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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-600

Model: DG-600
German Data Sheet No.: 370

Factory Serial No.: _____

Registration No.: _____

Date of Issue: April 1988

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

(Signature) _____

(Authority) Anerkannt durch Luftfahrt-Bundesamt

(Stamp)

(Original date of approval) 8. DEZ. 1988

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. In any case the original text in German language is authoritative.

Enclosure to flight manual DG-600

Please pay attention to the following items in addition to the flight manual.

1. To achieve the best thermaling performance, the DG-600 should not be flown at the aft C.G. limit.

   50 - 75 % of the permissible C.G. range is best, see also the report of experience by Ingo Renner.

2. The optimum amount of waterballast is 60 to 100 l (15.6 - 26 US.gal.) for european and similar conditions.

3. It is possible to thermal the DG-600 with landing flap position instead of the 10° position. By this the DG-600 can be flown a little slower or steeper without a penalty in sink speed.

   Please try yourself.

4. When extending the landing gear, it happens that the handle swings backwards some mm and you will not lock the handle, although you might think you did.

   Therefore after extending the landing gear make sure, that you press forward the handle again before rotating the handle towards the cockpit wall.

Translation

Oerlinghausen April 22 1989

REPORT OF EXPERIENCE WITH THE D G - 6 0 0

In August and September 1989 the Glaser-Dirks factory gave me and some other instructors of the Oerlinghausen flying school the possibility to gain extensive flying experience with the DG-600 serial no. 5 in Fuentemilanos (Spain). Before the DG-600 came to Fuentemilanos, it was flown in the Vinon competition by the french pilot Robert Prat.

Robert Prat told us, that he was very happy with the glide performance of the DG-600, but he recommended not to load to much waterballast.

For this reason and from our own experience in most cases, we loaded only 100 kg (26 US.gal.) waterballast.

First I flew the DG-600 with the rear C.G. position as common on most competition sailplanes, but I soon found out, that this was not the optimum as it was not easy to keep the DG-600 in constant circling flight position.

This was changed immediately when flying with a medium C.G. position. Now the handling was excellent and I and my colleagues enjoyed a lot of long cross country flights in the 15 m as well as in the 17 m configuration.

Some month before, my syndicate in Australia lost its Nimbus 3. Due to the low australian Dollar we decided to replace the Nimbus by a 15/17 m glider. Our choice was the most modern design, the DG-600. We received our glider with the first DG-600 delivery to Australia in December 1988.

But unfortunately the Australian certification procedure took longer than expected so I was not able to fly the DG-600 in the Australian championships in January 1989.

The members of my syndicate have been pleased with the DG-600 from the beginning especially by the extraordinary visibility from the cockpit which I knew already from my flying with the DG-300.

Following my recommendations my partners didn't try to fly the ship with the rear C.G. position. So they became aquanted with the best side of the DG-600 immediately: with the excellent handling and manoeuverability and the outstanding performance.

With all this experience and because I prefered to fly a very manoeuverable glider in the Alpes I decided to fly the DG-600 in the world gliding championships at Wiener Neustadt.
In addition this handy sailplane promissed more safety in case of outlandings in the small fields of the narrow Alpine valleys.

I could already experience the outstanding high speed performance, when running the long ridges in Spain.

But my wish didn't come true. A change of rules by the international gliding commission (IGC, CIVV) forced me to compete in the open class. The new rule says, that the world champion has to defend his title in the class, where he gained the title.

I was very surprised when I got knowledge of this new rule but the ICG was not willing to make an exception, so I had to refrain from flying the DG-600 in the last moment.

Kind regards

Ingo Renner

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 left hand margin, and the Revision No. and the date will be shown on the bottom left hand of the page.

Rev. No.	Affected Pages	Description	Issue Date	LBA Approval Date	Inserted Date Signature
1	0.1, 4.1, 4.4, 4.5, 4.7, 4.9, 4.11, 4.13, 4.14, 5.5, 5.6, 6.3, 6.9, 7.4, 7.7-7.9, 8.2, 8.3	TN 370-1 Manual-revision	July 90	13.07.90	
2	0.4, 9.1, 9.2, 9.3	Installation of winglets to 17 m wing tip extensions TN 370/4	Febr. 94	March 95	

0.1

Rev. No.	Affected Pages	Description	Issue Date	LBA Approval Date	Inserted Date Signature

0.2 List of effective pages

Section		page	issued	replaced	replaced
0		0.0	April 88		
		0.1	/		
		0.2	/		
		0.3	July 90		
		0.4	"		
		0.5	April 88		
1		1.1	"		
		1.2	"		
		1.3	"		
		1.4	"		
		1.5	"		
2	App.	2.1	"		
	"	2.2	"		
	"	2.3	"		
	"	2.4	"		
	"	2.5	"		
	"	2.6	"		
	"	2.7	"		
	"	2.8	"		
	"	2.9	"		
	"	2.10	"		
3	"	3.1	"		
	"	3.2	"		
	"	3.3	"		
4	"	4.1	July 90		
	"	4.2	April 88		
	"	4.3	"		
	"	4.4	July 90		
	"	4.5	"		
	"	4.6	April 88		
	"	4.7	July 90		
	"	4.8	April 88		
	"	4.9	July 90		
	"	4.10	April 88		
	"	4.11	July 90		
	"	4.12	April 88		
	"	4.13	July 90		
	"	4.14	"		
	App.	4.15	April 88		

0.2 List of effective pages (cont.)

Section		page	issued	replaced	replaced
5	App.	5.1	April 88		
	"	5.2	"		
	"	5.3	"		
	App.	5.4	"		
		5.5	July 90		
		5.6	"		
		5.7	April 88		
6		6.1	"		
		6.2	"		
		6.3	July 90		
		6.4	April 88		
		6.5	"		
		6.6	"		
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		6.8	"		
		6.9	July 90		
		6.10	April 88		
7		7.1	"		
		7.2	"		
		7.3	"		
		7.4	July 90		
		7.5	April 88		
		7.6	"		
		7.7	July 90		
		7.8	"		
		7.9	"		
8		8.1	April 88		
		8.2	July 90		
		8.3	"		
		8.4	April 88		
		8.5	"		
9		9.1	April 88		
	with TN 370/4 (optional)				
		9.1	Febr.94		
		9.2	"		
		9.3	"		

0.3 Table of contents

Section 1

0.3 Table of contents

Section 1

0.3 Table of contents

Section 1

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-600 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 sailplane manufacturer.

1.2 Certification basis

This type of sailplanes has been approved by the Luftfahrt-Bundesamt (LBA) in accordance with JAR Part 22 including Amendment Change 3 and the Type Certificate No. 370 has been issued on Jan. 24 1989.
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

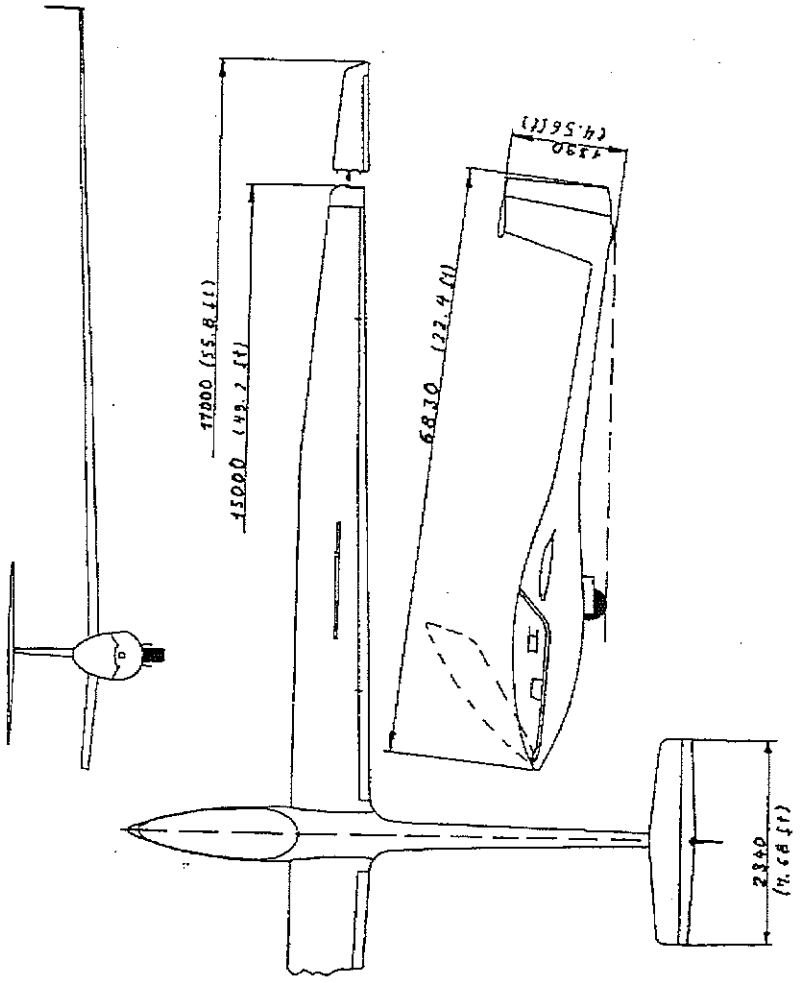
The DG-600 is a single seater high performance sailplane with 15 m wing span and wing tip extensions for 17 m span and with flaperons.
With 15 m wing span normal wing tips and as an option small winglets are available.

Further details: retractable main landing gear and tail wheel, waterballast tanks in the wings and in the fin.

Technical data

Wingspan	m (feet)	15	(49.2)	17	(55.8)
Wingsurface	m²(ft²)	10.95	(117.9)	11.59	(124.8)
Aspect ratio	/	20.55		24.94	
Length	m (ft)	6.83	(22.4)		
Fuselage width	m (ft)	0.63	(2.07)		
Fuselage height	m (ft)	0.81	(2.66)		
Horizontal tail span	m (ft)	2.34	(7.68)		
mean aerodynamic chord MAC	m (ft)	0.763	(2.503)	0.739	(2.425)
max.waterballast wings	kg(US.gal)	130	(34.3)	or 180	(47.6)
fintank max.	kg(US.gal)	6	(1.6)	6	(1.6)
max. weight	kg(lbs)	525	(1157)	525	(1157)
wing loading with 80 kg (176 lbs) payload	kg/m²(lbs/ft²)	ca.30.6	(6.27)	29.3	(6.0)
max.wing loading	kg/m²(lbs/ft²)	48	(9.83)	45.3	(9.28)

1.5 3-Side view



Section 2

2.1 Introduction

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

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

Note: The limitations apply for all standard wing tips:

a) normal 15 m tip
b) small 15 m winglets
c) 17 m wing tip extensions

2.2 Airspeed

Airspeed limitations and their operational significance are shown below:

	Speed	(IAS) km/h(kts)	Remarks
VNE	Never exceed speed	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	200 (108)	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	200 (108)	Do not make full or abrupt control movement above this speed, because under certain condition the sailplane may be over-stressed by full control movement.
VFE	Maximum Flap Extended speed		Do not exceed these speeds with the given flap setting
	L = + 15°	150 (81)	
	+10°, +5°	200 (108)	
VW	Maximum winch-launching speed	150 (81)	Do not exceed this speed during winch- or auto-tow-launching
VT	Maximum aero-towing speed	200 (108)	Do not exceed this speed during aerotowing
VLO	Maximum landing gear operating speed	200 (108)	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 color code significance are shown below:

Marking	(IAS) value or range km/h	(kts)	Significance
White Arc	88 - 200	(47.5 - 108)	**Positive Flap Operating Range** (lower limit is maximum weight 1.1 VSO in landing configuration. Upper limit is maximum speed permissible with flaps extended positive + 10°, + 5°)
Green Arc	96 - 200	(52 - 108)	**Normal Operating Range** (Lower limit is maximum weight 1.1 VS1 at most forward c.g. with flaps neutral. Upper limit is rough air speed.)
Yellow Arc	200 - 270	(108 - 146)	Manoeuvres must be conducted with caution and only in smooth air.
Red Line	270	(146)	Maximum speed for all operations.
L	150	(81)	Max. speed for landing configuration L + 15°
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 see sect. 6.3

Maximum landing mass: 525 kg, 1157 lbs

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

Maximum mass of all non lifting parts = 246 kg(542 lbs)

Maximum mass in baggage compartment = 15 kg(33 lbs)

Caution: Heavy pieces of baggage must be secured to the baggage compartment floors (screwing to the floors or with belts). Each floor can support 7,5 kg (16,5 lbs).

Maximum waterballast in the wings = 130 kg(287 lbs) or 180 kg(397 lbs) (s.sect. 7.10)

in the fin tank = 6 kg(13 lbs)

The max. take off mass is not to be exceeded.

Warning: Follow the loading procedures see sect. 6.

2.5 Center of gravity

Center of gravity range in flight is

220 mm (8.66 in.) up to 380 mm (14.97 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.

2.6 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	175	94.5
Stall Turn	170	92
Lazy Eight	150	81
Chandelle	170	92

2.7 Manoeuvering load factors

The following load factors are not to be exceeded:

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

2.8 Flight crew

max. load in the cockpit 110 kg 242 lbs

min. load in the cockpit 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 in the seat. Ballast put on the seat (lead ballast cushion) must be fastened at the connections of the safety belts. Installation for removable trim ballast see sect. 7.13.1.

2. If the DG-600 is equipped with a provision to install a battery in the fin (Option) the battery (mass 4,3kg-9.5lbs) 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. 4.5.9.

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 (conpensated in the aircraft, only requred in Canada)
Four piece symmetrical safety harness
VHF - transceiver (ready for operation)

Parachute automatic or manual type or a back cushion approximately 8 cm (3 in.) thick.

Required placards, check lists and this flight manual
Outside air temperature gauge with probe in the landing gear box. Marking blue for temperature below 2°C, (36°F).

b) **In addition for cloud flying** (Not permitted in the USA, Canada and Australia)

Magnetic compass (compensated in the aircraft)
Variometer
Turn and bank

Remark: Experience has shown that the installed airspeed 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 (96 - 225 ft)
Material: hemp- or plastic fibres

2.11.3 **Max. towing speeds**

Aerotow	VT = 200 km/h,	108 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	46 psi
Tail wheel	2 bar	28 psi

2.14 **Waterballast**

2.14.1 **Wing tanks**
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 asymmetrical loading condition.
Follow the laoding chart, see sect. 6.8.

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 temperature	°C	13,5	17	24	31	38
	°F	56	63	75	88	100
max. flight altitude	m	1500	2000	3000	4000	5000
	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

Glaser-Dirks Flugzeugbau GmbH

type: DG-600 Year of construction:
serial no: 6-

Maximum airspeeds	km/h	kts.
Winch launch	150	81
Aero-tow	200	108
Manoeuvring V_A	200	108
Rough air	200	108
Max. flap extended speed +10°/+5°	200	108
Landing gear operating	200	108
Maximum speed V_{NE}	270	146
Max. flap extended speed L	150	81

Approved aerobatic manoeuvres (only without ballast in the wings):
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
minimum	kg	lbs

battery in baggage compartment
battary in fin

entry if there is no provision to install a battery in the fin

entry if there is a provision to install a battery in the fin

Preflight 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?

Sollbruchstelle max. 6800 N
rated load max. 1500 lbs.

Gepäck max. 15 kg
baggage max. 33 lbs.

Reifendruck 3,3 bar
Tyre pressure 46 psi
Main wheel

Reifendruck 2 bar
tyre pressure 28 psi
tail wheel

limits for use of the fin waterballast tank

minimum ground temperature	°C	13,5	17	24	31	38
	°F	56	63	75	86	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.

Section 3

3.1 **Introduction**
Section 3 provides a checklist and amplification for coping with emergencies that may occur. Emergency situations can be minimized by proper preflight 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. The canopy will be opened by a spring and blown away by the oncoming air.

3.3 **Bailing out**
The low walls of the cockpit allow for a quick push-off exit.

3.4 **Stall recovery**
With a little stick forward and opposite rudder the glider can be recovered from the stall.
To recognize and prevent the stall, please refer to sect. 4.5.2.

3.5 **Spin Recovery**
Apply rudder opposite to spin direction, pause, then ease stick forward until the rotation ceases, centralize the controls and carefully pull out of the dive. The ailerons should be kept neutral during recovery.
To prevent unintentional spinning do not stall the sailplane and fly with enough speed reserve especially in gusty conditions and in the landing pattern.

Caution: The DG-600 is certified for intended spins only without waterballast and at aft C.G. positions, see sect. 4.5.8.

Waterballast in both wings does not influence the spin characteristics but increases the nose down pitch during spin recovery.

Height loss during recovery	m	50-100
	ft	160-330
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 2 turns with medium C.G. positions, see sect. 4.5.8. To prevent spiral dives intentional spinning should only be executed at the C.G. positions specified in sect. 4.5.8 without waterballast and recovery from unintentional spinning should be done immediately.

3.7 Recovery from unintentional cloud flying

Spins are not to be used to lose altitude. In an emergency, pull out the dive brakes fully before exceeding a speed of 200 km/h and fly at 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.

Section 4

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.

4.2.1 **Rigging**

1. Open the canopy.

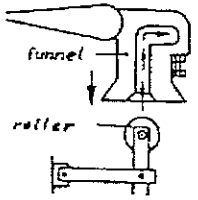
2. Clean and lube the pins, bushings and the control connections.

3. With a helper on the wingtip, push the wings into place. 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.
The flaperons should be held at neutral for rigging, airbrakes closed.

4. Rigging of the stabilizer
Set the trim **nose down.**
Set the stabilizer on, 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 will hold the elevator in the pertinent position.



Use an 13 mm wrench (supplied with your glider) to tighten the front mounting bolt. Turn it so that the securing sleeve engages the bolt.

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 wing water ballast tanks**

To fill the water ballast, first open the lever for the fin tank and then pull back the levers (top-right tank, bottom-left tank) for the wing tanks.

Place the glider wings horizontal. Attach the hose sytem supplied with your glider in the water outlets on the lower surfaces of the wings. Fill both wings simultaneous.

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. After filling close the valves with the water ballast levers and remove the hoses.

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.

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 should be closed.

4.2.5 Rigging and derigging the wing tip extensions

1. Disassemble the small 15 m wing tips.
   Use a diameter 6 mm pin for pressing in the locking pin on the wings upper side.
2. Insert the 17 m wing tip 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.
3. Disassembling of the wing tip
   This has to be done analogous to the small 15 m wing tips.

   The rigging of the small 15 m wing tips and of the winglets has to be done analogous to the 17 m wing tips.

4.3 Daily Inspection

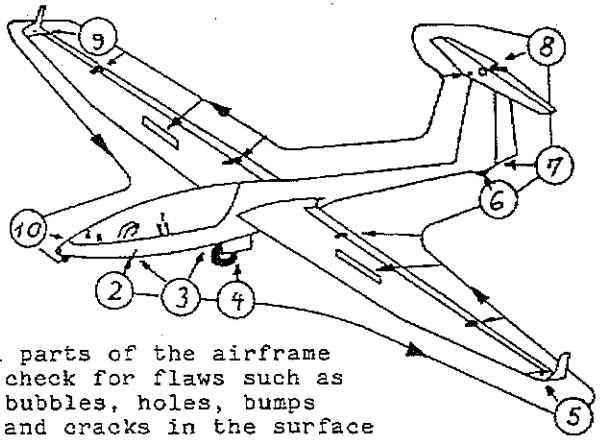
Please keep in mind the importance of the inspection after rigging the glider and respectively each day prior to the first take off. It is for your safety.

Caution: After a heavy landing or if other high loads have been subjected to your sailplane, you must execute a complete inspection refering 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, delamination 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)
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 refer to the loading chart in sect. 6!
4. Horizontal tailplane
   a) check the mounting points and the elevator control hook up for wear and corrosion
5. Rigging points for the insertable wing tips (15 m, 17 m)
   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 enough 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. 7.10 (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) is the right battery installed, connected and secured?
3. Tow hooks
   a) check the ring muzzle of the C.G. hook for wear and function
   b) check both hooks (if installed) for cleanness 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 center the next time!
   b) check the tyre pressure (3.3 bar, 46 psi)!
   c) check wheel brake and cable for wear and function

5. Left wing
   a) check locking of the wing tip
   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 in backward direction. 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, 28 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
   b) check the bulkhead and fin trailing edge shear web for cracks and delamination
   c) check the fin tank for correct amount of water filled in see sect. 4.1.3; in any case of doubt dump the fin tank
8. Fin - horizontal tail
   a) check the upper rudder hinge for wear and free play
   b) check if a battery is installed in the fin (Option), look through the plexiglass window in the left fin surface
   c) check the elevator for free play and correct control hook up, look through the plexiglas window
   d) check the securing of the front mounting bolt
   e) check the horizontal tail for free play
   f) check the TE or Multiprobe for correct insertion
9. Right wing
   see detail 5.
10. Fuselage nose
   a) check the ports for the static pressure and the pitot pressure for cleanness
   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 Preflight 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 Aerotow-winch 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 so that the indicator is 1 cm (0.5 inch) behind the forward position.

c) General: Set the wing flaps to -5°.
Hold the stick in the trimmed position.
As soon as aileron control is achieved, set the flaps to 5°. 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 200 km/h (108 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 +10°.
Set the trim nose down for a winch launch.
Use the normal winch launch procedure.

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

After reaching release altitude pull the tow release knob.

Recommended winch launch airspeed 110-120 km/h (60-65 kts).

Caution: Don't fly with less then 90 km/h (49kts) 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-600 will continue to fly level.
If the stick will be pulled further the DG-600 will drop the nose or drop one wing.
During the stall a large angle of attack will be reached.
At positive flap settings the DG-600 will stall over one wing, without flying level in stall. When reaching the minimum speed, the angle of attack has to be increased remarkable, before the DG-600 stalls over the wing, so that the stalled flight is easy to recognize.
With a little stick forward and opposite rudder the DG-600 can be recovered without much loss of height. Rain does not influence this behaviour noticeable. The max. loss of height is 30 m.
Stall airspeeds see sect. 5.2.2.

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

High speed flying
Flap settings 0°, -5°, -10°, -15°
The parallelogram control stick reduces the possibility of pilot induced oscillations.
The DG-600 can be trimmed nearly up to VNE.
Nevertheless don't release the stick at any time.
Do not exceed the max. airspeeds.(see sect. 2.2 !)

Thermaling
Flap setting: +5°.
+10° only for narrow thermals.
Don't thermal at min. speed but 10 km/h (5 kts) above minimum speed to fly inside the regime with low sink rates.
Thanks to the long fuselage, the DG-600 is directionally very stable.
Uneven lift can be optimized because of the excellent roll rate (45° to 45° in 3,0 - 3,5 sec.)

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 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-600 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 center next time. Simply hosing with water is the best cleaning method.

Landing with the landing gear retracted:
It is recommended to use this technique only on very short fields or if there are waves in cross direction in the field.
After wheel up landing check the fuselage belly and the tow hook for damage.

4.5.4 Flight with water ballast

Wing tanks
Recommended ballast for smooth thermals:

rate of climb			ballast	
m/s	fpm	kts	ltr.	U.S. gallons
below 1,5	300	3	none	
1,5-3	300- 600	3- 6	60	16
3 -5	600-1000	6-10	100	27
more than 5	1000	10	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 thermaling performance and handling, waterballast in the fintank should be used to compensate the forward move of C.G. due to the waterballast 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. 2.13 !
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	175 km/h	(95 kts)
3. Stall turn	Entry Speed	170 km/h	(92 kts)
4. Chandelle	Entry Speed	170 km/h	(92 kts)
5. Lazy Eight	Entry Speed	150 km/h	(81 kts)

Spins:

Caution: Stationary spinning is only possible at aft C.G. **positions** 340-380 mm (13.4-15 in.) behind datum.
Therefor spinning should only be executed at these C.G. positions. The C.G. position is determined according to sect. 6.8.
It is not necessary to extend the dive brakes during spin recovery. The DG-600 shows a very large nose down pitch after leaving spin. So you have to flare out correspondingly.

With **forward C.G. position** the DG-600 will not remain in a spin. Trying to induce a spin in the usual manner will result in a slip or a stall over one wing with the DG-600 recovering after a certain amount of 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 2 or 3 turns. Reaching this state you have to recover immediately.
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:
Opposite full rudder, pause, then ease stick forward. After the spin has stopped, neutralize the controls and carefully pull off excess speed.
Height loss during recovery is 50-80m(160-260 ft), the max. speed is 190 km/h (103 kts).

Section 5

5.1 Introduction

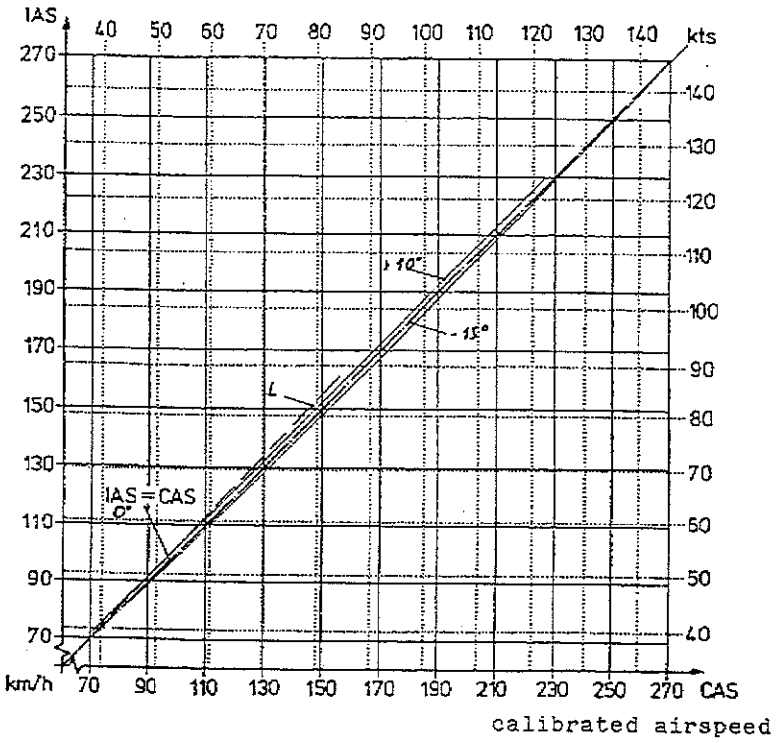
Section 5 provides approved data for airspeed calibration, stall speeds and take-off performance and non-approved additional information.

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

Indicated airspeed



Caution: The airspeed indicator is to be connected to the static ports and pitot probe in the fuselage nose.

5.2.2 Stall speeds

Min. airspeed in level flight.

Airbrakes retracted

Flap setting	wing loading				
	30	35	40	44	48 kg/m²
	6.1	7.2	8.2	9.0	9.8 lbs/ft²
L = +15°	64	69	74	78	81 km/h
	34.6	37.3	40.0	42.1	43.7 kts
+ 10°	65	70	75	79	82 km/h
	35.1	37.8	40.5	42.7	44.3 kts
0°	69	75	80	84	87 km/h
	37.3	40.5	43.2	45.4	47.0 kts
- 15°	74	80	85	90	94 km/h
	40.0	43.2	45.9	48.6	50.8 kts

Airbrakes extended

Flap setting	wing loading				
	30	35	40	44	48 kg/m²
	6.1	7.2	8.2	9.0	9.8 lbs/ft²
L	69	75	80	84	87 km/h
	37.3	40.5	43.2	45.4	47.0 kts
+ 10°	70	76	81	85	89 km/h
	37.8	41.0	43.7	45.9	48.1 kts
0°	73	79	84	88	92 km/h
	39.4	42.7	45.4	47.5	49.7 kts
- 15°	77	83	89	93	97 km/h
	41.6	44.8	48.1	50.2	52.4 kts

Flight mass		wing loading			
		15 m		17 m	
kg	lbs	kg/m²	lbs/ft²	kg/m²	lbs/ft²
330	726	30.1	6.16	28.5	5.84
380	838	34.7	7.11	32.8	6.72
430	950	39.3	8.05	37.1	7.60
480	1058	43.8	8.97	41.4	8.48
525	1157	47.9	9.81	45.3	9.28

The max. loss of height for stall recovery is 30 m 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

Measured by DLR/Idaflieg at DG-600 ser.no. 6-5

Performance data with 15 m span (S= 10.95 m², 117.9 ft²)

Wing loading	kg/m²	30	35	40	48
	(lbs/ft²)	(6.1)	(7.2)	(8.2)	(9.8)
min.sink rate	m/s	0.54	0.58	0.62	0.68
	(ft/min)	(106)	(114)	(122)	(134)
at V	km/h	80	86	92	100
	(kts)	(43)	(46)	(50)	(54)
best glide ratio	/	42.8	43.0	43.2	43.8
at V	km/h	95	103	110	120
	(kts)	(51)	(56)	(59)	(65)

Performance data with 17 m span (S= 11.59 m², 124.8 ft²)

Wing loading	kg/m²	30	35	40	45
	(lbs/ft²)	(6.1)	(7.2)	(8.2)	(9.2)
min.sink rate	m/s	0.50	0.53	0.57	0.61
	(ft/min)	(98)	(104)	(112)	(120)
at V	km/h	78	84	90	95
	(kts)	(42)	(45)	(49)	(51)
best glide ratio	/	48.3	48.5	48.7	49.2
at V	km/h	94	102	109	115
	(kts)	(51)	(55)	(59)	(62)

A variation in speed by + 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. (2ft/min).

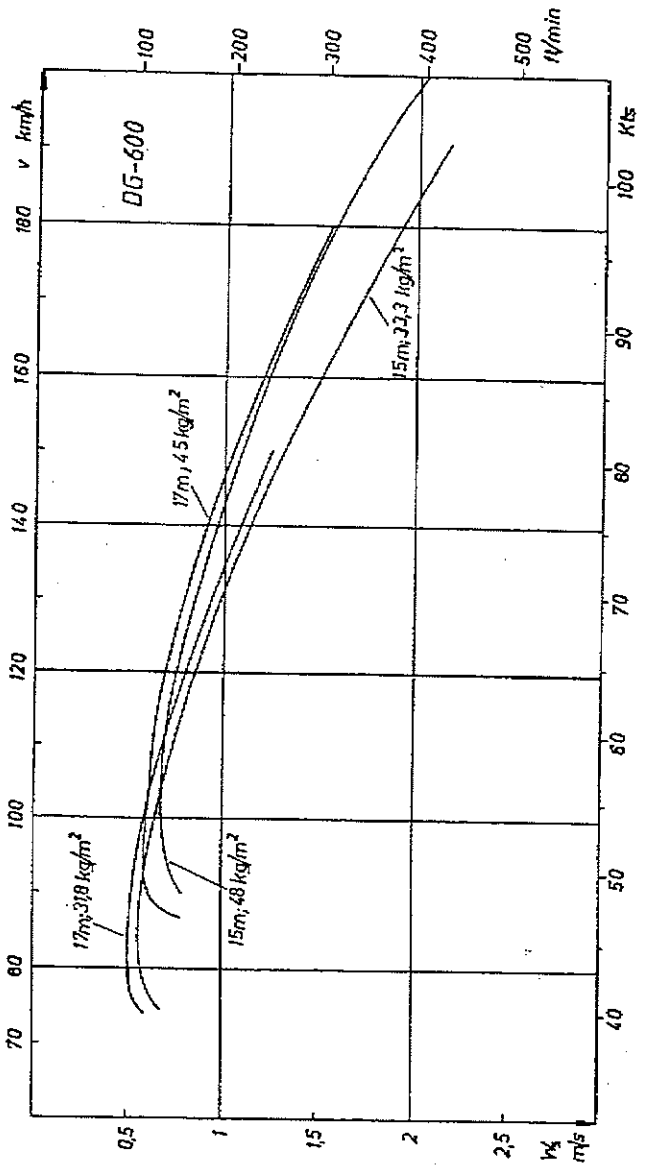
The aircraft should be flown with medium C.G. position (50-70%). At the aft C.G. limit the DG-600 is pitch sensitive which makes it difficult to fly with optimum thermaling speed.

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 ccordingly.

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

W/S (kg/m²)	30	35	40	44	48
flap +10°	upto 72	- 78	- 83	- 87	- 90
+ 5°	72-77	78- 83	83- 89	87- 94	90- 98
0°	77-86	83- 92	89- 99	94-104	98-109
- 5°	86-124	92-134	99-143	104-150	109-157
-10°	124-176	134-190	143-204	150-214	157-223
-15°	176-VNE	190-VNE	204-VNE	214-VNE	223-VNE

Speeds in kts

W/S (lbs/ft²)	6.1	7.2	8.2	9.	9.8
flap +10°	upto 39	- 42	- 45	- 47	- 49
+ 5°	39-42	42- 45	45- 48	47- 51	49- 53
0°	42-46	45- 50	48- 53	51- 56	53- 59
- 5°	46- 67	50- 72	53- 77	56- 81	59- 85
-10°	67- 95	72-103	77-110	81-116	85-120
-15°	95-VNE	103-VNE	110-VNE	116-VNE	120-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.
Set the flaps earlier, the higher the g-loads.
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 30 km/h (16 kts) at high speeds.

Section 6

6.1 **Introduction**
This section contains the payload range within the sailplane may be safely operated.
A procedures for calculating the inflight 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-600 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 (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 inflight 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 **246 kg (542 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)**

Max. weight without waterballast = WNLP + W wings

Max. weight with waterballast = 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 65 l (17.15 U.S. gal) or 90 l (23.8 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 (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).

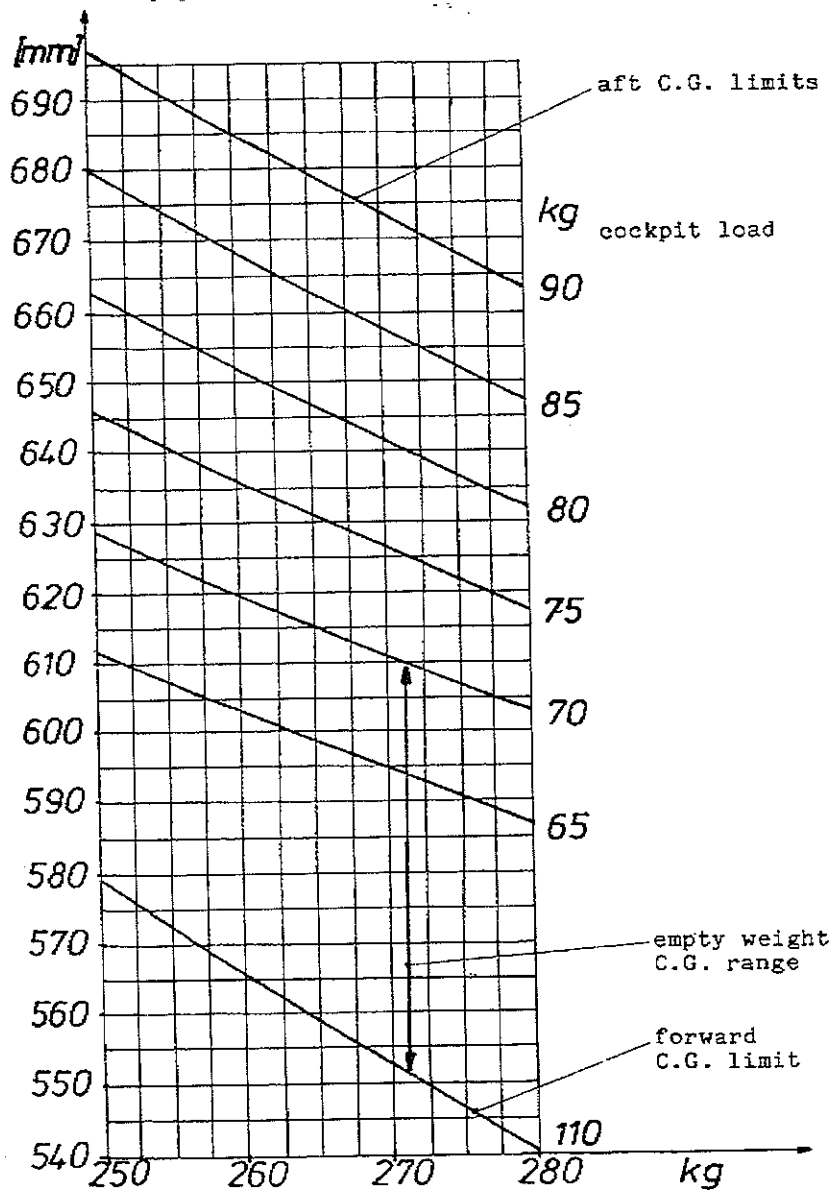
Weighing report (for 6.3)
Distances in mm, masses in kg

25.4 mm = 1 inch 1 kg = 2.2046 lbs.

Date of weighing:		14.2.03				
executed by:		G+K				
Date of equipment list:		4.02.03				
empty mass	15 m	263,95				
	17 m	269,15				
empty mass C.G.	15 m	653,4				
	17 m	648,2				
max. mass without W.B.	15 m	381,5				
	17 m	388,3				
max. load without W.B.	15 m	117,55				
	17 m	117,55				
max. load with W.B.	15 m	261,05				
	17 m	216,85				
cockpit load	min. (with battery in baggage compartment)	83				
	min. (with battery (4,3 kg) in the fin)	103				
	max.	110				
Inspector signature, stamp						

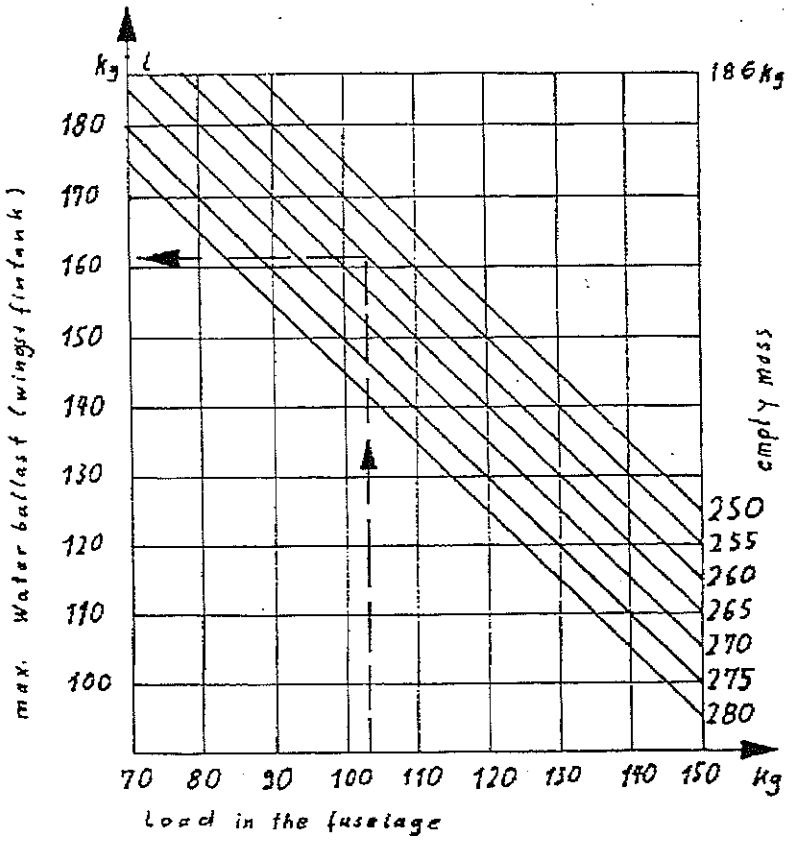
Note: If there is a provision to install a battery in the fin, the weighing is to be executed with this battery (Z 07, mass 4.3 kg - 9.5 lbs).
If there is no battery compartment in the fin, the weighing is to be executed with a battery in the baggage compartment.

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



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

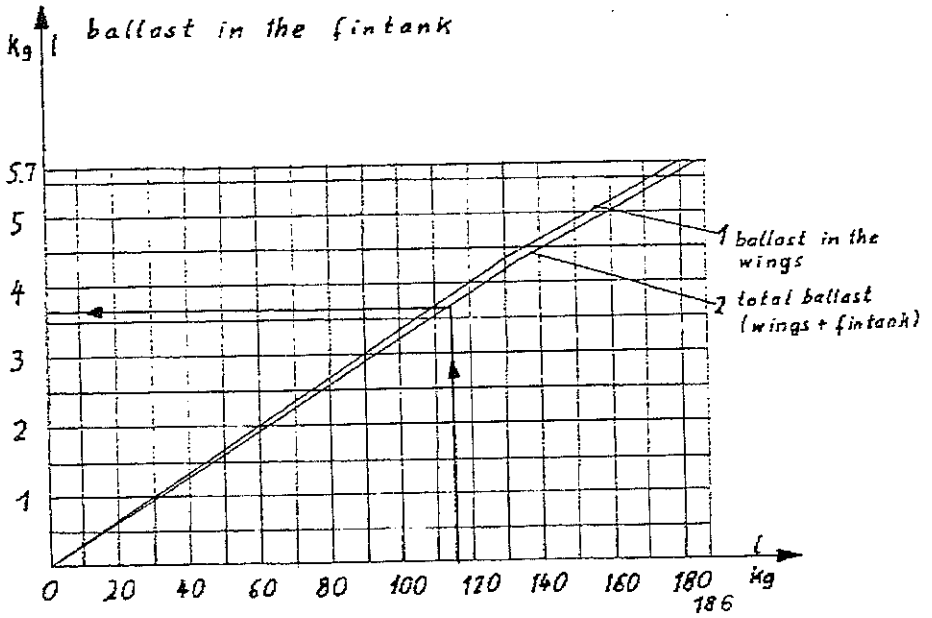
DG-600 ballast chart (for 6.8)
to determine the max. allowable waterballast in the wing tanks and in the fin tank.



1 kg = 2.2046 lbs

3.785 kg (l) = 1 US gal.

DG-600 ballast chart (for 6.8)
to determine the max. amount of ballast in the fin tank.



Example: From the diagram on page 6.7 a max. allowable ballast of 114 kg (wings + fintank) was determined. Curve 2 of the above diagram gives a fin ballast of 3.65 kg. The crossing point of the horizontal line with curve 1 gives the corresponding amount in the wing tanks of 110 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 inflight 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	260	0.57	148.2
pilot	78	- 0.51	- 39.8
waterballast in the wings	145	0.218	31.6
waterballast in the fin	4.7	4.378	20.58
battery	4.3	4.312	18.5
sum	492	CG=0.364	179.1

CG=moment/mass

The limits of the inflight C.G. 0.22 m - 0.38 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 page 33. 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:

$$XP = (XSF \cdot MF - XSE \cdot ME)/MP$$

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	-0.542	-0.493
105	-0.543	-0.495
100	-0.544	-0.497
95	-0.545	-0.499
90	-0.546	-0.501
85	-0.547	-0.503
80	-0.548	-0.506
75	-0.549	-0.508
70	-0.550	-0.510
65	-0.551	-0.512
60	-0.552	-0.514
55	-0.553	-0.516

Further C.G. positions:

Baggage or battery in baggae compartment:	0.210 m
Waterballast in the wings:	0.218 m
Waterballast in fintank:	4.378 m
Battery in fin:	4.312 m
Instruments:	- 1.030 m
Removable Ballast (Option see 7.13.1):	- 1.175 m

Section 7

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-600 is a singleseater high performance sailplane with 15 m wing span and wing tip extensions for 17 m span and with flaperons.
With 15 m wing span normal wing tips and as an option small winglets are available.

Construction

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

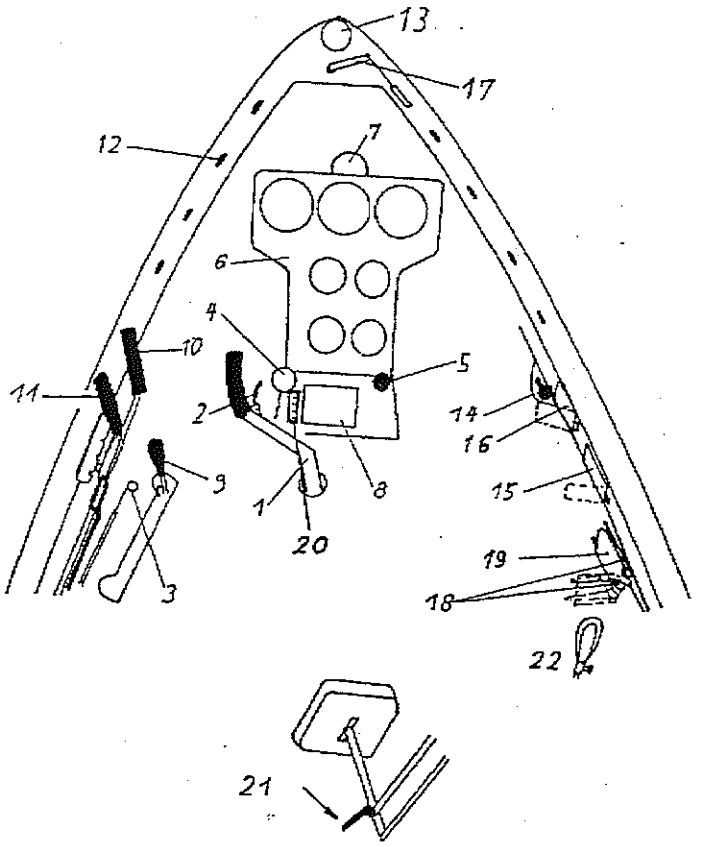
Canopy
Large single piece canopy, hinged at the nose, supported by a gas strut. Canopy glass made from clear Plexiglas or Plexiglas GS green 777 as option.

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

Color Airframe: white

registration numbers: grey RAL 7001
or red RAL 30101
or red RAL 3000
or blue RAL 5012

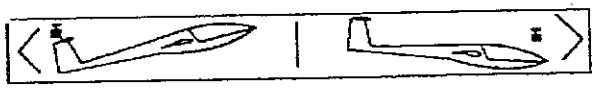
7.3 Cockpit, cockpit controls and placards



1) Control Column - Parallelogram type

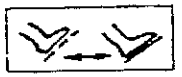
2) Release lever for the trim mechanism - green.
Operation see sect. 7.4.

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 6 x M 4, the cover can be removed towards the front.

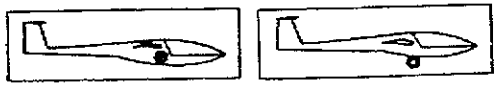
7) Compass installation position.

8) Radio installation position.

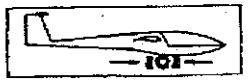
9) Undercarriage retraction - extension handle - black

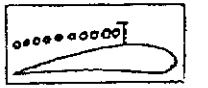
forward - undercarriage down
back - undercarriage retracted

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.

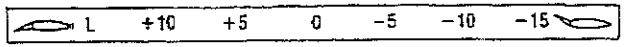


10) Airbrake handle - blue
The wheel brake is operated at the end of the air-brake handle travel and the flaps will be moved from negative to neutral.





11) Wing flap handle - black

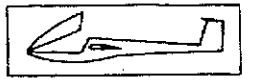


12) Constantly open anti fogging air vents

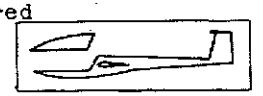
13) Main air vent

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

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) Adjustment lever for the head rest. Should the clamping force not be strong enough, tighten the other three mounting bolts also.

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

Elevator control:
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.
Spring trimmer with release lever at the control stick and position indicator at the left cockpit wall.
See diagram 1 M.M.
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).

Aileron and wingflap control:
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.
See diagram 3 and 4 M.M.

7.5 Airbrakes

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.
See diagram 3 and 4 M.M.

7.6 Landing gear see diagram 2 M.M.

a) Main wheel: retractable, assisted by a gas strut.
Spring mounted with steel compression springs.
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 (46 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 "Europa G 73"or "Europa G 88" for winch- and aerotow installed near the C.G.

additional as option "nose release E 75" or "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. 7.12 item 22).
The backrest can be screwed to the seat shell at 3 dipperent positions dependent on the thickness of the parachute.

7.9 Baggage compartment

Max. load 15 kg (33 lbs).
Each floor can carry 7.5 kg (16.5 lbs). Heavy pieces of baggage must to be secured to the floors.
The right floor is equipped with a compartment suitable for a battery no. Z 01.

7.10 Waterballastsystem see diagram 5 M.M.

a) The wingtanks are constructed as double wall bags with a capacity of 65 l(17.15 U.S.gal) or 90 l (23.8 U.S. gal) per wing. The 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 l (1.6 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 isll be 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**
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.
See diagram 6 M.M.
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. The white handle will be opened automatically by this.
The steel compression spring installed at the hinge will lift the canopy in the front, so that the oncoming air will blow it away.
Checking the emergency release on the ground:
Pull the emergency release knob, the canopy should spring open 1-2 cm (.4 in. to .8 in.) at the nose.
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 meachnism should be in the open position. Place the canopy on the hinge and press down. Relocate the locking mechanism.

7.13 **Miscellaneous equipment**

7.13.1 **Removable Ballast** (Option)
The ballast box at the right hand side of the instrument console underneath the carpet can accomodate 3 lead ballast weights 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**
Approved system: Dräger Höhenatmer E 20088
(demand diluter system)
For installation follow installationplan EOD see enclosure to M.M.
The system must be operated in accordance with the instructions of the manufacturer Mess.Dräger.
Max. capacity of oxygen bottles:
a) with diameter of the housing tube 104mm (4.1 in) max. 4 l
b) with diameter of the housing tube 135mm (5.3 in) (Option) max. 5l (US oxygen bottle size)

7.13.3 **ELT Emergency Locator Transmitter**
Approved system: Mar. Tech Devision EB-2B (CD)
Certification data sheet
Nr. 10.915-2
For installation follow installationplan 6 E 20 see maintenance manual.
The system must be operated in accordance with the instructions of the manufacturer Mar Tech Devision:
DAP Service manual, ELT EB-2B (CD) Eagle.

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 (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 plexiglass 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.

Section 8

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-600" have to be followed.

Before each rigging all the connecting pins and bushes should be cleaned and greased. This includes the control connectors. Every 3 months, 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-600 repair manual.
No repairs should be carried out without refering to the manual.

8.4 Tie Down, Parking

There are holes in the wingtip skids for securing the sailplane. 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 of freezing! On sunny days the cockpit should be closed and covered.

Note: Longer parking with exposure to sun and humidity will cause premature aging 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 and 17 m 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 occure 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 recommuded.

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 at the tail dolly and a wing tip wheel.

The tow bar and wing tip wheel may be ordered through the Glaser-Dirks factory.

8.7 Cleaning and Care

Exterior surfaces of the fibrereinforced 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)

- Longterm 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

Section not effective

Section 9

9. Supplements

9.1 Winglets at the 17m wingtip extensions

9.1 Winglets at the 17m wingtip extensions

Section 1

Introduction

In the following text the changes to those sections of the flight manual will be given which are effected by the installation of winglets at the 17m wingtip extensions.

Brief description

In addition to the wingtips described in sections 1 up to 8 of the flight manual, wingtips with 17m span and winglets are approved.
The installation of the winglets to the 17m wingtips must be executed according to the technical notes:
TN 370/4 for the DG-600 versions and
TN 866/3 for the DG-600M versions.

The height of the winglets is 0,30m (11.81 in.).

Section 2

Limitations

The max. take-off mass is reduced from 525kg (1157lbs.) to 480kg (1058lbs.).
The max. mass for selflaunch is unchanged at 440kg (970lbs.)!

Limitation placards

The placard shown below must be installed beside the limitation placard on the left cockpit side cover.

Max. mass with 17m span with winglets 480 kg (1058 lbs.)

9.1 Winglets at the 17m wingtip extensions

Section 5

Gliding performance

Comparison with 17m span:

Thanks to the winglets the max. L/D is increased by approx. one point.
The min. sink is reduced by approx. 0.015 m/s (0.3 ft/min.).