

MINUTES

MQYYM MAGNETIC MEASUREMENTS

TECHNICAL REVIEW

JUNE 14TH 2017 AT CEA

Summary

The goal of this review was to validate the design of the adaptation parts aiming at adapting the CERN magnetic measurements equipment to the CEA test facility. The review was also the opportunity to discuss about the CEA test facility, the possible CERN support and how the tests will be driven at CEA. We list here the comments and the recommendation of the reviewers along with the action items proposed by the design team to address them.

Participants:

- **CERN:** L. Fiscarelli, O. Dunkel, A. Foussat (reviewers)
- **CEA:** H. Felice, D. Simon, J.M. Gheller, P.Graffin, D. Bouziat, A. Madur, M. Kazazi, C. Lorin

Authors: D. Simon, H. Felice, J.M Gheller

Distribution: J.M Rifflet + Participants

Agenda :

- **Presentation of the magnetic measurements system at cold for the MQYYM tests and review of the drawings**
- **Discussion on warm magnetic measurements**
- **Schedule and conclusion**
- **Visit of the CEA winding facility and presentation of the MQYYM Coil 0**
- **Visit of the test facility**

1 COMMENTS ON CEA ADAPTATION DESIGN FOR MAGNETIC MEASUREMENTS:

Comment #1: The below of the part furnished by the CERN and linking the motor to the sealing electrical connections of the rotating coils is not flexible enough to create an angle large enough to recover a severe misalignment of the motor. This below was made for the LHC magnet measurements which did not need a large angle (~ 1 mrad). In the present CERN set-up, the MRU is free to move at the top and can compensate a misalignment.

Comment #2: The cylindrical INA bearing in permaglide that was planned to be used by CEA for centering the probe does not allow the probe to have any angle and if the bearing is not perfectly vertical the probe will not be vertical neither.

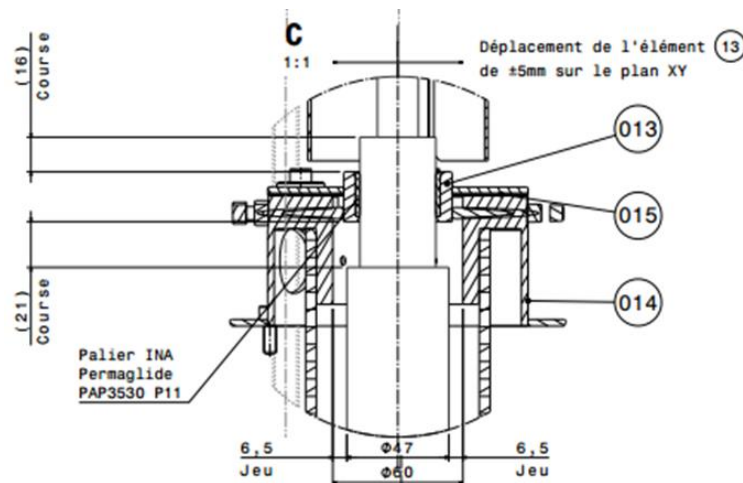


Figure 1: Centering of the probe

Comment #3: To be sure that all the system is working and that the shaft is turning well and continuously without too much frictions, a test at 100K could and should be planned.

Comment #4: The probe and all the associated wiring are very fragile. To avoid damaging the wires, a strongback should be considered to rigidify the probe during handling.

Comment #5: The wires are not twisted all along and the current leads are in the vicinity of the untwisted pairs. It would be important to check the lack of effect on the current leads on the wiring.

Action item #1: A below has to be added between the motor and the sealing electrical connections of the rotating probe.

Action item #2: The alignment of the rotating probe with respect to the magnet has to be done by using a spherical INA bearing rather than a cylindrical one.

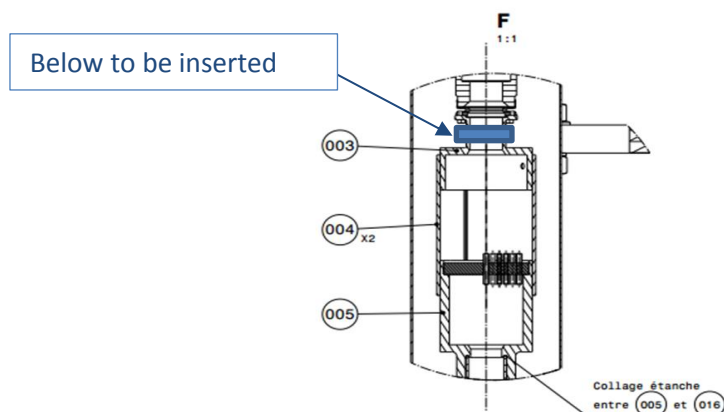


Figure 2: Sealing electrical connections of the rotating coil to the motor

Action item #3: The system will be tested at warm and at cold to be sure that there will not be any problem for the rotation of the shaft.

2 COMMENTS ON WARM MAGNETIC MEASUREMENT:

- Comment #1:** The tube where the probe will be insert has to be procured.
- Comment #2:** The support of the magnet for the magnetic measurements at warm has to be procured.
- Comment #3:** The collared aperture and the whole magnet will be measured
- Comment #4:** Lucio and Olaf have in mind a probe which could be used for the warm MM.

- Action item #1:** The 927 CERN's team could help the CEA to find a tube and supports for the magnet warm magnetic measurement.
- Action item #2** The probe that CERN wants to use have to be calibrated befor measurements.
- Action item #3 (CERN):** provide info on the dimension of the probe usable for the warm magnetic measurements.

3 COMMENTS ON THE PROCUREMENT OF THE PARTS

CERN has validated the CEA adaptation design and has given their green light to procure the parts pending that the modification proposed during the review are made. The procurement of the parts is planed to be done during summer 2017.

The rotating probe have already been send by CERN in Saclay. The motor and the part which link the motor to the electrical connection will be send when CEA will be ready to make a blank test and rotate all the magnetic measurments system. This will avoid that the motor and the adaptation part remain unuse while CERN needs it.

In the same way all the acquisition sytem for the magnetic system (one bay) will be send by CERN only when the MQYYM magnet will be ready to go back at CEA Saclay.

4 SCHEDULE

A updated new agenda schedule of the MQYYM fabrication and of the MQYYM warm and cold magnetic test has been presented (figure 3). This schedule is optimistic and depends on the availability of CERN team and of the reception on time of the magnet components to be procured.

	2017						2018				
	July	August	Sept	October	Nov	Dec	Jan	Feb	March	April	May
Fabrication of 4 coils for MQYYM											
All components and tooling at CERN				x							
Collaring* incl mech measurement of the coils + connection box											
Warm magnetic measurements											
Yoking											
Magnet at CEA								x			
Magnetic Measurement Acquisition System at CEA								x			
Cold test preparation											
Cold test and cold magnetic measurements											

Figure 3: MQYYM schedule pending availability of the CERN team. To be discussed with JC Perez and N Bourcey

5 COMMENTS ON CERN SUPPORTS AND TRAINING

CEA will be in charge the magnetic measurement of the MQYYM in Saclay. Nevertheless a minimum of two to three week training on CERN equipment and on the magnetic measurement is necessary. The training could be done on warm and cold magnetic measurements. D. Simon wil follow a training with L. Fiscarelli after September 2017.

CERN will send at Saclay an engineer one or two days at the very beginning of the CEA magnetic measurement to initialise the magnetic measurement hardware and software. Moreover L. Fiscarelli and O. Dunkel will be present partially to support the CEA new team for the warm magnetic measurement made at CERN.

6 COMMENTS ON THE TEST FACILITY VISIT

The test facility, where the MQYYM magnet will be tested, has been presented. There will have enough space to place the CERN acquisition bay close to the station. The alimentation and the DCCT system have been presented. The DCCT system will have to give informations to CERN acquisition bay. The alimentation have to be controled and some current profiles have to be programmed.

Action item #1 (CERN): provide typical test plan and current cycle so that CEA can start the discussion with the test facility team to implement the required parameters