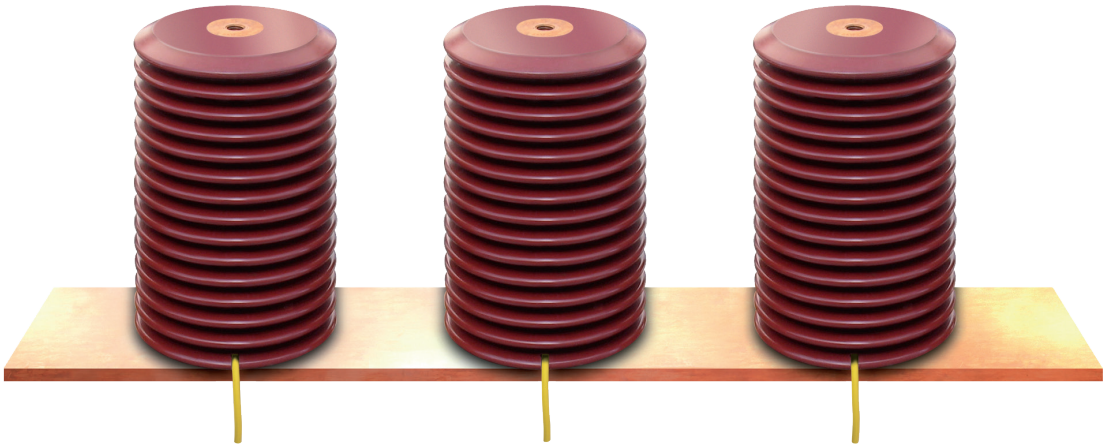


UFES™ Ultra-Fast Earthing Switch

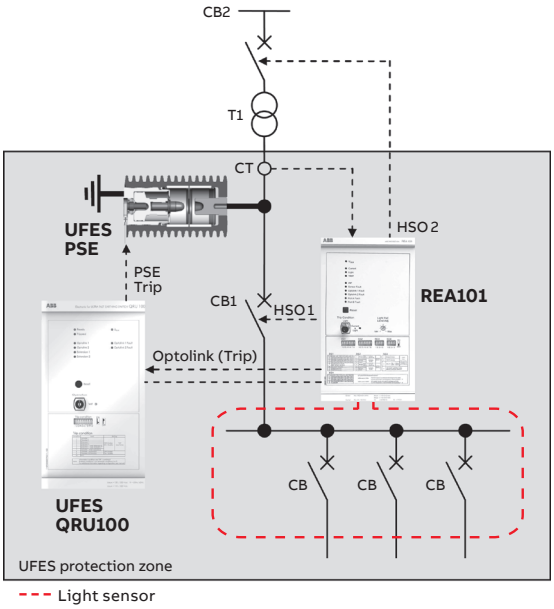
Active internal arc protection for low and medium voltage switchgear

- Protects operators and investments
- Minimizes downtime and damage on equipment
- Reduces costs related to arc fault impacts

UFES

S^3 – Speed, Safety, Savings

—
01 UFES application (example)
—
02 Energy release of arc faults and the thermal effects



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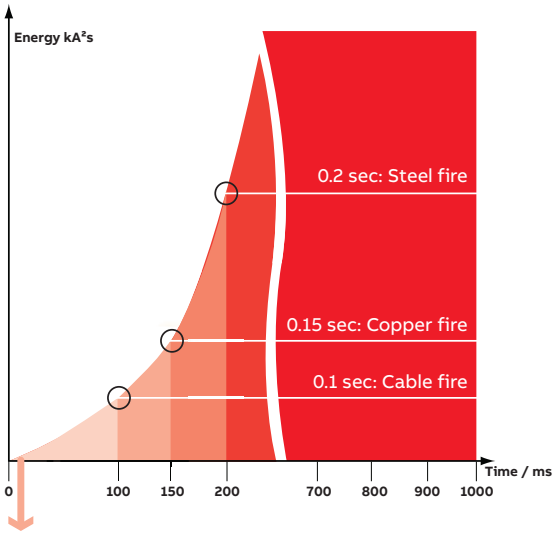

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02

The active arc fault protection device for switchgear
The occurance of an arc fault, the most serious fault within a switchgear system, is mostly associated with extremely high thermal and mechanical stresses in the area concerned. An active arc fault protection system based on the know-how gained from decades of experience with the ABB vacuum interrupter and I_s-limiter technology now effectively helps to avoid these negative effects if a fault should occur.

The Ultra-Fast Earthing Switch of type UFES is a combination of devices consisting of an electronic device and the corresponding primary switching elements which initiate a 3-phase short-circuit to earth in the event of a fault. The extremely short switching time of the primary switching element, less than 1.5 ms, in conjunction with the rapid and reliable detection of the fault, ensures that an arc fault is extinguished almost immediately after it arises. With a total extinguishing time of less than 4 ms after detection, an active protection concept with the Ultra-Fast Earthing Switch enables switchgear installations to achieve the highest possible level of protection for persons and equipment.

Greatly increased operator safety
... by effective prevention of hazardous situations

Minimized damage of electrical equipment and direct environment
... due to ultra-fast arc fault mitigation

Drastic reduction in downtimes & repair costs
... to avoid significant economic losses

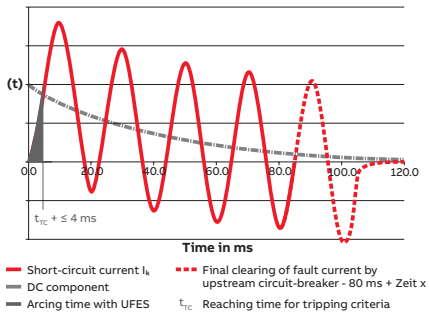
Application of active protection concepts for pressure sensitive environment
... e.g. where gas ducts are not applicable

Avoidance of the severe effects of an arc fault, such as:
- Extreme pressure
- Temperature rise up to 20,000 °C
- Burning / vaporization of metal and insulating material
- Release of particles and hot gases
- Intensive light / high acoustic stress

UFES

Ultra-Fast Earthing Switch

—
03 The Ultra-Fast Earthing Switch eliminates the arc fault in less than 4 ms after detection (grey area)
—
04 Example pressure curves, with and without UFES, in a compartment of an air-insulated medium voltage switchgear system with an internal arc fault current of 130 kA (peak) / 50 kA (rms)
—
05 Primary switching element for one phase



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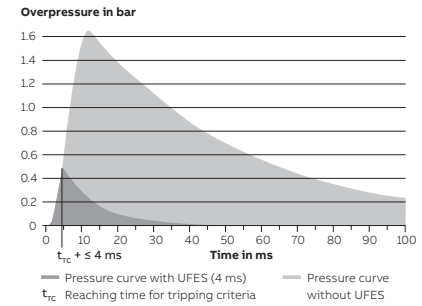

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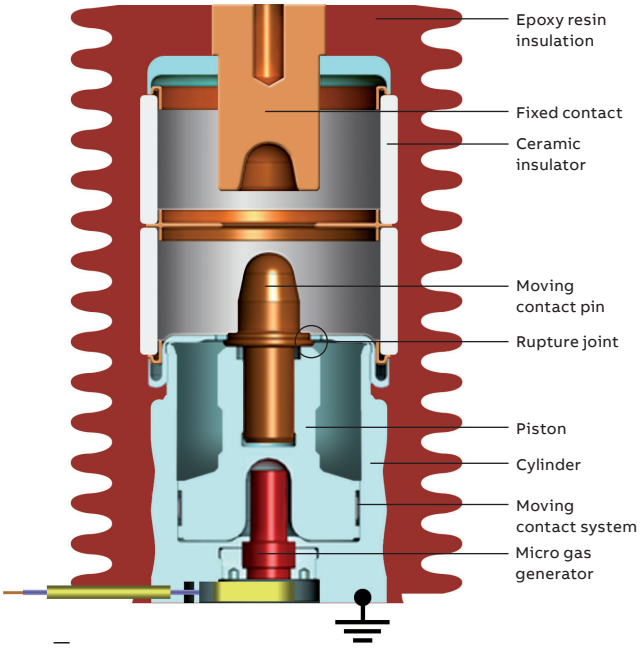

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UFES primary switching element type U1

Electrical maximum characterstics for each voltage category (Different types available)					
Rated voltage (rms) *	kV	1.4	17.5	27	36
Rated power frequency withstand voltage (rms)	kV	5	42	60	70
Rated lightning impulse withstand voltage (peak)	kV	12	95	150	170
Rated frequency	Hz	50 / 60	50 / 60	50 / 60	50 / 60
Rated short-time withstand current (rms)	kA	100	50 (63)	40	40
Rated peak withstand current	kA	220	130 (165)	104	104
Rated duration of short-circuit	s	0.5	3 (2)	3	3
Rated short-circuit making current	kA	220	130 (165)	104	104

Mechanical properties		
Dimension (diameter x height)	mm	~ 137 x 210
Closing time	ms	< 1.5
Contact bounce time	ms	0

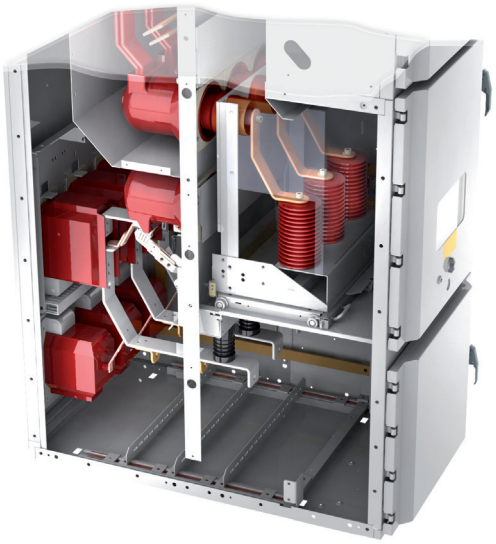
Service life expectation		
Number of closing operations		1
Mechanical	years	up to 30
Micro gas generator	years	up to 15

* 40.5 kV on request

UFES
Applications

—
06 ABB Service Box, top mounted
—
07 ABB with-drawable solution

—
06



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07

Selection of retrofit solutions
Particularly for older, non-IAC qualified switchgear systems, the Ultra-Fast Earthing Switch allows the highest degree of protection for equipment and operator safety to be achieved. A variety of solutions are available for retrofitting of existing switchgear systems.

ABB Service Box (up to 24 kV)
Universally usable ABB UFES Service Box for retrofitting of air-insulated switchgear
- Non-proprietary application
- Maximum installation flexibility to suit the space available

ABB withdrawable solutions
The UFES primary switching elements, installed in ABB withdrawable assembly or truck design, provides a simple opportunity to upgrade existing switchgear systems with active arc fault protection
- The contact with the busbars is established via the isolating contacts of the withdrawable assembly
- The optimum Plug & Play solution when vacant panels are available
- Similar solutions are also available for other switchgear types with trucks *

New ABB switchgear
Also for new ABB switchgear, the integration of UFES is a useful supplement in order to protect this investment against the impacts of an internal arc, and in addition, to increase the operator safety to a maximum. For switchgear of type UniGear ZS1 for example, the following technical solutions are available:
- UFES installation in a top box with direct connection to the busbar
- UFES installation in the cable connection compartment
- Separate panel with UFES draw-out unit

UFES components
The Ultra-Fast Earthing Switch can also be provided as a loose OEM component. There are different types of UFES kits available.

* on request

UFES

Active protection for switchgear

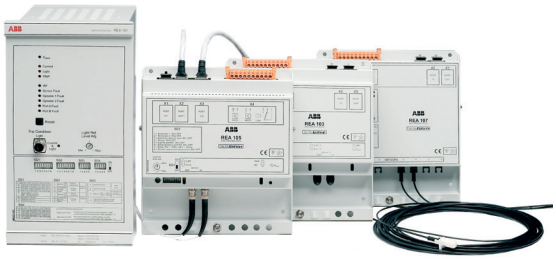
01 UFES electronics type QRU100

02 UFES primary switching element type U1

03 REA system

04 UFES electronics type QRU1

01



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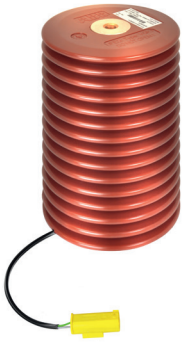

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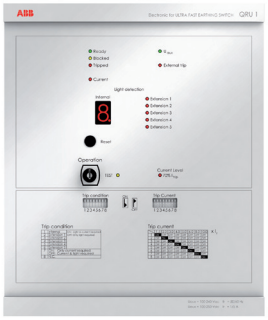

04

UFES electronics type QRU100

- Standard electronic tripping unit for the combination with ABB arc protection system REA
- 2 Optolink inputs for connection of the REA101 relay
- 2 High-speed inputs (HSI)
- Self monitoring
- Optolink supervision
- Testing mode for functional check
- DIP switch configuration
- Ideal for extension of existing ABB arc protection systems
- Alternative: Fault detection by non-ABB system (Compatibility verification required!)

UFES primary switching element type U1

- Ultra-fast operating mechanism with micro gas generator
- Vacuum interrupter
- Compact design
- Versatile in installation
- Long service life

ABB arc protection system REA

- Optical detection via line or lens sensors
- Overcurrent detection
- Selective protection
- Circuit-breaker failure protection

UFES electronics type QRU1

- Alternative electronic detection and tripping unit
- 3 current inputs
- 9 optical inputs for light detection by lens sensors
- Complete solution for simple protection zones
- For large protection zones expandable up to 159 lens sensors with ABB arc guard type TVOC-2
- Self monitoring
- Testing mode for functional check
- DIP switch configuration
- Fast fault localization

UFES certified by:

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Fax: +49 2102 12-17

abb.com/mediumvoltage

Additional information
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