

UL 489

UL 508

UL 1077

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Equipment BreakersEarth Leakage  
Circuit Breakers

ANNEX

## DFS Series RCCB Earth Leakage Circuit Breakers

RCCB Series compact Earth Leakage Circuit Breakers detect and interrupt earth (ground) faults. They are VDE approved for the European System (**NOT UL Approved as GFCI**) of protecting people, animals, equipment and property from dangerous line-to-ground and hock hazard currents.

US applications include ground-fault protection of equipment (GFPE) using the 10mA and 30mA fault current ratings, especially when high distributed capacitance or other leakages cause excessive nuisance trips at lower fault currents. Applications for the 300mA and 500mA ratings are equipment protection and fire prevention, limiting the energy of a fault to less than the minimum ignition energy for many materials.

### Type Designation

DFS (a) (b) (c)

(a): 11 = 16A, 12 = 25A, 13 = 40A,  
14 = 63A, 15 = 80A, 16 = 100A,  
17 = 125A

(b): 2 = 10mA, 4 = 30mA,  
6 = 300mA, 7 = 500mA

(c): 601 = 2 pole, 911 = 4 pole

Maximum Rated Line Current	Fault Trip Current	Cat. No.	Supersedes	Fault Trip Current	Cat. No.	Supersedes
16A	10mA	<b>09112601</b>	RP2101			
25A	30mA	<b>09124601</b>	RP2203	30mA	<b>09124911</b>	RP4203
25A	300mA	<b>09126601</b>	RP2230	300mA	<b>09126911</b>	RP4230
25A				500mA	09127911	RP4250
40A	30mA	<b>09134601</b>	RP2303	30mA	<b>09134911</b>	RP4303
40A	300mA	<b>09136601</b>	RP2330	300mA	<b>09136911</b>	RP4330
40A				500mA	09137911	RP4350
63A	30mA	09144601	RP2403	30mA	<b>09144911</b>	RP4403
63A	300mA	09146601	RP2430	300mA	<b>09146911</b>	RP4430
63A	500mA			500mA	09147911	RP4450
80A				30mA	09154911	RP4503
80A				300mA	09156911	RP4530
80A				500mA	09157911	RP4550
100A				30mA	09164911	RP4603
100A				300mA	09166911	RP4630
100A				500mA	09167911	RP4650
125A				30mA	09174911	RP4703
125A				300mA	09176911	RP4730
125A				500mA	09177911	RP4750

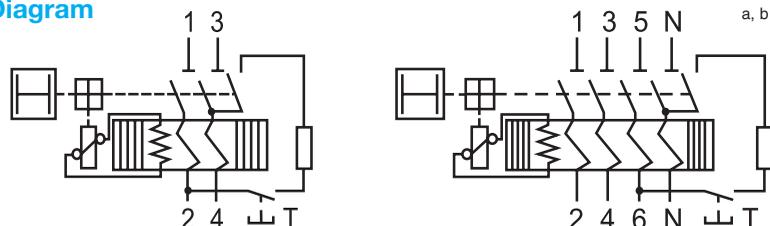
Stock items are shown in BOLD.

<b>Voltage Rating (maximum)</b>	230V AC, 50Hz	400Y/230V AC, 50Hz
<b>Min Operating Voltage Bank of Test Circuit</b>	150V	200V
<b>Short Circuit Withstand Rating</b>	No back-up fuse: Rated current (RC) 16/25/40A: 500A; RC 63/80A: 800A; RC 100A: 1000A; RC 125A-1250A. With back-up fuse: 10kA; Size of fuse: (2 pole version): RC 25/40/63: 100A; (4 pole version): RC 25/40/63A: 100A; RC 80/100/125A: 125A	
<b>Fault Trip Current Calibration</b>	DFS trips are calibrated at less than fault trip current for ensured safety (Typical trip range between 66.6-83.3% fault trip current, e.g., typical trip at 20-25mA for fault RC of 30mA)	
<b>Typical Life</b>	Fully functional after 5,000 operations to DIN/VDE 0664T10, IEC 61008-1 and 2000 additional fault current trips.	
<b>Standard Pack and Weight</b>	1/230g (0.6 lb.)	1/420-460g (0.9 lb.-1.0 lb.)
<b>Terminal Size Acceptability</b>	1.5-50mm <sup>2</sup> (16-1 AWG)	1.5-50mm <sup>2</sup> (16-1 AWG)
<b>Terminal Torque</b>	3Nm (26.5 lb.in.)	3Nm (26.5 lb.in.)

<sup>a</sup> For 2-Phase applications, terminal 5 and 6 (next to Neutral terminals) must be connected to one phase for the test circuit to be operable.

<sup>b</sup> For voltage systems without a neutral conductor. Please use jumper from "1" or "3" to top "N" terminal. This will assure proper functioning of the "test" circuit.

### Circuit Diagram



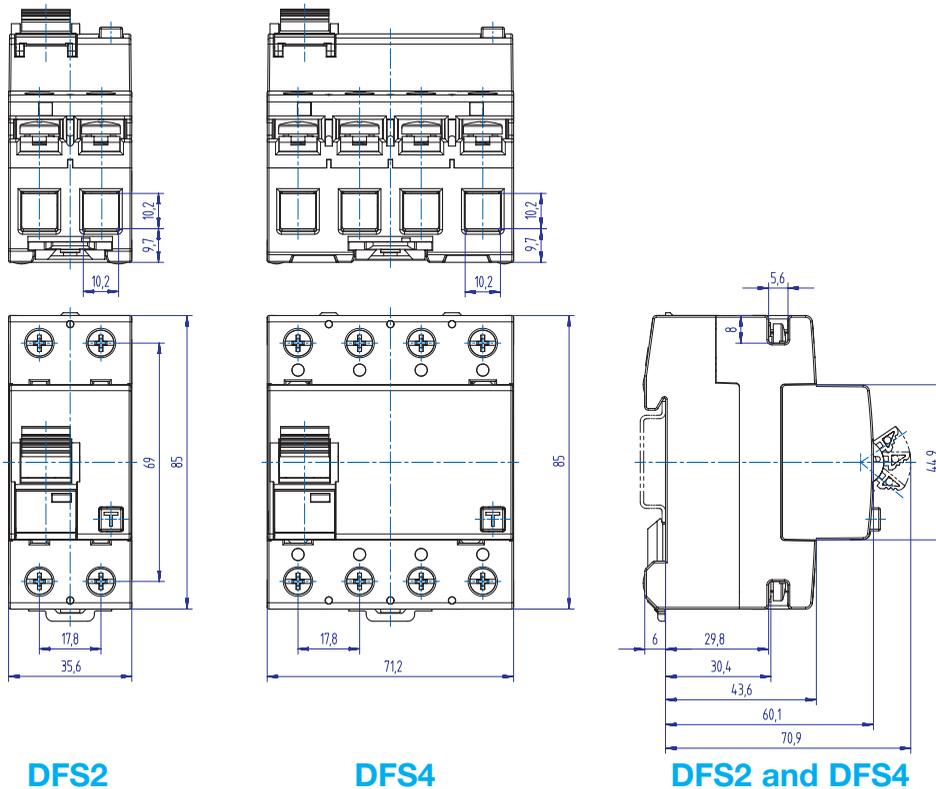
### DHI11 - Auxiliary Switches / Error Signal Switch

Contact Rating	Wire Size	Torque	Cat. No.	Supersedes	Circuit Diagram
6A / 230V AC 1A / 110V DC	1-1.5mm <sup>2</sup> (16 AWG)	max. 0.8Nm (7lb.in.)	<b>DHI11</b>	RH11	
Std. Pk.: 1					
Unit Weight: 45 grams (0.12 lb.)					
Width: 9mm (.354in.)					

Note: If the power system has a marked conductor, it must connect through the DFS and not be grounded at any point downstream.



Dimensions in mm



**DFS2**

**DFS4**

**DFS2 and DFS4**

**Temperature Range** Environmental Information marked with “Snowflake” approval for -25°C to 40°C (-13°F to 104°F) ambient temperature. (Temperature effect on RC: for every 10°C temperature rise above 40°C decrease RC by 7%.)

**Fluctuating Climate Conditions** According to IEC 60068-2-30: heat (25°C–55°C), relative humidity (93%–95%)

**Electrical Shock Protection** Uninsulated electrically live parts within 30mm of the operating handle are “finger safe” (terminal screw heads) and uninsulated live parts within 100mm of the operating handle are “back-of-hand safe” (terminals).

**Impact/Shock Protection** 20g with impact force half-cycle sinusoidal and 20ms duration, 18 impacts total with 6 on each principal axis (3 impacts each face). DFS is DIN Rail mounted during the test, and electrically loaded with 25% of Fault RC. Successful testing required no trip during the test, no damage and no loosened parts.

**Vibration/Seismic Resistance** 5g, at frequency of ≤80Hz, applied for 30 minutes along each of the three principal axes, plus 5 minutes of application at every established critical resonant frequency. DFS is DIN Rail mounted during the test, and loaded with 25% Fault RC. To pass, the DFS did not trip at 25% Fault RC, but did trip between each of the principal axis tests when the fault current was raised to 125% Fault RC, and there was no damage and no loosened parts. Suitable for machinery and mobile vehicle applications.

**Protection Class** IP20; higher protection Class is dependent on housing.

**Non-Sinusoidal Fault** The DFS is tested and approval stamped for tripping sensitivity to non-sinusoidal fault currents, which become zero or almost zero within one cycle of the line frequency. Waveforms and allowed trip-current ranges are as follows:

1. AC Sinusoidal Fault - 0.5-1.0 times Fault RC
- 2a. Pulsating DC Fault;  
Positive and Negative Half-Waves - 0.35-1.4 times Fault RC
- 2b. Phased Half-Wave, 90° - 0.25-1.4 times Fault RC  
Phased Half-Wave, 135° - 0.11-1.4 times Fault RC
3. Pulsating DC on 6mA  
DC (continuous) Base - Max. 1.4 times Fault RC + 6mA

**Insulation Category** At VDE rated voltage, suitable for Class C environments with relatively high dust and moisture levels and little HVAC control, e.g., industrial, commercial, agricultural; on machine tools, hoists, warehouse equipment, etc.; in boiler rooms, unheated storage, covered shipping/receiving, open workshops, etc.

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