

Maintenance Manual DG-1000T

No.	Page	Description	Date
12	0.2 ÷ 0.9, 0.9a, 0.10 ÷ 0.12, 1.2, 1.5, 1.11, 1.14, 1.15, 1.27 ÷ 1.29, 1.33, 2.1, 2.4 ÷ 2.6, 3.3, 4.8, 5.1, 6.1, 6.2, 6.4, 8.3, 9.2, diagr. 1, 9, 11, encl. 4 pages 1, 2, 2a, 3, Z193, SI 67-07, remove 5EP50	Manual revision TN1000/18	February 2011
13	0.6, diagrams 8 and 9	Wheel brake TN1000/21	July 2011
14	0.2 ÷ 0.7, 0.10 ÷ 0.12, 1.3, 1.5, 1.11, 1.16, 1.29, 1.30, 2.1, 2.6, 3.1, 4.6, 4.10, 4.12, 4.13, 4.19, 4.20, 6.1, 7.1, 8.2, 8.3, diagrams: 2, 3, 9, Enclosure 4 pages: 4, 7	Manual revision TN 1000/24, New type 12V sockets and plugs, Changes due to TN 4603-14 of the Solo company (Exchange of the axle of the upper drive belt pulley on pages 4.19 and 4.20)	October 2014

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0.2 List of effective pages

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0	0.0	June 2005	January 2007			
	0.1	see manual amendments				
	0.2		"			
	0.3		"			
	0.4		"			
	0.5		"			
	0.6		"			
	0.7	June 2005	January 2007	Febr. 2011	Oct. 2014	
	0.8	"		Febr. 2011		
	0.9	"		Febr. 2011		
	0.9a	Febr. 2011				
	0.10			Febr. 2008	March 2008	Oct. 2008
				Nov. 2008	Febr. 2011	Oct. 2014
	0.11	"		Febr. 2011	Oct. 2014	
0.12	"		January 2007	Febr. 2011	Oct. 2014	
1	1.1	June 2005	January 2007			
	1.2	"		Febr. 2011		
	1.3	"		Oct. 2014		
	1.4	"				
	1.5	"		Febr. 2011	Oct. 2014	
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	1.9	"		Febr. 2008		
	1.10	"		Febr. 2008		
	1.11	"		Febr. 2011	Oct. 2014	
	1.12	"				
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	1.14	"		March 2008	Febr. 2011	
	1.15	"		Febr. 2011		
	1.16	"		Oct. 2014		
	1.17	"				
	1.18	"				
	1.19	"		March 2008		
	1.20	"				
	1.21	"				
	1.22	"		October 2006		
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	1.26	"			
	1.27	"	Febr. 2011		
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	1.30	"	Oct. 2014		
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2	2.1	June 2005	March 2008	Febr. 2011	Oct. 2014
	2.2	"			
	2.3	"			
	2.4	"	Febr. 2011		
	2.5	"	Febr. 2011		
	2.6	"	May 2008	Febr. 2011	Oct. 2014
3	3.1	June 2005	Oct. 2014		
	3.2	"			
	3.3	"	Febr. 2011		
	3.4	"			
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4	4.1	June 2005			
	4.2	"	January 2007		
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	4.6	"	Oct. 2014		
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	4.9	"	Febr. 2008	Oct. 2008	
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	4.14	"			
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	4.20	"	Oct. 2014		
	2.21	"	January 2007		
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	4.28	"	January 2007		
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5	5.1	June 2005	Febr. 2011		
	5.2	"			
6	6.1	June 2005	Febr. 2011	Oct. 2014	
	6.2	"	May 2008	Febr. 2011	
	6.3	"			
	6.4	"	Febr. 2011		
7	7.1	June 2005	Oct. 2014		
8	8.1	June 2005	January 2007		
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diagram	issued	replaced/	replaced/	replaced/
1	May 2004	Oct. 2010		
2	Nov. 2001	Oct. 2014		
3	June 2005	Oct. 2014		
4	Nov. 2001			
5	Nov. 2001	January 2007		
6	Nov. 2001	January 2007	March 2008	Not valid for 10-101, and from 10-128 on
6a	March 2008			
7	Nov. 2004			
7a	Oct. 2008			
8	Nov. 2001	January 2007	July 2011	
9	June 2005	January 2007 Oct. 2014	Febr. 2011	July 2011
10	May. 2005	January 2007		
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12	Sept. 2003	January 2007		
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15	June 2005	January 2007		
15a	Oct. 2006	Dec. 2006	January 2007	
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19	March 2008			
20	Nov. 2008			
21	Nov. 2008	Oct. 2010		
22	Nov. 2008			
5EP34	25.01.90			
5V18	14.10.94			
10FW2	05.10.99			
10E4 issue A	28.10.08			
10E4 issue E	8.10.10			
10E102	14.09.05	5.12.05	26.01.06	
10E103	24.06.05			
Encl. 1	June 2005			
Encl. 2	June 2005	Page 1 January 2007	Pages 2, 3 May 2008	
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Encl. 4	Nov. 2008	Page 2, 2a , 7 Oct. 2010	1, 2, 2a, 3 Febr. 2011	4, 7 Oct. 2014
SI 67-07	5.11.2007			
Z193	4.11.2009			

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- Encl. 1 Download instructions for flightlog and service data from the DEI-NT
- Encl. 2 Instructions for transponder installation
- Encl. 3 Throttle handle in front and rear Cockpit TN1000/15
- Encl. 4 Electrically operated main landing gear
- SI 67-07 Service Info ballast box in the fin foam rubber rings
- Z193 406 MHZ ELT antenna BD3 installation 2-seaters

0.4 Airworthiness limitations

0.4.1 Repairs

Repair or replace damaged parts prior to next flight. Follow the instructions of the DG-1000 repair manual for repairs of the airframe. Repairs outside the scope of DG-1000 repair manual and major repairs must be accomplished at a certified repair station or by a certified mechanic rated for composite aircraft structure work in accordance with DG repair methods.

Use only genuine spare parts.

For all aircraft under EASA regulations the following applies: According to part 21, subpart M to accomplish major repairs an approved repair instruction is required, see also TN DG-G-01 “Approved repair methods according to EU Commission Regulation 1702/2003 part 21, subpart M”

0.4.2 Life time of the airframe

The maximum allowable operating time for German composite sailplanes and motorgliders was proofed for 12000 flight hours. The initial life time for the DG-1000T is 3000 flight hours and may be increased by inspections according to section 2.4 of this manual to 6000 h, 9000 h, 10000 h, 11000 h and 12000 h.

0.4.3 Life time of components

- a) The **gasket for the drainer valve** has to be exchanged after 6 years, part no. 60504402.
- b) The **spark plugs** have to be exchanged after 25 engine hours, part no.40050360.
- c) The **fabric straps of the safety harness** have to be exchanged according to the instructions of the respective manufacturer. If no limitations are given, exchange after 12 years, approved types see section 6.
- d) The **rubber cord** in the elevator control system see section 1.2.6 has to be replaced at least every 6 years, part no. 30091131.
- e) The **brake fluid of the wheel brake** has to be exchanged after 4 years (types see section 1.6.4).
- f) **Other components:**
All other components like tow hook, wheels, gas struts, control system parts, bolts, pins etc. have no life time limitation, but should be replaced when worn, damaged or disqualified by excessive corrosion.

0.4.4 Service time, maintenance documents

Follow the instructions of the respective manufacturer:

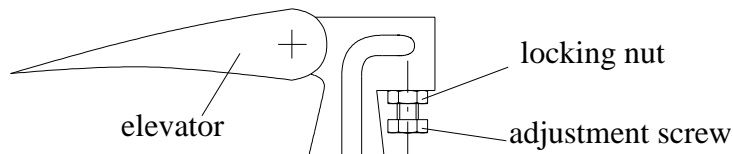
- a) Operating Manual for Safety Tow Releases
Series: Europa G 88 Safety Tow Release
latest approved version
Operating Manual for Tow Releases
Series: E 85 Nose Tow Release
latest approved version
- b) Safety harness: instructions of the manufacturer latest approved version.
Approved types see section 6.
- c) Minimum instrumentation: instructions of the manufacturer, approved instruments see sections 6.
- d) Engine: Manual for the engine SOLO Type 2350 C, latest approved version.
- e) Operating- and Service Instructions for propeller DG-P001 latest approved version.

Note: The Airworthiness Limitations section is FAA approved and specifies maintenance required under Secs. 43.16 and 91.403 of the Federal Aviation Regulation unless an alternative program has been FAA approved.

1.2.4 Elevator control circuit free play

With the elevator held fixed in the zero position, the free play at the top of the control column can be ± 2 mm (± 0.08 in.). Within the automatic elevator connection there should be no free play noticeable in the zero position when the elevator is moved at its trailing edge.

Any free play can be reduced by screwing in the adjustment screw on the automatic connector funnel.



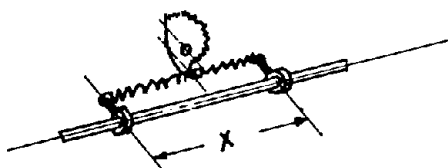
1.2.5 Trim

The trim mechanism should be adjusted so that with full forward (nose down) trim the control column is pulled by the trim springs into it's maximum forward position with a force P of approx. 30 N (6.6 lbs.).

The force P is to be measured with a spring balance at the upper end of the control stick. Read the force, when the stick just starts to move.

The tensioning of the trim mechanism springs is adjusted as shown in the sketch.
 $x = 340$ mm (13.4 in.)

The springs are located in the rear cockpit on the left hand side.



The correct adjustment should be verified in flight and corrected if necessary. Trimming should be possible up to 200 – 220 km/h (108 - 119 kts.).

Note: If the DG-1000T can be trimmed up to higher speeds it is likely that the trim is not sufficient in circling flight.

1.3 Rudder control

1.3.1 Rudder control circuit

see diagram 2

1.3.2 Rudder deflections and tolerances

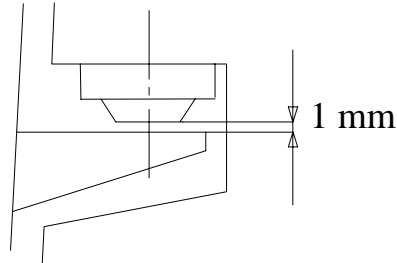
28° up to 29° which is 160 up to 165 mm (6.3 up to 6.5 in.) to both sides measured at 330 mm (13 in.) behind the hinge axis (lower rear end of the rudder).

1.3.3 Rudder stops

The rudder stops are located at the lower hinge of the rudder.

1.3.4 Axial space and free play

The maximum allowable space including free play at the upper hinge point is 1 mm (0.04 inch).



1.3.5 Seal the rudder

The rudder is sealed on both sides. On the outside Mylar seals and inside the fin with V seal tapes.

These seals are not to be removed.

If damaged replace the seals according to section 4.7.4.

1.3.6 Retaining spring for the pedal adjustment handle

A rubber cord with 2 mm (0.08 in.) diameter which pulls the pedal adjustment cable tight is installed in the console below the instrument panel. If this rubber cord is defective the handle of the pedal adjustment cable won't be pulled to the front so that it may hook into the trim release lever at the control stick with pedals in a rear position.

1.6.3 Main wheel (non retractable Version)

see diagram 9

This landing gear version is equipped with a drum brake instead of a hydraulic disc brake.

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 1.5.2c)

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 4.6.

c) The brake linings must be replaced if they are worn down to a thickness of 2.5 mm (0.098 in.). Removal of the brake calliper see section 4.5.1B or 4.5.2B..

Replacement set (2 linings, 6 rivets) Tost Nr. 075860.

d) The brake disc must be replaced if it is worn down to a thickness of 4.3 mm (0.17 in.).

1.6.5 Wheels, tyres, tyre pressures

Main wheel:

Tyre: 380 x 150 6 PR, diameter 380 mm (15 in.),

Wheel: Tost 5" wheel with disc brake, width 134 mm, axle 30 mm

Tyre pressure: 2,5 bar (36 psi)

Tail wheel:

Tyre 200 x 50 6 PR, diameter 200 mm (7,87in.)

Wheel: Plastic hub with ball bearings, part. No. S23

Tyre pressure 4 bar (58 psi)

Nose wheel (only version B) and C):

Tyre: 260 x 85, diameter 260 mm (10,2 in)

Wheel: Tost 4" wheel, width 85 mm, axle 20 mm

Tyre pressure: 2,5 bar (36 psi)

1.10 Massbalance and weights of control surfaces

After repairs or repainting the control surfaces weights and moments should not exceed the following limits:

Control Surface	Weight		Moment		Spring balance reading see instructions below	
	kg (lbs.)		kg×cm (lbs.×in.)		kg (lbs.)	
	min.	max.	min.	max.	min.	max.
Rudder (incl. massbalance)	3,5 (7,728)	5,2 (11,46)	-2,5 (-2,17)	+0,5 (0,434)	-0,25 (-0,55)	+0,05 (0,11)
Elevator (without pushrod)	2,25 (4,9)	3,0 (6,61)	9,0 (7,81)	12,0 (10,42)	0,53 (1,182)	0,71 (1,576)
Inboard ailerons light version	4,7 (10,36)	6,0 (13,23)	0 (0)	3,4 (2,95)	0 (0)	0,207 (0,457)
Inboard ailerons heavy version	5,7 (12,57)	7,0 (15,43)	0 (0)	2,5 (2,17)	0 (0)	0,152 (0,336)
Outboard ailerons (20m extension)	0,35 (0,77)	0,55 (1,2)	0,7 (0,61)	1,2 (1,04)	0,07 (0,157)	0,12 (0,27)

Negative moment means that the control surface is balanced more than 100%. In such case you have to apply a downward load at the measuring point.

Note: Before any changes to the massbalance weights are made, contact the DG Flugzeugbau factory.

Method for determining control surface moments

All control surfaces: Remove the control surface and hang it friction free on two hinge points.

It is important that ailerons and elevator are positioned upside up.

The inboard aileron must be hung at its first (root) and 5. hinge.

The elevator must be hung at hinges 2 and 5.

Control surface	measuring point	behind hinge axis	
		mm	in.
Rudder	lower edge	100	3,94
Elevator	centre, y= 70mm (2.76 in.)	168	6,61
Inboard aileron	aileron root	164	6,46
Outboard aileron (20m)	aileron root	98	3,86

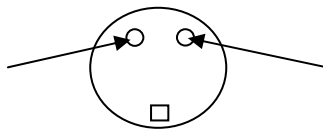
1.15.7 12 V Socket:

A socket is located in the front and in the rear cockpit (behind the pilots right shoulder). It is used for:

- battery charging (main switch in charging position)
- to provide power for external accessories (main switch “on”).

Connection of the socket terminals:

view from the cockpit



From ser. No. 10-120 on a BSB12 socket is installed.

Connection of the socket terminals: centre pin= + pole.

From ser. No. 10-202 on a Socket

XLR 3-pole NC3FD-LX-BAG is installed.

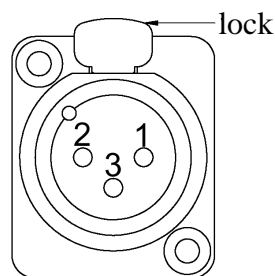
Connection of the socket terminals:

1= +

2= -

3= not used

view from the cockpit



Suitable plugs see parts list section 8.3.

1.15.8 Power plant extension-retraction mechanism:

See also sect. 1.13

The automatic extension and retraction is controlled by the control unit see sect. 1.15.3.

The extension-retraction motor will be switched off at the end limits by position switches see sect. 1.13.5.

Caution: If the proximity switch is defective (short circuit) a safety interlock in the control unit prevents the engine from being retracted automatically with the propeller not in the correct position. The retraction of the powerplant must be done with the manual switch. The DEI-NT will display the failure message “RPM Pickup”.

The proximity switch must be exchanged prior to the next engine start.

1.15.9 Manual extension-retraction switch

Manual extension and retraction is via one switch which is located on the instrument panel. When this switch is operated, the automatic extension/retraction system will be switched off. The automatic system will be switched on again when you operate the ignition switch. The manual switch activates the extension/retraction relays in the control unit directly, by-passing the safety.

1.15.10 Starter Press Button

The starter press button is located in the centre of the throttle handle and activates, via the interlocks, the starter relay in the control unit, see sect. 1.15.3.

1.15.11 Wiring

The wire gauges are given in the wiring plan 108E102 at the end of the wire No. in AWG.

Shielded wires may be identified by circles at their ends.

Specification			AWG	mm ²	
MIL-W_22759/16-	6	-WS	6	13	
MIL-W_22759/16-	8	-WS	8	8	
MIL-W_22759/16-	10	-WS	10	6	
MIL-W_22759/16-	14	-WS	14	2	
MIL-W_22759/16-	16	-WS	16	1,3	
MIL-W_22759/16-	18	-WS	18	0,9	
MIL-W_22759/16-	22	-WS	22	0,4	
MIL-C_27500-	22	TG1T14	22	0,4	with shielding
MIL-C_27500-	22	TG2T14	2x22	2x0,4	with shielding
RG 174					with shielding
LiYCY				1x0,25	with shielding
LiYCY				2x0,25	with shielding
LiYCY				3x0,25	with shielding
LiYCY				6x0,25	with shielding

Instead of wires from the MIL specifications mentioned above suitable wires approved for aircraft use from other aircraft or MIL specifications may be used: Operating range min.: -55°C up to 105°C (-67°F up to 220° F), in the engine compartment up to 150°C (300°F), operating voltage 600 V.

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 seal 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.
- 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 1.11).
- Check the canopy emergency releases according to section 7.14 of the flight manual.
- Check the rubber cords in the control system (see sections 1.2.6 and 1.7.5).
- Check the thickness of the wheel brake linings and of the brake disc (see section 1.6.4).
- Check if the brake fluid has to be exchanged (see section 1.6.4).
- Check the airbrakes according to section 4.4.
- Check the fin ballast tank system according to section 1.8.2.
- Check the fin ballast box according to section 1.9.
- Check the friction of the canopy opening handles (canopies removed from fuselage): A force of 10 – 20N (2.2 up to 4.4 lbs.) should be required at the end of the handle. If the force is too low tighten the hinge bolt of the handle accordingly.
- Check if the powerplant has been serviced according to section 3.6.1.
- Check the friction brake of the throttle control (see section 1.12.8).
Option: throttle handle in rear cockpit TN1000/15:
Check of friction brake not applicable, not installed.
- Check the torque of the propeller bolts (see section 3.6.1 item 23).
- **Tow hooks:** The operating and maintenance instructions for the release mechanisms, see sect. 0.4.4 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.

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. + 5. step).

3. Ask DG Flugzeugbau for the necessary inspection document (Life Extension Program DG – 1000, latest issue).

When you request the inspection document, the following data should be submitted: Model/Type, Registration, Serial Number and the operating hours at which the inspection will be performed. A charge will be made for the inspection document.

4. The inspection must only be done by a licensed repair station or inspector.

5. The results of the inspections have to be recorded in an inspection test report wherein comments are required for each inspection instruction. If the inspections are done outside the DG Flugzeugbau facilities, a copy of the records must be sent to DG Flugzeugbau for evaluation and information.

3 Maintenance

3.1 General maintenance

See also flight manual section 8.

Exterior surfaces of the fibre reinforced plastic parts

The surfaces are coated by a UP-gelcoat or by PU paint (Option). This gelcoat is protected by a hard wax coating which has been applied during production with a rotating disc ("Schwabbel" procedure). Do not remove the wax, because this would lead to shading, swelling and cracking of the surface. In general, the wax coat is very resistant. As soon as the wax coat is damaged or worn, a new coat has to be applied. If you store your aircraft often outside, this may be necessary every half year! "Schwabbel" procedure:

The best method is with an electric power buffer as we do in the factory. Also an electric drill may be used. Speed approximately 2000 RPM. Two packages of special cloth discs (Schwabbelscheiben) have to be installed. A block of hard wax has to be pressed against the rotating discs. By doing so, the wax becomes hot and is taken up by the cloth. The hard wax and the cloth discs should be purchased from the DG Flugzeugbau factory.

Wax Part-No. 70000121

Cloth disc Part-No. 70000600

Adapter W67 (for mounting the cloth discs to a power buffer with thread M14)
Part-No. 80010026

You get the best effect when polishing 90° to the microscratches of the sanding process.

Caution: Make sure that the surface does not get too hot, otherwise the finish will be damaged. Therefore move the polishing machine all the time, and do not stay on one spot!

4.5 Removal and installation of the undercarriage (main wheel)

4.5.0 General

Warning: A gas strut is installed inside the landing gear box to compensate the mass of the landing gear. The landing gear may retract by itself when unlocked by the force of the gas strut, especially when the glider is not in the normal position. So when working on the landing gear make sure that inadvertent retraction of the landing gear is prevented.

Removal of the gas strut in the landing gear control system: Use a screw clamp to pre-stress the gas strut sufficiently so that the bolts can be removed.

4.5.1 Undercarriage (main wheel), Version without nose wheel

see diagram 7

A Removal of the main wheel

1. Remove axis 10FW11/7 together with the 2 parts 10FW11/2.
2. Remove the wheel axle 10FW11/6 and the bush 10FW11/4.
3. Move the wheel with the brake assembly to the right, so that the pin of part 10FW18 slides out of the fork 10FW11/1. Now remove the wheel with the brake assembly.

B Removal of the brake assembly from the main wheel

1. This is only necessary if the tyre is to be removed or if the brake linings are to be exchanged.
2. Remove the 2 bolts A from the brake assembly.
3. Take off brake assembly with holder 10FW18 and take away the loose part (back plate assy.) with the brake lining.
4. During reassembly secure the 2 bolts A with Loctite 243 or safety wire.

Caution: Don't operate the airbrake and thus the wheelbrake with brake assembly disassembled, as the piston and the brake-fluid will be pressed out of the brake assembly. |

4.5.2 Undercarriage (main wheel), Version with nose wheel

see diagram 8

A Removal of the main wheel

1. Remove the bolt M 8 x 45 DIN 931-8.8 zn which secures the holder 5FW9 for the brake assembly to the front landing gear strut 5FW10.
2. Remove the axis 5F17/1 and the parts 5FW17/2.
3. Remove the wheel axis 5FW5 and the bush 5FW4/1.
4. Move the wheel with the brake assembly to the right, so that the pin of part 5FW9 slides out of 5FW10. Now remove the wheel with the brake assembly.

B Removal of the brake assembly from the main wheel

This is only necessary if the tyre is to be removed or if the brake linings are to be exchanged.

1. Remove the 2 upper bolts A from the brake assembly.
2. Take off brake assembly with holder 5 FW 9 and take away the loose part (back plate assy.) with the brake lining.
3. During reassembly secure the 2 bolts A with Loctite 243 or safety wire.

Caution: Don't operate the airbrake and thus the wheelbrake with brake assembly disassembled, as the piston and the brake-fluid will be pressed out of the brake assembly.

C Removal of the rear landing gear strut

1. Remove the baggage compartment floor and the rear cover of the baggage compartment.
2. Disassemble the wheel see A.
3. Retract the landing gear.

Warning: The landing gear will retract by itself when unlocked by the force of the gas spring!

4. Remove the short adjustable pushrod from the actuating lever 5FW8 see 4.5.0.
5. Disassemble the gas spring from the left side of the undercarriage box.
6. Extend the landing gear again.
7. Disassemble the 3 bolts M 6 x 40 LN 9037 which fix the parts 5FW7 and 5FW8 to the strut 5FW12. Work inside the landing gear box.
8. Pull out 5FW7 and 5FW8 (with the gas spring).
9. Take out the rear landing gear strut.

4.6 Filling and bleeding the hydraulic disc brake

Note: The master cylinder is mounted in an horizontal position. Due to the position of the reservoir filling and bleeding of the system is only possible from the lowest point which is the brake cylinder assembly at the wheel.

Necessary tools and material:

- open-end wrench 1/4" = 6.35 mm for the bleeder valve at the cylinder assy..
- 1 open-end wrench 11/16" = 18 mm.
- 2 Plastic syringes acid resistant, volume ca. 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 the 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 that the piston rod of the master cylinder is at its stop (brake open).
- Remove the main wheel according to section 4.5.1A or 4.5.2A. 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

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.

- Open the cover of 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, attach the bleeder assy. and fix it with the wrench 11/16".
- 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.
- 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

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 seals 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 repeat items 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.

4.10 Working at the powerplant

4.10.1 Mounting and tensioning of the drive belts

a) Tensioning of the drive belt

1. Tensioning and loosening of the drive belt is accomplished by turning the eccentric axis which carries the upper drive belt pulley.
2. Loosen the bolts M8 and M6 which clamp the axis far enough, that you can rotate the axis with a 32 mm open end spanner (a slim spanner is needed).
3. Rotate the axis anticlockwise (look from behind) with 25 Nm (18.5 ft.lb.) and hold it in this position. Retighten the bolts M8 and M6.
4. Measure the drive belt tension according to item c). If the tension is not correct proceed again according to item 2. and 3. with lower or higher torque as necessary. Measure tension again.
5. Adjust the proximity switch according to section 1.15.14.

b) Exchanging the drive belts

Additional to the items see a):

1. Remove the propeller.
2. Rotate the eccentric axis with a 32 mm open end spanner anticlockwise so far that there is no tension on the belts.
3. Lift the belts from the upper pulley, the front one to the front and the rear one to the rear.
4. Install new belts.
5. Tension the belts according to a).
6. Reinstall the propeller according to section 1.10.2.

c) Measuring the drive belt tension

Apply 120 N (27 lbs.) pressure or tension to both drive belts simultaneously in the middle between both pulleys vertically to the belts. The displacement of the belts shall be 5mm.

d) Removal and assembly of the eccentric axis

1. Perform work see a) 1. + 2. and b) 1. – 3..
2. Remove bolts M8 and M6 (see a) 2.).
3. Produce a wedge from hard-wood and hammer it into the gap to reduce the clamping force.
4. Apply penetrating oil e.g. WD40 to both ends of the clamping device and into the gap.
5. Insert a round hard-wood bar with dia. 20 – 25mm (.8 – 1 in.) approx. 300 mm (12 in.) long into the hole of the axis from the rear. Use a large hammer and drive the axis to the front until it comes out. Press strongly against the powerplant from the front while hammering.

6. If you find any seizing marks inside of the aluminium clamp remove them with fine abrasive paper.
7. Prior to reinstallation apply a thin film of oil to the axis.
8. Reassembly is the reverse of removal.

Caution: Removal of the pulley from the axis and reassembly must be performed by the Solo company.

Caution: Run the engine for approx. 30 minutes after exchanging the belts, then measure the drive belt tension again and adjust if necessary.

4.10.2 Mounting the propeller

Tightening torque of the propeller bolts is 20 Nm (15 ft lb) applied at the bolt heads. Tighten the bolts crosswise (torque wrench with 13mm socket and 13mm open end spanner). Make sure to mount the propeller-adapter 10M39 so that the rounded edges are at the propeller. Use new selflocking nuts each time when assembling the propeller.

4.10.3 Removal and installation of the fuel tank

1. Drain the fuselage tank using the built-in electrical fuel pump. To accomplish this disconnect the fuel supply line at the distributor near the carburettor and stick it into an appropriate can. Switch on the ignition and wait until the tank is drained.
2. Remove the rear baggage compartment wall.
3. Remove the vent-line (Nylon tube 6x1) from the tank.
4. Remove the supply line, excess fuel line and the Drainer line from the tank.
5. Remove the 2 bolts fastening the tank to the bulkhead.
6. Pull out the tank to the front.
7. Disconnect the electrical wiring for the fuel gauge and fuel sensor.
8. If the glider is to be operated without the fuel tank, the fuel lines must be sealed with clevis pins or by similar means. Fix the lines with ty-raps so that they can't interfere with any control system parts.

Installation is the reverse of removal. Check after installation that all fuel line connections are tight and if the fuel gauge works properly.

6 Instrumentation and accessories list

Air speed indicator (0 - 300 km/h, 165 kts)

Manufacturer	Type	Certification No.
Winter	6 FMS 4(diam. 80mm)	TS 10.210/15
	0-300 km/h Ident.No. 6421514 0-160 kts Ident.No. 6423514	
Winter	7 FMS 4(diam. 58mm)	TS 10.210/19
	0-300 km/h Ident.No. 7421514 0-160 kts Ident.No. 7423514	

The airspeed indicator must have colour coded speed ranges marked as indicated in the flight manual section 2.3.

Altimeter

Manufacturer	Type	Certification No.
Winter	4 FGH 10 (diam. 80mm)	TS 10.220/46
	1.000-10.000m Ident.No.4110 1.000-20.000 ft Ident.No.4320	
Winter	4 FGH 20 (diam.58mm)	TS 10.220/47
	1.000-10.000m Ident.No.4220	
Winter	4 FGH 40 (diam.58mm)	TS 10.220/48
	1.000-20.000ft Ident.No.4550	

Or any other TSO C 10b specified and approved altimeter with fine range pointer 1 turn max. 1000 m, 3000 ft.

Harness (seat)

Manufacturer	Type	Certification No.
Gadringer	BAGU 5202 G	40.070/32
	SCHUGU 2700 G	40.071/05
	rubber coated adjuster bars	
Schroth	4-01-0.104	40.073/11

7 List of special tools etc.

- A Special tool with 6 mm thread (W38/2) for the securing of the tailplane and for the locking pins of the rear wing suspension.
- B Special tool W36 (or a suitable pin with 6mm diameter) for derigging of the outboard wings and for the cover plate of the ballast box in the fin.
- C Tool for airbrake adjustment: 5V17 and rod according to drawing 5V18.

D Open-end wrenches

1/4" = 6,35 mm	SW 13
SW 7	SW 14
SW 8	SW 17
SW 9	11/16" = 18 mm
SW 10	SW 19
SW 12	SW 22

- E Allen key wrench
3 mm, 4 mm, 5 mm, 6 mm, 7 mm, 8 mm, 10 mm and 12 mm
- F Circlip pliers A (outside) for the range 8-14 mm for the tail wheel axis
- G Spring balance max. reading 50 N (11 lbs.) for determination of control surface moments (see section 1.10)
- H Spring balance max. reading 100 N (22 lbs.) for determination of airbrake overcentre locking moments (see section 4.4.2)
- I Nicopress tool 64 – CGMP for cable connections
- J For filling the wing ballast tanks: Hose with outside dia 25 mm (1 in.), 1 m (3.2 ft.) long.
- K For filling the fin ballast tank: Z27/2 Funnel with clear PVC hose inner diameter 12 mm (.47 in.) 1.9 m (6 ft.) long and hose connector GS 12.
- L Refuelling hose for fuselage fuel tank Z155/1
- M Torque wrench range 0 - 50 Nm (0 - 370 ft lb) with socket wrenches 10, 13, 17, 19 mm and 21 mm (13/16 in.) for sparkplugs and Allen key inserts 3, 4, 5, 10 mm
- N Wrench for spark plugs 21 mm (13/16 in.)
- O Spring balance max. reading 200 N (44 lbs.) for measuring belt tension
- P Crimp tool for clamps XO for 6mm bungee (bungee for retaining cable)

8.2 Parts for fuel system

60507550 Drainer CAV 110 (1/8" NPT)

Warning: Replace the seal ring of the drainer against part no. 60504402 prior to installation

60504402 Seal ring for drainer CAV 110 (for automotive fuel)

60507560 Electric fuel pump Facet 40105

60507558 Refuelling pump KAVAN 12 V up to ser. no. T28

60507562 Refuelling pump Facet 60106 from ser. no. T29 on
60500164 mechanical pump

60507571 MANN-fuel- filter 500009180 WK 31/2(10) for refuelling pump

41070521 Fuel distributor 10M52/1 with filter for primer valve and restriction
for excess fuel line

60000527 Fuel cock KH 1072 T

60507609 Coupling for fuel filler hose KL-006-0 WR513

60503070 Primer-valve IWP069

45001576 Full tank sensor ready assembled with wiring and plug

60000103 Fuel hose PU hydrolyse and microbe-resistant 6x1,5x9 mm

60000102 Fuel hose PU hydrolyse and microbe-resistant 8x2x12 mm

8.3 Parts for the electrical system

- 60510898 Battery 12V 17Ah
- 41076000 DEI-NT-DG1000T
- 41076020 DEI-NT-DG1000T second unit (rear cockpit)
- 41076010 Control unit-NT 10E601

- 60510815 Limit switch 164-025 05 for positions engine extended and for stopping the engine
- 60510463 Limit switch for propeller-stopper 164-564
- 60510464 Limit-switch engine retracted and engine extended 164-574, alternatively SI2010-B2T20YR30,5m
- 60510484 Manual extension-retraction switch MTG 206 S
- 60510854 Key switch 3 Pos, 2 Pol KL09-1908KA (Master switch)
- 60510362 Switch STA 106 E (selector intern-extern)
- 60510372 Press-button DJET 07.17502.21 for starter
- 60510375 Press-button 12G2904 for refuelling pump

- 60510385 Circuit breaker ETA 2A
- 60510386 Circuit breaker ETA 3A

- 60510437 Fuse 80 A for main battery
- 60510434 Fuse socket for main battery fuse 80 A

- 60510550 Proximity switch Insor INCT 1212
- 40871350 Proximity switch ready assembled with wiring and plug

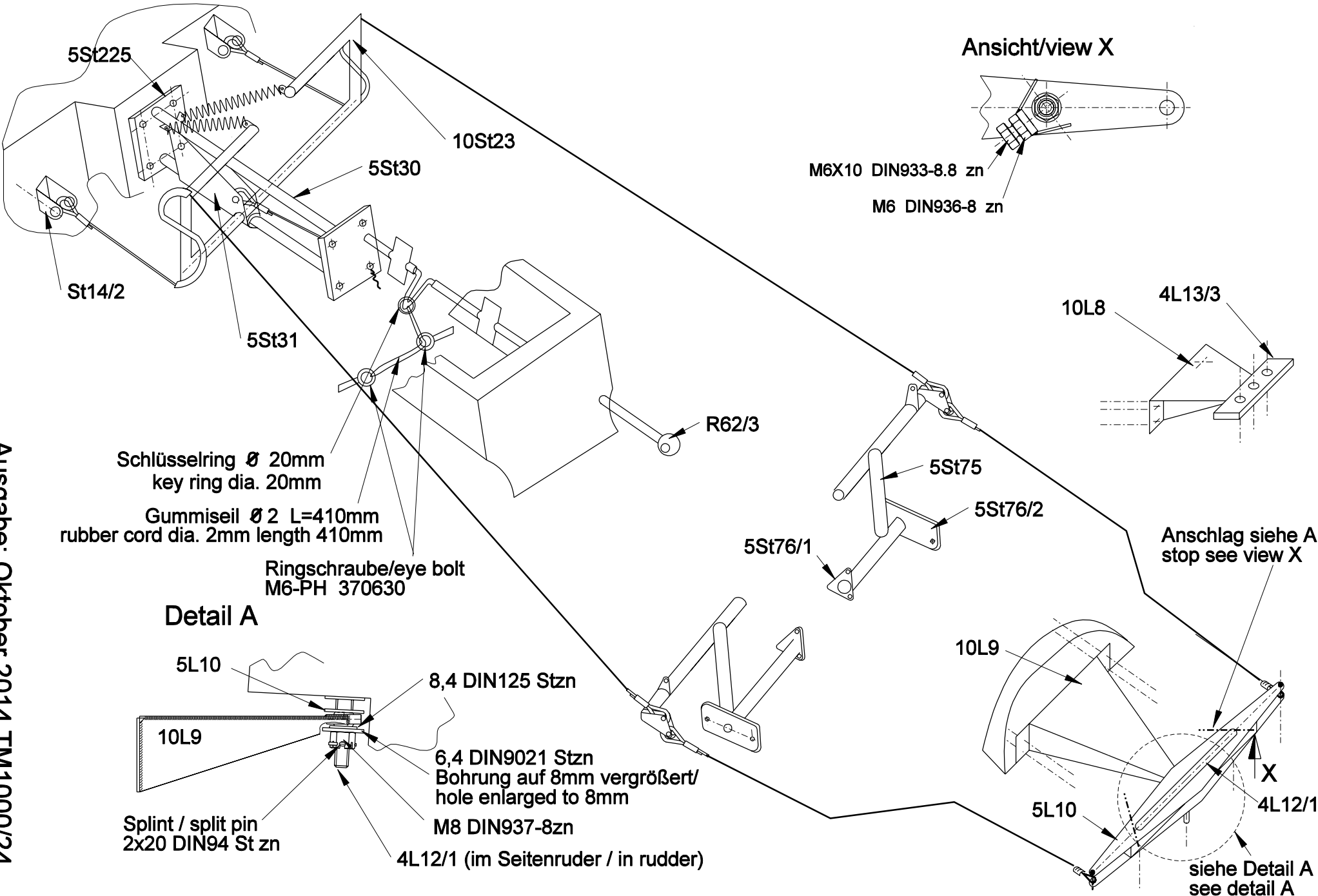
- 10002317 Preh plug for 12V sockets

From ser. No. 10-120 on:

- 60510796 Socket BSB12 (in main bulkhead)
- 60510797 Plug BSK12 (for socket BSB12)

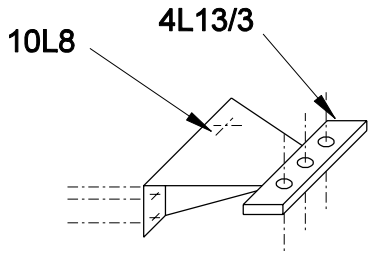
From ser. No. 10-202 on:

- 60510880 Socket XLR 3-pole NC3FD-LX-BAG (in main bulkhead)
- 60510881 Plug XLR 3-pole NC3MX-BAG (for socket XLR)



Ansicht/view X

M6X10 DIN933-8.8 zn
M6 DIN936-8 zn

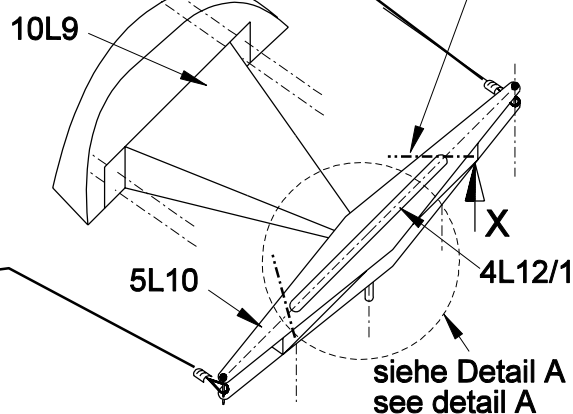
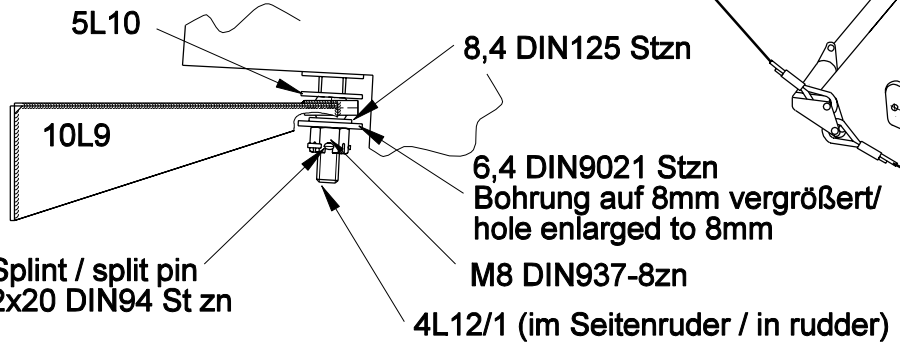


Anschlag siehe Ansicht X
stop see view X

Schlüsselring Ø 20mm
key ring dia. 20mm
Gummiseil Ø 2 L=410mm
rubber cord dia. 2mm length 410mm

Ringschraube/eye bolt
M6-PH 370630

Detail A



Quersteuerung
aileroncontrol

Steuerung im Rumpf
controls in the fuselage
DG-1000T

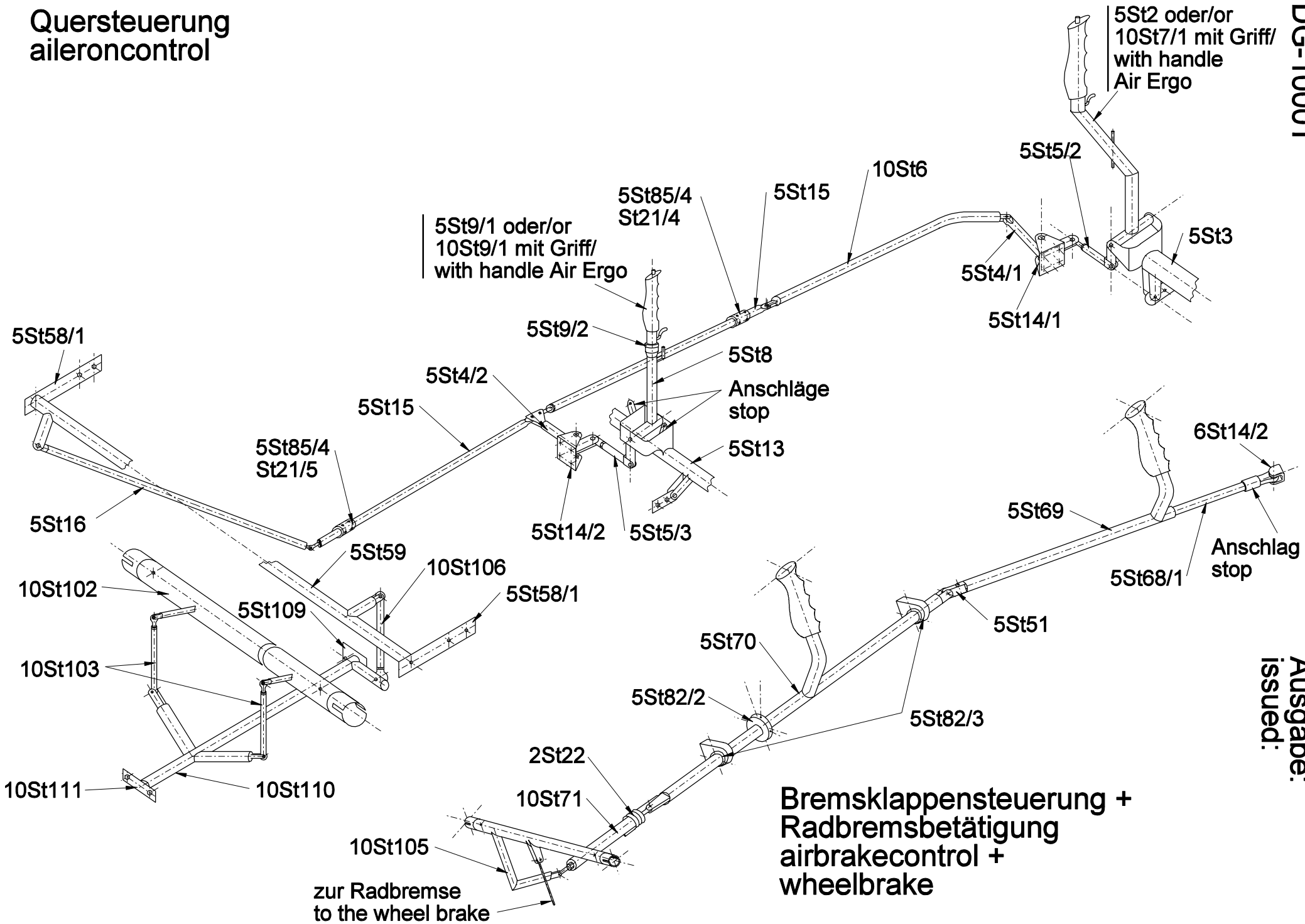
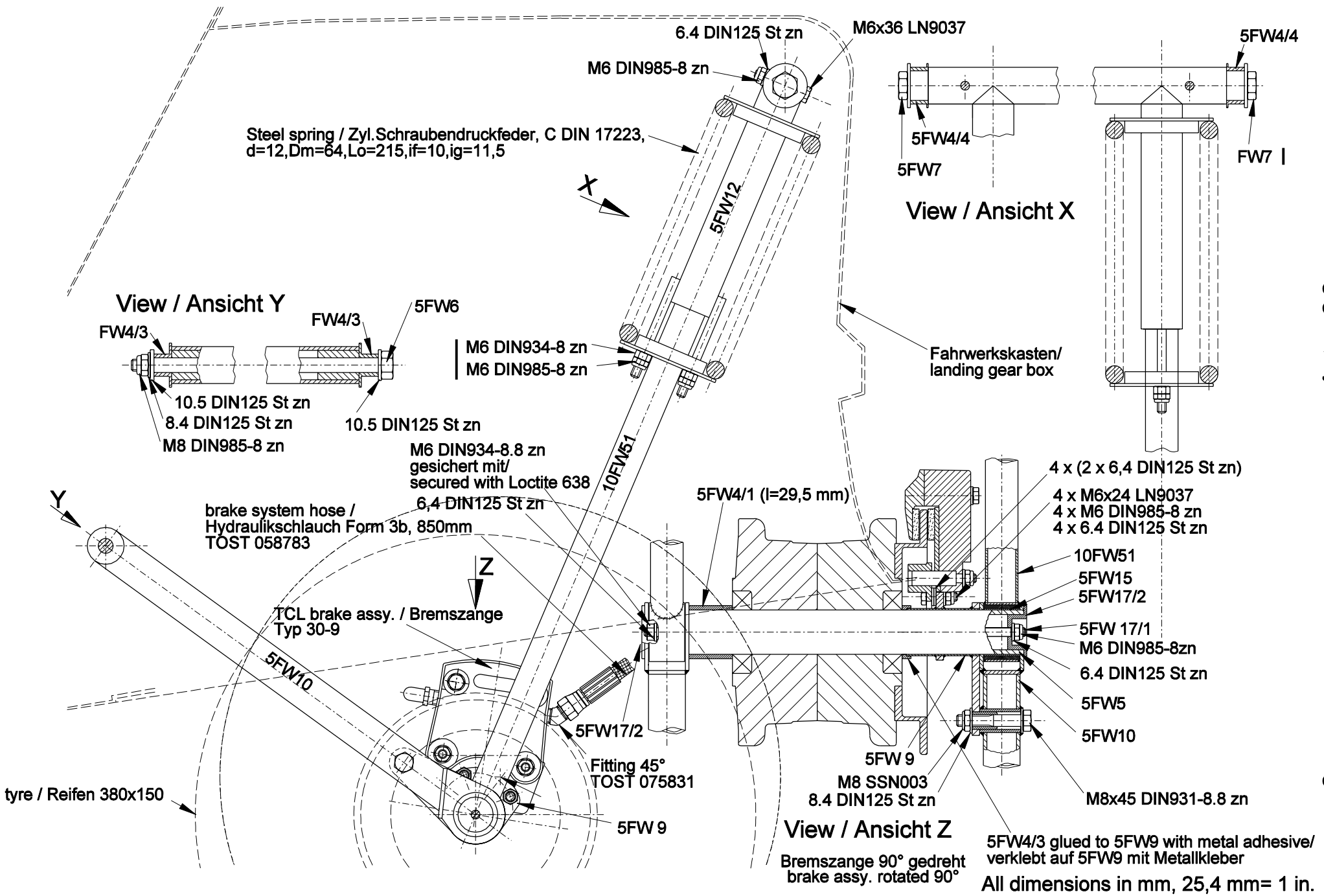


Diagramm 3
diagramm 3
Ausgabe:
issued:

Bremsklappensteuerung +
Radbremsbetätigung
airbrakecontrol +
wheelbrake



Ausgabe Oktober 2014 TM1000/24
issued October 2014 TN1000/24

Section 3 Maintenance

3.3 Greasing and oiling

Subsection amended

- Electrically operated landing gear: Clean and grease the slotted hole at the attachment of the spindle drive to the bell crank 10FW106 (see diagram 21).

Caution: The linear guide on which the spindle drive is moving during emergency extension of the landing gear is made from plastic and should not be greased .

If these parts have been greased inadvertently you have to disassemble the parts and to clean them completely with Acetone.

Section 4 Detailed instructions for assembly and servicing work

4.5 Removal and installation of the undercarriage (main wheel)

New Subsection

4.5.3 Electrically operated main landing gear

see diagrams 20 and 21

A-D Removal of the main wheel of the brake assembly from the main wheel of the lower landing gear fork 10FW11/1 and removal of the spring legs 10FW2 see section 4.5.1 A-D

E. Removal of the drag struts 10FW102 (left) 10FW102/2 (right)

- 1 Remove the main wheel see section 4.5.1 A.
- 2 Disassemble the gas strut from the left side of the landing gear box see section 4.5.0
- 3 Remove the 2 bolts M8 LN9037 which connect the struts to fork 10FW10/1. Mark the bolts. Don't interchange the bolts during reassembly!
- 4 Remove the 2 bolts M8×40 LN9037 which connect the struts to the rear fork 10FW91.
- 5 Remove the struts.

F. Removal of the front fork 10Fw10/1

see section 4.5.1 F

G. Removal of the shaft 10FW109 (with the latches for locking the LG in retracted position)

- 1 Remove the baggage compartment floor and the rear cover of the baggage compartment.
- 2 Disconnect the wiring from the limit switch (mounted to the left latch of the shaft).
- 3 Remove the push rod 10FW121 between bell crank 10FW130 and lever 10FW89.

Section 8 Partlist

new Subsection

8.5 Parts for the electrically operated landing gear

- 60000168 Lockable gas strut K0V2P-3-200-647-001/460N
- 41041400 Spindle drive completely assembled
- 60510463 Limit switch 164-(LG retracted)
- 60510464 Limit switch 164-574 (LG extended)
- 41040008 Limit switch XGG2-88-S20Z1 (gas strut)
- 60510506 Extension-retraction switch MTG 106 G (LG up, down)
- 60510375 Press button 12G2904 with cap 12G2910 black (LG up)
- 60510865 Switch 1006.1511 (**optional with TN1000/19, standard from ser.no. 10-157 on**)