



**SURF DESIGN STANDARD
SPECIFIED MANUFACTURERS OF
INDUSTRIAL CONTROL SYSTEM COMPONENTS**

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1.0 PURPOSE & SCOPE

1.1 Purpose

The purpose of this design standard is to list the permitted manufacturers of components utilized in new installations of industrial control systems at the Sanford Underground Research Facility (SURF). The purpose of standardizing industrial control system component manufacturers at the SURF is to:

- Maximize compatibility, interoperability, safety, and quality.
- Create hardware commonality and reduce spare parts inventory.
- Utilize a common software platform for programming, operator interfaces, and control system integration.
- Reduce the training needed to operate, maintain, and troubleshoot the control systems.

1.2 Scope

This design standard applies to components of industrial control systems used to monitor and control operations at the SURF. Specific components that this standard applies to can be found in Section 3.0.

2.0 DEFINITIONS

2.1 Programmable Logic Controller (PLC)

An industrial computer control system that continuously monitors the state of input devices and makes decisions based upon a custom program to control the state of output devices. Depending on the inputs and outputs, a PLC can monitor and record run-time data such as machine productivity or operating temperature, automatically start and stop processes, generate alarms if a machine malfunctions, and more. PLCs are a flexible and robust control solution that can be adapted to almost any application.

2.2 Human Machine Interface (HMI)

A user interface or dashboard that allows a person to monitor and control a machine, system, or device. In industrial settings, HMIs can be used to:

- Visually display data
- Track production time, trends, and variables
- Monitor machine inputs and outputs
- Display and allow for the resetting of system alarms
- Provide password protected access to process displays and allow for interaction with specific process devices

HMIs include dedicated field mounted display terminals, software based applications installed on desktop computers, and graphic HMI screens accessed as Internet/Intranet web pages.

2.3 Electric Power Quality Meter (PQM)

A device or component used to continuously measure, monitor, and analyze the quality of power available on a portion of a power distribution system. Measured and monitored variables may include current, voltage, real and reactive power, energy use, cost of power, power factor, and frequency. This device may include displays and relays for alerting of detected power quality disturbances. Power quality

disturbances include voltage sag, short interruptions, sustained interruptions, notching waveform distortions, voltage swell, harmonic waveform distortion, voltage fluctuation, noise waveform distortion, and voltage imbalance.

3.0 COMPONENTS WITH MANUFACTURERS SPECIFIED

The manufacturer(s) listed under each component below shall be specified and used on all new construction projects at the SURF.

- 3.1. *Programmable Logic Controller (PLC)***
 - Allen Bradley / Rockwell Automation
- 3.2. *Human Machine Interface (HMI)***
 - Allen Bradley / Rockwell Automation
- 3.3. *Electric Power Quality Meter (PQM)***
 - Allen Bradley / Rockwell Automation