Littelfuse®

Expertise Applied | Answers Delivered

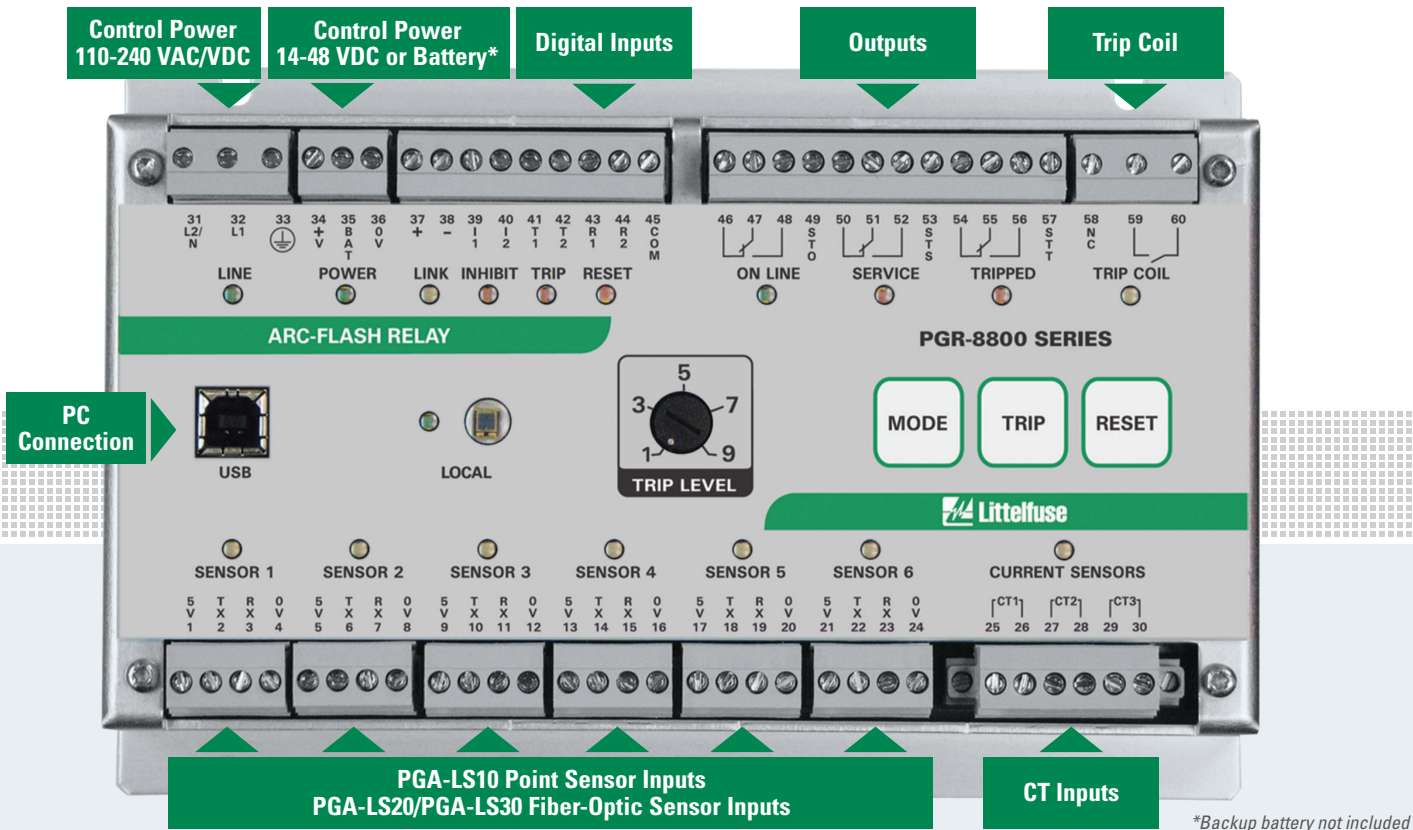# IMPROVE SAFETY AND RELIABILITY WITH INSTANT ARC-FLASH DETECTION

OVER 13,000 LITTELFUSE ARC-FLASH RELAYS INSTALLED WORLDWIDE

Fast Arc-Flash Detection

Circuit breakers (CBs) or overcurrent protection devices (OCPDs) alone do not provide optimal protection for your personnel and equipment. The Littelfuse Arc-Flash Relays rapidly detect an arc flash and send a trip signal to interrupt power.

PGR-8800 Arc-Flash Relay

Control Power 110-240 VAC/VDC · Control Power 14-48 VDC or Battery* · Digital Inputs · Outputs · Trip Coil

PC Connection

PGA-LS10 Point Sensor Inputs
PGA-LS20/PGA-LS30 Fiber-Optic Sensor Inputs

CT Inputs

Backup battery not included

Simple Plug & Play Installation and Maintenance

The **PGR-8800** and **AF0500** Arc-Flash Relays and sensors are easily retrofitted into existing switchgear or pre-installed in new equipment with little or no configuration. Even elaborate systems only take minutes to configure using the relays' built-in USB interface software, and the innovative digital inputs/outputs on the AF0500.

- Improve sustainability and life of electrical equipment
- Lower the Hazard Risk Category (HRC) of the equipment
- Provide protection against equipment damage and potential injury to personnel

- Easily installed without changes to existing layout
- Flexible sensor configuration for any application
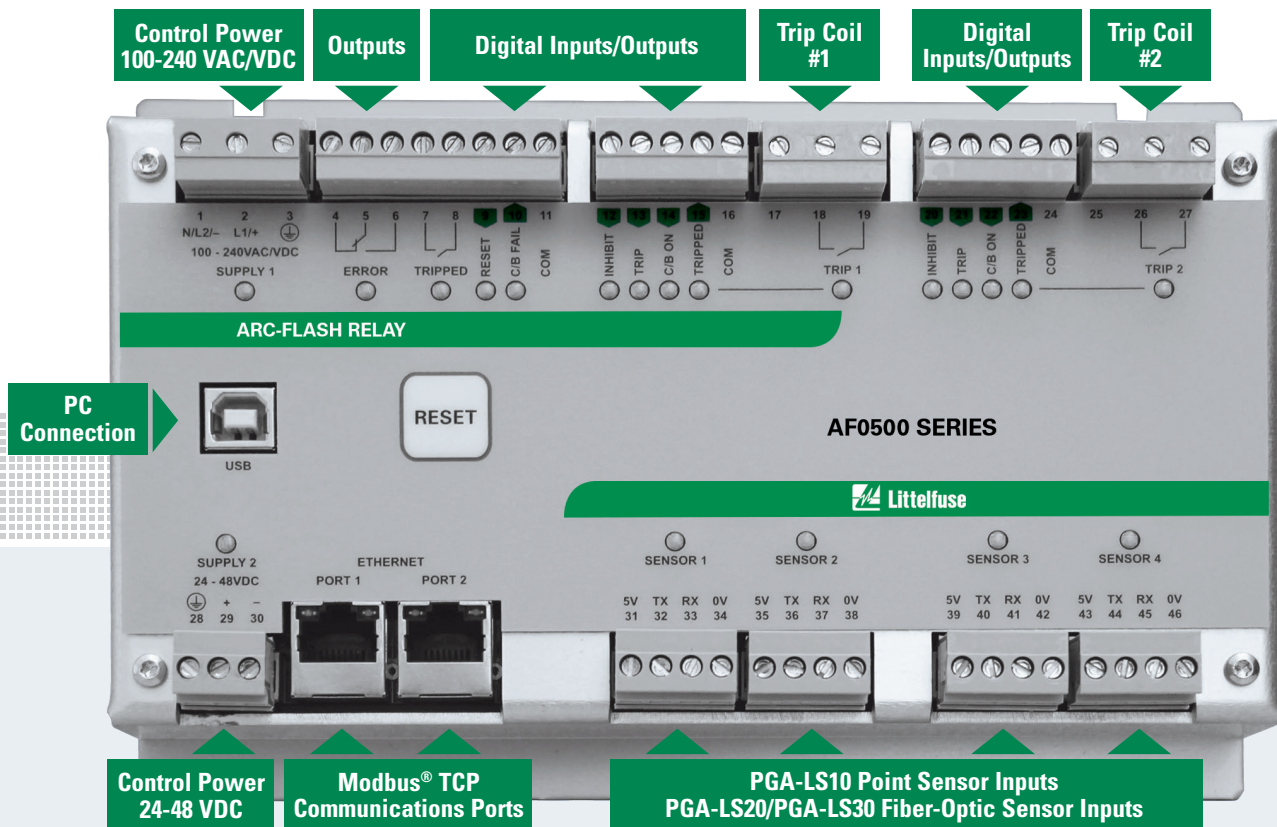- No additional software is required

Installs up to 8X Faster than Competition!

Installing a Littelfuse arc-flash relay can lower your HRC rating. See the case study at:
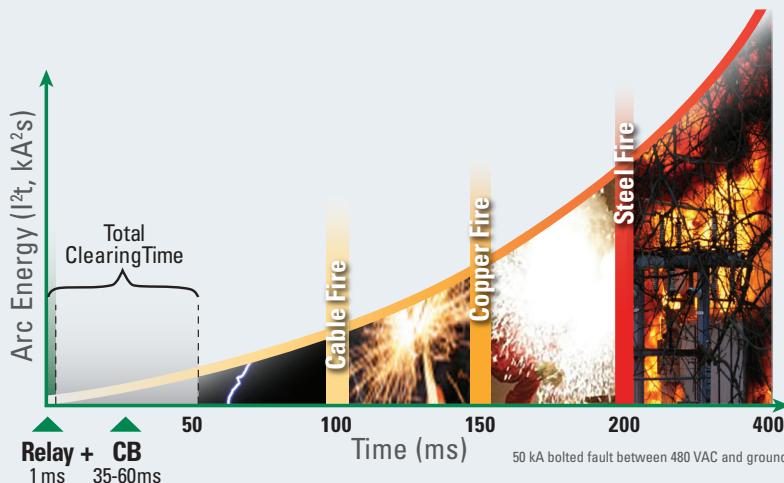Littelfuse.com/ArcFlashCaseStudy

in Less Than 1 ms
to Minimize Damage

AF0500 Arc-Flash Relay

| Control Power 100-240 VAC/VDC | Outputs | Digital Inputs/Outputs | Trip Coil #1 | Digital Inputs/Outputs | Trip Coil #2 |

PC Connection

ARC-FLASH RELAY

RESET

AF0500 SERIES

Littelfuse

| Control Power 24-48 VDC | Modbus® TCP Communications Ports | PGA-LS10 Point Sensor Inputs PGA-LS20/PGA-LS30 Fiber-Optic Sensor Inputs |

Damage Caused By Arc-Flash Incident

The Littelfuse Arc-Flash Relays use a 125-µs light-sampling scheme in combination with an ultra-fast IGBT output to be able to detect a developing arc flash and send a trip signal to a circuit breaker in less than 1 ms.

Arc Energy (I^2t, kA^2s)

Total Clearing Time

Cable Fire

Copper Fire

Steel Fire

50   100   150   200   400

Time (ms)

Relay + CB
1 ms   35-60ms

50 kA bolted fault between 480 VAC and ground.
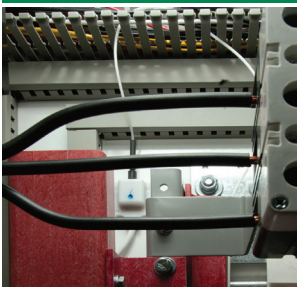
Superior and Robust
Sensor Design

Point Light Sensor

Line-of-sight light sensor detects an arc as small as 3 kA in a 2-meter half-sphere radius.

- Visual LED indication for "Ready" or "Tripped" state to assist with fault location
- Robust sensor design can withstand a detected arc-flash event
- Sensor can be installed up to 50 m (164 ft) away from relay; electrical cable can be cut and easily re-terminated in the field
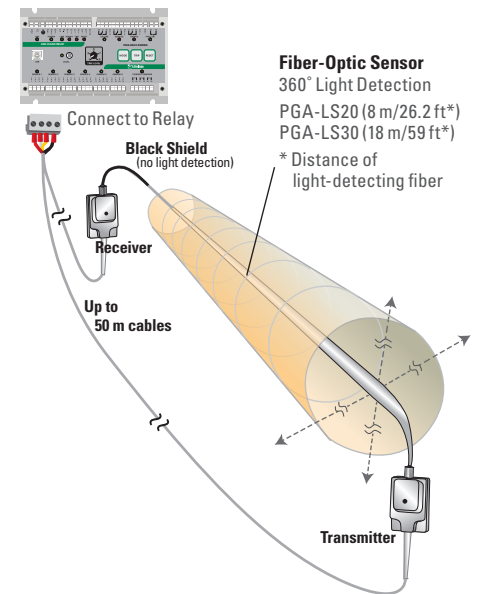
180° 2-meter Half-Sphere Sensor Viewing Angle

Connect to Relay

2.5m

Up to 50 m cable

2m
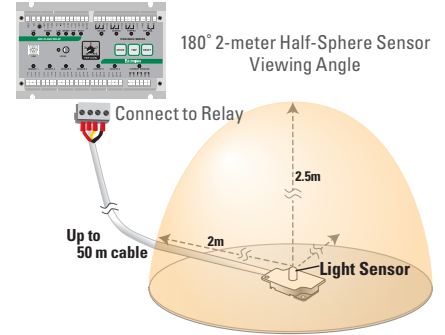
Light Sensor

PGA-LS20/PGA-LS30

Fiber-Optic Light Sensor

The 360° light sensor detects light throughout the entire length of the fiber. Ideal to protect bus bars, multiple compartment installations like motor control centers, or areas with many obstructions.

- Visual LED indication for "Ready" or "Tripped" state to assist with fault location
- Durable resin fiber material allows small bending radius (>5 cm) and greater flexibility without breaking
- Ready to install from the factory, no need to terminate in the field or polish as with glass fiber
- Fiber sensors can be installed in locations up to 50 m (164 ft) away from relay; electrical cable can be cut and easily re-terminated in the field

Connect to Relay

Fiber-Optic Sensor
360° Light Detection

PGA-LS20 (8 m/26.2 ft*)
PGA-LS30 (18 m/59 ft*)

* Distance of light-detecting fiber

Black Shield (no light detection)

Receiver

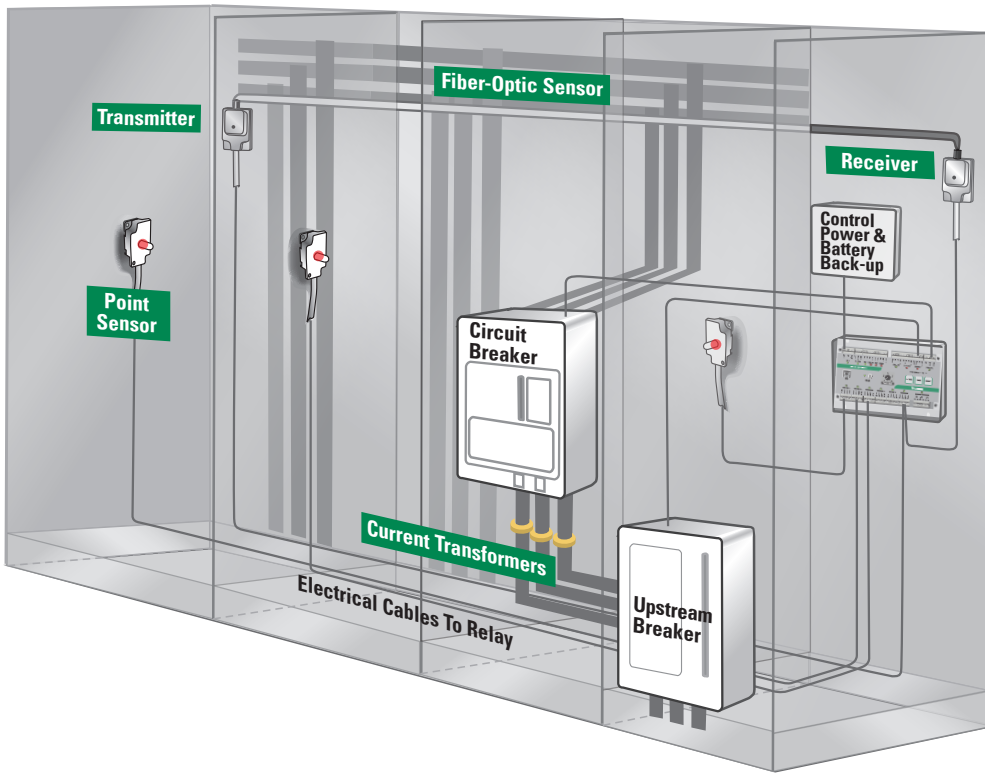Up to 50 m cables

Transmitter

Sensor Placement Recommendations

Generally, it is recommended to mount 1 or 2 sensors per cubicle to cover all horizontal and vertical bus bars, breaker compartments, drawers, and anywhere that there is potential for an arc fault. Threading a fiber-optic sensor through the cabinets and in areas where point-sensor coverage is uncertain results in complete coverage and an added level of protection. Even if policy is to only work on de-energized systems, all maintenance areas should be monitored for arc flash to prevent potential damage and additional cost. For more information, download the Installation Guide PF711 from Littelfuse.com/ArcFlash.

Fiber-Optic Sensor

Point Sensor 1

Point Sensor 2

Point Sensor 3

Point Sensor 4

☀ Arc Flash
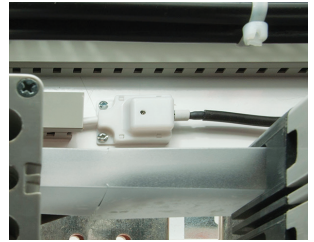— Fiber-Optic Sensor
▣ Point Sensors
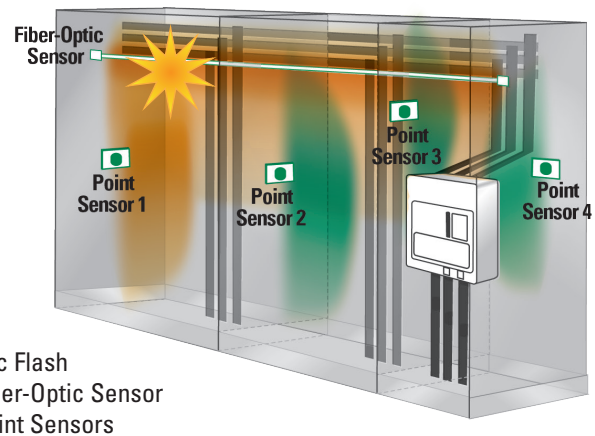
Scenario with point sensor placement on the wall of each compartment. Arc detection area for each sensor is shown in green shade. In this case, both Point Sensor 1 and the Fiber-Optic Sensor detected the flash as it was within their viewing area (shown in orange).

Application Example **PGR-8800**

Transmitter

Fiber-Optic Sensor

Receiver

Point Sensor

Control Power & Battery Back-up

Circuit Breaker

Current Transformers

Electrical Cables To Relay

Upstream Breaker

Application Example **AF0500**

Trip 1 Trip 2

Tie Breaker

Trip 2

Trip 1

Fiber-Optic Sensor

Fiber-Optic Sensor

Transmitter

Source 1 Breaker

Receiver

Point Sensor

Transmitter

Receiver

Source 2 Breaker

Fiber-Optic Sensor

PGA-LS20 and PGA-LS30
Detects light 360° along the entire length of the exposed fiber. Sensor is pre-wired with 10 m (expandable to 50 m) of electrical cable and a plug-in terminal block.
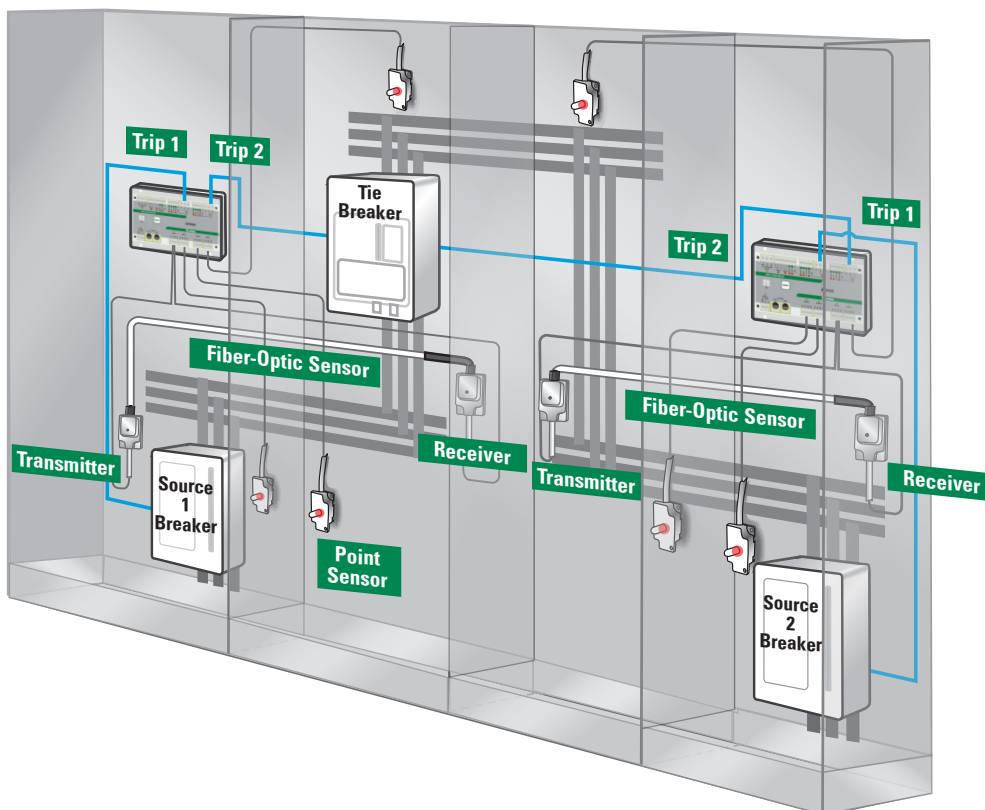
Point Sensor

PGA-LS10
Detects light at 180° angle in line of sight. Sensor is pre-wired with 10 m (expandable to 50 m) of electrical cable and a plug-in terminal block.

Breaker Connection

Sends trip signal to breaker trip coil (undervoltage or shunt trip) to interrupt power. Ability to trip upstream breaker if local breaker fails.

Current Transformers

Optional, PGR-8800 only
Measures current to help eliminate nuisance trips.

Reliable Operation with
Built-In Redundancies

When you are entrusting a safety device to protect equipment from catastrophic damage, it is important to know that it will operate as expected. Littelfuse Arc-Flash Relays do this by having built-in redundancies and health monitors, making maintenance and installation tasks faster, more efficient and helping to minimize downtime.

	PGR-8800	AF0500
Redundant Internal Trip Path ▪ Two internal trip paths for added reliability—if the microprocessor trip path fails, the backup analog trip path will seamlessly take over, sending an alarm notification to operators ▪ Backup analog trip path initializes very quickly upon power up, ensuring protection is enabled while energizing the system when hazard risk is higher	✓	✓
Health Monitoring ▪ Continuously monitors connection to trip coil to ensure path is intact ▪ LED indication of sensors' "Ready" or "Tripped" status on sensor and relay ▪ Sensors are durable enough to withstand a detected arc-flash event	✓	✓
Reliable Light Detection ▪ Two types of light sensors (point and fiber-optic) for different applications ▪ Adjustable light-level and wide-angle detection add flexibility ▪ Durable and flexible sensor design eliminates breakage and re-work	✓	✓
Upstream Tripping ▪ Ability to trip upstream device if the local breaker fails to clear the fault	✓	✓
Optional Current Detection for Fault Verification ▪ Avoid nuisance tripping with current-supervised arc-flash trips ▪ Phase Current Transformers for overcurrent detection ▪ Two user-defined definite-time overcurrent protection levels and times	✓	
Tie Breaker Tripping ▪ Ability to trip both incoming feeder and tie breaker when arc is detected in one section of a switchboard ▪ Affected part of the switchboard is isolated from the non-affected part		✓
Zone Tripping ▪ Ability to trip 2 separate zones with 1 relay ▪ Sensor zone assignment through simple PC configuration and/or digital inputs and outputs		✓

Technical Specifications

cULus CE C(-Tick) CSA

PGR-8800 Arc-Flash Relay

Relay Part Nos.	PGR-8800-00 PGR-8800-00-CC (conformal coating)
Sensor Inputs	6 light sensor inputs for PGA-LS10, PGA-LS20 and PGA-LS30 sensors
Sensor Part Nos.	PGA-LS10 (Point) PGA-LS20 (Fiber-Optic) PGA-LS30 (Fiber-Optic)
IEEE Device No.	Overcurrent (50), Arc Flash (AFD)
Input Voltage	100-240 Vac, 110-250 Vdc, or 14-48 Vdc
Dimensions	**H** 130 mm (5.2") **W** 200 mm (7.9") **D** 54 mm (2.2")
Optical Trip Settings	9-25 klux
Trip Coil Output	<1 ms; IGBT switch

Current Rating:	Voltage Rating:
750 mA cont.	24 to 300 Vac
20 A for 2 s	24 to 300 Vdc
10 A for 5 s	

Relay Outputs	Programmable Form C Output Contact: 5 A at 250 Vac/30 Vdc Status Output Contact: 3 A at 50 Vac/50 Vdc
Communications	RS-485, Modbus® RTU
System Expansion	Link up to 4 units
Sensors	Up to 24 (6 per unit)
Battery	24 V lead-acid gel cell (not included)
Approvals	CE, UL Listed (UL508), C-Tick, CSA, DNV
Warranty	5 years
Mounting	DIN, Surface Mount

PGA-LS10 Point Sensor

Type	Point light sensor
Detection Radius	180˚ Line-of-sight light sensor
Trip Status LED	Displays "tripped" state on each sensor
Health Status LED	Displays "ready" state on each sensor
Electrical Cable	10 m (32.8 ft) included, expandable to 50 m (164 ft)

AF0500 Arc-Flash Relay

Relay Part Nos.	AF0500-00 AF0500-00-CC (conformal coating)
Sensor Inputs	4 light sensor inputs for PGA-LS10, PGA-LS20 and PGA-LS30 sensors
Sensor Part Nos.	PGA-LS10 (Point) PGA-LS20 (Fiber-Optic) PGA-LS30 (Fiber-Optic)
IEEE Device No.	Arc Flash (AFD)
Input Voltage:	100 to 240 Vac, 110 to 250 Vdc or 24-48 Vdc
Dimensions	**H** 130 mm (5.1") **W** 200 mm (7.9") **D** 54 mm (2.1")
Optical Trip Settings	10-30 klux
Trip Coil Outputs	<1 ms; IGBT switch

Current Rating:	Voltage Rating:
750 mA cont.	24 to 300 Vac
20 A for 2 s	24 to 300 Vdc
10 A for 5 s	

Communications	Ethernet, 2 ports with internal Ethernet switch, Modbus® TCP
System Expansion	Unlimited
Sensors	4 per unit
Approvals	CE, UL Listed (UL508), C-Tick
Warranty	5 years
Mounting	Surface, DIN (with optional D0050 adapter clips)

PGA-LS20/LS30 Fiber-Optic Sensors

Type	Fiber-optic light sensor
Detection Radius	360˚ Line-of-sight light sensor
Trip Status LED	Displays "tripped" state on each sensor
Health Status LED	Displays "ready" state on each sensor
Sensor Length	**PGA-LS20:** 8 m (26.2 ft) active; 10 m (32.8 ft) total **PGA-LS30:** 18 m (59 ft) active; 20 m (66 ft) total
Electrical Cable	10 m (32.8 ft) included, expandable to 50 m (164 ft)

PGA-1100 Diode Logic Unit

Type	Diode Logic Unit
Diodes	1000V reverse voltage, 3 A continuous, 25 A for 1 second
Certification	CE
Dimensions	**H** 70 mm (2.76") **W** 20 mm (5.9") **D** 80 mm

Local Resources for a **GLOBAL** Market

Littelfuse products help protect electrical equipment used in marine, mining, petrochem and general industrial applications. We offer a broad and reliable selection of fuses, fuse blocks, protection relays and generator controls to improve safety and reduce downtime.

For decades, we have helped OEMs, electrical installers, design engineers and end-users select the right product for their applications. Today, Littelfuse offers a broader range of products addressing protection and control needs while still providing the same great service and support that customers have learned to expect.

Map locations: Trollhättan, Kaunas, Roskilde, Norwich, Swindon, Bremen, Calgary, Saskatoon, Bellingham, Rapid City, Lake Mills, Chicago, Baldwinsville, Champaign, Boston, Seoul, Yokohama, Wuxi, Suzhou, Shanghai, Noida, Dongguan, Taipei, Shenzhen, Piedras Negras, Muzquiz, Matamoros, Hong Kong, Lipa City, Singapore, São Paulo

■ International Sales, Distribution and Engineering Facilities
■ Research and Manufacturing Facilities

Littelfuse electrical product portfolio includes:

POWR-GARD® FUSES | **STARTCO ENGINEERING LTD.** | **SELCO** | **MotorSaver ELECTRONIC MOTOR CONTROL & PROTECTION** | **PumpSaver ELECTRONIC PUMP CONTROL & PROTECTION** | **SSAC** | **SymCom** | **Industrial SHOCK BLOCK™ LITTELFUSE® Products**

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WWW.LITTELFUSE.COM/ARCFLASH

Step-by-Step Instructions
For Every Stage of Your Decision Process

Visit Our Online Library at **Littelfuse.com/ArcFlash**

1. Research

TECHNICAL DOCUMENTS

- White Paper: Key Considerations for Selecting an Arc-Flash Relay (PF765)
- Technical FAQ

VIDEOS

- Overview of Arc-Flash Relay and Applications
- Features, Benefits and Installation of the PGR-8800 and the AF0500

2. Design & Specification

PRODUCT LITERATURE

- Datasheet
- Users' Manual
- Guideform Specification

LITERATURE APP

- Literature App is available for Apple devices only. Search for "Littelfuse" in the App Store.

3. Purchase Decision

Use our Workbook to quantify the impact of the PGR-8800 and AF0500 before you buy. The Littelfuse Arc-Flash Incident Energy Reduction Workbook (PF710) helps create a preliminary calculation of the reduction of Incident Energy by applying the PGR-8800 or AF0500 Arc-Flash Relay. It offers a typical scenario calculation as defined per IEEE 1584.

4. Installation & Maintenance

PRODUCT LITERATURE

- Application Guide (PF711)
- Commissioning Check-list (in Application Guide)

5. Post-Installation Support

Technical support from our professional engineers at **1-800-832-3873**

Form: PF136
Rev: 021215