

MAPro102 Numerical Earth Fault relay

Protection Functions

- This protection is based on fundamental frequency.
- Earth current setting range 0.005 to $2.5I_{en}$ step of 0.001
- Thresholds:
 - 3 independent levels, $I_{se>}$, $I_{se>>}$, $I_{se>>>}$
 - $I_{se>}$ setting range: 0.01 to $8I_{en}$ step of 0.001
 - $I_{se>>}$ setting range: 0.01 to $8I_{en}$ step of 0.001
 - $I_{se>>>}$ setting range: 0.01 to $8I_{en}$ step of 0.001
- Reset ratio: 95%
- Shortest operation time: <50 mSec (Instantaneous operation)
- Drop out time: <50 mSec
- Definite time delay(trip & reset): 0 to 600 Sec step of 0.01 Sec
- IDMT curves for trip: IEC: Short time Inverse (STI)
Standard Inverse (SI)
Very Inverse (VI)
Extremely Inverse (EI)
Long Time Inverse (LTI)
IEEE: Moderately Inverse (IMI)
Very Inverse (IVI)
Extremely Inverse (IEI)
- IDMT curves for reset: IEEE Moderately Inverse (IMI)
IEEE Very Inverse (IVI)
IEEE Extremely Inverse (IVI)
- Time multiplier setting:
 - Trip: 0.025 to 1.5 step of 0.001
 - Reset: 0.025 to 3.2 step of 0.001

Automation Functions

- Multi shot Auto Recloser
- Trip Circuit Supervision & circuit breaker fail detection
- Inrush Restrain
- Circuit breaker control

Recording

- Event recording (Capacity: 1000, Info.: state of D. inputs, D. outputs & LEDs. Data: event name label + time with 1ms acc.)
- Fault recording (Capacity: 50)
- Disturbance recording Capacity: 10 records, 16 samples/cycle
 - Pre fault time: 0.2 – 3 seconds (10 – 150 cycles)
 - Post fault time: 0.2 – 5 seconds (10 – 250 cycles)
 - Data: AC & digital inputs & outputs + date & time (with 1mSec accuracy)

Communication

- RS485 (rear connector, twisted pair wire)
 - Protocol: Modbus RTU
- USB (front connector) - USB (front connector)
 - Connector: Mini USB standard connector
 - Application: Information extraction & system programming by a local PC or laptop

Inputs & outputs

- AC inputs

- Earth current input: 1A & 5A by connection (specified in setting)
- Frequency: 50 Hz
- Burden: <0.01VA for 1A input at 0.1A
<0.05VA for 5A input at 0.5A
- Current thermal withstand: 1 Sec at $8I_n$
2 Sec at $5I_n$
Continuous at $3I_n$

- Digital inputs & outputs

- Digital inputs: 2 Independent optical isolated
Burden <10mA
Voltage range 35 to 150Vdc
Recognition time <5mSec
- Digital outputs: 4 configurable dry 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 operation time: <10mSec
Contact electrical & mechanical operate lifetime: >100000 times (at rated load)

- Power supply

- Aux. voltage range: 55 to 160Vac/dc
- Ripple: <8%
- Burden: 3W min, 6.8W max with all output relays energized.

Accuracy

- O.C. thresholds: +/- 0.5%
- Trip time:
 - Definite time: +/-1%, min: 10mSec
 - Inverse curves: +/-3% for STI, SI, VI, IMI, IVI
+/-5% for LTI, EI, IEI