# RotorSport UK Ltd Service Bulletin (Permit)

| Title: Improved IVO-prop motor | | |
|---|---|---|
| **SB No.: 098 Iss1** | **Related documents**<br>MC No: 276, 294, MC-323<br>CCAR No.: 064, 066 | **Compliance Category:**<br>~~**OPTIONAL**~~ or<br>**RECOMMENDED or**<br>~~**MANDATORY**~~ |
| **Applicability** | | |
| **Aircraft type & model:**<br>**Calidus, Cavalon** | **Aircraft serial nos. affected:**<br>**Any fitted with IVO-prop prior to 12.07.15** | |

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. For help, contact RotorSport on 44(0)1588 650769, or email info@rotorsport.org.

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

IVO-prop DL3-68 in-flight variable pitch propellers are available as an option for Cavalon and Calidus recreational gyroplanes. The blade pitch of these propellers is changed by means of an electric motor/planetary gearbox/leadscrew driving a simple linkage in the root of each propeller blade. There are no electrical switches limiting blade movement because when the linkage reaches hard-stops in the propeller hub the motor current increases rapidly and is disconnected by a special electronic interface module as soon as the increase is detected.
IVO-props under part number RSD4814 have been fitted to RSUK gyroplanes since January 2014 and there have been a few motor failures in service (as reported in CCAR-064 and CCAR-066). Under modification MC-323 and this SB-098 a motor of improved construction may be fitted to the propeller of an aircraft in service.

## Approval

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

## Manpower estimates

Accomplishment of this Service Bulletin requires the following personnel

(i) A3-7 Authorised engineer

Estimated man-hours to complete the task as a stand-alone item are; 1.5hour.

## Tooling required

Hand tools
Imperial-size spanners and sockets

## Weight and Balance Effects

No effect

## Manuals affected

The aircraft manuals are not affected.
IVO-prop Maintenance Manual RSUK0325 to be raised in issue to recognise the improved motor (part number RSD4848)

## Previous Modifications that affect the SB

None

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**Accomplishment instructions (Action required to implement this bulletin):**

Effective date of this SB is 12.07.15. There is no relevant MPD or other outside body documentation to be referenced.

**Important note: In order that propeller balance is maintained all parts must be re-assembled in the exact order and orientation as removed – mark the components accordingly.**

1. Park the aircraft on level ground and apply the wheel brakes. Remove the engine cowlings for access to the propeller hub and the brush-box assembly (see aircraft AMM)
2. Verify that the two Mag-switches and the Master Switch are OFF
3. Remove the complete propeller from the mounting hub by progressively releasing the six 3/8" AF hex-head bolts/captive nuts. If one bolt is left partially in place as a pivot point at the 12-o'clock position, the propeller may be swung away from the brush-box assembly elliptically, thereby avoiding damage to the fragile brushes. (If in doubt first remove the brush box bracket by releasing the two M8 retaining screws).
4. Transfer the propeller to a suitable work-bench and making reference to the propeller manual RSUK0325 remove the three blades then the motor/gearbox assembly.
   (NB: Service Bulletins SB-083 Fit IVO-prop to Calidus and SB-088 Fit IVO-prop to Cavalon provide further information)

Motor/gearbox assembly removed

5. Using a ½"AF spanner progressively release the three nuts. Tap and pull the end cap then the sleeve off the protruding studs to expose the electric motor

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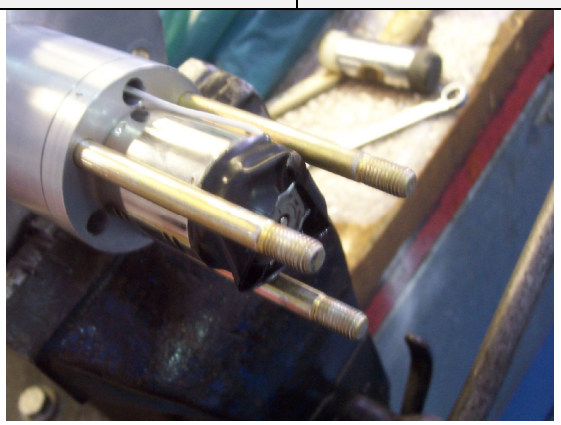
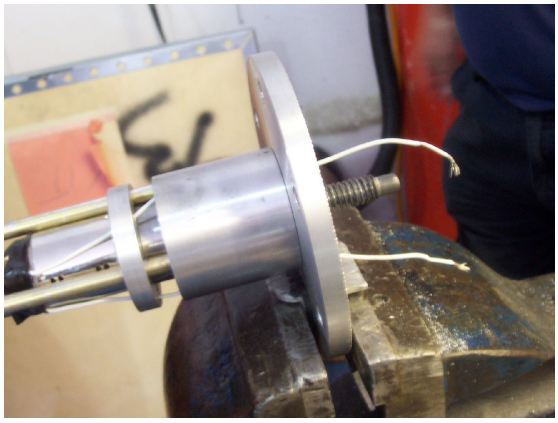


6. Using a plastic mallet tap the end of the leadscrew through the flange until the motor and planetary gearbox are released. **Caution – do not drop the gears! NOTE! The small gear on the end of the motor is a slide fit!**



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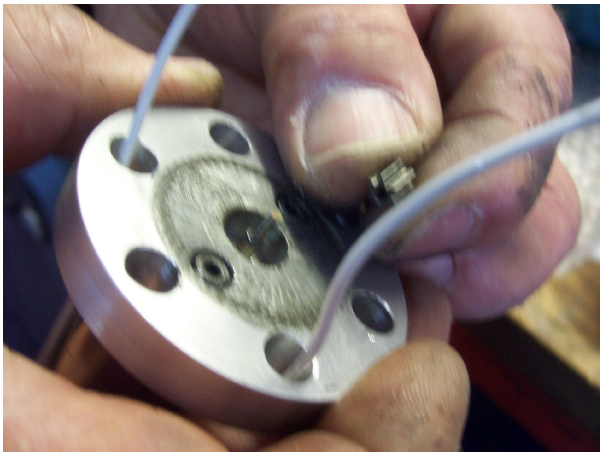
7. Remove the centre pinion then release the two cap-screws retaining the electric motor into the mounting plate. Feed the two electrical cables through the correct holes and fit the new motor to the mounting plate ensuring that the correct PCD threaded holes are selected and Loctite 243 is applied to the threads



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8. Refit the small gear, and reassemble in reverse order. The self-locking nuts may be re-used provided they are undamaged, have sufficient residual torque and Loctite 243 is applied to the threads

9. Using a supply fused at 10A apply 12VDC to the two leads and verify that the leadscrew spins freely in both directions. **Caution: the torque reaction is significant – hold the motor/gearbox securely**

10. Rebuild the propeller and fit to the mounting flange in accordance with the propeller manual and service bulletins. Ensure that the carbon brushes are not damaged when re-mounting the propeller

11. Refit the engine cowlings

12. Before flight and following safe practice a qualified gyroplane pilot must ground-test the propeller in accordance with the instructions in the Pilots Handbook, ensuring that fine pitch selected in the cockpit gives propeller fine pitch (in case the wires are reversed. If this is the case, swop over the connections to the brushbox)

**Alternate process;**

Where suitable soldering equipment is available, the propeller does not have to be removed;

1. Remove spinner (if fitted).
2. Remove the three securing screws for the motor housing, and remove the endplate and casing.
3. Remove the insulation tape from the end of the motor, and unsolder the connections to the motor.
4. Remove the motor and replace as items 6, and 7 above.
5. Remove the black insulation tape, unsolder the wires from the new motor, and solder original wires to the motor. Wrap insulation tape around the end of the motor in a similar manner to that which was removed.
6. Refit casing etc as 8.
7. Refit spinner (if fitted) with Loctite 243 on the screws.
8. Test as 12. above.

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

No parts manufactured during embodiment of this SB

**List of components (with purchasable part nos)**

Improved IVO-prop motor RSD4848

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## Interchangeability

Not affected

## Parts disposition

a) Disposal requirements – return removed motor (RSD4828) to RSUK for credit (subject to satisfactory inspection)
b) Environmental hazards of parts containing hazardous materials. Not applicable
c) Scrap requirements (eg mutilate scrapped items beyond use) – not applicable.

## Documentation (Service Bulletin Completion action)

a) Entries within the aircraft and propeller logbooks, eg CAA BCAR A3-7 Authorised Person to certify that the work is completed by writing *'SB-098 Improved IVO-prop motor fitted"* in the logbook white pages, and record the action in the pink pages entitled 'Modifications'. All entries must be signed by the CAA Authorised Person together with their CAA Authorisation number.

b) Completion of an SB worksheet (reference if attached, This must contain a PMR statement, and a final check item that no tools or equipment have been left within the aircraft)

c) No Permit change application document is required

d) PMR or Permit Flight Release form requirements are noted in b) above

| Document approval signatures | | | |
|---|---|---|---|
| **Engineering Manager**<br>Gerry Speich<br>Jul 27 2015 2:12 PM | **CVE (as required)**<br>**Not required as modification approved under MC-323** | **Chief Test Pilot (if flight performance or safety effect)**<br>**Not required** | **Head of Airworthiness**<br>Andy Lyons<br>Jul 29 2015 5:11 PM |

# Service Bulletin implementation Worksheet

| | | |
|---|---|---|
| **Aircraft type:** | **Serial no:** | **G-** |
| **Worksheet completed by:** | | **Document ref:** |
| **Worksheet cross-checked by (if applicable):** | | **SB-098 Iss1** |

Purpose – record service bulletin implementation actions taken to inspect aircraft and return to service.

| | |
|---|---|
| Maintenance manual referred-to and issue level/date: | Calidus – RSUK0061 Iss6 (published 10/06/14)<br>Cavalon – RSUK0288 Iss4 (published 08/06/15)<br>IVO-prop – RSUK0325 Iss2 (published 30/06/15)<br>(Delete as applicable) |

**Note: attach SB sheets to this document**

| Task | Notes | Eng'r check/date | Inspector check/date |
|---|---|---|---|
| Remove engine cowlings as required for access | | | |
| Remove propeller and check no damage to brushes | | | |
| Record inner and outer shim pack thickness | | | |
| Replace electric motor and verify correct assembly/orientation of the motor/gearbox. | | | |
| Bench test motor/gearbox | | | |
| Reassemble propeller and fit to aircraft in accordance with manual RSUK0325 | | | |
| Refit engine cowlings | | | |
| Ground-test propeller, ensuring the fine pitch selected gives propeller fine pitch, and vice versa. | | | |
| | | | |

| **Customer acceptance:** | |
|---|---|
| Name:<br><br>Signature/date: | Aircraft hobbs meter reading:<br><br>Confirm logbooks annotated: |
| **Permit Maintenance Release:**<br>***'The work recorded above has been completed to my satisfaction and in that respect the aircraft is considered fit for flight. I confirm that no tools, equipment or debris have been left in the aircraft'*** | |
| Engineer signature and date:<br><br>CAA PMR Authorisation ref : | Location where work completed |