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FLIGHT HANDBOOK

GROB G 103 »TWIN II«

This handbook must be carried on board at all times.

It refers to the GROB G 103 Sailplane

Registration: VH-GPF Factory Serial Number: 3651

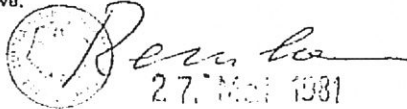
Owner: Adelaide Soaring Club

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

Published December 1980


Approval of translation has been done by best knowledge and judgement — in any case the original text in German language is authoritative.

Approved translation of the original text in German language is authoritative.


27. Mai 1981

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I.1. Updates

No.	Page	Reference	Date	Signature	LBA - Approval
1	21	Control of tailplane (TM315-11 only until S/N 3550)	01.10.1980		
2	1, 20, 20a	TM 315-58	04.11.1996		
3	1, 18	TM 315-52/2	14.02.1997		
4	1, 5a,	MSB 315-65/1	09.02.2006		
5	1, 5a,	OSB 315-66/1	09.02.2006		
6		Flight Manual Supplement Increase in AWW	15-12-04	P.elf	

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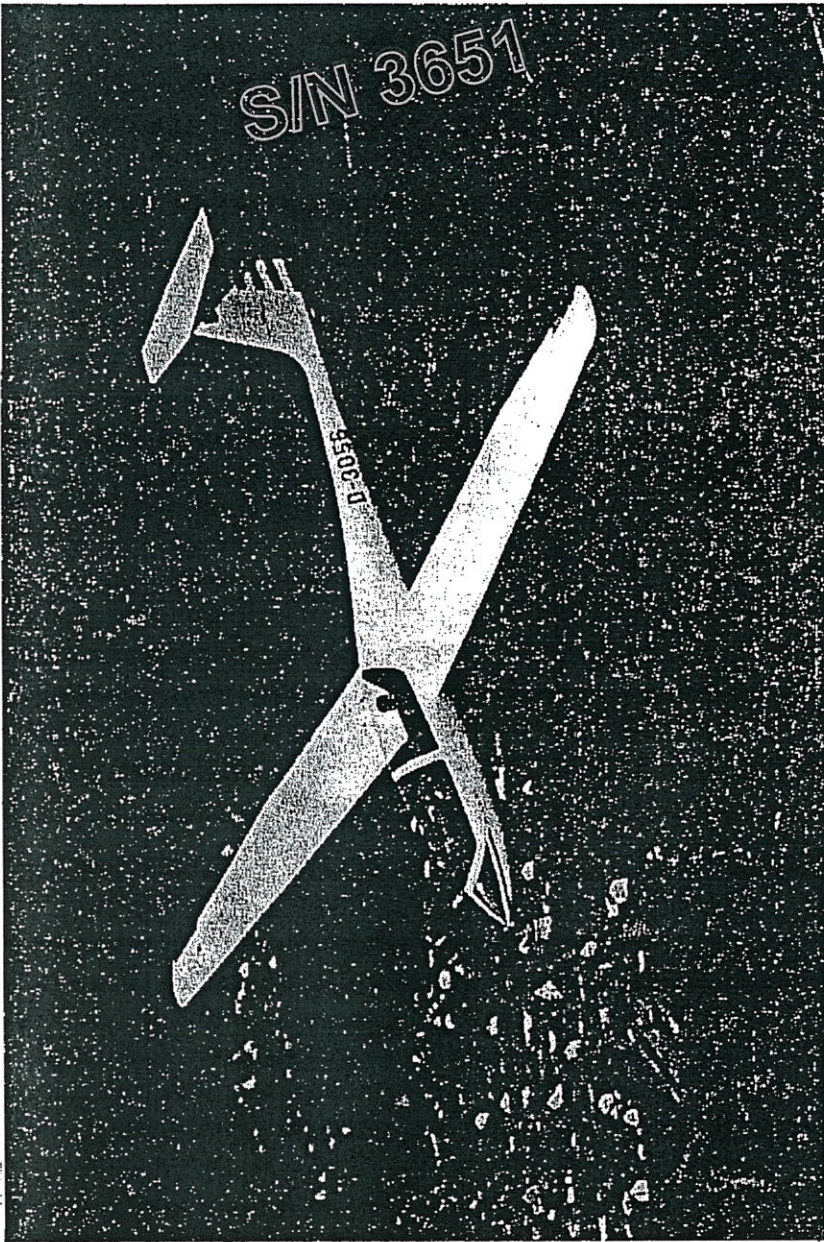
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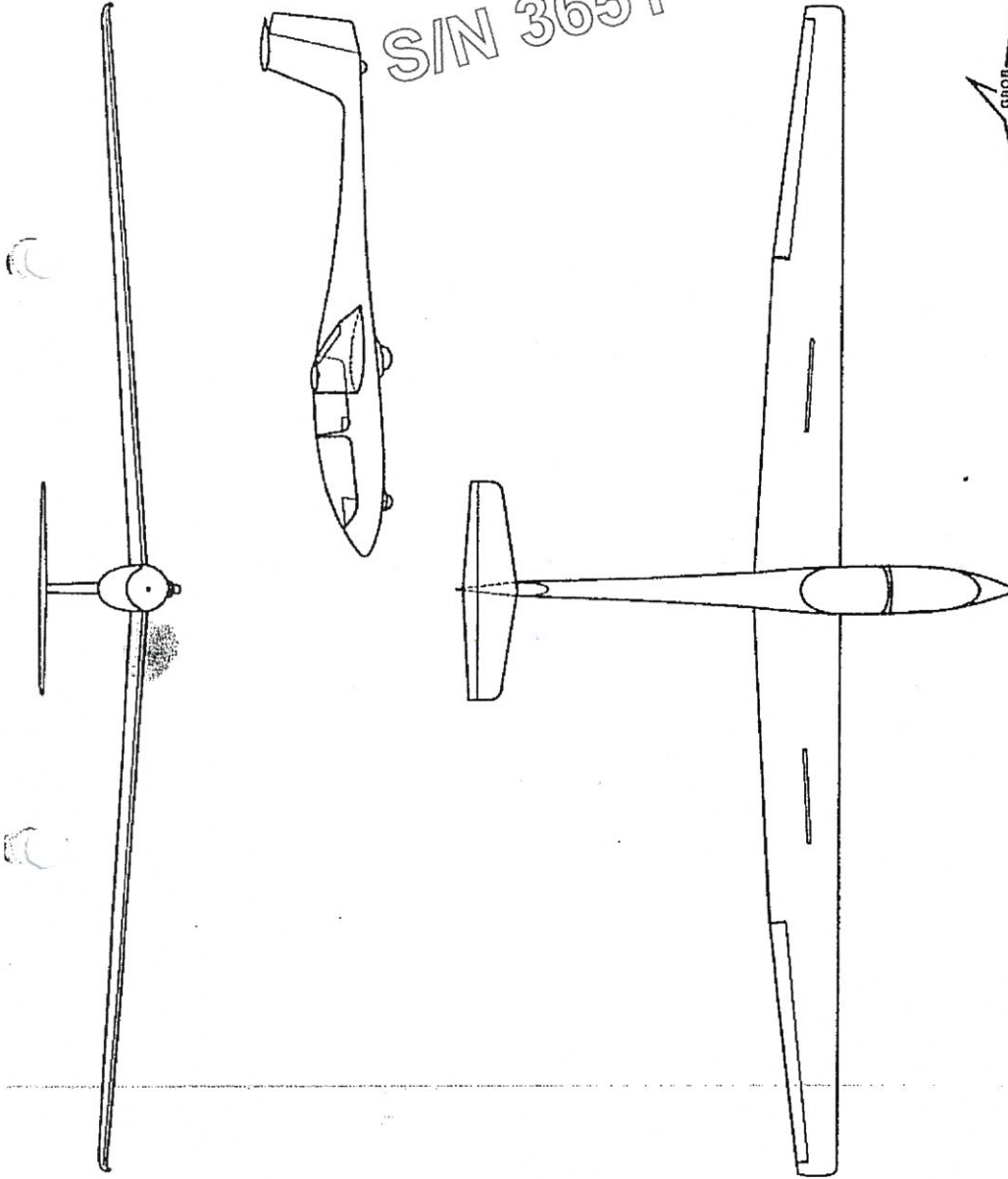
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If the fuselage reinforcement according to OSB 315-65/1 had not been performed the following is applicable:

The glider GROB G 103A "TWIN II ACRO" is derived from the GROB G 103 "TWIN II". Due to structural reinforcements the "TWIN II ACRO" is approved in the category "Acrobatic". According to MSB 315-65/1 only "simple aerobatics" (Loop, Turn, Lazy Eight, Chandelle, Spin) is approved (refer to II.2 and IV.9)

The

Flight Handbook for Aerobatics
GROB G 103A "TWIN II ACRO"
Edition February 1984
LBA approved

is invalid according to MSB 315-65/1 and must be removed from the Flight Handbook.

If the fuselage reinforcement according to OSB 315-66/1 had been performed the following is applicable:

The glider GROB G 103 A "TWIN II ACRO" is derived from the GROB G 103 "TWIN II". Due to structural reinforcements the "TWIN II ACRO" is approved and certified for aerobatics in conjunction with the following valid operating instructions:

Flight handbook for aerobatics,
GROB G 103 A " TWIN II ACRO",
edition February 1984,
LBA approved.

These operating instructions must be added to the flight manual and contain special instructions valid for acrobatic operations. Main modifications to the "normal" flight manual are contained in the following sections:

- | | |
|--|--------|
| - Airworthiness group (II. 1) | page 6 |
| - Permitted operating conditions (II. 2) | page 6 |
| - Minimum equipment (II. 3) | page 6 |
| - Maximum speeds (II. 4) | page 7 |
| - Flight envelope (II.5) | page 7 |
| - Load scheme (II. 8) | page 8 |

The following items were modified in the maintenance handbook with respect to the acrobatic version:

- Weights and moments of control surfaces (VI)

References to the flight handbook for aerobatics are shown on the affected pages of the "standard" flight manual.

I. 5 Description

The "TWIN II" is a high performance two seater sailplane with a T-tail, fitted with a non-retractable tandem undercarriage and upper surface airbrakes.

This sailplane is manufactured using the latest techniques in industrial Glass fibre construction.

It is designed for training, high performance and simple aerobatic flying.

Technical Data:

Span	17.5 m (57.4 ft.)	Wing Area	17.8 m ² (191.6 ft. ²)
Length	8.18 m (26.8 ft)	Maximum Flying Weight	580 kg (1279 lbs) <i>600 kg.</i>
Height	1.55 m (5.1 ft)	Maximum Wing Loading	32.6 kg/m ² (6.68 lbs/ft. ²)
Aspect Ratio	17.1		

II. Operating Limits

II. 1 Airworthiness Group

(U, Utility, LFSM)

The LFSM (Lufttüchtigkeitsforderung für Segelflugzeuge und Motorsegler) published 23. 10. 1975 are the basic rules and requirements for the licensing of a new type of glider or motor glider in Germany.

II. 2 Permitted operating conditions.

The plane is licensed for:

1. Flight in VMC
2. Simple Aerobatics (Loops, Stall turns, Lazy eight, Chandelle and Spin). *Only up to 580 kg.*
3. Cloud flying (When fitted with suitable instrumentation as defined in section II. 3). *Not Permitted in Australia.*

II. 3 Minimum equipment

1. 2 Air speed Indicators reading to 300 km/hr (162 kts, 187 mph)
2. 2 Altimeters.
3. Full Harness Straps in front and back cockpit.
4. Parachute or back-cushion at least 7 cm (3 inch) thick for each occupant.
5. Loading-limit-plaque in front and back cockpit.
6. Flight Limits plaque.
7. Flight Handbook.

Cloud Flying.

For cloud flying the additional instruments listed below must be installed.

1. Variometer.
2. Electric turn and slip indicator.
3. Magnetic Compass (Compensated inside the glider).
4. VHF-radio (operational).

II. 4 Maximum Speeds

Maximum permitted speed in calm air	$V_{NE} = 250 \text{ km/h (135 kts, 155 mph)}$
Maximum permitted speed in rough air	$V_B = 170 \text{ km/h (92 kts, 105 mph)}$
Maximum Manoeuvring speed	$V_M = 170 \text{ km/h (92 kts, 105 mph)}$
Maximum winch launch speed	$V_W = 120 \text{ km/h (65 kts, 74 mph)}$
Maximum Aerotow speed	$V_T = 170 \text{ km/h (92 kts, 105 mph)}$

Conditions in rough air are similar to those encountered in rotors, clouds, whirlwinds and when overflying mountain ranges.

Manoeuvring speed is the maximum speed at which full control deflections may be used. At maximum speed (V_{NE}) the control deflections should be restricted to 1/3 of the full range.

Air speed indicator markings

77-170 km/h=42-95 kts=48-105 mph	— Green arc
170-250 km/h=92-135 kts=105-155 mph	— Yellow arc
at 250 km/h = 135 kts = 155 mph	— Red line
at 95 km/h = 51 52 kts = 59 mph	— Yellow triangle
	(recommended minimum appr. speed)

Position Errors

The airspeed indicator must be connected to the following sources: Pitot head in the tail fin, static vents side of the fuselage between the two seats.

Using a calibrated ASI the position error is not greater than $\pm 2 \text{ km/h}$ or 1 kt or 1.2 mph. A calibration curve is therefore not necessary.

II. 5 Flight envelope.

The sailplane design limit load factors are as follows:

At manoeuvring speed	+ 5.3 — 2.65
At V_{NE}	+ 4.0 — 1.5
(Brakes closed and calm air)	

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II. 6 Weight limits

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 Empty weight about 380 kg (837,7 lbs)
 Maximum flying weight . . . ~~580~~ ⁵⁸⁸ kg (~~1278,67~~ lbs)
 Maximum permitted weight of non lifting parts ~~400~~ ³⁹⁶ kg (~~881,84~~ lbs)

II. 7 Centre of gravity position

The approved range of centre of gravity positions during flight is 260 mm (10.24 inches) to 460 mm (18.11 inches) behind the datum line, equivalent to 24.7% to 43.6% of the M.A.C. of the wing.
 A/c attitude: incidence board of 600:24 angle.
 The datum line is the front edge of the wing at the wing root.

The approved centre of gravity range does not get exceeded by the payload distribution specified in the loading plan II. 8.

The exact position of the centre of gravity at flying weight can be calculated according to VI. 5.

II. 8 Load scheme „TWIN II“

Minimum load in the front seat for all flight	70 kg (154 lbs)
Maximum load in the front seat	110 kg (242 lbs)
Maximum load in the back seat	110 kg (242 lbs)
Maximum load in both seats	220 kg (485 lbs)
Maximum load in the baggage compartment	10 kg (22 lbs)

The maximum flying weight of ~~580~~ ⁶⁰⁰ kg (1278,67 lbs) must not be exceeded.

Compensate missing weight in first seat through immovable ballast in first seat

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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
8-11-96	199H.	884 lbs 402 kg	762mm	392 lbs 178 kg
10-11-97	GFA FORM WE 10-11-97	410 KG	725mm	170 KG
1-3-2006	GFA FORM WE 1-3-2006	418 KG	717mm	182 KG

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

II. 9 Tow hooks

For Aerotow: Nose hook "E 75" with modification 1-79.
For Winch launch: Safety back release hook "G 72" or "G 73".

The E 75 and the G 73 Tost hooks are limited to 36 months after installation or 2000 launches whichever ever occurs first, at which time they are to be recertified by the manufacturer.

II. 10 Weak link strength recommended

Winch launch and aerotow 600 ± 60 daN 1323 ± 132 lbs

II. 11 Tire Pressure

mainwheel	6.00-6	2,5-2,8	bar
nosewheel	260x85	2,5	bar
tailwheel	210x65	2,5	bar

II. 12 Crosswinds

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

III. Emergency procedures

III. 1 Spin recovery

Recovery 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.

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III. 2 Canopy Jettison and Emergency Exit

- Pull red handles on right and left of canopy full back simultaneously.
- Push canopy up and away with the left hand
- Release safety harness
- Stand up and get out over left or right side depending on the attitude.
- When using a manual parachute grip release and pull firmly to full extend after 1-3 seconds

III. 3 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 6 knots:

Increase approach speed by 6 knots.

The characteristics during lift off and touch down remain the same.

Wing dropping

If a 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.

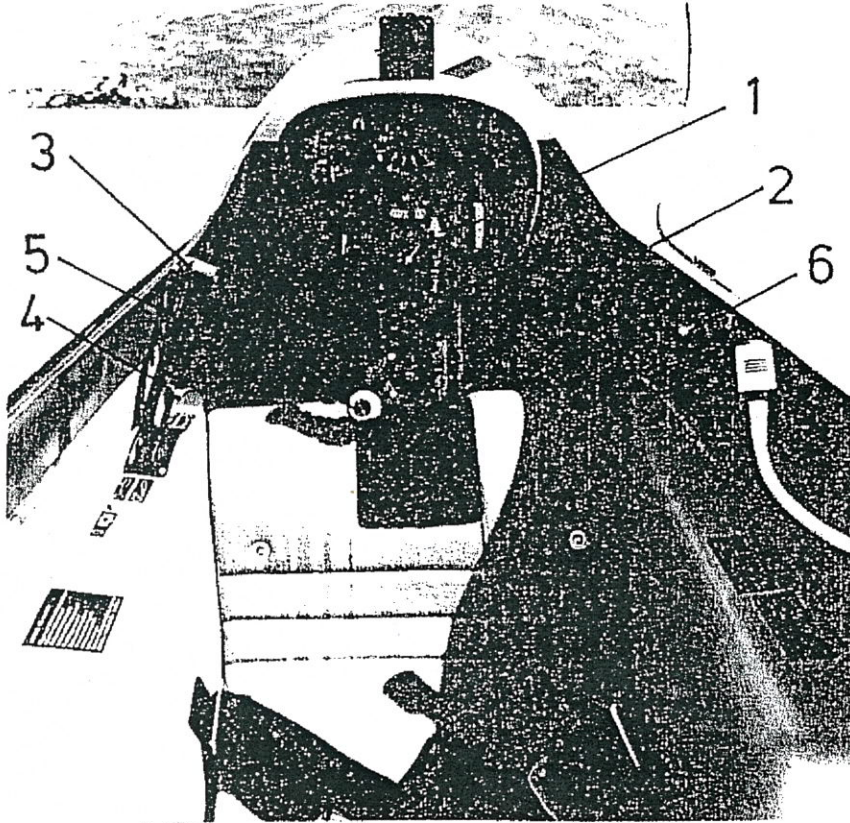
If one wing touches the ground or the aircraft changes direction by more than 15 degrees, release ^{cable} cable immediately.

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IV. Normal operation

VI. 1 Cockpit and controls

Front Seat.



- | | | | |
|---|-------------------------------|---|-----------------|
| 1 | Stick | | |
| 2 | Rudder pedals | 5 | Release knob |
| 3 | Airbrake lever and wheelbrake | 6 | Canopy jettison |
| 4 | Trim lever | | |

Ventilator top of instrument panel left side.

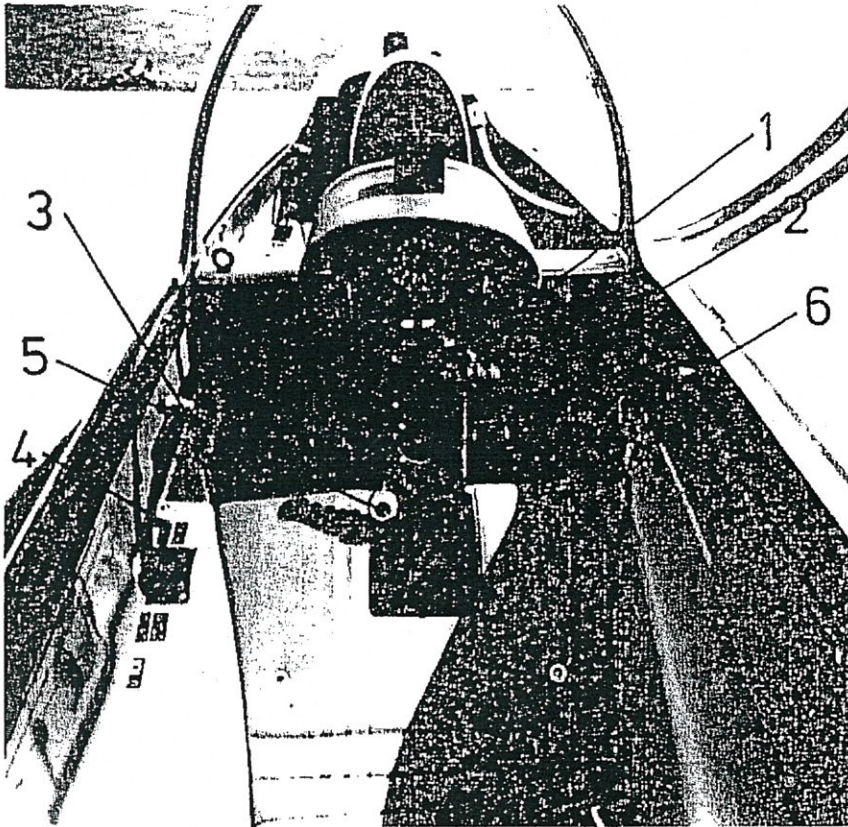
Rudder pedal adjustment top of instrument panel right side.

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IV. 1 Cockpit and controls

Back seat.

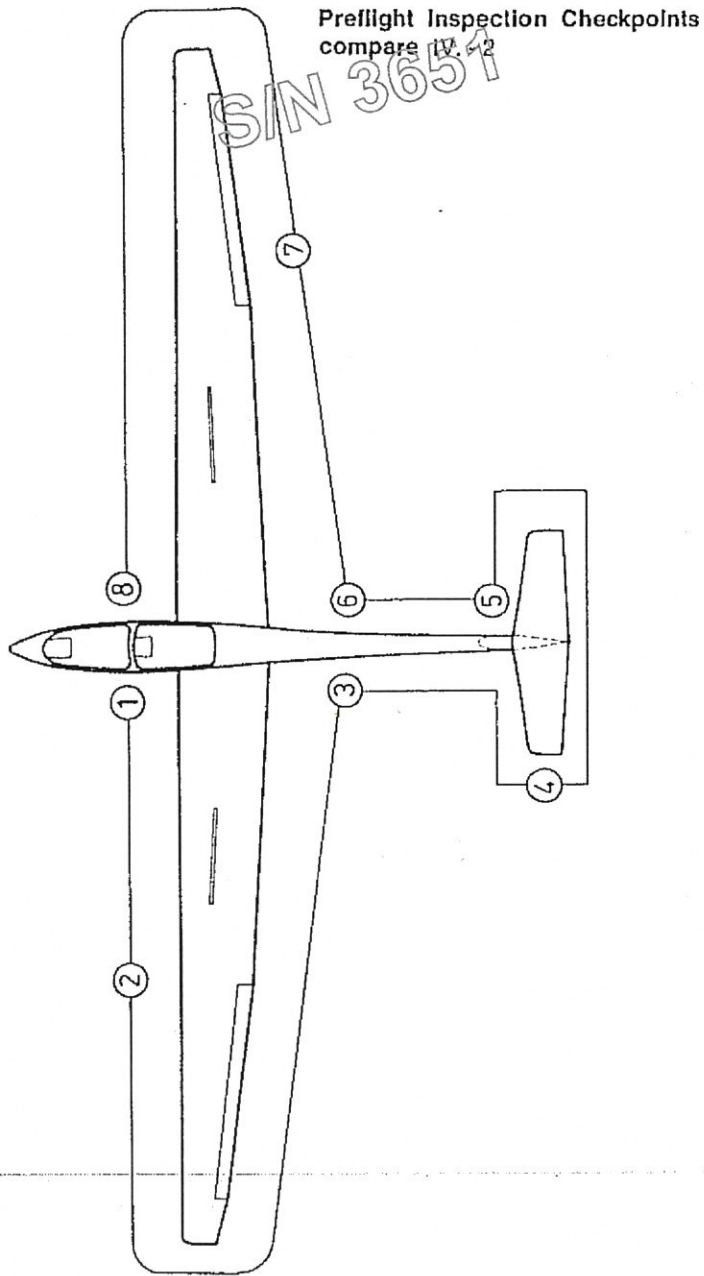


- | | |
|---------------------------------|-------------------|
| 1 Stick | 4 Trim lever |
| 2 Rudder pedals | 5 Release knob |
| 3 Airbrake lever and wheelbrake | 6 Canopy jettison |

IV. 2 Daily preflight inspection

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1. a) Open canopy.
b) Check the 4 wing fastenings inside the fuselage if locked.
c) Visually check all controls inside the cockpit.
d) Check for foreign bodies.
e) Test controls for full and free movement.
f) Check tire pressure 2.5 – 2.8 atm. = 35.6 — 39.8 PSI
g) Check condition of both hooks.
h) Check functioning of releases and wheelbrake.
 2. a) Check top and bottom of wing for damage.
b) Check ailerons for condition, freedom of movement and play.
c) Check airbrakes for condition, locking and fit.
 3. Check fuselage for damage especially on the underside.
 4. Check tail unit for correct assembly and that safety lock is in position.
 5. Check condition of the tailskid.
 6. Check the pitot tube, total energy venturi and static vents are clean.
 7. Repeat step 2 for right wing.
 8. Check static vents.

After heavy landings or excessive flight loads the entire glider should be checked. The wings and tailplane should be removed for these checks and if any damage is found an inspector should be consulted. The plane should not be flown before any damage is repaired.



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