

SEL-547



Distributed Generator Interconnection Relay

Utility-Grade Protection for Distributed Generation



Low-cost, compact package incorporates essential protection and control elements for distributed generation.

Features and Benefits

Protection and Control Elements Required by IEEE 1547

- Four undervoltage elements (device 27)
- Four overvoltage elements (device 59)
- Four over-/underfrequency elements (device 81)
- Directional power element (device 32)
- Synchronism check element (device 25)

Modbus® and SEL Communications Interface

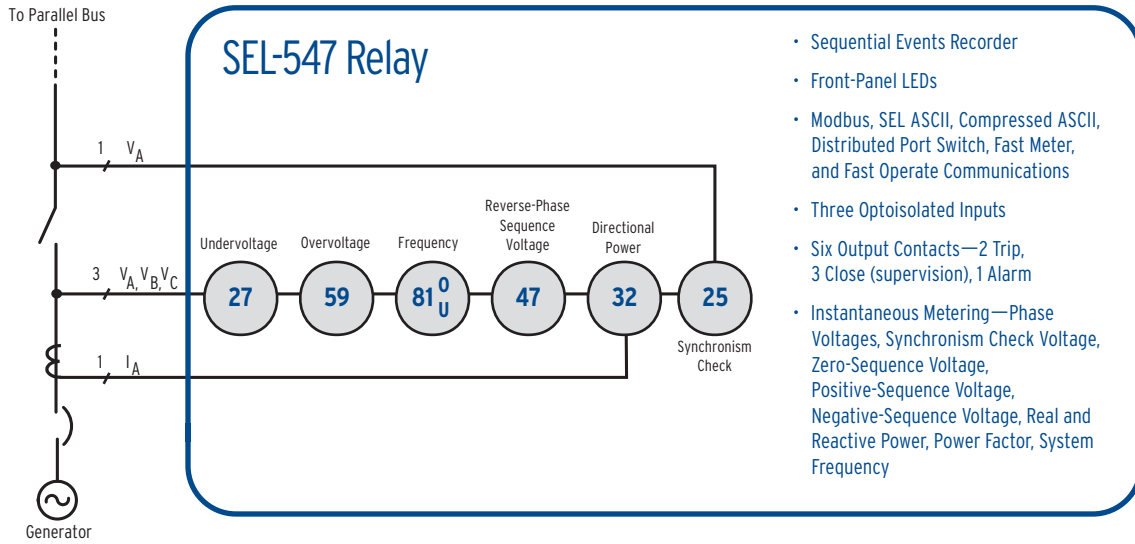
- Modbus communications protocol interfaces the SEL-547 to outside communications networks.
- Integrate with SEL communications processors using SEL Fast Meter and Fast Operate messages.

Additional Elements for System Protection and Restoration

- Over-/undervoltage or over-/underfrequency elements operate for local system islanding or system-wide voltage/frequency disturbances.
- Directional power element operates for power export violations or generator motoring.
- Synchronism check element detects healthy voltage, frequency, and angle, and supervises breaker/switch closing.

Making Electric Power Safer, More Reliable, and More Economical®

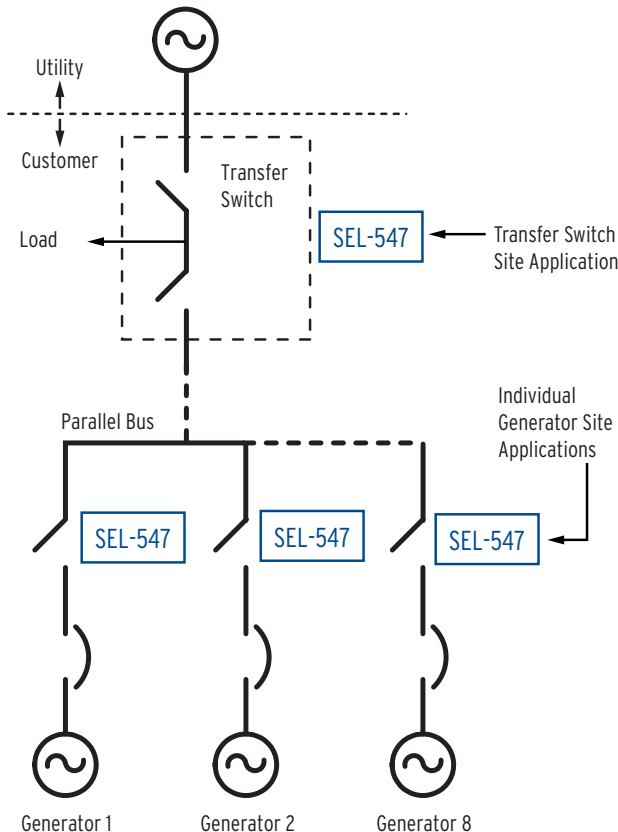
Functional Overview



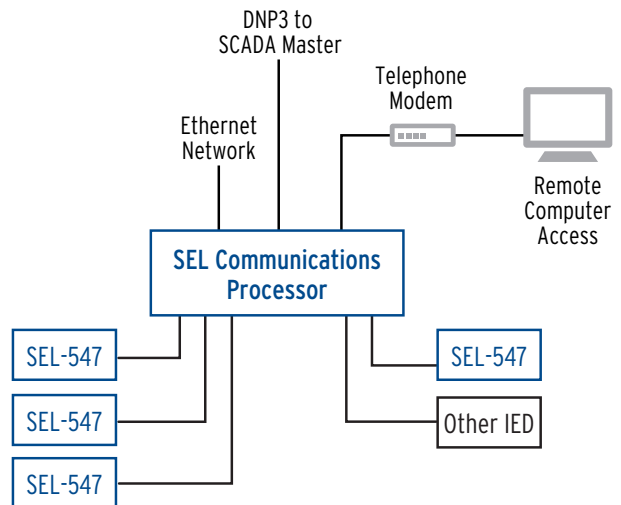
Distributed Generation and Utility Interconnection Protection

When the SEL-547 detects utility supply problems at the transfer switch site, it separates the customer system from the utility supply. When the SEL-547 detects a system problem that could adversely affect the generator at an individual generator site, it separates the individual generator from the rest of the system.

Apply the flexible SEL-547 at the transfer switch site (interconnection point between the utility and the customer) and at each individual generator site, as shown in the figure at left.

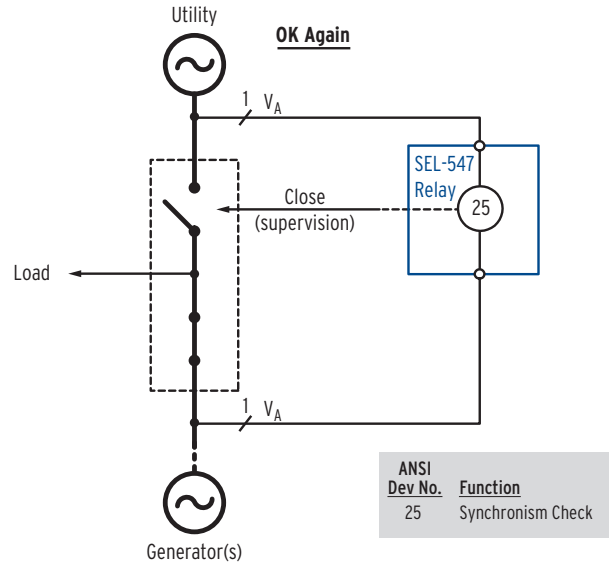
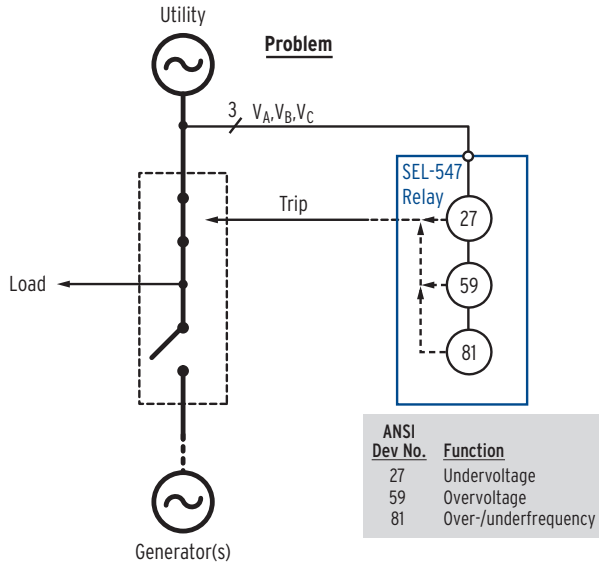


System Integration



Apply the SEL-547 with SEL communications processors for flexible access through local- and wide-area networks. View real-time values, download event reports, and send control commands over the same communications path.

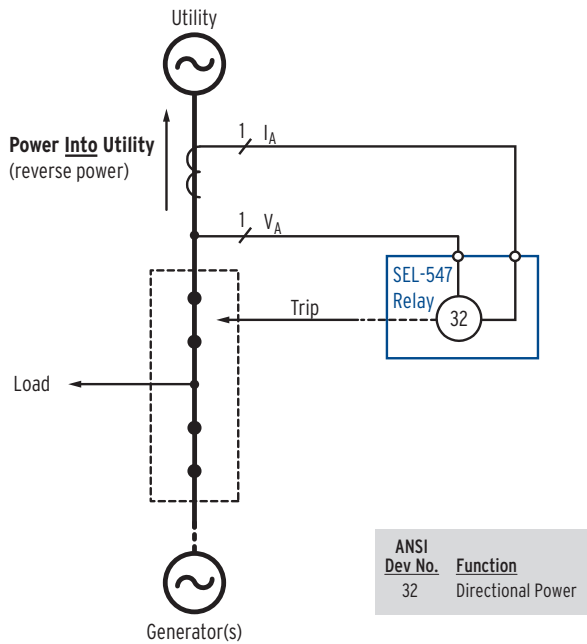
System Disturbance Detection and System Restoration



These two figures show the operation of the SEL-547 and an emergency backup generator for a system disturbance. The emergency backup generator is normally offline. In the first figure, the over-/undervoltage or over-/underfrequency elements in the SEL-547 detect local system islanding or a system-wide problem and trip the transfer switch, separating the utility supply from the load. A separate control (not shown) brings the emergency backup generator online, and the

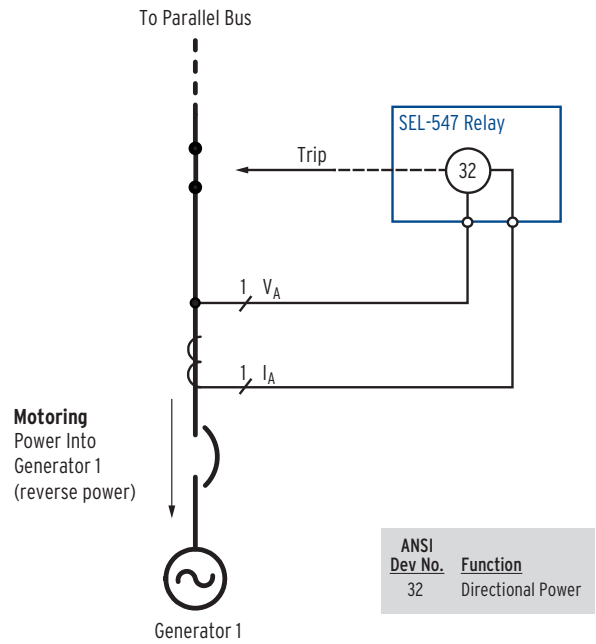
generator then supplies part or all of the load. Later, as shown in the second figure, the synchronism check element in the SEL-547 detects that the utility supply and generator are within normal bounds (voltage, frequency, and angle). The SEL-547 then issues a close (supervision) signal to a separate control (not shown) to close the transfer switch, reconnecting the utility supply to the load.

Reverse Power Flow Detection



In the figure above, the generator normally operates in a parallel mode, but with the restriction that no power can be exported to the utility. Due to reduced onsite demand or some other phenomenon, a net flow of power into the utility results. The directional power element in the SEL-547 detects this reverse power flow and trips the transfer switch, separating the utility supply from the load and generator.

Generator Motoring Detection



In the figure above, the generator normally operates in a parallel mode. For some reason (e.g., the generator loses its prime mover), power from the power system flows into the generator, motoring the generator. The directional power element in the SEL-547 detects this potentially damaging reverse power flow and trips the switch/breaker, breaking the parallel operation.

SEL-547 Distributed Generator Interconnection Relay

General Specifications

AC Voltage Inputs (wye-connected)

208–480 V_{L-L} nominal (120–277 V_{L-N} nominal)
[additional input for synchronism check, 120–277 V_{L-N} nominal]

AC Current Input

5 A nominal

System Frequency and Phase Rotation

50 or 60 Hz; ABC or ACB rotation

Optoisolated Inputs (three)

Apply 6–32 Vdc wetting voltage

Power Supply

6–32 Vdc input range; power consumption <10 W

Output Contacts (five plus one alarm)

6 A continuous carry @ 70°C; 4 A continuous carry @ 85°C
30 A make per IEEE C37.90; 8 ms pickup time

Serial Communications (300–19200 bps)

EIA-232 port (factory set: SEL ASCII protocol)

EIA-485 port (factory set: Modbus protocol)

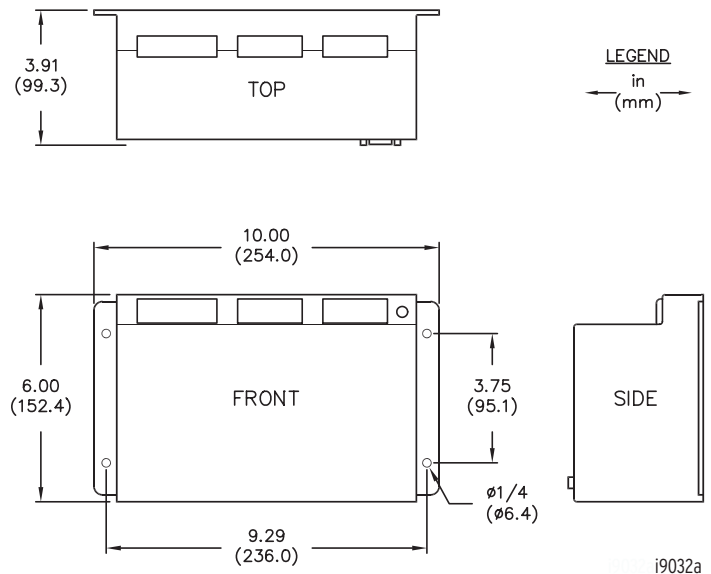
Operating Temperature

-40° to +85°C (-40° to +185°F)

Weight

2.55 pounds (1.16 kilograms)

Product Dimensions



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