0 Manual Contents

0.1 Log of Revisions

Rev	Pages	Reference	Rev. date
no.			
1	0-1, 0-3, 0-4, 0-5, 0-6, 0-8, 0-11, 1-	TN 8017, necessary changes to	Nov.
	27, 3-4, 4-16, 4-19, 4-21,	the power plant	2010
	10-2, 10-8, 11-2, 11-18, 11-20		
2	0-1, 0-3, 0-7, 1-1, 1-7,	TN8019, wheel brake actuated	Feb. 2011
	1-11, 1-12, 8-3	by airbrake handle.	
3	Title page, 0-1, 0-3, 0-4, 0-6 \div 0-8,	ÄM LS8-1, Miscellaneous	December
	$0-11, 1-3, 1-7 \div 1-9, 1-22, 1-29,$	improvements Ser.no. 8474	2011
	1-36, 1-40, 1-48a, 4-1, 4-21, 4-27,	and from ser. No. 8527 on	
	6-4, 10-2a, 11-15, 9E2		
4	0-1, 0-3, 0-7, 1-17, 8-1	TN 8021	January
		Small tailwheel	2015
5	0-1, 0-4 up to 0-8, 1-28, 1-30, 3-7,	Mechanical fuel pump	October
	4-12, 4-13, 4-23, 4-24, 4-28, 6-1,	Manual revision	2015
	6-2, 9-1, 10-2, 10-2a, 10-9	TN 8022	
6	$0-1, 0-3, 0-6 \div 0-8, 0-12, 1-10, 4-11,$	TN 8024	June
	5-3, 5-4, 5-6, 6-2, 8-1, 8-2, 9-1, 9-2,	Manual revision, repair manual	2016
	10-2		

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	0-10	April 2005			
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	5-16	April 2005			
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	5-18	April 2005			
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	4E01-02	26.05.2005			
	2E01-01	28.07.2005			
	9E2	28.11.2008			

0.4 LIFE LIMITED PARTS, MAINTENANCE INSTRUCTIONS

0.4.1 Repairs

Repair or replace damaged parts prior to next flight. Follow the instructions in the Repair Manual LS8.

Major repairs must be accomplished by an approved repair station or by an approved 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 Airframe structural Life limit

Maximum FRP structural life limit of sailplanes and powered sailplanes is 12000 hours of flight. To reach this limit, special inspections according to chapter 2.4 of this manual at 3000, 6000, 9000 and beyond that at every 1000 hours of flight must be performed.

0.4.3 Life Limits of Equipment Items

- a) Rubber fuel hose (connection between main and feeder tanks) and drainer sealing (Mogas resistant O-Ring) have a 6 year life limit and must be exchanged accordingly.
- b) **Spark plugs** have a 25 hours engine time limit and must be exchanged accordingly.
- c) **Safety harness webbing** life limited to 12 years after manufacture. Multiple point buckle and brackets on condition (Wear, corrosion etc.).

d) Further parts:

These parts as for instance wheels, gas struts, control system parts, pins and bushes are not life limited, but may require exchange based on condition (Wear, damage, corrosion).

1-10

1. System Description and Adjustment Data (continued)

1.4 Elevator Control System (continued)

1.4.2 Deflections and Tolerances

Elevator:	up	28° - 30°
	down	22° - 26°

For easier checking, measured angles may be converted to mm / in deflection values, using the actual local radius of the defined measuring place. See also table below.

Limit values for elevator deflections in Millimetres/Inches

local r	radius	22°	°to 26°	28	°to 30°
		d	own		up
mm	in	mm	in	mm	in
67	2.638	26 to 30	1.024 to 1.181	32 to 35	1.260 to 1.378
68	2.677	26 to 31	1.024 to 1.220	33 to 35	1.299 to 1.378
69	2.717	26 to 31	1.024 to 1.220	33 to 36	1.299 to 1.417
70	2.756	27 to 31	1.063 to 1.220	34 to 36	1.339 to 1.417
71	2.795	27 to 32	1.063 to 1.260	34 to 37	1.339 to 1.457
72	2.835	27 to 32	1.063 to 1.260	35 to 37	1.378 to 1.457

1.4.3 Stops

Elevator stops at lower control stick end. Adjustment by use of two 10°mm open end wrenches.

1.4.4 Elevator Rear Edge Play

Play should be measured with control stick fixed to <u>neutral position</u>.

Elevator: maximum 2.5 mm <0.1 in> at inner edge

4.5 Installation of Control Surfaces (continued)

Disassembly of Rudder

(1) disconnect rudder cables.

Attention: Don't loose spacing casings.

Attention: Rudder cables may be drilled. If this is changed unintentionally, neutral positions of rudder and pedals do no longer correspond and must be realigned as detailed below.

- (2) loosen nut at lower bearing (6mm thread, M6 LN 9348 or DIN 985-8zn, width over flats 10mm) using a socket wrench, remember sequence and position of washers.
- (3) lift rudder upward from bearings.

Assembly of Rudder

- (1) grease bearings according to lubrication schedule, see section 3.3.
- (2) If need be, install new V-type internal seal, see section 4.6.
- (3) lower rudder into bearings, do not use force!
- (4) check radial play of upper bearing: maximum permissible radial play 0.5 mm <0.02 in>. If necessary renew brass bushing. Make sure, that non-concentric position of bearing keeps relative position to direction of flight. Bond bushing with for instance Loctite 72 b (672).
- (5) connect rudder cables provisionally, do not forget to insert spacing casings into thimbles.
- (6) check rudder pedal alignment: with pedals in neutral position check if rudder is neutral.

If rudder is deflected to one side, twist <u>opposite</u> cable <u>counter-clockwise</u> (maximum 5 turns) until properly aligned.

Should more than 5 turns be necessary for alignment, exchange cables.

Caution: Never turn cables clockwise!

- (7) place washers on cable connection bolts and tighten nuts M6 LN 9348 or DIN 985-8zn, width over flats 10 mm, with maximum torque 6.4 Nm (0.65 mkg, 4.623 ft lbs).
- (8) set up washers at lower bearing as found during disassembly (normally: recessed washer first, then large washer). Tighten nut (6 mm thread, LN 9348 or DIN 985-8zn, width over flats 10 mm) with maximum torque 6.4 Nm, (0.64 mkg, 4.623 ft lbs). After assembly the rudder should have audible axial play, maximum axial play 1 mm (0.04 in), see section 1.5.
- (9) if necessary, restore gap seals (convex plastic strip) on both sides, see section 4.6.

Maintenance Manual LS8-st Weight and Balance

5.2 Calculation of Loading Limits

1. Determine Minimum Cockpit Load for 15 m wingspan and full and empty tail fin tank version following procedure given in section 5.1 from table "Empty Weight C.G. Position", section 5.4 in <kg/mm> or <in/lbs>. Minimum Cockpit Load for tail fin battery (3BR-199) removed (and installed in baggage compartment, when required) decreases by 10 kg <22 lbs>.

Finally resulting 4 different cockpit loads should be entered in the following places:

- a. in weighing report of inspection
- b. in Flight Manual section 6.2
- c. in cockpit placard under instrument panel cover
- d. in cockpit on data placard
- 1. Minimum Cockpit Load for full tail fin tank with tail fin battery
- 2. Minimum Cockpit Load for empty tail fin tank with tail fin battery
- 3. Minimum Cockpit Load for full tail fin tank without tail fin battery
- 4. Minimum Cockpit Load for empty tail fin tank without tail fin battery

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5.2 Calculation of Loading Limits (continued)

2. <u>Maximum approved Weight of Non-lifting Parts</u> may vary between 305°kg and 315 kg <672 to 694 lbs>, depending on empty weight and empty weight C.G. position.

In contrast to methods used up to now, maximum weight of non-lifting parts can be determined in relation to empty weight and empty weight C.G. position according to table in section 5.3. See also examples on end of this section.

<u>Maximum weight of Non-lifting Parts</u> should be entered into weighing report.

3. Determine Maximum approved Cockpit Load from table "Empty Weight C.G. Position", section 5.4 <kg/mm> or <in/lbs>. Maximum Cockpit Load normally should be 110 kg <243 lbs>, as given in empty weight C.G. table. It may be lower due to trim conditions, excessive equipment or repairs.

Calculate Maximum Cockpit Load on weighing report, see also examples at end of this section.

Resulting <u>Maximum Cockpit Load</u> should be entered in the following places:

- a. in weighing report of inspection
- b. in Flight Manual, section 6.2
- c. on Data Placard in cockpit
- 4. Empty Weight (perhaps increased by weight of permanently fitted trim ballast) should be entered in the following places:
 - a. in weighing report of inspection
 - b. in Flight Manual section 6.2 for calculation of maximum permissible water ballast weight
- 5. Battery position during weighing should be entered in the following places:
 - a. in weighing report and equipment list of inspection
 - b. in section 6.2 of Flight Manual
- 6. Enter engine installed or removed in Flight Manual section 6.2.

For permanent installation of trim ballast weights, see Maintenance Manual section 4.15.

Form for Weighing Report, see Maintenance Manual section 11.

5.2 Calculation of Loading Limits (continued)

Example for entry in Flight Manual section 6.2:

	Wing span		[m]	15	18
	Empty Mass		[kg] / [lbs]	316	325
	C.G. position	1	[mm] / [in]	649	
ock-	F	Fuel tank full	[kg] / [lbs]	1	110
Max. Cock- pit Load	Fuel tank	a partly filled	[kg] / [lbs]	1	110
	with tail-	Tail tank full	[kg] / [lbs]	1	130
Minimum Cockpit Loadg	battery	Tail tank empty (+)	[kg] / [lbs]		90
mnm Ig	without tail-	Tail tank full (+)	[kg] / [lbs]	1	120
Minim Loadg	battery	Tail tank empty (+)	[kg] / [lbs]		80
	Perm. fixed Trim	front	[kg] / [lbs]		
	mass	rear	[kg] / [lbs]		
	Dottorios	Seat	[No.]		2
Batteries installed		Baggage comp.	[No.]		0
	Vert. tail fin	[No.]		1	
	Engine (INsta	lled / RE moved)			IN
		nspector			8.2005 GS

The discrepancy between Maximum Cockpit Load of 110 kg <242 lbs> and Minimum Cockpit Load of 130 kg <286 lbs> with tail fin tank full and tail fin battery indicates, that before each take off the installation position of the tail fin battery must be checked and a functional check for the tail fin tank valve is required to make sure that no unintended amount of water remains in the fin tank.

To check the valve place tail tank filling adapter into the tank outlet and open the cockpit lever. If air cannot be blown into the tank, the valve is not functioning properly (for instance frozen solid or operating cable fractured).

6.3 Seat Belt Harness (with multiple point buckles)

Manufacturer	Туре	TCDS No.
Schroth	4-01-0.104 (Lap belt and	40.073/11
	shoulder strap)	
Gadringer	Lap belt 5202	40.070/32
	Shoulder strap 2700	40.071/05

6.4 Compass

Manufacturer	Туре	TCDS No.
Ludolph	FK 16, FK 5, FK 10	10.410/3
Airpath	C 2300, C 2400	TS 10.220/47
PZL	BS1, KJ-13A	FD 19/77
Bohli		Not approved, only as
		additional system

6.5 VHF transceiver

Manufacturer	Type	TCDS No.
Dittel	FSG-40 S	10.911/45
	FSG-50	10.911/71
	FSG-60 M	10.911/72
	FSG-70,71 M	10.911/81
	FSG-90	10.911/98JTSO
	FSG 2T	LBA.0.10.911/103JTSO
Becker	AR 3201-(1)	10.911/76
	AR 2008/25 (A)	10.911/48
	AR 4201	JTSO-2C37 D, ED-23A
	AR 6201	EASA.210.1249
Avionik Dittel	ATR 720 A	10.911/74
	ATR 720 C	10.911/83
	ATR 600	LBA.0.10.911/106JTSO
	ATR 500	LBA.0.10.911/113JTSO
	ATR 833	EASA.210.0193
Dittel Avionik	KRT2	EASA.210.10038036

or other radios approved according to TSO, JTSO or ETSO for use in aircraft.

MINIMUM COCKPIT LOAD:

with tail battery, tail tank empty

without tail battery, tail tank full

without tail battery, tail tank empty min.

Under instrument panel cover

Serial No.:

Data Placard

km/h

140

195

195

280

110

160

m ft

with 5"-wheel: 18 59 575 1267

Weight Limitations

Max. Take-off Mass *) 15 42 525 1157

with 4"-wheel: 18 59

Aerobatic manoeuvres not approved

Take-off under own power not approved

without tail battery, tail tank full min. _____

Lighter pilots must compensate lack of weight as

without tail battery, tail tank empty min.

with tail battery, tail tank full

DG Flugzeugbau GmbH

Winch launch/Auto tow

Never exceed (VNE)

Extend/retract engine

*) including water ballast

Maximum Cockpit Load

Minimum Cockpit Load

with tail battery, tail tank full

suggested in Flight Manual

with tail battery, tail tank empty

Engine extended

Type: LS8-t

Aero tow

In rough air

Airspeed Limits:

kg/lbs

min. ____

min.

Kt MPH.

76 87

105 121

105 121

151 174

68

86

59

99

kg lbs

525 1157

max.

min. _____

min. ____kg/lbs

At right cockpit wall

kg/lbs

kg/lbs

kg/lbs

kg/lbs

min. ___

8. Markings and Placards

LS8-st Checklist

This powered sailplane must be operated in compliance with operating limitations stated in the form of markings, placards and Flight Manual.

- 1. Main pins secured?
- 2. Horizontal tail secured?
- 3. Winglets secured?
- 4. Test controls?
- 5. Tail fin valve operating checked?
- 6. When water ballast, then always in wings and tail tank!
- 7. Check loading conditions
- 8. Check tail dolly removed
- 9. Fasten seat belt harness
- 10. Connect parachute static line
- 11. Lock air brakes
- 12. Check trim position
- 13. Check release system
- 14. Lock canopy
- 15. Propulsion system ready for use?
- 16. Sufficient amount of fuel?
- 17. Propulsion system retracted?

At underside of instrument panel

Tyre pressure 3.5 bar

on right landing gear door

Tyre pressure 2.5 - 3.5 bar (36 to 51 psi)

(51 psi)

above tail wheel, when fitted

Tyre Pressure

above tailwheel

6,2 bar/90 psi

small tailwheel according to TN 8021, if installed

at Baggage Compartment

Maximum Baggage weight 5 kg (11 lbs) (For soft items only)

Ball of bearing must be fixed

at forward horizontal tail attachment on vertical tail fin

DG-Flugzeugbau GmbH

 TYPE
 LS8-t
 .

 TCDS- No.
 902

Serial Number <u>8xxx</u>

Reg. Signs <u>D-xxxx</u>

Type placard at main bulkhead

CLOSED ■ Fuel Cock ▶ OPEN

Right Cockpit side at fuel cock

OPEN Deco ► CLOSED

Left Cockpit side at Deco-lever

Refueling pump at instrument panel

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8. Markings and Placards (continued)

▲ Soaring
Vario ASI
▼ powered

at instrument panel Static/pitot switches (Option)

16	
15	
14	
13	
12	
11	
10	
9	
8	
•	

Right- and left at main fuel tank front

FUEL: Two stroke Mixture 1:40 of Unleaded Four Star/Premium min. 95 ROZ or AVGAS 100 LL with 2-stroke oil Castrol Super TT/TTS

at left side of main bulkhead near refuelling pump

When using a battery in the vertical tail fin. Minimum Cockpit Load must be redetermined by weighing
Use vertical tail fin battery only with main fuse at battery

at vertical tail fin battery cover

<u>Canopy Emergency Release</u>: open left side normally, pull right side with approx.15 kg/33 lbs force to stop

at right canopy frame

Altitude related	
Never Exceed Speed	km/h
Up to 2000 m MSL	280
Up to 3000 m MSL	266
Up to 4000 m MSL	253
Up to 6000 m MSL	227
Up to 8000 m MSL	202
Up to 10000 m MSL	179
Up to 12000 m MSL	156

On panel near airspeed indicator, for countries operating with metric units only.

Altitude related Never **Exceed Speed** km/h Kt. mph Up to 6500 ft MSL 280 151 174 266 144 165 Up to 9800 ft MSL Up to 13100 ft MSL 253 136 157 Up to 19700 ft MSL 227 122 141 Up to 26200 ft MSL 202 109 126 Up to 32800 ft MSL 179 97 111 Up to 39400 ft MSL 84 97 156

On panel near airspeed indicator

DEI-NT Placarding

	0-5500
17	5500-6000
0.3 L	6000 RPM

Above DEI-NT Display



Below DEI-NT Switches

9. Parts List

In this list, the most important parts of propulsion system, electrical system as well as components of control surface sealing and water ballast system are provided.

For drawing numbers of control system parts refer to diagrams section 1. For drawing numbers of propulsion system brackets refer to diagrams section 10.

9.1 Engine parts

a) necessary for the 25 hours inspection

40050360 Spark plug S36 (Bosch W5AC Electrode gap 0,5 mm <0,02 in>) with pressed on screw cap, marked by red dot on insulator.

60507571 Fuel filter

b) Spare parts

1 1	
45002085	Spark plug cap Denso, 5kOhm
60510601	Ignition coil for SOLO 2350
45002081	Exhaust gasket, 1.5mm thick (2 units required)
45002071	Decompression valve (2 units installed)
45002088	Lift cylinder for LS8-t, HG7000-12-225-30, modified
45002038	Gas strut 600N for extension-retraction mechanism
45002039	Gas strut 100N for propeller stopper
45002074	Propeller stopper rubber stop

Shock mounts for engine installation

45002079	Upper engine shock mounts (2 units installed)
45002080	Lower engine shock mounts (2 units installed)

Fuel system

60507608	Fuel quick connector KL-006-2-SL007
	(Coupling for re-fuelling line)
< - < - < - < - < - < < < >	- · · · · · · · · · · · · · · · · · · ·

60507550 Drainer CAV 110 (1/8" NPT)

Caution: Exchange O-ring (Avgas type) as delivered with drain valve against part No. 60504402!

60504402	O-Ring for Drainer CAV 110 (Mogas type)
30092049	Fuel hose PUR 3x1,5x6mm hydrolyse and microbe-resistant
30092050	Fuel hose PUR 5x1,5x8mm hydrolyse and microbe-resistant
60000103	Fuel hose PUR 6x1,5x9 hydrolyse and microbe-resistant
60000102	Fuel hose PUR 8x2x12 hydrolyse and microbe-resistant
30092051	Metal mesh inner dia. 8 mm (for fuel lines)
60507525	Fuel hose with textile farbic 9,5x15
60507561	Electric fuel pump Facet 40106 (engine fed and re-fuelling)
60500164	Mechanical fuel pump Bing 8080 (no more available)
60500257	Mechanical fuel pump Mikuni DF44-18 from ser. no. 8529
	on and as spare part (for installation follow TN 8022)
45000162	Fuel cock 4M1-034

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Propeller attachment

45002052 Rubber stop for propeller

9.2 Parts for electrical system

45002070	Battery for power supply 12V/min.7Ah (2 installed)
45002049	DEI-NT for LS8-t
45002050	Control box-NT for LS8-t
60510463	limit switch 164-564 with plug contacts for positions retracted and extended
60510815	limit switch 164-025 with roller and screw contacts for intermediate positions
45002075	Proximity switch for RPM measurement, complete with three pin plug
60510484	manual extend-retract switch
60510478	master switch
60510360	fuel pump switch
	1 1
60510375	refuelling pump switch
60510385	Protective circuit breaker ETA 2A (automatic cut out)
60510386	Protective circuit breaker ETA 3A (automatic cut out)
60510387	Protective circuit breaker ETA 4A (automatic cut out)
45002072	Flat plug type fuse 15 A (blue) for batteries (main fuse)
60510797	Plug BSK12 (for 12V socket BSB12)
	~

Diagram 2: Fuel system up to serial no. L8528

