

# Monitoring Relays Frequency Monitoring Types DFB01, PFB01

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DFB01



PFB01

- Over/under frequency monitoring relays
- Measuring if power supply frequency is within set limits
- Measure on own power supply
- Measuring ranges
  - Voltage: 24 to 240 VAC
  - Frequency: 50 - 60 Hz
- Separately adjustable upper/lower level on relative scale
- Adjustable delay on alarm or on recovery (0.1 to 30 s)
- Programmable latching or inhibit at set level
- Output: 8 A SPDT relay N.D. or N.E. selectable
- For mounting on DIN-rail in accordance with DIN/EN 50 022 (DFB01) or plug-in module (PFB01)
- 22.5 mm Euronorm housing (DFB01) or 36 mm plug-in module (PFB01)
- LED indication for relay, alarm and power supply ON

## Product Description

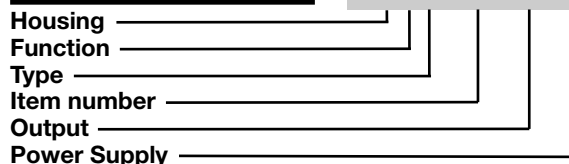
DFB01 and PFB01 are precise frequency monitoring relays. The relays monitor their own power supply from 24 to 240 VAC.

The advantage of using the latch function is that the relay can be kept energized

even after the end of the alarm condition. Inhibit function can be used to avoid relay operation when not desired (maintenance, transitions). The LED's indicate the state of the alarm and the output relay.

## Ordering key

**DFB 01 C M24**



## Type Selection

Mounting	Output	Measuring range
DIN-rail	SPDT	50-60 Hz
Plug-in	SPDT	50-60 Hz

Supply: 24 to 240 VAC

DFB 01 C M24  
PFB 01 C M24

## Input Specifications

Input		Upper level		Lower level
Own power supply	DFB01:	A1, A2 (24 to 240 VAC)		-2 to +0.2 Hz
	PFB01:	2, 10 (24 to 240 VAC)		
Measuring ranges		Upper level		Lower level
Selectable by DIP-switches	2 Hz range	-0.2 to +2 Hz	48 to 50.2 Hz	
	50 Hz	49.8 to 52 Hz	58 to 60.2 Hz	
	60 Hz	59.8 to 62 Hz	50 to 61 Hz	
10 Hz range	50 Hz	-1 to +10 Hz	40 to 51 Hz	
	50 Hz	49 to 60 Hz	50 to 61 Hz	
	60 Hz	59 to 70 Hz	50 to 61 Hz	
Contact input		Terminals Z1, Z2		
DFB02	Terminals 8, 9			
PFB02	> 10 kΩ			
Disabled	< 500 Ω			
Enabled	> 500 ms			
Pulse width				
Hysteresis		~ 0.05 Hz		
2 Hz range	~ 0.25 Hz			
10 Hz range				

## Output Specifications

Output	SPDT relay
Rated insulation voltage	250 VAC
Contact ratings (AgSnO <sub>2</sub> )	μ
Resistive loads	AC 1 DC 12
Small inductive loads	AC 15 DC 13
Mechanical life	≥ 30 x 10 <sup>6</sup> operations
Electrical life	≥ 10 <sup>5</sup> operations (at 8 A, 250 V, cos φ = 1)
Operating frequency	≤ 7200 operations/h
Dielectric strength	
Dielectric voltage	≥ 2 kVAC (rms)
Rated impulse withstand volt.	4 kV (1.2/50 μs)

## Supply Specifications

<b>Power supply</b>	Overvoltage cat. III (IEC 60664, IEC 60038)
Rated operational voltage Through terminals:	
DFB01: A1, A2	24 to 240 VAC $\pm$ 15%
PFB01: 2,10	24 to 240 VAC $\pm$ 15%
Dielectric voltage	4 kV
Supply to output	4 W
Rated operational power	4 W

## Mode of Operation

DFB01 and PFB01 monitor the frequency value of their own power supply.

### Example 1

(Non-latching mode - N.D. relay)

The relay operates and the yellow LED is ON as soon as the measured frequency exceeds the upper set level or drops below the lower set level for more than the set delay time. The relay releases when the measured frequency comes back within the upper and lower limits. The red LED flashes until the delay time has expired or the measured value falls off the limits.

### Example 2

(Latching mode - 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.

The relay releases and latches in alarm position as soon as the measured frequency exceeds the upper set level or 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. Provided that the frequency has dropped below the upper set level (minus hysteresis) or exceeded the lower set level (plus hysteresis), the relay operates when the interconnections between terminals Z1, Z2 or 8, 9 are interrupted.

## General Specifications

<b>Power ON delay</b>	1 s $\pm$ 0.5 s
<b>Reaction time</b>	(input signal variation from -10% to +10% or from +10% to -10% of the range)
Alarm ON delay	< 200 ms
Alarm OFF delay	< 200 ms
<b>Accuracy</b>	(15 min warm-up time)
Temperature drift	$\pm$ 200 ppm/ $^{\circ}$ C
Delay ON alarm	$\pm$ 10% on set value $\pm$ 50 ms
Repeatability	$\pm$ 0.02 Hz
<b>Indication for</b>	
Power supply ON	LED, green
Alarm ON	LED, red (flashing 2 Hz during delay time)
Output relay ON	LED, yellow
<b>Environment</b>	
Degree of protection	IP 20
Pollution degree	3 (DFB01), 2 (PFB01)
Operating temperature	-20 to 60 $^{\circ}$ C, R.H. < 95%
Storage temperature	-30 to 80 $^{\circ}$ C, R.H. < 95%
<b>Housing dimensions</b>	
DIN-rail version	22.5 x 80 x 99.5 mm
Plug-in version	36 x 80 x 94 mm
<b>Weight</b>	Approx. 150 g
<b>Screw terminals</b>	
Tightening torque	Max. 0.5 Nm acc. to IEC 60947
<b>Approvals</b>	UL, CSA
<b>CE-Marking</b>	Yes
<b>EMC</b>	
Immunity	Electromagnetic Compatibility
Emission	According to EN 61000-6-2 According to EN 61000-6-3

## Function/Range/Level and Time Delay Setting

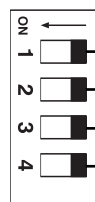
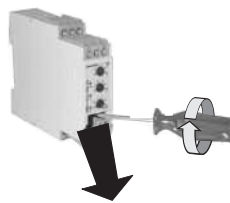
Adjust the system frequency setting DIP switch 3 and select the desired function setting the DIP switches 1, 2 and 4 as shown on the right. To access the DIP switches open the grey plastic cover as shown on the right.

### Selection of level and time delay:

Upper knob:  
Setting of upper level:  
-10 to +100% of the range.

Centre knob:  
Setting of lower level:  
-100 to +10% of the range.

Lower knob:  
Setting of delay on alarm time: 0.1 to 30 s.



### Setpoint range

ON: 2 Hz  
OFF: 10 Hz

### Relay working mode

ON: Normally De-Energized  
OFF: Normally Energized

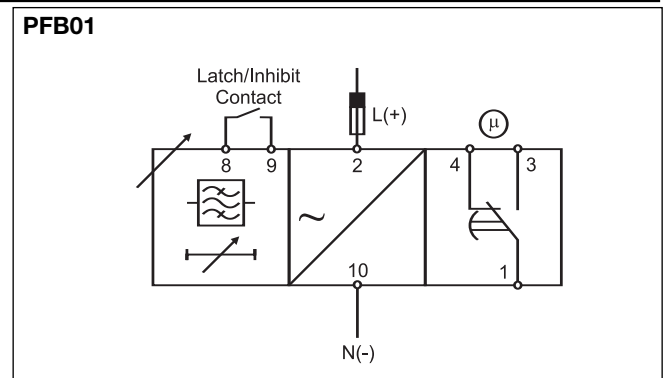
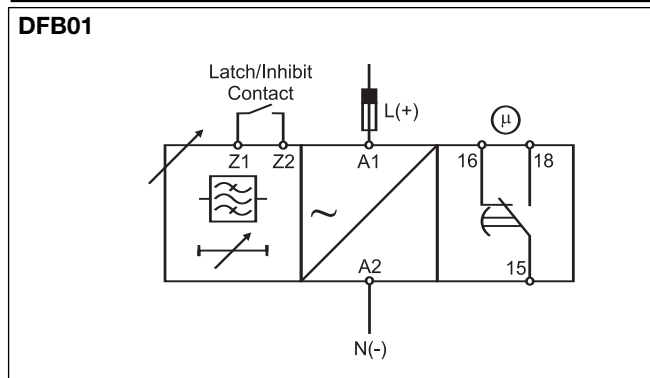
### System frequency

ON: 60 Hz  
OFF: 50 Hz

### Contact input

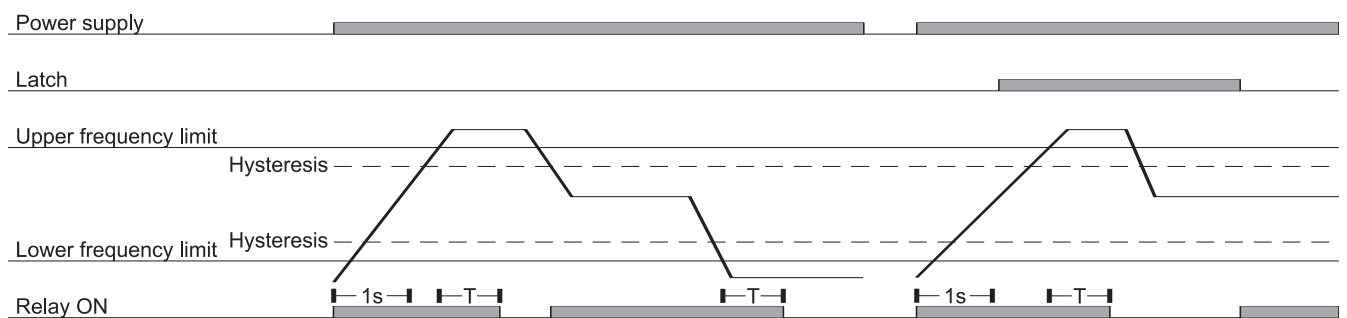
ON: Lacth function enable  
OFF: Inhibit function enable

## Wiring Diagrams



## Operation Diagrams

### Normally energized relay - Latch function



## Dimensions

