



# SEL-2414 Transformer Monitor Guideform Specification

The microprocessor-based device shall provide monitoring, control, and automation. Self-checking functions shall be included. Specific requirements are as follows:

**Front-Panel Visualization.** The transformer monitor shall be capable of displaying measured values, calculated values, I/O statuses, device status, and configuration parameters on a front-panel LCD display. The display shall have a rotating capability to display custom messages and data. Thirty-two display messages shall be provided. The front panel shall also have a minimum of six user-programmable LEDs and four user-programmable pushbutton controls.

**SELOGIC Programming Language.** The transformer monitor shall be capable of implementing a wide variety of logic and control functions using the tools available in the SELOGIC Programming Language. Logic shall have the ability to use math functions, comparison functions, and Boolean logic functions. Boolean logic loop execution time shall be  $\leq 5$  ms.

**Automation.** The transformer monitor shall include 32 local control logic points, 32 remote control logic points, 32 latching logic points, 32 counters, 32 math variables, 64 logic variables, and 64 timers.

**Small Form Factor.** The transformer monitor shall have a compact case with quick-disconnect connectors for analog and digital I/O to simplify installation.

**Flexible I/O.** The transformer monitor shall be configurable based upon end-user application requirements.

**Analog Inputs.** As an option the transformer monitor shall have the ability to support 32 current or voltage (jumper selectable) analog inputs. The allowed signal input range is  $\pm 20$  mA,  $\pm 10$  volts, or  $\pm 300$  volts.

**Analog Outputs.** As an option the transformer monitor shall have the ability to support 8 current or voltage (jumper selectable) analog outputs. The allowed signal output range is  $\pm 20$  mA or  $\pm 10$  volts.

**IRIG-B Synchronized, Timestamped Events.** The transformer monitor shall store up to 512 event records with IRIG-B synchronized timestamps. An internal real time clock shall be used for time stamping if an IRIG-B signal is not available.

**Sequential Event Recorder.** A chronological report shall be provided by the transformer monitor to help determine the order and cause of events and assist in troubleshooting. The last 512 input, output, and element events shall be recorded with 1 ms accuracy.

**Metering.** The transformer monitor shall include metering capabilities for real time current, voltage, power, and energy qualities, as well as phase demand and peak demand current values for all ac current and voltage inputs.

**RTD.** As an option, the SEL-2414 shall have the ability to support up to 10 RTD inputs with an internal SELECT I/O card or 12 RTD inputs in an external module (SEL-2600 series) for temperature measurements.

**Event Record.** The transformer monitor shall store up to 15 cycles of raw data with 16-sample/cycle resolution. Up to 17 most recent events are timestamped and stored in nonvolatile memory.

**Voltage Inputs.** Optional voltage inputs shall accept 0–300 Vac.

**Current Inputs.** Optional current inputs shall accept 0–5 A or, optionally, 0–1 A nominal current inputs.

**Digital Relay-to-Relay Communications.** The transformer monitor shall have eight transmit and eight receive logic elements in each of two communications ports for dedicated relay-to-relay communications. These elements shall be available for use in control logic.

**DNP3.** The transformer monitor shall be capable of operating as a DNP3 Slave Level 2 either serial or LAN/WAN. The device shall allow configuration of any incoming data or data calculated within the device to be available through any of three custom DNP data maps. All control points within the transformer monitor shall be available as DNP3 control points using latch on/latch off, pulse on/pulse off, or trip/close control functions. SER data shall be available as timestamped DNP event data.

**Modbus.** The transformer monitor shall be capable of operating as a Modbus slave either through a serial connection or Modbus TCP via Ethernet. The Modbus slave implementation shall allow direct access to any register within the device. The Modbus implementation shall allow control of any control point within the I/O processor and controller.

**IEC 61850 Ethernet Communications.** The device shall provide IEC 61850 compliant communications. The IEC 61850 capability shall include GOOSE messaging and defined logical node data points.



**PC Software.** The transformer monitor shall include compatibility with a PC software program for use in programming control settings and logic functions, and retrieving event data. The PC software is available, but not required to use the transformer monitor.

**Operating Temperature.** The transformer monitor shall have an operating temperature range of  $-40^{\circ}$  to  $+85^{\circ}\text{C}$  ( $-40^{\circ}$  to  $+185^{\circ}\text{F}$ ) and a power supply input operating voltage range of 85–264 Vac/85–275 Vdc.

**Specification Compliance.** The transformer monitor front panel shall meet NEMA 12/IP54. The programmable automation controller shall be type tested to sections of C37.90, IEC 60255, IEC 60068, and IEC 61000 standards.

**Warranty.** The transformer monitor shall have a minimum 10-year warranty.

