

# RotorSport UK Ltd

## Service Bulletin

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Upon completion of the action, the person responsible must enter details into the aircraft logbook/worksheet with the SB and/or CAA MPD (Mandatory Permit Directive) 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](mailto:info@rotorsport.org).

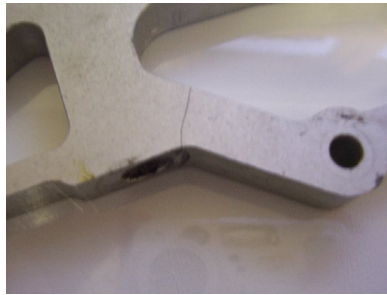
|   |  |  |
|---|--|--|
| <b>SB No.: 027 issue 1</b>  | CCAR No.: None   | Classification:<br><del>OPTIONAL</del> or<br><b>RECOMMENDED</b> or<br><del>MANDATORY</del> |
| Aircraft type & model<br>(applicability)<br>RotorSport UK MT-03and<br>MTOsport series | Aircraft serial Nos. effected<br>RSUK/MT-03/all<br>RSUK/MTOsport all |  |

### Problem description & cause of problem if known

Durability of the MTseries pre rotator has been shown less than ideal due to different operational and setup techniques used in the field. AutoGyro and RSUK have engineered two durability improvements for the pre-rotator system of MT-series aircraft that overcome these issues:

|                             |
|-----------------------------|
| Effective date:<br>01.03.10 |
|-----------------------------|

1) A small number of Pre-rotator Brackets RSD5023 have failed in service by way of a fine crack, originating at a mounting-screw hole and passing across a web – see photo below:



This crack would not result in a flight safety issue but may cause vibration and incorrect function of the pre-rotator. Can be resolved by replacement of Pre-rotator Bracket part number RSD5023 by M.PR01.06.01. (Modification Classification MC-128 refers).

2) Failure of an adhesive bond in Pre-rotator Drive Shaft RSD7082 could result in looseness and damage to the cross-bolt area at the aft end of the shaft. An improved design is now available in which the shaft is a fully-welded construction, available as part number M.PR01.01 (aka BG166). (Modification classification MC-132 refers)



### Availability

There are two routes to implement this service bulletin:

- Pre-rotator Improvement Kit RSD7181. This kit is supplied on a service overhaul basis and in addition to the bracket and shaft includes replacement of any other worn parts. To action this route the whole pre-rotator shaft /bracket assembly should be removed (as described later in this document) and returned to RotorSport UK Ltd. The overhauled assembly will be returned in due course.
- Replacement of the individual components.

### Safety effect

Improved durability

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### Weight and CG effect

None

Action required to implement this bulletin. Note: by CAA Authorised engineer only

1) By means of kit RSD7181 shown below. This is the route recommended by Rotorsport UK



To remove:

1. Make the aircraft safe for work by removal of the Master key and selection of both mags "off".
2. Disconnect the air-pipe from the air-cylinder fitting (simultaneously depress collet and withdraw the pipe).
3. Remove the pivot bolt from the air-cylinder rod-end, retaining all parts in sequential order for replacement.
4. Remove the two M8 mounting bolts together with friction washers and allow the air cylinder to hang free. (There is no need to remove the safety cable).
5. Remove the whole assembly by swivelling to one side and withdrawing from the splined shaft, leaving the drive-belt in place on the pre-rotator pulley.
6. Return the whole assembly to RSUK for inspection and overhaul

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To replace:

1. On receipt of the improved/overhauled assembly unpack and inspect for any transit damage (e.g. bent bracket or shaft)
2. To replace the assembly reverse the sequence "To remove" above.
3. Ensure that the splined shaft is lightly greased (LM grease), new nyloc nuts are used and all plain fasteners have Loctite 243 applied. Check alignment of the drive pulley, which may be adjusted by moving the bracket with the M8 mounting bolts set finger-tight. The two M8 mounting bolts should then be tightened to 25-35Nm.
4. Although there should be no change introduced by fitment of the assembly, check the belt tension and rate of engagement of the pre-rotator system without starting the engine, as described in "To refit" para 8 to para 13 below.

### 2) Implementation as individual parts

To remove:

1. Remove pneumatic pipe from banjo air fitting of cylinder (depress collet and pull airline free).
2. Remove bolt securing safety wire bracket to gearbox.
3. Remove two bolts and friction washers retaining Pre-rotator Bracket to gearbox.
4. Let the cylinder hang from the Lift Arm.
5. Lower assembly sufficiently to remove belt.
6. Withdraw whole assembly from splined shaft.
7. To gain access to the Pivot Bolt remove the Pulley/stub-shaft by removing the cross bolt. Note the position of all spacers/shims and retain in sequential order for replacement.
8. Remove the pivot bolt locknut and unscrew the pivot bolt. As this is retained with Loctite and there is little engagement of the Allen key it may be necessary to apply heat to soften the Loctite.
9. Remove all fittings from the Pre-rotator bracket (brake, 2-off guides, spring and spring mounting).
10. Return the old bracket and drive shaft to RSUK for inspection and disposal.

To refit, reverse the dis-assembly:

1. Refit all fittings to the improved Pre-rotator Bracket using new nyloc nuts
2. Apply Loctite 243 to the pivot bolt and replace. Set operating clearance so that the arm rotates freely with minimum play. Replace and tighten the lock-nut then re-check for free operation.
3. Replace the pulley/stub-shaft using Loctite 638 Retainer in the bearing bore. Replace the spacers/shims and if necessary adjust to give minimum end-float of the improved drive-shaft, then replace the cross-bolt and nyloc nut.
4. Apply a small amount of LM grease to the splines and replace the assembly. Fit the belt.
5. Apply Loctite 243 to the two retaining bolts and attach the Pre-rotator bracket to the gearbox casting. Ensure friction washers are in place. Hand-tighten only.
6. Refit the air cylinder using new nyloc nut and safety wire bolt using Loctite 243. Extend the cylinder fully, it may retract back 1-2mm due to the internal cushion.
7. Check the alignment of the pulleys with a straight edge and adjust the position of the bracket (it is slotted) as required.
8. Check the belt tension as described below and adjust the position of the bracket as required.
  - (i) With air cylinder fully extended grip the belt firmly between finger and thumb.
  - (ii) Using a small rule positioned above the brake sleeve measure between the outer edges of the belt at its narrowest point. The distance should be 88 – 90mm as shown in the photos below
9. Finally tighten the bracket-to-gearbox bolts to 25-35Nm.
10. If this does not result in sufficient tension the rod-end fitted to the cylinder should be moved as far as possible on to the rod thread. Use 8mm A/F and 14mm A/F spanners and reapply Loctite 243.

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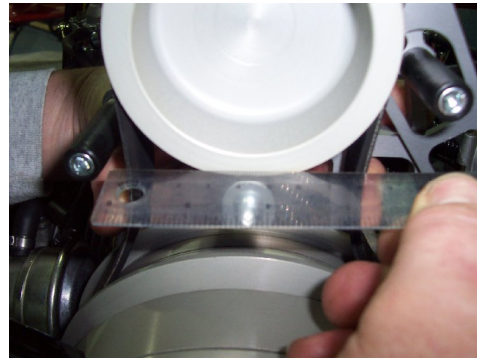
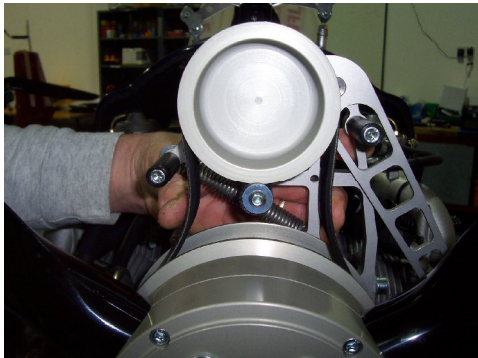
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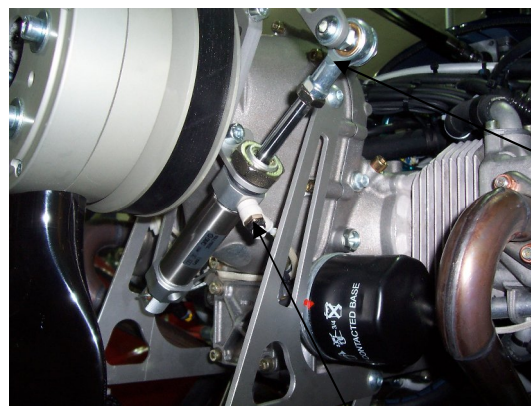
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11. Refit pneumatic pipe to cylinder banjo fitting and verify the pipe is not kinked or trapped.
12. Activate the function of the pre-rotator and verify that the air cylinder still has at least 10mm of travel available
13. Check the rate of engagement of the pre-rotator system:
  - (i) Operate the pre-rotator from the cockpit whilst looking rearwards and measure the time taken for the air cylinder to move fully in tensioning the belt. Note that the cylinder may move in increments, this is normal. The measured time should be 5 – 6 secs.
  - (ii) If the time is incorrect adjust the restrictor fitted to the nose of the air cylinder. To do this release the locking ring and turn the knurled adjuster inwards (clockwise) to increase the time or anti-clockwise (outwards) to reduce the time. If the nominal setting has been lost re-establish by setting the adjustment knob one full turn open from the fully closed position.
  - (iii) After adjustment retighten the locking ring.

**WARNING:** the above procedure must be conducted with the engine stationary and both mag switches selected "off".



Checking the belt tension



The rod-end moved to achieve belt tension

The restrictor used to adjust the rate of engagement of the Pre-rotator system

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Effect on Pilots Handbook or Maintenance Manual?



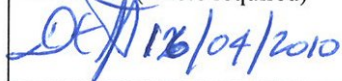
No, other than availability of parts and service kit to be noted in the next issue of the maintenance manual

Service Bulletin Completion action:

Issue Permit Maintenance Release Certificate (use attached worksheet, which also records the check actions taken).

CAA BCAR A3-7 Authorised Person to certify that the work is completed by writing 'SB-027 Pre-rotator improvements incorporated' in the aircraft logbook white pages, and record the action in the pink pages entitled 'Aircraft Modifications'. Both entries must be signed by the CAA Authorised Person together with their CAA Authorisation number.

SB authorised by: (name, signature, and date of signature)

|   |   |  |  |
|---|---|--|--|
| Quality Conformance<br>Manager 14.4.2010<br> | Engineering<br>Manager 14.4.10<br> | Chief Test Pilot (if flight<br>performance or safety effect) | Structures (where required)<br> |
|---|---|--|--|

|                              |            |      |             |           |
|------------------------------|------------|------|-------------|-----------|
| Document<br>completion date: | Issued to: | When | Issuer name | Signature |
|                              | Internal   |      |             |           |
|                              | CAA        |      |             |           |
|                              | Owners     |      |             |           |

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## Service Bulletin

|   |  |   |                         |
|---|--|---|-------------------------|
| Aircraft serial no.<br><br>Registration G-  | <b>Service Bulletin<br/>implementation<br/>Worksheet</b> | Date raised:<br><br>Raised by:                                  |                         |
| Purpose – record service bulletin implementation actions taken to update aircraft and return to service.  |  | Document reference: <b>SB-027</b>                               |                         |
| Maintenance manual referred to and issue level/date:  |  |   |                         |
| Note; attach SB sheets to this document   |  |   |                         |
| <b>Task</b>   | Notes  | Eng'r<br>check/date   | Inspector<br>check/date |
| Confirm which replacement parts have been fitted.   |  |   |                         |
| Confirm pre rotator engages and releases normally when activated from the cockpit   |  |   |                         |
| Confirm Confirm when operated that the smaller drive wheel returns onto the brake.  |  |   |                         |
| Confirm that the cylinder safety restraint wire is in place.  |  |   |                         |
| Confirm drive wheels are in line  |  |   |                         |
| Confirm belt tension set correctly  |  |   |                         |
| Confirm that splined shaft is greased (LM grease) and belt is lubricated (PTFE spray or talc)   |  |   |                         |
| Confirm any other nuts/bolts loosened are retightened securely, and that loctite 243 has been applied.  |  |   |                         |
| Confirm position of restrictor from fully closed (turns out)  |  |   |                         |
| Customer acceptance:<br>Name:<br><br>Signature/date:  |  | Aircraft hobbs meter reading<br><br>Confirm logbooks annotated: |                         |
| <b>Permit Maintenance Release: The work recorded above has been completed to my satisfaction and in that respect the aircraft is considered fit for flight.</b> |  |   |                         |
| Engineer/Inspector signature<br><br>Name:<br>CAA Authorisation code :   |  | Date of work<br><br>Location where work completed               |                         |