At the last TB agreed to move the PLC cabinet and the Dewar to the clean room.
Visits from Jean-Ives and several days spent by S. Ravat and L. Deront + young collaborator
Cooling system of silicon trackers: WP

WP elaborated by EP-DT: EDMS document(s)
2467122 v.1 "Workpackage agreement for EP-DT support to COMPASS" by Giovanna LEHMANN MIOTTO

2.2 Cold Silicon Tracker cooling control system

The cooling system of the Cold Silicon Tracker was built, commissioned and operated by CEA, the purpose is to cool down silicon detector modules with liquid nitrogen at a working temperature of 20 K. It is composed of a control rack, a valve box to distribute nitrogen to detectors and a dewar.

This system was dismantled in 2016. Travel difficulties due to the SARS-CoV-2 pandemic combined with the fact that CEA does not intend to continue ensuring the maintenance of this system in the long-term led COMPASS to require support from the EP-DT team to re-commission/refresh the system for the 2021. It is nevertheless understood that COMPASS will find a solution within the collaboration for operations and 24/7 response during running of the experiment it is not envisaged that EP-DT will only help re-installing the system and will apply several improvements for better cable and connections management.

The technical responsible in EP-DT for this work is Sylvain Raveau.

Tasks to be carried out by EP-DT/DE:

1. Assessment of the situation (starting already in 2020)
   - Carry out a complete analysis of the existing installation,
   - Compare it with the available documentation,
   - Perform, carry out a cables inventory,
   - Repair all damaged cables/connections
   - Carry out a first examination of the system to validate signals.
2. Improve system safety and maintainability
   - The current safety valves are closed by default and require a 48V power supply to be opened. Nevertheless, the safe position for the valves in this application is to be open. An uninterruptible power source needs to be supplied, in order to keep the detector safe during power outages. It is proposed to change the valves to a model that is open by default, thus eliminating the need for a safe 48V line.
   - Cables are at present directly connected to the equipment: this approach is not suited for devices that are regularly displaced. It is proposed to install patch panels at the PLC rack, valve box and at detectors 0, 3, 5.
   - The space available to make a patch panel at the detectors side is still to be checked with COMPASS.
3. Installation, test, commissioning
   - Install and connect the cooling system in its final position,
   - Check the PLC program to add or modify DataBlocks for DCS communication;
   - Re-wire the vacuum interlock system of the pumps;
   - Test of all signals with the PLC.

CEA still needs to provide support, as experts of the system. The contact person from CEA is Jean-Yves Roux. In particular, CEA has to provide:

- The original, last working PLC Program;
- The cabling documentation;
- Technical advice and information for aspects that are not fully documented;
- Expertise during commissioning.

3.2 Cold Silicon Tracker cooling system

Ravat will supervise the work on the EP-DT side. In collaboration with S. Levorato, EP-DT/DE personnel is not charged to COMPASS but is estimated for internal book-keeping: it is expected that this work will require 3 staff months (M. Deron, S. Ravat), for preparation, development, PSU supervision, validation, commissioning and follow-up with COMPASS.

Real costs will be billed directly to COMPASS on budget code 10x.

<table>
<thead>
<tr>
<th>Material</th>
<th>6000 CHF</th>
<th>Cables, connectors, patch panels, etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSU hours</td>
<td>220 h</td>
<td>Manufacturing in workshop and cabling installation</td>
</tr>
<tr>
<td>Total</td>
<td>17000 CHF</td>
<td></td>
</tr>
</tbody>
</table>

Valves ordered already
TUM account