

**NEW ZEALAND**

**AIRWORTHINESS CERTIFICATE**



**CIVIL AVIATION AUTHORITY  
OF NEW ZEALAND**

Nationality and Registration Marks	Manufacturer and Manufacturer's Designation of Aircraft	Aircraft Serial Number
<b>ZK-GNI</b>	<b>Grob-Werke GmbH &amp; Co K G G102 Club Astir IIIB</b>	<b>5613 CB</b>
Categories: <b>STANDARD</b>		
Flight Manual Ref: <b>AIR 2168</b>		Period of Validity: <b>NON TERMINATING</b>
Conditions: <b>Private Operations Only</b>		
<p>This Certificate of Airworthiness is issued pursuant to the Convention on International Civil Aviation dated 7 December 1944 and the New Zealand Civil Aviation Rules in respect of the above-mentioned aircraft which is considered to be airworthy when maintained and operated in accordance with the foregoing and the pertinent operating limitations.</p>		
Date of issue. <b>29 AUGUST 2000</b>		Signature  for Director of Civil Aviation

No entries or endorsements may be made on this Airworthiness Certificate and associated Flight Manual or other approved document except in the manner and by the persons authorised by the Director. If this Certificate is suspended or revoked as prescribed in the Civil Aviation Act 1990 or if the aircraft is deleted from the register for any cause this Certificate shall be returned to the Director.

# APPROVED FLIGHT MANUAL

MINISTRY OF TRANSPORT

CIVIL AVIATION DIVISION



Aircraft Manufacturer	
BURKHART GROB FLUGZEUGBAU GmbH & Co. KG	
Aircraft Designation	
GROB G102	
CLUB ASTIR III, CLUB ASTIR III b, STANDARD ASTIR III	
Nationality and Registration	Aircraft Serial Number
Marks ZK-GNI	5613Cb

This Flight Manual has been approved and is the Flight Manual referred to in the Certificate of Airworthiness.

Date of Approval 27.8.81

*Russell Heap*  
for Director of Civil Aviation

Issued by

*James*

Date

2/12/83

for Director of Civil Aviation

(i)

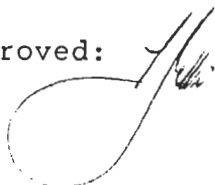
LOG OF PAGES

PAGE	DATED	PAGE	DATED
(i)	27. 8.81	(iii)	21. 8.90
A	21. 8.90	(iv)	10. 6.83
B	1.12.76	(v)	10. 6.83
B1	1.12.76	Chart 1	10. 6.83
B2	9. 5.85	Chart 2	10. 6.83
(ii)	1.12.76		

Except as amended by MOT/ATD pages and applicable approved Supplements, the following document completes this Flight Manual:

Pages 1 through 20b of the Flight Handbook (English Version) issued January 1981 for the Grob G102 Club Astir III, Club Astir IIIB and Standard Astir III gliders.

Approved:



Date: 21.8.90

for Director Civil Aviation

## INTRODUCTION

### GENERAL

This Flight Manual consists of pages and documents listed in the Log of Pages, together with incorporated supplements.

The Flight Manual shall be carried in the aircraft on all flights. It is the responsibility of the pilot in command to be familiar with the contents of this Manual and to comply with all limitations and directions contained therein relating to the operation of the aircraft. For operating information not included in this Manual, reference should be made to the appropriate operations or manufacturer's manuals.

### SUPPLEMENTS

Approved supplements are listed in the Log of Supplements. The owner must ensure that all approved supplements applicable to this particular aircraft are obtained and incorporated in the Flight Manual. On incorporation, the column headed "incorporated" in the Log of Supplements must be marked with an "X" against the supplement concerned.

Incorporation is to be recorded in the Amendment Record Sheet.

### AMENDMENTS

It is the owner's responsibility to ensure that amendments are incorporated on receipt of, and in accordance with instructions issued on behalf of the Director. No amendments, endorsements or entries may be made except in accordance with:

- (a) The Director's instructions.
- (b) The procedure of the preceding paragraph headed "Supplements".
- (c) New Zealand Civil Airworthiness Requirement F14 for weight and balance supplements only.

Approval of revisions to documents which form part of the Flight Manual but are not supplied by MOT/CAD, is notified by amendment of the Log of Pages. Such revisions are to be made on receipt of the Log of Pages amendment, but not before. If revisions notified as approved have not been received, the owner shall arrange for their urgent supply and shall inform the Regional Aircraft Surveyor.

### REFERENCES





Any references in this Manual to eligibility for types of operation under Foreign Regulations are applicable only if Civil Aviation Regulations, Civil Aviation

Safety Orders and New Zealand Civil Airworthiness Requirements are complied with. Any references in this Manual or on aircraft placards to Normal, Utility or Aerobatic categories relate to foreign Airworthiness Standards to which the aircraft was type certified and have no relevance to the classification of the aircraft under Civil Aviation Regulations 162. The permitted manoeuvres of these categories and associated limitations remain applicable for flight under New Zealand Civil Aviation Regulations.

#### CLOUD FLYING

Cloud flying is prohibited unless the equipment required by CASO 17, part 2, paragraph 2.2.4 is fitted to the glider.

AMENDMENT RECORD SHEET

Nr	Title	Pages Affected	Signed	Date
A/L 1	Empty Weight Expt. List	MOT 2174		5.12.87
	LOADING DATA	MOT 2173		5.12.81
	Hi-CAN Basic Station - JMW-AN	MOT 2129		10.08.88
	Incorporated A/L 1	B2, (iii) A		15.9.88

Amendments for this Flight Manual will be issued to the Registered Owner of the aircraft and must be incorporated and recorded on this sheet as soon as they are received.

Air 2168

ISSUED BY MOT/ATD

Letter	Title	Date of Issue	Incorporated
A	Comprises MOT Form 2173*		
B	Installation of Oxygen System	16. 8.90	

Approved:

Date: 21.8.90

for Director Civil Aviation

\*To be inserted by the Certifying Engineer



## MINISTRY OF TRANSPORT - AIR TRANSPORT DIVISION

## WEIGHT AND BALANCE DATA

ZK-GNI

A new sheet is to be completed whenever revised weight and balance data is established either by weighing or calculation.

Aircraft Make and Model

CMB ASTRA 36

EMPTY WEIGHT (see Note 1)

265.7 kg

C of G POSITION (~~state Fwd or~~ Aft of Datum)

68.5

MOMENT

18200.45

Data established by weighing/~~calculation\*~~

Performed by (state name and Licence/Approval No.)

S. SHIEMER

On (date)

11-2-94

Reason

Repairs

Report Ref. (If applicable)

FG2/N1

If established by calculation, state when aircraft last weighed

## Notes:

1. Empty weight includes unusable fuel, fixed ballast, full operating fluids and items in the Equipment List over page.
2. \* = delete as appropriate.



Burkhart Grob Flugzeugbau GmbH & Co. KG

8939 Mattsies

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# FLIGHT HANDBOOK

## GROB G 102

### **CLUB ASTIR III**

### **CLUB ASTIR III b**

### **STANDARD ASTIR III**

This handbook is to be kept on board the aircraft at all times.

It refers to the serie: CLUB ASTIR IIIb

Registration: ---

Factory Serial Number: 5613 Cb

Owner: Drake Aviation Ltd., Mr. Bruce Drake

P.O. Box 14051

Christchurch / New Zealand

German edition of operating instructions are approved under  
§ 12 (1) 2. of LuftGerPO.

Published January 1981

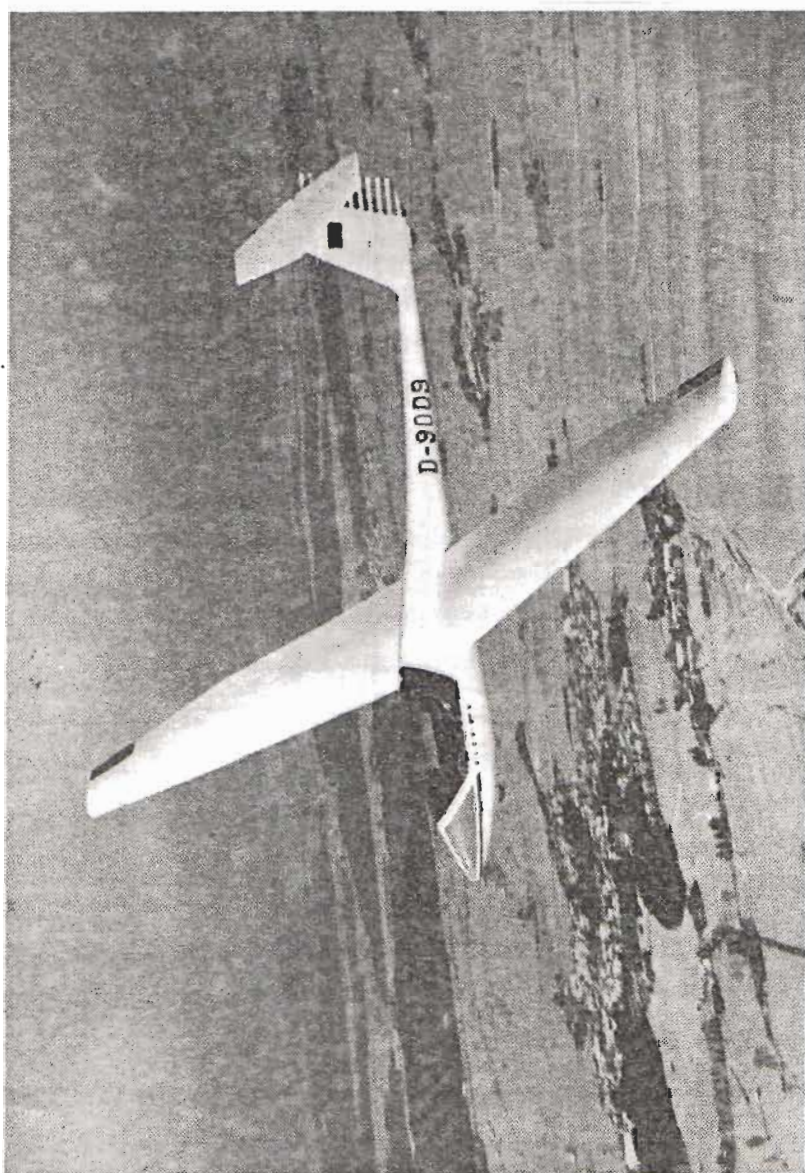
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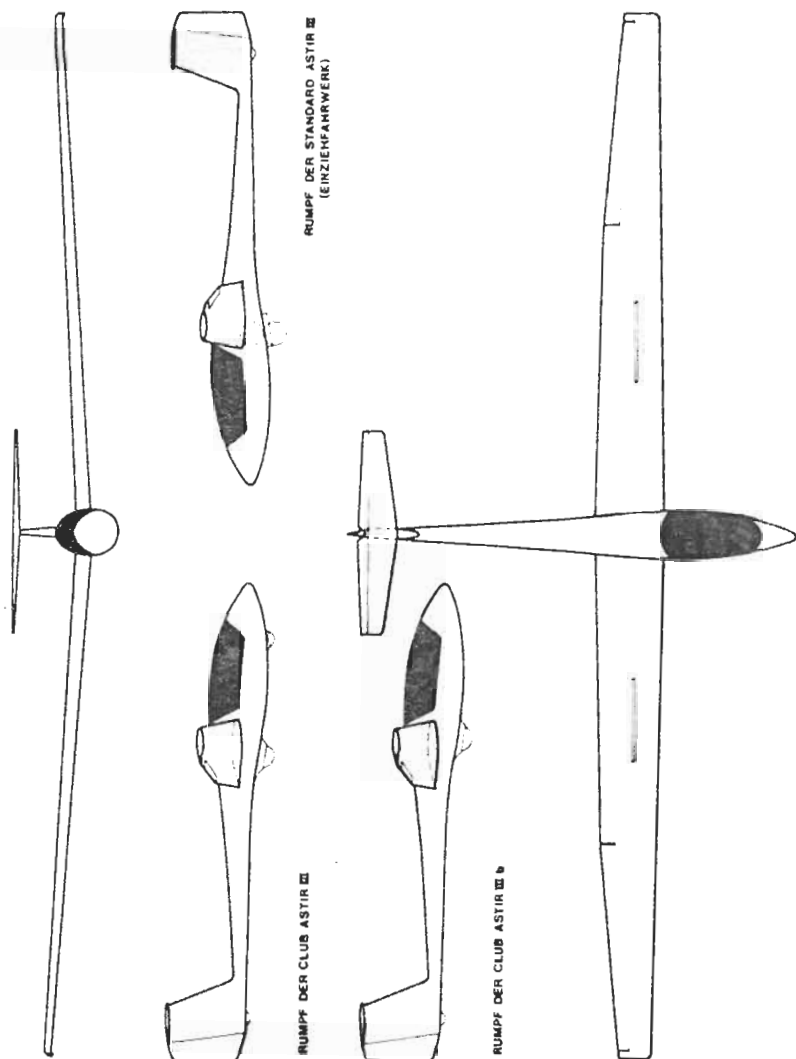
Approval of translation has been done to our best  
knowledge and judgement. In any case the original



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### 1.5 Description

The CLUB ASTIR III and IIIb a single seat performance glider for the club class with a T-tail and airbrakes on the upper wing surface.

The two versions have different undercarriage configurations.

The STANDARD ASTIR III is the equivalent high performance glider for the standard class, with retracting undercarriage and ballast tanks in the wings.

The glider incorporates the most modern fibre reinforced plastic technology. The fuselage belts are fabricated from Carbon fibre; all other surfaces and shells are glassfibre.

#### Technical Data

Wingspan	15,0 m
Length	6,75m
Height	1,3 m
Aspect ratio	18,2
Wing area	12,4 m sq.
Maximum flying weight with waterballast	450 kg
without waterballast	(380 kg)
Maximum wing loading	36,3 kg / sq. m (30,6 kg / sq. m)

## **II. Operating limits**

### **II. 1 Airworthiness group**

(U, Utility. LFS)

The edition of the "Airworthiness requirements for gliders" (LFS) which was published in February 1966 is the basis for the certification of this model

### **II. 2 Operational restrictions**

This aircraft is cleared for:

1. Flights under VFR (daytime)
2. Simple aerobatics (loop, stall turn, lazy eight, chandelle, spin)
3. Cloud flying (with suitable instruments - see II. 3)

### **II. 3 Minimum equipment**

1. Air speed indicator reading to 300 km/h (162 knots, 187 mph)
2. Altimeter
3. Four part safety harness
4. Back cushion of at least 3" depth when compressed, or parachute
5. Loading limit placard
6. Flight limits placard
7. Flight Handbook

### **Cloud flying equipment**

For cloud flying the following must also be installed:

1. Variometer
2. Turn and slip indicator
3. Magnetic compass (compensated for the aircraft)
4. Radio ready for use (no in Italy)



## II. 4 Airspeeds

Never exceed	VNE	250 km/h(135 kts, 155 mph)
Maximum Rough Air	VB	250 km/h(135 kts, 155 mph)
Manoeuvring speed	VM	170 km/h( 92 kts, 105 mph)
Maximum on winch launch	VW	120 km/h( 65 kts, 74 mph)
Maximum on aerotow	VT	170 km/h( 92 kts, 105 mph)
Maximum for operating landing gear, and L. G	VT	250 km/h(135 kts, 155 mph)
extended		

"Rough air" includes the turbulence likely to be encountered in wave rotors, clouds, whirlwinds, and while flying over mountain ridges.

The manoeuvring speed is the maximum speed at which full control deflections are permissible. At VNE only one third of the available movements may be used. True airspeed is higher than Indicated airspeed at altitude.

This fact has no influence on the strength and the aerodynamic loads on the sailplane. But for flutter prevention VNE must be decreased according to the following table.

Altitude (ft)	0-6500	10000	13000	16500	19000
VNE (indicated knots)	135	128	121	115	109
(indicated km/h)	250	237	225	213	202

### Air speed indicator markings

72-170 km/h	39-92 kts	45-106mph	Green bow
170-250 km/h	92-135 kts	106-155mph	Yellow bow
At 250 km/h	135 kts	155 mph	Red line
At 90 km/h	49 kts	56 mph	Yellow triangle (minimum approach speed at max. flying weight)

## II. 5 Flight envelope

The following g-loads must not be exceeded.

At VM	+ 5.3	- 2.65	At VNE	+ 4.0	- 1.5
(Airbrakes closed)					

## II. 6 Weights

Empty weight	appr. 260 kg (573 lbs)
Max. permissible without waterballast	380 kg (838 lbs)
Max. permissible with waterballast	450 kg (992 lbs)
Maximum permissible weight of non lifting parts	250 kg (551 lbs)

## II. 7 Center of gravity position

Permitted center of gravity positions in flight lie in the range  
from 310 mm (12,20 inches) to  
480 mm (18,90 inches)

behind the datum line, equivalent to 24 % to  
44 % of the M. A. C. of the wing.

A/c attitude: incidence board of 600:26 angle  
horizontal on the back of the fuselage.

The datum line is the wing root leading edge.

The permitted center of gravity range will not be exceeded if the  
loading is carried out according to the loading plan in section II. 8.

## II. 8 Loading limitations

Minimum weight in the seat	70 kg	(154 lbs)
Maximum weight in the luggage space	10 kg	( 22 lbs)
Maximum weight in the seat	110 kg	( 242 lbs)

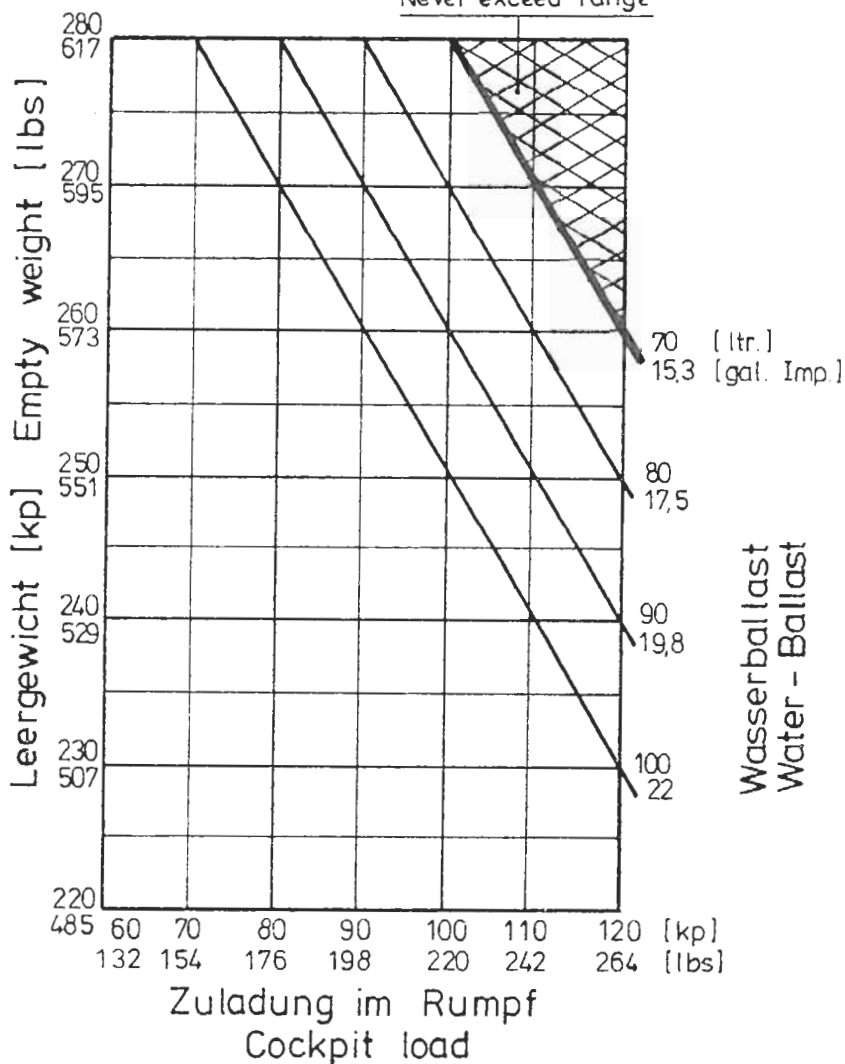
Pilot weights lower than 70 kg (153 lbs) must be compensated by  
ballast carried in the seat or by ballast weight installed in  
the ballast box located on the left side of the stick  
frame. The glider is provided with one 8,6 kg  
ballast weight. See placard on the cockpit for  
proper use of the ballast weight.

The maximum flying weight of 380 kg (838 lbs) without waterballast and of 450 kg (992 lbs) with waterballast must not be exceeded. Water ballast can only be loaded until this maximum weight is reached (see diagram on side 9 b).

Water ballast can not be used to compensate locking weight in the seat.

Waterballast chart (only Standard Astir III)

Unzulässiger Bereich  
Never exceed range



Wasserballast  
Water - Ballast

(einschließlich Gepäck; Baggage inclusive  
and ballast in ballast box)



## II. 9 Tow hooks

For Aerotow: Optional nose hook E 75 with modification 1-79.

For Aerotow and winch launch: Europa G 73 safety hook.

## II. 10 Weak link in launching cable

Aerotow and winch launch 500 kg (1100 lbs)  $\pm 10\%$   
(e. g. Weak link no.5, colour code white)

## II. 11 TIRE

Tire size Main wheel 5.00-5/Tire pressure 2,5 bar  
Nose wheel and Tail wheel  $\emptyset$  210x65 mm. 2,5 bar

## II. 12 Crosswinds

The maximum approved crosswind component for take off and landing is 20 km/h (11 knots, 12 mph)

## III. Emergency procedures

### III. 1 Spin recovery

Exit from spin can be accomplished by the standard recovery procedure:

- Full opposite Rudder
- Neutralise stick
- Ailerons should be central
- when rotation stops centralise rudder and pull out gently.

### III. 2 Canopy jettison and exit

The freedom of movement in the cockpit makes exit easy in an emergency. The point to fix the parachute is the red ring on the central tube behind the seatback.

- a) Pull red knob back on the left and disengage the pin.
- b) Pull red knob back on the right and with the left hand push canopy upwards.
- c) Unbuckle seat harness.
- d) EXIT over left or right side.
- e) Wait only 1-3 seconds before pulling the rip cord.

### III. 3 Landing with the undercarriage retracted

It is possible to land on soft and hard surface without risk of nosing over.

Approach normally and align in 2 point attitude.

Avoid a high roundout.

### III. 4 Miscellaneous

#### Flying in rain

No noticeable deterioration of flying characteristics is caused by wet or lightly iced wings.

A heavy deposit on the wing raises the stall speed by about 5 km/h (3 knots). Raise approach speed by 10 km/h (6 knots). The characteristic during lift-off and touch down remains the same.

#### Wing drooping

If the wing drops in a turn or straight flight, leave the stick neutral and apply rudder against the direction of rotation.

#### Ground looping

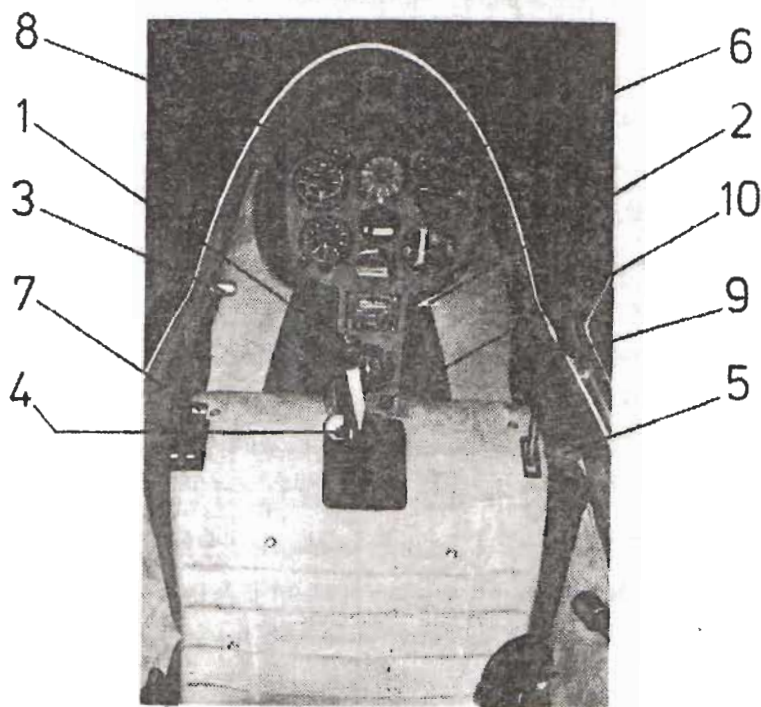
The aircraft is not prone to ground loop on take off. However if one wing touches the ground or the aircraft changes direction by more than 15 degrees during take off release tow cable immediately.

January 1981 :

#### IV. Normal operating procedure

##### IV. 1 Cockpit and control layout

Seat of Standard Astir III (Club Astir III and IIIb)



- 1 Controlstick
- 2 Rudder pedals
- 3 Airbrakes w. wheel brake
- 4 Cable release knob
- 5 Canopy jettison

- 6 Rudder pedal adjustment
- 7 Trim handle
- 8 Ventilation
- 9 Undercarriage handle
- 10 Waterballast jettison

The seatback is adjustable.

(Point 9 and 10 are not valid for CLUB ASTIR III and IIIb)



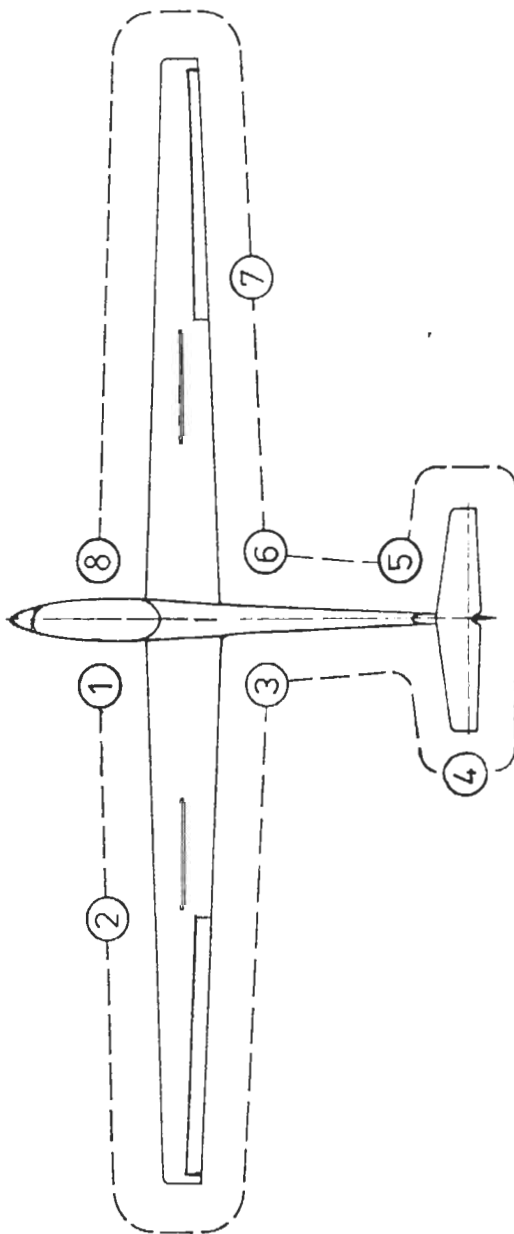
## IV. 2 Daily inspection

### Complete check round aircraft

1. a) Open canopy  
b) Check the 4 wing to fuselage quick locks are secure  
c) Visual check of all control mountings and linkages in cockpit area  
d) Check for loose objects (also through the access door for the main control linkages)  
e) Check full and free movement of all controls  
f) Check tire pressure (2, 5 bar) and condition  
g) Check condition of towhooks  
h) Check operation of towhooks and wheelbrake
2. a) Check upper and lower wing surfaces for damage  
b) Aileron (Check condition, free movement, play)  
  
c) Airbrakes (Check condition, fit and lock)
3. Check fuselage for damage, particularly on underside
4. Check tailplane for correct mounting and security
5. Check tail wheel, pressure (2, 5 bar) and condition
6. Check pitot and venturi
7. Check static holes are free of obstructions
8. See "2"
9. Check static holes

The aircraft should be checked particularly thoroughly after heavy landings or excessive demands have been placed on it in flight. Remove the wings and tailplane. If damage is discovered an inspector should be called in. The aircraft should not under any circumstances be flown until the damage has been repaired.

Complete check round the aircraft (cf IV. 2)



#### IV. 3 Pre flight check

1. Wing and T-tail attachments secured?
2. Parachute and safety straps secured?
3. Pedals adjusted?
4. Undercarriage lever locked in fully forward position?
5. Brakes closed and locked?
6. Full and free controll movement?
7. Trim set to neutral
8. Altimeter set to zero or to field elevation?
9. Radio switched on and set to the correct base frequency?
10. Canopy locked?
11. Cable on correct hook?
12. Beware: - Crosswind-Cable break!

#### IV. 4 TAKE OFF

##### TRIM

The trimhandle is on the left-hand side of the cockpit and can be progressively adjusted.

##### Winch launch

Trim neutral or nose heavy if the pilot is light.

Maximum winch launch speed is 120 km/h (65 knots, 74 mph).

The glider has a release hook in front of the wheel.

Winch launches cause no difficulties at all allowed centre of gravity positions and wing loadings.

The plane has no tendency to balloon up or to swing on the ground.

One should push forward slightly on the stick below about 100 metres (330 ft.) in the case of fast launches from a powerful winch. When the cable slackens pull the release firmly to its limit.

##### Aerotow launch

Recommended line length is 40 - 60 m (140 - 200 ft).

Trim neutral

Max aerotow speed 170 km/h (92 knots, 105 mph).

Use the nose hook for aerotow if it is installed.

Aerotow from the belly hook presents no problems to experienced pilots. In this case the undercarriage of the Standard

Astir III can not be retracted during the aerotow.

The aircraft can be controlled during the whole ground run by means of aileron and rudder using full deflections if required. There is no tendency to ground loop, even in strong cross winds.

The aircraft can be lifted off at an IAS of 65 km/h (35 kts); it takes off on its own, with the stick held neutral at an IAS of 70-74 km/h (38-40 kts)

The yellow release knob is mounted on the instrument panel and must be pulled right back to release.

#### IV. 5 Normal flight

The aircraft can be flown in all configurations throughout the permitted speed range. Full aileron and rudder movements

are only permitted up to the manoeuvring speed of 170 km/h (92 knots). At higher speeds the controls are to be used with corresponding care. For the elevator movements only the g-loads II. 5 are appropriate.

#### IV. 6 Slow flying and stalling

The stall warning is given by a noticeable buffeting of the tailplane. The stalling speed depends on the configuration and weight of the aircraft. The following standard values are appropriated to:

	Weight	Without brakes	With brakes
Without water ballast	380 kg	60 km/h	65 km/h
	838 lbs	32 kts	35 kts
With water ballast	450 kg	70 km/h	75 km/h
	992 lbs	38 kts	40 kts

Regarding the increasing stalling speed in relation to the bank angle.

On further rearward movement of the stick the aircraft goes into a controllable "mush", which can be controlled with ailerons and rudder. On forward movement of the stick the aircraft at once returns to its normal flying attitude. A swift backward movement of the stick will produce a nose drop; the ailerons will provide lateral control.

#### IV. 7 High speed flight

The aircraft has no flutter problems in the permitted speed range. Above 170 km/h (92 kts) all controls are to be operated with care and full control movements may no larger be given (see II. 4.). VNE is not exceeded in a 45 degrees dive with the airbrakes fully extended even at maximum all up weight.

#### IV. 8 Cloud flying

The minimum equipment for cloud flying is an Air speed indicator, Altimeter, Variometer, Compass, Turn and slip and Radio. Flight test to date have shown that the ASI system built in is not sensitive to icing. If G forces over 2 g are encountered or if the speed rises above 170 km/h (92 kts), extend the airbrakes to avoid overstressing. Spinning should not be contemplated as a recovery manoeuvre. In emergency extend the airbrakes and leave the cloud at 170 km/h (92 kts)

Cloud flying should only be carried out by pilots who have the necessary permission. The legal demands of airspace and instrumentation should be observed.

In Italy the sailplane needs no radio for cloud flying.

#### IV. 9 Simple aerobatics

Aerobatics should only be carried out by pilots who have the necessary permission.

Aerobatics may only be carried out without water ballast.

The following aerobatics are permitted:

##### 1. **Inside loop**

Entry speed 180 km/h (97 kts)

G load ca. 2 g

Exit speed 180 km/h (97 kts)

##### 2. **Stall turn**

Entry speed 180 km/h (97 kts)

At 70 knots (130 km/h) slowly apply rudder. Shortly before the stall assist with aileron. In the case of an unintentional hammerhead stall hold the controls firmly central.

##### 3. **Spins**

Reduce speed slowly to 70 km/h (38 kts): pull the stick back and give full rudder. The aircraft spins slowly at one turn every 5 seconds. The height loss is 220 ft. per turn.

Recovery: opposite rudder, pause, stick forward till rotation stops, recover gently at about 160 km/h (86 kts).

##### 4. **Chandelle**

Entry speed 150 km/h (81 kts)

Pull up to fly turn with 90 degrees bank. During turn decrease speed and exit from turn with rudder and aileron. The chandelle should be complete heading in the opposite direction at minimum speed.

##### 5. **Lazy eight**

Entry speed 120 km/h (65 kts)

Manoeuvres that involve negative g loads are prohibited. Unorthodox manoeuvres are likewise prohibited.

#### IV. 10 Approach and landing

The approach may be carried out at 90 km/h (49 kts).

The brakes are effective enough to carry out steep approaches. They cause a slight nose down trim change, so that the aircraft maintains the chosen airspeed automatically. Fully extending the airbrakes increases the stalling speed: do not extend the brakes fully during the roundout, to avoid heavy landings.

During touchdown do not fully extend the airbrakes due to a very strong wheelbrake effect.

The side-slip is quite controllable and, if needed this manoeuvre can be used for steeper approaches. But the side-slip is only effective by using a large angle of side-slip and should be finished at a safe height.

When flying the CLUB IIb, directional control can be maintained after touch down of the nosewheel by applying rudder down to a speed of 40 km/h (23 kts)

#### IV. 11 Flight with water ballast

A flight with maximum disposable load additional full amount of water ballast is comparable with a standard two-seat-glider. Therefore the flight characteristics of slow flying and stalling are different with water ballast flights to flights without water ballast. The stalling speed increases to about 70 km/h (38 kts). Greater control deflection are needed to correct the attitude. The entry to the spin is more abrupt than without water ballast, but it will be recovered by the standard procedure immediately. Slow flying and stalling with maximum gross weight should be practised at a safe height.

The water ballast tanks are located in the wings and contain approximately 45 litres per wing. They are filled through the plugs on the top surface of the wings, which can be removed with a rod.

Built in baffles ensure that no noticeable movement of the water occurs in flight, when the tanks are partially filled.

The water has to be poured in and not filled in under the pressure of the water-pipe.

Equal amounts of water must be put in each tank to make up the required amount, so that lateral stability is not impaired.

Water ballast is dumped through an opening under the fuselage behind the wheel-box. The valve is opened by pulling and turning the black knob at the right side of the instrument panel. Dumping of full water ballast takes about 3 minutes.

Air from the tanks escapes through an overflow pipe that runs down to the cleft of aileron.

When flying with water ballast the connecting adhesive tape that covers the gap between fuselage and wings, should be folded back on the underside in the region of the spar, so that any excess water which may appear runs out rather than down into the fuselage.

Before longer flights at temperatures around  $0^{\circ}\text{C}$  ( $32^{\circ}\text{F}$ ) the water must be jettisoned because of the danger of freezing.

It is strongly recommended that water ballast is jettisoned before landing.



The glider has to be parked over -night without water ballast due to the danger of freezing.

When de-rigging the water ballast tanks will empty themselves through the wing root connecting pipes.

If the glider has to be towed for a long way on a bumpy ground, the water tanks should be emptied to take care of the wing suspensions.

## V. Rigging and derigging

### V. 1 Rigging

The fuselage must be held firmly in an upright position when rigging. It is recommended that a **fuselage stand** or the trailer fittings are used. The glider can be rigged by **3 people**.

#### 1. Wings

Unlock the 4 main wing fittings in the fuselage (a). Unlock the air-brakes on the wings. Guide the right wing into the fuselage. The safety catches on the fuselage fittings should now be released, and on gently moving the wing to and fro will be heard to snap into place (b). Next guide the left wing into the fuselage. Move the wings tips up or down so that the pin on the end of the spar stub is lined up with the appropriate hole in the opposite wing root and slide into place. Next release the safety catches on the left hand fuselage fittings and by gently moving the wing tip forwards and backwards they too can be made to snap into place (b).

To lock the fuselage fittings turn so that the pins are engaged in the slots. A slow but firm fore and aft movement of the wing tip will allow the collar to be turned sufficiently. They should not however reach the end of the slot (c).

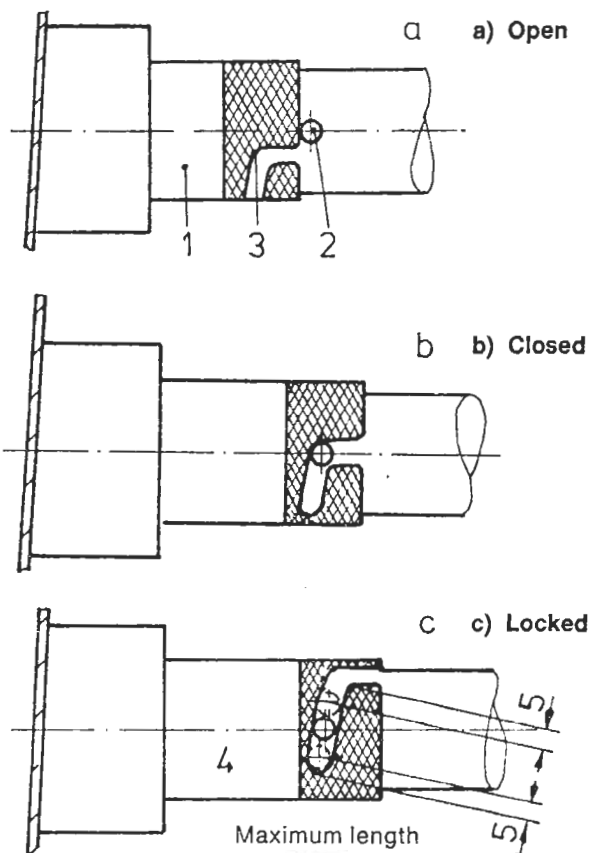
Check — The red rings on the fuselage sides must be covered by the rotating collars. The collars should be finger tight.

In the closed but not secured position (b) the wings cannot be withdrawn.

#### 2. The aileron and airbrake connections are behind the spar

The connecting rods can be connected by means of the quick lock fasteners through the inspection cover. If necessary the aileron has to be moved up and down to get the linkages into the right position.

After rigging the following check must be carried out to check the connections are secure:



After connecting the quick lock couplings make a visual check that the collar is extended forward over the bearing far enough for the safety pin to engage.

Having engaged the quick locks check that the safety pin cannot be moved without pressing it down. If it cannot be slid without pressing down the controls are properly connected.

### 3. Tailplane

Before assembly is commenced the front cover must be opened and the rotating wing bolt pulled out to the limit. **It is important to ensure, that the larger opening of the conical crillings in the inner rings of the horizontal stabilizer spar bearings fall to the rear.** The tailplane can best be positioned by standing behind the rudder. The tailplane can be rested on top of the fin with the elevator angled upwards so that the quick lock on the elevator push rod can be attached to the bearing on the elevator horn. The front of the tailplane can then be pushed back on to the three pins. It is then necessary to tighten the wing bolt clockwise to secure the tailplane. The assembly is complete when the wing bolt is sufficiently tight for there to be no play in any direction. The cover provides a safety measure as it can only be attached with the wing bolt horizontal. If necessary the wing bolt has to be turned a quarter turn to suit. Derigging is carried out in the opposite order and the wing bolt is unscrewed anticlockwise and pulled fully out.

**To control the correct mounting of the horizontal stabilizer it is important to ensure that the peaks of the mark-arrows at fin and elevator tabs face each other.**

### Checks to be made after rigging.

1. Check that the four collars in the fuselage are engaged and secure.
2. Check that the aileron, airbrake and flap connections are engaged.
3. Check the towhooks for correct function and operating forces.
4. Test the operation of the wheel brake and the tire pressure.
5. Check that the tailplane is securely seated, control the 4 markings.
6. Check the elevator is coupled correctly through the clear panel.
7. Check sense and full and free movement of controls with an observer.

### Derigging

Derigging is carried out in the reverse order and in this case it does not matter which wing is removed first. Excessive fore and aft rocking of the wing tips should be avoided.

### V. 2 Parking

When the glider is stored the canopy should be locked. Use the canopy cover attached to the wing tip skids. The rotating tail dolly wheel should be used for ground handling.

### V. 3 Transport

We recommend the use of a closed trailer for transporting the glider. The parts must be carefully supported and secured so they cannot slide.

#### 1. Fuselage

A fuselage trolley moulded to the shape of the fuselage and positioned in front of the main wheel. The minimum length of the trolley should be 400 mm and it can be attached to the wing fittings if required. The tail skid should be secured so that it cannot slide sideways.

#### 2. Wings

The minimum length for the spar support should be 200 mm and should start at the face of the root rib. The mounting must be padded well with foam rubber or felt.

The mounting under the aileron inboard end should be a shaped mounting block with a minimum length of 300 mm and height of 400 mm. The mounting must be padded with felt.

#### 3. Tailplane

Either horizontal on padded supports with the upper surface downwards and secured with straps or vertical supported on the leading edge in shaped mounting blocks.

Profile drawings are available for the manufacture of fuselage, wing and tailplane fittings.

### V. 4 Care of the glider

The entire surface of the glider is coated with weather resistant white polyester gelcoat.

The greatest care should be taken in maintaining the fibre glass surface of the glider. Luke warm water should be used to wash off dust, grease, dead flies and other dirty marks. More resistant dirt should be removed by using a mild cleaning agent. Only special silicon-free preparations should be used in maintaining the painted surfaces. (1 Z-Spezialreiniger — D 2, Fa. W. Sauer and Co., 5060 Bensberg or Reinigungspolish Fa. Lesonal).

Although very resistant the glider should be protected as much as possible against rain and dampness. Water that has seeped in should be dealt with by storing the glider in a dry place, frequently turning over the dismantled parts.

The most effective way to clean the canopy is to use a special perspex cleaner but if necessary luke warm water can be used. A soft, clean cloth or chamois-leather should be employed to wipe the canopy down. Never rub perspex with anything dry.

The Safety harness should be regularly checked for damage and general wear. The metal parts of the harness should be frequently checked for corrosion.

Because of its position, the winch launch hook is susceptible to getting very grimy and muddy. It must therefore be frequently inspected for damage, cleaned and greased. When the seat-well is removed the hook can easily be taken out. Remove the connecting wire from the lever and take out the retaining screws. For reconditioning, the tow hook should be sent with the record card to the tow hook manufacturer, Tost. For further details the manufacturers manuals should be consulted.

The cables and pulley for the nose and belly hooks should be checked for wear during the yearly inspection.

The wheel tyre pressure should be kept at 3,5 atmospheres  
2,5 bar. (36psi)

The wheelbrake of the drum type: If required the point at which the brake begins to drag can be adjusted. The adjustment is carried out by moving the Bowden cable at the drum end.

When the main wheel is being taken off for the purpose of cleaning, greasing or changing the tire, the Bowden cable should be disconnected from the brake-lever. Remove the screw cover on one side of the axle and take out the screws and the spindle. Remove the screws that hold the brake-lever in place. Take the wheel out by pulling it downwards. Clean all the parts and before re-assembly smear all of them with grease.

The discbrake:

The brake cylinder with the storage tank for brake fluid is mounted on the left side of the undercarriage-frame below the baggage room.

The marks for minimum and maximum reserve must be observed.

For refilling use brake fluid DOT 3 (amber).

Before assembling the glider the pins and sockets at the joints between wings and fuselage, and tailplane and fuselage, should be cleaned and greased.

**VI. Appendices****VI. 1 Performance**

All up weight	380	450	kg
Wing loading	30, 6	36, 3	kg/sq. m.
Best glide angle	36	38, 0	
at flying speed	92	105	km/h
Minimum sink	0, 62	0, 7	m/sec
at flying speed	76	85	km/h



