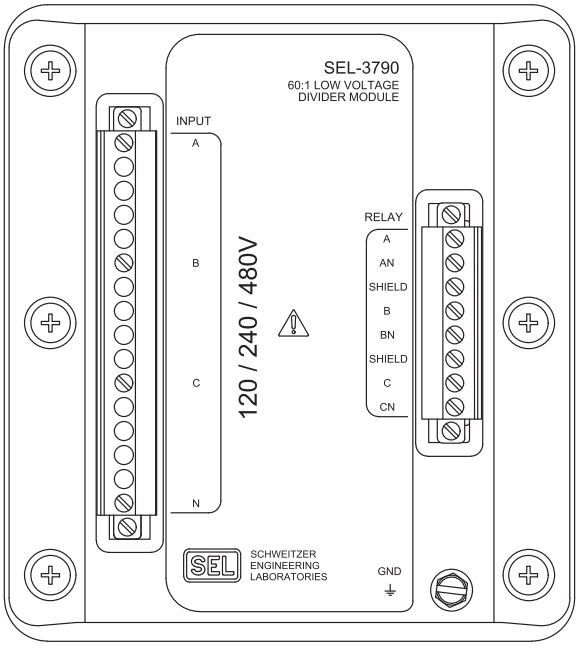
# SEL-3790 Low-Voltage Divider Module Instruction Manual


## Product Overview

*Figure 1* provides a functional overview of the SEL-3790 Low-Voltage Divider Module.

The SEL-3790 is a resistive voltage divider designed for use with low-voltage systems (120–480 Vac). It acts as a protective low-power voltage transformer (LPVT) with a 60:1 transformer ratio. The secondary output is considered an LEA output, and the output can be connected to a protective relay.




**Note:** Use a 24 AWG shielded Cat 5 cable to connect the SEL-3790 module output to the LEA inputs of an SEL-700 series relay.

**Figure 1 SEL-3790 Functional Overview**

# Safety Information

## Dangers, Warnings, and Cautions

This manual 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**<br>Refer to accompanying documents. | **⚠ATTENTION**<br>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.

**Other Safety Marks (Sheet 1 of 2)**

| | |
|---|---|
| **⚠DANGER**<br>The SEL-3790 Divider Module must be mounted downstream of a current limiting fuse. Always consider the arc flash hazard and the available incident energy at the device location. | **⚠DANGER**<br>Le module diviseur SEL-3790 doit être monté en aval d'un fusible limiteur de courant. Tenez toujours compte du danger d'arc électrique et de l'énergie incidente disponible à l'emplacement du dispositif. |
| **⚠DANGER**<br>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. | **⚠DANGER**<br>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. |
| **⚠WARNING**<br>Contact with instrument terminals can cause electrical shock that can result in injury or death. | **⚠AVERTISSEMENT**<br>Tout contact avec les bornes de l'appareil peut causer un choc électrique pouvant entraîner des blessures ou la mort. |

**Other Safety Marks (Sheet 2 of 2)**

| | |
|---|---|
| **⚠WARNING**<br>Use of this equipment in a manner other than specified in this manual can impair operator safety safeguards provided by this equipment. | **⚠AVERTISSEMENT**<br>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. |
| **⚠WARNING**<br>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. | **⚠AVERTISSEMENT**<br>Seules des personnes qualifiées peuvent travailler sur cet appareil. Si vous n'êtes pas qualifiés pour ce travail,<br>vous pourriez vous blesser, blesser d'autres personnes ou endommager l'équipement. |
| **⚠WARNING**<br>For UL compliance, install this product only in restricted-access locations (for example, dedicated equipment rooms, equipment closets, or similar). This directive is in accordance with Articles 110.26, 110.27, and 110.18 of the National Electrical Code, ANSI/NFPA 70 (2005). | **⚠AVERTISSEMENT**<br>Pour être conforme aux normes "UL", installer cet équipement uniquement dans des espaces à accès limité (chambres dédiées aux équipements, cabinets pour équipements ou équivalent). Cette directive est conforme aux articles 110.26, 110.27 et 110.18 du Code National de l'Électricité, ANSI/NFPA 70 (2005). |
| **⚠WARNING**<br>Do not perform any procedures or adjustments that this instruction manual does not describe. | **⚠AVERTISSEMENT**<br>Ne pas appliquer une procédure ou un ajustement qui n'est pas décrit explicitement dans ce manuel d'instruction. |

# Applications

**⚠DANGER**
The SEL-3790 Divider Module must be mounted downstream of a current limiting fuse. Always consider the arc flash hazard and the available incident energy at the device location.

**⚠WARNING**
For UL compliance, install this product only in restricted-access locations (for example, dedicated equipment rooms, equipment closets, or similar). This directive is in accordance with Articles 110.26, 110.27, and 110.18 of the National Electrical Code, ANSI/NFPA 70 (2005).

The following application examples represent only some possible uses for the SEL-3790.

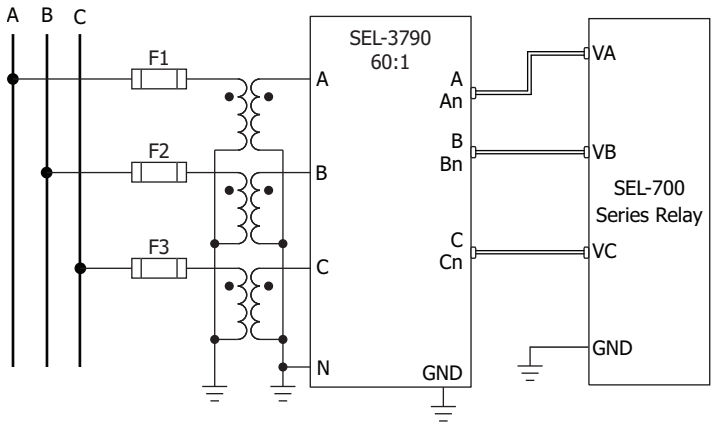



**Figure 2 Connection of PT to an SEL-3790 and an SEL-700 Series Relay**

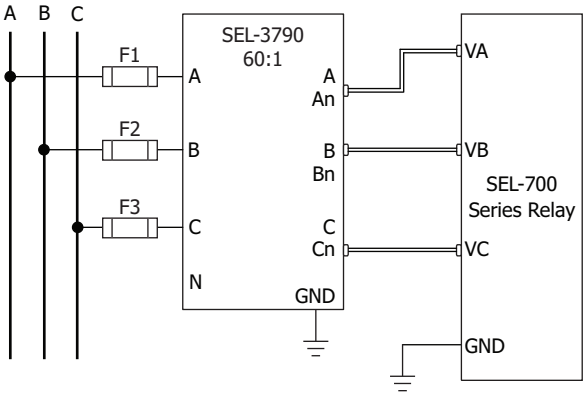



**Figure 3 Three-Wire Direct Connection of an SEL-3790 to an SEL-700 Series Relay**

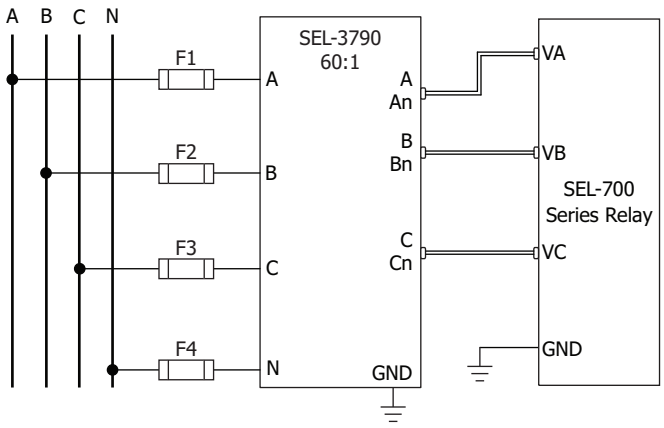



**Figure 4 Four-Wire Direct Connection of an SEL-3790 to an SEL-700 Series Relay**

# Installation and Maintenance

**⚠WARNING**
This equipment must be used in the manner specified in this instruction manual; failure to do so might impair the protection provided by the equipment.

Follow these installation and maintenance instructions for years of reliable, trouble-free service from the SEL-3790.

## Mounting

**⚠DANGER**
The SEL-3790 Divider Module must be mounted downstream of a current limiting fuse. Always consider the arc flash hazard and the available incident energy at the device location.

**⚠WARNING**
For UL compliance, install this product only in restricted-access locations (e.g., dedicated equipment rooms, equipment closets, or similar). This directive is in accordance with Articles 110.26, 110.27, and 110.18 of the National Electrical Code, ANSI/NFPA 70 (2005).

Mount the SEL-3790 in a protected environment, such as an outdoor weatherproof cabinet or inside a building. Mounting to equipment racks and cabinets is achieved by using the DIN rail on the back of the module. Refer to *Figure 6* for module dimensions.

As a safety measure, restrict access to the module and the exposed terminal strips. This is required for UL-compliant installation. When connected directly to the 120–480 Vac voltage source, the SEL-3790 must be mounted in the restricted access compartment. The low energy output of the SEL-3790 is used to safely bring the voltage measurements into the protection and control compartment.

A properly sized current limiting fuse shall be used to protect the input wiring to the SEL-3790. The fuse shall be rated for safe interruption of the maximum available fault current.

## Front-Panel Symbols

There are important safety symbols on the front of the SEL-3790.

Observe proper safety precautions when you connect the SEL-3790 at terminals marked by these symbols. In particular, the danger symbol located on the front panel corresponds to the following:

> **Contact with instrument terminals can cause electrical shock that can result in injury or death.**

**⚠WARNING**
Do not connect power to the SEL-3790 until you have completed the installation procedures.

Be careful to limit access to these terminals.


**Figure 5 SEL-3790 Front-Panel Power and Ground Connections**

## Grounding

Connect the grounding terminal labeled ⏚ to a rack frame ground or main station ground for proper safety and performance. Use 12 AWG (4 $mm^2$) or heavier wire less than 2 m (6.6 ft) in length for this connection. Make the ground connection before making the power connections.

## Terminal Connections

Terminate connections to the SEL-3790 with 12 AWG to 18 AWG wire for the primary input and 14 AWG to 24 AWG for the secondary output. SEL recommends using a shielded, twisted-pair cable with the shield grounded at the relay cabinet to connect the voltage divider module to the relay. One the divider side, the cable shield shall be connected to the divider **SHIELD** terminal.

## Cleaning

Use care when cleaning the SEL-3790. Use a mild soap or detergent solution and a damp cloth to clean the chassis. Be careful cleaning the front of the SEL-3790 because it is covered by a permanent plastic sheet; do not use abrasive materials, polishing compounds, or harsh chemical solvents (such as xylene or acetone) on any surface.

# Mechanical Diagrams

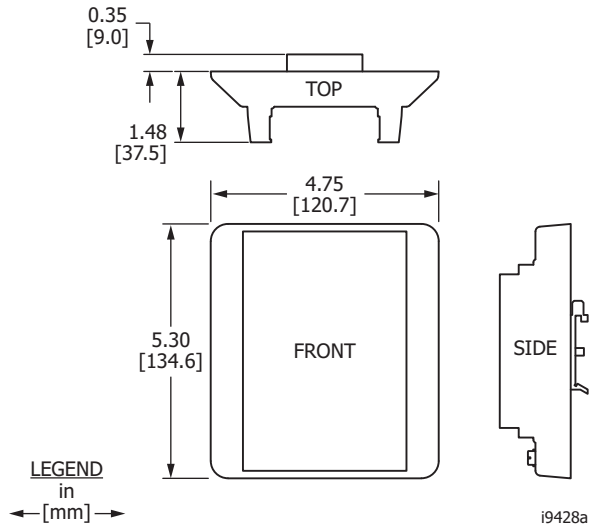



**Figure 6 SEL-3790 Dimensions and Drill Diagram**

# Specifications

## Compliance

Designed and manufactured under an ISO 9001 certified quality management system

47 CFR 15B, Class A

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Mark

RCM Mark

UKCA Mark

UL Listed to U.S. and Canadian safety standards (File E306608; QUYX, QUYX7)

## Tightening Torque

I/O Connectors: 0.5–0.6 Nm (4.4–5.0 in-lb)

## Terminal Connections

Terminals or stranded copper wire. Ferrule terminals are recommended. Minimum temperature rating of 105°C (221°F).

## General

Transformer Ratio: 60:1

Rated Accuracy: 1%

### Primary Input Ratings

Rated Operational Voltage: 120, 240, 480 Vac

Rated Insulation Voltage: 5.4 kVac

Rated Frequency: 50/60 Hz

Input Impedance: 5 MΩ (per phase)
10 MΩ (phase-to-phase)

### Secondary Output Ratings

Maximum Cable Length: 10 m

Rated Burden: 2 MΩ||50 pF

## Operating Temperature Range

–40° to +85°C (–40° to +185°F)
UL Rating: –40° to +40°C (–40° to +104°F)

## Humidity

0% to 95% without condensation

## Altitude

2000 m maximum

## Pollution Degree

2

## Insulation Class

II

## Object Penetration

IP10

## Overvoltage Category

III

## Unit Weight

0.32 kg (0.7 lb)

## Dimensions

46.5 mm x 120.7 mm x 134.6 mm
(1.83" H x 4.75" W x 5.30" D)

## Type Tests

### Environmental

Vibration: IEC 60255-21-1:1988
IEC 60255-27:2013, Section 10.6.2.1
Endurance: Class 2
Response: Class 2

Shock Resistance: IEC 60255-21-2:1988
IEC 60255-27:2013, Section 10.6.2.2
IEC 60255-27:2013, Section 10.6.2.3
Withstand: Class 1
Response: Class 2
Bump: Class 1

Seismic (Quake Response): IEC 60255-21-3:1993
IEC 60255-27:2013, Section 10.6.2.4
Response: Class 2

Cold: IEC 60068-2-1:2007
IEC 60255-27:2013, Section 10.6.1.2
IEC 60255-27:2013, Section 10.6.1.4
–40°C, 16 hours

Dry Heat: IEC 60068-2-2:2007
IEC 60255-27:2013, Section 10.6.1.1
IEC 60255-27:2013, Section 10.6.1.3
85°C, 16 hours

Damp Heat, Steady State: IEC 60068-2-78:2001
IEC 60255-27:2013, Section 10.6.1.5
40°C, 93% relative humidity, 10 days

Damp Heat, Cyclic: IEC 60068-2-30:2001
IEC 60255-27:2013, Section 10.6.1.6
25° to 55°C, 95% relative humidity, 6 cycles

Change of Temperature: IEC 60068-2-14:2009
IEC 60255-1:2010, Section 6.12.3.5
–40°C to 85°C, ramp rate 1°C/min, 5 cycles

### Electromagnetic Compatibility

EN 50263:1999 [BS EN 50263:2000]

### Electromagnetic Compatibility Immunity

Fast Transient Burst Immunity: IEC 60255-26:2013
[BS EN 60255-22-4:2002]
IEC 61000-4-4:2011
[BS EN 61000-4-4:2005]
Severity Level: 4 kV at 5 kHz and 100 kHz

Surge Immunity: IEC 60255-26:2013; Section 7.2.7
[BS EN 60255-22-5:2002]
IEC 61000-4-5:2005
[BS EN 61000-4-5:1995 + A1:1996]
Severity Level: 2 kV line-to-line, 4 kV line-to-earth

### Safety

Dielectric Strength: IEC 60255-27:2013
IEC 61010-1:2018
Severity Level: 5400 Vac for primary inputs

Impulse: IEC 60255-27:2013
Severity Level: 0.5 Joule, 7.2 kV

# Technical Support

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

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