GROB WERKE GMBH & CO. KG
Unternehmensbereich
Burkhart Grob Flugzeugbau
8939 Mattsies
Flugplatz Mindelheim-Mattsies
Telefon 08268/411
Telex 539623

GLIDER FLIGHT MANUAL

GROB G 102

CLUB ASTIR III

→ CLUB ASTIR III b

STANDARD ASTIR III

handbook is to be kept on board the aircraft
l times.
Glider Flight Manual is FAA approved for U.S.
tered gliders in accordance with the provisions
CFR Section 21.29 and is required by FAA Type
ficate Data Sheet No. G 33 EU.
fers to the serie: _____

tration: _____ Factory Serial Number: ____

: _____

_____

_____

n edition of operating instructions are
ved under § 12(1) 2. of LuftGerPO.
Published October 1982
LBA approved December 6, 1982

val of translation has been done to our best
edge and judgement. In any case the original
n German language is

I. General

I.1. Log of revisions

Revision No.	Pages affected	Description	LBA approval signature	Date

All Manuals for GROB G 102 can be ordered at:

- Burkhart Grob of America, Inc.
  1070 Navajo Drive, Bluffton Airport Complex
  Bluffton, OH 45817 (419)358-9015 or 9025
- Grob-Werke GmbH & Co. KG
  Unternehmensbereich Burkhart Grob Flugzeugbau
  Flugplatz Mindelheim-Mattsies
  8939 Mattsies, West-Germany
  (08268) 411

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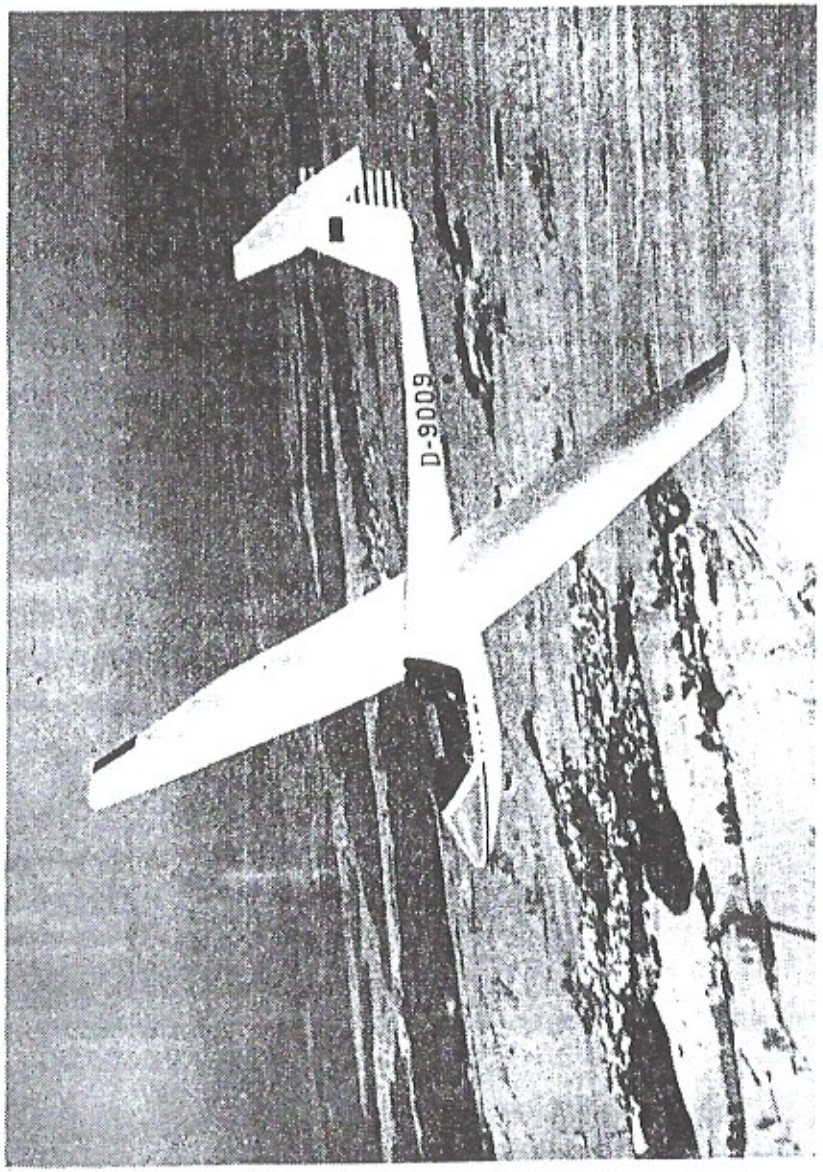
.2. Pages included:

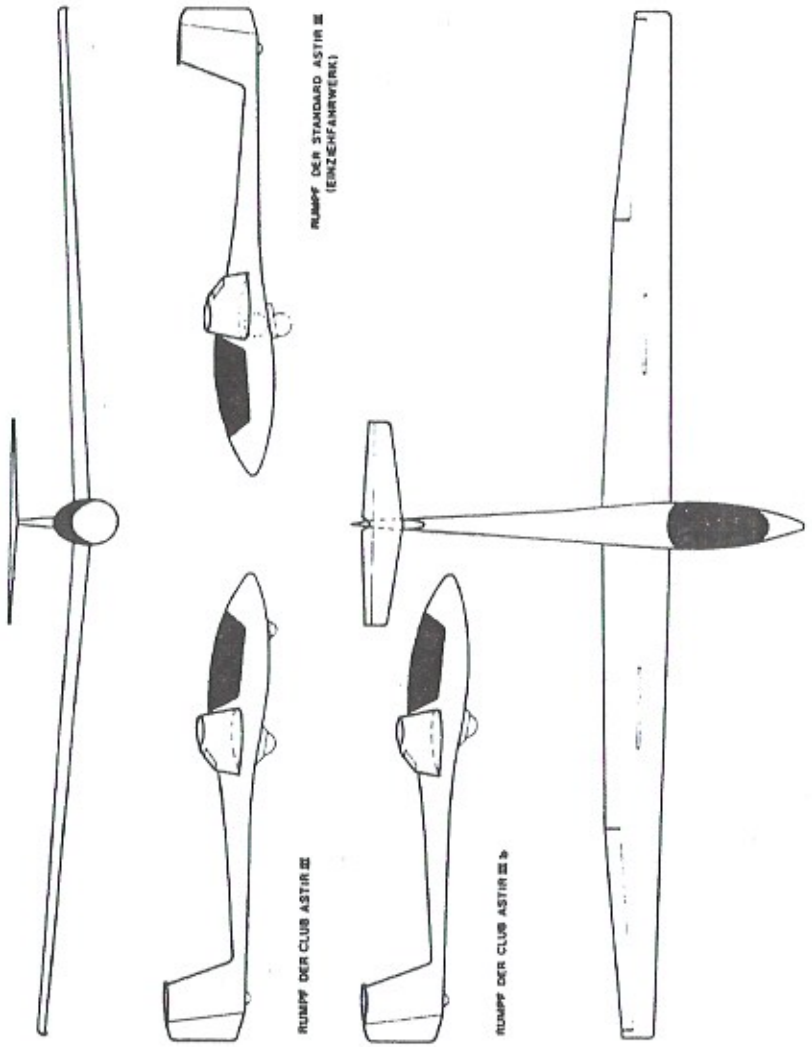
	Dec. 6, 82	27	Dec. 6, 82
a	Dec. 6, 82	28	Dec. 6, 82
	Oct. 82	29	Dec. 6, 82
	Oct. 82	30	Dec. 6, 82
	Oct. 82	31	Dec. 6, 82
	Oct. 82	32	Dec. 6, 82
	Dec. 6, 82	33	Dec. 6, 82
	Dec. 6, 82	34	Dec. 6, 82
	Dec. 6, 82	35	Oct. 82
	Dec. 6, 82	36	Oct. 82
O	Dec. 6, 82	37	Oct. 82
Oa	Dec. 6, 82	38	Oct. 82
1	Oct. 82	39	Oct. 82
2	Dec. 6, 82	40	Oct. 82
3	Dec. 6, 82	41	Oct. 82
4	Dec. 6, 82	42	Oct. 82
5	Dec. 6, 82		
6	Dec. 6, 82		
7	Dec. 6, 82		
8	Dec. 6, 82		
9	Dec. 6, 82		
O	Dec. 6, 82		
1	Dec. 6, 82		
2	Dec. 6, 82		
3	Dec. 6, 82		
4	Dec. 6, 82		
5	Dec. 6, 82		
6	Dec. 6, 82		

I.3. Contents

I.4. Total view (photo)



I.5. Three-side view



October 1982

I.6. 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 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 stringers are fabricated from Carbon fibre; all other surfaces and shells are glass-fibre.

Technical Data

Wingspan	15,0 m	(49,2 ft)
Length	6,75 m	(22,1 ft)
Height	1,26 m	(4,1 ft)
Aspect ratio	18,2	(18,2)
Wing area	12,4 m^2	(133,5 sq.ft.)
Maximum flying weight		
with waterballast	450 kg	(992 lbs)
without waterballast	380 kg	(838 lbs)
Maximum wing loading	36,3 kg/m^2	(7,4 lbs/sq.ft

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I. Operating limitations

I.1 Category of airworthiness:

U (Utility) according to JAR 22

Certification Basis: 14 CFR Sections 21.23 and 21.29 effective 1 February 1965; and Joint Airworthiness Requirements for Sailplanes and Powered Sailplanes (JAR-22), dated 1 April 1980.

I.2 Permitted operations:

1. VFR day
2. Simple aerobatics (loop, stall turn, lazy eight, chandelle, spin)

I.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 Manual

I.4 Airspeed limitations

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

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"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 arc (normal range
170-250 km/h	92-135 kts	106-155mph	Yellow arc (caution range)
At 250 km/h	135 kts	155 mph	Red line (max. speed)
At 90 km/h	49 kts	56 mph	Yellow triangle (minimum approach speed at max. flying weight)

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nstallation Errors of ASI
he airspeed indicator must be connected to
he following sources: Pitot head in the tail
in, static vents side of the fuselage near
he seat.
sing a calibrated ASI the position error is
ot greater than ± 2 km/h or 1 kt or 1,2 mph.
. calibration curve is therefore not necessary.

I.5 Flight envelope

'he following g-loads must not be exceeded.

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

:I.6 Weight limits

:mpty weight	appr. 260 kg (573 lbs)
lax. permissible /ithout waterballast	380 kg (838 lbs)
lax. permissible /ith waterballast	450 kg (992 lbs)
laximum permissible weight of non lifting parts	250 kg (551 lbs)

:I.7 Center of gravity position

'ermitted center of gravity positions in
:light lie in the range

from 310 mm (12,20 inches) to
480 mm (18,90 inches)

ehind the datum line, equivalent to 24% to
14% of the M.A.C. of the wing.

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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.

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 10a).

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

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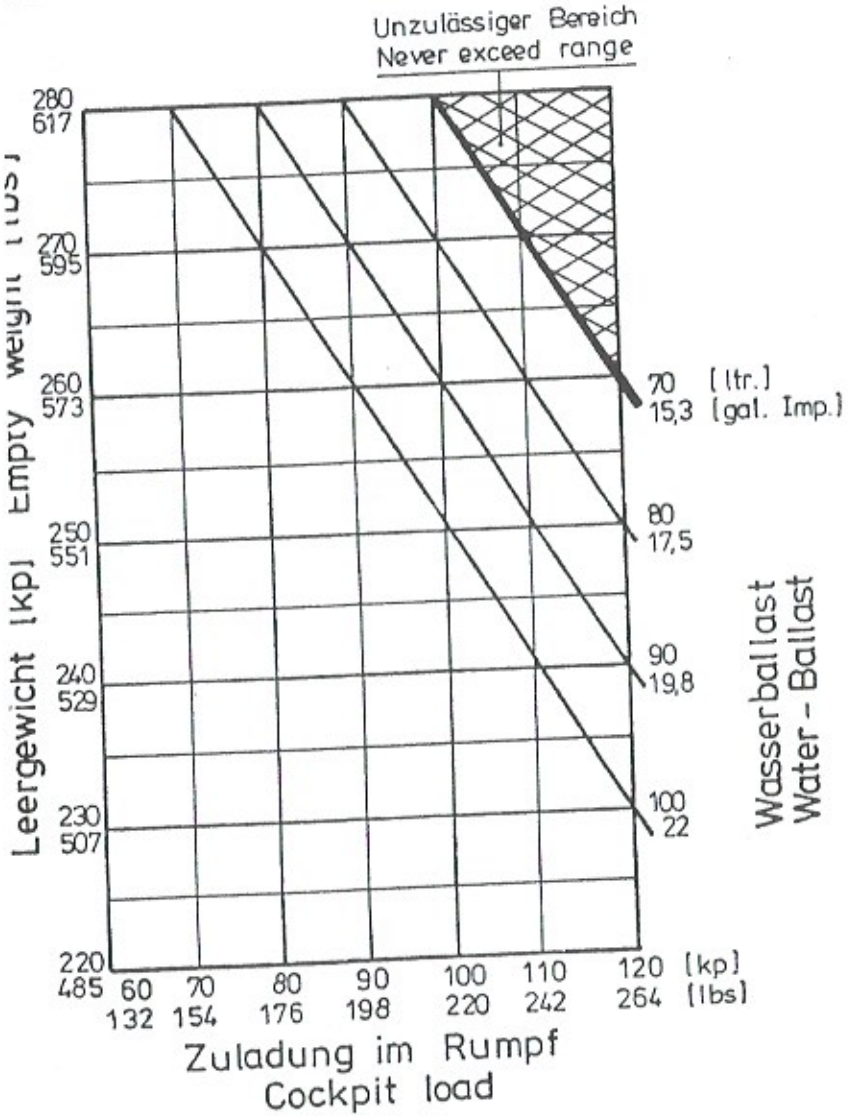
ıterballast chart (only Standard Astir III)



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

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Weighing report

Date of weighing: carried out by.	Equipment list used for weighing (date)	Empty (Weight) kg/lbs	Position of cg empty behind reference mm/inches	Maximum total payload kg/lbs

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.9 Tow hooks and cable length

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

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

nimum aerotow cable length 40 m (130 ft)
nimum launch cable length 600 m (1970 ft)

I.10 Weak link in launching cable

erotow and winch launch 500 kg (1100 lbs)±10%
e.g. Weak link no. 5,
colour code white)

I.11 Tire pressure

ire size Main wheel 5.00-5 / Tire pressure 2,5 bar

ose wheel and Tail wheel Ø 210 x 65 mm. 2,5 bar

I.12 Crosswinds

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

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II.13 Placards and markings

Maximum weight		kg	lbs
without water ballast:		380	836
with water ballast:	*	450	990
Airspeed limits	**km/h**	**m.p.h.**	**kts**
Never exceed	250	155	135
In rough air	250	155	135
Manoeuvering	170	105	92
On aerotow	170	105	92
On winch tow	120	74	64
Airbrakes	250	155	135
Gear extension	250	155	135

cockpit *(no valid for CLUB ASTIR III and IIIb)

Payload
Payload (pilot and parachute)
The maximum weight must not be exceeded.

Minimum payload: 70 kg, 154 lbs.
Less weight must be compensated with ballast in the seat or in the ballast box

Maximum load 110 kg 243 lbs

The maximum weight must not be exceeded.

cockpit

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:k before launch

and tailplane connections checked?
and free movement of controls?
chute secured?
)s tight and locked?
ils adjusted and locked?
es closed and locked?
correctly adjusted?
ieter adjusted?
)py locked?
e on correct hook?

are: – Crosswind! – Cable break!

kpit

ple aerobatics manoeuvers

ommended ry speed	km/hr	knots	mph
p	180	97	112
ll turn	180	97	112
ndelle	150	81	93
y eight	120	65	75
ns	--	--	--

obatics with waterballast is not allowed.

kpit

E: 2,5 bar (36psi)

e and Tail wheel cover

Weak links for towing
500 kp, 1100 lbs. max.
Tire: 2,5 bar 36 psi.

Main wheel cover

itude(ft)	0-6500	10000	13000	16500	19000
(KIAS)	135	128	121	115	109

r airspeed indicator

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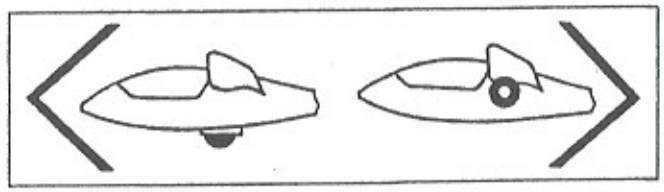
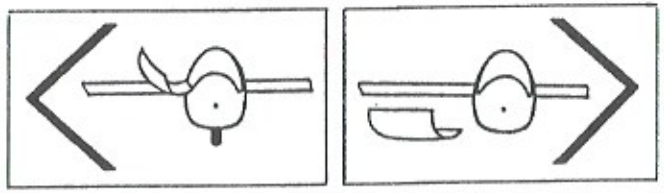


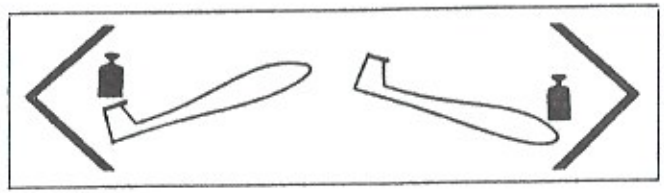
Undercarriag
lever (only
Stand. Astir
III)

Left

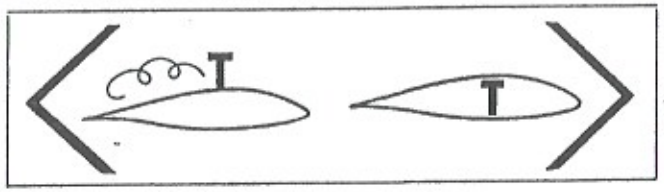


Canopy catch

Right side



Trimmer
green lever
(left side o
fuselage)



Airbrake
lever

Rudder pedal adjustment
(Instrument panel)

Wheel brake
(Airbrake lever)

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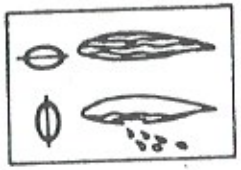
ble Release
nstrument panel)

Baggage maximum
22 lbs 10 kg

(luggage compartment)

ntilation
nstrument panel)



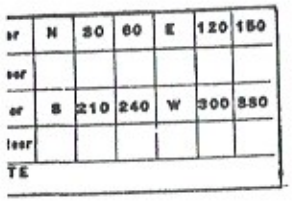
Water ballast jettison
(Instrument panel)
(Standard Astir III)

| on't push or
.ft here |
| --- |

Fin
(both sides)

.evator quick lock connected arkings notice otating knob turned in ailplane secured (cover closed)

Tailplane
checklist
(Fin)



near magnetic
direction indicator

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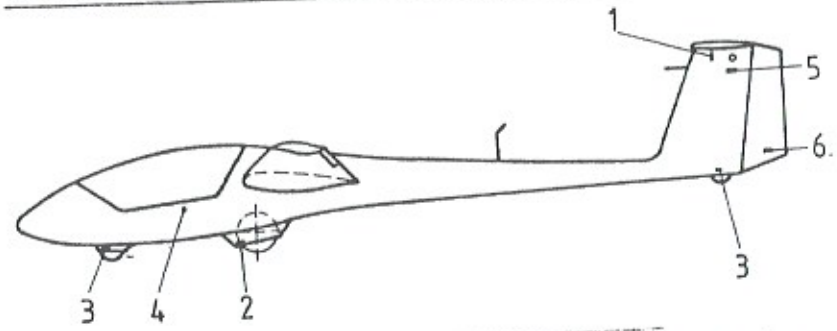
Number of ballast weights		
Weight of pilot (parachute incl.)	55-69,9 kg	70-110 kg
Number of weights	1	0
1 ballast weight: 8,6 kg		

cockpit

Labels and Markings outside of the fuselage



1 Control Markings for the correct rigging of the tailplane
2 Label of Tire pressure and weak link strength
3 Label of Tire pressure
4 Red rings around static pressure port
5 Placard for elevator fastening
6 "Don't push or lift here"

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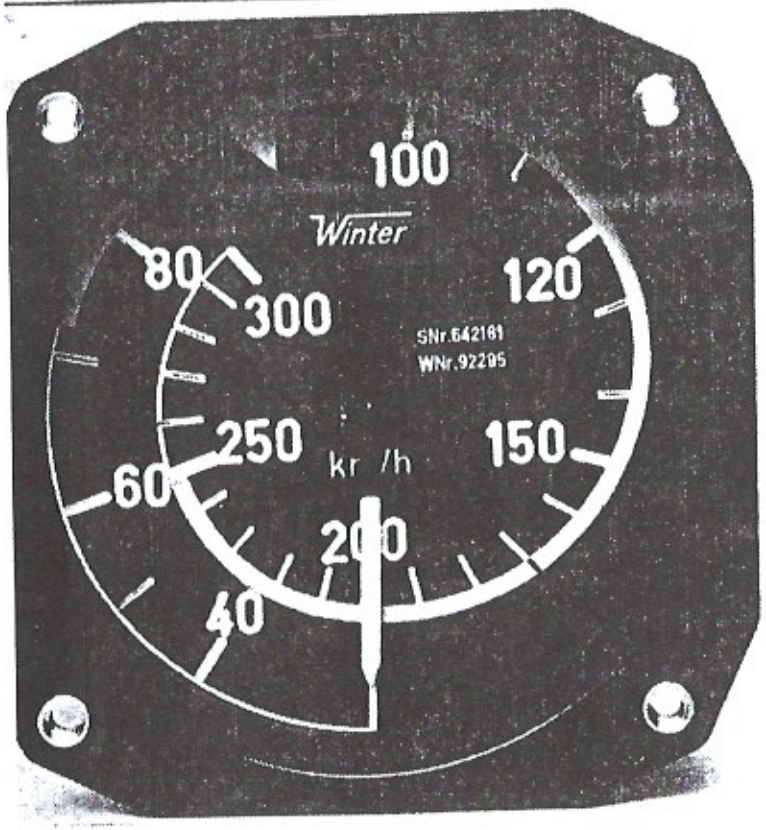
Air Speed Indicator Markings

knots	mph	Marking	Significance
39-92	45-105	Green arc	Normal range of flying speed
92-135	105-155	Yellow arc	Range of flying speeds to be used with care
135	155	Radial Red line	Maximum speed (VNE)
49	56	Yellow triangle	Minimum recommended landing speed at maximum all up weight

m/h(39 kts/45 mph) = Vs 1,1 under max. flight weight conditions



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III. Emergency procedures

III.1 Spin recovery

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

- Full opposite Rudder
- Neutralize stick
- Ailerons should be neutral
- when rotation stops neutralize 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.

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:.3 Landing with the undercarriage retracted (only STANDARD ASTIR III)

is possible to land on soft and hard
:face without risk of nosing over.
)roach normally and align in 2 point
:itude.
)id a high roundout.

I.4 Miscellaneous

ying in rain

ere is a noticeable deterioration of
ying characteristics by wet or lightly
ed wings, which raises the stall speed
about 5 km/h (3 knots).
crease take off and approach speed by
knots.

ng dropping

the wing drops in a turn or straight
ight, leave the stick neutral and apply
ıdder against the direction of rotation.

ound looping

ıe aircraft is not prone to ground loop
ı take off. However if one wing touches
ıe ground or the aircraft changes direction
/ more than 15 degrees during take off
elease towcable immediately.

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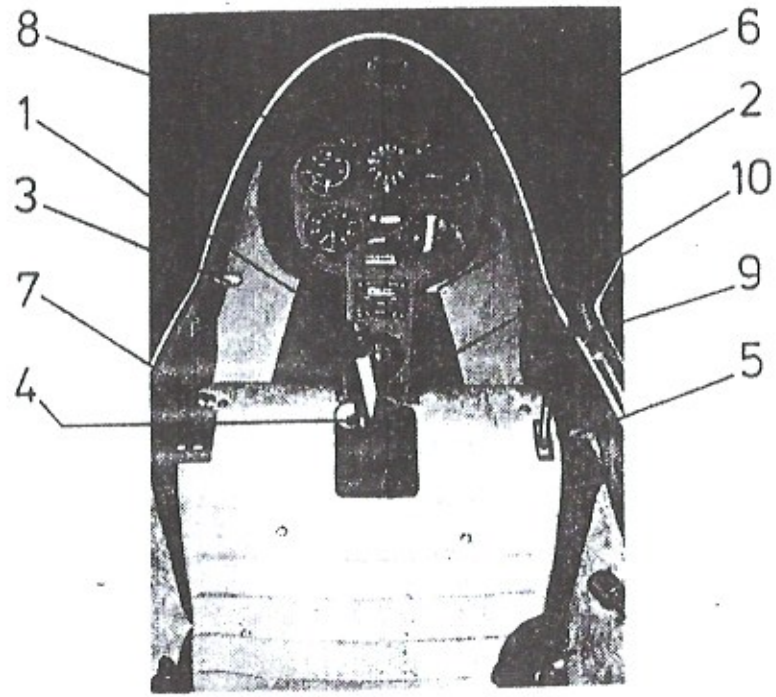
IV. Normal procedures

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 Trimhandle
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)

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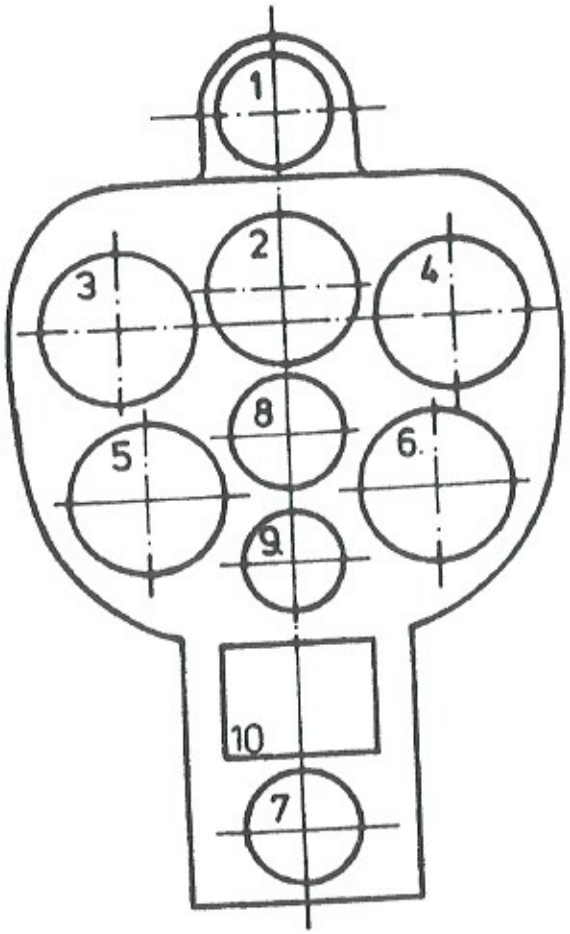
ndard instrument positions



Magnetic compass
Electrical vario indicator (optional)
Airspeed indicator
Variometer
Altimeter
Electrical vario control (Optional)
G-Meter or variable
Ball
Temperature (outside) or variable
Radio

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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 = 35,6 PSI) 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 = 35,6 PSI) and condition

6. Check pitot and venturi

7. Check static holes are free of obstructions

8. See "2"

9. Check static holes

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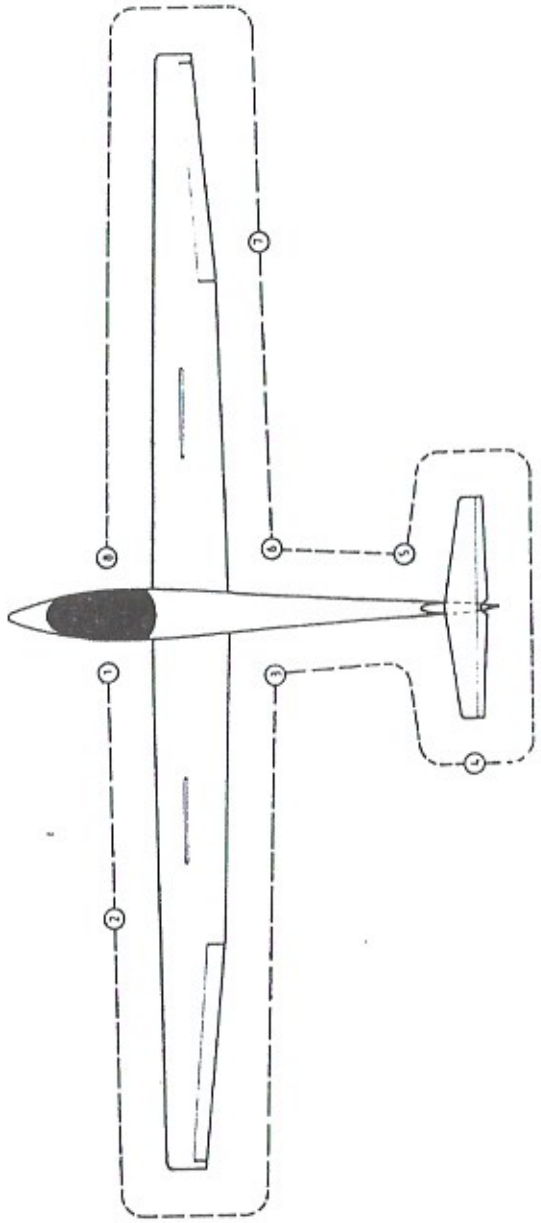
: aircraft should be checked particularly
›roughly after heavy landings or excessive
ıands have been placed on it in flight.
ıove the wings and tailplane. If damage
discovered an inspector should be called
. The aircraft should not under any
·cumstances be flown until the damage
; been repaired.

Complete check round the aircraft (cf IV.2)



V.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? (only Standard Astir III)
5. Brakes closed and locked?
6. Full and free control 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!

V.4 Take off

rim

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

inch launch

rim neutral or nose heavy if the pilot is ight.

aximum winch launch speed is 120 km/h (65 knots. 4 mph).
he glider has a release hook in front of the heel.
inch launches cause no difficulties at all llowed centre of gravity positions and wing oadings.
he plane has no tendency to balloon up or to wing on the ground. One should push forward lightly on the stick below about 100 metres 330 ft) in the case of fast launches from a owerful winch. When the cable slackens pull he release firmly to its limit.

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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.

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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
(only Standard Astir III)	992 lbs	38 kts	40 kts

Regard 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.

V. 7 High speed flight

The aircraft has no flutter problems in the permitted speed range. Above 170 km/h (92 kts) the controls must be moved no more than one third of the available movement. VNE is not exceeded in a 45 degrees dive with the airbrakes fully extended even at maximum all up weight.

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IV. 8 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.

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ə Approach and landing

ı approach may be carried out at 90 km/h (49 kts).
e brakes are effective enough to carry
steep approaches. They cause a slight nose down trim change, so
t the aircraft maintains the chosen airspeed automatically. Fully
ending the airbrakes increases the stalling speed: do not extend
brakes fully during the roundout, to avoid heavy landings.
ring touchdown do not fully extend the airbrakes
e to a very strong wheelbrake effect.
e side-slip is quite controllable and, if needed
s manoeuvre can be used for steeper approaches.
.t the side-slip is only effective by using a large
gle of side-slip and should be finished at a safe
ight. (90 km/h; 56 mph).
ıdder effect reversal have not been observed.

ıe temporary control force to overcome the force
versal or rudder lock is calculated approximately
to 5 daN (rudder pressure). The aileron does not
.ange its force direction, rather it returns indepen-
ntly from the full deflected position.
ıdder lock can be relieved without pilot input on the
.dder. After moving the aileron into neutral position,
e Sailplane rolls out of the Slip into wing level posi-
ɔn. Thereafter the rudder frees itself from the full
:flected position and the force reversal is relieved.
ɜing this method to end the Slip no bucking of forward
tching is evident. During roll out the Sailplane devia-
s only slightly from its original flight course. This
veling out manoeuvre takes only a few seconds.

IV.10 Flight with water ballast (only STANDARD ASTIR III)

A flight with maximum pay-load and additionally 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 adhesive tape that covers the gap between fuselage and wings, should not cover the gap on the underside in the region of the spar, so that leaking water which may appear cannot run down into the fuselage.

Before longer flights at temperatures around 0° C (32° 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.

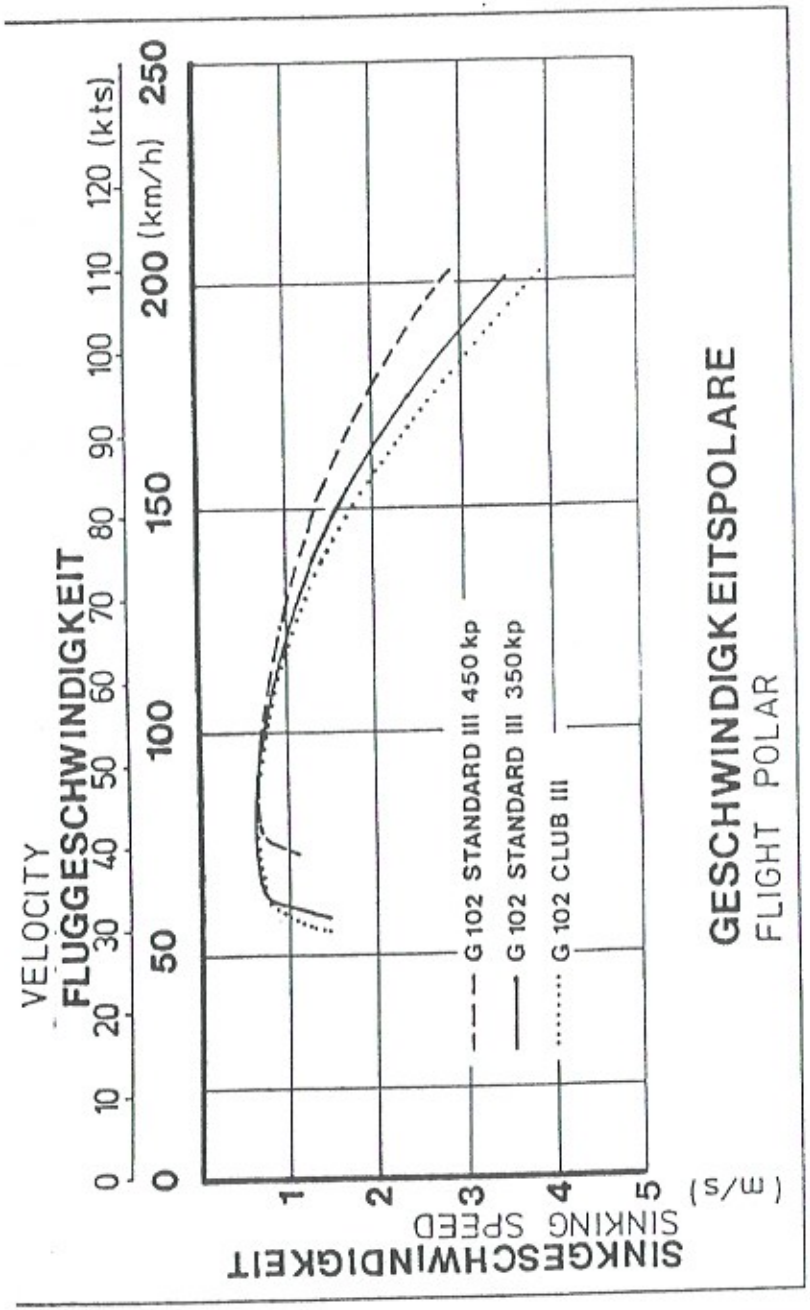
If the glider has to be towed for a long way on a bumpy ground, the water tanks should be emptied to take care of the wing suspensions.

V.11 Storage

When the glider is stored the canopy should be locked. To tie down the wing, a rope can be pulled through the wing tip skids.

V. Performance

All up weight	380 (838)	450 (992)	kg (lbs)
Wing loading	30,6(6,3)	36,3(7,4)	kg/m^2 (lbs/sq.ft)
Best glide angle	36	38,0	
at flying speed	92 (50)	105 (57)	km/h (kts)
Minimum sink	0,62(122)	0,7 (138)	m/sec (ft/min)
at flying speed	76 (41)	85 (46)	km/h (kts)



cember 6, 1982 Approved by LBA

VI. Rigging and derigging

VI.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 airbrakes 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.

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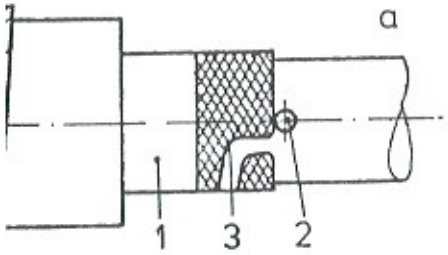

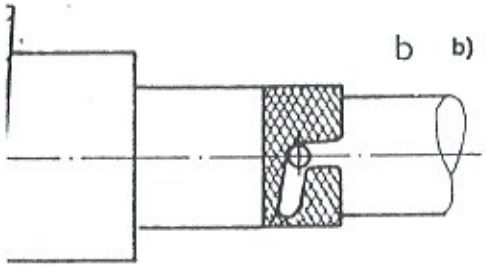

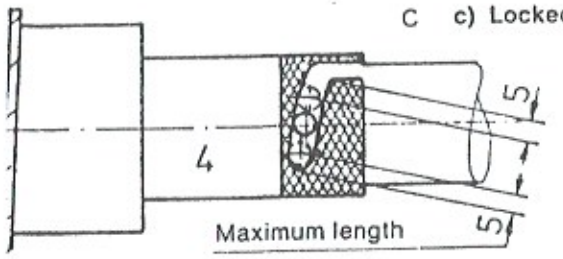

ər rigging the following check must be carried out to check the ınections are secure:

ər connecting the quick lock couplings make a visual check that collar is extended forward over the bearing far enough for the ety 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.

VI.2. 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.

3. Transport

/e recommend the use of a closed trailer for transporting the glider. he parts must be carefully supported and secured so they cannot ide.

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.
(400 mm = 16 in.)

. 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.
(200 mm = 8 in.; 300 mm = 12 in.)

. 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.

4. Simple Maintenance

'he entire surface of the glider is coated with weather resistant white ıolyester gelcoat.

'he greatest care should be taken in maintaining the fibre glass ;urface of the glider. Luke warm water should be used to wash off lust, grease, dead flies and other dirty marks. More resistant dirt ;hould be removed by using a mild cleaning agent. Only special sili-:on-free preparations should be used in maintaining the painted sur-aces. (1 Z-Spezialreiniger – D 2, Fa. W. Sauer and Co., 5060 Bensberg)r Reinigungspolish Fa. Lesonal).

)ctober 1982

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

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

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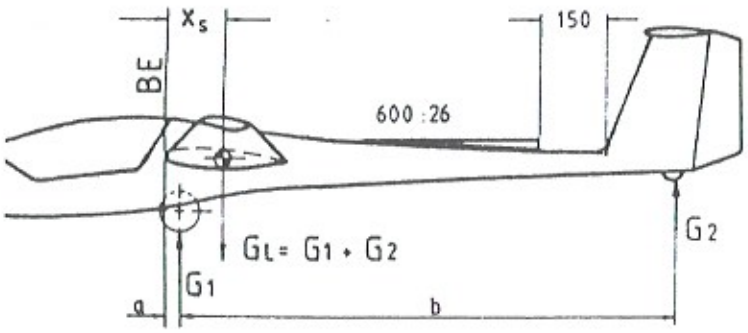
Measurement of centre of gravity

he determination of the center of gravity is made ith the undercarriage extended and the glider sup-orted on two scales in such a way that an inciden-e board of 600 : 26 angle is set horizontal on the ack of the fuselage.

he reference plane is situated at the front of the ing at the root. The distances a and b measured ith the help of a plumb line . The empty weight is ıe sum of the two weights G_1 and G_2.



um line: Front edge of the wing at the root rib (BE)

el means: With a 600 : 26 incidence board set up horizontal on top of the rear fuselage.

ght on main-wheel	G_1	=	kg / lbs
ght on tail-skid	G_2	=	kg / lbs
ty Weight G_L	$= G_1 + G_2$	=	kg / lbs
ance to main-wheel	a	=	mm / inches
ance to tail-skid	b	=	mm / inches

ty weight C. of G.

$$\frac{G_2 \times b}{G_L} + a = \text{——} + = \quad \text{mm/inches behind datum line}$$

measurements to determine the empty weight, the empty weight f G and the loading limitations must always be taken with the er empty of water ballast and without removable ballast weights.

tober 1982

Convertion	from	to	multiply with
	kg	lbs	2.2
	mm	inches	0.0394

If the limits of the empty weight C of G positions and the loading limitations chart are adhered to, the C of G of the loaded glider will be within the permitted range.

STANDARD and CLUB ASTIR III

Empty Weight kg	Range of C. of G. behind Datum (mm)	
	Forward	Aft
250	702	769
255	693	763
260	685	758
265	677	753
270	670	748
275	648	743
280	626	738

It should be noted that to make use of the maximum load the minimum admissable load for non lifting parts must not be exceeded.

The weight of the non lifting parts is the sum of the fuselage, tailplane, and maximum load in the fuselage and must not exceed 250 kg (551 lbs) or the maximum load permitted in the fuselage must be correspondingly decresed. This refers to the load of the fuselage.

The Centre of Gravity should be rechecked after repair, repainting, the installation of additional equipment or when a period of 4 years has elapsed from the time of last weighing.

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empty weight, empty weight C of G
.tion and the maximum load should be
›rded after each weighing on page 11
:he Flight Manual.

:ind out the Center of Gravity of the
led sailplane:

of G. of the pilot is located 552 mm
front of the datum line

of G. of the water ballast is located
'6 mm behind the datum line.

›ber 1982

N 7936 **Date:** 1 SEPT 2011

Fwd of Datum = -- Aft of datum = +

In flight C G limits: 12.2 in. to 18.9 in. Aft of datum

Item	Weight	Arm / CG	Moment
Original W&B	585.4	28.55	16713.17
PILOT	150.0	-21.7	-3255.00
NEW W+B	735.4	18.3	13458.17

MINIMUM PILOT WEIGHT IS 150 POUNDS

Item	Weight	Arm / CG	Moment

Item	Weight	Arm / CG	Moment

Checked by
Robert Mudd A&P 1878801 Robert J Mudd A&P 1878801

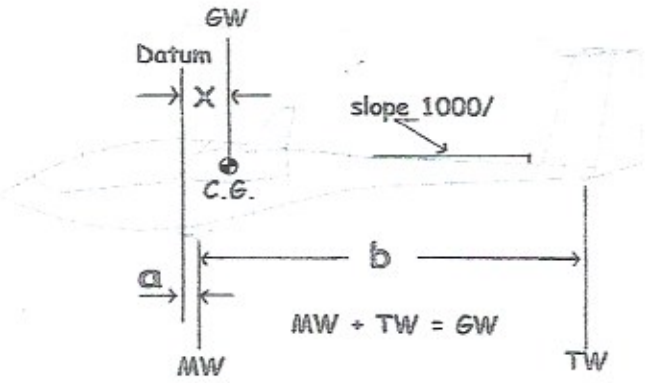
WEIGHT AND BALANCE FORM

Manufactured by: B. GROB FLUGZEUGBAU		Manufacture Date: 1985
Model: G-102 CLUB ASTIR IIIB	Serial Number: 5636 cb	Registration: N793G
Owner: MID-GEORGIA SOARING ASSOC. INC		
Weight and Balance data based on Equipment List dated: 1 SEPT 2011		

TECHNICAL DATA

1. Datum: Wing leading edge at its root rib
2. Leveling: Slope of fuselage top surface, ~~1000~~/ 600/26 At 170-205 STA. forward of vertical fin

WEIGH AND CENTER OF GRAVITY CALCULATION



Component mass	
Item	kgs. / lbs.
right wing + aileron	
left wing + aileron	
fuselage	
horz. stab. + elevator	
rudder	
Total mass	

Values for

MW 559.6 a 22.25

TW 25.8 b 143.1

MW + TW = GW 585.4

$$X = \frac{TW * b}{GW} + a = \text{Center of Gravity location aft of Datum}$$

$X = \frac{25.8 * 143.1}{585.4} + 22.25 = 28.55$ c.g. INCHES AFT OF DATUM

Note: The value of "a" and "b" can vary with the weight of the glider. These dimensions must be checked at each weighing.

Empty Weight c.g. range:

Flight Weight c.g. range:

Inches aft of Datum Forward limit 12.2 in Aft Limit 18.9 in

Millimeters aft of Datum Forward Limit _____ Aft Limit _____

Wing Bending Frequency / Minute _____

MAXIMUM ALLOWABLE WEIGHTS

PILOT G.G POSITION -21.7 INCHES

Useful load 250.6 LBS

Maximum Gross Weight 836 LB Maximum weight of non-lifting parts _____

Data Checked by Robert Mudd AP IX78501 Date 1 SEPT 2011

EQUIPMENT LIST

Registration: 793G **SN : 5636 Cb** **Manufacture Date: 1985**

Model: G-102 Club Astir III b

	REQUIRED ITEMS	WEIGHT lbs.	LOCATION in.
	Instrument panel location is _39.5_ inches forward of datum.	+ is aft and - is fwd of datum	
1.	4 point safety harness	2.5	– 21.7
2.	Air Speed indicator	0.2	– 39.5
3.	Altimeter	1.1	– 39.5
4.	Compass	0.6	– 45.5
5.			
	OPTIONAL ITEMS	WEIGHT lbs.	LOCATION in.
		+ is aft and - is fwd of datum	
1.	Cambridge glide calculator/navigation display NAV 50	1.2	– 39.5
2.	Cambridge Variometer display	075	– 39.5
3.	Winter slip/skid ball	02	– 39.5
4.	Astro teck digital timer/clock	0.5	– 39.5
5.	Dittle FSG 50 radio	0.75	– 39.5
6.	Outside Air temperature gauge	0.75	–39.5
7.	Barograph tray	0.75	+ 8.0
8	Dittle speaker and junction box and wiring	1.6	+ 8.0
9.	Battery and tray	9.0	+ 8.0
10.	Boom microphone	1.0	– 10.0
11.	Head Rest	1.0	00.00
12.			
13.			
14.			

Datum: wing leading edge at its root rib.

Data checked by: Robert J. Mudd A&P 1878801 Robert J Mudd A&P 1878801

Date: 1 Sept. 2001