DG Aviation GmbH

MAINTENANCE MANUAL

FOR THE MOTORGLIDER

DG-1001M

TYPE:	DG-1000
VARIANT:	DG-1000M
TC Data Sheet No.:	EASA.A.072
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12	0.1, 0.7, Enclosure 1 page 2 and diagram 2a	Rudder control operated by hand TN1000/36 Revision 1	January 2019
13	0.2, 0.6, 0.12, diagram 13, diagram 16A	TN1000/43, fuel injection system	September 2019
14	0.2, 0.7, enclosure 3 incl. diagram 2b	TN1000/36 Revision 2 Manual rudder control	May 2020
15	Title, 0.2 - 0.4, 0.6, 0.7, 0.12, 0.14, 1.3, 1.10, 1.12, 1.24, 2.6, 8.1, 8.3, 8.4, diagrams 5, 7, 12, 12a, drawing 10R146	TN1000/45 Manual revision	October 2021
16	0.2, 0.6, 0.7, Enclosure 1 page 3 and diagram 2b	TN1000/36 Revision 3 Manual rudder control	February 2023
17	0.2 – 0.4, 0.6, 1.20, 1.25, 1.30, 8.1	TN1000/47 Spindle drive	October 2023
18	0.2, 0.3, 1.3, 1.4	TN1000/50 adjustment of elevator free play	December 2023
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0.2 List of effective pages

Section	page	issued	replaced	replaced	replaced
0	0.0	October 2010	October 2021		
	0.1	"	See list of amendments		
	0.2	"	See list of amendments		
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	0.6	"	See list of amendments		
	0.7	"	See list of amendments		
	0.8	"	October 2012	July 2017	
	0.9	"	October 2012		
	0.10	"			
	0.11	"	July 2014		
	0.12	"	October 2012	October 2021	
	0.13	"	October 2012	July 2014	July 2017
	0.14	"	October 2012	July 2014	July 2017
			October 2021		
	0.15		July 2017		
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	1.3	"	July 2014	October 2021	December 23
	1.4	"	July 2014	December 23	
	1.5	"	October 2012		
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	1.7	"			
	1.8	"	October 2012		
	1.9	"	October 2012		
	1.10.	"	October 2012	July 2014	October 2021
	1.11	"	October 2012	July 2015	
	1.12	"	October 2012	October 2021	
	1.13	"			
	1.14	"			
	1.15	"			
	1.16	"			
	1.17	"			
	1.18	"			
	1.19	"			
	1.20	"	October 2012	October 2023	
	1.21	"			
	1.22	"			
	1.23	"			

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Section	page	issued	replaced	replaced	replaced
4	4.1	October 2010			
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	4.6	"	October 2012		
	4.7	"	October 2012		
	4.8	"	October 2012		
	4.9	"			
	4.10	"			
	4.11	"	October 2012		
	4.12	"	October 2012	July 2015	
	4.13	"			
	4.14	"			
	4.15	"			
	4.16	"			
	4.17	"			
	4.18	"			
	4.19	"	October 2012	January 2025	
	4.20	"	October 2012		
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	4.29	"	October 2012		
	4.30	"	October 2012		
	4.31	"			
	4.32	"			
	4.33	"			
	4.34	"			
5	5.1	October 2010			
	5.2	"			
6	6.1	October 2010	October 2012	September 18	January 2025
	6.2	"	October 2012	January 2025	
	6.3	"			
	6.4	"	October 2012		

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Diagrams (cont.)

Diagram	issued	replaced	replaced	replaced	replaced
19	October 10				
20	October 10	September 18			
21	October 10	January 2025			
22	October 10				
23	October 10	October 2012	July 2017		
24	October 10				
25	October 10				
26	October 10				
27	October 10				

Enclosures		issued	replaced	replaced
5EP31	Installation plan Dräger oxygen system	5.02.90		
10E4	Wiring plan electrically operated main landing gear	28.09.10		
10E202	Wiring plan DINA1 (in aircraft log)	29.07.10 1.06.2016 Issue H	28.09.12 issue C With coolant pump Pierburg	22.01.15 issue G with fuel pressure regulator Bosch
5V18	Tool for airbrake adjustment	14.10.94		
W51	Hook spanner for upper drive belt pulley bearings	20.11.96		
W59	Test adapter	18.06.02		
W66	Tool to check drive belt tension	17.09.10		
Z181	Installation of aerial for transponder in vertical fin DG-1000	18.04.08		
Z193	406 MHZ ELT antenna BD3 installation 2-seaters	4.11.09		
SI 67/07 /	Service Info Ballast box in the fin / foam rubber rings Inspection instruction No. 1 for TN1000/30	5.11.2007 March 2016		
Encl. 1	Rudder control operated by hand TN1000/36	August 2018 February 2023 Page3,diagr.2b	January 2019	May 2020
10R146	Installation of 3L oxygen cylinders	9.08.19		

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0.4 Airworthiness limitations

0.4.1 Repairs

Repair or replace damaged airframe parts prior to next flight. Follow the instructions of the DG-1000 repair manual. Repairs outside the scope of the DG-1000 repair manual and major repairs must be accomplished at an certified repair station or by an certified mechanic rated for composite aircraft structure work in accordance with DG repair methods or those methods approved by the national aviation authorities.
Use only genuine spare parts.
For all aircraft under EASA regulations the following applies: According to part 21, subpart ML 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-1000M is 3000 flight hours.
Extension of the life time to 12000 hours can only be achieved by implementing a comprehensive inspection program for the aircraft to be carried out in accordance with data that has been approved by an applicable aviation authority, see section 2.4 of this manual.

Only for USA

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.*

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4.2 Replacement of control circuit cables

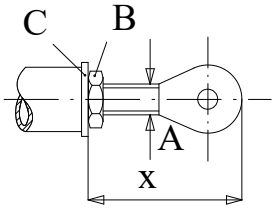
The following cable connections are approved:
3.2 mm dia. control cable construction 7x19 with Nicopress-sleeves 28-3-M Copper and tool No. 51-M850 or 63-V-XPM or 64-CGMP where the M groove is to be used. The above applies to the rudder cables, the tow release cable and the powerplant retaining cable.
The cable for the rudder pedal adjustment and the throttle control are 1.6 mm dia. control cable construction 7x7 with Nicopress-sleeves 28-1C Copper and the C groove for tool 64-CGMP should be used.
The same type of cable is used for the control cables of the throttle in Bowden outers with 2.6 mm inside diameter.

Attachment of the Nicopress sleeves should only be done using the respective tool. All the procedures and checks noted by the tool manufacturers should be followed.
Please refer to aircraft inspection and repair FAA AC 43.13-1 B or later issues.

Caution: Control cables according to MIL-W-83420 I/A (was MIL-W-1511A) or ISO 2020 (was LN9374) should be used.

4.3 Adjustment and servicing of the control circuit

a) In all cases, new self locking nuts LN9348 should be used.
b) Bolts which are not secured with self-locking nuts have to be secured with Loctite 243. Before installing the bolt clean the thread and the inside thread. Apply only 1 drop of Loctite on the bolt thread. Too much Loctite may cause damage when you try to loosen the bolt again.
c) With all adjustment work, it should be ensured that the rod ends are not screwed out too far from the pushrod - see sketch below for allowable max. distances for the two sizes used.



A	max. of x	
	mm	inch
M 6	36	1.4
M 8	60	2.36

Caution: All lock nuts (B) are secured by a spring washer (C) DIN6798 I. Be careful not to loose that washer!
Check all locknuts if loose and if necessary, tighten them firmly with an open end spanner. Apply a mark from nut to rod with securing paint or with a thin brush and a suitable paint e.g. synthetic lacquer.
In case the adjustment of a rod end must be changed, remove the paint and apply a new mark afterwards

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4.10.2 Mounting and tensioning of the drive belts

See diagram 20.

a) Tensioning of the drive belts

1. Tensioning and loosening of the drive belts is accomplished by the bolts of the front engine mounting.
2. Extend the engine so far that you are still able to hold the nut M14 of the rear bolt. Tension the bolt M14x110 with a 22 mm socket and ratchet from below the engine.
3. Measure the drive belt tension according to item c). If the tension is not correct proceed again according to item 2. with lower or higher tension, as necessary. Measure tension again.
4. If the tension is in the limits, torque the front bolt just so far that you still can turn it by hand.

Note: The front bolt acts as a fail-safe device in case the rear bolt fails. The front bolt shouldn't be tightened as otherwise the flexible engine mounting will be impaired.

Caution: With a failed rear bolt the drive belt slip will be higher and a failure message will be given by the DEI-NT. Exchange the bolt prior to the next engine operation.

b) Exchanging the drive belts

Additional to the items see a):

1. Remove the drive belt covers.
2. Eliminate tension of the belts be loosening the 2 bolts see a).
3. Exchange the belts.
4. Tension the belts according to a).

Note: To exchange the drive belts it is not necessary to remove the propeller and to disconnect gas strut and spindle drive from powerplant.

c) Measuring the drive belt tension

Accomplish measurement according to drawing W66 (enclosed to the MM). Turn the propeller one turn by hand prior to the measurement.
Use tools W66 and a calliper according to drawing W66.
Apply 100 N (22 lbs.) tension to the drive belts in the centre of the belts and vertically to the belts. The displacement of the belts shall be from 6 up to 9 mm.

Caution: Over-tensioning of the drive belts (i.e. a displacement smaller than 6mm) can lead to cracking of the power plant frame.

Caution: After exchanging the belts, activate the slip indication in the DEI-NT and watch the slip while operating the engine. With warmed up belts the belt slip indicator should show 5% ± 1%. If the slip is higher, the belt tension has to be set prior to the next take-off. Tensioning may be necessary more than one time, until the belts reach their final length.

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6 Instrumentation and accessories list

6.1 Air speed indicator

(range : 0 - 300 km/h, 165 kts)

Manufacturer	Type	Certification No.
Winter	6 FMS 4(diam. 80mm) 0-300 km/h Ident.No. 6421567 0-160 kts Ident.No. 6423567	TS 10.210/15
Winter	7 FMS 4(diam. 58mm) 0-300 km/h Ident.No. 7421567 0-160 kts Ident.No. 7423567	TS 10.210/19

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

6.2 Altimeter

Manufacturer	Type	Certification No.
Winter	4 FGH 10 (diam. 80mm) 1.000-10.000m Ident.No.4110 1.000-20.000ft Ident.No.4320	TS 10.220/46
Winter	4 FGH 20 (diam.58mm) 1.000-10.000m Ident.No.4220	TS 10.220/47
Winter	4 FGH 40 (diam.58mm) 1.000-20.000ft Ident.No.4550	TS 10.220/48
Garrecht Avionik	ACD-57 Multipurposedevice m. Elec. Indicator, Resulotion 2m	EASA.21O.1006331

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

6.3 Harness (seat)

Manufacturer	Type	Certification No.
Gadringer	BAGU 5202 G	40.070/32
	SCHUGU 2700 G	40.071/05
	rubber coated adjuster bars	
alternatively	BAGU 5202	EASA.21O.10039345
	SCHUGU 2700	EASA.21O.10039416
	from manufacturing year 2000 on	
Schroth	4-01-0.104	EASA.40.073/11
Autoflug	BAGU FAG – 7 D/O	40.070/30
	SCHUGU FAG – 7 H/O	40.071/21
	BAGU FAG-12 D-O	40.070/47
	SCHUGU FAG-12 H-O	40.071/25

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6.4 Compass

Manufacturer	Type	Certification No.
PZL	B - 13	FD 19/77
Ludolph	FK 16	10.410/3
Airpath	C 2300	
Airpath	C 2400P	
Hamilton	H I 400	TSO C 7c Type1
Bohli	46 MFK 1	(only as additional equipment.)

The compass should be compensated in the A/C. A deviation table must be installed if deviation is more than 5°.

6.5 VHF transceiver

Manufacturer	Type	Certification 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	EASA.21O.1304, REV.A
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
Filser/Funkwerk	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
F.U.N.K.E.	ATR 833	EASA.210.0193
TQ	KRT-2	EASA.21O.10038036

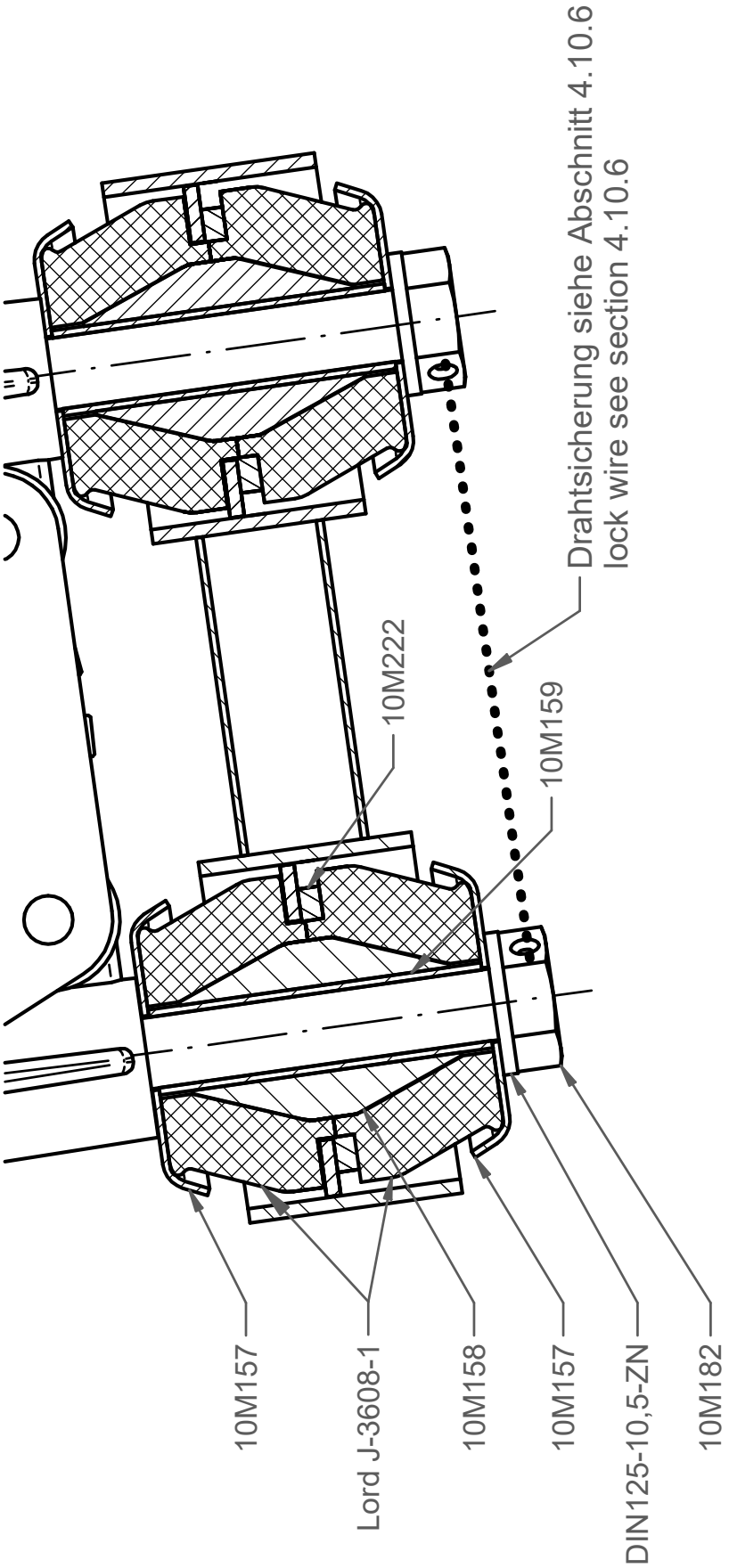
or other instruments certified for aircraft use according to TSO or JTSO or ETSO standards may be installed.

Note: Only radios with diameter 58mm (2 ¼ in.) can be installed at the assigned place in the console below the instrument panel.

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Motorlagerung hinten
Engine mount rear

Diagramm 21
diagram 21



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