## Monitoring Relays <br> 1-Phase Frequency Control Types SF 110, SF 125



- Frequency control relay
- Fixed bandwidth, 6 or 10 Hz (SF 110) or knob-adjustable bandwidth (SF 125)
- Quartz-controlled digital circuit (SF 125)
- Centre frequency: 50 or 60 Hz
- Output: 10 A SPDT relay
- Plug-in type module
- S-housing
- LED-indication for output ON
- AC power supply, 50 or 60 Hz


## Product Description

1-phase plug-in frequency control relays with fixed as well as adjustable bandwidth.

Often used in connection with generator equipment.

Ordering Key
SF 110024 50/6
Housing Function Output $\qquad$
Type
Power supply
Centre frequency
Bandwidth

## Type Selection

| Plug | Output | Centre frequency | Bandwidth | Supply: 24 VAC | Supply: 115 VAC | Supply: 230 VAC |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Circular | SPDT | 50 Hz | 6 Hz | SF 110024 50/6 | SF 110115 50/6 | SF 110230 50/6 |
|  |  | 50 Hz | 10 Hz | SF 110024 50/10 | SF 110115 50/10 | SF 110230 50/10 |
|  |  | 50 Hz | 1, 3, 5 Hz | SF 125024 50/5 | SF 125115 50/5 | SF 125230 50/5 |
|  |  | 50 Hz | 2, 4, 6 Hz | SF 125024 50/6 | SF 125115 50/6 | SF 125230 50/6 |
|  |  | 60 Hz | 6 Hz | SF 110024 60/6 | SF 110115 60/6 | SF 110230 60/6 |
|  |  | 60 Hz | 10 Hz | SF 110024 60/10 | SF 110115 60/10 | SF 110230 60/10 |
|  |  | 60 Hz | 1, 3, 5 Hz | SF 125024 60/5 | SF 125115 60/5 | SF 125230 60/5 |
|  |  | 60 Hz | 2, 4, 6 Hz | SF 125024 60/6 | SF 125115 60/6 | SF 125230 60/6 |

## Input Specifications

| Input <br> Pin 2 \& 10 | Supply voltage <br> measures on own supply |
| :--- | :--- |
| Centre frequency | 50 or 60 Hz |
| Bandwidth | Fixed (SF 110$):$ |
|  | 6 or $10 \mathrm{~Hz} \pm 0.5 \mathrm{~Hz}$ |
|  | Adjust. (SF 125$):$ |
|  | $1,3,5 \mathrm{~Hz} \pm 0.02 \mathrm{~Hz}$ or |
|  | $2,4,6 \mathrm{~Hz} \pm 0.02 \mathrm{~Hz}$ |
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## Supply Specifications

| Power supply AC types Rated operational voltage | Overvoltage cat. III (IEC 60664 (IEC 60038) |
| :---: | :---: |
| Through pins 2 \& 6024 | $24 \mathrm{VAC} \pm 15 \%, 50$ or 60 Hz |
| 115 | $115 \mathrm{VAC} \pm 15 \%, 50$ or 60 Hz |
| 230 | $230 \mathrm{VAC} \pm 15 \%, 50$ or 60 Hz |
| Voltage interruption | $\leq 40 \mathrm{~ms}$ |
| Dielectric voltage | 2 kVAC (rms) (supply/elect.) |
| Rated impulse withstand volt. | $4 \mathrm{kV}(1.2 / 50 \mu \mathrm{~s})$ (line/neutral, line/line), direct connection to electronics |
| Rated operational power AC supply | 2.5 VA |

## Output Specifications

| Output <br> Rated insulation voltage | SPDT relay 250 VAC (rms) (cont./elect.) |
| :---: | :---: |
| Contact ratings (AgCdO) | $\mu$ (micro gap) |
| Resistive loads AC 1 | 10 A/250 VAC (2500 VA) |
| DC 1 | 1 A/250 VDC (250 W) |
| or | 10 A/25 VDC (250 W) |
| Small inductive loads AC 15 | 2.5 A/230 VAC |
| DC 13 | $5 \mathrm{~A} / 24 \mathrm{VDC}$ |
| Mechanical life | $\geq 30 \times 10^{6}$ operations |
| Electrical life AC 1 | $\geq 2.5 \times 10^{5}$ operations (at max. load) |
| Operating frequency | $\leq 7200$ operations/h |
| Dielectric strength |  |
| Dielectric voltage | $\geq 2.0 \mathrm{kVAC}$ (rms) (cont./elect.) |
| Rated impulse withstand volt. | $4 \mathrm{kV}(1.2 / 50 \mu \mathrm{~s})$ (cont./elect.) (IEC 60664) |

General Specifications

| Reaction time | SF 110: | Relay operates: $\tau=0.1 \mathrm{~s}$ <br> Relay releases: $\tau=1 \mathrm{~s}$ <br> max. 2.5 s |
| :--- | :--- | :--- |
|  | SF 125: |  |

## Mode of Operation

SF 110
The relay monitors that the frequency of the power supply - 50 or 60 Hz nominally - is kept within a fixed tolerance. The tolerance has a value of $\pm 3 \mathrm{~Hz}( \pm 5 \mathrm{~Hz})$, which equals a fixed bandwidth of $6 \mathrm{~Hz}(10 \mathrm{~Hz})$.

As long as the frequency of the power supply is kept within the limits, e.g. 47 to 53 Hz ,
$\pm 0.5 \mathrm{~Hz}$, the relay will be in operating position, otherwise it will release.

SF 125
The relay monitors that the frequency of the power supply - 50 or 60 Hz nominally - is kept within certain preselected tolerances.
The bandwidth, which is set on the potentiometer at the
front of the relay, is $1,3,5$ or $2,4,6 \mathrm{~Hz}$, equaling the below tolerances:

## Frequency Tolerance

$1 \mathrm{~Hz} \quad \pm 0.5 \mathrm{~Hz}$
$3 \mathrm{~Hz} \quad \pm 1.5 \mathrm{~Hz}$
$5 \mathrm{~Hz} \quad \pm 2.5 \mathrm{~Hz}$
$2 \mathrm{~Hz} \quad \pm 1 \mathrm{~Hz}$
$4 \mathrm{~Hz} \quad \pm 2 \mathrm{~Hz}$
$6 \mathrm{~Hz} \quad \pm 3 \mathrm{~Hz}$
the power supply is kept within the limits, e.g. 49 to 51 $\mathrm{Hz}, \pm 0.01 \mathrm{~Hz}$, the relay will be in operating position.

The relay responds within 1 s . The delay is due to the fact that the measuring principle is a digital counting of the half cycles on a quartz-controlled base time of 1 s .

As long as the frequency of

## Operation Diagram



## Wiring Diagram



Power supply
SF 110, SF 125

## Range Setting

Bandwidth setting (SF 125)
The bandwidth is set by builtin potentiometer at the front of the housing.

## Hysteresis

SF 110: < 1\% of centre frequency.

