

SFC250 – SmartFuse 250

Monitoring and fault location in low-voltage grids



- Real-time monitoring and analysis of current and voltage
- Early recognition of grid anomalies
- Advance warning of critical overloads
- Automatic restoration of power supply
- Reduced Customer Minutes Lost (CML) and Customer Interruptions (CI)
- Surge current up to 9 kA
- Cable fault location with households still connected

DESCRIPTION

Is it possible to predict a power failure? Is it possible to reduce CML and CI to a minimum? And is it possible to locate cable faults while keeping consumers connected to the mains? Yes, it is – with the SmartFuse250 (SFC250)

The SFC250 is a multifunctional electronic circuit-breaker system for load currents up to 250 A, and Megger's all-in-one solution for low-voltage grids.

The SFC250 circuit-breaker system:

- Replaces conventional HRC standard fuses and is compatible with NH02 and NH03 fuse holders.
- Monitors and records current and voltage in real time
- Reports all incidents via mobile communication (GSM, 3G, WiFi) or LAN to the user
- Provides the user with advance alerts of critical overloads
- Can be configured to restore power automatically
- Provides the user with accurate fault location data through its integrated fault location algorithm
- Locates cable faults without disconnecting consumers from the mains
- Shows the user which grid section the SFC250 has been installed in through the system's integrated GPS module.

Monitoring and fault analysis

The SFC250 consists of a power module and a control module, and is so compact that the distribution cabinet can be closed after installation, making safety guards unnecessary.

After setting the desired parameters (circuit-breaker rating, reclosing sequence, etc.), the SFC250 takes over all other tasks – independently and automatically:

- The system registers the load current and voltage amplitude, and records all anomalies on the integrated 16 GB SD card.
- All anomalies are reported by text message or e-mail to the user, who can then identify whether a cable fault or grid overload is causing the circuit-breaker to trip.

No additional communication server necessary.



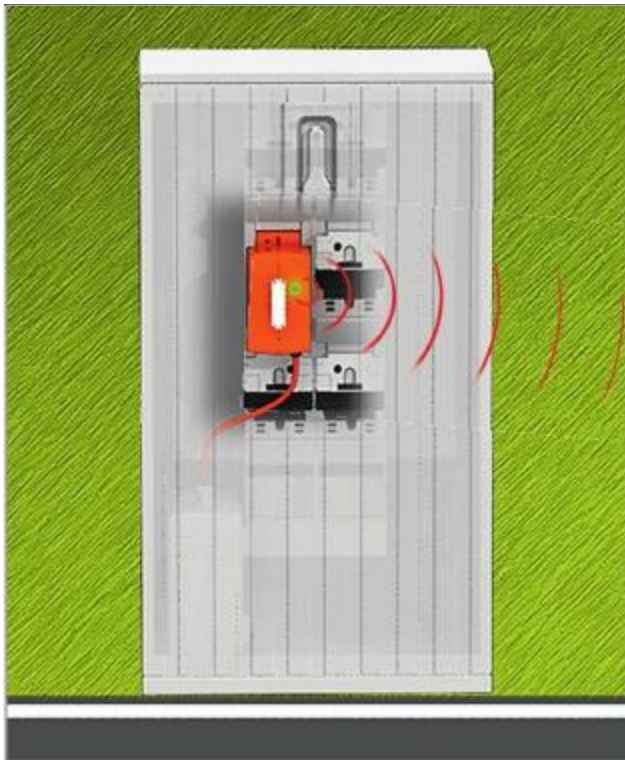
Advance warning

Critical grid overloads (e.g. due to the increased feed-in of renewable energies) cause conventional fuses to blow, which results in entire grid segments breaking down. In such cases, line crews are sent out to replace the affected fuse. But as soon as another overload occurs, conventional fuses blow anew, and the line crew must go back to the fault site.

This back-and-forth to the affected area is expensive in terms of both time and labour, but employing the SFC250 as an advance warning system will eliminate this cost.

As soon as the current load has reached the configured tripping threshold (e.g. 75%), the user automatically receives a warning message.

This advance warning buys the grid operator enough time to initiate appropriate measures to avert a power failure.



Automatic warning message

Pre-location

While conventional fault location using high-voltage can only take place once the households have been disconnected from the mains, the SFC250 can prelocate cable faults in low-voltage grids using either its internal location algorithm, or an additional reflectometer, without cutting off the supply to consumers.

The benefits for the user are clear to see:

- Time-consuming and cost-intensive searches for connected consumers are no longer necessary.
- Digging up cables to disconnect buildings is no longer necessary.
- Excavations are not necessary until the location of the fault has been found.

Automatic restoration of power supply

Intermittent faults are often a source of despair for grid operators and testing engineers. Conventional fuses blow at random times and entire residential areas are left without power. Line crews are constantly on the move to affected sites to replace fuses before the fault location process can start.

The SFC250 eliminates these constant trips. The intelligent circuit-breaker system has been designed to automatically switch off when the current reaches unsafe levels, and, depending on the configuration, to automatically switch back on at the zero crossing. In this way, no voltage spikes arise.

Additionally, due to the automatic power supply restoration, CML and CI are substantially reduced.

The SFC250 can be configured as follows:

- Time to reset: 1 to 120 seconds
- Number of reset attempts: 0 to unlimited
- Load current: 10 A to 250 A
- Messaging: E-mail and/or SMS text



Pinpointing

In conjunction with other devices, the SFC250 can pinpoint underground cable faults with unprecedented accuracy:

Pinpointing with surge wave receivers:

Using the power available in the grid, the SFC250 causes a flashover at the fault point. A surge wave receiver (e.g. digiPHONE+) connected to the SFC250 evaluates the acoustic signal and electromagnetic impulse that result from the flashover at the fault position and leads the user to the exact point of the fault.

Sheath fault location using a gas sensor

The SFC250's repeated reclosing causes the cable insulation at the fault point to burn off. When the insulation starts to break down, gases are emitted. A gas sensor (e.g. Fault Sniffer) detects and measures these burning gases and shows their concentration. The highest concentration of gas (directly above the fault) indicates the exact fault position.



digiPHONE+



Fault Sniffer

Control and operation

How would you like to operate the SFC250? By touchscreen? Through the control module? From your office PC? By smartphone, tablet, laptop, or remote control? No problem at all!

We have designed the circuit-breaker system in such way that users can decide for themselves which method best suits their preferences and the particular application as the situation demands. With the same intuitive interface on all control devices, the SFC250 communicates in simple language and can be operated with few simple commands. No apps to download, no additional software necessary – a simple browser is all you need.

Conclusion

Power grid monitoring and fault location are becoming increasingly important. The demands placed on testing engineers are constantly rising. Customers expect grid operators and technicians to minimize interruptions and restore power as quickly as possible. As the pressure on system operators is increasing, the cry for available smart system analysis tools is getting louder. Megger has developed the SFC250 to identify disturbances before they become critical, helping grid operators take corrective measures ahead of time to prevent power failures and other system disruptions that impair the power reliability and its quality.



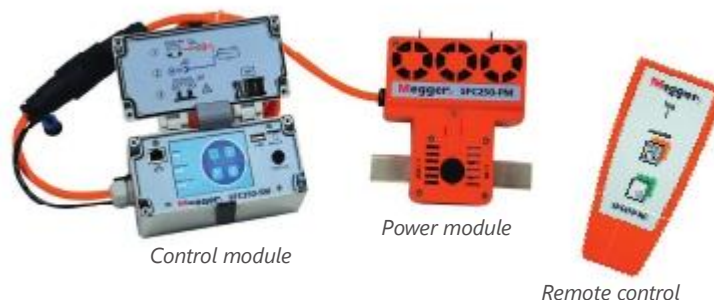
TECHNICAL DATA*

General

Triggering threshold	10 A to 250 A
Restart attempts	0 – unlimited
Waiting time until restart	1 – 120 seconds
Surge energy control	1 – 4 half-waves
Phase angle control in the event of surges	Can be set
Operating and storage conditions:	
Operating temperature	-20 °C to +50 °C
Operating humidity	50% at +40 °C 90% at +20 °C
Storage temperature	-25 °C to +70 °C
Memory for mains failure	Non-volatile event memory
Supply voltage for power and control module	Directly via power module 100 V ... 240 V, 50 Hz/60 Hz
Power consumption	20 VA + 1 W/A load current
Overvoltage category	to EN 60664: CAT IV 300 V

Power module

Load current	max. 250 A continuous current
Short-circuit/surge current	max. 9000 A
Internal fuses	Load circuit: 800 A HC-type; internal supply: 1.25 A F
Cut-out capacity	200 kA
Display	LED for indicating the switching status
Housing dimensions (L x W x H)	130 x 155 x 82 mm (excluding grip lugs)
Weight	3.0 kg
Protection rating	IP 20
Compatibility	Fuse holder NH02 or NH03



Control module

Power module

Remote control

Control module

Control system	Colour touch-screen
Memory	Micro SD card, 16 GB
Display	Illuminated touch display LED for indicating the operating status (when the cover is closed)
Interface	- GSM/UMTS modem (SIM card required) - Integrated GPS receiver (external optional) - USB 2.0 - WLAN/LAN - Wireless module (remote control activation)
Housing dimensions (L x W x H)	160 x 103 x 97 mm
Weight	900 g
Protection class	II
Protection rating	IP 42
Connections	- Neutral conductor connection - External trigger output - Connection coupling to the power module

Remote control

Power supply	2 x alkaline batteries 1.5 V/LR 6 (AA)
Protection rating	IP 40
Dimensions (L x W x H)	140 x 63 x 30 mm
Weight (with batteries)	150 g

ORDERING INFORMATION

Product	Order no.
Smart Fuse 250 1-phase set (without fault location function)	1006509
Power module, Control module, Remote control, Neutral conductor connecting lead, External power supply (EU plug) (for optional configuration of the device in the of ce), Carry case, Fuse 1.25 A (set of 10)	
Optional:	
Fault location function	90015840
Additional 800 A fuse	90007524
External GPS receiver	2007960

* We reserve the right to make technical changes.