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C3Po1B-08: New process instrumentation with Profinet APL for EPICS

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The cryogenic facilities at DESY in Hamburg (Germany), originally built for the HERA accelerator, is now in operation for more than four decades. Starting in 2005, the commercial control system and the 4.20 mA based process instrumentation were renewed step by step. DESY chose the free and open source software suite EPICS (Experimental Physics and Industrial Control System) for the control system. The process instrumentation was replaced by PROFIBUS fieldbus devices. For almost 20 years, the PROFIBUS fieldbus components have proven the very high reliability and robustness of PROFIBUS process instrumentation in 24/7 continuous operation. In terms of reliability, PROFIBUS is still state of the art today. However, new requirements such as Industrial 4.0 demand higher transmission rates right down to the process device level. With the release of the PROFINET-APL (Application Physical Layer) specification, it is now also possible to connect process instrumentation directly to Ethernet networks via a 2-wire connection. PROFINET provides the infrastructure to connect intelligent sensors and actuators directly via Ethernet to the free process control system EPICS. This paper describes which requirements are necessary to successfully connect PROFINET-APL to the process system EPICS. The required modification, PROFINET driver, I/O configuration and I/O cabling are described.

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