FLIGHT and OPERATING MANUAL

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Manufacturer:	G1Aviation
Year of construction:	
Model / Description:	G1
Airworthiness Group:	ultralight aircraft

This flight manual belongs to the ultralight aircraft described above. It must be carried on board at all times. The operating limitations, instructions and procedures specified therein must be carefully observed by the pilot.

For the scope and status of changes, see the table of contents and the list of changes.

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Flight manual:

version 1.0	designed on	October 15, 2022	through	Günther Spitzer
version	modified on		through	
version	modified on		through	
version	modified on		through	

change log

change number and date	modified pages	Description of the change

1 General information

1.1 Introduction

This section contains general information for the pilot and owner. This information will help you become familiar with the aircraft and will provide you with important information about loading, fueling, protecting and handling the aircraft on the ground. This section also contains definitions and explanations of the symbols, abbreviations and terms used in this manual.

1.2 Abbreviations and terminology

1.2.1 Definition of speeds

CAS	Calibrated Air Speed (corrected airspeed) displayed speed corrected for installation and instrument errors
IAS	Indicated Air Speed Speed indicated by the airspeed indicator
TAS	True Air Speed = CAS corrected for air pressure and temperature errors
V_D	design speed
V_{DF}	highest speed demonstrated in flight test
V_{NE}	permissible maximum speed
V_H	Maximum speed at maximum continuous power
V_B	Design speed for maximum gust strength Design
V_A	maneuvering speed
V_{lawyer}	Max. speed in strong turbulence Design speed with extended
V_F	flaps Maximum permissible speed for operating the flaps Stall
V_{FE}	speed in landing configuration / full flaps Stall speed in cruise
V_{S0}	configuration
V_{S1}	
V_{SF}	calculated stall speed with full flaps maximum
V_T	permissible speed in aircraft tow
V_{LO}	permissible maximum speed for operating the landing
V_C	gear cruising speed
V_X	Speed of greatest climb angle Speed of
V_Y	best climb

Not all information in this manual is used; it is provided for general information purposes only.

1.2.2 Metric system / conversion values knots (kts)

	x 1,151	= miles per hour (mph)
miles per hour	x 0.8688	= knots (kts)
knots	x 1,852	= kilometers
miles	x 1,609	= kilometers
feet	x 0.3048	= meter
inch	x 25.4	= millimeter
kg/cm2	x 14.3	= PSI
US gallon	x 3,785	= Liter
ft/min.	x 0.00508	= m / sec
m / sec	x 196.8	= ft / min
pound	x 0.453	= kg
kg	x 2,208	= pound
o C		= (o F - 32) x 1.1 / 2
o F		= (o C x 2 / 1.1) + 32
kp/m2	x 0.2041	= p.sq.f.
p.sq.f.	x 4.9	= kp/m2

Information usually:

speeds in	km/h
Distances in	NM
Climb rates at altitudes in	m/s
	ft

2 Operating limits

2.1 General

2.1.1 Speed information:

Below, all speed information is based on the**indicated speed (IAS)**unless otherwise stated.

Displayed speed Calibrated	**IAS**	(Indicated airspeed)
speed True speed	**CAS**	(calibrated airspeed)
	TAS	(true airspeed)

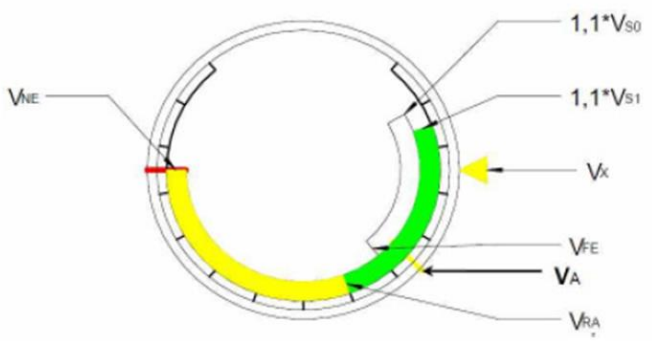
2.2 Flight speeds -

Limitations and their significance for the operation

	speed	IAS [km/h]	note
V_{NE}	maximum permissible speed	189	This speed must not be exceeded under any circumstances
V_{lawyer}	max. speed in strong turbulence	157	This speed must not be exceeded in strong turbulence. Upper limit of the green arc on the airspeed indicator.
V_A	maneuver - speed	141	Above this speed, no full or abrupt rudder deflections are permitted.
V_{FE}	maximum permissible speed for operating the flaps	109	Above this speed the flaps must not be extended. Upper limit of the white arc at
V_{SO}	Stall speed in landing configuration / full flaps	65	lower limit of the white arc on the airspeed indicator.
V_{S1}	Stall speed in cruise configuration.	70	lower limit of the green arc on the airspeed indicator.
V_{L0}	maximum permissible speed for operating the chassis	---	
V_y	speed for best climbing	105	
V_x	speed for best climbing angle	95	

2.3 Airspeed indicator markings

mark	IAS [km/h]	note
white arch	1.1*Vs0 – Vfe	Operating range with extended wing flaps.
green arch	1,1*Vs1 – Vra	Normal operating range
yellow bow	Vra – Vne	Caution area, operation only in calm weather
red radial marking	Vne	Maximum permissible speed
blue radial line	Vy	speed of best climb
Yellow Triangle	(min 1.3*Vs0) prefer more	minimum landing approach speed recommended by the manufacturer
yellow radial line	Va	Above this speed, no abrupt rudder deflections are permitted.



Airspeed indicator markings:

		IAS	CAS
white bow:	(1.1Vs0-Vfe)	**73 km/h - 109 km/h**	70 km/h - 104 km/h 74
green arc:	(1.1Vs1-Vra)	**77 km/h - 157 km/h**	km/h - 149 km/h 149
yellow sheet:	(Vra-Vne)	**157 km/h - 189 km/h**	km/h - 179 km/h 179
red line:	(Vne)	**189 km/h**	km/h

2.4 engine operating limits (engine limits)

Rotax 912 UL

Power and speed:

max. takeoff power	59.6 kW	at 5800 rpm
max. continuous speed	58 kW	at 5500 rpm
cruise flight (75%)	43.5 kW	at 5000 rpm

Rotax 912 ULS

Power and speed:

max. takeoff power	73.5 kW	at 5800 rpm
max. continuous speed	69 kW	at 5500 rpm
cruise flight (75%)	51 kW	at 5000 rpm

2.5 Engine monitoring instruments and markings

2.5.1 Oil pressure

Idle - Minimum pressure	0.8 bar	(red line)
Normal operating range	2 – 5 bar	(green arc)
Danger zone	5 – 7 bar	(yellow arc)
maximum	7 bar	(red line)

2.5.2 Oil temperature

Normal operating range	50 – 120 °C	(green arc)
Favorable operating range	90 - 110 °C	
Dangerous area	120 – 140 °C	(yellow arc)
maximum	140 °C	(red line)

2.5.3 Fuel pressure

Minimal	0.15 bar	(red line)
Maximum	0.4 bar	(red line)

2.5.4 Tachometer

Normal operating range	1400 - 5500 rpm
Caution range	5500 - 5800 rpm
Maximum permissible continuous speed Maximum	5500 rpm
permissible speed (nominal speed)	5800 rpm

2.5.5 Coolant temperature

maximum coolant temperature	120 °C

2.5.6 Cylinder head temperature (CHT)

maximum	135 °C

2.5.7 Exhaust gas temperature (EGT)

maximum	880 °C

2.6 Weight limits

2.6.1 Loading

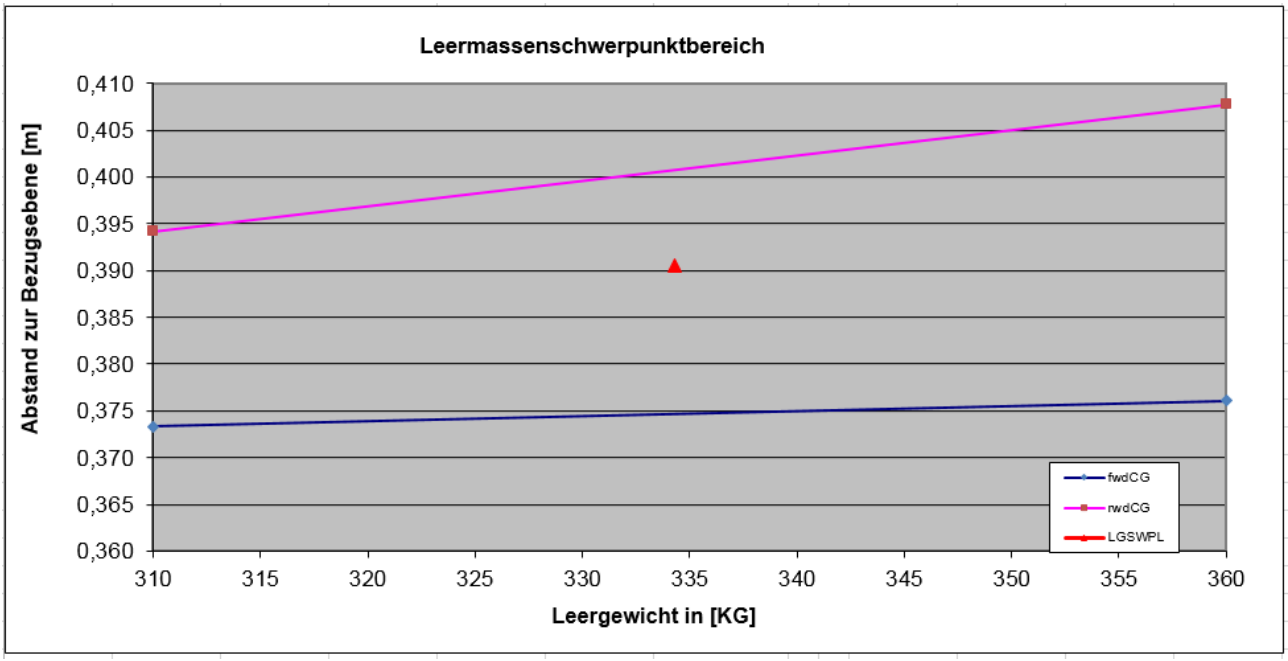
empty weight:	see weighing report
max TOW	600 kg
min TOW	390 kg
max load	see weighing report
minimum pilot weight	70 kg
max pilot weight	110 kg
max passenger weight	110 kg
max luggage	20 kg
max fuel quantity	140 liters

2.6.2 **Focus area** horizontal

reference line: reference point:	door frame below
	wing leading edge
reference level:	wing leading edge

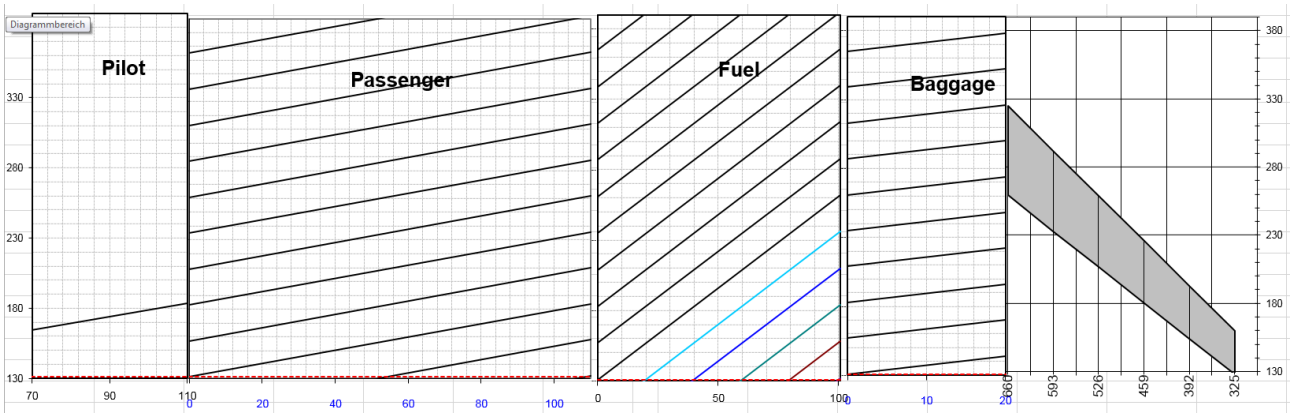
2.6.2.1 Empty weight centre of gravity area:

at	310 kg empty weight	between	373mm	and	394mm	behind BE
at	360 kg empty weight	between	376mm	and	408mm	behind BE



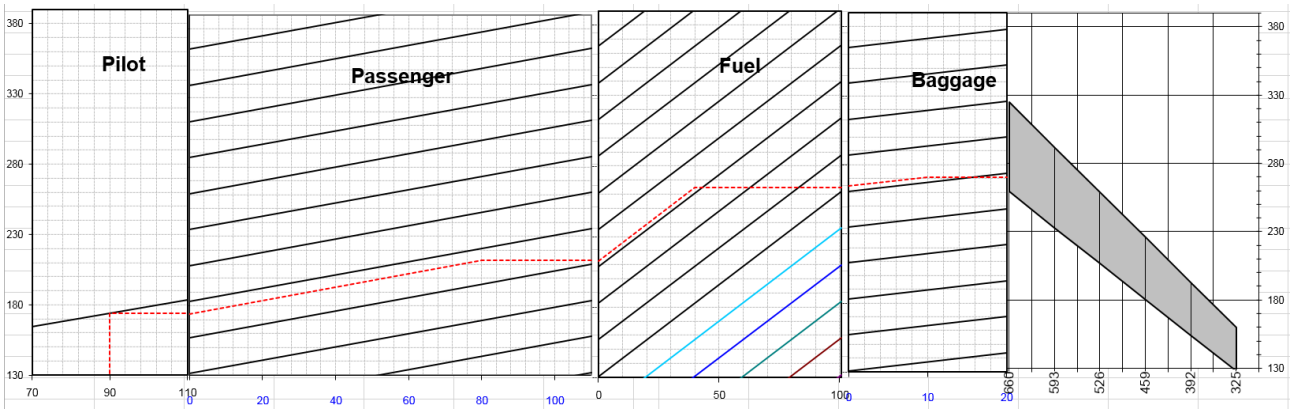
2.6.2.2 Center of gravity in flight:

Center of gravity in flight relative to	from	393mm	until	492mm	behind BE
the mean wing depth:	from	25.7%	until	32.6%	behind BE



Example:

empty weight	335 kg
pilot	90 kg
passenger	80 kg
fuel	40 kg (60L)
Baggage	10 kg
TOW	- 555 kg



Procedure:

pilot	90 kg	- - > Diagram Pilot at 90kg vertically upwards to the line	
Pax	80 kg	- - > Diagram Pax -->	parallel to the diagonal lines follow until the intersection with the vertical at 80kg
Fuel	40 kg	- - > Diagram Fuel -->	parallel to the diagonal lines follow until the intersection with the vertical at 40kg
Bag	20 kg	- - > Diagram Bag -->	parallel to the diagonal lines follow until the intersection with the vertical at 20kg

from here continue horizontally until it intersects with the vertical at the TOW of 555 kg.

The intersection point must be in the grey area, then the criteria for a permissible Center of gravity position reached in flight.

2.7 Flight Operation Limits

2.7.1 Flight figures

(approved / proven flight figures with permissible ranges of wing flap position)

Permitted flight manoeuvres: Turns with a bank angle of less than 60°.
Warning! Turning at an angle of more than 60° and aerobatics are not permitted. Tipping (especially under engine load), spinning and flight maneuvers with zero or negative load factors must be avoided at all costs. When using carburetor engines, such flight maneuvers pose an acute fire hazard!

2.7.2 Stall speeds

Vs1 =	70 km/h
Vs0 =	65 km/h
Vsf =	65 km/h

2.7.3 Speeds

Va =	141 km/h
Vfe =	109 km/h
Vlo =	omitted
Vra =	157 km/h
Vne =	189 km/h
Vdf =	210 km/h

2.7.4 Maximum permissible flight load factors

for V_A	=>	+ 4g / -2g
for V_{NE}	=>	+ 4g / -1.5g

2.7.5 Crosswind component during takeoff and landing

(limits for permissible wind conditions)

the highest verified crosswind component for take-off is: the highest verified	25 km/h
crosswind component for landing is:	25 km/h

2.8 Further limitations

2.8.1 Placeholder 1

2.8.2 Placeholder 2

2.8.3 Placeholder 3

3 emergency procedures (Information on procedures in case of emergency)

3.1 Emergency Procedures - Checklist

The following basic functions must be ensured in the event of an emergency landing:

1. Main switch	OUT OF
2. Magnets	OUT OF
3rd fire cock	TO
4. Belts	FIRMLY
5. Landing direction	Wind direction? Slope angle?
6. Door lock	Opening?

3.2 Flight speeds for safe operation

The following speeds should not be exceeded:

1. minimum final approach speed	100 km/h
2. minimum final approach speed in crosswind	110 km/h
3. Speed for best gliding	100 km/h
4. best climb speed	110 km/h

3.3 Engine failure

3.3.1 during the takeoff run (with sufficient runway length ahead)

1. Throttle lever	idle
2. Brakes	operate
3. Ignition switch	OUT OF
4. Main switch	OUT OF

3.3.2 after takeoff

1. Gliding speed	100 km/h
2. Ignition switch	OUT OF.
3. Magnets	OUT OF
4. Main switch	OUT OF

3.3.3 during the flight

1. Gliding speed	100 km/h
2nd fire cock	ON
3. Tank selector switch	check
4. Fuel pump	A
5. Ignition	EIN (BOTH)
6. Throttle control lever	about 2cm open
7. Starting tests	max. 2-3 times

If the propeller no longer rotates due to the airstream, the engine must be turned over using the starter motor. If the engine does not start, find an area free of obstacles and prepare for an off-field landing as follows:

1. Throttle control lever	CLOSED (fully pulled out)
2nd fire cock	CLOSED
3. both ignition switches	OUT OF
4. Main switch	OUT OF
5th speed	110 km/h

3.4 Take off

Follow the following order:

1. Be prepared for increased tax forces!!!	
2. Throttle control lever	VOLLGAS
3rd climb	min 100 km/h
4. at a safe height	retract flaps

3.5 Fires

3.5.1 Engine fire during start-up on the ground

Incorrect starting procedures, such as excessive activation of the auxiliary fuel pump, can result in a carburetor fire.

1. Auxiliary fuel pump	OUT OF
2. Fuel taps	close
3. Throttle control lever	ON (Full throttle)
4. Ignition	OUT OF
5th fire	if necessary, extinguish with fire extinguisher

3.5.2 Engine fire in flight

Although engine fires in flight are extremely rare, the following steps should be taken if one does occur:

1st fire cock	TO
2. Main switch	OUT OF
3. Gliding flight	initiate (100 km/h)
4. Propeller adjustment	highest speed (smallest gradient)
5. Ventilation nozzles	close

6. Choose a suitable field for the emergency landing
7. If the fire is not extinguished, increase gliding speed in an effort to find a speed at which a combustible mixture is no longer formed
8. Carry out an emergency landing as described in the paragraph "Emergency landing with the engine stopped". Do not attempt to restart the engine

3.5.3 Wing burn

1. Main switch	OUT OF
2. Ventilation	close

If necessary, perform a slip to keep flames away from the fuel tank and cabin.

3.5.4 Cable fire in flight

1. Main switch	OUT OF
2. All other switches (except magnets)	OUT OF

3. If the magnets remain on, the motor continues to run independently of all other electrical systems.

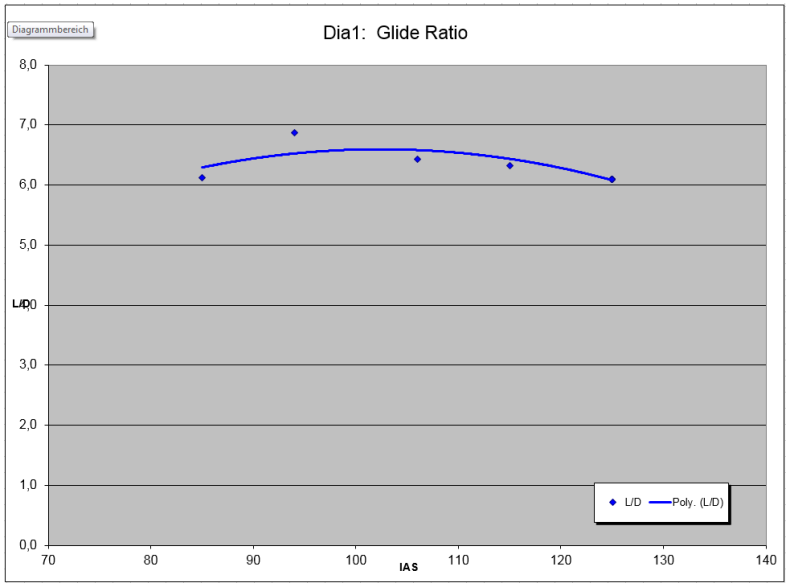
3.6 Emergency descent

1. Throttle control lever	idle
2nd descent	Do not exceed Vne

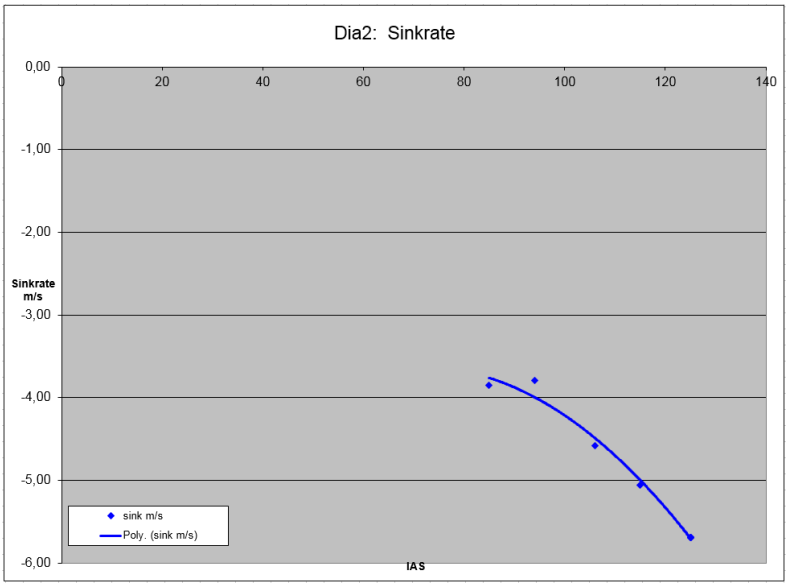
3.7 Gliding

Conditions: - Propeller rotating in the wind (engine idling)
- Speed: 100 km/h IAS

glide ratio 1:6.5 at about 100 km/h



minimal sinking: 3.8 m/s at about 85 km/h



3.8 Emergency landings

3.8.1 Precautionary landing with engine power (safety landing)

Before attempting a "safety landing", you should fly over the landing area slowly at a safe altitude, but low enough to check the terrain for condition and obstacles. To do this, proceed as follows:

1. Fly slowly over the selected area and evaluate the preferred touchdown area for the next landing approach.
2. Approach at normal approach speed km/h
3. Unlock doors in time.
4. During final approach, turn off all switches except magnets
5. Put on fully covered

3.8.2 Emergency landing with engine stopped

If time permits,

1. Check fuel level
2. Check the position of the fuel taps --> both UP
3. fuel pump --> A
4. Starting tests --> max. 2-3 times

If restart attempts fail, prepare for an emergency landing and select a suitable site.

3.9 Engine: rough engine running or loss of power

3.9.1 Magneto malfunctions

Sudden rough engine operation or misfire is usually a sign of magneto trouble. Land at the first opportunity.

3.9.2 Low oil pressure

If low oil pressure occurs together with normal oil temperatures, this indicates the possibility of a malfunction of the oil pressure gauge or the pressure relief valve. It is advisable to land at the nearest airfield to determine the cause of the malfunction. If a complete loss of oil pressure occurs together with an increase in oil temperature, this is reason enough to suspect impending engine failure. Therefore, immediately reduce engine power and look for a suitable field for an emergency landing / safety landing.

3.10 malfunctions in the electrical system

3.10.1 insufficient charging current indicator light RED

If the red indicator light is on during flight, it indicates that the generator is not supplying power to the system. All non-essential systems should be turned off.
There are no safety-relevant systems on board that would make an immediate landing at the nearest airport or even an off-airport landing necessary. However, during the flight, more attention should be paid to other signs of failure or, for example, the smell of burning, in order to be able to take appropriate measures at an early stage.

3.11Spin

Intentional spinning is not permitted.
The spin characteristics were not tested during certification! If the
aircraft goes into a spin, activate the rescue system!

3.12 Other emergency situations

3.12.1 Flight in icing conditions

Flying under known icing conditions is strictly prohibited. If icing occurs despite all precautionary measures, proceed as follows:

1. Turn around or change altitude to reach temperatures where icing is less likely.

2. Increase the speed to keep ice buildup on the propeller blades as low as possible
3. Plan a landing at the nearest airfield. If ice forms extremely quickly, look for a suitable area for an "outside landing"
4. If the ice on the leading edge of the wing is more than 5 mm, you must be prepared for a significantly higher stall speed
5. If necessary, perform a forward slip during the landing approach to improve visibility
6. Carry out approach at approx. 110 km/h
7. Steep turns during the landing approach should be avoided

3.12.2 Failure of the altitude control

The desired flight attitude can be maintained by trimming and/or regulating the engine power. If necessary, deploy the rescue device.

3.12.3 Failure of the aileron control

Light turns can still be flown using the rudder control. Crosswind landings should be avoided. If necessary, deploy the rescue system.

3.12.4 Failure of the rudder control

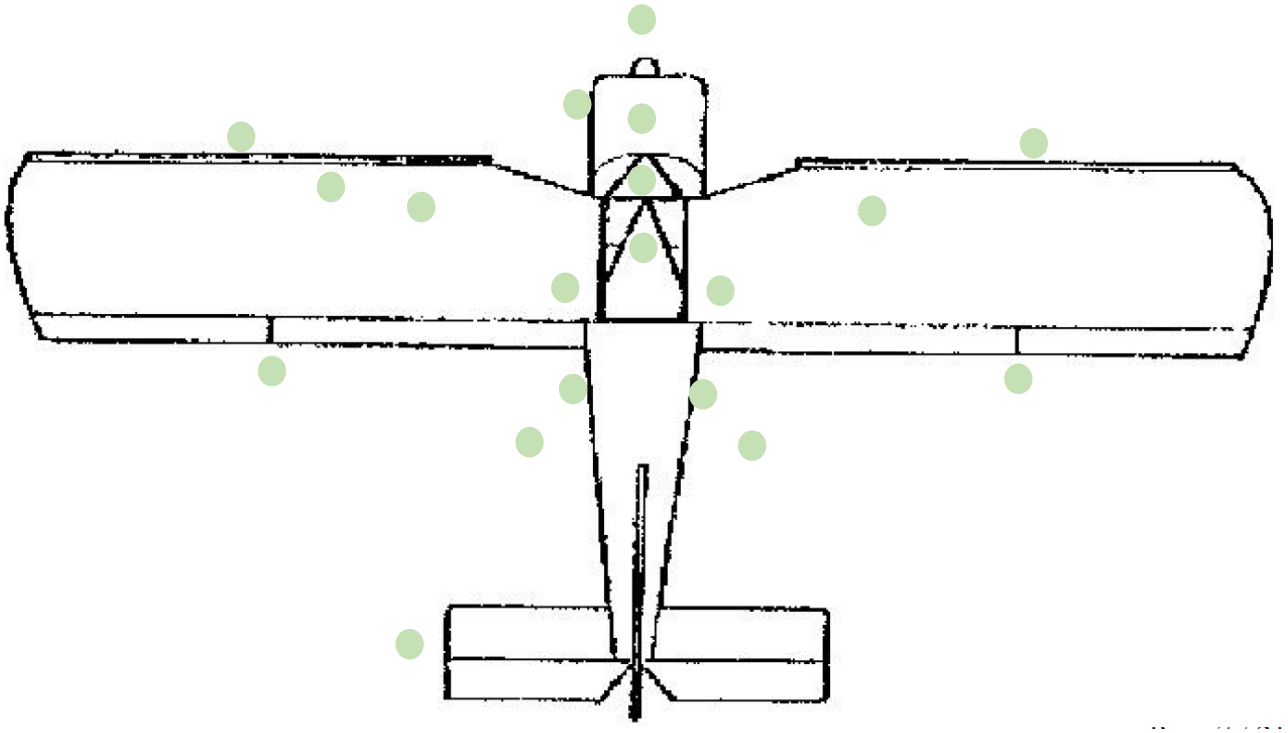
Light turns can still be flown using the aileron control. Crosswind landings should be avoided. If necessary, deploy the rescue system.

4 Normal operating procedures

4.1 General

4.2 Checklists "Normal Operating Procedures"

4.2.1 On the ground (pre-flight check)



pre-flight inspection

!!! - - - IGNITION - - - OFF - - - !!!

A)**propeller**	Damage, cracks, fastening screws, turning foreign bodies,
B)**engine**	leakage, missing or loose fastenings
	tight fit of all hoses / cables / carburettor Engine mount Rubber
	elements Function / cracks / tight fit Oil level? Coolant (only
	check expansion tank) Water separator: check, empty

C)**nose gear**	Condition, tire pressure, skid mark, rubber elements
D)**left statics decrease**	contamination
E)**chassis**	check (screws) tire pressure, slip
E)**left wheel**	mark, condition of leaks, dirt
E)**left brake unit**	
F)**tank cap**	tight, dense
F)**tank ventilation**	pollution
G)**pitot tube left strut**	Damage, dirt Damage / dirt Clearance,
H)**left wing nose**	play, damage Damage / dirt
I)**left QR / flaps**	
J)**hull**	
K)**Elevation/Windage/Trim**	clearance, play, damage
L)**hull**	Damage / contamination Free
M)**right QR / flaps**	movement, play, damage Damage /
N)**right wing nose**	contamination stuck, tight
O)**tank cap**	
O)**tank ventilation**	pollution
P)**chassis**	check (screws) tire pressure, slip
P)**right wheel**	mark, condition of leaks, dirt
P)**right brake unit**	
Q)**right statics acceptance**	pollution
R)**driver's cab**	Foreign bodies, loose objects, glazing, freedom of movement of the control fuses, rescue equipment secure fit
S)**fuel**	enough for flight plans + reserve

4.2.2 Before starting

fuel level	check all containers
fuel tap	all open (or as needed)
parking brake	dressed
doors	closed and locked
security goods	
altimeter	set
throttle	idle
choke	activated (when the engine is
rescue device	cold) released
main switch	a
strobe	a
magnets	both ON
propeller zone	FREE
ignition key	Start
oil pressure	min 3 bar after 10sec
warm-up	2 min 2000 rpm then 2500 rpm
radio/transport	

4.2.3 Before the start

magnet check	4000, drop max. 300, difference max. 115
fuel tap	right / left open
choke	normal
Succeed	Take off
trim	neutral (middle)
rudder control	freely moving
oil pressure	1.5 - 5 bar
oil temperature	min 50°
TO briefing	departure route, emergency landing options

4.2.4 S tart

speed	Minimum 5000 rpm
Drive	In a flat climb to about 110 km/h

4.2.5 climb

engine power	adjust
best climb	105 km/h
best climbing angle	95 km/h
retract flaps	At a safe height
instrument control	

4.2.6 Before the landing

downwind approach:

instruments	control
speed	120 km/h
Succeed	half
Trim	110 km/h

final approach

speed	110 km/h
Succeed	full
Trim	110 km/h

4.2.7 After landing

landing flaps	retract
fuel taps	both close
throttle	idle
radio/transport	out of
magnets	out of
Strobes/Nav	out of
main switch	out of
rescue device	secure

engine failure high altitude

Trim	110 km/h
control	gasoline
	magnets
	main switch
	instruments
	Start attempts max 2-3 times
terrain	without obstacles
wind direction	?
slope landing	?
radio	Mayday-Mayday-Mayday
straps	pull tight
doors	unlock
magnets	out of
main switch	out of

engine failure low altitude

RESCUE DEVICE	**TRIGGER**
magnets	out of
main switch	out of
straps	tight
doors	unlock

4.3 Extended Descriptions (Normal Operating Procedures)

4.3.1 Starting the engine

- Check carried out before take-off	
- brake	fix
- main switch	A
- electrical consumers	Out of
- Fuel taps both	On
Cold start:	
- throttle	Neutral (rear position) On
- Choke	(rear position)
Warm start:	
- throttle	A little gas (approx. 1-2cm)
- Choke	Off (front position)
- Propeller	FREE
- starter	operate
- oil pressure	check (min 3 bar within 5sec)

4.3.2 Warming up

- brake	fix
- Warm up	1400 -2000 RPM
- Operating temperature oil	approx. 50°
- Check magnets	4000 RPM (One circle from: should not drop more than 150 rpm) only
- full throttle	possible from 50°C oil temperature

4.3.3 Roles

Steer with the rudder pedals. The handbrake acts on both wheels simultaneously.

4.3.4 Starting the engine in flight

(Procedure for starting the engine in flight if special procedures are necessary)

Same starting procedure as for normal starting. Because the engine cools down very quickly when not in use, it may be necessary to set the choke.

4.3.5 Overdrawing

4.3.5.1 Aircraft – Behavior

The UL reacts well to a stalled flight condition. It shows no tendency to tip over or spin. The stalled flight condition is announced by a decrease in the effectiveness of the controls. The rudders become 'soft'.

4.3.5.2 Stall warning

There is no stall warning. The stalled flight condition is announced by a decrease in control effectiveness. The rudders become 'softer'.

4.3.5.3 Stall speed in different states

V_{S1}	70 km/h	(IAS)
V_{S0}	65 km/h	(IAS)
V_{SF}	65 km/h	(IAS)

4.3.5.4 Recovery from the stalled flight condition To end

the stalled flight condition

ONLY move the control stick forward, NO aileron input and NO rudder input.

==> Control stick forward (lead) ==>

Aileron to the middle

==> Rudder neutral

Loss of altitude when exiting the stall

max. approx. 100ft (30m)

maximum longitudinal inclination below the horizon when exiting the stalled flight condition

approx. 20°

4.3.6 Start

4.3.6.1 Procedure for normal start

After the corresponding operating values have been reached:

- Set flaps as required. Level 0 or 1.
- quickly accelerate to full speed (check that the tachometer shows at least 5000 rpm)
- Keep the control stick in the neutral position, pulled slightly if necessary.
- Allow the aircraft to continue accelerating in this attitude until it takes off on its own.
- Accelerate gently near the ground until the airspeed indicator shows at least 110 km/h.
- Climb at approx. 100 - 110 km/h.
- at a safe altitude - retract the flaps.

4.3.6.2 Crosswind during takeoff

In crosswind conditions, the control stick must be deflected against the wind, depending on the crosswind component, in order to keep the windward wing 'down'. After takeoff, the bank angle must be corrected accordingly.

The highest detected crosswind component at takeoff is approx.**25 km/h**.

4.3.6.3 Take-off distances

The take-off distance on a short-mown grass track over a 15m obstacle is approximately 330m (100hp) at sea level and in standard atmosphere.

Notes:

For every 14°C above standard temperature, the distances mentioned for the relevant altitudes must be increased by 10%.

Headwind:	For every 10 km/h the take-off distances must be shortened by 10%.
tailwind:	For every 10 km/h the take-off distances must be lengthened by 10%.

4.3.7 Landing

4.3.7.1 Procedure for normal landing

downwind approach:

- Speed 120 km/h
- trim set
- instruments control
- petrol transmission check, fill up the tank
- fuel pump
- wind conditions evaluate

Cross approach:

- Speed 110 km/h
- landing flaps level 2
- trim set

final approach:

- Speed 100km/h
- landing flaps level 3
- trim set

Landing:

- Gas idle
- Catch and float until the UL touches down in 3 point position.
- apply the brake if necessary

4.3.7.2 Procedure for landing in crosswinds downwind

approach:

- as with a normal landing

Cross approach:

- as with a normal landing

final approach:

- Speed 110 km/h
- landing flaps Set level 1 (max.
- trim 2)

Landing:

- Allow the wing facing the wind to hang. Hold the ailerons forward against the crosswind.
- Align and maintain the aircraft's longitudinal axis straight in the approach direction using rudder control.
- If necessary, touch down on one wheel at a slightly increased speed.
- after touchdown - continue to hold the ailerons against the crosswind - do not neutralize them.

The highest recorded crosswind component during landing is approximately 25 km/h.

4.3.7.3 Landing without engine power

final approach:

- Speed 110 km/h
- landing flaps level 3
- trim set

Landing:

- Catch and float until the UL touches down in 3 point position.

4.3.7.4 Landing distances

The landing distance on a short-mown grass runway over a 15m obstacle is approximately 350m at sea level and in standard atmosphere.

Note:

1. For every 5 kts of tailwind, the distances must be increased by 30%.
2. These figures assume IAS = 110 km/h when flying over the 15 m obstacle

4.3.8 Assembling and disassembling

see 8.1.3.1 Upgrade
and 8.1.3.2 Disarm

5 flight performances

5.1 General

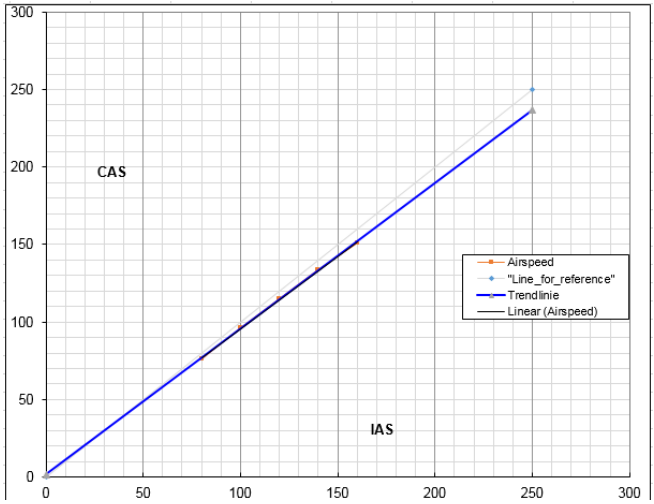
5.2 Speed correction (CAS vs. IAS)

This diagram allows the conversion from IAS (Indicated Air Speed) to CAS (Calibrated Air Speed) and vice versa. It is assumed that the instrument itself has no error.

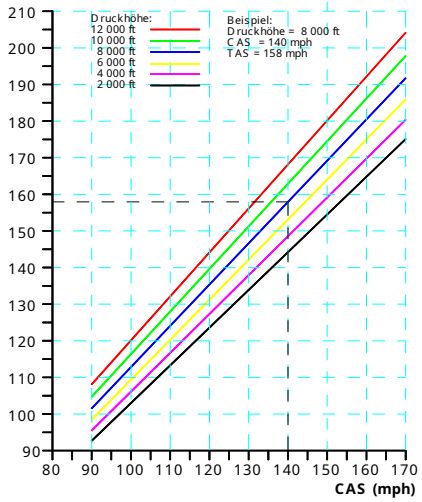
Conversion table:

	IAS	CAS	CAS	IAS
1	80	77	80	83
2	90	86	90	94
3	100	96	100	105
4	110	105	110	115
5	120	114	120	126
6	130	124	130	137
7	140	133	140	147
8	150	143	150	158
9	160	152	160	169
10	170	161	170	179
11	180	171	180	190
12	190	180	190	200
13	200	190	200	211

graphical representation:



5.3 Altitude correction for speed (TAS vs. IAS)



The diagram shows the altitude correction to convert the calibrated speed (CAS) to the true speed (TAS) at certain altitude levels.

5.4 Climbing performance

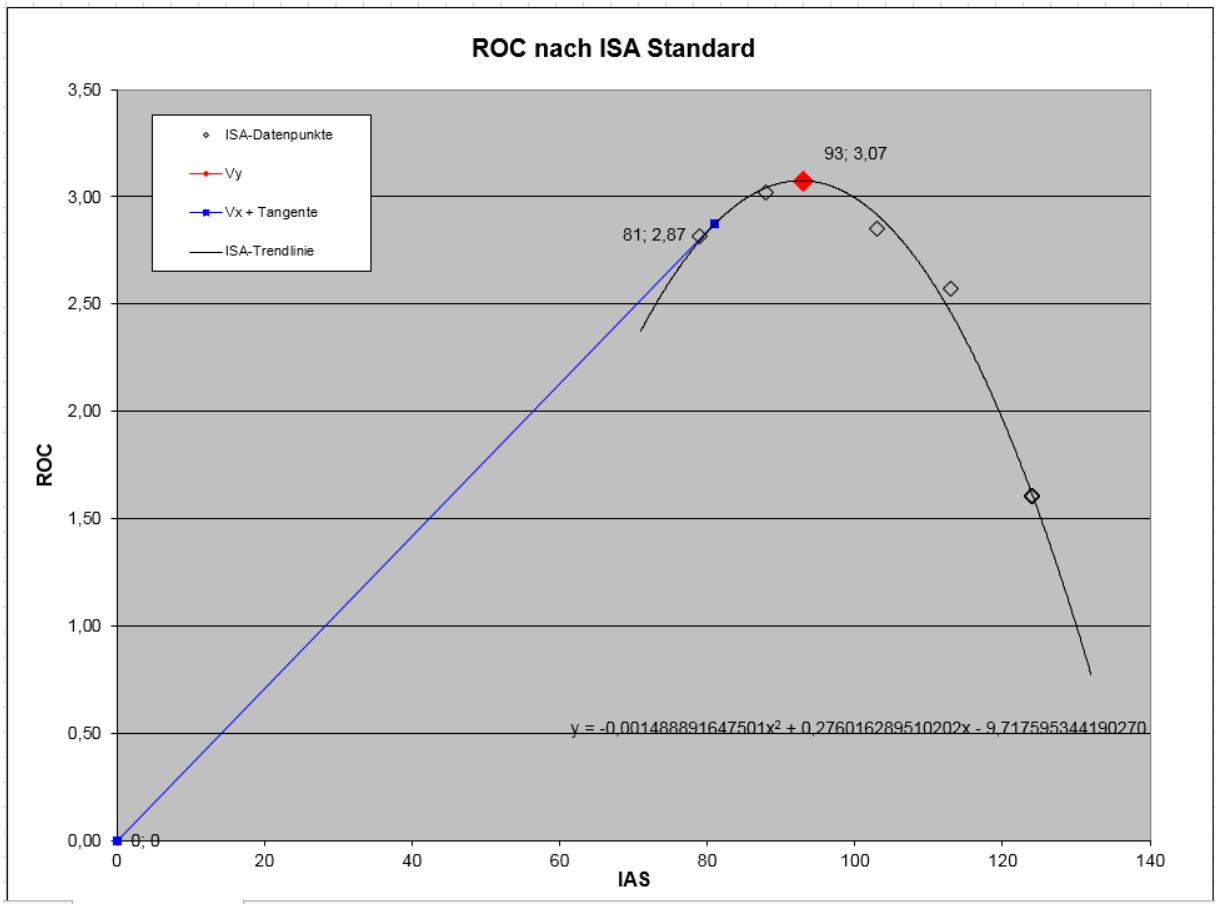
5.5 Speed for best / steepest climb

Speed for the **"best climbs"** with MTOW (sea level / ISA)

Speed: V_Y = 105 km/h (IAS) climb rate ROC = 3.07 m/s

Speed for the **"steepest climbs"** with MTOW (sea level / ISA)

speed Vx = 95 km/h (IAS) climb rate ROC = 2.87 m/s



6 Weight and center of gravity determination

MaxTOW	=	600kg
empty weight	=	approx. 330kg
payload	=	approx. 270kg

6.1 Weighing procedure

6.1.1 Weighing equipment

- 3 calibrated scales (measurement accuracy min 0.5kg)
- frame for jacking up (for tailwheel aircraft)
- spirit level
- wheel chocks
- spacers for height adjustment
- tape measures
- plummet
- possibly chalk or chalk line
- fuel tank
- Flight manual / manufacturer specifications.

6.1.2 Requirements

- flat ground
- closed room
- no temperature fluctuations, (enough time for acclimatization)
- UL must be dry and clean

6.1.3 Preparation

- Drain the fuel; only the amount of fuel that cannot be used up should remain in the tanks. (Caution: take safety precautions - e.g. provide fire extinguishers, etc.)
- remove ballast
- Clean
- Remove all items that are not part of the equipment and furnishings.
- Check and, if necessary, correct the equipment and furnishings list.
- Preparing the racks for jacking up – adjusting the height
- Preparing the scales – zeroing etc.

6.1.4 Implementation

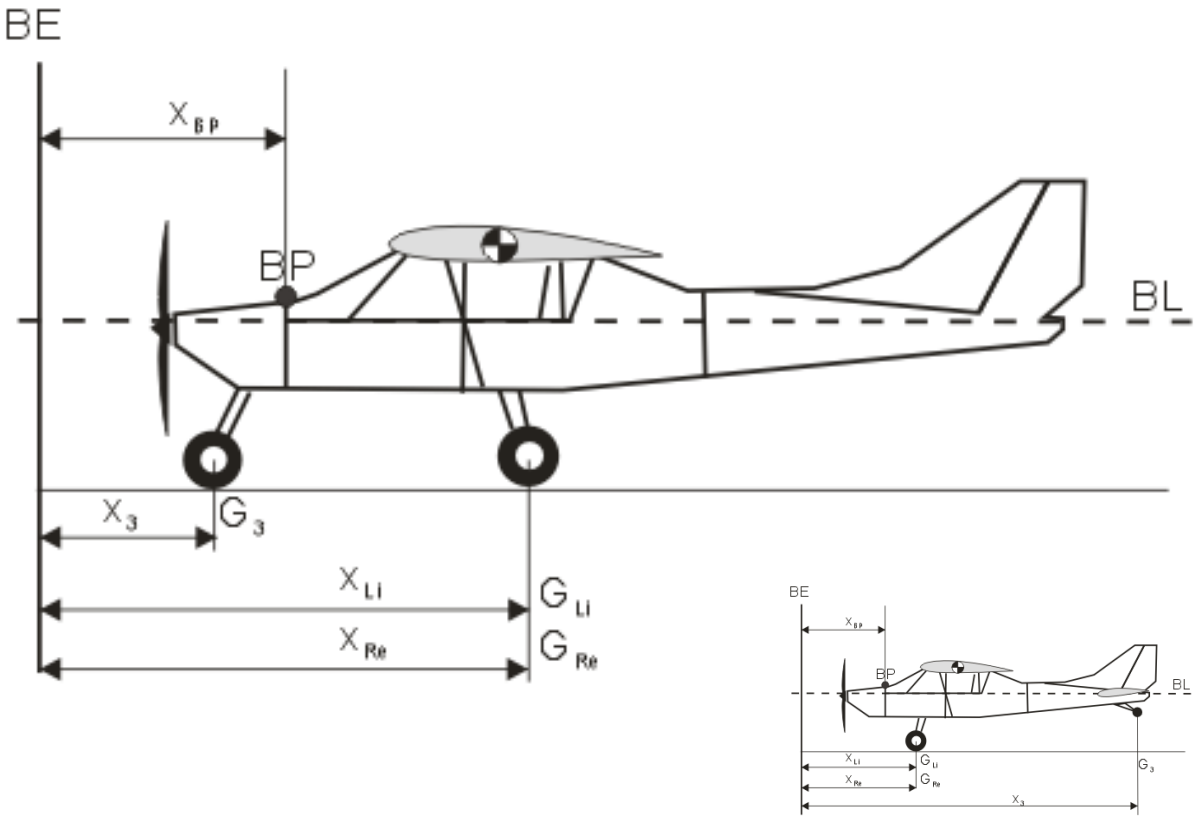
- Place UL on scales and secure against rolling away
- Check the horizontal reference line using suitable means, e.g. spirit level
- Determine the weights of all scales and enter them in Table 1: GLi, GRe, G3
- Enter individual moments: MLi, MRe, M3
- Determine empty weight: G = GLi, GRe, G3 M
- Determine total moment: = MLi, MRe, M3 S =
- Determine empty mass center of gravity: M / G
- Determine and enter values for Table 2:

6.2 Determination of the empty weight center of gravity

6.2.1 Diagram

BL=horizontal reference line
BP=reference point
BE=vertical reference plane

G_{Li}=weight on the left main gear wheel **G_{re}**= weight on the right main gear wheel **G_3**= weight on the tail wheel or nose wheel
x_{Li}=lever arm reference plane to left main gear wheel **x_{re}**= lever arm reference plane to left main gear wheel **x_3**=Lever arm reference plane to tail or nose wheel



horizontal reference line:	door frame bottom edge	(2° slope forward)
reference point:	wing leading edge	
reference level:	wing leading edge	

6.2.2 Empty weight center of gravity

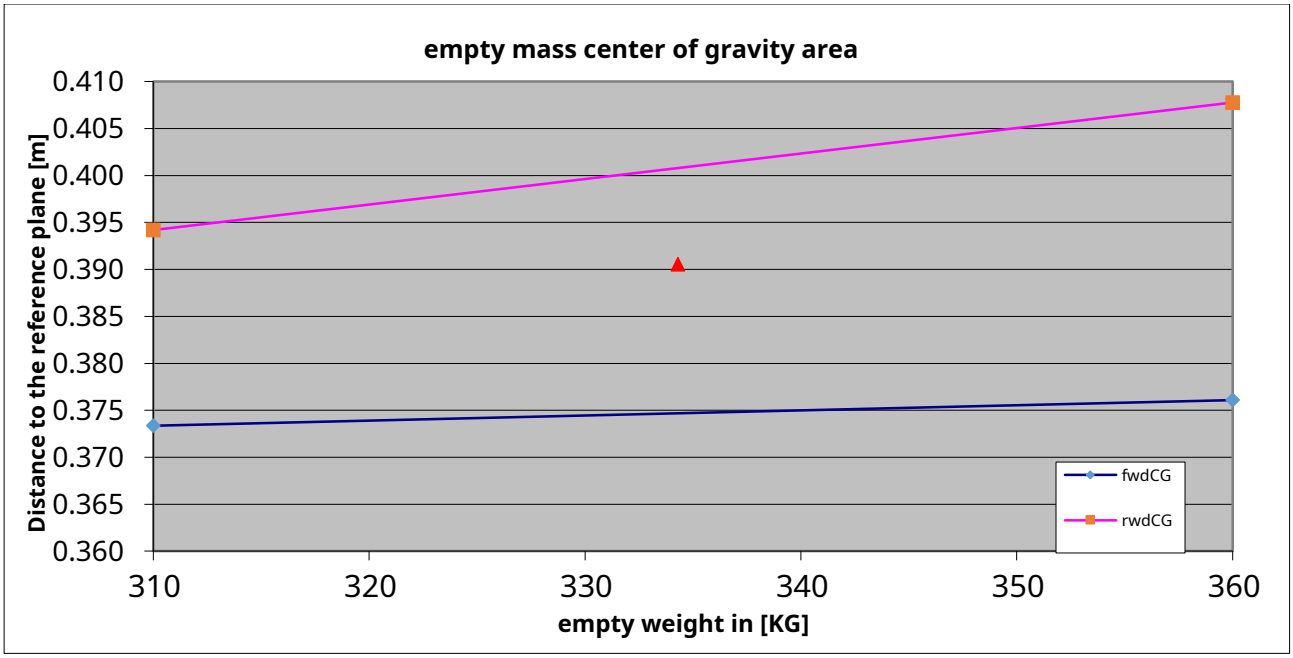
		Lever arms always related to BE		
		Weight [kg]	lever arm [m]	moment [kgm]
main gear left	$M_{Li} = G_{Li} * x_{Li}$	G_{Li}=	x_{Li}=	M_{Li}=
main gear right	$M_{re} = G_{re} * x_{re}$	G_{re}=	x_{re}=	M_{re}=
tail wheel or nose wheel	$M_3 = G_3 * x_3$	G_3=	x_3=	M_3=
empty weight	**$G = G_{Li} + G_{re} + G_3$**	G =		
total moment	**$M = M_{Li} + M_{re} + M_3$**			M =
empty mass center of gravity	**S = M / G**		S =	

- Determine the weights of all scales and enter them in Table 1: GLi, GRe, G3
- Enter individual moments: MLi, MRe, M3
- Determine empty weight: G = GLi, GRe, G3 M
- Determine total moment: = MLi, MRe, M3 S =
- Determine empty mass center of gravity: M / G

6.2.3 Permissible empty weight center of gravity range

ATTENTION: the permissible empty weight center of gravity range depends on the empty mass.

This diagram is generally valid.



The empty mass center of gravity area is interpolable and is located,

at **310**[kg] between**373**and**394**[mm] **360**[
at kg] between**376**and**408**[mm]

6.2.4 Loading plan

	min-max values		lever arms
pilot's seat	70	– 110 kg	0.780 m
passenger seat	0	– 110 kg	0.780 m
fuel	0	– 140 liters	0.660 m
luggage compartment	0	– 20 kg	1,300 m

6.3 Equipment list

equipment listacc. to LTF-UL §29 3.		
These parts are part of the basic structure of the UL and were part of the type certification.		
designation	model / manufacturer	
Motor		
propeller		
exhaust		
rear silencer		
rescue device		

equipment listacc. to LTF-UL §29 3.		
All equipment items that are not part of the basic equipment are listed here.		
designation	model / manufacturer	Weight [kg]
Total weight of the installed parts that are not part of the basic frame mass.		

6.4 Ballast, removable

(Information on the storage and securing of removable ballast)

There is no removable ballast!

6.5 Flight weight and flight weight center of gravity

Before each flight, the pilot must ensure that the aircraft is correctly loaded. The admissibility of a loading condition can be determined using the table.

To check the center of gravity, proceed as follows:

The basis is the table**'Determination of the center of gravity at flight mass '**

1. The values in the orange fields are already specified by the manufacturer, but these can also be taken from the loading plan under 'Lever arms'.
2. The yellow cells must be entered from the weighing report.
3. The weights of the crew, fuel and baggage must be entered in the corresponding white fields.
4. Calculate moments in the blue column M = G * H
5. Add all weights and enter in the line**total weight**in the green field.
6. Add all mass moments and in the row**total moment**in the green field.
7. The lever arm for the**center of gravity**as follows and enter it in the pink field.

Determination of the center of gravity at flight mass

		Lever arms always related to BE		
		Weight [kg]	lever arm [m]	moment [kgm]
empty weight (information from weighing report)				
1) pilot	M1 = G1 * x1		0.480	
2) passenger	M2 = G2 * x2		0.480	
3) fuel	M3 = G3 * x3		0.660	
4) Baggage	M4 = G4 * x4		1,300	
total weight	**G**=G1+G2+G3+G4			
total moment	**M=M1+M2+M3+M4**			
center of gravity	**S = M / G**			

Lever arm (flight center of gravity) = total moment / total weight

A flight may not be carried out if

- the flight mass center of gravity is outside the permissible flight mass center of gravity range or
- the determined total weight above the *'Maximum take-off weight'* (MTOW).

6.6 Note on the dashboard

The following table must be displayed visibly on the dashboard.

max. takeoff weight	**600.0**	[kg]
max. payload (with full tanks)	**170.0**	[kg]
min. payload	**70.0**	[kg]
_____ Date, signature and stamp of the examiner		

6.6.1 Permissible flight center of gravity area Note:

The flight mass center of gravity is always within the permissible range if the loading plan is adhered to and the empty weight center of gravity is within the permissible range.

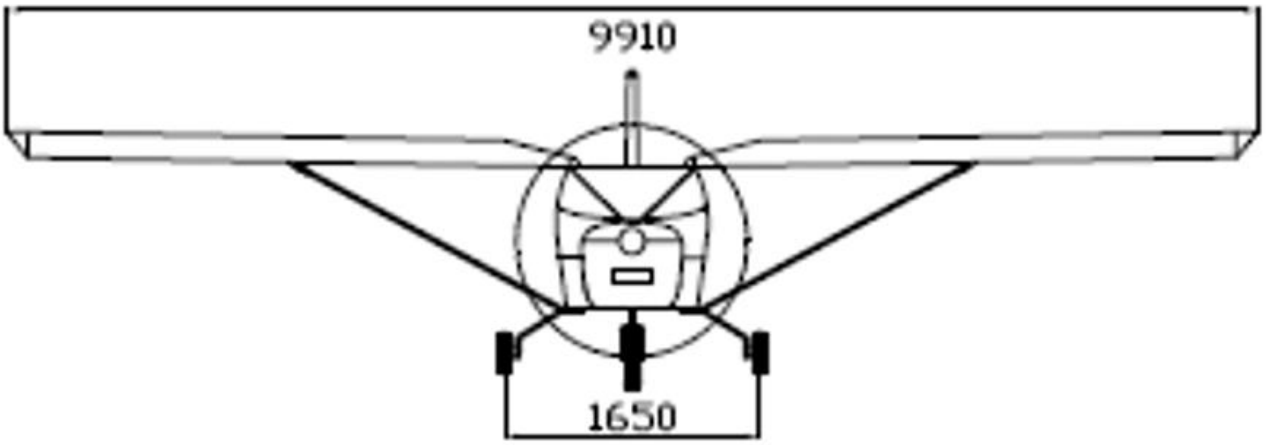
6.6.1.1 Center of gravity in flight:

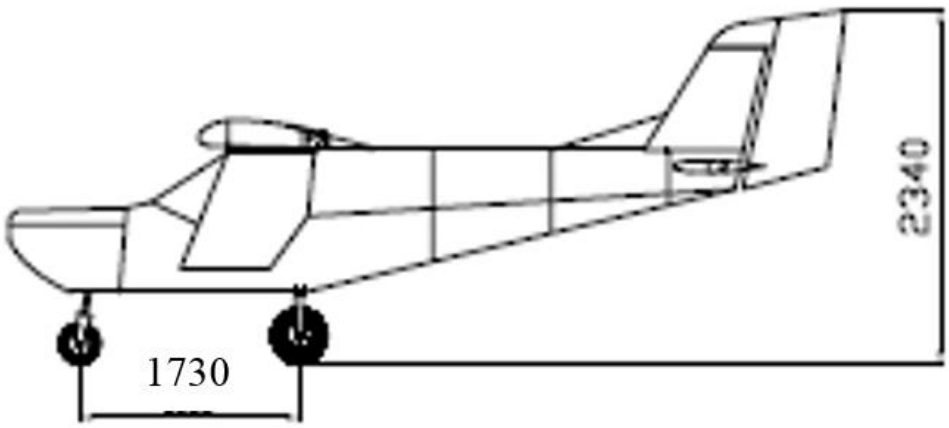
see 2.6.2.2 Center of gravity in flight:

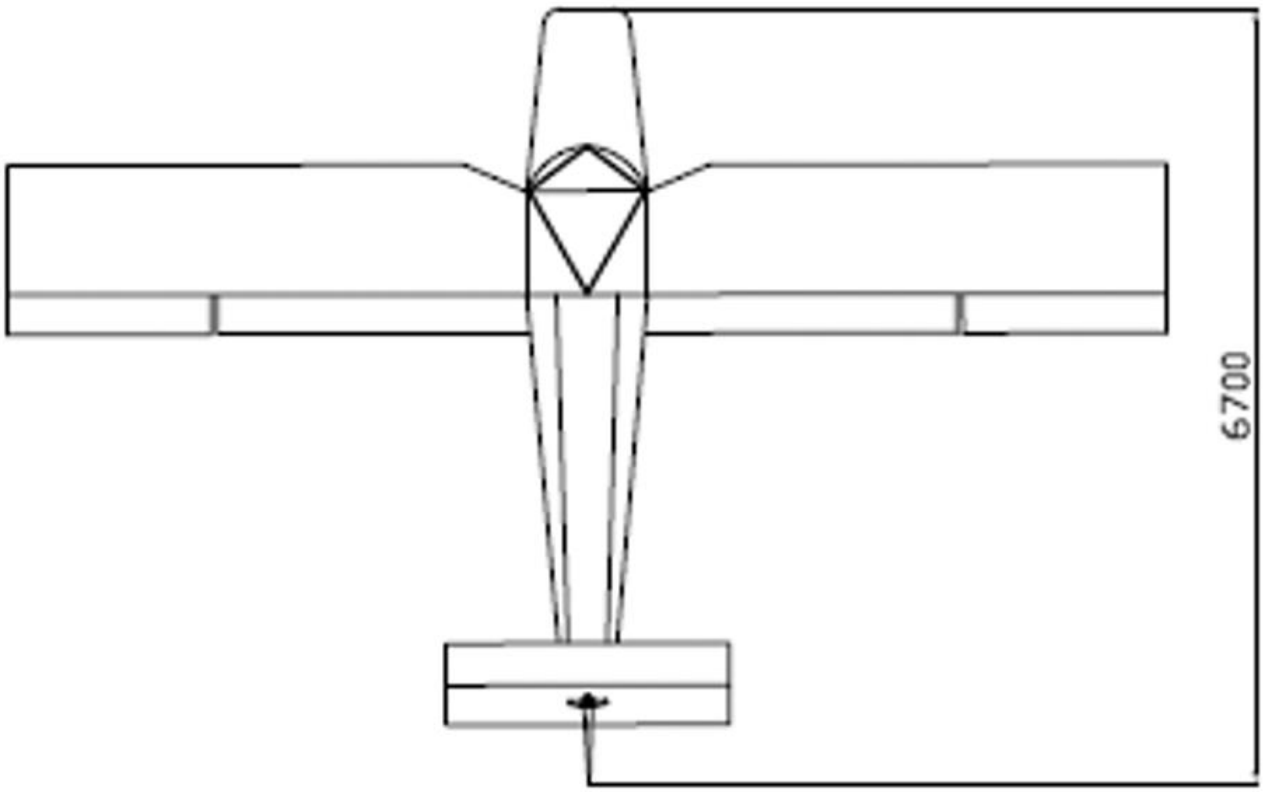
7 Description and functions of the aircraft and its systems

7.1 Description of the structure

7.1.1 Three-sided view






6700

7.1.2 General description

7.1.3 Overall dimensions

see point 8.1) Dimensions

7.2 Rescue equipment

7.2.1.1 Installation description

The rescue device is mounted in the middle behind the luggage compartment. The RG ropes are located in the upper part of the cockpit strut. Please refer to the rescue device operating manual for the function and technical data. Authorization to handle these pyrotechnic devices must be confirmed by an entry in the pilot's license (pyrotechnic instruction). The rescue device must be secured on the ground using the safety pin. The rate of descent is approximately 7 m/s. There are no basic rules of conduct for handling it. The decisive factor is the respective situation. At high altitudes there is more time to react.

rescue equipment suspension points
The rescue device has 3 suspension points. 2 at the front, each in front of the wing attachment points, and 2 at the rear on the rear metal structure of the cabin.

7.2.1.2**service** (Information on the function and operation of the rescue device)

triggering the rescue system

For the rescue system, every pilot needs training on how to handle pyrotechnic items.

There are no general rules of conduct when the rescue device has been activated. It always depends on the circumstances. At low altitudes, it is important to recognize the error quickly and act quickly, as the time until reaching the ground can be short.

Before activating the rescue system:

1. Tighten seat belts
2. Activate the rescue device by pulling on the red handle

after opening

3. Turn off the engine (ignition off)
4. Main switch OFF
5. Close the fire tap

The deployment handle is located at the top in the middle between the pilot and passenger seats. The hand force required to activate the rescue system is approximately 12 kg (you may need to pull with both hands).

The rocket is ignited by pulling the release handle and pulls the rescue parachute out through the opening in the aircraft fuselage.
Before reaching the ground: tense your muscles, place your head forward onto your chest, hold your hands protectively above your head and pull your legs up.

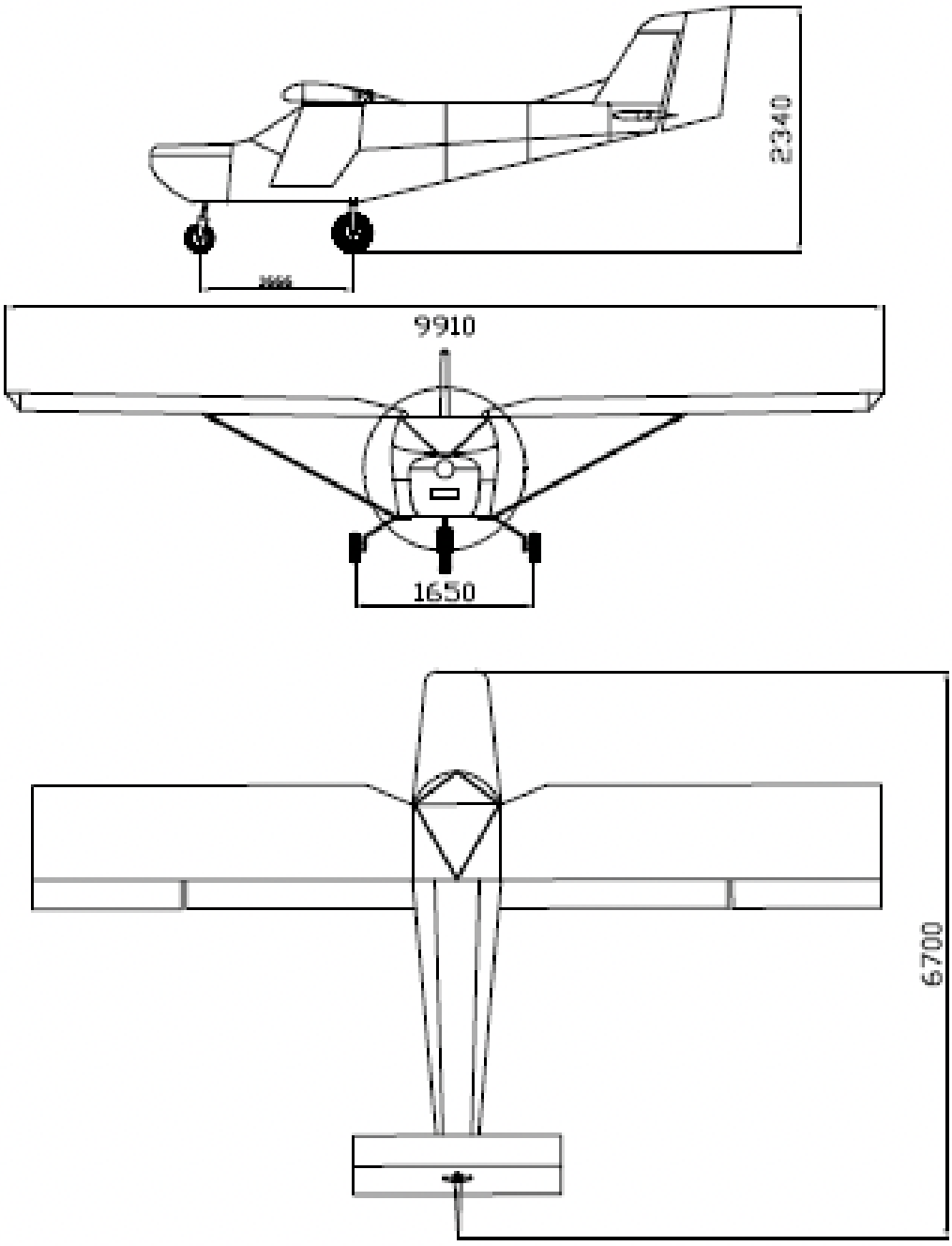
The screen is suspended in such a way that the aircraft can
undamaged wings and tail unit approximately horizontally, tilted slightly forward.

8 Operation, service and maintenance

8.1 General(description of the facilities)

8.1.1 Dimensions

All measurements in mm



8.1.2 Control surface deflections

ailerons:	up	13 cm	+ /- 2cm	
	downward	- 10 cm	+ /- 2cm	
elevator:	up	18 cm	+ /- 3cm	
	downward	- 26 cm	+ /- 3cm	
Rudder:	to the left	- 28.5 cm	+ /- 3cm	
	To the right	37.5 cm	+ /- 3cm	
trim tabs:	up	8.5 cm	+ /- 3cm	(adjustment range)
	downward	- 7 cm	+ /- 3cm	

8.1.3 Procedures for jacking, lifting and towing on the ground

8.1.3.1 Upgrading

Please refer to the current instructions in the 'Manufacturer's Instructions'.

8.1.3.2 Disarmament

Please refer to the current instructions in the 'Manufacturer's Instructions'.

8.1.4 Lubrication plans

There are no components that need to be lubricated periodically.

8.1.5 Electrical system / loads

The electrical system consists of a battery, an electrical ignition system with an integrated alternator and other devices that need to be supplied with voltage.
The main switch is used to switch the on-board voltage on and off. Radio devices are switched on separately or on the device itself. Fuses are provided for all devices.
The engine has its own hour meter that only becomes active when the engine is started.
All engine monitoring instruments operate with on-board voltage except for the cylinder head temperature indicator, which operates as a closed, independent system.

8.1.6 special maintenance procedures no

8.1.7 special test procedures no

8.1.8 List of special tools no

8.1.9 Materials for small repairs commercially available repair

materials, not further specified.

8.1.10 Ground transport no

special features

8.1.11 Cleaning and care commercially available

cleaning agents and methods

8.2 Aircraft - Maintenance

8.2.1 Cell Controls

The UL must be serviced or have serviced every 25, 50, 100 and 0 flight hours. These maintenance operations must be confirmed in the flight log.

8.2.1.1 Daily

See Checklist 4.2.1. Pre-flight check

8.2.1.2 25 hours - Cell inspection

1. Check the general condition of the aircraft structure
2. Clean and grease/oil all moving parts
3. Check all components for freedom of movement and excessive play, adjust if necessary
4. Check propeller for damage and cracks, check nose edge, check propeller screws/nuts
5. Check the battery acid level, check the vent line, check the area around the battery for corrosion.
6. Check the control for free movement and excessive play, check all bolt locks
7. Check carburetor cables for play, clean and grease/oil
8. Checking the control cables, the cable ends and thimbles as well as the Nicropress connections
9. Check the control cable guides, clean and grease
10. Check tension of control cables/rods, adjust if necessary
11. Check and clean air duct to oil and water cooler
12. Check the engine cooling system for leaks/chafing, check coolant
13. Check for oil leaks on oil cooling lines and engine
14. Check the general condition of the rescue device straps, check the attachments to the fuselage and surfaces
15. Check electrical cables for general condition, fastenings and chafing
16. Check that all electrical devices are functioning properly.
17. Check the chassis, tires and wheel covers for general condition and wear, check tire pressure
18. Check brake lines for damage and tight fit
19. Check, clean and grease the steering
20. All bolts/lock nuts of the wing connections
21. Check all rudders for free movement
22. Check all bolt locks
23. Drain fuel tanks
24. Check fuel system (lines, connections, connections) Check filter, el./mech. pump
25. Check fuel pressure
26. Check exhaust system for leaks and tight fit
27. Check engine mount mounting points and rubber mounts

8.2.1.3 50 hours - Cell inspection

All work from points 1-27 and the subsequent work

28. Check the rudder and flap deflections, adjust if necessary
29. Check the track of the main landing gear, check nose wheel / tail wheel
30. Checking the brake system, brake pads, lines
31. Check rudder connections

8.2.1.4 100 hours - Cell inspection

All work from points 1-31 and the following work

32. Check nose wheel steering and suspension, eliminate excessive play
33. Check firewall for corrosion, cracks and general condition
34. Check frames, bulkheads in the inside of the hull
35. Check the hull for loose screws, corrosion on control rods, stone chippings and deformations
36. Check control for excessive play, worn bearings and condition
37. Check rudder stops and adjust if necessary
38. Check wings and tail unit for loose paneling, loose screws, stone chip damage and deformations, check all bolts and locking nuts.
39. Check ailerons, elevator and rudder for loose screws, stone chip damage and deformation, check all bolts and lock nuts.

8.2.1.5 200 hours - Cell inspection

all work from point 1-39 and the following works

40. Change coolant, clean water cooler (3 liters)
41. Removal, cleaning, reinstallation of the oil reservoir

8.2.2 Checking the engine

Rotax 912, all variants

Checks and maintenance work must be carried out in accordance with the Rotax maintenance manual. Lifetime and running time limitations are not provided for the installed engine. The information in the Rotax maintenance manual under point**"major overhauls (TBO)"**are not binding for the installed engine. However, the information in the manual can provide a good starting point for your own decisions regarding continued use when the operating times listed are approaching or reached.

8.2.3 Propeller

The propeller manufacturer's maintenance instructions provide information on how to care for and maintain the propeller.

8.2.4 Determination of term and lifetime limitations

- No further operating time and lifetime limitations are specified for the airframe and supporting structure apart from the previous hourly checks.
- There are no further running time or lifetime limitations specified for the engine beyond the hourly checks specified in the engine manual.
- There are no further operating time or lifetime limitations for the propeller other than the maintenance and inspection work specified by the propeller manufacturer.

8.3 Modifications or repairs to the aircraft

After each repair or modification, a new weighing report must be prepared and the labels in the manual and cockpit must be changed accordingly.

8.4 Markings and labels

(List of markings and their locations)

markings	**installation location**
type plate:	fireproof, on the frame
Airspeed indicator:	on the dashboard
Altimeter:	on the dashboard
Compass:	on the dashboard
Engine instruments:	on the dashboard
Rescue device warnings:	at the ejection opening
Control system:	near controls
fuel level indicator:	near instrument
fuel selector switch:	proximity of switching element(s)
tank filler neck:	near the filler neck
loading plan:	On the dashboard
Aerobatics and spin prohibited:	On the dashboard

9 Appendix, Weighing Report Template

The weighing report provided in this appendix can be used as a template.

weighing report

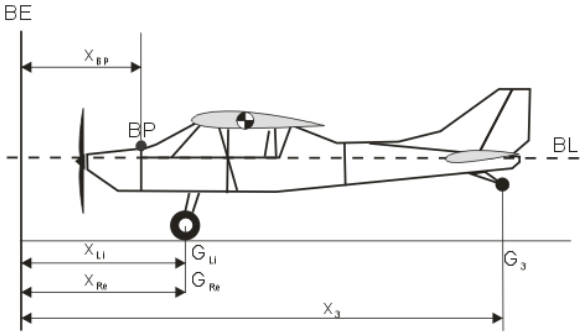
Date:

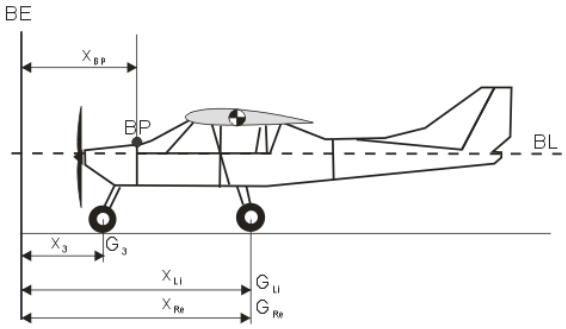
Manufacturer		Pattern	
serial number		year of construction	

BP = reference point BE = vertical reference plane BL = horizontal reference line

G_{Li}= Weight on the left main gear wheel G_{re}= Weight on the right main gear wheel G_3= weight on the tail wheel or nose wheel

x_{Li}= lever arm reference plane to left main gear wheel x_{re}= lever arm reference plane to left main gear wheel x_3= lever arm reference plane to tail or nose wheel





BL (horizontal reference line)	door frame below slope of 2° forward			
BE (vertical reference plane)	wing leading edge			
		Lever arms always related to BE		
		Weight [kg]	lever arm [m]	moment [kgm]
main gear left	$M_{Li}= G_{Li}* x_{Li}$	G_{Li}=	x_{Li}=	M_{Li}=
main gear right	$M_{re}= G_{re}* x_{re}$	G_{re}=	x_{re}=	M_{re}=
tail wheel or nose wheel	$M_3= G_3* x_3$	G_3=	x_3=	M_3=
empty weight	**$G = G_{Li}+ G_{re}+ G_3$**	G =		
total moment	**$M = M_{Li}+ M_{re}+ M_3$**			M =
empty mass center of gravity	**S = M / G**		S =	

Table 1

max. takeoff weight	**600**	[kg]
max. payloadwith full tanks		[kg]
min. payload	**70**	[kg]

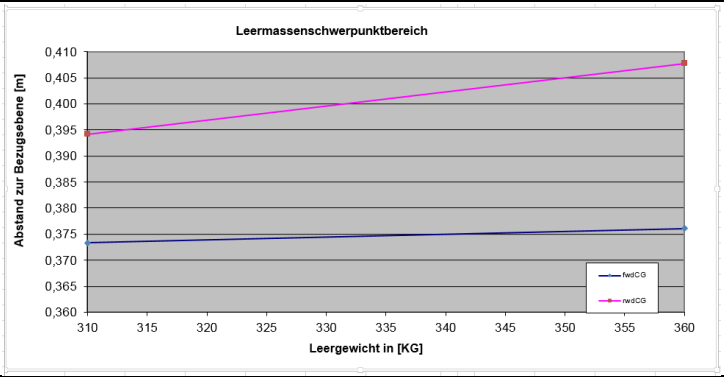
_____
Date, signature and stamp of the examiner

Table 2

A label containing the information in Table 2 must be visibly attached to the dashboard of the UL.

permissible empty weight center of gravity range:

at**310**[kg] between**373**and**394**[mm] at**360**[kg] between**376**and**408**[mm]
(interpolable)



The weighing was carried out according to the manufacturer's instructions. The calculated empty weight center of gravity is within the permissible range. The parts listed in the attached list were installed in the UL when it was weighed.

_____
signature of the examiner stamp examiner

weighing report **Date:**

equipment list acc. to LTF-UL §29 3.		
These parts are part of the basic structure of the UL and were part of the type certification.		
designation	model / manufacturer	
Motor		
propeller		
exhaust		
rear silencer		
rescue device		

equipment list acc. to LTF-UL §29 3.		
All equipment items that are not part of the basic equipment are listed here.		
designation	model / manufacturer	Weight [kg]
Total weight of the installed parts that are not part of the basic frame mass.		

flight weight and flight weight center of gravity Date:

Before each flight, the pilot must ensure that the aircraft is correctly loaded. The admissibility of a loading condition can be determined using the table.

Determination of the center of gravity at flight mass

		Lever arms always related to BE		
		Weight [kg]	lever arm [m]	moment [kgm]
empty weight (information from weighing report)				
1) pilot	M1 = G1 * x1			
2) passenger	M2 = G2 * x2			
3) fuel	M3 = G3 * x3			
4) Baggage	M4 = G4 * x4			
total weight	**G**=G1+G2+G3+G4			
total moment	**M=M1+M2+M3+M4**			
center of gravity	**S = M / G**			

To check the center of gravity, proceed as follows:

8. The lever arms in the orange fields can be found in the operating manual
9. The values from the current weighing report must be entered into the yellow cells.
10. The weights of pilot, passenger, fuel and baggage must be entered in the corresponding white fields.
11. Calculate moments in the blue column M = G * x
12. Add all weights and enter in the line **total weight** in the light green field.
13. Add all mass moments and in the row **total moment** in the dark green field.
14. The lever arm for the **center of gravity** determine as follows and enter in the pink field

Lever arm (flight center of gravity) = total moment / total weight

A flight may not be carried out if

- the flight mass center of gravity is outside the permissible flight mass center of gravity range or
- the determined total weight is above the 'Maximum Take-off Weight' (MTOW).

MTOW: 600 kg

Flight center of gravity area: 393 mm until 492 mm