Protrol

IPC4022

Fault Detector with Remote Terminal Unit Function

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

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 high sensitivity for pass through faults, also in networks where the earth fault currents are low.

D A T A S H E E T

IPC4022

Fault Detection

Overcurrent, I> and I>>

Settings overcurrent 0.0 – 10 000.0 A, 0 – 10 000 ms.

Earth Fault, I_0>

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.

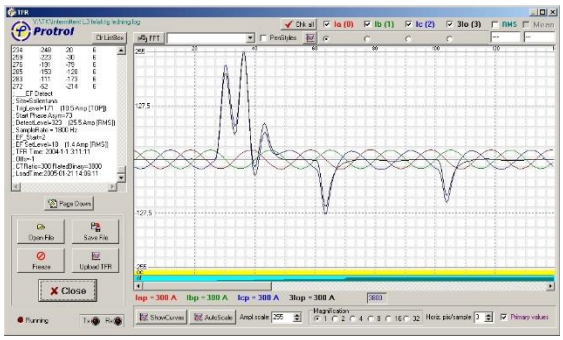
Settings high impedance earth fault 0.1 A – 100.0 A, 0 – 10 000 ms.

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.

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 analysed using Protrol Tool. The registered data can also be converted to COMTRADE format.



Remote Terminal Unit

Binary objects: 8 inputs (Single Point / Double Point). 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 0.5 – 100%):

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

Other Functions

HMI – User Interface

Detected overcurrent or earth fault is indicated by LEDs and can be acknowledged by a push button, remote control and/or after a pre-defined time up to 48 h.

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

Configuration is done using the built-in web interface.

Web Interface

The IPC4022 has a web interface that facilitates remote access using TCP/IP. In this interface it is possible to access status information and to configure the device. It is also possible to upgrade firmware and download transient fault recordings.

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Technical Data

General

Dimensions[2]:	195 x 105(115) x 75(80) mm. (l x w x h)
Assembly:	DIN bracket
Ambient temp:	-20 – +60 °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
Tests according to:	EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-6
EU directives:	ROHS, EMC

[2] The dimensions 115 mm and 80 mm includes the female contacts.

Service Port:

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

Inputs and Outputs:

Binary inputs:	8 BI, 24 – 110 VDC
Binary outputs:	2 signal and 1 power relays, 5 and 8 A breaking capacity at 250 VAC / 30 VDC.
Analog inputs:	3 AI, 1 A

All binary in- and outputs are equipped with LED indications. One signal relay is a dedicated watchdog relay.

Time Synchronization:

Protocol:	IEC60870-5-101/104, or (S)NTP

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

Article Number

The article number is specified as 101142(-W-XYZ).

Basic version: 101142

Options

IPC4022 can also be ordered with additional functionality which is specified by the following postfix to the article number of the basic version.

Option W = Hardware version 0-9

Option 0: – Basic version
Option 1: – 2 extra inputs

Option X = Hardware options 0-9[3]

Option 0: – Basic version, no options
Option 1: – RS232 interface

Option Y = Software options 0-9[3]

Option 0: – Basic version, no options

Option Z = Other adjustments 0-9

Option 0: – Standard
Option 1-9: – Software version 1-9

[3] Calculation of article number for options according to table:

Article Number	Option 3	Option 2	Option 1
0 - No options	-	-	-
1 - Option 1	-	-	X
2 - Option 2	-	X	-
3 - Option 1 & 2	-	X	X
4 - Option 3	X	-	-
5 - Option 1 & 3	X	-	X
6 - Option 2 & 3	X	X	-
7 - Option 1 & 2 & 3	X	X	X

Example article number

IPC4022 with extra inputs: 101142-1-000

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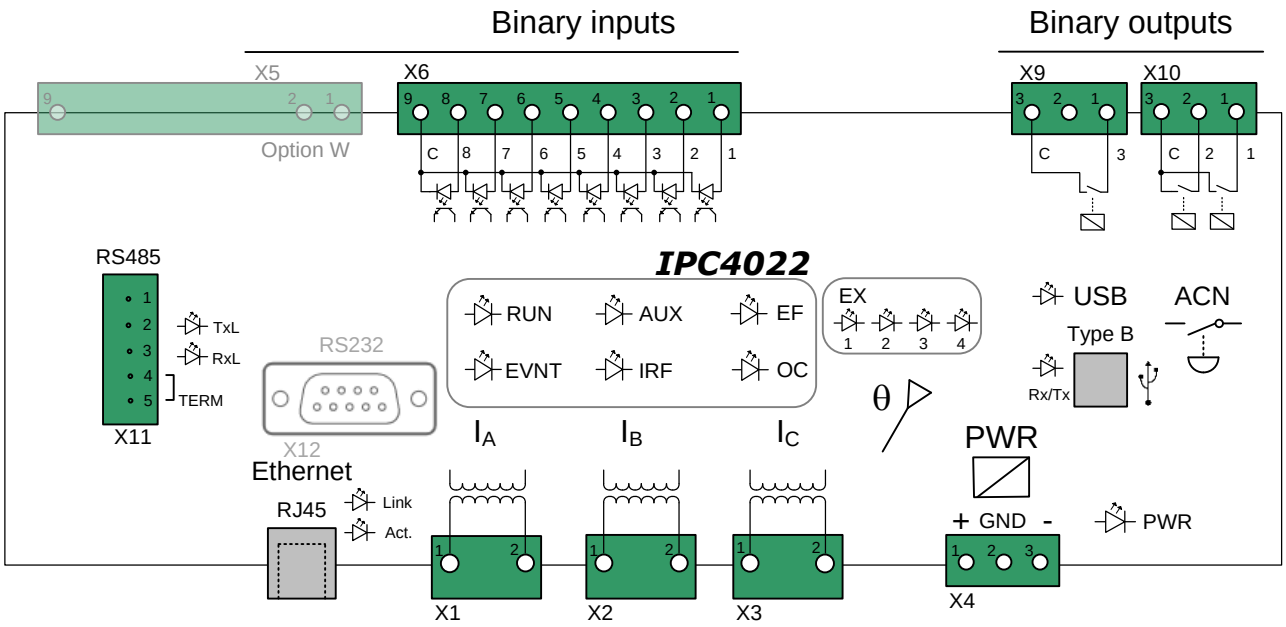
Schematic Overview



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