



VOLTAGE RELAY VR-100

Protection Program

PZ-16011E

Application

Voltage relay VR-100 is a multifunctional numerical relay used for busbar voltage monitoring in low and medium voltage plants. Relay VR-100 detects voltage deviation from set-up values and according to selected delay performs signalling and/or circuit breaker trip. Voltage relay VR-100 monitors unallowed voltage disturbances and its main application is generator and transformer protection. Relay can perform two stages of undervoltage and/or two stages of overvoltage protection. Relay measures phase voltages, line voltages, and residual voltage as well.

Functional Description

Voltage relay VR-100 uses advanced RISC processor technology and numerical signal processing. Phase voltages (UL1, UL2 and UL3) and residual voltage U_0 are connected to signal conditioning circuits (fig. 2). After conditioning processor performs fast sampling and calculates true RMS values of measuring quantities (phase voltages, line voltages and residual voltage). According to selected protection functions (under/over voltage) when the measured value exceeds pick-up value, START protection is signalled with yellow light on associated bi-colour LED element. If voltage disturbance is present longer than the set time delay, the relay trips. TRIP is signalled with turning the associated LED from yellow to red, and activating output stage (relay K). Output relays are programmable according to plant demands. Relay VR-100 has three digital inputs, that can be used optionally to perform logical functions (e.g. interlocking on undervoltage protection, remote reset, etc.).

As an option, device can be used for event recording. Device can record ten events (protection START or TRIP) with associated date and time tag. Remote indication of measured quantities and relay state is available via optical or RS485 link with host computer.

User interface is implemented with keyboard and LCD (2 x 16 digits with backlight). By means of LCD and keyboard, user can access measured and stored data and also set parameters of the device. The label for the signalling bi-colour LEDs is exchangeable, and user can enter text according to plant demands.

Main Features

- undervoltage and/or overvoltage protection
- numerical measuring signal processing
- true RMS phase and line voltage measurement
- true RMS residual voltage measurement
- high accuracy of tripping characteristics
- event recording for ten events
- optical or RS485 communication with host system
- LCD display with backlight for displaying measured data, events and parameters
- self test, local and remote indication of device's availability
- trip signalling with bi-colour LED elements
- four programmable relay outputs (option)
- small dimensions according to DIN 43700 for panel instruments

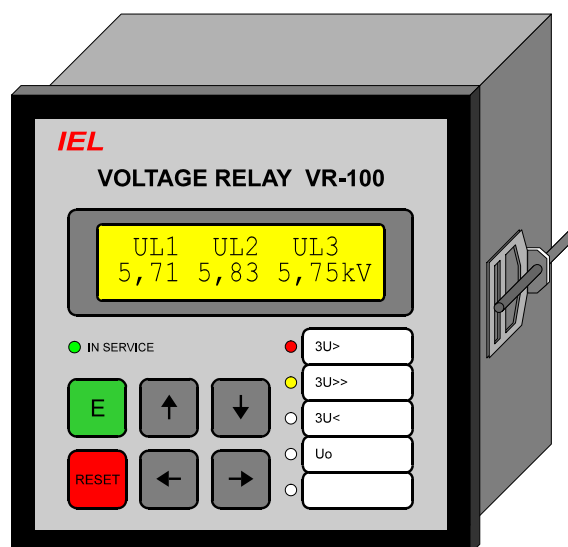


Figure 1. Voltage relay VR-100

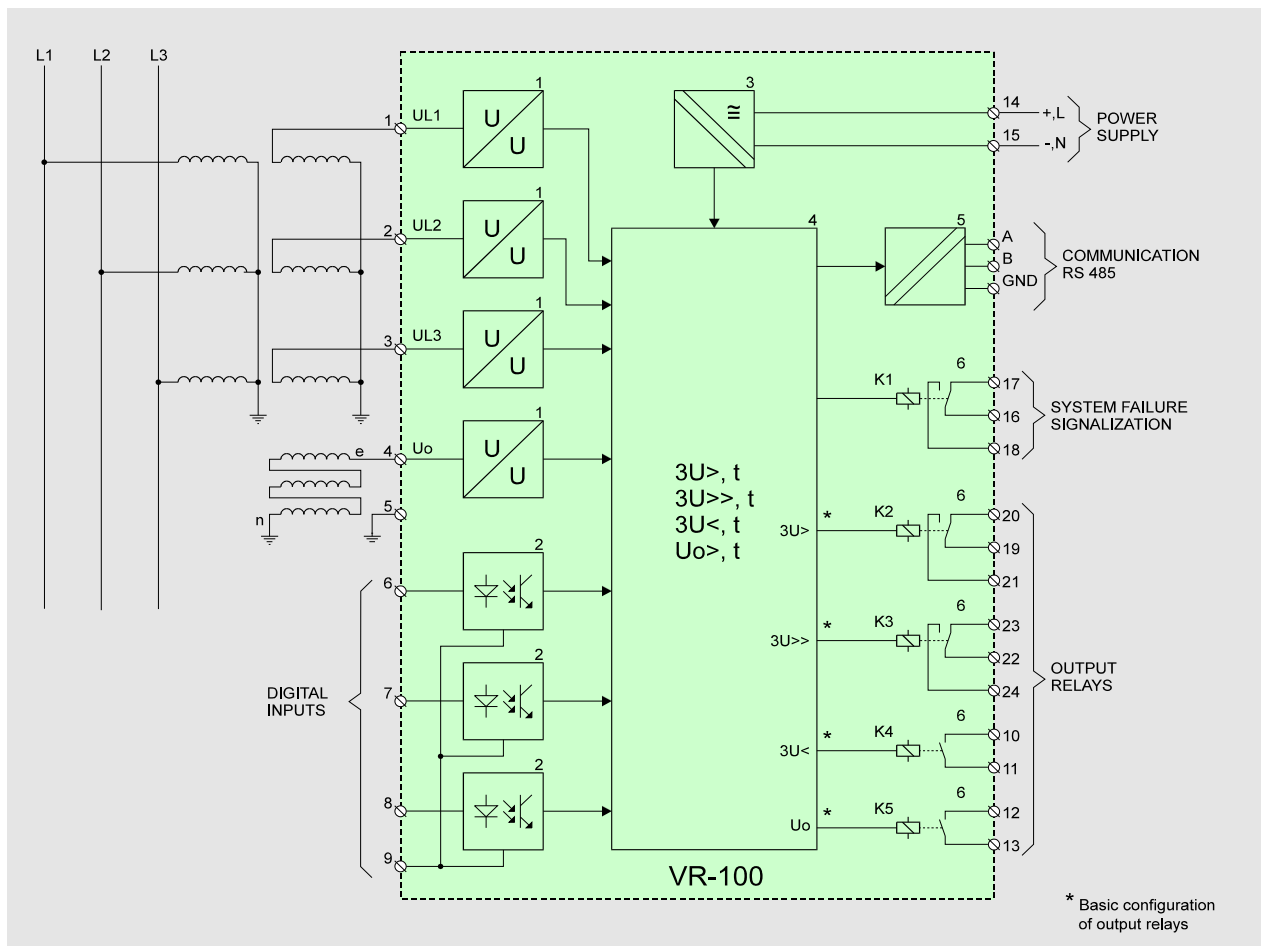


Figure 2. Connection diagram for voltage relay VR-100

Technical Data

Measuring inputs:

Number of inputs.....	4
Nominal voltage U_N	57,7; 63,5; 230V
Optional nominal voltage U_N	50 do 300V
Nominal frequency.....	50 or 60 Hz
Measuring range.....	0,1 to 1,7 U_N
Power consumption.....	<0,1 VA
Overload capability.....	cont.: 1,7 x U_N 10s: 2 x U_N

Digital input:

Number of inputs.....	3
Input supply.....	24 – 220VDC external

Relay outputs:

Number.....	5
Contacts (relay K1-K3).....	1 changeover
Contacts (relay K4-K5).....	1 NO
Breaking capacity.....	200VDC, 80W 100VDC, 55W 50VDC, 50W

Display and signalling:..... LCD display,
2x16 digits
5 bi-colour LEDs
yellow: START
red: TRIP

Power supply:

Auxiliary voltage.....	230V AC, +10% -20% 24V, 48, 110V, 220V DC +45% -20%, max. 5VA
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Communication:

RS 485.....	MODBUS RTU
Optical (option).....	820nm or 680nm

Undervoltage protection:

Voltage pick-up.....	20 – 170% U_N step 1V
Delay time.....	0,01 - 50s step 0,01s or ∞
Pick-up/drop-out time.....	<50 ms,
Drop-out condition.....	1,05
Pick-up voltage tolerance.....	3% set value
Delay time tolerance.....	1% set value or 10ms

Overvoltage protection:

Voltage pick-up.....	20 – 170% U_N step 1V
Delay time.....	0,01 - 50s step 0,01s or ∞
Pick-up/drop-out time.....	<50 ms,
Drop-out condition.....	0,95
Pick-up voltage tolerance.....	3% set value
Delay time tolerance.....	1% set value or 10ms

General data:

Temperature range.....	-20°C..+60°C
Insulation test voltage.....	2,5 kV, 50Hz, 1min between all insulated circuits

Mechanical data:

Mounting.....	in panel (DIN 43700)
Dimensions.....	96 x 96 x 90 mm

