Manual amendments

No.	Page	Description	Date	Signature
1	2, 3, 4, 34, 57, 63, 64, 93, drawing W57	Engine, powerplant drive belt tension, DEI- circuit breaker, manual revision TN 843/13	Oct. 1999	
2	2, 3, 4, 11, 19, 27, 45, 47, 48, 49, 51, 62, 71, 79, 91, wiring diagram 5E101, drawing W40	Greasing schedule, new attachment of the throttle cable from ser.no 5E213 on, manual revision TN 843/16	Jan. 2001	
3	2, 3, 4, 5, 23 - 28, 30 - 34, 36a, 37, 49 - 51, 54, 72, 73, 78, 79, 84, 91, 93, wiring schemes 5E101 issues G and H, 5E218	Engine control, manual extension and retraction control, carburettors, engine doors rubber cord, manual revision TN 843/17	March 2002	
4	2, 4, 24, 91, diagram 13b, wiring scheme 5E101 issue I, drawing 5E218	Extension-retraction unit, TN 843/18 issue 2	June 2003	
5	2, 3 , 4, 24, 25, 47, 48, 50, 64, 65, 68, 73, 75, 76, diagram 18, drawing 5M110	Manual revision Powerplant: retaining cable mounting in fuselage TN 843/19	March 2004	
6	2, 3, 4, 5, 42, 49, 68, 89, 89a, 93, Enclosure 1	Manual revision TN 843/24	January 2006	
7	2, 3, 4, 24, 38, 43, 60, 89, 89a	Manual revision TN 843/28	May 2008	
8	4, remove diagram 7, add diagram 7a	Wheel brake TN500/03	July 2011	
9	2 ÷ 4, 16, 37, 38, 40 ÷ 42, 57, 58, file working instruction No. 1 for TN348/20 issue 3 at the end of the MM	Headrest securing ropes in the rear cockpit, manual amendments TN500/05	September 2011	

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15	Propellerbrake	" "
16	Engine door control	" "
17	Retaining cable	" "
18	Retaining cable	March 04

Enclosures		**issued**
Equipment list	(94)	Nov. 98
Checklist for checks and maintenance work	(95)	Nov. 98
5EP31 Installation Dräger oxygen system		08.10.90
5EP50 Installation ELT ACK		07.12.98
5E101 Wiring scheme issue I		25.06.03
5E102 Wiring plan DIN A 1 (in aircraft log) **or**		2.07.03
5E102 Wiring plan DIN A 1 **together with**		02.02.99
5E218 Amendment to the wiring plan 5E102		25.06.03
Instructions for inspection 500/20		July 1995
Questionnaire for TN 348/4		" "
Working instruction No. 1 for TN 348/4		Oct. 1994
Working instruction No. 2 for TN 348/4		" "
5V18 Tool for airbrake adjustment		14.10.94
Drawing W40		30.11.99
Drawing W51		20.11.96
Drawing W57		10.09.99
Drawing 8E210		22.05.97
Drawing 5M110		23.10.02
Enclosure 1 Instructions for transponder Installation		Jan. 06
Working instruction No. 1 for TN348/20 issue 3, headrest securing ropes		22.10.08

1.6.4 **Hydraulic brake system**

a) Brake fluid approved specification DOT 3, DOT 4, SAEJ 1703.

The brake fluid must be exchanged at least every 4 years.

Warning: brake fluid is poisonous

b) Adjustment: see section 1.5.2 c)
If adjustment does not increase the braking effect as desired, the brake system is leaking or there is air in the brake system. Bleeding of the brake system see section 4.5.

c) The brake linings must be replaced if they are used up to a thickness of 2.5 mm (0.098 in.). Removal of brake calliper see sect. 4.4 B.

Replacement set (2 linings, 6 rivets) Tost No. 075860

d) The brake disc must be replaced if it is used up to a thickness of 4.2 mm (0.167 in.). Removal of the wheel see sect. 4.4 A.

b) Steerable nosewheel

1.6.5 Control system see diagram 10
The nose wheel is connected to the rudder control with springs.

1.6.6 Adjustment of the spring tension
The adjustment is made at the rear rudder pedals. Adjust so that the springs are just untensioned with nosewheel and rudder in neutral position.

1.6.7 **Tyre pressure:**

Main wheel	3	bar (44 psi)
Nose wheel	2.5	bar (36 psi)
Tail wheel	4	bar (58 psi)

2. Inspections

2.1 Daily inspection

see flight manual DG-500MB

2.2 Regular inspections

A) **After 200 flight hours and during the annual inspection**

Check the rudder cables for wear especially around the "S" tubes on the rudder pedals. Worn rudder cables should be replaced (see sect.4.2).
Check the sealing of the rudder (see sect.1.3.5).

B) **Annual inspection** (and 100hr inspection – only for USA)

- Execute all items of the daily inspection (see flight manual section 4.3). Check especially the headrest securing ropes in the rear cockpit according to "Working instruction No. 1 for TN348/20 issue 3" (attached to this manual) for correct assembly and for wear.
- Inspect all bolted connections and locking devices ie. locknuts, split pins etc.
- Check all metal parts for adequate greasing and rust prevention. (see sect. 3.3).
- Check the control surface deflections (see sect. 1.2 - 1.4).
- Check the free play in all control circuits (see sect. 1.2 - 1.6) and the fore and aft play of the wings (see sect. 1.10).
- Check the canopy emergency releases according to sect. 7.15 of the flight manual.
- Check the rubber cords in the control system (see sect. 1.2.6, 1.4.6 and 1.7.5).
- Check the thickness of the wheel brake linings and the thickness of the wheel brake disc (see section 1.6.1.4).
- Check if the brake fluid has to be exchanged (see sect. 1.6.4).
- Check the airbrakes according to "Instructions for inspection 500/20" (at the end of this manual).
- Check the friction brake of the throttle control (see sect. 1.11.8).
  Check the complete powerplant (see sect. 3.5.1 only with the 100 hr inspection)
- Check the torque of the propeller bolts see sect. 3.5.1 item 25 of this manual.
- Check the friction of the canopy operating handles see section 1.15.
- **Tow hook**
  The operating and maintenance instructions for the release mechanisms, see sect. 0.4 of this maintenance manual have to be followed.
- **All-up weight and centre of gravity**
  These should be checked at least every 4 years during the yearly inspection.

C) **Every 3 months**

Check the tension of the lines of the waterbag attachment (see sect. 4.1.).

D) **Special inspections**

Tow hook

After a wheel-up landing, the C.G. tow hook is to be cleaned. Check tow hook and tow hook bulkheads carefully for any damage.

C.G. weighing: After all work which may influence the C.G.

Fuselage cont.

To check the elevator control circuit and the bulkhead attachments in the fin area, the tailwheel and the cover plate in the wheel box should be removed.

Tailplane attachment:
Increased free play? Cracks in the fin top rib? Check if the aluminium parts of the tailplane attachment are bent or loose, check the tailplane locking device

Rudder mounts:
Increased free play? White areas in the glass fibre, bent rudder hinge pin supports?

Fuselage skin:
Outside: cracks, nicks, folds? Any separation of the skin from the core? inside: white spots, zig zag white lines, cracks? Has any bulkhead become loose?

C.G. tow release:
Especially after a wheel up landing, check for dirt etc., check for proper functioning. Has the tow release housing become detached from the fuselage?

Seat back bulkhead:
Cracks? Shoulder strap attachment point?

Belly harness attachment points:
Check for cracking around the mountings in the seat. Check the safety harness assembly.

Controls:
Check for proper functioning and condition of all controls and adjustment mechanisms (i.e. rudder pedal adjustment, tow release, air brake, control column and trim etc.).

Instruments:
Proper functioning? Dirt in the static ports or in the pitot probe?

Engine compartment:
Check for damage of the walls.
Does the engine retract without scratching the side walls? Do the engine doors close as well as before?
Check the condition of the fire resistant paint and the insulation?

Undercarriage:
Check to insure if properly aligned. No bent forks? Proper extension and retraction? Any dirt in the forward fork pivot? Any white areas or cracks in the wheel box? Remove the baggage area floor panels and inspect the wheel box from above. Undercarriage control circuit condition. Is there free play between actuating lever and rear upper fork?

Nose wheel and tail wheel
Any cracks or white patches around the attachment?

Check the steerable nose wheel for bent struts, damaged bearings and easy motion.

Horizontal tailplane-stabilizer:
Outer skins: Crushing, cracks, delaminations?
Mounting: Glued joint of the bushes, white areas around bushes, cracks in shear webs, cracks around locking plate?
Hinge mounts: checked?

Elevator:
Crushing, cracks, delaminations?
Hinge mounts checked? - Control surface horn bent or loose?

Do all **checks of the daily inspection (**see flight manual section 4.3).

2.4 Inspection procedure for increase of service time

1. **General**
   The results of fatigue tests of wingspar sections have demonstrated that the service time of GFRP/CFRP gliders and motorgliders may be limited to 12000 hours, if for each individual glider (in addition to the obligatory annual inspections) the airworthiness is demonstrated according to a special multi-step inspection program particularly with regard to the service life.

2. **Dates**
   When the glider has reached a service time of 3000 hours, an inspection must be done in accordance with the inspection program mentioned under point 3.
   If the results of this inspection are positive or if any defects found have been duly repaired, the service time of the glider is extended by another 3000 hours to a total of 6000 hours (first step).

   The above inspection program must be repeated when the glider has reached a service time of 6000 hours. If the results of this inspection are positive or if any defects found have been duly repaired, the service time of the glider is extended to 9000 hours (second step).

   When the glider has reached a service time of 9000 h the above inspection program must be repeated. If the results of the inspection are still positive, or if any defects found have been duly repaired, the service time may be extended to a total of 10000 hours (third step).

   Proceed analogous when reaching 10000 and 11000 hours (4. and 5. step).

4.5 Filling and bleeding the hydraulic disc brake

Note: The master cylinder is mounted in an upright position. This means that filling and bleeding the system is only possible from the lowest point, which is the brake cylinder assembly at the wheel.

Necessary tools:

1 open-end wrench 1/4" = 6.35 mm for the bleeder valve at the brake calliper.
1 open-end wrench 11/16" = 18 mm.
2 Plastic syringes acid resistant, volume approx. 100 ml (6 cu.in.). Use this syringe for brake fluid only! 1 bleeder assy Tost No. 075890.
1 m (3 ft.) transparent PVC hose inside diameter 8 mm (0.31 in.), fixed to syringe and bleeder assy with hose clamps.
Brake-fluid DOT 3, DOT 4 or SAEJ 1703.

1. **Preparations**

- Raise the fuselage, extend the landing gear.
- Fix left wheel door in the fully open position.
- Set the airbrake control in the retracted position.
- Remove the baggage compartment floor and rear cover, check that the actuating cable for the master cylinder is loose and if the piston rod of the master cylinder is at its upper stop.
- Remove the main wheel according to section 4.4 A. Place the wheel so that the brake hose makes no bow above or below the horizontal. If necessary lift the fuselage even more.

2. **Filling** (empty system)

Warning: Brake fluid is poisonous! Protect your hands and clothes. Remove all spilled brake fluid. Clean all parts which had contact with brake fluid with alcohol, don't use fuel or solvents.

- Remove the cap and the membrane from the reservoir.
- Fill the first syringe (with hose and bleeder assy.) with brake fluid, eliminate all air bubbles.
- Remove the protection cap from the bleeder valve at the brake calliper, attach the bleeder assy. and fix it with the 11/16" wrench.
- Open the bleeder valve at the cylinder assy, use the 1/4" wrench, fill in slowly the complete volume avoiding air bubbles.
- Fill the complete system up to 15 mm (0.6 in.) below the upper edge of the reservoir, avoid over filling.
- Close the bleeder valve at the brake calliper.

- Fill the first syringe again, open the bleeder valve and fill in further brake-fluid. Look at the reservoir while filling to see if air bubbles are coming out of the line. Fill up to 15 mm (0.6 in.) below the upper edge of the reservoir.
- Close the bleeder valve, reinstall the membrane and the cap to the reservoir and remove the bleeder assy.
- Check brake pressure according to step 3..
- Reinstall the main wheel.

3. **Check brake pressure:**
   - Extend the airbrakes, there must be a strong pressure when the wheel brake engages.
   - Check several times, the wheel brake must engage at the same point every time
   - If this is not the case, you have to bleed the system again, see step 5..

4. **Check the hydraulic brake system for leaks:**
   Extend the airbrakes with high force and hold it in this position for 2 minutes.
   Then check the whole hydraulic system visually for leaks. If necessary tighten the screwed joints or replace the sealings and bleed the system again.

Note: The adjustment of the length of the cable between the master cylinder and the airbrake control shaft restricts the max. airbrake extension height. The adjustment of this cable should be done with the glider rigged.

5. **Bleeding the hydraulic brake system**
   Remove the brake fluid from the reservoir using the syringe.
   Then execute again steps 2 and 3 of this instruction.

6. **Exchanging brake fluid** (every 4 years)
   - Perform preparations (see step 1.) of this instruction. It is not necessary to remove the main wheel.
   - Fill the system with new brake fluid (see step 2.). To accomplish this remove all brake fluid from the reservoir first with the second syringe. Used brake fluid is darker than new brake fluid and can easily be identified. Watch the reservoir while filling to see when the new fluid streams into the reservoir. Repeat the filling process until only new fluid is in the system and no air bubbles can be detected.
   - Perform steps 3. and 4. of this instruction.

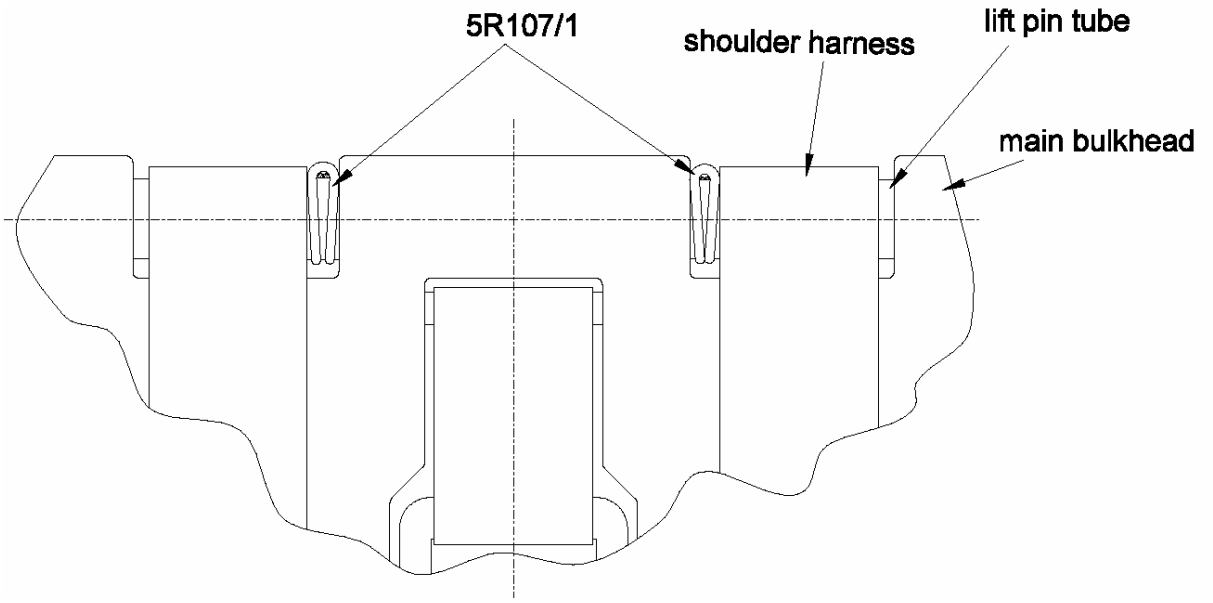
Working instruction No. 1 for TN348/20

Installing the headrest securing ropes in the rear cockpit

Note: The photos in this working instruction have been taken from a test stand and don't show the DG-500 main bulkhead.

1. Remove the old securing ropes.

2. Install the 2 loops 5R107/1 left and right beside the shoulder harness belts to the lift pin tube (see sketches and photos 1, 2, 4 and 5).



Sketch 1 (shown without headrest)

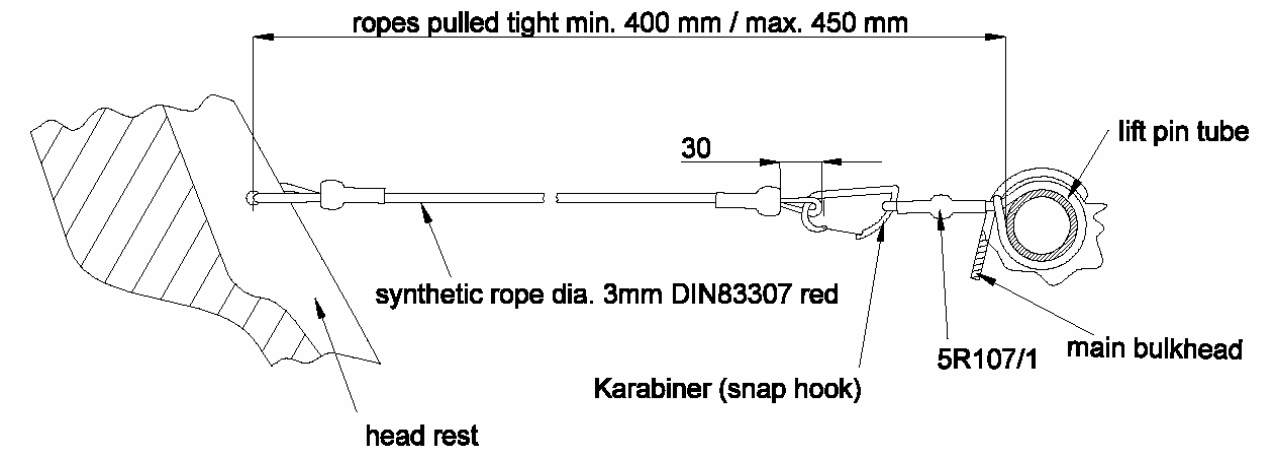
3. Installing new securing ropes to the headrest (see sketches and photos 2, 6 and 7):
   a) Insert one synthetic rope 600 mm long into the holes at the left hand side of the headrest and fix by knotting a Palstek. Secure the knot with heat shrink tubing (see photos 6)
   b) Slip a piece of heat shrink tubing onto the free end of the rope. Form a loop approx. 30 mm long and apply a knot according to sketch 7.
   Don't shrink the heat shrink tubing at this stage of work.
   Fix another rope to the right hand side in the same way.

4. Hook the Karabiners (snap hooks) into the loops to connect the ropes (see sketches and photos 2, 3 and 5).

5. Check: The distance between the holes in the headrest and the front side of the lift pin tube has to be min. 400 mm and max. 450 mm according to sketch 2 when pulled tight. Both ropes should have the same length.

6. Check: Pull the control stick into its aft position. The distance between the headrest and the upper end of the control stick (or the push to talk switch if installed) has to be min. 20 mm when the ropes are pulled tight.
   If necessary adjust the length of the ropes

7. Secure the knots from 3b) according to photo 7 with the heat shrink tubing already installed.



Sketch 2

Overall view



Photo 3

Installing the loops 5R107/1 according to item 2



Photo 4

Karabiner (snap hook) hooked in the loops according to item 4



Photo 5

Installation of the securing ropes at the head rest according to item 3 a)



Photo 6

Forming the loops at the securing ropes according to item 3 b)

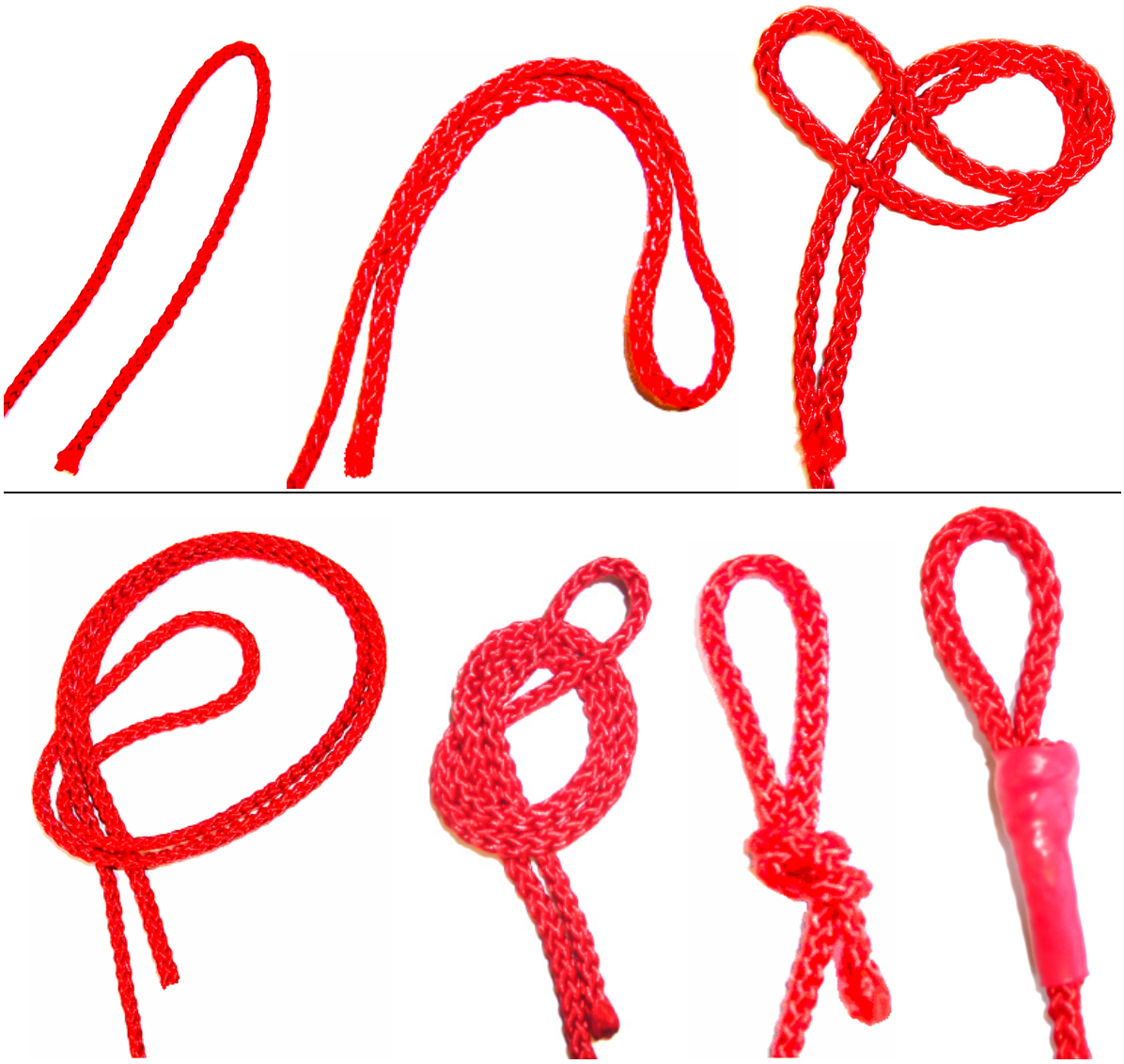


Photo 7

Material: retrofit kit part. no. 41060010

Caution:
Only the use of genuine parts supplied by DG Flugzeugbau GmbH and delivered with an EASA form 1 are permissible.

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