



# SEL-2245-3 Analog Output Module

The SEL-2245-3 provides dc analog outputs for the SEL Axion® platform. Within an Axion system, install as many as sixteen SEL-2245-3 modules with as many as three SEL-2245-3 modules per node.

## Front Panel

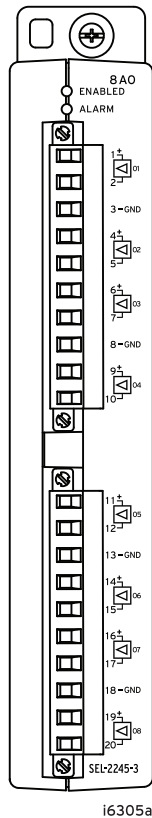


Figure 1 SEL-2245-3 DC Analog Output Module

## Mechanical Installation

Each SEL-2242 chassis/backplane has four or ten slots, labeled A-J. Slots B-J support the SEL-2245-3 modules.

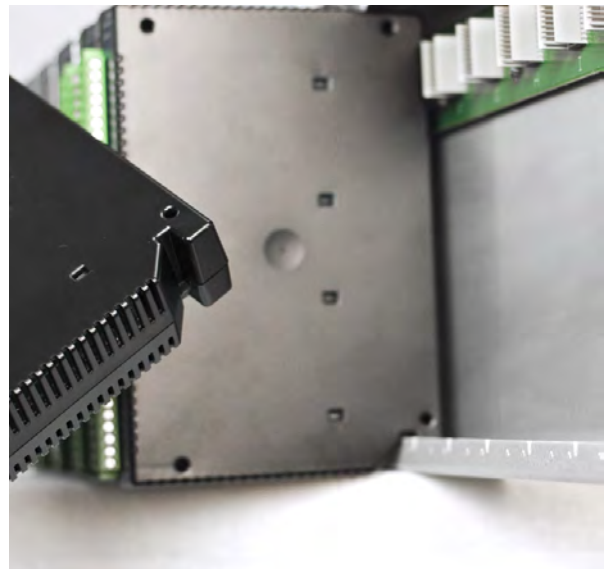


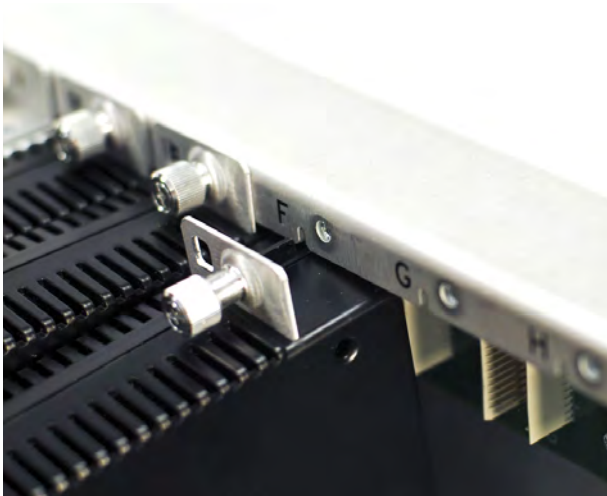
Figure 2 Notch for Module Alignment

To install an SEL-2245-3 module, tip the top of the module away from the chassis, align the notch on the bottom of the module (shown in *Figure 2*) with the slot you want on the chassis, and place the module on the bottom lip of the chassis as *Figure 3* illustrates. The module is aligned properly when it rests entirely on the lip of the chassis.



**Figure 3 Proper Module Placement**

Next, carefully rotate the module into the chassis, making sure that the alignment tab fits into the corresponding slot at the top of the chassis (refer to *Figure 4*). Finally, press the module firmly into the chassis and tighten the chassis retaining screw.



**Figure 4 Final Module Alignment**

## Output Connections

The SEL-2245-3 dc analog outputs include a plus sign to indicate the positive convention. Refer to *Specifications* for analog output ratings and to *Figure 1* for terminal assignments. You can configure outputs to drive  $\pm 20$  mA or  $\pm 10$  V signals. Configure outputs by adding a Fieldbus I/O connection for each module in ACSELERATOR RTAC<sup>®</sup> SEL-5033 Software. See the EtherCAT<sup>®</sup> section in *Section 2: Communications* in the SEL-5033 software manual for details.

### **CAUTION**

Use supply wires suitable for 60°C (140°F) above ambient. See product or manual for ratings.

### **ATTENTION**

Utilisez des fils d'alimentation appropriés pour 60°C (140°F) au-dessus ambiante. Voir le produit ou le manuel pour les valeurs nominales.

## LED Indicators

The LEDs labeled **ENABLED** and **ALARM** are related to EtherCAT network operation. The green **ENABLED** LED illuminates when the module is operating normally on the network. The **ALARM** LED illuminates during network initialization or when there is a problem with the network. Refer to *Section 3: Testing and Troubleshooting* in the *SEL-2240 Instruction Manual* for more information.

# Specifications

## Compliance

Designed and manufactured under an ISO 9001 certified quality management system

UL Listed to U.S. and Canadian safety standards (File NRAQ, NRAQ7 per UL508, and C22.2 No. 14)

CE Mark

## General

### Operating Temperature Range

-40° to +85°C (-40° to +185°F)

**Note:** Not applicable to UL applications.

### Operating Environment

Pollution Degree: 2

Overvoltage Category: II

Insulation Class: 1

Relative Humidity: 5–95%, noncondensing

Maximum Altitude: 2000 m

## DC Analog Outputs (SEL-2245-3)

### Current Mode

Output Range: -20.48 to +20.48 mA

Load Impedance: 0–750 Ω @ 20 mA, 100 μH

### Voltage Mode

Output Range: -10.24 to +10.24 volts

Load Impedance: >2000 Ω, 1 μF

### Step Response:

1 ms (10–90% response typical)

### Isolation:

2000 Vdc between outputs or ground

### Accuracy at 25°C

#### Outputs

Current Mode: ±0.3% of full scale typical  
±3% of full-scale worst case (during an EMI event)

Voltage Mode: ±0.2% of full-scale typical  
±2% of full-scale worst case (during an EMI event)

### Accuracy Variation With Temperature

#### Outputs

±0.01% of full-scale/°K (current or voltage mode)

## Type Tests

### Environmental Tests

Enclosure Protection: IEC 60529:2001 + CRGD:2003  
IP3X excluding the terminal blocks

Vibration Resistance: IEC 60255-21-1:1988  
Vibration Endurance, Severity: Class 2  
Vibration Response, Severity: Class 2

Shock Resistance: IEC 60255-21-2:1988  
Bump Test, Severity: Class 1  
Shock Withstand, Severity: Class 1  
Shock Response, Severity: Class 2

Seismic: IEC 60255-21-3:1993  
Quake Response, Severity: Class 2

Cold: IEC 60068-2-1:2007  
-40°C, 16 hours

Dry Heat: IEC 60068-2-2:2007  
+85°C, 16 hours

Damp Heat, Cyclic: IEC 60068-2-30:2005  
25°C to 55°C, 6 cycles,  
95% relative humidity

## Dielectric Strength and Impulse Tests

Impulse: IIEC 60255-5:2000  
IEEE C37.90:2005  
Severity Level:  
0.5 Joule, 3 kV channel to chassis  
0.5 Joule, 3 kV channel to channel

Dielectric (HiPot): IEC 60255-5:2000  
IEEE C37.90:2005  
Severity Level:  
2000 Vdc channel to chassis for  
1 minute  
2000 Vdc channel to channel for  
1 minute

## RFI and Interference Tests

### EMC Immunity

Electrostatic Discharge Immunity: IEEE C37.90.3-2001  
IEC 60255-22-2:2008  
IEC 61000-4-2:2008  
Severity Level: 8 kV contact discharge  
15 kV air discharge

Radiated RF Immunity: IEEE C37.90.2-2004  
Severity Level: 35 V/m  
IEC 61000-4-3:2008  
IEC 60255-22-3:2007  
Severity Level: 10 V/m

Conducted RF Immunity: IEC 60255-22-6:2001  
IEC 61000-4-6:2008  
Severity Level: 10 Vrms

Surge Immunity: IEC 60255-22-5:2008  
IEC 61000-4-5:2005  
Severity Level: 1 kV Line to Line,  
2 kV Line to Earth  
(The output accuracy will deviate from the specification unless a 1 s delay is implemented on the monitoring device.)

Fast Transient, Burst Immunity: IEC 60255-22-4:2008  
IEC 61000-4-4:2011  
Severity Level: Class A: 4 kV, 5 kHz;  
2 kV, 5 kHz on communication ports

Magnetic Field Immunity: IEC 61000-4-8:2009  
Severity Level: 1000 A/m for 3 seconds,  
100 A/m for 1 minute  
IEC 61000-4-9:2001  
Severity Level: 1000 A/m  
IEC 61000-4-10:2001  
Severity Level: 100 A/m

Surge Withstand Capability Immunity: IEC 60255-22-1:2007  
Severity Level: 2.5 kV common-mode  
1.0 kV differential-mode  
IEEE C37.90.1-2002  
Severity Level: 2.5 kV Oscillatory  
4.0 kV Fast Transient  
(The output accuracy will deviate from the specification unless a 100 ms delay is implemented on the monitoring device.)

Oscillatory Waves Immunity:	IEC 61000-4-12:2006 Severity Level: Ring Wave: 2 kV common, 1.0 kV differential Oscillatory: 2.5 kV common, 1.0 kV differential
Common Mode Disturbance Immunity:	IEC 61000-4-16:2002 Frequency: 0 to 150 Hz Severity Level: Level 4, Segment 4: 30 Vrms open-circuit, 15 to 150 kHz
Emissions	
Radiated and Conducted Emissions:	IEC 60255-25:2000 Severity Level: Class A

© 2014-2016 by Schweitzer Engineering Laboratories, Inc. All rights reserved.

All brand or product names appearing in this document are the trademark or registered trademark of their respective holders. No SEL trademarks may be used without written permission. SEL products appearing in this document may be covered by U.S. and Foreign patents.

Schweitzer Engineering Laboratories, Inc. reserves all rights and benefits afforded under federal and international copyright and patent laws in its products, including without limitation software, firmware, and documentation.

The information in this document is provided for informational use only and is subject to change without notice. Schweitzer Engineering Laboratories, Inc. has approved only the English language document.

This product is covered by the standard SEL 10-year warranty. For warranty details, visit [selinc.com](http://selinc.com) or contact your customer service representative.

## SCHWEITZER ENGINEERING LABORATORIES, INC.

2350 NE Hopkins Court • Pullman, WA 99163-5603 U.S.A.

Tel: +1.509.332.1890 • Fax: +1.509.332.7990

[selinc.com](http://selinc.com) • [info@selinc.com](mailto:info@selinc.com)

