## **DATA SHEET**

Article number 09116809



# residual current circuit-breaker DFS 4 016-4/0,30-A KV Twin puls- und wechselstromsensitiv Typ A, kurzzeitverzögert, unterbrechungsfreie Prüfung





#### **Function**

Residual current circuit-breakers (RCCBs) are components for implementing protective measure "Automatic disconnection of the power supply" as per VDE 0100 part 410 or corresponding international installation regulations. Series DFS 4 devices are compact two or fourpole residual current circuit-breakers. In the standard design, they only take up four module width units of space. Although DFS 4 devices for AC and pulsating DC residual currents are actually designed for three-phase networks, they can also be used in single-phase networks. However, in addition to these, special variants are also available for single or three-phase operation in the form of the AC/DC sensitive designs (type B, type B+). In spite of the compact dimensions, a number of different tripping currents and characteristics are available at rated currents, depending on the design, up to 125 A. They also have large two-tier terminals for large conductor cross-sections, a practical multi-functional switch toggle and can be provided with labels using free-of-charge software. The twin design is a combination of two complete RCCBs, which allows for a function test to be performed on every single sub-RCCB without switching off the load circuit. It provides complete residual current protection during the function test, in which each of the RCCBs working in parallel can carry the full rated short-circuit current. The continual flow of current during the test procedure is achieved through parallel switching of the switching contacts of both sub-RCCBs, i.e. when both RCCBs are switched on, one of the two sub-switches can be tripped using its test key, while the second switch takes on the power supply. If the function test shows that a faulty RCCB does not trip, the effectiveness of the protection can be restored by switching on the intact RCCB. A faulty device can be secured against switching on again in this case with the restart interlock WES 2 mounted at the factory. Type A residual current circuit-breakers are sensitive to pulsating and alternating currents. This function is independent of the mains voltage. Because they feature a response delay, residual current circuit-breakers in the KV design only respond to residual currents that last longer than a half-period of the power frequency. In contrast to instantaneous breakers, they are significantly less sensitive to brief impulse-like residual currents and facilitate problem-free operation, even when lightning or switching overvoltage in the system causes capacitative surge residual currents or insulation flashovers with a secondary current up to the zero point of the mains voltage. They therefore meet the requirements for lightning-resistant RCCBs as per Austrian standard ÖVE E 8601. The tripping times set out in national and international design regulations for instantaneous RCCBs are also observed by the KV design devices. In principle, therefore, they may be used instead of a standard breaker.

#### **Features**

function test for residual current circuit-breaker without interrupting power, residual current protection complies with standard even during testing procedure, no costs during system downtime, high system availability, high immunity against surge currents and mains-voltage-operated secondary current impulses, tripping not dependent on mains and auxiliary voltage, sensitive to AC residual currents and pulsating DC residual currents (type A), compact design for all rated currents, high short-circuit resistance, double-sided two-tier terminals for large conductor cross-section and busbar, switch position indicator, viewing window for labels, multifunction switch toggle with three positions: "on", "off" and "tripped"

#### Mounting

quick fastening to mounting rail, any installation position, supply from any direction

#### **Applications**

Power supplies to residential and purpose-built building as well as industrial facilities with TN-S, TT and TN-C-S networks, in which conventional RCCBs trip following transient leakage currents and this is not desired, such as in systems with long cable lengths behind the RCCB, lighting systems with lots of fluorescent lamps (> 20 lamps), computer systems and solar power systems, The twin design allows regularly prescribed function tests to be performed without disconnecting the power, Excluded is the application in TN-C systems and for the protection of installations in which electronic equipment could generate smooth DC currents or residual currents with frequencies other than 50 Hz.

#### Notes

WES 2 restart interlock mounted at factory

#### Accessories

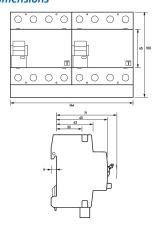
terminal caps KA, information stickers HAS, auxiliary switches DHi, restart locks DFS WES, software DBS

### Technical Data

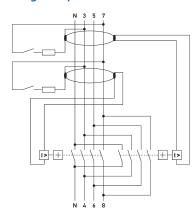
Series DFS 4 A KV Twin Number of poles 4 Rated current (AC) 5 Rated accurrent (AC) 5 Solective 15 Solective 16 Solective 17 Solection 17 Solection 16 Solective 17 Solection 16 Solective 17 Solection 1	Technical Data	DFS 4 016-4/0,30-A KV Twin
Residual current type Rated current (AC) Rated residual current tan  0.3 A  Short-time delayed Selective false min. Operating voltage range of test circuit max. Operating voltage range of test circuit Non-trip time Rod disconnect contact Rod disconnect c	Series	
Residual current (AC) Rated current (AC) Rated current (AC) Rated residual current (AC) Rated residual current (AC) Residual current	Number of poles	4
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Short-time delayed false Selective false Inni. Operating voltage range of test circuit  Non-trip time 10m 10m 5  Foreign to the selection of test circuit  Non-trip time 10m 10m 5  Foreign to the selection of test circuit  Non-trip time 10m 10m 5  Foreign to the selection of test circuit  Specification 10ad disconnect contact  Number 2  The selection of the selection of test circuit  Specification 10ad disconnect contact  Number 2  The selection of the selection of test circuit  Specification 10ad disconnect contact  Number 2  The selection of the selection of test circuit current  The selection of test circuit current 10 kA 10 k	Rated current (AC)	16 A
Selective min. Operating voltage range of test circuit max. Operating voltage range of test circuit max. Operating voltage range of test circuit with selection of test circuit of test circuit with selection of test circuit selection of test	Rated residual current I∆n	0.3 A
min. Operating voltage range of test circuit  **Max. Operating voltage range of test circuit  **Non-trip time**  **Non-trip tim	Short-time delayed	true
test circuit  Non-trip time  10 ms  Personance of test circuit  Non-trip time  10 ms  Personance of test circuit  Specification  Ioad disconnect contact  Number  2 min. Contact opening  Rated voltage (AC)  Rated voltage (AC)  Rated soltage (AC)	Selective	false
test circuit  Non-trip time  10 ms    load circuit   Specification   load disconnect contact		200 V
Specification   Ioad disconnect contact		440 V
Specification load disconnect contact Number 2 min. Contact opening 4, mm Rated voltage (AC) 230 V, 400 V Rated current (AC) 16 A Rated short-circuit current 10 kA Surge current strength 3 kA max. Total rated switching capacity Rated impulse withstand voltage A kV Rated frequency 50 Hz Current hack loss per current path 10 c A Back-up fuse OCPD 16 A Short-circuit backup-fuse SCPD 100 A Back-up fuse type 10 gG screw-type terminal top and bottom (load circuit) Reutral conductor position 10 c A maximum 10 parts of same type and cross-section) number of conductors per terminal 10 connecting capacity flexible 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, sloid 15 1 Cross section AWG, flexible 15 1 Cross section AWG, flexible 15 1 Greating position 10 potional 10 po	Non-trip time	10 ms
Number min. Contact opening 4 mm Rated voltage (AC) Rated voltage (AC) Rated current (AC) 16 A Rated short-circuit current 10 kA Surge current strength 3 kA max. Total rated switching capacity Rated impulse withstand voltage Rated frequency 50 Hz Current heat loss per current path Thermal Backup-fuse OCPD 16 A Short-circuit backup-fuse SCPD 100 A Back-up fuse type 9G screw-type terminal top and bottom (load circuit) Neutral conductor position Protection against direct contact Connection C3 Maximum number of conductors per terminal Cross section Solid 1-wire: 1.5 mm² 50 mm², 2-wire: 1.5 mm² 16 mm² Cross section AWG, Solid 15 1 Cross section AWG, Stranded 15 1 Cross section AWG, Stranded Cross section AWG, flexible 15 1 Cross section AWG, flexible Tightening torque 2.5 Nm 3 Nm General data Operating position max. Operating altitude above		load circuit
min. Contact opening Rated voltage (AC) Rated current (AC) Rated current (AC) Rated fort-circuit current 10 kA Surge current strength 3 kA max. Total rated switching capacity Rated short-directive current 8 yes with stand voltage Rated frequency 90 Hz Current heat loss per current path 10 kA Surge current path 10 kA Surge current strength 10 kB Surge current str	Specification	load disconnect contact
Rated voltage (AC) Rated current (AC) Rated current (AC) Rated short-circuit current 10 kA Surge current strength 3 kA max. Total rated switching capacity Rated frequency Rated frequency Current heat loss per current path Phermal Backup-fuse OCPD 16 A Short-circuit backup-fuse SCPD 100 A Back-up fuse type 9G Screw-type terminal top and bottom (load circuit) Neutral conductor position Protection against direct contact DGUV V3, VDE 0660-514, finger and back-of-hand proof Connection C1 Maximum number of conductors per terminal Cross section solid 1-wire: 1.5 mm² 50 mm², 2-wire: 1.5 mm² 16 mm² Cross section stranded 1-wire: 1.5 mm² 50 mm², 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid 1-5 1 Cross section AWG, flexible 1-5 1 Cross section AWG, flexible with ferrule Tightening torque 2.5 Nm 3 Nm General data Operating position optional max. Operating alittude above	Number	2
Rated current (AC) Rated short-circuit current 10 kA Surge current strength 3 kA max. Total rated switching capacity Rated impulse withstand voltage Rated frequency So Hz Current heat loss per current path Thermal Backup-fuse OCPD 16 A Short-circuit backup-fuse SCPD 100 A Back-up fuse type 3G screw-type terminal top and bottom (load circuit) Neutral conductor position Protection against direct contact Connection C1 Maximum number of conductors per terminal Cross section solid 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section standed 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, stranded 15 1 Cross section AWG, stranded 15 1 Cross section AWG, flexible Tightening torque 2.5 Nm 3 Nm General data Operating position position max. Operating altitude above		4 mm
Rated short-circuit current  Surge current strength  3 kA  max. Total rated switching capacity  Rated impulse withstand voltage  Rated frequency  So Hz  Current heat loss per current path  Thermal Backup-fuse OCPD  16 A  Short-circuit backup-fuse SCPD  100 A  Back-up fuse type  GG  screw-type terminal top and bottom (load circuit)  Neutral conductor position  Protection against direct contact  Connection C1 Maximum number of conductors per terminal  Cross section Stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, stranded  15 1  Cross section AWG, flexible  Cross section AWG, flexible  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Rated voltage (AC)	230 V, 400 V
Surge current strength  max. Total rated switching capacity  Rated impulse withstand voltage  Rated impulse withstand voltage  Rated impulse withstand voltage  Rated frequency  50 Hz  Current heat loss per current path  Thermal Backup-fuse OCPD  16 A  Short-circuit backup-fuse SCPD  100 A  Back-up fuse type  9G  screw-type terminal top and bottom (load circuit)  Neutral conductor position  Protection against direct contact  DGUV V3, VDE 0660-514, finger and back-of-hand proof  Connection C1 Maximum number of conductors per terminal  Cross section Solid  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible  15 1  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Rated current (AC)	16 A
max. Total rated switching capacity  Rated impulse withstand voltage Rated frequency  Current heat loss per current path  Thermal Backup-fuse OCPD  16 A  Short-circuit backup-fuse SCPD  100 A  Back-up fuse type  gG  screw-type terminal top and bottom (load circuit)  Neutral conductor position  Protection against direct contact  Connection C1 Maximum aumber of conductors per terminal  Cross section Solid  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, stranded  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Rated short-circuit current	10 kA
Rated frequency  Go Hz  Current heat loss per current path  Thermal Backup-fuse OCPD  16 A  Short-circuit backup-fuse SCPD  100 A  Back-up fuse type  Screw-type terminal top and bottom (load circuit)  Neutral conductor position  Protection against direct contact  Connection C1 Maximum number of conductors per terminal  Cross section AVG, solid  Cross section AWG, stranded  Cross section AWG, flexible  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  p. 4 kV  AkV  AkV  AkV  AkV  AkV  AkV  AkV	Surge current strength	3 kA
Rated frequency  Current heat loss per current path  Description of the path o		500 A
Current heat loss per current path Thermal Backup-fuse OCPD  16 A  Short-circuit backup-fuse SCPD  100 A  Back-up fuse type  gG  screw-type terminal top and bottom (load circuit)  Neutral conductor position  Protection against direct contact  DGUV V3, VDE 0660-514, finger and back-of-hand proof  Connection C1 Maximum number of conductors per terminal  Cross section solid  1-wire: 1.5 mm² 50 mm², 2-wire: 1.5 mm² 16 mm²  Connecting capacity flexible  1-wire: 1.5 mm² 50 mm², 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible  15 1  General data  Operating position  optional  max. Operating altitude above	Rated impulse withstand voltage	4 kV
path Thermal Backup-fuse OCPD Short-circuit backup-fuse SCPD Back-up fuse type gG screw-type terminal top and bottom (load circuit) Neutral conductor position left Protection against direct contact DGUV V3, VDE 0600-514, finger and back-of-hand proof Connection C1 Maximum number of conductors per terminal Cross section solid 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Connecting capacity flexible 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid 15 1 Cross section AWG, stranded 15 1 Cross section AWG, flexible with ferrule Tightening torque 2.5 Nm 3 Nm General data Operating position nax. Operating altitude above	Rated frequency	50 Hz
Short-circuit backup-fuse SCPD  Back-up fuse type  gG  screw-type terminal top and bottom (load circuit)  Neutral conductor position  left  Protection against direct contact  DGUV V3, VDE 0660-514, finger and back-of-hand proof  Connection C1 Maximum number of conductors per terminal  Cross section solid  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	·	0.2 W
Back-up fuse type gG screw-type terminal top and bottom (load circuit)  Neutral conductor position Protection against direct contact DGUV V3, VDE 0660-514, finger and back-of-hand proof  Connection C1 Maximum number of conductors per terminal Cross section solid 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Connecting capacity flexible 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section stranded 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid 15 1 Cross section AWG, stranded 15 1 Cross section AWG, flexible Trys section AWG, flexible with ferrule Tightening torque 2.5 Nm 3 Nm General data Operating position optional max. Operating altitude above	Thermal Backup-fuse OCPD	16 A
Screw-type terminal top and bottom (load circuit)  Neutral conductor position  Protection against direct contact  DGUV V3, VDE o660-514, finger and back-of-hand proof  Connection C1 Maximum  number of conductors per terminal  Cross section solid  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Connecting capacity flexible  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  nax. Operating altitude above	Short-circuit backup-fuse SCPD	100 A
Neutral conductor position  Protection against direct contact  DGUV V3, VDE o660-514, finger and back-of-hand proof  2 (conductors of same type and cross-section)  number of conductors per terminal  Cross section solid  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Connecting capacity flexible  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Back-up fuse type	gG
Protection against direct contact  DGUV V3, VDE o660-514, finger and back-of-hand proof  Connection C1 Maximum number of conductors per terminal  Cross section solid  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Connecting capacity flexible  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above		screw-type terminal top and bottom (load circuit)
Connection C1 Maximum number of conductors per terminal  Cross section solid  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Connecting capacity flexible  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Neutral conductor position	left
number of conductors per terminal  Cross section solid  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Connecting capacity flexible  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Protection against direct contact	DGUV V3, VDE o66o-514, finger and back-of-hand proof
Connecting capacity flexible  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	number of conductors per	2 (conductors of same type and cross-section)
Cross section stranded  1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm²  Cross section AWG, solid  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Cross section solid	1-wire: 1.5 mm <sup>2</sup> 50 mm <sup>2</sup> ; 2-wire: 1.5 mm <sup>2</sup> 16 mm <sup>2</sup>
Cross section AWG, solid  15 1  Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Connecting capacity flexible	1-wire: 1.5 mm <sup>2</sup> 50 mm <sup>2</sup> ; 2-wire: 1.5 mm <sup>2</sup> 16 mm <sup>2</sup>
Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Cross section stranded	1-wire: 1.5 mm <sup>2</sup> 50 mm <sup>2</sup> ; 2-wire: 1.5 mm <sup>2</sup> 16 mm <sup>2</sup>
Cross section AWG, stranded  15 1  Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Cross section AWG, solid	151
Cross section AWG, flexible  15 1  Cross section AWG, flexible with ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above	Cross section AWG, stranded	
ferrule  Tightening torque  2.5 Nm 3 Nm  General data  Operating position  optional  max. Operating altitude above  2000 m	Cross section AWG, flexible	
General data Operating position optional max. Operating altitude above 2000 m	·	15 1
Operating position optional max. Operating altitude above 2000 m	Tightening torque	
max. Operating altitude above 2000 m		General data
	Operating position	optional
MSL	max. Operating altitude above MSL	2000 M
Mechanical endurance min. 5000 cycles	Mechanical endurance	min. 5000 cycles
Electrical endurance min. 2000 cycles	Electrical endurance	min. 2000 cycles

Technical Data	DFS 4 016-4/0,30-A KV Twin
Storage temperature	-35 °C 75 °C
Ambient temperature	-25 °C 40 °C
Climate resistance	according to IEC 60068-2-30: humid heat / cyclic (25 °C / 55 °C; 93 % / 97 % RH)
Shock resistance	20 g / 20 ms Duration
Fatigue limit	> 5 g (f ≤ 8o Hz, duration > 30 min.)
Housing type	distribution board housing
Installation type	Mounting rail (35 mm)
Housing material	thermoplastic
Protection class	IP20 (installed: IP40)
sealable	true
Width	144 mm
Height	100 mm
Depth	77 mm
Installation depth	69 mm
Module widths	8
Weight	o.82 kg
Design requirements/Standards	VDE 0664-10, DIN EN 61008-1
Degree of pollution	2

## Dimensions



# Wiring example



Dimensional drawing Group view

Wiring diagram