TN 904-5

Subject: Shaft-coupling in pump-unit

Affected:: E1 Antares, 1 to 60E49

Date: 20.03.2014

Urgency: Before next flight

Reason: There have been cases where the shaft-coupling, which connects the shaft of the electric motor with the shaft of the hydraulic pump, has broken.
This leads to the loss of the ability to extend and retract the motor, and the ability to retract the landing gear. It is still possible to extend the landing gear.

Actions: Carefully read through the entire Technical Note prior to the implementation of the described actions.

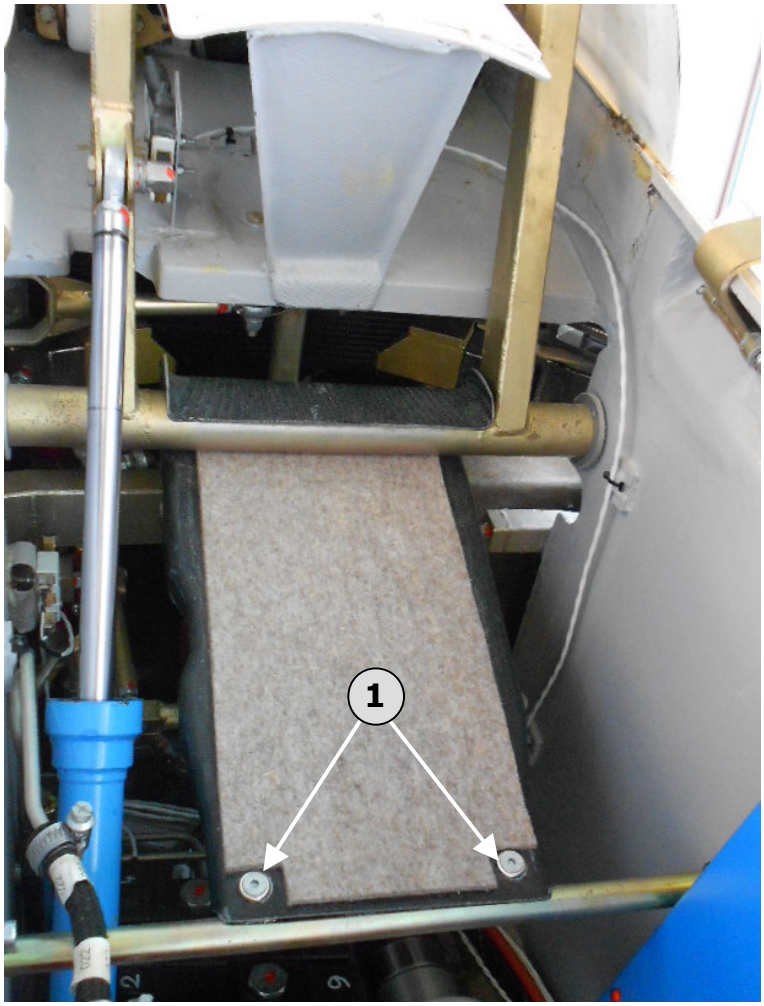
TN 904-5 replacement of the shaft-coupling in pump-unit

The following procedural steps must be performed:

1. Extend the motor and leave it in maintenance position (motor extended, motor bay covers open) as described in the flight manual (3.9.2.1.5).If the aircraft is not rigged, then the drive battery must be electrically disconnected from the fuselage prior to motor extension. In this case, 12V battery power must be supplied through the maintenance socket in the left leg-rest.
2. Remove all electric power sources as described in TN904-4, procedural step 1.

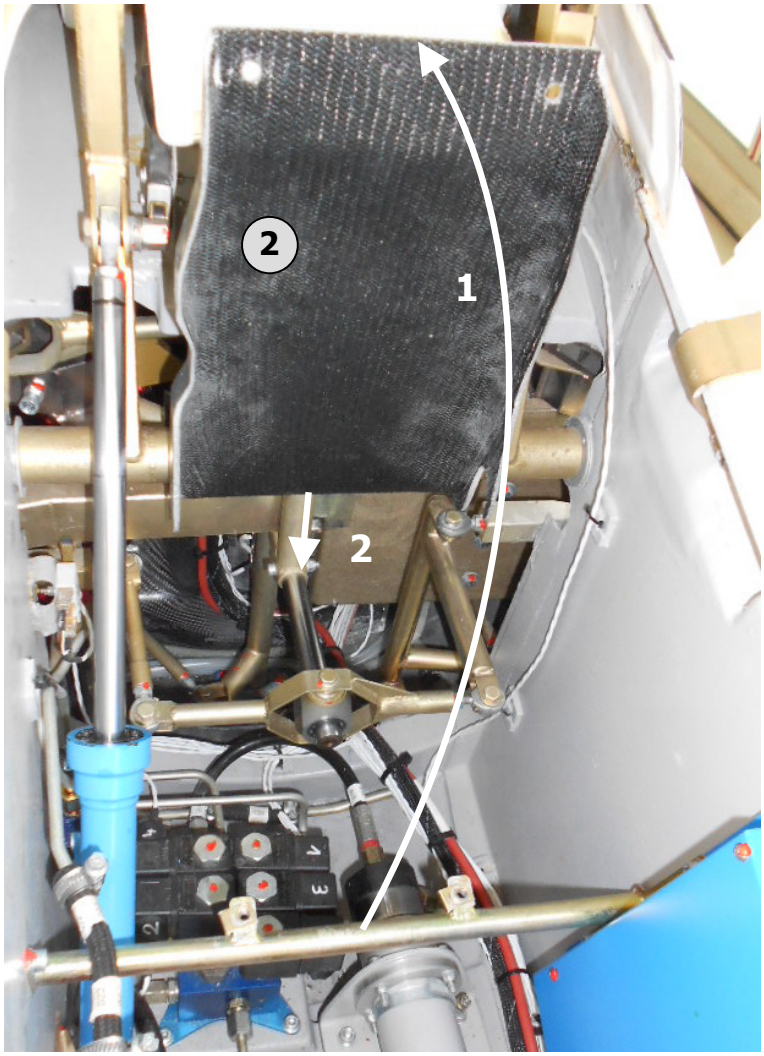
3. Release and remove the propeller-blade catcher:

a. Release the propeller-blade catcher



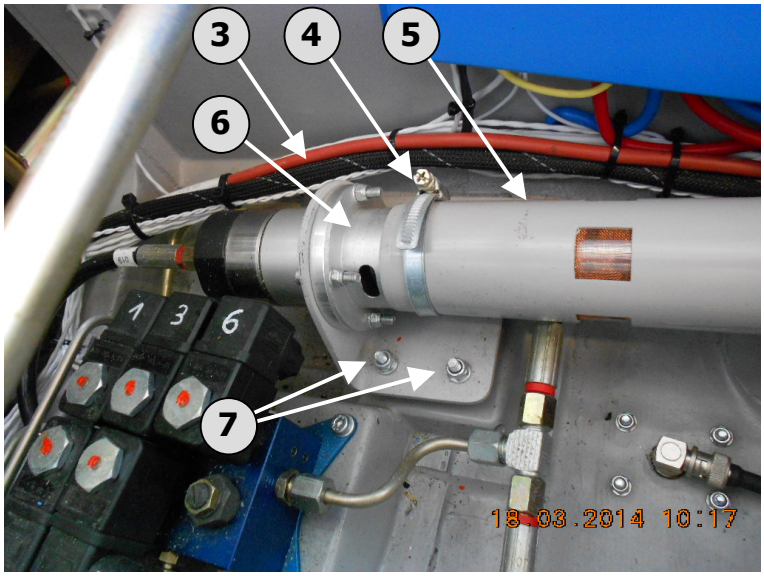
Use a 3 mm Allen wrench to remove the two M5 countersunk screws including collars (1).

b. Rremove the propeller-blade catcher:



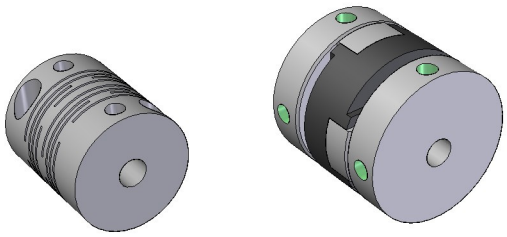
In the cockpit; position the flap control lever in position -3.
Flip the propeller-blade catcher (2) to a vertical position and remove it by sliding it downwards.

4. Release the pump unit (3)



c. Use a 7 mm wrench to loosen the clamp (4), which fix the motor cover (5) to the coupling enclosure (6).

d. Slide the coupling enclosure and the clamp so far to the back that the forward aperture in the coupling enclosure is exposed. Look through the aperture to identify the coupling.

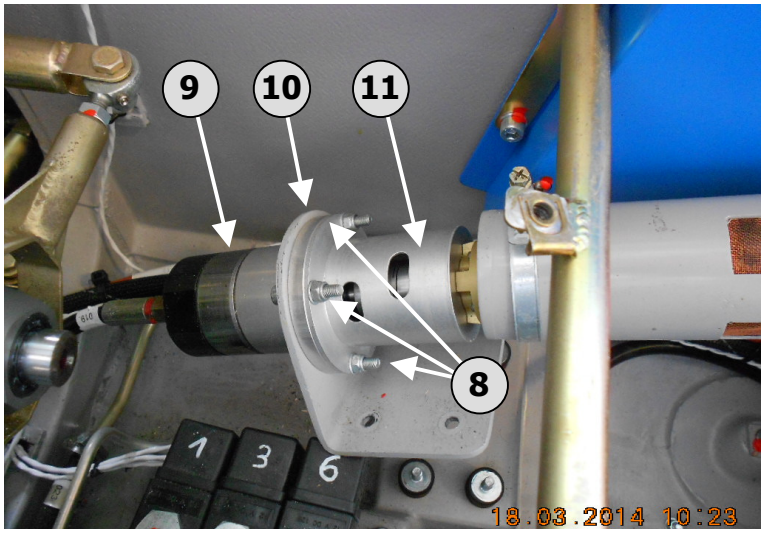


(1) (2)

If the installed coupling is identical to coupling (1) in the picture above, then this must be replaced. If the installed coupling is identical to coupling (2) in the picture above, then the procedural steps 4e to 8p are skipped.

e. Use a 10 mm wrench to remove the four M6 nuts (7) that connect the pump-init via shock-absorbers to the fuselage structure.

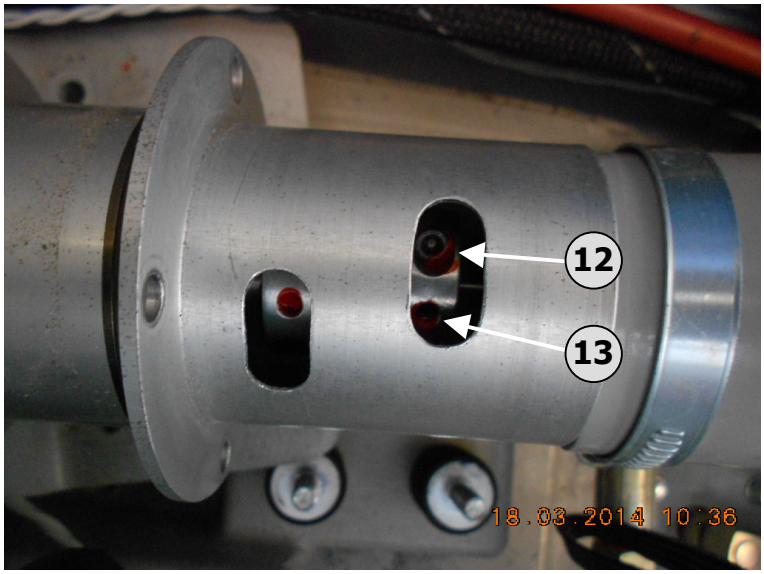
5. Separate motor from pump:



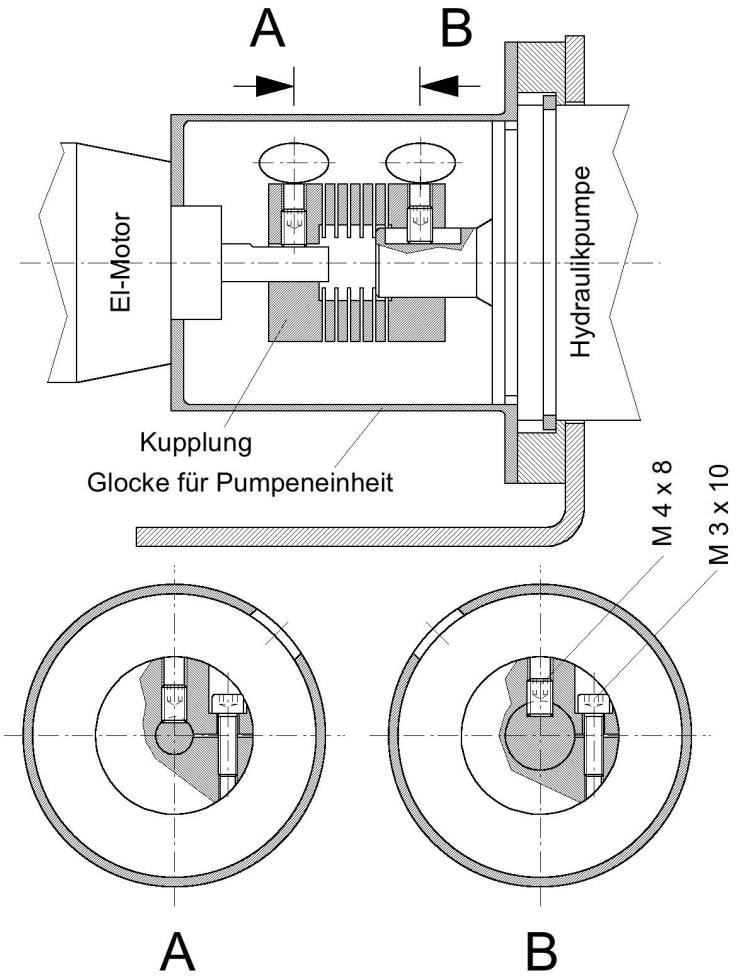
a. Rotate the pump-unit upwards and slide the motor enclosure so far backwards that the whole coupling enclosure (11) is exposed.

b. Use a 4 mm Allen wrench and an 8 mm wrench to remove the four M5 screws (8) that connect pump (9), mount (10) and coupling enclosure (11).

6. Disconnect the coupling

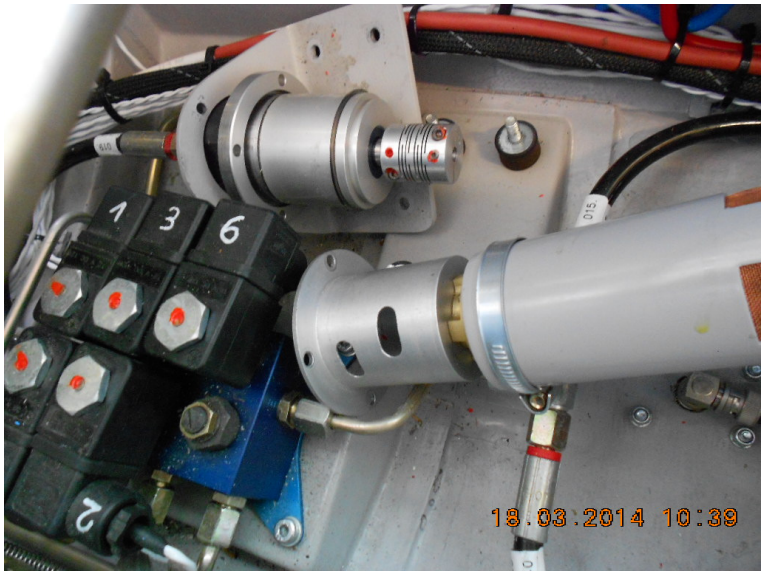


a. Rotate the coupling enclosure and the coupling until the clamp-screw M3 x 10 (12) and the stud-screw M4 x 8 (13) can be reached through the rear aperture in the coupling enclosure. In order to achieve this, it may be helpful to use a 2.5 mm Allen wrench as a lever



Use a 2.5 mm and a 3 mm Allen wrench to loosen the two screws in cross section A of the old coupling.

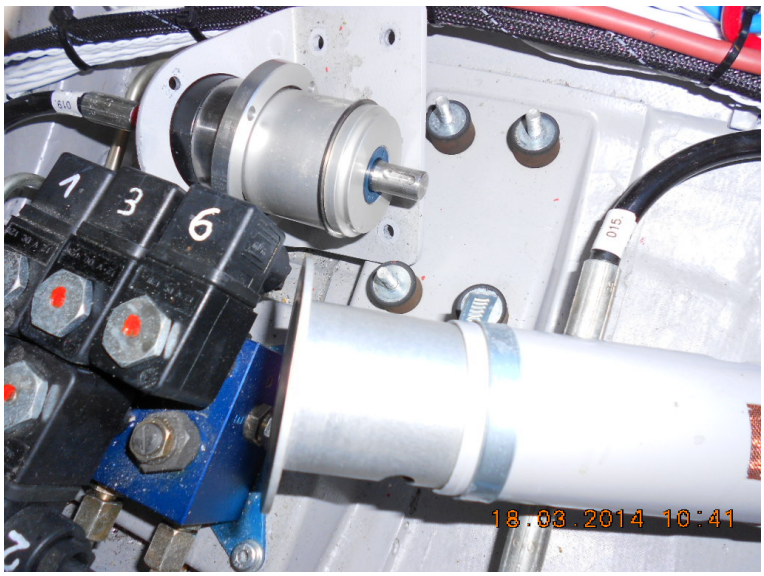
Attention: In some aircraft the coupling enclosure apertures are hand-made. Therefore, these may to some degree vary from the picture.



b. Pull the motor with the coupling enclosure apart from the pump.

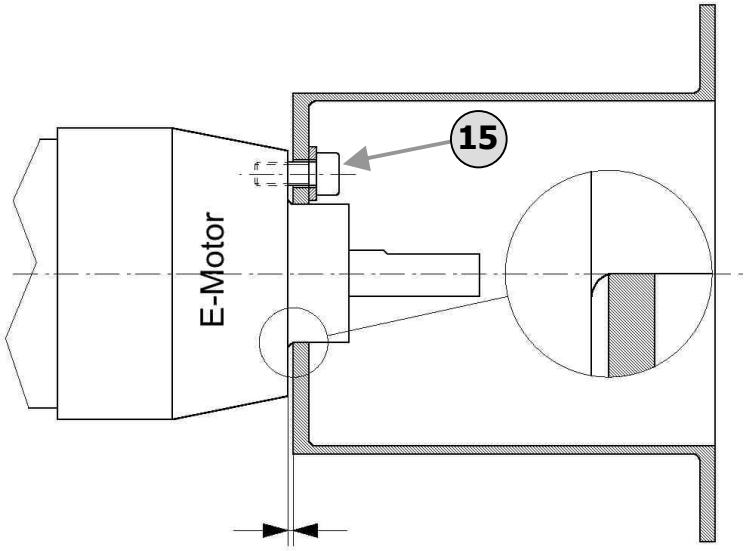
c. Use a 2.5 mm and a 3 mm Allen wrench to loosen the two remaining screws in the old coupling (14).

d. Remove the old coupling from the pump.



e. Inspect the shaft ends. Look for contamination and scratches. If required; clean and remove protrusions.

7. Check the motor installation:



Check whether there is a gap between the motor and the coupling enclosure. If this is the case, then use a 2 mm Allen wrench to remove the four M3 x 8 screws (15), which connect the motor and the coupling enclosure.

Separate the motor from the coupling enclosure and use a 90° countersink tool to fit the edge of the coupling enclosure to the radius at the motor. Before re-assembly: check the length of screws (15) (Screw length should be 8 mm). Re-install the motor. Use medium strength threadlocker (Loctite 243) on the screws and apply inspection lacquer

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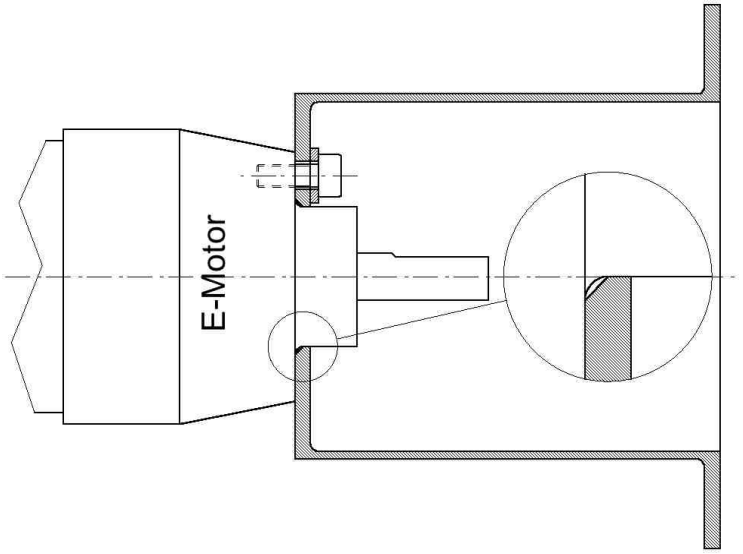
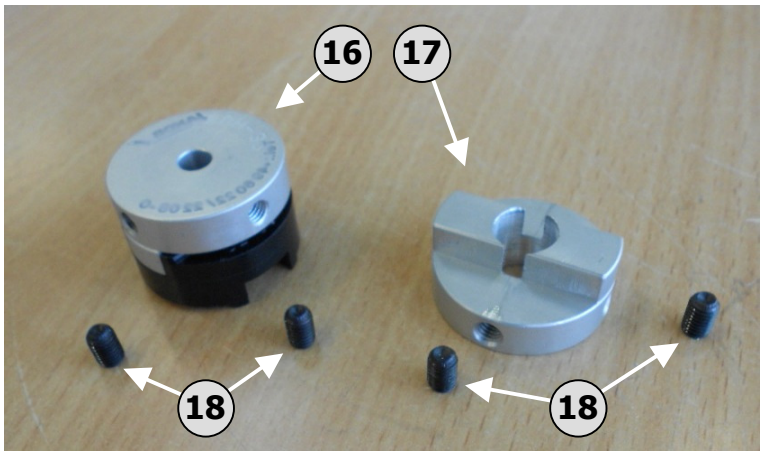


8. Install new shaft coupling:

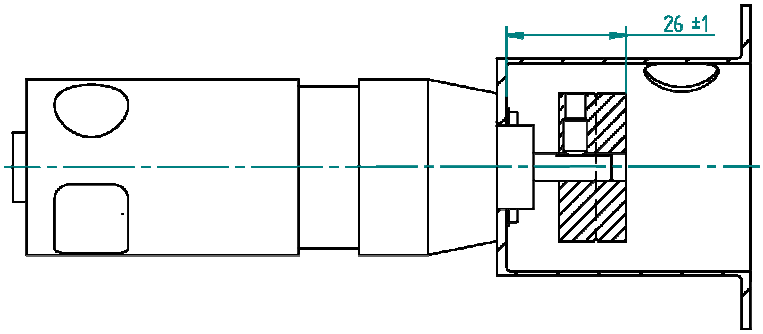


a. Separate the supplied new shaft coupling into two subassemblies. Subassembly A (16) consists of an aluminum part with a 6 mm hole, as well as the plastic part. Subassembly B (17) consists of an aluminum part with an 11 mm hole. Pull Subassembly A apart from Subassembly B.

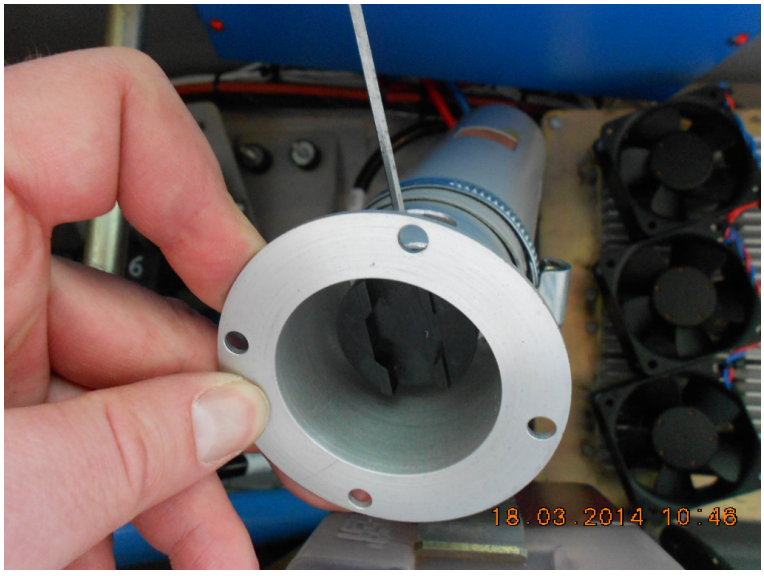
b. Use a 2.5 mm Allen wrench to remove all four M5 x 8 stud-screws (18) from both coupling subassemblies.

c. Apply medium strength threadlocker (Loctite 243) to two of the M5 x 8 stud-screws, and screw these sufficiently far into subassembly A (16), so that the threads engage.

d. Slide subassembly A onto the shaft of the motor, so that one of the two stud-screws will connect with the flat notch on the shaft.



e. Use a caliper rule to position subassembly A, conforming to the illustration above, at a distance of 26 +-1 mm away from the bottom surface of the coupling enclosure.



f. Use a 2.5 mm Allen wrench to tighten both M5 x 8 stud-screws

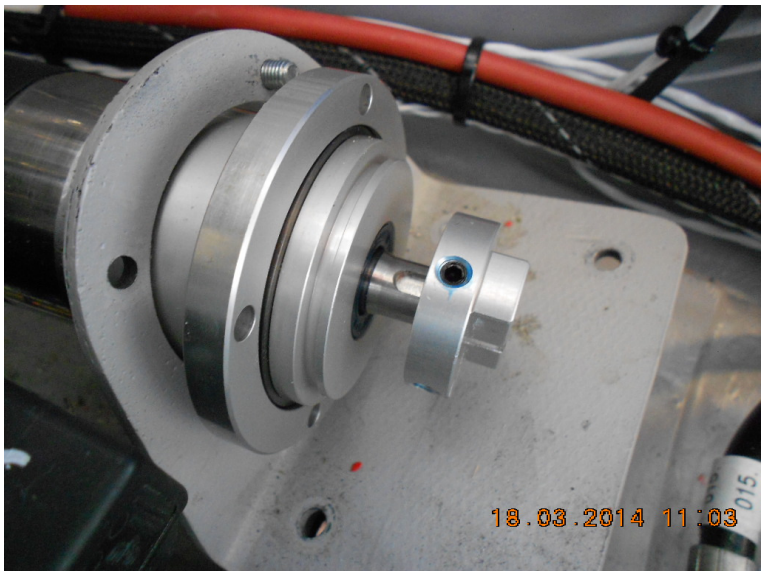
g. Practise procedural steps 8.h to 8.o without threadlocker and using old M5 locknuts in order to ensure that these Steps can be performed within the available threadlocker curing time.

h. Apply medium strength threadlocker (Loctite 243) to one M5 x 8 stud-screw and one M5 x 8 stud-screw. Screw these sufficiently far into subassembly B (17), so that the threads engage.

Note: The available time for performing procedural steps 8.h to 8.o is 10 minutes. Beyond this time, the threadlocker starts to cure.

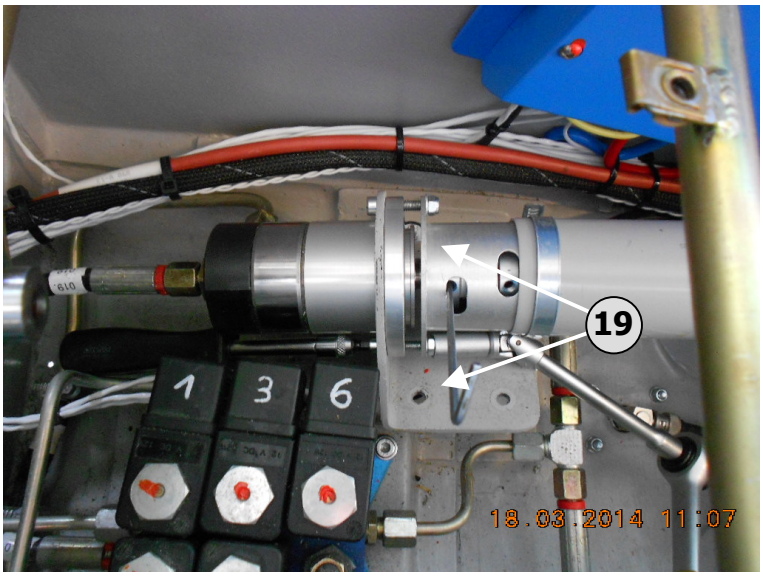
i. Slide Subassembly B (17) onto the pump shaft so that the M5 x 12 stud-screw engages the notch in the shaft.

j. Use a 2.5 mm Allen wrench to screw the M5 x 12 stud-screw sufficiently far in to prevent subassembly B from rotating in the pump shaft



k. Slide the subassembly B (17) so far away from the pump as the notch in the pump shaft allows, and use a 2.5 mm Allen wrench to slightly tighten the M5 x 12 stud-screw.

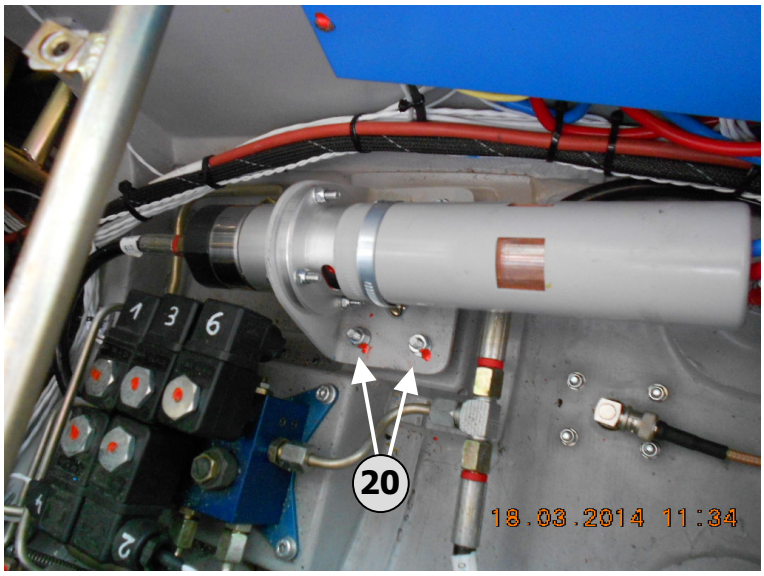
l. Slide subassembly A (16) completely into subassembly B (17).



m. Equip the four M5 screws (19) with new locknuts, and use a 4 mm Allen wrench and an 8 mm wrench to lightly screw pump, mount and coupling enclosure together with a small gap between the components.

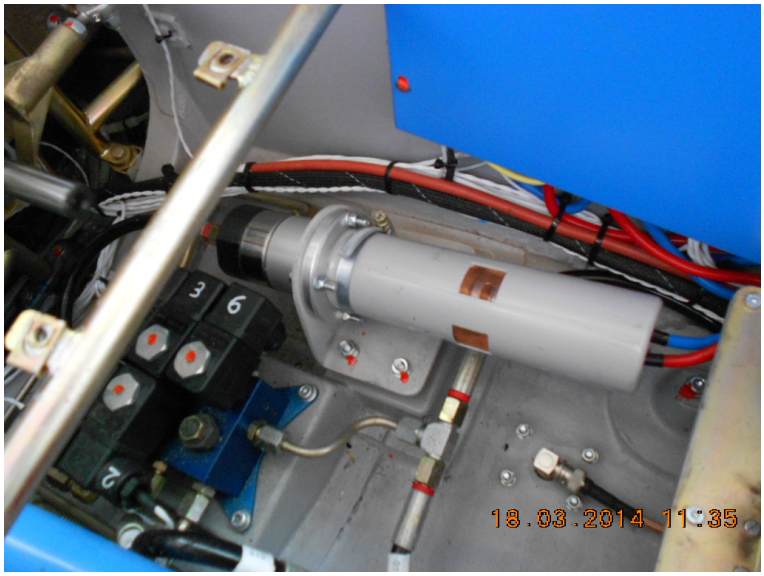
n. Use a 2.5 mm Allen wrench to slightly loosen the M5 x 12 stud-screw, and tighten the four M5 screws so that pump, mount and coupling enclosure are kept together without a gap.

o. Use a 2.5 mm Allen wrench to tighten both stud-screws in subassembly B. Apply inspection lacquer to the screw connections.



p. Position the pump unit on the four shock-absorbers. Apply medium strength threadlocker (loctite 243) to the M6 thread of

the shock absorbers, and use a 10 mm wrench to install four M6 nuts (20). Take care not to twist the shock absorbers when tightening the nuts. Apply inspection lacquer.



q. Slide the motor cover as far as possible onto the coupling enclosure and use a 7 mm wrench to tighten the clamp.

9. Reinstall the propeller blade catcher:
Perform procedural steps 3.b and 3.a in reverse in order to reinstall the propeller blade catcher.

10. Final functional test:

a. Rig the aircraft or disconnect the drive battery and use a 12V battery connected to the maintenance socket to supply the electrical system.

b. Turn the key-switch to position “ON” and wait until the system reaches the „system status“ screen.

Following the instructions in the flight manual, extend and retract the motor 3 times
If the aircraft is de-rigged, then the “Enter-“ and “PLUS-“ keys in the display unit much be held pressed for the aircraft to react to the single lever power control.

f. If no anomalies have been detected, then the retro-fit has been completed. If anomalies have been detected, please contact Lange Aviation GmbH.

11. Record TN 904-5 in the log book.

Personell: The action may be performed as pilot/owner maintenance. However, it must then be inspected according to the current regulations for qualified inspection personnel according to Part 66 (maintenance).

Materials:

- 1 x Assembly shaft coupling (Marked: SOH-32)
- 1 x Stud-screw M5 x 12
- 4 x Locknut M5
- 4 x Hex nut M6

Tools:

- Allen wrenches: 2mm, 2,5mm, 3mm and 4mm
- Wrenches 7, 8 and 10 mm
- Medium strength threadlocker Loctite 243
- A Caliper ruler

Mass: The change of mass is negligible.

C.G. position: The change of the C.G. position is negligible.

Approved by: European Aviation Safety Agency

Major Change Approval 10050056

Zweibrücken, 20.03.2014

Lange Aviation GmbH

European Aviation Safety Agency

MAJOR CHANGE APPROVAL

10050056

This Major Change Approval is issued by EASA, acting in accordance with Regulation (EC) No. 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation and in accordance with Commission Regulation (EU) No. 748/2012 to

LANGE AVIATION GMBH

BRUESSELER STRASSE 30
66482 ZWEIBRUECKEN
GERMANY

and certifies that the change in the type design for the product listed below with the limitations and conditions specified meets the applicable Type Certification Basis and environmental protection requirements when operated within the conditions and limitations specified below:

Original Type Certificate Number : EASA.A.092
Type Certificate Holder : LANGE AVIATION GMBH
Type Design - Model : E1 ANTARES

Description of Design Change:
TN 904-4: Retrofit of capacitor-PCB
TN 904-5: Shaft-coupling in pump-unit

EASA Certification Basis:
The Certification Basis (CB) for the original product remains applicable to this certificate/ approval. The requirements for environmental protection and the associated certified noise and/ or emissions levels of the original product are unchanged and remain applicable to this certificate/ approval.

Associated Technical Documentation:
- Description of Retrofit of capacitor-PCB (TN 904-4)
- Description of Shaft-coupling in pump-unit (TN 904-5)
or later revisions of the above listed documents approved by EASA.

See Continuation Sheet(s)

For the European Aviation Safety Agency,

Date of issue: 29 July 2014

European Aviation Safety Agency
Manfred HEICHEL
Project Certification Manager
General Aviation

Note:
The following numbers are listed on the certificate:
EASA current Project Number: 0010030504-001

Limitations/Conditions:
-Retrofit of capacitor-PCB for S-No. 1 to 69E52, 900, 901
Shaft coupling in pump-unit for S-No. 1 to 60E49

- end -

Note:
The following numbers are listed on the certificate:
EASA current Project Number: 0010030504-001

MAJOR CHANGE APPROVAL - 10050056 - LANGE AVIATION GMBH