# 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**

- **Housing**
- **Function**
- **Type**
- **Item number**
- **Output**
- **Power Supply**

## Type Selection

| Mounting | Output | Measuring range | Supply: 24 to 240 VAC |
|---|---|---|---|
| DIN-rail | SPDT | 50-60 Hz | **DFB 01 C M24** |
| Plug-in | SPDT | 50-60 Hz | **PFB 01 C M24** |

## Input Specifications

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

## Output Specifications

| | | |
|---|---|---|
| **Output** | | SPDT relay |
| **Rated insulation voltage** | | 250 VAC |
| **Contact ratings** ($AgSnO_2$) | | μ |
| Resistive loads | AC 1 | 8A @ 250 VAC |
| | DC 12 | 5 A @ 24 VDC |
| Small inductive loads | AC 15 | 2.5 A @ 250 VAC |
| | DC 13 | 2.5 A @ 24 VDC |
| **Mechanical life** | | ≥ 30 x $10^6$ operations |
| **Electrical life** | | ≥ $10^5$ 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

| | |
|---|---|
| **Power supply** | Overvoltage cat. III (IEC 60664, IEC 60038) |
| Rated operational voltage | |
| Through terminals: | |
| DFB01: A1, A2 | 24 to 240 VAC ± 15% |
| PFB01: 2,10 | 24 to 240 VAC ± 15% |
| Dielectric voltage | |
| Supply to output | 4 kV |
| 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

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

## Function/Range/Level and Time Delay Setting

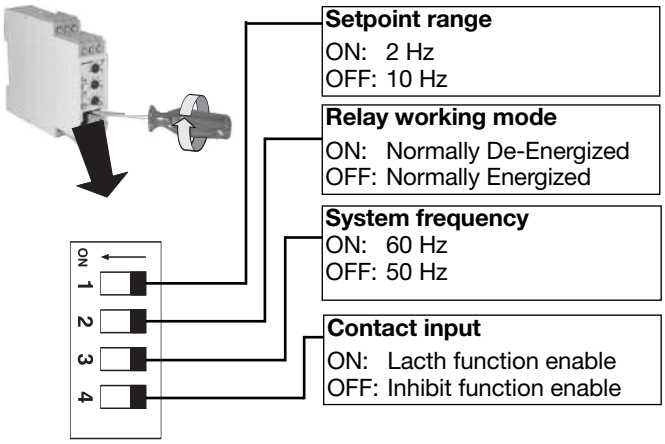
Adjust the system frequency setting DIP switch 3 and select the desired function setting the DIP switches 1, 2 and 4 as shown on the right.
To access the DIP switches open the grey plastic cover as shown on the right.

**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.



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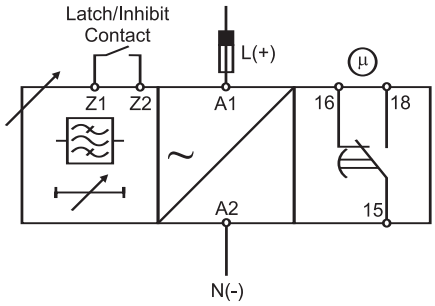
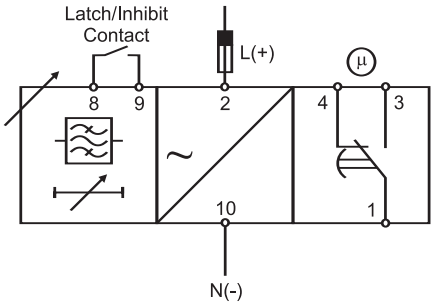
## Wiring Diagrams

**DFB01**

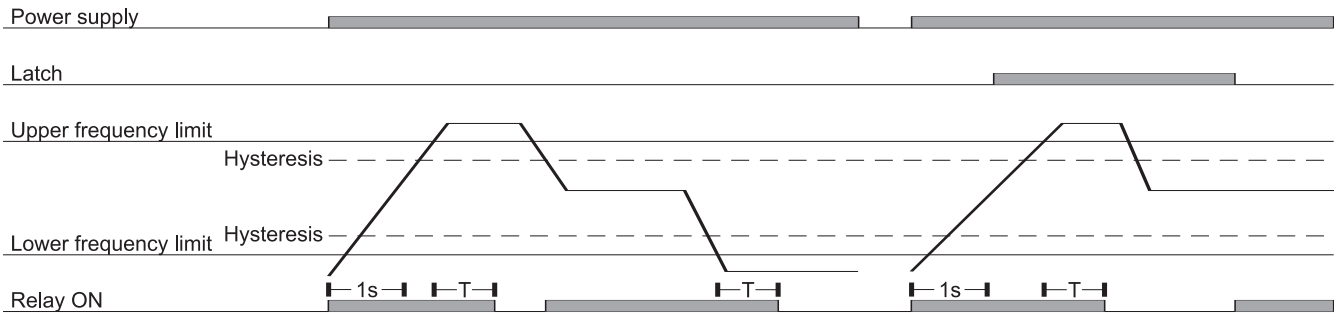



**PFB01**



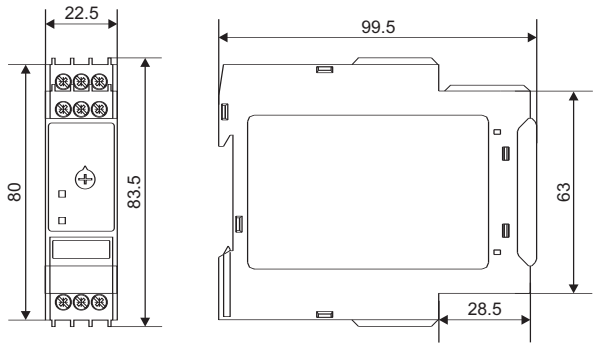

## Operation Diagrams

**Normally energized relay - Latch function**




## Dimensions

**DIN-rail**




**Plug-in**