

# VT Guard Pro / VT Guard Pro – D Solution for Ferroresonance Elimination

## Description

VT Guard Pro is an advanced security device that protects MV inductive voltage transformers (VTs) against ferroresonant oscillations. It is designed to be used in open-delta connection of three single-phase VTs. Ferroresonant oscillations may be initiated by transient events (such as switching operations) in power networks. The undamped ferroresonant oscillations are dangerous to the equipment installed due to large overcurrents and overvoltages which may lead to permanent damage of the equipment. VT Guard Pro belongs to a new family of advanced protection devices that protect VTs against ferroresonant phenomena by proper and prompt damping action (Fig. 1), without creating excessive power consumption (as in the case of using ordinary damping resistors) during normal operation of the network.



## VT Guard Pro and VT Guard Pro–D

Two versions of the VT Guard Pro are available. Both versions are identical from the functionality point of view (damping ability), but the VT Guard Pro–D has extended functions that allow self-diagnosis and enable possibility of cooperation with superior system. This diagnostic feature allows the device to check itself (functionality of its circuits) and is able to send information about its state to a superior system.

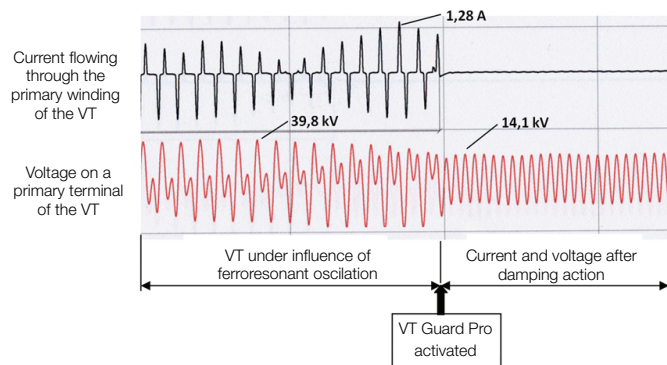


Fig. 1 - Experimental demonstration of VT Guard Pro effectiveness

## Application

VT Guard Pro should be connected in open delta configuration of three single-phase VTs, as it is shown in Fig. 2. VT Guard Pro may be used together with earth-fault protection already connected in open delta (VT Guard Pro should be connected in parallel to the earth-fault protection).

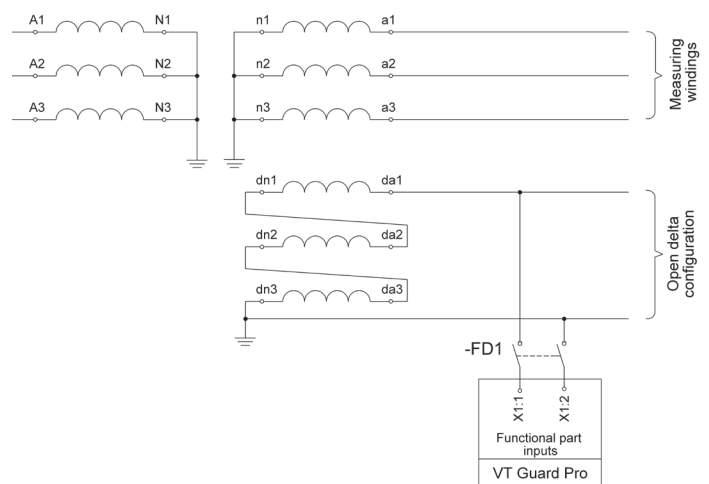


Fig. 2 – Connection of VT Guard Pro to open delta configuration (connection of the VT Guard Pro-D described in User manual)

## Advantages

- Lower resistance than in standard damping resistor (provides better damping ability)
- Mounted in the LV compartment on DIN rail
- Small size
- Applicable to MV instrument voltage transformers, with residual windings
- One VT Guard Pro protects all 3 voltage transformers in open delta connection
- High reliability (redundancy circuits)
- Advanced setting (time delay, threshold voltage)

### VT Guard Pro-D offers additional functions

- Diagnostic function LED status
- Cooperation with superior system

## Dimensional drawing

Dimensions (in mm) are shown on the Fig. 3

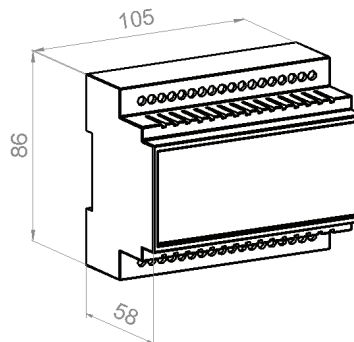


Fig. 3 - Dimensions

## Technical parameters

Device part	Functional	Rated operational voltage	$U_e$	100/110	V AC
		Max. operational current	$I_{e_{max}}$	10 A/0.2 s	
		Voltage range	$U$	0-110	V AC
		Nominal frequency	$f_n$	50/60	Hz
		Time delay	$t_d$	0.4; 1.4; 2.4; 3.4	s
	Diagnostic	Threshold voltage	$U_t$	20; 25; 30	V
		Rated control supply voltage	$U_s$	100/V3; 100/3	V AC
		Voltage range	$U$	33-110	V AC
	Auxiliary contacts	Rated control circuit voltage	$U_c$	230 (max. 100 mA)	V AC
				220 (max. 100 mA)	V DC

Operating ambient temperature.....- 25 °C to + 50 °C

Storage & transportation temperature.....- 40 °C to + 85 °C

Humidity.....up to 90 %

Protection class.....IP 20

### Note:

VT Guard Pro contains: Functional part only

VT Guard Pro-D contains: Functional, Diagnostic and Auxiliary contacts

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