SIEMENS

Ingenuity for life

Maximized reliability and minimized operating costs

Medium-voltage outdoor systems for all climate conditions

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siemens.com/outdoorsystems

Outdoor vacuum switching devices from Siemens

The intelligent solution for tomorrow's smart grids

Power distribution grids are becoming more and more complex. This is why Siemens focuses on helping customers improve the reliability and efficiency of their distribution grids. This keeps them a step ahead of their challenges, from the control center via the grid to the consumer.

Outdoor switching devices are essential components of medium-voltage distribution grids with overhead distribution lines. Siemens' comprehensive portfolio of outdoor vacuum switching devices has been especially designed for a wide variety of climatic conditions.

Thus, type-tested reliability as well as long electrical life and mechanical robustness increase the profitability of medium-voltage grids. Outdoor switching devices offer the greatest possible benefit for every application, from the optimization of less developed network environments to the use in future-oriented smart grids.

Vacuum switching technology from Siemens

Maintenance-free equipment for your success

Benefits and features

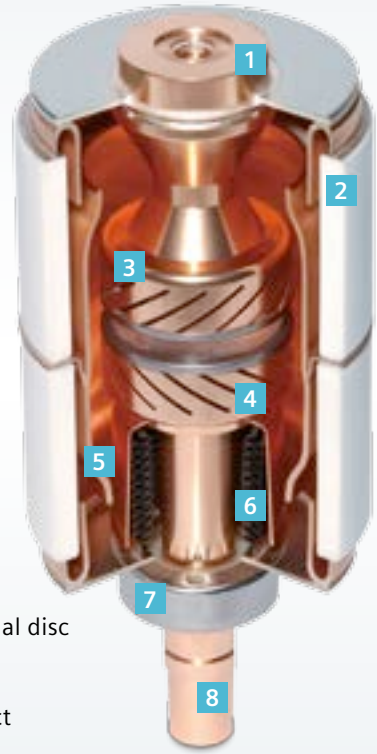
- Maintenance-free switch unit
- High breaking capacity
- Low contact resistance
- Interrupter optimally adapted to your application

Further information

Vacuum interrupters from Siemens work in a particularly reliable and safe manner. The arc, which results when the switching contacts are opened, can be physically well controlled in the vacuum.

As the contact gap is de-energized during the current zero crossing, a self-extinguishing switching principle is created, which minimizes wear on the contacts. This results in a substantially higher electrical switching performance and a practically maintenance-free operation. With the use of special materials and different geometries of the contacts, the Siemens vacuum interrupters are optimally matched to suit different load cases.

Siemens has consistently developed this technology, so that the vacuum interrupters ideally suit the conditions of medium-voltage circuit-breakers. Today, 80% of all medium-voltage circuit-breakers operate according to the vacuum switching principle.



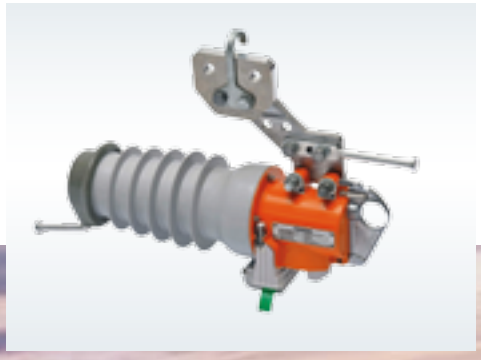
1 Fixed terminal disc
2 Insulator
3 Fixed contact
4 Moving contact
5 Shield
6 Metal bellows
7 Guide
8 Moving connection bolt

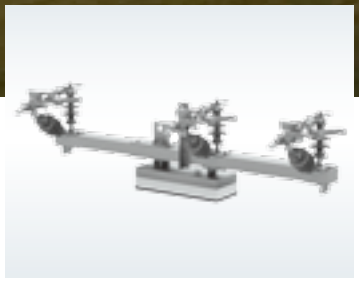
Vacuum interrupter

Live Tank 3AF0

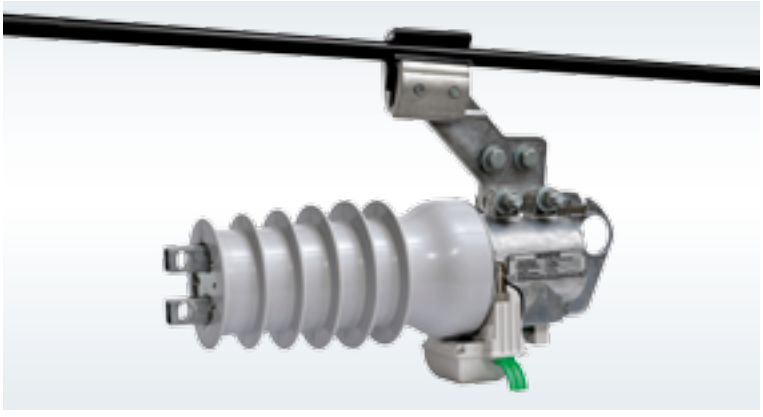
Dead Tank SDV

Portable Switch

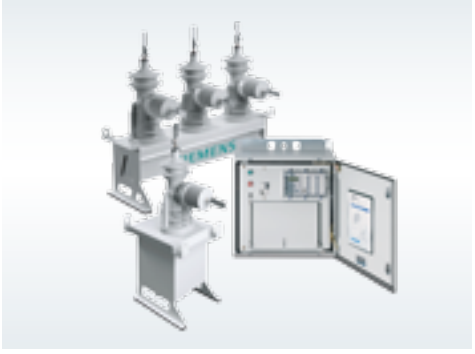




Disconnect Switch



Fusesaver 3AD8



Vacuum Recloser 3AD

Live Tank 3AF0

Low weight and space saving – for transformer substations and distribution grids

Benefits and features

- Easy transport
- Highly reliable and safe operation
- Low cost of ownership
- High electrical and mechanical endurance
- No maintenance of mechanical parts required
- Rated voltage 12 to 40.5 kV
- Rated normal current 630 to 2,500 A
- Rated short-circuit breaking current 20 to 31.5 kA

The Live Tank 3AF0 circuit-breaker has been especially conceived for breaking short-circuit currents in substations and in overhead-line systems.

Its type-tested, safety-oriented and robust design withstands the most adverse climate conditions and guarantees a long electrical and mechanical endurance.

The vacuum interrupter is protected against weather influences by means of an insulated enclosure.
The live-tank circuit-breaker is typically used in distribution grids of power utilities, in industrial applications and in railway power supply systems.

Further information

Further information

Dead Tank SDV

Arc-resistant circuit-breaker for distribution grids

In dead-tank circuit-breakers, the vacuum interrupter is installed in an earthed metal enclosure with a very compact design and a small footprint. Optionally, the circuit-breaker features an arc-resistant enclosure. It has been especially conceived for the ANSI market and fulfills the same switching duties as the Live Tank 3AF0. It can optionally be equipped with a stored-energy spring mechanism or a magnetic actuator.

Thanks to the circuit-breaker's robust enclosure and the vacuum switching technology, the maintenance cycles are particularly long, enabling cost-efficient application in transformer substations and distribution grids.

Benefits and features

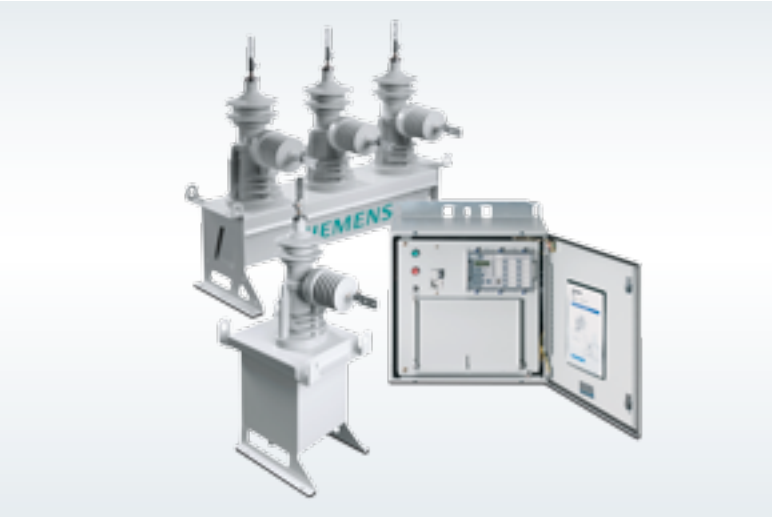
- Very compact design, small footprint
- Arc-resistant enclosure (optional)
- 10,000 operating cycles
- Rated voltage 15.5 to 38 kV
- Rated normal current 1,200 to 3,000 A
- Rated short-circuit breaking current 20 to 40 kA

Benefits and features

- Designs for single-phase, triple-single and three-phase applications
- Large number of protection, metering and monitoring functions including smart grid automation
- Fast fault isolation possible < 300 ms
- Rated voltage 12 to 38 kV
- Rated normal current 200 to 800 A
- Rated short-circuit breaking current 12.5 to 16 kA

Vacuum Recloser 3AD

Safety for overhead lines and transformer substations



The development of the Vacuum Recloser 3AD was backed by decades of experience in vacuum switching technology. The Recloser 3AD guarantees safe and efficient operation in the event of faults, avoiding permanent interruptions in distribution lines that may be caused by temporary fault causes, for example, by lightning strikes or branches falling down.

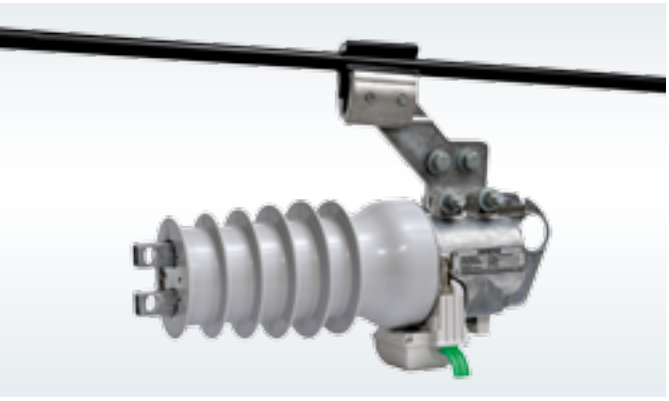
The Vacuum Recloser 3AD is used in transformer substations and on overhead lines. Like a circuit-breaker it switches normal and fault currents. In case of a temporary line fault, the recloser can trip and reclose up to four times. This ensures that temporary faults only result in short and temporary interruptions.

The recloser is available in a single-phase or three-phase design and provides a flexible solution due to its wide range of ratings; thanks to the intelligent controller, also for automated grid systems.

Further information

Fusesaver 3AD8

Saving costs with maximum grid availability



As an intelligent, compact and cost-efficient single-phase circuit-breaker, the Fusesaver 3AD8 is the fastest outdoor vacuum circuit-breaker worldwide. It is mainly used in rural distribution grids and can eliminate the effects of temporary faults in lateral lines, spur lines and T-offs almost completely. It is directly mounted on the overhead line.

Thanks to its incorporated microprocessor control and wireless communication, different parameters can be set without taking the device out of service. It is operated at line potential and self-powers autonomously. Fault detection is achieved with an extremely fast protection algorithm. Moreover, the Fusesaver 3AD8 can be integrated in a SCADA system with an optional Remote Control Unit (RCU).

The Fusesaver 3AD8 is a cost-efficient solution for optimized reliability and minimized operating costs in rural distribution grids.

Benefits and features

- Improves reliability and SAIDI/SAIFI (System Average Interruption Duration/ Frequency Index)
- Quick and easy installation – plug and play
- Lower operating costs due to reduced maintenance requirements
- Typical return on investment in less than two years
- More personnel safety
- Rated voltage 15.5 to 27 kV
- Rated normal current 40 to 200 A
- Rated short-circuit breaking current 1.5 to 6.3 kA
- Three-phase operations via wireless communication between the phases
- SCADA integration via optional Remote Control Unit

Further information

Portable Switches

Temporary isolation applications

While traditional in-line tension disconnects offer line crews a temporary isolation of a line at non-designated switching locations, the lack of a ganged switching capability creates operational inefficiencies.

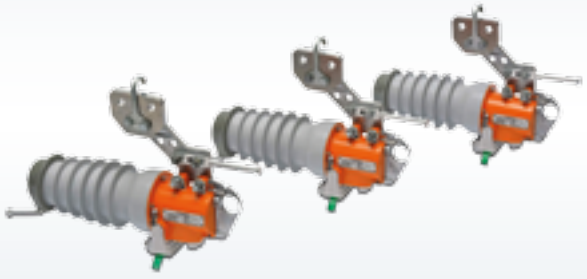
These are due to:
- Restrictions in load breaking capability
- Restrictions in load pickup
- The risk of ferro-resonance as an effect of single-phase switching operations
- The additional time to isolate upstream devices prior to operating the in-line disconnect.

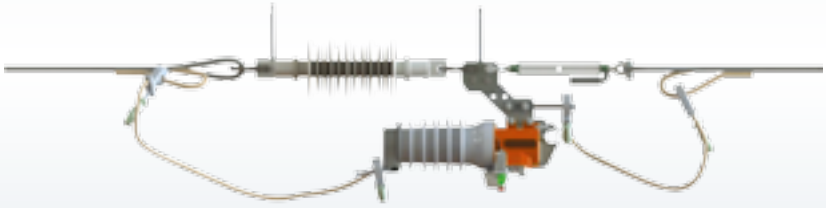
Siemens has addressed all of these problems by adapting the switching unit of the proven Fusesaver circuit-breaker into a preconfigured 3-phase synchronous portable switch kit. The phase-to-phase communication is achieved via the built-in radio system in the communications module. The switch units are suitable for in-line tension, line-hung or cross-arm mounting on already existing connection points for simple installation and visible isolation. What is more, the devices are electrically floating and require no earthing.

Benefits and features

- Minimized loss of customer minutes
- Minimized number of affected customers in case of unavoidable maintenance
- Easier installation than current devices
- Self-powered from onboard battery
- No configuration required
- Complete self-contained carry case
- Light, compact and easy to install using live-line practices

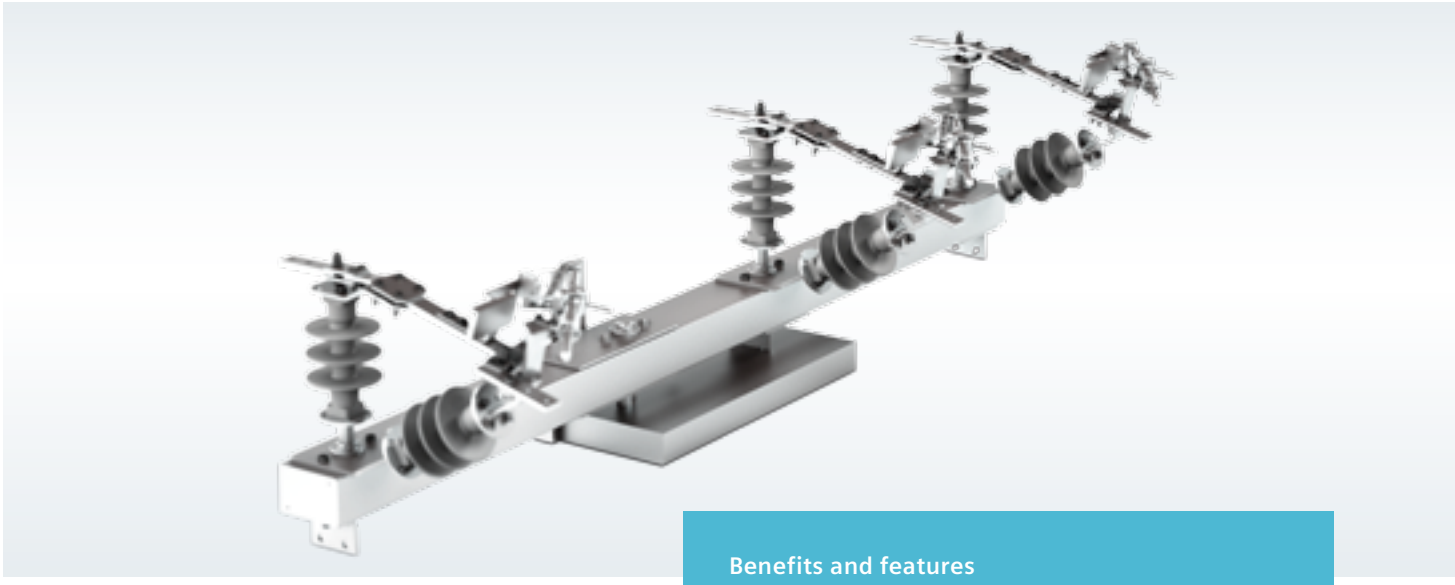
Further information





Disconnect Switches

Safety and reliability for ease of maintenance



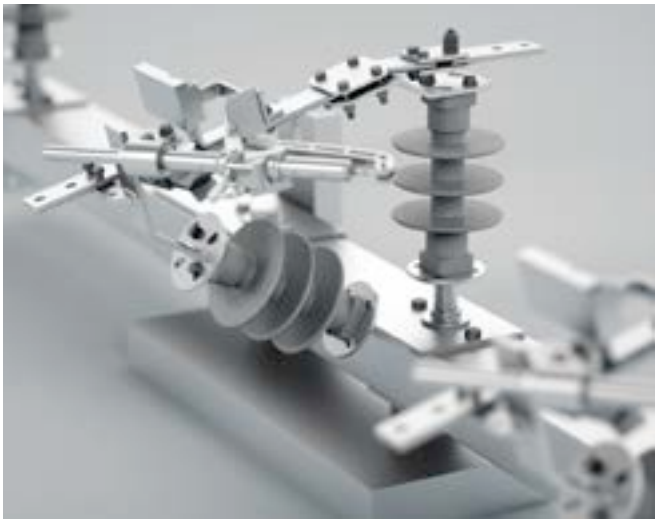
Especially designed for outdoor installations, switches are ruggedly built, reliable devices that splice right onto the line. As switch-disconnectors they serve to safely support the conductor while providing the required isolating distance for quick and safe line maintenance.

By the nature of its application, a line tension switch must mechanically support the line and provide high-voltage electrical isolation when the switch is in open position. To achieve this, the latest porcelain and polymer insulators may be chosen. The switches can be used in medium-voltage substations, in the line or on poles. Depending on the function intended, different switch designs can be applied.

Switches are available for both manual and motor operation, offering numerous other options, accessories and mounting configurations. All of these features make switches a flexible and low-cost solution that ensures safe and efficient maintenance work on line segments.

Benefits and features

- Quick detection of the line's switching state
- Simplified maintenance
- Flexible mounting options
- Various options for single-phase and multi-phase group-operated applications
- Rated voltage values up to 15 to 69 kV
- Rated normal current 600 to 2,000 A
- Rated lightning impulse withstand voltage 110, 150, 200 kV



Further information

Added value for our customers and partners – around the world

With tailor-made global sales and services

Siemens outdoor switching devices – innovative, future-oriented and cost-efficient

- Higher network availability and reliability
- Reduced outage times and number of affected customers
- Lower lifecycle costs compared to standard equipment
- Reduced operating costs
- Quick amortization of investment costs
- Avoidance of penalty payments
- Automatic restoration and fault isolation in meshed grids
- Flexible all-in-one solutions
- Eco-friendliness due to vacuum switching technology

An excerpt of our references

Reseller

EPCs

Traction power supply

Consultants

OEMs

Utilities

Argentina
Australia
Austria
Azerbaijan
Bangladesh
Bosnia
and Herzegovina
Belarus
Bolivia
Brazil
Bulgaria
Cambodia
Cameroon
Canada
Chile
China
Colombia
Costa Rica
Croatia
Czech Republic
Ecuador
Egypt
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South Korea
Spain
Sweden
Switzerland
Sri Lanka
Tanzania
Thailand
Turkey
Uganda
UK
Ukraine
United
Arab Emirates
USA
Venezuela
Vietnam

... and many more

Technical data

Outdoor switching devices	Live Tank	Dead Tank	Recloser	Fusesaver	Portable Switch
Rated voltage	up to 40.5 kV	up to 38 kV	up to 38 kV	up to 27 kV	up to 27 kV
Rated power-frequency withstand voltage	up to 95 kV	up to 80 kV	up to 90 kV	up to 60 kV	up to 60 kV
Rated lightning impulse withstand voltage	up to 200 kV	up to 200 kV	up to 195 kV	up to 125 kV	up to 125 kV
Rated normal current	up to 2,500 A	up to 3,000 A	up to 800 A	up to 200 A	up to 400 A
Rated short-circuit making current	up to 80 kA	up to 104 kA	up to 40 kA	up to 16 kA	up to 16 kA
Rated short-circuit breaking current	up to 31.5 kA	up to 40 kA	up to 16 kA	up to 6.3 kA	up to 6.3 kA
Number of operating cycles	10,000	10,000	10,000	2,000	2,000
Standards	IEC 62271-100	ANSI/IEEE C37.20.7	IEC/IEEE 62271-37-013; IEC 62271-111	IEC 62271-100	IEC 62271-100

Outdoor systems partner program

Local value add and engineering

Our offerings

Products
- Over 40 years of experience in vacuum interrupter technology
- Reliable switching devices and components
- High-end protection and automation devices
- Continuous improvement of our existing technology

Logistics and time to market
- Excellent, reliable logistic performance/ flexibility for order-specific applications
- Flexible levels of value add
- Tailor-made technology kits for your individual requirements

Partner support
- Technical documentation
- Detailed training
- Audits for quality approval, certification
- Sales and marketing support

Benefits and features

Technical differentiation from competitors
- Complete type tested systems
- High quality standard

Image
- Use of Siemens quality core components
- Partner agreement
- Strong and reliable long-term partnership for joint market access

Cost advantages
- Flexible level of value add (sales, preproduction, engineering, assembling)
- Less fixed costs
- Reduced production and processing time

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