

SIEMENS

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SIPROTEC Arc Flash Solutions

Arc Energy Mitigation and Remote Operation

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Electric arcs, resulting from breaker insulation aging, environmental conditions and operating errors, can damage expensive switchgear and are a fatal hazard to personnel.

Where arc-resistant switchgear is not available, there are safe modern solutions to deal with the arc-flash hazard:

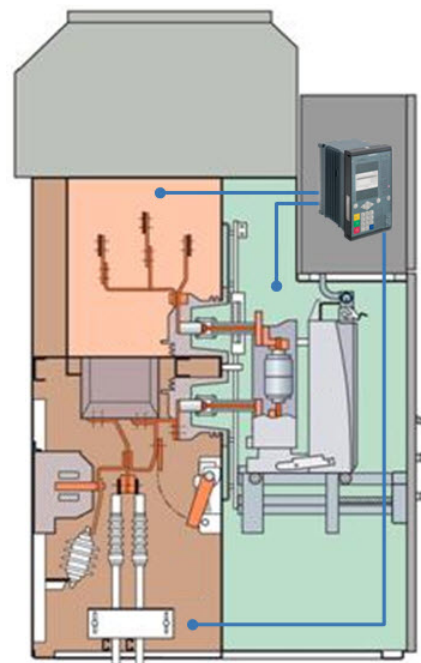
1. Minimize arc-flash energy with fast fault clearance protection technology
2. Operate breakers remotely at a safe distance, without changing existing protection or gear

Solution 1: Arc-Flash Energy Clearance

SIPROTEC detects electric arcs through an optical sensor via the arc protection module. Arcs are detected in ~3 ms as they develop, and with optional fault current supervision in ~4 ms, to trip immediately without overtripping.



The arc protection module can be used with your SIPROTEC protection for feeders (7SJ8), lines (7SA8, 7SD8, and 7SL8), transformers (7UT8), motors (7SK8), and generators (7UM8), as well as breaker management (7VK8),



This is the cross-section of an NXair switchgear unit (also compatible with GMSG). The point sensors (blue lines) and their connection cables are placed in the busbar compartment, the circuit breaker compartment and the cable connection compartment.

Up to 3 optical point or loop sensors can be connected per each plug-in module, for a total of up to 15 sensors on modular SIPROTEC devices. This means, a single device can reliably protect 5 switchgear units with point sensors and many more with loop sensors.

Point sensors are available with connecting cable lengths - between 3 m and 35 m. A superior alternative is loop sensors, which detect arcs along the whole sensor length. They are available from 5 m to 40 m. Loop sensors are connected through a supply line to the arc protection module. The supply lines are available from 3 m to 10 m.

Reliable, Remote and Safe SIPROTEC Solutions

Application

- Immediate detection of arcs in air-insulated switch-gears by optical sensors
- Limit damage to switchgear with Instantaneous trip in arc fault situations
- The arc protection is suited for all voltage levels



Advantages of SIPROTEC Arc Clearance

- One SIPROTEC relay can have 15 sensors, for 5 switch-gears with point sensors, or more with loop sensors
- Reliable arc detection with fault current supervision
- Extremely fast tripping time
- Minimization of thermal damage
- Higher personal safety
- Minimization of downtimes
- EMI safety thanks to purely optical sensors

Even with the fastest detection and tripping during arc flash hazards, Siemens recommends **reducing risks further by** operating breakers remotely.

Solution 2: SIEMENS Remote Breaker Controls

Operating breakers from a safe distance is smart and economical with the SIPROTEC and SICAM IO solution, and it does not require changing any existing protection devices or gear. Simply add the system, and protect your personnel from dangerous arc explosions.



Advantages of SIEMENS Remote Breaker Controls

- Easy installation with standard cables (fiber, RJ45)
- Scalable and it can be installed in limited footprint
- No change of protection equipment or settings
- No need to wear PPE for breaker operation, due to operator standing outside of the ARC boundary
- It can be installed outdoors as well as in metal clad switchgear
- File based configuration – reduces engineering and configuration effort

Recommendation: For a comprehensive arc hazard mitigation strategy, protecting both equipment and personnel, Siemens recommends combining both solutions.



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For all products using security features of OpenSSL, the following shall apply:

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (www.openssl.org), cryptographic software written by Eric Young (eay@cryptsoft.com) and software developed by Bodo Moeller.