

MAPro305 Numerical 3phase & residual over/under voltage relay

Technical Data

Input / Output (I/O) 5 digital input / 8 output dry contacts

RATINGS

Voltages

-Nominal voltage 57 – 130V_{ph-ph} eff. Operating range 0 to 260V_{ph-ph} eff.

Auxiliary voltage: 60 – 160Vdc

Frequency: Nominal value 50Hz, Operating range 45 – 55 Hz

Output Relay Contacts

-Contact ratings: AC max 10A/250V, 50W resistive, 25W Inductive with L/R 40mSec
DC max 0.3A/135V, 40W L/R 30mSec Contact op. time: <10mSec
Contact operate lifetime: >100000 times (at rated load)

Digital inputs

-All the logic inputs are optically-isolated and independent
-Energization of the logic inputs is realized with a DC or AC auxiliary voltage.

Burdens Voltage circuits:

-Reference voltage: V_n = 57 – 130V <0.25 VA
Aux. supply: 3W min, 6.8W max at all output rlys energized.

Optically-isolated inputs

-Logic input burden: < 10mA per input,
-Logic input recognition time: <5ms.

Timings & Accuracy

Under voltage protection

V<, V<< and V<<<

Range 0-130V:

Operate: DT: V_s ± 1%
IDMT: V_{operate} = 0.95V_s ±2%
Reset: (1.02-1.05) V_{operate} ±2%

Timer accuracy: 3% or 50ms whichever is greater

Trip time acc.: ≤ 50ms, or ±2% (times ≥ 200ms)

Overvoltage protection

V>, V>> and V>>>

Range : 5V-260V

Operate: DT: V_s ±2%
IDMT : V_{operate} = 1.1V_s ±2%
Reset: (0.95-0.98) V_{operate} ±2%

Timer accuracy: 2% or 50ms whichever is Greater (WIG)

Trip time acc.: ≤ 70ms, or ±5% (timers ≥ 200ms)

Residual over voltage protection

V₀>, V₀>> and V₀>>>

Range 0.5-130V (range A):

Operate: DT: V_s ±2% (0.5-5V), V_s ±7.5% (≥ 5V)
IDMT : V_{operate} = 1.1 ±2% (direct measurement)
Reset: 0.95V_{operate} ±2%

Timer accuracy: 2% or 40ms whichever is Greater (WIG)

Trip time instantaneous: ≤50ms

Hysteresis: V_{operate} – 0.2V (0.5 to 4V)

Settings for protections functions

CONFIGURATION:

General

Connection: 3V_{pn}, 3V_{pp}+V_r, 2V_{pp}+V_r, 3V_{pn}+V_r
Protection: phase-phase / phase – neutral
Default display: V_a,V_b,V_c,V_r
or V_{ab},V_{bc},V_{ca},V_r
or V_{ab},V_{bc},V_r

Protections

Under Voltage (ANSI code 27)

Threshold settings (secondary values)

Nominal voltage range A: 57 – 130V

V<, V<<, V<<<: Voltage Set 0.5...130.0V (by step: 0.1V)

Time delay settings

Each voltage element is associated to an independent time delay.

| Element | Time delay type |
|-----------------------|--------------------------|
| 1 st stage | Define Time (DT) or IDMT |
| 2 st stage | Define Time (DT) or IDMT |
| 3 rd stage | DT |

Inverse Time Delay Characteristic

The inverse characteristic is define by following formula:

$$t = \frac{TMS}{\left| \frac{V}{V_s} - 1 \right|}$$

Where: t = operating time in second, TMS = Time Multiplier Setting
V = Applied input voltage, V_s = Relay setting voltage

Note: This equation is only valid for $\frac{V}{V_s}$ ratio < 0.95

TMS: 0.019.9 (by step of 0.01)

t Reset (only DT) 0.00.....600.00 sec (by step of 0.01 sec)

Define time delay characteristics

tV<, tV<<, tV<<< 0.00.....599.00s (by step of 0.1s)

Over Voltage (ANSI code 59)

Threshold setting (secondary values)

Nominal voltage range:

V<, V<<, V<<<: Voltage Set 0.5...200.0V (by step: 0.1V)

Time delay settings

Same as under voltage protection

Inverse Time Delay Characteristic

Same as under voltage protection

Define time delay characteristics

tV<, tV<<, tV<<< 0.00.....599.00s (by step of 0.1s)

Residual Over Voltage / Neutral Displacement (ANSI code 59N)

Threshold settings (secondary values)

Nominal voltage range A: 57 – 130V

V₀<, V₀<<, V₀<<<: Voltage Set 0.5...130.0V (by step: 0.1V)

Other settings are the same as phase over/under voltage settings

COMMUNICATIONS

Front Port USB

Rear Port RS485 with Modbus RTU

Recording Functions

- Event recording
- Fault recording
- Instantaneous recording
- Disturbance recording