



## OVERCURRENT RELAY NR-300

Protection Program

PZ-12035E

### Application

Overcurrent relay NR-300 is intentionally developed for the power transformers' protection in distributive and industrial power stations 10(20)/0,4kV. The relay can be applied to protect power transformers of all standard powers (160 – 2000 kVA). It can also be used in applications where there is no auxiliary power supply in a power station because it can be powered from the measuring circuit through the current transformers. Small dimensions enable the relay to be built in directly in the medium voltage switchgear equipment.

### Functional Description

Overcurrent relay NR-300 is based on up-to-date RISC microcontroller's technology and numerical signal processing. Measuring currents from protected power transformer are transmitted via current transformers to NR-300 inputs (fig. 2). After converting currents into voltage signals, the processor performs fast sampling, calculates true RMS value of measuring currents and according to the set algorithm performs required protection function. The relay's tripping characteristics is divided into two segments (L,S).

Overcurrent protection in L segment (Long time delay) represents thermal overload protection of the transformer. The protection can be realized with the normal inverse, very inverse, extreme inverse, high voltage fuse characteristics or with the definite time characteristics. On demand, also other inverse characteristics types can be realized. Segment S (Short time delay) represents the short circuit protection with the definite time characteristic. NR-300 relay also implements an earth fault protection with definite time characteristic (option).

When the measured current exceeds overcurrent pick-up value of a power transformer  $I_{>}$ , according to defined characteristics the relay acts via pulse output stage (5) to the actuator (A) which trips the breaker (Y) using the breakers mechanical system. The relay contains "energy storage" (4) which provides the actuator's trip energy even in case of low trip currents.

On the front panel there are microswitches for setting the trip values. Overcurrent relay can be powered from the measuring circuit or auxiliary power supply. If the communication is needed, the auxiliary power supply should be used.

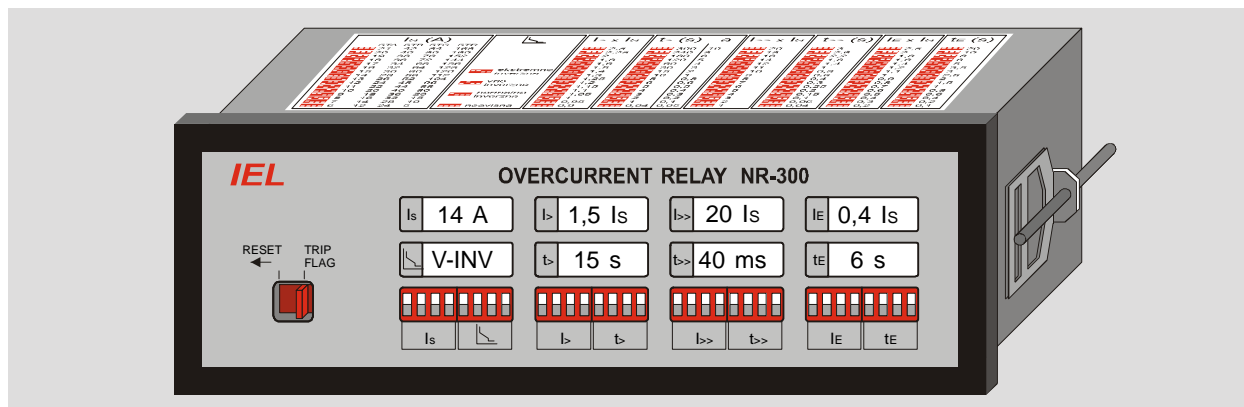


Fig 1. Overcurrent relay NR-300

### Main Features

- overcurrent relay with L, S tripping characteristics (Long time delay, Short time delay)
- numerical signal processing
- auxiliary power supply not needed
- true RMS current measurement
- high accuracy of tripping characteristics
- relay test via auxiliary winding of the current transformer
- wide measuring range from 0,8 to 70 In
- microcontroller measuring signal processing (RISC)
- wide trip time range from 30ms to several hours
- pulse stream to drive actuator ensures safe trip in case of breaker mechanism failure
- self test
- small dimensions according to DIN 43700 for panel instruments and direct build in the medium voltage switchgear equipment

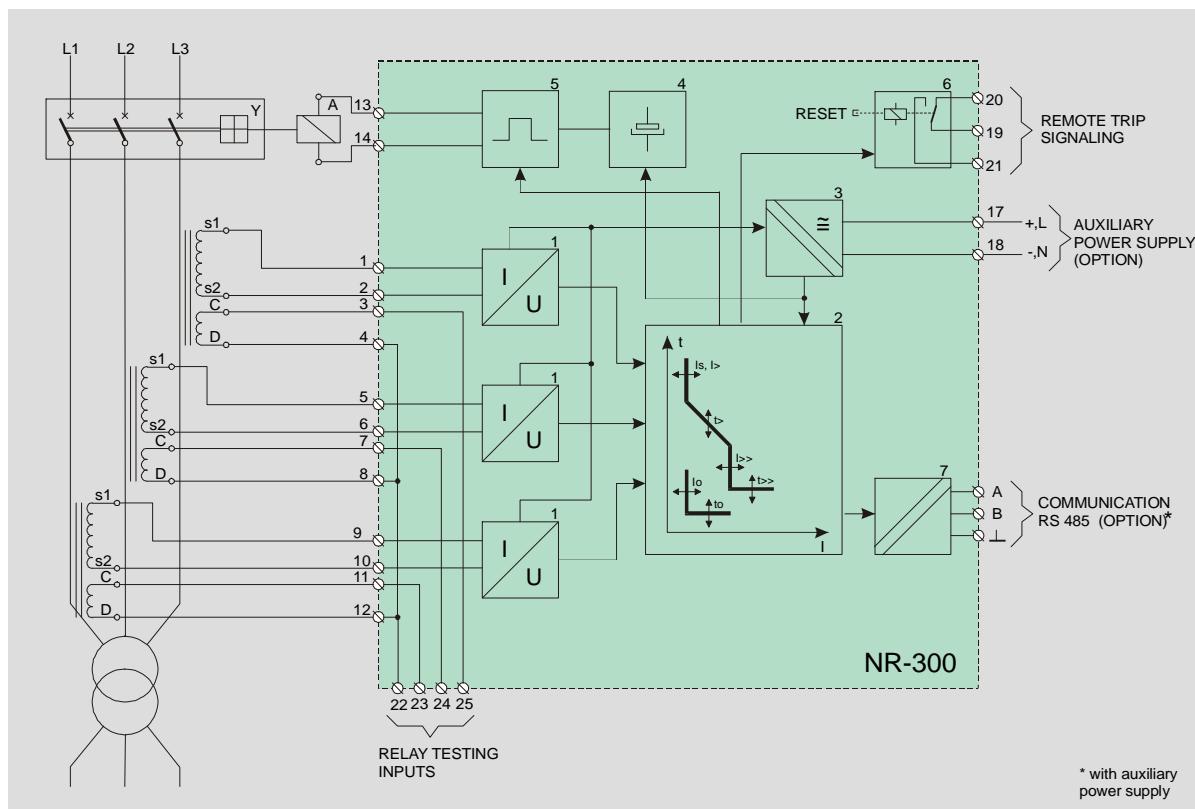


Fig. 2. Connection diagram for Overcurrent relay NR-300

## Technical Data

### Inputs:

Nominal current  $I_N$  ..... 25mA or 75mA  
 Normalized input current  $I_S$  ..... 1 to 3,5  $I_N$   
 Measuring range ..... 0,8 to 20 $I_S$   
 Power consumption ..... <0,3 VA  
 Overload capability (current path) .. cont.: 10 x  $I_N$   
 1s: 100 x  $I_N$

### Protection characteristics:

- a) Overcurrent protection characteristics (HRN EN 60255-3 compatible) .. normal inverse, very inverse, extremely inverse, definite time, HV fuse  
 Current setup  $I_b$  ..... 0,8 to 2,5  $I_S$   
 Trip time  $t_b$  ..... 0,04 to 300s
- b) Short circuit protection characteristics ..... definite time  
 Current setup  $I_o$  ..... 1 to 20  $I_S$   
 Trip time  $t_o$  ..... 0,04 to 3s
- c) Earth fault protection (option) characteristics ..... definite time  
 Current setup  $I_E$  ..... 0,2 to 2,5  $I_S$   
 Trip time  $t_E$  ..... 0,1 to 20s

### Outputs:

Pulse output – actuator ..... 24 V,  $E=0,1Ws$   
 Trip signaling – bistable relay with a flag and mechanical reset ..... changeover contact,  $U_{max} 250V, I_{max} 10A$

### Power supply:

from measuring circuit ..... via current transformers  
 Auxiliary voltage (option) ..... 110 or 220V AC  
 +10% -20%  
 24V, 110V, 220V DC  
 +45% -20%

### Communication:

RS 485 (option) ..... MODBUS RTU protocol

### General data:

Temperature range ..... -30°C..+60°C  
 extended on demand

### Mechanical data:

Mounting ..... in panel, DIN 43700  
 Dimensions ..... 144 x 48 x 105 mm

