Energy management software

PowerVision Plus

Version 1.6.6

INSTRUCTION MANUAL

(M98232901-03-21A)

SAFETY PRECUATIONS

Follow the warnings described in this manual with the symbols shown below.

	**DANGER** Warns of a risk, which could result in personal injury or material damage.

	**ATTENTION** Indicates that special attention should be paid to a specific point.

If you must handle the unit for its installation, start-up or maintenance, the following should be taken into consideration:

	Incorrect handling or installation of the unit may result in injury to personnel as well as damage to the unit. In particular, handling with voltages applied may result in electric shock, which may cause death or serious injury to personnel. Defective installation or maintenance may also lead to the risk of fire. Read the manual carefully prior to connecting the unit. Follow all installation and maintenance instructions throughout the unit's working life. Pay special attention to the installation standards of the National Electrical Code.

	**Refer to the instruction manual before using the unit** In this manual, if the instructions marked with this symbol are not respected or carried out correctly, it can result in injury or damage to the unit and / or installations.

CIRCUTOR, SA reserves the right to modify features or the product manual without prior notification.

DISCLAIMER

CIRCUTOR, SA reserves the right to make modifications to the device or the unit specifications set out in this instruction manual without prior notice.

CIRCUTOR, SA on its web site, supplies its customers with the latest versions of the device specifications and the most updated manuals.

www.circutor.com

	**CIRCUTOR,** recommends using the original cables and accessories that are supplied with the device.

CONTENTS

REVISION LOG

Table 1: Revision log.

Date	Revision	Description
10/13	M98232901-03-13A	Software version 1.4
01/17	M98232901-03-17A	Software version 1.6 Changes in the following sections: 2.3.1. - 2.3.2. - 3.1.2.4. - 3.3.3.4. - 3.4.1.7. - 3.4.1.9. - 3.4.2.6. - 3.4.3.4. - 5.1.1.1. - 5.2.2.1. - 5.2.3. -6.7. - 7.1. - 7.1.5. - 7.1.6. - 7.1.7. - 7.1.8. - 7.1.9. - 7.1.10. - 7.2. - 7.3.
07/18	M98232901-03-18A	Software version 1.6.1
09/19	M98232901-03-19A	Software version 1.6.4 Changes in the following sections: 1. - 2.2. - 2.3.1. - 3.1.2.5. - 3.3.1.1. - 3.3.1.2. - 5.2.2.2.1. - 5.3.2.2. - 6.1
04/21	M98232901-03-21A	Software version 1.6.6 Changes in the following sections: 2.3.1. - 5.3.2.2. - 7.1.

Note: *Device images are for illustrative purposes only and may differ from the actual device.*

1.- INSTALLATION OF PowerVision Plus SOFTWARE

Before you install **PowerVision Plus**, remember that the PC where it will be installed must meet certain requirements. These requirements are:

- Windows XP, Vista or Windows 7 (32 bits and 64 bits).
- Java JRE 1.6.0 or higher virtual computer (included in the installation).
- Pentium III processor or higher.
- At least 512 MB of memory (we recommend 1024 MB).
- At least 200 MB of free space on hard drive for the installation of the program and data storage.
- CD-ROM.
- Windows-compatible mouse and keyboards.

Insert the **PowerVision Plus** CD to begin the installation process. The first thing you will see is the installation welcome screen:

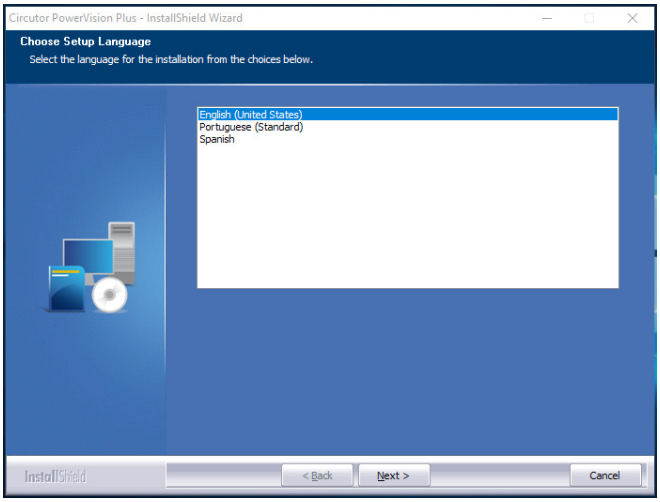


Figure 1:Installation home screen

If the welcome screen does not appear automatically when the insert the CD, you will need to run the installation file from the CD-ROM manually.
To commence the installation process, choose the installation language. Once you do this, the welcome screen will appear.

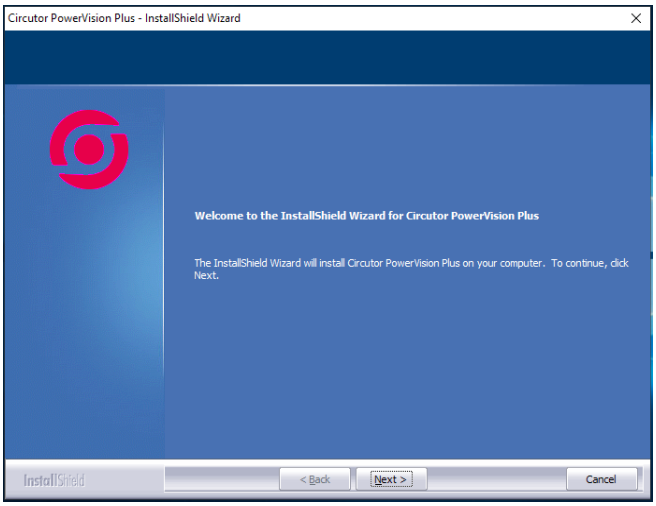


Figure 2:Installation welcome screen

Click "**Next**". A screen will appear with legal information about the application you are about to install. If you agree with all of the conditions shown, tick the option "**I accept the terms of the licence agreement**" and then click "**Next**". Otherwise, cancel the installation by clicking on "**Cancel**" or return to the previous screen by clicking on "**Back**".

If you wish, you can print the terms of use of the application by clicking "**Print**".

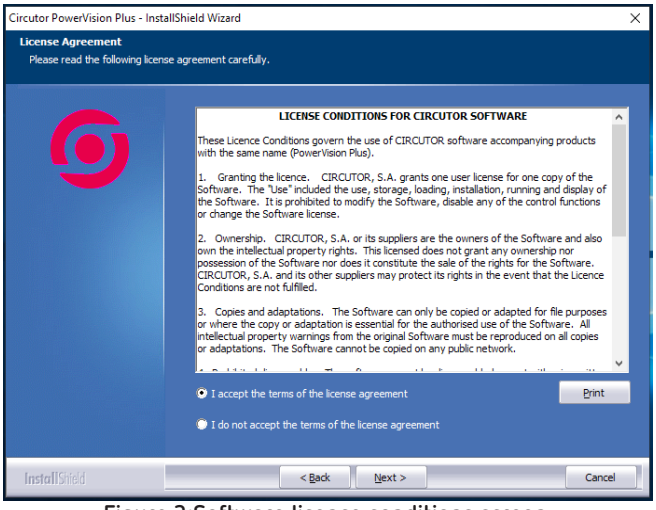


Figure 3:Software licence conditions screen.

On the next screen that appears you will have to enter the user name, name of the organisation and licence number. The licence number is a 10-digit number, the first six of which are always **775353** and the last four of which are random.

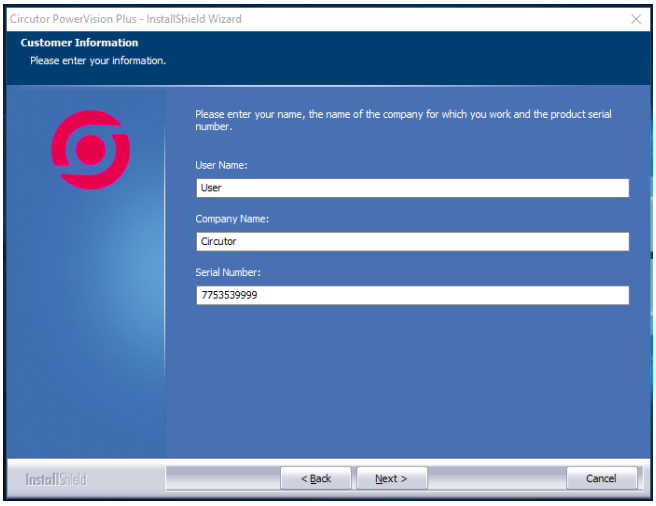


Figure 4:User information screen

On the next screen you can choose the directory where you want to install the application. The installation program proposes a directory for the application which you can change by clicking on "**Change**".

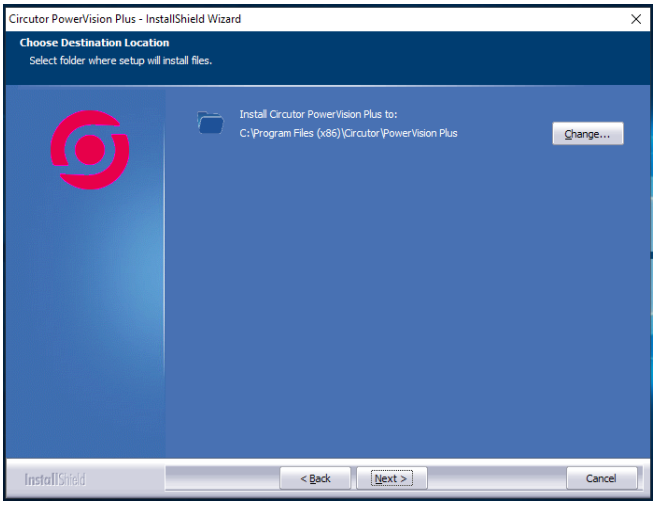


Figure 5:Selection dialogue for the installation folder

If you select "**Change**", a dialogue box will appear where you can select the new directory where the application should be installed.

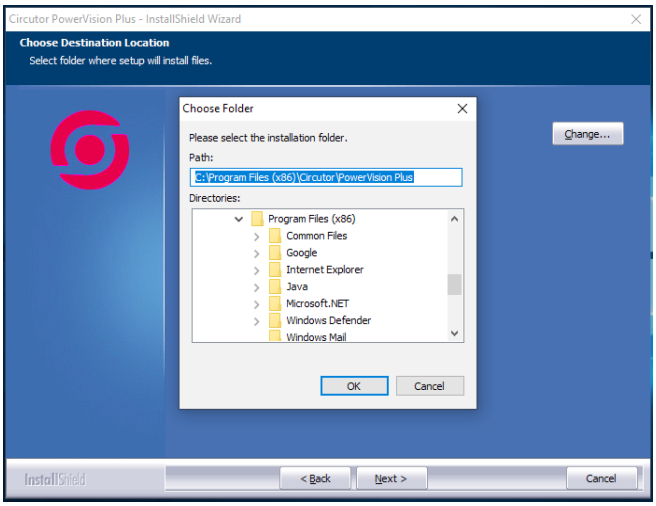


Figure 6:Selection dialogue for the installation folder

If you click on "**Next**", a dialogue box will open informing you that everything is ready for the installation

to begin. To start the installation, click "**Install**".

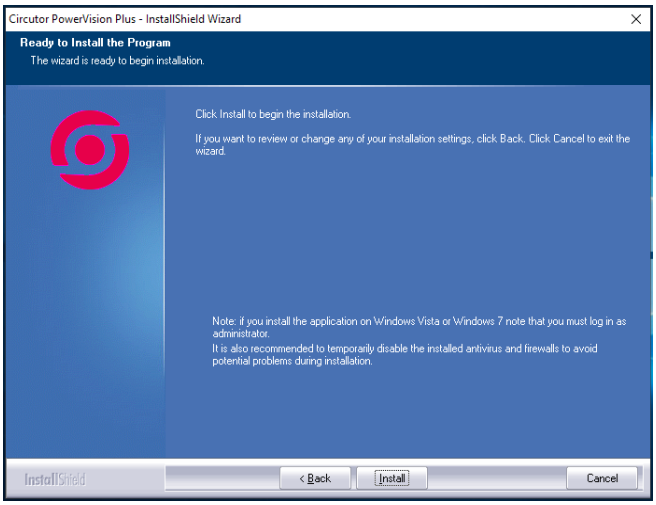


Figure 7:Installation start dialogue

Once you click on install, a dialogue box will appear with a progress bar showing the installation status. You can cancel the installation at any time if you wish by clicking on "**Cancel**".

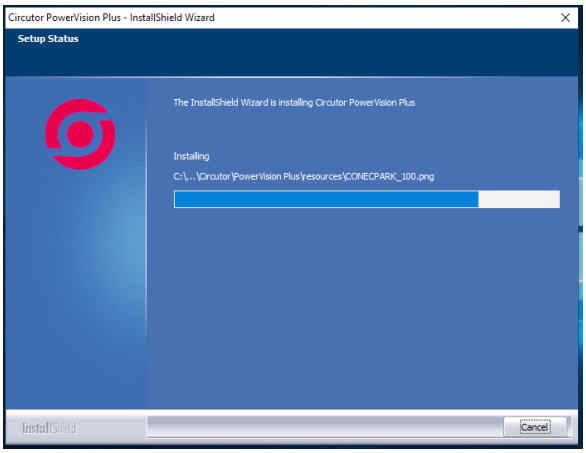


Figure 8:Installation progress dialogue

Once the installation progress bar is complete, another dialogue box will appear informing you that the services needed to complete the installation are about to initialise.

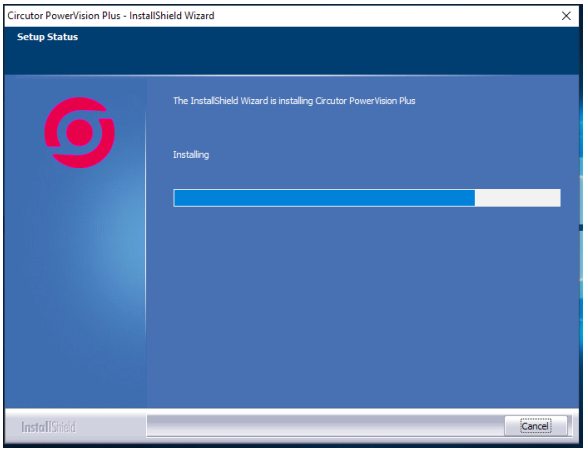


Figure 9:Installation complete dialogue.

If the installation was completed successfully you will see the following dialogue box:

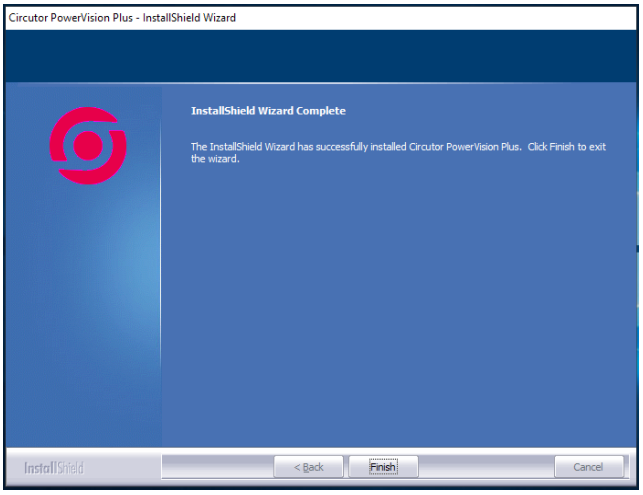


Figure 10:Installation successfully completed dialogue.

2.- INTRODUCTION TO PowerVision Plus

2.1.- BRIEF DESCRIPTION OF THE APPLICATION

PowerVision Plus is a software program designed as an application for working with Circutor power analyzers and **AR6, AR5, CAVA, QNA, CVMK2** and **CVM-BDM-1M** measuring devices. This application allows you to read the historical data stored in the devices and to display them with all of the details a user could need.

On the one hand, it allows you to communicate with the different portable **AR5** and **CAVA** devices, downloading the data stored in these devices' internal memories and then display the data or run reports. On the other hand, it allows you to communicate with and configure the **CVMK2**, **QNA** and **CVM-BDM-1M** devices using serial communications, Ethernet or GSM in the case of the **QNA**. **QNA** devices can also communicate via GSM.

In order to maintain a certain degree of compatibility with the previous version of **PowerVision**, a file analysis function has been provided, with a change in the maintenance philosophy which now treats them as just another element in the configuration structure.

2.2.- WHAT TOOLS DOES PowerVision Plus OFFER?

In this new version of **PowerVision**, the application's interface has been significantly simplified to make it more pleasant, amenable and easier to use.
When you start the application, the first thing you will see is the home screen. A series of progress dialogue boxes will then appear, informing you with messages that the application is initialising.

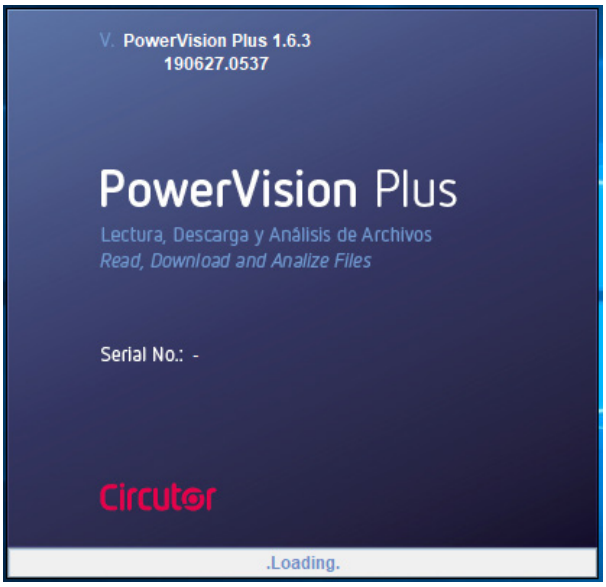


Figure 11:Home screen

Once the application has loaded, the **PowerVision Plus** home screen will appear. You can now begin using the application.

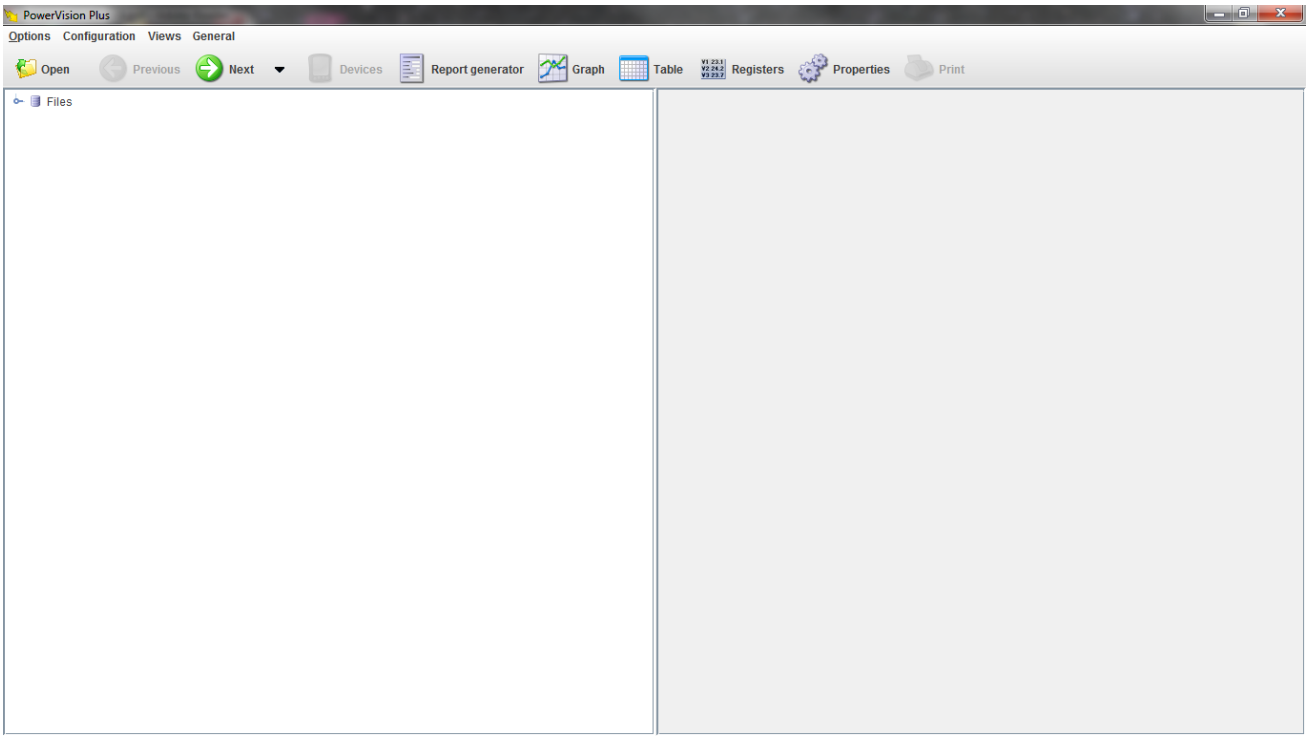


Figure 12:PowerVision Plus home screen

By default, the application displays a menu bar and a toolbar with all of the possible actions that can be performed. Each one of these properties is described below.

You will also notice that in the main panel there is a tree with a single node named "**Files**" which is created by default. To understand each element of the interface and its functionalities, please see the following section.

2.3.- USER INTERFACE

2.3.1.- MENU BAR

The menu bar at the top provides access to all of the application's functionalities. This bar contains four main menus, "**Options**", "**Configuration**", "**Views**" and "**General**". The "**Options**" menu contains the following sections:

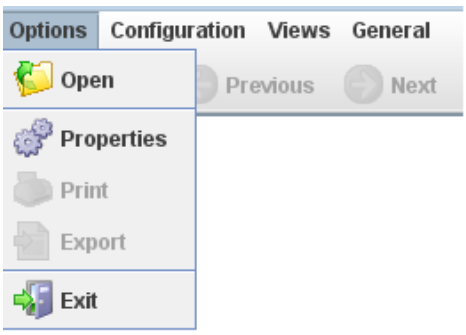


Figure 13: Options menu.

- *Open*: allows you to open the files to add them to the application.
- *Properties*: Shows the properties of the view that is currently active. This option can be active or not depending on the view in progress.

- *Print*: Prints the view that is currently active. This option can be active or not depending on the view in progress.
- *Export*: Exports currently active view. This option can be active or not depending on the view in progress.
- *Exit*: Exits the application.

The "**Configuration**" menu is divided into the following sections:

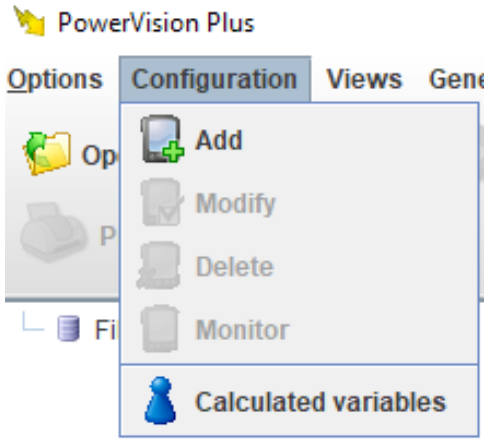


Figure 14: Configuration menu.

- *Add*: adds an element to the device tree on the home screen. This option may or may not be active depending on the selection.
- *Modify*: modifies the selected element on the device tree. This option may or may not be active depending on the selection.
- *Delete*: eliminates the selected element from the device tree. This option may or may not be active depending on the selection.
- *Monitor*: launches the monitoring view of the selected device. This option may or may not be active depending on the selection.
- *Calculated variables: provides access to the configuration of calculated variables.*

The "**Views**" menu contains the following options:

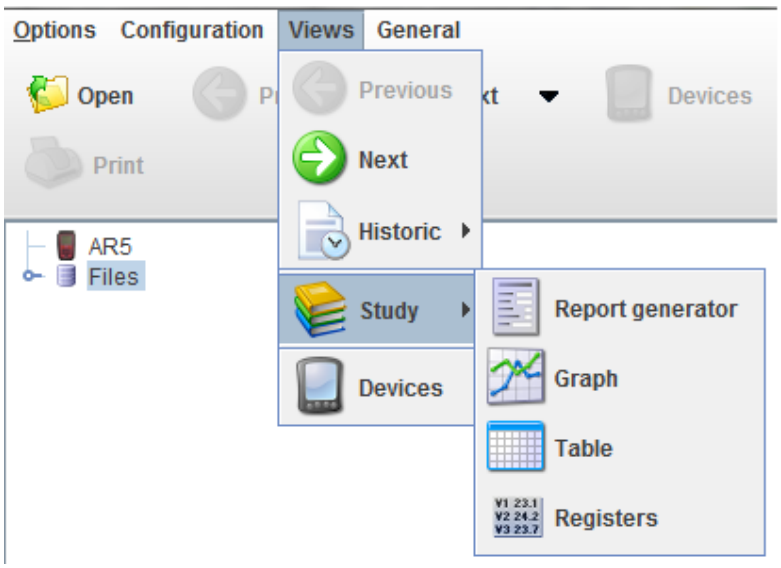


Figure 15: Views menu.

- *Previous*: brings you back to the previous view.
- *Next*: brings you to the next view.
- *Historic*: allows you to immediately access any log view.
- *Study*:
  - ✓ *Report generator*: allows you to access the report generator.
  - ✓ *Table*: allows you to access the table view.
  - ✓ *Graph*: allows you to access the graphic view.
  - ✓ *Registers*: allows you to access the logs view
- *Devices*: allows you to access the main devices view.

Finally, the "**General**" menu consists of the following sections:

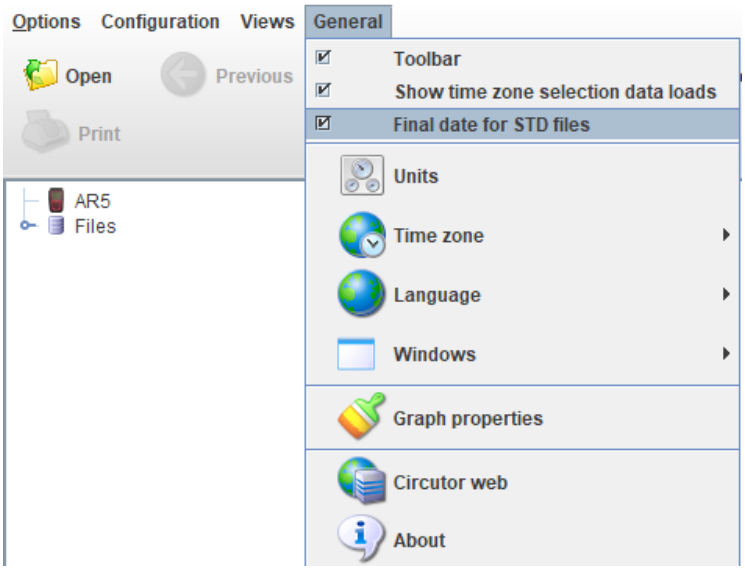


Figure 16: General menu.

- *Toolbar*: allows you to display or hide the toolbar.
- *Status bar*: Allows to show or hide the status bar. Only shows if the updates are enable.
- *Show time zone selection data loads*: shows or hides the time zone selection dialogue box when adding files with LTC format. Refer to section "***6.3.- TIME ZONE SELECTION***"
- *Final date for STD files*: Allows you to select the date that is shown in the STD files. If selected, the end date of the register is shown, if not, the start date of the register is shown.
- *Units*: allows you to configure the units of each type of variable supported by the application.
- *Time zone: enables you to configure the time zone in which you want to work, to correctly interpret the dates and times of imported files.*
- *Calculated variables*: Go into the calculated variables configuration.
- *Language*: allows you to change the application language.
- *Windows*: enables management of open windows. Has the following functions:
  - ✓*Close all:* closes all the windows.
  - ✓*Minimise all:* minimises all the windows.
  - ✓*Show all:* opens all the windows.
  - ✓ *Horizontal tile:* displays the windows horizontally.
  - ✓ *Vertical tile:* displays the windows vertically.
  - ✓*Cascade:* displays the windows in cascade.
- *Graph properties*: To modify the background color of the graphs
- *Circutor website:* links to the **CIRCUTOR PowerVision**.
- *Software Update:* Access to the **PowerVision Plus** download page. Only appears if there is a new version.
- *About:* Access information about the application.

2.3.2.- TOOLBAR

The toolbar allows the user more direct access to the most important options at all times.

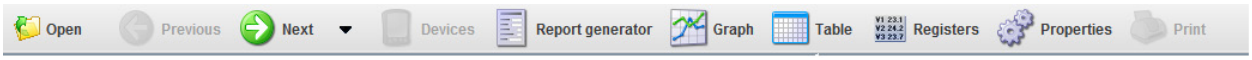


Figure 17:Toolbar.

The toolbar offers the following options:

- **Open**: allows you to open a file to add it to the application.
- **Previous**: brings you back to the previous view.
- **Next**: brings you to the next view.

- **Down arrow**: displays any log view.
- **Devices**: allows you to access the main device configuration view.
- **Report generator**: allows you to access the report generator view.
- **Graphic**: creates a graphic.
- **Table**: creates a table.
- **Registers**: enables access to the registers.
- **Properties**: displays the properties window of the current view.
- **Print**: enables printing of current view.

Use the context menu of the button bar to hide or display buttons. Access this menu by right-clicking on the toolbar.

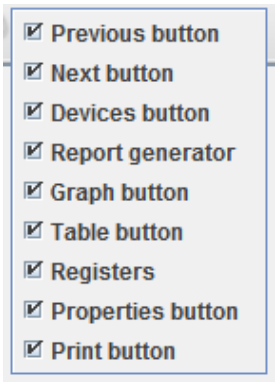


Figure 18:Toolbar setup menu.

On this menu we can define which buttons we want to show and hide.

3.- CONFIGURATION OF COMMUNICATIONS AND DEVICES

This section explains all of the steps involved in configuring the communications with the **AR6**, **AR5-L, AR5** and **CAVA** portable power analyzers and the panel power analyzers **QNA, CVM-K2** or **CVM-BDM-1M**. It also explains how to configure, to monitor in real-time and to download data from all these devices.

3.1.- DEVICE MANAGEMENT

3.1.1.- INTRODUCTION

The default view on the **PowerVision Plus** is the device configuration panel. This view is divided into two sections. Section on the left where appears a list of added devices or files and a section on the right with device properties (it appears just in case that user selects on the left side a device).

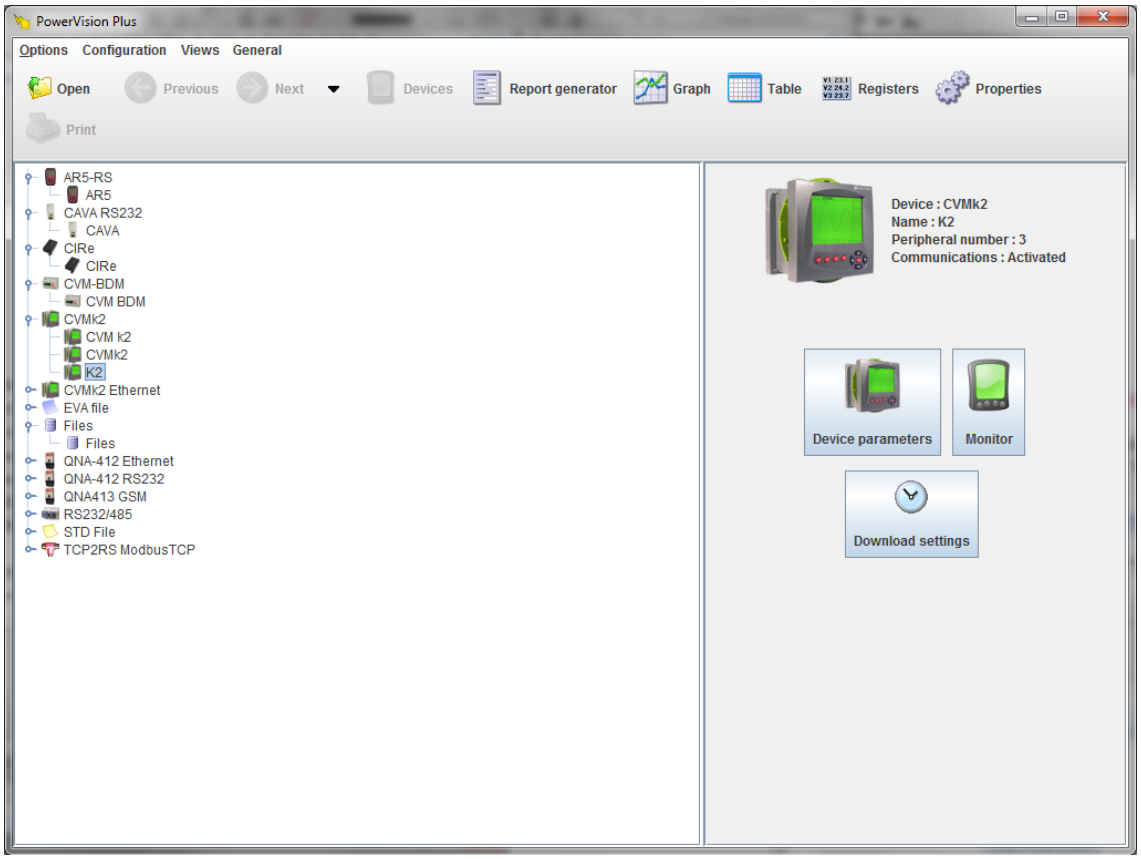


Figure 19:Main view with the device connections and files tree

The purpose of this view is to help the user maintain all of the devices and files added to the application simply and graphically.

The first time you run **PowerVision Plus**, the device tree will be displayed with just one node: "**Files**". This node serves as a container for files added temporarily or permanently.

There are three different ways of displaying the device management view: **by connection, by device** or **by groups of devices**.

You can change the view by choosing the "**Properties**" option on the toolbar or by choosing "**Options**" on the main menu.

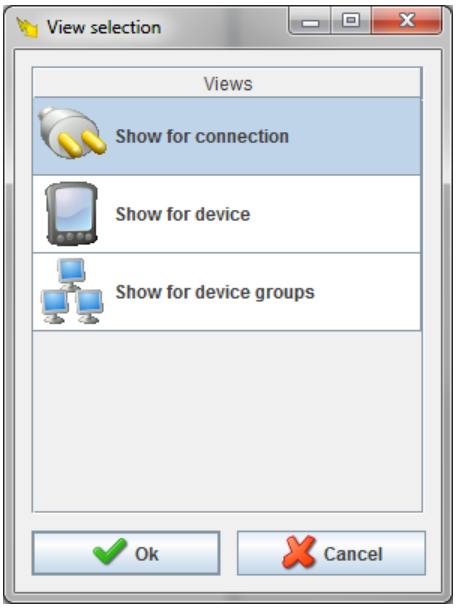


Figure 20:View selection dialogue

3.1.2.- VIEW BY CONNECTION

To access this view, follow the instructions in section "***3.1.1.- INTRODUCTION***" of this chapter.

In this view you can see the devices you have configured and their physical distribution, as well as the files that have been added to the "**Files**" node. This is the only view in which you can configure the communication parameters of the devices.

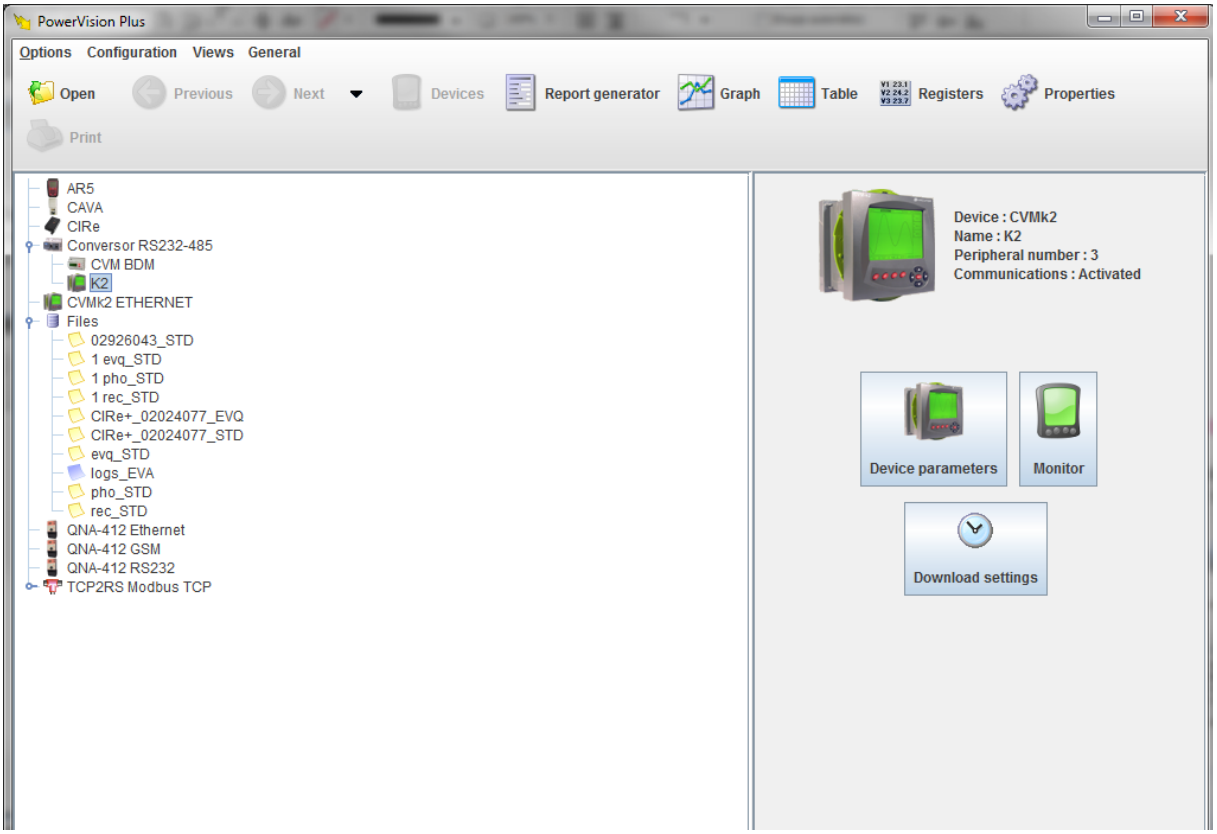


Figure 21:View by connection

3.1.2.1.- Add a device

To add a device, position the mouse cursor over the device tree panel and right click on the mouse without selecting any node on the tree. The following dialogue box will appear:

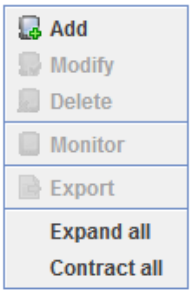


Figure 22: Add a device.

The following dialogue box will appear if you choose the "**Add**" option:

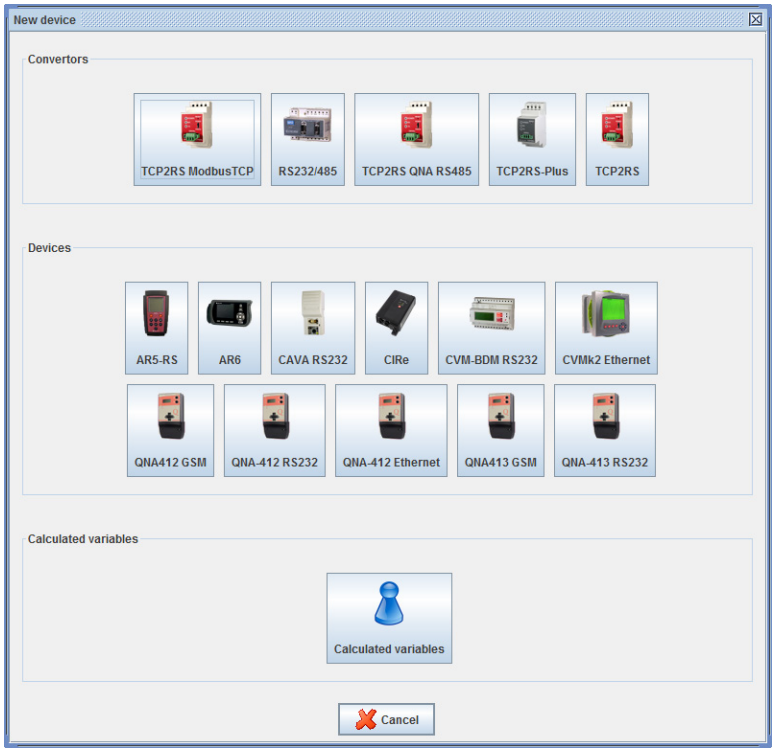


Figure 23:Top tier device selection dialogue.

You can also access this dialogue box from the "**Configure**" menu choosing the "**Add**" option or by pressing the "**Insert**" key on the keyboard.
The converter devices appear at the top of the dialogue box and the analyzer devices appear at the bottom. To learn more about each type of device, read sections ***"3.1.2.3.- Delete a device"***, ***"3.1.2.4.- Monitor a device"*** and ***"3.1.2.5.- Export"***.

Simply click on the type of device you want to add and the appropriate configuration dialogue box will be displayed.

	The power quality analyzer **QNA500** doesn't has a specific driver in **Power Vision Plus** because this device has an integrated WEB Server that allows, in contradistinction to other devices, to configure, to monitor on line values and to download files from any web-browser (or FTP client software), so it's not necessary to provide an specific driver to do these functions in **Power Vision Plus**. To analyze files recorded by a **QNA500**, user must download requested files to the PC by using a web-browser and then open files from **Power Vision Plus** to analyze them.

If you wish to add a second tier device, you must first select the converter device and right click on the node, at which point the following sub-menu will appear:

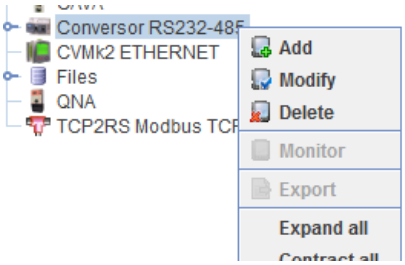


Figure 24:Interaction with a second tier device

The following dialogue box will appear when you select the "**Add**" option:

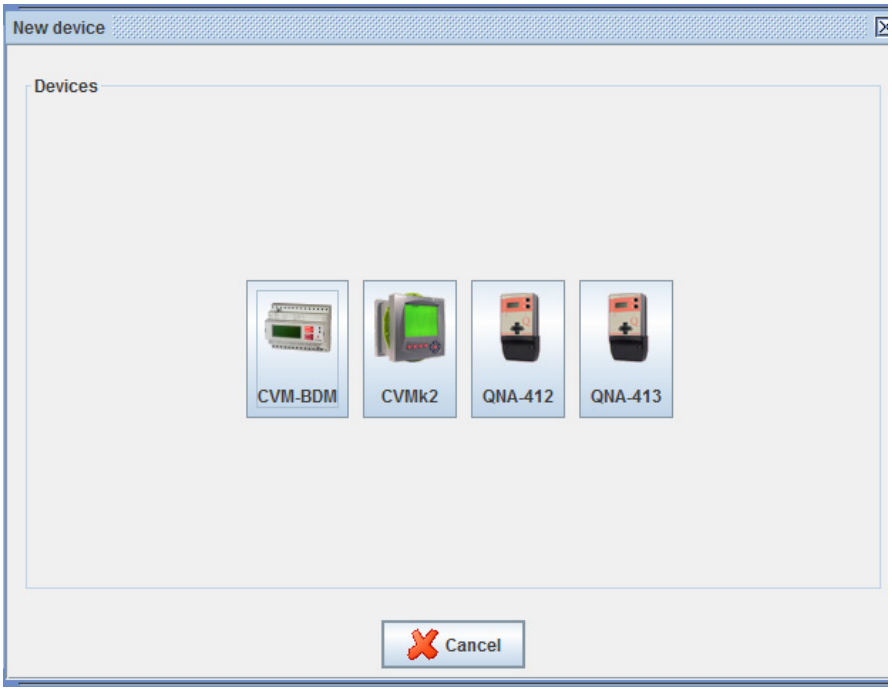


Figure 25:Second tier device selection dialogue

The contents of this dialogue box will vary depending on the converter device selected. See section *"3.2.- CONVERTER CONNECTION"* for further details.

3.1.2.2.- Modify a device

If you wish to modify a device, select the node from the device tree and right click the mouse to access the options sub-menu.
Select "**Modify**" and a dialogue box will open for modifying the device.

3.1.2.3.- Delete a device

Select the node to be deleted from the device tree, right click the mouse and choose "**Delete**" from the sub-menu that appears.

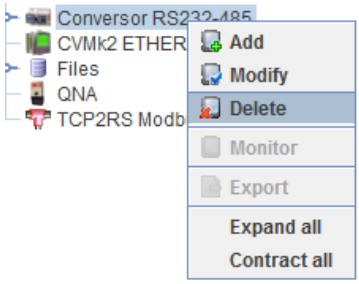


Figure 26:Delete option on the options sub-menu

The application will ask you to confirm that you want to delete the device.

Remember that if you delete a device with connected devices (subnodes), the connected devices will also be deleted.

3.1.2.4.- Monitor a device

Choose a device from the tree, right click the mouse and choose "**Monitor**" from the sub-menu that appears. You may also select the device from the menu and click directly on the "Monitor" button on the properties panel to the right.

Remember that you can only monitor the devices that have this functionality, such as the following devices: **QNA**, **CVMK2**, **CVM-BDM-1M**, **CAVA**.

For more information on monitoring devices, consult the individual section on each type of device

3.1.2.5.- Export

Is posible to export to text some data from devices that supports files or data register to visualize alter with other programs like EXCEL. Note that this functionality is an extension of the export of tables and graphs because it allows a more fast and flexible data export.

To export data, select the file to export from the devices tree, "click" right button and select "**Export**" from submenu.

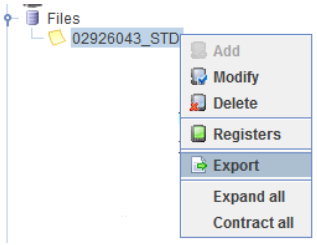


Figure 27: Export option.

Ask for the name of file to wich data will be export.

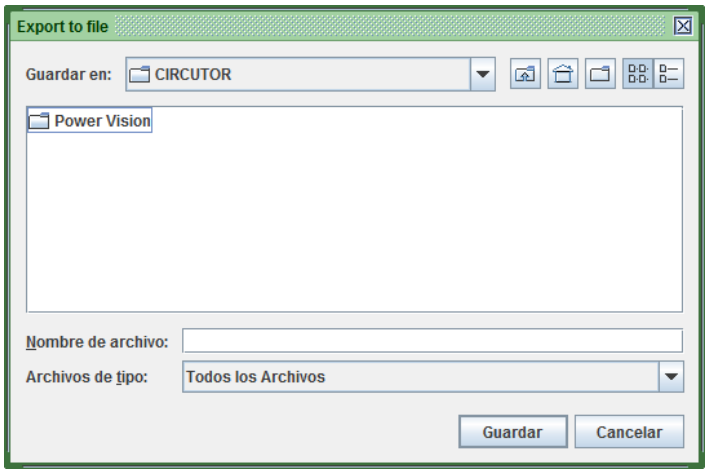


Figure 28: Export file screen.

Then will open a dialog where you can select the export settings:

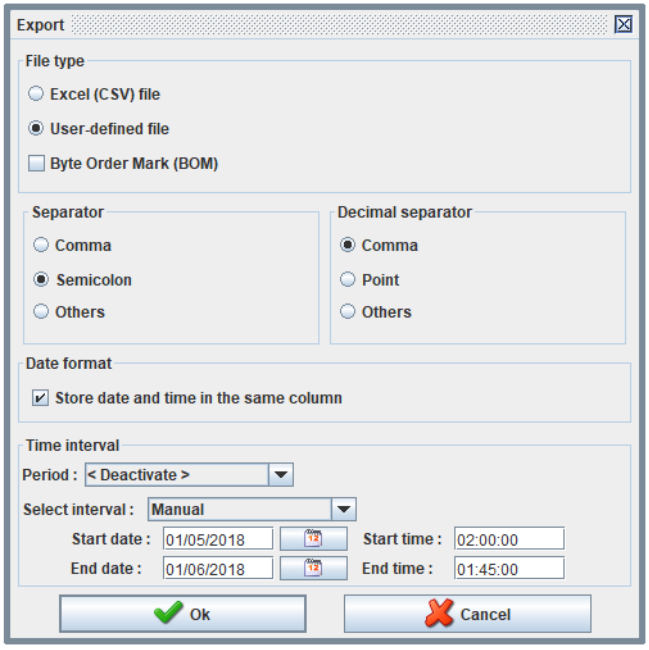


Figure 29: Configuration export.

The parameters to configure are:

- File type: **CSV**-type (Comma Separated Values) file, customised file or Byte Order Mark, in which a character is added to the beginning of the file indicating the use of Unicode encoding. If you select the first option, the attributes will be set by default and you will not be able to modify them.

- Separator: Character to separate data.
- Decimal separator: Character to decimal point.
- Date format: you can save the date and time in a same column.
- Time interval:
    - Period: Period of data to export. You can disable and take the time saved in the data, automatically chosen depending on the range or select from a list of general periods.
    - Interval selection: can select the start date and end of data to export. May indicate either manually or by the last day, week or month

If you do not want to continue to export press the cancel button, otherwise press the OK button. Then you will see a progress dialog while the application seeks to export variables. If the data register are variables of different types (standard, harmonic waveforms) the following dialog will be opened:

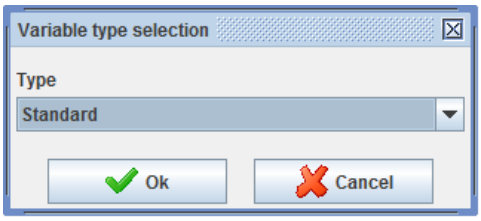


Figure 30: Variable type selection.

To continue, press "**OK**." Then progress will resume pending the export of data. You can cancel the export at any time by pressing the "**Cancel**".

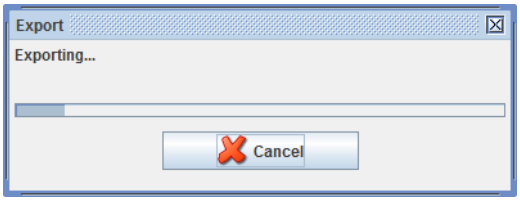


Figure 31:Dialog for export process

3.1.3.- VIEW BY DEVICE

To access this view, follow the instructions in section "***3.1.1.- INTRODUCTION***" of this chapter. This view allows you to display the devices grouped by type. If you add several devices of the same type to the application (several **QNA412 Series**, various **CVM-K2** Ethernet, etc.), you can easily see all the devices of the same type.

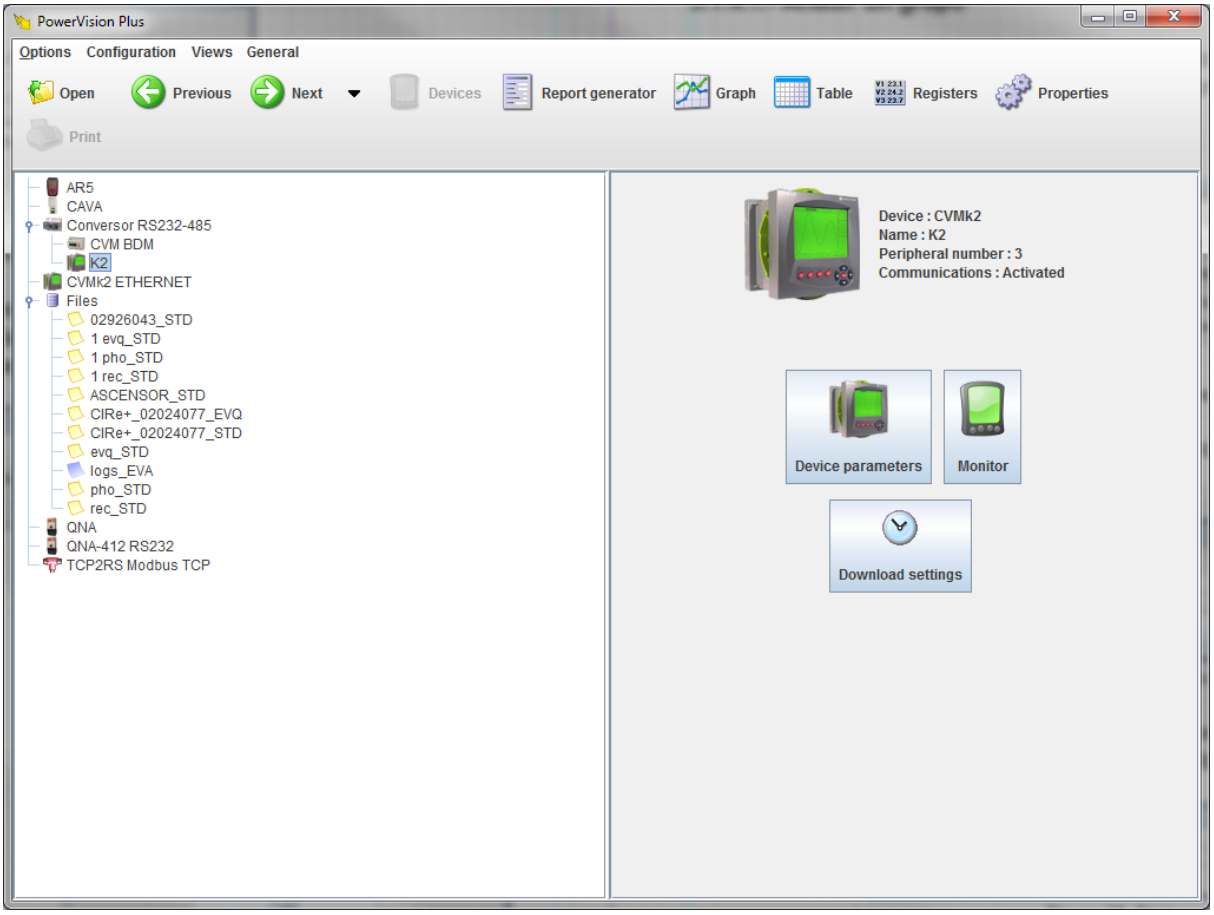


Figure 32:View by device

3.1.4.- DISPLAY BY DEVICE GROUPS

This view allows you to organise the devices and files you have added to the application in folders. There are two types of elements in this view:

✓**Groups**: acting as folders, no two on the same level can have the same name.

✓**Devices**: they refer to the devices added in view by connection. If you eliminate a device in this view, you will only be eliminating the reference to it.

	By default, when you add a device or file in view by connection, a reference to it is automatically added in view by groups.

3.1.4.1.- Add a group

Position the mouse on the left panel where the group and device tree is displayed. Right click the mouse and a sub-menu with the possible options will be displayed.

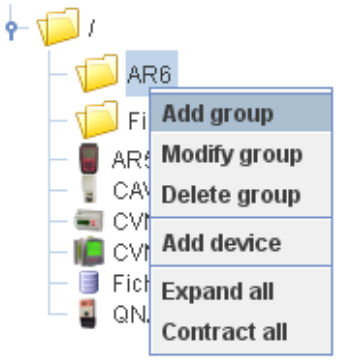


Figure 33:Sub-menu of possible options for a group

Choose the "**Add group**" option. A dialogue box will appear asking you for the name of the group:

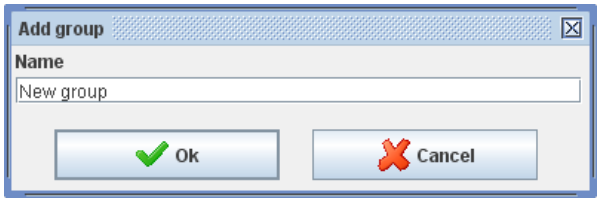


Figure 34:Dialogue for adding a group

Click on **OK** to create the new group. A progress dialogue will appear indicating that the application is processing the requested change.

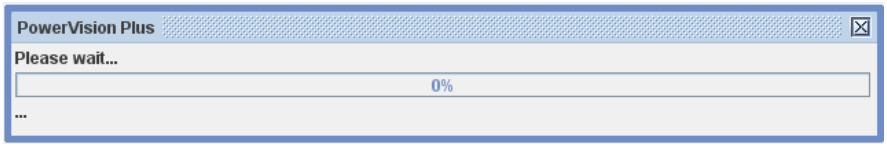


Figure 35: Dialogo de progreso.

At the end of the process, the view will be displayed again with the group and device tree, including the newly-created group.

3.1.4.2.- Modify a group

Allows you to access the sub-menu of options of a group node by selecting and right-clicking. Select the "**Modify**" option and a dialogue box for changing the name of the group will appear.

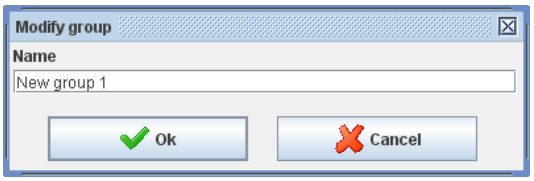


Figure 36:Dialogue for adding a device to a group

Change the name and click on **OK** to complete the modification.

3.1.4.3.- Add a device

Choose a previously-added group or position the cursor anywhere on the group tree panel where there is no element. Right click to access the options sub-menu and choose the "**Add device**" option.

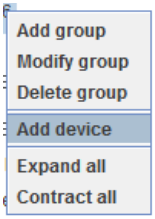


Figure 37: Add a device.

A list of the devices that can be added to the selected tree will then be displayed.

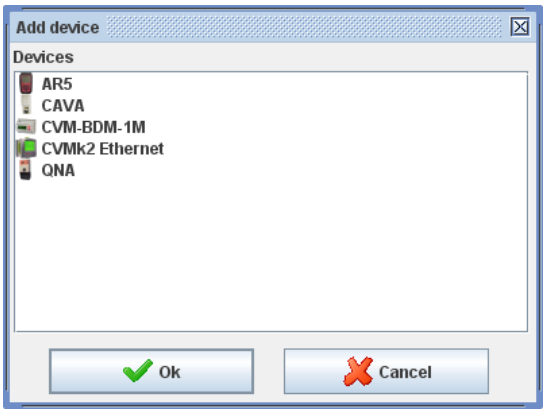


Figure 38:Dialogue for adding devices

Click on **OK** to add the selected devices.

3.1.4.4.- Eliminate elements of the view

Select a node or nodes from the group tree. Access the options sub-menu by right clicking the mouse and select the "**Eliminate group**" option if you are choosing groups or "**Eliminate device**" if you are selecting devices. You cannot select groups and devices at the same time.

The application will ask you to confirm that you want to delete the selected groups or devices.

3.1.4.5.- Move a device or group to another group

To facilitate the organisation of the elements in this view, you can move the device and group nodes to other group nodes. You can only move one element at a time.

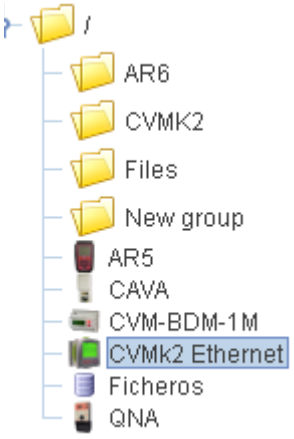


Figure 39: Move a device.

To move a node, left click the mouse to select it and drag it to the desired position. As you are dragging the node, you will see the cursor image change, indicating whether or not the node can be added to the new destination.

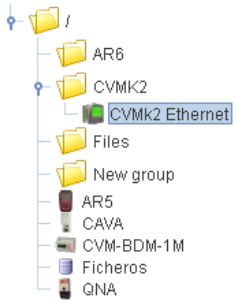


Figure 40: Example of a device node moved to a folder

3.2.- CONVERTER CONNECTION

The most important aspects for working with the types of converters available in **PowerVision Plus** are explained below. To configure devices, make sure the devices by connection view is active and remember the explanations given in point ***"3.1.2.- VIEW BY CONNECTION"***

3.2.1.- RS232 / 485

This type of converter allows you to connect devices that work with **RS-485** serial connections to the PC's **RS-232** port.

The following dialogue box will appear when you add a device:

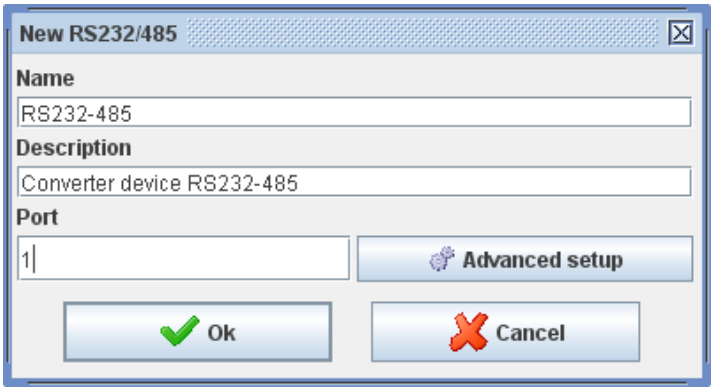


Figure 41: New RS232/485.

The parameters to be configured are:

- Name: alphanumeric code that uniquely identifies the device for the entire application.
- Description: alphanumeric code reserved for a brief description.
- Port: Number of the serial port that the program uses for communication with the converter.
- Advanced setup: You can configure the waiting time for a response from the device and the communication speed.

3.2.2.- TCP2RS

This type of converter connects devices with serial communications (**RS-232, RS-485**) to an Ethernet network using the **TCP/IP** protocol.

The following dialogue box will appear when you add a converter:

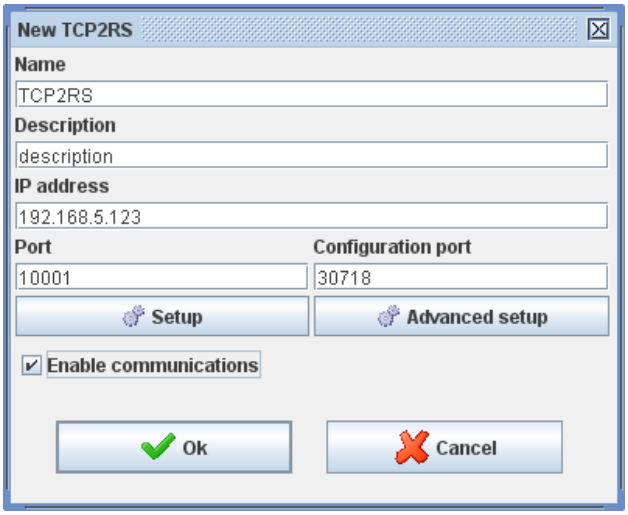


Figure 42: New TCP2RS.

The parameters to be configured are:

- Description: alphanumeric code reserved for a brief description.
- IP address: address used by the application to communicate with the device. This parameter can be an IP address or a name.
- Port: communication port. (We recommend that you do not change it).
- Configuration port: communication port used by the application to configure the device. (We recommend that you do not change it).
- Setup: allows you to configure the Ethernet communication parameters. See section *"3.5.- CONFIGURATION ETHERNET PARAMETERS"*
- Advanced setup: Allows you to configure the waiting time for a response from the device.
- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, Power Vision Plus does not monitor in real time neither data downloading.

If you have any problems configuring the Ethernet address of a **TCP2RS** converter, we recommend that you read section *"3.5.- CONFIGURATION ETHERNET PARAMETERS"*

3.2.3.- TCP2RS ModbusTCP

This converter connects devices with serial communications (**RS-232 / RS-485**) to an Ethernet network using the IP protocol (**ModbusTCP** for connection-oriented communications).
The following dialogue box will appear when this type of converter is added or modified:

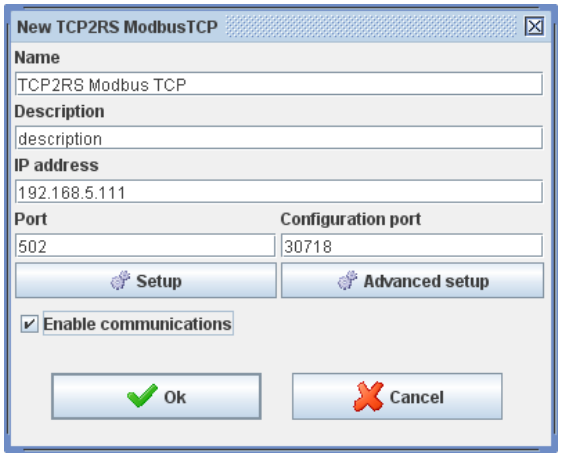


Figure 43: New TCP2RS Modbus TCP

The parameters to be configured are:

- Name: alphanumeric code that uniquely identifies the device for the entire application.
- Description: alphanumeric code reserved for a brief description.
- IP address: address used to communicate with the device, which may be an IP address or a domain name.
- Port: communication port: by default, the **Modbus TCP** protocol communicates through port 502.
- Configuration port: communication port used by the application to configure the converter. This port is **30718** by default.
- Setup: allows you to configure the communication parameters via the Ethernet. See section *"3.5.- CONFIGURATION ETHERNET PARAMETERS"*
- Advanced setup: you can configure the waiting time for a response from the device.
- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, Power Vision Plus does not monitor in real time neither data downloading.

If you have any problems configuring the Ethernet address of a **TCP2RS ModBusTCP** converter, we recommend that you read section *"3.5.- CONFIGURATION ETHERNET PARAMETERS"*

3.2.4- TCP2RS QNA RS485

This converter connects the **QNA412** and **QNA413** devices that work with **RS-485** serial communications to an Ethernet network using the IP protocol.
See the previous section for information on how to configure a **TCP2RS** converter.

3.2.5- TCP2RS Plus

The **TCP2RS Plus** converter connects equipment that works with a serial communication (RS-232/RS-485) to an Ethernet network using IP protocol.
When adding or modifying this device, the following dialogue box appears.

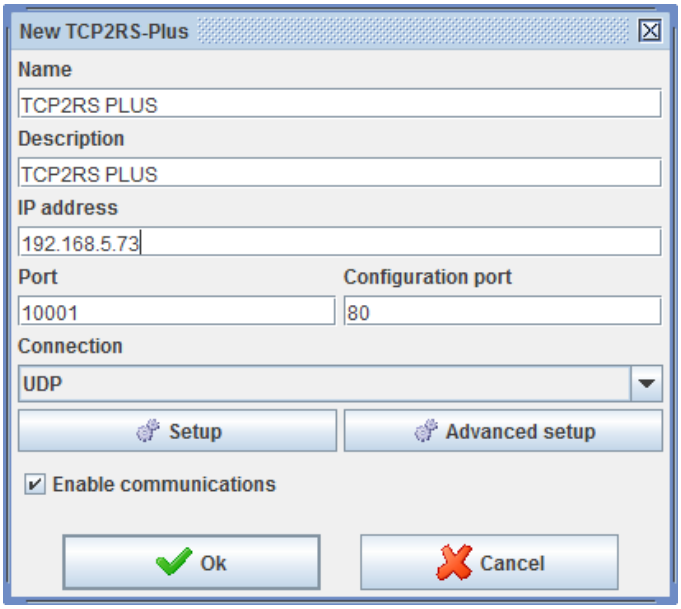


Figure 44: New TCP2RS Plus.

The parameters to be configured are:

- Name: Alphanumeric field that uniquely identifies the device throughout the program. There are no two devices in the configuration with the same name.
- Description: Enter a brief description of the device using alphanumeric type data.
- IP address: Corresponds to the address the program uses to communicate with the device. This parameter can be an IP address or a name. This address should not be confused with the MAC address.
- Port: Corresponds to the communications port.
- Configuration port: Corresponds to the communication port the program uses to configure the device. This port is 80 by default.

⚠	For a **TCP2RS Plus** device to communicate via a router the following steps must be followed: **1 -** In the **'IP Address'** field enter the router's IP address. **2 -** In the **'Port"** field enter the communications port and redirect this port on the router to the device's communications port. **3 -** Redirect the configuration port on the router to port 80 of the converter. ***NOTE:*** For information on readdressing ports consult the router user manual.

- Connection: Indicates whether the connection is **UDP, TCP** or **MODBUS-TCP.**

- Setup: By clicking the button a dialogue box will appear where a number of parameters of the device can be configured.

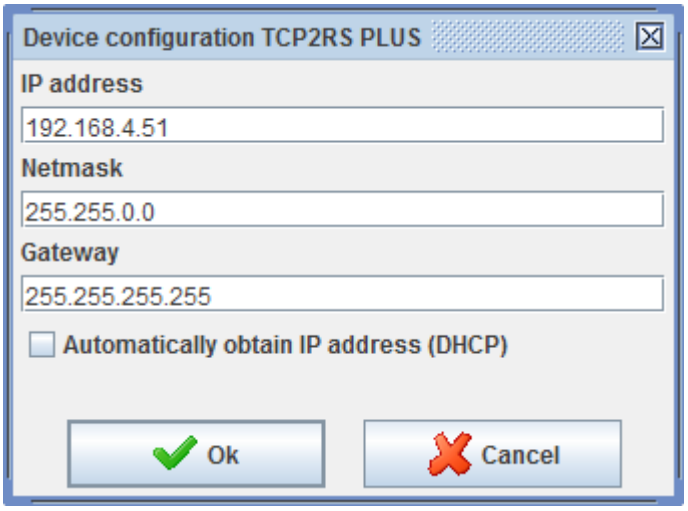


Figure 45: Device configuration TCP2RSPLUS

Where:

- *IP address:* Corresponds to the IP address used to communicate with the device.

- *Netmask:* Corresponds to the subnetwork mask used on the network where the device is connected

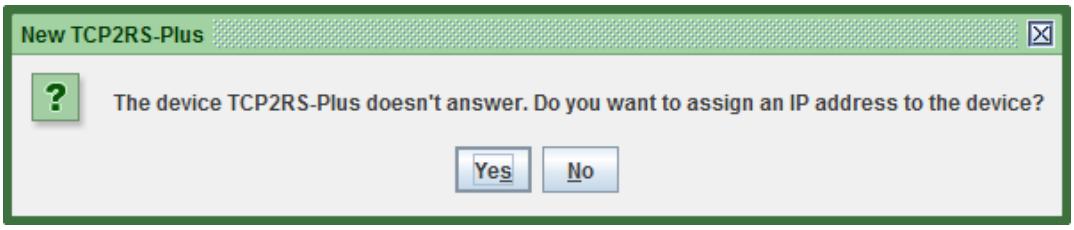
- *Gateway:* Corresponds to the address of the gateway if the device is not on the same network as the PC containing the program.

- *Automatically obtain IP address (DHCP):* This option should be enable if the user wants to get an IP address automatically from a DHCP server.

- Advanced setup: Allows the configuration of additional parameters on the device.

- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, Power Vision Plus doesn't monitor in real time neither data downloading.

On adding or modifying the device, the software will try to detect it. If it is unable to detect it, if the device is new or has not been allocated an IP address or has an allocated IP different to that introduced in the **'IP Address'**, it will ask if you want to assign a new IP address to the converter.



	It will only be possible to assign an IP address to the device if it is connected on the same network as the computer running the software.

If user press button **'Yes'**, the following dialogue box will appear, which will allow to assign a new IP address to the device.

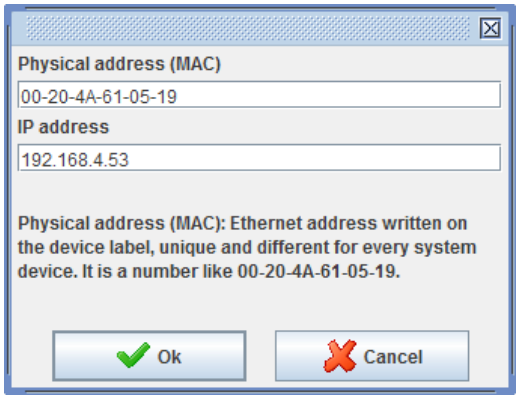


Figure 46: Assign a new IP

Where:

- Physical address (MAC): Ethernet address that each device has, which is unique and distinct on all network devices. The hardware address that any network interface has. Will be of the type **00-20-4A-61-05-19**.

- IP address: IP Address to be allocated to the device that has the physical address introduced in the previous field.

If it is possible to assign an IP address to the converter, the following dialogue box will appear to finish setting up the communication parameters.

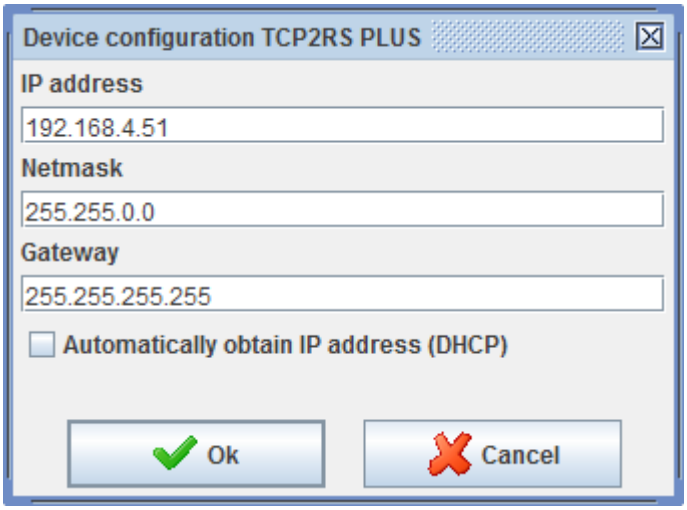


Figure 47: Device configuration TCP2RS PLUS.

3.3.- CONNECTION OF A PORTABLE DEVICE

3.3.1.- AR5

3.3.1.1.- Add or modify an AR5

First, connect the **AR5** device to a free serial port on the PC. Once connected, you must include the device on the device tree in the devices by connection view
The following dialogue box will appear once you add the device:

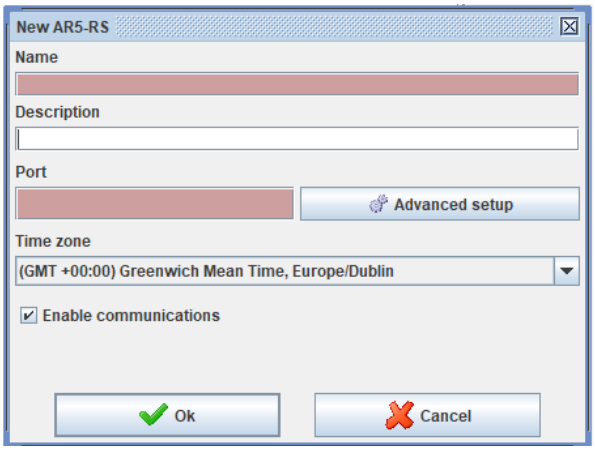


Figure 48:AR5 communication configuration dialogue

The parameters to be configured are:

- Name: alphanumeric code that uniquely identifies the device for the entire application.
- Description: alphanumeric code reserved for a brief description.
- Time zone: select the time zone with which the file records were saved. Once the data is download you will see the data in your local time.
- Port: Number of the serial port that the program uses for communication with the device. Is possible to assign the same port to **AR5** and **CAVA** o serial devices with unable communications.
- Advanced setup: Configuration of the transmission speed. The default speed is 19200. Therefore, if the device is configured differently you will need to change this value.
- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, **Power Vision Plus** does not monitor in real time neither data downloading.

⚠	By default, **PowerVision Plus** configures the serial communications in asynchronous mode with 8 data bits, no parity bit and 1 stop bit. This configuration cannot be changed so you must make sure that the device is configures with these parameters in order for the communications to work properly.

Once you have created the device you will see that a new node has been created for the **AR5** device on the device tree.

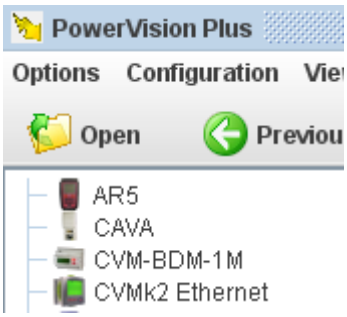


Figure 49:Example of a configuration with an AR5 added.

If you want to modify the communication parameters, choose the node and click the "**Modify**" option under "**Configuration**" on the main menu and on the sub-menu of options for the device tree node.

3.3.1.2.- Download data

To access the data stored in the device, select devices by connection view using the "**Devices**" button on the taskbar. Right click on the **AR5** added to the device tree. The following will appear on the right panel:

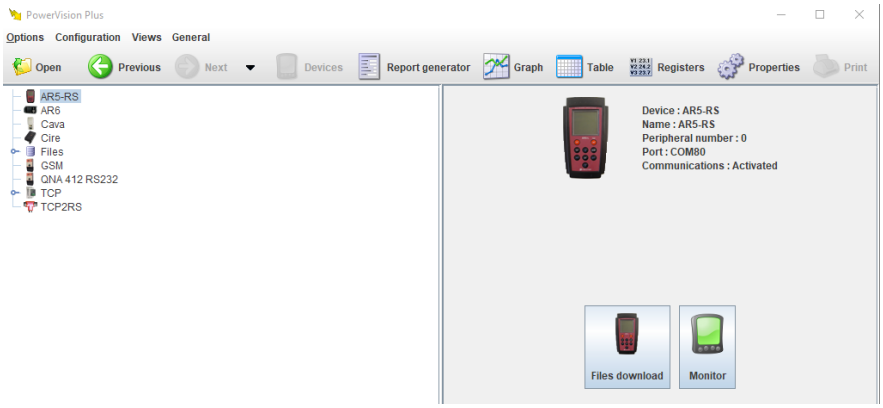


Figure 50: Download data AR5.

Choose "**file download**". A dialogue box will then appear with the files contained in the **AR5** created from the data gathered by the device. These files can be analysed using graphics, tables or quality studies.

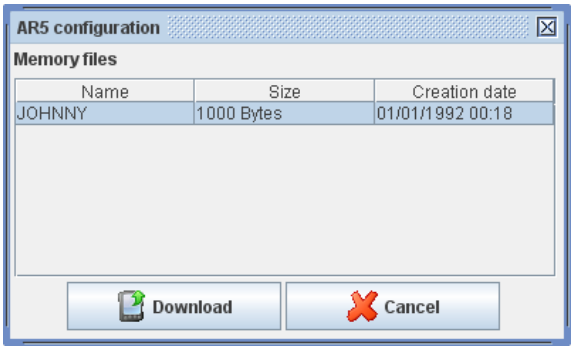


Figure 51:AR5 file download dialogue

This dialogue box contains a table showing the following information for each file: the name of the **AR5** file in the memory, the size in bytes and the creation date (date of the **AR5**).

To download a file, select the row for that file from the table and click "**Download**". To cancel the process, click "**Cancel**".

The following dialogue box will appear when you click "**Download**":

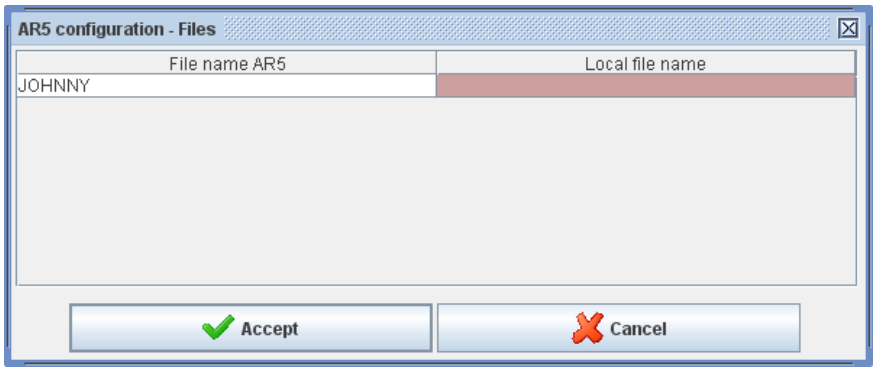
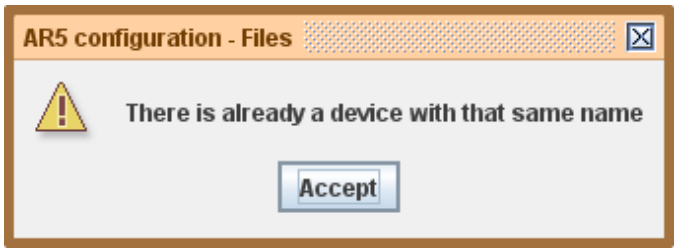


Figure 52:Dialogue of files to be downloaded from the AR5

Here you will need to enter the new name of the file to be downloaded. Remember that this name must not be the same as the name of any other element on the device tree since the downloaded file will be displayed as an element on that tree. If you enter a name that already exists, the application will display the following message:



To start the download, click on "**Accept**" in the **AR5** file download dialogue box. A progress dialogue box will then appear informing you of the progress of the download.

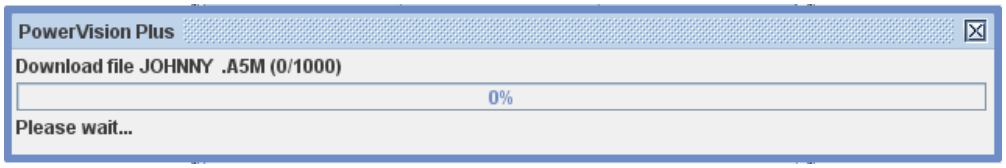
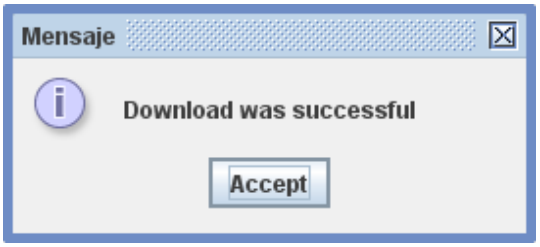


Figure 53:Download progress dialogue box

Once the download process is complete, a message will appear informing you of this.



Accept the previous dialogue and wait for the application to reconfigure the configuration. You will notice that the downloaded file appears as a child node of the **AR5** device on the device tree.

Figure 54:Example of a downloaded AR5 file

If an error occurs while downloading the selected files, the application will display a message with the errors encountered.

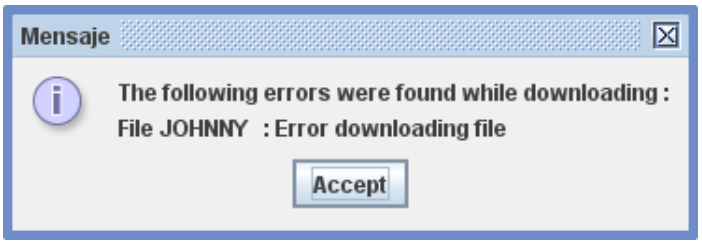


Figure 55:Example of AR5 file downloading error

3.3.2.- AR6

3.3.2.1.- Add or modify an AR6

Connect the device **AR6** to a USB port on your computer. Once connected, you must include the device in the device tree view devices by connection

Adding the device appears the next dialog:

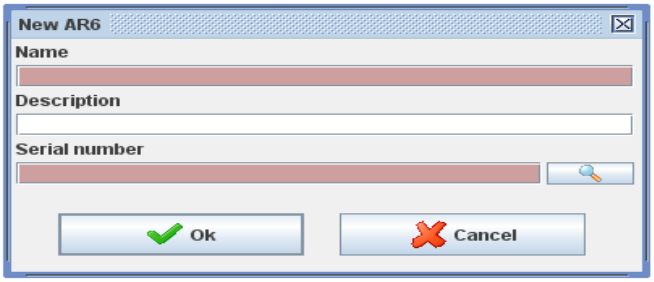


Figure 56:AR6 configuration dialogue.

The configurations parameters are:

- Name: Alphanumeric field to identiy the device into the application.
- Description: Alphanumeric field to write a description of the device.
- Serial number: Serial number of the connected device.

The serial number field you can enter it directly or you can ask the application to finds automatically. To find automatically the serial number of the connected device use the button  and the application Hill show with the search serial numbers.

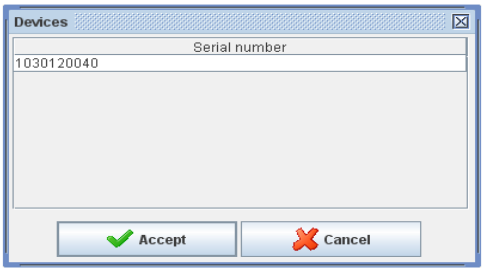


Figure 57: Serial numbers.

If the application does not find **AR6** connected computers will display a message informing you. Once you have created the device into a new node, corresponding to an **AR6** in the device tree.

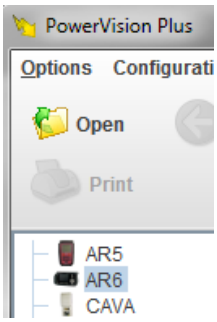


Figure 58:Configuration example with an AR6

To change the parameters of the **AR6**, select the node and click the "**Edit**"on the "**Settings**" menu from the main menu or in the submenu options in the device tree node.

3.3.2.2.- Download data

To acced to the data recorded into the device, select the connections devices visualization with the button "**Devices**" in the tool bar.
Select with the right button the **AR6** added in the devices tree and in the screen has to appear:

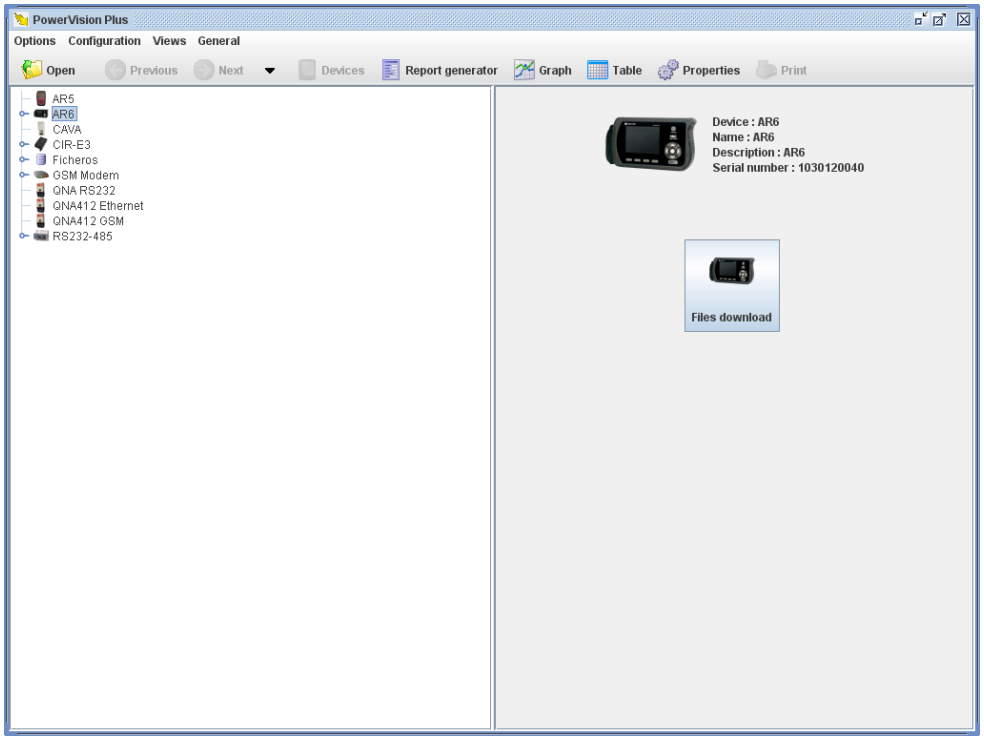


Figure 59: Download data AR6.

Select "**Download files**". Will appear a windows with de recorded measures in the **AR6** and for each one a list of the related files. These files could be analyzed using graphs, tables or quality analysis.

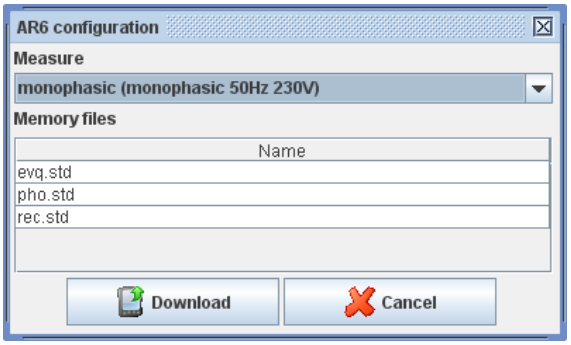


Figure 60:Download data AR6 dialogue.

This dialog shows a list of the stored measurements and each of them the list of related files. For each file displays the name it has in memory of **AR6**.

To download a file, first select a measure and then in the file table, select the files to download. Some extent might not have files. Finally click on "**Download**" if you want to add files to the application or click "**Cancel**" to exit.

If you click "**Download**" will display the following dialog:

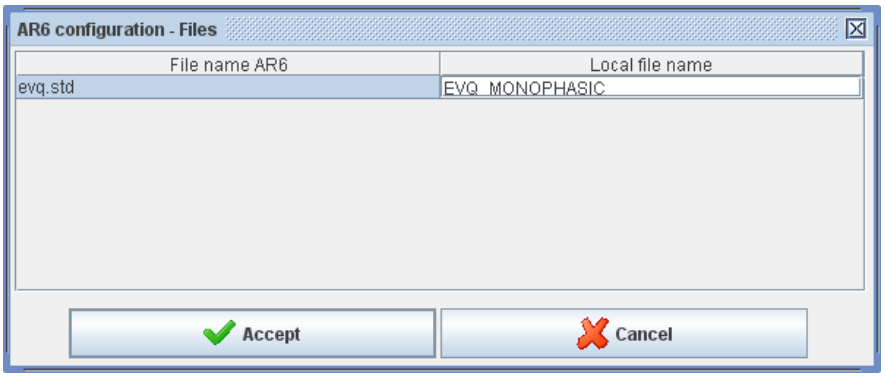
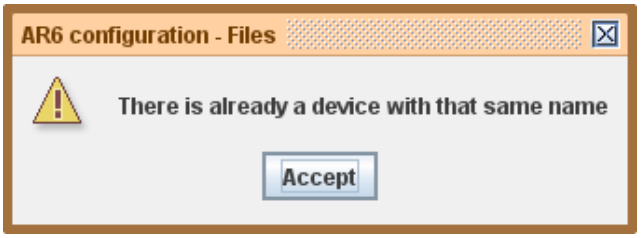


Figure 61:Files to download from an AR6

In this dialogue you have to enter a new name for the file to download. Note that this name must be unique with respect to all elements of the device tree, since the file is downloaded and displayed as an element of that tree. If you add an existing name, the application will inform you with the following message:



To begin downloading click "**Accept**" the dialogue of files to download the **AR6**. Then you will see a dialogue informing the download progress.

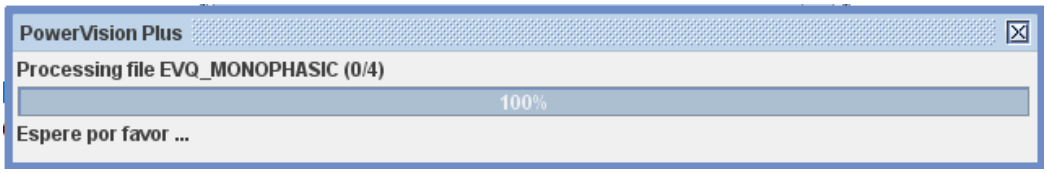


Figure 62:Download dialogue progress

The **AR6** device stores the files with the local time (LTC). When the files are downloaded with **PowerVision Plus**, the application will request the time zone from which the record dates will be converted. Please refer to Section ***"6.3.- TIME ZONE SELECTION"*** or more information about this procedure.

Once downloaded, you must wait for the application to reconfigure the settings. You'll notice that the downloaded file is displayed as a child node **AR6** device in the device tree.

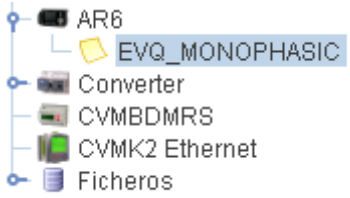


Figure 63:Example of a downloaded file

In case there is an error downloading the selected files the application will display a message with the errors found by each of them.

3.3.3.- CAVA

3.3.3.1.- Add or modify a CAVA

First, connect the **CAVA** device to one of the computer's free serial COM ports. Once connected, you must include the device on the device tree in the devices by connection view
The following dialogue box will appear once you add the device:

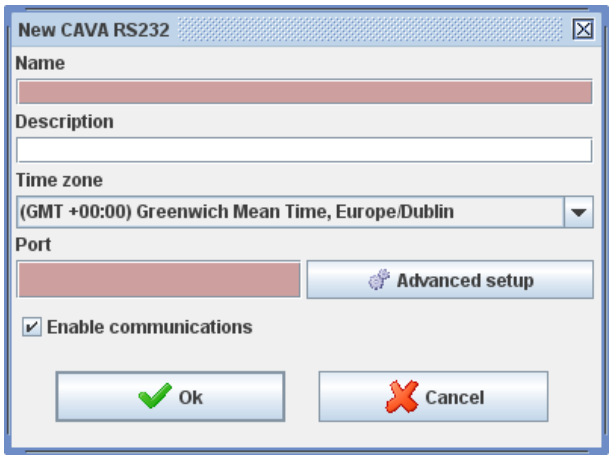


Figure 64:CAVA communication configuration dialogue box

The parameters to be configured are:

- Name: alphanumeric code that uniquely identifies the device for the entire application.
- Description: alphanumeric code reserved for a brief description.
- Time zone: select the time zone with which the file records were saved. Once the data is

download you will see the data in your local time.

- Port: Number of the serial port that the program uses for communication with the device. Is possible to assign the same port to **AR5** and **CAVA** o serial devices with unable communications.
- Advanced setup: Configuration of the transmission speed. The default speed is 19200. Therefore, if the device is configured differently you will need to change this value.
- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, Power Vision Plus does not monitor in real time neither data downloading.

⚠	By default, **PowerVision Plus** configures the serial communications in asynchronous mode with 8 data bits, no parity bit and 1 stop bit. This configuration cannot be changed so you must make sure that the device is configures with these parameters in order for the communications to work properly.

Once the device has been created, a new **CAVA** node will appear on the device tree.

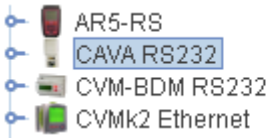


Figure 65:Example of a configuration with CAVA added.

If you want to modify the communication parameters, choose the node and click the "**Modify**" option under "**Configuration**" on the main menu and on the sub-menu of options for the device tree node.

3.3.3.2.- Configure parameters

Right click to select the created node on the device tree. The following information will appear on the right panel:

Figure 66:Information panel for a CAVA device

Clicking on "**Device parameters**" will take you to the following configuration screen:

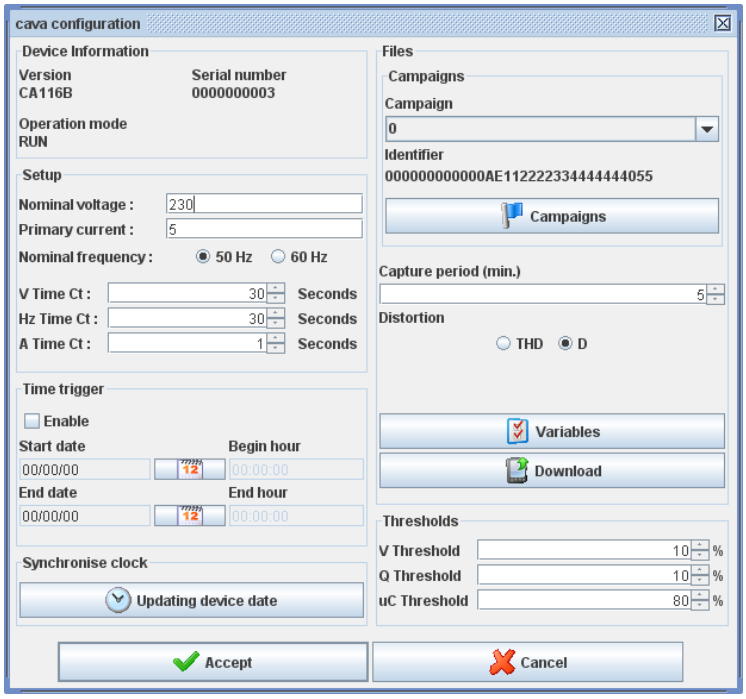


Figure 67:Dialogue box for CAVA device parameter configuration

In this dialogue box you can configure the device's internal parameters. When you open the dialogue box, the application will read the device's configuration and display the data on the corresponding form.

	To modify the device's configuration data, it must work in "**HOLD**" mode". A warning will appear if the device is not in that mode when you try to download the data. If this happens, close the window and change the device's mode to "**HOLD**". The next time you open the configuration dialogue box you will be able to modify the parameters.

The information on the device is shown at the top.

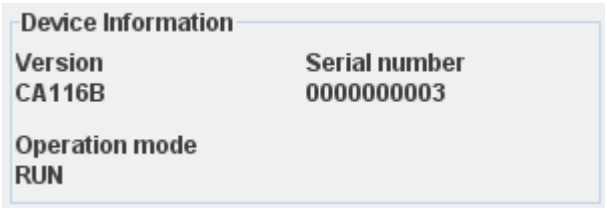


Figure 68: Device information.

The parameters of the electrical network, nominal voltage, frequency and some constants are defined in the box called **parameters**.

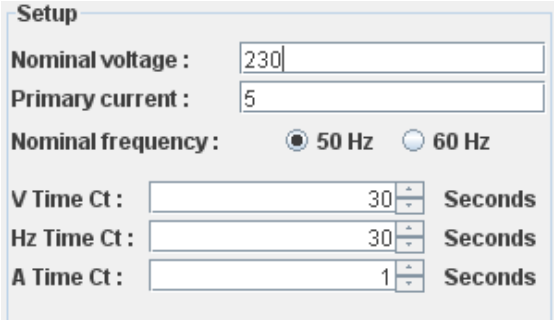


Figure 69: Parameters.

Below that, the **Time trigger** box contains the following parameters:

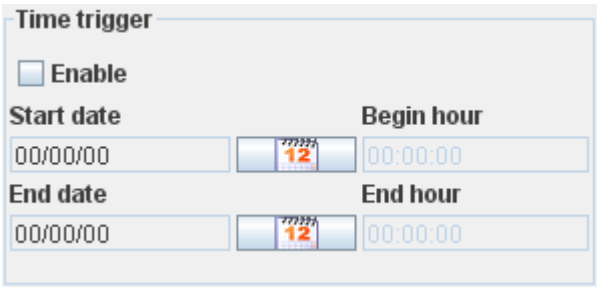


Figure 70: Time Trigger.

- Enable: enables or disables the time trigger.
- Start date / Begin hour: defines the trigger start date.
- End date / End hour: defines the trigger end date.

In the **Files** box you can configure the campaign parameters, the log period in minutes, the distortion and you can also select the variables to be logged or perform a download.
In the **Campaign** box you can configure the parameters for identifying different measurements within the same file. To configure the different campaigns, click on "**Campaigns**".

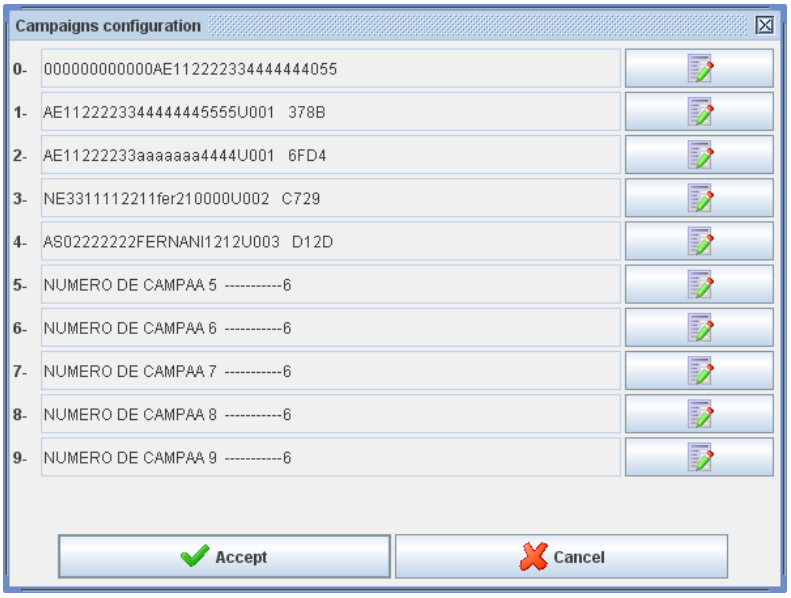


Figure 71:Campaign configuration dialogue box

To select the variables to be logged, click on "**Variables**". A dialogue box will appear with all of the variables supported by a **CAVA** device. The variables configured in the **CAVA** appear by default.

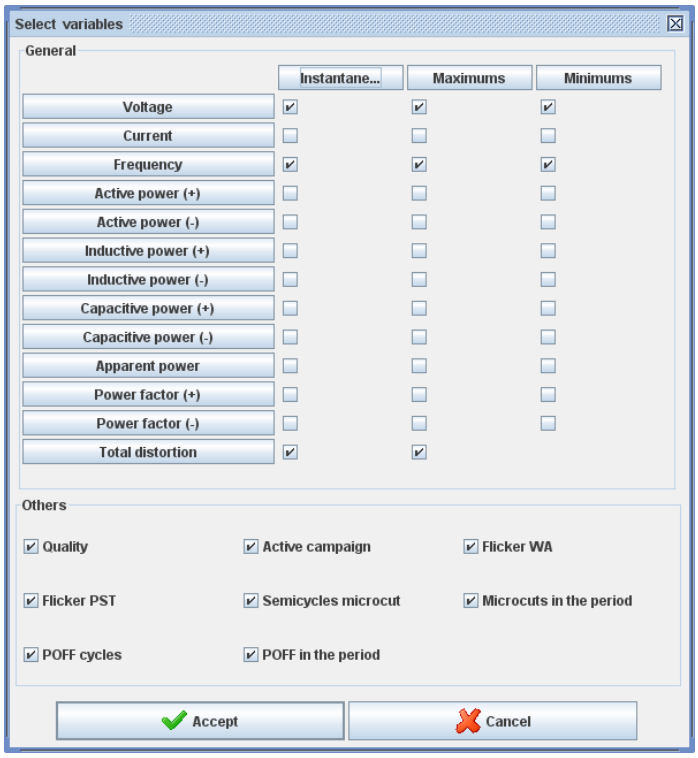


Figure 72: Select variables dialogue

In the **thresholds** section you can change the different thresholds of the **CAVA** device.

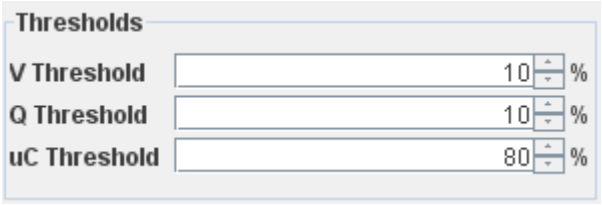
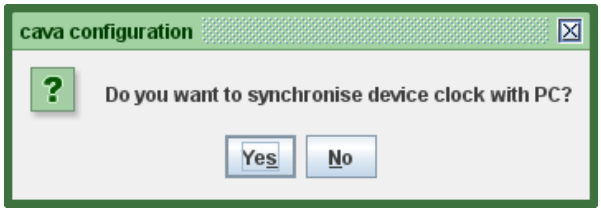
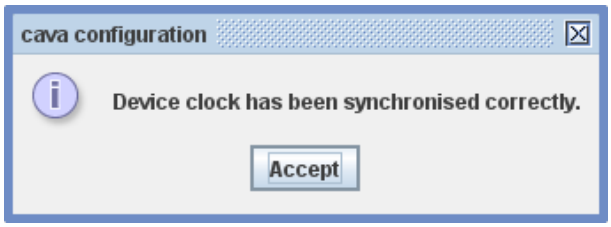


Figure 73: Thresholds

If you want to synchronise the PC time with the **CAVA**, click on "**Update date of device**". The application will ask you for confirmation:



To continue, click **Yes** and the application will automatically notify the device of the new date. The following message will appear once the update is complete:



For more information on how to configure a **CAVA** device, please consult the device manual.

3.3.3.3.- *Download data*

Go to the **CAVA** parameter configuration window described in the previous section. When the dialogue box appears, click on "**Download**".

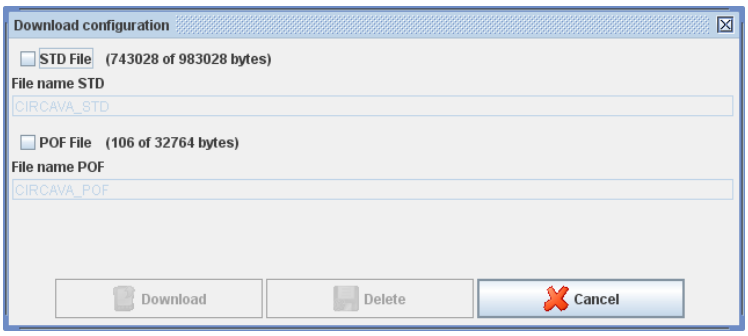


Figure 74:CAVA device download dialogue box

	In order to download data from the device, it must be operating in "**HOLD**" mode.

This window allows you to select the files to be downloaded or delete them from the **CAVA** memory. The two types of files that can be downloaded are: files in **STD** format and files in **POF** event format. To download the files presented, choose the desired option: "**STD file**", "**POF file**" or both. When you select one of these options, you can either give the file to be downloaded a name or allow the name to be assigned by default. Remember that the name cannot be the same as that of any other element on the device tree since the file, once downloaded, will be displayed as another device on the tree.

To start the download, click "**Download**". Wait for the downloading process to finish.

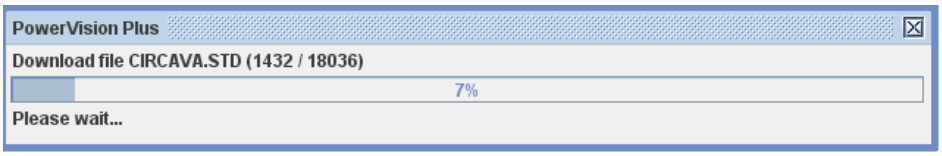
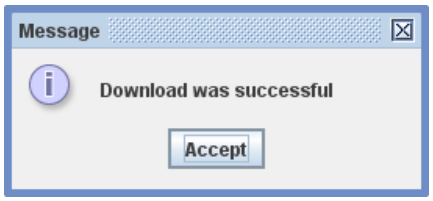


Figure 75:CAVA file download progress dialogue box

The following message will appear if the download is successful:



Click **Accept** and wait for the application to reload the configuration. Once this is done you will see the downloaded file or files as subnodes of the **CAVA** device on the device tree.

Figure 76:Example of configuration with two downloaded CAVA files

3.3.3.4.- Monitor

Select the node for the **CAVA** device on the device tree. Click directly on the "**Monitor**" button on the properties panel to the right, or right-click on the selected node to access the options sub-menu and click the "**Monitor**" option. You can also access monitoring by choosing "**Configuration**" from the main menu.

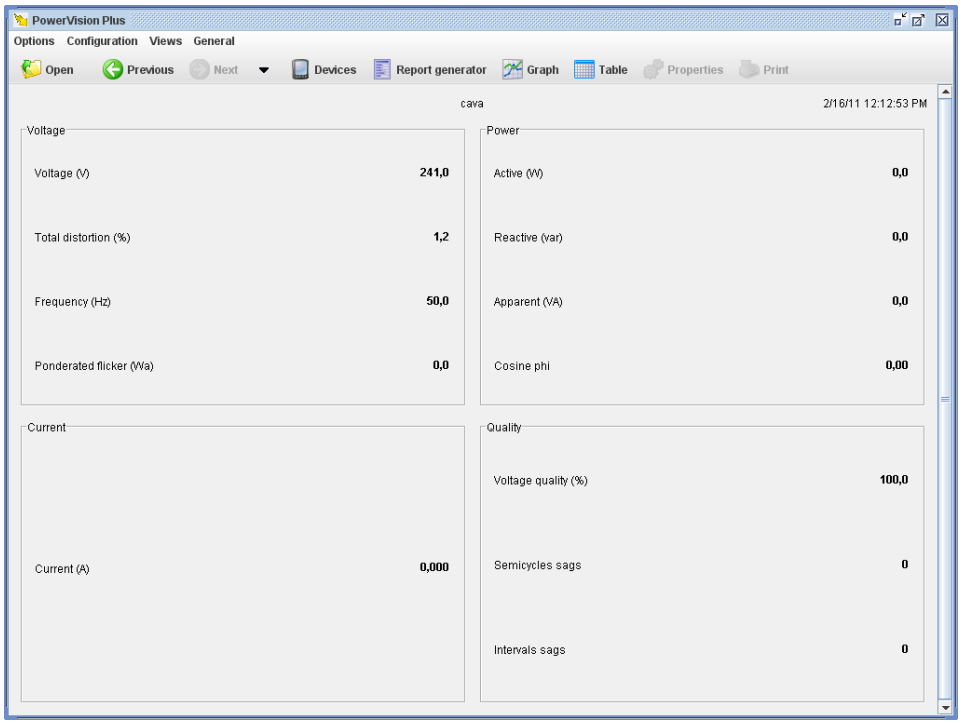


Figure 77:Monitoring screen of a CAVA device

3.3.4.- CIR-e3

3.3.4.1.- Add or modify a CIR-e3

First you must connect a memory device **CIR-e3** to the computer. Once connected, you must include a device **CIR-e3** in the device tree view of devices per connection
Adding the device will display the following dialogue:

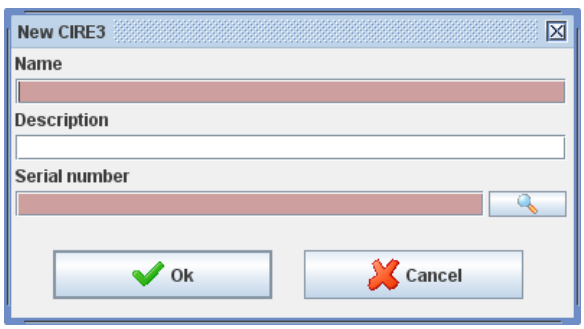


Figure 78:CIR-e3 configuration dialogue

The configuration parameters are:

- Name: Alphanumeric field that will identify the device in all the application.
- Description: Alphanumeric field to write a description of the device.
- Serial number: Serial number of the connected device.

  The serial number field you can enter it directly or you can ask the application to find it automatically. To find the serial number of the connected equipment must press  and the application will display a dialogue with the serial numbers found.

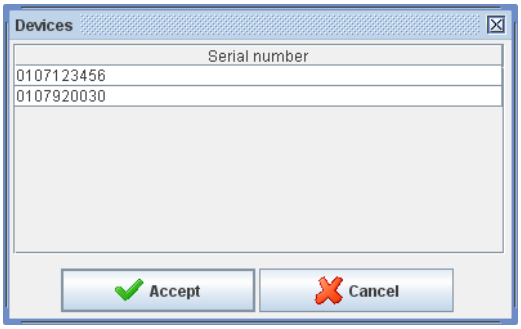


Figure 79:Serial number dialogue.

If the application does not find configuration files **CIR-e3**, a message appears informing you.

Once you have created the device look like you have created a new node, corresponding to a **CIR-e3** team in the device tree.

Figure 80:Example CIR-e3 added

To change the parameters of the **CIR-e3**, select the node and click the "**Edit**"on both the "**Settings**" menu from the main menu and the submenu options in the device tree node.

3.3.4.2.- Download data

To access data stored on the device select the View Devices by connection with the "**Devices**"from the taskbar.

Select the Right **CIR-e3** added in the device tree. In the right pane should display the following:

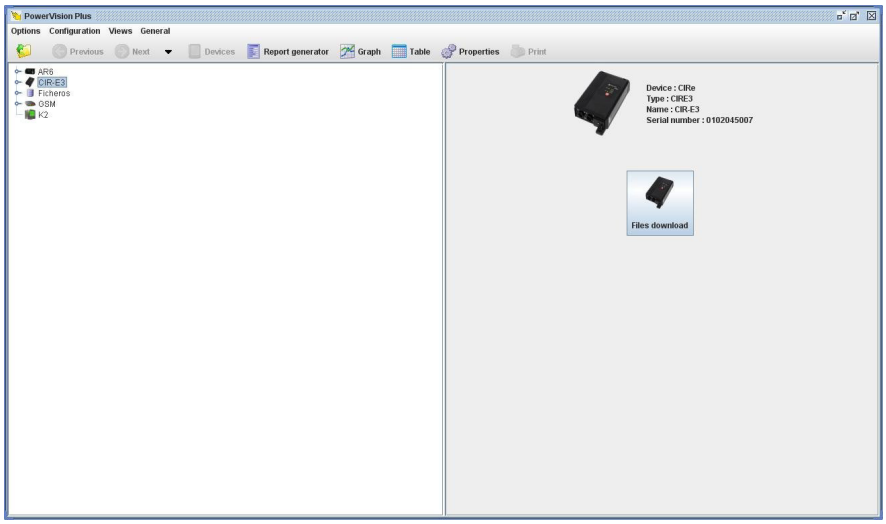


Figure 81: Download data CIR-e3.

Select the "**Download File**". Then a dialogue with the files found. These files may be analyzed using graphs, tables or quality analysis.

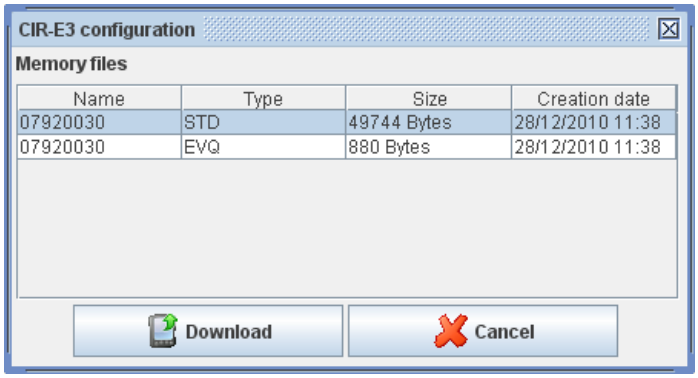


Figure 82:CIR-e3 download files list

If you want to add files to the application select the files to download and press the "**Download**" button. Otherwise click "**Cancel**" to exit.

If you click "**Download**" will display the following dialogue:

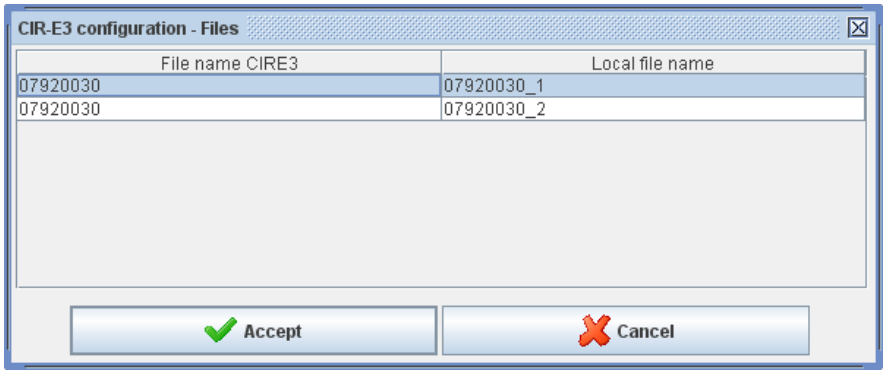


Figure 83:CIR-e3 download files

In this dialogue you have to enter a new name for the file to download. Note that this name must be unique with respect to all elements of the device tree, since the file is downloaded and displayed as an element of that tree. If you add an existing name, the application will inform you with a message.

To begin downloading click "**Accept**" the dialogue of files to download from **CIR-e3**. Then you will see

a dialogue informing the download progress.

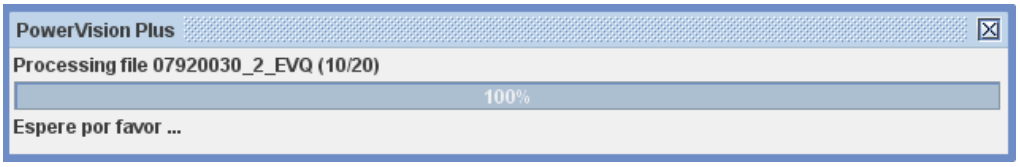


Figure 84:Download process bar

Once downloaded, you must wait for the application to reconfigure the settings. You'll notice that the downloaded file is displayed as a child node **CIR-e3** device in the device tree.

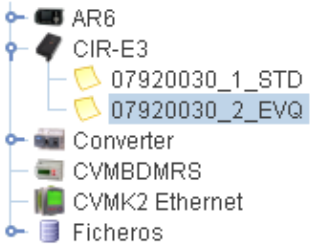


Figure 85:CIRe3 downloaded example

In case there is an error downloading the selected files the application will display a message with the errors found by each of them.

3.4.- CONNECTION OF A POWER ANALYZER

3.4.1.- QNA412 – QNA413

3.4.1.1.- Add a QNA RS232/485

Connect the **QNA-412 RS** or the **QNA-413 RS** device (from now on **QNA**) to one of the computer's free COM serial ports. Once connected, you will need to include the device on the device tree in the devices by connection view.
The following dialogue box will appear once you add the device:

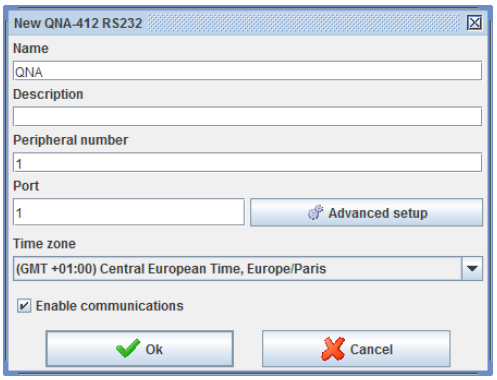


Figure 86:Dialogue box for configuration of QNA412 RS232 communications

The parameters to be configured are:

- Name: alphanumeric code that uniquely identifies the device for the entire application.

- Description: alphanumeric code reserved for a brief description.
- Peripheral Number: Number identifying the device in communications. If the device is connected to a converter, i.e., if it is on the second level, this number must be the same for all devices connected to that converter. (We recommend that you do not change this field).
- Port: Number of the serial port that the program uses for communication with the device. Is possible to assign the same port to **AR5** and **CAVA** or serial devices with unable communications.
- Advanced setup: configuration of the communication speed with the device and maximum delay for communication with the device. The default speed is 19200. Therefore, if the device is configured differently you will need to change this value. A delay of 0 means that this value is not taken into account.
- Time zone: select the time zone with which the file records were saved. Once the data is download you will see the data in your local time.
- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, **Power Vision Plus** does not monitor in real time neither data downloading.

⚠	By default, **PowerVision Plus** configures the serial communications in asynchronous mode with 8 data bits, no parity bit and 1 stop bit. This configuration cannot be changed so you must make sure that the device is configures with these parameters in order for the communications to work properly.

Once the device is created, a new **RS232 QNA** node will appear on the device tree.

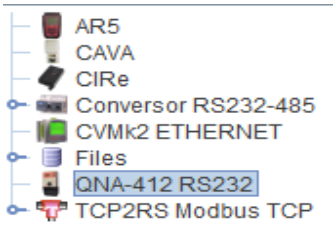


Figure 87:Example of a configuration with an RS232 QNA added.

If you want to modify the communication parameters, choose the node and click the "**Modify**" option under "**Configuration**" on the main menu and on the sub-menu of options for the device tree node.

3.4.1.2.- Add a QNA Ethernet

Connect the **QNA Ethernet** device to an accessible TCP/IP network. Once connected, you must include the device on the device tree in the devices by connection view (see section ***"3.1.2.- VIEW BY CONNECTION"***).

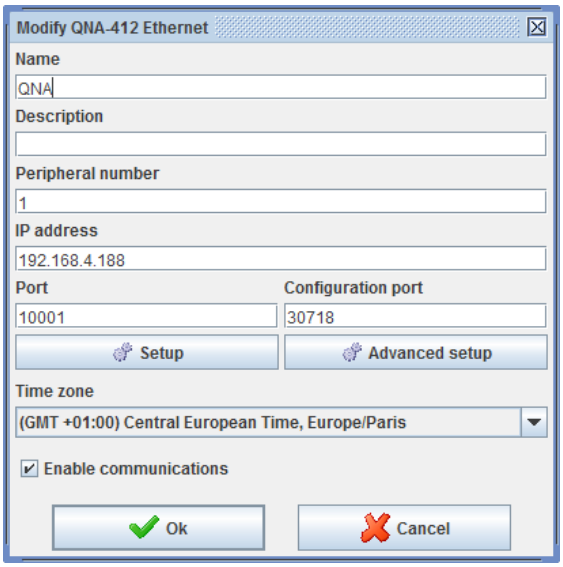


Figure 88:Dialogue box for configuration of QNA412 Ethernet communications

The parameters to be configured are:

- Name: alphanumeric code that uniquely identifies the device for the entire application.
- Description: alphanumeric code reserved for a brief description.
- Peripheral Number: number that identifies the communications device. (We recommend that you do not change this field).
- IP address: address used to communicate with the device, which may be an IP address or a domain name.
- Port: the default communication port is 10001.
- Configuration port: communication port used by the application to configure the device. This port is 30718 by default.
- Setup: allows you to configure the communication parameters via the Ethernet. See section *"3.5.- CONFIGURATION ETHERNET PARAMETERS"*
- Advanced setup: you can configure the waiting time for a response from the device.
- Time zone: select the time zone with which the file records were saved. Once the data is download you will see the data in your local time.
- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, Power Vision Plus does not monitor in real time neither data downloading.

Once the device is created, a new **QNA Ethernet** node will appear on the device tree.

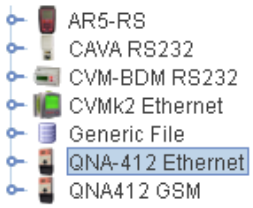


Figure 89:Example of a configuration with an QNA412 Ethernet added.

If you want to modify the communication parameters, follow the same steps as above (*"3.4.1.1.- Add a QNA RS232/485"*).

If you have any problem configuring the Ethernet address of a **CVM-K2 Ethernet** device, we recommend that you read section *"3.5.- CONFIGURATION ETHERNET PARAMETERS"*

3.4.1.3.- Add a QNA GSM/GPRS

To connect a **QNA GSM/GPRS** to **PowerVision Plus** you will need to use a compatible modem connected to the computer through the serial port. Through the application you can add a **QNA GSM/GPRS** device directly as a first level.

When you add the **QNA GSM/GPRS** to the device tree the following dialogue box will appear:

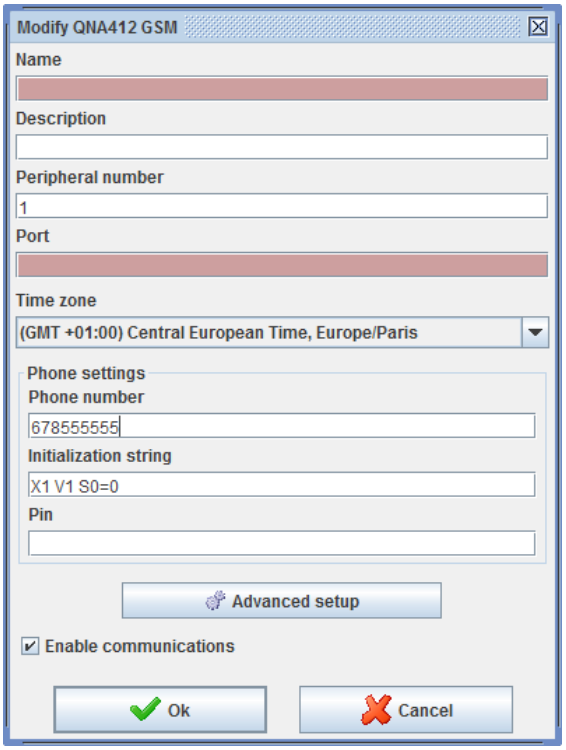


Figure 90:Dialogue box for configuration of QNA412 GSM communications

The parameters to be configured are:

- Name: alphanumeric code that uniquely identifies the device for the entire application.
- Description: alphanumeric code reserved for a brief description.
- Peripheral Number: number that identifies the communications device. (We recommend that you do not change this field).
- Port: Number of the serial port that the program uses for communication with the modem.
- Time zone: select the time zone with which the file records were saved. Once the data is download you will see the data in your local time.
- Phone number: number called by the GSM modem to connect to the **QNA GSM**.
- Initialization string: this pertains to the modem and the default configuration should not be changed (X1 V1 S0=0).

- Pin: PIN number of the SIM card in the GSM modem.
- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, Power Vision Plus does not monitor in real time neither data downloading.

In the advanced setup you can edit the following parameters:

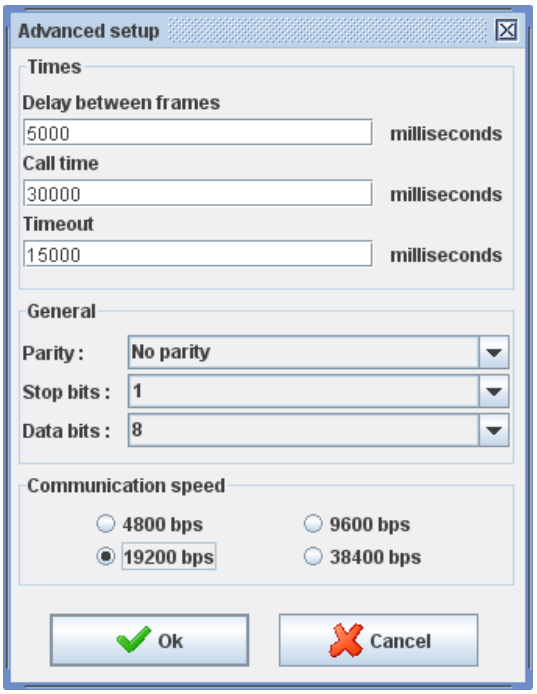


Figure 91:Dialogue box for advanced configuration of QNA GSM communications.

- Delay between frames: maximum delay between frames received in milliseconds. The default value is 5000.
- Call time: maximum call time in milliseconds. The default value is 30000.
- Timeout: maximum waiting time for communication with the device in milliseconds. The default value is 15000.
- Parity: you can choose parity, uneven parity or even parity.
- Stop bits: choose between one or two stop bits.
- Data bits: choose between 7 or 8 bits.
- Communication speed: you can choose from speeds of 4800, 9600, 19200 or 38400 bps.

3.4.1.4.- Configure parameters

To access the **QNA** parameters, select the node for the **QNA** you want to configure. The following options will appear on the left-hand panel of properties in the devices view:

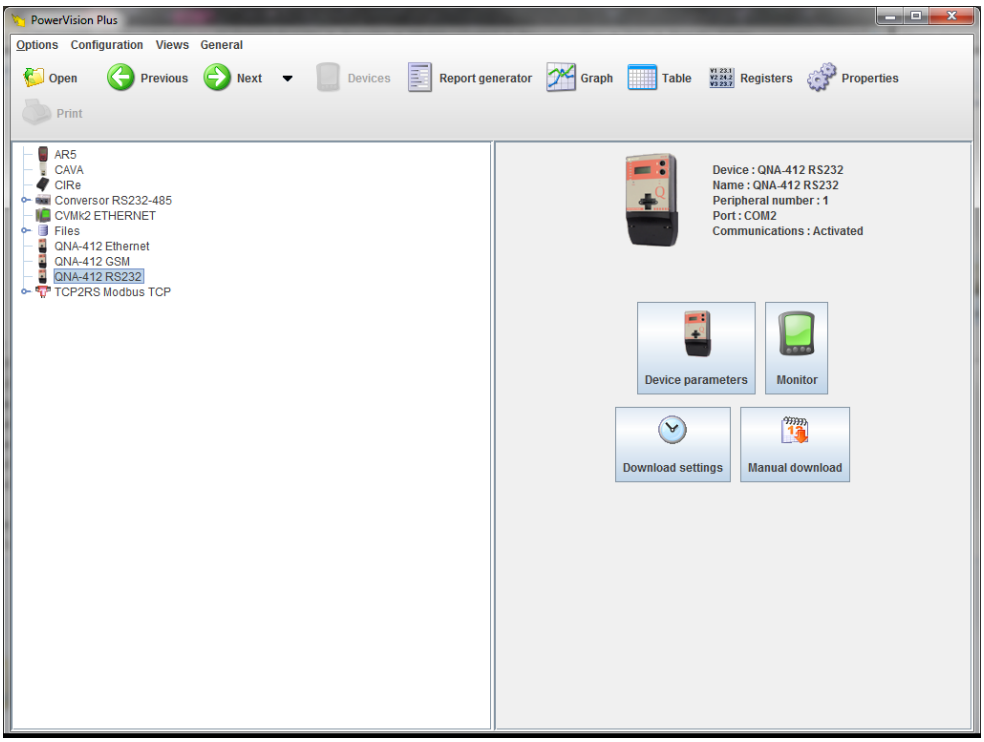


Figure 92: Configure parameters QNA.

To access the parameter configuration dialogue, click on "**Device parameters**". The standard configuration dialogue box for a **QNA** will then appear.

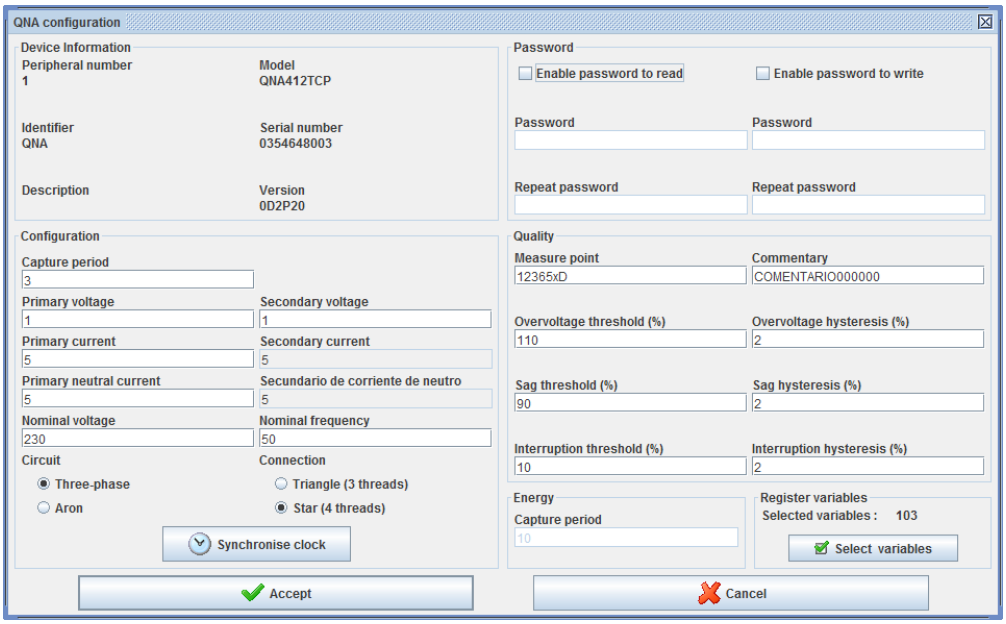


Figure 93:Dialogue box for standard QNA parameter configuration

The information for the device is shown in the section titled "**Device information**".
The "**Password**" section allows the password to be enabled or disabled to block both the reading and writing of values and the configuration of the device.

The section titled "**Configuration**" allows you to configure the following values:

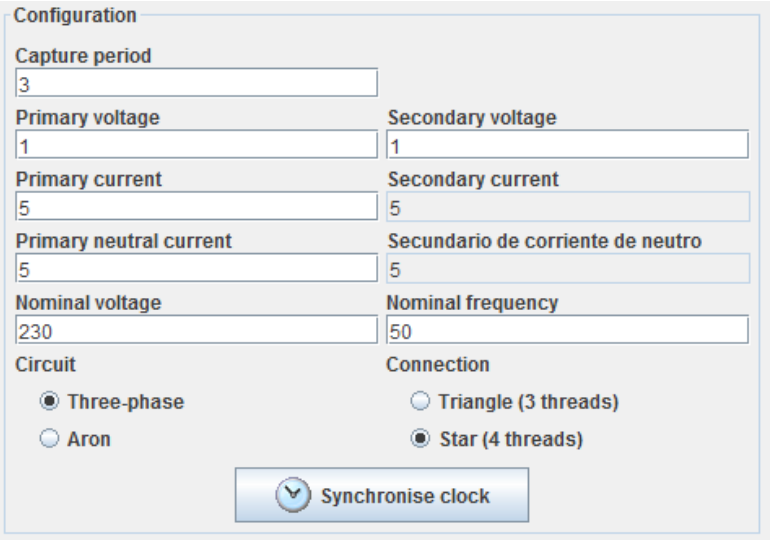


Figure 94: Configuration

- Capture period: minutes between records saved in the device.
- Primary voltage: Primary voltage of the device
- Secondary voltage: Secondary voltage of the device.
- Primary current: primary current of the device.
- Secondary current: secondary current of the device.
- Primary Neutral current: primary current of the device.
- secondary Neutral current: neutral secondary current of the device.
- Nominal voltage: phase-phase voltage for a 3-wire configuration and phase-neutral voltage for a 4-wire configuration. If the measurement is taken via the voltage transformer, the value here must refer to the secondary.
- Nominal frequency: Nominal frequency of the device.
- Circuit: type of circuit to which it is connected to take the measurement. Choose between **three-phase** (3 phases) or **Aron** (using two connections for the measurement).
- Connection: Enables the type of connection to which it is connected to carry out the measurement to be chosen, whether **Triangle** (connection between phases, without neutral) or **Star** (3-phase connection and neutral)
- Synchronise clock: It synchronise device date and time to the PC date and time, in UTC format.

Under the section titled "**Quality**" you can configure the following parameters:

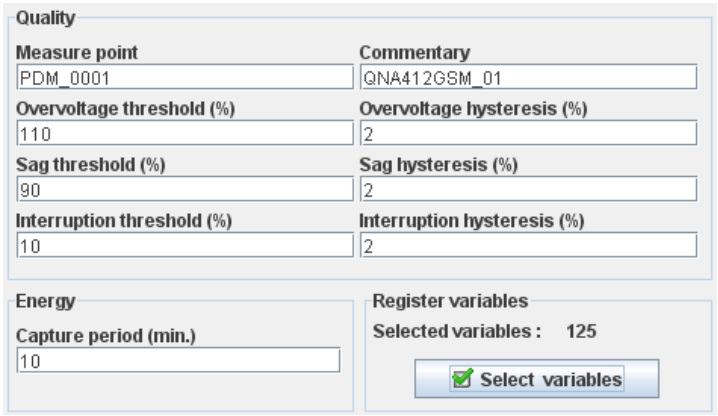


Figure 95: Quality

- Measuring point: Brief description of the measuring point where the **QNA** is located.
- Commentary: Brief description of the measuring point.
- Overvoltage threshold: programming of overvoltage percentage. Any semi-cycle whose effective value exceeds this percentage will be considered overvoltage.
- Overvoltage hysteresis: configured so that the starting voltage is different to the voltage at the end of the overvoltage. An overvoltage will start when the voltage threshold value is exceeded and will finish when it is lower than the value defined by the difference between the threshold and the hysteresis.
- Sag threshold: sag detection programming. Each semi-cycle with an rms value not reaching this defined value will be understood as a sag.
- Sag hysteresis: configured so that the starting voltage is different to the voltage at the end of the sag. A sag will start when the voltage does not exceed the threshold value and will finish when this is lower than the value defined by the sum of the threshold and the hysteresis.
- Interruption threshold: defined as PowerOFF (no voltage, interruption) when the voltage drops below the value set.
- Interruption hysteresis: configured so that the starting voltage is different to the voltage at the end of the interruption. A interruption will begin when the voltage does not exceed the threshold value and ends when it exceeds the value defined by the sum of the interruption threshold and hysteresis.

The section titled "**Energy**" enables you to specify the energy capture time expressed in minutes.
The section titled "**Register variables**" allows you to choose the variables to be used by the **QNA** to save the record values.

3.4.1.5.- Configure GSM or GPRS parameters

The **QNA GSM** devices allow you to configure a series of special parameters for remote communication. To access these parameters, access the devices parameters as in the previous section but this time selecting a **QNA GSM.**

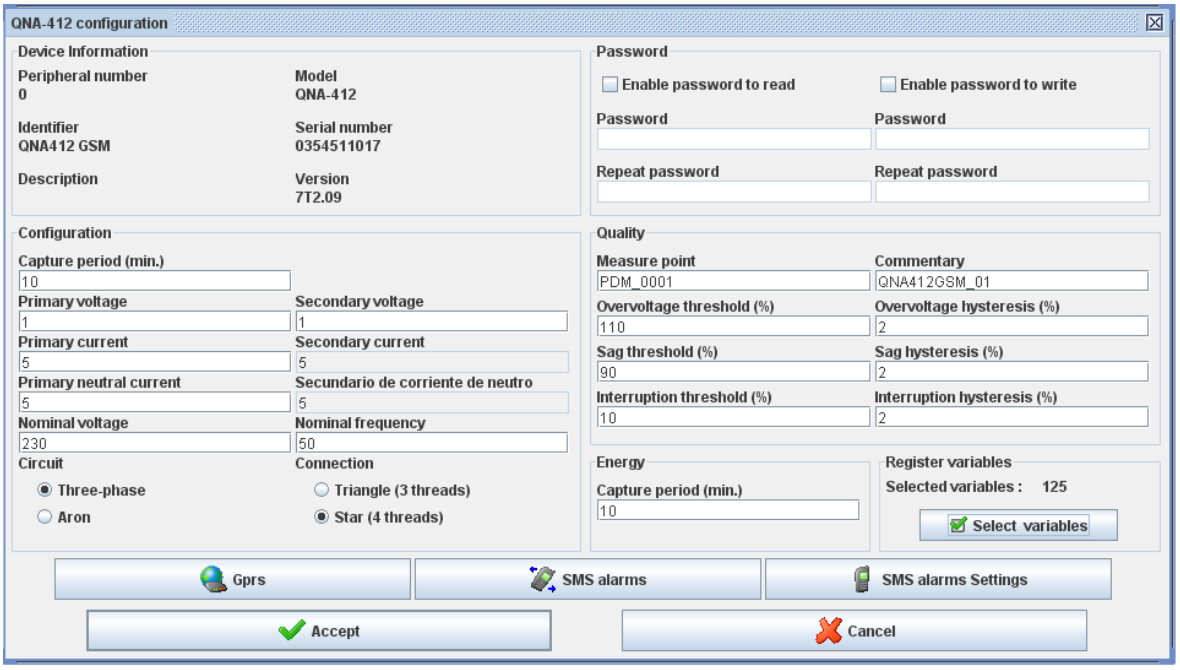


Figure 96: QNA-412 GSM parameter configuration dialogue box

In addition to the standard **QNA** parameters you can also configure GPRS parameters and SMS alarms and change the remote PIN.

In addition, the power quality analyser **QNA** has a GPRS communication mode type. This mode has a specific functionality which allows to the QNA to work as a Master sending files periodically unlike a GSM connection that needs that somebody establish a connection with the device.

GPRS mode allows that the **QNA** connects to an FTP server with fix IP address through Internet and by using a specific user and password provided by the IT administrator of that server, it can copy files recorded in memory since last sending. In any case, files on the power quality analyzer are deleted after being sent. (to see further details about the files structure read the user manual of the power quality analyzer **QNA 412-413**).

To see the GPRS configuration for the device, click "**Gprs**" at the bottom of the dialogue box. The following dialogue box will appear:

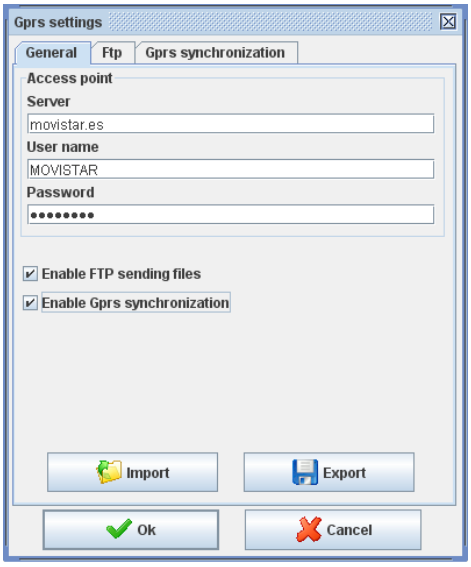


Figure 97:GPRS configuration, main section

You can configure the main GPRS parameters on this screen: the access point and FTP, time synchronisation via GPRS, files to be downloaded, date and time to start sending and cadence (value between 1 and 24 hours).

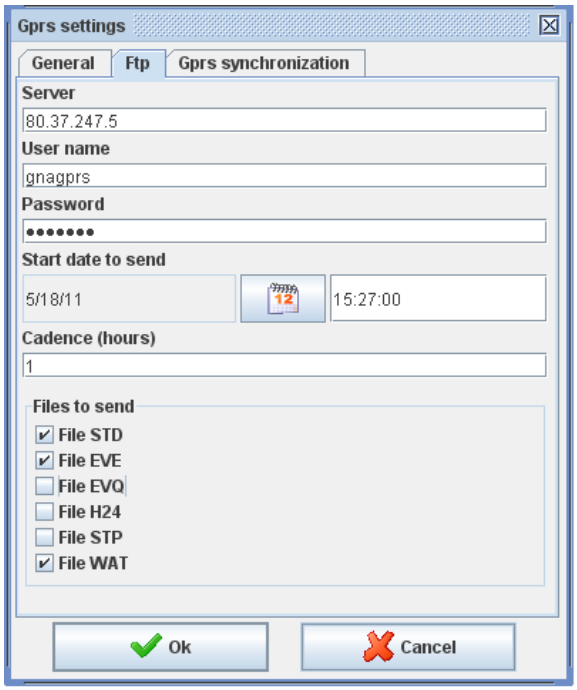


Figure 98:GPRS configuration, FTP

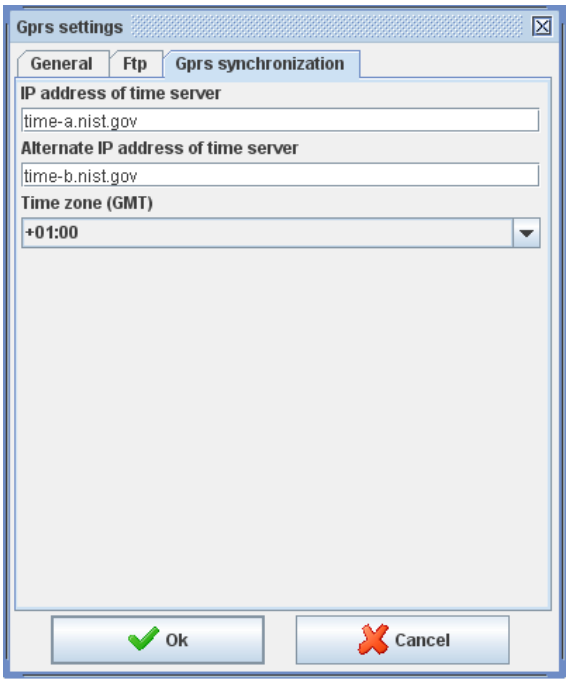


Figure 99:GPRS configuration, GPRS synchronisation

You can import or export the GPRS configuration from a disk file, thereby allowing you to save different configurations.

To configure SMS alarms, click on "**Alarms**". You will see a dialogue box that looks like this:

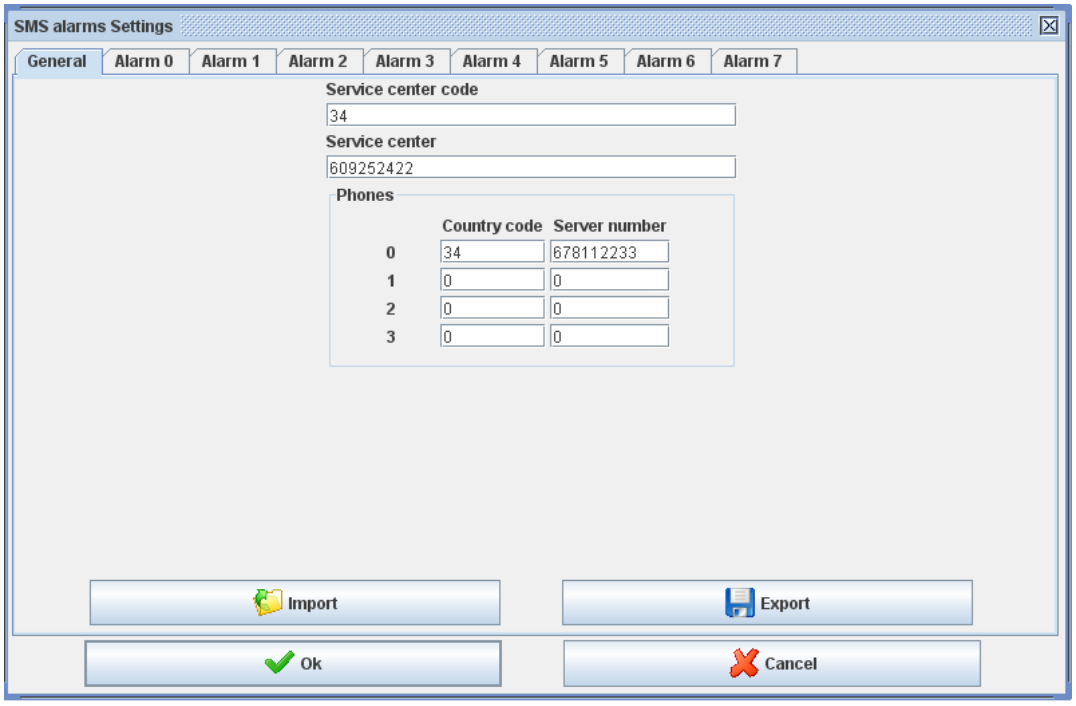


Figure 100:Alarm setup dialogue box

In this dialogue box you can configure the different alarms and the telephones for the alarms. There are up to 8 possible alarms by default (depending on the **QNA**), for which you can configure the variable, delays, activation time, activation hours, maximum and minimum hysteresis, maximum and minimum values and the telephones to which each alarm is sent.

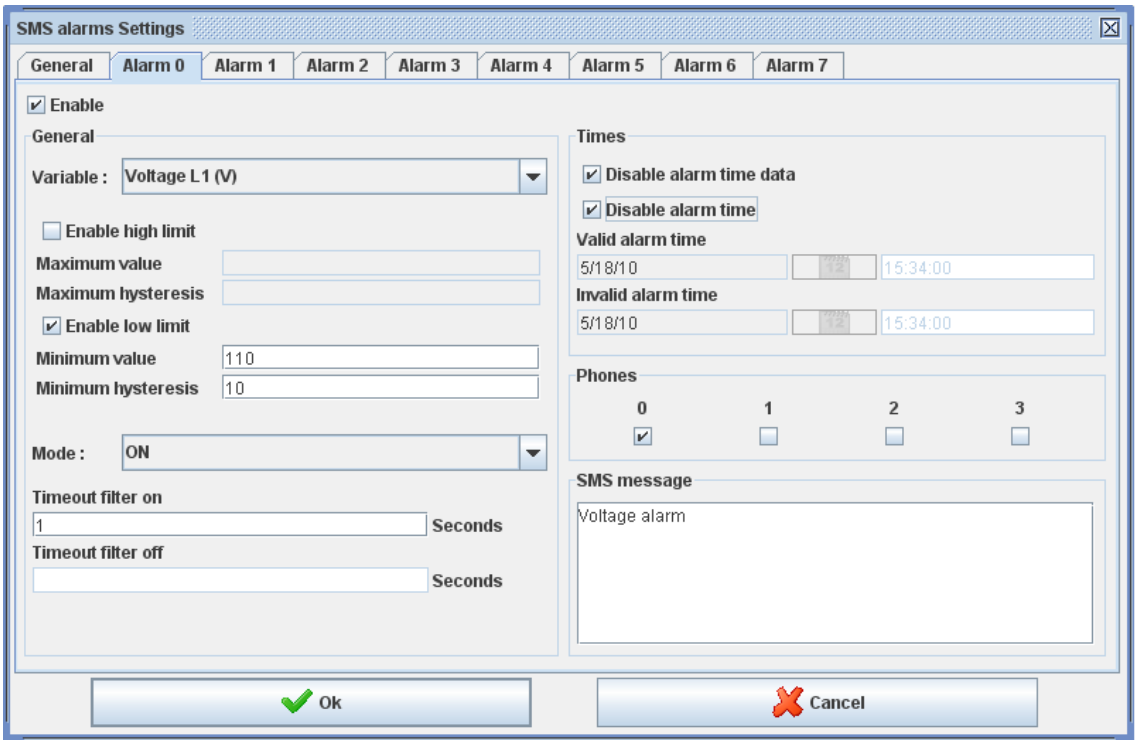


Figure 101:Dialogue box for alarm setup enabling the first alarm

In this case you can also import or export the information to a disk.

Finally, to configure the PIN for the remote **QNA-GSM** click "**Change PIN**". The following dialogue box will appear:

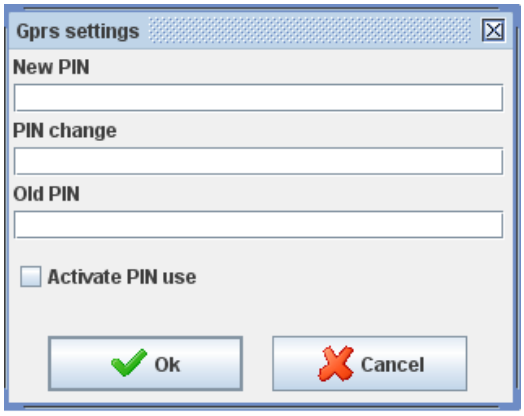


Figure 102:Dialogue box for modification of remote QNA-GSM PIN

To change the PIN in this dialogue box, the application will ask you for the old PIN, the new PIN and the new PIN again. To activate or deactivate the use of the PIN, use the option "**Activate use of PIN**".

3.4.1.6.- Configure automatic downloads

Select a **QNA** device and on the left panel of properties in devices view click on "**Download settings**".

Figure 103:"Download configuration" button

A dialogue box will then appear for configuring downloads for the **QNA**.

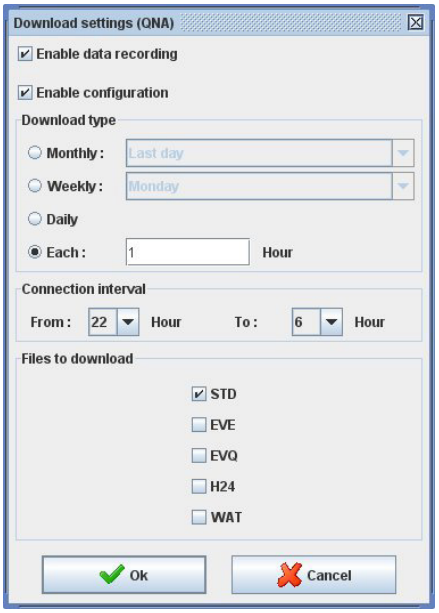


Figure 104: Configure downloads QNA

You can configure the following parameters in this dialogue box:

- Enable data recording: If you disable this option, the device will not download data or be recorded to the database.
- Enable configuration: If the configuration is disabled, the device will download data by default every two hours. If enabled, the configured download parameters will be taken.
- Download type: with this option you can choose when you want the downloads to occur. You can choose from among the following options:
    - ***Monthly***: between the 1st and the 30th or the last day of the month. For months with more or fewer than 30 days, such as February, the download will take place on the first day after the selected day. ***For example***, *if you select 30 for February, the download will take place on 1 March.*
    - ***Weekly:*** from Monday to Sunday.
    - ***Daily***: daily download starting at 00:00.
    - ***Each x hours***: the data will be download every x hours.
- Connection interval: allows you to configure the time interval during which the automatic downloads will be performed. This option is useful as a saving with connections that are subject to

telephone tariffs. Bear in mind that certain downloads may require more time than specified. Assign the same value to the start and end parameters so as not to limit the download time.

- Files to download: allows you to select the files for downloading from the **QNA**. Choose from **STD, EVE, EVQ, H24, WAT** files.

3.4.1.7.- Manual download

Allows to download a data in a date range and save the result into database. To access the manual download settings you must press the button shown in the left pane of properties:

You'll see a manual download dialogue for **QNA**:

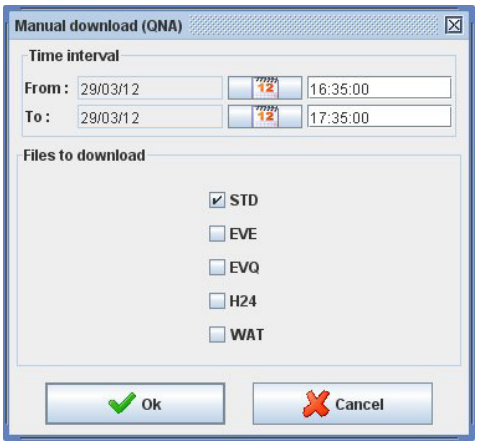


Figure 105: Manual download

Through this dialogue you can configure the following parameters:

- Time interval: interval data downloads.
  - From: Starting date of data download.
  - Up: End of data to download.
- Files to download: list of file types to download. You can select only one each time to download.

3.4.1.8.- Download data

A **QNA** device allows you to download data automatically. By default, the application is configured to download the data automatically every hour. These data are added to the application's internal database of subsequent analysis using the graphic, table and quality report tools.

3.4.1.9.- Monitoring

Select the node for the **QNA** device on the device tree. Click directly on the "**Monitor**" button on the properties panel to the right, or right-click on the selected node to access the options sub-menu and click the "**Monitor**" option. You can also access monitoring by choosing the "**Configuration**" option from the main menu.

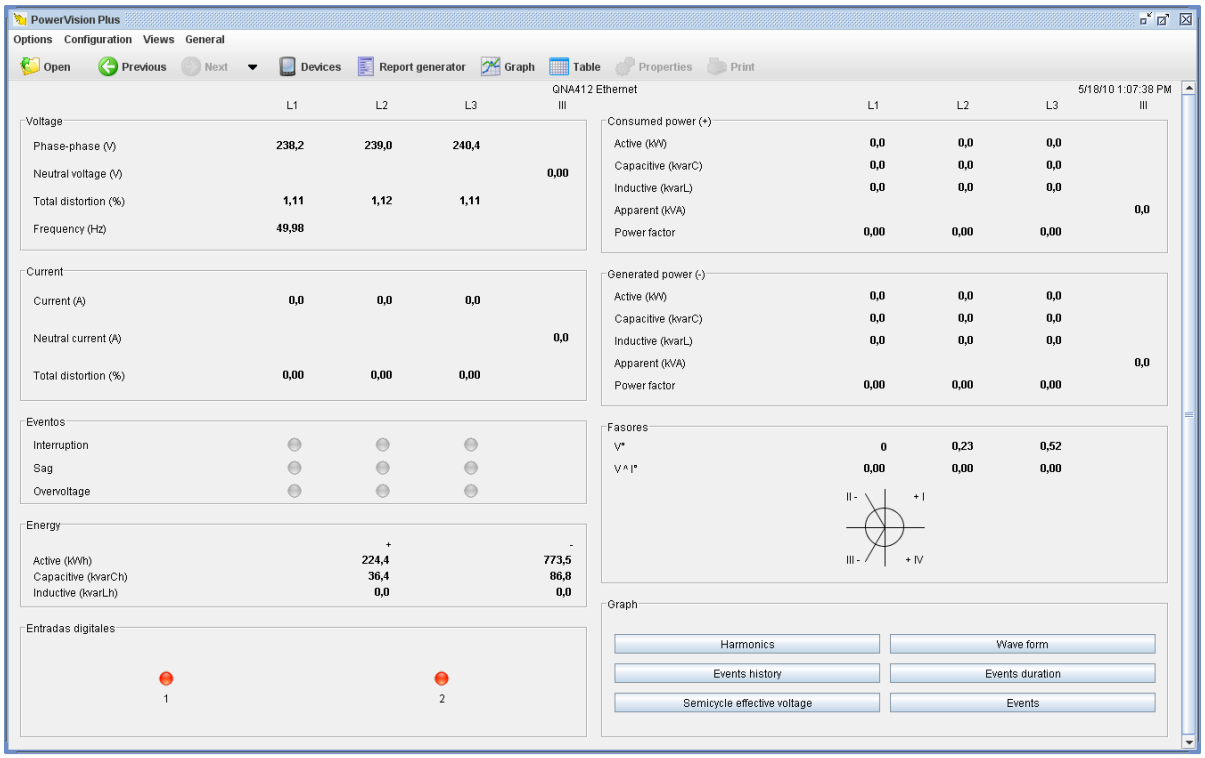


Figure 106: Monitoring

3.4.2.- CVM-K2

3.4.2.1.- Add a CVM-K2 Ethernet

Connect the **CVM-K2 Ethernet** device to an accessible TCP/IP network. Once connected, add the device to the device tree in devices by connection view (see section *"3.1.2.- VIEW BY CONNECTION"*).

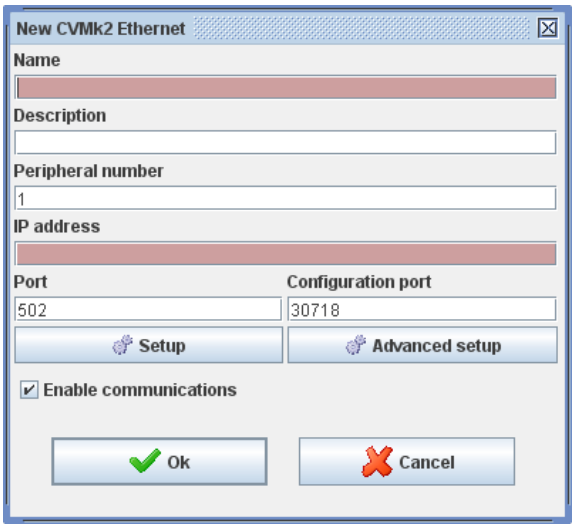


Figure 107:Dialogue box for configuration of CVM-K2 Ethernet communications

The parameters to be configured are:

- Name: alphanumeric code that uniquely identifies the device for the entire application.
- Description: alphanumeric code reserved for a brief description.
- Peripheral Number: number that identifies the communications device. (We recommend that you do not change this field).

- IP address: address used to communicate with the device, which may be an IP address or a domain name.
- Port: the default communication port is 502.
- Configuration port: communication port used by the application to configure the device. This port is 30718 by default.
- Setup: allows you to configure the communication parameters via the Ethernet. See section ***"3.5.- CONFIGURATION ETHERNET PARAMETERS"***.
- Advanced setup: you can configure the waiting time for a response from the device.
- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, Power Vision Plus does not monitor in real time neither data downloading.

Once the device is created, a new **CVM-K2 Ethernet** node will appear on the device tree.

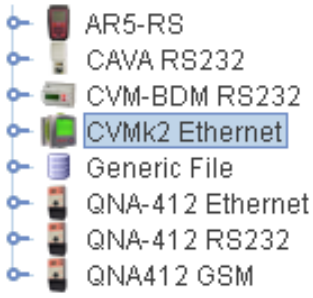


Figure 108:Example of a configuration with an CVM-K2 Ethernet added.

If you want to modify the communication parameters, choose the node and click the "**Modify**" option under "**Configuration**" on the main menu and on the sub-menu of options for the device tree node.

If you have any problem configuring the Ethernet address of a **CVM-K2 Ethernet** device, we recommend that you read section ***"3.5.- CONFIGURATION ETHERNET PARAMETERS"***.

3.4.2.2.- Add a CVM-K2 by serial communication

To add a **CVM-K2** device by serial communication, you must first connect a converter and add it to the device tree (see section ***"3.2.- CONVERTER CONNECTION"***).

Next, select the converter node and add a **CVM-K2** device to it. These types of subordinates are known as tier two.

The configuration dialogue is similar to that of the **CVM-K2 Ethernet** but in this case you only need to configure the following parameters: name, description and peripheral number.

3.4.2.3.- Configure parameters

In order to access the configuration parameters of a **CVM-K2** device, select a node that represents a K2 on the device tree.

On the right panel you will see the configuration options:

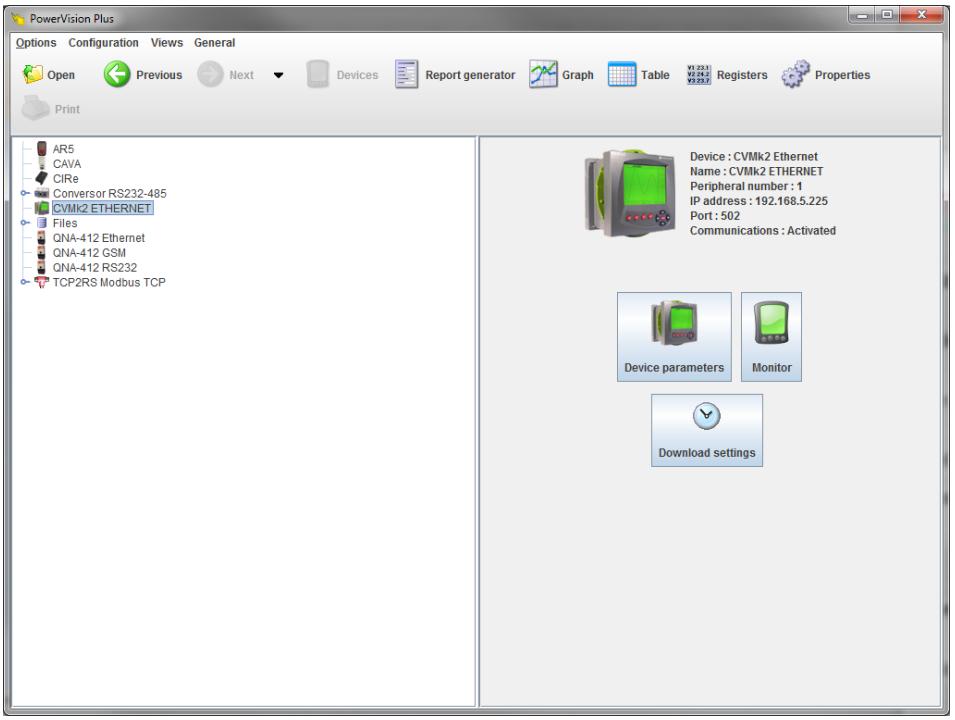


Figure 109: Configure parameters

To access the parameter configuration dialogue box, click on "**Device parameters**". The **CVM-K2** parameter configuration dialogue box will appear.

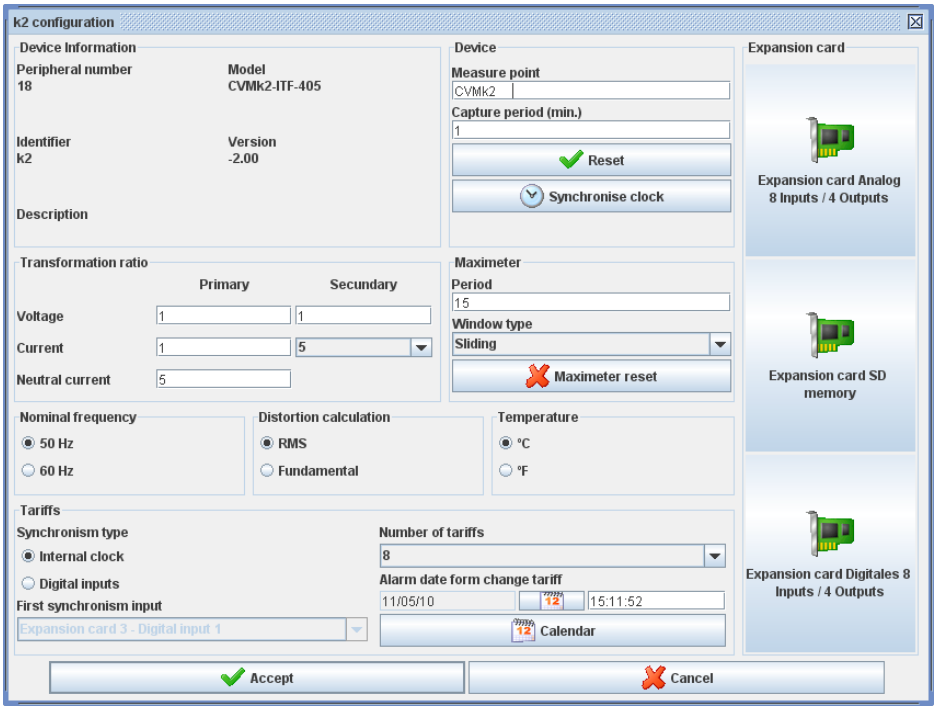


Figure 110:Dialogue box for CVM-K2 parameter configuration

On this screen you can configure the device's internal parameters. The different sections are described below.

The section titled "**Device information**" contains general information about the device.

Under the section titled "**Device**" you can configure:

- *Measure point*: description of the device for display and identification on the device screen.
- *Capture period*: period, in minutes, for generating values when a memory expansion card has been inserted in the device.
- *Reset*: pressing this button will reset the device's energy meters.
- Synchronise clock: It synchronise device date and time to the PC date and time, in UTC format.

In the section titled "**Transformation ratio**" you can configure the voltage transformation ratios, current and neutral current of the device.

In the **maximeter** section you can configure:

- Period: Maximeter integration period, which can vary between 1 and 60 minutes.
- Window type: Type of window used to save the maximeter value, which can be fixed or sliding.
- Maximeter reset: click to set the maximeter to zero.

You can also configure the nominal working frequency, the distortion rate calculated by the device and the units of value of temperature measurements.

The **CVM-K2** device allows you to configure different tariffs. To do so, use the parameters in the sections titled "**Tariffs**".

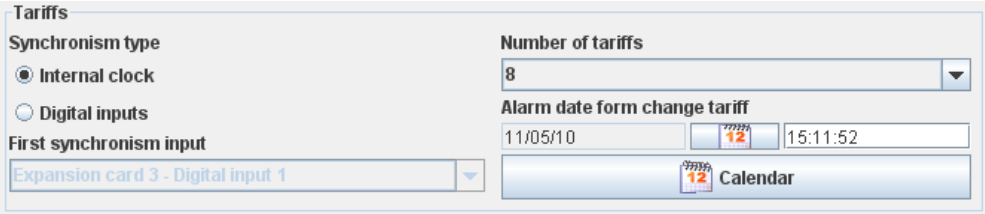


Figure 111: Tariffs

- Synchronisation type: tells the device whether the tariffs are synchronised by the device itself (internal clock) using the configured calendar or whether an external signal is used for synchronisation (digital input). The digital input type is only allowed when the device has digital input expansion cards.
- First synchronisation input: Only if the synchronisation type is by digital inputs. Select the digital input that corresponds to tariff 1.
- Number of Tariffs: Indicate how many tariffs are used in the device. You can change the number of tariffs used to configure the daily calendar profiles (see the section titled "Calendar" below).
- Alarm date from charge tariff: Only if synchronisation is by internal clock. Indicate a date that the alarm will sound when a tariff change is due.
- Calendar: Only if synchronisation is by internal clock. Allows configuration of the tariff calendar by which the device will be governed.

Calendar

Here the configured device tariff calendar is shown. Each calendar day is colour coded by day type.

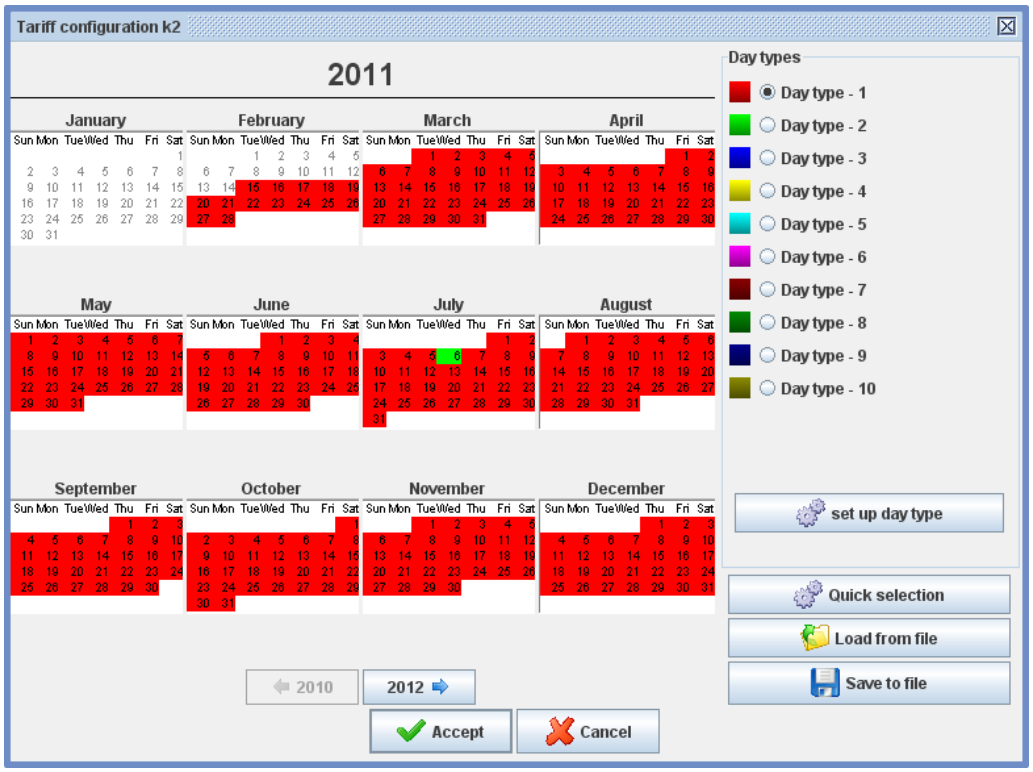


Figure 112:Calendar configuration dialogue box

The device can only be configured for 365 days a year from the current date. For this reason the image begins on June 1, 2010 and ends on May 31, 2010. If you do not change the calendar configuration, it will remain the same for all subsequent years.

Day selection is as follows:

- Left click a day to select it.
- Left click on the first day and drag the cursor over the selected days in that month.
- Use the quick selection option.

The options available under "**Day types**" allow you to select the type of day you want to assign to the different days on the tariff calendar. Left click on a calendar day to assign the selected type of day to that day.

"**Set up day type**" allows you to access a screen where you can configure the different types of days and the tariffs applicable to each time slot of each type of day.

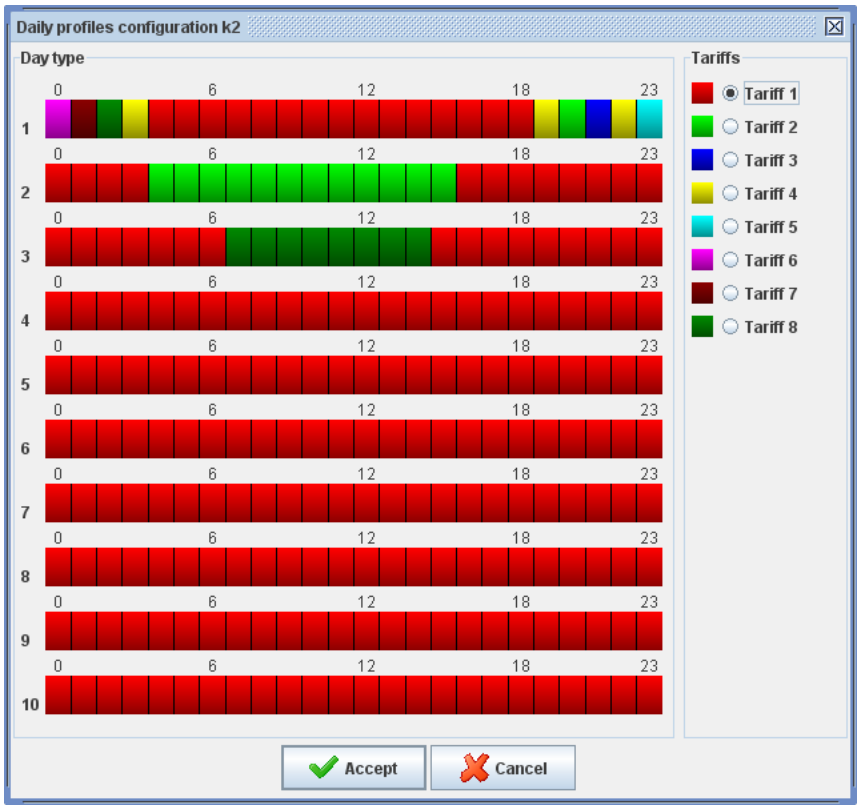


Figure 113:Type of day configuration dialogue box

Each type of day is divided into 1 hour time slots

To assign a tariff to a day of the week, first select the desired tariff, then proceed as follows:

- Clicking the left mouse button on one of the type of day sections, marking only the section selected.
- Left click a start section, hold down the SHIFT key, then left click an end section to select all sections in-between. The initial and final sections must both correspond to the same type of day.

The option titled "**Quick selection**" allows you to select calendar days automatically. The following screen appears when you click:

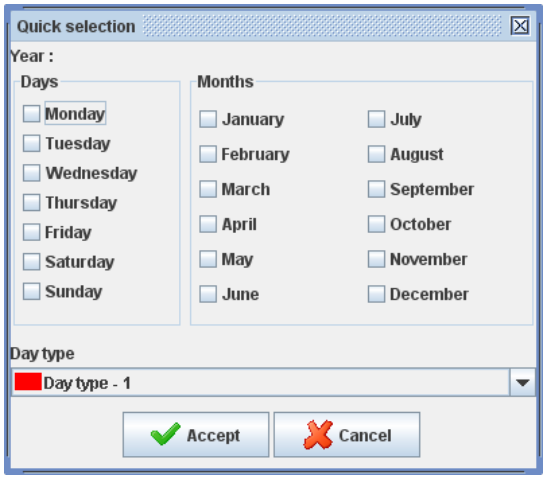


Figure 114:Quick day selection dialogue box

With this dialogue box you can select the days and months to be marked on the calendar and the type

of day to apply to the selection.

Finally, using "**Load to file**" and "**Save to file**" you can load or save the configuration of calendars and day type in a file saved to the disk. These options are useful if you want to configure different devices with the same calendar.

3.4.2.4.- Expansion cards

Configuration options may or may not appear according to the number and type of expansion cards in the device. To configure the expansion cards, go to configuration parameters for the **CVM-K2** (see section "*3.4.2.3.- Configure parameters*") and click on any one of the "**Expansion card** " buttons on the right side of the dialogue box

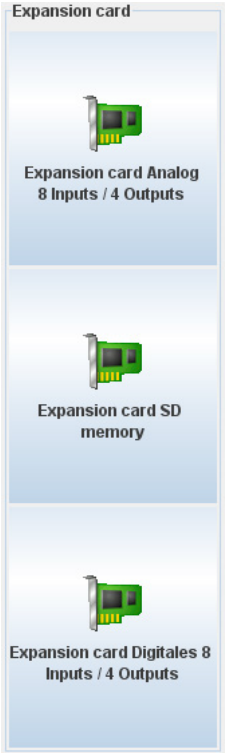


Figure 115:Expansion card configuration section

3.4.2.4.1.- Digital input / output

⚠	Depending on the card model, the number of inputs and outputs may vary.

Using the configuration dialogue box for this type of expansion card you can configure both the card's input and output parameters.

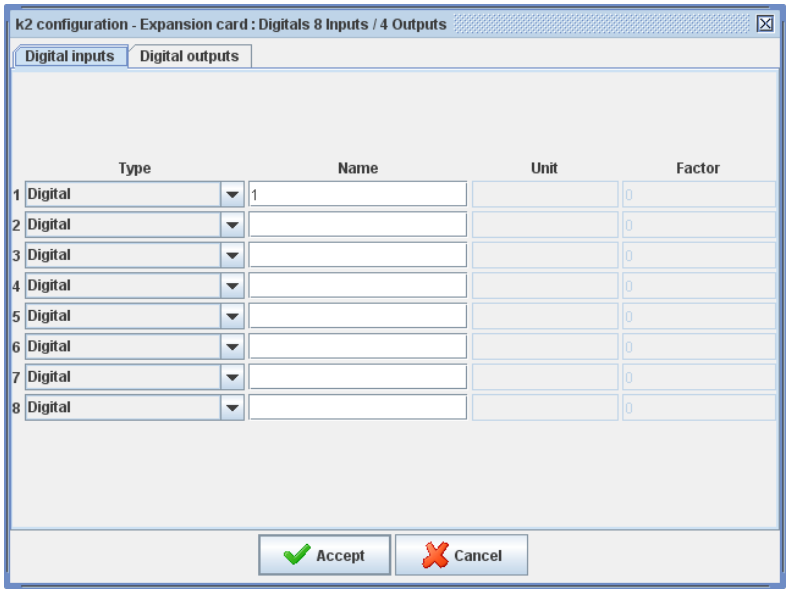


Figure 116: Expansion cards: Digital inputs

Each of the digital inputs may be configured as a digital input and therefore the status of the input can be monitored (open or closed) or used as a meter, counting the number of pulses that occur in the digital input.

The digital input parameters to be configured are as follows:

- *Type*: choose digital or meter.
- *Name:* Alphanumeric data type for the identification of the digital input on the device display.
- *Unit*: enabled for meter type only. This is an alphanumeric code for identifying the value unit.
- *Factor:* enabled for meter type only. Multiplier value for each pulse detected at the input.

To configure digital outputs, choose the pertinent tab. This output equation corresponds to a conditional expression to decide when the device should act on the digital output depending on the alarms configured.

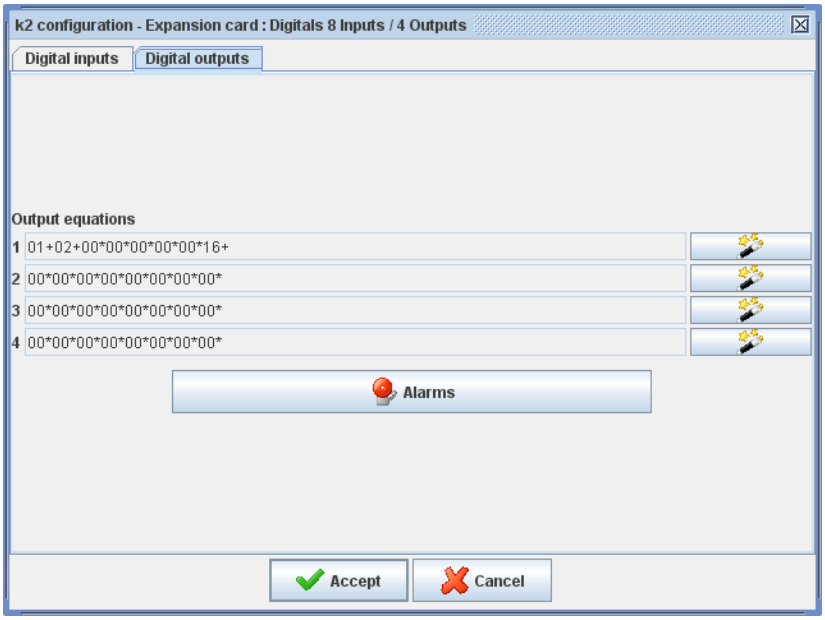


Figure 117: Expansion cards: Digital outputs

To configure the equation, click the button alongside each equation expression  .

The dialogue box for equation configuration is as follows:

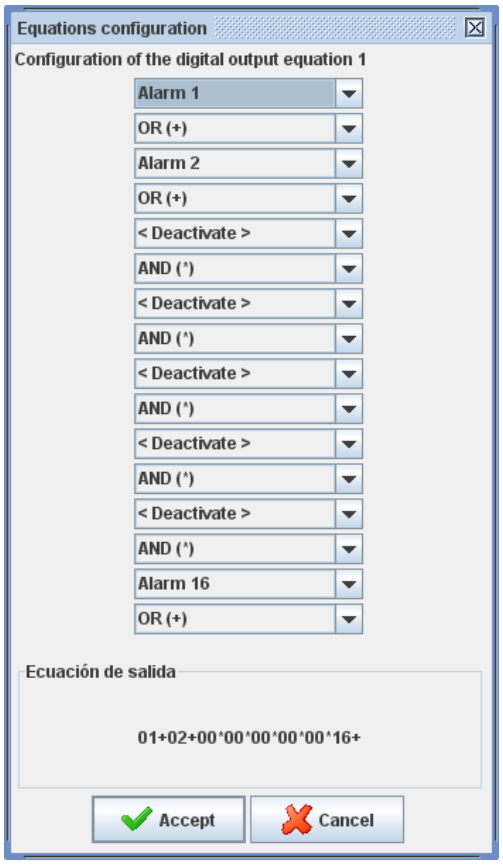


Figure 118: Equation configuration.

Here you can select the alarm and the operation to be performed (AND or OR). To obtain more information on the operation of the digital output equations consult the device manual.

Click on "**Alarms**" to configure the alarms to be used in the output equation. The alarm setup dialogue box is as follows:

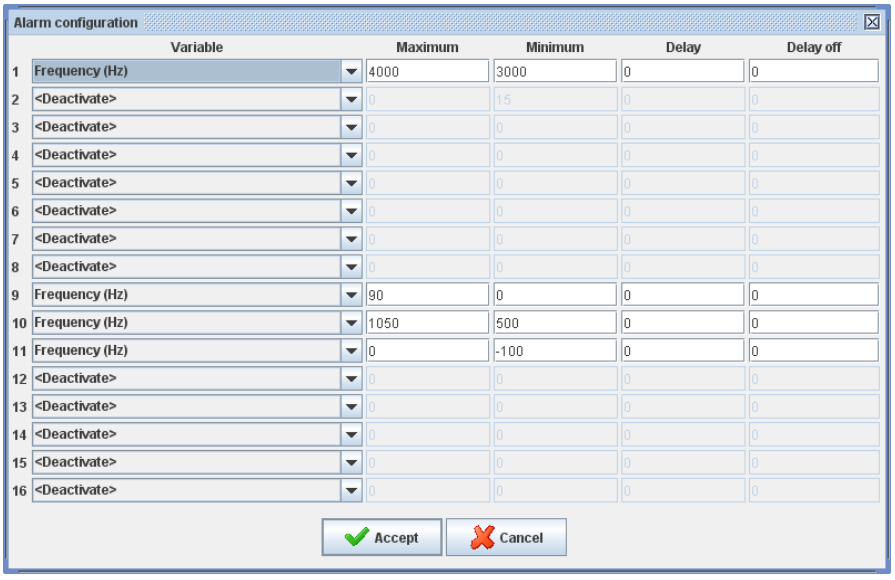


Figure 119: Alarms configuration

The parameters to be configured are:

- *Variable*: In this field any of the parameters associated with the alarm and measured by the device can be selected. The maximum and minimum alarm unit values are indicated in brackets.
- *Maximum:* The maximum value to control is configured. The range allowed depends on the selected variable.
- *Minimum:* The minimum value to control is configured. The range allowed depends on the selected variable.
- *Delay*: Alarm delay in seconds after activation.
- *Delay off*: Alarm delay in seconds after deactivation.

3.4.2.4.2.- Analogue inputs / outputs

	Depending on the card model, the number of inputs and outputs may vary.

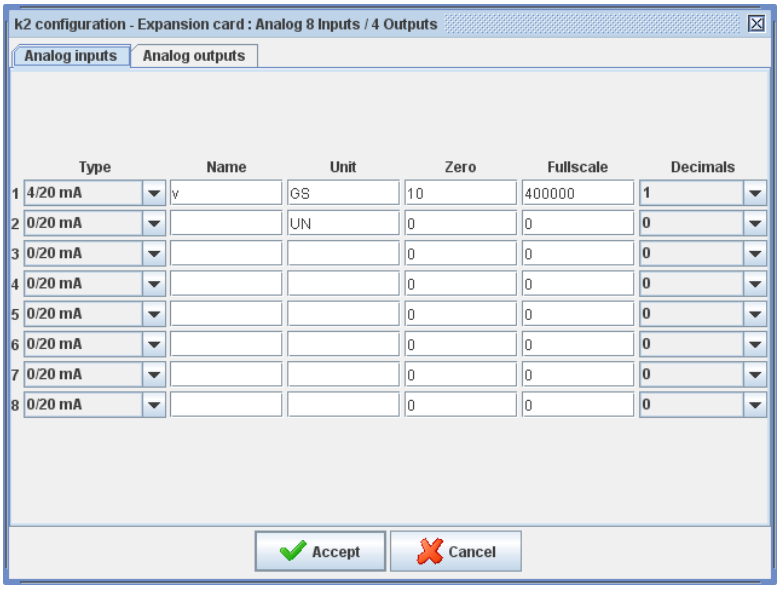


Figure 120: Expansion cards: Analogue inputs

Here you can configure the expansion card's analogue inputs and outputs. The parameters you can configure for digital inputs are as follows:

- *Type*: input type allows you to choose from among the different types of input signals accepted by the device.
- *Name:* A brief description of the analogue input for its identification on the device screen.
- *Unit*: A brief description of the analogue input measurement units for display on the device screen.
- *Zero*: Value of the parameter to which the zero of the scale is assigned.
- *Fullscale*: Value of the parameter to which the maximum value of the scale is assigned.
- *Decimals*: Number of decimals of the value measured by the analogue input.

Click the corresponding tab to configure analogue outputs.

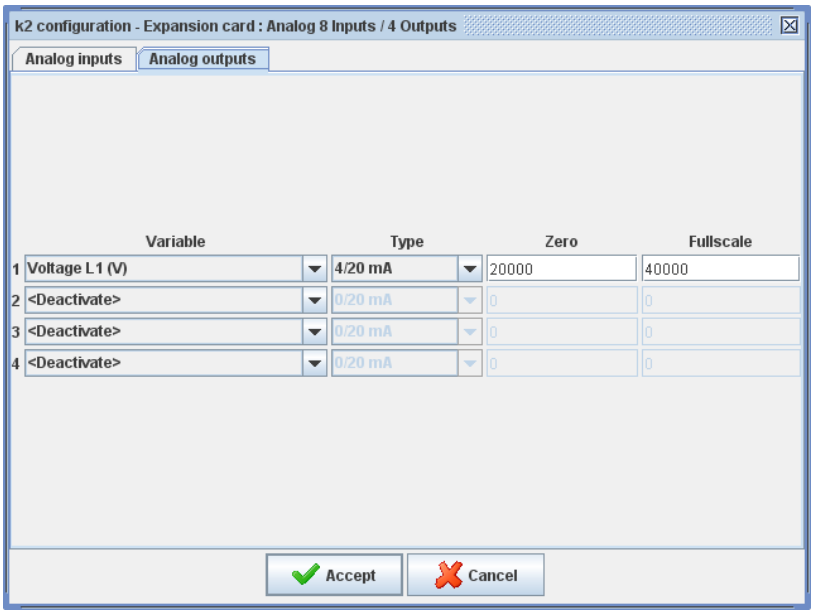


Figure 121: Expansion cards: Analogue outputs.

For each output you can configure:

- *Variable*: Permits any parameter the device measures for analogue outputs to be selected
- *Type*: Allows selection of the different output types the device can generate.
- *Zero*: Value of the parameter to which the zero of the scale is assigned.
- *Fullscale*: Value of the parameter to which the maximum value of the scale is assigned.

3.4.2.4.3.- 4 digital outputs / 4 analogue outputs

Using the configuration dialogue box for this type of expansion card you can configure both the card's analogue output and digital output parameters.

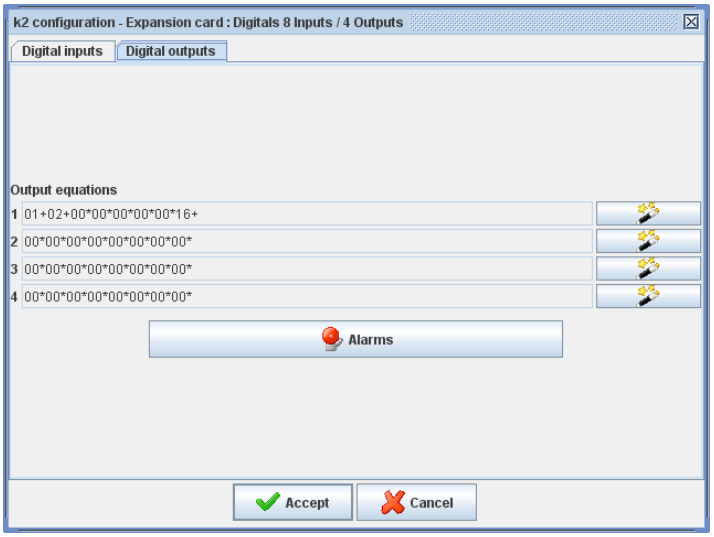


Figure 122: Expansion cards: Digital outputs.

The options needed to configure the digital outputs will appear when you open the dialogue box. To learn how to configure these parameters, please see the previous section titled "**digital inputs / outputs**".

Click the corresponding tab to configure analogue outputs and the following dialogue box will appear:

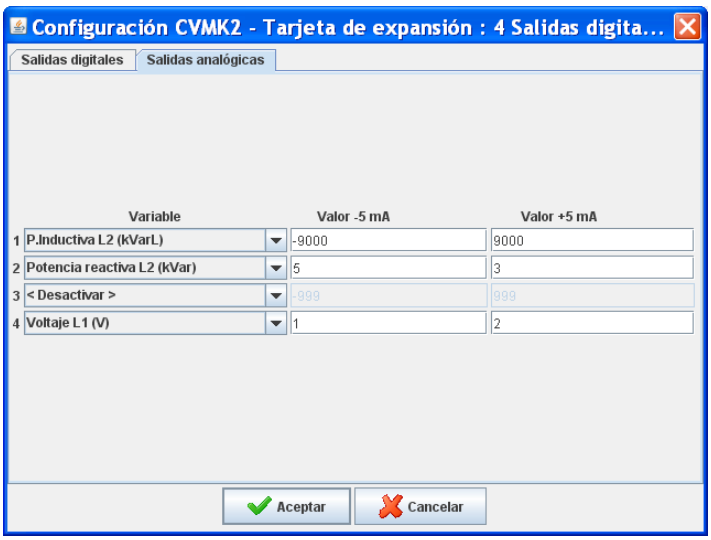


Figure 123: Expansion cards: Analogue outputs.

For analogue outputs you can configure the following:

- *Variable*: Enables selection of any parameter the device measures for analogue outputs to be selected
- *Value -5mA*: Value of the parameter which is assigned to the -5 mA output.
- *Value +5mA*: Value of the parameter which is assigned to the +5 mA output.

3.4.2.4.4.- SD Memory

With this option you can see the following information on the SD memory card inserted in the device: status, whether the card is working property or whether there is any problem such as write-protection, the size of the card and the remaining free space.

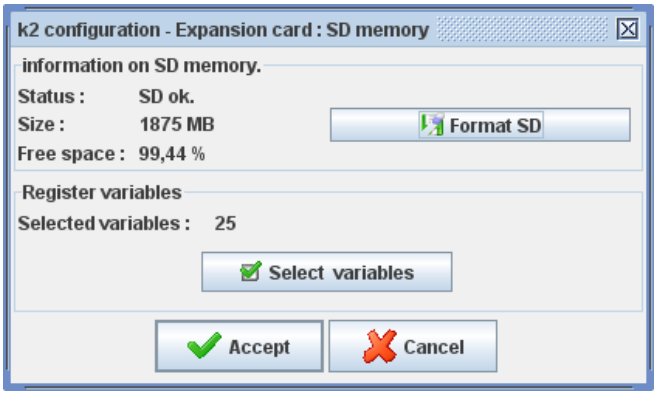


Figure 124: SD memory

Click on "**Format SD**" to format the SD card. Any data not downloaded by the software will be erased.

The section titled "**Register variables**" indicates how many record variables are selected in the device. If you click on "**Selected variables**" a dialogue box will appear where you can select the variables saved in the device.

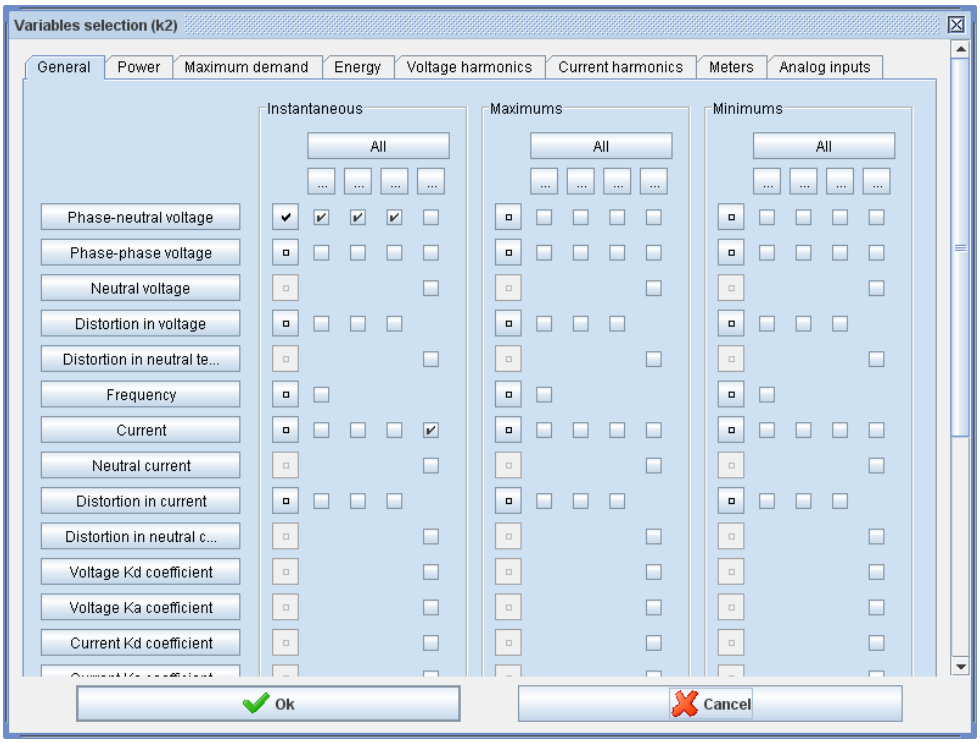


Figure 125:Variable selection dialogue box

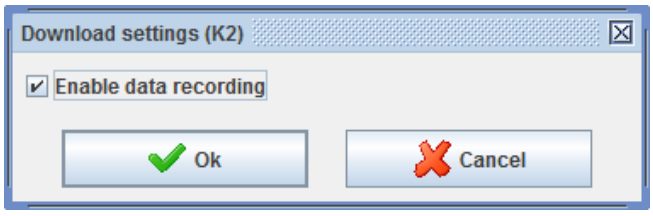
3.4.2.5.- Download data

The **CVM-K2** allows you to download data automatically every two hours.

These data are added to the application's internal database of subsequent analysis using the graphic, table and quality report tools.

Additionally you can configure whether to enable or disable data recording. To configure this setting click on the Settings icon in the left pane downloads:

Then a dialog where you can set the recording parameter information:



3.4.2.6.- Monitoring

Select the node for the **CVM-K2** device from the device tree. Click directly on the "**Monitor**" button on the properties panel to the right, or right-click on the selected node to access the options sub-menu and click the "**Monitor**" option.

You can also access monitoring by choosing the "**Configuration**" option from the main menu.

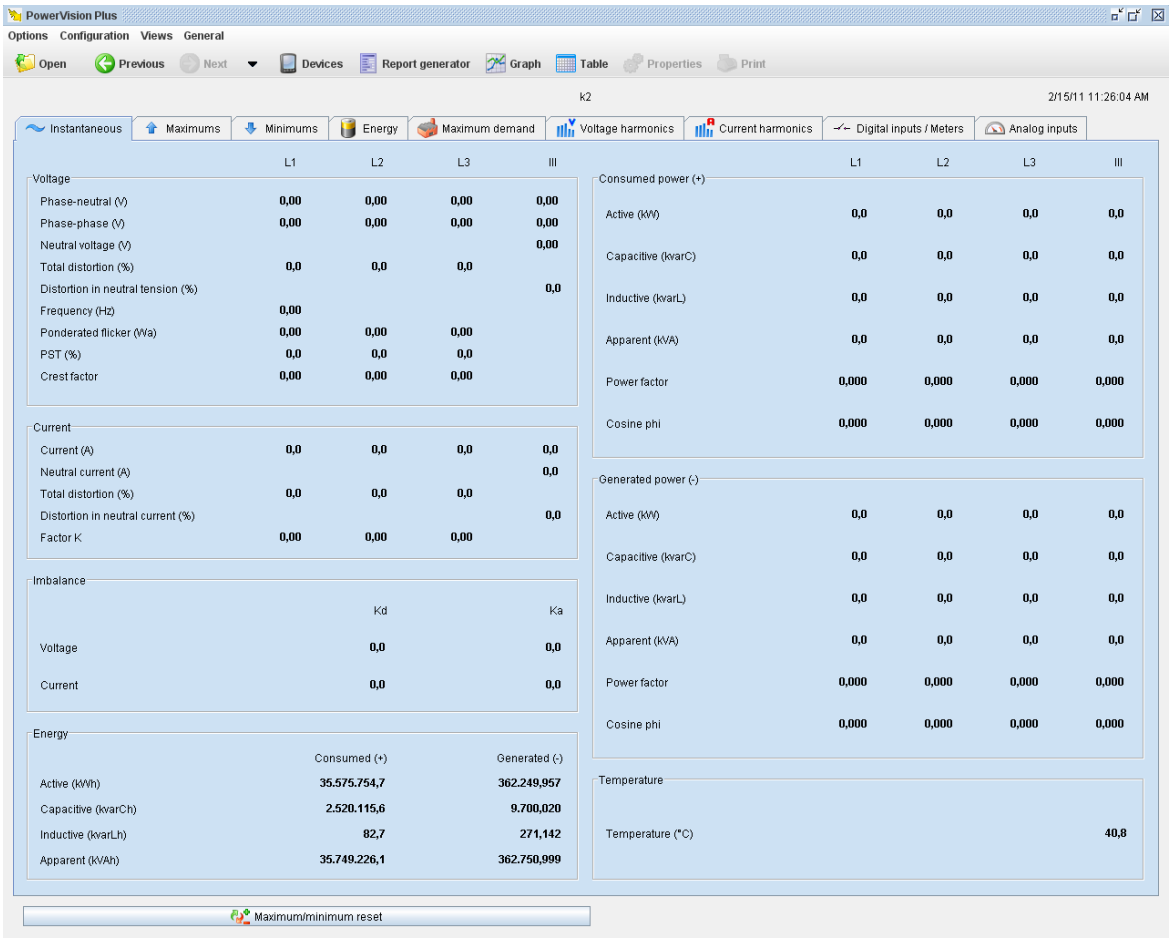


Figure 126:CVM-K2 monitoring screen

3.4.3.- CVM-BDM-1M

3.4.3.1.- Add or modify a CVM-BDM-1M

To add a **CVM-BDM** either connect it directly using an RS232 cable or using a converter (see section *"3.2.- CONVERTER CONNECTION"*). The connection method depends on the model of the device, so we recommend that you read the equipment's documentation for more information.

Once connected, you must include the device on the device tree in the devices by connection view (see section *"3.1.2.- VIEW BY CONNECTION"*).

The following dialogue box will appear when you add a device through a converter:

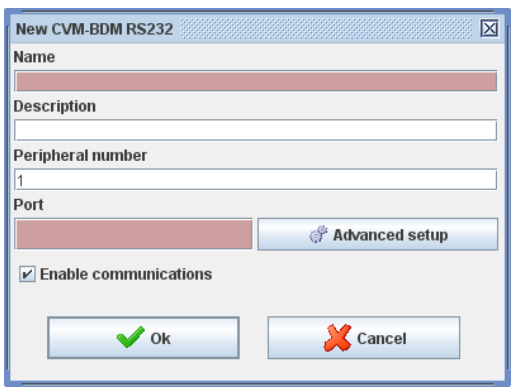


Figure 127: New CVM-BDM-1M

The parameters to be configured are:

- *Name:* alphanumeric code that uniquely identifies the device for the entire application.
- *Description* alphanumeric code reserved for a brief description.
- *Peripheral Number*: number that identifies the communications device. If the device is connected to a converter, i.e., if it is on the second level, this number must be the same for all devices connected to that converter. (We recommend that you do not change this field).
- Enable communications: By selecting this option, user could enable real-time communications and data downloading with a device. If this option is not selected, Power Vision Plus does not monitor in real time neither data downloading.

Once you have created the device a new **CVM-BDM-1M** node will appear on the device tree.

Figure 128:Example of a configuration with an added CVM-BDM-1M

When the **CVM-BDM-1M** is added as a serial device, you will also have to configure the serial port number, the communication speed (19200 bps by default) and the maximum waiting time (0 by default).

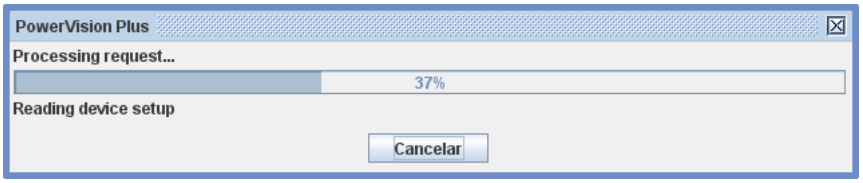
	By default, **PowerVision Plus** configures the serial communications in asynchronous mode with 8 data bits, no parity bit and 1 stop bit. This configuration cannot be changed so you must make sure that the device is configures with these parameters in order for the communications to work properly.

If you want to modify the communication parameters, choose the node and click the "**Modify**" option under "**Configuration**" on the main menu and on the sub-menu of options for the device tree node.

3.4.3.2.- Configure parameters

Choose the desired node of the **CVM-BDM-1M** device on the device tree and click on "**Device parameters**"" on the right panel.

A progress bar will then appear as the device's parameters are being read.



A parameter configuration dialogue box will appear at the end.

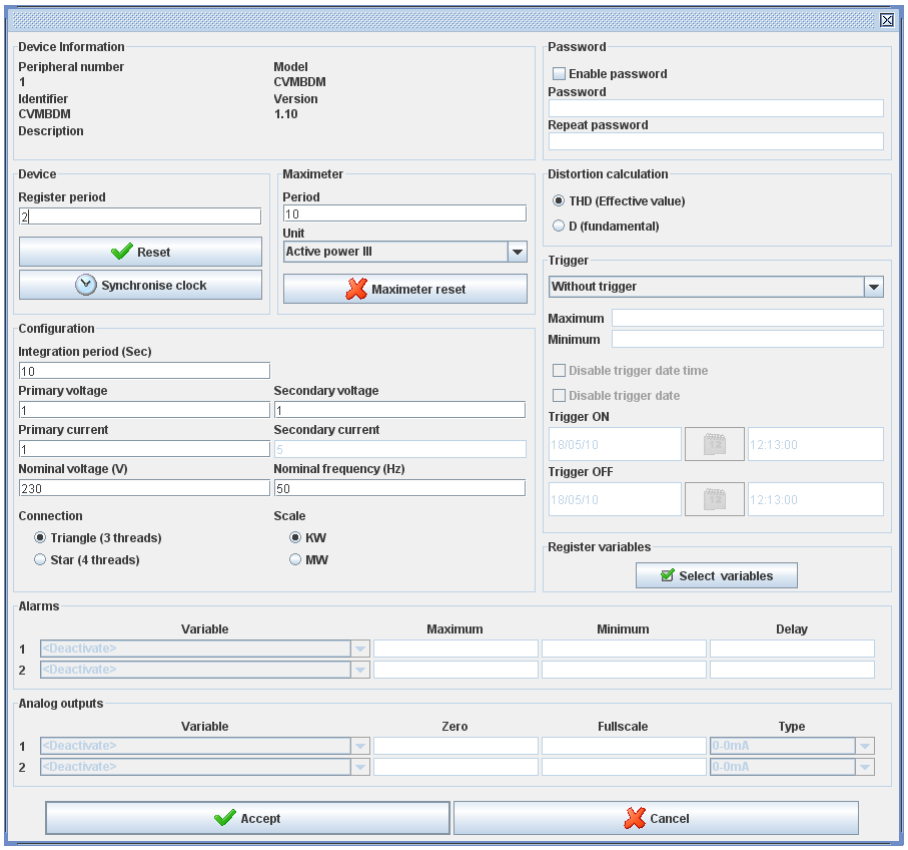


Figure 129:CVM-BDM-1M configuration dialogue box

The section titled "**Device information**" contains general information about the device.

The "**Password**" section allows the password to be enabled or disabled to block both the reading and writing of values and the configuration of the device.
In the device section you can configure the following parameters:

- Recording period: Period for generating values, in minutes.
- Initialise energy meters: pressing this button will reset the device's energy meters.
- Synchronise clock: It synchronise device date and time to the PC date and time, in UTC format.

In the "**Maximeter**" section you can configure:

- Period: Maximeter integration period, which can vary between 1 and 60 minutes.
- Unit: select the parameter you want to control.
- Maximeter reset: click to set the maximeter to zero.

Under the section titled "**Configuration**" you can configure the following parameters:

- *Integration period*: integration time in seconds.
- *Primary voltage*: Primary voltage of the device
- *Secondary voltage*: Secondary voltage of the device.
- *Primary current*: primary current of the device.

- *Secondary current*: secondary current of the device.
- *Nominal voltage*: phase-phase voltage for a 3-wire configuration and phase-neutral voltage for a 4-wire configuration. If the measurement is taken via the voltage transformer, the value here must refer to the secondary.
- *Nominal frequency*: Nominal frequency of the device.
- *Connection*: Enables the type of connection to which it is connected to carry out the measurement to be chosen, whether **Triangle** (connection between phases, without neutral) or **Star** (3-phase connection and neutral)
- *Scale*: scale value in kilowatts or megawatts.

In the section titled "**distortion calculation**" you can also configure the harmonic distortion rate.

In the section titled "**Trigger**" you can configure the trigger values for filtering using a selected variable. The parameters that can be configured include:

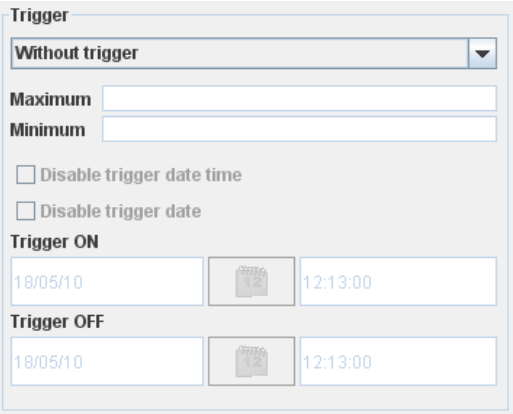


Figure 130: Trigger.

- *Trigger variable*: appears as a list from which you can select the variable to be applied to the trigger. If you do not want to activate the trigger, choose the first option on the list: "No trigger".
- *Maximum*: maximum filter value.
- *Minimum*: minimum filter value.
- *Trigger ON*: activation date of the trigger.
- *Trigger OFF*: deactivation date of the trigger.

If you do not want to activate trigger dates, choose the option "**Disable trigger date**".
The section titled "**record variables**" allows you to choose the variables to be used by the **CVM-BDM-1M** to save the recorded values.

In the section **"Alarms"** and **"Analogue outputs"**

	Depending on the model, the analogue alarm and output options may or may not be activated. See the device's manual for additional information.

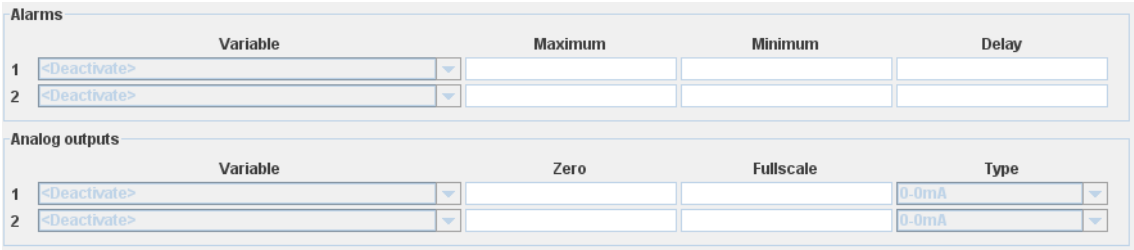


Figure 131: Alarms and Analogue outputs.

You can configure the following parameters for a maximum of 2 alarms:

- *Variable*: In this field any of the parameters associated with the alarm and measured by the device can be selected.
- *Maximum:* The maximum value to control is configured. The range allowed depends on the selected variable.
- *Minimum:* The minimum value to control is configured. The range allowed depends on the selected variable.
- *Delay*: Alarm delay in seconds after activation.

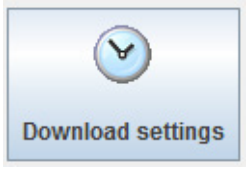
For each analogue output you can configure the following parameters:

- *Variable*: Permits any parameter the device measures for analogue outputs to be selected
- *Zero*: Value of the parameter to which the zero of the scale is assigned.
- *Fullscale*: Value of the parameter to which the maximum value of the scale is assigned.
- *Type*: Allows selection of the different output types the device can generate.

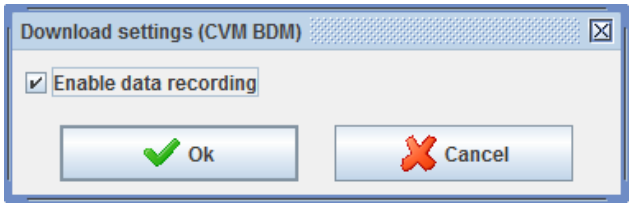
3.4.3.3.- Data download

The **CVM-BDM-1M** allows you to download data automatically every two hours. These data are added to the application's internal database of subsequent analysis using the graphic, table and quality report tools.

Additionally you can configure whether to enable or disable data recording. To configure this setting click on the Settings icon in the left pane downloads:



Then a dialog where you can set the recording parameter information:



3.4.3.4.- Monitoring

Select the node for the **CVM-BDM-1M** device from the device tree. Click directly on the "**Monitor**" button on the properties panel to the right, or right-click on the selected node to access the options submenu and click the "**Monitor**" option. You can also access monitoring by choosing the "**Configuration**" option from the main menu.

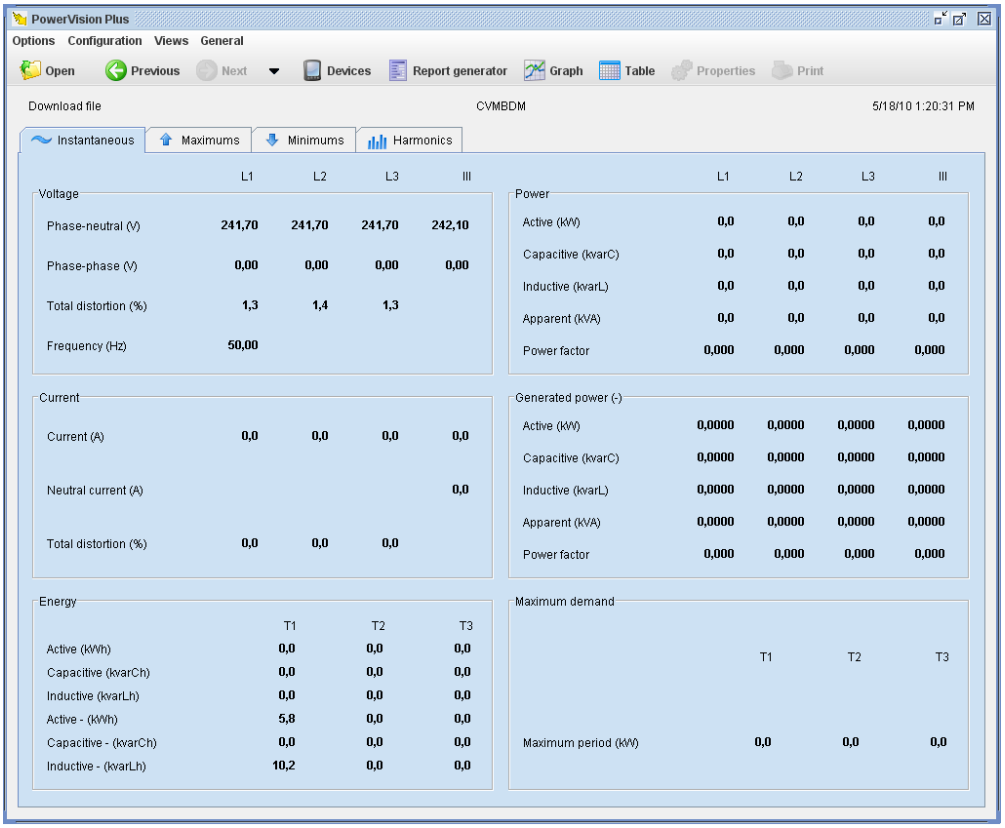


Figure 132:CVM-BDM-1M monitoring screen

3.5.- CONFIGURATION ETHERNET PARAMETERS

All Ethernet connection-oriented devices (converters **TCP2RS**, **QNA Ethernet**, **CVM-K2 Ethernet**) have certain configuration parameters in common.
When you add one of these devices, **PowerVision Plus** may not be able to communicate with the address entered by the user.

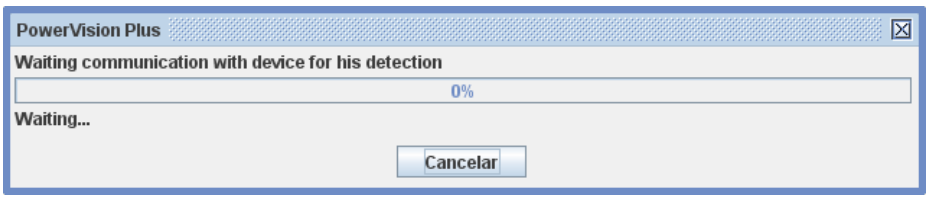
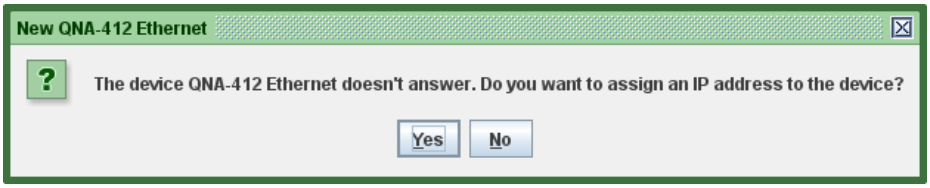


Figure 133:Dialogue box for communications with the Ethernet device

The dialogue box shows the status of the request to communicate with the address entered. You can stop the process by clicking "**Cancel**".

If the device cannot communicate with the address, the application will display the following message:



If you click on "**Yes**", the following dialogue box will appear where you can assign an IP address to the device.

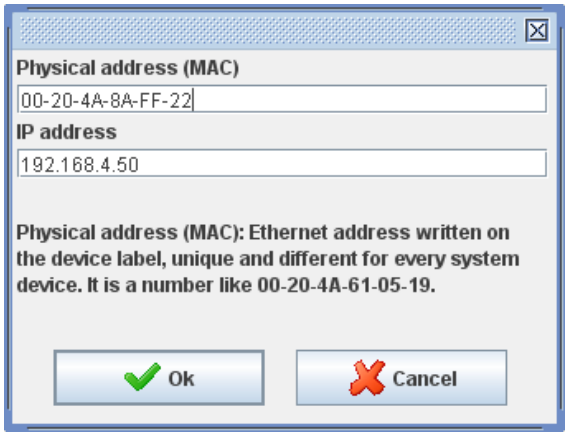


Figure 134: Assign a IP address.

The parameters to be configured are:

- *Physical address (MAC):* The unique Ethernet address for each network device. The hardware address that any network interface has. Will be of the type **00-20-4A-61-05-19**.
- *IP address*: IP Address to be allocated to the device that has the physical address entered in the previous field.

If it is possible to assign an IP address to the converter, the following dialogue box will appear:

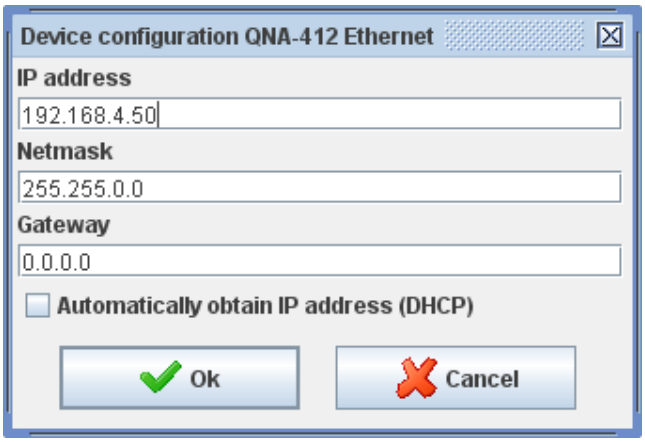


Figure 135: Device configuration.

In this dialogue box you can configure the following:

- *IP address*: Corresponds to the IP address used to communicate with the device.
- *Netmask:* Corresponds to the subnet mask used on the network where the device is connected
- *Gateway:* Corresponds to the address of the gateway if the device is not on the same network as the PC containing the program.
- *Automatically obtain IP address (DHCP)*: This option will be enabled when we want the device

to automatically receive the IP address via a DHCP server.

To finish setting up the rest of the parameters for communication with the device, click on "**OK**".

If you have already added the device and want to change the parameters, go to the communication configuration screen and click on "**Parameters**". You can now configure the parameters as described above.

4.- CALCULATED VARIABLES

Sometimes it is necessary to obtain the result of a transaction between variables of different devices, for example, the sum of energies. **PowerVision Plus** has the **calculated variables** function to do this actions. The values of these variables are the result of mathematical operations between device variables.
You can access to the **calculated variables** in the menu '**Configuration / Calculated Variables**".

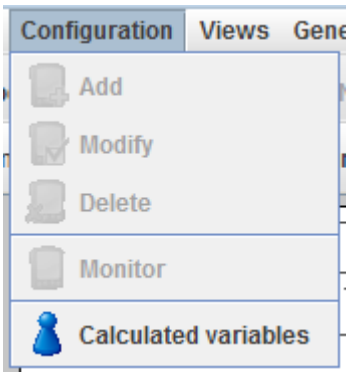


Figure 136: Calculated variables.

Next window, allows to user to add, to modify or to delete calculated variables.

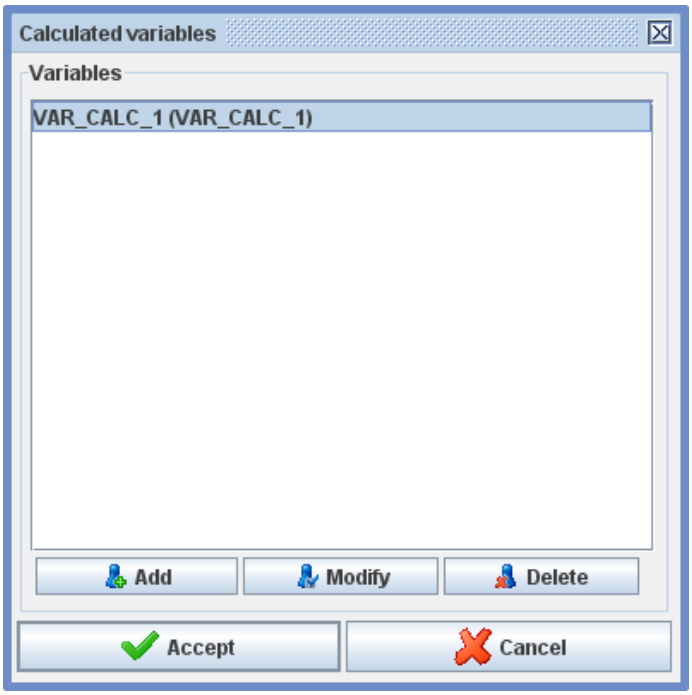


Figure 137: Calculated variables menu

To add a new variable, click on "**Add**" and it appears the following dialogue:

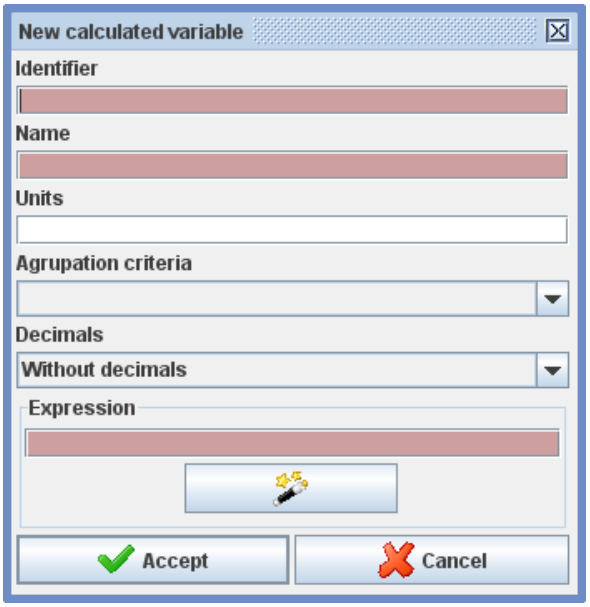


Figure 138: New Calculated variables

The parameters to configure are:

- Identifier: to identify each of the calculated variables to be used in expressions and conditions
- Name: Name of the calculated variable.
- Units: text of the units in which state the estimated value of the variable
- Aggrupation criteria: grouping variable values in charts or tables. For example, if we value every 5 minutes and we group every 15 minutes, this is to group 3 values in only 1

  ✓**Maximum value**

  ✓ **Minimum value**

  ✓ **Average value**

  ✓**Last value**

  ✓**Summation values**

- Decimals: select from 1 to 6 decimal or none
- Expression: formula that will lead to the result of the calculated value. Can be entered manually or through the wizard

5.- REPORT GENERATOR

5.1.- REPORT GENERATOR INTERFACE

The report generation module consists of:

✓**Main menu:** the basic program options are shown at the top.

✓**Toolbar**: The tools needed to interact with the template are located on the left side.

✓**Edition panel:** located in the centre, this is the part where the template is constructed by inserting the necessary blocks.

✓**Properties panel**: the properties of the blocks of the selected template appear on the right.

The application contains no defined styles or templates that are installed by default but does offer two quality standards. For more information on the standards, please see the pertinent section.

You will need to interact with the edition panels, properties and toolbars to create templates. Use the toolbar to add blocks to the edition panels and configure each one of the property panels. For more information, see the chapter ***"5.3.- REPORTS"***

5.1.1.- MAIN MENU

5.1.1.1.- Templates

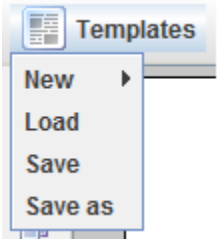
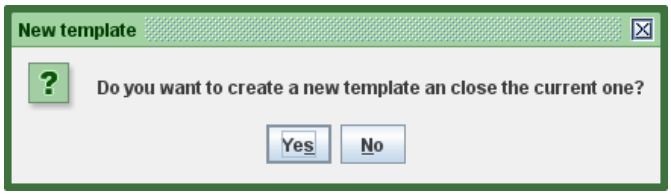


Figure 139: Templates.

- **'New'** option: Create a new template. Position the pointer of the mouse on "**New**" to access the options.

Figure 140: New

To create an empty template or create a template from a standard, if a template was already open you will be asked to confirm that you want to create the template.



Choose the first option to create an empty template. Choose the second option to create a template from a standard, in which case the following dialogue box will appear:

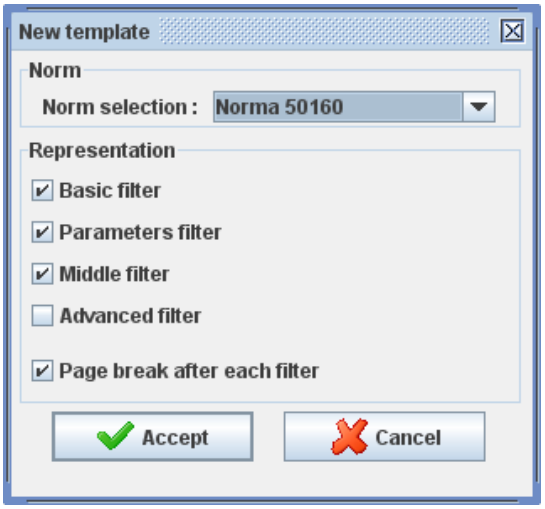


Figure 141: New template.

Choose the standard you want to use to generate the template from the list and choose the blocks to be included in the frame titled '**Representation**'. The '**advanced filter**' option will be disabled by default, since generating a report with this block could take a considerable amount of time depending on the data involved. For more information on standard blocks see, the subsection ***"5.3.1.2.7.- Standard block".***

- '**Load**' option: shows the list of templates saved in the application.

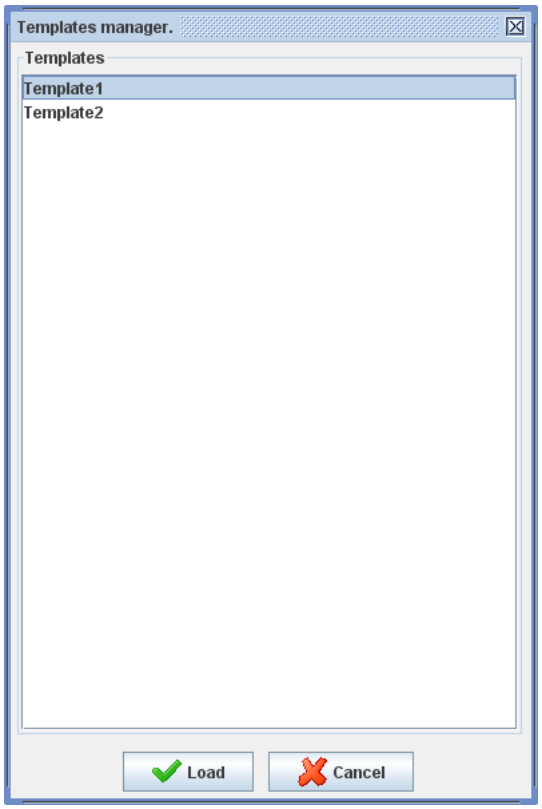


Figure 142: Load

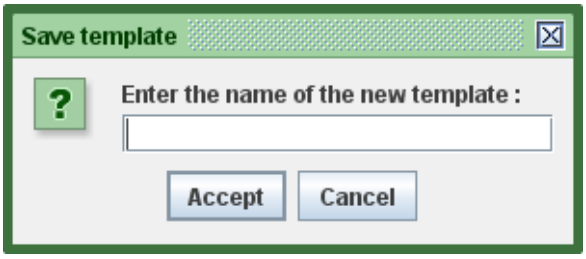
To load a template, you must select the desired element from the list and right click on '**Load**' or double right click on that item. If the selected template was already opened, the '**Load**' button will appear as disabled. If you do not want to open a template, click on '**Cancel**'.
You can also modify or delete templates from the list. To bring up the sub-menu, left click on the name of the template.

Figure 143: Modify or detele a template.

Using the '**Modify'** option, a dialogue box will appear where you can change the name of the template. If the name entered coincides with the name of an existing template or if the name contains invalid characters, a message will appear telling you it is not possible to make the change.

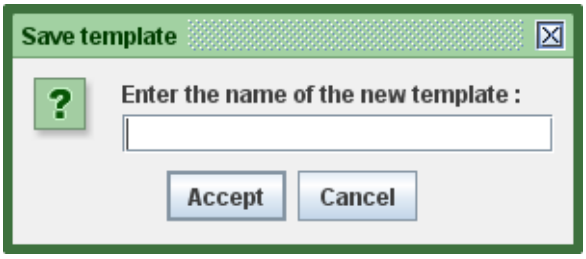
Use the '**Delete**' option to delete the selected template. A confirmation dialogue box should always appear. If you want to delete the template that is open and accept the action, the current template will close and will be deleted by the application.

- '**Save**' option: Use this option to save the data for the active template.



If the template has not been saved previously, enter a correct template name and click on '**Accept**'. If you do not want to save the changes, select '**Cancel**'.
If the template was saved previously, when you save the application will tell you whether or not the action has been performed correctly.

- '**Save as**' option: use this option to save the data for the new template created.



You must enter a correct template name and click on the '**Accept**' button. If you do not wish to save the template click on the '**Cancel**' button.
When you save, the application will tell you whether or not the action has been performed correctly.

5.1.1.2.- Generate a report

When you click on this option a dialogue box will open to generate a report from the chosen template.

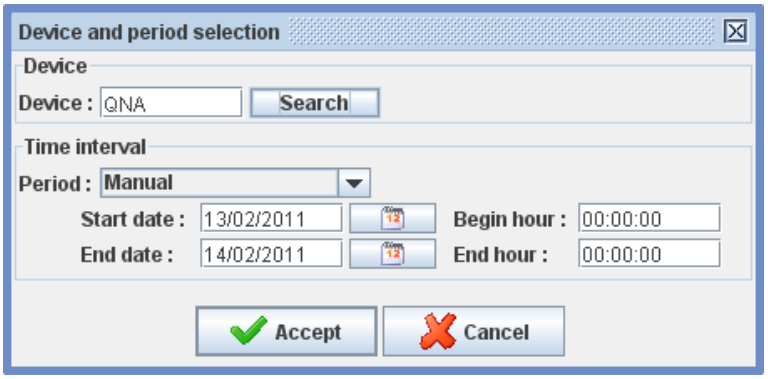


Figure 144: Device and period selection

By default, the fields shown in red indicate that they do not contain a correct value and therefore the report will not be validated. Complete the following fields correctly:

- *Device*: device identifier that user wants to use to create a report.
- *Period:* drop-down list that shows the possible time intervals to apply when you create a report by using a template. There are the following time intervals: **manual**, **automatic**, **last day**, **last week** and **last month**. If you select "**automatic**" the application will automatically choose the range of data from files and devices configured in the report.
- *Start date / Begin hour*: start date for report data.
- *End date / End hour* : End date for report data.

You can enter the device indicator manually or look for it using the device selection assistant by clicking on '**Search**'.

For more information on device selection, see the section titled ***"5.1.3.- SELECTING DEVICES AND VARIABLES"***

The value entered in the start date field must be less than the value in the end date field. By default, the period shown by the application will be **Manual** and the dates will be the last 24 hours.

To generate the report, click on '**OK**'; if you do not want to proceed with the report generation, click on '**Cancel**' or hit '**escape**'.

For more details on report generation, see the ***"5.3.- REPORTS"*** and '***"5.3.2.- REPORT GENERATION"***

5.1.1.3.- Power quality standard

This option allows you to manage the standards and filters used to build the templates. See ***"5.2.- POWER QUALITY STANDARD"*** for further details.

5.1.1.4.- Styles

With this option you can manage the styles used in the application, e.g., applying them to the added blocks with text format configuration.

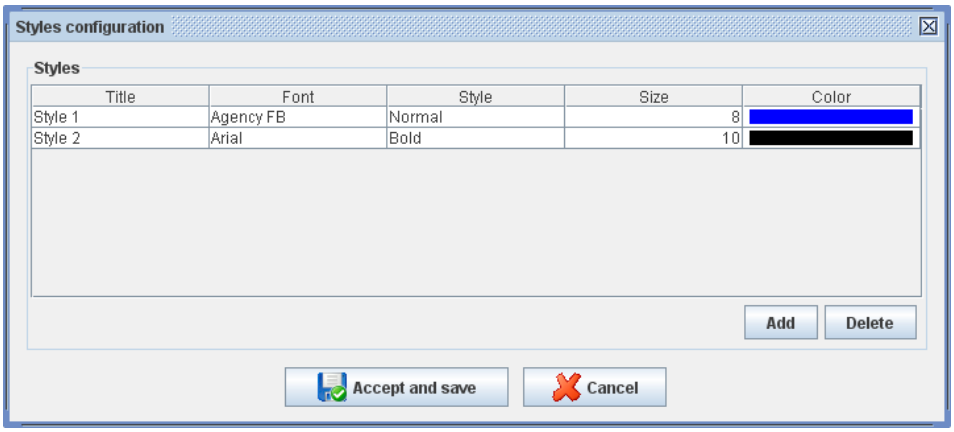


Figure 145: Styles configuration

5.1.1.4.1.- Add a style

To create a new style, click on "**Add**" and a style configuration dialogue box will appear.

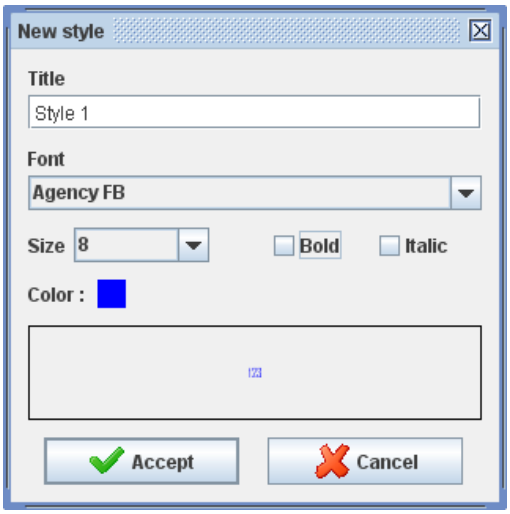


Figure 146: New style.

In this dialogue box you can configure the title of the style, font, size, colour and whether it should be boldface or italic. To create the style, click on '**Accept**'; if you do not want to create it, click '**Cancel**' or hit the **'Escape'** key.

To change the colour of the text, click on the box next to the word "**colour**" and a colour selection dialogue box will appear.

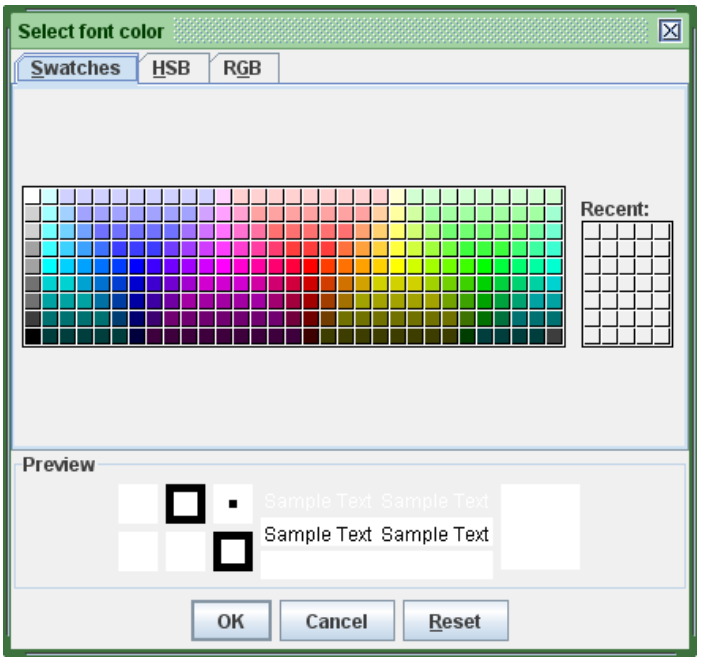


Figure 147: Select font color.

Select the desired colour and click '**OK**'.
Once you have created the style, a new row will appear on the main table with the properties assigned to the style.

5.1.1.4.2.-Modify a style

If you want to modify a style, double click on the solid line of the styles table; a dialogue box will appear which is the same as the one for creating a style but will initialise showing the properties of the selected style.

5.1.1.4.3.- Delete a style

To delete a style, right click on the selected style on the main table and click '**Delete**'. You need to accept the confirmation dialogue in order to proceed with the deletion.

5.1.1.4.4.- Accept and save changes

In order to permanently create, modify or eliminate a style in the main dialogue box, you need to click on '**OK and save**'. If you click on '**Cancel**' all changes will be lost.

5.1.1.5.- Configuration

Use the configuration option to modify the application's general parameters.

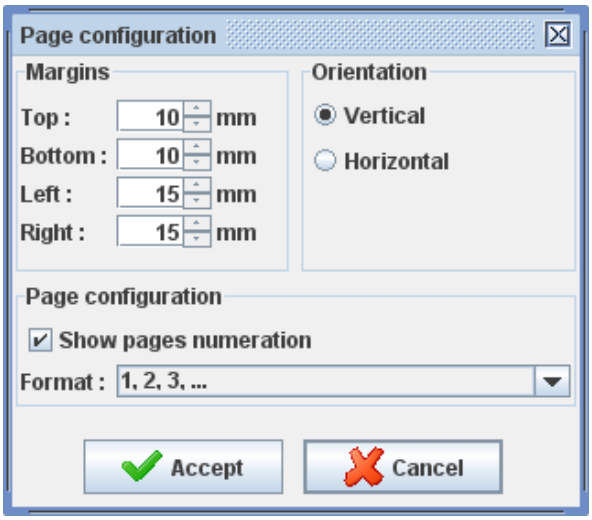


Figure 148: Page configuration.

- *Margins*: general margins of the pages of the report generated.
- *Orientation*: general layout of the pages of the report generated.
- *Page configuration*: allows you to configure whether you want to show the page numbers and, if so, the style of the page numbers.

For further details on page configuration, see the ***"5.3.- REPORTS"*** and ***"5.3.1.2.10.- Page break block"***.

5.1.2.- TOOLBARS

5.1.2.1.- Select block

Allows you to select the blocks added previously in the edition panel. If you have selected another option from the toolbar (delete, add block, etc.) click this option to activate the selection.

5.1.2.2.- Cut

Allows you to copy a block and remove it from the template, although you can also do this by pressing '*Control + X*'. You need to select the block before you can cut it..

5.1.2.3.- Copy

Allows you to copy a template block, which can also be done by pressing '*Control + C*'. You need to select the block before you can copy it.

5.1.2.4.- Paste

This option allows you to paste the previously cut or copied blocks. You can paste the same block as many times as you want by clicking Paste or pressing '*Control + V*'.
When you click on Paste, the copied block will be pasted in the last template position by default. If you paste a block by using the key combination indicated above, the block will be pasted in the position closest to the mouse pointer.

5.1.2.5.- Delete

Allows you to eliminate blocks from the active template. To delete a block you will need to select the

delete tool, position the cursor on the desired block and right click the mouse.
When you select the delete option, the mouse pointer will change to , indicating that the block is going to be deleted. To change the status of the pointer, select a different option from the toolbar.
It is important to note that the application does not ask for confirmation when you delete a block and it has no system for restoring or undoing changes.

5.1.2.6.- Other tools

The toolbar contains the icons needed to add blocks to the active template. These icons are as follows:

Text *Data* *Grill* *Variable* *Events*

Image *Standard* *Graphics* *Tables* *Page break*

When you click on one of these options the icon of the mouse pointer will change to a cross (┼) indicating that the application is adding a block.
For further details on how to include blocks and their properties, see the chapter titled ***"5.3.- REPORTS"***

5.1.3.- SELECTING DEVICES AND VARIABLES

You will have to select devices or variables to manage the quality standards or configure certain template blocks. There are two types of variables:

- *Free variable*: a variable that is not connected to any IP address or any particular device. It is represented by the generic variable identifier only.
- *Linked variable*: a variable that is associated with a specific IP address or device.

Free variables are used to improve template reuse, i.e., as generic identifiers to facilitate the generation of reports on different addresses and devices..

5.1.3.1.- Selecting free variables

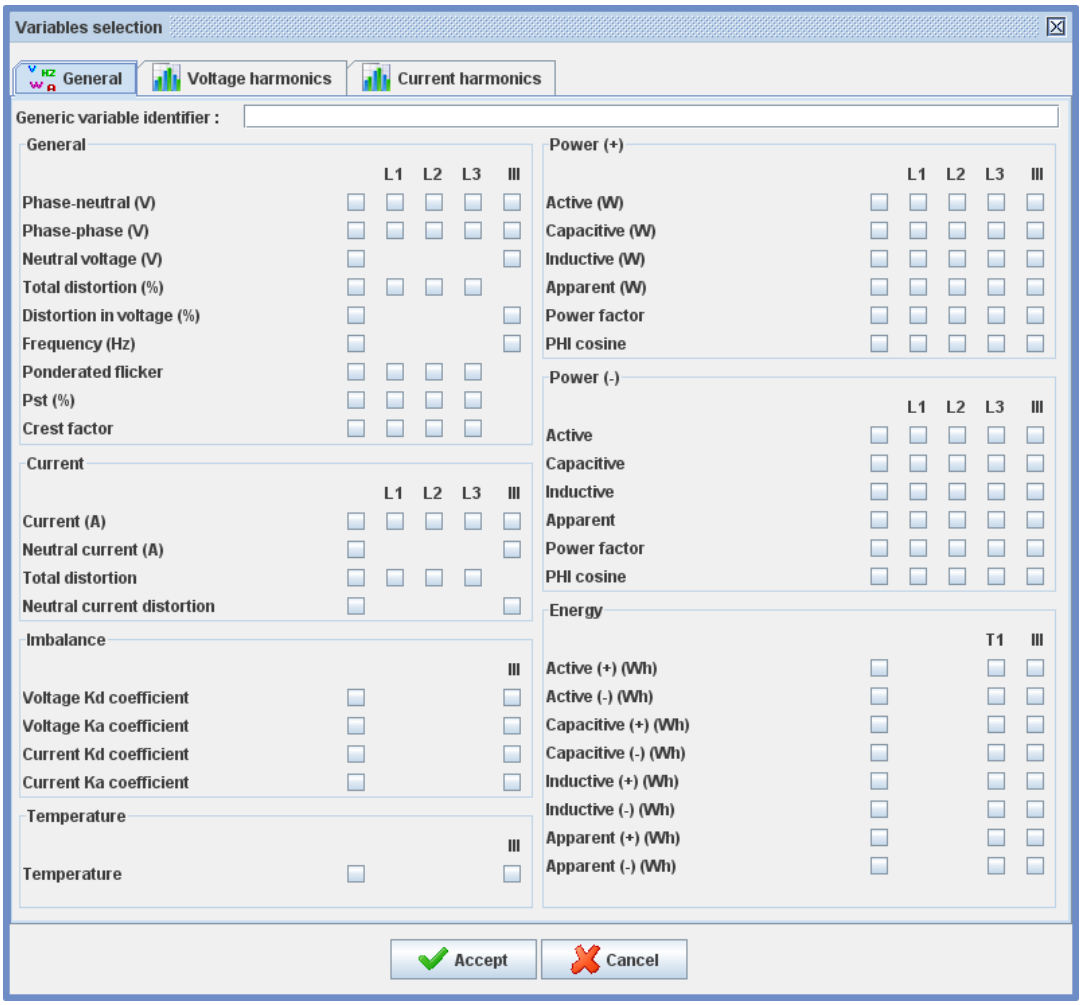


Figure 149: Selecting free variables.

To select free variables, a dialogue box will appear showing the main variables used by the devices that are compatible with **PowerVision Plus**. To select a specific variable, simply mark the boxes for the variable and phases.

If the variable you want to add is not shown in the dialogue box, you can add the variable identifier in the field titled '**generic variable identifier**'.

5.1.3.2.- Selecting linked variables

When you add a linked variable, a progress bar will appear and will be continuously updated until the application is able to recover the list of available devices.

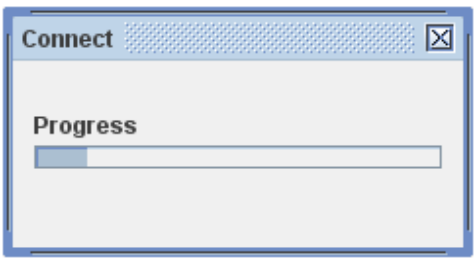


Figure 150: progress bar.

The devices available for selection are then displayed.

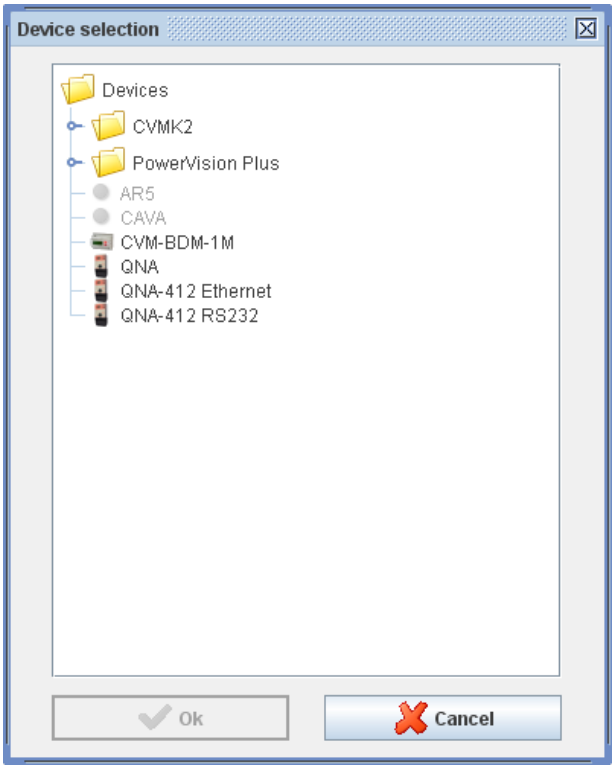


Figure 151: Device selection.

Select a device from the tree and click on '**OK**'. If you do not want to continue with the variable selection, click on '**Cancel**' or hit the '**Escape**' key.

Depending on which device you selected, the specific variable selection screen will appear next. For example, for a **QNA412** device the screen will be:

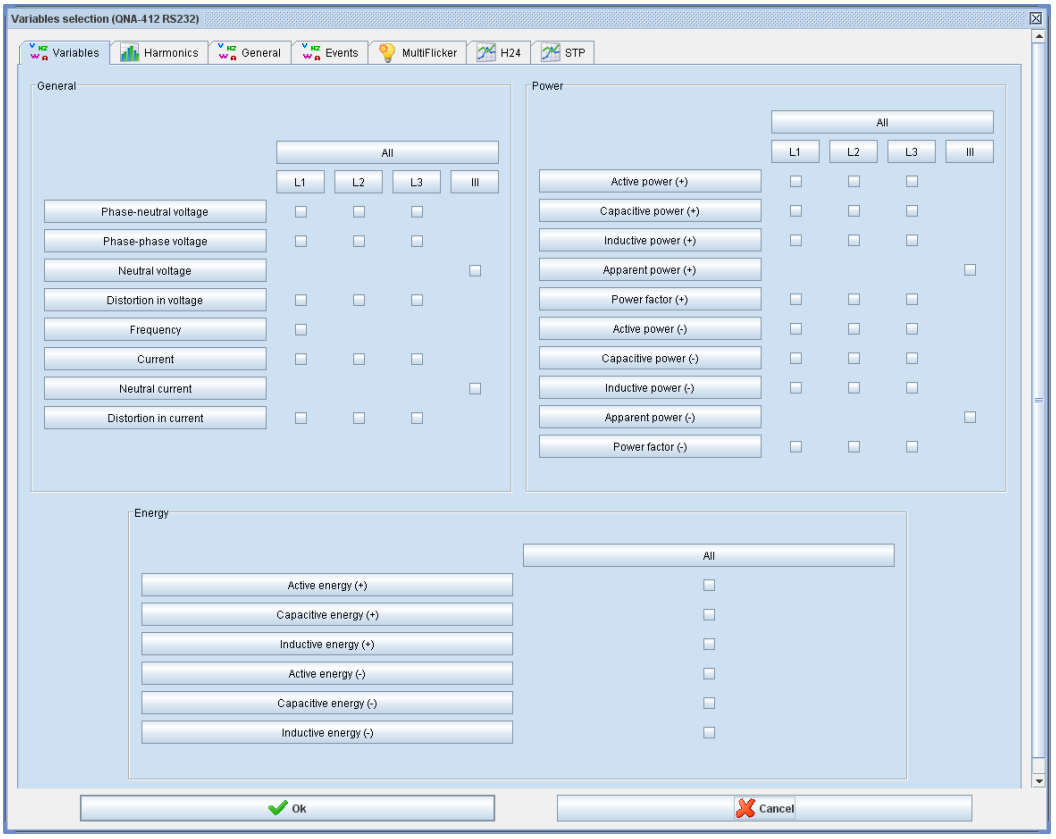


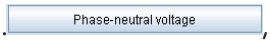
Figure 152: Selection variables QNA412

You can mark as many variables as you wish by clicking on the checkboxes that are displayed by

variable type and phase. If a variable is already checked, you cannot uncheck it since it is disabled for selection.

If you choose '**All**', all of the boxes in phase columns will be selected or unselected.

If you click on a phase button (**L1, L2, L3, III**) only the boxes for that phase will be modified.

If you select the buttons of a variable, e.g. 

, all of the boxes for that variable will be selected or unselected.

If you click on  , the selection of the boxes for phases 1, 2 and 3, instantaneous and maximums or minimums (if any) will be modified.

5.2.- POWER QUALITY STANDARD

5.2.1.- DEFINITION OFF STANDARDS, FILTERS AND PARAMETERS

A power quality standard provides a set of rules for establishing certain quality limits to be applied to a set of data. These rules are represented by a standard composed of a series of filters. A filter, in turn, is composed of a series of values (parameters) which constitute the specific limits of each rule.

There are two types of standards:

- **Predefined:** these standards cannot be created, modified or deleted. They are internal to the application.
- **Modifiable**: these standards can be modified by the user.

There are two different types of filters:

- **Predefined**: there are fixed parameters that depend on the filter type. The predefined filter types are 'Voltage', 'Frequency', 'Flicker Plt', 'Flicker Pst', 'Harmonics' and 'Unbalance'.
- **Modifiable**: these filters can be freely modified by the user by adding free or linked variables and parameters.

A parameter is characterised by type and associated value. The parameters added to a filter can be relative or absolute:

Table 2: Parameter.

Parameter		
	Relative (%)	Absolute
Base value	✓	
Values for OK	✓	✓
Maximum for OK	✓	✓
Minimum for OK	✓	✓
Maximum discardable	✓	✓
Minimum discardable	✓	✓

5.2.2.- CONFIGURATION OF STANDARDS

5.2.2.1.- Management od standard

Choose the '**Quality standards**' option from the main menu to manage quality standards. A dialogue box such as the one below will open where you can create, modify or eliminate standards and filters:

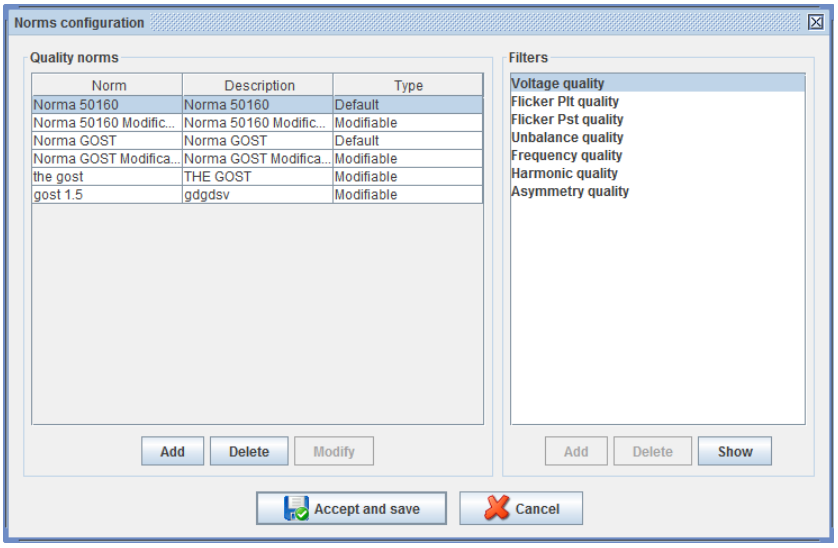


Figure 153: Management of standards.

To add a standard, click on the '**Add**' button in the section titled '**Quality standards**'; a dialogue box will open where you can enter the name of the standard and a description. You can also add a standard by clicking '**Insert**'.

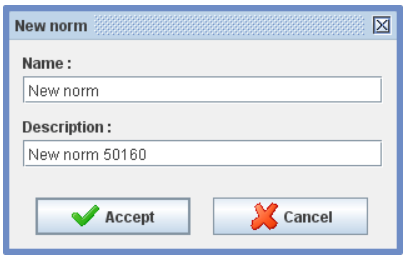


Figure 154: New standard.

To modify a standard that has already been created, choose a standard from the '**Power Quality standards**' list and click on '**Modify**' in the section. You can also do this by right double-clicking on the desired standard. If you select a predefined standard you will not be able to modify or delete it.

To delete a standard, select the row where the standard is located and delete it by pressing the minus sign "**-**" in the section titled '**Quality standards**'. You can also delete a standard by selecting it from the table and clicking '**Delete**'. To add or delete filters, follow the same steps as for standards except that in this case you will use the buttons in the '**Filters**' section. See the next two sections for information on modifying filters.

To create filters, a dialogue box will appear where you can select the type of filter to be created. If you select a predefined filter you will also have to select the subtype.

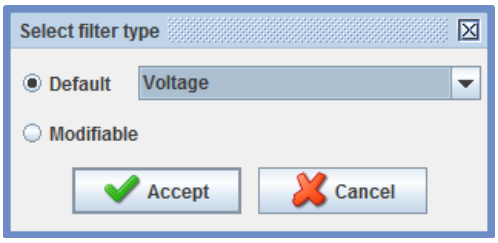


Figure 155: Select filter type.

5.2.2.2.- Editing predefined filters

As indicated at the beginning of this chapter, there are six different kinds of predefined filters. The possible configurations of each one are described below.

5.2.2.2.1.- Voltage filter

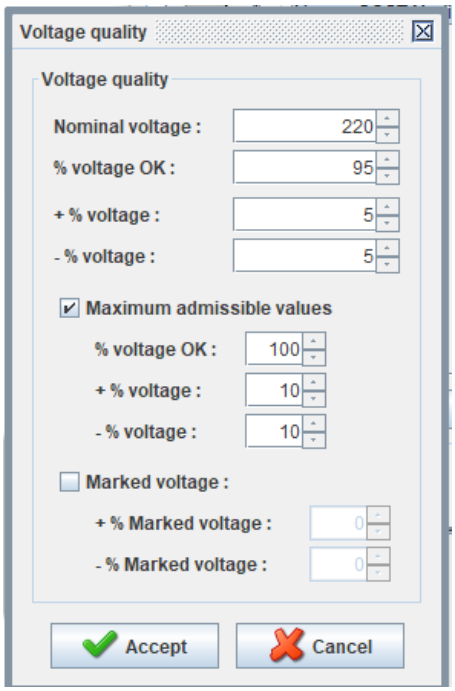


Figure 156: Voltage filter

- *Nominal voltage*: base voltage against which the samples are compared. You must specify this value since the programme will not search for the nominal voltage of the device.
- *% of voltage OK*: the percentage of the voltage value between the upper and lower limits required for the voltage value to be considered correct.
- *+ % voltage*: percentage above the base nominal voltage at which the value is considered correct.
- *- % voltage*: percentage below the base nominal voltage at which the value is considered correct.
- *Maximum admissible values: enables values to enter voltage ranges.*
- *% Voltage OK: percentage of values within the lower and higher ranges for the voltage value to be considered OK.*

- *+ % Voltage : percentage above the base nominal voltage for the value to be considered OK.*
- *- % Voltage : percentage below the base nominal voltage for the value to be considered OK.*
- *Marked voltage*: if you mark this option, you can determine the margins outside of which the values will not be considered for all samples. If you do not mark it, all samples will be considered.
- *+ % marked voltage*: percentage above base voltage at which values will be discarded. If the value exceeds the upper limit, it will not be counted in the computation.
- *- % marked voltage*: percentage below base voltage at which values will be discarded. If the value falls below the lower limit, it will not be counted in the computation.

5.2.2.2.2.- Flicker Plt and Filcker Pst filter

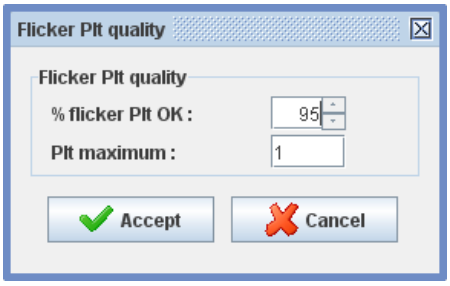


Figure 157: Flicker Plt and Filcker Pst filter

- *% Flicker Plt OK*: percentage of Plt samples that must fall below the maximum Plt value for the study to be considered correct. In the image below, 95% of the samples have been configured below 1 in order for the filter to be considered correct.
- *Plt Maximum*: maximum value above which it is considered incorrect.

For the Plt flicker the parameters are analogue.

5.2.2.2.3.- Unbalance filter

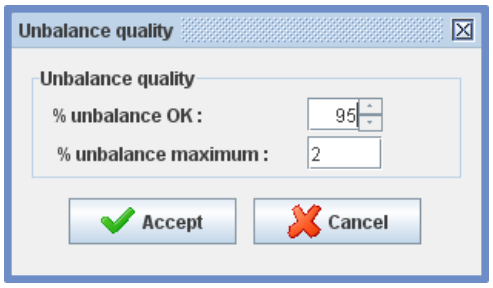


Figure 158: Unbalance filter

- *% unbalance OK*: percentage of samples of the unbalance coefficient that must be under the maximum allowed value in order for the filter to be correct.
- *% unbalance maximum*: maximum unbalance coefficient value above which it is considered incorrect. The value is expressed as a percentage..

5.2.2.2.4.- Frequency filter

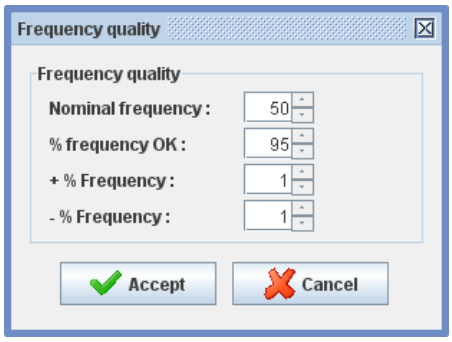


Figure 159: Frequency filter.

- *Nominal frequency*: base nominal frequency against which the samples are compared. This value is required.
- *% frequency OK*: percentage of values falling within the upper and lower limits required for the value to be correct.
- *+ % frequency*: percentage above the nominal frequency required for the value to be considered correct.
- *- % frequency*: percentage below the nominal frequency required for the value to be considered correct.

5.2.2.2.5.- Harmonic filter

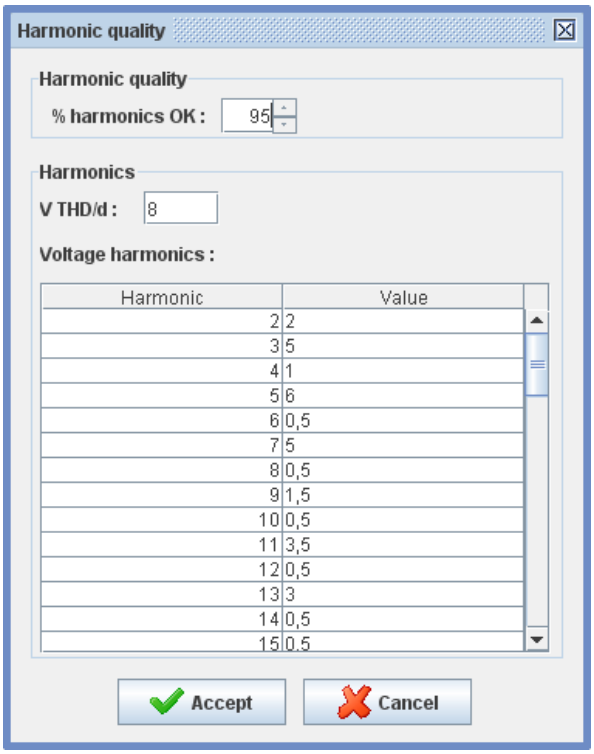


Figure 160: Harmonic filter

- *% harmonics OK*: percentage of records that must meet the filter parameters in a specific period of time in order to be correct.
- *V THD/d*: maximum value of the harmonic voltage distortion for the filter to be correct.

- *Voltage harmonics*: list of values on which the maximum values of each harmonic can be specified. You can configure the value of up to 64 harmonics including the relative value of each one (%).

5.2.2.3.- Editing modifiable filters

Go to the dialogue box for edition modifiable filters when you want to create or modify a filter. When creating a filter of this kind, you will see a dialogue box such as the one below:

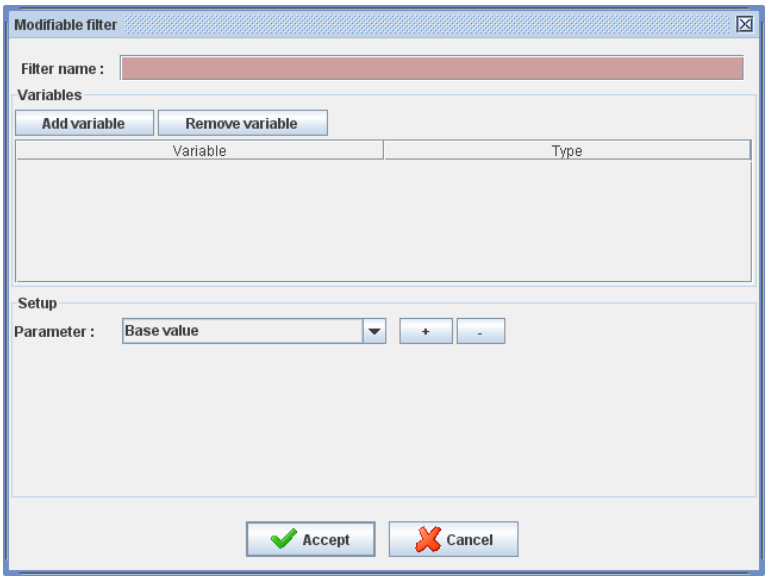


Figure 161: Modifiable filters

There are three clearly differentiated sections in this dialogue box:

Filter name: In the text box of the '**Filter name**' field you can add or modify the name of the filter for identification purposes. If the text box appears with a red background it means that the entered text is invalid.

Variables

In this section you can manage the variables that define the filter, adding both free and linked variables. This panel is composed of two buttons for adding and removing variables and a table where the added variables are displayed.
To add a variable, click on '**Add variable**' and a dialogue box will appear for selecting the type of variable.

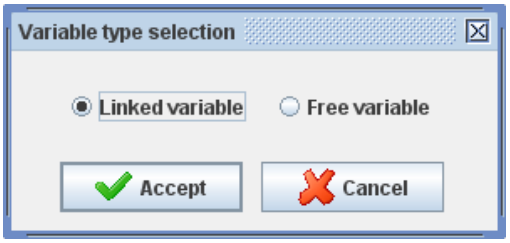


Figure 162: Variable type selection.

To select a linked variable, follow the procedure described above (see ***"5.1.3.- SELECTING DEVICES AND VARIABLES."***). When you select it, a new row will be created on the variables table which will show the variable identifier and the type (linked). For linked variables the device's identifier is the character '.' (period) and the variable identifier.

Figure 163: Variables.

If you want to add a free variable, click on '**Add variable**' again and mark '**Remove variable**' in the dialogue box. Select the variable as described above and a new entry will be created in the variables table.

Figure 164: Free Variable

You will see in the '**Variable**' column that the new variable is shown with the identifier only and in the '**Type**' column it is shown as free. Note that when you create a variable, the parameter panel is updated, creating new tabs for each one of the variables added.

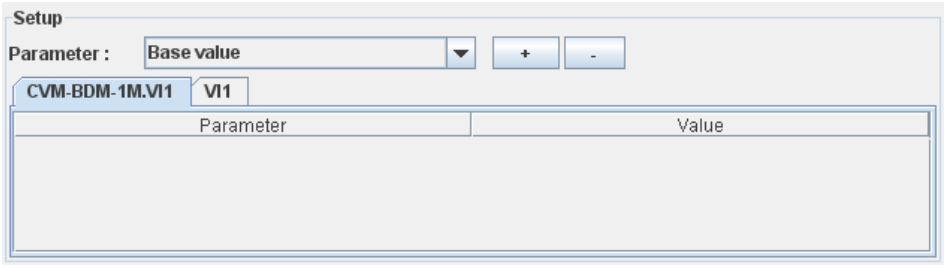


Figure 165: Parameters

To delete a variable, select the variable you want to delete and click on '**Delete variable**'. The program will ask you for confirmation before deleting it.

Parameters

On this panel you can manage the parameters of each one of the variables added to the filter. The panel is composed of a list of available parameters, two buttons for adding and deleting parameters and a table where the managed elements are displayed.
As mentioned at the beginning of the chapter, the parameters can be relative or absolute. The different parameters are defined below:

- *Base value*: value against which the samples are compared. You can add up to three decimals
- *% of values for OK*: total percentage of correct values out of total for the filter to be correct.
- *% maximum relative for OK*: percentage above the 'base value' parameter for considering the value correct (to one decimal place).
- *% minimum relative for OK*: percentage below the 'base value' parameter for considering the value correct (to one decimal place).

- *Maximum discardable %*: percentage above base value for discarding values (to one decimal point).
- *Minimum discardable %*: percentage below base value for discarding values (to one decimal point).
- *Set number of values for OK*: total number of correct values compared to total samples.
- *Absolute maximum for OK*: absolute maximum value of correct values required for the filter to be considered correct. You can add up to three decimal points.
- *Absolute minimum for OK*: absolute minimum value of correct values required for the filter to be considered correct (to three decimal places).
- *Absolute maximum discardable*: value above the parameter value 'Set number of values for OK' for discarding values. If the value exceeds the limit, the sample will not be considered.
- *Absolute minimum discardable*: value below the parameter value 'Set number of values for OK' for discarding values. If the value exceeds the limit, the sample will not be considered.

In order to add a parameter you must have added at least one variable to the filter. If you have added one, select a parameter from the '**Parameter**' list and click "**+**". If you have already added the element to the variable, a message will appear telling you this.

If you have not already added that element, the table will be updated with the new entry for the selected variable. In the '**Parameter**' column you will see the name of the parameter and in the **'Value**' column you will see that it is in red, indicating that the value is incorrect.

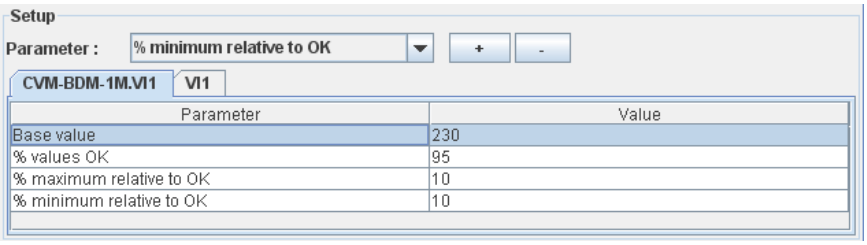


Figure 166: Parameter.

It is important to note that there are certain conditions for combining the parameters of a variable. These restrictions include:

- If you add a relative filter (base value) you cannot add an absolute filter (set number of values for OK); the reverse of this is also true.
- If you want to add a relative parameter, you will have to include the following parameters: '***Base value', '% of values for OK', '% maximum relative for OK' and '% minimum relative for OK***'.
- If you want to add an absolute parameter, you will have to include the following parameters '***Set number of values for OK', 'Maximum absolute for OK' and 'Minimum absolute for OK.***

The maximum and minimum discardable values are optional for both relative and absolute parameters. To delete a parameter, select the variable that contains the parameter, select the parameter from the list at the bottom and click on '-'.

As with predefined filters, the changes will only be applied to the filter if you click on "**OK**". Bear in mind

that all form fields must be validated. It may happen that when a filter has several variables you cannot see all of the parameters of each variable and there may be one or more that have not been validated.

When you click on '**OK**' the program will automatically select the tab of the variable containing parameters that have not be validated, showing incorrect values with a red background.

5.2.3.- SPECIFICATIONS PARTICULAR TO THE GOST STANDARD

The **GOST** standard has some features that are slightly different from the original **50160** standard used in the software.

In the predefined "**Filters**" window of the **GOST** standard, we find maximum admissible values in the sections for voltage quality, unbalance quality, asymmetry quality and frequency quality.

These values are predefined, and if you want to change them to use them in a report select the "**Editable**" **GOST** standard and change the parameters manually just as would be done with any other standard.

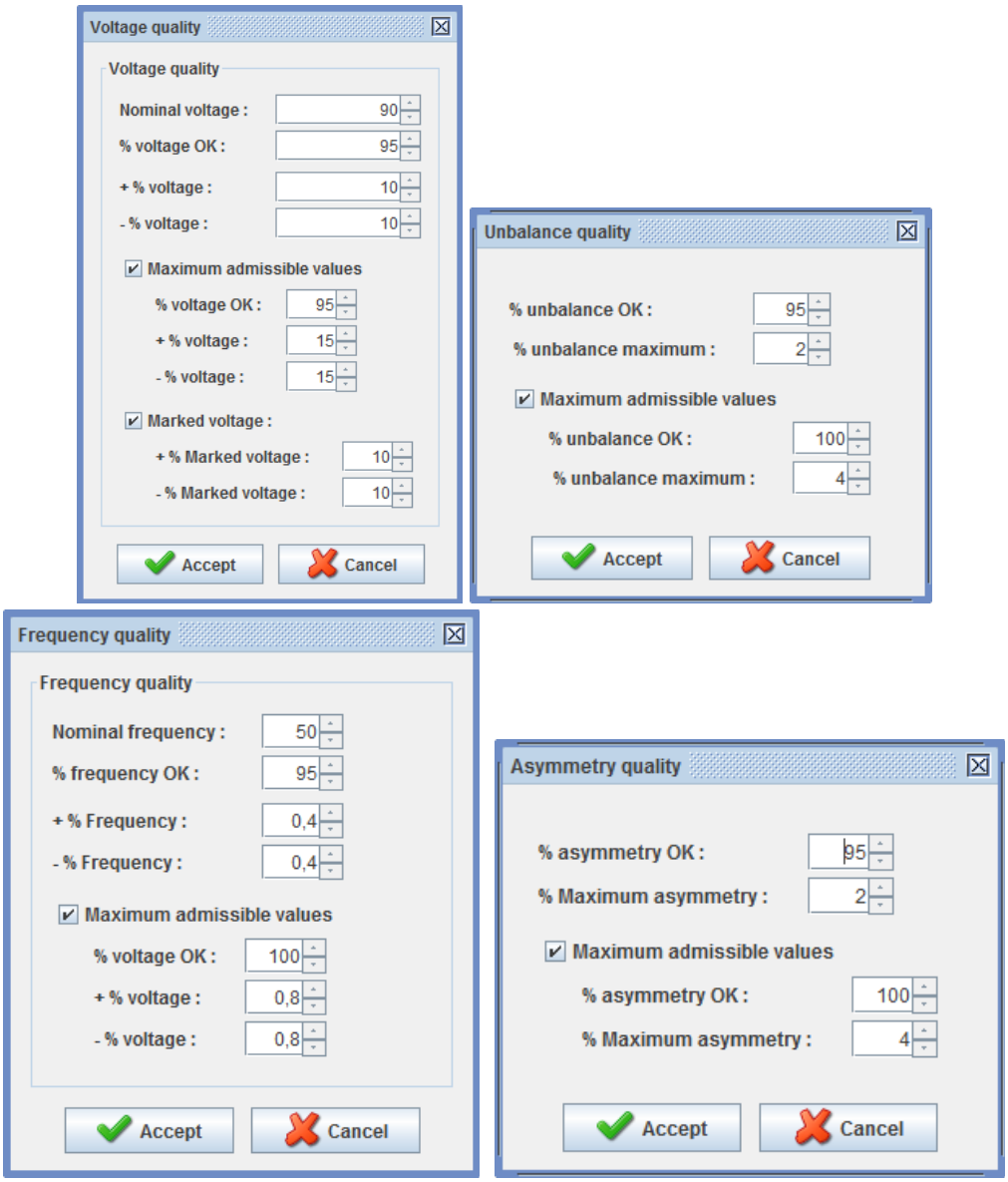


Figure 167:Voltage, unbalance, asymmetry and frequency quality windows of the GOST standard

There is a "**Configuration**" tab to adjust harmonic quality and maximum admissible values of THD/d, where you can adjust the voltage value/range for the value ratios for the harmonic to be used.

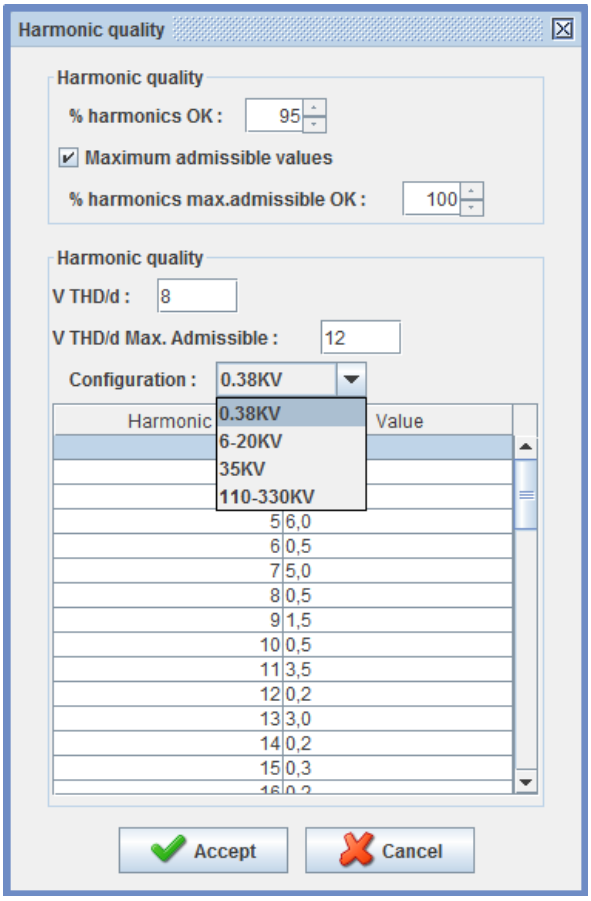


Figure 168:Harmonics quality window of the GOST standard

To save any changes in the "**Configuration**" tab, click "**Accept**". If you do not wish to save the changes click the "**Cancel**" button.

5.3.- REPORTS

5.3.1.- EDITING REPORTS

In the first part of this chapter we defined the basic components of the report edition area. In this section we will describe how to interact with the report design area and the different types of blocks and their properties.

5.3.1.1.- Desing panel

The design panel is the main part of the program that offers all of the options needed to create the templates used to run reports.

This panel is divided into three areas:

- here you can configure the design of the report (see section ***"2.3.2.- TOOLBAR"*** for further details).
- **Worksheet:** view of the template design.
- **Panel of properties:** a panel that shows the properties of the blocks added to the worksheet.

The worksheet is displayed as a container where the different types of block are added or removed. The distribution is sequential, i.e., when you add blocks they are positioned one under the other on the worksheet.

Bear in mind that this panel represents the logical distribution of the blocks in relation to one another and you should not confuse what you see on this screen with the appearance of the final report. The inner and outer margins of the worksheet, the distance between blocks or the appearance of each one when the template is created is very different to the way they will look on the final report.

5.3.1.1.1.- Select a block

Click on the tool to select a block. Position the cursor on a block that has been added to the worksheet and right click on the block.

You can tell which block is selected because the contour lines around the block change to a dotted line and the features of the selected block appear on the property panel to the right.

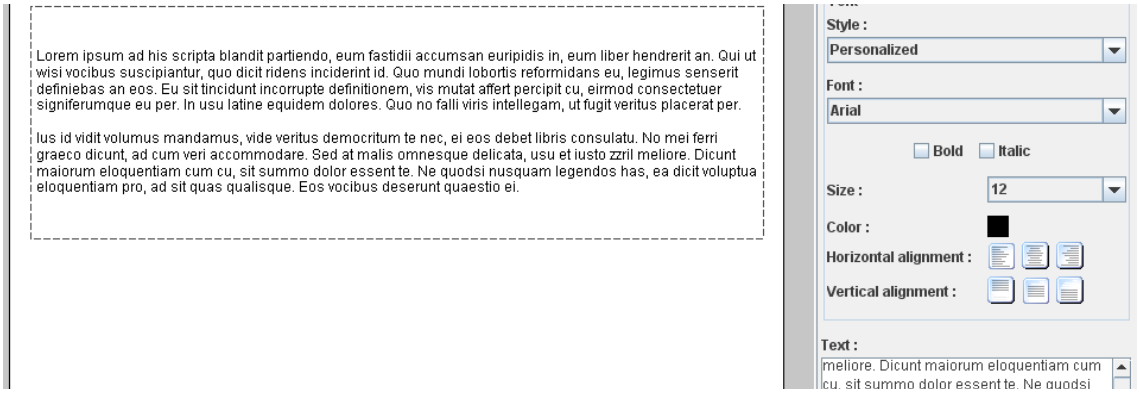


Figure 169: Select a block

The example above shows a block of selected text and the properties of the block on the panel to the right.

To deselect a block, click on any part of the edition sheet outside the box containing the selected block.

5.3.1.1.2.- Adding a block

To add a block, select the desired option on the toolbar (text, variable, event, etc.), position the cursor near the desired position and right click.
You can add blocks to the worksheet directly or to a cell inside a grid type block.
The different block options are described in further detail below.

5.3.1.1.3.- Deleting a block

See section *"2.3.2.- TOOLBAR"*

5.3.1.1.4.- Moving a block

To move a block, right click on the block you want to move and, without releasing the mouse button, drag the block to the desired location. You can only move the block inside the edition sheet but never to another block, except in the case of grid type blocks which are explained below.

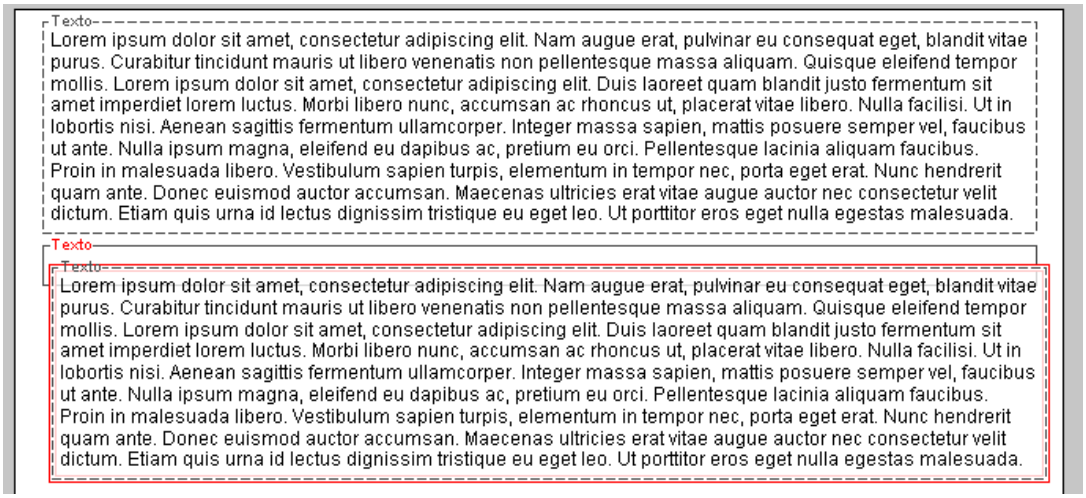


Figure 170: Moving a block

If you try to move a block to a position that is not permitted, the contour lines around the block will turn red. If the contour lines turn green, it means that you can move the block to that position

5.3.1.1.5.- Copying, cutting and pasting bloks

See section *"2.3.2.- TOOLBAR"*

5.3.1.2.- Block tools

Use the panel of properties on the right side of the screen to configure the design blocks. While each type of block has its own configuration parameters, most share a common panel of font format properties.

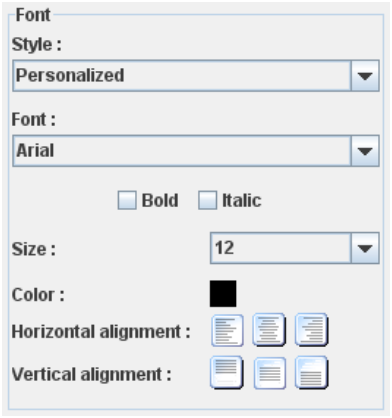


Figure 171: Block tools

On this panel you can configure:

- *Style*: predefined style configured in the styles editor.
- *Font*: here you can configure the font and the format.
- *Size*: here you select the size.
- *Colour*: text colour (between 8 and 72).
- *Alignment*: allows you to define the horizontal alignment (left, centred, right) and vertical (top, centred, bottom) of the text inside the block. These properties depend on the type of block.

If you select a personalised style you can configure the font-related fields; otherwise, they will be disabled.

Blocks that use tables as elements for displaying the information will also use a common configuration panel.

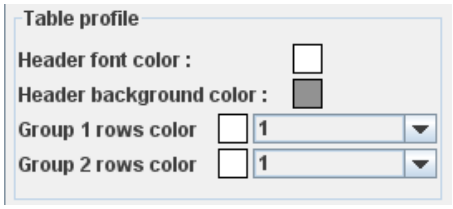


Figure 172: Table profile

The typical table attributes are as follows:

- *Header font colour*: defines the colour of the table header text.
- *Header background colour*: defines the background colour of the table header.
- *Group 1 rows color*: allows you to define the colour of group 1 and the number of rows to which it applies.
- *Group 2 rows color*: allows you to define the colour of group 2 and the number of rows to which it applies.

5.3.1.2.1.- Text block

Allows you to add fixed strings to the template; the string can be as long as you want it to be with any characters you want, including line breaks.

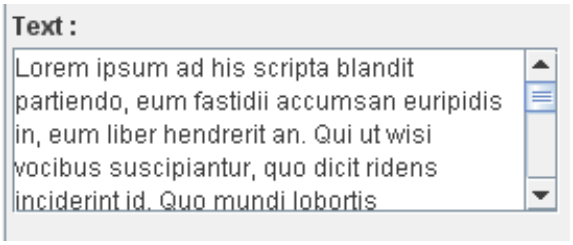


Figure 173: Text block

Here you can configure the text properties and the contents of the text to be displayed. Every time you write something in the text box, the contents of the block are updated on the edition sheet.

5.3.1.2.2.- Data block

This block allows you to show a date on the report, which can either be the date on which the report is generated or a set date.
In addition to the text properties that are common to most blocks, the following properties can also be configured:

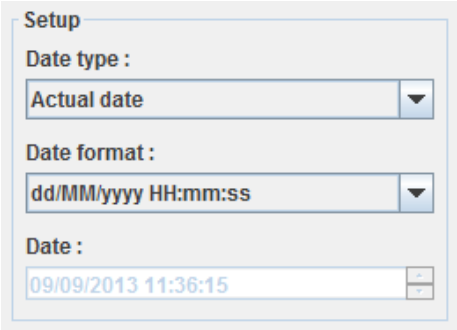


Figure 174: Data block.

- *Date type*: you can select current date or free date. If you select free date, the '*Date*' field will be enabled.
- *Date format*: allows you to define the date format. The meanings of the format letters are as follows:
    - 'dd': day of the month.
    - 'MM': month of the year.
    - 'yyyy': year.
    - 'HH': hour (0 to 23)
    - 'mm': minutes.
    - 'ss': seconds.
- *Date*: this option is only enabled if you choose 'Free date'. allows you specify a specific date to be displayed.

5.3.1.2.3.- Grid block

This type of block allows you configure the distribution of various types of blocks in rows and columns on the template. The size of the grid can be anywhere from 1X1 to 10X10 and any combination of sizes in between.

You can only add certain types of blocks to each cell on the grid: text, date, variable, event, image, graphics and standards block in basic mode.

	Voltage (20%)	Voltage (75%)
Voltage phase 1:	(20*[VI1])/100	(75*[VI1])/100
Voltage phase 2:	(20*[VI2])/100	(75*[VI2])/100
Voltage phase 3:	(20*[VI3])/100	(75*[VI3])/100

Figure 175: Grid block

When interacting with this type of block, the following actions are possible:

- *Adding or deleting a column*: position the cursor on the upper contour line of the block until the cursor changes to ↓ and right click. A pop-up will appear with the following options '**Insert column**' and '**Delete column**'. Choose the desired option.
- *Adding or deleting a row*: position the cursor on the left contour line of the block until the cursor changes to → and right click. A pop-up will appear with the following options: '**Insert row** ' and '**Delete row**'. Choose the desired option.
- *Resizing a column*: Position the cursor on one of the lines separating two columns until the cursor changes to ↔. Left click the mouse and, without releasing the button, drag the separation line to the desired position, and then release the button.
- *Selecting blocks inside the grid*: when there are blocks inside a grid, the contour lines of these blocks are a lighter colour than normal. When you position the cursor on these blocks, the size of the contour lines changes, indicating that you can select them. Click on the desired block and the status of the contour lines of the block will change to selected.
- *Moving a cell block*: select a block and drag it to an unoccupied cell. If the cell is occupied, the contour lines of the block being dragged will turn red; if the cell is empty, they will turn green.
- *Select a grid block*: place the cursor on a position inside the block until the contour lines of the main block are highlighted. When the cursor changes to , right click the mouse and drag the block to the desired position.
- *Accessing the block's properties*: select the block. The block's attributes will appear on the side panel of the properties, where you can configure:
  - ✓*Rows*: number of rows in the grid (1 to 10).
  - ✓*Columns*: number of columns in the grid (1 to 10).

Limitations

You cannot resize rows or combine cells.
You cannot copy a grid block. To copy the internal blocks to another grid, select and copy them one by

one.
If you configure a number of files and/or a number of columns that is smaller than the block being edited, you will lose the information in the rows and/or columns that are outside of the configuration (the application will not ask you for confirmation).

5.3.1.2.4.- Variables block

In this block, you can include variable identifiers and expressions. You can also combine the values obtained on the configured device variables and present the resulting value as the application of a predefined formula.
In addition to text properties you can also configure:

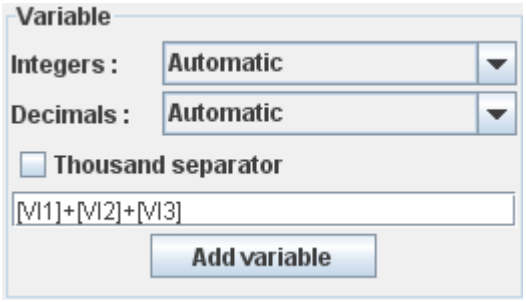


Figure 176: Variables block.

- *Integers*: allows you to define the number of whole numbers in the result.
- *Decimals:* allows you to define the number of decimal points in the result.
- *Thousand separator*: if this is activated, the results will be displayed with commas.
- *expression text*: allows you to specify the expression that will be used to calculate the final result.
- *Add variable*: allows you to include free or linked variables in the expression.

The characters of the variables in the expressions must include the typical identifiers of those variables "**[**" (beginning of the variable) and "**]**" (end of the variable). The example above shows how the sum of the three voltage phases is expressed.

The format of the variables is as follows:

- *Free variables*: Variable identifier (VI1, AI1,...)
- *Linked variables*: indicates the device identifier and the variable identifier. The format is shown in the following example:

  "**[QNA412.VI3]**" *represents the 'phase 3 voltage' variable of the* **QNA412** device.

To see which operators can be included in the block expression, see the related section in the appendix

5.3.1.2.5.- Events block

This type of block allows you to record all of the event occurring in a specified period of time, based on certain parameters acting as filters when calculating the results.

The following example shows a block of events with a magnitude filter between 75% and 90%, a duration filter between 1 and 3 seconds and recordings for all three phases:

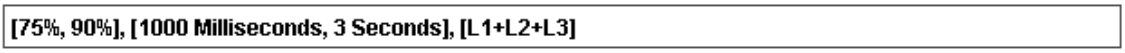


Figure 177: Events block

You need to specify the '**compact events**' expression. Compacting means that the application reduces the number of events in an interval, treating them as the same event (without a considerable margin of error). For example, three consecutive events - sag, interruption, sag - could be considered a single interruption event. Another example of this would be when two overvoltage events that occur very close together are considered a single, longer overvoltage event (**time hysteresis**).

The **time hysteresis** parameter is used by the program to determine if two events are close enough together. This parameter defines the maximum distance between two events for considering them consecutive. This distance is interpreted as the time between the end of one event and the beginning of the next one in the same phase.

The properties that can be configured for this type of block are as follows:

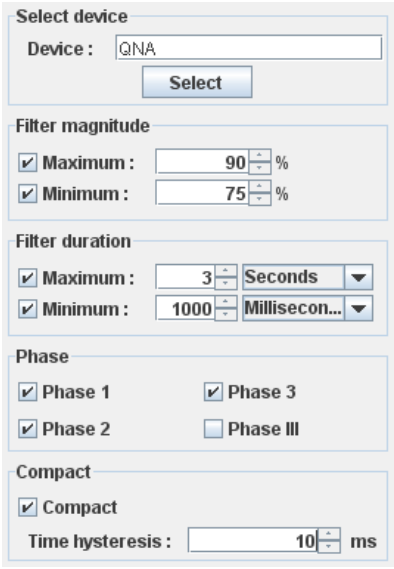


Figure 178: Event blocks.

- *Select device*: If the '**Select device**' is not selected you can link the filter on the block to a device. If not selected, the filter will use the entered data when the report is generated.
- *Filter magnitude*: allows you to define the maximum or minimum magnitude percentage to be filtered in event values.
- *Filter duration*: allows you to define the maximum and/or minimum duration to be filtered in events values.
- *Phase*: allows you to select which phases are filtered out of a set of values. You can select phases 1, 2 or 3 or three-phase ('Phase III').
- *Compact*: compacting determined by time hysteresis value.

5.3.1.2.6.- Image block

Allows you to include fixed images in the template. The properties you can configure for this block are:

- *Maintain proportions*: when activated, the original width and height proportions of the image are maintained. when deactivated, the dimensions will be forced to adapt to the frame of the block.
- *Search image*: opens a file selection box for changing the image of the block.

When an image is added to the template, an image selection dialogue box is opened before being inserted in the worksheet. Select an image from your computer and click OK. The application supports the following image formats: GIF, JPG and PNG.

5.3.1.2.7.- Standard block

This type of block allows you to add quality studies to the report based on the standards configured in the standards manager.

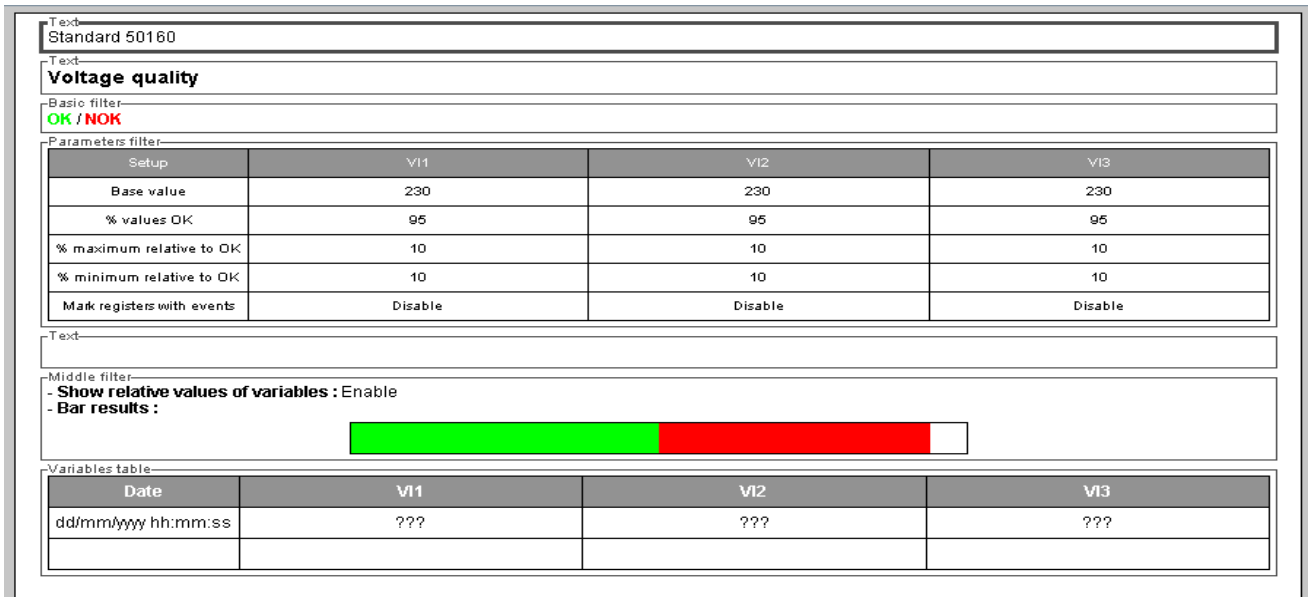


Figure 179: Standard block.

There are four types of default block representations.

✓ Basic filter

With this option it is possible to see whether or not the results of the data analysed have passed through the filter by means of a configurable message. With this type of filter you can modify the attributes of the text in the block in addition to the following:

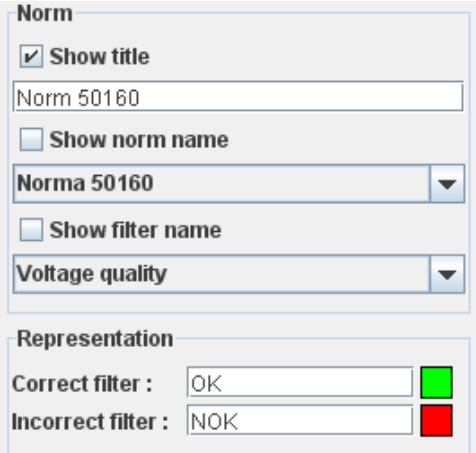


Figure 180: Basic filter.

- *Show title*: the title assigned by the user may or may not be shown.
- *Show norm name*: the name of the standard may or may not be shown.
- *Show filter name*: the name of the filter may or may not be shown.
- *Correct filter*: allows you to configure the text to be shown for correct filter results as well as the colour.
- *Incorrect filter*: allows you to configure the text to be shown for incorrect filter results as well as the colour.

✓ **Filter parameter**

Shows a table with all of the selected filter parameters along with the configured values. This an information type option.

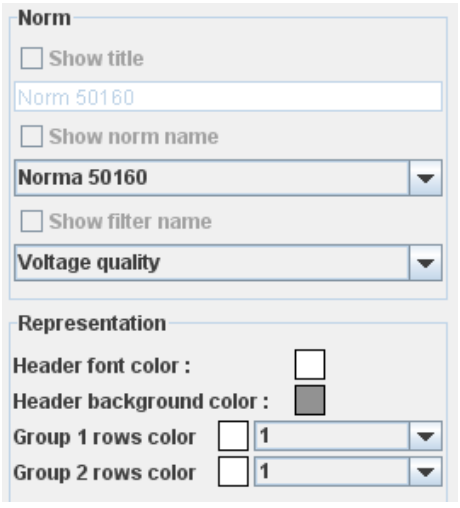


Figure 181: Filter parameter

For this block it is not possible to show the title, name of the standard or filter (as you will see, the buttons are disabled). However, you can select the standard and the filter for the block using the list of enabled options.

✓ **Normal filter**

The filter results are displayed in outline form. You can display the principal values of the results and a bar showing the percentage of correct and incorrect values.
When the report is generated you will see the most representative values calculated relative to the study:

- *Variable*: Name of the variable to which the filter is applied.
- *Maximum value*: maximum value of all values filtered for the variable.
- *Minimum value*: minimum value of all values filtered for the variable.
- *Average value*: average value calculated from all of the values filtered for the variable.
- *% correct*: the percentage of values that meet the filter parameters.
- *Value of the %*: maximum value of the defined percentage of samples in the filter.

These parameters are fixed and cannot be modified.

On the other side, a results bar displays the correct and incorrect parts of the values.

✓ **Avanced filter**

With this option you can view a table with all of the values for the defined interval when the report is generated. For this block you can configure the typeface, filter and standard as well as the typical parameters of a table.

5.3.1.2.8.- Graphic block

With this type of block you can graphically represent all of the data obtained for the specified time period when the report is generated. You can create four different types of graphics showing different variables and events: **variables, record of events, duration of events and CBEMA/ITIC curve type.**
To add this type of block, select the graphics option from the toolbar and right click on a position on the template worksheet. A dialogue box will then appear where you can choose the type of graphic. Choose one or click on '**Cancel**' or hit '**Escape**' if you do not want to add any.

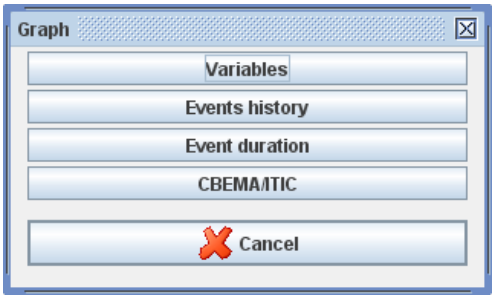


Figure 182: Graphic block.

5.3.1.2.8.1.- Variables graphic

The variables graphic blocks allow you to embed a graphic in a report where you can view the values of the configured variables.

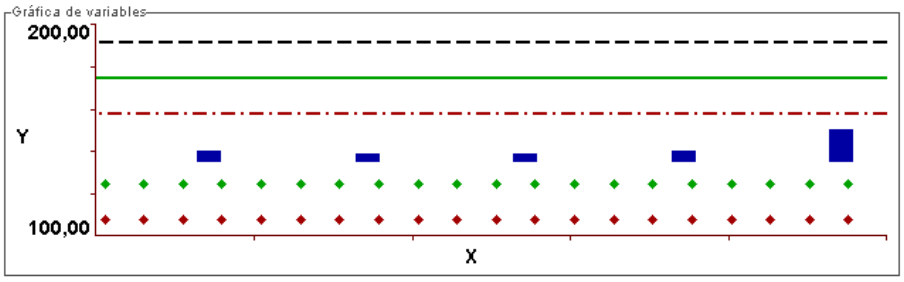


Figure 183: Variables graphic

In addition to the type of text and styles, you can also configure the following properties for the block:

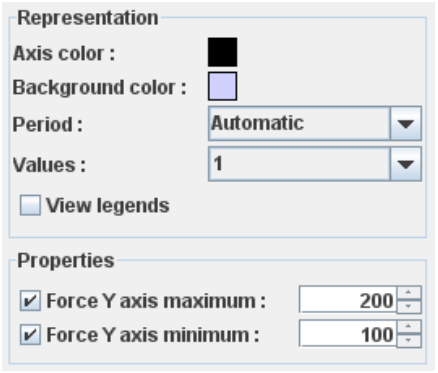


Figure 184: Variables graphic: properties.

- *Axis color*: colour or the axes of the graphic.
- *Background colour*: colour or the axes of the graphic.
- *Period:* allows you to define the quantity and distribution of the information shown on the graphic. The possible values are 1 minute, 5 minutes, 10 minutes, 15 minutes, 20 minutes, 30 minutes, 1 hour, 1 day, 1 month or automatic.
- *Values*: only enabled if you choose the automatic period. Determines the number of variables to be displayed on the graphic.
- *View legends*: activate the option if you want to show the legend of the graphic.
- *Force Y axis maximum*: activate this if you want to force an (absolute) maximum value for the Y axis. The values that exceed this limit will not be displayed.
- *Force Y axis minimum*: activate this if you want to force an (absolute) minimum value for the Y axis. Values below this limit will not be displayed.

You can also configure the variables you want to show on the graphic. To do so, there is a list where you can add up to 8 variables.

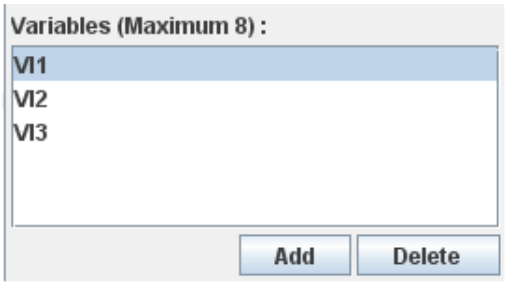


Figure 185: Variables list.

To add a variable, click on '**Add**'. To delete a variable, first select the variable from the list and then click on '**Delete**'.

Each variable on the list is shown with the typical identifier for that variable. You can configure each one by right clicking on the desired variable which will bring up a panel like this:

Figure 186: Variables configuration.

With these properties you can configure how each variable is illustrated.

- *Colour*: configure the colour of the variable.
- *Type*: you can select the type of graphic: bars, lines or points.
- *Line style*: this option is only enabled if you selected line graphic. the line configuration can be a solid, broken or dotted line, line-dot or line-dot-dot.
- *Point style*: only enabled for bar graphics. The permitted values are *dot, circle (5x5), square (5x5), diamond (5x5), X (5x5 o 3x3) or cross (5x5 or 3x3).*
- *Line width*: only enabled for line graphics. Allows you to define different line thicknesses.

5.3.1.2.8.2.- Events graphic

You can configure three different types of event graphics: historical, duration and **CBEMA/ITIC** curve type. When you add one of these types of graphics, you will see a preview in the editor which represents neither the values of the events to be obtained nor the exact form of the graphic once generated.

Use the block's panel of properties to configure this type of graphic. Note that the properties are divided into three different sections: **'General, 'Thresholds**" and '**Phases**'

Figure 187:Properties.

- **General:** eln this panel you can configure the general properties of an event graphic.ie
  - *Font*: typeface to be used in the graphics.
  - *Device selection*: select the device to be associated with the selected block (if you want to associate them). If you do not wish to associate them, disable the '**Device selection**' option.
  - *Representation:* allows you to configure the colour of the graphic's axes, the background colour and whether or not you want the legend to show.

Figure 188: Represtation

- *Properties:* allows you to configure the general parameters of the values to be represented such as forcing the maximum and minimum values of the Y axis (in absolute values). You can also configure whether or not the events should be compacted with a time hysteresis value expressed in milliseconds.

- **Thresholds**: allows you to configure event thresholds, i.e., which ones to show and which ones not to show, the value you want them to have and how you want them to be displayed.

- **Phases**: with this option you can configure which events to show depending on the phase in which they occur: phases 1, 2, 3 or three-phase. For each phase you can configure:

  - *Enable/disable phase*: show or hide the events of a phase.

  - *Point type:* type of dot used to represent the value of the event on the graphic.

  - *Dot colour*: colour to be used to represent the event.

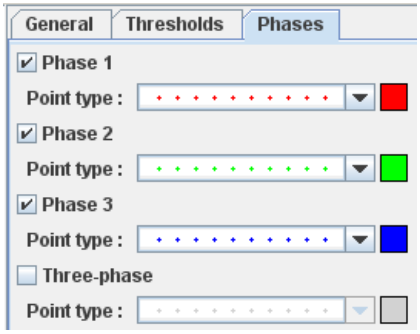


Figure 189: Phases: Dot color.

Keep the following definitions in mind when studying three-phase events:

- **Sag**: Temporary reduction in voltage that falls below a certain threshold. In a three-phase system, the sag begins when the voltage on at least one channel falls below the threshold and ends when the voltage of all channels measured is equal to or greater than the threshold.

- **Overvoltage**: Temporary increase in voltage above a certain threshold. In a three-phase system, the overvoltage begins when the voltage on at least one channel rises above the threshold and ends when the voltage of all channels measured is equal to or less than the threshold.

- **Interruption**: Voltage reduction that falls below a certain threshold. In a three-phase system, the interruption begins when the voltage on at least one channel falls below the threshold and ends when the voltage of one of the channels is equal to or greater than the threshold.

Event history graphics

Graphics of this type allow you to see the history of events recorded by a device during a specified period of time. This graphic uses dots to represent all of the events obtained, where each dot represents an event.

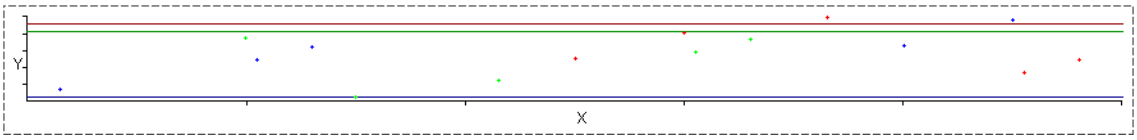


Figure 190: Event history graphics.

Event duration graphic

This type of graphic shows the events classified by duration. In this case you see the same set of configurable events as above, but this time with the events classified by the duration of the event and shown on the X axis.

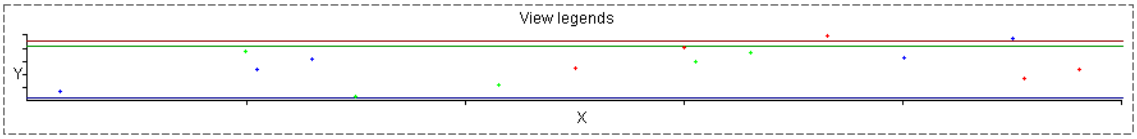


Figure 191: Event duration graphic.

The distribution is configured by the user and each one is shown on the graphic as a broken vertical line.

As in the case of logged event graphics, you can configure general, threshold and phase parameters. You can also configure the time intervals using the '**Intervals**' tab.

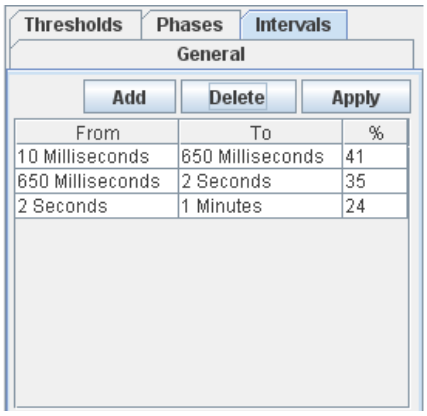


Figure 192: Intervals.

For each interval you can configure:

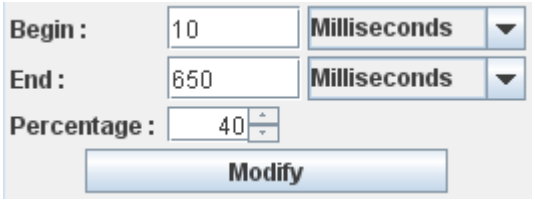


Figure 193: Interval parameters.

- **Begin**: initial duration of the interval.
- **End**: final duration of the interval.
- **Percentage**: percentage of the X axis occupied by the interval when displayed graphically.

The start and end duration values can be expressed in milliseconds, seconds, minutes, hours or days. The intervals must be consecutive and cannot overlap. For example, if you add an interval between 10

and 650 milliseconds, you will have to add another with a start value of at least 650 milliseconds, since the end value is not taken in the duration interval.

The percentages must add up to 100, although you can add any percentage value you want and when you accept the changes the application will recalculate each one with the correct relative value.

To modify the intervals, first click on '**Modify**' to add the changes to the table of intervals and then click on '**Apply**' to update the block data on the worksheet.

CBEMA/ITIC curve type graphic

This type of graphic is similar to the event duration graphic except that the X axis is a logarithmic scale. The time values are expressed in terms of duration in seconds on the X axis and used to configure the curve (**CBEMA/ITIC** or **SEMI F47**).

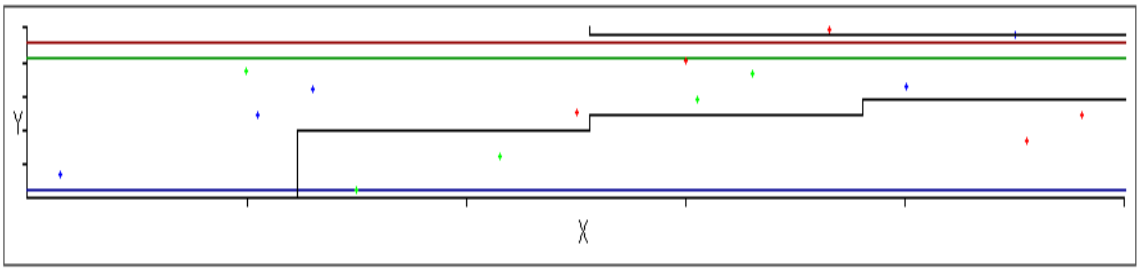


Figure 194: CBEMA/ITIC curve type graphic

The configuration of this graphic is very similar to that of the other event graphics, although here you can configure the type of curve used to compare the events and show the events that are inside the permitted area of the curve and/or those that are not.

5.3.1.2.9.- Table blocks

With table type blocks you can include lists with the values of the configured parameters in your reports. As with graphic blocks, in this case there are variable tables and event tables. The configuration of table blocks is similar to that of the graphic blocks.
All blocks of this kind have common table configuration parameters.

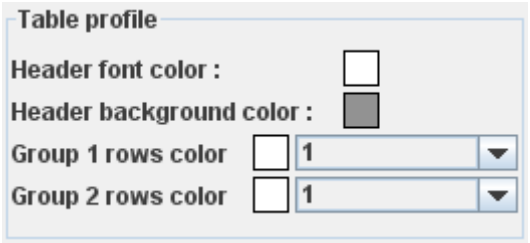


Figure 195: Table profiles.

- *Header font colour*: specifies the colour of the table's header text.
- *Header background colour*: specifies the background colour of the table's header.
- *Group 1 rows color*: specifies the colour of group 1 rows.
- *Group 2 rows color*: specifies the colour of group 2 rows.

To add this type of block, select the tables option for the toolbar and right click on a position in the

template worksheet. The same dialogue box as the one for the graphic blocks will appear; choose the type of table you want to add.

5.3.1.2.9.1.- Variable table

In this case you can include tables of the values of any variable available for the device in the report. The design sheet shows a fixed table which does not reflect what the table will actually look like when generated. This merely allows you to see that the block is a table and to quickly confirm which variables are configured.

Date	VI1	VI2	VI3
dd/mm/yyyy hh:mm:ss	???	???	???

Figure 196: Variable table.

For this type of table you can configure: the table text format, the general configuration of the table, the period values and the number of values to be shown if you select automatic period (see the section on the configuration of variable graphics). You can also choose up to 8 linked or free variables for each column of the table..

5.3.1.2.9.2.- Table of events

As with graphics, you can configure three different types of events tables: **CBEMA/ITIC type historical**, **duration and curve**. Remember that the tables you see in the design area do not show the actual values or events and will look different when the real table is generated.

Since many of the configuration parameters for event tables are similar to the ones for event graphics, in this section we will only describe the ones that are different.

All event tables share certain configuration properties including:

- *Source*: configuration of the table source format.
- *Select device*: allows you to select the device. You can add this information manually or use the assistant by clicking on "**Select**".

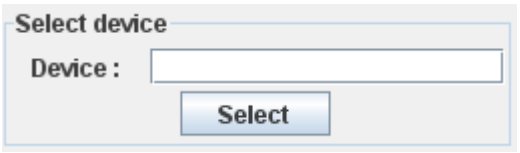


Figure 197: Device selection.

- *Table configuration*: common parameters defined at the beginning of the chapter.
- *Compact*: allows you to define event compacting.
- *Add durations*: shows the results as a sum of the durations.

Historical events table

This type of table shows the date of the events and the values of the configured phases.

Date	VI1	VI2	VI3
dd/mm/yyyy hh:mm:ss	???	???	???

Figure 198:Historical events table .

For this type of block you can configure:

- *General properties*: properties mentioned above.
- *Thresholds*: allows you to configure a filter for the thresholds and which thresholds to display.
    - *Filters*: allows you to determine the maximum filtering value for the values of a particular threshold. For example, if the devices returns sag values between 80% and 90% and you only want to see events of this kind under 85%, configure the filter as follows:

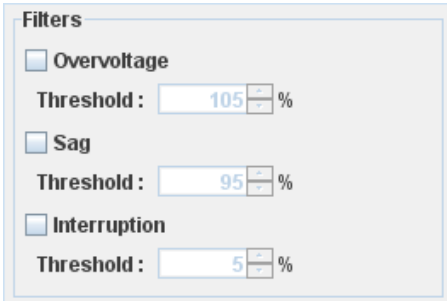


Figure 199: Filter.

    - *See threshold*: you can configure the values to be shown on the table filtered by the pertinent threshold. For example, if you do want to see overvoltage events, disable the option:

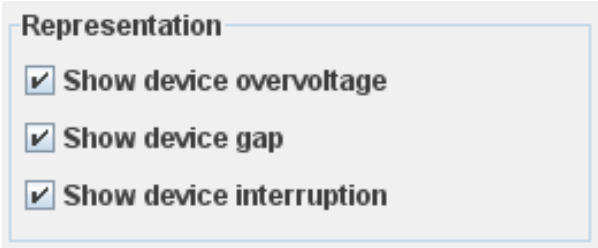


Figure 200: Representación.

    - Phases: you can select the phases to be shown on the table, which may be phases 1, 2, 3 or three-phase.

Event duration table

With this table you can see the number of events in each configured interval and the percentage of nominal voltage of each one.

Time interval	(0 ms, 1 ms)	(1 s, 10 s)	(10 s, 1 h)
(0%,5%)	L1,L2,L3	L1,L2,L3	L1,L2,L3
(5%,95%)	L1,L2,L3	L1,L2,L3	L1,L2,L3
(105%,150%)	L1,L2,L3	L1,L2,L3	L1,L2,L3

Figure 201: Event duration table.

For this block you can configure:

- *General table properties*: text format, device selection, table configuration parameters and event compacting.
- *Thresholds*: this option allows you to configure the list of threshold intervals to be shown on the table.
- *Phases*: here you can indicate if you want to show the sum of the event durations and if you want to show the events in single-phase or in three-phase format.
- *Intervals*: allows you to configure the duration intervals the same way as for event duration graphics.

To add a threshold to a list of thresholds, just click on '**Add**' and complete the '**Start**' and '**End**' fields. Remember that the Start value must be lower than the End value. To delete threshold intervals, select a row on the table and click '**Delete**'. To apply the changes, click '**Apply**'; otherwise, the changes will not be applied to the worksheet.

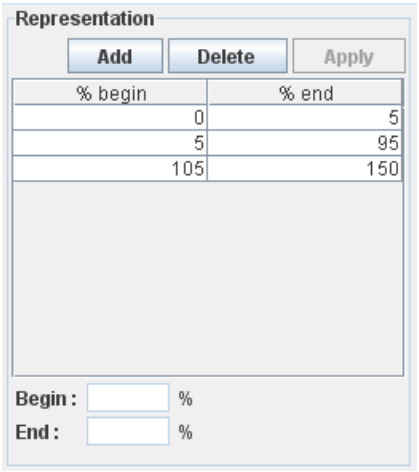


Figure 202: Event duration table: Configuration.

CBEMA/ITIC curve type table

This type of table offers a summary of events falling inside and/or outside of the tolerance limits of the selected curve. The configure of this type of table is very similar to the configuration of an events table, except that here you can configure the type of curve to be applied (**CBEMA/ITIC or SEMI F47**).

Curve	Correct events	Incorrect events
ITIC/CBEMA	L1,L2,L3	L1,L2,L3

Figure 203: CBEMA/ITIC curve type table

5.3.1.2.10.- Page break block

With this type of block you can easily see where the page breaks are on the report template. Remember that these page breaks are forced by the user, i.e., when the report is run the application will automatically generate all of the pages needed to show the data. These blocks are used to force page breaks in the specified locations only.

Figure 204: page breal block.

When you add a page break block to a template, if the properties are enabled the application assumes that the properties configured for the block are to be applied starting at that point. If the page properties have been configured in the application's properties manager and you want to apply different page properties to a certain interval, you will have to add two page breaks: in the first enable the configuration required and in the second disable it (or configure a new one) so that starting at that point the page properties will change.

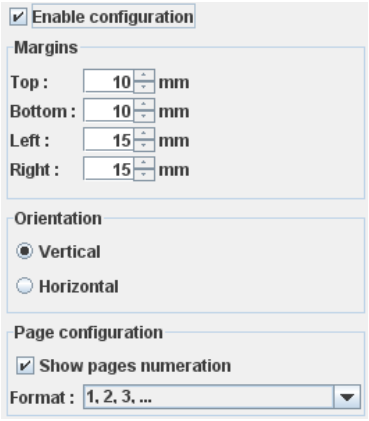


Figure 205:page breal block: Configuration

With this block you can configure the page parameters in the same way as the general parameters from the application's properties manager.

- *Enable configuration*: enables or disables the page configuration for the block. Remember that the configuration applies from the current block position to the next one.
- *Margins*: margin size in millimetres.
- *Orientation*: page layout. Select vertical for portrait mode or horizontal for landscape.
- *Show page numeration*: enable or disable display of page numbering.
- *Format*: page numbering format. You can choose just the page number or the page number along with the total number of pages (e.g. "5 / 10" means page 5 out of a total of 10).

5.3.2.- REPORT GENERATION

In this section we will describe the two main windows involved in the report generation process: the **progress dialogue box** and the **report dialogue box**.

5.3.2.1.- Progress dialogue box

Once you have completed the template you can generate a report on the specified device and time interval.
When you generate a report, the first thing you will see is the progress window informing you of the progress in gathering the report data.

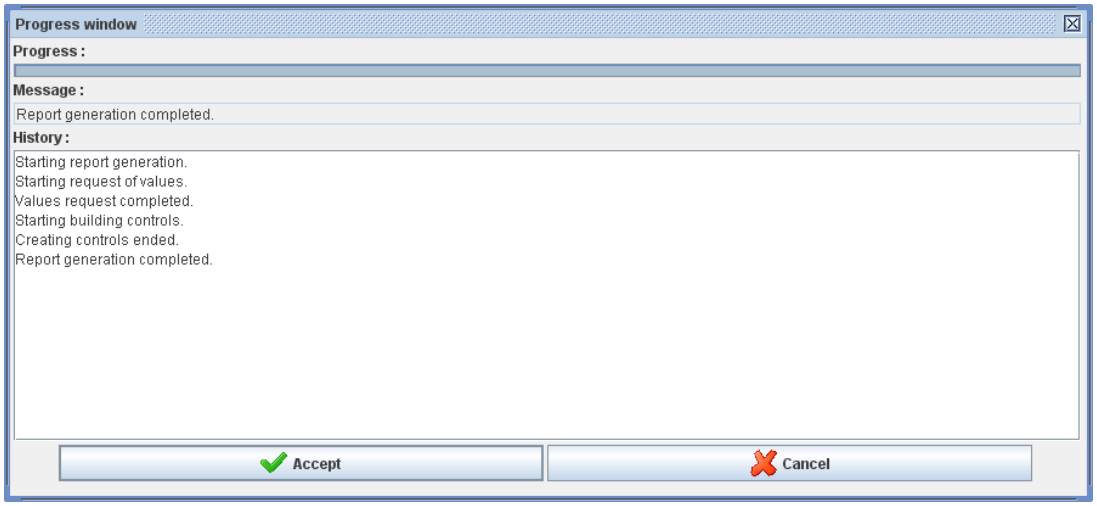


Figure 206: Progress dialogue box.

This screen shows a progress bar, a text box showing a message explaining the actions being performed and another text box showing previous messages.

At the end of the progress bar the '**Accept**' button will be enabled. Click to access the report window. If you want to cancel the report generation process, click on '**Cancel**'.

5.3.2.1.1.- Description of messages in progress window

The report generation process is divided into two clearly differentiated phases: **data collection** and **report generation**. In the first phase, the application connects with all of the devices configured in the template and retrieves the data for the specified block type. In the second phase, the application builds the final report based on the template and the recovered data.

The most common messages that can appear in the progress dialogue box are discussed below:

- '*Initialising report generation*
- '*Initialising request for values*': Start of the communications and value request phase.
- '*Request for values completed*': End of the communications and value request phase.
- '*Initialising creation of controls*': start of the report creation phase.
- '*Creation of controls completed*': end of the report creation phase.
- '*Report generation completed*': indicates that the report has been generated.

If you have added blocks that require a request for values such as blocks of variables, events, graphics, tables or standards, a specific message will appear informing you of the status of the request for the specific value.

There is a common pattern to these types of messages:

If the message is a warning or error, the string '**[ERROR]**' will appear at the beginning of the message.

If the block is a table or graphic of events, the requested device will also appear. Finally, a message will appear showing the results of the request.

A table will then appear showing the most important messages associated with collecting the data for the report generation process:

Table 3: Messages in report generation process.

Message	Block type	Description
No value obtained for the variable DD.VV	Variable	The identifier is not known. DD would be the identifier of the device and VV the identifier of the variable (e.g., QNA412.VI1)
Error analysing the expression of the variable	Variable	The expression entered in the variable block is not correct.
Value of the DD.VV variable recovered successfully.	Variable	The value of the variable was recovered successfully.
No event values were obtained.	Events	No values could be obtained either because of communication problems with the device or because the device contained no event information.
Event values recovered successfully.	Events	Could not connect with device to recover event values..
No values obtained for the events table.	Event tables	No event values were obtained.
Event table recovered successfully.	Event tables	Values obtained correctly.
No event graphic obtained.	Event graphic	No event values were obtained.
Event graphic recovered successfully.	Event graphic	Values obtained correctly.
No values obtained for the variable table.	Variables tables, standard	Values were not obtained for all tables or there was a request error.
Variables table recovered successfully.	Variables tables, standard	Values obtained correctly.
No values obtained for graphic.	Variables graphic	Values were not obtained for all tables or there was a request error.
Values for graphic recovered successfully.	Variables graphic	Values obtained correctly.
Internal application error.	All.	Usually appears when there is a problem generating the template blocks. Can also be caused by an unexpected internal error in the application.
Could not communicate with the device.	Variables, events, tables, graphics, standards.	The requested value cannot be recovered, e.g. the device is not available.

It is important to note that the time needed to generate a report can vary considerably depending on the data to be processed and the period of time selected. The table or graphic blocks and particularly the standard blocks in the advanced option are the blocks that can slow the application down the most when generating reports.

5.3.2.2.- Report dialogue box

One the application has finished generating the report, click '**OK**' on the progress dialogue bar to see the report screen.
Click on the '**Options**' menu for a dropdown sub-menu which contains the options '**Print**' and '**Export**'.

These tools are explained below.

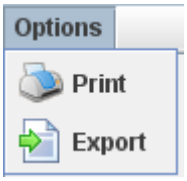


Figure 207: Options menu.

To change the page, click '**Pages**' on the toolbar at the bottom of the screen. Select the page you want to go to and click the corresponding option. The entry with a '**dot**' beside it represents the active page.

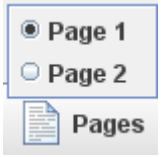


Figure 208: Pages.

You can also enlarge the report by clicking on '**Zoom**'. Select the desired option; the zoom is 100% by default

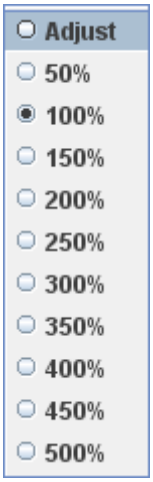


Figure 209: Zoom.

Some of the details that should be considering when generating reports are explained below.

✓ **Variable**

If you add a variable block and the application cannot obtain the value, the corresponding value will not be generated in the report. Likewise, if the expression is configured incorrectly, no value will be shown for that block.

✓ **Events**

If you add an event type block and the application cannot find a value for that block, the value associated with that block will not appear in the report.

✓ **Graphics**

Two examples of the same graphic, configured differently, are shown below. The first block was configured with the default parameters with the three voltage variables selected. The second one has the graphic's text and properties configured.

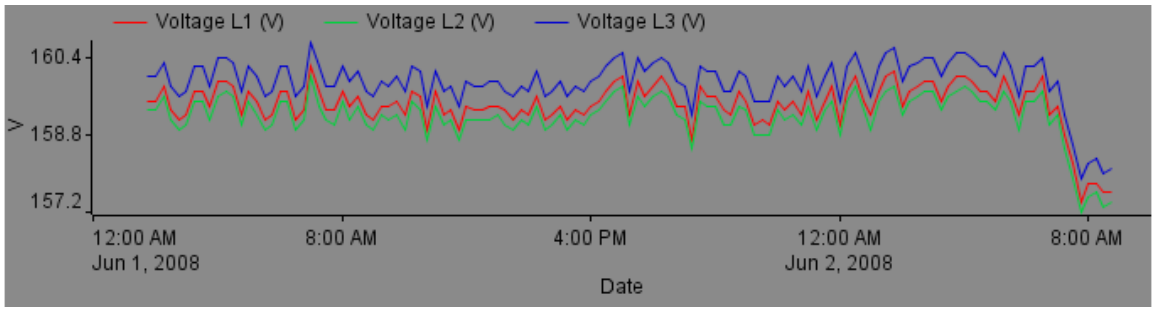


Figure 210: Graphics: default parameters.

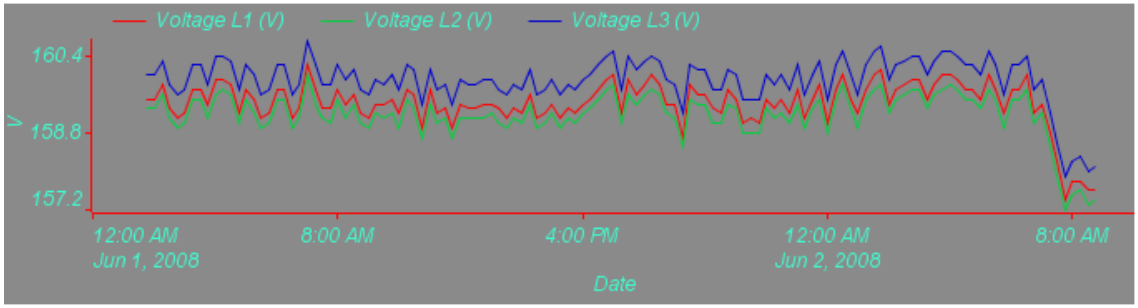


Figure 211: Graphics: properties configured.

Remember that if you add a graphic block template (of variables or events) and those values are not found when the report is generated, the graphic will be empty.

✓ Tables

Below is an example of a table block with configured variables. Note that the names of the variables appear in each column of the table header. It is also important to note that the date format cannot be configured since this is determined by the application automatically.

Date	Voltage L1	Voltage L2	Voltage L3
Sunday 01 23:30:00	159.5	159.3	160.0
Sunday 01 23:45:00	159.8	159.5	160.3
Monday 02 00:00:00	159.0	158.8	159.5
Monday 02 00:15:00	159.7	159.5	160.2
Monday 02 00:30:00	160.0	159.8	160.5
Monday 02 00:45:00	159.5	159.3	160.0
Monday 02 01:00:00	159.2	158.9	159.6
Monday 02 01:15:00	159.7	159.5	160.2
Monday 02 01:30:00	160.0	159.7	160.5
Monday 02 01:45:00	160.1	159.8	160.6
Monday 02 02:00:00	159.4	159.2	159.9
Monday 02 02:15:00	159.7	159.5	160.2
Monday 02 02:30:00	159.8	159.6	160.3
Monday 02 02:45:00	159.9	159.7	160.4
Monday 02 03:00:00	159.9	159.7	160.4
Monday 02 03:15:00	159.5	159.3	160.0
Monday 02 03:30:00	159.8	159.6	160.3
Monday 02 03:45:00	160.0	159.7	160.5
Monday 02 04:00:00	160.0	159.8	160.5
Monday 02 04:15:00	159.9	159.7	160.4
Monday 02 04:30:00	159.7	159.5	160.2
Monday 02 04:45:00	159.7	159.5	160.2
Monday 02 05:00:00	159.5	159.3	160.0

Figure 212: Tables.

If you generate a historical events type table you will see that for each cell containing a value there is an icon showing the type of event. For overvoltage events, the icon is ⬆, for sags, %⬇ and for interruptions ⬇.

Fecha	Eventos-Histórico L1	Eventos-Histórico L2	Eventos-Histórico L3
17/08/01 2:02:59.490		109,48 (1h 800 ms - V...	
17/08/01 2:14:45.820	85,60 (7' 15" 930 ms - ...		
17/08/01 2:22:03.010	86,18 (1' 21" 140 ms - ...		
17/08/01 2:23:24.600	86,52 (1' 6" 140 ms - V...		
17/08/01 2:24:31.730	86,67 (4' 15" 110 ms - ...		
17/08/01 2:28:46.850	86,93 (29" 690 ms - V...		
17/08/01 2:29:16.550	86,80 (9" 950 ms - Vm ...		

Figure 213: Historic tablet.

The maximum or minimum value of the event (depending on the type of event), the average value of the event (Vm) and the value prior to the event will be included in the columns for each phase. All these values will be expressed as a percentage of the nominal voltage.

The maximum, minimum and prior values are RMS values over one cycle updated every semi-cycle ($U_{RMS1/2}$)

Maximum value: $U_{RMS1/2}$ maximum during the entire event.

Minimum value: $U_{RMS1/2}$ minimum during the entire event.

Note: *In the event is a gap, the significant value will be the minimum. In the event that it is an over-voltage, the significant value will be the maximum.*

Prior value: $U_{RMS1/2}$ of the cycle before the one that caused the event.

Average value: $U_{RMS1/2}$ average during the event.

Note in the example above that there are cells in which the values are cut off. We recommend that pages containing these types of tables be configured in landscape mode which provides much greater width for displaying the data. Remember that you must use the page break block to configure individual pages.

If you are trying to generate a report with tables (variables or events) and the application cannot find any values for the tables, the tables will not appear in the report. Likewise, if you add an event duration table and it is not properly configured, the table will not appear.

✓ Standard

If you generate a report with a basic standards block, you will see examples of the text configured for correct and incorrect results. If the application cannot find any values to apply the standard filter, the configured value will appear in the report for the incorrect result.

The parameter type standards block appears with the parameters configured for the table and the variables to which the filter has been applied.

Parameters	Voltage L1	Voltage L2	Voltage L3
Base value	230	230	230
% values OK	95	95	95
% maximum relative to OK	10	10	10
% minimum relative to OK	10	10	10
Mark registers with events	Disable	Disable	Disable

Figure 214: Standard.

In an average type standards block, the values relative to the filter (if configured) and the results bar would be displayed.

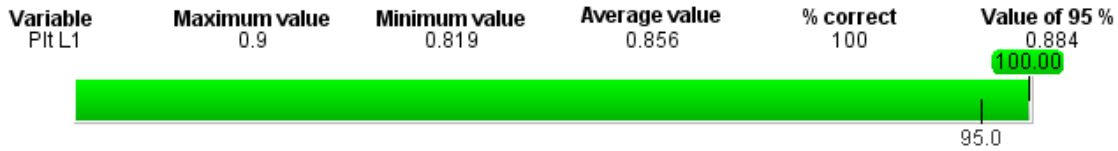


Figure 215: result bar.

The value of all values that have passed through the standards filter are shown at the top of the results bar. The maximum limit is shown at the bottom of the results bar.

If the filter was configured more restrictively, the colour of the bar changes as the level of correct values compared to the permissible limit varies.

Figure 216: Result bar example.

By default, advanced type standards blocks are generated as normal tables but with each type of individual result represented differently:

- Correct values are shown in the configured colour.
- Incorrect values are shown in red.
- Marked values are shown in orange (if configured).

The colours for incorrect or marked values cannot be configured.

16/05/08 18:00:15.000	234,00	235,00	235,00
16/05/08 18:15:00.000	235,00	236,00	236,00
16/05/08 18:30:00.000	234,00	235,00	235,00
16/05/08 18:45:00.000	233,00	235,00	234,00
16/05/08 19:00:00.000	232,00	233,00	233,00
16/05/08 19:15:00.000	232,00	233,00	233,00
16/05/08 19:30:00.000	231,00	233,00	233,00
16/05/08 19:45:00.000	233,00	234,00	234,00
16/05/08 20:00:00.000	233,00	235,00	234,00

Figure 217: Standard block

Finally, note that if you generate a report with average or advanced type blocks and the application cannot find values to apply to the filter, those blocks will not appear in the report.

5.3.3.- PRINT AND EXPORT REPORTS

5.3.3.1.- PRINTING

To print a report, click on '**Print**' in the '**Options**' menu of the report dialogue box.
A dialogue box will then open informing you that the application is retrieving the information needed to print the report.

Figure 218: Printing: collecting report pages.

A message will then appear informing you that the retrieval process has concluded, followed by the appearances of the printing dialogue boxes.

Figure 219: Printing: pages collected correctly.

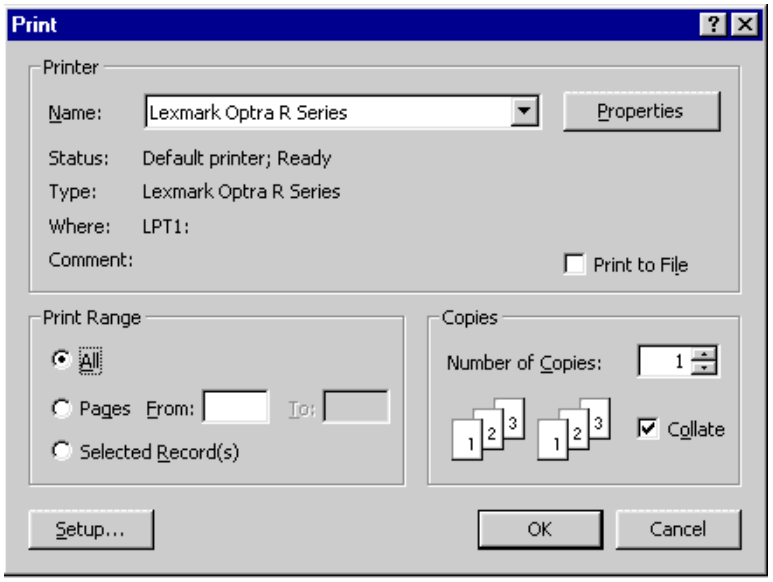


Figure 220: Print configuration.

Configure printing properties and click OK. The message in the application dialogue box will change, telling you that the report is printing.

Figure 221: Printing: printing report.

The process concludes when the dialogue box is hidden and the printing begins.

5.3.3.1.- Exporting

The exporting of reports basically consists of translating all of the data related to the blocks containing numeric information into an external file. The file format is **CVS**, i.e., an EXCEL file where the data are separated by semicolons ";". The application has no export properties.

To export a report, select '**Export'** from the '**Options**' menu. A system dialogue box will appear where you can select the files. Select a location for the file to be exported, give the file a name and hit OK. The exportation is complete when the application's progress dialogue box disappears.

Remember that the exported **CSV** file may not be identical to the report you generated. This is because the text blocks, grids, images or page breaks may not be preserved when the file is exported.

6.- FILES

6.1.- INTRODUCTION

To maintain compatibility with earlier versions of **PowerVision**, the **PowerVision Plus** application maintains the data file handling features of the different devices.

PowerVision Plus allows you open the following file types:

- **A5M**: standard AR5 file.
- **A5I**: harmonics file.
- **A5D**: Disturbances file.
- **A5F**: Flicker file.
- **H24**: Daily harmonics file.
- **STD**: General standard file.
- **EVE**: Events file.
- **EVA**: Extended events file.
- **EVQ**: Quality events file.
- **WAT**: Energy file.
- **COMTRADE**[(1)]: Transients file.

[(1)]**COMTRADE** (IEEE C37.111) files have the information of the transients recorded by the power quality analyzer **QNA500**. This standard structures the data in 2 different files (file **.CFG** which has the data structure and header; and **.DAT** file which has the data of each transient. **Power Vision Plus** requires both files to get all the data, but to search this files only use the extension **.CFG**. To avoid when you want to open this type of files, **.CFG** and **.DAT** files must be in the same path and must have the same name. In that way, **PowerVision Plus** compact these 2 files in 1 and add it to its internal data base. From this moment, user has available this file in the tree menu that appears on the left side of the application.

As already mentioned in previous sections, the main view of the application contains a device configuration tree that will help you to keep all of your work elements in order. These work elements can be both devices and files.
By default, the tree contains a "**Files**" node where you can keep a list of the files added to the application.

Figure 222:Device tree with files node selected

When you add a file, it appears as a child file of the "**Files**" node. All file elements are represented by the icon .

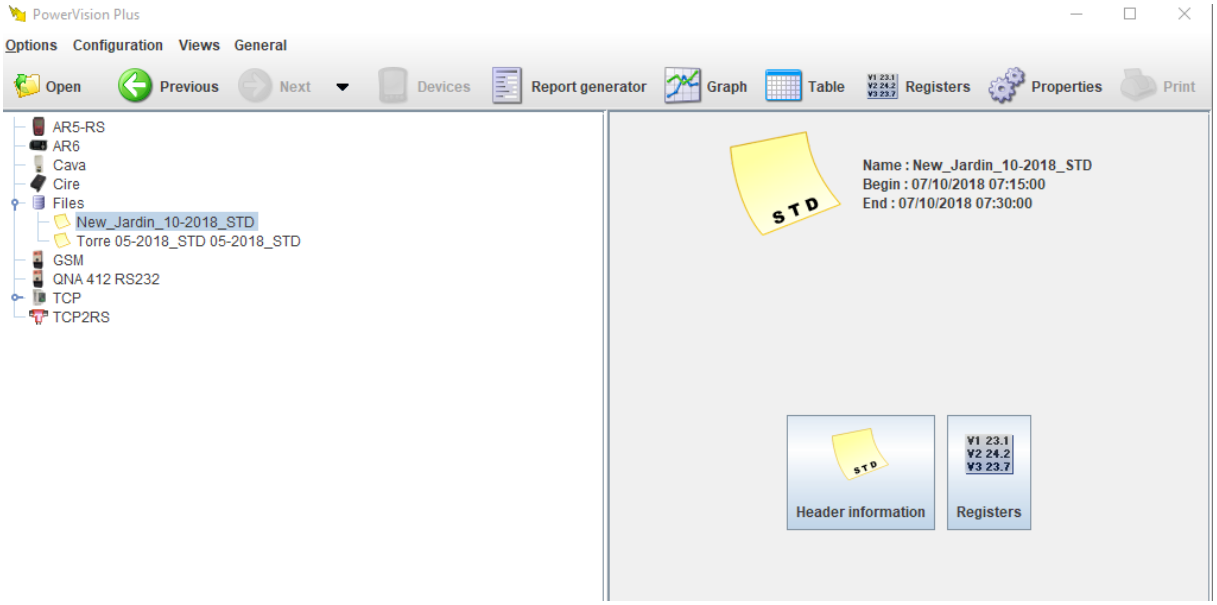
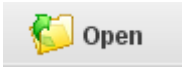


Figure 223: File add

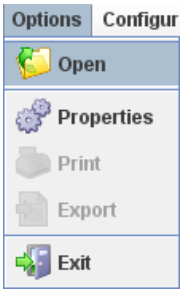
6.2.- OPEN A FILE

There are two ways to open a file in **PowerVision Plus**:

- Select the "**Open**" option on the toolbar.



- Select "**Open**" on the "**Options**" sub-menu of the main menu.



When you click on one of the two options, a dialogue box opens where you can select the files you want to add.

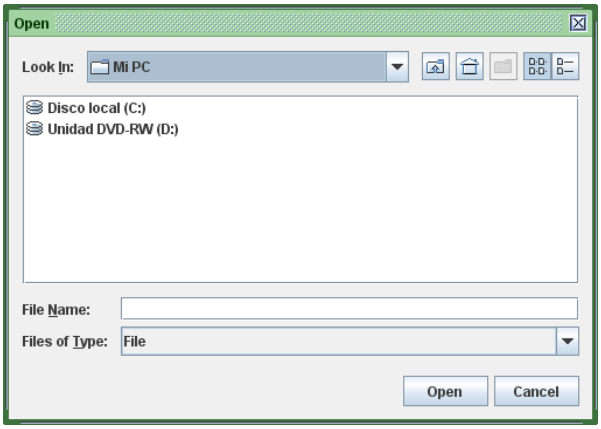


Figure 224:Dialogue box for opening a file

Select the file or files you want to open by first clicking on the desired directory and then the file(s). Remember that to select more than one file you will need to press the CTRL or CAPS key while making your selection with the mouse.

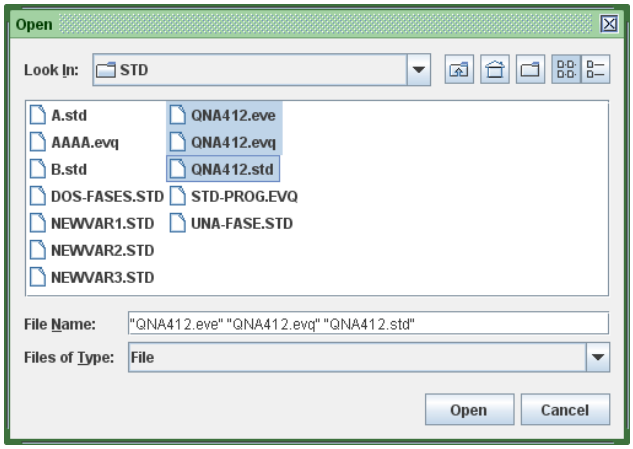


Figure 225:Multiple file selection

Once you have selected the file or files you want to open, click on "**Open**". If you do not want to select a file, click on "**Cancel**".

The next time the dialogue box for opening files appears, it will show the last directory accessed.

After you click on "**Open**", the application is ready to add the file to the database. To keep you informed of what the application is doing at all times, there is a dialogue box that shows the status.

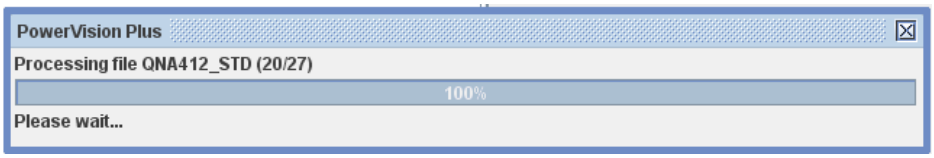
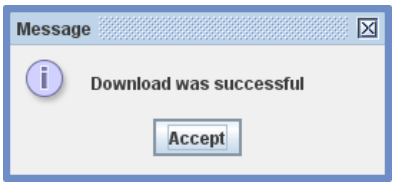


Figure 226: Progressing dialogue.

When the process is complete, a message will appear telling you that no errors were encountered when adding the file or files.



Wait for the application to load the data. At this point you should see the file added to the device tree as a subnode of the "**Files**" node. This node is selected by default.

Note, that when you add a file, the application names the new node with the name of the added file plus the character "_" and the file type. For example, if you were to upload a file called "**QNA.STD**", the name of the node created would be "**QNA_STD**". Check the introduction section for information on the types of files that are supported.

If the file has already been added, the application will show you a message telling you this:

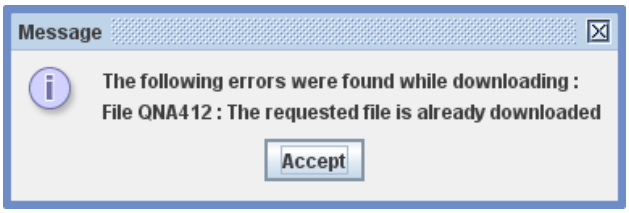


Figure 227: Error message.

If the application finds an error in the files to be added or the file has no records, a message such as the one below will appear with a brief description of the error:

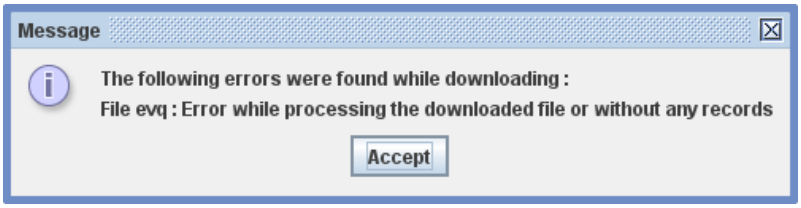


Figure 228: Error message.

In that case, the software will attempt to open the file anyway so you can check the data in the file header or records that are not corrupt.

Additionally, to open files more quickly, allowing the user to drag files from the desktop to the application. Simply hold open selected files and drag them anywhere on the main application window.

Also lets you open files by double clicking on the file to open. Note that the file has to be associated with the application. See your operating system manual for more information about associating files to a program.

6.3.- TIME ZONE SELECTION

The different files supported by **PowerVision Plus** are originally configured with local time (LTC) or universal time formats (UTC), since some units work with these formats. **PowerVision Plus** works with UTC dates.

When opening files in LTC format, a dialogue box will be displayed to request the time zone to which you wish to convert the file record dates.

Figure 229:Time zone selection dialog

The following properties can be selected on this dialogue box:

- Time zone: select the time zone with which the file records were saved. Your local time zone dates will be shown when the file is added to the application.

- Show time zone selection dialogue : enable or disable this option if you wish the application to show the dialogue box again or not. If you disable this option, the application will remember the last selected time zone and automatically apply it to the next files opened with dates in LTC format.

In addition, you can enable or disable the "**Show time zone selection**" option from the General menu to show or hide the time zone selection dialogue box.

Figure 230: Show time zone selection dialogue.

The time zone conversion function will also be applied to some devices working with file download functions, such as **AR6** or **CIRe3**.

6.4.- MODIFY OR DELETE FILES

You can change the names of the files added in **PowerVision Plus** or delete them.

To change the name of a file node, select it and choose the "**Modify"** option from the "**Configuration**" menu; alternatively, you can right click on the file node and select Modify from the pop-up window. The following dialogue box will appear:

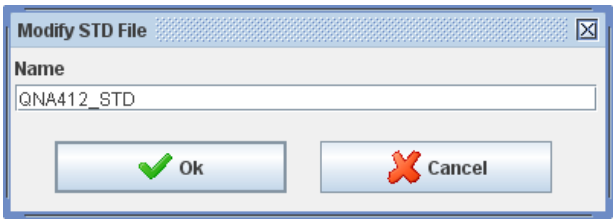
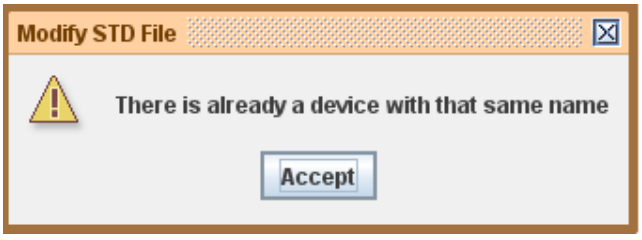


Figure 231: Modify STD files.

In this dialogue box you can change the name of the file node. Remember that the name must be unique to the entire application, i.e., may not be the same as any other node on the device tree.
If you enter a name that is already taken, the following message will appear:



To delete a file, select the file node or nodes you want to delete and select "**Delete**" under "**Configuration**" on the main menu; alternatively, right click on the node you want to delete on the pop-up window. You can also delete a node by selecting the node and clicking "**Delete**".

The application will ask you for confirmation before deleting the selected node(s). To continue with the deletion, click "**Yes**"; otherwise, click "**No**" or hit "***Escape***".

6.5.- FILE HEADER TABLE

On the file header table you can see the general file parameters such as the number of records, the number of variables, transformation ratios, etc.
To access this table, select the node of the file you want to view. When you select the node from the device tree, the properties are activated on the right panel.

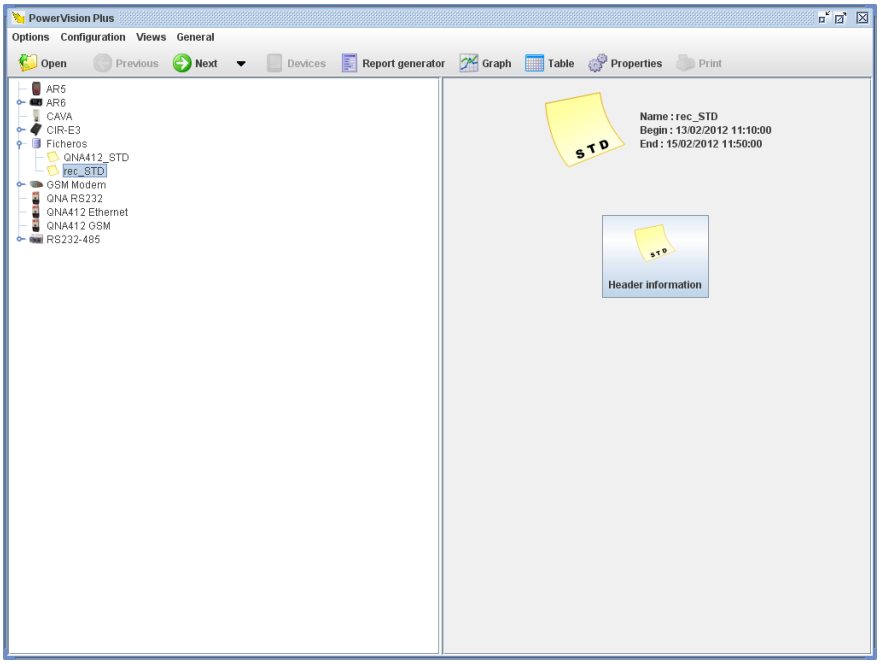
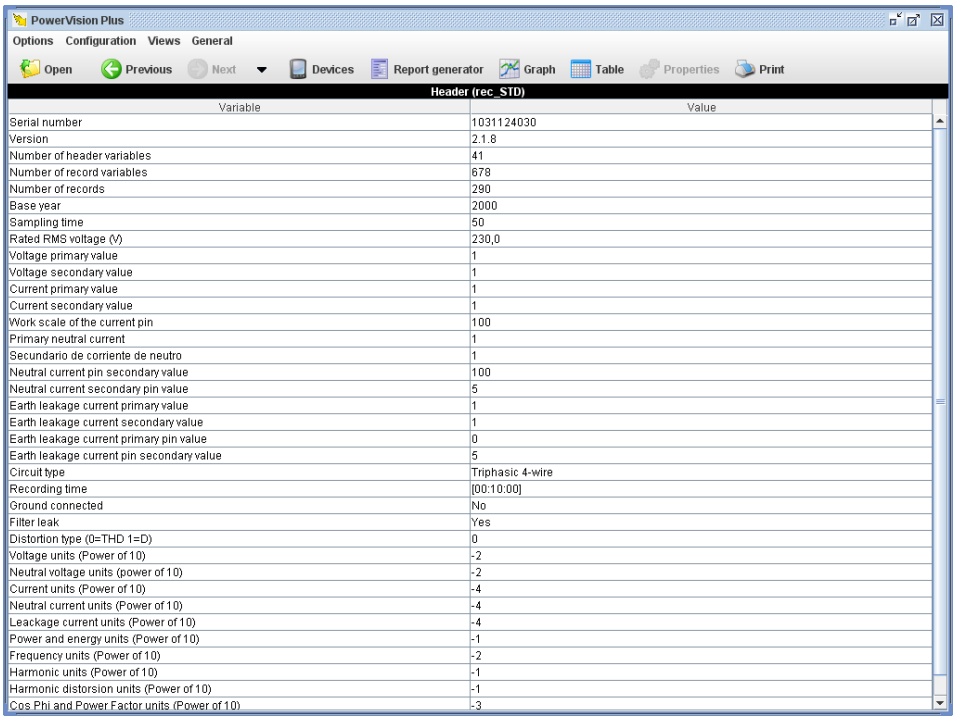


Figure 232: Access to file header table.

To access the file header table, click on "**Header information**" on the right panel.
The table will appear with the header information for that file.



Variable	Value
Serial number	1031124030
Version	2.1.8
Number of header variables	41
Number of record variables	678
Number of records	290
Base year	2000
Sampling time	50
Rated RMS voltage (V)	230,0
Voltage primary value	1
Voltage secondary value	1
Current primary value	1
Current secondary value	1
Work scale of the current pin	100
Primary neutral current	1
Secundario de corriente de neutro	1
Neutral current pin secondary value	100
Neutral current secondary pin value	5
Earth leakage current primary value	1
Earth leakage current secondary value	1
Earth leakage current primary pin value	0
Earth leakage current pin secondary value	5
Circuit type	Triphasic 4-wire
Recording time	[00:10:00]
Ground connected	No
Filter leak	Yes
Distortion type (0=THD 1=D)	0
Voltage units (Power of 10)	-2
Neutral voltage units (power of 10)	-2
Current units (Power of 10)	-4
Neutral current units (Power of 10)	-4
Leackage current units (Power of 10)	-4
Power and energy units (Power of 10)	-1
Frequency units (Power of 10)	-2
Harmonic units (Power of 10)	-1
Harmonic distorsion units (Power of 10)	-1
Cos Phi and Power Factor units (Power of 10)	-3

Figure 233:Header table of an STD file

6.6.- HOW TO CREATE TABLES OR GRAPHICS

You can create graphics or tables to analyse file data.
If you want to create a table or graphic for a specific file, click on "**Table**" or "**Graphic**" on the toolbar. A dialogue box will appear with the available devices and files.

You can also create a table or graphic by selecting the corresponding node on the device tree and clicking on "**Table**" or "**Graphic**" on the toolbar.
For more information on how to view tables or graphics, see chapter ***"7.- GRAPHIC, TABLES AND REGISTERS"***

6.7.- VIRTUAL VARIABLES

The **PowerVision Plus** software can calculate a set of electrical variables (of voltage and current and in each phase) based on files that only contain wave shapes:

✓ **Harmonics:**

Table 4: Voltage harmonics.

	Voltage harmonics					
	L1		L2		L3	
	x:1..15	x:16..50	x:1..15	x:16..50	x:1..15	x:16..50
	ARMxV1		ARMxV2		ARMxV3	
FILE	X	X	X	X	X	X

Table 5: Current harmonics.

	Current harmonics								
	L1			L2			L3		
	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50
	ARMxA1			ARMxA2			ARMxA3		
FILE	X	X	X	X	X	X	X	X	X

✓ Fundamental component:

Table 6: Voltage fundamental

	Voltage fundamental					
	L1		L2		L3	
	x:1..15	x:16..50	x:1..15	x:16..50	x:1..15	x:16..50
FICHERO	X	X	X	X	X	X

Table 7: Current fundamental

	Current fundamental								
	L1			L2			L3		
	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50
FILE	X	X	X	X	X	X	X	X	X

✓ RMS:

Table 8:Voltage RMS.

	Voltage RMS					
	Instantaneous					
	L1		L2		L3	
	x:1..15	x:16..50	x:1..15	x:16..50	x:1..15	x:16..50
	RMSxV1		RMSxV2		RMSxV3	
FILE	X	X	X	X	X	X

Table 9:Current RMS.

	Current RMS								
	Instantaneous								
	L1			L2			L3		
	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50
	RMSxA1			RMSxA2			RMSxA3		
FILE	X	X	X	X	X	X	X	X	X

✓THD harmonic distortion:

Table 10: Voltage distortion.

	Voltage distortion					
	Instantaneous					
	L1		L2		L3	
	x:1..15	x:16..50	x:1..15	x:16..50	x:1..15	x:16..50
FILE	X	X	X	X	X	X

Table 11: Current distortion.

	Current distortion					
	Instantaneous					
	L1		L2		L3	
	x:1..15	x:16..50	x:1..15	x:16..50	x:1..15	x:16..50
FILE	X	X	X	X	X	X

7.- GRAPHIC, TABLES AND REGISTERS

7.1.- CREATE A GRAPHIC

One of the most powerful tools **PowerVision Plus** offers is the possibility of creating graphics from the variables of the devices (tendencies). To access this view, you can choose the "**Views**" menu option, then "**Study**" and finally "**Graphic**" or click on the "**Graphic**" button directly on the toolbar.

Typically, in order to create a graphic you will need to choose which variables pertaining to which devices will be part of the graphic. When you choose the "**Graphic**" option, whether from the main menu or from the toolbar, a dialogue box will appear where you can select the device and the variables that you want to be part of the graphic.

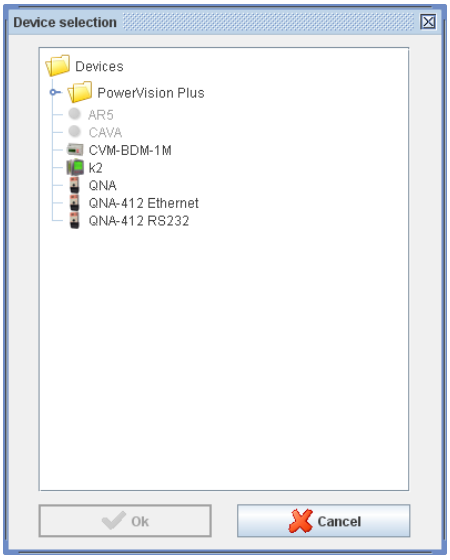


Figure 234:Device selection dialogue box

Despite the fact that to begin with you can only choose variables from a single device to create the graphic, you will later be able to add the variables of other devices to the graphic (this will be explained below). If you choose the "**Graphic**" option while in device monitoring view, the application interprets this to mean that you want to create a graphic for the device you are viewing and will skip the previous screen. Depending on the device chosen, a screen will appear for selecting the graphic type.

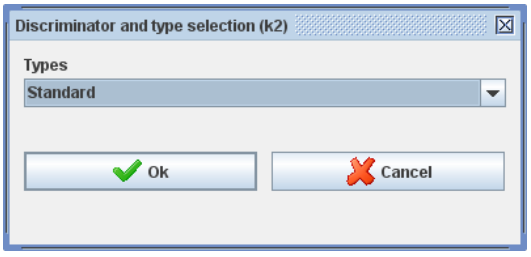


Figure 235:Graphic type selection dialogue box

Once you select the graphic type, a variable selection screen will appear.

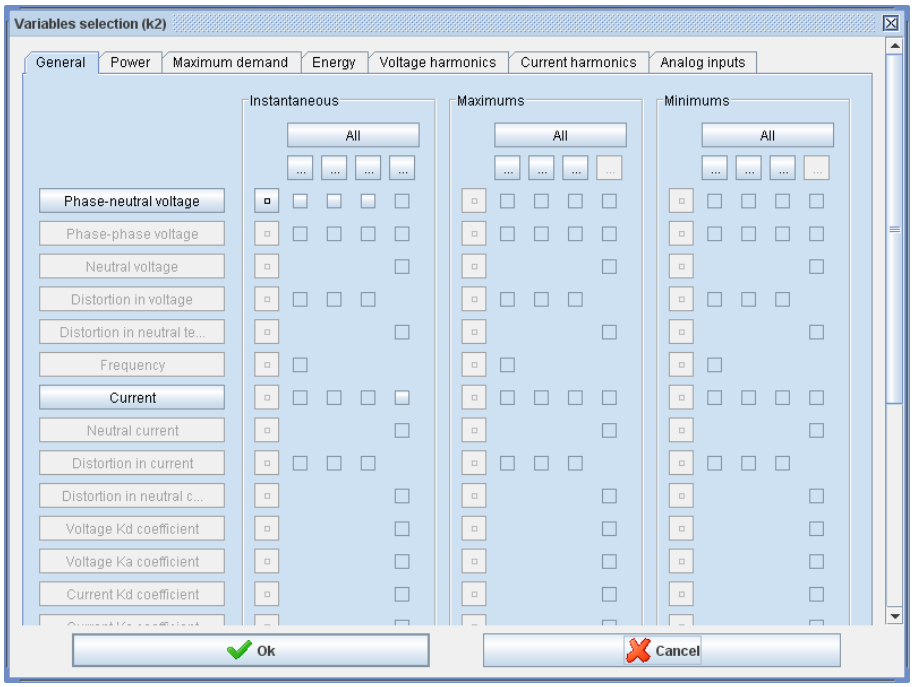


Figure 236:Variable selection dialogue box for creating a standard graphic for an Ethernet CVM-K2 device

Here you can choose the variables you want to be included on the graphic. The appearance of this screen depends on the device and graphic type.

If you select a non-standard graphic type, e.g., a harmonics graphic, the variable selection screen will look like this:

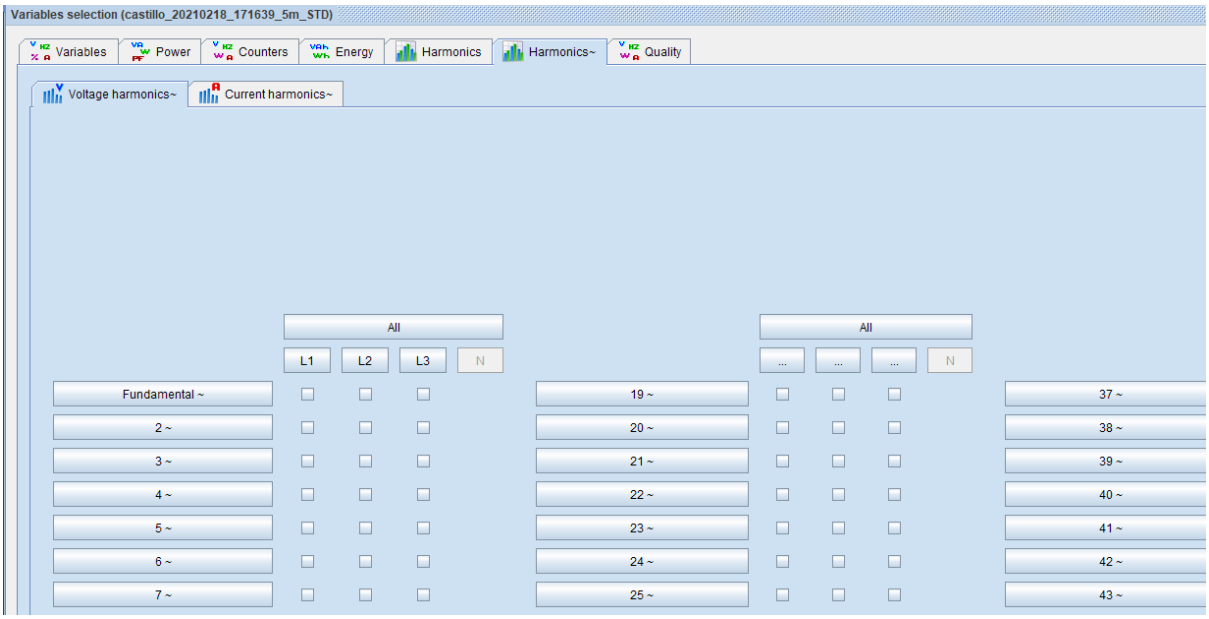


Figure 237:Harmonics variable selection dialogue box

In the **Harmonics** section, the harmonics calculated by the analyzer (average of all the registration period) are selected.

In the **Harmonics ~** section, the harmonics calculated by the **PowerVision Plus** (average of the last cycle of the last recorded second) are selected.

Note: *These values has not to coincide, unless it is a very stable installation in time as far as harmonics are concerned.*

Note: *Always is more accurate the measure done by the analyzer than the measure done by the* ***PowerVision Plus*** *because it has more data to do the average.*

Finally, once you have selected the variables you want to view, a view of the graphic will be displayed with the variables in question. The system automatically chooses the representation period and the grouping of data, which can obviously be changed later.

The meaning of both concepts and how they can be modified will be explained below.

It should be noted that the grouping chosen is a week and the period is typically 30 minutes.
Likewise, you can choose certain default representation types (lines, bars, etc.), colours and distribution of variables on axes and areas based on the variables represented.

All these features can be modified later. A description of what they mean and how they are modified will be explained later.

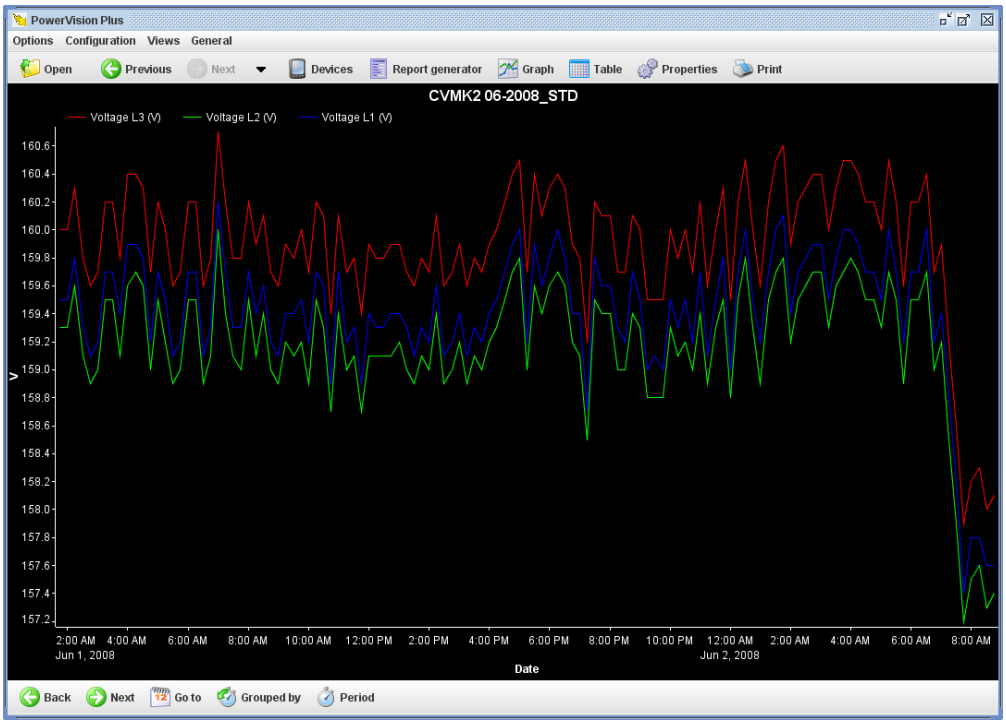


Figure 238:Standard variable graphic

As can be seen a typical graphic consists of a series of common features:

- **Title**: Located at the top, it is a text that describes the graphic you are viewing. Titles will typically contain the names of the devices to which the variables you are viewing refer. They may contain several lines of text, so that they can be represented as subtitles.
- **Representation areas**: These are the area where the data are displayed. A graphic typically consists of just one area, as in the example above, but may have various areas, each positioned one under the next. Each area contains some common features:
    - **Key**: provides general information about the variables that are represented in the area. This information is often the color of the variable, the type of representation, the title of the graphic and, in some cases, a value indicating some feature of the variable for the current representation (for example it is typical to see on energy variables the accumulated value of all the visible values).

- **Y-axis**: provides information on the units of the variables that are represented in this axis and the range of values that are being displayed. At first the range is calculated so that they fit all the values of all the variables included in this axis. Typically, an area has a y-axis, although this may be modified by the user as will be explained later.
- **X-axis**: typically, this is the time axis and is located at the bottom of the representation area. Here the time interval being represented may be seen. Usually predefined time intervals are represented (day, month, etc.), but the user can choose the most suitable as shown later. Similarly, there are types of graphics where this axis does not represent time, in this case the units represented and the range of values contained will be indicated.
- **Drawing area**: contains the graphic representing the variables of the area in question. There is a drawing area for each area of representation.

- **Toolbar**: contains a series of actions that can be performed on the graphic. Depending on the type of graphic it will contain more or fewer options. Typical actions are going to the previous interval, going to the next, going to a user-defined interval, grouping according to a predefined interval or changing the grouping period.

Any graphic can always be found in the so-called "**operating mode**", which determines the behaviour of the drawing area and the use of the mouse on it. There are four possible modes of operation:

- **Zoom mode**: allows enlargements be made on one portion of the graphic. This mode is accessed through the F1 key or the corresponding graphic context menu option.
- **Pan mode**: allows the current window to be moved using the mouse, dragging and releasing. This mode is only available if a Zoom has already been carried out. It is accessed by the F1 key or the corresponding graphic context menu option.
- **Tooltip mode**: allows variable values viewing at the position cursor. This mode is accessed with the F3 key or the related context menu option.
- **Magnifying glass mode**: enables the area under the cursor to be enlarged in a separate window. This mode is accessed with the F4 key or the related context menu option.

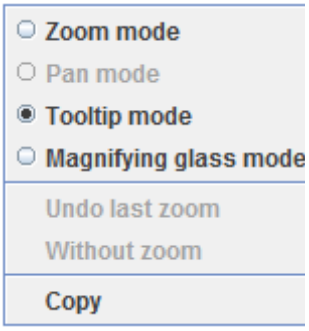


Figure 239:Graphic context menu

You access this menu by right-clicking on the graphic.

The last option "**Copy**" enables you to copy the current graphic to the Windows clipboard.

7.1.1.- ZOOM MODE

The zoom mode permits magnification of a portion of the drawing area with the mouse. In this mode the cursor looks like a magnifying glass.

The cursor indicates whether or not it is over an area where magnification is possible (typically not outside the drawing). To start an enlargement, left click on the drawing point where one corner of the new viewing window is desired and, without releasing the button, move the cursor to the point where the opposite corner of that window should be.
It is interesting to see that while moving the cursor discontinuous lines indicating what will be the new viewing window will appear if the button is released. The cursor also informs whether or not the selected area is valid as a new viewing window by changing the appearance of the mouse cursor.

This may be because it is too small, narrow or wide, both in window units (pixels) and variable units, both in the X axis and the Y. For example, where the variable period is one hour, magnification of an area of the drawing of less than an hour on the X axis is not permitted.

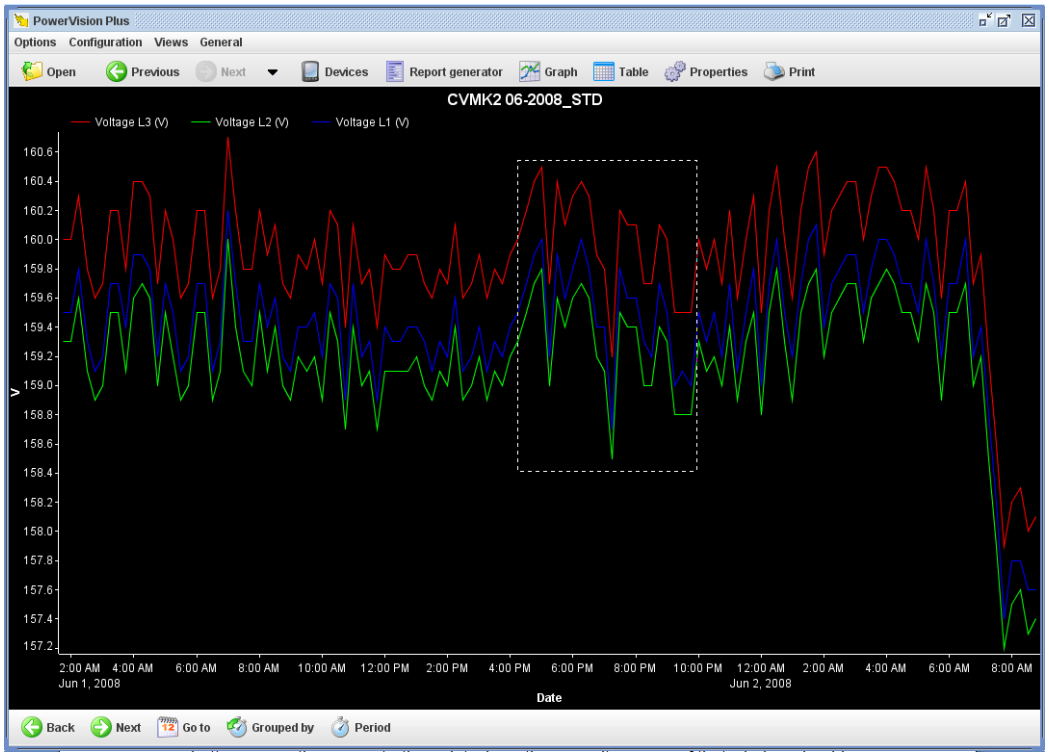


Figure 240:Magnifying an area of the drawing in the Zoom mode

Releasing the left mouse button accepts the discontinuous window as a new viewing window. The action will be automatically executed and the enlarged area chosen will be displayed.

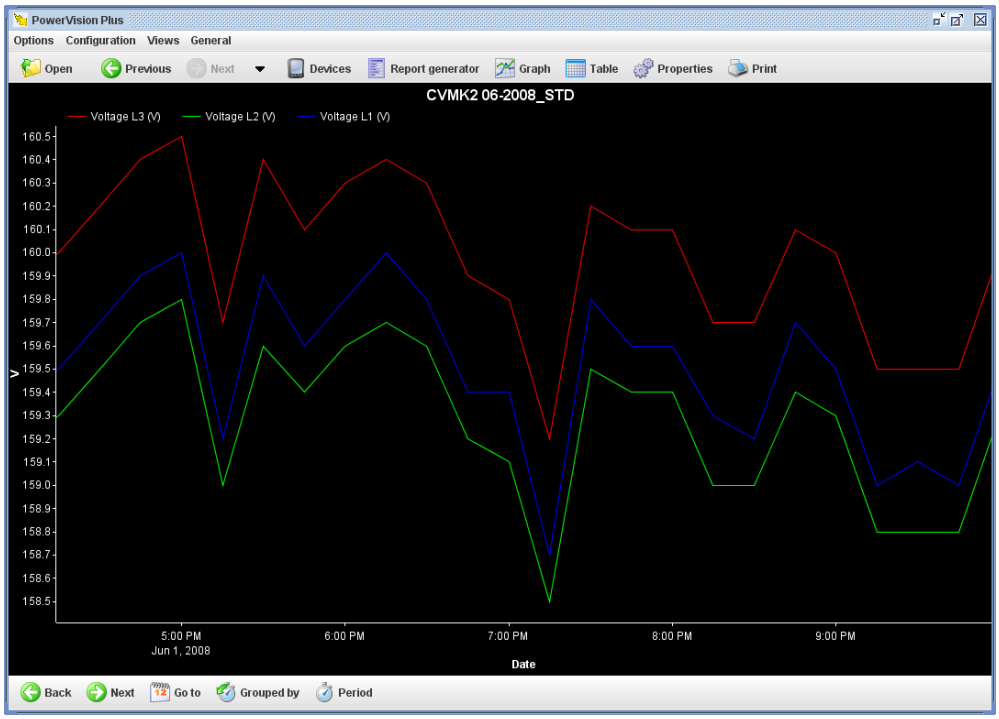


Figure 241:Graphic with the enlargement of a specific area

The process can be repeated as many times as desired, provided the system permits it. Enlarging enables the "Panning mode" which will be described later, as well as the "Remove last zoom" and "Without zoom" options in the context menu.

The "**Remove last zoom**" option displays the previous enlargement, namely the display from which the present enlargement was made, while the "Without zoom" option eliminates all enlargements at once.

Enlarging a graphic with several display areas is worth commenting on. If an enlargement is made on a graphic of this type it can be seen that not only do areas marked off with dashed lines appear in the display area, but they also appear in other areas too, selecting the same interval X (usually time).

Figure 242:Zooming in with a graphic with several areas of representation selected in the first zone

This behaviour is defined by default, giving priority to conserving the same X-axis in all areas (it is usually useful to compare values with the same dates or intervals, and therefore does not apply if the X- axes are different, and is only included in the enlargement of those areas with similar X-axes , even if they are not consecutive). Note that when the enlargement is carried out in more than one area all the new selections are horizontal.

The behaviour of the "**Zoom mod**e" can be changed by varying the idea previously discussed using the "Control" or "Shift" keys while selecting the new viewing window.

The "Control" key forces the selection to include only the area where the enlargement is being made; therefore if the graphic consists of a single area this modifier has no effect. If the enlargement is being made between two different areas (one corner of the new window is in one area and the other in a different area), only the areas between the two are included.

For example, if the enlargement is started in the first area and finished in the second, only these two areas and not the third will be enlarged. A curious effect caused by this mode is that areas with different X-axes can appear. In addition, this behaviour does not take into account whether the X-axes are equal or not, always forcing the enlargement regardless of this information, thus allowing the expansion of two areas with different X-axes, something that would be impossible with the default behaviour.

Figure 243:Graphic with areas with different X axes (the first area has an X-axis different from the other two)

The "Shift" key forces the enlargement to only affect the X-axis, even in the area where the expansion is taking place, but keeps the enlargement of all the areas maintaining the X-axis, as in the default behaviour. Note that if a graphic consists of a single area this change in behaviour causes the non-selection of the new viewing window not to affect the Y-axis.

The combination of clicking the "Control" key and the "Shift" key at the same time will enable enlargement of graphics with more than one representation area, a single area depending on their X-axis. The user

can freely combine the various behaviours in successive enlargements.

7.1.2.- PANNING MODE

"**Panning mode**" is available when an enlargement is in effect, enabling viewing window movement using the drag and drop technique. In this mode the cursor looks like a hand.

As you can see the cursor indicates whether or not it is possible to move the viewing window (typically not when out of the drawing area).

To start a movement, left click on the point of the drawing required as an anchor and, without releasing the button, drag the cursor to move the window to the desired location. Note that the window moves in real time with cursor movement.
It is interesting to see that once the anchor is positioned the cursor will change to indicate the viewing window may be moved.

Movement is limited by the margins of the viewing window before making the first enlargement. Therefore, if viewing a week of data, movement cannot be made to the previous or following week using the pan option, or above the upper margin of the Y-axis, or below the lower margin of the same axis.

In graphics with more than one display area the pan mode establishes, by default, behaviour by which all areas with the same X-axis as the area where the anchor is established must move. This behaviour can be changed using the "Control" key. Holding down the key while moving the window indicates to the program that only the window on which the anchor is established must move. This will cause the X-axes to be unequal.

7.1.3.- TOOLTIP MODE

The "**Tooltip mode**" displays the values of variables located closest to the cursor with respect to the X-axis. These values are updated instantly as the cursor is moved. In this mode the cursor looks like a hand.

The mode behaves in such a way as to show the values closest to the mouse position with respect to the X-axis of all the areas that share the same X-axis.

Figure 244:Graphic in Tooltip mode

For each area of representation with the same X-axis a window is shown with the value of the X-axis (typically the date) and information about the variables that are represented in this X position (typically the variable name, its value and its units).
The behaviour of this mode is changed by clicking the "Control" key, so as to show only the information window of the area at the cursor location.

In graphics with a high density of values, several different values with different X coordinates of a variable may fall into the same cursor position. In this case there will be no values accessible through cursor movement. To access all the values, without omitting any, the value viewing window may be moved using the cursor keys (left or right). These keys allow movement to the value immediately before or immediately after the current value, even if this is drawn in the same screen position.

With some types of graphics there is more than one value of the same variable at the same X-coordinate. This does not happen if the X-axis is time; but it can happen in other cases, as for example in an event duration graphic, which will be seen later. In these cases the maximum and minimum value of each variable in that X-coordinate will be shown.

7.1.4.- MAGNIFYING GLASS MODE

The "**Magnifying glass mode**" displays an enlargement in a separate window for the area around the position of the cursor. The enlargement window is updated instantly as the cursor is moved, always showing the area around it.
If **magnifying glass mode** is entered, and the cursor remains on the representation area, an enlargement window will automatically appear, and a dotted box will appear in the drawing area indicating that the area represented by the cursor is enlarging, and it may be moved as desired, automatically displaying the enlargement in the superimposed window.

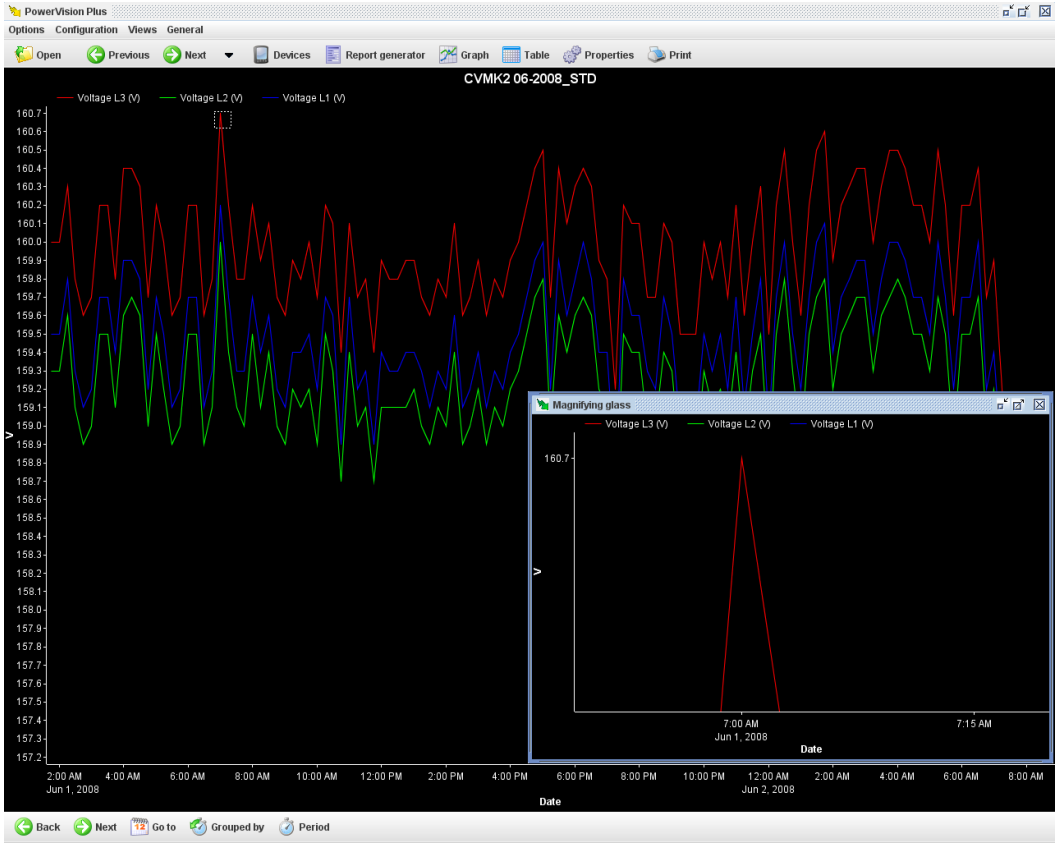


Figure 245:Zoom mode graphic with an amplified area

Upon leaving the representation area the enlargement window will disappear, and upon returning, the cursor will have the following appearance:

This indicates the cursor is in the magnifying glass area, and that enlargement of the area is possible (by left clicking). Logically, the extension window can be re-sized and positioned as desired like any other window.

Another possibility is to vary the size of the square area around the cursor. This can be done with the mouse wheel or, if the mouse does not have this feature, by using the "+" keys "(greater square area) and"- "(smaller square area).

7.1.5.- TOOLBAR

The graphics always have a toolbar at the bottom that allows a series of actions related to the data to be shown.

Figure 246: Toolbar

The typical options available in the toolbar are:

- **Back**: Displays the previous interval of data. Typically, the range of previous data is a function of data grouping and, if grouped by days, upon going to the previous interval the previous day's data is displayed. There are types of graphics where grouping does not make sense, because they are displaying values of a specific date (for example in **QNA** harmonics graphics). Clicking on this option in this case displays the next date immediately following that contains data.

- **Next**:Displays the next interval of data. Typically, the interval of data following this is based on the data grouping and, if grouped by weeks, after going to the following interval data from the following week is displayed. There are types of graphics where grouping does not make sense, because they are displaying values of a specific date (for example in **QNA** harmonics graphics). Clicking on this option in this case displays the next date immediately following that contains data..

- **Go to**: Displays data within a user-defined time interval. There are graphics where it makes no sense to specify an interval (harmonics graphic in **QNA**), and this permits indication of the exact date desired.

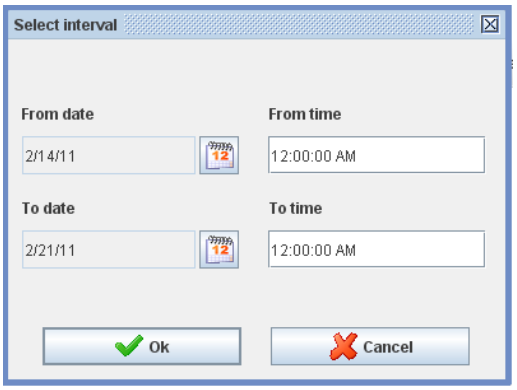


Figure 247:Display data interval selection dialogue

- **Grouped by**: Allows data grouping to be changed. Grouping is just the data interval you want to display. Typically there are five predefined groupings: day, week, month, quarter and year.

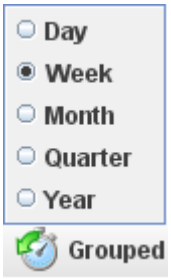


Figure 248:"Grouped by" Selection Menu

- **Period:** Enables desired data period to be specified. Each device can be configured to store data every so often, typically in periods of 10 or 15 minutes. Use this option to view data in a different period, which must always be higher than that defined by the device. Note that there is an "**Automatic**" option, which directs the program to choose the period that best suits the selected grouping.

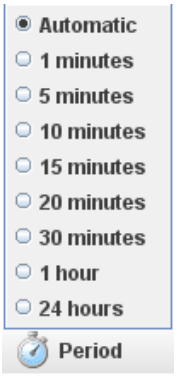


Figure 249:Period selection menu

Note that there are special graphics where the last two options ("**Grouped by**" and "**Period**") are meaningless and therefore not available.

- **Clone window:** Enables you to make a copy of the current graphic in a new window, keeping the original graphic in the main window.

- **Floating windows:** Enables you to move the current graphic to a new floating window so that the main window where it originally appeared disappears.

7.1.6.- GRAPHIC PROPERTIES

Many more aspects of the representation may be configured using the graphic "**Properties**" option. This option can be accessed using the "**Options**" menu, "**Properties**" sub-menu, or directly with the "**Properties**" button on the main toolbar.

Suppose a graphic is made up of the variables of three voltage phases, the distortion in phase one, and the current of phase one and two of the **QNA** measuring equipment. The application will provide us with a view of the graphic with default configuration, namely a graphic grouped as a week, set at the current week, with 30-minute periods, with three areas of representation (one where all three voltages are placed, another where the distortion is placed and a final one where the two currents are placed) etc.

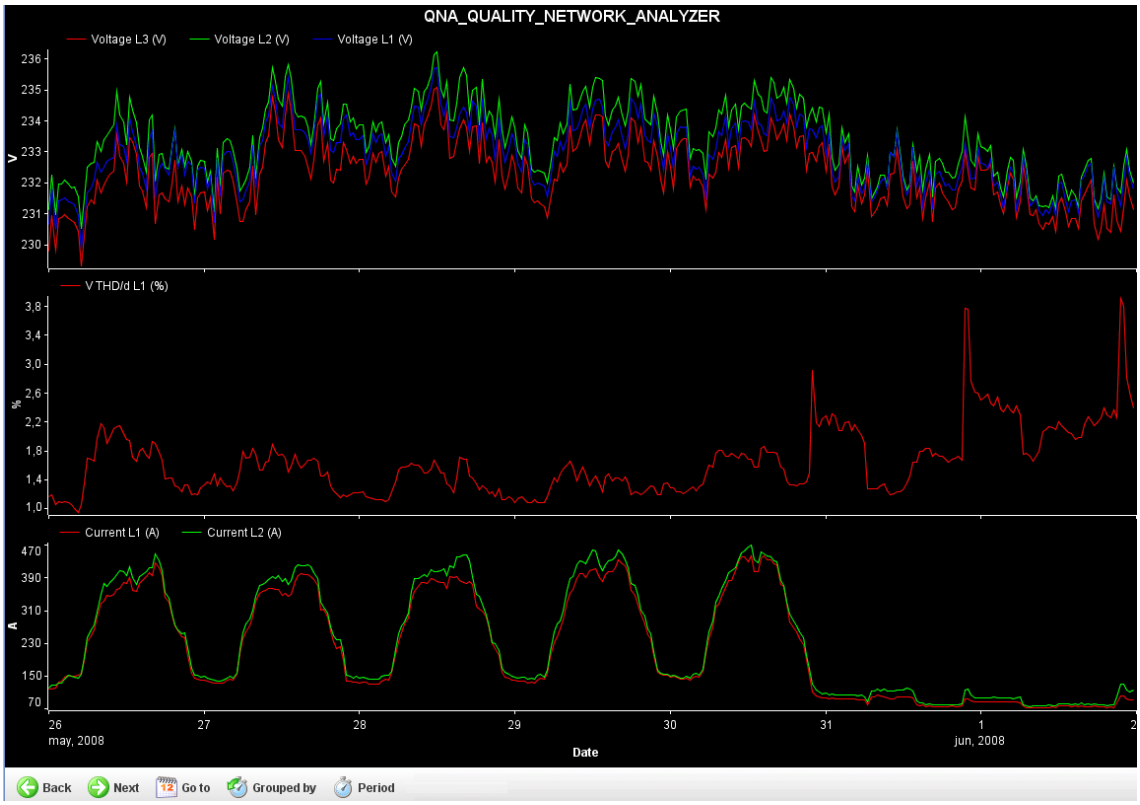


Figure 250:Graphic with variables from a QNA

Change the graphic properties by accessing the option previously indicated, and a window similar to the following will appear:

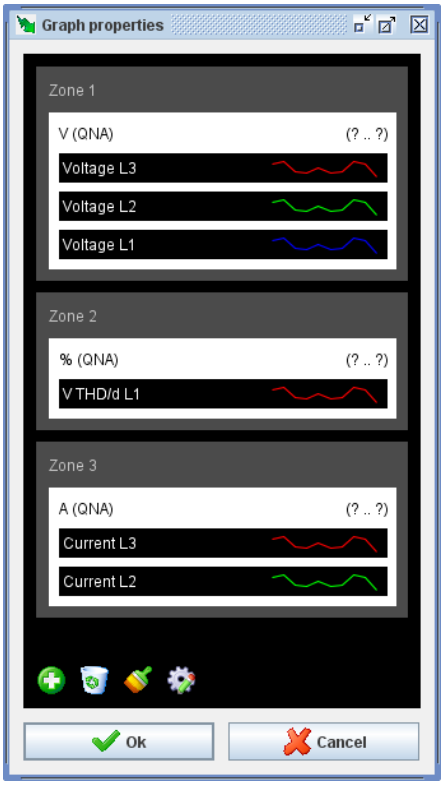


Figure 251:Graphic properties dialogue box

This window allows the following changes to the graphic:

- Configuring the title
- Modify the representation of each variable (lines, bars and points)
- Change the colour of each variable.
- Adding annotations to a variable
- Modify the y-axis margins.
- Remove areas, axes and variables.
- Add areas, axes and variables.
- Change the distribution of areas, axes and variables.

As can be seen in the previous window a schematic representation of the variables and their organisation into areas and axes is shown. When the cursor is floated over this representation, elements that can be modified (i.e. variables, axes and areas) will be highlighted.

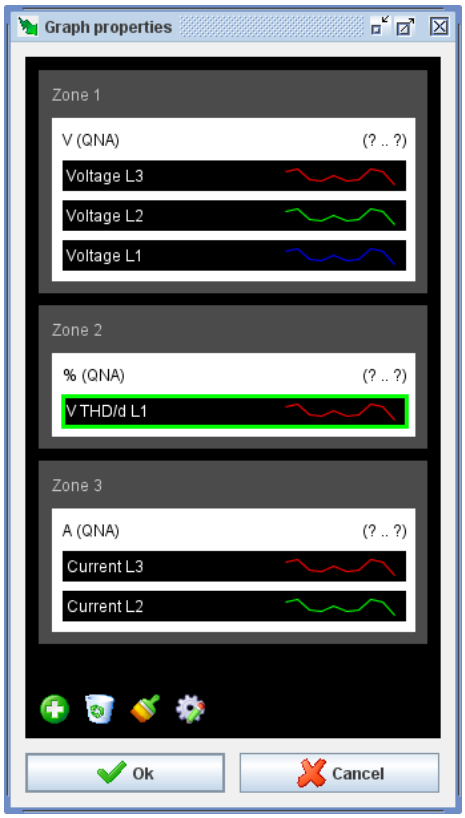


Figure 252:Select a variable and click to change its properties

To change, for example, the representation properties of the phase 1 voltage distortion variable, place the cursor here and left click.

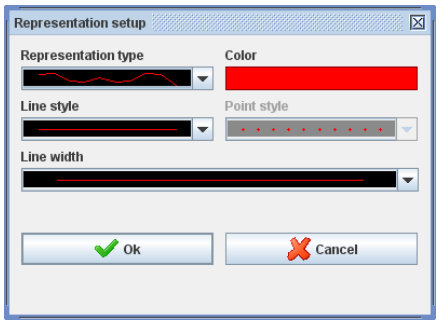


Figure 253:Variable representation configuration dialogue box

This screen permits configuration of the representation type (Lines, bars, or points), colour, line style (only if the line type representation is selected), the dot style (only if the dot type of representation is selected) and the thickness of the line (only if the line type of representation is selected) and the annotations that you wish to add.

If the line type of representation is selected, there are five different style types to choose from: solid, dashed, dotted, dash – dot and dash-dot – dot.

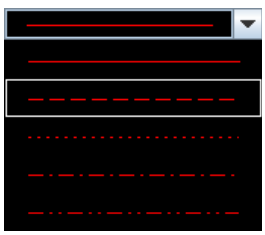


Figure 254:Selecting the line style

Line thickness may also be indicated.

Figure 255:Selecting line thickness

If dots are selected, dot type may be indicated.

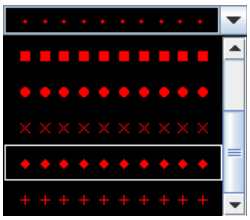


Figure 256:Selecting dot type

The configuration of the annotations, which appears at the bottom of the dialogue box for configuring how a variable is displayed, will be explained later.
Suppose that in the example the colour of the bars is changed to a deep lilac. Note that it is possible to change the colour for any kind of representation by left clicking on the colour chart

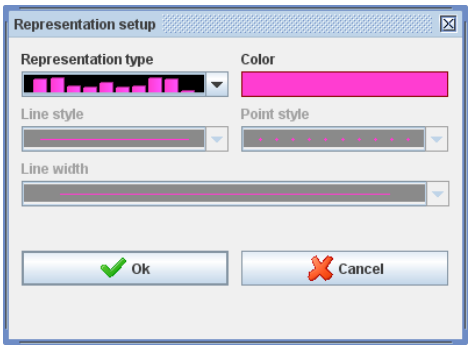


Figure 257:Selecting lilac coloured representation bars

This selection will be reflected on the graphic properties screen.

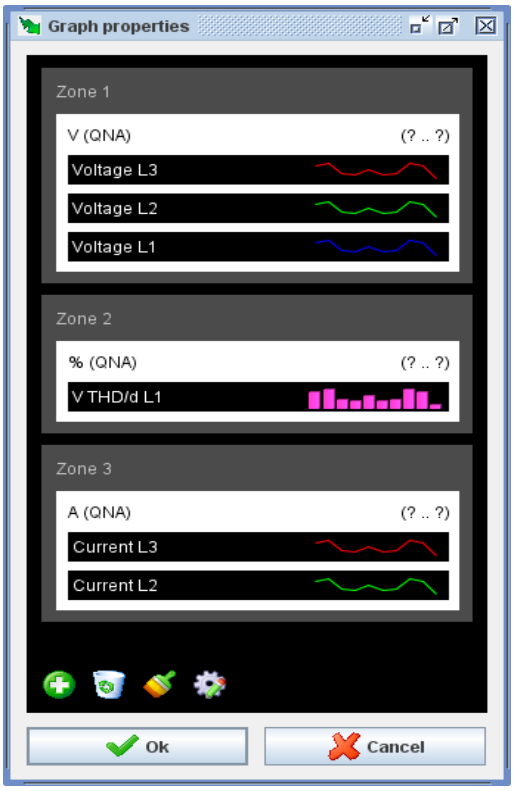


Figure 258:Change variable representation properties.

A property that can be changed on a variable is its position on the overall graphic. To make this change simply drag the variable to a new location. While dragging the variable, the positions where it can or cannot be "dropped" are indicated by red or green squares. Thus, a variable cannot be "dropped" on another variable (does not make sense) or on an axis (with a white background) with variable units different from the "dropped" variable. The variable may be "dropped" on any area (even on the same area but in another position), on an axis with the same unit type as the "dropped" variable (even within the same axis, but in another position) or "outside", i.e. between areas, above the first or below the last.

If the variable is "dropped" on an axis with the same unit type, the variable will be added to that axis in the order in which it was entered. The order in which they are placed is the order they are painted. Thus, the last variable of an axis is painted in the last place and will be displayed on top of the others (and thus may hide them). It is often useful to place the variables represented by bars first, otherwise they will almost entirely hide the others.

A new axis will be created where the variable is "dropped". This new axis will share the drawing area with the other axes of the area, and all will be painted in the order they have been "dropped".

If the variable is "dropped" "outside", an area will be created with an axis in that position. Bear in mind that if the variable was the only one on the axis, that axis will be removed and if, moreover, that axis was the only one in the area, that area will be removed as well. The variable may also be "dropped" in the trash at the bottom of the graphic properties screen; this action deletes it from the graphic. In the example the distortion variable will be moved to the area where the currents are, at the top, so that it will be painted first.

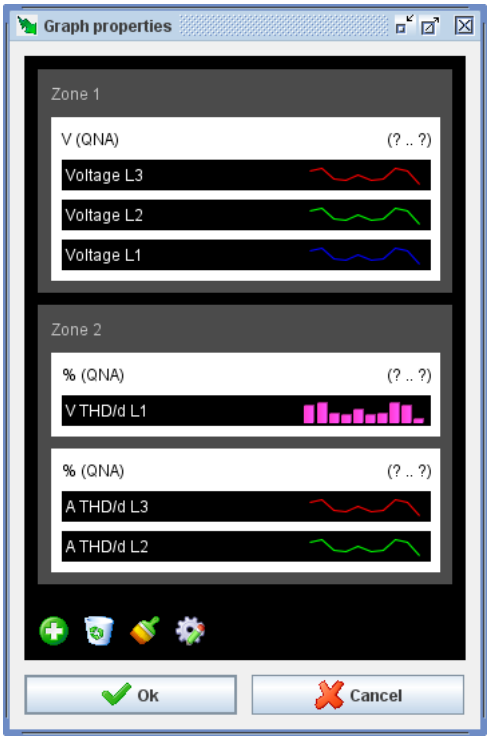


Figure 259:Moving a variable to another area

This way a new axis may be created within the area where the currents are found. Note that the area where the variable was found has disappeared and, therefore, the graphic now contains two areas. Note also that in the second zone, the distortion axis (and thus the phase 1 distortion variable), are painted first, afterwards that of the current, first phase 1 and then phase 2.

This produces the following graphic:

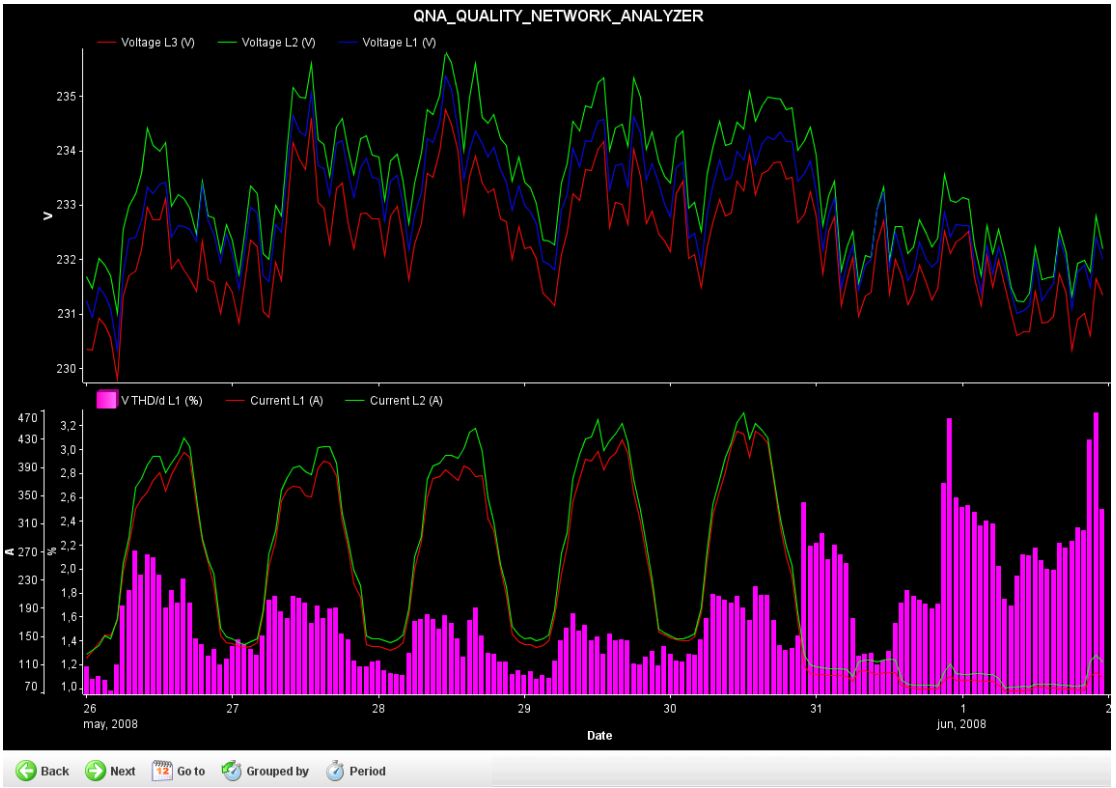


Figure 260:Graphic with two areas and two axes in an area

The axes of a graphic can also be configured using the properties window. In this window, click on the

axis to be configured and the following window will appear:

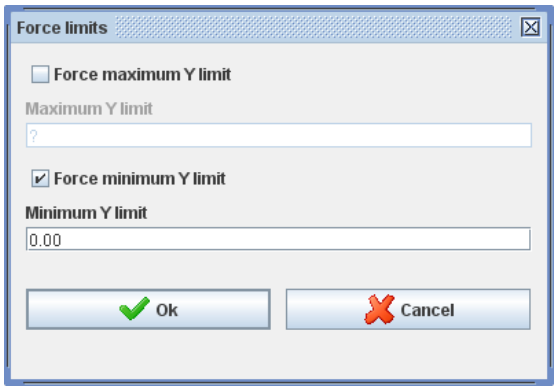


Figure 261:Axis configuration window

This window allows the limit values of the axis in its Y-coordinate to be set. By default the graphic engine sets limits which enable all the values of a variable to be shown. However it is possible to modify them manually using this option. In the example the minimum Y limit value of the axis where the voltages of the phases are zero will be set.

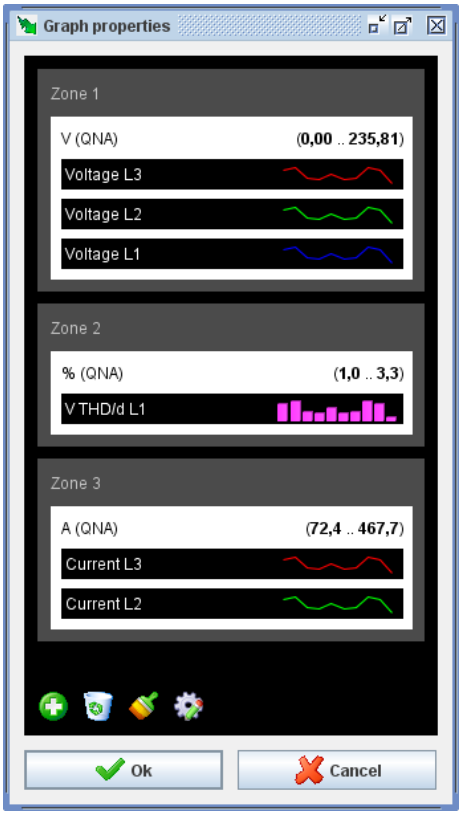


Figure 262:Forced axis minimum limit properties

Note that in axis properties the units may be seen, as well as the device the variables in parentheses belong to (provided the variables are from only one device), and the Y-axis limits (minimum and maximum value, in bold if this value is forced by the user).
Igual que las variables, los ejes pueden redistribuirse mediante el método de arrastrar y soltar. Like variables, the axes can redistributed using the drag and drop method. The operation is the same as dragging and dropping a variable. So, one axis can be dropped on another with the same unit type, on another area (or on the same area but in another position), or "outside" in the trash (deleting all the variables it contains).

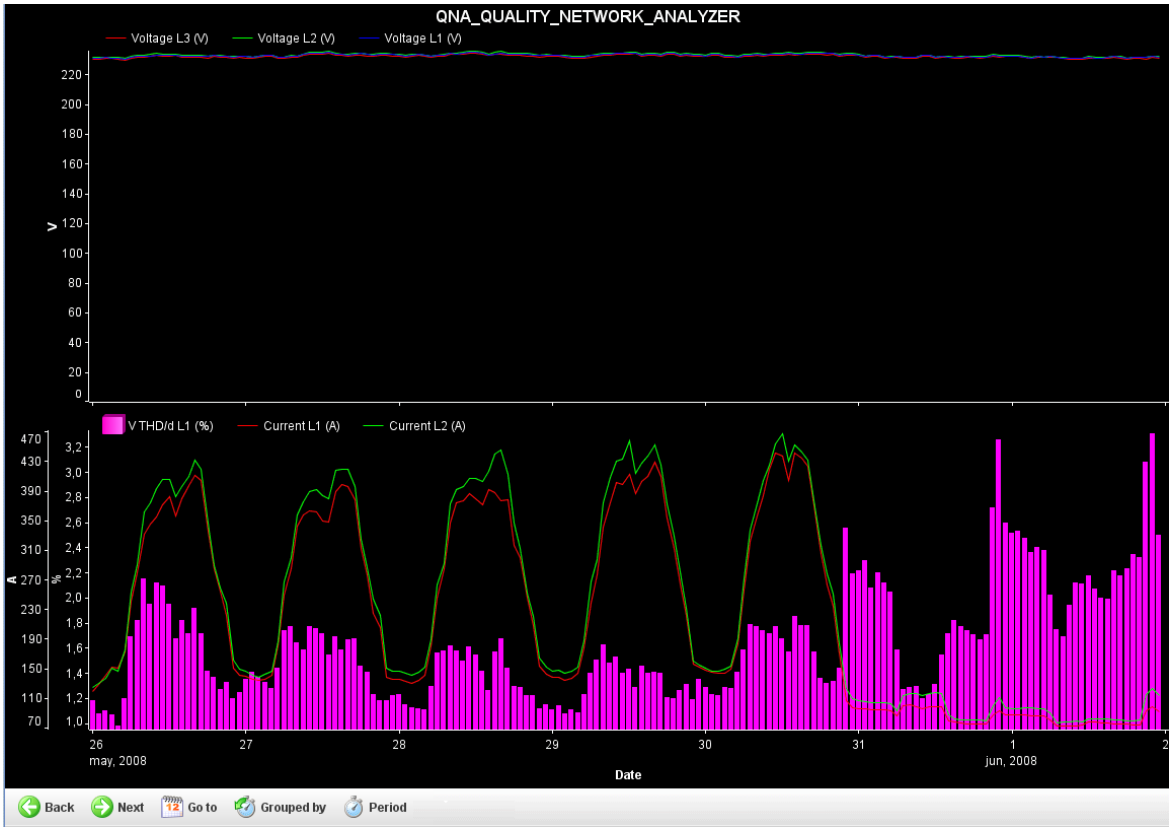


Figure 263:Graphic where the lower limit of a Y-axis has been forced

Finally, the only configuration of an area that may be changed is its position. So, like variables and axes, an area can be dragged to another position, but only within another area, "outside" or to the trash (deleting all axes and variables that it contains).

One of the most interesting possibilities offered by the property screen is that of adding new variables to the graphic. This is done by clicking on the button with the "+" sign, which is located on the lower left.

Device and variable selection windows will appear, allowing other variables to be added, including those from a different device. In the example a phase 1 voltage variable from another device has been added.

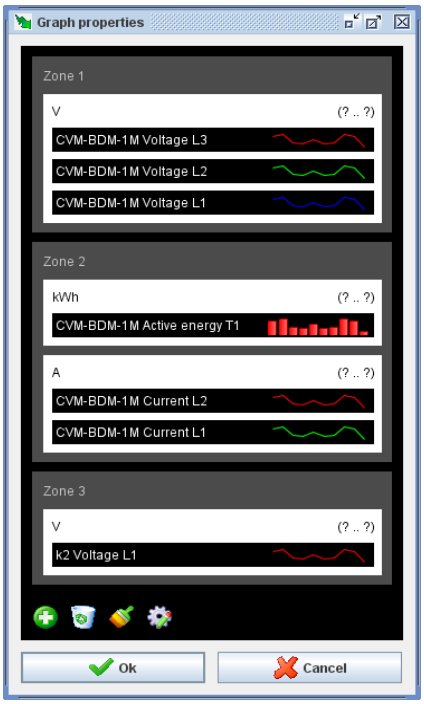


Figure 264:Adding a variable from another device

Note that the device information has disappeared from the axes and appears on each variable, because now there are no variables shown from one single device. The new variable (or new variables, if several were chosen) are organized into new areas at the end, and the limits of the new lines are unknown because they have not yet been loaded with data, although they may be forced by the user.

In the example the new variable was dragged onto the axis of the first zone and dropped on top of the axis, leaving the new variable as the first on the list. Note how the axis limits are inherited where they are released.

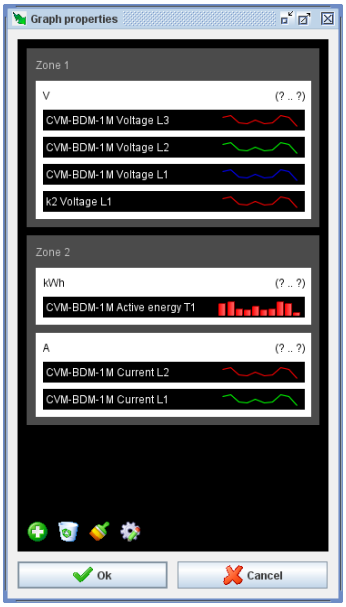


Figure 265:Variables of different devices on the same axis

Note that the device information has disappeared from the axes and appears on each variable, because now there are no variables shown from one single device. The new variable (or new variables, if several were chosen) are organized into new areas at the end, and the limits of the new lines are unknown because they have not yet been loaded with data, although they may be forced by the user.
In the example the new variable was dragged onto the axis of the first zone and dropped on top of the axis, leaving the new variable as the first on the list. Note how the axis limits are inherited where they

are released.

Clicking on this button lets the program decide whether or not there are any problems with displaying variable colours, and it will change the variables that it deems appropriate.

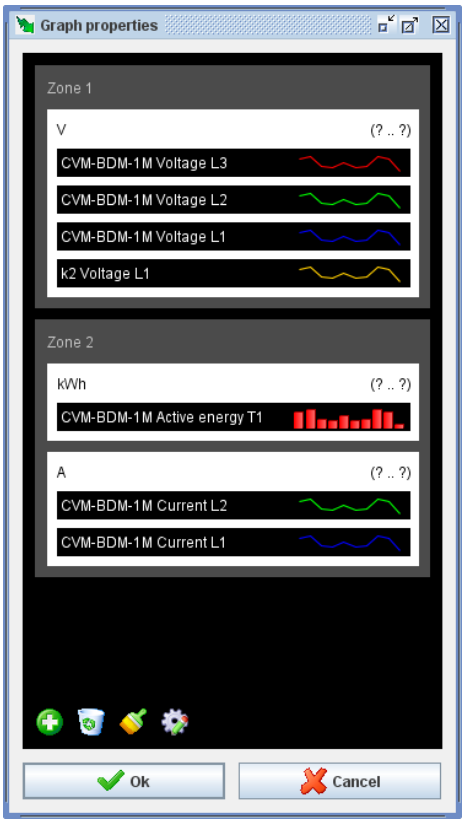


Figure 266:Intelligent automatic colour change

When you click on this button the title configuration window will open, where you can change the colours and text of the graphic title.

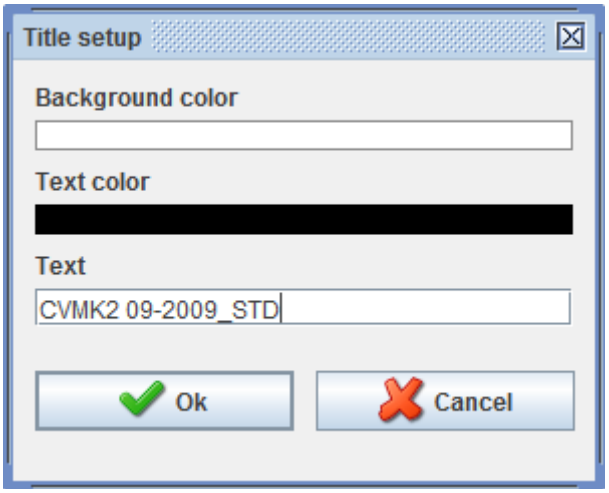


Figure 267:Title configuration window

Finally, we will explain how to configure variable annotations in a graphic.

For annotations, left-click on the  symbol for the annotations section at the bottom of the dialogue box for configuring how a variable is displayed. This will open another configuration window where you can configure the type of value (fixed, variable, maximum, minimum, average, etc.), the value (if you have selected Fixed or Variable), the line style, the line colour, the line thickness and the text of the annotation.

If you have chosen the variable option for value type, the  the icon will be activated and you can left-click on it to define the corresponding variable. A window will open where you can select this variable.
Otherwise, if you have selected a value type other than Fixed or Variable, the Value window will be blocked and you will not be able to modify it.

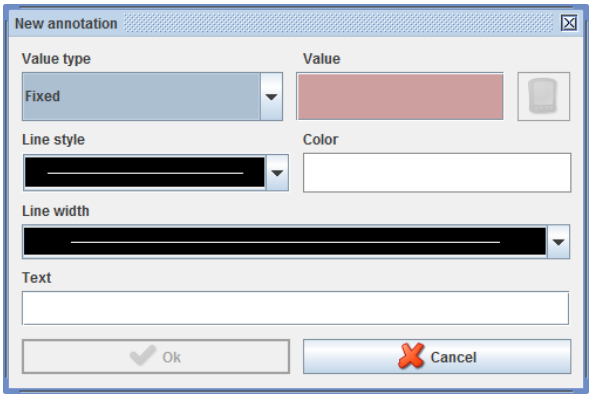


Figure 268:Annotations configuration window

For example, suppose we have the following graphic for L1 voltage:

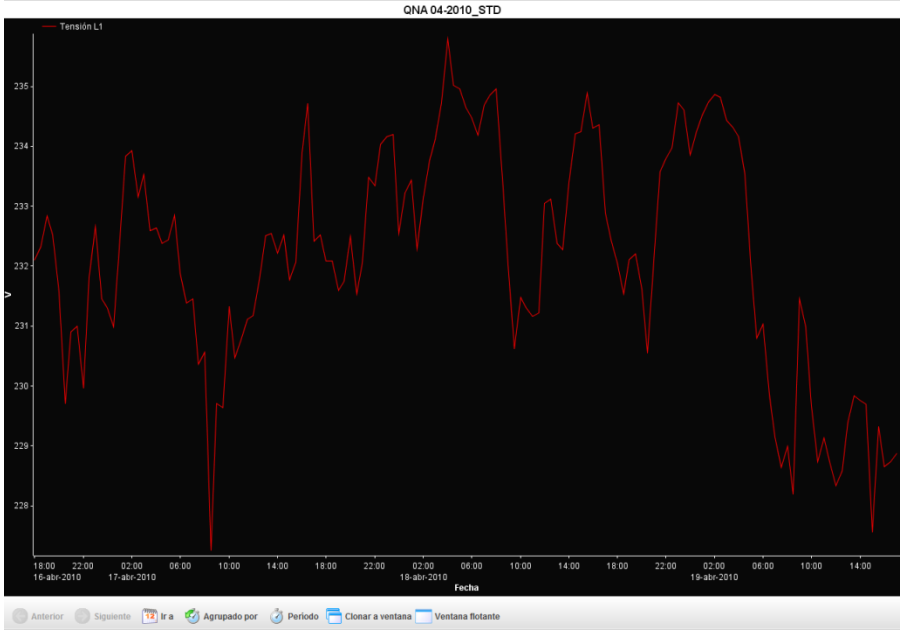


Figure 269:L1 voltage graphic

We will add an annotation to this graphic that represents the average value of this voltage. To do so, we will open the annotations configuration menu for the L1 voltage variable, as explained above. Select the "Average" value type, a light blue dotted line with minimum thickness, and enter "Average voltage" as the annotation text. The window will appear as follows:

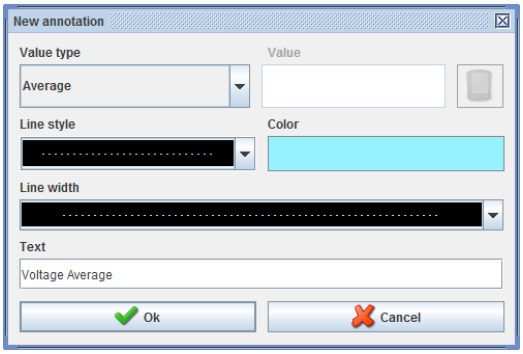


Figure 270:"Average voltage" annotation window

If you click on **Accept**, the annotation that you just created will appear and you can edit it whenever you want by selecting it.

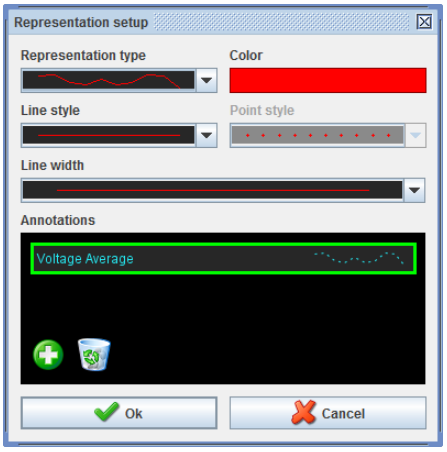


Figure 271:Configuration window with annotation created

If you accept all the changes, the graphic with the new annotation will appear as follows:

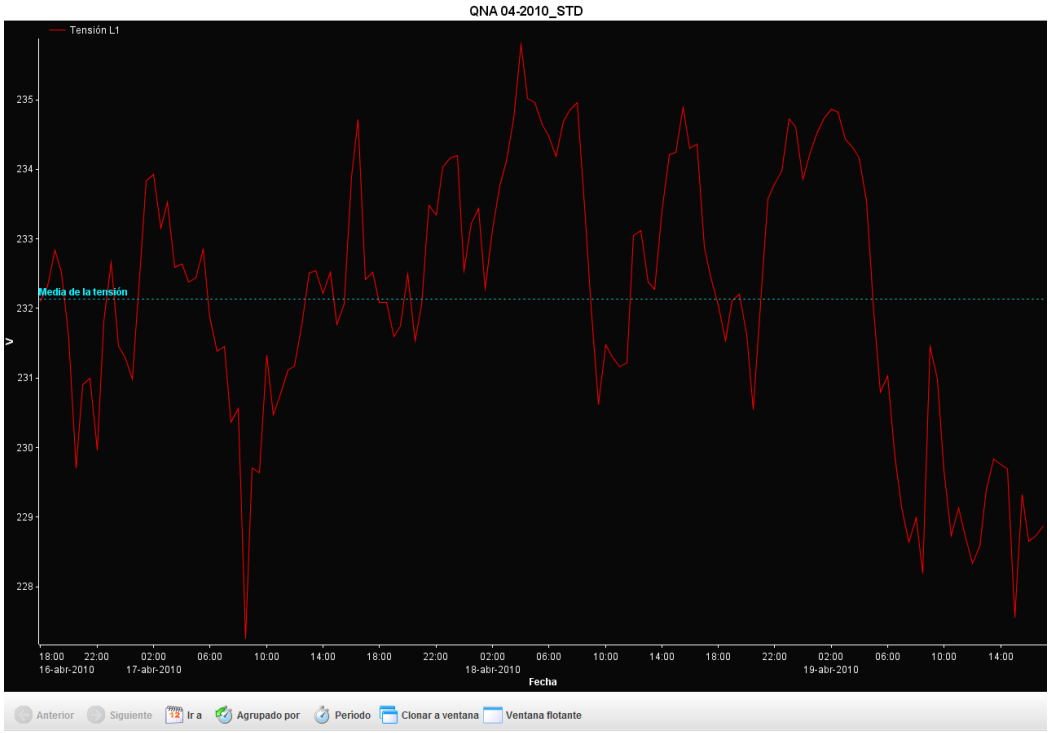


Figure 272:Graphic with annotation created

If you want to delete an annotation that you have created, select it in the variable display configura-

tion window and drag it into the recycling bin.

7.1.7.- PRINTING A GRAPHIC

The user can print the current graphic page at any time using "**Print**" " in the "**Options**" menu of the main menu or the "**Print**" button of the upper toolbar.
The software also lets you print multi-graphics.

7.1.8.- EXPORT GRAPHIC

The user may at any time export the graphic being viewed in a **PNG** format. This option should be accessed through "**Export**" in the "**Options**" menu of the main menu. .
The software also lets you print multi-graphics.
Note that graphics are exported with a white background to facilitate their inclusion in reports, studies, etc.

7.1.9.- GRAPHIC TYPES

So far we have seen standard graphic types, i.e. graphics comprising a number of areas, where each area has an X-axis, which is a time interval and a Y-axis for variable values. However, there are certain types of graphics that have distinct features.

A harmonics graphic would be a special graphic. This graphic is provided by those devices that calculate harmonics variables, whether voltage or current. This type of graphic may for example be found on **QNA** equipment, among others, and can show harmonic distortion for voltage as well as current in each phase.

As well as enabling you to show the fundamental in the grouped harmonics tables.

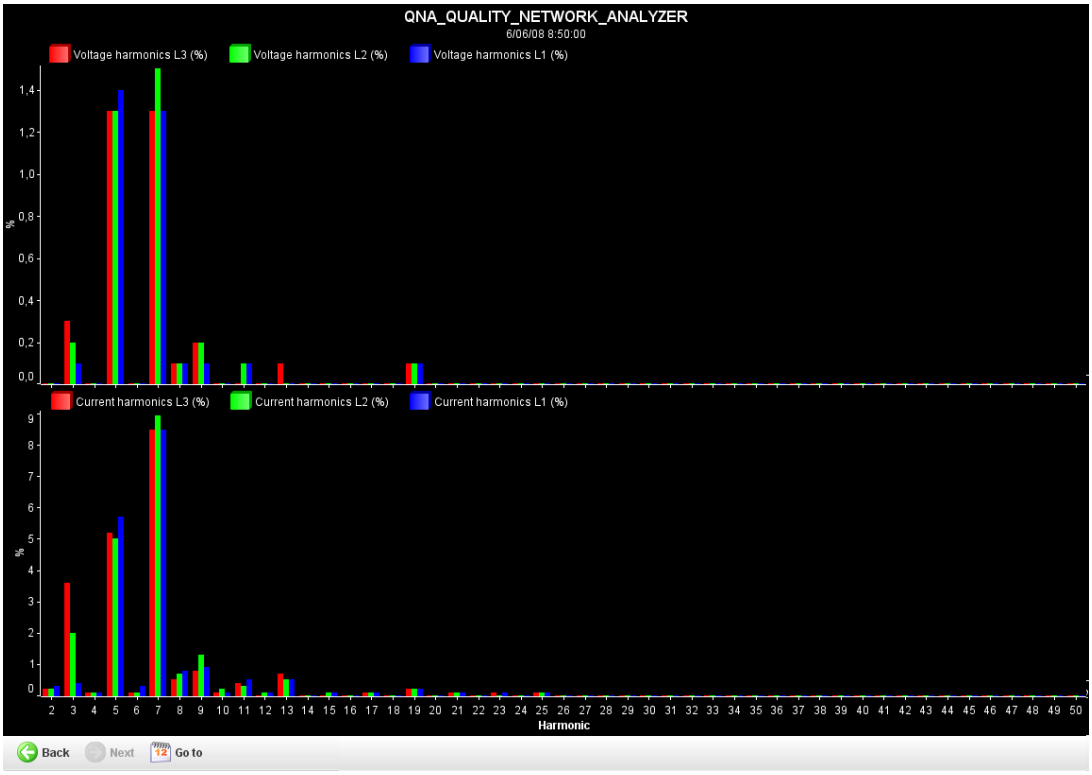


Figure 273:Harmonics graphic

This type of graphic has some special features:

- **Subtitle:** In the caption under the graphic title, the date of the harmonic distortion being displayed is indicated.
- **X-axis:** The X- axis does not represent time, but rather the harmonic number. It therefore lacks units.
- **Toolbar**: The toolbar contains some buttons that let you navigate to other logs. In other words, you can go to the previous log, the next log or directly to the log closest to a date specified by the user ("**Go to**" option). The other two buttons are used to manage the graphic window.
- **Properties:** The configurable properties of this type of graphic are the same as with a standard graphic, the only difference being that only variables from devices containing this type of variable are available.
- **Representation using bars:** Sets default representation to bars, as a special feature, but these can be reconfigured later.

Another special feature graphic is the wave shape graphic, generated by **QNA** equipment, which can provide a screenshot of the voltage wave shape as well as the current in each one of the phases.

The features of this graphic are very similar to the harmonics graphic. The only differences are that the X-axis units are milliseconds and that the representation is in lines by default. Only wave shape variables may be added to this type of graphic.

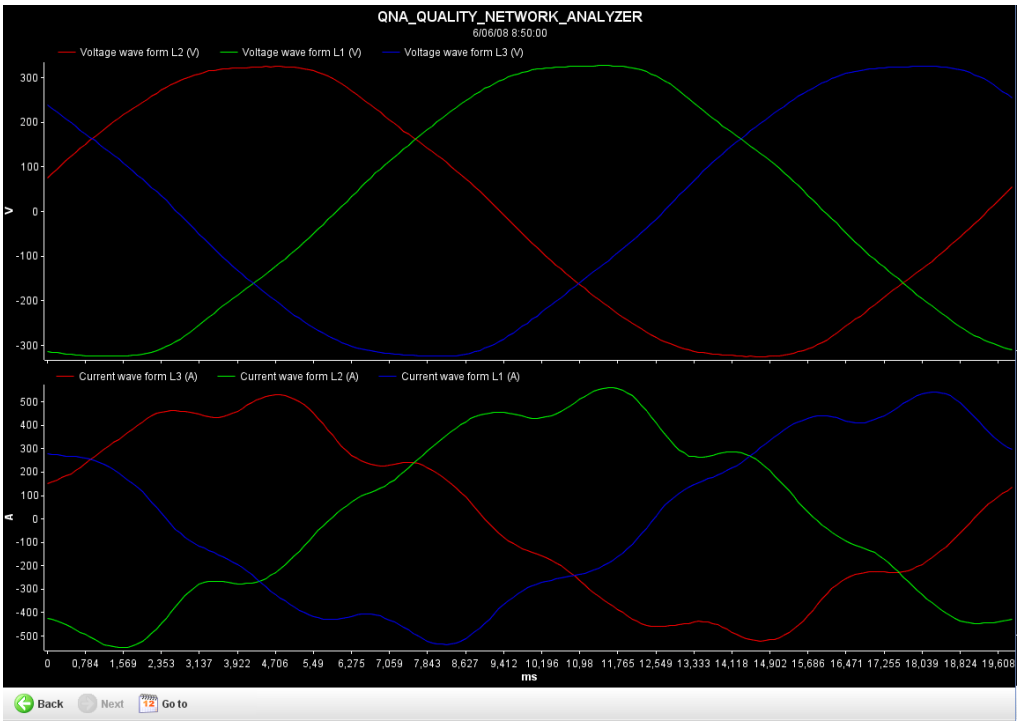


Figure 274:QNA wave shape graphic

Another special graphic is the event duration graphic

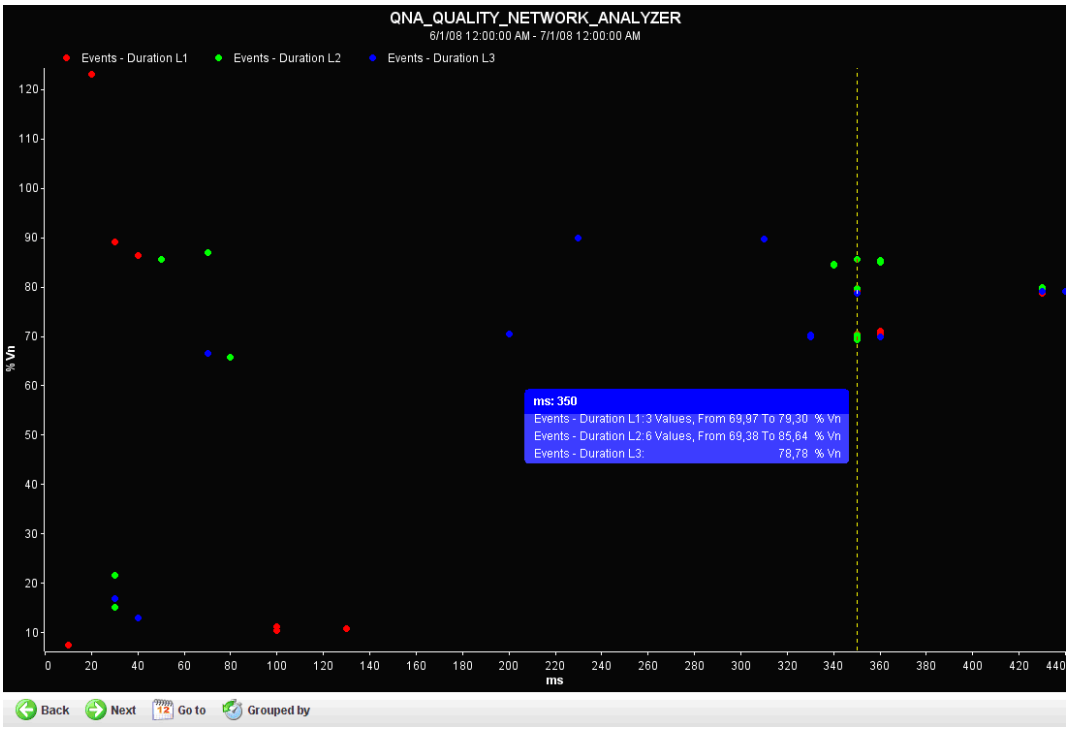


Figure 275:QNA event duration graphic

This type of graphic represents the voltage events registered during a period of time, organized according to their duration. This graphic has some special features:

- **X-axis:** The X-axis represents the duration in milliseconds.
- **Representation interval:** The events for an interval of time that can be configured by the user are represented.
- **Toolbar:** The toolbar may be used to move through time intervals, as well as define a new time interval, either pre-defined or fully configurable by the user.
- **Representation:** The default representation is dots, although it can be changed at will.
- **Tooltip:** It is typical to see in such a graphic a special tooltip indicating the number of values of the variable that exist at this point, and between which values it can be found, as it is normal that many values are repeated with certain duration.
- **Subtitle:** Unlike the harmonics and wave shape graphic, the subtitle here indicates the time interval displayed.
- **Adding new variables:** Only variables of the type being viewed can be added, (i.e., duration of events).

Another unusual graphic is that of logged events.

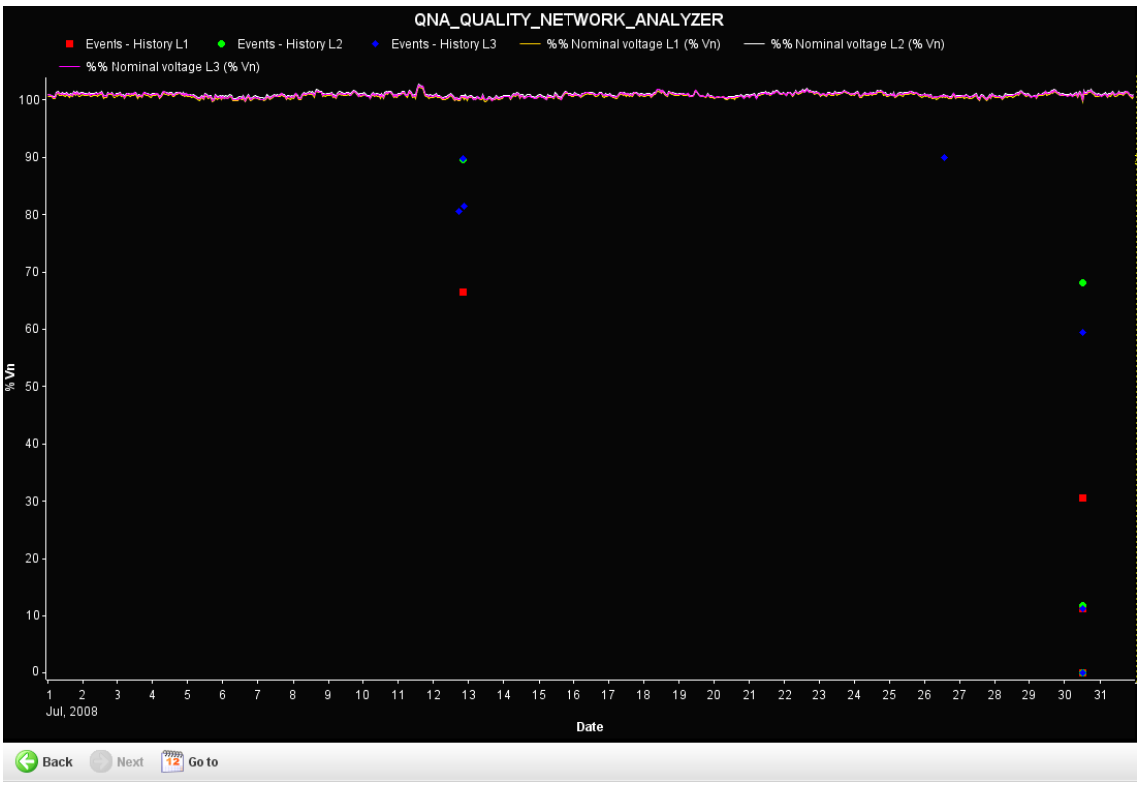


Figure 276:Logged events graphic

This graphic is essentially equivalent to a standard graphic, with all the same features. The only difference is that each event is depicted as a dot plus a horizontal line whose length equals the duration of the event represented.

Usually the values of events this graphic shows are accompanied by nominal voltage. In both cases the units are expressed as a percentage of the nominal value. Any other standard variable may also be added.

The last special type of graphic is the semi-circular effective voltage graphic.

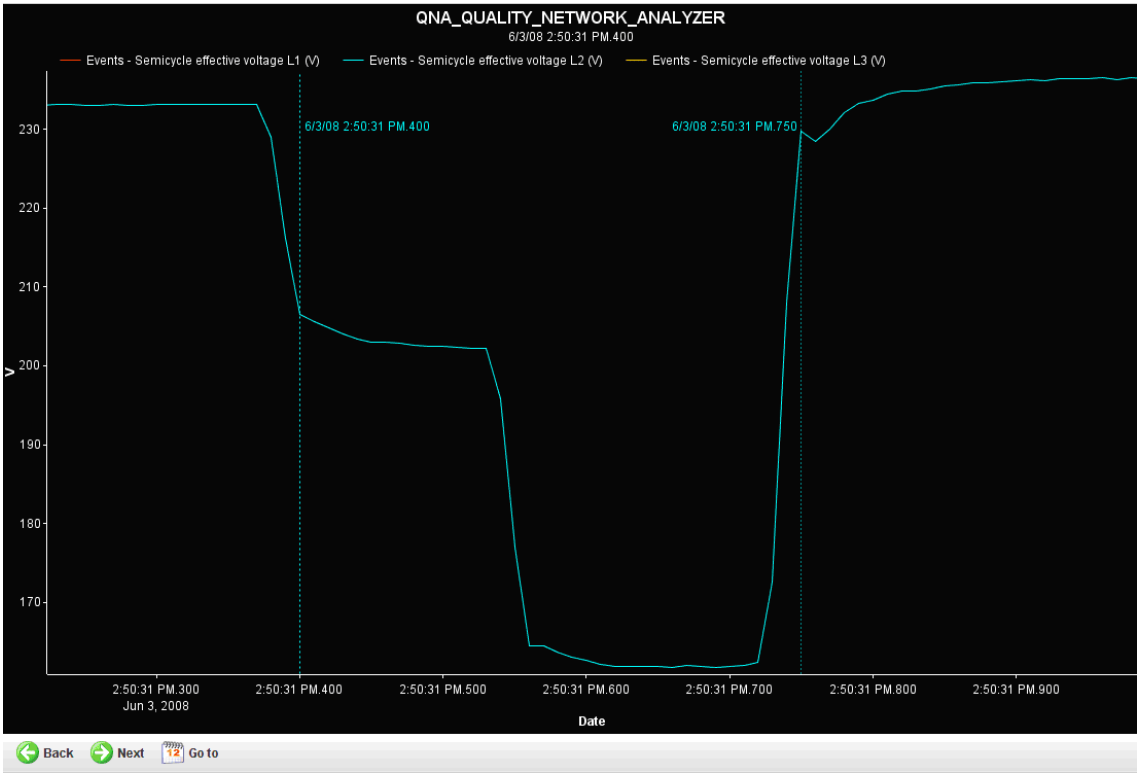


Figure 277:Semi-circular effective voltage graphic

This type of graphic represents voltage evolution within a short space of time in semi-circular intervals. These screenshots are made in response to an event capture at that moment.
Very similar to the wave shape graphic, the only difference being that the x-axis consists of dates as in a standard graphic, as the semi-cycle value capture takes place just at that moment.

7.1.10.- SPECIAL GRAPHICS

There are various types of special graphics that enable you to carry out specific operations and actions with certain types of files.

Firstly, the software enables you to create a wave shape multi-graphic when there are multiple direct variables.

You can obtain this type of graphic by selecting the "**Wave shape log**" option on the graphic type selection screen.

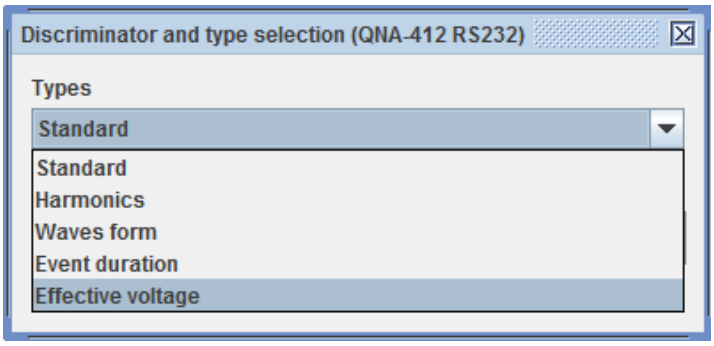


Figure 278:Graphic type selection screen with wave shape log option

If you choose this option, a multi-graphic similar to the one below will appear:

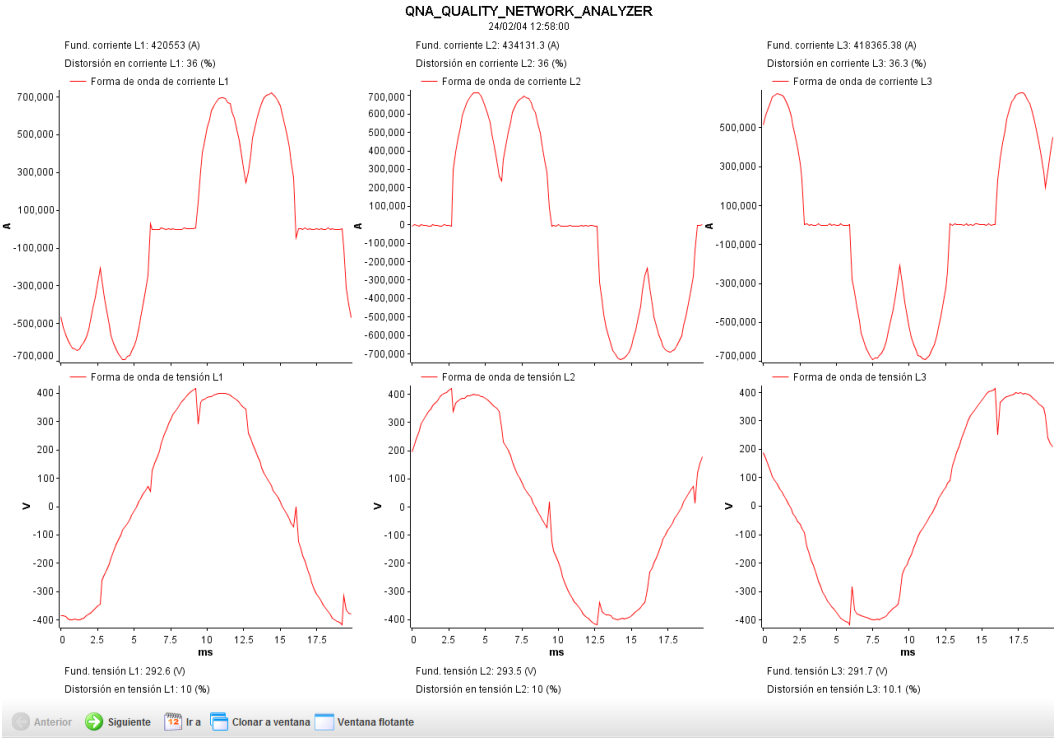


Figure 279:Wave shape multi-graphic

You can see that this type of graphic provides information related to the wave shape for voltage and current, the fundamental and the distortion.

With the "**Properties**" graphic option you can configure each of the graphics separately.
In the case of the multi-graphics above, there are three graphics in one and therefore three configuration tabs for each of them:

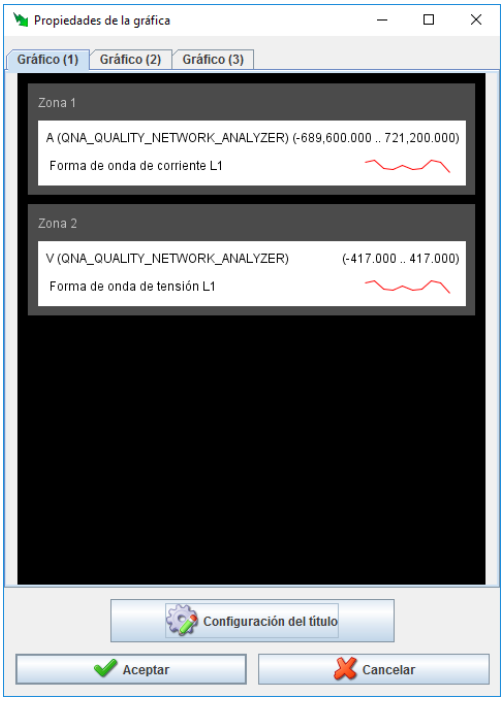


Figure 280:Multi-graphic configuration window

To implement the configuration, select the graphic that you wish to configure and follow the same procedure as for a normal graphic. You can configure the title of the multi-graphic with the "**Title con-**

figuration" button.

Another type of special graphic consists of merging the type 3 wave shape variables (transients) for files that allow it. This may be useful when you have wave shapes that are out of phase with each other and you want to display them in a single graphic.

To do so, open a "**Wave form**" graphic for the file in question.

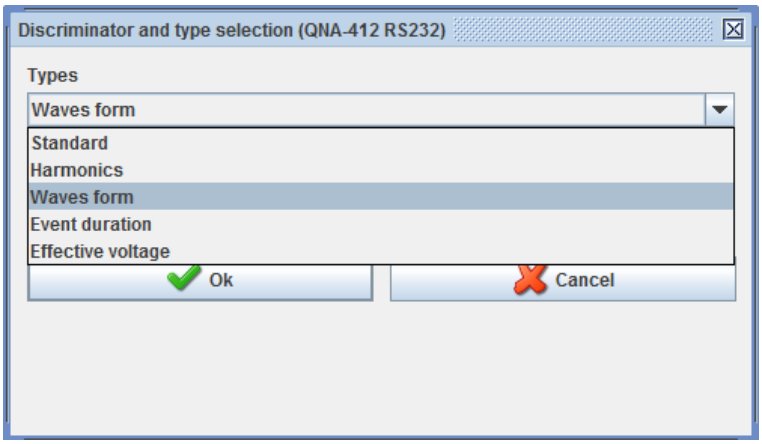


Figure 281:Graphic type selection window

If the file type is correct, a variables selection screen similar to the one below will appear:

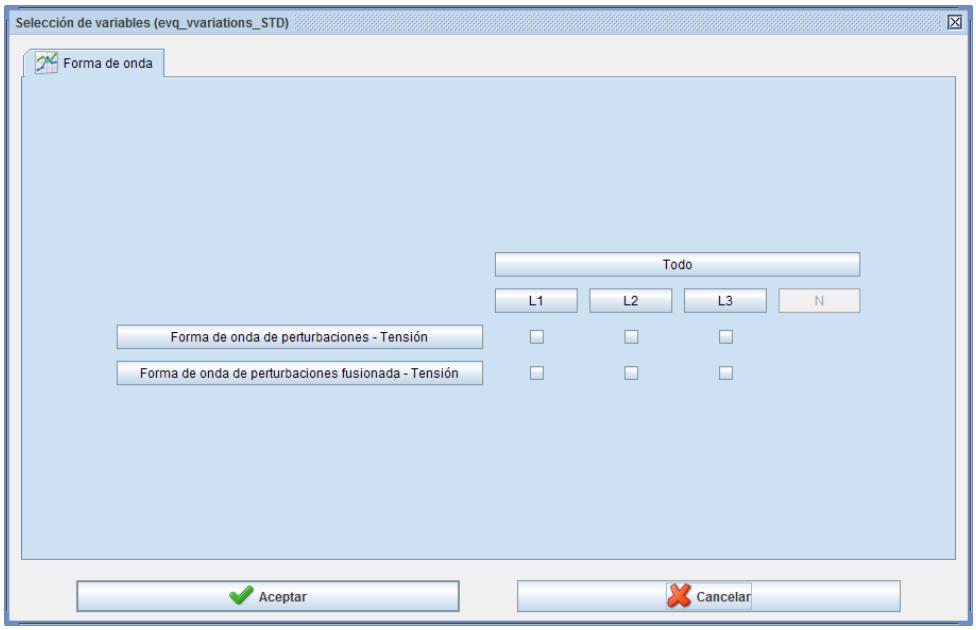


Figure 282: Variables selection screen for wave shapes.

To see the difference between the standard and merged displays of different wave shapes, first select just the standard wave shape and then just the merged wave shapes to see the advantages of the second option.

To view the standard graphic, select the first three variables:

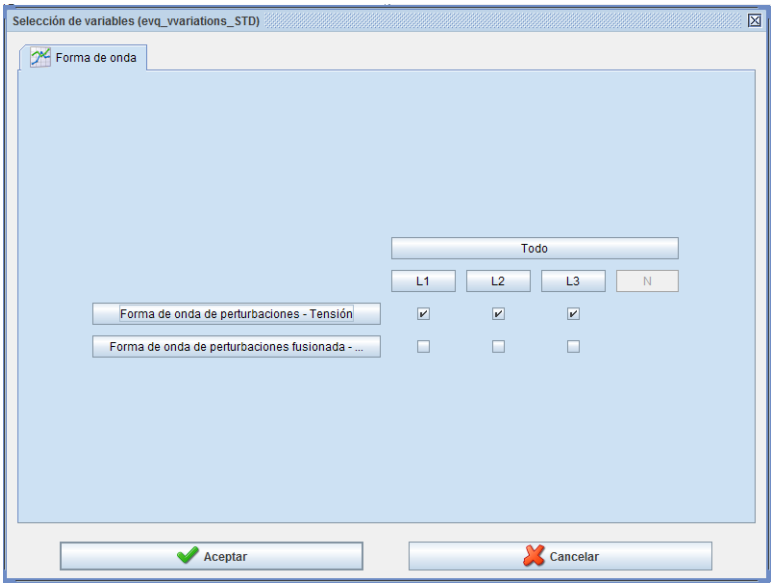


Figure 283:Variables selection screen for wave shapes

Suppose we obtain the following graphic:

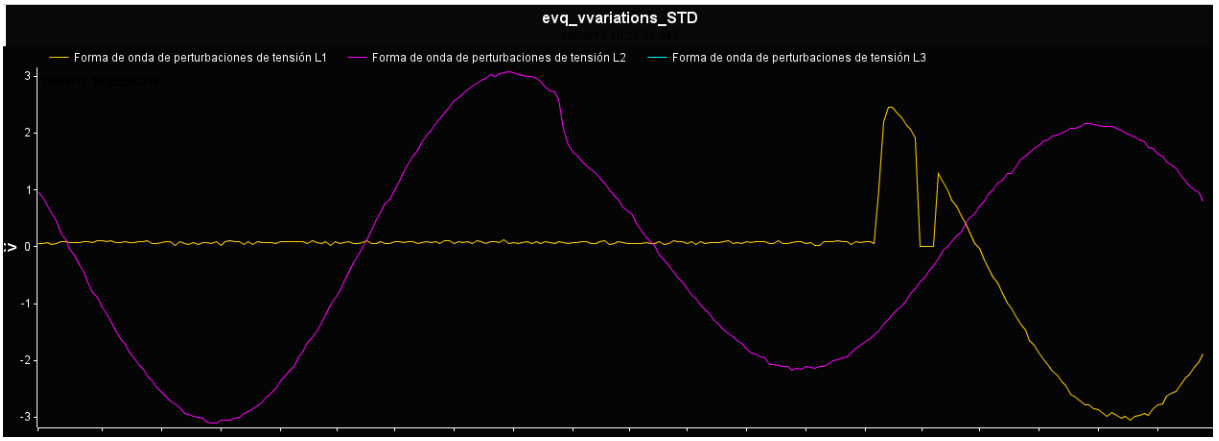


Figure 284:Voltage L1 and L2 wave shapes

We can see that only L1 and L2 appear. If we select "**Next**" on the toolbar at the bottom of the graphic, L3 will appear:

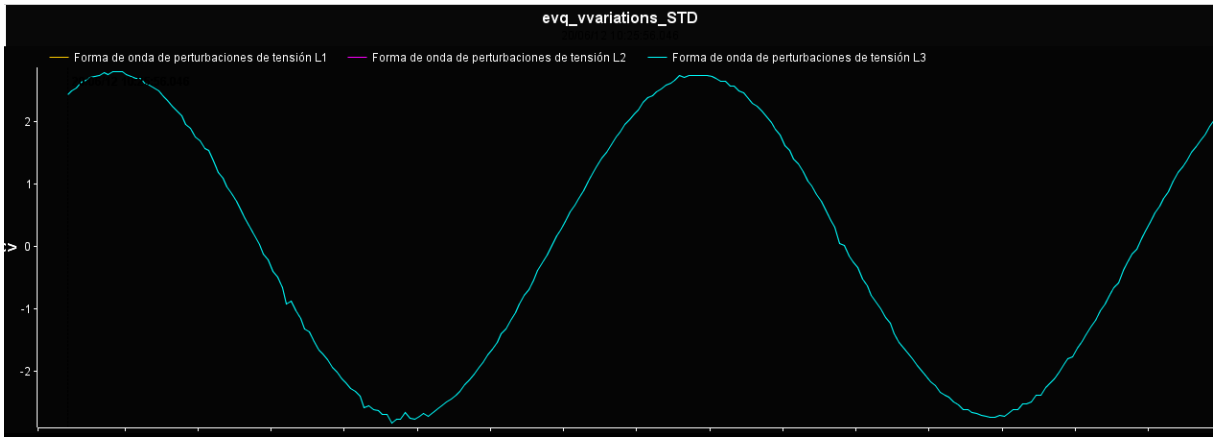


Figure 285:L3 wave shape

You can see that the voltage L3 wave shape is out of phase in terms of time with the other two wave shapes. Because of this, the programme displays the voltages separately, so that in order to see all the

wave shapes you have to move between graphics.

The merged wave shape function makes sense if you want to see the waves on a single graphic.
To do so, in the graphic variables selection window choose the following three variables and leave the first three unselected:

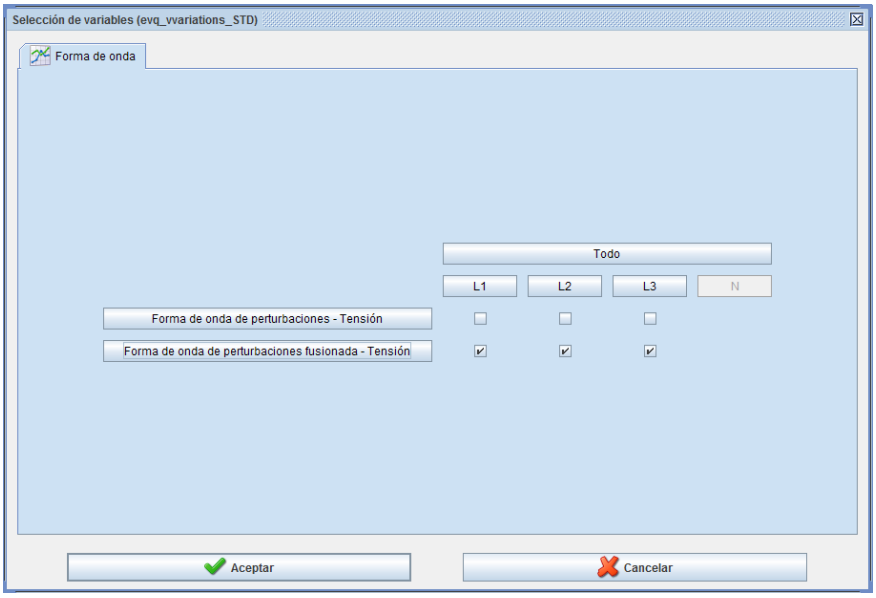


Figure 286:Variables selection screen for wave shapes

This is how to use the merged variables wave shape feature.
The three wave shapes are displayed in a single, much more compact and convenient graphic, despite being out of phase with each other (L3 with respect to L1 and L2).

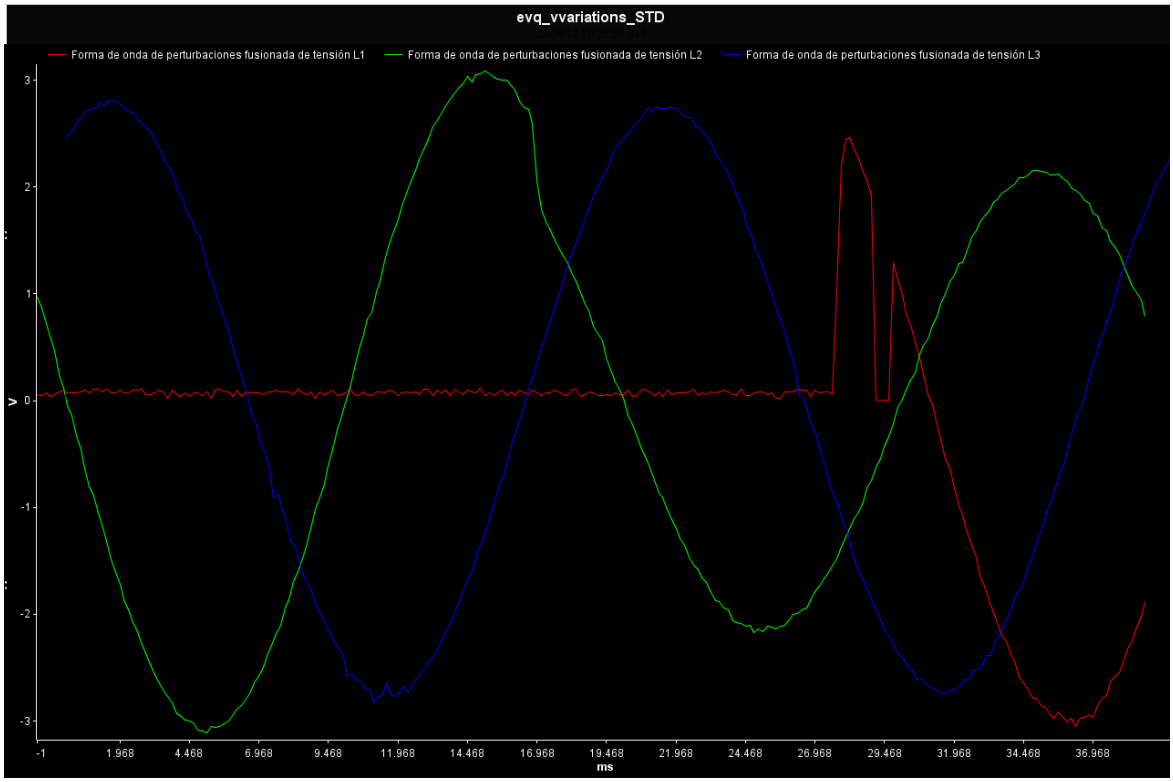


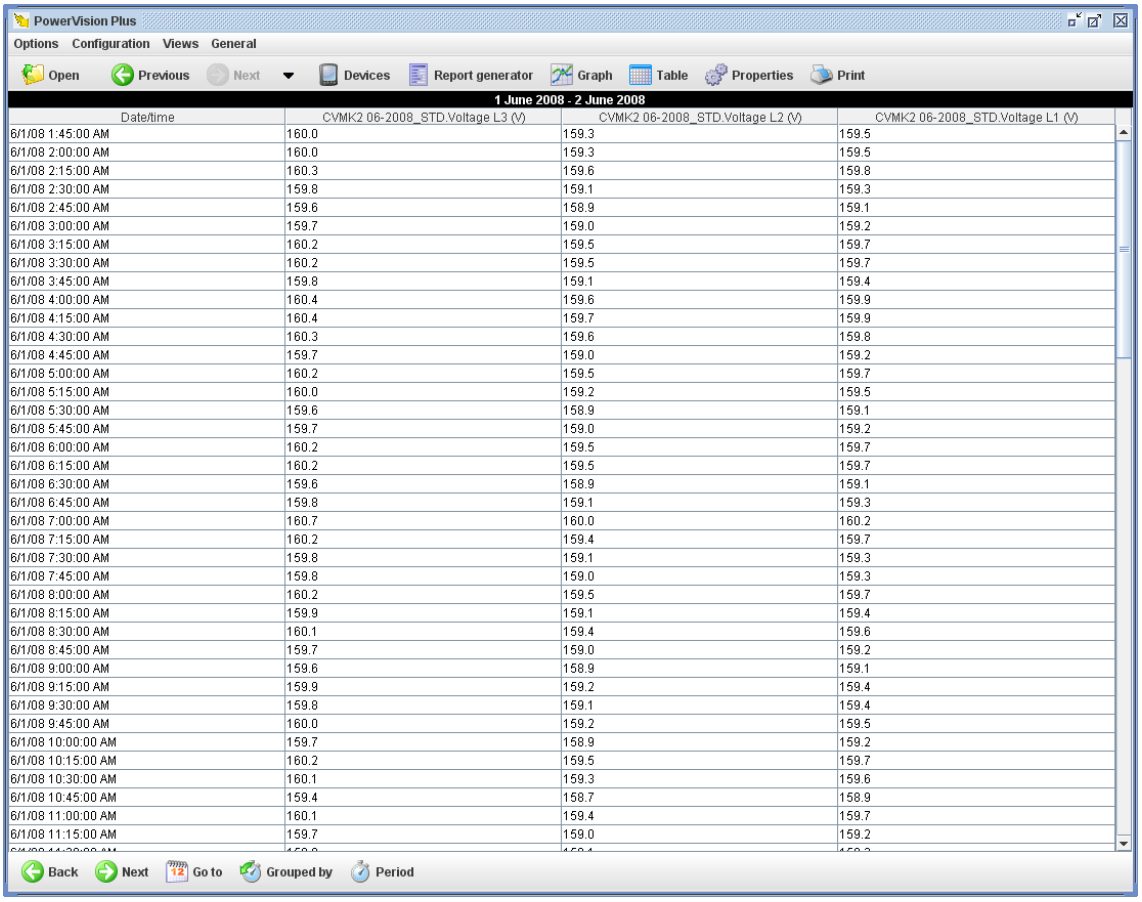
Figure 287:Merged wave shapes graphic

7.2.- CREATE A TABLE

Another important tool offered by the application is the ability to create tables of the variables of devices.

Access this view using the "**Views**" menu option, then "**Studio**" and finally "**Table**" or directly from the "**Table**" button in the toolbar. You can create predefined tables using the buttons defined for this purpose in some types of monitoring views of a device (e.g., in **QNA** monitoring view).

Typically, to create a table it is necessary to choose what variables from which devices will be part of it. The selection of these variables is carried out in the same manner as for generating a graphic. Selection produces a table like this:



Date/time	CVMK2 06-2008_STD.Voltage L3 (V)	CVMK2 06-2008_STD.Voltage L2 (V)	CVMK2 06-2008_STD.Voltage L1 (V)
6/1/08 1:45:00 AM	160.0	159.3	159.5
6/1/08 2:00:00 AM	160.0	159.3	159.5
6/1/08 2:15:00 AM	160.3	159.6	159.8
6/1/08 2:30:00 AM	159.8	159.1	159.3
6/1/08 2:45:00 AM	159.6	158.9	159.1
6/1/08 3:00:00 AM	159.7	159.0	159.2
6/1/08 3:15:00 AM	160.2	159.5	159.7
6/1/08 3:30:00 AM	160.2	159.5	159.7
6/1/08 3:45:00 AM	159.8	159.1	159.4
6/1/08 4:00:00 AM	160.4	159.6	159.9
6/1/08 4:15:00 AM	160.4	159.7	159.9
6/1/08 4:30:00 AM	160.3	159.6	159.8
6/1/08 4:45:00 AM	159.7	159.0	159.2
6/1/08 5:00:00 AM	160.2	159.5	159.7
6/1/08 5:15:00 AM	160.0	159.2	159.5
6/1/08 5:30:00 AM	159.6	158.9	159.1
6/1/08 5:45:00 AM	159.7	159.0	159.2
6/1/08 6:00:00 AM	160.2	159.5	159.7
6/1/08 6:15:00 AM	160.2	159.5	159.7
6/1/08 6:30:00 AM	159.6	158.9	159.1
6/1/08 6:45:00 AM	159.8	159.1	159.3
6/1/08 7:00:00 AM	160.7	160.0	160.2
6/1/08 7:15:00 AM	160.2	159.4	159.7
6/1/08 7:30:00 AM	159.8	159.1	159.3
6/1/08 7:45:00 AM	159.8	159.0	159.3
6/1/08 8:00:00 AM	160.2	159.5	159.7
6/1/08 8:15:00 AM	159.9	159.1	159.4
6/1/08 8:30:00 AM	160.1	159.4	159.6
6/1/08 8:45:00 AM	159.7	159.0	159.2
6/1/08 9:00:00 AM	159.6	158.9	159.1
6/1/08 9:15:00 AM	159.9	159.2	159.4
6/1/08 9:30:00 AM	159.8	159.1	159.4
6/1/08 9:45:00 AM	160.0	159.2	159.5
6/1/08 10:00:00 AM	159.7	158.9	159.2
6/1/08 10:15:00 AM	160.2	159.5	159.7
6/1/08 10:30:00 AM	160.1	159.3	159.6
6/1/08 10:45:00 AM	159.4	158.7	158.9
6/1/08 11:00:00 AM	160.1	159.4	159.7
6/1/08 11:15:00 AM	159.7	159.0	159.2

Figure 288: value table

Note that the typical value table consists of three parts:

- **Title:** This usually indicates what data period is displayed, although in special tables it may contain other information.
- **Body:** This contains a series of columns with the values each variable has in each record. Each column is a variable and contains a header with the same title.
- **Toolbar:** As in the graphic, the grouping and the displayed data period can be configured

There is a direct equivalence between the tables and graphics, in other words, the same type of graphic and table show the same values but in different formats and, obviously, with different configuration capacities.

This feature is used by the application to deduce what graphic or table to create when on a graphic or table display. That is, if a graphic is displayed and client table button is clicked, **PowerStudio** will deduce that a table of the variables represented in the graphic is requested, and will immediately display it. Likewise, if a table is displayed and the graphic button is clicked, the application will deduce that a graphic of the variables shown on the table is desired.

The operation of the toolbar is absolutely the same as the operation of the same bar on the graphic view.

It is possible to configure some aspects using the table "**Properties**" option. This option can be accessed using the "**Options**" menu, "**Properties**" sub-menu, or directly with the "**Properties**" button on the main toolbar.

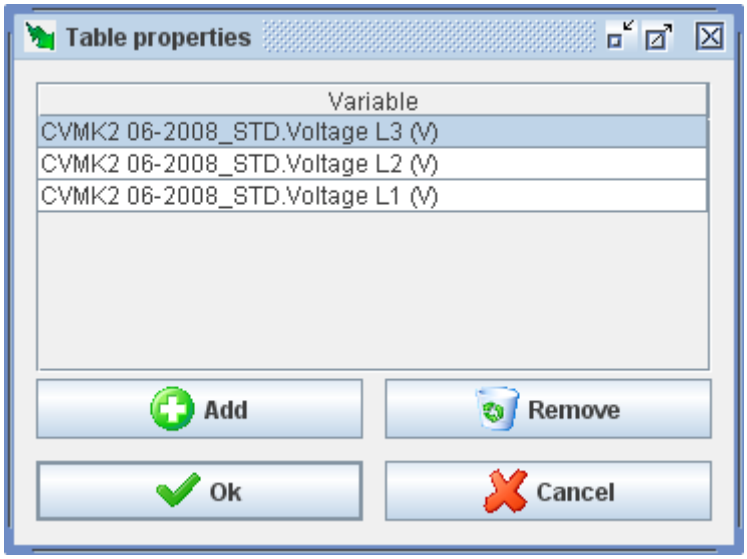


Figure 289:Table properties window

Use this window to add new variables to the table in the same way as they are added to the graphic, by clicking on "**Add**". It is also possible to delete variables from the table, simply by selecting the desired variables and clicking on the "**Remove**" button.

As with the graphics, the user can print the current table at any time using the "**Print**" option in the "**Options**" menu of the main menu or the "**Print**" button of the upper toolbar.

It is also possible to export this table by clicking "**Export**" in the "**Options**" menu of the main menu. You can select the file type, the column and decimal separator symbols, choose to save dates and times in one or two columns, and whether you want to export the entire document or just the selected rows.

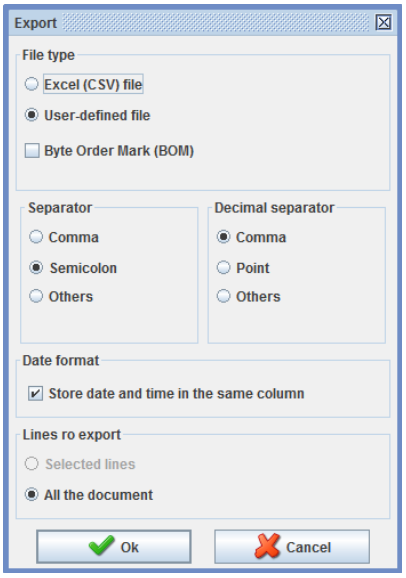
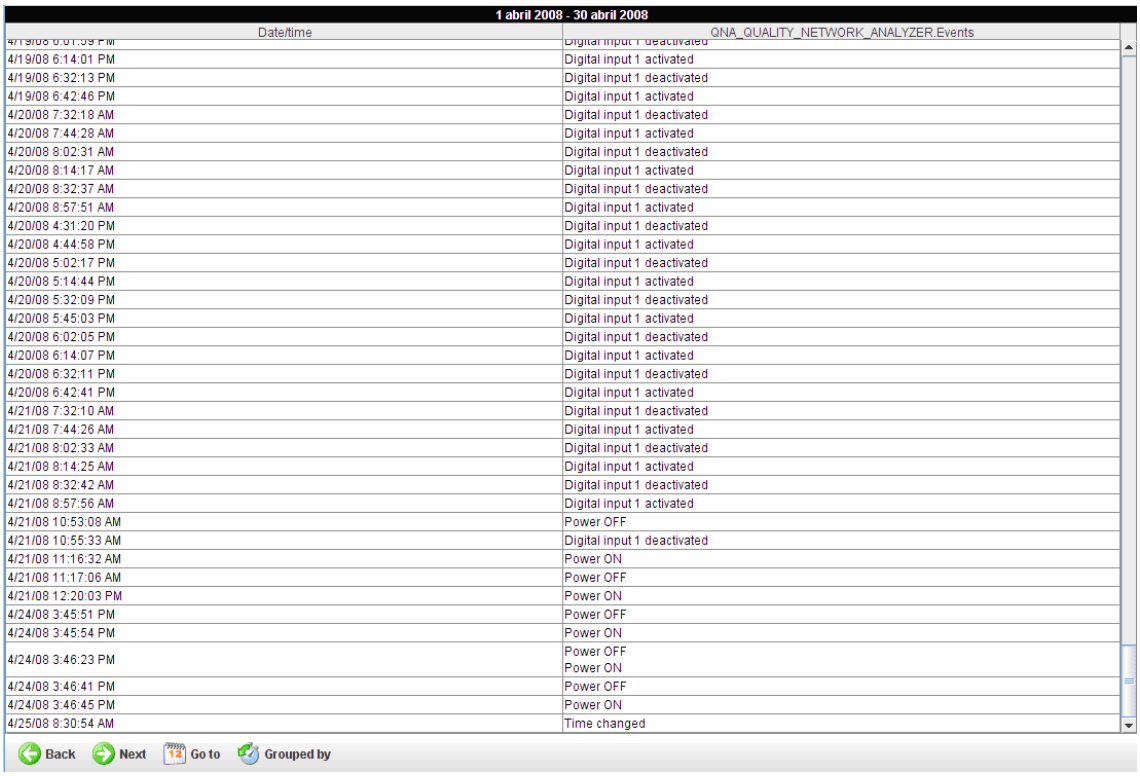


Figure 290:Export table window

A common feature in all tables is that they can be sorted by columns by clicking on them. By default, tables usually appear sorted by date, usually the first column, but they can be ordered by other variables. Clicking on the title of a column will place it in ascending order, clicking again on the same place sets it in descending order, and a third click will bring it back to its original format.

It is also possible to order a column so that a second column can later be ordered based upon the first. For example, for a column representing a category type pertaining to each row, and another representing a numerical value associated with each row, the category column may be ordered first by clicking on its title, and afterwards, while holding the "CTRL" key, click the magnitude column (once for ascending order or twice for descending order). This will order the table by group, and within each group, by size.

QNA equipment allows a special table to be created called "**Events**" that lets you view a list of events recorded by the equipment. This table can only be viewed from the corresponding button on the device monitoring screen and does not correspond with any graphic view.



1 abril 2008 - 30 abril 2008

Date/time	QNA_QUALITY_NETWORK_ANALYZER.Events
4/19/08 6:01:59 PM	Digital input 1 deactivated
4/19/08 6:14:01 PM	Digital input 1 activated
4/19/08 6:32:13 PM	Digital input 1 deactivated
4/19/08 6:42:46 PM	Digital input 1 activated
4/20/08 7:32:18 AM	Digital input 1 deactivated
4/20/08 7:44:28 AM	Digital input 1 activated
4/20/08 8:02:31 AM	Digital input 1 deactivated
4/20/08 8:14:17 AM	Digital input 1 activated
4/20/08 8:32:37 AM	Digital input 1 deactivated
4/20/08 8:57:51 AM	Digital input 1 activated
4/20/08 4:31:20 PM	Digital input 1 deactivated
4/20/08 4:44:58 PM	Digital input 1 activated
4/20/08 5:02:17 PM	Digital input 1 deactivated
4/20/08 5:14:44 PM	Digital input 1 activated
4/20/08 5:32:09 PM	Digital input 1 deactivated
4/20/08 5:45:03 PM	Digital input 1 activated
4/20/08 6:02:05 PM	Digital input 1 deactivated
4/20/08 6:14:07 PM	Digital input 1 activated
4/20/08 6:32:11 PM	Digital input 1 deactivated
4/20/08 6:42:41 PM	Digital input 1 activated
4/21/08 7:32:10 AM	Digital input 1 deactivated
4/21/08 7:44:26 AM	Digital input 1 activated
4/21/08 8:02:33 AM	Digital input 1 deactivated
4/21/08 8:14:25 AM	Digital input 1 activated
4/21/08 8:32:42 AM	Digital input 1 deactivated
4/21/08 8:57:56 AM	Digital input 1 activated
4/21/08 10:53:08 AM	Power OFF
4/21/08 10:55:33 AM	Digital input 1 deactivated
4/21/08 11:16:32 AM	Power ON
4/21/08 11:17:06 AM	Power OFF
4/21/08 12:20:03 PM	Power ON
4/24/08 3:45:51 PM	Power OFF
4/24/08 3:45:54 PM	Power ON
4/24/08 3:46:23 PM	Power OFF Power ON
4/24/08 3:46:41 PM	Power OFF
4/24/08 3:46:45 PM	Power ON
4/25/08 8:30:54 AM	Time changed

Figure 291:QNA events table

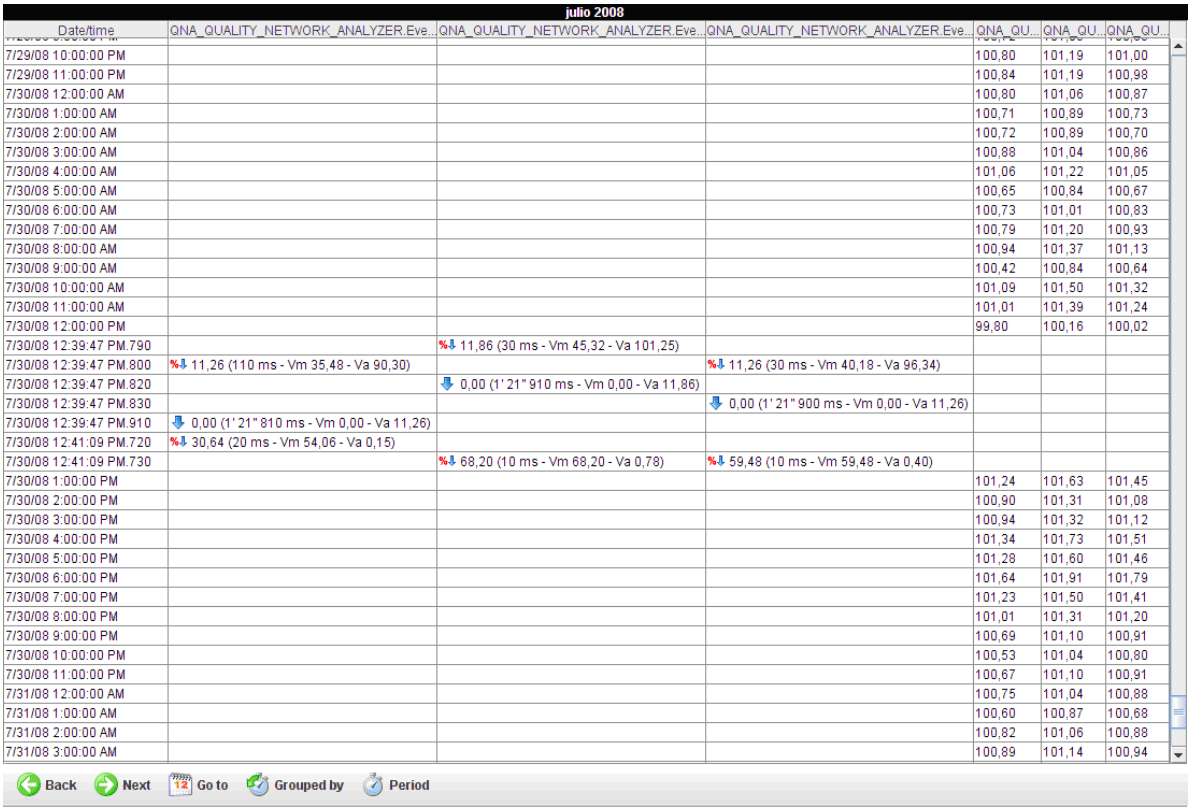
The table has two columns: the first is the date and time when the incident occurred, and the second is its description.

As you can see, this table does not allow the properties of the screen to be changed, nor the variable period (which would not, on the other hand, make any sense). However it is possible to print it in same way as other tables.

Special graphics have their equivalent table, and therefore we have table equivalents for harmonics graphics, wave shape, logged events, duration of events and effective voltage semi-cycle events.

The logged events table is peculiar in that for every event a great deal of information may be displayed:

- **Event Type:** An icon at the beginning of the report will indicate whether it is a sag, a interruption or an overvoltage.
- **Value of the event:** Indicates the most representative event value. In the case of an overvoltage this value is the highest recorded by the event, in other cases it is the minimum value reached. It is expressed as a percentage of the nominal voltage.
- **Duration:** The first value in brackets indicates the duration of the event.
- **Average voltage:** Indicates average voltage of the event, expressed as a percentage of the nominal voltage.
- **Previous voltage:** Indicates the voltage present at the beginning of the event, expressed as a percentage of the nominal voltage.



julio 2008

Date/time	QNA_QUALITY_NETWORK_ANALYZER.Eve...	QNA_QUALITY_NETWORK_ANALYZER.Eve...	QNA_QUALITY_NETWORK_ANALYZER.Eve...	QNA_QU...	QNA_QU...	QNA_QU...
7/29/08 10:00:00 PM				100,80	101,19	101,00
7/29/08 11:00:00 PM				100,84	101,19	100,98
7/30/08 12:00:00 AM				100,80	101,06	100,87
7/30/08 1:00:00 AM				100,71	100,89	100,73
7/30/08 2:00:00 AM				100,72	100,89	100,70
7/30/08 3:00:00 AM				100,88	101,04	100,86
7/30/08 4:00:00 AM				101,06	101,22	101,05
7/30/08 5:00:00 AM				100,65	100,84	100,67
7/30/08 6:00:00 AM				100,73	101,01	100,83
7/30/08 7:00:00 AM				100,79	101,20	100,93
7/30/08 8:00:00 AM				100,94	101,37	101,13
7/30/08 9:00:00 AM				100,42	100,84	100,64
7/30/08 10:00:00 AM				101,09	101,50	101,32
7/30/08 11:00:00 AM				101,01	101,39	101,24
7/30/08 12:00:00 PM				99,80	100,16	100,02
7/30/08 12:39:47 PM.790		%⇩ 11,86 (30 ms - Vm 45,32 - Va 101,25)				
7/30/08 12:39:47 PM.800	%⇩ 11,26 (110 ms - Vm 35,48 - Va 90,30)		%⇩ 11,26 (30 ms - Vm 40,18 - Va 96,34)			
7/30/08 12:39:47 PM.820		⇩ 0,00 (1'21" 910 ms - Vm 0,00 - Va 11,86)				
7/30/08 12:39:47 PM.830			⇩ 0,00 (1'21" 900 ms - Vm 0,00 - Va 11,26)			
7/30/08 12:39:47 PM.910	⇩ 0,00 (1'21" 810 ms - Vm 0,00 - Va 11,26)					
7/30/08 12:41:09 PM.720	%⇩ 30,64 (20 ms - Vm 54,06 - Va 0,15)					
7/30/08 12:41:09 PM.730		%⇩ 68,20 (10 ms - Vm 68,20 - Va 0,78)	%⇩ 59,48 (10 ms - Vm 59,48 - Va 0,40)			
7/30/08 1:00:00 PM				101,24	101,63	101,45
7/30/08 2:00:00 PM				100,90	101,31	101,08
7/30/08 3:00:00 PM				100,94	101,32	101,12
7/30/08 4:00:00 PM				101,34	101,73	101,51
7/30/08 5:00:00 PM				101,28	101,60	101,46
7/30/08 6:00:00 PM				101,64	101,91	101,79
7/30/08 7:00:00 PM				101,23	101,50	101,41
7/30/08 8:00:00 PM				101,01	101,31	101,20
7/30/08 9:00:00 PM				100,69	101,10	100,91
7/30/08 10:00:00 PM				100,53	101,04	100,80
7/30/08 11:00:00 PM				100,67	101,10	100,91
7/31/08 12:00:00 AM				100,75	101,04	100,88
7/31/08 1:00:00 AM				100,60	100,87	100,68
7/31/08 2:00:00 AM				100,82	101,06	100,88
7/31/08 3:00:00 AM				100,89	101,14	100,94

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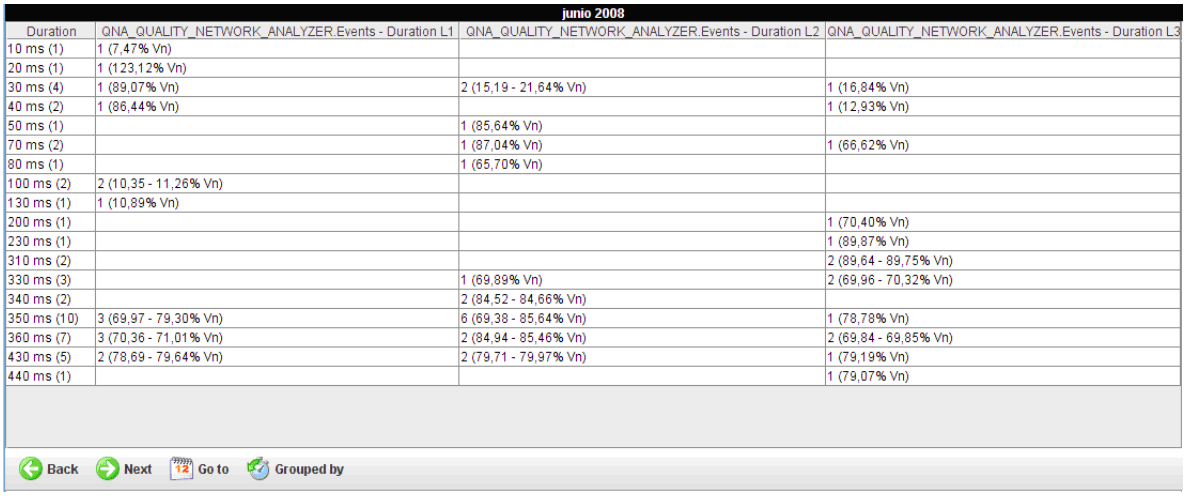
Figure 292:Event duration table

The event duration table displays a list wherein the first column contains the duration of events in the interval shown. Aside from the duration in itself, it shows the number of events in the interval with the same duration (irrespective of the phase).

In each variable column the number of events from that phase is indicated and between brackets the event value (if there is more than one event in this phase with equal duration, the minimum and maximum value of the events of the same duration in this phase are indicated).



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Duration	QNA_QUALITY_NETWORK_ANALYZER.Events - Duration L1	QNA_QUALITY_NETWORK_ANALYZER.Events - Duration L2	QNA_QUALITY_NETWORK_ANALYZER.Events - Duration L3
10 ms (1)	1 (7,47% Vn)		
20 ms (1)	1 (123,12% Vn)		
30 ms (4)	1 (89,07% Vn)	2 (15,19 - 21,64% Vn)	1 (16,84% Vn)
40 ms (2)	1 (86,44% Vn)		1 (12,93% Vn)
50 ms (1)		1 (85,64% Vn)	
70 ms (2)		1 (87,04% Vn)	1 (66,62% Vn)
80 ms (1)		1 (65,70% Vn)	
100 ms (2)	2 (10,35 - 11,26% Vn)		
130 ms (1)	1 (10,89% Vn)		
200 ms (1)			1 (70,40% Vn)
230 ms (1)			1 (89,87% Vn)
310 ms (2)			2 (89,64 - 89,75% Vn)
330 ms (3)		1 (69,89% Vn)	2 (69,96 - 70,32% Vn)
340 ms (2)		2 (84,52 - 84,66% Vn)	
350 ms (10)	3 (69,97 - 79,30% Vn)	6 (69,38 - 85,64% Vn)	1 (78,78% Vn)
360 ms (7)	3 (70,36 - 71,01% Vn)	2 (84,94 - 85,46% Vn)	2 (69,84 - 69,85% Vn)
430 ms (5)	2 (78,69 - 79,64% Vn)	2 (79,71 - 79,97% Vn)	1 (79,19% Vn)
440 ms (1)			1 (79,07% Vn)

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Figure 293:Event duration table

Harmonic and wave shape tables show the same information as the equivalent graphic but as a list. However, the effective semi-cycle voltage table shows more information.

7/12/08 8:23:04 PM.320
QNA_QUALITY_NETWORK_ANALYZER.Events - Semicycle effective voltage L2: Sag (20 ms), 89,60 % Vn (Vm 89,63 % Vn, Va 90,03 % Vn)
QNA_QUALITY_NETWORK_ANALYZER.Events - Semicycle effective voltage L3: Sag (10 ms), 89,70 % Vn (Vm 89,70 % Vn, Va 90,21 % Vn)

Date/time	QNA_QUALITY_NETWORK_ANALYZER.Events ...	QNA_QUALITY_NETWORK_ANALYZER.Events ...	QNA_QUALITY_NETWORK_ANALYZER.Events ...
7/12/08 8:23:03 PM.820		231,81	231,53
7/12/08 8:23:03 PM.830		231,66	231,48
7/12/08 8:23:03 PM.840		231,78	231,64
7/12/08 8:23:03 PM.850		231,73	231,51
7/12/08 8:23:03 PM.860		231,68	231,51
7/12/08 8:23:03 PM.870		231,76	231,59
7/12/08 8:23:03 PM.880		231,81	231,53
7/12/08 8:23:03 PM.890		231,81	231,56
7/12/08 8:23:03 PM.900		231,63	231,61
7/12/08 8:23:03 PM.910		231,91	231,71
7/12/08 8:23:03 PM.920		231,86	231,69
7/12/08 8:23:03 PM.930		231,53	231,51
7/12/08 8:23:03 PM.940		231,53	231,51
7/12/08 8:23:03 PM.950		231,53	231,61
7/12/08 8:23:03 PM.960		231,84	231,74
7/12/08 8:23:03 PM.970		231,76	231,71
7/12/08 8:23:03 PM.980		231,58	231,48
7/12/08 8:23:03 PM.990		231,60	231,25
7/12/08 8:23:04 PM.000		231,32	231,30
7/12/08 8:23:04 PM.010		231,43	231,41
7/12/08 8:23:04 PM.020		231,50	231,35
7/12/08 8:23:04 PM.030		231,48	231,46
7/12/08 8:23:04 PM.040		231,73	231,51
7/12/08 8:23:04 PM.050		231,58	231,30
7/12/08 8:23:04 PM.060		231,37	231,25
7/12/08 8:23:04 PM.070		231,53	231,30
7/12/08 8:23:04 PM.080		231,60	231,38
7/12/08 8:23:04 PM.090		231,50	231,48
7/12/08 8:23:04 PM.100		231,68	231,61
7/12/08 8:23:04 PM.110		231,60	231,48
7/12/08 8:23:04 PM.120		231,50	231,33
7/12/08 8:23:04 PM.130		231,66	231,46
7/12/08 8:23:04 PM.140		231,71	231,56
7/12/08 8:23:04 PM.150		231,66	231,53
7/12/08 8:23:04 PM.160		231,53	231,41

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Figure 294:Effective semi-cycle voltage table

As shown in the table title, data relative to the captured event is indicated, namely the date, type, duration, value, average voltage of the event and the previous voltage.

7.3.- ACCESS TO REGISTERS

The software also has the option of accessing the registers of the files that have been imported into the programme.

To access a register, select the required file in the file menu and then click on the "**Registers**" option in the main toolbar. You can also click on the "**Registers**" option that appears on the properties panel to the right (next to the "**Header information**" button) once you have selected the file.

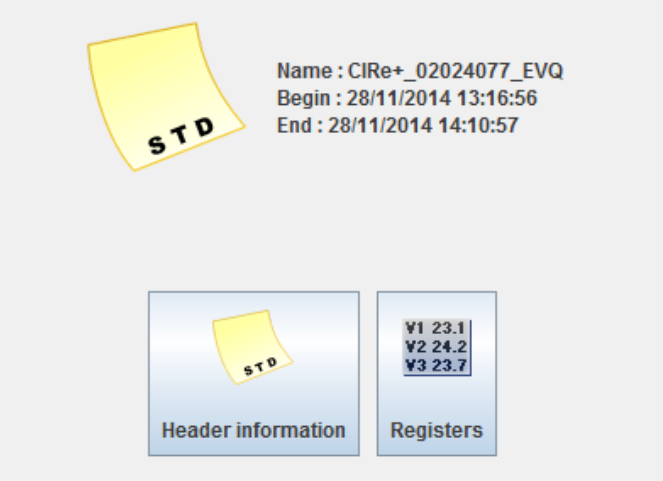


Figure 295:File properties panel with registers.

Once you have selected this option, the Registers screen will appear:

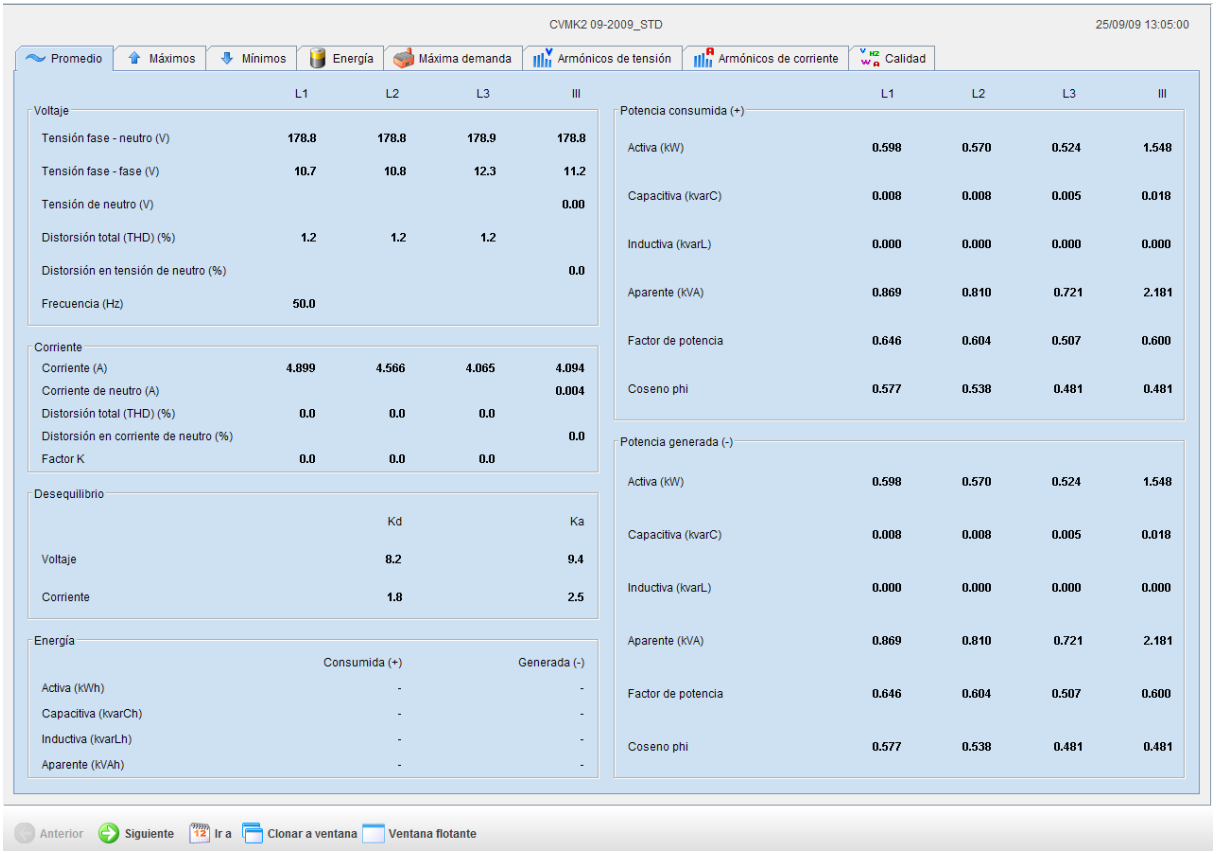


Figure 296:Registers screen

Here you can see the different data logged by the device at a particular date and time, which is shown at the top right of the screen. This screen varies depending on the device for the selected file.

You can navigate through the different tabs (which vary depending on the device and will not always be the same) to view the data that is of interest to you.

The following functions are available on the Logs window toolbar:

- **Previous:** enables you to view the data saved in the log for the previous period. Initially this option will not be active as when you open the logs window, it will show the first log saved in the file.

- **Next:** enables you to view the data saved in the log for the next period. When you are in the log for the last period, this option will be disabled.

- **Go to:** enables you to look up data for a date and time defined by the user. If you select a date / time after the last one saved in the log, the logs window shows you the data for the last log saved. Likewise, if you select a date / time before the first one saved in the log, the window will show the first log saved. In both cases it will show the date and time of the log displayed on the screen. The window that appears with this function is as follows:

Figure 297:Dialogue box to select log date

- **Clone window:** Enables you to make a copy of the current log in a new window, keeping the original log in the main window.

- **Floating window:** Enables you to move the current log to a new floating window so that the main window where it originally appeared disappears.

In the header information of the file that contains the log you can see the number of variables that each log contains, the total number of logs that have been created and the period of the log (time elapsed between consecutive logs in [hh:mm:ss] format).

8.- LANGUAGE MANAGEMENT

To change the application's language, select the "**General**" menu and then select "**Language**".

The available languages for the application will be listed in the pop-up menu. If you click on a language option different to the selected language, the application will reload all texts automatically without restarting the application.

By default, **PowerVision Plus** remembers the last language selection. Therefore, the next time you run the application the text will appear in that language.

	The available languages depend on the installation.

9.- MANAGING UNITS AND DECIMALS

The **PowerVision Plus** application allows the user to specify which units and decimals to apply when displaying the data on devices and files. It is important to note that this property is only for configuring how the data on tables and graphics will be displayed and has nothing to do with configuring the accuracy in devices.

The units and decimals you can modify refer to the following values: voltage, current, active power, (and apparent power), reactive power, active energy, reactive energy, apparent energy, harmonic distortion, frequency and harmonics.

To configure units and decimals, go to the "**General**" option on the main menu and select the "**Units**" option.

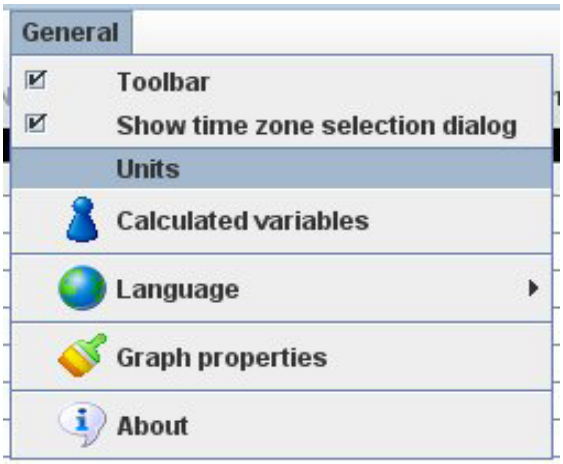


Figure 298: General menu.

The dialogue box for configuring units and decimals is as follows:

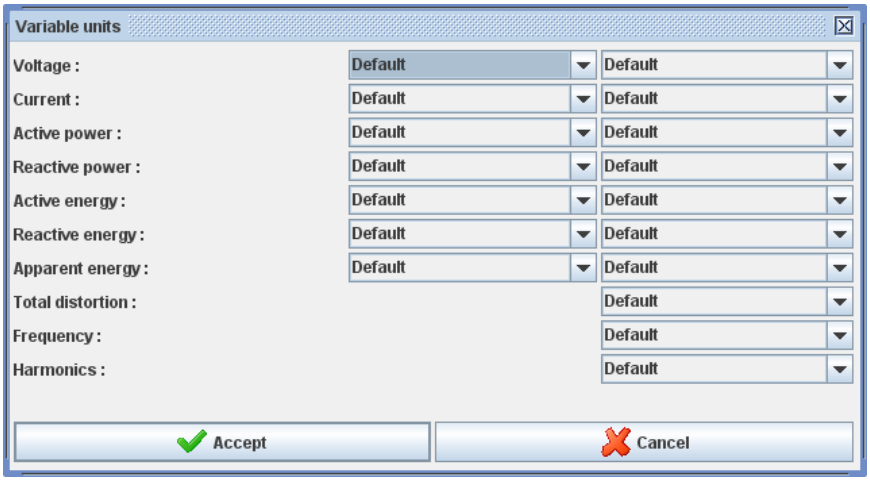


Figure 299: Units and decimals configuration.

For each type of variable you can configure the value of the units in the first column and the value of decimals in the second column. For each value, you can select any available value from the list or leave the pre-determined value for the variable by keeping the "**Default**" option selected.

For total distortion, harmonics and frequency, you can only modify the decimals since the units do not apply factor.
To change the configuration, click on "**Accept**". Wait for the application to update the configuration.

10.- SOFTWARE UPDATE

When starting the application, **PowerVision Plus** automatically checks the version you have installed is the latest available. If you have an outdated version, the application will display a bar at the bottom of the screen with the following icon:

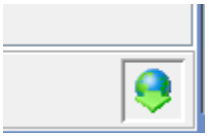
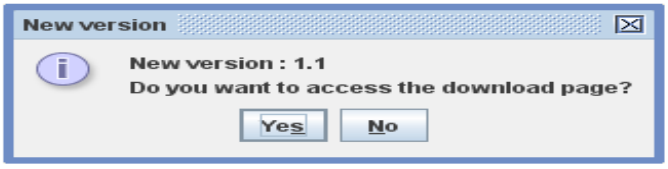
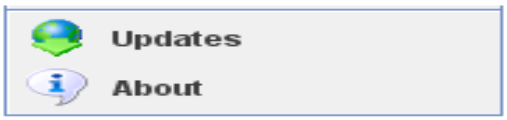


Figure 300: Icon will access the last version.

Click the icon will access the download page the latest version.



You can also access the download page from the **General** menu and **Updates** option. This option will only appear in the event that there is a newer version.



To enable the application to use the service of checking for updates, the application must access an Internet connection.

11.- APPENDIX

11.1.- VARIABLES

To use the references to variables measured by the devices, you need to know how each one of them is coded by the software.

The basic encoding comprises the device name and the variable code separated by a dot.

name.variable

In this way the software will know which variable is involved and which device to ask for its value.
This code (name-variable) can be used in reports, graphics and tables. Bear in mind that you can only view the variables that are stored in the historical value files.
For a better understanding, the variables are displayed in separate tables depending on the type of variable measured by the devices. The top rows correspond to the type of variable measured: whether the variable is instantaneous, maximum or minimum, the phase to which it relates, or any other information depending on the variable, and finally the code used (for example the instantaneous phase-neutral voltage of phase 1 will correspond to the code VI1). On the other hand, the columns to the left of each table will correspond to devices that can measure each of the variables, indicating with an 'X' if the variable will be measured by the device and with an 'O' if the variable will be measured depending on the version of the device or its configuration.

11.1.1.- VOLTAGES

Table 12: Phase - Neutral voltage

	Phase – neutral voltage											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	VI1	VI2	VI3	VI	VMX1	VMX2	VMX3	VMX	VMN1	VMN2	VMN3	VMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	O	O	O									

Table 13: Phase-phase voltage

	Phase-phase voltage											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	VI12	VI23	VI31	VI123	VMX12	VMX23	VMX31	VMX123	VMN12	VMN23	VMN31	VMN123
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	O	O	O									

Table 14: Nominal voltage

	Nominal voltage		
	Instantaneous		
	L1	L2	L3
	VPNOMI1	VPNOMI2	VPNOMI3
QNA	X	X	X

Table 15: Neutral voltage

	Neutral voltage		
	Instantaneous	Maximum	Minimum
	VNI	VNMX	VNMN
CVM K2	X	0	0
QNA	0		

Table 16: Absolute minimum voltage

	Absolute minimum - voltage					
	All registers			Valid registers		
	L1	L2	L3	L1	L2	L3
	V1MINT	V2MINT	V3MINT	V1MINV	V2MINV	V3MINV
QNA	0	0	0	0	0	0

Table 17: Voltage - Lower percentile (5%)

	Voltage – Lower percentile [5%]					
	All registers			Valid registers		
	L1	L2	L3	L1	L2	L3
	V1INFT	V2INFT	V3INFT	V1INFV	V2INFV	V3INFV
QNA	0	0	0	0	0	0

Table 18:Voltage - Higher percentile (95%)

	Votlage – Higher percentile [95%]					
	All registers			Valid registers		
	L1	L2	L3	L1	L2	L3
	V1SUPT	V2SUPT	V3SUPT	V1SUPV	V2SUPV	V3SUPV
QNA	0	0	0	0	0	0

Table 19: Voltage - Absolute maximum.

	Voltage – Absolute maximum					
	All registers			Valid registers		
	L1	L2	L3	L1	L2	L3
	V1MAXT	V2MAXT	V3MAXT	V1MAXV	V2MAXV	V3MAXV
QNA	0	0	0	0	0	0

Table 20: Voltage distorsion.

	Voltage distorsion								
	Instantaneous			Maximum			Minimum		
	L1	L2	L3	L1	L2	L3	L1	L2	L3
	DVI1	DVI2	DVI3	DVMX1	DVMX2	DVMX3	DVMN1	DVMN2	DVMN3
CVMBDM1M	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X
QNA	X	X	X						

Table 21: Distorsion in neutral voltage

	Distorsion in neutral voltage		
	Instantaneous	Maximum	Minimum
	DVNI	DVNMX	DVNMN
CVM K2	X	X	X

Table 22: Voltage distorsion - Higher percentile (95%)

	Voltage distorsion – Higher percentile [95%]							
	All registers				Valid registers			
	L1	L2	L3	III	L1	L2	L3	III
	DV1SUPT	DV2SUPT	DV3SUPT	DVSUPT	DV1SUPV	DV2SUPV	DV3SUPV	DVSUPV
QNA	0	0	0	0	0	0	0	0

11.1.2.- CURRENT

Table 23: Current

	Current											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	AI1	AI2	AI3	AI	AMX1	AMX2	AMX3	AMX	AMN1	AMN2	AMN3	AMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	0	0	0									

Table 24: Neutral current.

	Neutral current		
	Instantaneous	Maximum	Minimum
	ANI	ANMX	ANMN
CVMBDM1M	X	X	X
CVM K2	X	X	X
QNA	0		

Table 25: Current distorsion.

	Current distorsion								
	Instantaneous			Maximum			Minimum		
	L1	L2	L3	L1	L2	L3	L1	L2	L3
	DAI1	DAI2	DAI3	DAMX1	DAMX2	DAMX3	DAMN1	DAMN2	DAMN3
CVMBDM1M	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X
QNA	0	0	0						

Table 26: Distorsion in neutral current

	Distorsion in neutral current		
	Instantaneous	Maximum	Minimum
	DANI	DANMX	DANMN
CVM K2	X	X	X

11.1.3.- FREQUENCY

Table 27:Frequency

	Frequency		
	Instantaneous	Maximum	Minimum
	HZI	HZMX	HZMN
CVMBDM1M	X	X	X
CVM K2	X	X	X
QNA	X		

Table 28: Frequency - Absolute minimum

	Frequency – Absolute minimum	
	All registers	Valid registers
	HZMINT	HZMINV
QNA	0	0

Table 29: Frequency - Lower percentile (5%)

	Frequency – Lower percentile [5%]	
	All registers	Valid registers
	HZINFT	HZINFV
QNA	0	0

Table 30:Frequency - Higher percentile (95%)

	Frequency – Higher percentile [95%]	
	All registers	Valid registers
	HZSUPT	HZSUPV
QNA	0	0

Table 31: Frequency - Absolute maximum.

	Frequency – Absolute maximum	
	All registers	Valid registers
	HZMAXT	HZMAXV
QNA	0	0

11.1.4.- POWER

Table 32: Apparent power consumed.

	Apparent power consumed											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	VAI1	VAI2	VAI3	VAI	VAMX1	VAMX2	VAMX3	VAMX	VAMN1	VAMN2	VAMN3	VAMN
CVMBDM1M				X				X				X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA				O								

Table 33: Apparent power generated.

	Apparent power generated											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	NVAI1	NVAI2	NVAI3	NVAI	NVAMX1	NVAMX2	NVAMX3	NVAMX	NVAMN1	NVAMN2	NVAMN3	NVAMN
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA				O								

Table 34: Active power consumed

	Active power consumed											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	API1	API2	API3	API	APMX1	APMX2	APMX3	APMX	APMN1	APMN2	APMN3	APMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	O	O	O									

Table 35: Active power generated

	Active power generated											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	NAPI1	NAPI2	NAPI3	NAPI	NAPMX1	NAPMX2	NAPMX3	NAPMX	NAPMN1	NAPMN2	NAPMN3	NAPMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	O	O	O									

Table 36: Capacite power consumed.

	Capacitive power consumed											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	CPI1	CPI2	CPI3	CPI	CPMX1	CPMX2	CPMX3	CPMX	CPMN1	CPMN2	CPMN3	CPMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	O	O	O									

Table 37: Capacitive power generated

	Capacitive power generated											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	NCPI1	NCPI2	NCPI3	NCPI	NCPMX1	NCPMX2	NCPMX3	NCPMX	NCPMN1	NCPMN2	NCPMN3	NCPMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	0	0	0									

Table 38: Inductive power consumed.

	Inductive power consumed											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	IPI1	IPI2	IPI3	IPI	IPMX1	IPMX2	IPMX3	IPMX	IPMN1	IPMN2	IPMN3	IPMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	0	0	0									

Table 39: Inductive power generated.

	Inductive power generated											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	NIPI1	NIPI2	NIPI3	NIPI	NIPMX1	NIPMX2	NIPMX3	NIPMX	NIPMN1	NIPMN2	NIPMN3	NIPMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	0	0	0									

Table 40: Power factor consumed.

	Power factor consumed											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	PFI1	PFI2	PFI3	PFI	PFMX1	PFMX2	PFMX3	PFMX	PFMN1	PFMN2	PFMN3	PFMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	0	0	0									

Table 41: Power factor generated

	Power factor generated											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	NPFI1	NPFI2	NPFI3	NPFI	NPFMX1	NPFMX2	NPFMX3	NPFMX	NPFMN1	NPFMN2	NPFMN3	NPFMN
CVMBDM1M	X	X	X	X	X	X	X	X	X	X	X	X
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	0	0	0									

Table 42: cos Φ consumed.

	Cos φ consumed											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	COSI1	COSI2	COSI3	COSI	COSMX1	COSMX2	COSMX3	COSMX	COSMN1	COSMN2	COSMN3	COSMN
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X

Table 43:cos Φ generated

	Cos φ generated											
	Instantaneous				Maximum				Minimum			
	L1	L2	L3	III	L1	L2	L3	III	L1	L2	L3	III
	NCOSI1	NCOSI2	NCOSI3	NCOSI	NCOS-MX1	NCOS-MX2	NCOS-MX3	NCOSMX	NCOS MN1	NCOS MN2	NCOS MN3	NCOS MN
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X

11.1.5.- ENERGY

Table 44: Apparent energy

	Energía aparente			
	Consumed		Generated	
	III	Tariff y (y:1..9)	III	Tariff y (y:1..9)
	VAE	VAETy	NVAE	NVAETy
CVM K2	X	0	X	0

Table 45: Active energy consumed

	Active energy consumed								
	L1	L2	L3	III	Partial	Tariff y		Contract x (x:1..3)	
						y:1..3	y:4..9	Tariff y (y:1..9)	Total
	AE1	AE2	AE3	AE	PAE	AETy	AETy	AECxTy	AECxTOT
CVMBDM1M				X		0			
CVM K2				X		0	0		
QNA				0					

Table 46: Active energy generated

	Active energy generated								
	L1	L2	L3	III	Partial	Tariff		Contract x (x:1..3)	
						y:1..3	y:4..9	Tariff y (y:1..9)	Total
	NAE1	NAE2	NAE3	NAE	NPAE	NAETy	NAETy	NAECxTy	NAECxTOT
CVMBDM1M				X		0			
CVM K2				X		0	0		
QNA				0					

Table 47:Capacitive energy consumed.

	Capacitive energy consumed									
	III	Partial	Tariff		2nd quadrant (2Q)					
					L1	L2	L3	III	Contract x (x:1..3)	
			y:1..3	y:4..9					Tariff y (y:1..9)	Total
	CE	PCE	CETy	CETy	CE2Q1	CE2Q2	CE2Q3	CE2Q	CE2QCxTy	CE2QCxTOT
CVMBDM1M	X		0							
CVM K2	X		0	0						
QNA	0									

Table 48: Capacitive energy generated

	Capacitive energy generated									
	III	Partial	Tariff		4th quadrant (4Q)					
					L1	L2	L3	III	Contract x (x:1..3	
			y:1..3	y:4..9					Tariff y (y:1..9)	Total
	NCE	PNCE	NCETy	NCETy	CE4Q1	CE4Q2	CE4Q3	CE4Q	CE4QCxTy	CE4QCxTOT
CVMBDM1M	X		0							
CVM K2	X		0	0						
QNA	0									

Table 49: Inductive energy consumed.

	Inductive energy consumed									
	III	Partial	Tariff		1st quadrant (1Q)					
					L1	L2	L3	III	Contract x (x:1..3)	
			y:1..3	y:4..9					Tariff y (y:1..9)	Total
	IE	PIE	IETy	IETy	IE1Q1	IE1Q2	IE1Q3	IE1Q	IE1QCxTy	IE1QCxTOT
CVMBDM1M	X		0							
CVM K2	X		0	0						
QNA	0									

Table 50: Inductive energy generated

	Inductive energy generated									
	III	Partial	Tariff		3rd quadrant (3Q)					
					L1	L2	L3	III	Contract x (x:1..3)	
			y:1..3	y:4..9					Tariff y (y:1..9)	Total
	NIE	PNIE	NIETy	NIETy	IE3Q1	IE3Q2	IE3Q3	IE3Q	IE3QCxTy	IE3QCxTOT
CVMBDM1M	X		0							
CVM K2	X		0	0						
QNA	0									

11.1.6.- MAXIMUM DEMAND

Table 51: Maximum demand consumed

	Maximum demand consumed									
	Instantaneous					Maximum				
	L1	L2	L3	III	Tariff y (y:1..3)	L1	L2	L3	III	Tariff y (y:1..3)
	MDI1	MDI2	MDI3	MDI	MDITy	MDMX1	MDMX2	MDMX3	MDMX	MDMXTy
CVMBDM1M					X					X

Table 52: Maximum demand of apparent power

	Maximum demand of apparent power							
	Consumed				Generated			
	Instantaneous		Maximum		Instantaneous		Maximum	
	MDVAI	Tariff y (y:1..9)	MDVAMX	Tariff y (y:1..9)	NMDVAI	Tariff y (y:1..9)	NMDVAMX	Tariff y (y:1..9)
		MDVAITy		MDVAMXTy		NMDVAITy		NMDVAMXTy
CVM K2	X	0	X	0	X	0	X	0

Table 53: Maximum demand of active power

	Maximum demand of active power							
	Consumed				Generated			
	Instantaneous		Maximum		Instantaneous		Maximum	
	MDAPI	Tariff y (y:1..9)	MDAPMX	Tariff y (y:1..9)	NMDAPI	Tariff y (y:1..9)	NMDA-PMX	Tariff y (y:1..9)
		MDAPITy		MDAPMXTy		NMDAPITy		NMDAPMXTy
CVM K2	X	0	X	0	X	0	X	0

Table 54: Maximum demand of current

	Maximum demand of current							
	Instantaneous				Maximum			
	L1	L2	L3	III	L1	L2	L3	III
	MDAI1	MDAI2	MDAI3	MDAI	MDAMX1	MDAMX2	MDAMX3	MDAMX
CVM K2	X	X	X	X	X	X	X	X
	Maximum demand of current Tarifa y (y:1..9)							
	Instantaneous				Maximum			
	L1	L2	L3	III	L1	L2	L3	III
	MDAI1Ty	MDAI2Ty	MDAI3Ty	MDAITy	MDAMX1Ty	MDAMX2Ty	MDAMX3Ty	MDAMXTy
CVM K2	0	0	0	0	0	0	0	0

11.1.7.- HARMONICS

Table 55: Voltage harmonics

	Voltage harmonics							
	L1		L2		L3		Neutral	
	x:1..15	x:16..50	x:1..15	x:16..50	x:1..15	x:16..50	x:1..15	x:16..50
	ARMxV1		ARMxV2		ARMxV3		ARMxVN	
CVMBDM1M	X		X		X			
CVM K2	X	X	X	X	X	X	X	X
QNA	0	0	0	0	0	0		

Table 56: Current harmonics

	Current harmonics											
	L1			L2			L3			Neutral		
	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50
	ARMxA1			ARMxA2			ARMxA3			ARMxAN		
CVMBDM1M	X			X			X					
CVM K2	X	X	X	X	X	X	X	X	X	X	X	X
QNA	0	0	0	0	0	0	0	0	0			

Table 57: Maximum voltage harmonics (3 seg.)

	Maximum voltage harmonics (3 seg.)		
	L1	L2	L3
	ARMyMXCV1 (y:1..50)	ARMyMXCV2 (y:1..50)	ARMyMXCV3 (y:1..50)
QNA	0	0	0

Table 58: Maximum voltage harmonics (10 min.)

	Maximum voltage harmonics (10 min.)		
	L1	L2	L3
	ARMyMXPV1 (y:1..50)	ARMyMXPV2 (y:1..50)	ARMyMXPV3 (y:1..50)
QNA	0	0	0

11.1.8.- INTER-HARMONICS

Table 59: Voltage Inter-harmonics

	Voltage inter-harmonics							
	L1		L2		L3		Neutral	
	x:1..15	x:16..50	x:1..15	x:16..50	x:1..15	x:16..50	x:1..15	x:16..50
	IARMxV1		IARMxV2		IARMxV3		IARMxVN	
STD File only	X	X	X	X	X	X	X	X

Table 60: Current Inter-harmonics.

	Current inter-harmonics											
	L1			L2			L3			Neutral		
	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50	x:1..15	x:16..31	x:32..50
	IARMxA1			IARMxA2			IARMxA3			IARMxAN		
STD File only	X	X	X	X	X	X	X	X	X	X	X	X

11.1.9.- Pst / Plt

Table 61: Pst

	Pst		
	L1	L2	L3
	PST1	PST2	PST3
CVMBDM1M	X	X	X
CVM K2	0	0	0
QNA	0	0	0

Table 62:Pst – Upper percentile [95%]

	Pst – Upper percentile [95%]					
	All registers			Valid registers		
	L1	L2	L3	L1	L2	L3
	PST1SUPT	PST2SUPT	PST3SUPT	PST1SUPV	PST2SUPV	PST3SUPV
QNA	0	0	0	0	0	0

Table 63:Pst – Input x (x:1..20)

	Pst – Input x (x:1..20)		
	L1	L2	L3
	PST1DIx	PST2DIx	PST3DIx
QNA	0	0	0

Table 64:Plt

	Plt		
	L1	L2	L3
	PLT1	PLT2	PLT3
CVMBDM1M	X	X	X
CVM K2	0	0	0
QNA	0	0	0

Table 65:Plt – Upper percentile [95%]

	Plt – Upper percentile [95%]					
	All registers			Valid registers		
	L1	L2	L3	L1	L2	L3
	PLT1SUPT	PLT2SUPT	PLT3SUPT	PLT1SUPV	PLT2SUPV	PLT3SUPV
QNA	0	0	0	0	0	0

11.1.10.- INPUTS AND OUTPUTS

Table 66: Digital inputs.

	Digital inputs			
	x:1..4	x:4..18	x:19..24	x:25..50
	DIx			
CVM K2	0	0	0	

Table 67: Analogue inputs

	Analogue inputs											
	Instantaneous				Maximum				Minimum			
	x:1..1	x:2..3	x:4..8	x:9..24	x:1..1	x:2..3	x:4..8	x:9..24	x:1..1	x:2..3	x:4..8	x:9..24
	AIIx				AIMXx				AIMNx			
CVM K2	0	0	0	0								

Table 68: Digital outputs

	Digital outputs						
	1	2	3	4	x:5..18	x:19..20	x:21..24
	DO1	DO2	DO3	DO4	DOx		
CVM K2	0	0	0	0	0	0	0
QNA	0	0	0	0	0	0	

11.1.11.- METERS

Table 69: Meters

	Meter	
	x:1..24	x:25..50
	Cx	
CVM K2	0	

11.1.12.- CVM-K2

The specific variables of the **CVM-K2** devices are shown below. The common variables such as voltage or current are included in the variable tables.

Table 70: K_d Coefficient

	K_d coefficient					
	Voltage			Current		
	Instantaneous	Maximum	Minimum	Instantaneous	Maximum	Minimum
	KDVI	KDVMX	KDVMN	KDAI	KDAMX	KDAMN
CVM K2	X			X		

Table 71: K_a Coefficient

	K_a coefficient					
	Voltage			Current		
	Instantaneous	Maximum	Minimum	Instantaneous	Maximum	Minimum
	KAVI	KAVMX	KAVMN	KAAI	KAAMX	KAAMN
CVM K2	X			X		

Table 72: Temperature

	Temperature		
	Instantaneous	Maximum	Minimum
	TI	TMX	TMN
CVM K2	X	X	X

Table 73: K Factor

	K Factor								
	Instantaneous			Maximum			Minimum		
	L1	L2	L3	L1	L2	L3	L1	L2	L3
	KFAI1	KFAI2	KFAI3	KFAMX1	KFAMX2	KFAMX3	KFAMN1	KFAMN2	KFAMN3
CVM K2	X	X	X	X	X	X	X	X	X

Table 74: Factor Cresta

	Factor Cresta								
	Instantaneous			Maximum			Minimum		
	L1	L2	L3	L1	L2	L3	L1	L2	L3
	CFVI1	CFVI2	CFVI3	CFVMX1	CFVMX2	CFVMX3	CFVMN1	CFVMN2	CFVMN3
CVM K2	X	X	X	X	X	X	X	X	X

Table 75: Weighted Flicker

	Weighted Flicker		
	L1	L2	L3
	FWA1	FWA2	FWA3
CVM K2	X	X	X

11.1.13.- QNA

The following shows the specific variables of the **QNA** devices, the shared variables, such as voltage and current, have been included in the corresponding variable table.

Table 76: Event alarms

	Event alarms								
	Power cut			Sag			Overvoltage		
	L1	L2	L3	L1	L2	L3	L1	L2	L3
	ALEVEI1	ALEVEI2	ALEVEI3	ALEVES1	ALEVES2	ALEVES3	ALEVEO1	ALEVEO2	ALEVEO3
QNA	X	X	X	X	X	X	X	X	X

Alarm event variables will activate (value 1) when an event is produced in the **QNA** and will remain active for 5 seconds. When these 5 seconds have elapsed without any new event taking place, the alarm will deactivate (value 0).

Table 77: Voltage phasor / Voltage-Current phasor

	Voltage phasor		Voltage-Current phasor		
	L1-L2	L1-L3	L1	L2	L3
	FDV12	FDV13	FDVI1	FDVI2	FDVI3
QNA	0	0	0	0	0

Table 78: Meter of number of 10 cycle blocks

	Meter of number of 10 cycle blocks					
	With EVQ			With voltage off limits		
	L1	L2	L3	L1	L2	L3
	STCBE1	STCBE2	STCBE3	STCVB1	STCVB2	STCVB3
QNA	X	X	X	X	X	X

Table 79: Meter: 150 cycle integrations

	Meter: 150 cycles integrations					
	Of all STD parameters except voltage			Voltage		
	L1	L2	L3	L1	L2	L3
	STCIS1	STCIS2	STCIS3	STCIV1	STCIV2	STCIV3
QNA	X	X	X	X	X	X

Table 80: K_d and K_a coefficient

	K_d coefficient		K_a coefficient	
	Voltage	Current	Voltage	Current
	KDV	KDA	KAV	KAA
QNA	0	0	0	0

Table 81: Unbalance - percentile higher (95%)

	Unbalance – Percentil higher [95%]	
	All registers	Valid registers
	UBSUPT	UBSUPV
QNA	0	0

Table 82: Value meters

	Total no. of registers	Registers without events	Value meters					
			Frequency	Frequency without events	Plt	Plt without events		
						L1	L2	L3
	NREGTOT	NREGEVQ	CVHZ	CVHZEVQ	CVPLT	CVPLT1EVQ	CVPLT2EVQ	CVPLT3EVQ
QNA	0	0	0	0	0	0	0	0

Table 83: Event log

	Event log		
	L1	L2	L3
	HEVQ1	HEVQ2	HEVQ3
QNA	X	X	X

11.2.- VARIABLE EXPRESSIONS

For the report manager, you can configure blocks of variables by adding variable identifiers directly and combining them in order to run calculations on different variables at the same time.

You need to use various symbols to correctly combine two or more variables: parentheses ("(" y ")"), plus sign ("+"), minus sign ("-"), multiplication sign ("*"), division sign ("/") and power ("^"). You can also add whole or real values (using the "." character as a decimal point).

An example of an expression would be:

(4.3*([VI1]^3))-([VI1]/50)+[VI3]

You can use different mathematical expressions

- *sqrt(exp)*: Square root of the expression "exp
- *log(exp)*: Neperian logarithm of the expression "exp"
- *exp(exp)*: Number "e" elevated to the expression "exp"
- *sin(exp)*: Sine of the expression "exp" (in radiants)
- *cos(exp)*: Cosine of the expression "exp" (in radiants)
- *tan(exp)*: Tangent of the expression "exp" (in radiants)
- *asin(exp)*: Arcsine of the expression "exp"
- *acos(exp)*: Arccosine of the expression "exp"
- *atan(exp)*: arctangent of the expression "exp"
- *atan2(exp1, exp2)*: Extended arctangent of the expression "exp1/exp2"
- *log10(exp)*: Base 10 logarithm of the expression "exp
- *round(exp)*: Rounding to the nearest whole number of the expression "exp"
- *trunc(exp)*: Truncation to a whole number of the expression "exp"
- *pi()* : Returns the number PI (3.1415927...).
- *e()* : Returns the number E (2.7182818...).
- *mod(exp1, exp2)*: Returns the "exp2" module of the expression "exp1"
- *max(exp1, exp2)*: Returns the maximum of the two expressions
- *min(exp1, exp2)*: Return the minimum of the two expressions
- *abs(exp)*: Returns the absolute value of the expression "exp"
- *rand()*: Returns a real random value between 0.0 and 1.0
- *normalize(exp1, exp2)*: Returns "exp1" if "exp1" can be evaluated, otherwise it returns "exp2".

11.3.- FREQUENT QUESTIONS

11.3.1.- GENERAL

When installing PowerVision Plus, an error occurs that prevents the installation from finishing. What can I do?
We recommend that you do the following:

- If you are using the Windows XP operating system, start a session as the administrator. If you are using Windows Vista or Windows 7, right click on the **PowerVision Plus** installation icon and select the option "**Run as administrator**".
- Make sure the Windows firewall an any other firewalls you may have installed are disabled.
- Deactivate any antivirus programs installed on the PC.

Does the following message appear "The installation program has detected version 3.00.000" when you install PowerVision Plus 1.2 or higher and the system does not allow you to update the version? What can I do?

If you have **PowerVision Plus** version 1.0 or 1.1 installed and you are going to install version 1.2 or higher, we advise uninstalling the application and performing a new install.

The application is slower at times or it shows the following message "The table is too large" when a table is generated. What can I do?

You can select the memory reserve option from the application using the "-Xmx" parameter. You can modify the short-cut path created during the installation process by adding "-Xmx=XXXXM", where "XXXX" is the amount of memory in megabytes that will be reserved for the execution of this process. Check your operating system's manual to learn more about short-cut modification procedures.
An example of a short-cut path would be: "*"C:\Program Files\Circutor\PowerVision Plus\bin\PowerVisionPlus.exe" --P -Xmx=1024M*".
Bear in mind that there is a maximum memory limit that can be reserved, depending on the physical memory installed on your PC. The application will not start if you exceed this limit.

The application won't start. What is happening?

Make sure you have installed the latest virtual Java JRE Virtual Machine. The minimum version required is 1.6.

A device is not communicating. What could be causing this?

Make sure the device is switched on and in a mode that can communicate, ensuring particularly that it is not in the configuration or starting up mode. Make sure the device is connected to the PC or a compatible converter and that the wiring is correct. Make sure there is no possibility of any interference in the cable run from the device to the PC or between the device and the converter. If you are connected to a converter, check that the latter is properly connected to the PC. Verify that the grid is not overloaded with an excessive amount of devices. If the device is connected through a 232-485 converter make sure that its switches are in the correct position. Make sure that the bus does not have devices that communicate at different speeds or have the same device number. Check that the PC port is working properly.

A TCP2RS converter does not communicate. What could be happening?

Make sure the device is switched on and connected to the communications network. Make sure there is no possibility of any interference in the cable run from the converter to the PC. Make sure your PC is correctly connected to the communications network and can communicate with other devices connected to the network (for example with another PC). If you are using a router, make sure the communication port is redirected in the router, to the converter address.

I can't paint the graphic correctly. What could be happening?

If the graphic appears to have dots missing, verify that this is not because the variables are being represented with different periods.
If the graphics has widths that are not correct, ensure that the values are separated by the distance marked by the driver period. For example, if a device saves data every 5 minutes and we change the period to 15 minutes, the bars will be superimposed when displaying the bar graphics for the values prior to the change of period (every 5 minutes). If we change the period to a lower value, the bars prior to the change will appear narrower than necessary. In any case, the bar graphics of values separated by the distance shown in the Driver registration period will always appear correctly.

How can I communicate with a TCP2RS converter through a router?

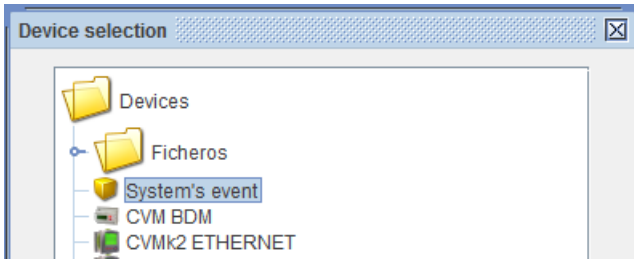
If you do not see any values when you think there should be, ensure that you have not zoomed in an area without values or that the Y-axis is not forcing levels for values which do not exist.
To communicate with a **TCP2RS** converter located in a sub-network different to the network in which the software is located, we can use a router as shown in the following image:

The **TCP2RS** converter should be added as follows:

- Enter the router address (192.168.120.201) – In the "Converter Address" field.
- Redirect port '10001' and '30718' in the router to the converter address (192.168.15.205). See the router manual for additional information.

How I can know if the GSM connection has been opened or closed properly or if there is any error when making a transaction?

You can view the actions of a GSM modem via system events. You can access the system event table through the "Table" and the tree shown in the "System Events":



Below you will find the event table with the messages caused by the action of a GSM device. Examples of these messages are: "The modem connection is properly closed, " "The modem could not close the connection", "scheduled download was initiated, " etc..

11.3.2.- REPORT GENERATOR

What will happen if I generate a report with free variables on a device that does not support them?

The variable blocks are designed so that you can add whatever variable identifier or expression you want. When you run the report, if no value is found for an identifier not supported by the target device, the expression will be invalid.

How do I resize a block inside a grid block?

For design reasons it is not possible to resize the block inside a grid block.
In order to resize a block contained in the cell of a grid, drag the subblock outside the areas of the parent block. Resize the subblock on the worksheet to the desired size and return it to the cell inside the grid block.

When I select the variables for a graphic block or table I cannot configure their order?

By default, the list of variables contains up to 8 identifiers arranged alphabetically. This is the order used to display the variables on the graphics or tables and it cannot be configured.
If you want to show different types of variables, we recommend that you use different blocks for each type of variable.

When inserting a standard type block, I select the predefined standard "50160" and advance filter. Why doesn't the harmonics option appear on the list of filters?

This option is disabled by default since the table it would generate would take up too much space in the report. To run a report with harmonic values you will need to create a modifiable filter and then add the voltage harmonics or current variables you need to show.

The values display is not what I expected. What could be happening?

It is possible that a formula (expression) refers to a variable of a device which does not communicate or that has not yet been interrogated for the first time.
When you evaluate the formula you may find an invalid operation such as the square root of a negative number or a number divided by zero.

12.- TECHNICAL SERVICE

In the case of any query in relation to device operation or malfunction, please contact the **CIRCUTOR SA** Technical Support Service.

Technical Assistance Service
Vial Sant Jordi, s/n, 08232 - Viladecavalls (Barcelona)
Tel: 902 449 459 (España) / +34 937 452 919 (outside of Spain)
email: sat@circutor.com

13.- GUARANTEE

CIRCUTOR guarantees its products against any manufacturing defect for two years after the delivery of the units.

CIRCUTOR will repair or replace any defective factory product returned during the guarantee period.

- No returns will be accepted and no unit will be repaired or replaced if it is not accompanied by a report indicating the defect detected or the reason for the return.
- The guarantee will be void if the units has been improperly used or the storage, installation and maintenance instructions listed in this manual have not been followed. "Improper usage" is defined as any operating or storage condition contrary to the national electrical code or that surpasses the limits indicated in the technical and environmental features of this manual.
- **CIRCUTOR** accepts no liability due to the possible damage to the unit or other parts of the installation, nor will it cover any possible sanctions derived from a possible failure, improper installation or "improper usage" of the unit. Consequently, this guarantee does not apply to failures occurring in the following cases:
  - Overvoltages and/or electrical disturbances in the supply;
  - Water, if the product does not have the appropriate IP classification;
  - Poor ventilation and/or excessive temperatures;
  - Improper installation and/or lack of maintenance;
  - Buyer repairs or modifications without the manufacturer's authorisation.

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