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.

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 with the slot you want on the chassis, and place the module on the bottom lip of the chassis as *Figure 2* illustrates. The module is aligned properly when it rests entirely on the lip of the chassis.

Figure 2 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 3*). Finally, press the module firmly into the chassis and tighten the chassis retaining screw.

Figure 3 Final Module Alignment

Output Connections

The SEL-2245-3 dc analog outputs include a plus sign to indicate the positive convention. Refer to *Specifications* on page 2 for analog output ratings and to *Figure 1* for terminal assignments. You can configure outputs to drive ±20 mA or ±10 V signals. Configure outputs by adding a Fieldbus I/O connection for each module in ACSELERATOR RTAC® SEL-5033 Software. See the EtherCAT® 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

UKCA Mark

Product Standards

IEC 60255-26:2013 - Relays and Protection Equipment: EMC
IEC 60255-27:2014 - Relays and Protection Equipment: Safety
IEC 60825-2:2004 +A1:2007 +A2:2010 for fiber-optic communications
IEC 61850-3:2013 - Comm Systems for Power Utility Automation

General

Operating and Storage Temperature Range

–40° to +85°C (–40° to +185°F)
Units should be stored and transported in their original packaging.

Note: Operating temperature evaluated for UL ambient 0° to 40°C.

Operating Environment

Pollution Degree:	2
Overvoltage Category:	II
Insulation Class:	1
Relative Humidity:	5–95%, noncondensing
Maximum Altitude:	2000 m
Vibration, Earth Tremors:	Class 1

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 over a 1-second period)
Voltage Mode:	±0.2% of full-scale typical ±2% of full-scale worst case (during an EMI event over a 1-second period)

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 Withstand, 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, Operational and Cold, Storage:	IEC 60068-2-1:2007 –40°C, 16 hours
Dry Heat, Operational and Dry Heat, Storage:	IEC 60068-2-2:2007 +85°C, 16 hours
Damp Heat, Cyclic:	IEC 60068-2-30:2005 25° to 55°C, 6 cycles, 95% relative humidity
Damp Heat, Steady State:	IEC 60068-2-78:2012 93% RH and 55°C for 10 days
Change of Temperature:	IEC 60068-2-14:2009 1 deg. per minute, –40° and +85°C, 5 cycles

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

Low-level analog dc signals were tested with shielded twisted pair for optimum noise rejection.

Slow Damped Oscillatory Waves:	IEC 61000-4-18:2006 + A1:2010 Severity Level: 2.5 kV common mode 1 kV differential mode
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:	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 Canada ICES-001 (A) / NMB-001 (A)

Technical Support

We appreciate your interest in SEL products and services. If you have questions or comments, please contact us at:

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