

MANUFACTURER  
S.A. CENTRAIR  
Aérodrome  
36300 LE BLANC

FLIGHT MANUAL

GLIDERS

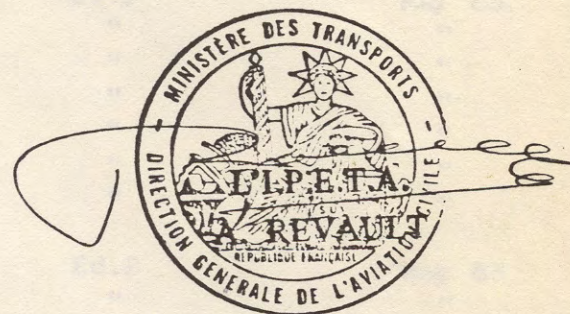
CENTRAIR 101 - 101 P - 101 A - 101 AP

REGISTRATION N°

SERIAL N°

APPROVED BY

The DIRECTION GENERALE DE  
L'AVIATION CIVILE (DGAC)



Date of approval : **18 JUL. 1983**

"This glider flight manual is the translation of an approved French flight manual. The note "DGAC approved" on certain pages means that these pages are an integral translation of the French issue approved by DGAC".

This glider flight manual is FAA approved for US registered glider in accordance with the provisions of 14 CFR Section 21.29 and is required by FAA type certificate data sheet N°  
The FAA manual consists of all uncoded and coded **B** pages marked "DGAC approved".

IMPORTANT NOTE

The practical value of this manual depends entirely upon it being correctly updated.  
The revisions are recorded on the last page. At this revision, the effectivity of the manual is specified overleaf.

THIS DOCUMENT SHALL BE CARRIED IN GLIDER AT ALL TIMES



## 2.1. BASIS FOR CERTIFICATION

The gliders CENTRAIR 101 - 101P - 101A - 101AP received on june 3 1982 the french type certificate N° 171 in the "U" (utility) category conforming to the JAR 22, april 1980 issue.

## 2.2. OPERATING LIMITS

This glider is approved for "Day VFR" flight only.

Not approved are :

- Aerobatic flight including voluntary spins;
- Winch towing using the forward tow hook.
- Flight with full water ballast bags when temperature is below freezing.
- Flight with the wings in a non symmetrical configuration (loading of water ballast bags or winglets).
- The use of cable ring different of the one allowed by hook's manufacture

## 2.3. AIRSPPEED LIMITATIONS IN INDICATED AIRSPPEED (IAS)

		Km/H	Knots
	Vne without winglets	250	135
- Never exceed speed	Vne with winglets	220	119
- Max. manoeuvring speed	Va	170	92
- Max. rough air speed	Vra	170	92
- Max. aerotow speed	Vt	170	92
- Max. winch launching speed	Vw	120	65
- Max. landing gear extended speed	Vle	170	92
- Max. landing gear operating speed	Vlo	170	92

## 2.4. AIRSPPEED INDICATOR MARKINGS

- Radial red line : (Vne without winglets) 250 Km/H - 135 Kts
- Red triangle with a "P" : (Vne with winglets) 220 Km/H - 119 Kts
- Yellow arc : range to be used with caution
  - in calm air 170 to 250 Km/H - 92 to 135 Kts (without winglets)
  - 170 to 220 Km/H - 92 to 119 Kts (with winglets)
- Green arc : normal operating range 80 to 170 Km/H  
43 to 92 ~~KNOTS~~
- Yellow triangle : lowest approach speed recommended 90 Km/H - 49 Kts (with empty water ballast bags);



## 2.5. FLIGHT LOAD FACTORS AT GROSS WEIGHT

- At 170 Km/H - 92 Kts (IAS)

Max. positive load factor  $n = + 5.3 g$   
Max. negative load factor  $n = - 2.65 g$

- At 250 Km/H - 135 Kts (IAS) without winglets

And at 220 Km/H - 119 Kts (IAS) with winglets

Max. positive load factor  $n = + 4.0 g$   
Max. negative load factor  $n = - 1.5 g$

## 2.6. WEIGHT LIMITS

### 2.6.1. Weight limits : glider not equipped with water ballast

Max. approved weight  
Max. weight of non lifting parts  
Empty weight equipped, about  
Useful load, about

101 - 101 A	101 P - 101 AP	
	15 M version without winglets	15 M version with winglets
363 Kg = 800.3Lbs	365 Kg = 804.7 Lbs	368 Kg = 811.3 Lbs
235 Kg = 518.1Lbs	235 Kg = 518.1 lbs	235 Kg = 518.1 Lbs
247 Kg = 540.1Lbs	247 Kg = 544.5 Lbs	250 Kg = 551.1 Lbs
118 Kg = 260.1lbs	118 Kg = 260.1 Lbs	118 KG + 260.1 Lbs

### 2.6.2. Weight limits : glider equipped with water ballast

Max. approved weight with loaded water ballast  
Max. approved weight with empty water ballast  
Max. weight of non lifting parts  
Empty weight equipped, about  
Useful load, about

101 - 101 A	101 P - 101 AP	
	15 M version without winglets	15 M version with winglets
455 Kg = 1003.1Lbs	455 Kg = 1003.1Lbs	455 Kg = 1003.1 Lbs
368 Kg = 811.3Lbs	370 Kg = 815.7Lbs	373 Kg = 822.3 Lbs
235 Kg = 518.1Lbs	235 Kg = 518.1Lbs	235 Kg = 518.1 Lbs
251 KG = 553.3Lbs	253 Kg = 557.8Lbs	256 Kg = 564.4 Lbs
117 KG = 257.9Lbs	117 Kg = 257.9Lbs	117 Kg = 257.9 Lbs

### 2.6.3. Maximum baggage weight

15 Kg - 33 Lbs secured



## 2.7. WEIGHT AND BALANCE

### 2.7.1. Center of gravity range

230 to 375 mm - 9.06 to 14.76 inches after of datum line.

Datum line : wing leading edge at wing root.

Levelling means : on top surface of fuselage tail cone, level using a gradient wedge of 45/1000.

### 2.7.2. Use nose ballast to stay within C. G. range

In the absence of a specific calculation for the considered glider as given in section 6 or in the weight and balance record, use the chart below to determine the number of necessary lead discs. Weight of one lead disc 2.2 Lbs  $\pm$  0.44

Lead discs quantity	Minimum weight equipped pilot	
0	70 Kg	154.3 Lbs
1	67 Kg	147.7 Lbs
2	65 Kg	143.3 Lbs
3	63 Kg	138.9 Lbs
4	61 Kg	134.5 Lbs
5	59 Kg	130.1 Lbs
6	57 Kg	125.7 Lbs
7	55 Kg	121.3 Lbs

NOTE : for a glider with optional equipment use the weight and balance information of this glider (see section 5 or weight and balance record) in order to determine a new chart using datas given in section 6.



## 2.8. REQUIRED EQUIPMENT

- Airspeed indicator )
- Altimeter ) connected to the front static parts
- Compass

See equipment list in section 6

## 2.9. TOWING-ROPE OR CABLE REQUIREMENTS

Towing-rope :

Maximum permissible nominal strength : 590 daN  
 Minimum towing cable length : 100 ft (30 m)

Winch-launching cable :

Maximum permissible nominal strength : 590 daN  
 (weak-link)

## 2.10. LIMITATIONS PLACARDS (in the cockpit)

2.10.1. Weight limits placard (placard located on the right side back of water ballast handle).

Placard for gliders CENTRAIR 101 - 101 A

- Glider not equipped with water ballast

Max. approved weight	363 Kg = 800.3 Lbs
Empty weight equipped	xxx kg = xxx.x Lbs
useful load	xxx Kg = xxx.x Lbs

- Glider equipped with water ballast

Max. weight with loaded water ballast	455 Kg = 1003 Lbs
Max. weight with empty water ballast	370 Kg = 815.7 Lbs
Empty weight	xxx Kg = xxx.x Lbs
Useful load	xxx Kg = xxx.x Lbs

xxx Kg : value specified for every new glider

0	10 Kg	22.0 Lbs
1	20 Kg	44.0 Lbs
2	30 Kg	66.0 Lbs
3	40 Kg	88.0 Lbs
4	50 Kg	110.0 Lbs
5	60 Kg	132.0 Lbs
6	70 Kg	154.0 Lbs
7	80 Kg	176.0 Lbs
8	90 Kg	198.0 Lbs
9	100 Kg	220.0 Lbs



Placards for gliders CENTRAIR 101 P - 101 AP

- Glider not equipped with water ballast

	15 mt version		15 mt version with winglets	
	Kg	Lbs	Kg	Lbs
Max. approved weight	365	804.7	368	811.3
Empty weight	xxx	xxx	xxx	xxx
Useful load	xxx	xxx	xxx	xxx

- Glider equipped with water ballast

	15 mt version		15 mt version with winglets	
	KG	Lbs	kg	Lbs
Max. weight with loaded water ballast	455	1003	455	1003
Max. weight with empty water ballast	370	815.7	373	822.3
Empty weight	xxx	xxx	xxx	xxx
Useful load	xxx	xxx	xxx	xxx

2.10.2. Airspeed limits (IAS)

(Placard located on the left hand side front of the  
water ballast handle)

Placard for the 4 versions

Max. manoeuvring speed	Va	170 Km/H	92 Kts	} 101A and 101 AP
Max. towing airspeed	Vt	170 Km/H	92 Kts	
Max. winch launching speed	Vw	120 Km/H	65 Kts	
Max. landing gear extended	Vle	170 Km/H	92 Kts	
Max. landing gear operating speed	Vlo	170 Km/H	92 Kts	

2.10.3. Weight and balance

(Placard located on the right hand side back of the  
water ballast handle)

Lead discs quantity	Minimum weight equipped pilot	
0	70 Kg	154.3 Lbs
1	67 Kg	147.7 Lbs
2	65 Kg	143.3 Lbs
3	63 Kg	138.9 Lbs
4	61 Kg	134.5 Lbs
5	59 Kg	130.1 Lbs
6	57 Kg	125.7 Lbs
7	55 Kg	121.3 Lbs

NOTE : This placard must be used if there is no chart of specific  
loading in the considered glider (2.7.2.).



#### 2.10.4. Opérating limits placards

Located on the left hand side front of the water ballast handle. .

Dayl M.F.R.. authorized

Are forbidden

- Voluntary spin and acrobatic flights
- Winch lauching with the front hook
- Flight with loaded water ballast when temperature is below 0° Celsius (32° F)
- Flight with the wings in assymetrical configuration

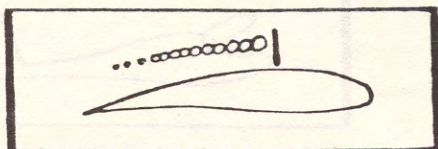
#### 2.10.5. Baggage limitation placards

Located on the right hand side of the baggage compartment.

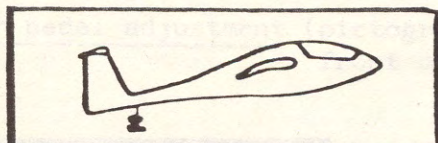
MAXI WEIGHT BAGGAGES  
15 Kg - 33.15 Lbs secured

#### 2.11. PICTOGRAPHS (inside cockpit)

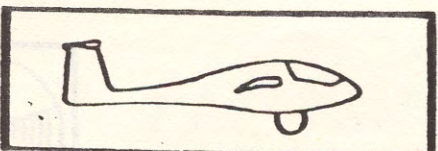
Airbrakes (pictographs located on left hand side of cockpit forward the blue handle)



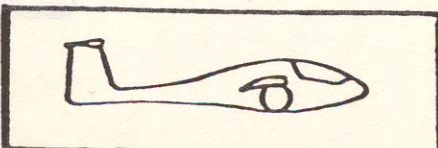
Trim : (pictographs located on left hand side of cockpit at front and back of green lever)



Landing gear for gliders CENTRAIR 101 A - 101 AP only



Pictographs located on lower left side of cockpit at front and back of black lever.

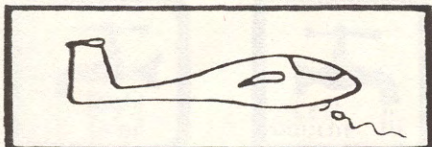




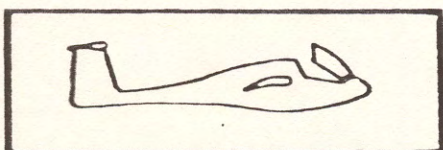
PICTOGRAPHS (continuation)

Tow release

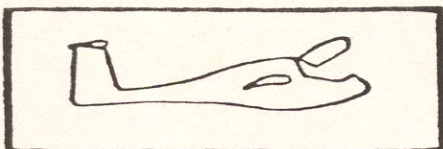
(Pictograph located under the yellow knob on left side of stick at base of instrument panel)



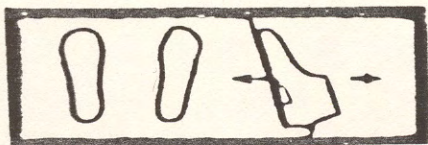
Canopy opening (pictograph located on each side of canopy frame in front of red knob)



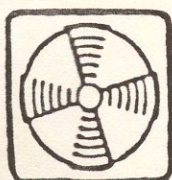
Canopy jettisoning (pictograph above instrument panel and on right side of red knob)



Rudder pedal adjustment (pictograph located under black knob on right front of the stick)



Ventilation (pictograph located on left side of grey knob on the upper part of instrument panel)





Water ballast (pictographs located front of every grey knobs on left and right cockpit walls)





### 3.1. STALL RECOVERY

- 1) Move control-stick forward
- 2) Make a smooth pull out

The loss of altitude should be less than 100 feet (30 M)

### 3.2. RECOVERY FROM UNVOLUNTARY SPIN

- 1) Apply full rudder against the direction of rotation of the spin
- 2) Move control-stick forward
- 3) Ailerons in neutral position
- 4) Be careful not to exceed VNE when pulling out of the dive

NOTE : the use of the airbrakes is permitted up the VNE but caution should be used when opening the airbrakes at high speed.

Spin recovery is influenced by the weight and C. G. location but in all cases recovery is in less than one revolution and the maximum loss of altitude is less than 260 feet (80 M).

### 3.3. a. HINGED CANOPY EJECTION

- 1) Open the 2 red handles (normal opening) located on either side of canopy
- 2) Pull red knob located under eye shade
- 3) Push canopy upward.

### 3.3. b. COMPETITION CANOPY EJECTION

- 1) Open the 2 red handles located on both sides of the canopy
- 2) Push the canopy upward;

### 3.4. BAIL OUT PROCEDURES

- 1) Canopy ejection as explained above
- 2) Open safety harness
- 3) Evacuate on the most favorable side so as to avoid the empennage
- 4) open the emergency parachute at a reasonable distance from the glider.



#### 4.1. PREFLIGHT CHECK

1. Open canopy
2. Check weight and set trim for take off
3. Check number of lead discs on board, make sure safety pin is in place \*
4. Check battery charge
5. Test the radio
6. Make sure you have hooked up the controls
7. Check clearance of airbrakes and locking mechanism
8. Check pitot tube and T.E. tube for obstructions
9. Check harness
10. Check insertion of wing pins in the fuselage. Make sure pins are latched with the safety mechanism
11. Close canopy (airbrakes remain open)
12. Check condition of right wing (movable surfaces, hinges) and lock of wing-tip or winglets (gliders CENTRAIR 101 P and 101 AP)
13. Check condition of the fuselage behind the wings
14. Take off tail dolly
15. Check tightness of bolt on the horizontal stabilizer and engage the safety (use tool furnished by the manufacturer)
16. Make sure the elevator quick connect (at end of control rod) is engaged
17. Check condition of horizontal tail
18. Check condition of left wing (movable surfaces, hinges and lock of wing-tip or winglets)
19. Check condition of landing gear and landing gear doors
20. Check the parachute
21. Check whether tow hook works

\* Important : after the installation of the lead discs, the butterfly nut must be properly fixed and checked before every take off. The safety pin must be tied. If the pilot weight exceeds 187.4 lbs, the pilot will have to remove the discs.

#### 4.1.2. CHECK AFTER REASSEMBLING

- Check insertion of the wing pins in the fuselage and tightness of the bolt on the horizontal stabilizer.
- Make sure you have hooked up the controls (see instructions in section 8)

#### 4.2. RUDDER PEDALS ADJUSTMENT

To move rudder pedals forward : pull back knob on right of stick foot and push pedals forward. Release knob and lock in place by putting a slight pressure on pedals.

To move rudder pedals backward : do not press on them. Pull back knob on right of stick. Release the black knob and slightly press on pedals to lock them.



#### 4.3. SEAT ADJUSTMENT

- A seat back that is adjustable only on the ground is provided. Adjust it for each pilot and make sure that the two locking studs are secure.
- For a bulky pilot, the seat back can be removed.
- An optional adjustable headrest can be provided with the seat back.

To adjust headrest :

- . Forward and backward adjustment : unlock headrest by moving it to the right and adjust headrest
- . Up and down adjustment : push the knob located in the right side of the headrest to unlock it and adjust headrest.

#### 4.4. COCKPIT VENTILATION AND WINDSHIELD DEFROSTING

Two ways of getting ventilation :

- Use the grey control on the instrument panel (pull = open)
- Use the air vent on the canopy window

#### 4.5. TOW CABLE HOOK UP

A TOST ring is compulsory.

The hook position requires special attention when the ring is attached. By pulling on the rope, one can check if the tow ring is properly secured.

#### 4.6. BEFORE TAKE OFF

- Controls : free and in right position
- Airbrakes in and locked
- Trim adjusted
- Cockpit closed and locked
- Adjustment of seat, harness and rudder pedals
- Altimeter (QFE, QNH)
- Airspeed indicator showing zero
- Aeration shut

#### 4.7. TAKE OFF

If for any reason, the glider leaves the towing axis by more than 20° release from tow immediately.

This procedure is a security instruction because of the positioning of the tow hook near the main point of support of the glider on the ground.

The runway borders must be clear before departure.

It is recommended to do the towing by aircraft with the front hook if the glider is equipped with it.



#### 4.8. AEROTOW

For gliders using a C.G. tow hook, the landing gear must stay down during the tow.

The recommended aerotow speed is 65 Kts.

#### 4.9. WINCH LAUNCHING

Retract gear only after release from tow due to the hook location. Winch tow with loaded water ballast is recommended in strong wind conditions.

The recommended winch tow speed is 60.5 Kts. Winch tow with the optional front hook is forbidden.

#### 4.10. LANDING

- Lower landing gear at a safe altitude
- The approach will be done at a minimum of 90 KM/H 49 Kts (this speed doesn't take into account either the wind strength or the wing loading)
- The glide ratio is 5 in the following configuration

Airbrakes fully extended

Indicated speed : 90 KM/H = 49 Kts

#### 4.11. CROSS COUNTRY AEROTOW

At the maximum towing speed (VT) 170 KM/H = 92 Kts and in bumpy air, this must be done :

Landing gear down

Trim in nose dive position

If the glider catches up with the towing plane, open slightly the airbrakes (be careful when airbrakes unlock) or

Put the glider in a slight side slip.

#### 4.12. FLIGHT IN RAIN OR HAIL

Water or ice will seriously increase your rate of sink. You must increase your airspeed by 10 KM/H = 5 Kts over normal approach airspeed.



#### 4.13. WATER BALLAST LOADING SYSTEM (if equipped)

##### Method

position the glider with a wing up;

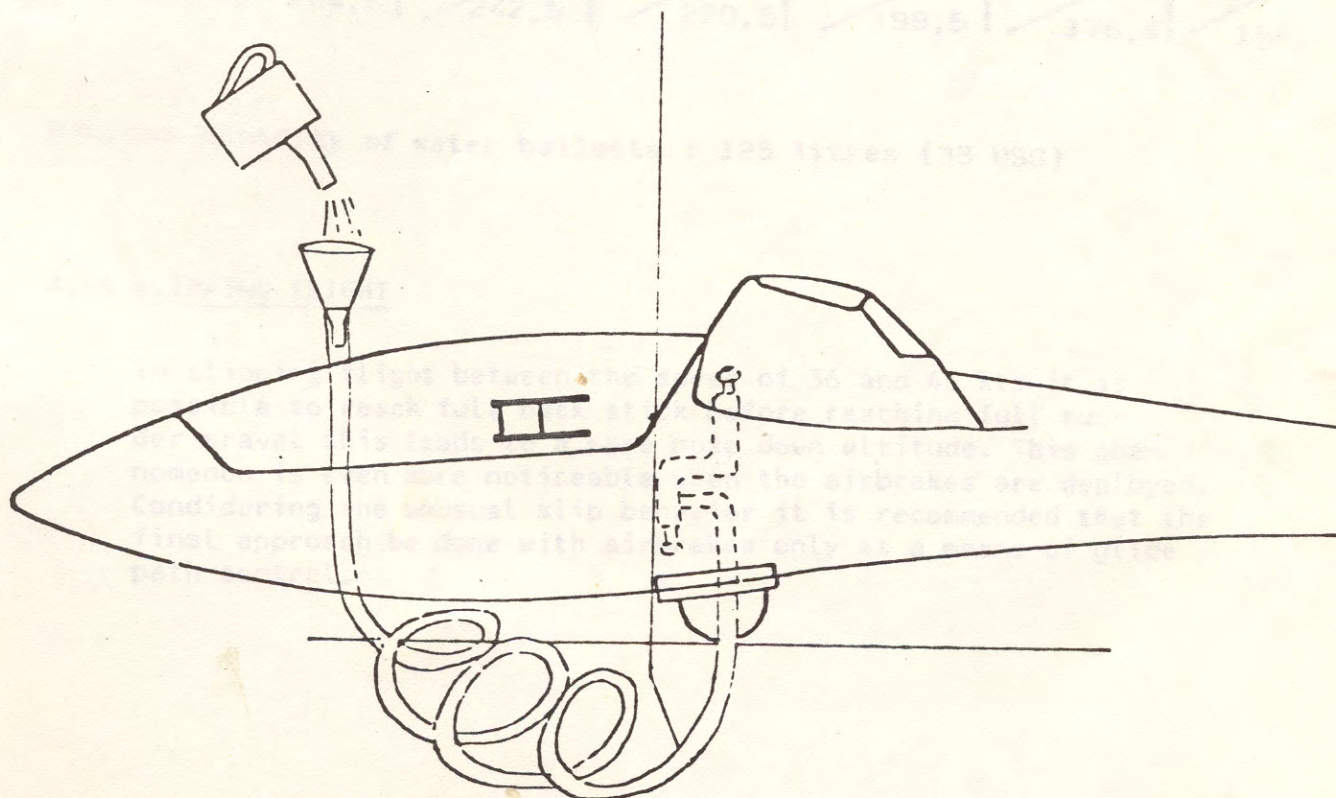
- Open the drain valve on high wing side
- Put in to the outlet (located at the back of landing gear doors) a flexible pipe of the corresponding diameter.
- Fix a funnel at the other end of the pipe and fill the tank.
- Once you have filled with the necessary quantity of water, close the valve
- For the other wing do like-wise.

NEVER FILL THE WATER BALLAST WITH PRESSURIZED WATER

NOTE : If the water ballasts ~~can be~~ filled without exceeding the gross weight (see page 4.5) then take off with full ballast is recommended as it minimizes water movement.

- The left handle opens the right wing ballast.
- The right handle opens the left wing ballast.

Flexible pipe fitted in the outlet





# LOADING OF WATER BALLASTS (continued)

The maximum authorized weight must never be exceeded.  
To determine the proper quantity of water, use the following table

<div>KG</div> <div>Lbs</div>		LIVE WEIGHT					
		65 143,3	75 165,3	85 187,4	95 209,4	105 231,5	115 253,4
Glider Empty weight	230 507	Full	full	full	full	120 264,5	110 242,5
	240 529	full	full	full	120 264,5	110 242,5	100 220,5
	250 551	full	full	120 264,5	110 242,5	100 220,5	90 198,5
	260 573	full	120 264,5	110 242,5	100 220,5	90 198,5	80 176,4
	270 595	120 264,5	110 242,5	100 220,5	90 198,5	80 176,4	70 154,3

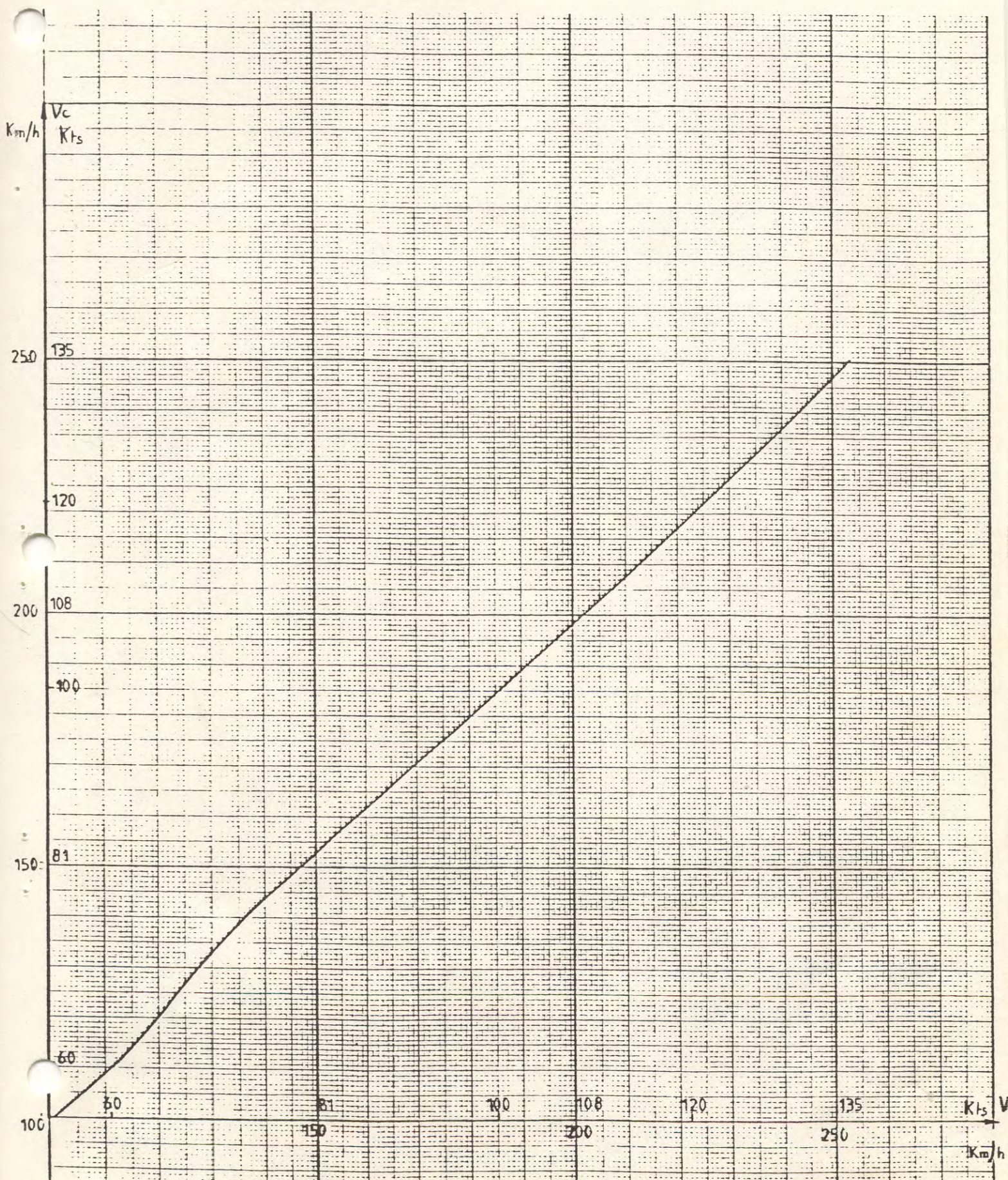
Maximum capacity of water ballasts : 125 litres (33 USG)

## 4.14 SLIPPING FLIGHT

In slipping flight between the speed of 36 and 45 kts it is possible to reach full back stick before reaching full rudder travel this leads to a more nose down altitude. This phenomenon is even more noticeable when the airbrakes are deployed. Considering the unusual slip behavior it is recommended that the final approach be done with airbrakes only as a means of glide path control.



5.1. - AIRSPEED SYSTEM CALIBRATION





## 5.2. STALLS

The following speeds are given for 2 usual weight of the glider.

1. Empty weight with equipment      250 Kg + load 90 Kg = 340 Kg  
551Lbs + load 199Lbs = 750 Lbs
2. Empty weight equipment      250 Kg + load 90 Kg + water 115 Kg = 455 Kg  
551Lbs + load 199Lbs + water 253Lbs = 1003Lbs

BANK	LOAD FACTOR	STALLING SPEEDS			
		at 340 Kg= 750 lbs		At 455Kg = 1003lbs	
		Km/h	Knots	Km/h	Knots
0°	1	63	34	73	39
30°	1,155	68	37	78	42
45°	1,414	75	40	87	47
60°	2	89	48	103	56

The extension of airbrakes increases the stall speed by 2.7 Kts. The approach to the stall brings about a measurable ineffectiveness of the stick (elevator and ailerons) and a slight tail buffeting.

### 5.3. CROSS WIND

Demonstrated crosswind : 11 Kts.

#### 5.4. GLIDE POLARS

See pages 5.3. and 5.4.



ISSUE 2

70 knots  
29/11

MAX UP 52

MIN SINK

MIN SINK 24

740 @ 80

65  
64.8  
120 32/10

40/1

Knots  
Km/h

108  
200

97.2  
180

86.4  
160

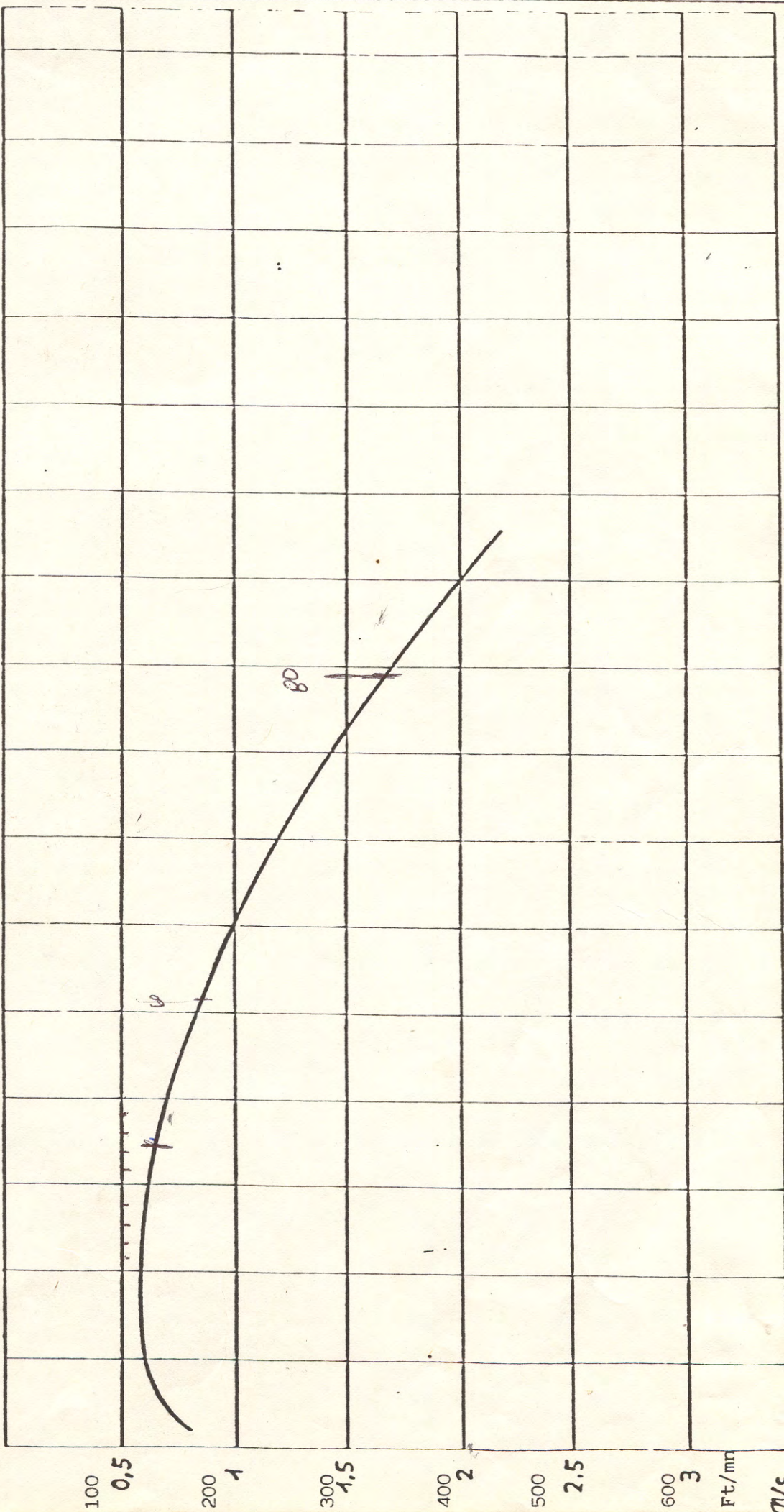
75.6  
140

64.8  
120

54  
100

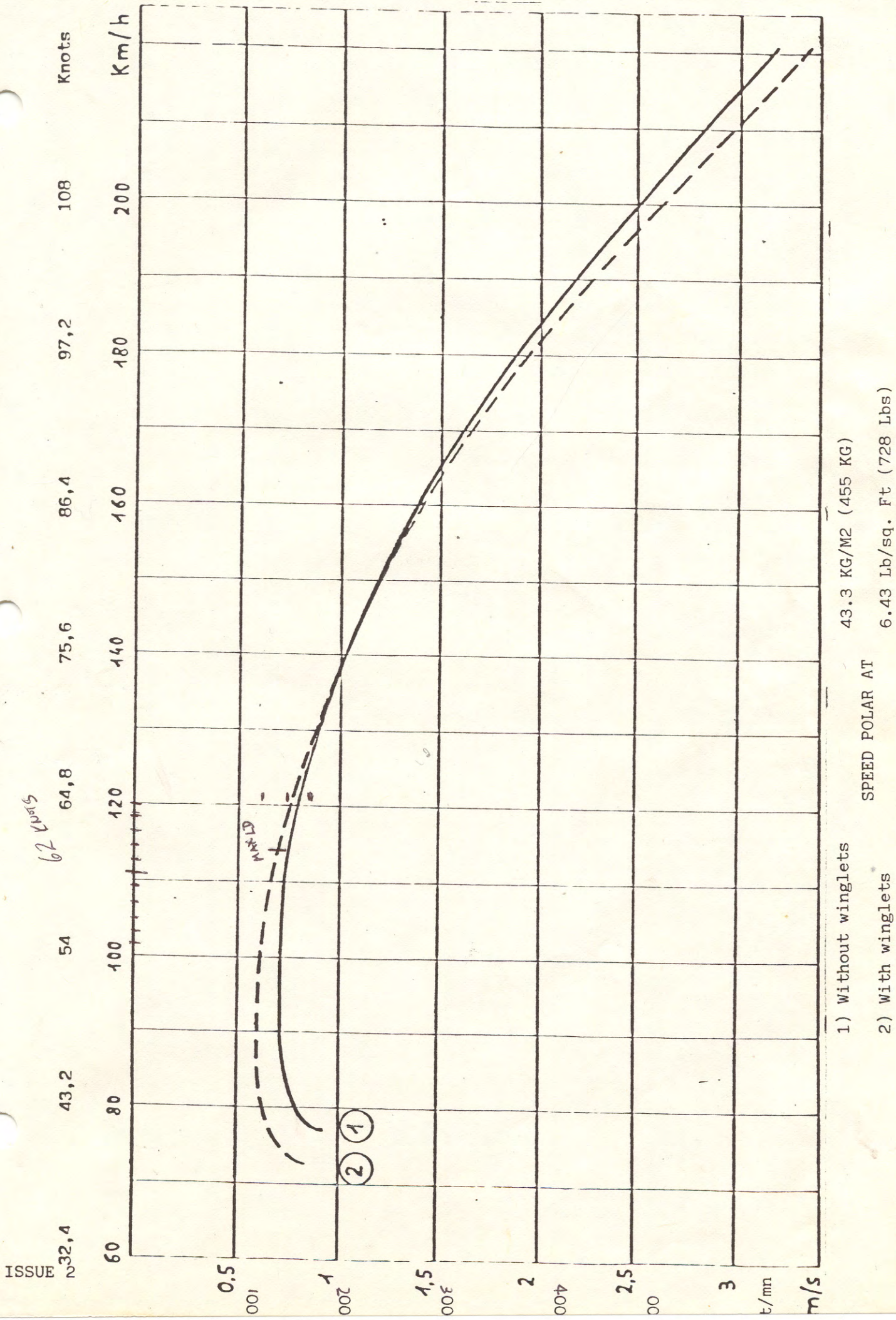
43.2  
80

32.4  
60



SPEED POLAR AT 31.4 Kg/m<sup>2</sup> (330 Kg) without winglets  
 8.87 Lb/Sq Ft (1003 Lbs)







6.87 14/gm<sup>2</sup>

31.4 kg/m<sup>2</sup>

31.4 kg/m<sup>2</sup>

Dry 33.73kg/m<sup>2</sup>

Wet 45.00kg/m<sup>2</sup>

L/D	km/hr	km/hr	Knots	Knots	Knots	Knots	Knots	Knots	Knots
31.4	70	2.23	37.8	1.2042	39.1608	1.247551	45.36	1.44504	
38.31	80	2.09	43.2	1.1286	44.7552	1.16923	51.84	1.35432	
40.32	90	2.23	48.6	1.2042	50.3496	1.247551	58.32	1.44504	
40.3	95	2.36	51.3	1.2744	53.1468	1.320278	61.56	1.52928	
39.68	100	2.52	54	1.3608	55.944	1.409789	64.8	1.63296	
36.81	110	2.99	59.4	1.6146	61.5384	1.672726	71.28	1.93752	
33.67	120	3.56	64.8	1.9224	67.1328	1.991606	77.76	2.30688	
30.35	130	4.28	70.2	2.3112	72.7272	2.394403	84.24	2.77344	
27.39	140	5.11	75.6	2.7594	78.3216	2.858738	90.72	3.31128	
24.75	150	6.05	81	3.267	83.916	3.384612	97.2	3.9204	
22.45	160	7.13	86.4	3.8502	89.5104	3.988807	103.68	4.62024	



## 6.1. IN FLIGHT CENTER OF GRAVITY

The maximum and minimum equipped pilot weight corresponding to the C.G. (Center of Gravity) limits are given by the weight sheet of each glider.

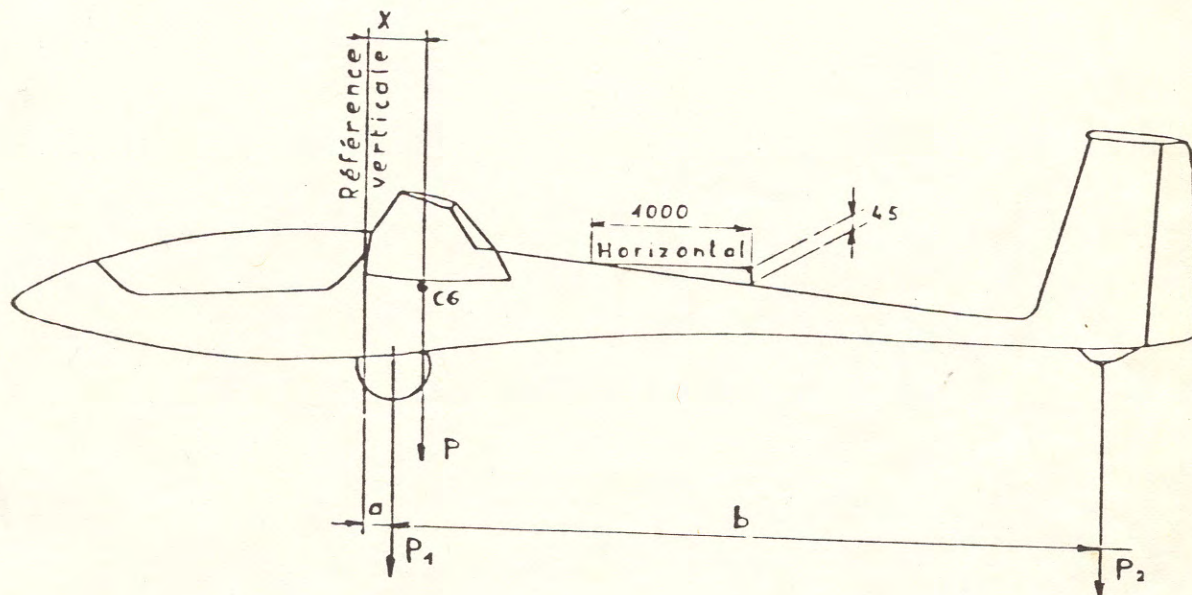
IMPORTANT NOTE : the weight sheet does not include the lead compensation weights, the water ballast or the optional equipment. To properly verify the C.G. limits with the optional equipment installed (lead weights, optional instruments or water ballast), use one of the following solutions as described in section 6.1.1 or 6.1.2.

### 6.1.1. WEIGHTING PROCEDURE

$$\text{Center of gravity position : } X = \frac{P_2 \cdot b}{P_1 + P_2} + a$$

a = ..... m (.....Ft)

b = ..... m (.....Ft)



#### Weighting method detail

- Put the two support points of the glider on scales
- Level on the upper generating line of the fuselage tail cone, a gradient wedge 45/1000 on horizontal line.
- Measure P1 and P2 (take away the tare/weight eventually used) and calculate X with the upper formula.

Support	Scale Reading	Tare	Net Weight
front			P1 =
back			P2 =



### 6.1.2. ARITHMETIC CALCULATION

6.1.2.1. Glider : serial number 101 ... Registration N° :  
 Empty glider lever arm (Blv) = ... m(...in) see weight and balance record  
 Empty weight with equipment (MVE) = ... Kg (... Lbs)

#### 6.1.2.2. Lever arm of the removable elements

Lead discs	- 1.84 M	(- 72.44 in)
Dash board	- 1.10 M	(- 43.31 in)
Pilot	- 0.65 M	(- 25.59 in)
Water ballasts	+ 0.15 M	(+ 5.91 in)
Battery	0.65 M or + 0.15 M	(+ 25.59 in or 5.91 in)
Oxygen bottle	+ 0.20 M	(+ 7.87 in)

#### 6.1.2.3. Example for in flight center of gravity calculation

	WEIGHTS	LEVER ARM	MOMENTS
Empty glider with equipment MVE	255	x 0.630	= 160.65 m Kg
Equiped pilot (with parachute)	77	x -0.65	= -50.05
lead discs	0	x -1.84	= 0
Radio VHF	1.2	x -1.10	= - 1.32
Battery	3.5	x 0.65	= 2.275
Water ballasts	118.3	x 0.15	= 17.745
	455 KG		129.3 m Kg

$$X = \frac{129.3}{455} = 0.284 \text{ m (0.932 Ft)}$$

Reference chord (socket) : c = 0.887 m (34.92 in)  
 So the center of gravity position in % of chord is

$$\frac{0.284}{0.887} = 0.32 \text{ so } 32 \%$$

#### 6.1.2.4. Calculation board

Designation	Weight x (m) (lbs)	lever arm (m) (in)	= Moment (m.kg)(in Lb)
Empty glider equiped			
Pilot			
lead discs			
Supl. equipment at the board			
Battery			
Water ballasts			
Supl. equipment			

Total weight : ..... Total moment : .....

$$x = \frac{\text{total moment}}{\text{total weight}} = \dots \text{ m (.... in)}$$



## 6.2. EQUIPMENT LIST

The glider has to be operated only in visuabl meteorological conditions at daylight.

Glider N° ..... Specification ..... Date :

Obligatory instruments	Presence on the glider	weight (Lbs)	Lever arm (inches)
One airspeed indicator WINTER 6FMS513 20-160 KTS		0.595	- 43.3
One barometer altimeter WINTER 4FGH1033 0-30000 Ft or one barometer altimeter WINTER 4HM6 0-20000 Ft or one certified sensitive altimeter		0.904 0.551 -	- 43.3 - 43.3 -

Other obligatory equipment	Presence on the glider	Weight (Lbs)	lever arm (inches)
One harness SIRBAIN 501 - 594 - 403		2.238	- 19.7
One wheel LELEU 2790.00		4.056	+ 4.7
One tire 500 X 5 GOODYEAR 301 016 090 Or DUNLOP 500 X 5		5.690	+ 4.7
One tube GOODYEAR TR 67		1.390	+ 4.7
One hook TOST G73		1.543	- 5.9
			or - 47.25



EQUIPMENTS LIST (continuation)

Optional instruments (not restrictive list)	Presence on the glider	Weight (Lbs)	FWD/AFT datum (inches)
VHF transceiver BECKER AR 2008/25B or VHF transceiver DITTEL ATR 720 Electric variometer Flight computer Watch board Electrical horizon Accelerometer		2.094   1.720	- 43.3   - 43.3



EQUIPMENTS LIST (continuation)

Optional instruments (not restrictive list)	Presence on the glider	Weight (Lbs)	FWD/AFT datum (inches)
Battery SONNENCHEIN 6FX5S A200		7.672	+ 25.6 or + 5.9
Battery rack 101 - 100 - 328		0.485	+ 25.6 or + 5.9
Water ballasts (one bag) S.G.T.P. 101 - 110 - 354		3.020	+ 5.9
Winglets		5.50	+ 7.9
Additional hook TOST G73 front or C. G. position		1.543	- 5.9 or - 47.25
Oxygen equipment		9.458 cylinder	+ 7.9 cylinder
Loud speaker			+ 5.9
Headrest			- 3.9



### 7.1. GENERAL DIMENSIONS

Maximum span	15 M	49.21 Ft	2.55 in
Total length	6.80 M	22.00 Ft	3.72 in
Total height	1.42 M	4.00 Ft	7.9 in
Wing aera	10.50 M2	113.02 sq.Ft	

### 7.2. WINGS

Evolutive airfoil COAP 01 to COAP 02			
Aspect ratio		21.43	
Dihedral		2.3 °	
Mean geometric thord	0.700 M	2.297 Ft	27.56 in

### 7.3. AILERONS

Aera		38.1 dm2	4.10 sq.Ft
Clearance angles	+ 14 ± 2°,	- 22° ± 2°	

### 7.4. AIRBRAKES

Double paddle type with opening only on upper surface  
 Drive through rods.

### 7.5. WINGLETS

Aera in vertical projection	0.13 M2	1.4 sq.Ft
Height/wing chord	0.80 M2	3.15 in
Winglet tip chord	9.5 cm	3.74 IN
Winglet chord at 0.65 M (2.13 Ft) from the tip	18 cm	7.09 in

### 7.6. HORIZONTAL STABILIZER

Aera	0.977 M2	10.76 sq.Ft
Airfoil FX 71 L 150/30		
Clearance angles	+ 18 ° ± 2°	- 22° ± 3.5°
Drive through rods		

### 7.7. VERTICAL STABILIZER

Aera	1.0 M2	10.76 sq.Ft
Rudder surface	0.3 M2	3.23 sq.Ft
Airfoil FX 71 L 150/30		
Clearance angles	± 30° ± 3°	
Cables drive		

### 7.8. LANDING GEAR

Type : retractable single wheel landing gear, drum brake  
 Tyre : 500 X 5  
 Control of main landing gear through rigid rods  
 Tail shoe made of expanded plastic foam with metallic skid  
 Tyre inflation : 2.6 to 3.4 bars according to the weight; 37.7 → 49.3 psi



#### 7.9. LEAD DISCS

A pin in front of the rudder pedals allows the installation of 7 lead discs weighing 1 Kg - 2.2 Lbs each. to maintain the center of gravity within its limit.

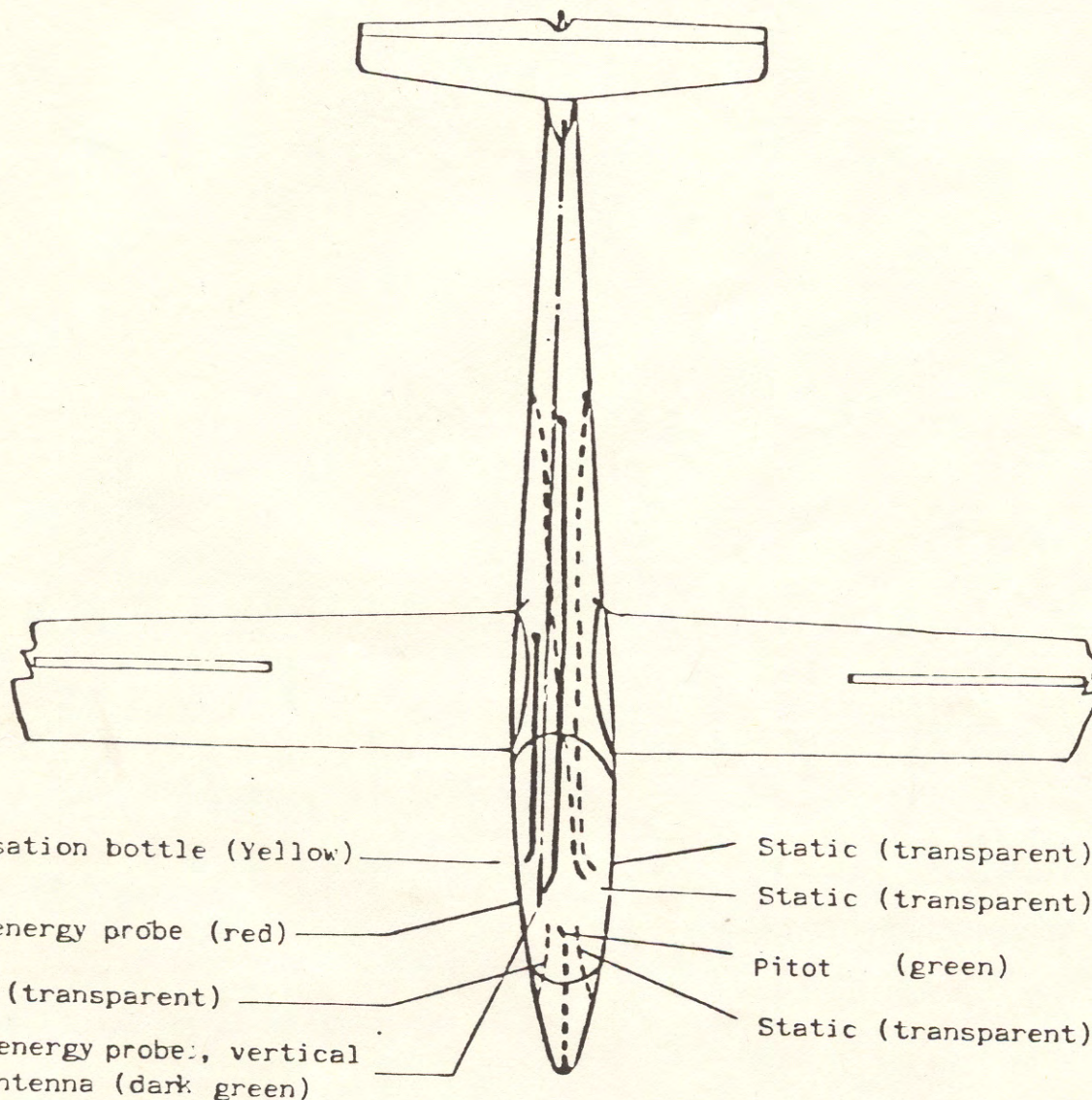
After the installation of the lead discs, the butterfly nut must be properly fixed and checked before every take off. The safety pin must be tied.



### 7.10 PITOT STATIC SYSTEM

Front static ports : altimeter, airspeed indicator and standard variometer

Back static ports : optional variometer(s)





### 8.1. NORMAL MAINTENANCE

- The glider must not be hangared in high atmosphere moisture conditions.
- Long exposure to sunlight is harmful to the skins.
- Avoid prolonged storage in non ventilated hangars or trailers
- Airbrakes do not include a drain. Sponge after rain or clean the airbrake boxes.
- The canopy must be preferably cleaned with soapy water and after with a soft cloth and appropriate cleaning products.
- Fiber glass gliders must be kept especially clean. Experience in competition has shown that performance was deteriorated by some 15 % at low speed and by 30 % at high speed if the glider was dirty.
- Clean the landing gear after landing on muddy ground.
- Often check the tyre pressure. It should be between 2.5 and 2.7 for a 350 Kg weight and between 3.2 and 3.4 for a 455 Kg weight; If the tyre pressure is too low, there will be a risk of damaging the landing gear doors while rolling.

See maintenance guide 101 for more details and periodic maintenance and repairing.

### 8.2. ASSEMBLY

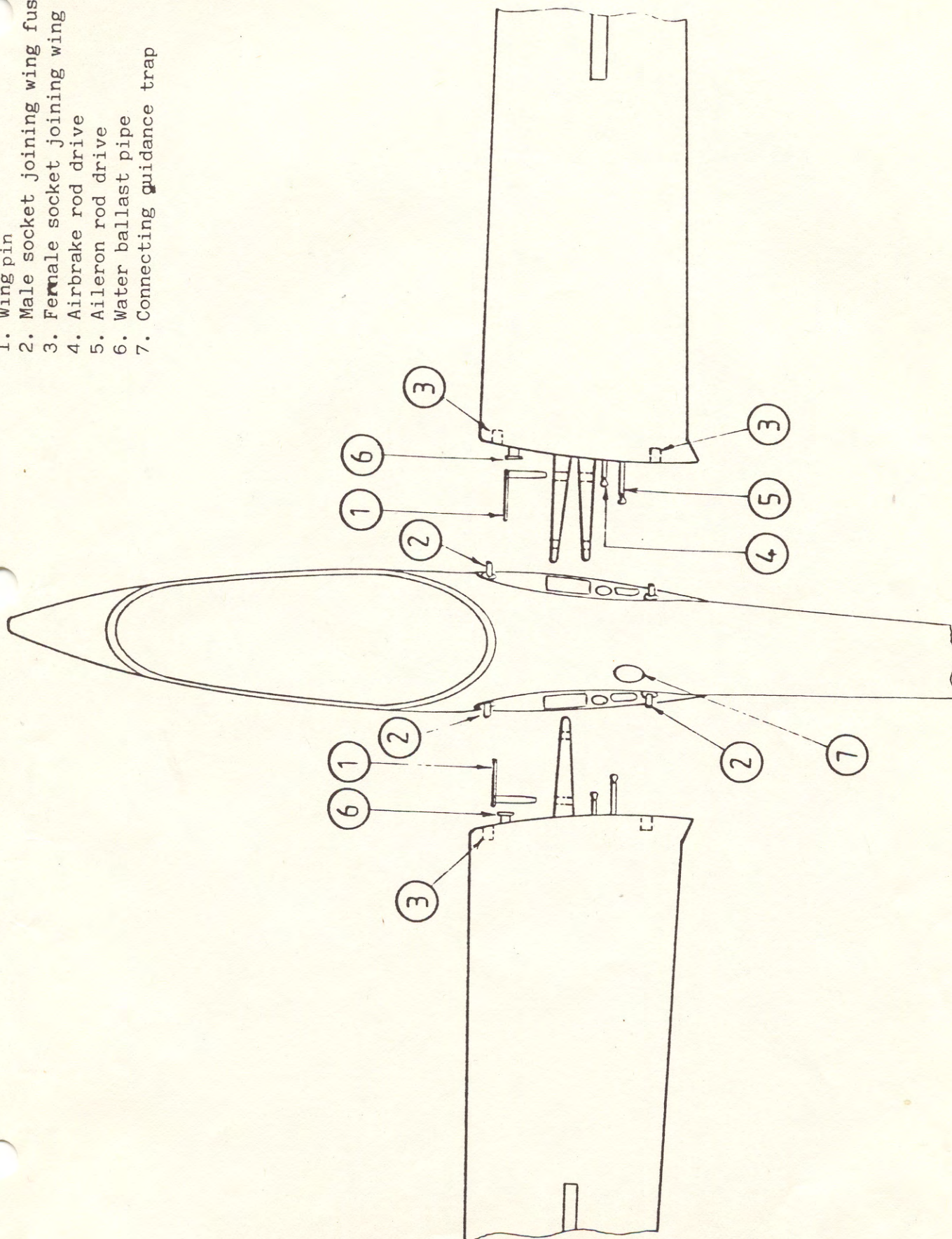
2 persons + assembly jig and props.

#### 8.2.1. Wings assembling

- All axles, sockets and joints must be cleaned.
- The right wing is inserted into the tunnel fuselage (take care of the control rod ends.
- Put the tip of the right wing on a prop.
- The left wing is jointed in the same way as the right wing (take care of the control rod ends.
- Get the wing pins from their socket. They must penetrate freely and by hand in to the spars.
- Fasten the security of the main wing pins.
- Joint the tips wings and key
- Check the wings jointing and fitting back-lash.
- Through the connecting guidance trap on the upper part of fuselage connect the four sockets as indicated on figure page 8.4.
- Fit the water ballast pipes and the cables drive values.



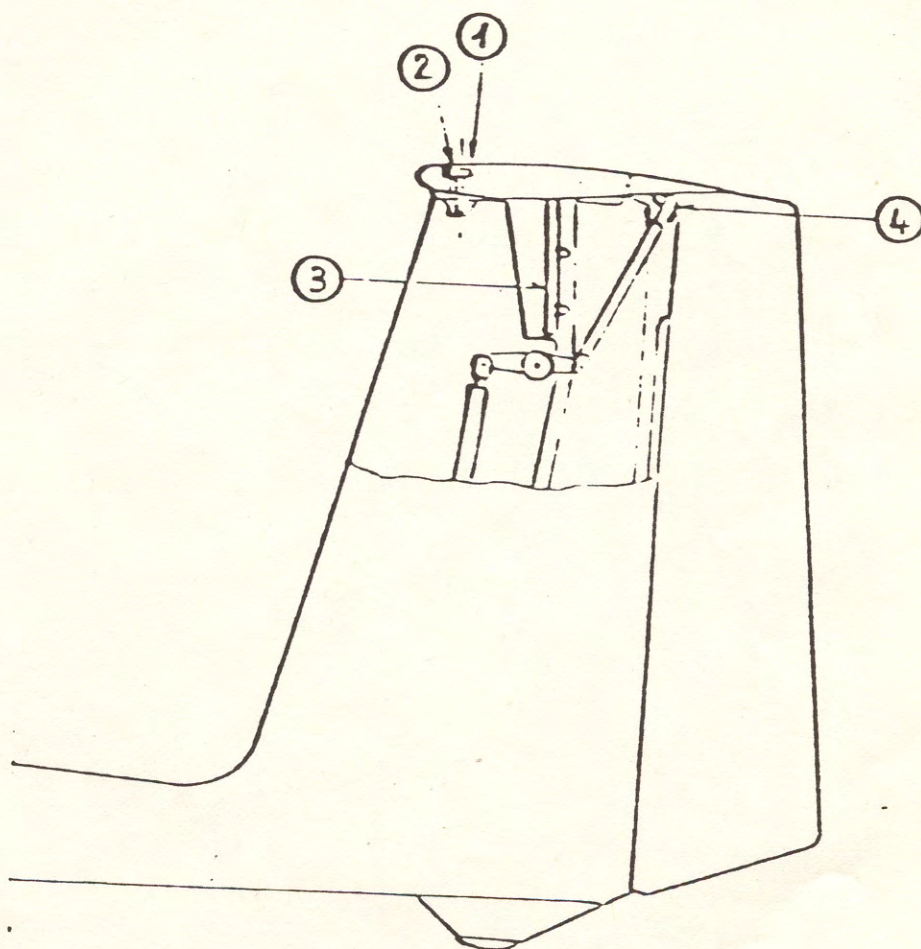
1. Wing pin
2. Male socket joining wing fuselage
3. Female socket joining wing fuselage
4. Airbrake rod drive
5. Aileron rod drive
6. Water ballast pipe
7. Connecting guidance trap





### 8.2.2 - Assembling horizontal stabilizer

Position the horizontal stabilizer so that the tongue fits into the slot in the vertical fin and two forward facing pins engage in the holes in the tongue. Secure the stabilizer to fin with castellated bolt using the T wrench provided. Secure the elevator push rod l'Hotellier fitting to the elevator horn and insert a safety pin.



1. Screw of leading edge
2. Braking device
3. Fixation fitting
4. Securing of the rod

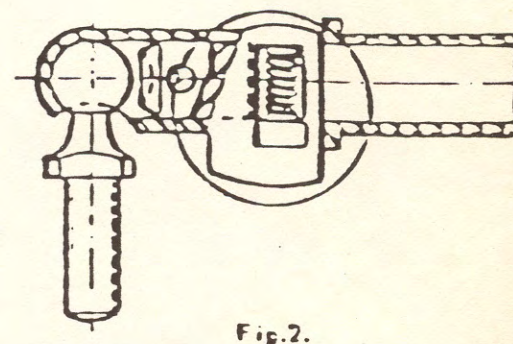
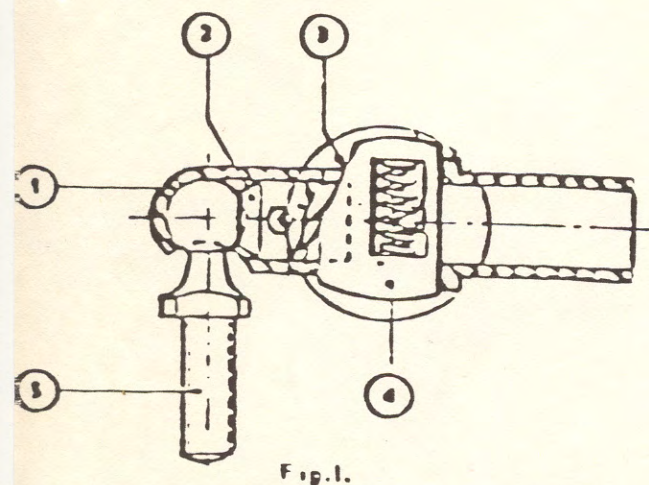


8.2.3 - FINAL CHECKING AFTER ASSEMBLY

- Connection of control rods

LOCKED SWIVEL

RELEASED SWIVEL



Check each point by pulling in the direction to separate the swivel from the ball. Check that the locking pin is in the position as shown in Fig. 1.

Securing wing pins

Check that the wing pins are positioned such that the spring loaded center hook retains the handles of both pins.

Horizontal stabilizer

Check that the horizontal stabilizer is correctly positioned, that the retaining bolt is secure and that the elevator push rod is correctly connected (fig. 1).

Before flying

Do as indicated in paragraph 4.1 and check the correct functioning of controls and clearance of all control surfaces.

8.3 TAKING DOWN

Opposite procedures of assembling. Don't forget to disconnect the controls first.



central

LR avec AR

Le Blanc, le 12 juin 1986

6/20/86

. Monsieur Tom KNAUFF  
Ridge Soaring Inc.

RD JULIAN

PENNSYLVANIA 16844  
- U.S.A.

Nos réf. :  
GR/CB 06/045

Subject : Use of sailplanes 101 B  
101B198 - 199 - 200 - 201 - 202 - 203 - 204

Dear Sir,

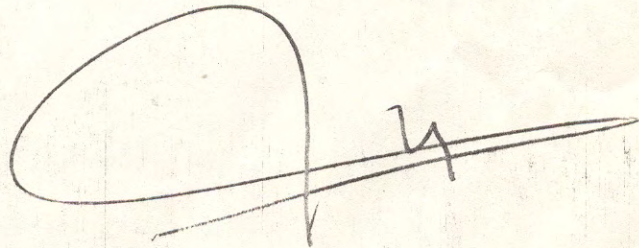
In default of knowing the names and addresses of the owners of the sailplanes 101B.

As a distributor of the aboved sailplanes, we beg you to inform the owners and users of sailplane Pegasus B as following :

- the use of rear water-ballasts of the wing is forbidden, the maximum mass being limited to 455 kgs and the V.A. to 170.

Please, could you acknowledge receipt and keep us informed of the following.

Yours faithfully,

A large, stylized handwritten signature in dark ink, consisting of a large loop followed by a horizontal line and a small vertical stroke.



MANUFACTURER  
S.A. CENTRAIR  
Aérodrome  
36300 LE BLANC

ADDITIONAL PAGES

FLIGHT MANUAL

GLIDERS

CENTRAIR 101 B

NON APPROVED BY THE  
DIRECTION GENERALE DE  
L'AVIATION CIVILE  
(D.G.A.C.)



## 2.1. BASIS FOR CERTIFICATION

## 2.2. OPERATING LIMITS

This glider is approved for "Day VFR" flight only.

Not approved are :

- Aerobatic flight including voluntary spins;
- Winch towing using the forward tow hook.
- Flight with full water ballast bags when temperature is below freezing.
- Flight with the wings in a non symmetrical configuration (loading of water ballast bags or winglets).
- The use of cable ring different of the one allowed by hook's manufacturer

## 2.3. AIRSPEED LIMITATIONS IN INDICATED AIRSPEED (IAS)

		Km/H	Knots
- Never exceed speed	Vne	250	135
- Max. manoeuvring speed	Va	188	102
- Max. rough air speed	Vra	188	102
- Max. aerotow speed	Vt	170	92
- Max. winch launching speed	Vw	120	65
- Max. landing gear extended speed	Vle	170	92
- Max. landing gear operating speed	Vlo	170	92

## 2.4. AIRSPEED INDICATOR MARKINGS

- Radial red line : (Vne) 250 Km/h - 135 Kts
- Yellow arc : range to be used with caution  
in calm air 188 to 250 Km/H - 102 to 135 Kts
- Green arc : normal operating range 84 to 188 Km/h -  
45 to 102 Kts
- Yellow triangle : lowest approach speed recommended 90 Km/H - 49 Kts  
(with empty water ballast bags);



## 2.5. FLIGHT LOAD FACTORS AT GROSS WEIGHT

- At 170 Km/H - 92 Kts (IAS)

Max. positive load factor  $n = + 5.3 g$

Max. negative load factor  $n = - 2.65 g$

- At 250 Km/H - 135 Kts (IAS) without winglets

And at 220 Km/H - 119 Kts (IAS) with winglets

Max. positive load factor  $n = + 4.0 g$

Max. negative load factor  $n = - 1.5 g$

## 2.6. WEIGHT LIMITS

Maximum approved weight with loaded water ballast	505 Kg / 1 113,33 Lbs
Maximum approved weight with empty water ballast	380 Kg / 837,75 Lbs
Maximum weight of non lifting parts	250 Kg / 551,15 Lbs
Empty weight equipped, about	260 Kg / 573,2 Lbs
Useful, load, about	120 Kg / 264,55 Lbs

### 2.6.1. Maximum baggage weight

15 Kg - 33 Lbs secured



## 2.7. WEIGHT AND BALANCE

### 2.7.1. Center of gravity range

230 to 375 mm - 9.06 to 14.76 inches after of datum line.

Datum line : wing leading edge at wing root.

Levelling means : on top surface of fuselage tail cone,  
level using a gradient wedge of 45/1000.

### 2.7.2. Use nose ballast to stay within C. G. range

In the absence of a specific calculation for the considered glider as given in section 6 or in the weight and balance record, use the chart below to determine the number of necessary lead discs. Weight of one lead disc 2.2 Lbs  $\pm$  0.44

Lead discs quantity	Minimum weight equipped pilot
0	TO BE SPECIFIED
1	
2	
3	
4	
5	
6	
7	

NOTE : for a glider with optional equipment use the weight and balance information of this glider (see section 5 or weight and balance record) in order to determine a new chart using datas given in section 6.



## 2.8. REQUIRED EQUIPMENT

- Airspeed indicator )
- Altimeter ) connected to the front  
static ports
- Compass

See equipment list in section 6

## 2.9. TOWING-ROPE OR CABLE REQUIREMENTS

Towing-rope :

Maximum permissible nominal strength : 590 daN  
Minimum towing cable length : 100 ft (30 m)

Winch-launching cable :

Maximum permissible nominal strength : 590 daN  
(weak-link)

## 2.10. LIMITATIONS PLACARDS (in the cockpit)

2.10.1. Weight limits placard (placard located on the right side  
back of water ballast handle).

Placard for gliders CENTRAIR 101 B

- Glider equipped with water ballast

Max. weight with loaded water ballast	505 Kg = 1113,2 lbs
Max. weight with empty water ballast	380 Kg = 837,7 lbs
Empty weight	xxx Kg = xxx.x Lbs
Useful load	xxx Kg = xxx.x Lbs

xxx Kg : value specified for every new glider



2.10.2. Airspeed limits (IAS)

(Placard located on the left hand side front of the water ballast handle)

Placard

Max. manoeuvring speed	Va	188 Km/H	102 Kts
Max. towing airspeed	Vt	170 Km/H	92 Kts
Max. winch launching speed	Vw	120 Km/H	65 Kts
Max. landing gear extended	Vle	170 Km/H	92 Kts
Max. landing gear operating speed	Vlo	170 Km/H	92 Kts

2.10.3. Weight and balance

(Placard located on the right hand side back of the water ballast handle)

Lead discs quantity	Minimum weight equipped pilot
0	TO BE SPECIFIED
1	
2	
3	
4	
5	
6	
7	

NOTE : This placard must be used if there is no chart of specific loading in the considered glider (2.7.2.).



#### 4.13. WATER BALLAST LOADING SYSTEM

Method

##### 4.13.1. Front water ballast

position the glider with a wing up;

- Open the drain valve on high wing side
- Put in to the outlet (located at the back of landing gear doors) a flexible pipe of the corresponding diameter.
- Fix a funnel at the other end of the pipe and fill the tank.
- Once you have filled with the necessary quantity of water, close the valve
- For the other wing do like-wise.

NEVER FILL THE WATER BALLAST WITH PRESSURIZED WATER

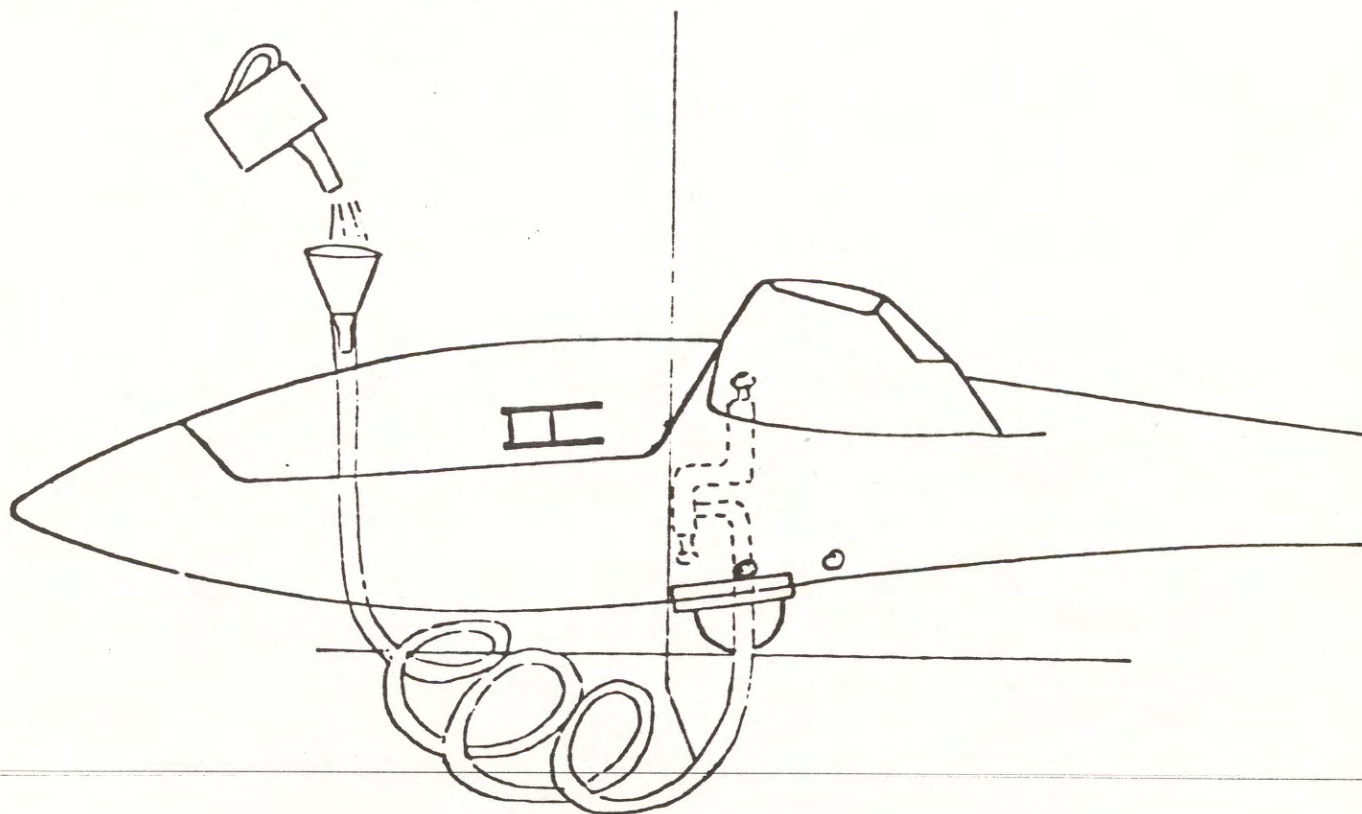
##### 4.13.2. Rear water ballast

You have to proceed as well as for the front water ballast using the taps and connected holes.

NOTE : If the water ballasts can be filled without exceeding the gross weight (see page 4.5) then take off with full ballast is recommended as it minimizes water movement.

- The left handle opens the right wing ballast.
- The right handle opens the left wing ballast.

Flexible pipe fitted in the outlet





LOADING OF WATER BALLASTS (continued)

The maximum authorized weight must never be exceeded.  
To determine the proper quantity of water, use the following table :

KG Lbs		LIVE WEIGHT					
		65 143,3	75 165,3	85 187,4	95 209,4	105 231,5	120 253,5
Glider empty weight	230 507	Full	Full	Full	Full	Full	155 341
	240 529	Full	Full	Full	Full	Full	145 319
	250 551	Full	Full	Full	Full	150 330,75	135 297
	260 573	Full	Full	Full	150 330,75	140 308,7	125 275
	270 595	Full	Full	150 330,75	140 308,7	130 286	115 253

Maximum capacity of front water ballasts : 120 litres (31,7 USG)

Maximum capacity of rear water ballasts : 40 litres (11 USG)

It is imperative to be sure of the trim of the glider everytime the water ballasts are used.

4.14. SLIPPING FLIGHT

In slipping flight between the speed of 36 and 45 kts it is possible to reach full back stick before reaching full rudder travel this leads to a more nose down altitude. This phenomenon is even more noticeable when the airbrakes are deployed. Considering the unusual slip behavior it is recommended that the final approach be done with airbrakes only as a means of glide path control.



### 6.1.2. ARITHMETIC CALCULATION

6.1.2.1. Glider : serial number 101 ... Registration N° :  
Empty glider lever arm (Blv) = ... m(...in) see weight and balance record  
Empty weight with equipment (MVE) = ... Kg (... Lbs)

#### 6.1.2.2. Lever arm of the removable elements

Lead discs	- 1.84 M	(- 72.44 in)
Dash board	- 1.10 M	(- 43.31 in)
Pilot	- 0.65 M	(- 25.59 in)
Water ballasts (front)	+ 0.15 M	(+ 5.91 in)
Battery	+ 0.65 M or + 0.15 M	(+ 25.59 in or 5.91 in)
Oxygen bottle	+ 0.20 M	(+ 7.87 in)
Rear water ballasts	+ 0.525M	(+ 20 in)

#### 6.1.2.3. Example for in flight center of gravity calculation

	WEIGHTS	LEVER ARM	MOMENTS
Empty glider with equipment MVE	255	x 0.630	= 160.65 m Kg
Equiped pilot (with parachute)	77	x -0.65	= -50.05
lead discs	0	x -1.84	= 0
Radio VHF	1.2	x -1.10	= - 1.32
Battery	3.5	x 0.65	= 2.275
Water ballasts	118.3	x 0.15	= 17.745
	455 KG		129.3 m Kg

$$X = \frac{129.3}{455} = 0.284 \text{ m (0.932 Ft)}$$

Reference chord (socket) : c = 0.887 m (34.92 in)  
So the center of gravity position in % of chord is

$$\frac{0.284}{0.887} = 0.32 \text{ so } 32 \%$$

#### 6.1.2.4. Calculation board

Designation	Weight x (m) (lbs)	lever arm (m) (in)	= Moment (m.kg)(in Lb)
Empty glider equiped			
Pilot			
lead discs			
Supl. equipment at the board			
Battery			
Water ballasts front rear			
Supl. equipment			

Total weight : ..... Total moment : .....

$$x = \frac{\text{total moment}}{\text{total weight}} = \dots \text{ m (.... in)}$$



## MISE EN PLACE DES POCHE DE WATER BALLASTS ARRIERES

---

- Planeur non équipé de ficelle : numéro 101 AO 198  
Utiliser une perche fourchue comme indiqué sur le schéma.
- Planeurs équipés d'une ficelle dont les extrémités sont fixées à l'intérieur de l'aile, en bordure du logement du water ballast :  
numéros 101 AO 199 - 101 AO 200 - 101 AO 201 - 101 AO 202 - 101 AO 203 - 101 AO 204 -
- Attacher l'extrémité de la poche à un bout de la ficelle, tirer sur l'autre bout jusqu'à ce que la poche soit en place dans son logement.  
Enrouler la ficelle et la fixer à l'intérieur du logement.

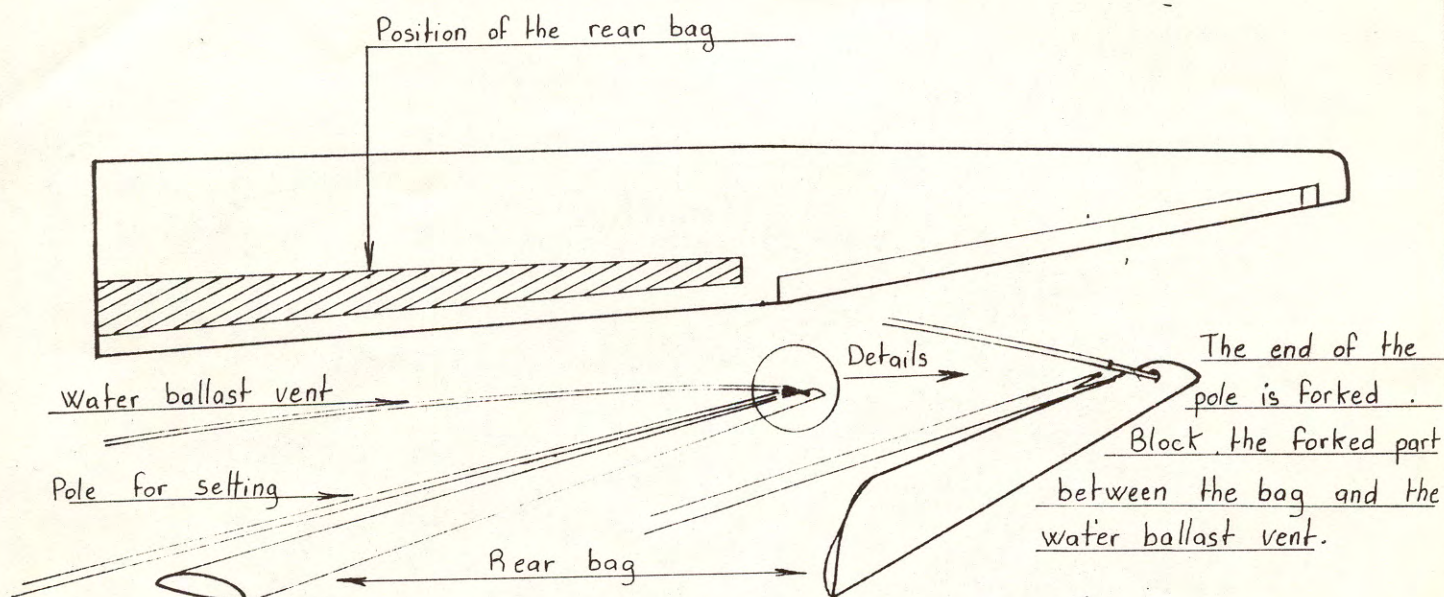
## MOUNTING OF THE REAR WATER-BALLASTS BAGS

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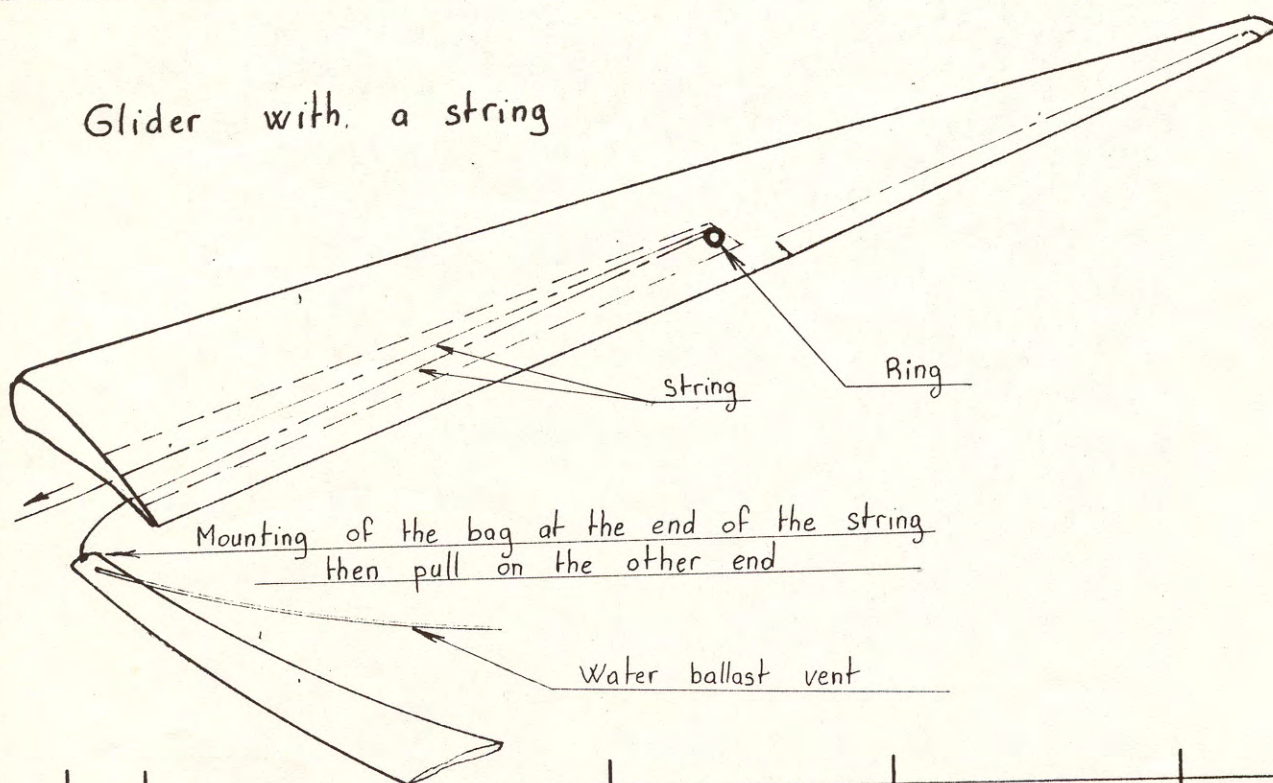
- Glider without any string : serial number 101 AO 198  
Use a forked pole as indicated on the plan.
- Gliders with a string  
(whose tops are fitted inside the wing at the edge of the water-ballast lodgment)  
serial numbers 101 AO 199 - 101 AO 200 - 101 AO 201 - 101 AO 202 - 101 AO 203 - 101 AO 204 -
- Tie the top of the bag at one edge of the string, pull on the other edge until the bag is placed in its lodgment.  
Roll up the string and fix it inside the lodgment.

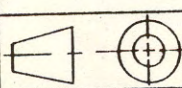


# Glider without string



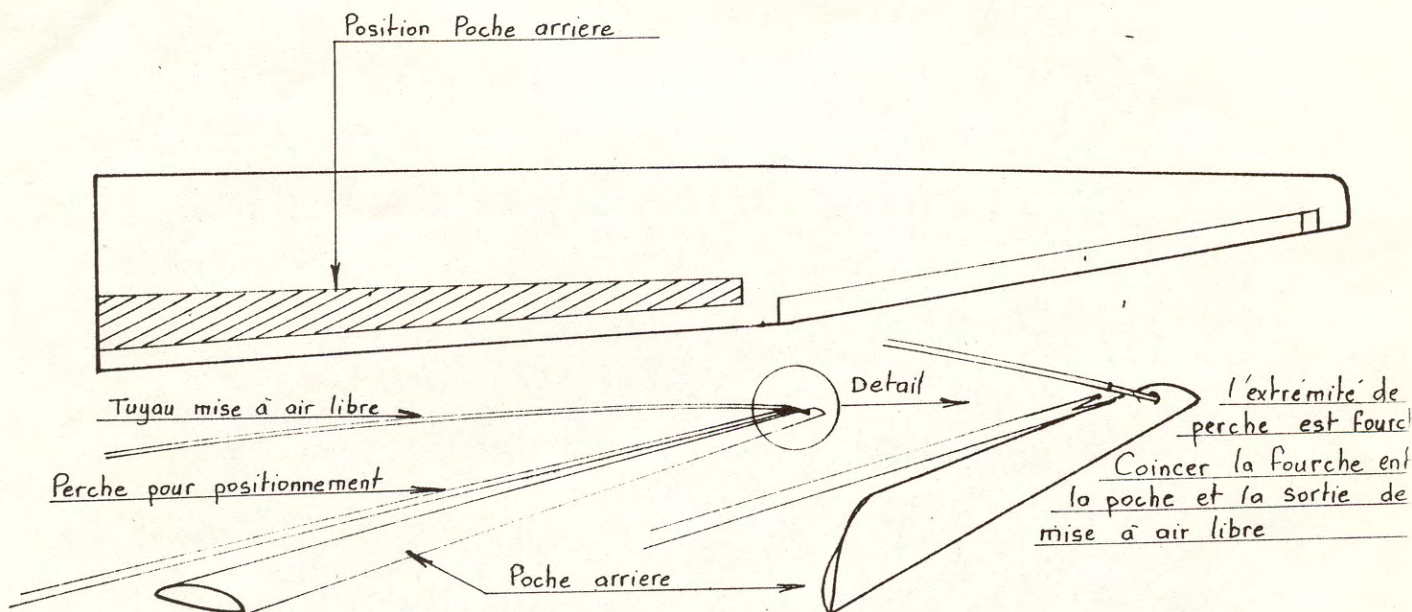
# Glider with a string



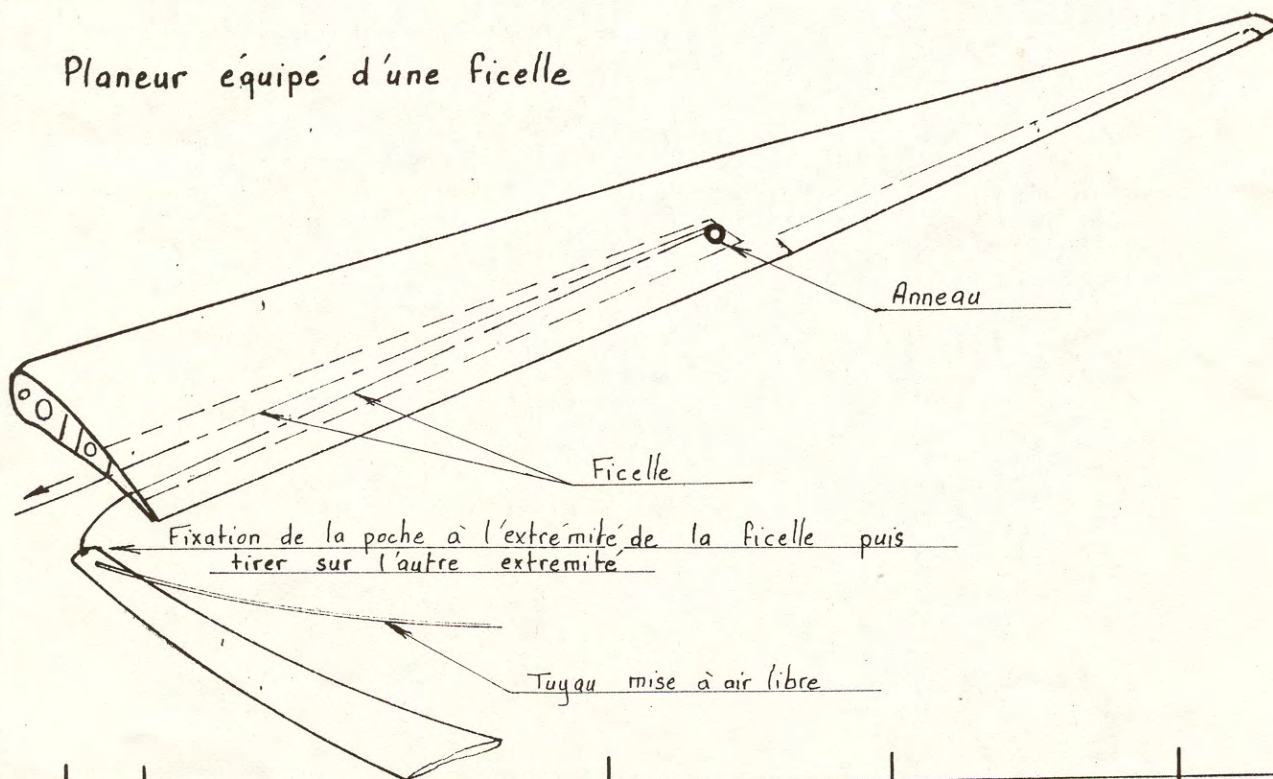
REP	NB	DÉSIGNATION	MATIÈRE	DIMENSIONS	OBSERVATIONS			
ECHELLE	Mounting of the rear W.B bag 101 B and 101 BC Gliders							
		SA CENTRAIR 36300 LE BLANC						
		Ce document est la propriété de S.A. CENTRAIR et ne peut être reproduit ou communiqué sans son autorisation.						
		The French version only relies on us			Dessiné par :	Vérifié par :	Date	ED



## Planeur non équipé de ficelle



## Planeur équipé d'une ficelle



REP	NB	DÉSIGNATION	MATIÈRE	DIMENSIONS	OBSERVATIONS
ECHELLE		- Mise en place poche arriere W/B Planeurs 101B et 101 BC			
		<b>SA CENTRAIR 36300 LE BLANC</b>			
		Ce document est la propriété de S.A. CENTRAIR et ne peut être reproduit ou communiqué sans son autorisation.			
			Dessiné par :	Vérifié par :	Date ED



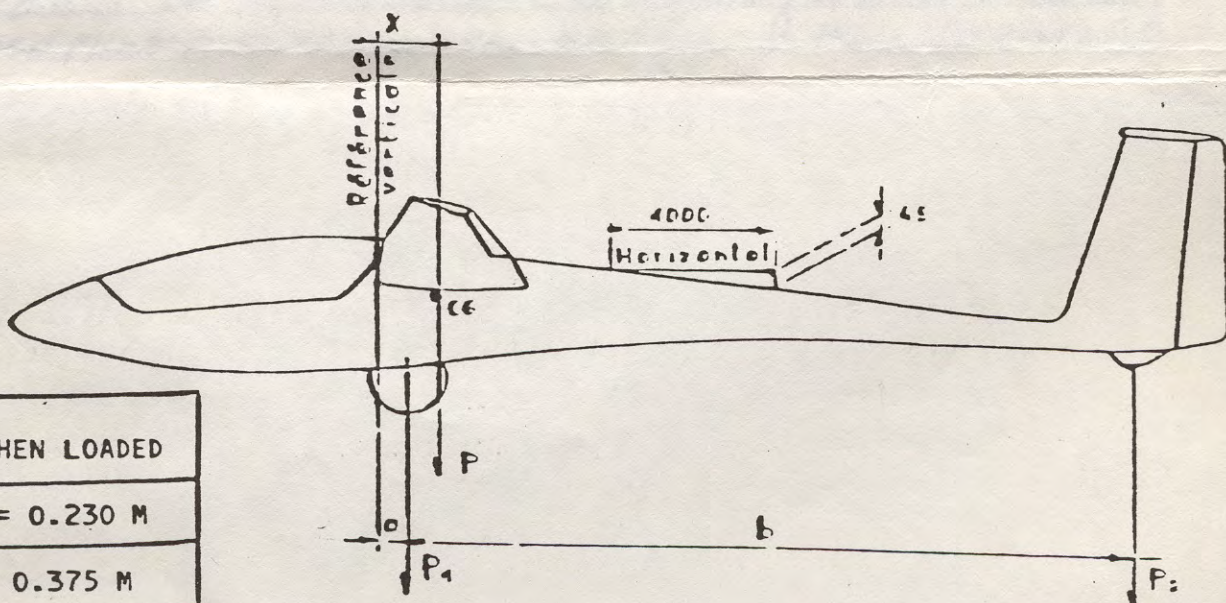
8.1 - WEIGHTING S/N 101A0203 Reg. No. N58KG

October 11, 1990

Datum line : wing leading edge at wing root

Levelling means : on top surface of fuselage tail cone, level using a gradient wedge of 45/1000.

Max. weight with loaded water ballast	455 kg = 1003.0 lbs.
Max. weight with empty water ballast	368 kg = 811.4 lbs.
Empty weight equipped	280 kg = 617.4 lbs.
Useful load	88 kg = 194.0 lbs.



C.G RANGE WHEN LOADED

FRONT : Ca = 0.230 M

REAR : Cr = 0.375 M

SUPPORT	LEVER ARM (M) (FT)	WEIGHT (Kg) (Lbs)	EMPTY WEIGHT LEVER ARM : Xo (B L V IN M OR FT)
FRONT P1	a : 0.115	242.2	$xo = \frac{P2}{P1} \cdot \frac{b}{P2} + a = 0.684$
BACK P2	b : 4.132	38.7	

$$(1) = \frac{MVE (Xo - Cr)}{L + Cr} = 84.7 \text{ kg or } 186.8 \text{ lbs. equipped pilot min. weight.}$$

$$(2) = \frac{MVE (Xo - Ca)}{L + Ca} = 88.0 \text{ kg or } 194.0 \text{ lbs. equipped pilot max. weight.}$$

or useful load minus optional equipment

Mean lever arm of the pilot : L = 0.65 M

Note: Lead discs weighing 6.5 kg (14.33 lb) have been installed on the rear post.


Revised  
 07/29/98

205R. More AEP1558563



# N58KG Weight and Balance

15 April 2009

<b>XU Aviation Ltd.</b> <b>2537 Huron Street</b> <b>London, Ontario</b> <b>Canada N5V 5J1</b>	<b>W/O 3881</b> <b>Reg: N58KG</b> <b>Model: Centrair 101A</b> <b>s/n : 101A0203</b> <b>Date: Aug 30/2002</b>
<ul style="list-style-type: none"><li>-removed and replaced rudder</li><li>-performed FRP repair on rudder</li><li>-removed ballast weights from base of fin</li><li>-New Empty Weight is 271.6 Kg and New Empty C of G is 595.1 mm aft of datum</li></ul>	
<p>" The maintenance described above has been performed in accordance with the applicable standards of airworthiness"</p>	
	

The above 30 August 2004 weight and balance for Pegasus 101A0203 lists a new empty weight of 271.6 Kg and empty C of G at 0.5951m. Using this information gives the following load restrictions for the equipped pilot, i.e. pilot plus parachute plus drinking water etc.

The maximum useful load is limited by the maximum allowed weight of N58KG with no water ballast and by the forward C of G of  $C_a=0.230$  m when using full front water ballast.

The minimum allowed weight is set by the rear limit of the C of G of  $C_r = 0.375$ m.

N58KG is certified in the USA as a 101A model and use of the rear water bags is forbidden.

	101A	101B
Maximum equipped pilot load, no water ballast	96.4Kg = 212.5 lbs	108.4 Kg = 239 lbs
Maximum equipped pilot load, full water ballast	65.1 Kg = 143.5 lbs	101.9 Kg = 224.7 lbs
Minimum equipped pilot load, no water ballast	58.3 Kg = 128.5 lbs	58.3 Kg = 128.5 lbs
Minimum equipped pilot load, full water ballast	32.3 Kg = 71.2 lbs	32.3 Kg = 71.2 lbs