ORION ITALIA

Protection relays & Metering division

IPR-A

Current Monitoring & Protection

Protection for Feeders, Generators & Industry

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
- *(46) Negative sequence timed overcurrent
- *(79) Reclosing (2 shots)
- 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 A steps (10 A to 6000 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 breaker status & 3 programmable
- Touchpad programming
- Breaker operation & trip failure

SIGNALLING

- 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

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

APPLICABILITY

Systems: Mono phase and 3 or 4-wire three phase system
Frequency: 50 and 60 Hz
Voltage: 69 kV maximum

(*) *IPR-A2 version only*

SPECIFICATIONS

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

MAX. POWER CONSUMPTION
12 VA (7W)

TEMPERATURE
Operational: 0 °C ÷ 50 °C
Storage: -20 °C ÷ 70 °C

RELATIVE HUMIDITY
Max. 90% (non condensing)

DIELECTRIC WITHSTAND VOLTAGE
2 kVac, 60 s

BURN IN
48 hours at 50°C

CONSTRUCTION
According to VDE, UL, CEI standards

OUTPUT CONTACT
Rated load: 8 A
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 commands

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 contact only, 500 Ohm max ON resistance
Output: 12 Vdc @ 10 mA provided by relay

TERMINAL BLOCK
Fixed, back connection terminals with 4-mm2 section cable (10 AWG)

FRAME
In ABS, auto-extinguish, with frontal panel 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 6000 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: 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: 1% or 10%
Delay time: 0 to 2000 ms. Steps: 10 ms
Accuracy: Pickup: ±3%
Time: +35ms max

GROUND TIME OVERCURRENT
Pickup level: 4% to 300% of CT. Steps: 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: 1% or 10% *Delay time:* 0 to 2000 ms. Steps: 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
NEGATIVE SEQUENCE TIME OVERCURRENT *Pickup level:* 4% to 300% of CT *Definite time:* 0.05÷600 s. Steps: 0.01/0.1/1 s *Time multiplier:* 0.1÷20.0. Steps: 0.1 *Dropout level:* 97% Ipk *Accuracy:* ± 3% of the setting *Def. Time accuracy:* included in ±3% or in ±60 ms (whichever is greater), at I >150% Ipk	**AUTOMATIC RECLOSURE** Programmable fast and/or slow autoreclose for protection of: phase time overcurrent ANSI 51 phase instantaneous ANSI 50 ground time overcurrent ANSI 51G/51N ground inst. overcurrent ANSI 50G/50N *Dead time 1st shot:* 0.1÷600.0 s. Steps: 0.1/1 s *Dead time 2nd shot:* 0.1÷600.0 s. Steps: 0.1/1 s *Reset time:* 1÷999s. Steps: 1 sec. *Block time after manual closure:* 1÷999s. Steps: 1 sec
EMISSION TEST **Radiated emissions** References: EN 55011; Port : enclosure; Class A, at 10m **Conducted emissions** References: EN 55011; Port: AC mains; Class A	**IMMUNITY TEST** ● Conducted disturbances induced by RF field References: EN 61000-4-6; Port: AC mains and signal lines ● Radiated electromagnetic field References: EN 61000-4-3; Port: enclosure ● Electrostatic discharge References: EN 61000-4-2; Port: enclosure ● Fast transients (burst) References: EN 61000-4-4 ; Port: AC mains and signal lines ● Surge References: EN 61000-4-5 ; Port: AC mains ● Voltage dips and short interruptions References: EN 61000-4-11 ; Port: AC mains

ORDER CODE

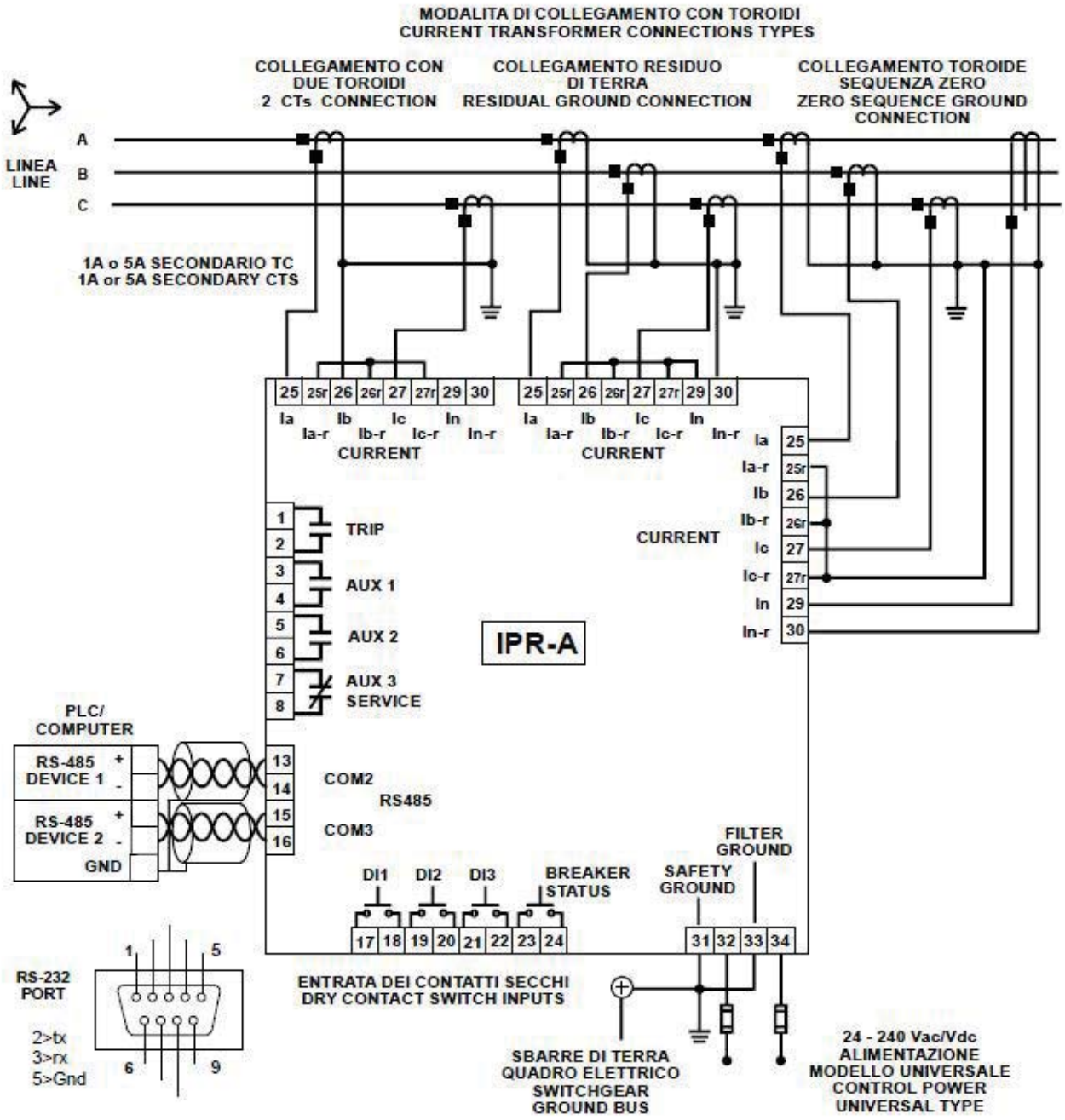
IPR – AXXX **PHASE AND GROUND CT RATED CURRENT**

1: 1 A CTs 5: 5 A CTs Ground CT rated current

1: 1 A CTs 5: 5 A CTs Phase CT rated current

1: Standard 2: Standard version + ANSI 46 + ANSI 79

WIRING DIAGRAM



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