

# Modern residual current protection

DFS F — sensitive to mixed frequencies

—— lightning-resistant

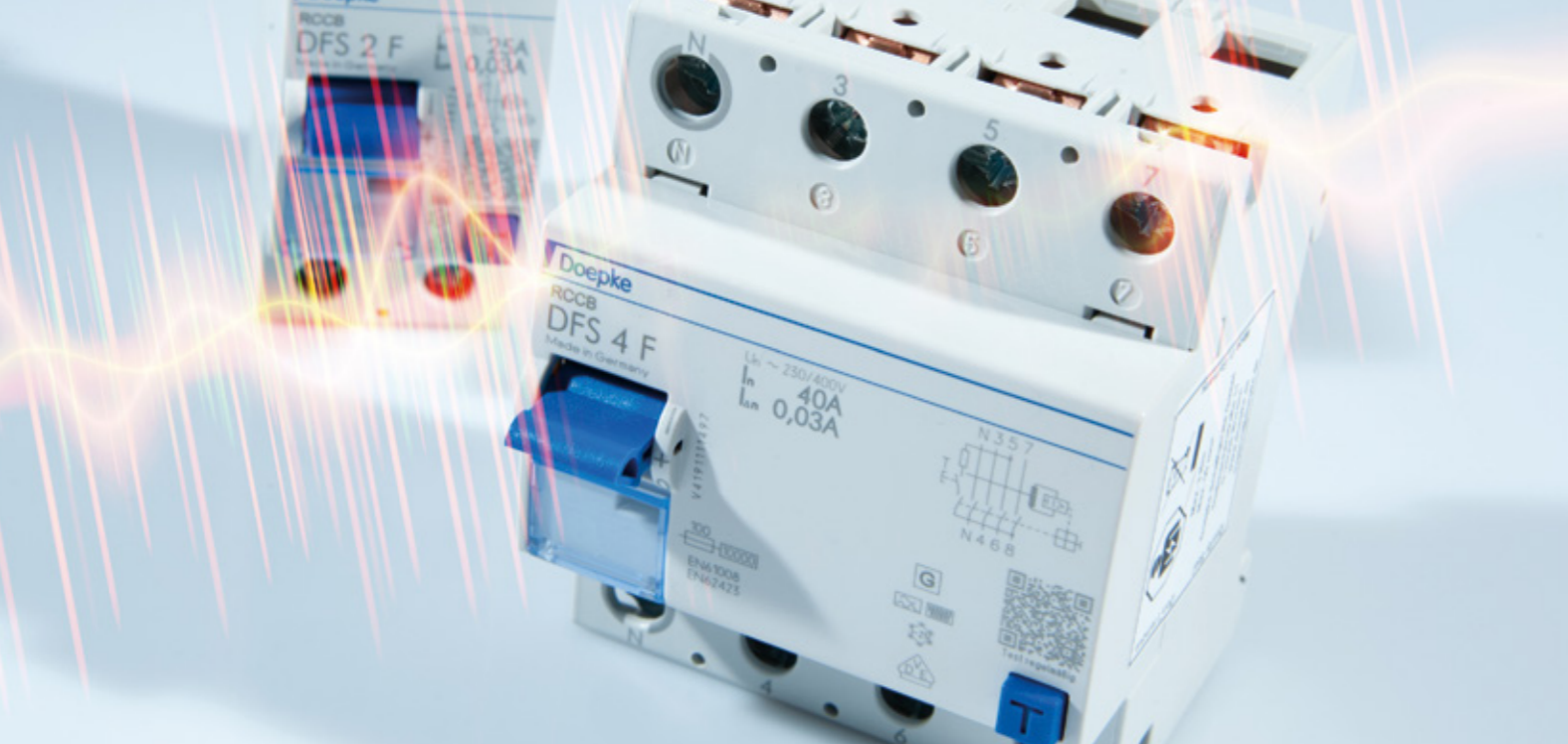
—— short-time delayed

DFS A KV – lightning-resistant

—— short-time delayed



Residual current circuit-breaker  
DFS 2/4 F



# Weathering the storm – using electricity safely when lightning strikes

## Overview of product features

	DFS Type A	DFS Type A KV	DFS Type F
Identifying AC residual currents and pulsating DC residual currents	✓	✓	✓
increased surge current strength		✓	✓
lightning-resistant		✓	✓
sensitive to mixed frequencies			✓

### Increased surge current strength and resistance to lightning

Type F and type A KV residual current circuit-breakers have higher immunity to surge currents, which may occur for instance when switching on air conditioning units, heating pumps, switched-mode power supplies or LED lights. In addition, type F and type A KV are resistant to lightning, meaning that they are protected against tripping due to false alarms caused by surge currents during storms.

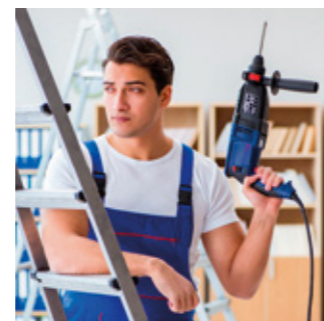
Our F and KV residual current circuit-breakers adhere to the tripping times set out in national and international design regulations for instantaneous residual current circuit-breakers. In principle, therefore, they may be used instead of a type A breaker.

## Future-proof protection with Doepke

**Type F** — Washing machines, agitators, hammer drills, welding equipment, heating and thermal pumps: Some of these devices are very much everyday items. As a result of the increased use of electronic equipment in private households, residual currents may occur which cannot be reliably detected by type A residual current circuit-breakers.

The reason for this is that single-phase operated frequency converters are increasingly being used to control the speed. In the event of faults, these frequency converters can generate residual currents with mixed frequencies other than 50 Hz.

**Safety first** — In contrast to type A RCCBs, the new type F RCCBs from Doepke not only detect alternating residual currents and pulsating direct residual currents corresponding to the mains frequency, but also residual currents consisting of mixed frequencies.



# Our recommendations for a modern house distribution system

## Type A

### Residual current circuit-breaker DFS A

- For pulsating and alternating residual currents
- Application areas: socket outlet circuits, conventional lighting

## Type A KV

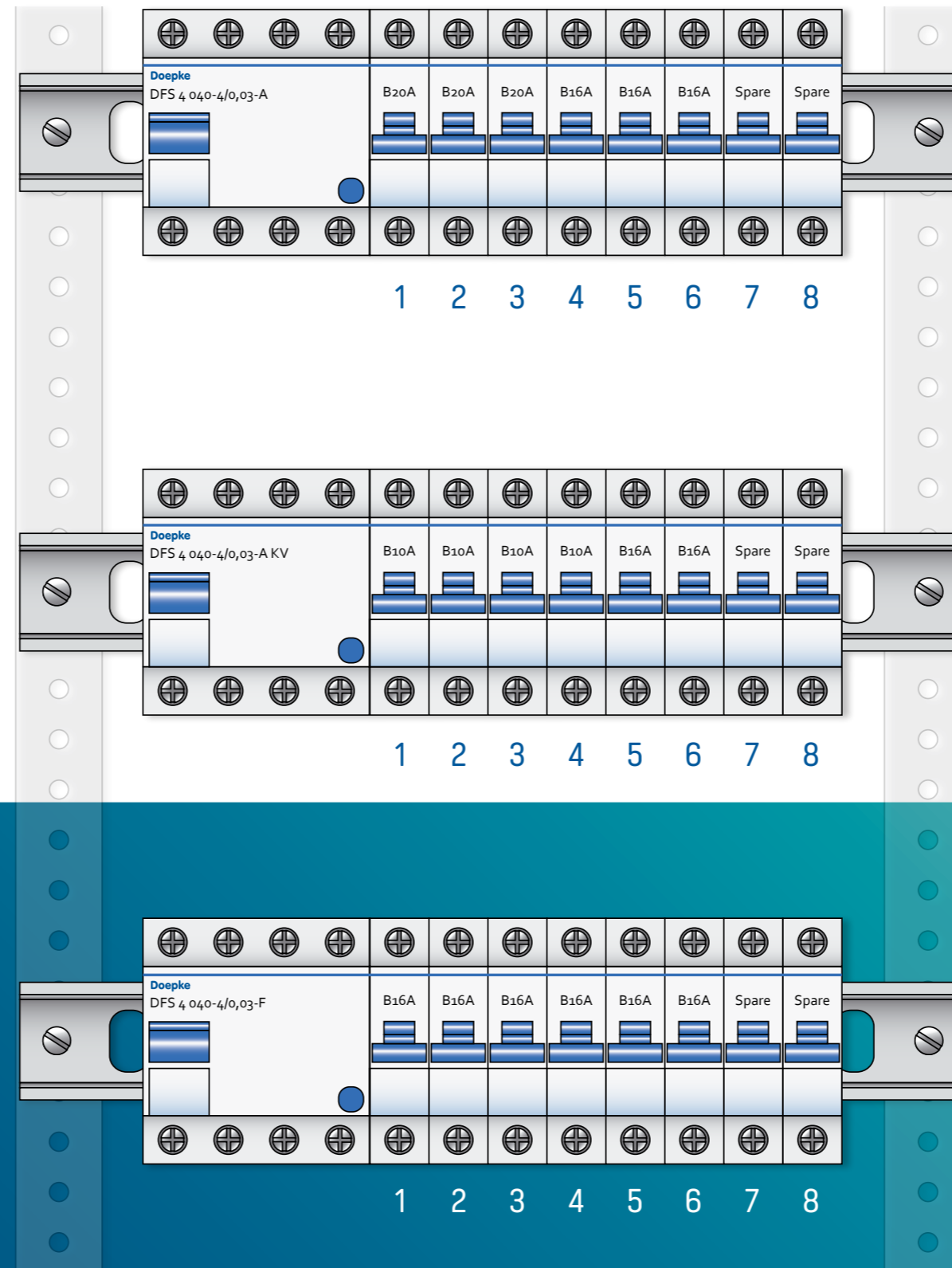
### Residual current circuit-breaker DFS A KV

- For pulsating and alternating residual currents
- KV = short-time delayed, has surge current strength
- Significantly less faulty tripping due to inrush currents from consumers such as: LED and fluorescent lamps or switched-mode power supplies
- Recommended in DIN VDE 0100-530

## Type F

### Residual current circuit-breaker DFS F

- For pulsating and alternating residual currents + residual currents with mixed frequencies
- Short-time delayed and lightning-resistant
- New addition to DIN VDE 0100-530
- Consumers with single-phase frequency converters: washing machines, heating or heat pumps, air conditioners



### Miniature circuit-breakers DLS 6

— Example assignment B 16 A/B 20 A:

- 1 – Electric oven with hob
- 2 – Electric oven with hob
- 3 – Electric oven with hob
- 4 – Socket outlets
- 5 – Freezer
- 6 – Refrigerator
- 7 – Spare
- 8 – Spare

### Miniature circuit-breakers DLS 6

— Example assignment B 10 A/B 16 A:

- 1 – LED lighting
- 2 – LED lighting
- 3 – Socket outlets
- 4 – Fluorescent lamps
- 5 – ICT/switched power supplies
- 6 – Solar power systems
- 7 – Spare
- 8 – Spare

### Miniature circuit-breakers DLS 6

— Example assignment B 16 A:

- 1 – Washing machine
- 2 – Heating pump
- 3 – Heat pump
- 4 – Air conditioners
- 5 – Vacuum cleaner systems
- 6 – Other devices with 1-phase FCs
- 7 – Spare
- 8 – Spare

#### Tip: Type A and F in EV design:

Buyers are increasingly opting for electric vehicles in the private sector: Doepke also has residual current circuit-breakers in an EV (electric vehicle) design specifically for protecting against the DC residual currents that can occur when charging electric vehicles.

# What does the standard say?

At present, the type F residual current circuit-breaker is already prescribed or recommended in VDE 0100-530 (Erection of low-voltage installations) for specific applications. However, type F residual current circuit-breakers are not suitable for the detection of smooth direct residual currents and therefore in no way replace a type B or B+.

Electronic devices equipped with single-phase frequency converters play an increasing role, particularly in private households, and the tendency is increasing.

Therefore a type F RCCB offers optimum, future-proof safety in electrical systems in which no smooth direct residual currents can occur.

Type F { sensitive to pulsating currents  
sensitive to mixed frequencies  
reduced susceptibility to surges

+ lightning-resistant

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= Doepke Type F



We are partners

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