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Design and deployment of a slow protection layer for a 100 MeV LINAC safety at KOMAC

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The Korea Multipurpose Accelerator Complex (KOMAC) operates a 100 MeV proton linear accelerator that accelerates proton beams from an ion source through a radio frequency quadrupole (RFQ) and drift tube linacs (DTLs). The accelerated beams are delivered to target rooms via beamlines to provide proton beam services to users. To enhance equipment protection and operational stability, a Machine Protection System (MPS) has been established. A Slow MPS has been additionally developed to handle slow response fault conditions including vacuum degradation , cooling system failure and power supply failures.
The system is implemented using industrial programmable logic controllers (PLCs) equipped with embedded Linux CPUs, and EPICS IOCs are executed within the PLC environment. Interlock signals from PLC ladder logic are delivered to the EPICS IOC using shared memory and PLC generated interrupts. The Slow MPS operates independently of the fast protection system and is integrated into KOMAC's EPICS based control system. This paper describes the implementation of the Slow MPS and integration with the EPICS based control system at KOMAC.

Footnotes

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