# SEL-2411

## Programmable Automation Controller


## Complete control and monitoring solution for power and industrial automation systems

- High-speed, programmable logic and dependable data acquisition for fast monitoring and control of your plant or substation.
- Dependable communication to SCADA systems and distributed control systems (DCSs) using IEC 61850, DNP3, or Modbus protocols.
- Flexible I/O options to fit your application requirements.
- Convenient local setting, monitoring, and control using the 5-inch, 800 × 480 color touchscreen display, programmable LEDs, and pushbuttons.
- Provides reliable operations in harsh environments with a rugged design that withstands vibrations, electrical overloads, transients, and extreme temperatures.

# Key Features

### Flexible Logic Programming

Easily program the SEL-2411 with powerful logic, math, timer, counter, and edge-trigger functions. Implement logic with SELOGIC® control equations or standard logic gates using the ACSELERATOR QuickSet® SEL-5030 Software graphical logic editor.

### Flexible I/O Configuration

Select I/O options to meet your system requirements. Options include digital or analog outputs; digital, analog, resistance temperature detector (RTD), and ac currents; and ac voltage inputs.

### Event Analysis

Conduct postevent analysis more efficiently with detailed event records. The SEL-2411 has a Sequential Events Recorder (SER) that stores up to 512 SER reports of digital input transitions, time-tagged to the nearest millisecond. You can send the SER data to a communications processor or computer for system analysis.

### Reliable in Harsh Environments

Designed and manufactured to reliably operate in harsh physical and electrical environments, the SEL-2411 withstands vibration, electrical surges, fast transients, and extreme operating temperatures of −40° to +85°C (−40° to +185°F) and meets stringent industry standards. In addition, the SEL-2411 is Underwriters Laboratories (UL) Class I, Division 2-certified for use in hazardous and potentially explosive environments.

### Designer Templates

Use QuickSet to create designer templates of your settings and hide all settings that do not need to change for common applications. The SEL-2411 retains a copy of the template in internal memory.

### Simple Commissioning

Access complete configuration functions on the front panel, and display settings, measurements, and calculated values. The SEL-2411 is also easily set with QuickSet.

### Flexible Mounting Options

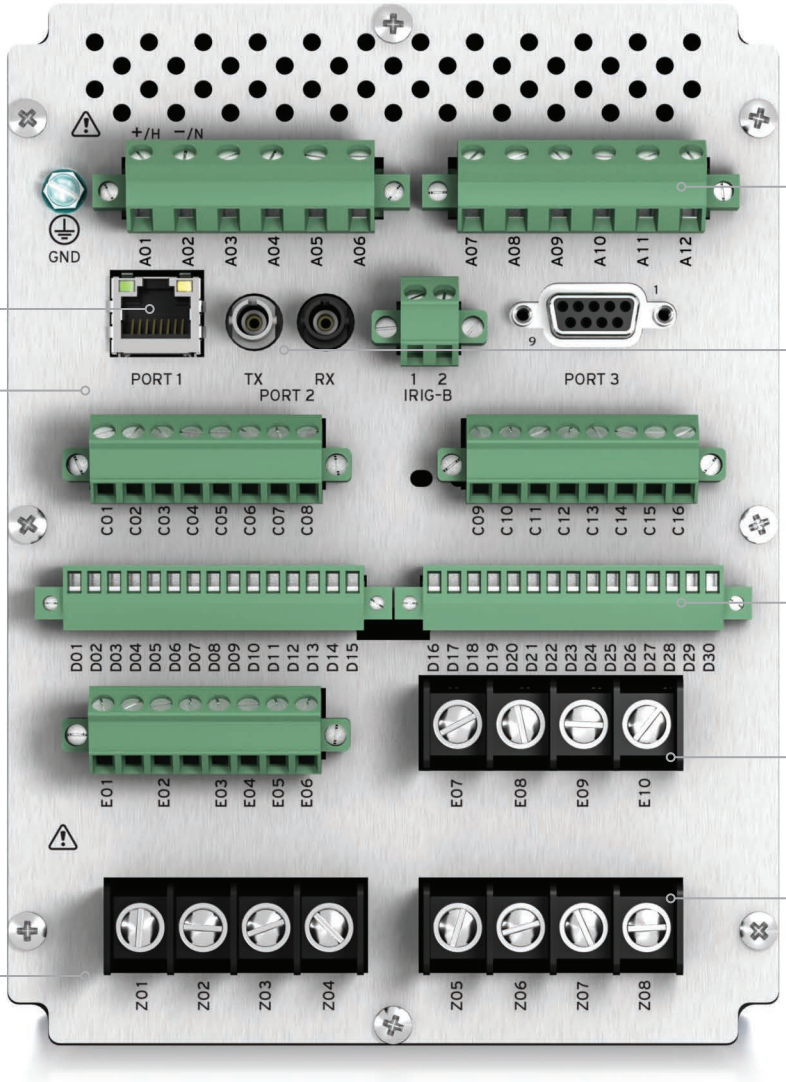
Mount the SEL-2411 into multiple existing locations using our complete line of mounting kits and adapters. Choose from rack-mount, surface-mount, wall-mount, indoor, and outdoor configurations.

# Overview


Optional horizontal chassis is available.
2 × 16 character LCD provides navigation, control, data, and diagnostics via default messages or customizable display messages.
Simple front-panel navigation provides operator access to settings and operational data.
Programmable front-panel LEDs with user-configurable labels alert operators to conditions.
Programmable operator pushbuttons with user-configurable labels allow front-panel customization.
SEL
SCHWEITZER ENGINEERING LABORATORIES
SEL-2411
PROGRAMMABLE AUTOMATION CONTROLLER
SEL-2411
TARGET RESET
ESC
ENT
ENABLED
LED 1
LED 2
LED 3
LED 4
LED 5
LED 6
PB 1
PB 2
PB 3
PB 4
PORT F

Wide variety of protocols and media options allow communication with other devices and control systems.

Four available slots for SELECT™ I/O cards expand application options.




Standard I/O includes three digital outputs and two digital inputs.

Optional fiber-optic serial port provides quick and easy access.

Ten RTD input card option increases I/O.

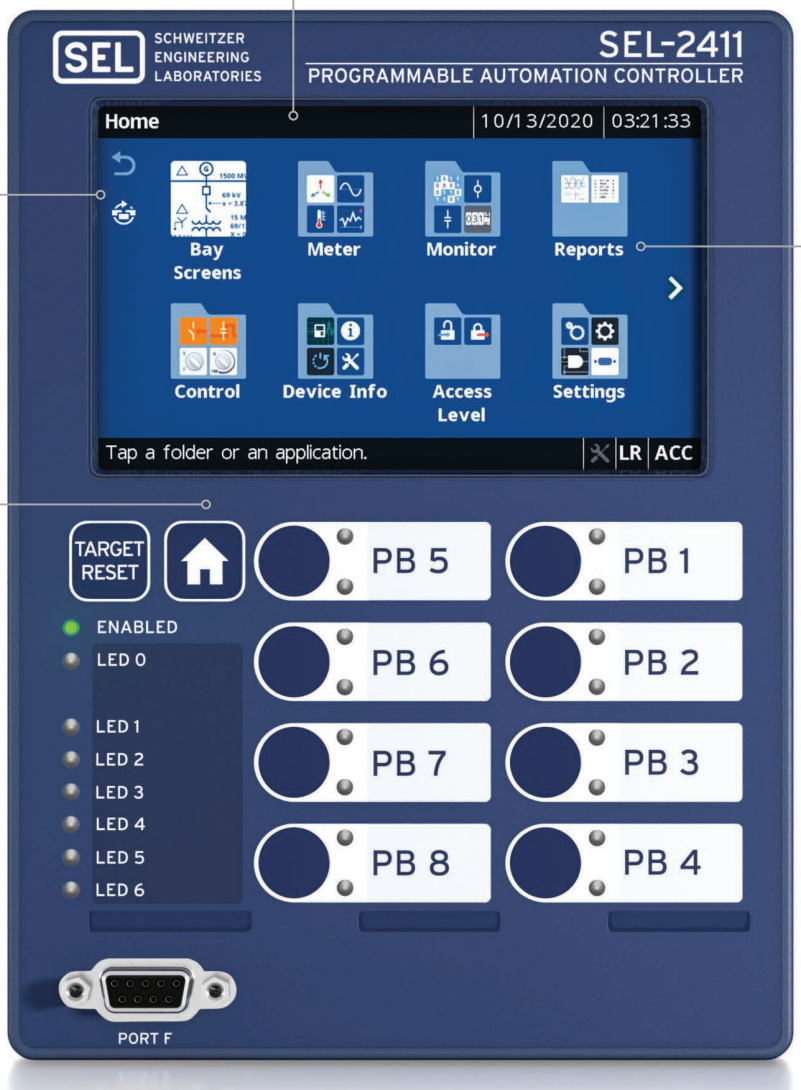
Three ac current/3-phase ac voltage input option.

Four ac current input option.

The 5-inch color display with a resolution of 800 × 480 offers direct navigation via a capacitive touchscreen.

A full onscreen keyboard facilitates easy adjustment of settings.

The home pushbutton allows users to easily return to the default home screen.




Folders and applications provide quick access to bay screens, metering and monitoring data, reports, settings, and more.

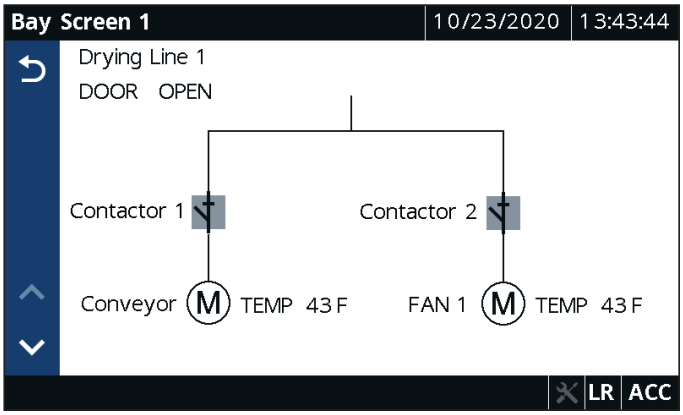
# Touchscreen Display Features and Functions

The SEL-2411 5-inch, 800 × 480 color touchscreen display mimics a one-line diagram for bay control and monitoring. With it, you can view metered quantities, phasor diagrams, device settings, event summaries, target statuses, and SER data.

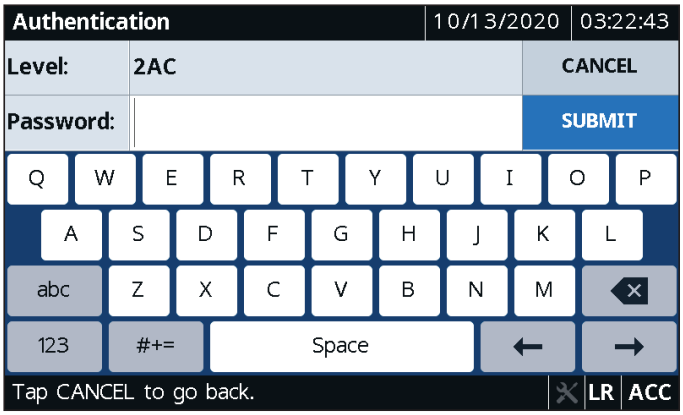
### Bay Screens and Bay Control

Select from predefined bay screens, or configure as many as five custom bay screens using the ACSELERATOR® Bay Screen Builder SEL-5036 Software and ACSELERATOR QuickSet® SEL-5030 Software. You can control one breaker, eight two-position disconnects, and two three-position disconnects and can view analog and digital data in a contextual display.

To control a breaker or disconnect, simply tap the Bay Screens application on the home screen and then the breaker or disconnect you want to control.

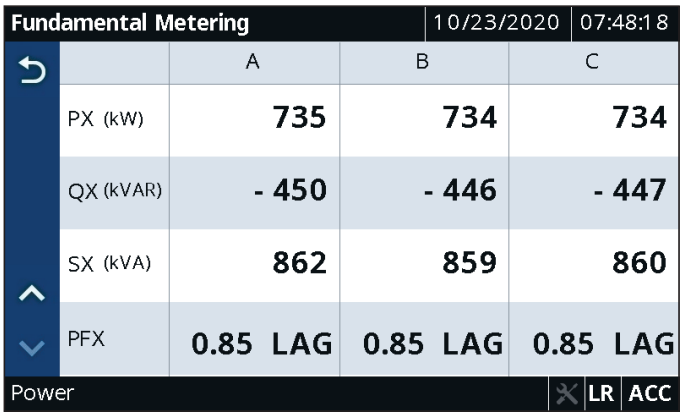



Next, enter your Level 2 password and tap Submit. The onscreen keyboard allows you to quickly and easily enter passwords, search for Relay Word bits, and enter settings.



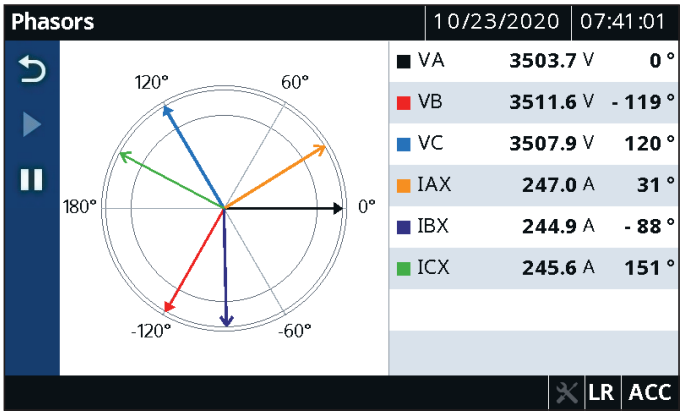
### Meter Fundamentals

View the real, reactive, and apparent power of each phase in your system, and monitor the power factor information to determine if the phase current leads or lags the phase voltage.



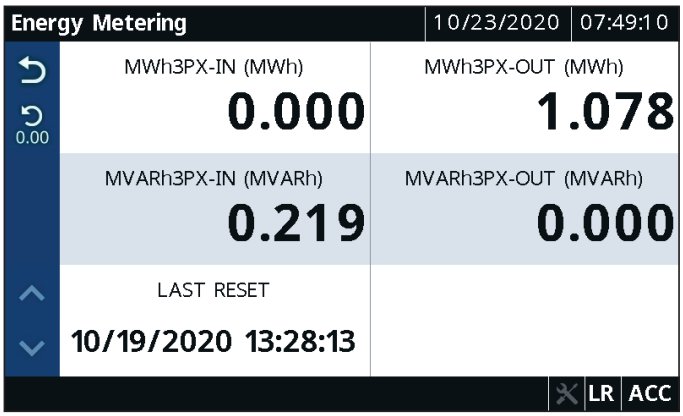

### Meter Phasors

View a graphical and textual representation of the real-time voltages and currents in a power system during balanced and unbalanced conditions. By analyzing the phasors, you can determine power system conditions.




### Meter Energy

Display the real, reactive, and apparent energy metering quantities imported and exported by your system. You can reset the energy values via the display and record the time and date of reset. Whether your system is a net energy producer or consumer, metered quantities accurately account for the power system energy flow.



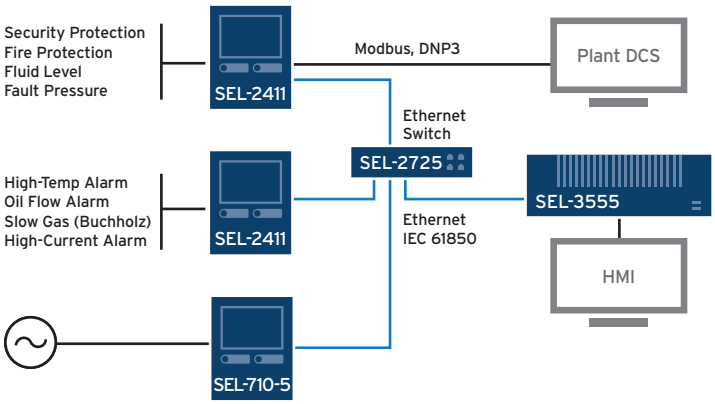
# Applications

### Generator and Industrial Plant Monitoring, Control, and Reporting

Implement automatic control or data acquisition using high-speed, deterministic logic with a very reliable device, instead of lower-reliability, slower programmable logic controllers (PLCs).

Sense pressures, temperatures, fluid levels, or other process values with dc analog inputs. Report them to your SCADA system or DCS, and include them in local automatic control equations as set points, feedback, or other variables.

Measure ac currents and voltages with the SEL-2411 to calculate three-phase watts and VARs for reporting and control logic. You can also implement underfrequency load-shedding, voltage, or VAR control; back up electrical protection; and record waveform profiles.

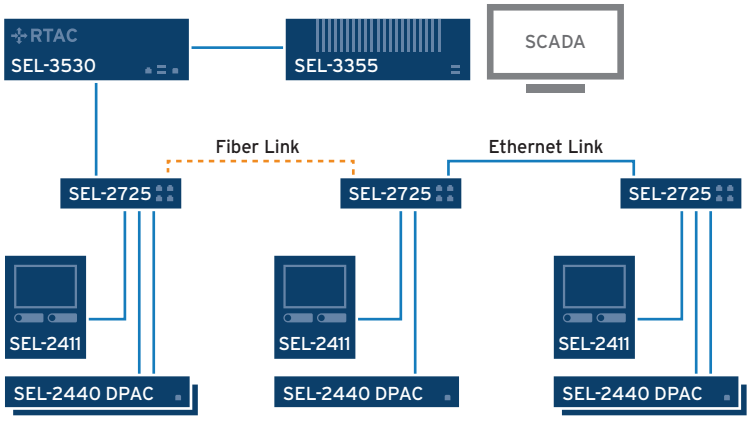



Plant monitoring and reporting example.

### Electrical Substation SCADA, Report Retrieval, and Engineering Access

Instead of settling for a remote terminal unit (RTU), use SEL communications processors, embedded automation controllers, relays, remote I/O modules, and the SEL-2411 for higher reliability, lower cost, and more functions. An RTU provides only remote I/O for SCADA without the benefit of the other functions available in a distributed SEL system. With the SEL-2411, you can:

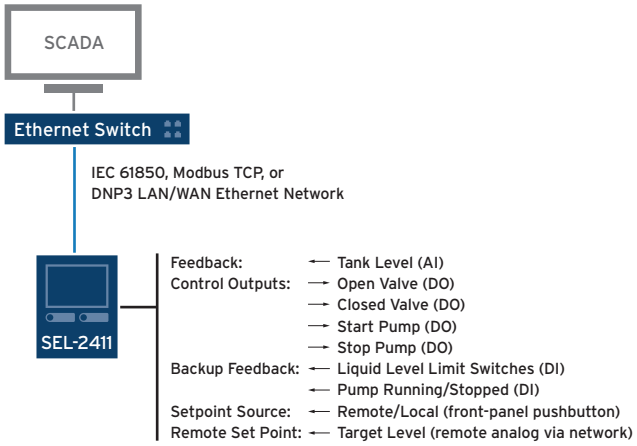
- Provide digital and analog I/O to SEL communications processors.
- Implement high-speed automatic control loops with SELOGIC control equations using combinational logic, analog comparison, edge-trigger, and timer functions.
- Manage protection and control settings, retrieve and file power system reports, time-tag changes to the nearest millisecond, and directly access devices for engineering maintenance.




Distributed substation SCADA example.

### RTU With Local Control

Apply the SEL-2411 as an RTU with local control and monitoring. Provide remote control and monitoring to a SCADA system over IEC 61850, Modbus, or DNP3 protocols. Save training, spare parts, and maintenance costs with SEL-2411 controllers instead of PLCs or dedicated controllers. The SEL-2411 offers a built-in HMI and pushbuttons to provide local control and display.




RTU example.

# Retrofit Replacement Kits

Mount the SEL-2411 into multiple locations using our complete line of mounting and enclosure options.

No cutting or drilling is required when you use the optional mounting kits. Replacing existing devices is quick and easy!

Visit **selinc.com/applications/mountingselector** to see the complete selection of mounting and enclosure kits.

# Specifications

| General Specifications | |
|---|---|
| **Displays** | 2-line × 16-character LCD<br>5-inch color touchscreen display, 800 × 480 pixels |
| **AC Current Inputs** | 5 A or 1 A |
| **AC Voltage Inputs** | 300 Vac or 8 Vac |
| **Power Supply** | **125—250 Vdc or 120—240 Vac**<br>Input voltage range: 85—300 Vdc or 85—264 Vac<br>**24—48 Vdc**<br>Input voltage range: 19.2—60.0 Vdc |
| **Communications** | Two EIA-232 ports and a third optional EIA-232/EIA-485 port using one expansion card position.<br>Single or dual Ethernet ports:<br>10/100BASE-T port<br>100BASE-FX fiber-optic port<br>Optional fiber-optic serial communications port |
| **Protocols** | Standard: Modbus RTU, Modbus TCP, DNP3, DNP3 LAN/WAN, MIRRORED BITS® communications, SEL Fast Meter, SEL Fast SER, SEL ASCII and binary communications, Parallel Redundancy Protocol (PRP), firmware-based Precision Time Protocol (PTP), and Rapid Spanning Tree Protocol (RSTP)<br>Optional: DNP3 Level 2 Outstation and IEC 61850 |
| **I/O Plug-In Cards** | Four card slots using the following cards:<br>8 analog inputs (AI)<br>8 digital inputs (DI)<br>14 DI<br>8 digital outputs (DO)<br>4 DI and 4 DO<br>4 AI and 4 analog outputs (AO)<br>3 ac voltage inputs<br>4 ac current inputs<br>3 ac current and 3 ac voltage inputs<br>10 RTD inputs<br>RTD/TC inputs |
| **Operating Temperature** | IEC performance rating −40° to +85°C (−40° to +185°F)<br>Class 1, Zone 2 rating of −40° to +70°C (−40° to +158°F)<br>Note: LCD contrast is impaired for temperatures below −20°C (−4°F) and above +70°C (+158°F). |
| **Dimensions** | **Horizontal Panel Mount**<br>Height: 144 mm (5.67 in)<br>Width: 192 mm (7.56 in)<br>Depth: 147.4 mm (5.8 in)<br>**Vertical Panel Mount**<br>Height: 192 mm (7.56 in)<br>Width: 144 mm (5.67 in)<br>Depth: 147.4 mm (5.8 in) |
| **Mount** | Panel mount |

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