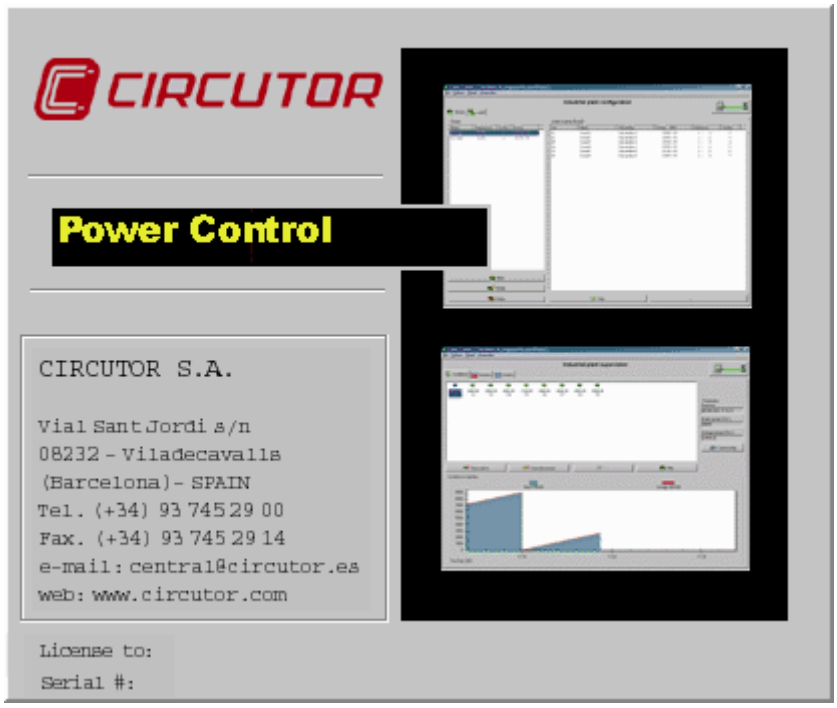


SOFTWARE

POWER CONTROL

USER'S MANUAL

(Cod.: M 981 450/ 01A)

1. Introduction

Power Control is a program specially designed to control and supervise the energy consumption of an installation.

It allows to configure power calendars, create installation loads and loads groups, define connection timetables and loads disconnection, display real time graphs of the consumption progress and loads connection and disconnection. The program allows to simulate it before we do the final supervision. Moreover, we can export data and also, we can do a consumption report of specified period.

2. Menus

When we open Power Control, presentation window appears. If we click over it, the main screen will appear. There, we'll be able to configure the program.

The available options in the program menu are:

- File
- Options
- Graph
- Information

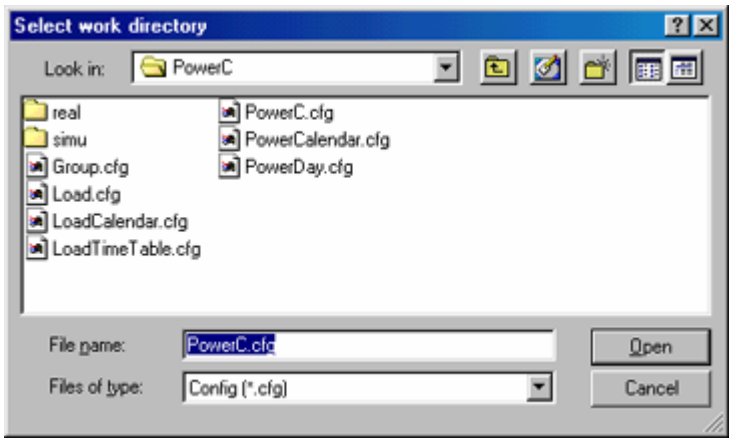
2.1. File

In File menu option, we can select or open the work path where there are all the configuration files of the program and the installation we want to supervise.

The available options in File menu are:

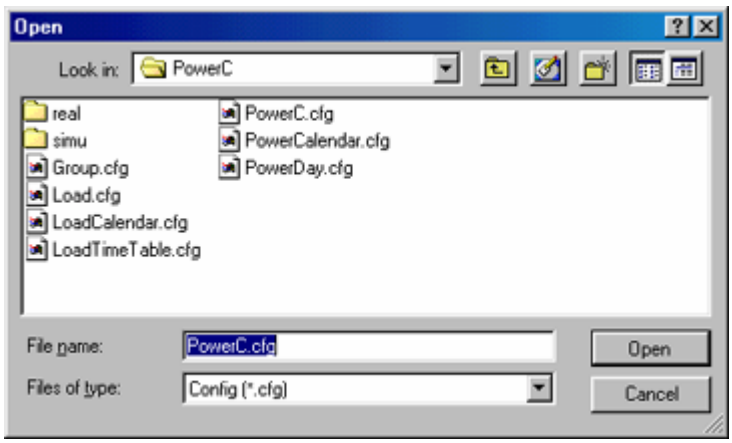
2.1.1. New

It allows selecting the new work path. Once we have selected it, the program will create all the configuration files. If the files are already created, it will delete them and it will create files without information.



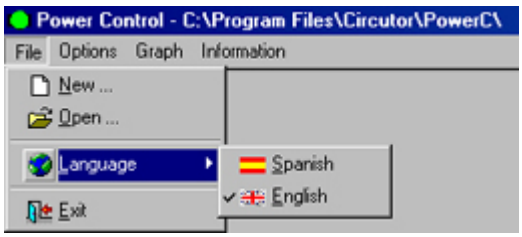
2.1.2. Open

It allows selecting a work path where the files of a previous installation are.



2.1.3. Language

It allows choosing the program language. The available options are: Spanish and English.



2.1.4. Exit

It ends the program execution.

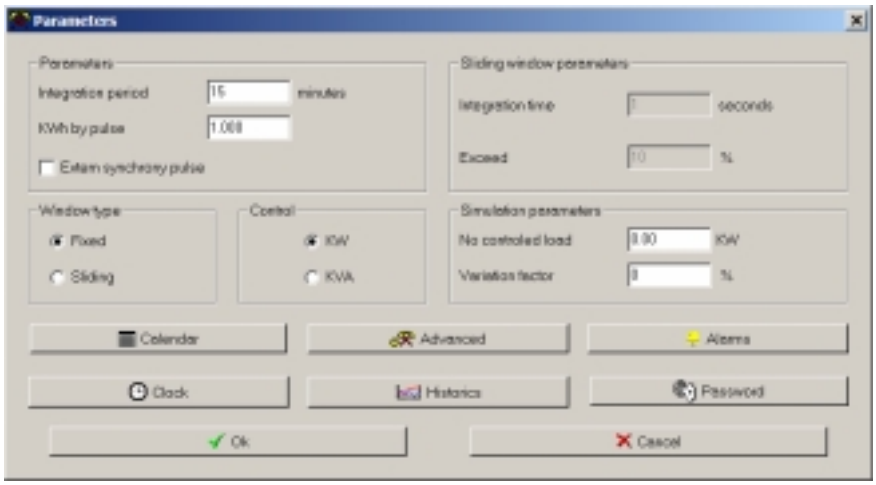
2.2. Options

In the Options menu option, we can modify the operation parameters of the program, unless select the groups and loads configuration screen or the simulation or supervision screens of the installation.

The available options in Options menu are:

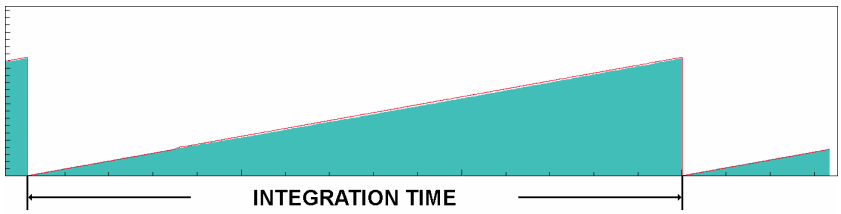
2.2.1. Parameters

Appears a window with several options to configure the program operation.

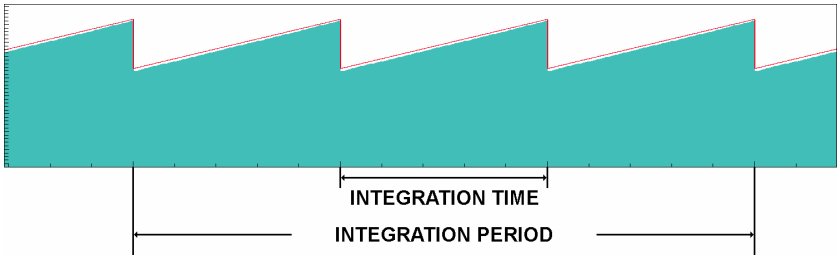


- Parameters
  - Integration period: Time in minutes where the values will be integrated.
  - KWh by pulse: Consumed energy value by pulse.
  - External synchrony pulse: Indicates what kind of pulse we want. External pulse or controlled for CA-4 pulse.

- Window type: Indicates the type of work mode. The type of window we can select, can be:
  - Fixed: When there is a synchrony pulse, the control period will reboot.



  - Sliding: It will give to each integration window a synchrony pulse according to the last control period.

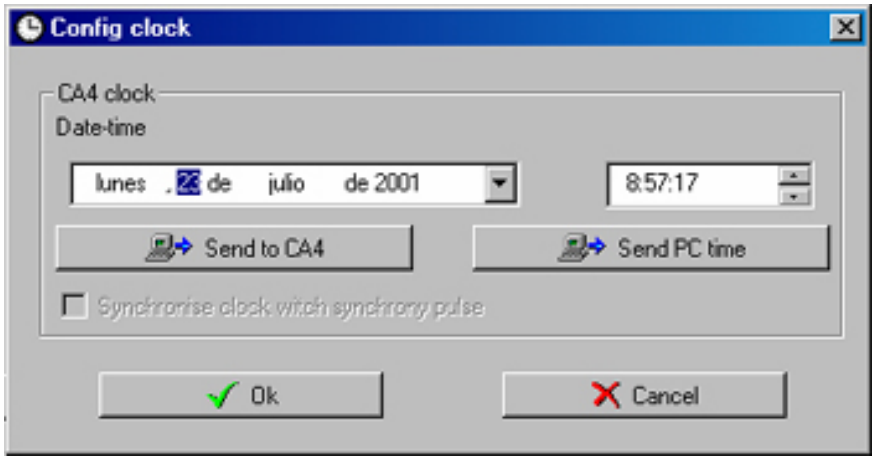


- Control: It will select the parameter we want to control in the installation.
  - KW (Active power)
  - KVA (Aparent power)

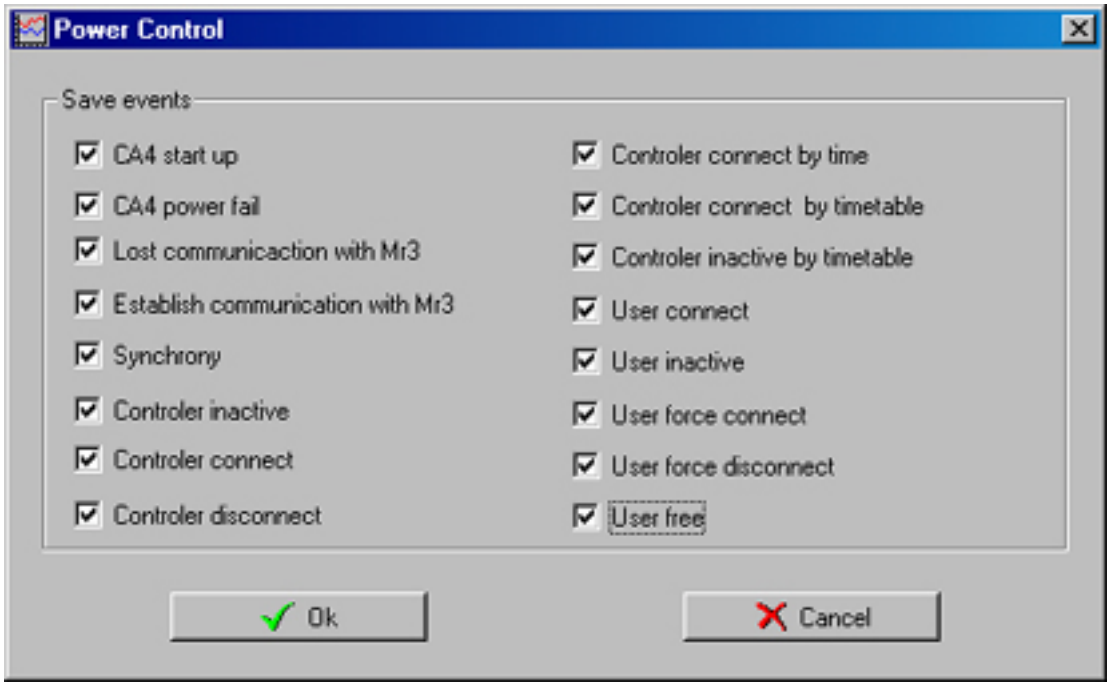
- Sliding window parameters: It will be enabled if we select sliding as type of window.
  - Integration time: It's the period where the programmed value will be integrated.
  - Exceed: It's the value (percentage) that increases the allowed consumption in each integration window (0 - 30%)

- Simulation parameters: They are the parameters that will be used in a simulation of the installation.
  - No controlled load: It's the power consumption value that the controller doesn't control.
  - Variation factor: It's the value (percentage) that modifies the power consumption to obtain a no constant consumption in the simulation (0 - 20%).

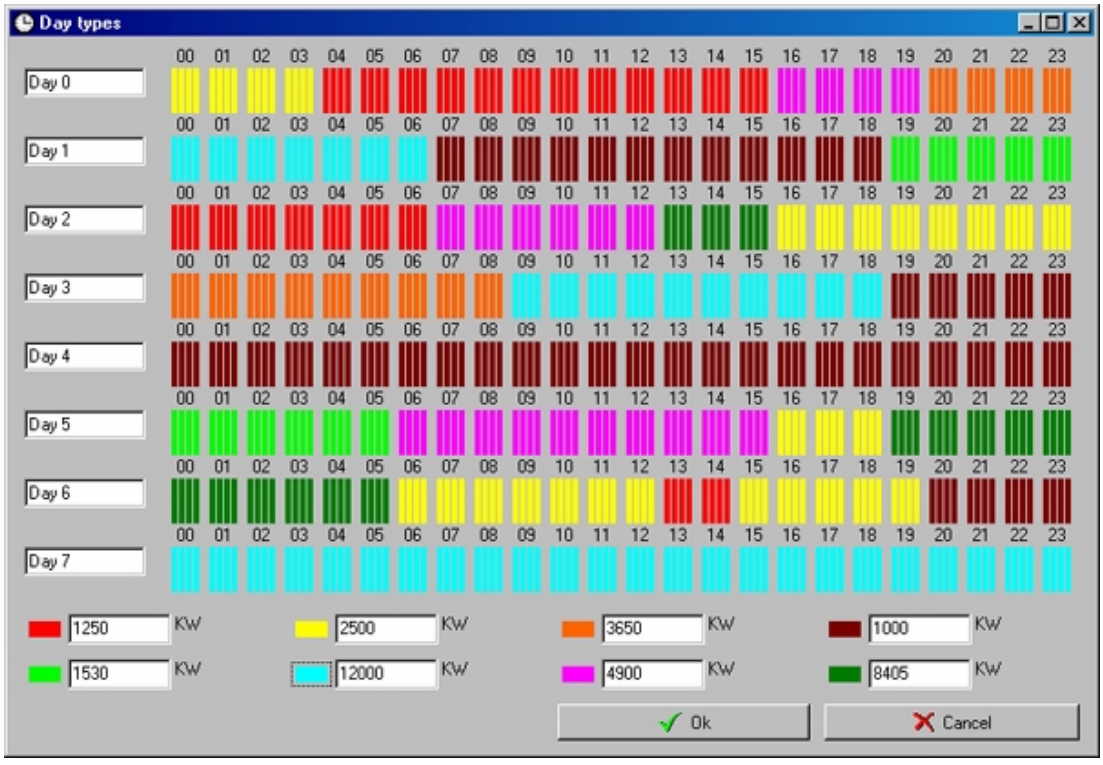
- Clock: It reads the internal clock of CA-4 that is connected to the PC. Then, a screen appears, there, we can modify date and time and send them to the device. If we check **Syncrhonize clock with synchrony pulse** option, the internal clock will be synchronized with the external pulse.



- Historics: A screen where we can select the parameters that will be saved to historics file, appears.

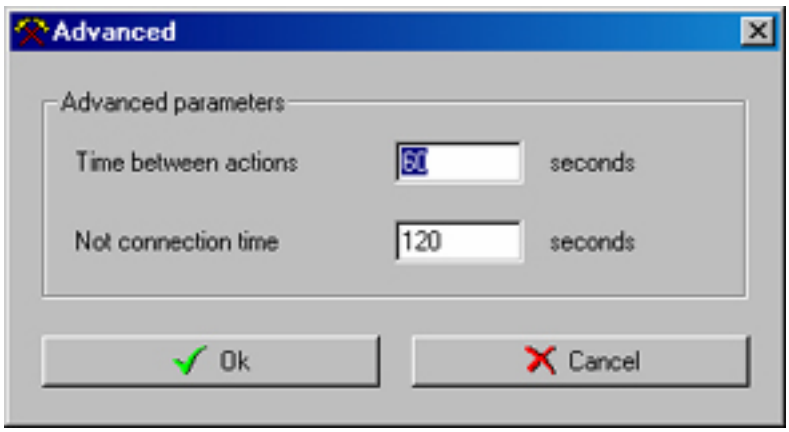


- Calendar: It allows configuring the maximum contracted power calendar. We can configure maximum 8 types of days with eight types of different target values.

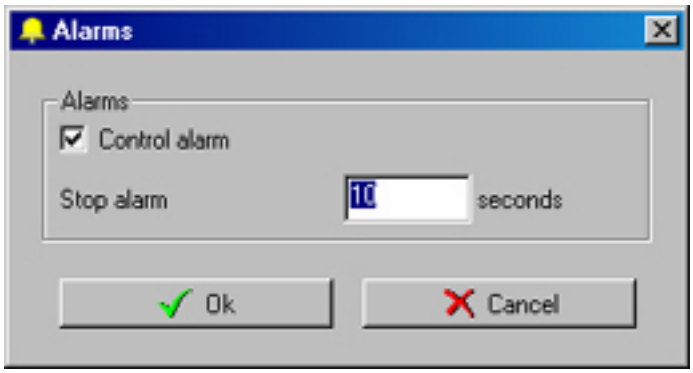


- Advanced: A screen where we can configure delay time between actions and reconnection.

- Delay between actions: Time in seconds (2 - 250) to take a decision about the loads control.
- Reconnection time: Time which won't be reconnected more loads at the end of the period (0 - 250).



- Alarms: A screen where we can enable a control alarm appears. This alarm will be activated where the controller hasn't got more loads to control and the real value is over the demand value.



When the alarm is activated, the following button appears:

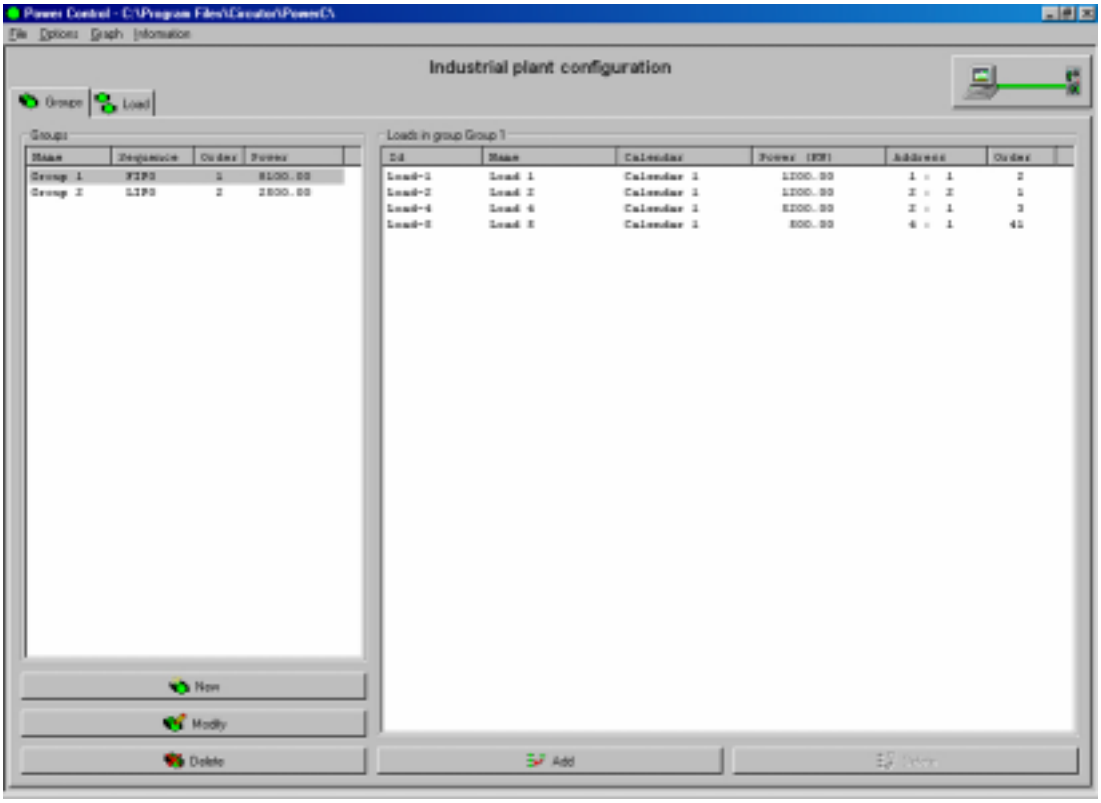
in the up-right side of the installation windows, in the two modes (simulation and supervision). The alarm will be disabled if we click over the button or if we wait the stablished time in the dialog box. If the time is 0, we must click over the button to stop it.

- Password: It allows locking the window. Once we have introduced the code, we won't be able to do any action on the program.

2.2.2. Configure

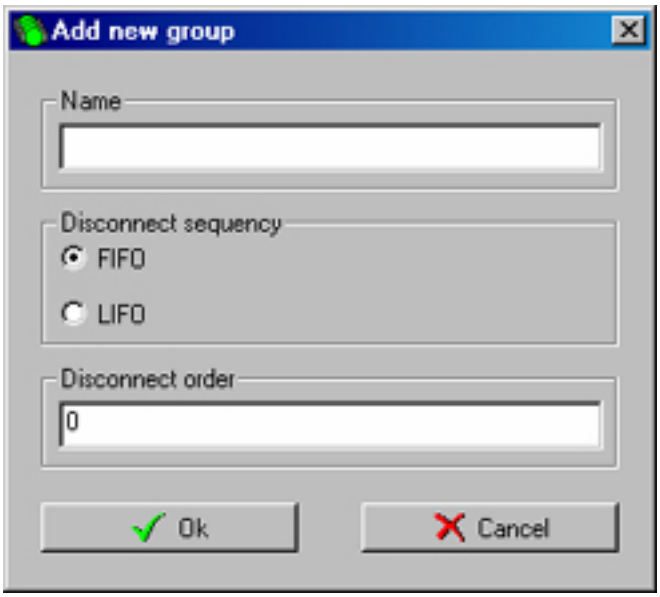
It allows configuring the loads groups and only the loads.

- Groups: We'll be able to add new groups, modify existing groups or delete previous groups. Moreover, we'll be able to add or delete loads from a group.



- Groups: A list with configured groups appears. The actions will be able to do are:

  - Add: It allows creating a new group.



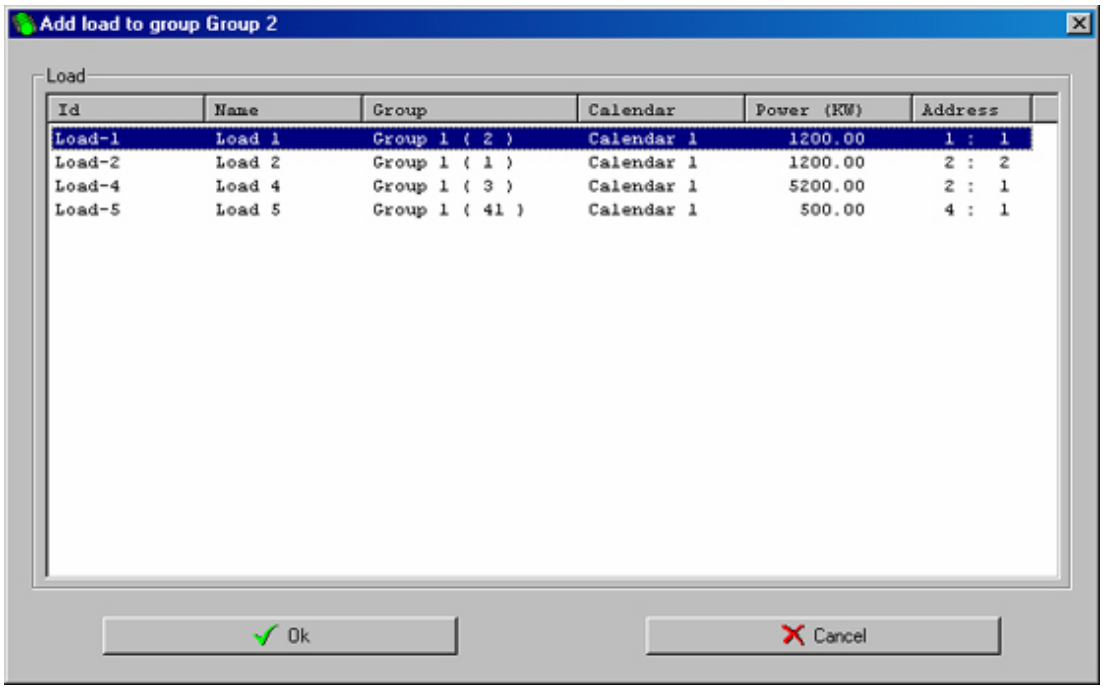
    - Name: Word to identify the loads group.
    - Disconnection sequence
      - FIFO: First in, first out. The order of the loads doesn't influence the first time, later, it depends on the load we have to disconnect.
      - LIFO: Last in, first out, normal stack.
    - Disconnection order: There is an order to disconnect the loads.

  - Modify: We can modify the data of selected group. To confirm the changes, we have to click over Accept button. To cancel the changes, we have to click over Cancel.

  - Delete: Selected group will be deleted. A message to confirm the group removal will appear. If we press Yes, the group will be deleted from the list.

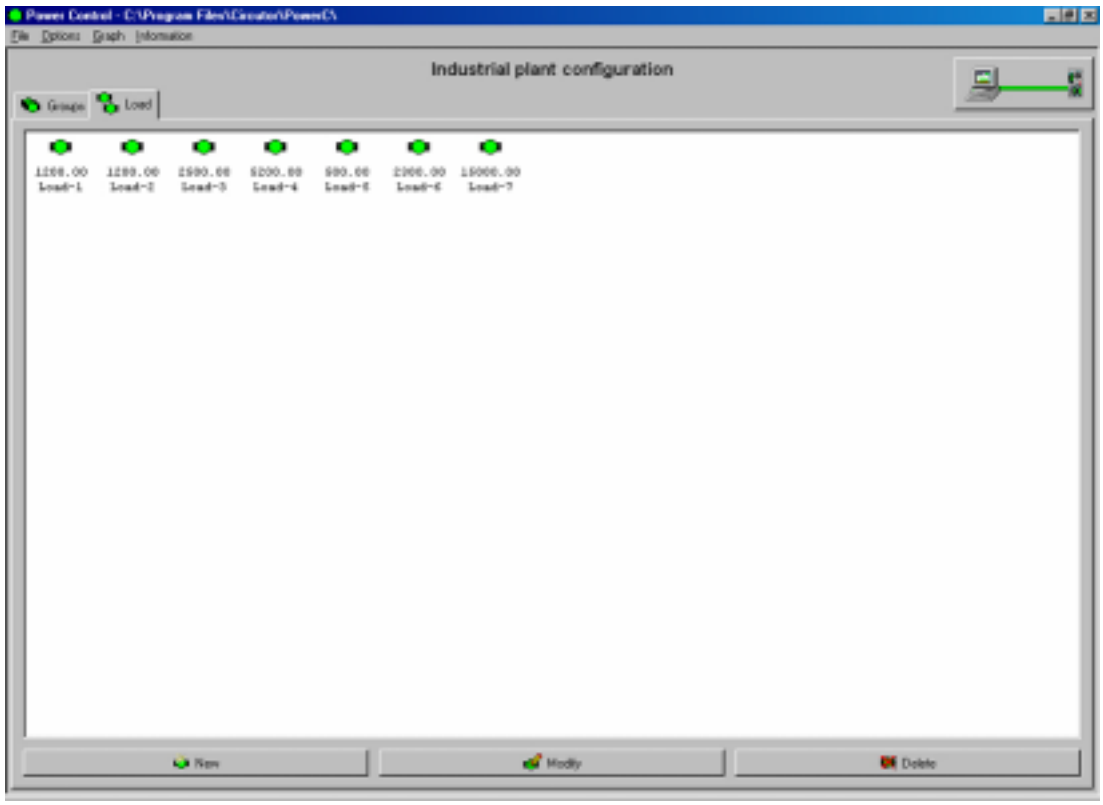
- Group loads: A list with all the loads of selected group appears. The actions will be able to do over the loads, are:

  - Add: A window with all the loads isn't of the selected group but they can be in other groups, appears. We can select and change the group clicking over Accept.

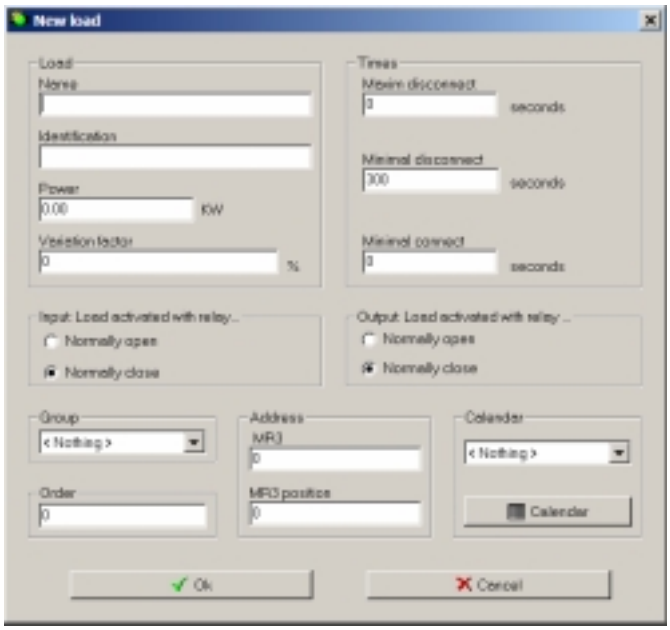


- Delete: It allows deleting the loads from the group that we have selected previously. A message to confirm the loads removal will appear. If we press Yes, the selected loads will be deleted from the list.

- Loads: We'll be able to add new loads, modify existing loads or delete previous loads. The following screen will appear:



- Add: It allows adding new loads to the installation. The following screen will appear:



- Loads:
  - Name: Load name
  - Identification: Name to identify the load in the installation.
  - Power: Maximum power of the load.
  - Variation factor: Value (percentage) that modifies the power consumption to obtain a no constant consumption in the simulation (0% – 20%).

- Time:
  - Maximum disconnected: Maximum time that the controller may has a load disconnected.
  - Minimum disconnected: Minimum time that the controller should has a load disconnected.
  - Minimum connected: Minimum time that the controller should has a load connected.

- Input: CA-4 and Mr-3 inputs allowed software to know load status. The input function is to know if load is activated or stopped.

- Output: Software use CA-4 and Mr-3 outputs to active or stop loads.

- Group: Group selection where we can find a load.

- Order: Load priority in the loads group to verify the load and unload times.

- Address
  - MR3: Expansion peripheral address (1 – 42).
  - Position in MR3: Position where the load is connected (1- 3).

- Calendar: Calendar selection to the connection and disconnection of the load. About more information, see Loads calendar section.

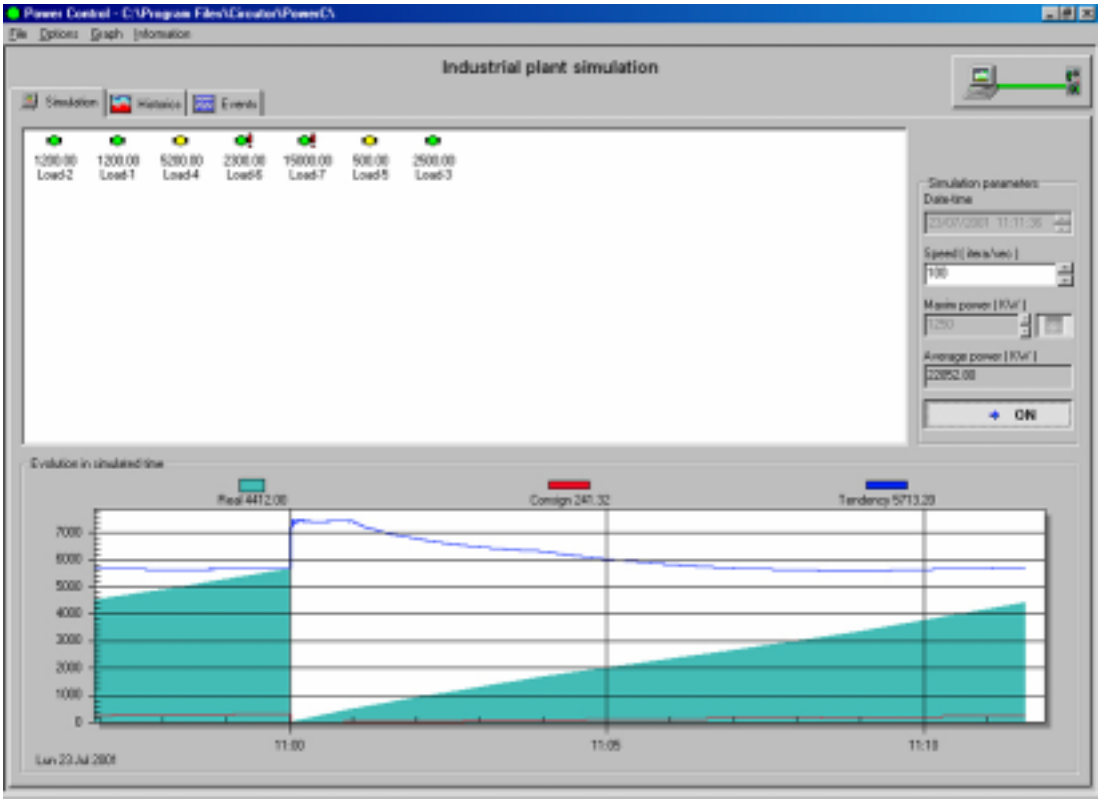
- Modify: It allows modifying the selected load data in the loads list.

- Delete: It allows deleting a load from the loads list.

2.2.3. Installation simulation

It allows doing a simulation with the groups, loads and parameters that we have configured in the program.

- Simulation: Will appear a list with all the configured loads, a simulation parameters and the consumption evolution in real time, graphically. To start the installation we must click over OFF image and if we want to stop it, we must click over ON image. The following screen will appear:



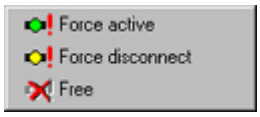
- Simulation parameters
  - Date and Time: Will appear the date and time of the simulation in real time. We can modify and introduce other date and time.
  - Speed: Number of iterations by second. It's the load simulation speed.
  - Maximum power: When we click over the button on the right, the target value will be the same that the main calendar. If it isn't pressed, we'll be able to introduce a target value.
  - Average power: It's the average power value of the installation.

- ON/OFF button: It starts or stops the installation simulation.

In the list where there are the configured loads in the system, if we right-click, a menu will appear and there, we'll be able to select the loads we want to display:

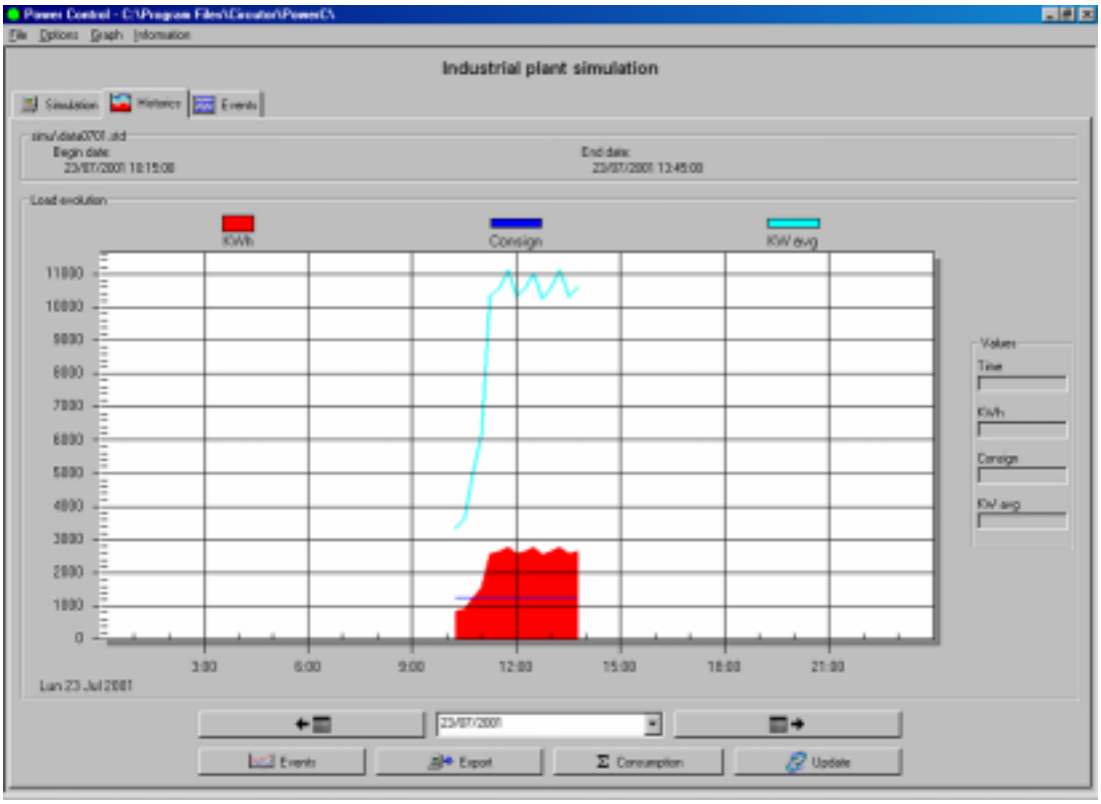
- All: All the loads
- Active: Active loads
- Inactive: Inactive loads
- Disconnected: Disconnected loads

Also, if we right-click over a load, a menu like the following menu will appear:



- Force active: The controller won't be able to disconnect the load
- Force disconnect: The controller will disconnect the load but it won't be able to connect again
- Free: It will remove any forced status in a load to continue a normal status operation

- Historics: An installation simulation historic will be displayed. The following screen will appear if we click over Historics folder:



When we do the program simulation, it creates a STD file where it saves the values are registering. This file saves the data each month. The graphs and events representation are data that the program saves in this file.

In the previous screen, appears the name of the file where the data is stored. The initial and final date of the file is displayed. In the graph, there are the simulation consumption (KWh), the target value and the average power of the simulation (KW avg). The time representation in the graph is about one day. If we click over the graph, will appear a cursor that we can use with the keyboard arrows to move for each graph value and we can display what each graph point means. On the right side of the graph, there are the values of the graph and they are stored in STD file.

Buttons:

Select the day we want to show in the graph or events table.

Go back a day in the file.

Go forward a day in the file.

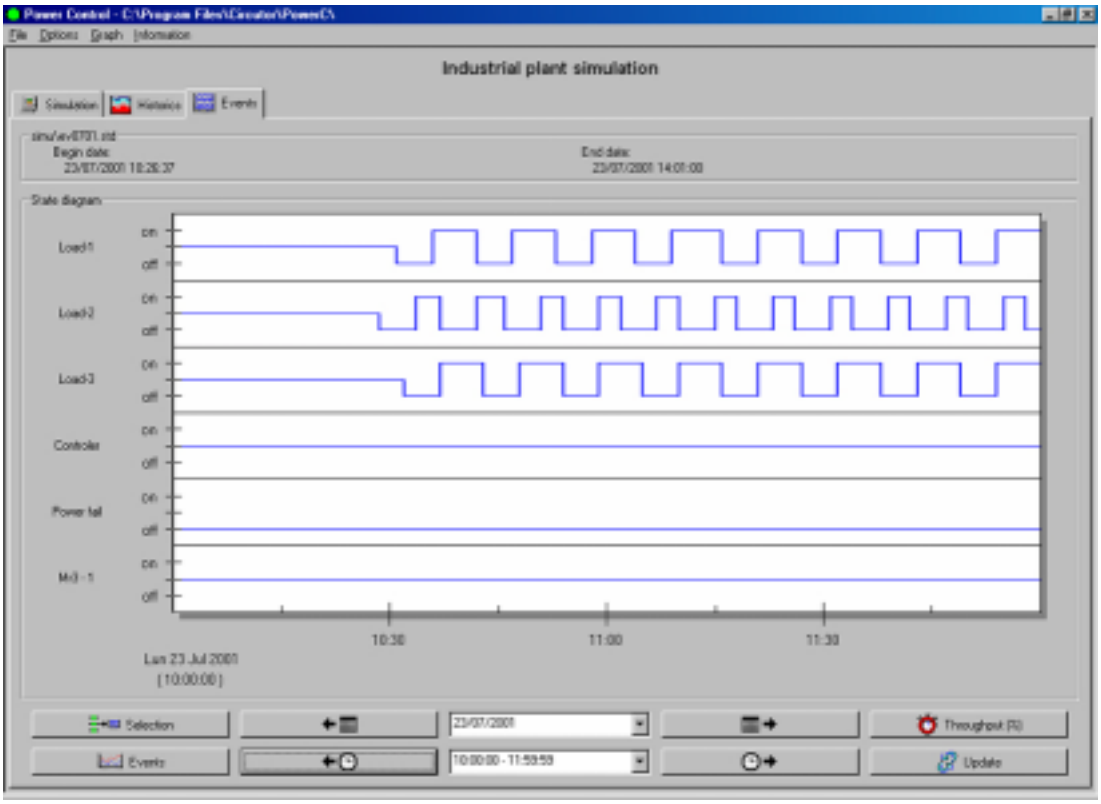
Events Show the events screen of the selected day. See Power Control buttons section for more information.

Update Upload the data with the new data of the file.

Export Export the data to text file or data base format. See Power Control buttons section for more information.

Σ Consumption Show the energy consumption. See Power Control buttons section for more information.

- Events: The events of the simulated installation will be displayed. The following screen will appear when we click over Events folder:



When we do the simulation, the program creates a STD file where it saves the simulation values that it registers. This file saves the data each month. The graph and events representation are data that it saves into this file.

In the previous screen, appears the name of the file where the data is stored. The initial and final date of the file is displayed. In the graph, there are the data connection and disconnection that we have selected previously. The time representation is a two hours period. If

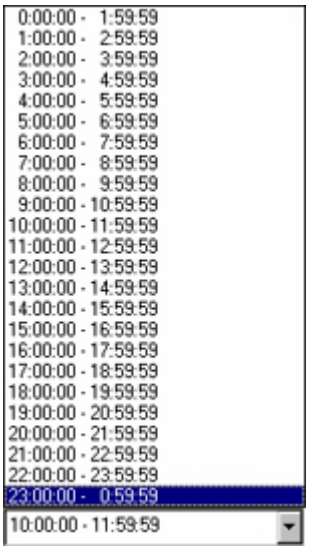
we click over the graph, will appear a cursor that we can use with the keyboard arrows to move for each graph value and we can display the time of this point. On the right of the graph, there are the values of the graph and they are stored in STD file.

Buttons:

Select the day we want to show in the graph or events table.

 Go back a day in the file.

 Go forward a day in the file.



Select the period time we want to show in the graph or events table.

 Go back in the time period.

 Go forward in the time period.

Display the data selection screen we want to show in the graph. See Power Control buttons section for more information.

Display the load throughput screen.

Events Display the selected day events and time period. See Power Control buttons section for more information.

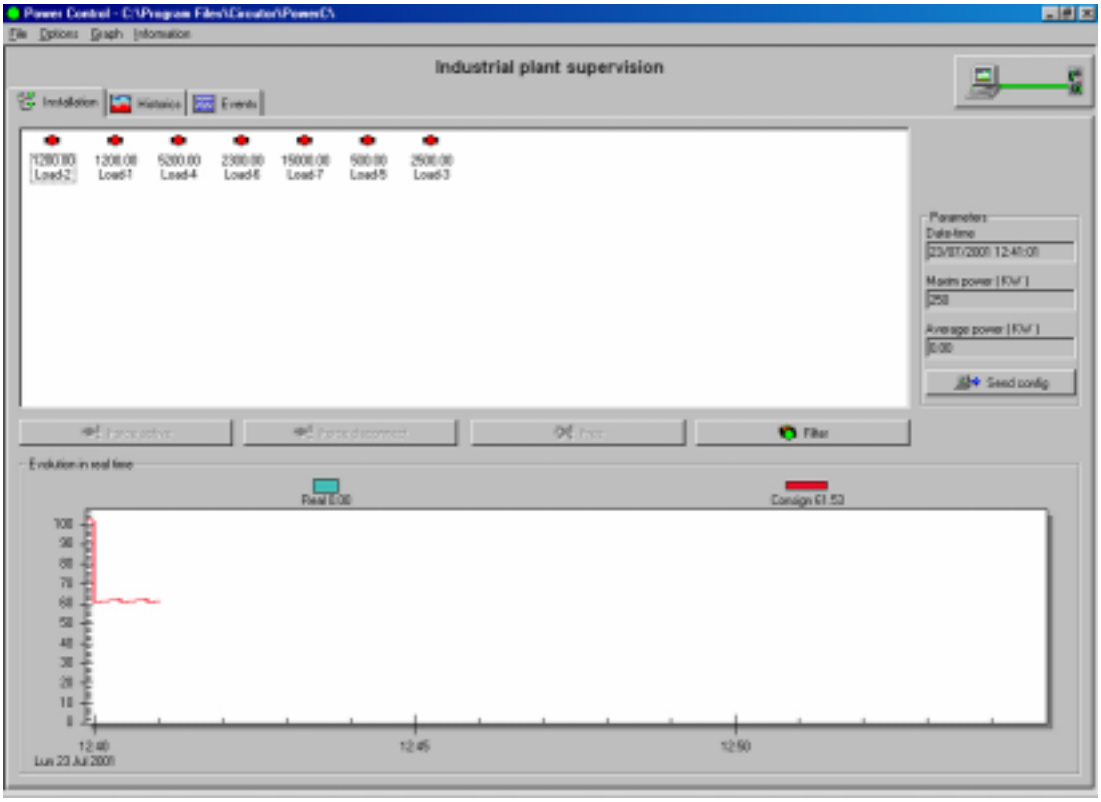
Update Upload the data with the new data of the file.

2.2.4. Installation supervision

It allows doing real time supervision with configured groups, loads and parameters of the program. It checks the controller configuration with the software configuration when we click over supervise mode.

- Installation: A list appears with all configured loads, taken parameters in real time and the consumption evolution in real time, graphically.

  The supervision will start when the screen appears (we have communicated with the controller, previously) and the communications with the program are correct. If doesn't exist communication with the controller we won't be able to supervise the installation in real time.



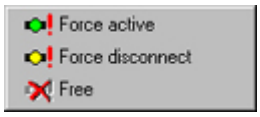
- Supervision parameters
  - Date and Time: The date and time of the supervision will appear in real time. We can modify and introduce other date and time.
  - Maximum power: The target value will be the calendar target value we have assigned in the configuration.
  - Average power: It's the value of the average power of the installation.

- Send configuration: It sends the configuration to the controller.

If we right-click over the list where the configured loads are displayed or if we click over the Filter button, a menu will appear, where we'll be able to select the loads we want to show:

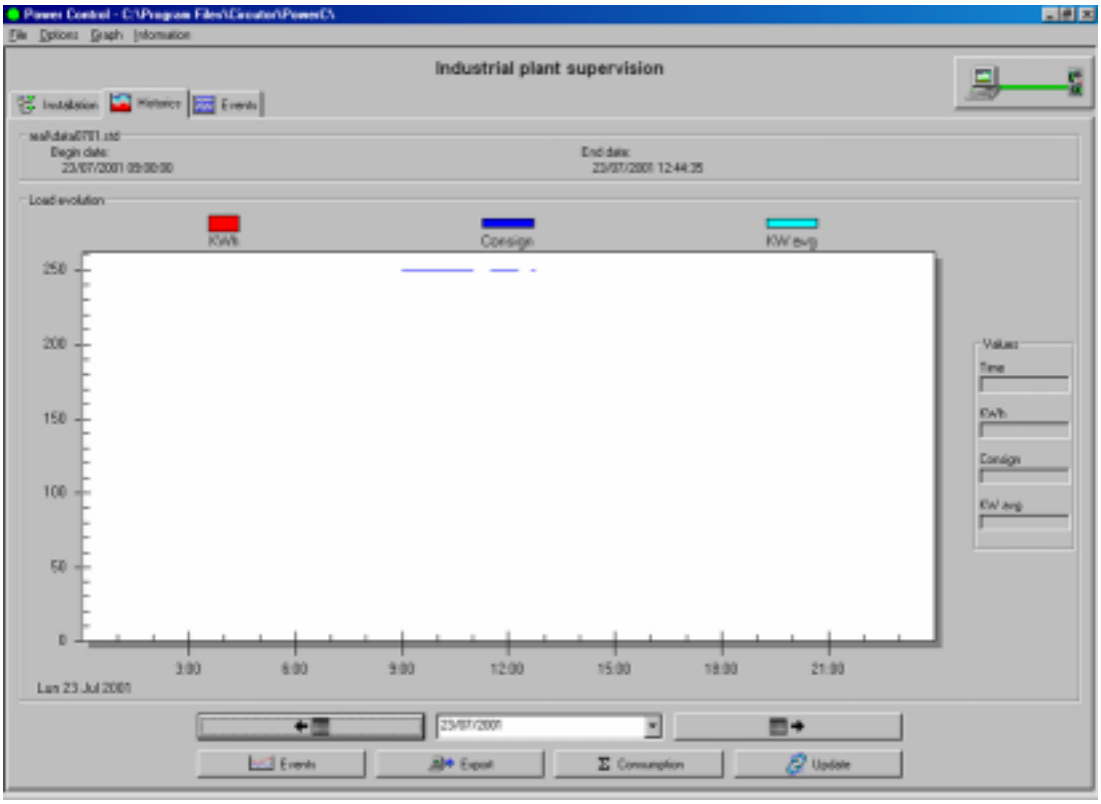
- All: All active loads.
- Active: Active loads.
- Inactive: Inactive loads.
- Disconnected: Disconnected loads.

If we right-click over a load will appear a menu like this:



- Force active: The controller won't be able to disconnect the load.
- Force disconnects: The controller will disconnect the load but it won't be able to connect again.
- Free: It will remove any forced status in a load to continue with its normal status

- Historics: A real time historic of the installation will be displayed. If we click over the Historics folder, the following screen will appear:



When we do the supervision, the program creates a STD file where it saves the values it is registering. This file saves the data each month. The graph and events representation are data that this file contains.
In previous screen, appears the file name where the data is stored. The initial and final date of the file is displayed. In the graph appear the simulation consumption (KWh), the target value and the average power of the simulation (KW avg). The representation in the time graph is about a whole day. If we click over the graph will appear a cursor that we can use with keyboard arrows to move for each value of the graph and we can display what each graph point means. On the right side of the graph appear the showed values in the graph, which are stored in the STD file.

Buttons:

Select the day you want to display in the graph or events table.

Go back a day in the file.

Go forward a day in the file.

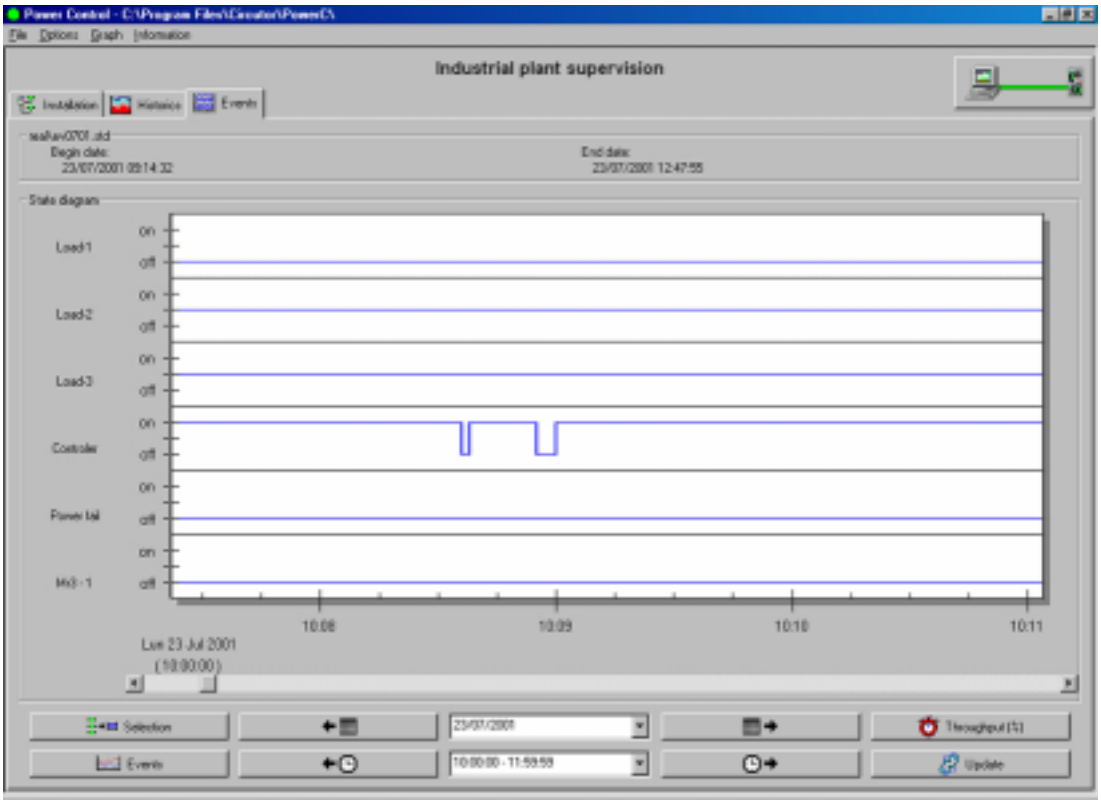
Events Display the events screen of the selected day. See Power Control buttons section for more information.

Update Upload the data with the new data of the file.

Export Export the data to a text file or a data base format. See Power Control buttons section for more information.

Σ Consumption Display the energy consumption. See Power Control buttons section for more information.

- Events: The installation events will be displayed in real time. The following screen will appear if we click over Events folder:



When we do the program supervision, the program creates a STD file where it saves the values are registering. This file saves the data each month. The graph and events representation are data that this file contains.

In the previous screen, there is the file name where the data is stored. The initial and final date of the file is displayed. In the graph, there are the data connection and disconnection that we have selected previously. The time graph representation is a two hours period. If we click over the graph, will appear a cursor that we can use with

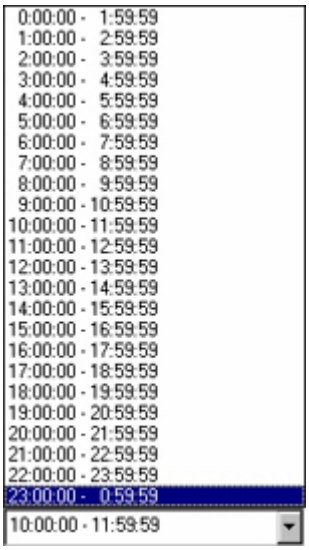
keyboard arrows to move for each graph point and also, we can use it to show the time of this point.

Buttons:

Select the day we want to show in the graph or events table.

 Go back a day in the file.

 Go forward a day in the file.



Select the time period we want to show in the graph or events table.

 Go back in the time period.

 Go forward in the time period.

Display the screen of the data we want to show in the graph. See Power Control buttons section for more information.

Display the loads throughput screen. See Power Control buttons section for more information.

Display the events screen of the selected day and time period. See Power Control buttons section for more information.

Upload the data with the new data of the file.

2.2.5. Lock / Unlock

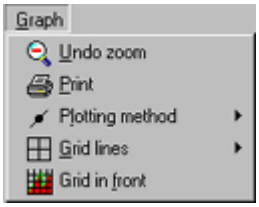
If we click over Lock / Unlock option, we can lock the software window, so, we won't allow to do actions with the installation to non-authorized people. If we want to unlock it, we'll need a password.

When the software is locked, this icon will appear in the communication icons.

2.3. Graph

The options of the Graph menu are common to all the graphs that are in the program.

However, if we click over the graph and then, we right-click over it again, the following menu will appear:



- Undo zoom: If we want to do a zoom over the graph, we must keep pressing the left button of the mouse and then, we must drag the mouse, then, a square will appear. Once we have selected the area, we have to keep out the left button of the mouse and the zoom will be done. This option will display the graph to its initial status, again.

- Print: The displayed area of the graph is printed.

- Plotting method: The graph can be displayed in three different modes:
  - Line (default)
  - Point
  - Point and line

- Grid lines: It will be selected if the graph is displayed with separation lines. There are four options:
  - Both
  - Horizontal
  - Vertical

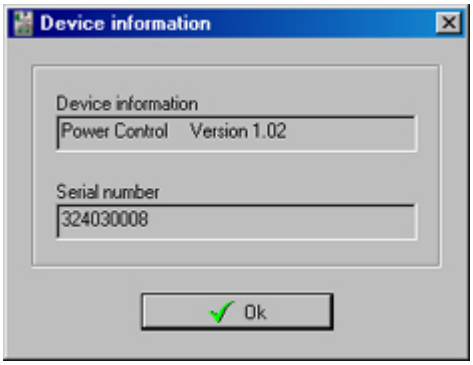
- None (default)

- Grid in front: It must be selected if we want to show the separation lines in front of or behind the graph.

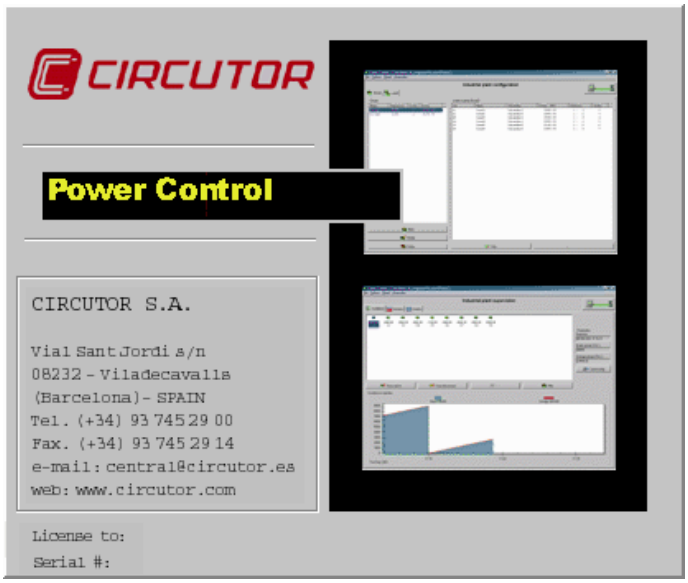
2.4. Information

In the Information menu option, there is information about the device and program. The following menu will appear:

- Device: A window with controller information and serial number will appear (type and version).



- About …: The presentation screen will appear.



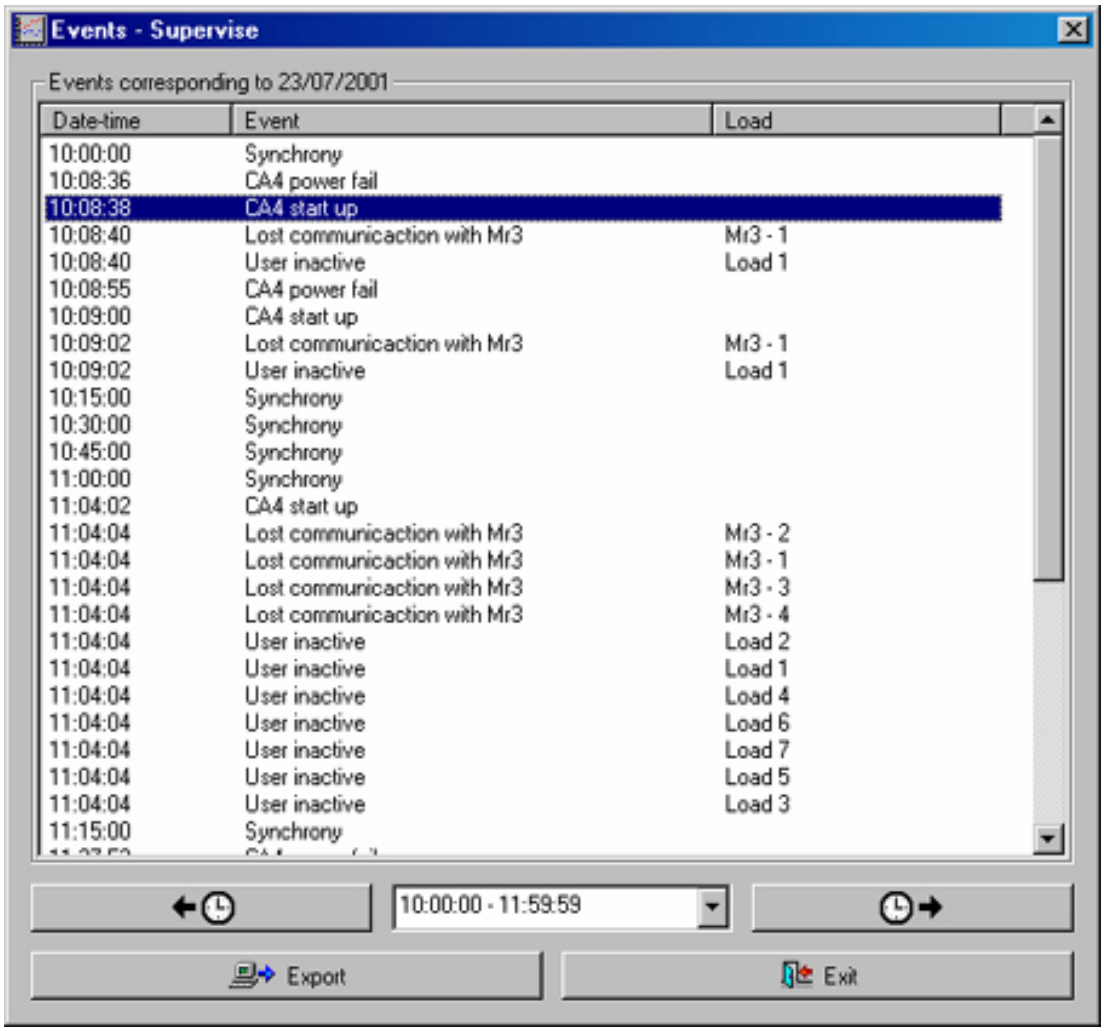
3. Power Control buttons

Then, there is information about the most common buttons of the simulation and supervision screens.

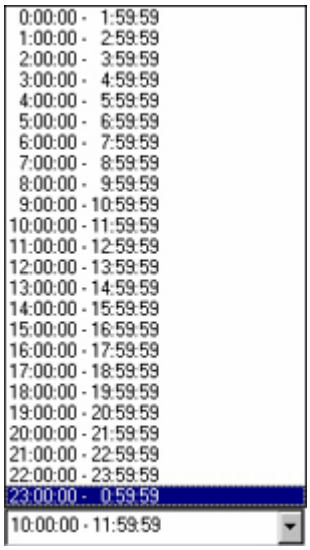
3.1 Events button

In the simulation or supervision, displaying will appear a window where the events of a specific day or time period will be showed.

The following window will appear:



Buttons:



Select the time period we want to show.


Go back in the time period.

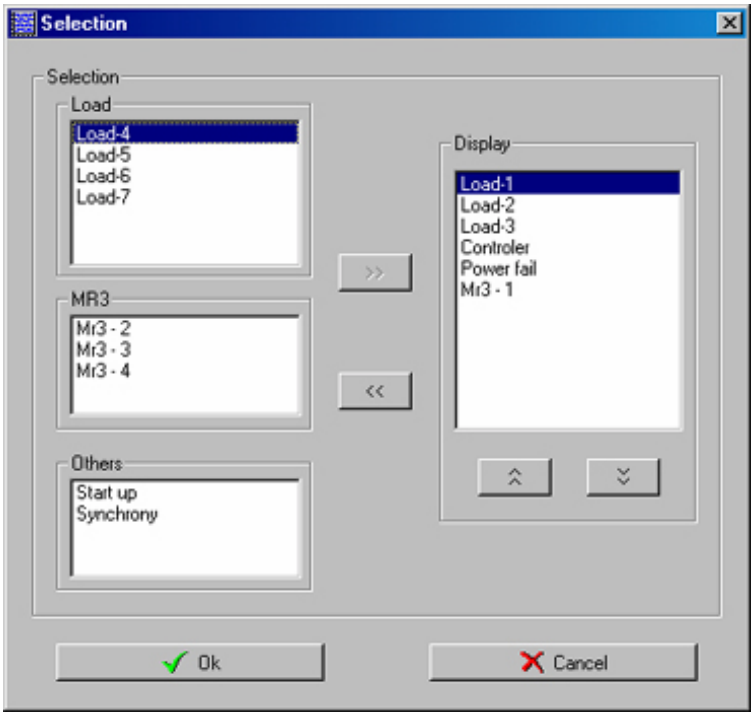

Go forward in the time period.

Export the data to text file or data base format. See Export Button for more information.

3.2. Selection Button

In the simulation or supervision displaying will appear a window where we can select the parameters we want to show in the events graph.

The following screen will appear:



We can select different types of parameters:

- Loads: Loads we have configured in the installation.
- MR3: Expansion peripherals we have configured in the installation.
- Other: Any other data to display.

Buttons:

 Add to the Show box list the parameter we have selected.

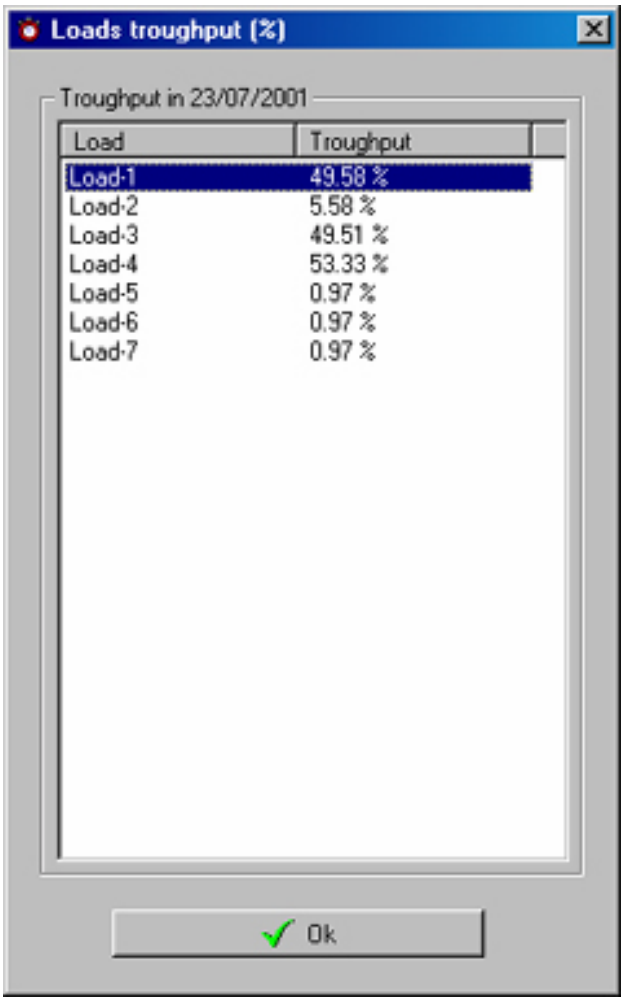
 Remove from the Show box list the parameter we have selected.

 Priority to display the graph.

3.3. Throughput button

In the simulation or supervision displaying, will appear a window where will be showed the time (percentage) that the installation loads (of selected day) have been enabled.

The following screen will appear:

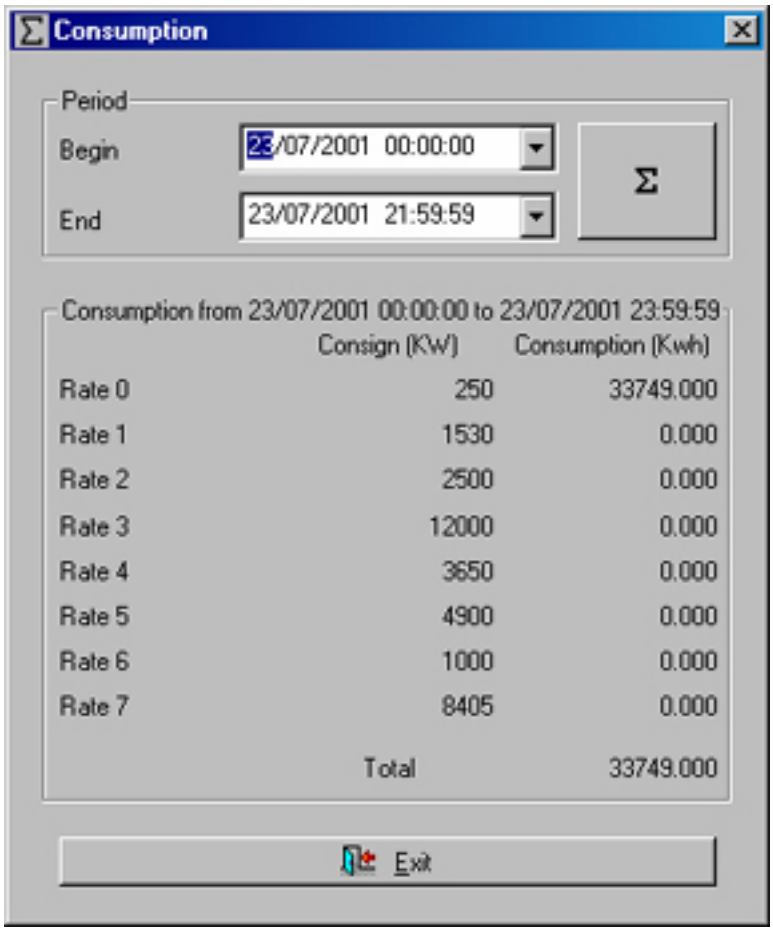


In the loads column appears all the installation loads, and in the throughput column appears the time percentage of each load. This throughput is the selected day in the visualization or supervision screen.

3.4. Consumption button

The addition of the energy consumptions (divided by tariffs) will be displayed. We can select the period we want to show in the consumption addition. A list will appear with 8 types of tariffs with the target value for each tariff and the final consumption in this period for each tariff.

The following screen will appear:



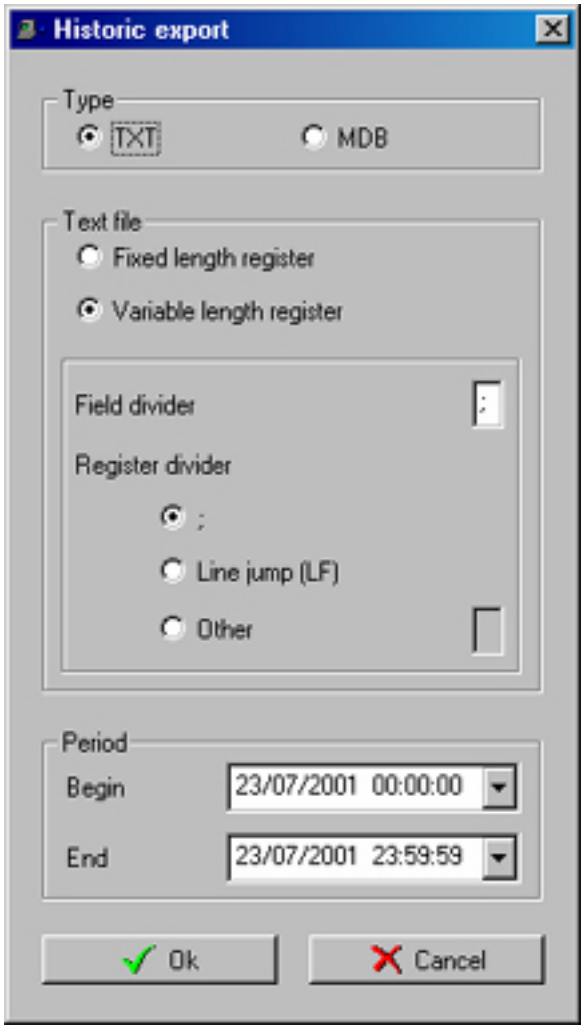
Buttons:

Upload the displayed data. It will be enabled when we modify the period we want to display.

3.5. Export button

It allows exporting the data in the selected period to text or data base format.

The following screen will appear:



- Type of file
  - Text (TXT)
  - MDB (Microsoft Access Data Base)

- Text file: If we select text format this field will be enabled
  - Fixed length register: The registers fields will have the same length.
  - Variable length register: The registers fields will have variable length and we'll specify the fields and registers dividers.

- Period: We'll specify the period of the data we want to export.