No.	Page	Description	Date
11	0.2, 0.5, 0.6, 6.1, diagrams 7 + 20	Drive belt tensioning bolt, manual revision TN1000/40	September 2018
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

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0.2 List of effective pages

Section	page	issued	replaced	replaced	replaced
0	Title	October 2010	October 2021		
	0.1	"	See list of amendments		
	0.2	"	See list of amendments		
	0.3	"	See list of amendments		
	0.4	"	See list of amendments		
	0.5	"	See list of amendments		
	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		
	1.1	October 2010			
	1.2	"	October 2012		
	1.3	"	July 2014	October 2021	
	1.4	"	July 2014		
	1.5	"	October 2012		
	1.6	"			
	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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List of effective pages (cont.)

Section	page	issued	replaced	replaced	replaced
	1.24	October 2010	October 2012	October 2021	
	1.25	"	October 2023		
	1.26	"			
	1.27	"			
	1.28	"	July 2015		
	1.29	October 2010			
	1.30	"	October 2023		
	1.31	"	October 2012		
	1.32	"			
	1.33	"	October 2012		
	1.34	"	October 2012		
	1.35	"			
2	2.1	October 2010	October 2012	July 2017	
	2.2	"	October 2012	July 2017	
	2.3	"	October 2012		
	2.4	"	October 2012		
	2.5	"			
	2.6	"	October 2012	July 2017	October 2021
3	3.1	October 2010	October 2012		
	3.2	"	October 2012		
	3.3	"	October 2012		
	3.4	"	October 2012		
	3.5	"	October 2012	July 2017	
	3.6	"	October 2012		
	3.7	"	October 2012	March 2016	Febr. 2018
	3.8	"	July 2015		

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List of effective pages (cont.)

Section	page	issued	replaced	replaced	replaced
7	7.1	October 2010	March 2016		
	7.2	October 2012	March 2016		
8	8.1	October 2010	October 2012 October 2023	July 2017	October 2021
	8.2	"	October 2012 July 2017	July 2014	July 2015
	8.3	"	October 2012 March 2016	July 2014 October 2021	July 2015
	8.4	"	October 2012	October 2021	
	8.5	July 2014			
9	9.1	October 2010			
	9.2	"			
	9.3	"			
	9.4	"			
	9.5	"			
	9.6	"			

Diagram	issued	replaced	replaced	replaced	replaced
1	October 10				
2	October 10	October 2012	March 2016		
2a	August 18				
2b	January 19	February 23			
3	June 05	October 2012			
4	Nov. 01				
5	October 10	October 2021			
6	October 10				
7	October 10	October 2012 October 2021	Dec. 2017	March 2018	Sept. 2018
8	October 10				
9	October 10				
10	October 10	July 2017			
11	October 10				
12	October 10	July 2017	October 2021		
12a	August 18	October 2021			
13	October 10	Sept. 2019			
14	October 10	July 2017			
15	October 10	October 2012	Dec. 2017		
16	October 10	October 2012	July 2015		
16A	Sept. 2019				
17	October 10				
18	October 10				

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1.13 Retraction - extension mechanism

1.13.1 Layout:

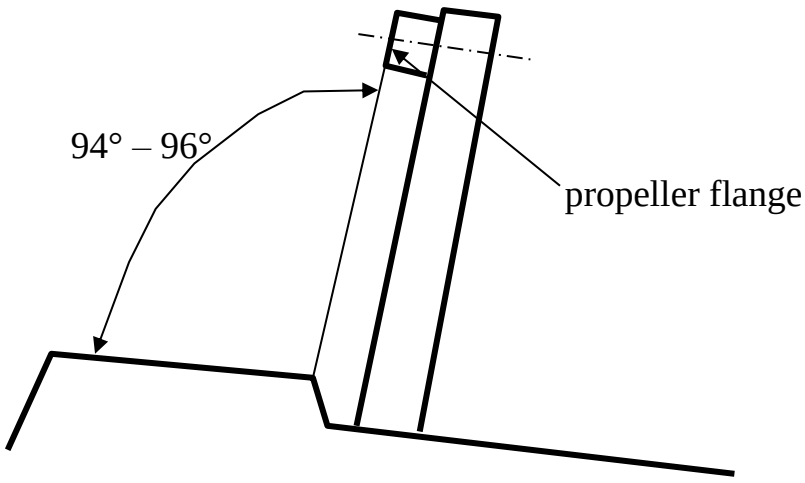
see diagrams 25 and 26 and 15 (propeller stopper)
Type of parts see section 8.1.2.
The retraction-/extension mechanism (spindle drive) consists of a 12 V electrically driven sealed ball screw shaft with electromagnetic brake.
If TN1000/47 (spindle drive replacement) has been carried out, with trapezoidal thread and without motor brake.
A tension gas-strut is installed parallel to the spindle drive to compensate the engine weight.

1.13.2 Extension force of the gas-strut

Time for extension approx. 8 seconds, time for retraction approx. 8 seconds. If TN1000/47 (spindle drive replacement) has been carried out, the extension and retraction times are approx. 12 seconds each.
If the extension takes much longer than the retraction (3 seconds) then the gas-strut must be replaced. Measure at room temperature, with full batteries and via the ignition switch.

1.13.3 Adjusting the powerplant retaining cable

Extend the engine via the ignition switch until the extension is switched off by the position switch.
The powerplant shall be in the position shown on the sketch.
The retaining cable must be tensioned. If necessary adjust the limit switch (see section 1.13.5.1) and/or via the adjustment screw at the rear engine bay bulkhead, see diagram 18. Secure the adjustment screw by fastening its lock nut.



1.13.4 Position switches

Position engine retracted: via a switch actuated by the drive mount.
Position engine extended: via a switch actuated by the muffler frame

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1.15.3 Control unit

This aluminium box is in the upper mid fuselage on the right hand side.
The control unit incorporates the following functions:

1. Master switch for battery: MOSFET-semi-conductor relays.
2. Master switch for generator: MOSFET-semi-conductor relays.
3. Startermotor control: The starter motor is actuated by a MOSFET-semi-conductor relay. This applies to the normal engine start (ignition on) and also the slow turning of the propeller into retraction position (ignition off). Activation is via the starter button.
   The control unit prevents the starter motor working whilst the engine is running.
   The position switch “engine extended” (see sect. 1.13.4 and 1.13.5) activates the control of the starter motor only when the engine is extended.
4. Control of the extension-retraction procedure. The extension-retraction relays are also mounted inside the unit.
   The proximity switch see 1.15.16 prevents the automatic retraction of the engine as long as the propeller is not in the correct position for retraction (with the manual extension-retraction switch see sect. 1.15.11 not operated).
5. Switched 12V outputs with MOSFET-semi-conductor relays:
   a) Fuel pump
   b) coolant pump
   c) Ignition coil (2 x) (provides 12V to the ignition coils with ignition on)
   d) ECU + injection valves
   e) Emergency system
   f) Refuelling pump
   g) Spindle motor brake (not applicable if TN1000/47 is carried out)
6. Propeller speed measurement for slip indication and for engine speed indication when switched over to the emergency system. Measurement is via the proximity switch see section 1.15.16. The drive belt slip will be determined by comparing the engine speed given by the ECU with the propeller speed, taking into account the reduction ratio.
7. Fuses for several circuits are installed in the control unit (see section 1.15.14).

Warning: To avoid damage disconnect the power plug first when removing the control unit. Plug in the power plug after the other plugs when installing the unit,

Caution: When you plug in the connector plugs, carefully fix the plugs with their screws and secure the screws with Loctite 221.

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1.15.14 Circuit breakers and fuses

1. In the console of the instrument panel:
   a) Circuit breaker 2 A for electric variometers etc.
   b) Circuit breaker 3 A for the radio
   c) 3A for turn and bank or artificial horizon
   d) Circuit breaker 3 A spare eg. for the transponder
2. The battery main fuse is located in the cockpit floor in a recess behind the foot of the instrument panel: 1 piece1s 80 A.
4. Resettable fuses are installed in the DEI-NT unit for the following circuits:
   a) Alarm outlet 2 fuses 0,2A
   b) Change over switch when extending the powerplant 0,2A e.g. for a Headset.
5. In the control unit-NT:
   Resettable fuses are protecting the following circuits:
   a. DEI-NT 0.4A
   b. DEI-NT rear cockpit 0.4A
   c. 12V sockets 4A
   d. Bug wipers 7A
   e. 12V sensors 0.2A,
   f. 5V sensors 0,05A

   A safety fuse 40A protects the Generator

   The following circuits are activated by semiconductor switches and protected by resettable fuses:
   a. Engine extension-retraction motor 9 A
   b. Fuel pump 9A
   c. Coolant pump 4A
   b) Ignition coils 2 x 4A
   c) ECU and injection valves 4A
   d) Emergency system 9A
   e) Refuelling pump 4A
   f) Spindle motor brake 2,5A (no function, if TN1000/47 is carried out)

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8 Partlist

Please find the part no's of the control-system parts and of the metal fittings of the powerplant in the following diagrams.

Note: The number at the left hand side is the DG part no.. Please use these numbers for ordering any parts.

8.1 Parts for the powerplant

8.1.1 Parts necessary for the 25 hours inspection

60500150 Gaskets for exhaust manifold (2 pieces needed)
60500185 Air intake filter K&N RU2760
70002200 Oil for airfilters with cottonfabric K&N 99-05046
60000377 Copper sealing ring 10x14x0,8 DIN 7603 A

8.1.2 Spare parts

8.1.2.1 Power plant and extension retraction system

40050360 Spark plug S36 (Bosch W5AC electrode gap 0.5 mm) with screw cap fastened to the thread by crimping, marked with a red dot of paint on the insulator
60510821 Spark plug connector Bosch 0356351032 1kΩ, no longer available
4502085 Spark plug connector PVL (alternative to Bosch)
4502085 Spark plug connector Champion (alternative to Bosch)
60500155 Gasket for coolant outlet
60500127 Nut for spring coupling M8 for exhaust muffler
60500128 Spring for spring coupling M8
60000337 Spring for propeller stopper
41071730 Starter motor: 10M173DENSO 128 000-1671 12 V modified
60510831 V-drive belt Optibelt Super X-Power XPZ 2540 Ld (5 pieces needed)
40871711 Drive belt roller 10M101
59332050 Front bearing for upper pulley 32205 B
59320320 Rear bearing for upper pulley 320/32 X
52200054 Securing washer 20 DIN462 for upper pulley front bearing
30002028 Special grease for upper pulley bearings SKF LGMT3
39001028 Exchange kit nuts and bolts for 400 h overhaul
60000157 Gas strut for ext.-retr. drive S47/2 with Ultra-bush
60504045 Ext.-retr. spindledrive type Stross BSA10 RN1 C205 (no longer available)
60504060 Ext.-retr. spindledrive type Stross ATL-10 assembled with fork 10M170 and flange 8M230/2
60000219 Rubber mount at engine hinge axis in engine mount: Ultra-bush 0118055.60
41071170 Front engine shock mount 10M117
60504014 Rear engine mount Lord J-3608-1 Shock mount
60001115 Clamps XO for 6mm bungee (bungee for retaining cable)
52130011 Securing washer 13 DIN432-St zn for powerplant main hinges
60000338 Rubber buffer 3917210000 (engine tilt limit stop)

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