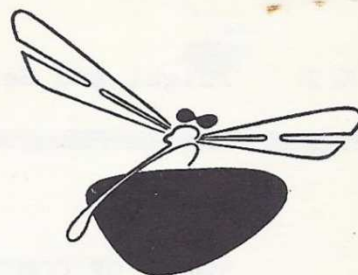




Standard Libelle 201 B

I - VORY



FLIGHT AND SERVICE MANUAL

for the Sailplane Type

GLASFLÜGEL

STANDARD
Libelle

Translation of the German Manual
Issue: July 1972

201 B

This document should always be carried in the sailplane!

It belongs to the Sailplane

GLASFLÜGEL Standard- Libelle 201B Factory No.

Registration No.:

Manufacturer: GLASFLÜGEL Ing. Eugen Hänle,
7311 Schlattstall, Germany
Tel. 07026 / 855

Owner:

Confirms with Data Sheet No. G 13 B



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Amendments:

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2	Procedure operative PA 84-128 Libelle 7	10	26.6.86	



1. WEIGHT and C.G. RANGES

Max. gross weight 350 kg (770 lb)

Max. weight of the none-lifting parts 210 kg (462 lb)

Max. weight of instrument panel 10 kg (22 lb)

The precise weight of the parts can be taken from the last inspection report.

Weighed on: (date)					
by: (name)					
Empty weight with normal instrumentation with addit. instrumentation with radio equipment with oxygen equipment					
Empty weight C.G.- position (in. behind datum pt.)					
Max. payload					
Water-ballast at max. payload					

Empty weight C.G.:

After installing new equipment, after repairs, after new painting, or any other changes which might affect the weight of the Libelle it is advisable to take a look at the range of normal empty weight C.G., on page 6. Please make up necessary weight by fixed ballast.

Flight C.G.:

The correct flight C.G. has a great influence on the flight characteristics and performance of your Standard- Libelle. This is under- estimated in many cases, but it is of utmost importance if maximum performance is to be achieved. It is worthwhile to calculate your own flight C.G.



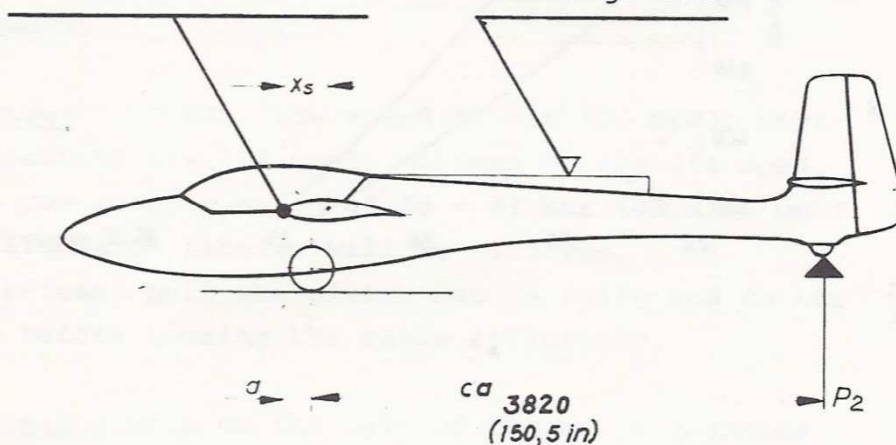
To balance your sailplane:

Datum point

leading edge of
wing at $y = 425 \text{ mm}$
(16,7 in.)
from center of
fuselage

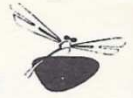
Datum line

Angular model
100:7 on
fuselage back



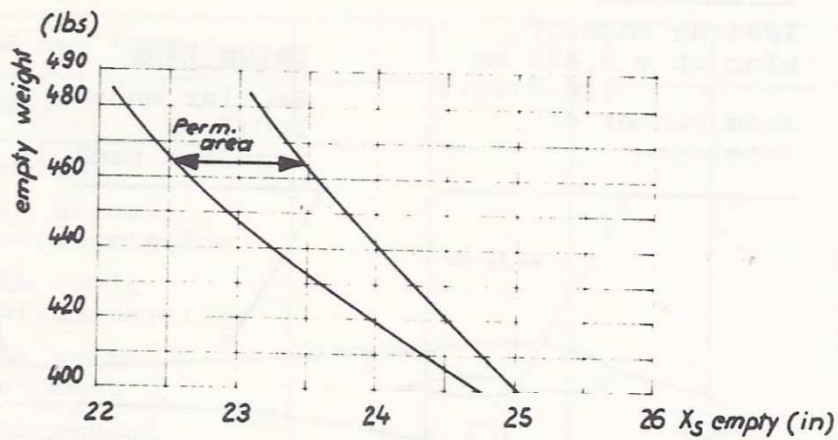
The empty weight C.G. is always understood to be without pilot and parachute, but including all fixed accessoires, instruments, etc. Balancing of the sailplane must always be done with empty water bags.

The flight C.G. is always understood to include pilot and parachute and all accessories (also barograph, camera, cushions etc.)



$$x_{s \text{ empty}} = \frac{P_2 \text{ empty} \cdot 150,5}{\text{total empty weight}} + a$$

$$x_{s \text{ flight}} = \frac{P_2 \text{ flight} \cdot 150,5}{\text{total gross weight}} + a$$



The sailplane is prepared for a payload in the cockpit (pilot and parachute) of between 165 and 243 lb.

If the weight of pilot and parachute should be insufficient, an equalizing ballast must be fastened securely in the seat.

The allowed range of flight C.G. $x_{s \text{ flight}}$ is between 9,6 and 13,7 in.



2. FLYING OPERATIONS

Before every take-off be sure that the canopy and the airbrakes are locked.

Emergency release of canopy: 1. Push canopy lever all the way up; 2. Turn the grip on the lockbar 90 ° and push off canopy.

Winch tow: Max. tow speed ^{120 km/h} 65 kts (74 mph), most agreeable ^{90 - 100 km/h} 50 - 54 kts * (56 - 62 mph). Take-off is normal in all respects.

Aerotow: Max. tow speed ^{150 km/h} 81 kts (93 mph); most agreeable ^{120 km/h} 65 kts (74 mph), minimum ^{90 km/h} 50 kts * (56 mph). When you reach a speed of ^{70 - 80 km/h} 38 - 43 kts * (43 - 50 mph), the Standard- Libelle will be airborne. For release pull the clutch handle fully and do not turn before loosing the cable definitely.

The yellow grip on the left of the stick operates both hooks, winch and aero.

Recommanded length of rope: 40 - 60 m (130-200 ft).

The cockpit- layout is not suitable for automatic parachutes.

Airbrakes

The airbrakes are actuated by the blue grip on the left.

* With waterballast increase these speeds by about ^{10 km/h} 5,4 kts (6,2 mph).



Flight comfort:

- A. The seating position is variable by
1. Seat back: Adjust by moving the grip on the right just below the canopy edge.
 2. Knee cushions: Inflate or deflate by the two air balls (one for each side).
 3. Rudder pedals: Adjust by pulling the black grip on the right of the stick; this unlocks the pedals. To move them forward, push by feet until the desired position is reached. To move the pedals backward, pull grip until desired notch is reached.
- B. Cockpit ventilation: Lift up the handle on the canopy lock. Possible also in towing flight. Clear vision panel at left side of canopy. Adjustable nose- ventilation at both cockpit sides.
- C. Trimming of elevator: Spring trim, with trim-lever on the stick. Adjust by pushing the green knob -
push for "nose- down",
pull for "nose- up " .
- D. Wheel brake: Pull black grip on the stick.

Sit in the cockpit and check if you can reach all the controls easily. Check also if you have good visibility for both normal flight and tow.



Free Flight:

Stalling speed for total weight	250 kg	550 lb =	61 km/h	33 kts (38 mph)
	290 kg	640 lb =	66 km/h	36 kts (41 mph)
	350 kg	770 lb =	74 km/h	40 kts (46 mph)
Minimum sink	250 kg	550 lb =	70 km/h	38 kts (44 mph)
	290 kg	640 lb =	75 km/h	41 kts (47 mph)
Best glide ratio f.total weight	250 kg	550 lb =	85 km/h	46 kts (53 mph)
	290 kg	640 lb =	95 km/h	51 kts (59 mph)

All datas are valid at ca. " optimum flight C.G. range ".

Critical conditions:

During stalled flight the Libelle is easily stabilized by co-ordinated use of ailerons and rudder.

Too much rudder or skidding will possibly result in a spin.

Recovery from a spin: stick normal, rudder against rotation.

With the C.G. in forward position the sailplane has a tendency to a spiral-dive and builds up high speed; recover with caution between 75 and 92 kts (87 - 105 mph).

During high-speed-flight carefully watch the speed limits! Carefully actuate the air-brakes during high-speed-flights! In cloud-flying you should fly especially accurately. Spinning is not permitted as a rescue measure!

Landing:

1. Recommended approach speed ^{85 km/h} 46 kts (53 mph)
2. Extend air-brakes if needed
3. Side slip is possible with or without landing-aids
4. Take care that the aircraft is not stalled too soon during flare ont.

Before first take-off

Please study all the above tips and try the controls for free operation, after the sailplane is completely rigged.



Remarks - flying with water ballast

It is possible to carry waterballast after Technical Notes No. 201-10 or 201-12 are completed.

In both wings there are water bags with a capacity of 5,5 gallons each. The bags are connected by two flexible tubes to the dumping valve. The bag in the lower wing is filled through the elbow fitting at the root-rib, while the water-tap is closed. Be careful to fill each wing with the same quantity of water. Filling the bags by a pressure hose is not permitted. If the temperature is below 32° F the water may freeze, therefore be careful to dump the water in time.

Because of the higher wing-loading the stalling speed increases (see page 9) and the efficiency of the ailerons decreases. Before landing, the water should be dumped, if this is not possible, the approach speed should be more than 50 kts (58 mph).
92 km/h

Max. weight of waterballast as shown in the following table:

Empty Weight	Payload	75 165	85 185	95 205	110 225 lb
180 kg 400 lb	Water	50 110	50 110	50 110	50 110 lb
190 kg 420 lb		50 110	50 110	50 110	50 110 lb
200 kg 440 lb		50 110	50 110	50 110	45 105 lb
210 kg 460 lb		50 110	50 110	45 105	* lb
220 kg 480 lb		50 110	45 105	*	* lb

* Caution: With this payload the max. weight of the none-lifting parts may be already exceeded.

During high altitude flights without waterballast the water dump valve must always be kept open.

*P.A. 84-128 / Libelle I
Glasflugel 604.1*



3. OPERATION DATA and LIMITATIONS

Airspeed limits:

Max. speed	250 km/h	135 kts (155 mph)
Aero-tow	150 km/h	81 kts (93 mph)
Winch launch	120 km/h	65 kts (74 mph)
Auto tow	120 km/h	65 kts (74 mph)

Sailplane category: LFS Normal sailplane

Limitation: the sailplane is not certificated for acrobatics.

Minimum required equipment

LFS	FAR 21.23 + 23.1303
Air speed indicator range 27-143 kts(31-165 mph) 50 - 265 km/h	Air speed indicator range 27-143 kts (31-165 mph) 50 - 265 km/h
4- piece safety belt	4-pieces safety belt
Parachute, as surrogate a cushion	Parachute, as surrogate a cushion with a thickness of 4 in. in compressed state
Technical data placard	Technical data placard
Trim plan	Trim plan
Owner's flight and service manual	Owner's flight and service manual

For cloud-flying in addition to this:

- Variometer
- (Compass when LFS)
- Turn and bank indicator
- Altimeter

According to the experience gained up to now, the installed ASI system is usable for cloud-flying.

Safety-link in tow-cable: for winch and aero-tow 1100 lb

Pressure of the main wheel: 2,5 atm. = 37 psi for
total weight up to 660 lb. 3,0 atm. = 44 psi for
total weight up to 770 lb
300 kg
350 kg



Dear friend of the Standard- Libelle,

now the official text is finished. Would you kindly also read some hints from the manufacturer:

- Rigging:
1. Bolts and bores are cleaned and greased;
 2. Insert left wing first;
 3. Insert right wing. Make sure that air-brakes are retracted;
 4. Insert wing horizontal bolt;
 5. Connect control pins of the ailerons;
 6. Insert elevator into fin, screw in the front safety bolt and fasten it.

make sure that the connection studs are really into the elevator (move the elevator).

- - - - - ready!

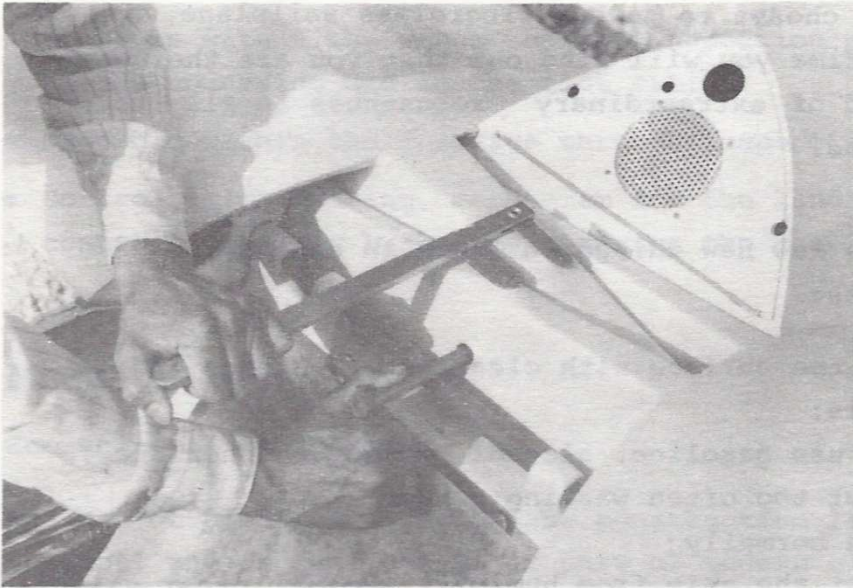
Derigging:

1. Loosen safety screw of elevator and pull it out. Remove elevator;
2. Disconnect control pins of ailerons;
3. Pull out main bolt;
4. Remove right wing first, then left wing.

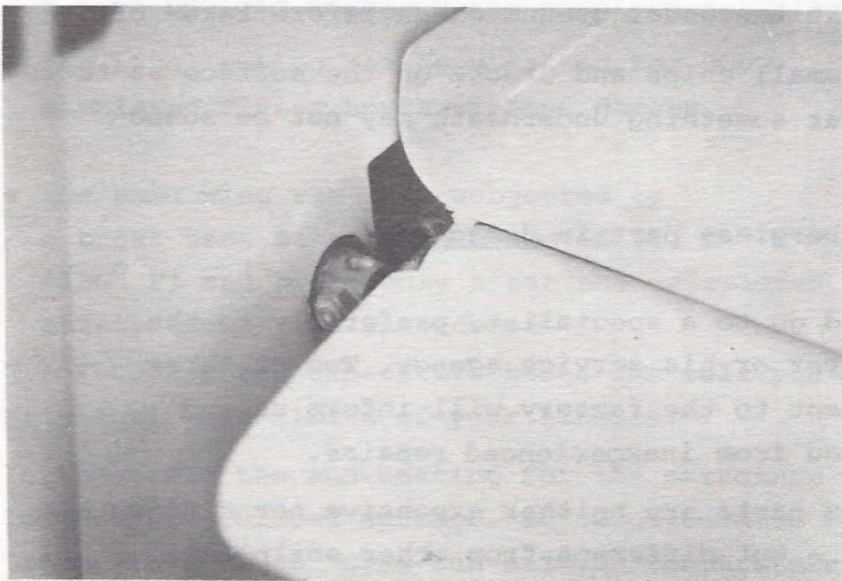
Please look at the pictures in this manual before the first rigging!

Check list before take- off:

Check list is fixed in the cockpit. Never forget to use it in every case before take-off!



This is the correct connection of the wings!



... and this is the connection of the elevator.



Maintenance and Care

You have chosen to have a fiberglass sailplane, and in a short time you will find out that you are the owner of a bird of extraordinary robustness in all its daintiness.

There are few new things to learn in caring for fiberglass:

- Clean the surface with clear water, sponge and a chamois;
 - never use gasoline, alcohol, lacquer thinner etc.;
 - and not too often washing powder;
 - polish normally;
 - protect the ship from humidity as with other sailplanes;
 - and from over exposure to intense heating and intense strong load (see table on page 15);
- and make the usual ground check before take-off.

Look for small chips and cracks on the surface as these signal that something underneath may not be sound.

When a fiberglass part is damaged:

you should go to a specialist, preferably to the manufacturer or his service agency. Two or three photos, sent to the factory will inform us and protect you from inexperienced repairs.

Fiberglass parts are neither expensive nor difficult to repair - but different from other sailplanes. One needs to know the correct procedure.



From time to time it is necessary to inspect your sailplane more closely, and to clean and grease all bearing joints and connecting points. They are as follows:

- Controls within the wings through inspection plates on the underside and in the root rib;
- Controls within the fuselage through inspection plates;
- Control stick bearing, mechanism for the landing gear, controls, and air brakes by removing the seat panel.

Appendix:

Something about PLASTICS.

The use of plastics in sailplane construction is not a new concept, and in fact the major part of modern glues used for wood and metal structures are plastics.

The Libelle, however, is the first production sailplane to not only be tested by calculations and small sample parts, but also by load tests on the complete sailplane structures:

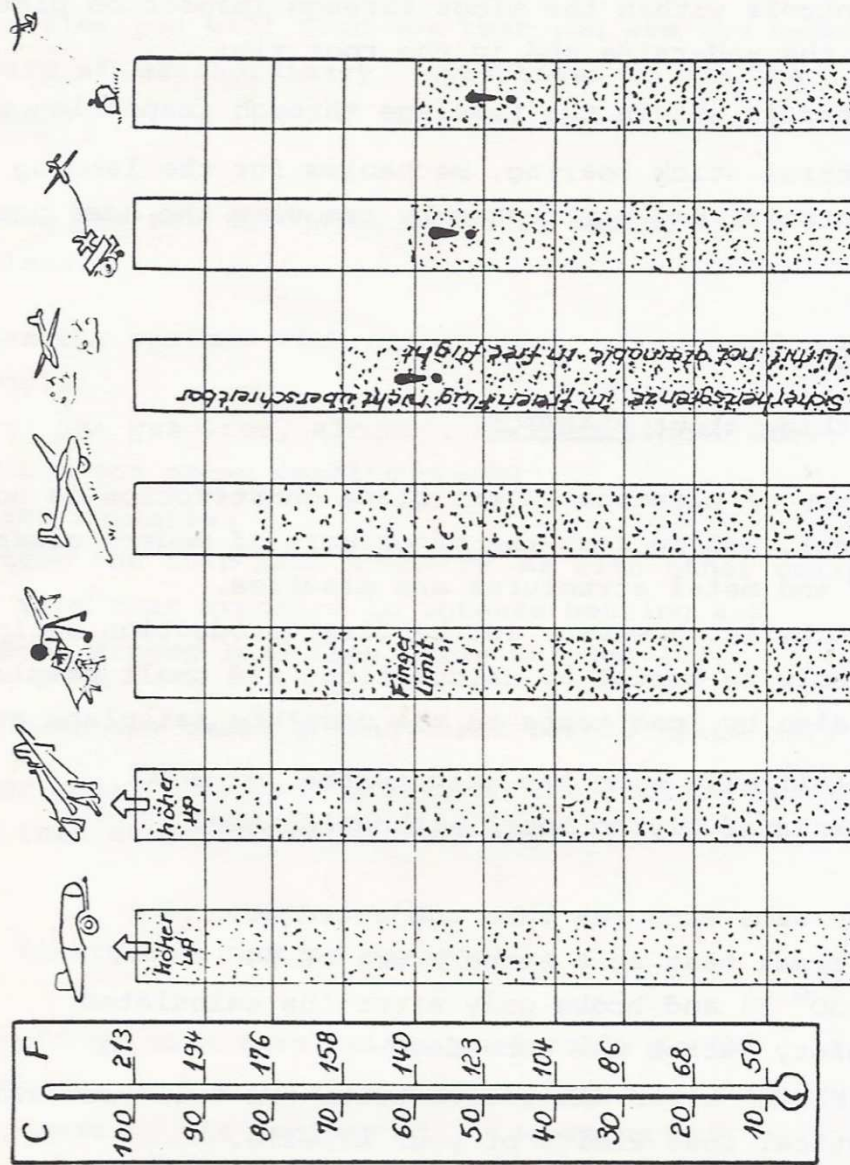
- the Libelle wing has been tested for 9000 simulated flying hours without damage.
- the same wing was then subjected to a break test at a temperature of 54° C (130° F) and broke only after the calculated safety factor was exceeded.

GLASFLÜGEL after exhaustive tests can tell you exactly the practical load limits of your Libelle.

In the table the sun-heating for the structure is the value for a white-colored surface. It is calculated for an air temperature of 38° C, a sun-heating temperature of 12° C and a security factor of 4° C. Other colours may develop higher temperatures and for this reason all loaded parts of the Libelle must be white.



Table is for white coloured surface



valid for the factory-new sailplane

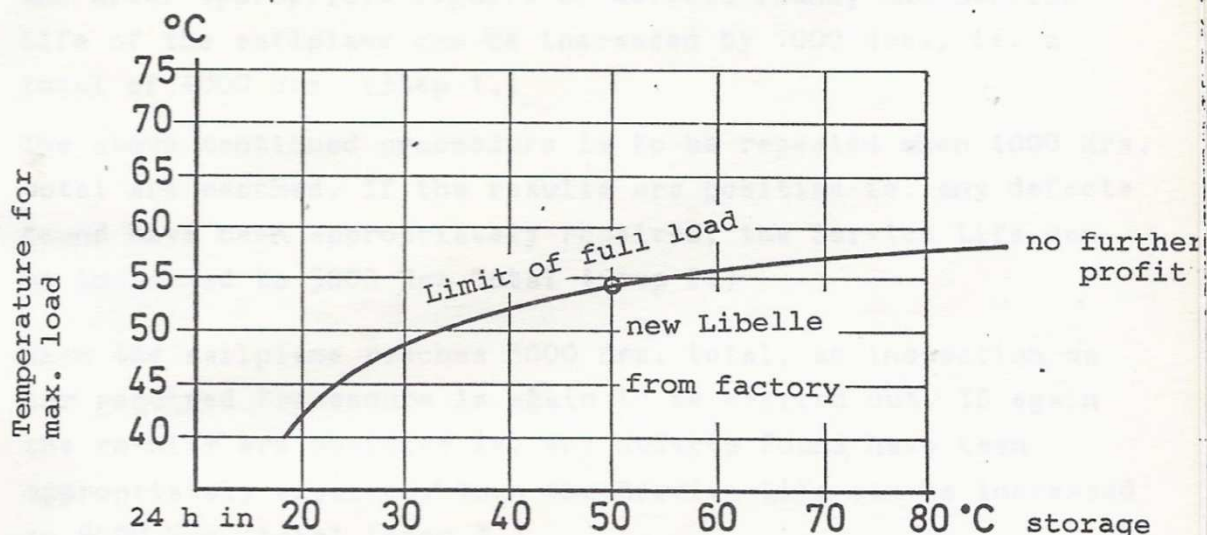
This is what you can expect of your Libelle

Copyright: GLASFLÜGEL



Hot trailers:

Do not be afraid that the Libelle will soften therein, or will get distorted leading edges or interior tensions. This is not possible in this type of structure and is its big advantage. To the contrary: an even warming during a tensionless storage (this is the case in every good trailer) is like a tempering action: the limit of fullload will always go a little higher:



But like any fine sailplane do not roast now your Libelle intentionally! A repeat of the warming will not get a profit.

You may be assured that the Libelle, following you to a hot country, will adjust itself to the circumstances of its new life without difficulty or damage.