0.1 Record of revisions continued

Rev. No.	Affected Pages/ section	Description	Issue Date	EASA Approval Date	Inserted Date Signature
8	0.5, 9.1-9.12	Electrically operated main landing gear TN1000/14	November 2008	28. January 2009	
9	0.6, 9.1, 9.2, 9.13	Special equipment for very small pilots TN1000/17	May 2010	20. July 2010	
10	0.2 – 0.5, 1.4, 1.5, 2.9, 2.10, 4.3, 4.5, 4.6, 4.8, 4.9, 4.12, 6.3 ÷ 6.6, 6.11, 7.1, 7.2, 7.8, 7.10, 7.12, 7.13, 9.7, 9.13	Manual revision TN1000/18	February 2011	13.05.2011	

0.2 List of effective pages

Section		page	issued	replaced/	replaced/
0		0.0	March 2002		
		0.1	see manual amendments		
		0.2	"		
		0.3	"		
		0.4	"		
		0.5	"		
		0.6	March 2002		
1		1.1	"		
		1.2	"		
		1.3	"		
		1.4	"	Febr. 2011	
		1.5	"	Febr. 2011	
		1.6	"		
2	App.	2.1	March 2002	Sept. 2003	
	"	2.2	"		
	"	2.3	"		
	"	2.4	"		
	"	2.5	"	May 2008	
	"	2.6	"		
	"	2.7	"	January 2005	
	"	2.8	"		
	"	2.9	" Febr. 2011	Sept. 2003	May 2008
	"	2.10	"	Febr. 2011	
	"	2.11	"	Sept. 2003	
	"	2.12	"	May 2004	May 2008
3	"	3.1	March 2002		
	"	3.2	"	May 2004	Oct. 2004
	"	3.3	"		
	"	3.4	"		
	"	3.5	"	January 2005	
4	"	4.1	March 2002	January 2005	
	"	4.2	"		
	"	4.3	"	May 2004	Febr. 2011
	"	4.4	"		

0.2 List of effective pages (cont.)

Section		Page	issued	replaced/	replaced/
4	App.	4.5	March 2002 Febr. 2011	Sept. 2003	June 2004
	"	4.6	"	Febr. 2011	
		4.7			
	"	4.8	"	Febr. 2011	
	"	4.9	"	Febr. 2008	Febr. 2011
	"	4.10	"		
	"	4.11	"		
	"	4.12	"	Febr. 2011	
	"	4.13	"	Febr. 2008	
	"	4.14	"		
	"	4.15	"		
	"	4.16	"		
	"	4.17	"	January 2005	
	"	4.18	"		
	"	4.19	"		
	"	4.20	"		
	"	4.21	"		
	"	4.22	"		
	"	4.23	"		
	"	4.24	"		
5	"	5.1	March 2002		
	"	5.2	"		
	"	5.3	"		
	"	5.4	"	Sept. 2003	
	App.	5.5	"		
		5.6	"		
		5.7	"		
6		6.1	March 2002		
		6.2	"		
		6.3	"	Sept. 2003	Febr. 2011
		6.4	"	Febr. 2011	
		6.5	"	Sept. 2003	Febr. 2011
		6.6	"	Febr. 2011	
		6.7	"		
		6.8	"		
		6.9	"		
		6.10	"	Sept. 2003	
		6.11	"	Febr. 2011	

0.2 List of effective pages (cont.)

Section	Page	issued	replaced/	replaced/
7	7.1	March 2002	Febr. 2011	
	7.2	"	Febr. 2011	
	7.3	"		
	7.4	"		
	7.5	"	Febr. 2008	
	7.6	"	June 2004	
	7.7	"		
	7.8	"	Febr. 2011	
	7.9	"	Febr. 2011	
	7.10	"	Sept. 2003	Febr. 2011
	7.11	"	Oct. 2004	
	7.12	"	Febr. 2011	
	7.13	"	May 2008	Febr. 2011
8	8.1	March 2002		
	8.2	"		
	8.3	"		
	8.4	"		
	8.5	"		
	8.6	"		
9	9.1	March 2002	May 2010	
	9.2	"	May 2010	
	9.3	"		
	9.4	"		
	9.5	"		
	9.6	"		
	9.7	"	Febr. 2011	
	9.8	"		
	9.9	"		
	9.10	"		
	9.11	"		
	9.12	"		
	9.13	May 2010	Febr. 2011	

1.4 Descriptive data

The DG-1000S is a two-place high performance sailplane for training and cross country flying and in addition for aerobatic training.

The DG-1000S is available with different spans:

A) Wing constructed from carbonfibre reinforced plastics with parting at y= 8,6m and wing tips for 20 m span with Winglets.
   Wing tips for 18 m span are optional.
B) Wing constructed from carbonfibre reinforced plastics with 18 m span without parting.
   Parting at y= 8,6m is optional

- Automatic hook ups for all controls.
- Comfortable seating and modern cockpit design similar to the DG-single-seaters - safety cockpit.
- Large 2 piece canopy for very good in-flight vision.
- Draught free canopy demist and 1 adjustable swivel air vent for each pilot.
- Sealed airbrake and landing gear boxes.
- Controls in each cockpit.
- All controls are operated with the left hand, which enables the right hand to remain on the control stick.

The DG-1000S is available with 3 different versions of the undercarriage:

A) Very high spring mounted retractable main wheel with disc-brake, tail wheel.
B) High spring mounted retractable main wheel with disc-brake, tail wheel and nose wheel
C) Fixed spring mounted main wheel with disc-brake, tail wheel and nose wheel.
   The main undercarriages versions B and C are interchangeable.

Other characteristics:

Waterballast in the wings and in the fin are optional with 18m span and standard with 20m span.

Standard: A ballast-box is installed in the fin. It can be used to compensate the mass of the rear pilot and as a trim-possibility for heavy pilots.
Max. ballast capacity: 12 kg.

Option: 2 ballast boxes in the front cockpit. The trim-weights used for the trim-ballast box in the fin also fit into these ballast boxes.

Technical data

Span	m	18	20
Wing area	m^2	16,72	17,53
Aspect ratio	/	19,38	22,82
Length	m	8,57	
Fuselage height	m	1,0	
Fuselage width	m	0,73	
Span of the horizontal tailplane	m	3,2	
Waterballast Wings	max. kg (l)	160	160
Waterballast fin	max. kg	6,2	
Trim ballast fin	max. kg	12	
Empty mass with basic instruments*	ca. kg	411	415
Wing loading (with one Pilot 80kg)	ca. kg/m²	29,4	28,2
max. take off mass (max. TOW)	kg	750	750
max. wing loading	kg/m²	44,9	42,8
Aerobatics		unlimited Category „A“	simple
max. TOW for aerobatics	kg	630	630
max. speed	km/h	270	270

*Options will increase the empty mass accordingly!

2.10 Minimum equipment

As minimum equipment only the instruments and equipment specified in the equipment list (see maintenance manual) 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 (0-165kts.);
Speed range markings see sect. 2.3

Altimeter Range: 0 – min. 10.000 m,
Altimeter with fine range pointer, 1 turn max. 1000 m (3000 ft.)

Four piece symmetrical safety harness

VHF - transceiver (ready for operation)

Outside air temperature gauge with probe in the fuselage nose.
Marking blue for temperatures below 2°C, (36°F).

Battery Z110 or a ballast weight of 5.5kg (12.1 lbs.) installed in the battery box in the fin

Parachute automatic or manual type or a suitable firm back cushion approximately 8 cm (3 in.) thick for the front seat and 3 – 8 cm (1 – 3 in.) thick for the rear seat

Required placards, check lists

Flight and maintenance manual.

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

Magnetic compass compensated in the aircraft.

Variometer

Turn and bank indicator

c) **In addition for aerobatics** (Category Aerobatic)

Accelerometer capable of retaining max. and min. g-values with markings red radial lines at +7 g and -5 g.

Remark:
Experience has shown that the installed airspeed indicator system may be used for cloud flying.

2.11 Aerotow, winch and autotow launching

2.11.1 Weak links

	Winch launching	aerotow
max.	11000 N (2425 lbs.)	11000 N (2425 lbs.)
recommended	10000 N $\pm$ 1000 N (2200 lbs. $\pm$ 220 lbs.)	10000 N $\pm$ 1000 N (2200 lbs. $\pm$ 220 lbs.) for tow behind aeroplanes 6000 N $\pm$ 600 N (1323 lbs. $\pm$ 132 lbs.) for tow behind slow tow planes eg. Ultralight planes or touring motorgliders

2.11.2 Towing cables

For aerotow 30-70 m (100 - 230 ft)
Material: hemp- or plastic fibres

2.11.3 Max. towing speeds

		maximum	maximum
Aerotow	V_T =	185km/h	100 kts.
Winch- and autotow	V_W =	150 km/h	81 kts.

2.11.4 Tow Release

The C.G. tow release (installed in front of the main wheel) is suitable only for winch- and auto launching..
The nose hook is to be used only for aerotow.

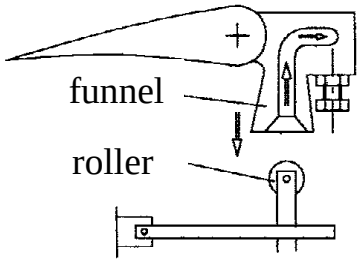
2.12 Crosswinds

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

4. Rigging of the stabilizer
   Install the battery Z110 or a ballast weight of 5.5kg (12.1 lbs.) in the battery box in the fin, connect the battery. Exemption for extremely light pilots, see section 6.8.4.
   Caution: Rigging of the horizontal tailplane is only permitted with **nose down** trim-setting. Therefore operate the trim release lever and push the control stick forward, then release the lever to engage the trim (don't operate the trim control knob, the trim should not be pushed to the most nose down position).

   Screw the tool W 38/2 into the securing plate (near the top of the left surface of the fin). Pull out the securing plate with the tool, move it downwards to engage in the rigging position. 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 engage and slide forward in the funnel if you hold the elevator in the pertinent position.

   Release the securing device by pulling out with the tool and engage the securing device by lifting the tool. The securing plate must be flush with the surface of the fin. Screw out the tool.

   Check for correct elevator connection by looking from the rear into the gap at the right hand side of the rudder.

5. Rigging of the outboard wing panels (20m wing extensions or 18 m wing tips): Insert the wing tip extensions into the wing. Press in the locking pin with your finger.
   Insert the wing tip as far as the aileron connector starts to slide onto the aileron.
   Strike firmly with the palm of your hand on to the wing tip to lock in the wing tip extension.

6. Tape the gaps of the wing-fuselage junction and at the wing joint.

7. Execute a positive control check, one helper to hold firmly the control surfaces is needed.

4.2.3 Filling the fin ballast tank

This tank must be filled after filling the wingtanks. Determine the amount (see section 6.8.6). Connect the transparent funnel equipped filling hose (supplied with the aircraft) via the hose connector GRS 10-12 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.
Fill with clean water using a graduated measuring vessel.
In addition you may check the content level by holding the filling hose against the scale on the fin.
After filling, push the fin tank dump lever in a forward direction (the dump valve will be closed by a spring).
Then remove the filling hose with the hose connector.

4.2.4 Ballast box in the fin

To fill the ballast box remove the Plexiglas cover plate by inserting a 6mm pin into the hole of the upper locking device and move the locking pin downwards. Determine the amount of trim-weights according to section 6.8.7. Slide the weights into the rails of the box. The heavy weights with 2,4 kg (5.3 lbs.) each must be installed in the lower 4 sections and the lighter weights with 1,2 kg (2.65 lbs.) each in the upper 2 sections. It doesn't matter in which sections the weights are installed (in case that not all sections will be filled up), but it is not allowed to insert the light weights into the sections for the heavy weights. Close the compartment.
Caution: When changing trim ballast, check condition and correct gluing of the foam rubber rings 10L45/2 in the ballast box in the fin. Without these rings a correct indication is not possible.
Replace damaged rings according to Service Info 67-07, attached to the MM.

Warning: Check that the locking device has engaged completely.
Tape the cover of the fin ballast box with tape min. 19mm (3/4 in.) wide prior to each flight.
A control light in the front instrument panel starts blinking after each transaction with the weights. By counting the amount of blinks, the amount of ballast can be determined. For a heavy weight 2 blinks appear and 1 blink for a light weight, this means 10 blinks if the box is filled up completely. After a pause of 2-3 seconds the blinking will be repeated etc. The blinking can be stopped by pressing on the control light. Pressing again on the control light reactivates the blinking feature.
After filling the ballast box you should check the correct indication of the control light.

Ballast box in the fin cont.

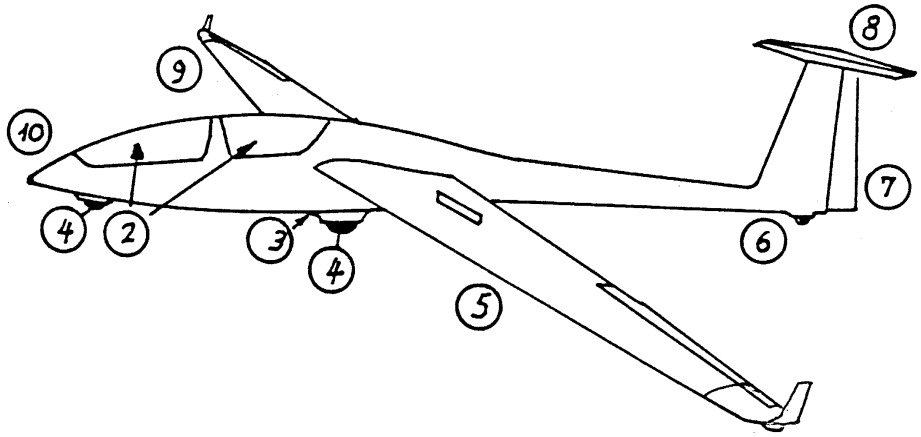
In addition with TN413/4 executed, standard from ser. no. 10-49 on:
A switch will be operated by the locking pin of the ballast box cover. As long as the switch is not closed, the control light for the ballast box will blink with doubled speed without interruption. The blinking can't be switched off by pressing on the control light contrary to the blinking which indicates the amount of ballast.

4.2.5 Derigging

Derigging follows the reverse of rigging.
Waterballast must be dumped first.
Lock the airbrakes.
For disassembling the securing pins of the wings the tool W 38/2 must be screwed into the thread completely.
The brass part of the tool will then disengage the securing of this bolt.
It is recommended to leave the securing pin in the right wing while you derig the left wing.

Derigging of the outboard wing panels (20m wing extensions or 18 m wing tips):
Use a 6 mm diameter pin for pressing in the locking pin on the wings upper side.
Pull out the wing tip or the wing tip extension.

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 section 7.14 (not each day, but min. every 3 month);
   c) check the main pin securing;
      check the securing ropes of the headrest (not applicable for the Version mounted at the lift pin tube);
   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 for wear and function;
   h) check the radio and other parts of the electric system (fuses!) for function. If there is no electrical power, it can be expected that the battery in the fin is not fitted. **Flying without this battery is only permitted when flying solo with an extremely under weight pilot, (see paragraph 6.8.4) otherwise the forward C.G. limit may be exceeded**
   i) check the brake fluid level;
   j) check if the fin tank is empty
3. C.G. Tow hook
   a) check the ring muzzle of the C.G. hook for wear and function;
   b) check for cleanliness and corrosion;

4. Main landing gear and nose wheel (if fitted)
   a) check the struts, the gear box, the gear doors and the tyre for wear; dirt in the struts can hinder the landing gear from locking over centre the next time!;
   With TN1000/13 executed, standard from ser. no. 10-133 on:
   Check all parts of the landing gear positive locking device (notch and latch at the landing gear struts) for dirt. Check the Bowden cable for damage.
   b) check the tyre pressure;
   main wheel: 2.5 bar - 36 psi
   nose wheel: 2.5 bar - 36 psi
   c) check wheel brake and hose for wear and function;
5. Left wing
   a) check locking of the outboard wing;
   b) check the aileron for excessive free play;
   c) 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 backwards in direction of flight. If there is any water in the airbrake box this has to be removed;
   d) check the locking of the rear wing attachment pin.
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: 4 bar -58 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;
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 from the rear into the gap at the right hand side of the rudder;
   c) check the securing of the stabilizer;
   d) check the horizontal tail for free play;
   e) check the TE or Multiprobe for correct insertion and fix it with tape
   f) check the trim-weight box, correct number of weights, locking device completely engaged?

Caution: When changing the trim ballast check condition and correct gluing of the foam rubber rings to the mounting plate of the optical sensors in the trim-weight box. Without rings an indication error of the control lamp in the front instrument panel might occur. Replace missing rings according to Service Info 67-07 (attached to the maintenance manual).

9. Right wing see item 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.
    c) check the nose hook for cleanliness and corrosion.

4.5.1.2 Winch launch

Winch launch is only allowed at the C.G. tow hook!
Set the trim to neutral for winch launch.

Caution: During ground roll and initial take-off (especially when flying solo) push the control stick to a forward position to prevent excessive nose-up pitching rotation during initial take-off.

After reaching safety altitude gradually pull back on the stick, so that the glider will not pick up excessive speed. Don't pull too hard.
After reaching release altitude pull the tow release knob.

Recommended winch launch airspeed 110-130 km/h (60-70 kts.).

Caution: Do not fly at less than 90 km/h (49kts.) or not more than 150 km/h (81 kts.).
Warning: Winch launch with high take off weight requires a powerful winch!

4.5.2 Free flight

Stalling characteristics (level and turning flight)
When stalled the DG-1000S will warn by buffeting. If the stick is pulled further the DG-1000S will drop one wing.
Only at forward C.G. positions the DG-1000S can be flown in stall without wing dropping, maintain control during stalled flight only with the rudder, holding the ailerons neutral.
With stick forward and opposite rudder if required, the DG-1000S can be recovered without much loss of height. Rain does not influence this behaviour noticeably. The loss of height is ca. 50 m (160 ft).
Stall airspeeds see section 5.2.2.

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

6.5 Mass of all non-lifting parts (WNLP)

The max. mass of all non-lifting parts is 469 kg (1034 lbs.).

WNLP is to be determined as follows:
WNLP = WNLP empty + cockpit load (pilots, parachute, baggage, trim ballast, waterballast in the fin, removable items of equipment etc.).
WNLP empty = Total empty weight incl. permanently installed equipment minus weight of the wings.

6.6 Max. mass (weight)

Category A „Aerobatic“

Maximum take off weight:	630 kg	1389 lbs.
Maximum landing weight:	630 kg	1389 lbs.

Category „Utility“
with waterballast:

Maximum take off weight:	750 kg	1653 lbs.
Maximum landing weight:	750 kg	1653 lbs.

without waterballast: Maximum take-off and landing mass = $W_{NLP} + W_{wings}$

W_{NLP} = Maximum mass of all non lifting parts (see above)
W_{wings} = actual mass of the wings

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 6.7.

6.8 Loading chart

6.8.1 Cockpit load

see weighing report section 6.8.8.

a) single seated:
   max. load in the front seat 110 kg (242 lbs)
   min. load in the front seat see placard in cockpit and weighing report
b) two-seated:
   max. cockpit load is 210 kg (463 lbs.) with a max. of 105 kg (231 lbs.) in the front seat or 110 kg (242 lbs.) in the front seat and 90 kg (198 lbs.) in the rear seat.
   min. cockpit load in the front seat is the min. cockpit load see a) minus 40% of the load in the rear seat.
c) With these loads, the C.G. range given under section 6.8.8 will be kept in the limits if the empty weight C.G. is in its limits.

With lower pilot weight necessary ballast must be added in the seat or in the optional ballast boxes see below. Ballast put on the seat (lead ballast cushion) must be fastened at the connections of the safety belts.

Note: Extremely light pilots may remove the fin battery, see section 6.8.4.

6.8.2 Removable ballast for underweight pilots

Option: Ballast boxes in the front cockpit for removable Ballast (trim weights), see section 7.15.1.

6.8.3 Baggage

max. 15 kg (33lbs)
Heavy pieces of baggage must be secured to the baggage compartment floor (screwing to the floor or with belts). 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.). The added load in the fuselage must not exceed the max. load without waterballast (W.B.) see weighing report section 6.8.8.

6.8.4 Battery in the fin

Only the use of the factory supplied battery Z110 (mass 5.5 kg, 12.1 lbs.) is permitted.
Warning: Flying is only allowed with the battery in the fin as otherwise the forward C.G. limit may be exceeded.
Instead of the battery a suitable weight of 5,5 kg may be used.
Note: Extremely light pilots may remove the fin battery. This lowers the min. front cockpit load by 16 kg (35 lbs.). Install a battery in the baggage compartment according to section 7.15.5 instead.

6.8.5 Waterballast in the wing tanks (Option)

The tanks have a capacity of 80 l (21,2 US gallons) per wing
The permitted amount of waterballast is dependent on the empty weight and of the load in the fuselage and can be determined from the diagram "**Ballast chart"** section 6.8.10.
It is only allowed to fly with symmetric wing ballast!

6.8.6 Fin ballast tank (Option)

Water ballast in the fin tank should be used to compensate the forward move of C.G. due to the water ballast 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 following table.

waterballast in the	
wings	fin
kg	kg
20	0,6
40	1,3
60	2,1
80	2,9
100	3,8
120	4,6
140	5,4
160	6,2
/	/

waterballast in the	
wings	fin
lbs.	lbs.
40	1,2
80	2,7
120	4,2
160	5,9
200	7,5
240	9,2
280	10,8
320	12,4
350	13,5

6.8.7 Ballast box in the fin

a) Compensation of the C.G. shift due to the rear pilot:

The ballast box can accommodate max. 4 weights of 2,4 kg mass (heavy weight) and 2 weights of 1,2 kg mass (light weight), so the max. mass is 12 kg.

The number of weights can be determined by the following table:

Mass of rear pilot		Number of trim weights	Number of blinks of the lamp in the front instrument panel see section 4.2.4
kg	lbs.		
55	121	2 heavy + 1 light	5
65	143	3 heavy	6
75	165	3 heavy + 1 light	7
85	187	4 heavy	8
95	209	4 heavy + 1 light	9
105	231	4 heavy + 2 light	10

Warning: When flying solo the ballast box must be emptied!
Otherwise you will fly with a dangerous C.G. position, exept see b).
If the ballast box is filled up, the min. cockpit load in the front seat is raised by 35 kg (77 lbs.).
The resulting value (min. cockpit load in front seat from weighing without ballast + 35 kg) must be entered in the table on page 6.7 as value XX and also on the placard at the indication lights for the fin tank on the front instrument panel.
When using the trim weights make sure not to exceed the max. weight of 750kg (1653 lbs.) Category „U" or 630kg (1389 lbs.) Category „A" .

b) Trim-possibility for heavy pilots:

The ballast box may be used for this purpose too.
One trim weight of 1.2 kg raises the min. load in the front seat by 3.5 kg (7.7 lbs.).
One trim weight of 2.4 kg raises the min. load in the front seat by 7 kg (15.4 lbs.).
Example:

Min. cockpit load of the glider:	70 kg	permissible amount of trim weights
Mass of the front pilot:	84 kg	2 x 2.4 kg
Mass of the rear pilot:	65 kg	3 x 2.4 kg or 2 x 2,4 kg and 2 x 1,2 kg
Total amount of trim ballast:		12 kg

This means that the ballast box can be filled completely for this example.
Higher pilot masses can't be compensated.

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

flight: v = near the forward C.G.
h = near the aft C.G.

Pilot mass [kg]	Pilot C.G. lever [m] Front cockpit		Rear cockpit	
	v	h	V	h
110	-1,388	-1,335	-0,317	-0,272
105	-1,390	-1,336	-0,318	-0,273
100	-1,391	-1,337	-0,319	-0,274
95	-1,392	-1,338	-0,320	-0,275
90	-1,393	-1,340	-0,321	-0,276
85	-1,395	-1,341	-0,323	-0,277
80	-1,396	-1,342	-0,324	-0,278
75	-1,397	-1,343	-0,325	-0,279
70	-1,399	-1,344	-0,326	-0,280
65	-1,400	-1,345	-0,328	-0,281
60	-1,401	-1,346	-0,329	-0,282
55	-1,402	-1,347	-0,330	-0,283

Further C.G. positions:

Baggage and battery in baggage compartment	0,270 m
Waterballast in the wings	0,206 m
Fin ballast tank (see section 6.8.6)	5,260 m
Ballast box in the fin (see section 6.8.7)	5,400 m
Instruments in front panel	-1,910 m
Instruments in rear panel	-0,740 m
removable ballast (in front cockpit, Option, see section 7.15.1)	-1,960 m
Battery in fin (see section 6.8.4)	5,340 m
Tail wheel /see section 7.15.4)	5,305 m

7 Sailplane and systems description

7.1 Introduction

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

M.M. = Maintenance manual

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

7.2 Airframe

The DG-1000S is a two-place high performance sailplane, either
with 18 m span or
with 20 m span and permanently installed winglets

Construction

Wings	CFRP-foam-sandwich-shell with CFRP-roving spar caps
Ailerons	CFRP-foam-sandwich-shell
Rudder	GFRP-foam sandwich-shell
Horizontal stabilizer	GFRP-foam sandwich-shell with CFRP-roving spar caps
Elevator	GFRP-shell
Fuselage	GFRP-shell, fuselage boom sandwich-shell with Tubus core

Canopy

Two canopies hinged at the right hand fuselage side. Canopy transparencies made from Plexiglas GS 241 or optionally green GS Green 2942.

Tailplane

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

Colour

Airframe:	white		
registration numbers:	grey	RAL 7001	(Pantone 444)
or	red	RAL 3020	(Pantone 485)
or	blue	RAL 5012	(Pantone 307)
or	green	RAL 6001	(Pantone 349)

7.6 Landing gear

The DG-1000S is available with 3 different versions of the undercarriage:

A) Very high, spring mounted, retractable main wheel with hydraulic disc brake, see diagram 7 M.M, tail wheel.

B) High spring mounted retractable main wheel with hydraulic disc brake, see diagram 8 M.M, tail and nose wheel

C) Spring mounted, fixed main wheel with disc brake, see diagram 9 M.M., tail and nose wheel.

The main undercarriages versions B and C are interchangeable.

a) **Main wheel:**
retractable, assisted by a gas strut (locked in retracted position by an overcentre locking device) or non retractable.
Spring mounted with steel compression springs, fully sealed landing gear box,.

Tyre:	380 x 150 6 PR, diameter 380 mm (15 in.),
Wheel:	Tost 5” wheel with disc brake, width 134 mm, axle 30 mm
Tyre pressare:	2,5 bar (36 psi)

b) **Tail wheel:**

Tyre	200 x 50 6 PR, diameter 200 mm (7,87in.)
Wheel:	Plastic hub with ball bearings, part. No. S23
Tyre pressure	4 bar (58 psi)

c) **Nose wheel** (only version B) and C))**:**

Tyre:	260 x 85, diameter 260 mm (10,2 in)
Wheel:	Tost 4” wheel, width 85 mm, axle 20 mm
Tyre pressure:	2,5 bar (36 psi)

7.7 Tow hooks

See diagram 5 M.M.
Safety release "Europa G 88" for winch launch installed near the C.G.
"nose release E 85" installed in the fuselage nose for aerotow.
Both hooks are operated by the same handles.

7.11 Ballast box in the fin

A box for ballast (trim-weights) is installed in the fin. It can be used to compensate the mass of the rear pilot and as a trim-possibility for heavy pilots. Max. ballast capacity: 12 kg.

Filling see section 4.2.4, determination of the permissible amount of ballast see section 6.8.7.

Indication of the amount of ballast inserted is via a control light in the front instrument panel see section 4.2.4 and section 7.3 item 23).

7.12 Electrical system

Battery in the fin.
For C.G. reasons the battery is installed in the fin. Only the use of the factory supplied battery Z110 (12 V, min. 12 Ah, mass 5.5 kg, 12.1 lbs.) is permitted.
The battery fuse is installed at the battery, type: G fuse 250 V with indicator 5 x 25 medium slow / 4 A.
After inserting the connector plug in the fin the battery is connected to the electrical system of the glider. If you want to charge the battery inside the glider this can be done via the socket see section 7.3 item 20).
Warning: Use only automatic chargers designed to charge sealed lead acid batteries. To charge the battery to its full capacity a charger with 14.4 V max. charging voltage is necessary (normal automatic chargers charge only up to 13.8V). Such a charger is available from DG Flugzeugbau code no. Z 08.
For periodical recharging the “power independent “ unit is suitable. This unit is also available from DG Flugzeugbau.

All current - carrying wiring confirms to aeronautical specifications.

7.15.2 Oxygen system

a) Installation of the oxygen cylinders
Max. size of oxygen bottle is 7 l capacity with diameter 140 mm (5.5 in.)- If a bottle with smaller diameter is used, this bottle must be wrapped with plastic to come to the same diameter of 140 mm. The bottle must be fixed at its neck with a bracket Z 14 (available at DG-Flugzeugbau GmbH).

b) Installation of the oxygen equipment
To ensure a safe installation ask DG Flugzeugbau for an installation instruction. For the installation of the Dräger Höhenatmer E 20088 you will find an installation plan 5EP34 in the maintenance Manual.

7.15.3 ELT Emergency Locator Transmitter and Transponder

Installation see maintenance manual DG-1000S section 6.

Caution: Concerning 7.15.2 and 7.15.3
The installation has to be accomplished by DG-Flugzeugbau or by an approved service station and to be inspected and entered in the aircraft log book by a licensed inspector.

7.15.4 Heavy tailwheel

Instead of the standard tailwheel with plastic hub S23 a tailwheel with brass hub S27/1 may be installed. The installation kit S27/4 is available at DG Flugzeugbau.
The difference in mass between both hubs is 3.1 kg (6.84 lbs.). With the brass hub the min. front cockpit load is increased by 8.5 kg (18.74 lbs.). This higher value must be entered in the cockpit data placards and on page 6.7. Even if the heavy tailwheel is installed only sometimes, the higher min. cockpit load must be entered.

7.15.5 Battery in the baggage compartment with battery selector switch

An additional battery Z01 12V 12AH may be installed in the baggage compartment.
The battery fuse is installed at the battery, type: G fuse 250 V 5 x 25 medium slow / 4 A.

A battery selector switch must be installed in the front instrument panel.
In the centre position of the switch both batteries are disconnected from the gliders electrical system.
In position **I** (left) the battery in the fin is connected to the electrical system.
In position **II** (right) the battery in the baggage compartment is connected to the electrical system.

From ser. No. 10-170 on and all ser. No.'s with electrically operated landing gear: The selector switch is installed in the console below the front instrument panel.

up= battery in baggage compartment

down= battery in the fin

4.5 Normal procedures

new subsection

4.5.12 Electrically operated main landing gear

4.5.12.1 Extension and retraction in flight

Retraction: For retraction switch and hold the toggle switch up and press the press button twice within 2 seconds. With each press on the button a signal will sound. The landing gear will retract automatically. You may let go of the switches. During retraction the centre (red) LED will shine and the upper green LED will blink. As soon as the landing gear is retracted and locked only the upper green LED will shine.

Warning: If the upper green LED doesn't start to shine and the red LED instead starts blinking refer to section 3.20 emergency procedures.

Extension: For extension switch the toggle switch down and let go.. The landing gear will be extended and locked.

During extension the centre (red) LED will shine and the lower green LED will blink. As soon as the landing gear is extended and locked only the lower green LED will shine.

Note: In case of high acceleration during extension or retraction an over current cut off system will switch off the spindle drive to protect the system. As soon as the g-loads decreasa, the landing gear will continue to travel.

Note: To save electrical power during flight the upper green LED will stop shining after approx. 5 minutes, landing gear retracted and locked.

4.5.11.2 Extending the landing gear via the emergency extension system.

The emergency extension system is also designed to be operated for in flight training purposes. Operation see section 3.19.

Resetting the system for normal operation should be executed after landing, for procedure see section 4.5.12.3.

Caution: It is strongly recommended to train the emergency extension in flight.

Note: Resetting the system for normal operation is also possible in flight. However, this is only permissible if there are 2 pilots on board, one pilot flying the glider and the other resetting the system.

Then you may retract the landing gear again according to section 4.5.12.1. to continue the flight.

9.4 Special equipment for very small pilots (TN1000/17)

To facilitate the operation of the glider by very small pilots 3 different items have been developed, which may be used separately or together.

9.4.1 Removable seat back for the front seat

a) Installation of the seat back: Install the seat back with 2 screws M6x16 DIN965 4.8 BIC with cup washers 15 x M6 MS NI NR4157 to the threads which have been installed according to working instruction No. 1 for TN1000/17.
b) The seat back may be adjusted further to the front by part Z198. Fix the part to the Velcro straps installed at the rear of the seat back.
c) DG-1000 from ser. no. 10-19 on: Remove the headcushion 8R80/2 from the holder on the rear instrument panel cover (fixed with Velcro). When removing the seat back reinstall the head cushion at the holder.
Install the head cushion see above to the Velcro straps installed at the front of the seat back. Instead of the approx. 70 mm (2.8 in.) thick head cushion a thinner head cushion approx. 40 mm (1.6 in.) thick may be used.
d) DG-1000 up to ser. no. 10-18: Remove the head rest from the seat (screwed connection. When removing the seat back reinstall the headrest.
Install a head cushion 8R80/4 to the Velcro straps installed at the front of the seat back.

9.4.2 Airbrake-pushrod with additional handle in front cockpit

For pilots with arms too short to lock the airbrakes an airbrake-pushrod with additional handle part 5St69/2 may be instead in the front cockpit according to working instruction No. 2 for TN1000/17 instead of part 5St69.
This part may remain in the glider for normal operation.

9.4.3 Rudder pedal plates for rear cockpit Z197

Pilots with very short legs may clip rudder pedal plates part no. Z197 on to the rudder pedals. Plates may be installed and removed as often as desired.