



BURKHART GROB
LUFT-UND RAUMFAHRT GmbH & Co. KG
8939 Mattsles

PILOT'S OPERATING HANDBOOK

Model : GROB G 103 C "TWIN III ACRO"
Serial No. : 34176.....
Registration No. : N41KP.....

Date of Issue: January 1989

This Flight Manual is FAA approved for U.S. registered gliders in accordance with the provisions of 14 CFR Section 21.29, and is required by FAA Type Certificate Data Sheet No. G39EU.

Pages identified by "LBA approved" are approved by

SKOV *Skov* (Signature)
LUFTFAHRT-BUNDESAMT (Authority)



(Stamp)

26. Mai 1989

(Original Date of Approval)

This sailplane is to be operated in compliance with information and limitations contained herein.

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

17.09.1992

 GROB LBA-Nr. 1-821



0.1 Record of Revisions

Any revision of the present manual, except actual weighing data, must be recorded in the following table and in any case of approved Sections endorsed by the responsible airworthiness authority.

The new or amended text will be indicated on the revised page by a black vertical line in the right hand margin, and the Revision No. and the date will be shown on the bottom left hand corner of the page.

Check before launch

Full and free movement of controls ?

Parachute secured ?

Straps tight and locked ?

Pedals adjusted and locked ?

Stakes closed and locked ?

Canopy correctly adjusted ?

Altitude indicator adjusted ?

Parachute correctly locked ?




Parachute on correct hook ?

Warning: - Crosswind ! - Cable break !

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Current State of Revision:

Rev. No.	Affected Section	Affected Pages	Date	Reference	Date of Approval	Date Inserted	Signature
1	0 2 3 4 6	0.3,0.4,0.5 2.3,2.5, 2.11,2.12 3.3 4.3,4.15 6.4	18 July 1989	TM 315-40	Sept. 8 / 89 		
2	0 2 3 4	0.3,0.4 2.7,2.8 3.6 4.15,4.21	23 Nov. 1989	TM 315-42	Nov. 24 / 89 		
3	0 1 4 7	0.1,0.3,0.4 0.5 1.5 4.6,4.15 7.7	08 May 1992	ÄM 315-18	03.06.92 		

0.2 List of Pages

Paragraph	Page	Date	Reference
0	front page		
	0.1	08.05.92	ÄM 315-18
	0.2		
	0.3	08.05.92	ÄM 315-18
	0.4	08.05.92	ÄM 315-18
	0.5	08.05.92	ÄM 315-18
	0.6	Jan. 89	
	0.7	Jan. 89	
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	1.2	Jan. 89	
	1.3	Jan. 89	
	1.4	Jan. 89	
	1.5	08.05.92	ÄM 315-18
	1.6	Jan. 89	
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	2.3	LBA approved 18.07.89	
	2.4	LBA approved Jan. 89	
	2.5	LBA approved 18.07.89	
	2.6	LBA approved Jan. 89	
	2.7	LBA approved 23.11.89	
	2.8	LBA approved 23.11.89	
	2.9	LBA approved Jan. 89	
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0.3 Table of Contents

	Section
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Normal Procedures (approved section)	4
Performance (containing partly approved and partly not subject to approval sections)	5
Weight and Balance (section not subject to approval)	6
Sailplane and Systems Description (section not subject to approval)	7
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SECTION 1

- 1. General
 - 1.1 Introduction
 - 1.2 Certification Basis
 - 1.3 Warnings, Cautions and Notes
 - 1.4 Descriptive Data
 - 1.5 Three-View Drawing

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1.1 Introduction

The Pilot's Operating Handbook has been designed to give all necessary information to pilots and instructors for safe and correct operation to give maximum performance of the GROB G 103 C TWIN III ACRO glider.

This handbook does include not only all data that must be furnished to the pilot according to design regulation LFSM but also supplemental data and considerations for operation, the manufacturer thinks to be of benefit to the pilot.

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1.2 Certification Basis

The GROB G 103 C TWIN III ACRO has been certificated by the Luftfahrt-Bundesamt in accordance with LFSM (Airworthiness Requirements for Gliders and Powered Gliders), Date of Issue October 1975.

Type Certification Sheet No. 04.315 was granted on May 26, 1989. The Airworthiness Category is "Acrobatic".

1.3 Warnings, Cautions and Notes

Statements in this handbook which are essential with regard to flight safety or handling are highlighted in the following manner:

"Warning"

means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety.

"Caution"

means that the non-observation of the corresponding procedure leads to a minor or to a more or less long term degradation of the flight safety.

"Note"

draws the attention on any special item not directly related to safety but which is important or unusual.

1.4 Descriptive Data

The GROB G 103 C "TWIN III ACRO" is a two-seater mid-wing glider with a damped T-type tail. State-of-the-Art technology is used to manufacture the glider in industrial FRP construction. It is used for instruction, training, performance and aerobatic flights.

The 2-section wing is triple tapered with airbrakes (Type GROB) on the upper side.

The two seats are in tandem arrangement. The two canopies are independent of each other and open to the right.

The main wheel of the non-retractable tandem landing gear is equipped with a hydraulic disk brake. The nose wheel is steerable (standard as of S/N 34171).

Technical Data:

Wing span	18.0	m	(59.06 ft)
Length	8.18	m	(26.84 ft)
Height	1.55	m	(5.09 ft)
Wing aspect ratio	18.5		
Wing area	17.5	m ²	(188.4 sq.ft)
Max. flight weight	600.0	kg	(1322.8 lbs)
Max. wing loading	34.3	kg/m ²	(7.03 lb./sq.ft)

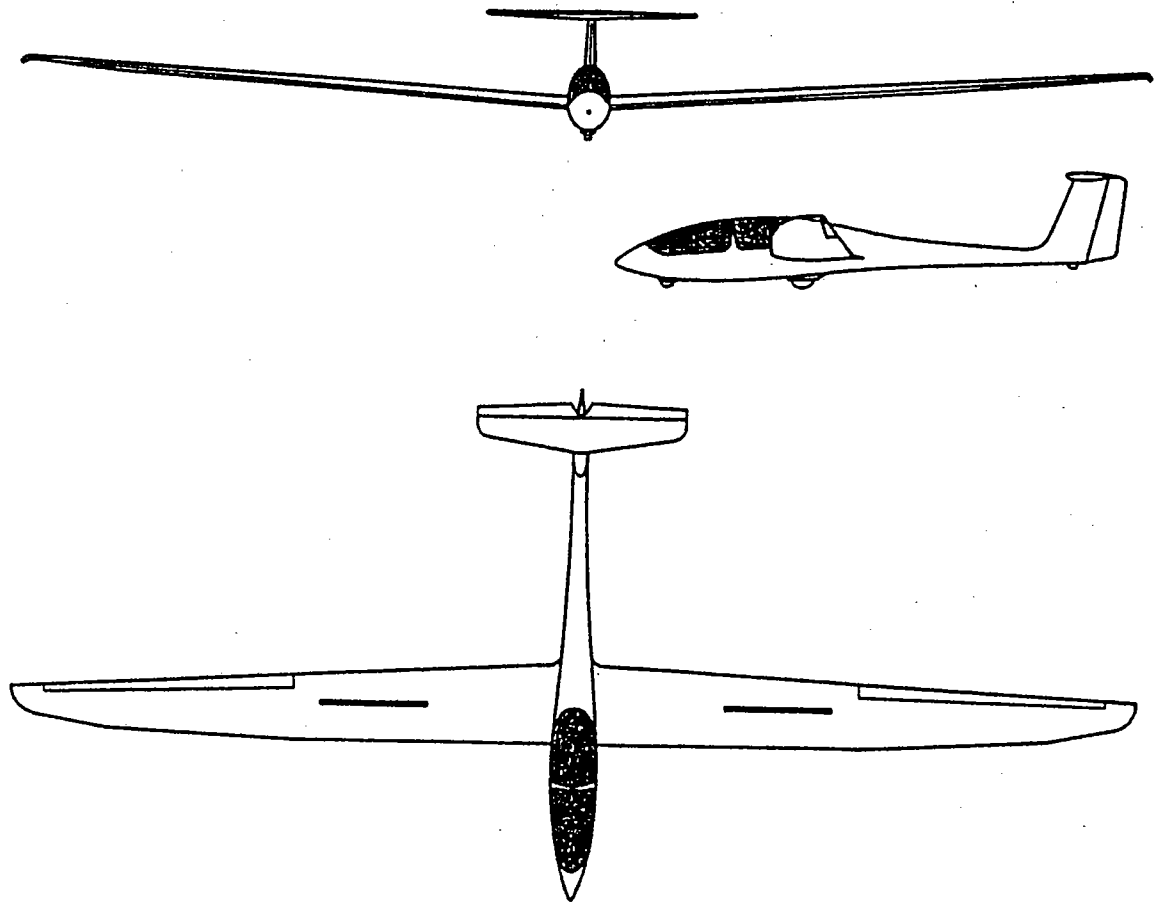
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1.5 Three-View Drawing



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SECTION 2

- 2. Limitations
 - 2.1 Introduction
 - 2.2 Airspeed
 - 2.3 Instrument Markings
 - 2.4 - reserved -
 - 2.5 - reserved -
 - 2.6 Weight
 - 2.7 Centre of Gravity
 - 2.8 Approved Manoeuvres
 - 2.9 Manoeuvring Load Factors
 - 2.10 Flight Crew
 - 2.11 Kinds of Operation
 - 2.12 Minimum Equipment
 - 2.13 - reserved -
 - 2.14 Aerotow and Winch- and Autotow-Launching
 - 2.15 Other Limitations
 - 2.16 Limitations Placards

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2.1 Introduction

This section includes operating limitations, instrument markings, and basic placards necessary for safe operation of the GROB G 103 C TWIN III ACRO, its systems and the equipment installed by the manufacturer.

The limitations included in this section and in Section 9 have been approved by the Luftfahrt-Bundesamt.

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2.2 Airspeed

The following table indicates the airspeed limitations and their operational guide:

	Speed	IAS (km/h) (kts)		Note	
V _{NE}	Never exceed speed in calm air			Never exceed this speed. Max. control deflection 1/3.	
				m ft	
			280	151	0-2000 - 6562
			265	143	-3000 - 9842
			240	130	-5000 -16404
			215	116	-7000 -22966
		190	103	-9000 -29528 altitude	
V _{RA}	Max. permissible speed in heavy turbulence	200	108	Never exceed this speed in heavy turbulence. There is heavy turbulence in lee-waves, cumulonimbus etc.	
V _A	Design manoeuvring speed	185	100	Do not make full or abrupt control movements above this speed. This might overload structure.	
V _W	Max. winch-launching speed	140	76	Do not exceed this speed during winch or autotow-launching	
V _T	Max. aerotowing speed	185	100	Do not exceed this speed during aerotowing	

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2.3 Instrument Markings

- Airspeed Indicator

The following table shows the airspeed indicator markings and colour code identification.

Marking	IAS (km/h)	(kts)	Indicates
Green arc	79 - 185	43-100	Normal operating range (lower limit $1.1 V_{S1}$ at max. weight and most forward CoG position and upper limit V_A)
Yellow arc	185 - 280	100-151	Manoeuvres must be conducted with caution and only in smooth air.
Red line	280	151	Maximum speed for all operations.
Yellow triangle	96	52	Approach speed at max. weight

- Acceleration Indicator

Red radial lines at $n = + 6.5$ and $n = - 4.0$.

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2.6 Weight

Max. permissible take-off mass:	600 kg	(1322.8 lbs)
Max. permissible landing mass:	600 kg	(1322.8 lbs)
Max. permissible mass of all non-lifting parts:	420 kg	(925.9 lbs)
Max. mass in baggage compartment:	10 kg	(22.0 lbs)

2.7 Centre of Gravity

Weight X Arm = Moment

CoG position range during flight

max. forward position: 270 mm (10.63 in.) aft of datum

max. aft position: 480 mm (18.90 in.) aft of datum

Datum (BE): Wing leading edge at the root rib

Aircraft attitude: Wedge 600:24 horizontally on upper side of fuselage in front of vertical fin

The flight weight CoG positions have to be strictly adhered to.

The permissible CoG range is not exceeded if the loading corresponds to the loading limitations according to POH, Sec. 6.2, page 6.5 .

A lack of weight in the pilot's seat shall be compensated by ballast (see POH Sec. 6.2, page 6.4).

For determination of the empty weight CoG position see Maintenance Manual, Section 7.

Arms:

Front Seat: 44.57 In (-)

Rear Seat: 1.38 In (+)

Trim Weights:

1 Trim Weight 12.3 lb 60.75 In (-)

2 Trim Weights 24.6 lb. 61.42 In. (-)

Baggage: 31.89 In (+)

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2.8 Approved Manoeuvres

The glider has been certificated for the following aerobatic manoeuvres according to airworthiness category "Acrobatic":

- Positive loop
- Turn
- Lazy Eight
- Chandelle
- Spin
- Slow roll
- Immelmann Turn
- Split S
- Inverted flight
- Inverted spin

Caution: The description of these aerobatic manoeuvres and the recommended entry speeds have been provided under Sec. 4.5.9 of the Pilot's Operating Handbook.

2.9 Manoeuvring Load Factors

The following manoeuvring load factors shall not be exceeded:

at V_A (185 km/h / 100 kts)	
max. positive load factor	$n = + 6.5$
max. negative load factor	$n = - 4.0$

With increasing speed the above values decrease as follows:

at V_{NE} (280 km/h / 151 kts)	
max. positive load factor	$n = + 5.3$
max. negative load factor	$n = - 3.0$

The above manoeuvring load factors are valid for operation with retracted airbrakes.

Max. manoeuvring load factor with the airbrakes extended

at V_{NE}	$n = + 3.5$
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2.10 Flight Crew

On solo flights, the pilot has to be in the front seat.

Min. load in the 1st seat	70 kg	(154 lbs)
Max. load in the 1st seat	110 kg	(242 lbs)
Max. load in the 2nd seat	110 kg	(242 lbs)

A pilot's weight in the front seat of less than 70 kg (154 lbs) shall be compensated by ballast. A pilot's weight between 55 and 69 kg (121 - 152 lbs) can be compensated by lead trim weights to be mounted in the supporting device (standard equipment) in front of the control stick frame.

2.11 Kinds of Operation

With the minimum equipment prescribed (see POH Sec. 2.12, page 2.8) the glider is certified for:

- (Day) VFR flights
- Aerobatic flights
(Positive loop, turn, lazy eight, chandelle, spin, slow roll, Immelmann Turn, Split S, inverted flight, inverted spin)
- Flights in clouds (if permitted by national operational regulations)

2.12 Minimum Equipment

- 2 airspeed indicators up to 300 km/h (162 kts)
with colour codings according to POH Sec. 2.3
- 2 altimeters
- 1 G-meter with trailing pointer (front panel)
- 2 symmetrical safety belts (each consisting
of 5 parts)
- 2 sets of pedal loops
- back cushions with a min. thickness of 7 cm
(2.77 in.) under load or manually or automatically
operated parachutes for each occupant

additional equipment for cloud flights

- 2 vertical speed indicators
- 1 turn-and-bank indicator
- 1 magneto compass (compensated with the aircraft)
- 1 VHF transceiver* (ready for operation)

* operational equipment

Instruments and other devices of the minimum equipment shall correspond to a certificated design.

2.14 Aerotow and Winch- and Autotow-Launching

Aerotow

Max. permissible speed: 185 km/h (100 kts)

Towing cable weak link: max. 845 daN

Min. length of cable: 40 m (131 ft)

Winch-Launching

Max. permissible speed: 140 km/h (76 kts)

Towing cable weak link: max. 845 daN

Warning: The towing cable weak link shall not exceed 845 daN
(including tolerance).

