

# SZIV-EP

## NUMERICAL LOSS OF MAINS PROTECTION



### *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 **SZIV-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 numerical loss of mains protection of type **SZIV-EP** is applied for distributed generators. It ensures that in case of loss of mains the embedded generators supplying the islanded part of the network are disconnected until the protections of the power utility clear the fault, and restore the normal network operation.

### *Main characteristics*

The device can realize the following protection functions:

- Overvoltage or undervoltage protection,
- Underfrequency or overfrequency protection,
- Frequency rate-of-change protection (df/dt),
- Vector surge protection.
- Very high frequency accuracy ( $\pm 0.001$  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).

Based on the fast and accurate frequency measurement over/under-frequency, rate of change of frequency and vector surge functions are realised.

The over/under-voltage function is based on discrete Fourier analysis.

The protection functions operate independently of each other; they can be enabled or disabled individually.

### ***Technical data***

General technical specification see in <b>EuroProt system information sheet</b>
Type tests see in <b>EuroProt system information sheet</b>
Design and sizes see in <b>EuroProt system information sheet</b>

### ***Setting ranges***

Parameter	Range
Overvoltage function	100 to 125, step 1 [%]
Time delay	0 to 60000, step 10 [ms]
Undervoltage function	75 to 100, step 1 [%]
Time delay	0 to 60000, step 10 [ms]
Overfrequency function	5000 to 5500, step 5 [/100 Hz]
Drop-of margin (hysteresis)	20 to 100, step 5 [/100 Hz]
Underfrequency function	4500 to 5000, step 5 [/100 Hz]
Drop-of margin (hysteresis)	20 to 100, step 5 [/100 Hz]
Rate of change frequency relay (df/dt)	500 to 3000, step 500 [mHz/s]
Drop-of margin (hysteresis)	100 to 500, step 100 [mHz/s]
Period count for gradient calculation	3 to 8, step 1
Accuracy, frequency relay	$\pm 0,001$ Hz
rate of change frequency relay (df/dt)	$\pm 0,05$ Hz/s
timers	$\pm 2$ ms
Operating time without time delaying	80 ms
Min. impulse duration	100 to 500, step 50 [ms]

## *Options*

- 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 [SZIV-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]