

Flight manual DG-800B

Warnings

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

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

- Never take-off without executing a serious pre-flight inspection according to the flight manual!
- Never take-off with a motorglider without checking the max. engine RPM and the ignition circuits!
- Always respect the relevant safety altitudes!
- With a motorglider never rely completely on the engine extending and starting. Plan your flight path so that you are always able to carry out a safe outlanding if necessary. Be aware that with the engine extended but not running the rate of sink increases remarkably. This means that with a motorglider you have to decide earlier for an outlanding than with a pure sailplane.
- Selflaunch only if you are sure that with an engine failure during the initial climb there is the possibility to execute a safe outlanding or to return to the airfield.
- Respect the stall speeds and always fly with a safety margin above the stall speed according to the flight conditions, especially at low altitudes and in the mountains.
- Use only the types of fuel and oil for your motorglider as specified in the flight manual.
- Use only the battery chargers as specified in the flight manual.
- Don't execute yourself any work on the control system except for greasing.
- Repairs and maintenance work should only be accomplished by the manufacturer or at certified repair stations rated for this type of work. A list of stations which have experience with DG aircraft may be obtained from DG Flugzeugbau..
- Even if no annual inspections are required in your country, have your aircraft checked annually (see maintenance manual section 2).
- Please pay attention to our web-site www.dg-flugzeugbau.de. There you will find the latest technical notes and service information for your glider:
<http://www.dg-flugzeugbau.de/en/maintenance-service-aircraft/technical-notes>
The „DG Pilot Info“ informs you immediately by e-mail about the publication of new technical notes and service information.
If you don't receive this info service, please click on the DG website on “News, Newsletter” Subscription to receive this service free of charge.

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0 Revisions

0.1 Record of revisions

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

The new or amended text in the revised page will be indicated by a black vertical line in the right hand margin, and the under lying document for the Revision and the date will be shown on the bottom of the page.

Note: Changes 1 up to 17 are not listed.

Rev. No.	Affected Pages/ section	Description	Issue Date	EASA Approval Date	Inserted Date Signatur e
18	all	New standardized format of the initial flight manual of Variant DG-800B	May 2012	14. Sept. 2012	
19	0.1, 1.2, 1.5, 1.6, 2.2, 2.5, 2.6, 2.9 ÷ 2.12, 3.4, 3.7, 4.5, 4.8, 4.9, 4.11, 4.15, 4.22, 4.25 ÷ 4.28, 5.3, 5.8 ÷ 5.10, 6.3, 7.2, 7.14, 7.16 ÷ 7.18, 8.7, 9.1 ÷ 9.5	Miscellaneous changes to the contents of the latest amendment of the initial flight manual, Coolant pump Pierburg, TN800/41	May 2012	14. Sept. 2012	
20	0.1, 0.5, 9.4	TN DG-G-11 NOAH Improvements	May 2015	7. July. 2015	
21	0.0, 0.1, 0.3 – 0.5, 2.10, 4.9, 4.10, 4.12, 4.25, 4.28, 7.2, 7.12, 7.18	Manual revision, TN800/45	July 2017	10.08. 2017	

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0.2 List of effective pages

Section	page	issued	replaced	replaced	replaced	replaced
0	0.0	May 2012	July 2017			
	0.1	/				
	0.2	/				
	0.3	/				
	0.4	/				
	0.5	see record of revisions				
	0.6	May 2012				
1	1.1	May 2012				
	1.2	May 2012				
	1.3	May 2012				
	1.4	May 2012				
	1.5	May 2012				
	1.6	May 2012				
	2	App.	2.1	May 2012		
"		2.2	May 2012			
"		2.3	May 2012			
"		2.4	May 2012			
"		2.5	May 2012			
"		2.6	May 2012			
"		2.7	May 2012			
"		2.8	May 2012			
"		2.9	May 2012			
"		2.10	May 2012	July 2017		
"		2.11	May 2012			
"		2.12	May 2012			
3		"	3.1	May 2012		
	"	3.2	May 2012			
	"	3.3	May 2012			
	"	3.4	May 2012			
	"	3.5	May 2012			
	"	3.6	May 2012			
	"	3.7	May 2012			
4	"	4.1	May 2012			
	"	4.2	May 2012			
	App.	4.3	May 2012			

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	App.	4.4	May 2012			
	"	4.5	May 2012			
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	"	4.8	May 2012			
	"	4.9	May 2012	July 2017		
4	"	4.10	May 2012	July 2017		
	"	4.11	May 2012			
	"	4.12	May 2012	July 2017		
	"	4.13	May 2012			
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	"	4.26	May 2012			
	"	4.27	May 2012			
	"	4.28	May 2012	July 2017		
5	"	5.1	May 2012			
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	"	5.6	May 2012			
	App.	5.7	May 2012			
		5.8	May 2012			
		5.9	May 2012			
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		5.13	May 2012			

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	6.9	May 2012				
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	8.7	May 2012				
9	9.1	May 2012				
	9.2	May 2012				
	9.3	May 2012				
	9.4	May 2012	May 2015			
	9.5	May 2012				

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2.14 Aerotow, winch and autotow launching

2.14.1 Weak links in towing cables

Aerotow, winch and autotow launching

recommended: 6000 N \pm 10% (1320 lbs. \pm 10%)

max.: 6600 N (1455 lbs.)

2.14.2 Towing cables

For aerotow:

Length 30-70 m (100 - 230 ft), material: hemp- or plastic fibres

2.14.3 Max. towing speeds

Aerotow	$V_T =$	maximum 190 km/h	maximum 103 kts.
Winch- and autotow	$V_W =$	150 km/h	81 kts.

2.14.4 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.

Warning: Winch launching is not permitted at the front hook even in the case that no C.G. hook is installed.

Note: The front hook is mandatory for Australia.

2.15 Crosswinds

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

2.16 Tyre Pressure

Main wheel	3,5 bar	(51 psi)
Tail wheel	2,0 bar	(29 psi)

2.17 Waterballast (Option)

Filling the water ballast is only allowed with a filling system which enables determination of the exact amount of ballast filled, e.g. water gauge or calibrated canisters.

Only symmetrical loading is allowed. After filling, balance the wings by dumping enough water from the heavy wing (see section 4.2.2).

Flight with leaking watertanks is prohibited, as this may result in asymmetrical loading condition.

Warning: Follow the loading chart (see section 6.8). The respective max. take off weights must not be exceeded.

2.18 Wing fuel tanks (Option)

Max. capacity 10 l (2.64 U.S. gal.) per wing.

Don't park the rigged glider with filled wing fuel tanks for extended periods!

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3. Tow hooks

- a) Check the ring muzzle of the C.G. hook for wear and function;
- b) Check both hooks (if installed) for cleanliness and corrosion;

4. Main landing gear

- a) Check the struts, the gear box, the gear doors and the tyre for wear; dirt in the front strut can hinder the landing gear from locking over center the next time!
- b) Check the tyre pressure (3.5 bar, 51 psi)!
- c) Check wheel brake and cable for wear and function;
- d) **Option disc brake:** Check the condition of the wheel brake assy. and the brake hose;

5. Left wing

- a) check locking of the wing tip;
- b) Check the flaperon hinges for excessive free play;
- c) Check flaperon drives for excessive free play;
- d) Check airbrake, airbrake box and control rod for wear and free play. It must be possible to retract the airbrake, even if it is pressed rearwards. If there is any water in the airbrake box this has to be removed;

6. Power plant checks

Extend the powerplant via the manual switch (ignition off).

- a) Check the connection of spindle drive and gas strut to engine and fuselage. To accomplish this extend the engine only so far, that you still can see the connection to the engine mount. Check especially for cracks in the spindle drive fork;
- b) Extend the powerplant completely;
- c) Check all screwed connections and their securing;
- d) Check function of throttle, and propeller brake;
- e) Check ignition system incl. wires and the spark plug connectors for tight fit;
- f) Check toothed belt for wear and correct tension, sudden loss of tension indicates damage of the engine assembly;
- g) Check engine retaining cable and its connections in the engine compartment and at the engine;
- h) Check fuel lines, electrical wires, Bowden cables and structural parts for wear and kinks;
- i) Check exhaust muffler, propeller mount, radiator, water pump and accessories for tight fit and any cracking. Check especially the cable which lifts the muffler during engine extension. To check the water pump, switch on the ignition. You should hear a buzz;

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- j) Apply strong pressure to the propellermount in forward, backward and sideward direction to check if the bolted connection between the engine block and the propeller mount or any thing else is loose or damaged. Check the rubber engine mounts also;
 - k) Visual check of the propeller;
 - l) Turn the propeller 1 revolution by hand listen for abnormal sounds which may indicate engine damage;
 - m) Drain condensed water from the fuel tank. The drainer is located in the main wheel box on the rear wall on the right hand side;
 - n) Check the outlet of the fuel tank ventline for cleanliness, the outlet is located directly behind the landing gear box;
 - o) Check the coolant level in the radiator by removing the radiator screw cap. Press down on cap for easier handling. The radiator must be filled up to approx. 25 mm (1 in.) below its top;
 - p) Check the coolant hoses visually for leaks and any defects of the outer surface.
7. Tail wheel
- a) Check for wear, free play and excessive dirt in the wheel box. Remove excessive dirt prior to take off!
 - b) Check tyre pressure (2 bar, 29 psi);
8. 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 or delamination;
9. Fin - horizontal tail
- a) Check the upper rudder hinge for wear and free play;
 - b) Check the elevator for free play and correct control hook up, look through the Plexiglas window;
 - c) Check the securing of the front mounting bolt;
 - d) Check the horizontal tail for free play;
 - e) Check the TE or Multiprobe for correct insertion, secured with tape?
10. Right wing
See detail 5.
11. Fuselage nose
- a) Check the ports for static pressure and pitot pressure for cleanliness;
 - b) If the sailplane has been parked in rain, you have to empty the static ports by sucking the water out of the ports.

4.5 Normal procedures and recommended speeds

4.5.1 Engine starting, taxiing procedures

4.5.1.1 Engine starting on the ground

- a) Check if the fuel cock is open.
- b) Master switch on.
- c) Switch engine master switch to "on".
- d) Extend the engine:

Up to ser.no. 8-218: there are two methods:

1. Switch on the ignition (the toggle has to be pulled out for switching).
The engine will be raised to its operating position automatically. Lift the cover of the manual extension-retraction switch. Switch off the ignition, rotate the propeller out of the vertical position, put down the red cover again.

Warning: When extending the engine via the ignition switch the starter motor may start cranking the engine in case the starter switch got stuck. Caution at the propeller.

2. Via the manual switch which is located on the right side console:
Lift the red cover and press the switch to the front.

Without TN873/19: Extend the engine only so far that you can rotate the propeller. Do not fully extend. The green control light "engine extended" should not be on. If the green light is on, retract the engine a little, until the light comes off. Turn the propeller out of the vertical position. Put down the red cover again.

With TN873/19, standard from ser.no. 8-195 on: Hold the switch until the extension procedure stops. Lower the red cover again

Note: If the red cover remains in the up position the automatic extension-retraction via the ignition switch is in-operative.

From ser.no. 8-219 on: there are two methods:

1. Hold the manual switch which is located on the instrument panel up until the extension procedure stops. The engine will be raised to its operating position. If you release the switch during the procedure the switch jumps back to the centre position and the extension stops.
2. Switch on the ignition (the toggle has to be pulled out for switching).
The engine will be raised to its operating position automatically. Switch off the ignition, press the manual switch up to switch off the automatic system, otherwise the engine will be retracted automatically.

Note: If you cannot extend the engine, check the circuit breaker first. Otherwise see section 8 trouble shooting.

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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 that at higher altitudes the true airspeed is greater than the indicated airspeed.

The max. speed V_{NE} is reduced according to the following table:

Altitude in [m]	0-3000	4000	5000	6000	7000	8000
V_{NE} indicated km/h	270	256	243	230	217	205

Altitude in [ft]	0-10000	13000	16000	20000	23000	26000
V_{NE} indicated kts.	146	138	131	124	117	111

3. Dump the water ballast before you reach freezing altitude or descend to lower altitudes.
4. Do not fly below 0°C (32°F) when your glider is wet (e.g. after rain).
5. **With coolant pump type Pierburg (TN800/41):** The antifreeze in the coolant of the engine is mixed normally for a lowest OAT of -20°C . For high altitude flights where lower temperatures may be expected you have to change the mixture for -40°C , see MM section 1.11.2.

4.5.10 Flight in rain and thunderstorms

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

Warning: Flights and especially winch launches in the vicinity of thunder storms should be avoided. Due to lightning discharge, carbon fibre structures may be destroyed.

With the engine running:

In normal rain, the rate of climb will be reduced by 1/3. The cross country cruising speed will also be reduced by approx. 10 km/h (5 kts). Take off in rain should only be done with a long enough airfield and attention given to safety. A take off should not be attempted in heavy rain.

4.5.11 Cloud flying

Cloud flying is only permitted without waterballast and with the engine retracted.

Take care to fly smoothly and coordinated. It is prohibited to use a spin as a method for losing altitude in the clouds. In case of emergency, pull out the dive brakes fully before exceeding a speed of 200 km/h and dive with max. 200 km/h (108 kts) to leave the cloud.

Warning: Flying in or near thunderstorm-clouds is prohibited.

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

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4.6 Flight with the engine removed from the aircraft

The DG-800B can be flown without the engine when the engine is sent for a major overhaul, or removed to decrease the aircraft empty weight for competition flying.

The following items must be executed: (see section 4.17 in the DG-800B maintenance manual).

1. Remove the powerplant.

The engine extension-retraction mechanism and the exhaust system will remain in the fuselage.

2. Remove the batteries, insulate the battery connector cables. Switch off the engine master switch.

Install and connect a battery in the baggage compartment (see section 7.17.4).

3. Install a mass behind the tailwheel box according to drawings 8R86 and 8R87. The drawings and the necessary parts can be ordered from DG Flugzeugbau.

Warning: Installation of a heavier tailwheel as a compensation mass is prohibited for flutter reasons.

4. C.G. recalculation

Carry out a C.G. calculation according to section 6.9 using the data of the following table. The inflight C.G. will be moved forward by approx. 0.0-0.020 m (0.0-0.8 in.) depending on the flightmass and empty mass C.G.

1 kg = 2.2046 lbs

0.305 m = 1 ft

	mass	C.G.	moment
	behind datum		
mass reduction	kg	m	kg x m
engine with propeller	-46.4	1.120	-51.97
batteries in front	- 8.2	-1.291	+10.59

additional mass

battery in baggage

compartment	+ 2.9	+0.17	+ 0.49
mass at tail	+ 5	+4.580	+22.9
total difference	-46.7	+0.385	-17.99

6. Tape the engine doors carefully with fabric tape.

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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-800B is a single-seater high performance motorglider with 18 m wing span.

As an option wings can be equipped with a parting device at $y = 7.25$ m, and with winglets for flying with 15 m span.

Winglets for 18 m span are optional equipment.

Construction

Wings	CFRP-foam-sandwich-shell with CFRP-roving spar caps
Flaperons	CFRP-skin
Rudder	GFRP-foam sandwich-shell
Horizontal stabilizer	CFRP-AFRP hybrid skin
Elevator	GFRP-skin
Fuselage	CFRP-AFRP-hybrid skin

Canopy

Large single piece canopy, hinged at the nose, supported by a gas strut.

Canopy transparency made from Plexiglas GS 241 clear or light green GS 2942 as option.

made from Plexiglas GS 241 clear or light green GS 2942 as option.

Tailplane

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

Colours

Airframe: white
registration numbers: grey RAL 7001 (Pantone 444)
or red RAL 3020 (Pantone 485)
or blue RAL 5010 (Pantone 301)
or blue RAL 5012 (Pantone 307)
or green RAL 6001 (Pantone 349)
or similar colours

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50) Display for the engine speed

a) **engine speed RPM x 10**, (With option EGT see also 46):

e.g. **6 0 2** means 6020 RPM engine speed.

When exceeding the max. continuous engine speed of 6300 RPM a blinking double point will appear in front of the last digit, e.g. **6 3 : 1** .

When exceeding the max. engine speed of 6600 RPM the whole display starts blinking **6 6 : 1** .

b) During engine start **P** will be displayed as long as the primer injects fuel into the carburetors.

c) After switching off the ignition (engine master still switched on) 3 dashes will be displayed - - - .

As soon as the propeller is aligned or the ignition is switched on again, the engine speed will be displayed.

- - - shows that the DEI is working in the sequence for automatic retraction. As long as the electric propellerbrake motor is operating, - **B** - will be displayed (from software version 8B10 on).

Caution: If **000** is displayed instead of the engine RPM the proximity switch at the upper drive belt pulley is defective (short circuit in the switch).

With this defect the control light 43 will not work and the automatic retraction of the engine will not be activated.

You have to retract the engine with the manual switch.

A new proximity switch must be installed prior to the next engine start.

Note: With older control units **000** may be displayed in case the Generator circuit breaker is blown. In such case the red generator control light won't start shining although the engine is not running. Check the Generator circuit breaker.

51) Display for cylinderhead temperature (coolant temperature) CHT in °C and battery voltage to switch over with switch 45 .

(With option EGT see also 46.)

CHT °C Battery V

When exceeding the max. allowable CHT= 95° C (203° F) the whole display starts blinking. **99** .

When exceeding the max. battery voltage of 14.7 V or when decreasing a voltage of 11 V the display switches over automatically to battery voltage and starts blinking. As soon as the battery voltage returns into its normal range of 11 - 14.7 V the display switches back to CHT.

Note: The tolerances of the CHT indicator is $\pm 5^{\circ}$ C (9°F).

The display nevertheless is in 1° C steps to show the tendency of temperature changes.

Note: If the measuring range of a gauge is exceeded or with a defective gauge **OL** will be displayed on the respective display, see 47, 50, 51.

7.17 Miscellaneous equipment (Options)

7.17.1 Removable Ballast in the fuselage nose (Option)

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

7.17.2 Oxygen system

Oxygen bottle installation

Max. size of oxygen bottle is 4 l capacity with diameter 100 mm (3.94 in.). The bottle must be fixed at its neck with a bracket part No. Z14.

Installation of the oxygen equipment

To ensure a safe installation ask for an installation instruction. For the installation of the Dräger Höhenatmer E 20088 you will find an installation plan 6EP27 in the maintenance manual.

7.17.3 ELT Emergency Locator Transmitter

To ensure a safe installation ask DG Flugzeugbau for an installation instruction. For the ELT ACK you will find an installation plan 8EP38 in the maintenance manual.

Installation of 406 MHZ ELTs: The installation must be performed according to TN DG-G-08. Only the ELT types given in the TN may be installed.

Caution: Concerning 7.17.2 and 7.17.3

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

7.17.4 Battery in baggage compartment with battery selector switch

An additional battery Z73/4 (sealed lead acid) or Z73/3 (LiFePO) with holder Z72 or Z01/7 (sealed lead acid) or Z01/5 (LiFePO) with holder Z200 may be installed in the baggage compartment. In this case a battery selector switch must be installed in the instrument console.

Switch function:

up = internal battery

centre position = off

down = additional battery

Preferably the gliding computers and loggers shall be connected to this switch.

The battery fuse is installed at the battery, type G250V 5x20 4A fast.

Caution: It is not permissible to operate a LiFePO type battery in an electric circuit together with other batteries. If you want to install more than 1 battery a further selector switch to switch over from 1 battery to the other must be installed at a suitable place in the cockpit.