SEL Smart Grid Solutions

Integrate Automation, Control, and Monitoring Solutions

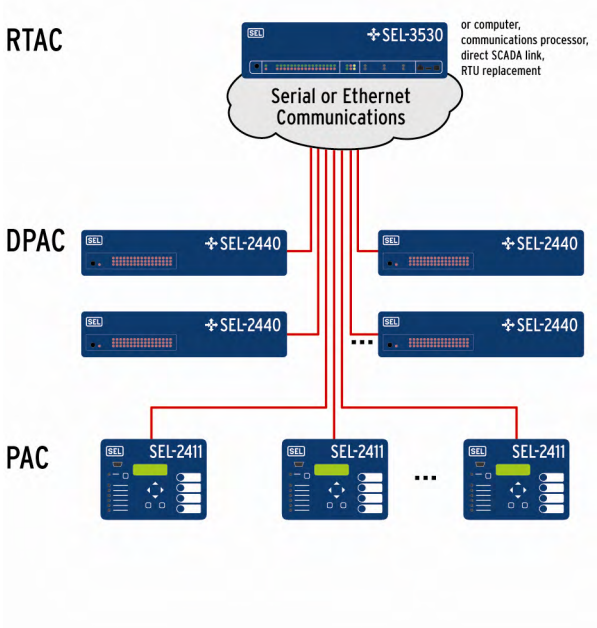
Smart grids need smart I/O. The SEL-2411 Programmable Automation Controller (PAC) and SEL-2440 Discrete Programmable Automation Controller (DPAC) provide intelligent, flexible, and rugged monitoring control functions at a low price.

Intelligent I/O provides far more benefits than traditional I/O in today's substation by increasing reliability, reducing costs, and improving functionality. Intelligent I/O provides for automatic control, SCADA communications, sequential events reporting, station integration, remote monitoring and control, and local interaction.

Critical automation, control, and monitoring solutions are available today at an economical price with the SEL-2411 and SEL-2440. SEL's utility-grade PACs withstand vibration, electrical surges, fast transients, and extreme temperatures and meet stringent protection relay standards.

Replace legacy RTUs, remote I/O, SERs, and PLCs with two complementary SEL PACs. Automatically control station auxiliaries, replace traditional latching relays, eliminate external timers, add annunciation, perform logic and math control functions, and more. For analog transducers and ac metering requirements, leverage the rugged SEL-2411 with ten available analog and digital I/O cards.

Use both the SEL-2440 and SEL-2411 for intelligent I/O requirements in your substation. Both provide rugged and reliable I/O solutions at an economical price. SEL PACs are hardened to meet stringent IEEE and IEC tests for harsh environments and are backed by SEL's no-questions-asked, worldwide, ten-year product warranty.



Features

- High reliability, rugged design, and low price
- Many input, output, and logic choices
- Critical reporting and logging
- Powerful communications and integration
- Increased security protection
- Simple commissioning
- Flexible mounting options

Applications

- Distributed I/O
- I/O expansion
- Remote terminal unit (RTU)
- Programmable logic controller (PLC)
- Auxiliary relay and contact multiplier
- Controller for breakers, switches, and security
- Advanced ac metering and analog transducer replacement (SEL-2411)

Smart Solution Price

The SEL-2440 DPAC with 48 I/O digital points starts at $960. The SEL-2411 PAC starts at $2,500 for 32 analog points. The SEL-2411 or SEL-2440 mounted in a fiberglass NEMA enclosure starts between $2,000 and $4,000. Complete I/O replacement solutions for 512 I/O points (384 DI and 128 AI) using SEL-2440 DPACs and SEL-2411 PACs with an SEL-3530 Real-Time Automation Controller (RTAC), SEL-2407® Satellite-Synchronized Clock, and 44U rack start at $28,000.

www.selinc.com
info@selinc.com
+1.509.332.1890

Smart Solution: Automation, Control, and Monitoring Guideform Specification

Inputs/Outputs. The device shall support a combination of inputs and outputs (48 I/O with the SEL-2440 and up to 37 I/O with the SEL-2411). Device inputs shall be optoisolated, polarity independent, and support ac and dc control signals. Device outputs shall be rated for 30 A make and 0.3 A break operation.

SELOGIC® Control Equations. The programmable automation controller shall be capable of implementing a wide variety of logic and control functions using the tools available in SELOGIC control equations. Logic shall have the ability to use math functions, comparison functions, and Boolean logic functions. Boolean logic loop execution time shall be ≤5 ms for the SEL-2411 and ≤2 ms for the SEL-2440.

Automation. The programmable automation controller shall include 32 local control logic points, 32 remote control logic points, 32 latching logic points, 32 counters, 32 math variables, 32–64 logic variables, and 32–64 timers.

IRIG-B Synchronized, Time-Stamped Events. Time stamps shall be time synchronized to the IRIG-B input with microsecond resolution and accuracy with the SEL-2440 or millisecond resolution and accuracy with the SEL-2411.The programmable automation controller shall store up to 512 event records with IRIG-B synchronized time stamps. An internal real-time clock shall be used for time stamping if an IRIG-B signal is not available.

Small Form Factor. The device shall have a compact case with quick-disconnect connectors for quick and efficient installation and replacement. Connectors shall have positive retention to ensure that connections are not lost due to sagging cables.

Sequential Events Recorder (SER). A chronological report shall be provided by the device to help determine the order and cause of events and assist in troubleshooting. The last 512 input, output, and other events shall be recorded with microsecond accuracy (SEL-2440) or millisecond accuracy (SEL-2411).

Distributed Network Protocol (DNP3). The device shall be capable of operating as a DNP3 Level 2 Outstation, 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 DNP3 data maps. All control points within the device 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 time-stamped DNP3 event data.

Modbus®. The device 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.

Operating Temperature. The device shall have an operating temperature range of –40° to +85°C (–40° to +185°F).

PC Software. The programmable automation controller 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 programmable automation controller.

Specification Compliance. The device shall be type-tested to sections of IEEE C37.90, IEC 60255, IEC 60068, and IEC 61000 standards. The SEL-2411 front panel also shall meet NEMA 12/IP54.

Warranty. The programmable automation controller shall have a minimum ten-year warranty.

SEL-2411 PAC Specific

Front-Panel Visualization. The transformer monitor shall be capable of displaying measured values, calculated values, I/O status, device status, and configuration parameters on a front-panel LCD. The display shall have a rotating capability to show custom messages and data. Thirty-two display messages shall be provided. The front panel shall also have a minimum of 6 user-programmable LEDs and 4 user-programmable pushbutton controls.

DC Analog Inputs. As an option, the programmable automation controller shall have the ability to support 32 current or voltage (jumper selectable) analog inputs. The allowed signal input range is ±20 mA, ±10 volts, or ±300 volts.

DC Analog Outputs. As an option, the programmable automation controller shall have the ability to support 8 current or voltage (jumper selectable) analog outputs. The allowed signal output range is ±20 mA or ±10 volts.

RTD. As an option, the SEL-2411 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 RTD Module) for temperature measurements.

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

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