DATA SHEET

*DFS 4 ***-4/0.**-HP*

Type B for heat pumps < 150 kHz

6000 kHz KV

Function

Residual current circuit-breakers (RCCBs) are components for implementing protective measure "Automatic disconnection of supply" as per BS7671 section 411. DFS 4 HP four-pole three phase devices (400V 50Hz) are specifically designed for use with Heat Pump inverters requiring the use of Type B AC/DC-sensitive RCDs.

DFS4 HP RCCBs detect smooth DC residual currents and all other residual currents <20kHz, in accordance with BS7671 531.3.3 (iv). The HP-optimised short-time delay reduces unwarranted tripping resulting from transient peaks associated with HP control, providing increased system availability.

Features

***Safety Note:** The existing standard for Type B RCDs BSEN62423 only provides for operational performance and testing < 1kHz!*

Refer to BS7671 Regulation 133.1.3: Modern heat pump inverters operate with switching frequencies in the region of 2 - 20 kHz, outside of the scope of the existing Type B standard. BS 7671 133.1.3 requires that the designer or other person responsible for specifying the installation shall confirm that equipment used outside the scope of its standard (in this case the RCCB) will provide the same degree of safety! - refer to the RCCB manufacturer for clarification.

DFS4 HP RCCBs can operate with leakage currents in the range 0<150 kHz. The PWM process and associated EMC filtering, produce harmonic currents which in turn result in high frequency leakage currents flowing in circuit. These currents can be significant if the EMC filters are not correctly matched to the inverter/motor design. The existing supply quality (harmonic content) may be a consideration. The Doepke DFS2-HP 30 mA provides protection within the threshold limits for ventricular fibrillation < 150 kHz as per IEC60479-2.

For the detection of smooth DC residual currents a minimum of 50V AC is required on two active conductors, the presences of this voltage is indicated by a green LED on the front of the device. D Neutral conductor can be left or right.

Mounting

Quick fastening to mounting rail, any installation position, supply preferably from above. Neutral conductor on the left.

Applications

DFS4 HP suitable for domestic, commercial and industrial installations with TN-S-, TT- and TN-C-S systems supplying heat pumps.

Notes

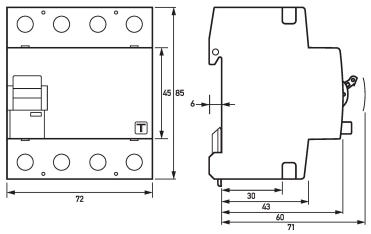
For use in 50 Hz AC systems. Not for use on the output side of controlled electrical equipment such as frequency converters.

Technical Data	DFS 4 ***-4/0.**-HP
Series	DFS 4 HP
Number of poles	4
Residual current type	B-HP
Rated current (AC)	25A, 40A, 63A
Rated residual current IΔn	30mA - other ratings available on request
Short-time delayed	true
Selective	false
min. Operating voltage range of test circuit	250 V
max. Operating voltage range of test circuit	440 V

Technical Data	DFS 4 ***-4/0,**-HP
Maximum rated operating voltage (Type A/AC	440 V AC
Minimum rated operating voltage (Type B operation)	50 V AC
Non-trip time	13 ms
Tripping frequency	0 Hz ... 150 kHz / IEC 60479-2: Base product standards BSEN61008, BSEN62423, VDE 0664-400
Maximum disconnection times	1 · IΔn: ≤ 300 ms; 5 · IΔn: ≤ 40 ms
Internal consumption	max. 0.8 W
	load circuit
Specification	load disconnect contact
min. Contact opening	4 mm
Rated voltage (AC)	400 V
Rated current (AC)	Refer to the individual product reference, data sheet available on request
Rated short-circuit current	6 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	Refer to front of device or data sheet on request
Short-circuit backup-fuse SCPD	100 A
Back-up fuse type	gG
	screw-type terminal top and bottom (load circuit)
Neutral conductor position	left or right
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 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	15 ... 1
Tightening torque	2.5 Nm ... 3 Nm
	General data
Operating position	optional
max. Operating altitude above MSL	2000 m
Mechanical endurance	min. 4000 cycles
Electrical endurance	min. 2000 cycles
Surrounding atmosphere	normal environmental conditions
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)
Housing type	distribution board housing
Installation type	Mounting rail (35 mm)

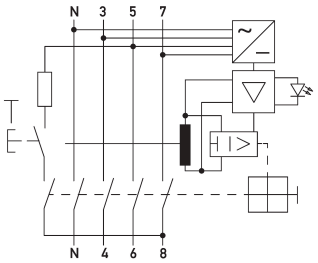
Technical Data	DFS 4 ***-4/0,**-HP
Housing material	thermoplastic
Protection class	IP20 (installed: IP40)
sealable	true
Width	72 mm
Height	85 mm
Depth	75 mm
Installation depth	69 mm
Module widths	4
Weight	0.451kg
Design requirements/Standards	EN 61008, EN62423 / Installation BS7671
Degree of pollution	2

Dimensions



Dimensional drawing Group view

Wiring example



Wiring diagram