



## DATA SHEET

### residual current circuit-breaker

#### DFS 4 040-4/0,30-B NK HD

AC/DC sensitive type B, fire protection according to VDE 0100-420, for harsh environments

Article number 09136995HD



#### 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 four-pole 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 circuit-breakers 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  $\geq 50$  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 wider-reaching 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 0 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 left

#### 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

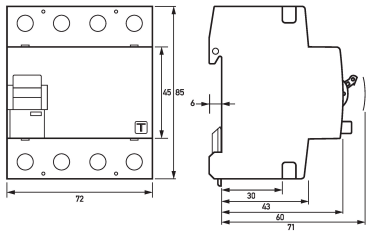
Technical Data

Technical Data	DFS 4 040-4/0,30-B NK HD
Series	DFS 4 B NK HD
Number of poles	4
Residual current type	B
Tripping characteristic curve	NK
Rated current (AC)	40 A
Rated residual current I $\Delta$ n	0.3 A
Short-time delayed	true
Selective	false
min. Operating voltage range of test circuit	200 V
max. Operating voltage range of test circuit	440 V
Minimum rated operating voltage (Type A/AC operation)	0 V AC
Minimum rated operating voltage (Type B operation)	50 V AC
Non-trip time	10 ms
Tripping frequency	0 Hz ... 150 kHz
Maximum disconnection times	1 · I $\Delta$ n: ≤ 300 ms; 5 · I $\Delta$ n: ≤ 40 ms
Internal consumption	max. 2.2 W
	<b>load circuit</b>
Specification	load disconnect contact
min. Contact opening	4 mm
Rated voltage (AC)	230 V, 400 V
Rated current (AC)	40 A
Rated short-circuit current	10 kA
Surge current strength	3 kA
max. Total rated switching capacity	500 A
Rated insulation voltage	400 V
Rated impulse withstand voltage	4 kV
Rated frequency	50 Hz
Current heat loss per current path	1.3 W
Thermal Backup-fuse OCPD	40 A
Short-circuit backup-fuse SCPD	100 A
Back-up fuse type	gG
	<b>screw-type terminal top and bottom (load circuit)</b>
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	2 (conductors of same type and cross-section)
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>
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 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, solid	15 ... 1
Cross section AWG, stranded	15 ... 1
Cross section AWG, flexible	15 ... 1

Subject to technical changes

Technical Data		DFS 4 040-4/0,30-B NK 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		85 mm
Depth		75 mm
Installation depth		69 mm
Module widths		4
Weight		0.484 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



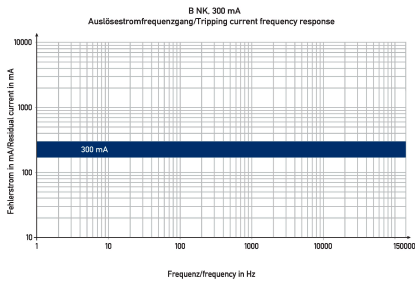
Dimensional drawing Group view

Wiring example



Wiring diagram

Diagrams



Characteristic B NK 300 mA