

# The Overvoltage Impulses Counter

## USE

Overvoltage events in electrical distribution systems are not new things, however they have not been regarded as particularly dangerous for the operating of industrial systems until now. The rising complexity of technological equipment, their aggregation into automatic production lines or one another close joining operational systems, along with the considerable amount of overvoltage-sensitive electronics in stated equipment, significantly increase the danger and amount of damage following overvoltage events. Regarding industrial operations, the sources of overvoltage events are:

Outdoor

- 1.- storm activity- lightning strikes
- 2.- switching processes in distribution systems

Indoor

- 3.- initiated by technological processes, generally switching processes of power components



**The frequency of overvoltage events could be very different, moreover by 8-9 place values.**

In addition to the low frequency of dangerous overvoltage events, which result in the necessity for long-term monitoring of the state of the mains, the positions in which we monitor the overvoltage events are also important. As the number of monitoring points grows, so does the number of devices needed, as it has been stated, only long-term monitoring can give a sufficient objective reflection of the state of the mains in terms of overvoltage surges.

**In a preferred way we recommend to monitor the appearance of overvoltage surges in these points:**

- Operating places with a danger of fire or explosion. It is advisable to provide these places with overvoltage protection devices when they are installed. The PPI equipment is suitable for mounting to all inputs, because it has integrated overvoltage protection category C, but the neutral conductor must be installed to all phases separately, too.
- The main distribution boxes the low voltage side of the electric connection registers overvoltage events coming from the external distribution network.
- The subsidiary distribution boxes, from which the places of operating systems are supplied, at which short-term shut-down also leads to serious interruption of the production process and marked damage. The subsidiary distribution boxes, which supply the composite and expensive (especially CNC) technological equipment, which damages have a very serious service (time and costs), and consequently also threaten significant loss of production.
- The points of electrical distributions, which can generate antenna effects regarding close lightning strikes, especially if the construction does not insure sufficient shielding.

**In evaluating information (numbers of pulses) obtained by the PPI equipment we recommend to principally consider the following circumstances:**

- the duration of monitoring - short-term monitoring, for only days or weeks has only very restricted value
- the appearance of storm activity in a close surroundings during monitoring period
- the mounting point of the equipment - the overvoltage surges coming from the external distribution network are attenuated by branching and by the length of the leads, correspondingly this is also valid in relation to the sources of overvoltage surges in an indoor distribution network.

## DESCRIPTION

The counter registers overvoltage events and at the same time protects the conductor to which it is connected against overvoltage. This conductor also acts as the power supply for the electronic circuits of the counter. If there is a power failure the counter is failproofed for two hours by its resident back-up power supply. At the end of this time period the counter is reset. This equipment is primarily intended for the long-term monitoring the occurrence of overvoltage surges in factory mains, mainly due to random events.

The level of overvoltage surge, which is registered with this equipment, is specified by the minimal value of flowing current and by applied varistor module. The parameters listed below are detached for the 8/20 current waveform, which is standardised for overvoltage protection class C according to VDE 0675-6, class II according to IEC 61643-1. The equipment is installed by mounting it on a DIN-rail and connecting it to the L, PE conductors or only by connecting it to the L, PE conductors. The information about the state of the counter is easily readable on the three-digit LED display.

The counter registers overvoltage surges, which initiate the current through the earthing conductor min. 20 A. According to the voltage of the applied varistor module 275V, 385V or 550V the minimal value of overvoltage, which is registered by the equipment is 650V, 950V or 1400V.

The equipment registers all overvoltage surges, whose energy responds to the 8/20 waveform and peak current value min. 20A.

The significant advantage of using the PPI equipment is that during the monitoring of overvoltage events, it also ensures protection against overvoltage surges in the position of its mounting. After an sufficiently long period it is possible to install type PU C or PU B serial-produced overvoltage protection instead of the PPI equipment and use the equipment for monitoring at another position of the mains.

#### TECHNICAL PARAMETERS

Rated voltage	$U_N$	230 V
Registration of impulse (8/20)	$I_{MIN}$	20 A
Range of counter	max.	999
Dimensions		72 x 65 x 112 mm
Material of the case		PAD 6.6
Connecting conductors		4 - 35 mm <sup>2</sup> max conductor diameter 7,5 mm

#### INTEGRATED OVERVOLTAGE PROTECTION

Nominal discharge current of module	ISN (8/20)	15 kA
Max. discharge current of module	ISNmax. (8/20)	40 kA
Short-circuit withstand of module		25 kA
Backup fuses		< 100 A gL/gG

#### ORDERING NUMBER

typ	obj.č.
PPI	97.001