|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name of Meeting**:  XFEL Working Group for LINAC operations | |  | | **Date:** | | 26.01.2012 | |
|  | |  |  | **Location:** | | 362/30b | |
|  | |  |  |  | |  | |
| **Meeting Chair:** | | **Participants** | | **Distribution List:** | | | |
| H. Schlarb | | Wolf-Dietrich Moeller, Andre Goessel, Stefan Choroba, Lutz  Lilje, Brunhilde Racky,  Kay Rehlich, Holger Schlarb, Julien Branlard  Excused: Joerg Eckoldt  Missing: Tobias Schnautz | | Wolf-Dietrich Moeller, Bernd Petersen, Stefan Choroba,  Holger Schlarb, Lutz Lilje, Kay Rehlich, Brunhilde Racky, Richard Wagner, Hans-Joerg Eckoldt, Markus Huening, Winfried Decking, Torsten Limberg, Michael Dressel | | | |
| **Minutes taken by:** | |
| H. Schlarb / J. Branlard | |
| **Review by:** | |
|  | |
| **Status:** draft | |
|  | |  | |  | | | |
| Topic: | | 5th Meeting of working group for XFEL linac operations Couplers | | | | | |
|  | |
|  | |
| Agenda: | | Approval of last meeting minutes Couplers  Discussion | | | | | |
|  | |
| No | Action Item | | | Due | Responsible | | Ref. |
| 1 | Review of minutes from last meeting: minor corrections. A couple of open points have been answered:  - it is not possible to reduce to one absorber instead of two per RF station.  - a connection in series of the absorbers is not allowed  It was also mentioned that it should be possible to start commissioning of the klystron into a load without personnel interlocks. This implies special arrangement with the radiation protection group | | |  |  | |  |
| 2 | General announcements:  - There is a meeting Friday Jan. 27 on cabling issues for personnel interlock in XTL to XHM. The outcome of this meeting should clarify who is responsible for the interlock cables.  - M. Huening mentioned that the RF gun was expected to be turned on as soon as possible. (~Spring ’13). | | |  |  | |  |
|  |  | | |  |  | |  |

| **No** |  | **Keyword** | **Description** | **Responsible** | **Date** | **Status** |
| --- | --- | --- | --- | --- | --- | --- |
| 3 | I | Couplers | Presentation about power couplers and the technical interlock system | Wolf-Dietrich Moeller |  |  |
|  |  | Presentation | - The XFEL couplers are mostly the same as for FLASH, except for the photomultipliers which are removed. They were too sensitive to radiation (triggered by beam losses) and too expensive.  - Several sensors are attached to the coupler for commissioning and safe  operation  - The specified range for the QL motors is Qext = 1e6-1e7. By experience, the total range is around a factor of 10 but the maximum values vary from coupler to coupler |  |  |  |
|  |  | Commissioning and installation | - The couplers are initially tested and conditioned on the test stand at LAL  - They are then re-commissioned at AMTF. The AMTF test uses the same interlock instrumentation as for the XFEL but different electronics  - The module installation was presented. The installation of the cable tree is still unclear but a series of meeting was started to address this issue. |  |  |  |
|  |  | Remarks | - How to ensure cable and sensors integrity and functionality of the interlock after transport and installation into the XTL?  - The QL motors need end-switches before mechanically movement is possible.  - The resonance motors do not have end switch, their excursion range is implemented in the PLC |  |  | O |
| 4 | I | Technical Interlock system | - Technical Interlock: TIL. The interlock system covers the RF operation of the module not just the main power coupler.  - The TIL is distributed into a master and slave subsystems  - An RS422 connection will be used for interlocking  - Prevision for future installation of a HV coupler bias to avoid potential multi-pacting. This HV bias will not be installed at the beginning (only after 2-3 years of linac operation) but will require an interlock because of the high voltage (between 3-4kV)  - Two vacuum pumps per cryo string are foreseen  - There is an option for the LLRF to get direct access to the TIL if the two systems are sitting in neighboring racks.  - Installation requirements: water, electricity + grounding, sensors, Ethernet, timing, MPS | Andre Goessel |  |  |
|  |  | Open points | - How the “cryo ok” signal is generated? Who generates it should be addressed at TC  - How to ensure that the MPS is in a reliable operation mode when coupler conditioning starts?  - How to protect piezo if the cryo temperature information is bypassed for warm coupler conditioning? 🡪 separate the cryo OK logic for the TIL and for the LLRF  - The TIL needs a calibrated power measurement of the klystron forward power for every cavity. This can be calculated using a calibrated power measurement at each arm of the klystron and the waveguide power distribution table. MHFp foresees a power meter for each klystron arm, but not for all cavities.  - The forward power waveforms are also required from the LLRF 🡪 this should be included in the klystron lifetime management development  Remark from MHFp: any new interlock requirements concerning the klystron power has to be communicated ASAP since production is imminent. |  |  | O |
|  |  | Discussion | Vacuum operation is only possible when the racks for controls are installed |  |  |  |
|  | I | Information from follow up email | The measurement in one place of the WG distribution is enough, as long as the forward power value can be recalculated for each cavity with the help of the known power distribution of the WG system.  The requirements for this power measurement are:   * independent of the pulse shape, length and rate * measurement of the peak power value of the RF pulse (Pmax where dt <=2us) * show real power measurement (i.e. one should see noise if the RF is off for more than 1 sec, not the last value) * The power should be detected for every RF pulse length (20, 50, ... , 1300 usec), so the power should be detected power for a minimum RF pulse width of 10 usec, and up to 2ms * The measurement repetition rate is 1 to 10Hz, if possible. And should also be available for a single RF shot * The frequency range depends on klystron (1.3GHz +/- 10MHz ??) * The power dynamic range (on the cavity) goes from 200W to the maximum output power of the klystron * A measurement resolution of 0.1dB is required. |  |  |  |
|  |  |  |  |  |  |  |