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Design of the control system for the cryogenic distribution systems of the European XFEL project

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The European XFEL project launched on June 5, 2007 will require four large cryogenic distribution boxes, two smaller cryogenic boxes, five feed- and end caps and six string connection boxes for the cryogenic system. For operating and diagnostic all cryogenic instrumentation is connected to Profibus. The cryogenic boxes are manufactured by several companies inside and outside of Europe. All instrumentations like temperature sensors, flow-transmitters, valve-controllers and so on are checked before assembly. All instrumentation is prepared in such a way that it can be easily integrated into the process control system.

The process control system EPICS (for Experimental Physics and Industrial Control System) is used to control and operate the cryogenic plant and all its subcomponents. A complementary component of EPICS is the Open Source software suit CSS (for Control System Studio). CSS is an integrated engineering, maintenance and operating tool for EPICS. CSS enables local and remote operating and monitoring of the complete system and thus represents the human machine interface.

More than 300 PROFIBUS nodes are foreseen to operate in the XFEL cryogenic facility. DESY will install an elaborate diagnostic and condition monitoring system. With these diagnostic tools it will be possible to examine the correct installation and configuration of all PROFIBUS nodes in real time. The condition monitoring system based on FDT/DTM technology shows the state of the PROFIBUS devices at a glance. This information will be used for preventive maintenance which is mandatory for continuous operation of the XFEL facility.

This paper will describe all steps form engineering to the facility acceptance tests and the first commissioning.

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