SEL-3560

Compact Real-Time Automation Controller (RTAC)

Compact, fast, and powerful RTACs for advanced data concentration and control

- Processes data up to 55 times faster than previous-generation RTACs, providing powerful computing for large-scale automation projects.
- Increases cybersecurity by using exe-GUARD® whitelist antivirus technology to allow only authorized applications to run.
- Provides 1 ms deterministic processing intervals for time-sensitive protection and automation control.
- Eliminates the need for a PC in the substation with an integrated video port and easy-to-use HMI.

Overview

Powerful

Designed for the most advanced automation applications

- 2.0 GHz Xeon quad-core processor
- Quad-core processing to complement the multithread IEC 61131 logic engine
- 8 GB of error-correcting code (ECC) RAM
- Three high-resolution display interfaces for local HMI support
- Two options available: SEL-3560S with a compact form factor or the SEL-3560E with two PCI/PCIe expansion slots

Reliable

Manufactured to operate in the harshest environments

- No fans, spinning drives, or moving parts to wear out
- Designed to withstand operating temperatures of −40° to +75°C
- Reliable operation in the presence of vibration, seismic, and shock (15 g) events as well as large electromagnetic fields or radio frequency interference (RFI)
- Ten-year, no-questions-asked warranty

Secure

Designed for secure operation and access

- SEL whitelist antivirus exe-GUARD technology to protect against malware and other cybersecurity threats
- Individual and role-based accounts for configuration software and HMI operation
- Centralized authentication through the Lightweight Directory Access Protocol (LDAP)
- Alerts via syslog, text/email, and Sequence of Events (SOE) logging
- Optional encryption for Ethernet-tunneled serial SCADA protocols and engineering access via Secure Shell (SSH) and Secure Sockets Layer (SSL)/Transport Layer Security (TLS) tunneling

Deterministic

Built for time-sensitive control applications

- Two deterministic processing tasks with configurable cycle times
- Configurable task cycle times as fast as 1 ms
- Diagnostics to help you manage and optimize all resources efficiently

Rugged Features

−40°C +75°C
−40°F +167°F

No Moving Parts

SLC SSD Memory

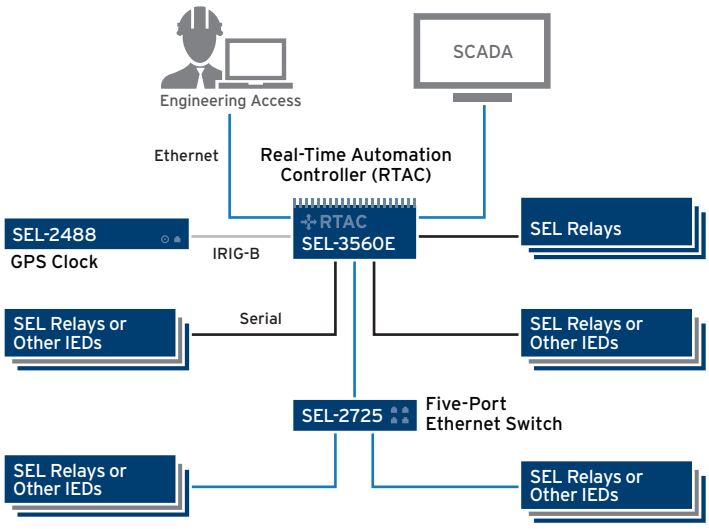
ECC Ram

Conformal Coating

Shock/ Vibration Resistance

ESD Resistance

Applications



Secure Data Concentration and Protocol Conversion

Deploy the SEL-3560 RTAC as a data concentrator using modern and legacy protocols, such as IEC 61850 MMS, Modbus, DNP3, IEC 61850 GOOSE, LG 8979, IEC 60870-5-101/104, the Parallel Redundancy Protocol (PRP), the IEEE 1588 Precision Time Protocol (PTP) Version 2, or MIRRORED BITS® communications. Integrate serial (SEL-3560E only) and Ethernet Intelligent electronic devices (IEDs).

Enable logging on any system or IED data tag to view and archive substation-wide event records. You can monitor substation networking equipment using the Simple Network Management Protocol (SNMP) and can send event-based syslog notifications to SCADA for complete substation awareness. The SEL-3560 is built with a focus on security to address NERC CIP requirements.

Distribution Automation or Microgrid Controller

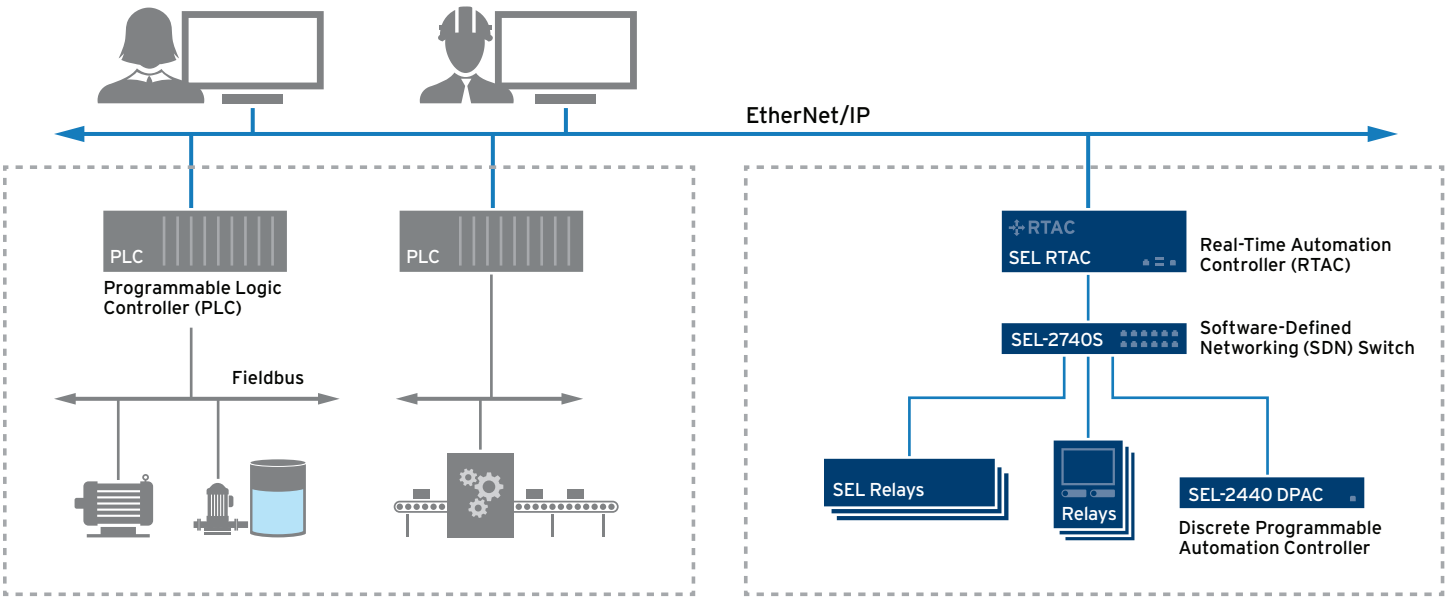
Deploy the SEL-3560 as an intelligent controller or a front-end processor (FEP) for a microgrid system. Its deterministic and automated control is fast enough to provide real-time balancing of generation and load. You can use the task scheduler to prioritize control, SCADA, and other tasks. Coupled with the secure, redundant, and self-healing network capabilities of the ICON and accurate time distribution to all IEDs, the SEL-3560 can control and monitor all aspects of a microgrid while also displaying data with the built-in HMI.

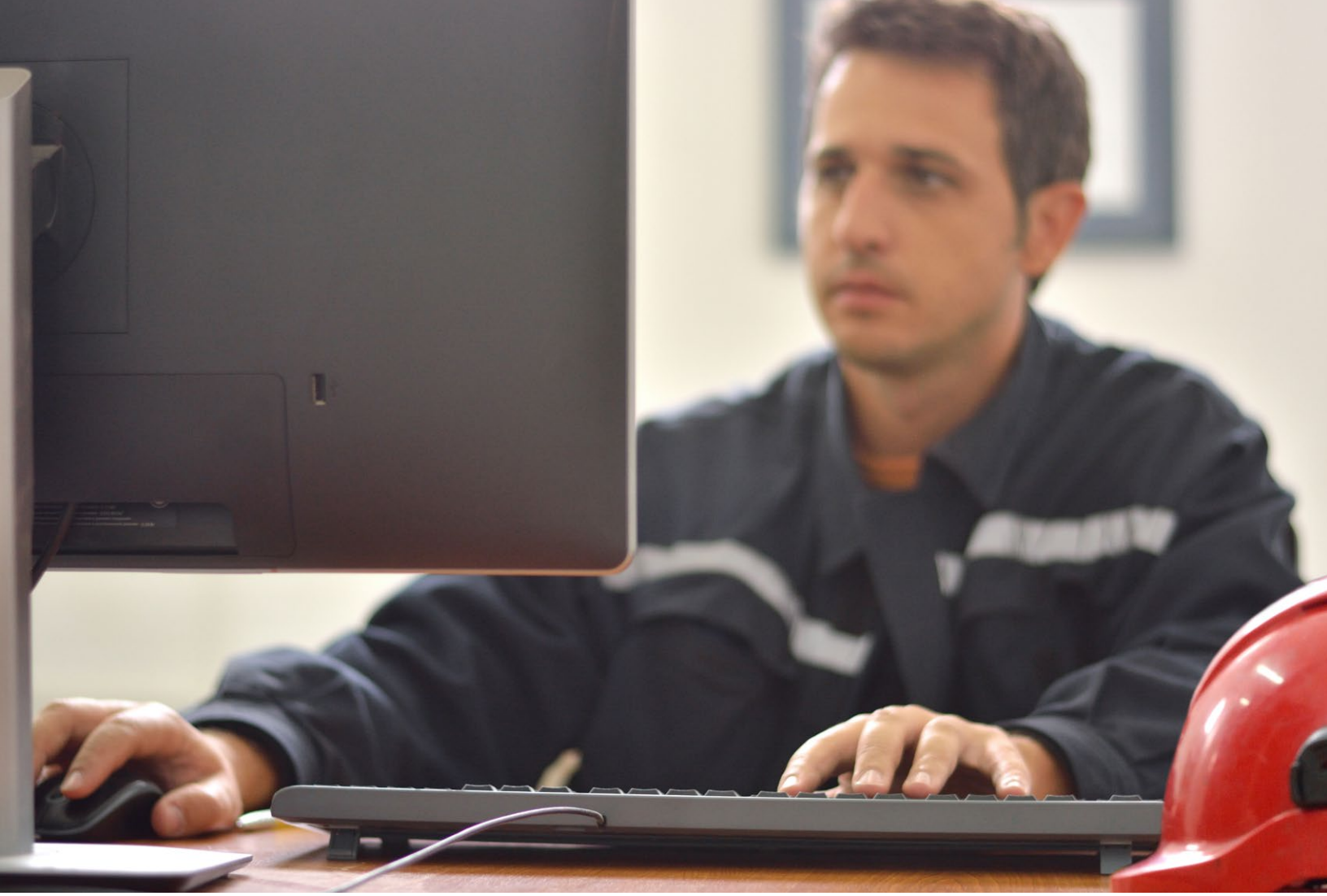
Remote Engineering Access and SCADA Communications

Enclosure cabinets are a part of a power system's remote operations and communications, and the compact size of the SEL-3560 is ideal for these small spaces. You can also collect, measure, and organize data from both serial (SEL-3560E only) and Ethernet IEDs through several of the RTAC's standard protocols, such as Modbus, DNP3, and MIRRORED BITS communications. The RTAC's serial ports and high-speed network connection give you multiple ways to gain secure, remote access. You can add expanded SEL-2240 Axion® I/O for remote monitoring and control of power system processes, maximizing state awareness and improving overall system performance.

Integrate Power Management With Industrial Control

The RTAC provides a powerful gateway between the substation and the factory using EtherNet/IP. This popular industrial protocol facilitates reliable communication between electronic devices in industrial automation systems. You can use the RTAC EtherNet/IP adapter to exchange critical data for real-time monitoring, process control, and power system integration.





Visualize Data and System Control With the Integrated HMI

The RTAC HMI, with HTML5 technology, provides an easy way to visualize data and create custom diagrams to monitor and control your system. The HMI provides authenticated access for multiple users and locations and is viewable from a remote web browser. The video output port on the SEL-3560 directly connects to a monitor, allowing you to quickly and locally view the HMI and SOE data without an additional computer.

All-in-One Performance

Combine automation processing and HMI visualization into one device with the SEL-3560. This eliminates the need for an additional substation computer dedicated to running the HMI, which reduces points of failure in your substation.

Live System Trend Values

Quickly visualize data values over a defined period of time. You can create custom trends when configuring your HMI or design trends on the fly in the HMI.

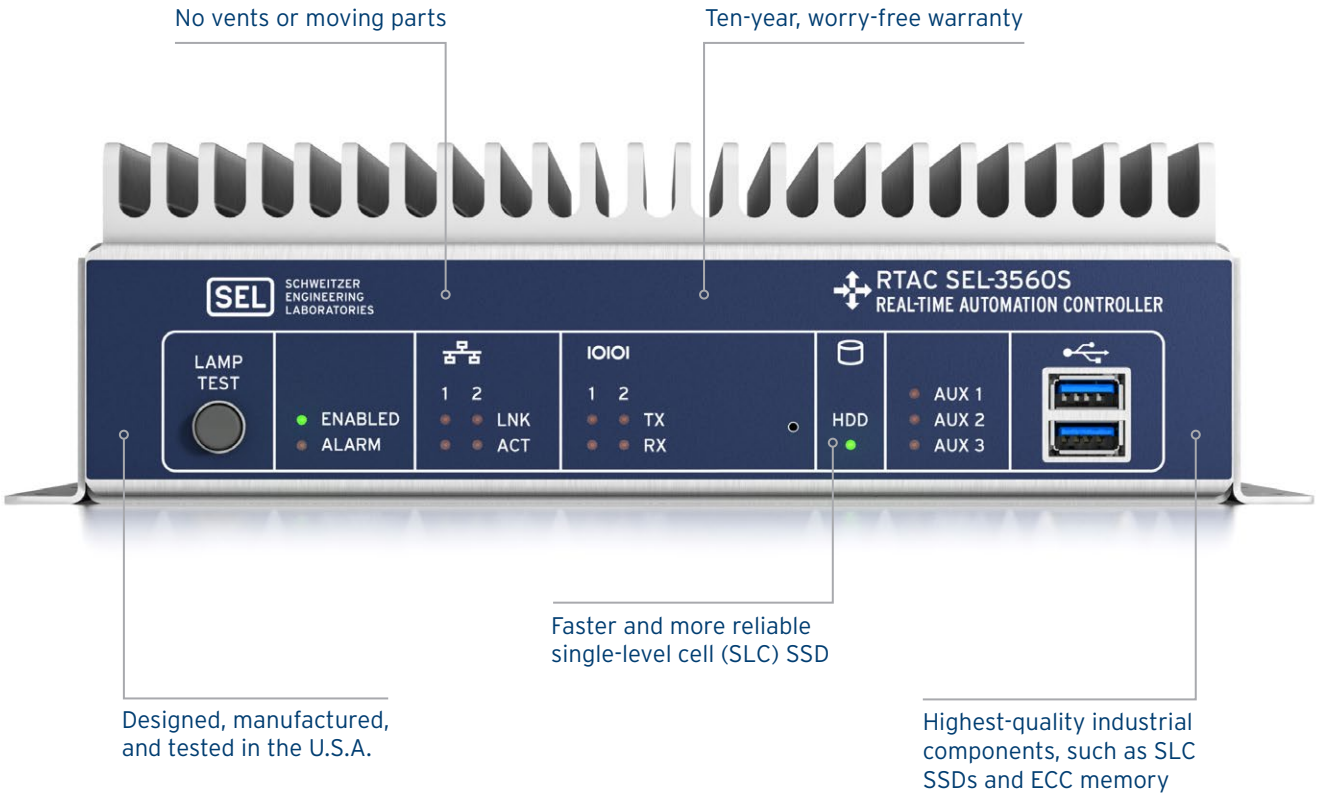
Simplified Tag Integration

Use RTAC tags in your HMI configuration. By sharing tags from the advanced logic processing engine, you can streamline HMI creation and design.

Easy-to-Use Diagram Configuration Tools

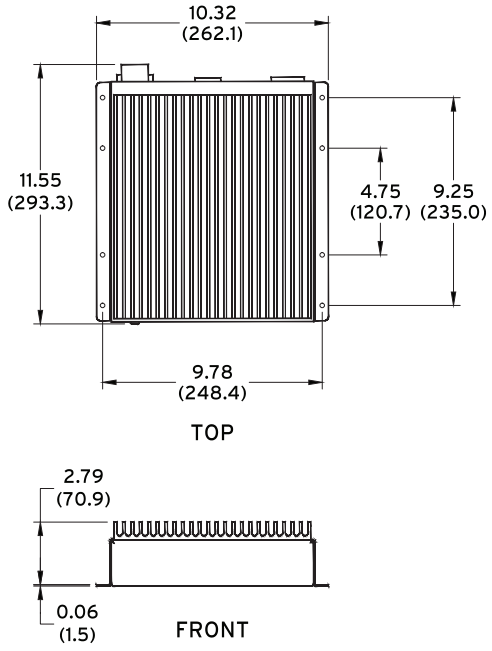
ACSELERATOR Diagram Builder™ SEL-5035 Software provides tools to simplify diagram creation. You can drag and drop controls onto the design palette, easily align and group diagram controls, and accelerate tag assignment with the search-and-replace functionality.

SEL-3560S Overview

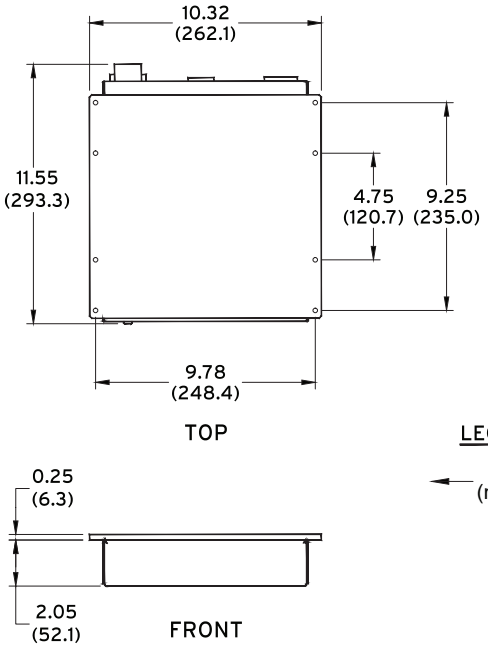


Product Physical Dimensions

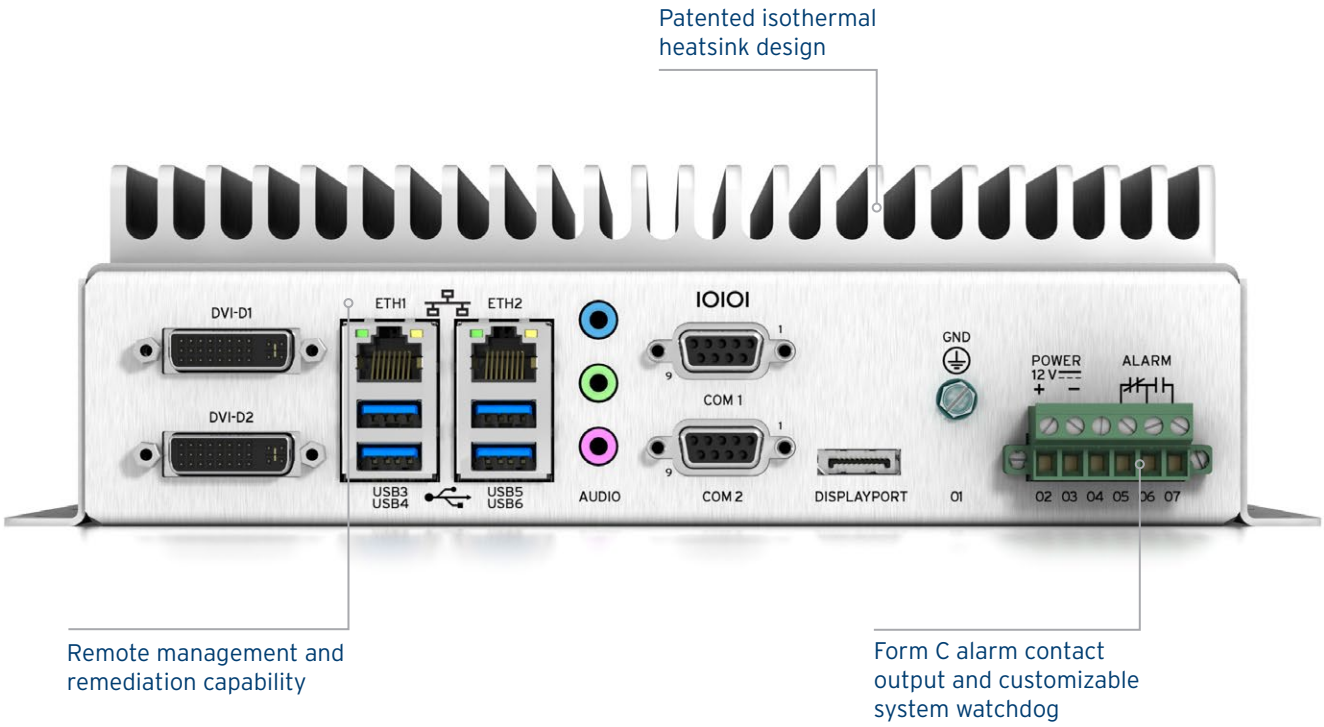
Standard Chassis



Conduction-Cooled Chassis

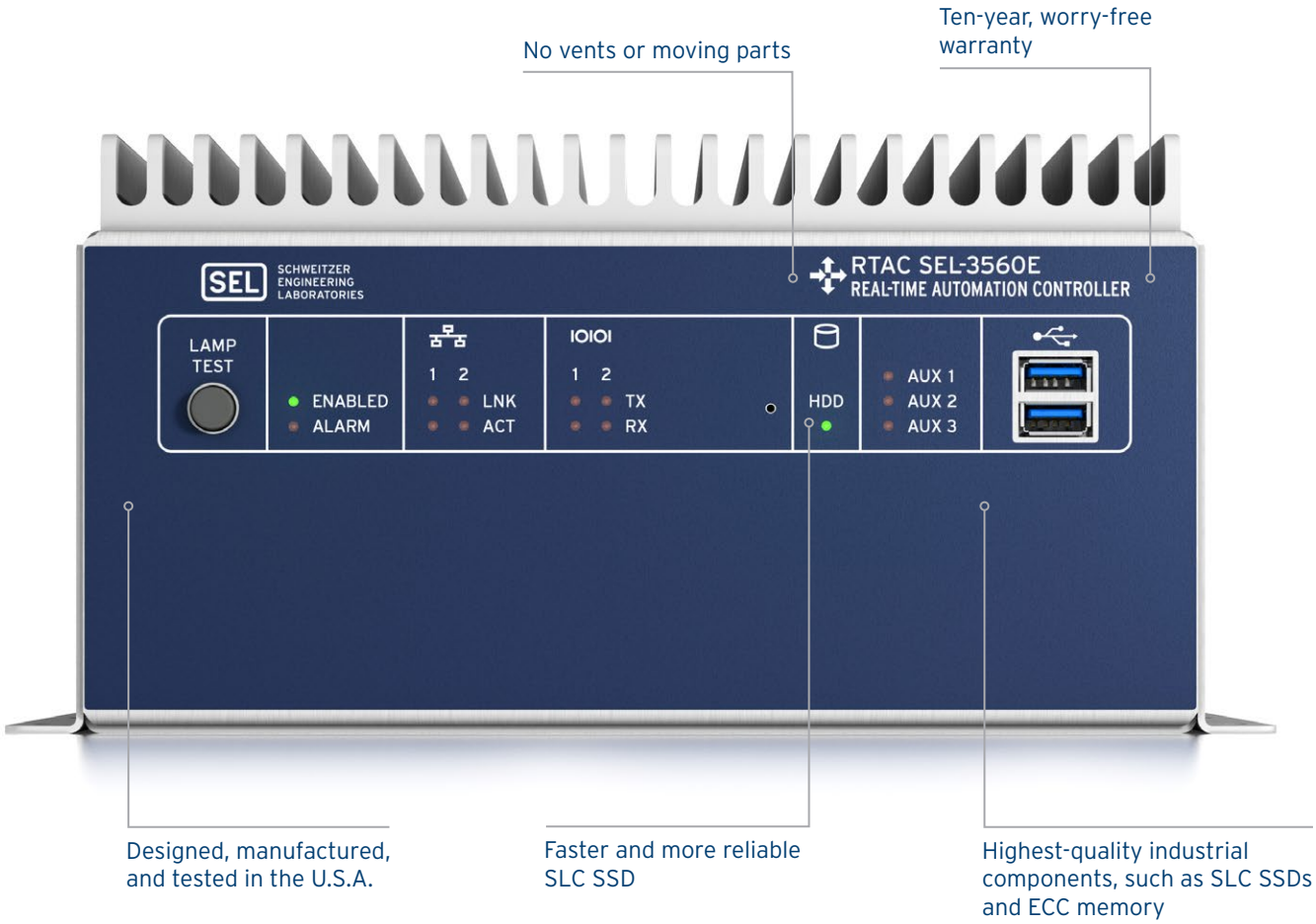


LEGEND
in
(mm)



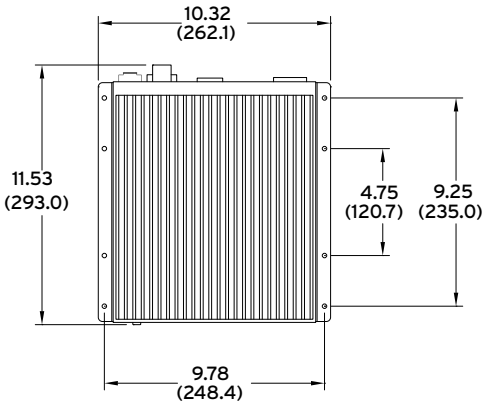
Ports	
Video	**Intel HD Graphics P530 Controller** Independent display outputs: 3 DVI-D maximum resolution: 1920 × 1200 bpp DisplayPort 1.2 maximum resolution: 4096 × 2304 bpp
Audio	**IDT 92HD91 HD Audio Codec** 3 analog 3.5 mm TRS jacks: line input, line/headphone output, microphone input **Intel Display Audio** DVI-D and DisplayPort connectors; digital audio bitstream output
USB	4 rear-panel ports, 2 front-panel ports USB 3.1-compliant, 2,000 mA current each
Ethernet	ETH 1: Intel WGI219LM, 10/100/1000 Mbps ETH2: Intel WGI210IT, 10/100/1000 Mbps
Serial	2 EIA-232 ports, DB-9 connectors, 300 to 115,200 bps; 5 V port power, 500 mA available on Pin 1

SEL-3560E Overview

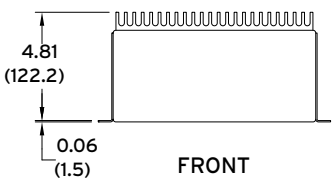


Product Physical Dimensions

Standard Chassis

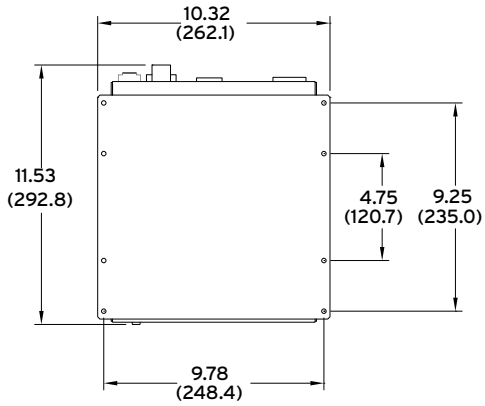


TOP



FRONT

Conduction-Cooled Chassis



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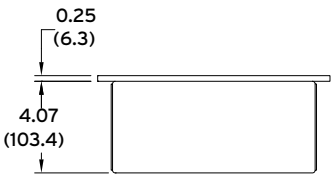
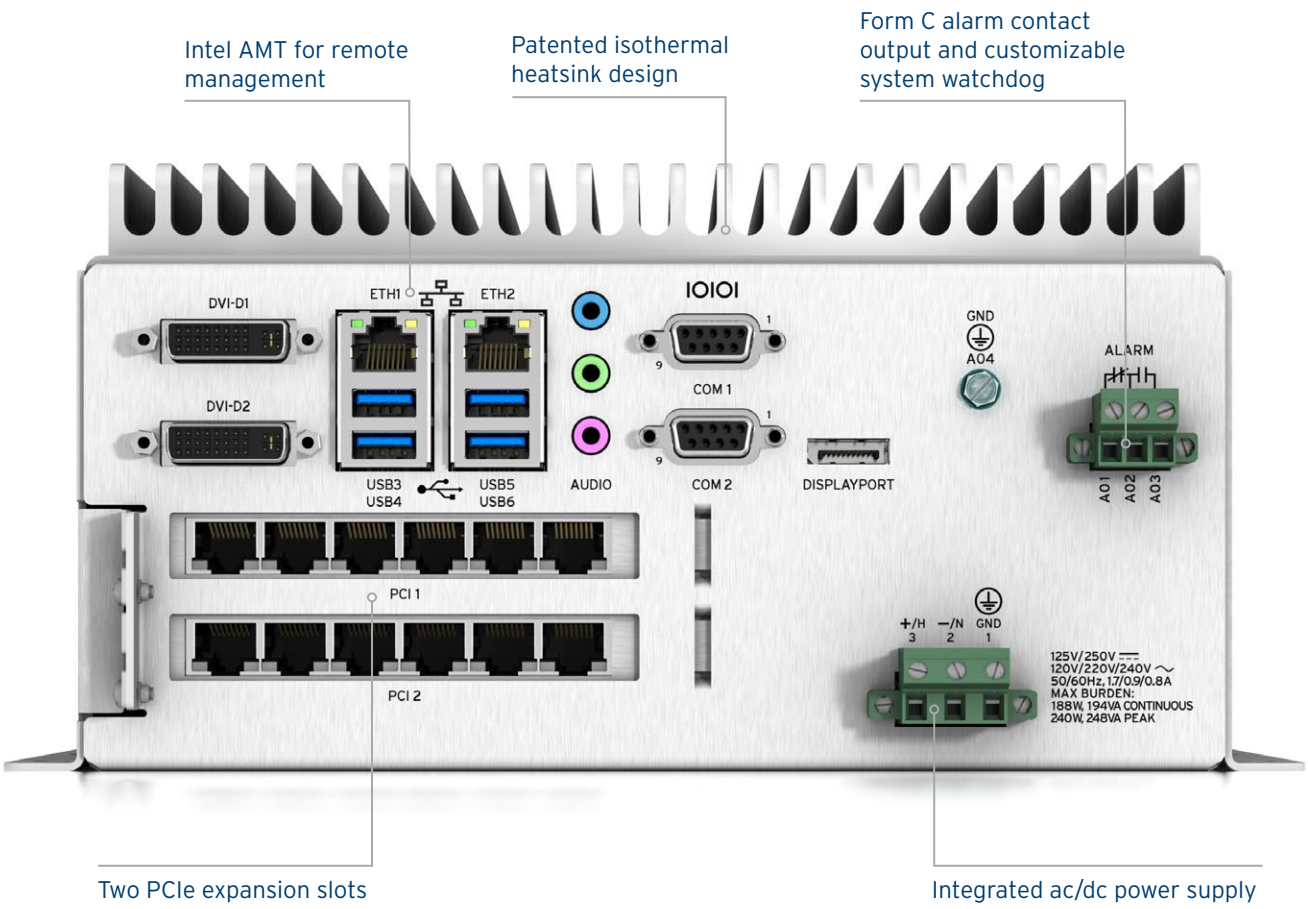


FRONT

LEGEND

in
(mm)



Ports

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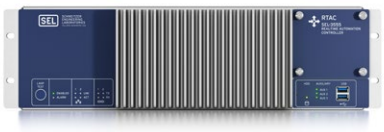
Audio	**IDT 92HD91 HD Audio Codec** 3 analog 3.5 mm TRS jacks: line input, line/headphone output, microphone input **Intel Display Audio** DVI-D and DisplayPort connectors; digital audio bitstream output
USB	4 rear-panel ports, 2 front-panel ports USB 3.1-compliant, 2,000 mA current each
Ethernet	ETH 1: Intel WGI219LM, 10/100/1000 Mbps ETH2: Intel WGI210IT, 10/100/1000 Mbps SEL-3390E4 PCIe x4 Expansion Cards: As many as 8 additional 10/100/1000 Mbps ports, copper or LC fiber small form-factor pluggable (SFP)*
Serial	2 EIA-232 ports, DB-9 connectors, 300 to 115,200 bps; 5 V port power, 500 mA available on Pin 1 SEL-3390S8 PCIe x1 Expansion Cards: As many as 18 additional EIA-232/422/485 ports, RJ45 connectors, 300 to 921,600 bps*
Expansion	Two PCI/PCIe expansion slots, enabling you to customize the system I/O to meet your application needs. Choose from a selection of SEL PCI/PCIe cards, or install a third-party expansion card.

*Optional feature

RTAC Line of Automation Controllers

SEL RTACs offer everything from powerful data management solutions to precise, deterministic control for utility and industrial applications. Integrated cybersecurity features facilitate secure, mission-critical monitoring and control while ensuring regulatory compliance. With our ten-year, worldwide warranty and unmatched technical support, the RTAC is the right choice for high-speed, deterministic automation.

Features	SEL-3555	SEL-3530 3U/1U	SEL-3530-4	SEL-3505/ SEL-3505-3	SEL-3560	SEL-2240 Axion® With SEL-2241 Module
Processor	2.0 GHz Intel Xeon quad-core	533 MHz	533 MHz	333 MHz	2.0 GHz Intel Xeon quad-core	533 MHz
RAM	Up to 16 GB	1 GB	1 GB	512 MB	Up to 16 GB	1 GB
Storage	30 to 480 GB	2 GB	2 GB	2 GB	30 to 480 GB	2 GB
Operation Temperature	−40° to +75°C (−40° to +167°F)	−40° to +85°C (−40° to +185°F)			**SEL-3560S:** −40° to +75°C (−40° to +167°F) **SEL-3560E:** −40° to +60°C (−40° to +140°F)	−40° to +85°C (−40° to +185°F)
Graphical HMI and Video	Viewing and control via web browser; integrated video; 1 DisplayPort; 2 DVD-D ports	Viewing and control via web browser			Viewing and control via web browser; integrated video; 1 DisplayPort; 2 DVD-D ports	Viewing and control via web browser
Power Supply	**Redundant** 120/240 Vac, 125/250 Vdc; and/or 48 Vdc	**Single** 120/240 Vac, 125/250 Vdc; 48/125 Vdc, 120 Vac; or 24/48 Vdc		**Single** 12/24 Vdc or 24/48 Vdc	**SEL-3560S:** Optional redundant **SEL-3560E:** Single 120/240 Vac, 125/250 Vdc; and/or 48 Vdc	**Redundant** 120/240 Vac, 125/250 Vdc; and/or 24/48 Vdc
Ethernet Ports	2 standard (up to 8 additional with PCIe expansion)	3	2	2	**SEL-3560S:** 2 standard **SEL-3560E:** 2 standard (up to 8 additional with PCIe expansion)	2
Serial Ports	8 standard (up to 18 additional with PCIe expansion)	33 (3U)/ 17 (1U)	4	**SEL-3505:** 4 **SEL-3505-3:** 3	**SEL-3560S:** 2 standard **SEL-3560E:** 8 standard (up to 6 additional with PCIe expansion)	4
USB Ports	6 USB 3.1	USB-B	USB-B	USB-B	6 USB 3.1	USB-B
Size/Mounting	3U rack/ panel mount	3U or 1U rack/ panel mount	1U half-rack/ panel, surface, or DIN-rail mount	Surface or DIN-rail mount	Surface or DIN-rail mount	5U rack/panel or surface mount (10-slot, 4-slot, and dual 4-slot)
Digital and Analog Inputs and Outputs	1 DO	8 DO/24 DI (3U); 1 DO/1 DI (1U)	1 DO/1 DI	**SEL-3505:** 1 DO/1 DI **SEL-3505-3:** 3 DO/8 DI	1 DO	**Available Modules** DI, DO, Fast high-current DO, dc AI, ac AI, dc AO
Other Features	Conformal coating	Conformal coating	Conformal coating	**SEL-3505:** V.92 modem **Both:** Conformal coating, ambient light sensor, and accelerometer	Conformal coating	Conformal coating
RTAC HMI	Embedded RTAC HMI	Embedded RTAC HMI	Embedded RTAC HMI	N/A	Embedded RTAC HMI	Embedded RTAC HMI



SEL-3555 RTAC

The SEL-3555 RTAC is a powerful, full-size RTAC solution with flexible options for your most demanding applications.

SEL-3560 RTAC

The SEL-3560 Compact Industrial RTAC comes in two form factors and offers the power and flexibility of the SEL-3555 in a smaller package.

SEL-3530/3530-4 RTAC

The SEL-3530/3530-4 RTACs are ideal for substation data concentration, for protocol conversion, and to provide a local or remote HMI for visualization and control.

SEL-3505/3505-3 RTAC

Suitable for use in utilities and industrial environments, the SEL-3505/3505-3 RTACs are lower-voltage versions of the SEL-3530. These compact RTACs are ideally suited for small enclosures, such as recloser controls, capacitor bank controls, or inverter cabinets that are exposed to harsh environments.

SEL-2240 Axion With RTAC Module

The SEL-2240 Axion is a fully integrated, modular I/O and control solution ideally suited for utility and industrial applications. It combines the communications, built-in security, and IEC 61131 logic engine of SEL RTACs with a durable suite of I/O modules that provide high-speed, deterministic control performance over an EtherCAT® network.

SEL-3560 Specifications

General

CPU	Xeon E3-1505L Quad-Core Speed: 2.0 GHz base, 2.8 GHz turbo Cache: 1 MB L2, 8 MB L3	
RAM	8 GB DDR4 ECC PC4-17000 (2,133 MHz)	
HMI	Viewable remotely or via the local display*	
Time Code Input/Output[1]	Input with supplied SEL-3390S8 Expansion Card, RJ45 connector, demodulated IRIG-B TTL-compatible	
Power Supply	**SEL-3560S** 125/250 Vdc or 120/240 Vac, or 48 Vdc; 50/60 Hz Dual power supplies* **SEL-3560E** Integrated 125/250 Vdc or 120/240 Vac high-voltage input, or 48 Vdc low-voltage input; 50/60 Hz	
Operating Temperature Range	−40°C to +75°C (−40 to +167°F)	
Weight	**SEL-3560S** 4.1 kg (9 lb)	**SEL-3560E** 6.8 kg (15 lb)

*Optional feature **For SEL-3560E only

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Protocols

Client
CDC Type II
Courier
CP 2179
DNP3 Serial, DNP3 LAN/WAN
eDNA**
EtherNet/IP—Explicit Message Client*
File Transfer Protocol (FTP)/Secure FTP (SFTP)*
Flex Parse
IEC 60870-5-101/104
IEC 60870-5-103
IEC 61850 MMS and MMS Client File Services*
IEEE C37.118 Synchrophasors
LG 8979
Modbus RTU, Modbus TCP
SEL Protocols
SES-92
Simple Network Management Protocol (SNMP)

Server
CDC Type II
DNP3 Serial, DNP3 LAN/WAN
EtherNet/IP—Implicit Message Adapter*
FTP/SFTP
IEC 60870-5-101/104
IEC 61850 MMS and MMS Server File Services*
IEEE C37.118 Synchrophasors
LG 8979
Modbus RTU, Modbus TCP
SEL Protocols
SES-92
SNMP Agent

Peer-to-Peer
IEC 61850 GOOSE*
Network Global Variable List (NGVL)
SEL Mirrored Bits Communications

Field Bus Protocol
EtherCAT to SEL Axion I/O Modules

SEL SCHWEITZER ENGINEERING LABORATORIES

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