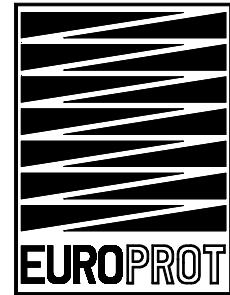


DFR-EP

DIGITAL FREQUENCY RELAY



Field of application

The **EuroProt** complex protection is basically a modular device. The modules are assembled and configured according to the application. This information sheet describes only one of the numerous possibilities: the **DFR-EP** factory configuration. The general description of the **EuroProt** devices is the document „**EuroProt complex protection, hardware and software description and user’s manual**”, (further „*EuroProt manual*”).

The digital frequency relay of type **DFR-EP** is applied on large power system to avoid dangerous system frequency drop and consequently system breakdown when power plant generators drop out. The frequency relays switch off predetermined consumers.

In some case, the frequency relay is used to generators as a frequency rising relay for overspeed protection.

Main characteristics

- Four independent frequency stages, rate-of-change frequency stage (df/dt).
- Underfrequency or overfrequency relay selection for the frequency stages.
- The stages can be enabled or disabled.
- Very high frequency accuracy (± 0.001 Hz).
- Large frequency and time delay range.

- Blocking on voltage break-down.
- 8 output contacts, programmable by software matrix.

Working principle

The three line-to-line input voltages are summed with weighting factors $(1-\sqrt{3}-2)$, and the hardware generates a square wave. The time between the rising edges of this square wave is measured by time counting. The frequency can be calculated with mHz accuracy. The algorithm signals to the processing routines if the detected frequency is within the acceptable limits (45-55 Hz).

Technical data

General technical specification see in EuroProt system information sheet
Type tests see in EuroProt system information sheet
Design and sizes see in EuroProt system information sheet

Setting ranges

Parameter	Range
Voltage relay	40 to 90 V
Frequency relay stages	45 to 55 Hz, step 0,01 Hz
Drop-of margin (hysteresis)	0,02 to 0,2 Hz
Rate of change frequency relay (df/dt)	0 to 10 Hz/s, step 0,1 Hz/s
Each frequency relay, pick up timer	0 to 50 s, step 0,05 s
reset timer	0 to 1,5 s, step 0,15 s
Self-check monitoring system, signal timer	0,1 to 10 s step 0,02 s
Accuracy, frequency relay	$\pm 0,001$ Hz
rate of change frequency relay (df/dt)	$\pm 0,05$ Hz/s
timers	± 2 ms
Operating time without time delaying	80 ms

Options

- Vector surge protection
- Interface to a SCADA system (see the **EuroProt** system information sheet)
- Need of output contacts with 4 A DC breaking capability
- Additional digital input modules (in the modularity of 8 pcs)
- Graphic LCD

Ordering information

- Type of protection [DFTK-EP]
- Rated V.T. voltage [100 V, 200 V]
- Design type [19 inch cabinet frame mounted device, panel mounted device with flash mounted form, panel mounted device with raised-hinged form]
- Auxiliary DC voltage [220 V, 110 V, or other]