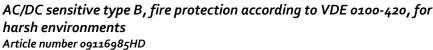


DATA SHEET

residual current circuit-breaker DFS 4 016-4/0,30-B NK R HD







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. Type B residual current circuitbreakers detect smooth DC residual currents and all other residual currents at frequencies up to 150,000 Hz. The operating voltage required for this is taken from the mains supply. Correct power supply is ensured when the voltage between the mains conductors is ≥ 50 V. Pulsating and AC residual currents are detected independent of the mains voltage. For residual current circuit-breakers with characteristic curve NK, the tripping current frequency response runs below human tolerance levels for shock currents with different frequencies. For RCCBs with a rated residual current of 30 mA, extensive personal safety is achieved even with residual currents above the rated frequency. With an upper tripping threshold of 300 mA at frequencies up to 150 kHz, significantly more sensitive and widerreaching protection from earth leakage currents is provided compared to characteristics B SK and B+. As a result, extensive fire protection is also possible even with electronic equipment with high clock frequencies. The wide scope of protection thanks to the NK characteristic requires the monitored system to be set up with low leakage currents. Devices in the standard design are intended for monitoring circuits with a rated voltage of 230 V, 400 V and a rated frequency of 50 Hz. With an airtight, encapsulated tripping mechanism from a special alloy and the stainless steel latch, residual current circuit-breakers in HD design are protected, in particular from corrosion, corrosive gases, moisture and extreme temperature fluctuations.

Features

AC/DC sensitive for residual currents with frequencies and mixed frequencies of o Hz (smooth direct current) up to 150 kHz, high availability even of voltage-independent detection of smooth DC residual current and AC residual current with frequencies not equal to 50/60 Hz thanks to full functional compatibility with mains voltages from at least 50 V AC on any two active conductors, mains-voltage-independent tripping when type A residual currents occur, 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", Neutral conductor position right

Mounting

quick fastening to mounting rail, any installation position, supply preferably from above

Applications

Commercial and industrial installations with TT, TN-S and TN-C-S systems, where power electronics equipment is used without galvanic isolation from the mains, e.g. frequency converters, switching power supplies, high-frequency converters, photovoltaic installations and UPS equipment with frequency converters without transformers, Facilities at risk of fire

Notes

suitable for use in 50 Hz AC networks, RCCBs for other frequencies available upon request, Not designed for use in direct current networks or on the output side of controlled electrical equipment such as frequency converters.

Accessories

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

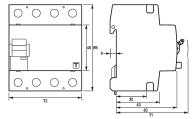
Technical Data

Series DFS 4 B NK HD Number of poles 4, Residual current type B Residual current type B Residual current (AC) 16 A Rated cresh (AC) 16 A Rated residual current (AC) 16 A Rated desidual current (AC) 16 A Rated residual current (AC) 16 A Robert	Technical Data	DFS 4 016-4/0,30-B NK R HD
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Residual current type Tripping characteristic curve Robert Fine delayed Tripping characteristic curve Robert Fine delayed True Selective False Min. Operating voltage range of test circuit Max. Operating voltage range of test circuit Max. Operating voltage range of test circuit Minimum rated operating voltage (Type A)AC operation) Minimum rated operating voltage (Type A)AC operation) Non-trip time Tripping frequency Robert Fine Sport S		· · · · · · · · · · · · · · · · · · ·
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woltage (Type A/AC operation) Minimum rated operating		250 V
voltage (Type B operation) Non-trip time 10 ms Tripping frequency Alan: ≤ 300 ms; 5 · I∆n: ≤ 40 ms Internal consumption max. 2.2 W Internal consumption Ioad direcuit Specification Ioad disconnect contact min. Contact opening A mm Rated voltage (AC) Rated divoltage (AC) Rated short-circuit current 10 kA Surge current strength 3 kA max. Total rated switching capacity Rated insulation voltage Rated direcuits witching Rated insulation voltage Rated frequency So Hz Current heat loss per current Thermal Backup-fuse OCPD 16 A Short-circuit backup-fuse SCPD 3 co A Back-up fuse type 3 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 Cross section solid 1 -wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid 1 -wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid 1 -wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid 1 -wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid 1 -wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid 1 -wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid 1 -wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, solid		o V AC
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Maximum disconnection times 1 - IΔn: ≤ 300 ms; 5 - IΔn: ≤ 40 ms Internal consumption max. 2.2 W Specification load disconnect contact min. Contact opening 4 mm Rated voltage (AC) 230 V, 400 V Rated dourrent (AC) 16 A Rated short-circuit current 10 kA Surge current strength 3 kA max. Total rated switching 500 A capacity 4 kV Rated insulation voltage 4 kV Rated frequency 50 Hz Current heat loss per current 0.2 W path 1 fo A Thermal Backup-fuse OCPD 16 A Short-circuit backup-fuse OCPD 16 A Back-up fuse type gG Screw-type terminal top and bottom (load circuit) Neutral conductor position right Protection against direct contact DGUV V3, VDE 0660-514, finger and back-of-hand proof Connection C1 Maximum 2 (conductors of same type and cross-section) number of conductors per terminal 1-wire: 1.5 mm² 50 mm², 2-wire: 1.5 mm² 16 mm² Cross section solid 1-wire: 1.5 mm² 50 mm², 2-wire: 1.5 mm² 16 mm² <	Non-trip time	10 ms
Internal consumption max. 2.2 W load circuit	Tripping frequency	
Ioad circuit	Maximum disconnection times	1 · IΔn: ≤ 300 ms; 5 · IΔn: ≤ 40 ms
Specification load disconnect contact 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 500 A capacity 7 Rated insulation voltage 4, kV Rated insulation voltage 4, kV Rated impulse withstand voltage 50 Hz Current heat loss per current 0.2 W path 7 Thermal Backup-fuse OCPD 16 A Short-circuit backup-fuse SCPD 200 A Back-up fuse type 20G Screw-type terminal top and bottom (load circuit) Reutral conductor position 7 Protection against direct contact DGUV V3, VDE 0660-514, finger and back-of-hand proof Connection C1 Maximum 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 Cross section AWG, solid 15 1 Cross section AWG, stranded 15 1	Internal consumption	max. 2.2 W
min. Contact opening Rated voltage (AC) Rated current (AC) Rated short-circuit current 10 kA Surge current strength 3 kA max. Total rated switching capacity Rated insulation voltage Rated insulati		load circuit
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Surge current strength max. Total rated switching capacity Rated insulation 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 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	Rated current (AC)	16 A
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Capacity Rated insulation voltage 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 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 Cross section stranded 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² Cross section AWG, 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	Surge current strength	3 kA
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 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, solid		500 A
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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 right 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	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 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		0.2 W
Back-up fuse type screw-type terminal top and bottom (load circuit) Neutral conductor position right Protection against direct contact DGUV V3, VDE o66o-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	Thermal Backup-fuse OCPD	16 A
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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	Back-up fuse type	gG
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		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 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	Neutral conductor position	right
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	3	<u>-</u>
Connecting capacity flexible 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² 1-wire: 1.5 mm² 50 mm²; 2-wire: 1.5 mm² 16 mm² 15 1 Cross section AWG, stranded 15 1	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, stranded 15 1	Cross section solid	1-wire: 1.5 mm ² 50 mm ² ; 2-wire: 1.5 mm ² 16 mm ²
Cross section AWG, solid 15 1 Cross section AWG, stranded 15 1	Connecting capacity flexible	1-wire: 1.5 mm ² 50 mm ² ; 2-wire: 1.5 mm ² 16 mm ²
Cross section AWG, stranded 15 1	Cross section stranded	1-wire: 1.5 mm ² 50 mm ² ; 2-wire: 1.5 mm ² 16 mm ²
	Cross section AWG, solid	15 1
C NAC CLAIL	Cross section AWG, stranded	15 1
Cross section AWG, flexible 15 1	Cross section AWG, flexible	15 1

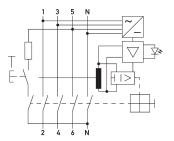
Technical Data	DFS 4 016-4/0,30-B NK R HD
Cross section AWG, flexible with ferrule	15 1
Tightening torque	2.5 Nm 3 Nm
	General data
Operating position	optional
max. Operating altitude above MSL	2000 M
Mechanical endurance	min. 5000 cycles
Electrical endurance	min. 2000 cycles
Surrounding atmosphere	harsh environmental conditions
Storage temperature	-35 °C 75 °C
Ambient temperature	-25 °C 60 °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 ≤ 80 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	72 mm
Height	8 ₅ mm
Depth	75 mm
Installation depth	69 mm
Module widths	4
Weight	o.485 kg
Design requirements/Standards	VDE 0664-10, VDE 0664-40, VDE 0664-400, ÖVE/ÖNORM E 8601, DIN EN 61008-1, EN 62423
Degree of pollution	2
Certifications	VDE

Dimensions

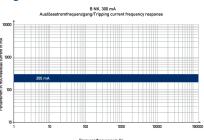
Dimensional drawing Group view



Wiring example



Diagrams



Wiring diagram

Characteristic B NK 300 mA