

Voltage Time Protection

VT 12 DX0

Application:

Protection VT 12 DX0 is an accuracy one-phase overvoltage or undervoltage protection relay for voltage increase over- or voltage decrease a under- preset value. The protection is time independent, it means that operates after preset time delay. The protection replaces VT 12, VT 12 X and VT 12 X1 types with identical dimensions and connection of terminals.

Description:

VT 12 DX0 is steady-state protection. The measuring element can work in overvoltage or undervoltage regime. This regime is adjusted by switch U> - U< (see Fig. 1). A preset voltage values (at DIL switches) apply for both regimes U< or U>.

An output relay (V) of measuring element has one make contact (v1). This relay operates after exceeding a preset value at U> regime or after drop under preset value at U< regime.

The signalling of operation measuring element is performed by memory circuit with LEDs (UL1, UL2, UL3). The LEDs are shut down by RESET push-buttons situated on the front panel and at the casing as well.

The time element is started from measuring element. A total time of protection is extended by measuring element time delay $t_0 = 60-75$ ms.

The output relay E has non-memory contacts e1 and e2, which return to quiescent state with the returning a measure element. The output memory relay Ep has contacts ep1 and ep2, that return to quiescent state by the RESET push-button.

The contact ep2 controls the signalling LED U/t, this signalling doesn't change in case of a loss of auxiliary voltage. It indicates a previous protection activity after an auxiliary voltage restoration.

The protection needs an auxiliary voltage for its operation. The protection is produced in two designs (auxiliary feeding ranges): 18 - 60 V AC, DC and 40 - 265 V AC, DC. V 32 DX0 is equipped with the signalling contact loss of auxiliary voltage. The relay Z for loss of auxiliary voltage is excited during a correct feeding and the contact z1 is opened.

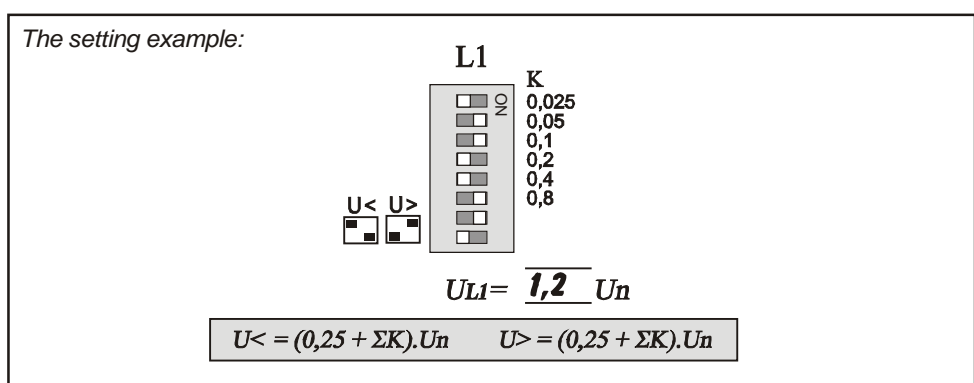


Fig. 1 The view of the control part a front panel a protection VT 12 DX0

Demanded setting: $U_{<} = 1,2 U_n$ $\Sigma K = 1,2 - 0,25 = 0,95 = \boxed{0,8} + \boxed{0,1} + \boxed{0,05}$

Testing:

The protection testing is possible with removed cover. Testing is available in two regimes:

1. The testing of impulse element and signalling - TEST push-button

This testing regime is possible also during operation. With pressing TEST push-button is simulated operation of impulse element and signalling LEDs (UL1). Output relay (V) is blocked.

2. The testing of signalling and output relays - TEST + RESET push-buttons

The coincident pressing TEST and RESET push-buttons started testing regime „TEST OUT“, which is simulated the protection operation including output relays E a Ep.

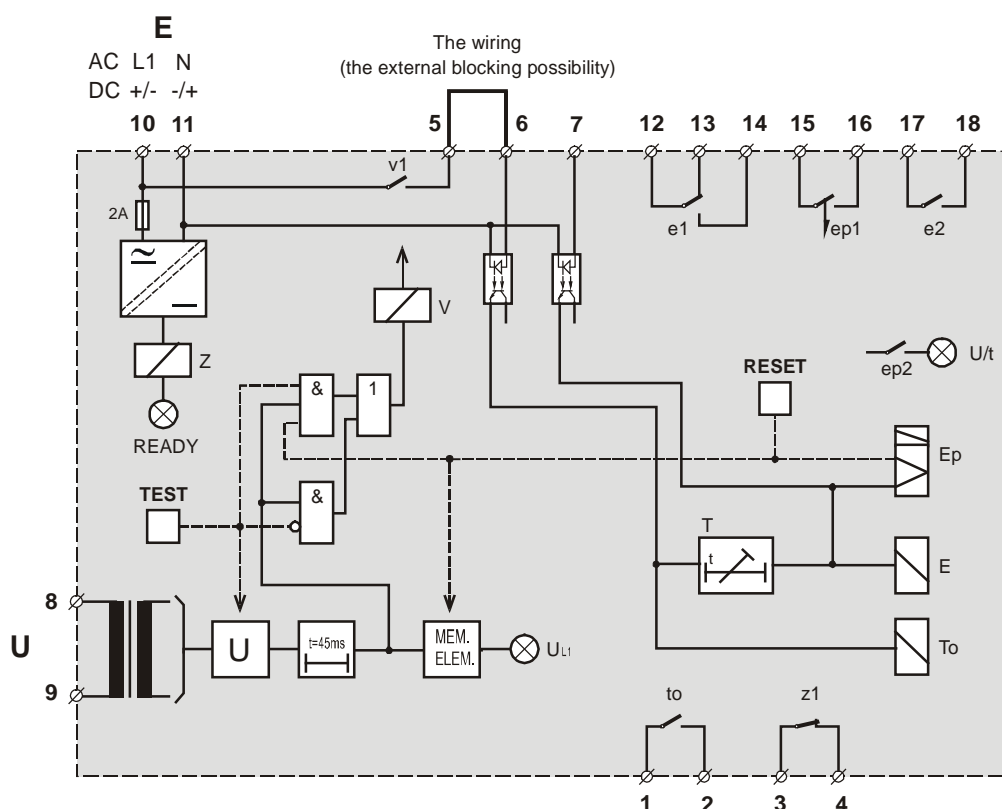


Fig. 2 The block diagram of the protection VT 12 DX0

Technical data:

Nominal voltage U_n	100 V / $\sqrt{3}$ or 100 V; 230 V or 400 V	
Nominal frequency f_n	50 or 60 Hz	
<i>Auxiliary voltage E</i>		
Voltage ranges	18 - 60 V DC, AC or 40 - 265 V DC, AC	
Auxiliary circuit consumption	< 7 W	
Overshoot time to current reduced:		
- 18 - 60 V DC, AC design	tp < 0,2 s at 48 V DC, AC; tp < 0,3 s at 60 V DC, AC	
- 40 - 265 V DC, AC design	tp < 0,2 s at 110 V DC, AC; tp < 0,9 s at 220 V DC, AC	
Ground terminal	on the casing	
Fuse nominal value	2 A	
<i>Measuring element</i>		
Adjustability	from 0,25 to 1,825 U_n by 0,025 U_n ; from 0,2 to 1,46 U_n by 0,02 U_n	
Permanent overload	2 U_n ; 1,6 U_n	
Accuracy	± 3 % of the preset value	
Resetting ratio of regime $U >$ ($U <$)	0,98 (1,02)	
Rise (return) time	45 - 50 ms ± 5 ms	
Accuracy	± 3 % of the preset value	
<i>Time element</i>		
Total time delay $t >$	$t_0 + \Sigma K$	
Basic time delay t_0	55 ms ± 10 %	
Time setting range ΣK	from 0,05 to 12,8 s by 0,05 s or from 0,1 to 25,6 s by 0,1 s	
Time accuracy	$\pm (10 \text{ ms} + 1 \text{ % from value } t >)$	
<i>Contacts</i>		
Sustained rating	4 A	
Switching capacity and rating for time 0,5 s	20 A	
Shock loading for time 30 ms	100 A	
Switching capacity for 110 V AC	2000 VA	
Maximum switching voltage	250 V DC, AC	
Breaking capacity for R/L = 40 ms	1,5 A at $U = 50$ V DC 0,3 A at $U = 110$ V DC 0,1 A at $U = 220$ V DC	
<i>Material</i>		
- relays V, To, Z	AgCd0	
- relays E, Ep	AgNi 90/10	
<i>Binary inputs</i>		
Number	2	
Input resistance	Rvst = 18 k Ω	for E = 18 - 60 V DC, AC
	Rvst = 36 k Ω	for E = 40 - 265 V DC, AC
Input voltage	18 - 60 V DC, AC	for E = 18 - 60 V DC, AC
	40 - 265 V DC, AC	for E = 40 - 265 V DC, AC
Threshold voltage	17,5 V	for E = 18 - 60 V DC, AC
	38 V	for E = 40 - 265 V DC, AC
Maximum input current	< 8 mA	
Activating time	< 1 ms	

Signalling LEDs

READY	green	- auxiliary voltage presence
UL1	red	- measuring element operation
U/t	red	- time delay elapse and output relays E and E operation

Working environment

Temperature range	from -25 to +55 °C
Working position	arbitrary
Operation type	continual

Insulating tests

Insulation strength	2 kV, 50 Hz, 1 min	IEC 60255-5
Pulse voltage test	5 kV; 1,2/50 μs	IEC 60255-5

Electromagnetic compatibility (EMC)

Interference of radio frequency	10 V/m	ČSN EN 61000-4-3
Impulse group	2/4 kV / 5 kHz	ČSN EN 61000-4-4
Surge	1,2/50 μs	ČSN EN 61000-4-5
Radiation	0,15 - 30 MHz	ČSN EN 55011

Mechanical performance

IP code	IP 20
Terminals	one conductor from 1,5 to 6 mm ² two conductors from 1 to 2,5 mm ²
Weight	2,5 kg

Information required for ordering:

Un - nominal voltage (100/√3 V; 100 V; 230 V; 400 V)
fn - nominal frequency (50; 60 Hz)
E - auxiliary voltage range (18 - 60 V_{ss,st}; 40 - 265 V_{ss,st})
t - time delay range (0,05 až 12,8 s; 0,1 až 25,6 s)

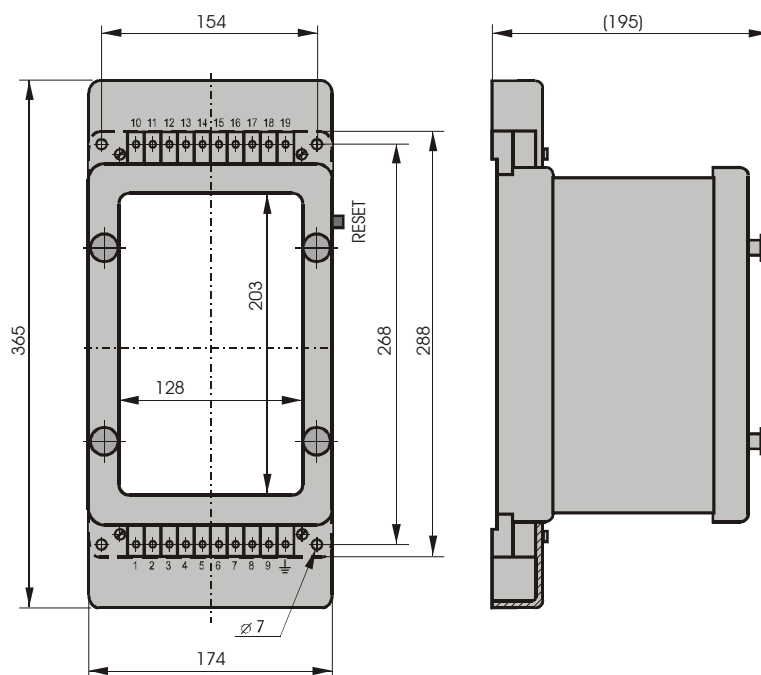


Fig. 3 The terminals position and dimensions protection VT 12 DX0