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LBA anerkannter Herstellungsbetrieb IB 25
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TN 826/22

Type: Glaser-Dirks DG-400

1. DESCRIPTION OF UNSAFE CONDITION:
Vibration damage of the powerplant.

2. PROBABLE CONSEQUENCE, IF UNSAFE CONDITION IS NOT RECTIFIED:
I.E. drive belt will come off pulley - no engine power, damage of engine.

3. IS CONDITION LIKELY TO EXIST IN OTHER PRODUCTS OF THE SAME TYPE? YES or NO:
All DG-400 see TN 826/22.

4. SERIAL NUMBER APPLICABILITY:
4 - 1 up to 4 - 249.

5. DIFFERENCES BETWEEN FCAA A.D. AND SERVICE BULLETIN, IF ANY?

./.

6. BASIS OF SERVICE LIFE OF LIFE LIMITED PARTS (e.g. service experience, test or analysis):

./.

7. BASIS OF INSPECTION TIMES:

./.

8. AVAILABILITY OF REPLACEMENT PARTS:
Glaser-Dirks, will be shipped with technical note.

9. COMPATIBILITY OF MODIFICATION WITH OTHER AIRPLANE COMPONENTS:

./.

10. NUMBER OF SIMILAR INCIDENTS/REPORTS:

./.

11. APPROXIMATE COST TO ACCOMPLISH MODIFICATION/INSPECTION:
Parts supplied free of cost.
Working time ca. 4 hours.

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SUBJECT : Powerplant DG-400

EFFECTIVITY : DG-400 all serial no.'s up to 4-249. Instruction 3 only DG-400 serial no. 4-151 up to 4-249 and all DG-400's where the starter motor was exchanged for the new type Bosch American E-Starter 992807.

ACCOMPLISHMENT : Instruction 1 with the daily inspection. Instructions 2 - 5 as soon as possible, but at latest at the next 25 h inspection.

REASON : Vibration damage occured on some DG-400's. Our investigations resulted in the modifications which shall be executed with this technical note. One major reason for damage was that the engine manufacturer didn't drill the rear mounting holes for the propeller mount deep enough on some engines.

INSTRUCTIONS :

1. Inspection of the powerplant, see flight manual section 4.1 item 16, for tight fit of all parts, especially the rear mount of the upper part of the powerplant (propeller mount) and the mounting of the starter motor.
   If you detect any defect it is prohibited to operate the engine before the defect is repaired.
   If parts mentioned in the instructions 2-4 are concerned, instructions 2-5 have to be executed before you use the engine again.

2. Modifications see "Working Instruction No. 1 for TN 826/22".

3. Retrofitting of a holder for the starter motor "Bosch American E-Starter 992807" see "Working Instructions No. 2 for TN 826/22".

4. After execution of all modifications check the ignitiontiming see "Manual for Rotax engine type 505" section 8.7 and "Working Instruction No. 3 for TN 826/22". If the ignition timing is out of limits it is prohibited to operate the engine before the timing is corrected.
   Correction of ignition timing see working instruction No. 3 item 2.

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5. Exchange diagram 6 in the maintenance manual against the new issue January 1990 and amend page 0.2 to the maintenance manual.

MATERIAL : For all DG-400's ser. no. 4-1 up to 4-249
Working instructions no. 1, 2, 3 for TN 826/22
maintenance manual page 0.2
diagram 6.

2 washers 4 M 31/2
2 bolts M 12 x 30 DIN 7984-8.8
2 bolts M 8 x 22 DIN 912-8.8
1 piece of rubber 70 x 45 x 2 mm
2 selflocking nuts M 10 SSN 003

\- - -

in addition for DG-400 serial no. 4-151 up to 4-249 and all DG-400's where the starter motor was exchanged to the new type Bosch American E-Starter 992807

2 distance washers 8 x 14 x 0.3
1 starter mounting 4 M 70
1 screw Taptite 1/4-20 UNCX 3/4
1 spring washer 6.4 DIN 6798 I
1 nut STD 1411

WEIGHT AND BALANCE: Influence negligible.

REMENTS : Instruction 1 may be executed by the owner himself.
Instructions no. 2 - 5 are to be executed by the manufacturer or by a licensed workshop and to be inspected and entered in the aircraft logs by a licensed inspector mentioning TN 826/22.

Bruchsal 4, January 10, 1990

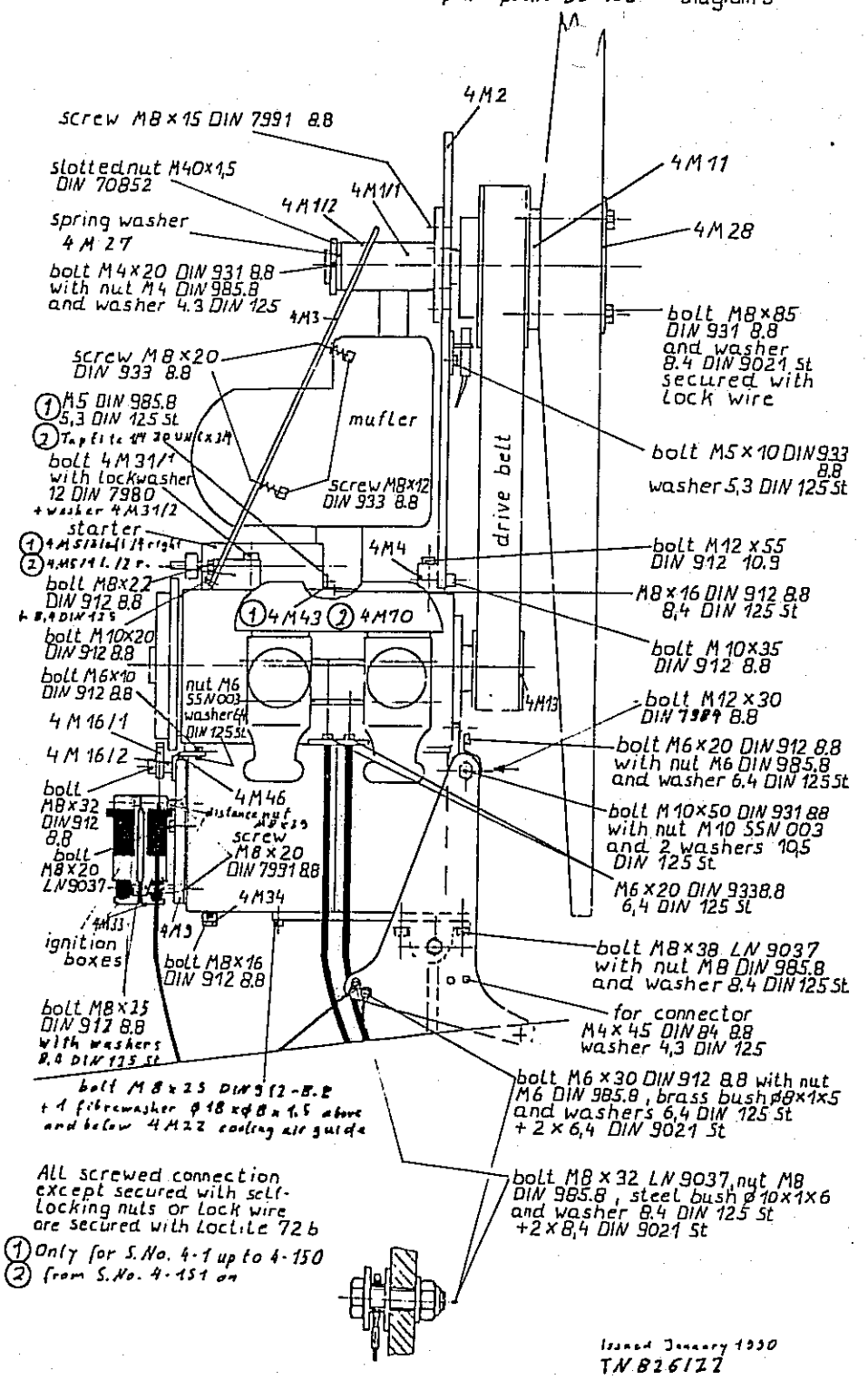
Author: W. Dirks

W. Dirks

LBA - approved:
The German original of this TN has been approved by the LBA under the date of 25. Jan. 1990
The translation into English has been done by best knowledge and judgement. In any case of doubt the German original is authoritative.

Manual amendments

No.	Page	Description	Date	Sign.
21	2, 3a, 12 install. sketch EFK	Additional tow hook for aerotow TN 826/21	Oct. 89	W.
22	diagram 6	Modifications of the powerplant TN 826/22	Jan. 90	W



Issued January 1990
TN 826/22

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Working Instruction no. 1
for TN 826/22
Instruction 2

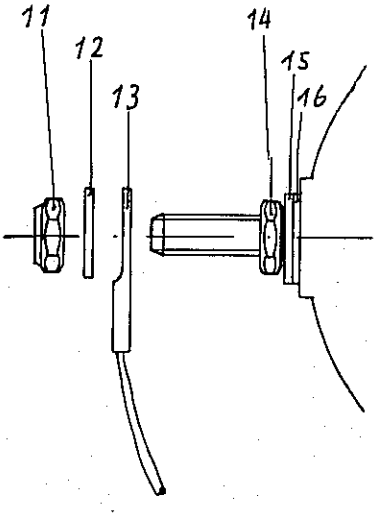
Concerning: all DG-400 up to ser.no. 4-249.

Numbering of parts see drawing 1 for this working instruction and the sketches in this instruction.

1. Extend the engine, then switch off main switch.

2. Disconnect the positive wire from the starter motor.

   a) Bosch Starter type DG



11. self locking nut DIN 985 - 8 zn
12. washer 6.4 DIN 125 St zn
13. positive wire
14. nut M 6 DIN 936 - 8 zn
15. spring washer 6.4 DIN 6798I
16. washer material brass

   When screwing off the nut (11) hold the nut (14) with a 10 mm fork end spanner.

   b) Bosch American-E-Starter

   With this type of starter motor the nut 14 is not existing. The nut 11 is a nut STD 1411 (1/4 inch thread), spanner must be 11 mm (7/16 inch).

3. Dismount the carburettor cover, therfore remove the 2 screws (10). Secure the carburettor intake from dirt etc.

4. Dismount securing bolt (1).

5. Dismount slotted nut (2) and spring washer 4 M 27 and the ring (3).

6. Dismount the spring at the exhaust manifold.

7. Dismount the lower mounting bolts (4) of the rear propeller-mounting plate 4 M 3.

8. Take off rear propeller mounting plate 4 M 3 with the exhaust muffler.
   It is not necessary to dismount the muffler from the plate 4 M 3. You need only to bend forward the front propeller mounting plate 4 M 2.

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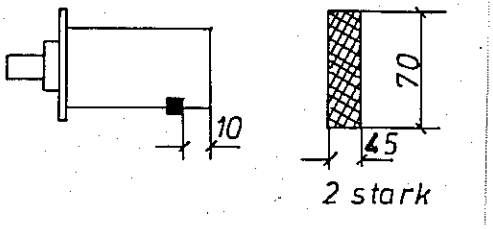
9. Dismount the front and the rear mounting bolts of the starter motor (5) and (6).
Take off the starter motor.
During reassembly the modification item 14 must be executed.

10. Dismount rear mounting blocks 4 M 5, therefor remove the bolts 4 M 31/1.
During reassembly the modification item 13 must be executed.

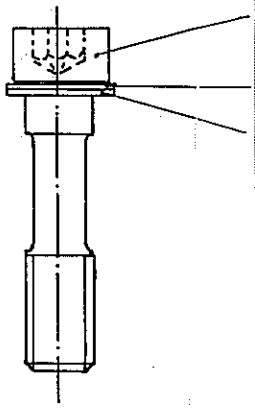
11. Degrease the lower side of the starter motor and glue on the rubberplate 70 x 45 x 3 mm (2.75 x 1.77 x 0.8 inch).



12. Prior to reassembly clean all parts with acetone and remove remants of loctite from all threads.
During reassembly secure all screwed connections with Loctite 72 b except for securing bolt (1), slotted nut (2) and bolts (7).
All bolts secured with Loctite should be marked with red securing paint.

13. Mount the blocks 4 M 5 into the engine. Therefore recut the the threads in the engine and check the contact surface between engine and 4 M 5 for evenness.
Before reassembling inspect the bolt 4 M 31/1 for cracks.

Modification: Place a washer 4 M 31/2 underneath the the springwasher.



bolt M 12 4M 31/2

springwasher 12 DIN 7980

washer 4 M 31/1
(diameter inside 12.2 mm, .48 inch
diameter outside 18 mm, .71 inch
thickness 2 mm, .08 inch).

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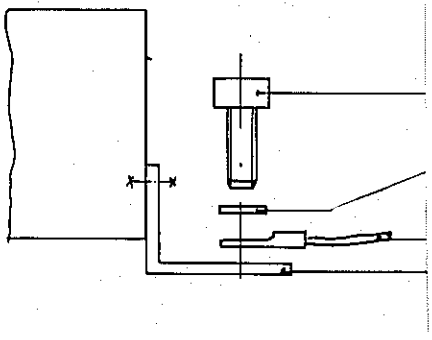
14. Mounting of the starter motor: Bosch type DG

Note: With starter motor Bosch American E-Starter execute the "working instruction no. 2 for TN 826/22" instead of this section.

Modification: Replace the two mounting bolts (6) M 8 x 25 DIN 912-8.8 by M 8 x 22 DIN 912-8.8

Mount starter motor with bolts (5) and (6) and a washer 8.4 DIN 125 St under each bolt head.
With bolt (5) the earth wire has also to be fixed.



M 8 x 16 DIN 912-8.8

8.4 DIN 125 St zn

earth wire

mounting bracket 4 M 43

15. Mount the rear propeller mounting plate 4 M 3 with the exhaust muffler. Place the muffler into the exhaust manifold. Position the plate 4 M 3 correctly and fix it with the bolts (4) to the blocks 4 M 5.
Place a washer 10.5 DIN 125 underneath the bolt heads.
Fix the spring from muffler to manifold. Mount the part 4 M 1/2 (3), springwasher 4 M 27 and slotted nut (2).
Further work see section 4.1 maintenance manual "Mounting and tensioning of the drive belt".

16. Mount the carburettor cover again to parts 4 M 4 and 4 M 5 with the bolts (10) and washers 5.3 DIN 125.

17. Exchange the mounting bolts at the front engine mount 4 M 6.
Don't execute this work on both sides at the same time!

a) Dismount nut and washer from bolt (7).
Push bolt as far inside the rubber mounting block (9) as to make it flush with block (8).

b) Screw out bolt (9) of plate 4 M 6.
Clean the threads.

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c) Replace bolt (9) M 12 x 30 DIN 912-8.8 by a bolt M 12 x 30 **DIN 7984-8.8** (low head). Screw the new bolt with washers 13 DIN 125 into the front mounting plate 4 M 6.

d) Push back the bolt (7) into place, attach washer 10.5 DIN 125 to the bolt and screw a **new** selflocking nut M 10 SSN 003 onto the bolt.

Now execute the same modification on the other side.

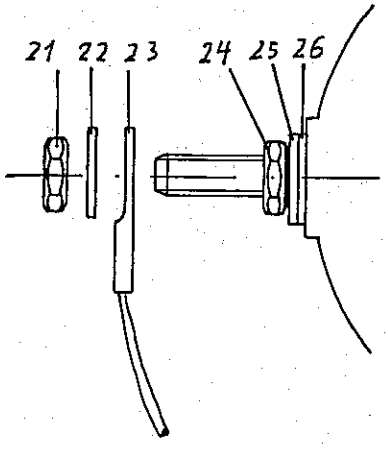
18. Connect positive wire to the starter motor.

a) Bosch starter type DG

See sketch under item 2.
Fix nut (14) on the bolt protuding out of the starter. Put on positive wire, washer (12) and screw on nut (11).

b) Bosch American E-Starter

Modification:



21. Nut STD 1411
22. Springwasher 6.4 DIN 6798 I
23. Positive wire
24. Nut STD 1411
25. Springwasher 6.4 DIN 6798 I
26. Brass washer

Fix nut (24) on to the bolt protruding out of the starter. Put on positive wire (23) and springwasher (22) and screw on nut (21). Use an open end spanner 11 mm (7/16 inch).

Tightening torques

M 12----------50 Nm (37 ft lb)
M 10----------40 Nm (30 ft lb)
M 8----------24 Nm (18 ft lb)
M 6----------10 Nm (7.5 ft lb)

Securing

Secure all screwed connections with Loctite 72 b except for those secured by selflocking nuts. All bolts secured with Loctite are to be marked with red securing paint.

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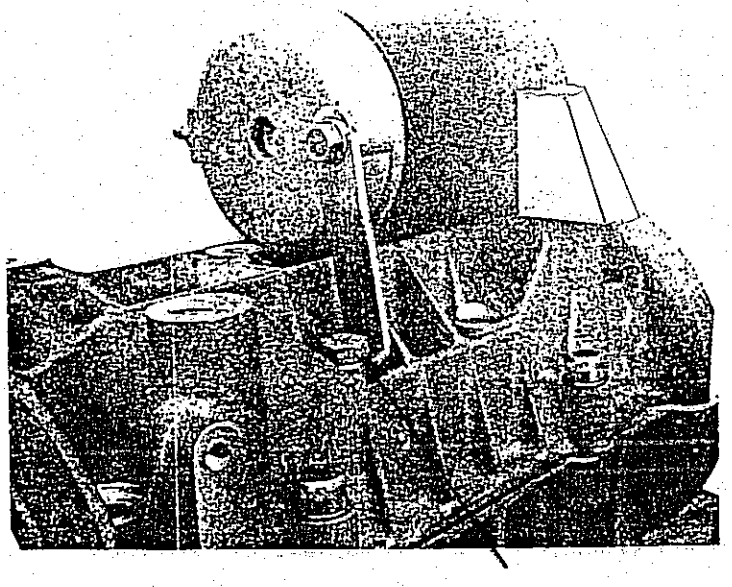
Working Instruction no. 2
for TN 826/22
Instruction 3

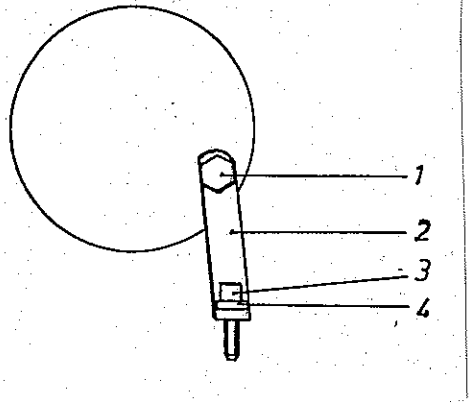
Concering only DG-400 serial no. 4-151 up to 4-249 and all DG-400's where the starter motor was exchanged for the new type Bosch American E-Starter 992807.

All items of the "working instruction no. 1 for TN 826/22" except for item 14 have to be executed.

This instruction replaces item 14 of working instruction no. 1.

1. Retrofit of a holder for the starter motor





sketch 1

1. Tapetite screw 1/4 - 20UNCX 3/4
2. Holder 4 M 70
3. Bolt M 8 x 16 DIN 933-8.8
4. Springwasher 8 DIN 127

Remove bolt (3) and springwasher (4) from the engine (see photo). Fix the holder 4 M 70 to the starter motor with screw (1) (see sketch 1). This screw cuts the thread into the hole of the starter motor.

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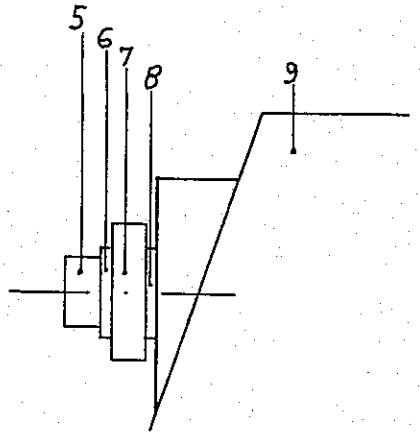
2. Modification at the rear mounting:

   - Replace the two mounting bolts M 8 x 25 DIN 912-8.8 by bolts M 8 x 22 DIN 912-8.8.
   - Place a distance washer 8.4 DIN 522
     (inside diameter 8.4 mm - 0.33 inch)
     (outside diameter 14 mm - 0.56 inch)
     (thickness 0.3 mm - 0.01 inch)
     in the cutout of the starter motor flange.

   Mount starter according to sketch 2 to the blocks 4 M 5.

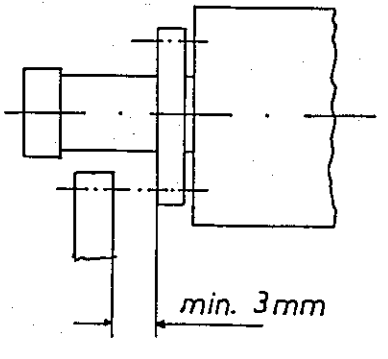
Sketch 2



5. Bolt M 8 x 22 DIN 912
6. Washer 8.4 DIN 125
7. Starter motor flange
8. Distance washer 8 x 14 x 0.3
9. Mounting blocks 4 M 5

3. Fix the holder 4 M 20 with bolt (3) to the engine according to sketch 1, don't use Loctite.

4. Check if a free play of min. 3 mm (.12 inch) is between starter motor pinion and starter gear.



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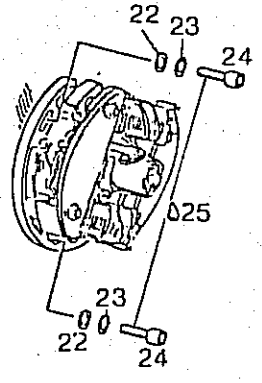
Working Instruction no. 3
for TN 826/22
Instruction 4

Checking the ignition timing

1. Checking must be executed with warm engine.
   The ignition timing mark at the starter gear should be cleaned and marked with chalk.
   The checking of the timing should be done according to the manual for Rotax engine type 505, page 11, section 8.7.

   Note: The clamp of the ignition stroboscope lamp has to be clamped to a cleaned ignition wire. The pointer on the clamp must point towards the spark plug.

2. If the ignition timing is out of limits for correction the armature plate must be turned.
   This should be done with the starter gear still assembled to the engine.
   Via the openings in the magneto housing loosen the screws (24) which hold the armature plate (4mm allen key wrench).
   After turning the armature plate fix the bolts and check the ignition timing again.

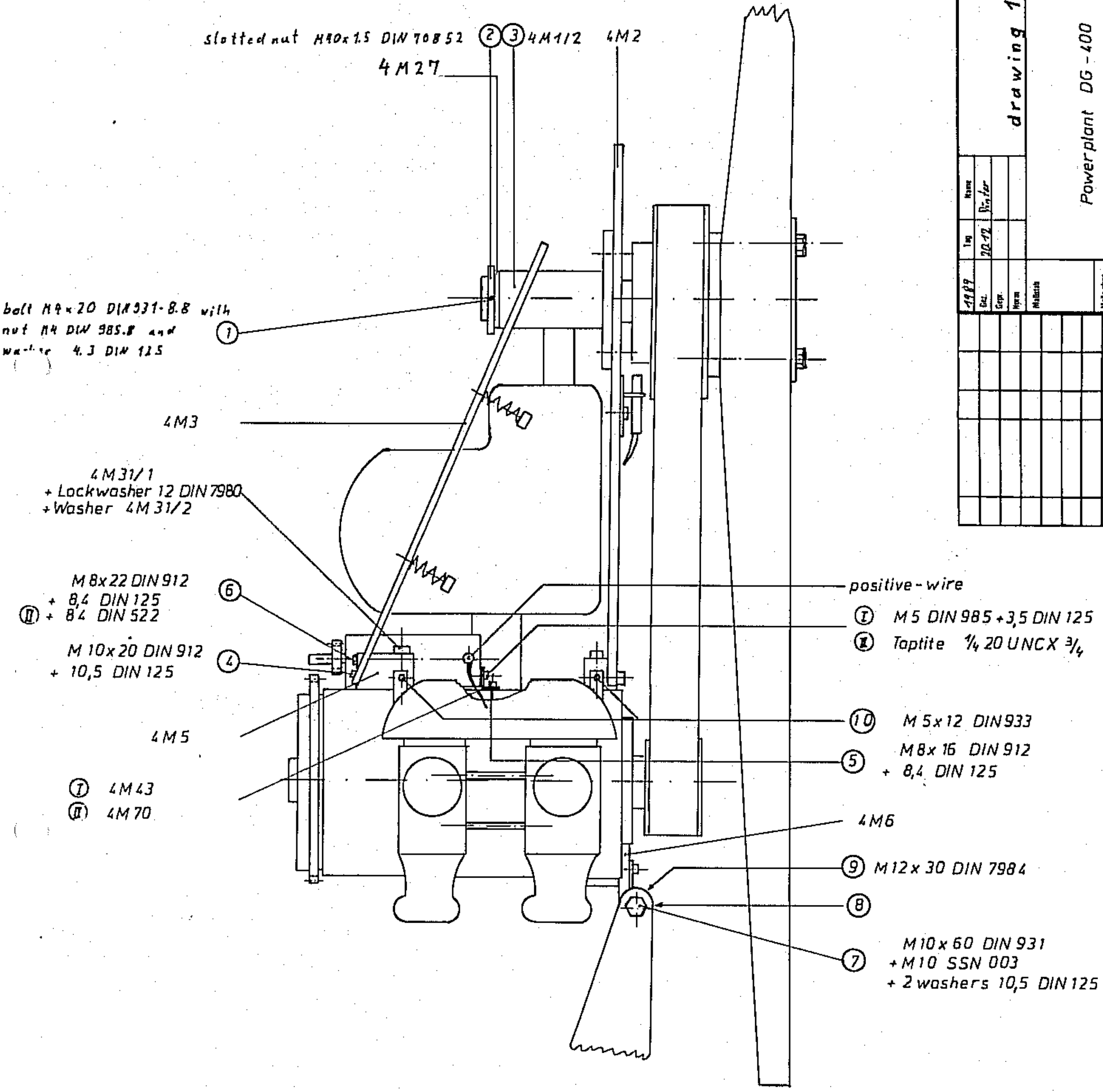


   Repeat this procedure until the timing is correct.

3. When the timing is correct the screws (24) have to be secured with Loctite 72 b.
   Therefore you must remove the magnetic flywheel assembly according to the instructions of Rotax technical bulletin no.505-04 page 3 - 5 (enclosed).
   Check if the woodruff key between crankshaft and magneto housing is damaged (shear failure).
   If this is the case, the woodruff key must be replaced (Rotax part no. 246050 or 3x3.7 DIN 6888) and the ignition timing must be checked and corrected again. You have to start again with item 1 of this instruction

   Dismount one of the screws (24) secure it with Loctite and screw it in again. Then dismount and secure the second screw (24).

   Assemble again the magneto flywheel assembly according to Rotax technical bulletin no. 505-04 page 3 - 5.



Ⓘ only for S.Nr. 4-1 up to 4-150

Ⓘ from S.Nr. 4-151 on

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drawing 1

Powerplant DG-400

1989

Instructions for the removal and refitting of magneto flywheel ass'y and exchange of starter gear

1) Disassembly:

1.1. If coverplate fitted, remove it (ill. 1).
Re-use not forseen.

Tool: Socket spanner 13 A/F

1.2. Fasten flywheel fixture with three hex. HD. screws M8 x 16 to flywheel (ill. 2).

Tool: Flywheel-fixture 876 080
socket spanner 13 A/F

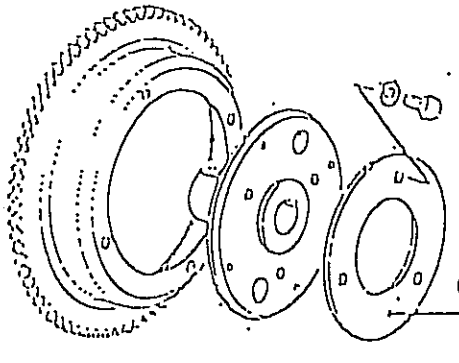
1.3. Remove hex. nut M22 x 1,5 from crankshaft (ill. 5).

Tool: Socket 30 A/F on torque wrench or on suitable extension

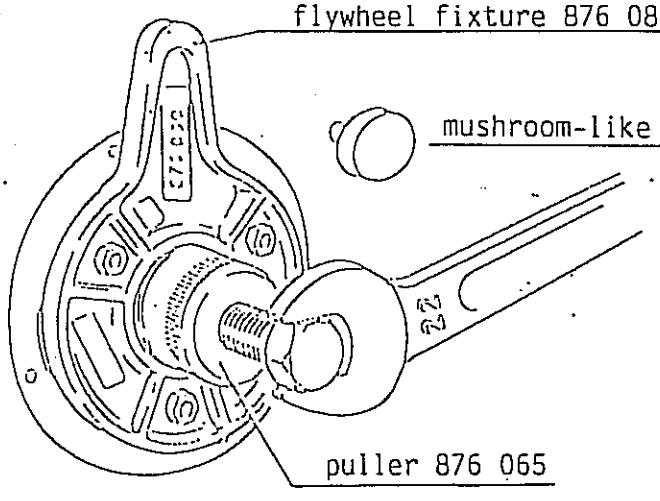
1.4. Place protection cap or mushroom-like protector on crankshaft end, fasten puller to flywheel fixture and pull off flywheel.

Tool: Protector 876 557
puller 876 065
open end or socket spanner 22 A/F

Advice: If need be, break bond of flywheel to crankshaft taper by carefully heating up to 120°C.



Ill. 1

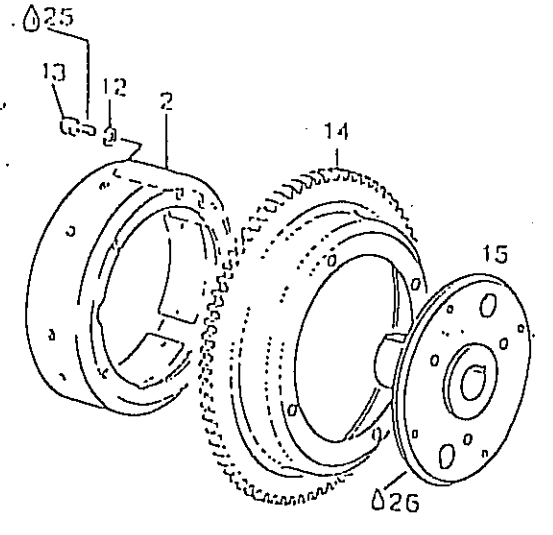


Ill. 2

2) Exchange of the starter gear

2.1. Strip flywheel assembly to its components of magneto housing item 15, starter gear item 14 and magneto ring item 2 after removal of the four allen screws M6 x 11,5 item 13. Clean mating surfaces, remove Loctite residues.

2.2. Fit new starter gear 995 956, apply Loctite to mating surfaces, tighten screws M6 with 10 Nm.



item	part no.	designation
2	993 500	magneto ring
12	945 751	lockwasher A6 DIN 123
13	840 370	allen screw M6 x 11,5
14	935 956	starter gear 77 t
15	865 638	magneto housing
25	899 785	Loctite 221
26	899 788	Loctite 648

3) Refitting of flywheel assembly:

3.1. Degrease taper of crankshaft and magneto housing with suitable degreasing agent.

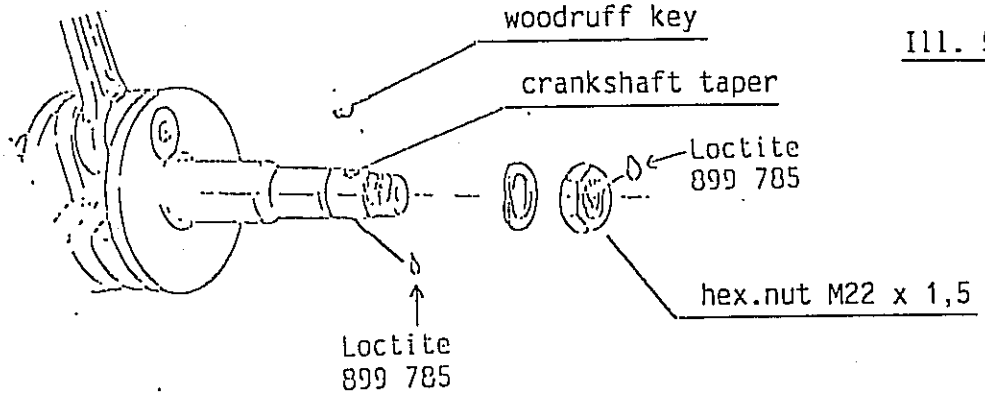
3.2. Insert woodruff key (ill. 5).

3.3. Apply Loctite 221, 899 785, on crankshaft taper.

3.4. Fit flywheel assembly on crankshaft.

Important: Make sure that armature plate ass'y and flywheel ass'y is clean and free of foreign matter.

3.5. Secure hex. nut M22 x 1,5 with Loctite 221, 899 785, tighten with 140 Nm.



Ill. 5

4) Meet three hours curing time for Loctite, prior to engine start.

Reparaturanleitung zur Demontage und Montage des Magnetgehäuses sowie Austausch des Starterzahnkranzes

1) Demontage:

1.1. Abdeckscheibe (wenn vorhanden) abschrauben (Bild 1). Wiedermontage nicht mehr nötig.

Werkzeug: Steckschlüssel SW 13

1.2. Magnetgehäusehalter am Magnetgehäuse mit 3 Sechskantschrauben M8 x 16 festschrauben (Bild 2).

Werkzeug: Magnetgehäusehalter 876 080
Steckschlüssel SW 13

1.3. 6kt-Mutter M22 x 1,5 abschrauben (Bild 5).

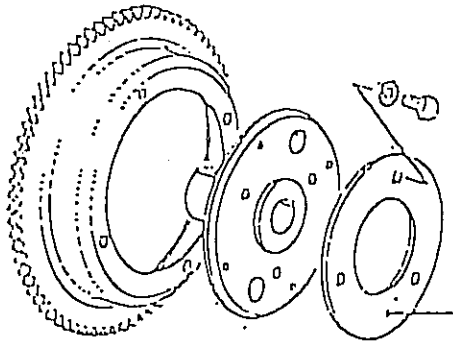
Werkzeug: Steckschlüssel SW 30 mit Verlängerung (Drehmomentschlüssel)

1.4. Schutzkappe oder Schutzpilz auf Kurbelwelle aufstecken und Abzieher in Magnetgehäusehalter einschrauben und Mangnetgehäuse abziehen (Bild 2).

Werkzeug: Schutzpilz 876 557
Abzieher für Magnetgehäuse mit geeigneter Verlängerung
Gabelschlüssel oder Steckschlüssel SW 22

Hinweis: Bei zu starkem Festsitz ist die Konusverbindung auf ca. 120°C vorsichtig zu erwärmen.

Bild 1



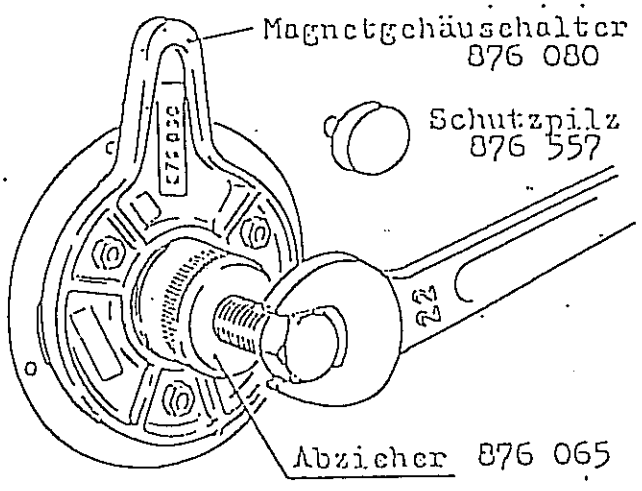
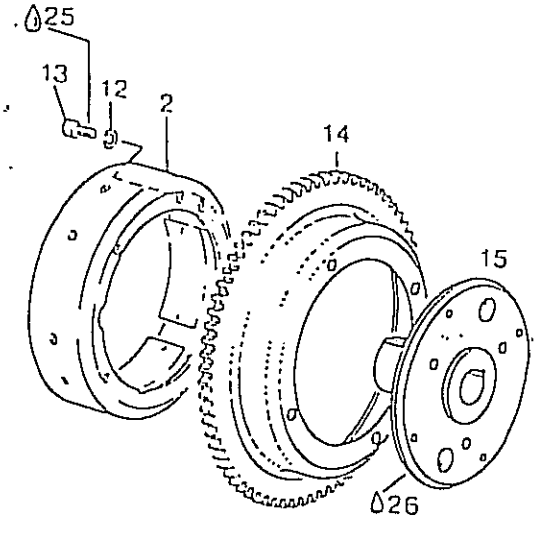


Bild 2

2) Austausch des Starterzahnkranzes:

2.1. Die 4 Zylinderschrauben M6 x 11,5 Pos. 13, mit denen Magnetgehäuse Pos. 15, Starterzahnkranz Pos. 14 und Magnetrad Pos. 2 zusammengeschraubt sind, lösen und verklebte Teile auseinandernehmen und Kontaktstellen reinigen (Kleberreste entfernen).

2.2. Neuen Starterzahnkranz 995 956 montieren, Kontaktflächen mit Loctite dünn bestreichen, Schrauben M6 mit 10 Nm anziehen.



Pos.	Teile-Nr.	Benennung
2	993 500	Magnetring
12	945 751	Federring A6 DIN 123
13	840 370	Zyl.Schraube M6 x 11,5
14	935 956	Starterzahnkranz 77 Z
15	865 638	Magnetgeh. kpl.
25	899 785	Loctite 221
26	899 788	Loctite 648

3) Montage des Magnetgehäuses:

3.1. Kurbelwellenkonus und Konus im Magnetgehäuse mit Entfettungsmittel reinigen.

3.2. Scheibenfeder auf Kurbelwellenkonus montieren (Bild 5).

3.3. Auf Kurbelwellenkonus Loctite 221, 899 785, auftragen.

3.4. Das Magnetgehäuse mit montiertem Magnetring und Starterzahnkranz ist auf die Kurbelwelle aufzusetzen.

Wichtig: Vor dem Aufsetzen des Magnetgehäuses mit Magnetring auf die Kurbelwelle ist zu achten, daß die Zündanlage sauber und frei von Fremdkörpern ist.

3.5. Gewinde der Sechskantmutter M22 x 1,5 mit Loctite 221, 899 785, sichern und Mutter mit 14 kpm anziehen.

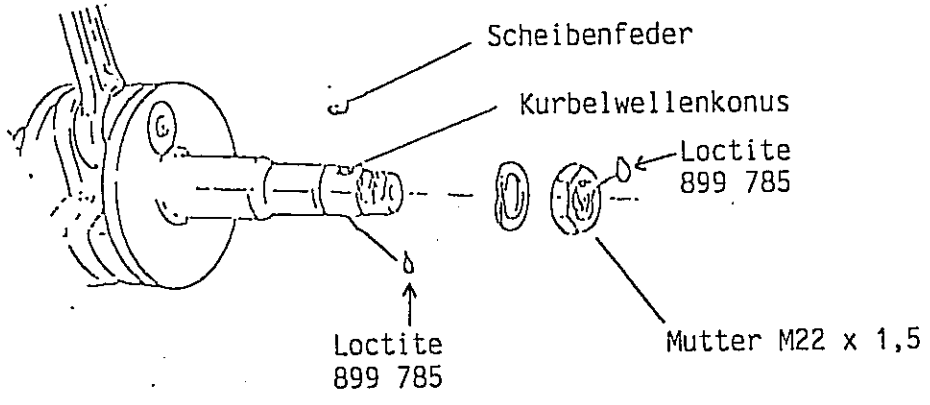


Bild 5

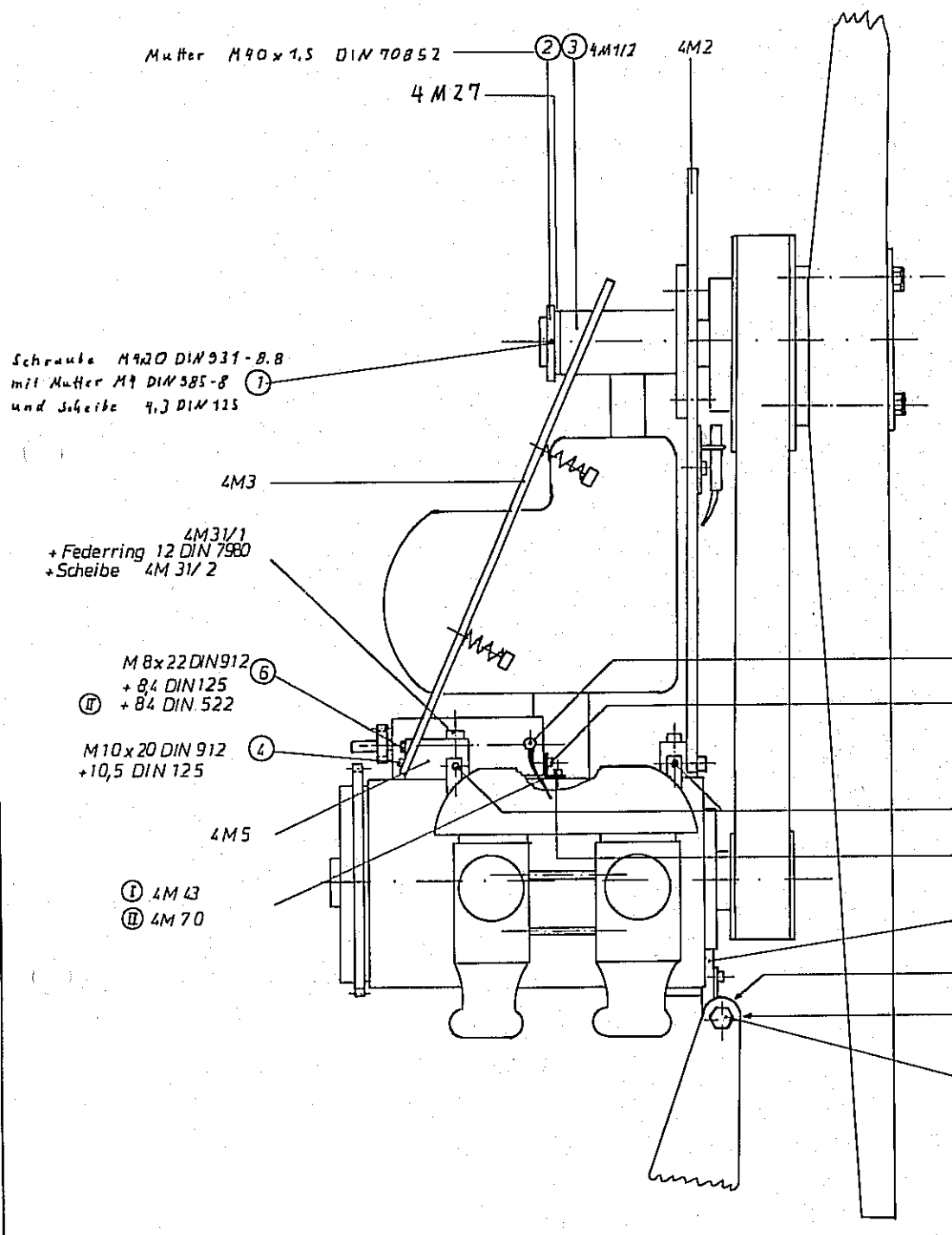
4) Vor Inbetriebnahme 3 Stunden Loctite-Aushärtezeit einhalten!

Glaser-Dirks Flugzeugbau GmbH
7570 Bruchsal 4
Im Schollengarten 19-20

DG

Zeichnung 1

Triebwerk DG - 400



I Nur bei W.Nr. 4-1 bis 4-150

II Ab W.Nr. 4-151