

**GFCI AND SPGFCI**  
FOR COMMERCIAL AND  
INDUSTRIAL APPLICATIONS

# Shock Protection

## for Larger Loads and Higher Voltages



**1. NEMA 4X & IP69K Rated Enclosure**  
Prevents access to hazardous parts and provides protection against water, humidity and corrosion.

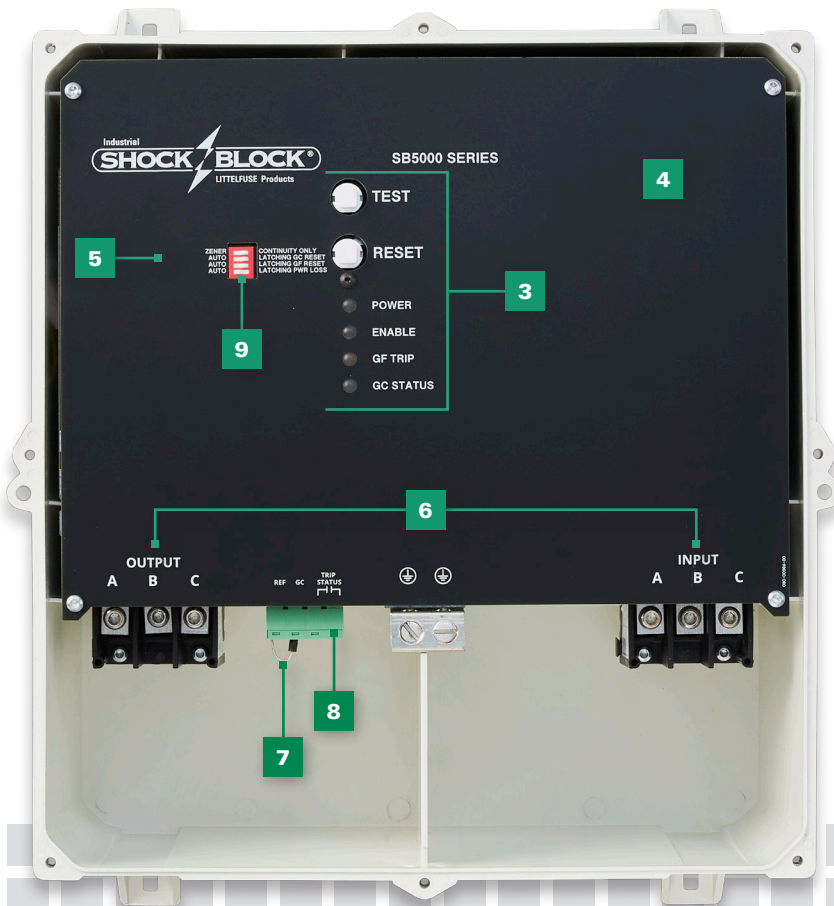
**2. Lockable Latch**  
Allows for a tamper resistant installation so that settings can only be changed by authorized personnel.

## The Shock Block® SB5000

The Industrial Shock Block SB5000 series is a personnel protection device designed to meet the requirements for GFCIs and special-purpose GFCIs defined by UL 943 and UL 943C, and:

- Protects personnel from electrical shock where standard GFCI breakers and receptacles are not available
- Offers an comprehensive solution to detect leakage current and isolate electrical hazards to prevent fatal shocks from occurring
- Monitors the continuity of the ground circuit to isolate electrical hazards before they lead to shock events
- Prolongs the life of the internal contactor by offering undervoltage, brownout and chatter detection
- Is available as a GFCI, special-purpose GFCI, and equipment ground-fault protective device (EGFPD)
  - GFCI models have a fixed 6 mA trip level (Class A)
  - Special-Purpose GFCI models have a 20 mA trip level (Class C and D)
  - EGFPD models can be set to trip at 6, 10, 20...100 mA in increments of 10 mA

Inside view of SB5100



### 3. Operator Interface

Shows unit status, alarm types, percent of leakage current and also has TEST and RESET capabilities.

### 4. Available in GFCI, Special-Purpose GFCI, and EGFPD Models

GFCI models (fixed 6 or 20 mA trip levels) and EGFPD models as shown (adjustable trip levels) per UL 943, UL 943C, and UL 1053.

### 5. Selectable Trip Levels (EGFPD only)

Provides adjustable trip levels for systems with leakage current higher than GFCI 6 mA and 20 mA standards.

### 6. Input/Output

Input from incoming power source and output going to the load.

### 7. Ground Check

Monitors continuity of ground wire between Shock Block and load. Built-in on all Shock Block models for proactive protection.

### 8. Remote Indication

Auxiliary contact indicates the internal contactor status.

### 9. Flexible Configuration

Selectable manual reset or auto-reset for brownout, power-up, and ground monitor interruptions to fit plant safety protocols

**Commercial kitchens now require a Class A GFCI for 208 V equipment up to 100 A; for applications where Class A GFCIs cannot be applied, utilize Class C & D special-purpose GFCI models with UL 943C Listing.**

The SB5000 meets all UL 943 and 943C requirements and more:

- Reliable performance
  - 85%, 100%, and 110% of the rated voltage
  - Full-load and no-load
  - -35 °C (-31 °F) to +66 °C (+151 °F)
- Leakage-current return path – ground-wire monitor
- SCCR of 10 kA for 32 and 60 A models, and 50 kA for 80 and 100 A models
- Environmental considerations
  - NEMA 4X and IP69K rated enclosure
- UL 943 inverse time trip curve
- UL 943 fixed trip level (GFCI 6 mA)
- UL 943C fixed trip level (SPGFCI 20 mA)

# Shock Block

## in Food & Beverage Processing



1 Bandsaw

2 Mixing/Grinding Appliances

3 Drop-Down Receptacles for Prep

4 Conveyor

### Common 3-Phase Loads in Food Manufacturing

In food and beverage processing, the environment is similar to the kitchen, except with even larger loads, harsher wash down requirements, and even higher voltages. So the cables for all the heavy portable equipment are prone to wear and tear, the cable couplers are more susceptible to water ingress from the wet environment, and the shock hazards are just as lethal at the higher industrial voltages.

The SB5000's NEMA 4X and IP69K rated enclosures allow for protection and operation out on the production floor instead of complicated installations in dry electrical rooms. Utilizing the ground check feature available on every model of the Shock Block, is a proactive way to isolate the hazard caused by damaged cords and plugs before someone gets shocked.

# Shock Block in Commercial Kitchens



- 1 Drop-Down Receptacles for Prep
- 2 Mixing/Grinding Appliances
- 3 Electric Oven/Pizza Oven
- 4 Dishwasher
- 5 Electric Range
- 6 Deep Fryer

## Common 208 V Appliances in Commercial Kitchens

In commercial kitchens, the combination of a wet environment, stainless steel equipment and conductive surfaces creates a situation where shock is more likely to occur. Cooking equipment must be movable to meet sanitation standards, requiring appliances to be connected via plug and cord. Flexible cables are prone to wear and tear, and when the loads get larger, so do the cables. Larger conductors are less flexible, and the portable equipment they supply are larger and heavier too.

While dishwashers are often permanently installed – they are always required to be GFCI protected because of their proximity to water, heat, and electricity. The NEC only requires GFCI protection for 60 A and below, but Littelfuse offers additional protection all the way up to 100 A.

# Shock Block

## in Commercial Garages, Service Bays, & Maintenance Shops



- 1 Wheel Balancers
- 2 Pressure Washing Equipment
- 3 Lifts
- 4 Compressors
- 5 Welders

### Common 208 V Appliances in Garages, Service Bays, & Maintenance Shops

In Commercial Garages, Service Bays, and Maintenance Shops, the frequent use of portable equipment and the everchanging environment to accommodate different tasks can create situations where shock is more likely to occur. With so much portable equipment, and each worker focused on the task in front of them, leakage current from damaged cords and cables can present itself to those unsuspecting personnel.

For welding applications if the “working ground” lead is damaged or not setup properly then welding current will take alternate paths through facility structure, ground conductors, and conduit fittings. When this stray current runs through conduit or control panels, it causes the conductors to heat up and melt insulation. Use the SB5000’s built-in ground monitoring to make sure the effective ground-fault current path stays intact and proactively prevents future shock hazards from occurring.

# Safeguarding your people in other **Wet Environments**



GFCIs AND SPECIAL-PURPOSE GFCIs ARE VITAL WHERE PEOPLE, ELECTRICAL EQUIPMENT, AND WATER ARE PRESENT



1. Waste Water Facilities
2. General Manufacturing
3. Movie Sets
4. Amusement Parks/Swimming Pools

5. Fountains
6. Oil and Gas
7. Mining
8. Greenhouses

# Success Stories



## Commercial Kitchens

One of the top fast-food chains in America dedicated to a people-first workplace, uses five Shock Block GFCIs per location. When the NEC updated 210.8(B) requiring shock protection on three-phase 208 V plug-in equipment 100 A and below, the company didn't hesitate to add the protection. To them, this was more than code compliance. The Shock Block provides invisible shock protection to workers ensuring their safety. That's a good recipe for business.



## Food & Beverage Processing

A global food manufacturer with a goal to send everyone home safe from work every day uses Shock Block GFCI as a failsafe method to prevent electrical shock and eliminate risk to workers. In their manufacturing process, they use stainless equipment that is subject to frequent wash downs. The combination of electricity, metal, and water is a recipe for dangerous electrical incidents. Safety training and proper use of PPE are stressed, but there's still a risk of human error. This manufacturer uses the engineering control, SB5000, to remove the risk of human error and keep workers safe.



## Automotive Service Garages

When you have over 400 service stations nation-wide and growing, keeping business and the cars they service running is critical. Service garages are vulnerable because sharp tools used can damage cords and stray currents from welding can heat up conduit and melt conductors inside. This leads to leakage currents and compromised ground conductors—a hazardous situation. This partner was an early adopter when the NEC 210.8(B) required GFCI protection for any plug and cord equipment that is 208 V three-phase 100 A or below. They use 6 Shock Block GFCI for each location to not only meet code, but also drive a safer workplace.



## Television and Film Production

The Rental Shock Block GFCI was designed for the motion picture, television, and film industry. For film crews and cast, our high current rental GFCI provides the ultimate protection for people and equipment working in dangerous environments where electricity must coexist with water. Winner of the 1999 Academy Award® for Scientific and Engineering Achievement and is currently being used on several popular productions.





## General Manufacturing

When industrial equipment rolls over electrical cords, electrical shock incidents become a risk. A global manufacturer of window treatments took a proactive approach to ensure worker safety so they wouldn't have to face an electrical injury or fatality. The manufacturer went above the minimum code requirement of PPE alone to install the SB5000 for three-phase systems, where the line-to-line voltage is 480 V or less, as an engineering control to proactively protect personnel from shock.



## Greenhouses

The indoor farming market is rapidly growing to meet the ever-increasing food demand. The horticultural lighting equipment and watering systems used in these applications have flexible cords with connectors and plugs. This setup is common in the industry and now requires GFCI and SPGFCI protection to safeguard workers from electrical shock. Littelfuse Shock Block is the preferred solution for a system integrator that has been servicing the greenhouse industry for multiple generations.



## Fountains and Water Parks

When the most visited vacation resort in the world needed to comply with new NEC updates requiring GFCI protection for fountains they contacted Littelfuse. The Shock Block is installed on 250 V 60 A outlets around the resort to keep little—and big-kids safe while they splash in the fountains on hot summer days.

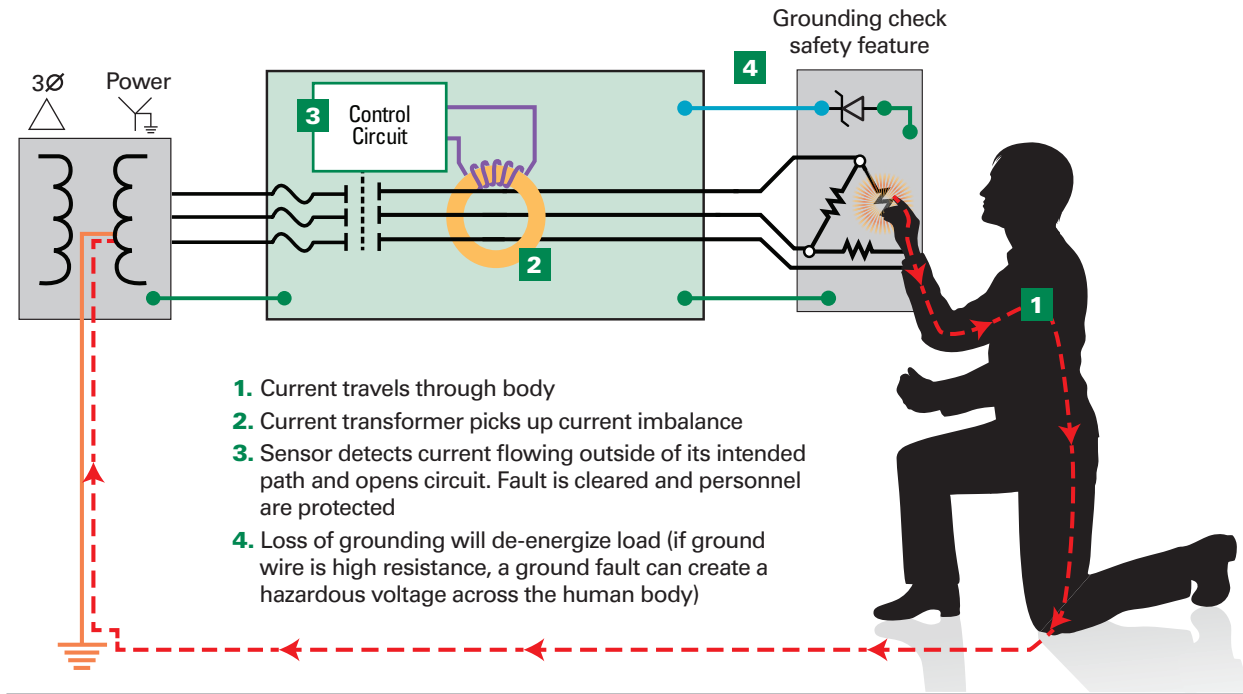


## Water/Wastewater

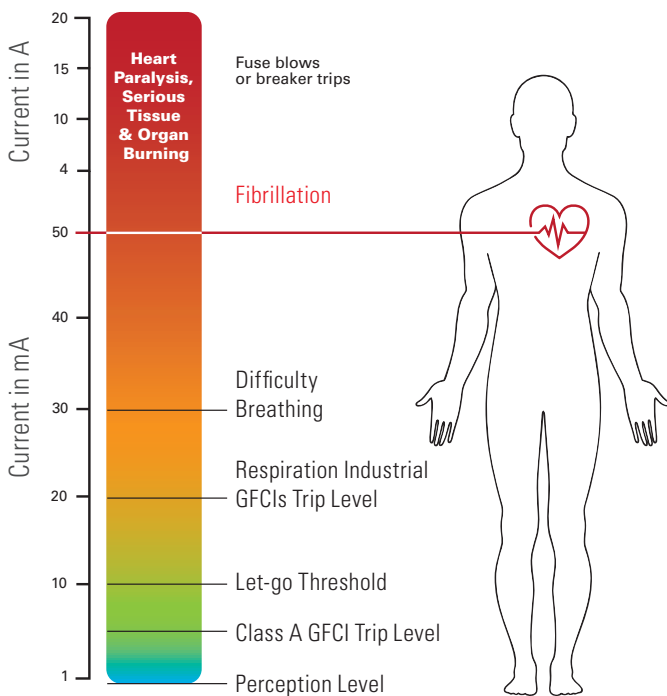
A municipal water utility company that supplies water to more than three million residents wanted to protect its workers from shock hazards. The facility has two tanks the size of Olympic swimming pools. The tanks must be manually cleaned requiring workers to enter while water is still present, and the 600 V submersible pumps are running. The company chose the Littelfuse Shock Block SB6100 EGFPD and installed them in the motor control centers that supply power to each pump. If a device senses a ground fault above the trip setting, it will open the circuit very quickly to protect workers from shock.

## How the Shock Block Works

The SB5000 detects leakage current and interrupts the circuit, significantly reducing or eliminating the shock potential. One key part of the additional safety features is that the SB5000 also monitors the ground wire from the SB5000 to the load for continuity. If the wire is broken or becomes loose, the SB5000 will signal an alarm and de-energize the circuit in less than half of a second.

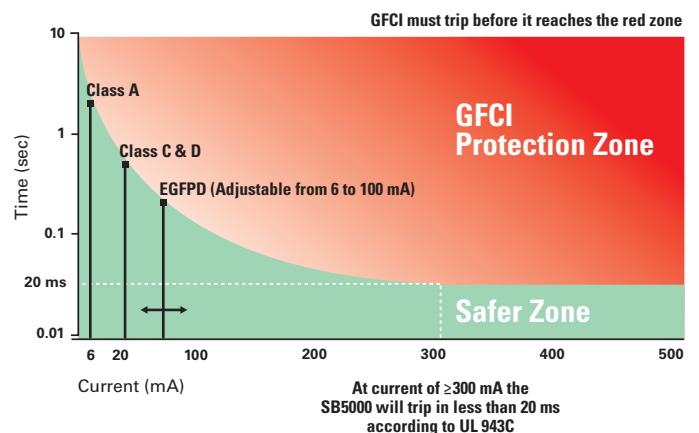


## Physiological Effects of 50/60 Hz Current Flowing Through the Body



## Shock Block SB5000 Special-Purpose GFCI Protection Curve

The UL 943 inverse-time curve allows momentary transient conditions to enable operations in real world installations. The boundary between the green and the red zone defines the maximum trip time allowed by UL 943. Therefore, for any given fault current, the device must operate before that time is exceeded to prevent dangerous current from flowing through the body.



# Technical Specifications



## SB5000 Industrial Shock Block

<b>Voltage Rating</b>	208 V, 480 V, 600 V
<b>Current Rating</b>	32, 60, 80, or 100 A
<b>System Type</b>	Three-phase, 3-wire (no neutral), 60 Hz; Single-phase, 2-wire (no neutral), 60 Hz; Single-phase, 3-wire (with neutral), 60 Hz for EGFPD versions only
<b>Short-Circuit Current Rating</b>	10,000 A (for SB5032 and SB5060); 50,000A (for SB5080 and SB5100)
<b>Trip Level Settings</b>	Fixed at 6 mA (Class A models); Fixed at 20 mA (Class C/D models) Selectable 6, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 mA (EGFPD models)
<b>Trip Time Setting</b>	Inverse time curve according to UL 943
<b>Ground Monitoring Circuit</b>	Selectable short or Zener termination; Fail-safe; CSA M421 compliant
<b>Enclosure</b>	IP 69K and NEMA 4X (Outdoor), Polycarbonate, Lockable
<b>Operating Temperature</b>	-35 °C (-31 °F) to 40 °C (104 °F), up to 66 °C (151 °F) with derating
<b>Dimensions</b>	For 32 A and 60 A: <b>H</b> 285.6 mm (11.25 in.); <b>W</b> 244.4 mm (9.62 in.); <b>D</b> 119.6 mm (4.71 in.) For 80 A and 100 A: <b>H</b> 383.4 mm (15.09 in.); <b>W</b> 327.1 mm (12.88 in.); <b>D</b> 137.4 mm (5.5 in.)



## Ordering Information

ORDERING NUMBER	LOAD RATING (A)	VOLTAGE (V)	TRIP LEVEL (mA)	UL CLASS	ENCLOSURE
SB5032-001-0	32	208	20 (Fixed)	UL 943C Class C SPGFCl	NEMA 4X, www.IP69K
SB5032-201-0		480		UL 943C Class D SPGFCl	
SB5032-301-0		600	6, 10–100 in increments of 10 (Selectable)	UL 943 / UL 1053 EGFPD	
SB5032-011-0		208		UL 943 Class A GFCl	
SB5032-211-0		480			
SB5032-311-0		600			
SB5032-021-0	208	6 (Fixed)	UL 943 Class A GFCl		
SB5060-001-0	60	208	20 (Fixed)	UL 943C Class C SPGFCl	
SB5060-201-0		480		UL 943C Class D SPGFCl	
SB5060-301-0		600	6, 10–100 in increments of 10 (Selectable)	UL 943 / UL 1053 EGFPD	
SB5060-011-0		208		UL 943 Class A GFCl	
SB5060-211-0		480			
SB5060-311-0		600			
SB5060-021-0	208	6 (Fixed)	UL 943 Class A GFCl		
SB5080-001-0	80	208	20 (Fixed)	UL 943C Class C SPGFCl	
SB5080-201-0		480		UL 943C Class D SPGFCl	
SB5080-301-0		600	6, 10–100 in increments of 10 (Selectable)	UL 943 / UL 1053 EGFPD	
SB5080-011-0		208		UL 943 Class A GFCl	
SB5080-211-0		480			
SB5080-311-0		600			
SB5080-021-0	208	6 (Fixed)	UL 943 Class A GFCl		
SB5100-001-0	100	208	20 (Fixed)	UL 943C Class C SPGFCl	
SB5100-201-0		480		UL 943C Class D SPGFCl	
SB5100-301-0		600	6, 10–100 in increments of 10 (Selectable)	UL 943 / UL 1053 EGFPD	
SB5100-011-0		208		UL 943 Class A GFCl	
SB5100-211-0		480			
SB5100-311-0		600			
SB5100-021-0	208	6 (Fixed)	UL 943 Class A GFCl		

## Accessories

**1. SE-TA6 Termination Assembly (Optional)**  
Termination assembly with terminals and mounting holes.



**2. SE-TA6-SM Stud-Mount Termination Assembly (Optional)**  
Ground-check termination for submersible pumps.



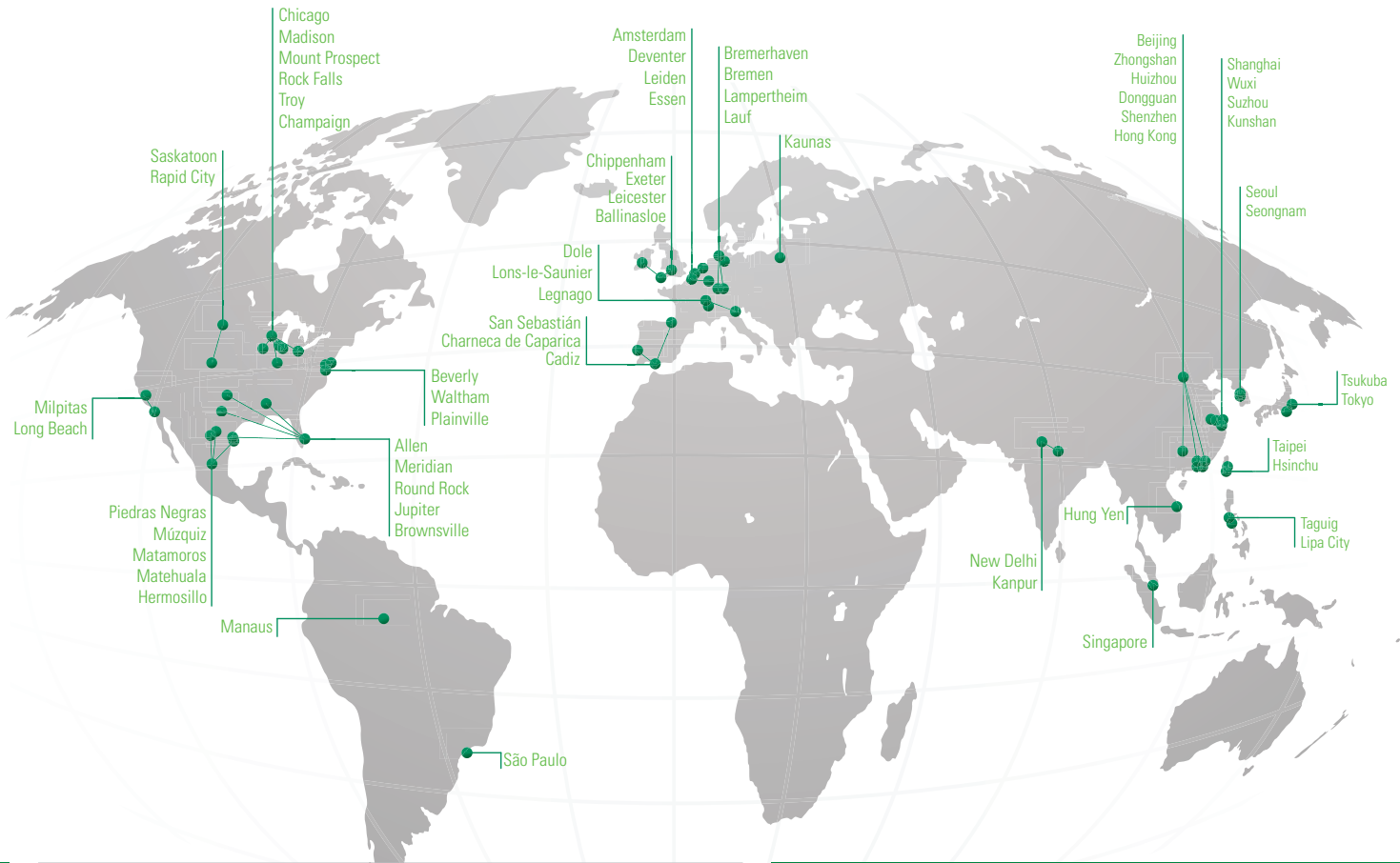
**3. 1N5339B Termination Device (Included)**  
Axial-lead ground-check termination, included with SB6000 series.



**4. SE-TA6ASF-WL Termination Assembly (Optional)**  
Compact 12 W ground-check termination assembly with convenient mounting holes and wire leads.



# LOCAL RESOURCES FOR A GLOBAL MARKET



## Littelfuse.com/ShockProtection

For a comprehensive library of resources including datasheets, product manuals, white papers, application guides, demos, online design tools, catalogs, and more, visit [Littelfuse.com/TechnicalResources](https://www.littelfuse.com/TechnicalResources).

### North America

**Littelfuse World Headquarters**  
8755 West Higgins Road, Suite 500  
Chicago, IL 60631, USA

**Littelfuse SymCom**  
1241 Concourse Drive  
Rapid City, SD 57703, USA

**Littelfuse Startco**  
140 – 15 Innovation Boulevard  
(The Galleria Building)  
Saskatoon, SK S7N 2X8, Canada  
Tel: +1-306-373-5505

**Littelfuse Hartland Controls**  
807 Antec Road  
Rock Falls, IL 61071, USA  
Tel: +1-815-626-5170

**Fuse and Relay**  
**Technical Support:**  
Tel: +1-800-TEC-FUSE  
Tel: +1-800-832-3873  
Fuses: techline@littelfuse.com  
Relays: relays@littelfuse.com

**Customer Service:**  
Tel: +1-800-227-0029  
E-mail: PG\_CSG@littelfuse.com

### Asia

**Littelfuse**  
Unit 1604B Desay Building,  
Gaoxin Nanyi Ave.  
Hi-Tech Industrial Park  
Nashan District  
Shenzhen, 518057, China  
+86 755 8207 0760

### Europe

**Littelfuse**  
Julius-Bamberger-Str. 8a  
Bremen, D-28279, Germany  
+49 421 82 87 3 147

**Western Automation**  
now part of **Littelfuse**  
2 Atreus Place, Poolboy,  
Ballinalsoe, Co. Galway,  
H53 TD 78, Ireland  
Tel: +353 (0) 90 9643359



Littelfuse products are certified to many standards around the world. To check certifications on specific components, please refer to the specific product datasheet on Littelfuse.com.