel to the carburetors by operating the squeeze bulb in the fuel line till the bulb is firm.
2. Ensure that the throttle is in **idle position**
3. Choke on (Cold Start)
4. Check that prop is clear of bystanders.
   When you are ready call loud **CLEAR PROP**
5. Ensure that the front of the aircraft is clear.
6. Operate brakes.
7. Pump primer 3 times.

8 Ensure rear seat belt is fastened so that it will not fly into prop and no other item is loose that will be drawn into the propeller stream. Call **CLEAR PROP** to warn observers.

Turn Ign switch on and switch to start position clockwise.

Normally the engine will start within 2 seconds. **Do not crank the engine more than 10 seconds if it does not start.**
Longer operation will overheat the starter motor.

Cold conditions require more priming.
Pump primer twice more and try again. The behavior of the engine will indicate the problem. In most cases it is too much or too little fuel to suit the temperature.

Should the engine not start after three or four attempts then it is possible that the engine is flooded with fuel.
To balance this situation, open the throttle to allow more air to be drawn in.

CAUTION: With the throttle open the aircraft will lurch forward when it starts.
Operate the starter with one hand on the throttle to immediately pull the throttle **back to idle** if it starts.
Operate the starter with the other hand and be ready to SWITCH OFF if an emergency arises.

When the engine starts allow it to idle at 2000 rpm for a full minute to allow the engine to reach operating temperature.

6.2 TAXIING THE AIRCRAFT

The Rudder pedals operate rudder and tail wheel steering. Control is easy and turning radius is average.
Taxiing in cross wind up to 15 mph creates no problem.
Both the rudder and tail wheel turn the aircraft in the same direction.
left turn PUSH LEFT PEDAL
For right turn PUSH RIGHT PEDAL
As speed increases the tail wheel will leave the ground and the rudder will be responsible for steering.
At times Low Speed Taxiing can be improved by pulling up elevator to hold the rear wheel firmly on the ground. When taxiing down wind keep the stick in Neutral Position.
Taxiing cross wind lean the stick into the wind to reduce lift on the upwind flapperon. Failure to keep the aircraft balanced will lead to Ground Loops.

6.3 Takeoff and climb

When the runway and the approach to the runway are clear taxi into starting position.

Always take off into prevailing wind. Takeoffs can be conducted in cross wind conditions up to 15 mph.

Go through the *Start Check List* (See Section 12.1)

Release the brakes and when the aircraft starts to roll keep the stick slightly pulled back. At 20 mph the tailwheel will lift off. With the tailwheel 1ft off the ground keep accelerating while keeping the aircraft on a straight line with positive and firm rudder movements. At 30 mph the aircraft will lift off in the ground effect. Pull the stick back slightly and keep the aircraft in an even climb at a constant speed of 40 mph. At an altitude of 300 feet reduce the throttle and keep climbing at 40 mph.

In very calm conditions and after extensive experience with the aircraft the climb can be performed with a single person onboard at 30 mph. At this speed the aircraft will climb best.

Important

During the climb it is imperative that the aircraft is not pulled into too steep an angle of attack, the aircraft will still be controllable but it will stop climbing. Inexperienced pilots can unwittingly bring the aircraft in such a situation especially when flying over obstacles.

6.4 Cross Country Flying

A Compass and map are essential equipment for cross country flights. The Dragonfly has a range limit of 100 miles in nil wind conditions. Extra fuel should be carried if flying into wind. Remember that the Dragonflys specialty is low speed. The Dragonfly can land in all terrain for refueling, but flying into wind will **necessitate** regular fuel stops.

A GPS is a useful tool when planning a cross country flight. When the country lacks landmarks a GPS and Compass will assist in setting a course.

6.5 Approach and Landing

Always land into the prevailing wind when possible

In idle the airspeed should always be kept at least at 35 mph. At half throttle the airspeed should always be kept at least at 40 mph
Conduct a conventional approach to the runway with a downwind leg, a cross wind leg and a final approach while observing any special landing circuit rules that may be in force at the airfield. Always keep a good lookout for other aircraft during the landing

Under normal conditions make the final approach with half throttle. Always make the final approach high with enough height to make the runway even with loss of the engine.

When the aircraft is 3 feet above the ground pull the stick back slowly and bring the aircraft into level flight above the ground while using the throttle to keep the aircraft at constant altitude and a speed of 30 mph. Then ease the throttle back while pulling slowly back on the stick and bring the aircraft to the ground gently. The correct landing speed is 25 mph. When the aircraft touches down pull the throttle all the way back and bring the aircraft to a halt possibly by using the brakes.

LANDING: When the Dragonfly is on the ground with all 3 wheels the wing has an angle of incidence of 13 degrees. This is sufficient angle of attack to lift the aircraft off the ground at flying speed. Therefore when you wish to land observe the old proverb "You don't land a plane, you fly it till it stops flying"
Hold the plane off the ground till the tail wheel touches first. Then reduce throttle.
Tail Draggers come to a halt quickly if landed in this fashion as the wing is at a high angle of incidence and creates maximum drag.
Experience will allow you to land by greasing it in on all three wheels together or front wheels first.
A hard landing front wheels first will lead to **kangarooing,** where the plane will take off again and again. This situation is best corrected by operating full throttle and take off again and make a fresh approach.
Never overfly any obstacles on the final approach.

6.6 Dead Stick Flying

If the engine is switched off while in the air let the engine cool at low throttle for a few minutes before switching the engine off. With the engine in idle turn the ignition switch to the "off" position. After a couple of revolutions the propeller will stand still.

The optimum speed for gliding with the engine off is 35 mph.

When landing with the engine off the approach must be steep with an airspeed of at least 45 mph. At 10 feet start easing back on the stick while closely monitoring the airspeed as the excess speed will be used up quickly when transferring to level flight.

Restarting the engine in the air is easily achieved. Turn the ignition switch to on, move the throttle a bit forward of idle, then start the engine while keeping a constant airspeed. The engine will turn easier than on the ground, due to the wind passing the propeller.

6.7 Emergency Procedures

Stall due to low airspeed.

Push the stick fully forward until the aircraft has recovered flying speed, then ease back on the stick till normal flying position.

Spin

In all cases where low air speed has caused a stall or spin the aircraft will continue out of control until a flow of air is re-established over the wings. **The immediate reaction must be STICK FORWARD.**

You must resist the temptation to pull the nose up.

There is an old aviators saying ***FORWARDS TO FLY. BACK TO DIE.***

If the aircraft begins to spin the reaction must be **STICK FORWARD and the opposite rudder. That means if you have entered a spin to the LEFT push hard on the right rudder pedal.**

Failure of elevator
The Horizontal Stabilizer is fixed at 13 degrees negative to the wing. Level flight can be maintained by increasing or decreasing air speed, with throttle use.
Should pitch be uncontrollable after an elevator failure even after experimenting with the throttle, shut down the engine and operate the emergency parachute

Failure of ailerons
The Dragonfly's ailerons double as flaps and are in permanent flap position. Should one aileron fail take immediate steps to balance the aircraft with the other and final balance with the rudder. Should both fail and the aircraft is uncontrollable with the rudder then the pilot should operate the emergency parachute after shutting down the engine.

Rudder failure
Use the ailerons to steer the aircraft by banking to achieve direction. Land the aircraft immediately following any control surface failure or suspect operation

Engine failure.
If the engine fails at altitudes below 100 m above ground level do not attempt to restart the engine. Conduct the emergency landing as described in section 5.6.

Land into the wind or uphill. Always monitor the airspeed closely. Do not turn close to the ground. Use a short flare.

If the emergency landing has to be in trees flare above the treetops and let the aircraft fall into the tree from the minimum height and the lowest possible speed. If a treetop landing is unavoidable and if the altitude is sufficient (more than 100 m above ground) use the emergency parachute.

Carburetor fire
Should the carburetor or engine catch fire immediately push the throttle to full. Side slip the aircraft and carry out an emergency landing.

6.8 PROCEDURE ON FLOATS

Flights on water can be pleasant when the water is smooth. Choose smooth conditions for your first float flights. Smooth water and nill wind usually go together so the take of run will be longer.

TAKE OFF: Align the river or lake to allow sufficient take off space. Open the throttle to full throttle.
The aircraft will be sluggish while the floats are fully wetted.
Pull the stick back fully to give maximum lift till the floats climb onto the step. Ease the stick forward to allow the aircraft to reach full flying speed of 45 mph.
Keep the aircraft skimming the water till you are satisfied that the speed will lift your passenger load and the floats. Then pull the nose up gently and leave the water. Climb gently and maintain airspeed till you have achieved an altitude of 100 meters then fly as normal.

LANDING: On smooth water can be a surprise. The sky reflected on smooth water will lead you to believe that you are higher than you are.
Don't look straight down. Keep your eyes ahead and keep the plane flying till it stops flying. Imagine you are landing tail first.

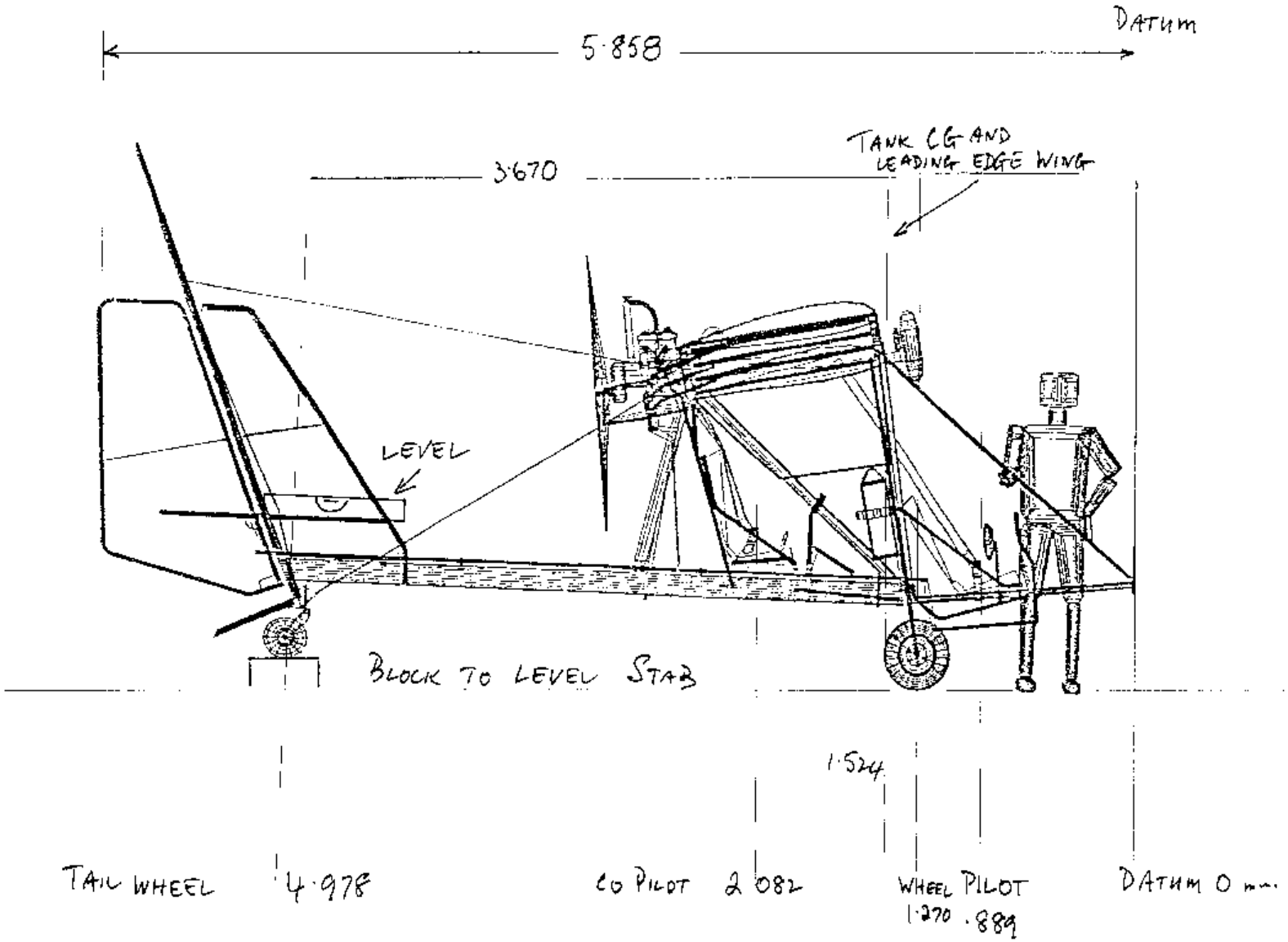
STRONG WIND: Always take off into wind, but strong wind and big waves go together. Take off and landings into big waves are punishing to the aircraft and pilot.

Strong Wind - Leaves rotors behind shore line trees and embankments.
Don't be tempted by the smooth water along the shore to make your landings.

Strong wind should be avoided till you are familiar with your territory and know how your aircraft behaves on floats.

7. MINIMAL EQUIPMENT LIST

- **One H-type seatbelt for each seat.**
- **Airspeed indicator with O - 80 Mph range**
- **Altimeter with Mb-correction scale.**
- **Compass with deviation table.**
- **Typeplate and loadsheet.**
- **Start checklist**
- **Emergency parachute system.**
- **Tachometer.**
- **Engine coolant temperature gauge.**
- **Engine Hour Meter.**


DATUM
5·858
3·670
TANK CG AND
LEADING EDGE WING
LEVEL
BLOCK TO LEVEL STAB
1·524
TAIL WHEEL
4·978
CO PILOT
2·082
WHEEL PILOT
1·270
·889
DATUM 0 mm.

WEIGHT & LOAD SHEET CALCULATIONS

9.1 The weight and position of the center of gravity (CG) of the empty aircraft must be established to conduct load sheet calculations

The aircraft must be weighed and measured in a fixed position and attitude and in windless conditions with wings level. Use a plumb line to project the following positions to the ground for measurements.

The Datum is the point where all measurements will be taken and we have selected the nose or cockpit front.

The attitude selected was to raise the tail wheel till the Horizontal Stabilizer was level by measurement with a level gauge (See sketch)

The weights and measurements were recorded in this position and results as follows

The Mean Aerodynamic Chord was calculated by adding the wing and flapperon area and divide by span.

MAC = AREA / MEAN SPAN = 17.02 m.sq / 10.39 m = 1.638 m

1.	DATUM	-	Cockpit front or nose	0
2.	Pilots Pelvis position	-	Pilot CG	.889 m
3.	Front Axle	-	Front Wheels	1.270 m
4.	Leading Edge of Wing	-		1.524 m
5.	Fuel Tank Center	-		1.524 m
6.	Rear Seat Pelvis position	-	Co Pilot CG	2.082 m
7.	Tail Wheel Axle	-		4.978 m

EMPTY WEIGHT WAS MEASURED AS FOLLOWS and the Moment Arm from DATUM used to calculate moments

Empty Weight	Mass	Moment Arm	Moments
Front Rt. Wheel	77 kg	1.270 m	97.79 kg.m
Front Left Wheel	79 kg	1.270 m	100.33 kg.m
Rear Wheel	69 kg	4.978 m	343.48 kg.m
Total Weight	**225 kg**	**Total Moments**	**541.66 kg.m**

CG from Datum = Moment / Mass = 541.66 kg / 225 kg = 2.407 m

The Leading Edge of the wing is 1.524 m aft of Datum

The empty weight CG position from the Leading Edge is then

2.407 m - 1.524m = .883 m

As a percentage of MAC .883 / 1.638 = .539 53.9%

To calculate the maximum AFT position permissible a 60 kg pilot with 5 kg of fuel will give this result.

ITEM	WEIGHT	ARM	MOMENT	RESULT
Aircraft	225 kg	2.407 m	541.57 kg m	
Fuel	5 kg	1.524 m	7.62 kg m	
Pilot	60 kg	.889 m	53.34 kg m	
	290 kg		602.53 kg m	2.077 m

As a percentage of MAC

2.077 - 1.524 = .533 / MAC = .553 / 1.638 = .337 33.7%

To calculate CG with Max take off weight MTOW with two 90 kg pilots
Ad full fuel

CG WITH MTOW - TWO 90 KG PILOTS

Aircraft	= 225 kg	2.407 m	541.57 kg m	
Fuel	= 15 kg	1.524 m	22.86 kg m	
Pilot	= 90 kg	.889 m	80.01 kg m	
Co Pilot	= 90 kg	2.082 m	187.38 kg m	
	420 kg		831.82 kg m	

CG = MOMENT / MASS = 831.82 / 420 = 1.980 M

DATUM - CG - DATUM - WING

1.980 M - 1.524 = .456

.456 / MAC 1.638 = .278 = 27.8%

CG WITH MAX FUEL & 100 KG PILOT FOR MAX FORWARD CG

	Weight	Arm	Moment	
Aircraft	225 kg	2.407 m	541.57 kg m	
Fuel	15 kg	1.524 m	22.86 kg m	
Pilot	100 kg	.889 m	88.90 kg m	
	340 kg		653.33 kg m	

CG from Datum = 653.33 / 340 = 1.921 M

Distance from Datum 1.921 - LE from Datum 1.524 = .397 m

CG = .397 / MAC 1.638 = .242 m 24.2%

9.1 CG POSITION REQUIREMENTS

The CG must never be forward further than 1921 mm from Datum nor further back than 2077 mm from Datum
The aircraft must never be flown solo from the back seat. The pilot minimum weight o 60 kg in the front seat is necessary to keep the aircraft in its CG range.
The CG range as a percentage of the chord of the wing is from 33.7% with the lightest pilot to 24.2% with the heaviest pilot.

9.2 The Dragonfly used to obtain the CG information was fitted with a 582 liquid cooled Rotax engine and a 6 blade IVO Propeller
The CG range is still valid if choice of engine is heavier or lighter.
It is permissible to move fixed items into a new position to achieve the correct balance.
The battery and parachute are two heavy items that can be mounted in new positions to achieve this result.
When an item is remounted take care that its new position does not impede its operation.

The empty weight CG should be 2.407 m from Datum or 53.9% of the MAC.
As stated in 9.2 this static empty weight balance can be achieved by remounting fixed items or adding ballast.

Aircraft Specific Weight and CG Position

Dragonfly Serial No:	
Empty weight with standard equipment:	**Kg**
Empty weight fully equipped:	**Kg**
Type: Dragonfly -	
Weight at tail wheel (M_R):	**Kg**
Weight at right main wheel:	**Kg**
Weight at left main wheel:	**Kg**
Total main wheel weight (M_F):	**Kg**
x:	**mm**
y:	**mm**
z:	**mm**
z%:	**% of MCA**
Maximum takeoff weight:	**450kg**
Maximum load:	**Kg**
Date:	
Inspector:	

9.3 Load Sheet EMPTY WEIGHT CALCULATIONS

	Weight Kg	Momentarm Meters	Moment Kgm.	Result
Left Front Wheel				
Right front Wheel				
Rear Wheel				
Fuel				
Pilot				
CoPilot				

10 TYPE PLATE DATA

Airspeed

	Solo	Dual
Stall speed	20 mph	28 mph
Maximum speed	65 mph	56 mph

Wingloading

Safe positive load	6 G
Safe negative load	4 G

Maximum operational windspeed

Laminar windflow	65 mph
Turbulent conditions	56 mph
Crosswind takeoff	15 mph

Aircraft load

Maximum load	See section 9.2
Minimum load	60 kg

The use of the aircraft is the sole responsibility of the pilot

Manufacturer _____

Serial No. _____

LTZ No. _____

Build year _____

Month _____

Empty Weight _____

11. EMERGENCY PARACHUTE SYSTEM

The manufacturers recommendations for mounting and maintaining the emergency parachute must always be adhered to. The parachute has its own operations manual that is supplied separately with this aircraft.

It is especially important to protect the parachutes from moisture. If the parachute ever gets moist or wet it must be opened, dried and repacked.

Parachutes with rocket deployment have a limited life span of the rockets.

The parachute and rocket should be returned to BRS each 5 years for recharge and repack.

There is a safety pin to prevent accidental deployment. This must be removed before each flight and replaced after each flight.

Before each flight check that the parachute is securely mounted on the aircraft and that the bridle is securely attached to the main root tube.

12 AIRCRAFT PERFORMANCE

The following stated aircraft performances are valid for the Dragonfly fitted with a 582 Rotax two stroke.

Four to one Gearbox ratio with a 6 blade IVO (Ground adjustable) Propeller.

12.1 Takeoff Distance:-

The stated values are valid at sea level in nil wind conditions and at temperature of 15 degrees C. The takeoff weights in the two cases were 340 kg solo and 430 kg two place on an even dry short grass runway.

Higher temperature, weight or altitude will require additional runway.

From a standing start the distance to take off:-

Solo	65 m
Two place	110 m

Take off distance to clear 15 m high obstacle:

Solo	150 m
Two place	300 m

Take off speed:

Solo	30 mph
Two place	40 mph

Speed on clearing a 15 m obstacle:-

Solo	35 mph
Two place	45 mph

12.2 CLIMB RATE

The stated values are for similar conditions as 12.1 and with engine operating at .6400 rpm.

Best climb rate is achieved:-

Solo	@	32 mph	@	1100 ft/min
Dual	@	37 mph	@	700 ft/min

12.3 CRUISING SPEED & RANGE ON 20 LT FUEL

Two stroke engines and the Dragonfly are **inefficient at high speed.**
Cruise at 5000 rpm will give 45 mph
Consumption at cruise is 8 lit per hour
Range is approximately 100 miles.

12.4 PERFORMANCE WITH ENGINE OFF

Minimum sink rate @ 35 mph

Solo	-	450 ft/min
Dual	-	550 ft/min

Best glide angle

Solo	35 mph @ 450 ft/min	= 7 to one
Dual	45 mph @ 550 ft/min	= 7.5 to one

The Dragonfly behaves much like a loaded truck rolling downhill.
More weight gives a better glide angle.

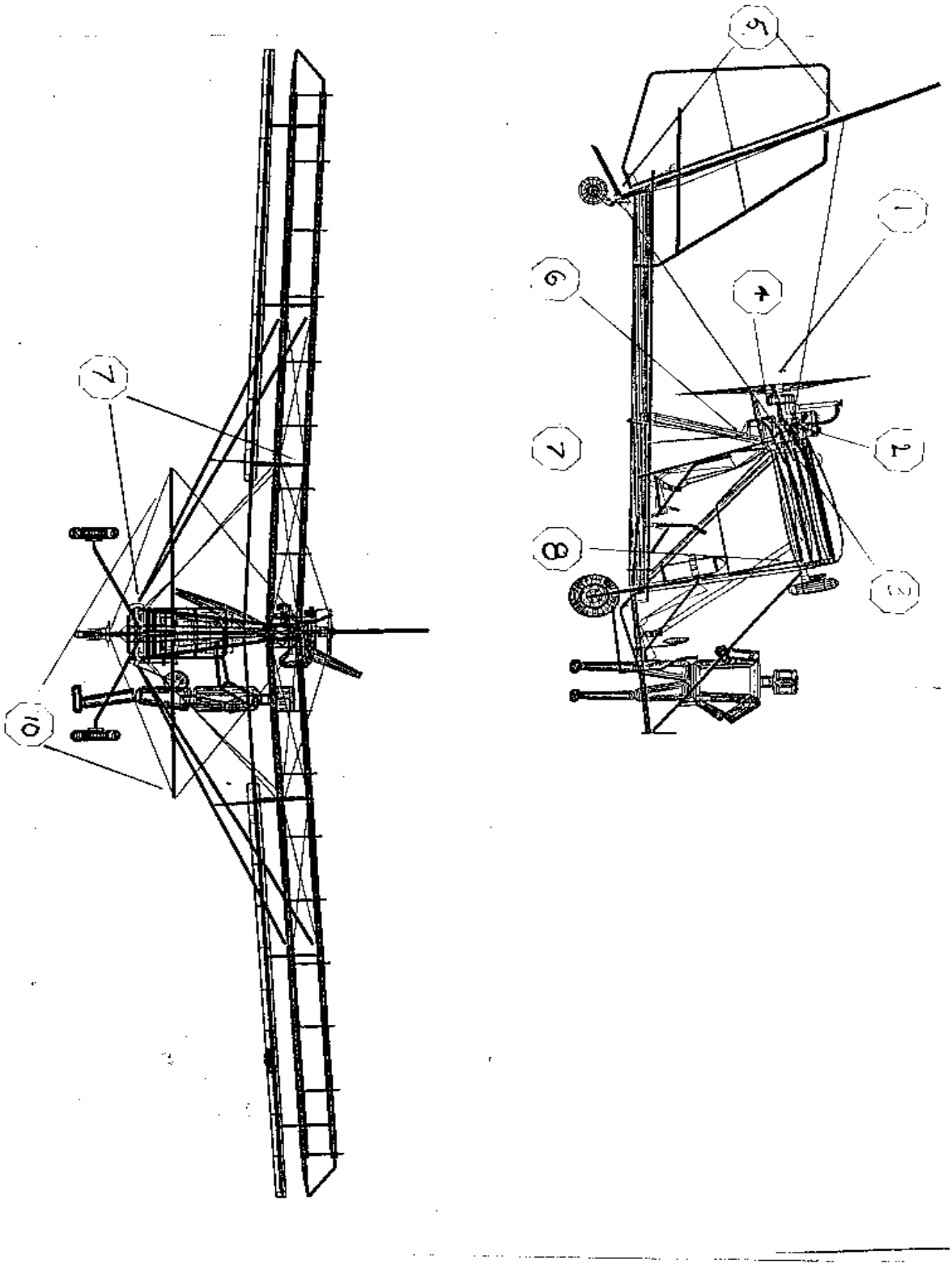
13 AIRCRAFT ASSEMBLY

Transport on trailer requires

1: Remove propeller - 6 mounting bolts
2: Disconnect throttle and carburetors
Disconnect Fuel Line and primer
Disconnect multi plug wiring
3: Disconnect starter cable
Remove gap cover and wing straps
4: Remove engine by removing 6 bolts through Lord mounts
5: Disconnect rear wing to tail cables at tail and fuselage
6: Disconnect Aileron push rods and Aileron torque tube
7: Disconnect struts at bulkhead and jury struts.
8: Remove 4 wing mounting bolts and remove wings with struts attached to wings. Fold jury struts to main strut.
Fold main struts to wings.
9. Mount wings on trailer. (See Sketch)
10. Disconnect horizontal stabilizer support cables by removing AN3 bolt at Stabilizer ends. Disconnect elevator connecting bracket.
11. Horizontal stabilizer and elevator will fold up to the vertical stabilizer and Rudder. Tie both the horizontal stabilizer tips together.
12. The fuselage and cockpit is easily handled and mounted on or in a trailer. For assembly Reverse the procedure.

Two skilled people can assemble a Dragonfly in 20 minutes.
Some of this procedure can be avoided by leaving the engine and propeller mounted if your trailer has sufficient space.

The engine must be supported in the trailer when the wings and struts are removed.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14 PREFLIGHT CHECKS

Every day the plane is prepared for flight the entire aircraft must be subjected to a preflight check whereby the pilot visually checks the aircraft to ensure that the aircraft is in a state safe for flying.

Sketch on next page:-

Conduct the preflight check as a walk around the aircraft starting at the nose while checking the following parts of the aircraft;

1) Aircraft and engine controls.
For each seat check that the rudder pedals and stick moves freely into all extreme positions. Check the links and connections on the stick and rudder to ensure that they are connected correctly and secured.
Check the condition of the seats and check that the seatbelts are securely fastened. Check that the fuel tank is securely fastened and with the cap screwed tight and containing the sufficient amount of fuel for the intend flight time.

2) Instruments.
Check that airspeed indicator works by blowing across the pitot tube, *never blow directly into the tube as this can permanently damage the instrument.* Ensure that the needle returns to zero position. Check the correct needle position of the other instruments.

3) Undercarriage and main wheels.
Check (visually) that the tyres have the correct air pressure. Check that the tyres are free of any damage. Check that the wheel nuts are in place and that the chrome molly axles are securely fastened to the fuselage.

4) Emergency parachute.
Check that the emergency parachute is securely fastened to the aircraft with the cover sitting in the correct position and with the bridle secured around the main root tube. Remove the safety pin from the release handle.

5) **Inside and left part of the wing**.

Remove the inspection panel behind the parachute and inspect the inside of each side of the wing ensuring that all battens are in place and that all tubing is undamaged. Replace the inspection panel and secure using the velcro strips. Check that the dacron wing surface is free of holes or other damage. Check that each end of the strut is securely fastened on the fuselage and wing respectively.
Check that the aileron is securely fastened to the wing and that it moves freely between the extreme positions. Check that the linkages and connections to the control surface are securely fastened.

6) **Engine and propeller**.

Check that the propeller is free of damage, especially delamination of the composite material. Check that the engine and muffler is securely fastened to the engine assembly plate and that this is securely fastened to the aircraft. Ensure that all safety wires are in place as required on the propeller, gearbox and engine bolts. Check that the oil tank and the radiator are filled and check that the ignition cables are securely in place on the spark plugs.

7) **Tail.**

Check that the rudder and elevator moves freely between the extreme positions.

Check that the linkage and connections for the control surfaces are securely fastened. Check (visually) that the tail wheel tyre has the correct air pressure and is free of damage. Check that the wires from the rudder pedals are connected correctly to the steering plate.

8) **Right part of the wing**.

As outside of the left wing.

14.1 Checklist Prior to Takeoff

Immediately prior to takeoff the pilot must go through the following Start Checklists:

1) Seatbelts securely buckled

2) Free movement of rudder pedals and stick to the extreme positions.

3) Safety pin removed from parachute release.

4) Sufficient fuel in tank for the intended flying time

5) Choke **ON**

6) Electrical instruments **ON**

7) Adjust altimeter

8) Check wind direction.

9) Test engine response to throttle

15 AIRCRAFT MAINTENANCE AND SERVICE

1) ***Maintenance and service***. All maintenance and service must be carried out by a skilled person. Any repairs or changes to the aircraft have to be reported and inspected.

2) ***Airworthiness inspection***. In the case of an experimental aircraft it is the responsibility of the builder or by a person appointed by the local authority.

3) ***Airframe repair***. Should be effected by the builder or appointed person using genuine or approved parts. Damaged parts should not be used for repair work.

4) ***Sail repair***. Small tears in the sailcloth on the wing, stabilizers and control surfaces can be fixed by means of self adhesive cloth, this can be purchases from the manufacturer or most sail lofts. When cutting the patch always round the corners off. Larger tears and damage to stitching in the sail should always be repaired by a sailmaker.

5) ***Maintenance and cleaning***. All metal parts are anodized to protect against corrosion and does not require any particular maintenance. The sail or airframe can be cleaned using water if grease or oil stains from the engine or exhaust has to be removed use warm water with a bit of dishwashing liquid. Do not use organic solvents to remove stains from the sailcloth.

6) ***Irregularities***. Technical irregularities or other deficiencies of the aircraft must be reported to the manufacturer.

7) ***25 hour check***. For every 25 hours of airtime the following must be checked:

The sparkplugs, the connections and linkages from the stick and rudder pedals to all control surfaces, if necessary oil or grease as required. Prop mounting bolt tension.

8) ***50 hour check***. For ever 50 hours of airtime the entire aircraft must be checked to the same extent as the preflight check (see section 13). Each of these checks should be documented with a completed checklist. The checklists should be filed chronologically.

9) ***Engine service and maintenance***. For service and maintenance of the engine please refer to the Rotax engine manual provided separately with this aircraft.

300 hour engine check. For every 300 hours of airtime the engine must be serviced by the manufacturer or an approved mechanic.

16 DIMENSIONS AND ADJUSTMENT DATA

Wingspan:	10.580 m
Wing area:	17.02 m sq
Wingchord:	MAC 1.638 m
Dihedral of wing:	2.25 degrees

The flapperons are mounted in a permanent flaps on position at an angle of 13 degrees posative to the wing. To accommodate all low speed requirements such as towing or flights on floats where low speed is essential.

The flapperons can be raised to 10 degrees posative by repositioning the anchor bolt in the additional hole on the flap adjusting bracket.
The horizontal stabilizer is set at 13 degrees negative angle to the wing to correct the pitching moment generated by the flapperons.
The range of 10 degrees to 13 degrees on the flapperons will be balanced by the fixed setting on the horizontal stabilizer.
Do not adjust the flapperons outside this range.