

SUBJECT : Airbrakes

EFFECTIVITY : DG-500 ELAN Trainer, all serial no's.

ACCOMPLISHMENT : prior to aerobatics with negative loads,  
latest at the next annual inspection

REASON : When executing aerobatics with negative  
loads with the DG-500 ELAN TRAINER, the  
airbrakes may be sucked out and flutter in  
the locked position.

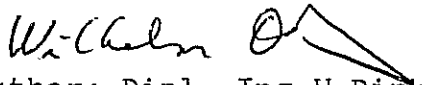
INSTRUCTIONS : 1. Aerobatics with negative loads are pro-  
hibited until instructions 2 and 3 have  
been executed.  
2. Inspection of the airbrakes according to  
instructions for inspection for TN 348/4T  
3. Manual changes  
Exchange the following manual pages  
against the new pages issued Oct. 1994.  
**Flight manual**  
0.1, 0.3, 4.14  
**Maintenance manual**  
1, 2, 3, 17  
In addition file the following documents  
at the end of the maintenance manual:  
Instructions for inspection for TN 348/4T  
Questionnaire and working instructions  
no. 1 and no. 2 for TN 348/4.

MATERIAL : Manual pages see instruction 3  
Instruction for inspection for TN 348/4T  
Questionnaire for TN 348/4  
Working instructions no. 1 and 2 for TN  
348/4T  
Special tool 5 V 17  
1 threaded rod M10 475 mm (18.7 in.) long  
6 nuts M10 DIN 931 or DIN 936  
(instead of metric thread M10 parts with  
3/8 in. thread may be used).  
drawing 5 V 18  
8 lock nuts M6 DIN 985 - 8 zn  
if necessary two U-brackets 5F 21/3  
and 8 poprivets Fero dia. 3 x 6.5 AL Mg5

WEIGHT AND  
BALANCE : no influence

REMARKS : The instructions are to be inspected and entered in the aircraft logs by a licensed inspector. Execute only the approved manoeuvres, listed in the flight manual.

Bruchsal 4, 17.Oct.1994



Author: Dipl.-Ing. W. Dirks

LBA - approved:

The German original of this TN has been approved by the LBA under the date of Oct. 26, 94. and is signed by Mr. Fendt. The translation into English has been done by best knowledge and judgement. In any case of doubt the German original is authoritative

Type certification inspector: Dipl.-Ing. A. Lange

## Inspection of the DG-500 ELAN Trainer airbrakes Instructions for Inspection for TN 348/4T

All inspections can be done with the glider derigged unless stated otherwise.

1. Make copy of questionnaire for TN 348/4.  
All measured data must be entered in one of the copies.
2. The airbrakes must retract at their outboard end first. When the airbrake cap is flush with the wing surface at the outboard end, the inboard end must be 3 - 6 mm (0.12 - 0.24 in.) above the wing surface.

If not, a modification according to working instruction No. 1 for TN 348/4 must be executed.

3. It is possible that the airbrake plates may interfere with the airbrake box at the lower end and at their outboard side. To check apply small balls of plastilin to the upper and lower airbrake plates, see sketch. Then lock the airbrake using special tool 5V 17 with a rod, see drawing 5V 18.

Extend the airbrake again and check to which thickness the plastilin was compressed. There should be a clearance of 2 mm (0.08 in.) at least. If necessary shorten the plates at their lower and outboard ends. The lower (rear) plate of the Trainer airbrakes may be shortened to a height of 107 mm (4.21 in.) instead of 115 mm (4.53 in.).



If you have to remove the upper plate, execute item 4 prior to reinstallation of the plate.

4. Measurement of the stiffness of the airbrake-system.

Remove the upper airbrake plate. Install the bolt at the inner bellcrank again, see sketch.

Lock the airbrake control at the wingroot.

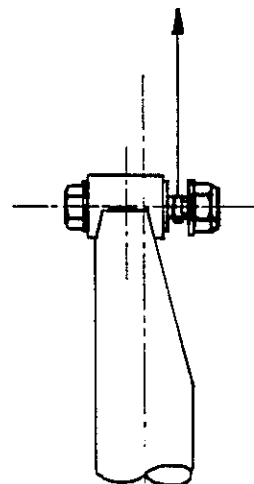
Pull at the bolt with a spring scale.

Measure the displacement of the bolt at a force of 30 daN (56 lbs.).

Max. permissible displacement is 42 mm (1.65 in.).

If you measure a larger displacement this may be an indication for a structural damage at the mounting of the airbrake control in the wingroot area.

Please, contact the manufacturer in this case.



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**Inspection of the DG-500 ELAN Trainer airbrakes**  
**Instructions for Inspection for TN 348/4T**

5. Checking the overcentre locking moment and angle.  
Check according to working instruction No. 2 for TN 348/4.

The locking moment must be measured as a force at 200 mm (7.87 in.) from the point of rotation. The force shall be 6.5 - 8.5 daN (2.95 - 3.86 lbs.). The sum of the forces of the left and the right wing shall not exceed 15.5 daN (7.03 lbs.).

The overcentre locking angle must be measured as a distance at 300 mm (11.81 in.) from the point of rotation.

If it was necessary to adjust the locking moments, rigg the glider after the adjustment and check if both airbrakes retract at the same time. Tolerance is 4 mm (0.16 in.). To measure retract the airbrakes so far, that the first cap is flush with the wing surface at the outboard end (in most cases at the right wing). Hold the airbrake handle in this position and measure how high the outboard end of the other airbrake is above the wing surface. If this is out of tolerance you have to reduce the locking moment at the brake which retracts first or to increase the locking moment at the brake which retracts last. But check that the locking moments remain in their tolerances. For this adjustment adjust the rod end in the airbrake box by 1/2 turn only.

6. If you have adjusted the locking moments under item 5 so you have to repeat check 3 at the respective airbrake.
7. Use new lock nuts M6 DIN 985-8 zn to secure all airbrake plates.
8. Send a copy of the completed questionnaire to GLASER-DIRKS.

File the original into your aircraft logs. This is important to find out if any changes of the adjustments have occurred during the time up to the next annual inspection.

Store the special tool properly as you need it for every annual inspection.

9. File this instruction with a blank copy of the questionnaire and with working instructions No. 1 and 2 to the end of the maintenance manual.



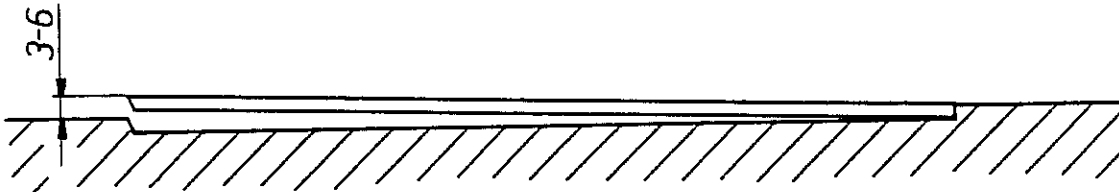
Author: Dipl.-Ing. W. Dirks

Issued: Oct. 1994

## Inspection of the DG-500 airbrakes

### Working instruction No. 1 for TN 348/4

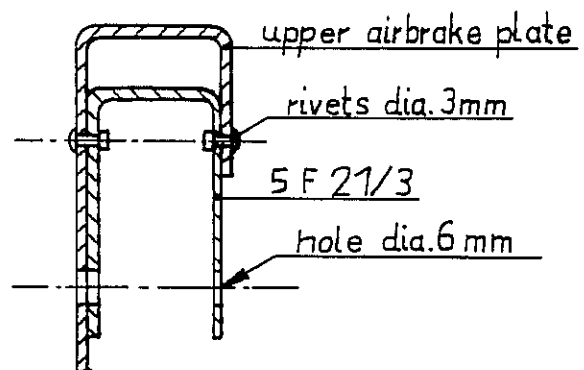
The airbrakes must retract at their outboard end first. When the airbrake cap is flush with the wing surface at the outboard end, the inboard end must be 3 - 6 mm (0.12 - 0.24 in.) above the wing surface.



If not, modify as follows:

With the modification a value of 5 -6 mm (0.2 - 0.24 in.) shall be adjusted.

1. Remove the bolt fixing the upper airbrake plate to the outboard bellcrank.
2. Drill out the 4 rivets which fasten the U-bracket 5F 21/3 to the airbrake plate. Use a 3 mm (0.118 in.) drill. Remove 5F 21/3.
3. Enlarge the 6 mm hole at which the outboard bellcrank was screwed to the airbrake plate to 7 mm (0.276 in.) diameter.
4. Insert a new bracket 5F 21/3 into the upper airbrake plate and bolt it together with the airbrake plate and with the bellcrank.
5. Retract the airbrake and measure the distance of the inboard edge of the airbrake cap to the wing surface. If the desired value of 5 -6 mm is not reached, you must repeat items 3 and 4. Enlarge the hole in steps from 7 mm to 8 mm (0.314 in.).
6. Drill the 3 mm (0.118 in.) rivet holes through the existing holes in the airbrake plate into bracket 5F 21/3. Fasten 5F 21/3 with 4 aluminium poprivets type Fero dia. 3 x 6.5 AL Mg5 with steel pin to the airbrake plate.



Author: Dipl.-Ing. W. Dirks

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## Inspection of the DG-500 airbrakes

### Working instruction No. 2 for TN 348/4

#### 1. Overcentre locking moment

To determine the moment a tool 5V 17 and a rod which you must produce according to drawing 5V 18 are needed. Place the tool on the airbrake control hook up at the wing root rib.

Unlock: Rotate away from the stop

Lock: Rotate until the pin 5ST41/2 touches the stop.

Measure the moment to lock the airbrake.

The locking moment must be measured as a force at 200 mm (7.87 in.) from the point of rotation. The force shall be 6.5 - 8.5 daN (2.95 - 3.86 lbs.). The sum of the forces of the left and the right wing shall not exceed 15.5 daN (7.03 lbs.).

Adjustment of the moment is done by adjusting the rod end at the pushrod inside the airbrake box.

Turn in the rod end: reduce the moment

Turn out the rod end: increase the moment

1/2 turn of the rod end changes the force by appr. 1.4 daN (3 lbs.).

#### 2. Overcentre travel (angle)

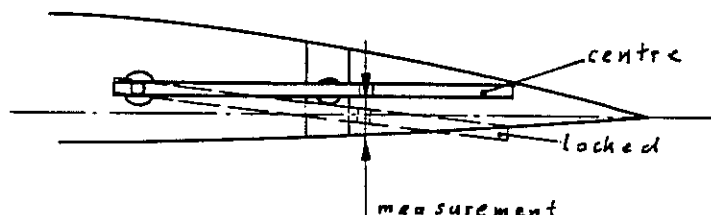
To determine the overcentre travel use again the tool, see above.

Place the wing horizontal on stands.

Unlock the airbrake only so far, that the airbrake does not unlock or lock again by itself.

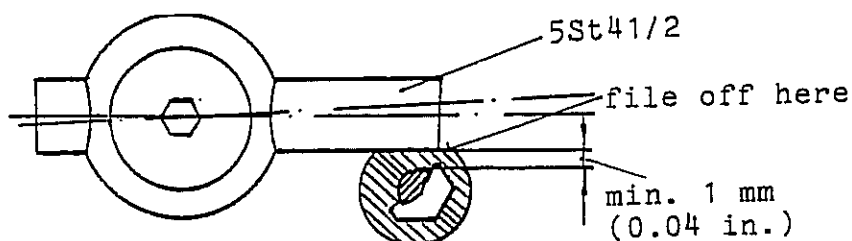
This is only possible in a very small range.

Measure the centre of this range at the position marked on the rod (300 mm, 11.8 in. behind axis of rotation) from the lower side of the wing. Then lock the airbrakes and measure this value too. The difference shall be  $16 \text{ mm} \pm 2 \text{ mm}$  ( $0.63 \pm 0.08 \text{ in.}$ ). This corresponds to an overcentre angle of  $3^\circ \pm 0.4^\circ$ .



**Inspection of the DG-500 airbrakes****Working instruction No. 2 for TN 348/4**

For adjustment file off the brass bush at the stop or use a larger brass bush if necessary (see sketch).  
You may order such bush from GLASER-DIRKS.  
Please, indicate the necessary diameter with your order.



3. Check the overcentre moment, see 1. again.
4. Follow instructions 1. - 3. for the other wing.

*W. Dirks*

Author: Dipl.-Ing. W. Dirks

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owner

GLASER-DIRKS FLUGZEUGBAU GMBH .....  
 Im Schollengarten 19-20 .....  
 D- 76646 Bruchsal .....  
 Germany .....

DG-500 ELAN ..... Ser.No. 5 E ... ..

Inspection of the DG-500 airbrakes  
 questionnaire for TM 348/4

| Item              | value prior to<br>modification     |           | value after<br>modification |           |
|-------------------|------------------------------------|-----------|-----------------------------|-----------|
|                   | left                               | right     | left                        | right     |
| 2                 | ..... mm                           | ..... mm  | ..... mm                    | ..... mm  |
| 3 + 6             | min. clearance lower (rear) plate  |           |                             |           |
| lower side.....   | mm                                 | ..... mm  | ..... mm                    | ..... mm  |
| outboard end..... | mm                                 | ..... mm  | ..... mm                    | ..... mm  |
|                   | min. clearance upper (front) plate |           |                             |           |
| lower side.....   | mm                                 | ..... mm  | ..... mm                    | ..... mm  |
| outboard end..... | mm                                 | ..... mm  | ..... mm                    | ..... mm  |
| 4                 | deformation                        |           |                             |           |
|                   | ..... mm                           | ..... mm  |                             |           |
| 5                 | overcentre lock                    |           |                             |           |
| moment.....       | daN                                | ..... daN | ..... daN                   | ..... daN |
| angle.....        | mm                                 | ..... mm  | ..... mm                    | ..... mm  |

Changes of adjustment compared to last inspection (please  
 indicate items and changes)

.....  
 .....  
 .....  
 .....  
 .....

inspection by: ..... signature .....

date: .....



## Inspection of the DG-500 airbrakes

## Working instruction No. 2 for TN 348/4

## 1. Overcentre locking moment

To determine the moment a tool 5V 17 and a rod which you must produce according to drawing 5V 18 are needed. Place the tool on the airbrake control hook up at the wing root rib.

Unlock: Rotate away from the stop

Lock: Rotate until the pin 5ST41/2 touches the stop.

Measure the moment to lock the airbrake.

The locking moment must be measured as a force at 200 mm (7.87 in.) from the point of rotation. The force shall be 6.5 - 8.5 daN (14.3 - 18.7 lbs.). The sum of the forces of the left and the right wing shall not exceed 15.5 daN (34.2 lbs.).

Adjustment of the moment is done by adjusting the rod end at the pushrod inside the airbrake box.

Turn in the rod end: reduce the moment

Turn out the rod end: increase the moment

1/2 turn of the rod end changes the force by appr. 1.4 daN (3 lbs.).

## 2. Overcentre travel (angle)

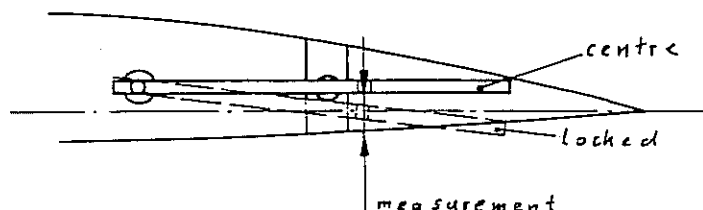
To determine the overcentre travel use again the tool, see above.

Place the wing horizontal on stands.

Unlock the airbrake only so far, that the airbrake does not unlock or lock again by itself.

This is only possible in a very small range.

Measure the centre of this range at the position marked on the rod (300 mm, 11.8 in. behind axis of rotation) from the lower side of the wing. Then lock the airbrakes and measure this value too. The difference shall be  $16 \text{ mm} \pm 2 \text{ mm}$  ( $0.63 \pm 0.08 \text{ in.}$ ). This corresponds to an overcentre angle of  $3^\circ \pm 0.4^\circ$ .



# Inspection of the DG-500 ELAN Trainer airbrakes Instructions for Inspection for TN 348/4T

5. Checking the overcentre locking moment and angle.  
Check according to working instruction No. 2 for TN 348/4.

**Caution:** Checks and installation must be done at room temperature (20 - 25° C). Please make sure that the wings have been warmed up or cooled down to this temperature. At other temperatures wrong measurement of the locking moment will occur.

The locking moment must be measured as a force at 200 mm (7.87 in.) from the point of rotation. The force shall be 6.5 - 8.5 daN (14.3 - 18.7 lbs.). The sum of the forces of the left and the right wing shall not exceed 15.5 daN (34.2 lbs.).

The overcentre locking angle must be measured as a distance at 300 mm (11.81 in.) from the point of rotation.

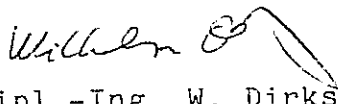
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6. If you have adjusted the locking moments under item 5 so<sup>t</sup> you have to repeat check 3 at the respective airbrake.
7. Use new lock nuts M6 DIN 985-8 zn to secure all airbrake plates.
8. Send a copy of the completed questionnaire to GLASER-DIRKS.

File the original into your aircraft logs. This is important to find out if any changes of the adjustments have occurred during the time up to the next annual inspection.

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Author: Dipl.-Ing. W. Dirks

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