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

Rev. No.	Affected Pages/ section	Description	Issue Date	EASA Approval Date	Inserted Date Signature
1	0.5, 7.14, 7.15	TN1000/09	October 2006	12.12.2006	
2	0.3-0.5, 1.5, 1.6, 2.5, 2.11, 2.12, 2.14, 2.15, 3.3, 4.13, 4.16-4.18, 4.21, 4.24, 4.25, 5.3, 5.5-5.8, 6.6, 6.8	TN1000/10 Manual revision	January 2007	March 27. 2007	
3	0.3 – 0.5, 2.12, 4.6, 4.12, 4.13, 7.14 – 7.17	TN1000/11 Manual revision	October 2007	5. Dec. 2007	

0.2 List of effective pages

Section		page	issued	replaced	replaced	replaced	replaced
0		0.0	July 2005				
		0.1	see manual amendments				
		0.2	"				
		0.3	"				
		0.4	"				
		0.5	"				
		0.6	July 2005				
1		1.1	"				
		1.2	"				
		1.3	"				
		1.4	"				
		1.5	"	Jan. 07			
		1.6	"	Jan. 07			
2	App.	2.1	July 2005				
	"	2.2	"				
	"	2.3	"				
	"	2.4	"				
	"	2.5	"	Jan. 07			
	"	2.6	"				
	"	2.7	"				
	"	2.8	"				
	"	2.9	"				
	"	2.10	"				
	"	2.11	"	Jan. 07			
	"	2.12	"	Jan. 07	Oct. 07		
		2.13					
		2.14		Jan. 07			
		2.15		Jan. 07			
3	"	3.1	July 2005				
	"	3.2	"				
	"	3.3	"	Jan. 06			
	"	3.4	"				
	"	3.5	"				
	"	3.6	"				
	"	3.7	"				
	"	3.8	"				

0.2 List of effective pages (cont.)

Section		page	issued	replaced	replaced	replaced	replaced
4	App.	4.1	July 2005				
	"	4.2	"				
	"	4.3	"				
	"	4.4	"				
	"	4.5	"				
	"	4.6	"	Oct. 07			
	"	4.7	"				
	"	4.8	"				
	"	4.9	"				
	"	4.10	"				
	"	4.11	"				
	"	4.12	"	Oct. 0707			
	"	4.13	"	Jan. 07	Oct. 07		
	"	4.14	"				
	"	4.15	"				
	"	4.16	"	Jan. 07			
	"	4.17	"	Jan. 07			
	"	4.18	"	Jan. 07			
	"	4.19	"				
	"	4.20	"				
	"	4.21	"	Jan. 07			
	"	4.22	"				
	"	4.23	"				
	"	4.24	"	Jan. 07			
	"	4.25	"	Jan. 07			
	"	4.26	"				
	"	4.27	"				
	"	4.28	"				
	"	4.29	"				
5	"	5.1	July 2005				
	"	5.2	"				
	"	5.3	"	Jan. 07			
	"	5.4	"				
	App.	5.5	"	Jan. 07			
		5.6	"	Jan. 07			
		5.7	"	Jan. 07			
		5.8	"	Jan. 07			
		5.9	"				

0.2 List of effective pages (cont.)

Section	Page	issued	replaced	replaced	replaced	replaced
6	6.1	July 2005				
	6.2	"				
	6.3	"				
	6.4	"				
	6.5	"				
	6.6	"	Jan. 07			
	6.7	"				
	6.8	"	Jan. 07			
	6.9	"				
	6.10	"				
	6.11	"				
7	7.1	July 2005				
	7.2	"				
	7.3	"				
	7.4	"				
	7.5	"				
	7.6	"				
	7.7	"				
	7.8	"				
	7.9	"				
	7.10	"				
	7.11	"				
	7.12	"				
	7.13	"				
	7.14	"	Oct. .06	Oct. 07		
	7.15	"	Oct. 06	Oct. 07		
	7.16	"	Oct. 07			
	7.17	"	Oct. 07			
	7.18	"				
	7.19	"				
	7.20	"				
	7.21	"				
	7.22	"				
	7.23	"				
	7.24	"				

2.14 Aerotow, winch and autotow launching

2.14.1 Weak links in towing cables

max. 10000 N $\pm$ 10%
max. 2200 lbs. ± 10%

2.14.2 Towing cables (for aerotow only)

Length: 40-70 m (130 - 230 ft)
Material: hemp- or plastic fibres

2.14.3 Max. towing speeds

		maximum	maximum
Aerotow	V_T =	185km/h	100 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 only for winch- and auto launching..
The nose hook is to be used only for aerotow.

2.15 Crosswinds

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

4.2.5 Installation of a battery in the fin

A battery in the fin may be installed optionally.
To accomplish the installation the locking bow (part 10L35 made from piano wire) must be removed. The locking bow prevents the installation of a battery and serves as indicator if a battery is installed, as its ends are visible from the outside.
After removing the battery reinstall the locking bow.
Warning: The fin battery raises the min. cockpit load see section 6.8.4.
Only the use of the factory supplied battery Z110 (mass 5.75 kg, 12.7 lbs.) is permitted. Don't put any other objects in the battery box.

4.2.6 Refuelling

Fuel is transferred via a permanently installed refuelling pump from a can where the correct amount of oil is added and mixed prior to filling.
Oil: Use only super two stroke oil according to section 2.6
Switch on the main switch of the aircraft and extend the engine.
Couple the fuel filler hose to the fuselage side coupling (in left hand front side of the engine compartment).
Start the pump by pressing the push button located next to the coupling. As soon as the fuselage tank is full a built in device automatically switches off the pump.
If you want to interrupt or to stop the filling procedure before the tank is full press again the push button.
Starting the pumping again is possible by pressing the push button again.
Warning: Make sure to fill in clean fuel without any water.

4.2.7 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 wing's upper surface. Pull out the wing tip or the wing tip extension.

4.5 Normal procedures and recommended speeds

4.5.1 Launch

Due to the towhook position being in the middle of the fuselage and the excellent effectiveness of the ailerons and rudder, the possibility of wing dropping or ground loops, even on a slowly accelerating aerotow is reduced. Take-off with strong crosswind is possible.

4.5.1.1 Aerotow

a) Aerotow is permitted only using the nose tow release. Set trim to neutral for aerotow.
   Version with nose wheel: Pull the stick until the nose wheel lifts off from the ground. Then control the aeroplane so, that nose wheel and tail wheel don't touch the ground.
   Version without nose wheel: Keep the elevator in neutral position.
   Don't try to lift off before you reach an airspeed of 80 km/h (43 kts.) (without ballast). On a rough airfield hold the control stick tight. The undercarriage can be retracted at safety height during the tow.
   Normal towing speed is 120-130 km/h (65 - 70 kts.).
   For a cross country tow the speed can be as high as 185 km/h (98 kts.).

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!

Note: Aerotowing behind slow tow planes eg. Ultralight planes or touring motorgliders:
The take-off distance may be remarkably reduced if the DG-1000T is towed with the engine extended and running at full power.
Recommended towing speed is 100km/h (54 kts.).
Starting the engine on the ground: extend the powerplant via the manual extension-retraction switch, start the engine in the same manner as described in section 4.5.4.1.
To ensure good communication with the tow pilot the use of a headset is recommended at least for the pilot in command.

Warnings:

1. Due to the shorter take-off distance the aerotow with engine extended and running is safer than with engine retracted. Nevertheless this take-off procedure is only permitted if the conditions are such that a tow with engine retracted will also be safe.
2. If the engine of the DG-1000T fails the tow must be terminated by releasing the towing cable, this procedure is applicable as long as the aircraft are still on the ground.

3. The DG-1000T pilot should keep his left hand at the throttle handle to enable him to close the throttle immediately in case the tow-plane terminates the tow (This is a standard procedure for powered aircraft pilots).
4. In case of termination of the tow when the DG-1000T is still on the ground close the throttle immediately, then release the towing cable and apply the wheel brake.
5. In case of termination of the tow when the DG-1000T is already in the air take the hand from the throttle, release the towing cable and continue the climb with full throttle. This is still applicable in case the tow plane remains on the ground.
6. If the tow is so fast that the DG-1000T engine may overspeed reduce the throttle as necessary. For a fast cross country tow the powerplant must be retracted.

4.5.1.2 Winch launch

Winch launch is only allowed using 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 110-120 km/h (60-65 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-1000T will warn by buffeting. If the stick is pulled further the DG-1000T will drop one wing.
Only at forward C.G. positions the DG-1000T 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-1000T can be recovered without much loss of height. Rain does not influence this behaviour noticeably. The loss of height is approx. 50 m (160 ft).
Stall airspeeds see section 5.2.2.
Caution: Flights in conditions conducive to lightning strikes must be avoided.

CAUTION: If the stall factor is set to 0.89 the stall warning is switched off completely. This setting is only allowed to eliminate a permanent stall warning in case a sensor fails. Send the DEI for repair to the manufacturer as soon as possible.

CALIBRATE FUEL G(auge): Calibration of the fuel gauge with empty tank. Push the selector knob, N will be displayed, rotate the selector knob, Y will be displayed. Push the selector knob to execute the calibration.

SYSTEM SETUP ****: Only for service by the manufacturer.

Push the selector knob until the DEI-NT beeps twice to leave the set-up screen.

FREEZE WARNING: Activation or deactivation of the warning message. You may deactivate this warning in case no watertanks are installed. When deactivated the OAT screen will still blink at low temperatures.
Push the selector knob, N will be displayed, rotate the selector knob, Y will be displayed, the FREEZE WARNING is activated. Rotate the selector knob N will be displayed, the FREEZE WARNING is deactivated. Push the selector knob to save this adjustment.

JOINT WARNING OUTP: Activation or deactivation of the signals (horn or the optional stick vibrator) to draw the pilots attention to the messages. Adjustment similar to Prop Brake.
Note: The signal for the stall warning will not be deactivated.

PRIMERTESTMODE: When you activate this mode the starter motor will be deactivated to enable testing the primer function see maintenance manual section 3.5.1 item 6.b). Adjustment similar to Prop Brake.

SWITCH-OFF WARNING: Activation or deactivation of the reminder to switch off the main switch. Adjustment similar to Prop Brake (from software version 1.7 on).

7.4.5 Display of powerplant failures and warnings

In case of powerplant failures and if warnings are necessary full screen messages are displayed. All messages may be verified by a short push of the selector knob, the DEI-NT changes back to the normal screen.

Powerplant failures:

Upper line displays "Failure" and is blinking, 2. line displays:

- "Engine Info" = no data transfer between DEI-NT and control unit
- "Spindle Fuse" = the fuse for the spindle drive is blown -> wait until it cools down and resets
- "RPM Pickup" = proximity switch defective -> automatic extension-retraction will be switched off
- "Primer Valve" = Primer-valve defective
- "OAT Sensor" = Outside air temperature sensor defective
- "CHT Sensor" = Cylinder head temperature Sensor defective
- "Fuel Sensor" = Fuel sensor defective

Warning messages:

Upper line displays "Warning " and is blinking, 2. line displays:

- "Canopy Open!" = rear canopy not locked
- "Spoiler" = airbrakes not locked, this warning is displayed only prior to and during take-off and will not be displayed when airbrakes are unlocked during the flight
- "Raise Gear" = Landing gear should be retracted, appears 4 minutes after take-off in case the landing gear is still extended
- "Landg. Gear " = Landing gear warning when airbrakes are unlocked and the landing gear is still retracted
- "Stall" = Stall warning appears simultaneously wit the acoustically or tactile stall warning.
- "Low Battery" = Battery voltage permanently below 11V
- "Battery Overch." = Battery voltage permanently above 14,7V
- "Switch Error" = wrong sequencing of switches during powerplant extension -> automatic retraction will be switched off
- "CBox OvrTemp" = Starter motor control in control unit above temperature limit
- "CHT OverTemp" = CHT above max. certified value
- "Water Freeze" = OAT below +2°C
- "Low Fuel" = low fuel level



- "Engine Speed" = Engine RPM above max. certified value.
- "Starter Run" = Starter motor didn’t disengage and produces electric power, stop the engine immediately to prevent damage of the electrical system. This message can't be deleted by pushing the selector knob.
- "Main Switch" = Reminder to switch off the main switch (from software version 1.7 on).

Explanation for failure messages

Spindle Fuse:

The re-settable fuse for the spindle drive may be blown in the following cases:
a) The propeller hub hooks during extension at the engine doors.
b) The limit switch in position engine extended or retracted is not operated.
As soon as the fuse is blown the Control Unit changes to manual extension-retraction mode and thus cuts off the electric power to the spindle drive and reports the failure to the DEI-NT.
After the cool-down time (approx. 10sec.) the message disappears and the symbol for manual operation (hand) will be displayed on the screen.
You may reactivate the automatic operation by operating the ignition switch, even during the cool-down time.
Case a) Retract the powerplant again manually, then try to extend the engine again..
Case b) Retract the engine manually a little and then try to extend the

powerplant manually up to its operating position.

Switch Error: wrong consecution of switches during powerplant extension
If the DEI-NT has detected a wrong sequencing of the limit switches during powerplant extension, the powerplant will not be retracted automatically after stopping the engine, but the system switches over to manual operation and „Switch Error“ and the “hand” symbol will be displayed on the centre display.
There is a possibility that the powerplant doesn’t stop in the position where the propeller should stop turning and the still turning propeller hits the propeller stopper.
If the pilot can’t detect any failure he may confirm the warning and reactivate the automatic retraction (switching the ignition on and off), but not before the propeller stops turning.

Error of the switch operated by the propeller-stopper, (no failure message)
It might be possible that the propeller stops just above the propeller stopper and presses on the stopper during powerplant retraction into the position where the stopper moves forward. The stopper can’t move forward and operate the switch in this position.. To avoid any damage the powerplant will not retract completely. To accomplish this the DEI-NT checks within 3 seconds if the switch has been operated. If not, the powerplant will be extended automatically to the powerplant position where the propeller usually stops turning.
Rotate the propeller out of this position by pressing the starter button, further powerplant retraction is as normal.
Note: only in this special case is it possible to rotate the propeller with the starter motor in this powerplant position (position where the propeller usually should stop turning).

7.4.6 FLIGHTLOG → PC:

The following data may be downloaded:
Date, take-off time, landing time, flight duration, engine time, max. engine RPM, max. CHT, max. EGT (if sensors are installed) of each flight
The duration of the max. values of engine speed and CHT have been over the limits.
Failure of the CAN interface (data transfer from DEI-NT to control unit)
resets of the DEI-NT
Over limit temperature of the control unit (hint for defects)
All messages and their confirmation

Download instructions can be found in the amendment to the maintenance manual.

7.4.7 DEI-NT in the rear cockpit (Option)

The DEI-NT in the rear cockpit is operated as a slave of the front DEI-NT. The functions and screens are similar to the front DEI-NT but no Flight log screen and no Set up screen and their functions are available.
Instead of the failure message "Engine Info" a failure message "CAN Connect" will appear if there is no data transfer between DEI-NT and control unit or if the front DEI-NT is defective.

7.5 Flight controls

Rudder control
See diagram 2 M.M
Cable system with adjustable pedals in the front cockpit.

Elevator control
See diagram 1 M.M.
All pushrods slide in maintenance free nylon ball guides.
Automatic control hook-up system. Spring trimmer with release lever at the control stick and control knob at the left cockpit wall. To trim, you have to operate the release lever at the control stick and place the control knob to the desired position.

Aileron control
See diagram 3 and 4 M.M.
Pushrods slide in maintenance free nylon ball guides.
Automatic control hook-up system.

7.6 Airbrakes

See diagram 3 and 4 M.M.
Double storey Schempp-Hirth type airbrakes on the upper wing surface.
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.