

# Monitoring Relays

## Frequency monitoring

### Type DFC01

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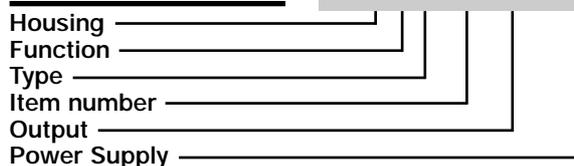
- Over and under frequency monitoring relay
- Measures if power supply frequency is within set limits
- Measures on own power supply
- Separately adjustable upper/lower level on relative scale
- Separately adjustable delay functions (0.1 to 30 s)
- Output: 2 x 8 A SPDT relays
- For mounting on DIN-rail in accordance with DIN/EN 50 022
- 45 mm Euronorm housing
- LED indication for relays, alarm and power supply ON

## Product Description

DFC01 is a precise frequency monitoring relay. It monitors its own power supply. Overfrequency and underfrequency can be monitored separately with two independent setpoints, delay times and relay outputs. The LED's indicate the state of the alarm and the output relay.

## Ordering key

**DFC 01 D B23**



## Type Selection

Mounting	Output	Supply: 24/48 VAC	Supply: 115/230 VAC
DIN-rail	2 x SPDT	DFC 01 D B48	DFC 01 D B23

## Input Specifications

<b>Input</b> Own power supply	A1, A2 or A2, A3	
<b>Measuring ranges</b> Selectable by DIP-switches	<b>Upper level</b>	<b>Lower level</b>
2 Hz range	+0.2 to +2.2 Hz	-2.2 to -0.2 Hz
50 Hz	50.2 to 52.2 Hz	47.8 to 49.8 Hz
60 Hz	60.2 to 62.2 Hz	57.8 to 59.8 Hz
10 Hz range	+1 to +11 Hz	-11 to -1 Hz
50 Hz	51 to 61 Hz	39 to 49 Hz
60 Hz	61 to 71 Hz	49 to 59 Hz
<b>Ranges</b> Upper frequency level	+10 to +110% of the selected range	
Lower frequency level	-110 to -10% of the selected range	
<b>Hysteresis (frequency)</b> 2 Hz range	~ 0.05 Hz	
10 Hz range	~ 0.25 Hz	

## Output Specifications

<b>Output</b> Rated insulation voltage	2 x SPDT relays N.E. 250 VAC
<b>Contact ratings (AgSnO<sub>2</sub>)</b> Resistive loads	μ 8 A @ 250 VAC 5 A @ 24 VDC
Small inductive loads	AC 15 2.5 A @ 250 VAC DC 13 2.5 A @ 24 VDC
<b>Mechanical life</b>	≥ 30 x 10 <sup>6</sup> operations
<b>Electrical life</b>	≥ 10 <sup>5</sup> operations (at 8 A, 250 V, cos φ = 1)
<b>Operating frequency</b>	≤ 7200 operations/h
<b>Dielectric strength</b> Dielectric voltage	≥ 2 kVAC (rms)
Rated impulse withstand volt.	4 kV (1.2/50 μs)

## Supply Specifications

<b>Power supply</b> Rated operational voltage through terminals:	Overvoltage cat. III (IEC 60664, IEC 60038) A1, A2 or A3, A2
B48:	24/48 VAC ± 15% 40 to 70 Hz, insulated
B23:	115/230 VAC ± 15% 40 to 70 Hz, insulated
<b>Rated operational power</b>	5 VA

## General Specifications

<b>Power ON delay</b>	1 s $\pm$ 0.5 s	<b>Housing dimensions</b>	
<b>Accuracy</b>	(15 min warm-up time)	DIN-rail versions	45 x 80 x 99.5 mm
Temperature drift	$\pm$ 1000 ppm/ $^{\circ}$ C	<b>Weight</b>	Approx. 220 g
Delay ON alarm	$\pm$ 10% on set value $\pm$ 50 ms	<b>Screw terminals</b>	
Repeatability	$\pm$ 0.5% on full-scale	Tightening torque	Max. 0.5 Nm acc. to IEC 60947
<b>Reaction time</b>		<b>Approvals</b>	UL, CSA
Frequency level		<b>CE Marking</b>	Yes
Alarm ON delay:	< 200 ms (delay < 0.1 s)	<b>EMC</b>	
Alarm OFF delay:	< 200 ms (delay < 0.1 s)	Immunity	Electromagnetic Compatibility
<b>Indication for</b>		Emissions	According to EN 61000-6-2 According to EN 61000-6-3
Power supply ON	LED, green		
Alarm ON	LED, red (flashing 2 Hz during delay time)		
Output relays ON	2 x LED, yellow		
<b>Environment</b>	(EN 60529)		
Degree of protection	IP 20		
Pollution degree	3		
Operating temperature	-20 to +60 $^{\circ}$ C, R.H. < 95%		
Storage temperature	-30 to 80 $^{\circ}$ C, R.H. < 95%		

## Mode of Operation

DFC01 monitors the frequency value of its own power supply.

### Example 1 (N.D. relay)

Both relays are OFF as soon as the frequency is above the lower setpoint and below the upper setpoint. When the measured frequency exceeds the upper set level for more than the set delay

time relay 1 is turned ON; if it drops below the lower set level for more than the set delay time relay 2 is turned ON. Each relay releases when the measured frequency comes back within its limits. The red LED flashes until the delay time has expired or the measured value falls off the limits.

### Example 2 (N.E. relay)

The relay operates and the yellow LED is ON as long as the measured frequency is within the upper and lower limits.

Relay 1 releases in alarm position as soon as the measured frequency exceeds the upper set level for more than the set delay time; relay 2 releases as soon as the

measured frequency drops below the lower set level for more than the set delay time. The red LED flashes until the delay time has expired or the measured value comes back within the limits. Each relay is activated when the measured frequency comes back within its limits.

## Function/Range/Level/Time Setting

Select the desired function setting the DIP-switches 1 to 6 as shown on the right. To access the DIP-switches open the plastic cover using a screwdriver as shown below.

### Centre left knob:

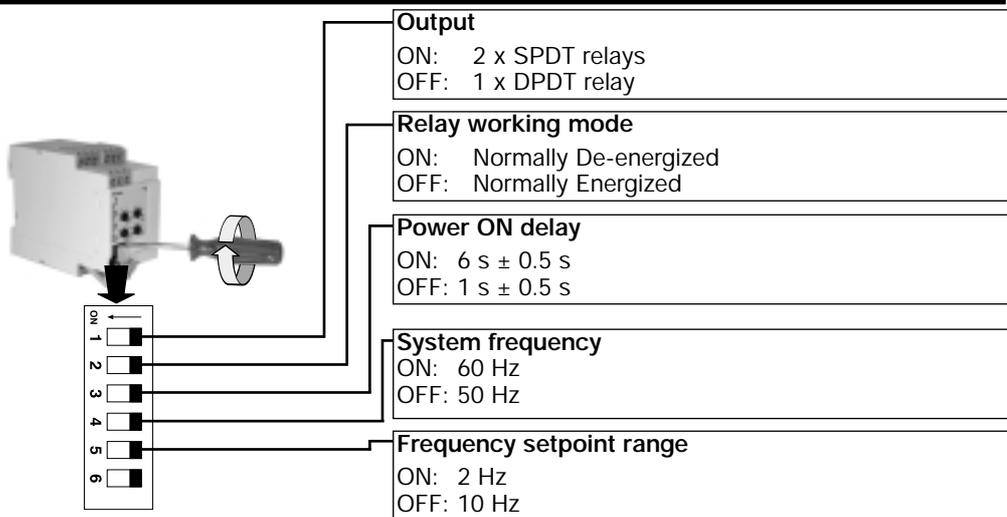
Setting of upper frequency level on relative scale.

### Centre right knob:

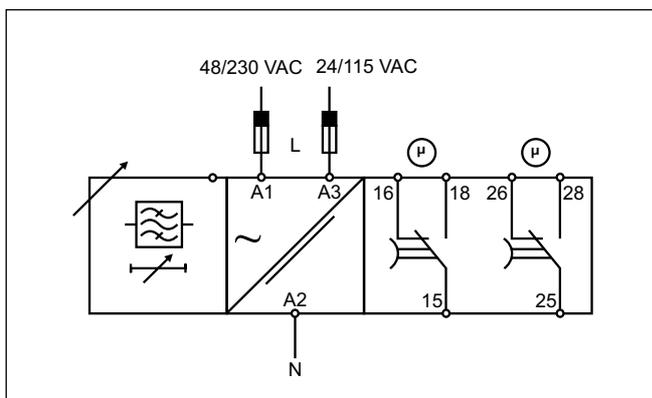
Setting of lower frequency level on relative scale.

### Lower knobs:

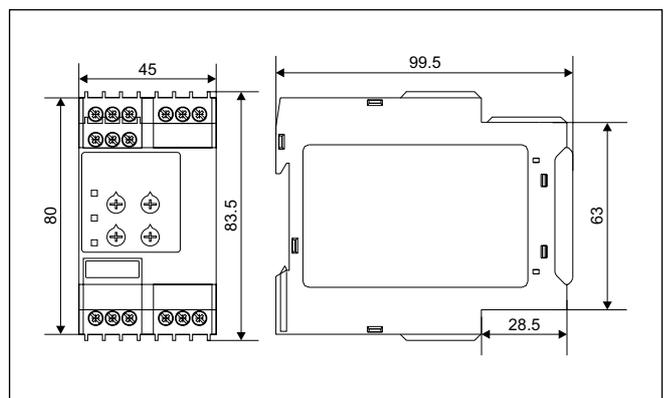
Setting of delays on alarm time on absolute scale: 0.1 to 30 s.



## Wiring Diagram

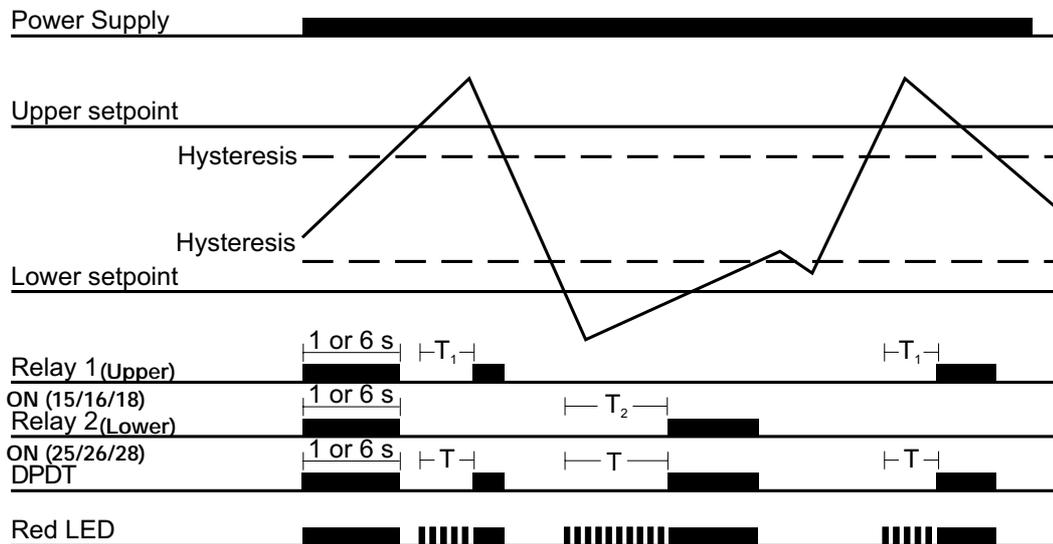


## Dimensions



## Operation Diagrams

Ex. 1



Ex. 2

