



SIEMENS

Ingenuity for life



The background image shows a close-up of a hand working on a Siemens 5SM6 AFD unit. The unit is a white, modular electrical device with several circuit breakers and terminals. A hand is using a red screwdriver to adjust a component. Overlaid on the image is a digital grid and glowing lines, suggesting a digital or smart technology theme.

Prevent electrical fires

The 5SM6 AFD unit in practical use

[siemens.com/afd-units](https://www.siemens.com/afd-units)

Reliable protection against electrical fires



5SM6 AFD unit alone (left) and in combination with a 5SU1 RCBO (right)

Even the slightest faults in electrical installations can have serious consequences. About one-third of all building fires are caused by electricity, and approximately 30 percent of these fires can be traced back to defects in the electrical installation itself. The 5SM6 AFD unit offers a reliable means of preventing electrical fires by identifying the faults and safely disconnecting the circuit before the wires overheat.

End-to-end protection concept

The 5SM6 arc fault detection (AFD) unit is available in two versions for currents up to 16 A and 40 A and in combination with miniature circuit breakers (MCBs) or with residual current operated circuit breakers (RCBOs). It is part of an end-to-end, mutually coordinated product range providing comprehensive safety in electrical installations.

Proven technology

The AFD unit is the first device on the European IEC market to provide protection against serial arcing faults. Since it was first introduced, it has proven its worth in schools, hospitals, laboratories, and many other buildings. With its patented SIARC detection methodology, it reliably prevents and protects people and property against electrical fires.

More information:

[siemens.com/afd-units](https://www.siemens.com/afd-units)

[siemens.com/protection-concept](https://www.siemens.com/protection-concept)

Standards-compliant protection

Recommended installation of AFD units

According to the international standard IEC 60364-4-42, AFD units are strongly recommended all over Europe as the recognized state-of-the-art technology in specific locations of use. Furthermore the installation of AFD units has become mandatory in Germany for many locations with the publishing of the standard DIN VDE 0100-420.

AFD units are to be installed in single-phase AC systems with an operating current no higher than 16 A.

Recommended installation according to IEC 60364-4-42

| | | |
|---|---|--|
|  Facilities with sleeping accommodations |  Woodworking industry, paper and textile factories |  Daycare centers* |
|  Locations with fire-propagating structures, such as high-rises, where a chimney effect can occur |  Storage areas with flammable materials |  Retirement homes* |
|  Branch circuits with a high connected load that supply electrical consumers like washing machines, dryers, or dishwashers |  Wooden houses and barns |  Barrier-free apartments* |
| |  Airports |  Public buildings** |
| |  Railway stations |  Laboratories |
| |  National monuments, museums |  Data centers |

* To be provided in bedrooms and living spaces

** With irreplaceable goods

Fire protection by prescription



The Karolinen-Hospital Hüsten is breaking new ground in the area of fire protection and relies on AFD units from Siemens.

Challenge

The Klinikum Arnsberg was constantly having to replace charred electrical outlets on extension cords. The cause: crushed cables, damaged insulation, or faulty terminal devices. Any of these can generate serial arcing faults, which in turn can cause smoldering fires. However, miniature and residual current operated circuit breakers (MCBs and RCCBs) alone can't detect this source of danger.

Solution

To eliminate this safety risk and guarantee the uninterrupted protection of patients, staff and buildings, the clinic relies on 5SM6 AFD units from Siemens for its site at Karolinen-Hospital. In addition to voltage and current, this device continuously measures high-frequency noise. Thanks to integrated filters and intelligent software, it can identify arcing faults and disconnect the circuit within a fraction of a second.

Benefits

- AFD units from Siemens protect highly sensitive circuits against serial arcing faults.
- Hot spots and smoldering fires are almost impossible.
- Specific protection of much used electrical consumers such as washing machines and dryers.



Ten AFD units from Siemens protect highly sensitive circuits in the Karolinen-Hospital Hsten against serial arcing faults.

“The AFD unit offers additional protection beyond conventional protection devices. If a fire is detected, the device identifies its cause, thus allowing the fault to be effectively corrected.”

Ulrich Molitor, master electrician for Klinikum Arnsberg



The right chemistry

All outlets at the laboratory workstations were retrofitted with AFD units.

Challenge

The specialty chemicals company C.H. Erbslöh stores up to 4,000 tons of chemicals and minerals in state-of-the-art high-rack units and tanks at the company's location in Krefeld, Germany. Fire protection and safety standards must be maintained at the highest possible level. A smoldering fire in the laboratory caused by a defective terminal in the electrical installation revealed a previously unknown source of danger.

Solution

A smoldering fire broke out in the laboratory during business hours, enabling the staff to switch off the power supply manually via the main circuit breaker. After determining the cause of the fire, the chemicals company installed touch-proof plug-in terminals and several 5SM6 AFD units from Siemens in order to reliably protect employees and expensive technology in the laboratory. With the patented SIARC technology AFD units reliably detect serial arcing faults such as those resulting from loose fixing screws or defective cables.



Thirteen AFD units reliably protect staff and sensitive technology in the laboratory of C.H. Erbslöh.

Benefits

- AFD units protect the socket outlets at the laboratory workstations as well as an outlet for the lab's dishwasher.
- Additional protection in combination with eight MCBs and five RCBOs.
- The electrical installation complies with the recognized start-of-the-art technology.

“Fortunately, new technical solutions are always emerging in the installation technology field.”

Roland Köhne, Köhne Elektrotechnik

A blessing for safety



The electrical installation in the historic St. Petri church in Arnsberg-Hüsten in the Sauerland region must comply with extremely high safety standards.

Challenge

The electrical equipment installed directly below the wooden roof truss of the 850-year-old church of St. Petri in Arnsberg-Hüsten was a potential risk factor for the building. Over time, cables can be damaged by rodents and, under certain conditions, high humidity in the

roof area can cause the contacts to oxidize – all of which can result in dangerous serial arcing faults when the power is switched on. The extreme buildup of heat can quickly lead to a smoldering fire, especially given that the cables are installed directly on wood.



“The new AFD unit perfectly complements the previously existing safety measures.”

Master electrician Harald Bendler, Elektro Bendler GmbH

Solution

A 5SM6 AFD unit specifically protects the lighting circuit in the historic roof truss of the church of St. Petri. It guarantees round-the-clock safety by continuously monitoring the circuit for possible arcing faults and switching it off within a fraction of a second when faults occur. Using an integrated self-test function, the AFD unit also regularly checks its own ability to function.

Benefits

- An AFD unit in the church of St. Petri in Hüsten specifically protects the roof truss lighting circuit.
- Protection of the electrical equipment directly beneath the historic roof beams.
- The electrical installation complies with the recognized state-of-the-art technology.

Fire protection is cool



Sophisticated refrigerator doors are loaded with electronics and are often subject to tremendous mechanical loads.

Challenge

The strict requirements of the food industry dictate that any products with even the slightest exposure to smoke must be disposed. This also applies to cold storage and freezing rooms where low temperatures and the often hectic operation of forklifts can subject doors to especially high stresses – for example, the crushing or crimping of electrical lines in the doors.

At cool it Isoliersysteme GmbH – the European market leader for refrigerator doors – heating cables prevent the door gaskets from freezing. Instead of counting on the door operator to provide a fully protected electrical supply all the way to the socket outlet, cool it already integrates the appropriate protection equipment into the door control system as a function of the application.

Solution

In addition to the MCBs and RCCBs, cool it integrates 5SM6 AFD units into specific doors to automatically detect serial arcing faults. To ensure its reliable functioning in the typically harsh conditions in which refrigerator doors are used, the solution was successfully tested in the Siemens laboratory for the heating cable model used.

Benefits

- An AFD unit protects the electrical equipment in the flex door – a double-leaf, fast sliding door for the logistics area with flexible door leaves.
- Protection components are installed directly in the refrigerator door.
- Additional reliable protection under harsh environmental conditions.

“The AFD unit and the additional protection associated with it are a further component in our protection concept that wasn’t technically possible before.”

Alexander Rolf, technical director for cool it

Safe holidays



Around 20 AFD units are installed in each of the four vacation houses.

Challenge

Camping and luxury don't have to be mutually exclusive, especially when a campground operator such as Eduard Mayr adds comfortable wooden houses to his offering. The four houses near Füssen in the Allgäu region of Germany have wooden interior and exterior walls with natural cellulose as insulating material.

This helps boost energy efficiency but it also places special demands on fire protection. Guests generally bring their own electrical devices, while consumers such as refrigerators continue to run as "unobserved consumers" when no guests are present.

Solution

5SM6 AFD units are installed in the wooden houses to supplement the MCBs and RCCBs. They reliably detect the serial arcing faults that can result when terminal connections are defective or multi-plugs and extension cables are damaged. Thanks to intelligent software, the AFD unit is able to distinguish between dangerous arc currents and those generated by other harmless sources of disruption such as vacuum cleaners.



In the summer of 2013, four vacation houses were added to the offerings at Camping Hopfensee (center of photo).

Benefits

- AFD units reliably prevent smoldering fires.
- The electrical installation reflects the recognized state-of-the-art technology.

“We have to choose quality.
It’s only through quality that
I can survive as a provider
over the long term.”

Eduard Mayr, owner of Camping Hopfensee

Safety in a dream house



Taste and quality shape the new building's architecture and interior design.

Challenge

In addition to enjoying technical innovations, builder Tobias Gebler wanted to provide complete protection for his young family. He equipped their new house in Markt Wald in the Allgäu region with state-of-the-art technology, including a number of large appliances such as a dishwasher and a microwave. However, the power consumption characteristics of these modern electrical devices differ from those of older devices – for example, washing machines have frequency converters – and require new, appropriate protection devices.

Solution

The protection concept using MCBs and RCCBs was supplemented with the 5SM6 AFD unit. Only this protection device is capable of reliably detecting serial arcing faults, thus closing the previous safety gap. If anything unusual is detected, the AFD unit disconnects the circuit within a fraction of a second.



“It was important to me that a recognized brand stood behind it. And Siemens stands for very good quality. If you’re going to do something, do it right!”

Tobias Gebler, builder

Benefits

- AFD units protect this dream house against serial arcing faults.
- Reliable distinction between harmless causes of faults, such as those generated by drills or vacuum cleaners, from dangerous arcs.
- Protection of washing machine, dryer, and kitchen circuits.

The latest protection for historic buildings



Modern technology protects both the historic section and the new section of the Beim Fuchsle inn.

Challenge

Historic buildings are particularly worthy of protection – including the Beim Fuchsle inn in the Allgäu region. In the Beim Fuchsle, sophisticated protection technology must ensure the all-round protection of both the 200-year-old section of the inn and the modern extension with seating for 90 additional guests and a restaurant kitchen.

Solution

Operators of the Beim Fuchsle inn rely on 15 installed AFD units. In addition to comprehensive fire protection, the electrical installation must also deal with the limited capacity of the incoming cable from the regional energy supplier. For this reason, a measuring device and KNX system for the central building control were added to the protection provided by 5SM6 AFD units as well as MCBs and RCCBs.



A harmonious transition from old to new: Spacious new construction (in the background) with seating for 90 additional guests and a restaurant kitchen with modern equipment supplement the main historic building.

Benefits

- AFD units are used in the Beim Fücksle inn to protect both the old and new construction against electrical fires.
- The electrical installation complies with the recognized state-of-the-art technology.

“We aimed for the highest standards in every area.”

Melanie Gebler, Beim Fücksle inn

Fire protection becomes child's play



To protect all the electrical circuits at the SieKids – Stromstrolche daycare center, 179 AFD units were installed in combination with MCBs.

Challenge

In daycare centers, the safety of the children has top priority. Children must feel safe and be able to develop freely, and the staff at the SieKids – Stromstrolche daycare center in Regensburg must be able to give them their undivided attention. To keep concerns about fires from getting in the way, the electrical installation must meet the highest safety standards.

Solution

The installation of 179 AFD units in the daycare center was accomplished quickly and easily. The AFD unit simply latches into the distribution board and can optionally be mounted on a miniature circuit breaker, for example. Time savings are also possible through integration into the planning tool.

Benefits

- AFD units protect the daycare center's electrical circuits.
- strongly recommended installation of AFD units in daycare centers according to IEC 60364-4-42.

“I’m glad that a safe AFD unit from Siemens was installed!”

Alexandra Immeyer, director of the SieKids – Stromstrolche daycare center

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