.1 Record of revisions

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

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

Rev. No.	Affected pages / section	Description	Issue Date	LBA Approval Date	Inserted Date Signature
1	0.3-0.5, 2.6,4.10, 4.15,4.17	TN 843/2	Febr.92	March 04, 92	
2	0.1,0.3, 0.4,0.5, 3.4, 6.6, 6.7, 7.2, 7.7, 7.8, 8.7	TN 843/5	Sept.92	Dec.08, 92	
3	0.1,0.3, 0.4,0.5, 2.6, 2.8, 2.10,	TN 843/7	Febr.96	April 08, 96	
	4.12, 4.13, 5.9, 6.5, 6.9, 7.17, 7.18, 8.2, 8.6				
4	0.1,0.3,2.6	TN 843/8	March 97	05.06.97	
5	0.1, 0.5, 7.11	TN 843/11	Dec. 98	Dec. 17, 98	
6	0.1, 0.3, 0.5, 4.8, 7.14, 8.2	TN 843/16	Jan. 01	07.02.01	
Rev. No.	Affected pages / section	Description	Issue Date	EASA Approval Date	Inserted Date Signature
7	0.3-0.5, 2.8, 3.1, 3.2, 3.4-3.7, 4.1, 4.8, 4.25, 7.1, 7.16	TN 843/28 manual revision	May 2008	August 1. 2008	

0.2 List of effective pages

Section	page	issued	Replaced/	replaced/	replaced	replaced
0	0.0	April 89				
	0.1 -	See record of revisions				
	0.2	"				
	0.3	"				
	0.4	"				
	0.5	"				
	0.6	April 89				
1	1.1	April 89				
	1.2	Febr. 91				
	1.3	April 89				
	1.4	"				
	1.5	"				
	1.6	"				
2 App.	2.1	"				
"	2.2	"				
"	2.3	"				
"	2.4	"				
"	2.5	"				
"	2.6	"	Febr.92/	Febr.96/	March 97	
"	2.7	"				
"	2.8	"	Febr.96	May 08		
"	2.9	"				
"	2.10	"	Febr.96			
"	2.11	"				
3 "	3.1	"	May 08			
"	3.2	"	May 08			
"	3.3	"				
"	3.4	"	Sept.92	May 08		
"	3.5	"	May 08			
"	3.6	"	May 08			
"	3.7	May 08				
4 "	4.1	April 89	May 08			
"	4.2	"				
"	4.3	"				
"	4.4	"				
"	4.5	"				
"	4.6	"				
"	4.7	"				
"	4.8	"	May 08			
App.	4.9	"				

0.2 List of effective pages (cont.)

Section		Page	issued	replaced	replaced	replaced	replaced
4	App.	4.10	"	Febr.92			
	"	4.11	April 89				
	"	4.12	April 89	Febr. 96			
	"	4.13	"	" "			
	"	4.14	"				
	"	4.15	"	Febr. 92			
	"	4.16	"				
	"	4.17	"	Febr. 92			
	"	4.18	"				
	"	4.19	"				
	"	4.20	"				
	"	4.21	"				
	"	4.22	"				
	"	4.23	"				
	"	4.24	"				
	"	4.25	"	May 08			
	"	4.26	"				
5	"	5.1	"				
	"	5.2	"				
	"	5.3	"				
	"	5.4	"				
	App.	5.5	"				
		5.6	"				
		5.7	"				
		5.8	"				
		5.9	"	Febr. 96			
		5.10	"				
6		6.1	"				
		6.2	"				
		6.3	"				
		6.4	"				
		6.5	"	Febr. 96			
		6.6	"	Sept. 92			
		6.7	"	Sept. 92			
		6.8	"				
		6.9	"	Febr. 96			

0.2 List of effective pages (cont.)

Section	page	issued	replaced	replaced	replaced	replaced
7	7.1	April 89	May 08			
	7.2	"	Sept. 92			
	7.3	"				
	7.4	"				
	7.5	"				
	7.6	"				
	7.7	"	Sept. 92			
	7.8	"	" "			
	7.9	"				
	7.10	"				
	7.11	"	Aug. 90	Dec. 98		
	7.12	"				
	7.13	"				
	7.14	"				
	7.15	"				
	7.16	"	May 08			
	7.17	"	Febr. 96			
	7.18	"	"			
8	8.1	"				
	8.2	"	Febr. 96	Jan. 01		
	8.3	"				
	8.4	"				
	8.5	"				
	8.6	"	Febr. 96			
	8.7	"	Sept. 92			
9	9.1	April 89				

2.9 Approved manoeuvres

This sailplane is certified for normal gliding in the "Utility" category.
Simple aerobatics are approved but only without waterballast and with the engine retracted.
The following aerobatic manoeuvres are approved see sect. 4.5.12:

Manoeuvre	recommended entry speed IAS km/h	kts.
Spins	/	/
Inside Loop	200	108
Lazy Eight	200	108
Chandelle	200	108

2.10 Manoeuvring load factors

The following load factors must not be exceeded:

at manoeuvring speed	VA	+ 5.3 -2.65
at max. speed	VNE	+ 4.0 -1.5
airbrakes extended	VNE	+ 3.5
wingflaps in landing position	VFE	+ 4.0

2.11 Flight crew

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 page 6.5
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. This means that 10 kg (22 lbs.) in the rear seat replaces 4 kg (8.8 lbs.) missing cockpit load in the front seat.
With these loads, the C.G. range given under 2.8 will be kept in the limits if the empty weight C.G. is in its limits. see loading chart in sect. 6.
Either the front seat or the rear seat may designated as seat of the pilot in command.
If the rear seat is to be designated it must be assured that all necessary operating items and instruments are installed and that the pilot in command has sufficient training in flying safely from the rear seat.

Caution: With lower pilot weights lead ballast must be added to the seat. Ballast put on the seat (lead ballast cushion) must be fastened at the safety belt anchorage points. Installation for removable trim ballast see sect. 7.16.1.

Note: For Australia the lower limit for the min. load in the cockpit should not exceed 66 kg (146 lbs.). A provision for removable ballast see sect. 7.16.1 is mandatory.

3. Emergency procedures

3.1 Introduction

3.2 Canopy jettison

3.3 Bailing out

3.4 Stall recovery

3.5 Spin recovery

3.6 Spiral dive recovery

3.7 Recovery from unintentional cloud flying

3.8 Engine failure

3.9 Fire

3.10 Loss of electrical power in flight

3.11 Starting the engine with the starter not working

3.12 Retraction or extension of the power plant with the normal mechanism not working

3.13 Landing with the engine extended and stopped

3.14 Flight with asymmetric waterballast

3.15 Emergency wheel up landing

3.16 Ground loop

3.17 Emergency landing in water

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.

Caution: Canopy jettison and bailing out should be trained several times on the ground before flying the aircraft.

3.2 Canopy jettison

To bail out the white-red canopy opening handle (left) has to be operated with your right hand. Open the canopy as far as possible.
If the canopy doesn't stay open (or is not blown away by the oncoming air), but is closed by the air pressure, you have to release the canopy in it's closed position by operating the red emergency release handle (right) with your left hand, then push the canopy upwards.

The retaining lines will tear off.

The gas struts (if installed) will disengage automatically.

3.3 Bailing out

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

Warning: If bailing out with the engine running it is necessary to switch off the ignition and retract the engine with the manual switch even with the propeller still turning. The propeller will be stopped by the engine doors. Don't try to stop the propeller vertical and to retract the engine using the normal method.

3.4 Stall recovery

Easing the stick forward and picking up a dropping wing with sufficient opposite rudder the glider can be recovered from the stall.
To recognize and prevent the stall, please refer to sect. 4.5.4.

3.5 Spin Recovery

Apply full opposite rudder against direction of the spin, 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.

3.8 Engine failure

3.8.1 Power loss during take off

Push the control stick forwards immediately, watch the airspeed indicator!

Sufficient runway
- land normally straight ahead with engine extended
- flaps L
- airbrakes as desired

Insufficient runway
- decision based on position, terrain and height
- close fuel cock, switch off ignition and main switch
- engine extended reduces L/D to 15!

3.8.2 Power loss during flight

Push the control stick forward immediately, watch the airspeed indicator!
Check
- fuel cock position?
- fuel quantity?

If no change, retract the engine or land with extended engine.

3.9 Fires

3.9.1 In engine on the ground

- close fuel cock and switch off ignition if the engine is still running
- keep engine extended
- switch off main switch
- use extinguisher, cloth or suitable external means to fight the fire

3.9.2 In engine in flight

- close fuel cock
- open throttle fully if engine is still running until engine stops
- switch off engine master switch
- land as soon as possible
- extinguish fire

3.9.3 In the fuselage in flight

3.9.3.1 Front fuselage (electrical fire)

- switch off main switch
- close ventilation, open swivel air vents and side window
- land as soon as possible if the fire is not extinguished (circuits are effectively protected by circuit breakers)

3.9.3.2 Rear fuselage (engine)

- close fuel cock
- open throttle fully if engine is still running until the engine stops
- keep engine extended or extend the engine
- switch off engine master switch
- if smoke prevents flying open ventilation
- land as soon as possible
- extinguish fire

3.10 **Loss of electrical power in flight**

3.10.1 With the engine retracted: Continue flying as a sailplane.

3.10.2 With the engine extended not running:

Look for a landing field to do a safe outlanding.

3.10.3 With the engine extended and running:

Don't stop the engine. Fly to the next airfield and land with the engine running.

The mechanical fuel pump and the coolant pump are driven directly by the engine to allow engine operation without battery power.

Avoid longer sinking flights with the engine idling as lubrication of the engine will be insufficient.

Therefore stop the engine for the landing or apply some throttle at least every 60 seconds to supply oil to the engine.

Landing with the engine extended see sect. 3.13.

3.11 **Starting the engine with the starter not working:**

In flight:

Extend the engine by switching on the ignition, when engine is extended increase speed as quickly as possible to approx 170 km/h (92 kts.) until the engine starts. Then flare out with max. 2 g. From the beginning of the dive to the lowest point of the procedure you need appr.150 m (500 ft). Therefore you should not start this procedure below 400 m (1320 ft) above ground. Otherwise a safe outlanding is preferable.

On the ground:
Handstarting the engine is not possible as you don't reach the necessary starting RPM.

You may carry out an aerotow and airstart the engine see above.

3.12 **Retraction or extension of the power plant with the normal mechanism not working**

Extend or retract the power plant via the manual switch on the right side console see sect. 7.3 item 24.

This procedure is only to be followed in an emergency as all safety devices (e.g. against retraction of the engine while running) are by-passed.

3.13 **Landing with the engine extended and stopped**

Wing flap setting +10° or L
Landing with the engine extended and stopped is not a potential risk.
However due to the high drag from the extended engine, the approach should be made not using airbrakes fully extended.
Fully extended airbrakes may result in a heavy and uncomfortable landing.
It is recommended to approach somewhat faster than usual.

3.14 **Flight with asymmetric waterballast**

If you suspect that the waterballast does not dump symmetrically you have to close the dump valves of the wingtanks immediately, to avoid greater asymmetry.
Asymmetry can be verified by the necessary aileron deflection in straight flight at low airspeeds.
When flying with asymmetric waterballast you have to increase the airspeed, especially in turns, so that you can avoid a stall at all costs.
If the aircraft does enter a spin, you have to push the stick forward clearly during recovery.
Fly the landing pattern and touch down approx. 10 km/h (6 kts.) faster than usually and after touch down control carefully the bank angle to avoid the wing touching the ground too early.

3.15 Emergency wheel up landing

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

3.16 Emergency ground loop

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

3.17 Emergency landing on water

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

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

Recommended procedures:

On downwind leg of the landing pattern:	Extend the landing gear, unlock the parachute harness (not the seat harness)
Touch down:	With landing gear extended and airspeed as low as possible.
At point of touch-down:	Use your left arm to protect your face against possible canopy fracture.
After touch down:	Unfasten seat belt harnesses and undo parachute.
Leaving the cockpit under water:	If the canopy has not fractured, opening the canopy may be possible only after the forward fuselage is almost completely filled with water.

Section 4

4. Normal procedures

4.1 Introduction

4.2 Rigging and derigging, filling the watertanks, refuelling
4.2.1 Rigging
4.2.2 Filling the wing watertanks (Option)
4.2.3 Refuelling
4.2.4 Derigging

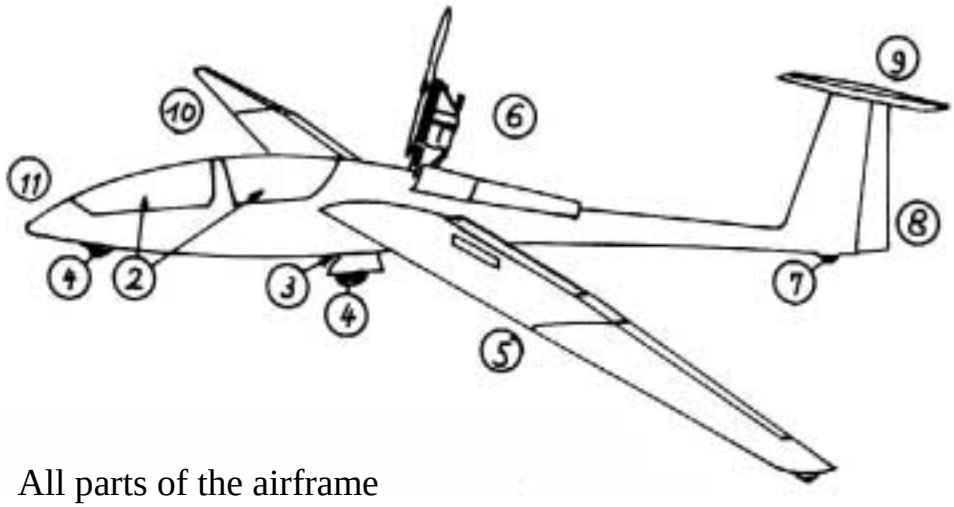
4.3 Daily Inspection

4.4 Pre-flight Inspection

4.5 Normal procedures and recommended speeds
4.5.1 Engine starting, taxiing procedures
4.5.2 Self-launching, take off and climb
4.5.3 Launch
4.5.4 Free flight
4.5.5 Cruise engine on and utilisation of the wing fuel tanks
4.5.6 Engine stop - retraction and extension – start inflight and after landing
4.5.7 Approach and landing
4.5.8 Flight with waterballast
4.5.9 Flight at high altitude and at low temperatures
4.5.10 Flight in rain and thunderstorms
4.5.11 Cloud flying
4.5.12 Aerobatics

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. 7.15 (not each day, but min. every 3 month)
   c) check the main pin securing
      check the securing ropes of the headrest in the rear cockpit for wear and function and length: is it possible that the headrest interferes with the control stick?
   d) check all controls for wear and function, incl. positive control check
   e) check the tow release system for wear and function incl. cable release check
   f) check for foreign objects
   g) check the instrumentation and radio for wear and function
   h) check the brake fluid level
   i) check the fuel filter for dirt and sludge
   j) check the engine controls
   k) check all fuses including the battery fuse
   l) check the extension-retraction mechanism by operating it in both directions. The extension time should not exceed 13 seconds!
      Note: If the mechanism can't be operated with the ignition switch or with the manual switch, check the circuit breaker.
   m) extend the engine with the manual switch

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 that at higher altitudes the true airspeed is grater than the indicated airspeed.
   The max. speed VNE is reduced. See the following table:

Altitude in Metres	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 or descend to lower altitudes.
4. Do not fly below 0°C (32°F) when your glider is wet (e.g. after rain).

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. Rain increases the wear on the leading edge of the propeller so that any flight in rain should be kept to the absolute minimum.

4.5.11 Cloud flying

(only 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 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 with max. 200 km/h (108 kts) to leave the cloud.

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

Section 7

7. Sailplane and systems description

7.1 Introduction

7.2 Airframe

7.3 Cockpit, cockpit controls and placards

7.4 Flight controls

7.5 Airbrake system

7.6 Landing gear system

7.7 Tow hooks

7.8 Seats and safety harness

7.9 Baggage compartment

7.10 Water ballast system

7.11 Powerplant

7.12 Fuel system

7.13 Electrical system

7.14 Pitot and static system

7.15 Canopies

7.16 Miscellaneous equipment (Options)
7.16.1 Removable ballast
7.16.2 Radioinstallation with automatic commutation
7.16.3 Oxygen system
7.16.4 ELT
7.16.5 Heavy tailwheel

7.13 Electrical system

Battery 12 V/26 Ah installed near the C.G. The main fuse is located directly at the battery box (type Bosch 1191017006, 100 A).
Battery charging by a generator which is installed in the engine. Recharging the batteries with an automatic battery charger is possible via the 12 V socket in the rear cockpit. Therefore the main switch must be in the "on" position. The change over switch in the DEI should be on "Avionik" and all instruments etc. switched off.
Warning: Use only automatic chargers designed to charge sealed lead acid batteries. To charge the battery to its full capacity an automatic charger with 14.4 V max. charging voltage is necessary (normal automatic chargers charge only up to 13.8 V). Such a charger is available through DG Flugzeugbau code no. Z08.
After charging switch off the main switch as with main switch on there is a small loss of current.
The DEI (digital engine indicator) controls all automatic and safety functions and displays the engine indications on digital displays. All current - carrying wiring confirms to LN aeronautical specifications.

7.14 Pitot and static system see diagram 8 M.M.

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

7.15 Canopies

To **jettison** the canopies in flight see section 3.2.

Removing a canopy:

Open the canopy, detach the restraining cable and if installed detach the gas strut from the front canopy. Then close the canopy and operate the red canopy emergency release handle (right) and the white-red canopy opening handle (left). Lift the canopy upwards.

Reinstalling a canopy:

Open emergency release and canopy locking levers. Place the canopy in vertical direction onto the fuselage. Close the emergency release. Open the canopy and snap in the retaining cable and the gas-strut (if installed).

Checking the canopy emergency release system:

a) check with open front canopy if the gas-struts (if installed) can be disengaged from their ball fittings (from canopy and from fuselage). Grease the ball fittings.
b) check with closed canopy if the emergency release handle can be operated and if the canopy can be removed easily, resp. if the canopy will be lifted by the gas-strut. Grease the locking pins.