



SEL-2725 Unmanaged Ethernet Switch



Features and Benefits

The SEL-2725 is an unmanaged five-port Ethernet switch and copper-to-fiber media converter. Single- or multimode fiber optics are available to accommodate a wide range of utility and industrial applications. The environmental specifications exceed the requirements of IEEE 1613 Class 2 and IEC 61850-3, making it suitable for operation in harsh environments, such as electric utility substations or industrial plants.

- ▶ **Easy Installation.** The SEL-2725 has no settings. Copper ports autoconfigure for crossover cables, autospeed detects for 10 or 100 Mbps links, and automatically detects half- or full-duplex operation.
- ▶ **Reliable Power Supply.** 10–275 Vdc power supplies exceed all harsh environmental standards along with a 3,000 year MTBF.
- ▶ **Robust Performance.** Operates above the required temperature range (-40° to $+85^{\circ}\text{C}$). Exceeds the requirements of IEEE 1613 and IEC 61850-3.

Use as a multiport media converter to connect Ethernet 10/100BASE-T devices to one location or equipment rack. Use the 100BASE-FX multimode or 100BASE-LX10 single-mode fiber-optic port options to interconnect devices with the central or managed Ethernet switch. Keeping the electrical connections short and localized greatly reduces the possibility of induced noise. When ordering the SEL-2725 with dual fiber ports, the sticker on the top of the product indicates what optics each port has.

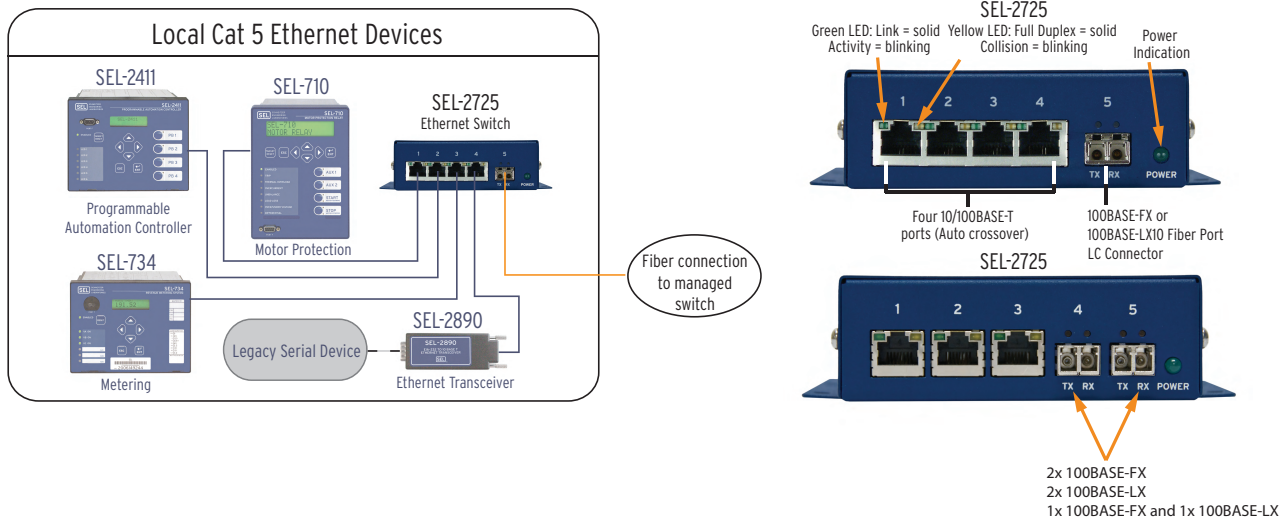


Figure 1 Ethernet Connections and Indicators

Installation and Maintenance

Power Supply

⚠ DANGER

Contact with instrument terminals may cause electrical shock which can result in injury or death.

You can order the SEL-2725 with the supply voltage listed in *Specifications*. The serial number label on the device lists the power supply voltage. The SEL-2725 power supply ceases operation when the input voltage is too low to maintain reliable operation. Applying the rated input voltage returns the SEL-2725 to proper operation.

Use 1.5 mm² (16 AWG) wire (or heavier) to connect to the **POWER** terminals. Use copper conductors only. Use AL, AL-CU, CU-AL, CC-CU, or CU-CC wire. When you use a dc power source, you must connect the source with the proper polarity, as indicated by the + and - symbols on the power terminals. After connecting the input wiring and introducing the external source of power, you will see the **POWER LED** illuminate. For compliance to UL/CSA/IEC 61010-1, the SEL-2725 must be installed so that the input power and protective grounding is not accessible during normal operation.

The storage of the equipment should be in the supplied packaging and must be kept between -40 degrees to 176 degrees Fahrenheit.

Protective Ground

Use 1.5 mm² (16 AWG) wire (or heavier) to connect to the **Protective Ground** terminal.

Disconnect Device

Disconnect device must be located in reasonable proximity and be readily accessible. This disconnect must also comply with IEC 60947-1 and IEC 60947-3 or an equivalent approved disconnect device appropriate for the country of installation and be identified as the disconnect device for this equipment.

The maximum current rating for the power disconnect circuit breaker or overcurrent device must be 15 A. Operational power is internally fused. This fuse is not user-replaceable. Should failure occur, return the unit to the factory for repair.

Branch Circuit Protection

The maximum current rating for the power branch circuit protection device must be 15 A.

Mechanical Diagrams

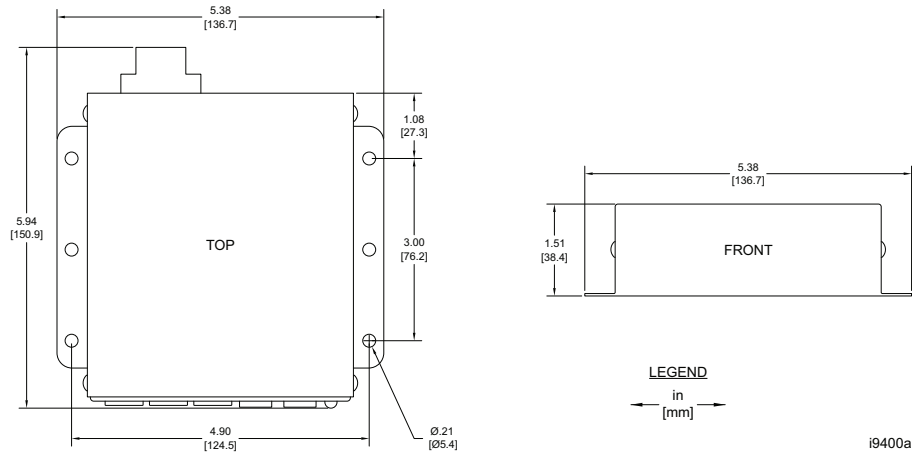


Figure 2 SEL-2725 Dimension Drawing

Specifications

Compliance

Designed and manufactured under an ISO 9001 certified quality management system
 FCC CFR 47 Part 15, Class A
 RoHS Compliant
 UL Listed to US and Canadian Safety Standards File E220228; NRAQ2/NRAQ8
 CE Mark

General

Switching Technology

Non-blocking, store and forward

Latency

Less than 10 μ s

LED Indicators

Power (green)
 Link/Activity (green per port)
 Full duplex/collision (yellow per port)

Network

IEEE 802.3u: 100BASE-T and 100BASE-FX or 100BASE-LX10
 IEEE 802.3: 10BASE-T
 IEEE 802.x: Flow control
 Address Table: 1000 MAC addresses

RJ45 Ports

Recommended Cable: Category 5(e) Shielded, Twisted-Pair Cable (STP) (SEL-C627)
 Autonegotiation: 10 or 100 Mbps, full- or half-duplex and MDI/MDI-X crossover

Fiber Optics

Class 1 LASER/LED Product: IEC 60825-1:1993 + A1:1997 + A2:2001
 Data Rate: 100 Mbps
 Connector Type: LC

Multimode
 (100BASE-FX) Option: 62.5 μ m fiber
 Lowest TX Level: -20 dBm
 Lowest RX Sensitivity: -31 dBm
 Optical Budget: 11 dBm
 Max Distance: 2 km
 Wavelength: 1300 nm
 Single-Mode
 (100BASE-LX10) Option: 9 μ m fiber
 Lowest TX Level: -15 dBm
 Lowest RX Sensitivity: -25 dBm
 Optical Budget: 10 dBm
 Max Distance: 15 km
 Wavelength: 1310 nm

Environmental

Operating and Storage Temperature

-40° to +85°C (-40° to +185°F)
 SEL-2725 UL Rating: -40° to +40°C (-40° to +104°F)

Relative Humidity

0% to 95% non-condensing

Altitude

2000 m

Note: Above 2000 m, derate dielectric strength and temperature according to IEEE 1613: 2009 Table 1 and Table 2. IEC 60255-27 certification below 2000 m only.

Operating Environment

Pollution Degree: 2
 Overvoltage Category: II
 Insulation Class: I

Enclosure Protection

IEC/EN 60255-27:2014

Power Inputs: IP2X
Enclosure: IP4X

Power Supply

Rated Voltage¹: 12–250 Vdc, 110–240 Vac (50/60 Hz)
Operational Voltage: 10.8–275 Vdc, 85–264 Vac (50/60 Hz)
Maximum Burden: 6 W, 350 mA

¹ Rated Voltage — UL Tested at this voltage.

Type Tests

Communication Product Testing

IEEE 1613:2009, Class II
IEC 61850-3:2013, Class II

Electromagnetic Compatibility (EMC) Emissions

Generic Emissions: EN 60255-26:2013
EN 61850-3:2014
47 CFR Part 15
ICES-001, Issue 5
CISPR 11:2009 + A1:2010
CISPR 22:2008
EN 55011:2009 + A1:2010
EN 55022:2010 + AC:2011
EN 55032:2012 + AC:2013
Severity Level: Class A

Electromagnetic Compatibility Immunity

Conducted RF Immunity: IEC 60255-26:2013
IEC 61000-4-6:2013
Severity Level: 10 Vrms

Electrostatic Discharge Immunity: IEC 60255-26:2013
IEC 61000-4-2:2008
IEEE C37.90.3-2001
Severity Level: 2, 4, 8 kV contact;
4, 8, 15 kV air

Fast Transient/Burst Immunity: IEC 60255-26:2013
IEC 61000-4-4:2012
Severity Level: Zone A

Magnetic Field Immunity: IEC 60255-26:2013
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

Power Supply Ripple: EN 61000-4-17:1999
+A1:2004 +A2:2009
IEC 61000-4-17:1999
+A1:2001 +A2:2008

Power Supply Dips and Interruptions: IEC 60255-26:2013
IEC 61000-4-11:2004
IEC 61000-4-29:2000

Power Supply Gradual Shutdown and Startup: IEC 60255-26:2013

Power Supply Discharge Capacitors: IEC 60255-27:2013

Power Supply Reverse Polarity and Slow Ramp: IEC 60255-27:2013

Radiated RF Immunity: IEC 60255-26:2013
IEC 61000-4-3:206 + A1:2007 + A2:2010
Severity Level: 10 V/m unmodulated
80 MHz–1 GHz, 1.4 GHz–2.7 GHz
IEEE C37.90.2-2004
Severity Level: 20 V/m 80% AM,
0.5 s keyed, 80 MHz–1 GHz

Surge Immunity: IEC 60255-26:2013
IEC 61000-4-5:2005
Severity Level: Zone B

Surge Withstand Capability: IEC 60255-26:2013
IEC 61000-4-18:2010
Severity Level: 2.5 kV peak common mode, 1.0 kV peak differential mode
IEEE C37.90.1-2002
Severity Level: 2.5 kV oscillatory,
4 kV fast transient waveform

Environmental

Cold: IEC 60068-2-1:2007
Severity Level: 16 hours at –40°C
IEC 60255-27:2013

Damp Heat, Cyclic: IEC 60068-2-30:2005
Severity Level: 25°C,
Relative Humidity: 93%
Duration: 6 cycles
IEC 60255-27:2013

Dry Heat: IEC 60068-2-2:2007
Severity Level: 16 hours at +85°C
IEC 60255-27:2013

Damp Heat, Steady State: IEC 60068-2-78:2012
Severity Level: 40°C at 90% for 10 days
IEC 60255-27:2013

Cyclic Temperature: IEC 60062-2-30:2005
Severity Level: –40°C to +85°C

Vibration: IEC 60255-21-1:1988
Severity Level: Class 2 endurance,
Class 2 response
IEC 60255-21-2:1998
Severity Level: Class 1 shock withstand,
bump, and Class 2 shock response
IEC 60255-21-3:1993
Severity Level: Class 2 (quake response)
IEC 60255-27:2013

Safety

Dielectric Strength: IEC 60255-27:2013
IEC 61850-3:2013
IEEE C37.90-2005
±3.6 kVdc on power supply
±1.5 kVac on Ethernet ports
Type tested for 1 minute

Impulse: IEC 60255-27:2013
IEC 61850-3:2013
IEEE C37.90-2005
Severity Level: Common Mode ±5 kV
power supply, ±1.5 kV Ethernet ports
Common Mode, Port to Port 5 kV
power supply, zero-rated, Ethernet ports

Protective Bonding Resistance: IEC 60255-27:2013
IEC 61850-3:2013
IEEE C37.90-2005

Compression Screw Terminals

Power Wiring

Insulation: 300 V minimum
Size: 12–18 AWG
Tightening Torque Min/
Max: 0.6–0.8 Nm (5–7 in-lb)

Note: Crimp ferrule is recommended.

Safety Information

Dangers, Warnings, and Cautions

This data sheet uses three kinds of hazard statements, defined as follows:

DANGER

Indicates an imminently hazardous situation that, if not avoided, **will** result in death or serious injury.

WARNING








Indicates a potentially hazardous situation that, if not avoided, **could** result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, **may** result in minor or moderate injury or equipment damage.

Safety Symbols



The following symbols are often marked on SEL products.

	CAUTION Refer to accompanying documents.	ATTENTION Se reporter à la documentation.
	Earth (ground)	Terre
	Protective earth (ground)	Terre de protection
	Direct current	Courant continu
	Alternating current	Courant alternatif
	Both direct and alternating current	Courant continu et alternatif
	Instruction manual	Manuel d'instructions

Safety Marks

The following statements apply to this device.

General Safety Marks

 CAUTION To ensure proper safety and operation, the equipment ratings, installation instructions, and operating instructions must be checked before commissioning or maintenance of the equipment. The integrity of any protective conductor connection must be checked before carrying out any other actions. It is the responsibility of the user to ensure that the equipment is installed, operated, and used for its intended function in the manner specified in this manual. If misused, any safety protection provided by the equipment may be impaired.	 ATTENTION Pour assurer la sécurité et le bon fonctionnement, il faut vérifier les classements d'équipement ainsi que les instructions d'installation et d'opération avant la mise en service ou l'entretien de l'équipement. Il faut vérifier l'intégrité de toute connexion de conducteur de protection avant de réaliser d'autres actions. L'utilisateur est responsable d'assurer l'installation, l'opération et l'utilisation de l'équipement pour la fonction prévue et de la manière indiquée dans ce manuel. Une mauvaise utilisation pourrait diminuer toute protection de sécurité fournie par l'équipement.
For use in Pollution Degree 2 environment.	Pour utilisation dans un environnement de Degré de Pollution 2.
Ambient air temperature shall not exceed 40°C (104°F). In locations where touch temperature safety is required.	La température ambiante de l'air ne doit pas dépasser 40°C (104°F) dans des endroits où la température des surfaces doit être suffisamment basse pour les toucher en toute sécurité.
Overvoltage Category: II	Catégorie de surtension : II
Insulation Class: I	Classe d'isolation : I
Ambient air temperature shall not exceed 85°C (185°F).	La température ambiante de l'air ne doit pas dépasser 85°C (185°F).
For use in a Type 1 enclosure.	Pour utilisation dans un boîtier de Type 1.
For all field wiring, use copper conductors only.	Pour tout le câblage sur le terrain, utilisez uniquement des conducteurs en cuivre
IP Rating Power Inputs: IP2X Enclosure: IP4X	Indice de protection Entrées d'alimentation : IP2X Boîtier : IP4X

Other Safety Marks

<p>⚠ DANGER Disconnect or de-energize all external connections before opening this device. Contact with hazardous voltages and currents inside this device can cause electrical shock resulting in injury or death.</p>	<p>⚠ DANGER Mettre hors tension ou débrancher tous les raccordements externes avant d'ouvrir cet appareil. Tout contact avec des tensions ou courants internes à l'appareil peut causer un choc électrique pouvant entraîner des blessures ou la mort.</p>
<p>⚠ DANGER Contact with instrument terminals can cause electrical shock that can result in injury or death.</p>	<p>⚠ DANGER Tout contact avec les bornes de l'appareil peut causer un choc électrique pouvant entraîner des blessures ou la mort.</p>
<p>⚠ WARNING Use of this equipment in a manner other than specified in this manual can impair operator safety safeguards provided by this equipment.</p>	<p>⚠ AVERTISSEMENT L'utilisation de cet appareil suivant des procédures différentes de celles indiquées dans ce manuel peut désarmer les dispositifs de protection d'opérateur normalement actifs sur cet équipement.</p>
<p>⚠ WARNING Have only qualified personnel service this equipment. If you are not qualified to service this equipment, you can injure yourself or others, or cause equipment damage.</p>	<p>⚠ AVERTISSEMENT Seules des personnes qualifiées peuvent travailler sur cet appareil. Si vous n'êtes pas qualifiés pour ce travail, vous pourriez vous blesser, blesser d'autres personnes ou endommager l'équipement.</p>
<p>⚠ WARNING Do not look into the fiber ports/connectors.</p>	<p>⚠ AVERTISSEMENT Ne pas regarder vers les ports ou connecteurs de fibres optiques.</p>
<p>⚠ WARNING Do not look into the end of an optical cable connected to an optical output.</p>	<p>⚠ AVERTISSEMENT Ne pas regarder vers l'extrémité d'un câble optique raccordé à une sortie optique.</p>
<p>⚠ WARNING Do not perform any procedures or adjustments that this instruction manual does not describe.</p>	<p>⚠ AVERTISSEMENT Ne pas appliquer une procédure ou un ajustement qui n'est pas décrit explicitement dans ce manuel d'instruction.</p>
<p>⚠ WARNING During installation, maintenance, or testing of the optical ports, use only test equipment qualified for Class 1 laser products.</p>	<p>⚠ AVERTISSEMENT Durant l'installation, la maintenance ou le test des ports optiques, utilisez exclusivement des équipements de test homologués comme produits de type laser de Classe 1.</p>
<p>⚠ WARNING Incorporated components, such as LEDs and transceivers are not user serviceable. Return units to SEL for repair or replacement.</p>	<p>⚠ AVERTISSEMENT Les composants internes tels que les leds (diodes électroluminescentes) et émetteurs-récepteurs ne peuvent pas être entretenus par l'utilisateur. Retourner les unités à SEL pour réparation ou remplacement.</p>
<p>⚠ WARNING Operator safety may be impaired if the device is used in a manner not specified by SEL.</p>	<p>⚠ AVERTISSEMENT La sécurité de l'opérateur peut être compromise si l'appareil est utilisé d'une façon non indiquée par SEL.</p>
<p>⚠ CAUTION Equipment components are sensitive to electrostatic discharge (ESD). Undetectable permanent damage can result if you do not use proper ESD procedures. Ground yourself, your work surface, and this equipment before removing any cover from this equipment. If your facility is not equipped to work with these components, contact SEL about returning this device and related SEL equipment for service.</p>	<p>⚠ ATTENTION Les composants de cet équipement sont sensibles aux décharges électrostatiques (DES). Des dommages permanents non-décelables peuvent résulter de l'absence de précautions contre les DES. Raccordez-vous correctement à la terre, ainsi que la surface de travail et l'appareil avant d'en retirer un panneau. Si vous n'êtes pas équipés pour travailler avec ce type de composants, contacter SEL afin de retourner l'appareil pour un service en usine.</p>
<p>⚠ CAUTION Class 1 LASER Product. This product uses visible or invisible LASERS based on model option. Looking into optical connections, fiber ends, or bulkhead connections can result in hazardous radiation exposure.</p>	<p>⚠ ATTENTION Produit LASER de Classe 1. Ce produit utilise des LASERS visibles ou invisibles dépendant des options du modèle. Regarder vers les connecteurs optiques, les extrémités des fibres ou les connecteurs de cloison peut entraîner une exposition à des rayonnements dangereux.</p>

General Safety Notes

The SEL-2725 is designed for restricted access locations. Equipment is intended for permanent installation indoors and inside an electrical/fire enclosure. Access should be limited to qualified service personnel. To ensure proper safety and operation, check the equipment rating, installation instructions, and operating instructions before commissioning or maintaining the equipment. Keep it in the box until ready for installation. Also check the integrity of any protective conductor connection before taking

any other actions. It is the responsibility of the user to ensure that the equipment is installed, operated, and used for its intended function and in the manner this manual specifies. The equipment should not be serviced. If this equipment is used for anything other than its intended function or in a manner this manual does not specify, any safety protection the equipment provides may be impaired. Positive or negative of the station battery inputs can be externally connected to the case ground, or other common ground, without damage.

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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