SEL-2245-221 Low-Voltage (LEA) Monitoring Module

The SEL-2245-221 provides low-voltage (LEA) monitoring inputs for the SEL-2240 Axion®. Within an Axion node, install as many as sixteen SEL-2245-221 modules per system in any combination.

Front Panel

Figure 1   SEL-2245-221-221 4 LEA Module

Mechanical Installation

Each SEL-2242 chassis/backplane has four or ten slots, labeled **A–J**. Slots **B–J** support the SEL-2245-221 modules.

To install the SEL-2245-221 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

Input Connections

The SEL-2245-221 4 LEA analog inputs include a dot next to the terminal number to indicate the positive convention. Refer to *Specifications* on page 3 for ac analog input ratings and to *Figure 4* for terminal assignments. You can configure low-voltage or low-energy analog (LEA) inputs for 0–30 V.

Configure inputs by adding a Fieldbus I/O connection for each module in ACSELERATOR RTAC® SEL-5033 Software. See the EtherCAT® portion in *Section 2: Communications* in the *SEL-5033 Software Instruction Manual* for details.
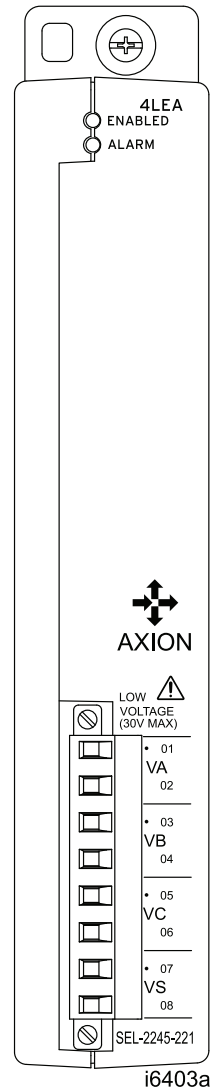

Figure 4   4 LEA Analog Inputs

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.

⚠**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.

Specifications

Compliance

Designed and manufactured under an ISO 9001 certified quality management system

UL Listed to U.S. and Canadian safety standards (File E220228; NRAQ, NRAQ7)

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

AC Metering Inputs

Frequency:	50/60 Hz
Range:	45–65 Hz
Typical Accuracy:	±0.005 Hz above 500 mV
Worst-Case Accuracy:	±0.01 Hz above 500 mV
Phase Rotation:	ABC, ACB
Input Configuration:	3-Wire Delta, 4-Wire Wye
Update Interval	
Fundamental Metering:	200 Hz
RMS Metering:	5 Hz

Voltage Inputs

V_{NOM}:	1.5 V
Measurement Range:	30 Vac peak 0.05–22 Vac RMS
Maximum:	300 VL-N for 10 s (surge)
Typical Accuracy:	±0.1% @ f_{NOM} and > 50 mV RMS ±0.1% @ f_{NOM} and > 50 mV Fundamental
Worst-Case Accuracy:	±3% ±1 mV @ f_{NOM} Fundamental/RMS
Angle	
Range:	±180°
Typical Accuracy:	±0.1° @ f_{NOM} and > 50 mV
Worst-Case Accuracy:	±2° @ f_{NOM}
Burden:	< 0.1 VA

Triggered Waveform Recording

Sampling Rates:	1, 2, 4, 8, 24 kHz software selectable
Record Duration:	0.1-second increments from 0.5 s to specified maximum for each sample rate
Maximum Record Duration:	6 s at 24 kHz 18 s at 8 kHz 36 s at 4 kHz 72 s at 2 kHz 144 s at 1 kHz
Record Pretrigger:	0.05 s minimum to a maximum of (record length—0.05) s
Waveform File Format:	COMTRADE (IEEE C37.111-1999 compliant)

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:	IEC 60255-5:2000 IEEE C37.90-2005 Severity Level: 0.5 Joule, 5 kV CT/PT inputs
Dielectric (HiPot):	IEC 60255-5:2000 IEEE C37.90-2005 Severity Level: 2500 Vac CT/PT inputs for 1 minute

RFI and Interference Tests

EMC Immunity

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

Digital Radio Telephone
  RF Immunity:
	ENV 50204:1995
	  Severity Level:
	10 V/m at 900 MHz and 1.89 GHz

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
	  (202 ms filter on RMS voltages and
	  frequencies, 33 ms filter on fundamental
	  frequencies; cable length ≤2 m)

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 communications ports
	  (cable length ≤2 m)

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 (cable length ≤2 m)

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 (cable length ≤2 m)

Common Mode
  Disturbance Immunity:
	IEC 61000-4-16:2002
	  Frequency: 0 Hz to 150 Hz
	  Severity Level: Level 4, Segment 4:
	  30 Vrms open-circuit, 15 kHz–150 kHz
	  (cable length ≤2 m)

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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Notes

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