

Title: Calidus Rotor Head II to III Upgrade		
AG-SB-2023-03-C-EN	Effective Date: 15.10.2023	Compliance Category: A - MANDATORY B - RECOMMENDED C - OPTIONAL
Applicability		
Aircraft type & model: AutoGyro Calidus	Affected Serial number(s): Calidus fitted with Rotor Head II	
The maintenance manual to be referenced is this stated or subsequent issue.		As per AutoGyro website
This form is the response from AutoGyro GmbH either against a problem found in the product in service requiring a containment or rectification action, or as service information for aircraft modification incorporation. For help, contact airworthiness@auto-gyro.com .		

Documentation (Service Bulletin Completion action)

The accomplishment of this Service Bulletin, or the decision of its rejection, must be properly documented within the aircraft records, in line with the requirements of the responsible aviation Regulatory Authority.

A worksheet may be attached to this bulletin to aid correct embodiment of this SB. This should be completed and retained with the aircraft records.

Category Codes

- A – Mandatory – failure to comply result in a significant reduction of flight safety, injury or death
- B – Recommended – failure to comply may result in reduced safety margin, injury and/or equipment damage
- C - Optional – improves operating behavior, reliability and/or maintainability

Document approval signatures

Head of Engineering	Head of Airworthiness
The technical content of this document is approved under the authority of the UK CAA Design Organisation Approval Ref: DAI/9917/06	

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Reason and overview of the Service Bulletin (cause of problem if known)

The AutoGyro Calidus has been produced with rotor head III as standard since April 2018. AutoGyro has developed a rotor head II to III modification set (46040) and are now able to offer this as an upgrade option to customers of Calidus with rotor head II.

The rotor head III has the advantages of a weight saving of approximately 1.3 kg and the ability of a maximum of 320 pre-rotation rpm, giving a shorter take-off requirement under comparable weather conditions.

Manpower estimates

The task may only be performed by an organization or individual entitled and trained to carry out maintenance on AutoGyro aircraft.

Estimated man-hours to complete the task as a stand-alone item is:

5.0 hrs including removal and re-fitting of the engine cowlings.

Compliance

This bulletin is optional and has no compliance timeline.

Customer Support

Can be contacted for questions. Materials and labour hours are not covered by this Service Bulletin.

Tooling required

Standard tools.

Weight and Balance Effects

No significant change to weight and balance.

Manuals affected

Changes in POH and AMM will be implemented with next revision.
Rotor head III will increase the maximum pre-rotation speed up to 320 rpm.
De-installation of the pre rotator coupling IV.I is not explained in AMM but similar to coupling II, and considered self-explanatory.

Previous Modifications that affect the SB

None

Accomplishment instructions (Action required to implement this bulletin):

All work is to be carried out in accordance with the latest model-relevant AutoGyro Aircraft Maintenance Manual.

Instructions

Unless otherwise stated in the text, screws and bolts are to be installed:

→ from left to right → from above to below → from front to rear

Location instructions:

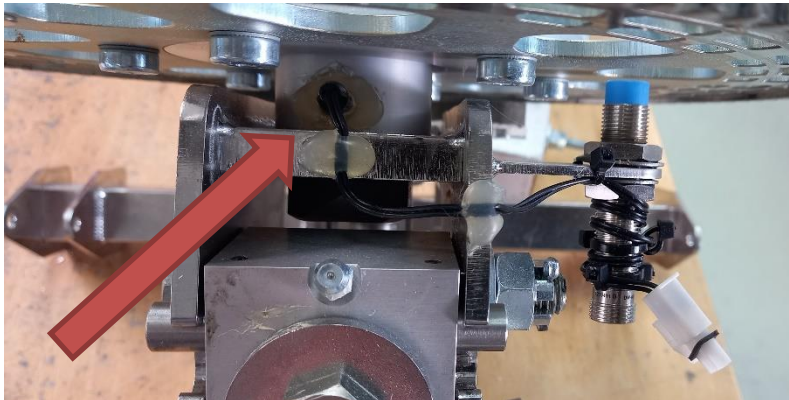
→ are always given in the direction of flight
(i.e. left = left side of the aircraft facing in its flight direction)

Unless otherwise stated in the text, the following torque settings are to be used:

M4:	4 Nm
M5:	6 Nm
M6:	10 Nm
M8:	25 Nm
M10:	35 Nm

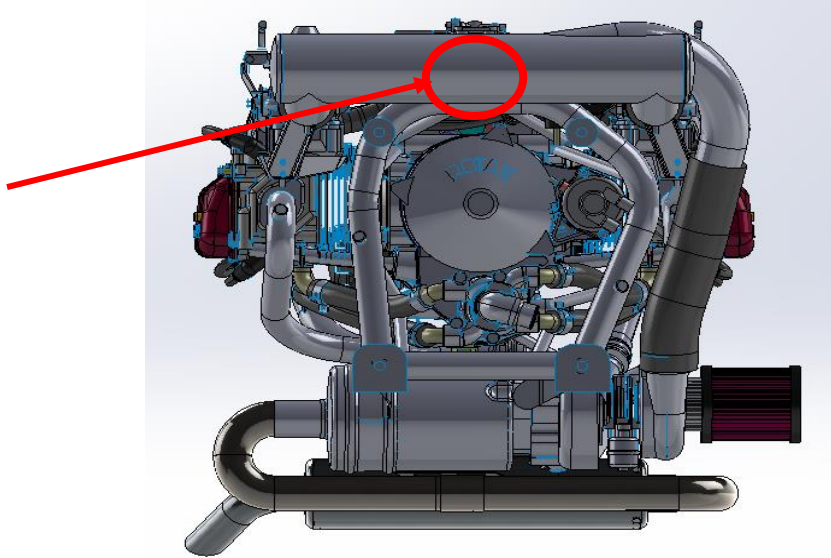
After the completion of each step / section sign the relevant Worksheet section

- 1.) Remove the Rotor system from the Rotor head according to job card 62-11-00 4-1 (Removal: Rotor – Teetering Parts) step 1-9. Disconnect the temperature sensor and carefully take it out of its bearing. The temperature sensor is retained with hot melt adhesive, which may be removed with a heat gun or knife. It will be used as outside temperature sensor with rotor head III.



- 2.) Remove forward and after mast and all engine cover as described in job card 52-00-00 4-1 (Removal-Installation: Cowlings).
- 3.) Replace the coupling with a coupling IV.1 according to job card 63-11-10 4-1. Be aware that the airbox in the Rotax 914 has to be modified for the coupling to fit in.

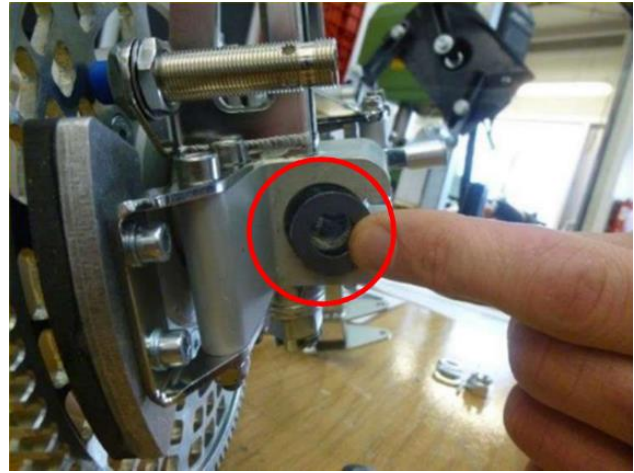
Remove the airbox and carefully create a 5-10mm deep indentation of around 30mm diameter into the airbox to create a gap between airbox and vertical pre rotator coupling shaft. Refit the airbox.



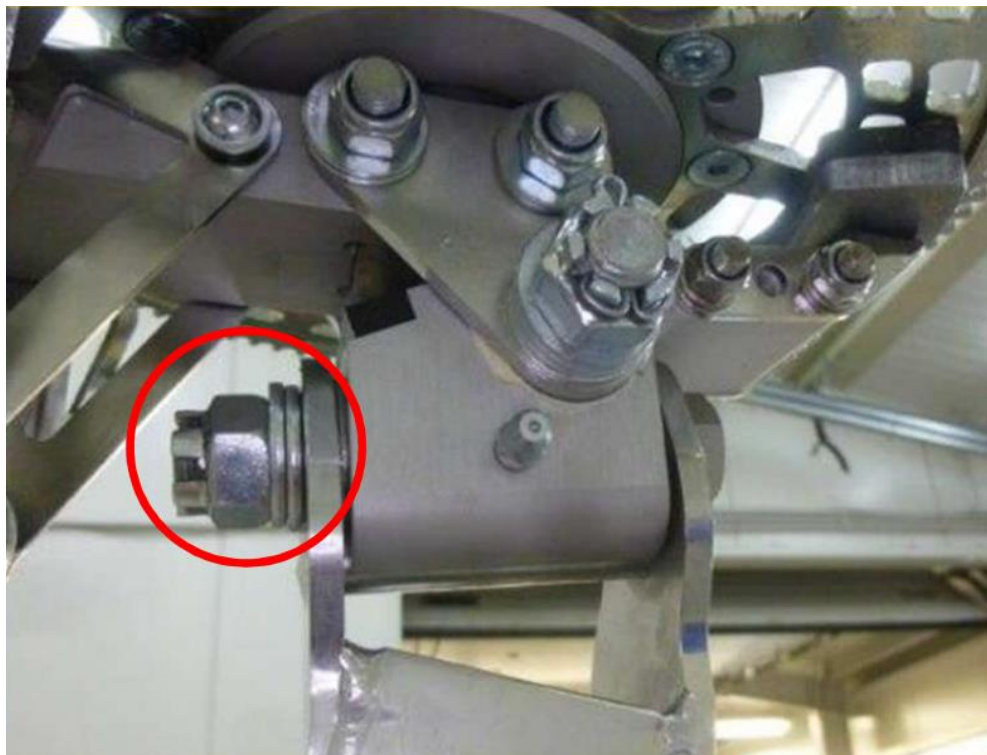
- 4.) Remove the upper mast as stated in job card 62-51-00 8-1 (Replacement: Mast Mounting Bushings) step 1 -9 and pay attention to the precautions and safety measures.
- 5.) For easier handling put the old upper frame into a bench vise. De-install the roll trim cylinder if installed and the nick / brake cylinder. Upper attachment of the roll trim cylinder has been removed to de-install the PPC and separate the upper mast from the frame. Just the lower nut needs to be removed. Loosen the two nuts for the pitch / brake cylinder and put it aside.
- 6.) Put the main frame II into a bench vise if possible and prepare the parts for the rotor head III. Please check if the aircraft is already installed with a main frame II. If you don't know than contact airworthiness and provide SN of the aircraft.

7.) Install the rotor head III as described in the pictures.

Insert 2x disc springs (convex side outwards) + shim into the front and rear rotor head as shown.



Assemble the rotor head to the mast making sure that all washers are in place and secure using the gimbal bolt + U13. Fit the castle nut M12 and 2x washer U13 as shown.



Caution: The forward U13 under the bolt head must not lie on the welding seam!

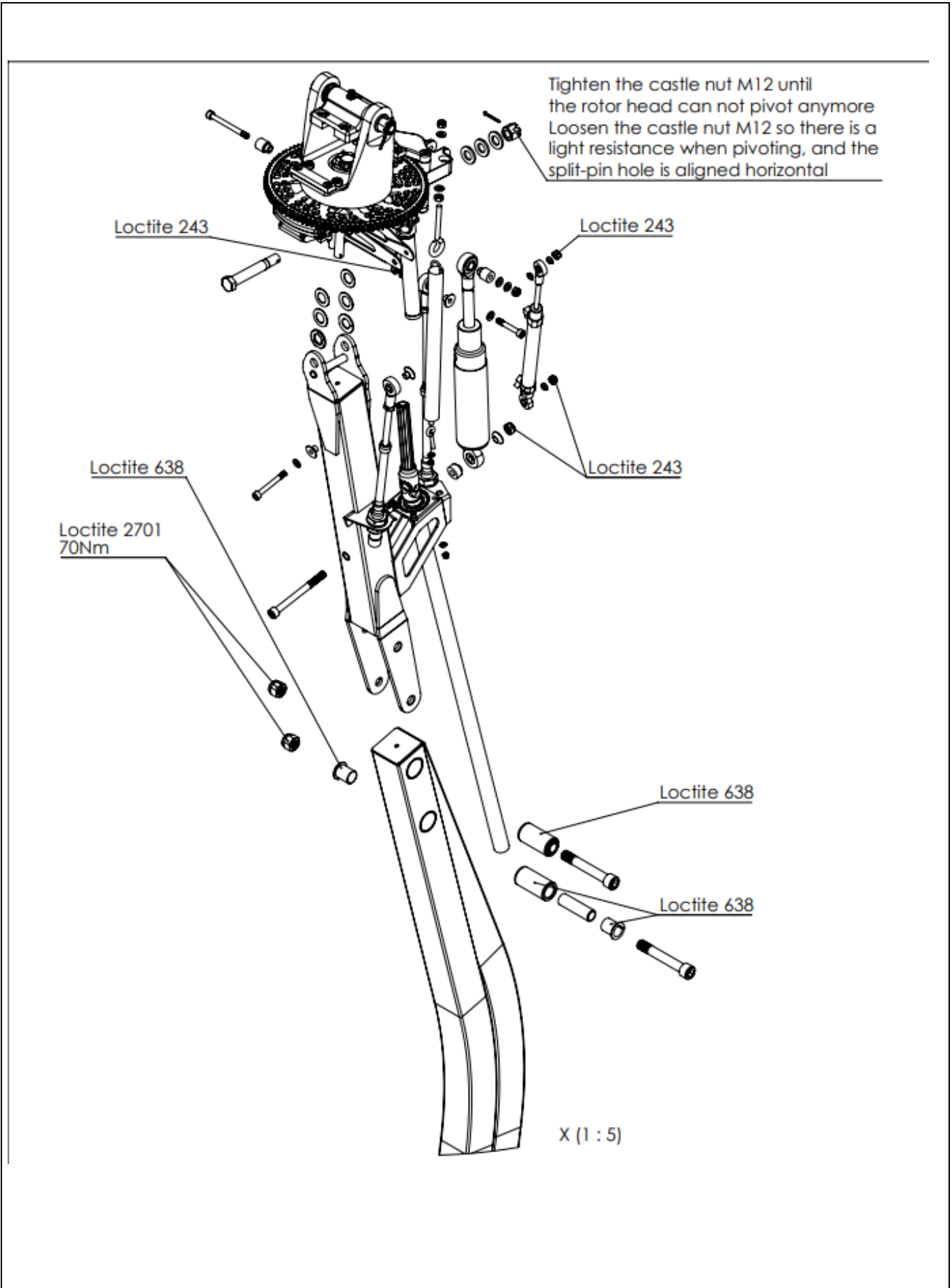
Rotor head assembling adjustment:

Tighten the castle nut M12 until the rotor head is no longer able to pivot. Loosen the castle nut M12 so there is a light resistance to pivoting, and the split-pin hole is aligned. If both of these conditions cannot be met, (i.e. Resistance with split-pin hole aligned) replace the castle nut M12 or use a suitable shim between the nut and the washer. Insert the split-pin horizontally and shorten the protruding legs to approx. 10mm and bend and secure as shown.



Caution: The castle nut must be in a position that it is possible to insert the split-pin lightly by hand!

Attach the grease gun to the grease nipples at the side/front and pump into the gimbal/bolt cavity until resistance is felt in the grease gun. Remove surplus Silicon grease Lagermeister 2002.



- 8.) Install brake / trim cylinder and the roll / trim cylinder back on the upper mast as described in the pictures and check the routing of the pneumatic hoses.

Illustration for the installation of roll / trim cylinder:

Assemble the brake / trim cylinder to the mast, using M8 70/18 and insert from front to rear, spacer 18-9/8 F + eye-end pneumatic cylinder + spacer 18-5,2/8 F + U8/24 washer + M8 Nyloc as shown.



46039 – rotor head III 21,5 • Assemble the upper attachment of the brake / trim cylinder to the rotor head using M6 56/10 A4-80 + 2x spacer and 2x U6 A.

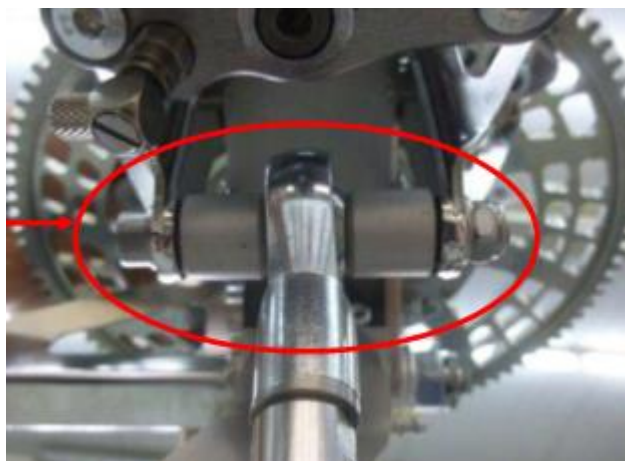


Illustration for the installation of roll / trim cylinder:

Assemble the roll-trim cylinder to the M6 attachment point at the mast as shown using spacers (angle towards rod end) and secure using U6/18 + M6 Nyloc and Loctite 243. Check clearance between bottom rod end and U6/18, if there is contact / blockage insert a further U6 washer.



Assemble the roll/trim cylinder to the previously inserted bolt using spacers (angles facing rod end) as shown and secure using U6/18 + M6 Si • Move the rotor head through its full range and ensure there is no blockage of the roll / trim cylinder. If necessary insert a further U6 between PPC roll mounting bracket and inner spacer as shown.





- 9.) Install the rear trim spring assembly as seen in the pictures.
NOTE! Fitment of the trim spring is optional.

The spring should be assembled so that there is light tension in the spring and rubber retaining bungee when the head is fully to the rear.



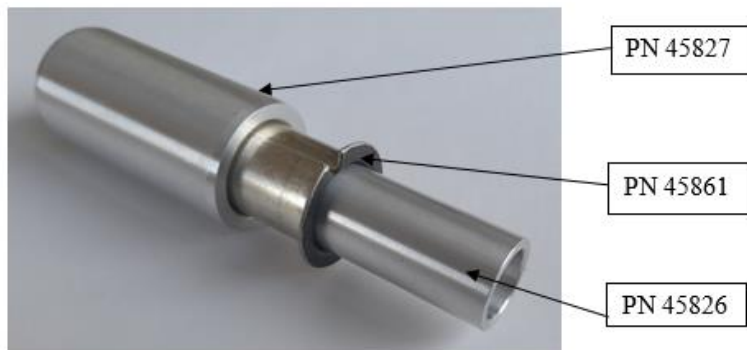


- 10.) Install the mast back on the aircraft as described in job card 62-51-00 8-1, step 12 - 24. Be aware that there has been a change which is not implemented in the Aircraft maintenance manual. The rubber bushing, 90 shore with PN 11082 will be installed in the upper mast attachment. Also check the extension of the PPC in the pictures.



Rubber bushing, 90 shore, PN 11082 for the upper mast attachment for the Calidus.

The lower attachment consists of PN 45826, PN 45861 and PN 45827

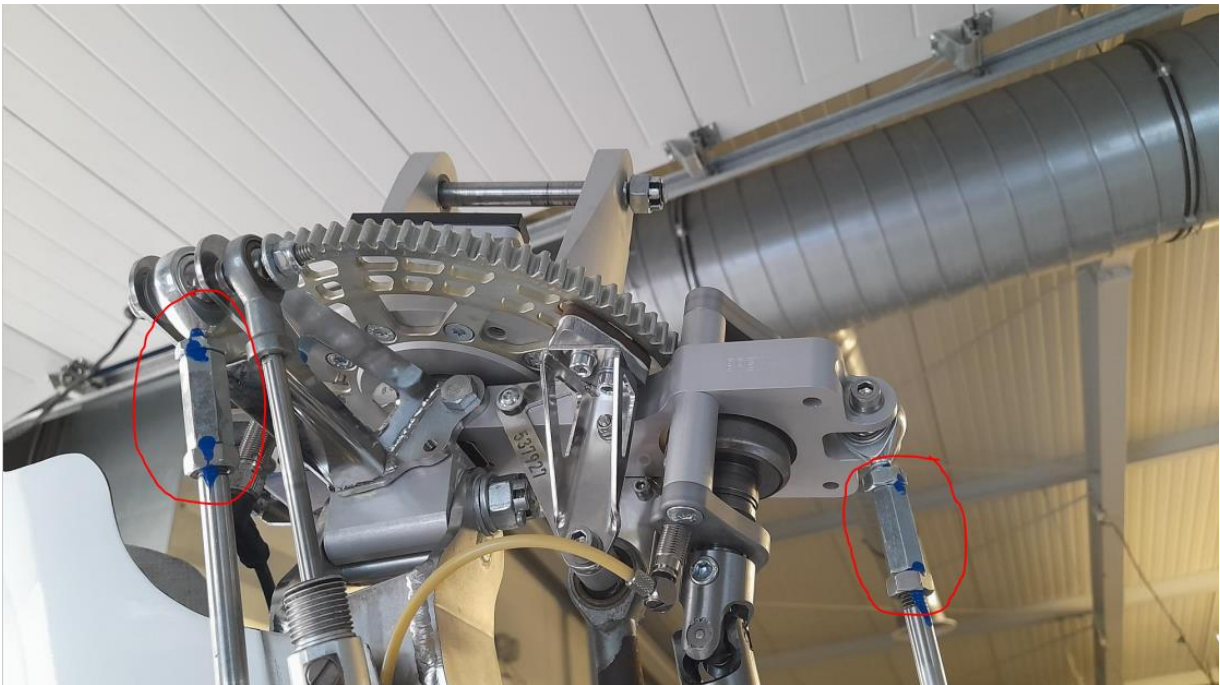


Be aware that the rubber bushing and the metal bushing are glued into the upper mast. This can be seen on the drawing on page 6. Holes in the mast and surfaces of the bushing needs to be cleaned and sanded. Don't use brake cleaner for cleaning the parts (AG-SIL-2018-03-A-EN). Recommended cleaner is Würth Metal cleaner 7063 or Loctite cleaner 7063.

Bond the bushes in place as per the AMM with Loctite 638
Grease the bushing in the lower connection before fitting the upper mast.

It may be necessary to extend the control push pull cables for the rotor head III upgrade. Extension pieces are provided, 30mm for roll and 40 mm for pitch PPC. A new ball end is included in the set. After finishing the installation of rotor head III and checking/adjusting the steering angles the extension pieces must be secured with mechanic lacquer.

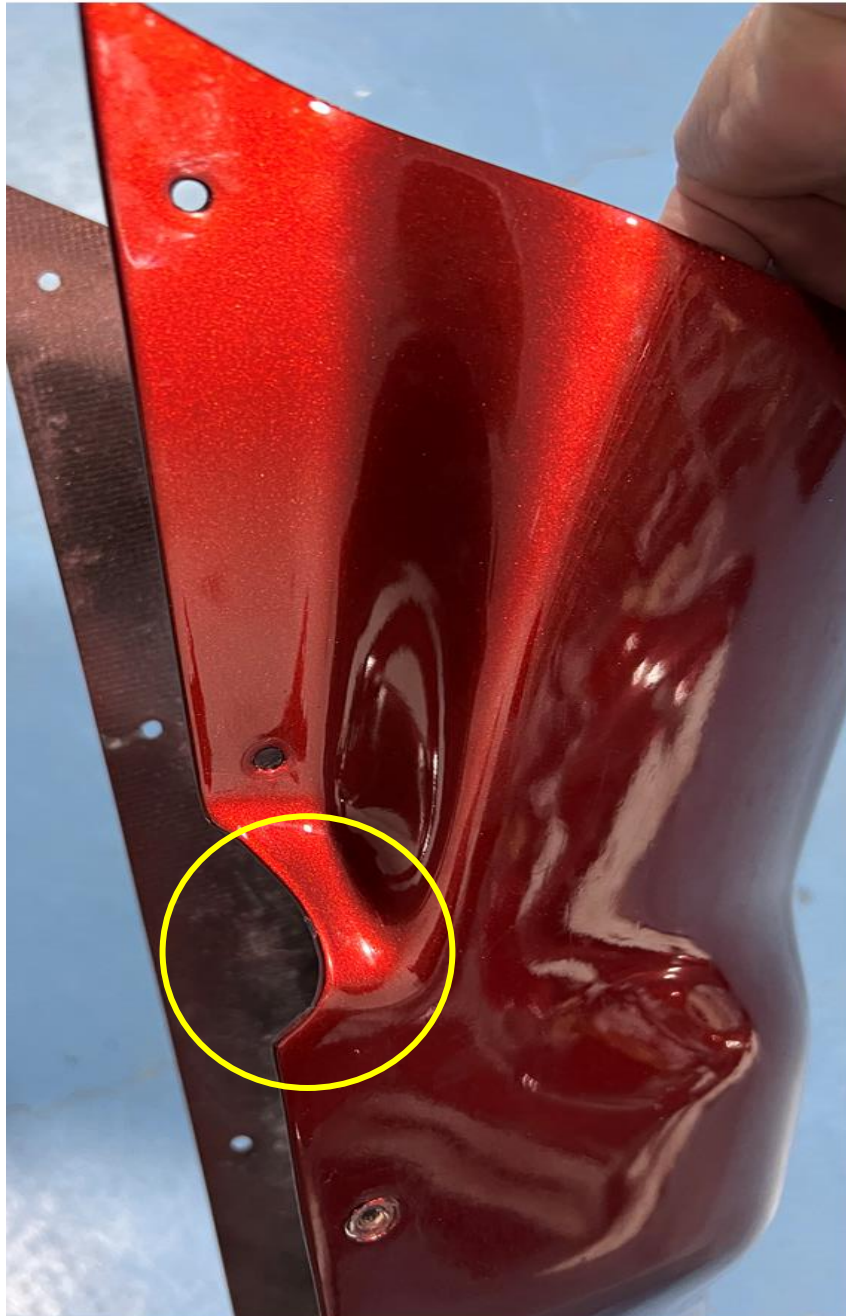
Ensure a minimum of 6 threads engagement within the extension piece, with a locknut either end.



- 11.) Remove the coupling III if installed. Update to IV.1 is required for rotor head III and the higher pre-rotation rpm. De-installation is described in job card 63-11-10 4-1, step 1-4. Installation of coupling IV or IV.1 will be added to the AMM but is similar to the installation of coupling III and job card 63-11-40 4-1, step 5-9 and considered self- explanatory.
- 12.) Check the angles of the rotor head III according to 62-32-00 6-1 and adjust if necessary.
- 13.) Fit the front mast cowl. The upper mast carries a new location to secure the front cowling. Fit the black plastic spacer over this welded-on lug, and drill a hole in the cowl to match. Secure with the provided M5 fastening.



- 14.) If everything is inspected check the fitting of the cowling. Due to the rotor head upgrade it needs to be reworked.



Mark the edge of the part and carefully grind a little bit away until the cowling can be installed without touching any moving part.

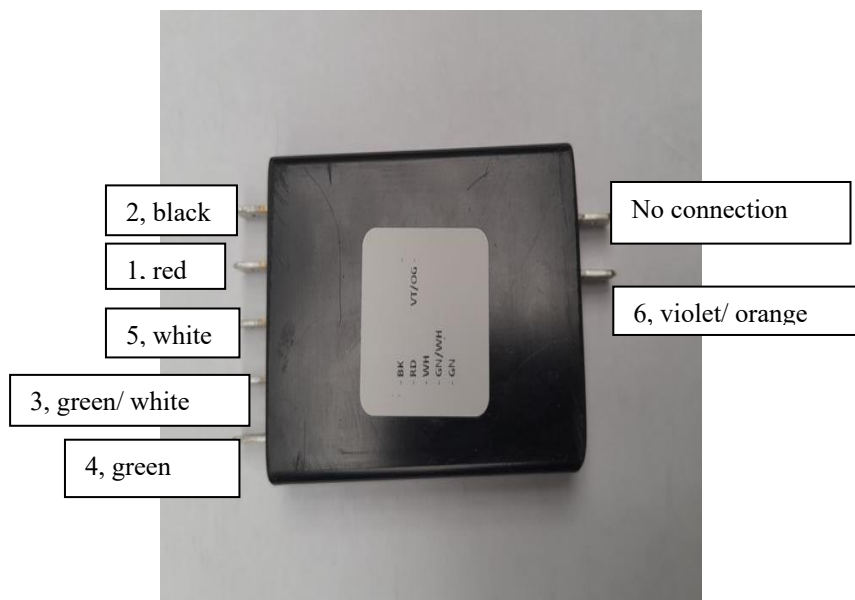


15.) Retrofit of the clutch LED

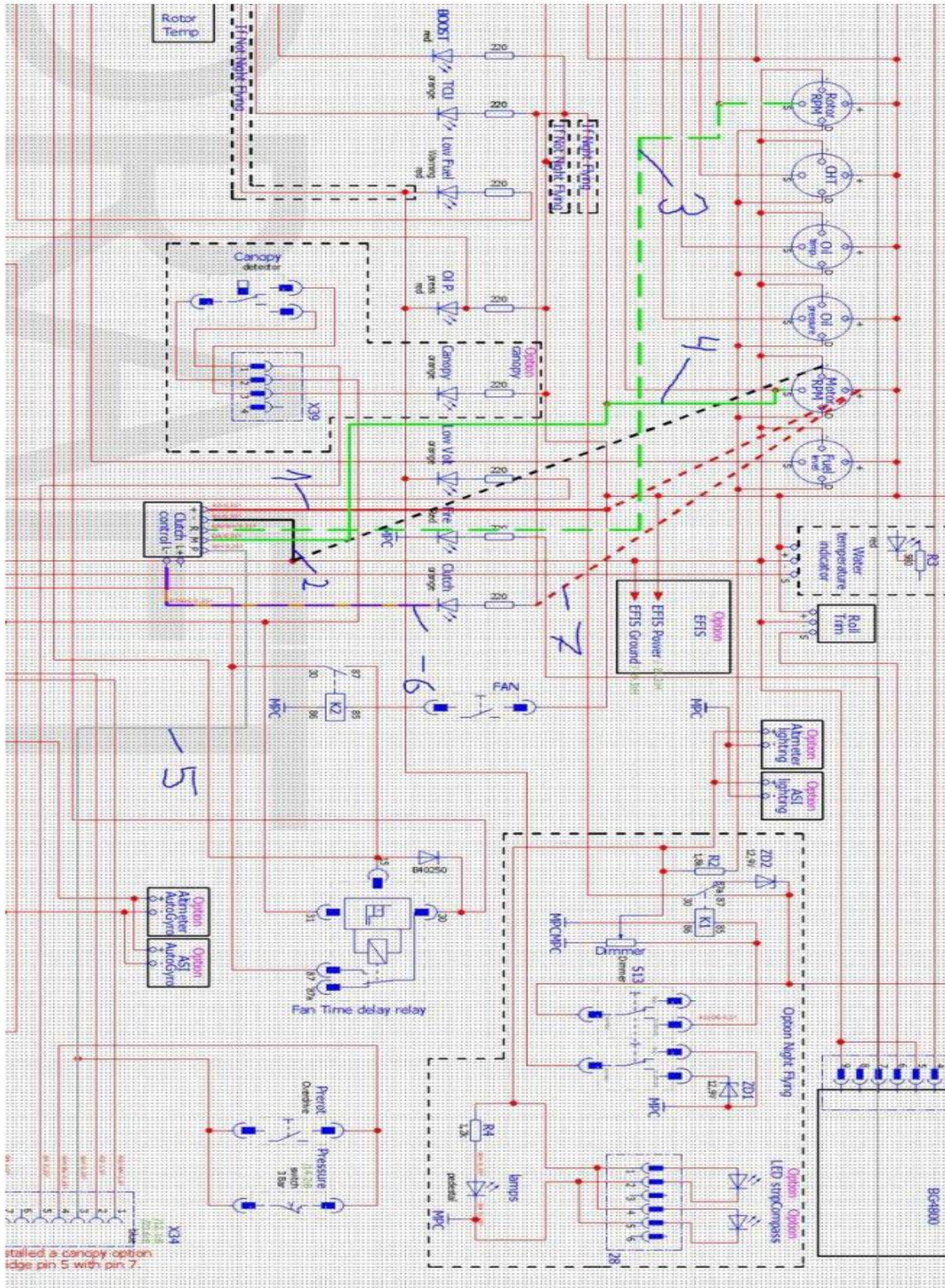
Possible LED position. A placard needs to be added to the cockpit panel.



Cable colour positions are described on the rear of the clutch control board. Numbers in the photo below relate to the numbers in the circuit diagram above.



Connections 1 to 4 and 7 can be connected directly to the respective instrument (rotor rpm/engine rpm) connections. Connection 5 is pinned in position 3 of the 9-pole plug from the cockpit side of the stick harness. The opposite ends of cables 1 to 6 must be connected to the clutch control board in the positions shown, and 7 to the LED, along with the plus cable from the instrument.



- 16.) Connect the temperature sensor to the connector at the upper mast and attach the sensor to the existing cable of the RPM sensor. Attach the placard "Outside Temp." to the Rotor Bearing Temperature indicator in the Cockpit.
- 17.) Check the angles of the rotor head III according to 62-32-00 6-1 and adjust if necessary.
- 18.) Let all reworks be checked by another competent person to be sure that everything is working as it should.
- 19.) Perform an FOD control and close the cowlings and covers according to job card 52-00-00 4-1
- 20.) Perform a ground run. For the German market let the aircraft be checked within a "Jahresnachprüfung".
- 21.) Perform a test flight in accordance with local flight requirements or relevant sections of the AutoGyro flight test protocol.

Any life-limit changes must be recorded within the aircraft documentation, in line with the requirements of the country of operation.

NIL

Material information (Parts required to be made to implement this service bulletin):

NIL

List of components (with purchasable part numbers)

46040 Conversion Kit Rotor Head III 21.5
 47980 Pneumatic Coupling IV.1
 30477 Silicone grease Lagermeister 2002
 33582 Screw locking varnish blue

Interchangeability

Not affected

Parts disposition

- a) Disposal requirements – None
- b) Environmental hazards of parts containing hazardous materials – NIL
- c) Scrap requirements (e.g. mutilate scrapped items beyond use) – NIL

Aircraft serial no. Registration:	Service Repair Implementation Worksheet	Date raised:	
		Raised by:	
Purpose – record service repair implementation actions taken, then to inspect aircraft and return to service.		Document reference: AG-SB-2023-03-C-EN	
Maintenance manual referred to and issue level/date:	MMM_CD_EN-16-06-13_HVY		
Note; attach any secondary sheets to this document			
Task	Notes	Eng'r check/date	Inspector check/date
Rotor system removed			
Cowlings of the AC removed			
Coupling replaced, airbox modified	Record serial no.		
Upper mast removed, Temperature sensor disconnected.			
Rotor head II and cylinders removed			
Rotor head III installed	Record serial no of head and of the teeter tower assy		
Trim cylinders attached and connected			
Pneumatic hoses connected, routing checked			
Rear trim spring installed according to the SB	(optional)		
Mast installed back on the aircraft, bushings glued in as described in the SB, distance pieces installed on PPC and PPC attached to the rotor head			
Replace coupling by coupling IV.1 if not already installed			
Mast cowlings modified and secure			
Clutch LED installed according to the drawing			
Movement of the rotor has been checked, all angles of hub and teeter parts are within tolerance			
Freedom of parts during pitch/roll movement, on the rotor head, the pre-rotator shaft and the rotor brake has been checked			

Aircraft serial no. Registration:	Service Repair Implementation Worksheet	Date raised: Raised by:	
Task	Notes	Eng'r check/date	Inspector check/date
Functional test: clutch LED, Brake / trim cylinder Roll trim cylinder Pre Rotator Full PN system functional check			
All Cowlings re-installed			
Rotor refitted, all rotor head split pins present: Teeter Bolt Main Bearing Bolt Pitch Bolt Roll Bolt			
Temperature sensor re-connected and attached. Placard installed.			
Confirm no tools or equipment left in aircraft			
Perform a Ground run or a "Jahresnachprüfung" for the German market			
Test flight in accordance with local flight requirements or relevant sections of the AutoGyro flight test protocol			
Customer acceptance: Name: Signature/date:	Aircraft Hobbs meter reading: Confirm logbooks annotated: (None)		
Permit Maintenance Release: The work recorded above has been completed to my satisfaction and in that respect the aircraft is considered fit for flight.			
Engineer/Inspector signature Name: Inspector Authorisation code if applicable:	Date of work Location where work completed:		
Welder signature Name: Welder Authorisation code if applicable:	Hildesheim		