Software
All of the equipment in the INGEPAC™ family can be accessed using powerful software tools developed by Ingeteam and which run on Windows®. Application software is specifically designed for simple and user-friendly access to the equipment.

INGEPAC™ PL70 offers protection for a wide variety of applications.

The PL70 family offers the most characteristic protection functions applicable to electric systems, economic and simple equipments. Apart from the main protection and automation functions (overcurrent, voltage, breaker failure, frequency, phase shift, field loss, autoreclose, synchrocheck), these devices offer a series of additional functions, such as communications, event recording, logic programming, breaker monitoring, etc., making of these machines an economic alternative for the automation of electric systems.

Protection functions
- 50/51, 50/51N Three-phase and earth overcurrent
- 67N Directional neutral overcurrent
- 50/51SN Sensitive neutral detection
- 46 Reverse sequence overcurrent (unbalance)
- 46BC Broken conductor
- 67N Directional isolated neutral overcurrent
- 50/51R Residual overcurrent
- 37 Minimum current
- 49 Thermal image
- 51V Voltage controlled overcurrent
- 50BF Breaker failure
- 87N Restricted earth protection
- 24 Overexcitation
- End fault protection

Other functions
- 79 Recloser
- Breaker monitoring
- 7ATCC: trip and close circuit supervision
- Openings, closures, kI2 counter
- Excessive number of trips alarm
- Command failure
- Pulse opening/closure command or change of status detection (latch)

Data Acquisition Functions
- Measurements historical report (maximum/minimum)
- Event, fault and oscillographic recorder
- Current measurement (fundamental and sequences), voltage and power measurement, demand maximeter
- Digital inputs and outputs

Communications
- D89 RS232 PROCOME protocol front port
- Up to 2 rear ports: RS232, RS485, Glass Fibre Optic, Plastic Fibre Optic, Ethernet
- PROCOME, Modbus, DNP 3.0, IEC60870-5-101 protocols

Synchronisation
- Via communications protocol or via demodulated IRIG-B input.

Local interface
- Keypad + local display (2 rows x 8 characters)
Main Features

- Wide variety of protection functions in models designed for specific applications
- Intuitive configuration and monitoring software supplied with the equipment. It does not require a previous configuration to communicate with the equipment.
- User-defined logic signals
- Digital inputs and outputs and programmable LED indicators
- Serial and Ethernet communication
- Real time monitoring and recording of the parameters of the breaker
- Events and faults recording
- Automatic reclosing functions
- 4 setting groups for the automatic adaptation of the relay’s programming to the grid conditions.
- Synchronisation via demodulated IRIG-B or global reference through communication protocols

Options

- Connections Connector for pin or ring type terminals
- Field interfaces

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Digital inputs</th>
<th>Digital outputs</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>6</td>
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<td>IRIG-B</td>
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<tr>
<td>2</td>
<td>7</td>
<td>11</td>
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</tbody>
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- Power supply: 12 Vcc; 24/48 Vcc; 125/220 Vcc; 220 Vca
- Power supply voltage measurement
- Communications ports All of the pieces of equipment have a front RS232 port for local access and additionally: 1 serial; 2 serial; 1 serial + 1 Ethernet
- Communication ports connection types:
  - Serial: RS232, RS485, Glass Fibre Optic, Plastic Fibre Optic
  - Ethernet: RJ45
- IP54 front lid
- Models by protection functions:
  - PL70IT (3xI phases + 1xI neutral): 50/51, 50/51N, 50/51R, 46, 46FA, 37, 50FI, 79, Cold load, 74TC/CC
  - PL70IS (3xI phases + 1xI neutral): 50/51, 50/51N, 50/51R, 46, 46FA, 37, 50FI, 79, Cold load, 74TC/CC
  - PL70IA (1xI + 1xV): 67NA, 74TC/CC
  - PL70ID (1xI + 1xV): 67N, 50FI, 74TC/CC
  - PL70IP (3xI phases + 1xI neutral): 50/51, 50/51N, 49, 46, 46FA, 87N, 74TC/CC
  - PL70IM (1xI): 50/51, 49, 50FI, 74TC/CC
  - PL70FI (3xI phases + 1xI neutral): 50FI (mono/three-pole), Flashover (by current measurement), End fault, 74TC/CC
  - PL70IV (3xI phases + 1xV): 50/51, 50/51R, 49, 46, 46FA, 51V, 50FI, 74TC/CC

Applications

- Protection for feeders with or without autoreclose
- Motor protection
- Backup protection for transformers
- Electric machines earthing protection
- Breaker protection
- Isolated neutral grids earthing protection