A PROGRAMMABLE LOGIC CONTROLLER-BASED SYSTEM FOR THE RECIRCULATION OF LIQUID C6 F14 IN THE ALICE HIGH MOMENTUM PARTICLE IDENTIFICATION DETECTOR AT THE LARGE HADRON COLLIDER

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Abstract

We present the design and the implementation of the Control System (CS) for the recirculation of liquid C6F14 in the HMPID. The HMPID is a sub-detector of the ALICE experiment at the CERN-LHC and uses C6F14 as Cherenkov radiator medium in twenty-one quartz trays for the measurement of the velocity of charged particles. The primary task of the Liquid Circulation System(LCS)is to ensure the highest transparency of C6F14 to ultraviolet light. In order to provide safe long term operation a PLC-based CS has been implemented. The CS supports both automatic and manual operating modes,remotely or locally. The adopted Finite State Machine approach minimizes the possible operator errors and provides a hierarchical control structure allowing the operation and monitoring of a single radiator tray. The LCS is protected against anomalous working conditions by both active and passive systems. The active ones are ensured via the control software running in the PLC whereas the human interface and data archiving are provided via PVSS, the SCADA framework which integrates the full detector control. The LCS has been fully commissioned over the last two years and proved to meet all requirements.

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