Document number RSUK0076

# Maintenance Manual
## Woodcomp SR3000/3 propeller


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**STATEMENT OF INITIAL CERTIFICATION**
**This manual complies with British Civil Airworthiness Requirements, CAP553 Section A, Chapter A5–3.**

**Signed** .....

**Date** 21/12/2009

**CAA Approval No: DAI/9917/06**

# Applicability

**Propeller type:** **Woodcomp SR3000/3**

**Propeller serial no.**

**Engine type:** **Rotax 912ULS or 914UL**

MTOsport fitted with the Woodcomp propeller

## CONTENTS AND CHECK LIST OF PAGES

**SECTION 1**
**AMENDMENTS TO THE SCHEDULE**

1. Where & when necessary RotorSport UK Ltd (hereafter referred to as RSUK) will issue updates to this maintenance standard, and will notify known owners to review the changes via the RSUK website with changes appropriately identified by a strike in the margin.
2. Aircraft operators are responsible for ensuring that amendments to their publication are carried out immediately and in accordance with instructions contained in amendment transmittal letters (where issued).

| ISSUE NUMBER | DATE | INSERTED BY | ISSUE NUMBER | DATE | INSERTED BY |
|---|---|---|---|---|---|
| **Initial** | | | 4 | | |
| 1 | 21.12.09 | | 5 | | |
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This permanent revision/amendment complies with British Civil Airworthiness Requirements, Section A, Chapter A5–3.
RotorSport UK Ltd approval signatures for the above manual issue.

| | |
|---|---|
| Signature: | Signature: |
| Position: Eng. Manager | Position: Inspector |
| Date: 21/12/2009 | Date: 9/02/10 |

(signatures on office reference copy)

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## SECTION 2

## FOREWORD

1. Applicability

This Schedule is intended for use on the RSUK version of the Woodcomp SR3000/3 propeller only, released on AAN29247 addendum 1.

Guidance

This aircraft which this propeller is fitted to may be being flown & operated under a CAA Permit to fly, and as such specific rules exist to cover maintenance actions, such as the types of work allowed by owners on Permit aircraft or CAP520 'Light Aircraft Maintenance'. It is the aircraft operators' responsibility to ensure the aircraft is operated within those rules and regulations.

3. Notes

RSUK provides this maintenance schedule so that, to the best of their knowledge, the operator is able to maintain the aircraft in a manner that will preserve its airworthiness. The manufacturer is unable to predict all operating conditions, and as such it is the operator's ongoing responsibility to assess the schedule for applicability to the environment operated within.

**Note; check your Permit to Fly – if compliance to this schedule is stated as required, then non-compliance will invalidate the Permit to Fly.**

## SECTION 3

## OWNER/OPERATOR RESPONSIBILITIES

Operators are responsible for the accomplishment of the maintenance prescribed in the schedule.

## CERTIFYING PERSONS RESPONSIBILITIES

Certifying persons must use their engineering skill and judgement in determining the depth of inspection needed and other matters that could affect the airworthiness of the gyroplane or propeller. In order to claim any alleviation on subsequent inspections, the gyroplane and propeller maintenance records must record the extent of previous inspections upon which the alleviation is based.

Certifying persons are responsible for recording in the appropriate log book or worksheet, any defects, deficiencies or additional maintenance required as a result of implementation of the schedule.

## GENERAL INSPECTION STANDARDS

The general inspection standards applied to individual task inspections must meet the recommended standards and practices of RSUK.

In the absence of general inspection standards, refer to CAA CAP 562 Civil Aircraft Airworthiness Information and Procedures (CAAIP) or other CAA recommended standards and practices, and/or the LAA Gyroplane Maintenance manual.

Inspections may be carried out without component removal or dismantling unless considered necessary or where required by the schedule.

## AIRWORTHINESS LIFE LIMITATIONS (RETIREMENT/SCRAP LIVES)

Airworthiness life limitations shall be those published by the CAA, state of design and RSUK.

Airworthiness life limitations should be recorded in the appropriate propeller worksheet and/or the propeller logbook CAP388.

There are no life limited parts on this SR3000/3 propeller

## AIRWORTHINESS DIRECTIVES

All applicable Airworthiness Directives or Mandatory Permit Directives issued by the CAA and the state of design must be complied with. Compliance with AD's or MPD's should be recorded in Part C of CAP'S 398, 399 or 400 (logbooks), or an approved equivalent.

**AIRWORTHINESS NOTICES**
All applicable mandatory CAA Airworthiness Notices must be complied with. Compliance with CAA Airworthiness Notices should be recorded in Part C of CAP'S 396, 399 or 400 (logbooks), or an approved equivalent.

**OVERHAUL AND TEST PERIODS**
Overhaul and test periods shall be those shown & recommended by RSUK.
The CAA may vary or mandate overhaul and test periods by the issue of an Airworthiness Directive or Airworthiness Notice.
The overhaul and test periods should be recorded in the appropriate propeller worksheet.

**SERVICE INFORMATION**
Service information (Service Bulletins, Service Letters, etc) published by RSUK should be formally technically assessed by the Owner/Operator and adopted if required to ensure operational safety and reliability, compliance with service information should be recorded in Part C of CAP 398, 399 or 400 (propeller) (logbooks), or an approved equivalent.

**MODIFICATIONS**
Approved modifications which have been carried out to the gyroplane, engine, components and radio after original manufacture, must be recorded in the appropriate log book(s).
Any recurring inspection or maintenance task resulting from approved modifications should be recorded in CAP 543 Time Limited Task Record, or an appropriate equivalent.

**DUPLICATE INSPECTIONS**
Following initial assembly or any disturbance of a control system or vital point, the procedures outlined in British Civil Airworthiness Requirements (BCAR) Section A/8, Chapter A6-2/B6-2 and A5-3 shall be applied. Certifications must be recorded in the appropriate worksheet, log book or aircraft technical log. In summary, this procedure requires that all and any such changes be cross checked by either a CAA approved Inspector or Certified or CAA Authorised Engineer prior to first flight, and this cross check shall be as thorough as practical – including physical tests if appropriate. In exceptional circumstances the CAA also allow another qualified gyroplane pilot to cross check modifications – this person must sign the logbooks to certify their actions with their pilots licence no.

**SCHEDULED MAINTENANCE WORKSHEETS**
Worksheets shown in Section 8 must be issued and the tasks certified for all scheduled maintenance checks. These worksheets become part of the maintenance records required to be kept by the operator.
All maintenance carried out in connection with a particular check should be certified on suitably referenced worksheets (an example available from the RSUK website) and included in the gyroplane records. These worksheets must be cross-referenced in the appropriate log book(s) giving general details of the additional maintenance carried out.

**DEFINITIONS**
Throughout the schedule the following terms and abbreviations have the stated definitions;
SERVICE/LUBRICATION (SERVICE/LUB):
The term 'Service or Lubrication' requires that a component or system should be serviced and/or replenished as necessary with fuel, oil, grease, water, etc., to the condition specified. The term service may also be used to require filter cleaning or replacement.
INSPECT (INSP):

An ‘Inspection' is a visual check performed externally or internally in suitable lighting conditions from a distance considered necessary to detect unsatisfactory conditions/discrepancies using, where necessary, inspection aids such as mirrors, torches, magnifying glass etc. Surface cleaning and removal of detachable cowlings, panels, covers and fabric may be required to be able to satisfy the inspection requirements.
OPERATIONAL CHECK (OP/C):
An 'Operational Check' is a test used to determine that a system or component or any function thereof is operating normally.
FUNCTIONAL CHECK (F/C):
A 'Functional Check' is a detailed examination of a complete system, sub-system or component to determine if operating parameters are within limits of range of movement, rate of flow, temperature, pressure, revolutions per minute, degrees of travel, etc., as specified in the appropriate maintenance manual. Measured parameters should be recorded.
CHECK (CHK):
A 'Check' is the verification of compliance with the type design organisation's recommendations.

**SECTION 4**
**PERMIT MAINTENANCE RELEASE**

**This maintenance certification system is specific in accordance with BCAR A3-7.**
Owner operators must ensure their airframe and engine logbooks either contain a sticker with the wording ‘Any reference to a Certificate of Release to service in this logbook shall be construed as a PMR’ & ‘The certification at the top of each page in Part A of this logbook is superseded by the following statement; The work recorded below has been completed to my satisfaction and in that respect the aircraft is considered fit for flight’, or have new logbooks containing this information.

For information on who can issue a PMR see CAP553; BCAR Section A, Chapter A3-7, Paragraph 12.5.

A signed PMR does not expire or is superseded by subsequent PMR’s, unless relating to a repeat of the same activity. A PMR remains active as long as the activity it relates to remains part of the aircraft.

On completion of any check required (‘required’=stated in the Permit to Fly) by the schedule, except pilot maintenance (see section 5) and Check A (see section 6), an entry shall be made in Column 6 of CAP398 Aircraft Log Book, CAP399 Engine Log Book, CAP400 Propeller logbook or an approved equivalent as Section 4. The certifying person's signature, authority and date must be made in Column 7 against the relevant category (Airframe, Engine, Radio).
The following is an example of an entry acceptable to the CAA, unless already pre printed on the page:

<table>
<tr><td rowspan="3">PERMIT MAINTENANCE RELEASE<br>Cross refer to workpack ref;<br><br>50 hr/100 hr/Annual Check (delete as appropriate)<br>has been carried out to my satisfaction at total airframe hours…….<br>and in that respect is considered fit for flight<br><br>Signed……...Authorisation ref…….Date…….<br>Maintenance Schedule Ref. RSUK0076 Issue 1</td><td>Airframe</td></tr>
<tr><td>Engine</td></tr>
<tr><td>Propeller</td></tr>
</table>

**Pilot Maintenance**
A licensed pilot who is the owner or operator of the gyroplane may carry out certain maintenance tasks prescribed in Air Navigation (General) Regulation 16. The issue of a PMR is not required. The pilot must include his pilot's licence number with his signature in the appropriate log book(s). The permitted pilot maintenance is as below;

**PERMITTED PILOT MAINTENANCE**
This section defines the type and extent of maintenance that may be carried out and certified by a pilot who is the owner of the aircraft and operates under a CAA Permit to Fly. Refer to CAA CAP 733 for more information.

1. Removal and replacement of the propeller spinner.
2. Replacement of slip ring brushes.
3. Blade repairs (see section 7.0 for limitations)
4. Replacement of propeller leading edge tape.

**Annual Check**

The annual check and all associated work must be accomplished under the supervision of an organisation appropriately approved by the CAA (eg RSUK or other CAA Authorised engineer). Use form F106 from the RSUK website

**SECTION 5**
**THE MAINTENANCE CHECK CYCLE**

| Check title | Content | Period |
|---|---|---|
| Check A | Check A | Prior to the first flight of the day |
| First 25 hour check | 25 hour check items (one time check, after new build) | Not exceeding 25 flying hours, or 1 year, whichever is the sooner |
| 100 hour check | 100 hour check items | Not exceeding 100 flying hours |
| Annual check | 25, 100 hour and annual check items | Not exceeding 12 months (see Note 5) & prior to renewal of Permit to Fly |

Use form F106 inspection/service records

**PERMITTED VARIATIONS (see Notes)**

| Tasks controlled by flying hours | Maximum Variation |
|---|---|
| 25 hour | +/- 5hrs |
| 100 hour | +/- 10hrs |
| **Tasks controlled by calendar time** | **Maximum Variation** |
| 6 months | 1 month |
| Annual | Prior to Permit renewal (see 5. below) |

Tasks controlled by more than one limit
The more restrictive limit shall be applied

**Notes**
1. Permitted variations may not be applied to applicable airworthiness life limitations, airworthiness directives or overhaul and test periods.
2. Permitted variations for tasks controlled by flying hours should not be understood to be a maintenance planning tool, but as an exceptional means to allow the operator to fly for a limited period of time until the required maintenance is performed.
3. Any application of a permitted variation to the maintenance check cycle period must be recorded in the appropriate log book(s) together with the reason for the variation by a person who is authorised to sign the log book entry for that particular check. Details of the permitted variation must be made visible to the pilot.
4. Permitted variations are not required to be deducted from the next scheduled check.
5. The annual check may be anticipated by a maximum period of 62 days without loss of the continuity of the maintenance check cycle. Thus, for example, where the full 62 days is invoked, the following annual check would become due 14 months after the completion of the annual check that was anticipated. The period by which the annual check was anticipated and the date of the next annual check shall be recorded in the appropriate log book(s).

**SECTION 6**

**PILOT'S PRE-FLIGHT CHECK**
Pre-flight checks are to be carried out in accordance with the MTOsport Gyroplane Flight Manual RSUK0043 or the MT-03 Gyroplane Flight Manual RSUK0011.

CHECK A - PRIOR TO FIRST FLIGHT OF THE DAY
For update control and one source of information, this check is not printed here. Refer to the Pilots Handbook.
For all inspection checks reference must be made to RotorSport UK Ltd, either via the website www.rotorsport.org or directly, for the latest schedule.

**SECTION 7 - SCHEDULED MAINTENANCE WORKSHEETS**
**To allow ongoing updates of these service sheets with field service information received, they are located on the RotorSport UK Ltd website www.rotorsport.org.**

**F106 issue 1, 25hr/100hr worksheet**
**F117 issue 1, 300hr worksheet**

**SECTION 8 - ANNUAL INSPECTION**
See F106, initial 25hr and 100hr Service worksheet
Or F117 300hr worksheet

**SECTION 9 - Aircraft systems description and maintenance methods**
**General notes;**

1. **These instructions are not all encompassing, and should always be used in line with good aircraft engineering practices, and manuals such as AC43.13. Repairs not shown must be approved by either the CAA or RSUK in writing.**
2. **Safety; working on an aircraft brings many hazards. Always wear suitable personal protective equipment such as overalls, safety glasses, safety shoes, gloves etc appropriate for the maintenance task. If possible render the engine inoperable prior to starting work.**
3. **Wherever possible SI units are used**
4. **Always use good quality tools appropriate for the task**
5. **Use of non standard or unauthorised parts or repairs will invalidate the warranty and the Permit to Fly. Parts specifically designed for this aircraft and supplied by RSUK will carry a certificate of conformity, which must be kept with the aircraft records.**
6. **Special tools (none at this time)**
7. **Lubricants. Use engine lubricants only as per Rotax instructions. Bearing grease or moly filled grease is suitable for aircraft lubrication points, preferably water resistant.**
8. **Loctites and sealants. Loctite 243 is used where required.**
9. **General corrosion prevention. Keep the aircraft in a non humid, ventilated area. If humidity is present, protect unplated components such as bolts etc with a proprietary spray such as WD40 or ACF50.**
10. **Help protect our environment by disposing of parts and fluids properly.**
11. **Standard bolt torques are M6 15Nm+/-2Nm, M8 25Nm+/-3Nm, M10 35Nm +/-4Nm, M12 100Nm +/-10Nm. Always assess the joint to be tightened and use engineering judgement – do not overtighten plastic or unsupported tube joints!**
12. **Specific aircraft parts list available separately from RSUK website.**
13. **Remember, maintenance, modification, and bulletin/MPD incorporations must be recorded on suitable worksheets and within the aircraft/engine logbooks – and signed appropriately.**
14. **Refer also to the pilots handbook as well as the drawings quoted and service parts list, all available from the RSUK website.**

**WARNING! PROPELLERS KILL! WHEN WORKING ON THE AIRCRAFT, UNLESS THERE IS A SPECIFIC REQUIREMENT TO HAVE THE AIRCRAFT LIVE, ENSURE THAT COILS ARE OFF AND KEYSWITCH OFF.**

**IF POSSIBLE DISCONNECT THE BATTERY, OR REMOVE THE SOLENOID ACTUATOR WIRE FROM THE SOLENOID TO PREVENT POSSIBLE STARTING.**

**This statement is made here only, to avoid continued repetition. It is the engineer's responsibility to ensure a safe working environment.**

## 1. Component identification

**1.1** The hub
The hub is marked at the outer surface of one hub arm with a number, e.g.: **SR 3000/3/R/T/CS/C – 3977**

SR 3000 – propeller type
3 – three bladed ( or 2 – twin bladed )
R – right direct of rotation ( or L – left direct of rotation )
T – tractor ( or P – pusher )
CS – constant speed
C – type of propeller blade ( or W – wide , J – Jabiru, B – scimitar )
399 – serial number
7 – year of manufacture

**1.2** The blades
At the rear of each blade root there is self-adhesive corrosion resistant stamped label with the following data imprinted on it: 3977 A 10/07
- 3977 – serial number of propeller
- A – Order of blade in set A, B, C
- Date of blade manufacture – October / 2007

**1.3 Part numbers**
RSD4358 Woodcomp SR3000 propeller with spinner 912ULS
RSD4359 Woodcomp SR3000 propeller with spinner 914UL
RSD4360 Brush box assy
RSD5123 Brush box bracket, 912
RSD5124 Brush box bracket, 914

RSD4375 Spinner (white)
RSD4376 Motor assy
RSD6009 Nylock nut
RSD5132 Propeller flange top hat spacer
RSD1110 Locking tab washer

Propeller internal part nos (for spares)

| | | |
|---|---|---|
| RSD4358 | | Woodcomp SR3000 propellor with spinner 912ULS |
| RSD4359 | | Woodcomp SR3000 propellor with spinner 914UL |
| RSD4357 | 3 | Blade Assy 914UL |
| RSD4422 | 3 | Blade Assy 912ULS |
| RSD4423 | 3 | Inboard plain bearing |
| RSD4424 | 3 | Outboard plain bearing |
| RSD4425 | 3 | Needle bearing race |
| RSD4426 | 3 | Split locking collar |
| RSD4427 | 3 | O-ring |
| RSD4428 | 3 | Axial load pin |
| RSD4429 | 3 | Worm Wheel |
| RSD4430 | | Blade edge tape |

| | | |
|---|---|---|
| RSD4431 | 1 | Hub assy |
| RSD4356 | 1 | Gear motor assembly |
| RSD4432 | 3 | Microswitch |
| RSD4433 | 1 | Centralising cone |
| RSD4434 | 3 | Worm gear |
| RSD4435 | 1 | Slip ring assy |

**2 . Performance data**

The following data are presented for information only and are in accordance with the design and structural parameters of the propeller at its current stage of development.
Max. engine power output: 115 HP (Rotax 914UL)
Max. propeller RPM: 2650 rpm
Range of operating temperatures: -25degC - +50degC
Number of blades: 3
Diameter : 1700 mm
The rate of pitch change from one end position to another – under load
Manual 5sec nominal
Automatic 5 sec nominal
Propeller mass: 10.75 kg (including the spinner) three bladed
Connecting flange – spacer:
A spacer is used for installation of the propeller and it is placed (see 6.2) between the propeller and the pre rotator hub mounted on the propeller flange of the engine, to which it is secured by the propeller fixing bolts.

**3. Design, structure and instruction for operation**

The propeller consists of the following main structural assemblies:
- Blades
- Hub
- Adjusting mechanism
- Spinner

3.1 Blades
The propeller blades are made of layered ash or beech glued by epoxy two component adhesive CH S Epoxy1200.

The root part of the blade is equipped with a duralumin boss, which is provided with bearings, sliding bushings and locking rings, which together hold the axial and radial forces.
For use in situations where greater blade wear is likely (sand airfield surfaces, float planes etc.), the blade is covered with 2 layers of glass or carbon fabric with low coefficient of friction. Also the

leading edges have polyurethane moulded inserts of for maximum resistance against water and foreign objects.
The propeller blades are manufactured wood composite / carbon – black
The blade tips are painted with white varnish Nitro-Enamel C-6000.

3.2. Hub
The material of hub is duralumin ČSN 424203. The hub consists of two parts. The hub body is machined from solid material. The hub is mounted to the engine by means of a spacer.

3.3. Adjustment mechanism
The SR 3000 is an electrical in flight adjustable propeller. Blade adjustment is carried out by means of an electrical servomotor, which is controlled manually from the cockpit by means of a rocker switch (mounted on the left of the pilot) or toggle switch incorporated in the Smart Avionics Constant Speed Controller. The Smart Avionics controller will also control the propeller automatically to one of three flight modes if selected. In this case the propeller becomes a constant speed propeller. The pilot has the choice of changing the mode of control in flight using a push button.

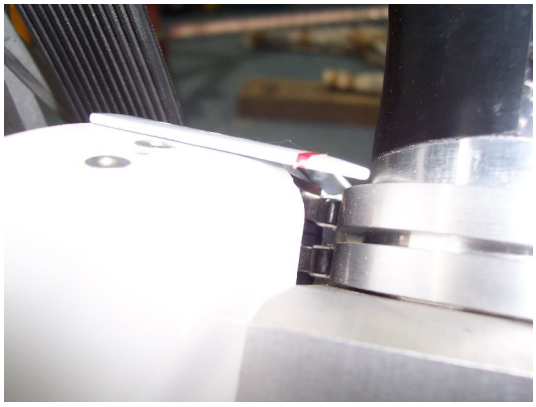
**3.3.1** Propeller blade pitch stops
The propeller is manufactured with physical machined pitch stops, to prevent the propeller being run too fine or too coarse. In use the stop position is controlled by microswitches, the physical stops are in case of electrical component failure.
WARNING! On no account may these be changed, they are positioned to allow the aircraft to meet the performance and safety requirements of BCAR Section T.

The fixed limit stops are machined at 21.5deg coarse and 13deg fine

The blade electrical pitch limit stop setting must be (+/-1deg)
Fine pitch 13.5 (912ULS) or 15.5 deg (914UL) deg
Coarse pitch 18.5deg in (912ULS) or 20.5deg (914UL).

**3.3.1.1** Control system stops - electrical
The primary pitch limit control is electrical. It operates in such a manner, that the end stop cam situated on the blade contacts and opens the electrical microswitch and the blade then stops at the preset angle. If it is over-ridden, the machined cut out in the blade stops against a dowel in the hub.

**3.3.1.2**. Control system stop backup, fine pitch
Should the primary microswitch system fail in fine pitch, the electrical servomotor is equipped with a second microswitch switch – in fine pitch only.

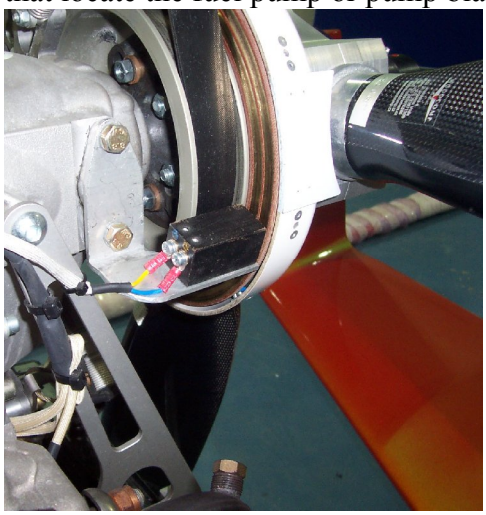

Picture showing pitch limit switches running on blade cams

**3.3.1.3** Checking the main system of stops.
When carrying out pre-flight checks the main system of propeller blade angle stops should always be checked. With engine not running, the propeller should be adjusted from the one end position to other. If the propeller adjustment stops in each end position in normal manner, the main stop system is in order. Note that the panel warning lamp lights when the propeller pitch is changing, and goes out when an end stop is reached. The controller will indicate '+++' or '---' when the stops are reached.

3.4. Spinner
The spinner diameter is 237mm.
Spinner material: Composite, painted to match the aircraft.
The whole spinner is fixed to the propeller by 9 stainless steel screws.
The spinner backing plate is used for final balancing of the complete propeller, by means of balancing weights glued inside the lower disk and held there by centrifugal force.

Balance weights

The attachment of the flange and carbon brush box on the Rotax engine is shown in the picture. The flange is mounted by means of 2 bolts, which screw into existing holes on the Rotax engine that locate the fuel pump or pump blanking plate.



Installation on 914UL engine (no mechanical fuel pump)

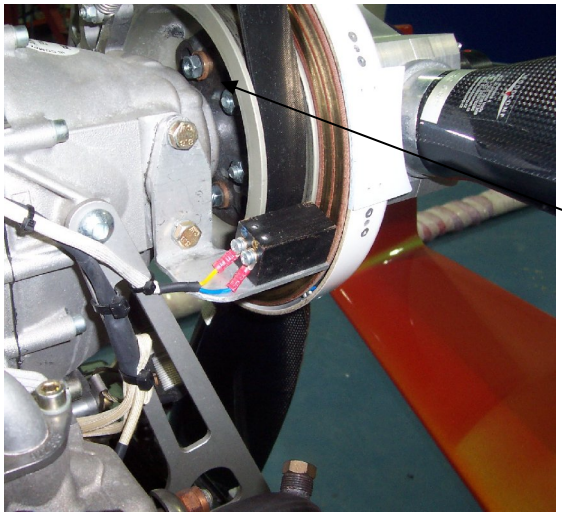
4.1 Propeller installation

The propeller is mounted on the engine flange using 6 off M 8 bolts, which protrude from the rear of the propeller. When seating the propeller it is necessary to be careful not to damage the carbon brushes, which supply the electric power to the propeller. Therefore remove the mounting bolts retaining the brush box bracket to the engine – this will improve access to the propeller retaining nuts too. Remember to use loctite 243 on the threads when refitting! Fit the top hat spacers through the propeller flange, a dab of loctite helps hold these in place. The propeller is gently pushed on to the propeller flange by hand, the tab washers located over each pair of bolts protruding through the top hat bushes, and then fitted with self-locking M8 nuts. The nuts are tightened from behind the propeller progressively in proper sequence by means of side spanner. Final tightening is done with a torque spanner set at 22 Nm. After torque checking, bend over the locking tab washer (always fit a new washer). Then the carbon brush housing is adjusted according such that the brushes run in the centre of the rings, and the brushes are free moving axially in the housing. Turn the propeller, to

check that the carbon brushes seat properly in the centres of the brass slipways, and make contact with their entire surfaces.

Engine gearbox flange with top hat spacers fitted

Pre rotator belt and drive drum fitted



Fit tab washer under the nuts here

Bolts tightened and brush box fitted.

Tab washer (RSD1110). To be fitted under each pair of nuts, and bent over after torquing nuts to 22Nm.

When refitting the brush box, align such that the brushes are centred on the slip rings, and running with the brush axis perpendicular to the ring. The brushes must have freedom of movement in and out as the propeller turns – check this. The screws holding the brush box to the bracket have some adjustment.
The brush box bracket to the engine bolts and power cable to brush box screws must be loctited with loctite 243. The brush box to bracket screws are wirelocked for security.
When new the brush length is 14mm. if worn to less than 4mm, replace. Note that the brushes must slide freely within the brush box, remove and clean them as required.

4.3. Checking the installation
Switch on the electric power source and check the propeller functions:
1. Switch on the electric master switch.
2. Check the function of the rocker switch on the seat, and the switch on the instrument panel, the function of the switching off propeller end positions and signalling the propeller blade adjustment
- when adjusting to a finer angle the light must go on, and the controller show '-' until it reaches the stops, then '---'. The light goes off.
- when adjusting to a coarse angle the light goes on, and the controller shows '+' until it reaches the stops, then '+++'. The light goes off.
3. Electrical stop system check.
With the engine not running, cycle the propeller from one end position to the other. The electrical system is functioning normally if the propeller reaches its end positions and the panel lamp goes out whilst the power is still on. If the light stays on, the electrical stops have been over ridden, and the propeller has stopped on the mechanical limit stops. Either the switching system has an electrical fault, or the microswitch stops are miss-set.
5. Adjust the propeller for the fully fine angle of incidence of the blades and carry out the engine test on the ground. During the engine ground test there must not occur any excessive vibration or unusual noise.
**WARNING NOTICE**
When making the engine ground test with the aircraft stationary, never adjust the max. coarse angle on the propeller when the engine runs at maximum power (full throttle). This may produce stall flutter on the propeller with subsequent damage.

5.1 Periodic inspections
Periodic inspections have to be carried out by the propeller producer or by an authorised person at the following time intervals: Use form F106 (initial 25hr and 100hr) or F117 (300hr) for details of requirements

| | | |
|---|---|---|
| First 25 hours | On the aircraft | Authorised mechanic |
| 100 hours | On the aircraft | Authorised mechanic |
| 200 hours | On the aircraft | Authorised mechanic |
| 300 hours | Service centre (overhaul) | RSUK or Authorised mechanic |

Repeat maintenance cycle.

WARNING!
A record of these periodic inspections of the propeller must be kept in the propeller logbook.

5.2 Special inspections
In case of significant (see section 7.0 for owner repair limits) blade damage, impact of a significant foreign object on the propeller, or if propeller overspeeding by more than 200 rpm has occurred, it will be necessary to transport the propeller to RSUK for damage assessment and frequency vibration of the blades to be carried out.

**WARNING**
A record of any special inspection must be made in the propeller logbook.

5.3 Overhaul
The period to overhaul is 300 hours of operation, repeated as required. Only an authorised person or RSUK may carry out propeller overhaul. The subsequent inspection system is identical with the system of inspections of a new propeller.
Before removing propeller from aircraft, assess and record pitch/axial backlash per blade and any service damage.
To remove propeller:
1. Remove spinner by removing the 9 retaining screws.
2. Remove and fix out of the way the brush box assy.
3. Bend over retaining tabs from propeller nuts, and remove the nuts.
4. Carefully extract the propeller, remembering it weighs around 12Kg.
5. Place propeller on a suitable workbench to allow disassembly.

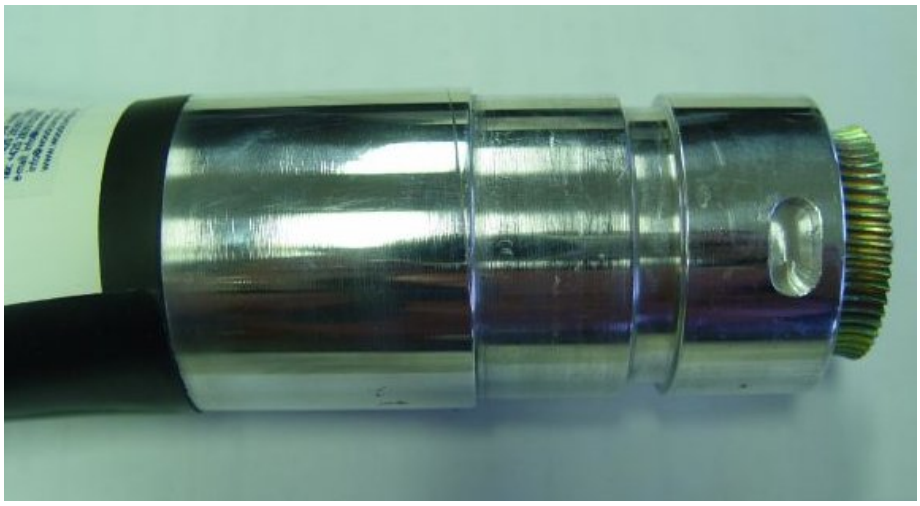
Dissassembly is the reverse of the following photomontage of the assembly process.

Check items during or after diss-assembly:

1. Wear on worm gears. Normal backlash allowable, 1deg max, measured on the blade at 75% of blade length. Wear may be evident on the blade worm gears. If so, remove the gear and rotate by 180deg, and refit (loctite 243). Check worm drive gears for wear – if required, replace.
2. Motor noise . Run motor and check for unusual noises. If found, replace.
3. Blade bearing wear (axial and radial). If bushes are worn, the blade tracking will wander. Replace as required with a new set per blade
4. Centre bush wear.
5. Worm gear bearing wear or noise.
6. Damaged blade. If a blade requires to be replaced, it must be supplied to suit the propeller balance from RSUK, and the propeller MUST be dynamically balanced after assembly onto the aircraft!

7. Broken microswitch or diode. Can be checked for function electrically.

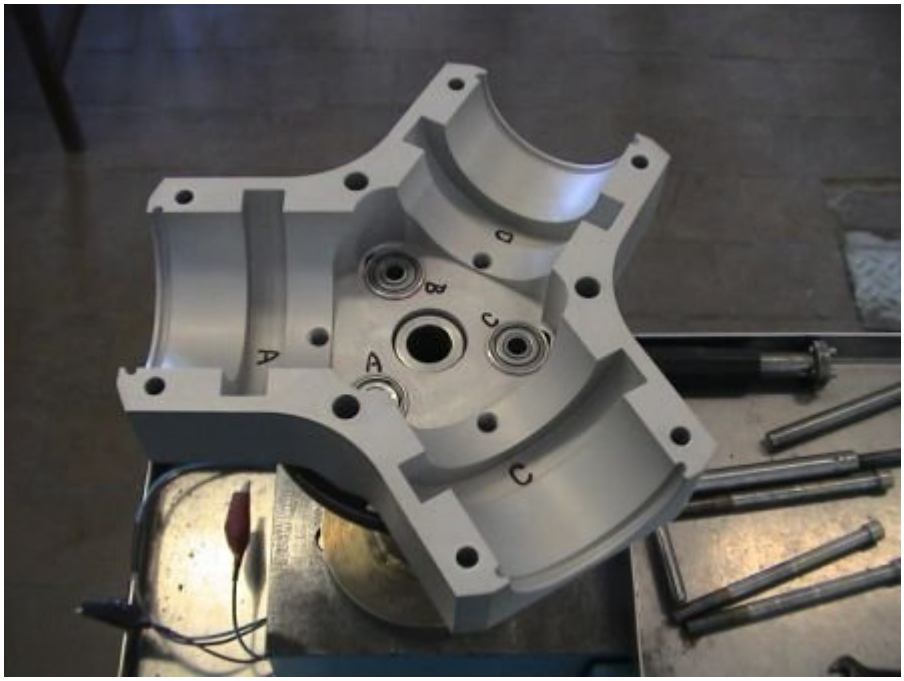

Blade end, without gear fitted.



Blade root, without bearings fitted. Note slot milled in end which is the pitch limit stop.

Blade bearing set. From left to right; O ring shaft seal; plain bearing; needle roller thrust bearing with an inner and outer plain race; split bush assy (retains the blade in the hub); inner plain bearing
Lubricate bushes with good quality chain lube.

Blade end, fully assembled with bushes and worm gear, and axial pin fitted




Inside of housing, with worm gear bearings installed

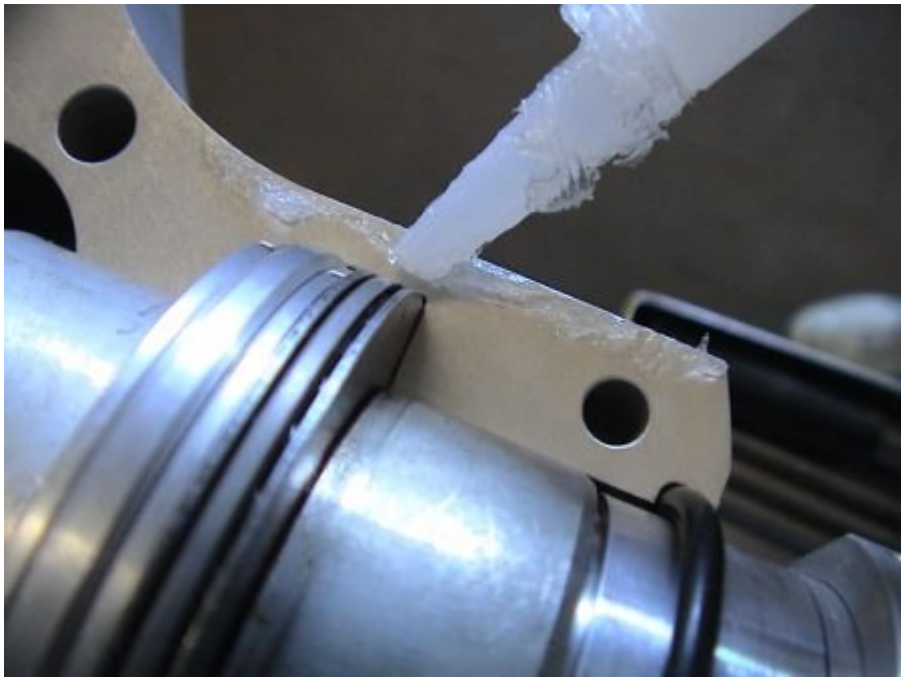

Grease gears before re installation with Aeroshell 5, MIL - G - 3514C.

Grease worms before re-installation with Aeroshell 5, MIL - G - 3514C.

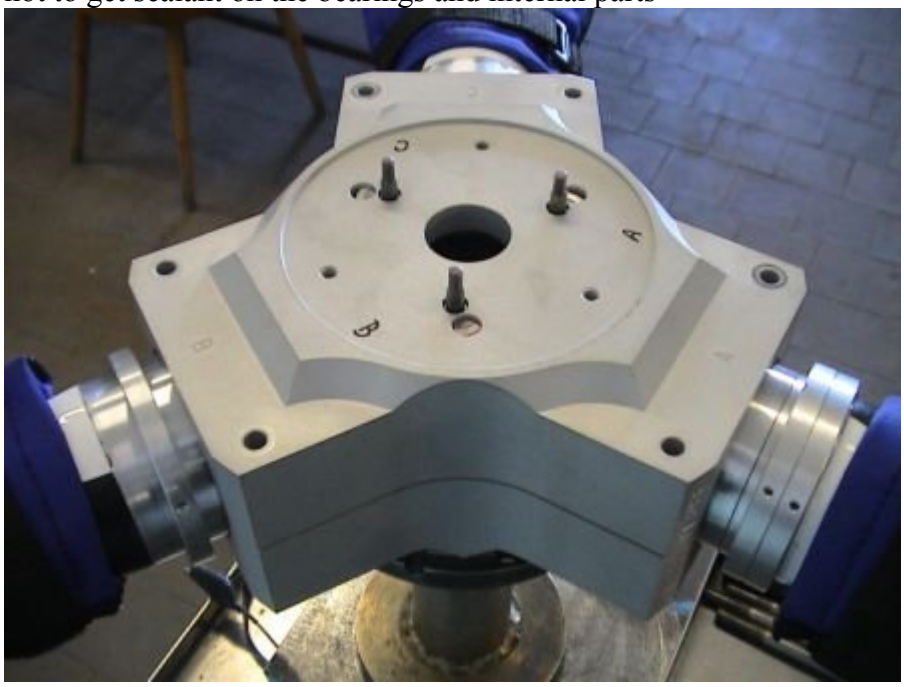

First blade fitted. Ensure the correct blade is mated into the correct hub slot!


Three blades fitted.

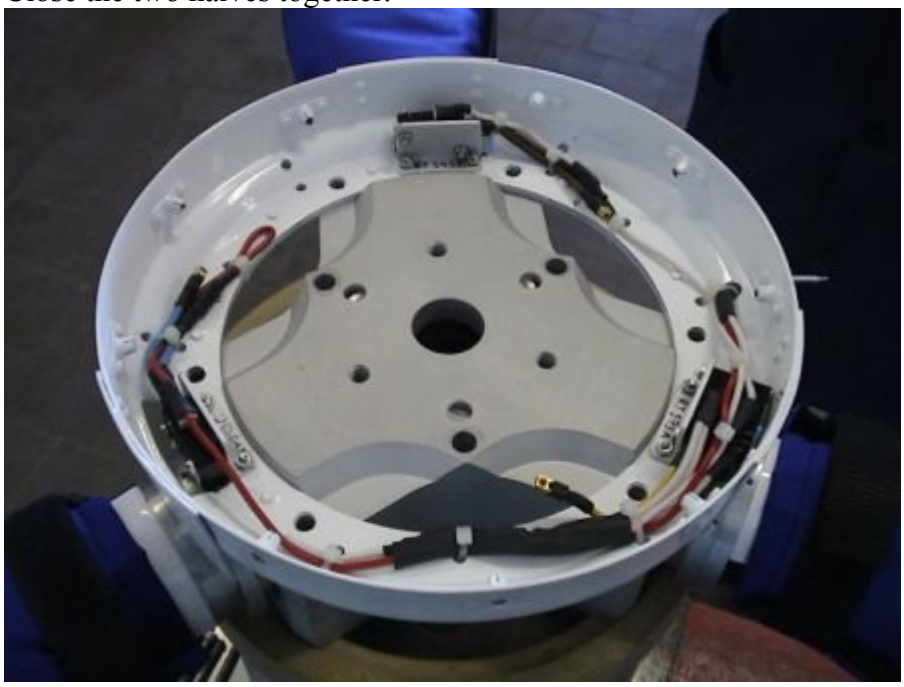

Worm drive gears fitted (three off)



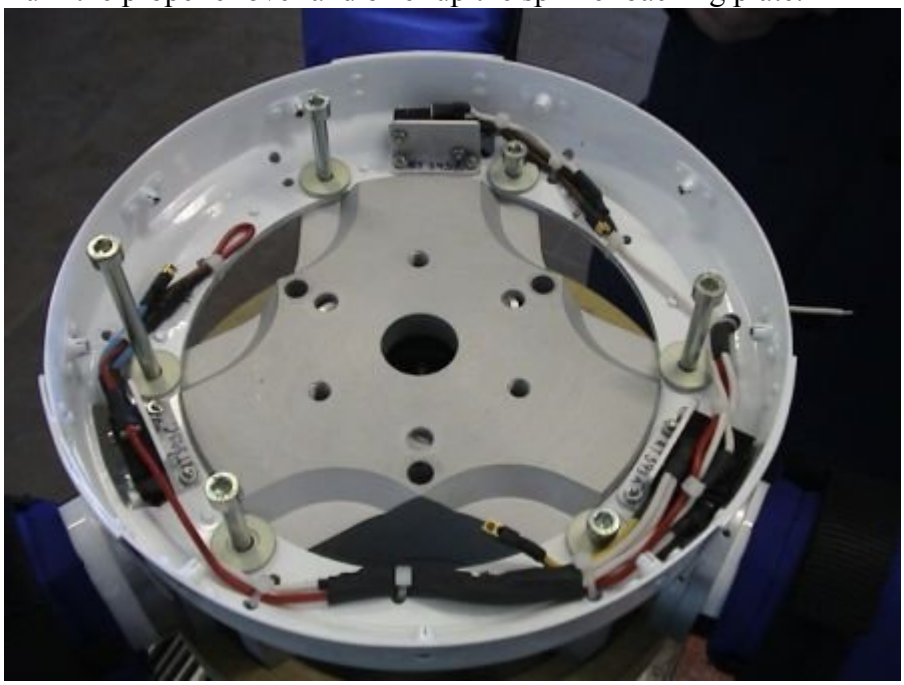
Apply a thin layer of silicon (MUST be non acidic, eg Sealant-RTV,Silicone,Ultra Blue,58730 or Loctite Ultrablack 5900) sealant to mating faces of the hub before closing the two halves. Take care not to get sealant on the bearings and internal parts



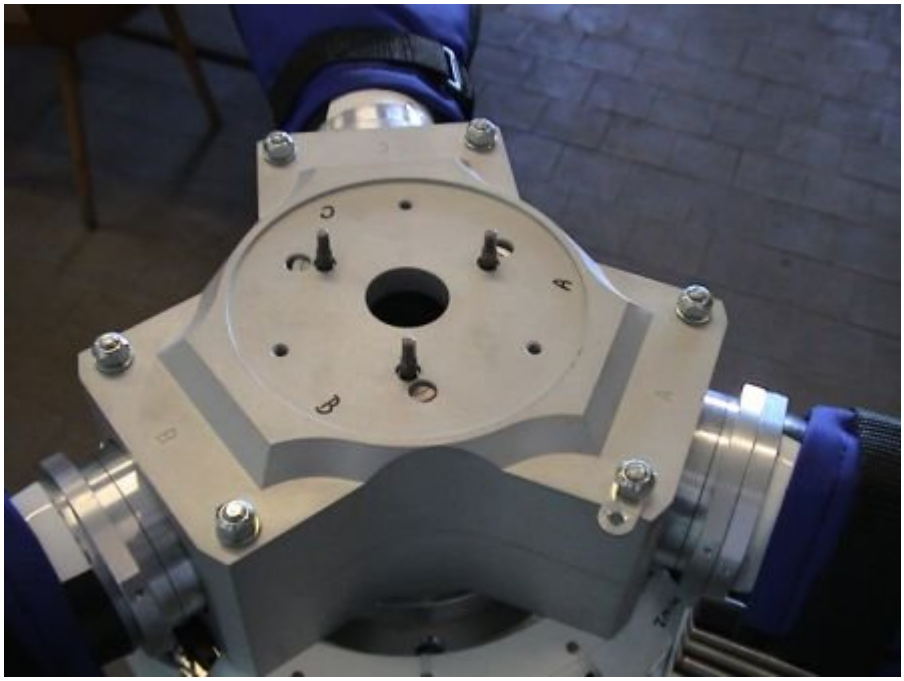
Close the two halves together.



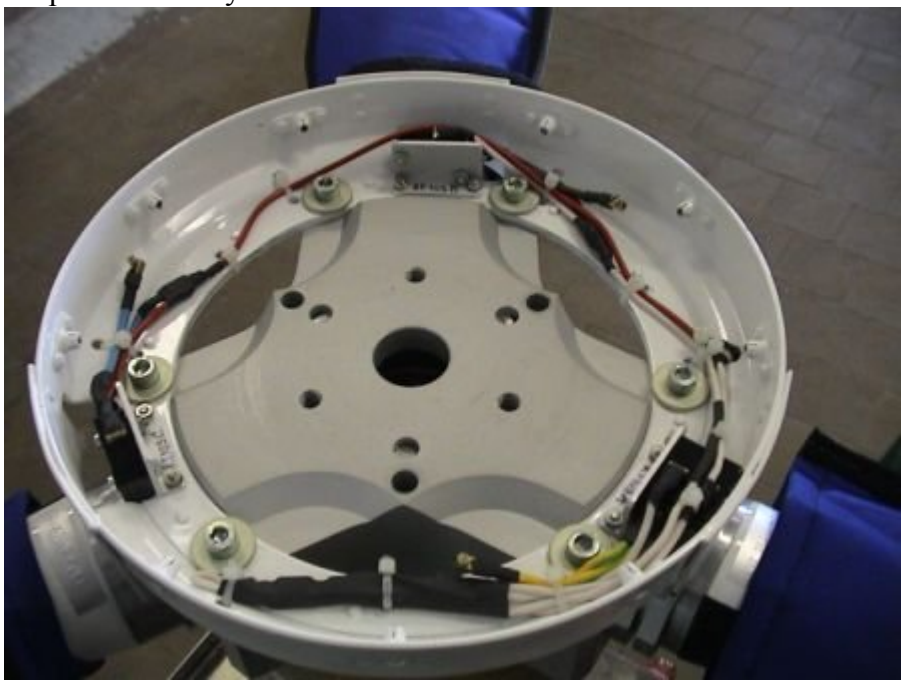
Turn the propeller over and offer up the spinner backing plate.



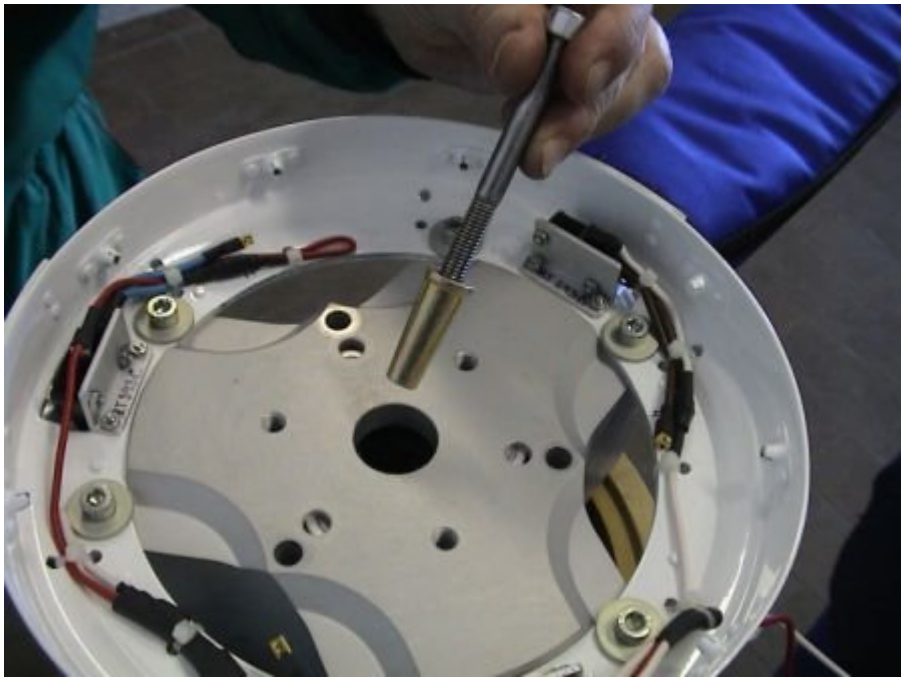
Fit bolts, and nuts/washers on other side. Do not forget the cable securing tab!
Torque to 10Nm



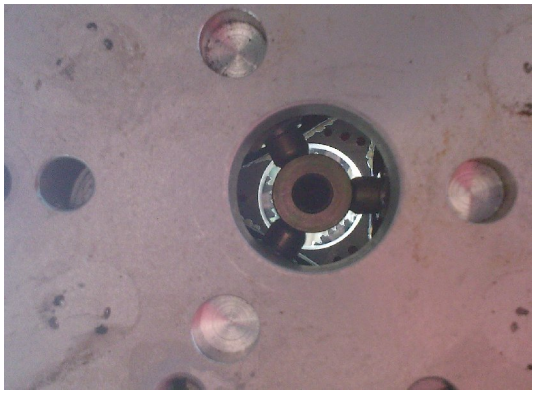
Propeller hub assy



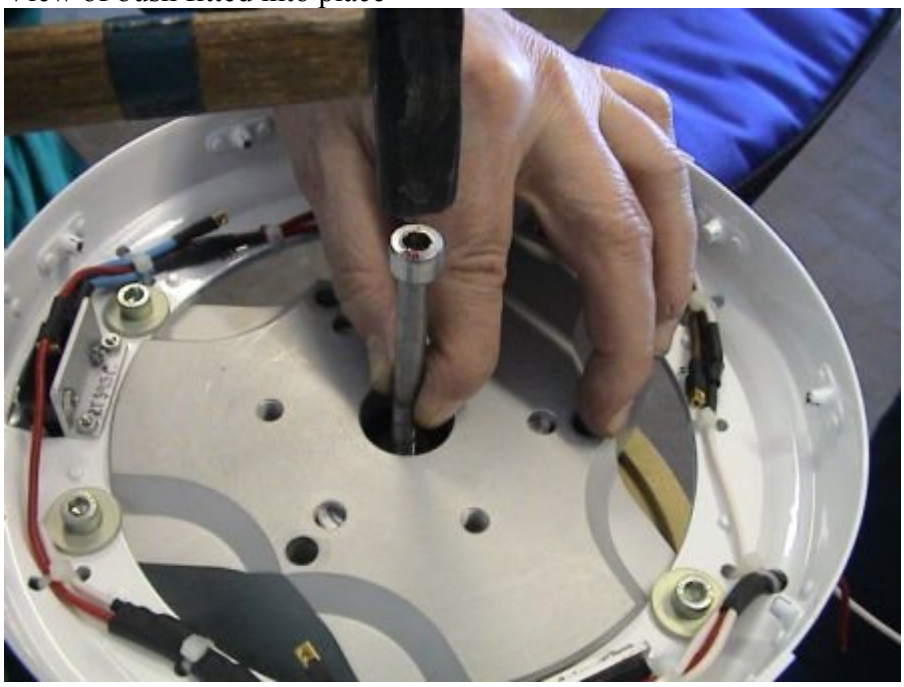
Rear of propeller with slip ring disc and spacer plate removed.

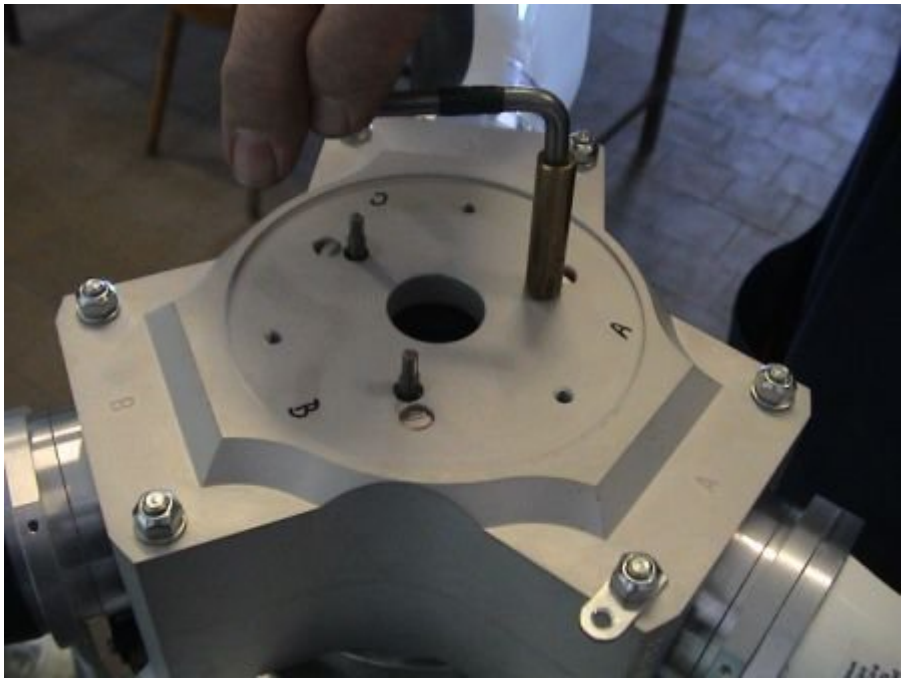


Using an old M8 cap head screwed into the end of the centre bush, gently tap it into place between the ends of the prop blades. It is tapered to allow adjustment (see later)

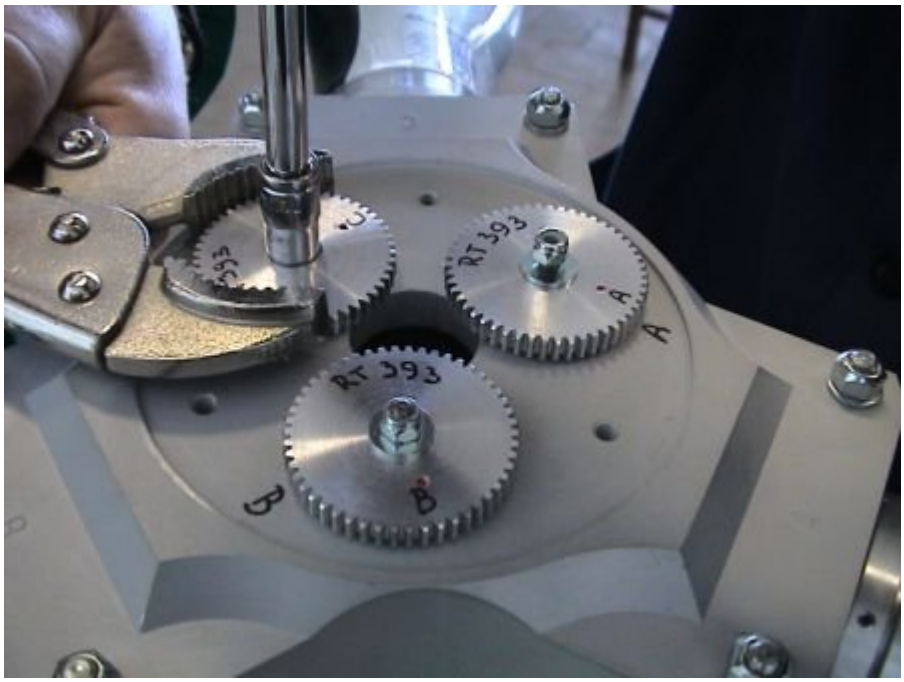


View of bush fitted into place

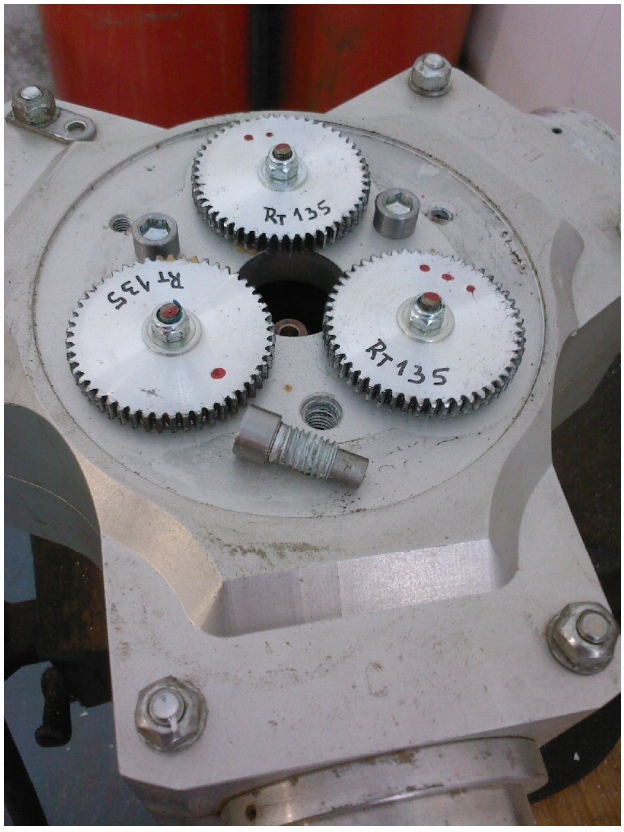




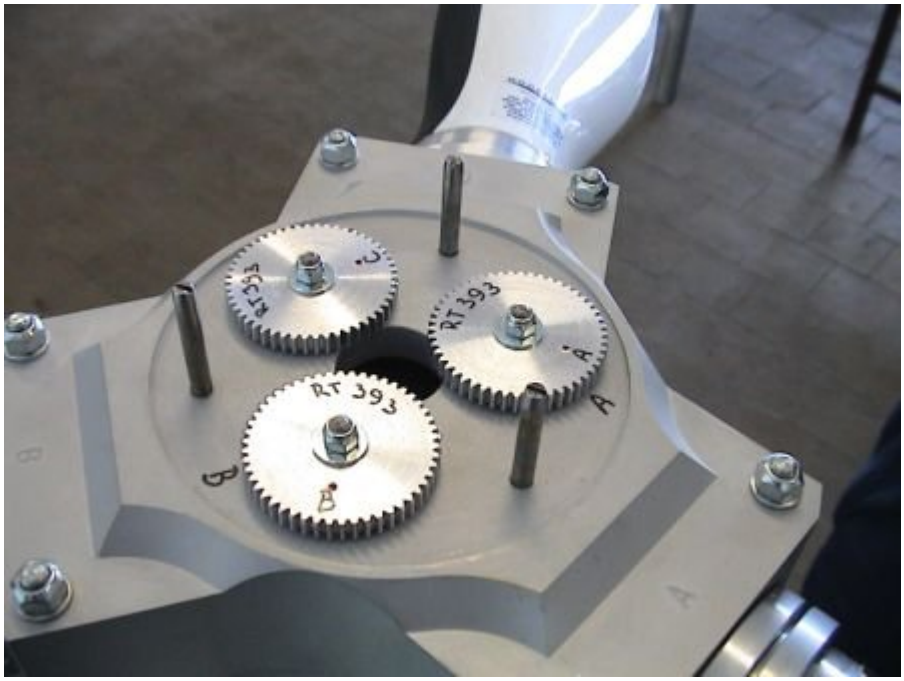
Operate each worm gear to check for free blade movement. Operational torque should be between 0.1 and 0.5Nm.



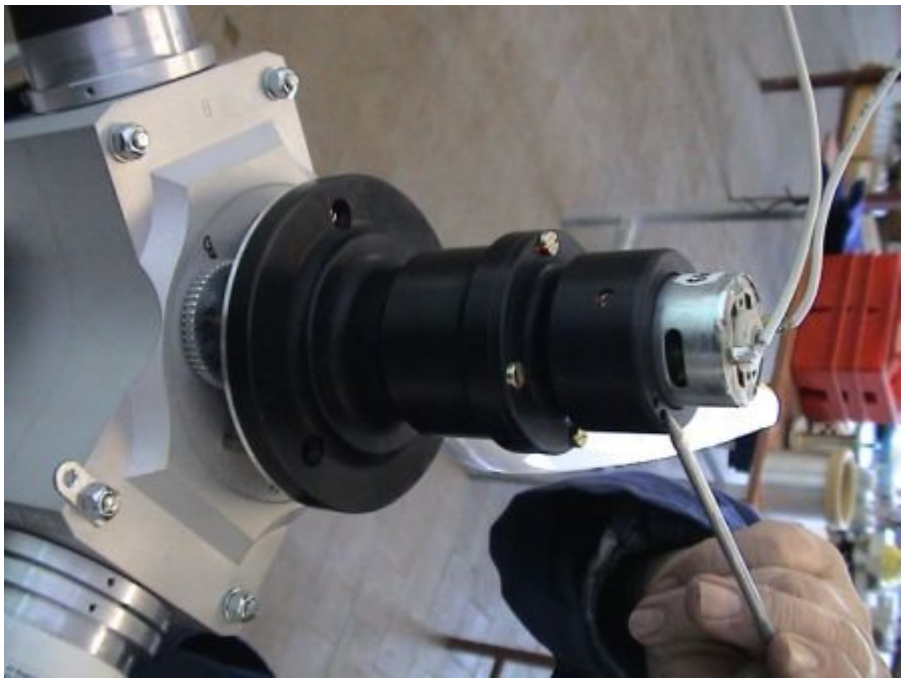

Fit gears, washers, and new nylock nuts. Tighten to 4Nm.



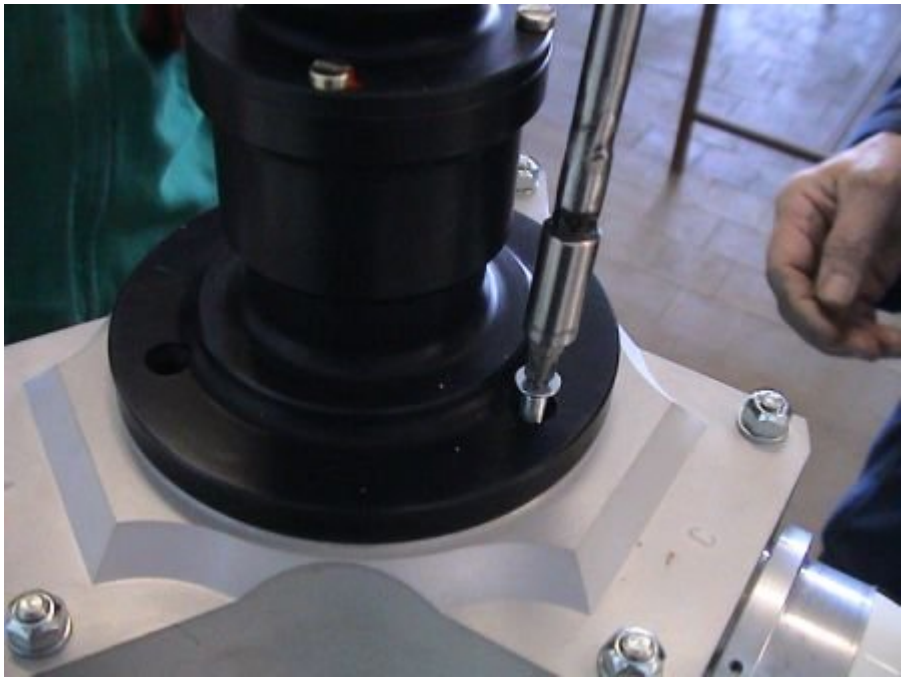

This view shows the three stop bolts, not fitted to the propeller shown in the other assembly views. The three special stop bolts have machined heads that locate in radial grooves turned in the ends of the blades. Tighten fully home with loctite 243.
With the pitch stops in place, turn the blade (using the gears) with the two microswitches to fully fine, against the limit stop. Back off around .2deg, and set the microswitches to trip on the cams at this point by loosening and repositioning the cams to suit – keeping the switch rollers in the centres of the cams. Back off the blade and then return to the stops, and ensure the switches both operate just prior to the limit stops being reached. The blade with one switch on is the coarse limit blade – adjust that to switch just prior to the limit stop being reached in the same manner. Ensure the three screws per cam are fully tightened.



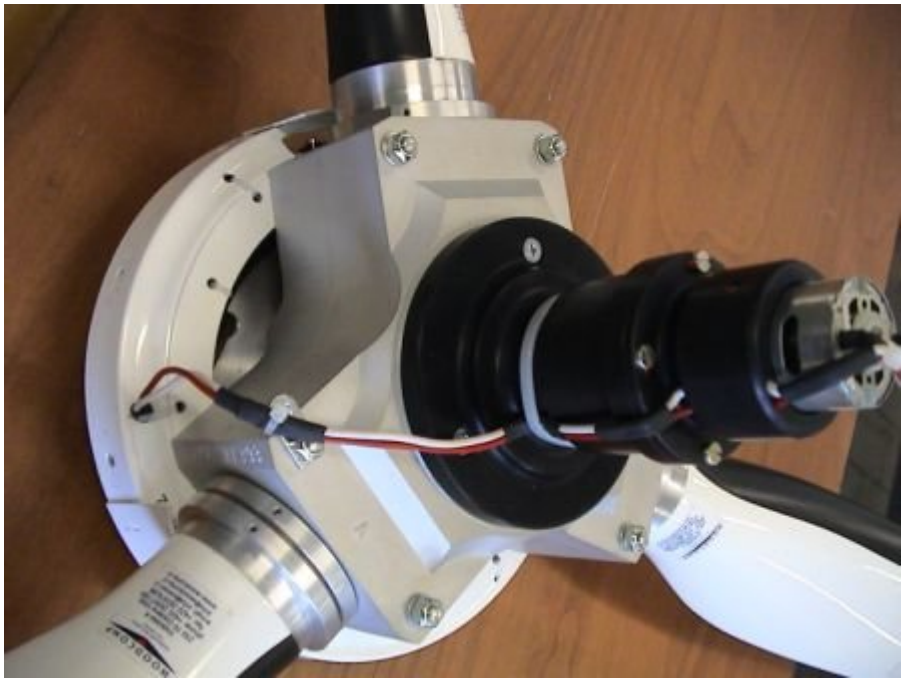

Carefully adjust all three blades such that the pitches are the same within 0.25deg, and set roughly mid range. Enusre when measuring all balds are turned in the same direction to remove backlash from the measurement. If on an assembly bench, lightly clamp the blades by tightening the locking screws. Otherwise use an old motor gear to align the three gears before offering up the motor.



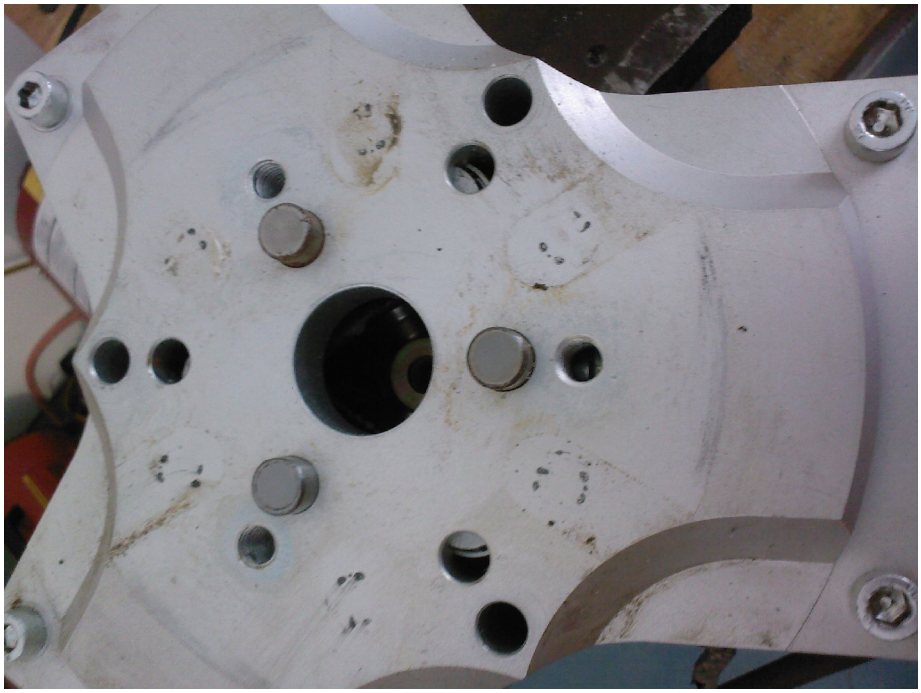
Offer the motor unit up to the hub assy. Wriggle it onto the hub. Recheck the blade angles after fitment to be within 0.25deg, remembering to turn the blades in the same direction to eliminate backlash error.
This part of the process may be carried out on the aircraft if on field service. Propeller blade pitch may be measured using a protractor held against, or fitted to, the rear face and end of the blade.



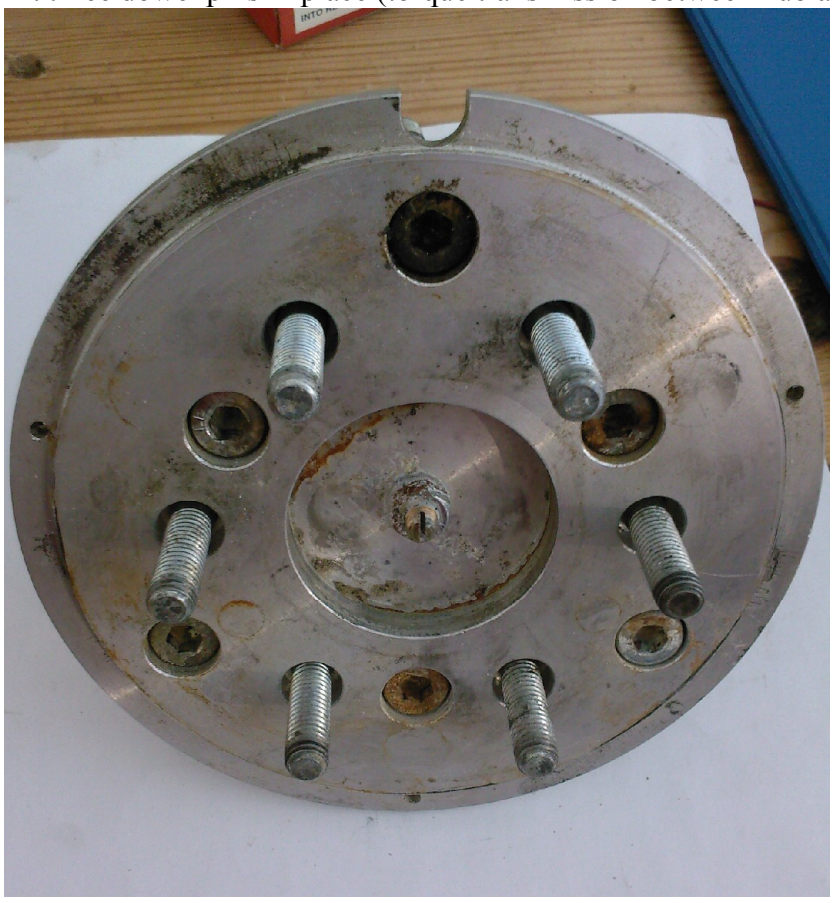
When fully down, remove the locking screws and fit the three motor screws, with loctite 243. Tighten securely.



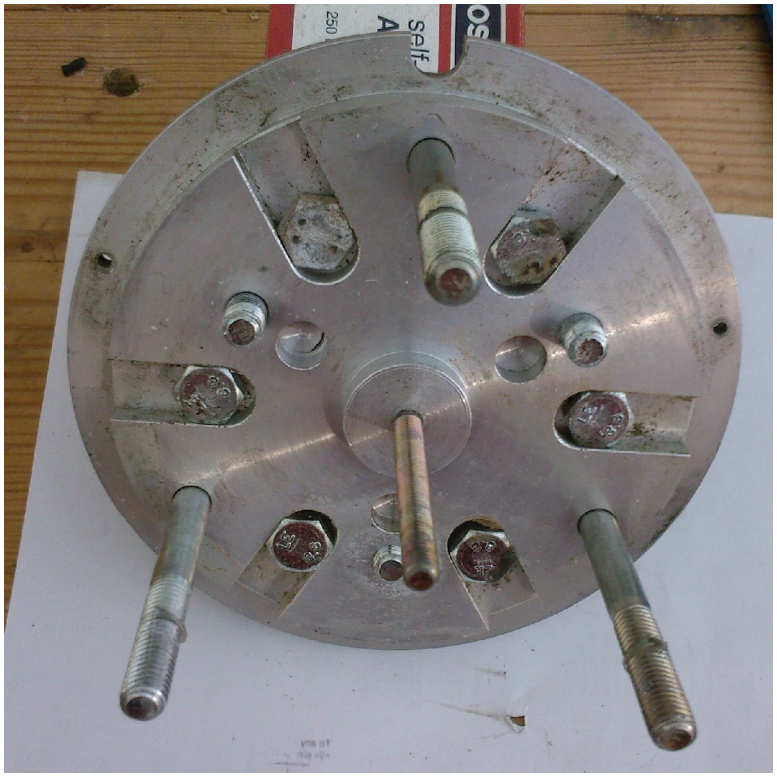
Note cable attached to outside of motor and to the hub tie point. Underneath the shrink sleeve at this point is the soldered motor to harness connection.



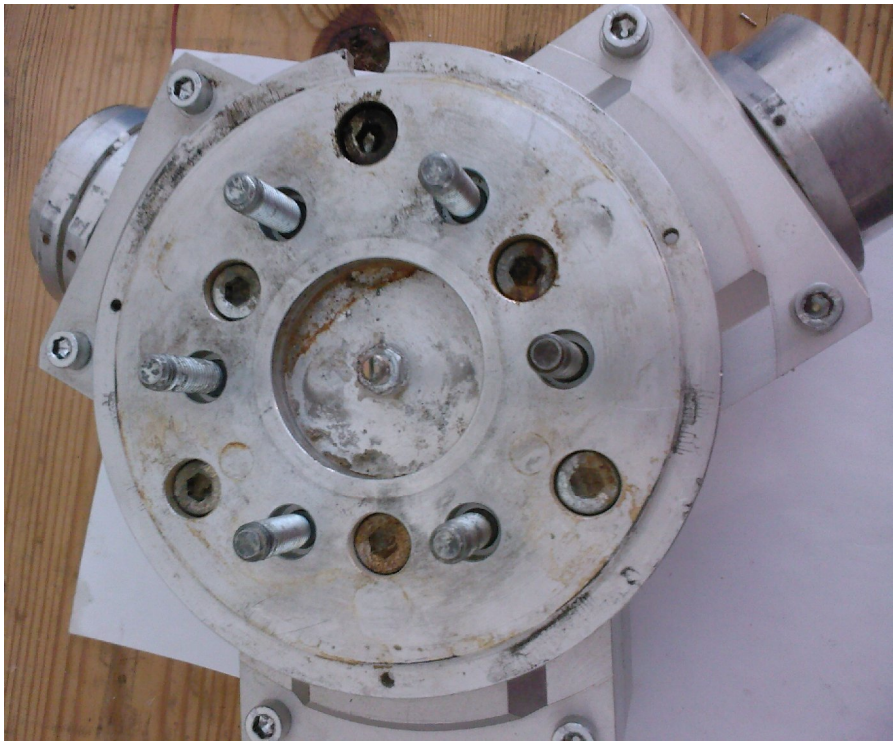
Fit three dowel pins in place (torque transmission between hub and spacer plate)



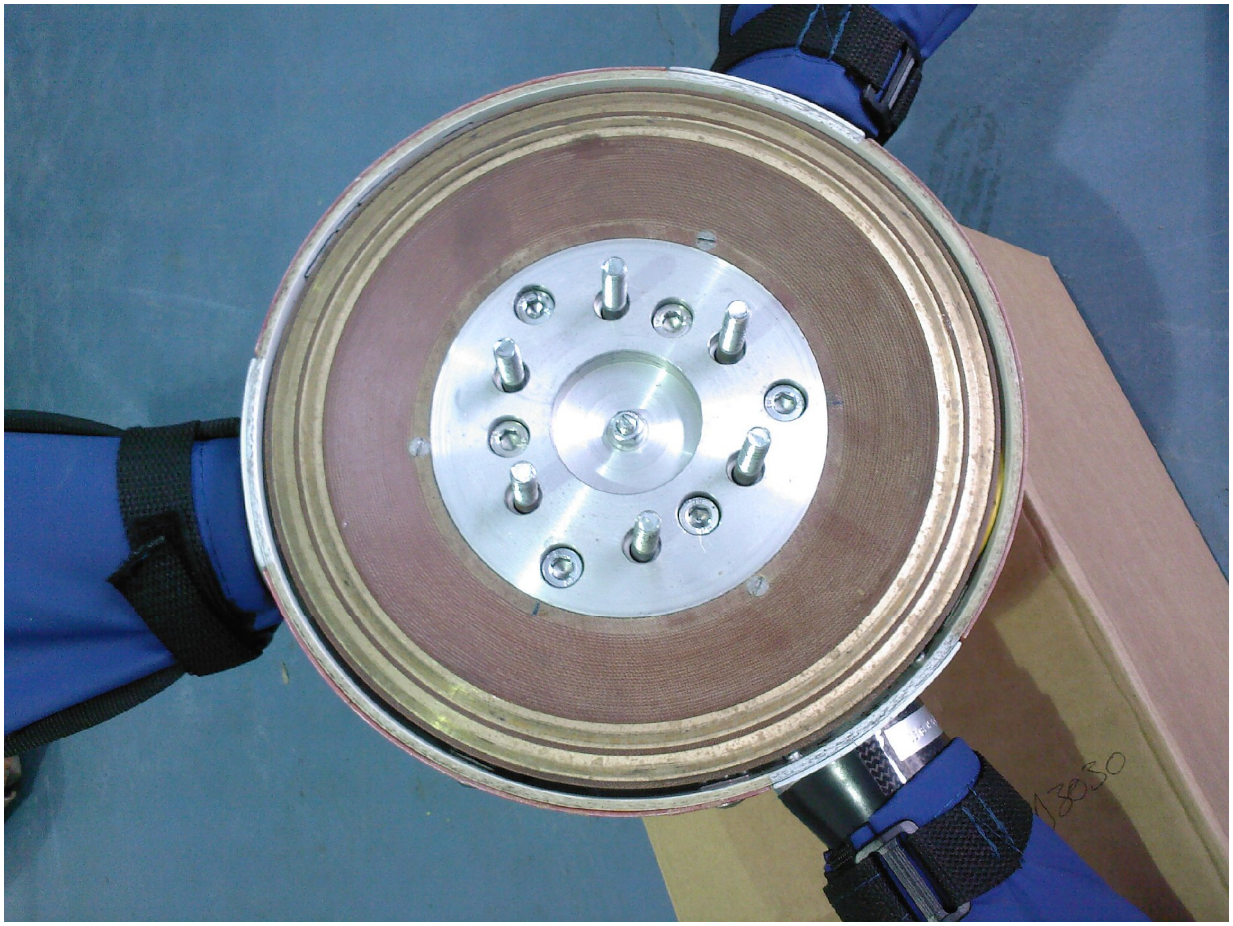
View of flange, engine face, with bolts fitted. Bolts are M8x40 grade 8.8



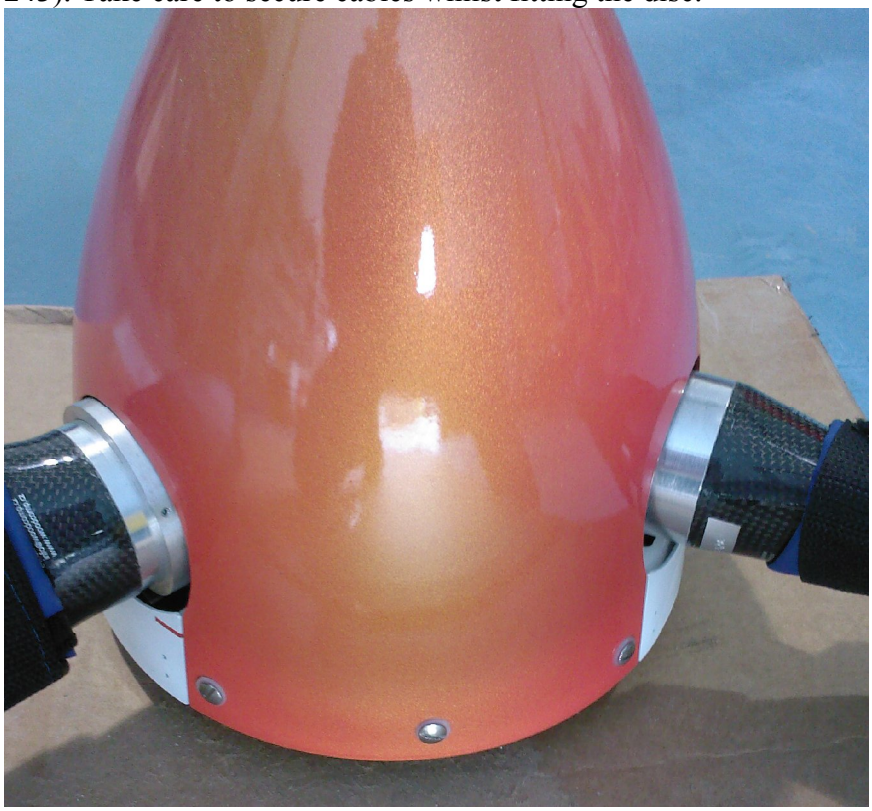
Propeller face of spacer, with bolts fitted. Ensure cleaned before fitment, including holes for dowels. Note centre screw for adjust blade axial float.



View of spacer plate, installed. Tighten bolts to 22Nm, loctited with 243. Once installed, adjust centre screw in or out to allow only minimal blade axial float. Tighten locknut.



Solder connections to the slip ring disc, and retain disc to hub with three c/sunk screws (with loctite 243). Take care to secure cables whilst fitting the disc.



Spinner is secured with 9 stainless fasteners and loctite 243.

.

After re assembly the propeller must be:
1. Checked that the blade pitch angles are still the same (using a proprietary gauge)
3. Checked for correct function – connect to a test set or to an aircraft, and apply power in the correct sense. Observe that the propeller goes from stop to stop within 8 seconds, and that the panel lamp goes out when the stops are reached in both directions of travel

**6. Maintenance**
In normal operation the propeller does not require any special maintenance.
In case of propeller contamination wash its surface with a cloth dipped in warm water with addition of household detergent.
**WARNING**
No other cleaning means or solvents are allowed.

**7. Repairs (owners)**

Surface damage not tearing through the glass or carbon fibre, and not exceeding 10mm in length or width, may be repaired using suitable epoxy resin, or superglue and carbon. The area must be thoroughly cleaned of insect debris and dirt, and abraded to give a good fresh key to bond into. Mix and load the epoxy onto the blade as per the adhesive instructions. Superglue repairs are built up in stages, a small drop of glue followed by a sprinkle of carbon or charcoal (which instantly sets the adhesive). Build up in layers to the height required. Once the adhesive is fully cured, flat back to the original blade profile and polished in for best performance. If the inner length of prop tape is damaged, replace it with a new service strip of tape. Ensure the original tape and any adhesive debris is removed first, and that the surface is clean and dry before adhering the new tape in place. Try to get it in exactly the same position as the original, to maintain propeller balance. All other work, unless specifically allowed under CAP733, must be completed by a CAA authorised person

**8. Problems and their elimination.**
The following problems may occur during the propeller operation:
**Possible problem cause and rectification**
Vibration in flight or on the ground: Static imbalance of the propeller
Check on the ground that the balance weights inside the spinner back plate are not missing and that there are no missing broken parts of the blades, which could cause the imbalance.
A well balanced propeller will significantly improve the engine and ancillary component service life. The Rotax recommended maximum is 0.1ips.
Mass balance weights used should be self adhesive aluminium wheel balance weights as used on car wheels, fitted inside the propeller spinner backing disc hub to a well cleaned, dry, surface.

Aerodynamic imbalance of the propeller
Check on the ground, with engine out of operation, if all three blades are adjusting simultaneously and smoothly. These defects can be rectified by a service agent.

The propeller does not adjust the blades and the panel lamp stays off.
Broken, worn or wrong contact of carbon brushes. Replace or adjust the brushes.
Check according to the diagram if there is proper electrical connection of propeller and of electrical joints.

Lubricant escape
Within the first 25 hours of operation there may be slight leak age of lubricant from the propeller, which has been used for its protection in storage. Clean the propeller with a cloth dipped in slightly warm water with detergent. Any other escape signals damage of the rubber tightening rings.

Replacement can be rectified by a service agent.

**9. Transport and storage**

9.1 Storage

9.1.1 Manner of storage

If removed from the aircraft, the propeller can be stored horizontally or vertically, but only in such a way that it is supported by the six M8 fixing bolts attaching it to the pad. In either case the ends of the blades must not support the propeller.

**WARNING**

It is forbidden to store the propeller in such a manner, that it is put on the ends of two blades and supported by the wall. During such long term storage distortion of the blades will occur.

9.1.2. Climatic conditions

Normal room temperature and relative humidity up to 80%.

9.1.3.3. Time of storage

The longest time of storage, during which the propeller does not need be subject to inspection by the producer, is 1 year when kept in the above-mentioned conditions.

# Section 10
# Modifications approved to date

| Mod No. | Description | Use and comments |
|---|---|---|
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# Service Bulletins issued to date

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**If in doubt about any service instruction, or service method, then refer to RSUK on the form below.**

This form is Part 1 of 2. This is the customer request form, Part 2 is the reply

This form is supplied to enable the owner/operator/maintainer to request factory support for a repair not documented in the maintenance manual supplied with the aircraft from RotorSport UK Ltd.
Depending on the problem identified, a corrective action is investigated and, if needed, CAA involvement and approval obtained prior to repair authorisation.

The information given is stored on a computer, and is only used within RotorSport UK and the CAA for the above purpose.

Return this form to:
RotorSport UK Ltd, Poplar Farm, Prolley Moor, Wentnor, Bishops Castle, Shropshire, SY9 5EJ. Or email service@rotorsport.org, or fax 01588 650769

| | |
|---|---|
| Aircraft type | Aircraft serial No. |
| Aircraft Registration No. | Aircraft Engine No. |
| Logbook Aircraft hours | Logbook Engine hours |
| Owner/operator name & contact detail | Maintenance organisation identified to carry out repair & contact detail |

Repair problem description & cause of problem if known

Name and address of contact person for this request

Sheet of

Signature & date

Telephone:
Email:

| | | |
|---|---|---|
| Date entered onto CCAR or REPAIR database:<br><br>CCAR No.:<br>REPAIR No.: | Acknowledgement sent (date)<br><br>Final reply sent | Job opened by (name & sig)<br><br>Job closed by: (name, sig & date) |

Form F023 Part 1 of 2

This form (Part 2 of 2) is the response from RotorSport UK Ltd to a Service Repair and Evaluation/Approval request, which specifies the company authorised repair method. Deviation from this method renders the authorisation ineffective.
Upon completion of the repair the repairer must enter details into the logbook/worksheet with the repair number and sign as normal.
If any problems with carrying out the work authorised, contact RSUK immediately on 44(0)1588 650769, or email info@rotorsport.org.

| Repair No.: | CCAR No.: | Repair classification: **MAJOR** or **MINOR** |
|---|---|---|
| Aircraft type | Aircraft serial No. | |

Repair problem description & cause of problem if known

Service repair authorised by RotorSport UK Ltd

Special tools & Health and Safety requirements, and/or components required for repair:

Quality Inspection requirements after repair:

Service repair authorised by: (name, signature, and date of signature)

| Quality Conformance Manager | Engineering Manager | Chief Test Pilot (where an effect on flight performance or safety) | Structures (where required) | Civil Aviation Authority (if a major repair) |
|---|---|---|---|---|
| | | | | |

| Document completion date: | Issued to: | When | Issuer name | Signature |
|---|---|---|---|---|
| | Internal | | | |
| | CAA | | | |
| | Owners | | | |
| | LAA/BMAA Inspectorate | | | |

Form F023 Part 2 of 2