IPC4022

Fault Passage Indicator and Remote Terminal Unit

IPC4022 is a fault passage indicator for overcurrent and earth faults with integrated remote terminal unit functionality. It has I/O for indications and watchdog function.

The standard IPC4022 detects faults in one feeder. Expanded versions are available for fault detection in up to three feeders. The system interfaces are IEC 60870-5-101 and -104.

Since the algorithm for earth fault detection does not require any voltage measurement, IPC4022 provides cost efficient fault detection with a high sensitivity for pass-through faults, also in networks where the earth fault currents are low.

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Fault Detection

Overcurrent, I> and I>>

Settings overcurrent 0.0 – 10 000.0 A, 0 – 10 000 ms. One stage can be configured for inverse time (IEC).

Earth Fault, I_0>

Ensto Protrol's patented Fault Pass Through earth fault detection for all indirectly earthed networks. Capable of detecting high impedance and arcing earth faults. Note that no voltage measurement is necessary for good selectivity at very low currents. The sensitivity is comparable with that of a directional earth fault protective relay.

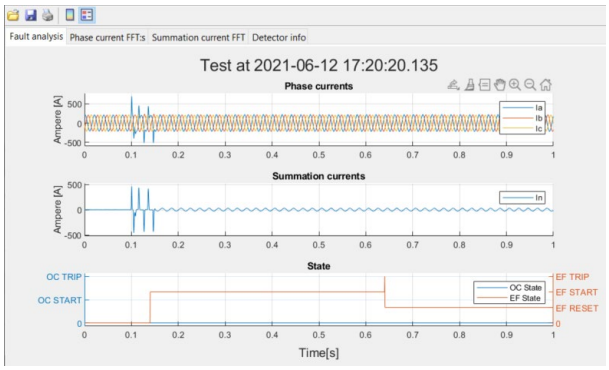
Settings high impedance earth fault 0.1 A – 100.0 A, 0 – 10 000 ms.

An arcing fault is concluded after two earth fault starts within a settable time, range 0 – 25 000 ms.

A non-directional earth fault stage is integrated, as well as phase-break detection.

Transient Fault Recorder

The built-in transient fault recording function registers currents and events from the last detected faults. It is possible to connect to the service port to analyse signals and events in detail. The transient fault recordings can be downloaded using the web interface and be further analysed. The registered data can also be converted to COMTRADE format.



Remote Terminal Unit

Binary objects: 8 inputs (Single Point / Double Point). Also, objects for Start and Trip I>, I>>, Io>, phase break and non-directional Io> (Single Point)

3 outputs (Single Cmd / Double Cmd), and object for remote acknowledge (Single Cmd)

Analog objects (spontaneous reporting with settable deadband 0.1 – 100%, or cyclic):

- Phase currents, rms
- Maximum current
- Average current 15 min
- Max fault current, I>/I>> [1]
- Residual current, $3I_0$
- Faulty phase(s), I>/I>> or I_0> [1]
- Temperature

[1] Deadband does not apply, transmitted upon event.

Expansion

IPC4022 can be ordered for fault detection of one line and in larger versions for two or three lines. This means that an expanded IPC4022 can handle larger secondary substations.

Expanded IPC4022 are specified by unique product codes. The extra current inputs for the additional lines are located to the left of the standard terminals of IPC4022. Also refer to the sections 'Ordering Information' and 'Overview Diagram'.

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Better life.
With electricity.

Other Functions

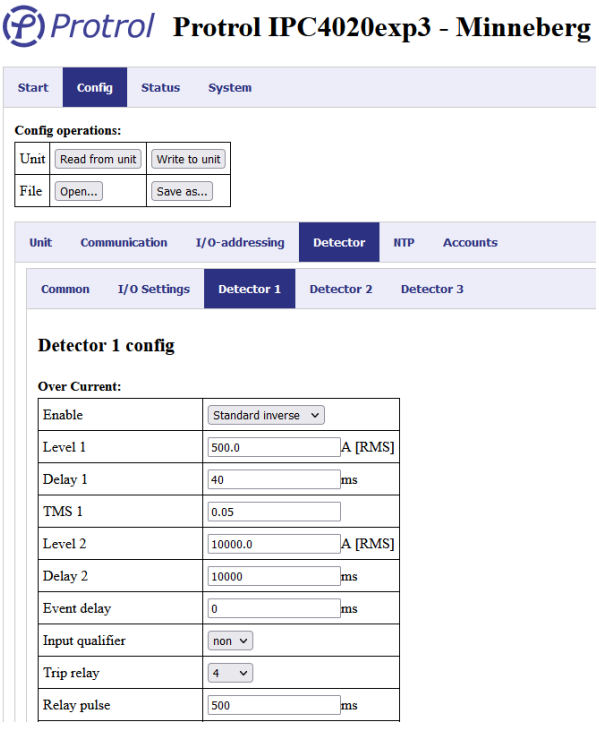
Physical Interface

Detected overcurrent or earth fault is indicated by LEDs and can be acknowledged by a push button, remote control and automatically after a pre-defined time.

Separate LEDs indicate binary inputs and outputs, status for power supply, internal supervision, and activity of the communication ports.

Web Interface

The IPC4022 device has a built-in web interface for local and remote access using TCP/IP. This interface enables the user to access status information and to configure the device. It is also possible to upgrade firmware and download transient fault recordings.



Technical Data

General

Dimensions:	IPC4022: 200 x 109 (115) [2] x 65 (74) mm (l x w x h) IPC4022exp2/3: 290 x 92(114) x 65(74) mm (l x w x h)
Weight:	420/950 g
Assembly:	DIN bracket
Ambient temp:	-40 – +70 °C
Supply voltage:	24 – 48 VDC
Supply current:	appr. 100 mA at 24 VDC
Standards:	EN 61000-6-2 – Immunity EN 61000-6-4 – Emission Class B EN 61000-6-5 – For installation in medium voltage substations EN 60068-2 – Environmental

Tests according to:	EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-6 EN 60068-2-1 EN 60068-2-2 EN 60068-2-30
EU directives:	ROHS, EMC

[2] The dimensions 115, 114 and 74 mm includes the female contacts.

Inputs and Outputs:

Binary inputs:	8 BI, 24 – 110 VDC
Binary outputs:	3 BO, max 115 VAC / 150 VDC One group with 2 relays, 8 A breaking current at 30 VDC (contakt X10). One group with 1 relay, 5 A breaking current at 30 VDC (contakt X9).
Analog inputs:	3 (+ 3/+ 6)[3] AI, 1 A rated current. I_{th} 2 A cont. / 20 A, 1 s

All binary in- and outputs are equipped with LED indications. Binary outputs are galvanically isolated. One output can be used as a watchdog relay.

[3] In total six analog inputs for IPC4022exp2, nine for IPC4022exp3

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Service Port:

USB: Type B
Ethernet: RJ45 10/100Base – TX Full Dupl.

Time Synchronization:

Protocol: IEC60870-5-101/104 or NTP
Drift: Max 3 ppm

System Interface:

RS485(-422)/RS232:
Plugin contact/DSUB9
Both 2- and 4-wire communication are supported using RS485. Bus termination can be done by connecting X11:4 and X11:5, also see section 'Overview Diagram'.

Ethernet: RJ45 10/100Base – TX Full Dupl.

Communication Protocol:

Protocol: IEC60870-5-101/104

Ordering Information

Product Code

Basic version IPC4022:	PT101142
Basic version IPC4022exp2:	PT101144
Basic version IPC4022exp3:	PT101145

Options

IPC4022 can also be ordered with additional functionality with the following product codes.

Hardware Options:

RS422-interface (4-wire):	PT850005
RS232 interface:	PT850001
2 additional inputs, contact X5:	PT850003

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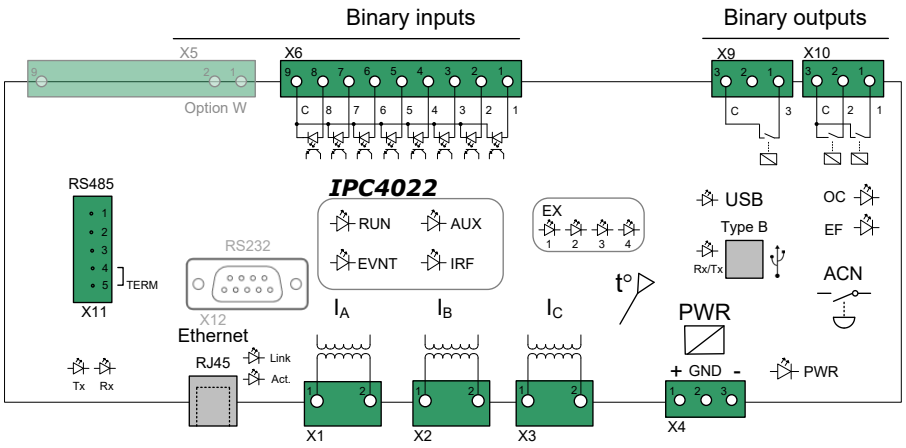
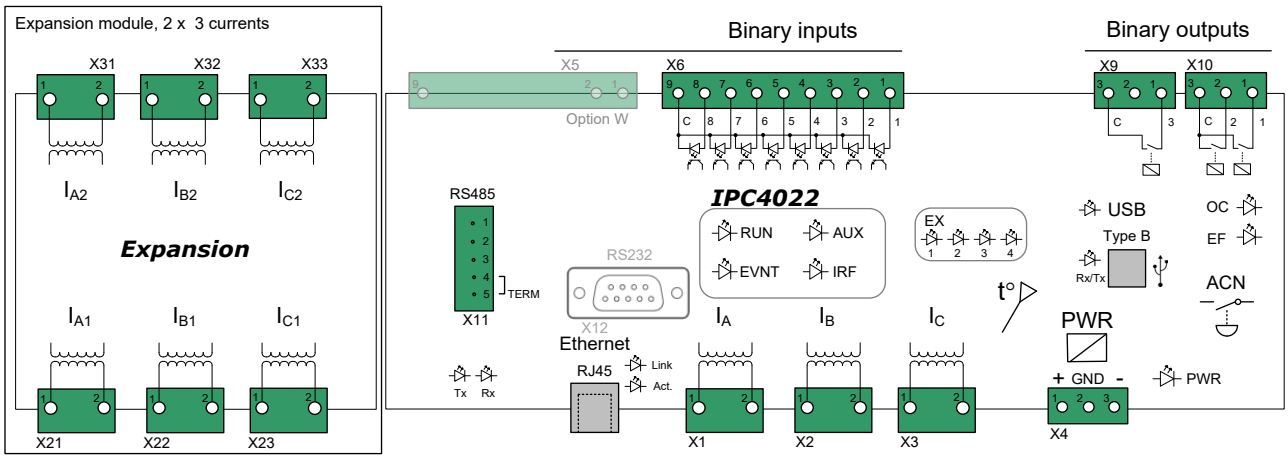
Schematic Overview

IPC4022 – one fault detector



IPC4022exp2/3 – two/three fault detectors



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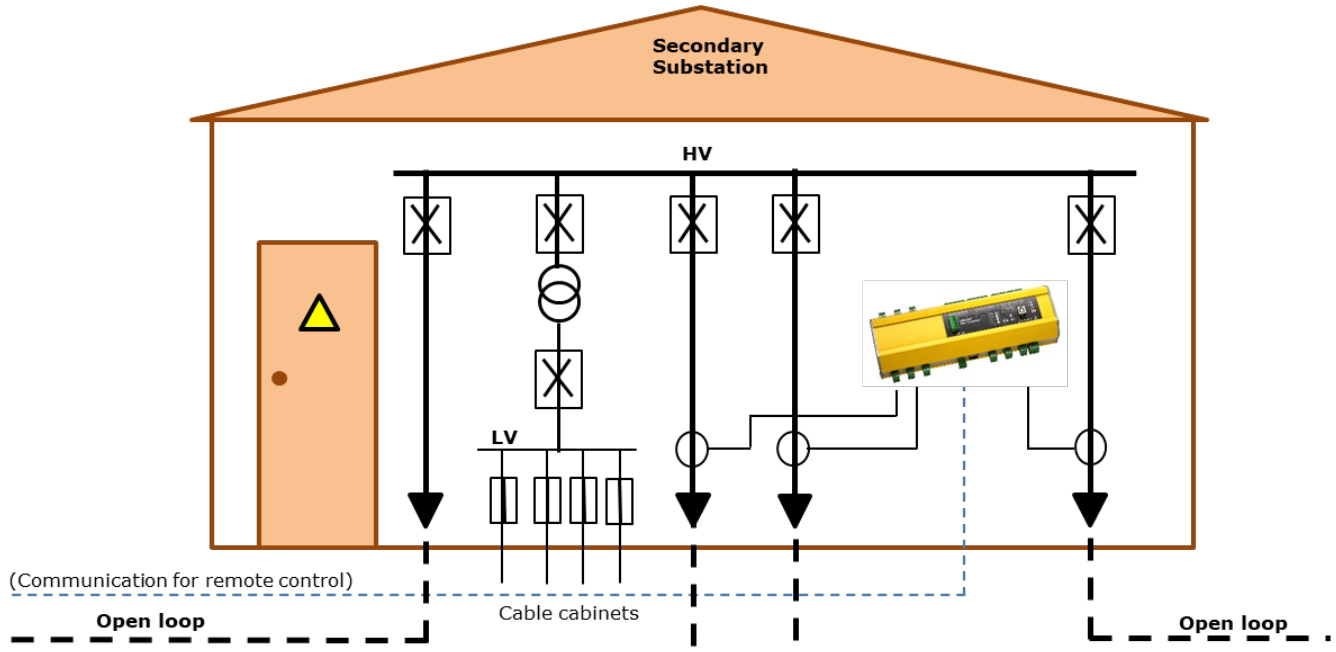
Typical Application

An IPC4022exp3 can monitor a typical 3+1 secondary substation; fault detection of three lines/cables and indications from primary equipment or other devices.



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