

**PROCESS AUTOMATION OF A 600 A HTS CURRENT LEADS
CRYOGENIC TEST FACILITY USING A FIELD NETWORK WITH
SMART INSTRUMENTATION.**

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- The Large Hadron Collider (LHC) currently under construction at CERN will make use of 1700 main superconducting magnets distributed around the 27 km tunnel, operating in superfluid helium below 2 K. Several thousand sensors and actuators will thus be spread throughout the tunnel. Therefore it is important to investigate industrial field networks. Such networks should provide considerable simplification in the cabling and maintenance requirements, compared with typical point to point connections between controllers and field devices. Although geographically concentrated, the types and diversity of sensors, actuators and control loops, found in the control system for the 600 A HTS current leads test facility (HTS600), are representative of the foreseen LHC cryogenic plant control. The HTS600 was then chosen as a pilot project to evaluate the performance and compatibility of both hardware and software solutions offered by Industry for field networks, integrated within a typical LHC cryogenic control system. This paper reports on the control system for the HTS600, that includes a Programmable Logic Controller (PLC), implementing 20 closed control loops, and a Profibus DP/PA network interconnecting 50 sensors and actuators from different manufacturers. These devices can be calibrated and parameterised remotely through the Profibus network. In view of lack of maturity of both the PA devices and the available software, this is the first complex Profibus DP/PA network that has been implemented and commissioned at CERN.