IPR-A

Current Monitoring & Protection

Protection for Feeders, Generators & Industry

DESCRIPTION

The Current Protection Relay (IPR-A) has been designed to measure the line and ground RMS currents under normal conditions or under disturbances. The current signals are sensed throughout current transformers (CT) from each line. This information is internally processed by the microprocessor in order to take the current protection actions defined under ANSI, IAC or IEC standard.

APPLICATIONS

- Primary and backup protection for utility feeder, power plants and industrial distribution systems.
- Protection of transformers, overhead lines, cables and generators.
- Allow the opening of the switch/disconnector within the limits of its capacity, leaving the circuit interruption fuses in the case of short circuit.

PROTECTION AND FUNCTIONALITY

- **(50)** Instantaneous overcurrent.
- **(50N/50G)** Instantaneous ground overcurrent.
- **(51)** Inverse time phase overcurrent
- **(51N/51G)** Inverse time ground overcurrent
- ANSI, IAC or IEC/BS142 curves included:
  - Moderately inverse.
  - Normal inverse.
  - Very inverse.
  - Extremely inverse.
  - Definite time.
- Overload alarm pickup level.
- Accumulated KA per phase on breaker interruption.

COMMUNICATION

- Remote communication using a PC or a PLC by 1 RS232 & 2 RS485 ports.
- Remote programming of the setpoints.
- Protocol used: Modbus RTU.

FEATURES

- CT primary ratio selectable in 5 amp steps (10 A to 5000 A).
- Line and ground RMS currents measurement.
- 1 trip relay and 2 programmable auxiliary relay.
- Control power drop or internal fault relay.
- Digital inputs: 1 bracker status & 3 programmable
- Touchpad programming
- Breaker operation & trip failure

SIGNALING

- LED and LCD display indication.
- Phase and ground current indication
- Last trip cause and storage of values
- Indication and storage of fault conditions and their values.
- Threshold LED for 50/50N, 51/51N.

ADDITIONAL FEATURES: (on request)

- 3 Setpoints Group for Phase & Ground Protections
- Autoreclose with 2 shoots
- Cold load pickup control

APPLICABILITY

One, three and four-wire system
50 and 60 Hz frequency system
Current max. 5000 A

SPECIFICATIONS

SUPPLY VOLTAGE
24÷310 Vdc, –15%, +10%
24÷240 Vac, -15%, +20% 50/60Hz

MAX. POWER CONSUPTION
12VA (7W)

TEMPERATURE RANGE
Operational: 0 °C a +50 °C
Storage: –20 °C a + 70 °C

RELATIVE HUMIDITY
Max. 90% (non condensing)

DIELECTRIC WITHSTAND VOLTAGE
2 KV 60 s

BURN IN
48 hours at 50 °C

CONSTRUCTION
According to VDE, UL, CEI norms.

OUTPUT CONTACT
Rated load: 8A
DC 150W resistive or 90W inductive (L/R=40 ms)
AC 2000VA resistive or 800VA inductive (PF=0.4)
Max. operating Voltage: 250 Vac, 125 Vdc

COMMUNICATIONS
Type: 1 RS232 port + 2 RS485 ports, Half duplex, 1200 → 19200 baud
Protocol: Modbus RTU
Functions: Read/Write setpoints
Read actual values
Execute command

LED INDICATORS
Relay status: Trip
Alarm
Out of Service
System status: Breaker closed, Breaker open, breaker earthed, pickup 50, pickup 51, pickup 50N/G, pickup 51N/G.
Display (LCD): 16 x 2 digits

DIGITAL INPUT
Type: Dry contacts only, 500 Ohm Max. ON resistance
(12 Vdc @ 10 mA provided by relay)

TERMINAL BLOCK
Fixed, back connection terminals with 4-mm^2-section cable (10 AWG).

FRAME
In ABS auto-extinguish with frontal in polycarbonate (IP54).

ASSEMBLY
The relay has to be fixed to the structure with the help of stirrups and screws.

DIMENSION
144 x 144 x 141 mm

WEIGHT
1.5 Kg

FRONT PANEL CUTOUT
137 x 137 mm

PHASE AND GROUND CT INPUTS
Source CT (In): CT (In) 5 A to 5000 A, Steps: 5 A.
CT secondary: CT 1 A or 5 A (specified when ordered).
Sampling: True RMS, 16 sample/s.
CT burden: 0.25 VA per phase at rated secondary current.
Continuous: 2xIn.
Current withstand capac.: 20 times In for 1 sec.
Accuracy: at <= 1xCT => ± 0.5% of 1xCT
at > 1xCT => ± 0.5% of 20xCT

PHASE TIME OVERCURRENT
Pickup level: 4% to 300% of CT, steps of 1%
Time multiplier: 0.1 to 20.0 for each shape curve
Reset: Time reset to zero each time current level falls below pickup threshold.
Accuracy: **Pickup:** ±3% of setting.
Time: ±3% of trip time or ±20 ms

INSTANTANEOUS PHASE OVERCURRENT
Pickup level: 4% to 1800% of CT, steps of 1% or 10%
Delay time: 0 to 2000 ms, steps of 10 ms
Accuracy: **Pickup:** ±3%.
Time: +35ms max

GROUND TIME OVERCURRENT
Pickup level: 4% to 300% of CT, steps of 1%
Time multiplier: 0.1 to 20.0 for each shape curve
Reset: Time reset to zero each time current level falls below pickup threshold.
Accuracy: **Pickup:** ±3%.
Time: ±3% of trip time or ±20 ms

INSTANTANEOUS GROUND OVERCURRENT
Pickup level: 4% to 1800% of CT, steps of 1% or 10%
Delay time: 0 to 2000 ms, steps of 10 ms
Accuracy: **Pickup:** ±3%.
Time: +35ms max

TIME OVERCURRENT CURVES
Phase and Ground: ANSI, IAC or IEC
Moderately Inverse, Normally Inverse, Very Inverse
Extremely Inverse, Definite Time

EMISSIONS TEST

1. Radiated emissions
Reference norm: CEI EN 50081-2, CEI EN 55011
Port: enclosure; class A; 30÷230 MHz / 30dBuV/m QP at 30 m; 230÷1000 MHz / 37 dBu V/m QP at 30 m.

2. Conducted emissions
Reference norm: CEI EN 50081-2, CEI EN 55011
Port: AC mains; class A; 0.15÷0.5 MHz / 79 dBuV QP; 0.5÷30 MHz / 73 dBu V QP.

IMMUNITY TESTS

1. Conducted disturbances induced by RF field
Reference norm: CEI EN 50082-2, CEI ENV 50141
Port: AC mains and signal lines; Level 3 (10 V/m rms not modulated); 0.15÷80MHz; 8%AM (1KHz).

2. Radiated electromagnetic field
Reference norm: CEI EN 50082-2, CEI ENV 50141
Port: enclosure; Level 3 (10 V/m rms not modulated); 80÷1000 MHz; 80% AM (1 KHz); Impulse modulation: 900 ± 5% MHz; 10 V/m; 50% duty cycle.

3. Electrostatic discharge
Reference norm: CEI EN 50082-2, CEI EN 61000-4-2
Port: enclosure; Level 2 (4 KV contact discharge); Level 3 (8 KV air discharge).

4. Fast transients (Burst)
Reference norm: CEI EN 50082-2, CEI EN 61000-4-2
Port: enclosure: AC; Level 4 (4 KV line to ground); Level 2 (2 KV line to line); 5/50 ns Tr/Th; 5KHz.

5. Power frequency magnetic field
Reference norm: CEI EN 50082-2, CEI EN 61000-4-8
Port: enclosure; Level 4 (30 A/m continuous field); Level 4 (300 A/m at 1 s)

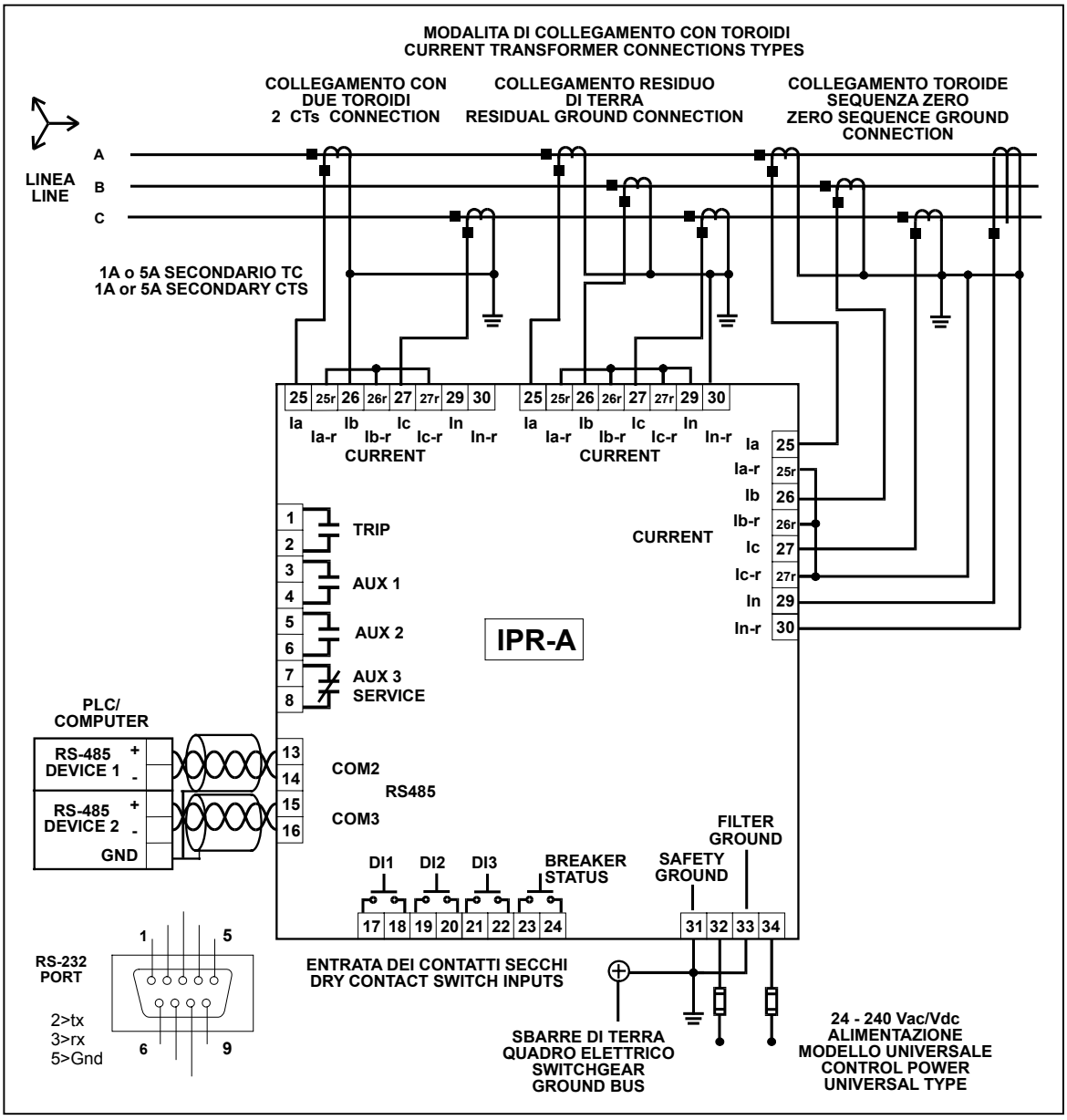
6. Surge
Reference norm: CEI EN 50082-2, CEI EN 61000-4-5
Port: AC mains; Level 4 (4 KV line to ground); Level 2 (2 KV line to line); 1,2/50μs, 0.5J

7. Voltage dips and short interruptions
Reference norm: CEI EN 50082-2, CEI EN 61000-4-11
Port: AC mains; Level 30% Unon at 10 ms; 60% Unon at 100 ms

ORDERING

IPR – AXXX

1: 1 A CTs	**5:** 5 A CTs	PHASE AND GROUND CT SECONDARY
1: 1 A CTs	**5:** 5 A CTs	PHASE SECONDARY
1: 1 A CTs	**5:** 5 A CTs	GROUND SECONDARY
1: Standard	X**:** Special Version	MODEL


MODALITA DI COLLEGAMENTO CON TOROIDI
CURRENT TRANSFORMER CONNECTIONS TYPES
COLLEGAMENTO CON DUE TOROIDI
2 CTs CONNECTION
COLLEGAMENTO RESIDUO DI TERRA
RESIDUAL GROUND CONNECTION
COLLEGAMENTO TOROIDE SEQUENZA ZERO
ZERO SEQUENCE GROUND CONNECTION
LINEA
LINE
A
B
C
1A o 5A SECONDARIO TC
1A or 5A SECONDARY CTS
25 25r 26 26r 27 27r 29 30
Ia Ia-r Ib Ib-r Ic Ic-r In In-r
CURRENT
TRIP
AUX 1
AUX 2
AUX 3
SERVICE
IPR-A
PLC/
COMPUTER
RS-485 DEVICE 1
RS-485 DEVICE 2
GND
COM2
RS485
COM3
DI1 DI2 DI3
BREAKER STATUS
FILTER GROUND
SAFETY GROUND
17 18 19 20 21 22 23 24
31 32 33 34
RS-232 PORT
2>tx
3>rx
5>Gnd
ENTRATA DEI CONTATTI SECCHI
DRY CONTACT SWITCH INPUTS
SBARRE DI TERRA
QUADRO ELETTRICO
SWITCHGEAR
GROUND BUS
24 - 240 Vac/Vdc
ALIMENTAZIONE
MODELLO UNIVERSALE
CONTROL POWER
UNIVERSAL TYPE