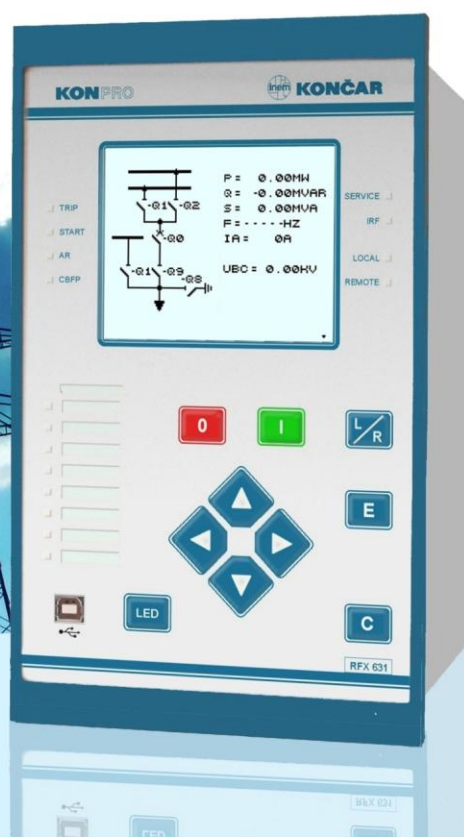




# KONČAR

Končar Electronics and Informatics, Inc

Secondary equipment



## USER MANUAL

### KONPRO

Configuration software

### RMS

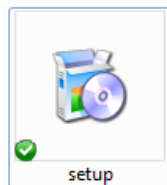


## Content

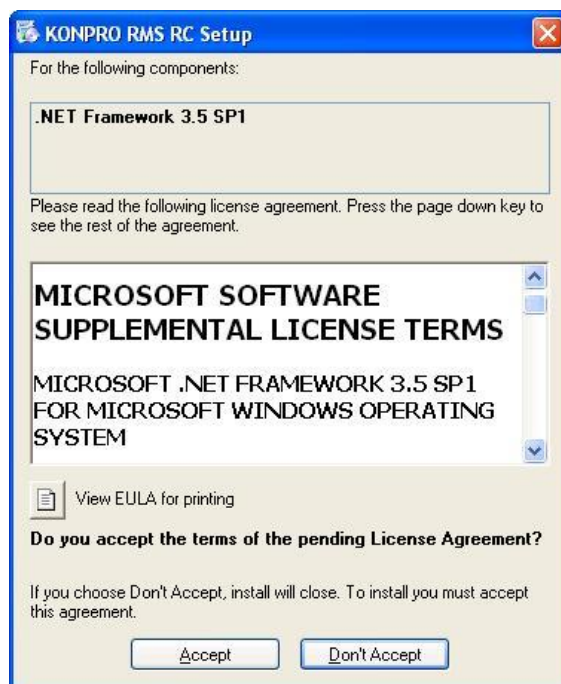
<b>1</b>	<b>Software installation instructions .....</b>	<b>Error! Bookmark not defined.</b>
<b>2</b>	<b>Software registration .....</b>	<b>5</b>
<b>3</b>	<b>User accounts .....</b>	<b>6</b>
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## 1 Software installation instructions

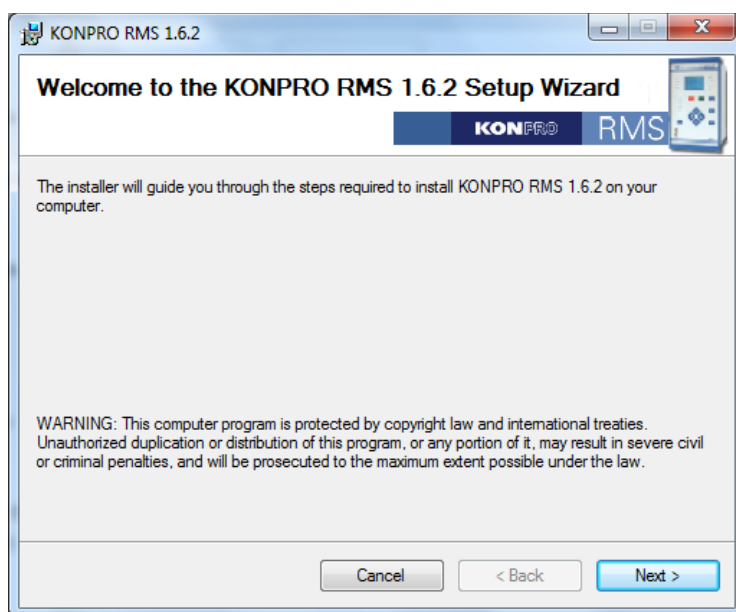
In order to set up **KONPRO RMS** software, user should run „**setup.exe**” that can be found on removable storage, provided by manufacturer:



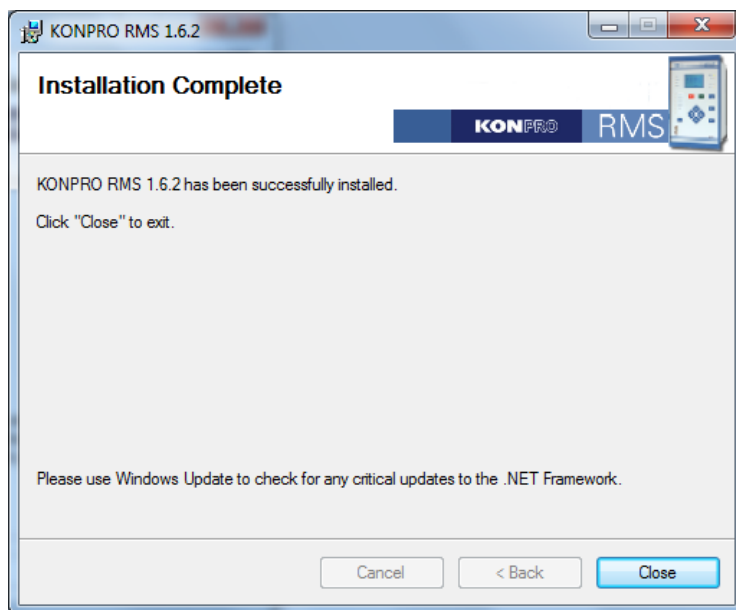
During installation procedure, system will be checked for „**Microsoft .NET Framework**” version, and if necessary, downloads „**Microsoft .NET Framework 3.5 SP1**”.



After installation of „**.NET Framework**”, **KONPRO RMS** software installation follows:

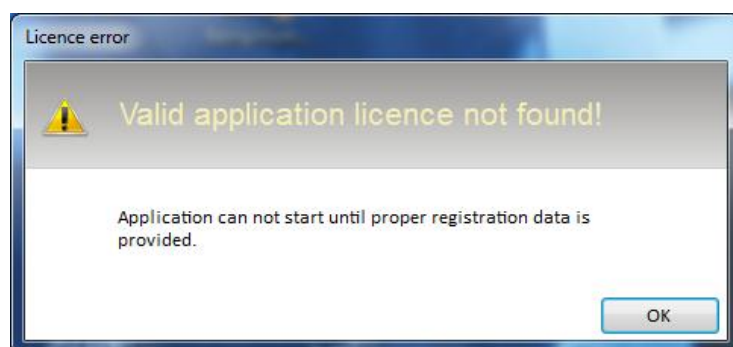


In order to help the user, "**Setup Wizard**" guides the setup process.



## 2 Software registration

Upon first start of program, there could be license error as shown below:



Once you click „**OK**“ in order to get to Application registration form, please enter registration data provided by manufacturer :

- „**License name**“
- „**Registration number**“

User can perform registration using „**Import from file**“ button, which allows us to perform registration using file provided by manufacturer.

Application registration

**KONPRO RMS**

Registration

Licence name:

Registration number:

Import from file

Register

Active licence information

Licence:	Unregistered	Registration date:	N/A
Feature set:	N/A	Expiration date:	N/A
Licence unit ID:	N/A		

Once registration data is entered, please click „**Register**“ button. If the data was correct and registration was successful, following form would appear:

Application registration

**Application registered successfully!**

Thank you for purchasing KONPRO RMS application.

OK

At this point, software is registered and user is free to create user accounts by starting program for first time.

### 3 User accounts

In order to create user account, user should create administrator account first. Using administrator account user is able to create accounts for any other user. Upon first program start after registration, following form will appear:

Program startup

**No administrator accounts found!**

Application requires at least single Administrator account to exist. Do you want to create Administrator account now?

Yes No Cancel

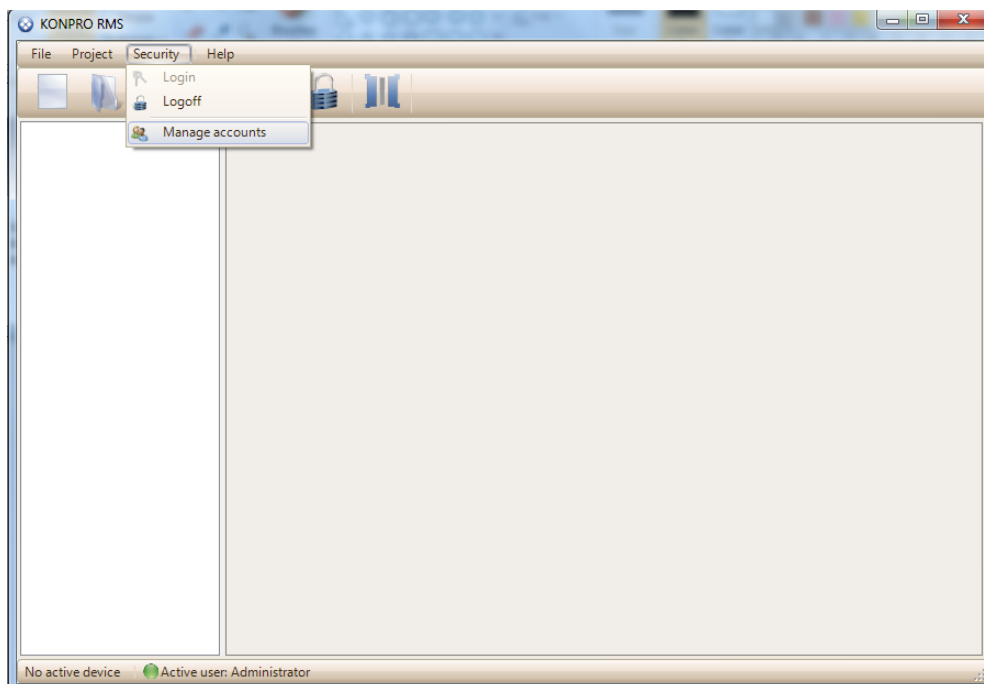
To create administrator account, please click “**Yes**” button. Following form will appear:

Please enter administrator user name and password and click the „**Apply**“ button to start program. In order to get to login form, select drop-down menu „**Security**“ and click „**Login**“ tab. Login form will appear and user is able to enter username and password in order to login:

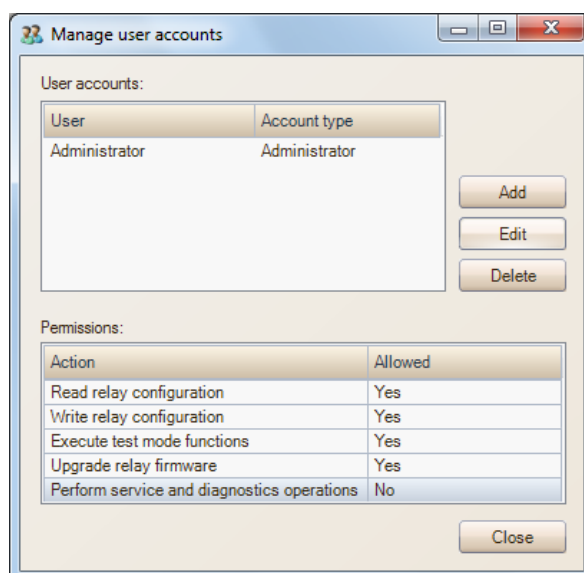
Once accurate information is entered and „**Login**“ button clicked, system will display successful logon account form:

At this point (administrator) user is able to create or edit other accounts by selecting drop-down menu „**Security**“ and select „**Manage accounts**“ tab.





Here we can add, edit or remove existing accounts using „**Add, Delete, Edit**“ buttons as shown by following form:



There are 3 types of user accounts:

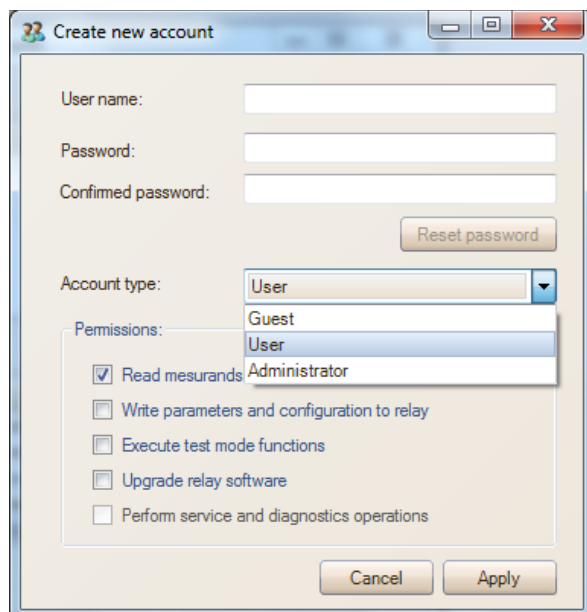
„**Guest**“ type account does not have permission nor ability to change any system settings. Using guest account, user is given access to measurement readouts and relay settings information only.

„**User**“ type account can be given following permissions:

- Measurement readouts and relay settings information access
- Editing system parameters and saving relay configuration
- Entering „Test mode“ function
- Relay firmware upgrade

„**Administrator**“ type account has default all mentioned options enabled.



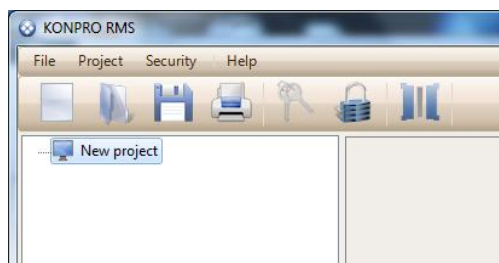


#### 4 Adding new project

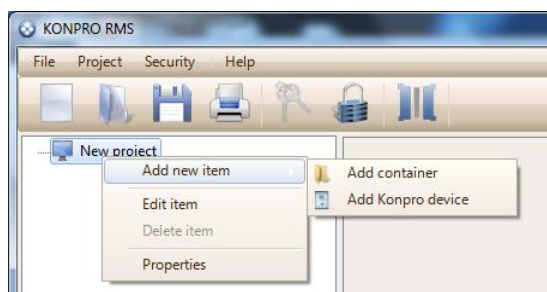
Once user is successfully logged in, new project can be created from **“File”** menu, by clicking the **„New“** tab, or by clicking button in toolbar, as displayed below:



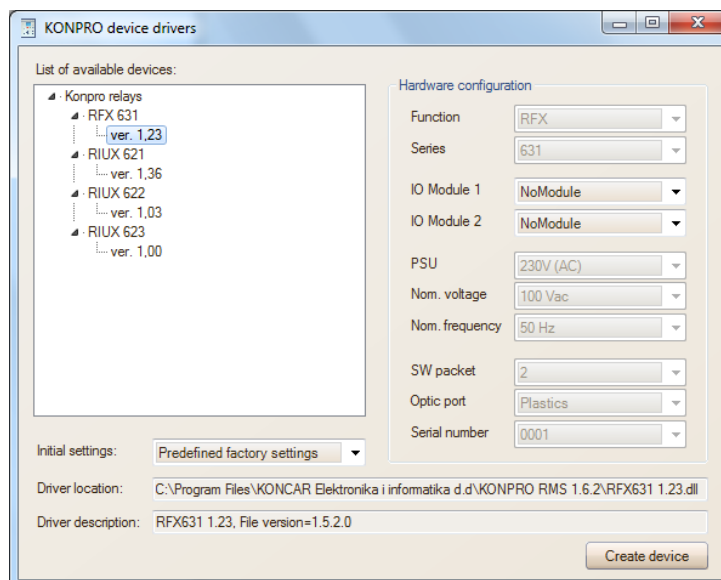
New project is created and displayed in project tree as shown below:



Using right click on **„New project“** item in project tree, drop-down menu appears containing several options displayed by following image:

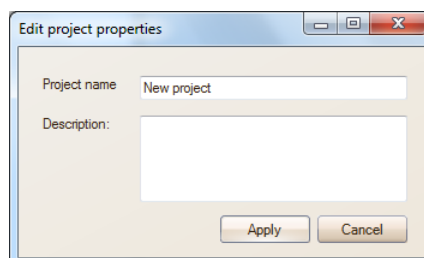


- **„Add new item“** contains following sub-items:
  - o **„Add container“** – creates sub-menu to be used as name of facility or station where relay is placed
  - o **„Add KONPRO device“** – adds relay and invokes following form:

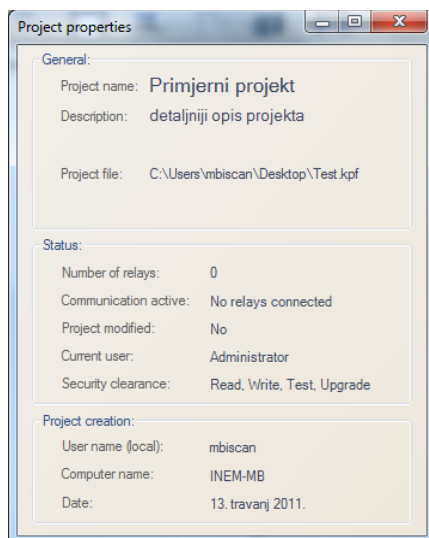


Here we are able to select what relay type is being added and what additional modules are present within. We are also able to select initial relay settings as not configured or as predefined using manufacturer settings.

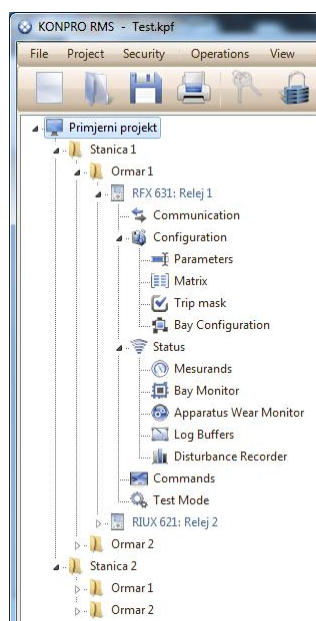
- **„Edit item“** – enables us to edit project name and description, as displayed by following image:



- **„Delete item“** – enables user to erase project. However, main project is not erasable.
- **„Properties“** – displays project information in more detail, as displayed by form below:



Using described tools, we are able to create project tree as displayed by following image:



Once project creation is complete, it is necessary to save it. To save project there should be no active communication with relay. Specific options are described in following chapters.

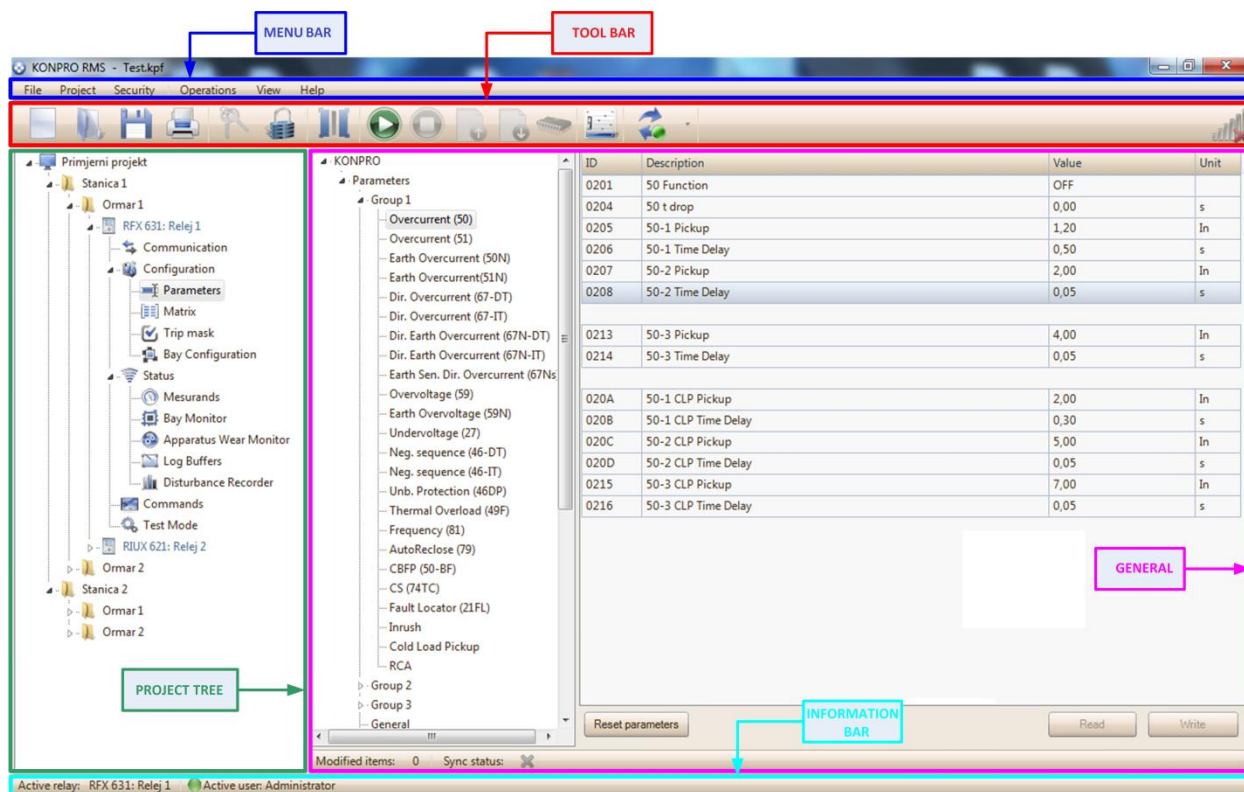
## 5 Menus and procedures

This chapter describes **KONPRO RMS** software in more detail.

### 5.1 User interface

User interface consists of following items (displayed by image below):

- Menu bar
- Tool bar
- Project tree
- Information bar
- General information container



#### 5.1.1 Tool bar



Tool bar contains basic or often used tools described below:



- New project creation



- Open existing project



- Save current project



- Current project printout



- Username and password information (login)



- User logoff



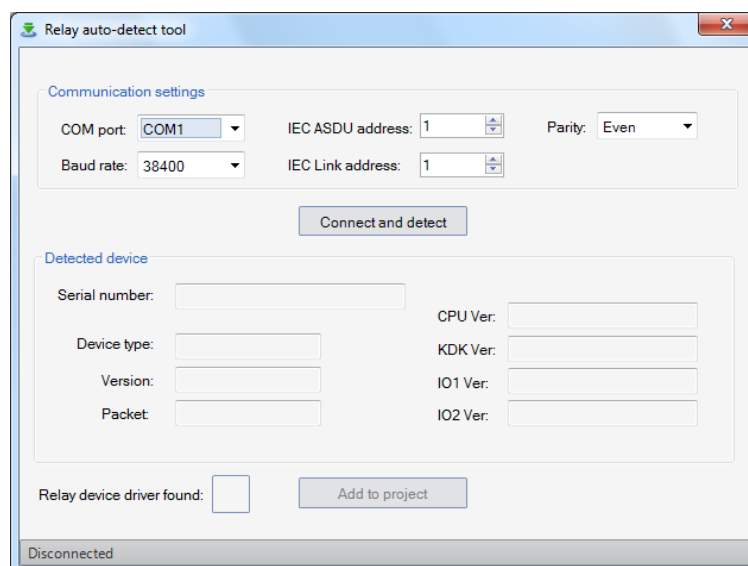
- Settings edition switch between primary and nominal



- KONVIEW application start



- Auto-detection of connected relay type (displayed below)



Once the communication settings are properly entered and „**Connect and detect**“ button clicked, relay system data (serial number, device type, version information and so on) is displayed and device can be added to project.



- Communication establish button



- Disconnect button



- Active relay parameters readout



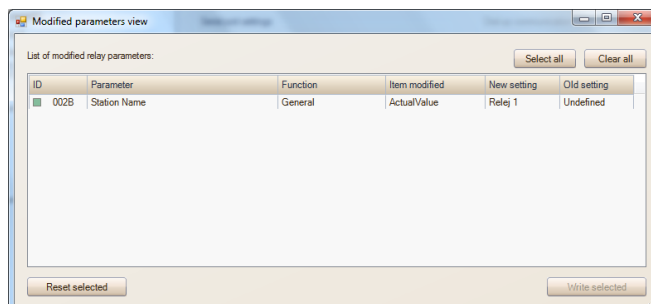
- Active parameters (to relay) transfer button



- Transferred parameters save to active relay flash memory



- Modified parameters view invoke button. Modified parameters view is useful during multiple parameters changing procedure. It offers overview and track of modified parameters on one place and selective approach to save or reset changed settings.



- Relay configuration reset button (reset to manufacturer default settings or to not configured state)



- Communication activity indicator



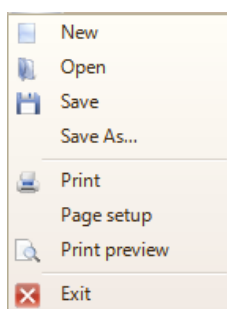
- Export IEC61850 configuration to connected device



- Export IEC61850 configuration to \*.iid format

## 5.2 File menu

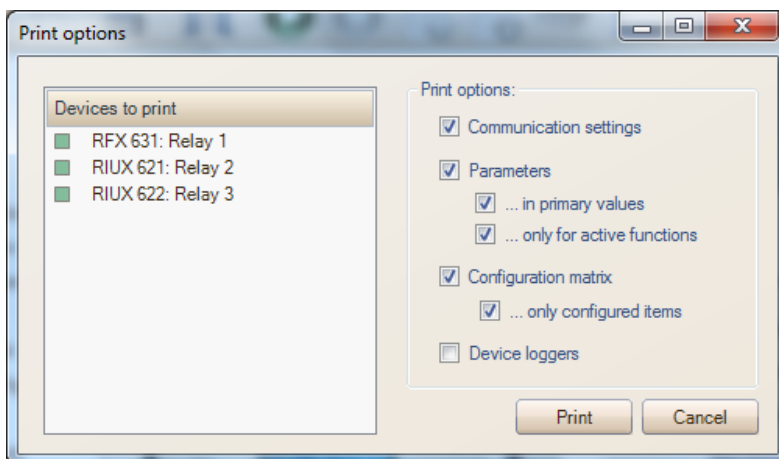
“**File**” drop-down menu contains following items (as shown by image below):



- |                   |  |
|-------------------|--|
| <b>New</b>        | - New project creation                       |
| <b>Open</b>       | - Existing project open                      |
| <b>Save</b>       | - Current project save                       |
| <b>Save as...</b> | - Current project save with option to rename |

- Print** - Settings printout
- Page Setup** - Page printout settings
- Print Preview** - Self described
- Exit** - Program shutdown

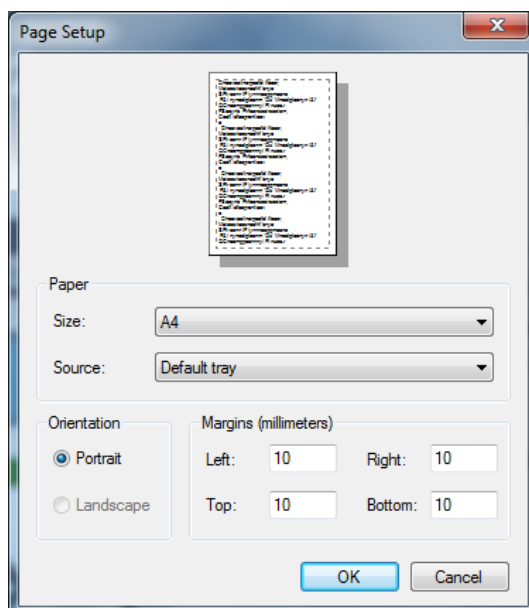
### 5.2.1 Print



In order to print relay settings, it is necessary to select relay (whether one, several or all) whose settings user wants to print. User is able to select specific settings and event records of each individual relay to be printed. Parameters to choose from are listed below (as well as shown by image above):

- **Communication settings**
- **Parameters:**
  - o In primary values
  - o Only for active functions
- **Configuration matrix:**
  - o Only configured items
- **Device loggers**

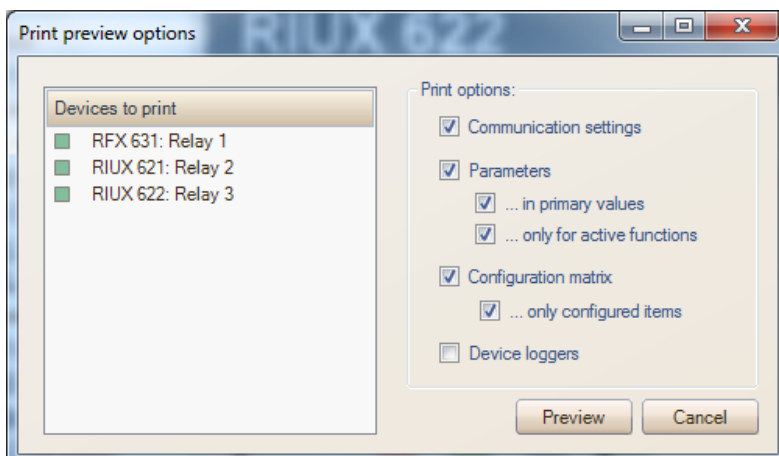
### 5.2.2 Page setup





Using page setup dialog form, user is able to configure printing margins, paper size and source.

### 5.2.3 Print preview



„**Print preview**“ contains the same options as described in chapter 5.2.1 „**Print**“. In order to print relay settings, it is necessary to select relay (whether one, several or all) whose settings user wants to print. User is able to select specific settings and event records of each individual relay to be printed. Parameters to choose from are listed below (as well as shown by image above):

- **Communication settings**
- **Parameters:**
  - o In primary values
  - o Only for active functions
- **Configuration matrix:**
  - o Only configured items
- **Device loggers**

## 5.3 Project

Menu bar contains drop-down menu **“Project”**, as shown by image below:

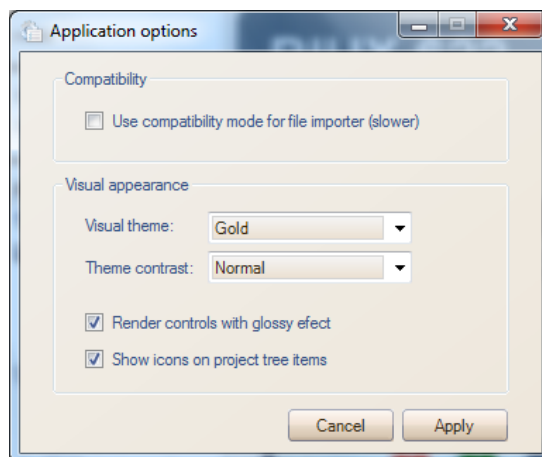


Explanations of specific sub-item functionalities are given by list below:

- Expand all** - expands whole project tree
- Collapse all** - collapses whole project tree
- RIUX 622: Relay 3** - currently selected relay with its options
  - **Import settings** - importation of earlier saved complete relay settings collection

- **Export settings** - exportation of complete relay settings collection
  - **Compare settings** - compare relay settings function
- Options** - software support options
- Properties** - general project properties

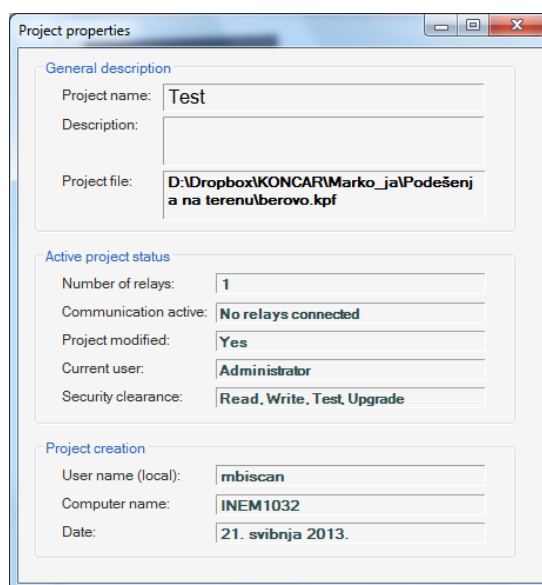
### 5.3.1 Options



If we are unable to import previous file containing relay settings into new relay, it is necessary to enable compatibility mode in Options dialog form.

Application options dialog form also contains visual appearance properties, as displayed by image above. User is able to choose between two visual themes - “**Gold**” and “**Blue**”, as well as 3 contrast themes – Light, Normal and Hard. User is offered enabling or disabling glossy effect, as well as controlling whether project tree icons shall be displayed or not.

### 5.3.2 Properties



Project properties dialog form contains general project description information (project name, description and project file path), as well as number of relays that active project contains. Furthermore, project properties dialog form contains communication activity status, project modified indication, current user account type, security clearance (user permissions), project creator (User name and Computer name) and date of project creation.

## 5.4 Security

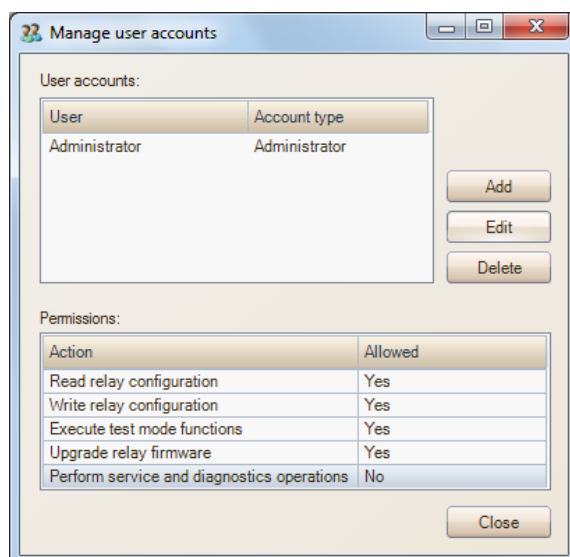
Under “**Security**” drop-down menu in Menu bar, user is offered following:



- |                        |                                   |
|------------------------|-----------------------------------|
| <b>Login</b>           | - User login form invoke          |
| <b>Logoff</b>          | - User logoff form invoke         |
| <b>Manage accounts</b> | - User account dialog form invoke |

### 5.4.1 Manage accounts

„**Manage accounts**“ dialog form contains command buttons that allow user to add, edit or delete existing user accounts.



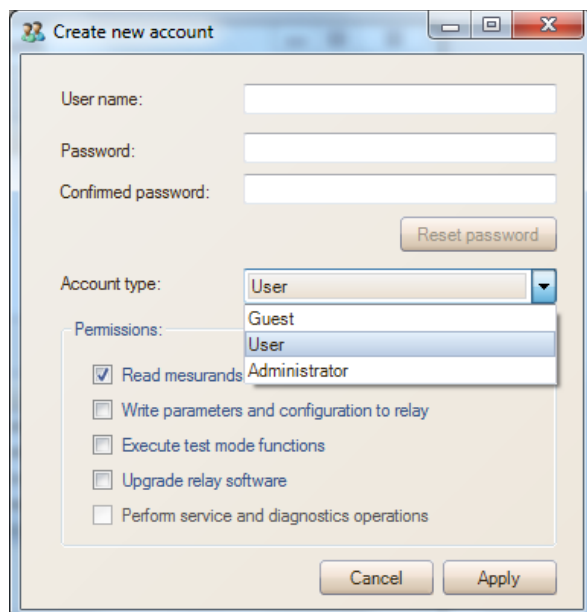
In order to create new user account, user should decide between 3 possible account types:

„**Guest**“ – Guest account type has security clearance with minimal permissions. Guest account is able to perform measurement readouts and relay settings overview, without possibility to change any relay setting.

„**User**“ – User account type can be permitted any of following:

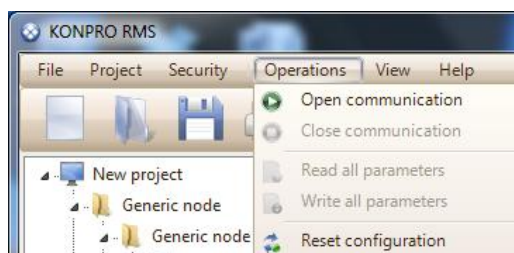
- Measurement readouts and relay configuration settings overview
- Relay parameters editing and configuration saving
- Starting of „Test mode“ function
- Relay firmware upgrade

„**Administrator**“ – Administrator account type has all above mentioned permissions allowed by default.



## 5.5 Operations

“Operations” drop-down menu is located at menu bar and contains following sub-items:

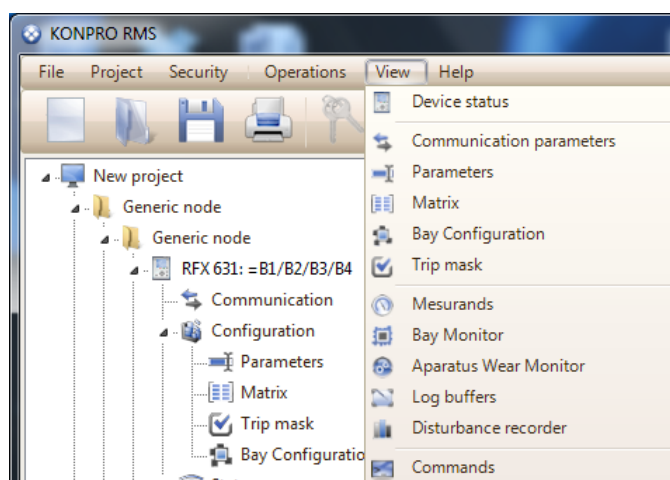


**Open communication**  
**Close communication**  
**Read all parameters**  
**Write all parameters**  
**Reset configuration**

- Relay communication initialization
- Relay communication stop
- Relay settings readout from relay
- Relay settings write to relay
- Relay configuration reset

## 5.6 View

“View” drop-down menu, located at menu bar, contains sub-items displayed by image below. These sub-items are contained under project tree as well, and will be explained in following chapters.



## 5.6.1 Device status

**RIUX 623**

**Identification**

Device generation: KONPRO  
 Device name: RIUX 623  
 Description: Numeric relay  
 Manufacturer: KONČAR - Elektronika i informatika d.d.  
 Software version: 1.00  
 Software date: 14.04.2010.

**Connected relay information**

Station name: Undefined  
 Serial number: RFX 631-00A11-200001  
 CPU sw. ver.: KPU 001: 1.26/1.05  
 LCD sw. ver.: KDK 002: 0.948  
 IO1 sw. ver.: N/A  
 IO2 sw. ver.: N/A

**Relay status**

Control type: Local  
 TRIP Type:  
 Active parameters group: 1  
 CPU temperature: 39,5°C  
 Protection active:  
 Test mode active:  
 Relay general TRIP:  
 Internal Relay Fault:

**Relay time**

Time synchronized:  
 Synchronize

„Device status“ sub-item invokes currently active relay system information screen, as shown above. The displayed data is divided into several categories:

**Identification** - General relay information:

- Device generation** - Relay product line name
- Device name** - Relay model name
- Description** - Description of relay function
- Manufacturer** - Name of manufacturer
- Software version** - Relay firmware version
- Software date** - Date of relay firmware upgrade

**Connected relay information** - Relay instance data:

- Station name** - Name of relay assigned station
- Serial number** - Relay instance serial number
- CPU sw. ver.** - Relay CPU firmware version
- LCD sw. ver.** - Relay LCD firmware version
- IO1 sw. ver.** - Relay first additional I/O unit firmware version
- IO2 sw. ver.** - Relay second additional I/O unit firmware version

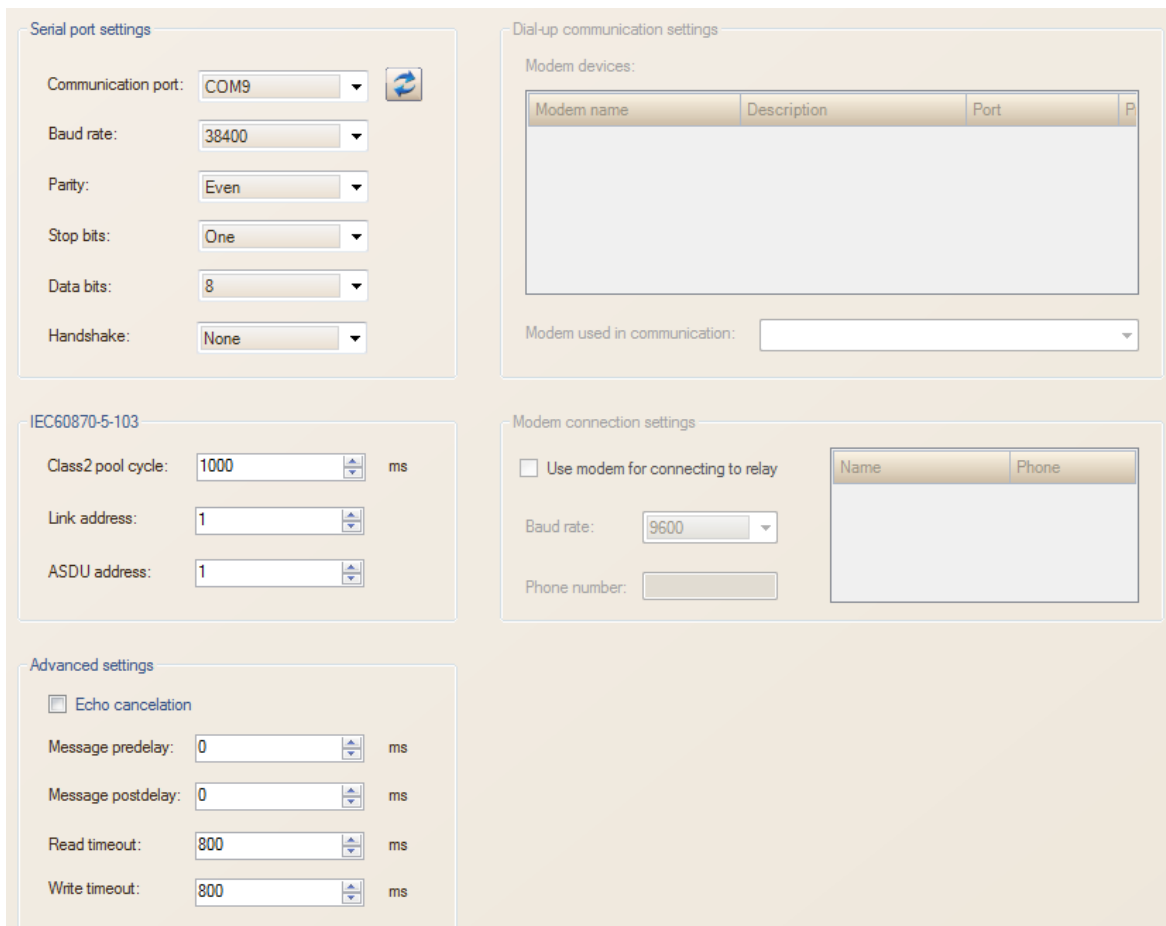
**Relay status** - Relay status information:

- Control type** - Control communication type (local or remote)
- TRIP Type** - Last protection activated function name
- Active parameters group** - Active parameters group number
- CPU temperature** - Temperature of relay CPU
- Protection active** - Indicates active protection (at least one protection function is active, not necessarily protection TRIP)

- Test mode active** - Test mode active indicator
- Relay general TRIP** - General device TRIP
- Internal Relay Fault** - Relay internal fault indicator

- Relay time** - Relay time synchronization control group
- Time synchronized** - Relay time synchronization indicator
- Synchronize** - Relay time synchronization button (time synchronization with PC time)

### 5.6.2 Communication parameters



„**Communication parameters**“ sub-item displays communication settings, as shown by image above. There are 5 control groups:

- Serial port settings**
- Communication port**
- Baud rate**
- Parity**
- Stop bits**
- Data bits**
- Handshake**

- Serial port communication parameters
- Communication port selector
- baud rate selector
- parity selector
- stop bit selector
- data bit selector
- handshake selector

- IEC60870-5-103**
- Class2 pool cycle**
- Link address**
- ASDU address**

- Relay address settings
- Not used
- Relay link address selector
- Relay ASDU address selector

- Advanced settings**
- Echo cancelation**
- Message pre-delay**
- Message post-delay**

- Additional advanced settings
- Echo enable (should be ON if relay echo is ON)
- Selection of time delay prior to message transmission
- Selection of time delay after message transmission



**Read timeout**  
**Write timeout**

- Time prior to read function timeout is declared
- Time prior to write function timeout is declared

**Dial-up communication settings**

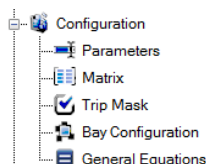
- Not used

**Modem connection settings**

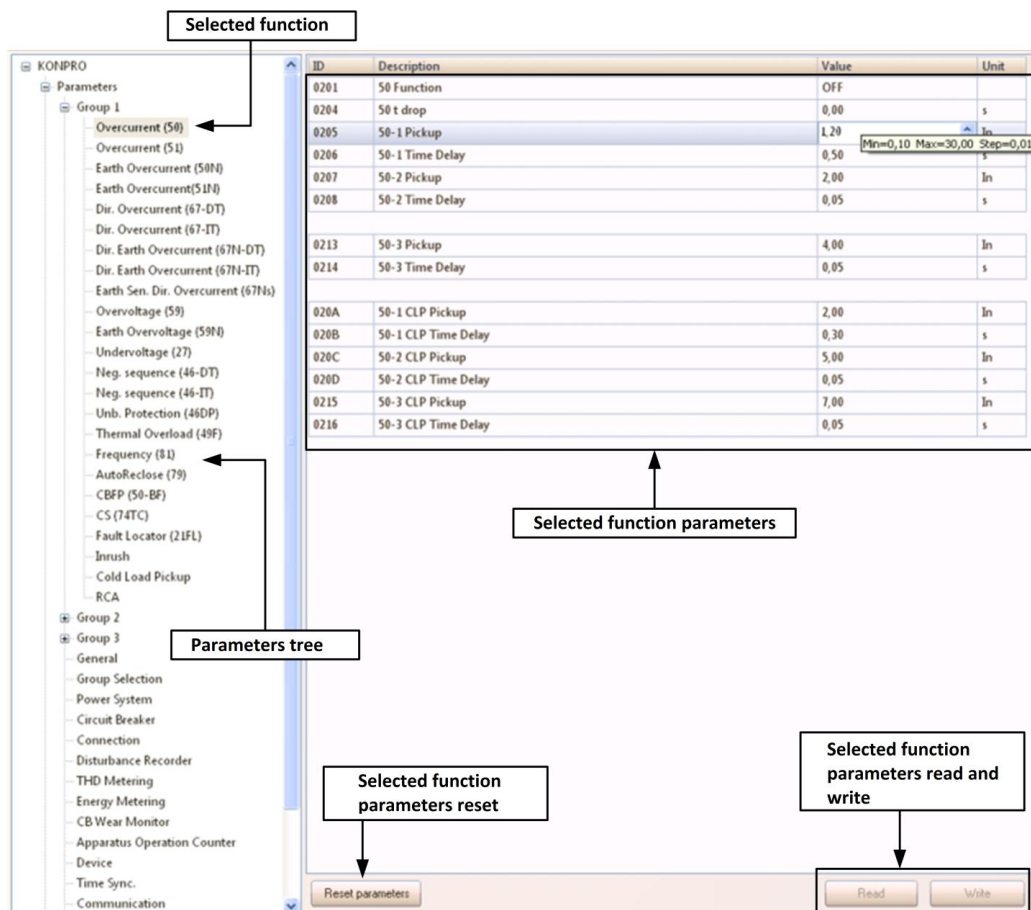
- Not used

### 5.6.3 Parameters

Further sub-items have configuration purpose and are grouped in project tree under „**Configuration**“ element, as shown by image below, whilst separated in „**View**“ drop-down menu.



#### 5.6.3.1 Parameters



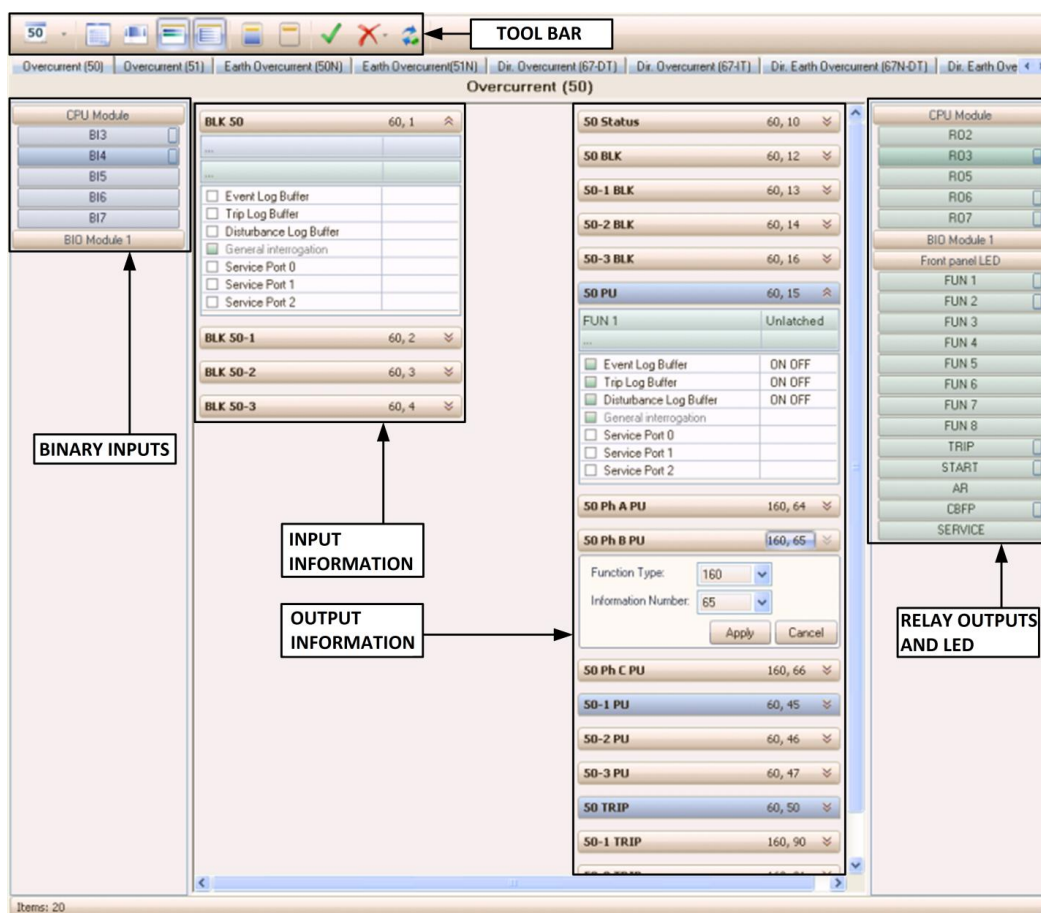
„**Parameters**“ sub-item contains both specific relay function settings overview and general relay settings. Left side of interface contains parameters tree of items grouped by function. Once specific function is selected, its parameters are displayed on right side of screen. User is able to change parameters by using double-click to invoke editing of selected textbox. If we at this point hold mouse pointer above textbox, a pop-up message containing minimal, maximal and resolution of settable parameter. Lower part of the screen contains three buttons:

**Reset parameters**  
**Read**  
**Write**

- Resets parameters of selected function to default values
- Reads relay parameters of selected function
- Stores selected function relay parameters



### 5.6.3.2 Matrix



„**Matrix**“ sub-item is used to set binary input and relay output parameters, as well as setting of relay input and output information. As displayed by image above, on top of screen there is a tool bar containing items whose explanation follows below. Lower part of screen is divided in three sections. Left section contains binary inputs of CPU and additional I/O units if present. Right section contains relay outputs of CPU and additional modules if present, with LED indicators. Middle section contains relay input and output information, grouped by protection functions.

#### Tool bar



Tool bar contains tools that simplify matrix configuration and are listed below:



- Information group selector



- Display all configured items



- Enable or disable detail configuration display



- Show or hide matrix element interconnections



- Show or hide matrix element configuration expand/collapse



- Expand current group configuration



- Collapse current group configuration



- Save all changes within matrix



- Remove all matrix interconnections or clear all elements configuration



- Reset matrix configuration to previous state

### Input information

BLK 50-1 60, 2	
BI5	High
R02	Unlatched
FUN 3	Latched
...	
<input type="checkbox"/> Event Log Buffer	ON
<input type="checkbox"/> Trip Log Buffer	ON OFF
<input type="checkbox"/> Disturbance Log Buffer	ON OFF
<input type="checkbox"/> General interrogation	
<input type="checkbox"/> Service Port 0	ON OFF
<input type="checkbox"/> Service Port 1	ON
<input type="checkbox"/> Service Port 2	ON OFF

Image above displays the Input information segment, containing binary inputs configurable table. Using inputs configurable table, user is able to activate specific input information as well as relay outputs and LEDs that are activated when adjacent information is active. There are several ways to configure binary inputs, relay outputs and LEDs:

- Using right click on empty field in information configuration offers drop-down menu containing „Add“ item and sub-menu that contains all binary inputs or relay outputs and LEDs, depending on field that was right clicked.
- Using „Drag and drop“, user is able to place any binary input, relay output or LED to proper information field.

Once we matched specific binary input with an information, we are able to select whether binary input is active in its „High“ or „Low“ state. Relay outputs and LEDs can be configured to stay ON even after corresponding information is deactivated („Latched“), or to turn OFF once corresponding information is deactivated („Unlatched“).

Each individual information (or variable) can be logged or not. There are several loggers: Disturbance logger, Event logger and Trip logger. Each logger event can be mapped to be transmitted to communication outputs (0,1 and 2). Each change can be sent or saved on each change from ON to OFF state („ON“), or to be sent or saved on any change („ON OFF“).

## Output information

50 PU 60, 15	
FUN 1	Unlatched
RO5	Latched
...	
<input type="checkbox"/> Event Log Buffer	ON OFF
<input type="checkbox"/> Trip Log Buffer	ON OFF
<input type="checkbox"/> Disturbance Log Buffer	ON OFF
<input type="checkbox"/> General interrogation	
<input type="checkbox"/> Service Port 0	ON OFF
<input type="checkbox"/> Service Port 1	ON
<input type="checkbox"/> Service Port 2	ON


50-3 BLK 60, 16	
...	
<input type="checkbox"/> Event Log Buffer	
<input type="checkbox"/> Trip Log Buffer	
<input type="checkbox"/> Disturbance Log Buffer	
<input checked="" type="checkbox"/> General interrogation	
<input type="checkbox"/> Service Port 0	
<input type="checkbox"/> Service Port 1	
<input checked="" type="checkbox"/> IEC 61850	ON OFF

Output information table, as shown by image above, offers configuration of relay output and LEDs. Configuration of binary inputs is not possible from this point. Configuration procedures are equivalent to ones used by input information configuration. If relay is equipped with IEC61850 communication protocol, in order to use specific information within IEC61850, it is necessary to configure it as shown by image above.

BLK 50-1 60, 2	
Function Type:	60
Information Number:	2
<input type="button" value="Apply"/> <input type="button" value="Cancel"/>	

User is able to change each input and output information FUN and INF number. If we click on upper right number (60,2 as displayed by image above), drop-down menu appears, containing function type and information number change controls. It is not possible to choose FUN and INF parameters that are already assigned.

As we use specific binary input, relay output or LED, usage indicator is charged on right side in information table row. Usage indicator is useful to determine amount of usage of specific input, output or LED (we can use it up to 10 times). Using double click on input, output or LED program displays drop-down menu that contains all the information (variables) where selected binary input, relay output or LED is being used, as shown by image below. If we double click one of items on mentioned list, program will take us to the selected information (variable) group.

RO2	
RO3	
46 PU 74TC Failure <b>Power System Fault</b> Gen. SPI Status 1 Gen. SPI Status 2	

## 5.6.3.3 Trip mask

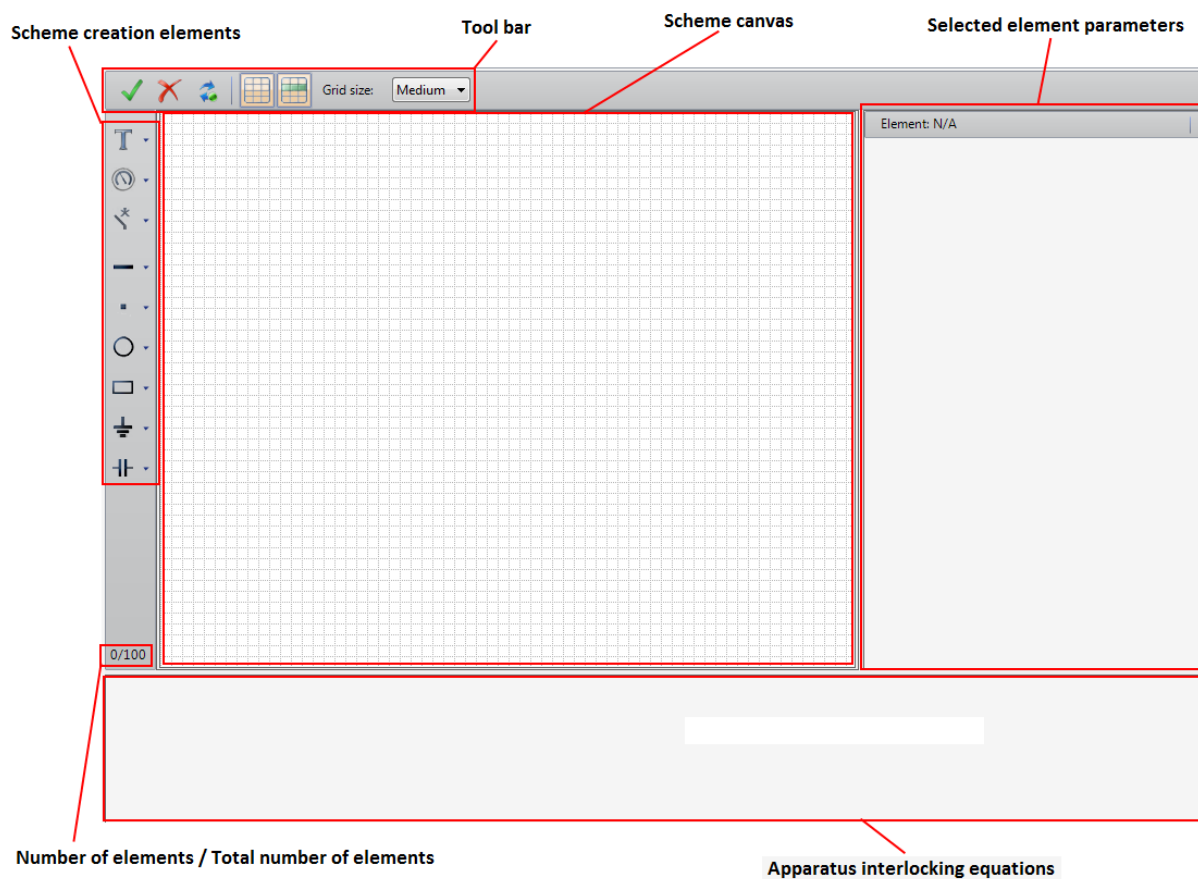
Trip element	Corresponding Function	Group 1	Group 2	Group 3
<input type="checkbox"/> External Trip				
<input type="checkbox"/> 50 TRIP	Overcurrent (50)	I>, I>>, I>>>	OFF	OFF
<input type="checkbox"/> 50-1 TRIP				
<input type="checkbox"/> 50-2 TRIP				
<input type="checkbox"/> 50-3 TRIP				
<input type="checkbox"/> 51 TRIP	Overcurrent (51)	OFF	OFF	OFF
<input type="checkbox"/> 50N TRIP	Earth Overcurrent (50N)	OFF	OFF	OFF
<input type="checkbox"/> 50N-1 TRIP				
<input type="checkbox"/> 50N-2 TRIP				
<input type="checkbox"/> 50N-3 TRIP				
<input type="checkbox"/> 51N TRIP	Earth Overcurrent(51N)	ON	OFF	OFF
<input type="checkbox"/> 67 TRIP	Dir. Overcurrent (67-DT)	OFF	OFF	OFF
<input type="checkbox"/> 67-1 TRIP				
<input type="checkbox"/> 67-2 TRIP				
<input type="checkbox"/> 67-3 TRIP				
<input type="checkbox"/> 67 IT TRIP	Dir. Overcurrent (67-IT)	OFF	OFF	OFF
<input type="checkbox"/> 67N TRIP	Dir. Earth Overcurrent (67N-DT)	OFF	OFF	OFF
<input type="checkbox"/> 67N-1 TRIP				
<input type="checkbox"/> 67N-2 TRIP				
<input type="checkbox"/> 67N-3 TRIP				
<input type="checkbox"/> 67N IT TRIP	Dir. Earth Overcurrent (67N-IT)	OFF	OFF	OFF
<input type="checkbox"/> 59 TRIP	Overvoltage (59)	U>, U>>	OFF	OFF
<input type="checkbox"/> 59-1 TRIP				
<input type="checkbox"/> 59-2 TRIP				
<input type="checkbox"/> 27 TRIP	Undervoltage (27)	OFF	OFF	OFF
<input type="checkbox"/> 27-1 TRIP				
<input type="checkbox"/> 27-2 TRIP				
<input type="checkbox"/> 81 TRIP	Frequency (81)	OFF	OFF	OFF
<input type="checkbox"/> 81-1 TRIP				
<input type="checkbox"/> 81-2 TRIP				
<input type="checkbox"/> 81-3 TRIP				
<input type="checkbox"/> 81-4 TRIP				
<input type="checkbox"/> 46 TRIP	Neg. sequence (46-DT)	OFF	OFF	OFF
<input type="checkbox"/> 46-1 TRIP				
<input type="checkbox"/> 46-2 TRIP				
<input type="checkbox"/> 46IT TRIP	Neg. sequence (46-IT)	OFF	OFF	OFF
<input type="checkbox"/> 67Ns TRIP	Earth Sen. Dir. Overcurrent (67Ns)	OFF	OFF	OFF
<input type="checkbox"/> 67Ns-1 TRIP				
<input type="checkbox"/> 67Ns-2 TRIP				
<input type="checkbox"/> 59N TRIP	Earth Overvoltage (59N)	OFF	OFF	OFF
<input type="checkbox"/> 59N-1 TRIP				
<input type="checkbox"/> 59N-2 TRIP				
<input type="checkbox"/> 46DP TRIP	Unb. Protection (46DP)	OFF	OFF	OFF
<input type="checkbox"/> 49F TRIP	Thermal Overload (49F)	OFF	OFF	OFF

„**Trip mask**“ configuration table is used to determine protections that are used for switch TRIP or just for signalization. It is possible to select only one protection so that only one level of specific protection TRIPs the switch, while remaining have only signalization purpose. For example, if we mark „**50 TRIP**“ element for „**Overcurrent [50]**“ corresponding function only, all the levels of that protection will TRIP the switch. If we, on the other hand, mark the „**50 TRIP**“ element for „**50-2 TRIP**“, only second level of overcurrent protection will TRIP the switch.

Once user has chosen all the necessary protections, next step is to save trip mask using „**Write Trip Mask**“ button in lower right part of screen. Once trip mask is saved, it is necessary to write it to relay „Flash“ memory using tool bar commands.

„**Tripmask**“ table contains „**Reset mask**“ button that resets trip mask to default, not configured state. Using „**Read Trip Mask**“ user is able to read trip mask from relay.

#### 5.6.3.4 Bay Configuration



„**Bay Configuration**“ menu (shown by image above) is used to configure first screen of RFX, RFD, RFC and RFM relays. It consists of several main sections whose explanation follows.

Tool bar:



- Apply and save front screen configuration



- Erase current front screen configuration



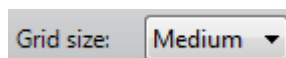
- Roll back front screen configuration to last saved state



- Show/hide canvas grid



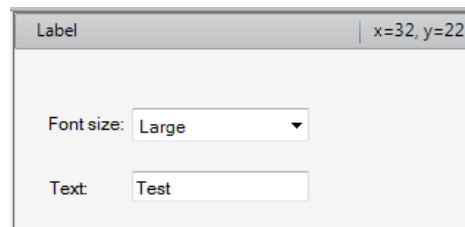
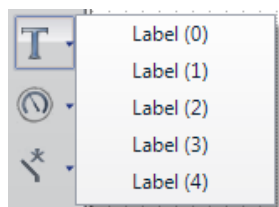
- Enable/disable align to grid



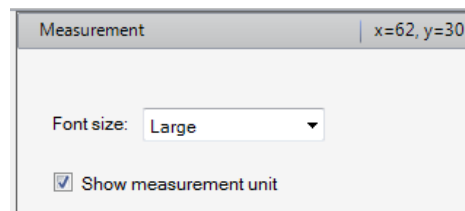
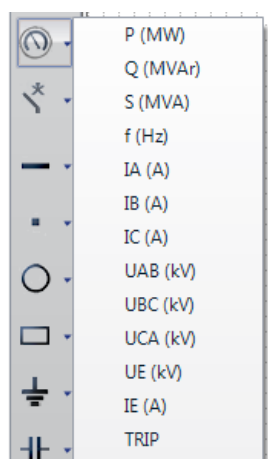
- Grid size menu with small, medium and large options

Following section offers explanation of available scheme creation elements:

- **„Labels“:** It is possible to place up to 5 labels on LCD display, as shown by image below. Each label can contain up to 12 letters. For each individual label it is possible to select small or large font size. Font size is selected using click on label and selection of specific label from drop-down menu in order to invoke Label parameters form as shown by image below:



- **„Measurands“:** Depending on relay type (RFX, RFC, RFD, RFM), there are different sets of measurands that can be displayed on relay LCD, together with scheme. Image below displays list of measurands for RFX relay type. Once specific measurand is placed on LCD screen, using left click on that measurand, measurand font size can be selected, as well as whether measurement unit will be displayed or not, as shown by image below:



- **„Switchgear“:** It is possible to add up to 10 switchgear elements (apparatus) on LCD screen (main (protected) switch included). Main switch can be added only once, with exception for RFD relay where it can be added twice. If we click on specific switchgear element, it will be displayed on screen with its name. Name of switchgear element can be changed the same way as described for Label elements. Using **“Delete”** button on keyboard it is possible to delete element name. Using right click on specific switchgear element, drop-down menu appears. When we add truck element, it will be added on display as two symbols with common parameters. In case that some of the symbols is not needed, they can be removed using **“Delete”** button on keyboard.



Apparatus x=17, y=75

Name:  Type: 2 Inputs

**Inputs**

Opened  Opened

Closed  Grounded

**Outputs**

Open  Open

Close  Ground

Description	Value	Unit
Control Enabled	NO	
t-pulse ON	0,25	s
t-pulse OFF	0,25	s
t-FeedBack	1,00	s

IEC103 (FUN, INF)

Status: 215, 105

CMD: 216, 5

Apparatus x=70, y=37

Name:  Type: 3 Inputs

**Inputs**

Opened  Opened

Closed  Grounded

**Outputs**

Open  Open

Close  Ground

Description	Value	Unit
Control Enabled	NO	
GND Control Enabled	NO	
t-pulse ON	0,25	s
t-pulse OFF	0,25	s
t-FeedBack	1,00	s

IEC103 (FUN, INF)

Status: 215, 103 Status GND: 215, 104

CMD: 216, 3 CMD GND: 216, 4

Each apparatus has following parameters:

- **Name** Apparatus label (if apparatus label is not displayed, it can be added using double click). Apparatus name can be up to 6 letters long.
- **Type** Apparatus type (each apparatus except for switch, is of "2 inputs" type (their state is determined from two binary input states and for them this parameter is not configurable). For switch apparatus, user is able to choose whether its state is determined from states of 3 or 4 binary inputs.
- **Inputs/Opened1** Selection of opened apparatus status active binary input. Predefined binary input for main switch is BI1.
- **Inputs/Closed** Selection of closed apparatus state active binary input. Predefined binary input for main switch is BI2.
- **Inputs/Opened2** This parameter is used only for the switch apparatus that uses 4 binary inputs for apparatus state determination. It is necessary to select binary input that is active while switch state is "not grounded".
- **Inputs/Grounded** This parameter is used only for the switch apparatus. It is necessary to select binary input that is active while the switch apparatus state is "grounded".
- **Outputs/Open1** Used only when "Control enabled" parameter is „ON“. It is necessary to select relay output whose function will be to disconnect apparatus on command. Predefined relay output for main switch is RO1.
- **Outputs/Close1** Used only when „Control Enabled“ parameter is „ON“. It is necessary to select relay output whose function will be to connect apparatus on command. Predefined relay output for main switch is RO4.
- **Outputs/Open2** This parameter is used only for the switch apparatus while parameter „GND Control Enabled“ status is "ON". It is necessary to select relay output that will unground the switch upon command.
- **Outputs/Close2** This parameter is used only for the switch apparatus while parameter „GND Control Enabled“ status is "ON". It is necessary to select relay output that will ground the switch upon command.
- **Control Enabled** Enables apparatus control in case of switch apparatus.
- **GND Control Enabled** Enables control of switch apparatus GND
- **t-pulse ON** Determines duration of connect impulse. t-pulse ON parameter can be set as low as 0,10s up to 30,00s with 0,01s.
- **t-pulse OFF** Determines duration of disconnect impulse. t-pulse OFF parameter can be set as low as 0,10s up to 30,00s with 0,01s.



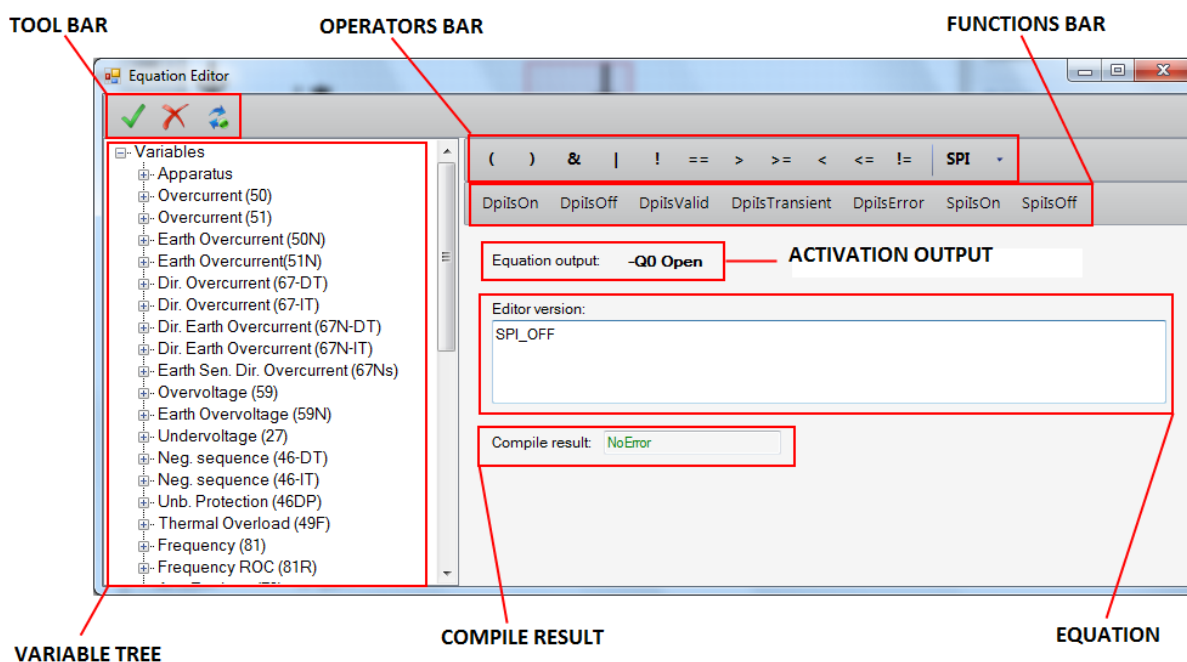
- **t-FeedBack** Successful command execution feedback information timeout. If not received within specified time period, "Timeout" error occurs. T-FeedBack parameter can be set as low as 0,10s up to 30,00s with 0,01s step.
- **CB Control** This parameter exists only for main (protected) switch and, in case switching from „Default“ to „Custom“, enables new relay output selection for local and remote switch control, while predefined relay outputs are being used for protected functions and APU.
- **IEC103/Status** IEC103 apparatus status address
- **IEC103/CMD** IEC103 apparatus command address
- **IEC103/Status GND** IEC103 apparatus status address (switch GND)
- **IEC103/CMD GND** IEC103 apparatus command address (switch GND)

If specific apparatus control is enabled, control enabling equation is displayed in associated part of screen, as shown by image below. First two equations are displayed for each apparatus, while remaining two are displayed only for switch apparatus is and control of both parts is enabled.

Open :	SPI_OFF	...
Close :	SPI_OFF	...
Grounded :	SPI_OFF	...
Grounded OFF:	SPI_OFF	...

Factory equation setup disables system control. In order to enable system control, it is necessary to properly set up apparatus equations. Button on right end of each equation invokes equation editor form, described in following chapter.

### 5.6.3.5 Equation Editor



Equation editor tool bar contains elements:



- Apply and save equation configuration



- Erase current equation configuration



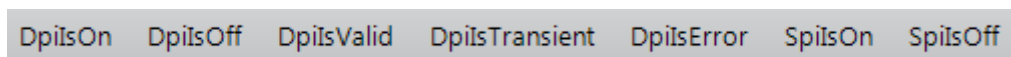
- Roll back equation configuration to last saved state

Next image displays operators bar that consists of items listed below:



- Open parentheses
- Closed parentheses
- Logic operator „AND“
- Logic operator „OR“
- Logic operator „NOT“
- Logic operator „GREATER“
- Logic operator „GREATER OR EQUAL“
- Logic operator „LESS“
- Logic operator „LESS OR EQUAL“
- Logic operator „IS DIFFERENT“
- SPI\_ON → LOGICAL 1
- SPI\_OFF → LOGICAL 0

Function bar is displayed by following image with their explanation listed below:



<b>DpiIsOn</b>	- function returns logical 1 if DPI variable equals 2, else returns 0
<b>DpiIsOff</b>	- function returns logical 1 if DPI variable equals 1, else returns 0
<b>DpiIsValid</b>	- function returns logical 1 if DPI variable equals 1 or 2, else returns 0
<b>DpiIsTransient</b>	- function returns logical 1 if DPI variable equals 0, else returns 0
<b>DpiIsError</b>	- function returns logical 1 if DPI variable equals 3, else returns 0
<b>SpiIsOn</b>	- function returns logical 1 if SPI variable equals 1, else returns 0
<b>SpiIsOff</b>	- function returns logical 1 if SPI variable equals 0, else returns 0

Functions **SpiIsOff** and **SpiIsOn** are used only with variables contained in group **User Defined Data** that in their name contain **SPI**.

Equation editor is not capable to receive text input. Equation is created using operators and function bar elements. If created equation contains logic error, „Compile Result“ field will display error.

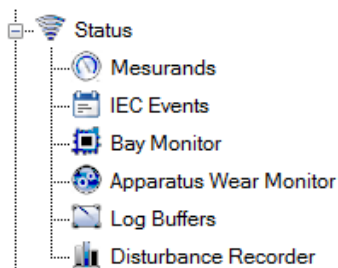
#### 5.6.3.6 General Equations



„**General Equations**“ section contains 4 equations that returns logical 0 by default. Resulting variable of these functions is contained in matrix. Button on right end of each equation invokes equation editor form, described in “Equation editor” chapter.

### 5.6.4 Status

Inputs and outputs status overview, measurements, disturbance and event logger configuration is performed using following configuration forms, that are grouped in project tree under „**Status**“ element, as shown by image below (they can be found in „**View**“ menu, where they are separated).



#### 5.6.4.1 Measurands



**Measurements**

Nominal	Primary	Secondary	Energy	49F	Fault Loc.
IA	0.00	In			
IB	0.00	In			
IC	0.00	In			
IE	0.00	In			
UA	0.00	Un			
UB	0.00	Un			
UC	0.00	Un			
UAB	0.00	Un			
UBC	0.00	Un			
UCA	0.00	Un			
UE	0.00	Un			
U1	0.00	Un			
U2	0.00	Un			
I1	0.00	In			
I2	0.00	In			
IE cos phi	0.00	In			

**I/O status**

IO module 1	IO module 2	CPU module	KDK module
RO101	BI201	BI1	FUN 1
RO102	BI202	BI2	FUN 2
RO103	BI203	BI3	FUN 3
RO104	BI204	BI4	FUN 4
RO105	BI205	BI5	FUN 5
RO106	BI206	BI6	FUN 6
RO107	BI207	BI7	FUN 7
RO108	BI208	BI8	FUN 8
RO109	RO201	RO1	TRIP
RO110	RO202	RO2	START
RO111	RO203	RO3	AR
RO112	RO204	RO4	CBFP
RO113	RO205	RO5	SERVICE
RO114	RO206	RO6	REMOTE
RO115	RO207	RO7	LOCAL
RO116	RO208	RO8	

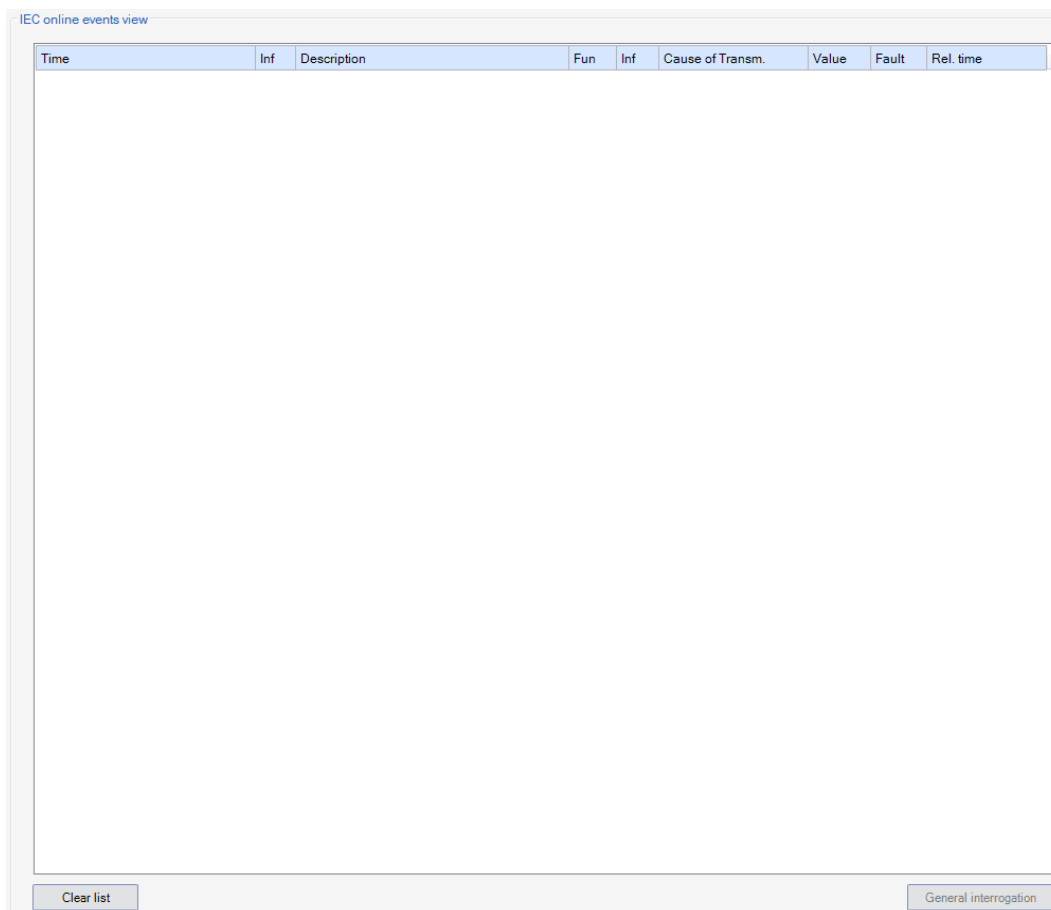
**IEC online events view**

Time	Inf	Description	Fun	Inf	Cause of Transm.	Value	Fault	Rel. time

Clear list      General interrogation

„**Measurands**“ section contains overview of current status of all measurements that are present on relay front display, as well as current state of all relay outputs, binary inputs and LEDs, as shown by image above. At same time, measurands section (under “IEC online events view” group) offers overview of changes and events that are configured to be transmitted over communication port at use. Using „**General interrogation**“ button it is possible to check current status of configured events.

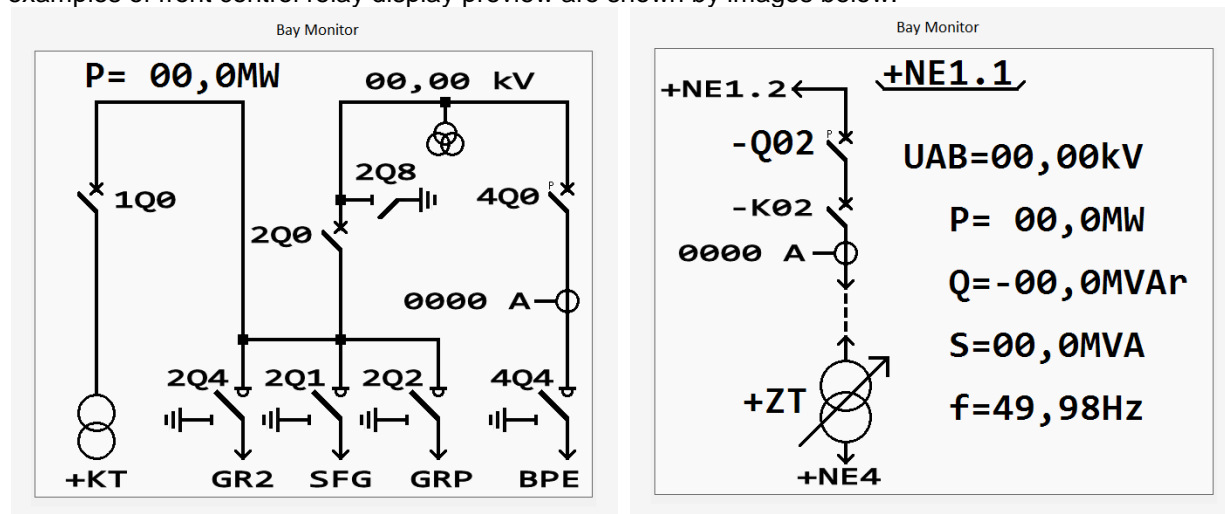
### 5.6.4.2 IEC Events



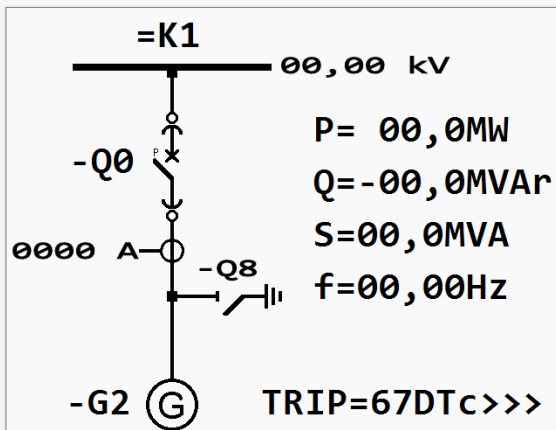
„IEC Events“ form contains information overview that are being transmitted using communication port according to IEC103 communication protocol. „General Interrogation“ button lists information configured to be transmitted over any communication port (can be useful for check of relay SCADA configuration). „IEC Events“ form can be used only while communication with relay is active, not during save data process or while communication with relay is not established.

### 5.6.4.3 Bay Monitor

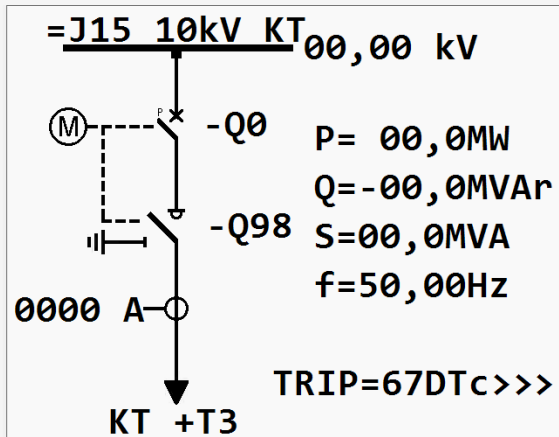
„Bay Monitor“ menu contains simple preview of front control relay display (except RIUX relay). Few examples of front control relay display preview are shown by images below:



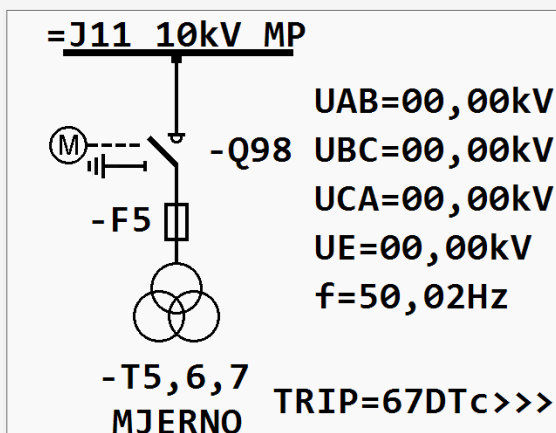
Bay Monitor



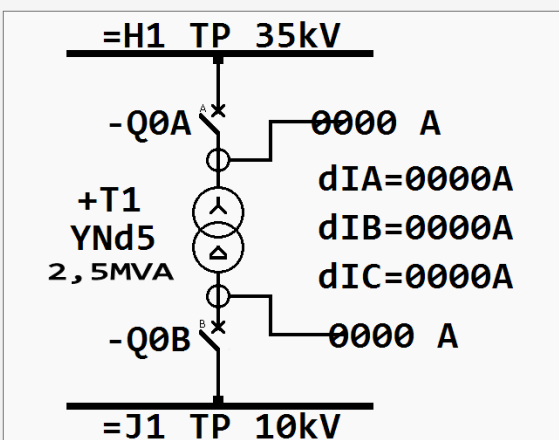
Bay Monitor



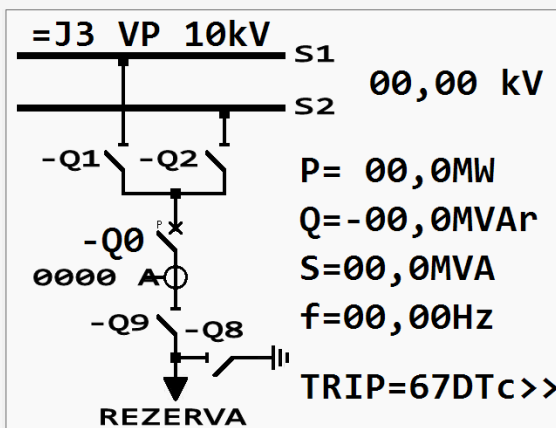
Bay Monitor



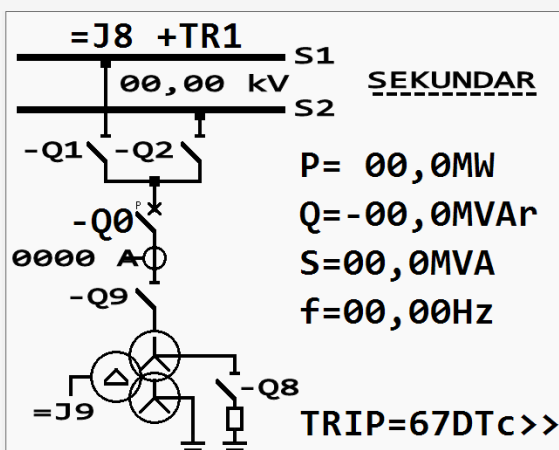
Bay Monitor



Bay Monitor



Bay Monitor



#### 5.6.4.4 Apparatus Wear Monitor

**CB Wear Monitor**

Function active: **OFF**      T-opening: 0,065 s  
 $\Sigma I^2 >$ : 15000      T-breaking: 0,080 s

Operating time	<input type="text" value="0"/>	h
Number of TRIPs	<input type="text" value="0"/>	
$\Sigma I_A$	<input type="text" value="0"/>	kA
$\Sigma I_B$	<input type="text" value="0"/>	kA
$\Sigma I_C$	<input type="text" value="0"/>	kA
$\Sigma I_A^2$	<input type="text" value="0"/>	
$\Sigma I_B^2$	<input type="text" value="0"/>	
$\Sigma I_C^2$	<input type="text" value="0"/>	

**Apparatus operation counter**

Operation counter 4Q0	<input type="text" value="0"/>
Operation counter 4Q4	<input type="text" value="0"/>
Operation counter 4Q4 GND	<input type="text" value="0"/>
Operation counter 1Q0	<input type="text" value="0"/>
Operation counter 2Q0	<input type="text" value="0"/>
Operation counter 2Q8	<input type="text" value="0"/>
Operation counter 2Q4	<input type="text" value="0"/>
Operation counter 2Q4 GND	<input type="text" value="0"/>
Operation counter 2Q1	<input type="text" value="0"/>
Operation counter 2Q1 GND	<input type="text" value="0"/>
Operation counter 2Q2	<input type="text" value="0"/>
Operation counter 2Q2 GND	<input type="text" value="0"/>

„Apparatus Wear Monitor“ menu (left side) contains data regarding sums of switch TRIP currents, as well as additional data regarding operation time and number of TRIPs performed, as shown by image above. Right side of apparatus wear monitor contains data regarding control display contained apparatus operation counters.

#### 5.6.4.5 Log Buffers

Update logs    Delete logs    Reset all logs    Options

Event logger    Trip logger    Disturbance logger

Information	Date and time	Indication	Cause of transmission	Value
58113	10. lipnja 2011. 15:07:51.388	1A Status	Spontaneous	OFF
65045	10. lipnja 2011. 15:07:51.405	Gen. SPI Status 1	Spontaneous	ON
65046	10. lipnja 2011. 15:07:51.406	Gen. SPI Status 2	Spontaneous	ON
42504	10. lipnja 2011. 15:07:51.839	27 PU	Spontaneous	OFF
42507	10. lipnja 2011. 15:07:51.839	27 TRIP	Spontaneous	OFF
40985	10. lipnja 2011. 15:07:51.842	Relay GENERAL TRIP	Spontaneous	OFF
40994	10. lipnja 2011. 15:07:51.842	Power System Fault	Spontaneous	OFF
58113	10. lipnja 2011. 15:07:59.354	1A Status	Spontaneous	Transient
65045	10. lipnja 2011. 15:07:59.363	Gen. SPI Status 1	Spontaneous	OFF
65046	10. lipnja 2011. 15:07:59.364	Gen. SPI Status 2	Spontaneous	OFF
58113	10. lipnja 2011. 15:07:59.366	1A Status	Spontaneous	ON
40994	10. lipnja 2011. 15:07:59.401	Power System Fault	Spontaneous	ON
42504	10. lipnja 2011. 15:07:59.402	27 PU	Spontaneous	ON
42507	10. lipnja 2011. 15:07:59.600	27 TRIP	Spontaneous	ON
40985	10. lipnja 2011. 15:07:59.601	Relay GENERAL TRIP	Spontaneous	ON
40985	10. lipnja 2011. 15:07:59.603	Relay GENERAL TRIP		Ia = 0,78A, Ib = 0,78A, Ic = 0,78A, Io = 0,31A
58113	10. lipnja 2011. 15:08:00.683	1A Status	Spontaneous	Transient
58113	10. lipnja 2011. 15:08:00.693	1A Status	Spontaneous	OFF
65045	10. lipnja 2011. 15:08:00.704	Gen. SPI Status 1	Spontaneous	ON
65046	10. lipnja 2011. 15:08:00.704	Gen. SPI Status 2	Spontaneous	ON
42504	10. lipnja 2011. 15:08:00.710	27 PU	Spontaneous	OFF
42507	10. lipnja 2011. 15:08:00.710	27 TRIP	Spontaneous	OFF
40985	10. lipnja 2011. 15:08:00.713	Relay GENERAL TRIP	Spontaneous	OFF
40994	10. lipnja 2011. 15:08:00.714	Power System Fault	Spontaneous	OFF
40961	15. lipnja 2011. 9:01:07.007	Device operative	Spontaneous	ON
40994	15. lipnja 2011. 9:01:09.012	Power System Fault	Spontaneous	ON
49925	15. lipnja 2011. 9:01:09.013	FUN 5	Spontaneous	ON
42504	15. lipnja 2011. 9:01:09.013	27 PU	Spontaneous	ON
49925	15. lipnja 2011. 9:01:09.016	FUN 5	Spontaneous	ON
42507	15. lipnja 2011. 9:01:09.016	27 TRIP	Spontaneous	ON
58113	15. lipnja 2011. 9:01:09.019	1A Status	Spontaneous	Transient

Event count = 500    New events = 500

„Log buffers“ menu contains tools for logs update, deletion, reset and options menu, together with event logger, trip logger and disturbance logger tabs. Options menu contains view options for logger display.



Event logger, shown by image above, contains information number, timestamp, indication, cause of transmission and value. Transmission cause can be spontaneous, remote and local.

Trip logger tab is shown by image below. Trip logger contains events sorted by fault number placed on left part of screen. Options menu offers selection whether event filtration will be performed according to „**Power system fault**“ or not. If „**Power system fault**“ filtration is selected, only events recorded in time window between „**Power system fault → ON**“ and „**Power system fault → OFF**“ information timestamp will be displayed. „**Power system fault**“ information must be configured to be included in logger, as well as „**General relay trip**“ information that enables all relay currents view at the time of fault.

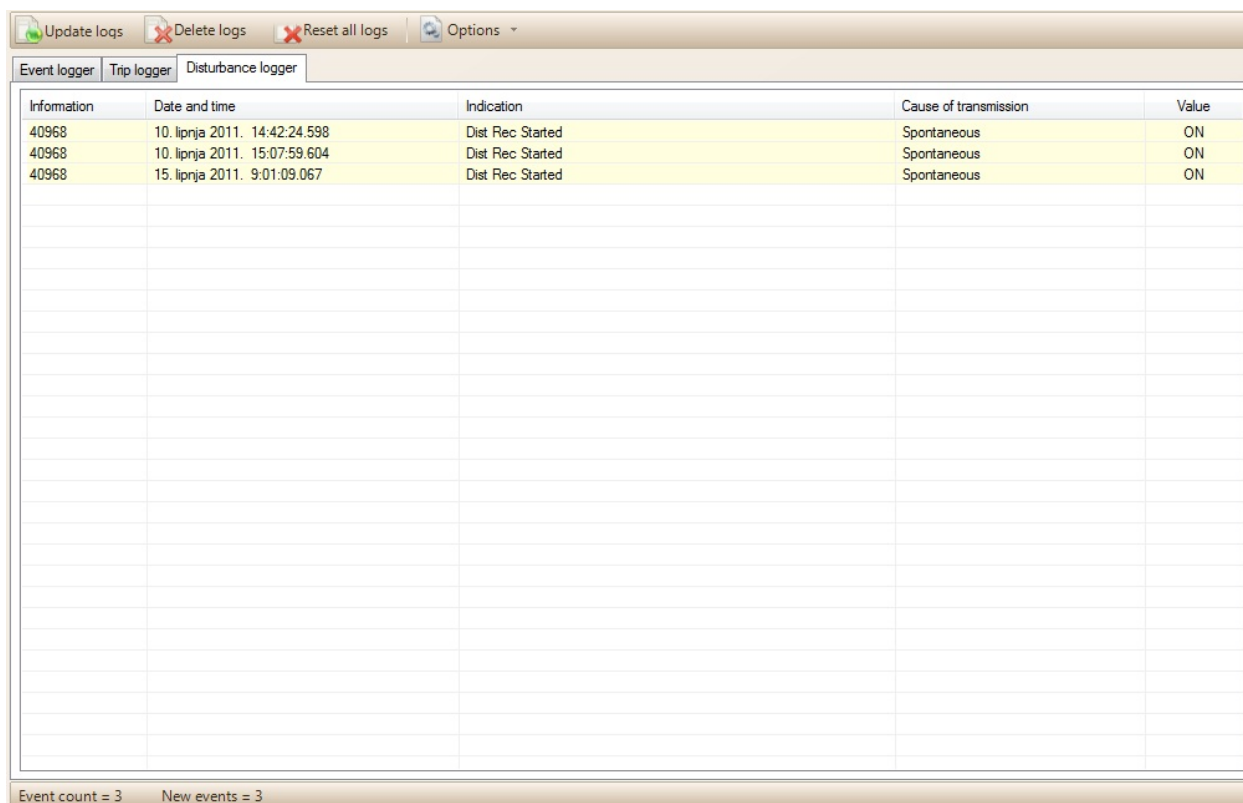
Disturbance logger, shown by image below, contains data regarding time of recorded disturbance, while records are to be viewed using „**Disturbance recorder**“ controls (explained in following chapter).

Using right click on Event, TRIP or Disturbance logger offers drop-down menu containing following list of tools:

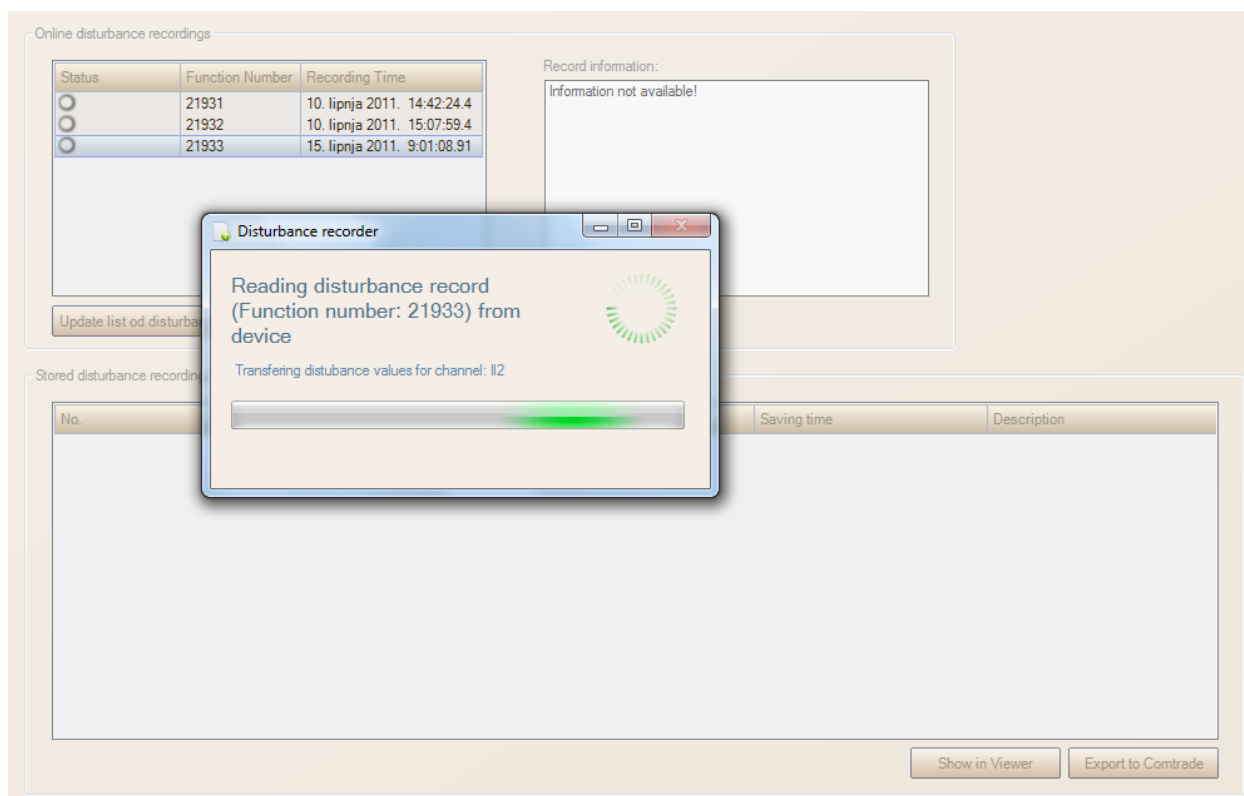
- „**Select all**“ Selection of all events
- „**Copy logs**“ Selected events copy
- „**Clear logs**“ Clear current logs
- „**Update logs from device**“ Relay logs read
- „**Delete log sin device**“ Erase relay logs
- „**Reset all logs**“ Erase all relay logs and set fault number to 0

Information	Date and time	Relative time	Indication	Cause of transmission	Value	FAN
40994	10. lipnja 2011. 15:07:59.401		Power System Fault	Spontaneous	ON	21932
42504	10. lipnja 2011. 15:07:59.402	0 ms	27 PU	Spontaneous	ON	21932
42507	10. lipnja 2011. 15:07:59.600	198 ms	27 TRIP	Spontaneous	ON	21932
40985	10. lipnja 2011. 15:07:59.601	198 ms	Relay GENERAL TRIP	Spontaneous	ON	21932
40985	10. lipnja 2011. 15:07:59.603		Relay GENERAL TRIP		la = 0,78A, lb = 0,78A,...	
58113	10. lipnja 2011. 15:08:00.683		1A Status	Spontaneous	Transient	21932
58113	10. lipnja 2011. 15:08:00.693		1A Status	Spontaneous	OFF	21932
42504	10. lipnja 2011. 15:08:00.710	1308 ms	27 PU	Spontaneous	OFF	21932
42507	10. lipnja 2011. 15:08:00.710	1308 ms	27 TRIP	Spontaneous	OFF	21932
40985	10. lipnja 2011. 15:08:00.713	1308 ms	Relay GENERAL TRIP	Spontaneous	OFF	21932
40994	10. lipnja 2011. 15:08:00.714		Power System Fault	Spontaneous	OFF	21932



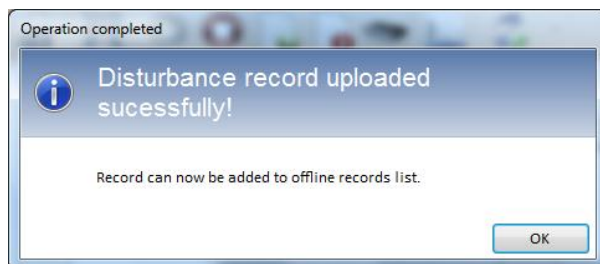


#### 5.6.4.6 Disturbance Recorder



„**Disturbance recorder**“ section contains disturbance records control tools. In order to refresh online record list, please click on „**Update list of disturbances**“ button. Online disturbance recorder can contain up to 8 records (or fewer for long records). Online record list is placed in upper left part of screen. Each online record list item contains its function number and recorded time of disturbance. Using double click on specific record or „**Read selected record**“ button click, online relay record readout is started.

Once record is successfully loaded, status indicator in record list will become dark green, indicating that related record is loaded and following message will appear:



Selection of loaded record in online record list invokes population of record information in right section of disturbance recorder screen, as shown by image below. Using double click on loaded record in record list user is able to store record in stored disturbance recordings list shown in lower part of screen, in order to make record available even during relay communication inactivity.

Online disturbance recordings

Status	Function Number	Recording Time
	21931	10. lipnja 2011. 14:42:24.4
	21932	10. lipnja 2011. 15:07:59.4
	21933	15. lipnja 2011. 9:01:08.91

Record information: 21933, 15. lipnja 2011. 9:01:08.912

Number of channels: 8  
 Number of information elements per channel: 1406  
 Number of grid faults: 21933  
 Interval between information elements: 500  
 Type of disturbances values: InstantaneousValues  
 Time tag of the first information recorded: 9:01:08.912  
 Fault status:  
 - Fault recorded with Trip  
 - Disturbance data waiting for transmission  
 - Disturbance data initiated by pick-up  
 - Disturbance data recorded during normal operation

Update list od disturbances      Read selected record

Stored disturbance recordings

No.	Function Number	Recording Time	Saving time	Description
-----	-----------------	----------------	-------------	-------------

Show in Viewer      Export to Comtrade

Prior to record storing, user is able to add record description using form shown below:

Add recording to offline list

Record information

Function number: 21933  
 Recording time: 15. lipnja 2011. 9:01:08.912

Record description:

Confirm      Cancel

Once online record is stored, status indicator of related record in online records list will change color to light green, and record will be added in stored records list. Stored records can be saved in KONVIEW usable format. KONVIEW is Končar application for disturbance records analysis. Using right click on stored record, drop-down menu appears, containing following items (shown by image below):

Selected record →

Edit description

Delete

Export to Comtrade

- Record description edit form

- Stored record deletion

- Stored record export in comtrade format

Delete checked records

- Selected records deletion

Delete all records

- All stored records deletion

Online disturbance recordings

Status	Function Number	Recording Time
<input type="radio"/>	21931	10. lipnja 2011. 14:42:24.4
<input type="radio"/>	21932	10. lipnja 2011. 15:07:59.4
<input checked="" type="radio"/>	21933	15. lipnja 2011. 9:01:08.91

Record information: 21933, 15. lipnja 2011. 9:01:08.912

Number of channels: 8  
 Number of information elements per channel: 1406  
 Number of grid faults: 21933  
 Interval between information elements: 500  
 Type of disturbances values: InstantaneousValues  
 Time tag of the first information recorded: 9:01:08.912  
 Fault status:  
 - Fault recorded with Trip  
 - Disturbance data waiting for transmission  
 - Disturbance data initiated by pick-up  
 - Disturbance data recorded during normal operation

Update list of disturbances      Read selected record

---

Stored disturbance recordings

No.	Function Number	Recording Time	Saving time	Description
1	21933	15. lipnja 2011. 9:01:08.912	15. lipnja 2011. 9:10:00.454	descriptopn of the fault

Selected record →

- Edit description
- Delete
- Export to Comtrade

Delete checked records

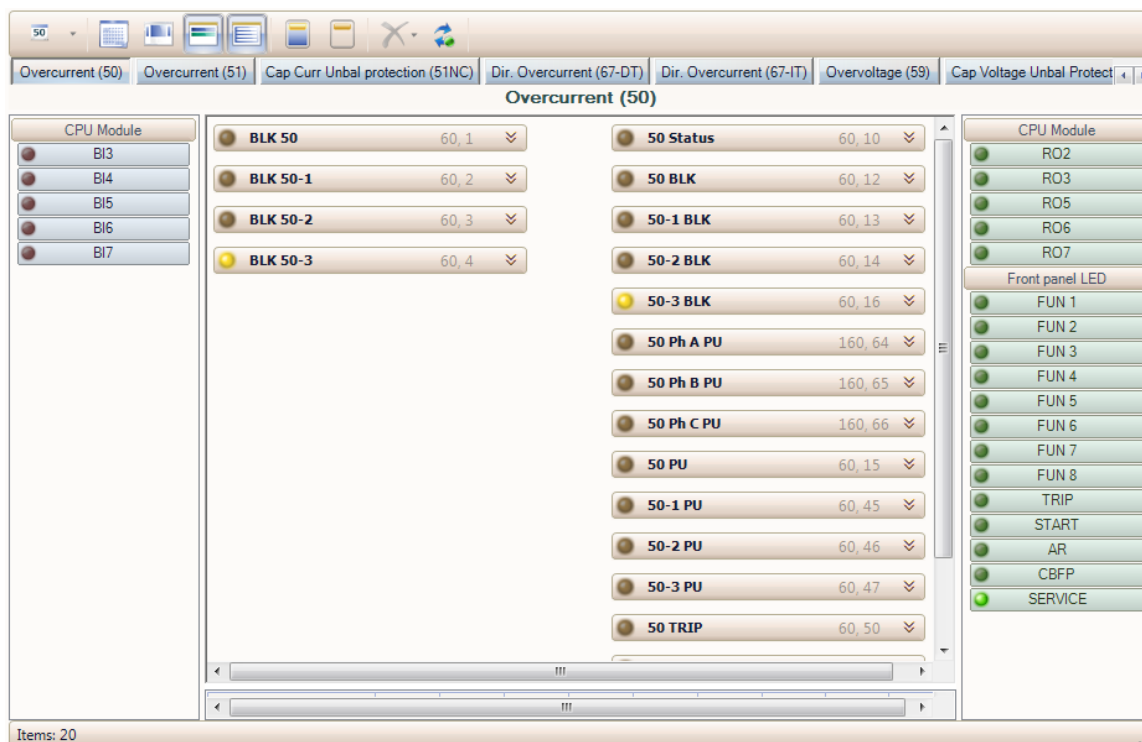
Delete all records

Show in Viewer      Export to Comtrade

### 5.6.5 Commands

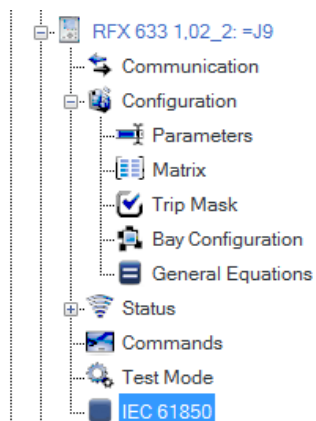
„**Commands**“ menu contains specific active relay IEC commands. Using mentioned commands is possible only while relay „**Remote**“ mode is active.

### 5.6.6 Test Mode



„**Test Mode**“ menu can be accessed only during active communication with relay. Test mode screen is similar to matrix menu, with all information indicators added (binary inputs, relay outputs and LEDs). Using click on indicators user is able to activate specific information, binary input, relay output or LED and (if configured), transmit to SCADA system for testing purposes. On „**Test Mode**“ exit event, relay reboots in order to return all information states in actual mode.

## 5.7 IEC 61850 Configuration



Left click on „IEC 61850“ element in relay tree (shown by image above) invokes IEC 61850 communication protocol relay configuration, shown by image below:

IED Generic Details	
Model	RFX61850BRD
Version	1.0.0
Serial Port Count	2
Ethernet Port Count	1
Maximum Disturbance Level Stored	3
Enable SYNC DB Monitor	False
TCP Connect Timeout (sec)	60

IED OSI Configuration	
AP Title	1.1.1.999.1
AE Qualifier	12
Presentation Selector	00000001
Session Selector	0001
Transportation Selector	0001

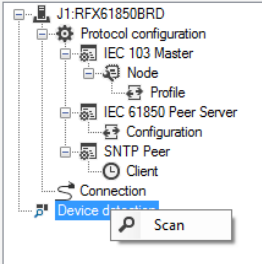
IP Configuration	
Network type	LAN
Ip Address	192.168.73.234

Ethernet0	
Ip Address	0.0.0.0
Subnet	255.255.255.0
Gateway	0.0.0.0

Time Configuration	
Selection Type	Manual
Date	23.7.2014.
Time	12:53:10
Time Zone	(UTC+01:00) Sarajevo, Skopje, Warsaw, Zagreb

**Gateway**  
Gateway

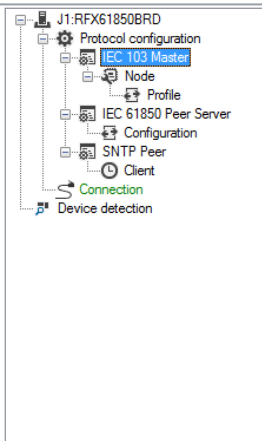
In order to establish relay communication it is necessary to select “Device detection” element, following by right click on came element. Described series of actions invokes „Scan“ submenu that finds all devices currently present on network, as shown by image below:



Serial No	Interface Name	IP Address	Net Mask	Mac Address	Product Key	Status	Gateway Interface	Gateway Address
1	eth0	192.168.73.234	255.255.255.0	00:25:97:00:6...	1343546742206	None	No	0.0.0.0

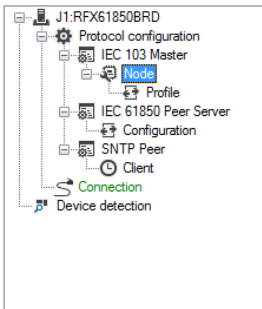
Upon device detection, it is necessary to set PC network settings „IP range“ to device appropriate address in order to make device configuration possible. Once PC network settings configuration is complete, upon root element of tree selection (J1:RFX61850BRD), basic options of IEC 61850 protocol appear. Under „**IP Configuration**“ user is able to set „Ip Address“ to specific relay address. Once proper IP address is configured, connection element will become green („**Connection**“), indicating connection establishment. Next step is to configure remaining communication parameters („**Ethernet0**“ and „**Time Configuration**“).

Selection of „**IEC 103 Master**“ tree element invokes communication settings list within device (as shown below). There is no need to change these settings.



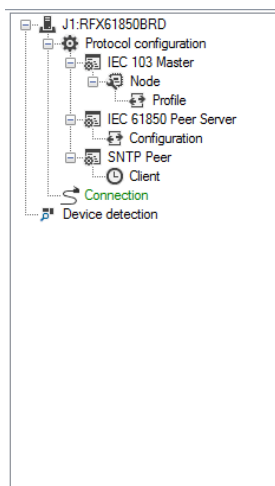
IEC103 Master Channel Parameters	
Port	Com1
Channel Type	RS232
RS485/RS422 Mode	Full_Duplex
Baud Rate	9600
Data Bits	8
Stop Bits	1
Parity	Even
Flow Control	None
CTS Delay (msec)	30
Port Transmission Delay (msec)	0
Link Address Size	1
First Char Wait (msec)	1
Offline Poll Period (msec)	30000
Frame Timeout (msec)	15000
Confirm Timeout (msec)	2000
Link Confirm Mode	Always
Retry Count	3
Enable Single Char Acknowledgement	False
Enable Single Char Response	False
Channel Failure Condition	All_Nodes_Failure

„**IEC 103 Master**“ element contains „**Node**“ sub-element (as shown below) that contains further default settings, that should not be changed.



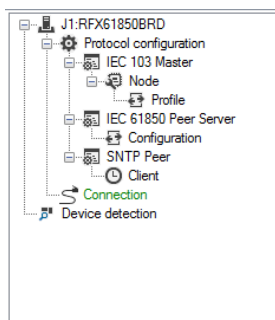
Node Parameters	
Link Address	1
ASDU Address	1
Polling Parameters	
Class1 Poll Delay (msec)	0
Class2 Poll Delay (msec)	500
Commands	
Enable Diagnostic Point Event	False
Quality Change Event	Generate_Internal_Event
Interrogation and Time Synchronization	
EOI Action Mask	3
Online Action Mask	3
Blocking Disable Mask	2
Clock Synchronization Interval (min)	3
General Interrogation Interval (min)	5

“Profile” sub-element of „Node” element contains „IEC61850 Mapping” and “IEC61850 Enabled Commands” tabs. „IEC61850 Mapping” tab contains relay readable and configured information, as shown by image below:



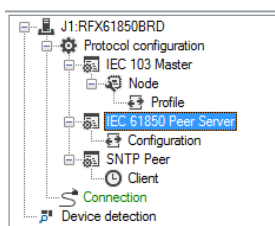
GIN	Name	ASDU	FUN	INF	MMSTag
A024	Control Type REMOTE	Time_Tagged_Message	150	194	LLN0\$ST\$Loc\$stVal
A10F	50-1 TRIP	Time_Tagged_Message	160	90	DT50LPTOC1\$ST\$Op\$general
FE15	Gen. SPI Status 1	Time_Tagged_Message	200	21	SUserGGIO1\$ST\$Ind\$stVal
FFFE	Internal	Time_Tagged_Message	65535	65535	ComStGGIO1\$ST\$Ind\$stVal
112	IEC IA	Measurands_I	160	148	IVPQFMMXU1\$MX\$PhV\$phsA\$scVal
113	IEC IB	Measurands_I	160	148	IVPQFMMXU1\$MX\$PhV\$phsB\$scVal
114	IEC IC	Measurands_I	160	148	IVPQFMMXU1\$MX\$PhV\$phsC\$scVal
115	IEC UA	Measurands_I	160	148	IVPQFMMXU1\$MX\$A\$phsA\$scVal
116	IEC UB	Measurands_I	160	148	IVPQFMMXU1\$MX\$A\$phsB\$scVal
117	IEC UC	Measurands_I	160	148	IVPQFMMXU1\$MX\$A\$phsC\$scVal
118	IEC Pr	Measurands_I	160	148	IVPQFMMXU1\$MX\$TotW\$mag
119	IEC Pq	Measurands_I	160	148	IVPQFMMXU1\$MX\$TotVAR\$mag
11A	IEC f	Measurands_I	160	148	IVPQFMMXU1\$MX\$Hz\$mag

„IEC61850 Enabled Commands” tab contains list of all executable commands. Each command from list can be enabled or disabled using controls shown by image below:



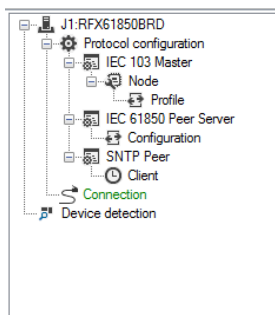
GIN	Name	FUN	INF	Enabled
A004	Energy Register Reset	160	100	<input type="checkbox"/>
A00E	Reset LED	160	19	<input checked="" type="checkbox"/>
A013	Group 1	160	23	<input checked="" type="checkbox"/>
A014	Group 2	160	24	<input checked="" type="checkbox"/>
A015	Group 3	160	25	<input type="checkbox"/>
AB03	79 Status	71	100	<input type="checkbox"/>
B109	49F Reset	169	9	<input type="checkbox"/>
B605	Start THD	174	5	<input type="checkbox"/>

„IEC 61850 Peer Server” tree element offers „IED Name” edition enabled configuration list, shown by image below:



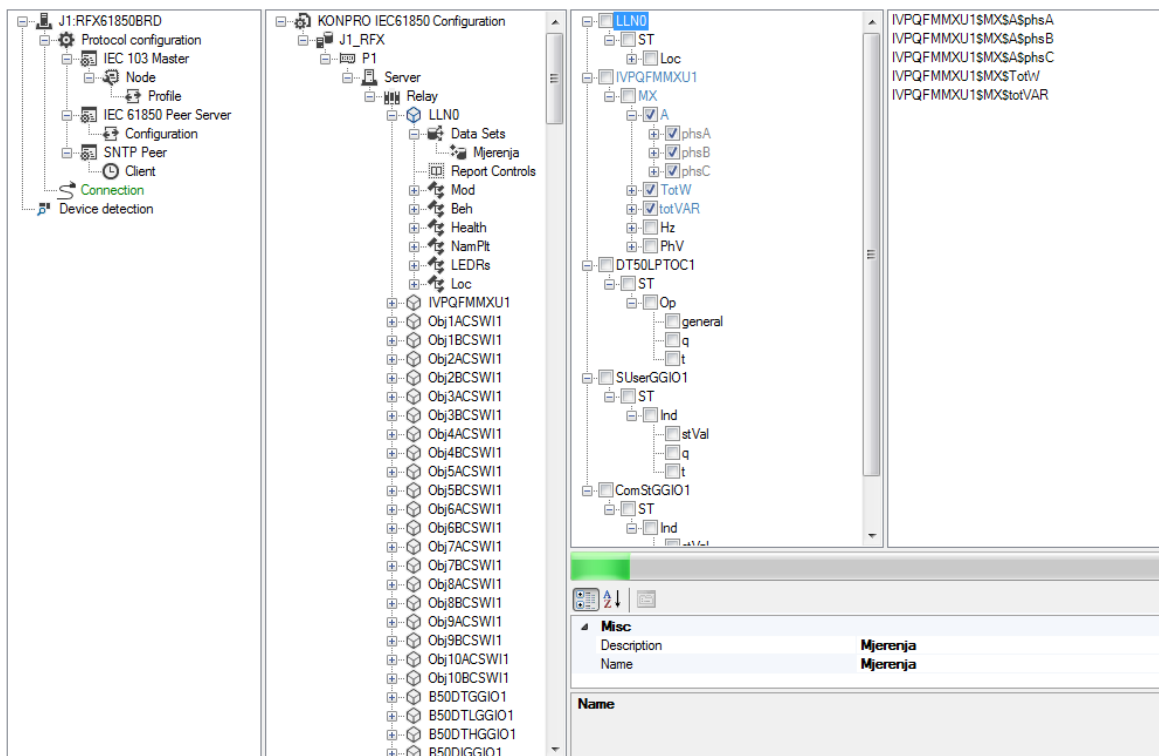
SCL Database	IED Name	Access Point Name	Report Scan Interval (msec)	Keep Alive Interval (sec)	Keep Alive TimeOut (sec)	Keep Alive Retry Count	Report Buffer Size (KB)
KON_IEC61850_db1.00.iid	J1_RFX	P1	2	0	3	3	100

„IEC 61850 Peer Server” element contains “Configuration” sub-element, which if clicked, invokes additional tree display that contains detail information present within relay. Creation of specific data sets and report controls is performed within displayed additional tree, using right click on specific additional tree elements, as shown by image below:

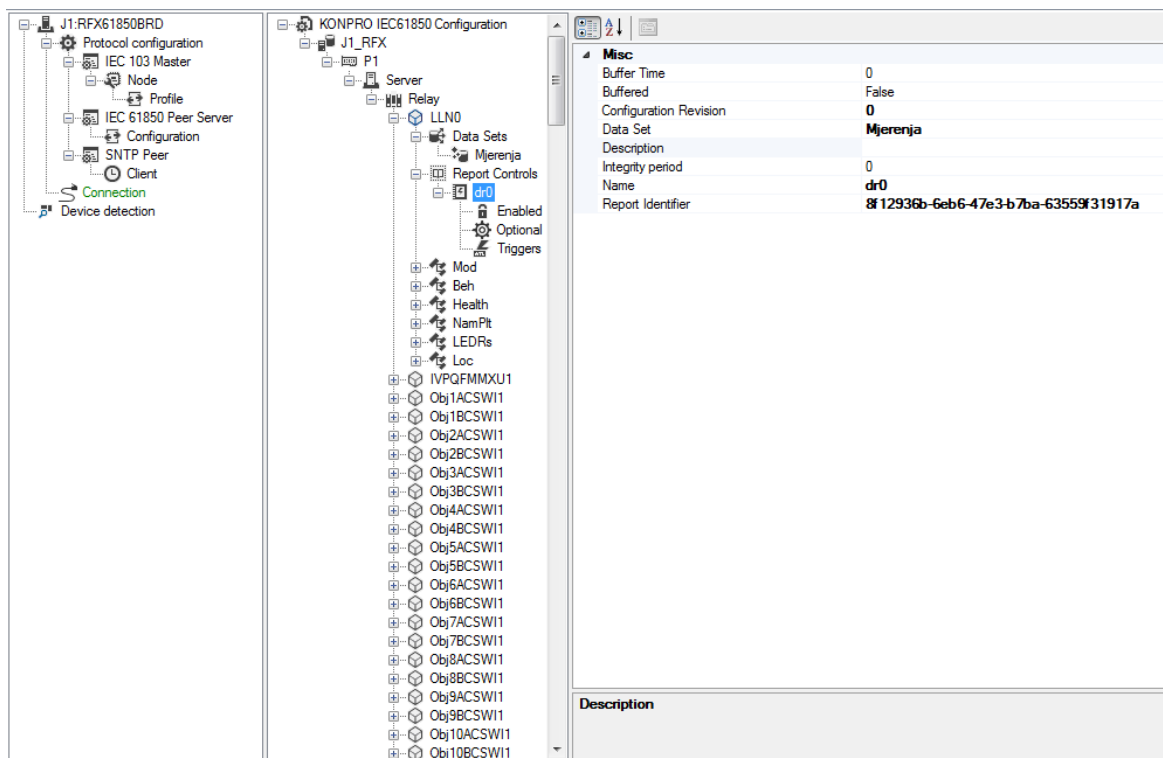




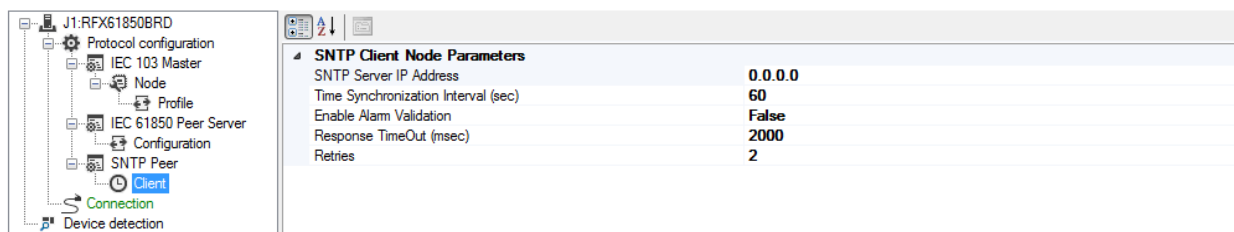
Adding data set places new element under Data set element in additional tree display and invokes added element configuration segment on right side of IEC61850 configuration screen, where new element name and description can be edited, as shown by image below. Furthermore, at this point user is able to configure information set to be contained within created data set, as well as to determine selected data set fullness.



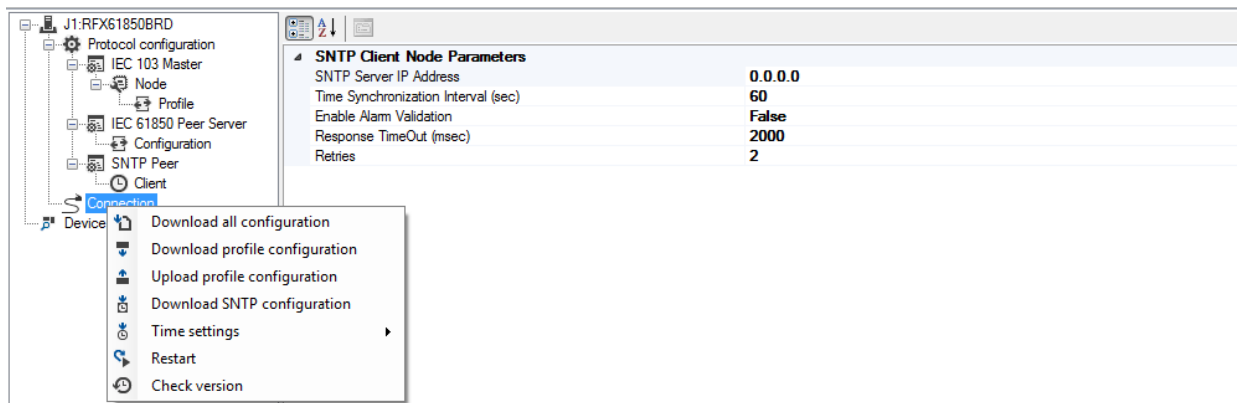
For every added data set it is necessary to add report control the same way as explained for adding data set. Report control data set reference must be configured, with other configurable parameters, shown by image below:



„SNTP Peer“ contains data used for time synchronization, shown by image below:



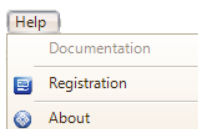
Once the data is configured, if using „Connection“ element click, drop-down menu appears, as shown by image below:



„Download profile configuration“ stores configuration to relay.

## 5.8 Help

„Help“ menu contains sub-items „Documentation“, „Registration“ and „About“, as shown by following image:



### 5.8.1 Documentation

„Documentation“ sub-item invokes document folder form containing software support and KONPRO device manuals.

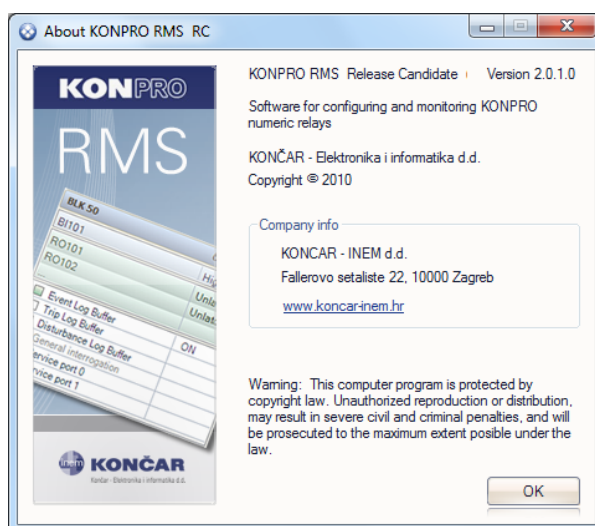
### 5.8.2 Registration

„Registration“ sub-item invokes application registration form, shown by image below:



### 5.8.3 About

„About“ sub-item invokes general software information form, containing software version and manufacturer data, as shown by following image.

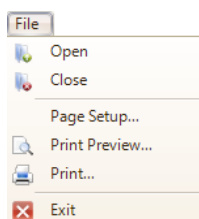


## 6 KONVIEW

As part of „**KONPRO RMS**“ software support for „**KONPRO**“ numeric relay series configuration, „**KONVIEW**“ application offers additional support for recorded disturbance view, saved in „**COMTRADE**“ format. „**KONVIEW**“ offers current, voltage and other configured signals waveform overview. In addition it is possible to view current and voltage harmonics and vector view.

### 6.1 Menus

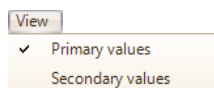
#### 6.1.1 File



„**File**“ menu contains elements shown by image above and described by list below:

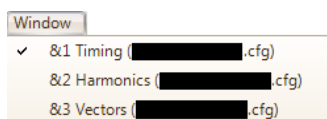
<b>Open</b>	- Open „ <b>COMTRADE</b> “ record file
<b>Close</b>	- Close current file
<b>Page Setup...</b>	- Invokes print configuration form (to set margin and orientation)
<b>Print Preview...</b>	- Invokes print preview form
<b>Print...</b>	- Invokes print form
<b>Exit</b>	- Exits program

#### 6.1.2 View



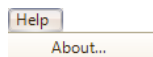
„**View**“ menu enables user to switch between primary and secondary values of displayed current and voltage signals.

#### 6.1.3 Window

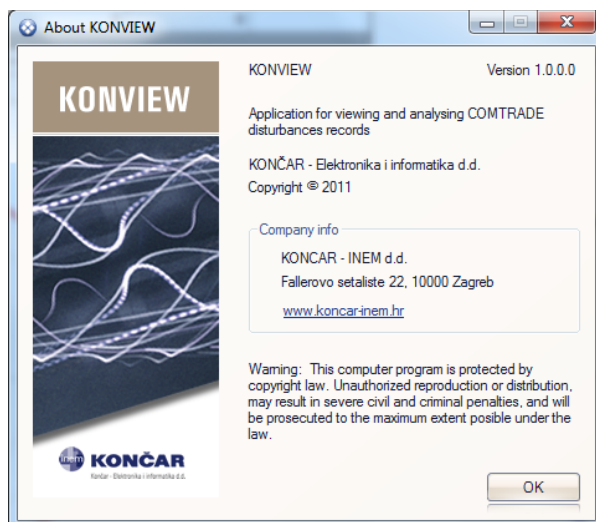


„**Window**“ menu enables user to select whether specific loaded file shall be displayed or not.

#### 6.1.4 Help



„**Help**“ menu contains sub-element „**About...**“, that invokes form containing software version and manufacturer data, as shown by image below:



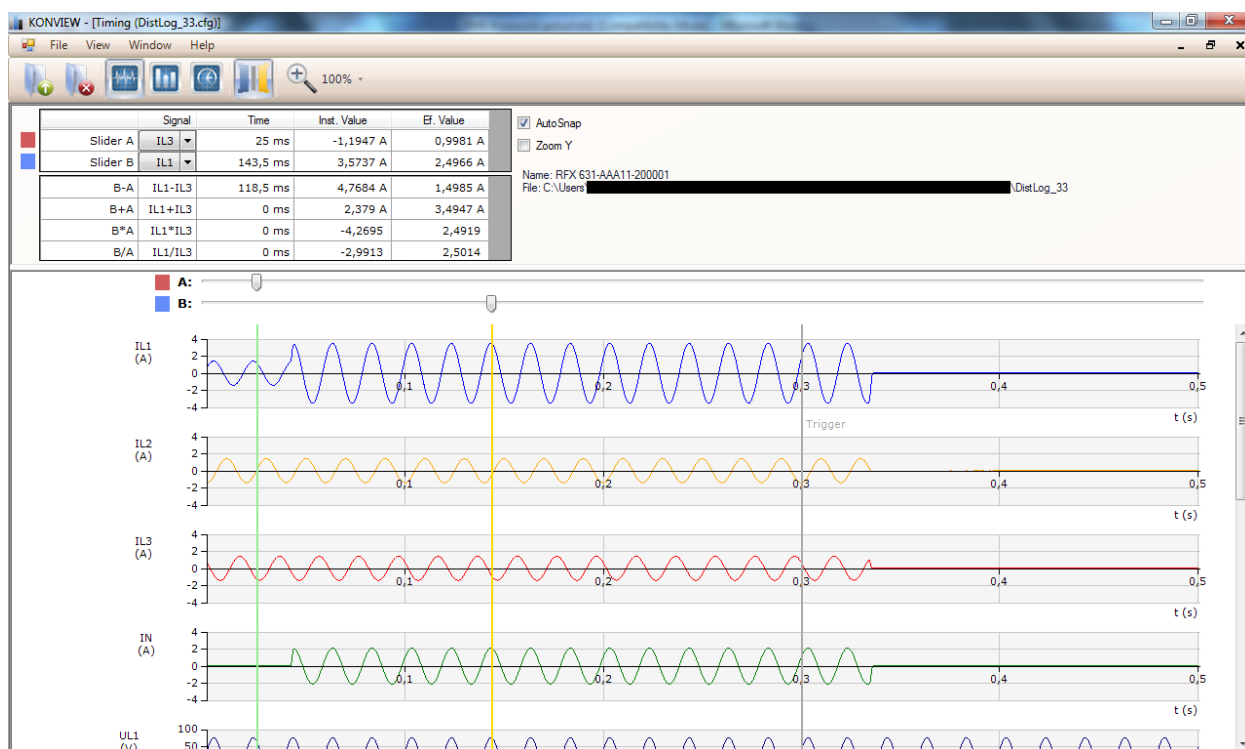
## 6.2 Tool bar



Tool bar is placed under menu bar and contains following list of tools:

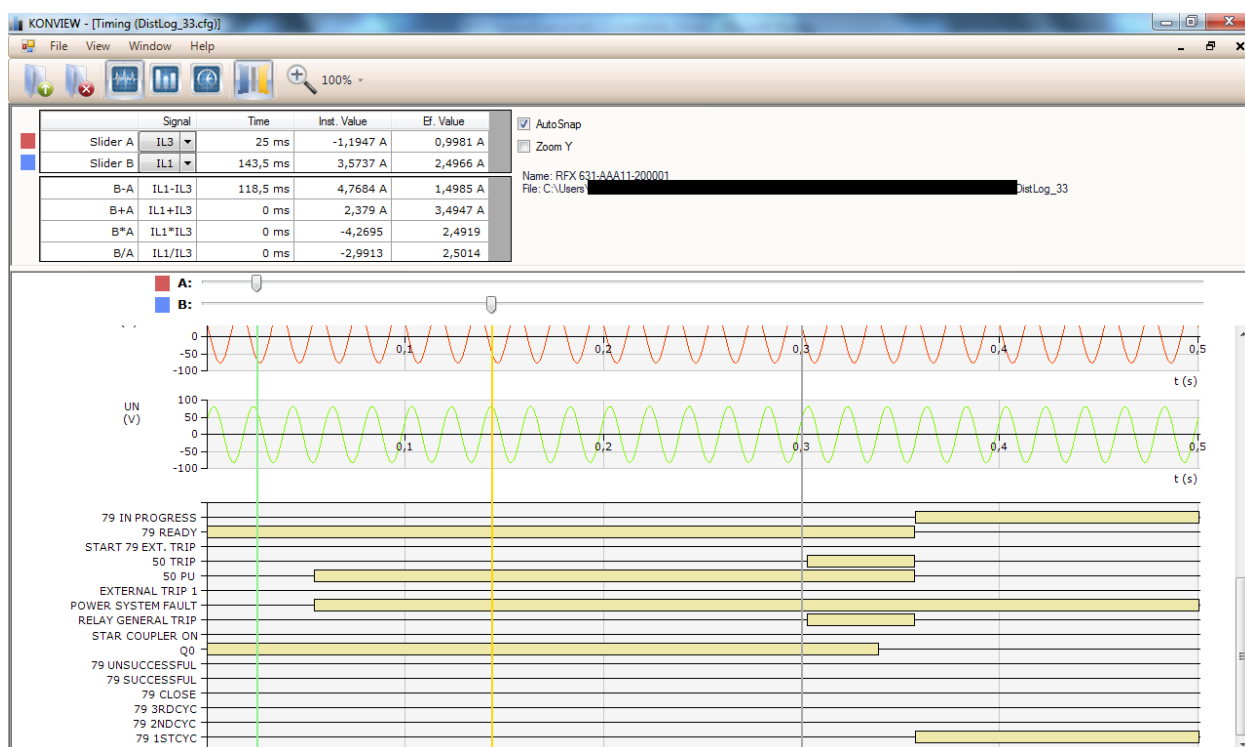
- |                          |  |
|--------------------------|--|
| <b>Open</b>              | - Open disturbance record                    |
| <b>Close</b>             | - Close currently opened file                |
| <b>Time view</b>         | - Display data using Time view               |
| <b>Harmonics view</b>    | - Display data using Harmonics view          |
| <b>Vectors view</b>      | - Display data using Vector view             |
| <b>Primary/secondary</b> | - Primary or secondary values display switch |
| <b>Zoom</b>              | - Zoom control (100%, 150%, 200%)            |

## 6.3 Time view



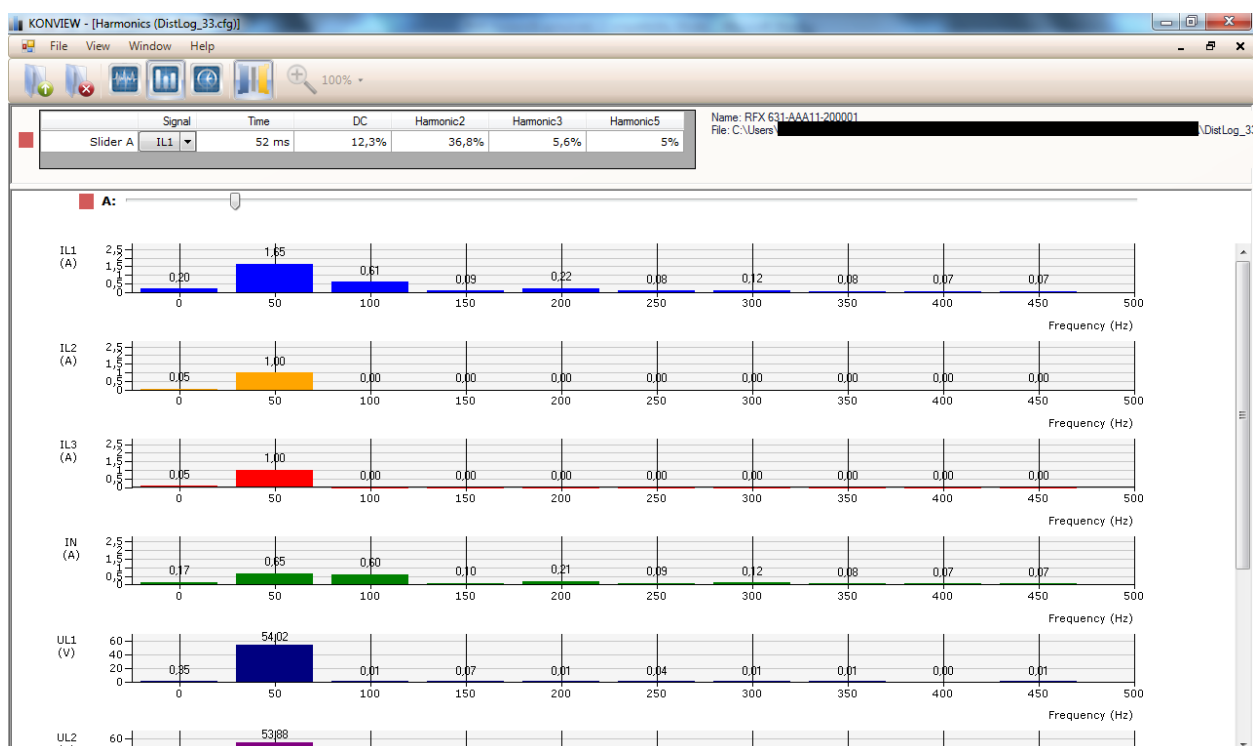
Time view screen in upper section contains enable and disable controls of „AutoSnap“ and „Zoom Y“ options, as well as data regarding device name and serial number and document location on PC. Left

side of screen contains selection of specific signals, with 2 track bars (A and B) to be used for signal analysis. Signal charts are placed in lower part of screen (IL1, IL2, IL3, IN, UL1, UL2, UL3 and UN), as displayed by image above.



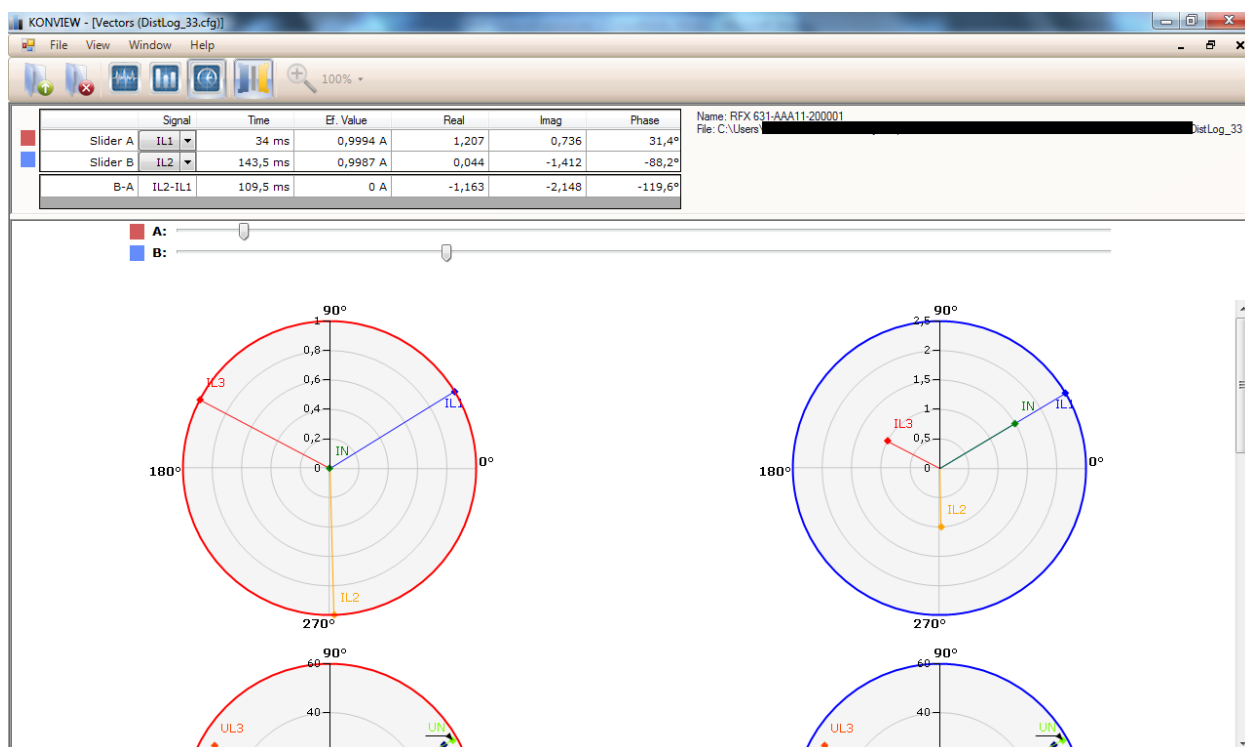
Configured information (variables) in Time view display is placed below current and voltage signals, as shown by image above.

#### 6.4 Harmonics view



Harmonics view screen contains one track bar for DC component and 2., 3. and 5. harmonic display control. Harmonics view displays up to 10 individual harmonics, as shown by image above.

## 6.5 Vector view



Vector view contains 2 separate track bars to be used for more detail data overview, with direct, neutral and inverse current components, as shown by image above.







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