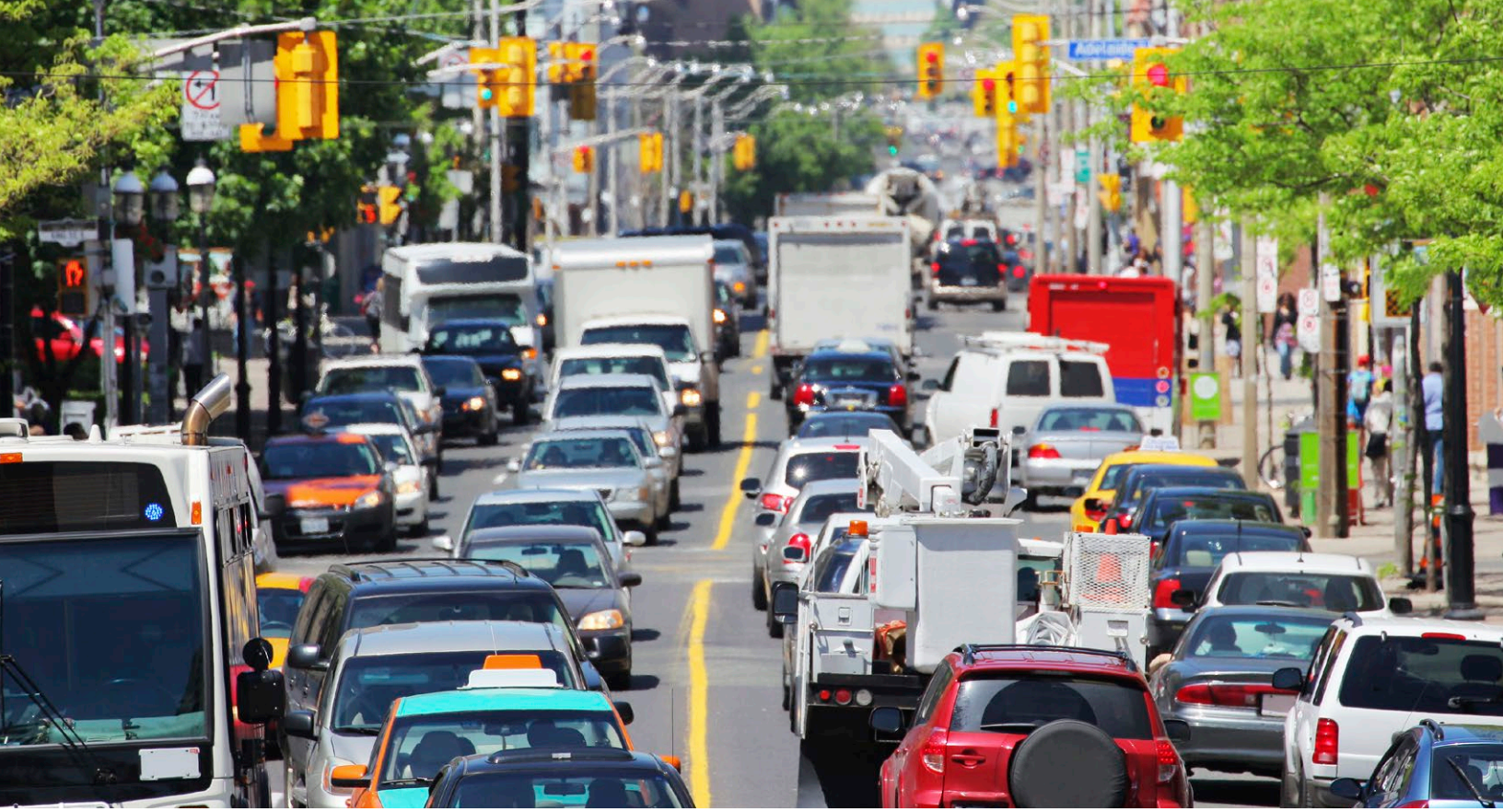
SEL-8301

Underground Distribution Sensor

Optimize Outage Management and Improve Underground System Reliability

- Line current measurement accuracy of 1.5 percent allows for more effective switching decisions and faster power restoration to customers during an outage.
- Energy harvesting provides up to 20 years of maintenance-free operation.
- Submersible design reliably operates in up to 15 feet of water to ensure delivery of status information in harsh conditions.
- Flexible design supports up to 12 phases with one device.



Improve Underground Infrastructure Reliability

Locating a fault in a high-traffic environment is challenging. Line crews are required to find the fault quickly while also being safe. Inspecting each location is labor-intensive and time-consuming unless aided by technology.

The SEL-8301 Underground Distribution Sensor helps reduce the fault-locating time by identifying the faulted circuit section remotely.

In addition to locating faults, crews can leverage the SEL-8301 system to further improve operational efficiency. The water depth sensor accessory automatically measures and reports the water level of a subsurface vault or manhole. This enables the utility to accurately dispatch the right number of pump trucks to the vault, ensuring that the vault is ready to enter when the repair crew arrives onsite.

A line-powered design, along with over-the-air firmware upgrades, leads to zero maintenance for the life of the product. SEL-8302 Current Transformers harvest energy from the load current flowing through underground distribution cables. With as little as 20 A of load current per phase, the SEL-8301 supports fault detection, outage detection, load current monitoring, and wireless reporting.

The design of the SEL-8301 simplifies the wireless fault indicator and load monitoring solution into one durable, submersible, line-powered product ready to deploy out of the box.

Performance and Durability

AutoRANGER® Fault Detection Technology

The SEL-8301 continuously monitors the underground distribution circuit and identifies faults. It automatically adapts its trip threshold based on the measured load current to ensure good coordination. The SEL-8301 monitors for system protection operations to distinguish between fault types, circuit outages, and normal system conditions. Determining the fault type enables you to prioritize repair efforts and improve system reliability.

Dual-Purpose, High-Accuracy Current Transformers

The device harvests energy from underground distribution cables while providing high-accuracy current measurements. The SEL-8302 Current Transformer's accuracy of 1.5 percent (typical) enables more informed switching decisions for emergency circuit configurations.

Designed for Harsh Subsurface Environments

Tested rigorously, the SEL-8301 and accessories are designed to reliably operate in harsh subsurface vault applications susceptible to flooding. The IP68 rating allows for reliable operation in up to 15 feet of water.

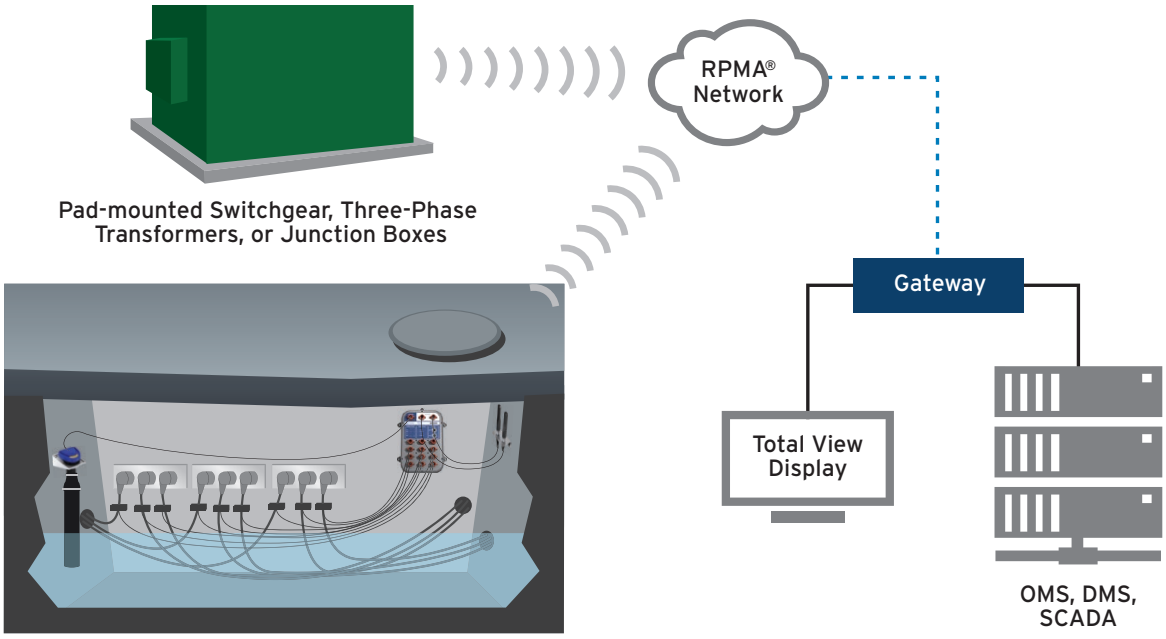
Maintenance-Free and Over-the-Air-Upgradeable

Line-Powered, Maintenance-Free Design

The SEL-8301 is load-powered and designed for 20 years of maintenance-free operation. Every SEL-8301 Underground Distribution Sensor is backed by SEL's no-questions-asked ten-year warranty.

Over-the-Air-Upgradeable

The SEL-8301 uses a Trilliant Random Phase Multiple Access (RPMA) wireless network, which provides two-way communications. In addition to wireless reporting of the fault and load status, the network also allows over-the-air firmware upgrades.



Install the SEL-8301 in pad-mounted enclosures and subsurface vaults. It integrates with RPMA networks to monitor up to 12 circuits with one reliable device.

Main Product Overview

Submersible housing.

Accessory port for water depth sensor.

Status LEDs provide simple indication of network connectivity, system status, and accessory status.

Tabs for magnetic or screw-mount applications.

Two antenna ports.

Pushbuttons for device activation and system status.

Easy-lock connection for as many as 12 SEL-8302 Current Transformers.

Power-harvesting capabilities from connected SEL-8302 Current Transformers.

Feature Overview

Accessory Port	Supports 1 water depth sensor
Current Transformer Ports	Supports up to 12 SEL-8302 Current Transformers
LED Display	12 sensor status LEDs
	4 system status LEDs
System Buttons	Simple 2-button user interface
Antenna Ports	Supports 2 remote antennas

-40°C +80°C
-40°F +176°F

15 g
Shock/ Vibration Resistance

Conformal Coating

15 kv
ESD Resistance

Energy Harvesting

2.4 GHz
Wireless

IP-68
Submersible

Encryption

Accessory Sensors

Water Depth Sensor

Connect a water depth sensor to enable automatic water level reporting. The sensor mounts near the top of a subsurface vault or manhole and uses ultrasonic waves to determine the water depth. Remotely view the water volume on a centralized display, and dispatch the correct number of pump trucks to each vault location.

SEL-8302 Current Transformer

Harvest power and measure current while continuously monitoring for faults on underground distribution circuits. The SEL-8302 is a submersible split-core CT. Easily attach the CT to insulated and shielded distribution cables.

Applications

Subsurface Manholes and Vaults

Eliminate the challenges of monitoring and trouble-shooting for faults in hard-to-reach subsurface applications, such as manholes and vaults. Add the water depth sensor accessory to dispatch the right number of pump trucks to flooded vaults.

Pad-Mounted Switchgear

Sectionalize around the faulted cable section on feeders connected to medium-voltage pad-mounted switchgear and junction boxes. Take advantage of the accurate SEL-8301, which collects reliable load data from monitoring load current levels at critical points on the distribution system to prevent cable overloading. This information helps operators make switching and sectionalizing decisions during emergency conditions.

Pad-Mounted Transformers

Monitor the load current at three-phase transformers feeding industrial and residential loads. Apply SEL-8302 Current Transformers to the outgoing phases of feedthrough transformers to determine the fault location within pad-mounted transformer loops with a normally open point.

High-Rise Distribution Feeders and Transformer Rooms

Monitor electric distribution circuits in high rises and large factory facilities. Utility personnel no longer need to enter a structure to locate the fault. All sensor statuses can be viewed remotely from a centralized location.

SEL-8301 Specifications

General	
Current Measurement Accuracy	±1.5 percent typical, ±4 percent specified
Current Measurement Range	20—650 A
Water Depth Measurement Accuracy	±0.5 in +1 percent of reading
Ports	12 current transformer ports for current measurement and energy harvesting (supports up to 12 phases or 4 three-phase circuits) 1 accessory port (supports up to 1 water depth sensor) 2 antenna ports (supports remote antennas)
Network	RPMA network
Radio Operating Frequency	2.4 GHz ISM band
Power Requirements	Load-powered with a minimum of 3 SEL-8302 Current Transformers 20 A per phase minimum with 3 SEL-8302 Current Transformers and with a 3-hour reporting interval
Operating Conditions	−40° to +80°C (−40° to +176°F)
Ingress Protection	SEL-8301: IP68 (up to 4.6 m [15 ft]) IEEE 495 section 4.4.2-2007 SEL-8302: IP68 (up to 4.6 m [15 ft]) IEEE 495 section 4.4.2-2007 Antenna: IP67 Water depth sensor: IP67
Weight	1.2 kg (2.7 lb)
Mounting	Mounting tabs for screws Optional magnetic mounts
Warranty	Ten-year, no-questions-asked

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