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F L I G H T M A N U A L

for the

S A I L P L A N E

DG-800S

Model: DG-800S

German Data Sheet No.: 384

Factory Serial No.: _____

Registration No.: _____

Date of Issue: April 1997

Pages as indicated by "App." are approved by:

(Signature)

(Authority)

(Stamp)

(Original date of approval) _____

This sailplane is to be operated in compliance with information and limitations contained herein.
The original German Language edition of this manual has been approved as operating instruction according to "Paragraph 12(1) 2. of Luft-Ger Po".
Approval of translation has been done by best knowledge and judgement.

Warnings

All sailplanes, especially those with retractable powerplants, are very complex technical devices. If you don't use yours as it is intended and within the certified operating limitations or if you fail to carry out proper maintenance work, it may harm your health or place your life in danger.

Prior to flying the aircraft read all manuals carefully and regard especially all **warnings, caution** remarks and **notes** given in the manuals.

- Never take off without executing a serious pre-flight inspection according to the flight manual!
- Never take-off with a motorglider without checking the max. engine RPM and the ignition circuits!
- Always respect the relevant safety altitudes!
- With a motorglider never rely completely on the engine extending and starting. Plan your flight path so that you are always able to carry out a safe outlanding if necessary. Be aware that with the engine extended but not running the rate of sink increases remarkably. This means that with a motorglider you have to decide earlier for an outlanding than with a pure sailplane.
- Selflaunch only if you are sure that with an engine failure during the initial climb there is the possibility to execute a safe outlanding or to return to the airfield.
- Respect the stall speeds and always fly with a safety margin above the stall speed according to the flight conditions, especially at low altitudes and in the mountains.

- Use only the types of fuel and oil for your motorglider as specified in the flight manual.
- Use only the battery chargers as specified in the flight manual.
- Don't execute yourself any work on the control system except for greasing.
- Repairs and maintenance work should only be accomplished by the manufacturer or at certified repair stations rated for this type of work. A list of stations which have experience with DG aircraft may be obtained from DG Flugzeugbau..
- Even if no annual inspections are required in your country, have your aircraft checked annually, see maintenance manual section 2.

Issued: February 1999

0.1 Record of revisions

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

The new or amended text in the revised page will be indicated 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 of the page.

Rev. No.	Affected Pages/ section	Description	Issue Date	LBA Approval Date	Inserted Date Signature
1	0.5, 9.1-9.3	TN 384/5 Winglets at the 18 m wingtips	June 98	22.7.1998	
2	0.4, 7.5	TN 384/6 Parking brake combined with an airbrake securing device (Piggott-hook)	Dec, 2000	7.02.2001	
3	0.3, 0.4, 2.5, 4.11, 4.15, 5.3, 6.9	TN 384/8 manual revision	Nov. 2001	17.12.01	
4	0.5, 9.1, 9.2, 9.4-9.6	TN 384/9 emergency bail out aid NOAH	January 2003	13.02.03	
Rev. No.	Affected Pages/ section	Description	Issue Date	EASA Approval Date	Inserted Date Signature
5	0.1, 0.5, 9.4	TN DG-G-11 NOAH Improvements	May2015	7.07. 2015	

0.2 List of effective pages

Section		Page	issued	replaced	replaced
0		0.0	April 1997		
		0.1	/		
		0.2	/		
		0.3	see record of revisions		
		0.4	"		
		0.5	"		
		0.6	April 1997		
1		1.1	"		
		1.2	"		
		1.3	"		
		1.4	"		
		1.5	"		
		1.6	"		
2	App.	2.1	April 1997		
	"	2.2	"		
	"	2.3	"		
	"	2.4	"		
	"	2.5	"	Nov. 01	
	"	2.6	"		
	"	2.7	"		
	"	2.8	"		
	"	2.9	"		
	"	2.10	"		
3	"	3.1	April 1997		
	"	3.2	"		
	"	3.3	"		
	"	3.4	"		
4	"	4.1	April 1997		
	"	4.2	"		
	"	4.3	"		
	"	4.4	"		
	"	4.5	"		
	"	4.6	"		
	"	4.7	"		
	"	4.8	"		
	"	4.9	"		
	"	4.10	"		
	App.	4.11	"	Nov. 01	

0.2 List of effective pages (cont.)

Section		page	issued	replaced	replaced
4	App.	4.12	April 1997		
	"	4.13	"		
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	"	4.16	"		
5	"	5.1	April 1997		
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	"	5.3	"	Nov. 01	
	"	5.4	"		
	App.	5.5	"		
		5.6	"		
		5.7	"		
		5.8	"		
6		6.1	April 1997		
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		6.3	"		
		6.4	"		
		6.5	"		
		6.6	April 1997		
		6.7	"		
		6.8	"		
		6.9	"	Nov. 01	
		6.10	"		
7		7.1	April 1997		
		7.2	"		
		7.3	"		
		7.4	"		
		7.5	"	Dec. 2000	
		7.6	"		
		7.7	"		
		7.8	"		
		7.9	"		
		7.10	"		

0.2 List of effective pages (cont.)

Section	page	issued	replaced	replaced
8	8.1	April 1997		
	8.2	"		
	8.3	"		
	8.4	"		
	8.5	"		
9	9.1	January 2003		
	9.2	"		
	9.3	June 1998		
	9.4	January 2003		
	9.5	"	May 2015	
	9.6	"		

0.3 **Table of contents**

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

1.1 Introduction

The sailplane flight manual has been prepared to provide pilots and instructors with information for the safe and efficient operation of the DG-800S sailplane.

This manual includes the material required to be furnished to the pilot by JAR Part 22. It also contains supplemental data supplied by the motorglider manufacturer.

1.2 Certification basis

This type of sailplane has been approved by the Luftfahrt-Bundesamt (LBA) in accordance with:

Airworthiness requirements:
JAR Part 22 sailplanes and powered sailplanes Change 4, issued 7th May, 1987.

The Type Certificate No. 384 has been issued on February 07, 1995.

Category of Airworthiness: Utility

1.3 Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes used in the flight manual.

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 DG-800S is a single-seater high performance sailplane with wing flaps.

Technical details

2-piece wing or 4 piece wing with parting at y=7.25m (Option).

Wing tips with winglets for 15 m span (Option)

Automatic hook-ups for all controls.

Comfortable seating and modern cockpit design, safety cockpit.

Large canopy for very good in-flight vision.

Draught free canopy demist and adjustable direct ventilation.

Sealed airbrake- and landing gear boxes.

Retractable main wheel, spring mounted.

Tailwheel.

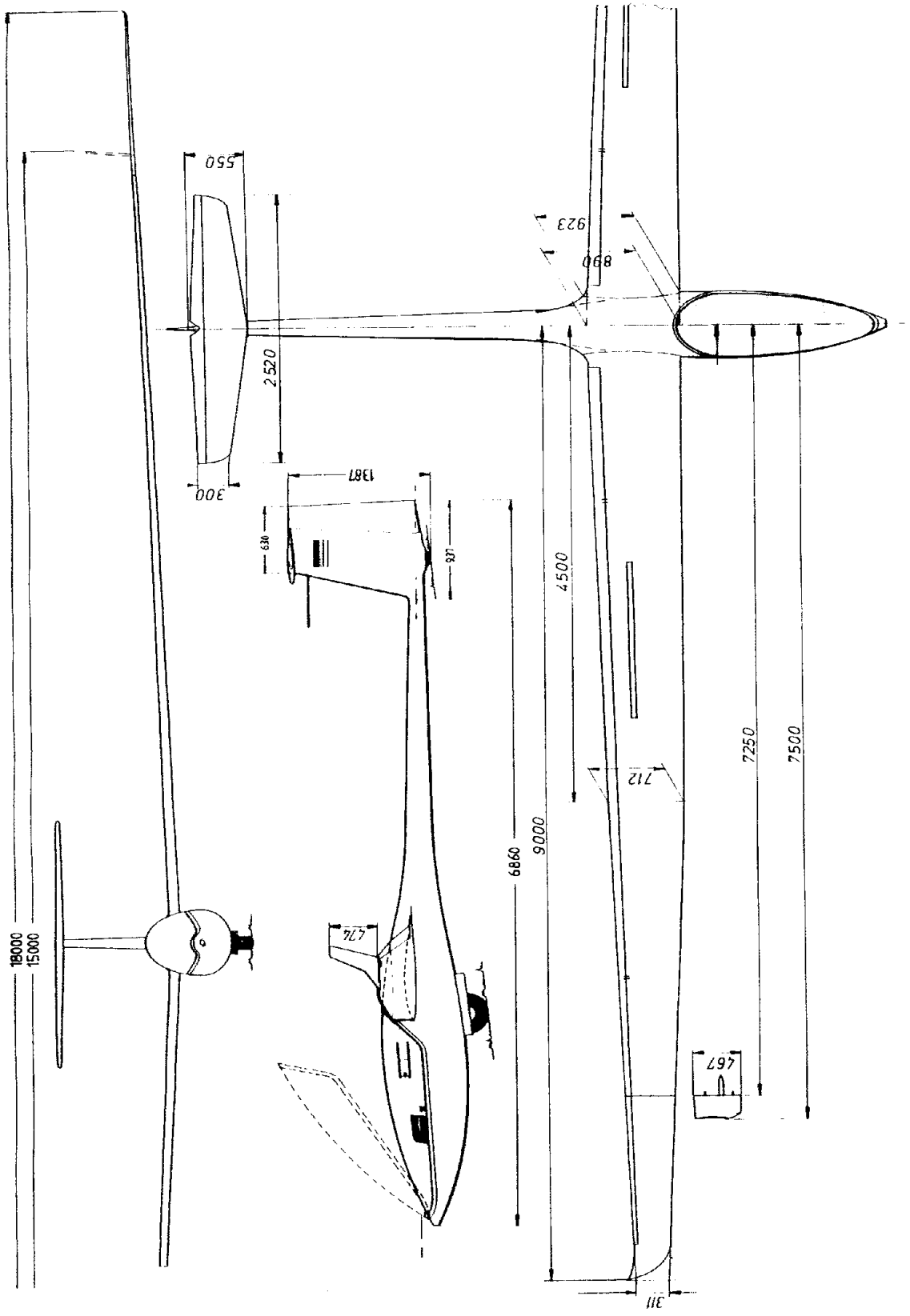
All controls are to be operated with the left hand, which enables the right hand to remain on the control stick.

Further details: Waterballast in the wings and in the fin.

1.5 **Technical data**

Wingspan m (feet)	15 (49.2)	18 (59.1)
Wing surface m² (ft²)	10.68 (115.0)	11.81 (127.1)
Aspect ratio /	21.07	27.42
Mean aerodynamic chord MAC m (ft)	0.734 (2.41)	0.700 (2.30)
Length m (ft)	6.86 (22.5)	
Fuselage width m (ft)	0.62 (2.03)	
Fuselage height m (ft)	0.81 (2.66)	
Horizontal tail span m (ft)	2.52 (8.27)	
Waterballast wings kg (U.S.gal)	120 (31.7) or	174 (46.0)
Waterballast fin tank kg (U.S.gal)	max. 6.2 (1.64)	
Empty weight without parting appr. kg (lbs.)	/	261 (575)
Empty weight with parting appr. kg (lbs.)	260 (573)	264 (582)
wing loading with 80 kg (176 lbs.) payload appr. kg/m²(lbs./ft²)	31.8 (6.51)	29.0 (5.94)
max. weight kg (lbs.)	525 (1157)	525 (1157)
max. wing loading kg/m² (lbs./ft²)	49.2 (10.08)	44.5 (9.11)

1.5 **3 view drawing**



Section 2

2. Limitations

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2.2 Airspeed

2.3 Airspeed indicator markings

2.4 Weight

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2.1 **Introduction**

Section 2 includes operating limitations, instrument markings and basic placards necessary for safe operation of the sailplane DG-800S, standard systems and standard equipment.

The limitations included in this section have been approved by the LBA.

2.2 **Airspeed**

Airspeed limitations and their operational significance are shown below:

	Speed	(IAS) km/h (kts.)	Remarks
VNE	Never exceed speed Flap settings 0° up to -9°	270 (146)	Do not exceed this speed in any operation and do not use more than 1/3 of control deflection.
VRA	Rough air speed	190 (103)	Do not exceed this speed except in smooth air and then only with caution. Rough air is in lee-wave rotor, thunderclouds etc.
VA	Manoeuvring speed	190 (103)	Do not make full or abrupt control movement above this speed, because under certain condition the sailplane may be overstressed by full control movement.
VFE	Maximum flap extended speed		Do not exceed these speeds with the given flap setting
	L	150 (81)	
	+5° up to +13°	190 (103)	
VW	Maximum winch-launching speed	150 (81)	Do not exceed this speed during winch- or auto-tow-launching
VT	Maximum aero-towing speed	190 (103)	Do not exceed this speed during aerotowing
VLO	Maximum landing gear operating speed	190 (103)	Do not extend or retract the landing gear above this speed

Warning: At higher altitudes the true airspeed is higher than the indicated airspeed, so VNE is reduced with altitude see sect. 4.5.5.

2.3 **Airspeed Indicator Markings**

Airspeed indicator markings and their colour code significance are shown below:

Marking	(IAS) range km/h	value or (kts.)	Significance
White Arc	88	- 190	**Positive Flap Operating Range**
	(47.5	- 103)	(lower limit is maximum weight 1.1 VSO in landing configuration. Upper limit is maximum speed permissible with flaps extended positive + 13° + 10°, + 5°)
Green Arc	97	- 190	**Normal Operating Range** (Lower limit is maximum weight
	(52	- 103)	1.1 VS1 at most forward c.g. with flaps neutral. Upper limit is rough air speed.)
Yellow Arc	190	- 270	Manoeuvres must be conducted with caution and
	(103	- 146)	only in smooth air.
Red Line		270 (146)	Maximum speed for all operations.
L		150 (81)	Max. speed for landing configuration L
Yellow Triangle		96 (52)	Approach speed at maximum weight without water ballast

2.4 **Mass (weight)**

Maximum take-off mass:
with waterballast : 525 kg (1157 lbs.)

without waterballast: W=WNLP + Wwings

WNLP = max. mass of all non lifting parts see below
Wwings = actual mass of the wings

Maximum landing mass: 525 kg (1157 lbs.)

Caution: It is recommended to dump the waterballast before landing on airfields. Dump the ballast before an outlanding in any case.

Maximum mass of all
non lifting parts = 250 kg (551 lbs.)
Maximum mass in baggage
compartment = 15 kg (33 lbs.

Caution: Heavy pieces of baggage must be secured to the baggage compartment floor.
The max. mass secured on one half of the floor (left and right of fuselage centre line) should not exceed 7.5 kg (16.5 lbs.).

Maximum waterballast
in the wings = 120 kg (265 lbs.) or 174 kg (384 lbs.)
(see section 7.10)
in the tail fin tank = 6.2 kg (13.7 lbs.)
The max. take-off weight is not to be exceeded.

Warning: Follow the loading procedures see sect. 6.

2.5 **Centre of gravity**

Centre of gravity range in flight is:

210 mm (8.27 in.) up to 350 mm (13.78 in.) behind datum.

datum = wing leading edge at the rootrib

reference line = aft fuselage centre line horizontal

C.G. diagrams and loading chart see sect.6.

2.5 Approved manoeuvres

This sailplane is certified for normal gliding in the "Utility" category.
Simple aerobatics are approved but only without waterballast.
The following aerobatic manoeuvres are approved see sect. 4.5.8:

Manoeuvre	recommended entry speed IAS km/h	kts.
Spins	/	/
Inside Loop	180	97
Stall Turn	180	97
Lazy Eight	180	97
Chandelle	180	97

2.7 Manoeuvring load factors

The following load factors are not to be exceeded:

Airbrakes retracted:

at manoeuvring speed VA + 5.3 -2.65
at max. speed VNE + 4.0 -1.5

Airbrakes extended:

at max. speed VNE + 3,5
Wingflaps landing setting at VFE= 150 km/h (81kts.) +4.0

2.8 Flight crew

max. load in the seat 110 kg 242 lbs.
min. load in the seat see placard in cockpit and weighing report page 6.5

With these loads, the C.G. range given under 2.5 will be kept in the limits if the empty weight C.G. is in its limits.
see loading chart in sect. 6.

Caution:

1. With lower pilot weights the necessary lead ballast must be added to the seat. Ballast put on the seat (lead ballast cushion) must be fastened at the safety belt anchorage points. Installation for removable trim ballast see sect. 7.13.1.

2. If the DG-800S is equipped with a provision to install a battery in the fin (Option) the battery (mass 4.3 kg (9.5 lbs.)) can be taken out and another battery be installed in the baggage compartment. This lowers the min. cockpit load by 20 kg (44 lbs.).

Note: For Australia the min. load in the cockpit should not exceed 66 kg (146 lbs.). A provision for removable ballast see sect. 7.13.1 is mandatory.

2.9 Kinds of operation

A) **With waterballast**
1. Flights according to VFR (daylight)
2. Aerotow
3. Winch- and auto-launching

B) **Only without waterballast**
1. Cloud flying (daylight): permitted when properly instrumented (see below).
2. Simple aerobatics see sect. 4.5.8.

Note: Cloud flying is not permitted in the USA, Canada and Australia.

2.10 Minimum equipment

As minimum equipment only the instruments and equipment specified in the equipment list (see maintenance manual sect. 6) are admissible.
Note: The actual equipment list is filed in the enclosures of the maintenance manual.

a) **Normal operation**

Airspeed indicator
Range: 0-300 km/h (0-165 kts.)
Speed range markings see sect. 2.3
Altimeter
Altimeter with fine range pointer, 1 turn max. 1000 m (3000 ft.)
Magnetic compass (compensated in the aircraft, only required in Canada)
Four piece symmetrical safety harness
VHF - transceiver (ready for operation)
Parachute automatic or manual type or a hard back cushion approximately 8 cm (3 in.) thick.
Required placards, check lists and this flight manual
Outside air temperature gauge with probe in the ventilation inlet in the fuselage nose. Marking blue for temperatures below 2°C, (36°F).

b) **In addition for cloud flying** (Not permitted in the USA, Canada and Australia)
Variometer
Turn and bank
Remark: Experience has shown that the installed airspeed indicator system may be used for cloud flying.
Caution: The weight of the instrument panel shall not exceed 5.4 kg (11.9 lbs.).

2.11 Aerotow, winch and autotow launching

2.11.1 **Weak links** max. 6800 N (1500 lbs.)
recommended 6000 N ± 10% (1320 lbs. ± 10%)

2.11.2 **Length of the towing cable**
for aerotow 30-70 m (100 - 230 ft)
Material: hemp- or plastic fibres

2.11.3 **Max. towing speeds**

Aerotow	VT = 190 km/h, 103 kts.
Winch- and autotow	VW = 150 km/h, 81 kts.

2.11.4 **Tow Release**
The C.G. tow release (installed in front of the main wheel) is suitable for winch- auto launching and aerotow.
Caution: If an additional front hook is installed (below the instrument console) it is to be used only for aerotow.
Note: The front hook is mandatory for Australia.

2.12. Crosswinds

The maximum crosswind component according to the airworthiness requirements for take-off and landing is 15 km/h (8 kts.).

2.13 Tyre Pressure

Main wheel	3.3 bar	(48 psi)
Tail wheel	2.0 bar	(28 psi)

2.14 Waterballast

2.14.1 Wing tanks
Filling the water ballast is only allowed with a filling system which enables to determine the exact amount of ballast filled in, e.g. water gauge or calibrated canisters.
Only symmetrical loading is allowed.
After filling balance the wings by dumping enough water from the heavy wing.
It is not allowed to fly with leaking watertanks, as this may result in an asymmetrical loading condition.
Warning: Follow the loading chart, see sect. 6.8.
The max. take off weight is not to be exceeded.

2.14.2 **Fin tank**

Warning: As it is dangerous to fly with empty wing tanks while ballast is resting in the fin, **it is prohibited to fill water into the fin tank if there is any risk of icing.** The flight conditions must comply with the following table.

min. ground	°C	13.5	17	24	31	38
temperature	°F	56	63	75	88	100
max. flight	m	1500	2000	3000	4000	5000
altitude	ft	5000	6500	10000	13000	16500

In addition the outside air temperature gauge is to watch. The OAT should not be lower than 2°C (36°F)!

2.15 **Limitations placards**

DG Flugzeugbau GmbH

type: DG 800S year of construction

serial no: 8-

Maximum airspeeds	km/h	kts.
Winch launch	150	81
Aero-tow	190	103
Manoeuvring V_A	190	103
Rough air	190	103
Max. flap extended speed +13° +10 +5°	190	103
Landing gear operating	190	103
Maximum speed V_{NE}	270	146
Max. flap extended speed L	150	81

Approved aerobatic manoeuvres (only without waterballast):
pos. Loop, Stall Turn, Chandelle, Spin

Maximum mass: 525 kg (1157 lb.)

Loading chart

Cockpit load (parachute included)

maximum	110 kg	242 lbs.	
minimum	kg	lbs.	battery in baggage compartment
minimum	kg	lbs.	battery in fin

Gepäck max. 15 kg
Baggage max. 33 lbs.

Pre-flight inspection
1. Lead ballast (for under weight pilot)?
2. Fin ballast tank emptied or correct amount filled in ?
3. Battery in the fin ?
4. Parachute worn properly ?
5. Safety harness buckled ?
6. Seat back and pedals adjusted ?
7. All controls and knobs in reach ?
8. Altimeter ?
9. Dive brakes cycled and locked ?
10. Wing flaps in take off position ?
11. Positive control check ? (One person at the control surfaces).
12. Trim ?
13. Canopy locked ?

Sollbruchstelle max. 6800 N
Rated load max. 1500

Reifendruck 3,3 bar
Tyre pressure 48 psi
main wheel

Reifendruck 2 bar
Tyre pressure 29 psi
tailwheel

limits for use of the waterballast tank

minimum ground temperature	°C	13.5	17	24	31	38
	°F	56	63	75	88	100
maximum flight altitude	m	1500	2000	3000	4000	5000
	ft.	5000	6500	10000	13000	16500

Alt.	m	0-2000	3000	4000	5000	6000
VNE	km/h	270	256	243	230	218
Alt.	ft	0-6600	10000	13000	16000	20000
VNE	kts.	146	138	131	124	117

Other cockpit placards see sect. 7.

3. Emergency procedures

3.1 Introduction

Section 3 provides a checklist and amplification for coping with emergencies that may occur. Emergency situations can be minimized by proper pre-flight inspections and maintenance.

3.2 Canopy jettison

To bail out open the red canopy emergency release handle. The white canopy opening handle will be opened automatically. A hook at the rear canopy lock will be rotated underneath the fuselage part of the canopy frame. Because of the hook the canopy will rotate about this point to leave the fuselage in a fast and safe way. The canopy will be opened by a spring and blown away by the oncoming air. If necessary, you have to push the canopy upwards with both hands on the Plexiglas.

3.3 Bailing out

First jettison the canopy, then unlock the safety harness and bail out. The low walls of the cockpit allow for a quick push-off exit.

3.4 Stall recovery

Easing the stick forward and picking up a dropping wing with sufficient opposite rudder the glider can be recovered from the stall.
To recognise and prevent the stall, please refer to sect. 4.5.2.

3.5 Spin Recovery

Apply full opposite rudder against direction of the spin.
Then ease stick forward until the rotation ceases, at aft C.G. positions at which the glider spins with the nose up, it is necessary to apply full stick forward.
Centralise the controls and carefully pull out of the dive.

The ailerons should be kept neutral during recovery.

Caution: To prevent unintentional spinning do not stall the sailplane. Fly with enough speed reserve especially in gusty conditions and in the landing pattern.

Intended spins with waterballast are not permitted.

Height loss during recovery	up to	m	150
		ft	500
max. speed during recovery		km/h	190
		kts.	103

3.6 Spiral dive recovery

Apply rudder and aileron in opposite direction and carefully pull out of the dive.

Spiral dive occurs only when spinning more than 3 turns with medium C.G. positions, see sect. 4.5.8.

To prevent spiral dives intentional spinning should only be executed at aft C.G. positions.

Recovery from unintentional spinning should be done immediately.

3.7 Recovery from unintentional cloud flying

Spins are not to be used to loose altitude. In an emergency, pull out the dive brakes fully before exceeding a speed of 200 km/h and fly with max. 200 km/h (108 kts.) until leaving the cloud.
At higher speeds up to VNE, pull out the dive brakes very carefully because of high aerodynamic and g-loads.

3.8 Flight with asymmetric waterballast

If you suspect that the waterballast does not dump symmetrically you have to close the dump valves of the wingtanks immediately, to avoid greater asymmetry.

Asymmetry can be verified by the necessary aileron deflection in straight flight at low airspeeds.

When flying with asymmetric waterballast you have to increase the airspeed, especially in turns, so that you can avoid a stall at all costs.

If the aircraft does enter a spin though, you have to push the stick forward clearly during recovery.

Fly the landing pattern and touch down appr. 10 km/h (6 kts.) faster than usually and after touch down control carefully the bank angle to avoid the wing touching the ground too early.

3.9 Emergency wheel up landing

It is not recommended to execute a wheel up emergency landing, as the energy absorption capability of the fuselage is much smaller than that of the landing gear. If the landing gear can't be extended use wing flap setting L and touch down with small angle of attack.

3.10 Emergency ground loop

If there is the risk of overshooting the landing strip you have to decide at least 40 m (130 ft) before the end of the field to execute a controlled ground loop. If possible turn into the wind, lift the tail by pushing the stick forward.

3.11 Emergency landing on water

From the experience with emergency water landing we know, that it is likely that the sailplane will dive into the water, cockpit first.

Therefore an emergency landing on water should be the last choice.
In the case of a water landing, however, extend the landing gear.

Section 4

4. Normal procedures

4.1 Introduction

4.2 Rigging and derigging, filling the watertanks,

4.2.1 Rigging
4.2.2 Filling the watertanks
4.2.3 Filling the fin watertank
4.2.4 Derigging
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4.3 Daily Inspection

4.4 Pre-flight Inspection

4.5 Normal procedures and recommended speeds

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4.5.2 Free flight
4.5.3 Approach and landing
4.5.4 Flight with waterballast
4.5.5 Flight at high altitude and at low temperatures
4.5.6 Flight in rain
4.5.7 Cloud flying
4.5.8 Aerobatics

4.1 Introduction

Section 4 provides checklist and amplification procedures for the conduct of normal operation. Normal procedures associated with optional systems can be found in section 9.

4.2 Rigging and derigging, filling the watertanks,

4.2.1 Rigging

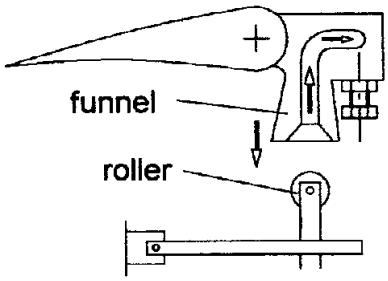
1. Open the canopy.

2. Clean and lube the pins, bushings and the control connections.

3. With a helper on the wingtip, push the right wing into place, then the left wing. All controls will hook up automatically. The flaperons should be held at neutral for rigging, airbrakes locked.
   Sight through the wing main pin bushings to determine alignment. Push the main pins in as far as possible. Turn the handles up to the fuselage wall, while pulling out the white securing knob, then release the knob back to its locked position.

4. Rigging of the stabilizer
   Set the trim **nose down.**
   Set the stabilizer on top of the vertical fin, so that the roller at the fuselage side push rod is inserted into the funnel at the elevator.

   Watch carefully the procedure.

   When the stabilizer is set down and laying on the fin, push it aft. The roller will slide forward in the funnel if you hold the elevator in the pertinent position.
   With a 13 mm wrench (supplied with your glider) tighten the front mounting bolt firmly (the brass securing sleeve will be pushed down by the wrench). Then rotate the bolt head a little back and forth so that the securing sleeve engages.
   The securing sleeve should move up so far, that its upper surface is even with the upper surface of the bolt head.

Check for correct elevator connection by looking through the Plexiglas window at the upper surface of the stabilizer.

5. Tape the gaps of the wing-fuselage junction.
6. Positive control check.

4.2.2 **Filling the watertanks**

First open the handle for the fin tank and then pull back the handle for the right tank (top handle). Place the right wing tip on the ground. Attach the hose in the water outlet on the lower surface of the wing. Fill with water. Close the valve. Place the left wing tip to the ground and fill the left tank accordingly. Filling with water ballast is only allowed with a filling system which enables you to determine the exact amount of ballast filled in, e.g. water gauge or calibrated canisters.

Warning: Fill the hose from your water containers but never from a mains pressure water supply. Filling the wing tanks with excessive pressure (more than 0.2 bar, 3 psi) will definitely burst the wing shell!

Caution: If the tanks are to be filled up completely you must suck the air out of the tanks with the filling hose.

Fill with the desired amount of water regarding the loading chart see sect. 6.
In case a valve leaks slightly, you may try to pull out the PVC pushrod of the valve to stop the leak. If this cannot be done successfully refer to maintenance manual 1.8.2. and 4.1. It is not allowed to fly with leaking watertanks, as this may result in asymmetrical loading condition. After filling the tanks, check to see if the wings are balanced. If one wing is heavier, dump enough water to balance the wings.

Warning: Follow the loading charts in section 6.8. The max. T.O.W. is not to be exceeded.

4.2.3 **Filling the fin waterballast tank**

Determine the amount see sect. 6.
Connect the transparent plastic filling hose via the hose connector GS 12 to the hose which comes out of the left rear end of the fuselage.

The funnel can be suspended at the top of the rudder (Filling hose with connector and funnel are supplied with the aircraft).
Fill with clean water using a graduated measuring vessel.

In addition, the loaded quantity can be checked by holding the filling hose to the scale at the fin (communicating tube).

After filling, push the fin tank dump lever in forward direction (the dump valve will be closed by a spring).

Then remove the filling hose with the hose connector.

4.2.4 **Derigging**

Derigging follows the reverse of rigging. Water ballast must be dumped before derigging.
The airbrakes must be locked.

4.2.5 **Rigging and derigging the wing tip extensions (Option)**

1. Insert the wing tip extensions into the wing.
   Press in the locking pin with your finger.
   Insert the wing tip as far as the flaperon connector starts to slide into the flaperon slot.
   Strike firmly with the palm of your hand on to the wing tip to lock in the wing tip extension.
2. Disassembling of the wing tip
   Use a diameter 6 mm pin for pressing in the locking pin on the wings upper side.
3. The rigging of the 15 m wingtips winglets (Option) has to be done analogous to the wing tip extensions.

4.3 Daily Inspection

Please keep in mind the importance of the inspection after rigging the glider and respectively each day prior to the first take off. It is for your safety.

Caution: After a heavy landing or if other high loads have been subjected to your sailplane, you must execute a complete inspection referring to maintenance manual sect. 2.3 prior to the next take off.
If you detect any damage, don't operate your sailplane before the damage is repaired. If the maintenance- and repair manual don't give adequate information, please contact the manufacturer.

A Inspection prior to rigging

1. Wing roots and spar ends
   a) check for cracks, delaminations etc.
   b) check the bushes and their glued connection in the root ribs and in the spar ends for wear
   c) check the control hook ups at the rootrib for wear and corrosion
   d) check the strings which hold the waterbags for sufficient tension (see maintenance manual sect. 4.1)
   e) Check the watertank compartment for water leaks

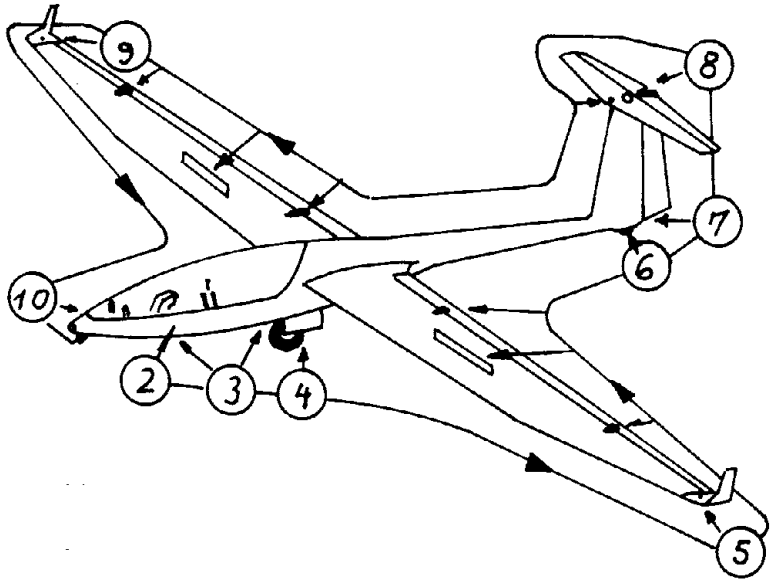
2. Fuselage at wing connection
   a) check the lift pins for wear and corrosion
   b) check the control hook ups including the waterdumpsystem for wear and corrosion

3. Top of the vertical fin
   a) Check the mounting points of the horizontal tailplane and the elevator control hook up for wear and corrosion
   b) Check if a battery is installed in the fin. In this case the loading chart (section 6) must be followed.

4. Horizontal tailplane
   Check the mounting points and the elevator control hook up for wear and corrosion

5. Rigging points for the insertable wing tips (Option)
   a) check the bushes and their glued connection at the inner wing panels for wear and corrosion
   b) check the lift pins and their glued connection at the insertable wing tips for wear and corrosion, and check the securing bolt for sufficient spring force.

B Inspection after rigging. Walk around the aircraft



1. All parts of the airframe
   a) check for flaws such as bubbles, holes, bumps and cracks in the surface
   b) check leading -and trailing edges of the wings and control surfaces for cracks
   2. Cockpit area
   a) check the canopy locking mechanism
   b) check the canopy emergency release see sect. 7.12 (not each day, but min. every 3 month)
   c) check the main pin securing
   d) check all controls for wear and function, incl. positive control check
   e) check the tow release system for wear and function incl. cable release check
   f) check for foreign objects
   g) check the instrumentation and radio for wear and function
   h) check if the correct battery is installed, secured and connected

3. Tow hooks
   a) check the ring muzzle of the C.G. hook for wear and function
   b) check both hooks (if installed) for cleanliness and corrosion
   4. Main landing gear
   a) check the struts, the gear box, the gear doors and the tyre for wear; dirt in the front strut can hinder the landing gear from locking over centre the next time!
   b) check the tyre pressure (3.3 bar, 48 psi)!
   c) check wheel brake and cable for wear and function

5. Left wing
   a) check locking of the wing tip (option)
   b) check flaperon for excessive free play
   c) check drives on the flaperons for tight screwed connection
   d) check airbrake- and box and control rod for wear and free play. It must be possible to retract the airbrake, even if it is pressed rearwards. If there is any water in the airbrake box this has to be removed.

6. Tail wheel
   a) check for wear, free play and excessive dirt in the wheel box. Remove excessive dirt prior to take off!
   b) check tyre pressure (2 bar, 29 psi)

7. Rear end of the fuselage
   a) check the lower rudder hinge and the connection of the rudder cables for wear, free play and correct securing
   c) check the fin tank for correct amount of water filled in (see sect. 4.2.3). In case of doubt dump the fin tank.
   b) check the bulkhead and fin trailing edge shear web for cracks delamination

8. Fin - horizontal tail
   a) check the upper rudder hinge for wear and free play
   b) check the elevator for free play and correct control hook up, look through the Plexiglas window
   c) check the securing of the front mounting bolt
   d) check the horizontal tail for free play
   e) check the TE or Multiprobe for correct insertion and taping

9. Right wing
   see detail 5.

10. Fuselage nose
    a) check the ports for the static pressure and the pitot pressure for cleanliness
    b) if the sailplane was parked in rain, you have to empty the static ports by sucking out the water at the ports.

4.4 **Pre-flight inspection**

1. Lead ballast (for under weight pilot)?

2. Fin ballast tank emptied or correct amount filled in?

3. Battery in the fin?
   Loading chart regarded?

4. Parachute worn properly?

5. Safety harness buckled?

6. Seat back and pedals adjusted?

7. All controls and knobs in reach?

8. Altimeter?

9. Dive brakes cycled and locked?

10. Wing flaps in initial take off position?

11. Positive control check? (One person at the control surfaces).

12. Trim?

13. Canopy locked?

4.5 Normal procedures and recommended speeds

4.5.1 Tow launch

Due to the towhook position in the middle of the fuselage (underside) and due to the excellent effectiveness of the ailerons and rudder, the possibility of wing dropping or ground loops, even on a slow starting aerotow is reduced. Take-off with strong crosswind is possible.

Aerotow

a) If only a C.G. release is installed, then the aerotow is to be executed with this release.
Set the trim full nose down for aerotow.

b) **Caution:**
If an additional tow release for aerotow is installed, only this release should be used for aerotow. Adjust the trim for aerotow to fully nose down position.

c) General: Set the wing flaps to +13°.
Hold the stick in the forward position.
Don't try to lift off before you reach an airspeed of 80 km/h (43 kts.) (without ballast).
On a rough airfield hold the control stick tight. The undercarriage can be retracted at safety height during the tow.

Normal towing speed is 120-130 km/h (65-70 kts.).

For a cross country tow the speed can be as high as 190 km/h (103 kts.), the flaps should be at a negative setting. (see sect. 4.5.2).

Warning: Aerotow with high take off weight requires a powerful tow plane.

Many tow planes are not certified to tow gliders with high take off weights. Reduce the take off weight if necessary!

Winch launch (only allowed at the C.G. release)

Set the wing flaps to +13°.
Set the trim nose down for a winch launch. Use the normal winch launch procedure.

After reaching 60 m (200 ft) gradually pull back on the stick so that the glider will not pick up excessive speed.

After reaching release altitude pull the tow release knob.

The recommended winch launch airspeed is 110-120 km/h (60-65 kts.).

Caution: Don't fly with less than 90 km/h (49 kts.)
and not more than 150 km/h (81 kts.).

Note: Winch launch with high take off weight requires a powerful winch!

4.5.2 Free flight

Stalling characteristics (level and turning flight)

When stalled with flap setting neutral or negative the DG-800S will continue to fly level.
If the stick should be pulled further the DG-800S will drop the nose or one wing.
During the stall a large angle of attack will be reached.
At positive flap settings the DG-800S will stall over one wing.
When reaching the minimum speed, the angle of attack has to be increased remarkably, before the DG-800S stalls so that the stalled flight is easy to recognize.

With a little stick forward and opposite rudder the DG-800S can be recovered without much loss of height. Rain does not influence this behaviour noticeably. The loss of height is appr.30m(100ft) if recovered immediately.
Stall airspeeds see sect. 5.2.2.

Caution: Flights in conditions conducive to lightning strikes must be avoided.

Wing flap settings

Optimal settings depending on the wing loading see sect. 5.3.2.

High speed flying

Flap settings 0°, -5°, -9°
The parallelogram control stick reduces the possibility of pilot induced oscillations.
The DG-800S can be trimmed almost up to high speeds.
Nevertheless don't release the stick at any time.
Do not exceed the max. airspeeds. (see sect. 2.2!)

Thermalling
Flap setting: + 10°.
+ 13° for narrow thermals
Thanks to the long fuselage, the DG-800S is directionally very stable.
Uneven lift can be optimized because of the excellent roll rate.

4.5.3 **Approach and landing**

It is recommended to dump the waterballast before landing on airfields. Dump the ballast before an outlanding in any case.
Abeam the landing point extend the landing gear and set the wing flap to 13° or L.
In calm weather approach with ca. 96 km/h (52 kts.) (ballast dumped!). With strong wind fly faster!

The very effective Schempp-Hirth dive brakes make a short landing possible.

While slipping, the rudder is sucked in its displaced position. So it is recommended to practice slipping at a higher altitude.

Strong crosswind offers no problem.
Do not approach too slowly with fully extended airbrakes otherwise the aircraft may drop during flare out.
When flaring out keep the airbrake setting you were using, opening them further may drop the sailplane.
You can land the DG-800S on soft fields with the landing gear extended, as there is no tendency of nosing over, if the stick is pulled backwards.
During ground roll the wing flaps may be kept in the landing position.
Clean the landing gear and tow release after landing in a muddy field. Dirt in the front strut can keep the landing gear from locking over centre next time. Simply hosing with water is the best cleaning method.

Landing with the landing gear retracted:
Wheel up landing is not recommended see emergency procedures sect. 3.9..

After wheel up landing check the fuselage belly and the tow hook for damage.

Landing with asymmetric waterballast
See emergency procedures sect. 3.8.

4.5.4 Flight with water ballast

Wing tanks

Recommended ballast for smooth thermals:

rate of climb			ballast
m/s	fpm	kts.	lt. U.S. gallons
below 1	200	2	none
1 - 2	200- 400	2- 4	60 16
2 - 4	400- 800	4- 8	120 32
more than 4	800	8	max. ballast

Do not exceed the maximum gross weight when loading the water ballast. The maximum quantity of water allowed is dependent on the empty weight and the cockpit load (s.sect.6).
In flight, the water drains at approx.0.5ltr./sec. (1.1 lbs./sec).

Fin tank

For optimal thermalling performance and handling, waterballast in the fintank should be used to compensate the forward move of C.G. due to the water ballast in the wings. Please refer to the loading chart in sect. 6.

Warning:

It is prohibited to use the fin tank in icing conditions see sect. 2.14 !
If there is the risk of freezing, dump all water before you reach freezing altitude or descend to lower altitudes.
If you suspect a tank is leaking, dump all water immediately.
Water ballast raises the approach speed, so it is recommended to dump the waterballast before landing. Dump the ballast before an outlanding in any case.

Filling the waterballast see sect. 4.2

After filling level the wings and check if the dump valves are tight. It is not allowed to fly with leaking watertanks as this may result in an asymmetric loading condition.

Dumping of the waterballast

First open the fin ballast tank lever, then open both wing ballast tanks together. Do not empty one wing tank after the other, to avoid an asymmetric loading condition.

Valves leaking, servicing

Please refer to the maintenance manual sect. 1.8 and 4.1.

4.5.5 **Flight at high altitude and at low temperatures**

With temperatures below 0°C (32°F) for instance when wave flying or flying in winter, it is possible that the control circuits could become stiffer. Special care should be taken to ensure that there is no moisture on any section of the control circuits to minimize the possibility of freeze up. It could be advantageous to apply Vaseline along all the edges of the airbrake cover plates to minimize the possibility of freezing closed.

Apply the controls in short periods.
It is not allowed to carry waterballast.

Caution:

1. At temperatures below -20°C (-4°F) there is the risk of cracking the gelcoat.
2. Attention must be paid to the fact at higher altitudes the true airspeed is greater than the indicated airspeed.
   The max. speed VNE is reduced. See the following table:

Altitude in meters	0-2000	3000	4000	5000	6000
VNE IAS km/h	270	256	243	230	218

Altitude in ft.	0-6600	10000	13000	16000	20000
VNE IAS kts.	146	138	131	124	117

3. Dump the water ballast before you reach freezing altitude at +2°C (36°F) or descend to lower altitudes.
4. Do not fly below 0° (32°F) when your glider is wet (e.g. after rain).

4.5.6 **Flight in rain**

With light rain the stall speed and the sink rate increases slightly and the approach speed has to be increased.

4.5.7 **Cloud flying**

(not permitted with waterballast)
Take care to fly smoothly and coordinated. It is prohibited to use a spin as a method for loosing altitude in the clouds. In case of emergency, pull out the dive brakes fully before exceeding a speed of 200 km/h and dive at 200 km/h (108 kts.) to leave the cloud.

4.5.8 **Aerobatics**

Permissible only without ballast in the wings

Execute only the approved manoeuvres. At the recommended entry airspeeds there is no need to pull up abruptly, unnecessarily stressing the aircraft. The following manoeuvres are easy to execute. Wing flap setting for all manoeuvres 0°.

Approved manoeuvres

1. Spins	/		
2. Inside Loop	Entry Speed	180 km/h	(97 kts.)
3. Stall turn	Entry Speed	180 km/h	(97 kts.)
4. Chandelle	Entry Speed	180 km/h	(97 kts.)
5. Lazy Eight	Entry Speed	180 km/h	(97 kts.)

Spins:

Caution: Continuous spinning is best at **aft C.G. positions** 330-350 mm (13.0 - 13.8 in) behind datum.

It is not necessary to extend the dive brakes during spin recovery. The DG-800S shows a large nose down pitch after leaving spin if you are spinning more than 2 turns. So you have to flare out correspondingly.

With **forward C.G. position** the DG-800S will not remain in a spin. The DG-800S will recover after 1-2 turns (depending on C.G. position). As the nose down pitch and the airspeed will be high with this C.G. position spinning should not be executed.

At **medium C.G. position** there is a tendency that the spin will turn into a spiral dive after 3 turns. Reaching this state you have to recover immediately. The spiral dive tendency can be avoided if you deflect the aileron into the direction of the spin when inducing the spin.

Inducing the spin: (Normal procedure)

Gradually bring the sailplane into a stall. When it starts to burble, pull the stick back completely and kick in full rudder in the spin direction.

Recovering from the spin:

Apply full opposite rudder against direction of the spin. Then ease stick forward until the rotation ceases. At aft C.G. positions at which the glider spins with the nose up, it is necessary to apply full stick forward. Centralize the controls and carefully pull out of the dive.

The ailerons should be kept neutral during recovery.

Height loss during recovery is up to 150 m (490 ft), the max. speed is 190 km /h (103 kts.).

Stall-turn

To fly a stall-turn safely, please proceed as follows:

After reaching the entry speed pull back the stick quickly, but not abruptly. During the pull out, shortly before reaching the vertical flight path initiate rotation with the rudder. Push the rudder quickly, but not abruptly. Also, at the highest point of the turn, the glider should still have a positive airspeed above stalling speed.

Be careful not to exceed the airspeed for max. control surface deflection as indicated in section 2.2.

When reaching the vertical dive, flare out immediately to minimize speed increase and g-load.

Caution:
A classical stall-turn with almost no airspeed at the highest point of the turn is very difficult to fly with a glider with larger wingspan, due to the high moment of inertia.

This effect is taken into account when using the above mentioned procedure.

Warning:
If the rudder is pushed too late and the rotation is insufficient, it is possible that the glider tailslides (falls tailwards).
If this happens, it is important to hold all controls firmly, preferably at one of the stops, until the nose swings down. Then flare out immediately.

5. Performance

5.1 Introduction

5.2 **Approved Data**

5.2.1 Airspeed indicator system calibration

5.2.2 Stall speeds

5.3 **Additional Information**

5.3.1 Demonstrated crosswind performance

5.3.2 Gliding performance

5.3.3 Flight Polar

5.3.4 Operating the wingflaps

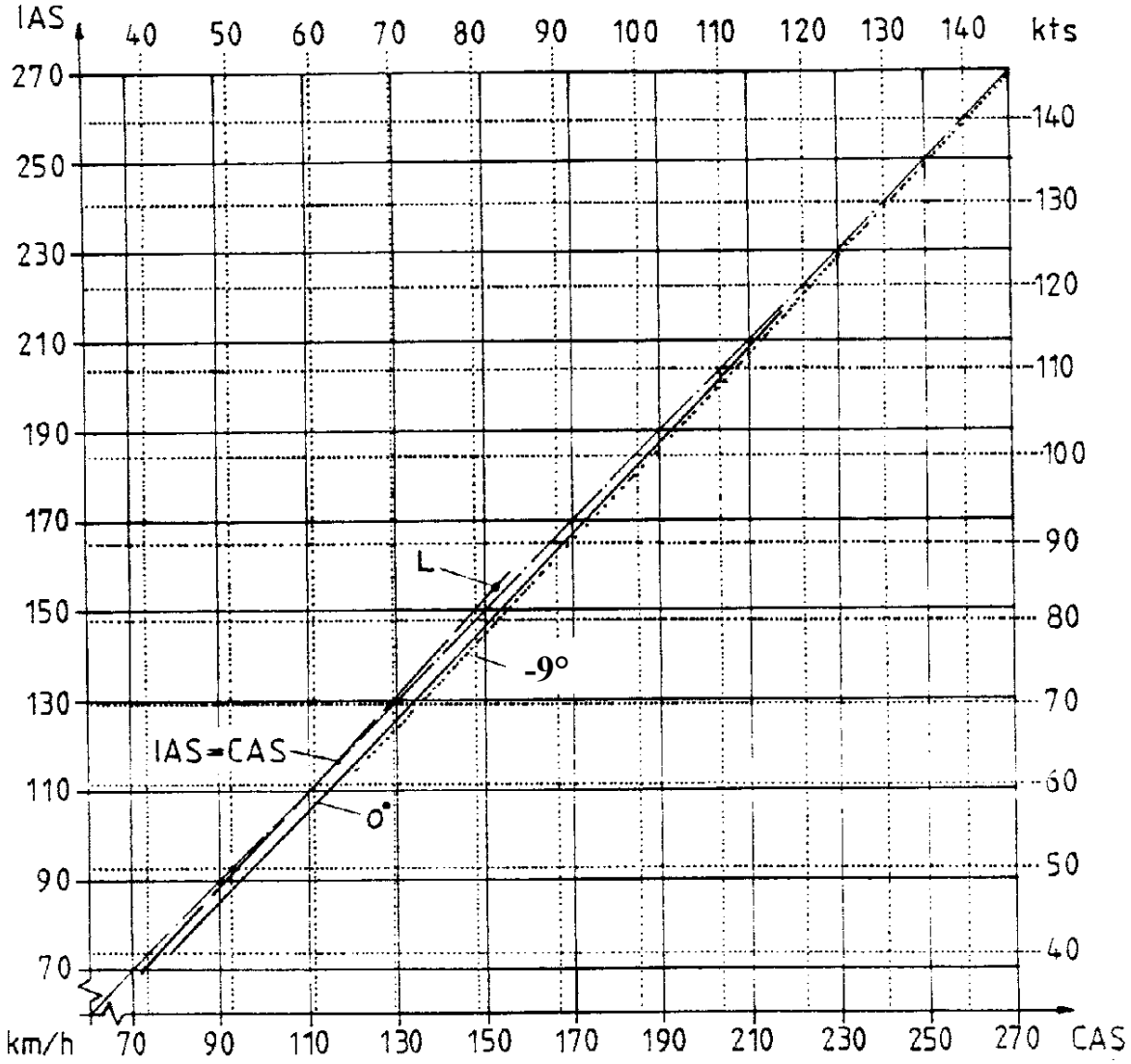
5.1 **Introduction**

Section 5 provides approved data for airspeed calibration, stall speeds and take-off performance and non-approved additional information.

The data in the charts has been computed from actual flight tests with the sailplane in good and clean condition and using average piloting techniques.

5.2 **Approved data**

5.2.1 **Airspeed indicator system calibration**



IAS= indicated airspeed
CAS= calibrated airspeed
Caution: The airspeed indicator is to be connected to the front static ports and the pitot probe in the fuselage nose.

5.2.2 **Stall speeds**

Min. airspeed in level flight.

wing span 18 m
Airbrakes retracted

Flap	weight						
setting	340	370	400	440	480	525	kg
	750	816	882	970	1058	1157	lbs.
L	61	63	66	69	72	76	km/h
	33	34	36	37	39	41	kts.
+13°	62	64	67	70	73	77	km/h
	33	35	36	38	39	42	kts.
0°	67	70	73	76	79	84	km/h
	36	38	39	41	43	46	kts.
-9°	71	74	77	80	84	88	km/h
	38	40	42	43	45	48	kts.

Airbrakes extended

Flap	weight						
setting	340	370	400	440	480	525	kg
	750	816	882	970	1058	1157	lbs.
L	67	70	73	76	80	84	km/h
	36	38	39	41	43	45	kts.
+13°	67	70	73	76	80	84	km/h
	36	38	39	41	43	45	kts.
0°	73	76	79	82	85	90	km/h
	39	41	43	44	46	49	kts.
-9°	75	78	82	86	89	94	km/h
	41	42	44	46	48	51	kts.

5.2.2 cont.

wing span 15 m
Airbrakes retracted

Flap setting	weight 340	370	400	440	480	525	kg
	750	816	882	970	1058	1157	lbs.
L	64	67	69	73	76	79	km/h
	35	36	37	39	41	43	kts.
+13°	65	68	70	74	77	81	km/h
	35	37	38	40	42	44	kts.
0°	71	74	76	80	84	87	km/h
	38	40	41	43	45	47	kts.
-9°	74	78	81	85	88	92	km/h
	40	42	44	46	48	50	kts.

Airbrakes extended

Flap setting	weight 340	370	400	440	480	525	kg
	750	816	882	970	1058	1157	lbs.
L	71	74	77	80	84	88	km/h
	38	40	42	43	45	48	kts.
+13°	71	74	77	80	84	88	km/h
	38	40	42	43	45	48	kts.
0°	76	80	83	87	90	94	km/h
	41	43	45	47	49	51	kts.
-9°	79	83	86	90	94	98	km/h
	43	45	46	49	51	53	kts.

The loss of height for stall recovery is appr. 30 m (100 ft) if recovered immediately.

5.3 Additional Information

5.3.1 Demonstrated crosswind performance

The demonstrated crosswind velocity is 15 km/h (8 kts.) according to the airworthiness requirements.

5.3.2 Gliding performance

(data evaluated by comparison flights)

Performance data with 15 m span (S = 10.68 m²)

Wing loading	kg/m²	32	35	40	49
	lbs./ft²	6.6	7.2	8.2	10.0
min. sink rate	m/s	.54	.57	.61	.68
	ft/min	106	112	120	134
at V	km/h	73	77	83	92
	kts.	39	42	45	50
best glide ratio	/	44.8	45.0	45.2	45.8
at V	km/h	98	103	110	122
	kts.	53	56	59	66

Performance data with 18 m span (S=11.81 m²)

Wing loading	kg/ m²	30	35	40	44.5
	lbs./ft²	6.1	7.2	8.2	9.1
min. sink rate	m/s	.47	.51	.54	.57
	ft/min	93	100	106	112
at V	km/h	72	77	83	87
	kts.	39	42	45	47
best glide ratio	/	49.8	50	50.2	50.7
at V	km/h	94	102	109	114
	kts.	51	55	59	62

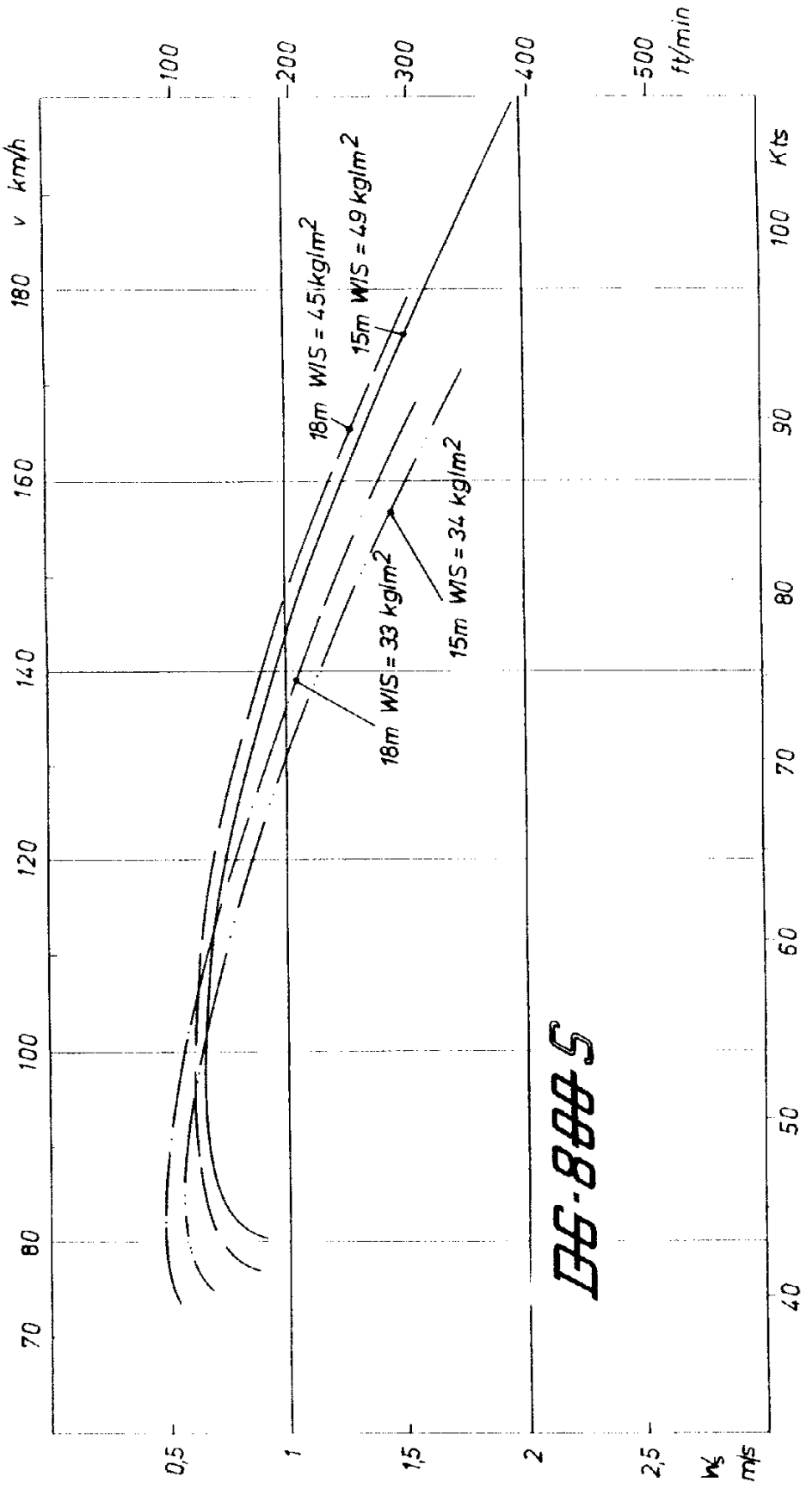
A variation in speed by $\pm$10 km/h (5 kts.) from the above will decrease the best glide angle by 0.5 glide points and increase the min. sink rate by 1 cm/sec. (2 ft/min).

For optimum performance, the aircraft should be flown with a C.G. position between medium and the rear of the allowable range.
However the aircraft will be more pitch sensitive at aft C.G. positions.

The wing fuselage joint and the tailplane locking bolt hole should be taped up and the aircraft thoroughly cleaned to obtain maximum performance.
The polars apply to a "clean" aircraft. With dirty wings or flight in rain, the performance drops accordingly.

Operating the wing flaps see 5.3.4.

5.3.3 **Flight polar**



5.3.4 **Operating the wing flaps**

The following flap settings should be used for optimum performance for the speed ranges and wing loadings specified:

Speeds in km/h
wing span 18 m

mass (kg)	340	370	400	440	480	525
+13°	up to 70	- 73	- 76	- 80	- 84	- 87
+10°	70- 79	73- 83	76- 86	80- 90	84- 94	87- 98
+5°	79- 88	83- 92	86- 95	90-100	94-104	98-109
0°	88- 119	92-124	95-129	100-135	104-141	109-147
-5°	119- 141	124-147	129-153	135-160	141-167	147-175
-9°	141-	147-	153-	160-	167-	175-VNE

wing span 15 m

mass (kg)	340	370	400	440	480	525
+13°	up to 74	- 77	- 80	- 84	- 88	- 92
+10°	74- 83	77- 87	80- 90	84- 94	88- 99	92-103
+5°	83- 92	87- 96	90-100	94-104	99-110	103-115
0°	92- 125	96-130	100-135	104-141	110-149	115-155
-5°	125- 148	130-154	135-160	141-167	149-176	155-183
-9°	148-	154-	160-	167-	176-	183-VNE

Speeds in kts.
wing span 18 m

mass (lbs.)	750	816	880	970	1060	1157
+13°	up to 38	- 39	- 41	- 43	- 45	- 47
+10°	38- 43	39- 45	41- 46	43- 49	45- 51	47- 53
+5°	43- 48	45- 50	46- 51	49- 54	51- 56	53- 59
0°	48- 64	50- 67	51- 70	54- 73	56- 76	59- 79
-5°	64- 76	67- 79	70- 83	73- 86	76- 90	79- 94
-9°	76-	79-	83-	86-	90-	94-VNE

wing span 15 m

mass (lbs.)	750	816	880	970	1060	1157
+13°	up to 40	- 42	- 43	- 45	- 48	- 50
+10°	40- 45	42- 47	43- 49	45- 51	48- 53	50- 56
+5°	45- 50	47- 52	49- 54	51- 56	53- 59	56- 62
0°	50- 67	52- 70	54- 73	56- 76	59- 80	62- 84
-5°	67- 80	70- 83	73- 86	76- 90	80- 95	84- 99
-9°	80-	83-	86-	90-	95-	99-VNE

To accelerate or flatten out, always use flaps and elevator simultaneously. Set the flap earlier in its position for the speeds listed above because flattening out raises the wing loading and speeding up lowers it. The higher the g-loads, set the flaps earlier. Flatten out with 1.5 g or speeding up with 0.5 g changes the optimal speed approximately 15 km/h (8 kts.) at low speeds and 30km/h (16 kts.) at high speeds.

6. Mass (weight) and balance

6.1 Introduction

6.2 Weighing procedures

6.3 Weighing record

6.4 Basic empty mass and C.G.

6.5 Mass of all non-lifting parts

6.6 Max. mass

6.7 Useful loads

6.8 Loading chart

6.9 C.G. calculation

6.1 Introduction

This section contains the payload range within the sailplane may be safely operated. A procedure for calculating the in-flight C.G. is also provided.

A comprehensive list of all equipment available for this sailplane is contained in the maintenance manual.

6.2 Weighing procedures

See maintenance manual DG-800S sect. 5. Datum: Wing leading edge at the rootrib. Reference line: aft fuselage centre line horizontal. If there is a provision to install a battery in the fin the weighing is to be executed with this battery (part No. Z 07, mass 4.3 kg - 9.5 lbs.)

6.3 Weighing record

The result of each C.G. weighing is to be entered on page 6.5. If the min. cockpit load has changed this data is to be entered in the cockpit placard as well. When altering the equipment, the new data can be gathered by a C.G. calculation.(see sect.6.8). The actual equipment list is enclosed in the maintenance manual.

6.4 Basic empty mass and C.G.

Actual data see page 6.5.
With the empty weight C.G. and the cockpit loads in the limits of the diagram on page 6.6, the in-flight C.G. limits will not be exceeded.

6.5 Mass of all non-lifting parts (WNLP)

The max. mass of all non-lifting parts is **250 kg (551 lbs.).**

WNLP is to be determined as follows:
WNLP = WNLP empty + cockpit load (pilot, parachute, baggage, barograph, cameras etc.).
WNLP empty = Total empty weight minus weight of the wings.

Note: With this definition the ballast in the fin tank is not to be counted to WNLP, as ballast in the fin tank is only allowed together with ballast in the wings.

6.6 **Max. mass (weight)**

Maximum Take-off mass: 525 kg, 1157 lbs.

Max. mass without waterballast: W=WNLP + Wwings
WNLP = max. mass of all non lifting parts see 6.5
Wwings = actual mass of the wings

Maximum landing mass: 525 kg, 1157 lbs.

6.7 **Useful loads**

Max. load **without** waterballast = max. weight
without waterballast - empty weight

Max. load **with** waterballast = max. weight
with waterballast - empty weight

The data is recorded on page 6.5.

6.8 Loading chart

Cockpit load see table on page 6.5.
With lower pilot weight necessary ballast must be added in the seat. Ballast put on the seat (lead ballast cushion) must be fastened at the connections of the safety belts.

Removable Ballast (Option) see sect. 7.13.1.

Baggage: max. 15 kg (33 lbs.)
Heavy pieces of baggage must be secured to the baggage compartment floors (screwing to the floors or with belts). Each floor can carry 7.5 kg (16.5 lbs.). The total load in the fuselage must not exceed the max. load without waterballast given in the table on page 6.5.

Waterballast in the wing tanks:
The tanks have a capacity of 60 l (15.85 U.S. gal) or 87 l (23.0 U.S.gal) per wing.

The allowed amount of waterballast
is dependent on the empty weight and of the load in the fuselage and **can be determined from the diagram on page 6.7 "ballast chart".**
It is only allowed to fly with symmetric wing ballast!

Waterballast in the fin tank
should be used to compensate the forward move of C.G. due to the waterballast in the wings. The amount of ballast in the fin is dependent on the amount of water in the wing tanks and to be determined from the diagram on page 6.8. Make sure not to exceed the max. weight of 525 kg (1157 lbs.).

Battery in the fin: (Option) see sect. 7.13.4. Only the factory supplied battery (part No. Z 07, mass 4.3 kg (9.5 lbs.)) is allowed to be used. If the pilot mass is less than the min. cockpit load, the battery may be removed from the fin and another battery installed in the baggage compartment. This lowers the min. cockpit load by 20 kg (44 lbs.).

Weighing report (for 6.3)

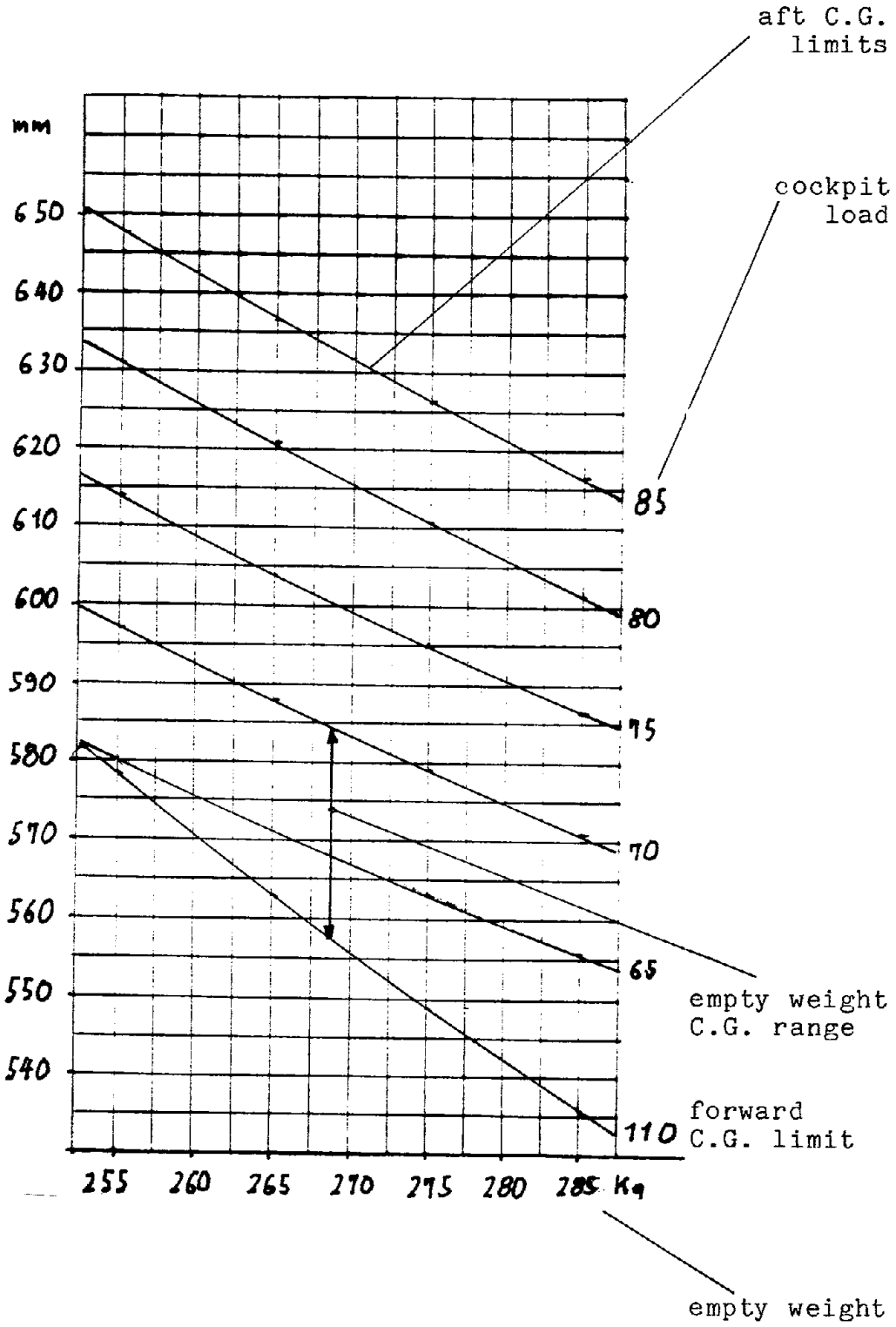
Distances in mm, masses in kg

25.4 mm = 1 inch 1 kg = 2.2046 lbs.

Date of weighing:						
executed by:						
Date of equipment list:						
empty mass 15 m						
18 m						
empty mass C.G. 15 m						
18 m						
max. mass without W.B. 15 m						
18 m						
max. load without W.B. 15 m						
18 m						
max. load with W.B. 15 m						
18 m						
min. cockpit load (with battery in baggage compartment)						
min. cockpit load (with battery (4,3 kg) in the fin))						
max. cockpit load	110					
Inspector signature, stamp						

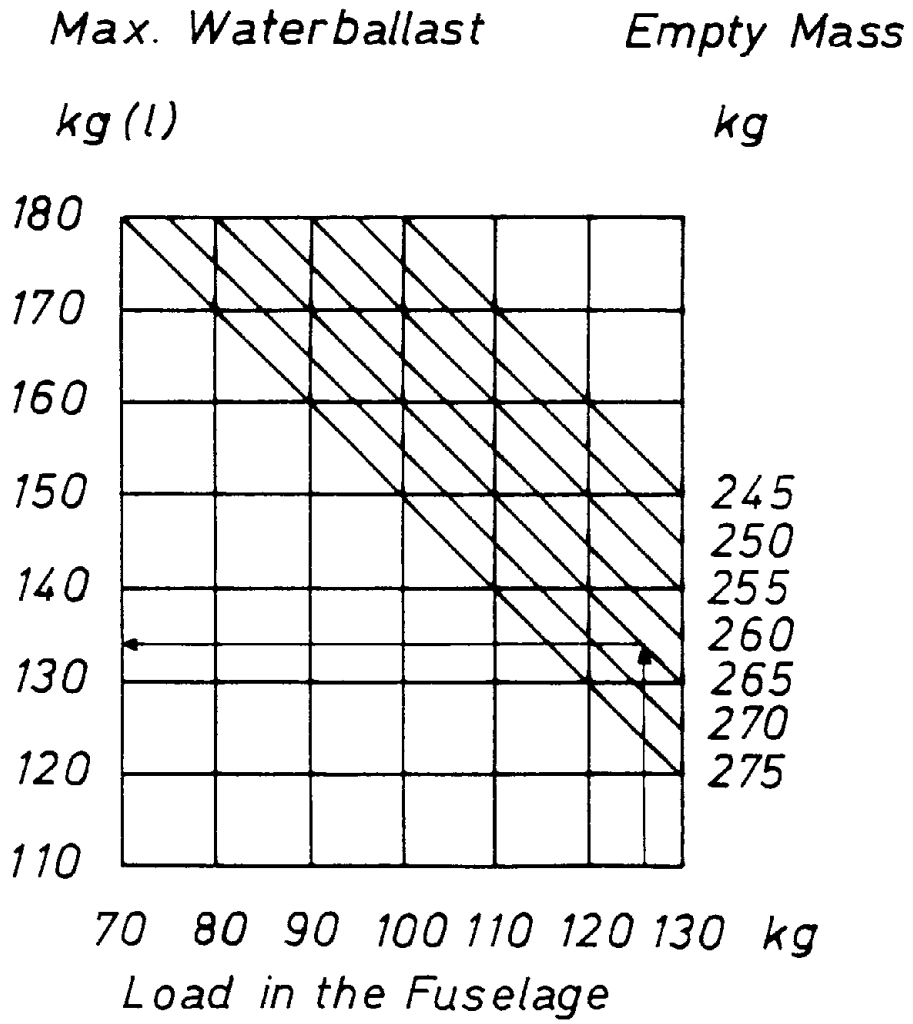
Note: If there is a provision to install a battery in the fin, the weighing is to be executed with this battery (part No. Z 07, mass 4.3 kg - 9.5 lbs.). If there is no battery compartment in the fin, the weighing is to be executed with a battery in the baggage compartment.

for 6.4 **Empty weight C.G. limits**



25.4 mm = 1 in., 1 kg = 2.2046 lbs.

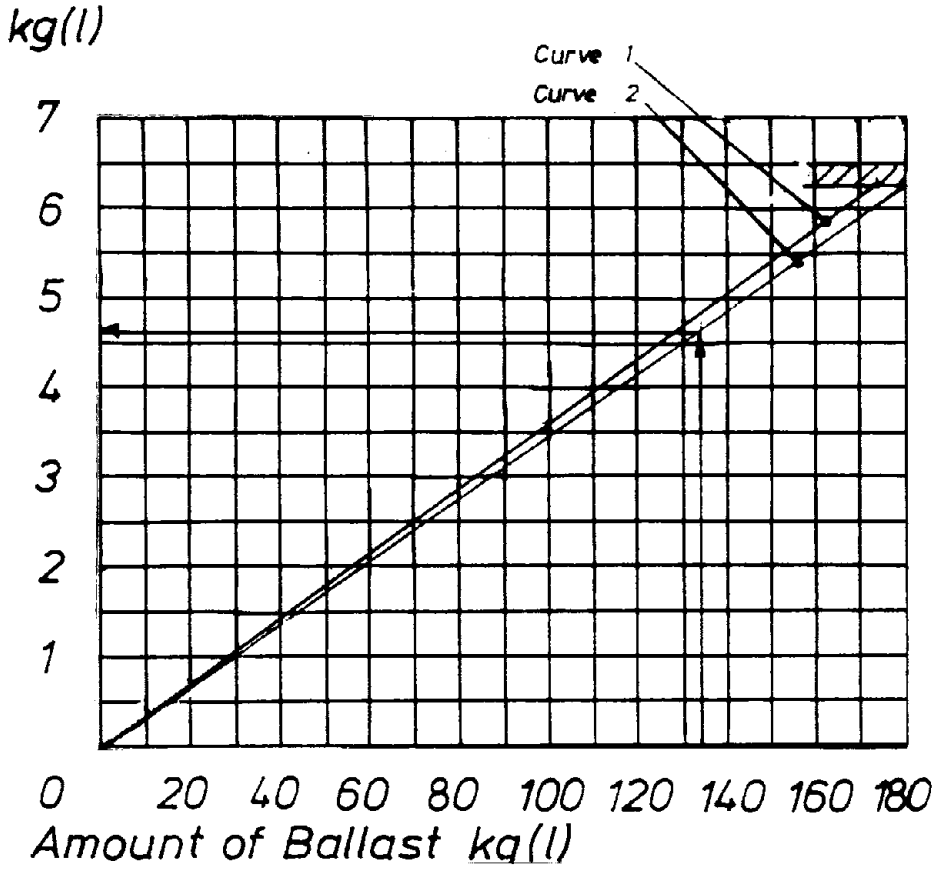
DG-800S ballast chart (for 6.8)
To determine the max. allowable waterballast in the wing tanks.
This diagram is valid for the max T.O.W. of 525 kg (1157 lbs.).



1 kg = 2.2046 lbs.

3.785 kg (l) = 1 US gal.

DG-800S ballast chart (for 6.8)
to determine the max. amount of ballast in the fin tank.



Curve 1 = ballast in the wing tanks
Curve 2 = total ballast (wing tanks and fin tank)
Example: From the diagram on page 6.7 a max. allowable ballast of 134 kg (wings + fintank) was determined. Curve 2 of the above diagram gives a fin ballast of 4.6 kg. The crossing point of the horizontal line with curve 1 gives the corresponding amount in the wing tanks of 129.4 kg.

Note: The fin waterballast determined from this diagram compensates only 80 % of the C.G. move due to the wing ballast, which will insure that in case of leaking wing tanks, the rear in-flight C.G. is kept in the limits.

1 kg = 2.2046 lbs.
3.785 kg (l) = 1 US gal.

6.9 C.G. calculation

The actual C.G. can be determined as follows:
For each item, the moment mass x C.G. has to be determined and to be summed up and divided by the total mass. See the following example:

1 kg = 2.2046 lbs. = .264 US gal. water 0.305 m = 1 ft

Item	mass kg	C.G. behind datum m	moment m kg
aircraft empty	265	0.56	148.4
pilot	78	- 0.55	- 42.9
waterballast in the wings	70	0.171	12
water ballast in the fin tank	2.8	4.338	12.2
	415.80	**XS=0.312**	129.7
		CG = moment / mass	

The limits of the in-flight C.G. 0.210 m - 0.350 m should not be exceeded!

The most important C.G. positions (behind datum):

Pilot:
The C.G. position is dependent on the pilots shape, mass, thickness of the parachute and the seat back position. The pilot C.G. position can be determined by executing a weight and balance measurement with glider empty and equipped with the pilot etc. see maintenance manual section 5. Please note, that the distance a has to be measured with both configurations, as it may change due to deflection of the landing gear.
The pilot C.G. can be determined by the following
Equation: XP = (XSF • MF - XSE • ME) / MP

MF = flight mass XSF = flight C.G. MP = pilot mass
ME = empty mass XSE = empty C.G.

If the actual pilot C.G. is not known, you have to take the values from the following table:

flight:	near the forward C.G.	near the aft C.G.
Pilot mass (kg)	pilot C.G. (m)	pilot C.G. (m)
110	-0.582	-0.533
105	-0.583	-0.535
100	-0.584	-0.537
95	-0.585	-0.539
90	-0.586	-0.541
85	-0.587	-0.543
80	-0.588	-0.546
75	-0.589	-0.548
70	-0.590	-0.550
65	-0.591	-0.552
60	-0.592	-0.554
55	-0.593	-0.556

1 kg = 2.2046 lbs. 0.305 m = 1 ft.

Further C.G. positions:

Baggage or battery in baggage compartment:	0.171 m
Waterballast in the wings:	0.171 m
Instruments	- 1.070 m
Removable ballast (Option see 7.13.1a):	- 1.743 m
Removable ballast (Option see 7.13.1b)	- 1.215 m
Tailwheel:	4.334 m
Waterballast in the fin tank	4.338 m
Battery in the fin	4.272 m

7. Sailplane and systems description

7.1 Introduction

This section provides description and operating of the sailplane and its systems.

Refer to section 9 "Supplements" for details of optional systems and equipment.

M.M. = Maintenance manual

7.2 Airframe

The DG-800S is a single-seater high performance sailplane with 18 m wing span. As an option wings can be equipped with a parting device at y = 7.25 m, and with winglets for flying with 15 m span.

Construction

Wings and flaperons	CFRP-foam-sandwich-skin CFRP-Rovings
Elevator	GFRP-skin
Horizontal tailplane and rudder	GFRP-foam-sandwich-skin
Fuselage	GFRP-skin

Canopy

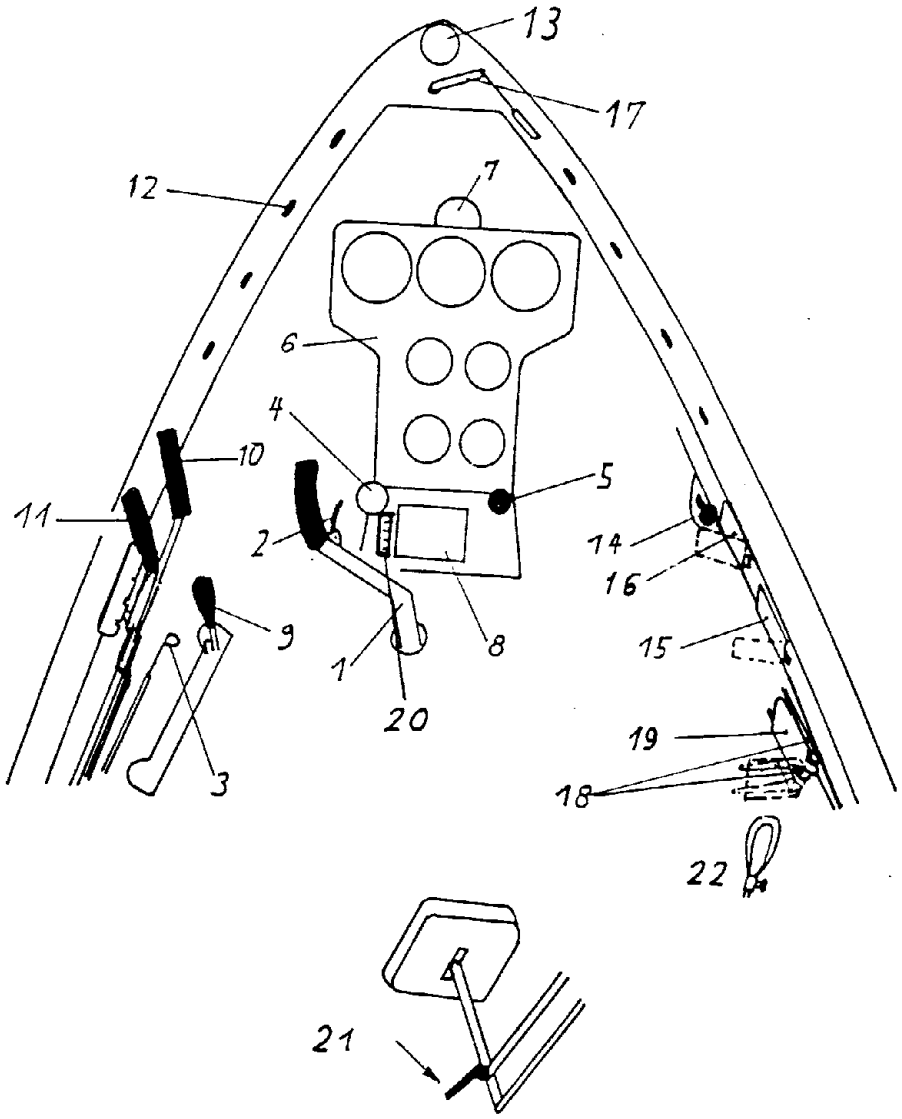
Large single piece canopy, hinged at the nose, supported by a gas strut. Canopy glass made from Plexiglas GS 245 clear or light green GS 2422 as option.

Tailplane

T-Tail with conventional stabilizer-elevator and spring trim.

Colour	Airframe:	white
	registration numbers:	grey RAL 7001
	or	red RAL 3020
	or	blue RAL 5012
	or	green RAL 6001

7.3 **Cockpit, cockpit controls and placards**



1) Control Column - Parallelogram type

2) Release lever for the trim mechanism - green.
Operation see sect. 7.4.

3) Trim position indicator and trim preselection lever

4) Tow release knob - yellow.

5) Rudder pedal adjustment knob - black 

By pulling on the knob, the locking pin will be disengaged and the rudder pedals can be pulled back towards the pilot or pushed forward away from the pilot.

6) Instrument Panel
After removing the side screws at the base 2 x M 6 and after removing the screws attaching the cover to the panel 4 x M 4, the cover can be removed towards the front.

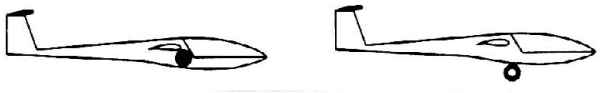
7) Compass installation position.

8) Radio installation position.

9) Undercarriage retraction - extension handle - black

forward - undercarriage down back - undercarriage retracted

The undercarriage is locked in the extended position by an overcentre locking arrangement, and an additional safety catch at the handle. The handle is to be turned toward the cockpit wall, so that the locking catch will engage.

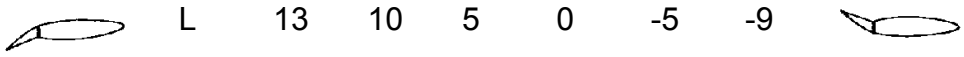


10) Airbrake handle - blue

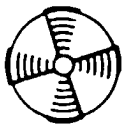
The wheel brake is operated at the end of the airbrake handle travel and the flaps will be moved from negative to neutral.

Optional parking brake combined with an airbrake securing device (Piggott-hook): Pull the airbrake handle back to actuate the wheelbrake and rotate the handle to the cockpit wall. A detent will engage in one of 4 notches to hold the system in this position.
In case the airbrakes mistakenly haven't been locked, a detent engages in one of several notches to avoid inadvertent deployment of the airbrakes. To open and to close the airbrakes the operating handle must be rotated into the cockpit so far, that the detent passes the notches.

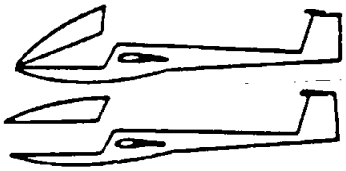
11) Wing flap handle – black



12) Constantly open anti fogging air vents
13) Main air vent
14) Air vent operating knob - pushed in – closed pulled out- open



15) Canopy opening handle - white
towards the nose - closed
into cockpit - open
16) Canopy emergency release handle - red
towards the nose - closed
into cockpit - open



17) Locking mechanism for the canopy emergency release towards the front – locked

15,16,17) please refer to section 7.12 too.

18) Wing water ballast dump handles - silver
upper handle - right hand water bag
lower handle - left hand water bag
forward - valve closed
into the cockpit - valve open

19) Fin waterballast dump lever
Rotate backward to dump. The wing waterballast can only be dumped after dumping the fin waterballast.
20) Outside air temperature gauge
21) Head rest.
The head rest is integrated in the back rest to take up the rebound forces of the pilots head in the case of a crash landing.
Warning: If the DG-800S shall be flown without back rest, a separate headrest (Option) must be installed.
22) Pneumatic back rest adjustment with air release thumbscrew.
The adjustment should only be used for minor comfort adjustment. For major adjustment, a harder material like a foam block approximately 300 mm x 300 mm (12 in. x 12 in.) should be used.

7.4 Flight controls

Rudder control:
See diagram 2 M.M.
cable system with adjustable pedals.

Elevator control:
See diagram 1 M.M.
Parallelogram control column stick. The parallelogram system reduces the possibility of pilot induced oscillations.
All pushrods slide in maintenance free nylon ball guides.
Automatic control hook up system.

Trim:
Spring trimmer with release lever at the control stick and position indicator at the left cockpit wall.
To trim, you have to operate the release lever and bring the control stick and the wing flap handle to the appropriate position for the desired trim speed.
If this is not enough, you can in addition push forward the trim indicator (release lever operated).
It is possible to fly the DG-800S with the trim released. A rubber cord connects the wingflap control with the trim system (see maintenance manual sect. 1.2.5) and applies forward trim with negative flap settings.

Aileron and wingflap control:
See diagram 3 and 4 M.M.
The wings feature single piece flaperons, which are driven at two places.
The mixing of aileron and flap deflections takes place in the fuselage.
Pushrods slide in maintenance free nylon ball guides.
Automatic control hook up system.

7.5 Airbrakes

See diagram 3 and 4 M.M.
Double storey Schempp-Hirth type airbrakes on the upper wing surface.
When operating the airbrakes the wingflaps will be moved from negative to neutral position.

The wheel brake is operated by the airbrake system.

Pushrods in the wings slide in maintenance free nylon ball guides.
Automatic control hook up system.

7.6 **Landing gear**
see diagram 2 M.M.

a) Main wheel: retractable, assisted by a gas strut,
spring mounted,
fully sealed landing gear box,
internal drum brake,
Tyre 5.00 - 5 4 PR or 6 PR
Diameter 362 mm (14.25 in)
Tyre pressure 3.3 bar (48 psi)

b) Tailwheel: Tyre 200 x 50 2 PR
Diameter 200 mm (7.87 in)
Tyre pressure 2 bar (28 psi)

7.7 **Tow hooks**
see diagram 5 M.M.

"Safety release G 88" for winch- and aerotow installed near the C.G..
additional as option "nose release E 85" installed under the instrument console, only for aerotow.

Both hooks are operated by the same handle.

7.8 **Seats and safety harness**
The seat is constructed as an integral inner shell. The backrest is adjustable by means of an aircushion (Adjustment see sect. 7.3 item 22). The backrest can be screwed to the seat shell at 3 different positions dependent on the thickness of the parachute.

The head rest is integrated in the back rest to take up the rebound forces of the pilots head in the case of a crash landing.

Warning: If the DG-800S shall be flown without back rest, a separate neckrest (Option) must be installed.

As safety harness only symmetric 4-point harnesses fixed at the given fixing points are allowed.

7.9 **Baggage compartment** Max. load 15 kg (33 lbs.).
Heavy pieces of baggage must be secured to the baggage compartment floor. The max. mass secured on one half of the floor (left and right of fuselage centre line) should not exceed 7.5 kg (16.5 lbs.).

7.10 Waterballastsystem

see diagram 5 M.M.

a) The wingtanks are constructed as double wall bags with a capacity of 60 l (15.85 U.S.gal) or 87 l (23 U.S. gal) per wing. The 87 l tanks are separated in 2 chambers to reduce the pressure load in case of spinning and positive g-loads. The separation also improves the handling of the glider with the tanks filled partly. The dump valves are mounted in the wings and the control is hooked up automatically when rigging the glider.

b) Fin ballast tank with 6.2 l (1.64 U.S.gal.) capacity. This tank is constructed as integral tank with a ventilation tube. Filling is via the dump valve. The dump valve is opened by a cable and closed by a steel tension spring. If you overfill the tank, the excess water drains via a hole in the rear fin shear web.

c) control handles
The handle for the fintank (wide plate) is above the wingtank handles, so that the wingtanks can only be emptied after opening the fintank.

Warning: It is prohibited to change this system!

The handle for the fintank will stay in the open position by an overcentre device. The upper handle is for the right and the lower handle for the left wingtank.

7.11 Pitot and static system

See diagram 6 M.M.

Pitot probe in fuselage nose, and static ports a short distance behind fuselage nose. The airspeed indicator and the altimeter are to be connected to these probe and ports.
Additional holder for a Multiprobe in the fin is to operate variometer and flight computersystems.
To preserve the sealings inside the holder the end of the probe should be greased with Vaseline from time to time.

7.12 Canopy emergency release

For emergency release only, the red handle at the canopy is to be operated. By this action the canopy opening lever will also be operated and a hook at the rear canopy lock will be rotated underneath the fuselage part of the canopy frame. Because of the hook in case of emergency release the canopy will rotate around this point and will leave the fuselage in a safe and fast way. The spring will open the canopy at the nose far enough to be blown away by the oncoming air.

Checking the emergency release on the ground:
Pull the emergency release knob, the canopy should spring open at the nose min. 6 cm (2.4 in.).
Reinstalling the canopy:

Pull the canopy hinge into the open position. Replace the emergency release spring. Two people are required to hold the canopy - one at the nose, the other at the rear. The emergency release locking mechanism should be in the open position. Place the canopy on the hinge and press down. Relocate the locking mechanism. Push the hook forwards at the rear canopy lock until it snaps in.

7.13 Miscellaneous equipment

7.13.1 Removable Ballast (Option)

a) **In the nose of fuselage**

Three lead ballast weights part No. Z11/1 up to Z11/3 each 2.25 kg (4.96 lbs.) can be fixed at the two M6 inserts in front of the rudder pedals. Each weight compensates a pilot mass of 5 kg (11 lbs.). The lead ballast weights are to be fixed with bolts M6 which must be min. 10 mm (.4 in.) and max. 35 mm (1.4 in.) longer than the thickness of the ballast weights.

b) **In ballast Box (Option)**

The ballast box at the right hand side of the instrument console underneath the carpet can accommodate 3 lead ballast weights part No. Z10 of min 2.16 kg (4.76 lbs.) each. Each weight compensates a pilot mass of 3.75 kg (8.27 lbs.). The lead ballast weights are to be fixed in the box with a M 8 wingnut.

7.13. 2 **Oxygen system**

Oxygen bottle installation

Max. size of oxygen bottle is 4 l capacity with diameter 100 mm (3.94 in.).
The bottle must be fixed at its neck with a bracket part No. Z 14.

Installation of the oxygen equipment

To ensure a safe installation ask for an installation instruction.

For the installation of the Dräger Höhenatmer E 20088 you will find an installation plan 6EP18 in the maintenance manual.

7.13.3 **ELT Emergency Locator Transmitter**

To ensure a safe installation ask for an installation instruction.
For the model ACK E-01 you will find an installation plan 8EP38 in the maintenance manual.

Caution: Concerning 7.13.2 and 7.13.3

The installation has to be accomplished by the aircraft manufacturer or by an approved service station and to be inspected and to be entered in the aircraft log book by a licensed inspector.

7.13.4 **Battery in the fin** (Option)

Only the factory supplied battery (part No. Z 07, mass 4.3 kg (9.5 lbs.)) is allowed to be used. If the pilot mass is less than the min. cockpit load, the battery may be removed from the fin and another battery installed in the baggage compartment. This lowers the min. cockpit load by 20 kg (44 lbs.).

By looking through a Plexiglas window in the left fin surface it can be checked, if the battery is installed.

To connect the fin-battery to the electrical system, the wiring coming from the instrument panel is to be plugged in the socket located at the rear wall of the baggage compartment.

8. Sailplane handling, care and maintenance

8.1 Introduction

8.2 Inspection periods and maintenance

8.3 Alterations or repairs

8.4 Parking

8.5 Trailering

8.6 Towing on the ground

8.7 Cleaning and care

8.1 Introduction

This section contains manufacturer's recommended procedures for proper ground handling and servicing of the sailplane. It also identifies certain inspection and maintenance requirements which must be followed if the sailplane is to retain that new-plane performance and dependability. It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered.

8.2 Inspection period, maintenance

The "Instructions for continued airworthiness (maintenance manual) for the DG-800S" have to be followed.

Before each rigging all the connecting pins and bushes should be cleaned and greased. This includes the control connectors. Once a year, all the bearings and hinges should be cleaned and greased. See the greasing programme of the maintenance manual. Each year the control surface displacements, adjustments and general condition must be checked. (See the maintenance manual).

8.3 Alterations or repairs

It is essential, that the responsible airworthiness authority be contacted **prior to** any alterations on the airplane to ensure, that the airworthiness of the sailplane is not impaired. It is prohibited to execute the alteration without the approval of the airworthiness authority. The manufacturer will not be liable for the alteration or for damages resulting from changes in the characteristics of the aircraft due to alteration. So it is strongly recommended to execute no alternatives which are not approved by the aircraft manufacturer. External loads such as external camera installations are to be regarded as alterations! Repair instructions can be found in the DG-800S repair manual. No repairs should be carried out without referring to the manual.

8.4 Tie Down, Parking

Use textile ropes or straps to tie down the wing tips. The fuselage should be tied down just ahead of the fin.

Water ballast can be left in the wings, for a few days only, but not when there is the possibility for freezing! On sunny days the cockpit should be closed and covered.

Note: Longer parking with exposure to sun and humidity will cause premature ageing of the skin of your sailplane.

8.5 Trailering

It is recommended to carry this valuable sailplane in a factory approved trailer.

Approved fitting points:
Wings:

1. Wing spar as close to wing rootrib as possible or a rootrib wing cradle.

2. A wing cradle at the taper change.

Stabilizer, wing tips and winglets:
Cradled as desired.
Fuselage:

1. A felt lined fiberglass nose cap which does not extend over the canopy secured to floor.

2. Fuselage dolly in front of the tow hook or a support attached to the lift pins, diameter 16mm (.63 in.) (use plastic or brass bushings).

3. Tail wheel well in trailer floor. Secure fuselage with a belt in front of the fin or hold it down with the trailer top (soft foam in top).

All aircraft structures should not be subject to any unusual loads. With high temperatures that can occur inside trailers, these loads in time can warp any fibre reinforced plastic sailplane.

The trailer should be well ventilated so as to prevent moisture build up which could result in bubbles forming in the gelcoat. A solar powered ventilator is recommended.

8.6 Towing on the ground

a) by towing at the tow hook using a rope with the standard double ring authorized for the release.

b) by using a tow bar which is to be fixed to the tail dolly and a wing tip wheel.

The tow bar and wing tip wheel may be ordered through the DG factory.

8.7 Cleaning and Care

Exterior surfaces of the fibre-reinforced plastic parts

The surfaces are coated by a UP-gelcoat. This gelcoat is protected by a hard wax coating which has been applied during production with a rotating disc ("Schwabbel" procedure). Do not remove the wax, because this would lead to shading, swelling and cracking of the surface. In general, the wax coat is very resistant. As soon as the wax coat is damaged or worn, a new coat has to be applied (see maintenance manual sect. 3.1). If you store your aircraft often outside, this may be necessary every half year!

Hints for care:

- Wash the surface only with clear water using a sponge and chamois.

- The adhesive remains of tape may be removed with petroleum ether (pure petroleum spirit) which should be applied and removed immediately, otherwise this may lead to swelling of the gelcoat.

- More stubborn dirt which cannot be removed by washing may be cleaned off with siliconefree, wax containing car polishes (e.g. 1Z Extra, Meguiars in USA)

- Long-term dirt and shading can be removed by applying a new hard wax coat (see maintenance manual sect. 3.1).

- Never use alcohol, acetone, thinner etc.. Do not use detergents for washing!

- Protect the surface from intense sunlight.

- Protect the aircraft from water and moisture. See sect. 8.4 and 8.5

- Remove water that has entered and allow the aircraft to dry out.

- Never store your wet aircraft in a trailer.

Plexiglas canopy:

- Use clear water and a chamois for cleaning.

- Stubborn dirt and small scratches can be removed by use of the "Schwabbel procedure" (see maintenance manual sect. 3.1).

Metal parts:

The pins and bushes for rigging the aircraft are not surface protected and must be covered with grease all the time. The other metal parts, especially the control stick and all handles should be preserved with metal polishes occasionally.

Section 9

9. Supplements

9.1 Introduction

This section contains the appropriate supplements necessary to safety and efficiently operate the sailplane when equipped with various optional systems and equipment not provided with the standard sailplane.

9.2 List of inserted supplements

Date of insertion	Document No.	Title of the inserted supplement
June 1998	9.3	Winglets at the 18m wingtips TN 384/5
January 2002	9.4, 9.5, 9.6	Emergency bail-out aid NOAH TN 384/9

9.3 Winglets at the 18m wingtips

Section 1

Introduction

In the following text the changes to those sections of the flight manual which are effected by the installation of winglets at the 18m wingtips will be given

Brief description

In addition to the wing configurations described in sections 1 up to 8 of the flight manual winglets at the 18m wingtips are approved.
The installation of the winglets to the 18m wingtips must be executed according to the technical note TN 873/9.

The height of the winglets is 0,50m (19.7 in.).

Section 4

Assembly and disassembly of the winglets

To assemble the winglets pull off the wingtips and slot in the winglets. The winglets are secured to the wings by means of a quarter turn fastener. With a screw driver turn the fastener a 1/4 turn in clockwise direction until it engages.
Removal is the opposite of that described above.
To fly with wingtips instead of winglets, secure the wingtips to the wings by taping the gap.

Section 5

Gliding performance

Comparison to 18m span:

Thanks to the winglets the max. L/D is increased by approx. 1.5 points.
The min. sink is reduced by approx. 0.03 m/s (0.6 ft/min.)

9.4 Emergency bail-out aid NOAH

Section 1
Introduction
In the following text the changes to those sections of the flight manual which are effected by the installation of winglets at the 18m wingtips will be given

Brief description
NOAH is a system to facilitate the bail-out of the cockpit in an emergency.
NOAH is a supplementation to the parachute.
NOAH features an airbag similar to a car airbag. The gas which is necessary to inflate the bag is stored in a pressurised gas cylinder. The actuation is by mechanical means via a handle at the right hand side near the control stick.
To actuate NOAH the canopy must be opened or jettisoned first. The system is secured by a metal plate at the actuation unit which is blocked by a GFRP block at the canopy frame.

When the NOAH system is activated the seat harness buckle will be opened prior to the opening of the pressurised gas cylinder. The pilot will be lifted by the airbag so that he can roll himself out of the cockpit.
If NOAH is used together with an automatic parachute, the emergency bail out procedure will be more or less automatic after operation of the NOAH handle.

Note: There is a small hole in the NOAH airbag close to the pressure relief valve. In case of inadvertent inflation of the airbag gas can stream out of this hole. This is to prevent injuries to the pilot if the seat harness buckle is not open.

Technical data:
Mass of all parts: approx. 4,5 kg
Generation of pressure: nitrogen approx. 200 bar
Filling time: approx. 2 seconds
Design range: pilot mass 110 kg up to 4 g

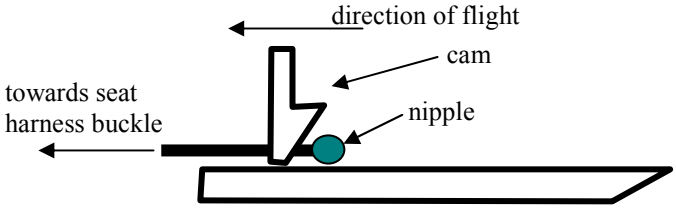
Section 3
Use of NOAH in case of an emergency bail out:
Note: We recommend strongly the use of an automatic parachute. Only with an automatic parachute will the bail out procedure be nearly automatic and precious time and altitude can be saved.

For the bail out jettison the canopy first, therefore pull the canopy emergency release and if necessary push the canopy upwards.
Warning: If there are loops at the rudder pedals make sure that your feet are out of the loops first.

Then pull the NOAH handle (at the right hand side next to the control stick, marked black and yellow) **strongly and quickly** up to its stop.
Roll out of the cockpit to the right hand side if possible, as on the left hand side the airbrake handle may impede the procedure.

Note: Don't operate the NOAH handle on the ground with open canopy as you may release NOAH and the pressurised gas cylinder must be filled again.

Section 4
a) Pre-flight inspection
Check the airbag, the high pressure hose and the operating cables for correct positioning and for any wear.
Check especially if the nipple of the cable which opens the seat harness buckle is positioned aft of the cam of the actuation unit see sketch:



detail of the actuation unit
(at the right hand side
cockpit wall in front of the
main bulkhead)

In case a pressure gauge is installed at the NOAH cylinder (TN DG-G-11 performed): Read the pressure gauge (Underneath the Plexiglas cover at the front of the tube for the oxygen cylinder). If the pressure is lower than 180 bar, the cylinder should be refilled, otherwise you have to expect a too small assistance for bailing out.

b) For normal opening of the seat harness buckle rotate the buckle only in clockwise direction.

c)

Section 7

The NOAH actuation handle is located at the right hand side abeam the control stick, it is marked black and yellow.
A sticker is wrapped around the actuation handle and the guiding tube for the actuation cable. The sticker serves as an additional means to guard against inadvertent operation.

Section 8

For inspections and maintenance please refer to the “manual for the emergency bail out-aid NOAH“.