RotorSport UK Ltd
Service Bulletin

This form is the response from RotorSport UK Ltd either against a problem found in the product in service requiring a containment or rectification action, or as service information for aircraft modification incorporation. 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 (see instructions below). For help, contact RotorSport on 44(0)1588 650769, or email info@rotorsport.org.

SB No.: SB-053 Iss1	CCAR No.:	Classification: ~~**OPTIONAL or RECOMMENDED or**~~ **MANDATORY**
Aircraft type & model (applicability) MT-03 MTOsport Calidus	Aircraft serial Nos. affected See comments below and refer to Appendix 1 for list of aircraft serial numbers affected.	

Problem description & cause of problem if known

RSUK have been made aware of a possible deficiency in the manufacturing process of main-bearing bolts part number BT696 (original rotor system) . For avoidance of doubt any bolt believed to be affected is to be changed. This will require a simple external visual examination, and if the potential deficiency is confirmed, then replacement is required.

Part numbers affected are:
Zinc-plated main bearing bolt BT696 (M.RK32.12, C.RK08.12) as part of:
Calidus rotor head assembly, original from RSUK/CALS/001
MTOsport rotor head assembly, original from RSUK/MTOS/024, or any repaired with parts made after 06.04.10
MT-03 rotor head assembly, any repaired with parts made after 06.04.10

MANDATORY!

FOR THOSE AIRCRAFT AFFECTED THIS SB MUST BE IMPLEMENTED WITHIN THE NEXT 30 FLYING HOURS, OR WITHIN 3 MONTHS OF THE EFFECTIVE DATE OF THIS SB.

Safety effect:
Improved

Weight and CG effect:
None

Effective date:
25.11.11

Action required to implement this bulletin:

1.Preliminary Inspection

1.1. Before removing any part, check whether the main bearing bolt is black (unplated) or silver coloured (zinc plated). ONLY zinc plated bolts installed prior to the effective date need to be changed

BT696 single split-pin hole (zinc plated)

2. MT-series aircraft

2.1. MT-series with original rotor system:

Remove and replace the rotor-head as described in 2.2 or 2.3 below
Remove and discard bolt BT696 and replace with RSD6361, using a smear of light oil on the bolt shank and exposed surfaces only. Use "3-in-1" oil RSD4531 or equivalent, do not lubricate the thread.

2.2. Dismantling and re-assembly detail

(i) Remove from aircraft

1. Position the aircraft on level ground and apply brakes/chock wheels. Remove the rotor as described in the Maintenance Manual.
2. Disconnect the two control rods at the top joints and tie to the mast.
3. Disconnect the pitch trim cylinder air-pipes noting the relative positions and blank air pipes. Remove the cylinder from its mast mounting (temporarily hold the shaft safety loop in place on the mast)
4. Remove the plug from the rotor-speed sensor and cut any cable ties so that the cable can be held clear and the rotor bearing temperature sensor can be unplugged
5. Remove the cross bolt from the top universal joint (UJ) and tip the rotor-head forwards so that the long drive-shaft comes free from the UJ. Rest the long drive shaft inside the safety loop.
6. Disconnect the 4mm pneumatic pipe from the bendix drive cylinder, blank the open pipe, and tie clear
7. Remove the split pin, and unscrew the nut from the pitch –pivot-bolt. Remove the bolt and lift the rotor-head away from the aircraft
8. NB: on early aircraft the pivot bolt head may be adjacent to the rotor-speed sensor requiring that the sensor is temporarily removed. Before doing this use a feeler-gauge to establish the clearance between the sensor face and the disk and note the orientation of the sensor. As soon as the head assembly is on the bench replace the sensor in the original position. Its face should be clear of the disk by 2 to 3mm.

(ii) Bench work

1. Place a 30mmAF ring spanner on the hex-head bolt on the underside of the rotor-head. Clamp this ring spanner in a substantial vice. Note the orientation of the bolt head.
2. Remove the split-pin from the castle-nut. With an assistant to steady the assembly in the vice, use a 30mmAF socket to unscrew the castle-nut from the bolt. It will be very tight.
3. Carefully lift the assembly on to the bench, remove the M20bolt and M20 plain washer . Keep the aluminium spacer (with bonded-in sensor) inside the bearing.
4. Fit the new bolt through the assembly, replace the M20 washer then fit the castle nut finger tight.
5. Holding the assembly in the vice as described in (1) above orient the bolt head to the required position, tighten the nut to 160Nm +/-20Nm and insert the new split-pin supplied in the kit. Check that the ring-gear/tower rotates freely both with and without the bendix gear engaged. Adjust clearance by slackening the bearing nut and moving the head to suit, and re-tightening.
6. Form the new split-pin supplied in the kit. Back-off to nearest split-pin hole is acceptable but minimum torque 140Nm must be realised. Form pin in nut only as shown in later bulletin photo.

(iii) Reassemble to aircraft

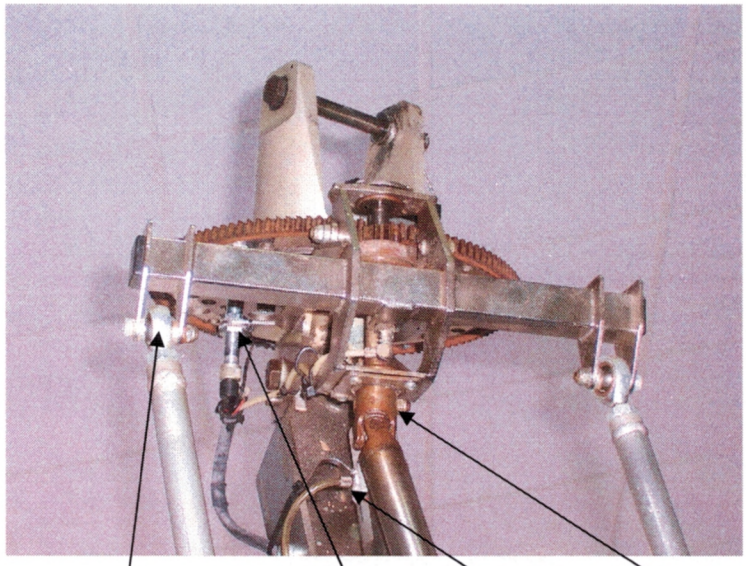
1. Offer the rotor-head assembly to the gimbal-block, replace the pitch-pivot bolt so that its thread is adjacent to the rotor rpm sensor and refit the washers, and castle-nut. Tighten the nut to 15Nm then back-off so that the head moves freely and there is no free-play. Fit the split-pin. Note: Fitting the pivot bolt with its nut adjacent to the rotor-speed sensor is the standard configuration for later aircraft and its reversal on early aircraft is approved under MC-056.
2. Lift the head so that the bendix drive shaft may be engaged then fit the cross-bolt and new nyloc nut/Loctite243. Tighten to 13-15Nm. Refit the bendix cylinder air pipe.
3. Reattach the pitch trim cylinder to its mast mounting using Loctite 243 and a new nyloc nut (M8). Check that the safety loop is correctly positioned
4. Refit the pneumatic pipes to the trim cylinder, confirming correct orientation
5. Refit the electrical cables to the rotor-speed sensor and rotor-bearing temperature sensor. Route and attach the cables with cable-ties so that they are clear of all mechanical movement.
6. Refit the control rods ensuring that all spacers are correctly positioned to allow unrestricted movement of the rod-end bearings. Use Loctite 243 and new nyloc nuts (2-off M6). Paint-mark the nut after tightening.
7. Using the control stick verify that the control system has full-and-free movement and correctly reaches the mechanical stops in pitch and roll. With the stick in mid-position, fully forward, the rotors head is set 1 degree to the left.
8. Verify that the rotor head rotates freely without and binding or bearing noise.
9. Switch on the a/c master switch and check that the trim/brake system functions correctly and that there is no leakage of air pressure. Set the rotor-brake fully on (stick will move forwards) and switch off the master switch.
10. Refit the rotor as described in the Pilots Handbook and Maintenance Manual, positioning the shims provided against the appropriate dot-marks.
11. Complete the inspection sheet appended to this SB to ensure correct task completion

2.3. Alternative process to remove and replace bolt in situ.

1. Position the aircraft on level ground and apply brakes/chock wheels. Remove the rotor as described in the Maintenance Manual.
2. Remove rotor bearing nut split pin, and slacken/remove nut and M20 plain washer . Use a slimmed spanner to locate the bolt head.
3. Remove the pitch bolt split pin, nut and bolt. On early MT's this may also require the removal of the rotor speed sensor as per above item 2.3 (i) 8.
4. Slide the head rearwards, noting that it will not fall off due to the pre rotator restraint strap, and remove the bearing bolt
5. Fit the new bolt through the assembly, replace the M20 washer then fit the castle nut finger tight.
6. Move the heads forwards and replace pitch pivot bolt and nut as per 2.2 (iii) 1.
7. Refit speed sensor if removed, gap to drive wheel is 1-2mm.
8. Orient the bolt head to the required position and holding the bolt with a suitable slimmed spanner, tighten nut to 160Nm +/-20Nm. Check that the ring-gear/tower rotates freely both with and without the bendix gear engaged. Adjust clearance by slackening the bearing nut and moving the head to suit, and re-tightening.

9. Insert the new split-pin supplied in the kit. Back-off to nearest split-pin hole is acceptable but minimum torque 140Nm must be realised. Form split pin in nut only as shown in later bulletin phot.
10. Continue process from 2.2. (iii) 7.

Photographs



MT-03 installation ready for removal

Head assembly held in bench-vice

3. Calidus aircraft

3.1. Calidus with original rotor system

Remove and replace the rotor-head as described in 3.3 below
Remove and discard bolt BT696 and replace with RSD6361, using a smear of light oil on the bolt shank and exposed surfaces only. Use "3-in-1" oil RSD4531 or equivalent, do not lubricate the thread.

3.2. Calidus with original rotor system – alternative approach

Replace rotor system with Rotorsystem II under SB039 (with SB050 if required).

3.3. Dismantling and re-assembly detail

(i) Remove from aircraft

1. Position the aircraft on level ground and apply brakes/chock wheels. Remove the rotor as described in the Maintenance Manual.
2. Cover the canopy with thick fabric to protect against any dropped tools
3. Remove the upper engine cowling and the two mast cowlings
4. Disconnect the pitch control cable. If fitted remove the damper from the rotor head. Note the spacer positions and orientation.
5. Disconnect the pitch trim cylinder air-pipes noting the relative positions, and blank the open pipes. Remove the cylinder from its mast mounting.
6. Disconnect the roll control cable and roll trim cylinder from the rotor head. Note the spacer positions and orientation.
7. Remove the plug from the rotor-speed sensor and cut any cable ties so that the cable can be held clear and the rotor bearing temperature sensor can be unplugged
8. Disconnect the 4mm pneumatic pipe from the bendix drive cylinder, blank the open pipe, and tie clear
9. Remove the split pin, and unscrew the nut from the pitch–pivot-bolt. Remove the bolt and lift the rotor-head away from the aircraft whilst sliding the pre-rotator shaft apart on its splines.

(ii) Bench work

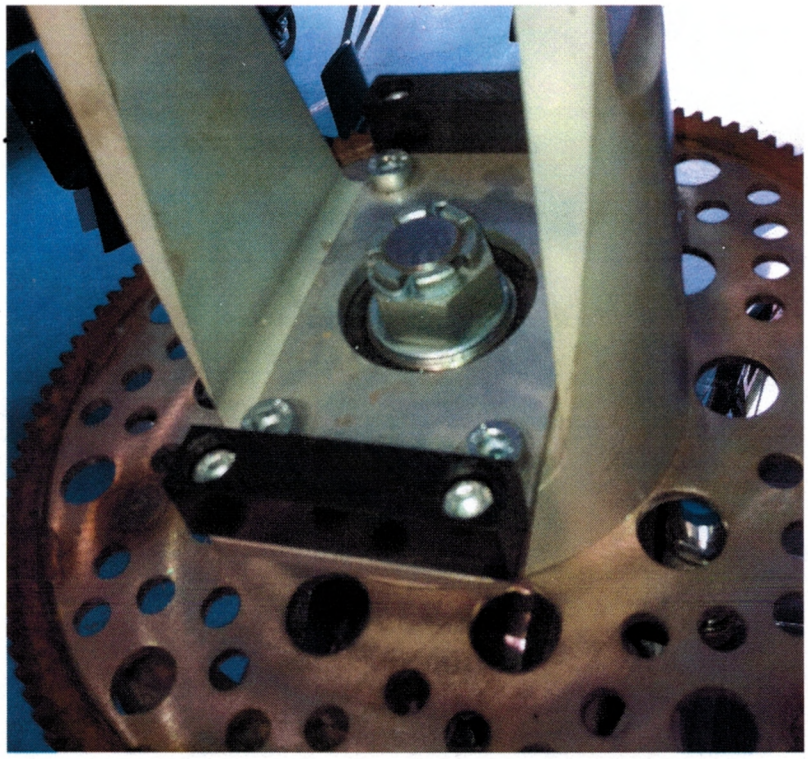
1. Place a 30mmAF ring spanner on the hex-head bolt on the underside of the rotor-head. Clamp this ring spanner in a substantial vice as shown in the photo above. Note the orientation of the bolt head.
2. Remove the split-pin from the castle-nut. With an assistant to steady the assembly in the vice, use a 30mmAF socket to unscrew the castle-nut from the bolt. It will be very tight.
3. Carefully lift the assembly on to the bench , remove the M20bolt, M20 plain washer and aluminium spacer (with bonded-in sensor)
4. Fit the new bolt through the assembly, replace the M20 washer then fit the castle nut finger tight
5. Holding the assembly in the vice as described in (1) above orient the bolt to the required position, tighten to 160Nm +/-20Nm and insert the new split-pin supplied in the kit. Check that the ring-gear/tower rotates freely both with and without the bendix gear engaged. Adjust clearance by slackening the bearing nut and moving the head to suit, and re-tightening.
6. Form the new split-pin supplied in the kit. Back-off to nearest split-pin hole is acceptable but minimum torque 140Nm must be realised. Form pin in nut only as shown in later bulletin photo.

(iii) Reassemble to aircraft

1. Offer the rotor-head assembly to the gimbal-block, engaging the pre-rotator shaft on its splines. Replace the pitch-pivot bolt so that its head is inside the roll arm and oriented so that its flats are held by the sides of the roll arm. Refit the washers, and castle-nut, tighten the nut to 15Nm then back-off so that the head moves freely and there is no free-play. Fit the split-pin.
2. Reattach the pitch trim cylinder to its mast mounting using Loctite 243 and a new nyloc nut (M8).
3. Refit the pneumatic pipes to the trim cylinder, confirming correct orientation
4. Refit the pneumatic pipe to the bendix air-cylinder
5. Refit the roll control cable and roll trim cylinder ensuring that the spacers are correctly positioned and orientated. Use Loctite 243 and a new nyloc nut (M6). Paint-mark the nut after tightening
6. Refit the pitch control cable and damper (if fitted) ensuring that all spacers are correctly positioned and orientated. Use Loctite 243 and a new nyloc nut (M8). Paint-mark the nut after tightening
7. Refit the electrical cables to the rotor-speed sensor and rotor-bearing temperature sensor. Route and attach the cables with cable-ties so that they are clear of all mechanical movement.
8. Using the control stick verify that the control system has full-and-free movement and correctly reaches the mechanical stops in pitch and roll. With the stick in mid-position, fully forward, the rotor head is set 1 degree to the left.
9. Assess the stick force/stiction effect when moving aft and fwds. The stick should be moved slowly away from each end-stop until the "stiction" effect is overcome. The maximum allowable forces are: moving aft 0.9kg, moving fwds 2.1kg. NB: the difference in force is due to the weight of the rotor-head acting on the control cable. If a damper is fitted it should be set to its minimum position for this test then returned to its original setting.
10. Verify that the rotor head rotates freely without and binding or bearing noise.

11. Switch on the a/c master switch and check that the trim/brake system functions correctly and that there is no leakage of air pressure. Set the rotor-brake fully on (stick will move forwards) and switch off the master switch.
12. Refit the mast cowlings and upper engine cowl.
13. Refit the rotor as described in the Pilots Handbook and Maintenance Manual, positioning the shims against the appropriate dot-marks.
14. Complete the inspection sheet appended to this SB to ensure correct task completion

4. All aircraft types – forming of split pin.



Top view of rotor bearing nut with split pin fitted – original rotor system.

Parts required to implement this service bulletin:
1-off RSD6361 IssA1 M20x1.5x84.5 (for original rotor system) to replace BT696 of same geometry
2-off RSD6054 Split-pin 3.2x40
RSD6008 M6 nyloc nut – as required
RSD6009 M8 nyloc nut – as required
RSD4206 2.4mm cable-ties – as required
RSD4207 4mm cable ties – as required
RSD4531 "3-in-1 oil" (or equivalent)

Effect on Pilots Handbook or Maintenance Manual?
None

Service Bulletin Completion action

Issue Permit Maintenance Release Certificate

CAA BCAR A3-7 Authorised Person to certify that the work is completed by writing 'SB-053 Iss1 Main bearing bolt inspection/replacement 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.				
The technical content of this document is approved under the authority of the UK CAA Design Organisation Approval Ref: ***DAI/9917/06***				
SB authorised by: (name, signature, and date of signature)				
Quality Conformance Manager 24/11/11	Engineering Manager 24/11/11	Chief Test Pilot (if flight performance or safety effect) N/K	Structures (where required) 24/11/2011 D. E. STARKEY	
Document completion date:	Issued to:	When	Issuer name	Signature
	Internal			
	CAA			
	Owners			
	LAA/BMAA Inspectorate			

RotorSport UK Ltd
Service Bulletin

Aircraft serial no. Registration G-	**Service Bulletin implementation Worksheet**	Date raised: Raised by:
Purpose – record service bulletin implementation actions taken to inspect aircraft and return to service.		Document reference: **SB-053**
Maintenance manual referred to and issue level/date:		
Note; attach SB sheets to this document		

Task	Notes	Eng'r check/date	Inspector check/date
Record aircraft service hours (from log-book)	Aircraft service hours		
Confirm all electrical cables re-installed and cable-tied (Temperature sensor and rotor-speed sensor)			
Confirm trim cylinder pneumatic pipes re-installed and properly cable-tied.			
Confirm control rods correctly refitted (MT-series) or cables correctly refitted (Calidus) and control system limited by head stops. Confirm pitch and roll pivot bolt and main bearing bolt split pins in place (3-off items)			
Confirm rotor teeter action free and reaching teeter stops. Confirm teeter bolt split pin in place			
Confirm pre-rotator bendix engages and releases and that air-pipe is reconnected (Note Calidus canopy must be closed).			
Confirm all cowlings correctly re-attached (Calidus only)			
Confirm stiction force to move the stick (item 9, page 3 of SB-039 - Calidus only)			
Confirm trim/brake function, rotor speed detection and bearing temperature indication satisfactory			
Confirm logbook entries completed:			

Customer acceptance: Name: Signature/date:	Aircraft hobbs meter reading Confirm logbooks annotated:
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: CAA Authorisation code :	Date of work Location where work completed

PLEASE FAX THIS BACK TO 01588650769 (or send by email to info@rotorsport.org)

Appendix 1 Affected aircraft:

MTseries aircraft with plated bolt

RSUK/MTOS/024	G-CGIC
RSUK/MTOS/025	G-YROA
RSUK/MTOS/027	G-RMTO
RSUK/MTOS/029	G-CGJC
RSUK/MTOS/030	G-DUDI
RSUK/MTOS/032	G-CGPG
RSUK/MTOS/034	G-KIMH
RSUK/MTOS/035	G-CGNC
RSUK/MTOS/036	G-CGNX
RSUK/MT-03/005	G-YROX

Calidus aircraft with plated bolt,yet to be changed to RSII

RSUK/CALS/002	G-YRRO
RSUK/CALS/004	G-CGJD
RSUK/CALS/005	G-YROZ
RSUK/CALS/006	G-KASW
RSUK/CALS/007	G-IROS
RSUK/CALS/008	G-CGJR
RSUK/CALS/011	G-OTTY
RSUK/CALS/012	G-CGLY
RSUK/CALS/014	G-CGLH
RSUK/CALS/015	G-CGMD
RSUK/CALS/016	G-MAKE
RSUK/CALS/017	G-CGUY