Motor issues update

N. Gandolfo – IJCLab - 10/11/2022

CM10 Motor reminders

- « CM10 Motor » is common alias for the motor #170944229 that failed on cryomodule CM10 during qualification tests.
- It was mount on CTS2 (DSPK-TUN-15).
- It has been replaced during July at ESS by another motor LN2 qualified.
- It is now part of an test plan to give on the reason of the failure and help to clarify the situation in order to state the future of the already qualified cryomodule.

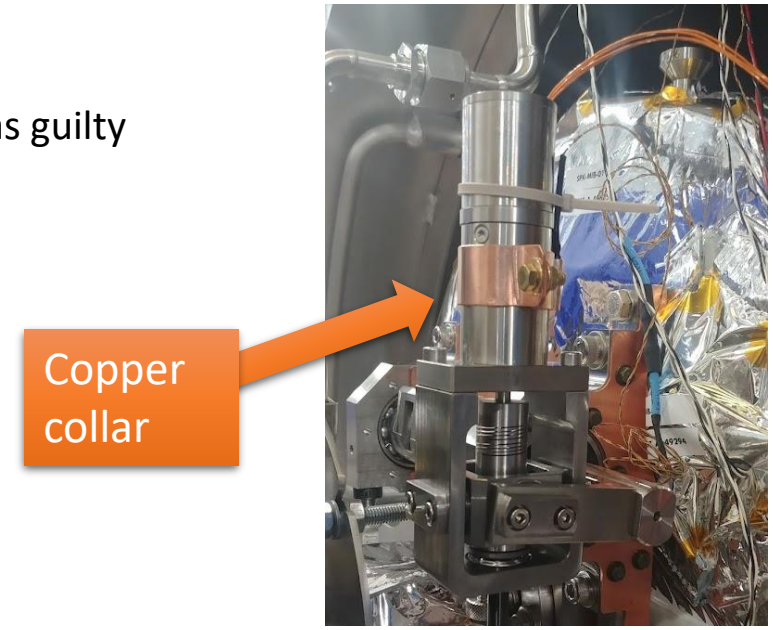
CM10 Motor test plan

Test plan description :

- Test the motor at LN2 again, until it fails, then warm-up.
- Remove the copper collar suspected by Phytron about the failure.
- Test it again.
  - If it fails again, collar is not guilty
  - If it does not fail, probably the collar was guilty

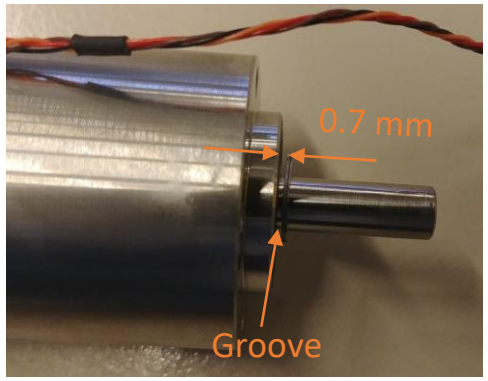
Test plan execution :

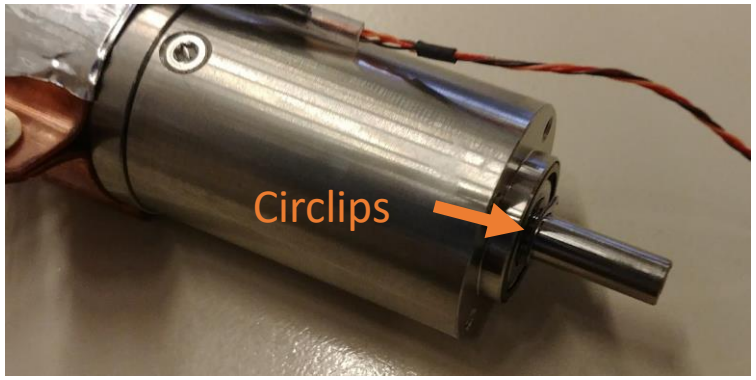
- Done : Motor failed very quickly, only at LT
- Done BUT… large axial play found on the shaft…



Axial play issue

After removing the motor support, the gearhead circlips has been found out of its groove, allwing then an axial displacement of the shaft of about 0.7 mm.





There is no clear explanation of when and why did it happened, two ideas :

A. Wrong assembling from Phytron : should have been seen when cabling, testing and assembling the motor to the tuner.

B. Undesirable force pushing toward the motor : not possible in nominal operation, still possible in weird configuration. For instance : if the disengage system is moved and then closed at non home position and the motor is not at home position and it goes back in negative direction, then it could be possible... but no probable.

Since we are doubting of the cause and consequences of this, we just replaced the circlips by « new » one (borrowed on another motor), and go for retesting in same condition.

CM10 Motor test plan updated

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Test plan execution :

- We are back here, next news early next week after cooling down.

Furthermore, new theory, new tests

There are serious doubt about the shaft tilting possibility that could damage the internal pinions (dry coating).

There are some discrepancies about the adjustment arrangement between shaft, bearing and housing around the front of the motor (gearbox bearing) from proto to serie, but also from batch to batch.

New set of parts have been designed and fabricated in order to mitigate the tilting possibilities, and validate this theory.

Tilting measured ~0.6°

Motor side view