



SEL-3530-4 Real-Time Automation Controller



Integrate station control, a web-based HMI, and logging through one reliable system.



Features and Benefits

Integrated Security

As with its bigger brother, the SEL-3530, you can make the SEL-3530-4 four-port RTAC the secure access point into your substation or plant using Lightweight Directory Access Protocol (LDAP) central authentication and role-based user authentication, access logs, and secure engineering access. Map security tags into SCADA reports for industry-leading integration of security technologies.

✤ Simple, Seamless Configuration

Quickly design an integrated substation system that includes protocol conversion, SCADA communications, synchrophasors, time synchronization, data management, flexible web-based HMI displays, and custom logic.

✤ Complete System Control

Communicate with any device through built-in client and server protocols. Exchange data through DNP3, Modbus[®], SEL Fast Messaging, MIRRORED BITS[®] communications, LG 8979, IEC 61850 GOOSE messaging, IEC 61850 MMS client, IEC 60870-5-101, IEC 60870-5-104, SES-92, and IEEE C37.118 for synchrophasors. Convert data between protocols, perform math and logic functions, and execute output logic for real-time control.

Unified Substation Logic

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

✤ Renowned SEL Reliability

The RTAC is designed and tested to meet or exceed IEEE 1613 and protective relay specifications for harsh environments to withstand vibration, electrical surges, fast transients, and extreme temperatures.

Making Electric Power Safer, More Reliable, and More Economical®

SCADA Applications



Data Concentrator and Poletop Device Controller

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High-Speed Control With SEL MIRRORED BITS® and IEC 61850 GOOSE Communications

Custom IEC 61131-3 Logic Solutions for SCADA, Synchrophasors, and MIRRORED BITS Communications





Flexible Web-Based HMI Display and Control

Step 3. Upload HMI screens to the RTAC.

Step 4. View HMI screens in the RTAC's web interface.



Security Applications



Event Collection Applications

IED Event Collection With Optional AcSELERATOR TEAM® SEL-5045 Software





Powerful 32-bit microcontroller delivers relay-speed I/O, logic,

Industry-leading, worldwide, ten-year warranty.

Widest operating temperature range (-40° to +85°C); use indoors and in outdoor cabinets.



Client (Master) Protocols:

IEC 61850 MMS
DNP3 Serial
DNP3 LAN/WAN
Modbus RTU
Modbus TCP
IEEE C37.118 Synchrophasors
SEL ASCII
SEL Fast Messaging
LG 8979

Server (Outstation) Protocols:

IEC 61850 MMS
DNP3 Serial
DNP3 LAN/WAN
Modbus RTU
Modbus TCP
SEL Fast Messaging
LG 8979
IEC 60870-5-101/104
SES-92

Peer-to-Peer Protocols:

IEC 61850 GOOSE

SEL MIRRORED BITS Communications Network Global Variable List (NGVL)

Fieldbus Protocol:

EtherCAT®





Two independent Ethernet ports available in 10/100BASE-T copper, 100BASE-FX multimode, or 100BASE-LX single-mode fiber; capable of operating on separate subnets. Demodulated IRIG-B input synchronizes the RTAC and connected IEDs to absolute time, drives the demodulated IRIG-B output, and enables synchronized control and management.



Real-Time Automation Products Reference Table

MOUNTING OPTIONS	SEL-3530 3U	SEL-3530 1U	SEL-3530-4	SEL-3505
Horizontal rack, 3U	\checkmark			
Horizontal panel, 3U	~			
Horizontal rack, 1U		\checkmark	\checkmark	
Horizontal panel, 1U		\checkmark	✓	
DIN rail-mount			\checkmark	\checkmark
Surface-mount			\checkmark	✓
POWER SUPPLY OPTIONS				
125/250 Vdc; 120/240 Vac	~	\checkmark	\checkmark	
48/125 Vdc; 120 Vac	~	\checkmark	\checkmark	
24/48 Vdc	\checkmark	\checkmark	\checkmark	
12/24 Vdc				\checkmark
REAR ETHERNET CONNECTIONS OPTIONS				
Two 10/100BASE-T	\checkmark	\checkmark	\checkmark	\checkmark
One 10/100BASE-T, one 100BASE-FX (multimode)	\checkmark	\checkmark	\checkmark	\checkmark
Two 100BASE-FX (multimode)	\checkmark	\checkmark	\checkmark	\checkmark
One 10/100BASE-T, one 100BASE-LX10 (single-mode)	\checkmark	\checkmark	\checkmark	\checkmark
Two 100BASE-LX10 (single-mode)	\checkmark	\checkmark	\checkmark	\checkmark
V.92 ANALOG MODEM OPTION				✓
I/0				
Standard (1 input, 1 output)	\checkmark	\checkmark	\checkmark	\checkmark
Option	24/8			
AMBIENT LIGHT SENSOR				✓
THREE-AXIS ACCELEROMETER				✓
CLIENT PROTOCOL OPTIONS				
SEL, DNP3, Modbus, IEEE C37.118 synchrophasors, LG 8979	\checkmark	\checkmark	\checkmark	\checkmark
IEC 61850 MMS	✓	✓	✓	
SERVER PROTOCOLS				
SEL, DNP3, Modbus, LG 8979, IEC 60870-5-101/104, SES-92, IEC 61850 MMS	\checkmark	\checkmark	\checkmark	~
PEER-TO-PEER PROTOCOL OPTIONS				
SEL MIRRORED BITS communications	\checkmark	\checkmark	\checkmark	\checkmark
IEC 61850 GOOSE	\checkmark	\checkmark	\checkmark	\checkmark
Network Global Variable List (NGVL)	\checkmark	\checkmark	\checkmark	✓
FIELDBUS PROTOCOL				
EtherCAT	\checkmark	\checkmark	\checkmark	
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
CONFORMAL COATING OPTION	~	\checkmark	\checkmark	\checkmark

Frequently Asked Questions

What features do I get for the base price?

By leveraging previous SEL designs and world class manufacturing, we can provide a complete automation system for a great price. Just as we do in our SEL-2030/SEL-2032 Communications Processors, we include a powerful logic engine in every RTAC. It is an IEC 61131 engine with an intuitive configuration environment: the AcSELERATOR RTAC SEL-5033 Software and RTAC web interface.

Your device will include four serial ports, two Ethernet ports, one USB port, an IRIG-B input and output, plus alarm contacts. All of the serial ports can be used in EIA-232 or EIA-485 mode via a software setting.

Finally, the RTAC ships with many popular and useful communications protocols. Client (master) protocols include: DNP3 serial, DNP3 LAN/WAN, Modbus RTU/TCP, SEL Compressed ASCII, SEL Fast Messaging, LG 8979, and SEL synchrophasors. The included server (outstation) protocols are DNP3 serial, DNP3 LAN/WAN, IEC 60870-5-101/104, SES-92, Modbus RTU/TCP, LG 8979, and SEL Fast Messaging. Also, we've built SEL MIRRORED BITS communications into the system for peer-to-peer communications.

What options can I get?

You can order the RTAC with 10/100BASE-T Ethernet or 100BASE-FX multimode fiber, or even a combination. With the 24 Vdc model, you can order your RTAC with 100BASE-LX single-mode fiber. With the optional AcSELERATOR Diagram Builder, you can build one-line diagrams, annunciators, and other HMI screens that you can view on the RTAC's web interface. Build high-speed control systems using IEC 61850 GOOSE messaging. Poll data sets and reports with IEC 61850 MMS.

I need to implement security measures. Can the RTAC help me?

Yes. You can apply unique login accounts and profiles to comply with role-based requirements. We included a "temporary" role so that consultant access can be automatically removed after a configurable date. Enable intrusion detection, notification, and logging to maintain system integrity. Use additional auditing, port control, web authentication, and password restrictions to comply with additional security requirements. All data in the RTAC are available for logic and communications, so you can easily report security information to the control center along with process SCADA information. As well, every RTAC supports LDAP central authentication that works with your existing LDAP authentication server.

Where is the RTAC designed and made?

It is designed and manufactured in our factory in Pullman, Washington. The RTAC firmware and software are developed in Pullman too.

Do I need to purchase a different license in order to get the logic engine or higher point counts?

No. Every RTAC includes the complete IEC 61131 logic engine and SEL ACSELERATOR RTAC configuration software. You can configure all needed points with every RTAC without additional license fees.

How long will it take to configure simple SCADA connections in a 4-feeder substation?

You will be amazed at how easy it is to set up simple systems with the RTAC. Twenty minutes is all you need to configure a complete 4-feeder system.

Is this running Windows®?

Just like SEL communications processors and relays, the RTAC runs on an embedded operating system that is designed for stability and security. No Windows here.

Does it meet all of the same standards as SEL relays?

Yes. The RTAC is tested in the same laboratory and to all of the same standards as our relays. The design engineers at SEL understand these standards, and they know their designs must not only comply, but also have margin beyond the standard. For instance, standards require a dielectric strength test (HiPot) of 2000 Vac. SEL adds margin onto the standard and requires the product pass at 2500 Vac—for a 25 percent margin above the standard. This requires careful attention to clearances, spacing, and many other parameters. Unfortunately, there are many companies that say their products, which cost much more and have (understandably) weaker warranties, are "designed to" the standards.

Can I make relay templates?

Yes. Once you configure a relay connection for the substation, use a simple copy-paste function to apply that template for other connected relays.

RTAC Product Comparison

DESIGN	RTAC	OTHERS	IMPORTANCE
HiPot routine test	~	?	Every SEL device is HiPot tested in manufacturing before it goes out the door. Others may not be and may fail during HiPot testing of your panels.
Utility-rated power supply	\checkmark	no	SEL makes its own power supplies, which have a 600-year MTBF. Others may use commercial supplies, like those found in computers.
-40° to +85°C	\checkmark	few	The SEL RTAC will work in outdoor cabinets and when air conditioning fails. Others probably won't.
Vibration	\checkmark	?	Designed and tested to work in vibration-prone environments.
Tested to IEEE C37.90	\checkmark	?	SEL type tests all products. Others may say only "designed to." Type tests prove secure, reliable performance.
PROTOCOLS			
IEEE C37.118 synchrophasors	\checkmark	no	Enables time-synchronized, wide-area reporting and control of the power system.
SEL MIRRORED BITS communications	\checkmark	no	Provides high-speed, secure, point-to-point communication.
IEC 61850 GOOSE	\checkmark	?	Optional GOOSE protocol enables high-speed, secure messaging for deterministic control schemes.
IEC 61850 MMS client	\checkmark	?	Optional MMS client provides polling of MMS-capable IEDs for buffered and unbuffered reports and data sets.
PROCESSING CAPABILITIES			
Integrated IEC 61131 logic engine	\checkmark	no	Provides local control and processing in a single software program; no additional charge.
System-wide SER and synchrophasor alarm logging	\checkmark	no	Provides a complete substation SER that includes configurable triggers, network security information, and time-aligned synchrophasor events.
COMMUNICATIONS			
Two integrated Ethernet ports with independent MAC addresses	~	NO	Enables switched or isolated Ethernet operation, including failover operation.
Integrated web-based HMI	V	no	SEL's optional integrated HMI extracts tags directly from the RTAC so you don't have to configure tags in multiple places or worry about complicated point mapping.
WARRANTY AND SUPPORT			
No-questions-asked, ten-year, worldwide warranty	\checkmark	no	Best in the industry.
Free, worldwide technical support	\checkmark	no	SEL maintains more than 90 offices in over 20 countries.
PRICE			
Base price includes software, logic engine, synchrophasors, and MIRRORED BITS communications	\checkmark	no	No device in the industry offers the combination of price and performance you get with the RTAC.

RTAC Web Interface for User Accounts and System Access

The embedded RTAC web interface means speedy setup and monitoring of critical security data, such as network access, user accounts, and system performance. Easily view and download station-wide logging and alarms without special software. Optionally, build flexible web-based HMI screens, and then view them on the RTAC's web interface.

			SEL Tree: Sun, Jan 7, Device: Substate	, 2011 5:01:01 PH 991	0.0.0			SELLOS
Step 1			Neugacon 4 Dashboard	Dashboard				
View system status on the dashboard. Enable or disable Ethernet ports for network applications		Bystem Data Philip Data Philip Data Data Data Gab Sanga Botwork Data Boarse Boarse Boarse Boarse Boarse Scotty Kob Sanka Scotty Kob Sanka	Derich Information with time: Device Letters: Device Letters: Device Letters: Device Letters: Device Letters: Letters: Device Letters: Device Letters:	e polycenskist same: Socialison (#762 Same: Socialis		System Statistic CPL togget (L4F): Hency cogget (L4F): Wellow CPL and CPL Strange cogget Strange cogget Strange cogget Strange cogget Cogget Area to Loss: Comme Frager Hodded Time of Present Dotal Statistic Corrule of Secoldry Mail OC Secoldry Mail OC Secoldry Mail OC Secoldry Mail OC	5 440261 /12 /15 /15 /15 /15 /15 /15 /15 /15 /15 /15	
with security	Etherne	t Interfaces	IP Address	MAC Addres	•	Enable Ping Enable ODB Enable Web	Access	Options
policies.		Eth_01	111.12.13.14/	24 00:30:a7:01:	0b:48	False False True		Edit
,		Eth_02	192.168.2.2/2	4 00:30:87:01:	0b:49	False True True		Edit
		Eth_F	10.202.13.202	1/24 00:30:e7:01:	Ob:4a	True True True		Edit
		USB_B1	172.29.131.1/	24 00:30:a7:01:	0b:4b	True True True		Edit

Step 3

Monitor operations and security events using the sequential events and alarm reports. Download reports via open database connectivity

(ODBC) to create a permanent record.

Download CSV					Reload Table
Actions 👻					Displays Page 1
Filter by Category 👻					Items Fer Fage: 100
Details * Time Stamp	Priority Cate;	pory Tag Name		Message	Ack Time Stamp
[open] 2010-12-31 20115151.744	Secu	iky SystemTags.	User_Logged_On	SEL logged on device vi	a 008C
[open] 2010-12-31 20115147.613	Secu	rity SystemTags.	User_Logged_On	SEL logged on device vi	a 005C
[open] 2010-12-28 02:09:22.128	Secu	rky SystemTags.	User_Logged_Off	SEL logged off device v	a 008C
[open] 2010-12-28 02:09:21.072	Secu	iky SystemTags.	User_Logged_Off	SEL logged off device v	a ODBC

Step 2

Create user accounts for system access and security logging. With the built-in, role-based accounts and secure communication, you control who can access sensitive information. Alternately, configure LDAP settings for central authentication.

settings for central authentication.					3 10 17	4 11 18	5 12 19	6 13 20	7 14 21	8 15 22
Accounts				30	31	1	20	3	4	5
List Users	Add New User Change Your Password					10				
User Name	Account State	Creation Date Last Login Password Changed	assword:							
SEL	ENABLED	2010-11-16 20:28:49 2011-01-02 16:56:26 2010-11-16 20:28:49		2 o 7 a	omple	ex Pa nt Ene	sswor	d		

ACSELERATOR RTAC SEL-5033 Software for System Design

ACSELERATOR RTAC Software simplifies the design of integration and automation.

Step 1

Select a device template for each client or server connection, and set communications parameters.





Send the configuration to the RTAC.



📮 Send	X
Logn Options Advanced Status Connection SEL RTAC Default Connection RTAC Address 172-23-131.1 User Name SEL Password Logn	
Send Send	

Step 2

Map source and destination tags using the Tag Processor, or copy SCADA maps directly from a spreadsheet.



SEL-3530-4 Real-Time Automation Controller (RTAC)

Hardware Specifications

Processing and Memory

Processor speed Memory Storage

Ethernet Ports

Rear connectors

2 rear 10 or 100 Mbps RJ45 female or LC fiber (100 Mbps only)

512 MB DDR2 ECC RAM

4 GB (2 GB reserved)

Serial Ports

Data rate Connector

Ports

Type

Data rate

Ports

4 rear EIA-232/EIA-485 (software selectable) 300 to 115200 bps DB-9 female IRIG-B outputs via Pins 4 and 6 Time synchronization +5 Vdc power on Pin 1 (500 mA maximum)

Power **USB** Ports Ports

1 front Type B

533 MHz

1 device port **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 Contact output

Power Supply Options

Option 1 125/250 Vdc. 120/240 Vac Range 100-275 Vdc or 88-264 Vac 48/125 Vdc. 120 Vac Option 2 38.4-137.5 Vdc or 88-132 Vac Range

1

1

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

DNP3 serial, DNP3 LAN/WAN, Modbus RTU, Modbus TCP, SEL ASCII, SEL Fast Messaging, IEEE C37.118, IEC 61850 MMS, LG 8979

Server

IEC 61850 MMS, DNP3 serial, DNP3 LAN/WAN, Modbus RTU, Modbus TCP, SEL Fast Messaging, LG 8979, IEC 60870-5-101/104, SES-92

Peer-to-Peer

SEL MIRRORED BITS communications, IEC 61850 GOOSE, Network Global Variable List (NGVL)

Fieldbus

EtherCAT

Engineering Access

SEL interleaved and direct transparent modes

Programmable Control

IEC 61131 logic engine

Human-Machine Interface (HMI)

Flexible web-based HMI



