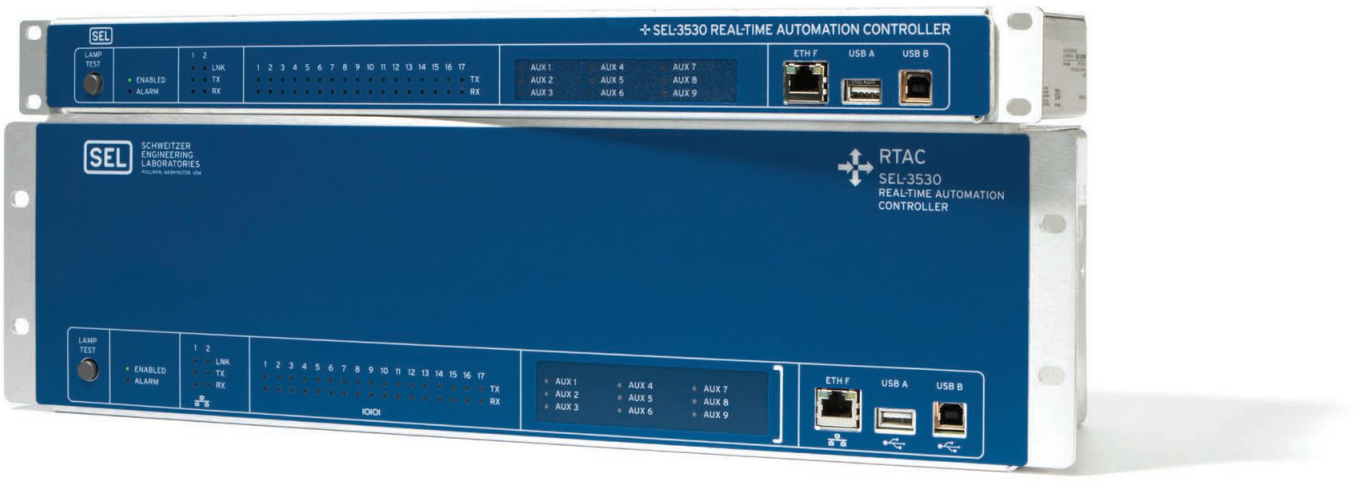
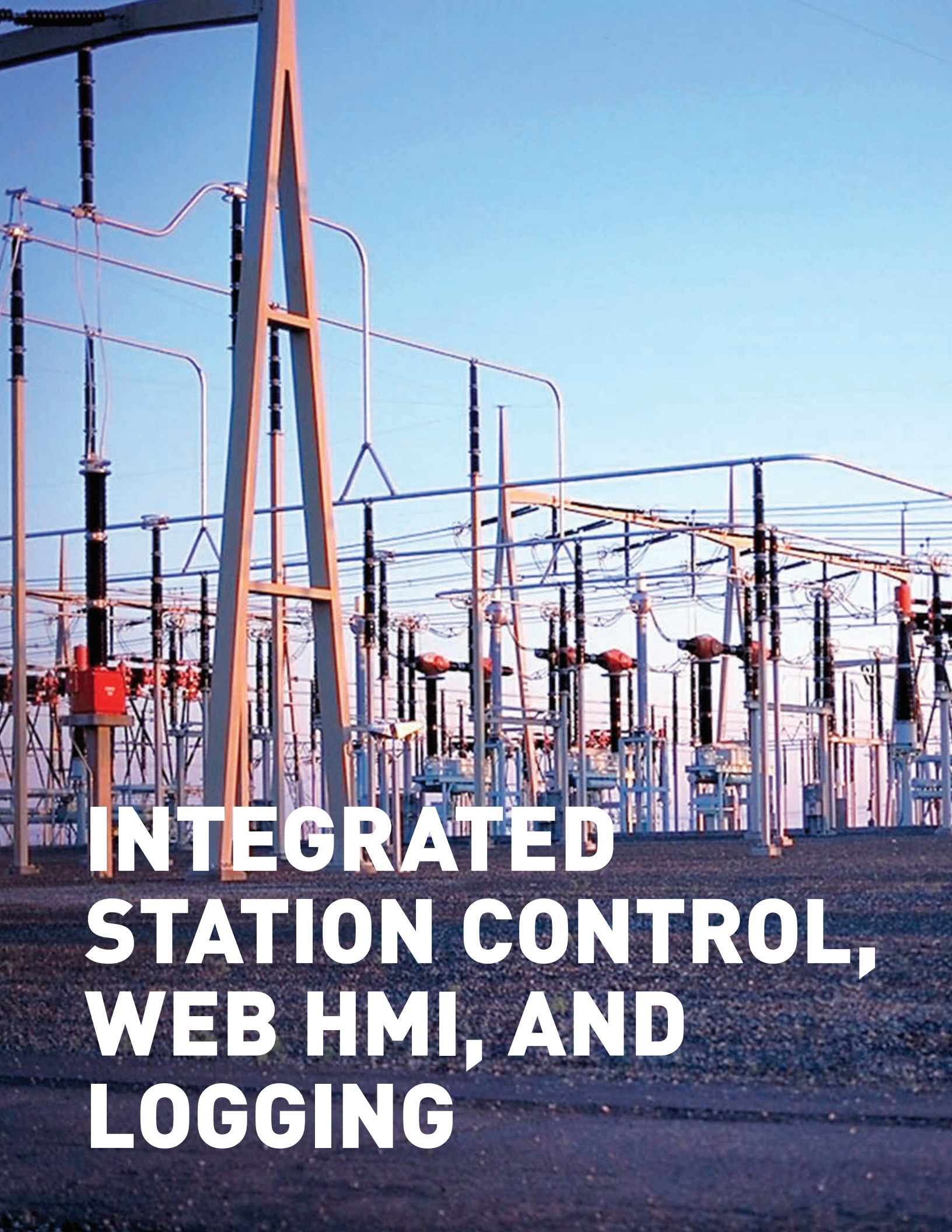
SEL-3530 RTAC

REAL-TIME AUTOMATION CONTROLLER





INTEGRATED STATION CONTROL, WEB HMI, AND LOGGING

KEY FEATURES

Network Security Device

Make the SEL-3530/3530-4 Real-Time Automation Controller (RTAC) the secure access point into your substation or plant. Implement Lightweight Directory Access Protocol (LDAP) central authentication and role-based user authentication, access logs, and secure engineering access via Secure Shell (SSH). Map security tags into SCADA reports for industry-leading integration of security technologies.

SCADA Remote Terminal Unit (RTU)

Quickly design an integrated substation RTU system that includes protocol conversion, SCADA communications, synchrophasors, time synchronization, data management, and custom logic.

IEC 61850 Integration

Integrate modern intelligent electronic devices (IEDs) into control and automation schemes with IEC 61850 GOOSE and the manufacturing message specification (MMS) client.

Data Concentration

Communicate with any device through built-in client and server protocols. Exchange data through DNP3, Modbus®, IEC 60870-5-101/104, LG 8979, SES-92, SEL Fast Messaging, Mirrored Bits® communications, and IEEE C37.118 for synchrophasors. Convert data between protocols, perform math and logic functions, and execute output logic for real-time control.

Event Collection

Detect, filter, and collect event data automatically from connected SEL relays. Fault location, fault current, and other data are populated into tags for easy retrieval through SCADA protocols. Automatically collect and archive events through the RTAC with acSELerator Team® SEL-5045 Software.

Substation Controller

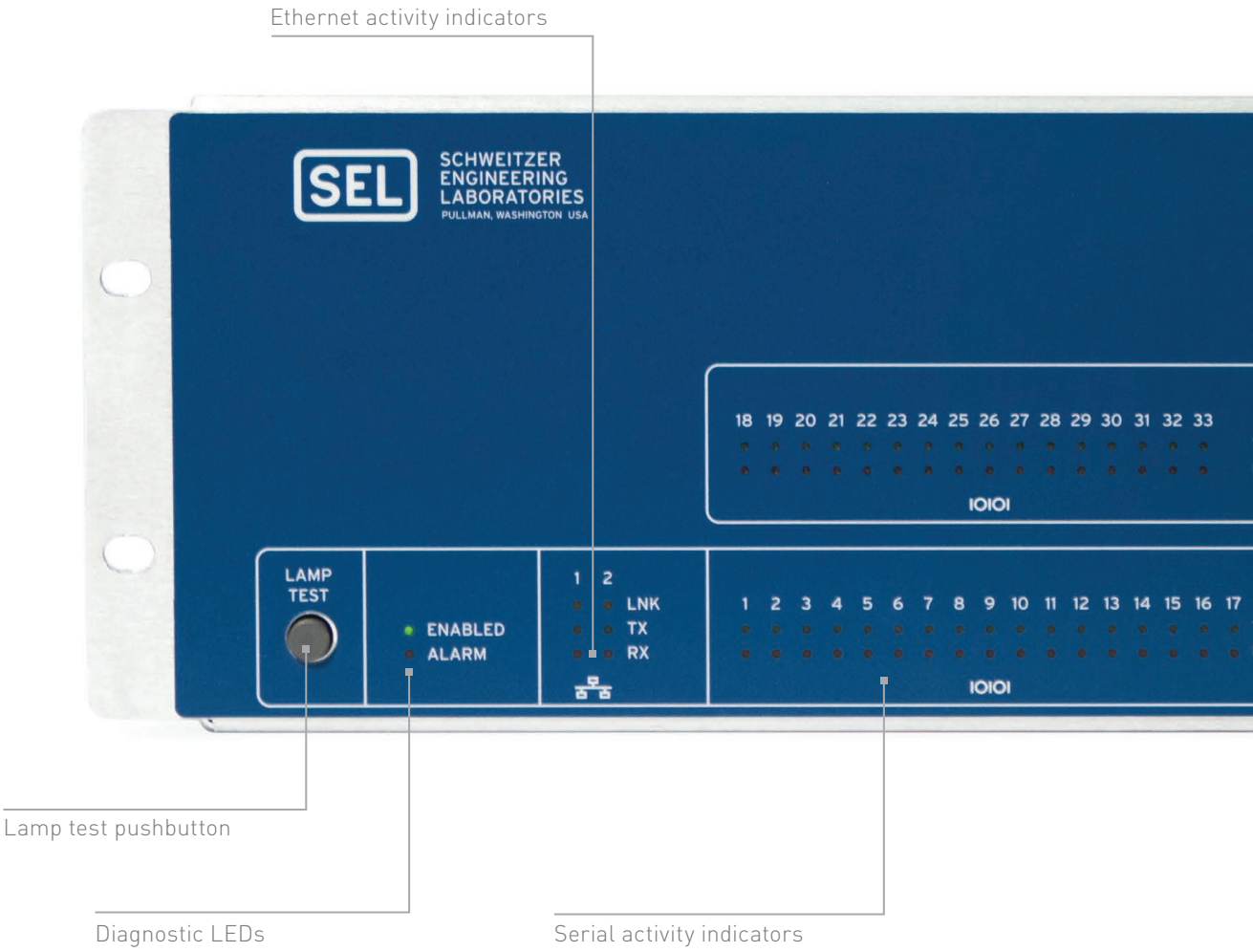
Create your logic solutions in the embedded IEC 61131 logic engine, which comes standard with every RTAC. Build custom user logic. Access all system tags, including diagnostics, contact I/O, protocol data, and communications statistics, to provide unparalleled control flexibility.

Operation Supporter/Regulator

Meet or exceed IEEE 1613 and protective relay specifications for harsh environments with the RTAC, which is designed to withstand vibration, electrical surges, fast transients, and extreme temperatures.

PRODUCT OVERVIEW

FRONT PANEL



POWERFUL

Powerful 32-bit microcontroller for relay-speed I/O, logic, and communications.

Embedded operating system designed for stability.

IEC 61131 logic engine with an intuitive configuration environment.

Error-correcting code (ECC) RAM for data integrity.

RELIABLE

Industry-leading, worldwide, ten-year warranty.

Widest operating temperature range of –40° to +85°C (–40° to +185°F); for use indoors and in outdoor cabinets.

SEL rugged power supplies with a 600-year MTBF.

No fans: quiet, clean, and reliable.

Optional conformal coating available.

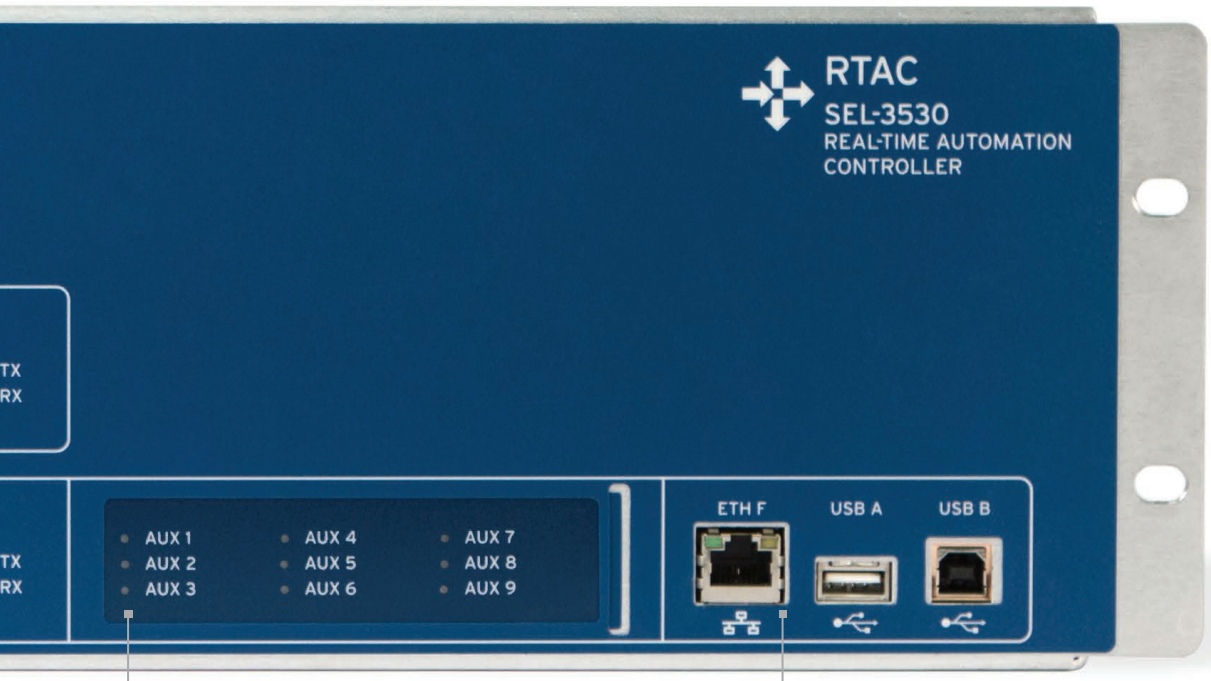
SECURE

Ability to apply unique login accounts and profiles to comply with role-based requirements.

Supports LDAP central authentication that works with your existing LDAP authentication server.

Intrusion detection, notification, and logging to maintain system integrity.

No backdoor passwords.

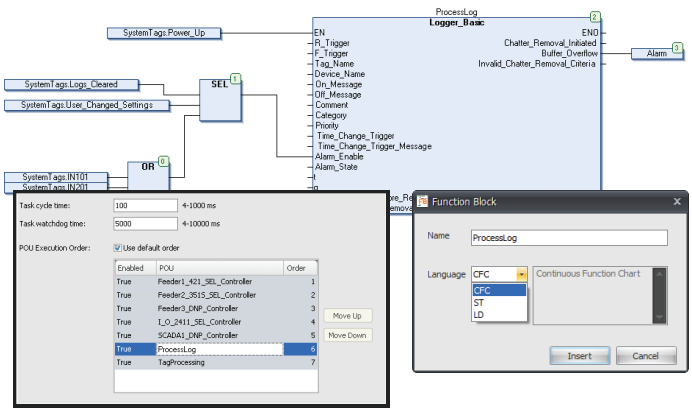


User-programmable, bicolored LEDs

Front ports for secure monitoring and configuration

IMPLEMENT CUSTOM LOGIC SOLUTIONS

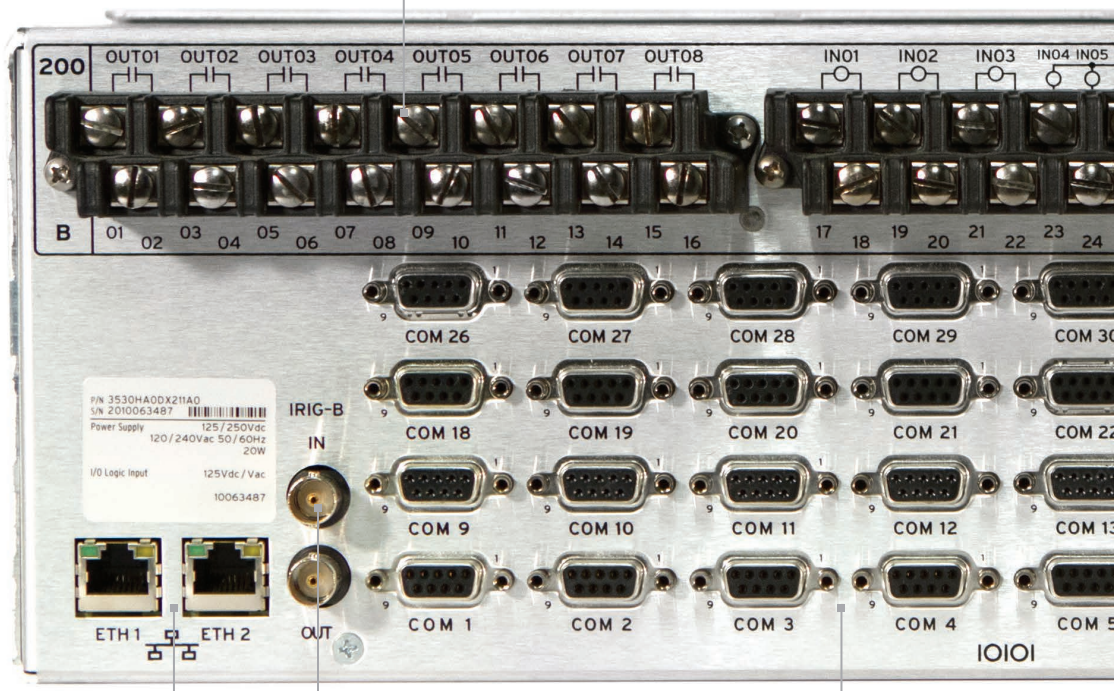
Design custom automation logic to control your system with ACSELERATOR RTAC® SEL-5033 Software, or monitor system performance using the prepopulated device tags. Scale values and create logic equations in a flexible IEC 61131 configuration environment by applying integrated tools. Perform complex math and logic calculations on any data within the RTAC using the built-in IEC 61131 logic engine using continuous function chart (CFC), structured text (ST), or ladder diagram (LD).



PRODUCT OVERVIEW

REAR PANEL

SEL screw-terminal connectors (STC) with #10 screws that accept ring terminals and are easy to connect and disconnect



Ethernet ports

Demodulated IRIG-B input

Up to 33 DB-9 EIA-232/EIA-485 software-selectable serial ports, which operate at up to 115 kbps

EXPANDABLE

24 contact inputs, 8 contact outputs (via optional I/O board).

Protection-grade I/O (optional).

All digital inputs are rated for ac and dc, and time-stamped to 1 µs resolution.

Industry standard 3U or 1U chassis height and expandable I/O options.

ACCURATE

Demodulated IRIG-B input that synchronizes the RTAC and connected IEDs to absolute time, drives the demodulated IRIG-B output, and enables synchronized control and management for synchrophasor-accurate timing.

Input thresholds that are all near one-half nominal voltage to avoid false assertions during faults and battery grounds.

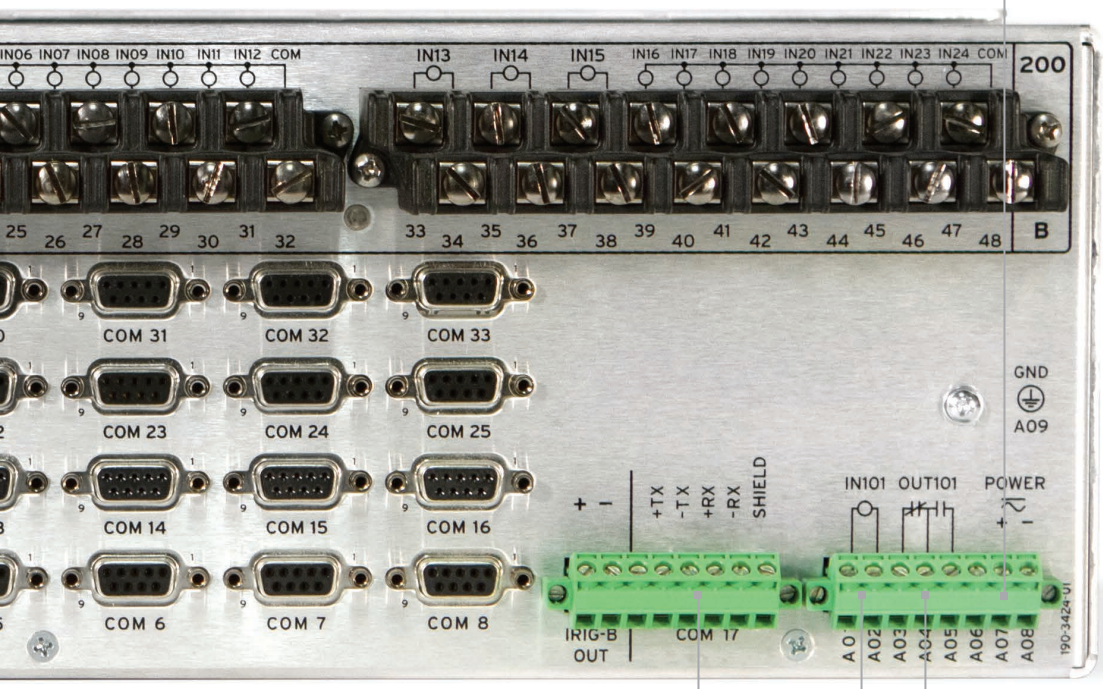
FLEXIBLE

Two independent rear Ethernet ports available in either LC fiber (single- or multimode) or RJ45 copper; capable of operating on separate subnets.

Three available power supply options.

Base configuration with many popular and useful client, server, peer-to-peer, and fieldbus communications protocols.

Three power supply options: 125/250 Vdc, 120/240 Vac; 48/125 Vdc, 120 Vac; or 24/48 Vdc



Isolated serial port with positive retention connectors for reliable, long-distance communication

Isolated contact input with user-settable voltage ranges for programmable control functions

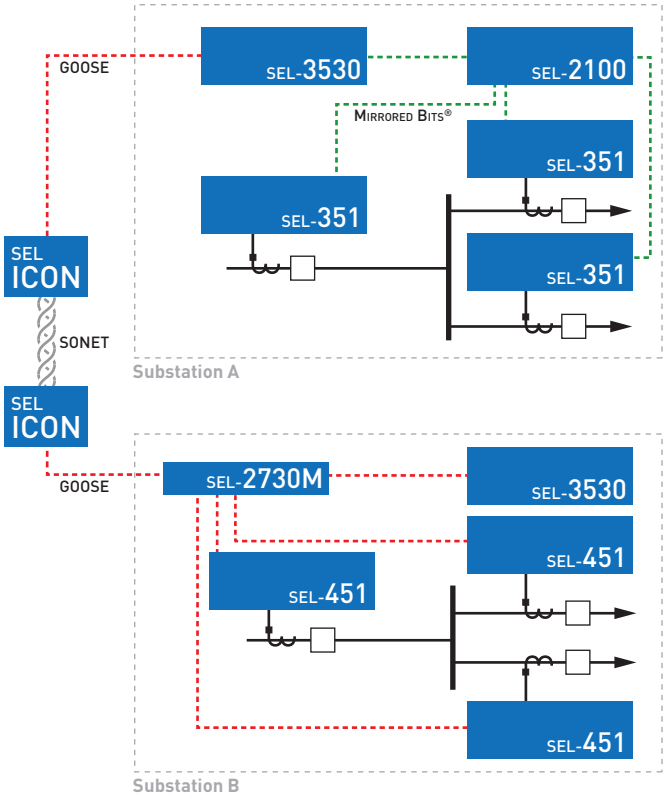
Programmable alarm contact for internal diagnostic status indication, communications access, and settings changes

PROTOCOLS	
CLIENT (MASTER)	IEC 61850 MMS, DNP3 Serial, DNP3 LAN/WAN, Modbus RTU, Modbus TCP, IEEE C37.118 Synchrophasors, SEL ASCII, SEL Fast Message, and LG 8979
SERVER (OUTSTATION)	DNP3 Serial, DNP3 LAN/WAN, Modbus RTU, Modbus TCP, SEL Fast Message, LG 8979, IEC 60870-5-101/104, and SES-92
PEER-TO-PEER	IEC 61850 GOOSE, SEL Mirrored Bits Communications, and Network Global Variable List (NGVL)
FIELDBUS	EtherCAT®

APPLICATIONS

POWER SYSTEM AUTOMATION

Enable high-performance control and monitoring schemes. The RTAC provides a bridge between Mirrored Bits communications and IEC 61850 GOOSE networks. Protection applications include directional element-based bus protection and replacement of tone-channel equipment for communications-assisted blocking, unblocking, permissive, and transfer trip schemes.

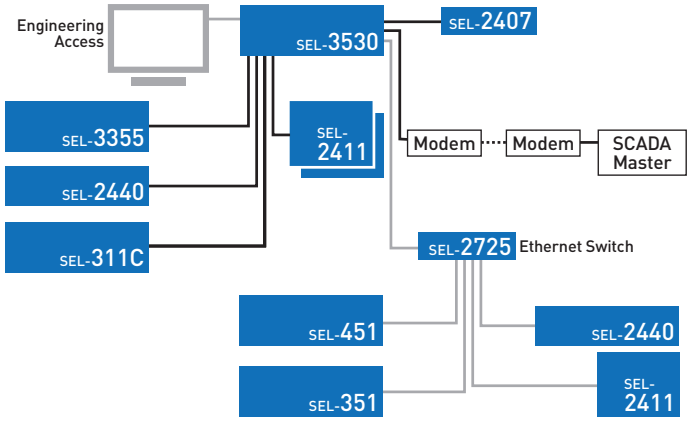


INTEGRATED HUMAN-MACHINE INTERFACE (HMI)

Build custom HMI displays quickly and easily without the need for mapping data tags. Because the interface is web-based, no special software is needed to view HMI displays.

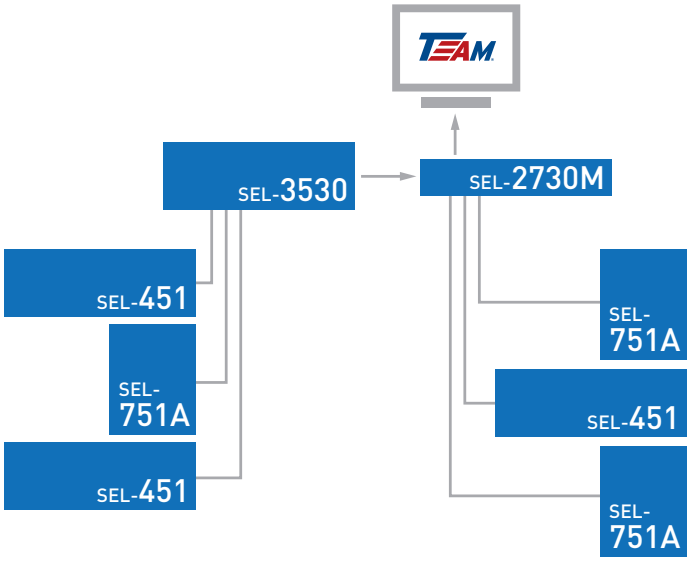
DATA CONCENTRATION AND SCADA

Deploy the RTAC as a data concentrator using protocols such as IEC 61850 MMS client, Modbus, DNP3, IEC 61850 GOOSE, LG 8979, IEC 60870-5-101/104, or Mirrored Bits communications, and integrate both serial and Ethernet IEDs. Enable logging on any system or IED tag to view and archive station-wide event records. Enable multiple SCADA connections via serial or Ethernet communications.



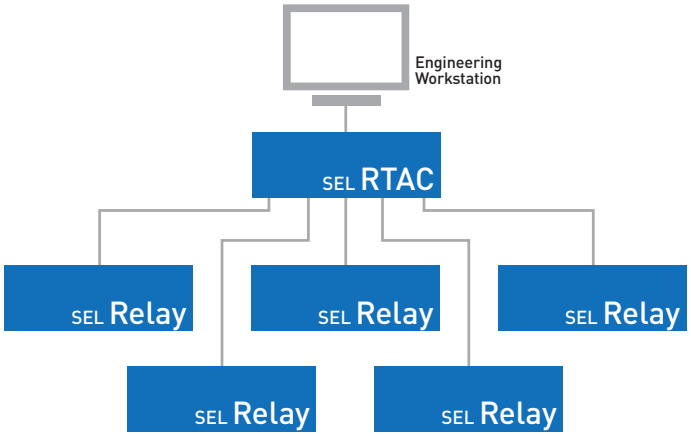
EVENT COLLECTION

Automatically detect, filter, and collect event data from connected SEL relays. Fault location, fault current, and other data are populated into tags for easy retrieval through SCADA protocols. Automatically collect events through the RTAC with acSELerator Team SEL-5045 Software.



ENGINEERING ACCESS

Securely gain remote access to the RTAC and connected devices via Ethernet to configure IEDs, monitor logs, and analyze diagnostics. Engineering access channels in the RTAC enable remote connections to devices using serial or Ethernet communications.



REAL-TIME AUTOMATION PRODUCTS COMPARISON TABLE

MOUNTING OPTIONS	SEL-3530 3U	SEL-3530 1U	SEL-3530-4[1]	SEL-3505[2]
Horizontal rack, 3U	x			
Horizontal panel, 3U	x			
Horizontal rack, 1U		x	x	
Horizontal panel, 1U		x	x	
DIN rail-mount			x	x
Surface-mount			x	x
POWER SUPPLY OPTIONS				
125/250 Vdc; 120/240 Vac	x	x	x	
48/125 Vdc; 120 Vac	x	x	x	
24/48 Vdc	x	x	x	
12/24 Vdc				x
REAR ETHERNET CONNECTIONS OPTIONS				
Two 10/100BASE-T	x	x	x	x
One 10/100BASE-T, one 100BASE-FX (multimode)	x	x	x	x
Two 100BASE-FX (multimode)	x	x	x	x
One 10/100BASE-T, one 100BASE-LX10 (single-mode)	x	x	x	x
Two 100BASE-LX10 (single-mode)	x	x	x	x
V.92 analog modem				x
I/O				
Standard (1 input, 1 output)	x	x	x	x
Option	24/8			
CLIENT PROTOCOL OPTIONS				
SEL, DNP3, Modbus, IEEE C37.118 synchrophasors, LG 8979	x	x	x	x
IEC 61850 MMS	x	x	x	
SERVER PROTOCOLS				
SEL, DNP3, Modbus, LG 8979, IEC 60870-5-101/104, SES-92	x	x	x	x
PEER-TO-PEER PROTOCOL OPTIONS				
SEL Mirrored Bits communications	x	x	x	x
IEC 61850 GOOSE	x	x	x	x
Network Global Variable List (NGVL)	x	x	x	x
FIELDBUS PROTOCOL				
EtherCAT	x	x	x	
SERIAL PORT OPTIONS				
Standard	17	17	4	4
Maximum with expansion	33	17	4	4
EIA-232/EIA-485 software-selectable	33	17	4	2
OTHER OPTIONS				
Ambient light sensor				x
Three-axis accelerometer				x
Conformal coating	x	x	x	x

[1] The SEL-3530-4 Real-Time Automation Controller (RTAC) is a compact version of the RTAC. All of the standard features of the RTAC are included, with the added ability to be surface- or din-rail-mounted.

[2] The SEL-3505 Automation Controller is a compact, surface- or din-rail-mounted, lower-voltage version of the RTAC. All of the standard features of the RTAC are included in the SEL-3505, making it a very powerful option for protocol conversion and a secure communications gateway to remote IED installations.

HARDWARE SPECIFICATIONS

PROCESSING AND MEMORY	
Processor speed	533 MHz
Memory	512 MB DDR2 ECC RAM
Storage	4 GB (2 GB reserved)
ETHERNET PORTS	
Ports	2 rear, 1 front
Data rate	10 or 100 Mbps
Front connector	RJ45 female
Rear connectors	RJ45 female or LC fiber (single-mode or multimode, 100 Mbps only)
SERIAL PORTS	
Ports	17 rear (standard), 16 additional rear (optional on 3U chassis)
Type	EIA-232/EIA-485 (software-selectable)
Data rate	300 to 115200 bps
Connector	DB-9 female (Ports 1–16, 18–33), isolated 8 Pin (Port 17)
Time synchronization	IRIG-B outputs via Pins 4 and 6
Power	+5 Vdc power on Pin 1 (500 mA maximum)
USB PORTS	
Ports	2 front
1 host port	Type A
1 device port	Type B
IRIG-B PORTS	
Ports	2 rear
IRIG-B input	Modulated or demodulated IRIG-B (female BNC)
IRIG-B output	Demodulated (female BNC)
ONBOARD I/O	
Contact input	1 (programmable)
Contact output	1 (programmable)
Expansion I/O board	8 contact outputs, 24 contact inputs (3U chassis only)
POWER SUPPLY OPTIONS	
Option 1	125/250 Vdc, 120/240 Vac, 50/60 Hz
Range	85–300 Vdc or 85–264 Vac
Option 2	48/125 Vdc, 120 Vac, 50/60 Hz
Range	38.4–137.5 Vdc, 88–132 Vac
Option 3	24/48 Vdc
Range	18–60 Vdc (polarity-dependent)
OPERATING TEMPERATURE	
IEC performance rating	–40° to +85°C (–40° to +185°F)

SECURITY FEATURES

Account Management

- LDAP central authentication
- User accounts
- User roles
- Strong passwords

Intrusion Detection

- Access/audit logs
- Alarm LED
- Alarm contact

Secure Encrypted Communications

- TLS/SSH
- HTTPS

AUTOMATION FEATURES

Protocols

- Client, server, peer-to-peer, and fieldbus

Engineering Access

- SEL interleaved and direct transparent modes

Programmable Control

- IEC 61131 logic engine

HMI

- Flexible web-based HMI

**MAKING ELECTRIC POWER SAFER,
MORE RELIABLE, AND MORE ECONOMICAL**

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