0 General

0.1 Manual amendments

No.	Page	Description	Date
0.1	all	Combination of the initial Maintenance Manuals of the Variants DG-500/22 ELAN, DG-500 ELAN Trainer, DG-500/20 ELAN and DG-500 ELAN Orion, new standardized format	December 2009
0.2	0,8, 1.9, 1.14, 4.2, 5.1, 6.1, 6.2	Miscellaneous changes to the contents of the latest amendments of the initial maintenance manuals	December 2009
1	0.3, 0.4, 0.7, add diagram 7a	Wheel brake TN500/03	July 2011
2	0.3, 0.4, 0.7, 1.11, 2.1, 2.3, 2.4, 4.5, 4.6, 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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0.2 List of effective pages

Section	page	issued	replaced /	replaced /	replaced /
0	0.0	December 09			
	0.1	See manual amendments			
	0.2	See manual amendments			
	0.3	See manual amendments			
	0.4	See manual amendments			
	0.5	December 09			
	0.6	"			
	0.7	"	July 11	September 11	
	0.8	"			
1	1.1	December 09			
	1.2	"			
	1.3	"			
	1.4	"			
	1.5	"			
	1.6	"			
	1.7	"			
	1.8	"			
	1.9	"			
	1.10.	"			
	1.11.	"	September 11		
	1.12.	"			
	1.13.	"			
	1.14.	"			
	1.15.	"			
	1.16.	"			
	1.17.	"			
2	2.1	December 09	September 11		
	2.2	"			
	2.3	"	September 11		
	2.4	"	September 11		
	2.5	"			
3	3.1	December 09			
	3.2	"			
	3.3	"			
	3.4	"			
4	4.1	December 09			
	4.2	"			
	4.3	"			
	4.4	"			
	4.5	"	September 11		
	4.6	"	September 11		
	4.7	"			

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Section	page	issued	replaced /	replaced /	replaced /
5	5.1	December 09			
	5.2	"			
6	6.1	December 09			
	6.2	"			
	6.3	"			
	6.4	"			
7	7.1	December 09			

Diagram	issued	replaced	replaced	replaced
1	April 90			
2	April 90			
3 DG-500/22 and /20	April 90			
3a DG-500 Trainer and Orion	January 1999			
4 DG-500/22 and /20	April 90			
4a DG-500 Trainer and Orion	April 90			
5	April 90			
6 DG-500/22 and /20	April 90			
6a DG-500 Orion	July 1995			
7	June 1993			
7a	July 2011			
8	April 90			
9 DG-500/22 and /20	April 90			
9a DG-500 Trainer	March 1992			
9b DG-500 Orion	July 1995			
10 only DG-500 Trainer	April 90			

Enclosure	issued	replaced	replaced	replaced
Equipment list	December 09			
5EP30 Installation ELT	27.02.91			
5EP34 Installation Dräger oxygen system	25.01.90			
Working instruction No. 1 for TN348/20 issue 3	22.10.2008			
Only DG-500/20, Trainer, Orion				
Instruction for inspection DG-500 airbrakes	December 09			
Questionnaire for TN 348/4	October 94			
Working instruction No. 1 for TN 348/4	October 94			
Working instruction No. 2 for TN 348/4	October 94			
5V18 Tool for airbrake adjustment	14.10.94			

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Diagrams

1	Elevator control circuit, trim
2	Rudder control circuit
3 DG-500/22 and /20	Controls in the fuselage (aileron, wing flaps and airbrakes)
3a DG-500 Trainer and Orion	Controls in the fuselage (aileron and airbrakes)
4 DG-500/22 and /20	Controls in the wings (aileron, wing flaps and airbrakes)
4a DG-500 Trainer and Orion	Controls in the wings (aileron and airbrakes)
5	Tow hooks
6 DG-500/22 and /20	Water ballast system
6a DG-500 Orion	Water ballast system
7	Landing gear, hydraulic wheel brake (wheels ser. No. up to ser. No. 51841 except for 51833)
7a	Landing gear, hydraulic wheel brake (wheels from ser. No. 52002 on and 51833)
8	Pitot/static system
9 DG-500/22 and /20	Placards
9a DG-500 Trainer	Placards
9b DG-500 Orion	Placards
10 only DG-500 Trainer	landing gear non retractable

Enclosure

Equipment list
5EP30 Installation ELT
5EP34 Installation Dräger oxygen system
Working instruction No. 1 for TN348/20 issue 3, headrest securing ropes in the rear cockpit

Only DG-500/20, Trainer, Orion

Instruction for inspection DG-500 airbrakes
Questionnaire for TN 348/4
Working instruction No. 1 for TN 348/4
Working instruction No. 2 for TN 348/4
5V18 Tool for airbrake adjustment

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1.6.1.4 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.

1.6.2 Main wheel non retractable (optional DG-500 Trainer)

1.6.2.1 System

See diagram 10
Instead of the hydraulic disc brake a wheel with drum brake is used.

1.6.3 Tyre pressure:

	DG-500/22, /20, Orion				DG-500 Trainer			
Main wheel	3	bar	(44.5	psi)	2.5	bar	(36	psi)
Nose wheel	2.5	bar	(36	psi)	2.5	bar	(36	psi)
Tail wheel	4	bar	(58	psi)	4	bar	(58	psi)

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2 Inspections

2.1 Daily inspection

see flight manual section 4.3

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 section 4.2).
Check the sealing of the rudder (see section 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 section 3.3).
- Check the control surface deflections (see sections 1.2 up to 1.4).
- Check the free play in all control circuits (see section 1.2 up to 1.6)
- Check the fore and aft play of the wings (see section 1.10).
- Check the canopy emergency releases according to section 7.15 of the flight manual.
- Check the rubber cords in the control system (see sections 1.2.6, 1.4.6 (only DG-500/22 and /20) 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 section 1.6.1.4).
- Check the airbrakes according to "Instruction for inspection DG-500 airbrakes" (attached to this manual) (not necessary for DG-500/22).
- **Tow hooks:** 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.

C Every 3 months

Check the tension of the lines of the waterbag attachment (see section 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..

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Fuselage cont.

To check the elevator control circuit and the bulkhead attachments in the fin area, the tail-wheel 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?

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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.
- Use the second syringe to remove all brake fluid from the reservoir.

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- 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.

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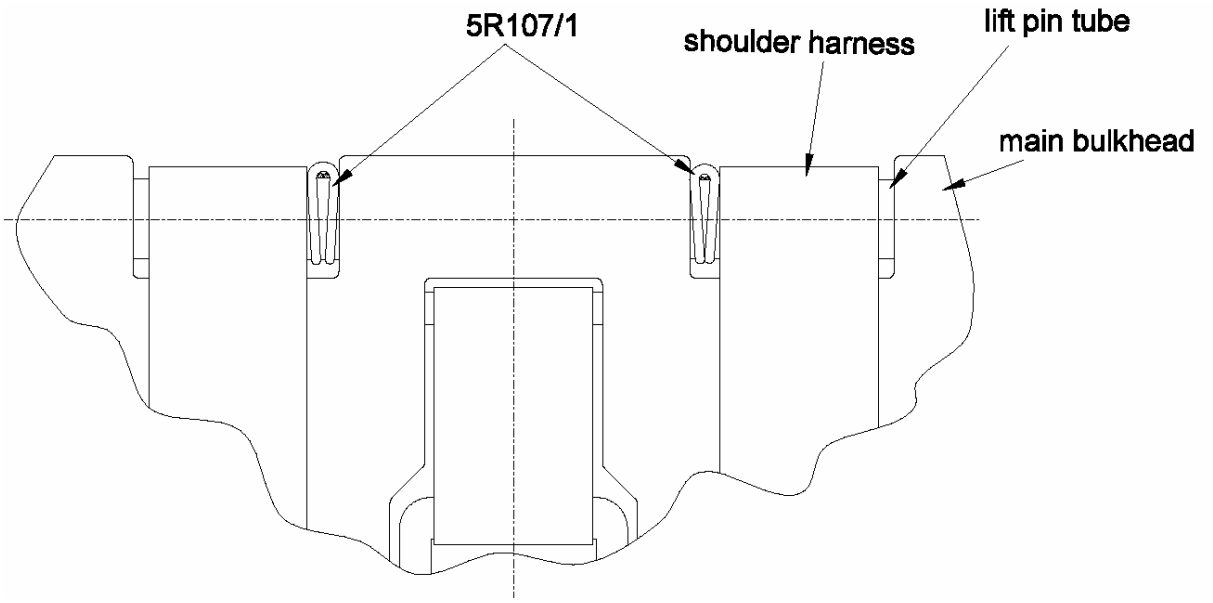
Working instruction No. 1 for TN348/20

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)

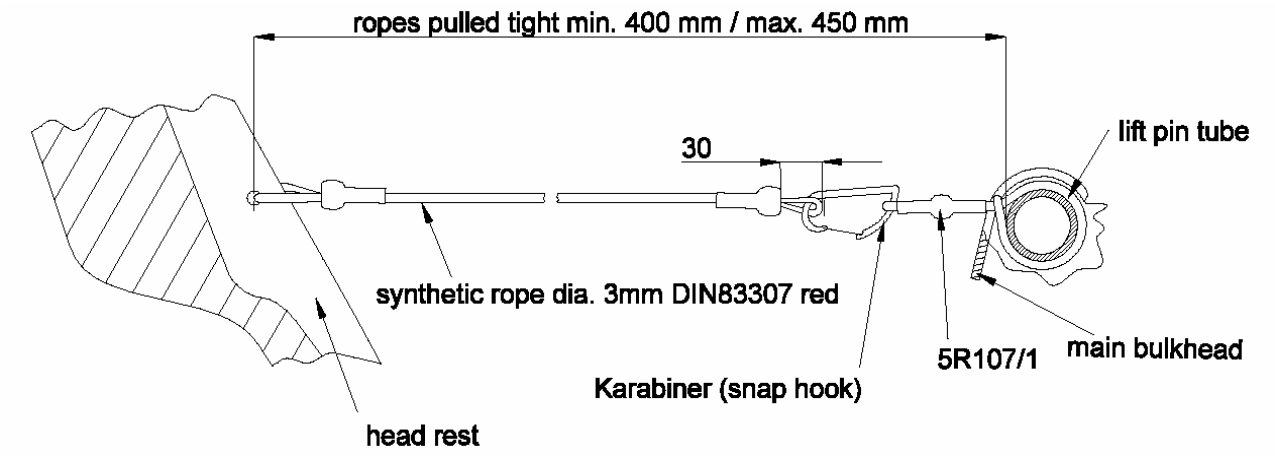
3. Installing new securing ropes to the headrest (see sketches and photos 2, 6 and 7):
   a) Insert one synthetic rope 600 mm long into the holes at the left hand side of the headrest and fix by knotting a Palstek. Secure the knot with heat shrink tubing (see photos 6)
   b) Slip a piece of heat shrink 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)

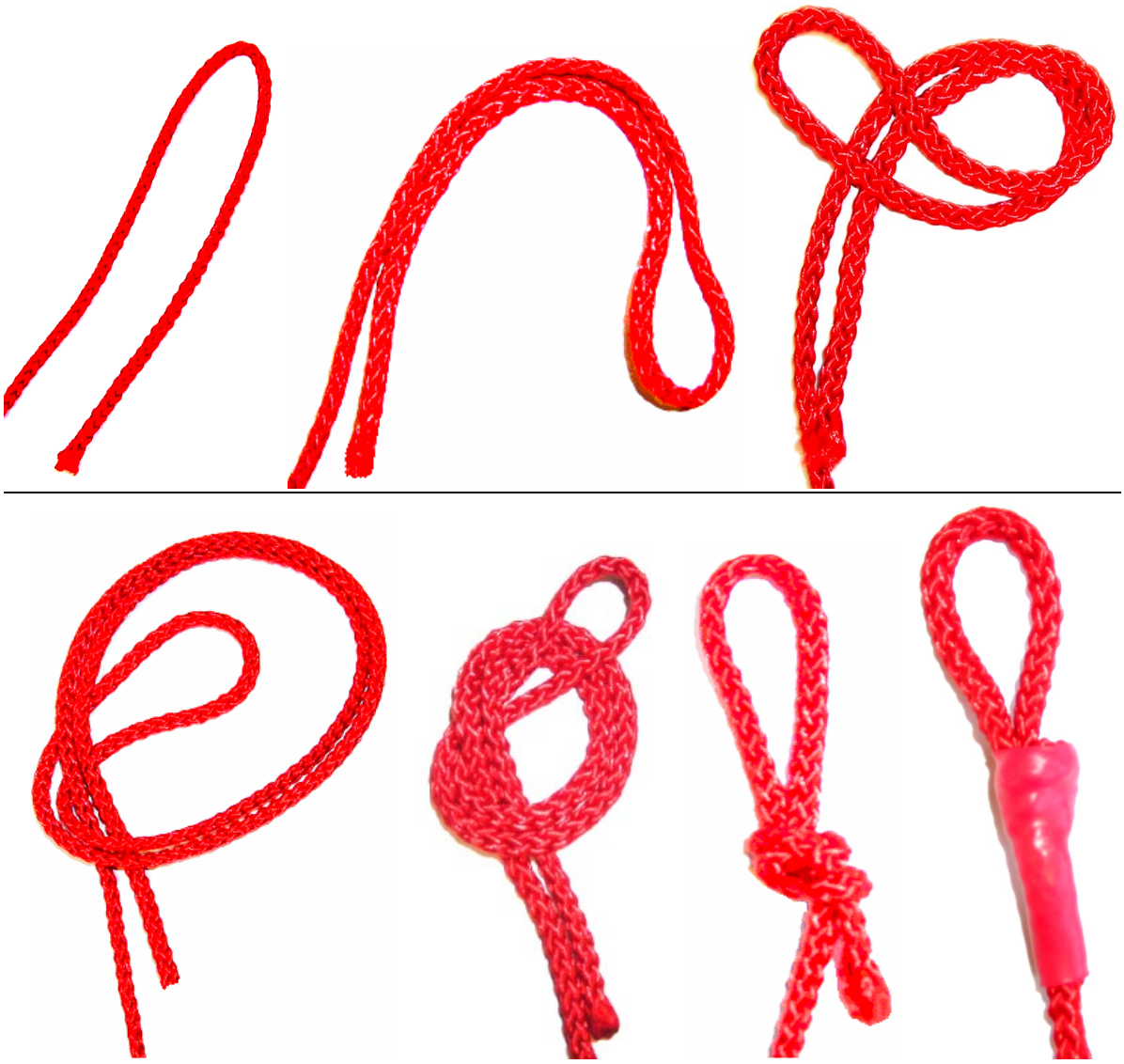


Photo 7

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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first edition: 26.05.2008
corrected 22.10.2008
corrected 13.09.2011

Issue 3: 13.09.2011
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