

D1000 Arc-fault Protection System



- Improve personnel safety
- Reduce damage and minimize costly repairs
- Minimize production downtime

D1000 Arc-Fault Protection system



Efficient protection of high, medium and low voltage switchgear

A continuous supply of power is important in modern energy infrastructure and most production facilities. Wherever electrical energy is generated and distributed, arc flash faults and accidents are likely to occur. An arc protection system is an efficient way to maximize the safety and minimize the damages.

SELCO's D1000 arc protection system is designed to dramatically reduce the effects of arc flash faults in high, medium and low voltage switchgear.



Fast protection is essential

An arc-fault in a switchboard or control gear develops within milliseconds and lead to the discharge of enormous amounts of energy. An arc fault is the result of a rapid release of energy due to an arcing fault between phase bus bars. If the arc flash is allowed to develop the result is that the massive energy discharge burns the bus bars, vaporizing the copper and thus causing an explosion. Finally this may cause extensive material damage and jeopardize the safety of operational personnel.

An arc protection system operates much faster than conventional protection relays and thus damages caused by an arc flash fault can be kept at a minimum level. As a general guideline, an arc will not cause any damage if it is eliminated within 35ms. If the arc is allowed to continue and last 100ms some damage will occur. An arc fault lasting 500ms may cause severe damage to the installation and will require extensive repair.

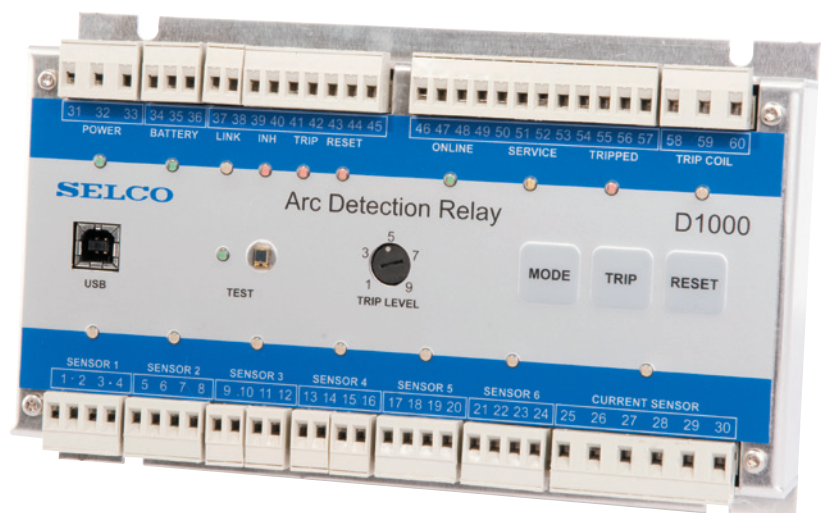


A short arc time is critical in order to avoid damage to personnel and material. It is therefore of vital importance that the source leading to the arc flash time is minimized and the power is disconnected as fast as possible – SELCO's D1000 arc protection system is the solution to this problem.

D1000 Functionality

The D1000 arc protection system is an advanced and fast arc protection system, offering the following features and functionality:

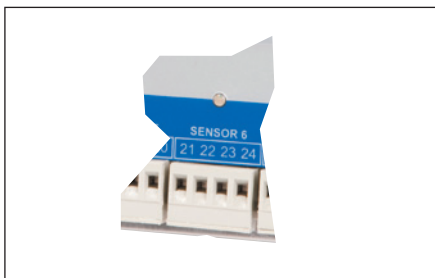
- Compact unit - arc fault and overcurrent protection
- High speed arc fault detection less than 1ms
- Over-current protection with detection within 1ms
- Combines optical fibre and point sensors
- Real-time event logging
- Self-supervision of sensors and protection unit
- Easy installation and configuration via USB



D1000 Arc-Fault Protection system

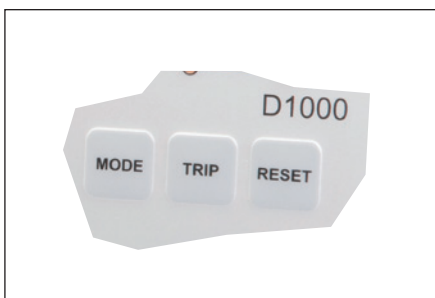
D1000 Arc flash protection unit

The D1000 is a stand-alone and high speed arc protection unit for electrical power distribution systems. D1000 supports both point and fibre sensor technologies for arc flash detection and supports up to six sensors. The sensors can be combined in any combination, depending on the application and requirements.



In case of an arc flash fault, the D1000 unit detects and generates a tripping pulse in less than 1 millisecond, to the circuit breaker(s) supplying the installation. The total arcing time is thus reduced to the mechanical opening time of the circuit breaker, which is typical around 50-75 milliseconds. The trip circuit is based on a solid state switch, providing fast reaction and drive capability for even the largest circuit breakers.

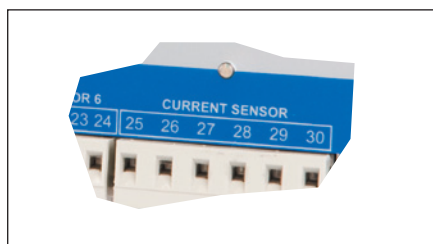
The D1000 unit is equipped with easy accessible select buttons; MODE, TRIP and RESET which makes it easy to switch between operation and service mode. and is used to test the trip output and configure the connected sensors.



The D1000 unit can be powered from either a DC or AC source. If the unit is powered from AC, it can charge a backup battery, which can drive the trip circuit with 24VDC.

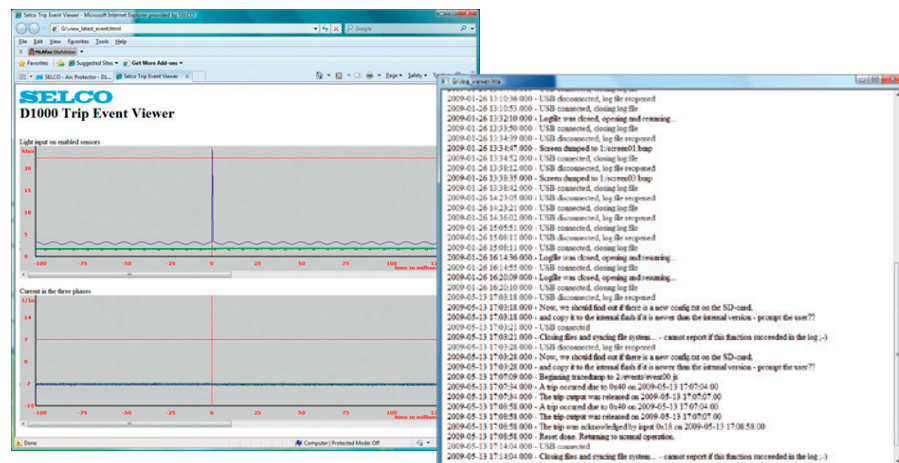
Built-in overcurrent protection

D1000 integrates 3-phase current measurement which can detect short- and overcurrent and reacts within 1 millisecond. This makes it possible to reduce unintended tripping from e.g. lightning flashes or welding without the traditional extra delay and expense of an external overcurrent relay. The overcurrent function can also be used to trip the breaker in case of short circuits or long-lasting overloads without arching.



Efficient self-supervision

The D1000 system provides continuous surveillance of the complete system including the connected sensors. Any system faults, like e.g. a sensor cable fault is indicated by a flashing online LED and is logged and reported.



Extended coverage with the Link Input

The D1000 Protection system is easy expandable, and D1000 units can be linked together to form a larger protection system. With the Link Input, up to four



D1000 units can be connected together, giving a total of 24 sensor inputs. Alternatively, the link feature can be used for RS485 MODBUS RTU communication (SCADA), and thereby easily integrate into an external monitoring and control system.

Real-time event logging

The built-in USB connection provides easy access to a real-time event log, which provides detailed diagnostic information about all events, including near misses and events related to daily operation (e.g. configuration changes, test, reset, and power cycling). This functionality improves and increases switchgear life-cycle expectancy.





Easy configuration

The D1000 is easy to install and set-up and in case any changes are needed this is easily done via the USB interface accessible from the front. The built-in user-friendly menu system is embedded in the D1000 unit and activates automatically when the unit is connected to a PC.

The built-in light sensor on the front makes it easy to adjust and verify that all sensors are correctly installed and equally sensitive. With the TRIP LEVEL adjustment on the front plate the sensitivity to light can be adjusted. The light range is 10-25.000 lux enabling use of sensors under different light conditions, indoor light, sunlight etc.



In small installations, the calibration TEST sensor can be used as a single arc detecting sensor, providing additional protection without added cost. Setup of the overcurrent detection, is easily done through the USB interface.

Flexible and efficient sensors

A1000 point sensor

The point sensor is a light-sensitive element based on phototransistor technology. It detects visible light radiation which is captured at the cylindrical top. The A1000 point sensor has a detection area of up to 2m with a characteristic of $180 \times 360^\circ$. The A1000 supports self supervision, and a clear blinking built-in LED indicates that the sensor is active. In case that the sensor reaches the trigger level the LED will light up constantly. The A1000 sensor is supplied with a 10m shielded cable.



A2000 fibre sensor

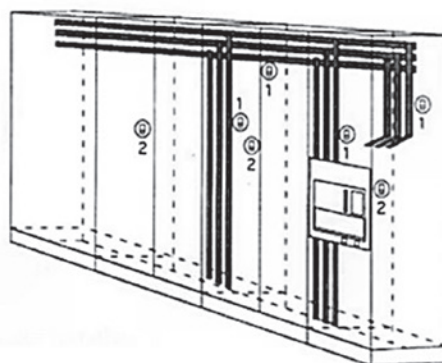
The A2000 fibre sensor is a light sensitive element based on optical fibre technology. The A2000 fibre sensor is a fully flexible fibre with a detection angle of 360° throughout the length of the fibre. The detection radius is up to 2 meter.



The A2000 fibre has 8 meter active cable length sensitive to light. The fibre sensor is ideal to install in electrical cabinets with drawer sections.

Easy installation

The D1000 system is easy to install and made to implement in new switchgear installations as well as retrofit projects. Both the D1000 unit and sensors are quick and easy to install. A general guideline is to mount 1-2 sensors per cubicle or chamber. It is important to cover all horizontal/vertical busbars (1) as well as breaker compartments (2) and drawers. Example is shown below:



D1000 Applications

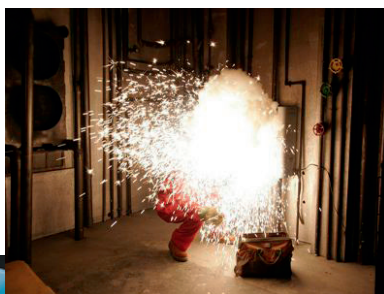
SELCO

In all areas where electrical energy is distributed the D1000 Arc protection system is the choice to ensure the highest possible personal and operational safety. Typical areas where the results of an arc fault can be fatal are within the following segments:

- Industry
- Power generation
- Marine
- Wind Power
- Offshore
- Infrastructure

With the arc fault protection it is important to protect the vital parts in the switchgear and power distribution boards. The part of the installations where the arc faults are likely to occur is around:

- Bus bars and bus bar connections
- Circuit breakers
- Transformers



Clear benefits with D1000 Arc Protection

D1000 improves personnel safety - Serious injuries to personnel can be avoided. Extreme heat, fire and pressure are some of the fatal results of an arc fault which develops. D1000 Arc fault protection helps minimizing this risk and improves safety.

D1000 reduces damage to material - Switchgear equipment and electrical installations are valuable assets. D1000 Arc fault protection can minimize or even avoid severe damage to costly electrical equipment, and allow a fast and safe power restoration.

D1000 Minimizes production downtime - The result of a sudden stop and downtime in the power supply can be expensive for any operation. A quick reaction from the D1000 arc fault protection system can reduce the production downtime to a minimum or to even nonexistent.

D1000 enables better insurance conditions - Insurance companies have seen the benefits of arc fault protection. In some case it is a requirement and some insurance companies are even willing to offer better conditions, when an efficient arc protection system like D1000 is installed to protect the electrical installation.

D1000 Technical Data

D1000 Arc Protection Unit	D1000.0010
Voltage Supply	85 -230 VAC 100 -250 VDC 24V Battery – Lead acid gel cell
Trip coil output:	IGBT switch, 200µs on-time, 2s pulsed (configurable)
Trip coil voltage range:	24 -600 VDC 24 -440 VAC
Signal contacts:	Online, Service, Tripped
Sensitivity:	10 – 25000 lux, Trip level adj. 1-9
Current inputs:	3-phase 5A (75A/1sec)
Burden:	<0,25VA/inputs at 5A
Current range:	1.5-3.0 x In (7.5-15A)
Response time	Less than 1ms (arc fault) Less than 1ms (overcurrent)
Number of detectors	Up to 6
System expansion	Up to 4 x D1000 units via Link connection
Interface:	USB
Power consumption	<3W
Ambient temperature	-25 to + 70°C
Dimensions (WxHxD)	200x130x52 mm
Mounting:	35 mm DIN Rail or screw-in

A1000 Sensor	A1000.0010
Type:	Point sensor
Detection area:	180 x 360° - 2m
Length	10 m shielded cable
Circuit check	Built-in – LED for visual feedback
Dimensions (WxHxD)	32x52x21 mm

A2000 Sensor	A2000.0010
Type:	Fibre optical sensor
Detection area:	360°
Length	8 m flexible fibre
Circuit check	Built-in – LED for visual feedback
Dimensions (WxHxD)	32x52x21 mm

Approvals/standards	
EMC standards:	EN60255-26
Enclosure:	IP 20

About SELCO

Since the origin in 1960, SELCO technology has provided the electrical power generation market with high class equipment, living up to the major international standards.

Generator Control, Protection & Monitoring

- Generator protection:
Short circuit, overcurrent, reverse power, excitation loss, engine protection.
- Generator controls:
Synchronizing, frequency control, active and reactive load sharing, load control, power management, engine control.
- Generator monitoring:
Voltage, frequency, power, insulation.

Alarm Annunciation and Indication

- Monitoring of current, temperature or pressure
- Indication of alarms
- Logging of alarms and events

Arc Detection

- Arc detecting relay
- Current relay
- Time relay

Main Office:

SELCO A/S
Betonvej 10
DK- 4000 Roskilde
Denmark
Tel.: + 45 - 70 26 11 22
Fax: + 45 - 70 26 25 22
e-mail: selco.dk@selco.com

SELCO China Ltd.
Room 428
550 Mincheng Road
200135 Shanghai Pudong
China
Tel.: + 86 - 2150281391
Fax: + 86 - 2150282025
e-mail: tp_he@selco-china.com.cn

SELCO ME L.L.C
P.O. Box 52898
Dubai
United Arab Emirates
Tel.: + 971 - 4 3413660
Fax: + 971 - 2 3413770
e-mail: selco.ae@selco.com

SELCO SE Asia Pte. Ltd.
50, Tuas Lot, Tuas Avenue 11, #3-25
Singapore 639107
Singapore
Tel.: +65 – 6316 2204
Fax: +65 – 6316 2203
e-mail: selco.sg@selco.com